

What to Look Out for When You Rent a Car Page 86

# POPULAR MECHANICS

AUG. 1967  
35 CENTS

Learn to  
Fly in  
High  
School?  
See Page 120



**POLICE**

## ROUGHER THAN RADAR!

First Report on the New  
Black Box that  
Catches You  
COMING or GOING



Can We Keep  
Our Astronauts  
Alive in Space? Page 82

Treasure Finders: Do They Really Work?

Build the Best-Looking Bar in Town—Two Great Hideaway Designs  
Plus Other Ideas: Page 136

New! Water-Thinned Enamel for Woodwork—World's Fastest Color Film

How to Fish with a Kite—Saturday Mechanic: Alternators

Troubleshooting Your Outboard by Ear—Dan Gurney's Driving and Racing Tips

Those Fancy Diagnostic Centers: Are They Really Better Than Joe's Garage?





**Bank Vault.**

**The Remington Model 742  
automatic locks up so strong  
it thinks it's a bolt action.**

The 30/06 is supposed to be strictly a bolt-action cartridge.

But a Remington Model 742 automatic handles it with ease.

It's no surprise to us.

A 742 locks up stronger than many bolt actions. That's why we can chamber it for such big shots as the 30/06, 280, 308 and 6mm. And why it's one of the most accurate big-game automatics.

How do you build this kind of muscle into an automatic?

We gave the 742 a solid steel receiver. We designed the action so that when the bolt is closed, the cartridge head is protected by three rings of steel.

Then, we added a modern, dependable system of gas operation that cuts "kick" without cutting power.

Check around. You can buy other automatics. But the Remington Model 742 is like money in the bank.

From \$159.95\*.



**Remington** 

Write for free 1967 Remington Catalog, Remington Arms Company, Inc., Bridgeport, Conn. 06602. In Canada: Remington Arms of Canada Limited.  
\*Fair Trade prices in states having Fair Trade laws. Prices subject to change without notice.





Town & Country truck tires—All-weather drive-wheel tire gives pickup trucks, delivery trucks, and sports vehicles extra bite through ice, mud, and snow.



Duplex tires — Extra-wide tire replaces dual tire assemblies, cuts down cost and extra weight. Trucks carry more payload.

**For any Truck.  
Any load.  
Any season.  
Any road.**



Transport 110 nylon cord tires —High strength, great impact resistance give this all-wheel tire maximum durability and safety on high-speed highway runs.

No matter what loads you carry. On what roads you run. You're going to get more for your money if you run on Firestone safety-built truck tires. Firestone Dealers and Stores from coast to coast offer a complete selection of Firestone truck tires. Just stop in and make your deal. Instant service. And specify Firestone tires on your new trucks.

Town & Country®, Duplex®, Transport-110—Firestone TM's

This One



Y47C-6LJ-YU87

**Firestone**   
**TRUCK TIRES**



# Why your wife needs a phone in your workshop

Chances are she's down in her laundry room as often as you're in your workshop.

So with an extension you're both spared that dash upstairs every time there's a call.

By the way, if she wonders why you're putting her phone in your workshop, point out that she can talk more comfortably when she's away from that noisy washer.



**AT&T**  
and Associated Companies



# Find another car under \$2,000 with all these advantages, and we'll buy it for you.

## 35 miles per gallon

And that's an honest 35. (A lot of people say they get more.)

## Concave seats that recline for sleeping

You know how soft foam rubber is. Well, that's the stuff we stuff our seats with. So if you sleep well at home you'll sleep well in a Renault 10.

You'll sit well, too. There are 18 adjustable seat positions. And 13½ inches of seat travel to make up for short or long legs.

## Engine over the drive wheels

In the winter you'll pass a lot of those big powerful cars.

The rear drive wheels can really bear down on snow and ice because the entire engine is bearing down on them.

## 4 doors as standard equipment

The two back doors make it easy to get to the back seat. Logical?

## 4-wheel independent suspension

Independent suspension means each wheel can move up or down without moving the one on the other side.

So when one wheel hits a bump, only one gets bumped. The other three keep the car and you going in a level position.

## 4-wheel disc brakes

Because of this system's ability to withstand heavy braking without fade, they have long been used on cars capable of over 160 m.p.h.

Imagine how fast they can make the Renault 10 stop.

## 4-speed synchromesh transmission

This design synchronizes the speeds of the engine and the transmission to allow the gears to mesh easily. Which makes shifting a lot easier on you and your transmission.

## Wet sleeve

When the cylinders wear out in a conventional engine, the whole engine has to be pulled out and rebored. (Sometimes it pays to buy a new car.)

A Renault piston moves in a removable wet sleeve. (It's 'wet' because it's surrounded by liquid coolant.) If the sleeve wears out, it can be easily replaced.

## Sealed liquid cooling system

Water heats more evenly than air. That's why our engine heats more evenly and operates more efficiently than an air-cooled engine. Which is also why it burns less gas.

Water-cooled systems are quieter, too. Water circulating around a cylinder acts as an insulator to keep the noise in the cylinder. And out of the car.

## 5-main bearing engine

Instead of three bearings, we support the crankshaft at five points, (which is more than some six cylinder engines do).

## Draft-free ventilation

On a hot day you don't have to get your hair blown off.

You can roll up the windows, open the dashboard vents, crack the back windows, and enjoy a little peace and quiet.

## Rack and pinion steering

Driving is no time for playing. That's why we use a system that eliminates play in the steering wheel.

## Turning circle of 30 feet

A short turning circle means you can make most u-turns in one clean sweep. (That funny little car you've seen so much of has a turning circle of 36 feet.)

## 2-speed hot-water heater and double outlet defroster (at no extra cost)

Our heater uses the same hot water that circulates around the engine. And because water heats more evenly than air, our system can produce more even heat than any of the air-type heaters.

## 11 cubic feet of trunk capacity

We're not the biggest in this compartment, but we're not the smallest, either.

The smallest has 2.3 cubic feet, which is about as much space as we have behind our back seat.

## A separate compartment for the spare tire

If you get a flat, you don't have to unload all your luggage to unload your spare tire. And you don't have to get dirt on everything when you put the flat tire away.

## 15 inch wheel

A larger wheel makes fewer revolutions to go the same distance. Which means you save rubber. Which means you save money.

Acceleration 0-60 in  
15.0 seconds

Top speed 84 m.p.h.

That's fast enough.

Price — \$1,647\*

This advantage speaks for itself.

**RENAULT** 

This applies to all existing models at the time of printing of this ad.



The Renault 10

\*East and Gulf Coast P.O.E.; West Coast \$1,699.

Whitewalls, automatic transmission, air conditioning optional.



# POPULAR MECHANICS

INTERNATIONAL EDITIONS: AUSTRALIA, BRAZIL, CARIBBEAN, DENMARK, FRANCE, MEXICO, SOUTHERN HEMISPHERE, SWEDEN

## AUTOMOBILES AND DRIVING

- [22 Automobile Clinic](#)
- [28 Detroit Listening Post](#)
- [42 Drivin' with Dan](#)
- [61 Watch It, Speeders!](#)
- [69 The "Big" Engine That Almost Did](#)
- [72 How Good Are Diagnostic Centers?](#)
- [86 We'll Never Be No. 1!](#)
- [92 Holy Toledo, a Jazzy Jeep!](#)
- [116 PM Owners Report: Dodge Polara](#)
- [122 Saturday Mechanic: How to Check Out Your Alternator](#)
- [160 Ventilating System for Your Car](#)

## SHOP AND CRAFTS

- [143 Hints from Readers](#)
- [148 Update Your Old Shopsmith with This Two-Way Stand](#)
- [151 Ring Nuts and Wrenches](#)
- [152 18 Ways to Get More from Your Portable Drill \(Flagged for Filing\)](#)
- [156 New Tools You Should Know About](#)
- [157 Hints from Readers](#)
- [161 Hints from Readers](#)
- [162 Make Your Own Metal Castings \(Flagged for Filing\)](#)
- [166 Make Your Own Tiffany Shade](#)

## SCIENCE AND INVENTIONS

- [10 Science Worldwide](#)
- [12 New Inventions](#)
- [26 Self-Propelled Surfboard](#)
- [64 Lightning Is as Deadly as Ever](#)
- [78 Test Your Mechanical Aptitude](#)
- [102 New Home for Old Inventions](#)

## REGULAR FEATURES

- [6 Letters](#)

## HOME AND YARD

- [38 Two New Materials for Home Builders](#)
- [58 Homeowners' Clinic](#)
- [99 New Paint Wonder: Water-Thinned Enamel](#)
- [130 Exciting New Products](#)
- [132 Weekend Projects for Your Home](#)
- [136 Build a Home Bar Just for the Fun of It \(Flagged for Filing\)](#)
- [158 Solving Home Problems](#)

## BOATING, OUTDOOR RECREATION

- [14 What's New Outdoors](#)
- [90 How to Fish with a Sky Hook](#)
- [106 How to Spot a Good Used Gun](#)
- [144 Troubleshooting Your Outboard by Ear \(Flagged for Filing\)](#)
- [146 Outboard Clinic](#)

## AEROSPACE, AVIATION, MILITARY

- [56 Aviation Jetstream](#)
- [82 Can We Keep Our Astronauts Alive in Space?](#)
- [110 Electric Power from Rocket Blasts](#)
- [120 Now We Can Teach Flying in High School](#)

## ELECTRONICS, RADIO AND TV

- [112 Treasure Finders: Do They Really Work?](#)
- [170 Shortwave—Have You Listened to It Lately?](#)

## PHOTOGRAPHY

- [96 World's Fastest Color Film](#)
- [128 Quickie Copying Stand from Plywood Scrap](#)

Cover Illustration by Ed Valigursky

## NEXT MONTH IN POPULAR MECHANICS

**What's with Those New Tires?** An incisive look at tomorrow's tires now rolling onto the market—how they're made, what they'll do and which are best for your car.

**Shotguns: Buying the Right Boom.** There's a lot to know about this favorite weapon of most hunters before you choose the right scattergun for you.



Published by The Hearst Corporation  
RICHARD E. BERLIN, PRESIDENT

RICHARD E. DEEMS  
President, Magazines Division

JOSEPH F. KERN  
Publisher

ROBERT P. CROSSLEY  
Editor

JAMES M. LISTON  
Executive Editor

JOHN A. LINKLETTER  
Managing Editor

WAYNE C. LECKEY  
Home and Shop  
Editor

SHELDON GALLAGER  
Assistant Executive  
Editor

THOMAS G. DAUER  
Art Director

CLIFFORD B. HICKS \_\_\_\_\_ Midwest Editor  
THOMAS E. STIMSON \_\_\_\_\_ Western Editor  
WILLIAM KILPATRICK \_\_\_\_\_ Automotive  
KEVIN V. BROWN \_\_\_\_\_ Aviation  
ARTHUR MIKESSELL \_\_\_\_\_ Boating  
DANIEL C. FALES \_\_\_\_\_ Outdoors  
BILL HARTFORD \_\_\_\_\_ Electronics  
LEONARD E. SABAL \_\_\_\_\_ Home Workshop  
GARRY WINTER \_\_\_\_\_ Copy and Production  
RICHARD H. FUNK \_\_\_\_\_ Associate Copy and Production  
KATHY GARAVUSO \_\_\_\_\_ Assistant Copy and Production  
ALVIN KIETZ \_\_\_\_\_ Assistant Art Director  
LEO R. WEEKS \_\_\_\_\_ Assistant Art Director  
NILS NELSON \_\_\_\_\_ Assistant Art Director  
GEORGE W. BLOW \_\_\_\_\_ Technical Art Director  
FRANK P. FRITZ \_\_\_\_\_ Chief Photographer  
SOPHIE GRONOWICZ \_\_\_\_\_ Director, Bureau of Information  
EVERETT JOHNSON \_\_\_\_\_ Cabinetmaker

ADDRESS ALL EDITORIAL COMMUNICATIONS TO: 575 Lexington Ave., New York, N.Y. 10022. For additional sources of information on the articles and products in this issue, write to Bureau of Information, Popular Mechanics, for free "Where-to-Find-It" list.

L. PARK BENJAMIN, Advertising Director

ADVERTISING OFFICES: New York: 575 Lexington Ave., Murray Hill 8-8500; Chicago: 520 N. Michigan Ave., 527-2400; Detroit: General Motors Bldg., TRinity 5-8711; Cleveland: Hanna Bldg., 1422 Euclid Ave., PROspect 1-0456; Los Angeles: 601 North Vermont Ave., 666-6263; San Francisco: 1101 Hearst Bldg., YUKon 2-0823; Savannah, Ga.: 310 Drayton St., ADams 2-1106.

SUBSCRIPTION SERVICE: Mail all subscription orders, changes of address, correspondence concerning subscriptions, and Postmaster notices of undeliverable copies to Popular Mechanics, Box 646, New York, N.Y. 10019.

Popular Mechanics is published monthly by The Hearst Corporation, 57th St. at 8th Ave., New York, N.Y. 10019, U.S.A. Richard E. Berlin, President; George Hearst, V-Pres.; Richard E. Deems, President of Magazines; John R. Miller, Executive V-Pres. of Magazines; William S. Campbell, V-Pres. and Director of Circulation; Joseph F. Kern, V-Pres. for Popular Mechanics; Frank Massi, Treasurer; Harvey L. Lipton, Secy. Single copy in the United States and Canada, 35 cents. Subscription prices: United States and Possessions, \$4.00 for one year; \$7.00 for two years; \$10.00 for three years. Canada, add \$0.50 for each year. Pan American Postal Union countries, add \$1.00 for each year. All other countries, add \$2.00 for each year. When changing address, give old address as well as the new, with postal-zone number, if any, and allow six weeks for change to become effective. Second-class postage paid at New York, N.Y., and at additional mailing offices. Authorized as second-class mail by the Post Office Department, Ottawa, and for payment of postage in cash. Registered as second-class matter at the Post Office at Mexico, D.F., Mex.co. June 20, 1950. © 1967 by The Hearst Corporation. All rights reserved. Printed in U.S.A.

AUGUST 1967

## 3 tools that stop leaks permanently.



They're 3 DOW CORNING®  
Silicone Rubber Sealers  
that repair, seal, insulate  
and waterproof.

These are the tough sealers like those developed by Dow Corning to help keep Gemini spacecraft in orbit. They'll stand up to extreme heat and cold. They're all silicone rubber. Guaranteed for 10 years against shrinking or cracking.

There's no guessing about which one to use. The color tells you which sealer does the job best. And even if you're "all thumbs", you'll find Dow Corning sealers give you a professional-looking job.

You'll find lots of new uses for these sealers. Pick up some at your hardware, paint supply or specialty store. They cost a little more than non-silicone sealers. But they're worth it.

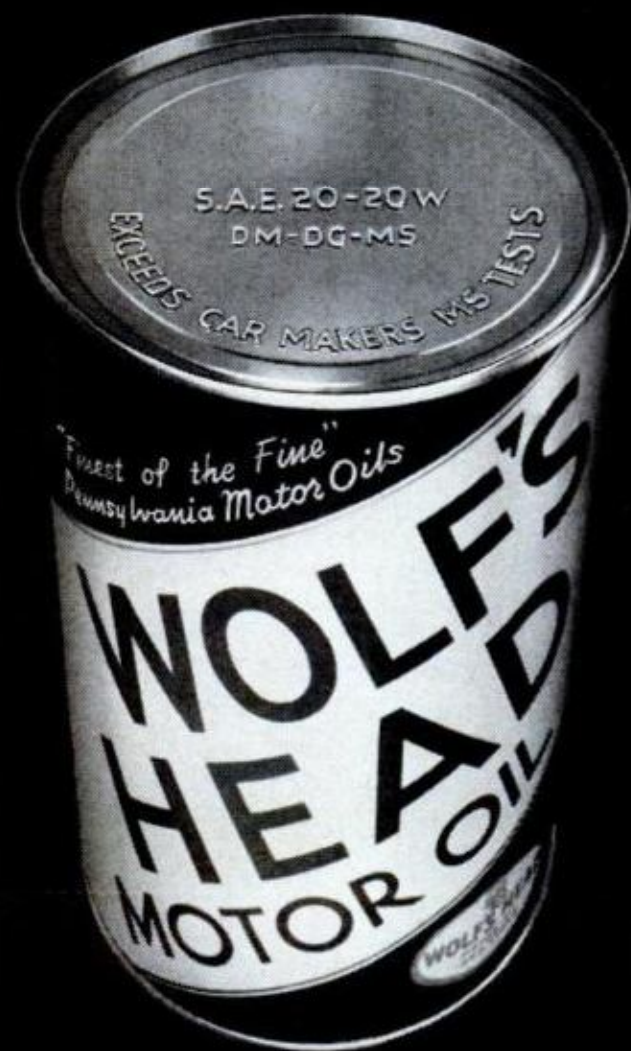
**CLEAR SEALER**  
**METAL SEALANT** (Aluminum)      **GLASS CAULK** (Black)

DOW CORNING

Consumer Products Division  
Midland, Michigan 48640



**Buy your oil  
the way  
you bought  
your car.  
Carefully.**



the Uncommon Motor Oil  
100% Pure Pennsylvania  
Wolf's Head Oil Refining Co.  
Oil City, Pa.

# LETTERS

TO THE EDITOR

## Angry young man

I enjoyed the *Racewatchers Guide to Competition Cars* (page 95, March PM), and it angered me no end when my mother threw it out. Please send me another issue.

Meriden, Conn.

ALAN STERNBERG

*Your mother did you a favor, because now we're sending you a big wall chart which anybody else—angry or not—would have to pay \$1.50 for by writing to Racewatchers Guide, Popular Mechanics, 575 Lexington Ave., New York, N.Y., 10022. (How's that for sneaking in a commercial?)*

## We dunnit first

The News Brief *Engine Compression Operates Spray Gun or Tire Pump* (page 128, March PM) gives the impression: What a clever device these English have invented! We think it's not quite fair as we pioneered such a device—the Enginair Tire Pump—37 years ago and have manufactured and marketed it ever since. G. H. Meiser & Co. Blue Island, Ill.

DAVID EDWARDS

*Okay, you win this round, but the English won't mind. They're still first with the Beatles, Twiggy and a stiff upper lip.*

## Right where it hurts

Seldom did a cleaning day go by that the Little Woman didn't have something to say about all those PMs in the way. I'd sort them by date, then, inevitably, become completely engrossed, and they would end up all over the house again. It's a hard thing to beat! Finally, I got the boxes in the garage, and every last box vanished. What a way to hurt a guy!

Please send me literature about the PM fleet. I've got to build another boat. Mobile, Ala.

ELBERT ROOT

*A new catalog of all PM publications and projects is on the way. Other readers can have one free by writing to the Popular Mechanics Service Bureau, 575 Lexington Ave., New York, N.Y. 10022.*

## Watch that pipe!

After reading *Four Weekend Projects with Pipe* (page 178, May PM), I must join [\(Please turn to page 8\)](#)



# WHO ELSE WANTS A BIG RAISE IN PAY?

**Stuck in a rut? Tired of your dead-end job? Here's proof you can step up to a high-salary position with prestige and security through LaSalle spare-time training.**

**J**UST LOOK at these enthusiastic letters. Have you ever seen anything like them? They are just a few of many hundreds of similar statements in letters that come from LaSalle students week after week, month after month, year after year.


LaSalle students have one ambition in common — to get out of the ranks of the untrained and earn big money, prestige and security in a key job. Isn't that your goal too?

Without interfering with your present work — and by devoting only a little of your spare time — you too can prepare rapidly for advancement in the field of your choice through LaSalle home study. The cost is surprisingly low.

LaSalle has been an acknowledged leader in home education for more than half a century. It has provided training in business, high school and technical subjects to more than 1,000,000 ambitious men and women. Its distinguished faculty includes some of the country's most outstanding authorities. That is why your LaSalle diploma is a credential recognized and respected by employers.


