

**ANNUAL AUTO SECTION**

# POPULAR MECHANICS

WRITTEN SO YOU CAN UNDERSTAND IT

JANUARY 1960

35 CENTS



EXIT



**50 PAGES ABOUT CARS**

*Pictorial history of auto industry in color*

**All U.S. Cars Plus 23 Top Imports**

**SPEC CARD FOR YOUR WALLET**

*Road Tests: Corvair, Falcon, Valiant*

# V NEW FROM GALE! THE MIGHTY... SOVEREIGN

DELIVERS A NEW DIMENSION IN BIG-POWER SPEED AND SMOOTHNESS

Brawn and **BALANCE** in a perfect power package! Here's the thrust and zip of 60 hp...the power reserve of a deep-chested **V-BLOCK** engine. Here's smooth, flowing power to plane the heaviest cruisers, to pull a troop of skiers. Here's **QUIETNESS**. **V SOVEREIGN** purring power "floats" on rubber, sealed by a fiberglass cover. Rugged reliability, too! From thermostat-control to quiet anti-friction bearings, to trim, slim "**TORPEDO**" underwater unit, the new Gale **V SOVEREIGN** is engineered for maximum economy and carefree long life.

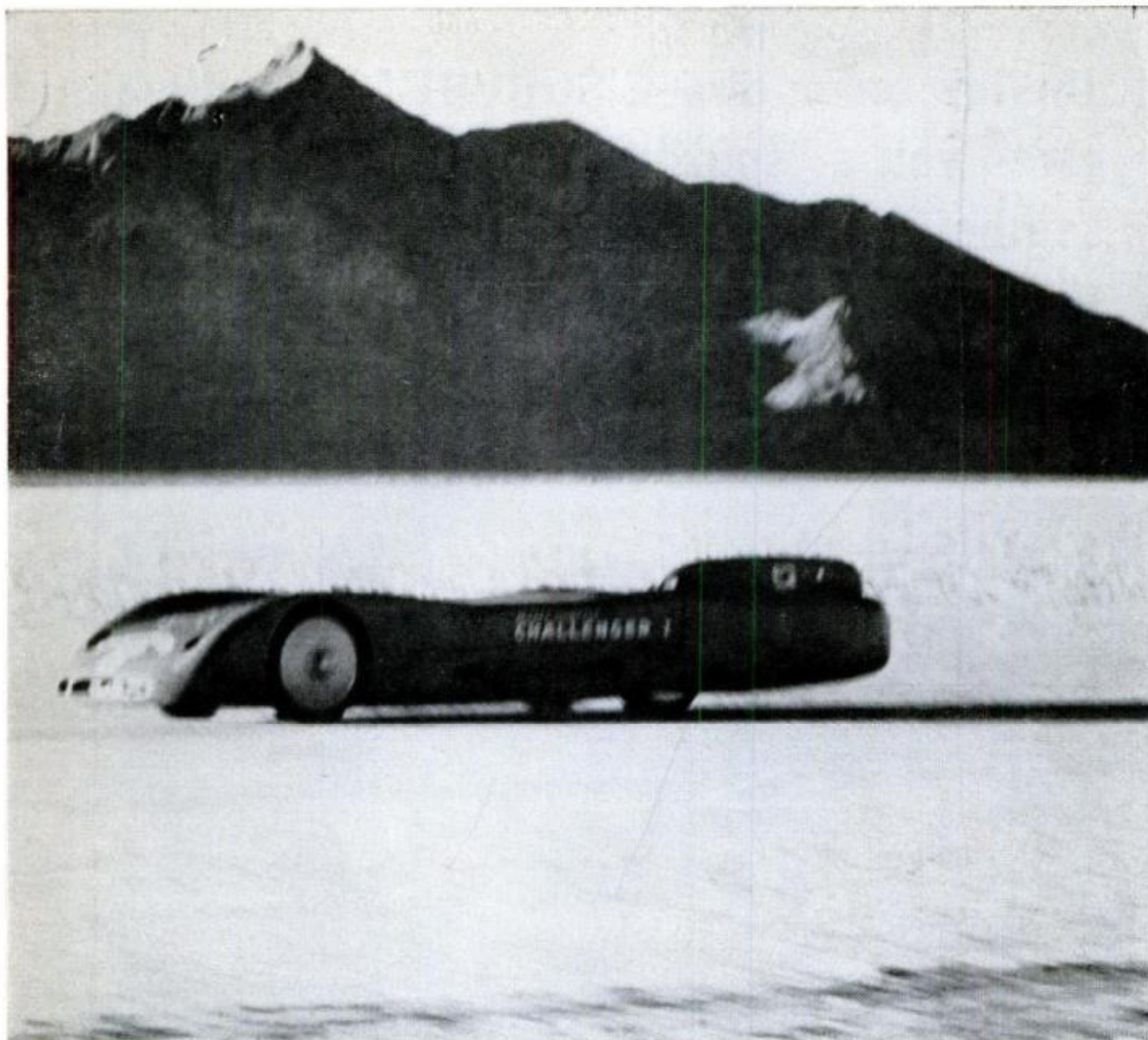
Take a look, skipper! See the new Sovereign and Buccaneer Motors—from 3 to 60 hp. Find your Gale dealer in the "Yellow Pages." Write for colorful brochure to: Gale Products, Dept. 310, Galesburg, Ill.



GET A GALE AND **GO**—ANYWHERE



GALE PRODUCTS, GALESBURG, ILLINOIS • DIVISION OUTBOARD MARINE CORPORATION



*363 m.p.h.! Mickey Thompson breaks the U.S. land speed record in his Challenger I, powered by 4 Champion-sparked Pontiac engines!*

**Q.** Why does Mickey Thompson, holder of the U.S. speed record, use Champion spark plugs?

**A.** Men whose careers depend on *performance* and *power* know they can *rely* on Champions! Your car will get a boost in performance—and *save gasoline*, too—with new Champions. Put in a set every 10,000 miles!



*World's favorite spark plug—engineered for every car built by Ford Motor Company, General Motors, Chrysler, American Motors, Studebaker-Packard and every major foreign maker.*



JANUARY 1960

This One

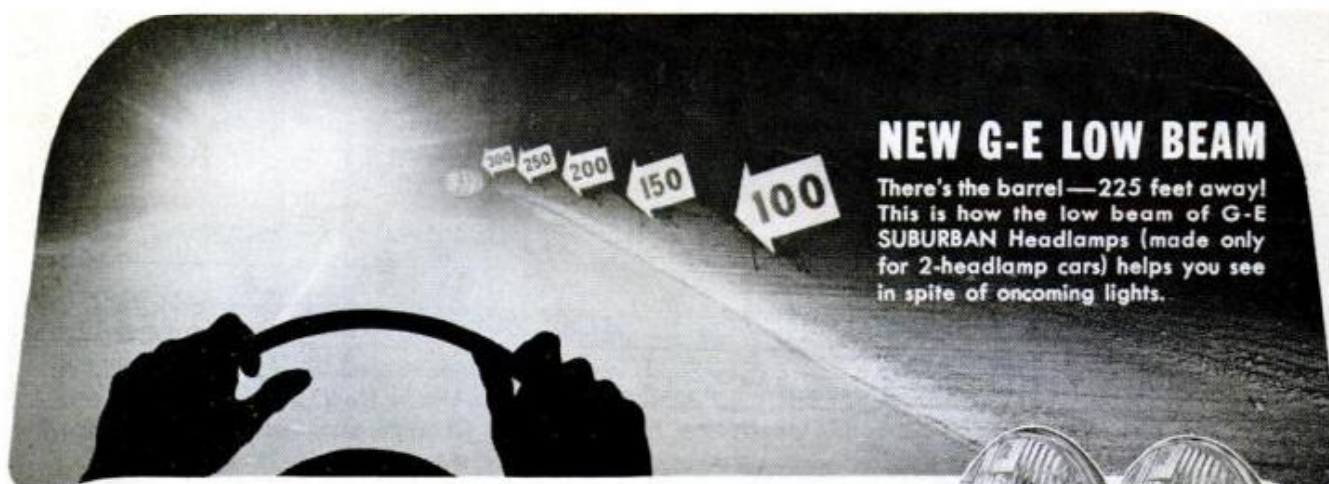


AHKC-K4P-SK75

1

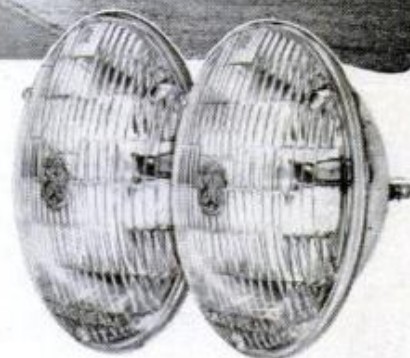
Three fourths of all night driving is now done with the low beam!

## The low beam of G-E SUBURBAN Headlamps gives you a "spotlight" effect . . . lets you see better in spite of the other car's lights



When there wasn't a great deal of nighttime traffic, you used the *upper* beam most often because it pushed a lot more light farther down the road. So, headlamp manufacturers put the upper beam filament on focus for maximum beam control.

Since nighttime traffic has increased tremendously, motorists find they must use the *low beam* more and more. So, General Electric now puts the *low beam* filament on focus to give maximum beam control where it's needed most—to provide a "spotlight" effect which directs more light down the right side of the road. That's why the low beam of new General Electric SUBURBAN Headlamps lets you see past the oncoming car when you're 75 to 200 feet apart. Only General Electric SUBURBAN Headlamps have this feature for 2-headlamp cars. General Electric Company, Miniature Lamp Department M-905, Nela Park, Cleveland 12, Ohio.



### ATTENTION ALL OWNERS OF 2-HEADLAMP CARS!

For approximately the same results as the four-headlamp systems in brand new cars (whose low beam filaments are also on focus) . . . have a pair of new G-E SUBURBAN Headlamps installed and aimed today. Tonight you'll see better in spite of the other car's lights.

*Progress Is Our Most Important Product*

**GENERAL  ELECTRIC**

# POPULAR MECHANICS®

Address communications to: 200 E. Ontario St., Chicago 11, Illinois. **SUBSCRIPTION SERVICE:** Mail all subscription orders, changes of address, correspondence concerning subscriptions, and Postmaster notices of undeliverable copies to Popular Mechanics, 250 West 55th St., New York 19, N. Y.

**Editor**

**RODERICK M. GRANT**

**Executive Vice-President**

**RICHARD E. DEEMS**

**Publisher**

**G. HARRY CHAMBERLAINE**

**Managing Editor**

**WAYNE WHITTAKER**

**Assistant Managing Editor**

**CLIFFORD B. HICKS**

**Shop Notes and Crafts Editor**

**JAMES R. WARD**

**Associate Editors, General Features**

**ARTHUR R. RAILTON, Automotive**

**JOHN A. LINKLETTER**

**Associate Editors, Shop Notes and Crafts**

**WAYNE C. LECKEY**

**W. CLYDE LAMMEY**

**Radio-Television, Electronics Editor**

**LOTHAR STERN**

**Assistant Editors, General Features**

**JAMES BIERY, ROBERT L. HULL, JR.**

**R. B. KIRKPATRICK**

**Assistant Editors, Shop Notes and Crafts**

**EARL WOBECK, GUERRINO F. AMATI**

**Assistant Editors, Makeup**

**WALLACE MYERS, JEAN KAVANAUGH**

**Art Staff**

**FRANK BEATTY, Director**

**HENRY NEHRBASS, Assistant Director**

**RICHARD A. POTTS, Art Editor**

**Eastern Editor**

**RICHARD F. DEMPWOLFF**

Room 4102, Empire State Bldg., New York City 1

**Western Editor**

**THOMAS E. STIMSON, JR.**

Suite 1003, 3460 Wilshire Blvd.  
Los Angeles 5, Calif.

**Advertising Manager**

**JOSEPH R. BUELL, JR.**

**Director, Bureau of Information**

**ALLAN CARPENTER**

**Advertising Offices**

Chicago: 200 E. Ontario St., Whitehall 4-0100;  
New York: Empire State Bldg., 350 Fifth Ave.,  
LOnacre 5-7580; Detroit: General Motors  
Bldg., TRinity 5-8711; Cleveland: Hanna  
Bldg., 1422 Euclid Ave., PRospect 1-0456; Los  
Angeles: 3460 Wilshire, DUnkirk 2-8458; San  
Francisco: Russ Bldg., 235 Montgomery St.,  
Yukon 2-0823.

Published monthly by Popular Mechanics Company, 200 E. Ontario St., Chicago 11, Ill. Richard E. Berlin, President; Richard E. Deems, Executive Vice-President; Fred Lewis, Vice-President and General Manager; John R. Miller, Vice-President; G. Harry Chamberlain, Vice-President; G. O. Markuson, Treasurer; R. F. McCauley, Secretary. Single copy in the United States and Canada, 35 cents; subscription rates in the United States and possessions and Canada: 1 year \$3.50; 2 years, \$6.00; 3 years, \$8.00. In countries of the Pan-American Postal Union, 1 year \$4.50; 2 years \$8.00; 3 years \$11.00. In all other countries 1 year \$5.50; 2 years \$10.00; 3 years \$14.00. If you plan to move, notify us at least 30 days in advance so you will not miss an issue. Give both your old and new addresses. Second-class postage paid at Chicago, Illinois, and at additional mailing offices. Entered as Second Class Matter at Post Office Dept., Canada. Registered as Second Class Matter at the Post Office at Mexico, D.F., Mexico, June 20, 1950. © 1959 by Popular Mechanics Company. All rights reserved. Printed in the United States of America.

JANUARY 1960

**FOREIGN EDITIONS**

SPANISH: Mexico-Caribbean, Southern Hemisphere

FRENCH, DANISH, SWEDISH, GERMAN, PORTUGUESE, DUTCH

Volume 113

JANUARY 1960

Number 1

## In This Issue...

Masters of Explosives - - - - -	97
I Lived With the Astronauts—Part II - - - - -	108
5000-Mile Game of Catch - - - - -	116
Strange Shapes on the Campus - - - - -	126
Arkansas Farmers Harvest Rice and Fish - - - - -	138

## ANNUAL AUTO SECTION

The American Automobile— A Pictorial History in Full Color - - - - -	144
1960 Parade of Cars - - - - -	151
Parade of Imported Cars - - - - -	162
How Good Are the Compact Cars? - - - - -	168
Those New Compact-Car Engines - - - - -	172
Gauges Are Not Just Ornaments - - - - -	175
How Do They Measure Up? - - - - -	178
World's Biggest Auto Show - - - - -	179
Solutions for Hard-Starting Problems - - - - -	184
Trouble Shooting the Tough Ones - - - - -	188

## For the Craftsman...

Hanging Bifold Doors - - - - -	191
The PM Houseboat—Part II - - - - -	200
Early American Clock—Part II - - - - -	216
Form-Turning Tools - - - - -	224
Radio, TV and Electronics - - - - -	238

## Regular Departments...

WHERE-TO-BUY-IT INDEX - - - - - 88

Pioneer of Science - - - - - 18	Detroit Listening Post - - - - - 151
Pentagon Sidelights - - - - - 24	Solving Home Problems - - - - - 196
An Eye on Space - - - - - 105	Shopping for Tools - - - - - 234
What's New for Your Home - 134	Clinic for Homemakers - - - - - 248

Turn to detailed index on page 88. Sources of additional information on items in this issue are shown on the Where-to-Find-It List, available without charge by writing the Bureau of Information, Popular Mechanics, 200 E. Ontario St., Chicago 11, Ill.

## Next Month...

YOU MAY SAVE your property—or your life—by reading the lead story in the February issue. "What to Do Until the Firemen Come" takes you through those important moments between the alarm and the arrival of professional fire-fighting help. . . . February also brings a timely report on a unique ship, rigged like a submarine of the near future, to test-fire the new and deadly Polaris missile



For  
External  
Rings  
Shaft Diam.  
1/16"–4"

# NEW PROTO TRUARC\* RETAINING RING PLIERS

Now you can remove and replace retaining rings simply and quickly, without damage to the rings. Proto Truarc Pliers handle the rings you find on shafts and linkages, in bores... on appliances, engines, parts and accessories, TV sets and radios.

#### HERE'S WHY PROTO TRUARC PLIERS ARE BEST:

- Precision ground tips, induction hardened at just the right angle, insure trouble free ring installation.
- Tips are permanent... can't lose them, don't have to set them.
- The right size plier prevents ring distortion, saves time. 12 Proto Truarc Pliers handle nearly all applications.
- External pliers for shafts up to 4" in diameter.
- Internal pliers for bores 3/16" to 7" in diameter.
- Universal pliers handle middle range of both.

You'll find Proto Truarc displayed soon at your Proto Dealers, including Hardware, Auto Parts, and Builders Supply stores all over the country.



For  
Internal  
Rings  
Bore Diam.  
1/4"–7"



**PROTO TOOLS**  
PROFESSIONAL QUALITY TOOLS

2202 Santa Fe Ave., Los Angeles 54, Calif.  
502 Allen St., Jamestown, New York  
1702 Oxford East, London, Ontario, Canada

\*Registered Trademark of Waldes Kohinor, Inc.

# PONTIAC'S TEMPEST ENGINES ARE FULL-HOUSE

Pontiac for nineteen-sixty is a mighty full package for those with a highly trained sense of car appreciation.

Lovers of true road machinery have been having a field day admiring the great new Tempest power plants. Ranging from the economy 215 horsepower model to the full-house 318 horsepower version, they're the most respected V-8's ever tucked under a passenger car hood. Gear boxes to match. Axle ratios to suit.

And listen. The noise boys have dampened

sound down to where you'll swear they've insulated the *road*. Suspension improvements have also helped in this department . . . as well as in ride and handling.

These are the kinds of advances you expect from the team that created Wide-Track Wheel Design—greatest cure for "car-sickness" in an American passenger car. 'Nuff said? Go see! You'll learn in a quarter mile why people who know cars *best* respect Pontiac *most*.

PONTIAC MOTOR DIVISION • GENERAL MOTORS CORPORATION

**PONTIAC** THE ONLY CAR WITH WIDE-TRACK WHEELS



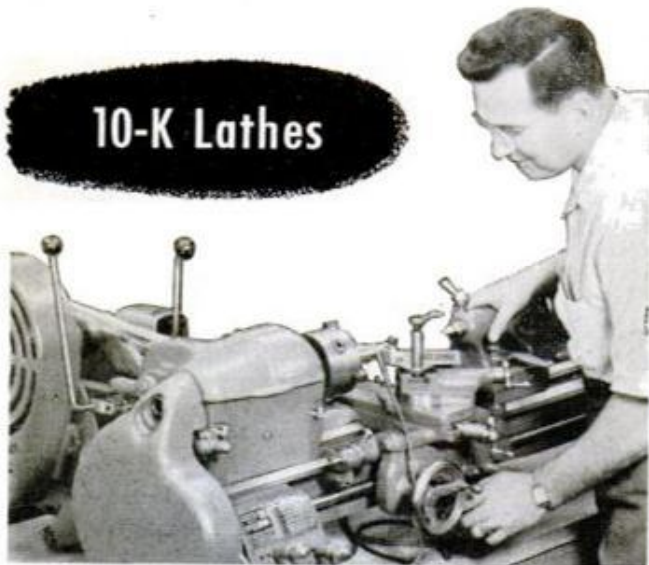
# More features

# for less money



## SOUTH BEND

### 10-K Lathes



- Accuracy for close-tolerance work.
- Smooth, vibration-free operation for exceptionally fine finishes.
- Superfinished, heat-treated spindle and bronze sleeve bearings for long, dependable service.
- 10" swing, up to 34" between centers, for handling wide variety of small work.
- 48 longitudinal feeds, 48 cross feeds, 48 thread cutting feeds (Model A).
- 4 types — 94 models to choose from. Prices start at \$388, f.o.b. factory.

Write for Catalog of South Bend Lathes, Milling Machines, Shapers, Drill Presses & Pedestal Grinders

### SOUTH BEND LATHE, INC.

South Bend 22, Indiana

Building Better Tools Since 1906

Up to 24 months to pay



## Over the Editor's Desk



Our family is still growing. *Popular Mechanics* takes great pleasure in welcoming two new members of its family of foreign language editions this month.

Holland becomes the home of our fifth European edition with the publication of "PM — het beste uit POPULAR MECHANICS" which, translated, means "PM—the best of POPULAR MECHANICS." Already we have long-established editions published in French and German, and two Scandinavian editions edited at Copenhagen, Denmark: one for Danish and Norwegian readers, another for Swedish.

Since May, 1947, a Latin-American and Spanish edition has been published at our Chicago office under the title *MECANICA POPULAR*. This month a new edition in the Portuguese language begins publication at Rio de Janeiro, Brazil, to serve the vast Portuguese-reading audience of that fast-growing land. To serve better the interests of both readers and advertisers the Spanish *MECANICA POPULAR* will be published in two separate editions, one aimed at the Mexico-Caribbean area and the South American countries of Peru, Ecuador, Colombia, and Venezuela; the Southern Hemisphere edition reaching Argentina, Chile, Uruguay, Paraguay and Bolivia.

Altogether, these eight foreign editions reach some 500,000 buyers each month in addition to the nearly 1,500,000 circulation of our own American edition.



### To the Editor:

That detailed and interesting article: "The Squash Bug Searches for Pay Dirt" (Sept. *PM*) was of more than normal interest to me, because of the statement that "even blue Kimberlite clay" might be detected through the use of organic reagents as an indicator.

A prospector just recently showed me about 15 small diamonds that he recovered from his placer-gold sluiceway while working a remote creek bed situated in a rugged area of the Valhalla Mountains here in British Columbia. This prospector admits it could take him many years to trace up that creek and its tributaries for the Kimberlite formation those diamonds came from. Here is an instance where the appli-

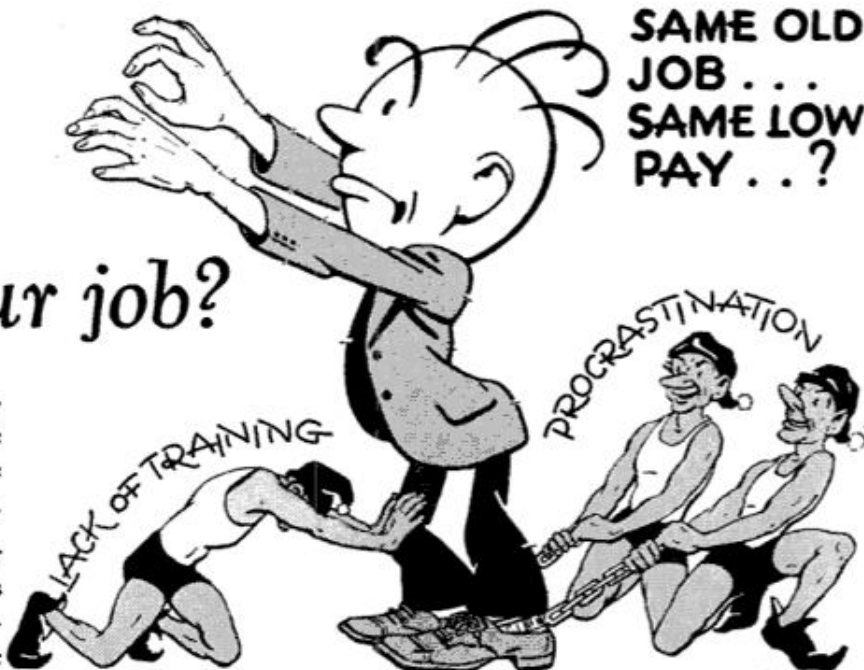
(Continued to page 10)



# Are You "STANDING STILL" on your job?

You can justify a real pay raise and a better position—by making one simple move—the move that opens the way to more earnings and promotions—*practical training*.

If YOU are "standing still" on your job—no promotions—only token increases in pay—then you had better do something about it. You know that if you are untrained, your chances of getting ahead are slim. NOW IS THE TIME TO PREPARE.



## WILL RECOGNITION COME?

The only answer, as you know, is that success *does* come to the man or woman who is really *trained*. LaSalle has provided the "key to success" for many thousands of ambitious people who have sought our training for more than fifty years.

Get all the facts. Investigate the opportunities in your chosen field. It costs you nothing to learn about LaSalle's proven and tested accredited correspondence courses in the major fields of business. You can train right in the privacy of your own home, progressing at your own rate.

You lose no time from work, and your instructors guide you every step along the way through our famous Practical Problem Method. Low cost—easy terms.

Don't let promotions pass you by—do something TODAY about your future.

*LaSalle*

**EXTENSION UNIVERSITY**  
A CORRESPONDENCE INSTITUTION

417 So. Dearborn St. Dept. 164X Chicago 5, Ill.

The coupon below is for your convenience. Simply mark the program in which you are most interested, and mail at once. We'll send you, without obligation, free booklets describing that field together with the opportunities and what you must know to be a success.

ACCREDITED MEMBER, NATIONAL HOME STUDY COUNCIL

**LA SALLE EXTENSION UNIVERSITY, A Correspondence Institution**  
417 South Dearborn Street, Dept. 164X, Chicago 5, Illinois

Please send me your booklet describing the program I have checked below:

- |   |  |  |
|---|--|--|
| <p><b>ACCOUNTING</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Modern Bookkeeping</li> <li><input type="checkbox"/> Basic Accounting</li> <li><input type="checkbox"/> Practical Accounting</li> <li><input type="checkbox"/> Principles of Acctg.</li> <li><input type="checkbox"/> Cost Accounting</li> <li><input type="checkbox"/> Federal Income Tax</li> <li><input type="checkbox"/> Accounting Systems</li> <li><input type="checkbox"/> Business Law</li> <li><input type="checkbox"/> Auditing Procedure</li> <li><input type="checkbox"/> Controllorship</li> <li><input type="checkbox"/> CPA Training</li> <li><input type="checkbox"/> Complete Accounting</li> </ul> | <p><b>LAW</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Law of Contracts</li> <li><input type="checkbox"/> Insurance Law</li> <li><input type="checkbox"/> Claim Adjusting Law</li> <li><input type="checkbox"/> Law for Trust Officers</li> <li><input type="checkbox"/> Business Law I</li> <li><input type="checkbox"/> Business Law II</li> <li><input type="checkbox"/> General Law</li> <li><input type="checkbox"/> First Year Law</li> <li><input type="checkbox"/> American Law and Procedure (LL.B. Degree)</li> </ul> | <p><b>BUSINESS MANAGEMENT</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Principles of Management</li> <li><input type="checkbox"/> Psychology in Business</li> <li><input type="checkbox"/> Selling &amp; Sales Management</li> <li><input type="checkbox"/> Advertising and Marketing</li> <li><input type="checkbox"/> Production Problems</li> <li><input type="checkbox"/> Business Financing</li> <li><input type="checkbox"/> Credits and Collections</li> <li><input type="checkbox"/> Office Management</li> <li><input type="checkbox"/> Managing Men</li> <li><input type="checkbox"/> Accounting &amp; Statistical Control</li> <li><input type="checkbox"/> Business Correspondence</li> <li><input type="checkbox"/> Organization &amp; Reorganization</li> <li><input type="checkbox"/> Legal Problems</li> <li><input type="checkbox"/> Complete Business Management</li> </ul> |
| <p><b>TRAFFIC &amp; TRANSPORTATION</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Organization &amp; Mgt.</li> <li><input type="checkbox"/> Classification, Rates &amp; Tariffs</li> <li><input type="checkbox"/> Transportation Agcy. &amp; Services</li> <li><input type="checkbox"/> Transportation Law &amp; Regulation</li> <li><input type="checkbox"/> Rate Making &amp; Rate Cases</li> <li><input type="checkbox"/> Complete Traffic &amp; Transportation</li> </ul>  | <p><b>FOREMANSHIP &amp; PRODUCTION METHODS</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Foremanship Training</li> </ul>   | <p><b>MANAGEMENT COURSES</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Basic Management</li> <li><input type="checkbox"/> Production Management</li> <li><input type="checkbox"/> Sales Management</li> <li><input type="checkbox"/> Advertising &amp; Sales Promotion</li> <li><input type="checkbox"/> Financial Management</li> <li><input type="checkbox"/> Personnel Management</li> <li><input type="checkbox"/> Sales &amp; Executive Training</li> </ul>   |
| <p><b>SECRETARIAL</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Secretarial</li> </ul>  | <p><b>STENOTYPE (machine shorthand)</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Secretarial</li> </ul>   | <p><b>SALESMANSHIP</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> LaSalle Sales Training</li> </ul>   |

Name.....Age.....

Address.....

City, Zone, State.....

# SKIPPED ME AGAIN!

POOR BURT! HE MISSED OUT ON THAT PROMOTION AGAIN!



I WAS DETERMINED TO MAKE GOOD IN MY JOB...BUT DETERMINATION, I FOUND, WAS NOT ENOUGH!

I HAD PLENTY OF EXPERIENCE... AND THE BOSS SEEMED TO LIKE ME. I LACKED JUST ONE THING—**TRAINING!**

SORRY, BURT! I KNOW YOU'VE WORKED HERE LONGER. BUT TED HAS THE SPECIAL TRAINING WE NEED. YOUR CHANCE WILL COME ...SOMEDAY!



**I. C. S.** IS THE OLDEST AND LARGEST CORRESPONDENCE SCHOOL IN THE WORLD. 256 COURSES. PERSONALIZED INSTRUCTION, CAREER GUIDANCE, EASY-PAY PLAN. DIPLOMA TO GRADUATES.

SIX MONTHS LATER... I.C.S. SENT MY BOSS REGULAR REPORTS OF MY PROGRESS. THEN ONE MORNING...

BURT, I'VE JUST MADE YOU THE ASSISTANT MANAGER OF YOUR DIVISION...AT \$15 MORE A WEEK. AND THE WAY YOU'RE GOING NOW, THIS IS JUST THE BEGINNING.

GOSH! THANKS MR. TAYLOR!



I GOT IT, HONEY! I GOT THE PROMOTION! OUR MONEY WORRIES ARE OVER! TODAY'S OUR LUCKY DAY!

TODAY AND THE DAY YOU MAILED THAT I.C.S. COUPON!



WHY NOT MAKE THIS YOUR LUCKY DAY? LET I.C.S. PUT YOU ON THE ROAD TO MORE PAY, RAPID ADVANCEMENT, REAL JOB SECURITY. HERE'S THE FAMOUS COUPON. MAIL IT NOW!

I WAS TIRED OF WAITING FOR "SOMEDAY."  
I MADE UP MY MIND TO ACT! I'D GET THE  
TRAINING I NEEDED...SOMEHOW!  
JANE HAD A SUGGESTION...

I CAN'T QUIT MY  
JOB AND GO BACK TO  
SCHOOL! AND I SURE  
DON'T WANT THAT  
NIGHT CLASS  
ROUTINE IN  
THE CITY!

WHY NOT STUDY  
AT HOME?...THE  
WAY DAD DID...  
WITH I.C.S.



JANE SHOWED ME AN I.C.S.  
ADVERTISEMENT IN POPULAR  
MECHANICS. THERE WAS THE  
FAMOUS COUPON.AND THERE WAS  
EXACTLY THE COURSE I WANTED..

SAY, THEY'LL SEND ME  
A CAREER KIT FREE...  
THREE BIG SUCCESS  
BOOKS.

DAD SAYS  
HE NEVER  
WOULD  
HAVE BEEN  
MANAGER IF IT  
WEREN'T  
FOR I.C.S.



# FREE!

I. C. S. CAREER KIT CONSISTING OF...

- 1 "HOW TO SUCCEED"  
32-PAGE GOLD MINE
- 2 CAREER CATALOG ...  
OPPORTUNITIES IN YOUR  
FIELD.
- 3 SAMPLE LESSON (MATH)  
SHOWS I. C. S. METHOD.

For Real Job Security—Get an I. C. S. Diploma! I. C. S., Scranton 15, Penna.

Accredited Member,  
National Home Study Council

## INTERNATIONAL CORRESPONDENCE SCHOOLS



BOX 90953A, SCRANTON 15, PENNA.

Without cost or obligation, send me "HOW TO SUCCEED" and the opportunity booklet about the field BEFORE which I have marked X (plus sample lesson):

### ARCHITECTURE and BUILDING CONSTRUCTION

- Air Conditioning
- Architecture
- Arch. Drawing and Designing
- Building Contractor
- Building Estimator
- Carpenter Builder
- Carpentry and Millwork
- Carpenter Foreman
- Heating
- Painting Contractor
- Plumbing
- Reading Arch. Blueprints

### ART

- Commercial Art
- Magazine Illus.
- Show Card and Sign Lettering
- Sketching and Painting

### AUTOMOTIVE

- Automobile
- Auto Body Rebuilding and Refinishing
- Auto Engine Tuneup
- Auto Technician

### AVIATION

- Aero-Engineering Technology
- Aircraft & Engine Mechanic

### BUSINESS

- Accounting
- Advertising
- Business Administration
- Business Management
- Cost Accounting
- Creative Salesmanship
- Managing a Small Business
- Professional Secretary
- Public Accounting
- Purchasing Agent
- Salesmanship
- Salesmanship and Management
- Traffic Management

### CHEMICAL

- Analytical Chemistry
- Chemical Engineering
- Chem. Lab. Technician
- Elements of Nuclear Energy
- General Chemistry
- Natural Gas Prod. and Trans.
- Petroleum Prod. and Engr.
- Professional Engineer (Chem)
- Pulp and Paper Making

### CIVIL ENGINEERING

- Civil Engineering
- Construction Engineering
- Highway Engineering
- Professional Engineer (Civil)
- Reading Struc. Blueprints
- Sanitary Engineer
- Structural Engineering
- Surveying and Mapping

### DRAFTING

- Aircraft Drafting
- Architectural Drafting
- Drafting & Machine Design
- Electrical Drafting
- Mechanical Drafting
- Sheet Metal Drafting
- Structural Drafting

### ELECTRICAL

- Electrical Engineering
- Elec. Engr. Technician
- Elec. Light and Power
- Practical Electrician
- Practical Lineman
- Professional Engineer (Elec)

### HIGH SCHOOL

- High School Diploma

- Good English
- High School Mathematics
- High School Science
- Short Story Writing

### LEADERSHIP

- Industrial Foremanship
- Industrial Supervision
- Personnel-Labor Relations
- Supervision

### MECHANICAL and SHOP

- Diesel Engines
- Gas-Elec. Welding
- Industrial Engineering
- Industrial Instrumentation
- Industrial Metallurgy
- Industrial Safety
- Machine Shop Practice
- Mechanical Engineering
- Professional Engineer (Mech)
- Quality Control
- Reading Shop Blueprints
- Refrigeration and Air Conditioning
- Tool Design  Tool Making

### RADIO, TELEVISION

- General Electronics Tech.

### INDUSTRIAL ELECTRONICS

- Practical Radio-TV Eng'g
- Practical Telephony
- Radio-TV Servicing

### RAILROAD

- Car Inspector and Air Brake
- Diesel Electrician
- Diesel Engr. and Fireman
- Diesel Locomotive

### STEAM and DIESEL POWER

- Combustion Engineering
- Power Plant Engineer
- Stationary Diesel Engr.
- Stationary Fireman

### TEXTILE

- Carding and Spinning
- Cotton Manufacture
- Cotton Warping and Weaving
- Loom Fixing Technician
- Textile Designing
- Textile Finishing & Dyeing
- Throwing
- Warping and Weaving
- Worsted Manufacturing

Name \_\_\_\_\_ Age \_\_\_\_\_ Home Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_ Working Hours \_\_\_\_\_ A.M. to P.M. \_\_\_\_\_

Occupation \_\_\_\_\_

Canadian residents send coupon to International Correspondence Schools, Canadian, Ltd., Montreal, Canada. . . . Special low monthly tuition rates to members of the U. S. Armed Forces.

# Check the Kind of Body YOU Want!

**RIGHT IN THE COUPON BELOW**

**... and I'll Show How EASILY You Can Have It!**

*Charles Atlas*

Twice winner and holder of the title "The World's Most Perfectly Developed Man."



JUST tell me where you want it—and I'll add **SOLID** INCHES of powerful muscle **SO FAST** your friends will grow bug-eyed with wonder. **I'LL SHOW HOW** you can be a new man in just 15 minutes a day—in your own home—or it won't cost you a penny!

I myself used to be a 97-lb. weakling. Men called me "Skinny." Girls made fun of me. **THEN** I discovered my great new muscle-building system—"Dynamic Tension." It turned me into such a specimen of **MANHOOD** that today I hold the title "**THE WORLD'S MOST PERFECTLY DEVELOPED MAN.**"

"Dynamic Tension" is the easy, **NATURAL** method you can practice in your own room—**JUST 15 MINUTES A DAY**—while your chest and shoulder muscles begin to swell . . . those arms and legs of yours bulge . . . and your whole body starts to feel "alive," full of zip and go!

**FREE** My 32-Page Illustrated Book  
Not \$1.00 — Not 10c — **BUT FREE**

Send **NOW** for my famous book showing how "Dynamic Tension" can make you a new man. 32 pages, packed with photographs, valuable advice, answers many vital questions. This book is a real prize for any fellow. Yet I'll send you a copy **absolutely FREE**. Just glancing through it may change your life. Rush coupon to me personally: **CHARLES ATLAS, Dept. 81, 115 East 23rd St., New York 10, N. Y.**



**CHARLES ATLAS, Dept. 81,  
115 East 23rd St., New York 10, N.Y.**

Dear Charles Atlas: Here's the Kind of Body I want:  
(Check as many as you like)

- |  |  |
|--|--|
| <input type="checkbox"/> More Weight—Solid—in The Right Places | <input type="checkbox"/> Powerful Arms and Grip    |
| <input type="checkbox"/> Broader Chest and Shoulders           | <input type="checkbox"/> Slimmer Waist and Hips    |
|  | <input type="checkbox"/> Powerful Leg Muscles      |
|  | <input type="checkbox"/> Better Sleep, More Energy |

Send me absolutely **FREE** a copy of your famous book showing how "Dynamic Tension" can make me a new man. 32 pages, crammed with photographs, answers to vital health questions, and valuable advice. I understand this book is mine to keep and sending for it does not obligate me in any way.

NAME .....

(please print or write plainly)

ADDRESS .....

CITY..... ZONE..... STATE.....

(Continued from page 6)

cation of surface soil testing with organic reagents could not only shorten his search to one season, but also lead to positive success.

More articles in similar vein will always be welcomed by many of us who are interested in discovering more of our natural resources.

L. C. de Kock,  
Nelson, B. C.

☆☆☆

## To the Editor:

For many years there have been articles written about the first auto made in this country. I have never seen any item about the car or cars that Terry Stafford of Topeka, Kansas, built in his bicycle shop on east 5th street.

I recall being in about third grade in the Harrison school in Topeka and after school I'd go to Stafford's shop and watch him build this car—a high, solid-tired device, rod for a steering lever, like an engine in a buggy. This was at the time of the big political issue between Bryan and McKinley prior to the election of 1896 so it is possible that Stafford was working on his car in 1895 or 1896. It could be as early as 1894. By the time of the Spanish-American war of 1898 the car was running the streets, as an old-timer. This could be the first car that ran, made west of Detroit or Chicago. It is my guess that had Stafford made this car in the industrial east instead of so far west, he might have become a sort of Henry Ford.

Edwin Wolff,  
Tooele, Utah

☆☆☆

## To the Editor:

I have read your magazine for many years and the car owner's reports really amuse me. Many owners complain of their cars being too low, too long, wide, hard to get in and out of, no legroom or headroom, too much glass, dislike gaudy styling, poor quality, etc. What I wonder is, why they bought the car? Didn't they road-test one, sit in one, or at least look at the car before buying? If they had, maybe we would have had sensible cars sooner.

Harold Olsen,  
Albuquerque, N. Mex.

☆☆☆

## Foreign-Car Report

We received so many letters about the foreign-car report (August and September PM) that we can publish only a few typical excerpts:

(Continued to page 14)

# Make More Money Soon Fixing Electric Appliances



**Actual Lesson  
FREE** Fast Growing  
Field Offers  
Good Pay, Security  
Interesting Work

## Learn at Home in Spare Time

Earn more money. Enjoy doing important, interesting work. Learn Electrical Appliance Servicing. This is a field of increasing opportunity. Today every wired home has many electrical appliances and millions and millions of new appliances are made and sold each year. Find out more about this great, growing field. Find out how NRI can train you, at home and in spare time to be an Appliance Service Technician. See how you can start soon to make extra money servicing appliances.

## Add to Your Income Soon After Enrollment Opportunities Increasing for Service Technicians

NRI Training is practical, thorough. You get easy-to-understand lessons, and NRI supplies parts to build professional type Multi-Use Tester. Use it to get practical experience. Soon, you can add to your income by servicing appliances. Build a profitable *sideline* for your spare time—qualify for a good job—develop a business and be your own boss. As an Appliance Service Technician, your opportunities are broad—your services wanted, gladly paid for, highly regarded in your community.

Appliances are necessary to comfortable, convenient living. Owners pay well to keep them in repair. The field is amazingly big. In addition to major appliances such as electric ranges, air conditioners, refrigerators, there are over 40,000,000 electric irons, 5,000,000 electric blankets, 15,000,000 coffee makers, plus more millions of vacuum cleaners, fans, toasters, mixers, etc.



## Learn and Earn With Tester Diploma When You Finish

Locate appliance troubles easily with Portable Appliance Tester you build. You use it to learn and do actual electric appliance repair jobs. For only \$3.00 with enrollment and \$6 per month, get training including Tester—a small price to pay for increased earnings. Mail coupon for Sample Lesson and Book—your first step toward more interesting work, bigger earnings. **NATIONAL RADIO INSTITUTE, Dept. AAO, Washington 16, D. C.**



Find Out What  
Appliance Repair  
Offers You

## Mail Coupon FOR LESSON AND BOOK FREE

**National Radio Institute**  
Dept. AAO, Washington 16, D. C.

Please send me Electric Appliance Servicing Lesson and Book FREE. (I understand no salesman will call.)

Name \_\_\_\_\_ Age \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

ACCREDITED MEMBER NATIONAL HOME STUDY COUNCIL



## You Can Earn **5½%** On Your Savings...By Mail

*It's Safe...and so much easier...*

Picture yourself in this profitable scene. You can save by mail from the comfort of your home and earn 5½%\* a year paid quarterly on your hard earned funds. First Western Savings, Nevada's largest Savings and Loan Association offers this attractive anticipated interest scheduled to begin January 1, 1960\*. This higher interest rate follows fourteen consecutive interest payments to First Western Savers of 5% per annum or more, paid quarterly. Quarterly payments allow you to easily withdraw funds without losing interest, or you can let the interest remain in the account for compound earnings, every three months.

Few savings institutions can offer such an attractive rate. First Western can do it because it is located in the fastest growing area in the country, where dollars are needed to finance expansion. The officers and directors of this \$34,000,000.00 institution are all community and state leaders of long standing. And, First

Western proudly boasts a long history of dependable performance and above-average earnings. Another important point; withdrawals-by-mail have always been paid instantly.

Saving by mail is the easiest and most profitable way to save—no traffic, no waiting in line, no wasted time. Determine now to join the First Western Savers from all 50 states and 51 foreign countries who save more and earn more by transacting their savings business... by-mail...with First Western Savings, Nevada's largest Savings and Loan Association.

You can open a Save-By-Mail account, with as little as \$1.00. The anticipated interest scheduled to begin January 1, 1960\* is: 5½% a year on accounts over \$5,000, and 5¼% a year on all others. Interest paid quarterly on all accounts. Funds received by the 15th of any month earn from the 1st.

*Write or mail funds to:*

**FIRST WESTERN SAVINGS**

AND LOAN ASSOCIATION, DEPT. T,

118 Las Vegas Blvd., South • Las Vegas, Nevada • A. G. Neumeyer, Pres.



# You'll soon be happy in a great new job...

...earning **BIG** money...

...if you start training **NOW** for success in

## AIR CONDITIONING AND REFRIGERATION

You could be earning top pay in months. It's mostly a matter of getting your training now. Your best bet is to be a mechanic in the air conditioning and refrigeration field. This industry is growing so fast that *20,000 newly trained mechanics are needed each year*. Over 150 million units are in use; over 5 million new air conditioners, freezers and refrigerators are sold annually. Skilled men are desperately needed for installation and repair work. Be a mechanic! *Mail coupon for free success booklets on CTI's amazing new Home Training Plan.*



### You can earn cash during your training

Because CTI training is so *practical*, you'll soon be making profitable service calls. Perhaps you'll work on your own. Or, you may prefer to get a part-time job with a local appliance dealer or air conditioning contractor. You can add to your present income this way. With extra cash, you can buy additional shop equipment, pay your tuition, even bank money.



### You could go in business and be independent

Own a business—and enjoy independence! Thrill to the satisfaction of being the boss. Give orders—not take them! The refrigeration field is ideal for getting started on your own. You can make friends as you make service calls. In time, you'll have a list of potential customers. You can also sign service contracts with food stores, taverns, restaurants, etc. Ever so many CTI graduates have their own successful shops. Most of them began with nothing more than their new training and pluck. You, too, can start small and grow big. Be a business man!

### You could get into the profitable new auto air conditioning field

Hundreds of thousands of new cars are being equipped with air conditioners. Auto dealers are advertising for skilled refrigeration mechanics, offering premium pay, to set up service departments. Or, you can go in business for yourself, and contract with auto agencies to do this type of installation and repair. You can make big profits either way.



*This is the home of CTI, one of the world's great home study schools. Through this Institute you receive "training you can trust." Over 40,000 career graduates from coast to coast.*

**COMMERCIAL TRADES INSTITUTE**  
1400 Greenleaf Avenue • Chicago 26, Illinois

**FIRST GET THE FACTS—THEN DECIDE**  
Mail Coupon Today for 2 Free Booklets

ONLY CTI SENDS PARTS  
AND TOOLS TO BUILD A  
CONDENSING UNIT!

**25  
BIG KITS**



### You learn fast because you practice with real equipment—Get experience

You train at home in spare time. No need to give up your present job; no need to leave home to attend a resident school. *CTI sends 25 kits of parts and tools to build a heavy-duty, commercial-type, 1/4 h.p. refrigeration high-side (illustrated above.)* You do 10 troubleshooting and service jobs—it's almost like field training!

After assembling and working projects with your unit, you may build an air conditioner, refrigerator, freezer, or milk cooler. *All parts and tools are sent without extra charge—they are yours to use and keep.*

### You get all these quality mechanic's tools



You get special "tools of the trade" as part of your training. Included is a pressure gauge, vacuum gauge and testing manifold. You'll use these tools to assemble and test the condensing unit. Thus, you get not just tools—but *equipment to practice with.* (Why settle for one without the other?)

### You must look into your opportunities

Thousands of CTI graduates (and students) tell us they are getting better jobs, earning more money, working steady. Many are going in business. It is surprising how many report the best benefit of all is that they gained self-confidence. With so much at stake, can you afford to neglect *your opportunities?* Isn't it worth a few minutes of your time to *find out?* Just fill out and mail the handy coupon! Be sure to act today.

### COMMERCIAL TRADES INSTITUTE

1400 GREENLEAF AVENUE  
CHICAGO 26, ILLINOIS

DEPT. R-679

Send me your two opportunity booklets, *Success in Air Conditioning & Refrigeration*, and *Lesson Sample*. Both FREE.

Name \_\_\_\_\_ Age \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_



# GIANT 2-Mile Range SUPER POWER SEARCHLIGHT



5  
CELLS

**FREE**  
Slip-On  
FOG  
LENS!

Slips on  
or off  
your  
search-  
light  
instant-  
ly. Pen-  
etrates  
deepest  
fog.  
Regula-  
tion  
amber  
color.  
Rush  
order  
now—  
get  
yours  
absol-  
utely  
FREE!

COMPARABLE  
4.98  
VALUE

**1.79**  
Plus  
Postage

### GIGANTIC 3" PARABOLIC REFLECTOR

Sensational introductory offer to win 25,000 new friends! This very same type flashlight selling for 4.98 elsewhere! The same high quality workmanship! The same huge candlelight power! Yet Thoresen brings it to you for only one dollar plus a few cents mailing charge . . . only while the present supply lasts. Imagine it—a SEARCH light nearly half a yard long for less than some single-cell penlight flashlights—and this new, deluxe model with 5 cells does the work of ten to fifteen smaller models—pierces pitch darkness up to 2 miles and even more!

### GIGANTIC HI-INTENSITY REFLECTOR HEAD

The secret of this search light's huge candlelight power is its PARABOLIC HIGH INTENSITY head with its Opti-View reflector that gives it bull's eye precision and incredible range. Three full inches across! No shadows! No rings! Just sheer brilliance reminiscent of the mid-day sun in July. Ideal for hunters, sportsmen, police, navy and army personnel, home owners, drivers, campers, etc.

### QUALITY CONSTRUCTION! 3-YEAR GUARANTEE!

Deluxe quality thruout! First quality components plus skilled workmanship make this one of the best ever produced. Has clamp on base for hanging on belt, plus compartment for extra bulb. Durable electrical contacts and reinforced switch. Genuine Korium chrome plate. Guaranteed 3 full years against all defects. It's your best buy in a high power search light. Get several now at Thoresen's crazy low price—only \$1.79 plus 18c mailing costs! Satisfaction guaranteed or money back! Rush coupon Now!

### Free Trial Discount Coupon

THORESEN, INC., Dept. 6-A-706  
585 Water St., New York 2, N. Y.

RUSH me the Super-Power Searchlight on 10-day trial, money-back guarantee. Also include my FREE Slip-on Fog Lens.

( ) \$1.97 check, cash or m.o. enclosed. (1.79 plus 18¢ mailing costs.)

( ) Send C.O.D. I'll pay extra C.O.D. fees.

PRINT  
NAME .....  
AND  
ADDRESS .....

Canadian address: THORESEN, Ltd.,  
439 King St. W, Toronto 2B, Ont.

(Continued from page 10)

"You'll probably be getting a good many letters about your article on which import is best for you. How about that gas mileage table? Was Dale Kelly driving with the emergency brake on? I drove a Fiat 600 for nine months and never got less than 43 miles per gallon."

Jack Shaw  
Monterey Park, Calif.

☆ ☆ ☆

"Why wasn't my car, the English Ford, compared with the others?"

Robert L. Dalton  
Kansas City, Mo.

☆ ☆ ☆

"Over-all your imported-car story was very good. I suspect that some of the owners who are unhappy with service have been having their cars serviced at 'back alley' garages and filling stations. I would suggest to them that most franchised dealers feel as I do that every DKW I put on the road brings in another customer. We service over 200 DKWs in this area and have yet to find an unhappy customer."

Walter A. Lee  
Woodbridge, Conn.

☆ ☆ ☆

"I read with interest the article on foreign cars. Generally I am in agreement with the article, but find a serious discrepancy between the gas mileage reported and mine. My figures for one year of operation on my 1958 Volvo show 583 gallons of gas used in 16,209 miles. This gives an average of 27.8 miles per gallon to one-decimal-place accuracy."

John P. Hoyt  
Professor of Mathematics  
Annapolis, Md.

☆ ☆ ☆

"Kudos are in order for your article 'Which Foreign Car is Best for You?' It is the best by far of many such articles on small cars recently. As the owner of a Dauphine I concur with most of your author's conclusions, but feel that some good points are a bit understated. My records show an average of 33.7 miles per gallon for in-town driving and up to 43.0 miles per gallon on extended travel on Florida highways. Also local dealer service is outstanding."

Mrs. J. B. Powell,  
Coral Gables, Fla.

☆ ☆ ☆

"I have just finished reading the September issue and, while my blood is still

(Continued to page 20)



**NOW!**  
at a price  
you can afford!

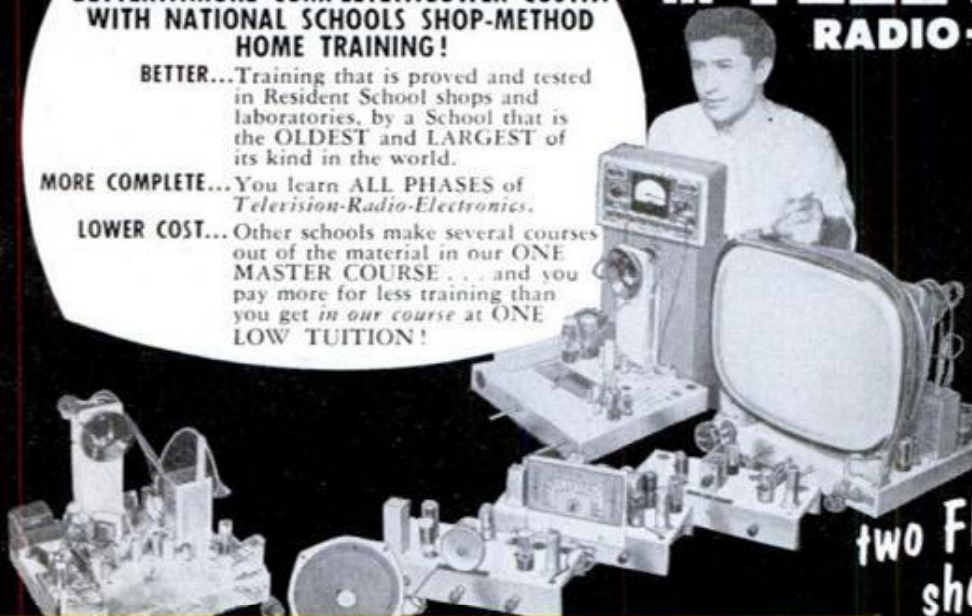
# MAKE MORE MONEY in TELEVISION RADIO-ELECTRONICS

**BETTER...MORE COMPLETE...LOWER COST...  
WITH NATIONAL SCHOOLS SHOP-METHOD  
HOME TRAINING!**

**BETTER...** Training that is proved and tested in Resident School shops and laboratories, by a School that is the **OLDEST** and **LARGEST** of its kind in the world.

**MORE COMPLETE...** You learn **ALL PHASES** of *Television-Radio-Electronics*.

**LOWER COST...** Other schools make several courses out of the material in our **ONE MASTER COURSE**... and you pay more for less training than you get in our course at **ONE LOW TUITION!**



These  
**two FREE** books will  
show you how!

You get all information  
by mail... You make  
your own decision... at  
home! **NO SALESMAN  
WILL CALL**

## TOP PAY... UNLIMITED OPPORTUNITIES LIFETIME SECURITY CAN BE YOURS!

You are needed in the Television, Radio, and Electronics industry! Trained technicians are in growing demand at excellent pay—in **ALL PHASES**, including Servicing, Manufacturing, Broadcasting and Communications, Automation, Radar, Government Missile Projects.

**NATIONAL SCHOOLS SHOP-METHOD HOME TRAINING**, with newly added lessons and equipment, trains you in your spare time at home, for these unlimited opportunities, including many technical jobs leading to supervisory positions.

**YOU LEARN BY BUILDING EQUIPMENT WITH KITS AND PARTS WE SEND YOU.** Your National Schools course includes thorough *Practical training—YOU LEARN BY DOING!* We send you complete standard equipment of professional quality for building various experimental and test units. You advance step by step, perform more than 100 experiments, and you build a complete TV set from the ground up, that is yours to keep! A big, new TV picture tube is included at no extra charge.

**EARN AS YOU LEARN.** We'll show you how to earn extra money right from the start. Many of our students pay for their course—and more—while studying. So can you!

**LESSONS AND INSTRUCTION MATERIAL ARE UP-TO-DATE, PRACTICAL, INTERESTING.** Every National Schools Shop-Method lesson is made easy to understand by numerous illustrations and diagrams. All instruction material has been developed and tested in our own Resident School Shops, Laboratories and Studios.

**SEND FOR INFORMATION TODAY**... it can mean the difference between **SUCCESS** and failure for you! Send for your **FREE BOOK** "Your Future in Television-Radio-Electronics" and **FREE Sample Lesson**. Do it **TODAY**, while you are thinking about your future. It doesn't cost you anything to investigate!

### GET THE BENEFITS OF OUR OVER 50 YEARS EXPERIENCE

Approved for  
GI Training



**NATIONAL SCHOOLS**  
Los Angeles 37, Calif.

### YOU GET...

- 19 Big Kits—**YOURS TO KEEP!**
- Friendly, Instruction and Guidance
- Job Placement Service
- Unlimited Consultation
- Diploma—Recognized by Industry
- **EVERYTHING YOU NEED FOR SUCCESS!**

### SHOP-METHOD HOME TRAINING COVERS ALL PHASES OF INDUSTRY

1. Television, including Color TV
2. Radio AM & FM
3. Electronics for Guided Missiles
4. Sound Recording and Hi-Fidelity
5. FCC License
6. Automation and Computers
7. Radar & Micro-Waves
8. Broadcasting and Communications

## NATIONAL TECHNICAL SCHOOLS

WORLD-WIDE TRAINING SINCE 1905

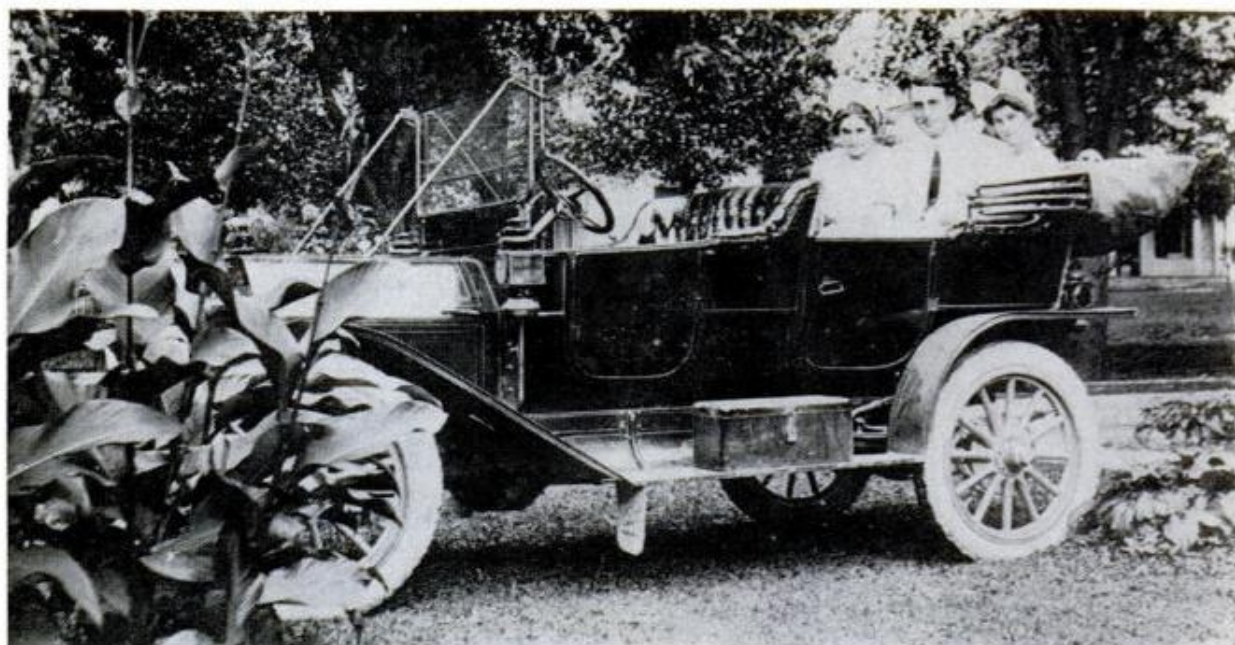
**MAIL NOW TO**  
**NATIONAL SCHOOLS, Dept. RB-10**  
4000 S. FIGUEROA ST., LOS ANGELES 37, CALIF.  
Rush free TV-Radio "Opportunity" Book and sample lesson. No salesman will call.

NAME \_\_\_\_\_ AGE \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

Check if interested **ONLY** in Resident School training at Los Angeles.  
VETERANS: Give date of Discharge \_\_\_\_\_

### RESIDENT TRAINING AT LOS ANGELES

If you wish to take your training in our Resident School at Los Angeles, the world's TV capital, start **NOW** in our big, modern Shops, Labs and Radio-TV Studios. Here you work with latest Electronic equipment - - professionally installed - - finest, most complete facilities offered by any school. Expert, friendly instructors. Personal attention. Graduate Employment Service. Help in finding home near school - - and part time job while you learn. Check box in coupon for full information.

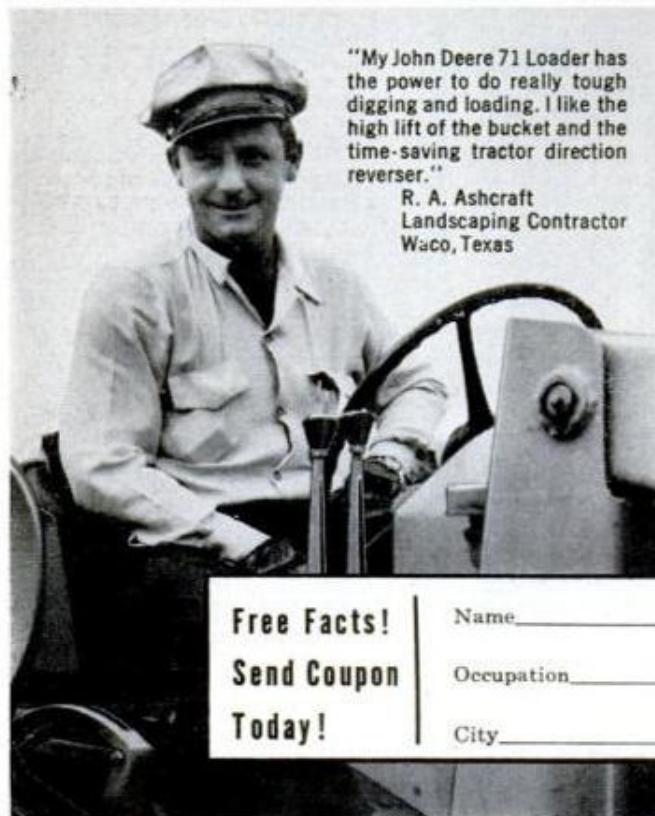


## Do You Know This Old Timer?

You think that "extras" are something new in the auto dealer's bag of tricks? You're wrong. Back when this car was in style, buyers had to pay \$125 extra for a windshield and a speedometer, bringing the total price of the car to \$1375. Even front doors cost extra. In this case,

the owner had them installed two years after he bought the car. The car had a carbide gas tank for the headlights on the right running board and a kerosene taillight. Recognize it? The handsome canna bush in front doesn't help, does it? Turn to page 285 for the answer.

## EARN GOOD MONEY in Excavating and Landscaping Start Now with Your Own Low-Cost John Deere Unit



"My John Deere 71 Loader has the power to do really tough digging and loading. I like the high lift of the bucket and the time-saving tractor direction reverser."

R. A. Ashcraft  
Landscaping Contractor  
Waco, Texas

You, as an independent contractor or subcontractor, can be a "man in demand"—grading, digging basements, pipe trenches, septic tanks—building earth dams for farmers. You'll be equipped for a variety of jobs with just one low-cost John Deere Industrial unit.

Get Started with John Deere Credit Plan.

Confidential agreement helps you buy new or used equipment. Write today for helpful free facts and name of your nearest John Deere Industrial Dealer. No obligation.



Free Facts!  
Send Coupon  
Today!

Name \_\_\_\_\_  
Occupation \_\_\_\_\_ Street \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_



John Deere Industrial Division  
Dept. 2335 • Moline, Illinois



**VIRGINIA**  
"My 10th year and business keeps growing. Have made as much as \$485 in one day"  
E. Roddey, Hampton.



**CALIFORNIA**  
"Made as much as \$347 on just one job. You can't miss with Duraclean" ...  
C. W. Morris, Sacramento.



**SOUTH DAKOTA**  
"Earned \$1571 in a single month. Homeowners here have great need for our services" ...  
L. Canaday, Rapid City

# These Men are Building Lifetime Businesses!

**ILLINOIS**  
"Have averaged over \$50,000 my first 3 years. Hqtrs' help make it possible"  
M. Lyons, Chicago.



**MINNESOTA** "Averaging over \$300 per month part-time. Nothing beats being your own boss" ...  
T. Mason, Winona.



**NEW YORK**  
"National advertising is tops. One lead from Hqtrs' got me 3 jobs totaling \$500" ...  
T. Cook, Freeport.

**ARKANSAS**  
"Every person thinks of owning a business. I know of no other which can offer a man so much" ...  
E. Bailey, Hot Springs.



## 6 WAYS TO MAKE MONEY

You get exclusive use of unique absorption process which cleans carpets and upholstery without harmful scrubbing, soaking or shrinkage. It's acclaimed by housewives, mfrs and backed by McCalls and Parents' Seals. Five other profitable services are soil retarding, mothproofing, flame proofing, spotting and carpet repairing. Thus, on most jobs you multiply profits. "Headquarters say gross \$9.00 per hour. I gross up to \$12.00. Many dealers I know do even better," says Dan Chilcott of N. Platte, Neb.

# You, too, can make BIG MONEY IN THIS Booming Industry



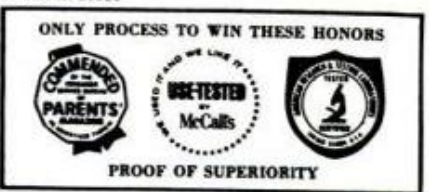
IN YOUR TOWN, there's a real opportunity right now for you to meet the growing demand for cleaning of costly carpets and upholstery . . . services for which homeowners are ready to pay good money. Mechanical methods have proved to be harmful to fabrics, so the field is wide open with our exclusive, safe, scientific absorption method of cleaning. Have you investigated this opportunity? Thousands like those above have, and are now enjoying the financial security of their own business. Many have started part-time and so can you!  
This business is easy to learn, and quickly established. There's no shop needed . . . you operate from home and provide all services in your customer's homes.

WE'LL train you, show you the proved methods for operating and building your own business, and then back you with 25 continuous services.  
By starting now, you will be getting in on the GROUND FLOOR of a \$750 million a year industry!

**WE HELP YOU GROW**  
Under our unique cooperative program, you are fully trained through a nearby dealer and at our 50-hour

training school. You're kept up-to-date through monthly magazines, nat'l conventions, and at regional meetings where Hqtrs' staff come to you in your area. You're backed by nat'l advertising in consumer (McCalls, Parents', House & Garden, etc.) and trade magazines. Others of 25 services which help assure your success include: Individual counseling (staff of specialists give you prompt, expert counsel), ad kits, folders, product development, plus others.

**EASY TERMS** Moderate payment establishes your own business—pay balance from sales. We furnish machines, sales material and enough supplies to return your TOTAL investment.



**What Manufacturers Say**  
". . . (Duraclean) standards in keeping with service to which . . . carpets and consumer are entitled." —Amisco (American Viscose Corp)  
". . . superior to any on-location process with which I'm familiar." —President, Modern Texting Co.  
". . . we approve this process . . . in keeping with better service to Mrs. Housewife." —Aldon Rug Mills



Free 16-page booklets detail dealership program. No obligations, no salesman will call. Clip and mail coupon today.

## "OWN A BUSINESS" COUPON

**DURACLEAN CO., 0-161 Duraclean Bldg., Deerfield, Ill.**  
Please rush FREE 16-page booklets which detail-how I may own my own business. I understand I am under no obligations and no salesman will call.

Name..... (please print)  
Address.....County.....  
City.....State.....

**DURACLEAN CO., 0-161 Duraclean Bldg., Deerfield, Ill.**

# YOU CAN PLAY



## ANY INSTRUMENT

**... even if you don't know a single note of music now!**

**I**MAGINE! Even if you never dreamed you could play... you can soon surprise your friends with your musical ability.



No special talent or previous training needed. Clear, simple directions tell you exactly what to do, so you can't go wrong! Spend a few minutes a day—and only a few cents per lesson. Teach yourself piano, guitar, accordion, organ, any instrument. Play popular, country music, hymns, classical, any other music—by note, quickly. Over **ONE MILLION** students have taken up music this famous way, including TV Star Lawrence Welk.

### Stop Cheating Yourself of These Joys!

Popularity! New friends. Gay parties. Good times. Career. Extra Money... understand, appreciate, converse about music. Learn lives and compositions of modern and great masters... Relax! Banish worries and frustrations. Satisfy self-expression, creative urge. Gain self-confidence.

### MAIL COUPON FOR FREE BOOK

See for yourself why our course has been successful for 62 years! Read the whole fascinating story of this wonderful course in 36-page illustrated book. For **FREE** copy, mail coupon. **U. S. School of Music, Studio 301, Port Washington, N.Y.**



(No salesman will call.)



**U. S. SCHOOL OF MUSIC**  
Studio 301, Port Washington, N. Y.

Please send me your 36-page illustrated Free Book. I'm interested in playing (name instrument) \_\_\_\_\_

I do  I do NOT—have instrument now.

Name \_\_\_\_\_ Age \_\_\_\_\_  
(please print)

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

## Great Pioneers in Science Do You Know Them?

—By James S. Thistle—

**SOME CALL HIM** “the pioneer of the Atomic Age,” largely because his theory of relativity expressed the equation for converting matter into energy. It is said that his letter to President Franklin D. Roosevelt in 1939, suggesting the use of atomic energy as a war weapon, brought about the dropping of the A-Bomb in 1945.

Born in Germany, this mathematical wizard taught in the Universities of Zurich and Prague, and later became director of the Kaiser Wilhelm Institute in Berlin. He won the Nobel Prize in physics in 1921. After the Nazi government stripped him of his property, position and citizenship in 1933, he accepted an appointment for life at Princeton's Institute for Advanced Study.

In 1940 this scientist-mathematician became a citizen of the U. S. after refusing to accept an offer to be president of Israel.

*These letters, unscrambled, spell the name of this month's Great Pioneer in Science:*

## LAETRINNEBESTI

(First and Last Names)

*Write the correct name here:*

Now turn to page 293 for the answer.

6-5-4-3-2-1...

DON'T LET TIME RUN OUT ON YOUR BIG CHANCE

to Prepare At Home for a Profitable Job in

# Electronics

Guided Missile Control—Radar—TV—Radio, etc.

**NO ADVANCED EDUCATION NEEDED!**

A breath-held hush! Dramatically the cold voice completes the count-down: "... 3 ... 2 ... 1 ..." And with a mighty roar, a missile rises from its launching pad, picking up speed that quickly lifts it out of sight. Another rocket thunders into space ... a triumph of ELECTRONICS and ASTRONAUTICS.

You may have a future in this fascinating field—with DeVry Tech's help. You—if you are 17-55—can train at home in your spare time. You, may be in that picture some day—a trained man with a fascinating job, a good future, making real money. You, as an electronic technician, can back the men who launch the missiles!

With DeVry's thorough training, you get on-the-job type of know-how. You handle tools, you build and operate instruments. You learn by following clear-cut directions, by viewing training movies AT HOME! It's thorough. It's proved. Get into this exciting field without taking your feet off the ground. Send the coupon NOW for details.



## TRAIN IN CHICAGO OR TORONTO LABORATORIES

Full time day and evening training programs in our well-equipped Chicago and Toronto Laboratories are also available.

## EMPLOYMENT SERVICE

helps you get started toward a good job or your own service shop when you complete the program.



### CHECK THESE EXCITING JOB OPPORTUNITIES!

Communications Technician • Computer Specialist  
Remote Control Operator • Instrument Technician  
Radar Man • Micro-Wave Technician • TV-Radio Specialist . . . PLUS MANY OTHERS

# DeVry TECHNICAL INSTITUTE

4141 Belmont Avenue, Chicago 41, Illinois  
ACCREDITED MEMBER OF NATIONAL HOME STUDY COUNCIL



## GET THIS FREE BOOKLET!

A copy of "ELECTRONICS IN SPACE TRAVEL" is yours for the asking. Mail the coupon NOW. See for yourself how YOUR future may fit into this exciting field.

*No Previous Technical Experience Needed!*

## MAIL COUPON TODAY!

DeVRY TECHNICAL INSTITUTE 2070  
4141 Belmont Ave., Chicago 41, Ill., Dept. PM-1-Q

Please give me a FREE copy of "Electronics in Space Travel" and tell me how I may prepare for a start in the Electronics field.

Name \_\_\_\_\_ Age \_\_\_\_\_  
Please Print

Address \_\_\_\_\_ Apt. \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

Check here if you face military service.

Canadian residents address DeVry Tech of Canada, Ltd.,  
626 Roselawn Ave., Toronto 12, Ont.

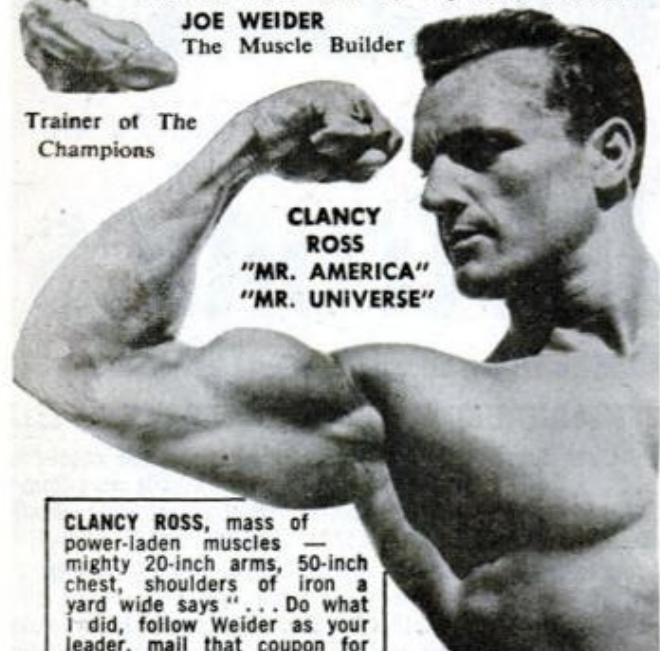
## THE \$10,000 CHALLENGE ONLY JOE WEIDER DARES TO MAKE!



**MY GUARANTEE!** Use my system for training and you will gain twice as much muscle and triple your power in less than Half The Time it would take by any other method.

**JOE WEIDER**  
The Muscle Builder

Trainer of The  
Champions



**CLANCY  
ROSS**  
"MR. AMERICA"  
"MR. UNIVERSE"

**CLANCY ROSS**, mass of power-laden muscles — mighty 20-inch arms, 50-inch chest, shoulders of iron a yard wide says "... Do what I did, follow Weider as your leader, mail that coupon for a Free Trial Course Today!"

### IN 15 MINUTES I'LL PROVE YOU CAN HAVE A RUGGED VIRILE, HE-MAN BODY!

**JUST 15 MINUTES TO THAT RUGGED, DYNAMIC, HE-MAN BUILD YOU ALWAYS WANTED!** Give me 15 minutes right in the privacy of your own home and I will prove to you that in half the time and with twice the ease, in just a few minutes daily, I will, through my **TRIPLE-PROGRESSION COURSE**, slap inches of steel muscles to your pipe stem arms, pack your chest with power and size, give you life-guard shoulders, dynamic, speedy athletic legs — add jet-charged strength to every muscle in your body. I don't care if you're short or tall, skinny or fat, office-worker, laborer, school-boy, or businessman, I must make a new virile he-man out of you, and also . . . help you build "inner strength" that will give you the virile look that women admire and men envy. What I did for Andre Lepine, Jack Delinger, Ray Schaffer and other "Mr. America" winners — and thousands of weaklings — I can do for you! Yes, I can turn you into a Real He-Man.

**Don't miss this once-in-a-lifetime opportunity  
LET ME PROVE TO YOU, AT MY OWN EXPENSE,  
EVERYTHING I SAY CAN BE DONE!**

**FREE MUSCLE BUILDING TRIAL OFFER.** Fill out coupon and mail to me. I'll rush you my **GIANT 48 page** course, filled with exercises, training secrets, heroic photos of mighty champions and private advice on how you can become a muscle star fast! This sensational offer is good only to males between 13 and 65 in normal good health.



**NOTHING  
TO BUY!**

#### AMAZING FREE TRIAL OFFER

**JOE WEIDER** Dept. 38-10A  
801 Palisade Ave., Union City, N.J.

Shoot the works, Joe! Rush me my **FREE INTRODUCTORY POWER-PACKED, MUSCLE-BUILDING COURSE.** (I enclose only 10c. to cover cost of handling and mailing.) I am under no obligation.

NAME ..... AGE .....

ADDRESS .....

CITY ..... ZONE ..... STATE .....

Canada: Mail to Joe Weider, 4466 Colonial Ave., Montreal, Que.

(Continued from page 14)

boiling, I am writing to take you to task for a very glaring omission in the foreign-car article. If this was indeed a survey of ten representative cars, as your writer insists, then how can you possibly explain the failure to include the English Ford? And the German-made Opel?"

Donald Leight  
Long Island City, N. Y.

☆☆☆

"As a foreign-car owner (VW) I cannot agree with your mileage figures based on a single 50-mile test. I have read dozens of test reports on Volkswagen, some covering as much as 2000 miles. The figure for VW should be 30 to 40 miles per gallon with the average about 32."

George F. Moore  
Joliet, Ill.

*Actually, the mileage figures shown in the September article are conservative, but are, PM thinks, an accurate reflection of the actual miles per gallon these cars will average over a year's normal usage. This includes considerable short-run operation, winter driving with wasteful choke operation, and all the other things that make actual miles per gallon much lower than publicized test miles per gallon. We could not test all imports, so decided to select a variety of designs and nationalities. The engine designs range from three-cylinder, two-stroke, water-cooled, through four-cylinder, four-stroke, air-cooled.—Ed.*

☆☆☆

"I am an owner of a Hillman Husky station wagon and am not in love with it or with the place where I bought it. Gas mileage is not 25 miles per gallon. I had to get a head gasket replaced. Cost was \$39.27 less 10 percent. A Chevrolet man told me it would cost \$19 on his car. You can see the difference in price. I hear the same stories about VWs and other cars of foreign make. I'll never be taken in by a foreign make again."

T. E. George, Jr.  
Fairfax, Va.

☆☆☆

"I believe if Ford had continued making the Model A and improved it and kept the price down, they would be selling more cars than any one of the Big Three."

C. L. McKee  
Greeley, Colo.

See page 183.—Ed.

(Continued to page 22)

POPULAR MECHANICS

# The STUDY of LAW

## A "Must" for the ambitious man seeking Business Success!

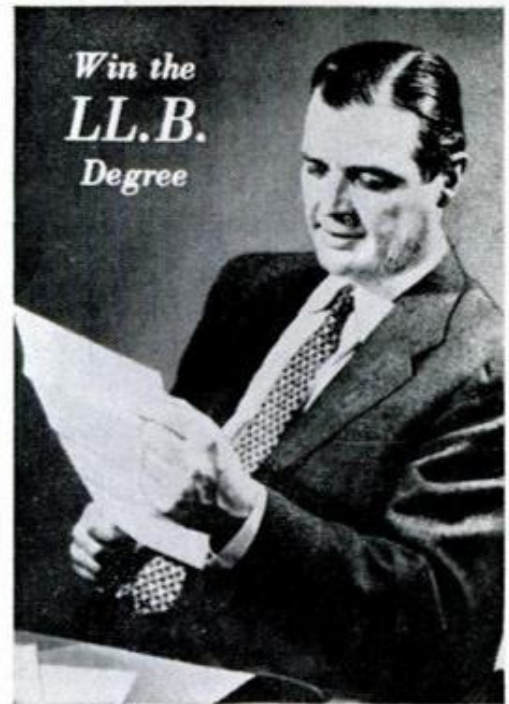
... Can YOU answer these legal problems?

**CASE #1** Jones wrote Smith making an offer. Smith wrote his acceptance and mailed it. Then he decided to call it off and telegraphed Jones to that effect. Jones got the telegram before he did the letter. May he hold Smith to the contract?

**ANSWER.** Yes. Both Smith and Jones became bound when the letter containing the acceptance was mailed.

**CASE #2** Doe said to Crane, "I will sell you 100 shares of XY stock at \$50." Crane said, "I'll give you \$45." Doe, knowing the market was unsettled, said nothing, but an hour later tendered 100 shares and a bill for \$4,500. May he hold Crane?

**ANSWER:** No. Crane's counter-offer was a rejection of Doe's offer.



## Law... A FASCINATING STUDY AND A LIBERAL EDUCATION

Law today is involved in practically everything we do—regardless of what our position or status in life may be. That's why thousands of ambitious men and women who never intend to practice are studying Law with LaSalle in spare time—not for a legal career but as an aid to business advancement.

Whether your work is related to banking, insurance, advertising, credit or collections, transportation, accounting, claim adjusting, merchandising, store proprietorship, partnership, brokerage, manufacturing—ANY FIELD—you need to understand and know Law.

The study of Law is a great help to men in every walk of life. Many physicians, clergymen, and other professional men are now studying Law with LaSalle as a matter of recreation, mental training, culture, as a necessary part of a liberal education.

Aside from the actual knowledge that you acquire, the reading of Law is conceded to be a superior developer of reasoning power. For all types of work, Law training develops keen, clear, quick, correct and decisive thinking. Reading a Law text is much more interesting to most people than a fiction story—you'll be learning the underlying principles of man's relation to society, his rights, privileges, and restrictions toward himself and his fellow man.

### STUDY AT HOME—IN SPARE TIME

You can study American Law and Procedure right in your own home—advancing at your own pace. For over 50 years we have helped more than 1,400,000 ambitious men and women to greater success in the business world. You too can benefit, as have so many before you. Low cost—easy terms.

The training includes the 14-volume LaSalle Law Library—American Law and Procedure. This library has been compiled by leaders in the field of Law. It covers the whole basic field of Law in an orderly and easily understood manner that can be quickly learned. Collateral reading and printed lectures on legal problems supplement the text. Law instructors who are licensed attorneys personally supervise your program from the first assignment to the LL.B. Degree or Diploma.

### SEND FOR TWO FREE BOOKS, "LAW TRAINING FOR LEADERSHIP" and "EVIDENCE"

If you are determined to enjoy the advantages of Law training—to prepare for greater future possibilities—send the coupon and get all the facts. The interesting and informative booklets, "Law Training for Leadership" and "Evidence" will be sent promptly, and without obligation. MAIL THE COUPON TODAY!

Accredited Member, National Home Study Council



A MOST UNUSUAL LAW LIBRARY

## SEND FOR FREE BOOKS

### OTHER LASALLE OPPORTUNITIES

- Accounting
- Traffic and Transportation
- Business Management
- Stenotype (Machine Shorthand)
- Modern Bookkeeping
- CPA Training
- Salesmanship

### LaSalle Extension University

— A Correspondence Institution —

Dept. 164LR 417 S. Dearborn St., Chicago 5, Ill.

Please send me, free of all cost or obligation, your latest illustrated booklets "Law Training for Leadership" and "Evidence."

Name..... Age.....

Address.....

City, Zone, State.....



**MEN! Make up to  
\$1,000<sup>00</sup>  
IN A MONTH!**

**without "SELLING"**

**Sensational Demand for Low-Priced Fire Alarm PLUS Sure-Fire "No-Selling" Plan Offers Ambitious Men Huge Profit Opportunities**

**AMAZING NEW INVENTION**



Even beginners who never sold anything in their lives are cleaning up unbelievable profits with the first practical effective, low priced Fire Alarm ever invented . . . needed, wanted in homes, factories, offices, stores, on farms, for boats, everywhere. Professional salesmen are making biggest profits in years! Later in this ad I'll tell you about the plan that's producing orders for 1 to 12 Fire Alarms per sale from 8 out of 10 prospects . . . without selling. Here are the facts about the Fire Alarm. It hangs on the wall like a picture—no wiring, no installation. It's always on guard . . . It "smells" a fire before danger point. When temperature rises, Fire Alarm goes off automatically, howls loud warning that can be heard 1/5 mile, wakes up soundest sleeper, give precious time to put out fire, call fire department, or escape. And it sells for only \$4.95 with profit up to \$2.70 on each one.

**Nearest Thing to AUTOMATION SELLING**

With our field-tested plan customers sell themselves. No cold canvassing. No hard selling. It's the nearest thing to "Automation Selling." Imagine a sales plan even a child can use successfully because the sales tools we give you (and which you leave with your prospects) do all your selling even while you sleep! No room here to give you all the details but if you want big money fast rush the coupon now.



**Make This Lighted-Match Demonstration**

Sensitive! Lighted match triggers Alarms in 3 seconds.

**Free Sales Kit**

Send no money. Just rush coupon below for all the exciting moneymaking facts, complete illustrated Sales Kit, everything you need to make money your first day. Learn how selling only 20 Fire Alarms a day pays

Made \$26.52 in 3 Hours!

"Received first shipment about noon. Worked 3 hours and made \$26.52 profit. It's a terrific seller!"  
—Stanley, Calif.



you \$1,080.00 profit in a month. No competition anywhere. Get in on the ground floor now. Rush this coupon.

**MERLITE INDUSTRIES, Inc.**

(ALARM DIVISION)

114 E. 32nd St., Dept. F-15H

New York 16, N. Y.

**ALVIN WESLEY, Sales Manager**  
Merlite Industries, Inc. (Alarm Division)  
114 E. 32nd St., Dept. F-15H, New York 16, N. Y.

Rush FREE SALES KIT and full details about your "No-Selling" plan which gives me opportunity to make up to \$1,000.00 in a month without cold canvassing and hard selling—automatically. I am not obligated.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

In Canada: Mopa Co., Ltd., 371 Dowd St., Montreal 1, P.Q.

(Continued from page 20)

"I was glad to read that people were not going all out, after all, for the space-age Chevrolet (the only space it reminds me of is the empty one in the stylist's head). It is a credit to the American car buyer's intelligence that he still rates the functional at least as high as the silly, the childish and the idiotic. I like the Volkswagen's motto: We change a car only to improve it, not to make last year's car look obsolete. (I don't like the Volkswagen, though.)

H. Landauer  
Tampa, Fla.



"How does it happen that the electric cars that are being experimentally built today have nowhere near the performance of electric cars on the market from 1910 to 1920? My mother drove one during those years which performed much better than the claims now. Art Railton's *Detroit Listening Post* article on the electric car seems to be contrary to the statements I have read in numerous other publications on the subject. Some comment to support the inference that all commentators on this subject are out of the step except Mr. Railton will be interesting."

R. W. Garlick  
Honolulu, Hawaii

PM, obviously, is not responsible for what other publications write on any subject. In the case of the electric-car (June PM), Mr. Railton investigated the claims and came up with his own conclusion, which was far different from the claims of the electric-car promoters (and other magazines also). His analysis seems to have been more accurate. As yet, the Charles electric car (which he was discussing) has not been built and, at last report, will not be built.—Ed.



"You say not to hold your breath waiting for the electric car. Well, I am not waiting and I will tell you why. I have owned three Detroit Electrics. In 1917 we drove an electric car from Long Beach to San Diego and had to do it by stages. We spent the night at Oceanside, had the batteries recharged. We had them charged again at San Diego and again at Oceanside on our return. After reading your article on electric cars I know that you have the right dope."

Bert C. Mills  
Burbank, Calif.

(Continued to page 26)



# DON'T BE HALF-TRAINED! Be A Master Technician

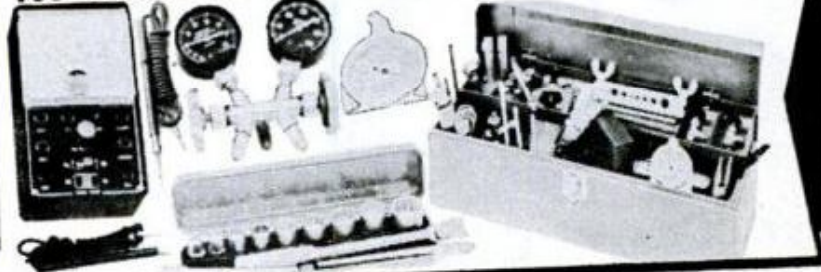
**NOW... ONE**  
modern master  
home training course  
**IN ALL 3 PHASES**



## AIR CONDITIONING - REFRIGERATION ELECTRICAL APPLIANCES

**ALL AT ONE**  
**LOW TUITION**  
only National Schools gives  
you this complete training  
at no extra cost

**YOU GET AND KEEP ALL THESE TOOLS AND INSTRUMENTS**



Incomplete training limits your earning power, even disqualifies you for top-pay jobs. The big service companies require *complete*, all-phase training. If you **open your own shop**, you'll be called upon to service and repair *all types* of refrigerators, air conditioners and appliances. With *complete* training—as only National Technical Schools can give you—you can accept *every* job, make *big profits* all year round.

### FUTURE BRIGHT FOR TRAINED MASTER TECHNICIANS

Over 30,000 new technicians must be trained annually. You are needed to help service and repair the 50 million air conditioners, refrigerators and electrical appliances that will need fixing this year alone. No wonder the Master Technician has steady work, at high pay, year after year. He can go places in his own business or with a manufacturer, dealer, distributor or department store. Armed with all-phase training, his earning power is unlimited.

### THE MOST FOR LESS

We give you illustrated Shop-Tested Lessons and Manuals...many other training aids...privilege of **CONSULTATION** with our instructors and engineers. Every lesson, every manual has been **SHOP** tested and approved.

### JOB TRAINING AT HOME

You get Professional Tools, Precision Instruments, **PLUS** a Factory-Made **APPLIANCE TESTER!** A shop-full of **PRACTICAL**, professional equipment. Use them to conduct over 100 experiments...also in Spare Time Work and **ON THE JOB**. It is all yours to keep...no **EXTRA MONEY DEPOSITS**...no **EXTRA COST** on your equipment kits.

### EARN AS YOU LEARN

We show you how. Many of our students pay for their entire course—and more—in Spare Time while learning. So can you. Graduate Advisory Service, too.

**GET THE BENEFIT OF OUR OVER  
50 YEARS EXPERIENCE**

**N.T.S. also offers training in  
TV - RADIO - ELECTRONICS  
and AUTO MECHANICS - DIESEL**



MEMBER



**NATIONAL TECHNICAL SCHOOLS**

WORLD-WIDE TRAINING SINCE 1905

4000 SO. FIGUEROA ST., LOS ANGELES 37, CALIF., U. S. A.

### RESIDENT TRAINING AT LOS ANGELES

If you wish to take your training in our Resident School at Los Angeles, start **NOW** in our big modern Shops and Labs. Here you work with latest equipment...professionally installed...finest...most complete facilities offered by any school. Expert, friendly instructors. Personal attention. Graduate Advisory Service. Help in finding home near school...and part time job while you learn. Check box in coupon for full information.

### ACTUAL LESSON



**SEND FOR  
FREE  
BOOK AND  
ACTUAL  
LESSON NOW!**

We'll rush you our big, illustrated **OPPORTUNITY BOOK** and **ACTUAL LESSON**, show you how easily you can learn. **NO OBLIGATION**; no salesman will call. Do it **NOW!** It costs nothing to find out.

**NATIONAL TECHNICAL SCHOOLS**

WORLD-WIDE TRAINING SINCE 1905

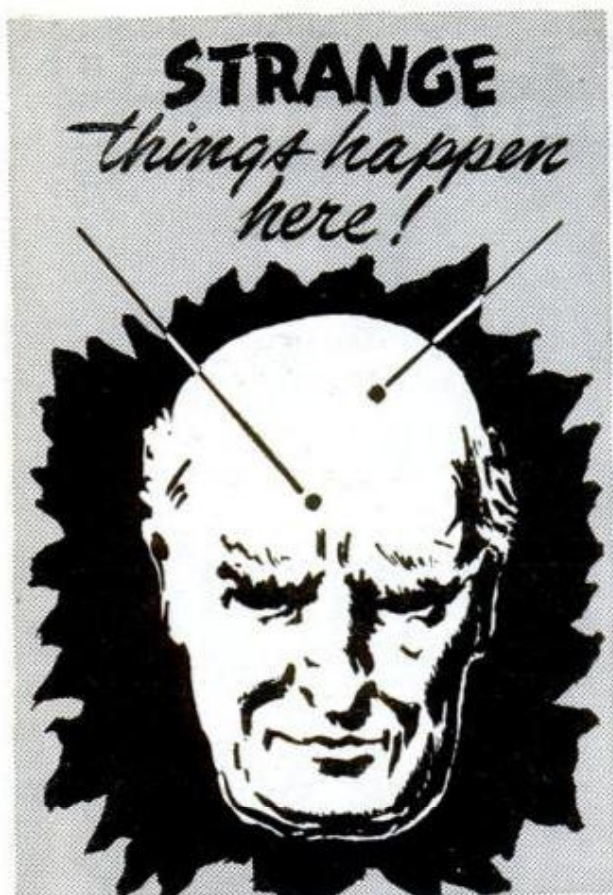
MAIL NOW TO  
National Technical Schools, Dept. CB-10  
4000 S. Figueroa St., Los Angeles 37, Calif.  
Rush **FREE "Opportunity" Book** and Actual Lesson. No Salesman will call.

NAME \_\_\_\_\_ AGE \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

Check here if interested **ONLY** in Resident Training at Los Angeles.



## The Dark Continents of Your Mind

DO YOU struggle for balance? Are you forever trying to maintain *energy, enthusiasm,* and the *will to do*? Do your personality and power of accomplishment ebb and flow — like a stream controlled by some unseen valve? Deep within you are minute organisms. From their function spring your emotions. They govern your *creative ideas* and *moods*—yes, even your enjoyment of life. Once they were thought to be the mysterious seat of the soul —and to be left unexplored. Now cast aside superstition and learn to direct intelligently these *powers of self*.

### Accept this *Free Book*

Let the Rosicrucians, an age-old fraternity of thinking men and women (not a religion), point out how you may fashion life as you want it —by making the fullest use of these little-understood *natural faculties* which you possess. This is a challenge to make the most of your heritage as a human. Write for the Free Book, "The Mastery of Life." Address: Scribe M.L.C.

## The ROSICRUCIANS

San Jose (AMORC) California



## Sidelights from the PENTAGON

By William R. Kreh

The Navy now has a cheap and effective way to protect its men from over exposure to high-energy radar beams—all because Lt. Walter Johnson of its Medical Corps one day got a hot seat.

Lt. Johnson was using an elaborate detector to measure microwave radiation aboard the guided-missile cruiser *Galveston* when, all of a sudden, he felt something burning him aft. The seat of his trouble was caused by a couple of flash-bulb-size neon lamps he had stuck in his hip pocket. The doctor had stood in the path of radar waves which caused the lamps to glow.

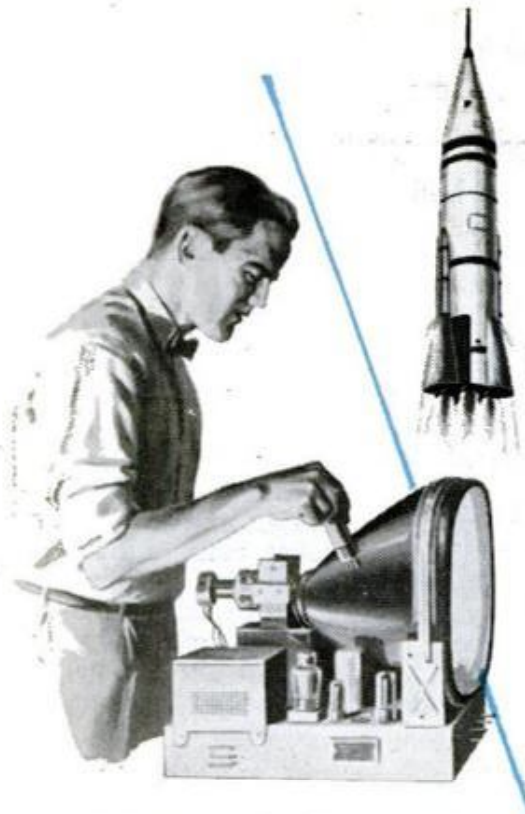
Now, each crew member aboard the *Galveston*, and other ships equipped with similar electronic gear, wears a little neon lamp on his uniform: When it lights, the wearer knows he's in a radar beam. The bulbs light well before the danger point from radiation is reached.

Walking is nothing new in the Army, but one group of soldiers recently gave this old game a new twist—they walked nearly 300 miles, backwards!

Men of the 105th Transportation Terminal Service stationed at Thule, Greenland, were given the job of discharging 297.6 nautical miles of submarine telephone cable, which was necessary for communication between Thule and Cape Dyer, Baffin Island. It was laid by a British cable-laying vessel. But because the cable was stored in circular tanks, the Army men had to guide it into place by walking backward in a continuous circle for its entire length.

Largest anchor chain in the world will be used by nuclear aircraft carrier *Enterprise*. Each 360-pound link is 28 inches long, 17 inches wide and nearly five inches thick. The chain will have a breaking strength of more than 2½ million pounds.

ANOTHER WAY RCA  
SERVES EDUCATION  
THROUGH  
ELECTRONICS



# 6 REASONS WHY RCA TRAINING IN ELECTRONICS can be the smartest investment you'll make in your *entire lifetime!*

**1. You get the finest training-at-home** under the supervision of the RCA INSTITUTES, experts in technical training for over 50 years. The very name "RCA" means dependability, integrity, and scientific advance.

**2. You get comprehensive training** in your choice of four complete, up-to-date Courses... from basic electronics theory to Color TV and Automation.

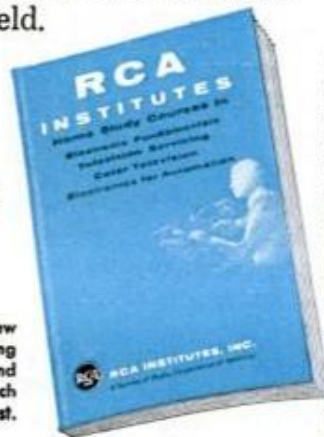
**3. You get an evaluation of your aptitude** for advanced training. RCA determines, for your benefit, whether you have the requirements for a career in the electronics field.

**4. You get prime quality equipment** as a regular part of your Course... equipment that you keep and use on the job. You never have to take apart one piece to build another.

**5. You get each study group on a pay-as-you-go basis.** Should you wish to interrupt your training at any time, you will not owe RCA Institutes a penny more, unless and until you decide to resume the Course.

**6. You get top recognition — worldwide.** Graduates of RCA Institutes now work for leaders in the electronics field; many have their own businesses. This record is true tribute to the high quality of RCA Institutes training.

Send for this  
64-page Home  
Study Catalog  
**FREE!**



RESIDENT SCHOOL Courses in New York City offer comprehensive training in Television and Electronics. Day and Evening classes start four times each year. Detailed information on request.

## RCA INSTITUTES, Inc. Home Study School PM-10

A Service of Radio Corporation of America

350 West Fourth Street, New York 14, N. Y.

Without obligation, send me **FREE** 64-page CATALOG on Home Study Courses. No salesman will call.

Name ..... Age.....  
please print

Address .....

City ..... Zone..... State.....

Korean Vets! Enter discharge date.....

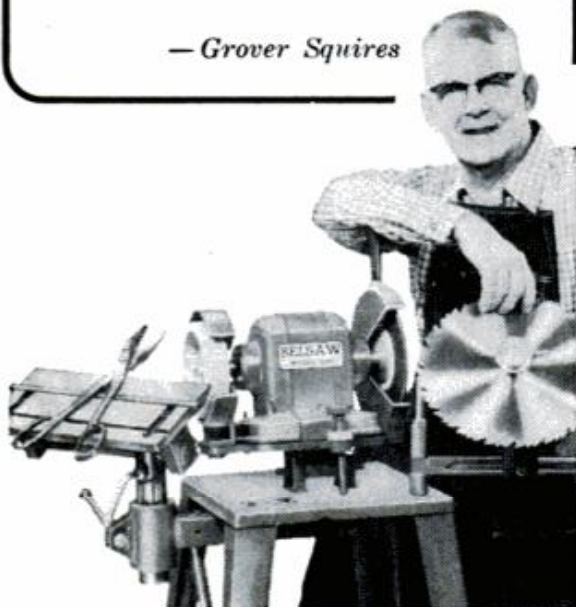
**CANADIANS** — Take advantage of these same RCA courses at no additional cost. No postage, no customs, no delay. Send coupon to:  
RCA Victor Company, Ltd., 5001 Cote de Liesse Rd., Montreal 9, Quebec

To save time, paste coupon on postcard.

MY SPARE TIME HOBBY MAKES ME

**\$5<sup>00</sup>** an hour  
**CASH PROFIT**

— Grover Squires



## START YOUR OWN SPARE TIME BUSINESS

You can turn your spare time into Big Cash Profits with your own **COMPLETE SHARPENING SHOP**... Grind saws, knives, scissors, skates, lawn mower blades... all cutting edges. Your Own Cash Business with no inventory... right at home... no experience needed.

**FREE BOOK** tells how you can start your own spare time business while you are still working at your regular job. Low Cost—time payments only \$15.00 a month. **Send coupon today.**



**FREE BOOK**

**BELSAW SHARP-ALL CO**  
710 Field Bldg.,  
Kansas City 11, Mo.

Send Free Book "LIFETIME SECURITY". No obligation.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

(Continued from page 22)

"I have been reading your report on foreign cars. To be truthful it makes me sore to hear people talk like these things are superior to American cars. There is a good old American car in every class that will surpass anything our competitors can build. I may be lazy but I like a little bit of comfort and horsepower and the day I can't afford a little bit of gasoline I will ride a kiddie car."

Paul Bogart  
Albuquerque, N. M.

★ ★ ★

"I found your articles on foreign cars in the August and September issues quite interesting, factual and impartial. The latter quality I particularly like, since many magazines definitely have an axe to grind when they discuss foreign cars. I have owned one foreign sedan for five years and also have an American sedan. Generally speaking, my foreign car seems better for local driving and short trips, but the American car is superior for long, high-speed superhighway trips."

D. B. Robinson, Jr.  
Madison, N. J.

★ ★ ★

"PM has gone to great length to help potential car buyers in choosing their next car. However, I would like to point out one fault. What has happened to the six-cylinder test reports on Ford, Chevrolet, Plymouth and Rambler? When you consider power, mileage, comfort and safety and the amount of car per dollar both in initial cost and cost of operation, only then can you make a true choice. Being a mechanic I have many views on this."

Donald E. Waldaker  
Vienna, Va.

★ ★ ★

"For two issues in a row, PM has literally run down the small imported cars. I want you to know that as long as there are people who know how to drive small cars, the big gas burners and high-repair-bill cars are going to lose out. That driver Kelly of yours better learn how to drive a car and Railton better get used to the fact that small cars are here to stay."

Sgt. Wm. Aplin, RCAF  
Canadian Forces in Europe

PM had no intention of running down the imports. It has tried to point out their good and bad features. Incidentally, PM's Auto Editor Railton is already accustomed to the fact that small cars are here to stay. He's owned a small, economy import since 1956, and just bought his wife an American compact car.—Ed.

(Continued to page 28)

# Superior's New Model 70 UTILITY TESTER® FOR REPAIRING ALL ELECTRICAL APPLIANCES and AUTOMOBILE CIRCUITS



Model 70—UTILITY TESTER  
Total Price...\$15.85—  
Terms: \$3.85 after 10 day  
trial, then \$4.00 monthly for  
3 months, if satisfactory.  
Otherwise return, no ex-  
planation necessary.

### As an electrical trouble shooter the Model 70:

- Will test Toasters, Irons, Broilers, Heating Pads, Clocks, Fans, Vacuum Cleaners, Refrigerators, Lamps, Fluorescents, Switches, Thermostats, etc.
- Measures A.C. and D.C. Voltages, A.C. and D.C. Current, Resistances, Leakages, etc.
- Will measure current consumption while the appliance under test is in operation.
- Incorporates a sensitive direct-reading resistance range which will measure all resistances commonly used in electrical appliances, motors, etc.
- Leakage detecting circuit will indicate continuity from zero ohms to 5 megohms (5,000,000 ohms).

### As an Automotive Tester the Model 70 will test:

- Both 6 Volt and 12 Volt Storage Batteries • Generators • Starters • Distributors
- Ignition Coils • Regulators • Relays • Circuit Breakers • Cigarette Lighters • Stop Lights • Condensers • Directional Signal Systems • All Lamps and Bulbs • Fuses
- Heating Systems • Horns • Also will locate poor grounds, breaks in wiring, poor connections, etc.

**INCLUDED FREE This 64-page book—practically a condensed course in electricity. Learn by doing.**

Just read the following partial list of contents: What is electricity? • Simplified version of Ohms Law • What is wattage? • Simplified wattage charts • How to measure voltage, current, resistance and leakage • How to test all electrical appliances and motors using a simplified trouble-shooting technique. • How to trace trouble in the electrical circuits and parts in automobiles and trucks.

Model 70 comes complete with 64 page book and test leads

**\$15<sup>85</sup>**  
only



**INDICATES  
RADIOACTIVITY  
IN 3 WAYS!**

- 1—BY NEON
- 2—BY PHONE
- 3—BY METER



## RCA RADIATION COUNTER

MADE TO SELL FOR \$150—OFFERED FOR ONLY \$47<sup>50</sup>  
(Much less than cost of Manufacture.)

Endless experiments and discoveries in the new exciting field of nuclear energy are made possible when you acquire this finely built and engineered device. In the past, a rugged counter which was suitable for the prospecting of radio-active ores such as uranium, thorium and radium, was unsuitable for laboratory

work due to the inability of combining accuracy with ruggedness. Conversely a laboratory counter, while being extremely sensitive, could not withstand use in the field where it would be subjected to abuse and abnormally hard knocks.

In the laboratory where determination of intensity (counts) of a reading are necessary, the WF-10AWB provides sensitivity for surpassing many laboratory counters.

### SPECIFICATIONS

Employs the extra sensitive 1B85 Bismuth Type Geiger Counter Tube. Sensitivity is .05 Roentgens per hour (1 MR/HR=2,000 counts per minute) • Three counting ranges: 0-100/1,000/10,000 counts per minute. • Handy reset button • Ideal for survey work because the complete unit weighs only 5½ lbs. • Sight and sound indications by neon flashes and headphones. Then when an indication is obtained you switch to meter reading for exact measurements. • Decontamination easy with damp cloth applied to the weather-

proofed aluminum case. • A radioactive specimen is included for instrument checking and experiments. • Included at no extra charge—U. S. Atomic Energy Commission booklet titled "Prospecting with a Counter." • R.C.A. Model WF-10AWB comes complete with self-contained batteries which provide over 200 hours of intermittent operation.

Comes with complete set of batteries, carrying strap, headphone, radio-active specimen and A.E.C. booklet Only

**\$47<sup>50</sup>**

RCA Radiation Counter  
Total Price .....\$47.50  
Terms: \$11.50 after 10 day trial,  
then \$6.00 monthly for 6 months  
if satisfactory. Otherwise return,  
no explanation necessary.

# SHIPPED ON APPROVAL NO MONEY WITH ORDER—NO C.O.D.

Try any of the above instruments for 10 days before you buy. If completely satisfied then send down payment and pay balance as indicated on coupon. **No Interest or Finance Charges Added!** If not completely satisfied return unit to us, no explanation necessary.

MOSS ELECTRONIC, INC.

Dept. D-701 3849 Tenth Ave., New York 34, N. Y.

Please send me the units checked on approval. If completely satisfied I will pay on the terms specified with no interest or finance charges added. Otherwise, I will return after a 10 day trial positively cancelling all further obligation.

Name .....

Address .....

City ..... Zone ..... State .....

Model 70 ..... Total Price \$15.85  
\$3.85 within 10 days. Balance \$4.00  
monthly for 3 months.

RCA Counter.... Total Price \$47.50  
\$11.50 within 10 days. Balance \$6.00  
monthly for 6 months

All prices net, F.O.B. N. Y. C.

**"\$10,784 IN ONE YEAR**  
**SERVICING RADIATORS!"**  
 —Sidney Rad. Shop, Sidney, Mont.  
 Make good money servicing auto-truck-tractor radiators. Easy to learn. Inland, world's largest radiator equip. mfr., offers complete package—equipment merchandising. "Pays-for-itself" Purchase Plan, free training. Small down payment on equipment starts you. Profitable dept. for garage or service station. Write:  
**INLAND MFG. CO., Dept. PM-1, 1108 Jackson St., Omaha 2, Nebr.**

**A GOLDEN OPPORTUNITY**  
**TO GET AHEAD IN AN INFLATION PROOF MILLION DOLLAR IMPORT MAIL ORDER BUSINESS**  
**An Urgent Message To Anyone Who Wants To Trade Debts For Dollars!**

**DEAR FRIEND**  
 If you're like most Americans today, you're a victim of the greatest disease of our decade, INFLATION. A deadly disease that robs you of the fruits of life with its symptoms of high prices, increasing living costs, mounting unpaid bills, burden-some taxes, no extra savings in the bank, and no real money to show for your efforts. If you're a person who wants to enjoy these "fruits", and be in an Import-Mail Order Business that lets you get ahead financially and pile up extra dollars, my message is meant for you! I want to help you as I've helped other ambitious men and women.

**START NOW! NO EXPERIENCE REQUIRED!**  
 My purpose is to set you up in a profitable Import-Mail Order Business . . . Not next year or next month, but RIGHT NOW, so you can start making money the same way I do. A way that has brought me security, financial independence, and allowed me to forget the fears of inflation.

**INFLATION HELPS BUSINESS GROW!**  
 The heading on this ad means "An Inflation Proof Million Dollar Import-Mail Order Business." That's no exaggeration. Today my sales have long passed the million dollar mark. Every penny of this came from mail order profits! If you show a sincere interest by mailing me the coupon below, I'll send you free details on how you can make the forces of inflation work for you and make you more money (with less effort) than you ever imagined!

**CASH IN ON FOREIGN MADE PRODUCTS (Imports)**  
 Everybody knows that there is fantastic profits in selling IMPORTS. When you buy abroad, you buy quality made foreign products at unbelievably low prices, due to low labor and manufacturing costs. Items costing 50c or \$1 sell up to \$5 or \$10 in this country. So, when inflation forces retail prices up—up—up here, your profits get bigger and bigger. Because I am already importing hundreds of fast-moving, profit-making items from all over the world, I will show you how you can do the same without experience or previous importing knowledge.

**NO INVESTMENT IN MERCHANDISE**  
 This business is air-tight, all laid out for you, ready to go! I make everything available to you at once! No advertising or investment in merchandise or inventory is necessary on your part. You do not even handle imports that you sell so easily, by mail to the public. About all you have to do is pick up the mail and bank your profits.

**EXCLUSIVE FRANCHISE IF YOU CAN QUALIFY**  
 Once you start making money in this new, exciting way, you will want to make sure it will last. This golden opportunity includes an Exclusive Franchise for you to hold as long as you qualify. With this Franchise as protection, you make more and more and more. Start as small as you wish at home or build a business requiring a special building and dozens of employees, if that is your ambition. My own success started on \$50 capital with no help from anyone (such as I now offer you).

**ACT NOW BEFORE IT'S TOO LATE!**  
 Only a limited number of Exclusive Franchises are available. I'll see that you get FREE DETAILS about this INFLATION PROOF MILLION DOLLAR IMPORT-MAIL ORDER BUSINESS immediately! No cost or obligation. Just fill out and Airmail the coupon now! There's a golden opportunity awaiting you. . . .

Cordially yours, **NELS IRWIN**

Send me FREE details about  
**INFLATION PROOF MILLION DOLLAR IMPORT-MAIL ORDER BUSINESS**  
 Print Your Name and Address

Name \_\_\_\_\_

Street \_\_\_\_\_

Town \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

Mail to: **NELS IRWIN, Dept. B51**  
**Mail Order Distributors**  
**15201 S. Broadway, Los Angeles 61, Calif.**

(Continued from page 26)

"In the October issue there was a picture of a 1910 Overland roadster. You are wrong. That was a 1914 Overland body, but the rest of the car was 1910 as you said."

William D. Johnson  
 Branchport, N. Y.

☆☆☆

"In reading your survey on imported cars, it comes to my attention that some of your answers are not quite true. As we are dealers for several of the cars mentioned, I am in a position to check my figures and yours. The luggage-space figure on the Morris is not up to par. The Morris has considerable more room than the VW (we are distributors of both). Should I be wrong, I apologize, but I am simply going by the experience I have had with imports through our distributorship."

George Smith  
 Fort Worth, Tex.

Luggage-space measurement is a difficult task because there is no recognized standard. Do you measure all the volume? Or just the usable volume? Or just the volume that will take luggage? The American auto industry can't decide this point even among themselves. PM has for years used an arbitrary one-cubic-foot cardboard carton as a unit. Unfortunately, sometimes this particular shape does not make full use of the available luggage space in a car (as perhaps in the case of the Morris). But if we were to use any other shape, the same problem would arise. There is need for some standardized measurement here.—Ed.

☆☆☆

"Enjoyed your impressions of the new compact cars. However, there is just one item I found to be inaccurate. You state, about the Falcon, that "the handshift gearbox is synchromesh in second and third and the shift lever is mounted on the floor."

I think you will find that the Falcon has a column-mounted lever which works very satisfactory. Personally, I think there is only one really fine stick shift transmission made in America. It is the four-speed transmission made by Chevrolet."

John Reynolds, Jr.  
 Tallahassee, Fla.

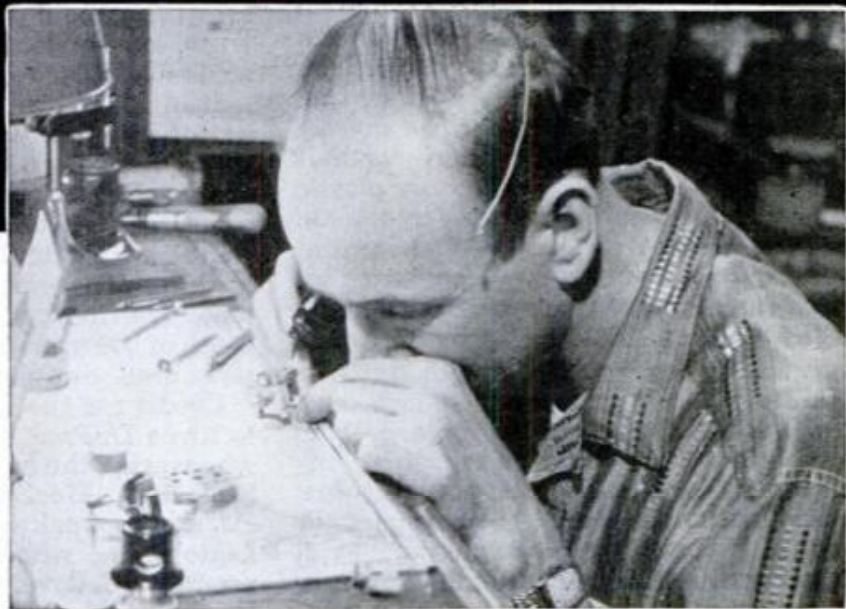
He's right. The Falcon shift lever is on the steering column. This was one of those weird blunders that nobody can explain how it happened.—Ed.

# Don't wish you were a **WATCH REPAIRMAN...**

## **Be one NOW!**

Opportunities for full or part time earnings are the best in years

*Make rapid progress  
the Sweazey Way*



## **CHICAGO SCHOOL OF WATCHMAKING** *will train you at home in your spare time*

Get set now for lifetime security or a business of your own. Have a second trade for emergencies or after retirement. Watch repairing is light, clean, fascinating. It frees you from the dull drudgery of tiresome or back breaking work. It offers excellent opportunities now for full or part time earnings.

### **Complete professional instruction for only \$5 a month**

No need to leave home or job. Learn in spare time. Chicago School of Watchmaking's exclusive Sweazey System shows you step by step how to repair all types of Swiss and American watches. It's practical, shop method training. You work with watches from your very first lesson. You need no previous experience. Age is no barrier. Diploma awarded. Send today for free sample lesson and complete information. No obligation, of course. No salesman will call.

**CSW has been training men and women for this trade since 1908**

Why not be one of our successful graduates? Learn how Chicago School's streamlined home training can speed your success.

*Member, National Home Study Council*

**CHICAGO SCHOOL OF WATCHMAKING**

*Founded 1908*

**2330 MILWAUKEE AVE., CHICAGO 47, ILL.**

**MAIL COUPON TODAY!**

## **FREE SAMPLE LESSON**

**CHICAGO SCHOOL OF WATCHMAKING**

2330 N. Milwaukee Avenue, Dept. 110, Chicago 47, Illinois

Please rush **FREE SAMPLE LESSON** and full information to tell me how I can learn watch repairing at home.

NAME \_\_\_\_\_ AGE \_\_\_\_\_

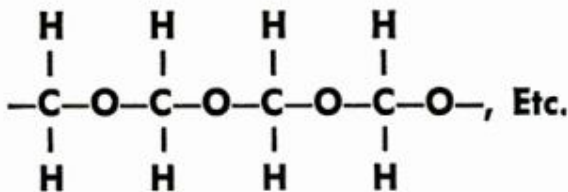
Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

### **SPECIAL TOOLS PROVIDED**



This set of tools is offered in your course at no extra tuition cost. They enable you to start repairing right away.



That is a chain of four formaldehyde molecules. Assembled in a line with no side branches, those molecules form what chemists call a lineal polymer. If space on this page permitted us to show a chain of a thousand of those molecules, we'd have the chemical signature of "Delrin" acetal resin, du Pont's newest plastic discovery. Result of 10 years' work and \$42 million worth of development, the tough, rigid thermoplastic may affect your life more than any plastic so far, since over 75 percent of its potential applications are in fields now dominated by die-cast metals; it will compete with steel, brass, aluminum and zinc in many areas.

Even at this early date, while the raw plastic costs 95 cents a pound—more than any of the metals it seeks to replace—it is so easily formed and finished that it is competing in some fields. Among its uses are automobile interior parts, moving parts in appliances, plumbing components, gears, bearings and bushings for almost any use, and consumer products ranging from fishing reels to aerosol containers. Zebco has

already marketed a fishing reel, made almost entirely of Delrin, which is light, very strong, and noncorrosive in salt water.

Delrin can be fabricated by conventional plastics methods, and once formed can be sawed, drilled, nailed, machined, painted—even coated with metal. As an example of its strength, it is impossible to strip threads cut into the plastic by a self-tapping screw. The head of the screw will twist off before the plastic gives up. It's resistant to wear, too—a Delrin speedometer cable ran against a steel worm gear for the equivalent of 100,000 miles at 110 miles per hour with negligible wear. In other field tests, it has been used as the support fingers in dishwashers, as a shower head, as fuel pump and carburetor parts, and even in cleats for football shoes. Performance in bushing and bearing tests has been excellent. Delrin has a friction coefficient on steel of .08 which puts it in a class with powdered graphite.

Credit for the Delrin development goes to three DuPont men—A. E. Barkdoll, Jr., who started the basic research 10 years ago; Robert N. MacDonald, who followed up Barkdoll's work with polymers; and W. H. Linton, Jr., who headed the 66-man research and development team since 1955. Production will begin this year in a new Delrin plant in Parkersburg, W. Va.

**ENGINEERING DEGREE IN 27 MONTHS**

B. S. degree (27 mo.): Aero., Chem., Civil, Elec., Mech. & Electronics. B.E. (36 mo.): Aero., Chem., Civil, Elec., Mechanical, Metallurgical. B.S. (36 mo.): Math., Chem., Physics. Prep courses. Demand for grads. Campus. 20 bldgs.; dorms, gym. Low rate. Earn board. G.I. appr. Enter March, June, Sept., Dec. 1610 E. Washington Blvd., Fort Wayne 2, Ind. Keeping pace with progress

**INDIANA TECHNICAL COLLEGE**



Mrs. Arthur H. Robinson  
3035 Thormal Avenue  
Rochester, New York

**1000 NAME AND ADDRESS LABELS \$1**  
ANY 3 DIFFERENT ORDERS \$2 ppd. Sensational bargain! Your name and address printed on 1000 finest quality gummed labels. Padded! Packed with FREE Plastic GIFT BOX. Use them on stationery, books, cards, etc. 1000 only \$1 ppd. SPECIAL OFFER — ANY 3 DIFFERENT ORDERS \$2 Satisfaction guaranteed. HANDY LABELS, 121 Jasperson Bldg., Culver City 1, California.

# INVESTIGATE ACCIDENTS

Train quickly in your own home for repeat income in the exciting, secure Claim Investigation and Claim Adjusting field. Our students and graduates are already earning \$4, \$5, \$6 an hour extra SPARE TIME — and up to \$10,000 a year Full Time. You need NO prior experience or higher education. Your age does NOT matter.

## HERE IS YOUR CHANCE FOR ACTION AND REAL JOB SECURITY

As a trained Claim Investigator you will (1) INVESTIGATE FACTS and (2) DISTRIBUTE MONEY as the representative of wealthy organizations.

No other business offers you greater opportunities for success and security. Here's why: The huge, rapidly expanding Claim Investigation and Adjusting Profession right now distributes more money than any other service industry. And it's growing fast. Over 200 MILLION ACCIDENTS must be investigated this year for Insurance Companies, Airlines, Railroads, Steamship Lines, and Government Offices.

MAIL NOW for FREE BOOK 

SEND TODAY for Big, FREE, Illustrated Catalog. Learn the exciting facts about Universal Schools' low cost training. No obligation. No salesman will call. GI APPROVED.



UNIVERSAL SCHOOLS  
6801 Hillcrest Ave.

Dept. PM-1, Dallas 5, Texas

Please rush me your FREE book on Claim Investigation. This does not obligate me and no salesman will call.

Name \_\_\_\_\_ Age \_\_\_\_\_

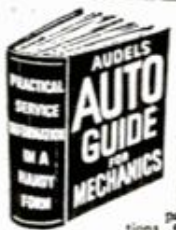
Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

Approved by Government for Korean Veterans



## WHAT ALL AUTO MECHANICS WANT TO KNOW



This Big Practical Book gives full information, with working diagrams, covering the principles, construction, ignition, service and repair of modern cars, trucks and buses.

**Diesel Engines, Hydramatic and Fluid Drives Fully Explained.**

A complete guide of 1696 Pages, with over 1500 illustrations showing inside views of working parts with instructions for service jobs. Completely up-to-the-minute! Priced at only \$6.



CIRCLE No. 1 IN COUPON

## HOW TO FIX HOME APPLIANCES

REFRIGERATORS TOASTERS IRONERS VACUUMS  
WASHERS DRYERS RANGES FREEZERS

Many other GAS AND ELECTRIC APPLIANCES

Handy Reference for Electric & Gas Servicemen, Mechanics, Dealers and Homeowners. Explains clearly and simply how to locate troubles, how to test, reassemble and connect. Wiring diagrams, 1000 Facts. Easy to read. Answers ALL your questions. 864 Pages. Illustrated. Only \$6.

CIRCLE No. 2 IN COUPON



## TV TELLS HOW TO ANSWER RADIO RADIO T.V. QUESTIONS SERVICE LIBRARY

HERE IS LATE INFORMATION IN A HANDY FORM FOR RADIO AND TELEVISION REPAIRMEN, SERVICEMEN AND STUDENTS

TWO COMPLETE VOLUMES - 1568 Pages - 1085 Illustrations and Diagrams. 1001 Important Facts and Figures on Modern T.V. Radio, Electronic Devices. INCLUDES TRANSISTORS & Transistor Circuits, Rectifiers, Record Changers, P.A. Systems, Phonograph Pick-ups, F.M., Auto Radio, Short Wave.

Basic principles, Construction, Installation, Operation, Troubleshooting. How to get Sharp, Clear T.V. Pictures. Install Aerials, How to Test. Explains COLOR SYSTEMS, Methods of Conversion, Terms, etc. Includes Ultra High Frequency. Quick ready reference or use as a home study course. Only \$8 for BOTH volumes.

CIRCLE No. 3 IN COUPON

## KNOW YOUR TRUCK

The TRUCK & TRACTOR GUIDE for Mechanics & Drivers, Foremen, Garagemen, Helpers, Owners, Trouble Shooters, Farmers, etc. Covering Gas & Diesel Motor Principles - Construction - Operation - Maintenance - Repair - Brakes - Service of all Parts. 1376 Pages. FULLY ILLUSTRATED. Index. Only \$5.

CIRCLE No. 5 IN COUPON

## PLUMBERS AND STEAMFITTERS GUIDES



Practical Trade Assistant & Reference Set. Explains in plain language and by clear illustrations, diagrams, charts, graphs and pictures the principles of modern plumbing practice including Pipe Fitting and Air Conditioning. 4 Vols. - 2624 Pages - 3542 Diagrams & Illustrations. Only \$8 for the complete set of 4 vols.

CIRCLE No. 6 IN COUPON

## PAINTING & DECORATING MANUAL

Inside Trade information on outside and inside work; how to mix paints, preparation of surfaces, paper hanging, wood finishes, tools, synthetic paints, color (with color chart), spray equipment, costs, estimating, etc. A COMPLETE guide to easier, better painting and decorating. 464 Pages. Fully Illustrated. Only \$2.

CIRCLE No. 7 IN COUPON

## 7-DAY FREE EXAMINATION

SEND NO MONEY - Pay the postman nothing! We are glad to send you any of the Audel Guides for absolutely FREE examination in your own home. We take all the risks and leave all the decisions up to YOU. There is no obligation! If you decide to keep the books of your choice you may pay for them under our astounding easy-pay plan of only \$2 a month.

### HERE IS ALL YOU DO

IT'S EASY TO ORDER: In the No-Risk Mail Order Coupon at the right just draw a circle around the number of Audel Guides you want us to send you for FREE EXAMINATION. We will send them to you at once to help you build a brighter future by increasing your SKILL. If for any reason at all you are not COMPLETELY satisfied, return the books to us, and that will end the matter! NO STRINGS OR CATCHES TO THIS OFFER.

**THEO. AUDEL & CO.**  
49 West 23rd Street, New York 10, N.Y.  
JANUARY 1960

## CARPENTERS AND BUILDERS GUIDES



PRACTICAL STOREHOUSE OF MODERN CONSTRUCTION INFORMATION. 4 vols. for carpenters and all woodworkers. Explains in easy language and by profuse illustration principles, advances, short cuts, trade secrets, all based on the NEWEST information.

Vol. 1 - Tools, steel square, saw filing, joinery, furniture, etc.; Vol. 2 - Builders' mathematics, drawing plans, specifications, estimates, etc.; Vol. 3 - House and roof framing, laying out, foundations, etc.; Vol. 4 - Doors, windows, stair building, millwork, painting, etc. 4 vols. 1964 Pages. 3700 Illustrations. Whole set only \$8.

CIRCLE No. 8 IN COUPON

## PRACTICAL ELECTRICITY

A COMPLETE HANDBOOK - Quick, simplified, ready reference. Complete instruction and practical information on the rules and laws of electricity - Maintenance of Machinery - A.C. and D.C. Motors - Armatures - Wiring Diagrams - House Lighting - Power Wiring - Meters - Batteries - Transformers - etc. Simple to understand. 1520 Pages. 2600 Illustrations. Priced at \$5.

CIRCLE No. 4 IN COUPON

## DIESEL

ALL THERE IS TO KNOW ABOUT MODERN DIESEL ENGINES - Basic principles, starting valves, timing, fuel pumps, fuel injection compressor, air compressors, pistons, cylinders, lubrication, cooling systems, etc. Answers on operation, calculations. 640 Pages. Fully Illustrated. Priced \$3.

CIRCLE No. 9 IN COUPON

## WELDERS GUIDE

Covers Electric, Oxy-acetylene, Thermit, Unionmelt welding for sheet metal, spot and pipe welds, pressure vessels and aluminum, copper, brass, bronze and other metals. Airplane work, surface hardening, hard facing, cutting, brazing, etc. 608 Pages. Fully Illustrated. Only \$3.

CIRCLE No. 10 IN COUPON

## MATHEMATICS MADE EASY

A COMPLETE HOME STUDY COURSE - Starting with the first principles of arithmetic, advancing step by step through the various stages of mathematics, including the rules and calculations for mechanical and electrical problems. NEW EASY correct methods. Includes plane and solid geometry, trigonometry, algebra, calculus, etc. Practical tests, reference tables and data. How to use slide rule. 752 Pages. 550 Illustrations. Priced at only \$3.

CIRCLE No. 11 IN COUPON

## NEW MACHINISTS AND TOOLMAKERS HANDBOOK

MODERN MACHINE SHOP PRACTICE - 5 PRACTICAL BOOKS IN ONE. New from cover to cover. Tells how to set up and operate lathes, screw and milling machines, shapers, drill presses and all other machine tools. A COMPLETE INSTRUCTOR AND REFERENCE BOOK. 1728 Pages. Fully Illustrated. Priced at only \$6.

CIRCLE No. 12 IN COUPON

## WIRING DIAGRAMS

This book gives the practical facts on wiring of electrical apparatus. It explains clearly and SIMPLY how to wire apparatus for all fields of electricity. Each diagram is complete and self-explaining. Know your HOOK-UPS! 304 Pages. Illustrated. Only \$2.

CIRCLE No. 13 IN COUPON

## REFRIGERATION & AIR CONDITIONING

FOUR BOOKS IN ONE - basic principles, servicing, operation, repair of: 1. Household Refrigeration. 2. Special Refrigeration Units. 3. Commercial & Industrial Refrigeration. 4. Air Conditioning Systems. A GOLD MINE of essential information. Completely up-to-date. 1360 Pages. Fully Illustrated and Indexed. Priced at only \$6.

CIRCLE No. 14 IN COUPON

## THE NEW ELECTRIC LIBRARY

A COMPLETE ENCYCLOPEDIA explaining in the simplest terms the fundamental principles, rules and applications of applied electricity.

### A COMPLETE COLLEGE EDUCATION!

Fully illustrated with diagrams and sketches, calculations and tables for ready reference. Questions and answers, Trial tests for practice study and review. All based on the most modern theory.

Vol. 1 - Principles and rules of electricity, magnetism, armatures, repairs. No. 15  
Vol. 2 - Dynamos, DC Motors, construction, installation, maintenance, etc. No. 16  
Vol. 3 - Testing instruments and tests, storage battery constr. and repairs. No. 17  
Vol. 4 - Alternating current, power factor, alternators, transformers. No. 18  
Vol. 5 - A.C. Motors, winding, maintenance, converters, switches, fuses, etc. No. 19  
Vol. 6 - Relays, condensers, regulators, rectifiers, meters, switchboards, etc. No. 20  
Vol. 7 - Wiring, house light and power, circuits, high

tension, plants, code, etc. No. 21  
Vol. 8 - Railways, signals, elevators, ignition, etc. No. 22  
Vol. 9 - Radio, telephone, telegraph, television, motion pictures. No. 23  
Vol. 10 - Refrigeration, illumination, welding, x-ray, electrical appliances, Index. No. 24  
7,000 fully illustrated pages. Priced at only \$20 for the ENTIRE SET. Also sold individually for \$2 each.



## ALL TYPES OF BLUEPRINT READING

How to read scales, the standard symbols, detail and assembly prints, working drawings, short cuts, hints and suggestions. THE MAN WHO CAN READ BLUEPRINTS IS IN LINE FOR A BETTER JOB. This book gives you the secret language, step by step in easy stages. 448 Pages, Very Fully Illustrated. Priced at \$3.

CIRCLE No. 25 IN COUPON

## MASONS & BUILDERS GUIDES

A PRACTICAL ILLUSTRATED 4 VOL. SET - Explaining in clear, simple language and profuse illustration, principles, advances, short cuts, trade secrets, based on modern practice - including how to figure and calculate various jobs.

Vol. 1 - Brick work, bricklaying, bonding, designs. Vol. 2 - Brick foundations, arches, tile setting, estimating. Vol. 3 - Concrete mixing, placing forms, reinforced stucco. Vol. 4 - Plastering, stone masonry, steel construction, blueprints. 4 Vols. 1440 Pages. 2067 Illustrations. Complete Set only \$8.

CIRCLE No. 26 IN COUPON

## ELECTRIC MOTORS

THIS GUIDE covers the construction, hook-ups, control, maintenance and trouble shooting of all types of motors. Includes armature winding. Explains entire subject in great detail in simple language. Over 1056 Pages of information. 617 Diagrams. All types of motors fully illustrated and indexed for ready reference. Priced at only \$5.

CIRCLE No. 27 IN COUPON

## OIL BURNERS

New, complete, explaining in detail both domestic and industrial oil burners. Includes electrical hook-ups and wiring diagrams. Fully covering the theory, construction, installation, operation, testing, servicing and repair of all equipment. Indexed for ready reference. Over 416 Pages. 320 Illustrations and Diagrams. Only \$2.

CIRCLE No. 28 IN COUPON

## ADDITIONAL IMPORTANT TITLES

The following Audel Guides are all the best in their fields, written in clear simple fashion, all lavishly illustrated. Circle the numbers wanted in the MAIL ORDER COUPON below. All books are sent for FREE EXAMINATION.

No. 29 SHEET METAL PATTERNS LAYOUTS. 1152 Pages. \$7.50	No. 30 SHEET METAL WORKERS HANDY BOOK. 448 Pages. .... 2.00
No. 31 MECHANICAL DRAWING GUIDE. 192 Pages. .... 2.00	No. 32 MECHANICAL DRAWING AND DESIGN. 480 Pages. .... 3.00
No. 33 ELECTRICIANS EXAMINATIONS. 272 Pages. .... 2.00	No. 34 ELECTRIC POWER CALCULATIONS. Page 480. .... 3.00
No. 35 ELECTRIC DICTIONARY. 9000 Terms. .... 3.00	No. 36 POWER PLANT ENGINEERS GUIDE. 1568 Pages. 5.00
No. 37 ENGINEERS AND FIREMANS EXAMS. 544 Pages. 2.00	No. 38 OPERATING ENGINEERS LIBRARY. 3 Book Set. 12.00
No. 39 PUMPS, HYDRAULICS AND AIR COMPRESSORS. 1760 Pages. .... 6.00	No. 40 HOUSE HEATING GUIDE. 1008 Pages. .... 5.00

## MAIL THIS NO-RISK COUPON TODAY!

THEO. AUDEL & CO - Self Improvement Publishers Since 1879 - P-1 1 2 3 4 5 6  
49 W. 23rd Street, New York 10, N.Y.

Please mail me for 7 days' FREE EXAMINATION the books I have circled at right. I agree to mail \$2 in 7 days on each book or set ordered, and to further mail \$2 a month on each book or set ordered until I have paid the purchase price, plus shipping costs. If I am not completely satisfied with my Audel Guides I may return them.

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

OCCUPATION \_\_\_\_\_

SAVE SHIPPING COSTS! Check here if you enclose complete payment with order. We pay postage charges. You have same return privilege.

# IT'S INCOME TAX TIME—

## Be Glad You're a "Do-It-Yourselfer"

By Allen J. Parker of the New York Bar

WHY BUILD, fix or paint it yourself?

"I get a kick out of doing these things," you might answer. "Then, too, I know that the job will be done the way I want it done. And, further, I save money."

All of these are good reasons. But there is another that becomes especially important this time of year. Doing it yourself can save on income taxes.

And what is income? Well, the Supreme Court and Internal Service agree that income does *not* include the value of your own services rendered to yourself without recompense, even though you save money by doing a job yourself. For tax purposes, a penny saved is not a penny earned.

For example, Sam and Bill work on the same shift at a plant. Both their houses need painting. Sam figures that apart from the cost of the paint, he can have his house painted for \$400. He decides to take a second job to earn this money.

Bill does the job himself, and saves the \$400. Are they even? Not when you take taxes into account. Even assuming the lowest income tax bracket of 20 percent, Sam has to earn \$500 in order to have \$400 left to pay the painter.

Suppose Sam helps Bill paint his house, and in return Bill does the same for Sam. In that case, they are, in effect, exchanging services and not simply doing work for themselves. However, so long as neither one of them could be said to be in the painting business, they still do not have any income tax to pay as "do-it-yourselfers."

If Sam and Bill work without pay on their church, they're really making a gift of their services. Same tax result: They're not taxed on someone else's saving money, although they can't take a charitable deduction for the value of their time.

Let's take it a step further. Suppose that Bill also builds an outdoor fireplace and patio, using fieldstone collected from the mountains. At an outlay of, say \$25, he has actually increased the value of his home by \$300. Is this \$300 taxable income? Not at all—at least, not until he sells the house. Even then this added value will not be taxed if he uses the money received from the sale to buy another house that is equally expensive. This is a break the tax law gives to homeowners. Otherwise, people who sold houses in time of inflation would find themselves faced with a heavy tax—

not so much because the house they sold was worth more, but because dollars were worth less. When they tried to buy a new house, they would face the same high prices, but with hundreds of dollars less money after the tax bite.

There are other tax savings around your home that you can pick up. The tax laws encourage home ownership by making mortgage interest and local property taxes deductible for federal tax purposes.

Almost equally important, although less obvious, is the tax savings represented by the money which you have invested in the purchase of your home. Suppose that your investment, represented by your down payment and payments of principal on your mortgage, now amounts to \$4,000. Presumably, you could have invested this \$4,000 in bonds, perhaps yielding five percent, or \$200 per year. If you are in a 20 percent income tax bracket, this would leave you only \$160 a year net after taxes for paying rent on an apartment. But when you invest \$4,000 directly in your own house, in effect, this investment is tax free.

The tax laws also say that you can deduct the cost of any casualty loss. This means the uninsured portion of any loss by fire, ice, flood, or damage to shrubs and trees through a severe and unusual drought. Even damage caused by termites is considered to be a casualty if the invasion is fairly sudden. A really serious loss, such as that caused by a tornado, could wipe out your taxes not only for this year but could result in a refund of taxes paid for two previous years and even a forgiveness of your taxes for several years to come.

How can you make the most of tax savings in your home?

First, by doing any work that you would otherwise have to pay someone else to do. Second, by keeping permanent records of all deductible items and permanent improvements that would increase the tax cost of your home. This includes the cost of little things, such as new shrubbery, flagstone walks or electric circuits that you buy and install as well as the cost of an entire wing or a finished attic.

These records will reduce income tax if you ever sell the house and don't buy a new one. The few cancelled checks or receipts don't take up much room. Keep them—they may prove valuable!

# new home-import business...

Now you can get exciting Imports at trifling cost abroad and sell them by mail order, or to friends and stores. New Plan starts you in full or spare time without capital or previous experience. Just imagine the *huge profit* you could make on this 17-jewel watch you can get for only \$2.87 in Europe—the 16-mm camera at just \$2.30, the transistor radio or the hunting rifle. Mellinger globe-trotting couriers discover and show you how to get fast-selling imports just like these—Show you how you can deduct your profit in advance, even *before* ordering merchandise.

## Famous World Trader Guides You

You'll receive personal step-by-step guidance from B. L. Mellinger, one of the most famous international traders the world has ever known. Mr. Mellinger even shows you how to put experience you have gained through jobs, hobbies and interests to work making extra import profits for you.



Hand carved Clock Germany 63¢



Spinning Reel with spare spool 96¢



Hunting Rifle Italy \$3.24

Sim. Pearl Necklace Japan 4½¢



Stainless Steel Dinner Service. 50 pieces \$3.54



Motorcycle Norway \$110.00



Tape Recorder with mike. Germany \$13.50



Derringer Pistol Germany \$5.74

MELLINGER CO.,

Dept. C251 • 1717 Westwood Blvd. • Los Angeles 24, Calif.



Tailor made Suit. Silk or Wool Hong Kong \$17.50



Lighter Japan 17¢



Binoculars Germany \$1.00

Transistor Radio with battery. Japan \$3.02



17-Jewel Watch France \$2.87

NEW PLAN SHOWS YOU HOW AND WHERE TO GET DAZZLING BUYS LIKE THESE FOR BIG PROFIT U. S. SALES. PRICES SHOWN ARE DIRECT FROM SUPPLIERS ABROAD. DO NOT ORDER FROM US ...

Fishing Fly hand tied 1¼¢

## You Keep ALL the Profits

This is a NEW idea for making money. Not a catalog "scheme" or franchise distributor "deal" where you buy catalogs and imports from others and watch them turn the *real* wealth of your labor into luxuries for themselves. *Mellinger puts you in direct contact with the ORIGINAL OVERSEAS SOURCE!* He makes no profit on your imports. The profits are all yours. On one of the lower priced products shown here, an importer following the Mellinger Plan has already taken in a *half million dollars!* You, too, can cash in on the big demand for imports, if you know this method.

## Free Samples — CONTACTS ABROAD

Following the Mellinger Home-Import Plan you receive FREE imports—and membership in International Traders, a world-wide organization of Importers and Exporters which helps beginners to a fast start. You will receive confidential monthly bulletins revealing names and addresses of actual overseas suppliers. You are shown how you can easily deal with foreign suppliers, how to get samples, how to make big savings on your own purchases.

## Rush Coupon for FREE Details

Start now to exciting cash profits in the new Import boom. Mail coupon for FREE BOOK, "Success Stories in World Trade," which will change your whole idea of the money you can make, full or spare time, in your own Home Import Business. No salesman will call. Airmail reaches us overnight.

Send for FREE Book!

MELLINGER CO., Dept. C251

1717 Westwood Blvd., Los Angeles 24, Calif.

Show me how these amazing buys abroad can give me my own big profit Home Import Business. Rush book and details without obligation. ALL FREE!

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY & ZONE \_\_\_\_\_ STATE \_\_\_\_\_

# DRAFTSMEN



**CASH BIG  
PAY CHECKS!**

**Train Now for  
more success,  
greater security**

**LEARN AT HOME IN SPARE TIME  
(or at college in Chicago)**

Check the want ads in any newspaper—SEE the big-pay opportunities open to you as a draftsman. What's more, you can learn this well-paid, prestige profession at home — quickly, easily! No special talent needed. Get complete, step-by-step Chicago Tech lessons in the mail, spend a few pleasant hours studying each week. In a short time you'll be a well-trained draftsman, ready to take your pick of many good jobs. Act now!



**Free Information—Mail Coupon Today!**

Get FREE TRIAL LESSON plus information about C.T.C. practical training. Learn what successful Chicago Tech graduates say about high pay and opportunities in drafting. No charge, or obligation.

## CHICAGO TECHNICAL COLLEGE

A-218 Tech Bldg., 2000 So. Michigan Ave.  
Chicago 16, Illinois

Mail me FREE lesson with facts about big opportunities in DRAFTING.

Name \_\_\_\_\_ Age \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

**It's EASY to be  
Why be Average?**

Now you can be dramatically taller...it's just as easy as stepping into a pair of "ELEVATORS"! These amazing shoes instantly add that all-important height you need to make you a BIG man . . . give you the boost you need to command the respect of everyone! And it's your secret because smartly-styled "ELEVATORS" look and feel like other fine shoes! Give yourself a lift—mail coupon NOW! Send for Free Booklet illustrating 34 styles TODAY!



THE ORIGINAL AND GENUINE  
**ELEVATORS**<sup>®</sup>  
HEIGHT-INCREASING SHOES  
"YOUR PERSONAL PEDESTAL"  
© TRADE MARK BY JERRY CARPIS CO., INC.

BROCKTON FOOTWEAR, INC.  
Dept. 6-10, BROCKTON 68, MASS.

Please send Free Booklet and name of nearest dealer. I understand this will be held in strict confidence and no salesman will call.

NAME \_\_\_\_\_ PLEASE PRINT

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_



University Microfilms, Inc., Ann Arbor, Michigan

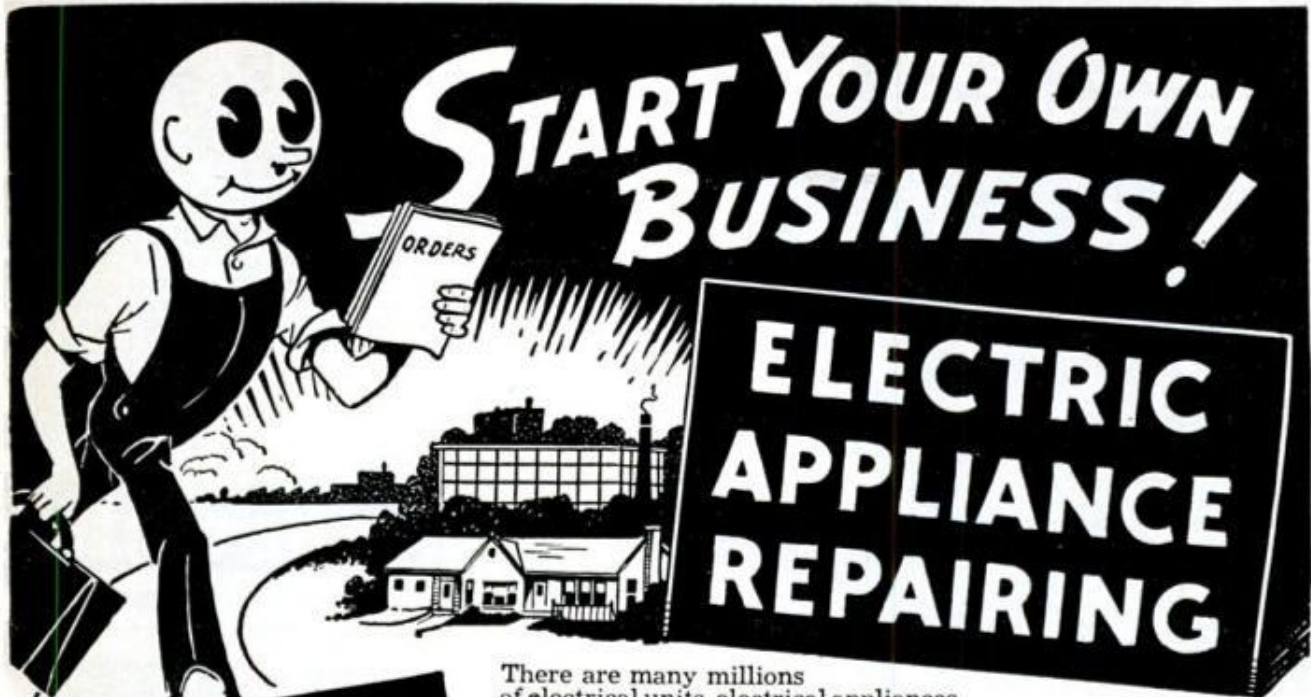
## Machine Duplicates Book In Few Minutes

Students and researchers can now have copies of rare, old or out-of-print books to mark up as they please. Eugene B. Power, a man who microfilmed 6,000,000 irreplaceable documents in England to protect their contents from the German blitz, has developed a machine, the Copyflo Xerox, that makes duplicates of books or magazines in a matter of minutes.

A book's pages are first copied on microfilm; a microfilm roll of the complete book is placed in the machine and a reproduction emerges (as shown above). Because of the order in which pages have to be microfilmed, each page of the facsimile is a double thickness of paper folded at the outside edge; the inside edges are glued to the book's spine.

The machine takes its name from a printing process, Xerography, and its ability to print successive pictures from microfilm in a continuously flowing process. In Xerography, a light is projected through a film negative—in this case of a book page—which casts a shadow on a metal plate positively charged with electricity and coated with selenium, a non-metallic element. Because selenium is sensitive to light, the entire surface of the plate—except for areas in shadow—becomes negatively charged. Shadow areas remain positive. A black powder is dusted over the plate and, carrying a negative charge, sticks to the shadowed areas. Paper, pressed against the plate, picks up the dust, becoming a duplicate of the original page. The Copyflo Xerox does all this automatically, then heats the page, fusing the powder into permanent print. Microfilm can be stored indefinitely, so the world's book treasures can now always be available.

MADE BY:  
HALOID XEROX INC.  
RICHESTER 3, N.Y.



# START YOUR OWN BUSINESS!

## ELECTRIC APPLIANCE REPAIRING

**WE FURNISH YOU THIS AMAZING ELECTRONIC KIT**

There are many millions of electrical units, electrical appliances, electrical machinery and electrical equipment in daily use . . . in factories, in homes, in office buildings and on the farm. Skilled electrical technicians with the proper "Know-How" are needed to keep all this electrical equipment in good running condition.

**\$5.00 to \$6.00 PER HOUR & MORE**

often charged for making ordinary repairs. In the privacy of your own kitchen, basement or garage we show you how to repair refrigerators, motors, vacuum cleaners, washing machines, toasters, sewing machines, etc. etc. How to do house wiring, farm wiring, etc.

If you are mechanically inclined, can hold and use tools, we can give you the training and time saving kits that will enable you to Command More Money at Work . . . Get a Better Paying Job Elsewhere . . . Or own a profitable business of your own.

CHRISTY Training Manuals are written in simple, easy-to-understand language, chock full of hundreds of detailed photographs and drawings that show step by step repairing procedures. Lesson manuals that are used daily by servicemen the country over.

We show you how to locate, quickly fix and what to charge customers. Many students report big earnings even before graduating!

The "Christy" ELECTRONIC KIT, a multi-purpose trouble detector quickly pin-points troubles for you.



**WE GIVE YOU ALSO THE CERAMIC HEATER KIT**



"Due to your course in 6 months I built a business which forced me to hire extra help." R. W., New Orleans, La.

"Only had your course a few short weeks and have already made \$800.00. Going to quit my job to operate my own business." J. D. S., St. Louis, Mo.

"I work at the ship yard. After hours I operate from my cellar and garage. Average \$10-\$15 clear every day."—W. Hanhy, Brockton, Mass.

Send today for full facts and how you can get CHRISTY training, lesson manuals, Electronic Kit and pay for it out of earnings while learning.

**FREE BOOK**

CHRISTY TRADES SCHOOL, Dept. A-8403 — 3214 W. Lawrence Ave., Chicago 25

**MAIL THIS COUPON TODAY!**

CHRISTY TRADES SCHOOL, Dept. A-8403, 3214 W. Lawrence Ave., Chicago 25  
Please rush me your **FREE ILLUSTRATED BOOK** about Electrical Appliance Servicing, facts on your Electronic Kit and Special form for paying later from earnings while learning.

NAME..... AGE.....  
ADDRESS .....

CITY..... ZONE.... STATE.....

**FREE CATALOG!**

# FREE! STAMP FREAKS



**FREE** — from World's Largest Stamp Firm, the Most Spectacular Offer Ever Made! 115 different genuine foreign postage stamps in all — Includes World's Largest and Smallest stamp PLUS fantastic collection of other stamp freaks. Weird designs, glittering colors, peculiar shapes — many from strange, mysterious lands in remote corners of the world — from Aden to Zanzibar! PLUS Giant Bonus collection of all-different stamps from other fascinating and exciting parts of the globe. **EXTRA!** Big Bargain Catalog; Collector's Guide; other stamp offers for free consideration. Send 10c for mailing. **ACT NOW!**

**H. E. HARRIS & CO., DEPT. F45, Boston 17, Mass.**

Rush free valuable collection of **STAMP FREAKS** etc. Enclosed is 10c for postage and handling.

Name .....

Street .....

City & State .....

## only 27 months for engineering degree

Realize your dream of becoming a graduate engineer. Then promotion will not pass you by. Share rewards awaiting college men . . . higher income . . . rapid advancement. Important firms visit Tri-State campus to interview seniors. Founded in 1884. *Bachelor of Science Degree in 27 months* in Electrical Engineering (Electronics or Power major). Mechanical, Civil, Chemical, Aeronautical Engineering. *In 36 months* a B. S. in Business Administration (General Business, Accounting, Motor Transport Management majors). For earnest, capable students. Small classes. More professional class hours. Well-equipped, new and modernized buildings, labs, dorms. Modest costs. Year-round operation. Enter Mar., June, Sept., Jan.

Write **J. E. McCarthy**, Director of Admissions, for Catalog and "Your Career" Book.



### TRI-STATE COLLEGE

410 College Avenue

Angola, Indiana

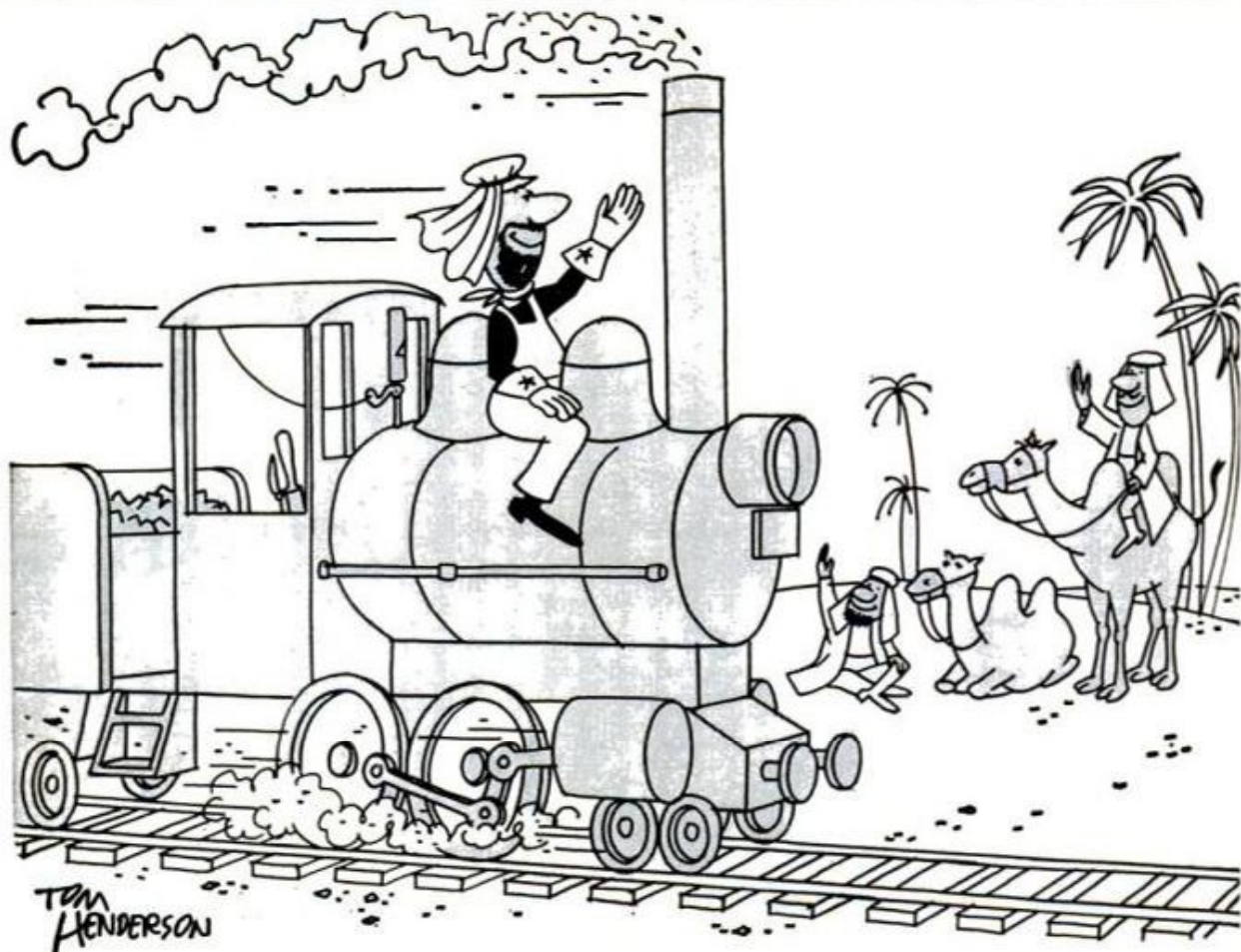
## You Can Have a HE-MAN VOICE

**STRENGTHEN** your voice this tested, scientific way. Yes—you may now be able to improve the **POWER** of your speaking and singing voice . . . in the privacy of your room! Self-training lessons, mostly silent. No music required.

### FREE BOOKLET

Write today for Eugene Feuchtinger's great booklet "How to Develop a Successful Voice." It's absolutely **FREE!** You must state your age. Booklet mailed postpaid in plain sealed envelope. No salesman will bother you. Send your name and age **RIGHT NOW!**

Perfect Voice Institute, 210 S. Clinton St., Studio AP-2, Chicago 6, Ill.



TOM HENDERSON



# I'd like to give this to my fellow men... while I am still able to help!

I was young once, as you may be—today I am older. Not too old to enjoy the fruits of my work, but older in the sense of being wiser. And once I was poor, desperately poor. Today almost any man can stretch his income to make ends meet. Today, there are few who hunger for bread and shelter. But in my youth I knew the pinch of poverty; the emptiness of hunger; the cold stare of the creditor who would not take excuses for money. Today, all that is past. And behind my city house, my

summer home, my Cadillacs, my Winter-long vacations and my sense of independence—behind all the wealth of cash and deep inner satisfaction that I enjoy—there is one simple secret. It is this secret that I would like to impart to you. If you are satisfied with a humdrum life of service to another master, turn this page now—read no more. If you are interested in a fuller life, free from bosses, free from worries, free from fears, read further. This message may be meant for you.

By Victor B. Mason

I am printing my message in a magazine. It may come to the attention of thousands of eyes. But of all those thousands, only a few will have the vision to understand. Many may read; but of a thousand only you may have the intuition, the sensitivity, to understand that what I am writing may be intended for you—may be the tide that shapes your destiny, which, taken at the crest, carries you to levels of independence beyond the dreams of avarice.

Don't misunderstand me. There is no mysticism in this. I am not speaking of occult things; of innumerable laws of nature that will sweep you to success without effort on your part. That sort of talk is *rubbish!* And anyone who tries to tell you that you can think your way to riches without effort is a false friend. I am too much of a realist for that. And I hope you are.

I hope you are the kind of man—if you have read this far—who knows that anything worthwhile has to be earned! I hope you have learned that there is no reward without effort. If you have learned this, then you may be ready to take the next step in the development of your karma—you may be ready to learn and use the secret I have to impart.

## I Have All The Money I Need

In my own life I have gone beyond the need of money. I have it. I have gone beyond the need of gain. I have two businesses that pay me an income well above any amount I have need for. And, in addition, I have the satisfaction—the deep satisfaction—of knowing that I have put more than three hundred other men in businesses of their own. Since I have no need for money, the greatest satisfaction I get from life, is sharing my secret of personal independence with others—seeing them achieve the same heights of happiness that have come into my own life.

Please don't misunderstand this statement. I am not a philanthropist. I believe that charity is something that no proud man will accept. I have never seen a man who was worth his salt who would accept

something for nothing. I have never met a highly successful man whom the world respected who did not sacrifice something to gain his position. And, unless you are willing to make at least half the effort, I'm not interested in giving you a "leg up" to the achievement of your goal. Frankly, I'm going to charge you something for the secret I give you. Not a lot—but enough to make me believe that you are a little above the fellows who merely "wish" for success and are not willing to sacrifice something to get it.

## A Fascinating and Peculiar Business

I have a business that is peculiar—one of my businesses. The unusual thing about it is that it is needed in every little community throughout this country. But it is a business that will never be invaded by the "big fellows". It has to be handled on a local basis. No giant octopus can ever gobble up the whole thing. No big combine is ever going to destroy it. It is essentially a "one man" business that can be operated without outside help. It is a business that is good summer and winter. It is a business that is growing each year. And, it is a business that can be started on an investment so small that it is within the reach of anyone who has a television set. But it has nothing to do with television.

This business has another peculiarity. It can be started at home in spare time. No risk to present job. No risk to present income. And no need to let anyone else know you are "on your own". It can be run as a spare time business for extra money. Or, as it grows to the point where it is paying more than your present salary, it can be expanded into a full time business—overnight. It can give you a sense of personal independence that will free you forever from the fear of lay-off, loss of job, depressions, or economic reverses.

## Are You Mechanically Inclined?

While the operation of this business is partly automatic, it won't run itself. If you are to use it as a stepping stone to independence, you must be able to work with your hands, use such tools as hammer and screw driver, and enjoy getting into a pair of blue jeans and rolling up your sleeves. But two hours a day of manual work will keep your "factory" running 24 hours turn-

ing out a product that has a steady and ready sale in every community. A half dollar spent for raw materials can bring you six dollars in cash—six times a day.

In this message I'm not going to try to tell you the entire story. There is not enough space on this page. And, I am not going to ask you to spend a penny now to learn the secret. I'll send you all the information, free. If you are interested in becoming independent, in becoming your own boss, in knowing the sweet fruits of success as I know them, send me your name. That's all. Just your name. I won't ask you for a penny. I'll send you all the information about one of the most fascinating businesses you can imagine. With these facts, you will make your own investigation. You will check up on conditions in your neighborhood. You will weigh and analyze the whole proposition. Then, and then only, if you decide to take the next step, I'll allow you to invest \$15.00. And even then, if you decide that your fifteen dollars has been badly invested I'll return it to you. Don't hesitate to send your name. I have no salesmen. I will merely write you a long letter and send you complete facts about the business I have found to be so successful. After that, you make the decisions.

## Does Happiness Hang on Your Decision?

Don't put this off. It may be a coincidence that you are reading these words right now. Or, it may be a matter that is more deeply connected with your destiny than either of us can say. There is only one thing certain: If you have read this far you are interested in the kind of independence I enjoy. And if that is true, then you must take the next step. No coupon on this advertisement. If you don't think enough of your future happiness and prosperity to write your name on a postcard and mail it to me, forget the whole thing. But if you think there is a destiny that shapes men's lives, send your name now. What I send you may convince you of the truth of this proverb. And what I send you will not cost a penny, now or at any other time.

VICTOR B. MASON

1512 Jarvis Ave., Suite M-2-A  
CHICAGO 26, ILLINOIS

## MODEL CHANGEOVER SALE! 1959 MODEL—BELOW COST!

### 8" TILT ARBOR SAW

#### BLADE TILTS—TABLE REMAINS LEVEL

Heavy duty all cast iron and steel construction. Precision ground cast iron table. Price includes massive cast iron mitre gauge and patented motor drive that fits any motor. Cross cuts, rips, bevels,

mitres, dados, cuts compound angles — everything expected of saws costing four times as much. Depth of cut adjustable; 0" to 2 1/4" — table always level. Send check or M.O. \$2.00 deposits on C.O.D.'s.

**SPECIAL BARGAIN** — This saw is our 1959 model. Each saw is brand new — sent to you in factory sealed cartons. Sold and guaranteed direct from the factory to you at a fantastic bargain.

#### FREE 10 DAY TRIAL — MONEY BACK GUARANTEE

Try this famous saw 10 days. If you are not satisfied that it does the work of any tilt arbor saw, regardless of price, return for immediate money back refund.

*Sent Express Collect.*

We reserve right to refund money if stock is exhausted

**AMERICAN MACHINE & TOOL CO.**

ROYERSFORD 19, PA.



Shipped Complete as shown Less Blade

MODEL 590  
**NOW \$9.95**  
Was \$24.95

## 8 FT. SPECIALS — 80c



Mammoth, man, mammoth! These GIANT 8 FOOTERS (new, genuine neoprene gov't. surplus) are terrific for fun or business. Great at parties, school proms, picnics, on the beach, etc. Just paint a message on 'em, inflate & fly, and they attract crowds to store or gas station openings, fairs, etc. Yours at a fraction of their original cost. Satisfaction guaranteed. Order several, they make wonderful gifts. Some sizes in limited supply.

8' dia.-80c ea. .... 2 for \$1.50  
13' dia.-\$1.95 ea.—15' dia.-\$2.95 ea.  
20' dia.-\$4.95 ea.

Postage pd. on ppd. orders.  
Cal. res. add sales tax.

FRANK SALES, Dept. PM160, 3930 Sunset Blvd., Los Angeles 29, Calif.

## Learn LANDSCAPE GARDENING

AND GROWING OF PLANTS. Latest information on propagation, soil-testing, plant growth regulators, garden design. Start a profitable business or wonderful hobby. Unique and modern home study course—accredited. Earn your certificate at home. May I send FREE, and without obligation, my Informative Booklet?

**NORM MORRIS NATIONAL LANDSCAPE INSTITUTE**

DEPT. M-10 11826 SAN VICENTE BLVD., LOS ANGELES 49, CALIF.

## Learn to MOUNT BIRDS

### Tan SKINS, make up FURS

Be a Taxidermist. Double your hunting fun. We teach you at Home. Mount Birds, Animals, Fish, Heads, common specimens. Fun and profits. Decorate home and **MAKE MONEY**. Mount game, tan for others. Big profits in spare time. **WRITE TODAY.**

100 game pictures in **FREE BOOK**. Hunters, get your copy. It's **Now Free**. Send post card. State your **AGE**.

**FREE BOOK** NORTHWESTERN SCHOOL OF TAXIDERMY  
Dept. 2501 Omaha, Nebraska

# Short Cut TO A Good Job

### Learn Auto Mechanics at Home in Spare Time

The auto-repair industry makes it easy for you to gain success! Consider the rewards: A mechanic earns excellent pay—up to \$3 an hour. He works steady—there are 100,000 job opportunities. He can go in business—America needs 25,000 more shops.



Let CTI train you at home. Along with simple, illustrated lessons, you get professional Mechanic's Tools and fine-quality Testing Instruments. CTI also includes instruction on Diesel Mechanics or Body & Fender Rebuilding at no extra cost. You may earn cash as you train. Mail coupon today for booklet and lesson samples.

**COMMERCIAL TRADES INSTITUTE** Dept. A1212  
1400 Greenleaf Avenue • Chicago 26, Illinois  
Send booklet, Make Big Money in Auto Mechanics.

Name \_\_\_\_\_ Age \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

Accredited by National Home Study Council



Messrs. Columbus Dixon, Ltd., Capitol Works, Empire Way, Wembley, Middlesex, England.

## Vacuum Cleaner for Streets

Litter and dirt that are picked up by a street vacuum cleaner in London are separated by a centrifugal system and collected in different compartments. Called a Litter-Vac, it is powered by a gas engine.

POPULAR MECHANICS



**NEW HOME-BUSINESS offers beginners BIG PROFITS!**

# "I Earn \$25<sup>00</sup> per Hour"\*

## Spray with Suede!

**\$1 Worth of Materials Brings You \$18—You pocket the profits!**

### WHAT IS FLOK-KRAFT?

If you've ever touched real suede or velvet—you know how Flok-Kraft feels and looks. Now, at last this beautiful new 3-dimensional finish, developed after years of experience, can be sprayed on anything—transforming ordinary things into expensive masterpieces of beauty. You must see it to believe it, so mail coupon below and receive free samples.



**FREE SAMPLES — MAIL COUPON NOW!**

\*Here is Mr. J. F. K. with a few of the items he has sprayed with Flok-Kraft. He is now earning \$25.00 per hour (\$400 for 16 hours work) just showing companies how to spray new Flok-Kraft.

your business grows, work full time—hire others to work for you. At first, do it all in your own home—a corner of your basement, garage, dining room, service porch or kitchen is all the space you need.

#### LEARN IN A FEW DAYS

Almost immediately you can learn Flok-Krafting and start earning money. It's fun, fascinating—we guide you with simple step-by-step instructions. No overhead, no expensive equipment, no experience necessary either.

#### JOIN THESE MEN AND WOMEN

who have already started. "Earning \$10,000 year from spare time start" **Mr. Hover, Ore.**; "Got \$52.50 doing auto trunks in four hours—earned \$13 per hour" **J. O., Mo.**; "Swamped with orders already" **W. F., Colo.**; "Got \$100 job first day" **C. H. E., Md.**; "Quick \$140 order from store—5 other orders in 4 hours" **H. G. R., Wis.**



Make old (even broken) radio and TV cabinets look better than new. Spray average size cabinet in 15 minutes with 34¢ worth materials and charge at least \$10.00.

**COVERS AND BEAUTIFIES FABRICS, METALS, GLASS, PLASTER, WOOD, PLASTIC—any surface!** Huge profits are waiting to be tapped in this tremendous new field. Over 5,000 big profit uses. Spray lamps, figurines, greeting cards, signs, automobile accessories, shoes, hats, card tables, toys, furniture, draperies, ceilings, walls—anything! Flok-Kraft makes old, damaged and worn objects beautiful and saleable—makes new things worth more. You can even spray cheap butcher paper and make it look like velvet-suede, and sell it for gift-wrapping paper.



400% profit possible just spraying figurines, toys—hundreds of other items with beautiful Flok-Kraft. Work at home—spare time!

#### WE FURNISH EVERYTHING YOU NEED

We offer to furnish you complete easy-to-understand instructions in addition to materials that enable you to start at once. All sent at our risk because we want to start new Flok-Krafters in every area.

#### HELP FILL HUGE GROWING DEMAND

Imagine, there is a possible 20 Million Dollars worth of Flok-Krafting to be done. Get your share! Be first in your area to fill urgent orders that come from stores, offices, homes, neighbors, gift shops, architects, auto dealers, etc. Learn how to get orders by mail order.



\$1000.00's are earned by individuals each year spraying Christmas trees with colorful Flok-Kraft. Flok-Krafted greeting cards are big business. Buy regular cards and spray them at home—sell for twice your price.



**AFTER BEFORE**

Recondition worn automobile interiors (doors, trunks, dashboards, seats, etc.) with Flok-Kraft. Just spray it on—works like magic!

#### RAINBOW OF COLORS

Amazing Flok-Kraft rayon and cotton fibers are now available in over 24 brilliant colors—even the amazing fluorescent "glow" colors that attract attention.

#### START AT HOME—SPARE TIME

Here's a rare opportunity to own your own business. Start small spare time—add to your present income. Then, as



#### ALL 3 FREE!

Just mail coupon below and receive ACTUAL USE-ABLE SAMPLES, BOOKLET of 50 HOME-BUSINESS OPPORTUNITIES and CONFIDENTIAL DETAILS—all sent free!

Copyright 1958

### FREE SAMPLES — RUSH COUPON TODAY!

**COAST INDUSTRIES (Home Business Division) Dept. B-1**  
15127 S. Broadway, Los Angeles 61, California

I am interested. I enclose no money. Rush Free Samples, Home-Business booklet and confidential details. I understand these are all sent absolutely free and no salesman will call.

Name \_\_\_\_\_ Age \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

Our references: your local bank & trust Co. We are members of the Los Angeles Chamber of Commerce.

• **FREE FACTS on How to Become a  
GOVERNMENT HUNTER  
GAME WARDEN  
OR  
FOREST RANGER**



**PROTECT FORESTS  
AND WILDLIFE  
ARREST VIOLATORS**

Don't be chained to office, desk, store counter, or factory machine. Prepare now, in spare time, for outdoor man's dream job in Forestry & Wildlife Conservation. Get the facts. Plan to live the life you love.

**THRILLS & ADVENTURE**

Forestry & Wildlife men hunt mountain lions—parachute from planes to help marooned animals or save life of injured campers—protect forests—arrest game violators. Adventure, public service, good pay.



**SECURITY — RETIREMENT —  
LOW LIVING COSTS**

Conservation careers are permanent. No layoffs. No worry about your paycheck. Living costs are low, too—and a government pension assures good income for life when you retire.

**HEALTHFUL OUTDOOR LIFE.** Hard muscles, bronzed skin and vibrant good health are extra rewards of outdoor living. Sleep under the pines. Catch breakfast from icy streams. *Feel and look like a million!*

**OPPORTUNITIES IN  
YOUR STATE?**

We show you how to seek out job openings today—Right Now — possibly in your own state and other states Coast to Coast. Age limits 17 to 45, sometimes older on private game farms and hunt clubs.

**MANY START \$3000  
YEAR OR MORE**

Fine starting pay, with regular advances established by law under Civil Service.



**FREE  
MAIL  
COUPON**



**VACATION JOBS FOR STUDENTS**  
No experience or preparation needed for vacation jobs in Nat'l. Parks & Forests, America's vacation wonderland. Many accepting Applications now. **FREE BOOKLET** tells how and where to apply.

**North American School of Conservation, Dept. D-171  
1038 South La Brea, Los Angeles 19, California**

• Please rush **FREE** facts on Forestry & Wildlife opportunities. **FREE** booklet "Vacations with Pay"—also your **FREE** "Select-a-Job Chart" details. All postpaid and no obligation to me.

NAME \_\_\_\_\_ AGE \_\_\_\_\_

STREET \_\_\_\_\_

TOWN \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

Member: Association of Home Study Schools, Washington, D. C.

**NEW  
FIBERGLASS  
LAPSTRAKE  
& PLYWOOD  
BOAT  
KITS**

Most complete line. 8' to 23'. Prams, row-boats, outboards, cruisers.

MAIL 50c (coin)  
REFUNDABLE  
for **BIG COLOR  
CATALOGS**



**U-MAK-IT, DeLAND, FLORIDA • DEPT. 12**

**SHORTHAND  
IN 6 WEEKS**

**Write 120 words per minute  
Age no obstacle—LOWEST COST**

Famous **SPEEDWRITING** shorthand. No symbols; no machines; uses ABC's. Easiest to learn and use. Fast preparation for a better position. Nationally used in leading offices and Civil Service. 120 words per minute—50% **FASTER** than Civil Service requirements. Over 500,000 taught by mail or through classroom instruction. The very low cost will surprise you. Typing available. 37th Year. Schools in over 400 cities in U.S., Canada, Cuba, and Hawaii.

Write For Free Booklet To: School of

**Speedwriting**  
Dept. 1501, 55 W. 42 St., N.Y. 36

**DID YOU SEE  
READER'S DIGEST  
ARTICLE ON**

**earn  
\$15  
HOUR as TAX EXPERT**

Our students earn as much as \$3,000 in 3 short months preparing income tax returns in spare time. Also operate lucrative year-round Business Tax Service. Dignified home-office business. Experience unnecessary. We train you; help you start. State approved home training program. Write today for free prospectus.

**UNION INSTITUTE, Lakewood 206, N. J.**

**BARBELLS**

**100 POUND SET \$12.80**

140-Pound, **CHROME DELUXE** Barbell-Dumbbell set only \$19.80. This is our feature set and is the finest ever manufactured. Training with adjustable weight is the **BEST** way to keep fit: the **ONLY** way to develop great strength and a perfect body. As the **strongest** and best equipped barbell company, **BUR** gives value and prices no one can equal.

**SEND FOR FREE CATALOG  
BUR BARBELL CO.  
Lyndhurst 9, New Jersey**

Extra Plates Only 12c Pound



Revell, Inc., 4223 Glencoe Ave., Venice, Calif.

**Weird But Famous Animals  
Become Take-Apart Toys**

Four of the improbable but world-famous animals created by Dr. Seuss, author of the best-selling books for children, have been made into plastic toys. Made in snap-together, interchangeable pieces (one animal has 29), they offer endless combinations with a mathematical possibility of 14 million variations. The animals are, left to right, Gowdy, the Dowdy Grackle; Roscoe, the Many-Footed Lion; Norval, the Bashful Blinket; and Tingo, the Noodle-Topped Stroodle. The high-density polyethylene plastic is unbreakable, non-toxic and lightweight.

POPULAR MECHANICS

# Shrinks Hemorrhoids New Way Without Surgery Stops Itch - Relieves Pain

For the first time science has found a new healing substance with the astonishing ability to shrink hemorrhoids and to relieve pain - without surgery.

In case after case, while gently relieving pain, actual reduction (shrinkage) took place.

Most amazing of all - results were so thorough that sufferers made astonishing statements like "Piles have ceased to be a problem!"

The secret is a new healing substance (Bio-Dyne\*) - discovery of a world-famous research institute.

This substance is now available in *suppository* or *ointment form* under the name *Preparation H*. Ask for it at all drug counters - money back guarantee. \*Reg. U.S. Pat. Off

MAKE BIG MONEY - ALL PROFIT - AT HOME

## INVISIBLE MENDING

Pays up to \$10 in an Hour!

Make moth holes, cigarette burns, tears, rips, disappear from all fabrics. Little-known craft pays extra spare-time profits at home. Write today for exciting details FREE!

**FABRICON, 6238 Broadway**  
DEPT. 321, CHICAGO 40, ILLINOIS



## KILLS • • NO CHEMICALS, GASES, ETC.

- MOSQUITOES • MOTHS, MILLERS
- FLIES, GNATS • FISH FLIES, ETC.

OVER 1/4 ACRE ANYWHERE

No insect recovery. Harmless. Guaranteed. Built to last 25 years. Beautiful outdoor lighting. Plug into any 110 volt socket.

NO AREA CONTAMINATION

Uses up to 200 watt bulbs. Grid cost 10c per month. Complete with fly attractor. Dead insect catcher. Cord. Directions, Etc. Very reasonable price - Write to -

**SING SING BUG CHAIR, INC.**  
Box P 3708, Oak Park 37, Mich.



## JEEP OWNERS

RE-POWER NOW WITH A V-8 OR 6 CYL. ENGINE - USE FORD-CHEV-MERCURY-GMC-PONT-STUDE-DODGE OR PLYMOUTH In Jeeps, Jeepsters, Sta-Wags, trucks, Kaiser & H. J. cars. Conversion Kits \$45.35 to \$56.90. Want fast action? Give us full information, send \$15.00 Dep. and we will ship correct kit. Bal. COD. Send full amount for prepaid shipment. Wire, phone or write today. Details FREE

**HOOSIER MACHINE PRODUCTS CO.**  
312 S. E. 6th St. Phone CR 6-3442 Pendleton, Oregon

## STOP FRONT DRIVE DRAG ON YOUR Jeep



PROVEN IN OVER A BILLION MILES OF SERVICE!

Warn Hubs on your 4 w.d. give double-duty value - economical, free-wheeling 2 w.d. (with added pep!), normal 4 w.d. - automatically with Lock-O-Matics, manually with Warn Locking Hubs. See your 4 w.d. dealer!

**WARN HUBS** WARN MFG. CO., Inc.  
Riverton Box 6064-A  
Seattle 88, Wash.

# TRAIN AT HOME

in Your Spare Time or in the Great Allied School

1338-42 South Michigan Ave.  
Chicago 5, Ill.

**DRAFTING - All Branches**  
• Mech. • Structural • Aeronautical

**ENGINEERING**  
• Industrial Engineering  
• Tool Engin. & Designing

**ELECTRONICS**

**AUTO MECHANICS**

**AIR CONDITIONING**  
Refrigeration - Heating & Cooling

**TOOL & DIE MAKING**  
Machinist Trade

Choose the Allied Way for Best Pay **SEND FOR FREE BOOKS**

Prepare for the best jobs in your spare time at home. With ALLIED'S practical home study program you can progress so rapidly that big new opportunities will soon be open to you. Students planning a career in engineering can begin their training in short courses at Home or at Allied Institute and continue progressively toward an Engineering Degree in 31 months. Allied is approved by Industry, National Home Study Council, Department of Education, Office of Public Instruction, State of Illinois, U. S. Department of Justice.

**ALLIED INSTITUTE OF TECHNOLOGY,**  
1338-42 South Michigan Ave., Dept. PM-10, Chicago 5, Ill.

Send me without obligation information on your courses:

<input type="checkbox"/> MECHANICAL DRAFTING	<input type="checkbox"/> AUTO MECHANICS
<input type="checkbox"/> STRUCTURAL DRAFTING	<input type="checkbox"/> ELECTRONICS
<input type="checkbox"/> ELECTRONIC DRAFTING	<input type="checkbox"/> AIR CONDITIONING
<input type="checkbox"/> AERONAUTICAL DRAFTING	<input type="checkbox"/> REFRIGERATION
<input type="checkbox"/> INDUSTRIAL ENGINEERING	<input type="checkbox"/> TOOL & DIE MAKING
<input type="checkbox"/> TOOL & DIE DESIGNING	

HOME STUDY  RESIDENT  VETERAN  NON-VETERAN

NAME ..... AGE.....

ADDRESS .....

CITY..... COUNTY..... STATE.....

# EXAMINE FREE! **AUDELS** DO-IT-YOURSELF ENCYCLOPEDIA

**JUST OFF THE PRESS!**  
NOW, AT LAST—AN AUTHENTIC GUIDE TO HOME IMPROVEMENT AND REPAIR!

FAMOUS AUDELS, the world's greatest publisher of mechanical books since 1879, has now utilized all its knowledge . . . all its great fund of inside trade information . . . to produce the greatest, most complete, easiest-to-use DO-IT-YOURSELF ENCYCLOPEDIA ever offered for American family use.

**SAVE HUNDREDS OF DOLLARS EVERY YEAR!**

With this remarkable, easy-to-use, set you can save a small fortune every year for home improvements and repairs.

- Over 1,000 Pages
- Set Weights 4 Pounds
- Each Volume 6 x 8 x 2
- Step-By-Step Plans
- Thousands of Photos
- Helpful Charts



**RICHLY BOUND DELUXE VOLUMES BOTH FOR ONLY \$8.95**  
(on easy payment plan)

## EVERYTHING YOU NEED TO KNOW

INSIDE THE HOUSE . . .		OUTSIDE THE HOUSE . . .		AROUND THE HOUSE	
Air conditioning	Doors	Kitchen layouts	Mortar	Room dividers	
Asphalt tiles	Electric wiring	Lawn grass guide	Painting	Screens	
Attics	Fireplaces	Lawn mower	Pickled pine finish	Spray painting	
Basements	Flagstone tiles	Lighting fixtures	Pipes	Stain finishes	
Book rack	Floor repairs	Locks	Plumbing	Stairs	
Built-ins	Furniture finishing	Lumber	Plywood	Upholstering	
Ceilings	Glazing windows	Marble tile	Polishing	Varnish finish	
Cement	High Fidelity	Masonry	Pools	Wallpapering	
Concrete	Insulation	Miller joint	Radiator covers	Wood floors	
Cornice, window				Work bench	

THOUSANDS OF OTHER IMPORTANT SUBJECTS

## MAIL THIS COUPON TODAY!

THRO. AUDEL & CO. — Self Improvement Publishers Since 1879 P1A  
49 W. 23rd Street, New York 10, N.Y.

Please mail me for 7 days FREE EXAMINATION my set of AUDELS DO-IT-YOURSELF ENCYCLOPEDIA. If I decide to keep the set I will send you \$3 in 7 days and then \$3 a month until I have paid the full purchase price of \$8.95 plus shipping costs. Otherwise I will return the set to you and owe nothing.

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

OCCUPATION \_\_\_\_\_

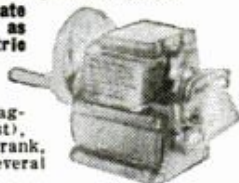
EMPLOYED BY \_\_\_\_\_

**SAVE SHIPPING COSTS!** Check here if you enclose complete payment with order. We pay postage charges. You have some return privilege.

## GOV'T SURPLUS ELECTRIC GENERATOR

Cost Over \$200.00 New; While They Last, \$3.95

Generates Up to 100 Volts. Use to generate electricity, to ring bells, light up lights, as a medical battery, deliver terrific electric shock as joke, many electrical experiments, classroom uses, etc. Hand crank or gear wheel drive. Made by leading electrical companies. Each has powerful magnets (alone worth more than total cost), generating armature, wire leads, gear crank, ready for use. Most new (never used). Several styles. Postpaid \$3.95.



Johnson Smith Company, Dept. 867, Detroit 7, Mich.

## New Jet Engine Burns Gasoline



Powerful continual thrust for models: boats, cars, planes. No moving parts. Easy to start. Runs on regular gas. \$1.49

6-in. long. Complete, Only \$1.49  
JOHNSON SMITH COMPANY Dept. 867 Detroit 7, Michigan

## Catalog of 2900 Novelties 10c

New Send 10c for amazing catalog of novelties, live animals, scientific supplies, hobbies, funmakers, planes & boats, looms, magic tricks, joke articles, unusual seeds, gadget timesavers, cameras, optical goods, projectors, movies, lucky jewelry, religious novelties, disguises, musical instruments, stamps, coins, puzzles, fortune tellers, radios, auto & bike accessories, telescopes, magnifiers, compasses, banks, smokers' gadgets, artists' supplies, printing sets, engines, motors, shockers, knives, billfolds, guns, rifles, sports, books, games, plants, etc. Send 10c.  
JOHNSON SMITH COMPANY Dept. 867 Detroit 7, Michigan

## 12-Foot Bull Whip



**HARD HITTING! LOUD CRACKING!** Experts knock ashes off cigarettes. Yank people off feet. Used by trainers, ranchmen. Loud cracker like shot-gun blast. 4-ply hand plaited all leather. With loop handle.

6-ft. \$1.98. 8-ft. \$2.69. 10-ft. \$3.29. 12-ft. \$5.45.  
JOHNSON SMITH COMPANY Dept. 867 Detroit 7, Michigan

## 215 STAMPS 25¢

plus 88 FLAGS OF THE WORLD  
plus BOY SCOUT SOUVENIR SHEET

Monaco 2¢  
President Get.  
FDR



What a bargain! You get the stamps shown here — plus Germany "Sputnik" Stamp, St. Thomas Explorer, Chile "Christ of the Andes." Grand total 215 stamps — all different! You also receive 88 Flags of the World in full color — plus Boy Scout Souvenir Sheet, an unusual tribute to the 1957 Jamboree. All this for 25¢ to introduce our Bargain Approvals. Midget Encyclopedia of Stamps included FREE.

Send 25¢ Today. ASK FOR LOT FO-33  
ZENITH CO., 81 Willoughby St., Brooklyn 1, N. Y.

## MAIL ORDER PUBLICATION FREE!

Men, Women, Families . . .

FREE publication,

"How to Make Money in

Mail Order," shows how to start

your own big profit home mail order

business without experience or product

investment. Reveals how and where to get best

products, how to pocket profits in advance, etc. Write

MAIL ORDER EXCHANGE, 1717 WESTWOOD,  
DEPT. C-251 - LOS ANGELES 24, CALIFORNIA

## \$3.25 OR 2 FOR \$6.00!

With 40 ft. of wire. Additional wire 3c ft. TESTED AND GUARANTEED. Write for free list of all types of telephones. Shipments FOB Simpson, Pa.

TELEPHONE ENGINEERING CO., Dept. 1 80, Simpson, Pa.

## INVENTORS NEEDED AT ONCE

If you have an invention you wish to sell outright or license on royalty, write us at once. We are seeking inventions of household items, games, toys, sports items, tools, and mechanical and technical devices. Patented or unpatented. For further information and free brochure outlining manufacturers' requirements, royalty rates, send name (no drawings, please) on letter or postcard at once.  
KESSLER CORPORATION, Dept. D-51, Fremont, Ohio

After the city,  
Before the state  
The ZONE keeps your mail  
From being late



The Post Office has divided 106 cities into postal delivery zones to speed mail delivery. Be sure to include zone number when writing to these cities; be sure to include your zone number in your return address — after the city, before the state.

## Flying TV Classroom Serves Six States

This fall, a DC-7 airplane will be an important aid in the teaching of grade-school, high-school and college students in six Mid-western states. Carrying two television transmitters, the DC-7 each school day will fly six hours in 10-mile circles centered some 50 miles northeast of Lafayette, Ind., and at a height of 22,000 feet. The transmitters will beam 24 half-hour lecture programs—some that have been recorded on video tape, some relayed from lectures being given below at Purdue University—over an area of 125,000 square miles. The courses can be tuned in by 13,000 schools.

"By using a plane, we'll be able to broadcast courses of instruction to many areas where they're not now available," says Dr. John E. Ivey, president of the Midwest Council on Airborne Television, the organization that will administer this bold experiment in educational TV from headquarters at Purdue. "If we are successful, we hope similar arrangements can be made all across the country. By pooling their resources in this manner, school districts and states can put into their classrooms a caliber of teaching none could afford alone."

The telecasts, which will cost slightly less than \$7 million a year to produce, will be financed with gifts from industry and philanthropic institutions. To make sure the expensive shows go on, the Council will keep a second DC-7 at some other field in the six-state area. "If one plane is grounded by snow, for example, chances are the other one can get in the air," says Ivey. "We expect to have a telecasting aircraft operating at least 98 percent of the scheduled time."

## Synthetic Penicillin Pill May Replace Shots

Syncillin, a synthetic penicillin in pill form, may not only obsolete penicillin injection, but may allow more people to use the antibiotic without getting dangerous allergic reactions that sometimes accompany "shots." The allergy-inducing enzyme, penicillinase, produced by micro-organisms, is not as active in destroying the experimental compound, explains Dr. Amel R. Menottie, scientific director of Bristol Laboratories, Syracuse, N. Y., where the drug was developed. Early tests also indicate Syncillin to be more potent than several injectable or other oral forms of penicillin. In test tube studies, for example, it destroyed staphylococcal strains that resist other penicillins.

# FOR YOU BETTER PAY and a BRIGHTER FUTURE IN AUTO MECHANICS AND DIESEL



Your spare time pays off BIG with our world-famous **SHOP TESTED Home Training**



MAKE YOUR FUTURE AS BRIGHT AS THEIRS

In a matter of months, you can quit your no-future job for a big-pay, big-future career as an Auto-Diesel Mechanic. Free Illustrated Book gives you the facts. Send coupon below. No Obligation. No Salesman will call.

### All Phase Training

N. T. S. students become skilled, all-around mechanics. Crystal-clear lessons, Shop-Tested manuals, real professional equipment, make it easy to learn. Big equipment kits, yours to keep. Earn as you learn...we show you how. Graduate Advisory Service.

N.T.S. Training is Better, More Complete, Lower Cost **BETTER...**

Because training is **SHOP-TESTED** in Resident School Shops & Labs. **MORE COMPLETE...** You learn all phases of Auto Mechanics & Diesel. **LOWER COST...** One low tuition covers entire cost of course and all equipment.

### Unlimited Opportunities

Trained mechanics make top money...are in demand at dealer shops, garages, large bus and truck lines, construction projects, government labs, factories, and many others.

YOU GET AND KEEP ALL THIS PROFESSIONAL EQUIPMENT



## NATIONAL TECHNICAL SCHOOLS

WORLD-WIDE TRAINING SINCE 1905  
4000 SO. FIGUEROA ST., LOS ANGELES 37, CALIF., U. S. A.



**FREE!**

Illustrated Fact Book & Actual Lesson

Mail coupon now.

Complete TV-Radio Electronics training also available.

RESIDENT TRAINING at Los Angeles!

If you wish to take Resident Training at Los Angeles, in our Big, Modern Shops & Labs, check special box in coupon for full information.

## NATIONAL TECHNICAL SCHOOLS

WORLD-WIDE TRAINING SINCE 1905

MAIL NOW TO  
NATIONAL TECHNICAL SCHOOLS, Dept. DB-10  
4000 S. FIGUEROA ST., LOS ANGELES 37, CALIF.

Send for FREE Auto-Diesel Opportunity Book and actual Lesson.

NAME \_\_\_\_\_ AGE \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

Check if interested ONLY in Resident School training at Los Angeles.

VETERANS: Give date of Discharge \_\_\_\_\_



Member



Here's the **EASY, Step-by-Step** Way to

# FIX ANY PART OF

Over 1100 Pages  
Packed With Practical  
"How-to" Help  
Like This:

Engines, Brakes, Ignitions, Transmissions, Rear Ends

**NOW**—Whether You're a Beginner or an Expert Mechanic—You Can "Breeze Through" ANY AUTO REPAIR JOB! MOTOR'S BIG BRAND-NEW AUTO REPAIR MANUAL Shows You **HOW**—With 2850 PICTURES AND SIMPLE STEP-BY-STEP INSTRUCTIONS.

ALL AUTOMATIC  
TRANSMISSIONS COVERED  
IN WORDS AND PICTURES

SPECIAL SECTION  
ON NEW  
POWER STEERING

HERE IS CHEVROLET  
TUNE-UP CHART



**Read These Letters from Satisfied Users**

Licks Job in 30 Minutes Another Mechanic Couldn't Handle. "Not long ago, I fixed motor another mechanic had worked on half a day. With your Manual I did it in 30 minutes.—C. AUBERRY, Tenn.

Paid For Itself On First 2 Jobs. "MOTOR's Manual paid for itself on the first 2 jobs, and saved me valuable time by eliminating guesswork. Now tune up and repair cars on which I've had no previous experience."—W. SCHROP, Ohio



Amazed Self and Friends. "I amazed myself and my friends, too. Now do jobs that stumped me before. Motor's Auto Repair Manual is a great buy.—MICHAEL BALICZKY, Newark, N. J.

## Covers Every Part of Every Car

YES, now it's easy as A-B-C to FIND and FIX any car trouble — from faulty carburetor to breakdown of automatic transmissions.

MOTOR'S NEW AUTO REPAIR MANUAL makes every job a breeze! First, you find what's wrong in a jiffy, with amazing new "Trouble-Shooter" section. Then you look up job in quick index. Turn to pages covering job. Follow the clear, illustrated step-by-step instructions. Presto — job is done!

No guess work! MOTOR'S Manual takes nothing for granted: Tells you where to start. What tools to use. Then it leads you easily and quickly through the entire operation!

to know to repair all models of 24 different makes—1952 thru 1959. Over ELEVEN HUNDRED giant pages. 2,850 "This-Is-How" pictures. Over 195 "Quick-Check" charts — more than 30,000 essential repair specifications. Over 225,000 service and repair facts. Instructions and pictures are so clear you can't go wrong!

Even a green beginner mechanic can do a good job with this giant manual before him. And if you're a top-notch mechanic, you'll find short-cuts that will amaze you. No wonder this guide is used by the U. S. Army and Navy! No wonder hundreds of thousands of men call it the "Auto Repair Man's Bible"!

Over 2,850 Pictures!  
So Complete, So Simple,  
You CAN'T Go Wrong!

BRAND-NEW REVISED Edition covers everything you need

Meat of 176 Official  
Shop Manuals

Engineers from every automobile plant in America worked out these time-saving procedures for their own motor car



**Covers All Models  
Of All These Makes  
Built Since 1952**

- |             |             |
|-------------|-------------|
| Buick       | Jeep        |
| Cadillac    | Lincoln     |
| Chevrolet   | Mercury     |
| Chrysler    | Nash        |
| Clipper     | Oldsmobile  |
| Continental | Packard     |
| De Soto     | Plymouth    |
| Dodge       | Pontiac     |
| Edsel       | Rambler     |
| Ford        | Studebaker  |
| Hudson      | Thunderbird |
| Imperial    | Willys      |

**COVERS ALL  
1959 MODELS**



**Same FREE 7-Day Trial Offer Applies on  
MOTOR'S New Truck Repair Manual**

Covers EVERY repair job on EVERY popular make of gasoline and Diesel truck made since 1952. Over 2000 illustrations; 300,000 facts. Over 800 big pages. A "must" for truck mechanics. For FREE 7-Day Trial, simply check proper box in the coupon at right.

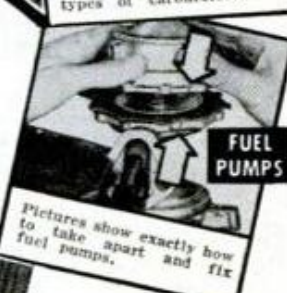
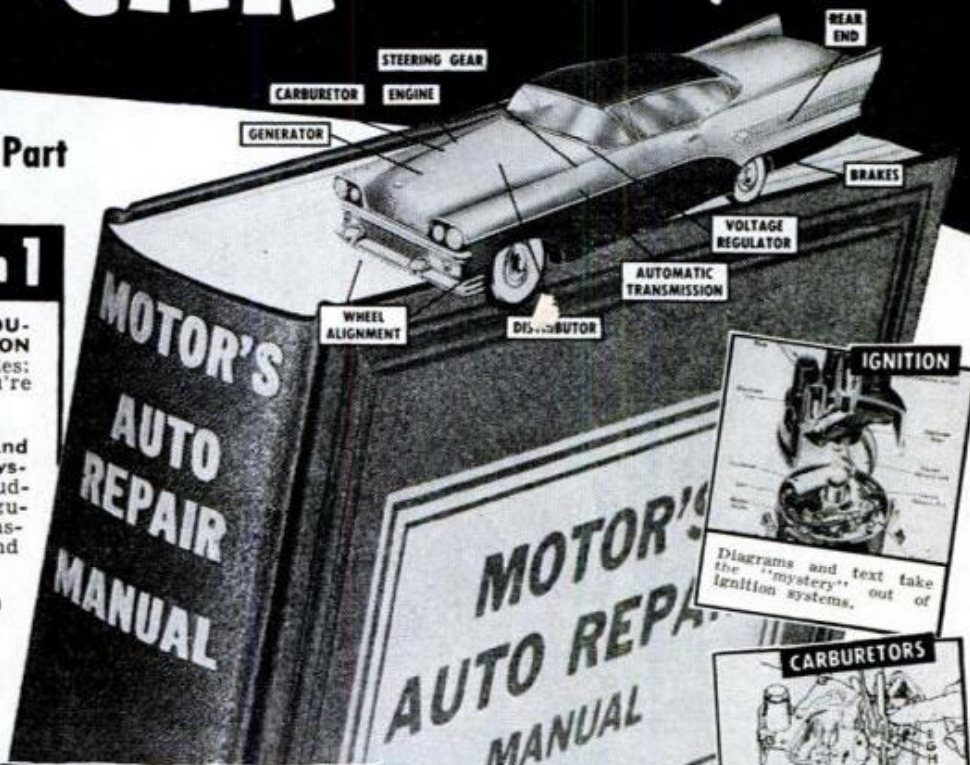
# ANY CAR

QUICKLY...  
EASILY...  
RIGHT!

## Generators—Yes, Any Part

### Now 3 Books in 1

- 1 Completely New "TROUBLE-SHOOTER" SECTION lists over 2,300 car troubles; helps you spot the one you're after in a jiffy!
- 2 How to Service, Repair and Overhaul All Car Parts, Systems and Components—including Generators, Voltage Regulators, ALL Automatic Transmissions, Power Steering and Brakes, etc.
- 3 Step-by-Step Instruction and Pictures for Repairing Parts on Each Specific Make and Model—with all essential specifications and dimensions for 24 different makes.



## Built From 1952 Through 1959

line. Now the editors of MOTOR have gathered together this wealth of "Know-How" from 176 Official Shop Manuals and "boiled it down" into crystal-clear terms in one handy indexed book!

### Everything You Need to Know

This giant manual includes ALL Automatic Transmissions, Covers Power Steering, Power Brakes, latest Carburetors, Engines, Fuel Pumps, Starting Motors, 12-Volt Systems, Generators, Distributors, etc. Plus big new "Trouble-Shooter" section that enables you to spot any one of more than 2,300 specific car troubles in a jiffy!

MOTOR'S brand-new Auto Repair Manual brings you Factory Specifications and Adjustment Tables, Tune-up Charts, Tables of Measurements and Clearances, Overhauling and Replacement Facts—and MUCH MORE.

Used by Armed Forces, hundreds of thousands of auto service men! YOU'LL want to try it, too—on the following GUARANTEE:

### Try Book FREE 7 Days

SEND NO MONEY! Just mail coupon! (Paste to postcard if you prefer.) When postman brings book, pay him nothing. Unless you agree this is the greatest time- and work-saver you've ever seen—return book in 7 days and pay nothing. Mail coupon now to: MOTOR Book Dept., Desk 011, 250 West 55th St., N. Y. 19, N. Y.

(School bookstores: write for discounts.)

**NEW REVISED! ENLARGED!**  
Covers all makes and models—including all 1959 cars.

**FREE 7-DAY TRIAL**

Return and Pay Nothing  
If Not Satisfied

### MAIL COUPON NOW FOR 7-DAY FREE TRIAL (Attach to Postcard if More Convenient)

MOTOR BOOK DEPT.  
Desk 011, 250 W. 55th St., New York 19, N. Y.  
Rush to me at once (check box opposite book you want):

MOTOR'S New AUTO REPAIR MANUAL. If O.K., I will remit \$2 in 7 days, \$2 monthly for 2 months and a final payment of \$1.95 (plus 45c delivery charges) one month after that. Otherwise I will return the book postpaid in 7 days. (Foreign price, remit \$10 cash with order.)

MOTOR'S New TRUCK REPAIR MANUAL. If O.K., I will remit \$3 in 7 days, and \$2 monthly for 2 months, plus 45c delivery charges with final payment. Otherwise I will return book postpaid in 7 days. (Foreign price, remit \$11 cash with order.)

Print Name ..... Age.....  
Address .....

City ..... Zone ..... State.....

Check box and save 45c shipping charge by enclosing WITH coupon in envelope entire payment of \$7.95 for Auto Manual (or \$9 for Truck Manual). Same 7-day return-refund privilege applies.

THREE  
MILLION  
COPIES SOLD  
•  
USED BY U.S.  
ARMED FORCES

## Free! AIRMAIL COLLECTION



Get this spectacular collection of all-different, genuine Airmails from strange, far-away countries, in Asia, Africa, Europe, the exotic Orient! World's largest airmail, scarce \$23 stamp, old Zeppelin, many many others. A truly remarkable collection containing stamps worth up to 30¢ each at catalog prices! EXTRA: Bargain Catalog PLUS other exciting offers. Send 10¢ for mailing costs. Act Now!

JAMESTOWN STAMP CO. Dept. F10PM, JAMESTOWN, N. Y.

RUSH my Free Airmail Collection and other offers. I enclose 10¢ for mailing costs.

Name .....

Street .....

City & .....

State .....

## FINANCIAL HELP TO START YOUR OWN HOME BUSINESS!



Tired of being squeezed between rising prices and a stationary salary? Could you use a nice little home-business to bring in extra income from your spare time, evenings and week-ends? I can show you how—will even help finance you, if you're short of cash. Sound unreasonable? Wondering how I can afford to do it? Well, it's simple. The business I'm talking about uses supplies. I make and distribute those supplies. So do other firms—but I'm willing to gamble that when your business gets rolling you'll rather do business with a friend than with strangers who did not show up until you were in the money. I've gambled the same way with hundreds of others, and it has paid off by helping me build the biggest business of its kind in the world! The Golden Rule of "do unto others..." always works for those who give it a fair trial.

What is this business? It's printing without a press, an amazing process I call "Screen Print." With it, you can turn out printing in gorgeous coloring that many big shops cannot duplicate, even with presses costing thousands of dollars! Yet my equipment (supplied to you with my instructions) weighs only a few pounds, can be set up on a small table in the corner of your garage, basement, attic, or even a bedroom. You can earn in a few hours to print on paper, metal, glass, plastic, leather, cloth, and about anything you can name—even on curved or round surfaces that ordinary printing presses cannot handle at all! And I show you how to get big-profit orders from stores, factories, theatres, schools, and practically every type of business or organization for miles around—even by MAIL ORDER coast to coast.



JUST SEND ME YOUR NAME & ADDRESS—NO MONEY

Remember, I'll help finance you, so don't worry about the money—whether you are employed or not. I'm sure I can help you get set in a home business that may settle your money problems forever. Just send name and address for FREE information, without obligation. TODAY SURE.

Mr. C. J. Nowak, President, Screen Print Co., Dept. 21, 15127 S. Broadway, Los Angeles 61, California



Cushman Motors, Lincoln, Neb.

## Mechanical Quarter Horses Speed Cattle Handling

Cow ponies took another step toward extinction in the San Antonio Union Stockyards when a fleet of electric scooters went into action in the handling pens. Horses are expensive to keep, and men on foot can't keep up with the cattle, but the little electric scooters can shoo a herd along at 11 miles an hour with near-equine maneuverability. Stockyard officials report that the new vehicles have increased the men's herding capacity by 50 percent, while helping reduce shrinkage, bruising and injuries to the cattle.

## Brittle, Light Beryllium May Carry Men Into Space

When man finally zooms into space, the ship he rides in may be made in part from the rare metal beryllium—if experiments carried on by Nonair Division of the Northrop Company, Los Angeles, continue to be successful. Until Nonair scientists struck on a way of extruding parts from beryllium, the metal—which is stiffer than steel and 33 percent lighter than aluminum—posed serious problems when considered for aircraft or space-ship use. It was stiff and brittle. Extrusion demands that metal be shaped by ramming it through a hot die, and beryllium would not stand up under such treatment. Nonair scientists have compensated for the brittleness by lubricating the dies with glass and making changes in the tooling apparatus. Beryllium is now heated to 2000 degrees F. and forced through dies at pressures up to 1700 tons. The desired length for spaceship parts is 20 feet. Nonair so far has produced parts 15 feet long and 1/8-inch thick.





## 2.3 HP Engine \$14.95 Postpaid

GOVERNMENT SURPLUS

This brand new quality engine which cost our Government many times this low price is offered you for use on go-carts, models, air-propelled boats, etc. Features and specifications: 2.3 H.P. @ 3400 Rpm, 2 cycle, 2" bore, 1½" stroke, roller bearing crankshaft, 3-ring aluminum piston, bronze connecting rod, Tillotson variable speed carburetor. Mfgd. by or for Jacobsen of Racine, Wis. for the U. S. Army. Shipped postpaid as shown except carburetor and timer must be attached. Propeller for engine sold less hub for \$6.00 additional. Instructions for assembly of timer and ign. included. Guaranteed or money refunded (less postage).

**ESSE RADIO COMPANY**

42 W. South St. Indianapolis 25, Indiana

## TELEPHONES



### MODERN CRADLE STYLE

\$3.00

2 for \$5.00

Genuine telephone company phones, re-conditioned. Ideal for Inter-House, House-to-Barn, Office to Shipping Room, etc. Battery operated. Guaranteed. Also, Magneto Telephones for Farms, Camps and Mines. Telephone Materials and Supplies of all kinds.

TELEPHONE DEPT. PM-123, 1760 Lunt Avenue, Chicago 26  
"America's Largest Independent Telephone Repair Shop"

**make your own Gems** 36<sup>50</sup>

The Gem Maker comes complete with all necessary equipment, including a super-charged diamond blade for sawing, and all the wheels for grinding, shaping and polishing; also complete instructions. The complete equipment as shown, less motor and belt for only \$36.50, c.o.d., Burlington, Wisconsin. Write today for information and literature.

**B&I MANUFACTURING CO.**  
Dept. P, Burlington, Wis.

## SUPER JU JITSU

**Now get tough double quick!**  
A course of instruction in the art of practicing and using this method of applying LIGHTNING-QUICK Super Ju Jitsu. Be Dangerous! These amazing lessons show you how it's done . . . in a big illustrated home-study course. The weapons are just your BARE HANDS—they can be used effectively if you know how and practice the art. Easy to learn; quick. Full 76-lesson course only \$5.95 postpaid—or COD, plus postage. Satisfaction or your money back guaranteed! Order "super Ju Jitsu Course."

NELSON-HALL CO., 210 S. Clinton St., Dept. BAP-2, Chicago 6, Ill.

Million Dollar Inventory — All Famous Brands

# TIRE SALE

AT LESS THAN WHOLESALE!

SAVINGS NEVER LESS THAN 50% UP TO 70% OFF REGULAR PRICES  
HEADQUARTERS FOR ALL SPORTS CAR TIRE SIZES  
SEND FOR YOUR FREE CATALOG!

**RELIABLE TIRE CO.** 728 MORGAN BLVD. CAMDEN 4, N. J.

These men are getting practical training in ...

# ELECTRICITY

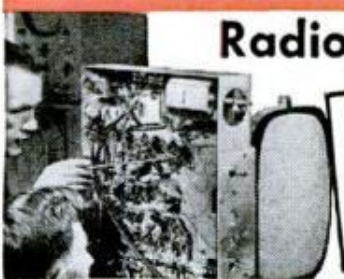


## ELECTRONICS

**ON REAL**

Motors • Generators  
Switchboards • Controls  
Modern Appliances  
Automatic Electronic  
Control Units

# TELEVISION



## Radio Electronics

**ON REAL**

TV Receivers  
Black & White and Color  
AM-FM and Auto Radios  
Transistors • Printed  
Circuits • Test Equipment

## Train in NEW Shop-Labs of COYNE

In Chicago—Electrical and Electronic Center of the World. Prepare for a better job and a successful future in a TOP OPPORTUNITY FIELD. Train on real full size equipment at COYNE where thousands of successful men have trained for 60 years—largest, oldest, best equipped school of its kind. Professional and experienced instructors show you how, then do practical jobs yourself on more than a quarter of a million dollars worth of equipment. No previous experience or advanced education needed. Employment Service to Graduates.

**Start Now — Pay Later — Liberal Finance and Payment Plans.** Pay most of tuition after graduation. Part-time employment help for students. Choose from nine yearly Starting Dates.

**Mail Coupon or Write to Address Below for Free Book** — "Guide to Careers." Whether you prefer ELECTRICITY, TELEVISION-RADIO or COMBINED ELECTRONICS TRAINING, which includes both fields, this book describes all training offered.

Information comes by mail. No obligation and NO SALESMAN WILL CALL.

B. W. Cooke, Jr., Pres. Founded 1899  
**COYNE ELECTRICAL SCHOOL**

Chartered as an Educational Institution Not for Profit  
1501 W. Congress Pkwy., Chicago 7, Ill., Dept. 10-3C

**MAIL COUPON** OR WRITE TO ADDRESS BELOW

COYNE ELECTRICAL SCHOOL  
New Coyne Building, Dept. 10-3C  
1501 W. Congress Pkwy., Chicago 7, Ill.

Send BIG FREE book and details of all the training you offer. However, I am especially interested in:

Electricity  Television  Both Fields

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

(I understand no Salesman will call)



# AMERICA'S NEED FOR 100,000 NEWLY-TRAINED MECHANICS



America's population has increased roughly 15 per cent in the past 10 years. When you compare this with the astonishing 43 per cent increase in car and truck registrations during the same time, you can easily see how America's need for 100,000 trained mechanics was brought about. This figure of 100,000 is based on an estimate of one of the country's most famous automotive vice presidents, a man who knows the automotive industry from his years of experience in the field.

But that's not the whole story. The fact is that today's cars and trucks are getting more and more complicated. Two or three highly-trained mechanics are needed to do the same repair job that one mechanic could do several years ago. Mechanics are becoming specialists in certain kinds of repair jobs, and more specialists are needed

as the complexity of our vehicles increases.

To give you an idea just how big the auto industry is, look at the following facts:

An average of 2,500,000 new drivers get licenses each year.

Over 36,000,000 households in the U.S. own automobiles.

There are 79,000,000 car, truck and bus drivers in America.

The automotive replacement parts business accounted for \$2,400,000,000 in sales in 1957 alone.

54% of all die castings made in the U.S. go into auto plants.

The auto industry buys almost 20% of all the steel produced in this country.

24% of all retail sales are for automotive products.

(Continued to page 84)

## COMMENTS FROM MEN WHO HAVE TAKEN TRAINING IN AUTO MECHANICS

"I am doing very well in the craft I learned through my correspondence course. During my training I made \$175. Today I am working full time as a general repair man. I am sure of a job with good pay any time."— *Samuel Dixon, Bronx, N. Y.*

"I am now working as an auto mechanic, earning \$4.50 an hour. That's doing very well, thanks to my training in mechanics."— *Edward McNamee, Poughkeepsie, N. Y.*

"I am a correspondence school graduate. Now I have a job as a service manager with five men under my direction. It was a grand feeling to get my diploma."— *Bill Wermuth, Oshkosh, Wis.*

"Because of what I learned through my training course in auto mechanics, I got a job taking care of a fleet of trucks. It's a steady job and I get a pay raise every three months."— *Tex Lamprecht, Calgary, Canada.*

# LEARN MEAT CUTTING AT NATIONAL

Pay After Graduation



The steady dependable trade of Meat Cutting taught easily in 8 short weeks. YOU LEARN BY DOING under actual meat market conditions in big modern school at Toledo.

For beginners or men with experience. Get a profitable store of your own. Remember, PEOPLE MUST EAT! Big pay jobs. Free employment help. Thousands of successful graduates.

Buying, cutting, percentage, pricing, advertising, selling, etc. A complete retail meat education. National School established 37 years. Get National training NOW. Pay your tuition in easy weekly

payments after you graduate. Send coupon for FREE school catalog — TODAY. G.I. approved.

**National School of Meat Cutting, Inc., Dept. 50-A, Toledo 4, Ohio**

Send me your FREE school catalog on National Training at Toledo in Meat Cutting, Meat Merchandising and Self Service Meats. No obligation. No salesman will call.

Name \_\_\_\_\_ Age \_\_\_\_\_  
 Address \_\_\_\_\_  
 City \_\_\_\_\_ State \_\_\_\_\_  
 Approved for Veterans

## STUDY TO BE A DOCTOR of Psychology or Metaphysics

Obtain a Ph.D., Ms.D., or Ph.D. Be a Teacher, Lecturer or Accredited Practitioner. Teach others how to achieve Health, Happiness and Contentment. Overcome problems. Correspondence Course only. Write for FREE book telling how.

**THE NEOTARIAN FELLOWSHIP**  
 Desk B, Pickwick Building Kansas City 6, Missouri

**Exclusive Double-Bearing HEAVY-DUTY PUMPS**  
 IRRIGATE • DRAIN • CIRCULATE • SPRAY  
 Use 1/4 HP motor or larger . . . . 1 HP for up to 7,500 GPH: 1,000 GPH 60" high; or 3,000 GPH from 25' well. 1 1/4" inlet; 1" outlet. Stainless shaft.  
**TYPE X-2** oil-less bronze bearings. Won't rust. . . . **\$10.95**  
**TYPE XB**—Ball bearing model. . . . **\$12.95**  
 Postpaid if cash with order. Rush your order today  
**MONEY BACK GUARANTEE**  
 Centrifugal and Gear Pumps in All Sizes  
**LABAWCO PUMPS, Belle Mead 2, N. J.**

Not everyone does as well, but T. N. CODY, who started a business of his own, reports...

For 12 months I've averaged  
**\$8000 PER MONTH INCOME**

—most of it clear profit for me!

Many men have discovered how to be independent, to be free of layoffs and bosses. C. G. Naples grossed more than \$200 his first week. A father-son combination grossed \$44,000 their second year. H. Lemon says, "I netted \$133 in one 8-hour day."

How much you make depends largely on you. You need no special skill, no large investment. Start part time if you wish.

**NO SHOP NECESSARY** • Our Electric Deterger shampoos rugs, carpets right on floor—removes dirt and grime and helps to show their natural color and beauty. So efficient and safe it is used by largest railroads and hotels.

► **This is not a lease proposition. You own the machine, you work when and where you please and all the money you take in is your own. You take no risk. Machines fully guaranteed.**



**MAIL COUPON TODAY FOR FREE BOOK**

**VON SCHRADER MFG. CO.**  
 110 "R" Pl., Racine, Wisconsin

Without obligation send me FREE booklet about your RUG DETERGER and tell me how I can start my own permanent, profitable business.

Name \_\_\_\_\_  
 Address \_\_\_\_\_  
 City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

# Been on the Scales Lately?

New tables of average weights for men and women, released by the Society of Actuaries after a three-year study of weight records of five million people, show that, on the average, women weigh less and men more than members of their sex did 30 years ago.

Here are the new average weights. Where do you stand?

## MEN

Height	Age 15-16	Age 17-19	Age 20-24	Age 25-29	Age 30-39	Age 40-49	Age 50-59	Age 60-69
5'-0"	98	113	122	128	131	134	136	133
2"	107	119	128	134	137	140	142	139
4"	117	127	136	141	145	148	149	146
6"	127	135	142	148	153	156	157	154
8"	137	143	149	155	161	165	166	163
10"	146	151	157	163	170	174	175	173
6'-0"	154	160	166	172	179	183	185	183
2"	164	168	174	182	188	192	194	193
4"	.....	176	181	190	199	203	205	204

## WOMEN

Height	Age 15-16	Age 17-19	Age 20-24	Age 25-29	Age 30-39	Age 40-49	Age 50-59	Age 60-69
4'-10"	97	99	102	107	115	122	125	127
5'-0"	103	105	108	113	120	127	130	131
2"	111	113	115	119	126	133	136	137
4"	117	120	121	125	132	140	144	145
6"	125	127	129	133	139	147	152	153
8"	132	134	136	140	146	155	160	161
10"	.....	142	144	148	154	164	169	.....
6'-0"	.....	152	154	158	164	174	180	.....

**FREE!**  
100  
WORLD-WIDE  
STAMPS  
...just  
released!



**HURRY! SEND TODAY** for colorful, valuable collection of 100 World-Wide stamps. Get new issues of past 12 months. From far corners of the world . . . Ghana, Togo, China, Polynesia, India, Australia, Honduras, Iceland and many others. Wonderful new additions to your collection. All different, all genuine, topicals, pictorials, bi-colors, mint and used. Limited supply. Only one to a collector. Plus free complete, helpful "Stamp Collector's Guide" and other offers for your FREE inspection. Send name, address, enclose 10¢ for handling and postage. Garcelon Stamp Company, Dept. 1PMX, Calais, Maine.

**GARCELON STAMP CO., Dept. 1PMX,**  
Calais, Maine — Rush FREE 100 Different Stamps, Collector's Guide, other offers. Enclosed 10¢ for handling. (PLEASE PRINT).

---




---



---

**BIG EARNINGS WAITING**  
for TYPEWRITER REPAIRMEN



Skilled men are in demand in the new, uncrowded field of typewriter repair. You'll quickly step into a high-pay job or business of your own, full or part time. EARN while learning easily at home under expert guidance. Materials, tools, typewriter supplied. Write TODAY for FREE book.

**TYPEWRITER REPAIR SCHOOL, INC.**  
Dept. A-10, 150 Park Ave., E. Rutherford, N. J.  
Lic. by New Jersey Dept. of Educ.

SEND FOR FREE BOOK  
Typewriter Supplied

**Learn** **MECHANICAL DENTISTRY**

To make Crowns, Plates, Bridgework, etc., for Dentists. Easy practical way to learn mechanical dentistry at home in spare time. FULL EQUIPMENT OF TOOLS AND MATERIALS INCLUDED WITH COURSE. Low tuition. Easy terms. Write for FREE BOOK about this money making profession that is not affected by machine age.

**MCCARRIE SCHOOL OF MECHANICAL DENTISTRY**  
207 N. Broad St., Dept. 96, Philadelphia 7, Pa.

**BE A COMMERCIAL**  
**Artist**  
—for less than 20c a day



Prepare for a fascinating, profitable Art career this easy, proven way. One "low-cost" teach yourself course covers Illustrating, Cartooning, Lettering, Oil Painting, TV Art, etc. Plus TWO ARTIST OUTFITS at no extra cost. Cash in on demand for trained artists. Be your own boss or high pay staff artist. FREE BOOK describes our easy method, opportunities in art. No obligation. No salesman will call. Just send your name, address to: **WASHINGTON SCHOOL OF ART, Studio 141, Port Washington, N. Y. (Estab. 1914).** Tear this out.



C-10

## Beauty by Colorcrete Can Earn High Incomes



Beautifying buildings by Colorcrete is a business opportunity awaiting men of modest capital everywhere. Owners of homes, stores, motels, schools — almost any type of construction — are looking for means to give lifetime eye-appeal to drab or dirty concrete, stucco and similar masonry surfaces. Colorcretors can do such jobs, in little time and at little cost, and pocket generous profits. Colorcrete is a cementitious material, applied by air pressure. Tough, tenacious, enduring; 30 colors. Investigate this low-investment enterprise by writing for the Opportunity Book.

COLORCRETE INDUSTRIES, INC.  
570 Ottawa Ave., Holland, Mich.

# COLORCRETE

**WORLD'S LOWEST PRICED CALCULATOR!**  
NEW! NEW! NEW!  
**TOM THUMB ADDING MACHINE**  
With beautiful Leatherette carrying case.  
MADE IN AMERICA BY AMERICANS  
Beware of cheap imported imitations.  
Adds Up To One Billion—1,000,000.000  
Subtracts—Multiplies—Divides

Not \$3.95 \$2.03 in  
But Only \$1.97 Penna. including 3% Tax.

Mistake Proof—Positively 100% Accurate—  
Lightning Fast—Shock Proof Solid Steel Mechanism  
**GUARANTEED FOR YOUR LIFETIME**  
Ideal for Housewives, Shoppers, Students, Engineers and Tax work. Take it to the Super Market—have \$3 every week. We pay postage if you send check, cash or money order—or just send your name & address and pay postman \$1.97 plus postage. Immediate Delivery—10 Day Free Trial—Satisfaction Guaranteed money refunded by return mail. **Special Gift Offer:** 2 Machines for only \$3.49. Agents Wanted—Make easy money selling a Top quality Calculator at our unbelievably low price.  
**TOM THUMB ADDING MACHINE**  
P.O. Box 5066, Dept. J-10, Philadelphia 11, Penna.



## NEW Improved Scope-Shot

Price Complete with 50  
**DISINTEGRATING PELLETS**  
They crack like a rifle  
when they hit—leave  
mark—puff of smoke!  
\$1.95  
P.P.

Big Bag of  
**250 EXTRA Pellets**  
98c P.P.

World's Finest Precision  
**SLINGSHOT**  
Scope-type  
sight!  
Millions Sold! Patent No. D-178,837

Pure gum rubber slings.  
Beautifully polished cast aluminum stock.  
Pistol grip. So powerful it kills small game. Fits pocket perfectly!  
Guaranteed. **FREE** shooting manual.  
Order NOW from: **GENERAL SPORTS**  
4184-MA Apple Street, Cincinnati 23, Ohio

**ROUTES PESTS!**  
Price without pellets \$1.50 P.P.  
**Order Now!**

## STOP SUFFERING AND START LIVING

WEB GUARANTEES IMMEDIATE, LASTING  
**RUPTURE RELIEF**  
—OR YOUR MONEY BACK IN FULL!



Enjoy a stronger, happier life. If a doctor says your rupture is reducible, the strong natural support and comfort of a WEB Truss offer lasting relief. Free trial period. Satisfaction guaranteed.

WRITE FOR FREE BOOK ON RUPTURE CARE

**WEB TRUSS CO.** DEPT. PM1  
HAGERSTOWN, MD.

JANUARY 1960

# prepare for your career in ELECTRONICS ELECTRICAL ENGINEERING RADIO-TV COMPUTERS

At MSOE, you can equip yourself for a career in many exciting, growing fields:  
**MISSILES • RADAR • AVIONICS  
AUTOMATION • RESEARCH  
DEVELOPMENT • ELECTRICAL  
POWER • ROCKETRY**

When you graduate from the Milwaukee School of Engineering, you are prepared for a dynamic career as an Electrical Engineer or Engineering Technician. Under a faculty of specialists, you gain a sound technical education in modern, completely equipped laboratories and classrooms. As a result, MSOE graduates are in great demand and highly accepted by industries nationally.

At MSOE, you will meet men from all walks of life and all parts of the country — some fresh out of high school or prep school, others in their twenties — veterans and non-veterans.

You can start school in any one of four quarters and begin specializing immediately. Engineering technicians graduate in 2 years with an Associate in Applied Science degree. For a Bachelor of Science degree in Engineering, you attend 4 years. A 3-month preparatory course also is available.



### FREE CAREER BOOKLET!

If you're interested in any phase of electronics, radio or television, be sure to look into the programs of study offered by the Milwaukee School of Engineering. Just mail the coupon.

## MILWAUKEE SCHOOL OF ENGINEERING

Dept. PM-160, 1025 N. Milwaukee St.  
Milwaukee, Wisconsin

Please send FREE Career Booklet. I'm interested in  
 Electronics  Electrical Power  Television  
 Mechanical Engineering  Radio  Computers  
 Electrical Engineering  Industrial Electronics

PLEASE PRINT

Name \_\_\_\_\_ Age \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

I'm eligible for veterans education benefits

# HOW TO MAKE THINGS OF PLASTICS

**Complete Low-Cost Home Training Course NOW Available**

There's exciting opportunities for you in Plastics Fabrication. Fun and relaxation as a hobby! Big money as a spare or full-time business! Course teaches fibreglassing, model building and how to make molded, cast, internally carved colored plastic jewelry, toys, furniture, novelties, signs. Professionally prepared. Used by Industrial Arts Teachers. All materials furnished. For men and women.

Accredited Member National Home Study Council  
**SEND FOR FREE BOOKLET**



**INTERSTATE TRAINING SERVICE**  
Dept. C-3, Portland 12, Oregon  
Send Free Booklet on Plastics Home Training Course.

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

## High School at Home

**MANY FINISH IN 2 YEARS**

No classes. No time wasted going to and from school. Progress as fast as your time and abilities permit. Standard H.S. texts supplied. Thousands enroll each year in this 63-year-old school. Send for FREE descriptive booklet.

**AMERICAN SCHOOL, Dept. H-145**  
Drexel at 58th St., Chicago 37, Ill.

Without obligation, please send FREE descriptive booklet.

Name \_\_\_\_\_  
Address \_\_\_\_\_  
Accredited Member National Home Study Council

## 95% PROFITS YEAR 'ROUND

Be your own boss, Operate a SIMPLEX lawn-mower sharpening service in your community. One compact machine grinds all mowers, sharpens cutlery. Low investment, 95% profit. Pays for itself in average month.

**SIMPLEX**

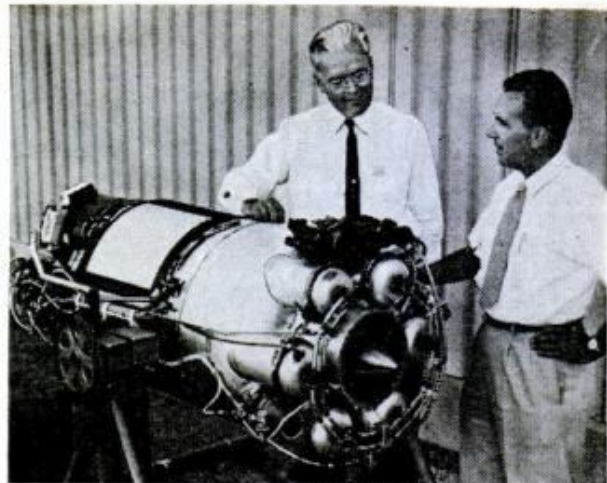
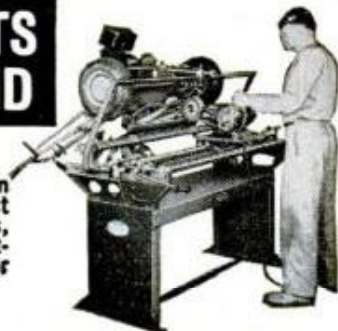
—4 Machines in One!

**Reel Grinder**—sharpens any mower reel in or out of mower.  
**Bed Knife Grinder**—grinds with either round or cup wheel.

**Rotary Blade Grinder**—hollow grinds any rotary mower blade.  
**Cutlery Knife Grinder**—sharpens cutlery, tools, scissors.

Send for free, money-making details!

The FATE-ROOT-HEATH Company • Dept. PM-1, Plymouth, Ohio



The Garrett Corp., AIRsearch Mfg. Div.,  
402 S. 36th St., Phoenix, Ariz.

## Gas-Turbine Compressor Gives Jets a Fast Start

Trailer-mounted gas-turbine compressors soon will be giving fast, pneumatic starts to jet engines of the supersonic B-58 bomber. The 300-pound turbine produces 850 horsepower and 210 pounds of airflow per minute, to start two of the Hustler's J-79 main engines simultaneously in less than 30 seconds; all four of the engines are started in less than one minute. Use of the mobile compressor to start the four engines, two by two, is faster and more economical than cross bleeding air from a started jet engine.

## "YOU ARE UNDER ARREST!"



Help Bring Crooks to Justice Through Scientific  
**CRIME DETECTION!**

We have taught thousands this exciting, profitable, pleasant profession. Let us teach you in your own home. Learn Finger Printing, Firearms Identification, Police Photography, Secret Service Methods thoroughly, quickly, at small cost. Over 800 of all American Bureaus of Identification employ I.A.S. students or graduates. Write for FREE "Blue Book of Crime."

(A Correspondence School Since 1916)

Institute of Applied Science, 1920 Sunnyside Ave., Dept. 1351, Chicago 40, Ill.



## Mr. "N" Made \$9,700 Last Year By Selling Just 20 KEEP/SAFES a Month!

Like Mr. "N" you can profit with KEEP/SAFE—the fine personal safe that undersells all others. Only safe sold direct. 95% of homes, farms and small businesses are prospects. \$30 to \$71 profit per sale, plus bonuses up to \$12 a safe. Choice territory, chance to become district agent. FREE DEMONSTRATOR! Get details, giving address including county.

**JOHN D. BRUSH & CO., INC.**  
575 West Ave. Rochester 11, N. Y.

## LEARN WHILE YOU SLEEP!



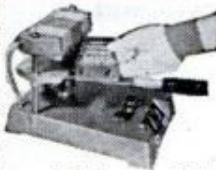
Hypnotize self, others while asleep with amazing hypnotic phonograph records, tapes. Free catalog lists 200 unusual records, tapes & equipment for sleep-learning & hypnosis experimenters. Sleep-Learning Research Ass'n., Box 24-D, Olympia, Washington.

POPULAR MECHANICS

## New Table Top Invention Puts You In... **PROFITABLE RUBBER STAMP BUSINESS**

Home Operators now make  
**\$9.40 AN HOUR** in business  
once monopolized by  
a few big companies

Special rubber stamps bring high prices—cost only pennies to make on new, low-cost table top machine. Take 27 cents worth of material, make perfect stamps, the kind businesses and offices now buy by the dozen at \$1.80 each. Make up to \$9.40 an hour. Start in spare time in your own home. Run machine on kitchen table using ordinary electrical outlet. Make any kind of stamp. We'll send you free information without obligation about this established, highly profitable business, now open to individuals for the first time. For free information send name today on a post card to  
**Rubber Stamp Div., 1512 Jarvis, Dept. R2A, Chicago 26, Ill.**



## BUILD FINE **GRANDFATHER** CLOCK NOW

The simple sensible **SPEEDE** Red-i-Kut way as thousands have — **FOR YOURSELF OR SELL AT A GOOD PROFIT. SAVE HUNDREDS OF DOLLARS. SHOP TESTED PLANS "SPIRIT OF THE CENTURY"** Narrow waist 33" tall or stately straight side **"SPIRIT OF AMERICA,"** **EASY-TO-FOLLOW photoprint PLANS & LIFE SIZE PATTERNS** tell all—plus **MOVEMENT BROCHURE \$40** up, of heavy brass weight (Kuempel original) Westminster, tube **BELL** chime, movements, **gorgeous** bronze-silver **MOVING MOON** dials. **3/4"** solid-mahogany **Jiffy Joint-Kwik-Bit** case kits. Send **\$1.00** today — Both plans **RUSH \$1.50** as folks have for over forty years.



Kuempel Chime Clock Works, 22 Kuempel Bldg., Minneapolis 16, Minn.

## **CONCRETE BLOCK HOME PLANS**

### **\$1000 COTTAGE**



Build your own 22'x26' cottage complete for \$1,000. Slab floor, beamed ceiling. Contains Liv. Rm., kitchen, two bedrooms, bath and fireplace. Blueprints, instructions and material list \$2.00 ppd. Money back guarantee. Other plans—\$1150 Garage Apt., \$1900 Duplex, \$2500 Ranch Home, \$3500 Cape Cod, \$3800 three bedroom, two bath, family room Ranch Home. Illustrated Folder, "How to Build Your Own Block Home," plus Plan Folder, 10c.

**QUALITY PLANS SINCE 1913**  
**BAILEY BUILDERS, 201 CHEROKEE, Little Rock, ARKANSAS**

26 YEARS IN BUSINESS AT THE SAME ADDRESS.

Beat the high cost of new tires.

**EXTRA MILEAGE TOP GRADE** Tires.  
(Written Insurance Guarantee). SEND AD

**WHY PAY MORE?** UP TO 15,000 MI.

Our entire stock of very slightly used

12 MOS. Written Guarantee. White Walls \$1.00 extra

600-16	\$5.22	670-15	\$5.22	700-15(6)	58.92	750-20(8)	\$12.22
600-16(6)	7.92	710-15	5.22	750-16(8)	10.72	825-20	18.92
650-16(6)	8.72	760-15	5.42	700-17	10.22	900-20	18.92
750-14	7.52	800-15	6.42	750-17	12.22	1000-20	19.92
800-14	7.52	820-15	6.72	650-20	10.02	1100-20	19.92
750-16(6)	9.82	700-16(6)	9.92	700-20	11.02	1000-22	20.92

"EXTRA SPECIAL" TOP QUALITY all size 4-ply pass. **\$8.72**  
**FREE TIRE** with 2 or more of these.—W.W. \$1.00 Extra.  
Factory Tube given—**GIANT TIRE SALE** EA.

Thousands of tires shipped all over the U.S.A. All tires shipped F.O.B. Phila. Send Check or M.O. with this ad. Dept. 2. No C.O.D.

**STANDARD 834 N. Broad St., Philadelphia 30, Pa.**



## **MOVING WITH THE JOB?**

Opportunity seekers find success the convenient, comfortable way in their Travel Trailers. Fully and smartly furnished, including showers, cooking facilities, your home on wheels adapts to any climate or site. Weatherized life-time construction, with conditioned air, gives you every home comfort, with ample storage space. Learn how to do it in **TRAILER TOPICS** the magazine of successful trailer living.

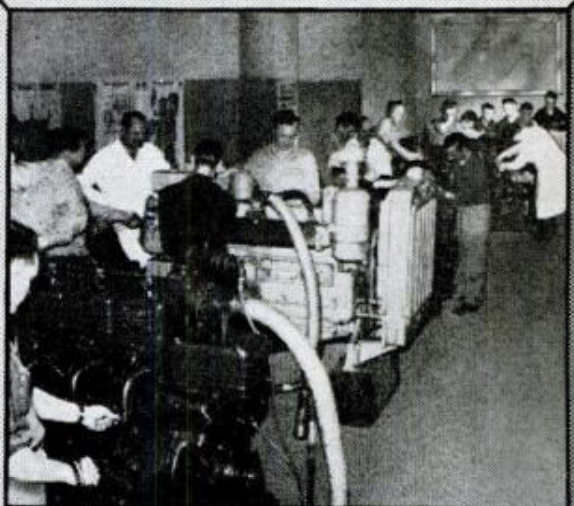
**SPECIAL OFFER \$1.00**  
4-Month subscription only

**TRAILER TOPICS** magazine

Suite 1570, 28 E. Jackson Blvd., Chicago 4, Ill.

JANUARY 1960

## **94.6% OF BAILEY GRADUATES ARE EMPLOYED AT TOP PAY IN THE FIELDS WHICH THEY WERE TRAINED!**



## **DIESEL-AUTO MECHANICS DESPERATELY NEEDED!**

We have a far greater demand for our students than we can fill!

We can show you an actual waiting list of leading companies throughout the world who have tried Bailey graduates — found them outstanding, and are coming back for more!

**Bailey Graduates are Successful . . . RECEIVE BIG PAY — HAVE SECURE FUTURE!**

The Famous Bailey Course prepares you for **BOTH Diesel and Gasoline Mechanics.**

This is a must—due to the advent of using Diesel principles, such as 'Fuel Injection' on passenger cars . . . use of gasoline engines for starting Diesel engines, etc. You learn all this at Bailey in the amount of time ordinarily required to learn just one of these subjects, **ALL FOR THE PRICE OF ONE.**

Don't be satisfied with a 'futureless', one-type job — learn how you can make **big money** now!

Write today for Free Booklet that takes you on a step-by-step camera tour through our spacious, modern shops — See Bailey students in action as they Learn-by-doing with the Famous Bailey Method of training!

We provide you with housing and part time jobs while in school, plus nation-wide placement service for graduates.

## **BAILEY Technical SCHOOLS**

1634 S. GRAND ST. LOUIS 4, MO.

### **MAIL TODAY!**

Please mail immediately this free booklet without obligation.

**FREE BOOKLET**



Name.....

Address.....

City.....State.....

APPROVED FOR VETERAN...NON-VETERAN

## EARN MORE - LEARN **AUTO** DIESEL MECHANICS

### OR TRAIN WITH OTHER GREER DIPLOMA COURSES

- |   |   |
|---|---|
| <input type="checkbox"/> AUTO MECHANICS       | <input type="checkbox"/> REFRIGERATION      |
| <input type="checkbox"/> DIESEL MECHANICS     | <input type="checkbox"/> AIR CONDITIONING   |
| <input type="checkbox"/> BODY & FENDER REPAIR | <input type="checkbox"/> MACHINIST TRADE    |
| <input type="checkbox"/> GAS-ARC WELDING      | <input type="checkbox"/> ADVANCED MACHINIST |

Skilled men are needed in every part of the country. Earn top pay in established shops or start your own business. Greer's expert instruction and actual shop training teaches you how. You learn by doing—quick, easy courses using the latest tools and equipment. Day, evening and part time instructions available.

**FREE** job placement assistance and convenient living accommodations are yours while training. Contact GREER'S FREE JOB PLACEMENT SERVICE when you enroll if you wish part time or full time employment.

### ENGINEERING DEGREE COURSES

- |  |
|--|
| <input type="checkbox"/> DIESEL AUTOMOTIVE ENGINEERING 27 MONTHS         |
| <input type="checkbox"/> REFRIGERATION & AIR COND. ENGINEERING 18 MONTHS |
| <input type="checkbox"/> WELDING ENGINEERING 18 MONTHS                   |

All Courses Approved  Civ. or  G.I.

Please rush me free literature on the trade indicated, at no obligation.

NAME \_\_\_\_\_ AGE \_\_\_\_\_

STREET \_\_\_\_\_

TOWN \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

Established 1902

## GREER SHOP TRAINING

Box A, 2236 S. Michigan Ave.

Chicago 16, Illinois

## Learn **PHOTOGRAPHY** at Home

Splendid opportunities. Prepare in spare time. Practical basic training. Long-established school. Send for free book, "Opportunities in Photography." No obligation.

American School of Photography, 835 Diversy Parkway, Dept. 1351, Chicago 14, Ill.

## Secrets of **VENTRILOQUISM** Now Revealed!



Easy to learn in 60 to 90 days with our Home Study Course. **RESULTS GUARANTEED.** Make Money! Be Popular! Have Fun! Big Opportunity! Radio, Television, Stage Appearances! For **FREE** information regarding price and terms **WRITE.** You must state your age. Dummy Catalog 25c. **MAHER HOME COURSE OF VENTRILOQUISM** Box 36, Studio PM-1, Kensington Station Detroit 24, Michigan

**500  
TRICKS**

## MAGIC TRICKS

**IT'S FUN To Do MAGIC**

Be popular! Amaze—mystify—entertain! For 40 years Douglas has satisfied customers all over the world. Now, you can enjoy this fascinating hobby. Only 10c brings our New 1960 Catalog 500 Tricks, containing brand new tricks for pocket, parlor, stage. Join in the fun—send 10c today!

**DOUGLAS MAGICLAND**  
Dept. M2, Box 274, Dallas 21, Texas

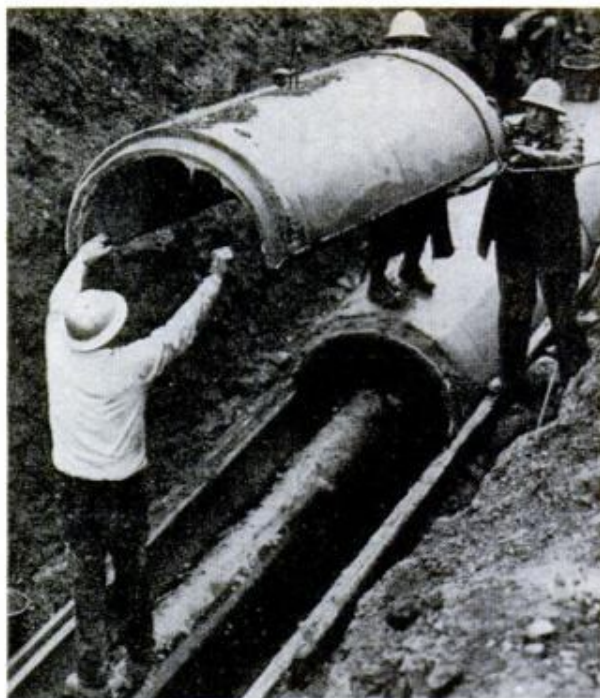
## FREE

### MUSCLE BUILDING INFORMATION

Sensational New Methods

Less Time—Less Effort—Better results

**BODY-TONE**, Box 638, North Miami 61, Fla.



## These Engineers Do Things by Halves

Building the new Freeway in Tacoma, Wash., created an unusual problem: The route passed above one of the city's major water lines, causing engineers to wonder how they were going to fix any future break without drilling the road. They solved the problem by making two half-sections of 24-inch concrete pipe. They placed one section below the Freeway's grade, laid in the water pipe and set on the other concrete section. The water pipe now can be jacked out to the side of the road for repairs.

## Air Conditioners Keep Fliers Cool

Navy pilots—who feel perfectly comfortable in their warm pressure suits at the subzero temperatures of high altitudes, but too hot when moving through the 90-degree air often found on the ground or flight deck—are now being equipped with all kinds of cooling devices. Prefabricated air-conditioned buildings are being installed at fields where there are ready rooms. Where there are none, air-conditioned trailers are being moved onto the fields; they also have suit-ventilation facilities, showers, drying and storage rooms, lockers and bathroom. After the pilots are briefed, they will be transported to their planes in air-conditioned trucks containing suit-ventilation facilities. Aboard ships, the pilots will have battery-powered air-conditioning units to keep them cool while going from ready room to airplanes.



Sworn statement from CHAS. LEMMING reads:

**"After starting my own business**



I've averaged

**\$100** A DAY

—most of it clear profit!"

Not everyone does as well... Mr. Lemming owns two machines

• In city of less than 50,000, Mr. Lemming started his own business after filling in coupon like one below. He averaged \$100 a day during first year, some days \$200. F. E. Doran grossed \$1050 in single month. Geo. Held grossed \$300 in one week.

How much you earn depends largely on you. No special skill, no large investment required for our electric upholstery cleaning machine. Start spare time until full time justified. Hire helpers as needed.

**NO SHOP NECESSARY** • You clean upholstered furniture on customers' premises—homes, hotels, motels, etc. Auto upholstering, too. No hauling; operate from your home. Watch business grow as satisfied customers tell friends. Supplies cost little, profits high.

If you want to be independent—free from layoffs, bosses—start profitable, year 'round business of your own. Ours is not a lease proposition. You own the machine, you work when and where you please, and all the money you take in is your own.

**FREE** book tells exactly how to do it.

MAIL COUPON TODAY FOR FREE BOOK

**VON SCHRADER MFG. CO.**  
110 "D" Pl., Racine, Wisconsin

Without obligation rush your **FREE** booklet about how I can start my own permanent, profitable electric Upholstery Cleaning business.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

**Finish HIGH SCHOOL AT HOME**

Complete 4 Yrs. in 12 Months

Learn More! Earn More! Enter professional or technical schools. Advance Socially. Live a Happier, Fuller Life. Individual Courses or complete schedule. **WRITE FOR SCHOOL BULLETIN.**

**ACADEMY FOR ADULTS**  
30 W. Washington, Dept. PM-160, Chicago, Ill.

**GOVERNMENT OIL LEASES LOW AS \$1 PER ACRE**

You do no drilling, pay no taxes, may realize a king-size profit without ever leaving home. Write for free map and literature.

**AMERICAN OIL SCOUTS, Dept. PM**  
8350 Santa Monica Blvd. Los Angeles 46, Calif.

**FISHERMEN**

SEND FOR **FREE CATALOGUE TODAY!**

FULLY ILLUSTRATED FULLY DESCRIPTIVE ALL PRICES LISTED

**Make Your Own SINKERS! JIGS! SQUIDS! CASTING AND SPINNING LURES!**

It's fun, It's easy with Sweet's **ALUMINUM MOLDS**

Molds for fresh and salt water fishermen. Handled and hinged for easy, fast operation. Over 100 types, 500 sizes. Write for free catalogue.

AS LOW AS

**\$2.95**

PER MOLD

**SWEET'S MOLDS**  
Tonawanda 16, N. Y.



Draftsmen earn more, enjoy pleasant working conditions. Get into **DRAFTING** and Blue-Printing, the starting point of all production. Trained Draftsmen are needed everywhere. Machines can never replace the draftsman.

**LEARN AT HOME IN SPARE TIME**

Revolutionary new method teaches you quickly the hows and whys of Mechanical, Structural, Machine, Architectural, etc. Drafting. You are sent professional drafting instruments, drafting equipment, portable drafting table, etc., at no extra cost. You learn by making actual drawings.

**BIG MONEY...ADVANCEMENT OPPORTUNITIES** offered trained draftsmen. Drafting is light, pleasant work, paying big salaries. Is a stepping stone to top managerial jobs. The draftsman plans the World of Tomorrow. That is why drafting is such interesting work.

**OWN YOUR OWN DRAFTING FIRM**

The investment requirements is small, the earning possibilities great. Many draftsmen eventually branch out into manufacturing the products they created. Learn of the opportunities in Drafting.

**MAIL THIS COUPON TODAY!**

**CHRISTY TRADES SCHOOL, Dept. DB-4603**  
3214-16 W. Lawrence Ave., Chicago 25

Mail at once your big **FREE** book on Drafting and Blue-Printing. Tell me how your Home Training and Professional Drafting Instruments, Portable Drafting Table, Drafting Equipment, etc. can be had on a **PAY AS YOU LEARN** plan.

NAME \_\_\_\_\_ Age \_\_\_\_\_

ADDRESS \_\_\_\_\_ CITY \_\_\_\_\_ STATE \_\_\_\_\_

# FREE! LAFAYETTE'S 1960 CATALOG



304 GIANT-SIZED PAGES

## CONTAINS

HUNDREDS OF EXCLUSIVE LAFAYETTE ITEMS NOT IN ANY OTHER CATALOG OR AVAILABLE FROM ANY OTHER SOURCE - SEND FOR YOUR COPY NOW!

See the newest and finest in Stereo Tuners, Amplifiers, Cartridges and Music Systems

- TAPE RECORDERS • PUBLIC ADDRESS SYSTEMS • AMATEUR EQUIPMENT
- INDUSTRIAL SUPPLIES • RADIO & TV TUBES AND PARTS • INSTRUMENTS
- TELESCOPES, BINOCULARS, MICROSCOPES & CAMERAS

Everything In Electronics

The Complete Catalog Featuring The Best Values Obtainable

LEADERS IN HI-FI

OUR

39th

YEAR

The most complete electronic supply catalog crammed full of everything electronic at our customary down-to-earth money-saving prices.

The largest selection of hi-fi components and systems; greatest savings on Lafayette endorsed "best-buy" complete systems.

EASY PAY TERMS AVAILABLE — 10% DOWN — UP TO 18 MONTHS TO PAY

**Lafayette Radio** P.O. BOX 222  
JAMAICA 31, N. Y.  
DEPT. LA-6

Send FREE LAFAYETTE Catalog 600

Name.....

Address.....

City..... Zone..... State.....

CUT OUT AND PASTE ON POST CARD

## ... TURN CONCRETE INTO GOLD!



MAKE UP TO \$75 A DAY IN YOUR OWN BUSINESS

If you want to have your own business — to start a business on your own — here's your big opportunity! New high speed, low cost General block machine produces up to 1,000 concrete blocks a day. Sell all you make to builders, supply houses, and others for homes, factories, buildings, garages. Cash in on the building boom! You can make profits of 100% to 150% — up to \$75. a day! General block machine equipped with 1/2 h.p. electric motor — or can be supplied with gasoline engine — works anywhere, in little space, indoors or out. Operates from ordinary house light socket. Simple, foolproof 3 step operation — so easy a child can do it. Makes superior 3 core blocks any size from 4" to 12" Also makes chimney, sash, corner and other types. Blocks meet any building code anywhere in the country. Materials — sand, water, cement, available anywhere. Simple illustrated operating instructions and mixing formulae for cement and cinder blocks supplied with each machine. Write for FREE folder with full information.

MOTOR DRIVEN

R.L.T. of New York City reports: "MY GENERAL BLOCK MACHINE PAID FOR ITSELF IN FIRST 2 WEEKS!"

Hundreds now in use the world over! Write for FREE details today!

EXTRA

Amazing illustrated book gives floor plans for 6 sensational concrete block bungalows. Tells how to lay blocks, lay out building lines, mix concrete, build steps, porch and concrete floors all at great savings. Written by experts. Can save many times the cost of the machine! Get it now! No strings attached. Send \$1.

BOOK SENT FREE IF YOU BUY MACHINE. \$1 REFUNDED IF YOU BUY LATER.

HOW TO BUILD YOUR OWN CONCRETE BLOCK HOME Only \$1 Prepaid

**GENERAL ENGINES CO.**

DEPT M-10, ROUTE 130, THOROFARE, N. J.

## GERMAN MOUNTAIN SKI CAP!

NEW U.S. SPORTSWEAR HIT! Bought in Western Germany; a limited supply of the original HIGH-FRONT "mountain" style (for fall & winter) of last summer's popular Afrika Desert Cap. All new, made of soft wool felt, fully lined. Unique 2-position pull-down earflaps to cover either (a) your ears alone or (b) both neck and ears. Colors: Mountain green, navy blue, field gray. \$5.95 plus 35c postage. State size & color. (Genuine Edelweiss mountaineers' cap-insignia, in gold and silver toned metal, \$2.50.)



Ainsworth Co., Dept. PM-10, 158 E. 38 St., New York 16, N. Y.

## COLLEGE DEGREES IN ENGINEERING & LIBERAL ARTS



Earned through HOME STUDY

Resident Classes also Available if Desired  
PACIFIC INTERNATIONAL COLLEGE OF ARTS & SCIENCES  
Primarily a correspondence school — 5719-T Santa Monica Blvd., Hollywood 38, Calif.

## TRAINED AND SKILLED MEN IN

### CLOCK AND WATCH REPAIR

Are Needed in Watchmaking, Electronics, Defense, Aviation, and other technical and precision instrument fields. NOW IS THE TIME TO LEARN THIS VALUABLE TRADE. But, Before You Enroll in Any HOME STUDY Course in Watchmaking, Write for Your Copy of "LEARN THE FACTS." KANSAS CITY SCHOOL OF WATCHMAKING 1226 Admiral Blvd. Kansas City 6, Missouri

## FOR BIG MEN ONLY!

SIZES 10 - 16 — WIDTHS AAA - EEE!



SEND FOR FREE CATALOG

We specialize in LARGE SIZES ONLY — sizes 10 to 16; widths AAA to EEE. Dress, sport, casual and work shoes; golf shoes; insulated boots; sock slippers; rubbers; overshoes; shoe trees. Also . . . sport shirts in your exact, extra-long sleeve length. Enjoy perfect fit in your hard-to-find size at amazingly low cost. Satisfaction Guaranteed. Sold by mail only. Write for FREE Style Book TODAY!

KING-SIZE, INC. 7820 Brockton, Mass.

### New Isotronic Training Method

## LEARN TV REPAIR IN ONE SHORT WEEK!

Now, after 5 year's research—a streamlined training system that *obsoletes all others!* In just 7 days you may earn \$150 weekly, without paying up to \$250 for training, studying long months! Developed by electronic scientists in cooperation with major TV mfr's., the new Isotronic method is the most practical ever devised! For conclusive proof, write for details and FREE SAMPLE LESSON. Use it on your own set or a friend's — repair it — convince yourself you can make big money immediately in your own TV business! Hurry — Free Lesson supply limited. Write:

TV SERVICING SYSTEMS, Dept. D-171  
1038 South La Brea, Los Angeles 19, California



Boeing Airplane Company, Seattle 24, Washington

## Intake of Jet Engine Protected by "Inner Tube"

Any size jet-engine intake can be protected on the ground with a lightweight expandable plastic plug now being manufactured by Boeing Airplane Company. The plug is equipped with an inner tube which may be inflated to fit any intake. The unit also covers the oil cooler and air compressor intakes which formerly required separate plugs. The new device replaces wood plugs which had to be shaped for each engine. In addition to lower cost, the plastic plugs weigh only five pounds compared to 50 pounds for the older type.

## Jet-Flight Planning Speeded by Computer

Planning of jet flights is being speeded by a new computer that cuts the time required to work out flight details from an hour to about three minutes. Up to now the computing has been done manually. The computer, developed by Bendix Aviation Corporation for United Air Lines, is asked by paper tape to lay out a flight plan for each of several possible routes. The tape carries information on wind, temperature, gross weight and fuel requirements. The computer then checks flight information stored on magnetic tape, completes its calculations and supplies detailed flight plans to the pilot for his decision.

JANUARY 1960

Even Men with No Experience  
are Making as High as

**\$1,000<sup>00</sup> IN A MONTH!**



A message to all men who are looking for a way to make more money faster, with one of America's greatest inventions wanted by millions.

Here's Your Opportunity to get into the **BIG MONEY CLASS FAST** with sensational **PRESTO FIRE EXTINGUISHER**

Over 3,000,000 Sold for Homes, Offices, Autos, Service Stations, Stores, Farms, Boats

Folks are Amazed when you Tell Them This New Kind of Protection Costs Only

**\$4<sup>95</sup>**

ONLY PRESTO HAS ALL THESE FEATURES

- Ends fire as fast as 2 seconds.
- Needs no inspection or recharging.
- Outperforms bulky extinguishers costing much more.
- Guaranteed for 20 years.

### Why Large Profits Are Easy

Everyone is terrified by FIRE! Millions have been waiting for this pure, simple, inexpensive safeguard. Most people who see the dramatic 5-second demonstration want one or more. You make as much as \$2.70 on every one. Get started in this rich new field now!

### Complete Sales Outfit FREE!

Mail coupon for big Illustrated Sales Kit with everything you need to make fine money first day — NOW. Every day you hesitate can cost you \$10, \$15, even \$50 you could be making! Everything FREE — no obligation — so MAIL COUPON TODAY!

**MERLITE INDUSTRIES INC.** 114 E. 32nd St., Dept. P-15H New York, New York

### BIG MONEY LIKE THIS EVEN IN SPARE TIME Reports \$80 a Week

Averaging less than a day or two a week. I have made as much as \$75 to \$80 a week. Walter Gable, Md.

Averages \$15.20 an Hour

For every hour I devoted to PRESTO, I earned an average of \$15.20. W. F. Wydallis, Ohio.

MERLITE INDUSTRIES INC. (Presto Div.)  
114 E. 32nd St., Dept. P-15H, New York 16, N. Y.

Rush me complete Sales Outfit with full details how I can make big money very first day with Presto Fire Extinguisher. All FREE, no obligation.

Name \_\_\_\_\_

ADDRESS \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

In Canada: Mopa Co., Ltd., 371 Dowd St., Montreal 1, P.Q.

For sportsmen  
6 to 60!



Broad line of models

**KITS** less motors, from **\$39<sup>95</sup>**

Complete kits with motors from \$109.95

Send 50¢ for 22-page catalog.

**ARNOLD-DAIN CORP.**

Box 78, Mahopac, N. Y.  
Dealer Territories Available

**TEAR OUT AND MAIL THIS AD  
FOR BIG BOX OF HOME PRODUCTS  
for FREE TRIAL!**

**SEND NO MONEY!**

Just tear out and mail this ad with your name and address for big Assortment of full-size packages of famous Blair Quality Products—lovely Cosmetics, Flavorings, etc. (\$1.35 retail value)—for **Free Trial**. Show friends, earn good money full or spare time taking orders for bargains in over 200 home needs. No experience, and no money needed to start . . . I give you credit. Tear out this ad today, mail with your name, address to get big Assortment for **FREE TRIAL**, and Money-Making Plans. **BLAIR, Dept. 32DA, Lynchburg, Virginia**



## MONEY in WORMS

Sell 20,000 fishworms per week @ \$4 per 1000 from a bed 3 feet wide and 8 feet long. We teach you how to raise and where to sell fishworms and crickets. Write for free literature. **CARTER WORM RANCH, PLAINS, GEORGIA**



## HIGH WAGES!

High Wages can be yours as an Operating Engineer of heavy construction equipment! Learn NOW to operate our diesel engined bulldozers, draglines, cranes, back hoes, scrapers and motorgraders! Machines of major manufacturers are used in our training program. Contractors are on our advisory staff. Contractors need trained operators and pay high wages to our graduates. We invite comparison and inspection of the nation's original construction equipment operator's training school. We are NOT a correspondence school, but a fully equipped educational institution in the beautiful Piedmont area of North Carolina where you will live while you learn.

Budget plan available. **VETERANS:** Ask about G.I. Benefits. Write TODAY for **FREE School Catalog**, no obligation, to

**NATIONAL SCHOOLS of  
HEAVY EQUIPMENT OPERATION**

Dept. D-3 P. O. Box 8415, Charlotte, N. C.



Bell Telephone Laboratories, 463 West St., New York 14

## Electronic Artificial Larynx Restores Speech to Voiceless

Researchers at Bell Telephone Laboratories have developed a self-contained, transistorized artificial larynx which will enable many voiceless persons to speak intelligibly and with control over volume, pitch, and inflection never before possible. With a little practice, the user can even sing simple tunes. The electronic larynx gives users up to 97 percent sentence intelligibility. The entire mechanism is enclosed in a plastic cylinder, 1¾ inches in diameter by 3¼ inches long, and is powered by two small mercury batteries or can be plugged into a 110-volt electric outlet.

## Scientist Says Algae Could Nourish World

If covered with growing algae, an area the size of Rhode Island could nourish the population of the world, according to Dr. C. M. Palmer, algologist of Cincinnati, Ohio. Algae, the little green plant that causes scum on ponds and lakes, is "ripe" for harvesting and can be put to good use—except that no one knows how to gather it inexpensively. It could supplement food and forage products and become a source of vitamins, animal feed, fertilizer and other organic products useful to man. Algae "gardens" now exist in many communities as a treatment for sewage.

# Get info.. PLASTIC LAMINATING AT HOME!



**THIS MAN...**

... is taking out of the machine a Plastic Sealing Job — ordered by mail — only 11c in material cost brings back \$2.58 in cash by mail. Capacity of machine: **\$25.00 profit per hour of operation.**

Get **ORDERS** and **CASH** from your mailman—do work in **SPARE TIME** at home — or expand into **FULL TIME** business. Send coupon for Free facts about the newest and most fascinating of all home operated businesses. For the first time a simplified machine brings the fabulous profits of **Plastic Sealing and Plastic Laminating** within the reach of the small operator. Anyone can learn to operate the machine with a few minutes practice—then with our **Magic Mail Plan** can get mail orders pouring in daily with cash in every envelope. **No canvassing—no selling.** We even

**Make up to \$5 an Hour.. MAGIC MAIL PLAN!**

supply the circulars you mail to bring back cash and orders. Don't waste a minute. Rush your name. We'll send you **FREE** and postpaid, pictures, prices, details, and all the facts you need to start. Mail coupon or send name on postcard. **No charge.** Warner Electric Co., 1512 Jarvis Av., Dept. L-2-A, Chicago 26, Ill.

## Make Thousands of Beautiful Art Creations

**COSTUME JEWELRY • CIGARETTE BOXES TRAYS • CANDLESTICKS • COASTERS LAMP BASES • BOOK ENDS...ALL IN SPARKLING COLORED PLASTIC**



**WARNER ELECTRIC CO., 1512 Jarvis Av. Dept. L-2-A, Chicago 26, Ill.**  
At no cost to me, please rush complete details postage prepaid. I am under no obligation.

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

Be a **LOCKSMITH!**  
**EARN WHILE YOU LEARN**  
Send for **FREE BOOK**

Big opportunities in this fascinating, profitable trade. Earn quickly—step into a well-paid job or start a business of your own, full or part time. Learn easily at home, all materials and special tools supplied. Write **NOW** for **FREE** book!

**LOCKSMITHING INST., Dept. 101, 150 Park Ave., E. Rutherford, N. J.**  
Licensed by State of N.J. Vet Approved

## LAW FREE BOOK THE LAW TRAINED MAN

Write today for a **FREE** copy of illustrated law book, "THE LAW-TRAINED MAN," which shows how to earn the professional Bachelor of Laws (LL.B.) degree through home study of the famous Blackstone Law Course. All necessary books and lessons provided. Moderate cost; convenient monthly terms. Write for **FREE** law training book today.  
**Blackstone School of Law, 307 N. Michigan Ave.**  
Founded 1890 Dept. 51 Chicago 1, Illinois

on any **ELECTROPLATE** object  
ANY OBJECT IN HOME SHOP GARAGE

NOW with our **NEW ELECTROCHEMICAL** outfit. You can easily do your own plating with the same **LUSTER** and **DURABILITY** as done by more expensive equipment. Outfit comes complete ready to start plating immediately. With instructions on plating metal and non-metal objects as Tools, Auto Parts, Silverware, Jewelry, Baby Shoes and 1001 other articles with **CHROME, NICKEL, COPPER, GOLD, etc.** SEND **NO MONEY.** Everything sent C.O.D. for the low price of **ONLY \$5.95** or send \$5.95 now and receive it postpaid. Money back in 7 days if not satisfied. **M. Z. Sales Co., Dept. 630, 113 West 42nd St., New York 36, N. Y.**

**PELLET FIRING LUGER AUTOMATIC**

- MAGAZINE LOADING CLIP
- OVER 15 MOVING PARTS
- FULLY AUTOMATIC

Automatic full size model of a Luger Automatic pistol—contains over 15 moving parts. Loads 8 complete rounds which snap into the hard butt simulating a Luger. Fires 8 bullet shaped pellets Has automatic slide action.

**ONLY \$198**

**MOST AUTHENTIC MODEL GUN WE'VE EVER SEEN**  
Comes to you with working parts disassembled with cleverly engineered springs, full instructions, supply of pellets and specially designed belt holster. **Full Money Back Guarantee.** Simply send \$1.98 plus 27c shipping charge or order C.O.D. From:  
**HONOR HOUSE PROD. CORP., Dept. CL-60, Lynbrook, N. Y.**

Millions have done it so can YOU!

Stop being **SKINNY** like I was  
Quickly **GAIN 25 LBS.** of **HANDSOME, POWER-PACKED MUSCLES** like I did  
Send for these 5 **AMAZING PICTURE COURSES**  
**All 5 FREE** before \$1 price goes back

1. How to **GAIN MIGHTY ARMS**
2. How to **GAIN A BIG CHEST**
3. How to **GAIN A MIGHTY BACK**
4. How to **GAIN POWERFUL LEGS**
5. How to **GAIN A GRIP OF STEEL**

Send 10c for postage for all 6 items  
Also **FREE Photo Book of Strong Men**  
**Jowett Institute, Dept. PM-01, 220 Fifth Avenue, N. Y. 1, N. Y.**

# ENGINEERING



Photo of Heald Students in Electrical Laboratory

**American Industry Steps Up Its Demand for Trained Engineers. Train Now at Healds**

**BACHELOR OF SCIENCE DEGREE, 30 MONTHS**  
SAVE 2 YEARS' TIME

- Degree Courses:**
- Electronic Engineering
  - Electrical Engineering
  - Highway Engineering
  - Mechanical Engineering
  - Structural Engineering
  - Civil Engineering
  - Architecture

- Diploma Courses:**
- TELEVISION  Color TV
  - Electronic Technician
  - Industrial Electronic Tech.
  - Tool & Die Design
  - Architectural Drafting
  - Mechanical Drafting
  - Structural Drafting
- Approved for Veterans**

**Enroll Now for New Term**  
**Heald College Ranks FIRST West of the Mississippi in "Who's Who in America"**  
Send for **FREE** Information  
**Heald Engineering College**  
Est. 1865  
**Van Ness at Post, Dept. P.M. San Francisco, California**

NAME \_\_\_\_\_  
STREET \_\_\_\_\_  
CITY \_\_\_\_\_  
STATE \_\_\_\_\_

# ENGINEERING

HOME  
STUDY  
COURSES

Courses written by world authorities in all branches of engineering and science. Step-by-step instructions using methods proved successful by thousands of our graduates. One hour each day in your spare time will start you off to higher pay, security and prestige. Fill in the coupon to-day and indicate the course of interest. We will send you a complete outline of the course with a booklet describing the Institute and our advanced teaching methods.

CIVIL ENG.  
SURVEYING  
ARCHITECTURE  
FORESTRY  
STRUCTURAL  
MECHANICAL ENG.  
INDUSTRIAL ENG.  
REFRIGERATION  
DRAFTING  
ELECTRICAL ENG.  
RADIO  
ELECTRONICS  
TELEVISION  
AERONAUTICAL ENG.  
HIGH SCHOOL  
CHEMICAL  
MATHEMATICS  
ACCOUNTING

## MAIL THE COUPON TODAY

Canadian Institute of Science & Technology Ltd.,  
738 Century Bldg., 412, 5th St. N.W., Wash., D.C.

NAME.....

ADDRESS.....

CITY.....STATE.....

COURSE OF INTEREST.....

Canadians: Send to C.I.S.T., 738 Garden Bldg.,  
263 Adelaide St. W., Toronto, Ont.



# C. I. S. T.

## DRAW ANY PERSON IN ONE MINUTE

Anyone Can Draw With This Amazing New Invention—Instantly! The "Magic Art Reproducer"

**NO LESSONS! NO TALENT!**

You Can Draw Your Family, Friends, Anything From REAL LIFE—Like An Artist Even if You CAN'T DRAW A Straight Line!



Complete for only  
**\$1.98**

Also Excellent for Every Other Type of Drawing!

• Human Figures • Outdoor Scenes, landscapes, buildings  
• Still life, vases, bowls of fruit, lamps, furniture, all objects • Copy photos, other pictures, portraits, etc. • Copy blueprints, designs, decorations, etc., for woodwork, machine, for needlework, crocheting, knitting • Copy all cartoons.

Yes, anyone from 5 to 80 can draw or sketch or paint anything now . . . the very first time you use the "Magic Art Reproducer" like a professional artist — no matter how "hopeless" you think you are! Anything you want to draw is automatically seen on any sheet of paper instantly! Then easily and quickly follow the lines of the "picture image" with your pencil . . . and you have an accurate original drawing that anyone would think an artist had done. Also makes drawing larger or smaller as you wish. Anyone can use it on any desk, table, board, etc.—indoors or outdoors! No other lessons or practice or talent needed!

Have fun! Be popular! Everyone will ask you to draw them. You'll be in demand! After a short time, you may find you can draw well without the "Magic Art Reproducer" because you have developed a "knack" and feeling artists have—which may lead to a good paying art career.

**FREE** with order

A.B.C. Guidance of Figure Drawing

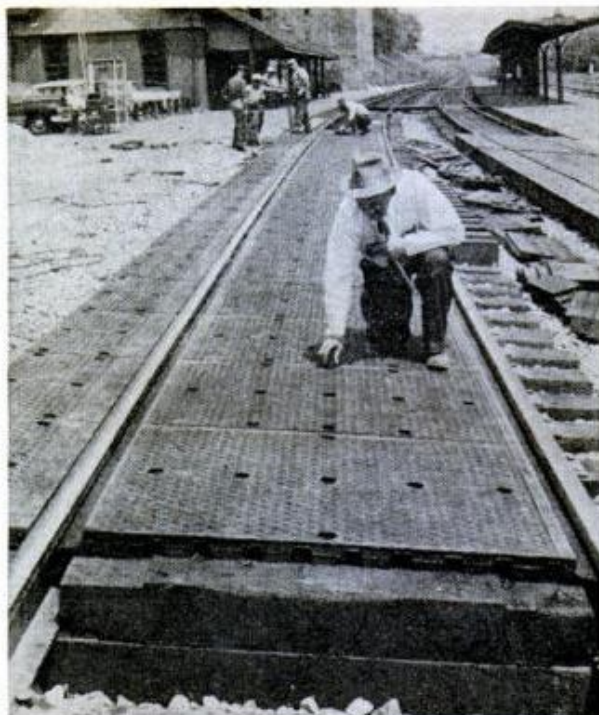
This valuable illustrated guide contains simple guidance on drawing human figures. Includes techniques, shading, proportions, etc., to use with your "Magic Art Reproducer" for added touches to your drawings.

**SEND NO MONEY!**

**Free 10-Day Trial!**

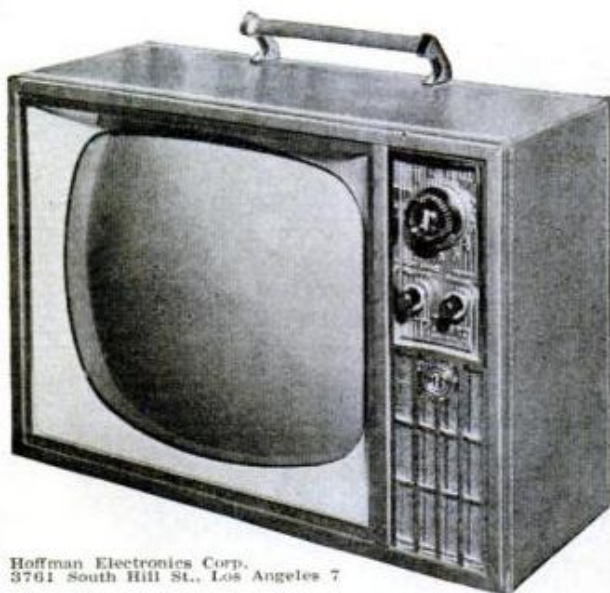
Just send name and address. Pay postman on delivery \$1.98 plus postage. Or send only \$1.98 with order and we pay postage. 10 Day Trial must satisfy or money will be refunded.

**NORTON PRODUCTS, Dept. 339, 296 Broadway, N. Y. C.**



## Rubber Rail Crossing Eases Track Bumps

Motorists in Wooster, Ohio, are finding one curved railroad crossing unbelievably smooth—it's made of rubber. Installed for the first time on curved tracks, the rubber crossing, according to Goodyear officials, will last about 20 years. Besides eliminating usual crossing bumps, the rubber pads never become caked with ice.



Hoffman Electronics Corp.  
3761 South Hill St., Los Angeles 7

## Portable TV Set Bound in Leather

To blend with informal contemporary furnishings in today's indoor-outdoor living, Hoffman Electronics has designed a portable television receiver bound in tan-colored, saddle-stitched leather. The 17-inch portable has been slimmed to a depth of only 7 $\frac{7}{8}$  inches for easy handling.

POPULAR MECHANICS

# LIVING FENCE



## Amazing Fast Growing Red Rose

See the sensational Red Robin Living Fence (Gloire Des Rosomanes) that's sweeping the country! Surround your property with beauty and protection for as little as 12c a foot. Plant this spring, have a vigorous Living Fence bursting with fragrant red roses this summer. Grows up to 6 feet. Not a multiflora. Keeps out intruders, noise. Available only from Ginden Nursery. Send name, address for free full-color landscape book, prices, guarantees, etc.

**GINDEN NURSERY CO. Dept. 3111 San Bruno, Calif.**

## MAKE BIG MONEY Selling 100% Waterproof Vulcanized Leather Boot

**FREE OUTFIT STARTS YOU!** Make \$10 to \$75—as much as \$250 extra per month with Mason's 100% water-tight leakproof LEATHER boot. VULCANIZED seams. Water shedding, "breathing" leather. Guarantees dry feet. Means a mountain of cash profits. One of 230 Mason dress, work, sport styles for men—women. 250,000 pair factory stock. Sizes—2½ to 15...AAAA to EEEE. Send for Free Selling Outfit.



**MASON SHOE MFG. CO.**  
Dept. G-14, Chippewa Falls, Wis.

# EXPLORING THE OCEAN'S GREATEST DEEPS

—A February feature,  
takes you down to the  
ocean floor aboard  
the U.S. Navy  
Bathyscaph

JANUARY 1960

# Save 1/2 on New ACCORDIONS

**IMPORTER-TO-YOU PRICES!  
over 40 new models from Italy!  
5 DAY FREE TRIAL**



## Buy on EASY TERMS!

Small Down Payment!  
Low as \$9.90 Monthly

## All Famous Makes!

Get in on these sensational values in world's finest Italian-made accordions! Play most popular instrument of all—for fun, leadership and profit! 40 newest models of glorious tone and breathtaking beauty offered at the amazing low prices—save 50% off mfr's list prices! Buy direct from world's largest dealer. Small down payment; easiest terms on balance. Extra bonus gifts FREE if you buy during sale. Trade-ins accepted. Try before you buy on FREE 5-day No-Risk Plan. Satisfaction guaranteed or money back. Double guarantee!

## RUSH COUPON TODAY!

See how easily you can now own and play a fine accordion. Rush coupon now for big new COLOR Catalogs and Low Discount Prices... ALL FREE! No obligation. Write to:

**Accordion Manufacturers & Wholesalers Outlet, Dept. R-10  
2003 W. Chicago Ave., Chicago 22, Ill.**

**Accordion Manufacturers & Wholesalers Outlet, Dept. R-10,  
2003 W. Chicago Ave., Chicago 22, Ill.**

## FREE BONUS GIFTS

- for promptness
- E-Z Lessons
- Music Stand
- DeLuxe Case
- other gifts, too!

## MONEY BACK GUARANTEE

**FREE  
COLOR CATALOGS**  
and low discount prices

Send FREE Color Catalogs and low discount prices.

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

Check here if you have accordion.

# 84 GREAT CARD TRICKS



**PLUS BIG 160 PAGE MAGIC CATALOG  
OF OVER 1000 TRICKS NOW BOTH FOR 50¢**

A fabulous collection of Card Tricks you can do! Book contains latest & best tricks used by magicians. The exciting big catalog lists 1000 tricks with balls, coins, flowers, cigarettes, rope, etc. Here's your chance to entertain & astonish others with exciting feats of magic. Rush name, address, & only 50¢ for everything!  
HOUSE OF 1000 MYSTERIES • 202-88 Pinewood, Trumbull, Conn.

## FLY YOUR OWN Bensen HELICOPTER

Simple to fly — build it yourself, with engine or as inexpensive glider type which can be mounted on floats or boat. Order 3-

view drawing, specs and photo of Glider for \$1 or motor powered Gyro-Copter \$2. Building plans and kits also available.

Send  
\$1  
or  
\$2

**BENSEN AIRCRAFT CORP., Dept. PM-10  
P.O. Box 2746, Raleigh, N. C.**

Name \_\_\_\_\_

Address \_\_\_\_\_



**World's Smallest**

# Home "Machine Shop" Pays You Profit of 400% for Spare Time!

**SET UP ANYWHERE. TAKES UP ONLY ONE SQUARE FOOT OF SPACE. BRINGS IN EXTRA CASH FOR SPARE TIME WORK**

## No house-to-house Selling

The product turned out by this machine is in big demand. Every man and woman in the country uses from five to twenty of them every day. The need is as great in small towns as it is in big cities. Actually, forty million of these little necessities are bought every single year.

But the giant corporations will never gobble up the business because it is strictly a local operation. In fact, neighbors will leave jobs at your home while you're at work—jobs you can turn out in a few minutes before dinner. So it is ideal for a one-man business—or a business made to order for a man and wife team.

The machine is so simple and easy to operate that a school boy or a woman can turn out professional work after a few hours' practice. Raw material that costs 20¢ turns out finished products worth a dollar—a 400% profit for the operator. We show you nine ways to keep orders coming in at a good, steady clip without any house-to-house selling.

I will be happy to send you the complete money-making story if you will send me your name right away. Information will be mailed to you—free and postage prepaid. Send name to me, Michael Roberts, 1512 Jarvis Ave., Dept. K-2-A, Chicago 26, Ill.

**MR. MICHAEL ROBERTS**  
Dept. K-2-A, 1512 Jarvis Ave., Chicago 26, Ill. **FREE!**

Dear Mr. Roberts: Without cost or obligation to me, please mail the complete facts showing how I can get started in an extra money business with the world's smallest Machine Shop. Everything you send me now is free and no salesman will call.

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

**AMAZING 6-SECOND HERCULES**

# SWIF SOLDER

**REAL SOLDER (NOT A GLUE). JUST SQUEEZE ON AND HEAT...42% FASTER THAN WIRE SOLDER\***

Squeeze on Hercules SWIF Solder and heat...even a match will work when you solder wires with SWIF. SWIF solders copper, brass, iron, steel, silver, zinc, tin, etc. Plumbers, electricians and electronics men choose SWIF because it gives them a real 50/50 tin-lead solder in time-saving, easy-to-use paste form. One tube of SWIF does the work of 3 to 4 times as much ordinary solder. Each tube comes with a free Do-it-Yourself Solder Leaflet that shows how to use SWIF for so many jobs.

\*Test report available on request.



Hobbies & Crafts    Electrical Wiring    Plumbing & Repairs

**ONE HANDY TUBE MAKES HUNDREDS OF CONNECTIONS... ONLY 69c**



Also available with acid flux in 4 oz., 1/2 lb., 1 lb. and 3 lb. containers.  
**HERCULES CHEMICAL CO., INC., 416 Broadway, New York 13, N.Y.**



Crow's Hybrid Corn Company, Milford, Illinois

## Corn Crossed with "Relative" Has More Ears per Stalk

To meet the demand for high-yield corn that is particularly suited to modern harvesting methods, a Midwestern seed-corn company has crossed present-day corn with its ancient "relative," teosinte, to produce a plant that has from six to 10 ears on every stalk. And the plants themselves are only five feet tall, which means that they will feed through a combine without clogging. Dr. Walter J. Mumm of Crow's Hybrid Corn Company made the first cross between corn and teosinte in 1950. Growing wild in Central America, teosinte is a grasslike plant with a harder stem than corn. It tassels like corn but bears its grain in slender spikes from nearly every joint of the stem. Each plant produces about 4000 seeds and the grain's protein content of 20 percent is twice that of corn. The result of Dr. Mumm's first teosinte-corn cross was a plant that produced a large number of tillers and a large number of small ears. Additional crosses back to corn increased the ear size and reduced the tillering. In addition to the advantages of many ears and uniform size, the new corn, which will be available in 1961, is resistant to heat, drouth and disease, and its hardy stalks repel corn borers.

"Large single ears were fine when corn was picked by hand," says Dr. Mumm. "They were easy to grasp and filled the wagon faster than a large number of smaller ears. But we're moving into an entirely new era of corn production and need a plant designed for modern methods."





## If Your Child is a Poor Reader

See how The Sound Way to Easy Reading can help him to read and spell better in a few weeks. New home-tutoring course *drills* your child in phonics with records and cards. Easy to use. University tests and parents' reports show children gain up to *full year's grade* in reading skill in 6 weeks. Write for free illustrated folder and low price. **Bremner-Davis Phonics, Dept. S-57, Wilmette, Ill.**

## WANTED! New Products

We urge manufacturers with products requiring sales representation in the automotive or service-station field to write to us. Inventors, if you have patented items applying to the same sales field, let us know and we'll work out manufacturing and distribution problems for you. *We have salesmen in every state.*

**JACK P. HENNESSY COMPANY, INC.**  
12 Depot Square \* Englewood, New Jersey

## Every Mason Wants



Masonic books for Blue Lodge Chapter, Commandery, Scottish Rite and Shrine. *Our Rituals Are Used the World Over*. Send for free catalog for Masons, Odd Fellows, Knights of Pythias, Knights of Columbus, etc.

**EZRA A. COOK PUBLICATIONS, INC.**  
P. O. Box 796 Dept. A50 Chicago 90, Ill.

## SIGN PAINTING

Home-Study Course - Only \$5.95

Teaches you commercial sign painting and sign building as it is being done TODAY in leading shops all over the country. Complete practical course for self-instruction. Shows latest methods of truck lettering, office doors, wood letters, reflecting signs, plastic, sprayed signs, gold leaf, silk screen process, up-to-date alphabets, money-making business information, etc.

**SATISFACTION GUARANTEED OR REFUND!**  
Contains all the instruction of a high-priced correspondence course. Full price, only \$5.95, postpaid. Or C.O.D. plus postage. No risk—order today. Satisfaction or money back! Order "Sign Painting Course." **NELSON-HALL CO., 210 S. Clinton St., Dept. 2AP-2, Chicago 6, Ill.**

## MEN PAST 40

**Afflicted With Bladder Trouble, Pains in Back, Hips, Legs, Nervousness, Tiredness.**

If you have these troubles, particularly bladder trouble, then your condition may be traced to Glandular Inflammation . . . a constitutional disease. Neglect of this condition often leads to premature old age and sometimes incurable malignancy.

The Excelsior Medical Clinic has a **New Free Book** that tells how thousands of men have been successfully treated here at Excelsior Springs for Glandular Inflammation by **NON-SURGICAL Methods**. They found soothing relief and a new outlook in the future of life.

This **Free Book** may prove of utmost importance in your life. Write Today. There is no obligation. **Excelsior Medical Clinic, Dept. B6129, Excelsior Spgs., Mo.**

JANUARY 1960

## "HOW I DOUBLED MY INCOME In Less Than A Year, As A CUSTOM UPHOLSTERER"



**Alvin Lederkramer, Former Low Salaried Auto Mechanic - Now Earns Big Pay**

"When I enrolled for UTS training I was an auto mechanic earning a meager salary. While learning I earned good spare-time money. After graduation, I got a job in upholstery with better pay than ever before. Now, less than one year later, I've doubled my income. Soon, I'll be in my own business—all thanks to UTS."

**WHAT DO YOU WANT? Your Own Profitable Business—A Steady Job—Substantial Sparetime Earnings—A More Secure Future? They're all Waiting for YOU in the Big-Opportunity Field of Custom Furniture Upholstery.**

There's a steady demand for your services as a trained upholsterer. You can **EARN Right Off** as you learn to make good money all year 'round at home, in your own shop, or in a well-paid job. N. Y. State-approved UTS Course teaches you professional custom furniture upholstery, reupholstery, slip-covers, furniture finishing, window cornice, cushion, and drapery making. **Course includes—FREE—ALL tools, complete frames and materials.**

### FREE ILLUSTRATED BOOK — FREE SAMPLE LESSON!

Our FREE book, "YOUR NEW WAY TO A SUCCESSFUL CAREER" with FREE Sample Lesson shows you how. **WRITE TODAY!** Training in N. Y. School also available. Accredited by N.H.S.C. Upholstery Trades School, Dept. MA-305, 721 B'way, N. Y. 3.

**MAIL COUPON TODAY. NO OBLIGATION**

## APPROVED FOR VETERANS

**UPHOLSTERY TRADES SCHOOL, Dept. MA-305**  
721 Broadway, New York 3, N. Y.

Please send me FREE book with FREE Sample Lesson. No obligation—no salesman will call.

Home Study  Training in N. Y. School

Name  (Please print plainly)

Address

City  Zone  State

Check if Korean Veteran

**MATERIALS FREE WITH COURSE YOU MAKE**

SLIPPER CHAIR

CLUB CHAIR

OTTOMAN

PLUS SLIP COVERS

Yours to keep or sell

## PREPARE FOR BETTER JOB, BIGGER PAY IN SPARE TIME AT HOME

Today, choose the job you want—and prepare for it in time you might otherwise waste. Or if you are already in the work you like best, start training now for quicker promotion and increased pay. During the past 63 years AMERICAN SCHOOL has helped ambitious people to reach higher goals. Check subject that interests you and mail coupon for full information.

**AMERICAN SCHOOL, Dept. G145, Drexel at 58th, Chicago 37, Ill.**  
Without obligation, please send FREE and postpaid, full particulars about the subject checked below.

- |  |  |   |
|--|--|---|
| <input type="checkbox"/> Accounting              | <input type="checkbox"/> Contracting             | <input type="checkbox"/> Mechanical Engineering |
| <input type="checkbox"/> Apprenticeship Courses  | <input type="checkbox"/> Diesel Technician       | <input type="checkbox"/> Mechanical Technology  |
| <input type="checkbox"/> Architecture & Building | <input type="checkbox"/> Drafting—Building       | <input type="checkbox"/> Metalworking Courses   |
| <input type="checkbox"/> Automotive Technician   | <input type="checkbox"/> Drafting—Machine Trades | <input type="checkbox"/> Plumbing—Practical     |
| <input type="checkbox"/> Better Foremanship      | <input type="checkbox"/> Electrical Engineering  | <input type="checkbox"/> Private Secretary      |
| <input type="checkbox"/> Blueprint Reading       | <input type="checkbox"/> Electricity—Practical   | <input type="checkbox"/> Retail Merchandising   |
| <input type="checkbox"/> Bookkeeping             | <input type="checkbox"/> Electronics—Industrial  | <input type="checkbox"/> Salesmanship—Outside   |
| <input type="checkbox"/> Business Management     | <input type="checkbox"/> HIGH SCHOOL COURSES     | <input type="checkbox"/> Sheet Metal Work       |
| <input type="checkbox"/> Civil Engineering       | <input type="checkbox"/> Machinists              | <input type="checkbox"/> Tool Making            |

NAME  OCCUPATION  AGE

HOME ADDRESS

CITY  STATE

**MAIL COUPON NOW**



Accredited Member NATIONAL HOME STUDY COUNCIL

GET READY FOR THE SPACE and SCIENCE ERA! SEE SATELLITES, MOON ROCKETS CLOSE-UP



# AMAZING OPTICAL BUYS

and OTHER SCIENTIFIC BARGAINS



## See the Stars, Moon, Planets Close Up! 3" ASTRONOMICAL REFLECTING TELESCOPE



60 to 180 Power — Famous Mt. Palomar Type! An Unusual Buy! Assembled—Ready to use! You'll see the Rings of Saturn, the fascinating planet Mars, huge craters on the Moon, Star Clusters, Moons of Jupiter in detail. Galaxies! Equatorial mount with lock on both axes. Aluminized and overcoated 3" diameter high-speed f/10 mirror. Telescope comes equipped with a 60X eyepiece and a mounted Barlow Lens, giving you 60 to 180 power. Low-cost accessory eyepiece available for higher powers. An Optical Finder Telescope, always so essential, is also included. Sturdy, hardwood, portable tripod. FREE

with Scope.—Valuable **STAR CHART** plus 2" page **"HANDBOOK OF HEAVENS"** plus **"HOW TO USE YOUR TELESCOPE"** BOOK.  
Stock No. 85.050-H.....\$29.95 postpaid

**KNOW THE TRUTH ABOUT POWER.** Telescope experts will confirm that an Astronomical Telescope will only give you practical powers to about 50 or 60 times per inch of objective diameter—powers above this only produce empty magnification—make viewing dim, difficult and unsatisfactory.

## 4 1/4" ASTRONOMICAL TELESCOPE!



UP TO 255 POWER! With this scope you can see everything as above but with greater power plus will split finer stars. Mirror has twice the light gathering power. Mirror guaranteed to give theoretical limit of resolution. Rack and pinion focusing, hardwood tripod, real equatorial mounting—only one adjustment follows stars! Aluminum tube. 6 power finder telescope. 2 standard size eyepieces and mounted Barlow lens give you powers of 40X, 90X, 120X, and 255X. Low-cost accessory eyepiece available for higher powers. FREE with Scope.—Valuable **STAR CHART** plus 272 page **"HANDBOOK OF HEAVENS"** plus **"HOW TO USE YOUR TELESCOPE"** BOOK. Shipping weight 25 lbs.

Stock No. 85.006-H.....\$74.50 f.o.b.

Same Telescope as above but equipped with Electric Clock Drive—  
Stock No. 85-094-H.....\$111.50 F.O.B. Barrington, N. J.

## Take Telephoto Shots Thru 7x50 MONOCULAR

This is fine quality, American made instrument—war surplus! Actually 1/2 of U. S. Govt. 7 x 50 Binocular. Used for general observation both day and night and to take fascinating telephoto shots with your camera. Brand new, \$195 value. Due to Japanese competition we close these out at a bargain price. Directions and mounting hints included.



Stock No. 50.003-H.....\$15.00 Postpaid

## BUILD A SOLAR ENERGY FURNACE

A fascinating new field. Build your own Solar Furnace for experimentation—many practical uses. Easy! Inexpensive! Use scrapwood! We furnish instructions. This sun powered furnace will generate terrific heat—2000° to 3000°. Fuses enamel to metal. Sets paper aflame in seconds. Use our Fresnel Lens—14 3/4" diameter... f.l. 14".  
Stock No. 70.130-H... Fresnel Lens... \$ 6.00 Pstpd.

## BEGINNER'S LENS KITS! FUN FOR ADULTS! FUN FOR CHILDREN!

Kits include plainly written, illustrated booklet showing how you can build lots of optical items.  
Stock No. 2-H—10 Lenses.....\$1.00 Postpaid

## INSTRUCTION BOOKLETS

	Stock No.	Price Pstpd.
How to Build Projectors.....	9014-H	30c
Homebuilt Telescopes.....	9006-H	40c
Photography With Your Telescope.....	9058-H	25c
ALL ABOUT TELEPHOTO LENSES.....	9036-H	60c
ULTRA CLOSE-UP Photography.....	9042-H	60c
The Camera Lucida.....	9059-H	20c
Infra-red Light and Its Uses.....	9040-H	75c
Homemade Stereo-Adapters.....	9032-H	30c
Homemade Stereo-Viewers.....	9034-H	30c
"Building a Condenser Enlarger".....	9038-H	40c
Time in Astronomy.....	9054-H	60c
FUN WITH OPTICS.....	9050-H	50c
HOW TO USE YOUR TELESCOPE.....	9055-H	60c

(Includes directions on how to take photographs thru your telescope)

## MAKE YOUR OWN ASTRONOMICAL TELESCOPE

See December, 1957 issue of POPULAR MECHANICS—Pages 188-192. 4 1/4" MIRROR KIT—Contains ready-to-use 4 1/4" diameter concave, aluminized objective mirror, lenses for 1" focal length eyepiece, and aluminized first surface diagonal mirror.  
Order  
Stock No. 50.074-H.....\$16.25 postpaid

## 'FISH' WITH A MAGNET

Go Treasure Hunting On The Bottom



Great idea! Fascinating fun and sometimes tremendously profitable! Tie a line to our 5-lb. Magnet—drop it overboard in bay, river, lake or ocean. Trawl it along the bottom—your "treasure" haul can be outboard motors, anchors, fishing tackle, all kinds of metal valuables. 5-lb. Magnet is war surplus—Ainco V Type—a terrific bargain. Lifts over 125 lbs. on land—much greater weights under water. Order now and try this new sport.  
Stock No. 70.183-H. 5-lb. Magnet.....\$8.50 Postpaid 15 3/4 lb. size. Will lift over 250 lbs.  
Stock No. 85.088-H. 15 3/4 lb. size.....\$22.50 F.O.B. Shipping weight 22 lbs. Barrington, N. J.

## New! 2 in 1 Combination! Pocket-Size

50 Power MICROSCOPE and 10 Power TELESCOPE Useful Telescope and Microscope combined in one amazing, precision instrument. Imported! No larger than a fountain pen. Telescope is 10 Power. Microscope magnifies 50 Times Sharp focus at any range. Handy for sports, looking at small objects, just plain snooping. Send Check or M.O. Satisfaction Guaranteed.  
Order Stock No. 30.059-H.....\$4.50 Postpd.



## Terrific Buy! American Made! OPAQUE PROJECTOR

Projects illustrations up to 3" x 3 1/2" and enlarges them to 4 ft. wide. No film or negatives needed. Projects charts, diagrams, pictures, photos, lettering in full color or black-and-white. Operates on 115 volt, A.C. current. 6-ft. extension cord and plug included, operates on 60 watt bulb, not included. Size 12" x 8" x 4 1/2" wide. Weight 1 lb., 2 oz. Plastic case with built-in handle.  
Stock No. 70.199-H.....\$7.95 Postpaid

## NEW BINOCULAR-TO-CAMERA HOLDER

For Exciting Telephoto Pictures Will Fit Any Camera Bring distant objects 7 times nearer with a 35 mm. camera, 7x50 binocular and our NEW BINOCULAR-TO-CAMERA HOLDER. Ideal for long-range shots of wild life, ships, planes, people, etc. Camera and binoculars attach easily. Use any binocular or monocular—any camera, still or movie. Take color or black and white. Full directions for taking telephoto's.  
Stock No. 70.223-H.....\$11.50 postpaid



## Play This New Game—MATH MAGIC . . . The Fun-Way to Math Skill!

Educator-approved! 3 fascinating games in one! Great fun for the whole family. Increases skill at addition, subtraction, multiplication, division. Includes Dial and Spinner, Numbered Cards, Plastic Tokens, etc.—also rules and directions.  
Stock No. 70.204-H.....\$3.00 Postpaid

## D-STIX CONSTRUCTION KITS for Science Fans, Hobbyists

Visualize your ideas. Crystallize your plans. Unique new D-STIX are ideal for "3-dimensional thinking." Colored wood sticks 1/8" thick and "easy-on" rubber joints approx. 3/16" diam. fit together fast—help you work out molecular structures, geometric figures, structural members, shapes, models of all kinds. Ideal for interesting children in developing shapes, structures. Durable kits. Money-back guarantee.  
Stock No. 70.209-H (230 pcs).....\$3.00 ppd.  
Stock No. 70.210-H (370 pcs).....\$5.00 ppd.  
Stock No. 70.211-H (452 pcs).....\$7.00 ppd.



# FREE CATALOG-H

128 Pages! Over 1000 Bargains!  
Yours for the asking

America's No. 1 source of supply for experimenters, hobbyists. Complete line of Astronomical Telescope parts and assembled Telescope. Also huge selection of lenses, prisms, war surplus optical instruments, parts and accessories. Telescopes, microscopes, satellite scopes, binoculars, infrared sniperscopes, math, learning and teaching aids.  
REQUEST CATALOG-H



ORDER BY STOCK NUMBER . SEND CHECK OR MONEY ORDER . SATISFACTION GUARANTEED!

**EDMUND SCIENTIFIC CO., BARRINGTON, NEW JERSEY**

WORLD'S  
BEST  
WANT-AD  
MEDIUM

# CLASSIFIED ADVERTISEMENTS



Advertisements in this section \$1.30 per word, each insertion, minimum 10 words, payable in advance.

To be inserted under proper classification, copy must be in our office the

20th of the second month preceding date of issue

F. W. Johnson, Manager, Classified Advertising

Popular Mechanics Magazine, 200 East Ontario Street, Chicago 11, Illinois

## YOU'LL PROFIT

By reading and answering the classified ads in this section. Hundreds of opportunities for you to make and save money

### AUTOMOBILES, MIDGET CARS

**BOYS** Power driven auto, two passenger. Plans, pricelist of parts 35¢. B. Sypher Co., Station P, Toledo, Ohio.

**CATALOG** On parts kits for golf buggy or Jr. sports car. 25¢. Indus Corporation, 1815 Madison, Indianapolis.

**ELECTRIC** Car plans \$1.00. Magnuson Co., Box 15003, San Diego 15, Calif.

**CHILDREN** 3 To 12 years, midget auto. Wood frame, forward-reverse. Build with or without kit. Plans, full size patterns, parts list, \$2.00 refundable. Gilliom Power Tools, St. Charles, Missouri.

**METROPOLITAN** Owner's handbook, new, 320 pages \$3.00. Volkswagen handbook \$2.00. Souping the Volkswagen for more power, speed. Renault owner's handbook \$3.00. 1959 Indianapolis Race Yearbook \$2.00. Catalog 200 automobile books free. Clymer, Los Angeles 6, Calif.

**HOTTSPARK:** Starting; pep; mileage; varitypers; mimeographs; multiliths. E. G., Elmsford, N. Y.

**NON-PROFIT** Organization offers automobile literature — old, modern and foreign; dealer books, service manuals, glossy photographs; free motor magazines. Write immediately; get on free mailing list. Auto Maniacs, Stockbridge, Mich.

### AUTO SUPPLIES AND EQUIPMENT

**IDLETACH**—New tachometer for setting idling speed of automobiles. One unit for 6 or 12 volt and 6 or 8 cylinder. Delivered \$9.95. Bob Salisbury, Box 17, Grossmont, Calif.

**NEW** Gasoline additive gives more power, quicker starting. Formula, directions. \$3.00. G. Gale, RD#1, Lakewood, N. J.

**PARTS,** Model "A." List 25¢ (refundable). Matco, Box 135, San Pedro, Calif.

**GIANT** Auto parts catalog. Thousands special accessories, speed, power, performance. Mileage, custom equipment. Send 25¢ (refundable). Newhouse Automotive Industries, 5805-PM1 Beverly, Los Angeles 22, Calif.

**WATER** Injection in carburetor gives smoother higher power. Complete details \$2.95. Carpenter, Dunwoody, Ga.

**CUSTOM** Speed equipment and engines. Illustrated catalog 50¢. Ledbetter Enterprises, 1015 17th, Texarkana 4, Texas.

**FOREIGN** Speedometer Service, 1707 W. Clarendon Avenue, Phoenix, Arizona.

**VOLKSWAGEN,** Porsche. Fine mechanical accessories. State model. Lane Engineering, 70 King's Hwy., North, Darien, Conn.

**NEW** Anti-Glare shield stops annoying glare from rear view mirrors. Greatest aid to night driving safety. Attach in seconds—no tools flips down for night, up for day. Only 75¢ postpaid. Molang Enterprises, Box 542, New Bedford, Mass.

**BUY Wholesale**—automobile accessories. Also merchandise. Catalog 25¢. Worldwide, New York City 60.

**FIBERGLASS** Sportscar bodies \$195. Also Sprite hardtops, and competition bucket seats. Catalog 25¢. Carter Engineering, 440 N. Wilder St., St. Paul, Minn.

**AUTO** Shop welding repair training in world's largest non-profit welding school. Low tuition. Free booklet. Hobart Welders, Box M-101, Troy, Ohio.

**JUST** Out: New 1960 catalog (365 completely illustrated pages) containing largest, most complete line of auto accessories and parts in the world. Save up to 50% on over 100,000 items, including Hollywood accessories, custom styling and hi-speed equipment, parts and accessories for all cars, trucks, foreign and sports cars, from 1920 to 1960 models. Write for this bargain-packed book today. Send 25¢ (refundable). J. C. Whitney, 1919PM-1 Archer, Chicago 16, Ill.

**EMERGENCY** Auto "Saf-T-Lite." Flashing red warning signals for roadside emergencies. Plastic. Uses 2 flashlight batteries. Plasticover, 72 Commerce St., Brooklyn 31, N. Y.

**MOTORISTS** Save gasoline vacuumating overrich mixtures. For free particulars, how to get one for your car for introducing write, Vacuumatic, Dept. 877, Wauwatosa, Wis. Salesmen wanted.

**TUNE-UP** Tips. Over fifty helpful hints. \$1.00 postpaid. Modern Automotive School, 323 W. Florence, Los Angeles 3, Calif.

**RING-Valve** job while driving. \$3.98. Unconditionally guaranteed. Mota-Nu-Box 8236, Fort Worth, Texas.

**RING-Valve** job while driving. \$6.00 postpaid. (9th successful year.) Guaranteed! Yellow Cab test-proven. Motaloy, Grantham, Penna.

**ELECTRIC** Fuel pumps. New six or twelve volts. Guaranteed. Only \$13.95 tax and postage paid. Sunshine Auto Parts, P.O. Box 4754 Fairview Park, Ohio.

**SAVE** Money on Jeep and army truck parts. Large inventory. Catalogs for Jeep or G.M.C. owners only. American Auto Parts Co., 1830 Locust, Kansas City, Mo.

**SIRENS,** Air-horns, lights! Catalog 10¢. McCanna Company, Tarrytown, N. Y.

**MAKE** Old cars run like new. Inexpensive. Free details. Newco, Box 164-B, Hunlock Creek, Penna.

**NEW** And used parts at savings. Complete guaranteed parts service for all models cars and trucks, 1924 and later. Largest in the West. Jeep and army parts specialists. Newest type shifting hubs for all Jeep and all military and latest production front end drive vehicles. \$27.50 and up. Write. Pioneer Auto and Truck Parts Co., 734 W. 13th Avenue, Denver 17, Colo.

**FREE!** New catalog. Speed, power, mileage increasing equipment. Discounts! Almqvist Engineering, Milford PM5, Penna.

### AUTO TRAILERS

**PICKUP** Coach kits. Blueprints. Literature 10¢. Comstock Trailers, Parsons, Kansas.

**TRAILER** Building guide, supply catalog, long floor plan, \$2.00. Booklet illustrating 5 models 50¢. Kamcraft, Box 1153, Milwaukee 1, Wis.

**BUILD** Expanding eight foot trailer. Accommodates five. Literature 10¢. Framar Company, Wilmington, Mass.

### MOTORCYCLES, BICYCLES, MOTORSCOOTERS AND SUPPLIES

**HARLEY-Davidsons** — Used bargains. New, used parts, accessories, all models. Bulletin 25¢. Knuth's (Factory Dealer), 1753 Muskego, Milwaukee, Wis.

**MOTORCYCLE** Parts. New, used. List 25¢. Ballak, 811 N. 9th, St. Louis 1, Mo.

**RECONDITIONED** Motorcycle motors. Chrome accessories. Complete stock Indian parts. Expert rebuilding. Fast service. Indian Motorcycle Sales, Kansas City 27, Missouri.

**BUILD** Friction motor bike \$10.00 up. Plans \$1.00. Jenks Rides, Audubon, Iowa.

**GOOD** Doodlebug motorscooter \$35. Moped \$75. Gasoline buggy \$60. Boys midget car \$35. Briggs engine \$5. Whizzer \$10. (Mailorder only). Send 25¢ (35¢ for first class mailing) for Directory-Catalogue Number 93, listing these and hundreds of other bargains, homebuilders parts, plans, etc. Midget Motors Directory, Athens, Ohio.

**NEWEST** Imported motorbikes \$199.50. Motorscooters from \$285.50. Motorcycles \$375 up. 1960 catalog 25¢. Motorcycle Import Corp., 505-A Fifth Ave., New York 17.

### AVIATION

**PROPULSION** Package — \$2.00. Five papers including information how to build man carrying helicopter jet engine. G&P Research Lab., Box 674, Bristol, Tenn.

**JIMMIE** Mattern navigational computer catalog. 10¢. Carlson, Box 5536, Oklahoma City 10, Oklahoma.

**BLUEPRINTS,** Lightplanes, gliders, motors, etc. Illustrated circulars 50¢. Sportplane building manual \$1.50. Kamcraft, Box 1153, Milwaukee 1, Wisconsin.

**HELICOPTER** — Completely engineered. You build from our drawings. Parts available. Send \$2.00 for photo, 3 view drawing, specifications and design information. Helicopter Research Co., Box 121, La Mirada, California.

**ANTI-GRAVITY** Engine. Completely designed. Diagrams, details, physics, plus "Man in Flight." Send \$2.00 today. Knowledge, 2900—9th Street, Rock Island, Illinois.

**CAPTIVE Helicopter, VTOL trainer** uses 12 to 70 HP engines. Payloads 50 to 500 pounds. Complete plans, design parameters, photographically illustrated instructions. \$3.00. Flight Dynamics, Box 5443, Raleigh, N. C.

**AVIATION Surplus bargain catalogue.** One dime. Box 22PM, Thomasville, Penna.

**BUILDING Your own high performance sport plane** is easy with our new simplified blueprints and detailed instructions. No experience required. Four economical models, one, two passenger, aerobatics. For complete details, brochures, photographs, 3-views, F.A.A. regulations on homebuilt airplanes, mail \$1.00 (postal, packaging expense) to Stits Aircraft, Box 3084M, Riverside, California.

**PROPELLERS.** Plans, supplies for airboats and snowplanes. Latest designs, prompt delivery. Catalog 25¢. Banks-Maxwell, Box 3301E, Ft. Worth 5, Texas.

**BUY Gov't surplus:** Aircrafts; engines; helicopters; boats; Jeeps; misc. Buy direct now from gov't. Send for "Depot Directory & Procedure" \$1.00. Gov't Surplus Sales, Box 425-PM, Nanuet, New York.

**RAMJET Helicopter.** Build inexpensively. Plans only \$1.00. Wooster Engineering, Box 259-R, Wooster, Ohio.

**HOMEBUILT Helicopter handbook** \$1.00. Directory \$1.00. Urshanair, 4332 N.P. Station, San Diego 4, California.

**OUTERSPACE Ship X-15.** Get genuine glossy 3 1/2 x 5 photo of N. American's newest aircraft plus catalog with thousands of latest jets, missiles, and historical planes. Send 25¢ to U. S. Sea & Air Photos, Box 75084X, Los Angeles 5, California.

#### BATTERIES, GENERATORS

**BATTERY Repair manual** \$3.00. Satisfaction guaranteed. Bayer Publications, 938E Betty Avenue, Neenah, Wisconsin.

#### ELECTRICAL SUPPLIES

**APPLIANCE Parts wholesale.** Catalogue 25¢. Seco, 26 South 20th Street, Birmingham 3, Alabama.

**6 AND 12 Volt car heater elements,** 31" tubular copper. Has a thousand uses. Makes ideal rear window defroster, foot-warmer, keeps food warm, heats baby foods, etc. Mail check or M.O. \$2.75 (post free) to actual manufacturers: Canadian Electric Heating Elements, 17, Taunton Road, Toronto 7.

**BOOK 200 Electric stunts** \$1.00. Kuttington, 875 Arastradero, Palo Alto, Calif.

**LAMPS—Parts catalog** containing wiring instructions, 25¢. Gyro Lamps, 5208P N.W. 35th Ave., Miami 42, Fla.

**ELECTRO-SCRIBE!** Engraves all metals, \$2.00. Beyer Mfg., 10511-H Springfield, Chicago 43.

**LAMP.** Electrical parts, wholesale. Thousands of items for repairing, converting. Catalog 25¢. Brown Lamp, Box 305, Clayton 5, Mo.

#### WELDING, SOLDERING, PLATING

**WELDERS,** 110/220, \$39.50. Morris, 1070 Inner Drive, Schenectady 3, New York.

**PLATING Equipment, supplies.** Complete line of anodes, solutions. Home workshops, industrial sizes. Hollywood Bronze Supply, Dept. C, 1624 East First, Los Angeles 33, California.

**ACETYLENE Welding outfit,** new, \$64.50. Arcwelders, \$56.50. Eagle Welding, Dept. PM, 5085 Broadway, Chicago 40, Ill.

**FREE Catalog, welders, welder kits.** Build 350-ampere welder using aircraft generator, plans 25¢. Agents wanted, Dunbar Manufacturing, Minneapolis 8, Minn.

**LOWEST Price ever.** Weller soldering gun. Retail \$14.95. Year guarantee. \$6.95. Devanney, 601 North Wayne, Angola, Ind.

#### MACHINERY, TOOLS, SUPPLIES

**TOOLMAKERS, Machinists.** Magnetic layout punch insures accuracy within ±.001. \$3.85. Magnetic Punch Co., 95 Fortfield Ave., Yonkers, N. Y.

**MAGNETIC Nail holder.** Holds brad or nail for first hammer blows. Housewife needs one too. \$1.00 to George W. Fitch, 4415 Edgebrook Road, Wheaton, Maryland.

#### SURVEYING INSTRUMENTS

**NEW And guaranteed factory rebuilt transits and levels,** sale or rent, with purchase option. We will repair, trade or buy old instruments. Write for list M-93. Warren-Knight Co. (Manufacturers of Surveying Instruments), 136 N. 12th St., Philadelphia 7, Penna.

#### ENGINES, MOTORS, DYNAMOS

**DIESEL Injector parts and fuel pumps** wanted. GM51-53-71-110. Bares, 7120 Carnegie, Cleveland 3, Ohio.

**WINDING Data,** 275 motors, single and three phase \$1.10. Data Company, 512 Kensington, Kansas City 24, Mo.

**REWIND Motors yourself.** Complete instructions \$1.00. Lewis Mfg., Howell, Michigan.

**AUTOMOBILE Engine, etc.** Unusual steam combination. Details \$1.00. Steam Workshop, Box 71E, West Chester, Penna.

**REWIND Motors yourself.** Simplified instructions and parts catalog \$1.00. Modern, Box 8715, Kansas City 14, Mo.

#### BOATS, OUTBOARD MOTORS

**BOAT Plans—Full size patterns,** frame kits. Modern inboards and outboards for amateur builders. Complete new catalog 50¢ or specify requirements. Glen Designs, 9152 Rosecrans, Bellflower, California.

**FULL Size, cut-to-shape boat patterns,** blueprints, 7 1/2-38 feet. Big new 88 pg. illustrated "Build a Boat" catalog of naval architect-designed cruisers, runabouts, skiffs, outboard boats, sailing, racing, houseboats, 50¢. "How to Build a Boat" booklet, \$2.50. Hardware and Equipment Catalog, \$2.00. Cleveland Boat Blueprint Co., Dept. A-66, Box 1651, Cleveland, Ohio.

**MARINE Conversions.** Ford, Chevrolet, Jeep engines. Catalog 25¢. Lehman Manufacturing Company, 800 Elizabeth Avenue, Linden 4, N. J.

**PROPELLERS, Plans, supplies** for airboats, snowplanes. Catalog 25¢. Banks-Maxwell, Box 3301F, Ft. Worth 5, Texas.

**NEW, Used, rebuilt marine motors.** Marine conversions, fittings. Free catalog. Stokes Marine Supply, Dept. 24, Coldwater, Michigan.

**SAVE Money.** New, used outboard motor parts. Send wants. Stamp appreciated. Outboard Motor Mart, 229-M State, Boston 9, Mass.

**I Want to send you proof of the wonderful pulling power of Popular Mechanics classified pages.** What's your proposition? Write me today. Include literature if possible. F. W. Johnson, Manager Classified Advertising, Popular Mechanics Magazine, 200 E. Ontario St., Chicago 11, Ill.

**WATER Proof, cast aluminum tail light** with stop and directional control wiring. \$5.45 factory c.o.d. P.O. Box 555, Hawthorne, California.

**PRIVATE Boat operators.** Get your boat for hire license. Course gets you through examination. Boat Operators School, Box 2601-G, San Francisco 26, California.

**SAILS, Sailboat equipment,** boatbuilders supplies, canvas. Catalogue. Alan-Clarke, 75 Chambers, New York, N. Y.

**FORDS And Jeeps 100% marine engines** with famous Convo-Kits. Deluxe catalogue 25¢ coin. Osmotors, 3627B Lawrence, Philadelphia 40, Penna.

**300 BOAT Plans, patterns,** catalog, 50¢. Trailers, kits, parts! Marinecraft, Box 161-M, Brighton, Mass.

#### ATHLETIC EQUIPMENT, BODY BUILDING COURSES

**FREE Muscle building information.** Body-Tone, Box 638B, North Miami, Florida.

**SLOWING Down? Legs and feet muscles ache and cramp? Poor circulation and numbness? Active men know you are only as young as you feet and legs.** If your answer to any one of these questions is yes, try the amazing Perrin Method. It activates, stimulates and intensifies circulation and energizes the nervous force. Perrin Method is a basic and organic force—a positive force. Deterioration of vigor leads to stagnation, resulting in incidence of painful and crippling disease. The Perrin Method is a progressive force, creating new cell activity thru acceleration and energizing nervous force and circulation. Contributing factors to the slowing down process such as weak kidneys, bladder irregularity and subnormal prostate glands can be brought to a higher degree of functioning. Perrin Method will enable you to control your energies and make them yield the desired result. Why lead an inferior existence? One fundamental requisite to good health is vital and vigorous nervous force. A dormant nervous force leads to premature age, frustration and despair. Perrin Method intensifies and elevates this force to the highest pinnacle. There is no expensive equipment or repeated cost connected with the Perrin Method. Write today for information. Ornin Company, 1434-17th Street, Des Moines, Iowa.

#### SPORTING GOODS, GUNS, FISHING TACKLE, ARCHERY, TRAPPING

**FREE Catalog** America's first and finest guaranteed waterproof Sta-Dri Sportsman boots. The Sport Mart, Inc., Box 8047, Dallas 5, Texas.

**GUNS, Swords, knives, daggers, flasks.** Large list 25¢ coin. Ed Howe, Coopers Mills 52, Maine.

**JAP Rifle altering to 30-06,** \$6.00. Japshells, \$3.95. Catalog 10¢. T. P. Shop, West Branch 11, Mich.

**10,000 Guns, Antiques, moderns, swords, armour.** Every description. Giant catalog \$1.00. Agramonte's, Yonkers 2 C, N. Y.

**MOLDS—For casting your own fishing sinkers.** Free illustrated booklet. Reading Instrument Co., Box PM78, Reading, Penna.

**CROSSBOWS! Hunting—Bows! Factory prices!** Jayco, Box 1355, Wichita, Kansas.

**BIG Money raising crickets and 12 inch African fishworms.** Free literature. Carter Ranch, Plains, Georgia.

**FREE—Wholesale catalog.** Beads, Spinners, Lure parts, Sinker molds, Jigs, Reels, Finny sports (ME), Toledo 6, Ohio.

**AMAZING Wholesale sporting catalog.** Save 70%. Tremendous selections. Econ-O-Mart, Whippany 2, New Jersey.

**KILL Submersed water weeds** which foul up motor propellers, tangle fishing gear, with R-H Weed Rhap-20. Granular 2,4-D. Inexpensive, easy to use, sure results. For free information write Reason-Hill Corporation, Box 36PM, Jacksonville, Arkansas.

**KNIVES, Imported.** Worldwide selection of rare daggers, gurrhas, stiletos, bowies, hunting, throwing knives. Terrific values. Free catalog. Clinton, Mt. Clemens 34, Michigan.

**MINNOW Graders.** Free circular. Crescent Mfg., Box 3303, Ft. Worth, Texas.

**SAVE! Gun & Tackle 100 page discount catalog.** Unusual and famous brands. Send 25¢ to Klein's, Chicago 24.

**FISHERMAN Catch up to 1,000 night-crawlers in the daytime.** Guaranteed. No digging. No electricity. Harmless, fast, easy. And lots of fun to see them come out. Super "Wormout" kit \$5.00 ppd. Bishop's, 29 Main Street, Bangor, Maine.

**WATERPROOF Triple thick polyethylene bags.** Keep food, clothes, sleeping bag dry—carry home fish, game. 13" x 13" x 36". 2 for \$1. Trader Jim, 6715-A E. 25th, Tulsa, Okla.

**FISHERMEN! Lurezem bait oil** doubles your catch. Guaranteed \$2. Details free. McGregor Sportsman, McGregor 1, Texas.

**CAMPERS, 5¢ brings valuable camping information.** Camper, Box 294, Weatt, California.

**85% SAVINGS** On lures and equipment. Free details. Postal Sales, Div. FI, 11139 McCormick, North Hollywood, California.

**5000 GUNS, Swords, war relics.** Catalog 50¢. Smith Firearms, Runnemed, N. J.

**MANUFACTURER'S** Year end close out. Quality spinning lures. List \$2.50 for 4—while they last \$1.00 post paid. Box 74, W. Barnstable, Mass.

**HOW** To catch fish with smell. Secret formulas, new recipes, \$1.00. Johnson's, 312-M Lake Avenue, Ithaca, New York.

**ARCHERY** Equipment—Supplies catalog 25¢. Jones, Box 343, Mineola, New York.

**FISHING** Supplies wholesale. Shake-speare rods and reels. Write for prices on your needs. Tackle, Box 24, Hutchinson, Kansas.

**HUNTERS, Shooters, collectors!**—Free brochure on guns, pistols, ammunition, accessories, edged weapons, etc. Send large self-addressed stamped envelope to: Martin B. Retting, Inc., Culver City R, Calif.

#### **EARTHWORMS, CRICKETS, FROGS**

**FREE** Picture folder, "How to Make \$3,000 Yearly, Sparetime, Backyard, Raising Earthworms!" Oakhaven-56, Cedar Hill, Texas.

**BIG** Money raising fishworms and crickets. We teach you how to raise and where to sell. Free literature. Medium redworms, 3000, \$5.95; 10,000, \$16.95. Carter Redworms, Plains, Georgia.

**\$200.00 WEEKLY** Possible, raising earthworms, basement, backyard, garage. Illustrated booklet \$2.00 explaining raising, feeding, marketing. Gay Worm Ranch, Box 13072, Dallas 20, Texas.

**WANTED.** Men, women worm raisers. Sherwood, Dept. T-2A, Monmouth, Maine.

**\$1,000 MONTHLY** Possible, raising earthworms, African giants! Backyard, garage, basement. Complete illustrated booklet, explains raising, feeding, packing, marketing. Send 25¢! Ozark Worm Farm-J, Willow Springs, Missouri.

**RAISE** Fishworms and rabbits on \$500 month plan. Free details. White's Rabbitry, Mt. Vernon, Ohio.

#### **BINOCULARS, TELESCOPES, MICROSCOPES, MAGNIFIERS**

**BUILD** Your own reflector, telescopes. Complete kits: mirrors, eyepieces, tripods, all other accessories. Request free illustrated literature. Criterion Manufacturing, Dept. DPM-60, Hartford, Conn.

**REFLECTOR** Telescope kits direct from factory. From \$7.75. Other optical do-it-yourself kits. Free booklet. Hampton, P.O. Box 772, Sparta, N. J.

**SPECIAL** Winter sale, amazing prices precision binoculars. Folder "Binocular Selecting," catalog free. Prentiss Importers, Mercury Bldg., West Los Angeles 25, Calif.

**BINOCULARS,** Telescopes, microscopes. Terrific values \$3.98 up. Request free money-saving catalog. Criterion, Dept. P-86, Hartford, Conn.

**TELESCOPES,** Binoculars, microscopes—all sizes. Complete telescope makers supplies. Free catalog. Suffolk Science, Mattituck, New York.

**TELESCOPES-Reflector,** reflector, kits and accessories. Free illustrated booklet. Dell Optics Co., Limited, Dept. PM, 327 55th Street, West New York, New Jersey.

**DYNASCOPE**—Amazing world-famous reflector telescope. Request free brochure. Criterion, Dept. DP-63, Hartford, Conn.

**REFLECTING** Telescope, 60X, completely assembled. Guaranteed observatory clearness. Free information. Skyscope, P.O. Box 55, Brooklyn 28, N. Y.

**WAR** Surplus bargains: millions of lenses, instruments, telescopes, binoculars, components and complete line of astronomical telescope items. World's greatest optical market-place! Send only \$1.00 for beginner's 10-lens kit and big instruction booklet stock 2-CH. Write for catalog CH. Free! Edmund Scientific Co., Barrington, New Jersey.

**TELESCOPES,** Mirrors, binoculars, microscopes, accessories. Free catalog. National Optical Company, 505 New York Avenue, Union City, New Jersey.

#### **PLANTS, SEEDS, BULBS, NURSERY AND GARDEN SUPPLIES**

**GROW** Dwarf trees! Instructions and seeds 35¢. Mail Order Specialties, 1439-D Sabraton Avenue, Morgantown, W. Va.

**WORLD'S** Greatest cash crop. Free information. Write Ginseng Gardens, Asheville, N. C.

#### **PETS—DOGS, BIRDS, RABBITS, HAMSTERS, ETC.**

**HAMSTER'S** Golden \$2.75 pair. Albino's whitebands creams. Free literature. Edgewater Hamstery, 106 Carter, Goshen, Ind.

**WILD** Animal pets—mammals, birds, reptiles. Catalog 10¢. Ray Singleton, Interbay Postoffice, Tampa, Florida.

**RAISE** Rabbits on \$500 month plan. Free details. White's Rabbitry, Mt. Vernon, Ohio.

**FROGS,** Wild jumbo proven best for breeders large supply. Oso Pier, 6124 Ocean Dr., Corpus Christi, Tex.

**RAISE** Rabbits. Most profitable way! Particulars free. Grinsteeds, Edwardsville, Illinois.

**EARN \$10,000** Yearly raising Angora rabbit wool for us. Information 25¢ coin. American Angora Company, Malta 12, Montana.

**GOLDEN** Hamsters—Pedigreed breeders \$3.85 pair. Albinos Whitebands. Literature. Moore's Hamster Ranch, Shepherdstown 25, West Virginia.

**MAKE** Money raising chinchillas, mink, rabbits, cavies for us. Free catalog. Keeney Brothers, New Freedom 2, Penna.

**STRAIGHT** Cooners! World's oldest kennel. Combination hounds, rabbit, fox, beagles, deerhounds, bird dogs. Puppies of all breeds. Prices reasonable. Trial. Free catalogue. Raccoon Mountain Kennels, Box 464, Boaz, Alabama.

**RAISE** Rabbits successfully by knowing facts. 48 page illustrated book describing 25 breeds. Housing, feeding, breeding, marketing, etc. Plus bulletin. 25 cents. American Rabbit Association, 36 Arba Building, Pittsburgh, Penna.

**HAMSTERS**—Ideal pets, \$2.95 pair. Free booklet. Jer-fre's Hamstery, 1447 Apple, Muskegon 13, Michigan.

**SKUNKS,** Reptiles, hawks, raccoons. Illustrated catalogue, 25¢. Trails End Co., St. Stephen, S. C.

**RAISE** Rabbits, make money. Information and prices sent free. Write: Johnson, 683, Kansas City, Missouri.

#### **FUR BEARING ANIMALS**

**MINK** Raising information free. Complete. Lake Superior Mink Farm, Superior, EE1, Wisconsin.

#### **FARMS, FARM LANDS, REAL ESTATE**

**FLORIDA** Homesites \$10 down, \$10 monthly buys your homesite in Central Florida's finest retirement and vacation community in the high ridge section near Sebring. On 84 square mile Highlands Lake. Free community parks and beaches. Get free color brochures, house plans; Learn how we help you plan, finance, build your low-cost, tax-exempt home. Write Florida Realty Bureau, Inc., Dept. E2M1, Lake Placid, Florida (AD58101).

**FLORIDA** Acres sale. Celebrating 50th year in homesite development business. Our sweeping price reductions on all properties will surely please you. Write today for full information, free! Wendell Wood, Fountain, Florida.

**FLORIDA**—Silver Springs, Ocala, Belleview improved homesites over 1/4 acre ready to build on. Large lake, park, beach, boat facilities on property. \$795.00, \$10.00 month. Write Box 568-I, Belleview, Florida.

**CENTRAL** Florida developments. Trailer homesites; also lakefront and highway lots; acreage. No interest. From \$295.00. Terms. Victor Roepke, DeLand, Fla.

**OPPORTUNITIES!** Government land. U. S., Alaska, Canada. Sledge Surveys, Macon, Mississippi.

**MR. Property Owner**—Want a map of your property? Write Deed-Ettes, Mt. Pocono, Penna.

**FREE** Strout catalog! Farms, homes, businesses, resorts, retirement properties. Over 3000 values in 36 states. 58 years' service. World's largest! Write Strout Realty, 7-MP S. Dearborn, Chicago 3, Ill.

**CANADIAN** Vacation lands: Full price \$285.00, for 40 acres, \$10.00 month. Suitable cottage sites, hunting, fishing camps. Free information. Land Sales Corporation, 130C Shaftesbury, Downsview, Ontario, Canada.

**FLORIDA.** Nice homesites. \$345 at \$10 monthly. Folder free. Howard Vernon, D-Land, Florida.

**OKARKS!** America's best place. Ten lovely timbered acres \$195. \$5.00 monthly. Descriptions mailed free. Write: Armstrongs, Shook, Missouri.

**HISTORIC** Country showplace. Unique 452-acre stock farm in same family since original establishment over century ago! Golden opportunity for some lucky person to develop picturesque modern-day farm and valuable country estate, only \$16,000 gets it! Nestled in scenic valley of beautiful southwestern Missouri. Mammoth cold-water spring, sparkling spring-fed brook winds its way through the pasture, 140 acres tillable, 312 wooded. Stately 8-room 5-bedroom home, 1,800 sq. ft. floor space, 70-ft. porch, fireplace, electricity, old-fashioned staircase, commanding views, majestic shade, old-time supply house near kitchen door designed for year-round food preservation, 60-ft. barn. Aged disabled owner's colorful, interesting, and valuable bargain, only \$16,000! Free winter catalog, bargains coast to coast! United Farm Agency, 2825-PM Main St., Kansas City 41, Mo.

**BUYING** Real estate? Know correct mortgage payments. Handy 160 page book shows monthly payments necessary to pay off mortgage. All interest rates from 3% to 7% including intervening fractions. Used by bankers, brokers, appraisers. Now available to public. Send \$1.00 to D. Behrend, Box 8124, Pittsburgh 17, Penna.

**CANADIAN** Tax sale lands, average price five dollars an acre. Small monthly payments. Farms, timber, hunting and fishing camps, minerals. Limited number of properties. Write at once for free catalogue. Tax Sale Service, Room 105, 120 Bloor Street, West, Toronto 5, Canada.

**\$5.00 MONTHLY** Buys 5 acres. Excellent fishing, near town, electricity. Price \$125.00. Free list. Box 425-P, Carthage, Missouri.

**FLORIDA** Homesites in the booming Tampa Bay area are available now at Willow Shores for the low, introductory price of only \$895. These are large 80x100' plots only 21 miles south of Tampa on Route 301, near schools, churches and shopping. Enjoy boating, swimming, and fishing all year long. Only \$10 down and \$20 per month buys your Florida homesite. Beautiful 1/4-acre (or larger) waterfront lots on the Little Manatee River are only \$25 down and \$50 per month, full price \$2295. Send \$10 down payment to reserve your Florida homesite now (down payment refundable within 45 days for any reason) and Willow Shores will send you your contract, plat showing location reserved for you, and colorful descriptive literature. Send \$10 to: Gulf Coast Land and Title Company, Developers: Dept. PM: 632 South Tamiami Trail; Sarasota, Fla.

#### **FARM MACHINERY AND SUPPLIES**

**GARDEN** Tractor—Nationally known—now sold at discount. Eliminates all hand hoeing, also tills. Nothing like it. Patent 2742840. Discount catalogue free. Autohoe, DePere 68, Wis.

**SEEDERS!** For farm PTO tractors, \$35.00. Literature? Sewell Machine Works, Versailles, Ky.

#### **PROFITABLE OCCUPATIONS**

**MAKE** Money making new greaseless doughnuts in kitchen. Sell stores. Free recipes. Michael, 3605 South 15th, Minneapolis 7, Minnesota.

**BECOME** Independent with your own franchise business. Thousands earning handsome incomes. Request interesting facts today. National Franchise Reports, PM-528, 333 North Michigan, Chicago 1.

**BIG** Money raising fishworms and crickets. Free literature. Carter Wormery, Plains, Georgia.

**AUCTIONEERING**—Home study course. Diploma granted. Auction School, Ft. Smith, Ark.

**RAISE** Pheasants on \$100 week plan. Little capital and space can make you independent. Free details. Great Central System, Columbus 1, Kansas.

**VENDING** Machines. No selling. Operate a route of coin machines and earn amazing profits. 32-page catalogue free. Parkway Machine Corporation, Dept. #25, 715 Ensor Street, Baltimore 2, Maryland.

**GROW** Mushrooms. Cellar, shed and outdoors. Spare, full time, year round. We pay \$4.50 lb. dried. We have 29,000 customers. Free book. Mushrooms, Dept. 99, 2954 Admiral Way, Seattle, Wash.

**\$200 WEEKLY** Extra introducing buyers to sellers, weekends. Men, women enjoy learning real estate by listening to records. First lecture free. Lee Institute, Brookline, Mass.

**MAILORDER** Beginner's literature. Write Carnahan Bros., 9610 Acacia, Fontana, Calif.

**BUY Wholesale:** 100,000 nationally advertised products. Appliances, cameras, sporting goods, housewares, watches, typewriters, tools, clothing, etc. Discounts to 60%. Buy-Rite, Box 258, Hawthorne 1, New Jersey.

**INVESTIGATE** Accidents—Earn \$750 to \$1,000 monthly. Thousands of insurance companies, airlines, steamship lines urgently need Accident Investigators. Make excellent full time or spare time income. Free book! No obligation. GI approved. Write: Universal Schools, CT-1, Box 8227, Dallas 5, Texas.

**MAGAZINE** Subscriptions. Highest commissions. Bonus. Qualified Agencies, 451GA Kingston, Brooklyn 25, N. Y.

**FREE** Book "990 Successful, Little-Known Businesses." Work home! Plymouth-7R, Brooklyn 4, New York.

**JOIN** The Camera Profit Club! Use any camera, make money spare, full time; experience not required. CPC, Box 1066A, Richmond, Calif.

**EARN** \$240.00 A month at home, spare time doing only two \$5.00 invisible mending jobs a day. Big money paid for service that makes cuts, tears disappear from fabrics. Steady demand. Details free. Fabricon, 6236 Broadway, Chicago 40, Ill.

**MAKE** Flexible molds. Cast plaques, figurines. Free sample. Tooker, 1045-M Fairview, Hamilton, Ohio.

**START** A magazine subscription business. Earn generous commissions on Popular Mechanics, Good Housekeeping and all others. Best commissions, bonus, all materials sent free. No experience needed. Write Popular Mechanics, Room 1-P, 250 West 55th St., New York 19, N. Y.

**REPAIR** Hydraulic jacks. Earn high wages. Free literature. Hydraulic Parts Supply, Box 4104, El Paso, Texas.

**REWIND** Repair motors. Easy. Profitable. Free details. Lincoln, Box R52, Hempstead, N. Y.

**SHARPEN** Scissors, pinkers. Inexpensive outfit. Clipper sharpening. Blackhaws, Sheldahl, Iowa.

**PIANO** Tuning learned at home. Musical knowledge unnecessary. Free booklet. American School Piano Tuning, Box 707, Gilroy, California.

**NEW** Soilless method raising night-crawlers, redworms. Three Oaks Ranch, Dresden, Tenn.

### BOOKS, PERIODICALS, PICTURES, POSTCARDS

**OUT-Of-print** books at lowest prices! You name it, we find it! Fast service. No obligation. International Bookfinders, Box 3003-PM, Beverly Hills, Calif.

"125 WAYS to Make Money with Your Typewriter." Proven methods. Clothbound. \$2.00. Returnable. Richards Press, Adelphi, Maryland.

"ASK And you shall receive." "Seek and you shall find." "A candle to light your way." This book tells you how. Only \$1.10 post paid. Gilbert Simmons, 596 Wrights Ave., Conneaut, Ohio.

100,000 10¢-BOOKS! Sensational subjects! Thousands titles! Three catalogs, (books-bargains), 25¢, refundable. Particulars free! Bargains, 1323-MB Chaparral, Corpus Christi, Texas.

**TRADE**, Buy, sell, rent new and used books, magazines, courses, etc., in new "Book Trader's Magazine" 15¢. Two issues 25¢. Pioneer Periodicals, 6376-PM Windsor Lane, San Jose 29, California.

**BRITISH** Book bargains—Any subject. Catalogues free. Transatbooks, Wantagh, N. Y.

**FREE** Catalog. Self-help books. Write: Wilshire, 8721 Sunset, Los Angeles 46P.

**BOOKFINDERS!** All subjects. Send wants! Jaher Book Service, 183 Hazelwood Drive, Westbury, N. Y.

"SCIENCE Milestones." Records march of science starting 400 years before Christ, right up to date. Amazing facts revealed. 312 pages packed with startling information that will thrill you. A real history of science. \$5.00. Literature free. Popular Mechanics Press, 200-SM East Ontario St., Chicago 11, Ill.

**EXCITING** Catalog packed with books covering most everything. Think of it—From cover to cover you will find described and illustrated hundreds of books telling how to fix and how to build almost anything. How to remodel your home; do your own decorating, plumbing, electrical work, carpentry, painting, furniture making and refinishing. How to build your own home workshop tools. Best books on welding, hobbies, homecraft. Send now for 1958 book catalog—only 10¢. Popular Mechanics Press, 200-BC E. Ontario St., Chicago 11, Ill.

**SCIENCE-Fiction** book bargains. List 10¢. Werewolf Bookshop, Verona, Penna.

**SPARETIME** Repeat profits taking magazine subscriptions. Special offers. Cassell Agency, Boynton Beach, Florida.

**SELF-HELP** Books all subjects. Free catalog. Box 102-A, Providence, R. I.

**SPORTSMEN!** Quickest way to become expert at your favorite activity! Send for catalog of books on hunting, fishing, self-defense, etc. Clinton Sportsmen's Books, Mt. Clemens 38, Mich.

**NATIONAL** Geographic magazines, 1888-1960, any issue. Periodical Service, Box 465-PM, Wilmington, Delaware.

**BUYER'S** Guide for the Sixties. Completely new book with expert advice on what to buy, when, where, and how much to pay; taxes, insurance, the stock market, investments, real estate, plus opportunities and predictions for the sixties. An introductory offer \$2.00. Palmer, Brooks, Steele & Co., 3230 Peachtree Rd. N.E., Atlanta, Georgia.

**SPARE-TIME** Bookselling. Free literature. Dacco, Box 781-K, Ridgecrest, Calif.

### GAMES, TOYS, NOVELTIES

**NIGHTMARE** Anyone? Tales of terror told with eerie background music on 12" LP record. Perfect for parties, etc. \$3.98. Nightmare, 1697 Broadway, New York 19-P.

### MAGIC TRICKS, PUZZLES, JOKER NOVELTIES

**EXCLUSIVE** Tricks! \$2.50 precision made vanishing coin for \$1.00 plus "Top Hat Topics" booklets. Lou Tannen, 120 West 42nd Street, New York 36, N. Y.

**BE** A magician! Large professional catalog of latest tricks, 35¢. Ireland, C-109 North Dearborn, Chicago 2, Illinois.

500 TRICKS, Douglas famous 120-page catalog now available just 10¢. Fastest service to magicians everywhere with latest in magic or parlor, stage, pocket. Send 10¢ today. Douglas Magicland, Dept. 11, Dallas, Texas.

3100 NOVELTIES, Jokes, tricks, gadgets, funmakers, hobbies. Big catalog 10¢. Johnson-Smith, D-498, Detroit 7.

**WORLD'S** Finest professional magic. Joker novelties. Giant illustrated catalog 10¢. Top Hat, Evanston 12, Illinois.

3000 TRICKS, Pocket, parlor, stage. World's finest magic catalog (408 pages), \$2.50. Kanter's, M-1311 Walnut, Philadelphia 7.

**PROFESSIONAL** Catalog, 175 pages, 25¢. Williams, 900 Plymouth, Ellwood City, Penna.

**CATALOG**, Free trick, 25¢. (1,500,399 tricks, jokes). Magico, Box 4373-P, San Antonio 7, Texas.

### COINS, TOKENS, CURRENCY

**TWELVE** Indianhead pennies \$1.00. 7 large Canadian cents \$1. Frank Herget, 2884 Bailey, Buffalo 15, N. Y.

**BARGAIN** Lots all different in Whitman folder. 10 Indian cents \$1.50; 10 Liberty nickles \$2.00; 10 Morgan dimes \$2.50; 10 Morgan quarters \$5.00; 10 Morgan halves \$9.50. Free list with orders. American Coin Company, 1921 Emerson North, Minneapolis, Minn.

\$6,500.00 WE Paid for 1794 dollar. Wanted certain others before 1904. \$4,000.00 for 1913 Liberty Head nickel. Certain 1955 cents \$20.00. Certain Lincoln cents before 1932. \$175.00; Indian cents \$225.00; Dimes before 1943. \$3,000.00; quarters before 1924. \$1,500.00; half dollars before 1929. \$3,000.00; \$3.00 gold pieces \$2,500.00. Wanted all gold coins, rare coins, etc. Canadian coins—1921 5¢ silver, \$100.00. 1889 10¢, \$100.00. 1921 50¢, \$750.00. Hundreds of others worth \$10.00 to \$3,000.00 each. For complete allcoin information, before sending coins, purchase our large illustrated guaranteed buying-selling catalogue, \$1.00. Catalogue dollar refunded \$20.00 sale. Worthycoin Corporation (K-440-C), Boston 8, Massachusetts.

**COMPLETE** Penny set, minus 5 key coins, good to uncirculated in folders, postage paid \$25.00. Western Coins, 2363 So. Robertson Blvd., Los Angeles 34, Calif.

**THREE** Brilliant uncirculated Mexican silver dollars \$1.00. Universal Services, Box 675, San Antonio 6—D12, Texas.

**WANTED** Canadian coins. Unbelievable prices paid. Complete pricelist 25¢. Philacoins, Regina 3, Canada.

**FOR** Sale 1913S, 1924S, 1931P, 1932D, 1938S, 1939D cents. All six for \$2. Gasser, Box 34615, Los Angeles 34, California.

**\$125.00** FOR certain Indianheads; Lincoln pennies \$100.00. All rare coins wanted. Booklet listing prices, 25¢. Lincoln Coins, D-229, Glendale, Arizona.

**GOLD** Plated Lincoln penny, looped for pendant and Rare Coin Guide \$1.00. Campbell's, Box 115, Mattoon, Ill.

9 DIFF. Indian cents \$1.00. 7 diff. Liberty nickels \$1.00. I. Doktor, P.O. Box 35151, Los Angeles 35, Calif.

**INDIAN** Coin, foreign coin, bargain lists. All 15¢. Hutchinson's, Box 4747, Philadelphia 34, Penna.

120 DIFFERENT Lincoln-head cents, only \$4.99 postpaid! Prices head send 25¢. France, P.O. Box 63, Evansville, Indiana.

**BRILLIANT** Uncirculated United States five dollar gold pieces, \$15.00. Twenty dollar, fine, \$45.00. Rare Coin Company, 31 North Clark St., Chicago 2, Ill.

**LARGEST** Coin magazine. 200 pages, 40¢. Scrapbook, 7320-J Milwaukee, Chicago 31.

**SPECIAL** \$1.00, 20 page bargain list, 7 different Indian cents, album. Hobby Sales, Box 4054, St. Paul, Minnesota.

**EIGHT** Different Indian cents \$1.00. Collector's Bargains, New Hope, Penna.

**FREE** List! U. S. coins. Lowest prices! Hugh's Coins, Hickory, N. C.

**STARTER** Collections. 12 Liberty nickels, \$2.50; 18 Barbour dimes, \$5.00; 15 Barbour quarters, \$8.00; 15 Barbour halves, \$15.00. All different, in folders, postpaid. Prager, 470 27th Avenue, San Francisco, California.

**RAREST** CC mint dollar, 1885 uncirculated \$7.50. Coin catalogue 50¢. Shultz, Salt Lake 10, Utah.

**TWELVE** Different barber dimes \$2.00. Bargain lists free. Sayers, 1008 Unaka, Johnson City, Tennessee.

**RARE** Unc. 1899-P silver dollar, each \$5.00. Butts, Box 889, Torrington, Wyo.

**NEW** 1960 Giant U. S. coin catalogue 25¢. Ace, 107 N. Dearborn, Chicago 2.

**NEW!** 1960 Buying Guide Canadian coins, 20 pages, 15¢. Marles, Box 833, Calgary, Canada.

**COIN** News Magazine, 35¢, subscription \$3.00 year. Dept. P, 231 North 18th, E. Orange, N. J.

**LINCOLN**. 25 Different, 1909-1934, \$1.50. DeWolf, 2041 Manchester, Cardiff, California.

**NUMISMATICS** Largest newspaper. Semi-monthly. Sample 25¢. \$2.00 yearly. Numismatic News, Box 452, Iola, Wis.

BEAUTIFUL Uncirculated United States \$20 gold pieces only \$45. Postpaid. Insured. J. Wozniak, 8329 Owens, Sunland, Calif.

COINS Bought, sold. Free list. United, 101 Cranston, Providence, R. I.

FREE Bonus offer! U. S. bargain list, 10¢ (refundable). Economy Sales Company, Mansfield, Massachusetts.

BARGAIN Lists free! Indianhead cent, 10¢. Farley, 204 Tanguy, Logansport, Ind.

CALIFORNIA Gold dollar. Real gold souvenir token, beautiful, dated 1850; Eureka above Lib.-like head. Rev., California gold; beautiful piece, only \$6.00 ea., postpaid insured. J. Wozniak, 8329 Owens, Sunland, California.

INDIAN Heads: 10 different dates \$1.00. Liberty nickels: 6 different dates \$1.00. Berry, Box 306, Westminster, Calif.

GET Profit and pleasure in collecting old coins. Send 20¢ for 68-page illustrated coin catalog. You'll be delighted with it. Send for it now. B. Max Mehl, Box 750-B, Costa Mesa, Calif. Oldest rare coin establishment in U. S. Established 59 years.

OLD Money wanted. Will pay \$5,000.00 for nickel of 1913 with Liberty head (not buffalo). We pay cash premiums for all rare coins. Send 5¢ for large coin folder. May mean much profit to you. Numismatic Co., Box 750-A, Costa Mesa, Calif.

LIST Featuring low prices, 5¢. Reiersen, 335 South G, Astoria, Oregon.

SWEDEN, 10 Different good coins. Between 1600-1800. Only \$5.00 cash or check. Palm, Postfack, Stockholm 32, Sweden.

QUEEN Elizabeth coronation proof set in official case \$11.95. World coin book \$4.00. Retail guidebook \$1.75. World's greatest bargain catalogue \$1.00 (deductible first \$10.00 order). Bebe's, 4514 North 30th, Omaha 11, Nebraska.

30 DIFFERENT Foreign coins \$1.00. Nice lot. Some older and larger coins included. Alfred Szego, Box 187, Jackson Heights 72, N. Y.

SIXTEEN Page 1960 retail price list of USA and Canadian coins for 10¢. Our selling prices on thousands of coins and coin collectors' supplies. Bryson Incorporated, 612A White, Toledo 5, Ohio.

UNIQUE 25¢ Piece. Colorado Centennial Gold Foke. Uncirculated mint condition. Four for \$1.00. Gold Dust, 2955 17th, Boulder, Colorado.

U.S. Coin list 10¢. Contains over 100 illustrations; 5,000 delightful bargains. Stoney, 260 Washington, Boston 8, Mass.

40 GENUINE Foreign bills, \$1.00. Musser, Box 505, Dunbar, West Virginia.

FREE Bargain list! U. S. coins. Jeff's, Box 105, Newton, N. C.

INDIAN Head cents, two different only 15¢. Approvals. Littleton Coin Company, Littleton R1, New Hampshire.

### STAMP COLLECTING

FREE, Surprise assortment, 50 different world wide. With attractive approvals. Banner, M-3, 2861 So. Yates, Denver 19, Colorado.

1960 ILLUSTRATED U. S. catalog—30¢. Refundable. Gama, 93 Nassau, 38, New York City.

BEAUTIES! Pictorials from Sudan, Monaco, Honk Kong, Iceland, Toga, New Caledonia, San Marino, Singapore, etc. Only 10¢. Approvals. Champlain, Isle La Motte, Vt.

142 DIFFERENT U. S. commemoratives \$1.00. 71 for 50¢. M. Philpot, 1902 Losey, La Crosse, Wisconsin.

FREE Packet! Five different foreign countries. Request fascinating approvals. Coral, Box 7095 (Ludiam), Miami 55, Fla.

8 DIFFERENT U. S. airmails free! Approvals accompany. Dee, Box 926, Ormond Beach, Florida.

INTRODUCING Our better United States approvals we offer 15 United States stamps including Columbian, Bi-Centennials, famous American, airs, others: only 10¢. Ocean Stamps, Box 64-PM, Brooklyn 29, New York.

210 DIFFERENT U.S. stamps \$2.00. Grassi, 515 Carr, Augusta, Georgia.

FREE Stamps equal the value of your first purchase from our U.S. approvals. White Mountain Stamps, Bethlehem, N. H.

BONANZA! 100 Different pictorials, mostly large, 20¢. Approvals. Curran Stamps, 16 Curran, Whitesboro, N. Y.

\$1.00 VALUE In free sets, approvals. Francis Lemle, Box 5646, Norfolk 16, Va.

FREE United States illustrated catalog. Simmy, Inc., 45-PM Bromfield, Boston, Mass.

10 BEAUTIFUL Mint British Colonies 10¢ with approvals. Bennett, Candor 3, N. Y.

1000 WORLDWIDE Stamps, many commemoratives, \$1.00. Approvals upon request only. Harrison's Stamps, 1435 First Ave., Oakland 6, Calif.

SURPRISE Set, fifty British Commonwealth, free with terrific approvals. Kawartha Stamps, Box 513, Peterborough, Canada.

50 DIFFERENT Large U.S. commemoratives 10¢ with approvals. Jack Clancy, Box 2187, Portland 14, Oregon.

25 U. S. Commemoratives 10¢ with approvals. Colonial Stamp Mart, 280 Main, Kingston 13, N. Y.

ENJOY Stamp collecting! Write for "Penny-provals." Penny-proval Service, New York Building, Saint Paul 1, Minn.

ADULTS! Like stamps? Then start your own mail-order business. Our free guidance program shows you exactly what to do, makes it easy, profitable for you. Details free! Columbia, 9268-MP Piney Branch Road, Silver Spring, Maryland.

1000 DIFFERENT, \$1.00 With approvals. Louis Golden, 6721 Eastwood, Philadelphia 49, Pennsylvania.

FREE! Fifty different stamps. Adult approval applicants. Norge, Ho-Ho-Kus, N. J.

FREE! Over 100 different, \$2.50 value, including space satellite, Israel, British, U.S., first U.N., Siberia. Approvals. Send 25¢ for mailing. Horace Gatewood, Winston-Salem, N. C.

LIQUIDATING Collections, 2¢ approvals. Job lots. Moredan Stamps, Wellesley 81, Mass.

JAPAN 100 Different plus 20 commemoratives only \$1.00 by air. T. Yonehara, 248 Eifuku-cho, Suginami-ku, Tokyo, Japan.

GIANT Issues collection: Laos elephant set, Brussels Fair, Olympics, jet aircraft, Boy Scout, Somali animals complete, Romania flags, Togo set, diamond popes, United Nations set, etc., plus big stamp dictionary and approvals. Everything 10¢! Stamex, Box 47-KM, White Plains, N. Y.