Check the subject you are interested in — then send the coupon below for FREE booklet. No obligation. Mail to LaSalle, 417 South Dearborn, Chicago, Illinois 60605.

**"My salary has increased 400% as a direct result of my LaSalle studies"**




Rudolph Urbatis,  
Port Chester, N.Y.

**"Salary more than doubled since enrolling"**




William T. Black,  
Canoga Park, Calif.

**"Income has increased 100 per cent since graduation"**



James L. Yonning,  
Manhattan, Kansas

**"I now earn three and a half times my former pay"**



Robert Fisher,  
Holbrook, Ariz.

## LA SALLE EXTENSION UNIVERSITY

A Correspondence Institution • 417 South Dearborn, Dept. 68-168, Chicago, Illinois 60605

Please send me, without cost or obligation, FREE booklet and full information on the field I have checked below:

### ACCOUNTING

- Complete Accounting with CPA Training
- General Accounting
- Income Tax
- Accounting Fundamentals
- Auditing
- Controllorship
- CPA Training
- Modern Bookkeeping

### BUSINESS MANAGEMENT

- Complete Business Management
- Credit and Collections
- Office Management
- Personnel Management
- Business Correspondence

### LAW COURSES

- Bachelor of Laws Degree
- Business Law
- Insurance Law
- Claim Adjusting Law
- Law for Police Officers
- Law for Trust Officers

### SALESMANSHIP

- Sales Management
- Complete Sales Training

### DRAFTING

- Basic Drafting
- Aeronautical Drafting
- Architectural Drafting
- Electrical Drafting
- Mechanical Drafting
- Structural Drafting

### REAL ESTATE

- Complete Real Estate
- Real Estate Brokerage
- Real Estate Management
- Real Estate Sales

### TRAFFIC AND TRANSPORTATION

- Complete Traffic Mgt.
- Transportation Law
- Rates and Tariffs
- Agency and Services
- Motor Truck Traffic

### STENOTYPE

- Machine Shorthand

### TECHNICAL COURSES

- Mechanical Refrigeration
- Air Conditioning, Refrigeration and Heating
- Diesel

### HIGH SCHOOL

- High School Diploma

### CAREERS FOR WOMEN

- Interior Decorator
- Dental Assistant
- Secretarial
- Accounting
- Bookkeeping
- Real Estate

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

Address.....County.....

City & State.....Zip No.....

Occupation.....Working Hours.....A.M.....P.M.

321



# Win a Workie- Watchie



Send us the most original use-of-the-month for Pliobond® adhesive and we'll send you this 9" Sony TV.

**PLIOBOND mends, seals, insulates, water-proofs. Bonds wood to metal to glass to cloth to plaster to rubber, etc.**

**Take it from there. Show us the most original Pliobond use and win something to watch while it dries.**

1) Describe in 50 words, or less, an interesting and unique use for Pliobond adhesive. Use entry coupon from local store, or plain paper no larger than 8½" x 11"

2) Send as many entries as you like to Goodyear Pliobond Contest, P O Box 9115, Akron, Ohio 44305. Send a label or other evidence of purchase with each entry.

3) Individual contests run in May, June, July, August, September and October, 1967. Winners will receive a Sony 9" portable TV set. These awards limited to one for each contest. Entries must be postmarked during the contest month in which you enter. All entries become the property of The Goodyear Tire & Rubber Company. None will be returned.

4) Entries will be judged by The Goodyear Tire & Rubber Company, and decisions of Goodyear will be final relating to questions about contest winners.

5) The contest is open to everyone in the United States and possessions or Canada except employees of Goodyear, the distributors and dealers of Pliobond adhesive and their immediate families. Contest is subject to Federal, State and local regulations.

6) All winners notified no later than November 30, 1967. A list of winners will be available if requested, and self-addressed, stamped envelope is enclosed.

**GOODYEAR**  
CHEMICALS

## LETTERS

(Continued from page 6)

the hordes of welders who should be writing you to warn anyone welding galvanized pipe: Beware of the fumes!

Allow more than adequate ventilation, and when you think you've enough, allow some more. I'm not certain just what chemicals are produced when the zinc coating of galvanized pipe is burned during normal welding, but personal experience and the advice of friends who weld for a living coincide. This whitish, thick smoke can set you on your hip pockets with a vengeance. I'm told it can be downright deadly in heavy concentration. Dunsmuir, Calif. R. D. BURCHELL

### Why the scratches?

In the drawings with the article, VC Firepower—Can We Match It? (page 97, June PM), why is it that you have shown the American weapons without scratches, chips, dents, or the like, and have shown the VC weapons with them? I am disappointed in your unfair presentation. Los Angeles MORTON KERN

*They're scratched because the VC won't let go of them very easily.*

You underestimated the weapons—both American and VC—in range and firepower. An example is the Chicom Type 56 Light Machine Gun (page 100). It's a Soviet weapon, and its cyclic rate of fire is a deadly 650, not the slow 150 rpm that you reported. There was one major exception—that "deadly" M-16.

I have never had to fire a rifle in combat, but I have had the chance to fire the M-1, M-14, M-16, the Type 53 and 56 carbines, as well as many other military weapons. Of all, I find the M-16 the least desirable. It has a high jamming rate; it is accurate, but at close range only. In fact, of all the rifles shown in your article, it has the least accurate ballistic range. Darien, Conn. FRANCIS HINES

### Annuals are back

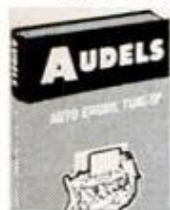
*The thousands of PM readers who in the past have purchased the PM annuals, 1033 Better Ways to Do It and Car Repair Annual, can anticipate brand-new 1968 issues. The first, 1033 Better Ways to Do It, should be on your newsstand right now. (If it isn't, ask your dealer to order it, or send 75 cents to the Popular Mechanics Service Bureau, 575 Lexington Ave., New York, N.Y., 10022, for your copy) The Car Repair Annual will go on sale the last week of September.*



**LEARN MORE—  
EARN MORE!**

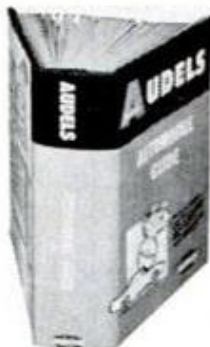
# AUDEL SKILL-BUILDING PRACTICAL GUIDES

## AUTO ENGINE TUNE-UP



**NEW**  
Complete tune-up procedures for all types of auto engines. Full adjustment data for carburetors, ignition, valves, etc. For the car owner who wants to do his own tune-up, as well as for the student or experienced mechanic. Fully illustrated. 416 pages. \$4.95

Circle No. 58 in Coupon



## AUTO GUIDE

**ALL-NEW**

biggest Auto Guide value! **\$6.95**

## FIX ANY CAR FAST!

**STEP-BY-STEP REPAIR GUIDE COVERS EVERYTHING:** Troubleshooting—unique symptoms-and-causes charts • Spark Plugs • Batteries • Tune-up • Distributors • Ignition Testing • Starters & Generators • Lighting • Tire Servicing • Brakes • Power Brakes • Front Suspension • Steering Systems • Wheel Alignment • Chassis, Springs & Shocks • Fuel Pumps • Carburetors • Cooling Systems • Lubricating Systems • Pistons & Rings • Crankshafts and Connecting Rods • Camshafts • Valves • Clutches • Automatic & Manual Transmissions • Drive Shafts & Universal Joints • Rear Axle Assemblies—**ABSOLUTELY EVERYTHING YOU SHOULD KNOW TO FIX ANY CAR!** Hundreds of illus. 736 pages. **\$9.95**

Circle No. 1 in Coupon

### Home Appliance Service Guide

How to fix refrigerators, washers, ranges, toasters, and all other electric & gas appliances. Fully illus. 608 pages. \$6.95

Circle No. 2 in Coupon

### Home Refrigeration & Air Conditioning

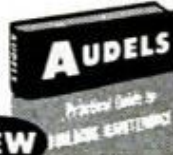
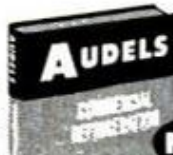
Servicing, operation and repair of all systems and machines, freezers, lockers, water coolers, etc. Illus. 576 pages. \$6.95

Circle No. 14 in Coupon

### COMMERCIAL REFRIGERATION

Practical guide and ready reference for students and workers. Covers all phases of installation, operation, maintenance and repair of commercial systems and machines. Complete coverage of electrical and mechanical work. Includes many useful tables and data. Fully illustrated. 544 pages. \$5.95

Circle No. 14B in Coupon



### BUILDING MAINTENANCE

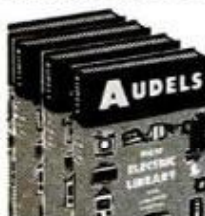
A guide for maintenance & custodial workers & building managers. Covers everything: Painting & Decorating • Plumbing • Concrete & Masonry • Carpentry • Roofing Maint. • Glazing & Calking • Elec. Maint. • Heating • Air Conditioning • Insect and Rodent Control, etc. Comprehensive; fully illustrated. 488 pages. \$4.95

Circle No. 99 in Coupon

### new Electric Library

10 volume electrical encyc. Answers questions on thousands of electrical problems. 9000 ill. 5558 pgs. Set \$25.00

Circle No. 15A in Coupon



### Practical Electricity

Complete handbook; practical, simplified ready reference on all electrical subjects. 1300 illus. 1088 pages. \$5.95

Circle No. 4 in Coupon

### TV-Radio Library

Two vols. on TV & radio circuits & how to install and repair all radio and TV including color. Illus. 960 pages. Set \$9.50

Circle No. 3 in Coupon



### MACHINISTS LIBRARY

Three volumes of ready reference on all the latest shop practices for machinists and toolmakers. Vol. 1—Practical Fundamentals of Basic Machine Shop Operations. Vol. 2—Setup and Operation of all the widely used, important shop machines. Vol. 3—Toolmakers Handybook with down-to-earth data on layouts, specifications, jigs and fixtures, gear forming, cams, etc. Illus. 1310 pages. 3-Vol. Set \$13.50

Circle No. 12N in Coupon



### CARPENTERS & BUILDERS GUIDES

Four all-inclusive volumes provide latest inside trade information on modern construction. Vol. 1—Tools, Steel Square, Joinery. Vol. 2—Builders Math, Drawings, Specs. Vol. 3—Layouts, Foundations, Framing. Vol. 4—Millwork, Power Tools, Windows, Doors, Roofing, Flooring. Most practical guide available. Thousands of diagrams, charts, graphs and photos. 1616 pages. 4-Vol. Set \$16.95

Circle No. 8 in Coupon

### Mathematics for Mechanics

A complete guide to the mastery of practical math. Simplified method makes learning fast and easy. Ill. 704 pgs. \$4.95

Circle No. 11 in Coupon

### Sheet Metal Pattern Layouts

Modern guide to all phases of sheet metal work, including pattern development. 350 layouts. Illus. 1152 p. \$7.50

Circle No. 29 in Coupon

### Blueprint Reading

For mechanics and construction men. Step-by-step explanation of how to read all types of blueprints. Ill. 416 pgs. \$4.95

Circle No. 25 in Coupon

### Electric Motor Guide

Covers hookups, control, maintenance and troubleshooting of all types of motors. Complete; 617 illus. 1062 pages. \$5.95

Circle No. 27 in Coupon

### Millwrights & Mechanics Guide

Practical information on plant installation; operation and maintenance data for foremen & workers. Illus. 1236 pgs. \$6.95

Circle No. 42 in Coupon

### Diesel Engine Manual

Complete practical guide to modern Diesel engines. Explains principles & how to maintain & oper. Illus. 544 p. \$6.00

Circle No. 9 in Coupon

### Truck and Tractor Guide

A guide for mechanics, drivers and maintenance men. Gas & Diesel repair, service and operation. Illus. 1366 pages. \$5.95

Circle No. 5 in Coupon

### Masons and Builders Guides

Four practical vols. for bricklayers, stone masons, cement workers, plasterers. 2000 illus. 1488 pages. Set \$10.50

Circle No. 26 in Coupon

### Plumbers & Steamfitters Guides

4 vols. of ready reference for plumbers, steam fitters, gas fitters, sheet metal workers. 3600 ill. 2318 pages. Set \$10.50

Circle No. 6 in Coupon

### Welders Guide

Practical guide to theory, operation. Maintenance of all types of electric, oxy-acetylene & Thermit welding. Ill. 626 p. \$4.95

Circle No. 10 in Coupon

### Foreign Auto Repair Manual

Up-to-date service data for all popular imports: English, French, German, Italian, Swedish. Illus. 592 pages. \$5.00

Circle No. 53 in Coupon

### Outboard Motor & Boating Guide

Practical details on all phases of outboard motor repair, maintenance and operation. Up-to-date. Illus. 446 pages. \$4.00

Circle No. 49 in Coupon

## 10-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 \$3 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 you are not COMPLETELY satisfied, return the books, and that will end the matter! NO STRINGS OR CATCHES TO THIS OFFER.

**THEODORE AUDEL & CO.**  
division of HOWARD W. SAMS & CO., INC.  
Indianapolis • New York

## MAIL THIS NO-RISK COUPON TODAY!

**THEODORE AUDEL & CO.—Self Improvement Publishers Since 1879—**  
4300 W. 62nd Street, Indianapolis, Indiana 46206

Please mail me for 10 days' FREE EXAMINATION the books I have circled at right. I agree to mail \$3 in 10 days on each book or set ordered, and to further mail \$3 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 \_\_\_\_\_  
PLEASE PRINT  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
Employed By \_\_\_\_\_

**SAVE SHIPPING COSTS!** Check here if you enclose complete payment with order (plus sales tax, if any). We pay postage charges. You have same return privilege.

### 1 New Auto Guide

2	3	4	5
6	8	9	10
11	12N	14A	14B
15A	25	26	27
29	42	49	53
58	99		

I have bought Audel books before



BY JOHN F. PEARSON  
**SCIENCE**  
WORLDWIDE

**NEW DRIVE AGAINST MOSQUITOES.**

A researcher at the University of California (Riverside) reports good results with a group of detergentlike chemicals in the control of the pesky insects. He says the chemicals—fatty nitrogen compounds used in industrial and agricultural products—are more effective than standard insecticides and are nontoxic to humans and warm-blooded animals. In addition, they kill by physical rather than chemical action, which may mean the bugs can't build up a resistance.

**SCOTLAND'S LEGENDARY MONSTER**

of Loch Ness is a real creature. At least, that's the opinion of Dr. Roy Mackal who, starting this summer, will carry out a two-year photographic search of the 24-mile-long, 750-foot-deep lake. The University of Chicago biochemist speculates that the "monster" may be a form of marine slug that represents a transitional state between the gastropods (snails and slugs) and cephalopods (squids and octopuses). It is possible, he says, that the parent forms were sea animals that became landlocked when land masses rose abruptly.

**HORROR PICTURES** and electric shocks will be used in an English hospital to treat drug addicts. The idea is to train them to associate their drug response with a highly unpleasant experience. While doses of heroin or cocaine are taking hold, the subjects will be hit with 70-volt jolts as they simultaneously view pictures of addicts in the worst stages of degradation. Called aversion therapy, the method has been used with reported success on compulsive gamblers and sexual deviates.

**MAN MAY HAVE INHABITED** the Americas as early as 40,000 years ago, according to U.S. Geological Survey scientists who have studied artifacts—crude tools and spear points—found near Puebla, Mexico, along with remains of Ice Age animals. The evidence will be subjected to intensive study before the scientists are ready to call it definitive. Earlier finds date back only 12,000 years.

**MORE TOOTH DECAY** is found in American women than in American men. In reporting the findings in a three-year health survey of 6700 persons, Public

Health Service officials said that pregnancy might be the factor causing the difference.

**OIL POLLUTION OF WATER**, such as that caused by the foundering of a super-tanker off the coast of England, can be cleaned up with a liquid compounded by a Netherlands inventor. He claims that when the liquid is sprayed on oil-contaminated water, it causes the oil to solidify into a carbonlike residue that can be collected or floated away.

**WHALE OF A CALL.** A 3000-pound female killer whale named Skana began to act sluggish and dispirited while being exhibited at a Vancouver, Canada, boat show. It was decided that "news from home" might boost her morale. A hydrophone was placed in her tank and hooked up with conventional telephone lines. A similar installation was made in the Seattle aquarium home, 140 miles away, of Skana's old pals, Katy and Kandu.

When Skana heard the high-pitched killer whale sounds from Seattle, she responded with similar outbursts and some fancy swimming. The conversation lasted for 10 minutes and was taped for future study.

**NEW OBSERVATIONS OF VENUS** indicate that the planet has no water—and therefore no life. That information comes from Dr. Gerard P. Kuiper, a leading astronomer of the University of Arizona. He reports that the observations were made with a special telescope aboard a Convair jet transport flying at 37,000 feet, well above 80 percent of the earth's atmosphere. Connected to the scope was an interferometer, an instrument capable of detecting the chemical content of radiating objects.

And those clouds around Venus that many a scientist vows hold water—they are probably nothing more than dust, says Dr. Kuiper.

**HOLLOW METAL SPHERES** are under test by Air Force engineers as replacements for conventional ball bearings in aircraft applications. The researchers think that the weight of standard bearings can be cut in half before there's any loss in strength. ★★ ★



# BIGGER BETTER SMALL ENGINES SERVICE MANUAL



It's ready... 8th edition Small Engines Service Manual. More than 300 pages of authentic easy-to-follow information on repair and upkeep of small engines. 1302 models of popular domestic and foreign makes. Many new models. Practical information. Written by expert mechanics in down-to-earth language and with lots of helpful illustrations. **EVERYTHING MECHANICS NEED!**

**MAKE \$\$\$**  
in Your Spare Time

for minor tune-up to major overhaul... Read how, see how from 780 photos and drawings. Big field and big part-time and full-time profits repairing Mowers, Garden Tillers, Cycles, Scooters, etc. . . . Order yours NOW and start a busy business . . . only \$4.95 postpaid.

**4.95**  
post paid

**SMALL ENGINES SERVICE MANUAL, Dept. 367**  
1014 Wyandotte Kansas City, Mo. 64105

## NEW CAR FURNISHED

This is only one of the benefits enjoyed by many Accident Investigators. Learn why this is called "the ideal job;" how men earn \$5 to \$8 an hour in this exciting, secure profession. Men without experience or college have easily trained and qualified. Send now for FREE BOOK of facts. No Obligation. Write Universal Schools, Dept. PM-8, 6801 Hillcrest, Dallas, Texas 75205.

## START YOUR OWN MONEY MAKING BUSINESS

Clean rugs on customers' floors — upholstery in their homes — even painted walls — with highly efficient electric machines which are making big money for others and giving them independence. Write today for complete information. It's FREE!

VON SCHRADER MFG. CO., Dept. 810 "R" Pl., Racine, Wis. 53403

## New Jet Engine Burns Gasoline



Powerful continual thrust for models, experiments, thrills! Operates by itself or drives model car, boat, plane, etc. **LOWEST PRICED GAS ENGINE.** Ram jet principle. No moving parts. Easy starting. Runs on regular gas. About 6" long. Use two for double power. **\$1.75** (52 for \$3.00). Complete. Each.

JOHNSON SMITH CO., DEPT. 213, DETROIT, MICH. 48224

## EARN \$200 A WEEK

### LEARN A TRADE YOU LIKE

After graduation you start as a mechanic in a good paying job; then advance to head mechanic or service manager. Many earn \$200 a week and up. You learn fast in our shops because you learn with tools on real equipment. Some students earn the greater part of their expenses while going to school.

Check the course in which you are interested.

- DIESEL MECHANICS  AUTO MECHANICS  
 WELDING  BODY FENDER REPAIR

Mail to: **AUTO-DIESEL COLLEGE**

226 7th Avenue, North, Department 86, Nashville, Tennessee  
Send me FREE catalog about course I have checked, also information about your FREE Placement Service.

Name \_\_\_\_\_

Address \_\_\_\_\_

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

AUGUST 1967

# SHOPPING MART

Products available by mail. Money-back guarantee.  
Order direct by Stock No. Send check or M.O.

## 3" ASTRONOMICAL TELESCOPE



See the stars, moon, phases of Venus, planets close up. 60 to 180 power. Aluminized and overcoated 3" diameter f/10 primary mirror, ventilated cell. Equatorial mount with locks on both axes. Equipped with 60x eyepiece and mounted Barlow lens. 3x finder telescope, hardwood tripod. Included FREE: "STAR CHART"; 272-page "HANDBOOK OF HEAVENS"; "HOW TO USE YOUR TELESCOPE" book \$29.95 ppd. Order # 85.050H.

Edmund Scientific Co., Barrington, New Jersey 08007.

## WAR SURPLUS ELECTRIC GENERATOR



Brand new Signal Corps Electric Generator. Generates up to 90 volts by turning crank. Use in high impedance relays. Charge ground & bring up night crawlers for bait or study. 2 Alnico Magnets alone now worth more than original gov't. cost of \$15. Wt. 2 lbs. \$6.95 Ppd. Order Stock No. 50.225H. Mtd. with light, to demonstrate electricity. \$11.95 Ppd. Order Stock No. 50.365H.

Edmund Scientific Co., Barrington, New Jersey 08007.

## "FISH" WITH A MAGNET



Go treasure hunting on the bottom! Fascinating fun & sometimes profitable! Tie a line to our 5-lb. Magnet—drop it overboard in bay, river, lake or ocean. Troll it along bottom—your "treasure" haul can be outboard motors, anchors, other metal valuables. 5-lb. Magnet is war surplus—Alnico V Type—Gov't. cost \$50. Lifts over 150 lbs., on land—much greater weights under water. \$12.50 Ppd. Order Stock No. 70.571H.

Edmund Scientific Co., Barrington, New Jersey 08007.

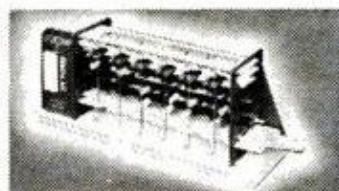
## AMERICAN MADE OPAQUE PROJECTOR



Projects illustrations up to 3" x 3 1/2"—enlarges them to 35" x 30" if screen is 6 1/2 ft. from projector, larger pictures if screen is farther away. No film or negatives needed. Projects charts, diagrams, color or black-and-white. Operates on 115 volts A.C. current . . . 6 ft. extension cord and plug included. Size 12" x 8" x 4 1/2" wide. Weight 1 lb. 2 ozs. Plastic case \$7.95 Ppd. Order No. 70.199H.

Edmund Scientific Co., Barrington, New Jersey 08007.

## NEW MODEL DIGITAL COMPUTER



Solve problems, tell fortunes, play games with miniature version of giant electronic brains! Adds, subtracts, multiplies, shifts, complements, carries, memorizes. Colored plastic parts easily assembled. 12" x 3 1/2" x 4 1/2". Incl. step-by-step assembly diagram, 32-p. instruction book covering operation computer language (binary system), programming, problems & 15 experiments. \$5.98 Ppd. Order Stock No. 70.683H.

Edmund Scientific Co., Barrington, New Jersey 08007.

## GIANT WEATHER BALLOONS



"Balls of fun" for kids, traffic stoppers for stores, terrific for amateur meteorologists. Create a neighborhood sensation. Great backyard fun. Exciting beach attraction. Amateur meteorologists use to measure cloud heights, wind speed and temp. Made of heavy duty neoprene. Inflate with vacuum cleaner or auto air hose; or locally available helium for high rise. 8' diam. \$2.00 Ppd. No. 60.568H. 16' diam. \$7.00 Ppd. No. 60.632H.

Edmund Scientific Co., Barrington, New Jersey 08007.

## GIANT FREE CATALOG



Completely new 1967 Catalog. 148 pages packed with nearly 4,000 unusual bargains. Exciting new categories. Many new items. 100's of charts, illustrations. Many hard-to-get war surplus bargains. Enormous selection of telescopes, microscopes, binoculars, magnets, magnifiers, prisms, photo components, etc. For hobbyists, experimenters, workshops. Shop by mail. No salesman will call. Write for Free Catalog "H" to

Edmund Scientific Co., Barrington, New Jersey 08007.





You can make money in

# WATCH REPAIR

## Learn at home the low cost Sweazey Way

Watch repairing pays up to \$6 an hour, part time watch makers report on survey. Unique and modern Sweazey home study System starts you making repairs right away on Swiss and American watches. Professionally prepared training. No previous experience needed. Special tools provided for practice. Tuition only \$5 a month. Diploma Awarded. Free sample lesson and opportunity book give all facts. Write today. No obligation.

**CHICAGO SCHOOL OF WATCHMAKING**  
Dept. 187, Fox River Grove, Illinois 60021

### FREE BOOK and SAMPLE LESSON

CHICAGO SCHOOL OF WATCHMAKING  
Dept. 187, Fox River Grove, Illinois 60021  
Please rush FREE BOOK and Sample Home Study Lesson.

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

Address \_\_\_\_\_

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

## Get Into Your Own BIG PROFIT HOME IMPORT BUSINESS



### BUY BELOW WHOLESALE Fantastic Bargains Get You Off to Quick Start

Cash in now at home, full or spare time. No experience needed. New, Drop Ship Plan offers first day profits. Deal direct by mail with overseas sources at below wholesale prices. Thousand more dazzling bargains with no product investment. FREE Book tells how.

8mm MOVIE CAMERA \$550

WALKIE TALKIE \$325

FIELD GLASSES 7 x 35 POWER \$240

CALENDAR WATCH WITH-OUT BAND \$233

### MAIL THIS COUPON

MELLINGER, DEPT. 258

1554 S. Sepulveda, Los Angeles, Cal. 90025

Rush FREE book "How to Import and Export" No obligation.

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

ADDRESS \_\_\_\_\_

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

# INVENTORS

INVENTIONS—NEW PRODUCTS—IDEAS DEVELOPED & PREPARED

For Commercial Appeal & Sales

DESIGN—MARKETING—PATENT SEARCHES—DRAWINGS

United States Patent Office former Patent Examiner

United States Government former Patent Adviser

Member: United States Chamber of Commerce

Second Decade of Reliable Service to

INVENTORS—MANUFACTURERS—ATTORNEYS

**THE RAYMOND LEE ORGANIZATION**

230-Z Park Avenue, New York, New York 10017

SEND FREE "INVENTION RECORD" Form & "IMPORTANT PATENT INFORMATION"

Name \_\_\_\_\_

Address \_\_\_\_\_

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

# NEW INVENTIONS

BY M. J. PEDERSEN

**AUTOMATIC CHOKE CONTROL** should aid cold starting. A small heating element, which won patent 3,291,461 for John Pope of Shrewsbury, Mass., is installed next to the bimetallic strip that controls the choke's air-intake valve. In cold weather, this valve frequently snaps shut, thus preventing the engine from starting. From the dashboard, where a light signals the driver when the valve is closed, the heater can be turned on just long enough—around 15 seconds—for the bimetallic strip to be heated sufficiently to open the valve.

**A CIGARET BOX** to make its contents more accessible has a hinged top and bottom. Push the bottom up and cigarets pop out at the top. Patent 3,282,465 went to William Davis of Smyrna, Tenn.

**INTERSECTION JITTERS** in drivers deciding whether they can make the green light up ahead may be alleviated if stoplights are equipped with a new timing signal that indicates the time left before the light changes. The electronic timer uses as a time base a 60-cycle alternating current, which powers the stoplight itself. A transistorized computer compares the seconds that have gone by with the total green-light period, then flashes the difference on a lighted panel. James Hines of Abilene, Tex., received patent 3,320,585.

**ROTARY COMBUSTION ENGINE** offering economy and simplicity of structure matches the power of a conventional piston engine. Cams controlling the geometry of the vanes lower the cost below that of previous designs. Four vanes deliver four power strokes per revolution to produce the smoothness of an eight-cylinder engine. Patent 3,299,865 was awarded Thomas Moyer of Newark, Ohio.

**BRAKES ON A TOWED CAR** are applied automatically by an actuator earning patent 3,318,422 for Eugenio Frescura of Bergamo, Italy. Attached to the tow bar, it goes into operation as the towing car decelerates. When the towed car begins to catch up with its tower, a piston compresses, activating an attached cable that connects with the brake pedal. As the distance between the two cars increases, the piston retracts to release the brake. ★★



# NOW YOU CAN BUY FORDS, CHEVROLETS, DODGES BELOW WHOLESALE!!

**NO GIMMICKS, NO HIDDEN CHARGES . . . THIS IS A STRAIGHT, HONEST OFFER! PROMPT DELIVERY GUARANTEED. RIGHT TO YOUR FRONT DOOR ANYWHERE IN THE UNITED STATES!!**



**ONLY \$50 DOWN AND THE BALANCE ON LONG EASY MONTHLY PAYMENTS!!! ANOTHER BIG SPECIAL FOR CLUB MEMBERS ONLY. JOIN TODAY. ONLY \$50 DOWN**

## HOW DO YOU GET IN ON THIS FABULOUS DEAL?

All you have to do is join the **WHOLESALE-DISCOUNT BUYERS CLUB**. As a member we'll show you how you can get the car of your choice\*promptly at the lowest price ever as shown above.

## WHAT ELSE DOES THE CLUB DO?

As a club member, you receive regular mailings with pictures and descriptions of dozens and dozens of name brand items that you can buy direct by mail at fantastic low, low wholesale-discount prices. Name brands such as DUNCAN-HINES, DORMEYER, COLEMAN, GRUEN, PRESTO, INTERNATIONAL SILVER, NUTONE, POLAROID, REMINGTON RAND, SCHICK, SMITH CORONA, SUNBEAM, WATERMAN, WEBCOR, WEAREVER, WESTINGHOUSE AND MANY, MANY MORE... APPLIANCES, TV SETS, TYPEWRITERS, WATCHES, JEWELRY, RADIOS, STEREO SETS, COOKWARE, FISHING SETS, SILVERWARE, HUNTING EQUIPMENT, BOOKS, GLASSWARE, LINENS, DRAPERY, FABRICS, FURNITURE,

## MONEY BACK GUARANTEE

We're so certain that you'll be absolutely thrilled as a member of the club, that we'll refund your \$3.00 membership fee anytime during the year you belong if you are dissatisfied for any reason whatsoever, with no questions asked. You have nothing to lose and everything to gain!

TOYS, FUR STOLES, HOSIERY, CLOTHING, SHOES, AND MUCH, MUCH MORE . . . Why pay regular retail prices? Join the **WHOLESALE-DISCOUNT BUYERS CLUB** today and start saving big money.

**WHOLESALE-DISCOUNT BUYERS CLUB  
DEPT. 196-8  
333 OLD TARRYTOWN ROAD  
WHITE PLAINS, NEW YORK 10603**

I enclose three dollars as payment in full for a year's membership in the **WHOLESALE-DISCOUNT BUYERS CLUB**. Please send complete information on the automobiles as described above, immediately by return mail. Also put me on the list to receive the descriptions and photos of name brand merchandise that I can purchase at wholesale and discount prices by mail. I understand that I am not obligated to buy anything and that I will receive a full refund of my \$3.00 membership fee at anytime, with no questions asked.

NAME \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_ STATE \_\_\_\_\_  
ZIP CODE \_\_\_\_\_



# WHAT'S NEW OUTDOORS

BY DAN FALES

**NO LONGER NEED YOU WORRY** about matches to start campfires. Now you can use a Metal Match that fits on a key ring. This ingenious invention is the "hottest" thing on the market. Using a knife, sharp rock, piece of glass or other sharp object, you slowly scrape filings from the match onto flammable material. Then scrape rapidly. This forces sparks



from the match, igniting the "dust" on the tinder. I've used one, and it surely starts fires in a hurry. With one 2½-inch match, you can light a thousand fires. Made from 10 earth metals like lithium, the match is unbreakable, waterproof, light, safe and will not leave marks on clothing. It sells for \$2.50 from Ute Mountain Corp., Box 2248, Grand Junction, Colo. 81501.

**HERE'S YOUR CHANCE** to get deeply involved in an issue that may well call for marches on state capitols, fights in legislative halls, and disagreements between fathers and sons. According to the American Littoral Society, only six states have an official fish. Most states have official trees, songs and flowers, but only Alaska, Alabama, California, New Mexico, Oregon and Wisconsin honor their respective fish: king salmon, tarpon, golden trout, cutthroat trout, chinook salmon and muskellunge. The limited recognition given fish

is surprising when you realize there are 30 million anglers in this country.

So ponder the question. Then write Nixon Griffis at the Society's Sandy Hook Marine Laboratory, Highlands, N.J. He'll send information on mounting a crusade for state recognition of your favorite piscatorial specimen. The society consists of some 2000 avid ocean and freshwater fishermen, fish watchers, aquarists, shell collectors, sport divers and waterside hobbyists. I wonder if the society has an official fish. Maybe it's the walleye honoring those fish watchers or waterside hobbists. Actually, the Society's purpose in life is the study and conservation of aquatic life. More power to them.

**WIPE-ON BUG PROTECTION** is what you get with Colgate's new Wash'n Dri insect repellent. Fashioned after the regular Wash'n Dri product, the insect repellent is a premoistened disposable towlette. You wipe it over exposed areas, except eyes and mouth. To discourage ticks, chiggers and other "no see 'ems," wipe socks, ankles and trouser cuffs.

**ARIZONA**, for such a dry state, has some good bass fishing. About 100 miles east of Phoenix lies San Carlos Reservoir, a nine-mile lake formed by Coolidge Dam. At the headwaters, six-pound largemouths wait for waterdogs (live bait that looks like a large lizard) or Bushwackers (Bomber Bait Co.'s weedless lures).

**I DON'T KNOW WHY**, but until recently I had become quite attached to a razor. It wasn't an ordinary razor. The head vibrated 6000 times a minute. There were no wires or batteries, just a spring that was tightened by twisting the bottom.

Anyway, I lost it on a camping trip out west. As far as I know, it's still vibrating, but in the hands of some cowboy that has cactus needles for a beard.

The Stahley razor costs \$24.60 for the stainless steel "live-blade" (as they call it) razor. It would make a good gift. Stahley is at 1811 St. John's Ave., Highland Park, Ill. 60035. ★ ★ ★





# MAGIC MAIL PLAN

that comes with this Little Machine  
CAN MAKE YOU \$1200 AN HOUR



The machine is turning out a job that will bring operator \$2.58, by mail. Material cost, only 11c

Write today for free facts about the newest and most fascinating of all new home operated businesses. For the first time, a simplified machine brings the fabulous profits of Plastic Sealing and Plastic Laminating within reach of the small operator. Anyone can learn to operate it 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 or Selling

Fill orders at home in spare time to start. Then expand to full time business. We even supply circulars to bring back cash and orders. Rush name for all the facts you need to start. A postcard will do. No charge.

**WARNER ELECTRIC CO., Dept. L2-JT**  
1512 Jarvis, Chicago, Ill. 60626

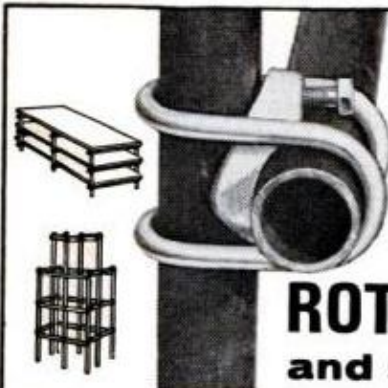
# REAL ESTATE

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, all ages, learn easily. Course covers Sales, Property Management, Appraising, Loans, Mortgages, & related subjects. **STUDY AT HOME** or in classrooms in leading cities. **DIPLOMA AWARDED.** Write TODAY for FREE Booklet! Accredited Member National Home Study Council. (Established 1936)

FREE BOOK TELLS HOW

**WEAVER SCHOOL OF REAL ESTATE**  
3521-P Broadway Kansas City, Mo. 64111



Build strong, useful structures at half the cost with **ROTA-LOCKS** and steel pipe!

Sturdy work benches, playground equipment, storage racks or other structures are built quickly and inexpensively using standard steel pipe and Rota-Lock... the new open loop locking device. One screw locks both pipes. 15 second assembly. 8000 lb. load capacity. Completely reusable.

Enter our Order No. \_\_\_\_\_ for these ROTA-LOCKS f.o.b. factory:

_____ ea. 3/4" x 3/4" Rota-Locks	@ \$1.20
_____ ea. 1" x 1" Rota-Locks	@ \$1.40
_____ ea. 1 1/4" x 1 1/4" Rota-Locks	1.60
_____ ea. 1 1/2" x 1 1/2" Rota-Locks	2.00
_____ ea. 2" x 2" Rota-Locks	2.80

Send Rota-Lock design load tables.

Company \_\_\_\_\_

Address \_\_\_\_\_

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

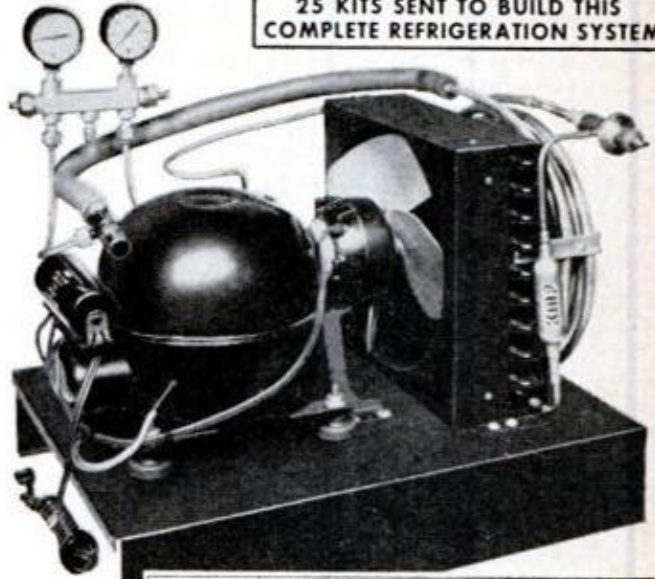
Signed by \_\_\_\_\_

**rota-lock** UP-RIGHT SCAFFOLDS  
Dept. 735 • 1013 Pardes Street  
Berkeley, California  
ALSO IN CANADA

# EARN BIG MONEY

IN  
AIR CONDITIONING,  
REFRIGERATION AND HEATING

25 KITS SENT TO BUILD THIS COMPLETE REFRIGERATION SYSTEM



APPROVED FOR GI TRAINING If you served since January 31, 1955 or are in service, check GI line in coupon

A better job, top pay and steady work are easily within your reach. Learn to repair and install air conditioning systems, refrigerators and freezers. Air conditioning is one of America's fastest-growing industries. Millions of autos and homes are being air-conditioned. The need for trained men is immediate and great.

**Make Home Your Training Center** — Learn by practicing. CTI sends 25 kits of tools and parts to build a complete refrigeration system — which you later convert into a refrigerator or freezer. The course is easy!

**Earn Money As You Train** — Since the CTI course includes training with real equipment, many students earn money repairing units soon after enrolling. On completing training they go into top pay jobs. Many get started in their own business.

**Mail Coupon Today** for free book. No obligation. Prove to yourself that the air conditioning, refrigeration and heating field is best for you — the easiest training to master and loaded with top pay opportunities.

Commercial Trades Institute, Chicago, Ill. 60626

### COMMERCIAL TRADES INSTITUTE

1400 Greenleaf Avenue  
Chicago, Illinois 60626 Dept. PM-867

Send book, *Be a Success in Air Conditioning, Refrigeration & Heating*. No obligation.