PENNY Approvals. Thousands. Bargains for pennies. Gifts with purchases. Penny Stamps, Orange, California.

UNITED Nations. Five different 10¢. Approvals. Anderson, 1112 Harrison, San Francisco 3, Calif.

MEXICO 25 Beautiful 10¢. Approvals. Salsman, Box 702, Berkeley, Calif.

TERRIFIC Value. Eight complete mint sets 10¢ with approvals. Beatties, 58 Glenagar, Islington, Ontario, Canada.

25 DIFFERENT Commemoratives 1893 up 10¢. U. S. approvals. K&B, Box 70, Brooklyn 23, N. Y.

BARGAIN US—101 different 25¢, with US. approvals. Stamps, Kennebunk, Maine.

FREE Sample! Interesting, informative, illustrated. National Stamp News, Anderson, South Carolina.

FREE 50 Worldwide, mailed with inexpensive approvals. University Stamps, P.O. Box 95, Tamiami Station, Miami 44, Florida.

TRADE Your duplicates toward our approvals! (Foreign only.) Complete information, 10¢. Variety Stamps, Box 98-P, Newton Highlands 61, Mass.

307 WORLDWIDE Different stamps only 25¢. Approvals. Niagastamp, St. Catharines 671, Ontario.

MINT U.S. at face! Older commemoratives only. Send 25¢ for all different packet with first selection mint U.S. approvals. Western, Box 1689P, Salinas, California.

1000 DIFFERENT Worldwide stamps \$1.00. Valued over \$20.00. Universal, Box 6, Kenosha 5, Wisconsin.

60 DIFFERENT U. S. (30 commemoratives) 25¢. No approvals. Seidenberg, Appleton, Wisconsin.

GIANT Approvals, thousands different, 1¢ and 2¢ each. Wahl's Stamp Exchange, 7008P Farragut, Chicago 31, Ill.

ALBUM Only 10¢! Hundreds of spaces! Stampmart Company, Hartford 1, Conn.

UNITED States commemorative collection containing 33 different—10¢. Approvals. White, 516-A Avenue L, Brooklyn 30, New York.

SELL Your surplus good grade stamps. Write, describing fully what you have. Vanroy Shirk, Lebanon, Pennsylvania.

AMAZING OFFER! 200 United States stamps — including commemoratives, airmails, high denominations to \$1.00. Only 10¢ to approval applicants! Illustrated bargain lists free. Mystic Stamp Co., Dept. 80, Camden, New York.

100 STAMPS, 10¢ With approvals. Smith, 508A Brooks, College Station, Texas.

OLD Scarce U.S. seconds on approvals. Slight imperfections, lowest prices. Hernefield, Clintonhill Sta., Newark 8, N. J.

100 OLD United States between 1861 and 1935, \$1.00. Roush Stamps, 51 Chestnut, Mansfield, Ohio.

225 STAMPS For only 10¢! This mammoth value includes airmails, pictorials; stamps from strange countries cataloging up to 25¢ each! Also approvals. Mystic Stamp Company, Camden 80, New York.

UNITED States price list, 116 pages, price 25¢. Mark Hanna, 335 Fifth Ave., Pittsburgh 22, Penna.

SELL Stamps to our readers. Your ad in this space will be read by thousands of stamp buyers. I'll prove that to you. Write now for Folder "S." F. W. Johnson, Classified Advertising Manager, Popular Mechanics, 200 E. Ontario St., Chicago 11, Ill.

14,000 DIFFERENT! Amazing new plan builds your collection systematically, country by country. Only 50¢ weekly. Free details. L. G. Ware, Stepney 75, Conn.

U. S. Mint flag set, complete, \$1.00. Free list. Brooks, 2323 Avenue X, Brooklyn 35, New York.

103 DIVERSIFIED British colony stamps only 10¢. Approvals. Niagastamp, St. Catharines 671-A, Ontario.

102 DIVERSIFIED Worldwide stamps 10¢. Approvals. Linstamp, St. Catharines 618, Ontario.

PENNY Approvals! Regardless catalogue! Kloster, 4164—52nd St., San Diego 5, Calif.

25 DIFFERENT Large American commemoratives 10¢. With approvals. Linstamp, St. Catharines 618-A, Ontario.

INTERESTING Worldwide animal stamp collection 10¢. With approvals. Niagastamp, St. Catharines 671-B, Ontario.

ECONOMICAJ, 1/2¢-3¢ Approvals. 33,000 varieties. Dresel, Box 128-N, West Englewood, New Jersey.

105 BRITISH Colony stamps, all different 10¢. Approvals. Crown Stamp Company, 901, Virgil, Ontario.

FREE United States price list of singles, plate blocks, FDC's. Introductory discount. Bailey, 45-G Bromfield, Boston, Mass.

135 DIFFERENT U.S. commemoratives \$1.00; 50, 25¢ Approvals. Harold Holub, 18 East 198 Street, New York 68, N. Y.

50 DIFFERENT Stamps free! Approvals. Marford, Box 48, Queens Village 29, New York.

FREE Giant collection, including U.S.A., British, foreign, to collectors requesting approvals. Stanley Zajac, 159 Emerson Ave., Toronto, Canada.

FREE. Valuable collections, each collection over \$5.00 catalog value, plus many other terrific gifts free when you buy our sensational foreign approvals. Topval, Box 486B, Redlands, Calif.

PACIFIC Islands, Australasia. 500 attractive mixed, \$1.50. Lang, Box 2, Hornsby, Australia.

100 STAMPS 25¢. Joseph Gaidar, 6615 South Ashland Ave., Chicago 36.

HONG KONG, 25 Different, 25¢. Foreign approvals. Spicka, 518 No. 85th, Omaha 14, Nebraska.

TOPS! Free book. "How to Collect Stamps." Send for your copy today. Approvals. Littleton Stamp Co., Littleton El. N. H.

VATICAN Coronation souvenir — Pope John XXIII card and 10 attractive stamps in protective plastic folder. Story of Vatican and coronation on reverse. A beautiful addition to any collection. 25¢ with approvals. Capital Stamp Co., Ferrysburg 2B, Mich.

APPROVALS. Current Australian. \$1. Viv. Martin, 139 Sternberg, Bendigo, Australia.

30 DIFFERENT Large 3¢ U. S. commemoratives plus bargain price list 25¢. Allison, 2204 Jefferson, Wilmington, Del.

SIX Mint Croatia triangles, 10¢. Approvals. Skwara, 730 Strawberry, Trenton 8, N. J.

DEALERS—Wholesale list. Postage 4¢. Frank, 5031 Queensberry, Baltimore 15, Maryland.

100 FOREIGN, 20 U.S. commemoratives, 10¢. Approvals. Weckerling, 806A Orange, Westlaco, Texas.

FREE 25 Japan—4¢ postage. Foreign approvals. Paul, 33 Altamont, Nixon, N. J.

A System that brings you 100 to 400 different new stamps of your own choice, each and every week. What every collector has dreamed about. Nothing else like it. This is entirely different. Complete details sent by return mail, merely by sending \$1.00 for one full year's membership or \$1.50 for two years. Las Vegas Stamp Service, 558 Oakley Blvd., Las Vegas, Nev.

FREE 400 Genuine postage stamps! Worth \$10.00 at catalogue prices. Africa, Europe, Asia, British Emp. A fascinating, valuable mixture from foreign convents, banks, etc. Who knows what you will find. Also free helpful collectors handbooks. Adults only. Fine approvals enclosed. Frasek Co., PM, White Plains, N. Y.

TERRIFIC Stamp bargain! Israel, Iceland, Vatican assortment—Plus exotic triangle set. Also fabulous British Colonial accumulation. Plus large stamp book. All four offers free. Send 10¢ to cover postage. Empire Stamp Corp., Dept. PM, Toronto, Canada.

U.S. Stamps. Giant bargain catalog 20¢. Raymax, 35VZ Maiden Lane, New York City 38.

100 DIFFERENT U.S. commemoratives 50¢. Approvals included. Shelton, Box 907-K, New York 8, N. Y.

FREE! Liberia airmail triangle, diamond, midget, mammoth to approval buyers. Plymouth, Dept. A-8, Bell, California.

300 FOREIGN Pictorials, etc. 35¢. George Gross, Westgate, Ames, Iowa.

STAMP Collecting outfit, includes packet worldwide stamps, package hinges, watermark detector, millimeter gauge. Everything 10¢ with approvals. Loraine Brown, Marion, Michigan.

FREE! Afghanistan, Bahawalpur, Negri Sembilan, Tanganyika, Thailand. Inexpensive approvals accompany. Nade's, 6316 Crescentville, Philadelphia 20, Penna.

90,000 STAMPS Sale: Bargain lot \$1. Extra special better stamps \$2. Giant assortment: singles, sets. Packets \$5. High value packet \$3. Persil, 436 N. Y. Ave., Brooklyn 25, N. Y.

50 ATTRACTIVE Pictorials 10¢ with approvals. Anarden, 6041 Columbus, Minneapolis 17, Minnesota.

FREE—Mint British colonies from Brunel, Solomon Islands, Negri Sembilan, Sarawak, St. Christopher, Nevis, Trengganu, Gilbert Ellice. Free with approvals. Viking, Great Neck 8, N. Y.

FREE! Wonderful, new 84 page U. S. catalog. Handling 10¢. Norrisco, Milwaukee 7, Wis.

200 U. S. Mission mixture, absolutely unpicked \$1.00; 15,000, \$5.00. Wesley Road, Box 285, Cedar Rapids 5, Iowa.

316 DIFFERENT! Only 25¢! Free gift! Approvals. Streff, 1419N American, Philadelphia 22, Penna.

66 DIFFERENT Stamps free with approvals. McDonald, 3113 E. Mariposa, Phoenix, Arizona.

50 FREE With approvals. Patton's Stamps, 660 California, Boulder City, Nev.

ISRAEL Collection, 60 different, only \$1.00. Stampbox, Box 74-P, Garfield, N. J.

511 DIFFERENT Worldwide, including Laos elephants, Somali animals 50¢. Approvals. Albemarle, Box 16, Kensington Station, Brooklyn 18, N. Y.

FREE—Any volume Scott's International Albums, Scott's 1960 catalogues, even Master Global albums free when you buy our sensational foreign approvals. Bargain Stamps, Redlands 2, California.

SUPERIOR Worldwide mission mixture. Amazing variety! Six ounces \$1.65. Pound \$3.95. Bay Nielsen, 4545B Harvard, Montreal 28, Canada.

GREATEST Premium! World-wide collection! Over 1000 different stamps from Angola, Nigeria, Ecuador, Macao, other exotic lands. Includes triangles, airmails, sport, animal, ship, map stamps. Catalog value over \$25.00. This exciting collection given to qualified customers. Request approvals, details, today. Odd Stamps Co., Dept. A5, Box 31, Redondo Beach, Calif.

WOW! 110 all different Germany 10¢. Zeppelins, semi-postals, airmails, high values, etc. Giant catalog, bargain lists included with beautiful approvals. Jamestown Stamp, Dept. A10PM, Jamestown, N. Y.

100 DIFFERENT Belgium free. UPU. Brussels Fair, railroad stamps free. Approval applicants only. Trylon, Box 31-P, Brooklyn 30, N. Y.

AIRMAILS: World wide selection, including first complete German airport set. Only a dime with approvals. Boger, Box 152, North Wales, Penna.

SEVENTY-Five different United States. Obsolete and current. 25¢. Ed. Keller, Library, Penna.

ZOUNDS! Amazing "Strange Countries" packet. Free with approvals! Saxon, Orange, California.

65 DIFF. U. S. commemoratives 50¢. No approvals sent. K. Plascyk, 4 Pasture Lane, Massapequa, Long Island, N. Y.

OVER 66 Countries. 1000 different collection, \$1.00. Dimond, 3152 Cuthbert, Oakland 2, Calif.

COMPLETE Collection for \$1.00, 300 different world wide including tropicals and pictorials, 50 different Mexico with commemoratives, 25 different U. S. revenues, 100 different Canada, one container of stamps from missions and convents. All this to approval applicants. Fire Island Stamp Company, Box 37A, West Islip, New York.

DAMAGED Old U.S. 1/2 catalog, on approval. K. Swartz, Maiden Bridge, N. Y.

1000 MIXED. Includes pictorials, 50¢. Knopp, Box 1381, Bristol, Conn.

U.S.A.—Canada—Newfoundland collection, including sports, animals, arctic, chemical, seaway. Only 25¢. Approvals. National Stamps, 196 Sparks, Ottawa, Can.

FREE! Giant bargain catalog. New edition listing thousands of bargains including U. S. and B.N.A. stamps, packets, mixtures, albums, accessories and supplies; sent with beautiful approvals. Jamestown Stamp, Dept. E10PM, Jamestown, New York.

PROTECT Your stamps. Free samples. Merchandise Service, 3211 Martin Ave., Evansville 12, Ind.

FREE! Colorful 215-different stamp collection! Cataloguing \$5.00! With adult, bargain approvals. Rush 10¢ postage. Philatelics, Dept. RE, New Paltz, N. Y.

15 AUSTRALIAN Commemoratives 5¢. Approvals. Van, Box 981, Columbus, Miss.

100 DIFFERENT World wide only 10¢ with approvals. R.J.E. Stamps, 2730 River Road, Marysville, Michigan.

FREE. U. S. pricelist plus foreign packet list. Thom, 4808—15th Avenue, Minneapolis 17, Minnesota.

222 DIFFERENT Worldwide plus 66 different U.S. 25¢. Unmounted approvals. Casto, Box 357, Dunbar, W. Va.

FREE! China collection, approvals. Send 10¢ postage. Coast, P.O. 2187AB, Santa Ana, California.

BEAUTIES! Israel ships, Viet-Nam, Japan bi-colored, three sets, 10¢ with temptingly priced approvals. Bischman's, 116 Mississippi Ave., Joliet, Illinois.

DENHOF'S New U. S. stamp album and supplements for all albums available now. Illustrated folder upon request. Ungar Publishing Co., 131 East 23rd Street, New York 10, N. Y.

KENYA—Queens 6 values, including 1/, free. Approvals. Lee Hoover, Box 3594, Portland 8, Oregon.

GODS Of Ancient Greece; Croatian Legion in Action; grab bags; Chopin; sputnik; U.N.; U.S.: Packets free with purchases. Details, approvals: Stamp Farm, M2-19, Oxford, Wis.

LOOK! 150 Diff. U.S. commemoratives \$1.00! Ewing, 2133 Lunt, Chicago 45.

U.S. Illustrated list free. Big irresistible discounts. National, Box 60, Boston 1, Mass.

700 MIXED U. S. various issues 25¢. Monjar, Fairmont, Cincinnati 14, Ohio.

LOOK! Six Queen Elizabeth mint sets from Singapore, Tristan, Malacca, Malta, Antigua. Caymans! 21 brilliant pictorials, 25¢. Attractive approvals. Gannon Stamps, Box 931, Canton 1, Ohio.

12,000 PENNY Approvals waiting for you! Many from exotic countries, pictorials, airmails, new issues. Tilbury, Box 862, Newark 1, N. J.

MOONE Rocket including 111 different stamps, 10¢ with approvals. Finney, Box 89, El Monte, Calif.

100 WORLDWIDE Plus valuable surprise set, 10¢ with approvals. Free merchandise coupon. Hobbies, 1603 Sun Valley, Austin, Minnesota.

100 DIFFERENT Norway, 25¢! Money-saving approvals. Carling, Howard City, Michigan.

U. S. Commemoratives: 202 different \$2. Moseley, 6 Hanley Downs, St. Louis 17, Missouri.

GUATEMALA, 29 Different, with approvals, 20¢. Fred Pittsley, South Montgomery, Napa, Calif.

FREE Surprise mystery packet with approvals. Dancer, 75-P6, Mansfield, Ohio.

1075 DIFFERENT \$1.00 with approvals. Klondike, 682 Jefferson, Elgin, Illinois.

FREE Monaco nudes. Hurry. Stamp Ranch, 902 Addison, Chicago 13, Ill.

HUGE Stock United States, Canada, British Colonies. Quality approval collections. Enclose 10¢. Peterson, 405 Northwestern Bank, St. Paul 1, Minn.

300 DIFFERENT Given free with approvals. Particulars. Windsor Stamps, 8834 Cornell Avenue, Chicago 17.

500 FINE Mixed U. S. 15¢. Wright, 201M Mealey, Hagerstown, Maryland.

MYSTERY Bag stamp collection, only 10¢. Hill Company, Box 51, Defiance, Ohio.

WORLDWIDE Collection 300 different, 30¢. Rayworth, 321 South Cicero, Chicago 44.

UNITED States. \$1.00 buys four fine unused airmails. #C7#C10. Approvals accompany. Whiton Paine, Westport 11, Connecticut.

JUNGLE And Space Age. Fascinating wildlife selection and original Sputnik stamp all free with terrific approvals. 5¢ handling. Stamp Imports, Peterborough, Ontario.

1000 DIFFERENT Worldwide. For approval buyers only. Jacobsen, Crompond, N. Y.

HUNDREDS Of free commemoratives and bi-colored stamps to buyers from our 1/2¢, 1¢ and 2¢ approvals. Orana, 704 S. Main, Santa Ana, Calif.

SIBERIA—Mint first issues free. Approvals. W-H Stampco, Wilkes-Barre, Penna.

WHOLESALE Mounted collections. No communist or kiddie junk! \$1.00 per sheet: Cadet, Selden, N. Y.

GERMANY, Von Hindenburg memorial, used, Scott 436-41, 20¢ with foreign approvals. Dunning, 1634 Chippendale, Houston 18, Texas.

25 AUSTRALIAN Commemoratives 10¢. Approvals. Binkowski, 944 Park, Schenectady, New York.

WORLDWIDE Quality mixture \$1.00. LaMountain 28, 4095 Melrose, Montreal, Canada.

WHOLESALE: \$10.00 Catalogue, \$1.00. All different, to introduce bargain lists. Stamparee, Sierra Madre, Calif.

TIBET! Scarce stamp 20¢. Adult approvals. Edwin Morr, 1204 Sandusky, Ashland, Ohio.

EXCHANGE! Send 100 different and 10¢. Receive same quality and quantity. Richard Laning, Richfield, Penna.



FINE U.S. stamps. \$5.00 Coolidge of the 1938 Presidential series, and the \$5.00 Hamilton of the 1954 series. Both for only \$1.00. Fine U.S. approvals included. Willett Co., P.O. Box 338, Dept. 45, Yorktown Heights, N. Y.

FREE! Triangles, pictorials, others, 55 different. Colorful, unusual approvals. Baird-Stamps, Box 8113, Portland 7, Ore.

EXCHANGE U.S. commemoratives: 20¢ catalog discount. Arkard, 5434 Glenwood, Chicago 40.

JUMBO Mint set free, introducing outstanding approvals. Philarama, Pennington, New Jersey.

#### ANTIQUES, RELICS, INDIAN GOODS, CURIOS

ILLINOIS: Selling hundreds — Confederate, Civil War, Indian War, western muskets, Kentuckies, Springfield, rifles, pistols, flasks, blunderbusses, flintlocks, frontiers, dueling, pepperboxes, Confederate-Union swords, bayonets, bullet molds, 12,000 collectors cartridges. \$20,000.00 Confederate bills. Gold coins. Indian cents. Agates, minerals, fossils. 50,000 Stonegate Indian relics, arrowheads, spearpoints, discoidal, gold nuggets, stagecoach guns. Mounted birds, daguerrotypes, hoisters, military insignias. Send 35¢ (refundable) for large listing. Heikes, Wenona, Ill.

4 ARROWHEADS \$1.00; Lists; Smith, 841 N. Tacoma, Indianapolis 1, Indiana.

10 ANCIENT Stone arrowheads. \$2.00. Stan's, 1054 Lilley, Columbus 6, Ohio.

ANCIENT Grooved stone tomahawk \$3.00. Indian relic list free. Lear's, Glenwood, Arkansas.

#### PRECIOUS STONES, MINERALS

TWELVE New Mexico minerals \$2.00, six fluorescents \$1.06, five crystallized minerals \$1.06, fools gold 35¢. Minerals, Winston, New Mexico.

PROSPECTORS! Learn from experienced geologists how to locate and identify rocks and minerals. A comprehensive home study course designed for anyone interested in exploring for valuable ore deposits. Write now for free literature. Pacific School of Mines, Dept. B-1, Box 2538, Palm Springs, California.

10 BAROQUE Semi-precious gem stones in soft leather jewelry bag. \$1.50. Forest Studio of the Black Hills, Box 1367, Rapid City, South Dakota.

FREE Bargain gem list. Lapidary and silversmith catalog, 56 pages, 25¢. O'Brien's, 1116M Wilcox, Hollywood 38, Calif.

GET Free catalog no serious rockhound, gem cutter, jewelry maker, hobbyist or craftsman can be without. Full of bargains, exclusive items, low prices from largest suppliers and authorities in the field. Free, new catalog just off the press, yours for the asking! Write Grieger's, Dept. C-11, 1633 E. Walnut, Pasadena, California.

"GEMS & Minerals Magazine," largest rock hobby monthly. Field trips, "how" articles, pictures, ads. \$3.00 year. Sample 25¢. Box 687A, Mentone, California.

SEMI-Precious uncut gems. Ten different for \$1.00. Request list 26. Prospectors Shop, 201 San Francisco, Santa Fe, New Mexico.

EARTH Science, the rockhounds national magazine. Subscription \$2.00. Sample 35¢. Box 1357-PM, Chicago 90, Ill.

#### HOBBIES AND COLLECTIONS

25 COLORFUL Selected seashells plus genuine sea horse and starfish \$1.00 post-paid. Includes free shell card in color with names and free tropical catalog. Treasure Highland, Airgate Branch PM, Sarasota, Fla.

COLLECTORS Matchbook covers, 100 different unused, \$1.00. Catalog 25¢. Album \$3.00. Charles Edelman, 1311-C East 84, Cleveland 3, Ohio.

INVENTING Can be an interesting and profitable hobby. Write for complete particulars. Institute of American Inventors, Dept. 40-E 635-F St., N.W., Washington 4, D. C.

COLLECT Foreign medals, daggers, helmets. Iron Cross with ribbon. \$1.50; Swastika emblem 25¢; catalog 25¢. Hobbies, Box 71-B, Rockaway 94, N. Y.

NAZI Insignia book, 600 illustrations, and 6 Nazi emblems, \$1.00. Hobbyland, Calgary, Canada.

PAINT Oils: Easy home-courses. Trial lesson \$1.00, specify marine, landscape, still-life, portraiture, or skyscape. Prickett-Montague Poplar Studio, Monterey, Massachusetts.

"THE Collector," newest magazine for collectors of anything. Free information. "The Collector," Box Four, Millersburg 3, Penna.

CANADIAN Military insignia, cap badges, accoutrements. Lists \$25. Empire Chevrons, 254 Codsell, Downsview, Ontario, Canada.

#### PHOTOGRAPHY, CAMERAS, PHOTO SUPPLIES

FREE! Kodak film for life. New Kodak film for every roll you send to develop. Jumbo size. Black and white: 8 exp. 80¢; 12 exp. \$1.05. Kodachrome: 8 exp. \$3.50, 12 exp. \$4.50. Send for price catalog for more savings. Satisfaction guaranteed. Yankee Photo Service, Box 1820-PM, Bridgeport 1, Conn.

PHOTOGRAPHY For pleasure or profit. Learn at home. Practical basic training. Long established school. Free booklet. American School of Photography, 835 Diversey Parkway, Dept. 3441, Chicago 14.

164 PAGE Photographic bargain catalog, listing thousands of photographic bargains. Send 25¢ for your copy, credited on first order. Dept. 1-C1, Central Camera Company, 230 So. Wabash Ave., Chicago 4, Illinois.

FAMOUS Japanese, German cameras. Import direct. Save 33-50%! Specify needs. (No catalogs.) Gieralt, 859 N. Paulina, Chicago 22.

#### PHOTO FINISHING

JUMBO Prints, 8 or 12 exposure roll, 59¢. Sun Studio, St. Joseph, Missouri.

TWO Beautiful prints from each picture on roll 8 exposures 45¢; 12 exposures 55¢. Thirty-eight years of satisfied customers. Quick service. Lens Photos, Dept. J-4, Janesville, Wis.

PHOTOS Enlarged 8x10 beautifully colored. \$1.00. Dick's Studio, Louisville 12, Ky.

25 WALLET Size silk finish photos from any picture \$1.00. Original returned unharmed. Studio, Drawer 701U, Springfield, Missouri.

8MM KODACHROME Processed \$1.00. Free mailers, photographic discount catalogue. Carter Color, Box 645, Utica 1, New York.

SEND This ad and only 25¢ with first roll. For extra rolls or without ad send our regular price as follows: 8 exp. 40¢, 12 exp. 60¢. Katz Photo Service, P.O. Box 63, Hopkinsville, Ky.

A Triple value. Quality, price, service. Color or black and white, 12 exp. (black and white) 59¢, 20 gift photos \$1.00. Holiday Photos, Dept. 16, Box 666, Denver, Colo.

A J-In-1 value. Price, quality, service. 20 gift photos, \$1.00, 12 exposure rolls (black and white), 59¢. Color or black and white. Interstate Photos, Dept. 11, Box 15, Aurora, Ill.

KODACHROME Processing by Kodak. 8mm. roll or 35mm., 20 exp., \$1.40. Prompt service. Write for mailers and prices. Color Pix, Dept. P, CPO Box 30, Kingston, N. Y.

TWELVE Exposure rolls 49¢. Wallets #0 for \$1.00. Lincoln Studios, Dept. K, Box 13, Lincoln, Nebr.

COLOR Processing! Anscochrome, ektachrome \$1.00, 35mm., 20-exposure roll mounted. Kodachrome 20-exposure or 8mm. movie \$1.25. U.S. Color Mart, Box 191, Hartford 1, Conn.

#### MOTION PICTURES AND SOUND EQUIPMENT

16MM. Sound films and equipment. Write, phone Entertainment Films Company, 2021 Broadway, New York 23.

SPECIAL Entertainment. 8mm. B&W, \$12.00, 16mm. B&W, \$20.00. Tex, Box 368, Terminal A, Toronto, Ont., Canada.

16MM. Sound films. Bargain bulletin. Duquette, 97-T Snow, Fitchburg, Mass.

MOVIE Film! Free catalog! ESO-R, 47th Holly, Kansas City 12, Missouri.

16MM. Sound, projectors, films. Sale, rental, exchange. Visit store or write for catalog. National Cinema, 71 Dey St., New York City.

FREE! Blackhawk's big sale catalog 8mm., 16mm. movies, 2"x2" color slides. Biggest selection anywhere! Projectors, cameras, supplies. Big discounts! Get free, every three weeks, 12-page newspaper size bargain list! Blackhawk Films, Davenport 14, Iowa.

5,000 8-16MM. Movie films. Free catalogues. International, Greenvale, N. Y.

MOVIE Camera film: 8mm. roll \$1.50, 16mm. 100' \$3.00. Free processing. Better Films, 742 New Lots, Brooklyn, N. Y.

16MM. Sound shorts. Tremendous assortment features, \$16.50 up. Used 16 mm. sound projectors, \$79.50 up. Catalog. Abbe Films, 417 West 44th Street, New York City 36.

10¢ BRINGS Big new cine manual for the 8mm., 16mm. movie maker. Save money on fresh b&w and color movie film, all home processing equipment. Superior, 448 N. Wells, Chicago 10.

16MM. Sound films, also 8mm. subjects. Bedner, 5300 So. Talman, Chicago.

ROSE Parade movies, color 8mm Kodachrome 150'. Every float depicted, \$17.50. Highlights: 50', \$6.00, 35mm slides, Dixie Color, Box 42177, Los Angeles 42, Calif.

8mm ROSE Parade color movies, 50' \$4.95. Complete parade 200' \$17.50, 12 color 35mm slides \$2.75. MovieLand, Box 10-M, Van Nuys, Calif.

8mm MOVIES, 50', comedies, cartoons, airplanes, hunting, fishing. Limited offer. Send \$1.00 each. MovieLand, Box 10-M, Van Nuys, Calif.

#### COLOR SLIDES

WESTERN Scenery. Best combination quality, price and individual selection service. Free lists. Slides, 711 Columbia Road, Colorado Spring, Colo.

TITLE Slide free. Send 35¢ for Meston's comprehensive catalog of color slides today. Meston's Travels, 3801N North Piedras, El Paso, Texas.

COLOR Slides of American beauties. Listings. Slides, Box 384, Chicago 90, Ill.

#### MUSIC & MUSICAL INSTRUMENTS

WOOD Flutes. Send for description and prices. C. A. Sevigny, P.O. 195, Chester, Conn.

ELECTRIC Guitars, amplifiers, wholesale. Free catalog. Carvin, P.M.M., Covina, Calif.

SONGWRITERS. With publisher contacts, want song ideas. Share royalties. No fees. Send poems: Songwriters' Associates, 1650 Broadway, New York City 19-G.

ACCORDIONS. Italy's best, guaranteed. 60% discount. Importers, 7445 East Seven Mile, Detroit 34, Mich.

GUITAR Making books, plans, imported woods, tools. List 10¢. Store, 510 East 11th Street, New York 9, N. Y.

SONGPOEMS And lyrics wanted. Mail to: TinPan Alley, Inc., 1650 Broadway, New York 19, N. Y.

POEMS Wanted for musical setting and recording. Send poems. Free examination. Crown Music Company, 49-C West 32 Street, New York 1.

SONGS Into dollars. Share \$33 million dollars yearly for new songwriters, song poets. Any subject, songs composed, published, promoted by largest firm. Information, appraisal free. Send Nordyke Music Publishers, 6000 Sunset, Hollywood 28 PM, California.

POEMS Wanted for musical setting and recording by America's largest song studio. Send poems. Free examination. Five Star Music Masters, 630 Beacon Building, Boston.

SWISS Musical movements, \$1.90. Helax, 218 W. 72nd St., New York City 23.

PLAY Guitar first lesson! Nationally advertised phonograph record method shows how. Free LP Album. Write Radiant, 1697 Broadway, New York City 19-M.

**LEARN** To play guitar, accordion, piano. 10 lessons on records with instruction book, \$4.98. 24 lessons, \$9.95. U. S. Gov't. approved. Vavro Institute, So. St. Paul, Minn.

**ACCORDIONS** — 1960 Models. Lowest discount prices. Save up to 50%. Free home trial. Trades accepted. Big color catalog free. Accordion Manufacturers, Dept. 10-R, 2003 Chicago, Chicago 22.

**POEMS**, Songs serviced. New plan. Sequoia Songwriters, 6419 Primrose, Hollywood 28, Calif.

**GUITAR** Offer for beginners! Top quality guitar plus famous "Play-at-Once" course! Guitar case, music stand. Terms. Free trial. Free folder. Ed Sale, Studio 1C, Bradley Beach, N. J.

**POEMS** Wanted for new songs and recording artists. Send: Successful Songs, 6 North Street, Danbury, Conn.

**VIOLINMAKERS**, Repairers. Fine tone wood, and all violin supplies. Send for free wholesale new price list. International Sales, 414-MPM E. Baltimore St., Baltimore 2, Maryland.

**MUSICAL** Instruments wholesale. Prices lists 10¢. Schier, 21 Russel, Edgewater, New Jersey.

**POEMS** Wanted! Best songs recorded free with 7-piece orchestra. Melodies written. Songmakers, 1472-M Broadway, New York 36.

**SWISS** Musical movements (best) \$2.50. Electrical \$5.75. Spielman, 131 West 42nd, New York 36.

**VIOLIN** Makers supplies. Free catalog. 309 W. Fourth, Los Angeles 13.

**PARTY** Records. Sample record and catalog \$1.00 postpaid. Hollywood Jokers, Dept. 9, 1624 North El Centro, Hollywood, California.

**ACCORDIONS** — Italian manufacturer introduces new models! Special low introductory prices at authorized dealers throughout United States. Insist on a genuine Castiglione accordion. Write for free catalog. Castiglione Accordion Company, Box 3862, Detroit 5, Michigan.

**PHONOGRAPH** Records cheap, postpaid. Catalogue. Paramount, Box 2026-M, Pine Castle, Fla.

**MUSICAL** Instruments. Overstock. Save to 1/2. Free lists. State type. Treasure-craft D41, Box 3103, Modesto, California.

**POEMS** Needed immediately for new songs and records. Free examination and appraisal. Send poems: Songcrafters, Acklen Station, Nashville, Tenn.

## RADIO, TELEVISION AND ELECTRONICS

**DON'T** Buy hi-fi components, kits, tape recorders, until you get our low low quotes return mail. Catalog free. Hi-Fidelity Centre, 1799M 1st Ave., New York 28, N. Y.

**CASH** For used short-wave ham receivers, transmitters and accessories. Treger, W91VJ, 2023 N. Harlem Ave., Chicago 35, Tuxedo 9-6429.

**RECORDERS**, Hi-Fi. Free wholesale catalogue. Carston, 215-PM East 88, New York City 28.

**CRYSTAL** Radio kit \$1.00; preassembled \$1.25; phone \$1.75; catalogue. Clearco Crystal Co., 2966 N. 4th, Milwaukee 12, Wisconsin.

**FREE!** Giant wholesale catalog on electronics, hi-fi, transistor, scientific, hobby, optics, photographic, housewares, jewelry, tools, novelties, toys. Write: Lektron, 131M Everett Ave., Chelsea 50, Mass.

**TAPE** Recorders, Hi-Fi components, sleep learning equipment, tapes. Unusual values. Free catalog. Dressner, 69-02M, 174 St., Flushing 65, N. Y.

**AMPEX** Tape recorders, components. Boynton Studio, 10-PM Pennsylvania, Tuckahoe, N. Y.

**LEARN** While asleep with amazing "Electronic Educator" endless tape recorder. Details free. Research Association, Box 24-N, Olympia, Washington.

**GOVERNMENT** Surplus radios, parts. Picture catalog 10¢. Meshna, Malden 48, Mass.

**ELECTRIC** Guitars, amplifiers, wholesale. Free catalog. Carvin, PMR, Covina, Calif.

**RADIO** And TV tubes at manufacturers' prices! 100% guaranteed! Brand new! No re-brands or pulls! United Radio, Box 1000, Newark, N. J.

**WANT** To make more money in radio service? Learn inside secrets. Write Greene, 75a Seventh Street, Barataria, Trinidad, West Indies.

**HI-FI** Phono outperforms \$1000 jukebox. \$99. R. Mitchell, 20042 Cameron, Detroit 3, Mich.

**GUARANTEED** Portable transistor radios. Sixes, \$28.94. Sevens, \$31.94. Accessories included. Murray Import, 8189 Heather, Fontana, Calif.

**CLOSEOUT** Pocket-size transistor radios. Guaranteed. Postpaid. \$9.98. Falco, 1024 Eureka, Lansing 12, Michigan.

## BUSINESS OPPORTUNITIES

**QUICK** Money! Repairing car batteries. At home! Easy too! Free details! Batteryman, Penrose, Colo.

**SELL** By mail. Mail order specialist shows how to start on low capital. Modern merchandising methods, not crackpot schemes. Free details. Griffin, 322 West State Street, Ithaca, New York.

**LEARN** Sewing machine repairing. To \$125 weekly. Sparetime. Supplies. Add to present business. Write today! Taylor Service, Box 2126, San Bernardino, Calif.

**OPERATE** Your own bookkeeping and collection service installation. Earn up to \$25,000 or more. Details. Allison, 295 Hamilton Blvd., Kenmore 17, N. Y.

**EARN** \$10,000 Yearly raising Angora rabbit wool for us. Information 25¢ coin. American Angora Company, Malta 77, Montana.

**WHAT** Is this mail order business? Get the one true answer. John Bishop, Box 153B, Ojai, California.

**MAIL** Trade magazine has moneymaking opportunities galore. Sample 25¢. Donovan, 79-PM Greenbelt, Levittown, New York.

**100% PROFIT** Selling reconditioned spark plugs. Free sample. Lee, 1608-H Roberts, Houston 3, Texas.

**FRANCHISES** Make profits! Operate your own independent franchised business as distributor, dealer or agency owner. Nationwide opportunities. National Franchise Reports is the recognized source for information regarding the booming franchise field. Write today for interesting free details of this helpful service. National Franchise Reports, W-528, 333 North Michigan, Chicago 1.

**FREE** Picture folder, "How to Make \$3,000 Yearly, Sparetime, Backyard, Raising Earthworms!" Oakhaven-38, Cedar Hill, Texas.

**VENDING** Machines. No selling. Operate a route of coin machines and earn amazing profits. 32-page catalogue free. Parkway Machine Corporation, Dept. #27, 715 Ensor Street, Baltimore 2, Maryland.

**SELL** Books by mail. 400% profit. Royal, Box 368-X, Cleveland 27, Ohio.

**PLASTERCRAFT** Molds, liquid rubber, plasters, flocks, candle supplies. Catalog and manual free. Blue Rapids Supply, Blue Rapids, Kansas.

**I Got** rich in the dry cleaning business with no investment, so can you. Free details. Write: Imperial School of Dry Cleaning, Dept. PMC, 1700 Touhy Avenue, Chicago 26, Illinois.

**STRIKE** It rich on small home repairs by using set prices. Details free. House Clinic, Dept. P, 7307 Fenton, Dallas 31, Texas.

**FREE!** Name brands catalog! Your own high profit business. Sell name brands, full or part time. No inventory, no investment. More than 2,000 name brand items; lowest wholesale prices. Watches, jewelry, cameras, hi-fi, stereo radios-phonos, appliances, housewares, hardware, power tools, luggage, musical instruments, garden equipment, sporting goods, toys, many others. 8 floors of name brands. Million dollar inventory. Orders shipped complete in 24 hours! Send for free, beautifully illustrated catalog now! Separate wholesale price list. H. B. Davis Corp., Dept. 11, 145 W. 15 St., New York 11, N. Y.

**PLATE** Baby shoes, jewelry, gifts. Bronze and colored pearl. We finance home businesses. Booklet free. Platex, 11029 South Vermont, Los Angeles 44.

**IF** You like motorcycles and money then send for Harley-Davidson dealership book on how to become a franchised dealer of motorcycles and a new line of motor-scooters. Here's a chance to own your own business with a very modest investment. The youth market is beginning to explode and the next few years promise a chance to cash in on it. Write for free illustrated dealership book today. Harley-Davidson Motor Company, Dept. P, Milwaukee 1, Wisconsin.

**BUY** Direct from factories. Appliances, cameras, watches! Free details! Cam Company, 6810PM—20th Ave., Brooklyn 4, N. Y.

**BUSINESSES**, Resorts, motels, investment property, ranches. Our special service dept. at your disposal. No obligation. World's largest. 58 years' service. Strout Realty, 7-MB S. Dearborn, Chicago 3, Ill.

**BIG** Money raising fishworms and crickets. Free literature. Carter Farms, Plains, Georgia.

**OPERATE** Mailorder folio business. Free details. Ballard's, 1834 Edgeland, Louisville 4, Ky.

**\$34.70** TWO Hours. Manufacturing concrete products. No selling. Carlayne Castings, 1803 Fremont, Rapid City, South Dakota.

**TO \$100.00** Weekly. Sparetime, home operated mailorder business. Successful beginner's plan. Everything supplied. Lynn, 10420-M National, Los Angeles 34.

**PIANO** Tuning learned quickly at home. Tremendous field! Musical knowledge unnecessary. Information free. Empire School of Piano Tuning, Champaign, Ill. (Founded 1935).

**WANT** To make big money at home? \$10.00 profit in an hour possible with invisible mending. Make tears, holes, disappear from clothing, fabrics. Steady year-round demand from cleaners, laundries, homes. Details free. Fabricon, 6234 Broadway, Chicago 40, Illinois.

**\$70 WEEKLY**—Home, spare time. Simplified mail bookkeeping. Immediate income—easy! Auditax, 34757A, Los Angeles 34.

**I Want** to send you proof of the wonderful pulling power of Popular Mechanics classified pages. What's your proposition? Write me today. Include literature if possible. F. W. Johnson, Manager Classified Advertising, Popular Mechanics Magazine, 200 E. Ontario St., Chicago 11, Ill.

**11,000** NEW Prospects daily. Baby record books, shoes, albums. Sell mailorder. Use our literature. Write: No-Co-Ro, Capitola, California.

**COPUBLISH** Mail Sale Advertiser, leading mail order paper. Details, latest copy, dime. Vanroy Shirk, Lebanon, Penna.

**FREE** Catalog. Contains hundreds of businesses, farms and income properties throughout U.S., Canada. Specify type and location desired. Deal direct with owners. U. I. Buyers Digest, 1608 Hillhurst, Dept. PM-3, Los Angeles 27, Calif.

**BRONZE** Baby shoes: Instructions, equipment and mountings for genuine electroplating process. Largest supplier of all plating equipment, supplies. Free catalog. Hollywood Bronze Supply, Dept. B-3, 1624 East First, Los Angeles 33, Calif.

**MAKE** \$46 From square foot plywood: jigsaw necessary. Free details. Woodart, Bridgewater, Mass.

**LIQUID** Molding rubber, free sample. Shellcraft supplies. Chaney's, 1907-A East Road, Jacksonville 11, Fla.

**FIX** Typewriters. Free repair course. Home operated. Remit 25¢ for book explaining free course and agency appointment. Athey, Tarentum, Penna.

**MANUFACTURER** Fishing lures, plastic, none better. 20 models pennies. Free circular. Quaker, 3514-24 N. Lawrence, Philadelphia 40, Penna.

**OPERATE** Profitable mail order business. Write Walter Service, 4159A East 112th, Cleveland 5, Ohio.

**EARN** Good money sharpening chain saws, scissors, cutters, knives. Free manual. Treyco, North Tonawanda, N. Y.

RE-Cast junk batteries into new. Latest achievements. Battery Laboratories, Bayou LaBatre, Alabama.

\$100 WEEKLY! Men, women! Work home! Sparetime. Free "Confidential Plan." Scott Sales, Box 388, Great Neck, New York.

IMPORT-Export business made easy. Individual setup service. Not just instructions. Hermes, 152 West 42, New York City 36.

BAKE New greaseless doughnuts in kitchen. Sell stores. Free recipes. Montgomery, 3605 South 15th, Minneapolis 7, Minnesota.

\$3.00 HOUR—Home, sparetime, assembling pump lamps. Easy. Free details. Ogor, Caldwell, Arkansas.

PLAQUES-Figurines-molds. Free details. Russo, 1196 Brooklyn, Bklyn 3, N. Y.

"MAIL Order World of Opportunities." Free subscription, details. GPO, Box 972-P, New York 1.

GAME Warden, government hunter, forestry, park and wildlife services announce job openings. All states. Enjoy outdoor work, good pay, real security. Complete information free! Write North American School of Conservation, Dept. DC-171, 1038 S. La Brea, Los Angeles 19, Calif.

FREE Book, "609 Odd, Successful Businesses." Work home; Box 1001-PMB, Evanston, Ill.

FOURTEEN Magic methods for extra home income. Free illustrated catalog. Dorco, Box 494, Muncie, Indiana.

MANUFACTURE, Import toys, vinyl dolls, plush animals, dollhouses. Huge profits. Benko, Box 188, New York City 21.

\$400.00 MONTHLY Raising giant worms. Odorless soilless method. Charlie Morgan, Bushnell, Florida.

\$250.00 WEEK Profit possible. Earn at home spare time with fascinating printing method. \$5 start you. Send no money now. Free confidential facts and valuable samples. Screen-Print TY, Los Angeles 61.

BE A notary. Information: Stationers, 515 East 33rd, Kansas City 9, Missouri.

NATURAL Molding rubber, extra thick. Free sample. W. Wooley, 1016-A Donald, Peoria, Illinois.

BIG Money—Operate own fix-it shop. Service household appliances, motors, mowers, saws, skates, etc. Free book. Christy Trades School, A-8503, 3214 Lawrence, Chicago 25.

GROW Living miniature forest (only inches high) or orchard that bears tasty tiny fruit. Learn amazing dwarfing secrets! Fascinating hobby! Profitable home-business opportunity! Free seeds and plan. (State your age.) Miniature Nurseries, Dept. JY, Gardena, California.

TAX Men are always in demand. Easy course offered. Lifetime occupation. Digitized and profitable. Free details. Kenneth Mills, 38238 Prospect, Willoughby, Ohio.

BUSINESS Kit free! Postcard puts you in business! Complete line 230 shoe styles, jackets! New discoveries pay big commissions. No investment. Send for free kit. Mason, Chippewa Falls KB-302, Wisconsin.

LEARN Professional TV servicing in one week! Fabulous new simplified system. No big expense. No studying. No tools or equipment. Spare, full time. Own your own big profit business! Save! Amazing but true! Free! Write: TV Systems, Dept. DC-171, 1038 So. LaBrea, Los Angeles 19, Calif.

TERRITORIES Open for "Auto-Moly" lubricant (doubles engine life). Small investment. Build future. State franchise. Pacific Lubricants, 5807-PM1 Beverly, Los Angeles 22, Calif.

IMPORT-Export opportunity, profitable, world-wide, mail-order business from home, without capital; or travel abroad. Established world trader ships instructions for no-risk examination. Experience unnecessary. Free details. Mellinger, C701, Los Angeles 24.

QUICK Profits, with no capital! Take orders for magazines your neighbors like, want. Make cash on the spot! We show how with free kit. Get yours now. Write McGregor Magazine Agency, Dept. 312, Mount Morris, Ill.

SEEKING New products? Get my outfit 47 money-making specialties. Latest conveniences for home, car. Send no money. Just your name. Kristee 114, Akron, Ohio.

"MAILORDER And the Law." Know about required licenses, federal and state regulations, taxes, etc. Only \$1.00. Included free: "Starting a Mailorder Business." Dorf, 186-M Covington Lane, Woodbury, New Jersey.

"50 NEW Home-Business Ideas" booklet, sample free. Spray exotic Velvet-Suede on anything. Flokraft-JY, Los Angeles 61.

DO You struggle to make ends meet. Our world-wide research offers many interesting opportunities. Details: World-Wide Research, 566 Bradford Ave., Fall River, Mass.

PRACTICAL Mailorder. Start small. Moneymaker (160), 722 East Silver Spring, Milwaukee 17, Wisconsin.

MAKE Extra money—Big cash commissions plus premiums for you and your customers. Sell advertising book matches. Sensational new tenor, glamour girls, hillbillies; dozens others. All sizes. Quick daily sales; big repeat business. Free master kit makes selling easy. No experience necessary. Superior Match, Dept. MX-160, 7530 Greenwood, Chicago 19.

MAILORDER To churches, motels, restaurants, institutions. Complete individual setup, not just instructions. Hermes Advertising, 152 West 42, New York City 36.

MAILORDER Magazines, catalogs, business opportunities, 25¢. Jack's House of Values, 3057 Brighton 4th Street, Brooklyn 35, New York.

MAKE Flexible molds. Cast plaques, figurines. Free sample. Tooker, 1045-R Fairview, Hamilton, Ohio.

PROFIT With Popular Mechanics' subscription plan. No investment, no experience needed. Earnings begin immediately when you obtain subscriptions for Popular Mechanics. Good Housekeeping and others. High commissions, bonus. No experience needed. Deal directly with the publisher. Write Popular Mechanics, Room 1B, 250 West 55th St., New York 19, N. Y.

HOME Shop manufacturer selling business, stock, tools, at cost. \$3000. Patented item. Nationally advertised. LaRue, 3000 Sheridan, Chicago 14, Ill.

\$3 HOURLY. Addressing-mailing weekly literature, regionally. Instructions 50¢. Refundable. Interstate, Delaware Station, Albany 9, N. Y.

START Your own business on credit (U.S. and Canada). Your own boss. 1383 dealers sold \$5,000 to \$33,500 in 1958. We supply stocks, equipment on credit. 200 home necessities. Sales experience unnecessary. Pleasant profitable business backed by world-wide industry. Write Rawleigh's, Dept. A-U-PPM, Freeport, Ill.

WANTED: Home producers, to be subcontractors. Cast plastic products for manufacturers in our clearing house service. Thousands of easily made items required. Cash in at home, without previous experience. Plastic Service Associates, Dept. 1-PM East Boston 28, Massachusetts.

LARSTONE Formula, foolproof, stucco paint, floor leveler, patching, etc. Quick profits, no risk, free details. 3419 9 East, Salt Lake City 6, Utah.

IMPORT. Mail-order, plastics offered in new three-in-one moneymaking opportunities. Free detail. Trialpha, 7950 Mammoth, Dept. F10, Van Nuys, Calif.

EXTRA Money unlimited with imports. For man and women. Shop International, Grangeville, Idaho.

HAIR Coloring pomade, proven mail-order success. Drop shipments. Marion Labs, Dept. 3P, Sunnyside, Long Island City, N. Y.

MAILORDER Business information. Details free. Fogle, Box 1004, Kermit, Texas.

MOTEL-Resort management. Qualify for hundreds fascinating, leisurely, well-paid executive openings. Learn at home. Free booklet. Motel Managers Training School, PM10, 612 S. Serrano, Los Angeles 5.

WANTED, Men, women. Raise bait for us at home. Full, spare time. Doesn't take up space. We furnish everything. Sherwood, Dept. T-2, Monmouth, Maine.

MAKE Own plastic cheap. 100 uses. Details. Stark, 14321 Wentworth, Chicago 27.

ENJOY A profitable business of your own selling the "World's Most Useable Bible." Profit from our 26 years experience. International Book Company, Dept. M., Box 118, Wichita 1, Kansas.

3000% PROFIT. Manufacturing needed home product. Easy. Sample, details, 25¢ (refundable). Stapleton Products, Lumber City, Georgia.

CASH From sawdust, tin-cans, newspapers. Over 200 methods. Instructions \$1.00. Charles Company, 42-GPS, Norwood, Ohio.

CAN The boss! Make strange building plastic from waste. Economical. Bays Laboratory, Chinle, Arizona.

BEGINNERS Mail order guide, rules, regulations. Listing mail order publications. 50¢. Curtiss Publications, 312 Olive, Porterville, Calif.

CANDIED Popcorn and potato chip equipment. Eakins, Box 933-AO, Springfield, Ohio.

IT'S Legal. How get-rich-quick mail order operators make thousands of dollars per month from classified ads costing as little as \$6.00! Many methods fully explained. Written by a practicing classified ad executive. Send only \$2.98 to Robert G. Wickham, Box 737, Clovis 1, New Mexico.

HOMESHOP Owners. Where and how to find work. Details free. Homeshops, Box 272P, Meadville, Penna.

LEARN Appliance service and repair. Motors, washers, refrigeration, cleaners, everything. Free booklet. Appliance, 11027 South Vermont, Los Angeles 44.

RAISE Rabbits on \$500 month plan. Free details. White's Rabbitry, Mt. Vernon, Ohio.

MADE \$10,000.00 Typing at home. Guaranteed proof. Amazing information 15¢. Lenore Felgen, 30 Washington, Oak Park, Ill. Dept. PM.

NEW Home-Import mail order profitability! Your mailbox stuffed with money! No selling. No experience. No investment. We supply everything. Free details. Mail Order Distributors (Import Division), 15201 South Broadway, Los Angeles B51C, Calif.

OPERATE Profitable low cost mail-order business! Write! Liberty, 210-PMJ6 Fifth Ave., New York 10, N. Y.

QUICK Money painting names on rural mail boxes. Instructions \$1.00. Jay, Box 574, New Orleans 7, Louisiana.

\$400 MONTH In unique new profit-sharing mail order system. Home Business Digest, 3026 Waterloo, Chicago 14, Ill.

EXCEPTIONAL Home business. Demands investigation. Free materials. Box 2012, Duncan, British Columbia.

GUARANTEED Market. Raise fishworms for us. Free details. Golden Farms, Lubbock 20, Texas.

BE A manufacturer. We supply pre-cut parts for new exclusive item. Small investment. Details free. Modern Home Co., Box 172, Northfield, Ohio.

HANDY Men to sell and install Met-L-Trak, the finest all-aluminum weather-strip-sash guide with built-in parting strip. Keeps wood windows weathertight at all times. F. L. Murphy, 79 Pleasant St., Dorchester, Mass.

PROFITABLE Home mail order business! Particulars free. Progressive, Box 422-B, Raymond, N. H.

"MAILORDER Laws and Regulations" and "Mailorder Rules for Beginners." \$2.00. Explain mailorder licenses, mail-order taxes, etc. Alvin Radford, 1200 Taylor Street N.W., Washington, D. C.

"A Mail Order Business of Your Own." New factual illustrated manual written by expert shows how. \$2 postpaid. Satisfaction guaranteed or money back! Free details. Wagner, 110 Callodine, Buffalo 26, New York.

MUSHROOMS Easier, quicker, cheaper. Magic preplanted trays. Newest facts free. "Mushroom Growing Handbook," illustrated, 96 pages, \$1.85. Spawn \$1.00, both \$2.00. Luxur, 641 South 19th St., Newark 3, N. J.

START Your own business. Be independent. Details free. Bryant, 1505½ Chestnut, Paso Robles, Calif.

**DOLLAR Maker tips.** Book of hard to find information on spare time business opportunities, \$3.00. No C.O.D. Bryant, 1505½ Chestnut, Paso Robles, Calif.

**FREE Details!** Your own business at home! Wide-open growing field. Experience unnecessary! No public contact! Free guidance anytime. It's new! It's different! Columbia, 9268-PM, 9268 Piney Branch Road, Silver Spring, Maryland.

**FABULOUS Profits** in exterminating! Easy. Information. F. Breeden, 3209 Marvin, Overland 14, Mo.

**EARN \$100.00 Weekly** part time from your arm-chair and in one year you'll receive a free trip to Europe for two. No selling. No mailorder. Pan Pacific, MAP, Box 595, Laguna Beach, Calif.

**LIQUID Marble.** Colorful, glossy; Molded, brushed, sprayed! Particulars free. Marbleizing Service, Edwardsville, Illinois.

**BEAUTIFUL Planters** from cans. Vyke Co., 4158 Jason, Denver 11, Colo.

### **MONEYMAKING OPPORTUNITIES**

**FREE:** Mailorder at its best. Beatty's, Box 4754P, Baltimore 11, Md.

**SQIGGLES!** Spaghetti shaped, donut tasting confection! Easily made. Wild-fire seller! Instructions and sample \$1.00. HHP, Route 3, 456-B, San Jose, Calif.

**CASH** For writing short, simple items! Walsh, Talbotville, Ontario, Canada.

**PROFITABLE Homework!** Guaranteed earnings. No selling. Everything supplied. Elvee, 556 Beacon, Manchester, N. H.

**MINK** Raising information free. Complete. Lake Superior Mink Farm, Superior, E.E.I. Wisconsin.

**VENDING Machines.** No selling. Operate a route of coin machines and earn amazing profits. 32-page catalogue free. Parkway Machine Corporation, Dept. #26, 715 Ensor Street, Baltimore 2, Maryland.

**GROW Mushrooms.** Cellar, shed and outdoors. Spare, full time, year round. We pay \$4.50 lb. dried. We have 29,000 customers. Free book. Mushrooms Dept.: 173, 2954 Admiral Way, Seattle, Wash.

**CIGARETTES:** Make 20 plain or filter-tips for 9¢. Facts free. Moberly, Box 821, Owensboro, Kentucky.

**EARN Money** evenings copying and duplicating comic cartoons for advertisers. Adservice, Argyle 1, Wisconsin.

**YOUR Own, easy-to-start, home mail-order business, sparetime.** Fascinating; profitable! Information free. Alfano, 19-PM Pine, Closter, N. J.

**BIG Money** raising fishworms and crickets. Free literature. Carter Hatchery, Plains, Georgia.

**READ "Progressive Mailtrade,"** the magazine that tells how to make money by mail. Quarter brings sample and special offer. Progressive Mailtrade, Box 357, Sheboygan, Wisconsin.

**WIN Contest money.** General Contest Bulletin gives hundreds of tips. Lists current contests, rules. Sample magazine 25¢. General Contests, 1609½ East 5th, Duluth 12, Minnesota.

**SELL Information** by mail. 10-to-1 profit ratio. Valuable suggestions free. Rawson Wood, 2753-F Fullerton, Chicago 47.

**AMAZING Successes** through franchises! Become exclusive franchise holder your territory. Information rushed. National Franchise Reports, MP-528, 333 North Michigan, Chicago 1.

**START Big-pay business** at home in spare time. No experience needed to operate little table-top machine for bronzing baby shoes. Make \$5.46 profit on every pair. Full particulars free. Send postcard to Mason, 1512 Jarvis, Room CM-2-A, Chicago 26, Ill.

**TEAR Out this ad,** and mail with name, address for big box of home needs and cosmetics for free trial, to test in your home. Tell your friends, make money. Rush name. Blair, Dept. 31DA, Lynchburg, Va.

**MEN - Women!** Start money-making plastic laminating business at home in spare time. Material that costs 11¢ brings back \$2.50. No canvassing or selling but mail orders bring in \$20 a day. Write for full particulars free. Rush name on postcard to Warner, Room CL-2-A, 1512 Jarvis, Chicago 26, Ill.

**EASY To start rubber stamp business** at home in spare time. Make up to \$9.80 an hour without experience. Facts free. Write to Roberts, 1512 Jarvis, Room CR-2-A, Chicago 26.

**MONEY In chemicals!** Make own products! Pocket all profits! Others work for you! Details free. Ranslow, 51 W. 32 St., Hialeah, Florida.

**SELL Diamonite gems;** more brilliant than diamonds. Credit arranged. Catalog 10¢. Diamonite, 2420-M 77th, Oakland 5, California.

**BUSINESS Kit free!** Postcard puts you in business! Complete line 230 shoe styles, jackets! No investment pay big commissions. No new investment. Send for free kit. Mason, Chippewa Falls KM-302, Wisconsin.

**MECHANICALLY Inclined?** Want security, business, prestige, high pay, and quickly? Ray Adcox, 2210 North 48, East St. Louis, Illinois.

**MAKE Big easy profits** making costume jewelry at home in spare time! Quick, easy to make, easier to sell! Details free! Don-Bar, 3511 W. Armitage, Dept. A-192, Chicago 47, Illinois.

**MAKE Money** writing short paragraphs! No tedious study. I tell you what to write, where and how to sell; and supply list of editors buying from beginners. Many small checks add up quickly. Write to sell, right away. Send for free facts. Benson Barrett, Dept. C-27-N, 7464 Clark, Chicago 26.

**IN 1952 I was unemployed, broke.** Today own \$18,000 home, drive Cadillac, have bank account. Anyone can do this. Write Norris Cole, 217 West 49th, Bradenton, Florida.

**MONEY-MAKING Opportunities,** Jobs, businesses, real-estate, investments, retirement. Free literature. Shoreland, 20 W. Jackson, Suite 1412, Chicago 4, Illinois.

**START A profitable subscription business** in spare time! We need men and women (young or old) as representatives for all leading national magazines. Liberal commissions on all subscriptions. Supplies free. No experience needed. Send this ad with your name and address to: Popular Mechanics, Room 1-0, 250 W. 55th St., New York 10, N. Y.

**NEW-Electric plastic laminating kit.** Easy. Profitable. Details. Burr Plastic, 330 East Centre, Kalamazoo, Michigan.

**\$200.00 MONTHLY,** Spare time. With tablesaw, bandsaw or jigsaw. Write. Holiday House, 7228 4th Plain, Vancouver, Washington.

**FURNISH Names.** Earn commission. Details free. Box 127, Denver 11, Colo.

**BIG Mail kit** contains "Cream of Crop" plans, ideas, special offers, for starting successful home moneymaking business! Details rushed free! Direct Mail Service, Box 581-PM, Bakersfield, California.

**OPERATE Profitable home import business!** Details free. Direct Mail Service Company, Box 581, Bakersfield 10, Calif.

**FREE Details-How to make big money** selling books by mail! Direct Mail Service Company, Box 581, Bakersfield, California.

**WIN Contests.** Latest contests, helps. Contests, 25 Earl, Red Bank, N. J.

**DANDY Moneymaking offer.** Profitable homework. Wall Mfg. Works, 1071 Linden, Zanesville, Ohio.

**SPARETIME Income** stenciling simple monograms. Experience unnecessary. Co-art, 111 Cronkhite, Danville, Illinois.

**REAL Opportunity** own profitable mail-order business. Sunny, 605 Alabama, Brooklyn 7, N. Y.

**\$340.00 MONTHLY** With jigsaw. Details. Elkman, 346F North Summit, Sioux Falls, So. Dak.

**GET Money** for newspaper clippings. Free details. Write: Whitted-16A, 2815 Nicholson, Dallas 24, Texas.

**PLATE Baby shoes, jewelry, gifts.** Bronze and colored pearl. We finance home businesses. Booklet free. Platex, 11029 South Vermont, Los Angeles 44.

**LEARN Appliance service** and repair. Motors, washers, refrigeration, cleaners, everything. Free booklet. Appliance, 11027 South Vermont, Los Angeles 44.

**700% PROFIT!** Learn how \$1 invested returns \$8 at once plus opportunity for unlimited income. No selling. Rush \$1 to Emerse Company, P.O. Box 125, Lincoln 1, Nebraska, for complete plan and free wholesale catalog.

**\$100 WEEKLY.** Mail-order business, little or no stock. Eblly, 3026 Waterloo, Chicago 14, Illinois.

**CAMERA Owners** big money for your snapshots. 100 top markets. Guaranteed. Send \$1.00. Brown, Box 2294, Philadelphia 7, Penna.

**MAKE Big easy profits** making costume jewelry at home in spare time! Quick, easy to make, easier to sell! Details free! Don-Bar, 3511 W. Armitage, Dept. A-192, Chicago 47, Illinois.

**GET \$10.00 Orders** by mail—keep \$8.00! Everything supplied. Albert, 2904 Unruh, Philadelphia 49, Penna.

**"BOOKKEEPING System** for Mailorder Beginners," \$1.00. Alvin Radford, 1200 Taylor Street N.W., Washington, D. C.

**AMAZING Earnings!** Become specialist with Diviningrod, Sideric Pendulum, etc. Startling information free! Radiesthetic Research, Dept. C, Box 41222, Los Angeles, California.

**RECEIVE Bushels of mail!** Get listed for life! Receive hundreds free product samples, free magazines, free money-making offers. Rush 25¢ and stamped addressed envelope. Columbia, 9268-MH, Piney Branch Road, Silver Spring, Md.

**INTERESTING Occupations.** Money-making, moneysaving ideas! Guarprod, 2036AP-66th, Brooklyn 4, New York.

### **EXPORT - IMPORT**

**FOR Exportation** into East Africa of any cheap item specially intended for Africans trade, contact Hepburn (Africa) Limited, P.O. Box 9953, Nairobi, Kenya.

**ADDRESSES** Of 100 foreign firms, \$2.00. Reid, Box 481, Clinton, N. C.

**DIRECTORY** Listing over 300 selected firms in 50 foreign countries exporting gifts, novelties, amazing money making offers. \$1.00. Imports Unlimited, 5916 California Street, San Francisco 21.

### **FORMULAS. PLANS. ETC.**

**FORMULAS.** Good ones. List free. Tops Laboratories, Box 43631-B, Hyde Park Station, Los Angeles, Calif.

**RESILVER Mirrors—make one-way mirrors.** Both \$1.00. Kem-Mir, Park Ridge, Illinois.

**NON-POISONOUS Fly repellent.** Dean Switzer, Chandler, Arizona.

**LATE, Modern manufacturing formulas.** List free. Moon Chemical, Martville, New York.

**FORMULAS** For latest money-making discoveries. New! Good! Valuable literature free! Miller, Chemist, 1517-D, Tampa, Florida.

**FORMULAS:** All kinds, latest, best. Literature free. Kemixal, Park Ridge, Ill.

**OPPORTUNITIES, Unlimited!** Latest specialty formulas, analyses, development, consultation. Monthly report of newest products. Exciting details, free. Alpha-Midwest, LaPorte, Indiana.

### **PLASTICS**

**LAMINATING Supplies.** Price list free. Solomon, 4 Beacham, Everett 49, Mass.

**CELLULOID Scrap.** Sheets, state thickness, colors. Celluloid, Box 8096, Newark 8, New Jersey.

**SIMPLIFIED Plastic** molding, repairing, trial unit \$2.00. Hallmark Dental Co., Box 1924, Detroit 31, Mich.

**LEARN Plastics** fabrication for spare time income. Low cost home training now available. Write for free booklet. Interstate Training Service, Dept. D-3, Portland 12, Oregon.

**PLASTICS—Plexiglas, Polyester, fiberglass, Acetate, supplies.** Manufacturers' distributor, sheets, rods, tubes, liquids, coatings, films. Large, small quantities. Complete instructive catalog, 50¢. Details free. Gem-O-Lite, 5529-X Cahuenga Blvd., North Hollywood, California.

**NEW Liquid casting plastic, clear, colors.** Embed real flowers, butterflies, photos, coins. Send 25¢ for two handbooks "How to Cast Liquid Plastics" and "How to Make Extra Money at Home." Castolite, Dept. A-101, Woodstock, Illinois.

**ELECTRIC Laminating kit.** Fun. Easy. Profitable. Details. Your social security card permanized in plastic, 25¢. Send now. Burr Laminating, 330 East Center, Kalamazoo, Mich.

**BOXES, Plastic.** Free list. Althor, 170 Bay 23 Street, Brooklyn, N. Y.

**PLASTIC** And supplies for laminating. Colamco, 12 Center, New Haven, Conn.

**DO-It-yourself** casting, molding, modeling plastics. Clear colors, accessories. No experience or machinery necessary. 64 page catalog 25¢. Castacraft Corp., Dept. A-23, P.O. Box 555, Palo Alto, California.

**LAMINATE-It yourself** pack \$1.00; Acetate, Mylar, folders, envelopes. Assortment \$1.00. Major's, 1740-B Columbia, Chicago 26.

## CHEMISTRY

**AMAZING** New book of science experiments, formulas, and catalogue of laboratory supplies. Only 35¢. National Scientific Co., 13 S. Park Avenue, Dept. PM-1, Lombard, Illinois.

**SMALL** Quantity chemicals. Apparatus, glassware, biology supplies. Illustrated catalog 25¢. Bio Chemical Products, Sumerset, Belmont, Massachusetts.

**EXPERIMENTERS—"Bargains Galore"** catalogue 25¢ (refundable). Hagenow Laboratories, Manitowoc, Wisconsin.

**ROCKET** Chemicals, supplies. New Catalog and plans sent with sample kit of tubes, fuse, chemicals, zinc and sulfur, \$1.00. Central Rocket Company, Waupaca, Wis.

**ROCKET** Supplies for amateur rocketry. Catalog 25¢. Mervin Hill Company, Boltz Pennsylvania.

**MICROSCOPE** Slides, anatomical. Free list. Bay, 409 Roosevelt, San Francisco 14, California.

**CHEMICALS** And apparatus for industrial, analytical, and private laboratories. Catalog 25¢. Dept. M-50, Biological Supply Co., 1176 Mt. Hope Ave., Rochester 20, N. Y.

**ILLUSTRATED** Catalog: Chemistry, mineralogy, biology 25¢. Tracey Laboratories, Evanston, Illinois.

**CHEMISTRY, Microscopic.** Insect, butterflies, rocks, minerals. Sets complete. Literature. Amateur Chemist and Microbiologist, 208 East Eleventh, Kansas City, Mo.

**232 PAGE** Catalog \$2.00. Laboratory materials. 7319 Vincennes, Chicago, Ill.

**CHEMISTRY** Catalog, 25¢; experiment book, 25¢; used list. Laboratory Sales, Box 161-A, Brighton, Mass.

**NEW 52 Page** science catalog. Prices reduced 30%. Catalog 25¢. Winn Chemicals, 124M West 23 St., New York 11.

## AGENTS WANTED

**MEN-Women** agents: Sensational new moneymakers — Beautifully hand-painted, plastic personalized photo enlargements, compacts, rings, bracelets, lockets, etc. Simply take orders, pocket 40% commission. We deliver and collect. Sales outfit free. Novelco, 3343 North Ave., Chicago 47.

**START** Your own International Shopping Service. Offer unique foreign imports at amazing discounts. Capital unnecessary. Free details. Bennett, 956-C, 52nd, Brooklyn 19, N. Y.

**GOLD** Or silver letters, numbers. Windows, doors, trucks. 1" to 6". 500% profit. Free samples. Atlas, Box 543-T, Oak Lawn, Ill.

**\$25 A Day** easy with 60% profit. Friends and neighbors will thank you for demonstrating new beauty tips and most glamorous ways to use famous Studio Girl Hollywood Cosmetics. Information I send you quickly qualifies you as a beauty adviser so you can make up to \$25 or more a day to start—or \$5.00 an hour for spare time. If you write me today I will include actual samples for which you pay nothing, now or ever. Send name, letter or postcard, to me personally. Harry Taylor, President, Studio Girl Cosmetics, Dept. 1201K, Glendale, Calif.

**BEAUTIFUL** Feather pictures! Free details. Sample 20¢, stamps. Apartado 1668, Mexico 1, D.F.

**EVERY** Man a prospect. Request refundable sales kit offer showing line of belt buckles, tie clasps, money clips, cuff links, lapels, individualized with customer's name and emblems, also cap badges for trucking, bus, taxi, police, firemen. Choice 3,000 emblems. Hook-Fast, Box 1425PM, Providence, R. I.

**BUSINESS** Kit free! Postcard puts you in business! Complete line 230 shoe styles, jackets! New discoveries pay big commissions. No investment. Send for free kit. Mason, Chippewa Falls KA-302, Wisconsin.

**BUY** Wholesale—25,000 items. Catalog 25¢. Matthews, 1480-C7 Broadway, New York City 36.

**WILL** You test new items in your home? Surprisingly big pay. Latest conveniences for home, car. Send no money. Just your name. Kristee 69, Akron, Ohio.

**\$1,000.00** A Month for making dramatic 3-second demonstration of amazing lightweight Presto Fire Extinguisher. New chemical used by airforce snuffs out fires instantly. Only \$4.95. Terrific commissions. Millions want it. Free kit. Merlite, 114 E. 32nd, Dept. P-66H, New York 16.

**DAMASCENE** Earrings! Exotic Orientalism. Huge profit. Ohga, PM-171, Sigakokusatu, Japan.

**BE** The Popular Mechanics representative in your neighborhood and earn big profits in your spare time. Write Popular Mechanics, Room 1-A, 250 West 55th St., New York 19, N. Y.

**RUN** A spare-time greeting card and gift shop at home. Show friends samples of our wonderful new 1960 all-occasion greeting cards and gifts. Take their orders and earn up to 100% profit. No experience necessary. Costs nothing to try. Write today for samples on approval. Regal Greetings, Dept. 58, Ferndale, Mich.

**REAL** Money making franchised territories open, selling nationally known Swami car polishing cloth, with General Electric Silicone oil. Part or full time. Over 1 million sold in U. S. Steady repeat business. Mill River Automatic Products Corp., Great Neck, N. Y.

**NEW** Car thief signal. Lightning seller. Thirty day trial. Northwest Electric, 274, Mitchell, South Dakota.

**WANTED.** Fire extinguisher salesman. Huge profits. Out-O-Matic, 1737B E. 31st Ave., Denver, Colo.

**PATENTED** Slipper massages feet while wearing. Sells \$5, cost \$3. Exclusive territories. Massgematics, 1901-S 12th, Allentown, Penna.

**LARGEST** Profits for you selling business cards. Free kit. Middaugh Printers, Dept. A1, Sugar Creek, Ohio.

**SELL** \$1.00 Bottles vanilla imitation for only 75¢, cost only 25¢. Write Frazier Extract, Winston-Salem 1, N. C.

**AGENTS—**Plastic coinwrap, counts and wraps pennies, nickels. Free details. Sterling Discount House, Box 626A, Dania, Florida.

**BIG** Profits. Stamp social security plates, key protectors. Sample 50¢. Catalog free. General Products, 188-PM State, Albany 10, N. Y.

**MEXICAN** Art goods! Free sample! Send 14¢ stamps mailing. Sylviak, Apartado 9036, Mexico City.

**EASY** Handwork makes fast-selling useful articles. Sample free. Sunmade Company, Brockton 64, Massachusetts.

**PRINTING.** Advertising salesmen—Excellent moneymaking sideline selling decalomania name plates, small quantities. Automobile initials, sign letters. Free samples. Ralco, XL, Boston 19, Mass.

**YOUR** Ad in this space will get you good agents for you. Yes, I'll prove it. Write for Folder "A" right now. F. W. Johnson, Classified Advertising Manager, Popular Mechanics Magazine, 200 E. Ontario St., Chicago 11, Ill.

**SELL** Champion, AC, Autolite spark plugs. Reconditioned, electroplated, guaranteed 10,000 miles. 100% profit. Free sample. Lee Plugs, 1608-E Roberts, Houston 3, Texas.

**YOUR** Own business—Used suits \$1.50; overcoats 65¢; mackinaws 35¢; shoes 12½¢; ladies' coats 30¢; dresses 15¢. Enormous profits. Catalog free. National Mail Order, 2111-AA Roosevelt Road, Chicago 8, Ill.

**BIG** Profits selling ties. \$2.00 value. \$6.50 dozen. Free catalog. Empire Cravats, 656-PM Broadway, New York City 12.

## BUY IT WHOLESALE

**WHOLESALE** Catalog: appliances, tools, toys. 25¢ refundable first order. Mathes Wholesale Outlet, 2901 Leslee Lake Drive, St. Petersburg 13, Fla.

**FREE** Wholesale bargain catalog on appliance, housewares, watches, tools, etc. 25¢ refundable. Robert French, 1804 So. 23rd Street, Louisville 10, Kentucky.

**WHOLESALE:** 850,000 Items. Supply source directory 25¢. Idealer, Park Ridge, Illinois.

**FREE** Catalog. Hand made western boots. Hall Boots, Box 246M, Ysleta Station, El Paso, Texas.

**NEW** Multicolor wholesale catalog, automobile catalog, and others. Housewares, appliances, refrigerators, freezers, washers, dryers, television, radios, furniture, clothing, luggage, binoculars, phonographs, recorders, cameras, projectors, typewriters, sewing machines, power tools, toys, sporting goods, watches, jewelry. Name brands. Huge discounts. Postcard: Selbyco, Decatur 152, Illinois.

**ELECTRIC** Guitars, amplifiers, wholesale. Free catalog. Carvin, PMW, Covina, Calif.

**BUY** Wholesale; 100,000 nationally advertised products. Appliances, cameras, sporting goods, housewares, watches, typewriters, tools, clothing, etc. Discounts to 60%. Buy-Rite, Box 258, Hawthorne 2, New Jersey.

**USED** And new watches \$2 up. Free list. Southern Watches, 5-PM So. Wabash, Chicago 3.

**LARGEST** Wholesale supply source in U.S.! Furniture, clothing, appliances, housewares, automobiles and accessories, tools, sporting goods, hobby supplies, farm equipment, imports, new products, bargain merchandise. Free details. Associated Wholesalers, Box 2068-DD, Sioux City 4, Iowa.

**2,000** PAGES Wholesale catalogs. Write: Mopam, Box 47, Newark, Ohio.

**BUY** Nationally advertised products at discounts to 60%. Appliances, watches, cameras, clothing, housewares, jewelry, toys, typewriters, tools, etc. Stephens Distributing Co., Box 1434, Atlanta 1, Ga.

**BOOTS.** Handsome western styles. Free catalog. Austin Boot Co., Box 5303J, El Paso, Tex.

**SAVE 65%!** Clothing, appliances, furniture, etc. United Wholesalers, 1265-M Broadway, New York 1, N. Y.

**BUY** Wholesale from 257 American, European, Japanese suppliers and tailor made suits from HongKong. World's largest supply. Write International Buyers, 216-M West Jackson Blvd., Chicago 6, Ill.

**TERRIFIC** Discounts. Brand names. Catalog free. Ed's Shopping Service, 1505½ Chestnut, Paso Robles, Calif.

**SAVE 80%!** Illustrated wholesale catalog 25¢. Cam, Barrett Hill, Lake Carmel, N. Y.

## SALESMEN—DISTRIBUTORS

**MAKE** Up to \$50.00 a day soliciting delinquent accounts. Terrific commissions. Write today. National Credit, 304Y Pickwick Bldg., Kansas City 6, Mo.

**SALESMEN.** Big money showing nationally advertised Down-Spout-O-Matic sensation wherever shown. Attaches to all down spouts, uncoils when it rains, recoils after it rains. Once in a lifetime item. Dry basements guaranteed. Commissions advanced. Special sample offer. Campbell Co., Rochelle 63, Illinois.

**MAKE** Extra money selling advertising matchbooks. Free catalog and sales outfit. Matchcorp., Dept. PM-10, Chicago 32.

**MAKE** Money selling sensational dwarf trees — Bear giant-size apples, peaches, pears. Ornamental. Also Stark-Burbank standard trees, roses, shrubs, vines, etc. Outfit free. Stark, Dept. 30110, Louisiana, Missouri.

**LIMITED** Number of distributors needed for "REN" typewriter ribbon reconditioner. Sample and details \$2.00. Modern Merchandise, Box 77531-PM, Los Angeles 7, Calif.

**WANTED:** Direct salesmen, distributors. 3-alarm instantaneous burn relief. Send \$1.00 for trial package. Dubbiarr Labs, St. Simons Island, Ga.

**MAKE** Extra money—Big cash commissions plus premiums for you and your customers. Sell advertising book matches. Sensational new tenoramas, glamour girls, hillbillies; dozens others. All sizes. Quick daily sales; big repeat business. Free master kit makes selling easy. No experience necessary. Superior Match. Dept. M-160, 7530 Greenwood, Chicago 19.

**CALENDARS.** Advertising novelties, matches. All styles, including religious, varnished, 12 sheet, girls. Hundreds of advertising novelties, book matches, etc. Fleming Calendar Co., Sales Division, 6539 Cottage Grove, Chicago 37, Ill.

**BUSINESS** Kit free! Postcard puts you in business! Complete line 230 shoe styles, jackets! New discoveries pay big commissions. No investment. Send for free kit. Mason, Chippewa Falls KS-302, Wisconsin.

**ANYONE** Can sell famous Hoover Uniforms for beauty shops, waitresses, nurses, doctors, others. All popular miracle fabrics—nylon, dacron. Exclusive styles, top quality. Big cash income now, real future. Equipment free. Hoover, Dept. A-100, New York 11, N. Y.

**HOW** Much money can you make with amazing new product giving 58% more power, 54% gas saving, to cars, trucks—proved by laboratory test. \$1,500 in month possible. Write for free money-making plans and proof. Pope Chemical, 114 E. 32nd St., Dept. G-58, New York 16, N. Y.

**WILL** You wear new suits and topcoats without one penny cost and agree to show them to friends? You can make up to \$30.00 in a day even in spare time, without canvassing. W. Z. Gibson, Inc., 500 S. Throop St., Dept. B-626, Chicago 7, Ill.

**SERVICE** Your area. Agents, dealers, farmers make \$125 up weekly distributing nationally advertised Campbell's Gro-Green Liquid and 100% soluble crystal fertilizer concentrates. No investment. Demonstration kit furnished. Campbell Co., (Est. 1928), Rochelle 5, Ill.

**I'LL** Send you free stocking sample newest advancement in hosiery since nylon. Patented, full-length. Stays up over-the-knee without supporters, without girdle! Nationally advertised price \$1.95. Make money introducing to friends at \$1.00 pair. American Mills, Dept. 350, Indianapolis, Ind.

**\$1,000.00** A Month for making dramatic 3-second demonstration of amazing lightweight Presto Fire Extinguisher. New chemical used by airforce snuffs out fires instantly. Only \$4.95. Terrific commissions. Millions want it. Free kit. Merlitta, 114 E. 32nd, Dept. P-66H, New York 16.

**CELLAR** Flood alarm. New invention prevents silent water damage from sump pump failure, burst water pipes. Large profits! Demonstration means sale! Interested? Write: Bristol Corp., 2450 Dewey Ave., Rochester 15, N. Y.

**SELL** Auto snack-bars. Holds sandwiches, drinks. Swings under dash. Retail \$4.75. Sample with display, \$3 postpaid. Southern Electric Products, Anderson, South Carolina.

**FULL.** Part time. Babies' patented jumper-exerciser. Booming market. Nationally known. Big profits. Free testimonials, literature. Shurtliff Manufacturing, 225 South Tenth, Pocatello, Idaho.

**MANUFACTURER** Of popular priced advertising specialties pays amazing 33 1/3% commission. Earn \$20 or more on every sale. Income unlimited. Williamson Co., 601 W. Washington, Chicago 6.

**71,000** ADVERTISING Novelties. Fifteen samples, \$1.00. (Refundable). Adelphia Specialty, 212 Yellowstone Rd., Plymouth Meeting, Penna.

**YOUR** Free copy of world's biggest sales magazine tells you how and where to make more money on your own in selling. Write Specialty Salesman Magazine, Desk 5B, 307 North Michigan, Chicago 1.

**IF** You're interested in making money in selling, see the hundreds of exceptional opportunities in Salesmen's Opportunity Magazine. Send name for your copy, absolutely free. Tell us what you're selling now. Opportunity, 848 N. Dearborn, Dept. 17, Chicago 10, Illinois.

**SELL** The hottest line of fishing tackle in 1960. Over 40 items. Free details. Samples \$3.50 value, \$2.00. Pat's Fishing Tackle, Box 164-P, Sheboygan, Wisconsin.

#### EMPLOYMENT INFORMATION

**EXCLUSIVE** Job information. U.S.A.—world-wide. Up to \$1500 monthly. Free information. Elsinger, Box 12, Detroit 13, Mich.

**COMPLETE** Job-hunter's guide \$1.00. Jobsco, Box 646, Scranton 2, Penna.

**CALIFORNIA** Job opportunities. Jim Smith, Box 6356, Los Angeles 55, Calif.

**FLORIDA** Jobs—West coast. \$1.00. 405 Virginia, New Port Richey, Florida.

**WANT** A good overseas or stateside job with higher pay? Transportation paid. Men—women. Free information. Employment Headquarters, 79 Wall Street, Dept. B-4, New York 5.

**MIAMI** Job classifieds. Male and female. \$1.00. Kay's Service, Box 7163, Miami 55, Florida.

**CHICAGO** Jobs, classifieds, over 1000 openings. Send \$1.25. McCarthy, P.O. Box 8536, Chicago 80, Ill.

**BOOMING** Latin America! Prosperous Brazil, Venezuela. Only hours from the States. New data regarding jobs, opportunities, conditions. American companies employing, etc. All skills required. Salaries to \$1,650.00 monthly; U.S. tax exempt. Bonuses, living allowances, travel expenses, exciting vacations, and more! First-hand information direct: \$2.00 (\$2.35 airmail) checks or money orders. Latin American Opportunities, Sabana Grande, Apartado 10212, Caracas, Venezuela.

**JOBS** On ships. \$100 weekly, beginners. Travel, adventure. Write: Seamans Service, Box 17-M, Brooklyn 8, N. Y.

**COMING** To Florida? Send for complete report. Jobs, salaries, cost of living. Information you need. \$2.00. Survey, 904 Chamber of Commerce Bldg., Miami 32, Fla.

**FOREIGN** Jobs—Latin America, Alaska, Canada, up to \$1500 monthly. Up-to-date 1960 foreign service directory gives complete information; hot list of firms hiring for military and civilian construction, aircraft, oil, exporters-importers, mining. How-when-where to apply. 12th successful year. \$1.00. Global Reports, Box 8873-S, Los Angeles 8, Calif.

**JOBS** On ships and yachts traveling foreign countries. Davenport's, 1354-K, G.P.O. New York 1, N. Y.

**COPYRIGHTED** Reports. Best paying companies, travel, adventure, promotions. Construction, aviation, shipping, oil fields, laborers, clerical, trades, supervisory, factory, unusual opportunities. Skilled, unskilled. Foreign, stateside. Only \$2.00 (\$2.25 airmail) (COD'S accepted). Satisfaction guaranteed. Included free: Special reports on Alaska, Venezuela, South America. Research Services, Meramec Building, St. Louis 5-PM, Missouri.

**FREE** Information—U.S.A., overseas jobs. High pay, transportation. Futures, Dept. M, 215 West 34th Street, New York City 1.

**LATEST** Foreign jobs. Highest wages, unlimited opportunities. Laborers, clerical, construction, electronics, oilfields, civil service. \$2.00 airmail. America's leading overseas employment researcher. Plus: newest South America, Alaska, Venezuela listings. Universal Research, Box 4912, Baltimore 20, Maryland.

**MERCHANT** Marine jobs. Top wages. Travel. Details free. Captain, Box 501-P, Reading, Massachusetts.

**PARIS!** Copenhagen! All Europe. Many high-paying jobs available with American companies in Europe. All fields. Travel, adventure, satisfaction guaranteed. Complete information, registration, advisory service from Europe's finest employment service. \$2.00. (\$2.50 airmail). European Employment Service, P.O. Box 3973, Frankfurt/M. 1, Germany.

**JANUARY** Foreign job list airmailed \$1. New Horizons Monthly, 550 Fifth Avenue, New York 36, N. Y.

**U. S. A.,** Foreign jobs, up to \$1500.00 monthly. Construction, clerical, supervisory, etc. Skilled, unskilled. Free transportation. Unusual opportunities. Complete information plus worldwide project listings. Only \$2.00 (\$2.25 airmail). Satisfaction guaranteed. International Reports, Dept. G, P.O. Box 621, San Jose 6, California.

#### SPECIAL SERVICES

**BIRTH** Certificates. Any state. Results guaranteed. Millers Service, Inverness, Florida.

**SHREWD** Buyer? That's you, by knowing what local dealers pay for name brands they sell: autos, accessories, appliances, etc. Amazing 64-page book reveals dealer costs of hundreds of famous products. Helps you bargain to rock-bottom. Rush \$1.00 for book, ppd. Money-back guarantee. Consumers Digest, 1102 Third Ave., Dept. A-51, Des Plaines, Ill.

**BIRTH** Certificates. Any state. Results guaranteed. Millers Service, Inverness, Florida.

**TEN** Unusual businesses, needed everywhere. These amazing profit-makers started for \$50-\$500 in sparetime. Soon developed into full-time big profits. \$1.00 now brings complete setting-up and operating plans. Business Research Foundation, Box 5034, El Paso, Texas.

**FREE!** Will seal in plastic one pocket size card free. Others 25¢ each, minimum order \$1. Send self-addressed envelope. National Plasti-Seal Company, P.O. Box 582, Tyler, Texas.

**THRILLING.** Your life analysis. Free literature. Peters, 122-A East 5th Ave., Escondido, Calif.

**BRICKLAYERS.** Information, opportunities, retirement details 5¢. Pretlo Services, Box 114, Durham, N. C.

**RENTAL** Library of mail-order literature. Free listing. Dacco, Box 781-J, Ridgecrest, California.

**INFORMATION** On anything. Ferguson Research Specialists, 116-14 141 St., South Ozone Park 36, N. Y.

#### EDUCATIONAL AND INSTRUCTION

**LEARN** How to make artificial parts of the body. Free literature. Adele Laboratories, 45-236, Miami, Florida.

**MANY** Earn \$1,500.00 per month operating collection agency. Franklin Credit, Roanoke, Virginia.

**INTERESTED** In sales career? Write: The Spaulding Co., Box 122, Fond Du Lac, Wis.

**LEARN** Tile setting at home. Free details. American Institute of Tile Setting, Box #217, Oakland 4, California.

**PIANO** Tuning pays. Learned easily at home. GI approved. 59th year. Free booklet. Niles Bryant School, Dept. P, 3731 Stockton, Sacramento 20, Calif.

**TECHNICIANS** Learn speedy scientific method for manipulating screwdriver, 50¢. Veejay, Box 69, Old Saybrook, Conn.

**LEARN** Asleep or awake. Self-help books, tapes, recordings. Free catalog. Drawer PM-697, Ruidoso, New Mexico.

**SECRET** Investigations. Experience unnecessary. Investigators particulars free. George Wagner, M125 West 86th, New York City 24.

**LEARN** Piano tuning at home! Only \$32.95 including tools. Write Tunecraft, Box 5074-M, St. Paul, Minnesota.

**PROFESSIONAL** Investigators. Home study. Badge, certificate, future. Box 41197-F, Los Angeles 41, California.

**LEARN** Real estate business fast. Unlimited opportunities. Economical home-study course. Particulars free. Gordon-Howard Institute, 320 Glover Building, Kansas City 5, Missouri.

**COLLEGE** Correspondence courses, for Doctor of Psychology, Metaphysics, Divinity. Catalogue. Dr. Dorothy B. Arnheiter, Forest Park, Greenwood Lake, New York.

**HIGH** School diploma at home. Licensed teachers. Approved materials. Southern States Academy, Station E-16, Atlanta, Ga.

**BE** A real estate broker. Study at home. Write for free book today. GI approved. Weaver School of Real Estate, 2018P Grand, Kansas City, Missouri.

**WANT** A diesel job? Higher pay? Advancement? We can help you qualify! Complete diesel, tractor and heavy equipment and Cummins Diesel Engine Shop-method home-training courses available. Write today. Interstate Training Service, Dept. B-3, Portland 12, Ore.

**DEVELOP** Mind power, personality while asleep. Use your phonograph, recorder. Amazing psychological tapes, records now available. Details free. Sleep-Learning Association, Box 24-N, Olympia, Washington.

**STUDY** For doctor's degree of psychology, metaphysics and divinity. Correspondence courses only. College of Divine Metaphysics, Dept. P-M, 2811 North Illinois, Indianapolis 8, Indiana.

**SING**, Speak with power. Self-training records. Amazing! Canfield, 2018-A Fifth Avenue South, Minneapolis 4, Minnesota.

**EARN** While you learn. Auto and diesel mechanics master this top paying trade. Many graduates earn \$100 a week and up. Approved for Korean veterans. For free information write Dept. No. 256, Nashville Auto-Diesel College, Nashville 3, Tenn.

**PHYSICAL** Therapy and massage. Home training. Practice privately or work with doctors and hospitals. Free catalogue. National Institute, Desk 4, 159 E. Ontario, Chicago, Ill.

**BOOKS**, Free general catalog, 100 pages. Text, vocational, educational, instructional subjects. Millions of volumes, new and used. Bargain prices. Books bought. Est. 1902. Long's College Book Co., Dept. PM, Columbus 1, Ohio.

**PIANO** Tuning pays. Big money in spare time. Learn at home in 30 days. No musical knowledge necessary. Phonograph, records, tools and instructions furnished. Personal instructions available. Free catalog. Capital Piano Tuning School, 3160 S.W. 16th Court, Fort Lauderdale, Fla.

**STUDY** To be a doctor of psychology, metaphysics, divinity or philosophy. Correspondence courses only. The Neotarian Fellowship, Desk 9, Kansas City 6, Mo.

**FINISH** High School at home, spare-time. No classes. Diploma awarded. Write for free catalog. Wayne School, Catalog HF-101, 2527 Sheffield, Chicago 14.

**SIDEWALK** Jungle protection. Teach yourself and son modern lightning defense against street gangs and hoodlums \$1.00. A & G Enterprises, Box 23087, Houston 28, Texas.

**HIGH** School at home in spare time with 63-year-old school. No classes. Standard high school texts supplied. Single subjects if desired. Credit for subjects already completed. Progress at own speed. Diploma awarded. Information booklet free. Write today! American School, Dept. X145, Drexel at 58th, Chicago 37.

**TIMESTUDY**—Ladder to careers in scientific management. Associated Techniques, Box 426, Cedar Rapids, Iowa.

**OIL** Coloring photographs—A fascinating hobby or profitable sideline for those with artistic talent. Learn at home. Easy simplified method. Free booklet. National Photo Coloring School, 835 Diversey Parkway, Dept. 3431, Chicago 14.

**INVESTIGATOR** Training—Robert B. Phillips Sr., Founder, former U.S. Government Special Agent. Write to 1917-K North Kenneth, Chicago 39, Ill.

**TRIGONOMETRY** In six easy lessons. Arithmetic is the only prerequisite. Used by industry in company sponsored training programs. Only \$2.95 ppd., Key-Trig, Box 2328, Long Beach, California.

**CAREER** Building books. Lists free. Clayton Mampa, 555 Surf, Chicago 14.

**PROFESSION**, 2 Yrs. college correspondence course physical therapy, massage. Complete 6 mo. Practice privately. Diploma. Write, Northwestern Institute, Box 368, Rock Falls, Ill.

**BLUEPRINT** Reading. Homestudy. Write Belton, 1059A North Lawndale, Chicago 51.

**LEARN** Another language at home, easily, quickly, naturally with Linguaphone, the World's Standard Conversational Method. You learn to speak French, Spanish, German, Russian, Modern Greek, any of 34 modern languages available on life-like conversational recordings. It's like living in another country. Complete language course available on free trial. Send for free book and details of free trial. No obligation. Linguaphone Institute, T-83-010 Radio City, New York City 20.

**\$50-100 INCOME** Day. School of Spray Painting. Herbert Schmidt, 26th Superior, Sheboygan, Wisconsin.

**HELP** Yourself to abundant living. Our courses have aided students to richer, fuller lives. Learn secret of contentment, happiness. Earn degrees Ps.D., Ms.D. Write for free book. College of Universal Truth Correspondence School, 23-C E. Jackson, Chicago.

**DISK** Jockeys in demand. Radio stations eager for men and women trained to do and sell own programs. Big money in salary, fees and commissions, plus personal appearances. Successful N.Y. disk jockey has trained thousands, will show you how. Free information. No salesman will call. Darwin, Studio B, 1639 Broadway, N.Y. 19, N.Y.

**DRAFTING**, Design, blueprint reading. Good paying. Easy to learn at home. Minimum age 17. Write Utilities Engineering Institute, Dept. TC-20, 2525 Sheffield, Chicago 14.

**USED** Correspondence courses and books sold and rented. Money back guarantee. Catalog free. (Courses bought.) Lee Mountain, Pisgah, Alabama.

**MASTER** Watchmaking at home. Free sample lesson. Chicago School, 2328-YA Milwaukee, Chicago 47.

**LEARN** Civil and criminal investigation at home. Earn steady, good pay. Institute Applied Science, 1920 Sunnyside, Dept. 161, Chicago 40, Illinois.

**"HOW To Train Horses"**—A book everyone who likes horses or ponies should have. Free. No obligation. Simply address, Beery School of Horsemanship, Dept. 1101, Pleasant Hill, Ohio.

**PROFITABLE** Welding training available Hobart Trade School, Box M-102, Troy, Ohio, GI approved. Finest equipment in U.S.A. Reasonable prices. Request catalog.

**ENGINEERING** And art degrees earned through home study. Electronics, electrical, mechanical, civil, physics, business administration, liberal arts. When writing, specify course desired. Pacific International College of Arts & Sciences, primarily a correspondence school. Resident classes also carried. 5719-B Santa Monica Boulevard, Hollywood 38, California.

**BE A** professional real estate broker, or appraiser, or both. Short concise, easily learned correspondence courses. H. Ward Conde, 327 Ouachita Ave., Hot Springs, Ark.

**INVESTIGATORS** Course. Credentials, diploma. Free information. Southwestern Institute Criminology, Box 2117-A, Lawton, Oklahoma.

**BOOKKEEPERS**. Operate your own "Dollar-A-Week" system. Ellis, Box 200, Cedar Grove, North Carolina.

**258 I. C. S. Courses**. Whatever your goal there's an I. C. S. course tailored to help you get ahead in your present job or find a new career. Write for free career kit. No obligation. International Correspondence Schools, Dept. 48953A, Scranton 15, Penna.

**LEARN** Appliance service and repair. Motors, washers, refrigeration, cleaners, everything. Free booklet. Appliance, 11027 South Vermont, Los Angeles 44.

**MIDWEST** Engineering School. Electro-Mechanical. Correspondence, 10923 Hillcrest, Hickman Mills, Missouri.

**EARN** College degrees in all college subjects from recognized institution; \$195; terms. Trinity College, 325 Bankers Trust Building, Indianapolis 4, Indiana.

**BE A** memory machine. Index your mind. Memorize instantly. Never forget. Lesson One, \$1, or complete course, \$20. Memory Research Center, Box 7191-C, El Paso, Texas.

**EARN** Degree from colleges abroad, taking test or courses. No travelling. Aureab, Central Valley, New York.

**COLLEGE** Outlines. High school paperbacks. Everyday handbooks. Free lists. Franks, 3121 South Racine, Chicago 8.

**USED** Correspondence courses, satisfaction guaranteed. Catalog 10¢ refundable. Courses bought. Bayles, 78-B Courtright, Wilkes Barre, Penna.

**SWEDISH** Massage. Home study. Diploma. Illinois Licensed School, 3809 Alta Vista, Chicago 13.

**CORRESPONDENCE** Courses, bought, sold. Lists free. Lohmer, 725 Lims, P-16, Burbank, Calif.

**AUCTIONEERING**. Learn. Records. 8542 Artesia, Bellflower, Calif.

## PLAYS, STORIES, MANUSCRIPTS

**FREE** 32 Page brochure to writers seeking a book published (fiction, poetry, non-fiction). Learn how to become a published author in five months, get 40% royalties, publicity and recognition. Write Percy Matson, Exposition Press, 386 Fourth Ave., New York 16, N.Y.

**WAN'T** Your book published? Learn how we publish, advertise, promote, distribute. Many successes. Free booklet PM. Vantage, 120 West 31, New York City. Midwest office: 220 S. Michigan Ave., Chicago, Ill.

## ADVERTISING AGENCIES, LETTER WRITERS, FOR ADVERTISERS

**ADVERTISING** Ratebook leading newspapers, magazines, free. Chicago Advertising Agency, Chicago 4.

**RECENTLY** Compiled from national advertising campaign, mailing lists of those interested in homework opportunities. First time offered. On gummed labels, \$10.00 per 1000. (Up to 6000 names.) National Mailers, Box 5428, Philadelphia 43, Penna.

**MAILING** Lists most any classification \$5.00 1000. Your circulars mailed with ours \$4.00 1000. Write for our literature. Dixie Mailers, King, N. C.

**ADVERTISING**, Result-getting ads prepared, placed newspapers, magazines, radio, anywhere! Lowest rates. Catalogue free. Baker Advertising Agency, 189 W. Madison, Chicago 2.

**CREATIVE** Advertising. Magnetic copy. Dramatic layouts. Moran Agency, Shoemakersville, Pennsylvania.

**ADVERTISE**: 24 Words, 100 Canadian newspapers, \$5.50. Lists free. Advertising Bureau, 10511-C Springfield, Chicago 43.

**"AMAZING** New Book"—"Profits From Classified Advertising." Tells how and what to advertise. Be sure to read this book before you invest one cent in advertising. Write for your copy now. Just send 10¢ for postage and handling. W. Johnson, Classified Advertising Manager, 202 East Ontario Street, Chicago 11, Illinois.

**NOW** Ready: New, amazing Classified Advertising Record Book—prepared especially for classified advertisers. Here is a book that tells you instantly whether or not your advertising in any publication is paying you real results. You can tell immediately how many inquiries each publication produced—how much cash received from every ad. Spaces are provided for the name and address of the publication, date of issue, space used, rate, cost of ad, key number, etc. You have a complete record of each publication right before your eyes. Plenty of space to keep accurate record of 28 separate publications. You can have a copy by sending only 10¢ to cover postage and handling. Send for your copy now. W. F. Johnson, Classified Adv. Mgr., Popular Mechanics Magazine, 204 E. Ontario Street, Chicago 11, Illinois.

## CARTOONING, COMMERCIAL ART, SHOWCARD & SIGN PAINTING, TATTOOING

**"HOW** To Make Money With Simple Cartoons." A book everyone who likes to draw should have. It is free; no obligation. Simply address Cartoonists' Exchange, Dept. 91-C, Pleasant Hill, Ohio.

**GUARANTEED** 152 Cosson course in sign painting. Details free. Stewart Sign Co., Box 787M, Pasadena, Calif.

**CARTOON** Your way to success! Internationally known instructor, Raye Burns, will personally teach you to create original, salable cartoons at home. Cost of course is very low. Write for free details. Raye Burns School, Box 3583-P, Cleveland 18, Ohio.

**YOU** Can entertain with chalk talks. Catalog 10¢. Balda The Cartoonist, Oshkosh, Wis.

**LEARN** Sign painting at home. Free talent test. Ben Kerns, Box 812-PM, Greenville, S.C.

**LEARN** Profitable, fascinating tattooing. Illustrated information \$1. Zeis, 728-C Leslie, Rockford, Illinois.

**LEARN** Sign painting with fascinating system. Straley, 410 S. Western. Springfield, Ohio.

**CAN'T Draw?** "Cartoonizer," talentless method 50¢. Surprise included! Hapitol, Route 3, 456-B, San Jose, California.

### RUBBER STAMPS AND OFFICE SUPPLIES

**THREE** Line rubber stamp, 1,000 embossed cards, \$3.95. Reed Press, Mishawaka, Indiana.

**RUBBER** Stamps, personalized items. Free catalog. Martin, 1425 Major Drive, Jefferson City, Missouri.

**4 LINES** \$1.00. Agents wanted. Sailors, 537 Conn., Gary, Indiana.

**THREE** Line pocket stamp or regular with free pad \$1.00. Barber, Marengo, Ohio.

**RUBBER** Stamps, 3 lines \$1.00. Jones, Box 4244, Memphis 1, Tenn.

**INDEXED**, Cushioned, 3 lines \$1.00, 4 or 5 lines, \$1.50. Signature stamps, \$3.50. (Script, print, or old English.) Free stock stamp literature. Youngers Stamp Shop, Princeton 4, Iowa.

**POCKET**, 3 Lines \$1.00, Guaranteed. W. J. Specialty, 8464 Manhattan, Detroit 11, Michigan.

**FREE!** Rubber stamp catalog. Many items. Campfeld, Box 798, Springfield 1, Mass.

### TYPEWRITERS, DUPLICATORS, OFFICE DEVICES

**AMAZING** Postcard printer \$9.95. Guaranteed. John's, 315 Pine, Summit Hill, Penna.

**STANDARD** Makes typewriters, adding machines. Miller, Box 505, Poteau, Okla.

**RECONDITIONED** Typewriters, duplicating, printing devices. \$25.00 up. Supplies. Appliances. DixieGraph, King, N. C.

**IBM** Electric typewriters \$49.95. Smith-Corona electric portables \$149.95. Continental Distributing Co., Box 71, Temple City, California.

### PRINTING, MULTIGRAPHING, MIMEOGRAPHING, GUMMED LABELS

**EMBOSSSED** Business cards \$3.95 1000. Diamant, 534 State, Hammond, Indiana.

**COPIES** Offset printed size 8 1/2 x 11, first 25 \$2.00, 2¢ ea. additional copy. Copy Boy, 11 Tyler Place, White Plains, N.Y.

**1,000 BUSINESS** Cards. Raised letters. \$3.95. Samples. Pioneer, PM-1 Island Park, N. Y.

**NEW!** 100 Letterheads, 5 1/2 x 8 1/2, 50 env., 4-lines, with outline sketch of your state, printed, \$2.50. Monitor, Buena Park 295A, Calif.

**SNAP-OUT** Forms and custom printing. Dispatch, Winslow, Indiana.

**250** 8 1/2 x 11 Hammermill letterheads \$2.95. 250 envelopes \$2.95. Samples! Davis, 7609 Spruce Road, Baltimore 22, Maryland.

**100** 6 3/4 Envelopes, 100 5 1/2 x 8 1/2 letterheads printed, \$2.00. M. Fortney, Route 3, Dillsburg, Penna.

**1000 RAISED** Printing business cards \$3.99 postpaid. Samples. Charles Casey, Cartersville, Georgia.

**1000 EMBOSSSED** Business cards at \$3.99 up to 7 lines. (Black or blue). Free sample cards and style chart. Palinkus, 1627-PM 33, Lorain, Ohio.

**OFFSET** Printing, 1000 8 1/2 x 11 \$4.95. Alpine, Box 676-E, Cupertino, California.

**MIMEOGRAPHING** - Offset. Complete lettershop services. Samples. Pennway Drawer 1470, Scranton, Pa.

**SEND** Postcard for free samples, prices. Mayfield, Box 8011, Chattanooga 11, Tenn.

**ATTRACTIVE:** Stickers, labels, circulars, cards. Samples. Fame, 291 Ellis, San Francisco 2, Calif.

**FREE** Business printing catalog. Samples. Howprint, 723-C Eunice, Webster Groves 19, Missouri.

**MIMEOGRAPHING**—Letters, pricelists, formulas, instructions. Lowest prices. Lem's Letter Shop, 5710 Stanton, Detroit 8.

**FREE** Catalog postpaid printing, rubber stamps. DM Press, Sebastopol, Calif.

**1,000 EMBOSSSED** Business cards \$3.50 postpaid. Samples. Ellis, 5909 Highlandview, Sylvania, Ohio.

**ADS** Running under this heading sell printing. Ask me for proof. I'll gladly send you amazing facts. Ask for Folder "P." F. W. Johnson, 200 E. Ontario St., Chicago 11, Ill.

**MULTILITHED** Sales letters, business forms, low prices, get facts, samples. Perkins Printing Service, Fremont, Nebr.

**FREE** Unusual catalog—business, personal printing, rubber stamps. Lowest prices. Barriskill, 1715 Julian, El Cerrito, California.

**THOUSAND** Embossed business cards \$3. Free catalog. Steinbergen, 1274Z Stebbins, New York City 59.

**500 GUMMED** Name and address labels in two-tone jewel type gift box and three line personalized pocket stamp. \$1.00. Henderson's, Beech Creek, N. C.

**OFFSET:** Expert layout and copy. Graphic art. Productive low cost mailing pieces. Grosch, Fox River Grove, Ill.

**100** 6 3/4 ENVELOPES. Printed, only \$1.00. Business or personal (specify which). Satisfaction guaranteed! Regal Enterprises, Printing Div., 216 W. Jackson, Chicago 6, Illinois.

**BUSINESS** Cards 400—\$2.00. Randolph Press, Box 3406-A, Detroit 3, Mich.

### PRINTING OUTFITS AND SUPPLIES

**RUBBER** Printing plates, cuts, stamps. Make your own with new midget moulding press. Complete outfit with supplies \$47.50. Lincoln Press, 220A Hartwell, Fall River, Mass.

**RUBBER** Stamp presses, supplies. Kiewiet, 2025 Barney Road, Kalamazoo, Mich.

**RUBBER** Stamp presses, hydraulic operated, electrically heated. Sizes 5"x8", 8"x12", 10"x15". Starting outfits, supplies. Printing presses, supplies. Custom Manufacturing, 507-P N. Jefferson, Springfield, Missouri.

**TYPE** For rubber stamp making and printing made from hard foundry metal. Send for free 20% discount catalog. Barco Type Founders, 64 Wagner Dr., Northlake, Ill.

**MAKE** Your own self-molding rubber stamps and printing cuts. Plexirubber, Argyle 1, Wisconsin.

**DO** Your own printing. Save money. Simple rules. We supply everything. Print for others; good profit. Raised printing like engraving too. Have home shop. Details free. Kelsey Presses, V-11, Meriden, Connecticut.

**PRINTING** Presses, type, supplies. Lists 4¢. Turnbaugh Service, Mechanicsburg, Penna.

### FOR INVENTORS

**HIGHEST** Cash, royalties. Inventors having good ideas, write. Inventors Creative Service, 354 South Spring, Los Angeles 13, Calif.

**PATENTS** Skillfully prepared and filed for total service charge of \$200.00 for U. S. and Canada for simple invention, with valuable development and market service. Accurate receipt for any data sent me. Patent search and valuable report \$15.00. 30 years' experience as patent and development engineer. Foreign patents obtained. Joseph O'Brien, 132 Nassau St., New York, N. Y.

**YOU** Can easily apply for patents. Save with complete professional kit. Free registration certificate. Patent Associates, Suite 1214, Commonwealth Bldg., Philadelphia 7, Penna.

**INVENTORS'** Complete service. Cash-royalties sales. Inventions researched. Patent development engineering. Free invention certificate. George Spector, Licensed Invention Engineer, 3615 Woolworth Building, New York.

**INVENTIONS**, Sold commission basis. Models constructed. Development. Model Products, Grain Valley 3, Mo.

**FREE** New patent vigilance and 24-hr. patent copy ordering. Patent Searching Service, 437 Washington Building, Washington 5, D. C.

**SEARCHES** \$6.00, including copies of related patents. Original "World-Wide" service to inventors, patent attorneys, manufacturers. Free "Record Form." Write Miss Jean Hayward, 310 Realty Building, Washington 5, D. C.

**INVENTIONS** Wanted now by my manufacturer clients. Patented. Unpatented. Write Gilbert Adams, Patent Broker, 80 Wall St., Financial District, New York City.

**PROTECT** Your invention. Apply for U.S. Patent. Free "Registration Form." Adren, 806 Wm. Penn Annex, Philadelphia 5, Penna.

**PATENT** Searches, including copies of nearest patents, \$6.00. Reports airmailed within 48 hours. More than 200 registered patent attorneys have used my service. For free invention protection forms, write Miss Ann Hastings, P. O. Box 176, Washington 4, D. C.

**PATENT** Searchers \$6.00. 48-hour service. Free invention protection forms. Formerly with U. S. Patent Office. Write Raymond L. Smith, Patent Searcher, 620 Sheraton Building, Washington 5, D. C.

**PATENT** Searchers \$6.00. 48-hour airmail service. Invention protection forms free. Write patent Engineering Service, 711 14th Street, N. W., Washington 5, D. C.

**OUR** Sales drawings in color sell your invention. Inexpensive. Free sample. Write Starck, Wells Bldg. Milwaukee, Wis.

**WE** Have the markets if you have the ideas. Harvey Engineers, Cambridge 1, Maryland.

**INVENTORS:** Test the commercial value of your patented or unpatented inventions, quickly and inexpensively. Write for free information. Institute of American Inventors, Dept. 40-B, 635-F St., N.W., Washington 4, D. C.

**INVENTORS!** Consider our offer first before selling or licensing your invention on a cash or royalty basis. Patented. Unpatented. Inventions on Demand, 79 Wall Street, New York 5, N. Y.

### INVENTIONS WANTED

**INVENTIONS** Wanted: patented, patent pending. 29 years experience promoting inventions. National Service Bureau, 3120 Meramec, St. Louis 18, Mo.

**IF** Your invention is adaptable to promoting we will contract for selling on cash or royalty. Free booklet outlines royalty rates, requirements. Kessler Corporation, C-51, Fremont, Ohio.

**PATENT** Or patent pending item? We will sell it to national manufacturers. No fees. Commission basis. Seaboard Research Corporation, Mewshaw Building, Glen Burnie, Md.

**INVENTORS'** Complete service. Cash-royalties sales. Inventions researched. Patent development engineering. Free invention certificate. George Spector, Licensed Invention Engineer, 3615 Woolworth Building, New York.

**FREE** List needed inventions. Protection form. Inventors Sales and Engineering Bureau, Dept. 161-D, Box 4973, Washington, D. C.

**INVENTIONS** Wanted now by my manufacturer clients. Patented. Unpatented. Write Gilbert Adams, Patent Broker, 80 Wall St., Financial District, New York City.

**INVENTORS!** Outright cash sale or royalties for your inventions. Patented. Unpatented. Constant demand from our client manufacturers. Write United States Invention Brokerage, 15 Park Row, New York 38, N. Y.

**SUPERIOR** Promotions. Patented; unpatented inventions. Information booklet, free. Superior, 338-344 North Rodeo, Beverly Hills, Calif.

**CASH**, Royalty, obtainable for good ideas, inventions. Ketchum's Advertising, B-1058A, Springfield, Illinois.

**INVENTIONS** Wanted. Patented; unpatented. Tremendous manufacturers lists. Global Marketing Service, 2420 77th, Oakland 5, California.



**INVENTORS:** Hundreds of manufacturers have requested our assistance in locating marketable new products. Complete information free. Institute of American Inventors, Dept. 40-D, 635-F St. N.W., Washington 4, D. C.

**INVENTORS!** Consider our offer first before selling or licensing your invention on a cash or royalty basis. Patented. Unpatented. Inventions on Demand, 79 Wall Street, New York 5, N. Y.

**ARE** You interested in offers from reliable manufacturers for your invention? Patented, unpatented. Harvey Engineers, Cambridge, Maryland.

#### PATENTS FOR SALE

**TOWING** Bar with wide-range hitch for sale to manufacturer and distributor. Makes connecting effortless. Raymond Carson, Faxon, Oklahoma.

#### MANUFACTURING

**MODELS**—Small lot manufacturing. Metals, plastics, etc. Milburn, Burlington, Kentucky.

#### MODELS, MODEL SUPPLIES

**ROCKET** Supplies. Kits, Parts, Catalog with plans, formulas, 25¢. Central Rocket Company, Waupaca, Wis.

**"POWER** Drives Handbook"—36 pages illustrating many types motor drives for model autos, boats, displays, turntables, etc. Mail 25 cents cash, returnable first order \$3.00 or more. Wilson's of Cleveland, Dept. PM, P.O. Box 8995, Ft. Lauderdale, Fla.

**LIONEL** Trains. Big discounts. Catalog 25¢. Mack Bros., 2043-P Chicago Ave., Chicago 22.

**SHIP** Models. Most complete line in New England, kits, fittings, plans, books, tools, engines, motors. Illustrated catalog 35¢. James Bliss & Co., Inc., Dept. SM, 342 Atlantic Ave., Boston 10, Mass.

**ROCKET** Supplies—Nozzles, cones, tubes. Specials also made. Catalog 10¢. Sky Mfg., Mineral Point, Penna.

**SHIP** And yacht model fittings; blueprints. Send 35¢ for illustrated catalog listing hundreds of items. A. J. Fisher, 1002-1 Etowah Ave., Royal Oak, Mich.

**SHIP** Model kits and fittings: Fishermen, clippers, frigates, schooners, brigs, tugboats. Also half-hull models for interior decoration. Send 25¢ for 1960 catalog and booklet. Model Shipways, Box 85, Bogota, N. J.

**SAVE** Money on model supplies. Miniature gas engine \$2.49; jet engine 49¢; 99 pc. HO train set \$10.95. Send 4¢ unused stamp for free 32 page bargain book "PM5." America's Hobby Center, 148 West 22nd Street, New York 11, N. Y.

**ROCKETS**—Powerful fuels: plans, construction, ignition, 75¢; Rocketry, Box 1655, Marysville, California.

**MODEL** Rocket—Complete with launching pad. Safe and simple to build. For complete plans, send \$1.00 to: Hobbies, P.O. Box 4084, Winston-Salem, N. C.

**POWER** Models. Unusual steam, gasoline and traction engines, fittings, metals. Jewelers needle files. Comprehensive, 92-page catalog, \$1.00. Chas. Cole, Ventura, Calif.

#### HOME CRAFTSMEN

**GRANDFATHER** Clock movements, kits, hardware, case plans \$1.50. Raymond Heckert, Box 131A Lemoyne, Penna.

**EASY** Plans: Spice racks, wall holders for bookmatches, stick matches, cigarettes, plates. \$1.00. H. A. Robinson, 3366 Columbia Road, Westlake, Ohio.

**SKIL-CRAFTS**—World's finest and largest selection of leathercraft, hobby craft, art & craft supplies. Free billfold or leathercraft kit with first purchase. Send 25¢ latest catalog. Skil-Crafts, Box 167-P, Joplin, Missouri.

**FREE.** New plans catalog. Make 2400 things. Fun. Profit. Craftplans, 1322-A Wabash, Chicago 5.

**KNOCKDOWN** Cedar chests, also over fifty kits. Catalog 25¢. Giles Kendall Co., Huntsville 2, Alabama.

**FREE** Leathercraft catalog—quality kits, leather, tools. Handcrafters, Dept. P, Box 427, Montrose, Calif.

**STYLECRAFT** "Pretraced" leather kits. Handbags, billfolds, filigree belts. Patterns on leather. Just carve, assemble and lace. "Precarved" kits also available. Send 25¢ for catalog, free folder. Refunded first order. Apache Leather Company, 2804 E. Washington St., Phoenix, Arizona.

**LEARN** Art metalcraft and jewelry making. Complete, inexpensive, home training course now available. Special tools and materials furnished. Write for free booklet. Interstate Training Service, Dept. L-3, Portland 12, Oregon.

**WOODWORKING** And cabinetmaking course for beginning and advanced home craftsmen. Only complete low-cost home training program available. Write for free booklet. Interstate Training Service, Dept. G-3, Portland 13, Ore.

**KNOCKDOWN** Cedar chests and lumber. Free price list. Bedford Lumber Company, Shelbyville, Tennessee.

**REMODEL** Your own home. Save hundreds of dollars. New, amazing book shows you how. Written so you can understand it. Step by step instructions make it easy. Fully illustrated, 400 photographs, hundreds of diagrams, 160 pages, \$3.50. Literature 10¢. Popular Mechanics Press, 200-RH East Ontario St., Chicago 11, Ill.

**PATTERNS.** Full size. It's easy to make tables, chairs, beds, chests, shelves, workbench, toys, Santa Claus lawn designs, and many others. Illustrated circular free. Popular Mechanics Press, 200PL East Ontario St., Chicago 11, Ill.

**GRANDFATHER** Clock movements, case plans, kits, Wholesale catalog 25¢. Mason-Sullivan, Noroton, Conn.

**MAIL** Orders promptly processed for steel items needed for pet projects, hobbies, etc. Specify size, type, quantity and length. Send inquiries to Admiral Steel Corp., 4152 W. 123rd St., Blue Island, Illinois.

**NEW** Big illustrated catalog. Supplies for leathercraft, metalcraft and numerous small inexpensive crafts. Prompt shipments. Top values. Latest ideas. Send 10¢ today to J. C. Larson Co., Dept. 9427, 820 S. Tripp, Chicago 24.

**FREE** Booklet! Concrete blockmaker, mixer plans. Loper, Box 76, Alloway, New Jersey.

**LEATHERCRAFT.** Send 10¢ for catalog. Saxcrafts, Inc., 1101 N. 3rd, Milwaukee, Wisconsin.

**101** PATTERNS Of smart gifts, novelties, shelves, action windmills plus "Make Money Jig Sawing." \$1.00. Mastercraft, J5M, 7041 Olcott, Chicago 31.

**CACTUS** Wood assortment, \$5.98 postpaid, 214A East Yavapai, Tucson, Arizona.

**MAHOGANY** Wood, usable scraps. Bargain. List 4¢. S. R. Marks Co., Montgomery 8, Ala.

**FREE!** New supply catalog loaded with moneymaking costume and shell jewelry designs. Easy instructions. Modern Craft, Box 11088-R1, Saint Petersburg 33, Fla.

**89** JIG Saw patterns. Beautiful shelves, ornaments, novelties. Plus "How Where to Sell" \$1.00. Mastercraft, J4M, 7041 Olcott, Chicago 31.

**PRACTICAL** Violin making with patterns, \$2.00 supplies. Chelsea Fraser, 2025 Stark, Saginaw, Michigan.

**CRAFTS.** Free catalog. Leathercraft, mosaics, enameling, metal tooling, stamp engraving, shellcraft, floralcraft, many more. Kit Kraft 201, Studio City, Calif.

**136** PAGE Supply catalog: enameling, ceramics, mosaics, jewelry. 50¢ (refundable). Bergen, 300B S.W. 17th Ave., Miami, Fla.

**LEATHERCRAFT.** Superior leather, tools, kits. Catalog 30¢. Midas, Box 1255, Huntington Park, California.

**16** LAWN Chairs, 22 tables, benches, trellises. Plans and necessary patterns. \$1.00. Mastercraft, J3M, 7041 Olcott, Chicago 31.

**VIOLIN** Making supplies. Free catalog. Fred Artindale, Box 71992, Los Angeles 1, Calif.

**FREE** Do-it-yourself leathercraft catalog. Tandy Leather Company, Box 791-K34, Fort Worth, Texas.

**KILN** Dried walnut, cherry, etc., hardwoods, blocks, lumber and squares. Midland Lumber Company, P.O. Box 262, Savannah, Missouri.

**OREGON** Myrtlewood. A rare, beautiful wood for the lathe. Ken Dorman, Oakland, Oregon.

#### DO IT YOURSELF

**FREE** Do-it-yourself leathercraft catalog. Tandy Leather Company, Box 791-K34, Fort Worth, Texas.

**CONVERT** Old bed to modern Hollywood style. Six 6" brass tipped legs, hardware, directions. Blonde, black, mahogany, walnut. \$2.00 delivered. Delwood Products, Box 2648, Baltimore 15, Maryland.

**BUILD** Your own concrete blockmaker. Easy. Inexpensive. Driven by 1/2 H.P. motor, or hand. Then build house, station, tornado or bomb shelter; save 1/2. Write: Clyde Lee, Mountain View, Oklahoma.

**LIFETIME** Welder from junk Pain Electric, R. 13, Fort Worth 3, Texas.

**DIAL** Inter-com telephone system you can build for few dollars. Plans \$3.00. Gerry Miller Electronics, Maquoketa, Ia.

**ELECTRIC** Laminating kit. Fun or profit. \$14.95. Therm Appliance, St. Charles, Ill.

**FREE** Check-list covering 340 classifications of projects, plans, instructions, service and repair information detailed in Popular Mechanics famous series of instructional booklets. These easy to follow booklets cover an extremely wide variety of do-it-yourself data on home remodeling, repair and improvement, hobbies, crafts, boating, games, lawn and garden, and hundreds of others. For your free copy of this helpful list of booklets, write: Service Bureau, Popular Mechanics, Room 517A, 200 East Ontario, Chicago 11, Ill.

#### WATCHES, OLD GOLD, JEWELRY

**COSTUME** Jewelry supplies, settings, rhinestones, etc. 88 page illustrated catalog. 30¢. Milady, Box 1328, G.P.O., New York City.

**10** SWISS Watches \$18.00 Catalog 25¢. Berkowitz, 1150 Castle Hill, New York City 62.

**FREE** Catalog. Costume jewelry parts. Supplies. Reasonable prices. Past service. Guaranteed quality. Unique merchandise. Folsom's, Box 52, Medford 55, Mass.

**GOLD.** Silver, platinum, diamonds, jewelry, watches, silverware, gold teeth, coins. Highest cash immediately, free information. Wilmot's, 1067A Bridge, Grand Rapids 4, Michigan.

**WATCHMAKERS** Journal contains watch repairing instructions. Sample copy 25¢. Box 3218-M, Daytona Beach, Fla.

**HIGHEST** Cash for old gold, jewelry, gold teeth, watches, diamonds, silverware, spectacles, platinum, mercury. Free information. Rose Refiners, Heyworth Building, Chicago 2.

**HIGHEST** Cash paid for old gold, jewelry, gold teeth, diamonds, watches, silver. Mail articles today. Information free. Chicago Gold Refining Co., 6 E. Monroe, Dept. 1858, Chicago 3.

**WATCH** And clock repairing books. Free catalog. North American, 2320-AO, Milwaukee, Chicago 47, Illinois.

**WATCHMAKERS',** Jewelers', lapidaries' catalog 25¢. Gengal, 8910 Venice, Culver City, California.

**WATCHMAKERS'** Tools, materials, supplies, watches Catalog. Gales, Box 1000, Chicago 90, Illinois.

**WATCH** Repair \$3.95. Write for free details: Watchco, 253-PM1 Hill St., Biddeford, Maine.

**UNUSUAL** Jewelry, gifts, imports. Free catalogue. Berlow's, 30 McAuliffe Rd., Randolph, Mass.

**EASY** To make costume jewelry. Catalog 10¢. Introductory kit including catalog \$1.00. J & M Novelties, Dept. CA-3, Box 173, Broadview, Ill.

#### RAZORS, BLADES, SHARPENING

**MEN!** Shave 100 times with one blade \$1.49, money back guarantee. Raysol, Poplar Bluff, Missouri.

**FREE!** Sample razor blade proves ours best. Costs less! North Star Products, Box 112-JM, Cedar Grove, New Jersey.

**BLADE RIOT!** 100 double-edged blades to display. Carton, \$1.25. Guaranteed. Sell to coworkers, stores, organizations. Dozen cartons (1200 blades) \$13.00! Baron Sales, 1423 Mulberry, Scranton 10, Penna.

#### FOR THE HOME

**HEAT** Your home for almost nothing. Details. Otttauquechee Products Co., Quechee, Vermont.

**50 VALENTINES** Only 25¢. Make biggest money showing friends best greeting card sellers for every occasion all year: Mothers, Fathers Day, Easter, birthday, everyday assortments, gifts, stationery. Samples on approval. Send 25¢ for valentine special. Midwest, 1113 Washington, Dept. 650-S, St. Louis 1, Mo.

**DRESSES** 24¢; Shoes, 39¢; men's suits, \$4.95; trousers, \$1.20. Better used clothing. Free catalog. Transworld, 164-G Christopher, Brooklyn 12, N.Y.

**MAKE** Money weaving rugs at home for neighbors on \$79.50 Union loom. Thousands doing it. Booklet free. Union Loom Works, Dept. 3, Boonville, N. Y.

**UNWANTED** Hair? Destroy unsightly hair on face, arms, legs permanently by killing the hair root with famous Mahler Epilator. Send 10¢ (postage and handling) for illustrated 16-page booklet "New Radiant Beauty." Mahler's Inc., Dept. 250A, Providence 15, R.I.

#### OF INTEREST TO WOMEN

**SELL** Fine fabrics. Get yours wholesale. Box 863, Norwalk, Conn.

**HOUSEWIVES**, Teachers, students, office workers, if you need extra cash each week but household or other duties prevent you from taking a part-time job, learn how you can earn by accepting orders to Popular Mechanics. Good Housekeeping and all other magazines. No experience needed. Write Popular Mechanics, Room 1W, 250 West 55th St., New York 19, N. Y.

#### PERSONAL

**MYSTIFYING!** Tell day of week, any date, in seconds, mentally. Self-addressed stamped envelope and \$1. Winsett, Box 289, Key Largo, Florida.

**BIBLE** Questions answered. Stamped envelope. Bylon, 17167 Bentler, Detroit 19, Michigan.

**BORROW** By mail. \$100-\$600. Anywhere. Air mail service. Postal Finance, 200 Keeline Building, Dept. 17-A, Omaha 2, Nebraska.

**HANDWRITING** Analyzed accurately. Sample analysis 30¢. Complete analysis \$1.00. Send with sample writing. Lamons, Lovelock, Nevada.

**LOANS** By mail. \$50 to \$600 for any purpose. Employed men and women eligible. Confidential. 2 years to repay. Write for free loan application. American Loan Plan, City National Bldg., Dept. PM-1010, Omaha 2, Nebraska.

**FIRE** Department greeting cards. 25 assorted \$2.50. Free brochure. Hobby Mats, Balsam Lake, Wis.

**BORROW** \$100 to \$600 by mail. Quick, easy, private. No co-signers. Repay in 24 small monthly payments. For the amount you want write today to Dial Finance Co., 410 Kilpatrick Bldg., Dept. A-1, Omaha 2, Nebraska.

#### REMAILING SERVICE

**CONFIDENTIAL** Remailing, 25¢. Monthly, \$2.00. A. Burlison, Box 5464, Dallas, Texas.

**LETTERS** Mailed 25¢; forwarded 30¢. Stella M. Lumsden, East 11 Pacific Ave., Spokane 3, Wash.

**SECRET** Mail receiving-forwarding system. \$4 month. Hedgpeth, Box 830, Alhambra 23, California.

**REMAILING** Letters, also picture cards, from this snazzy spot, 25¢. Anderson, Box 13412, Phoenix, Arizona.

**\$2.00 MONTHLY** Letters received and forwarded. Or 20¢ per letter. Box 14, El Segundo, California.

**BUSINESS** Or social mail receiving-forwarding service. Details free. John Green, Box 2353, Colorado Springs, Colo.

**WONDERFUL** Copenhagen. Reairmails, \$1. Holmes, Aeginovej 16, Copenhagen S., Denmark.

**RENT** Confidential postal mailing-receiving address. Agents since 1950. William McLaughlin, 800 Stewart, Columbus 6, Ohio.

**PROMPT**, Confidential remailing 25¢ letter. \$3.00 monthly. Heshmati, P.O. Box 4411, Carmel-by-the-Sea, California.

**NEW** York City remails. Confidential. Enclosed letter, 25¢. Box 66, Kew Gardens Sta., New York.

**FROM** Fabulous Las Vegas comes a most complete and confidential mailing service. Remails 25¢. Attractive monthly and bulk rates. Ora, Box 2314, Las Vegas, Nevada.

**MEXICO'S** Subtropical resort postcards furnished, reairmailed: 2-\$1.00. Replies forwarded free. Apartado 2042, Guadalajara, Mexico.

**REMAILS** From Air City 25¢, monthly \$3.00. Write: Campbell, 130 E. Dorothy Lane, Dayton 19, Ohio.

**CONFIDENTIAL** New York City, mailing, receiving, forwarding, address. \$3.00 month. Birnhan, 109 W. 42, New York 36, N. Y.

**LETTERS** Remaild 25¢. Forwarding 30¢, monthly rates. Sunset, Box 45, Hutchinson, Minnesota.

**FABENS**, Texas, remails 25¢ receiving, forwarding system. Complete mailing service \$3.00 monthly. L. H. Batton, Box 445, Fabens, Texas.

**JUAREZ**, Mexico, or El Paso, Texas, remails 3 for \$1.00. L. H. Batton, Box 445, Fabens, Texas.

**BOLIVIA**. Re-airmails \$1.00. Mario Arratia, Casilla, 2959, La Paz, Bolivia.

#### TREASURE FINDERS

**SEARCHING** For treasure? Transistorized electronic M-Scope locates it. Lightweight. Guaranteed. From \$59.50, easy terms. Free catalog. Fisher Research, Dept. C-1, Palo Alto, Calif.

**GOLD-Silver** detectors. Geiger counters. Violites for tungsten, etc., best available. Guaranteed. Information free. Detectron, Dept. 2, Sylmar, California.

**METAL** Locator kits and assembled models from \$39.90. Transistorized and underwater models available. Free catalog. Electronic Applications, Dept. M, Box 8, Arlington 10, Virginia.

**445 TREASURES**, United States map 2x3 feet, plus catalogue, \$1.00. Foul Anchor, Rye 2, N. Y.

**TREASURE!** Map, handbook, 25¢. Locators. Howe, 811 Kansas, Atchison, Kansas.

**SEARCHING**: For treasures or oil. Dirt tested free. Indicator \$25.00. Horton's Surface Oil Survey, Bell Rive, Illinois.

#### FOR SALE—MISCELLANEOUS

**FOR** Sale dies, molds, jigs to manufacturer wheel adapter for trailers, U.S. and Canadian patent. Wheel Adapter Company, Loveland, Colorado.

#### WANTED—MISCELLANEOUS

**CASH** For used Indian apparel including beaded headbands, chokers, necklaces, beaded belts, loose beads, etc. Send description to Sid Mintz, 858 North Mansfield Ave., Hollywood 38, Calif.

**WE** Pay \$89 for 89 Lincoln pennies. Information 10¢. Brooklyn Coin Co., 28 East 55th Street, Brooklyn 3B, New York.

**QUICKSILVER**, Platinum, silver, gold. Ores analyzed. Wholesale Terminal, Norwood, Mass.

**WANTED** 5,000,000 Different articles. Directory listing 5,000,000 articles bought by the government, where to sell, bidding and subcontracting information, plus how to receive financial aid, \$3.10. Why not make big money during the boom? Sell to Uncle Sam! Washington Sales, 1249 E. 69th, Seattle 15, Wash.

#### MISCELLANEOUS

**ORNAMENTAL** Iron designs. Book of 1600 beautiful, practical designs for railings, columns, etc. Free literature. Cunningham, 3881 South 3200 West, Salt Lake City 4, Utah.

**FABULOUS** Danish open sandwich recipes, \$1.00. Holmes, Aeginovej 16, Copenhagen, Denmark.

**FEATHER** Picture. Artistic catalog, papaya seeds, 25¢. Mexicana, 1104, Calexico, Calif.

**SOCIAL** Security cards engraved. Brass \$1.50. Buddy Products, Jonesport, Maine.

**ALASKA**, Travel, homesteading, hunting opportunities. Now available, the information you have been looking for. Air-mail post paid \$1.00 from MacRon Service, 1226 "G" St., Anchorage, Alaska.

**FREE** Information about Miracle Epoxy adhesive or send \$3.00 for postpaid kit. Rowell Products, 752 Vandalia, St. Paul 14, Minnesota.

**LIKE** Seashells? Send 10c to: White's, 1415 Boylan, Clearwater, Florida.

**LET** Us tell you how to turn the reading habits of your friends into profit for you. \$10.00, \$25.00 or \$50.00 can easily and quickly be made under our Popular Mechanics subscription plan. No experience needed. Write Popular Mechanics, Room 1M, 250 West 55th St., New York 19, N. Y.

**FALLOUT** Shelter you can build. Plans \$1.00. Wiman, Box 1005A, Douglas, Alaska.

**CIGARETTES**: Make 20 plain or filter-tips for 9¢. Facts free. Moberly, Box 915, Owensboro, Kentucky.

**100,000 PRODUCTS** Wholesale—Free catalog! Send postcard: Econ-O-Mart, Whippany 15, New Jersey.

**YOUR** Name wanted. We'll send 1000 publishers, mailers, wholesalers your name, on our list one year 25¢. Dixie Mailers, King, N. C.

**MONEY** Making and saving catalogue. Write: Adams, PM 210 5th Avenue, New York 10, New York.

**SUPER** Memory overnight! Success guaranteed! Bijou, Box 1727-M, Hollywood 28, California.

**RECEIVE**—Magazine samples, mail offers, bargains from everywhere. Get listed 25¢. Rorick, Cincinnati 26, Ohio.

**EPOXY** Adhesive kit \$1.50. Sunset Research Laboratories, Box 6117, Seattle 88, Washington.

**JAPAN**: Buy direct-mail order, kimonoes, dolls, etc. 24 page catalogue, manufacturers' names, addresses. Send \$1.00. Clarence Yamagata, 202 Naka 7, Bldg., Marunouchi, Tokyo.

**70 BIBLE** Lessons, 25¢. Bulletin, Box 87, Cathedral Station, New York City 25.

**DATE** Finder & calendar for any day, week, month. 200 years 1800-2000. 25¢ each. Novelty Calendars, P.O. Box 626, Norfolk 1, Virginia.

**AUTHENTIC** African wall masks. Rush 50¢ for catalog. J&M, P.O.B. 911, Wilmington, N. C.

**HOBBYISTS!** Collectors! Read, "Trading Post Magazine," 25¢. Thorne's, C-525 Dewey, Jackson, Michigan.

**"COBRA"**. Self-defense street-fighting tricks." Designed to help peaceful adults. \$2. Clarion, Box 9309-S7, Chicago 90.

**YOUR** Name on our giant mailing list, brings you moneymaking and other mail offers galore! Send 25¢ today. Direct Mail Service, Dept. PM, Box 581, Bakersfield, California.

**RECEIVE** Samples! Bargains! Offers! Mail from everywhere, 20¢. Lee Wiersma, Orange City, Iowa.

**COUNSELOR** On children's problems. Will advise parents by mail. Write Mrs. Clum, Box 397, Monroe, Michigan. \$2 per letter.

**RECEIVE** Mails, magazines, samples. Your name in numerous mailing lists, 25¢. Greenwood, Box 1116-BY, New York City 8.

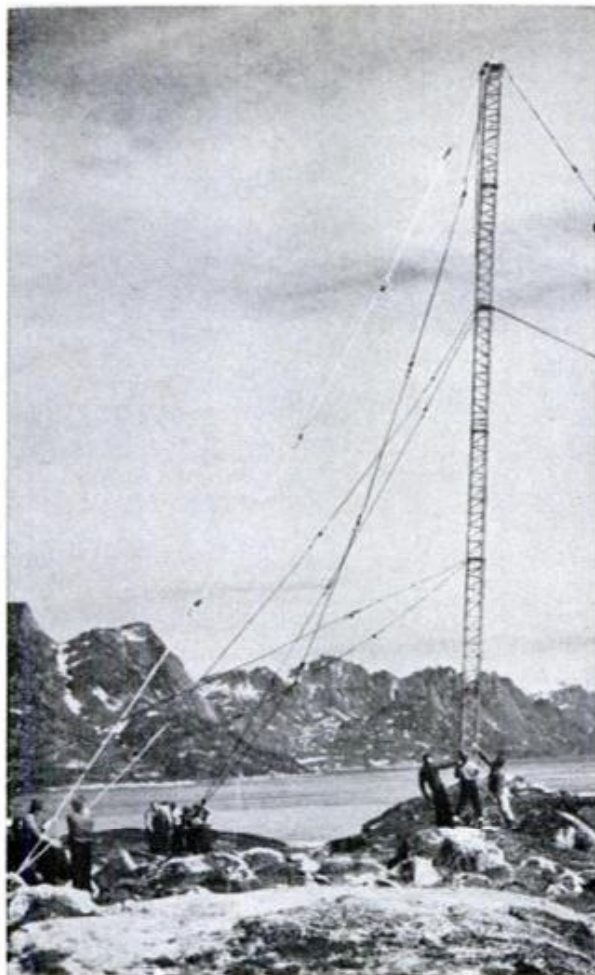
**LIFETIME** Profit! Start your own mail-order business. Our free guidance program shows you exactly what to do, makes it easy, profitable. Details free! Columbia, 9268-PMA Piney Branch Road, Silver Spring, Maryland.

**SPECIAL!** World's smallest Bible, 35¢. Four \$1.00. Henderson's, Beech Creek, N. C.

**ALUMINUM** Combination window kits, \$11.95. Pre-cut. Top quality. Literature. Gould's Hardware, Woodstock, Ontario, Canada.

**BIZARRE** Fashions! Illustrated catalogue, \$1.00. Renee, Box 2804-R, Hollywood 28, Calif.

**AFRICAN** Wood carvings. Free catalog on request. The Brownlee Co., Box 636, Yucaipa, Calif.



### Robot Radio Beacon on Island Guides Ships Through Fiord

Crew members of the Navy icebreaker *USS ATKA* recently erected an antenna on Cruncher Island to send a radio beacon automatically, guiding ships through a maze of islands and inlets into Sondrestrom Fiord, Greenland. Ships desiring to fix their position send out a coded signal. The beacon, a self-contained robot, responds by sending a signal for five minutes. The signal can be reactivated.

### Stamp-Size Circuit Replaces Transistor

Advances in electronic products and rocketry are forecast with the development of stamp-size circuits by five Army scientists. The new circuit, in  $\frac{1}{200}$  of a cubic inch, replaces a one-cubic-inch transistor circuit. In stencil-like fashion, materials are "printed" photographically on a tiny plastic wafer, eliminating all wires and casings. The circuits are expected to save the Army \$200 million a year. They will permit missiles to carry lighter payloads with no loss in essential equipment and will permit pocket-size TV sets to be built at a fraction of present cost.

JANUARY 1960

## ENGINEERING

DEGREE IN  
27 MONTHS

Students given option of studying engineering under accelerated program leading to **Bachelor of Science Degree in 27 months**; or the standard four-year program leading to **Bachelor of Engineering Degree in 36 months**. The **B.S. degree** in Mathematics, Chemistry, or Physics (including Nuclear Physics) may be earned in 36 months. By attending classes year-round, students can graduate in 3 years and have one year of experience and income in the time usually needed to complete a four-year college course. Preparatory courses. Thorough, practical program. Individualized instruction.

### Keeping pace with progress in science and engineering

Campus. Dorms, gym, playing fields. Superior faculty. 2,000 students. New Dana Science Building. Low tuition. Earn board. G.I. approved Enter March, June, September, December. Students from 50 states, 40 foreign countries. Send coupon for free catalog, full information. Enroll now!

## INDIANA TECHNICAL COLLEGE

510 E. Washington Boulevard, Fort Wayne 2, Indiana

Please send me free information on 27 mo. **B.S. DEGREES** in:

Aeronautical  Chemical  Civil  Electrical  
 Mechanical  Electronics

on 36 mo. **B. E. DEGREES** in:

Aeronautical  Chemical  Civil  
 Electrical (Power or Electronics)  Mechanical  Metallurgical

on 36 mo. **B.S. DEGREES** in:

Mathematics  Chemistry  Physics

Name \_\_\_\_\_

Address \_\_\_\_\_

### I'll Send You This Handsome SAMPLE CASE - FREE



and Show You How to Make  
Up to \$30.00 in a Day

Mail coupon for this Free Tailoring Sample Case packed with 100 beautiful, big-value suit and overcoat fabrics. Take orders from friends, fellow-workers, others, for fine quality, made-to-measure clothes. Pocket big cash profits in advance.

Because wearing our suits and overcoats brings more orders, we make it easy for you to get your own clothes without the cost. No experience is needed. **SATISFACTION GUARANTEED. SEND NO MONEY.** Just fill out and mail coupon - today!

**PROGRESS TAILORING CO., 500 S. Throop St. DEPT. A-216 CHICAGO 7, ILLINOIS**

**PROGRESS TAILORING CO., Dept. A-216  
500 S. Throop St., Chicago 7, Ill.**

Dear Sir: I WANT A MADE-TO-MEASURE SUIT TO WEAR AND SHOW, without paying 1c for it. Rush details and Sample Kit of actual fabrics, **ABSOLUTELY FREE.**

NAME \_\_\_\_\_ AGE \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_



**.22 Cal NEW 7 SHOT REPEATER AUTOMATIC.** The skilled hands of the German gunsmith is responsible for this .22 Caliber 7 shot repeater automatic with self-ejecting empty shells. Just 4 inches long, fits easily into pocket or purse. Ideal for sporting events. Stage use (Not available to Calif. residents). Not a lethal weapon—ammunition available exclusively from us. Money back guarantee. Comes for \$6.95 from **Best Values Co., Dept. F-51, 403 Market St., Newark, New Jersey.**

## Water Under Long Beach Stops That Sinking Feeling

Throbbing day and night, eight huge batteries of pumps are piping millions of barrels of water into the sands below Long Beach Harbor as engineers make a desperate, and apparently successful, fight to keep parts of the city from slipping under the sea. A 20-square-mile section of Long Beach that lies above the second richest deposit of oil in the United States has been sinking since the late 1930s, when oil was first pumped from the field. Today the area resembles a crumbling funnel. The ground has sunk two to three feet at the edges and as much as 26 feet at the center, which is near the \$170 million naval shipyard. As the ground gradually sank, parts of the shipyard were damaged and, in the city, sewer lines cracked, railroad tracks twisted. Bridges have been shortened and sections cut from wharves and buildings to keep stress from snapping them like kindling wood. If continued, the subsidence could knock out much of the oil field, which has returned the city \$317 million in royalties during the past 20 years and where an estimated billion barrels of oil remain; it has, in fact, caused \$25 million worth of

damage to pipes and parts of the 2900 active oil wells.

The water-injection program, begun in 1953 after the city and industry spent \$1,000,000 on geological and engineering studies, is designed to repressure the field by filling with water the voids left when oil was pumped from between rocks. It seems to be working, for some piers and parts of the shipyard have stopped sinking. At present, water is pumped from 93 seaside wells, desanded and chemically treated to kill bacteria and prevent corrosion, and then forced by high pressure into sand lying from 2000 to 6000 feet under ground. Now 87 percent completed at a cost of \$6,000,000, the system already is the world's largest repressurization project and, eventually, it will have 268 water wells and additional pumping stations to send one million barrels of water (44 million gallons) into the sands each day.

Ironically, the costly sinking has also brought about a benefit. The water used to repressure the substrata will, as it moves through sand, push oil there to the wells, where it will be pumped to the surface. Geologists estimate that 400 million barrels of oil, which otherwise could not be recovered, may thus be produced because Long Beach was forced to devise its system of water injection.

# DRAW George Washington

You may win a \$430.00 Scholarship in Commercial Art

Draw Washington's head any size other than this (bigger or smaller but not like a tracing). Use pencil. As winner of contest you get a complete art course—free training in commercial art. You are taught, individually, by professional artists on the staff of world's largest home study art school. Many former students now earn upwards from \$150 a week as commercial artists. Purpose of contest: to uncover hidden talent. Try for this free art course! Entries for February 1960 contest must be received by February 29. None returned. Amateurs only. Our students not eligible. Winner notified. Mail your drawing today.

**ART INSTRUCTION, INC.**, STUDIO 1130-1  
500 South 4th Street, Minneapolis 15, Minn.

Please enter my attached drawing in your  
draw-a-head contest. (PLEASE PRINT)

Name \_\_\_\_\_ AGE \_\_\_\_\_  
Occupation \_\_\_\_\_  
Address \_\_\_\_\_ Apt. \_\_\_\_\_  
City \_\_\_\_\_ Zone \_\_\_\_\_  
County \_\_\_\_\_ State \_\_\_\_\_



Accredited member of  
National Home Study Council

POPULAR MECHANICS



**An Easy Way to Earn  
EXTRA MONEY  
For Your  
NEW CAR!**

POPULAR MECHANICS—the magazine that helps you to *save money* on hundreds of projects—now offers you an opportunity to earn *extra money* as a spare-time or full-time subscription representative for POPULAR MECHANICS and *all other* leading national magazines.

Thousands of men, and women too, are earning substantial sums daily through this pleasant, convenient and profitable work. What *they* are doing, you can do too, just as easily and successfully. The rapidly growing interest of men in all kinds of practical crafts has created millions of potential subscribers for POPULAR MECHANICS — one of the easiest of all magazines to sell.

**MAIL THE COUPON NOW!**

Few ways of earning extra money at home are so convenient to engage in, so easy to start, so certain to add worthwhile amounts to your personal or family income. Let us send you complete details of our plan, free supplies—everything you need to start earning extra money at once.

POPULAR MECHANICS, Dept. 160  
250 West 55th St., New York 19, N. Y.

Please send me, without obligation, complete details of your subscription plan.

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY & ZONE \_\_\_\_\_

STATE \_\_\_\_\_

JANUARY 1960

**EARN \$125  
A WEEK AND UP**

**BE AN AUTO-DIESEL  
EXPERT—LEARN  
A TRADE YOU LIKE**

You learn fast in our shops because you learn with tools on real equipment. Students short of money may earn most of their expenses by doing part-time work. Experienced instructors explain WHY and show you HOW, then you DO IT YOURSELF. Forty years' experience training men. Successful graduates in 50 states and many foreign countries. Many of our graduates earn \$125 a week and up. Approved for veterans. Day and evening classes. Free bulletin—write today.  
**NASHVILLE AUTO-DIESEL COLLEGE**  
226 7th Ave., No., Dept. 86, Nashville, Tenn.

**OWN CALIFORNIA LAND**

STATE GOV'T LANDS. 500,000 Acres as low as \$2. per acre — min. offer 40 to 640 Acres. Ranch and Farm Tracts. Southern and Northern California Locations.

**NO HOMESTEADING! NO IMPROVEMENTS! NO SALES TO ATTEND!** You select, apply and **BUY DIRECT** through the mail. Lists & maps now available. **WRITE RESEARCH DIV.**

**PIONEER RANCHES** 8228 Sunset Blvd., Dept. 9  
Hollywood 46, Calif.  
LARGEST LAND CORPORATION OF ITS KIND IN THE WORLD

**DOLLS!**


Learn to make, repair and sell dolls and accessories at home. Excellent money making opportunities. May we send FREE informative booklet? No obligation!

**NORM & SUE'S DOLL HOSPITAL SCHOOL**, Studio M-10  
11826 San Vicente Blvd., Los Angeles 49, Calif.

*Learn* **ACCOUNTING**  
Business Administration

Bookkeeping, secretarial and allied subjects at home in your spare time or attend nationally approved resident school. Write for FREE Success Book giving complete details on courses, plans, rates and employment opportunities. G.I. approved. Write Dept. A

*Hills* **BUSINESS UNIVERSITY AND  
EXTENSION SCHOOL**  
619 W. MAIN ST. OKLAHOMA CITY 2, OKLAHOMA



**RUPTURED**

**BE FREE FROM TRUSS SLAVERY**

Surely you want to **THROW AWAY TRUSSES FOREVER**, be rid of Rupture Worries. Then Why Do you put up with wearing a griping, chafing and unsanitary truss the balance of your life? If you do, it will NOT be through necessity but through choice on your part.

Now there is a new modern **Non-Surgical** treatment that is designed to permanently correct rupture. These **Non-Surgical** treatments are so certain, that a Lifetime Certificate of Assurance is given. Write today for our New **FREE** Book that gives facts that may save you painful, expensive surgery. Tells **how non-surgically** you may again work, live, play, love and enjoy life in the manner you desire. There is no obligation.  
**Excelsior Medical Clinic, Dept. H6124, Excelsior Springs, Mo.**

## PROFIT IN YOUR SPARE TIME



**FIX SMALL GASOLINE ENGINES**  
Outboard • Powermower • Chain Saw • Tractor

Harry F. Peters, Spokane, Wash., says:  
" . . . your Course led me into a very  
profitable and enjoyable business."



**MAKE EXTRA MONEY**—or, repair your engines and SAVE. Illustrated, easy-to-understand, Home Study Course. FREE information. Write TODAY!

**LINCOLN TECHNICAL INSTITUTE**  
Suite T-E, 472 Market Street, Newark 5, New Jersey

## FISH MODERN ELECTRONICALLY with *Portable* LO-K-TOR

- Acclaimed by fishermen
- Completely Portable
- Shows fish at 80 ft. regardless of depth of water
- Uses low cost 6-volt lantern battery
- 5-yr. service guarantee
- FREE literature



Price complete with batteries . . . **\$148.50**

**LOWRANCE ELECTRONIC MFG.**

Dept. 8 Joplin, Missouri

## TOOLS and HARDWARE WHOLESALE!

**HUGE PROFITS!  
MORE MONEY!**

**Start Your Own Business**

Sell nationally advertised tools to your friends and neighbors. Also for your own industrial and institutional use. New giant wholesale catalog has room for only your name on it. You get all the orders and reorders. A MILLION DOLLAR INVENTORY AT YOUR FINGERTIPS. NO STOCK TO CARRY. ORDER AS YOU NEED IT! . . . Electric drills, saws, sanders, micrometers, snips, tool boxes, vises, motors, trowels, wrenches, socket sets, chisels, mitre boxes, squares, and many others too numerous to mention. **WHOLESALE DISCOUNTS UP TO 50% off . . .** Send \$1 deposit and get the new giant wholesale catalog. Your \$1 is credited to your first purchase or refunded if not 100% satisfied. Write NOW!

GET UP TO  
**50%**  
off

**U. S. SUPPLY CORP., Dept. 272** 149 Church St., N. Y. 7, N. Y.

## FORTUNES IN DIVING

**Train at Home in Spare Time**

**Write Today for Amazing Free Booklet**

Here is one of the greatest opportunities of our time. Make big money fast in Skin and Lung Diving. Trained divers needed in hundreds of industries and by government. Build a successful business of your own. Hourly rates among highest paid in any field. Training program by E. R. Cross, world famous master diver. Get the facts now. Mail coupon for **FREE BOOKLET TODAY!**

**DIVEMASTER, Dept. PM-10**

5637 W. 63rd Place, Chicago 38, Ill.

Send me free information about Diving.

Name \_\_\_\_\_ Age \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

## America's Needs for Mechanics

(Continued from Page 48)

These are a few of the reasons America's auto industry is one of the greatest industries in the world, and these are the reasons you will want to consider the field of auto mechanics carefully before you select a career.

Despite the tremendous demand for trained mechanics, figures show that less than one-tenth the required number of men are getting any kind of an automotive education. This means that there are endless opportunities in this field—opportunities just waiting for alert men with an eye to the future.

One of the best features of this field of work is that the demand for auto-mechanics isn't confined to big cities. Jobs are available in small towns from coast to coast. This means that, no matter where you live, jobs are waiting, and while you're learning auto mechanics, you can get practical experience right in your own home town.

The earning power of a qualified mechanic is comparable to that of a college graduate, and yet a qualified mechanic doesn't need the years of formal schooling required in other professions. In Chicago, for example, mechanics are earning, on the average, \$3.00 an hour. And this is just an average figure for a qualified mechanic—opportunities for more responsibility and greater specialization can lead to an income of as much as \$15,000 a year.

Another advantage of this field of work is that mechanics are seldom, if ever, out of work. There is always a demand for a skilled man—he can choose where he wants to work, and if he desires, he can make a comfortable living with a repair business of his own.

How can you get started in this lucrative field? You can actually become an expert in a matter of months, not years, and one of the best ways to start is to take a correspondence or resident-training course in auto mechanics.

One top correspondence school offers a total of 86 lessons covering every phase of car repair and diesel-mechanic training. If you're good with tools, if you like to know what makes things work, and if you take pride in workmanship, you probably have the natural ability to become a professional auto mechanic. You don't need previous training to become successful—just the will to get ahead and the desire to work with tools.

It isn't necessary to have a high school degree to take auto-mechanic training. This is a special field of practical knowl-

edge in which the will to learn is more important than previous formal schooling.

Correspondence training offers some advantages. You can set your own classroom hours and allow yourself plenty of time to complete your courses, although most students finish up within a year. Your lessons are graded and evaluated by qualified instructors and the correct answers are returned to you in the mail.

What about practical training? Many students find that after a few lessons they are able to make money with part-time repair work right in their own neighborhoods. If you own a car, you can put your correspondence training to practical use, but having a car isn't essential. When you learn the "how" and "why" of automotive maintenance, you'll find it easy to put your knowledge to practical use when the opportunity arises.

Resident training has the advantage of offering on-the-spot practical lab work to supplement lesson material. Many resident and correspondence schools offer special job-counseling services specifically designed to help you get the job you're looking for.

One highly-regarded school offers students a complete set of hand tools including a socket wrench set, pliers, screwdrivers, a ball peen hammer and a metal carrying case. Testing equipment is also offered—timing light, compression tester and vacuum gauge. In addition repair manuals are provided, and it's all included in the cost of tuition. Other schools offer similar equipment to help you get started in your repair jobs.

Training in auto mechanics might provide the pathway for a better job for you in one of America's leading industries. No question about it, the opportunities are almost unlimited, and if you're looking for a solid career opportunity, be sure to check this field.

For more information on school training opportunities, write Popular Mechanics Skills for America, 200 E. Ontario St., Chicago 11, Illinois.



## BUILD

and Save with  
this Home  
Plan Library

"Dream Home" Plans  
You Can Build or  
Contract

Over 700 plans custom designed to fulfill owner's cherished dreams, cost-saving, lasting construction, and to suit any site. You can save \$1000 or more whether you do the building or contract it. Complete working blue-print sets, materials lists, etc., at low-low cost



## SAVE!

Any 3 Illustrated  
Plan Books

**\$2**

(Ordered Separately  
Books - \$1 each)

- FAMILY ROOM HOMES 222 easy-living plans
- HILLSIDE & SPLIT-LEVEL 100 advantageous designs
- NEW TRENDS In Selected Homes... 260 special plans
- Block Masonry Homes 223 economical beauties
- WEEKEND PLANS Easy-to-build cabins, lodges
- DUPLEX HOMES 40 money-making plans

SEND TODAY! Postpaid in U.S. and Canada

## HOME BUILDING PLAN SERVICE

Studio P, 2454 N. E. Sandy Blvd., Portland 12, Oregon



Let me show you

### HOW TO SPEAK AND WRITE LIKE A COLLEGE GRADUATE

I have helped thousands of men and women who have not had college training in English to become effective speakers, writers, and conversationalists. With my new C. I. METHOD, you can stop making mistakes, build up your vocabulary, speed up your reading, develop writing skill, learn the "secrets" of conversation. You don't have to go back to school. Takes only 15 minutes a day at home. Costs little. 32-page booklet mailed FREE upon request. Send me a card or letter TODAY!

Don Bolander, Career Institute  
Dept. E-1051, 30 E. Adams St., Chicago 3, Ill.

## FREE EICO

### CATALOG

Build Your Own  
Hi-Fi, Radios,

Ham Gear, Test Inst., — Save 50%

Get started in ELECTRONICS the easy EICO way. No technical knowledge needed to build EICO kits. Simple, step-by-step "Beginner-Tested" pictorial instructions guide you all the way. LIFETIME service & calibration guarantee. Mail coupon now!



EICO, 33-00 Northern Blvd., L. I. C. 1, N. Y.  
Please send FREE catalog & name of local  
dealer. Dept. PM-1

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_



**YOUR REGULAR HOUSE WIRING  
BECOMES A SUPER-POWERFUL TV  
ANTENNA WITH**

## **Sensational PLUG-TENNA**

**Eliminates Costly Roof and Rabbit Ear Antennas.**

This amazing precision electronic unit plugs in like any electric cord—YET, uses no electricity—costs nothing to operate, and never wears out! Its secret lies in its ability to convert all the wiring in your apartment or home into one gigantic TV antenna—assures miracle clear reception from all directions in almost any area. Stays out of sight—out of the way—AND, it's perfectly SAFE! Excellent also for AM-FM and short wave radios, regularly \$4.98 ONLY \$2.49 ppd.

Send Check or M.O. If C.O.D. Fees Extra  
**MONEY BACK GUARANTEE**

**SCOTT-MITCHELL HOUSE, INC.**

Dept. HC22 415 S. Broadway Yonkers, N.Y.



## **I SOLD A MILLION STARS** (Verifiable)

**EVER HAVE AN IDEA?** Ours came out of the night sky and into national volume sales. NOW—you idea men and women, inventors, mail order people, I'll tell you how you too can get into the volume field. I'll reveal to you the know-how, how to create an idea, protect, promote it, make money for yourself. I've a FAT package of priceless information at LOW cost: testing lists, names of top volume users, vital facts, many sound tips. Lets start some action. Write for details. I'll give you a hand-up. **STEPHEN WALSH**, 1972 Fullerton Avenue, Costa Mesa 5, California. Refs. Dun & Bradstreet; Bank of America.



## **ADD UP TO 25 POUNDS of SOLID MUSCLES** or you pay NOTHING

**\$10 BODY MOLD** course included FREE with **DAN LURIE BARBELLS**. Only **DAN LURIE BARBELLS** and "Body Mold" courses produce such amazing results. 15 minutes a day can make you a bigger man. Send today for details. Order now at lowest factory price.

50 lb. set \$ 9.48 • 100 lb. set \$15.98  
150 lb. set \$23.48 • 200 lb. set \$29.98  
Semisteel sets approx. 10% higher. Extra wts. 15c per lb. Send 50% cash, balance C.O.D. F.O.B. Plant

**DAN LURIE BARBELL CO.**, 52-M1 Bristol St., Dept. 96A, Bklyn. 12, N.Y.

## **75 POWER TELESCOPE 25X-45X-75X \$398**

**NEW 3 in one telescopes, 3 variable 25X 45X-75X magnification. Brass bound, 25 power for ultra bright images 43 & 75 power for long range. Guaranteed to bring distant stars, moons, objects, sports 75 times closer.**

Most powerful scope sold anywhere near this amazing low price. American made, 5 sections. Opens 36", closes 1 ft.; contains 4 ground & polished lenses. Can also be used as powerful compound microscope. Mass production enables us to offer telescope complete at \$3.98 postpaid. Money back guarantee.

**CRITERION CO.**, Dept. PMB-77, 331 Church St., Hartford, Conn.

**BUY DIRECT  
• SAVE ON •  
TILLERS • TRACTORS**

Full line of attachments for mowing, gardening, farming  
2-3-4 H.P. TILLERS 12" 16" CUT

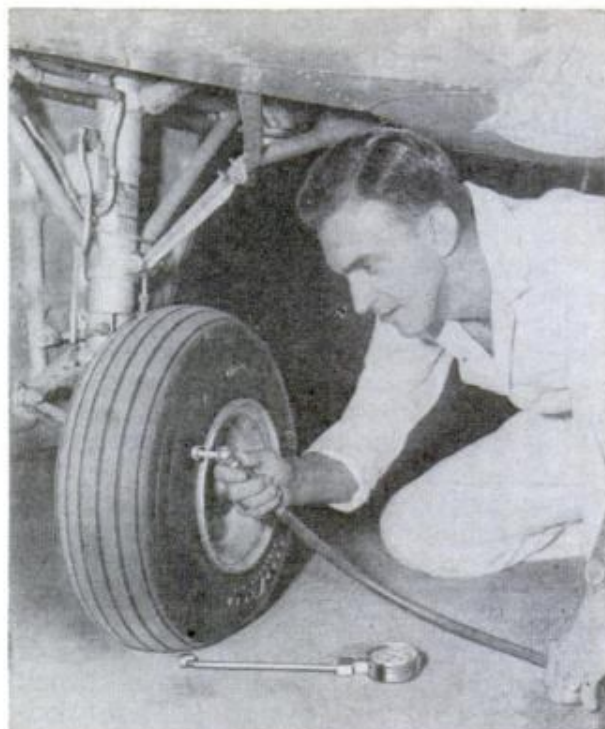
**FREE CATALOG  
& PRICE LIST**

5-6-7-9 H.P.  
2 wheel &



**RED-E TRACTOR CO.**

4th Street  
**RICHFIELD, WISCONSIN**



## **Tubeless Aircraft Tire Inflated Like Football**

Tubeless tires, inflated like a football with a needle, are now being used on military and commercial aircraft. Designed by Goodyear Tire and Rubber Company, the tires eliminate wheel-weakening valve stems and holes that cause concentrated stress. The two-inch needle is kept in a spongy container filled with lubricant. Points of inflation are marked by blue dots on the sidewalls.

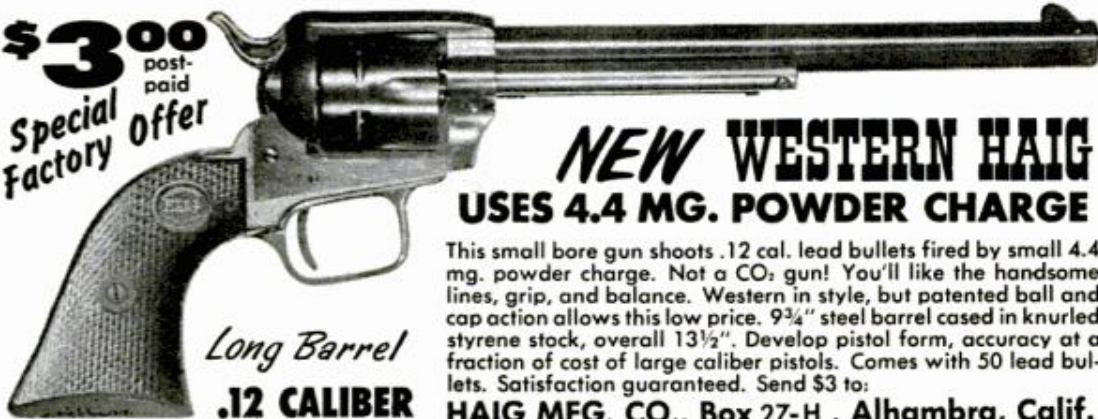
## **Detergents Find Way Into Drinking Water**

Detergents used in household cleaning are finding their way into drinking water, creating a serious public health problem, says Jesse M. Cohen, chemist at the Water Supply and Water Pollution Branch of the Robert A. Taft Research Center, Cincinnati, Ohio. He says filter and other water purification methods that remove soaps from sewage just don't work on the synthetic cleaners. Some idea of how widespread the pollution can be is shown in these figures: In 1958, more than 3.8 billion pounds of detergents were used in the U.S. compared to 1.3 billion pounds of soap. More than 85 percent of the detergent went down household drains. Cohen says data must be gathered to find if long-term ingestion of detergents is harmful. In the meantime, he said there is a simple test for detecting detergents in drinking water: Water at the tap will foam if detergents or other pollutants are present.

**American families are  
better housed —  
thanks to Advertising!**



**\$300**  
post-paid  
**Special Factory Offer**



*Long Barrel*  
**.12 CALIBER**

## NEW WESTERN HAIG USES 4.4 MG. POWDER CHARGE

This small bore gun shoots .12 cal. lead bullets fired by small 4.4 mg. powder charge. Not a CO<sub>2</sub> gun! You'll like the handsome lines, grip, and balance. Western in style, but patented ball and cap action allows this low price. 9 $\frac{3}{4}$ " steel barrel cased in knurled styrene stock, overall 13 $\frac{1}{2}$ ". Develop pistol form, accuracy at a fraction of cost of large caliber pistols. Comes with 50 lead bullets. Satisfaction guaranteed. Send \$3 to:  
**HAIG MFG. CO., Box 27-H, Alhambra, Calif.**



### WANT MORE MONEY? GET INTO PHOTOGRAPHY

Coast to coast, high-paying jobs in photography are waiting for people with that "know-how" to fill them. You can quickly, easily qualify at home with the world-famous NYI Learn-by-Doing Method. Write today for free catalog. Also resident training in N. Y. Our 50th Year. Approved for Veterans.

**NEW YORK INSTITUTE OF PHOTOGRAPHY**  
Dept. 49 10 West 33 St. New York 1, N. Y.

## REAL ESTATE BE A BROKER

**PAYS BIG! SEND FOR FREE, BIG, ILLUSTRATED CATALOG NOW!** Graduates report making substantial incomes. Start and run your own business quickly. Men, women of all ages, learn easily. Course covers Sales, Property Management, Appraising, Loans, Mortgages, and related subjects. **STUDY AT HOME** or in classrooms in leading cities. Diploma awarded. Write **TODAY** for free book! No obligation. Approved for World War II and Korean Veterans  
**WEAVER SCHOOL OF REAL ESTATE (Est. 1936)**  
2020R Grand Avenue Kansas City, Mo.

**FREE BOOK TELLS HOW**

## CONCRETE BIRD BATHS AND OVER 250 OTHER MONEY MAKING ITEMS



You've seen them all over the country... concrete bird baths, garden seats, flower boxes, appealing statuary, and many other items that add charm around the house and lawn. They're made by enterprising people, just like you, from our **COPYRIGHTED ALUMINUM MOLDS**. It's easy. It's fun. It's profitable.

Send \$2.00 today for this 82-page "How to" book. 20 pages of clear instructions. Valuable trade secrets. Over 250 items beautifully pictured (with description, dimensions, and prices of molds). Rushed to you by first class mail.

**CONCRETE MACHINERY CO., INC.**  
HICKORY 2, NORTH CAROLINA

Name \_\_\_\_\_  
Address \_\_\_\_\_

**HOW TO TURN CONCRETE INTO GOLD**

## MEN WANTED

Earn \$100 Per Week and up  
**AUTO DIESEL MECHANICS**

Master a trade with a future - learn Auto-Diesel mechanics in our shops. You learn with tools on real equipment. Earn while you learn. Many of our graduates earn \$100 per week and up. No previous experience necessary. Day and night courses. Approved for veterans. Write for free bulletin.

**NASHVILLE AUTO-DIESEL COLLEGE**

226 7th Ave., N., Dept. 75

Nashville 3, Tenn.

**POPULAR MECHANICS**  
MAGAZINE

now complete on  
**MICROFILM**

**VOLUMES ONE THROUGH NINETY-SIX**

Early volumes of **POPULAR MECHANICS** have been eagerly sought as collector's items. Now the monumental new microfilm collection makes this wealth of reference material available to all libraries.

Begun in 1902 as a weekly, **POPULAR MECHANICS** was one of the first "picture" magazines. It also pioneered the do-it-yourself idea, and its files contain plans for almost any project desired.

**Ninety-six volumes - \$750.00 for the set.**

**UNIVERSITY MICROFILMS, Inc.**

313 North First Street

Ann Arbor, Mich.

## Curious Coins! ODD PAPER MONEY!

Worth \$1 - But Yours

**FREE!**

to get names for our mailing list

**SEND TODAY** for this valuable packet of odd and curious coins, paper money - an exciting introduction to fastest growing hobby in the world! You'll find an African coin with a hole in the middle, a 50-pfennig coin from Germany, unusual money from Switzerland, Mexico, Austria, etc.. Actual value at least \$1-but yours **FREE** on this special offer!

**JOIN THE FUN RIGHT AWAY**

This is our way of showing how much fun others have collecting strange money - Money over 1500 years old - Gambling coins from old Siam - Tokens used for barter before Christ - and other exciting curios. All listed with other valuable offers for inspection. Get **FREE** packet of coins and money-plus \$100,000 Confederate Money bonus - by sending coupon (with 10¢ for shipping) to: **LITTLETON COIN CO., Dept. PM-1, Littleton, N. H.**

**ALSO FREE!**



**\$100,000 in CONFEDERATE "MONEY"!**

These lots-of-fun facsimiles are yours for promptness while the supply lasts.

**LITTLETON COIN CO., Dept. PM-1, Littleton, N. H.**

Rush **FREE** packet of "Curious Coins and Currency" plus \$100,000 in Confederate "money." I enclose 10¢ to help cover shipping. Also send lists of rare coins available and other offers for inspection. No obligation to buy.

Name.....

Address.....

City.....Zone...State.....

## AVIATION CAREER

**SPECIALIZED EDUCATION / PROFESSIONAL TRAINING... only 16 months to 2 years**

Top-pay prestige positions, bright future in aviation. Job opportunities waiting for you as soon as you're ready. Airframe and Powerplant Technician, Aeronautical Engineering Technologist, Business or Executive Pilot. Classes in Miami.

**SEND FOR FREE 48-PAGE BOOK**

Embry-Riddle Aeronautical Institute  
Dept. B Miami, Florida (Founded 1926)

Name.....

Address.....

City.....Zone.....State.....

### MEN AND WOMEN WANTED

**IT AIN'T SELLIN'** — just servicing. Take over YOUR AREA as our Service Distributor, keeping retail stores supplied. Nationally advertised 30-year-old line pays you up to \$20 an hour. For samples, highly successful plan—FREE—write NOVO, 3855 Lincoln Ave. Dept. L-18, Chicago 13.

## 'How to Make Money with Simple Cartoons'



A book everyone who likes to draw should have. It is free; no obligation. Simply address

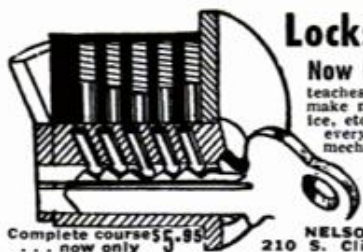
**FREE BOOK**

**CARTOONISTS' EXCHANGE**  
Dept. 91-D Pleasant Hill, Ohio

## BECOME AN EXPERT IN TRAFFIC and TRANSPORTATION

Traffic men earn \$4,000 to \$10,000 and up. Thousands of firms need experts on rates, tariffs, regulations. We train you thoroly in spare time at home for executive traffic jobs. Personal training under traffic authorities. Write for free book "Traffic and Transportation."

**LASALLE Extension University, 417 So. Dearborn St.**  
A Correspondence Institution Dept. 1647 Chicago 5, Ill.



### Locksmithing AND KEY MAKING

**Now Made Easy!** Practical up-to-date course

teaches you how to pick locks, de-code, make master keys, repair, install, service, etc. New self-instruction lessons for every handyman, homeowner, carpenter mechanic, service station operator, fix-it shop, hardware dealer, gunsmith. 53 easy illustrated lessons. Full price only \$5.95 postpaid; or C.O.D. plus postage. Satisfaction or refund guaranteed.

Complete course \$5.95  
... now only \$3.95

**NELSON-HALL CO., DEPT. AP-2**  
210 S. Clinton Chicago 6, Ill.

## GET INTO ELECTRONICS

V.T.I. training leads to success as technicians, field engineers, specialists in communications, guided missiles, computers, radar, automation. Basic & advanced courses in theory & laboratory. Assoc. degree in 29 mos. B.S. obtainable. ECPD accredited, G.I. approved. Graduates with major companies. Start Feb., Sept. Dorms, campus. H. S. graduate or equivalent. Catalog.