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

Address \_\_\_\_\_ Zip \_\_\_\_\_

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

Check for facts on GI Bill

Accredited Member National Home Study Council



**ACCOUNTING**

Accounting for Business Programmers  
 Accounting (Canadian)  
 Auditing  
 Business Law  
 Cost Accounting  
 C.P.A. Review  
 Estate & Trust Accounting  
 Executive Accounting  
 Federal Tax  
 General Accounting  
 Industrial Accounting  
 Junior Accounting  
 Legal Accounting  
 Office Accounting  
 Personal Income Tax Procedure  
 Practical Accounting  
 Public Accounting  
 Small Business Accounting  
 Starting & Managing a Small Bookkeeping Service

**ARCHITECTURE AND BUILDING**

Architectural Drawing & Designing  
 Architecture  
 Building Contractor  
 Building Estimator  
 Building Inspector  
 Building Maintenance  
 Carpenter-BUILDER  
 Carpentry & Millwork  
 House Planning & Interior Design  
 Mason  
 Painting Contractor  
 Reading Arch. Blueprints  
 Review in Arch. Design & Practice  
 Review of Mech. Systems in Buildings

**ART**

Amateur Artist  
 Commercial Art  
 Commercial Cartooning  
 Illustrating with Options:  
 —Magazine  
 —Advertising Layout  
 —Illustration  
 Interior Decorating  
 Oil Painting for Pleasure  
 Show Card & Sign Production  
 Show Card Writing  
 Sign Painting & Designing  
 Sketching & Painting

**AUTOMOTIVE**

Automatic Transmission Specialist  
 Automobile Body Rebuilding & Refinishing  
 Automobile Electrical Technician  
 Automobile Engine Tune-Up  
 Automobile Technician  
 Automotive Mechanic  
 Diesel-Gas Motor Vehicle Engines

**BUSINESS**

Advertising  
 Basic Inventory Control  
 Business Administration  
 Canadian Business Courses  
 Condensed Business Practice  
 Direct Mail & Mail Order Advertising  
 Industrial Psychology  
 Magazine & Newspaper Advertising  
 Managing a Small Store  
 Marketing  
 Marketing Management  
 Marketing Research  
 Modern Executive Management  
 Office Automation  
 Office Management  
 Production Management  
 Purchasing Agent  
 Retail & Local Advertising  
 Retail Business Management  
 Retail Merchandising  
 Retail Selling  
 Systems and Procedures Analysis

**CHEMICAL**

Analytical Chemistry  
 Chemical Engineering  
 Chemical Engineering Unit Operations  
 Chemical Laboratory Tech.  
 Chemical Process Operator  
 Elements of Nuclear Energy  
 General Chemistry  
 Instrumental Laboratory Analysis

**CIVIL ENGINEERING**

Civil Engineering  
 Construction Engineering Technology  
 Highway Engineering Tech.  
 Principles of Surveying  
 Reading Highway Blueprints  
 Reading Struct. Blueprints  
 Sanitary Engineering Tech.  
 Sewage Plant Operator  
 Structural Engineering Technology  
 Surveying and Mapping  
 Water Works Operator

**COMPUTERS**

COBOL Programming  
 Fortran Programming for Engineers  
 Programming for Digital Computers  
 Programming the 1401  
 Programming the IBM SYSTEM/360 Computer

**DRAFTING**

Aircraft Drafting  
 Architectural Drafting  
 Design Drafting  
 Drafting Technology  
 Electrical Drafting  
 Electrical Engineering Drafting  
 Electronic Drafting  
 Introductory Mechanical Drafting  
 Mechanical Drafting  
 Pressure-Vessel and Tank  
 Print Reading  
 Sheet Metal Layout for Air Conditioning  
 Structural Drafting

**CAST  
 YOUR  
 BALLOT  
 FOR  
 A  
 SUCCESSFUL  
 FUTURE!**

**253 I.C.S.**

Special rates to members of U. S. Armed Forces.

Approved for veterans under new G. I. Bill.



I.C.S. is the oldest, largest school of its kind. Over 200 courses for men and women. High school, business, secretarial, interior decorating, engineering. One for **you**. Direct, job-related. Bedrock facts and theory plus practical

application. You learn from experts. Diploma to graduates.

Clip and mail the coupon **now**. You'll receive, absolutely FREE, 3 valuable booklets that have helped thousands. But don't delay. Cast **your** "ballot" today!





**ELECTRICAL**

Electric Motor Repairman  
 Electrical Appliance Servicing  
 Electrical Contractor  
 Electrical Engineering (Power option or Electronic option)  
 Electrical Engineering Tech.  
 Electrical Instrument Tech.  
 Industrial Electrical Tech.  
 Power Line Design and Construction  
 Power Plant Operator (Hydro or Steam Option)  
 Practical Electrician  
 Practical Lineman  
 Reading Electrical Blueprints

**ENGINEERING (Professional Refresher Courses)**

Chemical  
 Civil  
 Electrical  
 Engineer-in-Training  
 Industrial  
 Mechanical

**ENGLISH AND WRITING**

Better Business Writing  
 Free Lance Writing for Fun & Profit  
 Introductory Technical Writing  
 Modern Letter Writing  
 Practical English  
 Short Story Writing

**HIGH SCHOOL**

High School Business  
 High School (Canadian)  
 High School College Prep. (Arts)  
 High School College Prep. (Engineering & Science)  
 High School General  
 High School Mathematics  
 High School Secretarial  
 High School Vocational

**LANGUAGES**

(Edited by Berlitz)  
 French  
 German  
 Italian  
 Spanish

**LEADERSHIP**

Basic Supervision  
 Industrial Foremanship  
 Industrial Supervision  
 Modern Woman as a Supervisor  
 Personality Development  
 Personnel-Labor Relations  
 Supervision

**MATHEMATICS**

Advanced Mathematics  
 Mathematics and Mechanics for Engineering  
 Mathematics & Physics for Technicians  
 Mathematics and Physics for Engineering  
 Modern Elementary Statistics

**MECHANICAL**

Aircraft & Power Plant Mechanic  
 Hydraulic & Pneumatic Power  
 Industrial Engineering  
 Industrial Management for Engineers  
 Industrial Engineering Tech.  
 Industrial Instrumentation  
 Machine Design  
 Mechanical Engineering  
 Quality Control  
 Safety Engineering Tech'gy  
 Tool Design  
 Value Analysis  
 Vibration Analysis and Control

**PETROLEUM**

Natural Gas Production & Transmission  
 Oil Field Technology  
 Petroleum Production  
 Petroleum Production Engineering  
 Petroleum Refinery Operator  
 Pipeline Engineering Tech.

**PLASTICS**

Design of Plastic Products  
 Plastics Technician

**PLUMBING, HEATING, AIR CONDITIONING**

Air Conditioning  
 Air Conditioning Maintenance  
 Domestic Heating with Oil & Gas  
 Domestic Refrigeration Heating  
 Heating & Air Conditioning with Drawing  
 Industrial Air Conditioning  
 Industrial Heating  
 Pipe Fitting  
 Plumbing  
 Plumbing & Heating  
 Plumbing & Heating Estimator  
 Practical Plumbing  
 Refrigeration  
 Refrigeration & Air Conditioning

**PULP AND PAPER**

Paper Machine Operator  
 Paper Making  
 Pulp Making  
 Pulp & Paper Engineering  
 Pulp & Paper Making

**SALESMANSHIP**

Creative Salesmanship  
 Real Estate Salesmanship  
 Sales Management  
 Salesmanship

**SECRETARIAL**

Clerk-Typist  
 Commercial  
 Engineering Secretary  
 Legal Secretary  
 Medical Secretary  
 Professional Secretary  
 Shorthand  
 Stenographic  
 Typewriting

**SHOP PRACTICE**

Drill Operator  
 Foundry Practice  
 Industrial Metallurgy  
 Lathe Operator  
 Machine Shop Inspection  
 Machine Shop Practice  
 Machine Shop Practice & Toolmaking  
 Metallurgical Engineering Technology  
 Milling Machine Operator  
 Multicraft Maintenance Mechanic  
 Practical Millwrighting  
 Reading Shop Prints  
 Rigging  
 Tool Engineering Tech'gy  
 Tool Grinder  
 Toolmaking  
 Turret Lathe Operator  
 Welding Engineering Technology  
 Welding Processes

**STEAM AND DIESEL POWER**

Boiler Inspector  
 Industrial Building Engineer  
 Power Plant Engineering  
 Stationary Diesel Engines  
 Stationary Fireman  
 Stationary Steam Engineering

**TEXTILES**

Carding  
 Carding and Spinning  
 Dyeing & Finishing  
 Loom Fixing  
 Spinning  
 Textile Designing  
 Textile Mill Supervisor  
 Textile Technology  
 Warping and Weaving

**TRAFFIC**

Motor Traffic Management  
 Railway Rate Clerk  
 Traffic Management

**TV-RADIO-ELECTRONICS**

Color Television Principles & Servicing  
 Communications Techn'gy  
 Electronic Fundamentals  
 Electronic Fundamentals (Programmed)  
 Electronic Fundamentals with Electronic Equipment Training  
 Electronic Instrumentation & Servo Fundamentals  
 Electronic Principles for Automation  
 Electronics and Applied Calculus  
 Electronics Technician  
 First Class Radiotelephone License  
 Fundamentals of Electronic Computers  
 General Electronics  
 General Electronics with Electronic Equip. Trng.  
 Hi-Fi Stereo and Sound Systems Servicing  
 Industrial Electronics  
 Industrial Electronics Engineering  
 Industrial Electronics Engineering Technician  
 Numerical Control Electronics & Maintenance  
 Practical Radio-TV Eng'g  
 Practical Telephony  
 Principles of Radio-Electronic Telemetry  
 Principles of Semiconductor-Transistor Circuits  
 Radio Servicing with Equipment Training  
 Radio & TV Servicing  
 Radio & TV Servicing with Equipment Training  
 Second Class Radiotelephone License  
 Sound Systems Specialist  
 Telephony, Electronics and Radio Communications  
 TV Receiver Servicing  
 TV Technician

# COURSES

Clip coupon—and take your first big step to real success! I.C.S., Scranton, Penna. 18515

In Hawaii: P. O. Box 418, Honolulu  
 In Canada: Mail to Scranton, Penna. Further service handled through I. C. S. Canadian, Ltd.  
 In other countries: I. C. S. World, Ltd.

**FREE! THE I.C.S. SUCCESS KIT!**

Three valuable booklets sent to you free when you mark and mail the I.C.S. coupon. No obligation.

1. "How to Succeed"—A new, exciting booklet that lets you evaluate yourself and your future in an entirely different way!
2. Complete catalog outlining job opportunities and outlook in your field of interest.
3. Sample lesson to demonstrate the success-proved I.C.S. method of spare-time study.

Accredited Member, National Home Study Council

**ICS****INTERNATIONAL CORRESPONDENCE SCHOOLS**

Box 00999Y, Scranton, Penna. 18515

Without cost or obligation, send me "HOW to SUCCEED," the opportunity booklet about the field I have indicated below, and a sample lesson.

Course in which I'm interested: \_\_\_\_\_  
(Select from listing above)

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

Address \_\_\_\_\_  
(Indicate Mr., Mrs., or Miss)

City \_\_\_\_\_ State \_\_\_\_\_ Zip code \_\_\_\_\_

Occupation \_\_\_\_\_ Working hours \_\_\_\_\_ A.M. to \_\_\_\_\_ P.M.

Employed by \_\_\_\_\_

Special I.C.S. booklets for women Convenient Payment Plans





# FREE!

## Trial lesson in DRAFTING & DESIGN

Prepare at Home In Spare Time  
For a Job with a Real Future!



Check the want ads in any city newspaper—SEE the big-pay opportunities open to you as a Draftsman. Thousands of men like yourself have prepared at home, in their spare time, for this well-paid, prestige profession. Easily learned in a few spare hours each week. Start now, and you'll soon be ready to take your pick of many good jobs! Approved for Veterans.

### FREE INFORMATION— MAIL COUPON TODAY

Can YOU learn Drafting at home? You'll never know until you send for our FREE TRIAL LESSON and find out! No charge, no obligation . . . send for it today. C.T.C. resident and home study courses in Engineering and other subjects have trained thousands since 1904. Accredited Member, National Home Study Council.

WE FURNISH EVERYTHING you'll need!

## CHICAGO TECHNICAL COLLEGE

K-205 Tech Bldg., 2000 So. Michigan Ave.  
Chicago, Illinois 60616

Rush FREE Trial Lesson in DRAFTING.

Name..... Age.....  
Address.....  
City..... State..... Zip.....  
New G.I. Bill! Veterans check here:



**REPOWER** with a 6 or V-8. H.D. ADAPTORS for using Car, Compact and some Truck engines. 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 276-3442, Pendleton, Oregon 97801

Give your zip code  
when answering ads



## Be an Architectural DRAFTSMAN

1000s big pay jobs open to trained Draftsmen (see "help wanted" ads in city papers). U. S. Labor Dept. says "42% more Draftsmen needed in next 10 years." Easy step-by-step spare time home-study plan has helped 100s beginners toward \$\$\$\$\$, security, prestige! Why not you? Send for "DRAFTING CAREER KIT" & new 5-Way Drafting Instrument—All FREE! No salesman will call. G. I. approved. Write & state age.

NORTH AMERICAN SCHOOL OF DRAFTING  
4500 Campus Dr., Dept. 4178, Newport, California 92660

## NEW CATALOG FOR THE WOODWORKER

Just like having a warehouse in your living room! Complete Catalog for Home Craftsman or Handyman. Imported Woods, Veneers, Tools, Hardware, Lamp Parts, Legs, Top Quality Kiln Dried Woods, Kits and other hard to find items. All at BARGAIN PRICES. Only 35¢ ppd.



## KAY-KRAFT MILLS

602 North 1st St., Dept. PM-7,  
Vincennes, Indiana 47591

## DOT SPEEDY RIVETS

"JUST SWAT with Hammer"



- Works like a charm . . . holds firm!
- Look for NEW red and yellow Skin-Pack Cards!
- Look for Colorful NEW Display Carton, too!
- Available in two sizes; nickel, gilt, black and brown colors!
- Sold at hardware stores.

**COLUMBIA FASTENER**

Every home should have Speedy Rivets . . . "The Fix-it Man's Best Friend"!

SUBSIDIARY OF UNITED-CARR  
3229 S. Ashland Av., Chicago, Ill. 60608



## EARN HIGH WAGES as a HEAVY EQUIPMENT OPERATOR

Train your way to high pay in the booming construction industry! Learn the skills you need to qualify . . . NOT by correspondence, but by actual field training on machines like the ones used by the industry. Huge training grounds in North Carolina, a million dollars worth of school-owned diesel-engined machines, experienced instructors, full 220-hour and 440-hour courses. National, the original school of heavy equipment operation, is a recognized leader. Member American Road Builders Assn., Services and Supply Division. Associate Member A.G.C. Full-time Job Advisory and Counseling Director on staff. VA approved. For men ages 17 to 56. Train Now-Pay Later plan . . . other payment plans also available. Write TODAY for FREE catalog and FREE copy of school newspaper reporting news of National School graduates.

NATIONAL SCHOOL OF HEAVY EQUIPMENT OPERATION, Dept. D-6  
P.O. Box 1686, Moores Chapel Road, Charlotte, N. C. 28201  
Please send me FREE illustrated school catalog and complete information. I understand there's no obligation.

Name..... Age.....  
Address..... Phone.....  
City..... State..... Zip Code.....



## FREE MUSCLE COURSE!

Trade in that skinny scrawny, milk toast or overweight body of yours for a new Weider Jet-Charged body, rippling with mountains of muscles loaded with energy, drive and virility, the envy of every man and admiration of every woman, now! In 15 minutes I'll prove you can slap on 4 inches of muscles to your chest,—3 inches to each arm—give you life-guard shoulders, trim your waist to athletic size—give you speedy athletic legs. I don't care if you're short or tall, (skinny or fat) young or not so young, expect a muscle building miracle when you send for my FREE course. Send only 25 cents to cover postage and handling and write to the Trainer of "Mr. Universe", "Mr. America", "Mr. Europe".



JOE WEIDER, Dept. 38-87D  
531 32nd St., Union City, N. J. 07087

HAVE  
YOUR OWN  
**MAIL  
ORDER  
BUSINESS**

## EASY DROP-SHIP PLAN

Start now—build your own Christmas & all-year business! Sell 65 popular products with catalog printed with your name, address. No risk — you get cash in advance, we Drop Ship orders. Sample catalog, details FREE. GIFT GUIDE, 3408½ MOTOR AVE. DEPT. 15, LOS ANGELES 90034

**BEGIN AT  
HOME**  
PART TIME  
NO  
MERCHANDISE  
INVESTMENT



## Fantastic Savings on NEW ACCORDIONS 1/2 OFF

40 NEW MODELS... 5-DAY FREE TRIAL

Just arrived! Standard and Electronic Accordions — Amplifiers! New ideas, New styling, New features! Buy direct from world's largest dealer. Importer-to-you prices. Trades accepted. Easy terms. Write for Free Color Catalogs.

Accordion Corp. of America, Dept. R-87  
5535 W. Belmont, Chicago, Illinois 60641

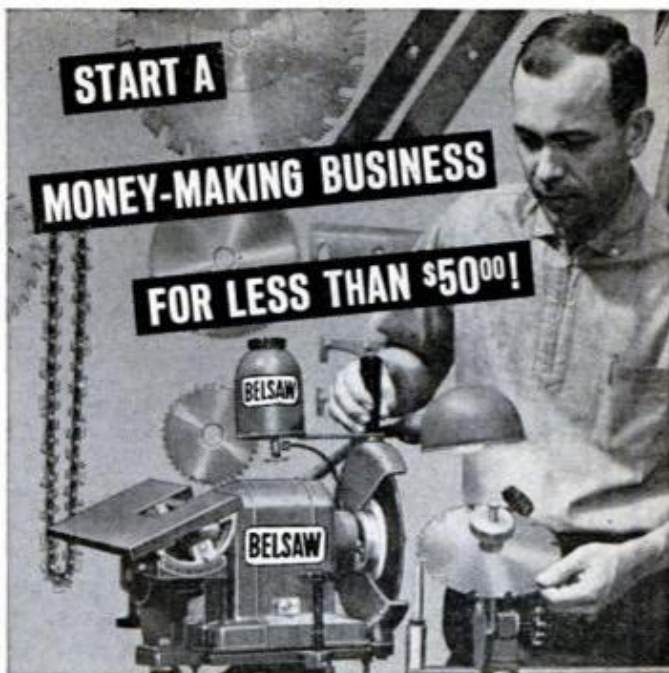


## Print Your Own

Cards, Stationery, Advertising, Circulars, labels, photo and movie titles, church work, tags, greeting, sympathy, prayer cards, etc. Save money. Pays for itself in a short time.

### Own a Printing Business

Good Profit. Raised printing like engraving too. Have home shop. We supply everything. Direct from factory, only. Easily followed rules. Write now for free details. **KELSEY PRESSES E-37 Meriden, Conn. 06450**



**START A  
MONEY-MAKING BUSINESS  
FOR LESS THAN \$5000!**

**No Selling, No Inventory... All  
Cash Profits and YOU Set The Hours!**

You can have your own lifetime business right at home... work in spare time... and make up to \$200 a month CASH! My FREE PLAN gives you all the facts: How to start, how to grow. You don't need previous experience. You don't have to sell. I'll even finance you. People bring you the work and pay cash. Over 90¢ of every dollar you collect is clear cash profit. And you work when you want to. Let me prove you can't find a more certain, lower cost, higher paying business of your own.

**Does The Belsaw Pay?  
YOU BET!**

W. R., Maryland

C. S., Minnesota

"My BELSAW is working fine and business is increasing by 20 to 30 customers a month. I've added one employee and am looking for a night man to handle rush jobs."

"The sharpening business has helped me buy two homes and three motor cars. The nice thing about the Sharp-All is that you get some cash every day."

## RUSH COUPON TODAY!

Just Mail Coupon — No Salesman Will Call

**FREE  
BOOK**

**BELSAW SHARP-ALL CO.**

Stan Field, President  
7185 Field Bldg., Kansas City, Mo. 64111

Name \_\_\_\_\_

Address \_\_\_\_\_

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

## BUILD YOUR OWN CAMPER AND Save!

Complete, easy to follow Camper Plans, Instructions and Materials List \$3.95

**SATISFACTION GUARANTEED**

PICKUP COVER PLANS \$2.00

EQUIPMENT CATALOG \$1.00

Refundable on first order.

**ORDER FROM THIS AD!**



**SAVE 50% ON  
VIKING CAMPER KIT**  
All items from our catalog to build a \$1,795.00 camper, 10 ft. or 10'6" size—Only \$847.10

Send Check or Money Order.  
For details send dime.

**VIKING CAMPER SUPPLY, INC.**

94-8P Glenwood Ave.

Minneapolis, Minn. 55403

Please send \_\_\_\_\_ for

which I enclose \$\_\_\_\_\_

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_

STATE \_\_\_\_\_ ZIP \_\_\_\_\_



# SOLUTIONS FOR MECHANICAL HEADACHES

# AUTOMOBILE CLINIC

BY MORT SCHULTZ

## Lady in distress

*My 1958 Volvo has an odd starting problem. Part of the time, the only way I can get the starter to work is to short across the solenoid, which isn't very dignified for a lady. Everything has been checked relative to the situation—new battery, new solenoid, new armature, new voltage regulator, new starter switch, and so on. The starter spins, but too sluggishly to crank the engine. Do you have any ideas on this?—Blanche Dyson, Caldwell, Kans.*

Yes, ma'am. I would say the starter drive is probably hanging up on the shaft. It's not uncommon with a Volvo starter. Have the starter drive removed. Clean and lubricate the shaft, and work it back and forth by hand a few times. This cure has worked before—maybe it'll work again.

## Rub-a-dub-dub

*That automatic transmission in my 1964 Pontiac Tempest has a case of washboard blues. It gives out with a rubbing sound when shifted from neutral to any range when the car is at a dead stop or just starts to move. When I pick up speed, sound disappears. I know "sound" is tough to diagnose via mail. So, if you're not happy, return my four bits.—Barney Booker, Bishop, Calif.*

I'm happy, but I don't think you'll be. Probably one of two things is causing the noise: 1, the gear box is getting badly sludged; 2, the converter is starting to go bad. Cleaning the strainer and replacing fluid may help if it isn't too far gone, so do that first. From there on, Barney, you'll have to take pot luck.

## Phew!

*What could cause gasoline to get into the oil of my 1963 Ford Falcon? The PCV's been cleaned religiously—five times—by a dealer who must have it "in" for this poor part. I think he's sniffing up the wrong system. Am I right?—Tom Rausen, Houston, Tex.*

Yeah, man. I've been schooled that there are two ways for gas to get into oil: via a bad economizer valve in the carburetor; via a ruptured fuel pump diaphragm. Odor around those a bit.

## A Marine mechanic

*Hope you'll pass this on to your readers, Mort. It will save them money . . . and keep them safer. It concerns the old problem of Corvair rear-tire wear. I own a 1962 Monza and had the same trouble. No more. Here's what I did:*

1. Installed heavy-duty rear springs that decreased rear negative camber.

2. Installed an Empi camber compensator to the rear end and an anti-sway bar up front.

3. Installed heavy-duty shocks, front and rear.

4. Increased tire pressure to 28 psi up front and 36 psi aft.

*I now get 35,000 miles to a set of tires and, believe me, the car is safer to drive.—S/Sgt. Thomas J. Doyle, USMC, APO San Francisco.*

That's taking the situation in hand, Tom.

## In a fog

*When my 1966 Volvo is left in the hot sun, an oil-like fog steams up and covers the windows and I can't wash it off. This happens even with the windows cracked. Can you tell me why?—E. C. Vermaleken, Hialeah, Fla.*

Although you don't say, I'll bet you have leather upholstery in the car. The fog's steaming up from the leather. It's quite common in hot climates. Unfortunately, there's little you can do about it. But you can keep the windows clean by washing them with ammonia. Leave the air vents open at all times, especially at night. This may not cure the problem completely, but it will help.

## Dental work

*The brakes are awfully soft on my 1965 Ford Galaxie 500. No mechanic has been able to help. Is the cure a secret?—Herman Hannenan, Racine, Wis.*

Well, you won't find it in the book, if that's what you mean. The 65s did have a tendency toward a soft pedal. Want to harden them up? Okay. Have a Ford mechanic (most of them know the score on this) remove the self-adjusters you now

*(Please turn to page 24)*





Road tests under tough driving conditions prove it...

# The Round Tire



rolls  
at least  
3,000  
miles  
further!

Road testing is just one of many things that confirm the consistently superb performance of an Atlas PLYCRON\*—The Round Tire.

You see, The Round Tire is made in a mold that's precision engraved to within 3/1000 of an inch of perfect round. Other molds can be out of round as much as 30/1000 of an inch.

This near-perfect roundness is just *one* of the many reasons why an Atlas PLYCRON Tire rolls more smoothly, wears more evenly.

**FOUR ACTUAL PLYS.** The Round Tire has 4-ply construction for greater strength plus many other marks of quality—a unique tread design which puts more rubber on the road—longer-

wearing tough rubber compounds. These are just a few of the many examples of the *care* that goes into building The Round Tire.

**SAFETY TESTED.** You'll be glad to know The Round Tire is also safety tested in 54 different ways.

In addition, complete sets of tires from various manufacturers' production for '67 cars were promptly road tested under identical conditions by an independent test fleet.

These tests showed you can expect 3,000 more miles from The Round Tire than from tires that come on most new cars.

Get *your* extra miles with The Round Tire!



## ATLAS PLYCRON

TRADE MARK "ATLAS" "PLYCRON" REG. U.S. PAT. OFF. © 1967 ATLAS SUPPLY CO.

Sold at over 50,000  
leading service stations  
Atlas Tires • Batteries • Accessories

AUGUST 1967

23



## AUTO CLINIC

*(Continued from page 22)*

have in the car and replace them with ones having narrower teeth.

### Mail reducer, we hope

*We have two Volkswagen 1500s in the family, and both have the same problem. Every time it rains, the cars won't go. I sprayed all wires and plugs and had tune-ups and stuff. The fact that it happens to both cars seems to indicate a common weakness in this model. Am I right?*

—James J. Coyle, P.E.I., Canada.

The fact that I've received quite a few letters about this problem for this car surely indicates a weakness common to the 1500 model. Let's take it by the num-

bers. There have been many carburetor modifications for this car, so make sure all have been applied. In addition, the higher compression of this model versus other VW types makes starting more difficult. And, the fact that the voltage output of the electrical system of the 1500 is just enough for cranking, make sure the electrical system is in tip-top shape and don't try to start with your lights on.

A thorough checkout of the electrical system is called for. If you still don't get snappy starts, it might help to have your dealer install a starting relay that shoots current directly from coil to starter. And, there's still another step you can take: Have your dealer replace the wire running from the ignition switch back to the engine where it is Y-ed to the choke heaters with a heavier wire.

## Service Tips

● **1967 Ramblers** with the 199 cu.-in. engine and Flash-o-Matic transmission have revised ignition timing and idle speed specs. New timing setting calls for 3° BTDC ( $\pm 1^\circ$ ). New idle speed specification is 525 rpm with the transmission in gear. By the way, if the car has air-conditioning, the final idle rpm must be set with the air-conditioning operating.

● **Chevrolet sparkplug boots** come in different colors for a purpose; they're color-coded. There are three common replacement types on the market: hypalon (black), neoprene (black) and silicone (red or orange). Any are okay to use unless your car has a high performance engine. In the case of the Chevy 396 and 427 cubic inchers, for example, when replacement is needed, use silicone boots. Since silicone boots by themselves aren't available from independent suppliers, the entire wire assembly has to be replaced. Silicone resists high tear forces better than others.

● **Oldsmobile airconditioners** can now rest all winter. Previously the manual called for occasional operation during the winter. Short-period operation now and then during cold weather was supposed to keep the compressor shaft seal lubricated and leakfree. Now, according to Oldsmobile, engineering tests reveal this procedure is no longer required on past or present models. Until you hear otherwise, the information applies only to Olds.

● **1966 Ford owners** may be having rough idle problems. A missing tip portion of the jiggle pin in the PCB valve could be causing it, especially in those cars with 289, 300, 340, 363, 361 and 391 cu.-in. engines. This missing tip allows air leakage past the valve, affecting the carburetor's air-fuel mixture. To check yours,

remove the PCV valve, hold it with its outlet end up and insert the blunt end of a pencil into the inlet end of the valve. Push up against the jiggle pin and watch for the 1/16-in.-dia. tip. If it isn't there, replace the defective valve.

● **Rambler tells us** that if you install over-size tires in your 1960 through 1966 Ramblers it could result in contact with the tie rod and end ball joints when you make a fast, full turn. To be safe, have a 1/8-inch spacer installed between the steering knuckle pin and the wheel spindle for additional clearance. It's called a front-wheel steering spindle spacer (part No. 3166546). You'll need one for each front wheel.

● **1964-66 Tempest owners** and owners of 1965-66 Pontiacs with V8 engines who have oil leaks from the rear of the oil-pan gasket should be aware of this cure: the oil pan strap and attaching bolts should be removed and discarded, then replaced with two oil-pan side rail bolts (part No. 504256), tightened to exactly 15 ft.-lb. (Overtightening could rupture the gasket at the bolt-hole area). This draws the gasket tight at corners where most leakage occurs.

If the oil-pan gasket has to be replaced, coat both sides of the new gasket with sealer in the strap area before installation. ★★★

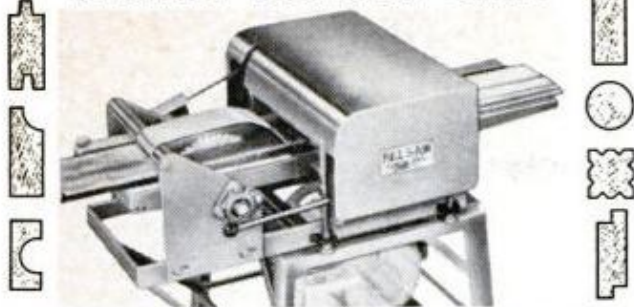
---

Each month Auto Clinic answers questions on car repair. For a personal reply, send 50 cents in coin to cover mailing and handling. Write Auto Clinic, Popular Mechanics, 575 Lexington Ave., New York, N.Y. 10022. One question per letter, please.

---



## PLANER · MOLDER · SAW!



Now you can use this ONE power-feed shop to turn rough lumber into moldings, trim, flooring, furniture . . . ALL popular patterns. RIP . . . PLANE . . . MOLD . . . separately or all at once with a one HP motor. Use 3 to 5 HP for high speed output. Low Cost . . . You can own this power tool for only \$30.00 down.

Send postcard today for complete facts.

BELSAW POWER TOOLS, 9081 Field Bldg., Kansas City, Mo. 64111

## WANT MORE MONEY? GET INTO PHOTOGRAPHY

Coast-to-coast, high-paying jobs in photography are waiting for people with the "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 New York. Our 57th Year.

**NEW YORK INSTITUTE OF PHOTOGRAPHY**  
Dept. 49-8 10 West 33 St., New York 1, N. Y.

## Bill Problems ? CAN'T MAKE ENDS MEET NOBODY REFUSED UP TO \$10,000.00

- POOR CREDIT, No Trouble. NOT A LOAN CO.
- Send Your Name for FREE APPLICATION
- AUTOMATIC ACCEPTANCE • Dept. 98
- 307 Pocasset Ave., Providence, R. I. or
- 318 Broadway Blvd., Reno, Nevada



Here's a practical way to increase your income and build security for your family. Earn extra money every week sharpening saws with a Foley Automatic Saw Filer. You can actually build your own business with it—without special training or previous experience.

TURN YOUR SPARE TIME INTO CASH. Make from \$3 to \$6 an hour evenings, week-ends. Start in your basement or garage. No canvassing. "I advertised in our local paper and got in 83 saws"—says M. L. Thompson. Every saw you sharpen with the Foley Filer brings you more customers. Hundreds are making extra money this sure, fast, easy way. You can too.

"Money Making Facts" explains how you can get business from home owners, farmers, carpenters, schools, factories, etc.. how to build your business and expand—every step of the easy way. Don't wait. Mail coupon now for this exciting book and easy pay plan. No salesman will call.

**FREE BOOK SHOWS YOU HOW TO START**

MAIL COUPON FOR FREE BOOK

FOLEY MANUFACTURING CO.  
843-7 Foley Bldg., Minneapolis, Minn. 55418  
Rush free book, "MONEY MAKING FACTS", and details on easy pay plan.

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



# Be a LOCKSMITH



JOEL DAIGLE says, "Earned \$1138.75 while training. Now have excellent locksmith job—and enjoy every minute of the work." Fort Kent, Me.



ROBERT N. MILLER says, "I earned \$2,000 while training. I now own a mobile shop and enjoy a successful full-time business." Oakland, N.J.



JOE E. WARREN says, "Paid entire tuition and made \$800 besides in spare-time, even before completing training." Overland Park, Kan.

## 306

Pieces of Professional Equipment. LOCKS, PICKS & TOOLS supplied for use with course.



## TRAIN AT HOME—EARN WHILE YOU LEARN

Add to YOUR INCOME FAST—even double it with easy sparetime earnings. Cash in on the nation-wide shortage of trained locksmiths. Quickly step into a big pay job, or start a high-profit shop of your own!

## EARN EXTRA MONEY RIGHT AWAY!

You can quickly qualify as a skilled locksmith. Age, education, minor physical handicaps don't matter in this ever-growing trade. So easy to learn it's like a fascinating new hobby!

Study at home as little as one hour a week. All special professional tools, supplies, including files, calipers, tweezers, cylinders, door handles, assemblies, gages, pins, springs, extractors, picks, locks and keys—supplied FREE. Gain practical experience by doing real jobs on car locks, house locks, padlocks, safe locks, etc.

Send for FREE BOOK. "Your Opportunities in Locksmithing" and FREE SAMPLE LESSON PAGES. No cost, no obligation, no salesman will call.

Only school of its kind: Licensed by State of New Jersey, Accredited Member National Home Study Council, State Approved Diploma.

**APPROVED FOR VETERANS**  
**LOCKSMITHING INSTITUTE, Dept. 1110-087**

(A Division of Technical Home Study Schools)—Little Falls, New Jersey 07424

Est. 1948

MAIL THE COUPON AT ONCE

LOCKSMITHING INSTITUTE, Dept. 1110-087,  
Little Falls, New Jersey, 07424

Please send without obligation the FREE illustrated book, "Your Opportunities in Locksmithing" and Sample Lesson pages. I understand no salesman will call.

Check here if eligible for veteran benefits.

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_





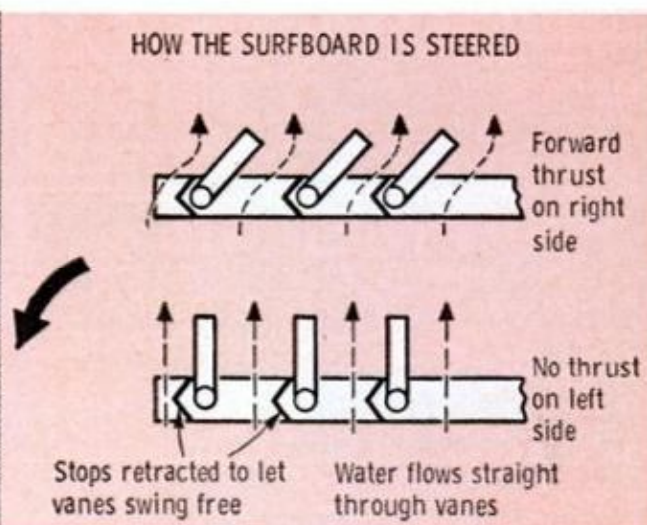
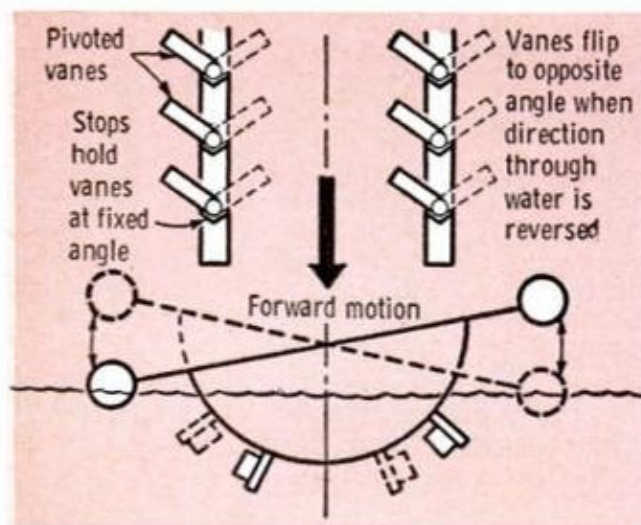
From next month's Inventors Show:

# Self-Propelled Surfboard Needs No Surf

An advance peek at the big upcoming new-idea exposition in New York City reveals a clever craft that scoots over the water on foot power alone



**TELLTALE RIPPLES** in the water prove the unusual surfboard is moving—but how? It has no engine



**ALL YOU DO** is rock gently from side to side and this amazing surfboard scoots mysteriously over the water with no visible means of power. The ingenious craft is one of 12,000 new inventions to be exhibited next month at the huge International Inventors and New Products Exposition at the New York Coliseum.

The surfboard's trick propulsion system consists of two rows of angled vanes running along the bottom like louvers in a Venetian blind. When the surfboard is rocked sideways, the angled vanes bite into the water like a propeller blade, pulling the craft forward. The vanes are piv-

oted so they automatically reverse their angle as you rock in the opposite direction. This keeps the craft moving forward no matter which way it's tipping.

You can even steer the surfboard. For this, there's a foot control that releases the vanes in either row so that they swing free instead of biting into the water. With only the right-hand vanes working, the craft is thus forced to turn to the left and vice versa. Outrigger pontoons at the sides keep the board from tipping over too far. The inventors are Arthur J. Curtiss and Cleon V. Wilson of Long Beach, Calif. ★ ★ ★

## Meet PM Editors at the Inventors Show

PM editors will be on hand at the International Inventors and New Products Exposition to greet visitors in person. Look for our booth. Here are important details about the show:

**Time and place:** Sept 9-17 at the New York Coliseum, 59th St. at Columbus Circle. Hours are 12:00 noon to 9:30 p.m.

**Get two tickets for one:** PM readers presenting this notice at the door may obtain two tickets to the show for the price of one. Prices are \$2.50 for adults and \$1 for children under 12. A directory listing exhibitors at the show is available for \$2 from Patent Exhibits, Inc., 554 Fifth Ave., New York, N. Y.



WHEN YOU'RE A HIGH-EARNING **MERLITE PRESTO SHINE DEALER**  
 YOU OFFER THIS FANTASTIC BARGAIN IN YOUR AREA:

ANY CAR WAXED AND POLISHED WITH GENUINE

**SIMONIZ® PASTE WAX... ONLY \$5<sup>95</sup>**

**New Patented Machine Lets You Do a Brilliant Job in Only 20 Minutes!  
 Doing 3 Cars an Hour Means You Can Make as Much as \$17.25 in an Hour!**

Motorists flock to Merlite Presto Shine Dealers because they offer and deliver a gleaming, long-lasting genuine Simoniz Paste Wax job for only \$5.95. Sure, Simoniz Wax jobs usually cost from \$12 to \$20—but, thanks to a sensational patented (U.S. Patent No. 2,967,315) new invention—the HM Polishing Machine—our Dealers can clean, wax and polish a car completely in only 20 minutes! The machine duplicates the motion of the human hand, gives car diamond-brilliant hard finish without streaks and swirls, and almost without effort. Even a child can use it after a few minutes of instruction. You can be Merlite Presto Shine Dealer in your area—work at home, spare or full time, make gross profit up to \$17.25 any hour you do 3 cars; have as many customers as you can accommodate!