**VALPARAISO TECHNICAL INSTITUTE**  
DEPT. D VALPARAISO, INDIANA

# Where-to-Buy-It Index

### Automotive

Hot seat keeps battery strong (Visionator, Inc., 120 N. Peoria St., Chicago 7, Ill.).....	106
Hillman Minx goes automatic.....	113
Restyled Anglia has new engine.....	113
Twin-deck rail cars carry foreign autos.....	122
Kit tells when to change oil (Gordon Labr., Towns-Worth Bldg., Box 1546, Annapolis, Md.).....	132
"Hot foot" for back-seat riders.....	132
"Not since the Model A".....	183

### Construction

Collapsible dam solves water-diversion problem.....	123
Sight-seers elevator.....	125
Strange shapes on the campus.....	126
Visitors see Tokyo from world's highest tower.....	128
Electronic guide steers canal builders.....	130

### Miscellaneous

Mine-planting aids developed by army.....	114
Vertical chessboard helps kibitzers.....	114
Who shot that arrow?.....	115
Up-the-stairs switchboards handle 6000 calls daily.....	123
Penny-a-year safety light for stairs and hallways (Westinghouse, Lamp Div., Public Relations Dept., Bloomfield, N. J.).....	125
Car sinks into flower-garden garage.....	129
Push-button coal processing.....	136
Army and Navy join forces to test ship-to-ship loading.....	137
Heating mat keeps concrete warm (Sno-Melter Mats, Easy-Heat, Inc., Lakeville, Ind.).....	137
Mockup battle trains tankers.....	143
Whirlybird trainer floats, won't fly.....	143
Self contained fire alarm works on flashlight batteries (Life-guard Alarm, Arondell Products Co., 3915 Powelton Ave., Philadelphia, Penn.).....	286

### Missiles, Rockets and Space

Soldiers get guided missile.....	107
Oil-spraying rocket calms waves for rescue operations.....	122
40-foot array antenna tracks space vehicles.....	124
Navy's "big dish" to probe universe.....	142
Electricity made by sunlight may power spaceman's radio.....	280

### Science

Remote handler for "hot" cobalt.....	106
Submarine viewer helps fishermen.....	113
Huge radio telescope stretches across desert (Convair Div. of General Dynamics Corp., San Diego 12, Calif.).....	121
"Replacement for man" does dangerous jobs (Hughes Aircraft Co., Culver City, Calif.).....	121
Paper test helps doctor choose effective antibiotic.....	122
"Boxcar" antenna for warning kit.....	132
Huge sundial also provides heat.....	133
Fixture supplies heat and light (Berko Electric Mfg. Corp., 212-40 Jamaica Ave., Queens Village 20, N. Y.).....	142
Instrument measures radiation absorbed by living tissue (Bausch and Lomb Optical Co., Rochester 2, N. Y.).....	262
Army adapts scuba unit.....	276

### What's New for Your Home

Baby stroller.....	134
Home canner and freezer packer.....	134
Door chain.....	134
Wastebasket holder.....	135
Adjustable bed.....	135
Magnetic door stop.....	135
Garbage can.....	135

### Radio, T.V. and Electronics

Custom build your stereo hi-fi system.....	238
--	-----

(Continued to page 90)



# DURO-PLASTIC MENDS EVERYTHING!

but a **BROKEN HEART...**  
and **THE CRACK OF DAWN**  
(Well, just about everything)

You've got a fix-problem? DURO-PLASTIC has the answer. Name your weapon! DURO-PLASTIC ALUMINUM, PLASTIC RUBBER, PLASTIC PORCELAIN REPAIR, Liquid STEEL, rust REMOVER, handy-patch . . . and others in tubes and cans. Available at all better hardware, automotive, paint and variety stores.  
From \$1.00 to 39¢ (in Canada \$1.29 to 49¢)



**WOODHILL CHEMICAL CO. Cleveland 14, Ohio**

**MAKE MONEY!**

**REPAIR HYDRAULIC JACKS**



**Earn While You Learn At Home**

Make up to \$5 an hour, full or part-time, in the competition-free field of Hydraulic Jack Repair. Millions of jacks in auto service stations, truckers, body shops, riggers, farms, need servicing. We show you HOW. Easy step-by-step directions.

Get! Folder PM-1 & free bonus offer

**Institute of Hydraulic Jack Repair**

P. O. BOX 50 • BLOOMFIELD, N. J.

A Correspondence School Licensed by N.J. Bd. of Ed.

**Learn BAKING At Home**

Baking is one of America's high industries in wages. Nearly depression-proof. Thorough basic home course lays sound foundation. If you have aptitude, write for **FREE BOOKLET**, "Opportunities in Commercial Baking." National Baking School, 835 Diversoy Pkwy., Dept. 1351 Chicago, 14, Illinois



**TOOLS WHOLESALE**

Start your own business, sell tools to your friends and neighbors, or buy tools for your own use and **SAVE MONEY \$\$\$**

**\$100 PUTS YOU IN BUSINESS**

A MILLION DOLLAR INVENTORY AT YOUR FINGERTIPS. NO STOCK TO CARRY. ORDER AS YOU NEED IT.

**BUY AT WHOLESALE PRICES.** Extra \$25.00 profit on your accumulated purchases. \$1.00 refund on first purchase or refunded if you are not 100% satisfied.

THOUSANDS!!! of Nationally Advertised items of Hand Tools, Power Tools, Machinist Tools, Tool Chests, Point Sprayers, Light Fixtures, Appliances, Guns, Gifts, Toys and other items too numerous to mention.

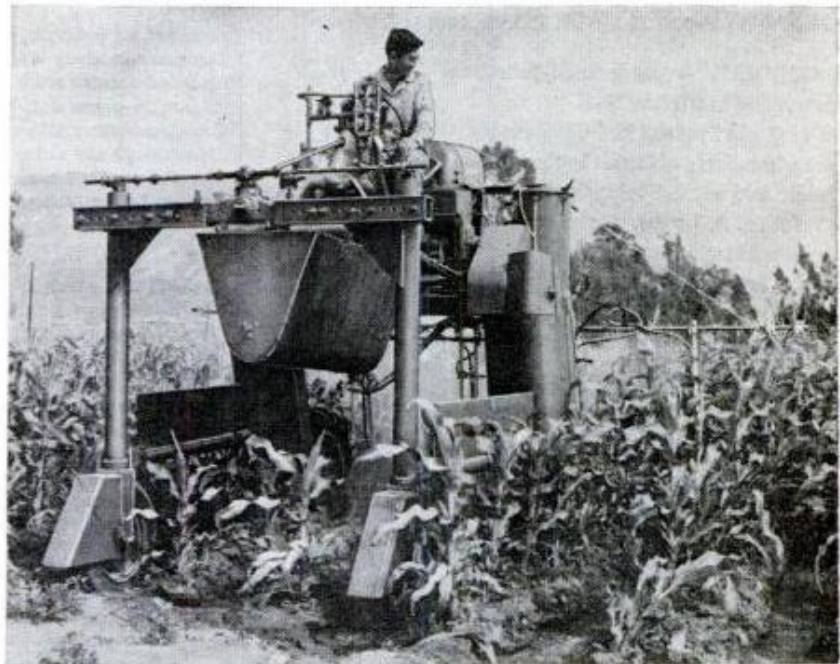
**WE SHIP COAST TO COAST**

Whise. Disc. up to 50% off

Dept. PM-1 107 Walnut St., Phila. 6, Pa.  
**SILVO HARDWARE CO.**

## Insect Sprayer Treats Many Crops

Straddling wide rows of corn and rasping along on four long legs, a new insecticide sprayer looks like a monster version of another effective insect killer—the praying mantis. Now in use at an experimental station run by the University of California, the sprayer—because of its great flexibility of operation—is speeding tests of insecticides. Its virtues may make it adaptable for general farm use. The diesel-powered machine has these features: The operator can, at the touch of a button, adjust the 15-foot-wide, rear-mounted spray boom from ground level to a height of five feet. In one hour, two men can adjust the width between wheels to fit spacing of crop rows. Experimental batches of insecticide may be mixed right on the field, because the sprayer carries two tanks, one of which contains water to vary solutions, or to mix new batches.



"We can test insecticides on a tall crop, such as corn, one day, and on a low crop, such as beans, the next," says Dr. Lauren D. Anderson, the University entomologist who designed the sprayer. He believes farmers could use the machine to good advantage, if it were stripped of extra tanks and fittings. A cotton grower, for example, could treat plants after they grew tall.

### Craftsman and Shop Notes Index

#### Automotive

Core of tire valve removed with cotter pin.....	187
Extended fuse circuit helps trace short circuits.....	187
Information on car engine kept on feeler gauge.....	187
Small drain hole prolongs muffler life.....	87
Trouble shooting the tough ones.....	188
Low brake pedal.....	189
Speedometer sticks.....	189
Safety switches.....	189
Sprung doors.....	189
Flashlight becomes flare for night auto repair.....	190
Replaced breaker points call for timing check.....	190
Small-car parking woes.....	190
Wrong spark-plug gap causes engine to overheat.....	190

#### Farming

Discarded implement wheel makes fine fence turnstile.....	193
Modified pin prevents injury.....	193
Rubber-tired planter wheels do better job of packing soil.....	211
Trailer for moving sows with litters.....	211
Mobile field-service station.....	232
Mount disk harrow on auto wheels.....	232
Use wooden ramps to unload grain.....	232

#### House and Home

Inexpensive stools from discarded items.....	195
Common items help to solve tough household problems.....	199
Garage location is winter asset.....	214
Hasp used to lock sill cock.....	214
Improvised snowplow cleans sidewalks.....	214
Record browser gives living area a luxurious touch.....	215
Umbrella and overshoe stand.....	222
Prevent water stains on rugs.....	223

#### Miscellaneous

Toolbox lid is handy blackboard.....	193
Drums turned on wooden platform.....	194
Painted arrows tell direction in which to move spirit level.....	194
Cigarette-paper dispenser.....	198
Leather tooling is easy.....	208
Display collection in egg carton.....	210
"Wetter water" makes chores easier.....	212
Repair for snowshoe binding.....	222

#### Shopping for Tools

Electric sharpener.....	234
Heavy-duty grinder.....	234
Midget speed-lettering template.....	234
Tiny tapping attachment.....	234
Zone-control unit.....	234
Adjustable stop gauge.....	235
Heavy-duty portable saw.....	235
Precision instrument scale.....	235
Rotating parts bin.....	235
Special micrometer.....	235
Combination clutch-brake.....	236
Novel design drills holes to any depth.....	236
Radial-arm saw.....	236
Roller-bearing tail center.....	236
Universal screw anchor.....	236

#### Soldering Tips

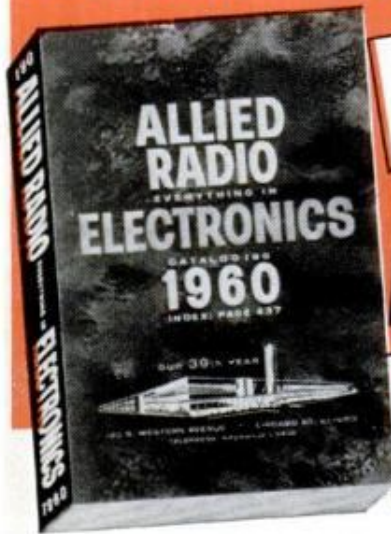
Rubber grommet.....	207
Sandpaper.....	207
Eye-glass case.....	207
Ceramic insulators.....	207
Extra tips for soldering iron.....	207

#### Solving Home Problems

Children's mittens kept dry.....	197
Container for paper bags.....	197
Doorstop made from garden hose.....	197
Hanging vase made from chianti bottle.....	197

(Continued to page 92)

# FREE ALLIED'S MONEY-SAVING 1960 ELECTRONIC SUPPLY CATALOG



value-packed SEND FOR IT!

SAVE ON EVERYTHING IN ELECTRONICS

EASIEST TERMS only \$2 down on orders up to \$50

## WORLD'S LARGEST STOCKS

Send for the most widely used buying guide to everything in Electronics for Experimenters, Builders, Amateurs, Servicemen, Engineers and Hi-Fi enthusiasts. Save on:

- KNIGHT-KITS®—Best in Build-Your-Own
- Everything in STEREO Hi-Fi
- Hi-Fi Music Systems and Components
- Tape Recorders & Phono Equipment
- Public Address & Paging Systems
- TV Tubes, Antennas, Accessories
- Amateur Station Equipment
- Latest Test & Lab Instruments
- Parts, Tubes, Transistors
- Everything in Tools & Technical Books

SAVE on everything in Electronics at ALLIED—get fastest service, expert personal help, guaranteed satisfaction. Send today for your FREE 1960 ALLIED Catalog.

Everything in Electronics from One Reliable Source

our 39th year

## ALLIED RADIO

- ALLIED RADIO CORP., Dept. 5-A
- 100 N. Western Ave., Chicago 80, Ill.
- Rush FREE 1960 ALLIED Catalog.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_



SEND FOR FREE CATALOG





General Electric, Schenectady 3, N. Y.

### Pellets Move Apart To Ground Lightning

Special pellets in a new lightning arrester act like a valve when excess voltage—usually caused by lightning—occurs in a line. They separate for a few millionths of a second to ground potentially dangerous surges, then close, returning the line to operating condition. The 120/240-volt arrester requires no maintenance and its aluminum hardware can be attached to the side of a house or hung from conduit adjacent to service lines. When service wires are stripped with pliers, the arrester may be attached and taped.

### CHANGE SPARK PLUGS REGULARLY

**LEARN TO EARN**

## HIGH WAGES

AS A HEAVY EQUIPMENT OPERATOR!

Secure a high paying future in the exciting construction industry today! Learn to operate bulldozers, draglines, cranes, back hoes, scrapers and motor graders on our actual construction projects!

- ONLY CONTRACTOR OWNED AND OPERATED SCHOOL IN WORLD
- ASSOCIATE MEMBER ASSOCIATED GENERAL CONTRACTORS
- MODERN EQUIPMENT
- V. A. APPROVED FOR G. I. TRAINING
- BUDGET PAY PLAN AVAILABLE

WRITE TODAY FOR FREE SCHOOL CATALOG

**WESTERN NATIONAL**  
SCHOOL OF HEAVY EQUIPMENT OPERATION

DEPT. 2      BOX 510  
WEISER, IDAHO      PHONE 910



**Better Than Your Own**

## SHOE STORE AT HOME



No investment, no experience needed. Just show magic cushion comfort to friends, neighbors, co-workers. Advance commissions to \$4.00 a pair, plus Cash Bonus, Paid Vacation, \$25.00 Reward Offer. Outstanding values for men, women, children. Money back guarantee. Shoe samples supplied without cost. Write TODAY for FREE new 84 page catalog and full details.

**TANNERS SHOE CO., 522, BROCKTON, MASS.**

**Two-Eyelet Hit With Cushioned Comfort**

## TIMESTUDY

Cash in now on the fast growing demand for Timestudy Men. Thousands needed in modern automated companies. Quick route to promotions and better jobs. Be ready for an important job in just one year! Good starting pay. Save big money for your Co. with simple Methods improvements. Production Control. Plant Layout. BEGIN ANY TIME. Free Job Placement. Request 40 page Bulletin and THE PAY INCREASE YOU WANT.

**Address INDUSTRIAL ENGINEERING COLLEGE  
3307 Washington Blvd., Chicago 24, Illinois**

# Jif 4-color ball pen by Waterman



A single motion of your thumb pushes one color down and the other color automatically retracts. Write in ink in Black, Blue, Red or Green. Perfect for drawing, too. Gleaming chrome finish. Fully guaranteed. \$6.95. If your dealer does not have the Waterman "Jif" in stock, use this coupon.

**WATERMAN, SEYMOUR, CONN.**

Please send me \_\_\_\_\_ "Jif" 4-Color Ball Pens at \$6.95 each.

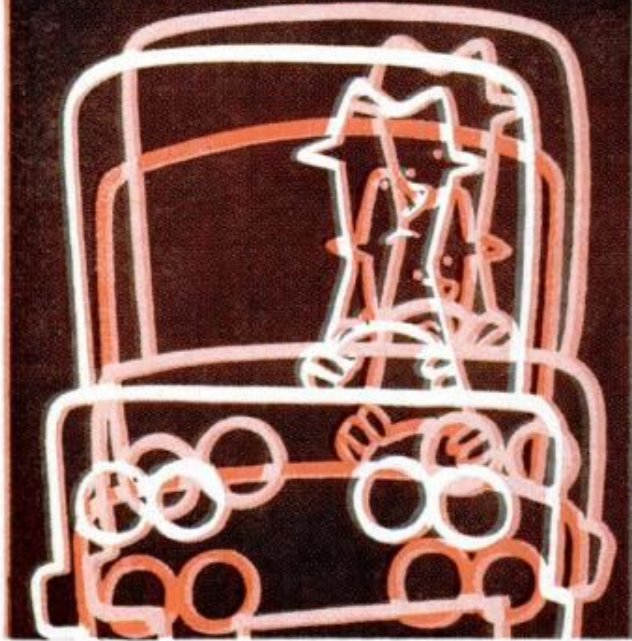
Remittance Enclosed \_\_\_\_\_ Please send C.O.D. \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

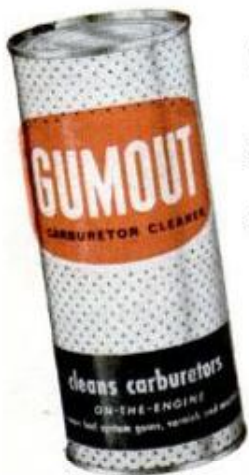
City \_\_\_\_\_ State \_\_\_\_\_

When rough idling  
shakes you up...



## HOW LONG SINCE YOU CLEANED YOUR CARBURETOR WITH **GUMOUT**

Ever notice that your car doesn't idle as smoothly as it once did? Maybe it stalls occasionally. Might be a little harder to start. Or it lacks pep and power. All because your carburetor is dirty!



### CLEAN YOUR CARBURETOR WITH GUMOUT

Just add GUMOUT to your gas tank. *Only* GUMOUT dissolves gum and varnish *completely* . . . restores engine power, stops gasoline waste. Don't take chances with substitutes. Insist on GUMOUT. Every car needs GUMOUT!

On sale at most service stations  
and auto supply stores.

**GUMOUT • CLEVELAND 4 • OHIO**

(Continued from page 90)

Paper cups with hot liquids easy to hold.....	197
Record albums displayed like pictures.....	197
Sewing machine thread kept from unwinding.....	197
Slipcovers easily adjusted on furniture.....	197
Stippled patterns for painting made from sponges.....	197
Work-top space in your kitchen.....	197

### Workshop Hints

Use cellophane tape to mask trim.....	193
Removable footrest eases painting pains.....	198
Tape holds hinges in place.....	198
Collapsible wooden sawhorse folds away when not in use.....	199
Graphite subs for carbon paper when making large tracing.....	210
Handsawing a butt joint.....	210
Acid drip caught in rubber ball.....	214
Holes for fastening door pulls located with calipers.....	222
Loosen rust-seized hinge pins with notched steel pry.....	222
Extension plank easily set up with these hooks.....	223
Shock guards for test light.....	223
Jointer operation made safe and sure.....	229

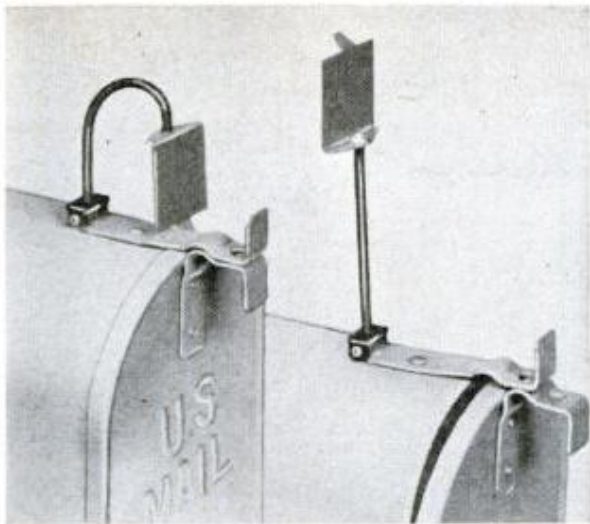
**NOTICE**—It is the intention of this magazine to provide its readers with information regarding the latest developments in the mechanical arts. Except where otherwise indicated, this magazine has no information as to any unexpired patents in respect of the developments reported herein. In the event that commercial use is to be made of any of the developments reported herein, it is suggested that legal counsel be consulted to avoid liability for patent infringement. It is not the purpose of this magazine to encourage patent infringement but, as indicated, it is the intention of this magazine to report on the latest developments in the mechanical arts.



Stormvelope Co., 6407 E. Halbert Rd., Washington 14, D. C.

### Envelope Around Screen Serves as Storm Window

Suited for use in rented apartments or homes, an inexpensive substitute for storm windows is now available. It is a plastic envelope that fits three standard sizes of casement-window screens. No tacking is required for the envelopes slip snugly over the screens. They provide one dead-air space between the sheets of polyethylene plastic, and another when the unit is set in the window. They fit metal screens 16 $\frac{5}{8}$  inches wide by 24, 36 and 48 inches long.



Grand-Jo Industries, P.O. Box 22, Detroit 23, Michigan.

## Flag Pops up When Mail Arrives

When the postman now opens the roadside mailbox door, a bright flag automatically springs up, easily visible from the house or the car. The attachment consists of a four-inch-long coil spring with a clamp that supports a red or yellow square metal flag. It is clamped to the top of the mailbox latch bracket. Each time you take the mail out, you connect the flag so that it will spring up when the door opens, saving unnecessary trips for mail.

# \$ POPULAR MECHANICS MEANS MORE MONEY IN YOUR POCKETS

**POPULAR MECHANICS**, the magazine that brings you money-saving ideas now brings you a perfect money-making opportunity.

We are looking for more men and women to introduce our magazines in their neighborhood, to accept orders for Popular Mechanics and other leading publications. If you have been looking for a way to earn a little extra each week—here's the answer!

No waiting for payday, you pocket your earnings right away! No experience necessary, you work when you please, as much as you please, your home is your office, and you are your own boss!

**YOU CAN EARN \$10.00, \$25.00, \$50.00** right away with our new Popular Mechanics Subscription Plan. **SEND NOW!**

Popular Mechanics Dept. 160-B  
250 West 55th St., N. Y. 19, N. Y.

Please send me your subscription plan!

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_



"I've seen them all ...

## CAPE CORAL IS MY CHOICE!"

says: **BILL STERN**, Dean of American sportscasters

**"IT'S FLORIDA'S WATERFRONT WONDERLAND!"**

"It's truly a Waterfront Wonderland, with everything you look to Florida for—and then some! It's the community of tomorrow—ready TODAY—rich in Nature's generous gifts, made even more wonderful by inspired planning and lavish improvements. Story-book location — ideal climate — High, dry fertile land — Full-scale construction program — A social life you'll love — all adding up to Waterfront Living at its best."



**CONNIE MACK, Jr.** says

**"THE PERFECT HOME ...  
THE PERFECT HOMESITE ...  
THE PERFECT COMMUNITY!"**

"You've never seen a parade of homes like Cape Coral's! Designed to take advantage of Florida's delightful year-round climate they invite the outdoors in, and give bright new golden meaning to every moment of your life. All sizes, too—from 2 Bedroom, 1 Bath to 4 Bedroom, 3 Bath with swimming pool. Why not select your homesite in Cape Coral now — TODAY — and plan for a better tomorrow!"

**STOP WISHING .. START FISHING!**

1/4 acre Homesites for as little as

**\$20** DOWN,  
PER MONTH!

Send for the most exciting book  
of its kind ever written! —  
**"THE CAPE CORAL STORY"**

It's yours for the asking  
**ABSOLUTELY FREE**  
Send no money, please



**CHAMBER OF COMMERCE MEMBER**

Lee County and Ft. Myers • Dade County • Florida State

**MAIL THIS COUPON TODAY!**

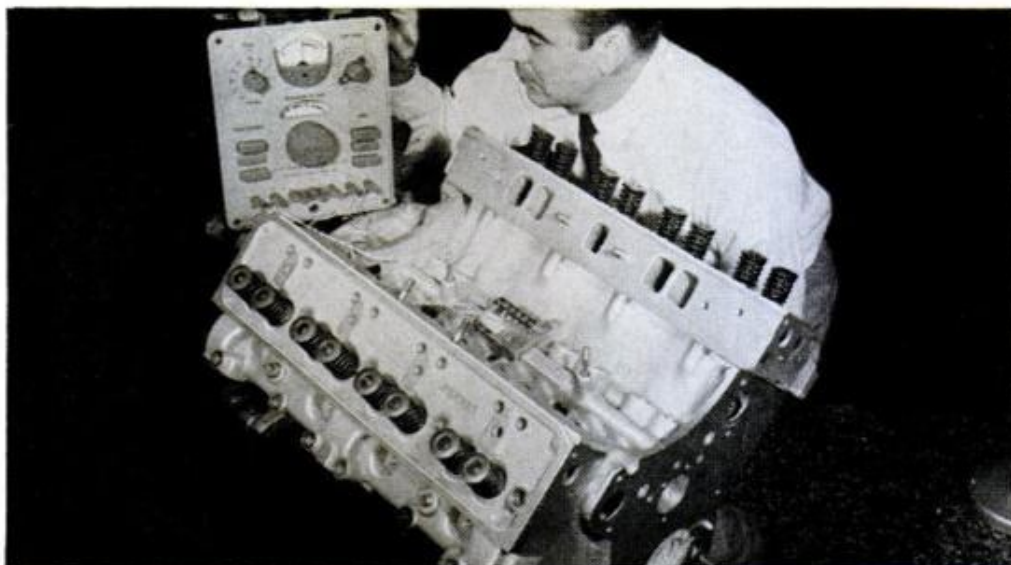
**Gulf Guaranty Land & Title Co., Dept. MS17**  
1771 N. Tamiami Trail, Fort Myers, Florida  
Please rush my **FREE** copy of "The Cape Coral  
Story" in full color.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

**Stress analysis of new aluminum auto engine at Alcoa lab. Use of aluminum in this engine reduced the weight of the cast iron production model nearly 25 per cent.**



## Why your 1960 car has four times more aluminum than your 1950 model

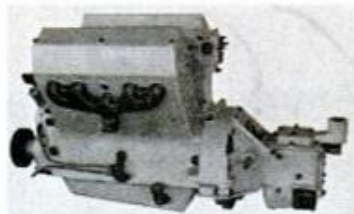
### Rugged new engines deliver more horsepower per pound

Power for one of the new U.S. compact cars comes from an exciting new aluminum engine. Because aluminum weighs only one-third as much as iron or steel, this power plant delivers far more horsepower per pound of engine weight.

Now let's say you get 17.5 miles per gallon of gas. Based on operating tests, if you reduce car weight 400 lb you'll boost that figure to 20 mpg. You'll get away from stop lights 10 per cent faster, too, because a big enemy of car performance is weight.

Airplane engines, toughest proving grounds for ruggedness and dependability, have been made of strong, tough aluminum since the time of the Wright brothers.

**Experimental aluminum V-8 engine built by Alcoa engineers in 1917.**

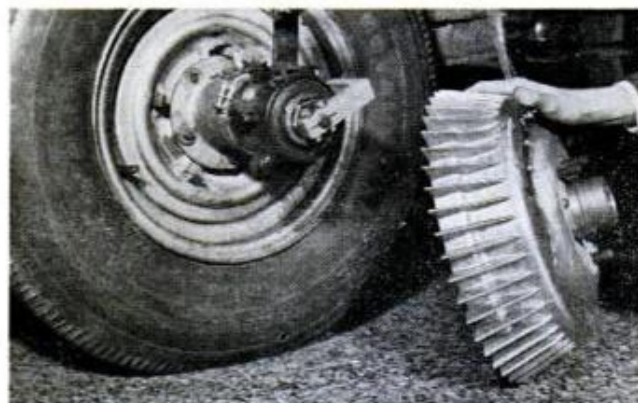


All U.S. cars have used aluminum pistons since 1955 (most earlier). Alcoa developed the special alloys and shapes which made these pistons possible. Racing car drivers have demanded aluminum heads since Barney Oldfield's day because they permit higher compression ratios. To nonracing car drivers, this means knock-free performance on regular gas.

By 1961 we predict you will see still more cars with aluminum engines. And with a lighter en-

gine, they can use lighter chassis, brakes, steering mechanisms and axles. This weight saving suggests lighter transmission, drive shaft, differential, radiator and wheels. In other words, the weight-savings snowball. That's why auto makers are switching to aluminum as fast as they can tool up for it. And Alcoa is contributing the same intense research to this move as it has for the past 50 years.

### Aluminum brakes reduce "fade" . . . save relining



Heat dissipation in aluminum brake drum (right) is measured in a heavily instrumented Alcoa test car. Special thermocouple pack fits over the wheel hub (left).

Two popular U.S. cars now have aluminum brake drums, a major advance in automotive safety. Because aluminum dissipates heat three times as fast as iron, aluminum drums stay many degrees cooler. After two or three "panic stops," or when braking down a steep grade, ordinary



brakes get hot and tend to "fade," so the lining loses its grip on the drum.

By contrast, aluminum brake drums have made 10 consecutive severe stops from 100 mph with no sign of brake fade. Iron brakes faded after 3 stops. In a controlled test under identical conditions, at 70 mph, an iron drum heated up to 630°F, while an aluminum drum only reached 420°F. Cool-running aluminum drums also increase the life of the brake lining. And they save weight, too—*unsprung* weight that lets wheels hug the road to give you a better ride.

### Aluminum grilles and trim stay showroom bright for years



You've probably noticed the big swing to aluminum for auto grilles and for trim, inside and out. Superb corrosion resistance is the reason. Aluminum that's anodized—a process perfected by Alcoa—has a surface of hard, brilliant *aluminum oxide* (the material from which sapphire is formed). This gleaming surface stays showroom bright till trade-in time and beyond.

Because it's not a coating, it can't chip or flake as paint does. Water is the only cleaner you'll need.

Versatility is another aluminum trim feature which gives the stylist a satin finish or brilliant polish, an exciting texture or beautiful, lasting color.

Everywhere on your car—upholstery, paint and trim—aluminum gives you gleaming beauty.

### COMING: lightweight, efficient aluminum radiators

This spring, one car will make its debut with an aluminum radiator. Weighing only about half as much as ordinary radiators, the new aluminum jobs will improve steering, cut front-end weight, reduce the load on shocks and springs.

Excellent heat conductivity and high corrosion resistance make aluminum a natural for radiators. Small wonder that more aluminum radiators are on the way.

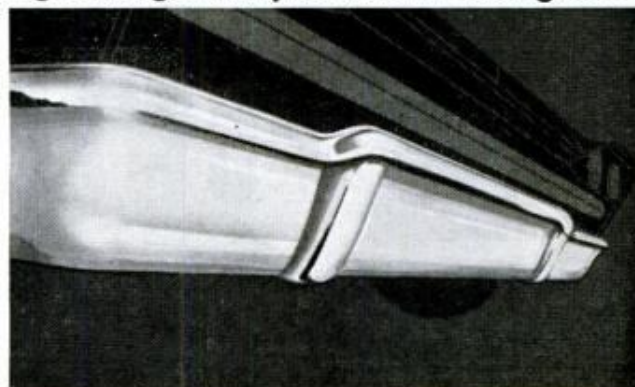


# ALCOA ALUMINUM

**Gives every car more Gleam and Go!**

JANUARY 1960

### TOMORROW: high-strength bumpers with lifetime gleam



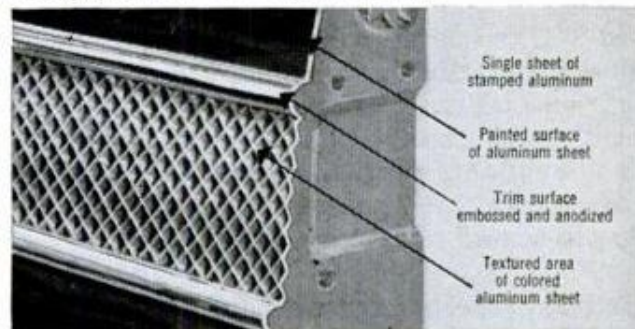
Within a few years most auto bumpers will probably be made of aluminum. Trucks and buses have been using them for years. Aluminum bumpers have great shock-absorbing capacity. They have no plating to chip off. They'll trim anywhere from 20 to 40 lb from front-end weight and give you better steering.

### How to heat and cool your 196X car



This special Alcoa sheet has tubing formed right into it during manufacture. Someday it may be used for auto floor, roof and side panels. In winter, hot water might flow through the tubes; in summer, cold gas from the auto air conditioner. (The tubes can also act as structural members . . . part of the auto frame.)

### Body panels with built-in trim



Today's auto trim is fastened onto the sheet body—a costly process. Tomorrow's cars may have body panels stamped from aluminum sheet, with raised sections left unpainted to form highly polished trim.

**Free Booklet—"Questions You May Ask About Aluminum in the 1960 Cars"**—gives more information on Alcoa® Aluminum in your new car. Write: Aluminum Company of America, 1814-A Alcoa Building, Pittsburgh 19, Pa.

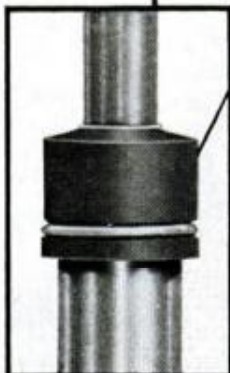
# Only Perfect Circle gives you 2-WAY POWER PROTECTION!

## 1. Perfect Circle Valve Seals

**solve problem of excessive oil consumption past valves!**

New rings and restored valve efficiency produce higher compression pressures—and higher deceleration vacuum. Increased vacuum draws oil through loose and worn valve guides. Stop this loss with *new* Perfect Circle Valve Seals!

**For best performance**, valve or ring jobs should include installation of Perfect Circle Valve Seals. The cost is surprisingly low.

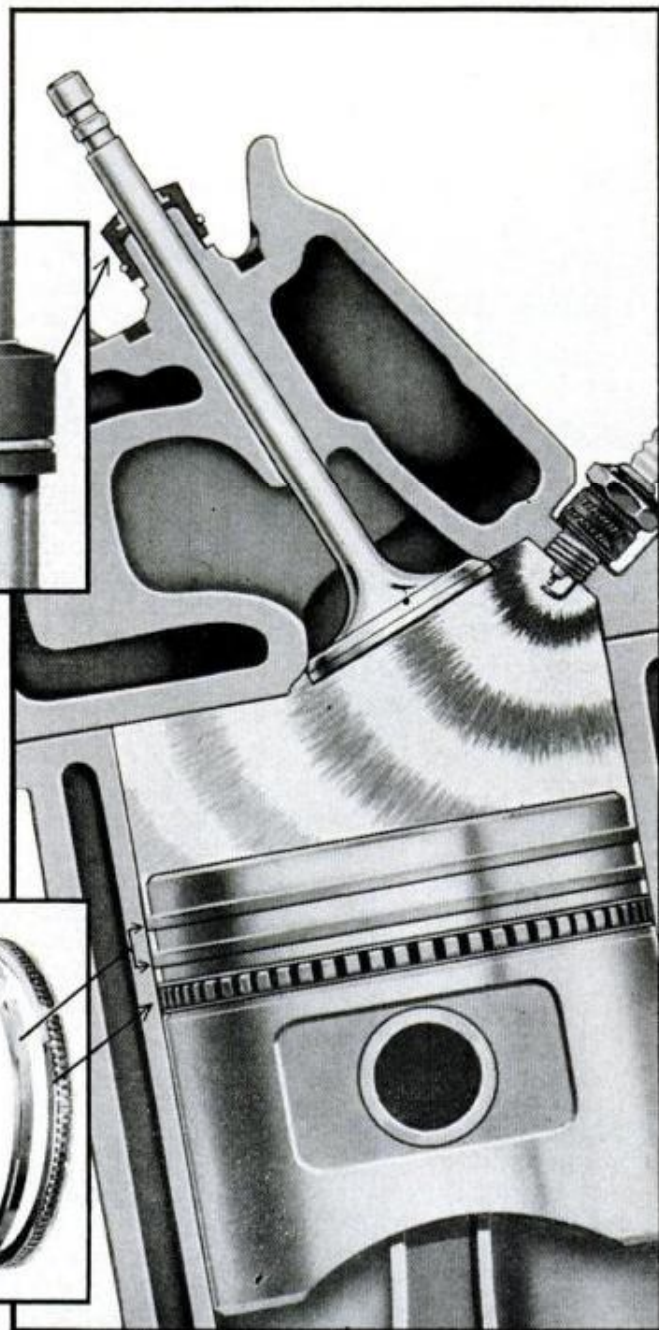
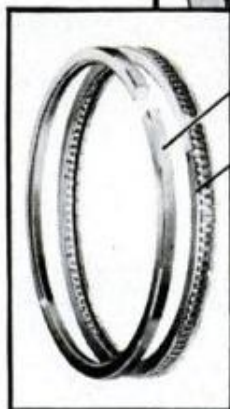


## 2. Perfect Circle 2-in-1 Chrome Sets

**solve problem of excessive oil consumption past pistons!**

2-in-1 Chrome sets provide the finest piston rings obtainable! Top rings and oil rings are plated with thick, solid chrome that doubles life of cylinders, rings, pistons. No tedious break-in is necessary, rings are pre-seated at factory.

**For best performance** install 2-in-1 Chrome sets for thousands of extra miles of power protection and positive oil control!



# PERFECT



# CIRCLE

Hagerstown, Indiana

PISTON RINGS

POWER SERVICE PRODUCTS

In Canada: Don Mills, Ontario



**POPULAR** JANUARY  
1960  
**MECHANICS**

WRITTEN SO YOU CAN UNDERSTAND IT  
VOL. 113 NO. 1

# *Masters of Explosives*

DuPont photos

Portrait of 1400 tons of explosives moving 700,000 tons of water and rock — a masterwork in demolition

By  
**Ted Dutton**

**"The cheapest way to 'bust up' anything is with explosives." That's the motto of the powder peddlers, trouble-shooting engineer-salesmen for the explosives manufacturers . . .**

JANUARY 1960

97



Deep inside Ripple Rock, DuPont engineers crimp detonating cord to canisters of Nitramex blasting agent. The cord detonates at the amazing rate of 20,000 feet per second, allowing instantaneous detonation of widely separated charges



DuPont photos

Zero plus a quarter-second at Ripple Rock. "Slipstick" Bickel fired the big shot from a sandbagged bunker 2500 feet from the blast, climaxing a three-year project that cost the Canadian government \$3,000,000 but thereby eliminated an old menace that sank 125 ships

**I**N THE SPRING of 1954, on the construction site of the colossal new highway bridge spanning the rough, cold Straits of Mackinac in Upper Michigan, a tense drama brewed.

At Alpena, steel fabricating crews had built the lower sections of two huge, circular caissons, 116 feet across, with 15-foot watertight tanks between inner and outer steel walls. Tugs had towed the brutes to the center of the Straits and spotted them between temporary anchor piers. Concrete, flowing into the tanks, slowly sank the monsters while ironworkers raced time and vicious spring gales to complete the inside sections.

Finally, 200 feet down, the caissons touched bottom. But now came the tricky part. Explosives lowered through wells were supposed to rip circular trenches in the lake bed, settling the wedge-bottomed caissons exactly eight feet into solid granite, without tilting or dislocating them a fraction of an inch.

The day came. The charges went down, and divers plunged into the icy, murky water, checking placement. Electrical connections were made and the area cleared. Down went the firing key. *Blooie!* Geysers of white water shot into the air. Spectators gasped as the great caissons lurched. But they sank obediently into the calculated position, to become the foundations of Big Mack's soaring main suspension towers.

Winning the sensational gamble caused no one any real surprise; near-miraculous feats are routine stuff to modern blasting experts. Old time blasters used to be self taught, but America's current crop of 20-

odd troubleshooting "powder peddlers" for such big explosives makers as DuPont, Atlas and Hercules are university-trained geologists or mining engineers, and are wizards at constructive destruction. Of course, nothing about blasting is ever really cut and dried; blasting engineers often draw assignments that tax even their remarkable ingenuity.

Today's blasting specialists wouldn't perform much magic were it not for modern high explosives. A Tyrolean named Kaspar Weindl fired the first industrial "shot" nearly 300 years ago to mine coal in Hungary. But primitive black powder was the only practical commercial explosive until the Swedish inventor, Alfred Nobel, exercised his inventive genius in the late 19th century.

In 1846, Ascanio Sobrero, a chemistry professor at the University of Turin, Italy, had discovered the explosive properties of nitroglycerin. But for years it was more an oddity than a practical explosive because it was too sensitive to handle, ship or detonate safely. Its only practical use, oddly, was in medicine, as a heart stimulant.

In 1867, Nobel absorbed savagely powerful but dangerously sensitive nitroglycerin in a sandy earth called *kieselguhr*. The safe, stable new compound—dynamite—won immediate acceptance in mines and quarries everywhere. Shortly, in California, Hercules and Giant powders appeared. These were "active dope" dynamites—nitro absorbed not in sand but in other granular explosives. In 1875, Nobel dissolved colloidal cotton in nitro, producing history's first blasting gelatin.



DuPont photos

Zero plus .8 second. The larger burst at the right is from North Rock; the smaller eruption from charges in South Rock, which were fired a few milliseconds later. The Ripple Rock blast was the largest intentional non-atomic explosion in the history of the blasting business

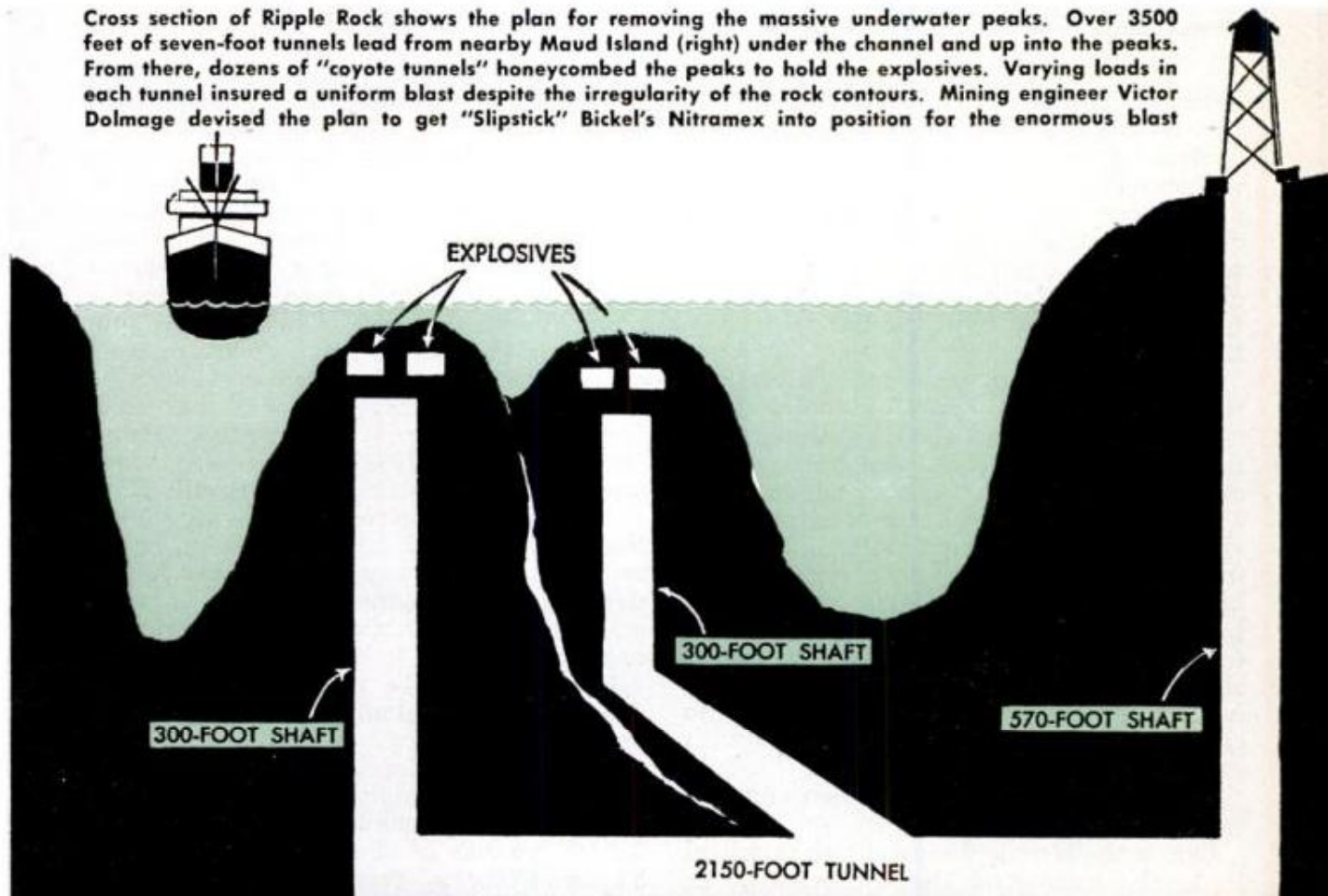
Zero plus 4.7 seconds. Great chunks of rock appear in the 1000-foot geyser of water and smoke as Ripple Rock blows its top. Photo on page 97 shows the explosion at its peak, 8.4 seconds after the moment the shot was detonated

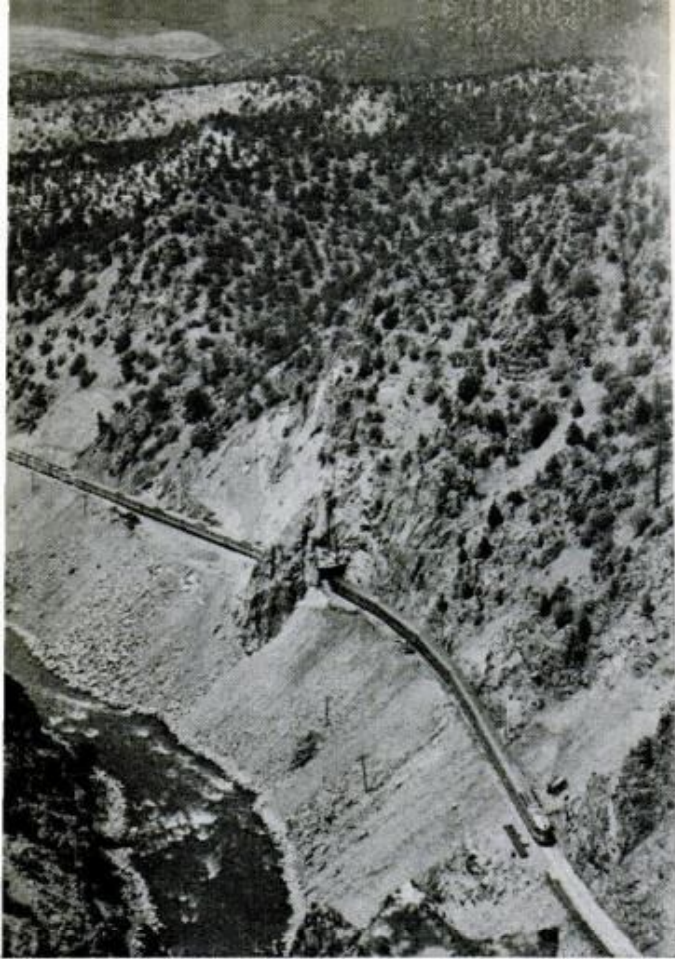
High explosives today are still basically the same but have become more powerful, less sensitive, and far more versatile. About 200 types and grades exist, including all possible combinations of strength, density, water resistance and flammability.

There are straight, gelatin and "free-running" pellet dynamites. A bevy of low-power "permissibles" have been cleared by the government for use in dusty, gaseous coal mines.

To this wide assortment have recently

Cross section of Ripple Rock shows the plan for removing the massive underwater peaks. Over 3500 feet of seven-foot tunnels lead from nearby Maud Island (right) under the channel and up into the peaks. From there, dozens of "coyote tunnels" honeycombed the peaks to hold the explosives. Varying loads in each tunnel insured a uniform blast despite the irregularity of the rock contours. Mining engineer Victor Dolmage devised the plan to get "Slipstick" Bickel's Nitramex into position for the enormous blast





Last eastbound passenger train passes through a 100-foot tunnel on the Denver and Rio Grande Railroad in Gore Canyon on the Colorado River. Plans to demolish the tunnel had to allow its removal without interrupting train service over the line



Immediately after the train had passed, Atlas experts fired a huge single blast calculated to blow the entire granite outcrop out into the canyon. 25,000 tons of rock had to be removed without damaging the busy roadbed beyond immediate temporary repair

been added new high-velocity blasting agents—ammonium nitrate compounds containing no nitro but combining vicious wallop with reassuring insensitivity. These agents can be burned, crushed, drilled, chopped, shot at or dropped great distances without detonating, but suitable primer charges, set off by Primacord fuse and electric blasting caps, will do the job every time.

Armed with such tools, today's blasting masters can crush, crack, puncture, fracture or obliterate just about anything. Routinely, they dig ditches, post holes, wells, canals, foundations, tunnels and quarries. They break up subsoil for tree planting, shatter boulders, extract stumps. They demolish sunken ships, knock down walls, break up log and ice jams, cut timber, prospect for oil, tap blast furnaces, and perforate oil-well casings. You name it; they'll shoot it—safely and efficiently, for time has proved the blaster's maxim that "the cheapest way to bust up anything is with explosives."

Yet there are problems, which come in many shapes.

One is the terrific financial risk involved in really king-sized shots. Normally, in

quarrying or open-pit mining, you drill rows of vertical holes, load them, connect your fuse network, and blow a modest portion of the face into the pit. But sometimes rock structures force you to dig "coyote" tunnels horizontally into a hill. Large coyote shots are amazingly efficient, for all the explosive force is expended in useful work. But there is risk of misfire. If only a portion of the blast goes off, the contractors can lose millions on mop-up work.

Perhaps the riskiest coyote shot ever fired was at barren Promontory Point, Utah, in June of 1957. The monster causeway to replace the Southern Pacific Railroad's old timber trestle crossing Great Salt Lake needed millions of tons of fill rock—enough to bury 25 city blocks 30 feet deep. To get it, engineers planned to break up a whole mountainside in a series of enormous blasts.

In the largest of these, Atlas Powder Company technical advisers were called in and dug a 5000-foot labyrinth of main and crosscut tunnels, loading them with 1,432,000 pounds of a high velocity nitrocarbonitrate blasting agent called Amocol and 385,000 pounds of 60-percent dynamite in 50-pound "sticks," this last to promote com-



As soon as the rubble stopped falling, two big shovels and dozens of men went to work pitching tons of pulverized granite over the side into the canyon. As they worked, track-laying crews followed at their heels installing the temporary tracks. Within one hour the eastbound California Zephyr, above, passed safely over the spot where only a freshly scarred rock outcrop marked the location of the old Gore Canyon tunnel

plete detonation. They hooked up a heavy-duty explosive fuse network and pushed the plunger. The ground shook miles away as the great cliff erupted into a maelstrom of black smoke and heaving, sliding rock. When the haze cleared, the cliff was gone. Three million tons of rock had been pulverized in seconds, and the largest non-atomic explosion fired to that date in the U.S. had been a smashing success.

But sheer firepower doesn't impress blasting engineers much. They're more intrigued by precise sharpshooting jobs like toppling 200-foot brick smokestacks down narrow alleys between buildings. You draw some chalklines, do some slipstick work, and drape gelatin necklaces around the stack, then stand back and hit the switch. Bingo! The carefully calculated charge drops her down the line, much as a lumberjack's V-cut "places" a big Douglas fir.

If that sounds tricky, it's no more so than shooting indoors in the middle of crowded business sections, and that's commonplace. Excavators fire dozens of dynamite shots in New York City subways each year, with trains whizzing past and with pedestrians going calmly about their business 20 feet above. Construction workers often blast inside occupied office buildings

—for instance, to cut out foundations for new equipment. Once a demolition gang blew three 30-ton steel vaults into scrap in the basement of a downtown Des Moines bank. They snaked gelatin along the seams, covered the work with a canvas muffler and let it rip. Customers and tellers upstairs felt a faint tremor, but they never heard a sound. Actually, sound is an inverse indicator of efficiency—the more racket and debris whistling around, the more energy is being wasted on thin air.

Back in 1944, after 18 months' incessant sharpshooting in Colorado, blasters met in the middle of the 13-mile Big Thompson Diversion Project water tunnel. So accurate had the trigonometry and blasting been that engineers measured only a  $\frac{3}{4}$ -inch error where the shafts joined. Blasting experts shrug off such routine feats. However, tunnel blasting does have special hazards, including ventilation, vibration and concussion. Unpredictable rock faults can sidetrack a shot in the wrong direction. Hidden springs, opened by a blast, can flood a tunnel in seconds. The new Fort Pitt auto tunnel near Pittsburgh posed a ticklish problem. Worked-out mine shafts honeycombed the hill to be driven. If a cave-in started, homeowners atop the hill



Workmen digging part of the 500-foot labyrinth of coyote tunnels used in the famous Promontory Point blast in Utah, which yielded three million tons of fill rock for a causeway across the Great Salt Lake. The blast is called by explosives experts "the riskiest coyote shot ever fired"



Atlas Powder Company engineers stuffed the tunnels at Promontory Point with 1½ million pounds of Amocol blasting agent spiked with 385,000 pounds of dynamite to insure total detonation. See the dramatic result at right

might have found themselves dropping down in the world. To prevent it, blasters laid their shots in rows, firing them in sequence a fraction of a second apart with ingenious new delay detonators. To the ear, such stuttering blasts sound like one "pow." But it's a mild noise, and produces little vibration.

#### Sam Russell's Classic

Normally, surface blasting is far less tricky than tunneling. It wasn't so with the classic—still to be duplicated—shot set off by Sam Russell, one of history's greatest blasters, in July, 1930.

As a phase of the Alcoa Power Company's Saguenay River project at Chute-A-Caron, Quebec, contractors had built a generating station and partially finished a power dam to serve it. Now a coffer dam must be built

to force the river through a diversion channel so the main job could be completed.

Plans went awry. Heavy rains swelled the river, hamstringing efforts to place sheet piling and fill dirt. A call went out for Russell, then working for DuPont, who came up with a fantastic idea. He built an 11,000-ton concrete block, standing on end at the river end of the pier. The block, 90 feet high and 45 feet wide, was shaped on the river side to match the contour of the stream bed. Russell said he could drop it into the stream, damming the wild waters. "You'll miss the mark," skeptics insisted, "or the block will break up during the fall."

Undaunted, Russell laid 1000 pounds of dynamite in carefully plotted holes drilled in the pier under the block. The time came. Nervously, Russell backed off and pressed the firing key. The concussion reverberated

U. S. Steel photo



Taconite, a type of quartz, is one of the hardest rocks on this continent, but also a good iron ore. To break it up for handling with power shovels, holes are sunk with a "jet piercer," which uses oxygen and kerosene to create a 4300-degree flame which melts a 40-foot hole in two hours. Ammonium nitrate is then poured into the hole and detonated. This agent is so insensitive that a newer method allows filling the holes automatically from a hopper mounted on an ordinary truck





Entire Utah mountainside turns into pulverized fill rock in a split second as the Promontory Point shot is fired through a complicated heavy-duty explosive fuse network. The relatively small amount of smoke and fly rock attests to the expert placement of the explosives, since noise and flying debris mean that explosive force is being wasted on thin air. This was the last of a series of shots supervised by Atlas technical advisors, and until the Ripple Rock shot was the largest non-atomic blast ever intentionally fired

off the canyon walls, as the huge block tumbled and landed with a terrific splash. Wild cheers went up, and Russell opened his eyes. His prefabricated dam lay—intact and functioning—just one inch from the calculated spot.

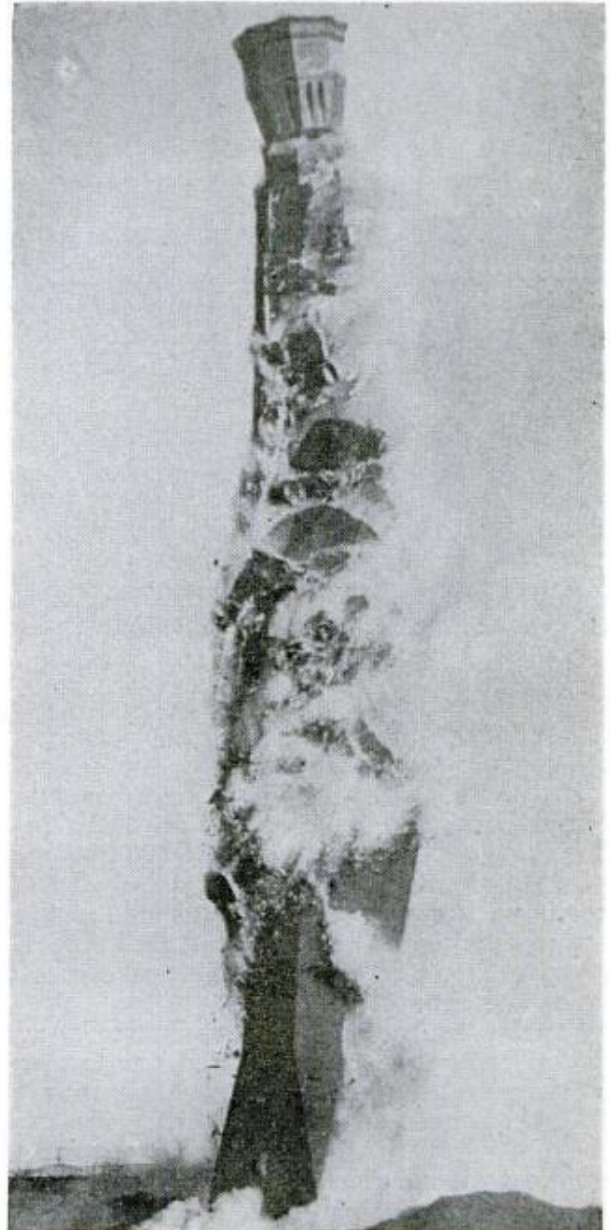
### The Biggest Shot of All

The great granddaddy of precision blasting jobs in more recent history came last spring in Seymour Narrows, 100 miles north of Vancouver. That spectacular blow-out can be attributed to the genius of another DuPont powder peddler—F. D. “Slipstick” Bickel, generally conceded until his retirement last year to be unrivalled in skill by anyone in his profession.

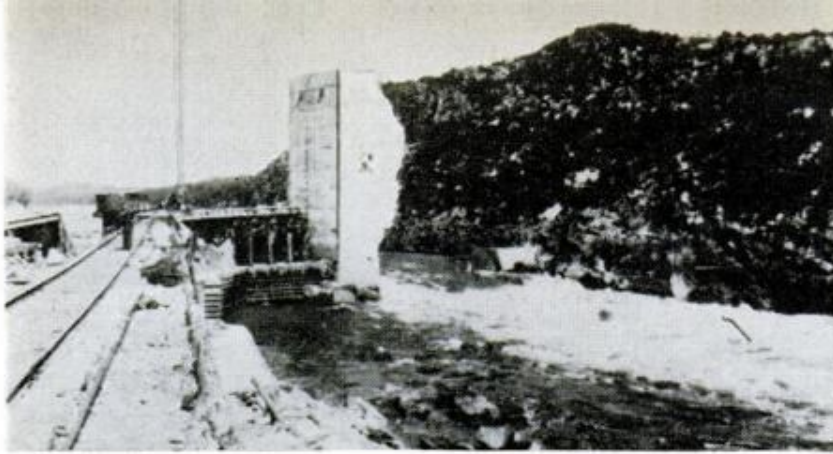
The target was Ripple Rock, a lethal reef lying astride the busy inside ship passage to Alaska. Ripple’s twin peaks, lying nine feet below the surface at low tide, created a deadly whirlpool. In 1875, it sucked two U.S. gunboats against the rocks, sinking them. Since then, it foundered 125 ships, with frightful loss of life and property. A few years ago, the Canadian government tried to place demolition charges from barges anchored over the peaks. But the rip tide snapped their cables and the barges went down, drowning nine men.

In 1955, Bickel and a mining engineer,

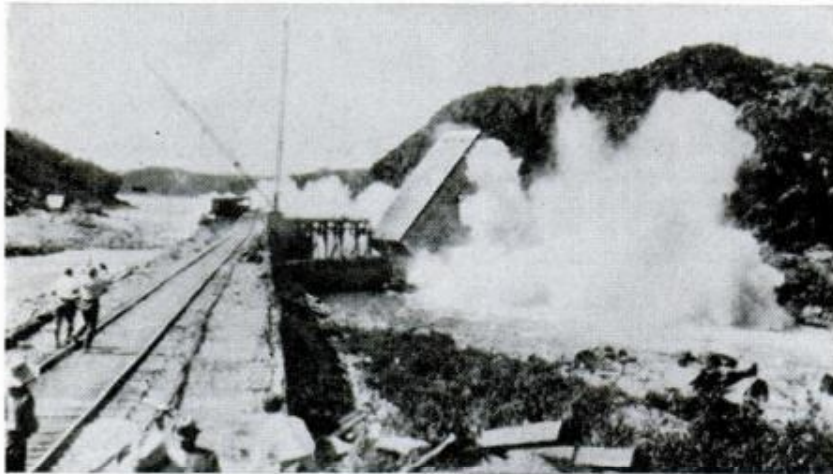
Spectacular blast of this 350-foot brick smokestack in Denver was witnessed by an estimated half-million people after much publicity. Many blasting engineers claim the shot was not good blasting technique, and that far too much explosive was used, but the stack came down in a tremendous rain of debris and cloud of dust that delighted but almost choked the spectators. The 58-year-old smelter stack had resisted seven days of blasting before this climactic shot



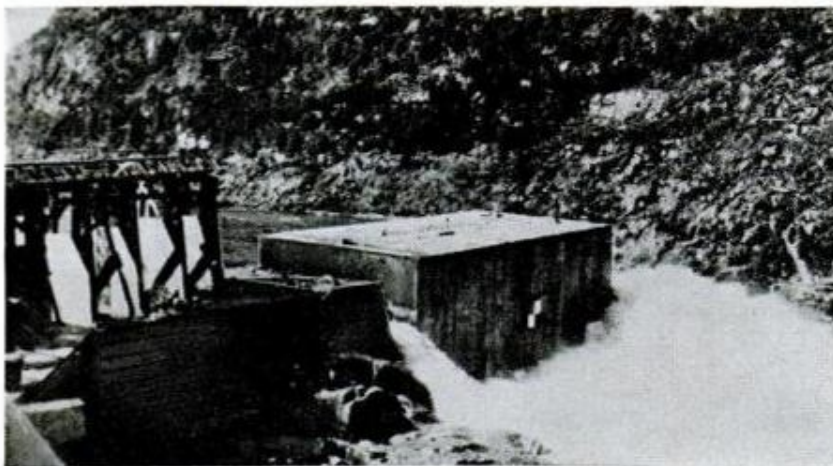
Rocky Mountain News photo



Sam Russell's "impossible" feat of damming the Saguenay River is still unequaled in precision blasting history. At left, the 11,000-ton concrete cofferdam stands poised over the river



1000 pounds of dynamite blew the pier out from under the dam, tilting it precisely into the river. The block was carefully shaped to fit exactly into the uneven contour of the river bottom



Intact and functioning, Russell's dam lies in place, just one inch from the calculated spot. The block dammed the main channel, forcing the river to flow through a power plant diversion channel

DuPont photos

Victor Dolmage took up the challenge. Abandoning the direct approach as too dangerous, that great team drove seven-foot tunnels 570 feet down from nearby Maud Island, thence 2150 feet laterally under the sea bed, and finally up 300 feet inside Ripple Rock. They honeycombed the peaks with coyote tunnels and loaded the tunnels with Nitramex blasting agents. The work cost \$3 million and needed three years to prepare.

Finally, in April of 1958, the Coast Guard halted shipping. Hard-hatted engineers crouched tensely in dugouts ashore; movie and sequence cameras began grinding; rockets went up to leave shock-recording smoke trails. Bickel, in the crowning act of his great career, slammed home the plunger. At first nothing happened. Then a

great mound of water bulged skyward. Through its center shot a 1000-foot geyser of debris, water and smoke. Pressure waves raced across the Narrows; fly rock beat a tattoo on the bunker tops. When the pall cleared, there was nothing to be seen on the unruffled waters—the fearsome whirlpool had vanished. Sounding craft went out to investigate and reported their findings. The great blast—the largest non-atomic explosion intentionally fired anywhere—had moved 370,000 tons of rock. It had trimmed 38 feet from the tops of the peaks, leaving ships a 47-foot clearance.

Once again, modern explosives and explosives engineering know-how had performed their accustomed vital service to mankind, and Ripple Rock had been "busted up"—cheaply—with explosives. ★ ★ ★

# AN EYE ON SPACE



By Dr. Dan Q. Posin

PROFESSOR OF PHYSICS, DE PAUL UNIVERSITY  
SCIENTIFIC CONSULTANT AND ADVISOR, COLUMBIA BROADCASTING SYSTEM

**S**ATELLITES have been gathering scientific information as they go sailing around Earth. But what other uses will develop as the satellite game is played more fully? Here is a list of possible developments:

**1. Research.** Satellites will carry more equipment to study radiation, the flight of tiny dust particles, stray atoms, solar light. Satellites will discover new radiation zones.

**2. Weather control.** Satellites will report on cloud formations. The motion of great cloud bodies can thereby be anticipated for weeks. This constitutes weather *forecast*. Weather *control* will come later. Satellites may release great quantities of chemicals which will break up advancing clouds.

**3. TV, radio, and telephone relay systems.** Plans already are under way to utilize satellites as relay links in several ways. In one system, three satellites spaced 120 degrees apart circle Earth, receiving signals from the ground and beaming them to each other for eventual down-shooting to Earth. A more advanced scheme is that in which three satellites are launched in an equatorial orbit up to 22,300 miles above Earth, each traveling at about 7000 miles per hour around Earth. In such a situation, the satellites turn with the Earth, each one remaining always above the same point on the ground. This situation is exactly equivalent to having three TV, radio or telephone towers 22,300 miles tall, but results in the saving of some lumber and steel. The system can also be used as a "post office without a building." On the ground, standard forms are filled out in the writing of a letter. These are scanned and turned into electrical signals which are then sent to the satellite overhead, which thereupon transmits the messages to the next satellite; and this one sends the radio signals to the ground, where they are converted back into words. The effect is that of a satellite messenger boy who has no legs and requires no tip.

**4. Solar cells.** Satellites can be used merely to orbit in space and collect solar energy, converting it into electrical power, later to be transmitted to a demanding point. This is strictly for the future.

**5. Beacons for space ships.** Satellites will certainly be out there, flashing lights and sending radio messages or signals, acting in general as beacons for space ships plying the vacuum ocean.

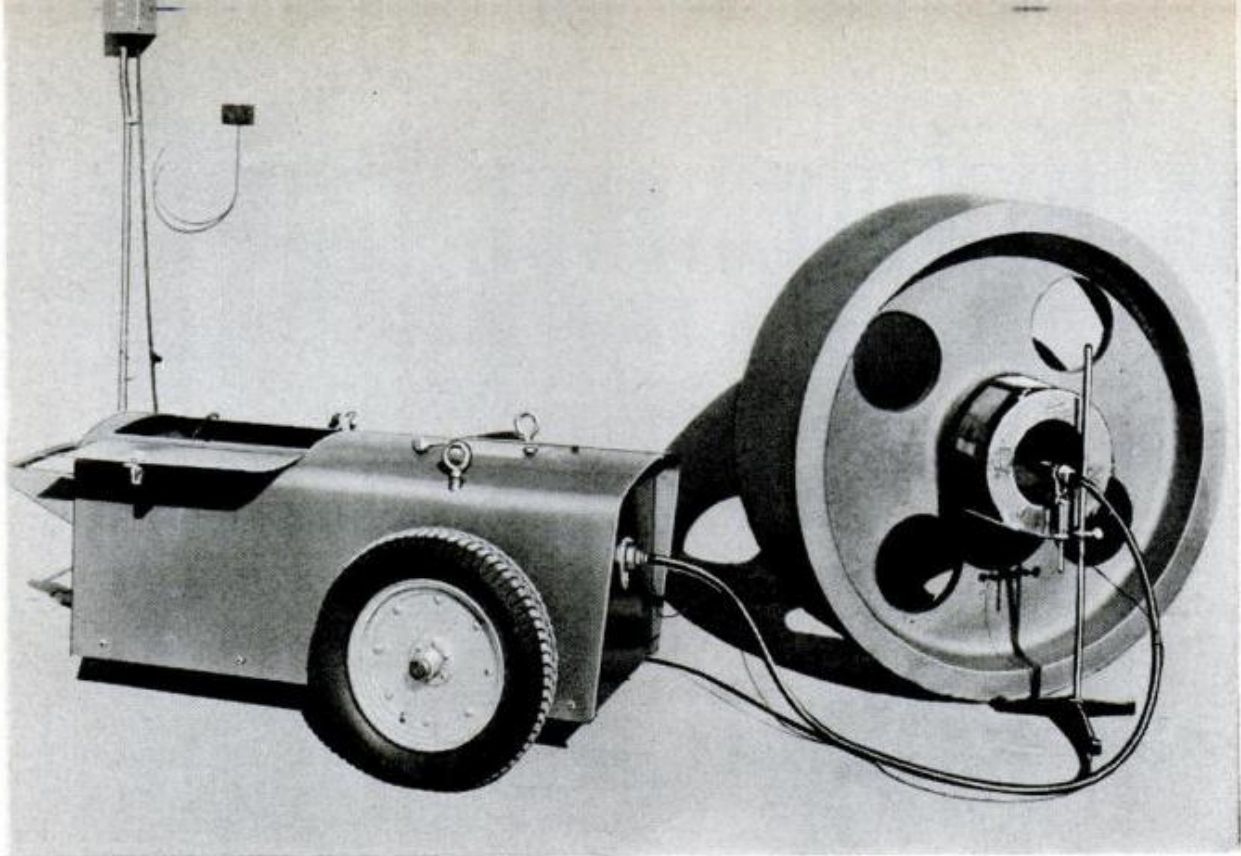
**6. Satellites as Earth navigation aids.** If a satellite's position at any moment is known over the surface of the Earth, then the satellite can serve as a star for the taking of bearings, regardless of the fact that it is moving.

**7. Rescue beacons.** Satellites can receive messages beamed by ships, airplanes or lost parties on the ground.

**8. Space steps.** Satellites will be streaming on various orbits. Thus, possibly 20 different elliptical orbits will surround Earth at desired distances, and the space ship will contact each as it goes onward to its destination.

**9. Satellites around the moon.** Satellites in orbit around the moon will keep constant watch, relay messages around the moon, as they will be doing also around the Earth. The moon explorers thus will know what their friends are doing on the other side of the moon.

**10. Satellites around the planets.** A series of satellites will certainly swing around Mars, Venus and some of the other planets.



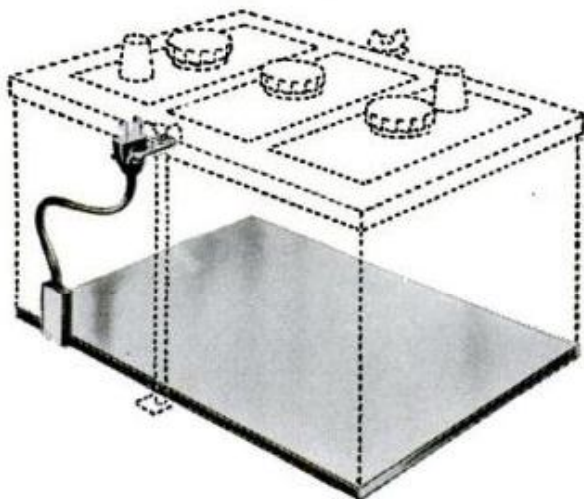
### Remote Handler for "Hot" Cobalt

Radiographic inspection of big steel parts like this 36-inch wheel is a simple thing; photographic film is wrapped around the outside, then a "pill" of the isotope cobalt 60 is placed in the hub. Patterns formed on the film by particles passing through the steel reveal inner flaws. It's simple—except that the pellet of cobalt is dangerously radioactive; this examining area is walled with 18 inches of concrete and the pill is kept in a lead safe. To protect personnel, yet allow fast, easy inspection, the National Supply Company of Pittsburgh, Pa., uses this mobile carrier. Hand-operated from outside the enclosure, it moves the pellet out of its lead jacket and into place through a flexible tube, then returns it when the exposure is finished. Control lights on the outside unit follow the pill, and the geiger counter monitors radiation outside.



### Hot Seat Keeps Battery Strong

Sub-zero temperatures won't bother your car battery if it sits atop a hot plate that keeps it at 60 degrees regardless of temperature conditions. The plate, which can be left under the battery all year round, is heated by 110-volt current from any household outlet. The heating coil is Nichrome wire molded into a heat-resisting plastic. Zinc-plated steel sheets protect the element, top and bottom, from acid damage. Batteries, when warm, have more than twice as much cranking power as they have when cold, so by maintaining a warm battery you are assured of quicker starts in winter.





Troops guide Lacrosse missile with tracker and range finder. Tracker, right, leads missile to the target

## Soldiers Get Guided Missile

Ground troops, using a mobile guidance system, can fire the Army Lacrosse missile and hit an enemy target with deadly accuracy. Quickly moved by Jeep or foot, the system guides the missile toward its target under any weather conditions. Conventional direction methods first locate the target. When the missile is fired, a tracker locks onto it and a computer guides the missile to its mark.



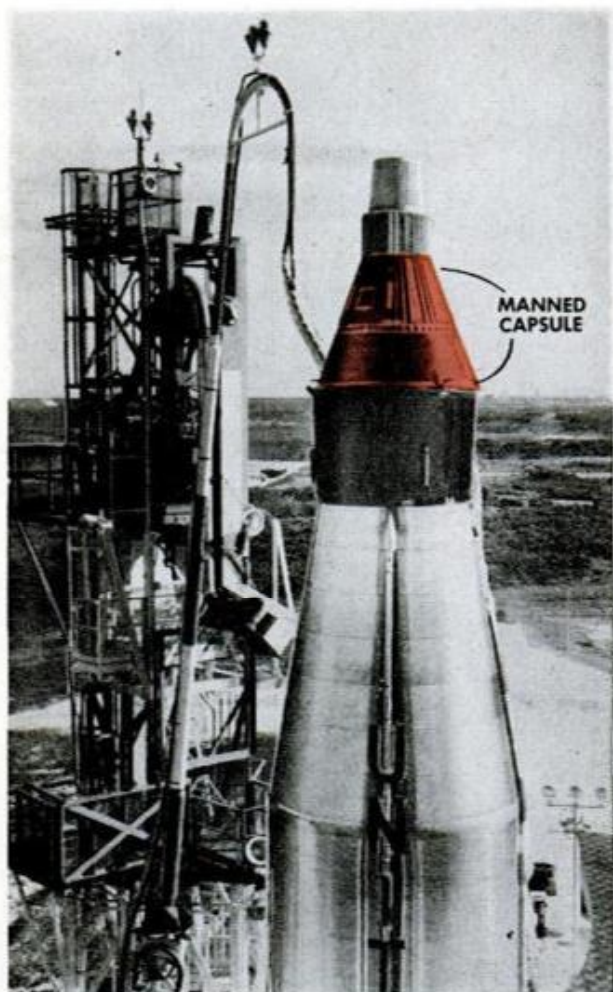
After initial blastoff, a Lacrosse missile (lower left) streaks to its target. Soldier at front line uses a portable range and direction finder (lower right) to measure accurately the exact distance to the target



# I LIVED WITH THE ASTRONAUTS

## PART II

By Joseph N. Bell



**B**EFORE THE FIRST Mercury Astronaut can be strapped in his contour couch and blasted off into space—either for a ballistics ride or an attempt at orbiting the Earth—there are a number of nagging problems still to be solved.

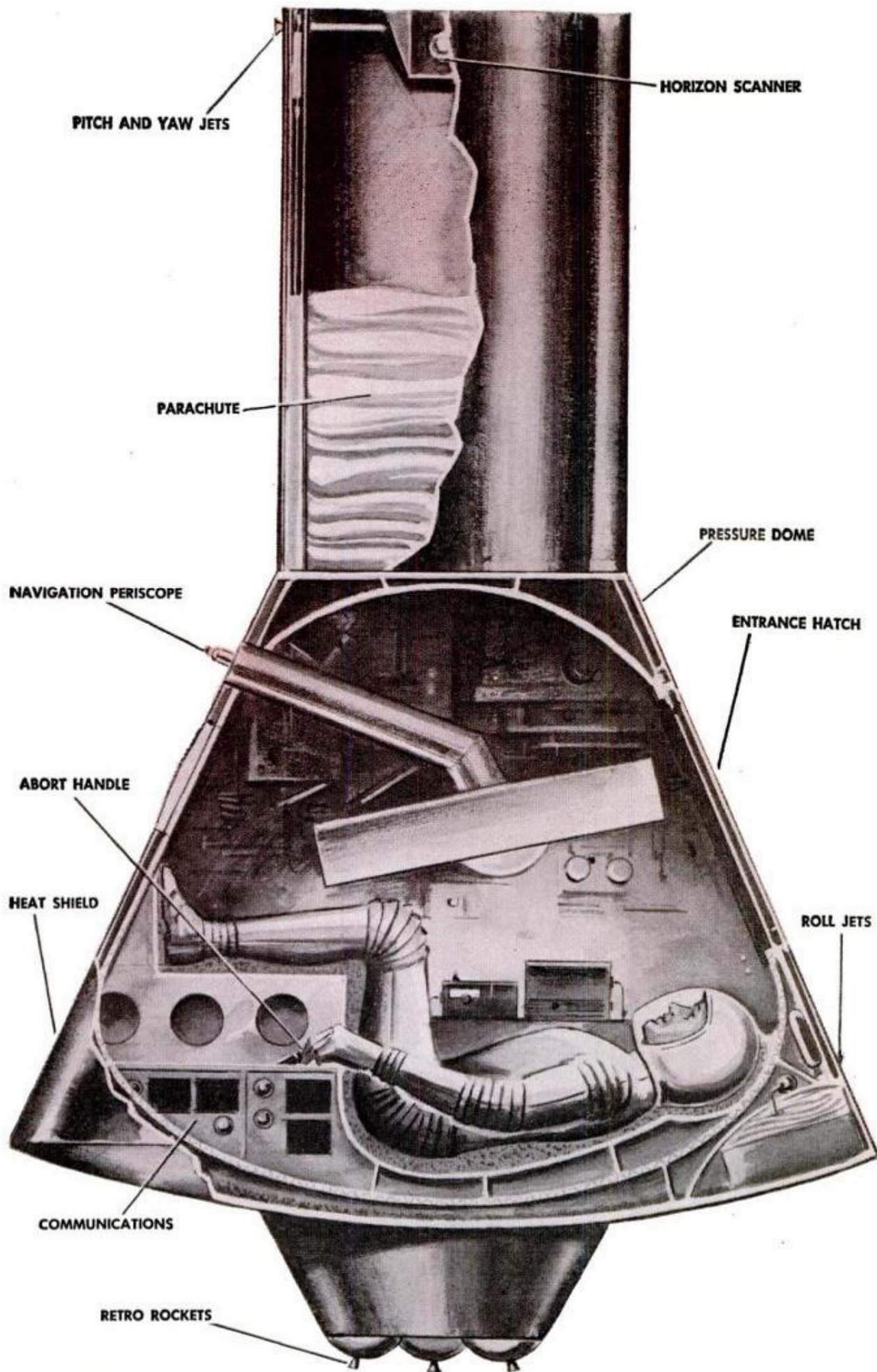
Robert R. Gilruth, head of the Space Task Group which directs Project Mercury, says: "We don't need any new scientific break-throughs to achieve this task. We do, however, have a formidable engineering job, and we expect many difficulties and surprises."

The seven Astronauts discussed some of these difficulties with me during the week I spent with them at Langley Field in Virginia. Each Astronaut has been assigned a particular specialty in which he works with engineers and scientists and then reports back to his fellow pilots. Here are some of the difficulties with which they are presently grappling:

**Yaw controls.** The peculiarities of space travel require a single hand-control easily accessible to the weightless Astronaut. This control presently combines the three attitude corrections which the pilot will have to make—pitch, roll and yaw. A forward-and-back motion opens jets which

Dramatic moment will come when one of the Astronauts lies inside the capsule atop the Atlas, ready to be blasted into orbit. Below, author (second from right) discusses problems of flight with three Astronauts





JANUARY 1960

109

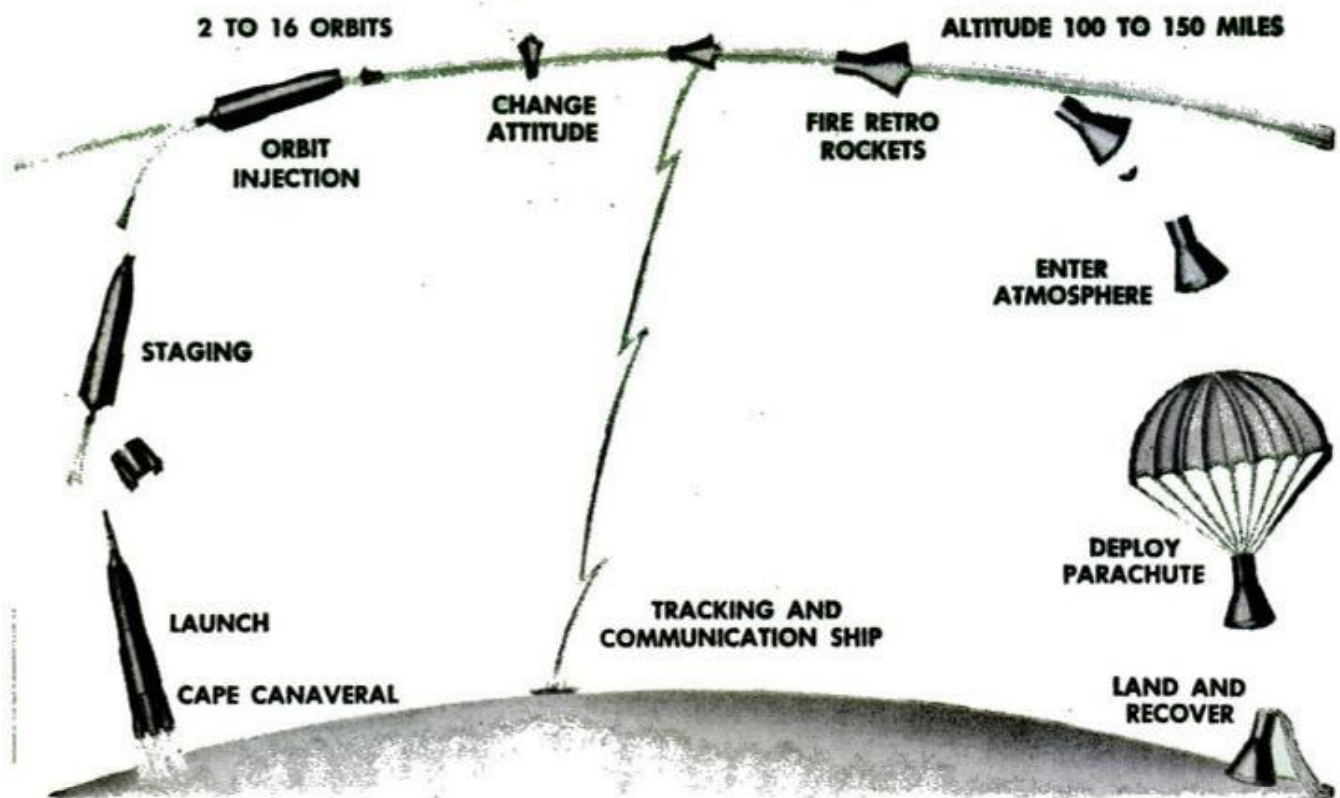


Diagram shows sequence of events as capsule is blasted into orbit, slowed, parachuted to earth and recovered

correct pitch, a sideways motion corrects roll, and a twisting motion controls yaw. This arrangement plus the design of the cockpit was one of the first things firmed up by the Astronaut-engineering team. However, experience on simulators has shown that the pilot sometimes gets yaw movement when he doesn't call for it. As a result, some of the Astronauts—particularly Wally Schirra—want to experiment with the yaw controls in a rudder pedal that can be foot-operated. Opponents say that sufficient foot movement will not be possible. However, experiments will undoubtedly be made in this direction.

**Tracking stations.** When the capsule has attained orbit, it will be followed by 14 tracking stations located at strategic spots throughout the free world. The Astronauts will also be able to communicate with these stations. Although the ideal locations have been selected, the sites haven't yet been cleared with the countries involved. There is also a shortage of funds for building the equipment needed for each of the tracking stations.

**Land recovery.** The Mercury capsule will drop by parachute at the rate of 30 feet per second—with a landing equivalent to jumping off a 15-foot wall. (When I

Though Astronauts took skin-diving instruction as a group, they are left on their own to keep in top shape







Model of the capsule is positioned in wind tunnel as part of the laboratory and free-flight testing program

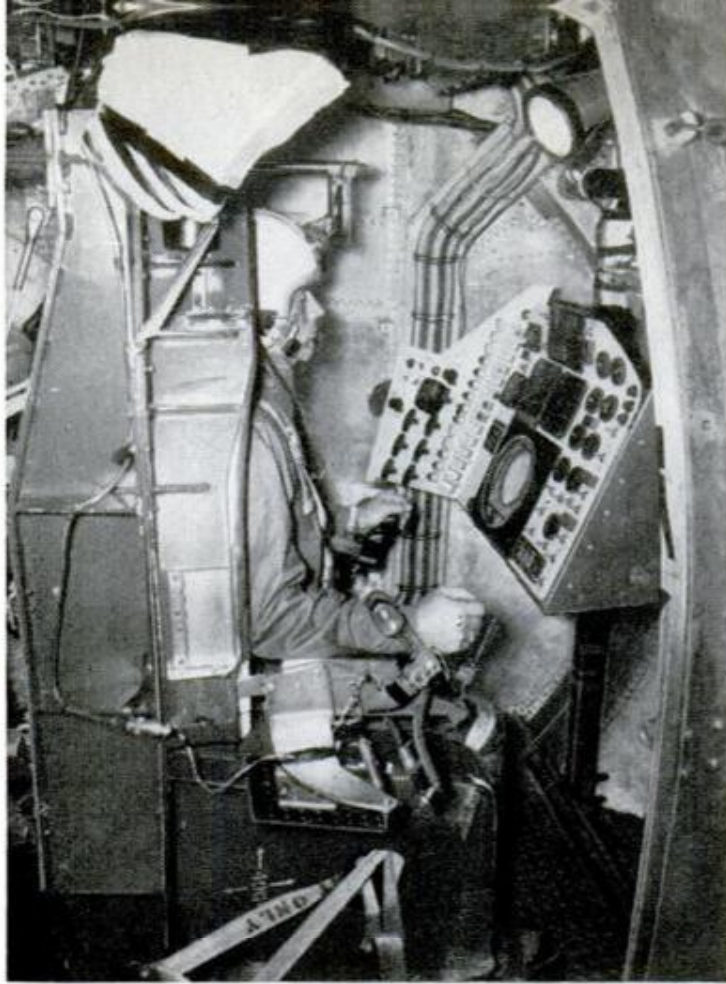
asked the Astronauts how this compared with a normal parachute jump, they all got out slide rules and came up with several different answers, finally deciding that a normal chute landing would be 21 feet per second or equivalent to jumping off a seven-foot wall.) Striking water at this rate, the Astronaut inside the capsule would not be hurt—and of course the plans are to recover the capsule in water. But even a tiny error in the time of re-entry could change the recovery point by many miles (an error of one second causes an error of five miles in landing position). Thus there is always a possibility the cap-

Although the Astronauts have strong feelings that the "first man in space" theme is being overstressed, the *Popular Mechanics* editorial team which visited Langley Field couldn't help speculating on the question. They came back with some definite ideas on the subject, and accordingly have deposited in a sealed envelope their predictions on the order in which the Astronauts will be sent up into space. This refers to the Redstone ballistic flights—not the orbital flights that will come along some months later. The envelope will be opened after public announcement of the first manned ballistic flight.

No plush quarters for the Astronauts. The men share this cramped office where they study technical reports

*PM* photo by Joe Fletcher





Instrument panel for the capsule has gone through many changes, mostly at the insistence of Astronauts who will have to use it



Carpenter climbs into F-102, assigned to Astronauts, for few minutes of relaxation

sule will come down on land—with no certain knowledge the occupant would be uninjured. A shock-absorbent material is being used beneath the pilot's couch, but land descents will have to be tested with animals before any exact knowledge is possible.

*Point of recovery.* For many reasons—

shifting winds, failure of automatic equipment, errors in timing—the accuracy of the capsule impact point is difficult to predict, but recovery is set up for a point in the Atlantic Ocean off the Bahama Islands. The capsule will be hoisted aboard a recovery ship—probably a destroyer—in a

(Continued to page 252)



Each of the Astronauts has a foam-plastic acceleration couch moulded to his body. Here the fit of Shepard's couch is carefully checked by a flight surgeon

## Hillman Minx Goes Automatic

Hillman offers a three-speed automatic transmission using two magnetic-powder clutches, one for low and intermediate gears and one for top gear. Metallic powder is "solidified" by current from the generator, engaging the coupling. As engine speed drops, the current is interrupted and the "solid" powder returns to its original "liquid" state, disengaging the clutch. Gear shifts are controlled by an electric "brain" sensitive to road speed and to accelerator position. No clutch pedal is needed and the selector lever is on the steering post.



With typical British reserve, Hillman's rear panel fins are restrained



## Restyled Anglia Has New Engine

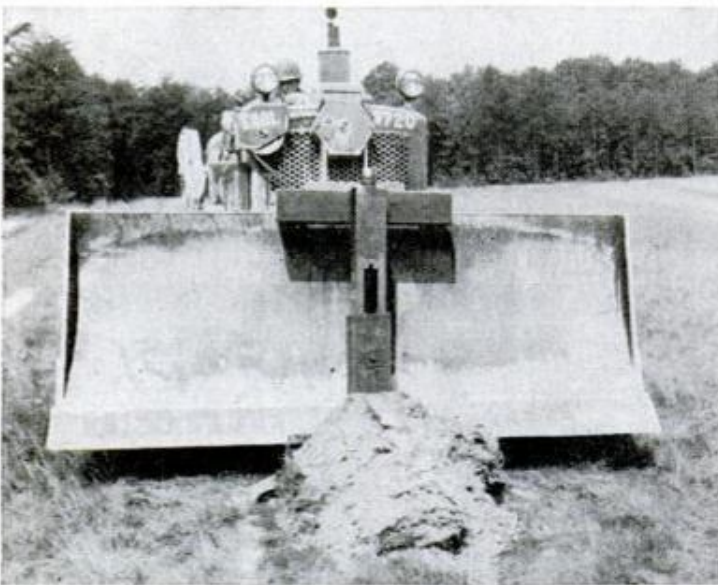
Ford of England's new Anglia features a reverse-slant rear window, a brand new, overhead-valve engine and four-speed transmission. The new four-cylinder engine of oversquare design has 41 horsepower. Anglia's unique rear window eliminates snow accumulation and also offers protection from the sun.



## Submarine Viewer Helps Fishermen

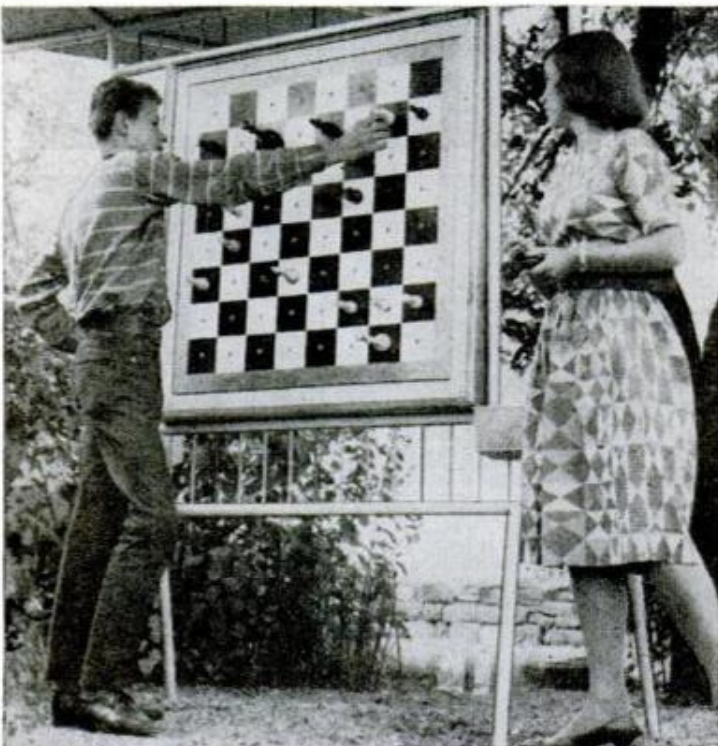
Next best thing to a glass-bottomed boat, an underwater viewing tube lets boaters peer through up to 30 feet of water to locate reefs, shoals, weed beds and other fish hang-outs, or find lost gear or motors on the bottom. Basically a length of six-inch aluminum tubing with a plate-glass window in one end, its available in two, four and six-foot lengths for use from any size boat.





## Mine-Planting Aids Developed by Army

Two new machine-driven diggers now speed planting of land mines by Army Engineers. Upper left, a two-man, jeep-mounted earth auger drills 100 holes an hour. It's a regular commercial earth auger with an eight-horsepower engine. At upper right and left center is an American adaptation of a British method: A cup-shaped scoop is mounted on a bulldozer blade, and can dig 11 holes a minute on a straight run with about 18 feet between holes. The scoop assembly can be fabricated in field shops and installed on any bulldozer.



## Vertical Chessboard Helps Kibitzers

Chess games attract knots of kibitzers wherever the game is played, but an ordinary table and chessboard has room for only a few spectators. The employees of a Berlin electronics firm, who play chess during their lunch period, installed a king-size vertical chessboard in the garden where they eat. With pegged chessmen fitted into holes drilled in the squares, the board allows an unlimited number of spectators to watch a single game. A roof over the board insures that none of the games will be called on account of rain.

☐ Russia is said to have developed a new glass that is harder than steel yet lighter than aluminum.

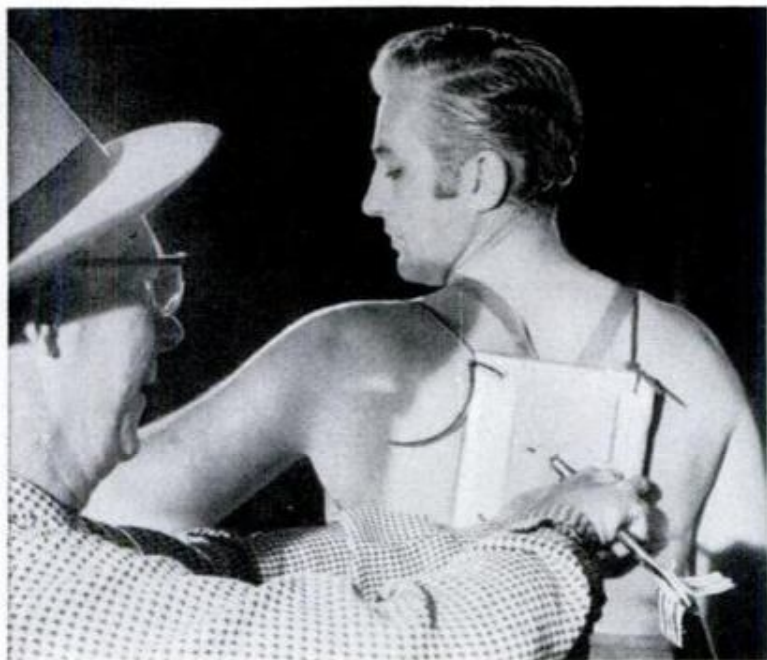
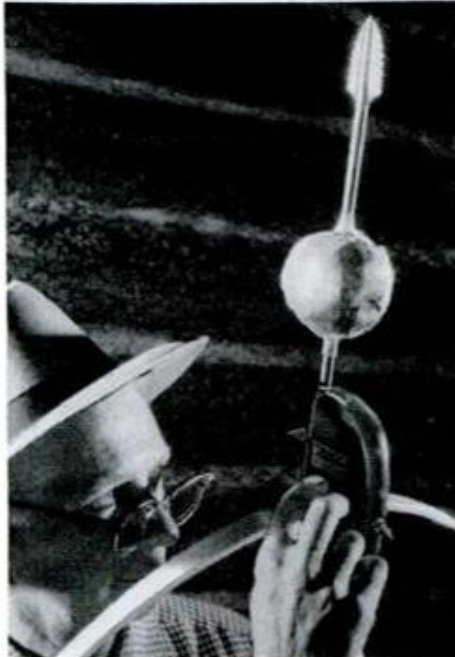


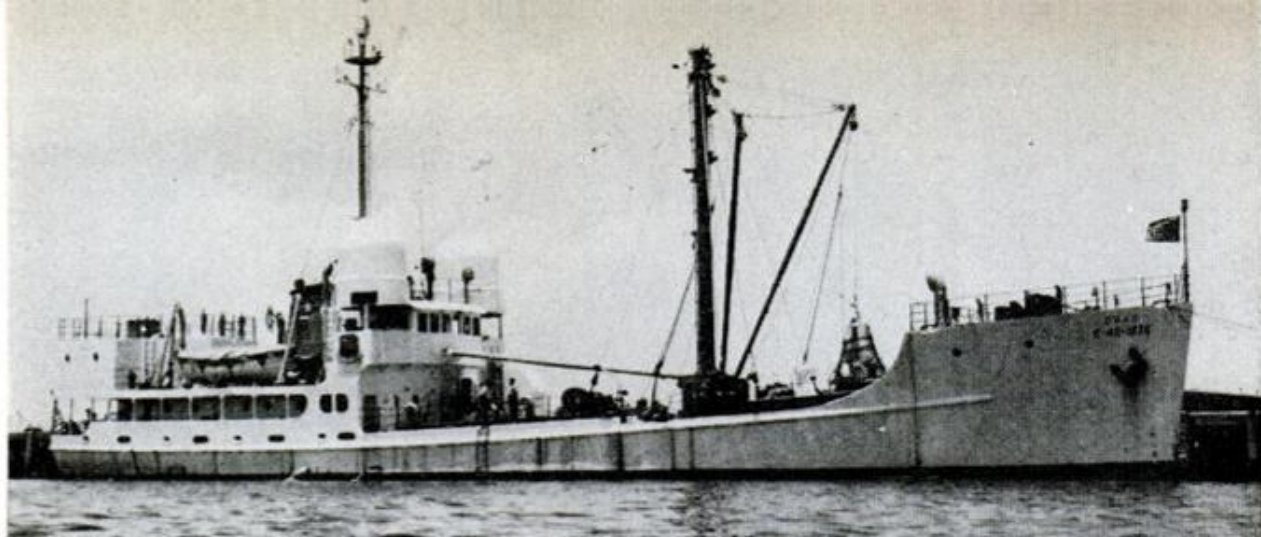
Photos by Richard Hartt

## Who Shot That Arrow?

Certainly not that Indian—he's a TV extra from Van Nuys who never drew a bow before this picture. But the gentleman standing behind *him* is "Senator" George Bahr, ace crossbowman, who has just fired the arrow (gently) into a thick block of wood strapped on the actor's back (see below). The old method, with the arrow placed beforehand, is much less convincing.

Right, the William Tell trick the easy way. Bahr shoots an arrow, apple and all, into the wall, the actor steps under it, and the camera does the rest. But he can do it for real, too, if the script calls for it





Ocean Range Vessel E-42-1836 stops in Port Canaveral between tours. Her usual port is Trinidad or Recife

## 5000-MILE GAME OF CATCH

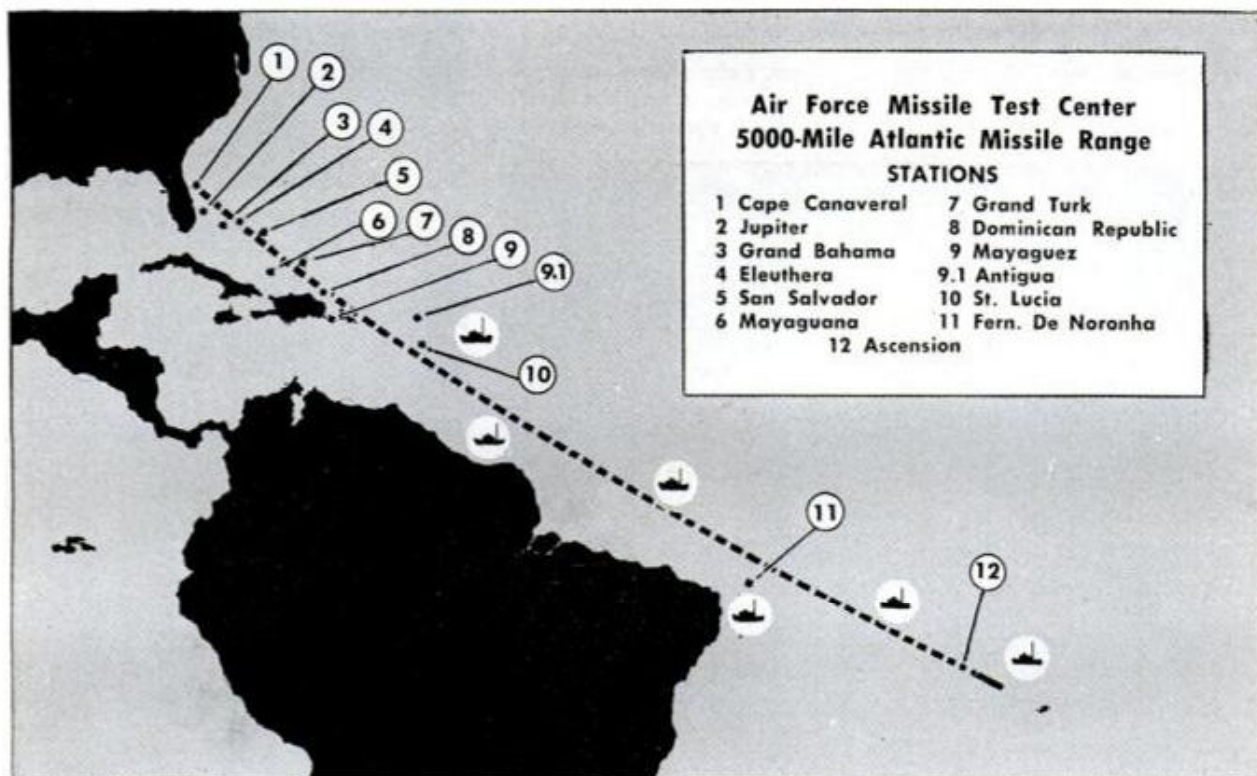
**Tracking and recovering a 15,000-mile-per-hour "fastball" from Canaveral takes a lot of teamwork and electronics skill**

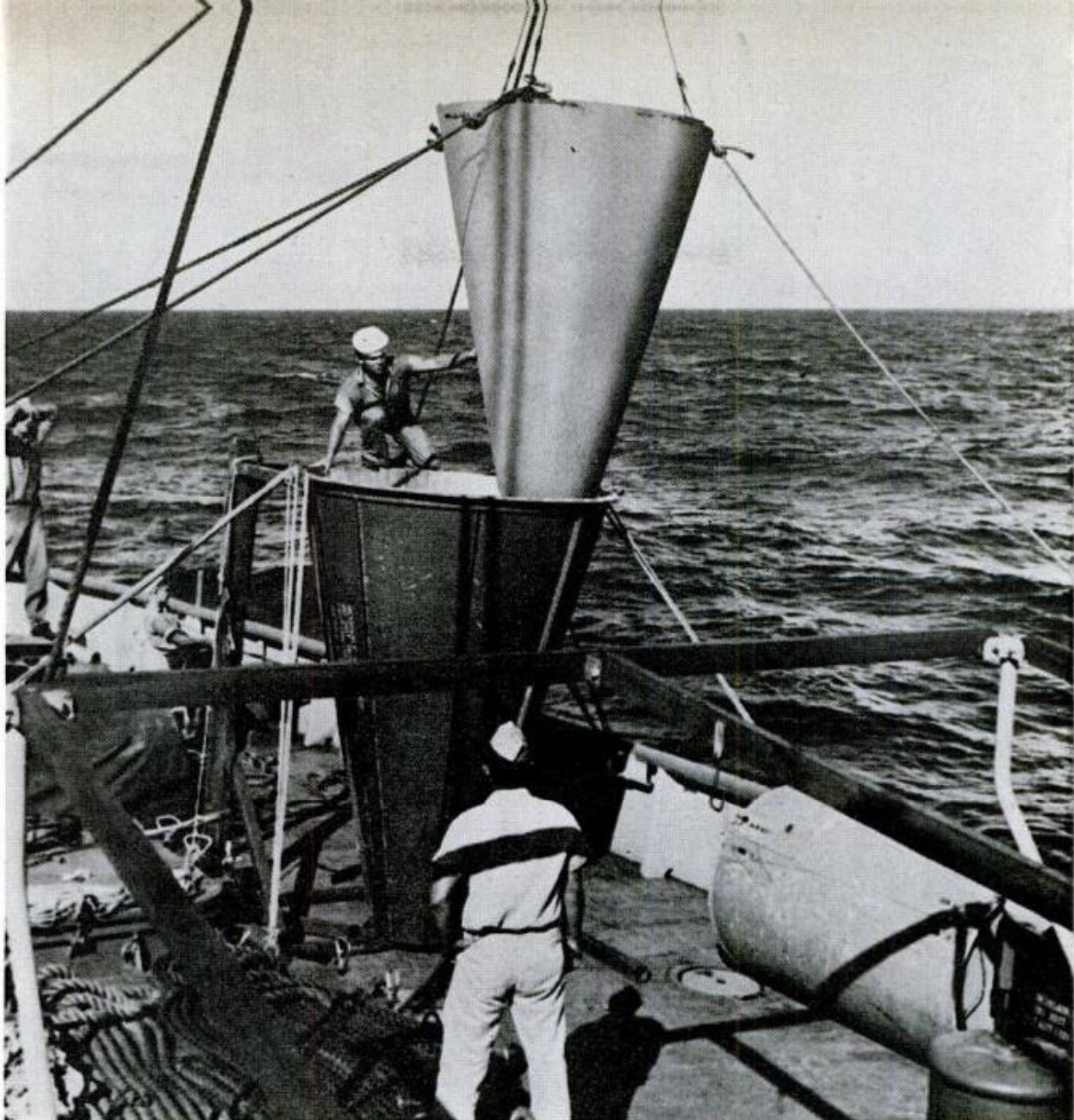
*By Richard F. Dempewolff*

**U**NDER GLARING FLOODLIGHTS, men swarm across a launching pad at Cape Canaveral, Florida. In the center of the milling army of foil-garbed specialists, a nine-story rocket juts skyward, spilling out liquid oxygen frost and vapor.

"T minus 20 minutes and counting!"

The terse countdown call blares from loudspeakers around the pad. It booms through the blockhouse. It croaks from headsets clamped to the ears of scores of technicians seated at a nightmare of in-





U. S. Army Photo

Recovered 90 minutes after firing, this Able-Baker nose cone is lifted into a container aboard the USS *Escape*

struments all over the missile "complex." It races out over the airwaves from powerful transmitters to island tracking stations in the Atlantic far off the coast of South America.

And, across 3500 miles of tossing, night-shrouded ocean, it crackles from radios in the darkened bridges and communications rooms on board six far-flung weird little ships. On these vessels, the men who hear it already are at their stations, monitoring banks of telemetry gear in "the hole" below decks, plotting precise positions in the navigation shack, and scanning the tropical sky through powerful glasses. High on each ship's superstructure, under a pair of huge white domes known to the crews as "the Mae Wests," corkscrew-shaped radio antennas clank and rumble as they peer this way and that across a precise sector of sky, like a pair of rolling electronic eyeballs.

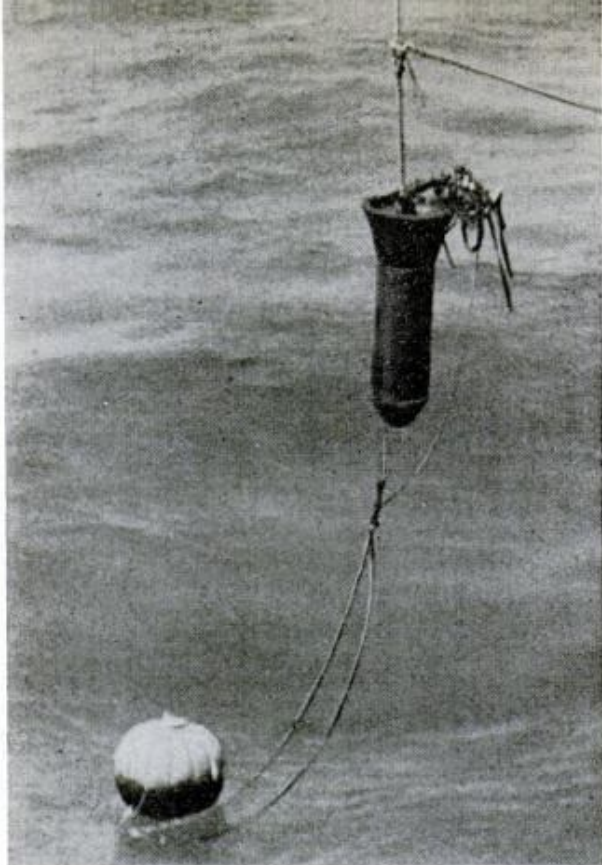
JANUARY 1960

The moment for which these hardy mariners may spend up to 45 miserable storm-tossed days on their heaving splinters of steel, is imminent. In 20 minutes, if all goes well, the missile will lift off its pad at Canaveral on a 5000-mile ballistic ride through space at 15,000 miles per hour. One by one, each station or ship will track it from horizon to horizon as it passes overhead. The crew on the last vessel, picketed at the end of the line beyond Ascension Island will—if the navigation was good and the weather is right—actually see the burning nose cone streak like a giant meteor toward the sea. If the mission involves recovery, their job will be to find that speck in the black ocean, lift it aboard ship without damage and bring it home.

#### Special Fleet

The special fleet that does this work is made up of half a dozen odd little radome-

117



Still attached to its flotation bag, cone from a Thor-Able rocket is hoisted aboard the *Coastal Crusader*



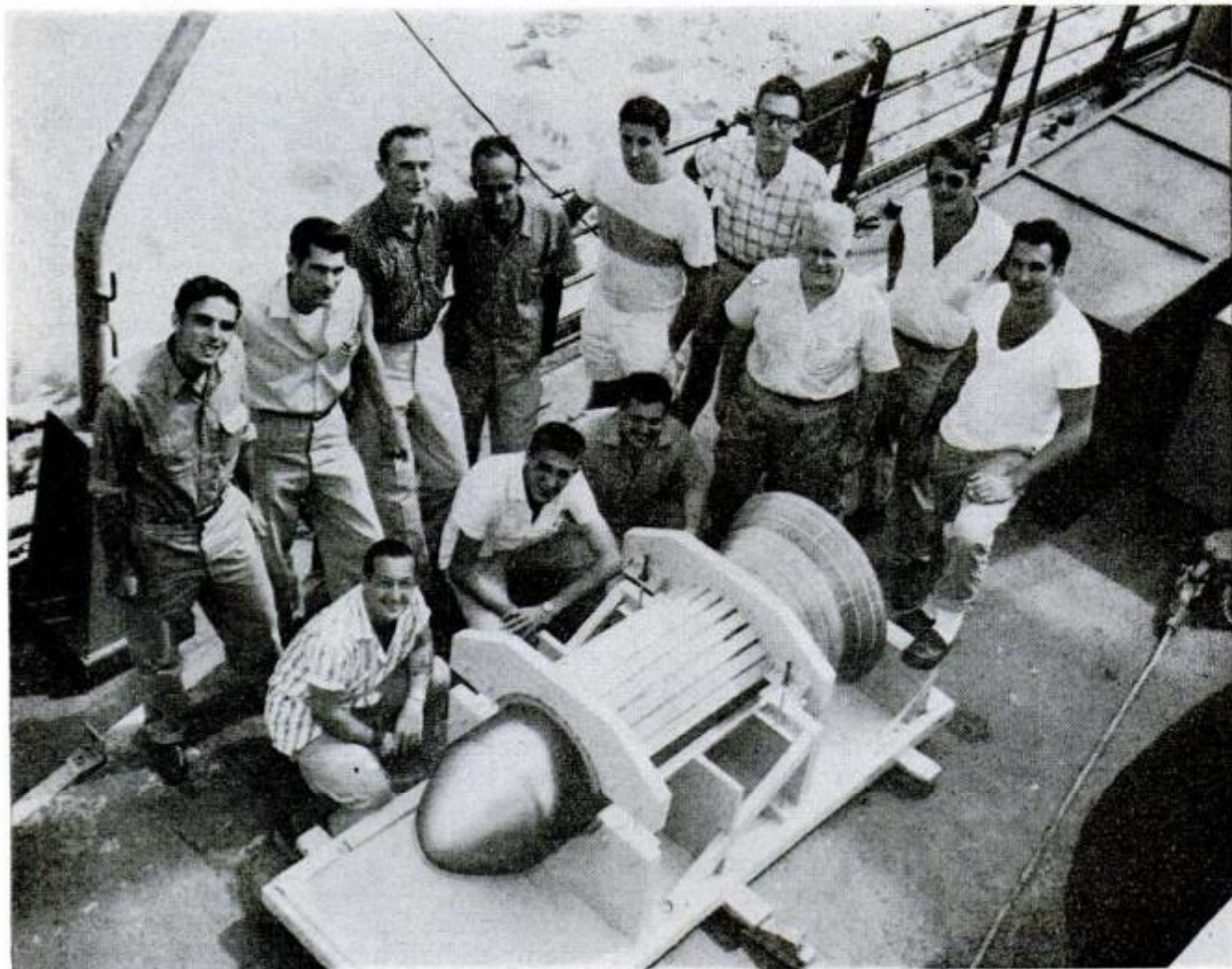
As the falling re-entry vehicle reaches 20,000 feet, a heat cover ejects, exposing the parachute compartments

Next in the sequence, a parachute whips out and slows the vehicle from hypersonic to subsonic speed

studded ships, each faintly resembling a miniature destroyer with a severe growth of lumps on its topside. Some have peculiar names like *Rose Knot*, *Sampan Hitch* and *Coastal Ansader*. A slightly smaller class has no names at all. Each is informally referred to by its crew members as "that bucket," but officially answers to a num-

Jubilant recovery crew surrounds the advanced ICBM re-entry vehicle taken from the Atlantic in April, 1959

U. S. Air Force photos







Fully deployed, the parachute further slows the descending vehicle to its terminal velocity



Inner part of recovery assembly separates; location aids and shark repellent are ejected



When inflated, balloon is tethered to float above the parachute

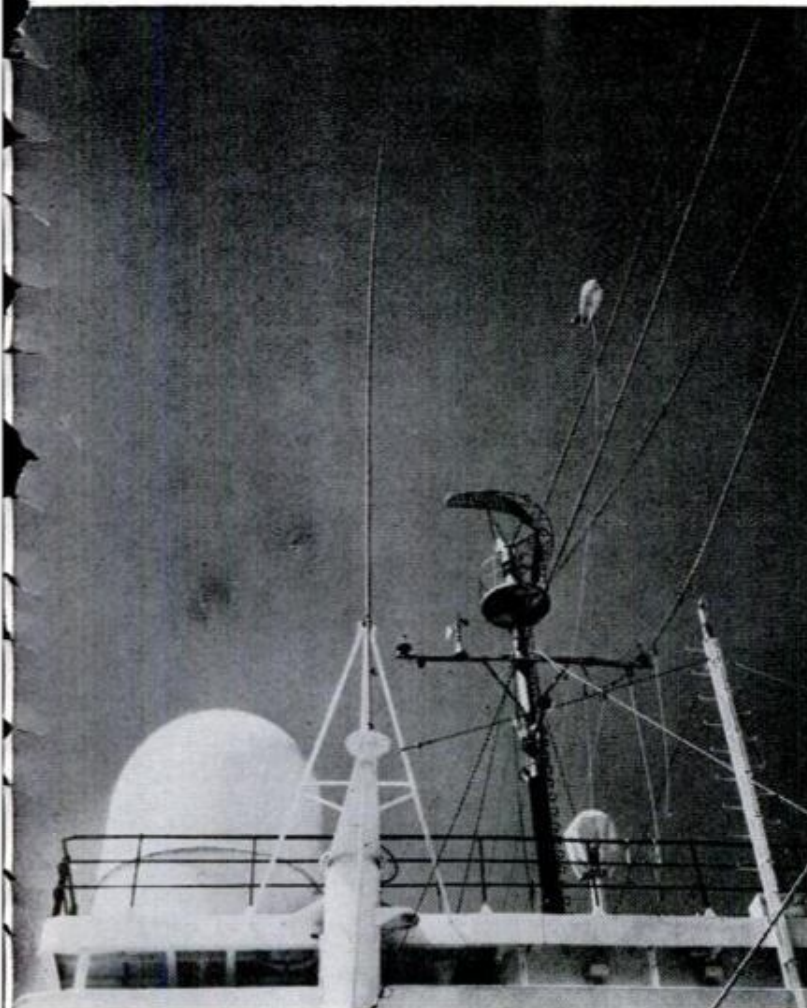


As the vehicle nears the water, it is falling at a rate of 60 to 100 miles per hour

ber designation such as ORV (Ocean Range Vessel) E-42-1836.

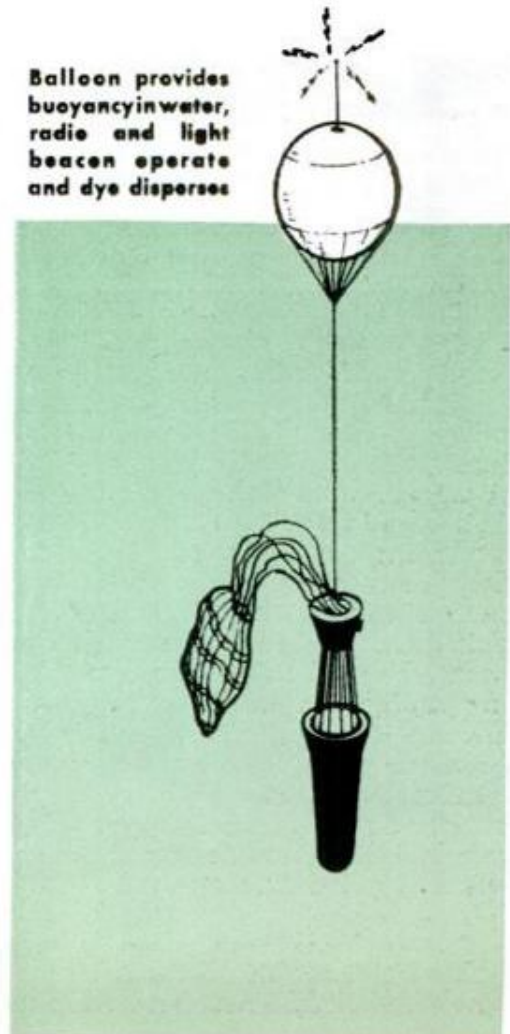
Originally, the latter were the Army's "FS" ships—a small frigate class used for freighting and supply during World War II. In the Korean fracas they ran the island coasts dropping and picking up bands of cloak-and-dagger shore parties—duty for which they were ideally suited. Drawing a scant

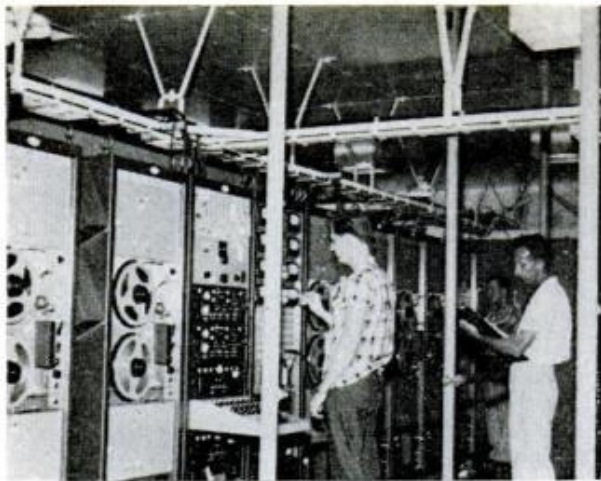
Kytoon aerial helps spot high missile under adverse conditions



JANUARY 1960

Balloon provides buoyancy in water, radio and light beacon operate and dye disperses





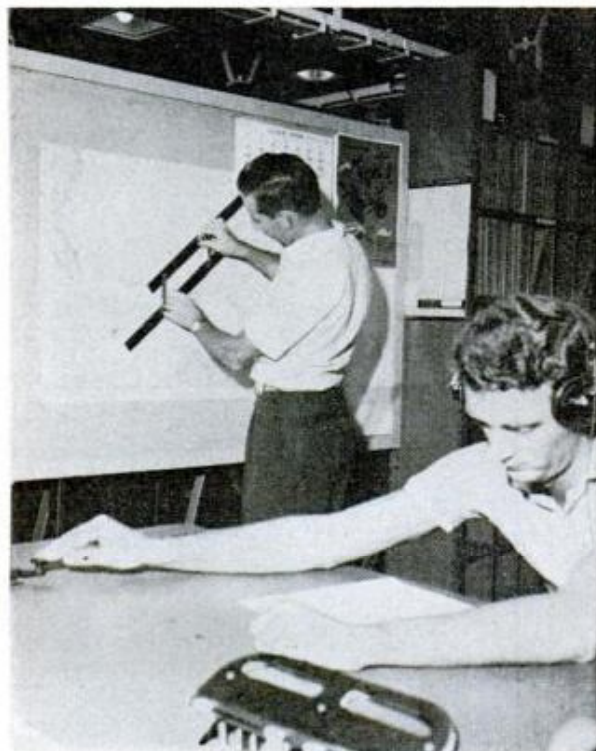
Signals from the missile and Canaveral are received and taped in "the hole"—the ORV's telemetry room



U. S. Air Force photo

In poor weather, infrared equipment picks up the scorching missile cone as it streaks in from space

Technicians, at left, locate with great precision the spot on the range map where the ORV will have to sit before a shoot. At right, another technician inspects a spiraling antenna inside the picket ship's radome

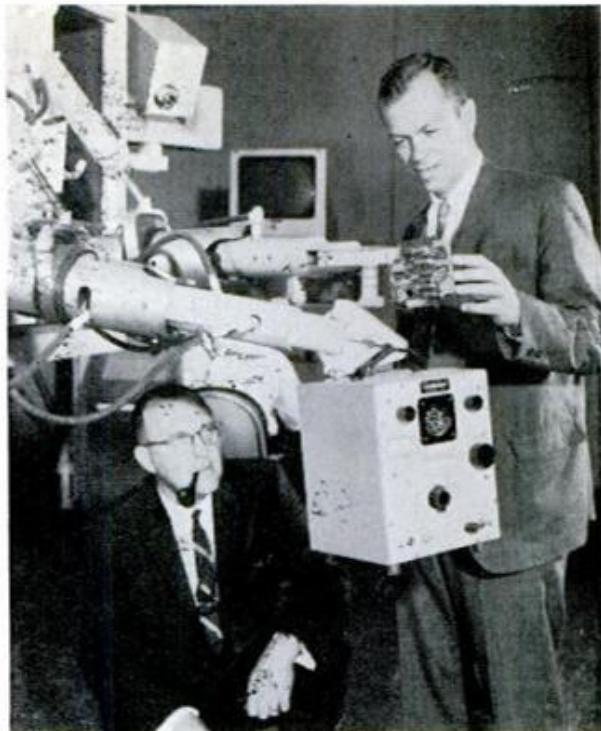
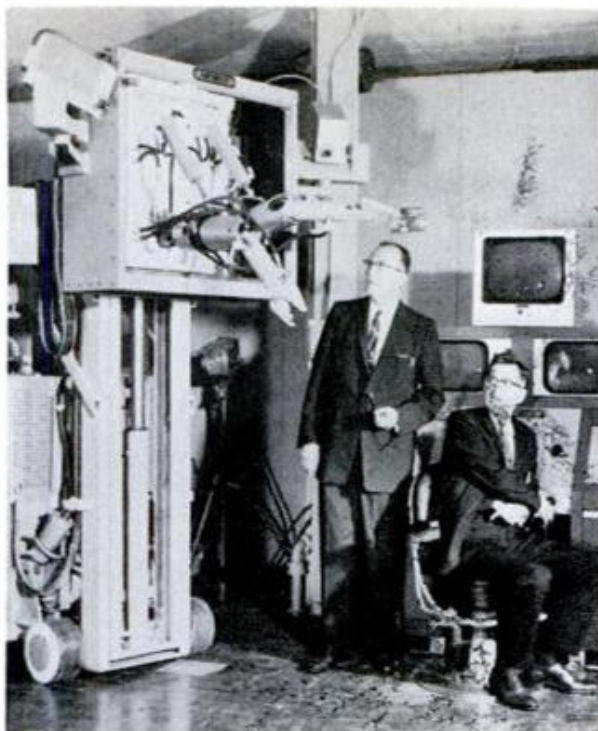


12 feet, boasting an overall length of only 176 feet with a slim 34-foot beam, they could ghost in and out of shallow harbors unnoticed at night.

Today, this trim little fleet, painted a gleaming white, reports to the Air Force and is operated under contract out of Port Canaveral by Pan American World Airways. On board each one, a highly skilled group of six or seven RCA technicians and engineers operates the complex maze of RCA-designed electronic wizardry that makes the fleet a vital link in the giant missile range chain.

It's one thing to send a mammoth chunk of fire-spitting steel out of this world, but quite another to keep track of where it goes and what it "sees" and "feels" en-route. Today, virtually all big missiles carry an instrument package designed to count cosmic rays, take temperatures, test magnetic fields, look at the sights through camera eyes and perform a host of other chores. All this data is radioed back to earth. To pick up these broadcasts from space, and track the big bird with pinpoint accuracy to its watery grave, telemetry stations are spotted along the earth under the missile's flight path. On the Atlantic range, stretching halfway across the ocean from Cape Canaveral, 10 such stations are strung through the chain of islands north of South America's coast. The last is in mid-ocean on Ascension Island. With all the handy islands, this still leaves unmonitored watery gaps totaling 3500 miles in

(Continued to page 264)



## "Replacement for Man" Does Dangerous Jobs

Mobot Mark I, the first mobile remote-controlled handling machine for use in radiation labs too dangerous for man, flexed his steel arms recently and showed how he can move into "hot" areas to perform intricate tasks. Remotely controlled

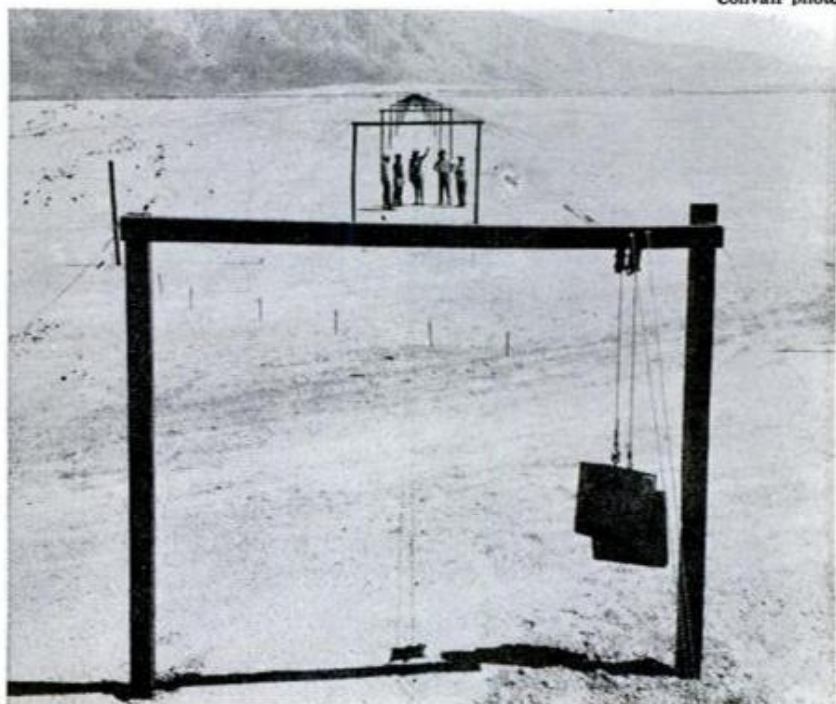
by operators who watch through closed-circuit TV eyes, Mobot, built by Hughes Aircraft Company, can lift 150 pounds with either arm, take apart a metal case with electronic hand tools and even remove a printed circuit.

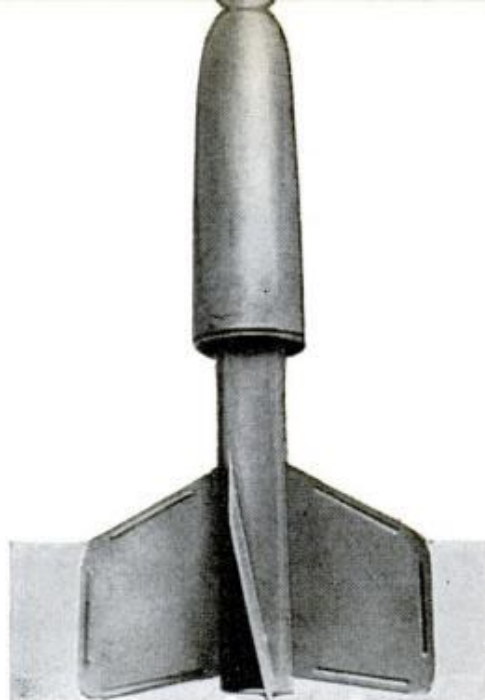
## Huge Radio Telescope Stretches Across Desert

Thousand-pound lead weights keep two miles of transmission lines of a huge radio telescope taut in the Anza-Borrego Desert, California. Radio signals from remote celestial objects are picked up by a grid of

eight parallel rows of north-south dipole elements, spaced 1443 feet apart along the east-west length of the transmission line. What the radio telescope "sees" is recorded as a wave pattern on paper.

Convair photo





## Oil-Spraying Rocket Calms Waves for Rescue Operations

Latest development by the German Rocket Society is a one-man, hand-fired oil-spraying rocket to be used in coastal rescue operations. Fired like a crossbow bolt, the rocket flies out 900 feet and explodes in mid-air. The tailfins are inclined

to cause the rocket to spin on its longitudinal axis, and the combination of spin and explosion sprays its quart of oil over nearly 90,000 square feet of water. Even that thin film will help calm rough water, and allows launching of rescue boats. The operator is protected from the exhaust gases by a shield on the launcher.

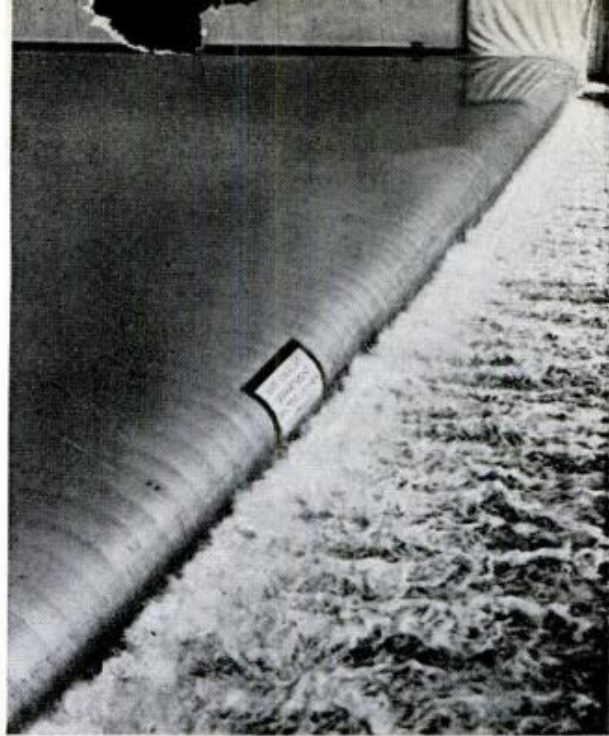
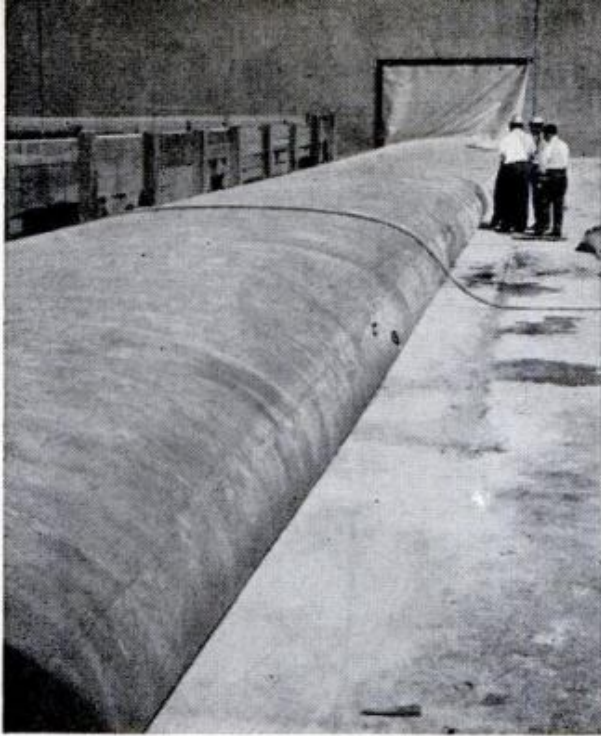


## Twin-Deck Rail Cars Carry Foreign Autos

One atop the other, new automobiles are being transported in double-deck freight cars across Europe. The special freight cars are used by the German Federal Railway between Germany and Switzerland.

## Paper Test Helps Doctor Choose Effective Antibiotic

Chemically treated filter paper is helping doctors decide what antibiotic to give for an infection. The paper is divided into several divisions, and small quantities of individual antibiotics are placed in each division. Infectious material taken from the patient is swabbed onto the paper, which is then sealed in a plastic bag and heated. If an antibiotic halts the growth of the bacteria causing the infection, the paper remains white. But if an antibiotic does not work, the bacteria grow and the paper turns red. The doctor administers the one that keeps the paper white.



### **Collapsible Dam Solves Water-Diversion Problem**

Faced with the problem of diverting water from the Los Angeles River with a structure that would not be torn out in a flood, the Los Angeles Department of Power and Water installed a collapsible

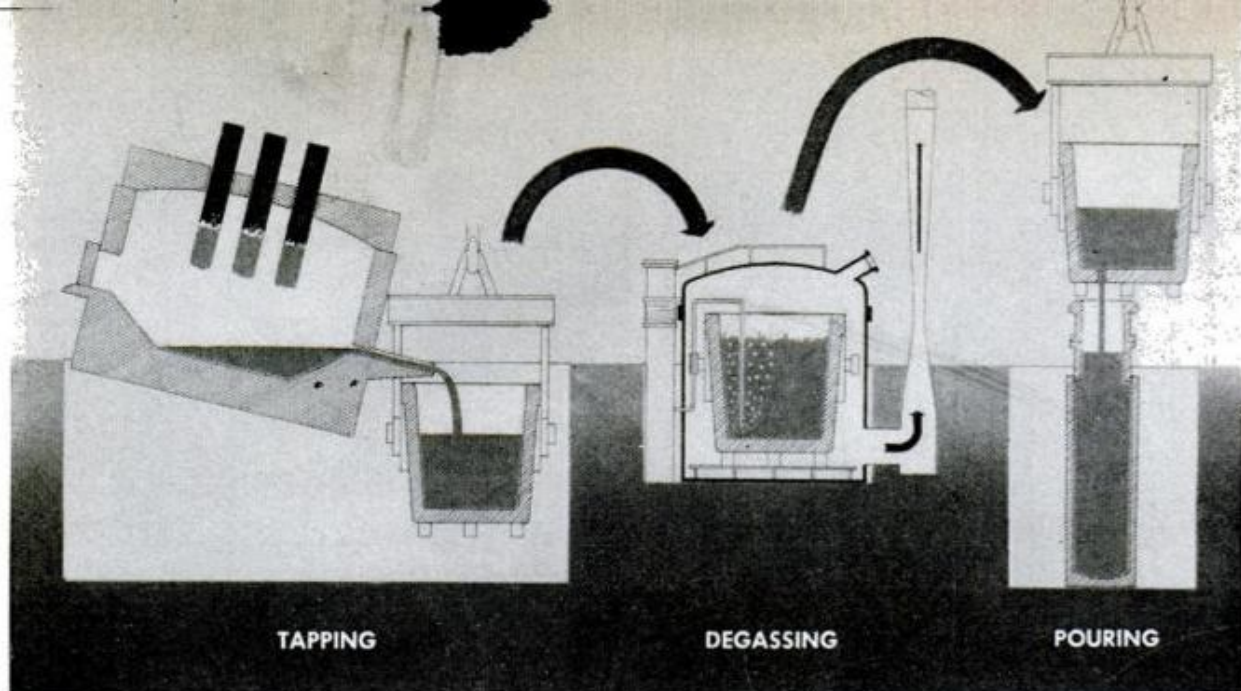
dam. It's a neoprene and nylon tube, 150 feet long and 30 feet around. Bolted to the river bottom, the tube automatically inflates with water when the river is low and deflates when it floods.

### **Up-the-Stair Switchboards Handle 6000 Calls Daily**

Twenty desklike switchboards, arranged on shallow steps of a winding stairwell, permit British Automobile Association operators to handle 6000 calls a day. Developed from a time-motion study, the

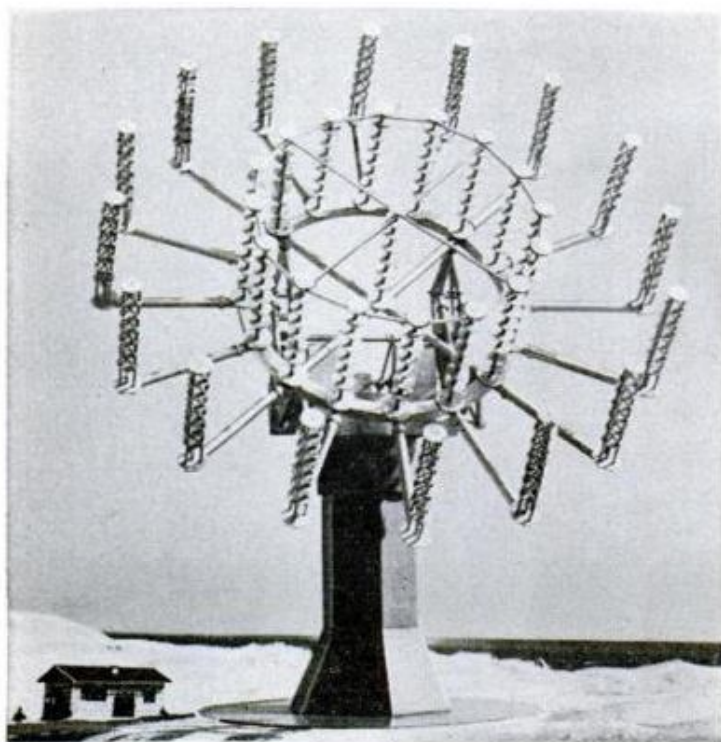
layout allows operators to give breakdown help and motoring information without leaving their seats. All are linked by phone to a control room at the top of the stairs, which contacts patrol cars.





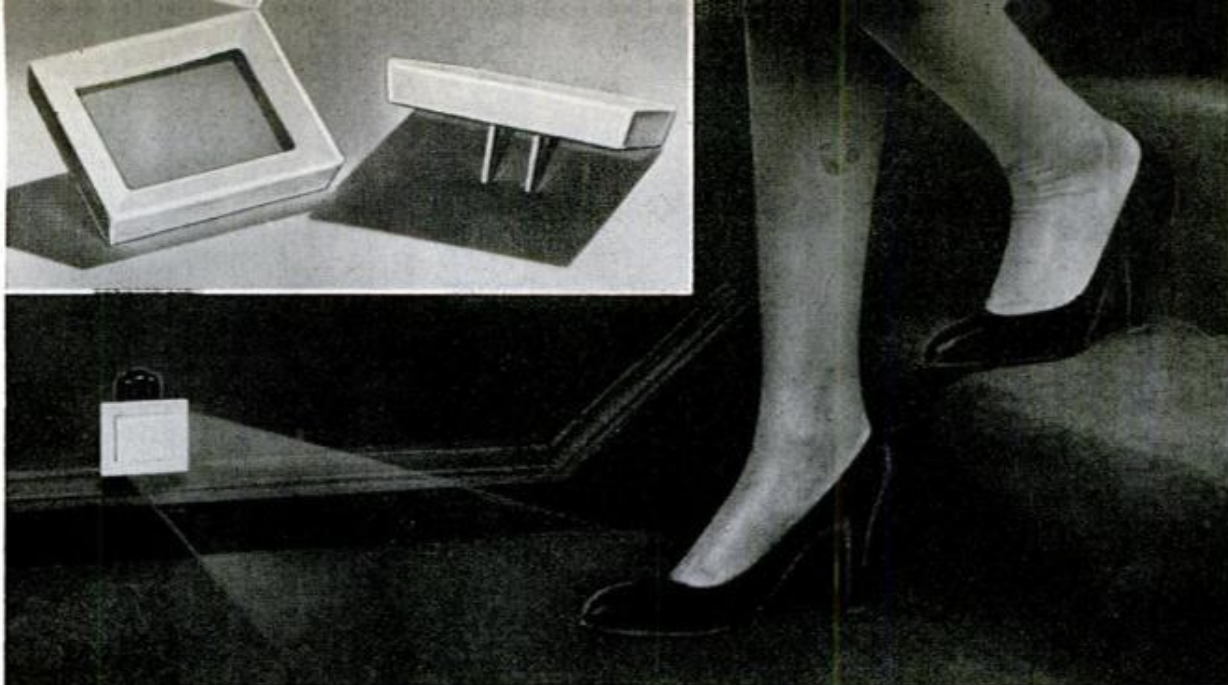
### Vacuum Degassing Method Produces Better Steel

Cleaner, tougher steel results from a vacuum degassing process developed by A. Finkl & Sons Company. After the electric furnace is tapped, the 3000-degree nickel alloy steel is degassed in a high-vacuum chamber where hydrogen, oxygen and nitrogen gases boil out. A helium gas injection increases circulation and allows more steel to be exposed to the surface. The degassed steel then goes into an ingot mold. At left is steel immediately after degassing.



### 40-Foot Array Antenna Tracks Space Vehicles

Departing from the "dish" type conventional antenna design is this array assembly developed by GB Electronics for tracking space vehicles. The National Aeronautics and Space Administration has purchased one of the new units for installation at the Wallops Island, Va., test site this spring. The antenna, combined with other equipment, can track vehicles in space with an assembly that has only a fraction of the weight and area of a conventional dish-type paraboloidal antenna. The new array antenna is 40 feet across, compared with the 60-foot dish paraboloid. It will cost less than \$250,000—or approximately half the cost of the tracking antennas now in use—and can be installed and maintained by fewer men.

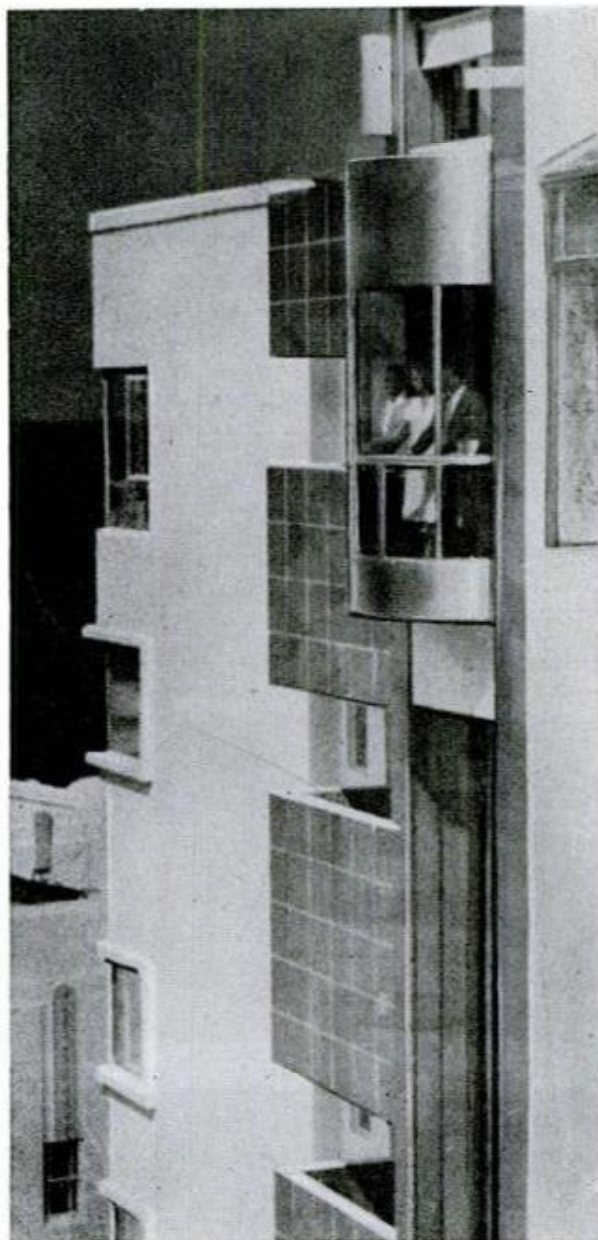


## Penny-a-Year Safety Light for Stairs and Hallways

Lasting nearly 10 times as long as an ordinary bulb, a flat "light bulb" provides a green safety light for stairways and hallways. The light has two prongs to be inserted into any outlet. According to Westinghouse, the lamp burns all year, day and night, for less than a penny.

## Sight-Seers Elevator

Patrons of the Saxony Hotel in Miami Beach, Fla., ride a glass-enclosed elevator that travels on the outside of the building, permitting a panoramic view of surroundings below. At night, lights in the elevator switch off so the guests have a view of the illuminated streets.



# Strange Shapes On the Campus



Set among trees at Lake Erie College is inviting Lincoln Commons, where 480 students dine and center their social life. The \$760,000 free-form structure was designed specifically with "feminine character"

By Sheldon A. Mix

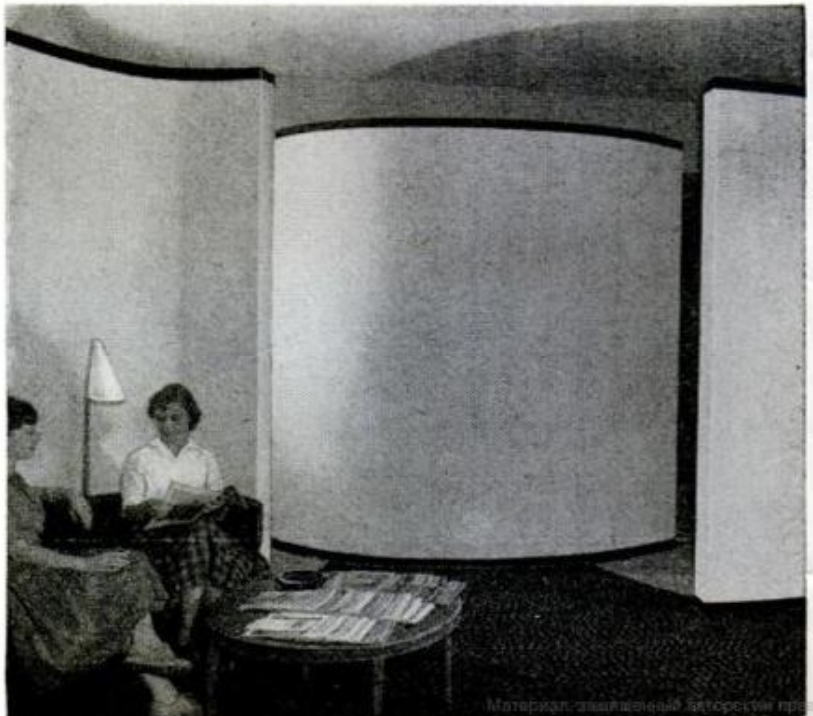
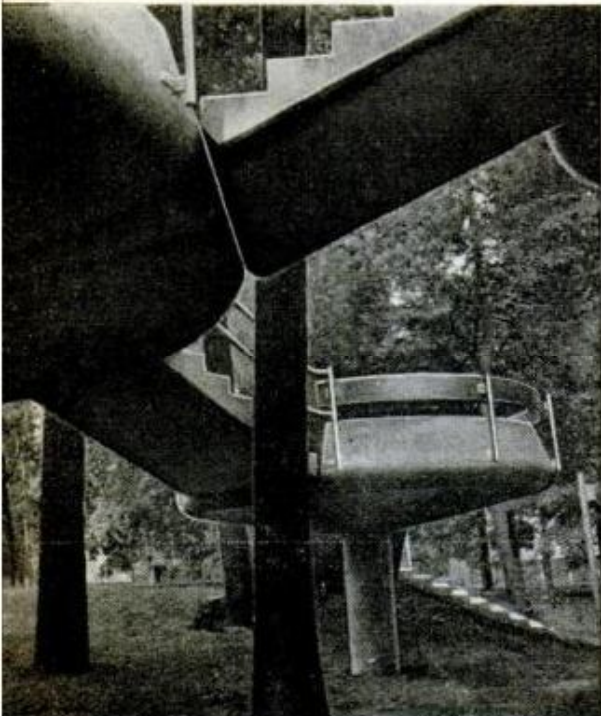
**F**OCAL POINT of the Lake Erie College campus in Painesville, Ohio, is a new, multifaceted student commons building with "lily pad" patios. In designing a combined dining hall and social center for the woman's college, architect Victor Christ-Janer produced a building of feminine character while at the same time har-

monizing it with the surrounding wooded terrain.

Only a few trees were removed in constructing the building. As a result, the college's 480 students, who take their meals on the building's third level, "dine in the tree tops" behind a glass-curtain wall. Circles and curves are dominant

Stairways do not connect with landings, giving the building a cantilevered look

Roundness is the Commons' dominant form. Also, note walls of reading lounge and hallway: They do not reach the ceiling







Four "lily pad" landings with their stairways enable students to get out of the building's second and third levels quickly. There are circular benches around the edges of each of the concrete structures at Commons

designs in the free-form building. On the ground level, terraces under trees outside the structure are linked to the interior by circular brick floor patterns. Rooms on the ground level are shaped by curved walls that stop about a foot short of the ceiling. Even the exhaust fans outside the building are located within a fenced circle. Steel structure supports open, interior stairwells.

The building is mainly a glass and steel frame encased in concrete. No brick is used above the outside walls of the ground level. Flared atop the structure is a 60-ton, exposed-concrete roof. On the ground level are a hi-fi room, a reading room and a lounge called "The Cave," which has a 12-sided fireplace with downward smoke exhaust. The second floor holds a snack bar and an expansive lounge area for study, television viewing and bridge. Deliveries are made on the ground floor and lifted by dumbwaiters to the third-floor snack bar and kitchen. ★ ★ ★

127



Smoke from the 12-sided fireplace, above, is drawn downward by a fan. View of lounge, below, shows how projections "bring in the outdoors"



# Visitors See Tokyo From World's Highest Tower



SIGHT-SEERS visiting the Tokyo Tower, the world's highest, view the Japanese capital from a two-story platform, halfway up the 1092-foot structure. The tower, which houses several local radio and television stations, tops the Eiffel Tower of Paris in height by 118.25 feet. Three elevators carry visitors to the platform. Weighing about 4000 tons, the tower's foundation can withstand a load of about 16,000 tons. The tower is fireproof and earthquake-proof. It is reported that the central platform is as rigid as the floor of a home and that visitors feel no vibrations. Constructed at a cost of about \$75 million, the tower is the highest commercial television tower in the world. At the very top are television antennas for six stations. Just below these antennas is the television and radio relay platform, 738 feet above the ground. Below the relay platform and just above the observation platform is a section of the tower containing FM broadcasting antennas and antennas for communications with mobile radio receivers.

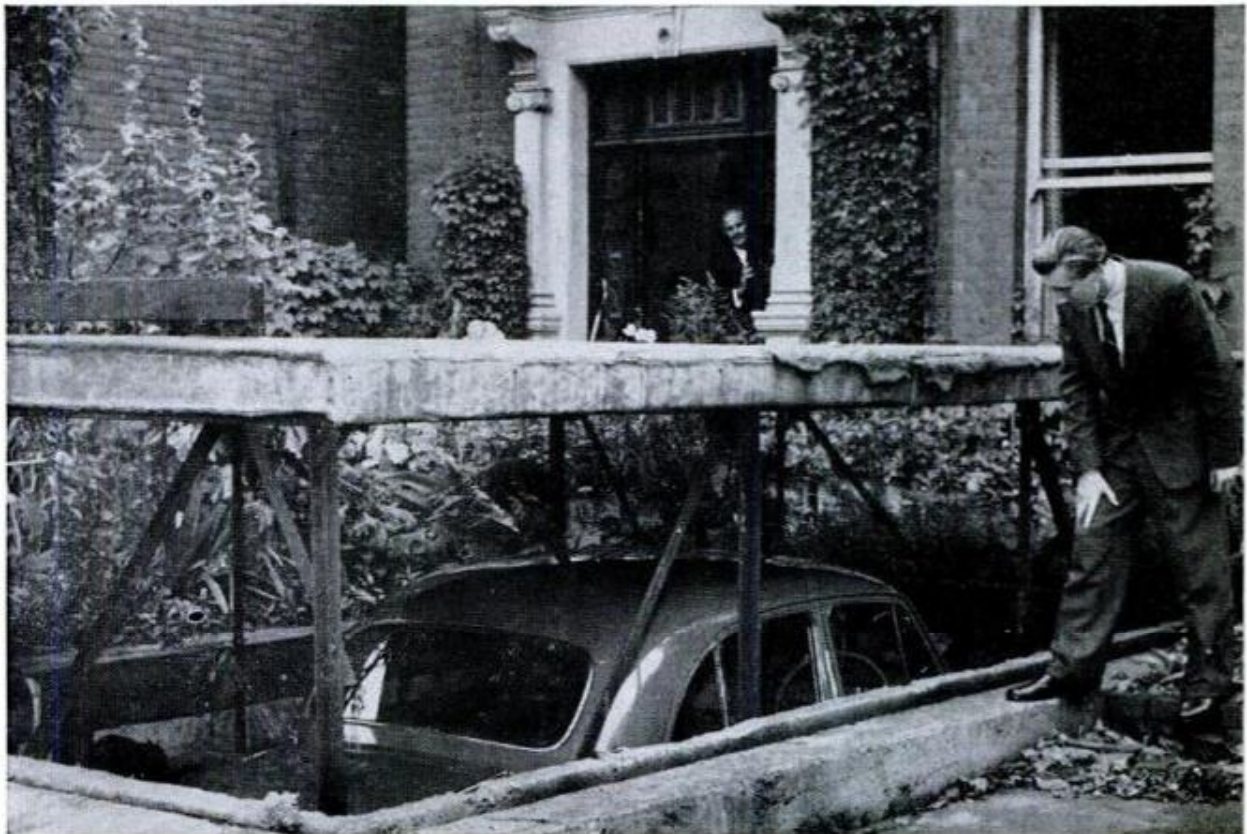


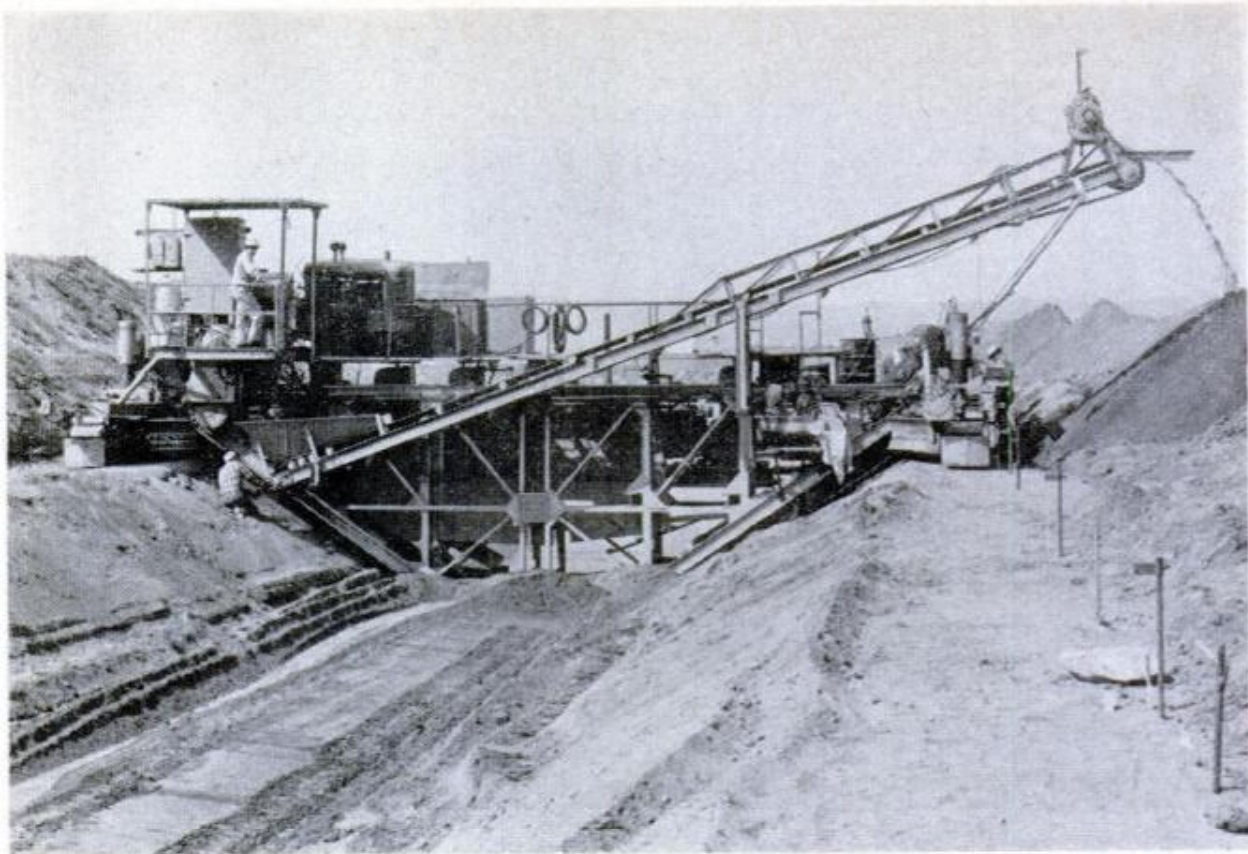


## Car Sinks Into Flower-Garden Garage

Colonel W. Wright's flower garden in front of his Hampstead, London, home looks like any other until he decides to park his car in the garage. His garage consists of a hydraulic ramp that lifts right out of the ground among the flowers and then lowers his car completely out of sight.

After driving his car onto the ramp, the colonel presses an electric button inside his house and a three-kilowatt motor lowers the ramp, putting the car to bed. This unique garage is exclusively Wright's too, since London laws do not allow such lifts to be installed anymore.

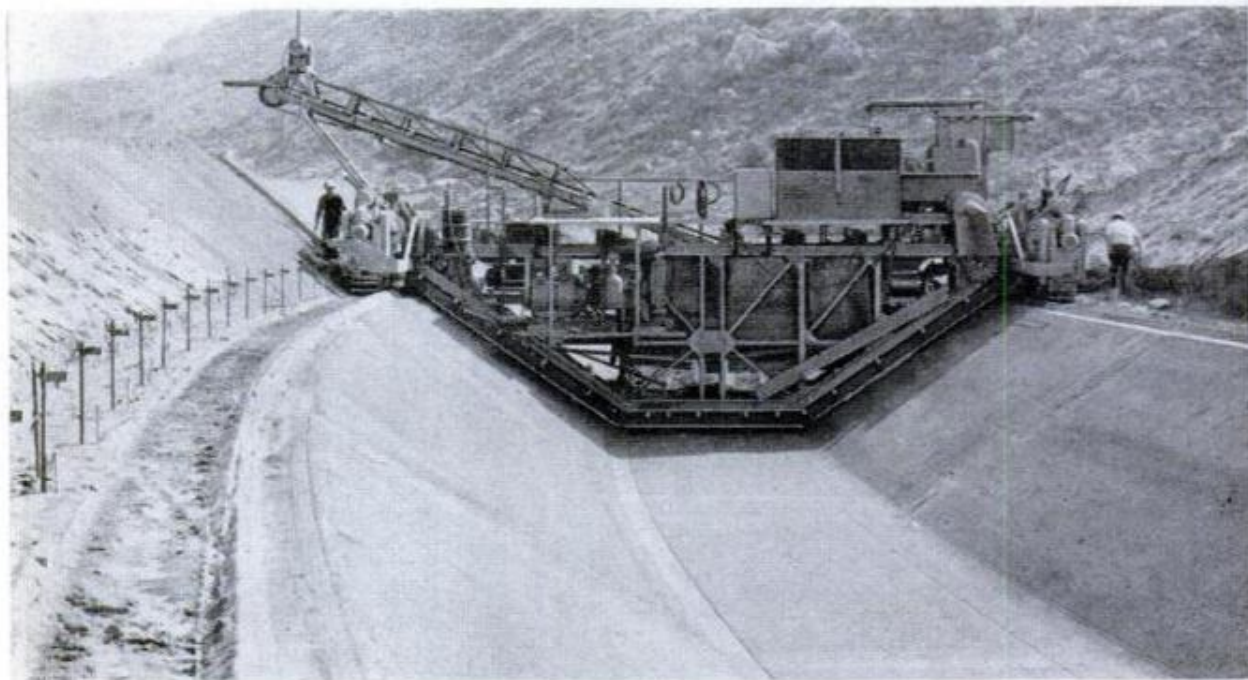


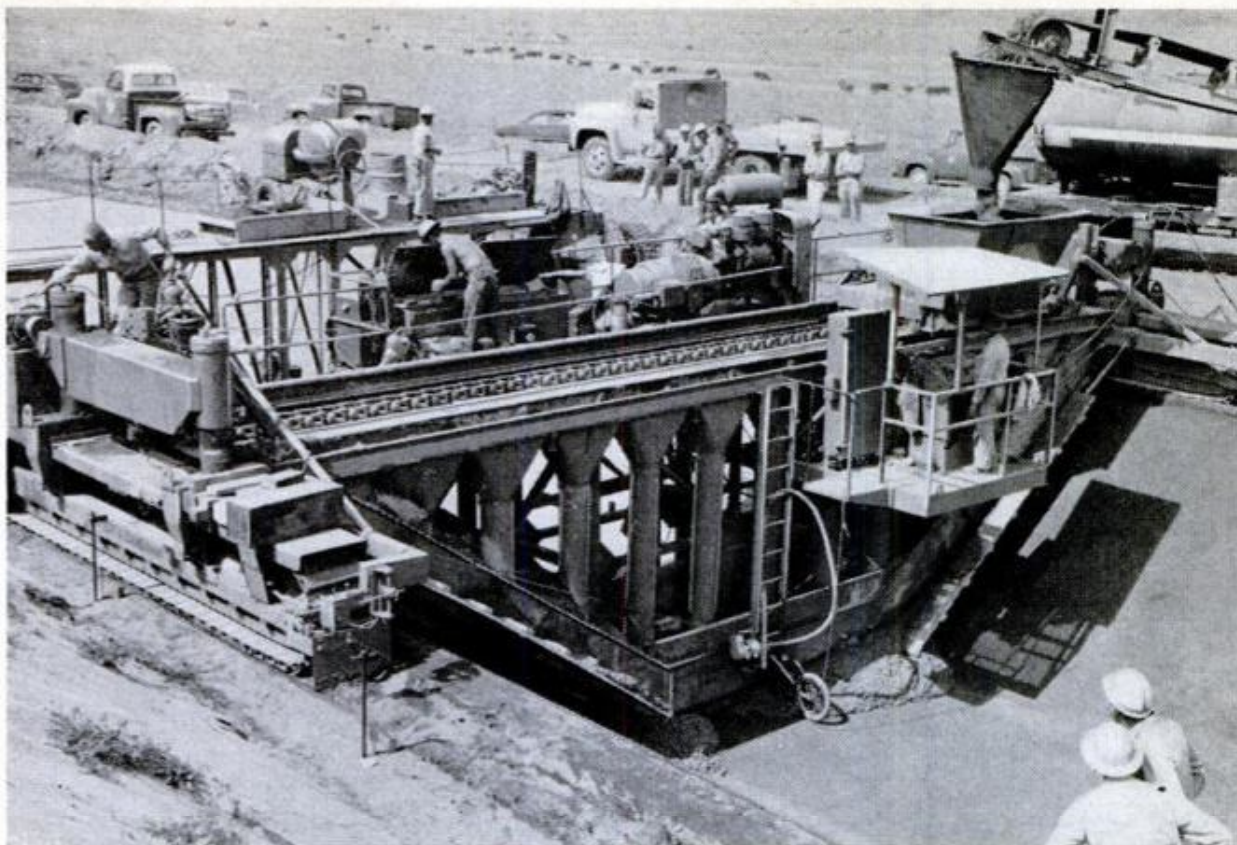


Front view of canal-building machine shows how it takes earth from roughed-out bed and dumps it, right. Posts, right foreground, support wire track which helps position machine without operator supervision

## Electronic Guide Steers Canal Builders

Rear view of machine shows the smooth bed it creates. The machine crawls on caterpillar treads. Its forward and lateral motions are controlled by an electronic regulator with metal fingers that "feel" wire

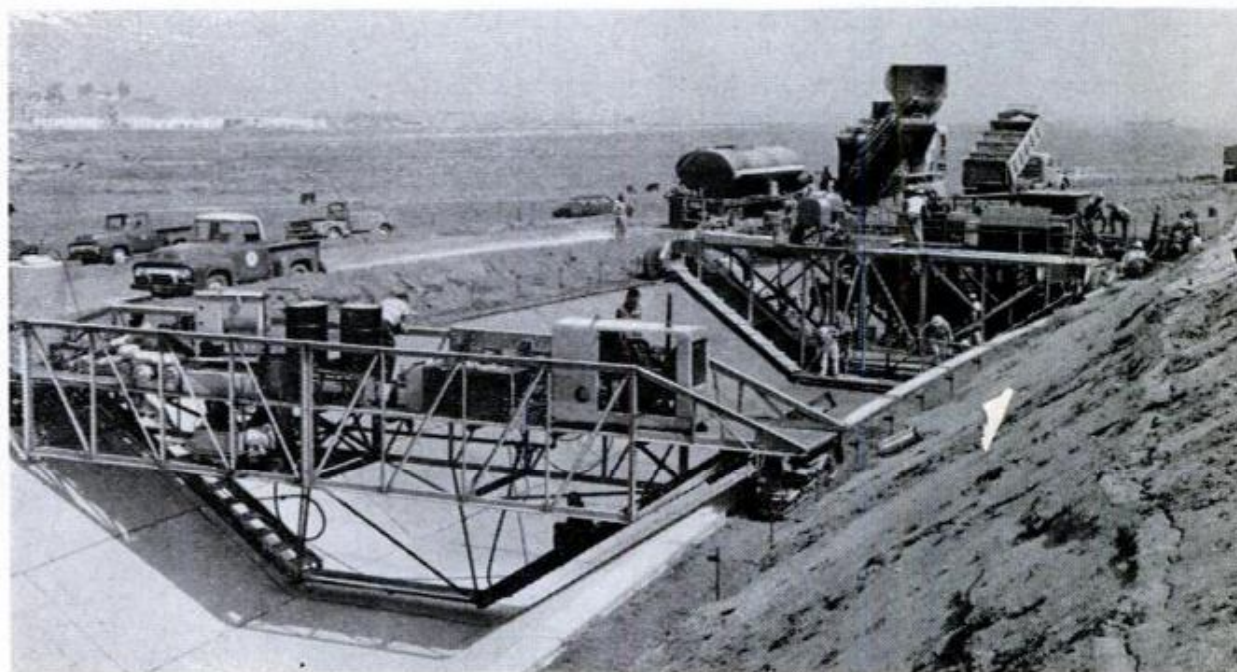
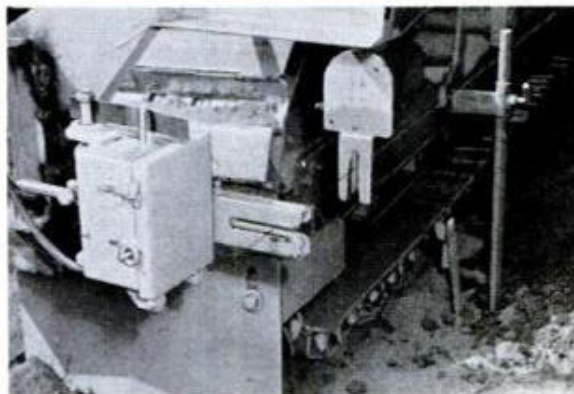




Man on platform controls filling of tubes with concrete splashing from mixer to hopper to conveyor

EARTHMOVING equipment has made easy the job of roughing out irrigation canals, but, until recently, smoothing the bed to grade was a time-consuming chore. The task was mechanized during building of a canal near San Jacinto, Calif. A huge machine smoothed and graded, then spread concrete. The monster was guided by electronics. ★ ★ ★

Metal fingers, right, grip wire, set machine's path. Traveling bridge, below, carries cement finishers



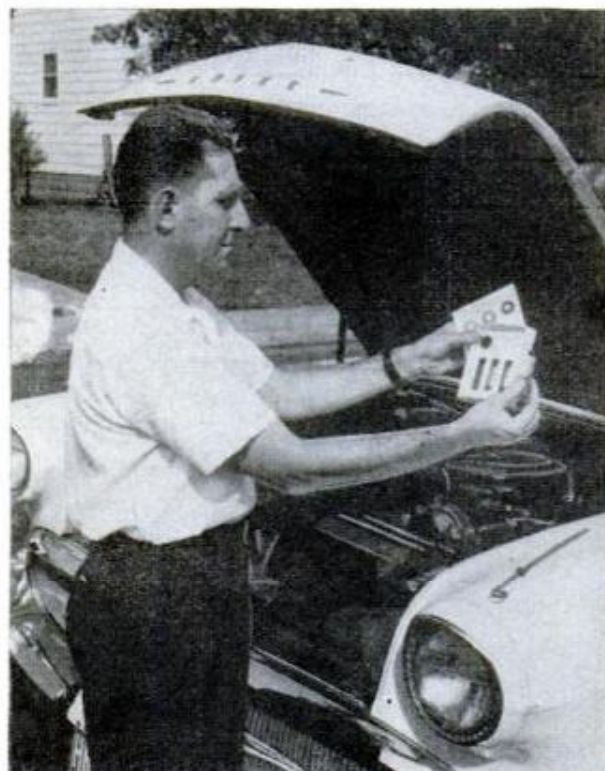


## "Boxcar" Antenna For Warning Net

Air invaders hundreds of miles away can be detected by a rotating 50-ton radar antenna which will soon join the nation's SAGE defense network. The unique antenna array represents a considerable advance in the state of radar antenna art. Its immense size—the housing is 104 feet long—is required to perform its distant-warning task. The antenna will be mounted on a three-story transmitter-receiver tower housing the 262 separate units that make up the system. The SAGE defense system gathers and computes early warning data and decides the best retaliatory tactics against targets.

## Kit Tells When to Change Oil

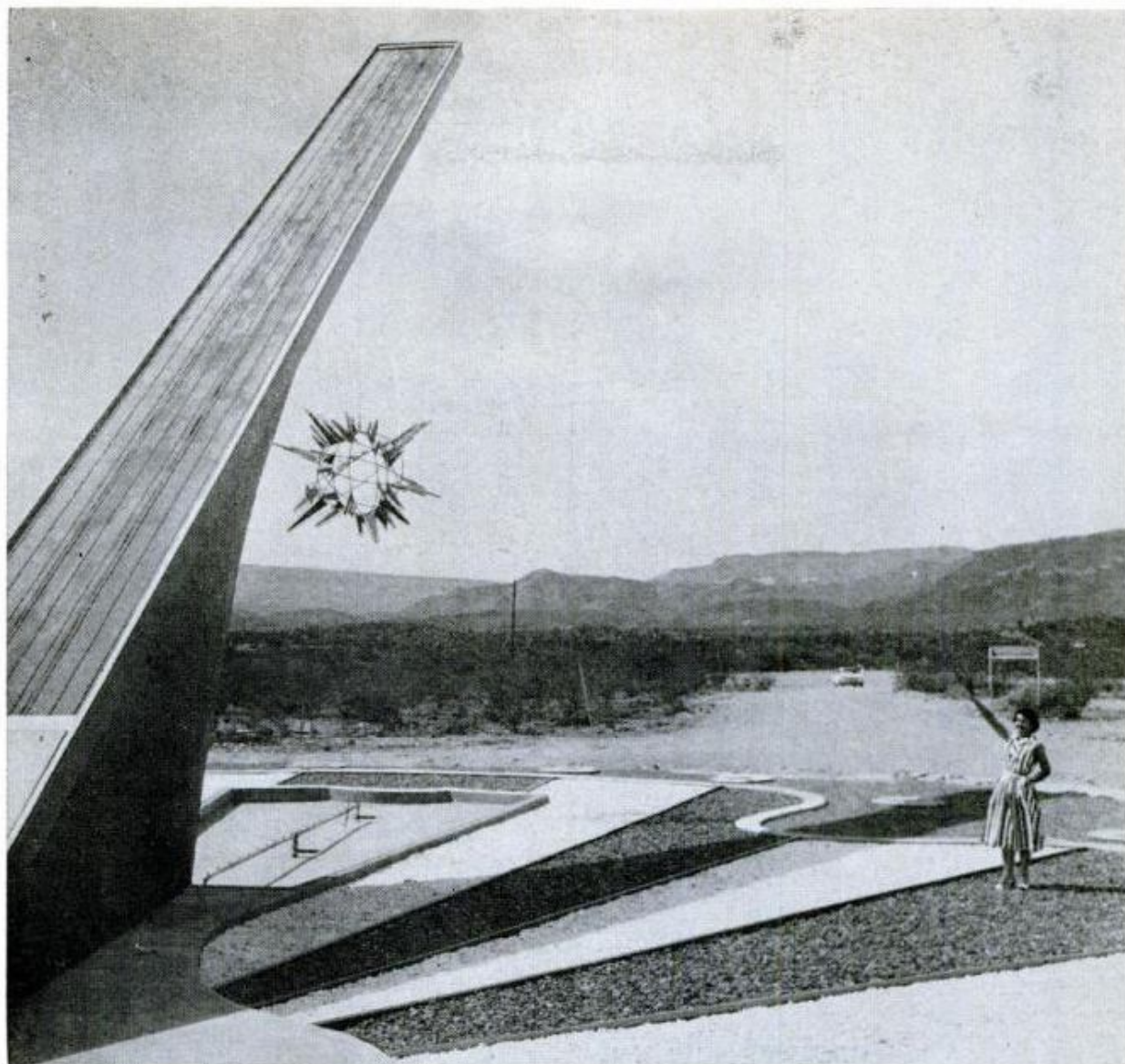
When to change engine oil? A kit that measures the solids and acids in oil helps you decide. An oil drop is placed on the test paper; if solids are present they will show up. A test liquid in a tube turns yellow if acid is present.



## "Hot Foot" for Back-Seat Riders

If a new electric heating pad is slipped under the floor mat, back-seat riders should have no complaints about cold feet. Operated by the auto's ignition system, it will warm up to 160 degrees F., using standard 12-volt current.

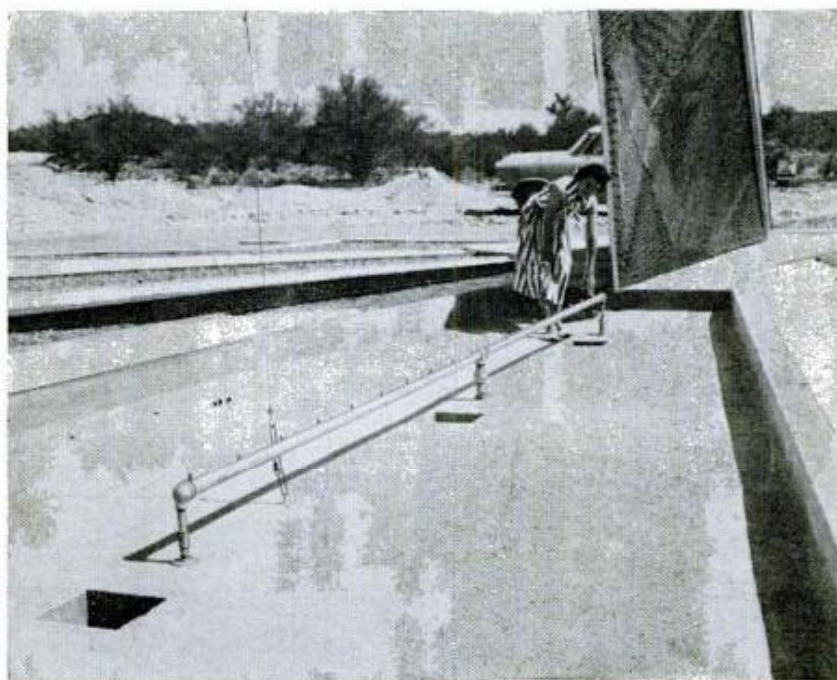




Woman at right is dwarfed by the huge gnomon and dial. The solar sphere hanging from the shaft is for effect only. Below, the reservoir and part of the copper pipe system that removes the sun-heated water

## Huge Sundial Also Provides Heat

RESIDENTS OF the growing colony of artists and writers at Carefree, Ariz., 26 miles north of Phoenix, can set their watches by one of the nation's biggest sundials. It also is unique in that the 66-foot long, 30-foot high structure was designed by a solar-energy expert to provide warm water for a solar heating plant. Water from a pool is heated by the sun, then pumped into a nearby real-estate office and shopping center, first commercial buildings in the community.



# WHAT'S NEW FOR Your Home



**BABY STROLLER** becomes a walker or sleeper with a few quickly-made adjustments. It converts to a walker when the canopy and footrest are removed, a sleeper when footrest is raised and backrest lowered. Fashioned from chromium-plated tubular steel, the multipurpose stroller has a shopping basket behind the seat, a built-in seat belt, and a white enameled steel snap-out tray. Upholstery is washable.

Hamilton Cosco, Inc., 2525 State St., Columbus Ind.

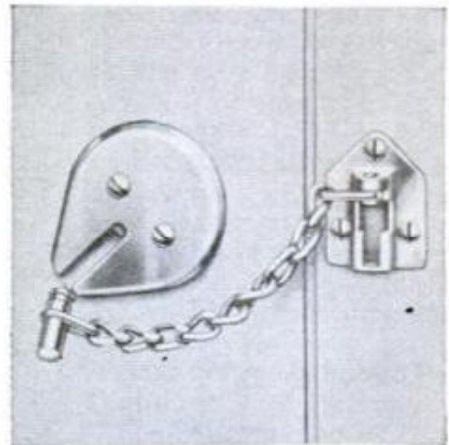
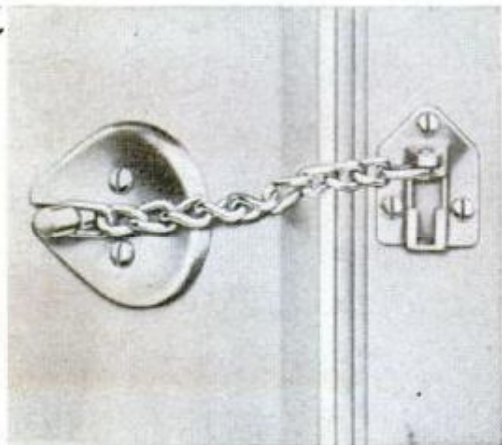


**HOME CANNER** and freezer packer uses no lead or solder and allows cans to be reused up to three times. Capable of handling four sizes of cans, the unit's sealing head crimps on the lid in factory style. The operator puts the filled can of fruit, vegetables, meat or game on the base plate, swings the head into place. Pressing a lever with her left hand, she turns a crank to crimp the lid.

Row Plastics and Die Casting Co., 2640 N. Southport St., Chicago 14, Ill.

**DOOR CHAIN** can be unfastened with a key from the outside. The parts are installed in the usual way (left) but the plate on the door is a lock; its cylinder extends outside (center). When unlocked (right), chain catch rotates and chain drops from slot. No key is needed to unfasten chain on inside.

Lockwood Hardware Mfg. Co., Fitchburg, Mass.

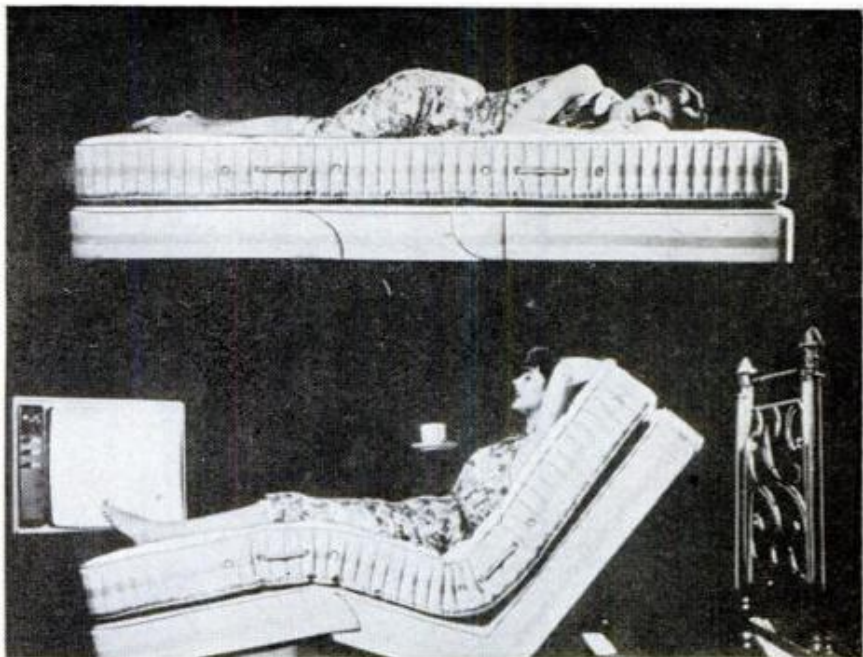






**WASTEBASKET HOLDER** fits on a slide behind a kitchen cabinet door and can be pushed from view. It has a lid, and holds 11 x 15 x 20-inch basket

Mutschler Brothers Co.,  
Nappanee, Ind.

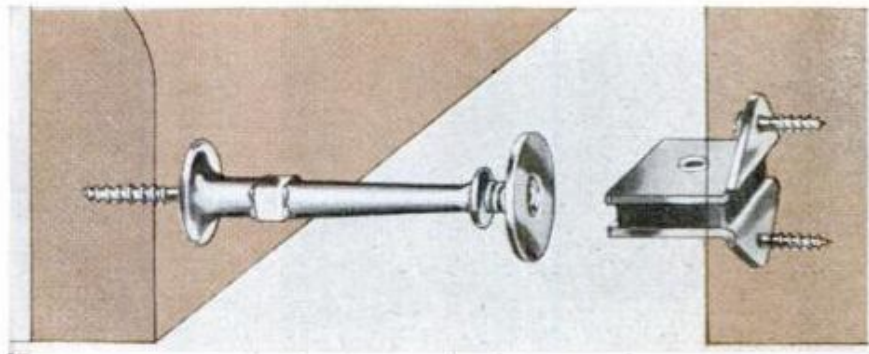


**ADJUSTABLE BED** automatically lifts a sleeper to awakening position. Designed to give support for reading, TV watching or to be used as a foot, head or backrest, the mattress-box spring combination performs the wake-up chore when plugged into a clock radio. It comes in twin size, and is available with either manual or electrical adjusting controls

The Simmons Co., 1870 Merchandise Mart, Chicago 54, Ill.

**MAGNETIC DOOR STOP** prevents a sudden breeze from slamming the door shut and holds it open for ventilation. The contact plate (wall mounted at left) has a spring to cushion impact. Unit may also be used on hinged windows

Durabilt Metal Products Co.,  
Union City, N.J.



**GARBAGE CAN** takes a beating without losing its lid. A 3/8-inch steel ring encircles top of can. Metal fingers under lid hold firmly under ring. The lid can be removed only when the handles on the cover are squeezed together

PEEM, 1946 E. Buchanan,  
Phoenix, Ariz.





Rock, shale and other refuse extracted from the coal climbs a 2400-foot hill aboard one of plant's conveyors. At top, the load is automatically dumped and then spread into a valley

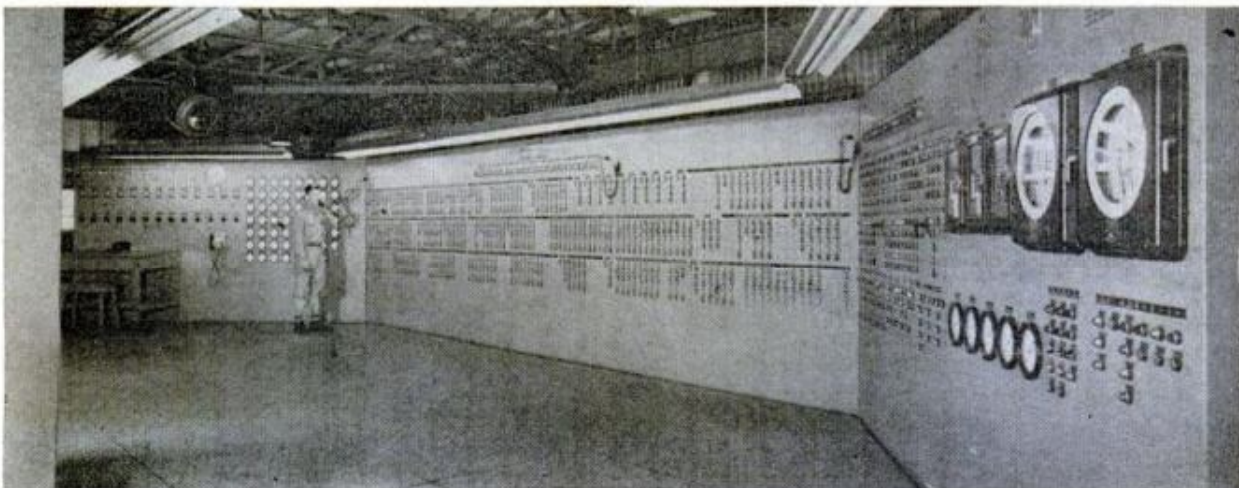


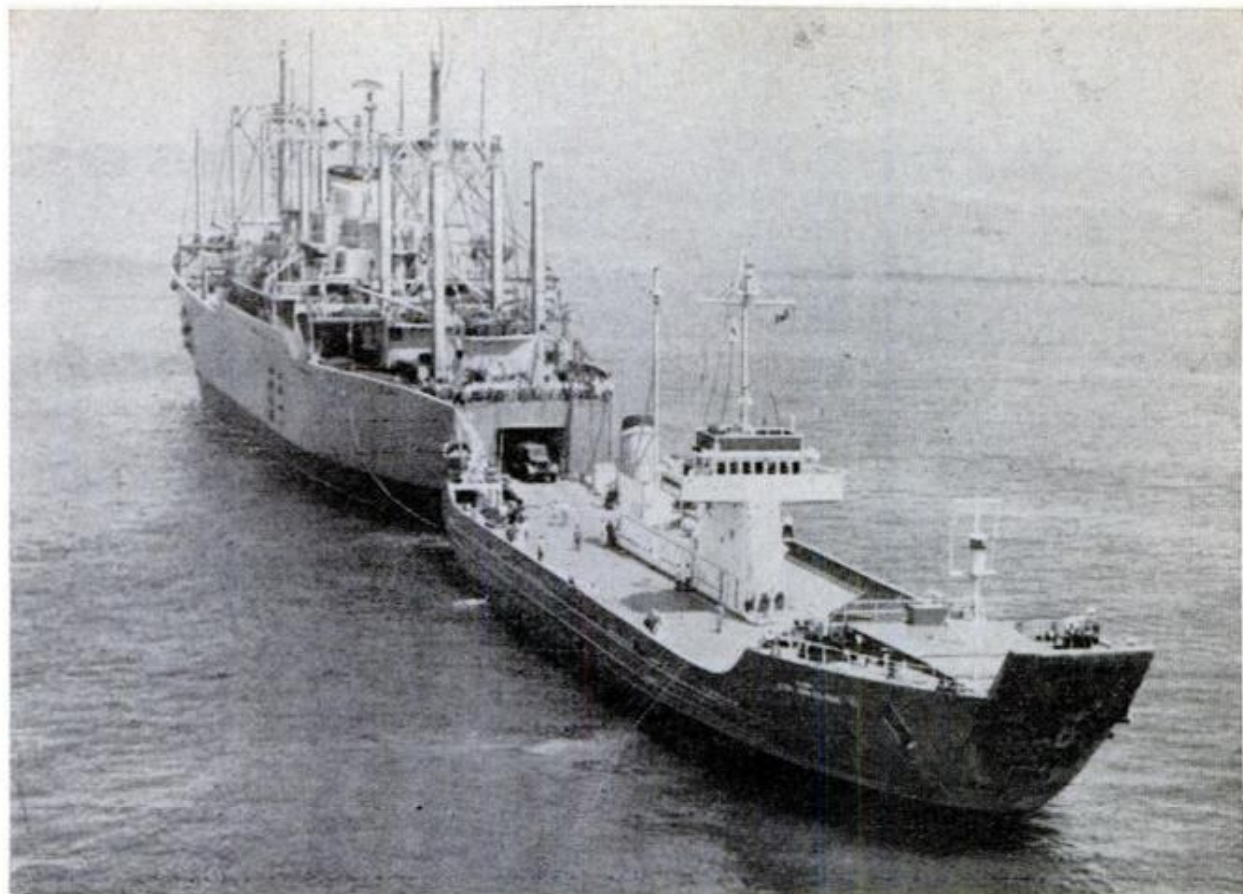
## Push-Button Coal Processing

Five men, pushing 600 buttons at a new 10-story coal preparation plant in Clinchfield, Va., control the automated processing of 15,000 tons of coal each two-shift day. All told, only 16 men are needed for each shift at the plant, which is roughly the size of a football field. Because huge machines such as one capable of lifting and unloading 22 to 24 railroad cars of mined coal an hour, are linked by a variety of conveyor belts, the five button pushers—without leaving their control centers—guide coal through screens, wash boxes, centrifuges, heat dryers, load 18 railroad cars an hour, and dump refuse into a valley a half-mile away.

Fine coal is settled out in these pools (foreground) and water is filtered and re-used. Note hill conveyor

One man can control 90 percent of operations from 80-foot-long panel in 10-story coal-processing plant





## Army and Navy Join Forces to Test Ship-to-Ship Loading

Joined stern to stern with the Navy transport *Comet*, the Army's new shallow-draft lighter *Page* takes on cargo. Designed to relieve beachhead bottlenecks, the *Page* unloads on the beach through a bow ramp,

then pushes off with a hydraulic ram and goes back for another load. The 338-foot craft is designed to draw only four feet of water at the bow. It can handle the biggest trucks, tanks, and mobile equipment.

## Heating Mat Keeps Concrete Warm

Steam lines in concrete walks, drives or floors are ideal for melting snow or heating barn floors, but few homes or small buildings have steam systems. A new electric heating mat, embedded in concrete, does the same job. The basic mat is 10 feet long and 18 inches wide. It uses 230-volt current to produce 42 watts per square foot and can be bent around odd shapes or to fit under stairs.

### *Number, Please!*

Whenever you write us to

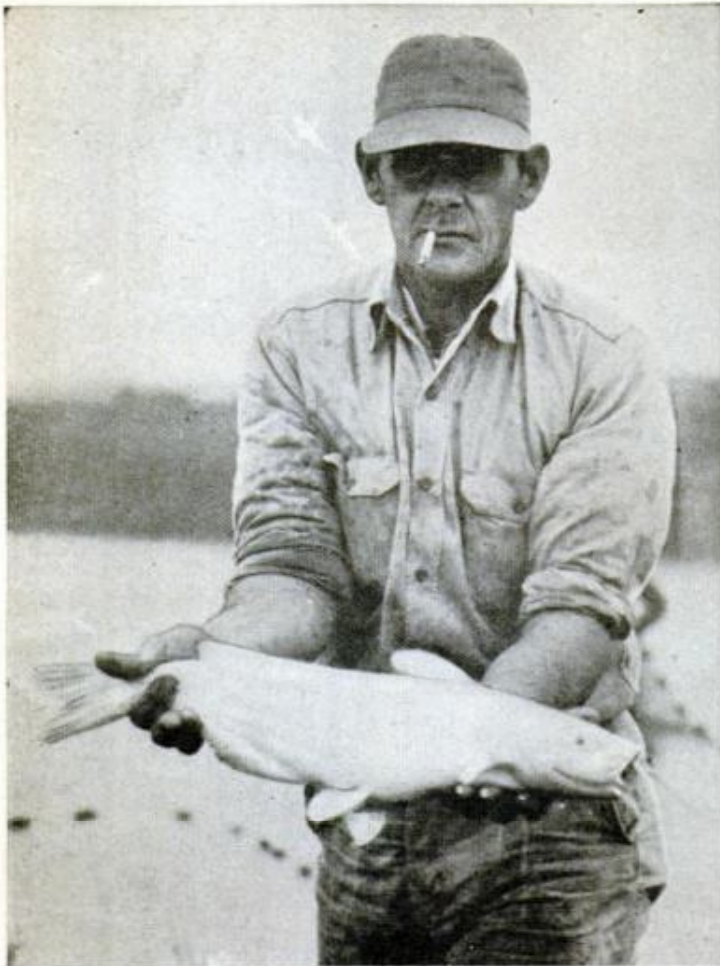
- Renew your subscription
- Change your address
- Order your own or a gift subscription

... In fact, whenever you write us,

**PLEASE INCLUDE YOUR CITY POSTAL ZONE NUMBER IN YOUR ADDRESS**

*This insures better delivery.  
It helps you and it helps the postman.*





New Arkansas farm crop includes husky, albino catfish. Ben Nelson, above, developed the highly edible, meatier strain

The "feed" is minnows. Ewell Nixon, the man who originated fish farming in the area, fills a net from a rice field



## Arkansas Farmers Harvest Rice and Fish

Photos from Caterpillar Tractor Co.

**S**IT IN ON a conversation between a couple of Arkansas farmers, and you're likely to get the idea they've been too long in the sun with their hats off. You might hear comments like, "Ed's got his south 40 in catfish this fall," or "That lower field should harvest about 20 tons of bass."

These aren't the meandering of sunstroke victims though. They're commonplace remarks among a group of farmers who are carrying on a unique form of agriculture—fish farming.

Today, dotted throughout the fertile farmland of central Arkansas are more than 300,000 acres of flooded pasture. Placidly swimming in the hip-deep waters bordered by earthen dikes are hundreds of thousands of catfish, buffalo, bass and crappie. They're being grown to maturity by farmers-turned-fishermen, who sell their wriggling crops to fish markets and groceries at profits exceeding those from any rooted crop they ever planted.

Fish farming—now in its twelfth year—has become big business in this prairie-flat region. The nation's only fresh-water-fish cooperative processing plant, located at Dumas, Ark., was set up in 1958 by the Fish Farmers' Cooperative Association. It now does a weekly volume of over \$3000, selling mostly to supermarkets in Arkansas and Mississippi.



Harvest is taken with seines. Some Arkansas farmers now net more income from fish than from root crops

The world's largest minnow hatchery, at Lonoke, yearly sells millions of finger-sized minnows to the farmers as "feed." More than 200 farmers are licensed by the state Game and Fish Commission to raise and market fish at present and more are applying all the time.

The industry originated in 1947 on the property of Ewell Nixon, a Lonoke rice farmer, who today is the dean of the land-locked fish growers.

Nixon had decided to reap two rewards from one act when he flooded one of his fields and stocked it with bass and buffalo. Agricultural experts had told him that a stocked pond would increase the fertility of his rice field — and provide some excellent off-hours angling.

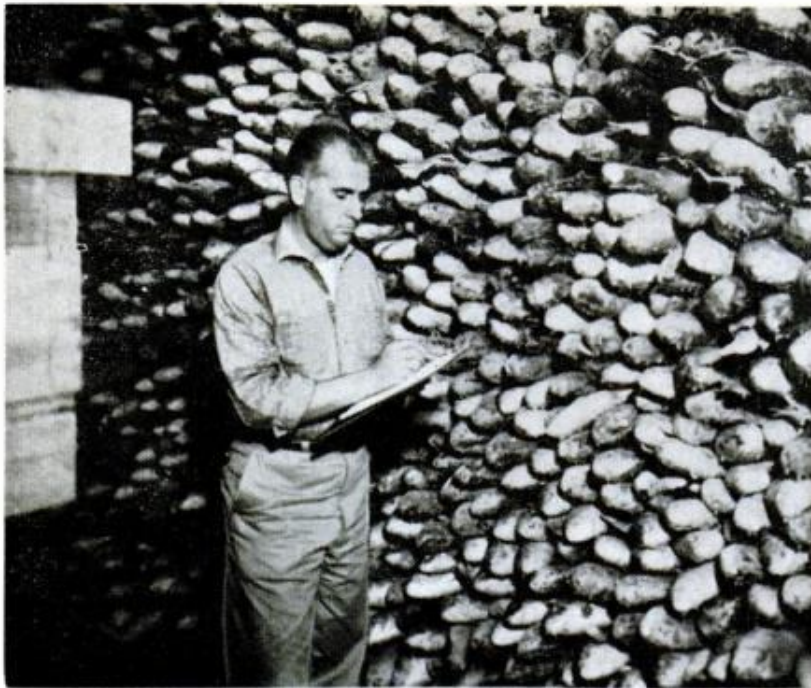
Later, after he drained the field and planted it to rice, the harvest he got per acre was twice that of the previous, record yield. Meantime, however, he had sold his fish harvest at a good profit, and found there was market for all he could raise.

Ankle-deep in water at the edge of field, Nixon and helpers corral fish in a crib

That proved to be the opening step. Soon Nixon's neighbors around Lonoke were bulldozing up dikes and turning water into their fields. Rice suddenly became a secondary crop in the area, taking a back seat to fish.

It didn't take long for the area citizens to become expert in fish husbandry. Now it's routine for rice and fish to rotate as tenants of the same field.





Fish are frozen solid and stacked like cordwood to await shipment from the Fish Farmers' Cooperative. Right, minnows and fingerlings are transported to farms in polyethylene bags pumped full of oxygen

Here's how the system works. The ideal fish-rice rotation begins in the fall after rice harvest. Dikes are built and fields are flooded, from wells, to a depth of three to four feet. Two pounds of minnows are thrown in per acre, to forage on rice stubble and multiply as future fish food. In the following spring, 300 catfish fingerlings are added per acre to feed on the minnows. By that time, the minnow population has grown so large that the catfish can dine voraciously without making a noticeable dent in their numbers. By fall, the farmers must seine out a portion of the minnows to be sold or used for stocking new ponds.

After a year in the water, the catfish weigh from one to two pounds, and are ready for sale. Using hinged drain pipes which extend through the dikes, the farmers drain their fields, trapping the fish in specially dug low spots. The fish are easily seined out and dumped in tubs for trucking.

Most of the state's "field-bred" fish are marketed through the cooperative at Dumas. The cooperative is a modern fish-processing plant, owned by the farmers themselves who put up \$45,000 at \$10 a share to supply the original capital. Today, the 12 to 20 workers at the plant clean and dress some 15,000 pounds of fish per week, most of which are sold to 120 supermarkets through the state.

When the production of the ponds is too great for the cooperative to handle quickly, the fish are stored in special freezer-rooms. There they are frozen hard as flatirons in temperatures down to minus 40 degrees, until they can be processed or shipped.

In operation less than a year, the plant has handled 375,000 pounds of fish, about 85 percent being buffalo. The record yield brought to the co-op thus far was chalked up by Eric Schenebech, a nephew of innovator Ewell Nixon, who harvested 21 tons of catfish, buffalo and bass from an 80-acre pond—averaging out to 525 pounds an acre. He expects to better his mark. "I didn't follow all the recommended techniques," he admits. "I should be able to do better next year."

A program of selective processing on the part of co-op officials has paid off in the market place. The average price for their buffalo has been 17 cents a pound, some seven cents higher than the average wholesale price.

#### Must Increase Production

Markets are still growing, and Malcolm Johnson, a co-op president, says, "Our major problem in the future will be one of supply. We need more reservoirs. That, plus more efficient management of fish farms, could increase production by as much as 200 per cent."

To support this burgeoning business, a 5000-acre minnow nursery prospers on Rt. 70, near Lonoke. It's made up of scores of ponds, ranging from 50 to 160 acres in size. They are tended by four brothers, and, collectively, constitute the Anderson Minnow Hatchery. The hatchery was originally started to supply minnows for sport fishermen, but with the fish-farming boom, it grew enormously, and now most of its production goes into nearby farm fields.



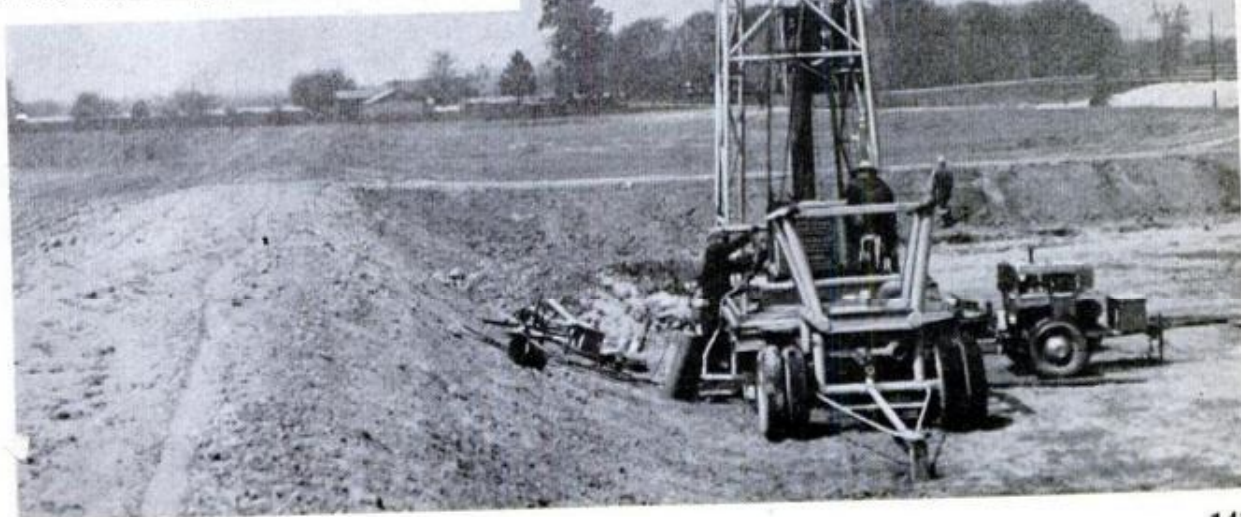
Caterpillar tractor operator raises up dikes to hold three feet of pond water

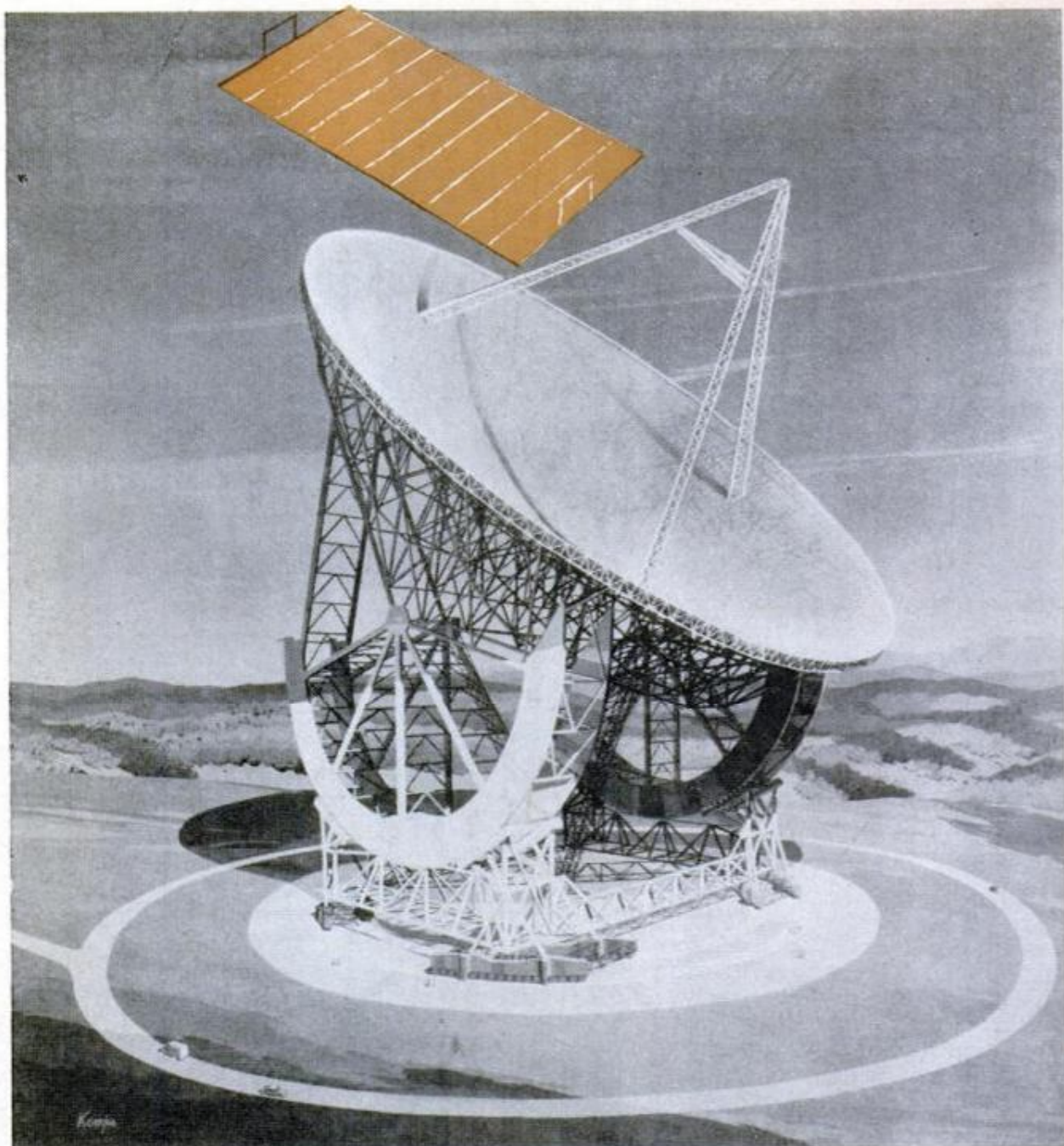
### New "Golden" Catfish

The hatchery has also developed a new strain of fish that promises to do its bit toward improving the farmers' profits. Gleaming pinkish-gold in color, it looks like a rich cousin of the normal mud-gray catfish, but has more edible meat per pound. The new strain is an albino catfish developed by Ben Nelson, a technician at the Anderson Hatchery. He spawned nearly a million of the new breed last year, selling most to the fish farmers.

"They should help farmers' business a lot," he says. "Not only do  
(Continued to page 286)

After a field is diked, wells are dug to insure water supply for developing fish





## Navy's "Big Dish" to Probe Universe

With a diameter equal to the length of two football fields, the Navy's 600-foot radio telescope being erected in Sugar Grove, W. Va., will catch signals from astral bodies

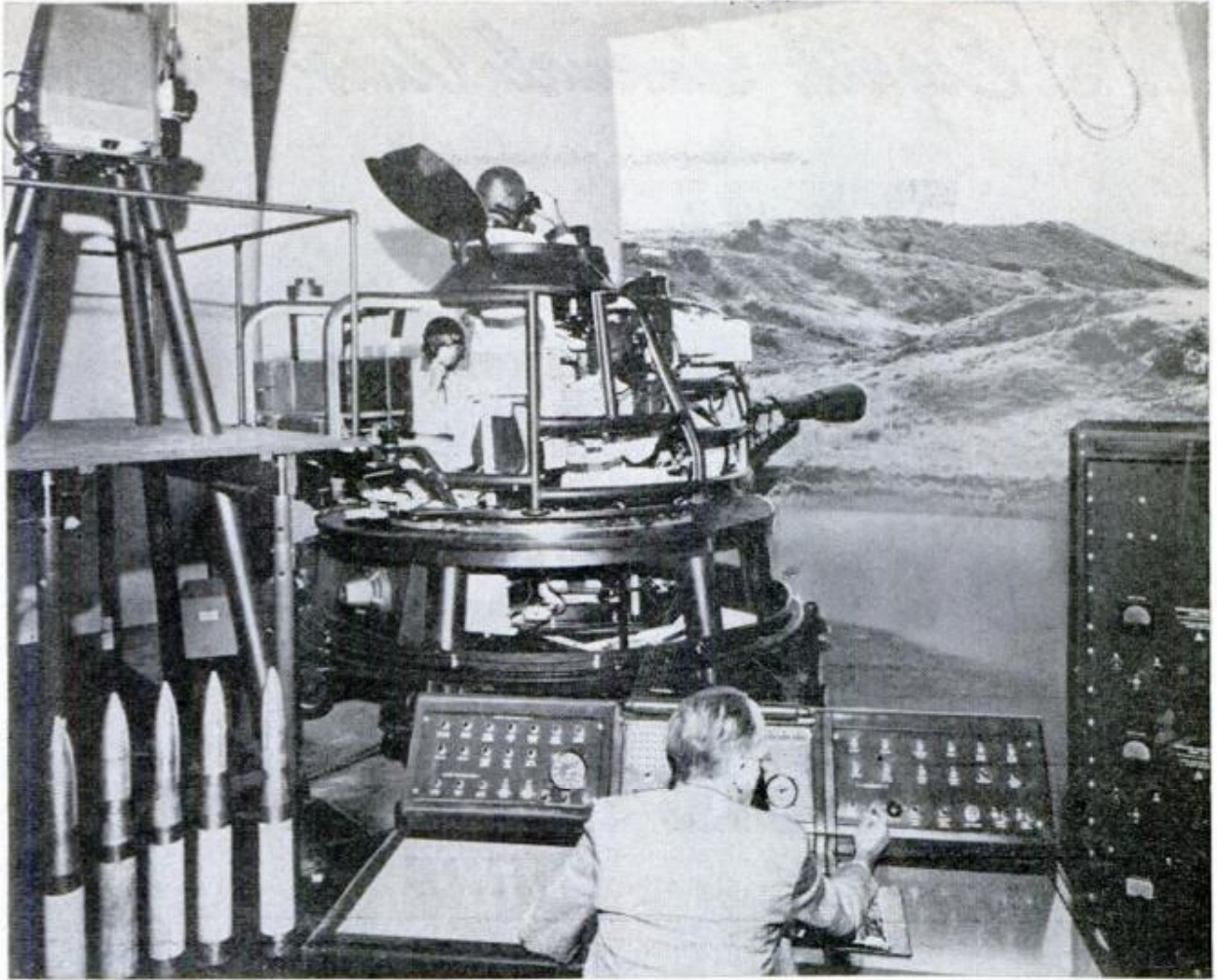
as far as 38 billion light years out in space—19 times the distance probed by the optical telescope at Mount Palomar, Calif. The 20,000-ton unit will be completed in 1962.



## Fixture Supplies Heat and Light

Combining electric radiant heating with built-in lighting, a recessed ceiling unit supplies 1000 watts of heat and 200 watts of light. The unit, designed for both commercial and home use, is available in 120, 208 and 240-volt models, with either polished chrome or baked white-enamel finish.





## Mockup Battle Trains Tankers

Marine Corps tank crews can be tested for combat readiness *indoors* with a battle conditions simulator designed for the Navy by engineers of the Jam Handy Organization. Working in a real tank turret stripped of armor, the crew can perform 23 operations and use 10 of their instruments under

conditions realistically simulated on a half-dome screen, complete with sound effects. Computers record "rounds" fired from the real 90-mm. rifle, hits on target tanks, and efficiency in tracking and hitting the targets. Instructors can gauge the crew's efficiency better than in field maneuvers.

## Whirlybird Trainer Floats, Won't Fly

Captive, yet free, the German Bolkow BO 102 Heli-Trainer gives realistic preflight training without the expense of electro-mechanical flight simulators and at one-fourth the cost of a real helicopter. It is linked to the ground by a pivot mount in early stages, then mounted on pontoons so the student can move it around a pool but can't take off. The pre-flight grad can solo after about two hours of dual instruction.



# PM's *Eighth Annual Auto Section*

# THE AMERICAN AUTOMOBILE

**UNFOLD THESE PAGES**



NOTHING MAN has invented has had the impact of the automobile. Nothing has added such convenience, yet nothing has created so many problems for society.

No single product has so rearranged our lives and our geography. As a result, no place in America (and soon none in the world) is the same. The cocoonish, isolated village is doomed, for better or for worse.

Because it is so much a part of our lives, the automobile has made more money for more people than any other product in history. It has created a handful of billionaires, hundreds of millionaires, uncounted thousands of rich individuals and kept millions more employed.

To pay tribute to this business, the biggest business of all, PM presents a pictorial history of the still-surviving companies. These are the most durable of about 1500 American companies that have built cars since 1900. They have proved their durability by their existence and their flexibility by the new, smaller cars introduced this year.

PM wishes to acknowledge the help of the library staff of the Automobile Manufacturers Association as well as the assistance of the Goodheart-Willcox Company, publishers. Detailed chassis and engine drawings were done by George W. Blow, PM staff artist.

**Research by Robert L. Hull, Jr.**

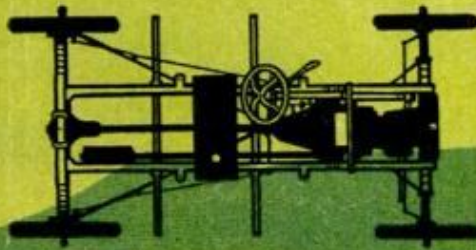
**Art work by Phil Austin**






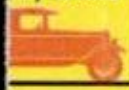







#### **READY-TO-FRAME FULL-COLOR REPRINTS AVAILABLE**

Reprints of these two charts, printed on one side only and on one continuous sheet, are available as long as the supply lasts. Send 25 cents in coin to the Bureau of Information, Popular Mechanics, 200 E. Ontario, Chicago 11, Ill.

Typical Chassis Of The Decade

Typical Engine



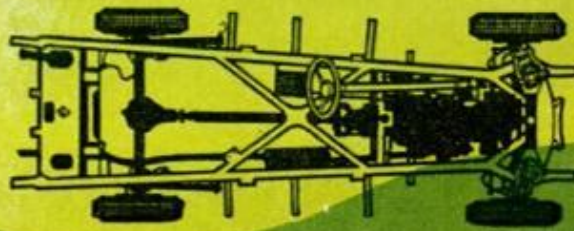
1922	1923	1924	1925	1926	1927	1928	1929	1930	
<p>1st 4-wheel hydraulic brakes</p> <p>1st carburetor air cleaner</p>	<p>1st Ethyl gas</p> <p>Balloon tires standard</p> 	<p>1st hydraulic shock absorbers</p> <p>Hot-water car heaters</p> <p>Safety glass</p>				<p>Downdraft carburetor, auto radios</p>  <p>Air silencer, straight-through muffler</p>			
<p>1st offers led engine</p>	<p>Thermostatic control for cooling system</p> <p>Millionth Buick built</p> <p>Oakland 1st to use Duco spray finish</p>	<p>1st with chrome plating</p> <p>Cadillac 1st: crankcase ventilation</p> <p>2 millionth Buick</p> <p>1st Pontiac</p> 	<p>1st Viking</p>  <p>1st LaSalle</p>  <p>Sales: 1,001,880; passes Ford 1st time</p>	<p>Viking discontinued</p> <p>Marquette light 6</p> <p>Cadillac 1st: synchromesh</p> <p>Overhead-valve 6</p>	<p><b>OLDSMOBILE</b></p> <p><b>CADILLAC</b></p> <p><b>BUICK</b></p> <p><b>PONTIAC</b></p> <p><b>CHEVROLET</b></p> <p><b>CORVAIR</b></p>				
<p>1st vs Lincoln Henry Leland</p> 	<p>Over 2 million Model T's built this year</p>	<p>9109 Model T's built Nov. 25, world's record</p>	<p>Safety-glass windshield standard</p> <p>Ford sells 454,416; passed by Chevrolet</p>	<p>Model A born</p>  <p>Scopes evolution trial</p> 	<p><b>FORD</b></p> <p><b>LINCOLN</b></p> <p><b>MERCURY</b></p> <p><b>CONTINENTAL</b></p> <p><b>THUNDERBIRD</b></p> <p><b>EDEL</b></p> <p><b>FALCON</b></p>				
<p>1st 4-wheel car; Maxwell formed</p>	<p>"The Good Maxwell" born</p> 	<p>Chrysler Corp. formed</p> <p>Maxwell car dropped</p>	<p>Chrysler buys Dodge</p>  <p>Plymouth Motors; 1st Plymouth</p>  <p>De Soto Motor Corp.; 1st De Soto</p>	<p><b>DODGE</b></p> <p><b>CHRYSLER</b></p> <p><b>PLYMOUTH</b></p> <p><b>DE SOTO</b></p> <p><b>IMPERIAL</b></p> <p><b>VALIANT</b></p>					
<p>1st 4-wheel car with engine</p> 	<p>4-wheel brakes</p>	<p>Packard 1st with hypoid gearing</p> <p>Low-priced Ajax</p>  <p>1st Whippet</p> <p>Erskine small 6</p>	<p>Fuel pumps introduced</p> <p>Studebaker takes over Pierce-Arrow</p>	<p>Free wheeling</p>	<p><b>PACKARD</b></p> <p><b>NASH</b></p> <p><b>WILLYS</b></p> <p><b>STUDEBAKER</b></p> <p><b>HUDSON</b></p> <p><b>KAISER-FRAZER</b></p> <p><b>RAMBLER</b></p>				

8  
7  
6  
5  
4  
3  
2  
1

ANNUAL PRODUCTION OF PASSENGER CARS IN MILLIONS

Typical Chassis Of The Decade

Typical



1931 1932 1933 1934 1935 1936 1937 1938

HISTORICAL HIGHLIGHTS

- Steel-backed insert bearings
- Hydraulic valve lifters
- 50 millionth U.S. car built
- 1st automatic choke, inside sun visors

- 1st turn signal



- GM independent front suspension

- All-steel roof
- Card with disappearing headlights
- Sloping side windows, built-in defrosters

OLDSMOBILE  
CADILLAC  
BUICK  
PONTIAC  
CHEVROLET  
CORVAIR

- Buick 1st with vacuum-powered clutch

- Oakland discontinued

- 10 millionth Chevrolet built


- 3 millionth Buick built
- Millionth Pontiac built

- Oldsmobile 1st with automatic transmission
- Rear coil spring
- Pontiac revives steering column gearshift
- 14 millionth Chevrolet built


FORD  
LINCOLN  
MERCURY  
CONTINENTAL  
THUNDERBIRD  
EDEL  
FALCON

- Ford V8; Model A dropped


- Midwest drought; 700 dead




- Introduction of Lincoln-Zephyr



- Unit chassis-body



- 1st Lincoln Continent




DODGE  
CHRYSLER  
PLYMOUTH  
DE SOTO  
IMPERIAL  
VALIANT

- Vacuum power brakes

- Airflow design: body & frame combined, synchronized front and rear springs

- Flexible engine mounting, vacuum spark advance

- Millionth Plymouth built




PACKARD  
NASH  
WILLYS  
STUDEBAKER  
HUDSON  
KAISER-FRAZER  
RAMBLER



- Rockne 6

- Essex Terraplane: airplane power to weight ratio
- Ignition key starting

- Depression model "One-Twenty", \$1000 8 cylinder, big sales success
- Millionth Nash built
- Nash's Lafayette



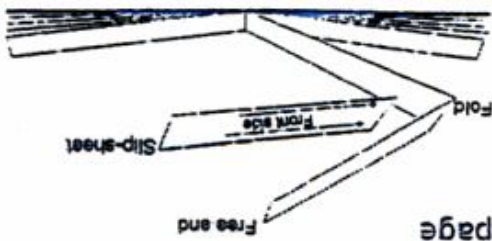
- Nash-Kelvinator merger

- Electric hand remote control gearshift

- Nash introduces fresh-air heater

- Offers windshield washers

1. Open the foldout page
2. Insert this sheet with
  1. Front side touching the free page
  2. Arrow pointing to the fold
3. Slice the folded edge
4. Close the page and slip-sheet

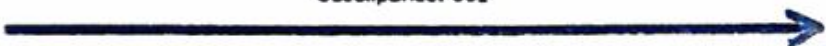


Inverted Foldout slip-sheet



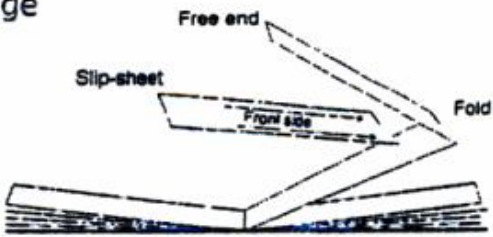
Folded edge of the page

GbsSlipSheet-001



Foldout slip-sheet

1. Open the foldout page
2. Insert this sheet with
  1. Front side touching the free page
  2. Arrow pointing to the fold
3. Slice the folded edge
4. Close the page and slip-sheet



1. Follow instructions on the other side

Back

Gbs5lipBack-0018



Inverted Back

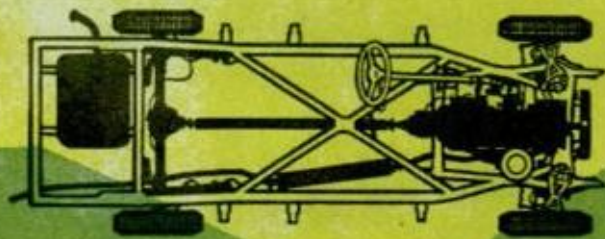
1. Follow instructions on the other side



Engine

Typical Chassis Of The Decade

Typical Engine



1939	1940	1941	1942 to 45	1946	1947	1948	1949	1950
<ul style="list-style-type: none"> <li>Crosley car</li> <li>Sealed-beam headlights</li> </ul>			<ul style="list-style-type: none"> <li>Feb. 9, 1942: civilian auto production halted</li> <li>300,000th Willys Jeep</li> <li>Gas rationing ends Aug. '45</li> </ul>	<ul style="list-style-type: none"> <li>Rear-engine Tucker</li> </ul>	<ul style="list-style-type: none"> <li>Extra soft tires</li> <li>Henry Ford dies</li> <li>100 millionth motor vehicle built</li> </ul>		<ul style="list-style-type: none"> <li>Buick offers tinted glass</li> <li>100 millionth U.S. passenger car produced</li> <li>2 new small cars</li> </ul>	
<ul style="list-style-type: none"> <li>Olds 1st with Hydramatic</li> <li>LaSalle discontinued</li> </ul>		<ul style="list-style-type: none"> <li>Pearl Harbor</li> </ul>	<ul style="list-style-type: none"> <li>1st nuclear chain reaction (Univ. of Chgo.)</li> </ul>		<ul style="list-style-type: none"> <li>Starts tailfin; lightweight high compression V8</li> <li>1st car with torque converter</li> </ul>		<ul style="list-style-type: none"> <li>1st two-door hardtop</li> <li>1st low-priced automatic transmission</li> </ul>	
<ul style="list-style-type: none"> <li>27 millionth Ford built</li> <li>Lincoln omits running boards</li> </ul>			<ul style="list-style-type: none"> <li>1944, D-Day Invasion of Europe</li> </ul>					
<ul style="list-style-type: none"> <li>1st Mercury</li> </ul>			<h1>WAR YEARS</h1>		<ul style="list-style-type: none"> <li>Continental discontinued</li> </ul>		<ul style="list-style-type: none"> <li>Korean invasion</li> </ul>	
<ul style="list-style-type: none"> <li>Chrysler's fluid coupling clutch</li> </ul>	<ul style="list-style-type: none"> <li>5 millionth Dodge built</li> <li>4 millionth Plymouth built</li> </ul>		<ul style="list-style-type: none"> <li>1st atomic bomb drops on Hiroshima; war ends</li> </ul>				<ul style="list-style-type: none"> <li>Chrysler pioneers nylon upholstery</li> <li>Power steering, air-cooled brakes, oriflow shocks, 180 horsepower</li> </ul>	
<ul style="list-style-type: none"> <li>Packard 1st with air conditioning</li> <li>1st with wrap-around bumpers</li> <li>Willys Americar</li> <li>End of Pierce-Arrow</li> <li>Last Terraplane (Essex)</li> </ul>	<ul style="list-style-type: none"> <li>U.S. Army Jeep</li> </ul>		<ul style="list-style-type: none"> <li>Civilian Jeep</li> <li>Studebaker 1st post-war styling</li> <li>Kaiser-Frazer Corp. formed</li> </ul>	<ul style="list-style-type: none"> <li>Hudson 1st with step-down design</li> <li>Kaiser, Frazer cars, 1st with continuous fender lines</li> </ul>			<ul style="list-style-type: none"> <li>4-wheel drive wagon</li> <li>Small Henry J</li> <li>Frazer dropped</li> <li>Small Rambler introduced</li> </ul>	



# POPULAR MECHANICS

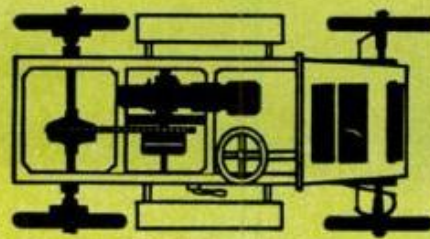
## THE AMERICAN AUTOMOBILE

A pictorial history of the nation's surviving automobile manufacturers.

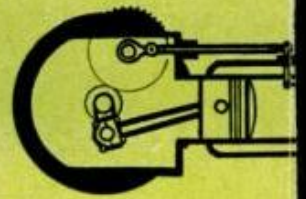
Copyright 1959 Popular Mechanics Co.

ANNUAL PRODUCTION OF PASSENGER CARS IN MILLIONS

Typical Chassis Of The Decade



Typical Engine



HISTORICAL HIGHLIGHTS

AUTOMOTIVE FAMILY HISTORY

1893 to 1900

1893 Duryea 1st car built in U.S.A.



1895 Selden patent

1898 Winton 1st U.S. car sold



1901

Autocar 1st U.S. shaft-driven car

Packard patents H-slot gearshift



1902

1903

Winton 1st car to cross U.S.



1904

Ignition locks

1st Glidden Tour

Front bumpers appear

1905

1st service station in U.S.

Demountable rims

Fisher Body organized



1907

1908

1909

### GENERAL MOTORS

Olds Motor Works 1899  
Detroit Automobile Co. 1899

1897 Olds Motor Vehicle Co., first Oldsmobile

Curved-dash Olds, 1st U.S. mass-produced car



Cadillac Auto. Co. makes 1st Cadillac



Cadillac Motor Car Co.

Buick Motor Co., first Buick



GM buys Olds

GM buys Buick

Oakland Motor Car Co., 1st Oakland



General Motors formed

1896 1st Ford gasoline car



### FORD

Pres. McKinley shot and killed



Henry Ford Automobile Co. 1st Ford Model A



Ford Model N



Ford Model T, left drive



Admiral reaches North

1899 Columbia and Electric Vehicle Co.

### CHRYSLER

1898 1st Columbia



30,000 die as eruption destroys St. Pierre, Martinique



Maxwell-Briscoe Motor Co. Incorporated

Maxwell-Briscoe car



San Francisco earthquake, fire; 452 dead



1st round-world cruise of U.S. fleet



Mexico joins U.S. Motor

Ohio Automobile Co. 1899 1st Packard



### OTHER MAKES

Thomas Jeffery Co.

Packard Motor Car Co.



1st Rambler

Studebaker electric

Windshields 1st standard on Rambler 1st Overland



Standard Wheel Co.

Packard pioneers magneto ignition



1st Studebaker gasoline car

Overland Automobile Co.

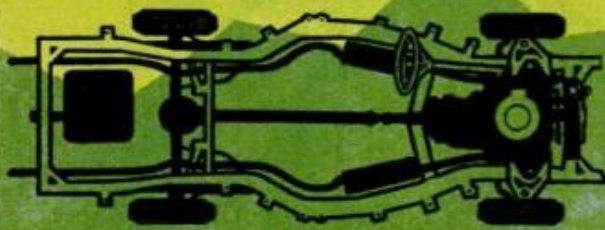
Rambler 1st with spare tire, wheel


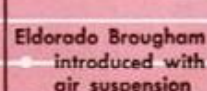








Willys-Overland Co.

Hudson Car 1st

**Typical Chassis Of The Decade**

**Typical Engine**



	1952	1953	1954	1955	1956	1957	1958	1959	1960	
<p>power race</p> <p>2 new small cars</p>	<ul style="list-style-type: none"> <li>Price cuts</li> <li>Automatic transmissions take over</li> <li>Small car bid fails</li> <li>Tubeless tires standard all cars</li> <li>V8 era begins</li> </ul>	<ul style="list-style-type: none"> <li>Introduction of tailfins</li> <li>Industry adopts 12-volt batteries</li> <li>Directional signals standard equipment</li> <li>License plate size standardized</li> <li>4 headlight era starts</li> </ul>	<ul style="list-style-type: none"> <li>Air suspension widely available</li> <li>Start of trend toward sensible cars</li> <li>Imported car sales soar</li> <li>14-inch wheels</li> </ul>	<ul style="list-style-type: none"> <li>Sales success of AM and S-P</li> <li>Aluminum-engine era begins</li> <li>3 new small cars</li> </ul>						
<p>Automatic headlight dimmer</p>	<ul style="list-style-type: none"> <li>Wrap-around windshield on 1954 models</li> <li>3rd place in industry sales</li> <li>Plastic-body Corvette</li> </ul>	 <ul style="list-style-type: none"> <li>Supreme Court rules on school integration</li> <li>Fuel injection offered</li> </ul>	 <ul style="list-style-type: none"> <li>Eldorado Brougham introduced with air suspension</li> <li>Sales decline drops to 4th</li> </ul>	 <ul style="list-style-type: none"> <li>Rear-engine Corvair</li> </ul>	<p><b>OLDSMOBILE</b></p> <p><b>CADILLAC</b></p> <p><b>BUICK</b></p> <p><b>PONTIAC</b></p> <p><b>CHEVROLET</b></p> <p><b>CORVAIR</b></p>					
<p>tain opens 1st liner service</p>	<ul style="list-style-type: none"> <li>1st power seat; 205 horsepower</li> <li>Transparent roof optional</li> <li>Two-seat T-Bird</li> </ul>	<ul style="list-style-type: none"> <li>Retractable hardtop</li> <li>Retractable rear window</li> <li>Reborn as Mark II</li> </ul> 	<ul style="list-style-type: none"> <li>Continental now Lincoln series, Mark II dropped</li> <li>Four-seat T-Bird Edsel introduced, vertical grille</li> </ul> 	 <ul style="list-style-type: none"> <li>Red rocket hits moon</li> </ul>	<p><b>FORD</b></p> <p><b>LINCOLN</b></p> <p><b>MERCURY</b></p> <p><b>CONTINENTAL</b></p> <p><b>THUNDERBIRD</b></p>					
			<ul style="list-style-type: none"> <li>Chrysler 300 A</li> <li>Front torsion bars throughout corporation</li> <li>Imperial 1st with curved side windows</li> </ul>	<ul style="list-style-type: none"> <li>Sputnik I</li> <li>Explorer I</li> </ul>  	 <ul style="list-style-type: none"> <li>Valiant introduced</li> </ul>	<p><b>DODGE</b></p> <p><b>CHRYSLER</b></p> <p><b>PLYMOUTH</b></p> <p><b>DE SOTO</b></p> <p><b>IMPERIAL</b></p> <p><b>VALIANT</b></p>				
<p>era-Willys car long, low sporty styling</p> <p>Hudson Jet</p>	<ul style="list-style-type: none"> <li>Studebaker-Packard Corp. American Motors Corp. Kaiser-Willys Corp. Sales decline begins</li> <li>Henry J dropped</li> </ul>	<ul style="list-style-type: none"> <li>Torsion bars</li> <li>Push-button drive and electric doors</li> <li>Willys drops car, makes only Jeeps</li> <li>Jet dropped</li> <li>Kaiser discontinued</li> </ul>	<ul style="list-style-type: none"> <li>Built on shell of Studebaker</li> <li>Packard discontinued</li> <li>Nash discontinued</li> <li>Hudson discontinued</li> <li>Rambler American</li> </ul> 		<p><b>STUDEBAKER-PACKARD CORP.</b></p> <p><b>AMERICAN MOTORS CORP.</b></p> <p><b>WILLYS MOTORS</b></p>					

*Phil Austin*

1. Follow instructions on the other side

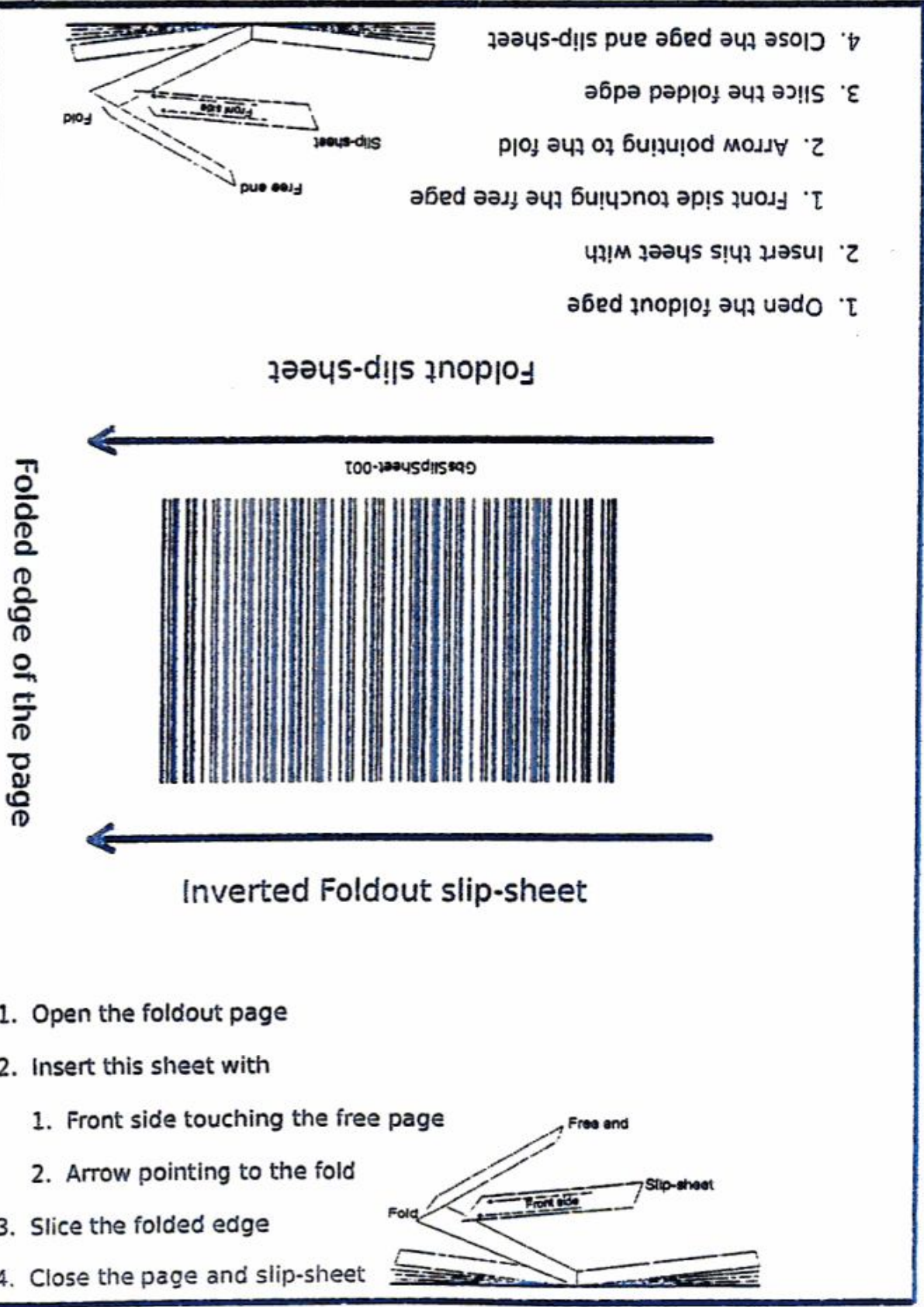
Back

Gbs5llpBak-0018



Inverted Back

1. Follow instructions on the other side



1. Open the foldout page
2. Insert this sheet with
  1. Front side touching the free page
  2. Arrow pointing to the fold
  3. Slice the folded edge
  4. Close the page and slip-sheet

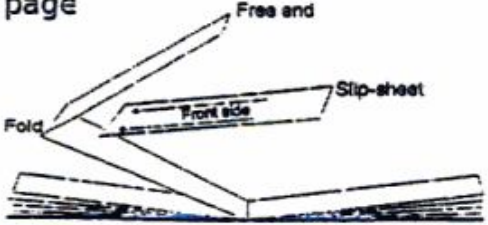
Foldout slip-sheet

Folded edge of the page

GbsSlipSheet-001

Inverted Foldout slip-sheet

1. Open the foldout page
2. Insert this sheet with
  1. Front side touching the free page
  2. Arrow pointing to the fold
  3. Slice the folded edge
  4. Close the page and slip-sheet



# 1960

# P A R A D E O F C A R S

**P**ROUD, THAT'S what the industry is—proud of itself. And with reason. It proved its vitality, its flexibility. It proved that it responds to public demand, after all.

Sure, there was a period of delay, a period which gave critics a chance to shriek. But the delay wasn't due to mental ossification, but to that old mass-production bogeyman, lead time.

All the while the highly articulate critics were tearing around in their chariots screaming about Detroit's failure to act, the industry was acting—at full speed. Never before have three all-new cars, with all-new engines, been brought out with such speed, with such rightness. As one engineer said, "It sang right from the start."

These designs are good. These new cars are good — not perfect yet, but good. Better than they were expected to be. Anybody who has driven them knows this. *PM's* test report on page 168 also shows it. They make sense and that is what the public said it wanted.

Detroit executives must have had to do considerable lip-biting and fist-clenching to keep from shouting back last year as so many critics, private and governmental, accused them of stupidity, of failure to respond to the public's wishes. But they did hold their tongues and now the new cars speak for them—loudly and clearly. Where are the critics now?

Yet the industry is not real certain how many of you do want the smaller, more economical cars. Things looked clearer in 1958. Then, the party was draggin', sales were laggin', and the switch began — a switch to smaller cars. But then along came 1959 and big cars started to sell again (to be sure, compact cars like Rambler and Studebaker sold even better). Apparently, it really was the recession that had cut sales in 1958 and not the size of the cars. By this time next year, the industry will feel better about its

gamble — or worse, depending on your reaction.

Total industry production in 1959 was up about 32 percent over 1958 (see chart on page 158). Some companies have more than doubled production. A few are down, but these are De Soto, the late Edsel and Lincoln, three cars that certainly can't be considered bellwethers.

Biggest news, of course, is the tremendous upsurge at American Motors (even more spectacular was its skyrocketry on the stock exchange). Many 1959 buyers, anxious to show more sense, turned to Rambler.

As a result of its sudden prosperity, American Motors, instead of being a tiny, seen-but-not-heard

member of the minority (as it was content to be a few years back) has become an outspoken, bold challenger that now builds more than half as many cars as Chrysler Corporation.

So bold is it that it claims, just as Da Vinci "invented" Mona Lisa, so it "invented" the compact car, preferring to forget that not too long ago all cars were compact (if size is the only criterion).

Actually, the three new compact cars are exciting more for their weight than for their over-all length or wheelbase. The Falcon and Corvair weigh about 2300 pounds (Valiant weighs 2635, much of its extra weight being due to the bigger-than-necessary engine which was not specially designed for a compact car, but for Plymouth).

By comparison, the 1960 Rambler six weighs 2948 pounds. Even the American with only 100-inch wheelbase weighs 2500 pounds. These all-new compacts, despite the AM ads, are not just copies of Ramblers, but are all-new, bold engineering achievements in their own right with modern design to reduce unnecessary bulk.

And the interesting thing is that they are so different from each other that the buyer's choice is wide.

The year 1959 will be remembered

(Continued to page 284)





## VALIANT

Valiant, Chrysler's compact car, features a six-cylinder engine inclined 30 degrees to the right. Its aluminum intake manifold has six curved tubes that feed directly to each cylinder. An alternator charges while the engine idles. Unit constructed, the car has torsion bars in front, leaf springs at rear and offers a wagon with rear-facing third seat.



## LARK

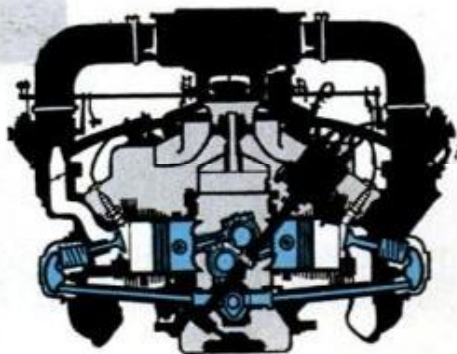
Studebaker's Lark, introducing a convertible and four-door wagon (rear-facing third seat extra), has an improved 90-hp. L-head six and a virtually unchanged 180-hp. V8. Sporty Hawk retains its styling but drops its six, adds a bigger 210-hp. V8.



## CORVAIR

Corvair long will be remembered as the most revolutionary car to hit the American automotive scene in three decades. The GM compact entry sports an air-cooled, flat six made mostly of aluminum and mounted in the rear. Unit-built, it has fully independent coil suspension. The floor hump is gone, due to a transaxle combining the transmission, engine and differential. Corvair, now a four-door sedan, plans a two-door coupe in January.

Engine Drawings  
By George W. Blow





## FALCON

Simply styled on the outside, Ford's Falcon is the most luxurious compact inside. Available in two and four-door sedans, Falcon has a unit body and lots of luggage space. There are high coil springs in front. It is powered by an inline six with a short, very rigid, block that results in the industry's shortest stroke.



## AMERICAN

After a successful revival—American accounted for 25 percent of AMC's 1959 model run—the small Rambler sticks with a winner but adds a four-door sedan. One of two remaining L-head sixes, American's changes include more glass area, doors that open wider. Power steering, outside tire mount are extra. Other models: two-door sedan, wagon.



**E  
C  
O  
N  
O  
M  
Y  
  
C  
L  
A  
S  
S**

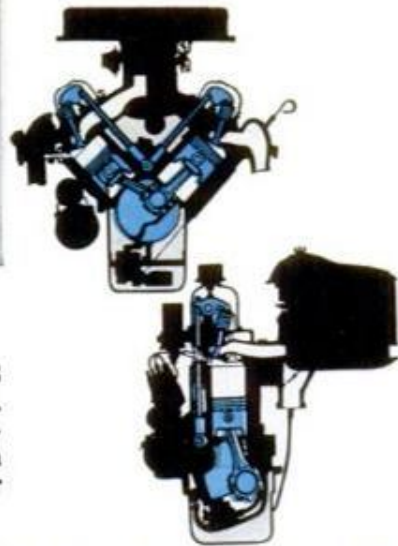
	VALIANT* V-100	LARK*	CORVAIR* 500	FALCON* Fordor	AMERICAN* Deluxe
Price	\$2053	\$2046	\$2038	\$1974	\$1844
Wheelbase	106.5	108.5	108.0	109.5	100.0
Length	184.0	175.0	180.0	181.2	176.3
Width	70.4	71.4	66.9	70.0	73.0
Height	53.3	57.5	51.3	54.5	57.3
Shipping weight	2635	2592	2305	2288	2494
Headroom, front	33.6	36.0	34.0	33.9	35.3
rear	33.4	35.0	33.4	32.8	34.0
Legroom, front	44.4	44.0	42.8	43.3	44.0
rear	38.9	39.0	36.5	39.4	37.5
Hiproom, front	57.0	59.5	57.8	57.1	58.0
rear	56.9	59.0	57.6	57.0	45.3
Kneeroom, rear	28.0	28.0	26.0	27.9	25.1
Trunk volume	24.9	16.5	15.6	23.7	17.7
		6	V8		
Displacement	170	169.6	259.2	140	144.3
Horsepower	101	90	180	80	90

\*All specifications for lowest-price 6 cylinder four-door models except as noted.



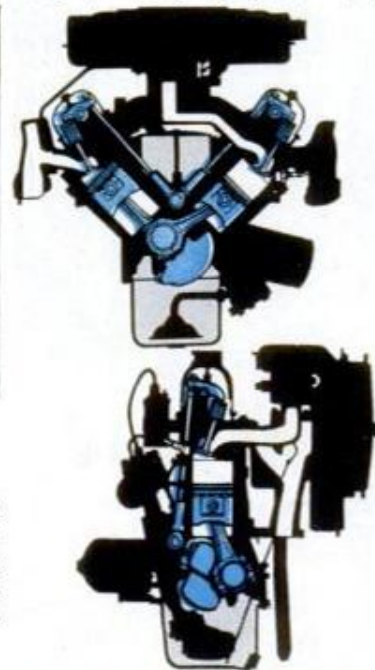
## CHEVROLET

Joining the swing to economy, Chevrolet has an economy V8 with a low-lift camshaft and is designed to run on regular gas. There's also an overhead-valve six, plus optional 283 and 348-cubic-inch V8s. Fuel injection, still offered on Corvette, has been dropped by Chevy. Corvette styling is unchanged. There's easier trunk access on the big Chevrolet, too.



## FORD

Ford's dartlike styling highlights the body-length fender lines and provides a sleek, low appearance. The wraparound windshield is gone, but there's 17 percent more windshield glass area. Under the new sheet metal, Ford offers four engines, a 223-cubic-inch six and three V8s developing up to 300 horsepower. Loading space in the wagons is a foot longer.



## PLYMOUTH

Plymouth has two new engines, one for economy and one for power. The all-new six, tilted 30 degrees to the right, permits a low hoodline, lowers the center of gravity. Then there's the 330-hp. V8 with ram induction, which provides extra power in the 20-to-60 m.p.h. range. Retaining its fins, Plymouth now is unit built. Options include door locks that lock automatically when the engine is started.







## DODGE DART

Fourth new 1960 car is Dodge Dart, a low-price car built on the Plymouth chassis. Three series—Seneca, Pioneer and Phoenix—offer six bodies from club sedan to nine-passenger wagon. Three engines: a tilted economy six, 318-cubic-inch V8, and a ram-induction V8 for the Phoenix.



**LOW  
PRICE**



## RAMBLER

All-new, Rambler retains the same styling concept, but now offers rear-facing third-seat wagon. Wagon tailgate is replaced by a side-hinged door. Horsepower on the Rebel V8 is cut to 200, while OHV six stays at 127. Grille, front and rear bumpers are in two sections to reduce repair costs. Unit body. Suspension by coils front and rear.



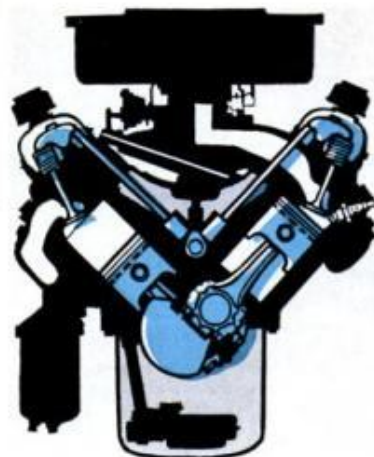
	CHEVROLET*		FORD*		PLYMOUTH*		DART*		RAMBLER*	
	Biscayne		Fairlane		Savoy		Seneca		Super	
Price	\$2423		\$2424		\$2429		\$2454		\$2387	
Wheelbase	119.0		119.0		118.0		118.0		108.0	
Length	210.8		213.7		209.4		208.6		189.5	
Width	80.8		81.5		78.6		78.0		72.2	
Height	56.0		55.0		54.6		54.8		57.1	
Shipping weight	3570		3706		3500		3600		3282	
Headroom, front	36.1		34.0		34.8		34.6		35.0	
Headroom, rear	34.3		33.9		34.2		34.5		34.0	
Legroom, front	44.5		43.3		45.4		46.3		43.0	
Legroom, rear	42.5		41.6		38.1		43.5		40.0	
Hiproom, front	65.3		62.2		63.0		63.0		59.8	
Hiproom, rear	65.4		63.6		62.4		62.4		60.1	
Kneeroom, rear	29.2		31.7		28.4		27.4		26.8	
Trunk volume	30.0		33.5		29.4		30.7		27.9	
	6	V8	6	V8	6	V8	6	V8	6	V8
Displacement	235.5	283	223	292	225	318	225	318	195.6	250
Horsepower	135	170	145	185	145	230	145	230	127	200

\*All specifications for lowest-price V8 four-door models, except as noted.



## PONTIAC

Pontiac offers an improved 389-cubic-inch V8, including an economy version, along with the new Ventura two and four-door hardtops. V8 options range from 215 to 348 hp. Variations in power are due entirely to different carburetion and compression. Also optional are aluminum wheels with integral hub and brake drum.



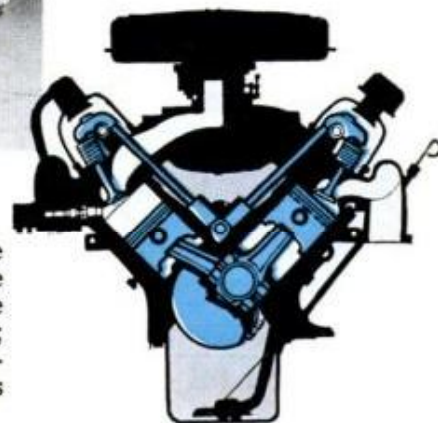
## AMBASSADOR

Ambassador, the big Rambler, is nearly two inches lower and shorter. Among its many styling changes is a compound windshield that has 24 percent more glass area. Unit-built, Ambassador is powered by a two-barrel carburetor, 250-hp. V8 engine that runs on regular gas.



## DODGE

Completely new, with a unit body, Dodge keeps its same personality, adds emphasis to its fins. There are two Dodge series, Matador and Polara, instead of three. Each has three engine options: A 361-cubic-inch V8; a 383-cubic-inch V8; plus the 383 V8 with ram induction. All have 10.0 to 1 compressions. Chrysler Corporation's torsion bar suspension is up front, leaf springs in back.





## BUICK

In addition to a restyling to give it a heavier look, Buick features a huge extra-quiet muffler placed cross-wise behind the rear axle instead of usual multiple-muffler system. A mirrored instrument panel adjusts to suit each driver. Engines: Economy V8; standard 250-hp. V8; and 401-cubic-inch V8 for Invictas, Electras only.



# LOWER



## EDSEL (Deceased)

You'll have trouble finding one, but there are some 1960 Edsels on the road (only 2820 were built). Never before has a car so carefully planned, failed so completely. Most of the planning, however, was by merchandisers who couldn't tell a camshaft from a crankshaft. In three years, 110,749 Edsels were built—the most costly 110,000 cars in history.



# MEDIUM

	PONTIAC* Catalina	AMBASSADOR* Super	DODGE* Matador	BUICK* LeSabre	EDSEL* Ranger
Price	\$2702	\$2587	\$2935	\$2870	\$2697
Wheelbase	122.0	117.0	122.0	123.0	120.0
Length	213.7	198.5	212.6	217.9	216.4
Width	80.7	72.2	78.0	80.0	81.5
Height	56.6	56.9	54.9	57.2	55.0
Shipping weight	3935	3414	3725	4219	3758
Headroom, front	34.8	35.0	34.6	34.7	34.0
rear	33.9	34.0	34.5	33.9	33.9
Legroom, front	45.3	43.0	46.3	44.2	43.3
rear	41.9	40.0	44.1	42.2	41.6
Hiproom, front	65.4	59.8	63.0	65.4	62.2
rear	65.4	60.1	62.4	65.1	63.2
Kneeroom, rear	28.1	26.8	29.4	28.8	31.7
Trunk volume	35.0	27.9	29.7	15.0†	33.5
Displacement	389	327	361	364	6 V8 223 292 352
Horsepower	215	250	295	250	145 185 300

\*Lowest-price V8 four-door models, except as noted.  
†Usable luggage space, not total trunk volume.



## OLDSMOBILE

Oldsmobile puts its economy engine, the 371-cubic-inch V8, in the 88. This engine operates on regular gas. A 394-cubic-inch V8 is standard on the Super 88 and the 98 series. The tailfins are gone and bodies are one to two inches shorter over-all. Super 88 and 88 series have rear-facing third-seat wagons, the 98 has no wagon.



## DESOTO

De Soto hopes for a sales comeback with all-new styling and unit body. Only four-door sedans, two and four-door hardtops are available in Fireflite, Adventurer series. Engines: 361-cubic-inch V8 standard on Fireflite; 383-cubic-inch V8 for Adventurer with ram induction extra.



### PRODUCTION OF 1959 MODEL PASSENGER CARS

1. CHEVROLET	1,471,071	Up 18.7%
2. FORD	1,394,684	Up 46.8%
3. PLYMOUTH	424,692	Up 6.2%
4. PONTIAC	383,320	Up 76.4%
5. OLDSMOBILE	382,865	Up 29.1%
6. BUICK	284,089	Up 17.4%
7. RAMBLER	258,980	Up 121.3%
8. DODGE	151,851	Up 9%
9. MERCURY	150,000	Up 12.5%
10. CADILLAC	142,272	Up 16.8%
11. STUDEBAKER	131,377	Up 163.9%
12. AMERICAN	91,491	Up 198.6%
13. THUNDERBIRD	67,456	Up 77.7%
14. CHRYSLER	64,244	Up 5.5%
15. DE SOTO	45,307	Down 12.1%
16. EDSEL	44,891	Down 28.8%
17. LINCOLN	26,906	Down 9.4%
18. AMBASSADOR	23,769	Up 63.1%
19. IMPERIAL	17,262	Up 7.2%

TOTAL FOR INDUSTRY—5,566,527 passenger cars—Up 31.8% from 1958

### PERCENTAGE OF INDUSTRY PRODUCTION

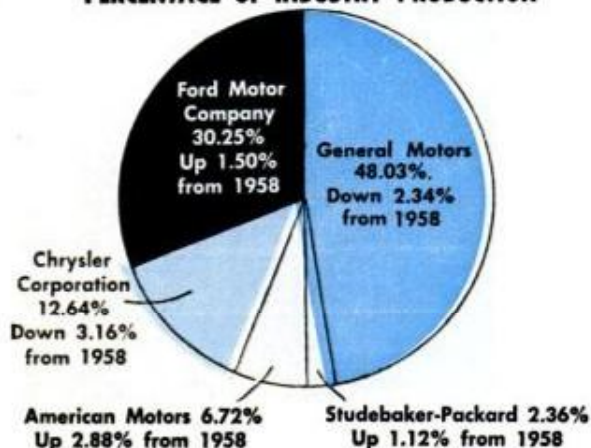


Chart shows how many 1959 models of each make were produced and how this compares with 1958. Period covered is approximately a year, beginning August 1958.

POPULAR MECHANICS



## CHRYSLER

Chrysler's "300"-inspired styling is molded around a unit body, providing more legroom, higher seats. Windsor, Saratoga models are powered by 383-cubic-inch V8, New Yorker by 413-cubic-inch 350-hp. V8. New 300F is due later, will feature four bucket seats.



## MERCURY

Conservatively styled, Mercury is stressing soft ride and quietness of operation. Two V8s operate on regular gas (a larger V8 on premium). No four-barrel carburetors are available, all engines having two-barrels for better economy. Montclair and Park Lane models have 430-cubic-inch V8, with 310 horsepower, hydraulic valve lifters.



U  
P  
P  
E  
R  
  
M  
E  
D  
I  
U  
M

	OLDSMOBILE* Dynamic 88		DE SOTO* Firelite		CHRYSLER* Windsor	MERCURY* Monterey	
Price	\$2900		\$3017		\$3194	\$2730	
Wheelbase	123.0		122.0		122.0	126.0	
Length	217.6		215.4		215.4	219.2	
Width	80.6		79.4		79.4	81.5	
Height	56.5		55.0		54.9	55.7	
Shipping weight	4109		3865		3815	3981	
Headroom, front	34.7		34.6		34.6	33.2	
Headroom, rear	33.9		34.5		34.5	32.9	
Legroom, front	45.0		46.2		46.2	44.2	
Legroom, rear	42.2		44.1		44.1	43.6	
Hiproom, front	65.4		63.0		63.0	62.5	
Hiproom, rear	65.2		62.4		62.4	62.8	
Kneeroom, rear	28.8		29.4		29.4	32.5	
Trunk volume	18.3†		29.7		29.7	29.1	
	Std.	Opt.	Std.	Opt.		Std.	Opt.
Displacement	371	None	361	383	383	312	383
Horsepower	240	None	295	305	305	205	280

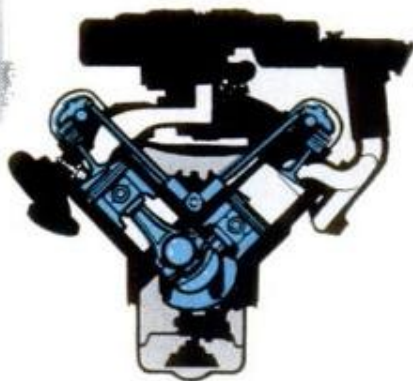
†Usable luggage space, not total trunk volume.

\*Lowest-price V8 four-door sedans, except as noted.



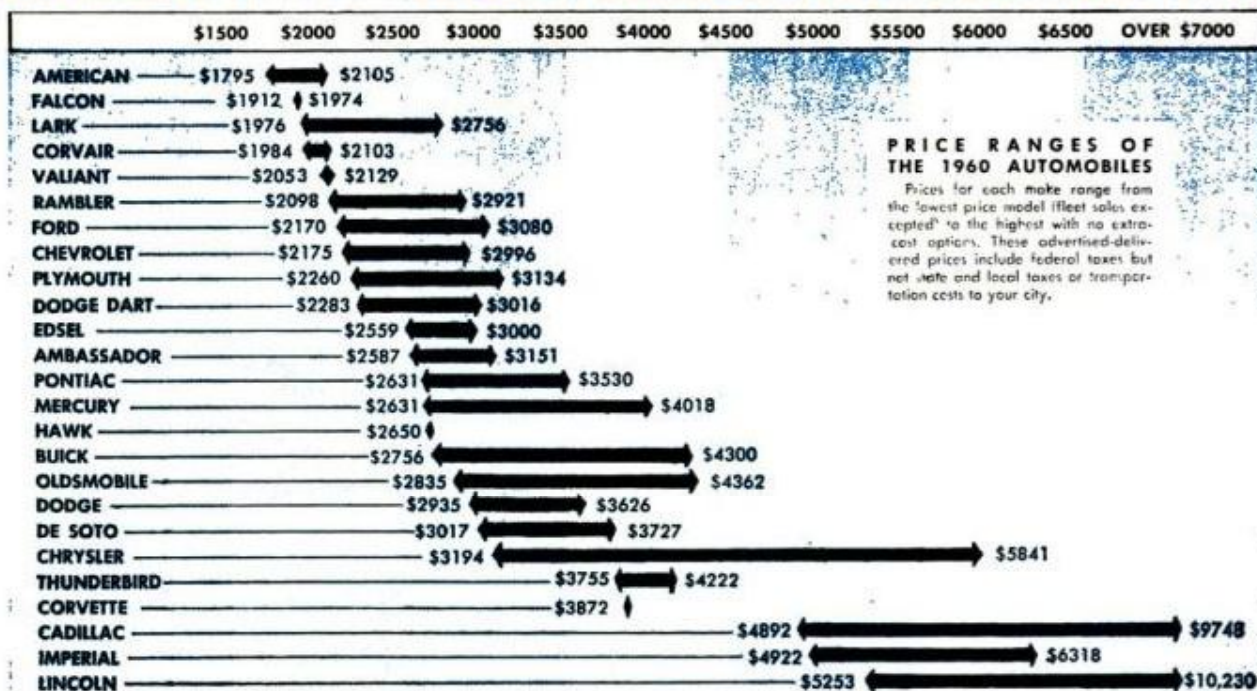
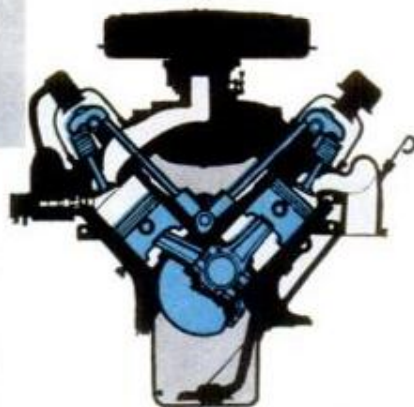
## LINCOLN

Most important change in this year's Lincoln and Lincoln Continental is the switch to leaf springs, replacing coils in the rear. Gone are the trailing arms. Lincoln retains its 430-cubic-inch V8, but has cut horsepower by 35 to 315 and has added a new carburetor. Unit-built, both cars have had grille and rear styling changes. Roof and rear window are new.



## IMPERIAL

Restyled, but retaining such characteristics as gunsight taillights, Imperial is powered by a 413-cubic-inch V8 developing 350 horsepower. Unusual features are high-backed driver's seat, electroluminescent non-glare panel lights and elliptical steering wheel. New back window gives LeBaron a town-car look. It is only frame-plus-body car at Chrysler.



### PRICE RANGES OF THE 1960 AUTOMOBILES

Prices for each make range from the lowest price model (fleet sales excepted) to the highest with no extra-cost options. These advertised-delivered prices include federal taxes but not state and local taxes or transportation costs to your city.



## CADILLAC

Improved Cadillac brakes have finned, extended rear drums that keep brake temperature 30 percent lower under hard usage. Automatic parking brake releases when car is put in gear with engine running. Engines: Two 390-cubic-inch V8s, 325 and 345 hp. Air suspension on Brougham, Biarritz, Seville; optional on others.

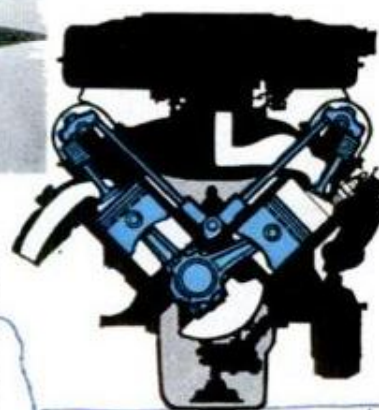


**H  
I  
G  
H  
P  
R  
I  
C  
E**



## THUNDERBIRD

Thunderbird, fast becoming the second best-selling Ford Motor Company car, is introducing the first sliding sun roof on an American car as optional equipment. Also new is an automatic top that folds into the trunk of the convertible. T-Bird engines: 300-hp. 352-cubic-inch V8 and 350-hp. 430-cubic-inch V8.



SEE JULY 1960, 14.

	LINCOLN* Sedan	IMPERIAL* Custom	CADILLAC* "62"	THUNDERBIRD* Hardtop
Price	\$5441	\$5029	\$5080	\$3755
Wheelbase	131.0	129.0	130.0	113.0
Length	227.2	226.3	225.0	205.4
Width	80.3	80.1	79.9	77.0
Height	56.7	56.7	56.2	52.5
Shipping weight	5016	4700	4805	3799
Headroom, front	34.9	34.5	34.2	34.5
rear	33.7	33.8	33.4	33.3
Legroom, front	44.0	46.3	46.1	43.4
rear	44.9	42.9	45.3	38.0
Hiproom, front	60.2	61.0	65.0	59.6
rear	65.2	60.2	64.9	48.7
Kneeroom, rear	35.2	31.8	31.4	26.2
Trunk volume	29.2	31.8	16.4†	20.5
Displacement	430	413	390	352
Horsepower	315	350	325	300

\*Lowest-price V8 four-door models except Thunderbird.  
†Usable luggage space, not total trunk volume.

# FOREIGN CARS-1960

IMPORTS HAVE PROSPERED. Will they continue to, now that Detroit offers "compacts?" Nobody can be certain, but it seems unlikely that cars as big as the Corvair, Falcon and Valiant will compete with VW, Renault and Simca. Sensible, quiet and comfortable as they are, the new compacts don't drive the same, don't "feel" the same, as the more nimble, alert, small imports.

They are still worlds apart—smaller worlds perhaps, but worlds nonetheless.

Certainly after a spectacularly prosperous 1959, no import plans to surrender sales without a struggle. Dealers are stronger than ever and will fight it out with these newcomers, the American compacts. The outcome, as always, is in your wallets, dear public.



## FIAT

Square lines give the Fiat 1200 an elegant look. Luxurious interiors have reclining front-seat backrests and an optional folding rear seat. Suspension: coils in front and leaf springs in the rear. Top speed is 87 m. p. h. Fiat's 18 models range in price from \$1098 to \$3498.



## MERCEDES BENZ

Featuring a wider, lower grille, the Mercedes-Benz 220 has four headlights, fins and more luggage space. Valve-gear and camshaft changes provide 124 hp. Suspension: coils. Other models unchanged.



## HILLMAN

One of two small imports offering automatic transmission, Hillman uses a magnetic powder to work the clutch. Styling changes include a wider windshield and rear fins. Unit body has coils in front, rear leaf springs. Horsepower is upped to 57.

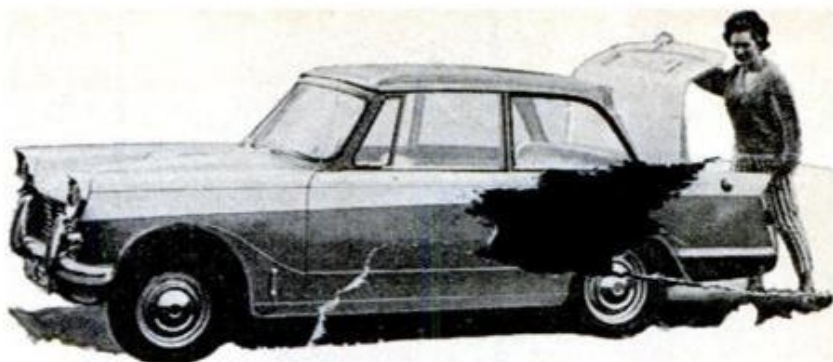
\*Port-of-entry price at New York City

	Price*	Engine Type	Displacement	Horsepower	Weight	Overall Length	Overall Width	Turn Circle
FIAT 1200	\$1998	Inline 4, OHV, front	74.5	63	2050	154.4	57.4	34.5
MERCEDES 220S	\$4283	Inline 6, overhead cam, front	133.9	124	2940	192.2	70.7	37.4
HILLMAN Minx	\$1849	Inline 4, OHV, front	91.2	57	2172	162.0	60.8	36.0



## TRIUMPH

Triumph's new Herald Saloon combines style with such features as independent four-wheel suspension, large luggage capacity and greasing only every 12,000 miles. Suspension: coils in front, leaf springs in rear.



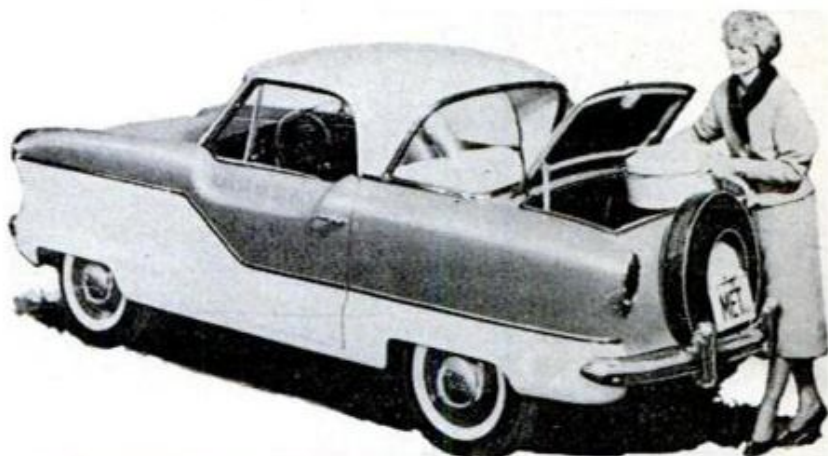
## ENGLISH FORD

England's Ford Anglia is an exciting styling change with sloping hood and reverse-slant rear window. New engine has large bore, bigger valves and drives through a four-speed transmission. Unit body with front coils, rear leaf springs.



## METROPOLITAN

Although styling is unchanged, Metropolitan now has outside trunk access and side window vents. Continued are the same Austin A-55 engine and the unit body. Front suspension uses coils and the rear has leaf springs.



## LANCIA

Powerful, luxurious and expensive, the Lancia Flaminia coupe seats four to five persons. With a top speed of 105 m.p.h., it is the only make powered by a V6. Suspension: coils in front, leaf springs in the rear.



\*Port-of-entry price at New York City

	Price*	Engine Type	Displacement	Horsepower	Weight	Overall Length	Overall Width	Turn Circle
TRIUMPH	\$1699	Inline 4, OHV, front	57.8	38.5	1760	153.0	60.0	25.0
FORD ANGLIA	\$1583	Inline 4, OHV, front	61.0	41	1625	153.5	57.3	32.0
METROPOLITAN Hardtop	\$1672	Inline 4, OHV, front	90.9	55	1890	149.5	61.5	35.0
LANCIA Flaminia	\$6355	V6, OHV, front	150.0	131	3173	184.5	68.4	40.0



## VOLKSWAGEN

Soundproofing and engine refinements make the 1960 Volkswagen the quietest ever. While styling is the same, additions include a front sway bar, horn ring, recessed steering post and push-button door handles. Suspension is fully independent by torsion bars.



## DAF

Only small economy car to offer an automatic transmission as standard equipment is the Dutch Daf. Daf has no clutch pedal. It's belt-driven. Never needs greasing either. Suspension: coils in front, leaf springs in rear.



## SAAB

Hoping to expand its U.S. market, Swedish Saab will offer a two-door station wagon this spring. Major sedan change is that the door is no longer hinged at rear. Saab keeps its front-wheel drive, coil suspension, unit body.



## ALFA ROMEO

Alfa Romeo, in its 2000 line, offers luxury and comfort (at a price) plus a small engine with lots of power. A 118.5-cubic-inch engine develops 120 horsepower and 105 m.p.h. speeds. Suspension is with coil springs.

\*Port-of-entry price at New York City †Figures for sedan, not wagon shown here

	Price*	Engine Type	Displacement	Horsepower	Weight	Overall Length	Overall Width	Turn Circle <sub>r</sub>
VOLKSWAGEN	\$1565	Flat 4, OHV, rear, air-cooled	72.7	36	1609	160.6	60.6	36
DAF	\$1469	Air-cooled, flat twin, OHV, front	36.0	22	1390	142.0	57.0	28
SAAB 930†	\$1895	Inline 3, two-cycle, front drive	46.0	38	1806	158.0	62.0	36
ALFA ROMEO 4-door sedan	\$5028	Inline 4, twin overhead cams	118.5	120	2958	186.0	67.0	25.8

## VAUXHALL

Vauxhall wagon increases loading ease with a counter-balanced tail door and spare tire flush against the right side. Grille and side panels are new while the inline-four engine is unchanged. Suspension: front coils; rear leaf. Unit body.



## NSU PRINZ

Sporting minor styling and engineering changes are the NSU Prinz sedan and coupe. Sedan (photo) has reclining front seats. Able to seat four in a real pinch, coupe has a top speed of 85 m.p.h. Both use coils and have unit bodies.



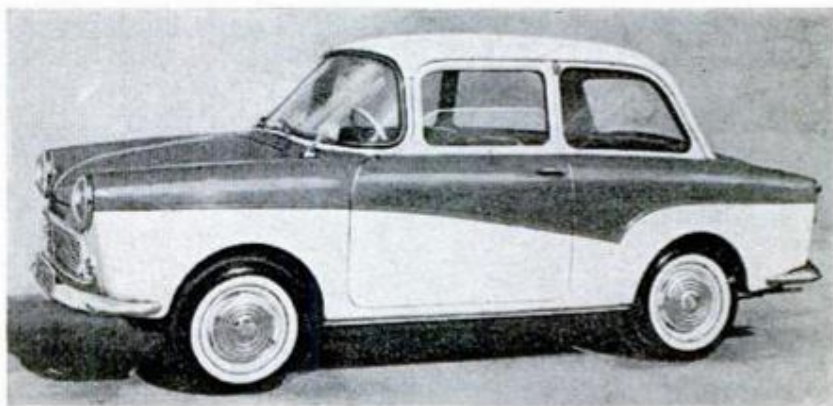
## BORGWARD

Only prototypes of the new Borgward (photo) have been built, but this latest entry shows the American influence. Luxurious and big, it has a six-cylinder engine. The four-cylinder Isabella is unchanged. Both use coil suspension.



## GOGGOMOBIL

Goggomobil's new Isar series comes with a four-seat two-door sedan and two-door wagon. Spare tire rests under the hood atop air-cooled engine and there are extra-big brakes. Front suspension: coils; rear, leaf springs.



\*Port-of-entry price at New York City †Data for Isabella, not model shown here

	Price*	Engine Type	Displacement	Horsepower	Weight	Overall Length	Overall Width	Turn Circle
VAUXHALL Victor	\$1957	Inline 4, OHV, front	92.0	55	2200	167.7	63.5	34.0
PRINZ NSU	\$1398	Inline 2, OHV, air-cooled, rear	35.0	26	1200	124.0	56.0	28.0
BORGWARD†	\$2495	Inline 4, OHV, front	89.6	66	2200	175.6	68.2	36.0
GOGGOMOBIL Isar	\$1495	Flat 2, OHV, air-cooled, front	41.3	30	1408	133.8	57.3	29.5



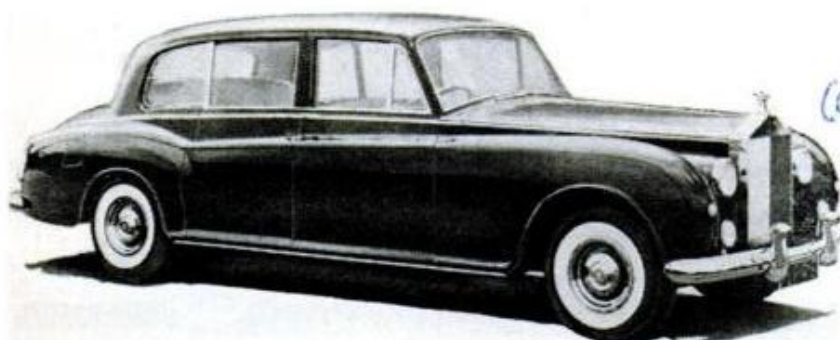
## LLOYD

Slated to compete against VW, the flat-four German Lloyd Arabella has ample interior, trunk room, clean styling. There's a wrap-around rear window, optional sunroof. Suspension: fully independent by coils. Other Lloyds are unchanged.



## SIMCA

Cheaper version of the Simca Elysee is this new Etoile, five-passenger sedan. Heater, automatic choke standard. Three new Simca models are on sale in U. S. Other models virtually unchanged. Coils in front; leaf springs, rear.



## ROLLS-ROYCE

*(see OCTOBER 1960, p.16)*

Rolls-Royce offers its first V8, and it's aluminum, no heavier than the old six. Hydraulic tappets help make engine very quiet. Silver Cloud styling is unchanged. New limousine model is Phantom V. Coils in front; leaf springs, rear.



## RENAULT

Renault promises greater riding comfort with auxiliary springs in addition to its fully independent coils. Also new are stops to hold doors open. Styling changes are minor. Caravelle, 4CV round out the line.

\*Port-of-entry price at New York City

	Price*	Engine Type	Displacement	Horsepower	Weight	Overall Length	Overall Width	Turn Circle
LLOYD Arabella	\$1688	Flat 4, OHV, front-drive	54.4	42	1532	150.0	60.0	32.4
SIMCA Etoile	\$1798	Inline 4, OHV, front	78.7	50	2050	164.9	61.9	35.6
ROLLS-ROYCE Silver Cloud	\$14,895	Aluminum V8, OHV, front	380.0	N.A.	4365	211.8	62.8	41.8
RENAULT Dauphine	\$1645	Inline 4, OHV, rear	51.5	32	1397	155.0	60.0	30.0

## AUTO UNION

Auto Union 1000 models are unchanged except for a wrap-around windshield on all but four-door saloons and wagons. New is the tiny Junior, two-door with 34 hp., a lively car. It has torsion bars; 1000, leaf springs.



## BMW 700

BMW's newest entry into the small car field is the 700 with a two-door coupe and sedan. Unit body makes the car real solid and rear engine powers it to speeds of 75 m.p.h. Luggage space, spare are up front. Suspension is by coils.



## JAGUAR

In the new 3.8, Jaguar has a compact luxury car for the American market. The five-passenger sports sedan features four-wheel disk brakes, power steering and automatic transmission. Other Jaguars are unchanged.



## CITROEN

Continuing its advanced engineering which includes a central hydraulic system, Citroen is unchanged. So is the 2CV. But British Citroen plants are building plastic-body 2CV's, portending future changes.



\*Port-of-entry price at New York City

†Data for sedan, not wagon shown here

	Price*	Engine Type	Displacement	Horsepower	Weight	Overall Length	Overall Width	Turn Circle
<b>AUTO UNION</b>	\$2301	Inline 3, two-cycle, front-drive	58.8	57	1991	164.8	66.1	37.7
<b>BMW 700</b>	\$1898	Flat 2, OHV, air-cooled, rear	42.5	35	1389	139.4	58.3	29.5
<b>JAGUAR 3.8</b>	\$4740	Inline 6, front, twin overhead cams	230.6	220	3136	180.8	66.8	33.5
<b>CITROEN DS19†</b>	\$3245	Inline 4, OHV, front-drive	116.6	75	2475	189.0	70.6	36.0



# How Good Are the

## ECONOMY



CITY  
**20.1**  
miles  
per gallon

COUNTRY  
**22.7**  
miles  
per gallon

**CORVAIR**

0 to 30  
**5.0**  
seconds

0 to 60  
**16.5**  
seconds

40 to 60  
**9.3**  
seconds

## ACCELERATION



City test was 50 miles at average of 18 m.p.h., never over 30 m.p.h. Corvair did best on this.

All three cars had handshift transmissions. Times are the average of 8 runs, 4 each way.



CITY  
**19.7**  
miles  
per gallon

COUNTRY  
**22.9**  
miles  
per gallon

**FALCON**

0 to 30  
**5.9**  
seconds

0 to 60  
**21.1**  
seconds

40 to 60  
**14.5**  
seconds



Country test was 50 miles on rural roads at speeds from 40 to 70. Falcon did best on this.

Falcon's 3.10-to-1 rear axle (the others have 3.55 axles) makes it slowest by a wide margin.



CITY  
**18.4**  
miles  
per gallon

COUNTRY  
**20.9**  
miles  
per gallon

**VALIANT**

0 to 30  
**4.8**  
seconds

0 to 60  
**14.5**  
seconds

40 to 60  
**9.0**  
seconds



Valiant's extra weight, bigger engine give it about 9 percent less economy than other two.

Valiant is best here, but Corvair comes close. Both show up well in 40-to-60 passing range.

All photos by Don Honick



# COMPACT Cars?



**BOULEVARD**  
Excellent. Engine noisy at high speed.

**ROUGH ROADS**  
Excellent. Quiet, no harshness or wheel fight.

**SEATING**  
Very low. Good back support. No center hump, front or rear.

Seats may be too low for some. Car has safe, secure feeling on corners, over rough roads.

**FRONT**  
Low roof, low seat mean you must get down to enter, climb up to leave.

**REAR**  
Somewhat easier, although you still have to climb out.

**DOOR OPENING**  
Inside handles tiny. Rear doors hard to close from inside.



Vertical stick is exactly as long as floor-to-door-header distance on Corvair—38.5 inches.



**BOULEVARD**  
Excellent. Engine extremely quiet.

**ROUGH ROADS**  
Poor. Considerable harshness and wheel fight. Noisy.

**SEATING**  
Excellent height. Good support. Rear seat center bottoms on tunnel easily.

Silky as a royal coach on smooth roads, on a rough stretch it turns into a bumpy pumpkin.

**FRONT**  
High roof, high seat make getting in and out easy.

**REAR**  
No four-door sedan was available at time of test.

**DOOR OPENING**  
Large, easy-to-use inside handles. Outside good. No rear doors tested.



Same stick in Falcon door opening shows there is about two inches more clearance, arrow.



**BOULEVARD**  
Excellent. Engine fairly quiet.

**ROUGH ROADS**  
Excellent. Quiet, tight, no harshness. Some wheel fight.

**SEATING**  
Excellent height. Front seat tilts back too much. Good padding atop hump.

Easily best over-all ride of three, although rear end tends to break loose on chuckholes.

**FRONT**  
High door opening, high seat make it best in and out.

**REAR**  
Easiest to get in and out of back seat as well.

**DOOR OPENING**  
Good operation, front and rear, but hold-open stops are inadequate.



Again the same stick, this time on Valiant, and there's even more open space, arrow.

## TRUNK SPACE



Grocery bags stand upright in Corvair's front trunk, but for long trips luggage space is small, irregular.



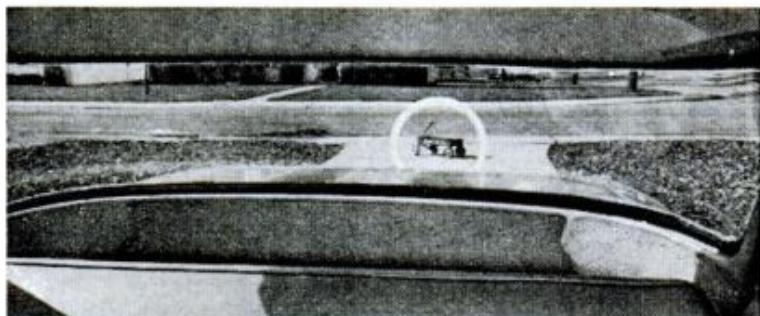
Groceries must be laid flat in Falcon's trunk, but it has lots of room for long trips, even enough for golf clubs.



Groceries won't stand up in Valiant, but spare tire under floor makes trunk biggest, most usable of three.

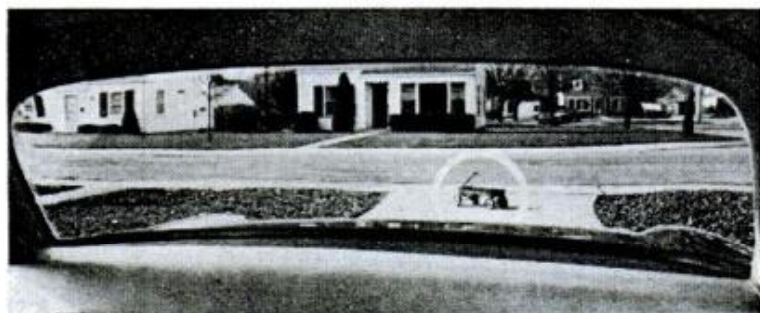
## VISIBILITY

### CORVAIR



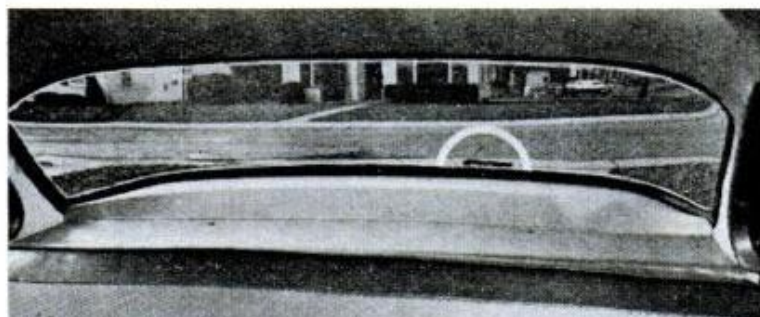
Wagon is 18.5 feet behind rear bumper, clearly visible to Corvair driver as he backs up. Huge rear window gives wider view than camera can cover. Front visibility is excellent. Wipers leave no unclear center in windshield.

### FALCON



Car and wagon in same places. Falcon driver easily sees wagon as he backs up. Window is more vertical, shows more distance, less width than Corvair's. Front visibility is excellent. No unwiped center in windshield there either.

### VALIANT



Car and wagon same, but Valiant driver can just see the top of wagon. Backing up could be nerve-wracking in a child-infested suburban driveway. Front visibility is excellent except wipers do leave center area untouched.

---

## SUMMARY

Which is best?

That's for you to decide. Each of us has his own favorite features. Some want a nimble car, others a heavy car. Some want luggage room, others just an around-town car. Some want economy, others want performance too.

One thing is certain: Drive each of these cars before making up your mind. And don't forget those other two cars in this category: Rambler and Lark, both good automobiles.

Here's a quick summary: →

170

## CORVAIR

Spirited, that's the Corvair. It has a lot of joy built into it. Air-cooled, rear engined, it should require little attention, summer or winter. Traction is excellent on snow or ice.

Surprising performer for 80 horsepower, being just behind the 101-horsepower Valiant. Economy is good although its gas heater will reduce that somewhat in cold weather.

Of the three cars, this is certainly the most fun, but you can't drive it with the trunk so full that the lid won't close.

POPULAR MECHANICS



## HANDLING



With lightest front end, Corvair is easiest to park. Nimblest in traffic, most fun around corners. Shifting is smooth, but long reach to 2nd. Holds the road well, no wandering.



Big steering wheel, slow ratio make Falcon easy to park, but eliminate nimble, sporty feeling. Gearshift on steering post is stiff, clumsy. Front end gets light at high speeds.



Heavy engine, fast ratio make parking the Valiant hard work. Power steering desirable. Gearshift a delight, best ever built in the U.S.A. Not nimble, but best over-the-road car.

## MISCELLANEOUS

### CORVAIR



Low, no-grille Corvair easy to wash. New scissors jack simplifies tire changing. Dimmer switch too high. No rear ashtray. Dash has only speedo, gas gauge.

### FALCON



Simple Falcon body easy to clean. Grille is flimsy. Interior well finished. Wipers stall on full throttle. Hand choke. Dimmer switch in bad spot. Hood has prop.

### VALIANT



Valiant's bulges hard to wash. Park brake takes strong leg. Vertical scales on dash hard to glance-read. Speedo not easily read at night. Wipers noisy.

## FALCON

Sensible, easy to get in and out of, high seated, good visibility. Suspension is great on minor irregularities, but leaves much to be desired on chuckholes and washboard.

Best long-trip economy, but its 3.10 rear axle penalizes it in city as more downshifts are required. There is a 3.56-axle option that would give better performance, but somewhat less economy.

Except for stiff shift, this is best around-town "hacking" car. Docile, tame and gentle.

JANUARY 1960

## VALIANT

Solid and substantial, with good seat heights, lots of luggage space and surprising quietness and comfort. Best ride over-all.

There's none of the small-car feel that many want and many more don't. It has a lot of power, plenty of speed and gives a secure feeling.

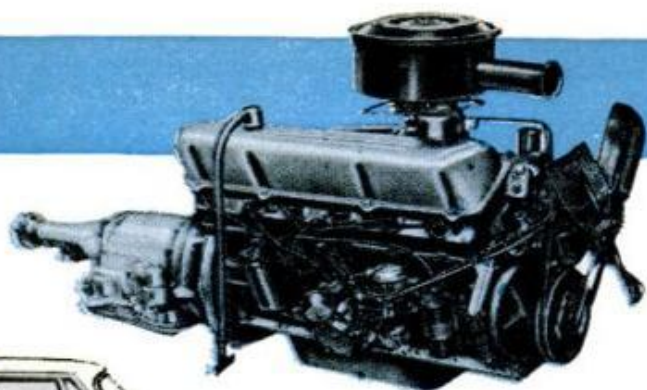
It has more style, with its lunging nose, semi-fast back and fake spare-tire cover.

Of the three, this is the most sturdy, most versatile, all-purpose car.

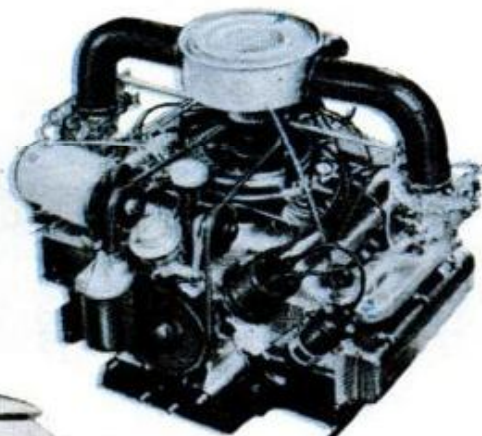
171

# Those New

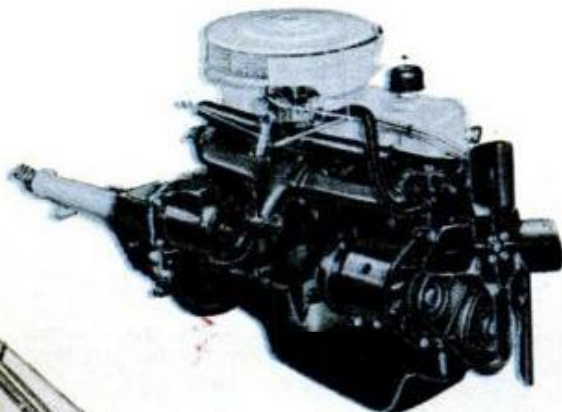
By Roger Huntington



**VALIANT**



**CORVAIR**



**FALCON**



**YOU'VE BEEN** able to buy domestic compact cars for a long time. Even before today's Ramblers and Larks, there were the Willys Aero, the Hudson Jet, the Henry J.

All these cars had one thing in common: They all used long-stroke high-friction engines that were originally designed about 20 years ago and not specifically designed for lightweight economy cars.

Thus the three new compact-car engines are the first truly modern engines tailored to fit the new concept in American autos. There are no excuses for compromise now. That's why it's so interesting to see such a wide variety among the three engines—from an air-cooled pancake to a tilted in-line six. Twenty years of engineering apparently haven't brought agreement on even the most elementary principles.

From the very beginning, GM used an entirely different design and merchandising philosophy from Ford and Chrysler in the compact-car field.

The two smaller companies felt a scaled-down version of a conventional Detroit sedan would fill the bill. But GM figured it would take something different, something new, to sell in this market. And, it figured, that the type of buyer most interested in this car would be the kind to appreciate advanced engineering features.

The answer was an air-cooled, rear-engine car with four-wheel independent suspension.

The rear-engine layout required cylinders opposed in pancake fashion to keep down over-all length. And it had to be made with lots of aluminum to prevent excessive rear-end weight.

In the case of the Valiant, the Chrysler people planned to use this basic engine in a wide variety of car sizes and styles and in a wide range of bore and stroke sizes. (Actually, this engine had been in the works before the Valiant program was started—it was the engine destined to replace the flathead Plymouth six.) It was logical to tilt the whole thing 30 degrees to one side to reduce over-all height and allow lower hood lines, especially with the long-stroke versions. By tilting, it was also possible to move the water pump to the side which also cut over-all length. The fact that the tilt left room on one side for an advanced free-flow manifold design was a bonus feature.

Otherwise the Falcon and Valiant en-

# Compact-Car Engines

gines are quite conventional inline sixes with rocker-operated inline overhead valves in wedge-shaped combustion chambers, four-main-bearing crankshafts, oversquare stroke-bore ratio and single-throat carburetors.

Ford, through advanced foundry techniques, was able to hold the weight of the cast-iron Falcon engine to 345 pounds, only 35 pounds more than the aluminum Corvair engine.

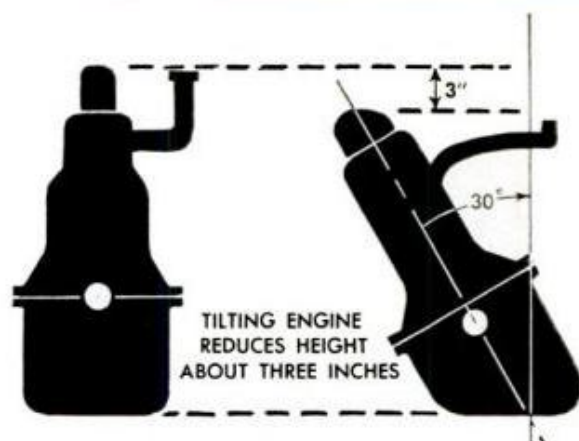
Also of interest is the fact that the Corvair crankshaft gets by without any counterweights. With adjacent throws in each of three pairs spaced 180 degrees apart, one throw balances centrifugal forces on its mate. Without weights, the whole crank weighs only 25 pounds. And as long as we have to buy steel by the pound, every little bit saved helps.

As for fuel economy, Ford and Chrysler had little trouble designing miserliness into the engines. They were working with tried-and-true features that they knew so well. Chevrolet, on the other hand, was breaking new ground with its flat six. And it had a real rough time getting MPG.

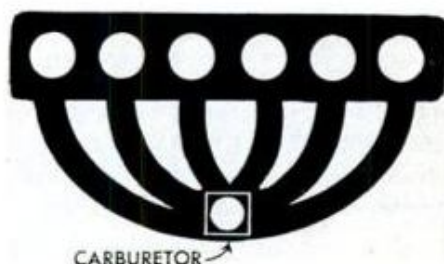
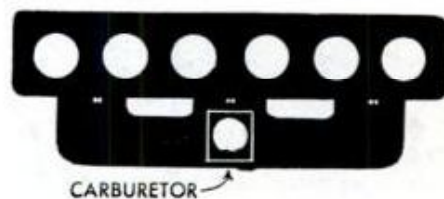
For one thing, the cylinders on an air-cooled engine run hotter than on a water-cooled job, so you can't use as much compression with regular gas. Corvair has only an 8.0 to 1 compression ratio, compared with 8.7 on the Falcon, 8.5 on the Valiant. This means a little less energy bled out of each drop of gas. Then, too, Corvair had to use a separate carburetor for each bank of cylinders because of the long distance between ports. This caused additional problems. The uneven suction impulses with three cylinders on each manifold caused lopsided mixture distribution between cylinders and the very low air flow through each carb made low-speed flexibility a problem.

Corvair's final solution was a masterpiece. Special carburetors were used with weird spoked nozzles that cause turbulence in the air flow and meter fuel smoothly at very low speeds. These carbs were offset toward one end of the manifolds. The offset prevented the flooding of the center cylinder (which occurred when they were located centrally). For some reason that Chevy engineers don't yet understand the far cylinder is not starved.

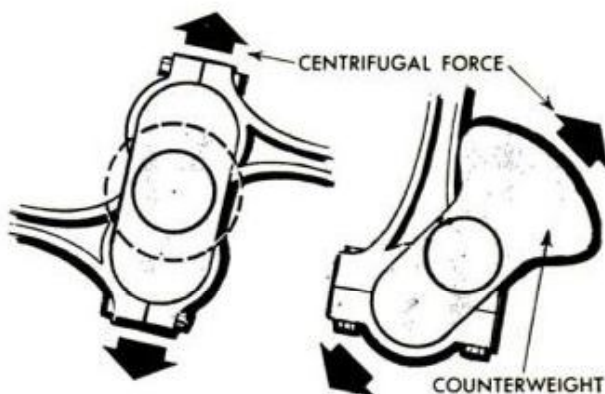
Then there is no exhaust heat on the Corvair intake manifolds. These are cast integral with the aluminum heads and sections are made very thick. The manifolds thus pick up heat from the cylinders and



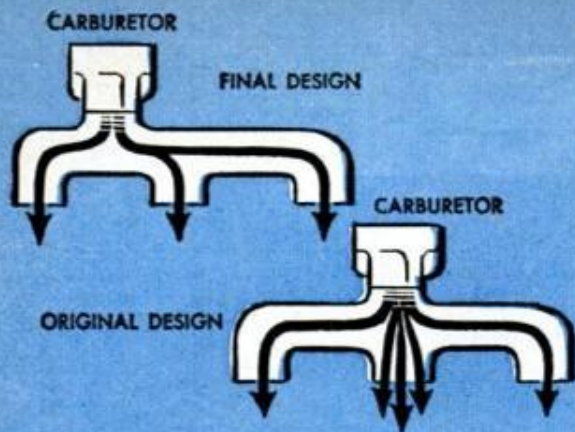
Valiant's inline six, is tilted 30 degrees for a lower hoodline. A plus feature is the fact that the tilt allows a long, free-flow manifold with easy curves



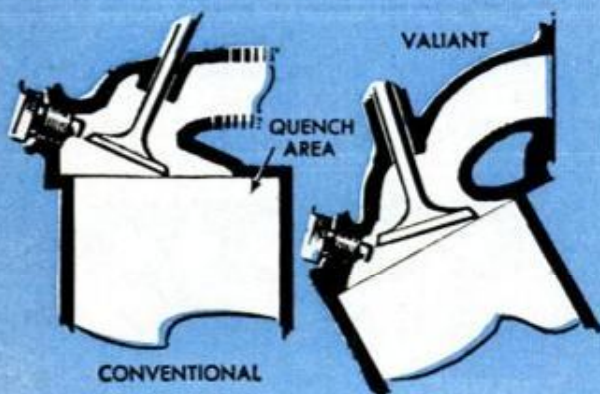
Usually, an inline six manifold is the "log" type, upper drawing, with sharp corners. Valiant's is a "bunch of bananas" with gentle curves, lower drawing, that give excellent breathing to all six cylinders



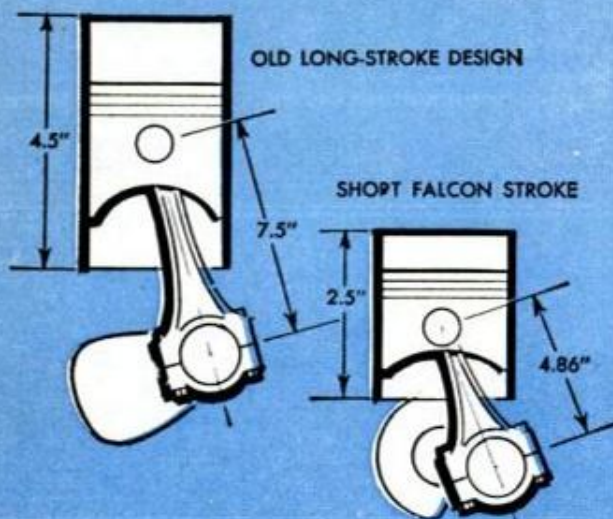
Corvair's flat design allows one throw to balance the other, left, so no crankshaft counterweight is needed to offset centrifugal force as at the right



Originally, the Corvair carburetor was mounted at the center of the manifold, but this overloaded the middle cylinder. Final design, top, is offset. On one bank it's near front, on other near rear of engine



Valiant's engine has an open combustion chamber, at right, that contributes to its excellent breathing. Walls are not squeezed around the valves to create a quench area over the piston as in the usual design



Lower end of Falcon engine is probably most rigid ever built for an inline six. Very short stroke and short connecting rods provide solid, compact layout

store it, giving an even warmth to help vaporize the liquid gasoline without the usual hot spot that robs power. Finally, a single automatic choke valve is located in the air-filter inlet, serving both carburetors, preventing the rough running you'd get if one choke shut off before the other.

Result of all this: The dual carburetors on the Corvair can be leaned down to give as good mileage as the Falcon and Valiant and still allow the pancake engine to run dead smooth. This was quite an engineering accomplishment, believe me.

On paper and in fact, the Valiant is the hottest engine of the bunch. It has about 30 more cubic inches and fair-size ports and valves. Its horsepower output is greater.

Contributing to its surprising power is the free-flow intake manifold. Instead of the usual "log" type manifold common to inline sixes, we have six separate pipes sweeping from a central carburetor chamber to six separate intake ports in the head. There are no sharp corners.

This not only reduces breathing restrictions, but fuel-air mixture distribution among cylinders is better than with a simple log manifold.

Add to this the open combustion chamber, where the walls are not squeezed in around the valves to give a flat quench area over the piston and you can see the reason why the Valiant has excellent breathing. Evidence of this is the very flat peak at the top of the horsepower curve between 4000 and 5000 revolutions per minute.

Whether the market will demand that these engines be boosted substantially in performance is still uncertain. If it does, the potential is apparently there.

All the camshafts are very "cool" now and could be readily hopped up. Corvair already has a hot-cam option. Rumors are that the option includes solid lifters and that it will put out over 90 horsepower at 6000.

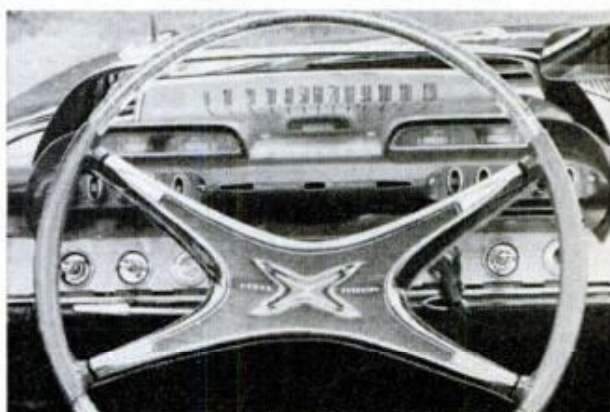
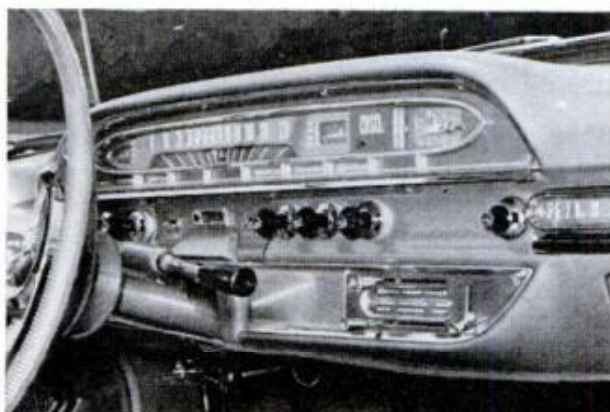
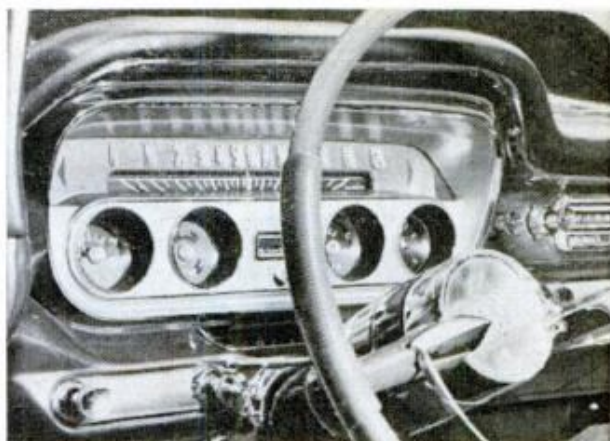
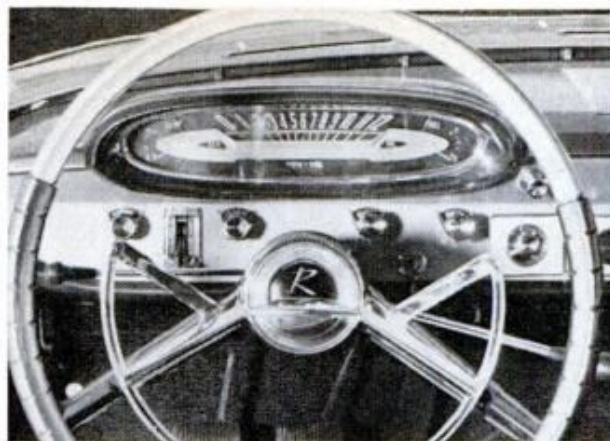
We understand that the Falcon engine has been wound up to 5600 revolutions per minute in second gear by Ford engineers without any protest from the valve gear.

Valves and ports could be enlarged, compression ratios raised for premium gas, bores and strokes increased.

But engineers worry about other things than performance and economy. There is durability, too. These new engines have achieved some great advances here.

The Falcon engine is the smoothest, quietest power plant ever put out by Ford engineers. They found that the long studs usually used to hold the rocker cover on top literally made a sounding board out of the stamped cover. It broadcast engine vibrations like a loudspeaker. Engine noise

(Continued to page 288)



# GAUGES ARE NOT JUST ORNAMENTS

By Dale Kelly

**W**HAT'S THE most useful gauge on the dash? Probably the speedometer. From it, you learn how well your engine is performing, how legal is your speed. From the related odometer, you compute miles per gallon, tire and brake-lining life.

Yet do you know how accurate your speedometer is? Or your odometer? Generally, they are somewhat "rigged" to exaggerate speed and distance so you are favorably impressed with performance and economy. It is simple to calibrate the instruments.

To check out your speedometer, drive your car at a constant speed (being careful to keep it constant) for a measured mile, available on any toll road,\* clocking the number of seconds it takes. Compute the true speed by dividing the number of seconds into 3600. The table below saves you the trouble for three speeds. It's wise to check your speedometer at the various speeds posted as limits—speeds like 30, 50, 70. If you know how accurate your gauge



**SPEEDOMETER**

is, you'll be less likely to run afoul of the radar cops.

To calibrate the odometer, slow down at the first milepost and record the odometer reading exactly to the tenth. Then drive 50 miles or so and compare your odometer mileage with the true mileage. Divide the indicated distance by the actual distance, point off two decimal places and you'll get the number of miles indicated per 100 true miles.

\*If you don't have access to a measured mile turn to page 290 for an explanation of how to lay out one.

		SPEED-TIME TABLE FOR MEASURED MILE																												
SPEEDOMETER READING		30 MPH								50 MPH								70 MPH												
TIME (SECONDS)		116	118	120	122	124	126	128	130	133	72	73	74	75	76	77	78	79	80	53.0	53.5	54.0	54.5	55.0	55.5	56.0	56.5	57.0	57.5	58.0
TRUE SPEED (MPH)		31.0	30.5	30.0	29.5	29.0	28.5	28.0	27.5	27.0	50.0	49.0	48.5	48.0	47.5	47.0	46.0	45.5	45.0	68.0	67.0	66.5	66.0	65.5	65.0	64.5	63.5	63.0	62.5	62.0



## AMMETER

The ammeter shows if your battery is being charged or discharged and how rapidly. Charging action of the generator moves the pointer toward "C" (charge); battery discharge by use of lights or radio moves the pointer toward "D" (discharge). When the generator is charging at the same time current is being drawn by lights and ignition, the ammeter shows the net charge or the difference between what's going in and what's coming out of the battery.

With the engine running faster than idle, the ammeter normally shows a charge. With the engine stopped and current being used, the ammeter should show a discharge. With the engine stopped and everything off, the reading should be zero.

If, under this condition, the ammeter shows a slight discharge the stoplight

switch may be stuck. If it reads charge, it is defective or incorrectly connected. After installing a new battery you check for proper polarity by turning on the lights. If the battery is hooked up backwards, the ammeter will read charge, not discharge.

A violent deflection to extreme discharge usually indicates a short circuit. If this can't be cleared at once, remove one battery cable to avoid wiring damage. An abnormally high reading on the charge side could mean that the regulator is not working. In this case, you can use the car without risk of burning out the generator by temporarily disconnecting the wire that runs between the "F" (field) terminals of the generator and the regulator.

Each time the engine is started, the generator charges at a high rate for as long as is necessary to replace the energy used during cranking.

Rate of charge or discharge (the actual number of amperes) is worth knowing because with it you can figure how long it will take to charge or discharge the battery fully. Suppose, for example, that you want to leave the headlights burning on a parked car. If the lights show a 10-ampere discharge on the ammeter and you have a nearly new 60-ampere-hour battery, it should carry the load for six hours. Unfortunately most ammeters have no numerals.



## OIL PRESSURE GAUGE

The oil pressure gauge measures the pressure at which oil is being delivered to the engine. It cannot tell you how much oil is flowing, because it is connected to the dead end of a branch line from the pump.

As long as the oil level in the crankcase is high enough to reach the oil-pump intake, the gauge will show the proper pressure. Any change in the amount of oil

above the level of the intake will not affect the reading. When the oil drops below this level, the gauge will register zero pressure.

If you think you are running low on oil, but the gauge pointer is steady at its usual reading, the oil level is not yet too low. However, you may not have enough oil to last another five miles, so keep your eye on the needle. As soon as it wavers, you know you should add oil at once.

A gradual decrease in oil pressure as a car ages is usually an indication of bearing wear. Proper repairs should restore the pressure substantially to the reading obtained when the car was new. Unless the engine is badly worn, an appreciable decrease in pressure as the engine warms up indicates that the oil is losing viscosity (becoming thin or light) and you can use the gauge to compare one brand of oil with another in this respect.

### WHAT ABOUT WARNING LIGHTS?

Warning lights are used instead of ammeters and oil pressure gauges on many cars. These do not provide the same data.

An oil pressure light that goes on when pressure drops below 8 pounds can't distinguish between 9 pounds and 40 pounds. Yet the difference can be very important.

A generator warning light does not warn when the charging is too low or too high, only when

the generator is not charging at all. You may be taking more electricity from the battery than the generator is putting back in, but the light won't tell you this and eventually you'll end up with a dead battery. Nor will the light warn of a discharge when there should be none as, for example, when the headlights are left on.

Unless you remember to check the lights after turning on the ignition and before starting the engine, the bulbs may be burned out just when you need them.

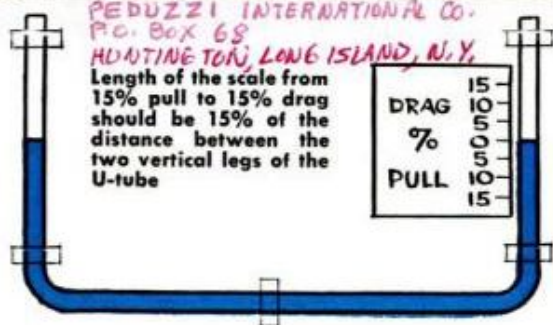
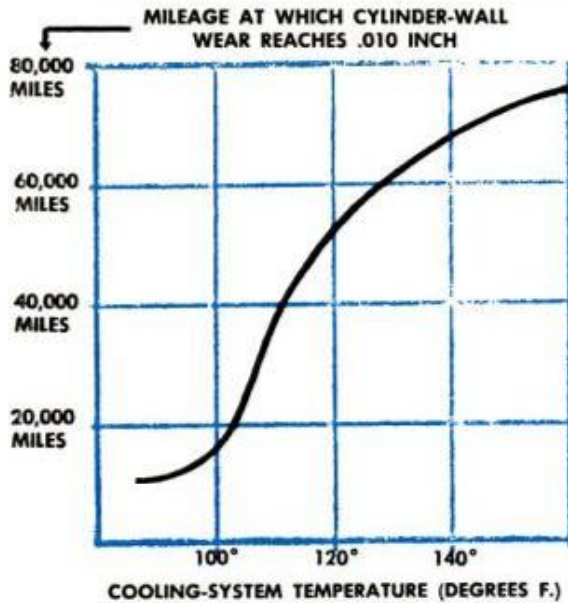
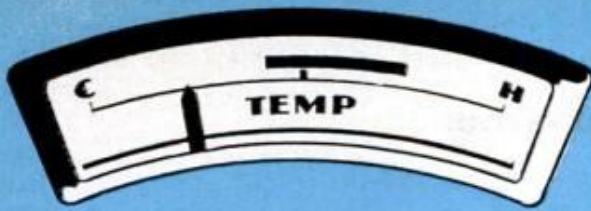
## TEMPERATURE GAUGE

Engine temperature indicators show the water temperature in the cooling system. Most carry only relative markings such as "cold," "hot." A scale with numerals to indicate degrees is, of course, best.

Cooling water normally runs at the temperature at which the thermostat opens. It may, however, exceed this temperature in very hot weather, particularly if the engine is working hard or the cooling system is clogged with rust or dirt. It may not reach this temperature in very cold weather, particularly if speed and engine load are low as in traffic.

The graph at left shows a cold engine wears out faster than a warm one. Life of cylinder walls is cut in half if the cooling system temperature is reduced from 160 to 110 degrees and is again cut in half if it drops to 100 degrees. Overheating, of course, can do great damage in a short time.

Higher temperatures than normal are usually due to one or more of the following: Insufficient water, slipping fan belt, obstructed air flow through radiator, obstructed water flow through radiator or engine, or failure of thermostat to open. Abnormally low temperature is usually due to failure of thermostat to close.



Performance meter is made by taping a transparent plastic tube to window and adding colored water

## PERFORMANCE METER

There are two types of performance meter, quite different in appearance but working the same. One is essentially a case enclosing a pendulum, free to swing forward and backward in response to car motion and to move a pointer over a scale. One commercial type is shown at left.

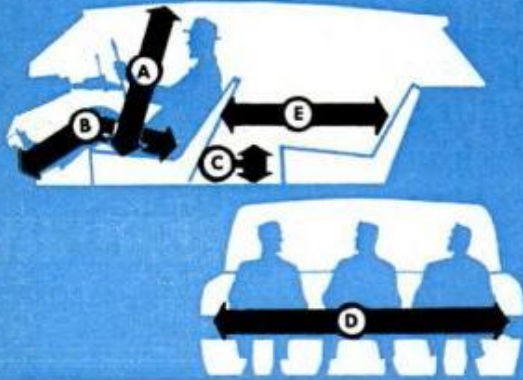
The other has a steel ball or a liquid in a transparent tube. This type can rather easily be homemade, see drawing at left.

Installation involves nothing more than attaching the meter to any stationary object in the car and leveling it so that the liquid column or pointer rests at zero when the car is stopped on a level surface. No other connections need be made.

If the car is driven at a constant speed on a level road, the meter will read zero, indicating that rear-wheel horsepower is neither more nor less than the amount needed to overcome wind resistance, tire resistance, braking friction, etc. If the throttle is suddenly opened wide, the pendulum or liquid will swing to the rear at an angle proportional to the acceleration. This, in turn, is proportional to the amount by which the full-throttle horsepower exceeds that needed for constant speed.

(Continued to page 292)

# HOW DO THEY MEASURE UP?



## HEADROOM (A)

Front	Rear		
Chevrolet	Studebaker Lark	36.1	35.0
Studebaker Lark	Studebaker Hawk	36.0	34.5
Studebaker Hawk	De Soto Fireflite	35.5	34.5
American	Chrysler	35.3	34.5
Rambler	Dodge Dart	35.0	34.5
Ambassador	Dodge	35.0	34.5
Lincoln	Chevrolet	34.9	34.3
Plymouth	Pontiac Vent., Bonn.	34.8	34.2
Pontiac Cat., Str. Chf.	Plymouth	34.8	34.2
Buick LeSabre, Inv.	Rambler	34.7	34.0
Oldsmobile 88, Sup. 88	American	34.7	34.0
Dodge Dart	Ambassador	34.6	34.0
Dodge	Cadillac 62	34.6	34.0
Chrysler	Buick LeSabre, Inv.	34.6	33.9
De Soto	Pontiac Cat., Str. Chf.	34.6	33.9
Imperial	Oldsmobile 88	34.5	33.9
*Thunderbird	Lincoln Contin.	34.5	33.9
Buick Electra	Ford	34.2	33.9
Oldsmobile 98	Imperial	34.2	33.8
Corvaire	Lincoln	34.0	33.7
Ford	Oldsmobile Super 88	34.0	33.5
Cadillac 60	Buick Electra	33.9	33.4
Falcon	Oldsmobile 98	33.9	33.4
Valiant	Corvaire	33.6	33.4
Mercury Park Lane	Valiant	33.3	33.4
Merc. Mont., M'clair	Buick Electra 225	33.2	33.3
Pontiac Vent., Bonn.	Thunderbird	32.9	33.3
Cadillac 62	Cadillac 60	32.8	33.1
	De Soto Adventurer		33.1
	Mercury		32.9
	Falcon		32.8

\*All specs except Thunderbird are for 4-door models.

## LEGROOM (B)

Front	Rear		
Imperial	Oldsmobile 98	46.3	45.5
Dodge Dart	Buick Electra	46.3	45.4
Dodge	Buick Electra 225	46.3	45.0
Chrysler	Lincoln	46.2	44.9
De Soto	Cadillac 60	46.2	44.5
Cadillac 62	Chrysler	46.0	44.1
Cadillac 60	De Soto	45.8	44.1
Plymouth	Dodge	45.4	44.1
Pontiac Cat., Vent.	Merc. Mont., M'clair	45.3	43.6
Pontiac Str. Chf., Bonn.	Dodge Dart	45.2	43.5
Oldsmobile 88	Cadillac 62	45.0	43.3
Oldsmobile Super 88	Imperial	44.6	42.9
Chevrolet	Chevrolet	44.5	42.5
Valiant	Oldsmobile 88	44.4	42.4
Oldsmobile 98	Oldsmobile Super 88	44.3	42.2
Buick LeSabre	Buick LeSabre	44.2	42.2
Mercury	Buick Invicta	44.2	42.0
Buick Invicta	Pontiac Catalina	44.0	41.9
Studebaker Lark	Ford	44.0	41.6
Studebaker Hawk	Pontiac Star Chief	44.0	41.4
Lincoln	Lincoln Contin.	44.0	41.4
American	Mercury Park Lane	44.0	41.4
Buick Electra	Pontiac Ventura	43.8	40.8
Thunderbird	Pontiac Bonneville	43.4	40.3
Ford	Ambassador	43.3	40.0
Falcon	Rambler	43.3	40.0
Ambassador	Falcon	43.0	39.4
Rambler	Studebaker Lark	43.0	39.0
Corvaire	Valiant	42.8	38.9
	Thunderbird		38.1
	Plymouth		38.1
	American		37.5
	Corvaire		36.5
	Studebaker Hawk		36.0

## SEAT HEIGHT (C)

Front	Rear		
Studebaker Lark	Ambassador	12.8	14.2
Chrysler	Rambler	12.3	14.2
De Soto	Lincoln	12.3	14.2
Plymouth	Oldsmobile 98	12.2	14.2
Dodge Dart	Buick Electra	12.0	14.2
Dodge	Falcon	12.0	14.2
Imperial	Oldsmobile Super 88	11.7	14.0
Buick Electra	Pontiac Catalina	11.4	13.8
Valiant	Cadillac 60	11.4	13.7
Falcon	Oldsmobile 88	11.4	13.5
Lincoln	Chevrolet	11.3	13.5
Buick LeSabre	Pontiac Star Chief	11.2	13.5
Thunderbird	Buick LeSabre	11.0	13.5
Buick Invicta	Valiant	11.0	13.4
Studebaker Hawk	Buick Invicta	10.9	13.4
Cadillac 60	Dodge Dart	10.5	13.3
Mercury	Dodge	10.4	13.3
Oldsmobile 98	Ford	10.3	13.2
Cadillac 62	Thunderbird	10.2	13.0
Rambler	Mercury Park Lane	10.2	13.0
Ambassador	Plymouth	10.2	12.9
Oldsmobile 88	Chrysler	10.2	12.8
American	De Soto	10.0	12.8
Chevrolet	Merc. Mont., M'clair	10.0	12.4
Oldsmobile Super 88	Imperial	9.9	12.4
Pontiac Cat., Vent.	Cadillac 62	9.8	12.2
Pontiac Str. Chf., Bonn.	Pontiac Ventura	9.6	12.0
Corvaire	American	9.4	11.9
Ford	Pontiac Bonneville	9.3	11.7
	Studebaker Lark		11.0
	Corvaire		10.4
	Studebaker Hawk		9.6

## HIPROOM (D)

Front	Rear		
Pontiac Cat., Str. Chf.	Pontiac Vent., Bonn.	65.4	66.2
Buick LeSabre, Inv.	Cadillac 62	65.4	65.6
Oldsmobile 88, Sup. 88	Pontiac Cat., Str. Chf.	65.4	65.4
Pontiac Ventura	Chevrolet	65.3	65.4
Chevrolet	Oldsmobile Dyn. 88	65.3	65.2
Buick Electra	Lincoln	65.2	65.2
Pontiac Bonneville	Buick LeSabre, Inv.	65.2	65.1
Oldsmobile 98	Oldsmobile Sup. 88, 98	65.2	65.0
Cadillac 62	Buick Electra	65.2	65.0
Plymouth	Buick Electra 225	63.0	64.9
De Soto	Lincoln Contin.	63.0	64.9
Chrysler	Cadillac 60	63.0	64.2
Dodge Dart	Ford	63.0	63.6
Dodge	Mercury	63.0	62.8
Cadillac 60	Chrysler	62.7	62.4
Mercury	De Soto	62.5	62.4
Ford	Plymouth	62.2	62.4
Imperial	Dodge Dart	61.0	62.4
Lincoln Contin.	Dodge	60.4	62.4
Lincoln	Imperial	60.2	60.2
Rambler	Rambler	59.8	60.1
Ambassador	Ambassador	59.8	60.1
Thunderbird	Studebaker Lark	59.6	59.0
Studebaker Lark	Studebaker Hawk	59.5	58.0
Studebaker Hawk	Corvaire	59.5	57.6
American	Falcon	58.0	57.0
Corvaire	Valiant	57.8	56.9
Falcon	Thunderbird	57.1	48.7
Valiant	American	57.0	45.3

## REAR KNEEROOM (E)

Lincoln	35.2
Merc. Mont., M'clair	32.5
Buick Electra	31.9
Oldsmobile 98	31.9
Imperial	31.8
Ford	31.7
Cadillac 62	31.6
Buick Electra 225	31.4
Lincoln Contin.	31.2
Cadillac 60	31.0
Mercury Park Lane	30.2
Chrysler	29.4
Dodge	29.4
De Soto	29.4
Chevrolet	29.2
Buick LeSabre, Inv.	28.8
Oldsmobile 88	28.8
Oldsmobile Super 88	28.6
Pontiac Vent., Bonn.	28.5
Plymouth	28.4
Pontiac Cat., Str. Chf.	28.1
Valiant	28.0
Studebaker Lark	28.0
Falcon	27.9
Dodge Dart	27.4
Rambler	26.8
Ambassador	26.8
Studebaker Hawk	26.5
Thunderbird	26.2
Corvaire	26.0
American	25.1

## TRUNK VOLUME (Cubic Feet)

Pontiac Str. Chf., Bonn.	40.0
Pontiac Cat., Vent.	35.0
Ford	33.5
Imperial	31.8
Dodge Dart	30.7
Chevrolet	30.0
Dodge	29.7
Chrysler	29.7
De Soto	29.7
Plymouth	29.4
Lincoln	29.2
Mercury	29.1
Rambler	27.9
Ambassador	27.9
Valiant	24.9
Falcon	23.7
Thunderbird	20.5
*Oldsmobile	18.3
American	17.7
*Buick Electra 225	17.0
Studebaker Lark	16.5
*Cadillac	16.4
Corvaire	15.6
*Buick LeSabre, Invicta, Electra	15.0*
Studebaker Hawk	14.9

\* Usable luggage space  
Total trunk volume data not available





# WORLD'S BIGGEST AUTO SHOW

AUTOMOBILES speak a universal language. Men everywhere crowd around a shiny new car, sharing its excitement. Ideologies vanish, language barriers evaporate before this common denominator, the automobile.

It is man's greatest servant, yet his fondest dream. It's practical, yet it's visionary. It's down-to-earth, yet it's pie-in-the-sky.

That's why men pilgrimage to auto shows all over the world. Biggest and most spectacular is held in Frankfort, Germany, every other year. Here is the story of that show.

**By Art Railton**

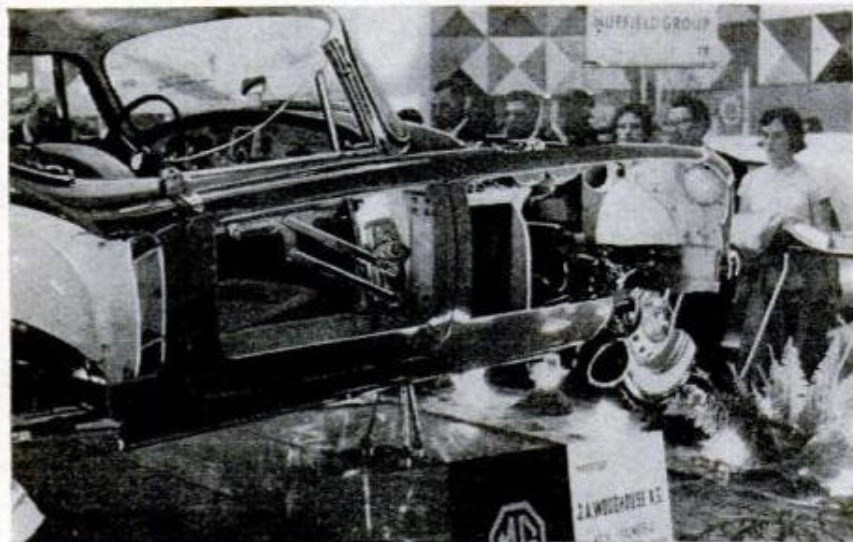
Photos by the author

Unveiled at Frankfurt was the bigger, fancier Borgward six



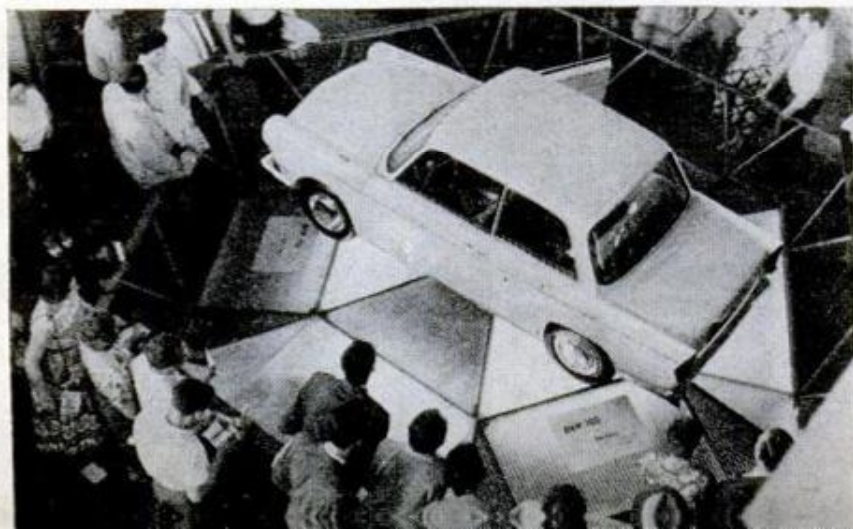


American cars were there, but only 1959 models. The 1960s were first shown at the Paris show a week later. Here, at the GM stand, a Pontiac attracts the attention of Europeans who still marvel at the tremendous bulk of the American automobile



There are a million square feet of displays, of which a fourth is out of doors like this display of trucks. The outdoor exhibits add a "state fair" atmosphere as the customers stroll among them

Cutaways of bodies and engines fascinate all, but especially the European who seems more interested in the mechanism of the car than in its appearance



Surprise hit of the show was the BMW 700 two-door sedan that, the company hopes, will snare sales from Volkswagen. It has a modern flat roof, lots of glass. Its two-cylinder air-cooled engine is rear-mounted, of course



You can take a 10-minute-long free ride in any car. You pick up a ticket at the car's exhibit area and present it at the demonstrator-car park where there are 242 brand-new cars of all makes, each with a chauffeur just for this purpose. Many who don't want to ride, stand around to watch the new cars in action

Camping trailers are also on exhibit. There were 60 of them at the show. Sizes range from this big one down to lightweights for cars like VW. The German couple, like fair-goers everywhere, enjoy a chocolate-coated ice-cream bar (more ice than cream, however)



World's largest truck, the French Berliet 700, was shown in one of the several truck buildings. Altogether, there are 23 separate halls of exhibits. The 10-day show (it is not open nights) had 900,000 paid attendance with 144,000 of them on a single day

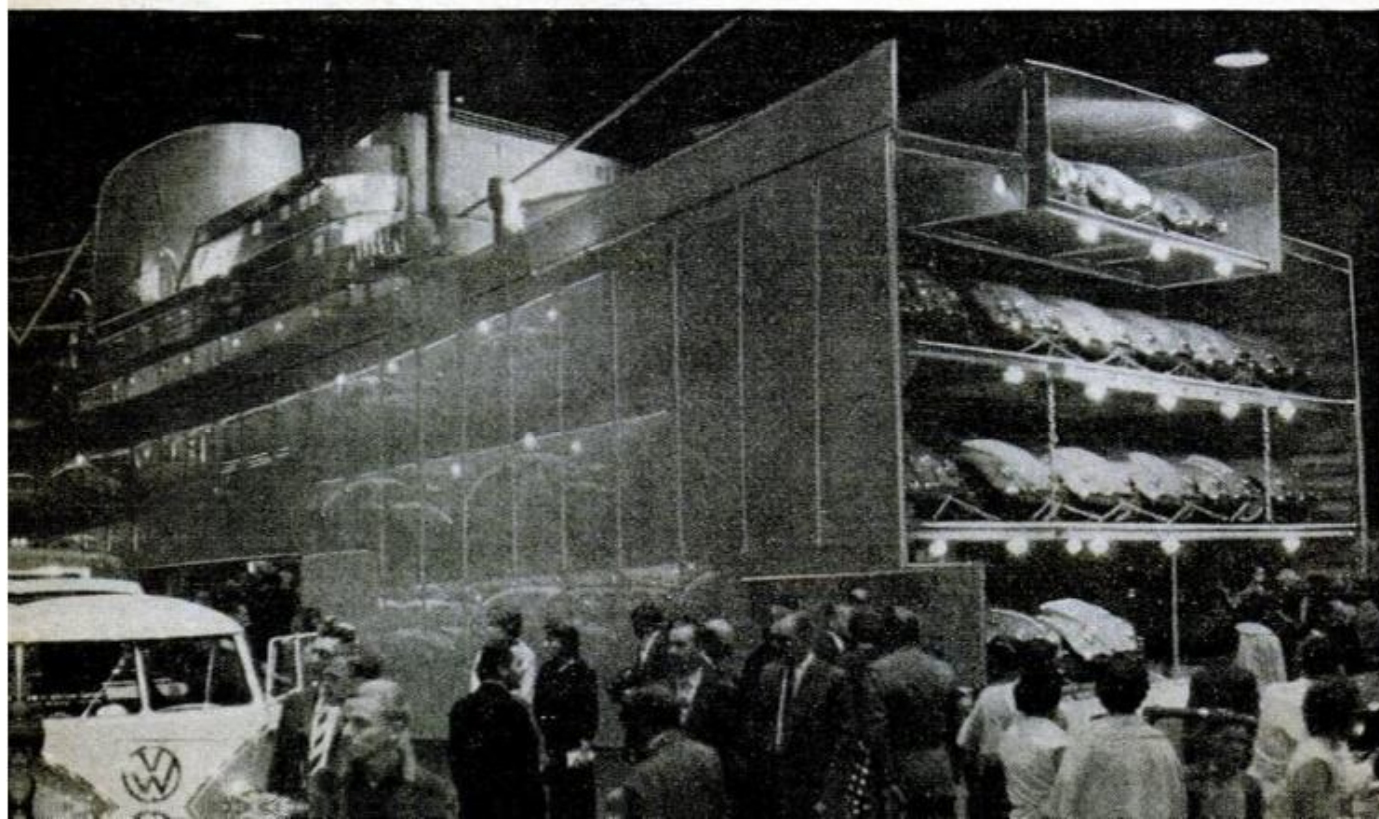


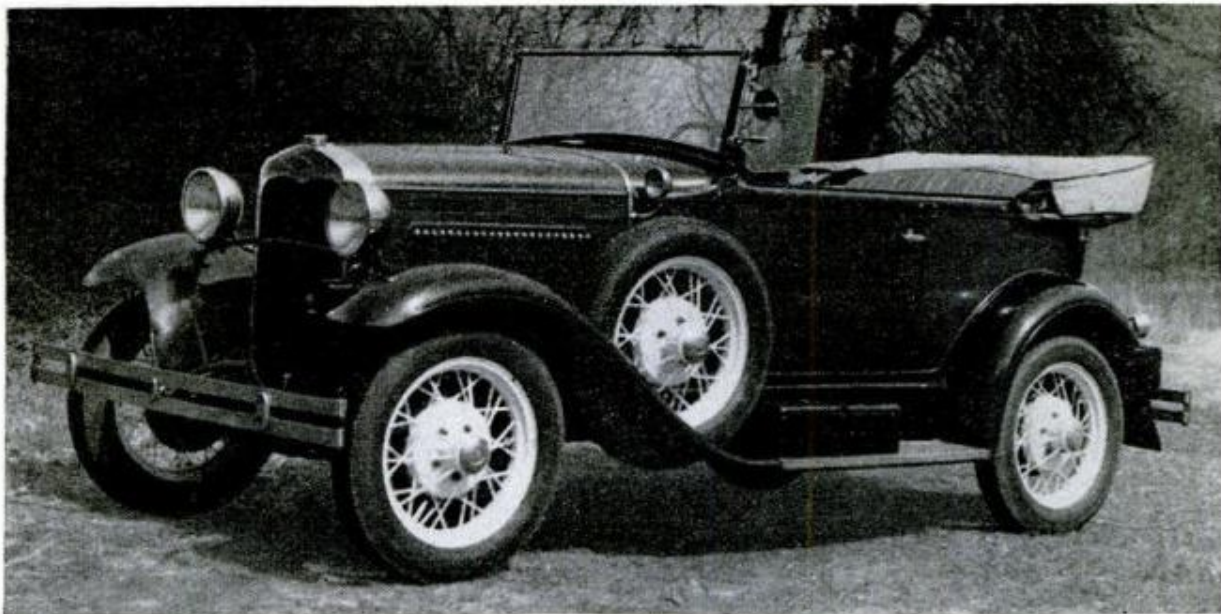


Some companies take over an entire building and remodel it. One of these is the Mercedes-Benz hall, always a beautiful display. Those are real cars, not models, on that platform

Spare parts and accessories are displayed by 551 companies. This is a typical brightwork exhibit. Altogether, there are 726 companies from 13 nations in the show, with 42 makes of cars from outside Germany being exhibited

Volkswagen, Germany's top producer, built a realistic copy of a freighter at one end of its exhibit hall to represent its worldwide export business. Those are full-size cars, lined up and tied down as in actual shipment





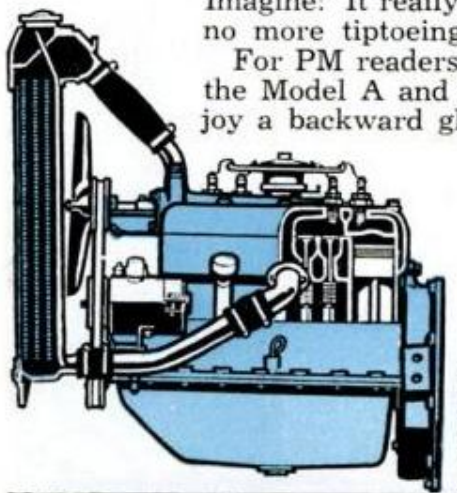
In 1930, this \$440 Deluxe Phaeton made you the biggest sport in town

## “Not Since the Model A . . .”

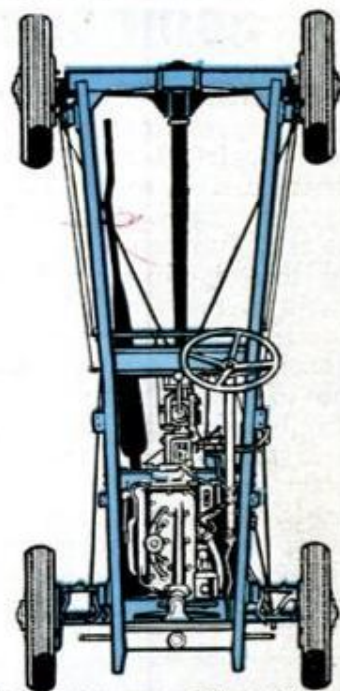
It's an exciting year for the auto industry. Not since the Model A Ford has there been so much speculation, so much excitement. This is due, of course, to the new small cars—the Corvair, the Falcon and the Valiant.

Just as exciting, just as eagerly awaited, back in December 1927, was the Model A. Imagine! It really did have a gearshift lever no more tiptoeing among the three pedals.

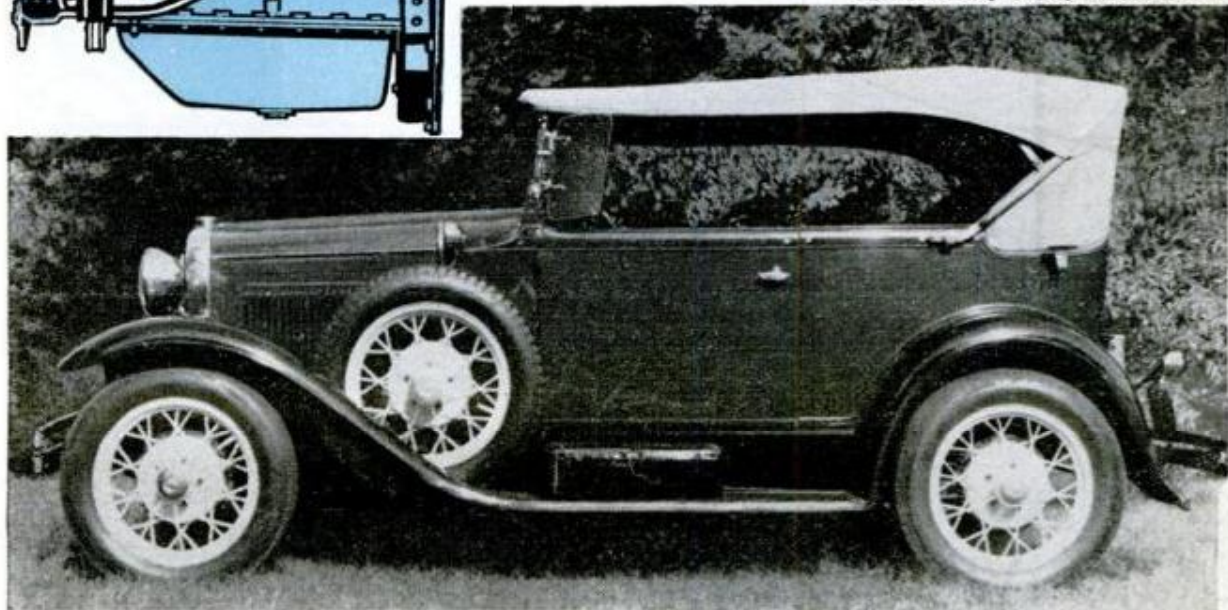
For PM readers too young to have known the Model A and for older readers who enjoy a backward glance, here is the car that made hearts flutter back in the late Twenties.

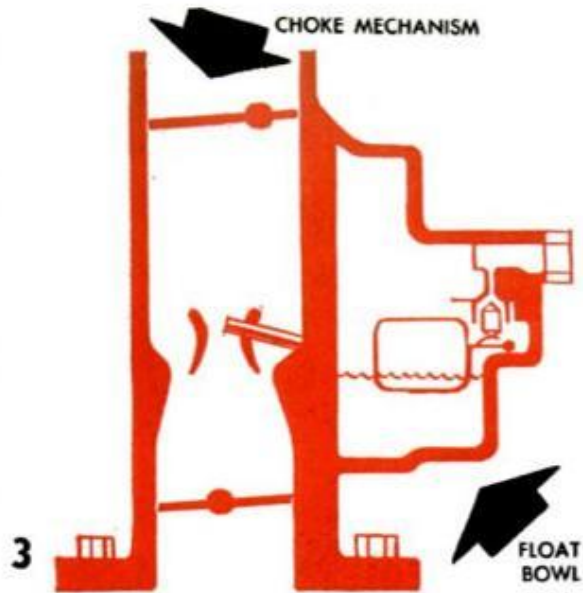
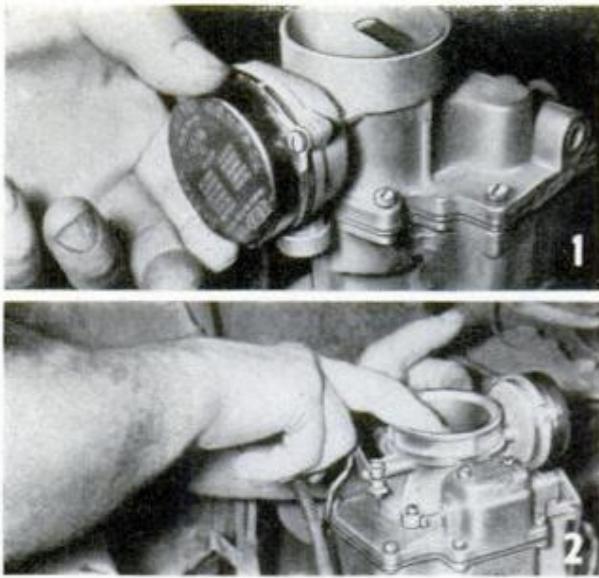


Engine, left, and chassis, right, were simple, but the “A” was as flashy as a racer



Photos courtesy owner, Edward Eikman





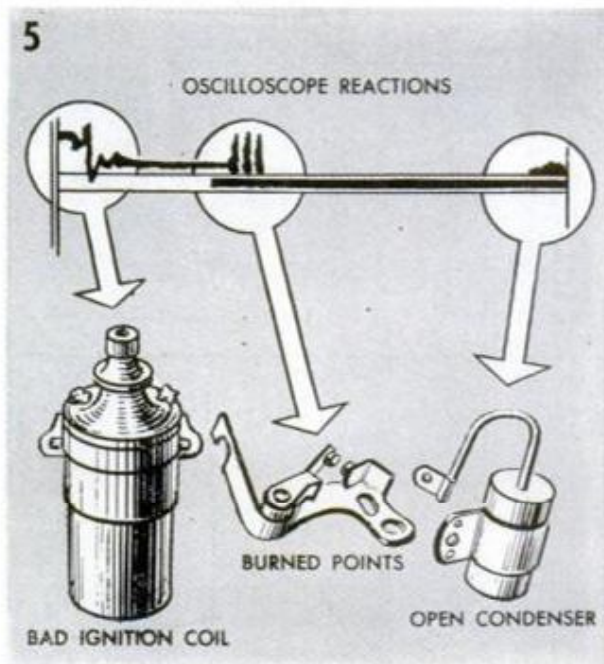
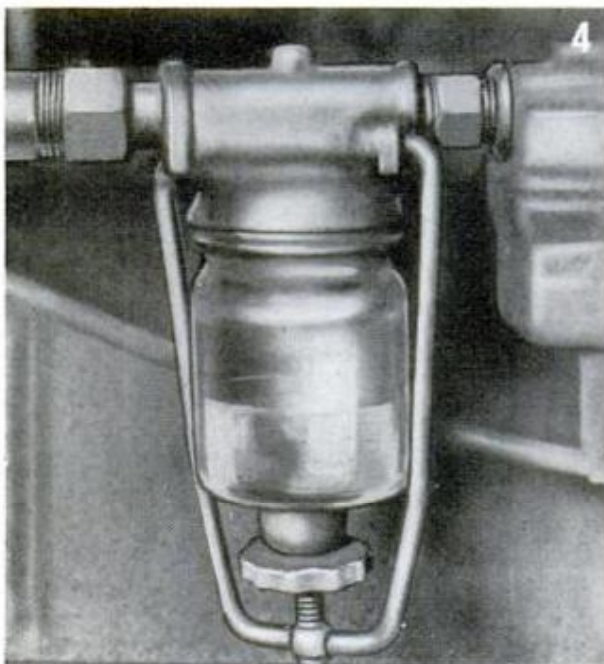
## Solutions for Hard-Starting Problems

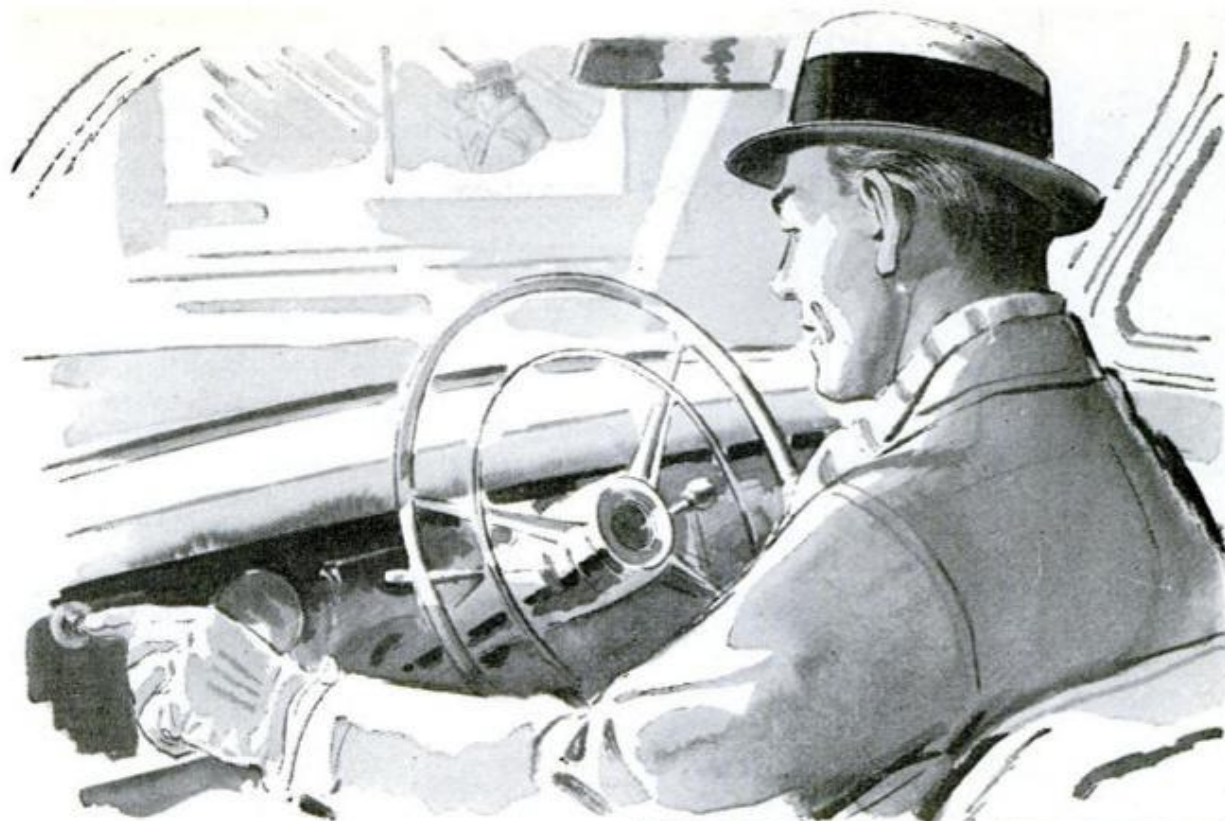
**P**ERIODIC engine tune-up and general inspection and adjustment of the fuel and electrical-system components are the best possible insurance against hard winter starting when the thermometer dives to zero and below. A car that started easily during warm summer and cool fall months may balk the first really cold morning when congealed lubricants, cold gasoline and contracted metal parts gang up to make starting tough. At this time, trouble-shooting knowledge is handy.