**WE TRAIN YOU PERSONALLY IN YOUR AREA!**

We send a skilled Instructor to your area to train you in operation of the machine, how to start and run your business, how to get fleet business from car dealers, rent-a-cars, taxi firms, etc. You get this training **without 1¢ cost!** And if you decide, after your training, not to become a Merlite Presto Shine Dealer, **you're not out a single penny!**

**MERLITE PRESTO SHINE CORP., DEPT. Y-15P**  
 114 East 32nd St., New York, N.Y. 10016

**FREE! FULL BIG-PROFIT DETAILS!**

If you're interested in getting into the big-money brackets, we'll send you an Outfit which fully describes your big future as a Merlite Presto Shine Dealer, either spare or full time. Outfit comes to you by mail—prepaid, FREE, no obligation. Fill in and mail the coupon TODAY!

**Merlite Presto Shine Corp., Dept. Y-15P**  
 114 East 32nd St., New York, N.Y. 10016

Rush complete details of the big-profit Merlite Presto Shine Dealer opportunity—FREE, prepaid, no obligation.

Name \_\_\_\_\_  
 Address \_\_\_\_\_  
 City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

**NEW RUBBER STAMP BUSINESS  
 PAYS BEGINNERS UP TO \$16.50 AN HR.**

**START AT HOME  
 IN SPARE TIME  
 with Table Top Machine!**

**We Help Finance You  
 ... at less than bank rates!**

The multi-million dollar Rubber Stamp business—once controlled by a few big companies—is now being taken over by small operators—one in each community throughout the United States. Men and Women who have this inexpensive machine can turn out huge quantities of Rubber Stamps with special wording that buyers once were forced to buy from big cities. Material costing only 27c makes a stamp that sells for \$2.75. The machine that does the work is simple and easy to operate and it turns out as many as six Rubber Stamps at a time, each with different wording such as names, addresses, notices, stock numbers, prices and other "copy" needed by offices, factories and individuals. Working full capacity, it can earn as much as **\$33.00 an hour for the operator!** Now you can get into the big-pay business yourself, with your own home as headquarters. You don't need experience. We supply everything, including complete instructions and eight ways to get business coming in fast. **We even help finance your start.** Start making up to \$16.50 an hour from the very beginning. Cash in on the profitable Rubber Stamp business in your community, right away. We'll mail full particulars FREE and no salesman will call. Be first in your locality. Rush coupon today or send your name on postcard to:

**RUBBER STAMP DIV., Dept. R-2-JT**  
 1512 JARVIS AVENUE • CHICAGO, ILL. 60626



**RUBBER STAMP DIV.**  
 1512 Jarvis Ave., Dept. R-2-JT  
 Chicago, Illinois 60626 **FREE!**

Please rush full particulars about your financing plan and the little machine that can get me started in the profitable Rubber Stamp business at home in spare time. Everything you send me is FREE and no salesman will call.

NAME \_\_\_\_\_  
 ADDRESS \_\_\_\_\_  
 CITY \_\_\_\_\_ STATE \_\_\_\_\_ Zip Code \_\_\_\_\_



DETROIT

# LISTENING POST

BY BOB IRVIN

**CAR DOORS LINED WITH PILLOWS?** Window-crank knobs the size of half an orange? Door-lock buttons as big as golf balls? Sound nutty? Sure, but, according to the auto industry, the interior of your new 1968 car would look just like that—a sort of glorified padded cell—if just one of the government-inspired safety regulations was carried out to the letter. To demonstrate what it feels would be the impractical design that would result if all technical regulations were rigidly enforced, the industry cobbled up a special car that—of course—looked ridiculous. When one federal attorney saw the nightmare, he got his dander up and charged that, “these people (the industry) are trying to make idiots out of the U.S. government.” Cooler government heads, however, merely said they thought the industry was making “an extreme interpretation” of what is required. Its point made, the industry stressed that such safety features as soft plastic knobs on the window cranks and flexible buttons on the door locks were designed in Detroit, not Washington.

**AMERICAN MOTORS** seems to be keeping unusual company these days. For ten years AMC strictly observed the auto industry's anti-racing resolution. In fact, it held out long after Ford and Chrysler fell off the wagon. But now it would appear there are different straws in the wind. A blown Rambler Six engine, said to crank out 560 hp, showed up at this year's Indy race. It didn't qualify, but it moved the car at close to 160 mph. And out in California, an AMC Rebel is due to hit the drag-racing trail. Obviously, AMC's new management has, at least a different idea.

**BETTER CAR SEATS** have been urged by safety researchers at the University of California in Los Angeles. UCLA's Derwyn Severy says, “a properly designed seat system represents the most important safety feature that may be provided for the motorist.” What does Severy think of present seats? Not much. “They correspond approximately to a lightweight, padded living room slipper-chair,” he says. Severy believes a good model for the future would be the “capsule seat” designed for the Liberty Mutual “survival car.” He crash-tested the car and concluded that the seat had “exceptional overall protective qualities.”

**RADIAL TIRE BOOSTERS** have modified their tune from “now” to “wait 'til next year.” The switch in sentiments stems from a low installation rate of radials on 1967 cars—less than one percent in the case of Ford. And it was Ford that wanted to make the revolutionary tires standard equipment on a couple of its cars, but had to back off because of quality-control problems. Reportedly, the problems have been licked. One immediate problem is that the tire-buying public doesn't know enough about radials. However, Ford officials add, usage of the tires could increase almost overnight “if Washington decides they're the greatest thing since hula hoops.”

**ELECTRIC CAR POTENTIAL** is somewhat dubious, according—perhaps predictably—to the oil companies. Mobil officials, for example, say they believe the gasoline-powered piston engine will be made pollution-free before electric cars can be made practical. Maurice J. Schlatter, a senior chemist for Chevron, predicts gasoline engines in automobiles will hold sway at least through the end of this century. What about fuel cells? “Someday,” says Schlatter, “they may find specialized vehicle applications. In the distant future, in fact, such use may be extensive.” How far is “distant?” The 21st century, says Schlatter.

**CAR CRITIC RALPH NADER** and the auto companies agree on at least one thing—  
*(Please turn to page 30)*





**This is the standard of the world.**



**This is the plug that sparks the standard of the world.**

(Isn't that all you'll ever need to know about spark plugs?)

**Full Time Firepower**



MARK OF EXCELLENCE  
AC SPARK PLUG  
DIVISION

For Safety's Sake, Check Your Headlamps—Replace with AC Guide Lamps

AUGUST 1967

29



(Continued from page 28)

that the federal government should engage in independent auto safety research. Nader believes the companies have withheld useful safety devices from the public and would like the United States to make its own evaluations. The companies claim they've withheld nothing and would favor federal research because they feel certain it would support their stand.

A case in point is the tilting seat: It's supposed to swivel front-seat occupants backward in the event of impact, thus eliminating the so-called "second collision." The device is more than ten years old, but has never been successfully marketed. However, because of the current safety interest, it's being looked at again. Ford conducted crash tests a few months ago and still doesn't believe the device has merit. But the seat's maker, allying itself with Nader's "crusade," claims Ford sabotaged the tests, an allegation Ford hotly denies. Hence the interest on the part of both sides for government-sponsored independent research. And it looks like they'll get their wish: The government recently announced almost 50 research contracts totalling about \$10 million.

**THE TURBINE-POWERED RACE CAR** that set the Indianapolis "500" racing fraternity and fans on their ears this year, even though it didn't win, is about as close as Studebaker will ever get to producing cars again, according to company president Byers Burlingame. "I don't think there's a chance in a million that we'll ever go back to manufacturing passenger automobiles," he says.

Studebaker will continue its present efforts in the car aftermarket and auto equipment fields, however. STP division (of Studebaker) president Andy Granatelli has said his company plans to build at least ten more turbine-powered race cars, mostly for sale to "whoever wants to buy 'em."

**THAT SINGLE HEADLIGHT** coming at you on a dark night could be a one-eyed car or a motorcycle. If it's a car, which lamp is out, left or right? To take the guesswork out of such potentially ticklish situations, Indiana University's Dr. Merrill Allen has developed reflective rings that fit around headlights. The rings reflect light back from approaching cars, thus enabling oncoming drivers to determine the situation about seven times quicker than without the rings. Still under development, the rings could become part of a car's safety package. ★★★



**This point lets you bore holes up to 1½" with small electric drill**

**It's hollow ground to bore cleaner, faster at any angle**

**NOW YOU CAN** increase the boring range of your small electric drill or drill press. New Irwin Speedbor "88" bits bore faster, cleaner holes up to 1½" in any wood. ¼" shank chucks perfectly. No wobble, no run-out. Sharp cutting edges on Irwin exclusive hollow ground point start holes faster, permit spade-type cutters to bore up to 5 times faster. All Irwin Speedbor "88" wood bits are forged from single bar of special bit steel, tempered full length and machine-sharpened for extra accuracy, longest life. 17 sizes, ¼" to 1½". Buy individually or in sets from your Irwin hardware or building supply dealer.

**Only 80¢ each, sizes 1/4" to 9/16" 5/8" to 1", \$.90 ea., 1 1/8" to 1 1/2", \$1.40 ea.**

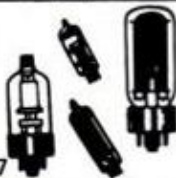
**IRWIN SPEEDBOR "88" WOOD BITS**  
at Wilmington, Ohio, since 1885

Tape this ad to the back of your TV or Radio Set

**ALL TV-RADIO RECEIVING TUBES \$1.50**

• ALL BRAND-NEW, First Quality. All Types Available. • Orders Shipped First Class Same Day Rec'd. • Unconditionally Guaranteed. • 24 Month Warranty.

Send \$1.50 for ea. tube + 50¢ postage & handling of entire order. FREE: Write for TV Test Chart and Tube List to Dep't. PM-87



UNIVERSAL TUBE CO. Ozone Park, N. Y. 11417

MAIL TODAY FOR FREE BOOKLET ...

Showing the most beautiful school in the country... elaborately equipped with the most modern, scientific testing equipment known.

Day and evening classes. Good, full & part time jobs and housing provided.



1645 S. Grand, Dept. P.M., St. Louis, Mo. 63104

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

Street \_\_\_\_\_

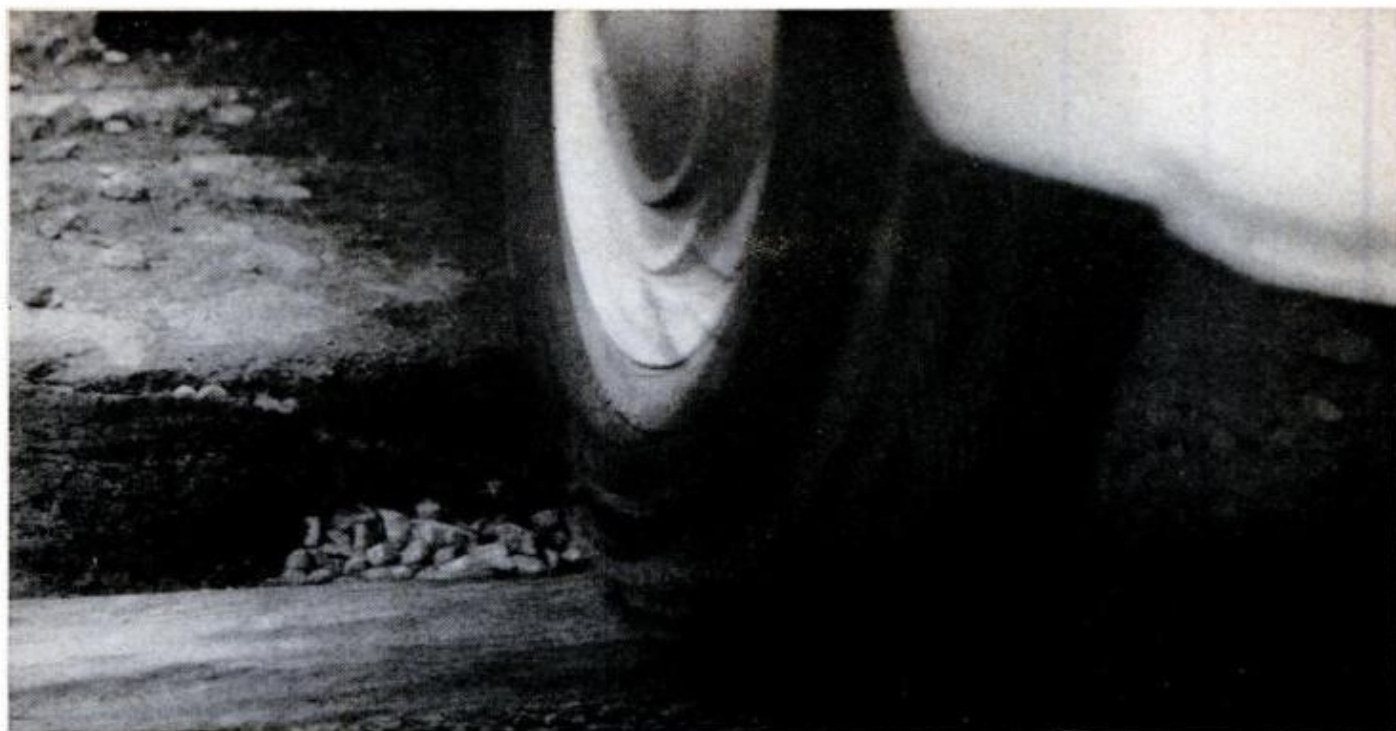
Town \_\_\_\_\_ Zip \_\_\_\_\_ State \_\_\_\_\_

Telephone \_\_\_\_\_

WORLD FAMOUS

**BAILEY TECH SCHOOL**





# WE CAN'T SOFTEN THE BUMPS...

but Goodyear gives you The Workhorse—  
tough-job tire for pickup and delivery work.

When you do pickup and delivery driving, there's one problem you keep running across.

Bumps.

That's where the Workhorse tire comes on strong. The triple-tempered nylon cord carcass shrugs off bruises and scrapes.

This tire is built for the stop-and-go grind of pickup and delivery.

In addition to triple-tempered nylon, the Workhorse has Tufsyn, toughest rubber Goodyear ever used in tires. Has 14% deeper tread. Thicker undertread, too. Up to 17%

more rubber between the cord and the road. The Workhorse delivers as much as 25% more mileage than tires used now in most pickup and delivery work.

The Workhorse has stronger sidewalls for extra load-carrying strength. Helps you haul more. In fewer trips.

Workhorse prices start at about \$15.00.\* When you need tires for your truck—tell them to mount the Workhorse. At your Goodyear Dealer's or Goodyear Service Store. Goodyear, Akron, Ohio 44316.



The Workhorse tire gives you a choice of two tread designs. Rib-type for over-the-road use. Extra-traction design for on and off-the-road use.

# GOODYEAR

Tufsyn, Workhorse—T.M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

\*[Size 6.00 X 16, 6 PR. Rib-type, black sidewall. Plus \$2.38 federal excise tax and recappable tire. Prices in effect at all Goodyear Stores. See your Goodyear Dealer for his competitive prices.]





## TEST YOUR TALENT

**AWARDED MONTHLY: \$675.00**  
Scholarship in Commercial Art

Draw the Viking in pencil—and make your drawing a different size from the picture.

If you win the art scholarship prize, you get the complete course in commercial art taught by one of America's leading home study art schools, Art Instruction Schools. You will receive personal attention from professional commercial artists in the fields of advertising art, illustrating, cartooning and painting.

Even if you do not win, you will get a professional estimate of your talent without cost.

Entries for current contest must be in before September 30, 1967. None can be returned. Our students and professional artists are not eligible. Mail your entry in right away!

**AI/ART INSTRUCTION SCHOOLS**  
Studio 7G-2570 • 500 So. Fourth St., Minneapolis, Minnesota 55415  
*Please enter my drawing in your draw-a-head contest.* (PLEASE PRINT)

Name \_\_\_\_\_  
Occupation \_\_\_\_\_ Age \_\_\_\_\_  
Address \_\_\_\_\_ Apt. \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_  
County \_\_\_\_\_ Zip Code \_\_\_\_\_

Accredited by the Accrediting Commission of the National Home Study Council. Approved for Veterans Training.



# The Devil has quite a temper!



We're proud of the temper in Red Devil's high carbon steel blades . . . just one of the quality features in our full line of putty knives, wall scrapers, wood scrapers and other home patch-up tools. Buy the best! Buy Red Devil!

## Red Devil, Inc

UNION, N. J., U.S.A.

# Check the Kind of Body You Want

Charles Atlas



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

Just tell me, in coupon below, the kind of body you want—and I'll give it to you SO FAST your friends will be amazed. "Dynamic-Tension," my easy, 15-minute-a-day method, will make your chest and shoulders bulge . . . arms and legs surge with power . . . your whole body feel "alive!"

**FREE BOOK** Learn how I became "World's Most Perfectly Developed Man"—Mail coupon! CHARLES ATLAS, Dept. 88, 115 East 23rd Street, New York City, N. Y. 10010

**CHARLES ATLAS, Dept. 88, 115 East 23rd St., New York, N. Y. 10010**

Dear Charles Atlas: Here's the Kind of Body I want:

(Check as many as you like)

- |  |  |
|--|--|
| <input type="checkbox"/> Broader Chest, Shoulders              | <input type="checkbox"/> Powerful Arms, Legs, Grip |
| <input type="checkbox"/> More weight—Solid—in the Right Places | <input type="checkbox"/> Slimmer Waist, Hips       |
|  | <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 questions, and valuable advice. No obligation.

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

ADDRESS \_\_\_\_\_

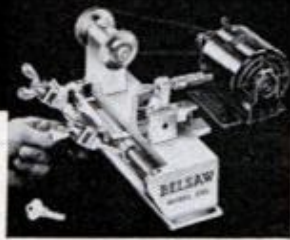
CITY \_\_\_\_\_ ZIP \_\_\_\_\_

STATE \_\_\_\_\_ CODE \_\_\_\_\_

In England send to: Charles Atlas, Chitty St., London, W. 1



**This Machine Puts You in a Business that Can Pay You \$25.00 Every Five Hours!**



**YOU CAN HAVE IT FREE!**

to earn as you learn

**YOUR OWN**

**LOCKSMITH BUSINESS**



Now Belsaw helps you start faster with this free \$125 master locksmith key maker. Train at home with easy picture lessons guided by your own mail instructor. Get real job training on all type locks. We send the tools, equipment needed to prepare you for one of the most profitable, fastest-growing trades today. Age, schooling, condition no handicap in this big-cash business of your own. You easily learn all about locks and get business help, too: how to start, charge, get jobs, everything! Thousands have succeeded the easy Belsaw way.



Change combination of pin tumbler cylinder **EARN \$1.50 in 15 MIN.**

**TYPICAL JOBS EARN YOU \$271 PART TIME (in only 53 hours!)**

Owner loses key; pick car trunk—**EARN \$5.50 in 10 or 20 MIN.**



Install new knob door lock—**EARN \$15.00 in 30 MIN.**



After-hour emergency opening—**EARN \$2.50 to \$5.50 in 20 MIN.**

You will be amazed how easy it is after reading "Keys To Your Future!" Write for this free book now.

**MAIL COUPON—NO SALESMAN WILL CALL**

**BELSAW INSTITUTE, 1082 Field Bldg., Kansas City, Mo. 64111**

Send me complete details—without obligation.