If the engine turns over but will not start, most likely the fuel system is at fault. Fig. 8 shows the main components. First check the automatic choke. Remove the cover from the mechanism, Fig. 1, and check for binding in the spring, shaft and

other sensitive parts. If this is not the cause of the trouble, have someone press the accelerator down and feel the choke valve with your finger, Fig. 2 and upper arrow of Fig. 3. It should move under light pressure. A bit of gasoline will loosen a frozen or stuck choke valve.

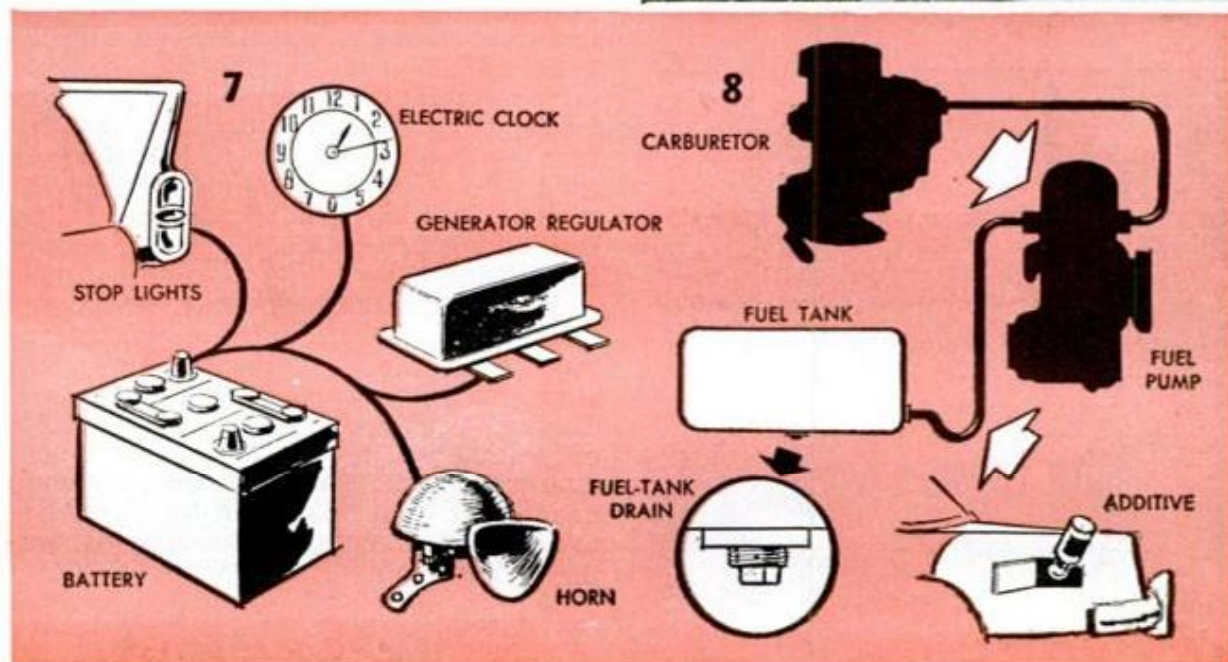
With the choke set correctly, the engine may run a few seconds and die. In this case the gas in the carburetor float bowl, lower arrow Fig. 3, is used up. This indicates a freeze-up in the fuel line or in the filter bottle, Fig. 4. Freezing usually occurs in the lowest parts of the line, near the tank or the pump. Accessible lines may be thawed out by wrapping them in cloth and pouring hot water over them. It is a good idea to drain the tank and

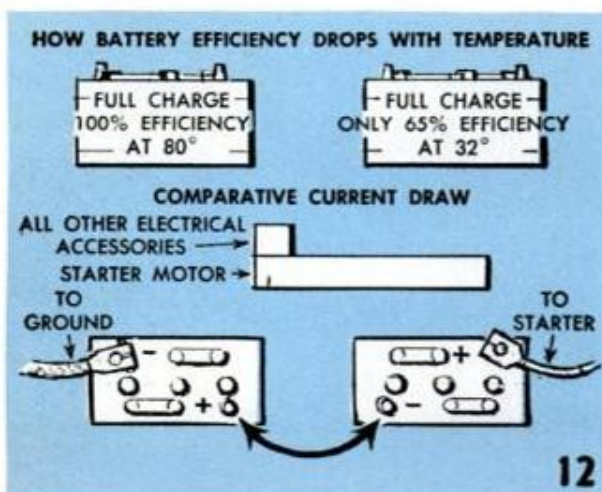
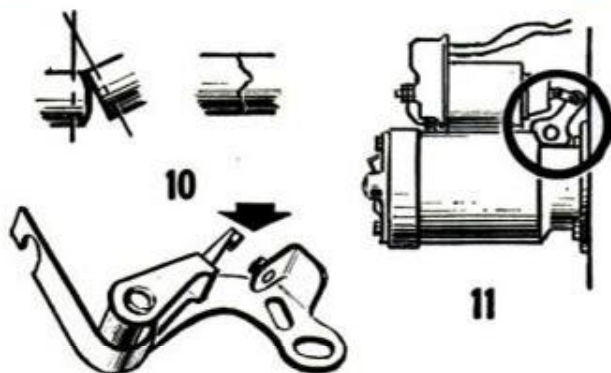
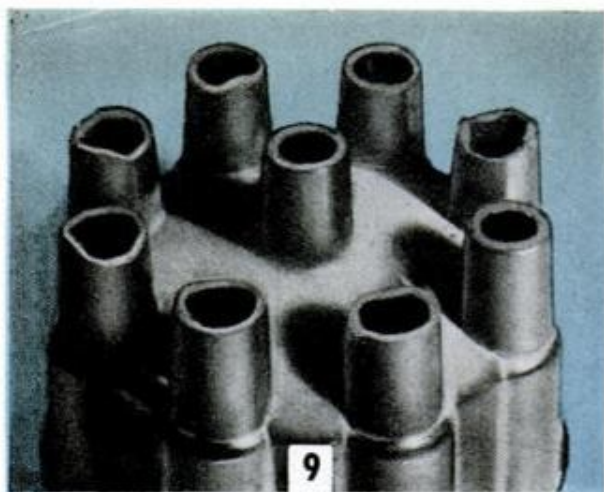




then use an additive in the fuel. Also keep an eye on the starting motor. Water and mud may freeze at the point circled in Fig. 11 and make the starter inoperative.

The electrical system can cause hard starting too. An electric clock, incorrectly adjusted generator regulator and heavy use of lights and horn, Fig. 7, in winter traffic all tend to put a greater strain on the battery. When you consider that a fully charged battery is only 65 percent efficient at 32 deg. F., and only 40 percent efficient at zero, it is evident that a battery must be kept in top condition if it is to handle the load on a cold winter morning. Take a look at Fig. 12 and note





the comparative current draw. Be sure that the generator and its regulator are working at maximum efficiency.

No doubt you are familiar with the practice of using a booster battery to get a car started. The most common procedure is to wire the two batteries in parallel. However, if you are really in a jam because both batteries are low, and they have the same voltage rating, try wiring them in series. To do this, connect the negative post of the booster battery to the positive post of the car battery, and the booster's positive post to the car's starting motor, as indicated in Fig. 12. This doubles the voltage so be sure to turn off all unnecessary switches to avoid damaging your instruments. Do not operate the starting motor and ignition switch for more than a few seconds at a time with this hookup. Also, when adding water to your battery, Fig. 6, be sure to run the car a while to mix the water with the electrolyte, or it may freeze and crack the battery casing.

If the fuel system and the battery are in good order and problems persist, the ignition system is next in line for a check. Fig. 5 shows how a mechanic locates trouble in faulty ignition parts with an oscilloscope by noting the response of the instrument to the various components. You, of course, do not have this instrument, but you can look for the obvious signs of trouble in the same parts—the coil, distributor, points and condenser. Burned-away high tension distributor-cap sockets, Fig. 9, will keep your car from starting on a wet, snowy morning. Worn or poorly aligned points are a detriment in any weather but more so in winter. Good contact of the points is impossible if they are worn or pitted or misaligned as in Fig. 10. Timing should be checked against a drop in temperature and perhaps retarded a bit to ease cold starting. Accurate timing is best achieved with the use of a stroboscope as in Fig. 13.

Intermittent short circuits can cause trouble by slowly running down the battery. Or there may be a slow leak that will not show up on the ammeter even when the motor is shut off. Finding this type of short is a job for a mechanic with the necessary instruments.

At the end a trip back home, get into the habit of speeding up the motor before turning it off. Then, as the engine slows to a stop, pump the accelerator a few times. This will provide the engine with a charge of fuel ready to be fired as soon as the engine turns over. Starting an engine should be followed by at least a half-hour's driving to help replace the energy used by the battery while cranking the engine.

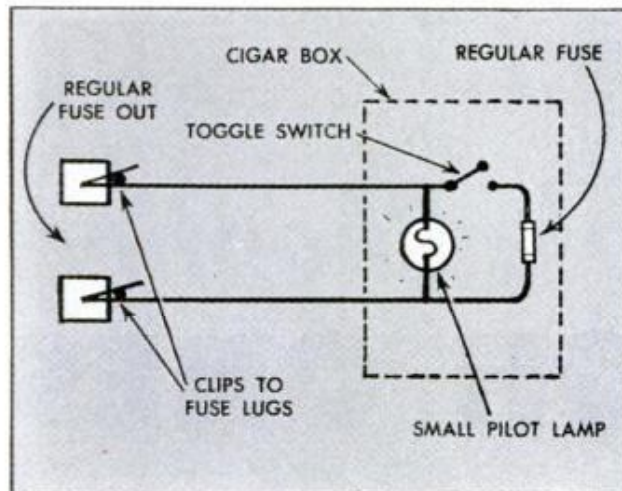
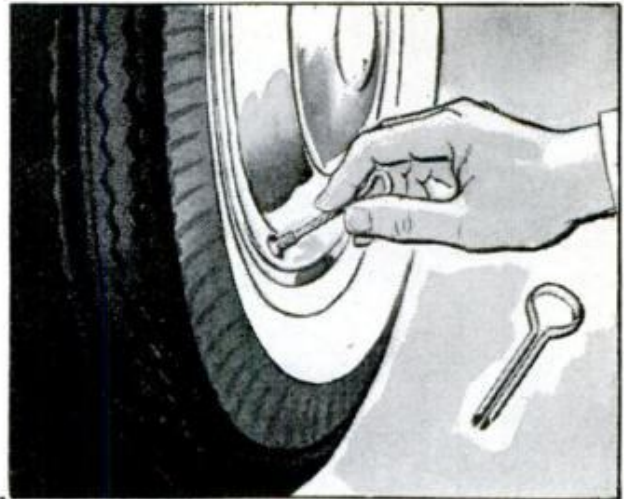
★ ★ ★



## Core of Tire Valve Removed With Cotter Pin

In an emergency, you might try using a cotter pin to remove the core of a tire valve. Cut the jaws of the cotter pin to equal length with a pair of cutter pliers, and spread them just enough to fit snugly over the core. You may find it necessary to file the ends of the pin square. A slight twist should be enough to remove the core. If necessary, a pair of pliers can be used to turn the pin in the case of an unusually tight core.

Daniel Bousha, Jackson, Mich.



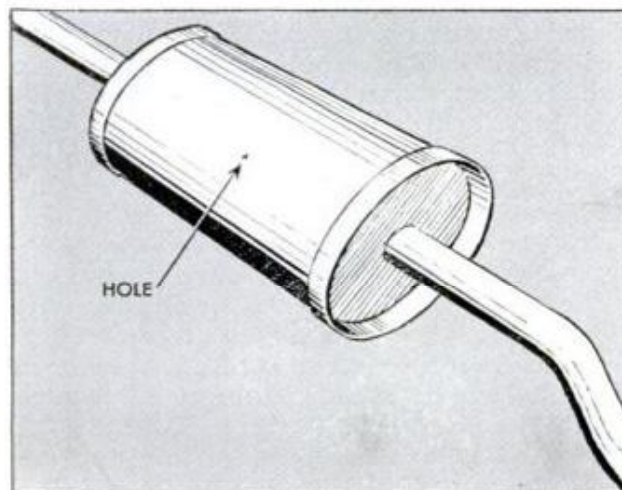
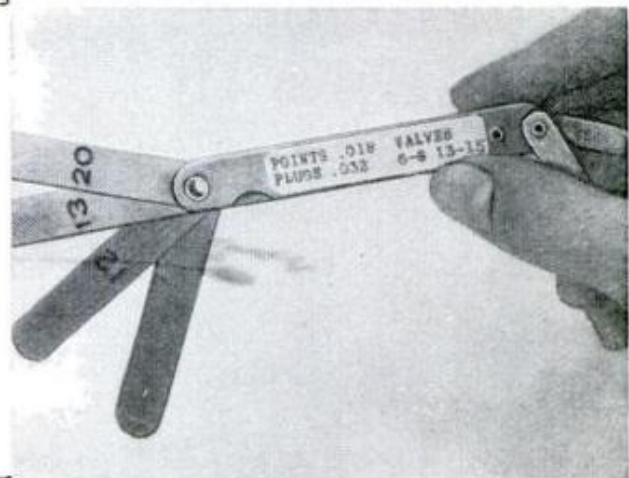
## Extended Fuse Circuit Helps Trace Short Circuits

An intermittent short that drains the battery can be traced with this simple tester. Extend the regular fuse from your car with a pair of leads connected to the fuse lugs. Mount the fuse in a cigar box with a pilot light and a toggle switch as illustrated. With the circuit of the car in use, the light will come on when the fuse blows and the switch is in the closed position. When the circuit is not in use, and the switch is open, it will light, being in series with a load across the fuse terminal lugs.

## Information on Car Engine Kept on Feeler Gauge

Important information on your car engine, such as spark-plug gap, ignition-point setting, firing order of the plugs, and valve clearance will always be at hand for instant reference if kept on the handle of the feeler gauge. Type or write the information on a paper label and glue it to the gauge, or use a piece of white tape. To protect the lettering, cover the label with cellulose tape.

Richard Hanscom, Elmhurst, Ill.



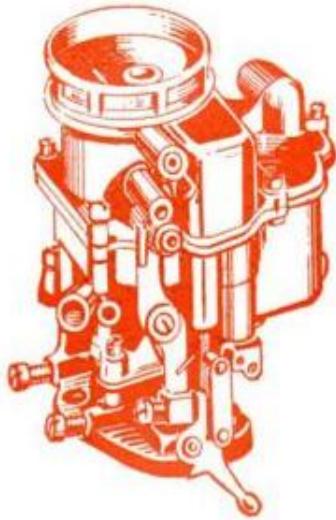
## Small Drain Hole Prolongs Muffler Life

Your muffler's greatest enemy is the condensation which collects in it after the car is left parked and the muffler is allowed to cool. The condensation is apt to be greatest in winter, especially after frequent short runs. The life of a new muffler can be prolonged, however, if you drill a small hole in the lowest portion in order to allow the condensation to drain out. Contrary to what many believe, this will not materially affect the safety qualities of the muffler.



# Trouble Shooting THE TOUGH ONES

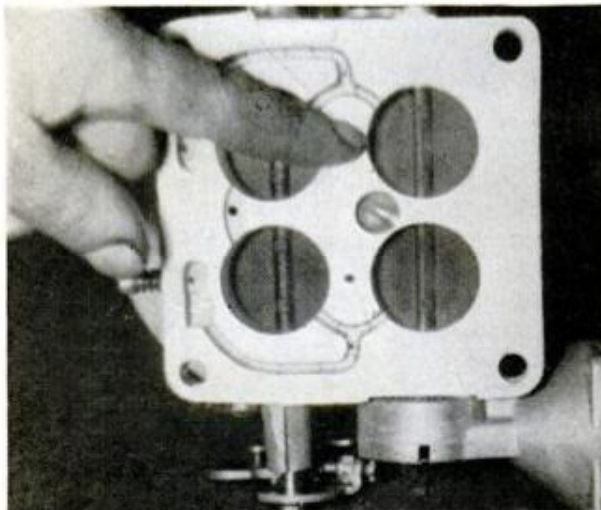
By Ben L. Davis



TUNING AN AUTO ENGINE is not just a matter of hooking up the cables from a "magic box" and reading a few dials, especially when a job is encountered that seems to defy all attempts at setting it right. Such was the case when a 1955 Mercury came into the shop.

This driver was convinced that his car couldn't be tuned, because the engine idled roughly despite several visits to as many garages. Since the motor was fairly cold the opportunity of listening to it warming-up suggested that the condition was somewhere in the carburetor. Irregular idling became more apparent as the automatic choke opened and the speed dropped. Adjusting the air-bleed screws had little effect.

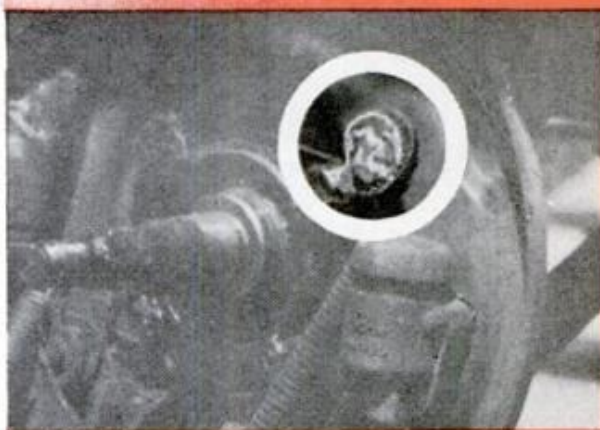
On a hunch, the carburetor was pulled off. I expected to find either clogged passages or a poor gasket. This presumption also proved false. Turning even closer attention to the carburetor gave the tip off. The secondary throttle valves on this four-barrel job were not in line with each other. Therefore, one of them couldn't have been seating at idle speed, photo at left, which accounted for the unevenness. Aligning the valves correctly and readjusting the engine took care of this tough one. ★ ★ ★



# Unusual Locations Where Trouble May Occur

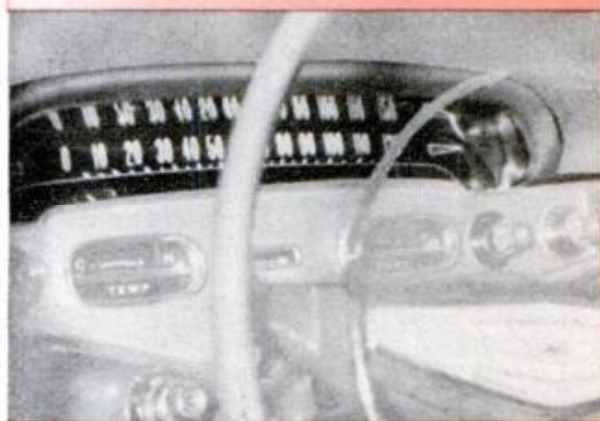
## Low Brake Pedal

Inability to get a high pedal on the 1955 British Ford is most likely due to a brake adjustment failure. A pin which joins the adjustment bolt head to the eccentric cam inside the wheel may break free from the cam. More often than not, the trouble begins when someone rotates the adjustment bolt in the wrong direction. This will bring the straight edge of the cam in contact with a brake-shoe pin. Pressure at this point will break the cam loose. Remember, the proper direction in which to turn the adjustment bolt is the direction away from the cylinder.



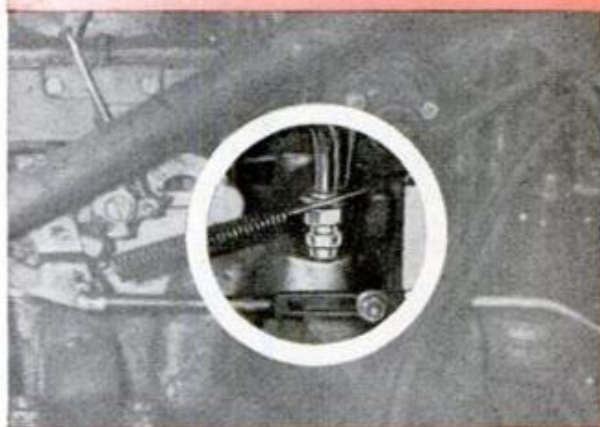
## Speedometer Sticks

Most automobile manufacturers calibrate the speedometers on new cars so that they register a higher speed than is actually being driven. This is done for safety reasons. The speedometer on the 1958 Chevrolet, however, does just the opposite. The needle sticks at zero and will spring back to its proper position only after the car is driven several blocks. The trouble is due to the design of the dial which causes the needle to hug the dial face. It is necessary to remove the speedometer and bend the needle away.



## Safety Switches

In their efforts to eliminate automobile troubles, manufacturers have added gadgets which sometimes work at cross-purposes. The 1957 Dodge, for instance, has two automatic safety switches between the ignition and the starter motor. The vacuum starting switch, circled, makes use of the engine vacuum to avoid accidental cranking while the motor is running. The switch is sometimes so effective that the motor cannot be cranked at all. You may then find it necessary to join the two wires leading to it in order to start your car.



## Sprung Doors

*SEE CORRECTION,  
APRIL 1960, p. 16*

Hardtops are beautiful automobiles, but be careful that you don't allow yours to be placed on a frame-contact hydraulic lift. This kind of lift will cause the car to rest with its weight on the frame and the hardtop will come under a "hogging" stress. This means that the points of support are brought closer together than they are when the car is resting on its wheels. The result—the weight of the body will be thrown outward and the doors will be sprung.





## Flashlight Becomes Flare For Night Auto Repair

Roadside repairs can be dangerous, especially at night. There is always the danger that drivers of oncoming cars will not see you in time to stop. You can prepare for such an emergency by carrying a homemade flare in your car. The flare consists of a flashlight covered by a red plastic container like the ones in which food, beverages and ice cream are bought. A wire stand can be devised to hold the flashlight upright in the road, or you can place it in a larger container stuffed with rags or paper. Placed a few feet up the road, the flare will provide a light strong enough to be visible at a considerable distance.

Arthur R. Tanner, Jr., Poughkeepsie, N. Y.

## Wrong Spark-Plug Gap Causes Engine to Overheat

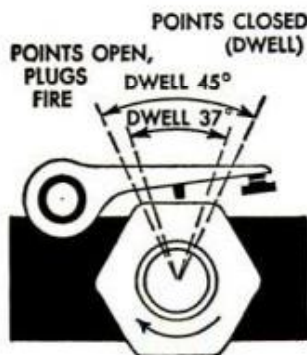


An automobile engine may at times be sluggish in performance and may even overheat due to no apparent cause. If the cooling system is not at fault, check your spark plugs. Poor spark-plug point adjustment can affect engine performance and reduce gasoline mileage.

Be sure that the spark plugs are set to the gap specified for the make and model of your car. A gap of less than .025 in. may not cause the engine to misfire but is bound to give you less than peak performance.

Glen F. Stillwell, Manhattan Beach, Calif.

## Replaced Breaker Points Call for Timing Check



Tune-up mechanics should never neglect to check the timing after installing a new set of points. Wear on the cam-follower arm, and a tilting of the breaker support plate, will change dwell angle more than two or three degrees.

Keep in mind that the plug fires only when the points are open. Thus, the earlier the points open, the greater the spark advance. Notice in the illustration that the breaker points open four degrees earlier when the dwell angle is changed from 45 to 37 degrees.



## Small-Car Parking Woes

Small cars with short wheel bases may be popular for their fuel economy and handling ease, but they take a beating in diagonal parking spaces where they are constantly being bumped by larger cars. Not being able to spot a small car hidden by its larger neighbors, the driver of a large car may pull in and actually hit the small job. With an increase in the number of complaints from the owners of both kinds of cars, many police departments have endorsed the idea and encouraged the drivers of small cars to allow the rears of their cars to stand in line with those of the cars parked on either side. In this way, an approaching motorist can easily see that the space is occupied.

John Yolton, Hayward, Calif.

**WHAT TO DO** about a closure for that problem clothes closet, that storage wall, that hall doorway opposite the bathroom—where there's no room to swing a conventional single door? The answer to that one is, use bifold doors. Decorwise they add an attractive detail to any room, swing in half the space, open and close at a touch, and are easy to hang with the new bifold door hardware.

Although you can use any one of several conventional single doors, or make them yourself, the louver or shutter-type doors pictured are recommended. They are light and easy to handle and can be finished in the natural wood or to match any color scheme. Have the hardware and doors at hand, but before you begin work, note these figures: To calculate the widths to which the individual doors must be cut to fit in a four-door installation when the hardware is surface-mounted, divide



Photo courtesy The Stanley Works

## HANGING

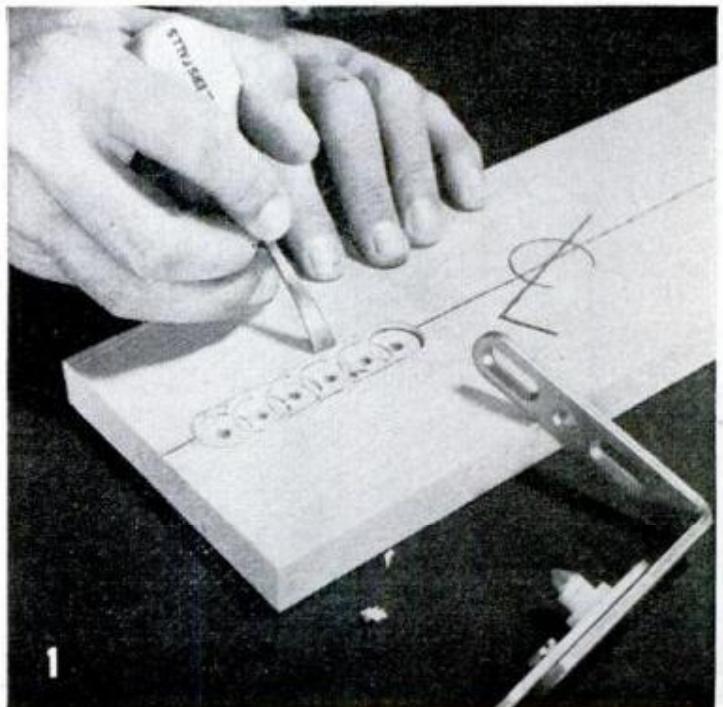


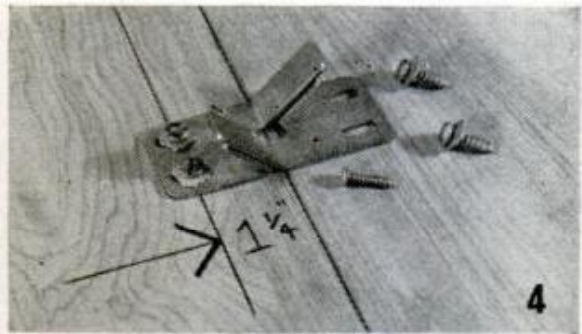
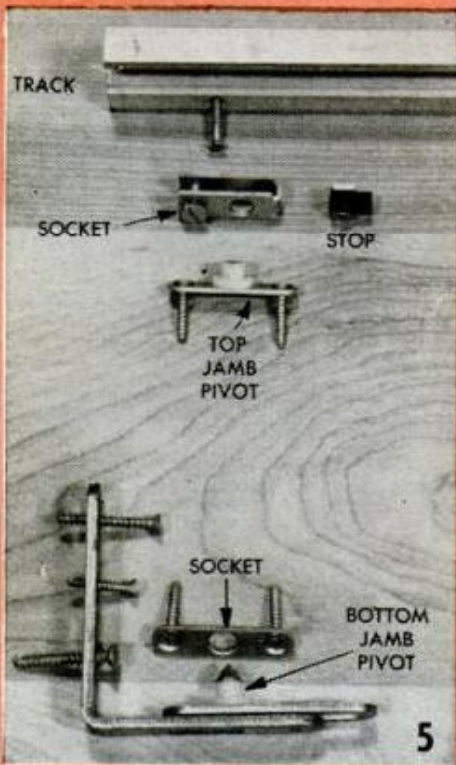
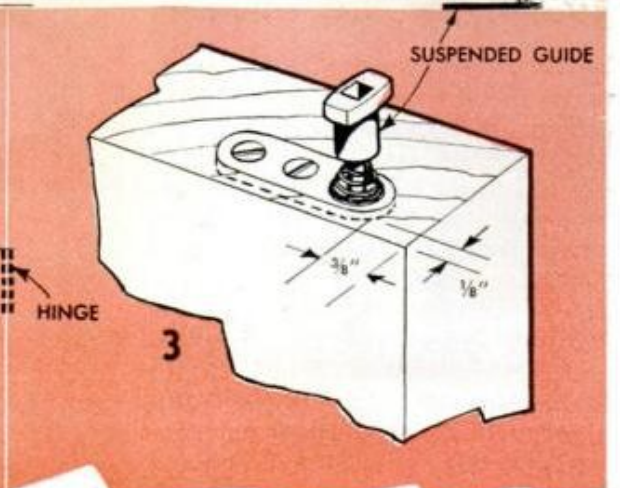
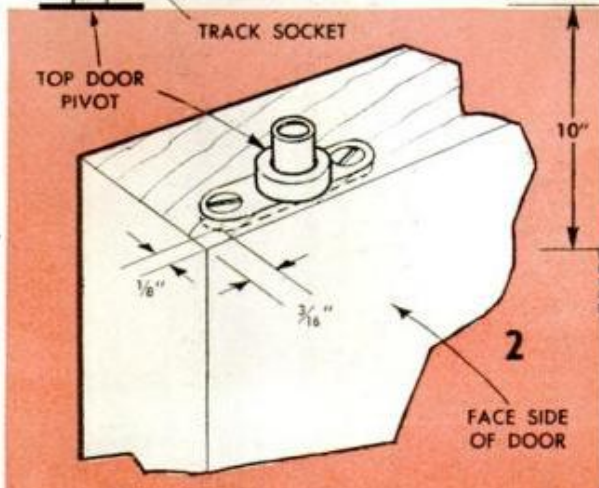
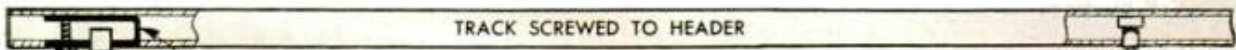
## BIFOLD DOORS

By R. J. DeCristoforo

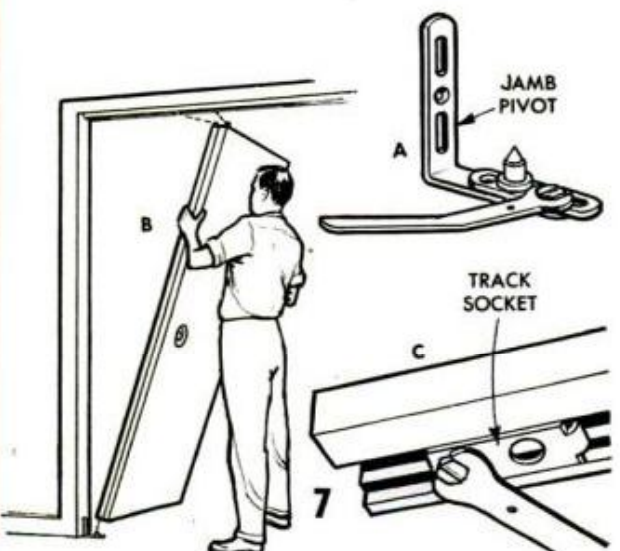
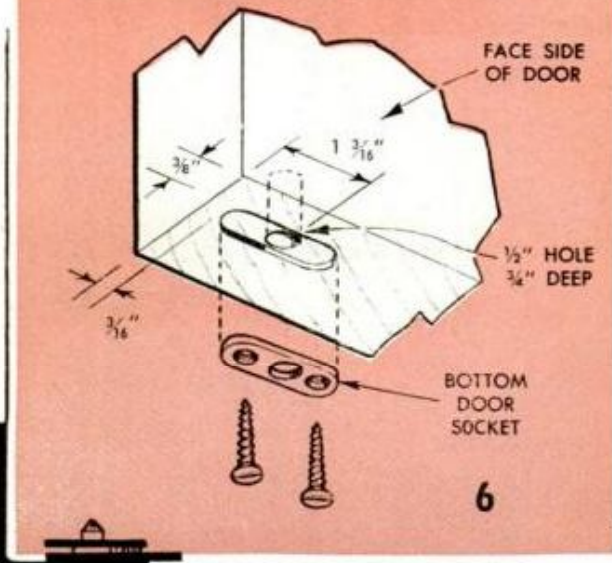
the width of the opening by 4 and deduct  $\frac{3}{16}$  in. If only two doors are used divide by 2 and deduct  $\frac{1}{4}$  in. If the bottom jamb pivot, Fig. 7, detail A, is mortised into the jamb as in Fig. 1, add  $\frac{1}{8}$  in. to the total of the door widths. The door height for mortised hardware must equal that of the finished opening less  $1\frac{3}{16}$  in. These dimensions apply when measuring from floor to header. Allow for rugs and carpeting.

Now note Figs. 2, 3, 6 and 7 which show the location of the butt hinges on the pairs of doors and how the top door pivot, the suspended guide and the bottom door socket are mortised into the top and bottom edges of the doors. The track socket, top pivot, bottom socket and jamb pivot are shown in their relative positions in the left-hand photo on the following page. The suspended





guides are attached to the inside pair of doors. The track is attached to the header as in Figs. 2 and 3. The track and the jamb pivot can be centered on the header and jamb as in Fig. 1, or can be attached flush with one edge. Only one section of track is used for a two-door job. Two sections are required for four doors. Place the pairs of doors in position as in Fig. 7, detail B. Note that the track socket and jamb pivot are adjustable for plumbing the doors after placement, Fig. 7, details A and C. Finish the job by installing the aligners as in the photo above. ★ ★ ★



## Discarded Implement Wheel Makes Fine Fence Turnstile

Sagging gates and run-away livestock are made a thing of the past with this fence turnstile. It is made by cutting away the rim and all but four of the spokes from a discarded implement wheel. A pipe axle is driven into the ground in the center of the fence opening. The hub and spokes are then mounted on the axle. The turnstile turns easily, permitting easy passage for adults and children, but providing an effective barrier for the livestock.

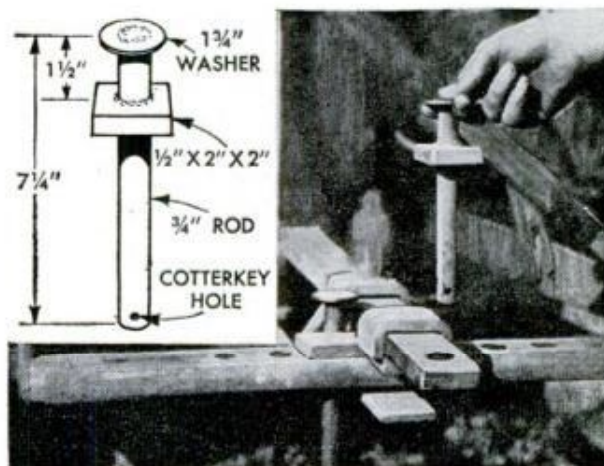
G. E. Hendrickson, Argyle, Wis.



## Modified Pin Prevents Injury

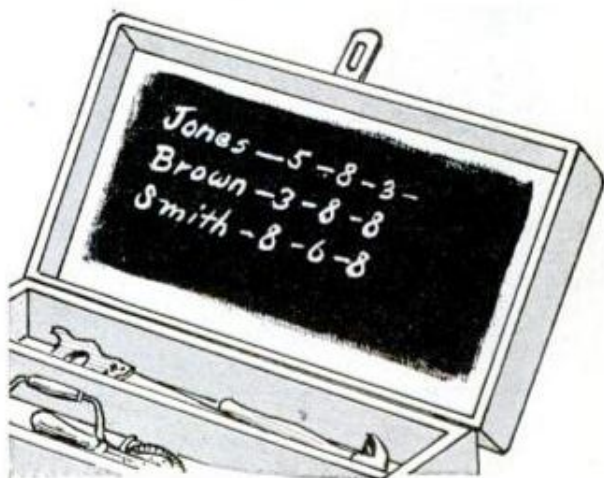
There is no need to risk injuring your hands and fingers every time you work the hitch on your tractor. Two safety hitch pins, like the ones illustrated, will hold the drawbar without sideplay. A 1 3/4-in. washer is welded to the top of a 3/4 x 7 1/4-in. rod. About 2 1/2 in. below this, weld on a block about 1/2 x 2 x 2 in. The block will leave enough pin length below itself to hold the drawbar. The space between the block and the washer provides a "handle" which you can grasp without fear.

A. M. Wettach, Mt. Pleasant, Iowa



## Toolbox Lid Is Handy Blackboard

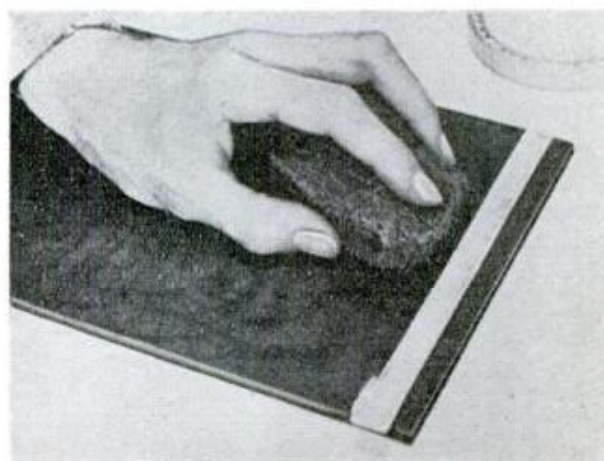
Job estimates, time records, dimensions and the like, have a way of getting lost, smudged and torn if kept on paper or in a small notebook. This problem is done away with if you use a portable blackboard. Simply paint an area on the inside lid of your tool box with blackboard paint. All you need to carry now is a piece of chalk which can be kept in the tool box itself. The data will be safe, handy, private and readable at all times. Rubbed with a damp cloth, the board is ready to be used again.—G. E. Hendrickson, Argyle, Wis.



## Use Cellophane Tape to Mask Trim

Don't risk ruining a fine piece of craftsmanship in the last stages by running a piece of sandpaper or steelwool over a cross-grain edge or trim strip. You can make a simple mask to avoid this by placing a piece of cellophane tape over the cross grain. This will allow you to do the waxing or sanding right up to the edge of the cross grain without leaving an unfinished area between the two pieces of wood. The trim strip itself can be finished in the same way without ruining the previous sanding or waxing job by masking the area around it with the same kind of tape.

R. Hanscom, Elmhurst, Ill.





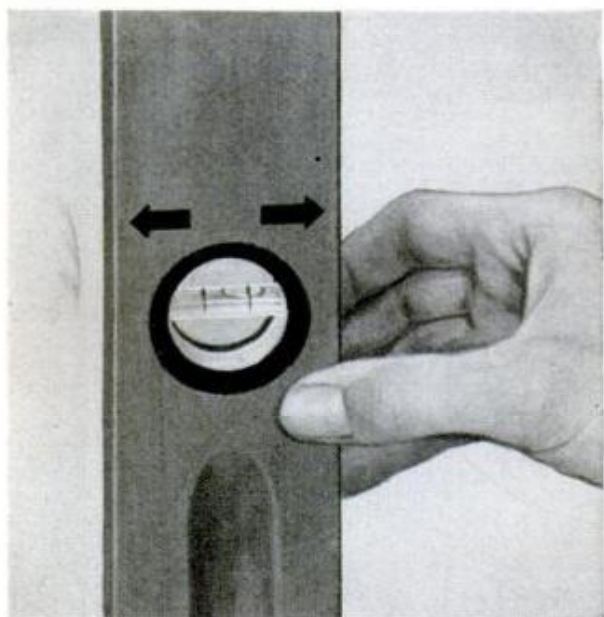
## Photographer's Timer Alarm Quieted With Adhesive Tape

In a small, quiet darkroom, the sudden, loud ringing of a timer alarm can be quite disconcerting, especially if you happen to be engrossed in other work at the time it goes off. The alarm of a timer, such as the one in the photograph, can be quieted down in the following manner. Remove the cover from the timer and apply several layers of heavy surgical, adhesive tape to the bell at the point where it is struck by the clapper. The tape will serve to effectively reduce the loudness of the ringing to a bearable level and you will still be able to hear it at a considerable distance from the darkroom if you must leave a timed project in process.—Kenneth Murray, Colon, Mich.



## Drums Turned on Wooden Platform

When heavy, steel drums are to be loaded into a railway car or truck, it is often necessary to roll them into position on the loading platform and then turn them at right angles to roll them onto the loading ramp. Since the steel drums are made with straight sides, considerable effort must be used to twist them into the proper position. To solve this problem, a four-way ramp, like the one illustrated, can be made easily. Lap a piece of 2 x 4 in. stock about 3 ft. long into another piece of the same length. The pieces should be cut so that both ends slope from the center. Secure the two pieces with heavy nails and you will be able to roll, twist and turn steel drums with less than half the effort it once required. If it is secured permanently between the loading dock and the ramp, the device will ease both the loading and unloading of the barrels.—G. E. Hendrickson, Argyle, Wis.



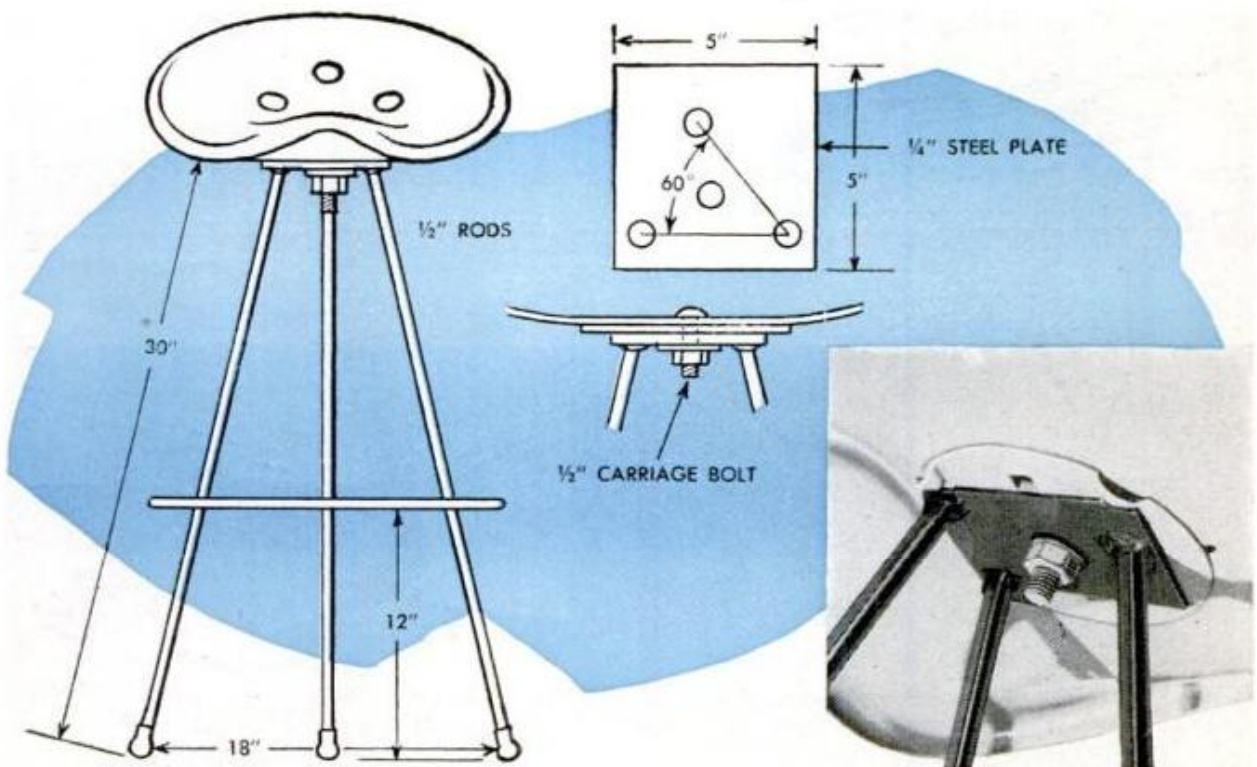
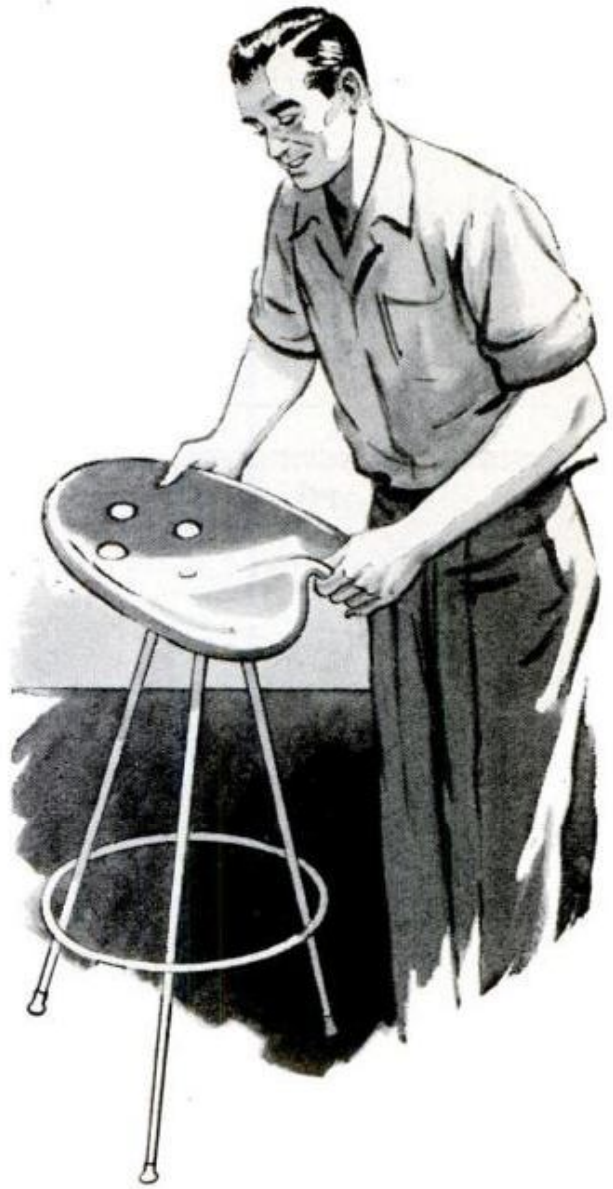
## Painted Arrows Tell Direction In Which to Move Spirit Level

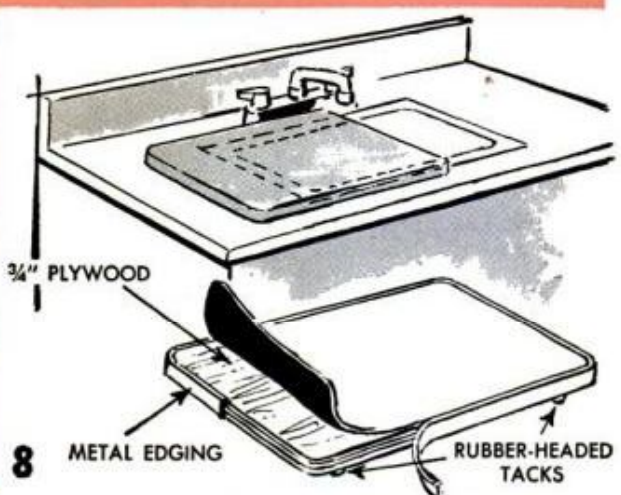
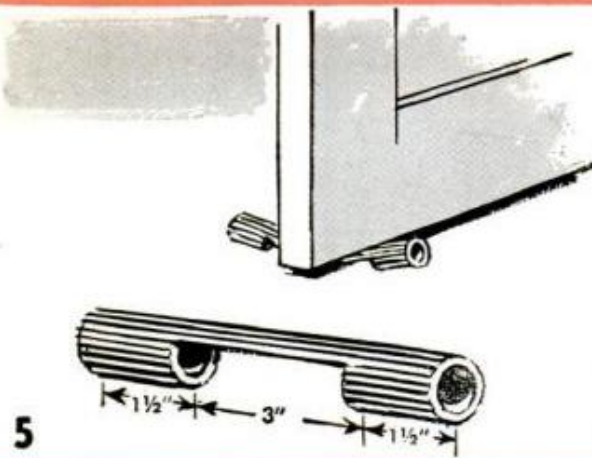
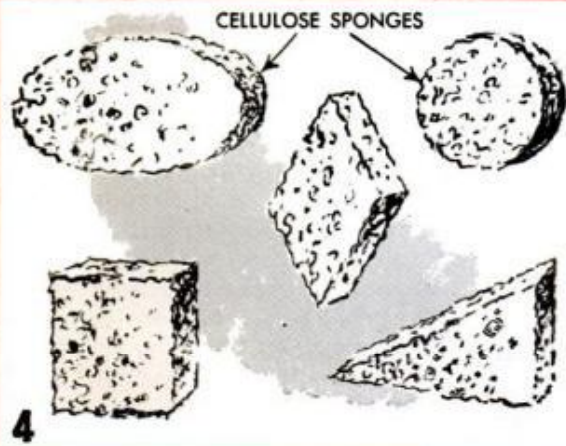
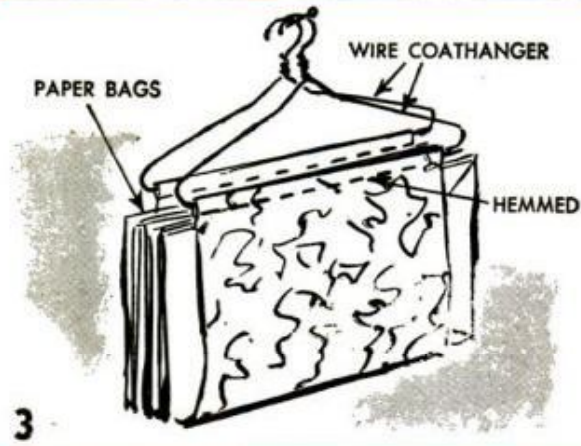
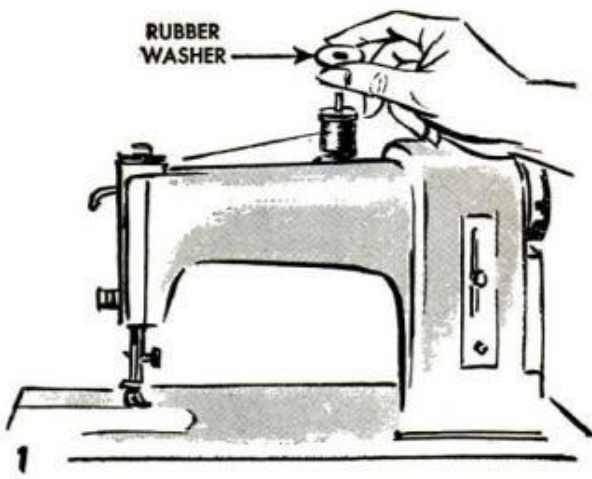
If you have ever tried to level or to plumb work with a spirit level, you may have found yourself becoming confused trying to decide which way to move the level and the work to bring the bubble to center. The next time you try this, you will eliminate all guess work if you paint an arrow at each end of the bubble tubes. The arrow at the end of the tube where the bubble stops will automatically indicate the direction in which the level must be moved in order to bring the work into proper position and the bubble to center. The direction in which to move the level will be determined at a glance. Arrows may be cut from reflective tape for working in poorly lighted areas.—R. Hanscom, Elmhurst, Ill.

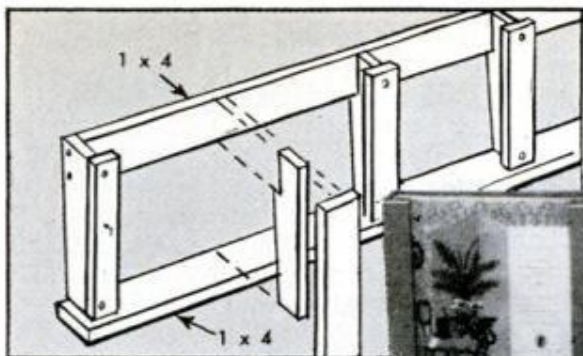


# Inexpensive Stools From Discarded Items

AROUND MOST HOMES and farms there are discarded items lying about that can be converted into useful and attractive additions for the home, shop, or recreation room. Utility stools, for example, can be made at practically no cost. The one shown was made from the seat of an old cultivator and makes a comfortable shop or bench stool. If you want something different, make several and use them as counter stools. The legs are  $\frac{1}{2}$ -in. steel rods welded to a  $\frac{1}{4}$  x 5 x 5-in. steel plate. The leg assembly is then secured to the seat with a  $\frac{1}{2}$ -in. carriage bolt. The height of the seat may, of course, vary to suit individual needs and tastes. A similar stool may also be made from an old kitchen chair. The legs are removed and replaced with either wooden or metal legs of the desired length. An old fashioned dining-room chair with arm rests used in this manner makes a fine "captain's" chair. If you are a boat owner, here is something else you can try; saw the legs off an old kitchen chair and secure the back and seat with screws or C-clamps to a boat seat. Add cushions and you will have provided yourself with a comfortable back rest. Folding or card table chairs may also be used in this manner. They have the added advantage of folding out of the way when not in use or when additional deck-space is needed. You will find the uses for discarded items are almost limitless.







9



## Solving HOME PROBLEMS

**1. SEWING-MACHINE THREAD** can be kept from unwinding too fast if a rubber washer is fitted snugly over the tip of the spool spindle. Cut the washer from a piece of inner-tube rubber just large enough to cover the head of your largest spool of thread

**2. A HANGING VASE** for ivy, Chinese evergreen or other water-grown plants can be made from a small Chianti bottle. Stripped of its straw base, it can be hung from a trellis or near a window where the light will shine brightly through the clear, green glass

**3. PAPER BAGS** won't be scattered all over the kitchen if they are kept in this handy container. It is made of cotton or plastic material hem-stitched to two wire hangers and can be hung in any convenient corner. It also makes a fine carrier for wild or garden flowers

**4. STIPPLED PATTERNS** for walls, panels and novelties are painted with flat synthetic sponges. Cut the sponges into oval, or diamond shaped patterns and your work will have that "different" look. Sponges can be cleaned and stored for future use

**5. A DOOR STOP**, which will mar neither the floor nor the door finish, is made from a piece of garden hose. A section of the hose is cut out leaving two larger end pieces. Slipped under the door, it lets you adjust the door opening without removing the stop

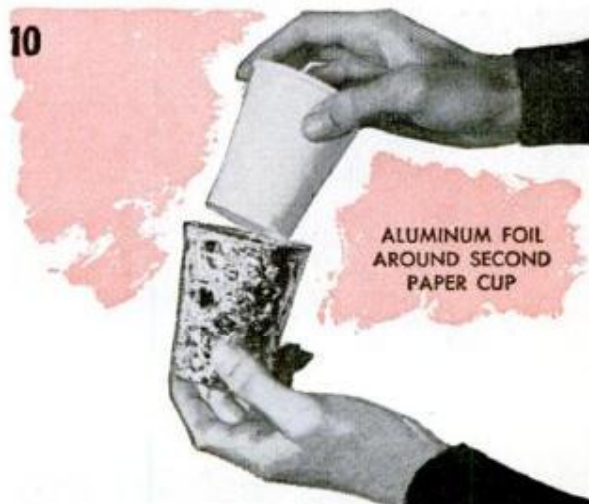
**6. CHILDRENS' MITTENS** will be kept dry and comfortable through a day of hard snow playing if a small plastic food bag is first slipped over each mitten. They are fastened with a stout rubber band over the opening at the child's wrist. The plastic will prove durable and inexpensive to replace when torn

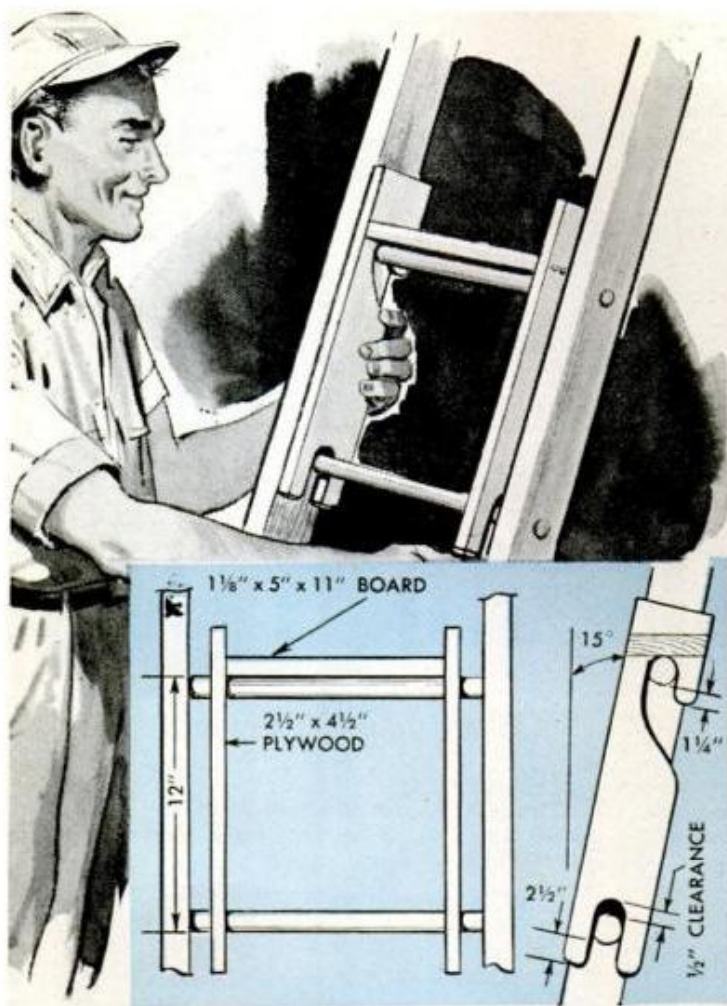
**7. SLIPCOVERS** are adjusted easily on your overstuffed furniture, using a rubber plate scraper to tuck the fabric into the spaces between the cushions. The scraper does the job without tearing the fabric

**8. WORK-TOP SPACE** in your kitchen can be increased with a cover fitted over the sink. Made of 3/4-in. plywood and covered in colors to suit, the cover slides on and off the sink on rubber-headed tacks

**9. RECORD ALBUMS** are displayed like pictures on the wall and become part of the room decoration with this modern album holder. The holder can be cut and assembled in one evening. Its length and depth are determined by individual taste and storage needs

**10. PAPER CUPS** used to hold hot liquids will neither scald your hands nor allow the liquid to cool rapidly if the cup is placed inside another cup which has been covered inside and out with aluminum foil



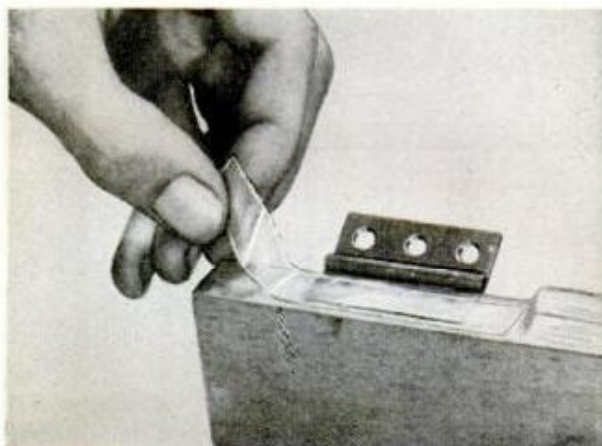


## Removable Foot Rest Eases Painting Pains

Standing for long hours on the narrow rungs of a ladder will tire your feet and increase your general fatigue. This removable foot rest will remedy the situation. The step is cut from  $1\frac{1}{8}$  x 5 x 11-in. stock. The sides are  $2\frac{1}{2}$  x  $4\frac{1}{2}$ -in. plywood, slotted as indicated in the illustration. The top slot forms a hook which fits over the top rung of the ladder. It is important for safety's sake to allow a  $\frac{1}{4}$ -in. overlap so that the rest cannot slide off. The bottom of the rest does not really touch the rung. A clearance of  $\frac{1}{2}$  in. is allowed between the rung and the top of the slot. Thus, your full weight will be centered on the top portion of the rest. Make the rest narrow enough to slide between the sides of the ladder. It will be a simple matter to lift the rest out and raise it up the ladder to suit your needs. The pieces are held together with  $\frac{1}{2}$ -in. wood screws and should support your weight in comfort and safety. —Robert L. Sargisson, Berwyn, Ill.

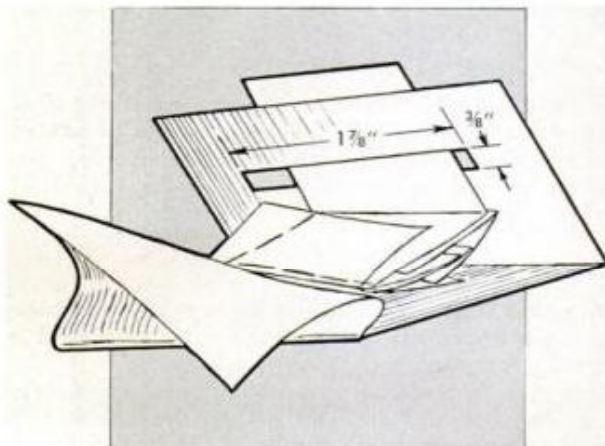
## Tape Holds Hinges in Place

Screwing hinges into a standing door or holding them to a precise place in their rabbets can be an annoying job as the hinges have a way of sliding out of place. This bit of nuisance can be eliminated with a piece of cellophane tape. The tape, placed over the hinge, will hold it in place while the screws are being driven. The tape is then stripped off. Since the tape leaves no residue of adhesive, there is nothing further to remove or clean before applying a coat of finish—H. Hanscom, Elmhurst, Ill.

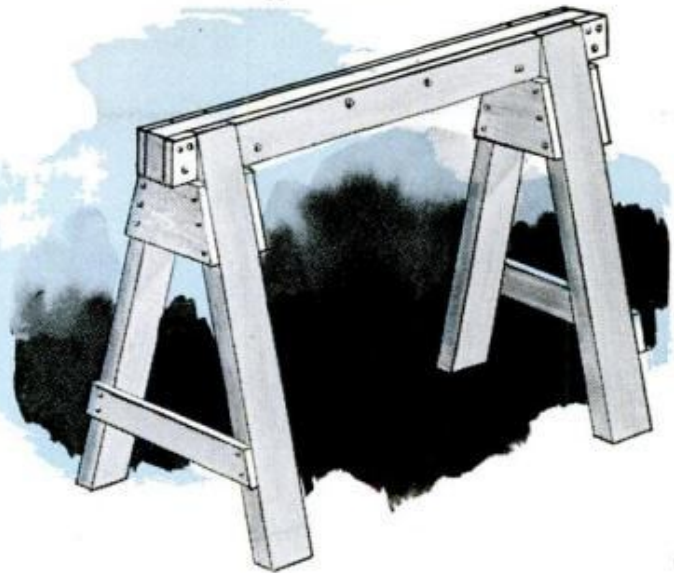


## Cigarette-Paper Dispenser

Rolling your own can be exasperating when a stiff wind threatens to take away your "makings." However, a dispenser can be made in a few minutes. Cut a  $\frac{3}{8}$  x  $1\frac{7}{8}$ -in. slot in the back of the paper book your cigarette paper comes wrapped in. Fold the papers end to end and interlace them so that the top fold of each sheet covers the bottom fold of the sheet above. Insert the first sheet through the slot in the cover and the papers will pop out one at a time as you need them.—B. D. Hill, Meridian, Miss.

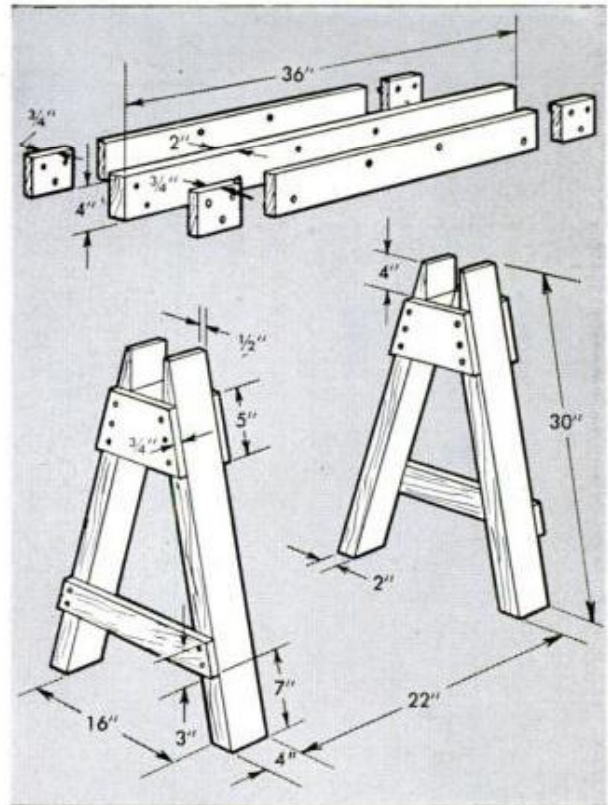


# Collapsible Wooden Sawhorse Folds Away When Not in Use



If yours is a small home workshop with limited working space, you will prize this strong and sturdy, yet completely collapsible sawhorse. Though collapsible, the sawhorse is designed so that there is no sacrifice in utility or in strength. The cross bar of the horse is a piece of 2 x 4-in. stock on each side of which are centered and mounted two pieces measuring  $\frac{3}{4}$  x 4 x 20 in. On the ends are mounted four pieces  $\frac{3}{4}$  x 4 x 4. This leaves a space four inches from each end which fits into the top of the leg assembly. Each set of legs is constructed of a pair of 2 x 4-in. pieces 30 in. long. Each piece, beginning 4 in. from the top, tapers to  $\frac{1}{2}$  in. Two sets of  $\frac{3}{4}$  x 5-in. braces serve to secure the leg assemblies at the top, and a piece measuring  $\frac{3}{4}$  x 3 on the outsides near the bottom finishes the job of construction. The sawhorse is put together by sliding the cross bar into place. The spaces left in the bar at the ends are sanded smooth on the inside edges so that the bar fits easily into the openings at the top of each leg assembly. All pieces are secured with  $\frac{3}{4}$ -in. wood screws.

Ted M. Fenn, Skokie, Ill.



## Common Items Help to Solve Tough Household Problems

Items common to every home often can help solve a tough problem. For instance, glycerine will remove a stopper stuck in a bottle. Pour a little around the neck of the bottle and allow it to stand for a few hours. The stopper will then come off with little trouble. Glycerine can also be used as a lubricant for kitchen appliances. The use of petroleum-based oils would spoil your food. It is a good lubricant for mixers, beaters, blenders and the like, and is at the same time odorless and tasteless. Even

such a common thing as bread can be put to surprising uses. Since the slightest amount of dampness in a verticle copper tubing installation will make soldering impossible, something is needed which will absorb the moisture and yet not clog the pipe. A piece of bread inserted a few inches up the pipe will absorb the moisture and help to sweat the joint. When the soldering job is finished, the water can then be turned on and will wash the bread away.



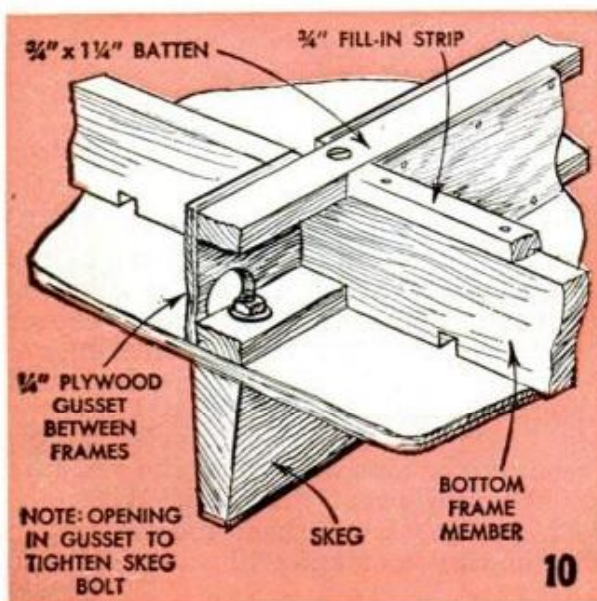
## BUILDING THE PM HOUSEBOAT

PART II

**I**N THE EVENT you have not actually started construction of this trim little houseboat, presented last month, a clarification in dimensions of the bottom frame members should be noted. Bottom members of frames 1, 2 and 8 are  $4\frac{1}{2}$  in. wide, whereas bottom members of frames 3, 4, 5, 6 and 7

are  $5\frac{1}{4}$  in. wide. While this  $\frac{3}{4}$ -in. variation tends to "level" out the floor at the bow and transom, it is of no great consequence if you have gone ahead and made all the bottom members  $4\frac{1}{2}$  in. wide. It merely means that the floor will have a somewhat greater upward sweep as it follows the contour of the hull bottom at the bow and transom. Also, any question as to how the joints are staggered in planking the bottom of the hull is clarified in Fig. 11. The two panels identified with color are applied first and at the specific frames indicated. You can't miss in applying the rest of the panels.

Resuming construction, your next step is to saw off the projecting waste ends of the side frame members. Since the deck has a 2-in. camber (crown), these members should be cut off at a 4-deg. angle rather than at right angles. A T-bevel held against the side planking is a handy tool to use for marking each member for sawing. A handsaw will have to be used for this and you should try to saw as squarely as possible. The projecting ends of the stiffeners at the bow and transom also are cut off at this time but these are cut flush



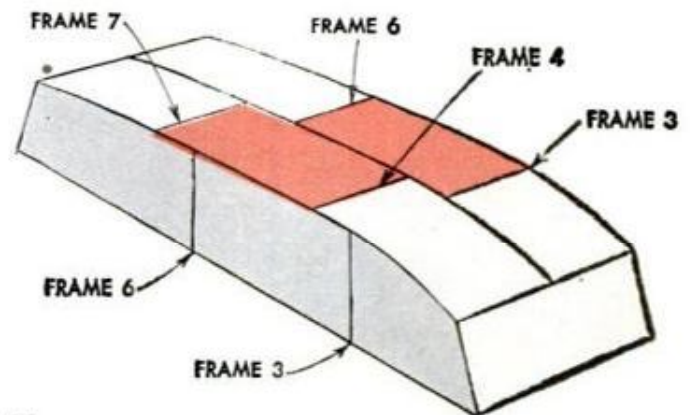
with the faired edge of the planking. In both cases, the waste ends are cut off at the very edge of plywood planking.

The nine floor battens including the main one at the center are added next. These are placed on top of the bottom frame members, from bow to transom, directly above the planking battens and keel and against the side frame members. A single brass screw (2½"-No. 10) is used at each frame to fasten the battens, whereas two screws are used to fasten the center batten in place directly above the keel. Fig. 10 shows how the floor and bottom planking battens, as well as the keel, are boxed-in with ¼-in. plywood gussets to give additional rigidity to the hull at points where the skegs are attached. The gussets are cut to fit between the frames and flush with the tops of the floor supporting members. Openings are made in the gussets at points opposite the skeg bolts so there is provision for future tightening of the nuts. Gussets are added only to the members to which the skegs are bolted. They are not applied to the other battens. Since the supporting floor members rest on top of the frames, fill-in strips are used to bridge the gap between the longitudinal members. These are nailed and glued to the top edges of the frames as shown in Fig. 10. You'll have better footing when working inside the hull if it is floored now. However, since bilge access openings must later be cut in the floor, as well as openings for members which support the forward berths, the ¼-in. floor panels should only be fastened temporarily in place at this time. Floor the entire area between the frame side members, from bow to frame 8.

Your next step is to cut five deck beams. These are laid out on 1½-in. fir stair-tread

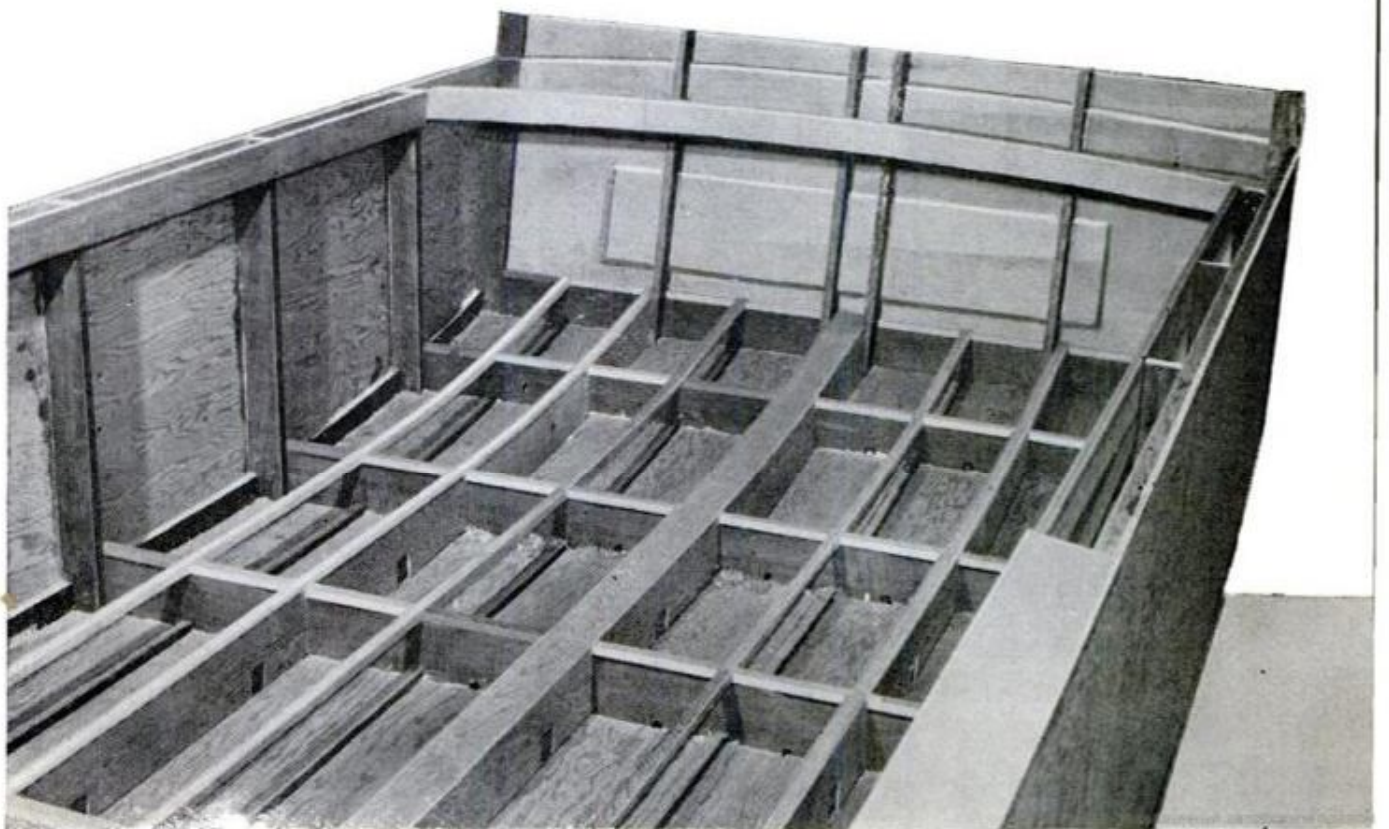


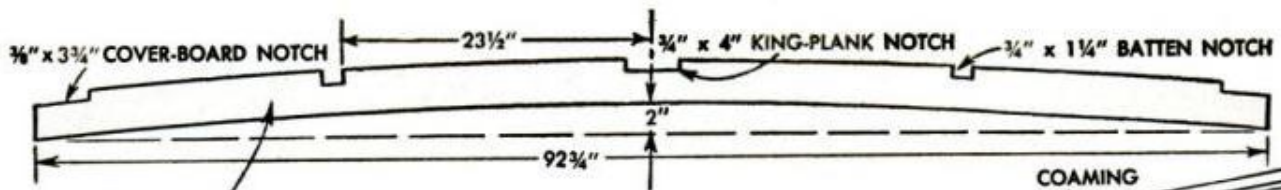
Waste ends of frame side members, plus bow and transom stiffeners, are sawed off even with top of planking. Side members are cut off at 4-deg. angle



## 11 ARRANGEMENT OF BOTTOM PLANKING

material, following Fig. 12. Cut to fit between and butt against the sheer members, the three beams for the fore deck are notched at the ends for cover boards and also for a king plank and two deck battens. Two of the beams are fastened to the for-





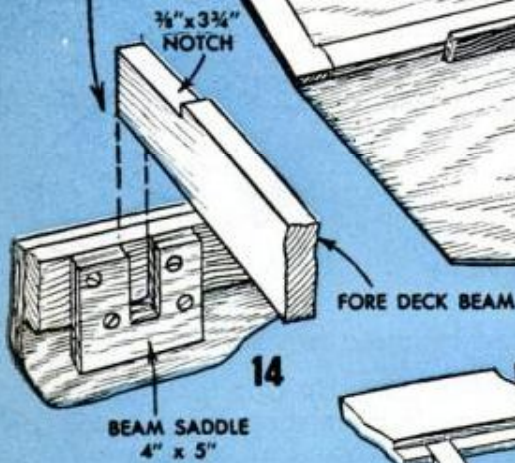
1 1/2" x 3 3/4"  
DECK BEAM

**12** FORE AND AFT DECK BEAMS, 4 REQD.

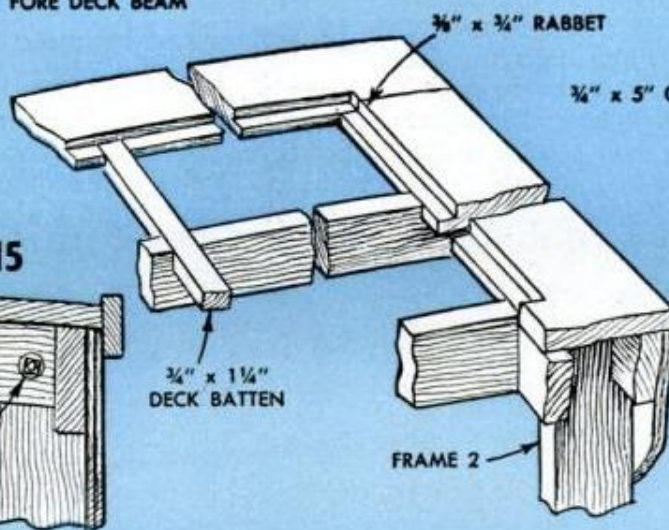
COAMING

FRAME 2  
SHEER CLAMP

RABBETED



**14**  
BEAM SADDLE  
4" x 5"



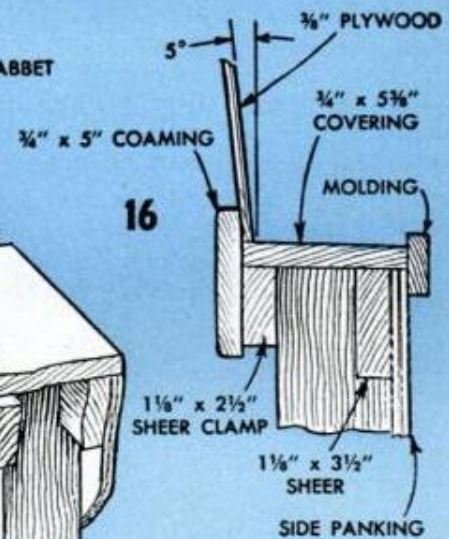
**15**  
3/8" x 3/4" RABBET

DECK BEAM  
1/4" CARRIAGE BOLT

SECTION A-A

3/4" x 1 1/4"  
DECK BATTEN

FRAME 2



**16**

1 1/8" x 2 1/2"  
SHEER CLAMP

1 1/8" x 3 3/4"  
SHEER

SIDE PANKING

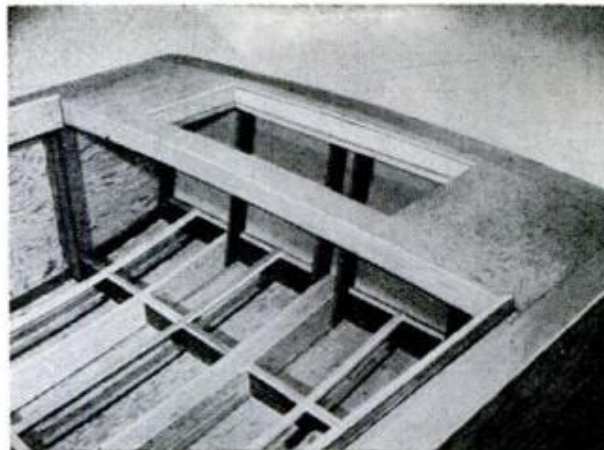
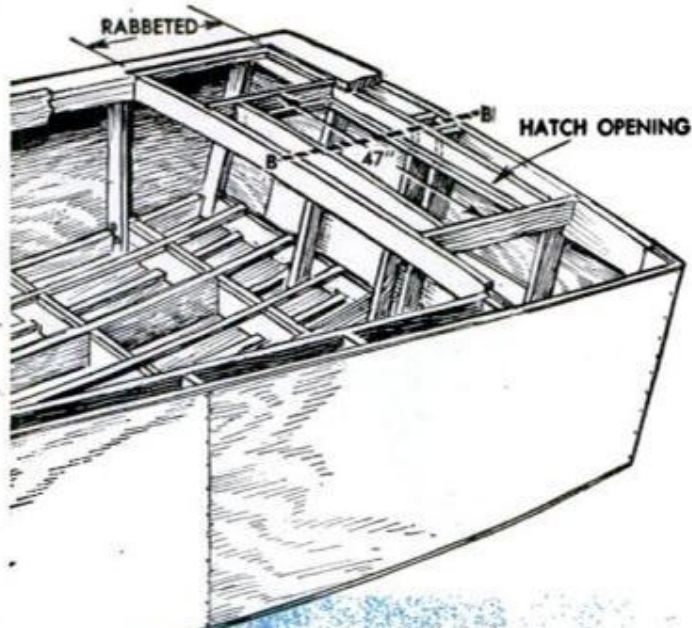
**13**

ward faces of frames 1 and 2 with glue and a single brass carriage bolt as shown in Fig. 15. The third fore-deck beam rests in two plywood saddles which are cut as shown in Fig. 14 and glued and screwed to the sheer members midway between the bow frame and frame 1. Glue the beam in the saddles and drive long brass screws into the ends through the planking and sheer members. The fourth deck beam, which is bolted to frame 8, differs from the others in that no notches are required. Dadoes, however, are first cut 1/2 in. deep

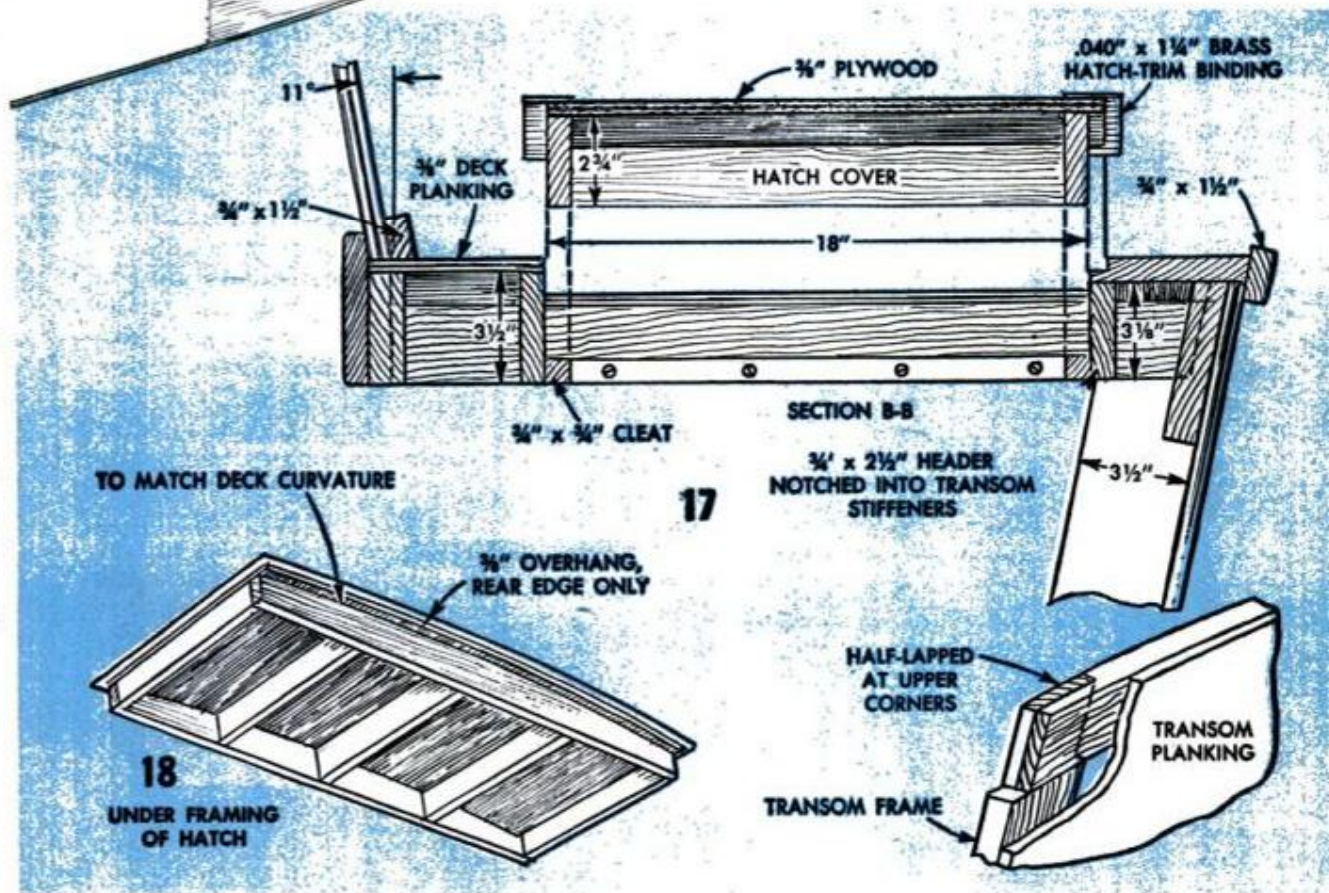
across the aft face of the beam to house the members which frame the aft hatch opening. Locate the dadoes so they center at points marked 23 7/8 in. each way from the center line of the hull.

Members called the inner sheer clamps are added next to both port and starboard sides. These butt against deck beams at frames 2 and 8 and are glued and screwed to each side frame member as in Fig. 16. Next in order are the cover boards which are applied along the sheer and across the bow and transom. Due to the overall length

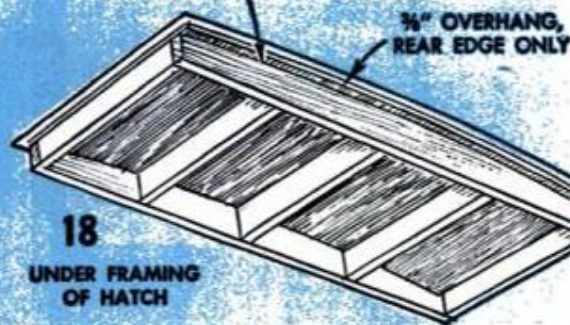




Hatch to gas tanks and battery compartment is framed as detailed below. Hatch cover rests on cleats screwed to inside of opening. One-piece plywood deck is cut out over opening after deck is fastened in place. Deck is later covered with glass-fiber cloth



TO MATCH DECK CURVATURE

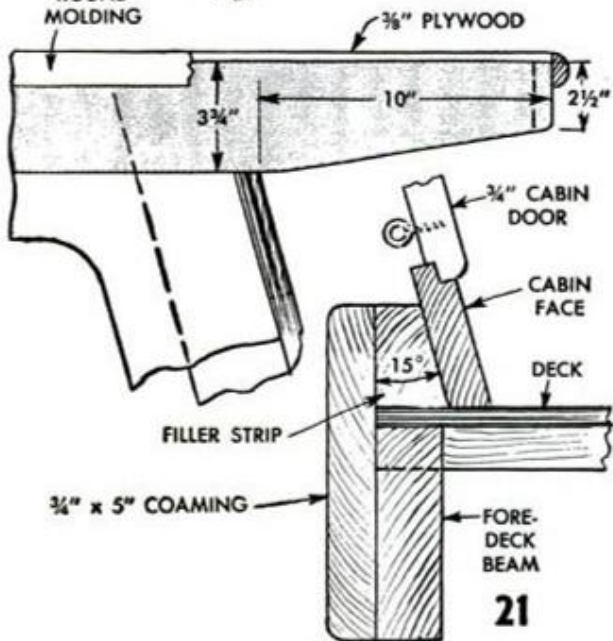
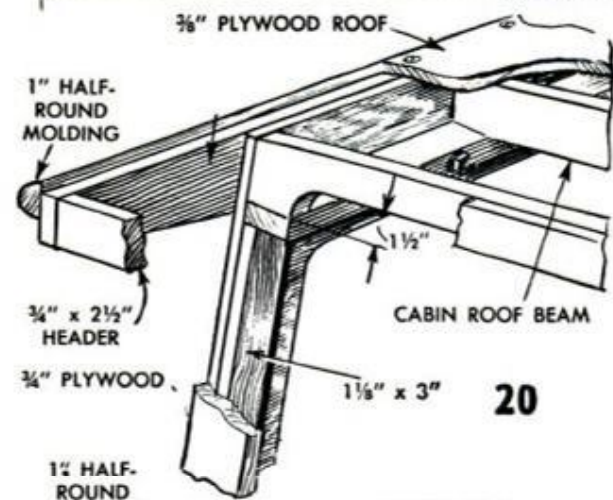
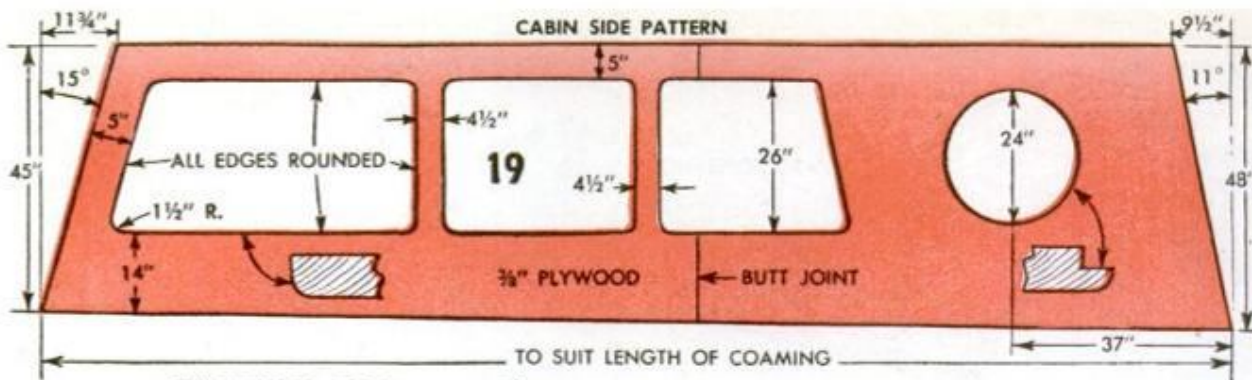


18

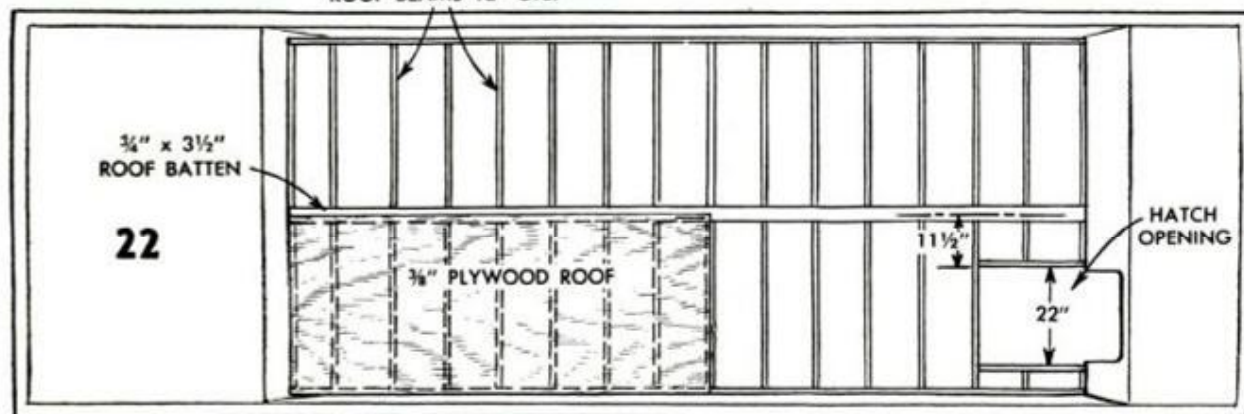
UNDER FRAMING OF HATCH

required, chances are the boards will have to be pieced along the sheer. Note that they butt against the bow and transom cover boards. In studying Fig. 13, you will notice that portions of the cover boards, both fore and aft, are rabbeted to allow the deck planking to fit flush. If a portable router is at hand, the rabbeting can be done after the cover boards are in place, otherwise the rabbeting should be done beforehand. Most of it can be worked with a circular saw and later squared up with a chisel. Being only  $\frac{3}{4}$  in. thick and 8 ft.

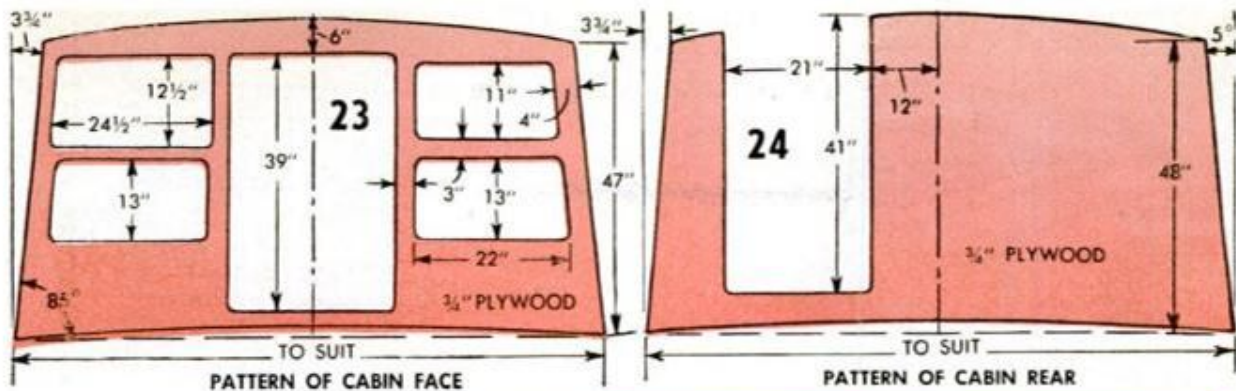
long, you'll have no trouble in springing-in the bow and transom cover boards to assume the 2-in. deck crown. After the cover boards are installed you can complete the framing of the fore deck by adding the king plank and battens. Notches in the bow cover board house the forward ends of these members. A single panel of  $\frac{3}{8}$ -in. plywood is used to plank the fore deck. This fits flush in the cover-board rabbets. At frame 2 the deck planking is brought even with the after face of the deck beam.



ROOF BEAMS 12" O.C.

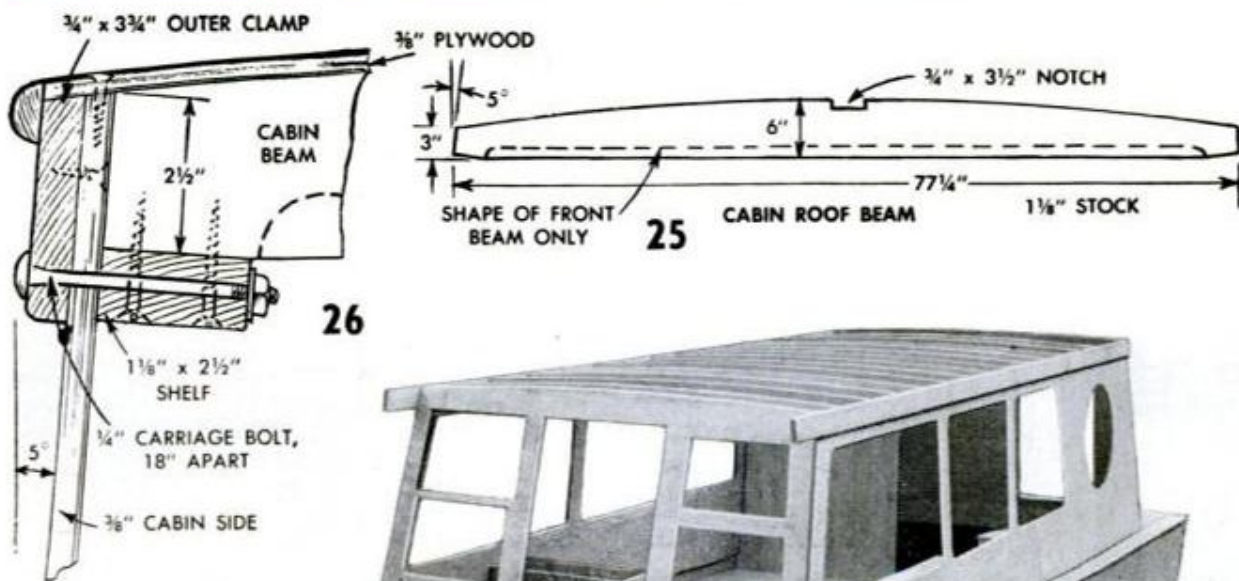


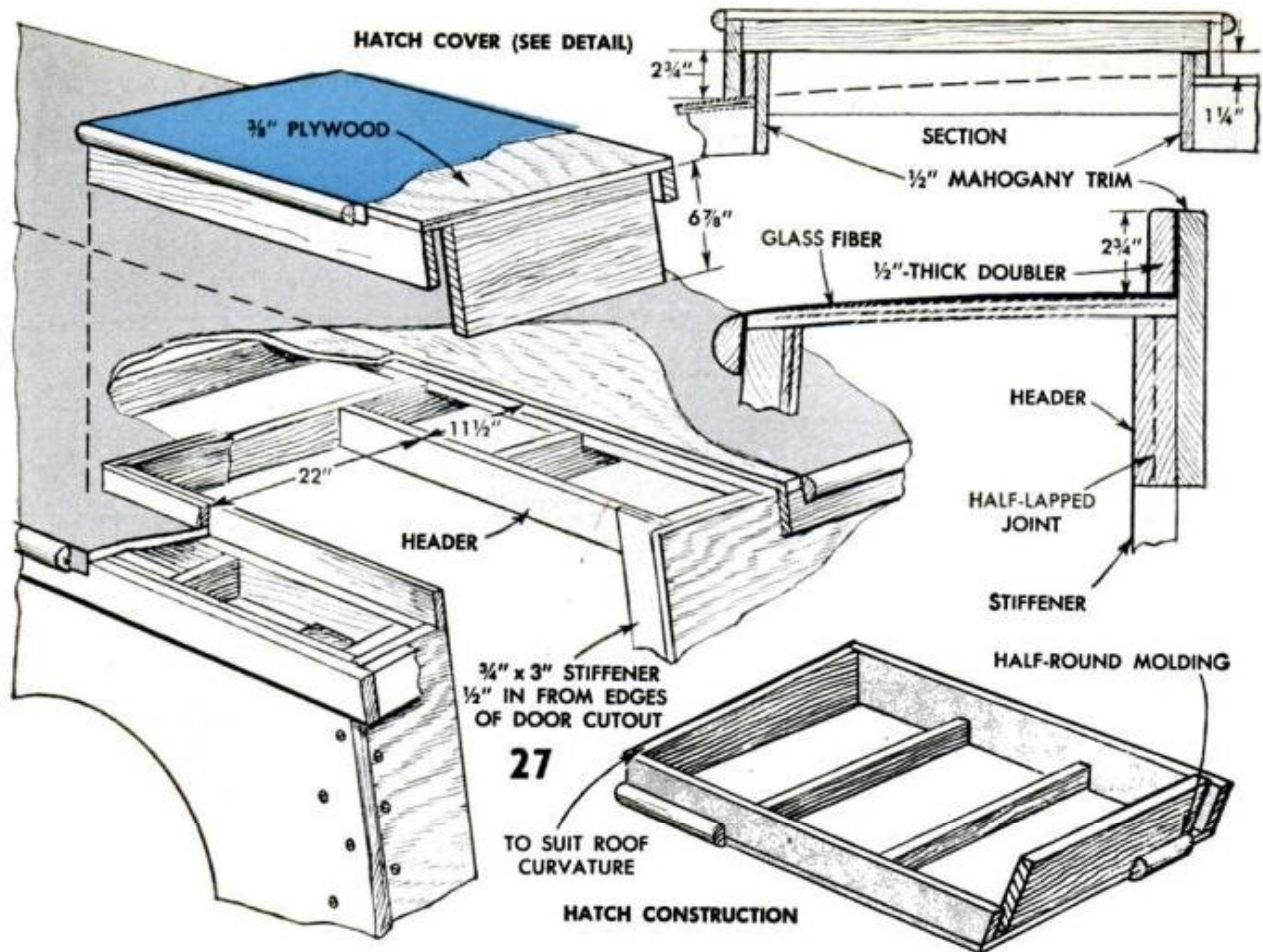
The 18 x 47-in. hatch opening in the aft deck is framed with four headers installed as shown in Fig. 17. Here a sectional drawing at the centerline shows how 3/4 x 2 1/2-in. members are housed in the dados previously made in the deck beam and in dados cut in the top transom member. The hatch opening is made 18 in. wide by fitting crowned headers between the others, one being 3 1/2 in. wide and the other 3 1/8 in. wide. You will note that the latter is positioned flush with the rabbeted edge of the transom cover board. The after-deck planking is a single plywood panel too, cut out over the hatch and trimmed to fit neatly in the rabbeted edges. While the hatch cover actually rests on 3/4-in.-sq. cleats in the opening, the cover planking overhangs the after edge 3/4 in. to fill the cover-board rabbet. It also has a flat-brass, overhanging trim binding applied all around the top. The binding is left off, however, until after the decks and cabin roof have been covered with glass fiber. Like the planking on the fore deck, the after-deck planking is kept flush with the forward face of the deck beam. As a final step before starting the cabin, a 5-in. coaming member is added to the faces of the sheer clamps and the deck beams. Projecting 1 1/4 in. above the cover boards and fore and aft decks, you will note in Fig. 16 that the coaming has a 5-deg. bevel 1 1/4 in. wide along the outer top edge at the sheer. The coaming across the aft deck has an 11-deg. bevel but the coaming across the fore deck has no bevel at all. Instead, a 1 1/4-in.-wide filler strip,



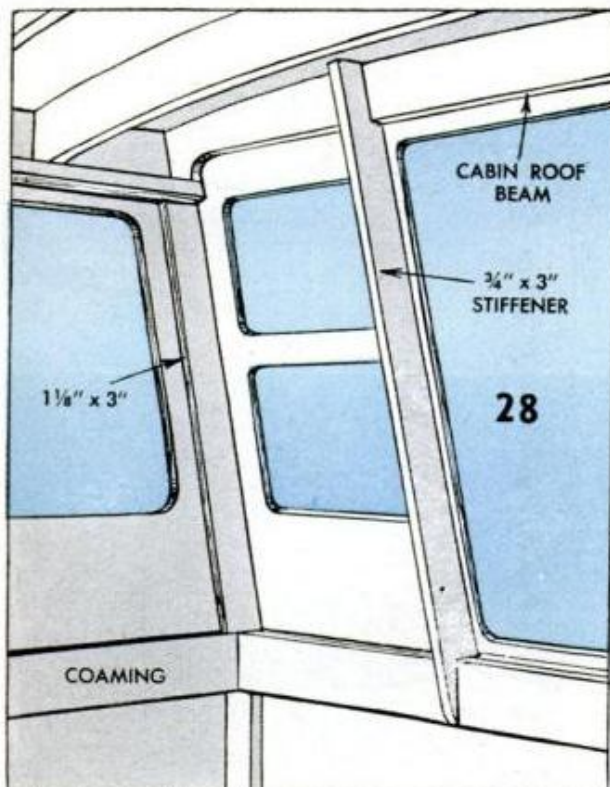
### MATERIAL LIST

- |  |   |
|--|---|
| 8 pcs.— $\frac{3}{4}$ " x $1\frac{1}{4}$ " x 20'-4"—Floor battens                | 1 pc.— $1\frac{1}{2}$ " x 2" x 84"—Fore filler strip                              |
| 1 pc.— $\frac{3}{4}$ " x 4" x 20'-4"—Center batten                               | 2 pcs.— $\frac{3}{4}$ " x $3\frac{3}{4}$ " x 16'-6"—Outer roof clamps             |
| 3 pcs.— $\frac{3}{4}$ " x $1\frac{1}{4}$ " x 12'-0"—Batten filler strips         | 2 pcs.— $\frac{3}{4}$ " x $3\frac{3}{4}$ " x 84"—Outer roof clamps (Fore and aft) |
| 6 pcs.— $\frac{1}{4}$ " x $5\frac{1}{4}$ " x 20'-0"—Plywood gussets              | 1 pc.— $\frac{3}{4}$ " x $3\frac{1}{2}$ " x 16'-6"—Cabin-roof batten              |
| 3 pcs.— $1\frac{1}{4}$ " x $5\frac{1}{2}$ " x 92 $\frac{3}{4}$ "—Fore-deck beams | 4 pcs.— $\frac{3}{4}$ " x 48" x 9'-0"—Cabin-roof panels (Plywood)                 |
| 1 pc.— $1\frac{1}{2}$ " x $5\frac{1}{2}$ " x 92 $\frac{3}{4}$ "—Aft-deck beam    | 4 pcs.— $\frac{3}{4}$ " x 1" x 12'-0"—Cabin-roof molding (Half round)             |
| 2 pcs.— $\frac{3}{4}$ " x $1\frac{1}{4}$ " x 60"—Fore-deck battens               | 2 pcs.— $\frac{3}{4}$ " x $2\frac{1}{2}$ " x 26"—Aft-hatch headers                |
| 1 pc.— $\frac{3}{4}$ " x 4" x 60"—Deck king plank                                | 1 pc.— $\frac{3}{4}$ " x $3\frac{1}{4}$ " x 48"—Aft-hatch header                  |
| 2 pcs.— $1\frac{1}{8}$ " x $2\frac{1}{2}$ " x 17'-0"—Outer cabin sheer clamps    | 1 pc.— $\frac{3}{4}$ " x $3\frac{1}{4}$ " x 48"—Aft-hatch header                  |
| 2 pcs.— $\frac{3}{4}$ " x 5 $\frac{3}{8}$ " x 96"—Bow, transom cover boards      | 2 pcs.— $\frac{3}{4}$ " x $2\frac{3}{8}$ " x 47"—Hatch framing                    |
| 2 pcs.— $\frac{3}{4}$ " x 5 $\frac{3}{8}$ " x 24'-0"—Sheer cover boards          | 5 pcs.— $\frac{3}{4}$ " x $2\frac{3}{8}$ " x 16 $\frac{1}{2}$ "—Hatch framing     |
| 2 pcs.— $\frac{3}{4}$ " x $1\frac{1}{2}$ " x 24'-0"—Sheer molding (Oak)          | 1 pc.— $\frac{3}{4}$ " x $\frac{3}{4}$ " x 11'-0"—Hatch cleats                    |
| 2 pcs.— $\frac{3}{4}$ " x $1\frac{1}{2}$ " x 96"—Bow, transom molding (Oak)      | 1 pc.—.040" x $1\frac{1}{4}$ " x 60"—Metal hatch trim                             |
| 2 pcs.— $\frac{3}{4}$ " x 5" x 84"—Fore and aft coaming                          | 2 pcs.— $\frac{3}{4}$ " x 4" x 26"—Cabin-hatch framing                            |
| 2 pcs.— $\frac{3}{4}$ " x 5" x 17'-0"—Sheer coaming                              | 1 pc.— $\frac{1}{2}$ " x $2\frac{1}{4}$ " x 28"—Hatch doubler strip               |
| 2 pcs.— $\frac{3}{4}$ " x 4" x 5"—Deck-beam saddles (Plywood)                    | 1 pc.— $\frac{1}{2}$ " x $1\frac{1}{4}$ " x 28"—Hatch doubler strip               |
| 1 pc.— $\frac{3}{8}$ " x 60" x 96"—Fore-deck planking (Plywood)                  | 1 pc.— $\frac{1}{2}$ " x $2\frac{1}{2}$ " x 25"—Hatch doubler strip               |
| 1 pc.— $\frac{3}{8}$ " x 30" x 60"—Aft-deck planking (Plywood)                   | 2 pcs.— $\frac{1}{2}$ " x 7" x 26"—Hatch-opening trim (Mahogany)                  |
| 2 pcs.— $\frac{3}{8}$ " x 48" x 17'-0"—Cabin side panels (Plywood)               | 1 pc.— $\frac{1}{2}$ " x 7" x 22"—Hatch-opening trim (Mahogany)                   |
| 2 pcs.— $\frac{3}{4}$ " x 48" x 96"—Cabin ends (Plywood)                         | 1 pc.— $\frac{3}{4}$ " x $8\frac{1}{2}$ " x 30"—Hatch sides                       |
| 2 pcs.— $1\frac{1}{8}$ " x $2\frac{1}{2}$ " x 15'-6"—Beam shelf members          | 1 pc.— $\frac{3}{4}$ " x 7" x 24"—Hatch end                                       |
| 15 pcs.— $1\frac{1}{8}$ " x 6" x 78"—Cabin roof beams                            | 1 pc.— $\frac{3}{4}$ " x 5" x 24"—Hatch end                                       |
| 4 pcs.— $1\frac{1}{8}$ " x 3" x 45"—Corner stiffeners                            | 1 pc.— $\frac{3}{8}$ " x 25" x 30"—Hatch deck (Plywood)                           |
| 4 pcs.— $\frac{3}{4}$ " x 3" x 53"—Doorway stiffeners                            | 1 pc.— $\frac{3}{8}$ " x 1" x 9'-0"—Half-round molding                            |





Below,  $\frac{3}{4}$ -in. members called stiffeners, are installed at both door openings. Placed on each side  $\frac{1}{2}$  in. in from the edges of the door cutouts, the stiffeners are notched to fit over roof beam and coaming



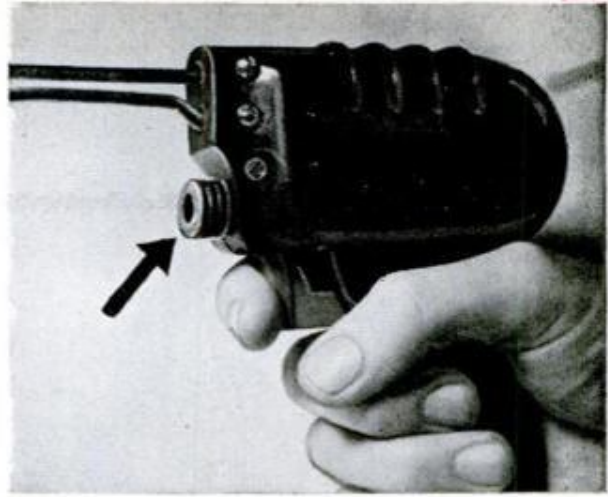
beveled 15 deg., is bowed to the deck curvature and glued and screwed to the forward face of the coaming. See Fig. 21. In each case, the degree of bevel corresponds with the inward slant of the cabin members.

Figs. 19, 23 and 24 give the patterns for the plywood sides and ends of the cabin. Since the ends lap the sides, cut and install the sides first. Here two panels will have to be butted together to obtain the overall length required, which is taken directly from the job by measuring the distance from the beveled filler strip to the beveled coaming aft. Window cutouts are identical in both side panels of the cabin and these are best cut and shaped with portable electric tools. After the lower edges of the side units are beveled to fit against the cover boards, they can be glued and screwed to the beveled edges of the coaming. Temporary blocks backing up the butted joints in the panels, plus braces placed from side to side, will hold the assembly until the cabin ends can be installed. The cabin ends are cut from  $\frac{3}{4}$ -in. plywood, following Figs. 23 and 24. Again, overall sizes are taken from the job and the pieces fitted directly. The front cabin door measures 25 in. wide. Where the lower edges of the panels are cut to match the

(Continued to page 274)

# SOLDERING TIPS

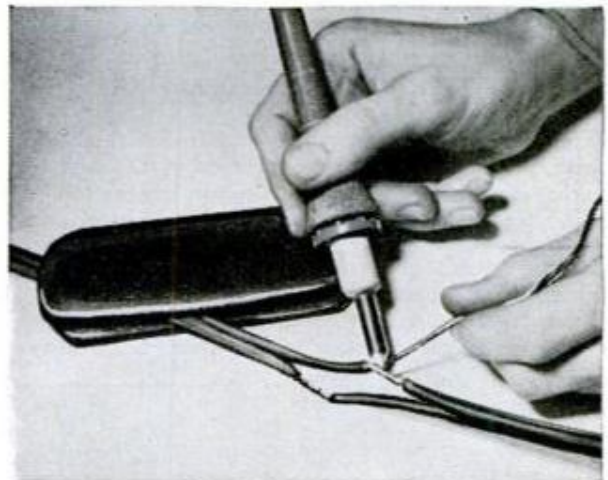
**RUBBER GROMMET** cemented on "spotlight" bulb of a soldering gun prevents the bulb from becoming broken when it is carried in a toolbox with other tools. The grommet hole is centered on the built-in lens of the bulb so as not to obstruct the light beam



**SANDPAPER** cemented on the lid of a soldering-paste can provides a handy abrasive for cleaning the soldering-iron tip and brightening parts to be soldered. Used as a worktable when soldering small parts, the rough-surfaced sandpaper tends to hold them in place

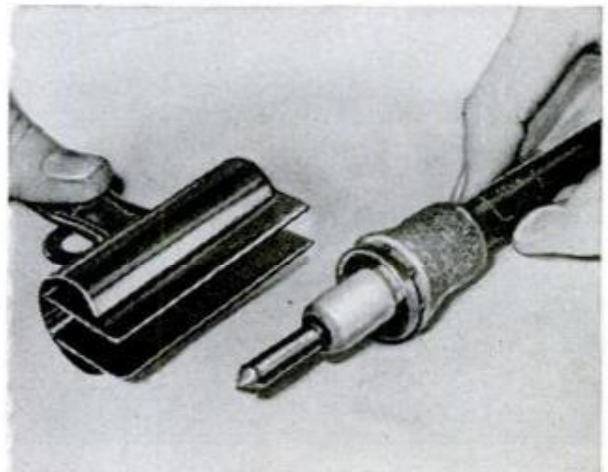
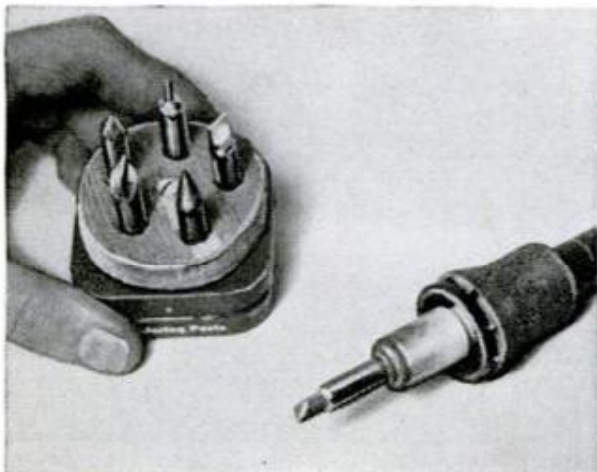


**EYE-GLASS CASE** has strong grip and enough weight to hold wires and small parts in position while soldering them together. The space inside is a good place to carry spare soldering tips, wire solder and other small items needed for a job away from the shop



**CERAMIC INSULATOR** on pencil-type soldering iron kept in a toolbox can be protected from breakage by clipping a paper clamp on it as indicated in the photo below right. Then, when tools are dropped in the box there is no danger of hitting the insulator

**EXTRA TIPS** for a soldering iron are inserted in holes drilled in a wooden disk that is bolted to the soldering-paste can. The holder permits quick selection of tips and reduces the risk of losing them



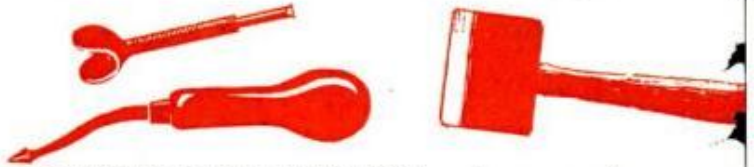


Place a piece of heavy paper, cut to the shape desired, on a piece of leather known as seven-ounce thickness. With the paper as a guide, cut the leather to the appropriate shape with a sharp swivel knife

You may want to experiment with several possible patterns for the tooling. When you have decided on a design, make a detailed drawing of it on a piece of tracing paper also cut to the appropriate shape



# LEATHER TOOLING IS EASY



**I**T MAY TAKE TALENT and years of intensive training to make an expert leather craftsman, but almost anyone can work in leather and produce articles that are decorative and highly useful. All you need are a few inexpensive tools, a piece of leather, imagination and a bit of patience. Articles such as wallets, ladies' purses, or holsters, like the one shown on the next page, can be worked in leather and carried with the pride that comes from having conceived and done the work yourself. Leather goods are not only handsome but durable as well.

Tooling is something you will find easy to learn. The tools, especially made for this work, will seem to work almost automatically once you get the knack and feel of them. Stitching, though a bit more complicated, can be learned by anyone able to tie Boy-Scout knots or sew a simple hem-stitch. The variety of articles you can make is limited only by your own ingenuity. Once you have started into leathercraft, you are in for many evenings full of accomplishment and surprise. ★ ★ ★

Fasten the tracing-paper drawing onto the cut-out leather with small pins or paper clips. Press your modeling tool over all the main lines of the design so that an impression is made visible on the leather



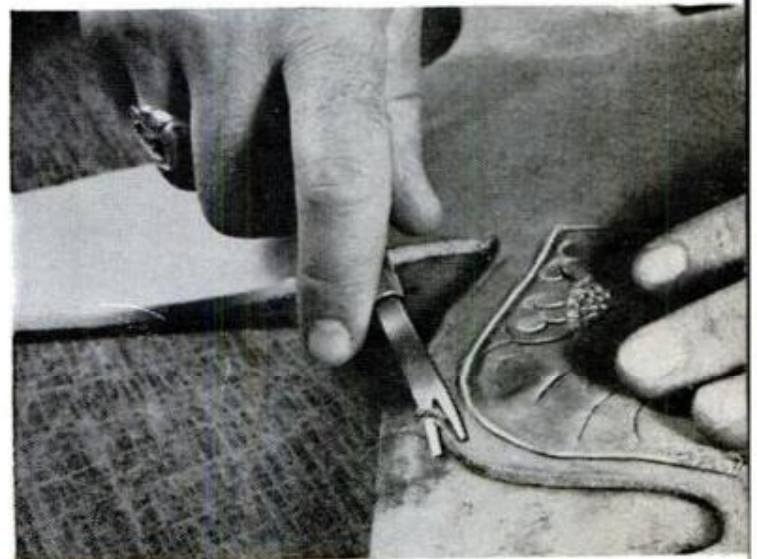
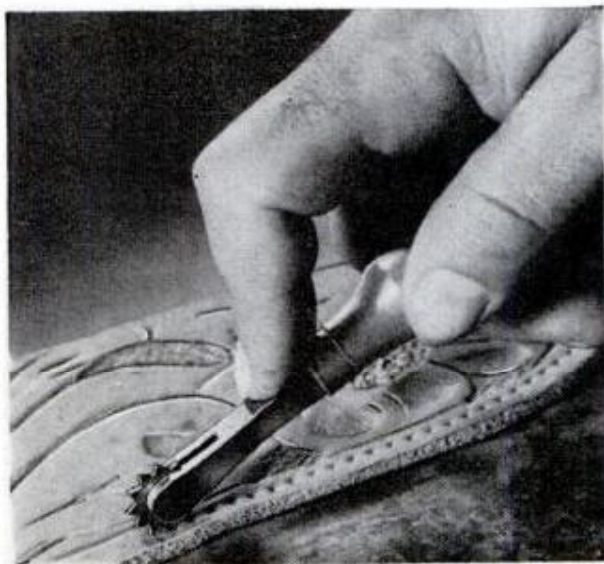


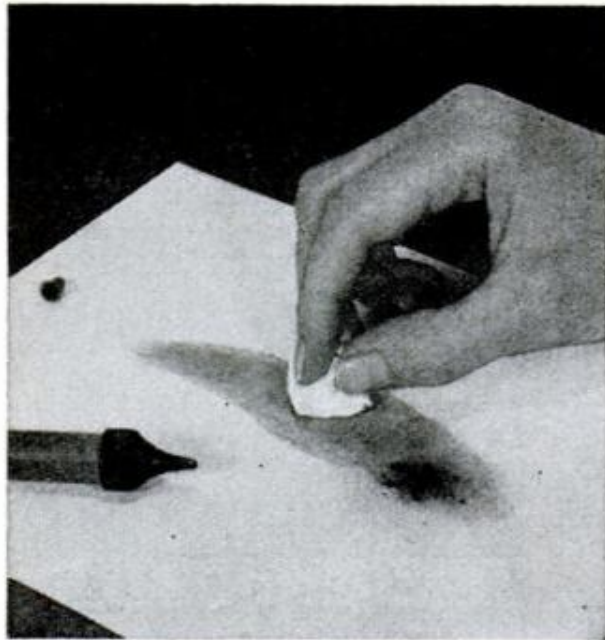
Having moistened the leather with a damp cloth, you are ready to begin working directly in the leather, above right. With a swivel knife, the one with the saddle-shaped handle, cut along the lines previously impressed with the modeling tool. Remember, never cut deeper than one third the leather's thickness

Now draw the blunt end of the modeling tool along the cut lines, right. The proper use of the tool will turn the slits into smooth, sculptured contours, containing and forming the design. This is the first step toward giving leather the depth which is the distinctive mark of a finely-tooled piece of work

Special marker wheels, below, come in various sizes. They are used principally to mark indentations in the leather which serve as guides for punching or stitching. The same indentations may also be used as a part of the general design along borders, or where a line of equally spaced dots is desired

A special split knife, below right, will allow you to smooth the rough edges of your work, and is useful where beveled edges are desired. In making wallets, holsters, or any type of case where a fine lacing or stitching is desired, this tool will allow for tight, close, neat-looking seams on your work



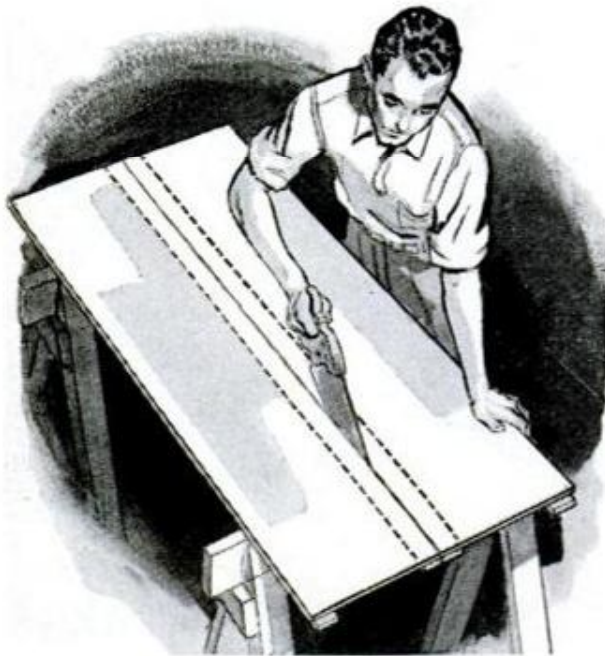


## Graphite Subs for Carbon Paper When Making Large Tracing

When making a tracing of drawings or plans covering an area that is too large to use carbon paper, try rubbing powdered graphite on the back of the pattern to provide a tracing medium as shown. If more than one copy is desired, it may be necessary to apply a touch-up coat of graphite. This tracing method is especially useful when reproducing outlines for paintings and artwork, where lines produced by carbon paper tend to "bleed" through the paint. Graphite lines erase easily without leaving a smudge.

R. Hanscom, Elmhurst, Ill.

☐ One or two wide strips of adhesive tape applied lengthwise to each shoe sole helps to give firm footing on icy pavement.



## Handsawing a Butt Joint

Here is an easy way of obtaining a tight-fitting butt joint on long pieces of plywood to be glued together, when a jointer is not available to true the meeting edges. First rough cut the plywood panels to be joined together, if this has not been done. Then arrange three lengths of thin stock on a pair of sawhorses so that when the panels are butted together on them, they are supported at the outer sides and along the joint as shown in the drawing. Then tack the panels lightly in position on the center strip and saw along the joint line with a hand-saw, cutting the support member as well. The saw kerf will remove material from each of the facing edges of the joint to provide a perfect fit, unless of course, a wide gap has been left by poor rough cutting.

Daniel Bousha, Jackson, Mich.



## Display Collection in Egg Carton

Egg cartons make practical, inexpensive display trays for small sea shells, mineral specimens, insects and other small items. The pockets are numbered, and a typed legend identifying each specimen according to number, is stapled to the lid of each carton as shown in the photo. Cartons may be reused after disposing of the previous collection, simply by typing new legends to describe the new specimens. The soft material of which such cartons usually are made, helps to protect delicate specimens from damage. When carrying cartons of specimens to an exhibition, cotton is laid on top of the pockets to prevent intermixing. Cotton batten, 1-in. thick, is best for this purpose.—E. V. Reyner, Salinas, Calif.

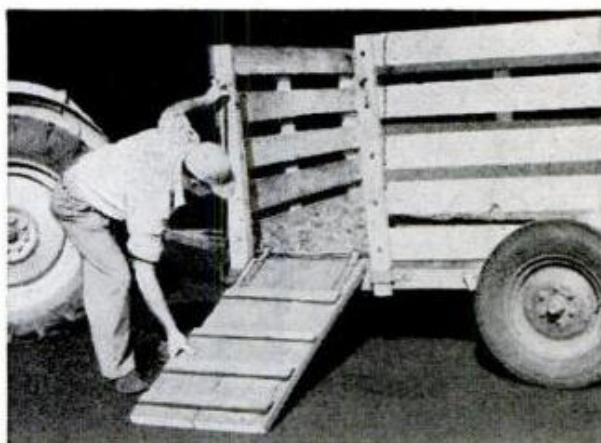




## Trailer for Moving Sows With Litters

Sows with litters are hauled safely in this trailer from farrowing house to pasture on one large Midwest hog farm. The safety feature is in the loading and unloading of the animals. A side door forms a ramp when lowered and two gates carried in a rack at the back of the trailer are hooked in position on the trailer, one on each side of the ramp as shown in the photo above. This chute arrangement combined with an axle-level trailer bed, minimizes the risk of injury to sows or piglets when loading or unloading them.

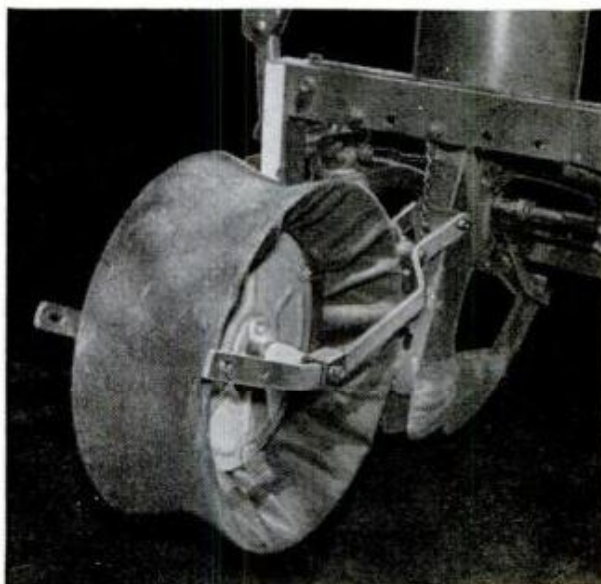
A. M. Wettach, Mt. Pleasant, Iowa.



## Rubber-Tired Planter Wheels Do Better Job of Packing Soil

Inner tubes stretched around the rims on packer wheels of a corn planter as shown at right, do a better job of firming loose soil, according to one farmer. Another advantage of this arrangement is that old cornstalks are prevented from catching in the open parts of the wheels which are covered by the inner tubes. Each wheel requires one tube, which is severed at the valve and then cut along the center of its inside circumference. After stretching the opened tube around the wheel rim, the overhanging portions are folded inward toward the center and the edges are then "stapled" together with hog rings.

A. W. Ranniger, Carroll, Iowa.



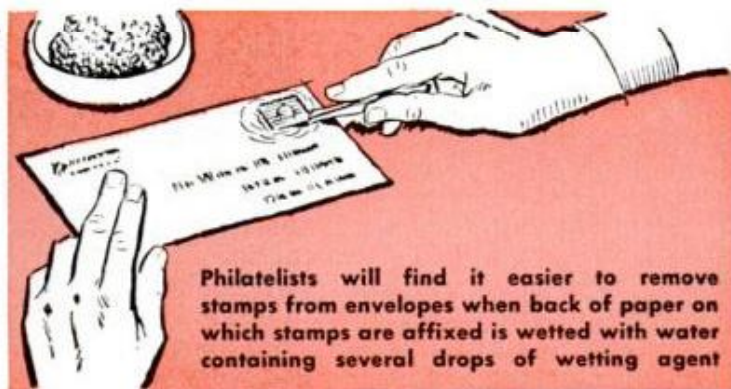
# "WETTER WATER"

## Makes Chores Easier

**A**DD JUST A small amount of wetting agent to cleaning water, photo-negative rinse, liquid insecticide, or most any other water-base solution used around the home and you will get much-improved results with less effort. Available at most chemical and photo-supply stores, commercial wetting agents work their wonderful magic by lowering the surface tension of water. This in turn, promotes more rapid penetration of surfaces being cleaned, or treated and permits other chemicals in the solution to which it is added to attain a more perfect distribution. The latter characteristic also saves on material. Mild household detergents have a similar effect on water, but they cannot be used for

most non-cleaning applications because other chemicals present would be harmful.

The amount of wetting agent required for a job depends upon the type of application. When mixed in a solution for cleaning windows, moistening gummed tape, or for removing postage stamps,  $\frac{1}{2}$  tsp. per qt. of water is sufficient. Solutions used for removing insects spattered on a car, and for other difficult cleaning jobs, require a greater concentration of wetting agent, 1 tsp. per pt. of water. To the latter,  $\frac{1}{2}$  pt. of isopropyl alcohol is added, making the solution even more effective as a cleaning agent. Some of the more common applications of "wetter water" are illustrated below and on the next page. ★ ★ ★



Philatelists will find it easier to remove stamps from envelopes when back of paper on which stamps are affixed is wetted with water containing several drops of wetting agent

"Wetter water" makes easy job of cleaning walls and waxed floors. Good solution to use for this purpose consists of wetting agent,  $\frac{1}{2}$  tsp., water, 1 qt. Apply with sponge and wipe dry with cloth. Fine too, for removing bugs stuck on bumper and hood of car



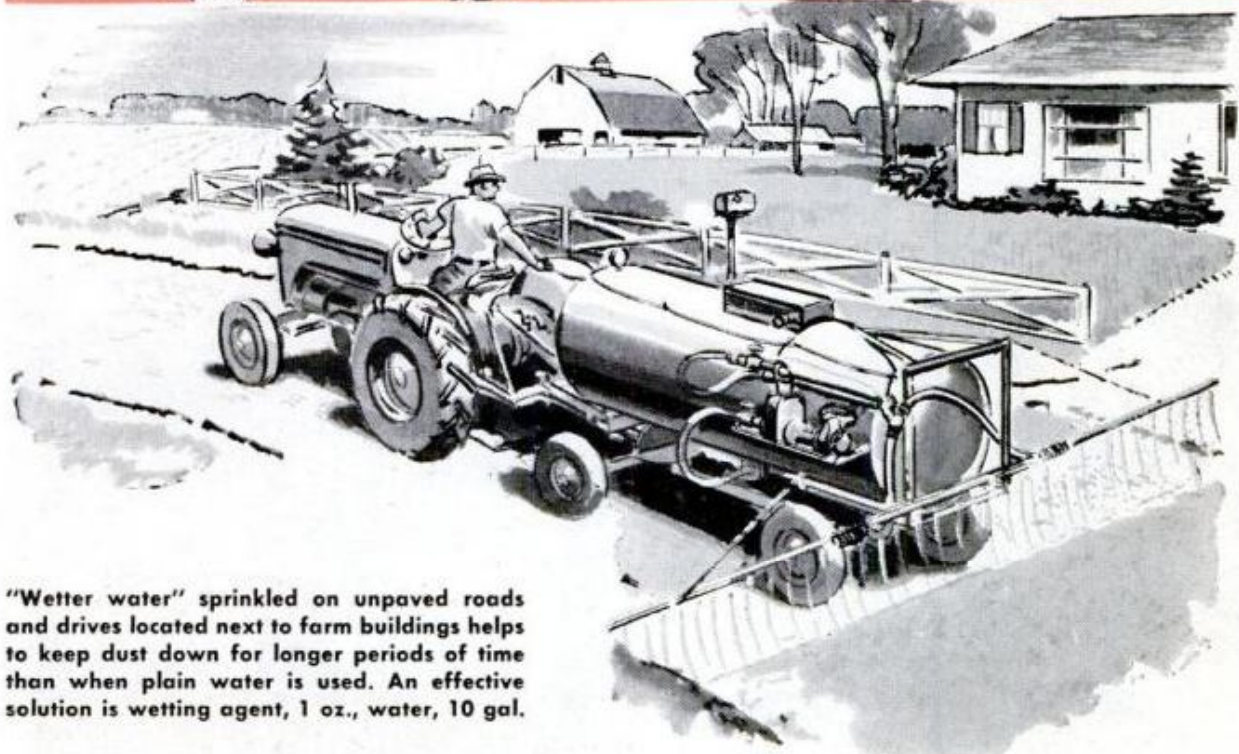
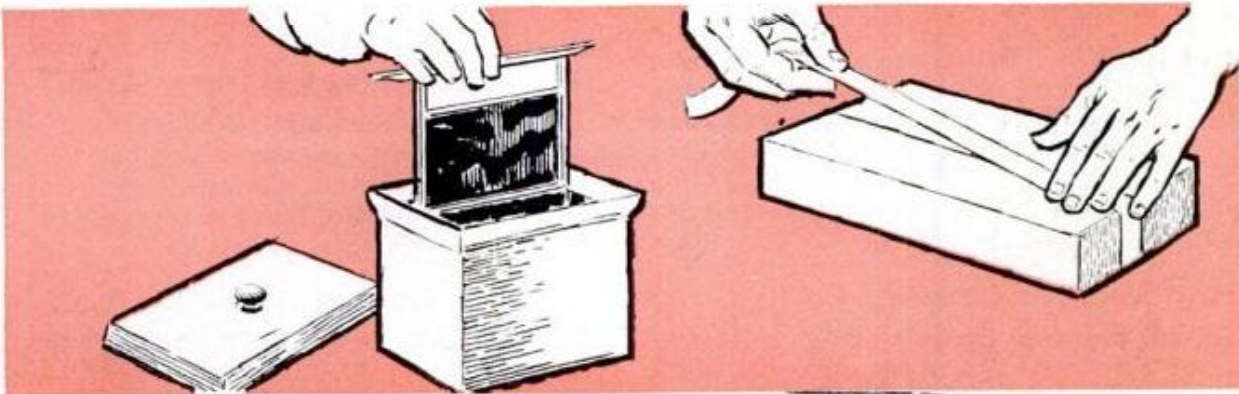


Photo courtesy Season-All Sales Corp.

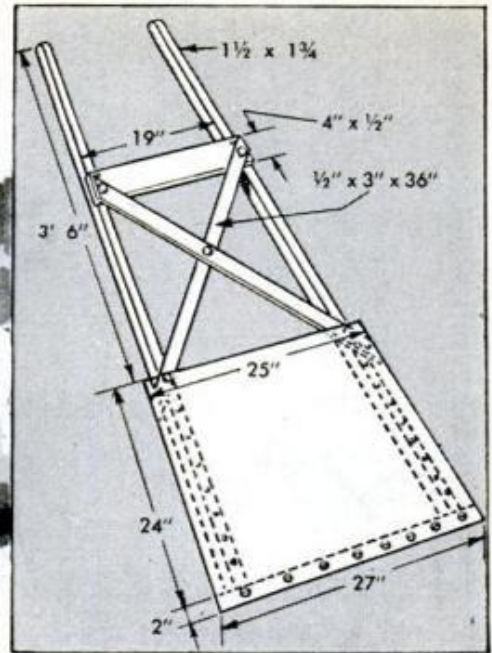
To avoid streaked results when washing windows, mix 1 tsp. of wetting agent with the wash water. Water spots won't appear on photo negatives and prints, if they are given final ½-min. rinse in solution consisting of wetting agent, 1/10 oz., water, 1 gal.



Garden spray does a better job of covering leaves of shrubbery and plants when 2 tsp. of wetting agent are mixed with each gal. of insecticide solution. Several drops of wetting agent stirred in water used for moistening gummed tape makes it adhere better



"Wetter water" sprinkled on unpaved roads and drives located next to farm buildings helps to keep dust down for longer periods of time than when plain water is used. An effective solution is wetting agent, 1 oz., water, 10 gal.



## Improved Snow Plow Cleans Sidewalks

Instead of shoveling snow from your sidewalks this winter, why not use a simple plow like the one shown. It will handle snow up to two or three inches deep, and will save lifting. The plow consists of a sheet-metal blade screwed to fairly long handles of hardwood. The lower edge of the blade is faced with a heavy steel strip bolted to the blade to produce a long-lasting edge, which is beveled to provide a

scraping action. The handles are braced horizontally and with an X-brace.

W. D. Terrill, Oak Park, Ill.

## Garage Location Is Winter Asset

Make your new garage serve another purpose by placing it where it will serve as a windbreak in the winter. If summers in your area are the more severe, place it where it will serve as a sun shield.

## Hasp Used to Lock Sill Cock

Small children consider it great fun to turn on a sill cock and let the water run. The running water will ruin flower beds and even cause serious leaks in house foundations. To prevent this, attach a hasp to the side of the house so that the slot aligns with the opening in the sill-cock handle. A padlock passed through the hasp and the handle will prevent the latter from being turned.—Daniel Bousha, Jackson, Mich.

## Acid Drip Caught in Rubber Ball

If you have ever used a bottle of acid you have no doubt had spots of corrosion left on your workbench and floor by the acid that dripped down the side of the bottle. To prevent this, cut a rubber ball in half and cut a hole in the bottom of one of the resulting rubber cups. Slipped over the top of the bottle, the cup will catch the drippings and can be washed after each time it is used.



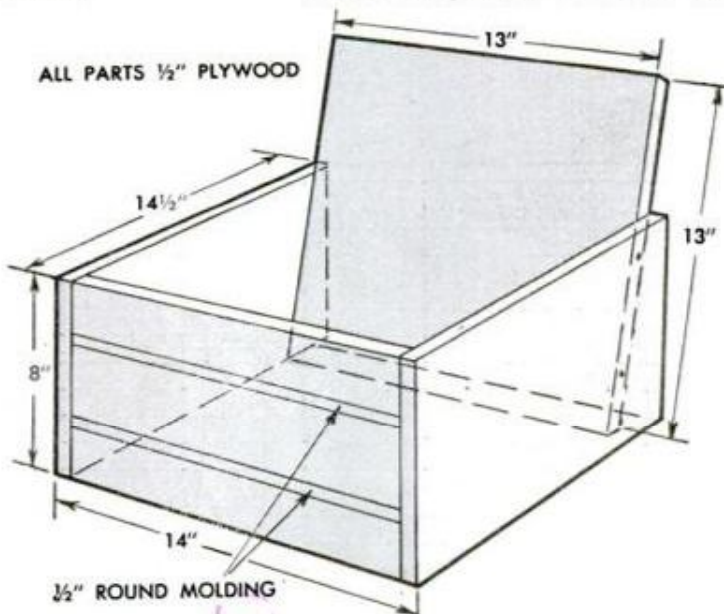
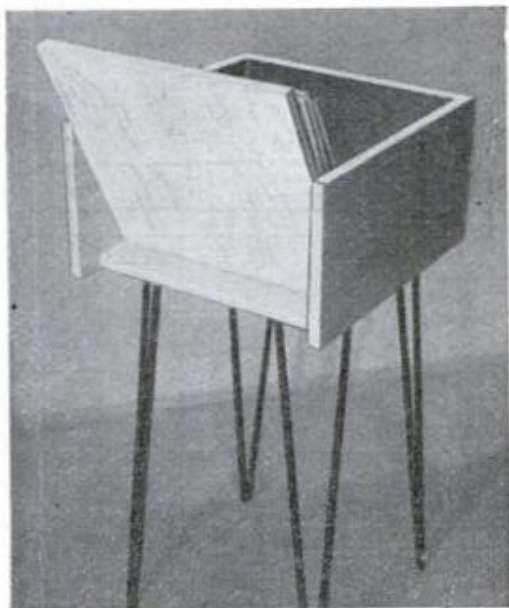


## Record Browser Gives Living Area a Luxurious Touch

THOSE LP RECORDS hidden away in a closed cabinet are hard to get at, difficult to select, and add nothing to the appearance of your living room. Their colorful jackets standing in this modernistic browser will make your record collection the focal point of your decor. The browser is made of  $\frac{1}{2}$ -in. plywood, with sides measuring  $14\frac{1}{2}$  in. long and 8 in. high. The front is 14 in. wide. The backboard against which the records lean, measures  $13 \times 13$  in., and, like the other parts, is secured with countersunk wire brads. The one

illustrated was tilted two inches in from the back at the bottom. When assembly is completed, sand all parts and fill all cracks and holes with filler. Now screw the legs on. Wrought-iron legs, like those illustrated, may be purchased at little cost. Set all screws 1 in. in from the bottom edge. The height of the legs may depend on the height of your phonograph for easy access to the records. Two strips of aluminum molding on the front add a distinctive touch. Stain and finish as desired.

Al Toffler, Falls Church, Va.



# Early American Clock Has



Original clock pictured and detailed by courtesy of The Museum of Science and Industry, Chicago



By E. R. Haan

PART II

NOW THAT YOU have made the pillar-and-scroll clock case and the front and back plates of the 30-hr. wooden movement as described in Part I last month, you are ready to make and install the gear trains. There are two trains, the time train, Fig. 31, and the strike train, Fig. 45. These trains are shown in their relative positions in Fig. 29, which pictures the movement with the front plate and count wheel removed. Note that the strike train,

Fig. 45, includes, in addition to the wheels and pinions, detents S-6, S-7 and the striker S-8. Detents S-6 and S-7 are detailed in Fig. 35 and the striker in Fig. 36.

Except for the escapement wheel, which is made from hard brass, all gear wheels are made from quarter-sawed black cherry. The wheels are turned and toothed separately and are then mounted on the spindles, of which the pinions are an integral part. All wheels except T-1, T-4, T-5 and

**WHEEL**

30

NOTE—"T" REFERS TO GEARS IN TIME TRAIN; "S" TO THOSE IN THE STRIKE TRAIN. SEE FIGS. 29, 31 AND 45

LAY OFF TOOTH FACES FROM LINES A AND B

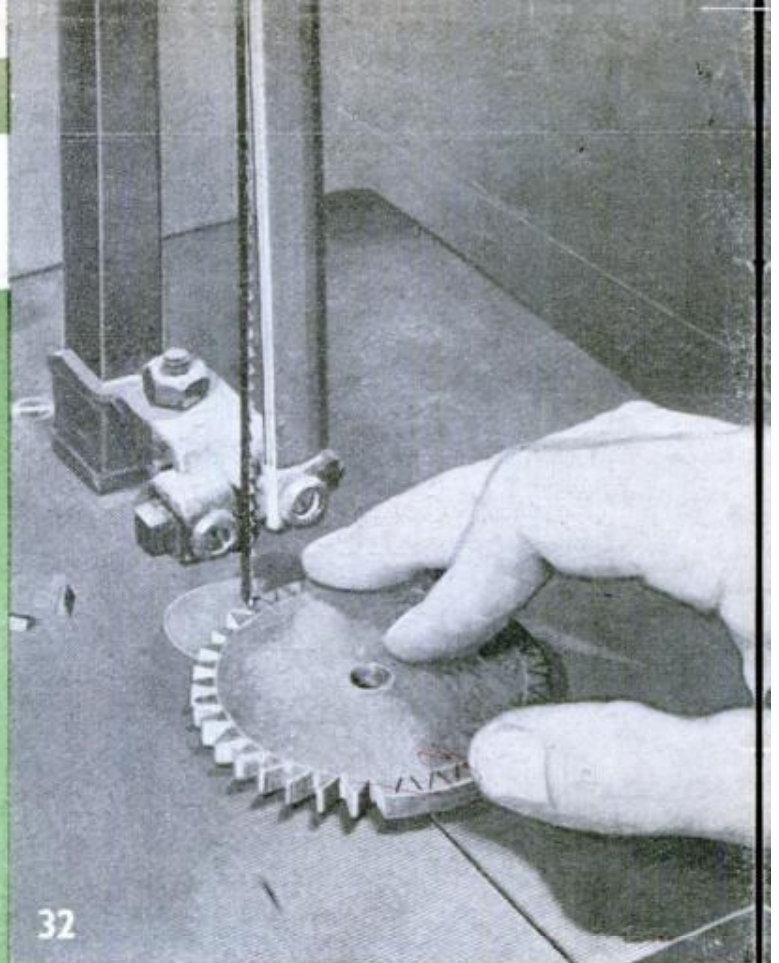
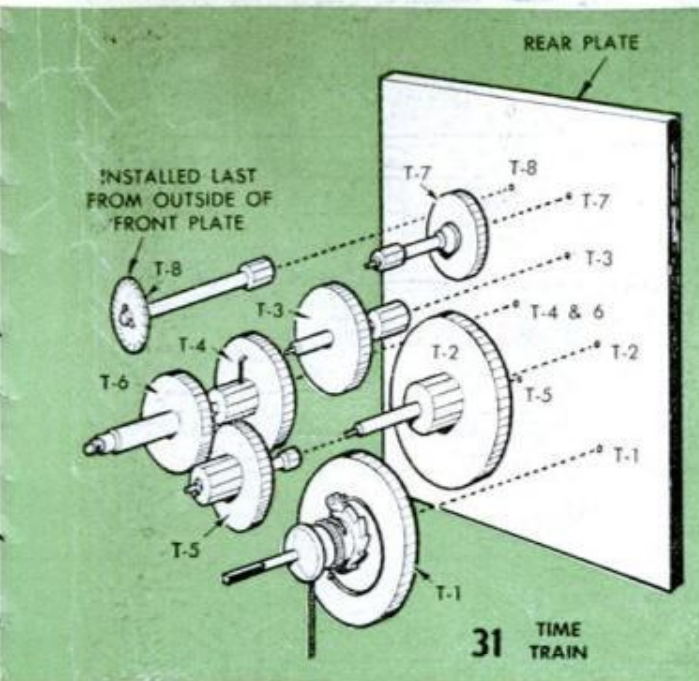
**PINION**

PINIONS ARE INTEGRAL PART OF SPINDLES

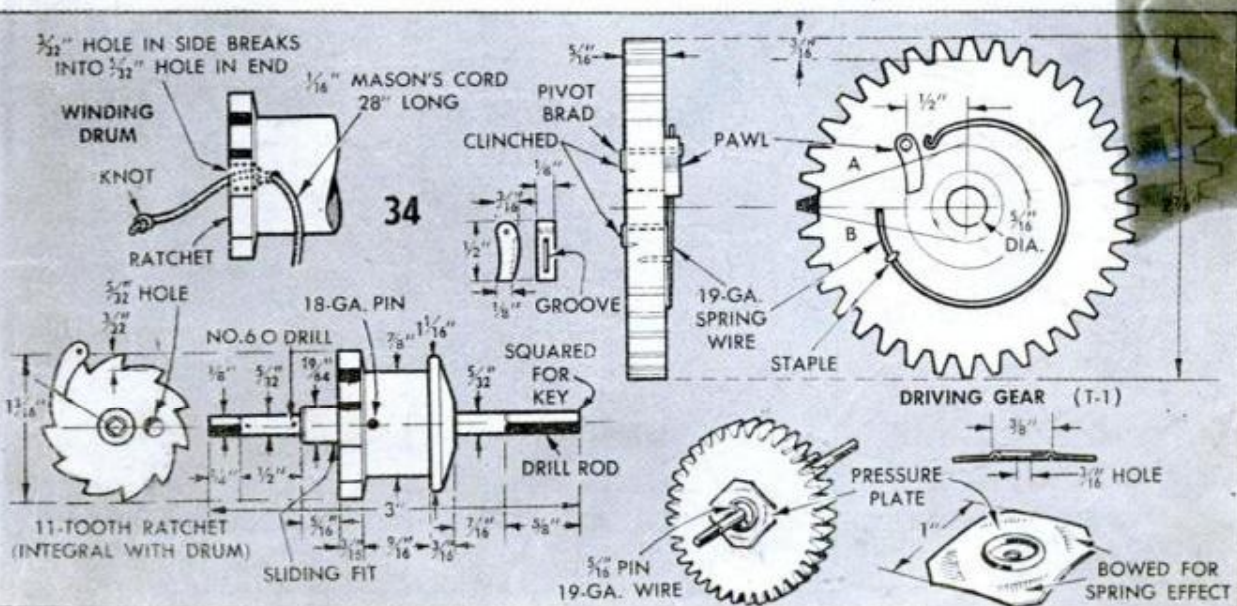
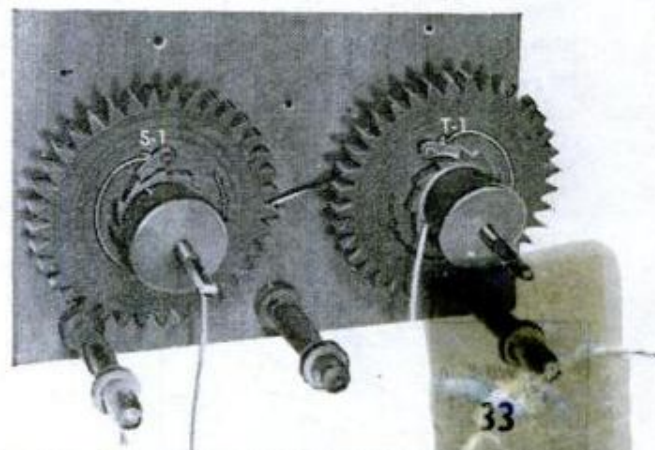
Wheel Number	Number of Teeth	Radius of Circle "A"	Radius of Circle "B"	D	G	W	D	Number of Teeth	T	G
T-1	36	1/2	3/32	27/8	3/16	1/16				
T-2	48	7/32	13/32	3	3/16	1/16	11/16	8	3/32	3/16
T-3	36	1/8	3/8	23/16	3/16	1/16	9/16	8	1/16	3/32
T-4	40	3/8	3/16	25/16	5/32	1/16	5/8	9	1/16	5/32
T-5	36	1/4	3/16	23/16	5/32	1/16	3/4	12	1/16	5/32
T-6	36	1/4	3/16	21/16	5/32	1/16				
T-7	32	3/32	7/16	111/16	1/8	1/16	17/32	8	1/16	1/8
T-8	42	11/32	NONE	17/16	1/8	NONE	15/32	8	1/16	1/8
S-1	ALL PARTS SAME AS T-1 BUT REVERSED									
S-2	36	3/16	3/16	2 1/2	7/32	1/16	13/16	9	3/32	3/16
S-3	36	3/8	5/32	2 1/2	3/16	1/16	19/32	8	1/16	1/8
S-4	36	5/32	3/8	2 1/16	5/32	1/16	15/32	6	1/16	1/8
S-5	FLY FAN			2 1/4			15/32	6	1/16	1/8
S-9	52	3/32	3/32	2 7/16	1/8	1/32				

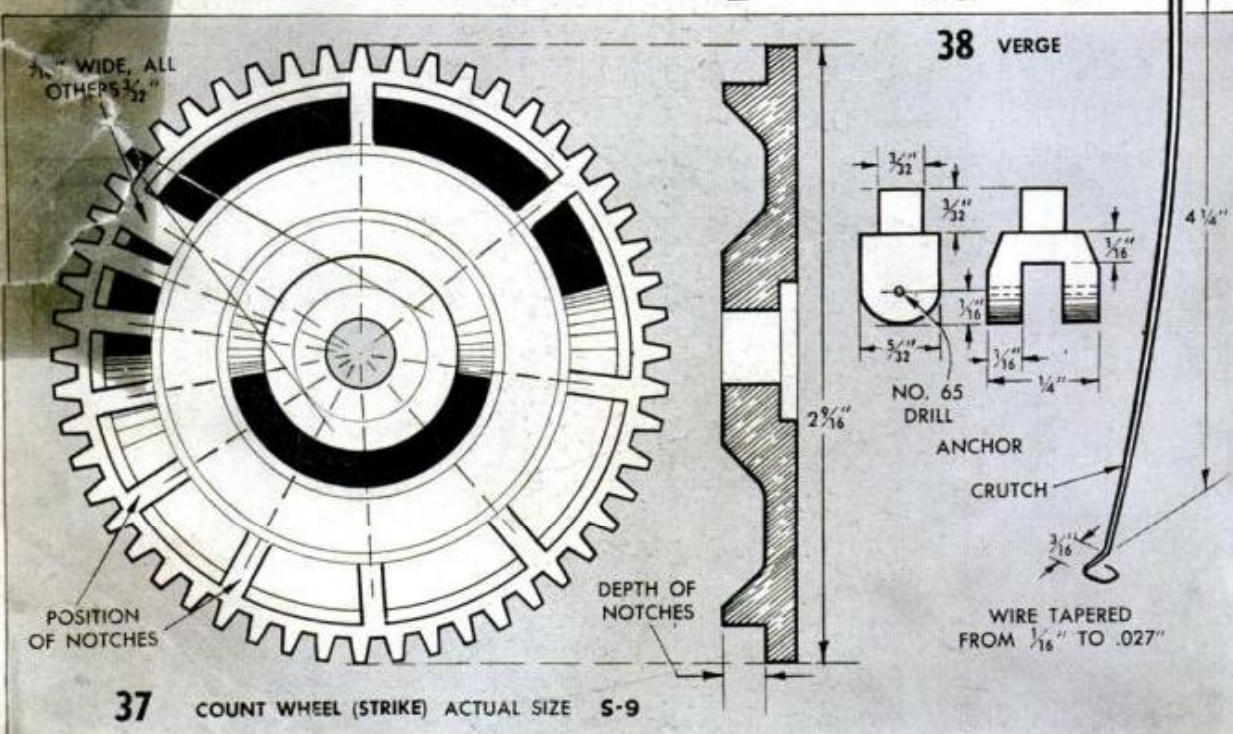
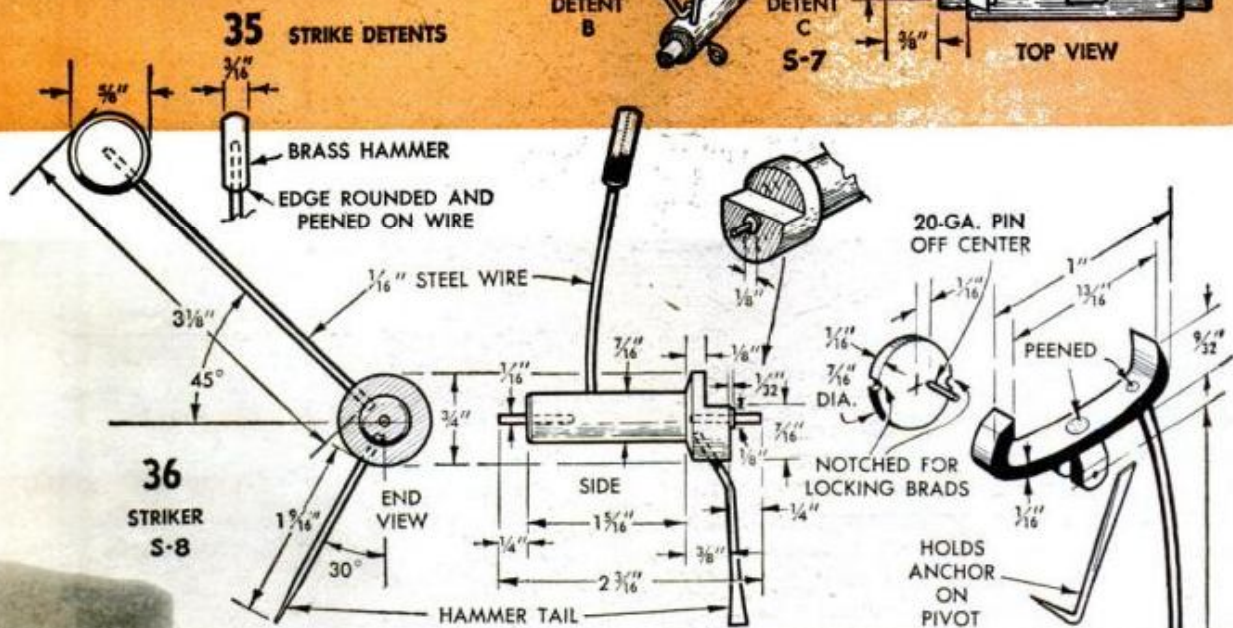
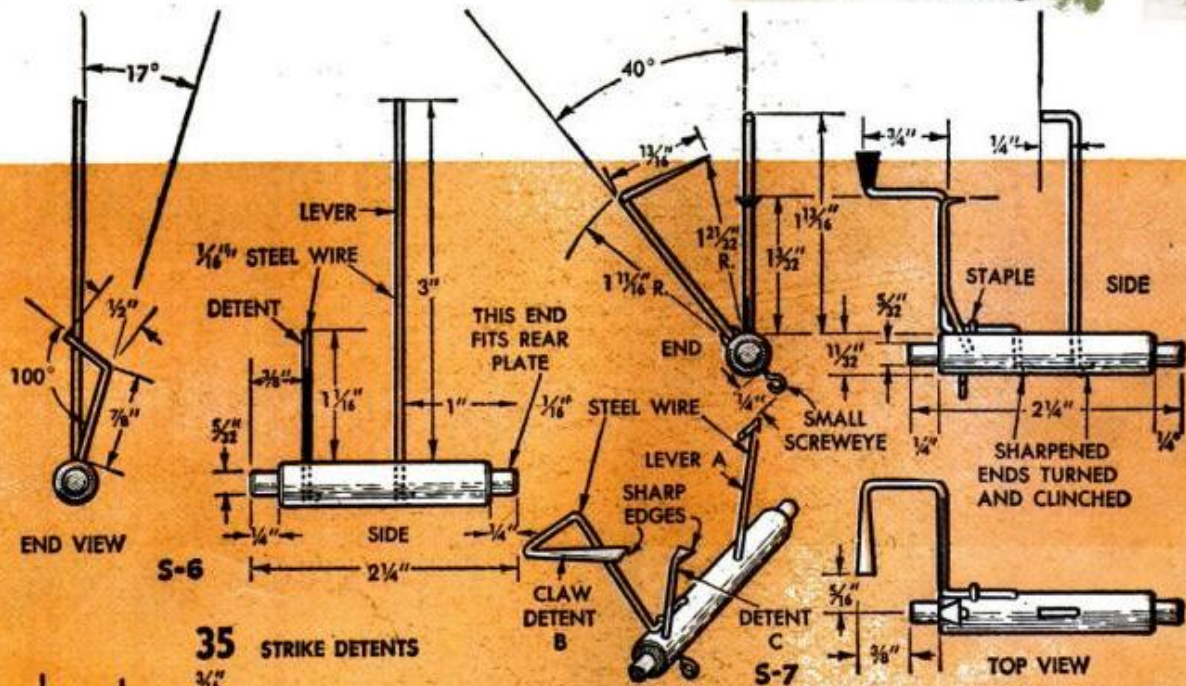
29/16

# Wooden Works

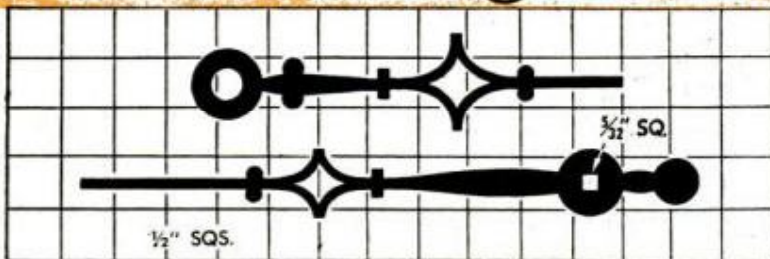
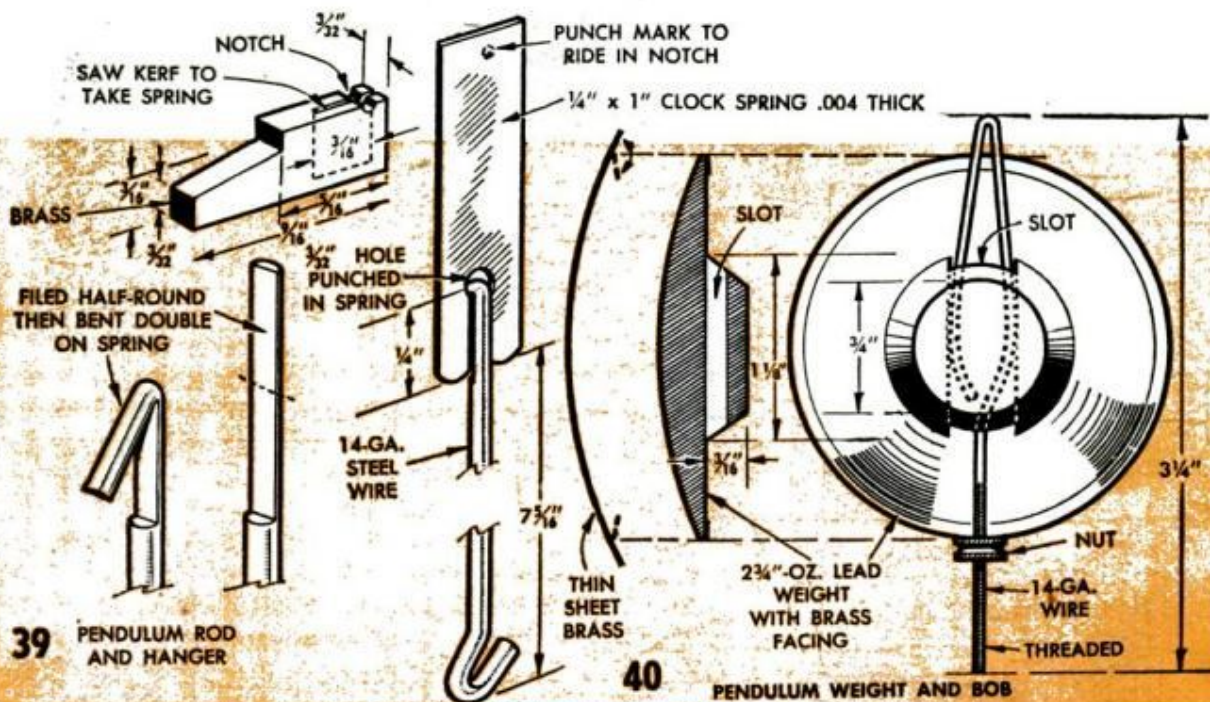


S-1 are glued and bradded in place. The four wheels just referred to must be free to turn on the spindles. Although the original spindles usually were turned from laurelwood, you can use hard maple, boxwood or lemonwood. The  $\frac{1}{16}$  in. pins in the ends of the spindles are cut from drill rod. The driving gears, or great wheels, Figs. 33 and 34, turn free on the winding drums, Fig. 34. Both wheels, T-1 and S-1 in Figs. 30 and 33, are identical in size and number of teeth, except that they are made right and left as are the ratchets, Figs. 33 and 34. The winding drums are turned from hard-







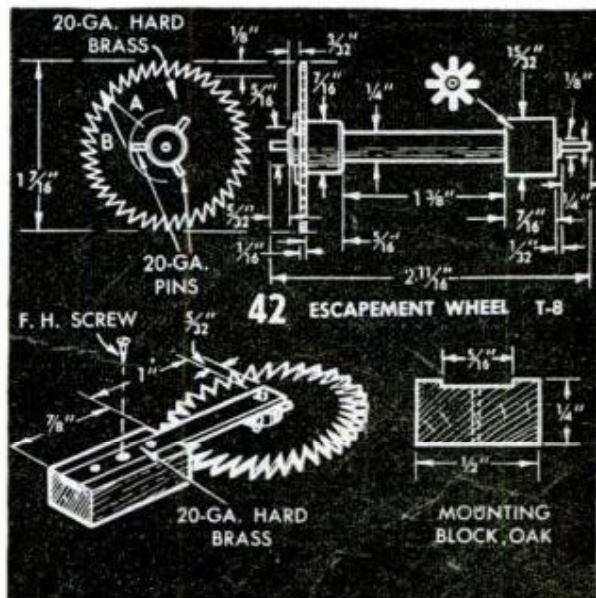


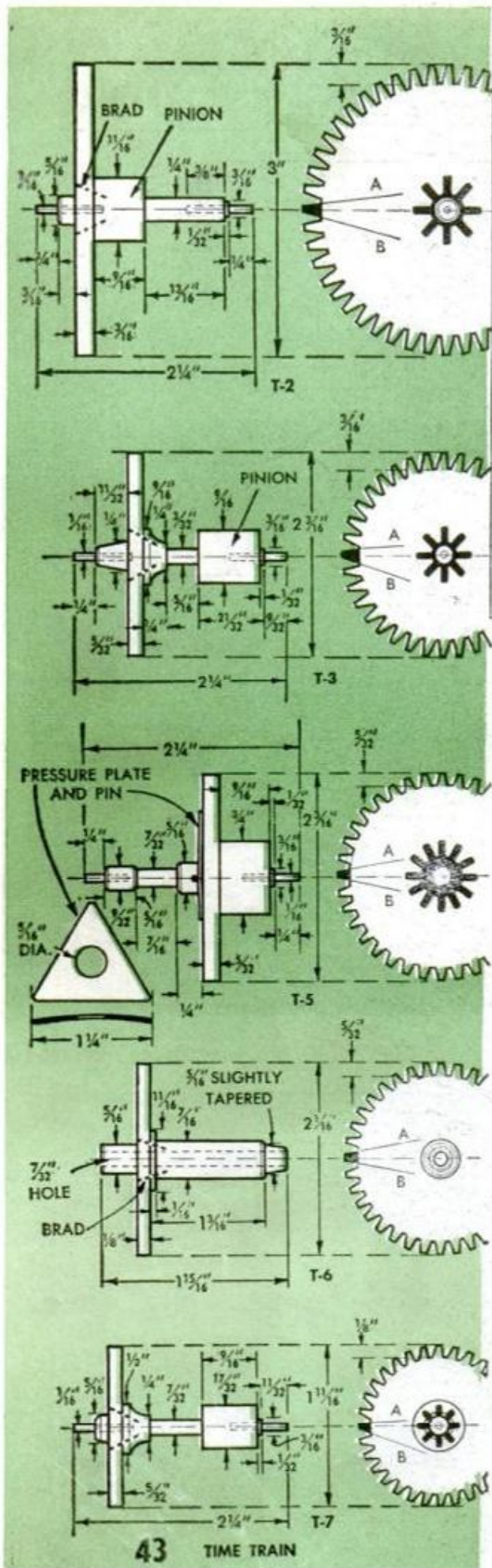
wood and are center-drilled for a light drive fit on the drill-rod spindles. On each drum the great wheel is mounted on a projection of the drum, in which position it is adjacent to the ratchet. The spring-loaded pawls, also made from hardwood, engage the ratchets as in Fig. 33. The great wheels are held in place by pins and pressure plates of thin sheet metal made and assembled as in the lower right-hand details, Fig. 34.

The table, Fig. 30, gives the data needed to make the wheels and pinions in both gear trains. Here it will be noted that each wheel is identified by the letters T and S (time and strike) and a number for convenience. The tangential lines A and B, Fig. 30, locate the tooth faces from circles A and B. Note also that the lines A and B appear on the drawings detailing the gears. One other point to take special note of before making the pinions: In Fig. 30 the pinion is shown in the rough-filed shape, or profile. Although the gears will mesh with the pinions and operate when the latter are filed to the rough shape, friction in the trains can be greatly reduced by finishing the pinion teeth, or leaves, to a bulbous, or pear-shaped, profile. This can be done with a few light touches of a fine round file after rough-filing to the profile.