NAME \_\_\_\_\_

Address \_\_\_\_\_

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



**DRAINS** cellars, cisterns, wash tubs; **\$8.95**  
**IRRIGATES - CIRCULATES - SPRAYS**

1,001 uses. Stainless shaft. Won't rust or clog! Use 1/6 HP motor or larger... 3/4 HP for up to 2,400 GPH; 450 GPH 80' high; or 1,800 GPH from 25' well. 1" inlet; 3/4" outlet. Coupling included free. **\$8.95.**  
**HEAVY DUTY BALL-BEARING PUMP.** Up to 5,200 GPH; or 3,000 GPH from 25' well. 1 1/4" inlet; 1" outlet. **\$12.95**  
Postpaid if cash with order. **MONEY BACK GUARANTEE**

**Centrifugal and Gear Pumps in All Sizes**  
**LABAWCO, Box 7, Belle Mead, N. J. 08502**

**New Portable LIGHT PLANTS**

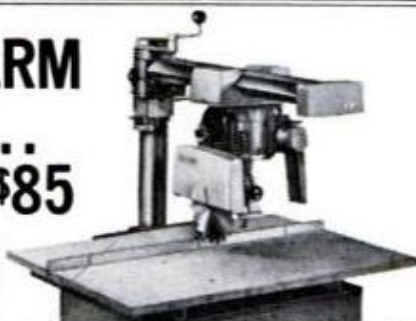
110-120 V. A. C. 1500 watts, 60 cycles. Weight 24 lbs. Size 10" x 5". Fanbelt driven from car, pickup or gas engine of 2 1/2 or 3 h.p. Operates 1/2" Drills, Saws, T.V. Brand new. Money back guarantee. Regular \$89.50 now \$49.50. With switch, pulley and voltmeter. Send check or money order.

**VIRDEN PERMABILT CO.**

Box 7066 (P.M.)

Amarillo, Texas 79109

**RADIAL ARM SAW KIT... for under \$85**



Buy direct from factory, assemble yourself. Easy to follow instructions, all parts, nuts and bolts incl. Guaranteed for life patent pending radial arm track; twice the usual bearings for extra rigidity, greater precision. Rips 24", crosscuts 12"; belt brake. \$84.85, less motor, freight collect. Optional G.E. motors: 1/2 h.p., \$14.80; motor developing to 1 h.p., \$23.80. Money back guaranteed by one of world's largest manufacturers of bench type power tools. Write for brochure. Terms if desired or check or M.O. to American Machine & Tool Co., Dept. PM 87, Royersford, Pa. 19468.

**CEILING TILE?**

Install it faster, easier and better...



with **ARROW'S T-50 HEAVY DUTY STAPLE GUN**

**THE GUN FOR 1001 FASTENING JOBS**

- Install ceiling tile
- Install insulation
- Weatherstrip doors and windows
- Reupholster furniture
- Staple wire fencing to posts
- Repair window and door screens
- Fix loose wiring to floors, walls
- Replace worn window shades
- Tack down carpets
- Lay new linoleum
- Attach vines to trellis
- Affix plywood panels to walls
- Wrap and staple young tree trunks
- Line kitchen and closet shelves
- Hang drapes and curtains
- Make decorative cornices
- Cover valences with material
- Put up Christmas decorations
- Staple down building felt
- Quickly repair odd wood-working jobs

**USE THIS AS A HANDY CHECK LIST**

**ARROW FASTENER COMPANY, INC.**

Saddle Brook, New Jersey 07663





## Would you like to earn up to \$8.00 an hour for pleasant spare-time work?

**Switch to full time if you like. No selling!**

If you're an average person, with some high school education, the door is wide open to get into a fast-growing professional field. No previous experience is necessary. You can operate privately part-time, then switch to full-time later and you can often earn while you learn.

What has caused this tremendous opportunity? The ever-increasing number of claims being filed by people because of accidents, fires, storms. Insurance companies, transportation firms and governmental agencies must hire trained people to investigate the damage and pay out the millions of dollars to settle these claims. The law requires it. And the demand for good trained accident investigators far exceeds the supply!

### We Train You Privately by Mail

The Liberty School of Claim Investigating has quickly trained hundreds of people, who used to work at boring, humdrum jobs in factories and offices to become professional accident investigators. Only 15 minutes reading a day puts you on the road to success. You can progress as fast or as slow as you wish.

Since there are only 24 lessons, some trainees have received their diplomas in five or six weeks. Others prefer a more leisurely training program. (And the cost is less than you'd imagine, with payments as little as \$10 a month.)

### Earnings Like These in Our Files!

Anthony Allen of Baltimore writes that he is now making \$1080 a month. John Parzynski, a former plant guard, writes he has made \$38 a day, working only part time. Bill Peck averaged \$188 a day investigating hurricane claims. Oscar Silcox earns as much as \$100 a day working as an independent investigator.

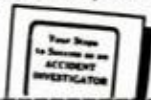
### Your Choice of Three Interesting Careers

(1) Be a Company Staff Investigator. A car is furnished. Starting pay and benefits equal about \$8,000 a year. (2) Be a Spare-Time Investigator. Lots of people keep their regular jobs and earn \$50 to \$100 a week extra. (3) Be an Independent Investigator. Work from your home. (No special tools or equipment required.)

### Free Employment Help Offered

We give you FREE employment help through our NATION-WIDE PLACEMENT SERVICE—or show you how to start an investigating business of your own at home.

The coupon below or postcard addressed to Jim Edwards, Dept. 58, Liberty School, 162 E. Cook, Libertyville, Illinois 60048, brings you complete information. No salesman will call. (Liberty School is fully approved under the G.I. Bill for Veterans Benefits.)

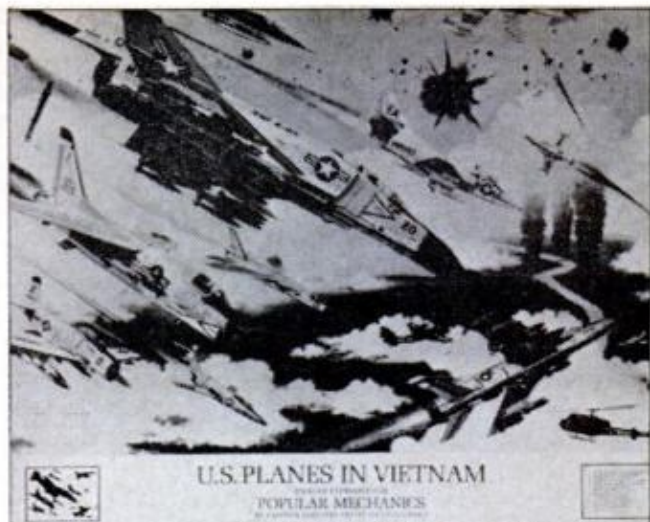


Jim Edwards, Director, Dept. 58  
Liberty School of Claim Investigating  
162 E. Cook, Libertyville, Illinois 60048

**MAIL FOR FREE INFORMATION**

Rush me your FREE BROCHURE showing how I can make as much as \$1,000 a month full time or up to \$8 an hour part time by getting into the Booming Accident Investigating Field. This does not obligate me in any way, and no salesman will call.

Name \_\_\_\_\_ Age \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_



# YOU CAN OWN THESE PAINTINGS



## 30 U.S. PLANES IN ACTION

All beautifully depicted in two exciting lithographs of paintings done exclusively for Popular Mechanics by famous aircraft artist Ed Valigursky.

Now these beautiful lithographs can be yours.

"U.S. Warplanes in Vietnam" and "U.S. Helicopters in Vietnam" are full color reproductions depicting the various types of aircraft that are now seeing duty in that war-torn country.

Exciting and educational, the set, suitable for framing, is printed on expensive heavy weight stock. Measuring 19 x 25 inches, it can be hung in the library, den, children's room or just anywhere around your home.

**Send \$1.95 to: Aircraft Paintings, Popular Mechanics, 575 Lexington Avenue, New York, New York 10022.**

**POPULAR MECHANICS—AIRCRAFT PAINTINGS**  
575 Lexington Avenue, New York, N. Y. 10022

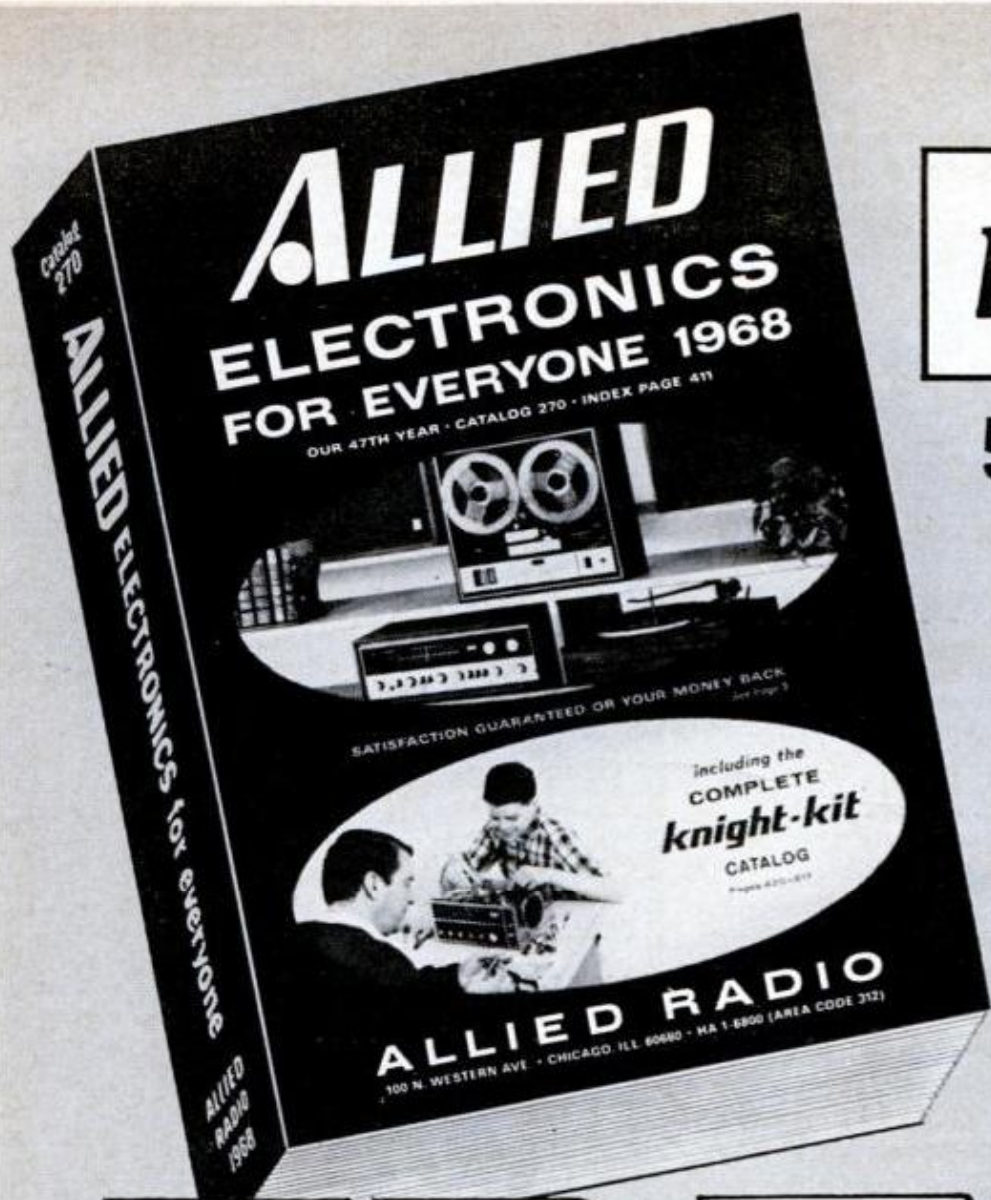
I have enclosed \$ \_\_\_\_\_ for \_\_\_\_\_ copies of Popular Mechanics Aircraft Paintings.

Name \_\_\_\_\_

Address \_\_\_\_\_

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





*new!*

**518 PAGES**

- Stereo Hi-Fi
- Famous Knight-Kits
- Tape Recorders & Tape
- CB 2-way Radios
- Walkie-Talkies
- FM-AM & AM Radios
- Short Wave Receivers
- Portable TV
- Phonographs
- Amateur Gear
- Intercoms & PA
- Automotive Electronics
- Test Instruments
- TV Antennas & Tubes
- Power Tools, Hardware
- Tubes, Transistors
- Parts, Batteries, Books

**FREE**

**1968  
ALLIED  
CATALOG**

MAIL THIS  
COUPON  
IF CARD  
HAS BEEN  
REMOVED

ALLIED RADIO, DEPT. 6-H, P.O. BOX 4398  
CHICAGO, ILLINOIS 60680

Send me your free 1968 Catalog

NAME (Please Print)

ADDRESS

CITY

STATE

ZIP



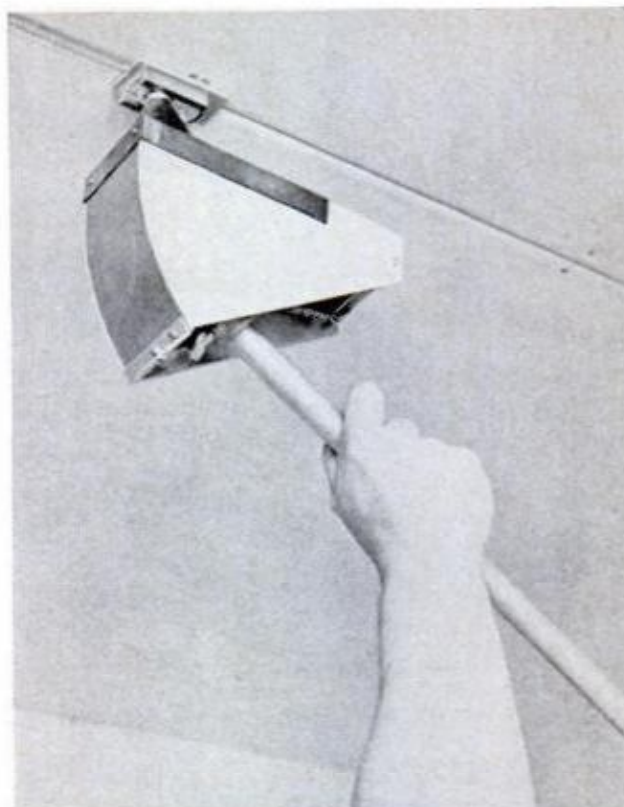
# Two new materials for home builders



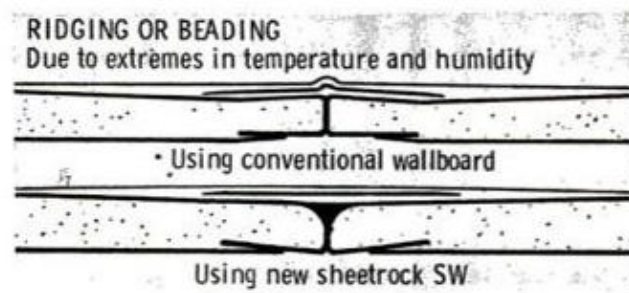
**PREFILLING** the grooved joints with the Durobond 90 compound can be done with a conventional 5 or 6-in. putty knife. Normal taping and finishing follow

## Improved Sheetrock solves bulging-joint problem

The elimination of unsightly beading and ridging of joints is cited as the major advantage of U.S. Gypsum's Sheetrock SW, a new gypsum wallboard featuring rock-hard rounded and tapered edges. Installed similarly to other drywall panels, Sheetrock SW is immune to joint deformity due to twisted framing, poor board alignment and extremes of temperature and humidity. The only additional step involved is that of applying a prefill compound, preferably Durobond 90, which can be taped after about 1½ hours.

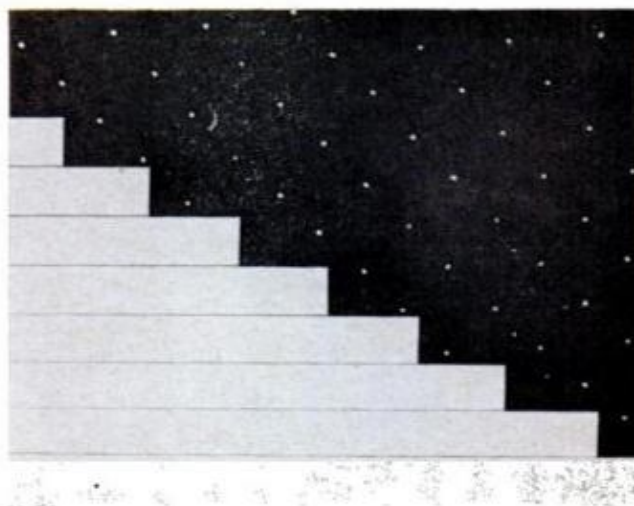


**AUTOMATIC PREFILLING** with an Ames tool will be a welcome sight to contractors. All that's needed is a simple adapter fitted to the head of the tool



## Vented sheathing is answer to paint peeling

A new insulation sheathing has been developed by Morell Air Vent Co. of Wickliffe, Ohio, in answer to the age-old problem of blistering and peeling of exterior house paints. The underlying principle involves the release of water vapors that normally form between the siding and sheathing of a home. Thus the vented sheathing has small waterproof perforations engineered in size and spacing to allow the trapped vapors to pass into the inner wall, where they are harmlessly released. Tests have proved that solid-insulation barriers which make homes airtight also cause most paint-peeling.





# NEW FINCO COLOR SPECTRUM antennas are "signal customized" for better color reception...

"the ANTENNA that captures the RAINBOW"



No two reception areas are alike in the number of stations, UHF and VHF, station channel frequencies, and signal strengths.

FINCO has developed the Color Spectrum Series of antennas – "Signal Customized" – to exactly fit the requirements of any given area. There is a model scientifically designed and engineered for every area, even the most troublesome, and for all combinations of signal conditions.

Check this chart for the Finco "Signal Customized" Antenna best suited for your area.

STRENGTH OF UHF SIGNAL AT RECEIVING ANTENNA LOCATION	Strength of VHF Signal at Receiving Antenna Location				
	NO VHF	VHF SIGNAL STRONG	VHF SIGNAL MODERATE	VHF SIGNAL WEAK	VHF SIGNAL VERY WEAK
NO UHF →		 CS-V3 \$10.95	 CS-V5 \$17.50   CS-V7 \$24.95	 CS-V10 \$35.95	 CS-V15 \$48.50   CS-V18 \$56.50
UHF SIGNAL STRONG →	 CS-U1 \$9.95	 CS-A1 \$18.95	 CS-B1 \$29.95	 CS-C1 \$43.95	 CS-C1 \$43.95
UHF SIGNAL WEAK →	 CS-U2 \$14.95	 CS-A2 \$22.95	 CS-B3 \$49.95	 CS-C3 \$59.95	 CS-D3 \$69.95
UHF SIGNAL VERY WEAK →	 CS-U3 \$21.95	 CS-A3 \$30.95	 CS-B3 \$49.95	 CS-C3 \$59.95	 CS-D3 \$69.95

NOTE: In addition to the regular 300 ohm models (above), each model is available in a 75 ohm coaxial cable downlead where this type of installation is preferable. These models, designated "XCS", each come complete with a compact behind-the-set 75 ohm to 300 ohm balun-splitter to match the antenna system to the proper set terminals.



**THE FINNEY COMPANY**  
34 West Interstate Street  
Dept. PM • Bedford, Ohio 44146

Send for free brochure

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_



# POPULAR MECHANICS SHOPPING GUIDE



## USE THOSE BABY FOOD JARS TO STORE THINGS

Sturdy, plastic caps snap into 1/4" pegboard and hold quarter twist food glass jars. Perfect for storing all kinds of small parts and things. Keep your workshop neat. 10 for \$1; 36 for \$3; 72 for \$5; 500 for \$32.50. Handy Dandys only. No jars. Shipping paid anywhere USA. Send payment with order—no C.O.D. **WICKLIFFE INDUSTRIES, INC., P.O. Box 244, Dept. PM-8, Wickliffe, Ohio 44092.**

## HARD-TO-FIND TOOLS

**NEW CATALOG** of exceptional useful tools rarely found in stores or other catalogs. Industrial—professional quality only. Used by wood & metal workers, repairmen, welders, machinists, clock, watch and instrument makers, jewelers and model makers. Brookstone tools solve problems—make work easier, more fun. Send 20¢.