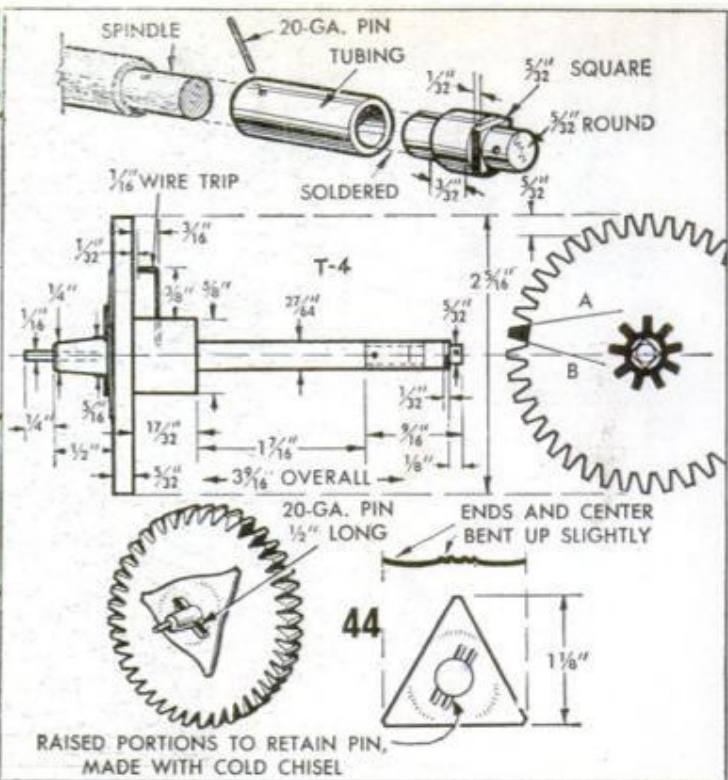
The rough thickness of the teeth should be slightly over the finish dimension T in Fig. 30 to allow for filing to final shape.

Faces, or slopes, of all gear-wheel teeth are flat. It is quite important that the faces of the teeth be laid out and cut at the angles indicated. Teeth on all the larger gear wheels are easily and quickly roughed out on the bandsaw as in Fig. 32. Use a narrow blade,  $\frac{1}{8}$  in., and be careful to keep the





43 TIME TRAIN

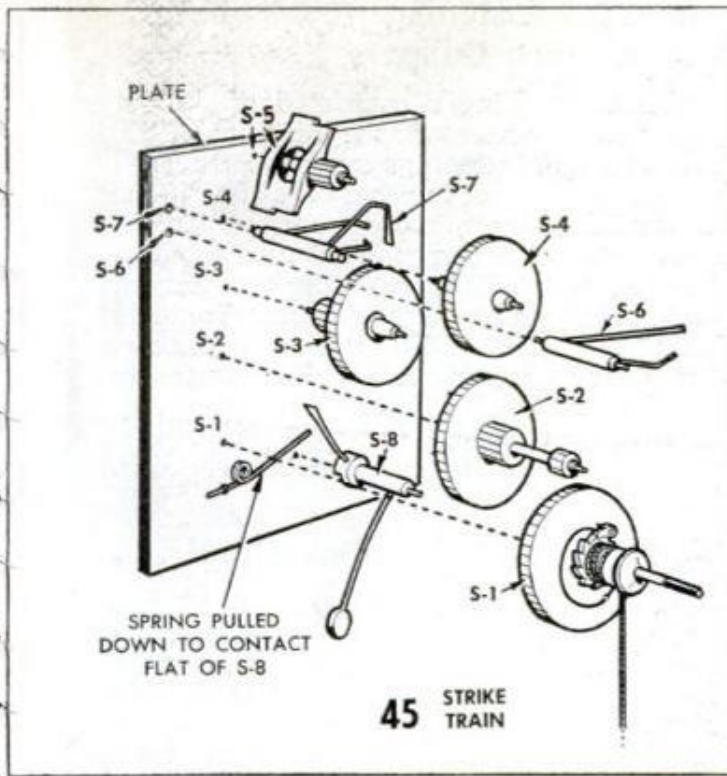


RAISED PORTIONS TO RETAIN PIN, MADE WITH COLD CHISEL

cuts in the waste. It's best to rough-cut teeth of the smaller gear wheels on a jig-saw, using a fine fretwork blade.

Several details of the assembly should be clearly in mind before turning the spindles and mounting the wheels. The minute wheel, T-4 in Fig. 44, and the wheel T-5 in Fig. 43, turn free on the spindles and are held in place with triangular pressure plates made and fitted as in the lower details, Fig. 44. The hour wheel, T-6, Fig. 43, is mounted on a hollow spindle that slips over the hand-post assembly, T-4 in Fig. 44. This arrangement allows the hour and minute wheels to rotate at different speeds. The wire trip on the T-4 pinion, Fig. 44, frees the detents that control striking sequence and is the only connection between the time and strike trains.

The escapement wheel, Fig. 42, and the count wheel, Fig. 37, call for special care both in layout and tothing operations. The count wheel is shown actual size in Fig. 37. Note especially the contour of the wheel in the sectional view and also the position of the notches in the raised rim. When the strike train is assembled and is in locked position the flattened projection of detent B, part S-7, Fig. 35, engages one of the notches. When the strike train is fully released by the trip wire on part T-4, Fig. 44, the detent B, part S-7, Fig. 35, is lifted clear of the notch in the count wheel. This clears the strike train and permits it to operate. The distance between the notches in the raised rim of the count wheel determines the number of times the mechanism will strike. The count wheel is driven by the end pinion of the assembly

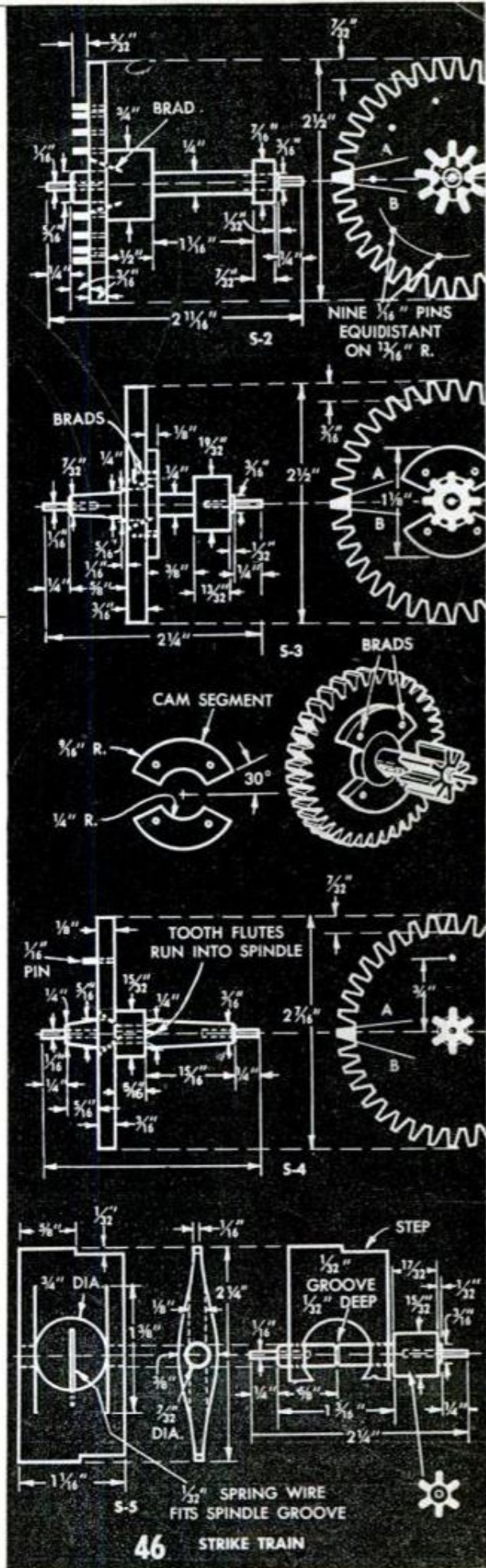


S-2, Fig. 46. The spaced pins on the gear wheel S-2 engage the hammer tail of the striker S-8, Fig. 36 when the parts of the strike train are in operating position. Make the count wheel from a piece of specially selected cherry and be careful to file the notches to a uniform depth and width. Notice also that the layout lines for the tooth slopes, or faces, are tangent to a single concentric circle.

Filing the teeth of the escapement wheel, part T-8, Fig. 42, begins with a painstaking layout of the tooth slopes. The teeth must be spaced with precision as otherwise the pallets of the verge assembly, Fig. 38, will not engage and release properly. Scribe the lines A and B with a sharp-pointed scriber so that they are easily seen. Scribe a circle to indicate the depth of the teeth. A needle file (handled type) of the knife shape usually will be found best for filing the teeth to the required shape. All teeth must be filed to a sharp point and to a uniform height. When mounted, the wheel is wedged tightly against the shoulder of the spindle by three pins, the ends of which enter holes drilled equidistantly in the spindle hub. The pins also fit into indentations made in the wheel with a small cold chisel so that they prevent the wheel from turning on the spindle.

The verge, Fig. 38, consists of the pallet, or rocker, the anchor, or yoke, and the crutch wire. The unit is available ready-made or possibly may be salvaged from an old spring movement. In either case it may be necessary to fit a new crutch wire of the correct length. If you make the

(Continued to page 278)

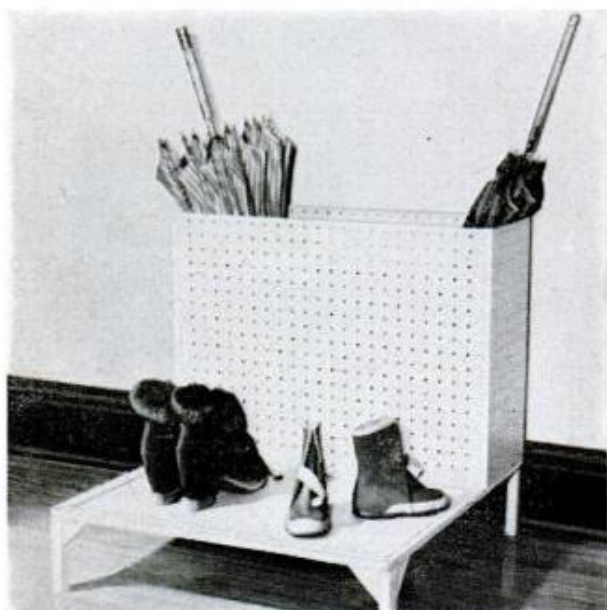




## Holes for Fastening Door Pulls Located With Calipers

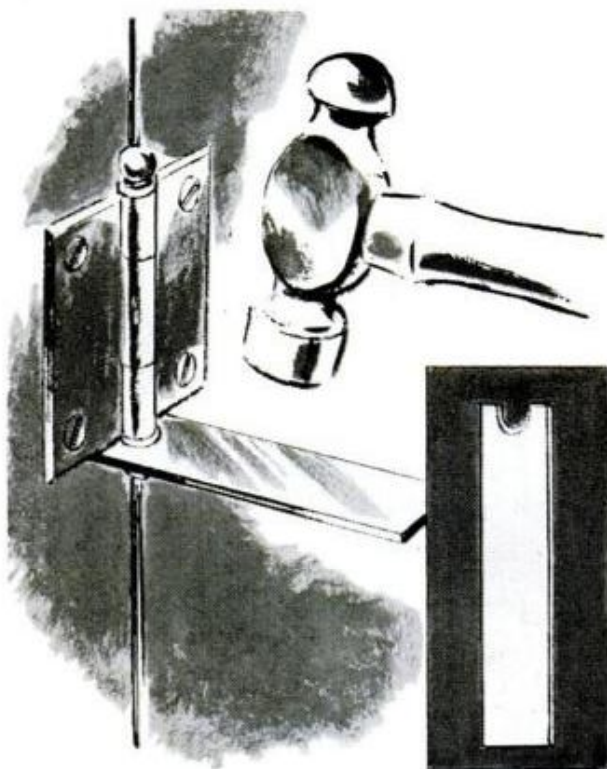
When installing a cabinet door pull of the type shown at left, the locations of the holes for the fastenings can be transferred quickly to the door with a pair of calipers. This method is also more accurate than using a ruler to measure the distance between fastener holes. Calipers of the type shown can be adjusted so that the points coincide with the centers of the holes in the handle. Then, when transferring bolt locations to the door for drilling, there is no possibility of making an error.

G. E. Hendrickson, Argyle, Wis.



## Umbrella and Overshoe Stand

This combination rain-gear stand not only provides convenient storage for overshoes and umbrellas but leaves more space in the guest closet for other things. Designed by Masonite Corp., the stand is made of 1/4-in. tempered hardboard, except for the legs and framing members which are cut from 1 x 1-in. stock. The base is 24 in. square, the front 18 in. of which has a 1-in.-wide border of hardboard glued to it to retain water from wet overshoes. The rear 6 in. of the base forms the bottom of the 18-in. high umbrella holder. The legs are 6 in. high. Front legs are braced with wooden angles glued in place as shown, rear ones are extensions of framing members. The stand is painted to match surrounding decor.



## Loosen Rust-Seized Hinge Pins With Notched Steel Pry

Door hinge pins that are rusted tight usually can be loosened with the aid of the pry shown. The latter is a 1/8 x 1-in. length of flat steel in one end of which a semi-circular notch is filed as in the detail. One side of the notch is beveled so that it can be forced between the hinge and shoulder of the pin more easily. To avoid bending the pry, it is best to tap it with a hammer rather than pressing down on the handle.

Robert L. Sargisson, Berwyn, Ill.

## Repair for Snowshoe Binding

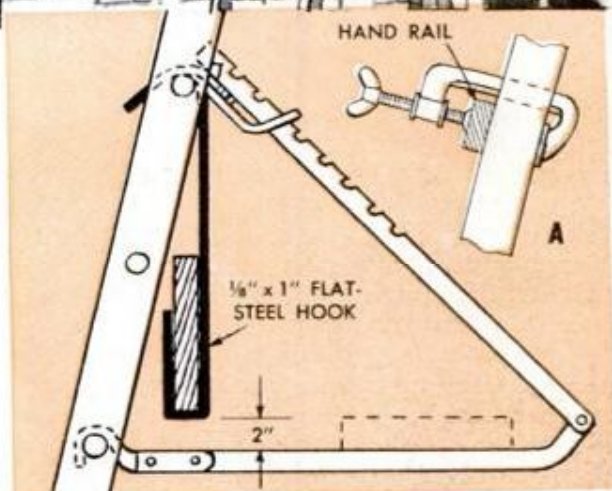
Here is a quick repair for a broken snowshoe binding when afield. Before setting out, cut 2 bands 1 1/2-in. wide from an inner tube and slip one over each ankle. Then, when a sandal strap breaks, stretch the band over the toe piece and hook it under the boot toe.—D. Duffey, Clintonville, Wis.



## Extension Plank Easily Set Up With These Hooks

Raising a heavy work plank or extension plank to a high working position on ladder jacks is not an easy job for one man, unless a pair of hooks are used like the ones shown. Each of the hooks is shaped from a length of  $\frac{1}{8}$  x 1-in. flat steel so that one end can be hooked over the edge of a plank and the other end hooked on an extension-ladder rung as indicated in the drawing at right. Note that the overall length of the hooks is approximately 2 in. less than the distance between a first and third rung.

In use, a pair of hooks are slipped on a plank and spaced to line up with ladder locations. Then each end of the plank is hung on the highest rung that can be reached

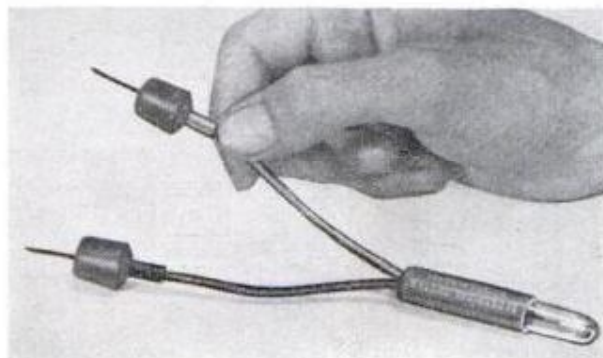


from ground level, after which it is raised to the desired height one end at a time as illustrated. A hand rail, each end of which is clamped to a ladder rail as shown in detail A, serves as a safety accessory. Attached at waist height, it also provides a convenient place to hang paint buckets.

Robert L. Sargisson, Berwyn, Ill.

## Shock Guards for Test Light

Fuller balls slipped on the probes of a neon circuit-testing light as shown in the photo, prevent the fingers from slipping accidentally and touching the uninsulated probes.—H. Hanscom, Elmhurst, Ill.



JANUARY 1960

## Prevent Water Stains on Rugs

Rug stains resulting from spilled water that has been allowed to soak through to the backing can be avoided, if the water is blotted up before it soaks in, according to the National Institute of Rug Cleaning. Pure water alone, can produce such stains which usually are brown or yellow in color. Recommended blotting procedure is to first use white unstarched terry cloth, white absorbent tissues, or white paper towels. Then place fresh blotting material on the wetted area and weight it down. As the remaining moisture rises to the ends of the tufts it will continue into the blotting material, carrying the impurities with it instead of leaving them at the surface of the rug pile. Often the best means of concealing a stain is to cover it with furniture or scatter rug.

223

# Form-Turning Tools

By C. W. Woodson

**D**UPLICATING machining operations on small parts having curved and irregular finished shapes by manipulating the lathe carriage by hand is a time-consuming procedure and the accuracy of the work is never entirely reliable. Parts having stepped shoulders, radii at one or both ends, concavities, beads, tapers, and other surface features that cannot be machined completely when chucked or mounted between centers, usually can be worked speedily with form-turning tools. These generally are carried in special mounting fixtures on the cross slide to permit machining and cutting off with fast, in-and-out movements of the cross slide alone, the carriage remaining in a fixed position, or requiring only short longitudinal movements between stops.

Forming tools can be ground to combine several cuts in one operation and can be designed for turning curved and irregular parts to a uniform shape. In some setups this can be done without moving the lathe carriage. Tools ground as in Figs. 1 and 2 can produce any number of duplicate pieces with speed, accuracy and uniformity.

When only a few duplicate parts are to be made certain types of jobs can best be turned by single-point tools, as in Fig. 3, saving time over grinding an intricate forming cutter. With a little practice the tool can be accurately controlled, operat-

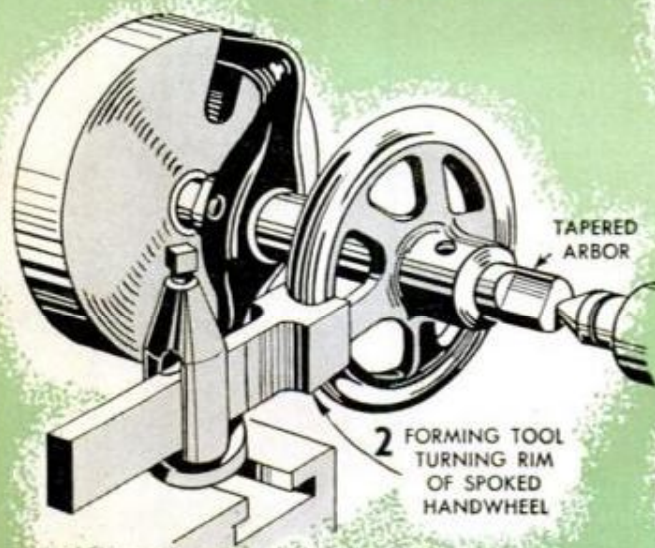
ing by hand both the lathe's longitudinal and cross feeds simultaneously. Use of a template, as the work progresses, will insure accurate results.

Many jobs, such as rounding the ends of rods, can be readily accomplished with ordinary tool bits ground as in Fig. 4. The single tool bit can also be ground for turning a concave, a short taper, or various other shapes on the ends of work pieces. Where individual parts are to be formed from plastics, or the softer metals, the work can be done with special hand chisels ground from ordinary flat files as in Figs. 5, 6 and 7. The surface near the end of the file is ground smooth and perfectly flat, the tip brought to the desired shape and beveled at approximately 30 deg. to form a cutting edge. Be careful not to overheat files when grinding.

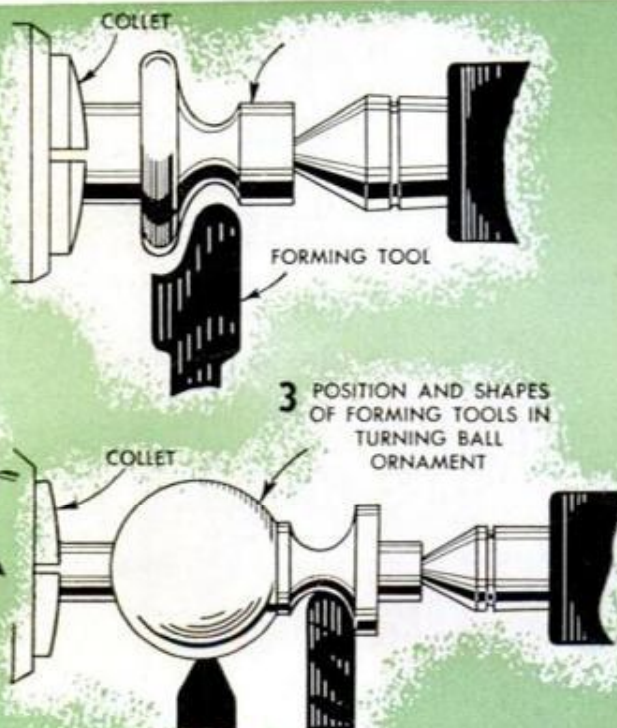
These tools can be used by hand on a small lathe in a manner similar to wood-turning chisels. A bar of flat steel held in the toolpost and projecting from one side to act as an improvised toolrest will allow many odd shaped jobs to be accurately formed, as in Figs. 6 and 7.

Hand-forged tools of various shapes, Fig. 8, are convenient for turning inside and outside V-cuts, convex and concave shapes and for rounding right-hand and left-hand corners simultaneously. Tools of this type are milled or filed to shape before harden-

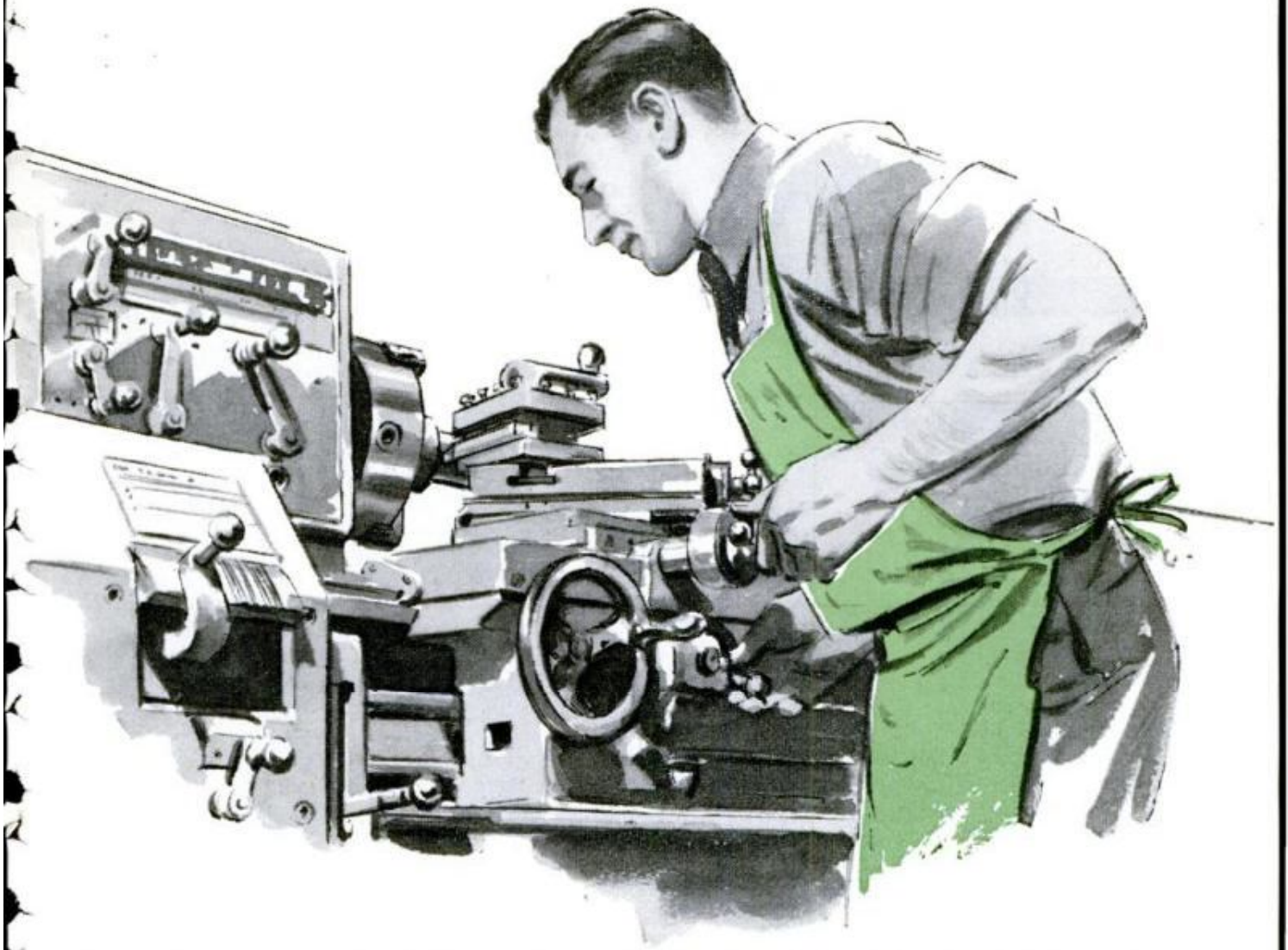
1 RIGHT, SMALL HANDWHEEL FORM-TURNED FROM SHOULDERED WORKPIECE



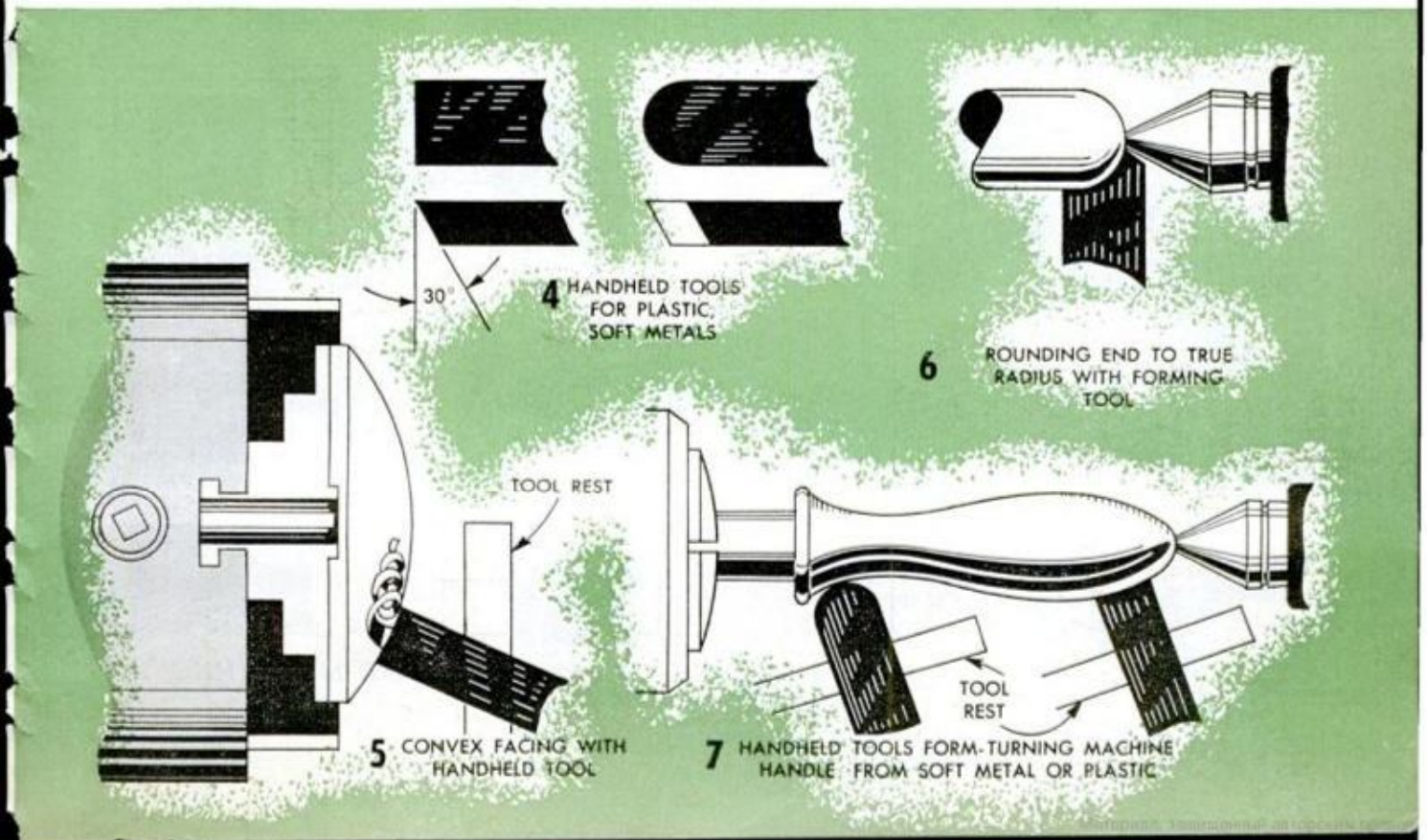
2 FORMING TOOL TURNING RIM OF SPOKED HANDWHEEL

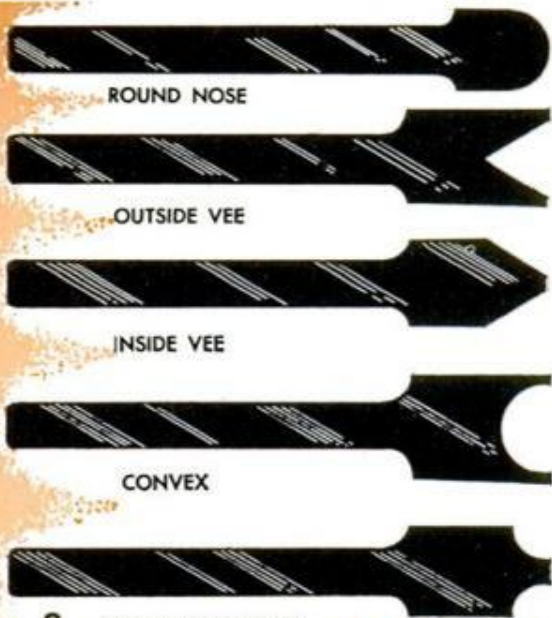


3 POSITION AND SHAPES OF FORMING TOOLS IN TURNING BALL ORNAMENT

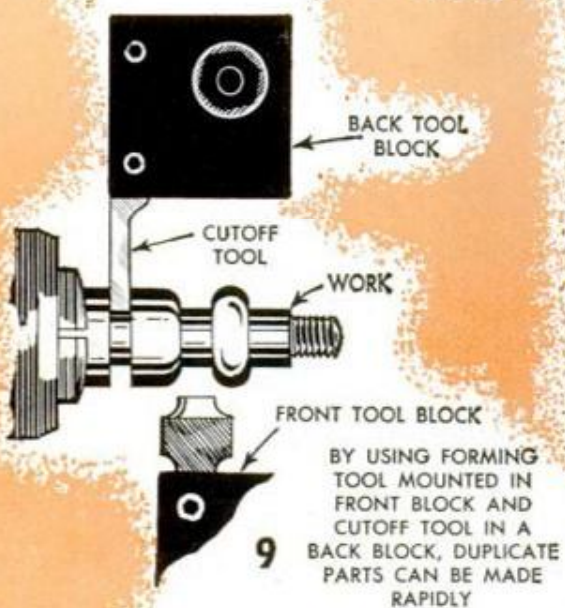


Parts made from soft metals and plastic can be turned with tools made by grinding discarded files to the contour required as in Figs. 4 to 7 inclusive below. Of course, care must be used when grinding to avoid overheating and drawing the temper of the file. After grinding, fit the file with a suitable handle





8 CORNER ROUNDING



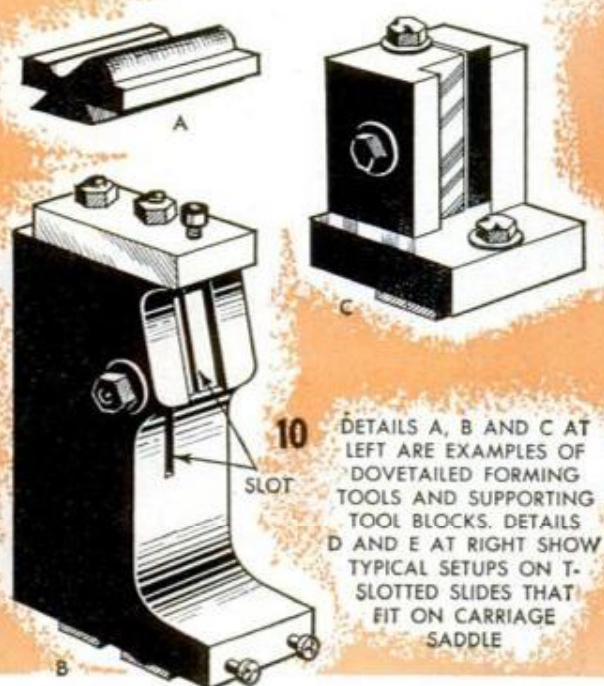
9

ing. They are then ground and honed perfectly flat on top to produce a sharp edge and are given the same clearance angle of ordinary lathe toolbits. Cutters for forming irregular curved shapes also can be ground from flat tool steel and fastened to a suitable shank for mounting in the toolpost or in a turret-type tool block. Both the work and the wide cutters of this type must be mounted rigidly and the lathe run at slow speed to avoid chatter marks.

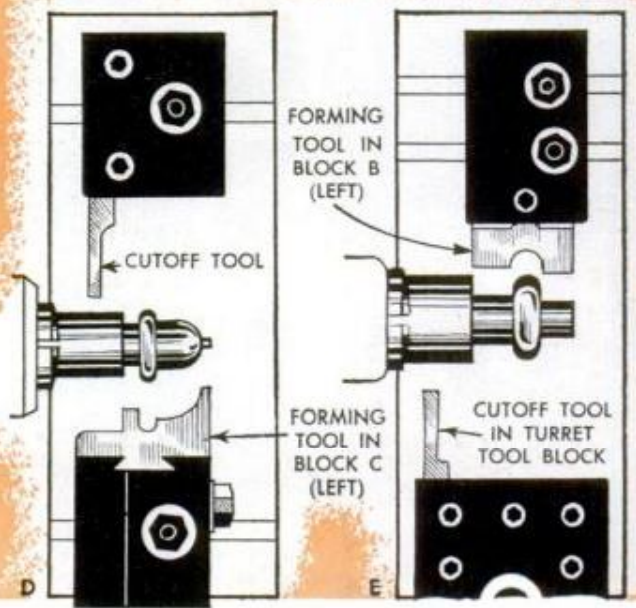
Forged cutters, of the type shown in Fig. 9, can be ground to form one diameter and two radii. In this setup the cutoff tool is mounted on the rear of the cross slide for cutting off the completed workpiece. Forged cutters are generally mounted directly in the toolpost or in the turret tool holder and are the simplest of all types of forming cutters.

In addition to the forged forming cutters there are two other types, the dovetail or straight forming cutters and circular forming cutters. The straight forming cutters detail A, Fig. 10, are mounted on a cross slide in tool holders, similar to those in Fig. 10, details B and C. They are held in a dovetail slot and are locked at the desired height by a clamp screw. The short holder generally is set up on the front of the cross slide, detail D, where a typical job is being formed, while the taller holder is used with an inverted tool on the rear of the cross slide. On some types of work the position of the tools is reversed as in detail E, Fig. 10. Forming cutters of the straight, or

Forming tools that cut several curved shapes simultaneously require a rigid tool block mounted on the cross slide as in Figs. 9, 10 and 11. Cutoff, or parting, tools can be arranged to work from front or back



10





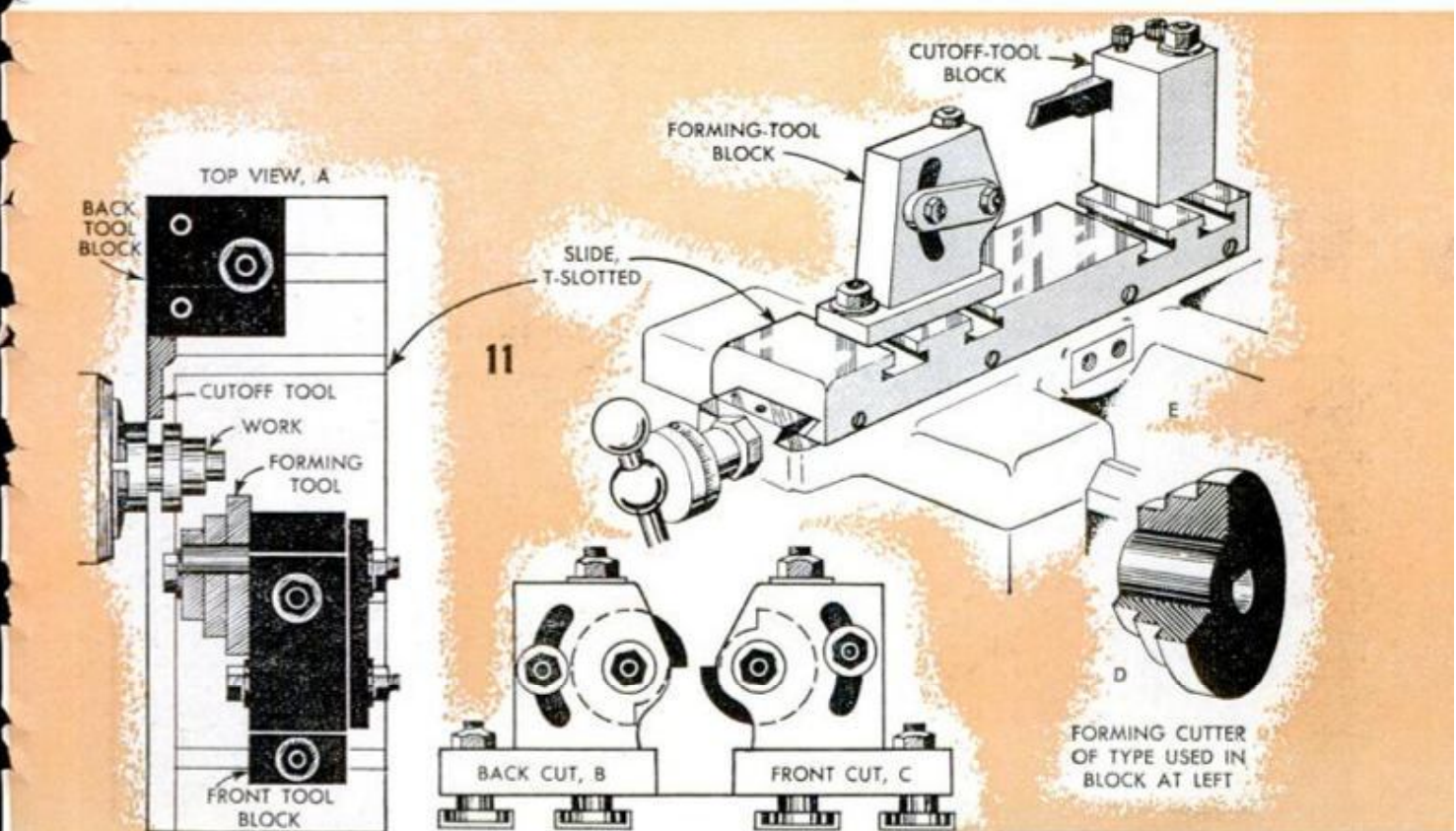
dovetail type, detail A, Fig. 10, have the contour ground the full length of the tool and are set in the holder at an angle to provide front clearance. With the cutting edge of the tool ground flat and square across one end it can be resharpened repeatedly and still accurately retain its original shape. Each tool holder should have rocker or swivel in the base for adjusting any slight inaccuracy in the setting of the cutter or holder. The dovetailed forming cutter, while difficult to shape, is easily set up, the exact form is retained throughout its life and the tool is rigid and can be operated under moderately heavy lathe feeds.

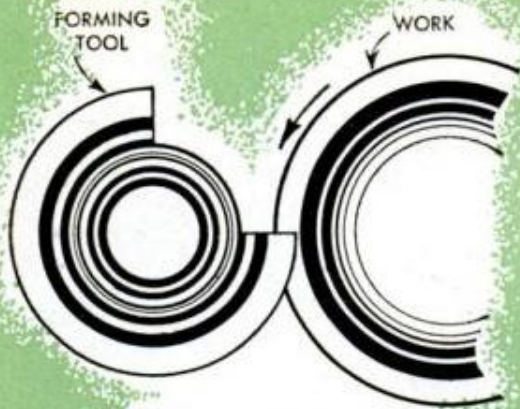
Circular forming cutters, with their contours properly shaped, can be used for a wide variety of operations. The contour running entirely around the circumference gives the tool exceptionally long life. As the cutting edge is dulled by use the top surface can be reground repeatedly and the resharpened cutter, when ground radially, will always retain its original shape.

Circular forming cutters detail D, Fig. 13, are usually mounted in a holder of the type shown in details A, B and C. Often the regular cross slide is removed and another of the type shown in detail E, Fig. 11, is substituted. A typical setup is shown in details A and E where the circular cutter is mounted in the holder at the front of the cross slide and the cutoff tool set up to make its cut from the back. For extreme accuracy the cutting edge is set at lathe



center height as in Fig. 12, where the cutter face is in a horizontal plane running through the center of the work. On roughing cuts, Fig. 13, the cutting face can be given a top rake of 5 to 10 deg. This will speed the work but will slightly change the shape of the cut. To give the cut its





**12** FOR ACCURATE CUTS TOOL IS SET AT LATHE-CENTER HEIGHT



**13** FOR ROUGHING CUTS USE TOP RAKE OF 5° TO 10°

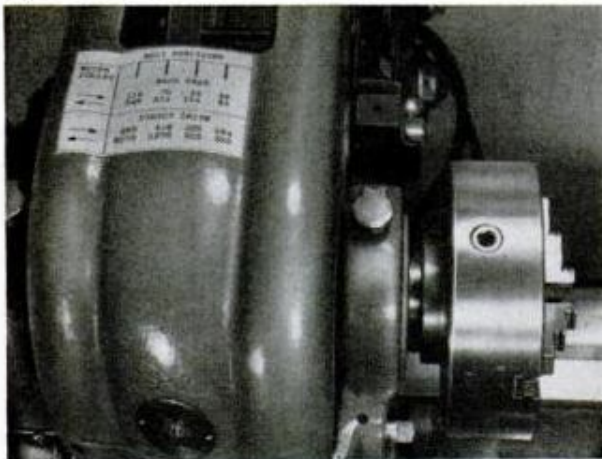
proper shape, the finishing tool, with its cutting edge ground radially and set as in Fig. 12, must follow the roughing operation if the work is to match the contour of the cutting tool.

The ability to take smooth finishing cuts with forming tools will depend largely on the rigidity of both the lathe and the tool holder. The tool holder must support the

forming cutter rigidly to make moderately heavy feeds possible. The work should be gripped firmly and any overhang supported by the tailstock center or, when necessary, by the steady rest. Overhang of the cutting tool must be held to a minimum for smooth cuts under average to heavy feeds to avoid any possibility of tool chatter.

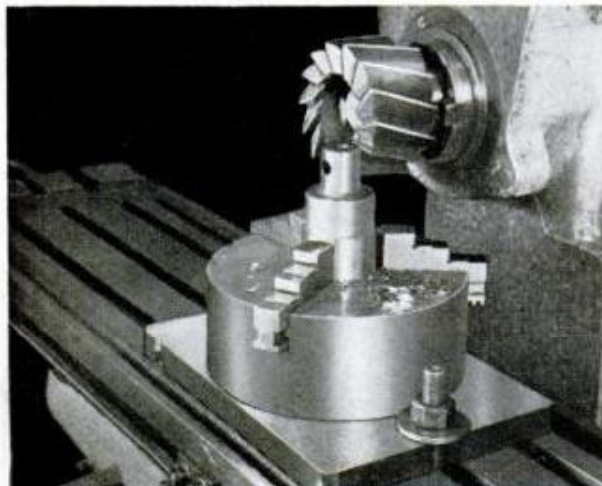
★ ★ ★

### Speed Chart Gives Belt and Gear Settings at a Glance



All lathes, even the smallest machines, have charts giving spindle speeds and other data for settings of the change gears. But here's an added convenience in the form of a typed chart attached to the hinged headstock guard where the various combinations are easily seen. Arrows indicate belt positions on the motor and headstock pulleys. Gear combinations also can be indicated if desired. The values can be typed or hand lettered on good quality paper and then the sheet is sprayed with a clear lacquer to prevent smudging. Attach the sheet to the headstock guard with glue or tape.—H. Hanscom, Elmhurst, Ill.

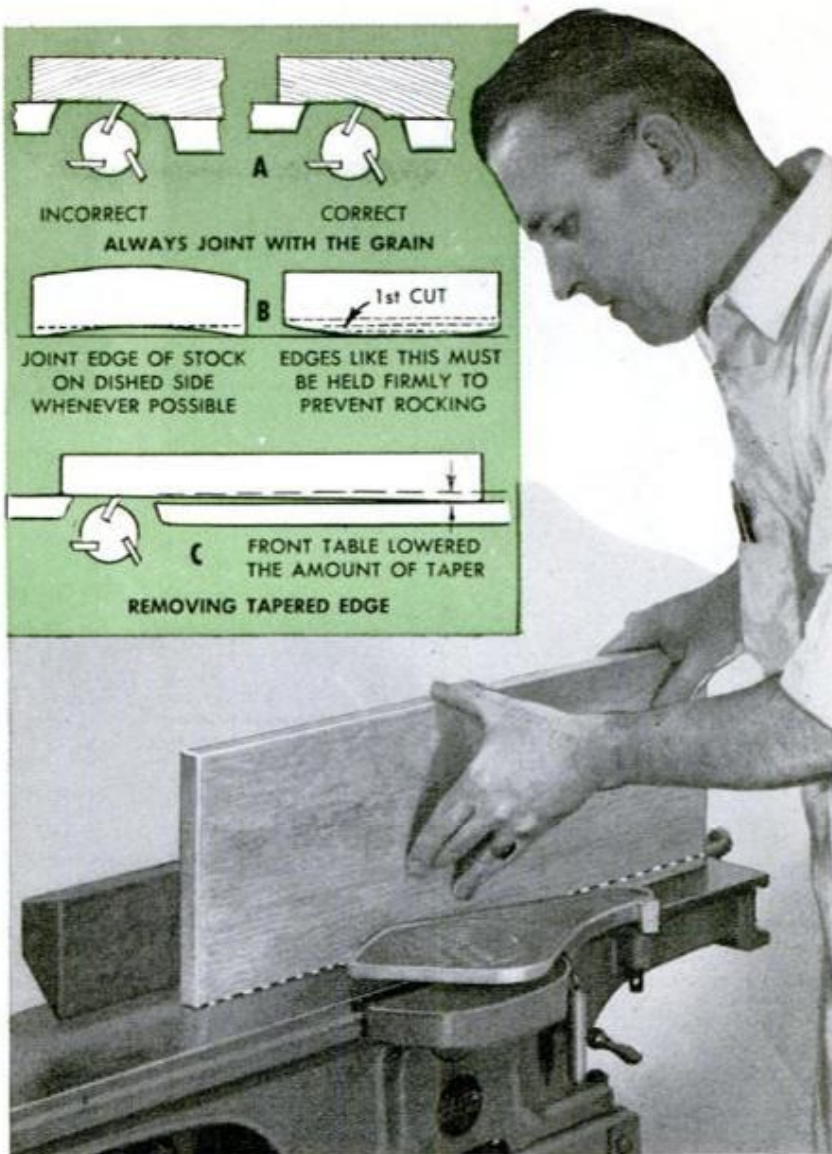
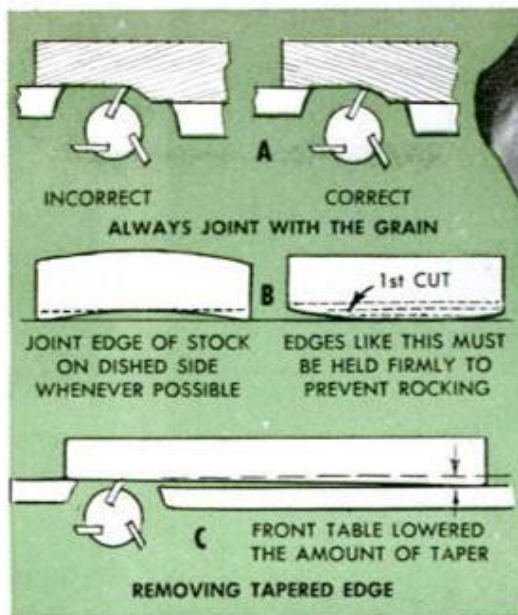
### Lathe Chuck Increases Range of Work on Milling Machine



A three-jaw chuck makes a handy work-holding device on a milling machine, greatly increasing its range of work on small parts which are difficult to mount in a vise. Cuts can be made direct off the machine spindle or by means of the overarm on any parts that are within the chuck's capacity. The chuck can be mounted on the machine table in various ways but one of the simplest is that pictured. Here the chuck is screwed to a flat steel plate, milled on both faces and bolted to the machine table. The chuck is centered on the plate and is held in place with the three screws with which it is normally attached to a backing plate.

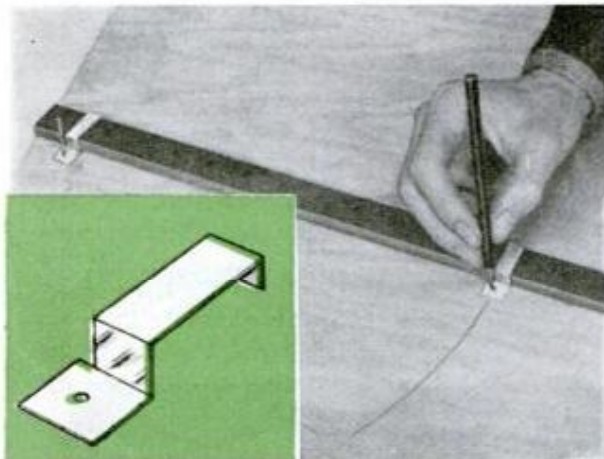
## Jointer Operation Made Safe and Sure

First among the ABC-s of safe jointer operation is the rule of always planing with the grain of the wood, detail A. Next, if you must joint the edge of a piece of stock warped along the length as in the lefthand detail, B, take the concave edge first. Then turn the piece over and plane the convex edge, being careful to prevent the stock from rocking. Use the same procedure when facing stock that is cupped, or dished, due to warping. Take light cuts and check the direction of the grain before planing. When planing a taper on square stock or when squaring up wide stock as in the photo, lower the front table of the machine a distance equal to the taper, detail C. Then place the forward end of the stock on the rear slowly. Jointer knives must be sharp.



## Trammel For Large Diameters

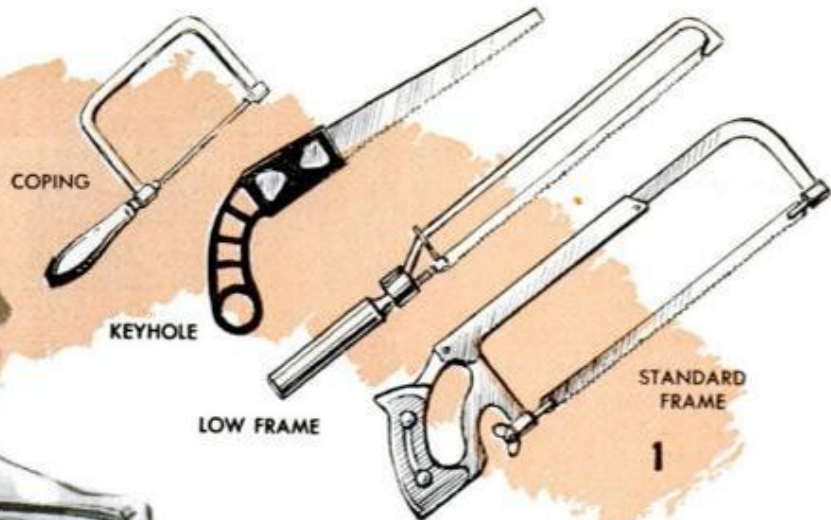
Fit a yardstick or a length of lattice stock with two sheet-metal clips, drill the projections of the clips for a brad and pencil point and you have a handy trammel for striking large arcs or complete circles. The clips should fit tightly so they will hold securely at any desired point.



## Lifter For Glue-Bottle Cap

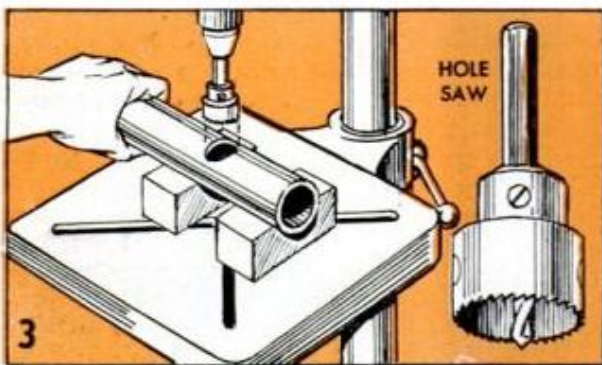
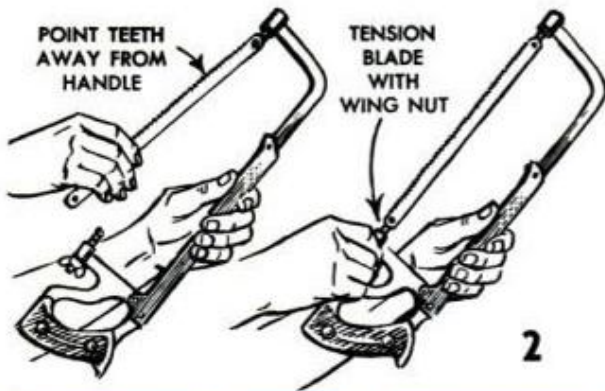
Glue bottle caps that snap onto the flanged spout in a friction fit are often difficult to remove. To prevent splitting the cap, drop a small metal washer over the end of the spout before you press the cap in place. The washer provides a means of lifting the cap with a straight pull.



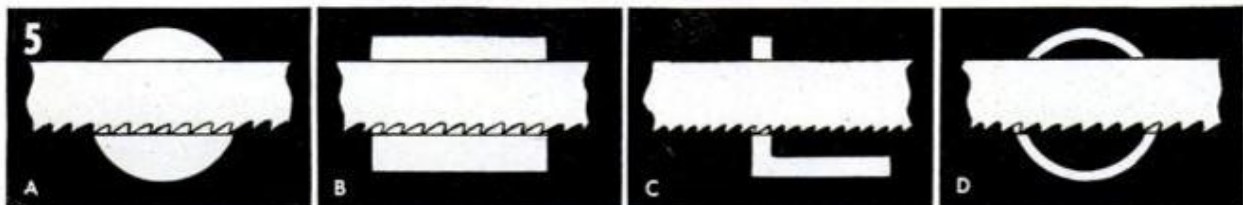


# HACKSAWING CAN BE EASY

WHEN SAWING METALS the trick in producing uniformly good work is in knowing how to handle the hacksaw, what blade to use, and how to position the work in a vise. Common hacksaw frames are shown in Fig. 1, the standard frame being the most widely used. Insert the blade in the frame and tighten to the correct tension as in Fig. 2. Lock channels, angles and I-shapes in the vise as in Fig. 4. These positions allow you to cut at an angle through the thin sections. If the parts are relatively small you'll do better work using a blade having 18 teeth per inch. Solid rounds and rectangular shapes Fig. 5, details A and B, can be cut with a blade having 14 teeth per inch. Tubing and thin sheet metal should be placed in the vise between blocks of softwood and cut with a blade having not less than 24 teeth per inch. Note Fig. 5, details C and D and you'll see why, in cutting thin sections, two teeth must always be in contact. Otherwise, you've got trouble. The hole saw, Fig. 3, also is a hacksaw of a type. Use it in your drill press to cut clean holes in sheet metal and large-diameter tubing.



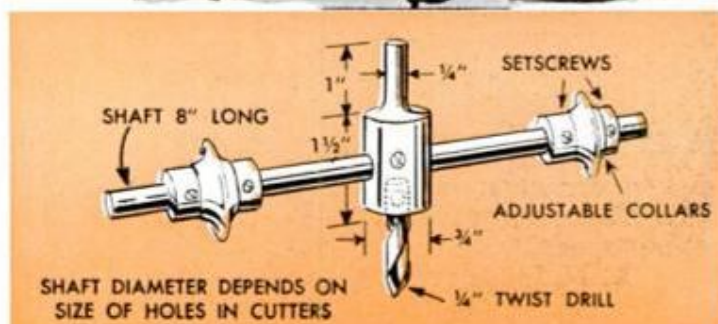
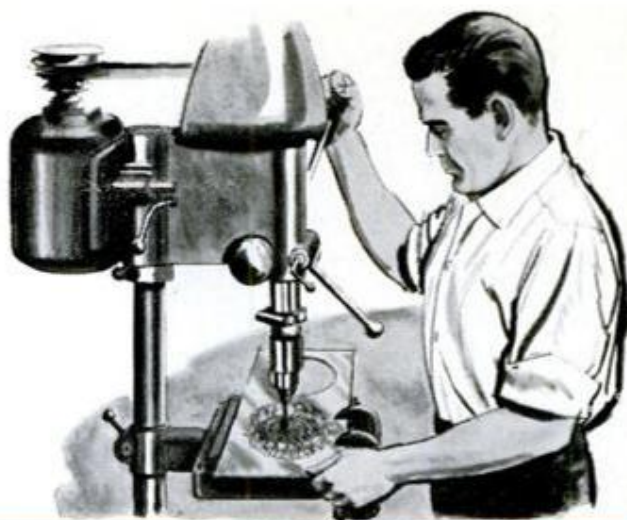
METHODS OF CLAMPING IRREGULAR SHAPES IN VISE



## Drill Press Attachment Cuts Circles in Steel

With this device, a drill press or a portable electric drill can be used to cut disks in light sheet metal. The circle cutter consists of a twist drill holder turned from  $2\frac{1}{2} \times \frac{3}{4}$ -in. steel stock. One insert end is shouldered to 1 in. in length and  $\frac{1}{4}$  in. in diameter. The opposite end is drilled to receive a  $\frac{1}{4}$ -in. twist drill and also is drilled and tapped for set screws. Cross drill another hole through the center of the guide. Its diameter will depend on the size of the shaft and cutters you plan to use. Slip an 8-in. shaft into the holder and on each end mount a cutting wheel taken from a pipe cutter. Fit shaft collars on each side of the wheels to hold them in position. They will permit adjustment for circles up to 8 in. in diameter.

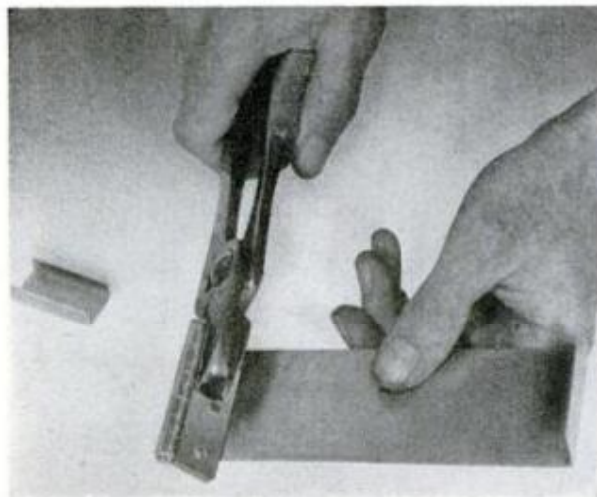
Edwin B. Davenport, Fairfax, Calif.



## Butt Hinge Serves as Brake For Bending Sheet Metal

It is possible to make a sharp, right-angle bend in light sheet metal without scratching or marring the surface. A square butt hinge of average length makes a good brake for such bends. Close the hinge on the metal along the line on which the bend is to be made. Grip the hinge with a pair of pressure or slip-joint pliers and bend upward. Larger bending operations can be done by placing the work between two blocks of hardwood or heavier gauge metal. The work, placed between these and locked in a bench vise, can be bent with hand pressure and a rubber mallet.

R. Hanscom, Elmhurst, Ill.

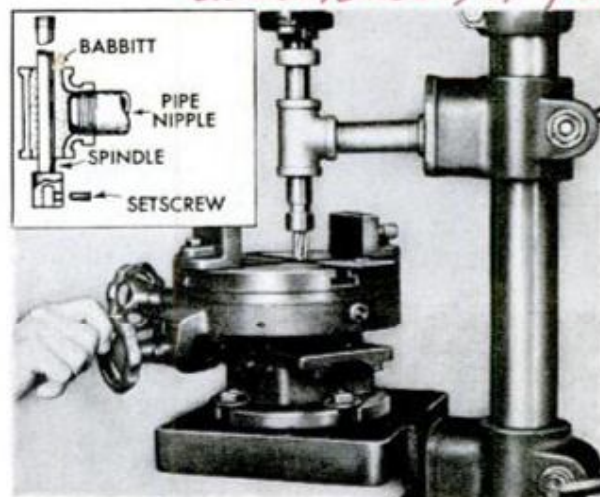


## Extra Swiveling Table Bracket Supports Spindle Extension

An extra table bracket, available from the manufacturer of your drill press, can be utilized to carry a bearing for a spindle extension used for milling and high-speed routing. A pipe nipple and tee serve as a bearing for the drill-spindle extension. The pipe nipple is screwed into a floor plate attached to the milled face of the table bracket. The tee is bushed with babbitt to provide a bearing for the spindle extension. The same setup can be used with a router bit for wood working at high speeds or to drive a cup-type abrasive wheel in high-speed grinding operations.

Hugh Botts, New York, N. Y.

*203 X 78th St, NY 24*



## Mount Disk Harrow On Auto Wheels

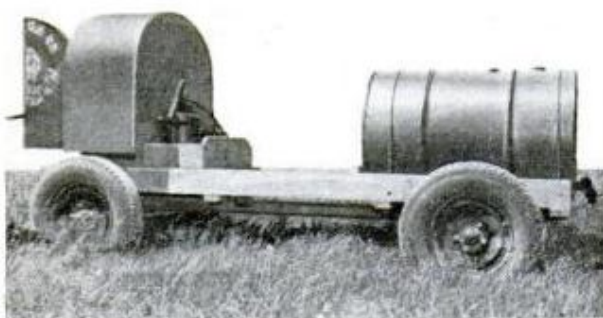
The problem of moving a disk harrow from place to place without causing damage to the blades can be solved by simply adding wheels. If two rubber-tired auto wheels are fastened to the frame of the harrow, they will provide a means of transport that is always ready and available for use. For transporting from one field to another, the harrow is turned over backward onto the wheels. This allows it to be pulled more easily and at higher speeds. This also prevents dulling of the disk blades when they must be taken over gravel or asphalt roads.

A. W. Ranniger,  
Carroll, Iowa



**Ink stains** in rugs can be removed if a few simple rules are observed, according to the National Institute of Rug Cleaning, Inc. Ink dries rapidly and should be blotted at once. Use paper towels, tissues, or white cloth. Remember to blot—not rub. Do not use milk as it may set the stain. Now apply a dry cleaning fluid. Work it in and blot the

excess. Then apply a solution of detergent and warm water. Rinse the spot and if it persists, add ammonia to the detergent solution. Regular ink removers are risky as they may remove the dyes as well as ink. Paper towels or cloth, folded to an inch in thickness, are now placed on the spot and weighted down.



## Mobile Field-Service Station

This mobile service unit saves trips and time when field work is under way. It is assembled on a four-wheeled trailer to which is bolted a light box. A 100 gal. gasoline barrel is secured by steel hoops. Part of an old tank truck holds oil cans, tools, funnels, a pressure-grease outfit and other needed items. The rig is left in the field and is refueled by the tank truck.

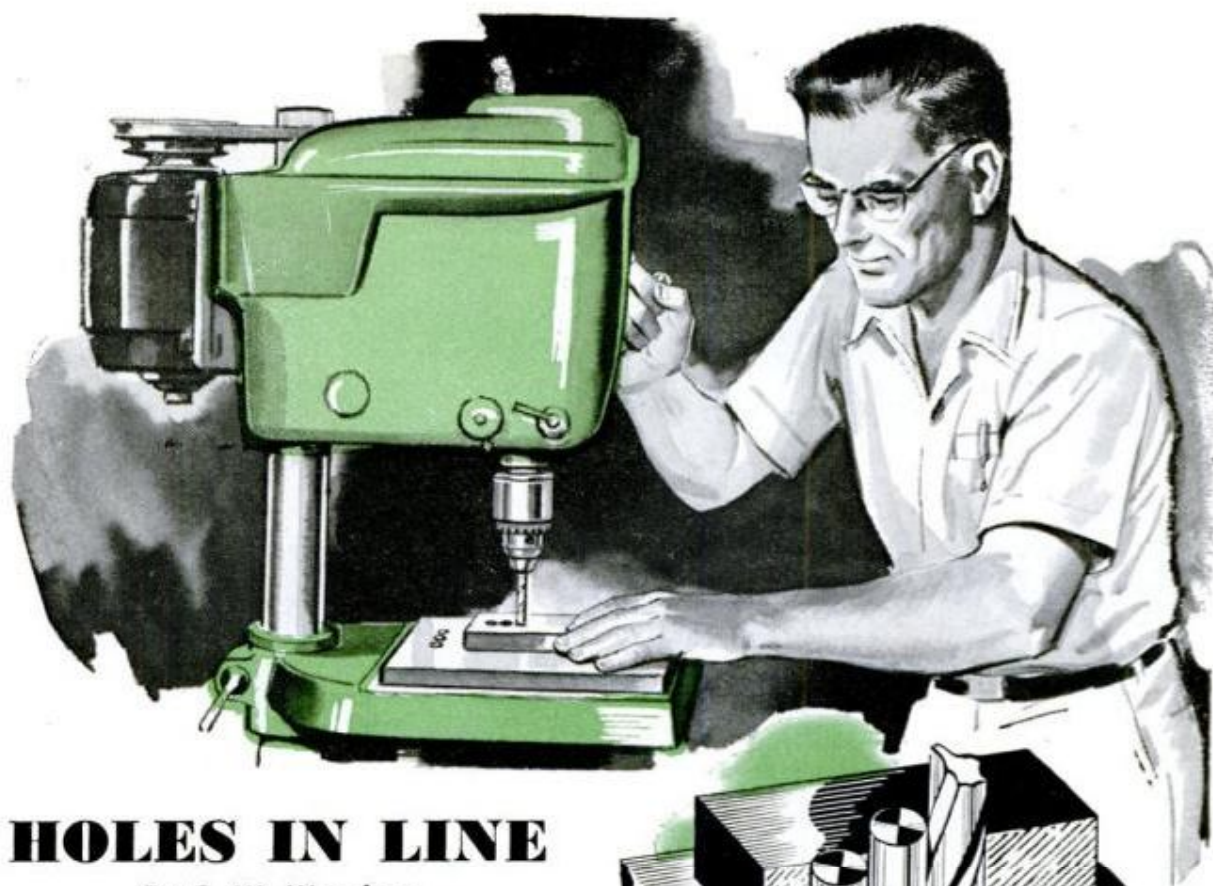
Richard Hatch, Donnellson, Iowa

## Use Wooden Ramps To Unload Grain

Where facilities are limited, this ingenious set of ramps takes the place of a mechanical dump to unload grain from trailer to elevator hopper. Each wedge-shaped ramp is set on two 6-ft. runners made of 2x6-in. stock. A 20x10-in. plank extends from one end of the runners up to the top of a 2x10-in. post, 2 ft. high. The ramp is placed under the trailer which is backed up and tilted. The grain is then allowed to pour out into the elevator hopper.

Loren R. Reif, Danville, Iowa

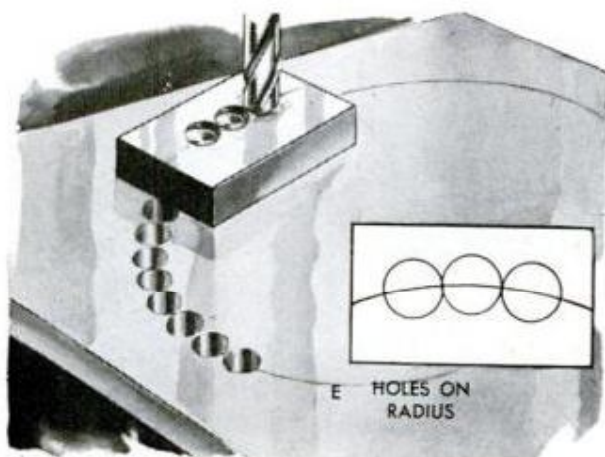
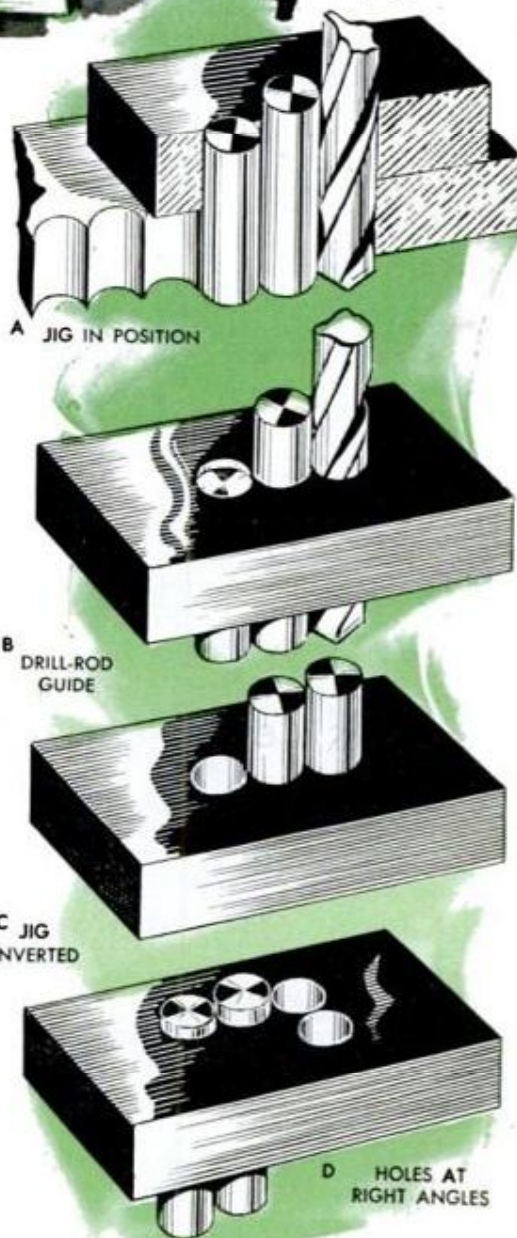


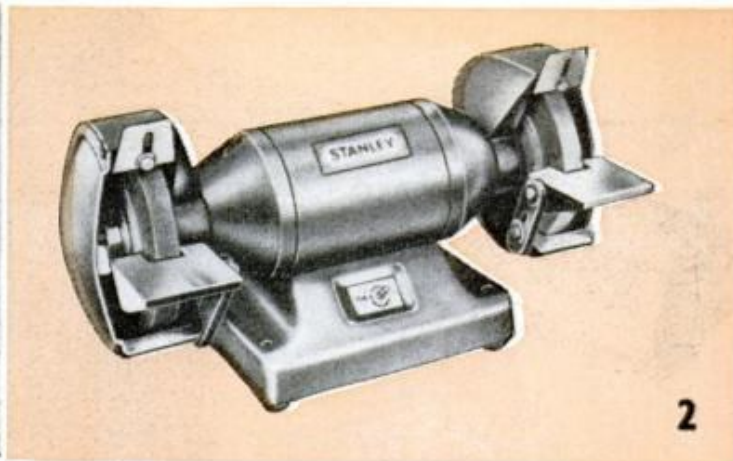


## HOLES IN LINE

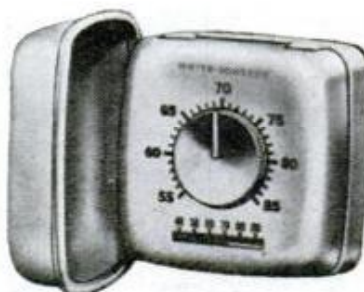
By C. W. Woodson

WHEN IT'S NECESSARY to drill rows of holes in line or on a radius as in roughing out a die, a jig gives you a degree of accuracy not ordinarily attainable in any other way. When you know the diameter of the holes to be drilled, make a simple jig as in the sectional view A, and cut two pins from drill rod of the same diameter as the holes. Place the jig and drill the first hole. Insert a pin and drill the next hole. Insert the second pin and drill the third hole as in detail B. The pins serve as locators as is shown in detail C, the jig being inverted to show how the pins keep the row of holes in line. Rows of holes also can be drilled at right angles as in detail D, or on almost any radius by using two pins as in detail E, which shows a jig in use.





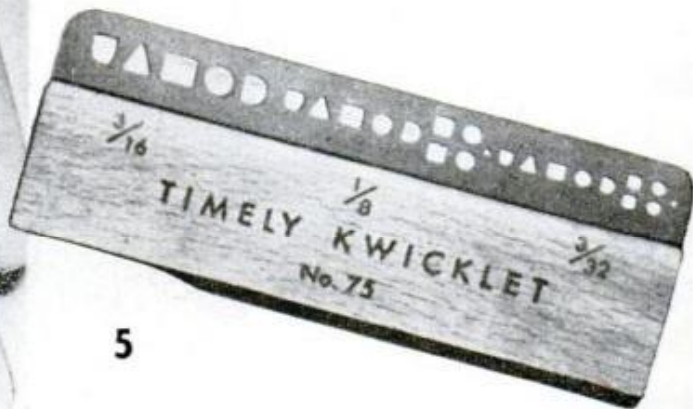
# SHOPPING FOR TOOLS



3



4



5

**1. ELECTRIC SHARPENER** uses removable abrasive belts in place of the usual grinding wheel. Wide selection of belts for polishing wood or other soft materials as well as grinding metals. Powered by ¼-H.P. motor, grinder is ideal for home as well as shop  
Bromick Mfg. Co., Fargo, N. D.

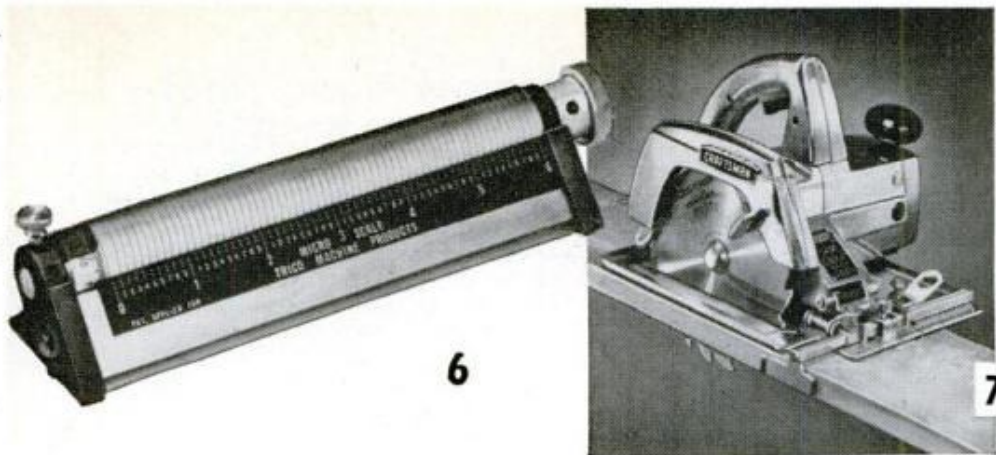
**2. HEAVY-DUTY GRINDER** available in ¼ and ½ hp., features two wheels and tool rest adjustable for height, angle and distance from wheel. Extended frame permits grinding large, odd-shaped parts. Sealed ball-bearings are lubricated for normal life  
The Stanley Works, New Britain, Conn.

**3. ZONE CONTROL UNIT** for single-pipe heating system is mounted on radiators. Automatic water valve and low-voltage thermostat feed heat from zone to zone. Valve blends water temperatures, eliminating water hammer and heat expansion noise  
White-Rodgers Co., St. Louis, Mo.

**4. TINY TAPPING ATTACHMENT** weighs ten ounces, has steel tapping capacity from #00 to #6. Lead error eliminated by free floating action and planetary ball reversing mechanism. Spring loaded ball clutch stops tap instantly on hard spots and holes  
Tapmatic Corporation, Costa Mesa, Calif.

**5. MIDGET SPEED-LETTERING TEMPLATE** allows anyone to do expert lettering. Skeletonized letters made through five cut-outs can be finished free hand without guide or space lines. Cantilevered construction eliminates smearing of inked letters or pencil lines  
Timely Products Co., Baltimore Ohio



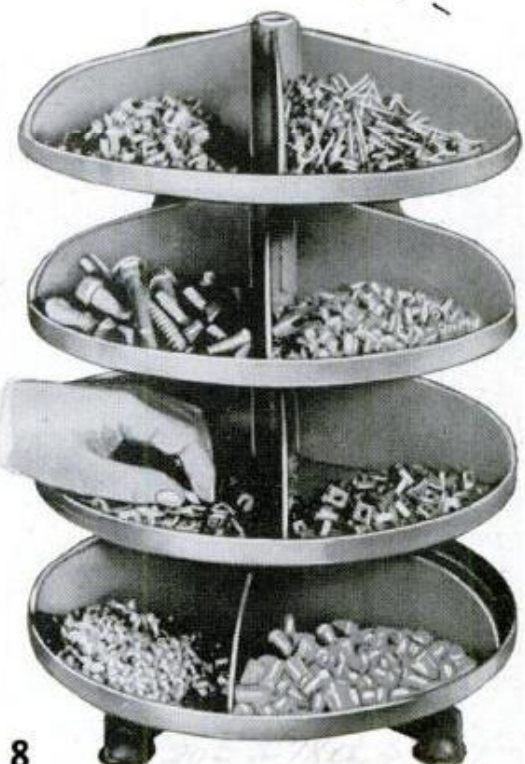


**6. PRECISION INSTRUMENT SCALE** permits setting of instruments to three decimal places without need for gauge blocks. Has direct reading scale and dial calibrated in .001 increments. Knob moves a helical scribed line on the barrel to give two fixed points for settings in tool and die, and design work where accuracy counts  
 Trico Machine Products Corp., ~~Cleveland~~, Ohio

*WILLOUGHBY,*

**7. HEAVY-DUTY PORTABLE SAW** features a safety switch which cuts off all current in case of overload. Push-button rotor eases blade changes. Balance and comfort are provided by a two-position guide knob. A telescoping rip fence gives 30 percent greater ripping capacity and makes for easy storage. Saw has a 2 hp. motor  
 Sears Roebuck and Co., Chicago 7

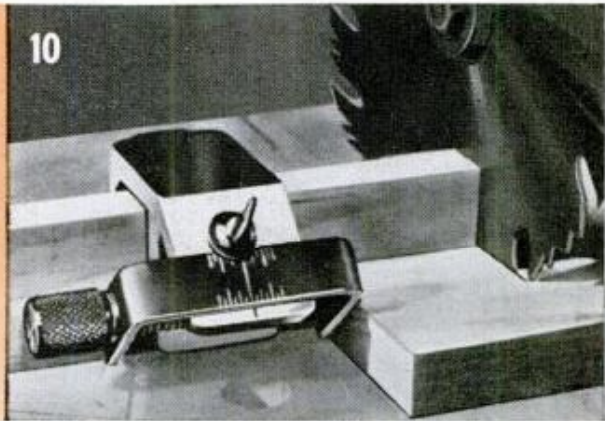
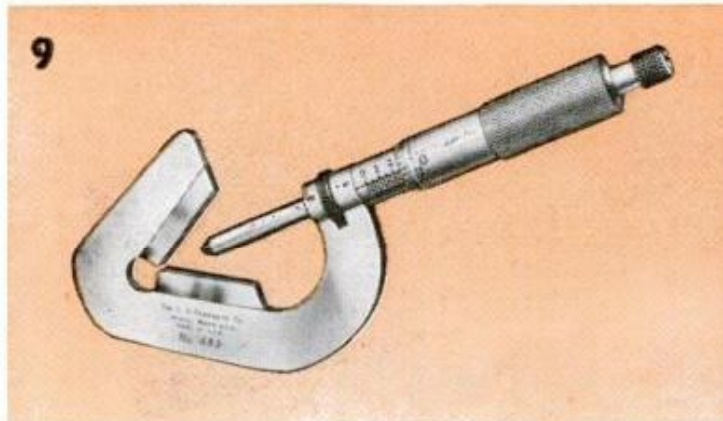
**8. ROTATING PARTS BIN** has four trays that revolve at a touch of the finger. Each tray is divided into five sections, giving easy access to screws, nuts, bolts, nails. Of heavy steel construction, it eliminates the need for shelves and saves bench space. Valuable addition for the shop or hobby enthusiast, also for salvage shops  
 Walker Manufacturing Co., Cleveland, Ohio



**9. SPECIAL MICROMETER** designed with three-point contact, detects out-of-round settings on centerless grinders. Also measures three-fluted cutting tools, taps, milling cutters, and reamers. Used like a conventional outside micrometer, "mike" has carbide facings to eliminate wear under abrasive conditions that can cause inaccuracies  
 L. S. Starrett Company, Athol, Mass.

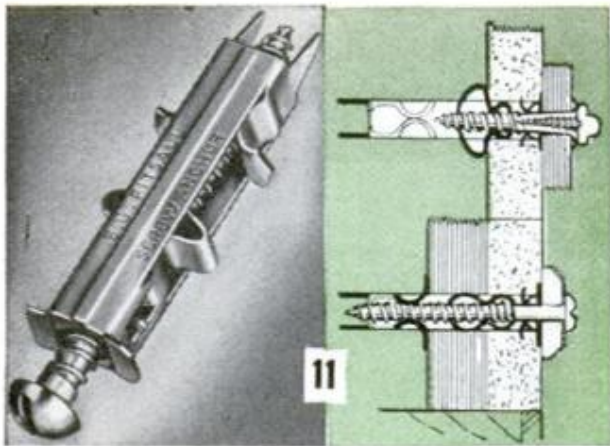
**10. ADJUSTABLE STOP GAUGE** used on radial and bench saws assures accurate cutting of wood stock. A scale graduated in 1/16 in. is easily set to exact measurement. Locks in place allowing craftsman quick, precise work. Gauge is made of aluminum and fits on either side of the saw. Eliminates need for "C" clamps on saw table  
 L. Stahl, Saginaw, Mich.

8



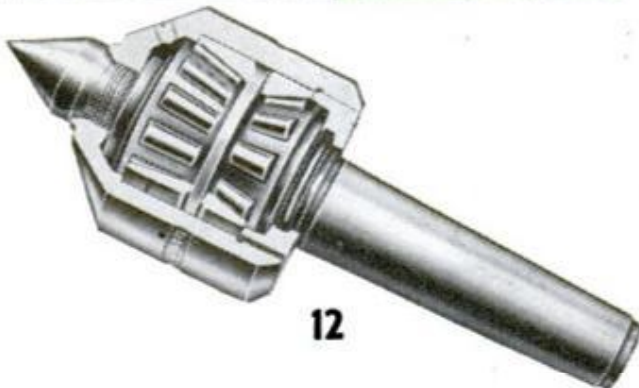
9

10



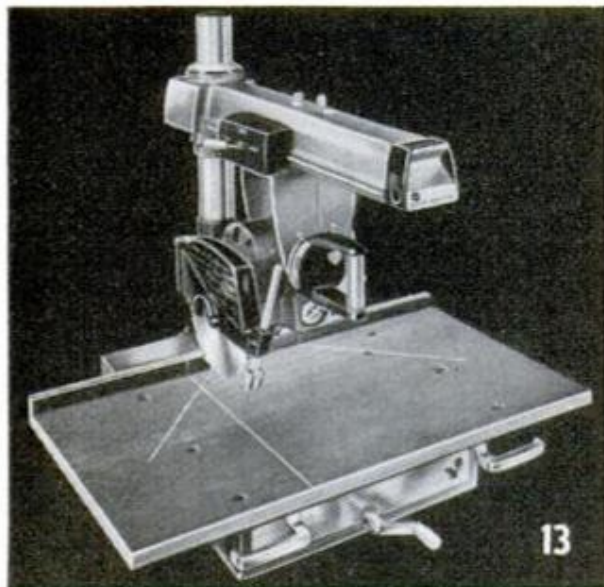
**11. UNIVERSAL SCREW ANCHOR** is adaptable to almost any size screw, screw eye, screw hook, etc. Short size makes it ideal for use in modern thin-wall construction. Anchoring ability comes from spring clamps within the square tube. Spring clamps open and hold the screw and spring pressure operates each shoulder independently. Square construction, though fitted into round, drilled holes, has a digging-in quality which assures a permanent fit

Fitsall Distributors Inc., Hempstead, N. Y.



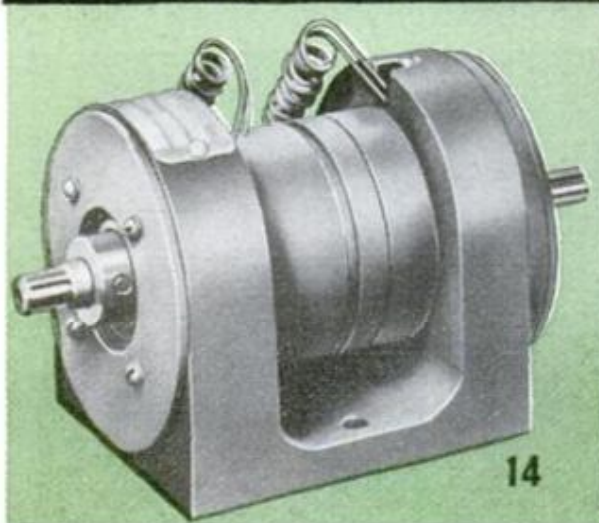
**12. ROLLER-BEARING TAIL CENTER** for metal lathes has tapered roller bearings, a replaceable center point and a special bearing adjustment. The roller bearings allow the center to absorb extreme thrust and radial loads with minimum wear. A special built-in adjustment for preload and a take-up for bearing wear prolong the center's life. Center points are of heat-treated chromium steel. Any design may be used depending on the material being machined

Trio Machine and Manufacturing Co., Cleveland, Ohio



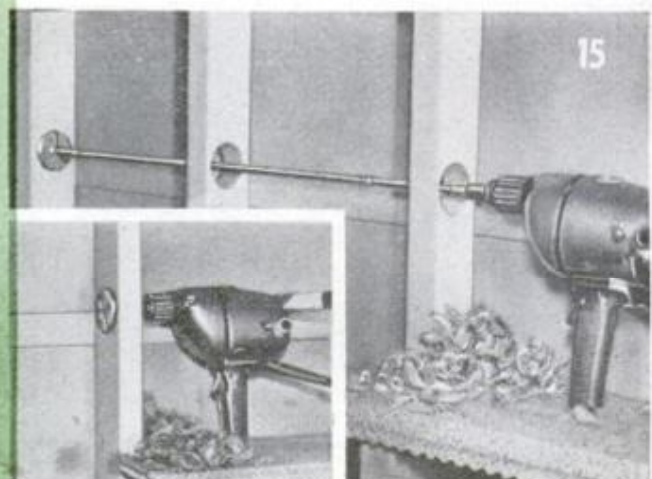
**13. RADIAL-ARM SAW** has many special features. Out-front controls allow instant, simple, one-hand operation and a selective drive gives a range of seven speeds with the correct RPM for any job. Fence changing is eliminated with a sliding, one-piece table and the coil cord is hidden so it can't be damaged. The arbor can be used at either end, permitting use of the blades on the left or the right sides. This allows full table capacity for all miter cuts

Yuba Consolidated Industries Inc., San Francisco, Calif.



**14. COMBINATION CLUTCH-BRAKE** comes as a complete unit with bearings, shaft and stand. Both clutch and brake are magnetically set, including a neutral position. They can be furnished with a common armature, splined to the driving shaft, or given a common hub with separate armatures to key the hub to the shaft with zero backlash. Torque ranges run from 25 in. oz. to 175 in. lbs. Both clutch and brake can be wound for voltages up to 90 volts DC

Stearns Electric Corporation, Milwaukee, Wis.

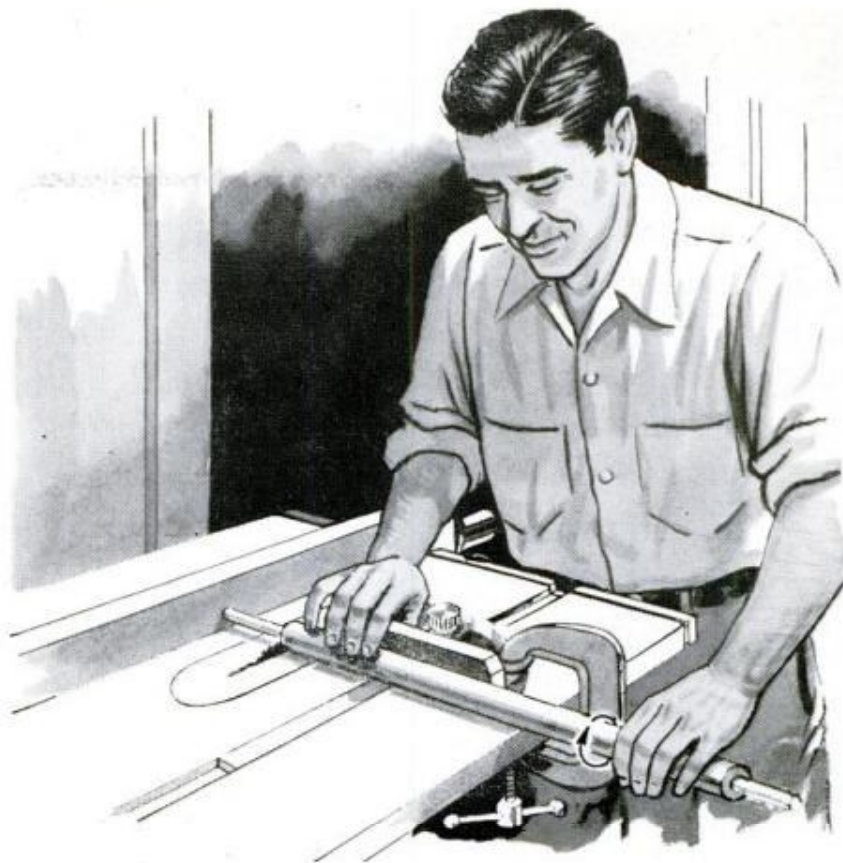


**15. A BIT** of novel design makes it possible to drill holes up to 2-9/16-in. in diameter with a 1/4 or 1/2-in. drill. Tool steel blades mounted on extensions allow holes to be drilled to any depth. Plumbing and wiring can be installed without disturbing existing plaster walls. Planing action of the drill cuts only .020 in. per revolution, requiring less torque than other bits of similar size. Extensions are threaded so that ordinary pipe may be used for extension

Time Saver Tools, Inc., Skokie, Ill.

## Miter Gauge and Saw Turn Perfect Tenon

A dowel hole bored by hand in the end of round stock will probably not be perfectly concentric, or in exact alignment with the axis. Avoid such inaccuracy by sawing a round tenon on the end of the stock. Clamp a miter gauge to the table of a circular saw so that the work extends over the center and at right angles to the blade. Adjust the saw or table for minimum depth cutting. Using the fence as a stop, rotate the stock against the direction of blade rotation and remove a layer of wood the length of the tenon. Readjust the cutting depth until the desired diameter is reached being careful not to cut too deeply.



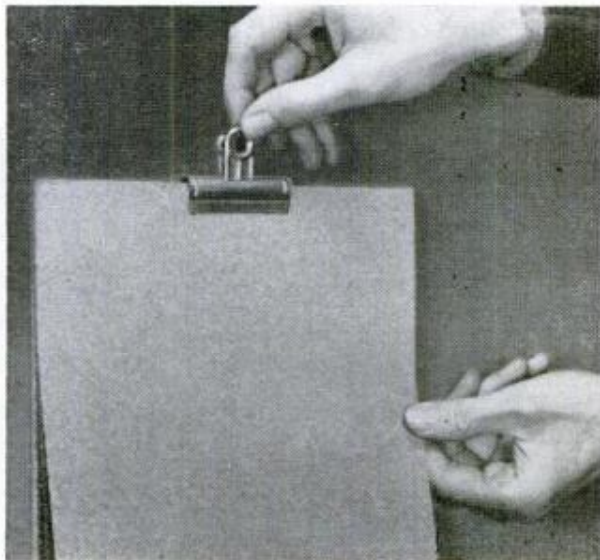
## Sandpaper Slides Into Place With Aid of Metal Plate

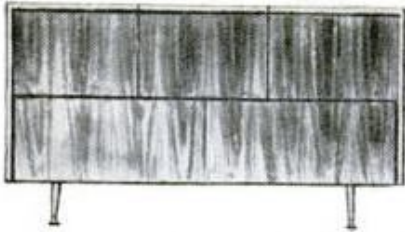
When fitting sandpaper into a floor sander, it is necessary to get the ends of the paper well down into the slot of the drum. This is difficult to do with the open-coat abrasive because the rough surfaces contact one another and prevent the ends from sliding easily. If a small metal plate—long enough to cover the entire width of the paper—is slipped between the sandpaper faces, it will prevent them from contacting one another and will permit them to slide freely into place. The metal is removed before clamping the paper.



## Large Spring Clip Keeps Sandpaper Handy

Loose and scattered sheets of sandpaper can often lead to a case of short temper and frayed nerves—especially when you can't find the particular grade of paper you're looking for. A large spring clip makes a convenient sandpaper holder, and since the clip can be hung on a wall the paper remains flat and isn't apt to get creased and crumpled as it would in a drawer. The desired grade can be selected quickly by leafing through the sheets and can be removed from the clip without removing the rest of the paper.





*Selecting and building the components of your personalized stereo-fidelity system takes some work and a more-than-superficial insight into the problems of sound reproduction. But the results are worth the effort. In this article, after some initial thoughts on hi-fi buying, we'll describe the construction of an equipment cabinet. Subsequent articles will deal with the selection and construction of speaker systems and electronic component kits which meet your individual needs from a standpoint of both quality and cost*



(1961 Electronic Bk)

# RADIO TV HI-FI

**ELECTRONICS**

## For the quality you want, at a price you can afford CUSTOM BUILD YOUR STEREO HI-FI SYSTEM

PART I

By Lothar Stern

**L**ET'S TALK HIGH FIDELITY. Let's dispense with the glowing adjectives of the advertising-copy writer and discuss it in the more subjective terms of *what, why* and *how*. The object—to help answer some of the questions that will come up when you go to buy your hi-fi music system, and to help you select units which fill your immediate needs *without becoming obsolete in the wake of future developments*.

What is fidelity? Webster calls it "exactness—as in copy," and no one will quarrel with this definition. It's when we add the word HIGH that we run into conflicting opinions. The manufacturer of a low-priced unit may well justify the hi-fi label on his instrument by comparing its performance with that of a table-model radio or portable phonograph, and the difference is often demonstrable. But the connoisseurs, those who love and KNOW music, have different values. They rate a system not in terms of how much better is it than an inferior one, but how much worse is it than the ultimate—the orchestra itself. And by those standards the difference between a true high-fidelity system and some others bearing the hi-fi label can be as dramatic as the difference between today's motion pictures and the "flickers" of yesteryear.

Balancing this performance difference is the difference in cost. Perfection, or near-perfection, in anything is expensive, and hi-fi is no exception. The person who buys a low-priced unit on the strength of the hi-fi label alone is likely to be seriously disillusioned after a more intimate contact with true high fidelity.

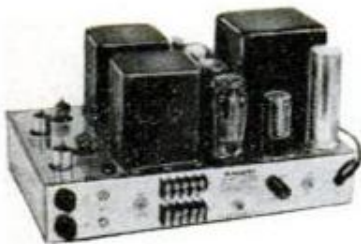
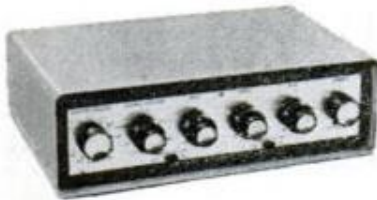
On the other hand, let's be practical. The high cost of hi-fi is hardly justified for the casual listener. If you like music only as a background—to bridge the lull in a conversation or to stimulate the appetite—if the boom of the bass drum gives you a headache or conditions prevent you from playing your music system just barely above a whisper you may as well stick to one of the lower-priced music systems which can satisfy your musical tastes at a relatively low cost. If, however, you enjoy listening to music for an hour or two to the exclusion of other activities, if you want to hear music as it was intended to be heard, an investment in anything less than true high fidelity would be a poor one indeed.

### Two Ways to Buy Hi-Fi

There are two ways of buying your hi-fi system. The first—and that's the easiest way—is to visit a large music store, pick out two or three sets within your budget, listen to them and buy the one that sounds best. The whole procedure shouldn't take more than an evening or two and chances are that your purchase will be quite satisfactory—at least for a while.

The second method is far more involved, but in the long run it offers a number of advantages. It consists of buying the separate components which make up a complete system and interconnecting them yourself.

**About Furniture Consoles.** What's wrong with complete, cabinet-installed hi-fi systems? From a standpoint of actual performance—nothing. Today it is possible to buy cabinet consoles which perform as well as some of the best custom-built systems. But you can't buy these in table-top designs or at bargain prices. Good lumber is expensive and cabinet makers don't work for nothing. While a mass-produced cabinet costs less than a custom-built



Small but representative sampling of kit-built hi-fi components includes preamps., radio tuner, power amplifier, tape recorder and record player. Critical selection assures top quality at lowest cost

one, you'll still pay considerably more for a cabinet model than for individual components capable of equivalent performance.

But even if you're willing to pay extra to have everything neatly consolidated in an attractive piece of furniture, the cabinet models still have a number of drawbacks. No. 1—lack of self-expression.

When you buy a cabinet model you buy the components which the manufacturer thinks are best in a given price range. But his ears aren't necessarily the same as yours and his opinion of what's best may differ quite radically from your own. Then, too, your choice is likely to be governed as much by cabinet styling as it is by actual sound quality. This sounds better, but that one looks better; and so you buy for style rather than quality.

Versatility must be considered too. Few phono consoles have provisions for the eventual addition of a radio tuner. If you buy a radio-phono combination, you'll run into the same problem should you try to add a tape recorder at a later date. And, in the event of major changes in the hi-fi field, such as the recent advent of stereo, a cabinet model may become virtually obsolete.

**What About Separate Components?** Most of the limitations of cabinet models are obviated by the purchase of individual components. You can choose from literally dozens of record players, tuners, amplifiers and speaker systems in almost any price range. You don't get a cabinet, unless you buy one at a premium price, but then you're no longer tempted to sacrifice sound quality for furniture appearance. You choose the components that sound best to *your* ears; you buy with an eye towards possible expansion, and in the event of future changes you replace only the part that is obsolete.

But don't expect to save money on components-built hi-fi systems. In fact, the reverse is often true. By the time you're through comparing components in various price ranges, you'll realize that there is a difference. Flaws, compromises and inconveniences often overlooked in cabinet models are actually accentuated in a components-comparison and, initially, you'll probably spend as much for a components system than you would for a furniture model. But you'll have better sound, more lasting satisfaction and a new interest in good-music listening which makes the selection of hi-fi components a highly rewarding project.

### Building Your Own

There's one way, however, of obtaining the ultimate in fidelity while still going easy on the family budget. That's by building the components yourself.

Now hold on a minute! Before you turn to the next article because you even had trouble assembling Junior's bicycle, read just a little further. You *can* build your own hi-fi system! Regardless of your previous electronic experience,—even if you don't know the difference between a resistor and a vacuum tube—you can put together a number of component *kits* which perform as well as the best commercially assembled jobs at a savings of up to 50 percent. All you need is a little patience, willingness to follow instructions and the ability to use a soldering iron and other simple hand tools.

But it does take some effort, and the actual assembly of the components is likely to be the easiest part of the over-all job.

**The Specifications Story.** When you buy a cabinet model, or even factory assembled components, your ultimate selection will probably be based on a listening test. Most cities, and many of the smaller towns, have demonstration rooms where hi-fi components can be compared. Test records and tapes are available to help you in your selection (these will be discussed more extensively in a future article) and you need only a superficial acquaintance with the principles of high fidelity.

Not so with kits! These are normally purchased by mail directly from the manufacturer and there are few, if any, places where kits of various concerns can be compared. When buying kits, therefore, you are dependent almost entirely on the manufacturers specifications and your ability to correlate these to your requirements.

Are the specifications accurate? In most cases—yes! This opinion was arrived at after the construction and test of a good number of kits by different manufacturers, and by carefully studying independent laboratories' reports on others. Variations do exist but, in most cases, kit manufacturers are scrupulously honest in their ratings and a number of kits tested actually exceeded some of the specifications claims.

Entirely aside from the money-saving aspect, building your own hi-fi system offers some very worthwhile fringe bene-

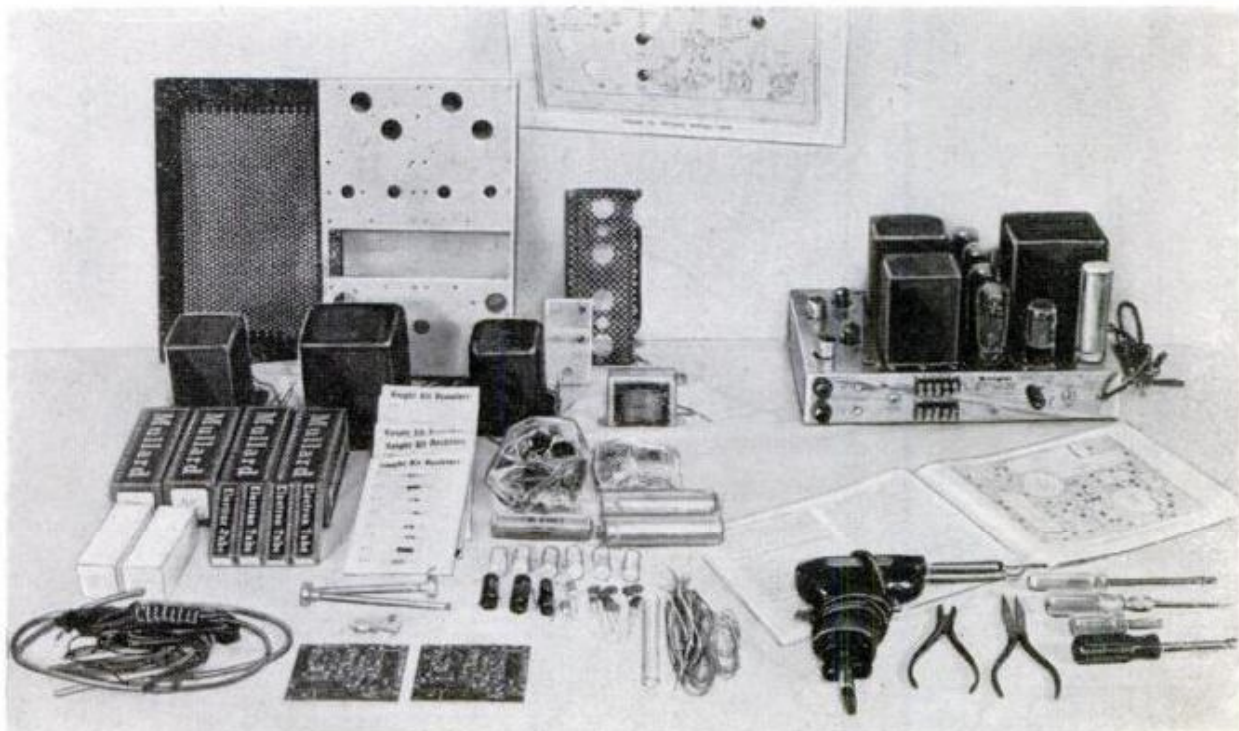
fits. Kit building is fun—providing you enjoy that type of activity as a hobby—and there's real satisfaction in saying "I built it myself" when others admire the performance of a particular unit. But more than that. The knowledge gained contributes to the more efficient use of the equipment and can substantially reduce maintenance and repair costs. Summarily, a kit-built system represents the most for your money—both in performance and satisfaction.

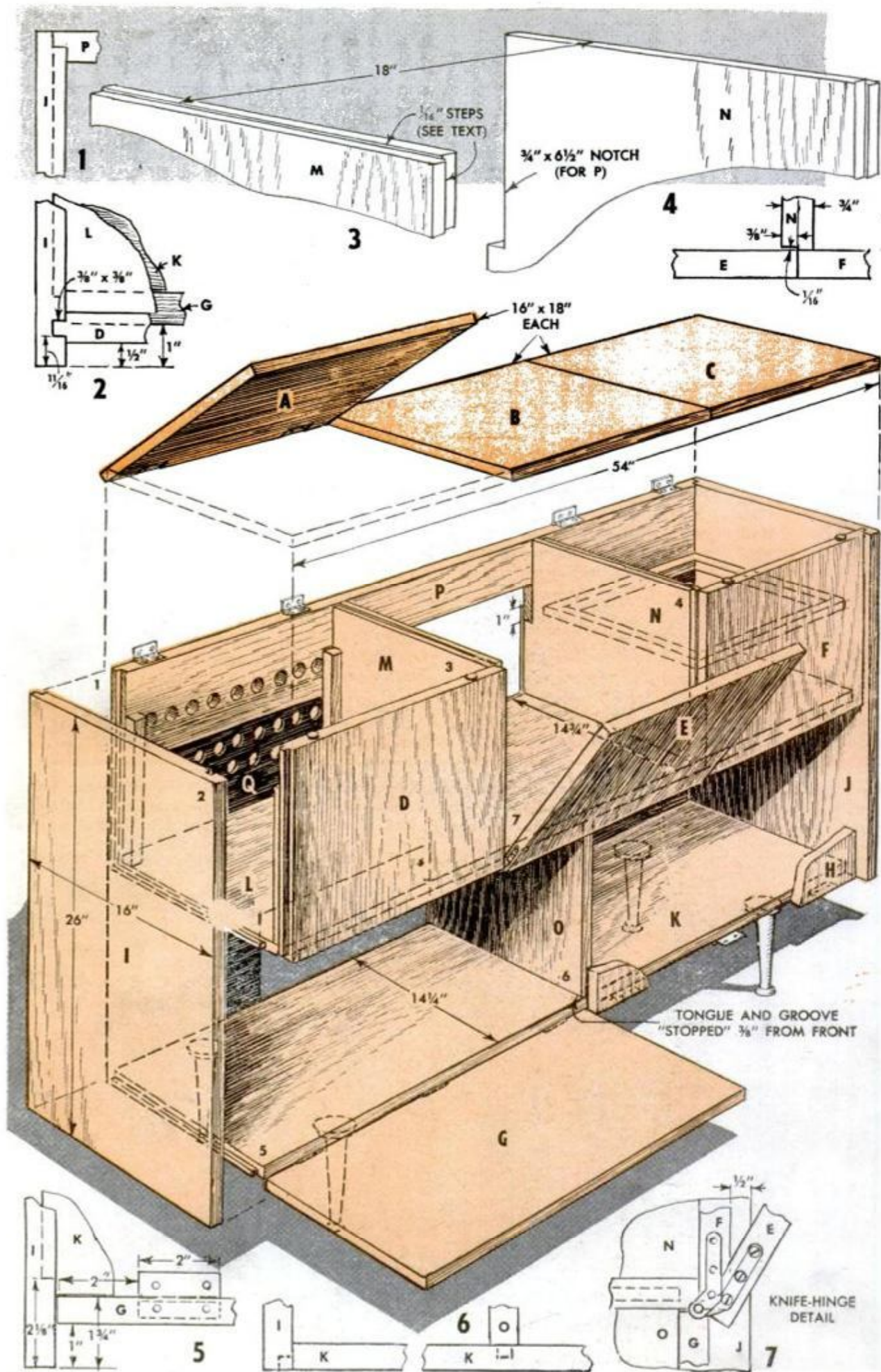
### The Equipment Cabinet

Hi-fi components are attractive. They are as much at home on end tables and open shelves as they are in custom-designed cabinets. But they must be interconnected with cables, and the "interior decorator" is likely to balk at a maze of wires marring the decor of her livingroom. A cabinet, therefore, is an essential part of most high-fidelity systems.

Describing the construction of an equipment cabinet before discussing the equipment itself may seem a little like placing the cart before the horse—but it isn't. While many aspects of hi-fi are subject to personal opinion and preference, one thing is certain: the hi-fi enthusiast eventually will want a complete system—record player, radio and tape recorder. Though the budget may limit the initial purchase, the relatively low cost of electronic kits permits rapid expansion. The cabinet must be able to handle your total needs and the unit described here meets this condition.

From assortment of individual parts to a compact, 60-watt stereo power amplifier in about 13 hours. Knight kit supplies even precut wires and solder—can be assembled with simple tools shown. Elaborate, step-by-step instructions manual and wall-sized pictorial diagrams, typical of most kits, insure success







X122

Tastefully styled equipment cabinet, designed as a home-workshop project, houses wide variety of hi-fi components. Details, left, and illustrations on following pages show simple construction



## BUILDING AN EQUIPMENT CABINET

Designed with the do-it-yourselfer in mind, this cabinet includes all the features required for a complete, functional stereo-fidelity system. It's small enough (only 16 1/4 in. deep) to fit into most living-rooms and its contemporary styling blends in with virtually any type of furniture. Simple enough to be built by anyone familiar with the use of a power saw, it depends mainly on the matched grain of the wood itself for its distinctive appearance.

There's no dustcatching trim and no fancy fittings. Press-to-open touch latches eliminate the need for handles and its very simplicity is your assurance that, if you like it now, you won't tire of it in the years to come.

But let's take a closer look at the design.

Horizontally, the cabinet is divided into two sections. The upper section has three compartments—the lower one, two. The upper right-hand compartment is designated for a record player, concealed by a hinged top, while the identical left compartment can house a tape recorder.

The center section of the top is permanently fastened down so that it can be used as a resting place for a decorative center piece. Access to the center compartment is gained through a drop-leaf front panel so that there will be a minimum of stooping when manipulating the controls of the components (the preamplifier and radio tuner) mounted in this section.

Record storage is provided in the lower right hand section which, alternatively, could be employed as a speaker enclosure. There's ample space in the lower left hand compartment for a power amplifier or any other components or accessories which may be desired to round out the system.

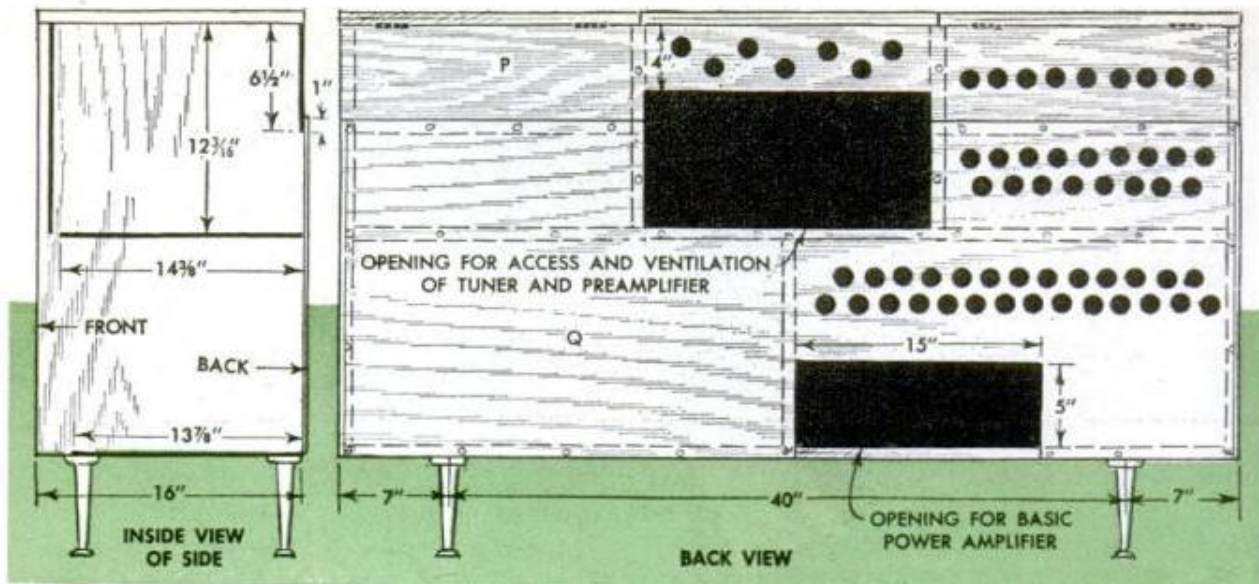
A word of warning here. While all compartments are large enough to house a representative number of components, it would be impossible to design a single cabinet to fit every possible combination

TABLE 1 — LIST OF MATERIALS

CODE	DESCRIPTION	SIZE	REMARKS
<b>1 SHEET VENEER PLYWOOD, 3/4" x 48" x 96", (Veneer two sides, matched one side)</b>			
A, B, C	TOP LIDS	16" x 18"	
D	LEFT FRONT PANEL	12 3/4" x 17 5/8"	3/8" x 3/8" tongue in left edge, stopped 3/8" from bottom
E	CENTER DROP DOOR	12 3/4" x 18"	
F	RIGHT FRONT PANEL	12 3/4" x 17 5/8"	Same as D but tongue in right edge
G, H	BOTTOM DROP DOORS	13 1/4" x 26 1/4"	
I, J	LEFT AND RIGHT SIDES	16" x 26"	See side view and detail drawings for groove and rabbet dimensions
P	BACK HINGE-SUPPORT	6 1/2" x 53 1/4"	3/8" x 3/8" rabbet on each end. See rear view for cutout
<b>1 SHEET 3/4" FIR PLYWOOD</b>			
K	BOTTOM	14 1/4" x 53 1/4"	3/8" x 3/8" stopped rabbet each end, 3/8" x 1/4" stopped groove in center, see details 5 & 6
L	HORIZONTAL PARTITION	14 3/4" x 53 1/4"	3/8" x 3/8" stopped tongue each end, 3/8" x 1/4" stopped grooves for M, N, O
M, N	TOP PARTITIONS	12 5/10" x 14 3/4"	3/8" x 1/4" stopped tongue bottom edge, see details 3 & 4 and text
O	BOTTOM PARTITION	13" h. x 14 1/4" d.	3/8" x 1/4" stopped tongue top and bottom edges
<b>1 SHEET 1/4" FIR PLYWOOD</b>			
Q	BACK PANEL	20 1/2" x 53 1/4"	See rear view for details. Screw to rear edges

Weldwood flexible wood trim (veneer tape), 9 rolls, @ 1" x 8'; Weldwood plastic resin glue—mix as directed—for all glued joints; Weldwood contact cement for flexible wood trim; 1" x 2" (open) butt hinges (10); 1 pr knife hinges (IR & IL) for center drop door; friction lid supports (1 for each lid, 1 for center drop door); Stanley reversible lid supports, (2 for each lower door); brass legs (6") with mounting plates; rubber tack bumpers (4).

*Craftsman Wood Service  
2729 S. Mary  
Chicago 8*



Side and back views of cabinet. Heavy, black lines in side view are grooves and rabbets cut in side pieces

without a considerable increase in size. If you already have a set of components, check the dimensions to make sure that everything will fit properly. It's a relatively simple matter, in the initial layout, to allow for an extra few inches in any direction.

Almost anyone handy with tools can put together some sort of cabinet. It's the choice of lumber and the attention paid to construction details which spells the difference between a professional job and one which looks like the homemade variety. We'll try to point out some of the pitfalls but the main thing is—work slowly, carefully, accurately. It's faster to measure twice and be sure you're right than to waste a piece of material and start over in the event of an error.

**Choice of Lumber.** Before you can order your materials you'll have to decide what type of lumber you want. This cabinet was made of 3/4-in. walnut-veneered plywood which takes an excellent finish. To match the other furniture, you may prefer some other veneer. They're available in a great many types and patterns. A visit to your lumber or plywood dealer is recommended so that you can personally select your exact requirements. Matching the grain pattern of the exposed pieces is important. Take a close look at the front-view photograph of the completed cabinet. It isn't by accident that the "flames" of the upper panels coincide with those of the lower ones. It was planned that way.

The patterns of some veneers may be confusing and it is sometimes difficult to pick just the right combination. One good method is to cut out full scale tissue paper templates of the necessary veneered pieces (see Table 1) and to move these around on the matched veneer surface until the best

possible solution has been worked out.

Employ the factory-cut edges of the plywood sheet as one edge of as many pieces as possible. This gives you a straight edge to use as a guide on your bench saw. If you're careful, you should be able to cut all the face pieces from a single 4 x 8-ft. sheet of veneered ply, but some of the more difficult patterns may require a second sheet.

Now trace the templates on the wood surface with chalk or a soft pencil, being careful not to score the surface. Since the face veneer is only 1/28th in. thick, it is easily damaged beyond satisfactory repair. Label each piece with the code number coinciding with that in Table 1 and in the "exploded view" drawing.

You'll need a sharp handsaw, or a portable power saw, to rough-cut the individual pieces from the large plywood sheet. Be careful here—the underside of the thin veneer chips easily when cutting across the grain. Unless there's plenty of space between the pieces it's a good idea to "score" the underside of the wood deeply with a sharp knife near the "finish" line. Any chipping will then end at the scored line.

Finishing cuts on the individual pieces should be made on a bench saw, but even here care must be taken to avoid chipping. The use of a planer (hollow ground) blade helps, but doesn't eliminate it altogether. The best way is to accurately set the rip fence of the saw for the final cut and score the underside of the piece by running it through the saw with the blade clearing the table by a mere 1/16th in. Then, when you finally cut off the waste, with a second pass, you'll have a clean edge which requires no sanding.

Before you touch a blade to the wood,

carefully study the construction details of the exploded view and the side and rear views. Since complete, step-by-step instructions can't be given here, it will pay you to become thoroughly familiar with the various parts of the cabinet and with the assembly details. We can, however, point out a few details which will help clarify the construction.

**General Construction.** Tongue-and-groove construction, with rabbets for the lid-hinge support piece (P) and bottom piece (K), is used throughout. This provides a sturdy cabinet while eliminating the need for unsightly and hard-to-install cleats. All joints are made with a good wood glue (see list of materials) which, when dry, makes a stronger and neater union than either nails or screws. All exposed plywood edges are covered with Weldwood flexible wood trim (to match the surface veneer) to give the completed cabinet the appearance of being made from solid lumber.

Careful inspection of the drawings reveals that, wherever a tongue-and-groove joint is used, the tongues are  $\frac{3}{8}$  in. less than the total length or width of the panel and the grooves are correspondingly "stopped." This adds gluing surface, thereby increasing the strength of the joint. The rabbets in bottom piece (K) and the corresponding rabbets in side pieces (I) and (J) are similarly treated.

Special attention should be paid to compartment separators (M) and (N). Detail 3 shows the cutting details for these pieces. Note that the  $\frac{3}{4}$  x  $6\frac{1}{2}$  in. notch in the rear permits flushmounting of lid-hinge-support (P) with the back edges of the side pieces. A  $\frac{1}{16}$ -in. step in the top edge of both (M) and (N) raises the permanently fastened lid (B) slightly above the two outside lids. This small difference is compensated for in the front by rubber bumpers fastened to the top edges of (D) and (F). In the rear, the outside lids are leveled by careful recessing of the hinges.

The  $\frac{1}{16}$ -in. steps in the front edges of (M) and (N) provide the slight amount of clearance needed for proper operation of the touch-latch used in conjunction with drop-door (E).

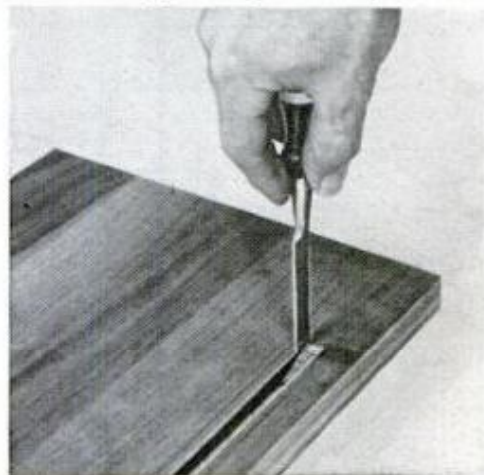
Looking at the rear view, the holes and cutouts in lid-support (P) and back (Q) are for ventilating purposes. Electronic components get hot during operation and require adequate air circulation. The number of holes and the pattern isn't important. Remember, however, that each compartment housing a heat-producing component must be furnished with a cool-air intake at the bottom and a hot-air outlet at the top. The more material cut away, without weakening the panel, the better.

After all parts have been cut to size, dry-fit all joints—that is, assemble all unhinged parts. This is the time to check for accuracy of fit and to correct any discrepancies—not after glue has been applied. You'll probably need some help for this, unless you have enough bar clamps to hold the cabinet together. Always protect the stock from damage by clamps with wood blocks. Check everything carefully. After glue has been applied, it may be too late.

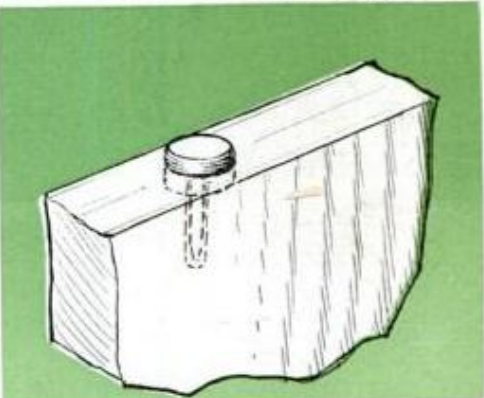
Satisfied with the fit, you can start the final assembly. Try to have everything you need in readiness beforehand—glue, a damp rag with which to



Careful setting of saw blade and rip fence makes cutting of tongues a simple matter

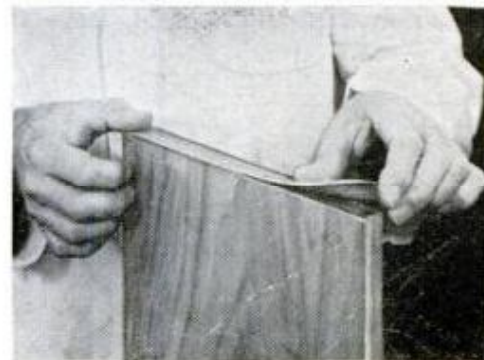


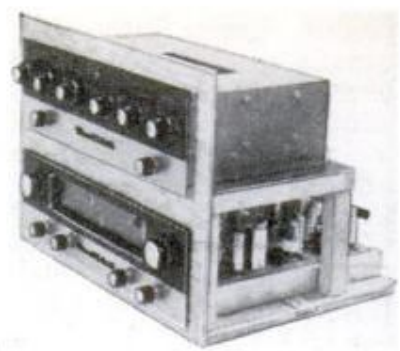
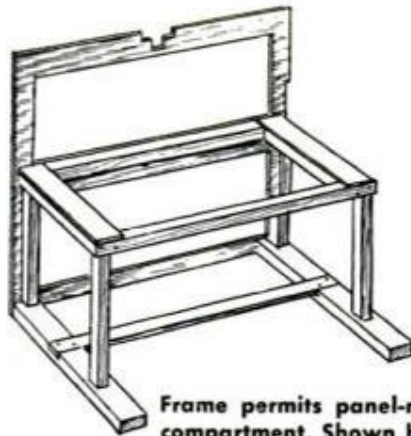
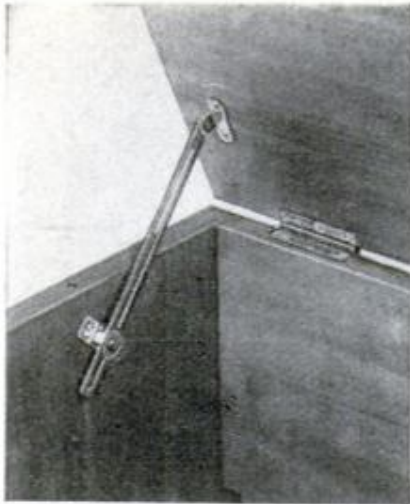
Stopped grooves are cut with dado set or by repeated passes with regular blade—chisel is used to square stopped end



Bumper tacks recessed in top edge of front panels cushion the impact of dropped lids

Below: Veneer tape glued to exposed plywood edges gives solid lumber appearance





Frame permits panel-mounting of components in center compartment. Shown here with Heath tuner and preamp

Left: Friction lid-supports limit travel of left and right lids

wipe off the excess, sufficient bar clamps, and a try square to check for squareness of the assembled parts. Use plenty of glue between the joined pieces—enough so that it oozes out all along the edges as the joint is brought under pressure. The excess, however, should be wiped off, before it has had a chance to harden.

Best starting procedure is to lay the end pieces (I) and (J) on edge and join them to bottom piece (K). Wood screws may be used, through the bottom piece, to hold these parts together. They won't add much to the strength of the union, but they will eliminate the need for an unwieldy set of clamps. If screws are to be used, be sure to predrill pilot holes (after checking for squareness) before glue is applied.

Horizontal divider (L) is next, followed by front panels (D) and (F). Again, make sure that all parts match perfectly.

The rest is easy. Like the bottom piece, hinge support (P) may be fastened to the sides with screws since these won't show from the front. Dividers (M), (N) and (O) are next, followed by lid (B). The latter may need to be trimmed so that it just bridges the stepped-up edges of (M) and (N).

Now it's time to tape all exposed edges. Contact cement is recommended for this job, but this takes special care. You only get one chance, since the cement makes an immediate bond. Make sure that the tape lines up evenly with the entire surface before making contact. Otherwise you'll ruin a lot of tape. Trim the excess tape with sharp knife or razor blade and finish with fine garnet paper.

Hinges for lids (A) and (C) are recessed in the top edges of (P) and underneath the lids. Properly installed, they will raise the back of these pieces  $\frac{1}{16}$  in., to be flush with the back of center lid (B). The outside lids are leveled at the front with rubber bumps installed on the top edges of (D) and (F). The bottom doors (G) and

(H) are then hinged in a similar manner.

Knife hinges are used for the drop-door (E). Remember, however, that all doors and lids must be taped before being installed. A bit of jockeying, even some edge trimming, may be required to obtain a close fit between these and the adjacent stationary panels.

Installation of the  $\frac{1}{4}$ -in. plywood back (Q) and the various items of hardware completes the construction project. The hardware consists of three friction lid supports (one for each of the hinged lids and one for the center drop door), four reversible lid supports (two for each of the bottom doors), three touch latches and a set of brass legs with mounting plates. The instructions supplied with the touch latches should be followed carefully to assure proper operation of the three doors.

A word about "finishing." The appearance of even the best cabinet can be utterly ruined by a poor job of finishing. The way you finish your cabinet depends, of course, on the rest of your furniture. You may wish to stain or just varnish the outside, or you may decide to paint the whole works. We won't try to second-guess your requirements by furnishing instructions here. Anyway, there's plenty of available literature on the subject and we suggest you visit your library unless you've had plenty of previous experience in this line of work.

### Looking Ahead

For all practical purposes, the cabinet is finished. There still remain a few odds and ends, but these will have to wait until you have selected your equipment. For example, you'll have to provide corner posts or some sort of frame to which the mounting boards of the record player and tape recorder can be fastened (see "exploded view") and you'll have to drill holes in various separator panels through which

(Continued to page 282)

# Fastest moving Sea-Horse ever launched

## JOHNSON V-75

... combines new speed,  
power and dependability  
in 1960's "dream" motor!

The 1950's were exciting years in outboarding! Ten years ago who could have imagined the progress that has been made in outboard power, speed and dependability?

### An all-new motor for a new decade

But what lies ahead for the 1960's? Johnson engineers have come up with their answer—the all-new Sea-Horse V-75, a "dream" of a motor. For the first time in outboard history you can get the best of speed, power, quietness and dependability in a single power plant.

### A new high in "V" power

Johnson's famed, balanced-firing V-engine design now develops a full 75 hp, O.B.C. certified at an easy running 4500 r.p.m. Displacement is 89.5 cu. in. This fast-thrusting power makes heavy cruisers feel frisky as runabouts!

### New speeds of over 40 m.p.h.

Actual on-the-water tests have verified that this is the fastest moving Sea-Horse ever launched. One reason: the V-75 has a remarkably compact, yet complete, lower unit gearcase. The lower unit is *blade-thin*, cutting the water with far less drag than any lower unit ever before—an engineering masterpiece when you consider that it still allows *full* gearshift. You also get a choice of 3 propellers, at no extra cost, to get maximum performance whatever your boat or load.

### New ideas in dependability

Over two million Sea-Horses already built (more than any other make) have earned the reputation of being the most dependable outboards afloat. But Johnson engineers were not satisfied. For 1960 the V-75 has outboarding's first automatic choke for faster starting in any weather. They have added new hydraulic shock absorbers to absorb the shock of the motor when it flips up and comes down, should you hit an underwater obstacle at high speed.



New Sea-Horse V-75...\$895 with electric starting

See this exciting V-75 and six other new Sea-Horses, 3 to 40 hp, now at your Johnson dealer's. He's listed in the Yellow Pages under "Outboard Motors."

## New Dexall Brush Cleaner

- Cleans paint hardened brushes easily.
- Cleans all types of bristles.
- Nonflammable — re-usable.

*Snaps paint-hardened brushes  
back to life!*



**DESHLER PRODUCTS, INC.**  
Deshler, Ohio



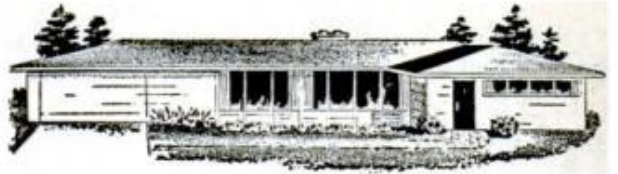
*Modernize old-style  
wood finishes*

## New Dexall Wood Bleach

- Effective, fast-acting on  
woodwork, furniture, floors.
- Will not harm wood or  
natural grain.
- Nonflammable. Eliminates  
hours of sanding!

*At paint and hardware stores everywhere.*

## Clinic for Homemakers



As a service to our readers in solving the hundreds of problems pertaining to a home—inside or out—the editors of *Popular Mechanics* invite you to present your problems to The Clinic Editor for help and advice. Address your questions to The Clinic Editor, *Popular Mechanics Magazine*, 200 East Ontario Street, Chicago 11, Ill.



### Salvaging Old Workbench

*Q—I have just purchased an old cabinet workbench in used (very much used!) condition. The top is very rough, chipped, or hacked, away on the front edge nearly through the thickness of 3 in. One drawer front is split across its width and the whole cabinet shows the marks of long and hard usage. But the bench is all hard wood and heavy and I'd like to put it back in*

*usable condition. Any suggestions? — I.L., Pa.*

*A—We'd begin with the top. Wire-brush the chipped, or hacked, area to clean off dust and grit, metal chips and whatever else may be present. Then cut away the damaged wood with a sharp chisel, cutting in from the edge and down from the top on a scribed line so that you finish with a side mortise large enough to remove all the damaged wood. Then fit a piece of matching wood into the opening, taking care to cut the piece to a close fit. Glue and clamp the filler piece in place. Take the damaged drawer next. Remove the sides by tapping the parts lightly with a hammer, or better, a wooden mallet. Open the split, apply glue and draw up tightly with clamps. If the split is not too old, you should get a reasonably good joint. If the drawer bottom is damaged in any way or is coated with dirt or soaked with oil, now is the time to replace it. The same is true of the sides. Separate the parts carefully and then make a duplicate part, or parts, as a replacement. Plane the top first across the width and then lengthwise to expose new wood. Plane the patch flush at the edge. Any unwanted holes that may have been drilled in the top can be plugged with short lengths of hardwood dowel.*

### Closed Louvers

*Q—During the winter months my low attic seems to be very cold, in fact, the temperature is very nearly equal to that outside on a cold day. It has seemed to me that it would be best to close the louvers during the winter months. Do you agree? N.M., Minn.*

*A—No. If you close the louvers tightly, you are inviting trouble from moisture condensation. Leave them open all winter long for that is when they do their best and most important job, that of ventilating the attic, equalizing the temperature with that outside and preventing frost formation*

*(Continued to page 250)*

# YOUR ROCHESTER-GM CARBURETOR SPECIALIST OFFERS THESE

## FACTORY-RECOMMENDED WAYS TO NEW CAR POWER!



### Hear About Carb-AIRator?

Many a motorist has—and every user has become enthusiastic because Carb-AIRator—a hot idle compensator that fits all cars, cures stalling and rough idle due to excessive under-hood heat. This can be mighty annoying and Carb-AIRator, quickly and easily installed, can end it for you. Get rid of rough idle, stalling and hard starting due to under-hood heat. Get Carb-AIRator. It's that simple!



### Need a New Carburetor?

If you do you'll be money ahead getting a brand new original equipment Rochester-GM Carburetor. These new units contain the newest carburetor advances to up-date your performance and mileage. Check the new low price for a new Rochester-GM Carburetor, America's number one original equipment carburetor!

If quality service is your business, ask your nearby UMS distributor about the service-minded Rochester-GM line of factory-recommended performance items. Rochester Products Div. of General Motors, Rochester, N. Y.



Rochester-GM Carburetor specialists have scientific Kleanout kits on hand that enable them to give you a quick on-the-car carburetor clean-out, or an off-the-car

carburetor clean-out with Off Kar kits. Each has factory-recommended components to do a thoroughly satisfactory job for you. Should your carburetor need overhaul, these same specialists have just the answer; Rochester-GM Carburetor Master kits. All the right parts for a top-quality job insure your getting your carburetor back into the new car condition you want.



### BT-3 Balanced Tune-up

is the new thorough-going method of checking and adjusting to restore compression, ignition and carburetion to new car performance standards. This GM-approved

procedure brings back the satisfying, smooth flow of power you want from your car. Remember—it's a three-way improvement—and you need all three: tight compression, snappy ignition, top carburetion. Ask your Rochester-GM Carburetor specialist to put your engine back in the top performance and economy bracket.



America's  
number one  
original equipment  
carburetors

# ROCHESTER CARBURETORS

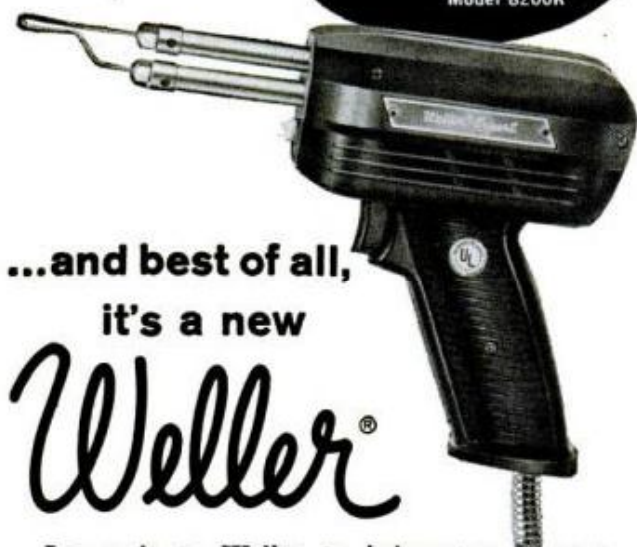
FIRST TIME . . . a soldering kit with

# DUAL HEAT GUN

FOR ONLY

**\$7.95**

LIST  
Model 8200K



...and best of all,  
it's a new

**Weller®**

Leave it to Weller to bring you greater soldering advances and values! Here's the newest and finest gun made . . . with the versatility of *Dual Heat*. Just touch the trigger for high (125 watt) or low (90 watt) heat as your job requires. Saves time, gives extra convenience for precision soldering. Tip life is also increased because you use high heat only when necessary. New *high efficiency* tip. Instant heat. Spotlight.



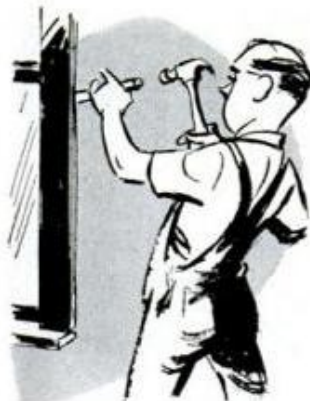
## KIT INCLUDES:

- New Dual Heat Soldering Gun
- Wire Bristle Cleaning Brush
- Soldering Aid
- All-purpose Solder

*Everything you need for expert soldering*

WELLER ELECTRIC CORP., 601 Stone's Crossing Rd., Easton, Pa.

in the attic space on exposed nails and rafters. You do not mention undue consumption of fuel, or any shortage of heat and this is an indication that your home is well insulated and provided with a vapor barrier and that the louvers are of the correct size to adequately ventilate the attic.



## Paint Peels From Casing

**Q**—Every year the paint peels from my window casings. I've tried everything I could think of to prevent this, have used different kinds of paint, removed the paint to the bare wood and primed with shellac, aluminum paint, and a prepared primer. Still it peels from the outside surface. What causes this and what can I do to prevent it?

Y.S., New York

**A**—Using different kinds and types of paint will not prevent the trouble. You must have old type window frames with weight wells at each side of the frame. Moisture from the air in the rooms passes into the wells around the trim which is never tight. It then forces its way through the casing to a point under the outside paint film. Here it breaks the bond of the paint and causes it to peel from the wood. Sometimes this can be prevented by removing the trim pieces, coating the exposed face of the casing with asphaltum varnish or a prepared primer and a finish coat of oil-base outside paint. Or, fill the space within the weight well with an insulating material, cover it with a vapor barrier such as aluminum foil, or any of the various coated materials available for this purpose. Then hang the sash on spring balances.



## Fireplace Wood

**Q**—I have a large natural fireplace that I like to make use of during the fall and winter months, but the cost of such woods as I've been using are prohibitive. Just what is the longest lasting wood for a fireplace? We seem to burn a lot of wood but don't get much heat in return.

T.D., Ky.

**A**—Perhaps the kind of wood is not so much at fault as are the methods of laying and maintaining a fire. We note your mention of a large fireplace. If, for example, you build and maintain a relatively "clean," small fire in a large fireplace you will use a lot of fuel and get very little heat from it. If you lay and maintain the fire on a low bed of ash, or no ash at all, you will get much the same result. If you keep the damper wide open the fire will burn brightly until the fuel is consumed and most of the heat will go up the flue, more especially if the latter is long and straight and the draft is strong. The trick in keeping fuel consumption at the minimum and at the same time obtaining maximum heat from an open fire is largely in the methods of laying and maintaining the fire and of adapting the methods to the conditions. The best procedure in a large fireplace begins with use of a backlog of the correct size. This should be cut to extend across the width of the fireplace and should be at least 6 in. or better, in diameter. Green wood is best, but if the backlogs are seasoned leave them outside so that they are always damp. Keep the fire burning against the backlog with smaller sized pieces of fuel.





## WHO "SPOTTED" THE LARK WITH RUBBER?

➤ The Studebaker engineering, design and sales departments did it. The latter believes it easier to sell a quiet, squeak-free car. And that's just what they have. ➤ The Lark is literally spotted with over 300 live rubber cushions, grommets, bushings and seals strategically positioned throughout the body and chassis to reduce noise, damp vibration and eliminate the troublesome wear of metal-to-metal contacts. This is illustrative of the very high premium Studebaker places on detail, quality and sound engineering practice. ➤ These are not idle words because after more than 750 million road miles of owner use, Studebaker-Packard corporate figures clearly show that Lark repair and maintenance costs are well below the automobile industry average. ➤ Not only does The Lark save for you, but it performs for you . . . day after day, year after year. See your Studebaker Dealer and enjoy a Lark demonstration. And you don't have to count the cushions, grommets and bushings. ➤ When you drive the car, you'll know they're there!

*LOVE THAT* **LARK** *BY STUDEBAKER*

## The Handiest Plier of them All

use it  
as a  
**PLIER**

**CHAN NEL LOCK**<sup>®</sup>

use it  
as a  
**WRENCH**

You'll do hundreds of jobs faster, easier with a CHANNELLOCK Plier. Gives you terrific, parallel-jaw gripping power. Five undercut, machined channels can't slip . . . the tighter you grip, the tighter they lock. Long and compact . . . a jim-dandy on hard-to-reach jobs. Available in three jaw capacities:  $\frac{7}{8}$ " ,  $1\frac{1}{2}$ " and 2". Ask your tool supplier for a genuine CHANNELLOCK Plier. If he's out of them, ask him to order one for you.

Write for Catalog of Complete Line of Pliers

**CHAMPION DEARMENT TOOL COMPANY**

Meadville 1, Pennsylvania

## I Lived With the Astronauts

(Continued from page 112)

cargo net. However, because of the many variables involved, a complicated network of communications—directed from Cape Canaveral—is being established and tested on practice shots to insure that trajectory information can be dispatched to the recovery force as quickly and efficiently as possible.

*Reactor nozzles.* Astronaut Gus Grissom told me: "We're having some difficulty with the reactor nozzles that control the attitude of the capsule. There's too long a delay from the time the pilot activates the control until the reaction takes place." There has also been some difficulty with the automatic pilot picking up stray signals which confuse the mechanism. Both of these problems have been referred back to the manufacturers of the equipment and are under study there.

*Reliability of the Atlas booster.* Deke Slayton, whose specialty is the Atlas, says: "There's no question about the ability of the Atlas to put us in orbit: our only problem here is reliability which so far hasn't been good enough. But we know we'll have that licked by the time we're ready to use it."

*Pressure suits.* One of the most vexing problems facing the Astronauts is proper protection of the pilot against the heat of re-entry. When the capsule plunges into denser atmosphere as it comes out of orbit, air friction will heat it to 1600 degrees F. on the downward end, the interior temperature of the capsule walls will rise to about 300 degrees F., and the air temperature to over 100 degrees. A suitably ventilated pressure suit to protect the Astronaut against this heat has not yet been perfected. Thus far, in simulated flights, the Astronauts have been wearing Navy Mark IV suits. They now have on order 20 suits in which the air will flow through a waist connection, circulate through the suit and be exhausted through a pipe in the helmet. They hope these suits will solve the ventilating problem.

### Minor Difficulties Will Arise

The foregoing will give some idea of the specific sort of problems with which the Astronauts are wrestling. The major breakthroughs are behind them, but minor difficulties will probably continue to arise right up to flight time.

What is flight time? Although it is impossible to pinpoint dates, there is a definite progression that will have to be fulfilled before one of the Astronauts is

(Continued to page 254)

**EXPERT ENGINE SERVICE**

with...

# SATISFACTION GUARANTEED!

**ENGINE TROUBLE? Car acting up?  
Need a tune-up? No pep? Using too much  
gas? Get it fixed where you're assured  
a top quality repair!**

There's a BIG DIFFERENCE between a "get-by" engine repair... and the top engine performance which can be guaranteed by shops using the Sun Service System.

A "get-by" job can't possibly compare with a top quality job... and expert mechanics know it. That's why they use Sun Service System testing equipment to make those precision adjustments that spell the difference between a "get-by" job and a top quality job that restores all the pep, power and economy you paid for when you bought that car.

So when you're on the road... or in your neighborhood... stop at the station, repair shop or dealer that displays this "Satisfaction Guaranteed" sign. It's your assurance that he guarantees satisfaction through the use of Sun instruments.

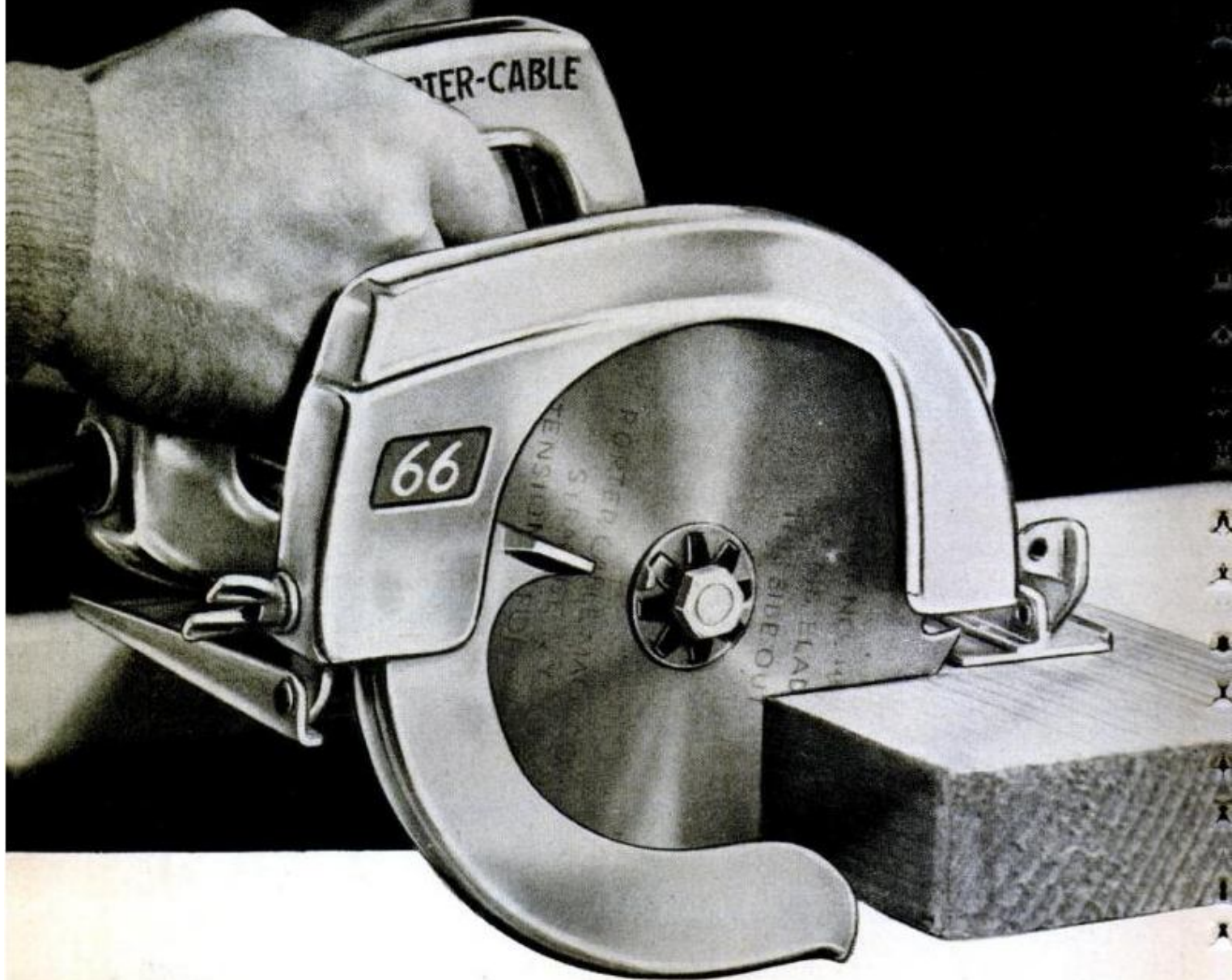


*This message sponsored by  
Sun Electric Corp., Chicago, Illinois, on behalf of over  
75,000 Car Dealers, Service Shops, Service Stations  
who use the*



Copyright 1960 Sun Electric Corp. 789

**Porter-Cable**  
*Quality Power Tools*



**CREATED FOR THE MOST PARTICULAR CRAFTSMAN**  
**... Porter-Cable 6½" CIRCULAR SAW**

Power tools are a long term investment. That is why you should consider every Porter-Cable feature . . . the Model 66's extra powerful motor that enables you to make every possible cut, including 45 degree angles for 2 x 4's, safety telescoping guard, instant depth and calibrated bevel adjustments, famous kick-proof clutch, self-lubricating bearings. And like every Porter-Cable tool, it has that custom quality look . . . and the built-in ability to deliver top performance year after year. Buy during Porter-Cable's January tool days . . . Model 66 Saw . . . only \$39.95.

**PORTER-CABLE MACHINE COMPANY**  
0141 Marcellus Street, Syracuse 4, N. Y.

actually put into orbit. Here is the sequence of events that will take place before the first manned orbital flight:

1. *Firing of empty ballistic capsule.* On Sept. 9, 1959, a model of the Mercury capsule—called "Big Joe"—was fired for the first time, and the capsule recovered in the South Atlantic. Failure of the Atlas stages to separate properly caused the firing to be reported as unsuccessful. But the primary objective for Project Mercury—to discover how the heat shield of the capsule would stand up under the heat and shock of re-entry—was successfully fulfilled. Although the Atlas' failure caused the capsule to fall some 200 miles off the scheduled impact spot, the tracking system operated well, and the capsule was recovered speedily. The automatic parachutes opened as they should and cushioned the descent of the capsule. The heat shield also passed its test with top marks. I examined the recovered capsule—still pocked with seaweed—in the NASA laboratories, and it appeared in excellent shape. There is little doubt that, had a man been aboard, he would have survived the flight.

The firing was the first of a series of such shots to be made with the empty capsule. No one knows how many will be necessary to prove out the equipment, but an educated guess might be a half dozen, with the last one or two employing the actual Mercury capsule with full instrumentation.

2. *Firing ballistic capsule with an animal aboard.* Once the equipment is found satisfactory, animals will be strapped in the Astronaut's couch in actual Mercury capsules and fired on the ballistic range—using Redstone rockets which are cheaper than the Atlas. The animals will probably be monkeys or chimpanzees. The scientists would like to use a gorilla or a bear because their size and weight more closely approximate those of a man, but these animals are extremely difficult to handle and can't be put under sedation without confusing the medical data needed. A compromise possibility is a pig, which is easy to handle and has tissues comparable to man. There will probably be another half-dozen ballistic shots with animals aboard.

### First American in Space

3. *Firing ballistic capsule with a man aboard.* If we are to deal seriously with "firsts," the first American in space will actually be the first Astronaut to ride in a Redstone ballistic shot. The Redstone will carry the capsule about 100 miles into the air and some 130 miles out over the Atlantic from Cape Canaveral. At the

(Continued to page 256)

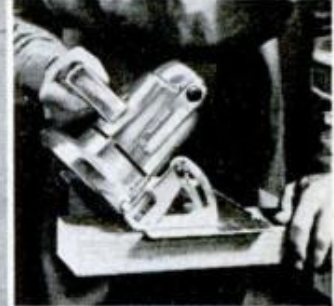
## What the POWERFUL Porter-Cable MODEL 66 SAW can do...



This portable power saw is the workhorse in any shop... built with professional features for top performance; converts to stationary saw with accessory saw table. Do a multitude of cutting tasks with wide variety of available blades.



**POCKET CUTS**—Cuts openings quickly and easily in existing walls for windows, medicine cabinets, heat ducts, etc.



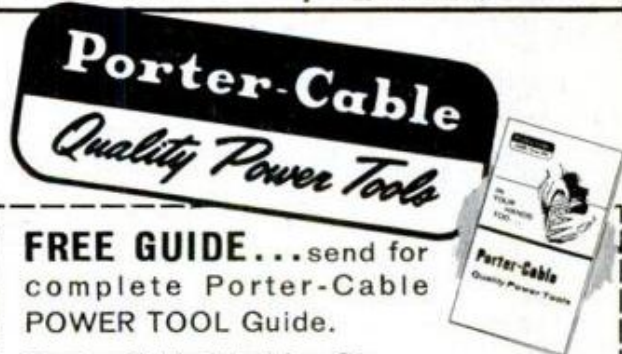
**BEVEL CUTS**—Model 66 bevel cuts any angle from 0° to 45°—in 2" dressed lumber. Calibrated quadrant for accurate angles.



**KICKPROOF CLUTCH**—Automatically puts saw into "neutral" if it jams or pinches in the cut. Prevents kickback for all around safety.



**TELESCOPING GUARD**—New design of telescoping guard eliminates jamming and "drag" at the start and during any type cut.



**FREE GUIDE...** send for complete Porter-Cable POWER TOOL Guide.

Porter-Cable Machine Co.  
0141 Marcellus Street, Syracuse 4, N. Y.  
Please send me FREE copy of your illustrated Power Tool Guide.

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

top of its trajectory, the Astronaut inside the capsule will have about five minutes of weightlessness in which to find out how he will react to the longer orbital flight to come. The entire Redstone flight will take about 15 minutes, and everything will be automatic. Stresses on the pilot will not be as great as the orbital shot, weightlessness will be shorter, acceleration less, and heating on re-entry not as severe. But the five minutes will be invaluable in preparing the pilots for the orbital shot. Probably three or four—possibly more—of the Astronauts will take this ride, with about a month required between firings to get ready for the next one. Project Mercury officials hope to send the first Astronaut on a ballistic missile ride sometime in 1960.

4. *Orbital flight and recovery of the empty capsule.* This step may be eliminated if the preceding steps have been satisfactory and the Atlas has proven its reliability in other tests. The Atlas is expensive, and if Mercury officials feel that no new data can be turned up by firing an empty capsule into orbit, they may pass this step completely. It's impossible at this point to predict, but the chances are that this shot won't be deemed necessary.

#### **Animals First**

5. *Orbital flight with animals.* This is an absolute prerequisite of manned space flight. The animals which prove out best in the Redstone firings will again be introduced to the Astronaut's couch and sent this time into orbit. These flights will provide all the remaining necessary data for putting a man in orbit. Physiological reactions of the animals will be carefully observed, all of the automatic controls will be checked in actual operation, and re-entry and recovery techniques tested.

6. *Manned orbital flight.* Finally, after all the special problems have been solved and all the previous steps performed with success and reliability, the first Astronaut will be sent into orbit. He will probably be told several days, at least, in advance of the firing; there will be no last minute histrionics. (The Astronauts have a wonderful cartoon posted on their bulletin board which shows seven men doing push-ups in the morning haze at Cape Canaveral, with the project director looking on trying to make a choice.) Selection probably will not be willy-nilly, nor by lot; by the time this step is ready to be taken, chances are that special conditions will dictate the selection of the Astronaut to go first. If a reasonable choice is available—and the Astronauts think there will be—the selection will be made that way, probably by the project director.

All of the Astronauts will have an important part in the orbital flight. Four will probably be at Cape Canaveral, one in the capsule, the others working in control and communications centers. Two of the remaining Astronauts will be spotted at strategic tracking stations around the globe, while one will work with the recovery team. An Astronaut—who fully understands what is going on in the capsule—will be on hand at every control point where a vital decision may have to be made. And the Astronaut in the capsule will be able to communicate with one of his fellow Astronauts whenever he feels the need.

The Astronaut making the flight will be fed a low-refuse diet for several days before the shot. There will be no provision for refuse disposal or food in the early flights; urine will be taken care of in a tube.

When the Atlas is ready for firing, the Astronaut will mount the gantry and crawl into the couch secured to the bottom of the capsule. He will be strapped in at about seven stress points along his body. When all the equipment has been carefully checked, there will be a countdown, then a blastoff. This is probably the most dangerous point of the entire operation. If the Atlas doesn't fire properly, then an instant decision has to be made in either the capsule or the central control to abort the Mercury mission. There won't be much time to think it over. Once the decision has been made, the press of a button will activate a set of emergency rockets which will separate the capsule from the Atlas, and blast it 2500 feet into the air. There an emergency parachute will open and lower the capsule and its occupant into the water.

#### **Capsule Will Go Into Low Orbit**

If the shot is successful, the Atlas booster will be left behind at a height of about 50 miles. The missile itself will continue to about 100 miles, going into a low orbit. At this point in the flight the capsule will be separated from the top of the Atlas rocket, and the Astronaut will orbit by himself, weightless and free of the earth's atmosphere.

First, he will turn the capsule over, with the fat end forward—the position in which his re-entry will start. Then, watching the periscope in front of him, he will be able to see about 1680 miles of the earth's surface scudding below. He can track himself and check the altitude of the capsule by visual reference to the horizon and geographical check points. He will have voice communication with various tracking sta-

(Continued to page 258)

# PEEL PAINT OFF



Furniture



Floors



Boats



Woodwork



## KLEAN-STRIP PAINT REMOVER

Fast • Clean • Non-inflammable

THE KLEAN-STRIP CO., INC.

2340 S. Lauderdale, Memphis 6, Tenn.



STAINLESS STEEL OIL RING, U.S. PAT. NO. 2,789,872

## Sealed Power *Stainless Steel* oil ring does things no other ring can do!

Stainless steel oil rings deliver superior oil control—and for easily understood reasons. First, stainless steel resists the corroding and pitting effects of the gases of internal combustion engines. This means the oil ring surface stays clean. There is nothing for sludge or carbon to cling to. Thus the return oil vents stay open and you get the *long lasting* oil control you expect.

Second, stainless steel has no significant tension loss at engine operating temperature. This is unlike carbon steel oil rings. No tension loss assures proper tension of the side rails of the oil ring against the cylinder walls—even in tapered and out-of-round bores. Again, this proper tension is exerted for the entire life of the ring which means better oil control longer.

## Sealed Power KROMEX PISTON RING SETS Preferred Performance

Pistons • Pins • Sleeves and Sleeve Assemblies  
Valves and Valve Parts • Tappets • Water Pumps  
SEALED POWER CORPORATION • MUSKEGON, MICH.

**SMALL! POWERFUL!**

### ECONOMY TRACTOR

**Unequaled value! Low price!**  
America's finest tractor. Ruggedly built. Easy to operate. 790 lbs. Borg-Warner clutch, trans. and diff 140 to 1 reduction. 40% more drawbar pull than ordinary tractors 8-1/4 H. P. engine. 20 quick change implements. HOOD, FENDERS.

Thousands in Use Write for complete details.  
Engineering Products Co.  
1005-K-1 Anoka Ave.  
Waukesha, Wis.

## BOAT PLANS—PATTERNS & FRAME KITS

Designed by a Naval architect & specially prepared for amateur builders.

New 80-page catalog illustrates over 35 "Build-it-Yourself" power boats with step-by-step photos and instructions for building your own boat at a big savings.

Send for your copy now  
Only 50c

**GLEN L.** 9152T Rosecrans  
Bellflower, Calif.

## BIG, NEW DELTAGRAM

Famous bi-monthly magazine packed with new ideas for extra fun and profit in your workshop. 28 pages, colorfully illustrated. Build anything from a birdhouse to a boat with complete plans, instructions and bills of materials. Only \$2.00 a year; \$3.00 for 2 years. Send check or money order to: THE DELTAGRAM, Rockwell Manufacturing Co., 502A N. Lexington Avenue, Pittsburgh 8, Pa.

Works in seconds!

## Loosens Rusted Bolts nuts, screws, "frozen" parts!

# LIQUID WRENCH®

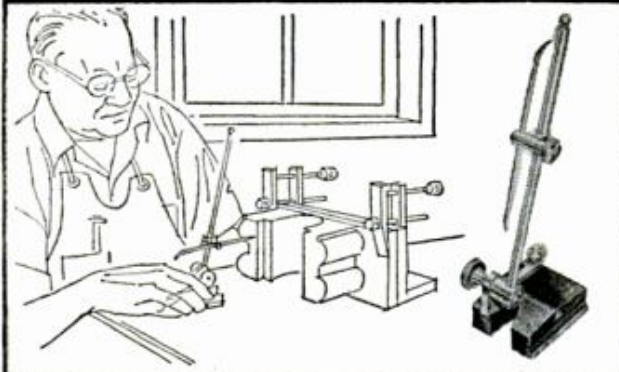
SUPER-PENETRANT

The super-penetrating rust solvent that quickly loosens rust and corrosion.

**AT ALL HARDWARE  
AND AUTO STORES**

RADIATOR SPECIALTY COMPANY  
CHARLOTTE, N. C.

## PATTERNMAKER or



## PATIO BUILDER



You'll work better with

# Starrett<sup>®</sup> TOOLS

Whether you work for pleasure or profit, you'll find tools in the big Starrett catalog that will sharpen your skill, speed the job, make it easier and more rewarding. Send today for your *free* copy. Use the coupon.

**STARRETT TOOLS are carried by leading Industrial Supply Distributors and Hardware Tool Stores.**

THE L. S. STARRETT COMPANY  
Dept. AP, Athol, Massachusetts

Please send my free copy of Catalog 27 describing over 3,000 Starrett Tools for professional and amateur craftsmen.

Name.....  
Occupation.....  
Address.....  
City.....Zone.....State.....



tions as he passes over them; if voice fails, he will be able to communicate through telemetry.

All of the control adjustments necessary to orbit the capsule, correct its altitude, and eventually guide its re-entry will be automatic. If the automatic controls work properly, it won't be necessary for the pilot to do anything more than observe. But no one—least of all the Astronauts—expects this to happen.

"We'll take advantage of every opportunity to operate the equipment," said Al Shepard. "Everything automatic can also be done manually. We're up there to bring back data; certainly we'll play with the controls."

After about 4½ hours—during which the capsule has orbited the earth about three times—retro-rockets will automatically turn the capsule downward almost vertically and push it once again into the Earth's atmosphere. If the automatic retro-rockets don't operate properly, the Astronaut can fire them manually from the capsule or they can be fired from the ground. Here the friction of the capsule pushing air out of its way as it returns Earthward will produce intense heat, both inside and outside the capsule. The atmosphere will also slow the descent of the capsule until at 65,000 feet a drag chute will open to steady the capsule and further reduce its speed.

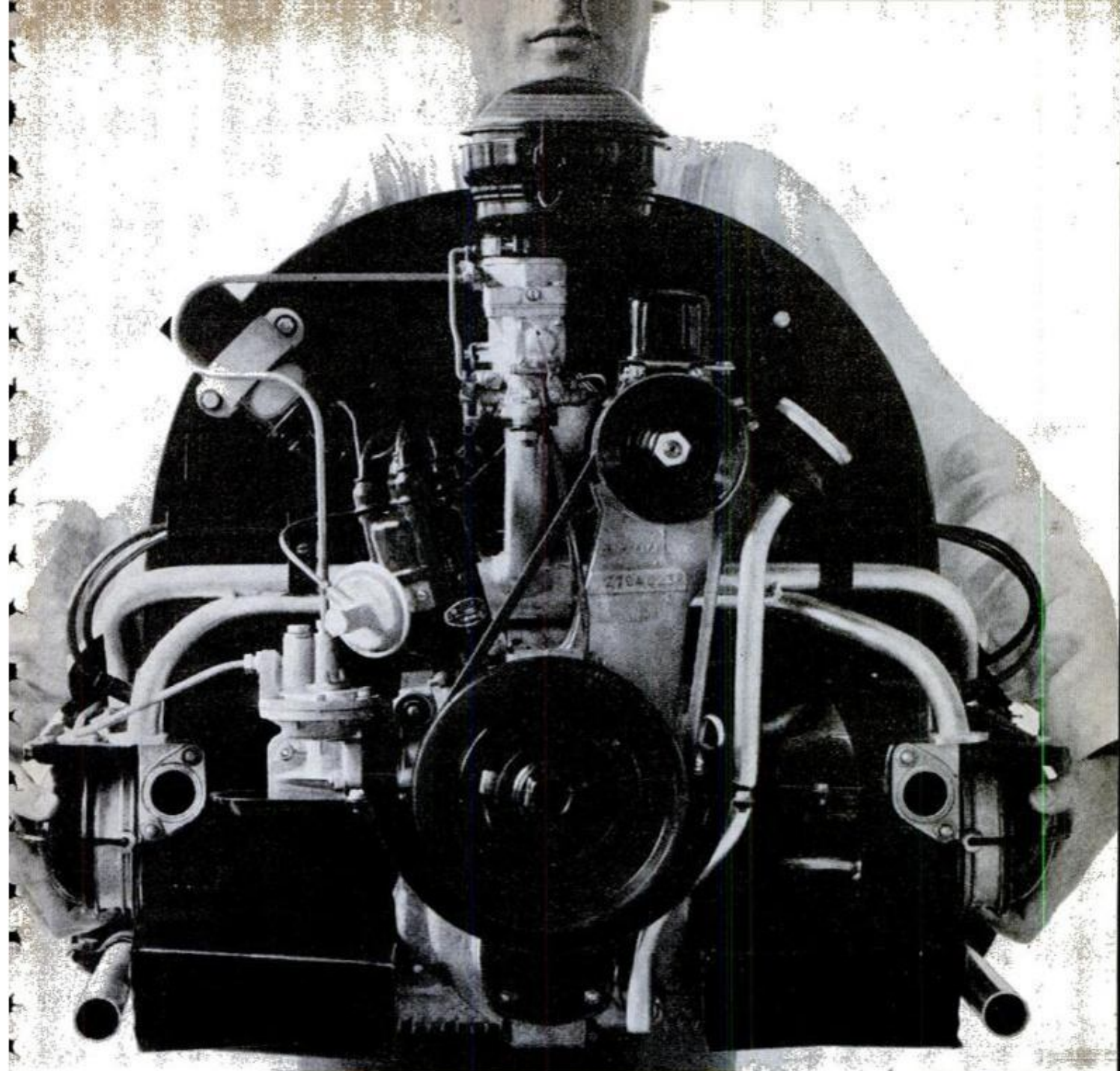
At about 20,000 feet, the main parachute will be thrown out to cushion the final descent. Throughout the descent, ground communications stations will track the capsule and plot the spot it will land. If all has gone properly, it will drop into the ocean. The Astronaut's couch will protect him against the impact, and the capsule will float until the rescue team arrives to draw it out of the sea—brought to the exact spot by lights, radio signals and dye markers all spread automatically from the capsule. Thus will end the first extended junket by an American into space.

### Years of Effort

Behind this trip will lie many years of dedicated effort from thousands of hard-working and talented people to whom success means a great deal. One of the NASA scientists told me, with very real feeling: "What if we kill the first man? That's what worries me. It's a life that we can't spare, certainly. But it's much more than that. It might ruin the whole project—make us all look like a bunch of half-baked dreamers. We all know this thing is right and that it'll work, but there's always a chance of failure the first time out. That's

(Continued to page 260)





© 1960 VOLKSWAGEN

# 198 lbs.

**(why Volkswagen's aluminum engine is still years ahead of its time)**

Dead weight in an engine is the enemy of efficiency.

That's why airplane engines are made of aluminum. Why Volkswagen's engine is ingeniously cast of aluminum and magnesium alloys (even lighter than aluminum).

Volkswagen reduces dead weight in still other ways. The engine is air-cooled—no bulky radiator. (No water to freeze in winter, or boil over in summer.) And placing the engine in the back gets rid of the conventional heavy driveshaft while giving direct power to the wheels. (In

mud, sand, ice, snow, where other cars skid, you go.)

As a result, the Volkswagen engine weighs only 198 lbs. and every pound works. You get an honest 32 miles to the gallon (regular gas, regular driving) and will probably never need oil between changes. And the engine is so efficient, top and cruising speeds are the same. You can go 70 mph without strain, all day long.

These are some of the reasons a used VW is worth almost as much as a new one. Your VW dealer will show you the others.



**NOW** you can  
*easily*  
**DESIGN** your own  
**V-BELT DRIVES**



...New  
**DRIVE DESIGNER**  
for light machines  
gives you correct  
pulley and V-belt  
sizes by merely  
turning a dial.

Using this simplified **DRIVE DESIGNER**, Gates Vulco V-Pulleys and the highly flexible "2000 Series" Gates Truflex V-Belts—available at hardware and implement stores everywhere—it is a simple matter to design a drive which will give you long, trouble-free service at whatever machine speed you desire.

**Truflex V-Belts Ideal for Small Pulley Drives**

Special, Flex-Weave cover enables Truflex V-Belt to bend easily around small pulleys... results in far longer belt life.

Send for **NEW V-Belt Drive Designer Today!**



The Gates Rubber Company, Sales Division, Inc.  
Dept. 15-999 So. Broadway, Denver 17, Colorado

Please send me the new Gates Truflex V-Belt **DRIVE DESIGNER** by return mail. I am enclosing 25c to cover cost of handling and mailing.

Name.....  
(Please Print)

Address.....

City.....Zone.....State.....

**Gates Truflex V-Belts**

the worst thing that could happen. The next worst is that an initial failure would torpedo the whole project. Yet it's a calculated risk that goes along with every pioneering exploration that's ever taken place. All our energies are directed toward preventing this; yet, it could happen."

But a week of talking with the people involved in Project Mercury left me with a strong feeling of confidence in their ability to bring it off. Optimism is infectious around Langley; no one is anticipating failure—least of all the Astronauts. The place feels and smells of success. But one thing is certain: the effort won't be made until virtually everyone involved is convinced of the overwhelming probability of a successful flight.

In this atmosphere of prevailing optimism, the Astronauts don't always agree on everything by any means—but their differences are technical and not personal. There is no individual among them that they thrust forth as their leader. All of these men are rugged individualists, and they feel no need for seeking leadership. They respect and trust one another completely, but this doesn't prevent them from disagreeing when the occasion warrants. None of them is aggressive; they feel no need to be. Glenn and Cooper are perhaps the most easygoing, Grissom the quietest, Shepard the most outspoken, Carpenter the most scholarly, Schirra the most straightforward, and Slayton the prototype of the dashing military pilot. When a question is asked the group, they invariably defer to the individual whose specialty is most closely allied to the answer sought. None of the Astronauts were close friends before Project Mercury; several of them had met in passing. Now they are more than close friends; they're a team in every sense of the word.

**Beyond Mercury**

What happens after the first Mercury shot has been successfully launched and returned? Project directors aren't planning this far ahead yet. But without question, the other Astronauts will have their turns at longer and longer orbital shots, leading first to an orbit of the moon and return, then to an orbit of other planets in our solar system. Mercury is just a bare beginning; the Astronauts will form the nucleus of a growing corps of space travelers to come along in the years ahead.

Right now it seems presumptuous for man to think of exploring the far reaches of our universe—and reaching out to new and undiscovered universes. Yet, this is certain to happen once the first long step into space has been taken. The solar sys-

(Continued to page 262)



## Wood Carvers!

"HERE'S THE  
NEWEST  
IN THE  
CARVING FIELD!  
\$10.95 PER SET!  
OVERALL LENGTH OF  
EACH TOOL 6½".  
PLASTIC HANDLES



6 PIECE CARVING SET

Most Complete Line of Chisels and Gouges  
CATALOG AVAILABLE!"

**BUCK BROS. INC.**  
RIVERLIN WORKS MILLBURY, MASS.



## MILES • DOLLARS HULL AUTO COMPASS

One wrong turn means wasted hours and mileage, lost dollars, lost appointments. Eliminate guesswork with a famous, dependable HULL AUTO COMPASS. \$5.95 to \$7.50. At your dealer's or write for literature.

BOAT OWNERS NEED 'EM, TOO!

HULL MFG CO. • P.O. Box 246-D-1 • Warren, O.



**STOP WASTING MONEY**  
on worn-out piston rings  
Get **HASTINGS**  
STEEL-VENT

## Next Month

Visit the fleet  
of U.S. submarines  
being armed with  
the POLARIS—the  
guided missile  
that makes torpedoes  
"child's play"

★ ★ ★

In the FEBRUARY  
**POPULAR  
MECHANICS**

## SOMETHING NEW To Do! To Make! To Enjoy!

Authentic Model World Famous  
**Cyclone 9** Radial  
Aircraft Engine

Motorized — Regular  
**ACTION  
Models**



## Action

One cylinder with cut-away section (optional) shows piston and connecting rod in motion as prop is turned by hand or when powered.

# Monogram

Hobby Kits FOR FAMILY FUN

## Year's Most Fascinating Hobby Kit Now at Your Favorite Store

Select this magnificent kit with electric motor or regular kit (and add your own motor). Get a Monogram super-detailed action model of the famous Wright Cyclone — 9 cylinder engine of 50 famous airplanes. Latest version (C9HE — 1525 H.P.). Stands 5½ inches high in shop type service rack dolly as pictured. Parts precision molded in four colors of plastic. Requires no painting. Illustrated Cyclone Engine book included. Authentic model with amazing detail.

### Regular Kit • Can be Motorized • \$1.98

Contains engine, service rack dolly, stub propeller and Cyclone Book. Instructions for motorizing. Only kit of its kind. Simple assembly.

### Deluxe Motorized Kit • With Motor • \$2.98

Same as above, with electric motor, battery box with switch, lead wire, sundries and instructions. A real deluxe presentation kit.

Made by Monogram Models, Inc. • Chicago 32

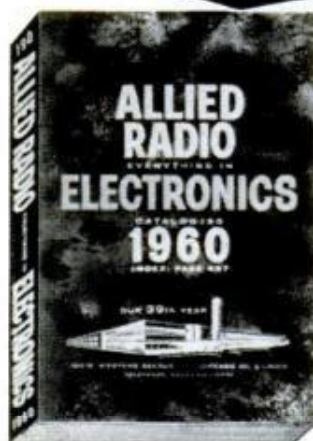


**BUILD THE BEST!**

build quality money-saving

**knight-kits®**

A PRODUCT OF ALLIED RADIO



see them all in

**ALLIED'S**  
1960 ELECTRONIC  
SUPPLY CATALOG

**FREE**

build your own...  
it's easy...it's fun!

**SAVE UP TO 50%**



HI-FI  
KITS



INSTRUMENT  
KITS



HOBBY KITS



HAM  
KITS

world's  
largest  
stocks



See the 1960 KNIGHT-KIT line—available only from ALLIED. KNIGHT-KITS are lowest in cost, convenience-engineered for easiest assembly—the only kits with money-back guaranteed specifications. Send today for the 1960 ALLIED Catalog—select your KNIGHT-KITS—and...

**SAVE ON EVERYTHING  
IN ELECTRONICS**

Get more for your money in Stereo hi-fi systems and components; save on recorders and tape; Amateur station equipment; TV tubes, antennas, accessories; test instruments; electronic parts, tubes, transistors, tools, books. Send today for your **FREE 1960 ALLIED Catalog!**

**EASIEST TERMS**  
only \$2 down on  
orders up to \$50

**FREE**  
catalog

**ALLIED RADIO**

100 N. Western Ave., Dept. 24-A, Chicago 80, Ill.

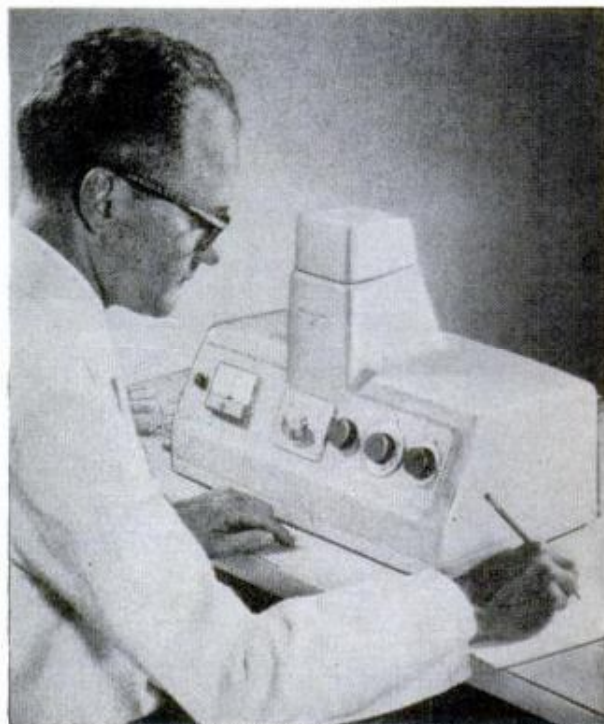
Rush **FREE** 1960 ALLIED Catalog

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

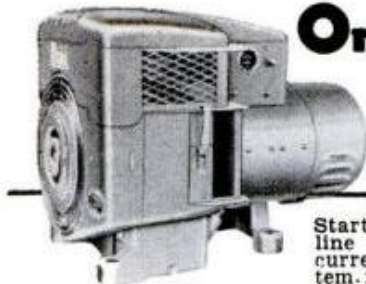
tem we now hope to explore is tiny in relation to the limitless universe about us—and there are many dedicated and adventurous men who are chafing for the opportunity literally to reach out of this world into the new dimensions that lie beyond. The seven young men at Langley Field who will take our first manned vehicles into space are at the vortex of this movement into space, and they deserve to be there. They are outstanding representatives of the very best that this nation and this civilization can offer in reaching out a hand to the mysteries that lie beyond the atmosphere of the earth. ★ ★ ★



Bausch & Lomb Optical Co., Rochester 2, New York

### Instrument Measures Radiation Absorbed by Living Tissue

X-ray and gamma-radiation measurements are accurately read with a microdosimeter system developed by Bausch & Lomb Optical Company. The system is composed of a detector, a very small cylinder or rod of silver-activated phosphate glass, and a reader, which is a special fluorimeter designed to measure the change in fluorescence that takes place in the rod as a result of high-energy radiation exposure. Three features of the system make it valuable in the field of radiology: It is easy to make implants because of the small size of the rod; the system has a wide range of application, being equipped for both X-ray and gamma-ray study; and it allows individual as well as cumulative dose readings to be taken over an extended period. A major medical application is the measurement of radiation energy absorbed by living tissue.



## Onan Emergency Electric Plants



**PORTABLE MODELS**  
500 to 10,000 watts. Supply plug-in power anywhere!

Start automatically when high-line power is cut off, supply current for lights, heating system, freezer, water pump, stove, all appliances and machines. Prevents losses and hardships. Plant stops automatically when power is restored. Compact, easy to install. 500 to 200,000 watts A.C. Priced from \$319.00.

Write for Free Folder

**D. W. ONAN & SONS INC.**  
3321 UNIVERSITY AVE. S.E. • MINNEAPOLIS 14, MINN.



## GENUINE ALNICO MAGNETS

**AMAZING, PERMANENT, NON-ELECTRIC, HIGHLY PRACTICAL.** Conduct interesting experiments. Hundreds of uses. Retrieve valuable steel items such as guns, tackle from fresh or salt water; tools from tanks & drains. **GUARANTEED.** Try any magnet one week.

### MONEY BACK IF YOU ARE NOT WELL-PLEASED

M-710 (Wt. 53 oz.) Has pull of 225 lbs. on steel block.	\$18.00
M-625 (Wt. 70 oz.) Has pull of 125 lbs. on steel block.	\$10.00
M-575 (Wt. 18 oz.) Has pull of 75 lbs. on steel block.	\$ 7.00
M-500 (Wt. 13 oz.) Has pull of 50 lbs. on steel block.	\$ 5.00
M- 90 (Wt. 5 oz.) Has pull of 15 lbs. on steel block.	\$ 3.50
M-102 Pocket Magnet, 5 lb. pull, 2 for	\$ 1.50
M- 47 Hot Pad Magnets, 10 for \$1.00	50 for \$ 4.87
M- 35 Hobbyist assortment of 8 magnets.	\$ 2.00

Send M.O. or check. We pay postage. Sorry no C.O.D.'s.

**MIAMI MAGNET COMPANY,** 3240 N. W. 27TH AVE. MIAMI 42, FLORIDA

# NEW!



## MARLITE RANDOM PLANK

*beautiful wood-grain paneling for random-effect walls in any room*

New Marlite Random Plank is made for easy installation—16" wide, 1/4" thick, edges tongued and grooved. Beautifully styled, too. Six new Trendwoods complement any room, any decor. And Marlite's melamine plastic finish needs no painting or further protection; resists stains and mars for years. For complete facts, see your building materials dealer or write Marlite Division of Masonite Corporation, Dept. 142, Dover, Ohio.

5967

**Marlite**® plastic-finished paneling

ANOTHER QUALITY PRODUCT OF MASONITE® RESEARCH

Your first pipeful tells you why so many smokers are switching to **AMPHORA**



# AMPHORA

Make your *next* pipeful AMPHORA, the even-burning, longer lasting, gentle blend from The Netherlands, available in pouch or tin, at tobacco counters everywhere.



JANUARY 1960



**This nugget of Information on how to get**  
**Double Pleasure**

**from your Outboard Motor & Boat**

**THE 1960 MICHIGAN WHEEL OUTBOARD CATALOG** contains carefully engineered propeller recommendations for virtually every specific engine-boat-and-purpose combination . . . and there's one, proved by exhaustive tests, to provide the finest possible performance of which your outfit is capable. Switching to a MICHIGAN prop usually results in amazingly improved performance.

**BETTER SKIING . . . MORE SPEED . . . BETTER CRUISING . . . CORRECTION OF BOAT "SQUATTING" . . .** whichever you want, can be obtained with the proper MICHIGAN wheel. And it is easy to spot in the new MICHIGAN catalog. See your Michigan dealer or write for your **FREE** copy — it's the Outboarder's Bible — contains, among other valuable data:

**8 CHECK POINTS TO BETTER OUTBOARD PERFORMANCE . . .** extremely important data gained from years of experience on what you can do to your outfit to enhance performance . . . plus literally hundreds of **BARGAINS IN BOATING ACCESSORIES.**

**MICHIGAN WHEEL COMPANY**  
 Dept. PM, Grand Rapids 2, Mich.

Gentlemen: Please send me **FREE** of charge a copy of your new 1960 Outboard Catalog.

NAME \_\_\_\_\_

\_\_\_\_\_

STATE \_\_\_\_\_

263

**5000-Mile Game of Catch**

(Continued from page 120)

the big ICBM shooting gallery. And it is these holes that the tiny ships of the telemetering fleet must plug.

"Usually half of the ships are scheduled for duty," explains Captain Siegmund Hilseth, rugged tow-headed skipper of ORV E-42-1836. "The rest are in port, perhaps Trinidad or Recife, for resupply, repair, and to give the men a needed rest from weeks of being cooped up at sea." An average tour for a down-range picket ship, according to Hilseth, is about 21 days, though some have been out for as long as seven weeks due to lengthy countdown "holds" and severe tropical storms.

**Shoot Set Up at Canaveral**

A picket ship's tour of duty begins when a big shoot is set up by "Range Scheduling" at Canaveral. Captain and Technical Leader generally learn about it when a cryptic radio message in code crackles in from Patrick Air Force Base. "TEST # AM 11C XXX PROCEED LAT 14' 20" LONG 2' 43" XXX ON STATION TIME 06 1500 T-TIME 07 1700 RTN TRI." In English, this means that Atlas Missile 11C will blast off at 5 p.m. Greenwich time on the 7th, but that at 3 p.m. of the 6th, this particular picket ship must be on station at a pinpoint on the map beyond Ascension Island, returning to Trinidad after the bird has flown.

Crewmen, routed from tropical beach resorts, hotels and homes are all aboard 24 hours before departure. "We will be on station by F (firing day) minus one," announces the skipper. "You are on voice control with Cape Canaveral central control until the shoot is terminated or scrubbed. We go!"

Steaming out across the Atlantic in a tiny ship crowded with electronic gear and people can be grim duty. Hilseth's crew numbers 24, in addition to five technicians who report to RCA's instrumentation leader, Grady Cole—"Which leaves no mattress space to spare on this transistorized canoe," according to one crewman.

Enroute to rendezvous with the missile, life on board the ORV simmers down to a monotony of chores and wallowing through heaving seas.

"Our object is to get out on station and sit," says Hilseth. "But what hurts is when we lie out there pitching, rolling and gyrating to the four compass points for weeks during delayed shoots. For 10 days we rode out one hurricane so bad everyone was thrown from his bunk. Big ships went down in that storm, but no ORVs.

(Continued to page 266)

**ELMER'S  
GUIDE to  
GOOD  
GLUING**

*16-page  
gluing  
guide*

**FREE**

For the Home Handyman

16 illustrated pages give hints and tips on how to glue what to what—and the right glue to use for every job indoors and out. Send a stamped, self-addressed envelope for your free copy. The Borden Company, 350 Madison Ave., New York 17, New York.

**ONE-MAN SAWMILL** LOW \$50<sup>00</sup> AS... 50<sup>00</sup> DOWN

Take BELSAW Portable Sawmill right to the trees—turn out valuable lumber for home and farm—sell to local yards—make up to \$50 a day custom sawing for neighbors. BELSAW lasts a lifetime. No crew needed. Power with tractor or auto engine. Beginners get excellent results. Send today for FREE BOOK.

**BELSAW MACHINERY CO**  
3450 Field Bldg. Kansas City 11, Missouri

**BETTER BUILT**

Sure to please the most particular. Free catalog to tool-makers and machinists.

**GERSTNER TOOL CHESTS**  
460 Columbia St. Dayton 7, Ohio

**FREE POWER TOOL CATALOG**

Get the right tool for the job! Write:

World's largest maker of electric tools **Black & Decker®**  
Dept. MO10, Towson 4, Maryland

FOR PANELING... BUILT-INS... CABINETS... FURNITURE

*The Complete Interior*

**WOOD FINISH**

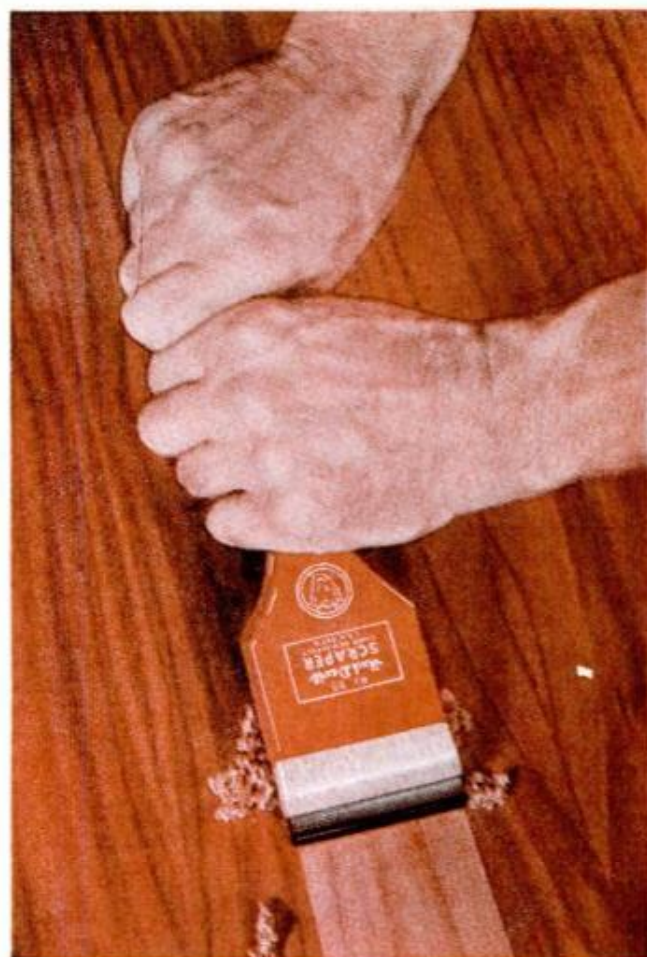
*in One Can*

**READY TO USE**

A finer clear, semi-gloss for natural wood beauty. Non-darkening. ANYONE can use Deft... it's so easy.

Wherever paints are sold, or write Dept. PM Deft, 1526 W. 228th St., Torrance, Calif.

Free Shop Chart on Wood Finishing. Write Dept. SSPM. ←



**REFINISHING?  
IT'S A SNAP  
WITH  
THE RIGHT  
Red Devil  
SCRAPER!**



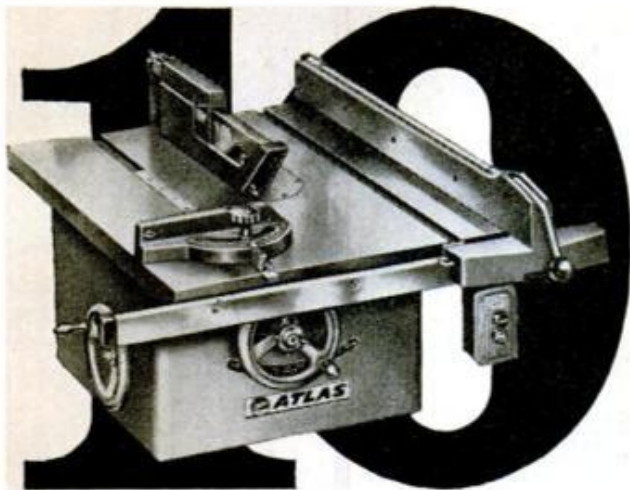
That's why Red Devil offers you a choice: 18 different kinds of Wood Scrapers! Find out which is best for you at the most helpful dealer in your neighborhood... the one who sells Red Devil Tools:

Glass Cutters • Wall Scrapers • Glaziers' Tools  
Wood and Paint Scrapers • Hardware Specialties  
Putty Knives • Floor Polishers • Paint Conditioners

**Red Devil Tools.**  
Dept. PM-1, UNION, N. J., U. S. A.

PLEASE SEND FREE BOOKLET  
"How To Prepare Surfaces  
For Finishing."

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_ 2901



**\*10 NEW FEATURES . . .**

**\*10 reasons why the NEW**

*Atlas*

**10" TILT/ARBOR BENCH SAW**

**is the greatest value ever!**

- 1 NEW Cast-iron cradle, saw arm, trunnions . . . it's the heaviest, most rigid mechanism of any 10" bench saw, for superior workmanship. Saw alone weighs 165 pounds!
- 2 NEW Big table capacity — 20" x 27½", 59½" x 27½" with two grill-type extensions.
- 3 NEW Solid, ground steel arbor, ¾" diameter at the bearings — big lubricated-for-life ball bearings.
- 4 NEW Double-locking lift-off fence—cast aluminum for lasting accuracy.
- 5 NEW Big, efficient mitre gauge — keyed to table for greater cutoff capacity.
- 6 NEW Free-turning 6" diameter cast-iron hand-wheels.
- 7 NEW Removable motor mount for easy portability.
- 8 NEW Dual V-belt drive for transmission of full power, spring mechanism for proper belt tension.
- 9 NEW Motors . . . continuous duty, totally enclosed, designed specifically for saws.
- 10 NEW Economy . . . you have never seen such "plus value" features, such rugged quality in a saw so modestly priced!

**ONLY \$129.75**

Slightly higher West of Rockies.

**\*10 REASONS WHY YOU SHOULD WRITE FOR COMPLETE ILLUSTRATED LITERATURE, TODAY!**



*Atlas Press Company*

1-24 N. Pitcher St., Kalamazoo, Mich.

**QUALITY MACHINE TOOLS SINCE 1911**

"That's when a crew comes apart. We had one technician so seasick he couldn't eat a crumb for 15 days. Took in his belt one inch a day until he looked like death. We've had men fake seasickness to get out of the service—stealing sandwiches from the galley at night when they thought no one could see them — but this fellow couldn't help himself; he even got sick when were tied up at dockside."

During long drifting periods, the men play cards, read, look at antique movies and grumble. Good days are spent rigging nets to scoop up flying fish attracted by lights the men hang on the fantail at night. This provides bait for dolphin, dogged in on handlines next day. "We've caught five footers," boasts the skipper, "and then we celebrate. Small things out there become huge events—like the whole day we spent watching the antics of a baby whale playing around the ship."

But the real fun begins on "F-Day." Up on the bridge, Hilseth and his navigator have been busy for days checking their navigation to within a hair's breadth of the predicted impact point of the missile. "The human and electronic brains at Canaveral can calculate with remarkable accuracy where that bird will drop," explains the skipper. "Nose cone pick-ups have been made in as little as 20 minutes. While the antennas clank around over our heads, we figure our precise current and wind drift, and correct our position with engines. We want to be not too close, but not too far from where that white-hot steel will plunge from space into the sea. The RCA boys watch that missile from the side, bow-on, and swing with it as it arcs across the sky. If I have to swing the ship, the antenna man down below goes crazy keeping his helicals pin-pointed on that radar blip screaming across the sky."

#### Technicians at Stations

Long before the shoot, all the technicians are lined up at their stations, where they've been running simulated count-downs, feeding data into their maze of electronic gear on one dummy "shoot" after another.

The telemetry room was not dubbed "the hole" for nothing. It is approached from the forward deck by ladder, opening into a vast steel-walled cavern below decks. "It was converted from a cargo hold," Grady Cole explains, "and there's 12 inches of concrete in the roof—not for protection against wild missiles, but for ballast. Without it the ship would ride like a cork." Actually, the comparison isn't too far-fetched anyway. Stout oak

(Continued to page 268)



**Thrills  
Excitement  
Perhaps  
a career!**

**Send  
young minds  
soaring into  
the amazing  
realm of  
science...**

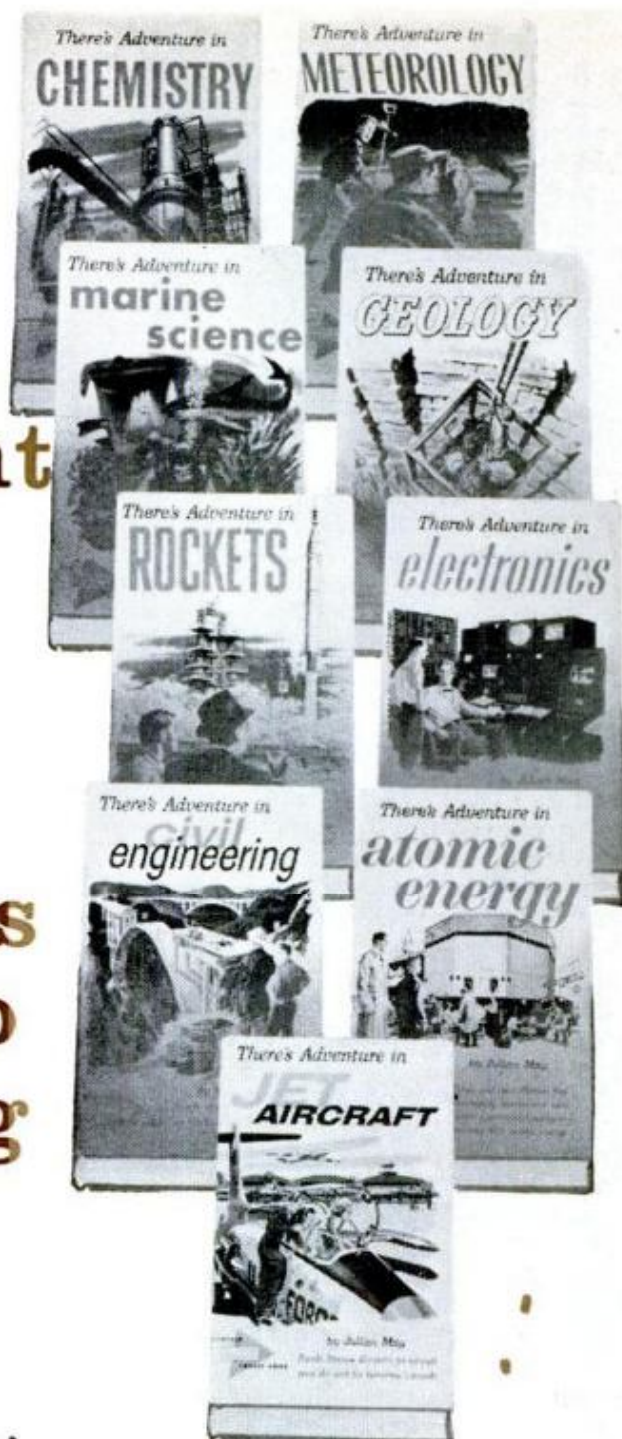
*The sparkling adventures of  
Randy and Sam Morrow in the  
breathtaking world of science;*

**POPULAR  
MECHANICS** each-  
\$2.95

***There's  
Adventure***

**BOOKS**

**JANUARY 1960**



bars lace the aisles between equipment racks—"so we can remain standing at a 45-degree angle," Cole points out.

Under that concrete sit the 24-foot-long banks of dials, switches, recording reels and electronic tubes—"everything from transistors to power tubes 15 inches high and eight inches across," says Cole. "It takes nine tons of sea-water-cooled air conditioning to keep this place at 70 degrees when everything is running."

Everything begins really running, in a bustle of activity, when countdown at Canaveral—relayed through the Pan Am communications man on board—closes in on "T-Time." Along the electronic corridors, earphone-clad technicians monitor their stations. One man stands by the remote controls that turn the antennas this way and that inside their white domes topside. "At a certain calculated time and place in the sky we expect to start picking up signals from the missile," says Cole, "so the two independently controlled tracking antennas in the Mae Wests are homed in at a predetermined 'look angle.' If the signal doesn't come in when it should, we can send our own signal through the circuits and check them out almost instantaneously—so we know right away the missile has wandered, not us. Then we go nuts replottting flight curves from data pouring in from other range stations via Canaveral."

#### Continuous Record

Once the bird is picked up on the scopes, everyone aboard works to keep it there, and the ship's tape-recorder memory, in charge of two busy RCA experts, locks up a continuous record of all events occurring aboard the soaring missile, on the ship, plus data from other range vessels and stations. Superimposed on this high-frequency and UHF-coded jumble are continuous time signals squealing in from WWV. "A single shoot uses up 28,000 feet of tape," Cole reveals. "If played off at the usual record speed in your home, you'd have about two and a half days of continuous 'music.'"

At the tuning station, another man functions at high speed and precision. "He's got to know the precise instant of lift-off and exactly where the missile is at any instant after launch," says Cole. "He works to a tolerance of 50 milli-seconds, which means that at any *fifty-thousandths* of a second, he must be able to pinpoint the missile in flight—and don't forget it's traveling at 15,000 to 18,000 feet per second!"

In spite of all the hazards and pitching seas, no ORV has ever caused a countdown "hold" due to malfunctions, though

Grady Cole winces at some near calamities. "Once, our only ballast tube blew just two hours before T minus zero," he recalls. "A young electronic genius in our crew sat down and, without any 'specs' to help him, mathematically worked out a combination of home-made resistors that pinch-hit for the missing link and gave us the whole shoot. Another time, at T minus 30 minutes, a timing component went out. We just ran the shoot without any time. Luckily, it was a faultless one."

As minutes tick by and the bird nears its target, a lookout man from ship's personnel stands in the bow peering up at the black sky. Close to the prescribed instant, if all goes well, and near a predicted place in the firmament, he'll spot blazing streaks of light arching toward the sea—usually two or three—like spectacular shooting stars. These will be the rocket's final stage, the nose cone and the separated instrument capsule, plummeting into the atmosphere at 15,000 miles an hour. "There she is!" he bellows, and everyone goes limp. "That yell," says Cole, "is the pay-off for all our trouble."

Though Hilseth's ship hadn't been involved in a nose-cone recovery up to last summer, several other ORV and search ships have. For them, the real chills come after the shoot terminates.

#### Search for Nose Cone

Usually, three ships, arranged in a triangular group around the predicted impact point, lie in wait for the plunging payload. Often Navy ships do this job. Aircraft, on hand to help spot the cone in the tossing ocean, sweep the area in grid patterns. As the whirling, white-hot pieces of metal burn down through the atmosphere, the picket ships start their hunt, sailing a system of circles and squares over the sea. All units tune radios to a special frequency, ready to pick up signals being transmitted from the recovery package.

The rig that is used to bring a recovery package safely back from space involves an ingenious arrangement of parachutes and flotation gear. As the glowing nose cone hits the outer atmosphere, a switch, triggered by the sudden slack in speed, actuates a timer that starts a recovery sequence in the cone. At 20,000 feet, the rear cover of the re-entry vehicle pops off. A small ribbon parachute whips out and slows the plunging hardware from hypersonic to subsonic speed. Then a second, larger drag chute is released, and brings the space vehicle to earth at an impact velocity of 60 to 100 miles per hour—slow enough for a safe water landing.

(Continued to page 270)

LOOKING FOR  
LONGER WEAR  
IN WORK SHOES?

# TRY *Thom McAn* SHOES with **NEOPRENE SOLES!**



Neoprene soles give longer wear... resist oil, grease, chemicals and cold weather cracking. Neoprene soles are resilient... cushion each step... help make standing jobs less tiring.

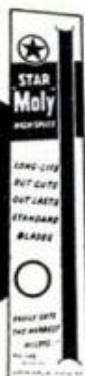
*Ask for neoprene soles the next time you buy work shoes.*



BETTER THINGS FOR BETTER LIVING... THROUGH CHEMISTRY



**STAR**  
**Hack Saw Blades**  
**and Frames**  
... used throughout  
industry



★ For better, faster metal cutting in your ★  
★ home work-shop or on the job, use the ★  
★ Hack Saw Blades preferred by people ★  
★ who know — Star. "Handy-Pak" conven- ★  
★ ience, with card holding one or two ★  
★ blades, makes storing and handling eas- ★  
★ ier and safer. Cards give valuable and ★  
★ helpful tips on metal cutting. Ⓜ 1483 ★

### Star "Lever-Lock" Hack Saw Frames

★ • automati- ★  
★ cally position and tension blade. • high-strength ★  
★ tempered steel back. ★

★ • perfectly balanced to ★  
★ make cutting easier. ★

★ At all leading hardware stores — ★  
★ be sure and ask for STAR ★

★ Send 10¢ in coin for information-filled ★  
★ booklet on metal cutting. ★

★ **CLEMSON BROS., INC.** Middletown ★  
★ N.Y., U.S.A. ★

**NOW!** a hi-compression  
**staple gun**  
for only  
**\$4.95**

With Exclusive  
Push-button Loading  
and Built-In  
Staple Extractor.

Indispensable for home use... and never before priced so low! This compact, all steel, powerful SWINGLINE 101 staple gun is ideal for insulation, carpentry, upholstery, screening, wire fencing, plus thousands of other uses. Handle locks to fit pocket. Lightweight, maneuverable, jam-proof! Staple sizes 1/4", 5/16". Send for FREE book—"Tips for Tacking".

*Swingline*® INC.

Dept. PM-1-0 Long Island City 1, New York

At some point in the last plunging mile, a big balloon is also ejected from the cone and automatically inflates itself. This ball is sectionalized—like the segments of an orange—so that if the impact bursts the skin at any point, remaining segments will keep it afloat. The instrument package, hitched to the balloon by 50 feet of nylon line, dangles deep under the sea's surface where it won't be battered by waves. The balloon, bobbing atop the waves, carries a transmitter that starts broadcasting a homing signal as soon as it hits the water. It also blinks a white light from the tip of its antenna, and automatically spreads a fluorescent dye marker around itself for easier visual sighting by the planes.

Aboard any of the ORVs closing in on that package will be a few extra passengers, including skin divers and, if there happens to be a living cargo in the capsule, a medical scientist or two. First search vessel to spot the balloon (planes usually pick up the radio signal first and vector the ships in) rings it in the glare of spotlights. Over the side go the divers on a raft. One will swim down to hook a retrieving line to the dangling instrument package. Others stand by to help if needed. Some nose cones are huge things weighing half a ton or more. There are other problems, too.

### Sharks Gave Trouble

Early in the recovery business, two divers heading down for the first Jupiter C nose cone found themselves in a mass of frenzied sharks that beat the water to a froth as they struck at the underside of the balloon and slashed at chutes and shrouds. It was too late to do anything about it, so the divers went on with their job while men in the raft beat at the monsters with oars and clubs. Men with high powered rifles aboard ship didn't dare shoot for fear of hitting the swimmers. So many sharks thrashed the area no one could get an accurate count. Later, investigation proved that the water in that area was alive with huge whites, tigers and makos, wildly attracted to missile recovery packages for reasons known only to themselves. To make recovery safe for divers, current recovery capsules spread a copper-acetate shark repellent around themselves.

Despite the remarkable efficiency of recovery packages, heartbreaking things happen. The capsule carrying Old Reliable, first monkey to soar through space last year, was spotted by the blinking light on its balloon marker. Then, as the ships steamed toward it, the light went out and

(Continued to page 272)

## For fun, adventure... **GO CUSHMAN®**

The road looks excitingly different from the saddle of a superbly engineered Cushman scooter, for years the first choice of young America for sleek styling, dynamic ruggedness and safe roadability. Dependable Cushman Husky 4-cycle engine delivers up to 100 miles per gallon, for an operating cost of less than a penny per mile.

Sold and serviced nationally

Ask your dealer for  
**FREE demonstration**  
or write for colorful booklet

*The smart  
1960  
Pacemaker*



*The dynamic 1960 Super Eagle*



**CUSHMAN MOTORS**

1040 No. 21st, Lincoln, Nebraska

A subsidiary of Outboard Marine Corporation,  
maker of Johnson and Evinrude outboard motors

Please send Scooter Booklet.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_

**All You Need to Repair Your HYDRAULIC JACKS!**



**jack-pack**  
HYDRAULIC JACK REPAIR KITS & JACK OIL

All Makes All Models

Kits contain easy-to-follow instructions and all packings necessary to make your jack work like new.

Save Money.. Try a Jack-Pack Today!

- NO MORE BIG JACK REPAIR BILLS
- NO MORE HIGH FREIGHT CHARGES
- NO MORE LONG EQUIPMENT TIE-UPS

**JACK-PACK MFG. CO.**  
2115 NO. MARIANNA AVE., LOS ANGELES 32, CALIF.

Write for Folder

FEATURED AT AUTO PARTS STORES EVERYWHERE!




# MAGNETS

TSX-15 Magnet Assembly (150 lb. pull) Each..... \$ 9.50  
 TS-2 Alnico 5 Pot Holder Magnets 50 magnets. 3.50  
 TS-5A Rectangular U's (4 lb. pull) 10 magnets. 3.25  
 Total regular value.....\$16.25

**SPECIAL INTRODUCTORY OFFER (ALL 61 MAGNETS) ONLY..... \$11.75**  
 TS-6 Sample Magnets & Catalog (over 200 sizes listed)..... 25c  
 Send check or money order, sorry, no C.O.D.'s  
 We specialize in Magnets — 10 Day Trial — Money Back Guarantee

**TERRY SALES CORPORATION**  
 2812 LAFAYETTE, BOX 295, NEWPORT BEACH, CAL. OR P.O. BOX 98, LAKE PARK, FLA.



## "FIRE UP"


YOUR ENGINE AT ALL SPEEDS WITH  
 AUTO LITE RESISTOR SPARK PLUGS WITH

# POWER TIP

LOOK FOR THE PROTRUDING TIP!

## OUTWORKS THEM ALL

Prepares the toughest soils in one operation. All-purpose tiller-tractor tills to 12" deep —12" to 40" wide. 3 models; 7 rotor styles including mulchers. 40 attachments include all tractor tools, mowers, snow plow. Tough chain-gear drive. Send for details.



Pat'd. Also Pat. Pend.

# MERRY TILLER

Northern Life Building, Box 1829, Seattle 11, Wash.

# ALL NEW! 1960 Edition of Constantine's WOODWORKING CATALOG & MANUAL



Since 1812—World's Largest Source for Rare Woods and Woodworking Supplies, Tools, Hardware, Plans, Projects!

Whether you work with wood for fun or profit—get your copy of this biggest Constantine Catalog & Manual! Hobbyists and professionals say it's the world's one truly complete source for the rare imported and domestic woods, veneers, plywoods, bandings, inlays, mouldings, carvings—plus hard-to-find hardware, lamp parts, wood finishing and upholstery supplies, patterns, tools, woodworking materials—at bargain prices! Also exclusive Inlaid-Wood-Picture Kits. Includes natural-color Identification Chart of 60 rare woods... pages of inspiring projects for furniture, etc. Complete with instructions. We ship same day. Send 25c with coupon for postage and handling (refunded with first order).

**FREE**—Year's subscription to "Chips & Chats"... every issue filled with exciting ideas for woodworkers... free with Catalog!

**ALBERT CONSTANTINE AND SON, INC.**  
 2050 Eastchester Rd.  
 Dept. A-5, New York 61, N. Y.

Albert Constantine and Son, Inc.  
 2050 Eastchester Rd., Dept. A-5, New York 61, N. Y.

Enclosed 25c (refunded on first order) for new 1960 Constantine Catalog & Manual. Also send **FREE** a year's subscription to "Chips & Chats."

Name .....

Address .....

City ..... State .....

## ADJUSTABLE MITER BOX & CORNER CLAMP



2 TOOLS IN ONE

No. 44—COMBINATION MITER BOX AND CORNER CLAMP  
 Holds the wood and holds your saw. Uses any handsaw for accurate cuts from 0 to 180°. Full 3" capacity. Sides of joints exposed. **\$2.75 PPD.**

No. 33 Works the same as No. 44, but without saw guide attachment. **\$1.75 ppd.**

Adjusts to any angle!

## SAW SHARPENING IS EASY

Super Filer No. 11 joints and sharpens hand and circular saws 6" to 10" with all teeth correct in height, depth, pitch, bevel. When file hits steel roller, teeth are finished. Saw runs true with no side pull. Includes 8" file. **\$9.95 PPD.**



FREE LITERATURE

"TRU-CIRCLE" saw set automatically sets teeth at 10° or more. **\$2.95 PPD.**

**MONEY BACK GUARANTEE**

A. D. MCBURNEY, 5908 Hollywood Blvd., Hollywood 28, Cal., Dept. A-10

## NOW! HOME CRAFTSMEN CAN OWN THIS PROFESSIONAL ARC WELDER

**EASY TERMS ONLY \$98.50 F. O. B.**



Now you can own a Trindl full 125 amp Industrial Welder at a price far less than smaller machines. With a Trindl 125A you can weld metals up to 1/2 inch thick. Operates off either 110 or 220 volt line, properly wired. 16 heat stages from 20 to 125 amps. Make and repair anything of metal around the home, garage, farm or shop, like a professional. No previous experience or training needed. Full "do-it-yourself" instructions with each machine. Complete only \$98.50 f.o.b. factory, or write for details. Trindl manufactures a complete line of heavy duty welding machines. Dealer inquiries invited.

**TRINDL PRODUCTS Ltd., Dept. T2-A**  
 1807 So. Clark St., Chicago 16, Ill.

**FREE** WRITE FOR COMPLETE DETAILS AND EASY PAY PLAN

**Guaranteed 12 MONTHS IN CONTINUOUS OPERATION**

## NEW OAK FLOORING LAYS LIKE TILE

over concrete, wood or old tile floor



## Bruce Laminated Oak Block

Modernize your home by installing this beautiful hardwood floor over your old floors. Or use low-cost Bruce Laminated Blocks to create new living space in attic, basement or addition.

**Easy to lay** — Just apply adhesive (Bruce Everbond Coldstik) and lay blocks. Tongues and grooves assure tight fit. No nailing . . . and no sanding or finishing either, because Bruce Laminated Blocks are completely prefinished at the factory. Your new floor is ready to be used and admired as soon as you lay it.

**Moisture-resistant** — Blocks are 9" square and only ½" thick. The three oak plies are laminated under heat and pressure with waterproof glue to prevent expansion and contraction. Ask your lumber dealer for a cost estimate. Mail coupon for color literature on Bruce Laminated Blocks.



### SEND FOR COLOR FOLDER

E. L. Bruce Co.  
Box 397-W Memphis 1, Tenn.  
Send complete information on Bruce  
Laminated Oak Block Floors.

Name \_\_\_\_\_

Address \_\_\_\_\_

### Bruce LAMINATED Oak Block Floors

By the world's largest hardwood flooring maker

radio signals quit. No trace of the recovery package ever was found. Though the last telemetered data proved that Old Reliable had survived his flight, the entire assembly obviously sank—in 3000 fathoms. Whether the balloon broke up on impact or was destroyed by sharks no one will ever know.

Since then, nose cones and capsules have been built with integral flotation. Lt. (jg) Edward Fay, who dove for the famous capsule containing Able and Baker, had a heartrending jolt when, at the end of the line beneath the balloon, he found only frayed nylon. "No nose cone!" he shouted when he surfaced. But as searchlights swept the water, the big Jupiter cone was spotted, heaving peacefully atop the waves nearby. Its own flotation cells had saved the two famous monkeys when the landing impact snapped the line. Everyone knows the rest of that story.

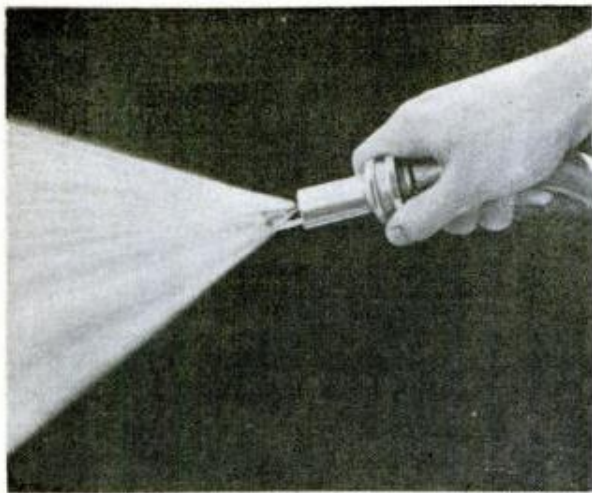
There will be bigger and more exciting recovery stories to tell as the space-flight program progresses. And you can be sure that in every one, the doughty little Ocean Range Vessels, tossing on a desolate black sea, will be out there making the catch. ★★★



Burgess Battery Co., Div. of Servel, Inc., Freeport, Ill.

## Stacked Cells Make Batteries

Hermetically sealed and rechargeable, a new selection of nickel-cadmium cells and batteries are versatile in application. A range of multiple-cell batteries can be designed from individual cells which, rated at 1.25 volts, come in eight sizes—from finger-tip to standard flashlight battery sizes. A dab of a tough, conductive silver wax placed on positive and negative sides of each cell permits them to be connected in series by mere stacking. The manufacturer says normal life of multiple-cell batteries can be extended many times if they are recharged before they discharge more than one-half of their capacity.



Bete Fog Nozzle, Inc., 309 Wells Street, Greenfield, Mass.

## Garden Hose Nozzle Produces Fine Spray

Extra-fine water spray for garden care is obtainable with a hose nozzle equipped with a specially tapered spray mechanism. Made of aluminum, the nozzle has no internal parts and consists of a single large pipe. It produces the mistlike spray at ordinary city water pressures, according to the manufacturer.

## SAVE MONEY on LUMBER with the LOW-COST BELSAW PLANER



### Convert Rough and Random Size Lumber Into Cabinet Finished Stock

Now anyone can make perfect cabinet finished stock from low-cost rough lumber... any size up to 12 3/4 inches wide and 6 inches thick. Turn out high grade finished material at a fraction of the cost you pay lumber yards. Big 42-inch-long bed makes it easy to plane heavy, wide and long pieces... BELSAW self-feeds at 14 to 34 feet per minute.

### USE THIS ONE LOW-COST MACHINE for Planing, Jointing, Sawing, Milling, Tongue and Groove.

You can easily make flooring, siding and many other popular patterns with your Belsaw. Your Belsaw quickly pays for itself with savings on raw materials and profits on finished stock... a highly profitable machine for custom work. Compare Belsaw with any 12-inch planer on the market... Belsaw gives you more essential features—yet costs you \$50 to \$125 less than others.

### Send Today for Free Literature on the Belsaw Multi-Duty Planer.

**BELSAW MACHINERY CO 2050 Field Bldg. Kansas City 11, Mo.**

ADVANCED DESIGN — REMARKABLE PERFORMANCE

### BOAT TRAILER KIT Only \$59.50

Assemble and Own This High Quality Trailer—for 1/3 the Cost! Handles Boats up to 16' Long. Other Model Capacities to 2000 lbs.—Boats to 21 ft.

All parts furnished to assemble to a few pieces locally purchased pipe. Cuts freight costs. Trailer completely engineered—no drilling or cutting—assemble and tighten U-Bolts. "Easy Launcher" tilting bed available.



**EASY FACTORY FINANCING.** Write today for free catalog showing other sizes, models, and prices.

**TRAILER PRODUCTS COMPANY, INC.** Dept. PM-1, P.O. Box 176, Kingsport, Tenn.

**ESCAPE THE GRAVITATIONAL PULL OF EVERYDAY CARES**

**OUT OF THIS WORLD**  
By Dr. Dan Q. Posin

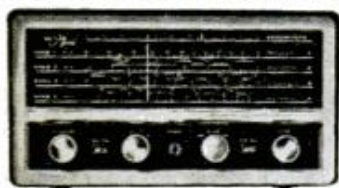
**DR. DAN Q. POSIN**

Discover the mysteries of Space Science and Electronic Magic in a new fascinating way. Authentic information so cleverly and simply written that you will be amazed at the knowledge you will absorb effortlessly. For a delightful experience in "painless" education, read "OUT OF THIS WORLD."

AVAILABLE AT YOUR FAVORITE BOOKSTORE OR WRITE DIRECT — \$3.95  
POPULAR MECHANICS PRESS—200 EAST ONTARIO ST. CHICAGO 11, ILL.

Dept. PM 160

# IT'S FUN TO BE AN ARMCHAIR ADVENTURER



With a NATIONAL NC-60 SPECIAL Shortwave Radio Receiver you can cross the six continents in the comfort of your favorite chair, visit foreign lands, eavesdrop on aircraft, ships at sea and radio hams. Enjoy standard broadcast too, with this powerful new radio receiver. Suggested price only \$59.95. Write for literature and name of nearest dealer.

## JOIN THE NATIONAL ASSOCIATION OF ARMCHAIR ADVENTURERS

SEND 50c for membership certificate and exciting new book on Shortwave Listening. Tells when, where, how to listen, provides log for listing countries you hear. SEND 50c to:

### National Radio Co., Inc.

MELROSE 76, MASS.

A wholly owned subsidiary of National Co., Inc.



Export: AD AURIEMA, INC. 85 Broad St., New York, N.Y., U.S.A.

In Canada: CANADIAN MARCONI CO., Toronto 17

## HOME IMPROVEMENT

LIBRARY

12 AUTHORITATIVE MANUALS

FOR ONLY \$2.00

★ Now sold together in a service packet for the first time—a complete library of Popular Mechanics' home service, repair and improvement booklets—all 12 offered at one low group price. Listed below are only a few of the many topics covered:

★ Additions and Remodeling—How to modernize kitchens: how to work with concrete around the home: how to lay linoleum and tile: how to refinish floors and woodwork: how to remodel basements and attics: how to modernize walls and ceilings.

★ Basic Service and Repairs—House wiring and electrical repairs: plumbing repairs made simple: how to paint inside and out: how to cure your leaky basement: how to winterize your home: how to insulate your home.

★ The home owner who owns the HOME IMPROVEMENT LIBRARY will be prepared. Send your order in at once!

**ONLY \$2.00**

SERVICE BUREAU POPULAR MECHANICS, Room 517  
200 E. Ontario, Chicago 11, Ill.

Enclosed find remittance in the amount of \$2.00. Please rush the complete HOME IMPROVEMENT LIBRARY (12 booklets).

Name.....

Address.....

City..... State.....

## PM Houseboat

(Continued from page 206)

2-in. camber of the deck, the upper edges are cut to give the cabin roof a 3-in. camber, or crown. The cabin is backed up on the inside at the corners with  $1\frac{1}{8}$  x 3-in. stiffeners, Fig. 28, which fit between the coaming and shelf members which are installed next. These members tend to stiffen the cabin sides at the roof line and also tie together the roof and sides. Since the outer clamp members and the shelf members are held integrally, as shown in Fig. 26, you'll do best to apply the outer-clamp members first, letting them extend 10 in. at the front to support the roof overhang as in Fig. 20. The shelf members are located  $2\frac{1}{2}$  in. down from the top of the cabin sides and are glued and bolted in place with brass carriage bolts passing through holes drilled in both shelf and clamp members.

Fifteen beams are needed for the cabin roof and these are laid out on  $1\frac{1}{8}$ -in. fir stair-tread stock as in Fig. 25. Note that the ends are angle cut 5 deg. to conform with the slanting cabin sides and to let the beams rest flat on their supporting shelves. You can leave the lower edges of the beams straight or bandsaw them to coincide with the 3-in. crown. In either case, one beam is cut narrower than the others as indicated by the dotted line. This is necessary to provide clearance for hinging the forward cabin door. Since one beam must be located to provide a gluing surface for the forward bulkhead of the head, start placing them so that one falls directly above the side members of frame 6. From here the beams are spaced approximately 12 in. center to center and glued and screwed in place as you go. Before the cabin can be decked over, a hatch must be framed in the roof over the companionway aft. This is located aft of the roof beam at frame 6 and made to measure 22 in. wide as shown in Fig. 22. Actually, the headers which frame the opening should align with the door stiffeners by half-lapping the ends so that the two are flush. It takes four 4 x 8-ft. panels of  $\frac{3}{8}$ -in. plywood to cover the roof. These are placed lengthwise and shifted so that abutting joints center on the roof batten and a beam. After the roof is cut out over the hatch, the opening is lined on three sides with a  $\frac{1}{2}$ -in. mahogany coaming. Since the hatch cover should be level in relation to the roof crown, the mahogany coaming on the port side of the hatch will project higher above the roof than the coaming on the starboard side of the opening. Study the sectional view Fig. 27.

(Continued to page 276)

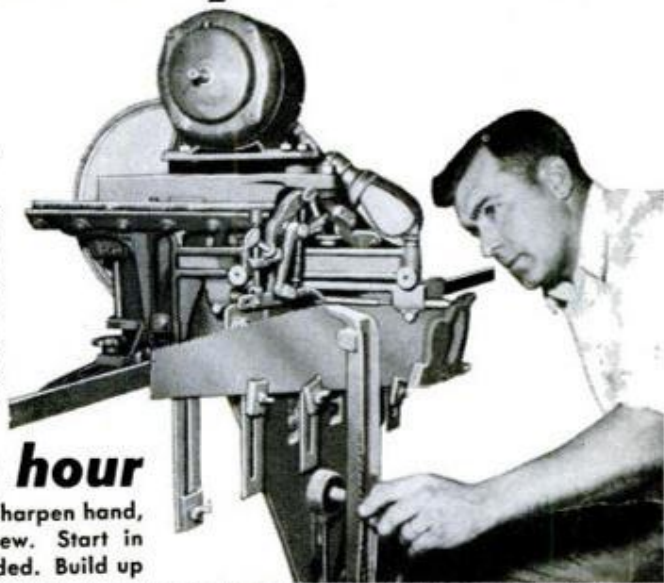


# "WE PAID FOR OUR HOME with a Foley Saw Filer"



Here is the true story of Leslie Patrick—as told by his wife, who wrote us about their success in a town of 12,000.

"I can truthfully say that when Mr. Patrick got his Foley, he made a good and wonderful investment. When we moved here in March, 1946, we had only a Model A Pickup and all our belongings were in it. Since then, my husband has done so well with his Foley Saw Filing Machine and repair shop that we bought a house and paid for it and have two nice boys; bought a new car and built an addition to our house; and he has got a lot of new machines in the shop that a person needs in business. Nicest of all, it is all paid for."



## Make from \$3 to \$6 an hour

With the new model 200 Foley Automatic Saw Filer, you can sharpen hand, band, combination and crosscut circular saws just like new. Start in spare time, in your garage or basement. No experience needed. Build up a steady, repeat CASH business which will buy YOU a home or new car. Send coupon for FREE BOOK—"Money Making Facts." Time Payments available. No salesman will call.

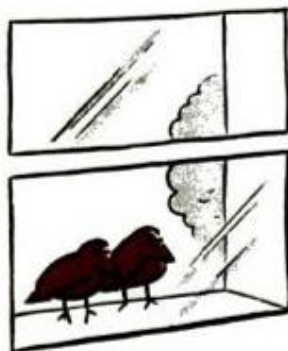


FOLEY MFG. CO., 116-0 Foley Bldg., Minneapolis 18, Minn.

Send Free Book "Money Making Facts" and Time Payment Plan.

Name \_\_\_\_\_

Address \_\_\_\_\_





## Command Performance- with **GRAVELLY** Power!

Gravelly does the jobs other tractors can't! The unmatched performance of the Gravelly Tractor gives you dependable POWER at your command to mechanize your lawn, garden and farm jobs.

POWER to plow deep and easy . . . perfect seeded in *one operation*. Change attachments, mow the toughest rough or the finest lawn. Choose from 30 job-proved, year-round tools!

NEW full-flow Oil Filter, NEW Power—now 6.6 HP—integral REVERSE, ALL-GEAR DRIVE. Optional Electric Starter, Riding or Steering Sulkies. Ask your authorized Gravelly Sales and Service Dealer for a FREE DEMONSTRATION. Or, write for FREE 24-page "Power vs Drudgery" Booklet today!



INSTALLMENT PLAN AVAILABLE

**GRAVELLY TRACTORS, INC.**

P.O. BOX 601-A DUNBAR, W. VA.



Mechanic's full-size  
all-steel

## TOOL CHEST

ONLY  
**\$25<sup>90</sup>**  
F.O.B.  
ST. PAUL



Here's a home workshop "buy"—the nation's largest full-sized chest! It's heavy duty with 4 big compound-glide drawers—built-in lock—26" x 12½" x 12¼". Baked-on blue-grey finish is grease resistant. Your money back if not satisfied. Protect your tools . . . order now!

**PORTA-CAB** deluxe tool chest on wheels. Cork linings protect tool finish—extra-deep drawer for power tools. Work-table top. Write for free bulletin and price list describing this and 15 other models.



(Huot rhymes with "do it")

**HUOT MFG. CO.**

555 No. Wheeler St., St. Paul 4, Minn.

At this stage the cabin roof is water-proofed with glass-fiber cloth laid in a wet coat of polyester resin and then topped with another. The cloth is turned down about 1 in. all around the roof and turned up at the hatch coaming. While the resin is still tacky the raw edges of the glass-fiber cloth on the coaming are covered with ½-in.-thick doubler strips. The raw edges of the cloth at the roof line are concealed with 1-in. half-round molding. The glass-fiber covering is eventually painted.

The cover for the hatch is designed to slide forward to open which means that the wide member aft must be a little less in length than the width of the door cutout. Cross cleats on the underside of the hatch cover ride on the hatch coaming. Fig. 27 details the cover. Like the cabin roof, it, too, is covered with glass-fiber cloth and trimmed with half-round molding. Hooks may be used to lock the hatch cover from the inside. Knee braces applied to the inside will strengthen the rear member of the cover. This member, incidentally, should be wide enough to align with the lower edge of the outer clamp member when the hatch cover is in the closed position.

(Continued next month)



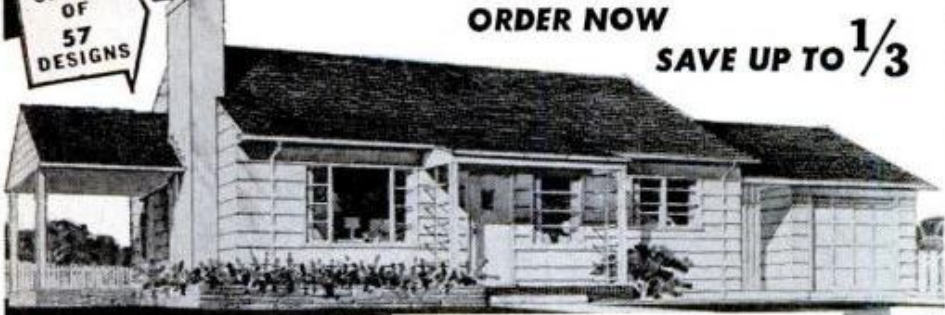
## Army Adopts Scuba Unit

No tell-tale bubbles reveal a diver's position with a new self-contained scuba unit developed by Dr. Christian J. Lambertson and Army Research Engineers. The unit uses an oxygen supply through a re-breathing system which chemically absorbs exhaled carbon dioxide; the oxygen and chemical supply will last about two hours at a moderate work rate. The lung is designed for self-contained diving to 25 feet, and can be converted for static diving to 60 feet by switching to compressed air with an air feeder hose and compressor. The entire unit, including lead weights for the average diver, weighs 96 pounds.

# CUT-TO-FIT HOMES CUT BUILDING COSTS

CHOICE OF 57 DESIGNS

ORDER NOW  
SAVE UP TO 1/3



Build your own home and save the builders' profit — plus savings in lumber and labor with Sterling Ready-Cut-Homes. Anyone can assemble with simple, easy to follow plans furnished. Every house complete with all lumber, roofing, nails, glass, hardware, paint, doors and windows marked ready to erect. Freight paid. Complete building plans ready for filing at low cost. Sold separately if desired. Write today!

PRICED FROM \$2150 UP  
Five Easy Payment Plans  
Send 25c for NEW COLOR CATALOG

INTERNATIONAL MILL AND TIMBER CO.  
DEPT. PM10 .. BAY CITY, MICHIGAN

## ARCO ROUTER-DRILL

Saws • Drills  
Routs • Files

Fits any Elect. Drill. Cuts own starting hole and any shape in any direction tool is moved. Cuts plywood, lumber, formica, non-ferrous metals, thin sheet steel. Send check. M.O.—ppd. No COD

Order today on our 20-day Money Back Guarantee.

**\$1.39**

ARCO ARROW METAL PRODUCTS CO.  
Dept. PM-1, 421 W. 203rd St., N.Y. 34, N.Y.

## Print Your Own

Cards, Stationery, Advertising, Circulars, labels, photo and movie titles, church work, tags, etc. Save money. Sold direct from factory only. Raised printing like engraving, too.

**Own a Printing Business**

Print for Others, Good Profit. Have home shop. Junior press \$15; Senior \$29 up. We supply everything. Easy rules. Pays for self in short time. Write for free catalog of outfits and all details.

**KELSEY PRESSES, C-37 Meriden, Conn.**

## GET THE HABIT OF READING OUR CLASSIFIED ADS.

Wonderful Opportunities      Amazing Bargains

## Jiffy SAWHORSE BRACKETS

NO NAILS NO SCREWS NO BOLTS

Now a sawhorse in a jiffy! Just use Jiffy Brackets and 2x4s. Sold by hdw. and bldg. supply stores everywhere, or order direct. \$1.95 A pair. Higher W. Coast

**GRAND HAVEN STAMPED PRODUCTS CO.**  
Grand Haven, Mich.

## KING MIDGET

**FOR 1960**

More aluminum, lighter weight, better performance, beautiful styling. Still Worlds Lowest Priced Car. Drive it for 75c a week. Rider Agents Wanted. If no dealer near you send 25c for 32 page picture book, full details, dealer price. Or send \$1 (refunded first order) for this and Service Manual plus Repair Manual and 15 5 x 7 photos of car and factory.

**MIDGET MOTORS CORPORATION, ATHENS 1, OHIO**

## 4 SIMPLE, EASY-TO-USE WAY WELDER

only 14.75 F.O.B.

ANYONE CAN WELD, BRAZE, SOLDER, CUT, HEAT MOST ANY METAL WITHOUT EXPERIENCE

Over 200,000 in use in homes, garages, farms, shops, factories everywhere. Save money—earn money, making and repairing auto bodies and parts, fenders, furniture and railings, farm equipment, machinery, lawn mowers, toys. Does 1001 jobs on iron, steel, bronze, brass, aluminum, etc. Operates on any properly wired 110 AC or DC line.

**SEND ONLY \$3** Pay postman \$11.75 plus C.O.D. charges. Simple instructions included. Ideal lifetime gift for hobbyist, mechanic, hot rodder, homeowner. Order direct on 10-day money back guarantee or write for literature FREE.

**FOUR WAY WELDER CO., Dept. F2-A**  
1810 S. Federal St. Chicago 16, Ill.

## Special Offer 25¢

Hear these authentic recordings of dramatic events from

**"The Amazing World of Short Wave Listening"**

narrated by Alex Dreier, Radio-TV "Man on the Go"

- President's voice from outer space!
- Actual capture of a desperate criminal!
- Radio amateur at Little America!
- Ships at sea . . . aircraft in action!

**S-38E receiver \$59.95**

3 short wave bands plus standard broadcast. Built-in speaker, headset output.

**hallicrafters...**  
DEPT. 14, CHICAGO 11, ILL.

Gentlemen: Please rush by return mail my recording, "The Amazing World of Short Wave Listening." I enclose 25¢.

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_

MAIL COUPON TODAY!

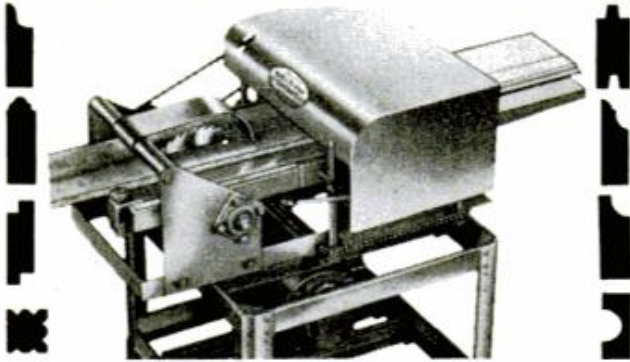
SAWS

PLANES

MOLDS



## NEW BELSAW MULTI-DUTY POWER TOOL



Now you can use this ONE power-feed shop to turn rough lumber into high-value moldings, trim, flooring, furniture ... ALL popular patterns.

### RIP... PLANE... MOLD...

separately or all at once by power-feed ... with a one horsepower motor. Use 3 to 5 HP for high speed commercial output.

### FULLY SAFE-GUARDED,

Low Cost... You can own this money-making power tool for only \$30.00 down payment.

Write TODAY for free Catalog

**BELSAW POWER TOOLS** • 900 Field Bldg., Kansas City 11, Mo.

## SURE CURE FOR EXHAUST LEAKS

**New Magic MUFFLER SEALER**

- SEALS NEW — REPAIRS OLD — MUFFLERS AND PIPES
- HEAT-PROOF — PERMANENT
- EASY TO USE — JUST SQUEEZE THE PLASTIC TUBE
- MAKES FASTER, EASIER INSTALLATIONS
- MAKES EVERY CONNECTION A PERFECT FIT!
- PREVENTS RUSTED CONNECTIONS
- MENDS HOLES AND BURST SEAMS LIKE NEW!
- WORKS LIKE PUTTY — DRIES HARD AS METAL

SEALS NEW — REPAIRS OLD MUFFLERS AND PIPES

\$1.00 for large 6 oz. tube at leading Auto Supply Stores or send \$1.00 direct to:

**MAGIC IRON CEMENT CO., INC.** 5400 Bower Avenue  
Cleveland 27, Ohio

## Early American Clock

(Continued from page 221)

rocker use tool steel, file to the shape indicated, finish the pallets with a fine oilstone and then harden. Oilstone the pallets again after hardening to make sure that the surfaces which contact the escape wheel are glass-smooth.

The pendulum rod, Fig. 39, the pendulum weight (which consists of the lead weight and the brass facing assembled), and the bob wire, Fig. 40, are available readymade. The original weight is  $2\frac{1}{8}$  in. in diameter and if it is purchased its weight and diameter should be specified. The pendulum hanger, upper left-hand detail in Fig. 39, you make yourself from brass. It is fitted into a mortise cut in the front plate, the location of the hanger being shown on the movement-plate template in Part I.

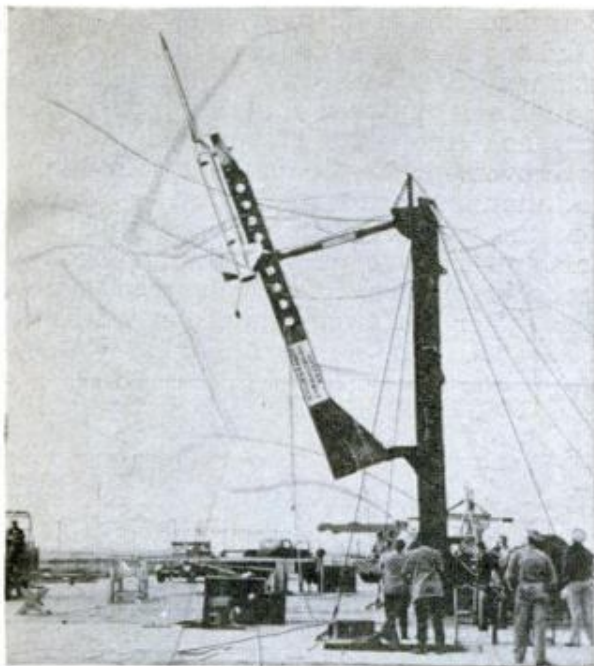
Suitable hour and minute hands similar to those detailed in Fig. 41 also are available readymade. They may require individual fitting to the hand post.

The strike detents, parts S-6 and S-7 in Fig. 35, and the striker, part S-8 in Fig. 36, are quite easy to make. Use the same hardwood for the turned spindles that you used for the gear spindles of the time and strike trains. The final parts to be made are the fly fan, part S-5, Fig. 46, and the cam segments which are fitted on one face of the gear wheel, S-3 in Fig. 46, and are glued and bradded in place as indicated. The fly fan is made from softwood, such as basswood, and is held in place on its spindle by a short length of spring wire which engages a groove cut in the spindle at the time it is turned. Note that the fly-fan spindle carries a pinion which, in assembly, is driven by the gear S-4, Fig. 46. The purpose of the fly fan is to control the speed of the strike train.

The pin on one face of the gear wheel S-4, Fig. 46, engages detent C of the part S-7, Fig. 35, when the strike train is inoperative. After a striking sequence has been completed and the detent B, part S-7, Fig. 35, drops into a notch on the count wheel, the detent C drops into a position in line with the sweep of the pin on the rotating wheel S-4. In this position detent C engages the pin and stops the strike train.

When assembling the movement, mount the gears of both trains on the back plate as in Fig. 29, including the detents S-6 and S-7 and the striker S-8. In assembling the detents, the lever of S-6 is placed under lever A of the part S-7. When placing the striker, S-8, the rebound spring is pulled down to contact the flat on the striker spindle. See Fig. 36 and the note in Fig. 45.

(Continued to page 280)



## Shoot "Sodium Cloud" Rockets From Suspension Launchers

Current "sodium cloud" rocket firings being conducted by the National Aeronautics and Space Administration at Wallops Island, Va., mark the first use of zero-length suspension-type launchers with ASPAN (ASP with NIKE booster) rockets. Only the NIKE booster — suspended beneath the launching rail — is supported by the launcher while the solid-propellant second-stage rocket is held atop it with a coupling. The launcher operates like a crane, speeding and simplifying the handling of rockets. Purpose of the firings is to determine wind direction and velocity over the rocket's range and to measure the rate at which matter disperses in the upper atmosphere. A spectacular yellow-orange sodium-vapor cloud released during the first firing of the series began at an altitude of 50 miles and stretched upward 145 miles.



## G E A R S

**In Stock — Immediate Delivery**  
Gears, speed reducers, sprockets, thrust bearings, flexible couplings, pulleys, etc. A complete line is carried in our Chicago stock. Can also quote on special gears of any kind. Send in your blueprints and inquiries.

**Send for Complete Catalog No. 10 CHICAGO GEAR WORKS**  
440-50 N. Oakley Blvd., CHICAGO 12, ILL.

## Start a profitable business of your own

**easy-to own!**

**NEW SHOP TYPE WELDER**—The 180 amp. "Hustler" welds, cuts, burns holes, hard-surfaces, and heats metal for bending and forming. It's a complete welding package — including accessories, and meets REA requirements.



Get complete information...no obligation! →



## ...there's BIG MONEY in arc welding

**NEW COMBINATION WELDER**—The 200 amp. "Power/Weld" furnishes DC current for welding and simultaneously provides 110/220 v. AC power for running tools, pumps, lights, sprays, etc. Can also be used as an emergency power source.

**for outside or shop use.**

**HOBART BROS. CO., Box M-10 TROY, OHIO, Ph. FE 2-1223**

# FIBERGLASS or PLYWOOD

50 Models  
8—18 Ft.

**FACTORY-DIRECT PRICES**  
**FREIGHT Paid to You**



**18 FT. CRUISERS, 8 Models: from \$379**



12, 14, 16, 18 ft. runabouts, ski-models, convertibles, utilities: \$114 up. 8, 10, 12, 14, 16, 18 ft. racing, fishing, utilities: \$41.95 up.

**FIBERGLASS 14 & 16 ft. From \$299 (at right)**

Interlocking units (lower right photo) snap together, bond into 1-piece boat easily assembled in one evening.



**FIBERGLASS 14 ft. Sail Boat \$299 with sail**



Luger's preformed preassembled units are easily assembled by anyone. Equal factory-built yet save 1/2 to 3/4. FREE catalog has all details, trailers, accessories, paint, Fiberglass supplies.

**MONEY-BACK GUARANTEE EASY TERMS 1/4 DOWN**

**SEND FOR FREE COLOR CATALOG**

# LUGER BOAT KITS

Dept. B-1, 9200 Access Rd., Minneapolis 20, Minn.

## FOCUS YOUR EYE on BENJAMIN

SMOOTH BORE BB OR RIFLED 22—AIR OR GAS GUNS—ROUND LEAD AMMO EFFECTIVE UP TO 100 FT.

## AMAZING NEW Line of REPEATERS

WITH THE LATEST IMPROVEMENT IN FAST, SURE, GRAVITY LOADING ACTION AND

**PIGGY-BACK SHOT MAGAZINE**

A Shot is placed in Firing Position each time Bolt is Pulled Back and Closed. Flash Ammo Count on Full View Magazine.



No. 3600 BENJAMIN Super 100 Shot BB Gas Rifle. Non-Toxic—Safe—Convenient—Uniform Hi-Velocity Power. —  
No. 3620 BENJAMIN Super 85 Shot Cal. 22 Gas Rifle . . . \$20.95  
No. 3100 Super 100 Shot BB Air Rifle. Adj. Shooting Force \$23.95  
No. 3120 BENJAMIN Super 85 Shot Cal. 22 Air Rifle . . . \$25.95

No. 1320 BENJAMIN 35-Shot Cal. 22 Air Pistol \$24.50

**FREE** Catalog All Models Benjamin Single Shot & Repeaters—Cal. BB or 177 or 22. Also, Special Hunting & Fishing Knife Offer.  
**BENJAMIN AIR RIFLE CO., 896 MARION ST., ST. LOUIS 4, MO.**

\$18.95



## NOW — A MAJOR BREAK-THROUGH IN DISTRIBUTOR POINT DESIGN

Wake up your auto ignition system—give new life to your car or truck with the sensationally new and long lasting JORIN TRIPLE-CONTACT\* DISTRIBUTOR POINTS. Get peak performance—faster starting, faster acceleration, smoother high speeds and smoother idling. Increase gasoline mileage and cut down crank case dilution.



No change necessary in  
Distributor Plate or Condenser

JORIN POINTS' round contact surfaces slide together smoothly, prevent point bounce—no bounce, no burn! No other points have the new, unique, fully tested and proved better JORIN Action! Self-aligning, self-cleaning, self-ventilating! Five times longer point life is not unusual, saves money, time and delivers maximum ignition system efficiency!

You'll actually feel the difference the minute you touch the accelerator. There's an instant surge of power, a power you've never felt before.

If your garage or auto dealer can't supply you, send only \$3.50 postage paid (1956-59 General Motors Cars \$4.50).

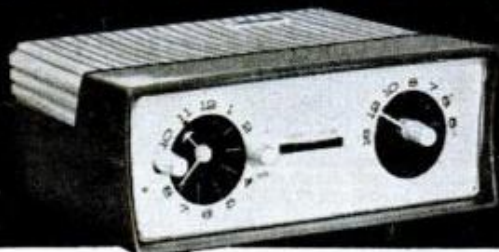
**MONEY BACK GUARANTEE** if not satisfied after 10 days use.

**F. E. WOOL, DISTRIBUTOR**

109 Williams Street, Williamsport, Penna.

\*U.S. & Canadian Patents Pending

## new FROM HEATHKIT® transistor clock radio



**EASY TO ASSEMBLE . . . COMPLETELY PORTABLE  
. . . UP TO 500 HOURS ON BATTERIES**

Take it with you . . . on trips, to the beach, in a boat . . . Nothing to plug-in, just goes and goes on inexpensive batteries. Lulls you to sleep, wakes you up, tells time and plays all day long. Leather carrying case available. **ONLY \$45.95.**



**HEATH COMPANY**

Benton Harbor 17, Michigan

a subsidiary of Daystrom, Inc.

Send the latest Free Heathkit Catalog.

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

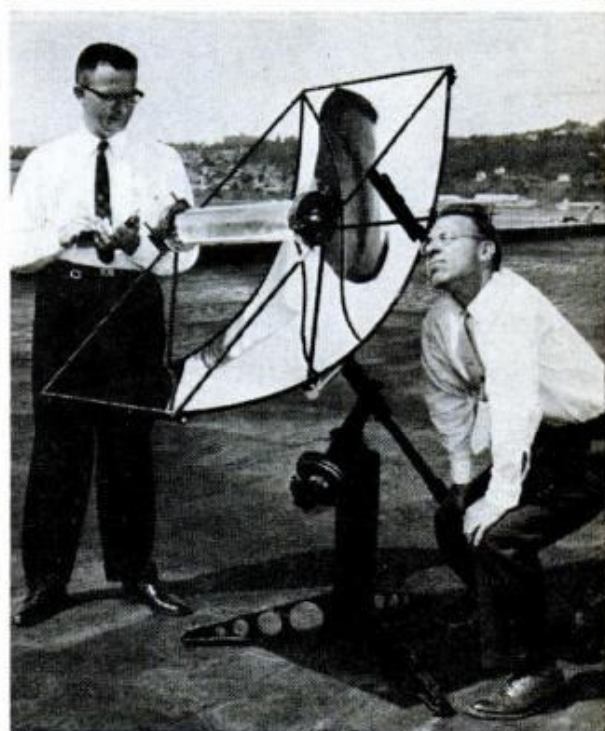
CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

Note: Price subject to change without notice.

280

Then place the front plate over the posts at the top and work the spindles into the bushings. Small hardwood pins passing through holes in the shouldered ends of the posts hold the plate in position. Mount the movement in the case and fit dial, pendulum and hands and attach the cords from the winding drums to the weights. Finish all exposed parts of the mahogany case in the natural color of the wood with filler, sealer and two coats of flat varnish.

★ ★ ★



Boeing Airplane Company photo

## Electricity Made by Sunlight May Power Spaceman's Radio

Two engineers have proposed that a three-pound thermoelectric generator be used as an auxiliary source of power for spacemen on missions taking months or years to complete. Niles F. Schuh and Ralph Tallent say the generator is capable of converting energy from the sun into 2.5 watts of power—enough to operate a radio broadcasting a strong signal back to earth. The Westinghouse generator has a 20 by 50-inch aluminum sheet mounted in a semi-cylindrical shape to collect sunlight and concentrate its heat on thermoelectric material—in this case, two different metals which generate electricity in a closed circuit so long as the junctions of the metals are maintained at different temperatures. A mechanical problem connected with using the generator in space, and one they believe can be solved, is that the collector must have a large surface plate which can be collapsed during the ascent through dense air, and extended in space.

POPULAR MECHANICS

## GUNK-it-yourself!

Gunk® G.P. removes grease from engines or concrete floors; cleans paint brushes, power mowers, or machinery completely, economically, safely. It's ready-to-use, rinses off with water, won't clog drains. Quart size with handy "Squirt Spout" top speeds application. Insist on the best degreaser—the original "GUNK" at better automotive supply and hardware retailers everywhere. © REG. TRADE MARK.



**GUNK CHICAGO CO.**, River Forest, Illinois  
serving the Midwest and Southwest  
**RADIATOR SPECIALTY CO.**, Charlotte, No. Carolina  
serving the East, Southeast and far West

**Tremendous Savings on Hundreds of Surplus and Newly Manufactured Items!**

Equipment for farm, home, work-shop, factory. Hydraulic equipment, pumps, motors, construction and diesel equipment and parts, etc. Write for FREE Catalog today!

**GROBAN SUPPLY CO.**

1139 S. Wabash Ave., Dept. PM1, Chicago 5, Ill. WE 9-3793

## WATERBURY FOR TILLING PLOWING MOWING

A FULL LINE 3 to 9 HP  
2 WHEEL • 4 WHEEL

FREE CATALOG • LOW PRICES • DEALERS WANTED

Many attachments available

**WATERBURY**  
Box 2734-D, Milwaukee, Wis.



**WHAT TO DO  
UNTIL THE  
FIREMEN  
COME**

Read this special  
article in the  
**FEBRUARY**  
issue and make  
your home safe

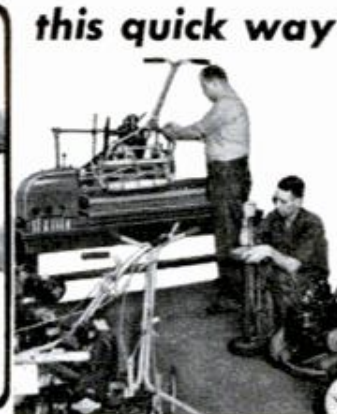
JANUARY 1960

## START A BUSINESS this quick way



### FOR ROTARY POWER MOWER BLADES

The Foley 314 Grinder puts a perfect cutting edge on all rotary power mower blades.



## with these 2 machines you can sharpen ALL HAND AND POWER LAWN MOWERS

Here's a business you can start in spare time, and begin to make a CASH PROFIT right away. The Foley Lawn Mower Sharpener handles up to 3 or 4 reel type mowers per hour. Prices run \$2.00 to \$3.00 for hand mowers, \$5.00 to \$8.00 for power mowers. You get 99c profit out of each dollar.

With the Foley Grinder you can sharpen rotary power mower blades, rip, cross-cut and combination circular saws, dado heads, ice skates, knives, scissors, shears, all sharp-edged tools.



**FREE PLAN** tells how to put yourself right into a home business that will pay you \$3 to \$6 an hour. Send coupon today for **FREE BOOK** on how to sharpen power mowers and Special Combination Money Saving Offer. No obligation—no salesman will call.

**FOLEY MFG. CO.**, 107-8 Foley Bldg., Minneapolis 18, Minn.

Send Free Plan on lawn mower business and Special Combination Offer.

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

Rare, Fancy & Imported Woods... Veneers... Plywoods  
Mouldings... Patterns... Hardware... Mosaic Tile  
Ornaments... Tools... Archery and Skiing Supplies

## Everything You Need in Craftsman's New and Home WOOD Workshop CATALOG

Get Yours! Rush Coupon Today!

132 pages



OVER  
1,500  
ITEMS

**NEW—MOSAIC TILE PROJECTS!**

World's Largest Selection of Finest Domestic and Imported Woods . . . .

Mouldings, Hardware, Tools—ALL AT LOW MONEY-SAVING PRICES!

Your complete wood buying guide and project book. Craftsman is your best, most complete source

of finest kiln-dried domestic and imported woods, beautiful wood inlays, colorful bandings, matched

plywoods, embossed mouldings, carved ornaments, newest wood-

working tools, "hard-to-find" cabinet hardware; more than 1,500 items! Packed with newest

scroll saw patterns, project ideas and money making plans. Enclose 25c (refunded with first order) to help pay mailing and handling cost. Write TODAY to

**CRAFTSMAN WOOD SERVICE CO.**,

Dept. A-1 2729 S. Mary St., Chicago 8

**CRAFTSMAN WOOD SERVICE CO.**, Dept. A-1

2729 S. Mary Street, Chicago 8, Ill.

Enclosed find 25c. Rush new CRAFTSMAN WOOD CATALOG.

NAME \_\_\_\_\_

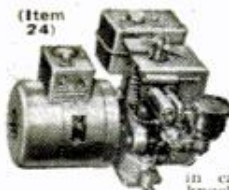
ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_

ZONE \_\_\_\_\_

STATE \_\_\_\_\_

281



### 700 Watt Light Plant PUSH BUTTON START

115 v. 60 cyc. AC Powered by a rugged 2.2 HP, easy starting Briggs engine. No wiring necessary—just plug in and operate. Plenty of current for any oil burner, freezer, brooder, emergency lights, etc. which require up to 700 watts. Ideal for television and radios. Complete with voltmeter and built-in winding to charge 6 v. auto batteries. (Item 24) Wt. 75 lbs. Easily fits in car trunk. Be prepared if storm knocks out power lines. Reg. \$275... **\$143.50**

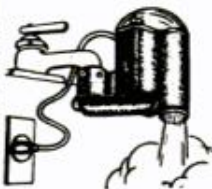
**1200 Watt Plant** (Item 45) same as Item 24 but larger generator and engine with 50% greater output... **\$199.50**

**ELECTRONIC BRAIN** Now Available On All Our Plants Up To 100,000 Watts!

Allows plant to saunter along at a thrifty idle till electricity is called for. Then instantly... automatically, plant comes up to full speed with a steady 115 volts of power. When demand stops, the BRAIN returns plant back to that same thrifty idle. Saves gas, doubles engine life! If BRAIN desired, specify & add 3 lb. and \$35 to plant price.

### FAUCET WATER HEATER

Instant hot water for just pennies—You just slip MASTER MECHANIC'S new Faucet Water Heater over any faucet—plug it in a wall outlet and you've got steaming hot water instantly for dishes, shaving, washing baby's bottle, etc. Simple and safe—operates on ordinary 110 v. house current—costs only 2 1/2 cents per hour for hot water. Ideal for homes, shops, cabins, trailers, etc. Easily regulated from lukewarm to full hot. Fully guaranteed. (Item 408) Wt. 2 lbs. **Factory price \$4.95**



### HEAVY DUTY D-C ARC WELDER

Use as portable or shop welder. Up to 300 amps, Senior model. Made for years of trouble-free, continuous service. Will handle light or heavy jobs. Easily welds up to 3/4" plate using 1/4" rods. Built-in air cooling system. Arc is easy to strike and hold, because of specially designed arc stabilizer. Hi-lo switch and dial control gives wide range of welding heats. Run welder at 2600 rpm. with tractor, jeep or 15 hp. gas engine, or 7 hp. elec. motor and triple V belt or flat pulley. You can pay more, but you can't buy a better weld. **\$119.50** or. Wt. 110 lbs. \$400.00 value.

**WELDING KIT.** Two 10 ft. leads, welding helmet, electrode holder, ground clamp. Sold only with welder at... **\$10.50**

Send 10c for 100 page Catalog—FREE with order. Prices f.o.b. factory—Send check or M.O.

**MASTER MECHANIC MFG. CO., Dept. A-16 Burlington, Wis.**  
Southern Customers Order from Dept. A-16, Box 65, Sarasota, Florida

## Shop PM Ads for Exciting Direct-Mail Offers

**NOW**

VOLKSWAGEN  
RENAULT  
ENGLISH FORD  
METROPOLITAN  
and many others.



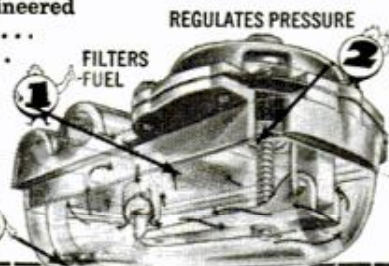
**SPECIAL**

# MILESMASTER 1.5

Enjoy all the famous regulation and filtration action features of Milesmaster—the genuine Fuel Pressure Regulator... Now, specially engineered for European engines... no increase in price...

provides smooth throttle through gears. Stops stalling, flooding, vapor lock and rough idling.

TRAPS METALLIC ABRASIVES



Take this coupon to your dealer— if he can't supply send order to...

**MILESMASTER, INC., Dept. 105, 1550 E. 74th Place, Chicago 19, Ill.**

**MONEY BACK \$6.95 GUARANTEE** complete with fittings

## Building an Equipment Cabinet

(Continued from page 246)

the cables of the various interconnected components can be passed. Finally, you may want to "panel mount" the tuner and amplifier in the center compartment, though these components could be installed merely by setting one on top of the other.

But there are instances where the equipment cabinet becomes more than a mere housing for the electronic components. In cases where a loudspeaker is to be mounted in the main cabinet, the design of the speaker compartment can have as great an influence on the quality of the overall sound as that of any other component.

Normally, the installation of the speaker in the same cabinet with other electronic components is frowned upon by the confirmed audiophile. Small speakers in limited-size enclosures, it is argued, can not reproduce the lowest bass tones with the same efficiency as their larger counterparts. Further, vibrations set up within a speaker enclosure could adversely affect the performance of the record player and other components mounted in a common cabinet. But these arguments are only partly valid.

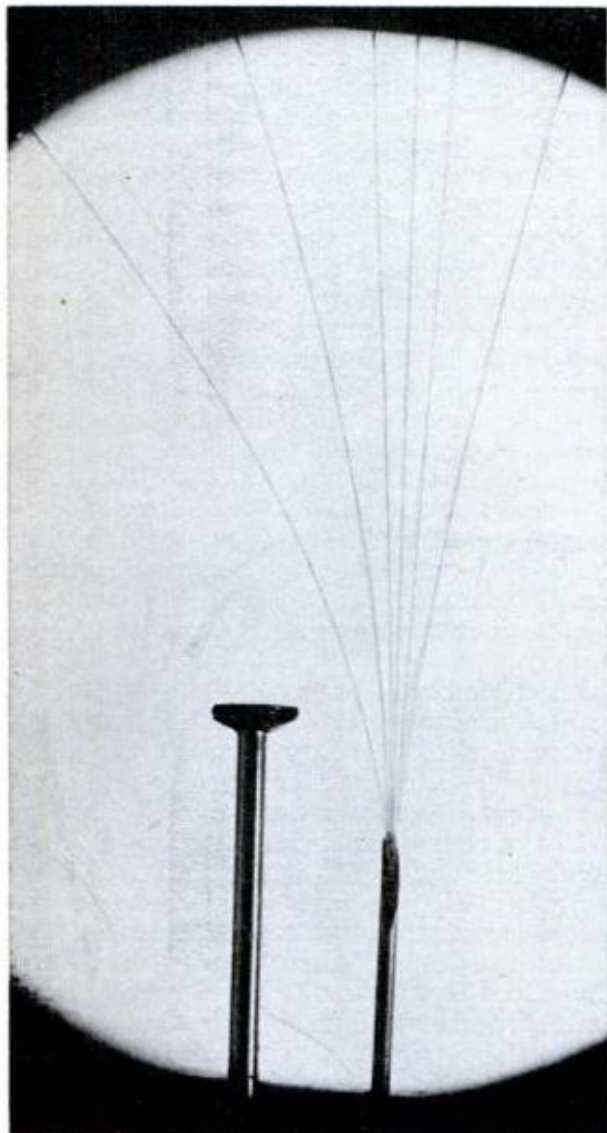
Today it is possible to buy speakers especially designed for small enclosures, and some of the so-called "bookshelf" systems are among the most highly rated units in the field. The problems of interaction between speaker and other parts usually can be resolved by careful isolation. While a separate speaker enclosure is definitely preferable, where space is a factor a built-in speaker can give excellent results.

The storage compartment of the cabinet, behind one of the lower drop doors, has ample volume for adequate housing of 8", 10" or 12" speakers. The installation of a complete monophonic speaker system will, of course change the appearance of the cabinet to some extent. Since such speakers must radiate outward into the living room, the speakers are front-mounted on the panel which, in turn, must be covered with grille cloth to protect the speaker cone. Though the adjacent storage compartment is not altered, it is probably best, from an appearance standpoint, to carry the grille-cloth pattern to the adjacent door as well, framing the edges with a suitable molding or trim.

For stereo it is possible to use a system whereby only the low frequencies are produced by the speaker in the cabinet. The high frequencies, together with the stereo information, can be reproduced by two



small, wall-mounted speakers, one on either side of the main cabinet. In such cases it is possible to mount the low-frequency speaker in the bottom of the compartment, facing the floor, so that the appearance of the cabinet need not be altered. Speaker systems, including construction data, will be discussed more thoroughly in next month's issue. ★ ★ ★



### Smaller-Than-Hair Tubing Strains Helium From Gas

Fused quartz microtubing so small in diameter that six lengths fit into an ordinary hypodermic needle (compared above with a pinhead) is playing a big role in a new process for obtaining rare helium gas. The general method of separating helium from natural gas requires huge plants to liquefy the gases. Using the tiny tubing, the new process can take place in a chamber about three feet long and 1½ inches in diameter. The capillary process strains helium out through the tubes.

JANUARY 1960

## REVOLUTIONARY NEW DESIGN SAVES YOU \$20 TO \$40 4 1/8" JOINTER PLANER



NEVER BEFORE POSSIBLE AT SO LOW A PRICE

NOW ONLY \$19.95

(shipped complete as shown)

### SOLD DIRECT FROM FACTORY

Patents pending on revolutionary new engineering developments make this bargain possible. This is a power plane with all the features of machine tools costing 3 times OUR PRICE. It planes, rabbets, bevels, aids beveling and glueing joints; is so rugged and durable we guarantee it unconditionally for ten years.

### SEE THESE QUALITY FEATURES

All cast iron and steel construction • Balanced steel cutter head • Hardened and ground knives • Precision ground cast iron tables • Rugged cast iron base • Table depth adjustable 0" to 3/8" • Cast fence with single action cam lock • Pat. lift-off aluminum guard • Big, full size—22" long • Shp. wt. 25 lbs.

Order By Mail — Sold Direct From Factory to You  
OUR 30TH YEAR SEND \$19.95 CHECK OR M.O.  
SEND C.O.D. WITH \$3.00 DEPOSIT  
(If not completely satisfied after ten days return for full refund.) Shipped express collect.

AMERICAN MACHINE & TOOL CO., INC.  
ROYERSFORD 78, PENNSYLVANIA



**YOU** NEED THIS

## FREE GIANT 1960 B-A CATALOG



204 KING-SIZED PAGES

EVERYTHING IN RADIO TV AND ELECTRONICS

100'S OF NEW ITEMS LISTED HERE FOR 1st TIME

21 PAGES OF BARGAINS NOT IN ANY OTHER CATALOG

### BURSTEIN-APPLEBEE CO.

Dept. PM, 1012 McGee St., Kansas City 6, Mo.

Send Free 1960 B-A Catalog No. 601.

Name.....

Address.....

City..... State.....

SEND FOR IT TODAY

## Parade of Cars

(Continued from page 151)

for the continued jump in sales of imported cars (double the 1958 total), with Volkswagen and Renault selling about a third of the total, the other 50 makes sharing the other two-thirds.

Will these import sales hold up in the face of the compacts? To this writer, at least, it seems that they will. These new American cars are not so competitive with the high-volume imports as many think. They are nowhere near as economical, or as nimble, or as fun-to-drive. Those buyers who insist on these attributes will still buy foreign.

The smaller the average American car becomes (and the compacts have shortened the average American car from 209.1 inches over-all in 1959 to 207.5 inches in 1960), the more acceptable, the less "foreign," the imports become. Next year's additional compacts (such as the Comet to be sold by Mercury dealers this spring) will reduce average American-car length even more.

Engineering achievements of the year (and it has been a great year for the slide-rule boys) include the rear-engine, air-cooled Corvair, the slanted inline six of the Valiant, the sudden emergence of unit bodies in every company except Studebaker-Packard, the start of the era of aluminum engines (and wheels, too), and the continuing trend toward lower horsepower, increased economy. Engines will continue to get smaller—the days of the mammoth V8 are numbered. Smaller, more efficient V8s are on the way.

Styling advances include the none-too-soon demise of the wraparound windshield with its aggravating dogleg that bangs knees of the non-proficient. Every one of the new body shells introduced for 1960 is wrapless. A couple of years ago, the wrap was the badge of modernity. Now it's gone where the old clay models go.

Virtually dead also are such former must-haves as dual exhausts, continental spare tires, four-barrel carburetors and those other affectations of the must-be-first-away crowd.

Useful innovations survive. Such items as windshield washers are obviously here to stay. It is to the credit of the good sense of the public that those expensive and useless extra-cost items, ballyhooed as the latest and greatest, have vanished like the hula hoop. Even two-toning is becoming rare as the public moves toward more sobriety.

Time continues to take its toll. This year, the Edsel was laid to rest after two years of feeble struggle. It never did learn

to walk, spending its brief life at a crawl.

In the first year (1958 model), it sold 63,110 cars. Ford Motor Company's product planners had predicted it would sell at least 200,000. Second-year sales dropped to 44,819. Before the struggle ended on November 17, 1959, the 1960-model run had added up to 2809 Edsels.

Millions of dollars were lost in this venture, evidence of the fallibility of the product planners and motivators. It is likely that more man hours went into selecting the car's name, into choosing the precise shade of green for the dealers' signs, into setting up the introductory publicity, than into the engineering of the car itself. Here was the real tragedy.

But to turn to happier things. There are several lively births to report. The three new compacts, Corvair, Falcon and Valiant, plus the pseudo-new Dodge Dart (really a Plymouth in Dodge clothing), bring the total number of makes to 24 (of which all but the Corvette and the Studebaker Hawk are shown in the Parade of Cars).

Next year a few more new names will be added, but probably a few will be removed as public taste takes its toll.

Worthy of note also is the continued success of the Thunderbird, a success that far exceeds the dreams of its creators. So successful is it that you can expect to see competitors put out by other companies within a year or two.

Ford Motor Company has put all its car production under Ford Division, including production of Mercury and Lincoln cars. However, Lincoln-Mercury engineering and sales are still separate.

Chrysler has all car production under a single leadership (as well as all engineering) and the separate divisions are more sales organizations than anything else.

General Motors alone retains the sharp divisional setup and, being biggest and richest, perhaps alone can afford it. But its Fisher Body division, which builds all GM bodies, gives a similar advantage.

What will more centralization mean? It means that cars in the future may tend to become more and more alike mechanically with the various car names denoting differences in body style and function rather than differences in social level or luxury.

Thus, for instance, Mercury might sell all Ford Motor Company's station wagons and nothing else. De Soto might sell all Chrysler Corporation's convertibles, Buick might sell all GM's highway cruisers.

All this, of course, is speculation, but there is more fluidity, less certainty in the industry today than ever in its history and from these shifting sands many changes will certainly result.

Finally, any roundup of the year wouldn't be complete without a mention of the extended steel strike which forced all producers to curtail production and, in some cases, to shut down entirely. What effect this will have on the relative sales of the various makes is unknown right now. What this will do to the course of the industry is a big question because the pattern of sales in this, the test year of the compact cars, may determine the future course of the industry for many years to come.

If nothing else, the steel strike will reintroduce a sales technique that hasn't been used since shortly after World War II — "we've got immediate delivery."

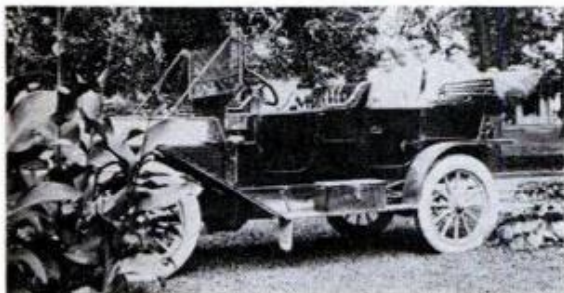
Cars that are available will sell, those that aren't, obviously won't. Let's hope the one you plan to buy is. ★★★

### Deodorants for Airports?

How do you keep airports smelling anything like a rose when jet planes blast the odor of kerosene all over the place? That's one problem of the jet-age, says Thomas M. Sullivan, deputy director of aviation for the New York Port Authority, operator of New York International (Idlewild) Airport. There also are problems of noise, destructive blasts at takeoffs and storing huge quantities of fuel. Until someone finds a better solution, Sullivan says the odor must be dissipated by extensive air-conditioning and ventilating systems in terminals and hangars. Idlewild has tried to contain noise since it began handling jets in October, 1958. Half the takeoffs are routed over water, for example. But shrieks still slash the area. Sullivan suggests that more efficient engine design, use of suppressors, and accelerated takeoffs that get planes quickly upstairs can minimize the problem.

### Do You Know This Old-Timer?

(answer to quiz, page 16)



**1909 EMF**

JANUARY 1960



**LUFKIN**

new leader in  
precision tools

### Only Lufkin offers you a decimal radius gage

It is designed to save you time and effort . . . to give you greater accuracy with readings from 0.10 to 1.000, and no burrs to throw you off.

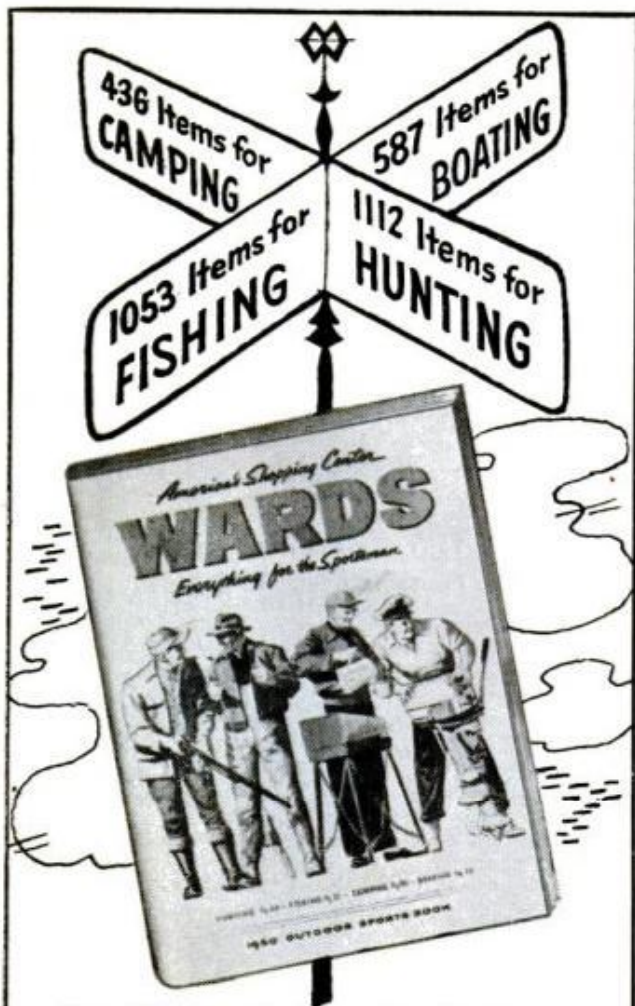
**Hardened stainless steel** blades, for a lifetime of accurate service. Holder for this No. 75 gage is 4½" long, reaches into small, out-of-the-way places. Adjusts over 180° arc, keeps blade edge perpendicular to surface measured.

Durable vinyl case holds blades in individual pockets, makes selection easy.

**YOUR INDUSTRIAL DISTRIBUTOR**  
is the man to see for Lufkin precision  
tools. Lufkin, Saginaw, Michigan.



285



Over 3000 wonderful and exciting items for the sportsman in Ward's FREE 1960 Outdoor Sports Book. 128 pages filled with everything for hunting, fishing, camping, and boating. See these NEW items: Electronic Fish Finder, All-in-one Camp Kitchen, Seascope, Surf Sailers . . . and many more.

Make your selections the easy way . . . from Ward's new catalog. Everything guaranteed. Use your credit . . . charge it or pay by the month. Mail coupon below or see nearest Ward Retail or Catalog Store.

## SEND NOW...IT'S FREE!

Mail to: **Montgomery Ward, Dept. PM6-1**  
in city nearest you.

Chicago 7, Ill.; Baltimore 32, Md.; Albany 1, N. Y.; St. Paul 1, Minn.; Denver 17, Colo.; Kansas City 23, Mo.; Portland 10, Ore.; Oakland 16, Calif.; Fort Worth 1, Tex.

Please send, without obligation, my FREE copy of Ward's big exciting 128-page 1960 Outdoor Sports Book, ready about Feb. 15.

NAME \_\_\_\_\_  
(Please PRINT Name and Address Plainly)

Street Address or Route and Box No. \_\_\_\_\_

POSTOFFICE \_\_\_\_\_ ZONE \_\_\_\_\_

STATE \_\_\_\_\_ PHONE \_\_\_\_\_

## Arkansas Farmers Harvest Rice and Fish

(Continued from page 141)

they look more appetizing than regular channel cat, but they skin out easier and have less throw-away."

In future years, "Anderson Golden Catfish" should become well known to anglers throughout the U. S.; fingerlings have been shipped to nurseries in all parts of the country. The first, and probably the largest crops, however, will be harvested from Arkansas fields.

Fish farming, like most new industries, has its problems. One is the "swimming weeds"—commercially useless green sunfish, that gobble up minnows intended for fattening fish. When they get mixed in a tub of minnows, they must be removed before they devour the whole shipment. With no selective "weedkiller" known, these pests have to be removed by hand, the oldest known method of weed control.

At least one would-be fish farmer has gone back to dirt farming. He was a gentleman farmer from Little Rock, who decided he'd get a chunk of the fish-farming profits, even though he'd never seen a catfish. He and his wife parked themselves on the end of a pier, determined to hook a specimen for study. When his wife landed a big one and plopped it beside him, he got a quick look at the spiny-faced fish, recoiled in fright, and fell off the end of the pier.

Other than this disturbance, the pond-fields of Arkansas are calmly giving the state economy a big boost—and their owners a growing profit. ★ ★ ★

## Self-Contained Fire Alarm Works on Flashlight Batteries

No bigger than a standard flashlight and powered by flashlight batteries, a self-contained fire alarm sounds a siren that can be heard over  $\frac{1}{2}$  of a mile when tripped by a temperature over 135 degrees. Made of aluminum, it is hung by a nail on any wall near the ceiling; rising heat will trip the alarm in time for occupants to escape from a burning home. Since it's battery-powered, no wiring is needed for installation anywhere.



Arandell Products Co., 3915 Powelton Ave., Philadelphia, Pa.

**WAR SURPLUS** AND OTHER **BARGAINS** **SAVE UP TO 90%**



**SOUTH WIND HEATER & ACCESSORIES**

Mfg. for govt. antarctic expeditions for jeeps and half-tracks. Heating unit puts out over 20,000 B.T.U.'s. Burns any type gas. 6 volt system. Dim: 8 1/4" W x 18 1/2" L x 9 3/4" H. Fuel consumption extremely low. 1 gal. per 8 hrs. Terrific for trucks, boats, tractors... farms, warehouses, ranches, boat houses, cabins, etc. Complete with service & installation manuals and over 360 components. Approx. GOVT. COST \$550. Shpg. wt. 120 lbs. gross. **NEW \$39.95.**

**DC JET GENERATOR ARC WELDING KIT** Complete with GE Type CM-77 Generator (30 volts D.C., 400 Amp., 3000 RPM up; ampere rating is for continuous duty, intermittent amperage is 500 to 600 amps.), also 2 rheostats, 1 voltage regulator, 1 voltmeter, 1 electrode holder, 2 ea. 25 ft. lengths No. 0 welding cable, 1 welder's mask, 1 toggle switch, 10 lb. vacuum packed 1/8 in. welding rods, pair welder's gloves & spline coupling. All units guaranteed pre-tested. Wt. 110 lbs. Approx. GOVT. COST \$700. All items, now only **\$64.50.**

\*G.E. Generator noted above can be purchased separately. Makes deluxe heavy-duty welder comparable to the finest commercial welders available. Wt. 90 lbs. Approximate GOVT. COST \$600. Gen. alone—**\$49.50.**



**BUILD YOUR OWN ARC WELDER, LIGHT PLANT OR BATTERY CHARGER \$37.50**

Kit incl. 1 Navy NEA-5 Gen. combination AC-DC type. AC 115 V. DC 24 V., 200-300 Amps. 2 complete generators in 1, yet no larger than reg. gen. Ideal for home, shop and farm lighting plants. Delivers 1200 Watts AC, DC side for charging batteries, welding and operating war surplus motors. Also in kit: 2 Voltage Regs., AC & DC, Reverse Current Relay, 30' New Welding Cable, 1 Ammeter, Rheostat, Electrode Holder, Toggle Switch, Welder's Shield, Wiring Diagram for kit. Wt. under 100 lbs. Approx. GOVT. COST \$650. Kit—**\$37.50.** Navy NEA-5 Gen. as above, purchased separately, **\$23.50.**



**DOUBLE-V SPLINE 3" PULLEY** For P-1, R-1, GE Gen. shown above. Heavy-duty machine-broached steel. Heavily constructed, will handle any job. Set screw locked. Shpg. Wt. 3 lbs. **NEW. \$5.95.**



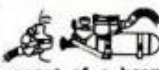
**BENDIX GEROTOR PUMP & MOTOR—NEW!**

Use wherever fluid pumping required. Excellent for hydraulic installations. Has 3/4" pipe connections built-in relief valve adjustable up to 1500 lbs. Max. cap. 6 GPM. 1 1/2 H.P., 24 V. motor. Use on 12 to 36 V. Approx. GOVT. COST \$350. **\$8.75.**



**OXYGEN BREATHING SUPPLY UNIT.**

Designed for the Air Force for high altitude flying, also ideal for medical purposes. Compact, portable; could save your life in the event of a heart or asthma attack. Complete with steel oxygen bottle, cylinder pressure gauge, demand type reg., oxygen flow blinker, 36" hose and face mask. Shpg. wt. 20 lbs. Tested, checked and filled. Approx. GOVT. COST \$250. **NEW. \$39.95.**



**ELECTRIC PUMP WITH CONTROL UNIT**

Runs on 12 or 24 V. Centrifugal type. Draws 5.2 AMPS. Has built-in removable filtering screen. Great for bilge, circulating or sump pump... bait tanks, etc. Pumps 500 GPH. Complete with on and off switch rheostat, 2 speeds (hi & lo). Mfd. by Ingersoll-Rand. Shpg. Wt. 7 lbs. Approx. GOVT. COST \$195. **NEW \$8.95.**

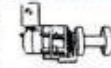


**SENSITIVE ALTIMETER** in 20 ft. increments. 0 to 35,000 ft. (inches of Mercury). Famous Pioneer. Tested & inspected in our own instrument lab. Guaranteed perfect. Approx. GOVT. COST \$150. Wt. 2 lbs. **\$13.95**



**ELECTRIC STORAGE BATTERY WINCH**

Powerful reduction gear, fully reversible, ball bearing, safety locking device. Will handle from a 1000 to more than 2000 lbs. pull. Use on 6, 8, 12, 24, 32 V. battery. Holds 50' of 1/4" cable. For tractors, boats, tow trucks, etc. Complete with mounting bracket for mounting in any position. Approx. GOVT. COST \$400. **NEW. \$46.50.**



**NEW 1960 CATALOG!** Tremendous catalog—our biggest ever—fully illustrated—1000s of bargains in war surplus & other items. Send 25c in coin for your copy today or free copy with order. Where ppd. indicated applies to US only. Other prices FOB Culver City, Cal. Send cash, check, money order. 50% dep. COD.



**AIRBORNE SALES CO., INC. DEPT. PM 160**  
8501 Stellar Drive, Culver City, Calif.

**MAKE HOME IMPROVEMENTS NOW**

Now!

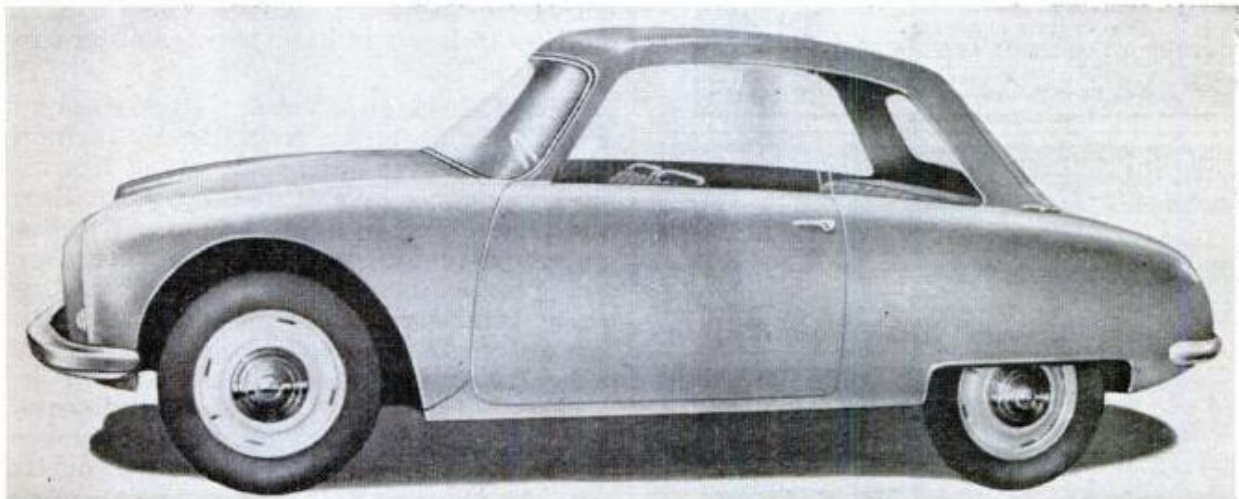
**TEST YOUR OWN** for filament breaks  
**TV & RADIO TUBES**



**All of Them — Even Picture Tube**

Nearly half of TV service calls are due to defective filaments. Tester shows if filaments are good. Insert tube in tester. Light shows if tube is burned out. Easy, safe to use. One service call saved pays for tester. Metal case, AC or DC. Checks fuses, appliances, etc. Only **\$3.98** ppd. or C.O.D. plus charges. Deluxe Model **\$4.98.** Instructions, Guaranteed.

**GEIGER ENGINEERING CORP., Dept. AB-113**  
6349 N. Western Ave., Chicago 45, Ill.



**World's Ugliest Car Gets a Beauty Treatment**  
*(for British Only)*

Without doubt the world's ugliest (and yet the most lovable) automobile is France's Citroen 2CV. The French love it so much they wait two years for delivery. But not the British. The car's angular lines with flat sheet metal that looks

homemade just doesn't appeal to them. So the British subsidiary of Citroen has brought out a plastic two-door hardtop body to replace the ugly duckling. Suspension, engine and drive are unchanged. The new model is called the Bijou.

## SAVE 75% ON RECONDITIONED HIGH SPEED DRILLS

### HIGH SPEED TAPER SHAFT DRILLS

WE GUARANTEE ALL DRILLS TO BE IN FIRST CLASS CONDITION WITH AT LEAST 60% OF ORIGINAL FLUTE LENGTH, SHARP AND READY TO GO. DRILLS SHIPPED POST PAID.

Size	Price	Size	Price	Size	Price	Size	Price
1/8" Dia.	\$1.99	1/2" Dia.	\$14.99	3/4" Dia.	\$19.99	1" Dia.	\$24.99
3/16" Dia.	\$2.49	5/8" Dia.	\$19.99	1 1/4" Dia.	\$29.99	1 1/2" Dia.	\$34.99
1/4" Dia.	\$2.99	3/4" Dia.	\$24.99	1 3/4" Dia.	\$39.99	2" Dia.	\$44.99
5/16" Dia.	\$3.49	1" Dia.	\$29.99	2 1/4" Dia.	\$49.99	2 1/2" Dia.	\$54.99
3/8" Dia.	\$3.99	1 1/4" Dia.	\$34.99	2 3/4" Dia.	\$59.99	3" Dia.	\$64.99
1/2" Dia.	\$4.99	1 3/4" Dia.	\$39.99	3 1/4" Dia.	\$69.99	3 1/2" Dia.	\$74.99
5/8" Dia.	\$5.99	2" Dia.	\$44.99	3 3/4" Dia.	\$79.99	4" Dia.	\$84.99
3/4" Dia.	\$6.99	2 1/4" Dia.	\$49.99	4 1/4" Dia.	\$89.99	4 1/2" Dia.	\$94.99
1" Dia.	\$7.99	2 3/4" Dia.	\$54.99	4 3/4" Dia.	\$99.99	5" Dia.	\$104.99
1 1/4" Dia.	\$8.99	3" Dia.	\$59.99	5 1/4" Dia.	\$109.99	5 1/2" Dia.	\$114.99
1 1/2" Dia.	\$9.99	3 1/4" Dia.	\$64.99	5 3/4" Dia.	\$119.99	6" Dia.	\$124.99
1 3/4" Dia.	\$10.99	3 3/4" Dia.	\$69.99	6 1/4" Dia.	\$129.99	6 1/2" Dia.	\$134.99
2" Dia.	\$11.99	4" Dia.	\$74.99	6 3/4" Dia.	\$139.99	7" Dia.	\$144.99
2 1/4" Dia.	\$12.99	4 1/4" Dia.	\$79.99	7 1/4" Dia.	\$149.99	7 1/2" Dia.	\$154.99
2 1/2" Dia.	\$13.99	4 3/4" Dia.	\$84.99	7 3/4" Dia.	\$159.99	8" Dia.	\$164.99
2 3/4" Dia.	\$14.99	5" Dia.	\$89.99	8 1/4" Dia.	\$169.99	8 1/2" Dia.	\$174.99
3" Dia.	\$15.99	5 1/4" Dia.	\$94.99	8 3/4" Dia.	\$179.99	9" Dia.	\$184.99
3 1/4" Dia.	\$16.99	5 3/4" Dia.	\$99.99	9 1/4" Dia.	\$189.99	9 1/2" Dia.	\$194.99
3 1/2" Dia.	\$17.99	6" Dia.	\$104.99	9 3/4" Dia.	\$199.99	10" Dia.	\$204.99
3 3/4" Dia.	\$18.99	6 1/4" Dia.	\$109.99	10 1/4" Dia.	\$209.99	10 1/2" Dia.	\$214.99
4" Dia.	\$19.99	6 3/4" Dia.	\$114.99	10 3/4" Dia.	\$219.99	11" Dia.	\$224.99
4 1/4" Dia.	\$20.99	7" Dia.	\$119.99	11 1/4" Dia.	\$229.99	11 1/2" Dia.	\$234.99
4 1/2" Dia.	\$21.99	7 1/4" Dia.	\$124.99	11 3/4" Dia.	\$239.99	12" Dia.	\$244.99
4 3/4" Dia.	\$22.99	7 3/4" Dia.	\$129.99	12 1/4" Dia.	\$249.99	12 1/2" Dia.	\$254.99
5" Dia.	\$23.99	8" Dia.	\$134.99	12 3/4" Dia.	\$259.99	13" Dia.	\$264.99
5 1/4" Dia.	\$24.99	8 1/4" Dia.	\$139.99	13 1/4" Dia.	\$269.99	13 1/2" Dia.	\$274.99
5 1/2" Dia.	\$25.99	8 1/2" Dia.	\$144.99	13 3/4" Dia.	\$279.99	14" Dia.	\$284.99
5 3/4" Dia.	\$26.99	9" Dia.	\$149.99	14 1/4" Dia.	\$289.99	14 1/2" Dia.	\$294.99
6" Dia.	\$27.99	9 1/4" Dia.	\$154.99	14 3/4" Dia.	\$299.99	15" Dia.	\$304.99
6 1/4" Dia.	\$28.99	9 1/2" Dia.	\$159.99	15 1/4" Dia.	\$309.99	15 1/2" Dia.	\$314.99
6 1/2" Dia.	\$29.99	9 3/4" Dia.	\$164.99	15 3/4" Dia.	\$319.99	16" Dia.	\$324.99
6 3/4" Dia.	\$30.99	10" Dia.	\$169.99	16 1/4" Dia.	\$329.99	16 1/2" Dia.	\$334.99
7" Dia.	\$31.99	10 1/4" Dia.	\$174.99	16 3/4" Dia.	\$339.99	17" Dia.	\$344.99
7 1/4" Dia.	\$32.99	10 1/2" Dia.	\$179.99	17 1/4" Dia.	\$349.99	17 1/2" Dia.	\$354.99
7 1/2" Dia.	\$33.99	10 3/4" Dia.	\$184.99	17 3/4" Dia.	\$359.99	18" Dia.	\$364.99
7 3/4" Dia.	\$34.99	11" Dia.	\$189.99	18 1/4" Dia.	\$369.99	18 1/2" Dia.	\$374.99
8" Dia.	\$35.99	11 1/4" Dia.	\$194.99	18 3/4" Dia.	\$379.99	19" Dia.	\$384.99
8 1/4" Dia.	\$36.99	11 1/2" Dia.	\$199.99	19 1/4" Dia.	\$389.99	19 1/2" Dia.	\$394.99
8 1/2" Dia.	\$37.99	11 3/4" Dia.	\$204.99	19 3/4" Dia.	\$399.99	20" Dia.	\$404.99
8 3/4" Dia.	\$38.99	12" Dia.	\$209.99	20 1/4" Dia.	\$409.99	20 1/2" Dia.	\$414.99
9" Dia.	\$39.99	12 1/4" Dia.	\$214.99	20 3/4" Dia.	\$419.99	21" Dia.	\$424.99
9 1/4" Dia.	\$40.99	12 1/2" Dia.	\$219.99	21 1/4" Dia.	\$429.99	21 1/2" Dia.	\$434.99
9 1/2" Dia.	\$41.99	12 3/4" Dia.	\$224.99	21 3/4" Dia.	\$439.99	22" Dia.	\$444.99
9 3/4" Dia.	\$42.99	13" Dia.	\$229.99	22 1/4" Dia.	\$449.99	22 1/2" Dia.	\$454.99
10" Dia.	\$43.99	13 1/4" Dia.	\$234.99	22 3/4" Dia.	\$459.99	23" Dia.	\$464.99
10 1/4" Dia.	\$44.99	13 1/2" Dia.	\$239.99	23 1/4" Dia.	\$469.99	23 1/2" Dia.	\$474.99
10 1/2" Dia.	\$45.99	13 3/4" Dia.	\$244.99	23 3/4" Dia.	\$479.99	24" Dia.	\$484.99
10 3/4" Dia.	\$46.99	14" Dia.	\$249.99	24 1/4" Dia.	\$489.99	24 1/2" Dia.	\$494.99
11" Dia.	\$47.99	14 1/4" Dia.	\$254.99	24 3/4" Dia.	\$499.99	25" Dia.	\$504.99
11 1/4" Dia.	\$48.99	14 1/2" Dia.	\$259.99	25 1/4" Dia.	\$509.99	25 1/2" Dia.	\$514.99
11 1/2" Dia.	\$49.99	14 3/4" Dia.	\$264.99	25 3/4" Dia.	\$519.99	26" Dia.	\$524.99
11 3/4" Dia.	\$50.99	15" Dia.	\$269.99	26 1/4" Dia.	\$529.99	26 1/2" Dia.	\$534.99
12" Dia.	\$51.99	15 1/4" Dia.	\$274.99	26 3/4" Dia.	\$539.99	27" Dia.	\$544.99
12 1/4" Dia.	\$52.99	15 1/2" Dia.	\$279.99	27 1/4" Dia.	\$549.99	27 1/2" Dia.	\$554.99
12 1/2" Dia.	\$53.99	15 3/4" Dia.	\$284.99	27 3/4" Dia.	\$559.99	28" Dia.	\$564.99
12 3/4" Dia.	\$54.99	16" Dia.	\$289.99	28 1/4" Dia.	\$569.99	28 1/2" Dia.	\$574.99
13" Dia.	\$55.99	16 1/4" Dia.	\$294.99	28 3/4" Dia.	\$579.99	29" Dia.	\$584.99
13 1/4" Dia.	\$56.99	16 1/2" Dia.	\$299.99	29 1/4" Dia.	\$589.99	29 1/2" Dia.	\$594.99
13 1/2" Dia.	\$57.99	16 3/4" Dia.	\$304.99	29 3/4" Dia.	\$599.99	30" Dia.	\$604.99
13 3/4" Dia.	\$58.99	17" Dia.	\$309.99	30 1/4" Dia.	\$609.99	30 1/2" Dia.	\$614.99
14" Dia.	\$59.99	17 1/4" Dia.	\$314.99	30 3/4" Dia.	\$619.99	31" Dia.	\$624.99
14 1/4" Dia.	\$60.99	17 1/2" Dia.	\$319.99	31 1/4" Dia.	\$629.99	31 1/2" Dia.	\$634.99
14 1/2" Dia.	\$61.99	17 3/4" Dia.	\$324.99	31 3/4" Dia.	\$639.99	32" Dia.	\$644.99
14 3/4" Dia.	\$62.99	18" Dia.	\$329.99	32 1/4" Dia.	\$649.99	32 1/2" Dia.	\$654.99
15" Dia.	\$63.99	18 1/4" Dia.	\$334.99	32 3/4" Dia.	\$659.99	33" Dia.	\$664.99
15 1/4" Dia.	\$64.99	18 1/2" Dia.	\$339.99	33 1/4" Dia.	\$669.99	33 1/2" Dia.	\$674.99
15 1/2" Dia.	\$65.99	18 3/4" Dia.	\$344.99	33 3/4" Dia.	\$679.99	34" Dia.	\$684.99
15 3/4" Dia.	\$66.99	19" Dia.	\$349.99	34 1/4" Dia.	\$689.99	34 1/2" Dia.	\$694.99
16" Dia.	\$67.99	19 1/4" Dia.	\$354.99	34 3/4" Dia.	\$699.99	35" Dia.	\$704.99
16 1/4" Dia.	\$68.99	19 1/2" Dia.	\$359.99	35 1/4" Dia.	\$709.99	35 1/2" Dia.	\$714.99
16 1/2" Dia.	\$69.99	19 3/4" Dia.	\$364.99	35 3/4" Dia.	\$719.99	36" Dia.	\$724.99
16 3/4" Dia.	\$70.99	20" Dia.	\$369.99	36 1/4" Dia.	\$729.99	36 1/2" Dia.	\$734.99
17" Dia.	\$71.99	20 1/4" Dia.	\$374.99	36 3/4" Dia.	\$739.99	37" Dia.	\$744.99
17 1/4" Dia.	\$72.99	20 1/2" Dia.	\$379.99	37 1/4" Dia.	\$749.99	37 1/2" Dia.	\$754.99
17 1/2" Dia.	\$73.99	20 3/4" Dia.	\$384.99	37 3/4" Dia.	\$759.99	38" Dia.	\$764.99
17 3/4" Dia.	\$74.99	21" Dia.	\$389.99	38 1/4" Dia.	\$769.99	38 1/2" Dia.	\$774.99
18" Dia.	\$75.99	21 1/4" Dia.	\$394.99	38 3/4" Dia.	\$779.99	39" Dia.	\$784.99
18 1/4" Dia.	\$76.99	21 1/2" Dia.	\$399.99	39 1/4" Dia.	\$789.99	39 1/2" Dia.	\$794.99
18 1/2" Dia.	\$77.99	21 3/4" Dia.	\$404.99	39 3/4" Dia.	\$799.99	40" Dia.	\$804.99
18 3/4" Dia.	\$78.99	22" Dia.	\$409.99	40 1/4" Dia.	\$809.99	40 1/2" Dia.	\$814.99
19" Dia.	\$79.99	22 1/4" Dia.	\$414.99	40 3/4" Dia.	\$819.99	41" Dia.	\$824.99
19 1/4" Dia.	\$80.99	22 1/2" Dia.	\$419.99	41 1/4" Dia.	\$829.99	41 1/2" Dia.	\$834.99
19 1/2" Dia.	\$81.99	22 3/4" Dia.	\$424.99	41 3/4" Dia.	\$839.99	42" Dia.	\$844.99
19 3/4" Dia.	\$82.99	23" Dia.	\$429.99	42 1/4" Dia.	\$849.99	42 1/2" Dia.	\$854.99
20" Dia.	\$83.99	23 1/4" Dia.	\$434.99	42 3/4" Dia.	\$859.99	43" Dia.	\$864.99
20 1/4" Dia.	\$84.99	23 1/2" Dia.	\$439.99	43 1/4" Dia.	\$869.99	43 1/2" Dia.	\$874.99
20 1/2" Dia.	\$85.99	23 3/4" Dia.	\$444.99	43 3/4" Dia.	\$879.99	44" Dia.	\$884.99
20 3/4" Dia.	\$86.99	24" Dia.	\$449.99	44 1/4" Dia.	\$889.99	44 1/2" Dia.	\$894.99
21" Dia.	\$87.99	24 1/4" Dia.	\$454.99	44 3/4" Dia.	\$899.99	45" Dia.	\$904.99
21 1/4" Dia.	\$88.99	24 1/2" Dia.	\$459.99	45 1/4" Dia.	\$909.99	45 1/2" Dia.	\$914.99
21 1/2" Dia.	\$89.99	24 3/4" Dia.	\$464.99	45 3/4" Dia.	\$919.99	46" Dia.	\$924.99
21 3/4" Dia.	\$90.99	25" Dia.	\$469.99	46 1/4" Dia.	\$929.99	46 1/2" Dia.	\$934.99
22" Dia.	\$91.99	25 1/4" Dia.	\$474.99	46 3/4" Dia.	\$939.99	47" Dia.	\$944.99
22 1/4" Dia.	\$92.99	25 1/2" Dia.	\$479.99	47 1/4" Dia.	\$949.99	47 1/2" Dia.	\$954.99
22 1/2" Dia.	\$93.99	25 3/4" Dia.	\$484.99	47 3/4" Dia.	\$959.99	48" Dia.	\$964.99
22 3/4" Dia.	\$94.99	26" Dia.	\$489.99	48 1/4" Dia.	\$969.99	48 1/2" Dia.	\$974.99
23" Dia.	\$95.99	26 1/4" Dia.	\$494.99	48 3/4" Dia.	\$979.99	49" Dia.	\$984.99
23 1/4" Dia.	\$96.99	26 1/2" Dia.	\$499.99	49 1/4" Dia.	\$989.99	49 1/2" Dia.	\$994.99
23 1/2" Dia.	\$97.99	26 3/4" Dia.	\$504.99	49 3/4" Dia.	\$999.99	50" Dia.	\$1004.99
23 3/4" Dia.	\$98.99	27" Dia.	\$509.99	50 1/4" Dia.	\$1009.99	50 1/2" Dia.	\$1014.99
24" Dia.	\$99.99	27 1/4" Dia.	\$514.99	50 3/4" Dia.	\$1019.99	51" Dia.	\$1024.99
24 1/4" Dia.	\$100.99	27 1/2" Dia.	\$519.99	51 1/4" Dia.	\$1029.99	51 1/2" Dia.	\$1034.99
24 1/2" Dia.	\$101.99	27 3/4" Dia.	\$524.99	51 3/4" Dia.	\$1039.99	52" Dia.	\$1044.99
24 3/4" Dia.	\$102.99	28" Dia.	\$529.99	52 1/4" Dia.	\$1049.99	52 1/2" Dia.	\$1054.99
25" Dia.	\$103.99	28 1/4" Dia.	\$534.99	52 3/4" Dia.	\$1059.99	53" Dia.	\$1064.99
25 1/4" Dia.	\$104.99	28 1/2" Dia.	\$539.99	53 1/4" Dia.	\$1069.99	53 1/2" Dia.	\$1074.99
25 1/2" Dia.	\$105.99	28 3/4" Dia.	\$544.99	53 3/4" Dia.	\$1079.99	54" Dia.	\$1084.99
25 3/4" Dia.	\$106.99	29" Dia.	\$549.99	54 1/4" Dia.	\$1089.99	54 1/2" Dia.	\$1094.99
26" Dia.	\$107.99	29 1/4" Dia.	\$554.99	54 3/4" Dia.	\$1099.99	55" Dia.	\$1104.99
26 1/4" Dia.	\$108.99	29 1/2" Dia.	\$559.99	55 1/4" Dia.	\$1109.99	55 1/2" Dia.	\$1114.99
26 1/2" Dia.	\$109.99	29 3/4" Dia.	\$564.99	55 3/4" Dia.	\$1119.99	56" Dia.	\$1124.99
26 3/4" Dia.	\$110.99	30" Dia.	\$569.99	56 1/4" Dia.	\$1129.99	56 1/2" Dia.	\$1134.99
27" Dia.	\$111.99	30 1/4" Dia.	\$574.99	56 3/4" Dia.	\$1139.99	57" Dia.	\$1144.99
27 1/4" Dia.	\$112.99	30 1/2" Dia.	\$579.99	57 1/4" Dia.	\$1149.99	57 1/2" Dia.	\$1154.99
27 1/2" Dia.	\$113.99	30 3/4" Dia.	\$584.99	57 3/4" Dia.	\$1159.99	58" Dia.	\$1164.99
27 3/4" Dia.	\$114.99	31" Dia.	\$				

# Just Out! WORLD'S BIGGEST AUTO PARTS & ACCESSORIES CATALOG-FREE!



✓ 1960 RELEASES

Now — SAVE UP TO ONE-HALF on all your automotive needs! This giant new catalog includes thousands of accessories and parts for your car, truck, hot rod, custom car or station wagon — from early models to brand-new 1960 models, as well as sports and foreign cars. It features the latest Hollywood and Custom equipment not yet in stores — new high speed parts . . . in addition to hard-to-find exact replacement parts for old and current models alike!

✓ 388 PAGES

Buy Direct by Mail from Whitney — and SAVE MONEY!

Our tremendous buying power and huge volume enable us to cut prices to rock bottom. You actually save up to 50% and more! We stock over 100,000 items, ready for immediate shipment — with new, improved facilities to speed up service on every order. Buy everything automotive from one source. Satisfaction guaranteed.

Mail coupon NOW!

**100,000 ITEMS IN STOCK**

Every order shipped the SAME DAY for speedy service, fast delivery.

## THIS COUPON BRINGS FREE CATALOG

J. C. Whitney & Co. 1917 P-1 Archer., Chicago 16, Ill. Please send me your giant Catalog of Auto Parts & Accessories. I enclose 25c to cover part of mailing and handling cost (refunded on first order of \$5 or more). Offer good in U. S. A. only.

Name \_\_\_\_\_  
 Address \_\_\_\_\_  
 City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_



## FREE AMAZING NEW BOOK "HOW TO ANSWER ADS"



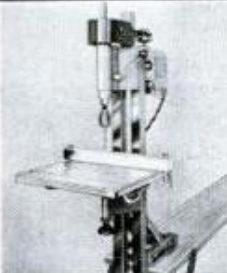
Never before have you seen anything like this. Tells you in simple language the correct way to answer ads. Gets you quicker replies—better results, and greater satisfaction. Will save you time and money and it's ABSOLUTELY FREE. No obligation whatever. Every reader of advertising should have this booklet. Send a postcard for your copy NOW. F. W. JOHNSON, Popular Mechanics Magazine, Room 600-A, 204 East Ontario Street, Chicago 11, Ill.

## IS THIS OFFER TOO GOOD TO BE TRUE?

We Pay All Freight For Your FREE Home Trial!



It's true. We pay all freight for your FREE home trial. Factory to you only \$79.95. Handles big jobs. 100% ball bearing. Think of the fun you'll have and the money you'll save with your own workshop. Only \$10 down delivers \$79.95 Supershop prepaid to your home. Write for full details, color brochures. FREE home trial plan. Mail postcard now.



VERT. DRILL PRESS

Power Tools Division  
 UNITED INDUSTRIES, Inc.  
 127 Yates Ave., Beloit, Wisc.



SEAL YOUR DOORS AND WINDOWS AGAINST COLD, RAIN, WIND AND DIRT WITH

*Bridgport*  
**INNER-SEAL**  
 WEATHERSTRIPPING  
 and Cut Your Fuel Bills, Too!



Made of flexible sponge rubber, reinforced with spring wire and neoprene coated for extra toughness, long-wearing Inner-Seal is easy to put on — you can do-it-yourself with hammer, scissors and tacks. Get INNER-SEAL at your hardware store today! Only 10c a foot.

Write for FREE FOLDER "How to Weatherstrip Your Home!"  
 Dept. PM 1.



BRIDGEPORT FABRICS, INC.  
 BRIDGEPORT 9, CONN.

# ever work with plywood?



Who hasn't. There isn't a more useful wood available. But here's a tip. You often work with and across grain at the same time. No problem for STANLEY SURFORM®! Every SURFORM tool handles plywood with ease. SURFORM tools from \$1.59 to \$3.69 are the best surface forming tools made for wood, plywood, plastics, asphalt tiles, brass, copper, aluminum, and even mild steel.



SURFORM File  
doing a smooth job

For free folder on miracle speed SURFORM tools, write Stanley Tools, Dep't. 6201, New Britain, Conn.

## STANLEY®

FREE THE HISTORY OF THE COMPASS SEND FOR YOUR COPY

New **DINSMORE**  
*Celebrity*  
COMPASSES

in Beautiful **GOLD OR SILVER**

A jeweled, precision instrument—designed for modern cars. Full, indirect illumination. Sharp, clear letters. Silver or gold Celebrity models \$7.45, standard models \$5.95, illuminated \$6.95.

APPROVED BY AUTO MAKERS  
Fine Quality Compasses for over 31 Years

DINSMORE INSTRUMENT CO.  
1802-21 Kelso St., Flint 1, Michigan

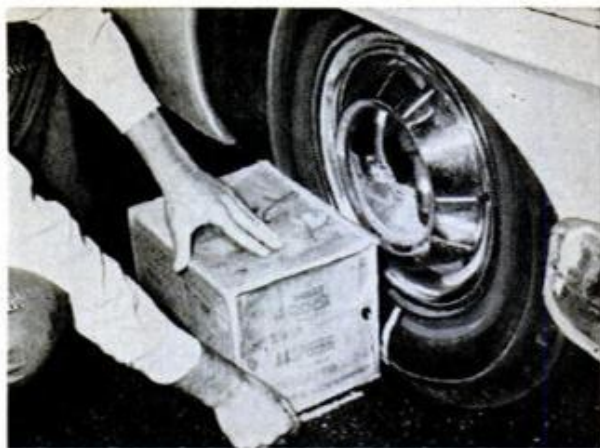


Write  
for Folder



The skilled hand of the German gunsmith is responsible for this .22 caliber, 6-shot repeater automatic with self-ejecting clip. Just 4" long, fits easily into pocket or purse. Ideal for sporting events, stage use. Not lethal weapon—ammunition available exclusively from us.  
(Not available to California residents).

Comes for \$6.95 ppd. from  
BEST VALUES, Dept. A309, 403 Market, Newark, New Jersey



## Here's How to Lay Out Your Own Course

By Dale Kelly

For those who don't have ready access to a measured mile (see page 175), it may be more convenient to lay out their own test course. Measuring a mile with a 100-foot tape is a chore, but there is a much easier way.

First, you measure the circumference of the right front tire of your car. You do this by marking the tire and pavement with the help of a box (see photo above).

Carefully move the car forward until the tire has rolled exactly one turn. Make a second mark on the pavement opposite the mark on the tire. Measure the distance between the two marks. This is the effective circumference of the tire.

Second, decide how long you want the test course to be in inches. A mile is 63,360 inches, but a shorter course of only 17,600 inches can be laid out in less time and makes for easier arithmetic because the constant for the course is an even 1000 (the time would be 25 seconds at a true speed of 40, 20 seconds at 50, 15 seconds at 67, etc.).

Third, mark the right front tire with a rag or large piece of tape so it can be seen by your helper from the front seat as the car is moving. Mark the beginning of the course with a stake at the roadside or a blob of paint on the roadway. Divide the number of inches of the tire circumference into the inches in your course length. With your helper leaning out the window counting the wheel revolutions, drive slowly over the course until the wheel has made the correct number of turns. Mark the end of the course.

Fourth, to check your speedometer you run over the course at a constant speed and time your run in seconds. If you use the short 17,600-inch course, you divide the number of seconds into 1000. If you are using a full mile course (63,360 inches) you divide into 3600 (the number of seconds in an hour). The result in either case is the true speed in miles per hour.



# SURPLUS SALE

GOVT. SURPLUS  
EXCESS INVENTORY  
BANKRUPT STOCK

## STANDARD DIAL PHONE



• Item #715. Modern hi-efficiency attractive dial phone. Use for extension to main line on private system. Use several for complete private system, etc. Complete. Work on any system. Govt. cost \$25.  
**SALE ..... \$9.95 Ppd.**

## CONTRACTORS LEVEL-TRANSITS

• Item #804. Leading make brand new latest model level-transit with tripod and case. Used by leading builders, schools, etc. 12-X scope, high accuracy, use as level or transit. Limited time offer.....  
**\$69.95 Ppd.**



## GEAR REDUCTION MOTOR

• Item #542. Multiple gear-ball bearing motor with enclosed 54 to 1 reduction gear box. High torque, 100 to 200 rpm output, reversible. Runs on 6 or 12 v DC or 110 AC through series resistors. Many uses. Cost \$35.  
**SALE..... \$5.97 Ppd.**



## BUILD LOW COST ELECTRIC AUTO

• Item #572. Be first in your area to build-operate your own real electric "town car." Powerful, speeds to 30 miles, quiet, a new motoring experience.  
• Build car around our top quality surplus gear reduction battery motor. Govt. surplus motor operates from 12-volt storage battery. Use single motor or two motors (one on each wheel.) Simple to construct. Haul one or two adults. Motor gear ratio 1-100. Output shaft speed 100 RPM. Motor reverses instantly.  
• Experts say electric cars are coming back. Get in on this fine buy! Govt. cost over \$300.  
**SALE... \$22.70 FOB**  
Wt. 38 lbs.



## POWER PLANTS

• Amazing buys in DeLuxe Govt. 115-v 60-c plants.  
Large selection. Write for descriptive catalog. All F.O.B.  
• 1000-W .. \$169.75  
• 3000-W .. 289.50  
• 5000-W .. 495.00  
• 7500-W .. 498.50  
(DC-115-v) 169.50  
Get Free Catalog.



## AIR COMPRESSOR BARGAINS

• For painting, cleaning, tires, fermites. Assemble own outfit.  
• Item #450. DeLuxe Kit. Compressor, tank, gauge, regulator, paint gun, relief valve, fittings, hose, instructions. List \$52.  
**SALE ..... \$43.91 FOB**  
• Air Components. Compressor 1-cyl. \$19.35. Air Tank \$11.95. Regulator \$3.95. Pop-off \$1.95. Press. Gauge \$1.89. Finest Paint Gun \$11.50. Auto Switch \$4.75.



## AUTOMATIC REMOTE CONTROL SWITCH

• Item #738. Amazing telephone automatic switch. Complete with dial and bank. Dial any number. Use for experimental remote control, telephone system, etc. Govt. cost over \$100.  
**SALE..... \$14.21 FOB**



## WINCHES—SPEED REDUCERS

• Govt. 86-to-1 ratio heavy duty ball bearing reducer. Input shaft 3/4" dia. Output 1" dia. Wt. 14 lbs. Govt. cost \$137.50.  
**SALE..... \$19.69**  
• Hand winch, 1000 lb. \$8.95  
• Hand winch, 2000 lb. dual ratio 3-1, 9-1. A buy.. \$28.95  
• Hand hoist, 2000 lb... 19.80  
All F.O.B.



## SPECIAL OF THE MONTH!

### LEADING MAKE ELECTRIC GRIDDLE

• Item #124. Large family size leading brand electric griddle. Designed for latest low cholesterol cooking. Excess grease drains off. Large enough for family of 6.  
• Heavy cast aluminum with long life imbedded element. Automatic dial temperature control.  
• One of our better bargains. Money back if not fully satisfied. Complete with cord. Operates on 115-v. 1200-w. Wt. 8 1/2 lbs. Adv. price \$21.95.  
**SALE..... \$11.88**  
(include enough for postg. to your town.)



## MISCELLANEOUS SURPLUS

• Fish and worm shocker..... \$ 3.89  
• 200-Amp Welding generator..... 18.95  
• Pressure Air Tank (8" x 13")..... 3.45  
• Hydraulic Control Valve..... 9.95  
• 12-v DC Robot Control Motor..... 5.95  
• 115-v AC Control relay..... 1.19  
• Old Fashioned Magneto Wall Phones 7.95  
• \$2,000 Aircraft Gyroscopes—A buy 12.91  
• 6 x 1.50 Rubber Tired Wheels..... .81  
**6 or 12-V Storage Battery Winch**  
• Item #311. Powerful fully reversible ball-bearing gear reduction winch. 1000-2000 lb. pull. Use on 6 or 12-v battery. Holds 40' of 1/4" cable. For trucks, docks, boats. Govt. cost \$280.  
**SALE \$46.71 FOB**

## HYDRAULIC EQUIPMENT BARGAINS

Savings to 80%. Build loaders, diggers, presses, etc. All brand new.  
• Control Valve, 1 or 2 way... \$18.00 Ppd.  
• Tractor Pump 1000 psi... 45.50 Ppd.  
• 12-v Motor & Pump 1000 psi... 16.95 FOB  
• 2-Way cyl, 2 1/2" bore, 9" str... 12.91 FOB  
• 1-Way, 3 1/2" bore, 12 ft. str... 69.50 FOB  
Many other types, sizes, items.



Electronics, Power Tools, Binoculars, Hydraulics, Power Plants, Air Compressors and thousands of other items.

**SURPLUS CENTER**  
LINCOLN, NEBR DEPT. 803

# KIT BOATS

Boat Plans  
Patterns  
Frame Kits



KIT CATALOGS—Over 50 Models—Pre-assembled. Runabouts, Cruisers, Fishing (8' to 19'). Anyone can assemble. Complete Marine Accessories, Fiberglass plastics, Trailers, Paint, etc. Also Catalog on 50 Modern Plans and Patterns. Prefab Frame Kits—  
SEND 10c FOR 2-COLORED CATALOGS

FREE FREIGHT—SAVE 2/3  
**CRAIG-CRAFT, Tonawanda 1L, N. Y.**

# BRONZE FOUNDRY



Schools • Home Workshops • Inventors  
Make your own castings of aluminum, copper, bronze, silver. Foundry sets are available in four sizes, capacity 1 1/2 lb. to 36 lb. of red brass. 2400 Deg. F. blast furnace included with each. Write for Free Circular.

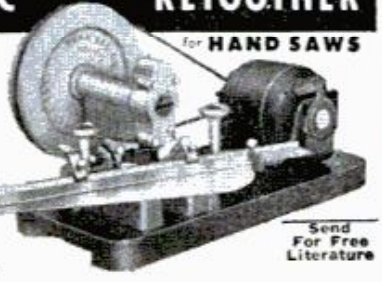
**KANSAS CITY SPECIALTIES CO.** DEPT. P-1, P.O. BOX 6022, MARYSVILLE, KANSAS

# NO JOB WORRIES

PLASTEX INDUSTRY needs manufacturers on small scale for big production of Lamps, Clock Stands, Art Goods, Novelties in Plastic Marble imitation. No Experience necessary. 1/2 material makes regular 10c store sellers. Moulds furnished for fast production. Small investment brings good profit. Big wholesale orders now being placed. Ambitious men have chance for real prosperity and job security. Our NEW FREE booklet will interest and benefit you.  
**PLASTEX INDUSTRIES, Dept. A**  
3400 Third Ave. New York 56, N. Y.

# AUTOMATIC RETOOTHER

MAKES NEW PROFITS  
for HAND SAWS  
Cuts new teeth in 50 seconds—any size 4 to 16 points. Old teeth fall off as chips. Easy to operate. A perfect job.  
**BURR MFG. CO.**  
8933-J VENICE BLVD.  
LOS ANGELES 34, CALIF.  
Send For Free Literature



# BSA MOTORCYCLES

The most popular motorcycle in the world



For all that's best in two-wheeled fun and sport, there's no better way to win the highway than with this champion engineered BSA Golden Flash twin. 40 cubic inches for smooth cruising power, zestful acceleration, and flexible performance, beautifully balanced and smartly styled on BSA's twin tube frame.

Send this coupon for free catalog.  
Western: HAP ALZINA  
3074 Broadway  
Oakland, Calif.  
Eastern: BSA INCORPORATED  
639 Passaic Ave.  
Nutley, N. J.  
Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_  
State \_\_\_\_\_ Age \_\_\_\_\_ Dept. PM-1


**NEW** Taft "CAT KIT"  
14 FT. CATAMARAN BOAT KIT



**EASY TERMS**  
18 ft. roominess, seaworthiness, at Taft's low, low mass production price. Other models from \$42. **\$279** Freight Paid

**FREE COLOR CATALOG** **TAFT MARINE WOODCRAFT**  
Dept. PM-160  
636 39th Ave. N.E.  
Minneapolis, Minn.

**BUILD YOUR OWN MIDGET ROADSTER \$25 BUILDS BODY & FRAME**



IT'S EASY TO BUILD A PONY ROADSTER or Pick-Up in few spare hours. Uses 2 hp engine, 450 lb. loads, 70 m.p.gal., plenty of speed. Great for kids, sturdy utility car. Designed for **VERY LOW-COST** assembly from **PARTS BOUGHT IN YOUR NEIGHBORHOOD**. Use home tools. **COMPLETE** step-by-step plans, 17 large-size pages, 30 "show-how" photos. Body templates, complete material. **ORDER NOW. ONLY \$2.95** postpaid.

parts list and hood insignia. Satisfied or money back.  
**PONY PLANS, Dept. 31, 100 S. VERMONT, LOS ANGELES 4, CALIF.**

**I'm walking  
on  
air...**



Just had my annual medical check-up. (Smart move.) I'm making out a check to the American Cancer Society, right now—that's a smart move, too.

**Guard your family!  
Fight cancer with  
a checkup and a check!**

**AMERICAN CANCER SOCIETY**

## Performance Meter

(Continued from page 177)

When the car coasts in neutral, the meter, because of frictional resistances just mentioned, will read slightly on the other side of zero. The amount of this will show up any abnormal drag due to soft tires, misaligned wheels or dragging brakes.

When the brakes are applied, the meter will read over on the drag side and the reading will equal the total braking force expressed as a percent of car weight.

None of these tests has to be made on a level road. If the road is level, the meter will read acceleration or deceleration in "G" units (a G equals 22 miles per hour per second). If the speed is constant, the meter will read the grade in percent.

Regardless of grade or change in speed, the meter will indicate the acceleration that could have been obtained on the level and the grade that could be climbed at a constant speed.

## VACUUM GAUGE

After you have had a little experience interpreting its readings, a vacuum gauge connected to the inlet manifold will give you a wealth of information on the condition of your engine. It also will give a fairly accurate indication of gas mileage.

With the engine idling or with the car running at any given speed and load, a high vacuum indicates a healthy, economical engine. Almost any condition that cuts down on efficiency or increases load will automatically require more throttle opening for a given performance.

This will admit more atmospheric pressure to the manifold and the increase in pressure will be reflected on the gauge as a decrease in vacuum. With a given throttle opening, an engine in good condition will idle at a relatively high speed and this will cause a high vacuum.

If, by using a light foot on the accelerator pedal while driving, you keep the vacuum above seven inches, you will avoid the uneconomical or over-rich mixture provided at full power by most carburetors. This will save quite a bit of gasoline at some sacrifice in acceleration.

A careful reading of the gauge over a long period will show up any changes in load such as might be caused by soft tires, misaligned wheels, dragging brakes, tight or dry bearings.

You can buy an ordinary vacuum gauge at a plumbing supply house or a hardware store for about \$3. Or, if you prefer, for several times the price you can buy a special automobile vacuum gauge with a com-

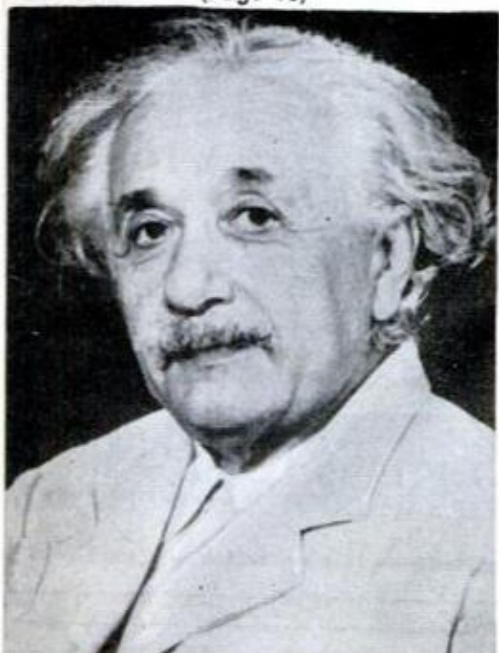
plicated and often misleading scale which claims to read directly in miles per gallon. However, it indicates better mileage in second than in high and worse mileage when an overdrive is in use than when it is not.

In a car with vacuum windshield wipers you simply connect a "tee" at the point where the wiper line enters the intake manifold. The hose to the gauge connects to the "tee". If your car has a vacuum booster pump, don't connect between the pump and the wiper. In cars with electric wipers, you may be able to remove a plug in the manifold to get vacuum. In a few cases you may have to drill and tap the manifold.

If you buy an ordinary vacuum gauge and install it yourself use rubber windshield wiper hose. It is stiff enough so it won't collapse under vacuum. To prevent vibration of the gauge pointer you will probably need a restriction in line, preferably at the end nearest the manifold. You can get this by cutting the head off an inch-long machine screw whose thread diameter is a snug fit in the rubber hose. You then push the threaded portion into the tubing and it smooths out the needle vibration by its restrictive effect. ★ ★ ★

## This Month's "Great Pioneer in Science"

(Page 18)



**Albert Einstein (1879-1955)**

JANUARY 1960

**HYDRAULIC CYLINDERS**  
1500 PSI, long stroke cylinder - Has Stroke of 15-5/8", Bore 1-3/8", Shaft 1", Length 22", No. H-14  
Cost Gov't approx. \$120.00  
Palley Catalog Price \$11.75 **795**

New 1500 PSI Dbl. Action Cylinder. Ideal for clutch or throttle control when used as a master & slave. Has 5/8" bore, 4-1/8" stroke, 7/16" shaft, 9-5/8" closed length. Parts are 1/4" tube (7/16-20 thread), No. H-60 **375**

1500 PSI Double Action CYLINDER - Bore 1-1/2", Shaft 9/16", Stroke is adjustable 1-3/16" to 4-3/8", length 14-1/2". No. H-84... **395**

Double Action Hydraulic Cylinder. Will stand 2000 PSI. Steel barrel. Ideal for hydraulic press. Has 2-1/2" bore, 7" stroke, 1-5/8" shaft, 19" length. Catalog No. H-24D **995**  
Palley Cat. price \$12.75

1500 PSI Dbl. Action HYD. CYLINDER Has 2-3/8" bore, 19" stroke, 1-1/4" shaft, 30 1/4" lgh. Gov't cost approx. \$75.  
No. H-53AN - NEW ..... \$24.88  
No. H-53AU - USED ..... 17.88

**FOUR WAY HYDRAULIC VALVE**  
No. V-13USU  
Sliding piston type with built-in relief valve to limit stroke. Pressure balanced in neutral position. Has 5/8" AC tube ports.  
Reg. Catalog price \$12.75 **788**

**4-WAY HYD. VALVE**  
No. H-V7A-1 **395**  
A spring loaded, poppet type valve. Pressure balanced. Off in neutral. Has 1/2" tube ports. Cost Gov't approx. \$30

**NEW ARRIVALS!**  
Wooster built DYNAMOMETER TEST STAND - With 10 HP motor. \$1475.00  
Reliance POWER UNIT with 20 HP motor. Write for details. . . . \$995.00

We have largest on-the-shelf stock of Hydraulic Cylinders in the world. Including extra large sizes and special lift cylinders. Send us your specs.

**100 TO 1 GEAR MOTOR**  
Here's a real "workhorse" in a compact, heavy duty gearhead motor. The gear ratio is 100-to-1 giving the 24 volt DC motor tremendous power. A reversible clutch is set at 375 foot-pounds. Take-off shaft is double-keyed and is 1-1/16" dia. **ONLY 2450**

**AIR OR OXYGEN TANKS**  
Pressure tested to 400 PSI. Ideal for air, acids, chemicals, experimental uses, etc. Has 1/4" pipe ports. Size: 12-1/2" x 24". 2100 cu. in. **1295**  
No. G-1U - Used  
No. G-1N - NEW . . . \$16.95

**F-1 Stainless Steel TANKS**-500 cu. in. capacity. Size: 10"x18" . . . \$10.95

**J-1 Large Volume AIR or CHEMICAL STORAGE TANKS**  
Has 18,000 cu. in. capacity (77 gallons). All stainless steel. Size: 24" x 45" lgh. Worth \$150. No. J-1 ONLY **9950**

**D-2 Carbon Steel AIR TANKS** - Tested to 400 PSI. Capacity 500 cu. in. Size: 6 1/2" x 24". D2-C - NEW... **595**

**TO ORDER** - Send check or M.O. 1/2 deposit with C.O.D.s. All prices are F.O.B. Los Angeles Warehouse. All items sent postage or freight collect.

**palley's**  
2263 E. VERNON AVE., DEPT. PM-10  
LOS ANGELES 58, CALIFORNIA

**SPECIAL HYDRAULIC SALE**  
**CENTRIFUGAL BRASS WATER PUMP**

Ideal for draining basements, sumps, flooded areas. Must be primed. Has brass body and rotor. Stainless steel shaft is bearing mounted. Inlet is 1 1/2" pipe, outlet is 1-3/4" hose. Delivers 6000 GPH at 1 ft. head at 1800 RPM using a 1/3 HP motor . . . . . **1995**  
MOUNT BASE for above pump \$4.25.

**85 TO 1 RATIO GEAR DRIVE**  
For use where tremendous power at a low take-off speed is desired. Drives through a train of 6 gears that rotate on self-lubricating high speed roller bearings. The take-off shafts are 1/1/4" and 3/8" in diameter. Has 180° offset drive. Overall size: 6"x4"x2-1/2". NEW... **995**

**GOV'T SURPLUS BLOWER/MOTOR**  
Operates on 24 volts DC at 1.35 amps. Direct drive fan blade turns 4700 RPM. Fan has central intake and two opposed exhaust ports. Fan housing is 8" in diam. Motor 3"x3". No. EM-BL3 **388**

**BLOWER/EXHAUST FAN**  
Miniature type. 4" diam. fan forces air thru 5 inch long housing. Has 1/100 HP, 27.5 VDC electric motor, tandem mounted behind fan blade. Lifetime bearings. For ventilating closed compartments, darkroom, etc. . . **488**

**NEW 3-3/4 HP ELECT. MOTOR**  
An ideal motor to operate a portable winch such as tow truck or utility boat. Series wound for continuous duty. Rated 3.75 HP at 2300 RPM. Draws 240 Amps on 24 volt DC. Has 5/8" diameter drive shaft . . . . . **1295**

**2500 lb. LIFT HOIST**  
Ideal for garages, shops, on boats, jeeps, trucks, etc. Has 24 to 1 ratio through a worm gear drive. Has free-spool, pull-out clutch and a three-speed crank. Comes with 18 ft. of 3/16" high tensile strength steel cable. Lifts up to 2500 pounds. **3795**

**2-TON WINCH HOIST**  
Has a 4 to 1 gear ratio. Positive action, dog type brake plus a drum-shoe type brake. Drum is 6-1/2" wide with a 2-1/2" cable depth. Overall size: 14" x 12" x 13" high. Complete with mounting frame and crank. **2995**

**VICKERS 1500 PSI PUMP**  
No. H-P5AUSU **2575**  
A positive displacement type pump. Will displace .208 cu. in. per rev. Pressure limit is 1500 PSI or 3750 RPM.

**MOUNTING UNIT** for above pump - Will adapt pump to 5/8" key slotted drive shaft. Has sealed-in bearings and 4-hole foot mount. NEW... **1695**

**NEW STRATO POWER HYDRAULIC PUMP**  
Variable displacement piston type pump. Delivers 7-1/2 GPM at 1800 RPM. Maximum output 15 GPM at 3600 RPM. Has full flow at 1275 PSI. Rotates either direction. Adjusts to lower or higher PSI by replacing springs. Parts are: 1" AN on suction, 5/8" AN on pressure, 3/8" AN case drain. NEW Only... **3900**  
MOUNT for above pump same as under Vickers Pump above . . . . \$16.95

293

Cast your ballot for a successful future!

# 258 I.C.S. COURSES



I. C. S. is the oldest and largest correspondence school. 258 courses. Business, industrial, engineering, academic, high school. One for you. Direct, job-related. Bedrock facts and theory plus practical

application. Complete lesson and answer service. No skimping. Diploma to graduates.

Send for the 3 free booklets offered below and find out how I. C. S. can be your road to success.

**SCHOOL OF AERONAUTICS**  
 Aero-Engineering Technology  
 Aircraft & Engine Mechanic  
 Aircraft Drafting  
 Aircraft Mechanic  
 Aviation—Engine Mechanic

**SCHOOL OF ARCHITECTURE AND THE BUILDING TRADES**  
 Architectural Drafting  
 Architectural Drawing & Designing  
 Architectural Interiors  
 Architecture  
 Building Contractor  
 Building Contractor with Drawing  
 Building Estimator  
 Building Maintenance  
 Carpenter—Builder  
 Carpentry & Millwork  
 House Planning  
 Lumber Dealer  
 Painting Contractor  
 Reading Architects' Blueprints

**SCHOOL OF ART**  
 Advertising Layout & Illustration  
 Amateur Artist  
 Commercial Art  
 Commercial Cartooning  
 Fashion Illustrating  
 Figure Drawing & Painting  
 Magazine & Book Illustrating  
 Show-Card & Sign Lettering  
 Sign Lettering  
 Sketching & Painting

**SCHOOL OF AUTOMOBILES**  
 Automobile  
 Automobile Electrical Tech'n  
 Automobile—Engine Tune-Up  
 Automobile Rebuilding & Refinishing  
 Automobile Technician  
 Diesel—Gas Motor—Vehicle Engineer

**SCHOOL OF BLUE-PRINT READING AND DRAFTING**  
 Aircraft Drafting  
 Architects' Blueprints  
 Architectural Drafting  
 Drafting & Machine Design  
 Electrical Blueprints  
 Electrical Drafting  
 Electrical Engineering Drafting  
 Electronic Drafting  
 Junior Mechanical Drafting

Shop Blueprints  
 Structural Blueprints  
 Structural Drafting

**SCHOOL OF BUSINESS**  
**Accounting**  
 Auditing  
 Business Law  
 Cost Accounting  
 Federal Tax  
 General Accounting  
 Junior Accounting  
 Practical Accounting  
 Public Accounting

**Advertising**  
 Magazine & Newspaper Advertising

**Business**  
 Business Administration  
 Business Management  
 Business Management & Marketing  
 Business Management & Production  
 Canadian Business  
 Management Marketing  
 Condensed Business Practice  
 Office Management  
 Purchasing Agent  
 Railroad Administration

**Salesmanship and Retailing**  
 Creative Salesmanship  
 Managing a Small Business  
 Real Estate Salesmanship  
 Retail Business Management  
 Retail Merchandising  
 Retail Selling  
 Sales Management  
 Salesmanship  
 Salesmanship & Sales Management

**Traffic**  
 Motor Traffic Management  
 Railroad Rate Clerk  
 Traffic Management

**Leadership**  
 Industrial Foremanship  
 Industrial Supervision  
 Modern Leadership  
 Personnel-Labor Relations  
 Supervision

**SCHOOL OF CHEMISTRY AND CHEMICAL ENGINEERING**  
 Analytical Chemistry  
 Chemical Engineering  
 Chemical Engineering Unit Operations

Chemical Laboratory Tech'n  
 Chemical Production Foreman  
 Elements of Nuclear Energy  
 General Chemistry  
 Industrial Analytical Chemistry  
 Industrial Chemistry  
 Plastic Production Foreman  
 Plastic Technician  
 Professional Eng'r—Chemical

**SCHOOL OF CIVIL ENGINEERING**  
 Bridge & Building Foreman  
 Civil Engineering  
 Construction Engineering  
 Highway Engineering  
 Mathematics & Mechanics for Engineers  
 Mine Surveying & Mapping  
 Principles of Mapping  
 Principles of Surveying  
 Professional Engineer—Civil  
 Railroad Engineering  
 Reading Structural Blueprints  
 Roadmaster  
 Sanitary Engineering  
 Section Foreman  
 Sewage Plant Operator  
 Structural Drafting  
 Structural Engineering  
 Surveying & Mapping  
 Water Works Operator

**SCHOOL OF COMMERCE**  
 Business Correspondence  
 Clerk-Typist  
 Commercial  
 Modern Letter Writing  
 Professional Secretary  
 Shorthand  
 Stenographic  
 Typewriting

**SCHOOL OF ELECTRICAL ENGINEERING**  
 Electrical Appliance Servicing  
 Electrical Contractor  
 Electrical Drafting  
 Electrical Engineering  
 Electrical Engineering Drafting  
 Electrical Engineering Technician  
 Electrical Instrument Technician  
 Electric Motor Repairman  
 Illumination Engineering  
 Technology  
 Industrial Electrical Eng'r's  
 Power House Engineering (Fossil; Steam & Hydro)  
 Power Line Design & Construction  
 Practical Electrician

Practical Lineman  
 Professional Eng'r—Electrical  
 Reading Electrical Blueprints

**SCHOOL OF ELECTRONICS**  
 Calculus for Electronics  
 Electronics Drafting  
 Engineering  
 General Electronics Technician  
 Guided Missiles  
 Industrial Electronics  
 Practical Radio-Television  
 Radio & Television Servicing  
 Radio & Television Servicing with Practical Training  
 Radio Operating  
 Radio Servicing  
 Radio Servicing with Practical Training  
 Servicing Electronic Devices  
 Servicing Sound Equipment  
 Television Receiver Servicing  
 Television Technician

**HIGH SCHOOL**  
 Analytic Geometry  
 British History  
 Business  
 Business Law  
 Calculus  
 Canadian History  
 Chemistry  
 College Preparatory—Arts  
 College Preparatory—Engineering & Science  
 English  
 English-for-French I  
 English-for-French II  
 English-for-French III  
 General  
 Good English  
 High School Equivalent  
 High School Mathematics  
 Mechanical Drawing  
 Psychology  
 Secretarial  
 Short Story Writing  
 Special Subjects  
 Technical Writing

**SCHOOL OF INDUSTRIAL ENGINEERING**  
 Industrial Engineering  
 Industrial Instrumentation  
 Office Administrative Eng'r's  
 Quality Control  
 Safety Engineering Technology

**SCHOOL OF INTERNAL COMBUSTION ENGINES**  
 Diesel Engines  
 Gas Engines  
 Internal Combustion Engines

**SCHOOL OF MATHEMATICS**  
 Calculus for Electronics  
 High School Mathematics  
 Mathematics and Mechanics for Engineering

**SCHOOL OF MECHANICAL ENGINEERING**  
 Boilermaker  
 Drafting & Machine Design  
 Industrial Piping Drafting  
 Junior Mechanical Engineering  
 Junior Mechanical Engineering  
 Mechanical Drafting  
 Mechanical Engineering  
 Professional Eng'r—Mechanical  
 Tool Design

**SCHOOL OF PETROLEUM**  
 Natural Gas Production and Transmission  
 Oil Field Technology  
 Petroleum Production  
 Petroleum Production Eng'r  
 Petroleum Refinery Operator  
 Petroleum Refining  
 Petroleum Technology

**SCHOOL OF PLUMBING, HEATING AND AIR CONDITIONING**  
 Air Conditioning  
 Air Conditioning Maintenance  
 Air Conditioning with Drawing  
 Domestic Heating  
 Heating  
 Heating & Air Conditioning with Drawing  
 Heating Drawing & Estimating  
 Plumbing  
 Plumbing & Heating  
 Plumbing & Steam Fitting  
 Plumbing Drawing & Estimating  
 Practical Plumbing  
 Steam Fitting

**SCHOOL OF RAILROAD OPERATION AND SHOP**  
 Air Brake Equipment  
 Car Inspector & Air Brake  
 Diesel Electrician  
 Diesel Engineer & Fireman  
 Diesel Locomotive  
 Diesel Machinist  
 Railroad Administration  
 Railroad Car Repairer

**SCHOOL OF REFRIGERATION**  
 Domestic Refrigeration  
 Refrigeration

Refrigeration & Air Conditioning

**SCHOOL OF SHEET METAL**  
 Sheet-Metal Drafting  
 Sheet-Metal Worker

**SCHOOL OF SHOP PRACTICE**  
 Electric Welding  
 Foundry Practice  
 Gas & Electric Welding  
 Gas Welding  
 Heat Treatment of Metals  
 Industrial Metallurgy  
 Machine Shop Inspection  
 Machine Shop Practice  
 Machine Shop Practice & Toolmaking  
 Metallurgical Engineering  
 Practical Millwrighting  
 Quality Control of Metals  
 Reading Shop Blueprints  
 Resistance Welding Tech'gy  
 Rugging  
 Technology  
 Tool Engineering Technology  
 Toolmaking  
 Welding Engineering Tech'gy

**SCHOOL OF STATIONARY ENGINEERING**  
 Combustion Engineering  
 Power Plant Engineering  
 Stationary Building Engineer  
 Stationary Diesel-Electric Engineering  
 Stationary Diesel Engineering  
 Stationary Foreman  
 Stationary Steam Engineering  
 Steam Engine Operation

**SCHOOL OF TELEPHONY**  
 Practical Telephony

**SCHOOL OF TEXTILES**  
 Carding  
 Carding & Spinning  
 Cotton Manufacturing  
 Dyeing & Finishing  
 Loom Fixing  
 Spinning  
 Synthetic Throwing, Warping & Weaving  
 Textile Designing  
 Textile Eng'r's Technology  
 Textile Mill Supervisor  
 Warping & Weaving  
 Woolen Manufacturing  
 Worsted Manufacturing

For Real Job Security—Get an I. C. S. Diploma! I. C. S., Scranton 15, Penna.

Accredited Member,  
 National Home Study Council

## INTERNATIONAL CORRESPONDENCE SCHOOLS



BOX 34953A, SCRANTON 15, PENNA.

Without cost or obligation, send me "HOW to SUCCEED," the opportunity booklet about the field I have indicated below, and a sample lesson (Math.)

Name of the course in which you are interested \_\_\_\_\_

Your Name \_\_\_\_\_ Age \_\_\_\_\_ Home Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_ Working Hours \_\_\_\_\_ A.M. to \_\_\_\_\_ P.M. \_\_\_\_\_

Occupation \_\_\_\_\_

Canadian residents send coupon to International Correspondence Schools, Canadian, Ltd., Montreal, Canada. . . . Special low monthly tuition rates to members of the U. S. Armed Forces.

# Isn't our OLSON BROADLOOM Wonderful?"



"It's Reversible—so we can use Both Sides."

*4-color Tweed beauty possible only the Olson Loom-Woven Way*

**Like Millions of Olson Customers, You, Too, Can**

**SAVE UP TO 1/2—FACTORY-TO-YOU**

**Send Us Your Old Rugs, Carpets, Clothing**

**OLSON DISPLAY ROOMS IN MANY CITIES... FACTORY REPRESENTATIVES IN MANY MORE.**  
We'll mail you our nearest address when you write for catalog. If you wish, we can come to your home with samples in many areas—or you can order by mail.

**FREE Beautiful New OLSON Catalog in Color, Model Rooms—Gift Coupon**

This "Business Reply"-coupon requires NO stamp or envelope. Please write name and address clearly in space provided—then cut out and drop in mailbox. Pay no attention to printing on back of coupon.



I GUARANTEE to send you the finest, longest-wearing Broadloom Rugs or wall-to-wall Carpeting you ever had for so little money. We add New Wools and we'll LOAN our material Free if you're short. *Walter E. Olson*

Write Your Name and Address — Cut Out and Mail

FROM:—

YOUR NAME.....

ADDRESS.....

TOWN..... STATE.....

**FIRST CLASS**  
Permit No. 66  
Chicago, Ill.

**BUSINESS REPLY MAIL**  
NO POSTAGE STAMP NECESSARY IF MAILED IN THE UNITED STATES

Postage Will Be Paid By—

**OLSON RUG CO. Dept. K-16**

Catalog Division Chicago 41, Illinois

**NO MATTER** where you live, rush "Business Reply"-coupon at left (no stamp needed). Get beautiful new OLSON Rug and Decorating Book . . . FREE . . . plus exciting FREE Gift Offer. Learn how valuable wool and material in old rugs carpets, clothing, is scientifically reclaimed like new, bleached and separated. Seasoned wool is merged with choice NEW WOOL dyed and spun into yarn. Then we weave heavy, deep-textured, Reversible New Broadloom Rugs or wall-to-wall Carpeting All this within a week. Double the wear and luxury at Savings up to 1/2.

**NO RISK OFFER:** Send materials at our expense. Satisfaction guaranteed. Monthly payments if you wish. Our 86th year.

**LOVELY NEW COLORS, PATTERNS**

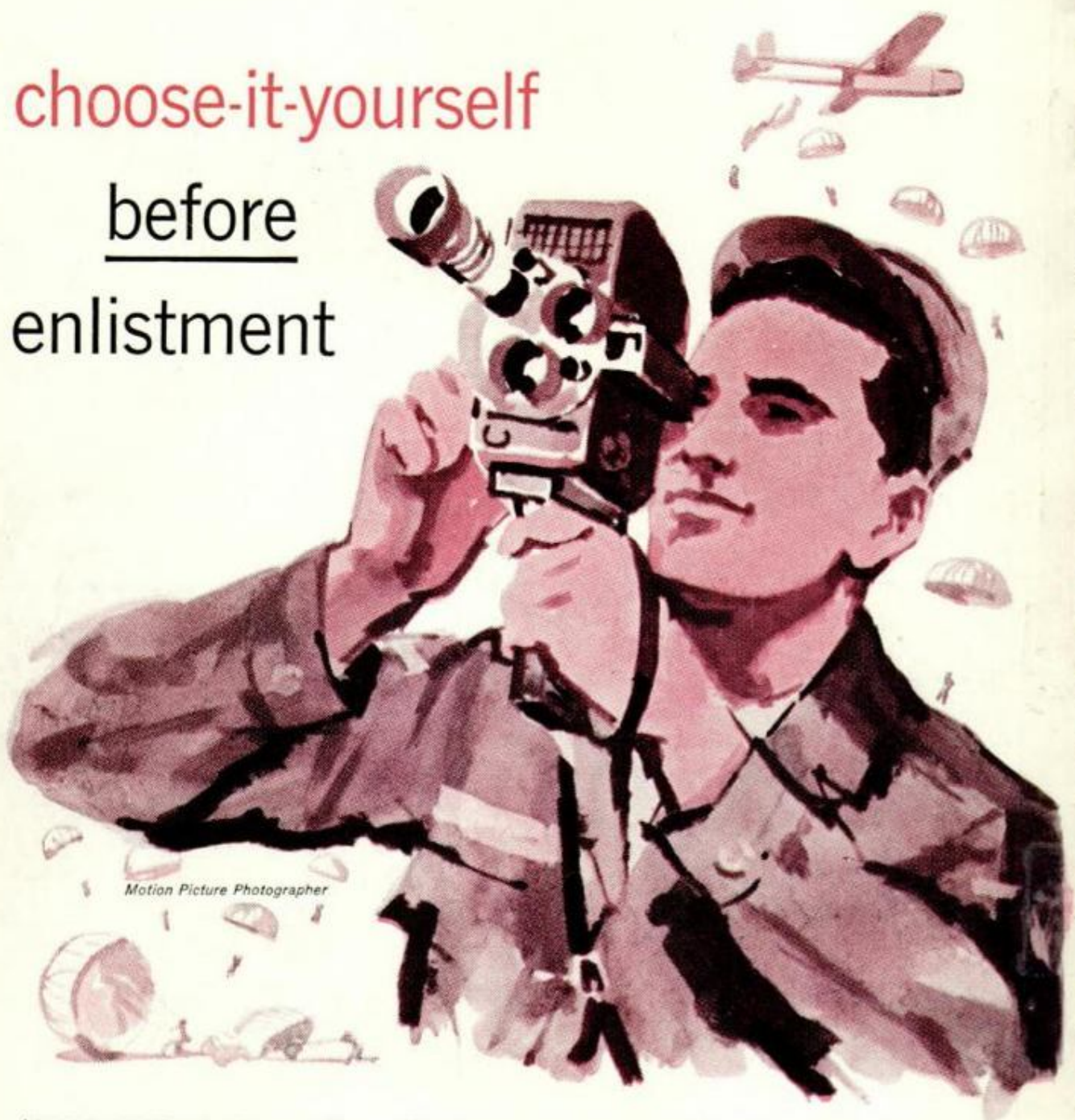
- |  |  |   |
|--|--|---|
| Any size you want in a week—up to 18 feet wide, seamless, any length. 19 width looms. No wasted yardage. | Smart TWEEDS<br>Solid Colors<br>Embossed Effects<br>Early American<br>Oriental Designs | Moder Casual<br>Florals<br>Scrolls<br>Ovals |
|--|--|---|

**OLSON RUG CO.** Chicago New York San Francisco

want training in Photography? Mechanics? Electronics?

choose-it-yourself

before  
enlistment



*Motion Picture Photographer*

It's up to you! The Army's new "Choose-it-Yourself" System lets you choose valuable training before you enlist. Here's how it works: **1. Choose** before enlistment. Choose your training from fields like Photography, Missiles, Communications, Construction, Automotives—and many more. **2. Qualify** before enlistment. Take aptitude and physical exams to qualify for the training you've chosen. **3. Know** before enlistment. If you qualify, you know you'll get the training you want. Your choice is written into your future Army record—guaranteed before you enlist. **Choose, qualify, know — this week!** Ask your Army recruiter to show you his complete list of available training fields.

CHOOSE IT



YOURSELF VOCATIONAL TRAINING SYSTEM

**US ARMY**