### BROOKSTONE CO.

8724 River Road, Worthington, Mass. 01098



## STEEL SHELVING

60" h. 4 adjustable shelves 12"x36". 2 nuts & bolts. Gray. Assemble with screwdriver. Ship. wt. 25 lbs. "Special" 4 for \$25. Send check or M.O. F.O.B. Falls Church, Va. residents add 3% sales tax. Catalog 25¢.

FALLS CHURCH OFFICE FURNITURE  
Box 219 Falls Church, Va. 22046

## WORLD'S RAREST STAMP!



### 4 THRILLING OFFERS IN 1 — ONLY 25¢

1. World's rarest stamp, value \$100,000, reproduced on scarce new postage stamp of Guyana — unique in history!
2. Gold and Silver Stamps: valuable collection of 25 incredible stamps, color-crafted in gold or silver! Includes Burundi (cannibal); Fajera (Queen Nefertiti); Antigua (Winston Churchill); Cape Verde (Golden Towers); Uruguay (John F. Kennedy); Qatar (Precious Round Coin Stamp), etc.
3. Fabulous "Stamps on Stamps" — Qiwain (famous Penny Black — world's first stamp) ... other remarkable issues!
4. Complete U. S. Catalog — 786 illustrations. Also, other thrilling stamps from our approval service, which you may return without purchases (and cancel service any time) — but all four offers are yours to keep!

Send name, address, zip and 25¢ — TODAY  
H. E. HARRIS, Dept. R-113, Boston, Mass. 02117



## STRATFORD TRAILER KIT

Build your own camper trailer from kit or plans. Included in kit is completed tent, welded steel work & special hardware. Camper opens to 6 1/2' x 16' long, also 7' x 16'. Features double beds, dinette, cabinets. Sleeps 6 or more. Kit \$324. Or parts sold separately. Complete building plans with 15 photos—\$3.00 or send 10¢ for circular.

**STRATFORD FABRICATING CO.**  
P.O. Box 4006-P, Newfield Sta.,  
Bridgeport, Conn. 06607



## FREE GASKET MANUAL

Valuable Facts for those who value Top Performance:

- Rear End Gasket Installation Tips
- Correct Way to Install Pump Gaskets
- New Type Gaskets for Valve Covers
- Important Steps in Head Gasketing
- Metal Shim Gaskets
- How to Make Sure Gaskets Fit

**FELPRO** 668

Division of Felt Products Mfg. Co.

32 pages of tips—hints—facts about gaskets and how to improve engine performance

Published as a service to the nation's mechanics, schools and car owners by Fel-Pro, Inc., one of the world's leading gasket manufacturers.

Write:  
**FEL-PRO, INC.**  
7452 N. McCormick Blvd., Skokie, Illinois  
Dept. PM-8

## SHOCK-PROOF MILLERS FALLS

Lifetime Guaranteed Tools  
THOUSANDS OF EXCITING TOOL VALUES

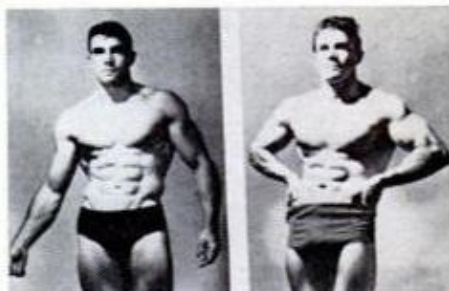


Send 25¢ today for our Big 148-Page Tool Catalog which features Millers Falls Hand and Electric tools and Hundreds of other Nationally Advertised Brands of Tools too numerous to mention.

We ship coast to coast at prices hard to beat

**SILVO HARDWARE CO.**  
Dept. PM-8, 107 Walnut St.  
Phila., Pa. 19106

AMERICA'S NO. 1 CLASSIFIED SECTION CAN BE FOUND ON PAGE 46 IN THIS ISSUE



## Look Trimmer . . . Be Trimmer

If your waistline isn't what it should be, and you are seeking to improve upon its appearance FAST! Order the newly designed "Exer" Kit TODAY!

Send waist size—\$2.95

House of Health Products, Inc.  
Dept. PM-15

310 E. 1st St., Dayton, Ohio 45402

## Stamp Your Name PERMANENTLY

reg. size Identify articles you own  
**\$3.95** ppd. **EVERSTAMP**



Hardened tool steel. Reg. Size 1/16" 15 letters max. last name only.

Names shown actual size

**SMITH**

Large size 1/2" \$5.25  
10 letters max.

Stamp just about anything you own with one blow of a hammer. Made by the Henry A. Evers Co., Inc., makers of quality marking devices since 1898. Makes thousands of impressions. Send check or money order.

**HENRY A. EVERS CO., INC.**  
Dept. P 72 Oxford St., Prov., R. I. 02905

### DIE TOOL

Comparable to a \$9.00 die tool, now available at this special price.

- TOOLS
- LUGGAGE
- BOOKS
- SPORTS
- PAINT
- BRUSHES
- PIPES
- GUNS
- FLASH-LIGHTS
- DRAFTING TOOLS
- PLUS HUNDREDS OF OTHER ITEMS

## New Catalog Shows You How 6 Machines-in-1 for Low Price of 1

Be independent, enjoy having your own money making business. Make as much as \$6.00 an hour sharpening circular and hand saws, knives, scissors, pinking shears, tools, planer blades, clippers, etc.



### MAKE MONEY SHARPENING

Housewives, hobbyists, barber and beauty shops—supermarkets, farmers—everybody needs sharpening service. Start Now for Less than \$50. Thousands of successful Treyco users. Guaranteed quality. Factory-to-you savings. Write me for complete new catalog right now.

BURTON W. MANTH, President

**TREYCO PRODUCTS, INC.**  
381 Niagara St.  
N. Tonawanda, N.Y.  
Established 1946



## CONTRACTORS WANTED MAKE BIG MONEY



**WATERPROOFING—NEW OR OLD—BASEMENTS—POOLS—WALLS With EVERHARD IRONIZED WATERPROOFING.**

Applied on Inside While Leaking. No Digging Necessary. We Have Used It for Over 36 Years and on Thousands of Basements. Order a 10 lb. Package Now (Enough to Do a \$100.00 Job). Shipped C.O.D. \$10.00 or Save \$1.00 and Send \$9.00 with Order.

F.O.B. ALTADENA  
QUANTITY DISCOUNTS

**PULLEN WATERPROOFING CO.**

2030 Pinecrest Drive, Altadena, Calif. 91001



## Art LESSONS \$6 a month

Study Art for pleasure and profit. Learn Drawing, Painting, Advertising Art at home in spare time for only \$6 a month. Assignments corrected with overlays and returned to you by mail. Write for FREE BOOK. No obligation.

**WASHINGTON SCHOOL OF ART Studio 148, Port Washington, New York 11050. Estab. 1914.**

Accredited Member NHSC.  
Tear out ad as reminder.



## UNIQUE MILLING ATTACHMENT

Fits All Small Metal Lathes!

Ideal for home milling! Handles dove-tailing, T-slotting and most other milling operations easily. Vise and angle plate machined from iron casting. Industrial quality. First time offered to home workshops!

**Money Back Guarantee:** You get 15 day trial. If not completely satisfied, return it and we'll refund your money immediately!

You cannot buy a better milling attachment at this low price! **ONLY \$41.95 POSTPAID**

Send check or money order. We pay postage.



**J & R TOOL AND MFG. CO.**

Box 3204 E. 14th St. Station  
Des Moines, Iowa 50316



## "Kennedy Looks at Lincoln" Penny

NEW, DIFFERENT, AND PERFECTLY LEGAL. Thousands of these unusual memento coins have been sold at 25¢ each. Now get yours for only 5¢. (Just one to a customer, please.)

You'll also receive our big FREE Catalog illustrating coins and supplies, PLUS selections of coins on approval returnable without obligation. Send name, address, and 5¢ to Littleton Coin Co., Dept. LK-24, Littleton, N. H. 03561.



## 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 name for free facts.

**BENSON BARRETT, Dept. 27-V**  
6216 N. Clark St., Chicago, Ill. 60626



For more information on articles and products, write to the PM Bureau of Information for "Where-to-Find-It" list.



### FREE!!! POWERFUL MUSCLES FAST!

Fantastic New Discoveries in the science of bodybuilding. Now, in the privacy of your bedroom, our method will add inches of powerful muscles to arms, chest, shoulders & legs. Learn secrets on trimming the waist with ultra-modern methods—fast! Results Guaranteed! Send for free brochure, Universal Bodybuilding, Box 4327-M-6, Northeastern, Dearborn, Mich. 48126.



## DIAL TIRE PRESSURE GAUGE

keeps your tires in safe shape with guaranteed accuracy. World's best-selling tire gauge—helps improve steering, cornering, braking, tire life, gas mileage. Only \$2.19, including handy case. Buy it where you buy car accessories, or send check or M.O. to:



**JAY INTERNATIONAL CORP.**  
Dept. PM, 615 W. Colfax St.  
Palatine, Illinois 60067

## 3/8 DRIVE SOCKET SET SAVE \$5.68

Includes 9 popular size sockets 3/8 thru 7/8; 13/16 spark plug socket; 1 1/2" extension; 6" extension; 7 1/2" ratchet—packaged in metal carrying case. Reg. value \$18.74.  
**Special price . . . \$12.88**



#4513



## COMBINATION WRENCH SET

SAVE \$2.63

Includes the 7 sizes you use most . . . 1/4 thru 5/8". Reg. value \$9.51.



#1707

**Special price . . . \$6.88**

## GREAT NEW DWELL-TACHOMETER WITH LARGE 6" METER

Guaranteed one year—burn-out, materials, workmanship. Double jewelled D'Arsonval meter with three Dwell ranges: 15-45 for 8 cyl. engines, 20-60 for 6 cyl. engines, 30-90 for 4 cyl. engines. Operates on either 6, 12 or 24 volt systems. Shock absorbing hi-impact case.  
**NEW LOW PRICE . . . \$28.88**



#635

Send check or money order, we pay postage.

HUNDREDS OF TOOL VALUES—

ALL MAJOR BRANDS

For complete Durabilt tool catalog send \$1.00 . . . deducted from next order.

**DURABILT TOOL CO.**

Box 583, North Bellmore, N. Y. 11710

## SECRETS of Teaching Yourself MUSIC

revealed in your own home  
this money-saving way



**YES!** Teach yourself Piano, Guitar, Accordion, Violin, ANY instrument—even if you don't know a single note now! No special "talent," no previous training needed. Famous low-cost U.S. School of Music Course, with step-by-step pictured lessons, make it simple as A-B-C.

Everything is in print and pictures. First you are told what to do. Then a picture shows you how. It's as easy as cutting a soft cake. You start by playing actual pieces. Sooner than you may imagine you'll amaze friends by playing your favorite music—popular, classical, jazz, contemporary music, dance tunes, etc. Over 1,250,000 students all over the world.

### Stop Cheating Yourself of These Joys

Popularity. New friends. Gay parties. Musical career. Extra money. Banish worries, frustrations. Satisfy self-expressions, creative urge. Gain self-confidence.

Write today for 36-page illustrated FREE book. **U.S. SCHOOL OF MUSIC, Studio A308, Port Washington, N.Y. 11050.** (Est. 1898. Approved by N.Y. State Education Dept.)



**FREE BOOK**

Name . . . . .

Address . . . . .

City . . . . .

State . . . . . Zip . . . . . Code . . . . .



# Drivin' with Dan

Is winning at Indy all car, or all driver? How did it feel not to be at the wheel when your team car won Le Mans? What happened to you at Indy? Dan Gurney answers these and other provocative questions



**TRADITION IS OBSERVED** at drivers' meeting prior to 1967 Indianapolis "500" as Dan Gurney joins other drivers in autographing coveted checkered flag

**Q.** Jochen Rindt was quoted as saying that driving an Indianapolis car is "close to the art of programming a computer." He said driving the Brickyard is 15 percent driver and 85 percent car. What do you think about this?—Joe Bartells, Miami, Ohio.

**A.** In a way, he may be right. Certainly the way Parnelli Jones and the turbocar dusted the rest of us off this year would indicate that having a superior car isn't necessarily a handicap. But, on the other hand, a number of cars at Indy this year wound up somewhat wrinkled, which would seem to indicate the necessity of having aboard a fellow who can at least steer. Yes, Indy is a race for cars, particularly during the early "stringing out" stages. But after about 300 miles or so, es-

pecially if it's hot, it takes a fine driver to hang in there all the way.

**Q.** Recently, I was called "Willie the Weaver" by a passenger in my car; he objected to my habit of switching back and forth between lanes in heavy freeway traffic. I explained that my object wasn't to go fast or make time, but to keep as much distance as possible between my car and the fellows ahead and behind. He said I was nuts; that it was safest to stick to one lane. Dan, I've seen several chain reaction crackups and the thought of being involved in one scares the pants off me. With this in mind, am I wrong being a "Willie the Weaver?"—Chuck Barnard, San Diego, Calif.

**A.** Not if, as you say, your object is only to keep distance between you and the other guy. I'm assuming, of course, you make full use of hand signals, your rear-view mirrors, direction signals and so forth. If, without resorting to any careless and/or reckless driving habits, you can safely cross back and forth, then I think it's good driving practice to give yourself "lots of air." If you'll notice, drivers tend to stick together in what highway patrolmen often call "wolf packs"—groups of several cars bunched up with often as much as a mile or more between them. I try to avoid these packs myself. I figure if something is going to go wrong, I'd rather it happen in private.

**Q.** Watching this year's Indy on TV, I was impressed—and not favorably—by all the decals plastered all over the cars. I think they spoil a car's good looks. Is this out-and-out commercialism necessary?—George Pilotti, Hamden, Conn.

**A.** George, I bow to no man in my appreciation of good looks, even when it comes to race cars. But, realistically, racing is an extremely expensive undertaking, and if various  
(Please turn to page 52H)



# If we hadn't made it with fiber glass, we could never call it the cool tire.

Heat is the enemy of tires. The hotter they get, the less safe they become. And the faster they wear out.

With this in mind, we set out to build a tire that would stand up to heat, especially on long trips and at high turnpike speeds.

Four years of research, and over 5,000,000 miles of road testing have gone into the development of this product.

Now we've got it. We call it the cool tire.

The cool tire is made with fiber glass; belts of fiber glass which are found between the rubber and the nylon cords. These belts keep the tread firm and tough.

(A firm, tough tread means less abrasion, less scuffing of rubber against the road. In short, a cooler tire.)

The cool tire virtually eliminates blowouts.

And it can give you at least 10,000 more miles of wear (don't be surprised if you get 20,000) than you can get with an ordinary tire.

The cool tire is here.

The Armstrong Rubber Company, West Haven, Connecticut; Des Moines, Iowa; Natchez, Miss.; Hanford, Calif.

**ARMSTRONG**  
Cool tires made with fiber glass





# MAKE IT BIG WITH NTS

PROJECT METHOD

HOME TRAINING

IN INDUSTRY...  
IN YOUR OWN BUSINESS...  
IN MILITARY OR GOVERNMENT

## ELECTRONICS DIVISION

Master Course in Color Television • Color TV Servicing • Electronics-TV-Radio Servicing and Communications • Master Course in Electronics-TV-Radio and Industrial Electronics • FCC License Course • Radio Servicing (AM-FM Transistors) • Television Servicing (including color lessons) • Stereo, Hi-Fi and Sound Systems • Basic Electronics • Electronics Math



## AIR CONDITIONING, REFRIGERATION DIV.

• Air Conditioning, Refrigeration & Electrical Appliances Master Course  
• Air Conditioning-Refrigeration Servicing Course



## AUTO-MECHANICS DIVISION

• Automotive-Diesel Master Course  
• Automotive Mechanics  
• Diesel Mechanics  
• Engine Tune-up and Electricity



## HOME APPLIANCES DIVISION

• Home Appliance Master Technician's Course  
• Home Appliances Servicing  
• Handyman Appliance Repair



## NATIONAL TECHNICAL SCHOOLS

WORLD-WIDE TRAINING SINCE 1905

4000 South Figueroa Street Los Angeles, Calif. 90037

### HIGH SCHOOL AT HOME



National offers accredited high school programs. Take only subjects you need. Study at your own pace. Everything included at one low tuition.

### CLASSROOM TRAINING AT LOS ANGELES

NTS occupies a city block with over a million dollars in training facilities. Check special box for details.

FREE BOOK & SAMPLE LESSON



APPROVED FOR VETERANS

## NATIONAL TECHNICAL SCHOOLS

WORLD-WIDE TRAINING SINCE 1905

4000 So. Figueroa St., Los Angeles, Calif. 90037

Please rush FREE OPPORTUNITY BOOK & SAMPLE LESSON for division checked below. Check one only.

- ELECTRONICS DIVISION  
 AIR CONDITIONING, REFRIGERATION DIV.  
 AUTO-MECHANICS DIVISION  
 HOME APPLIANCES DIVISION  
 High School at Home (Dept. 201-87)

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

Address \_\_\_\_\_

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

- Check for veteran training under new G. I. Bill.  
 Check if interested ONLY in classroom training at Los Angeles



# You CAN MOLD FIBER GLASS

Fun • Results • Use ordinary home workshop tools • Make objects of thrilling beauty, tremendous strength, lightweight • Easy, illustrated, step-by-step BOOK tells how • Explains molds, lay-ups, resins, fabrics, decorations • Beginning projects outlined • Order your book now, \$2.00 postpaid.

R. L. JOHNSON CO.  
DEPT. A, 4132 LOMITA, DALLAS, TEXAS 75220



## Solves Repair Problems

Durham's fills cracks and holes in plaster, wood and tile. Won't shrink or fall out. Economical, easy to use. Big 4-lb. can, only 1.60 at lumber, paint, and hardware dealers, or shipped direct postpaid in U. S. for \$2.00. Money-back guarantee. Order now. Donald Durham Co., Box 804-T, Des Moines, Iowa.



ALL FAMOUS BRANDS!  
**TIRES!** FARM TRUCK AUTO  
AT LESS THAN WHOLESALE  
SAVINGS NEVER LESS THAN 50% up to 70% OFF REG. PRICE!  
HEADQUARTERS for ALL SPORT CAR TIRE SIZES  
FREE • SEND FOR YOUR FREE CATALOG • FREE!

RELIABLE TIRE DIST., 1111 Chestnut St., Camden, N. J.

## A "NEVER-BEFORE" OPPORTUNITY to Learn Quick—Earn Quick at Home



## Be a TYPEWRITER REPAIRMAN

NOW, for the FIRST TIME, you can get into this booming, uncrowded, high-income field! You can easily, quickly cash in on the one skilled trade with proved industry training, never before available by home study!

- Earn up to \$50 per week in Spare Time
- Step into well-paid jobs
- Be the Boss of a big-profit business of your own

Great DEMAND for trained men. Over 25 million typewriters need service and repairs. Find out how YOU can cash in FAST on this 300 million dollar market. WRITE TODAY: Typewriter Repair School, Dept. 310-087, Little Falls, New Jersey 07424. N. J. Lic'd. Acct'd. Member Nat'l. Home Study Council

Earn while you learn to fix, rebuild, resell ALL MAKES AND MODELS, you get real typewriter, sub-assemblies, professional tools all at NO EXTRA COST with course. Illustrated step-by-step instruction under guidance of industry experts. Get full facts in FREE BOOKLET from only school authorized to give you industry-approved training and State Approved Diploma. Approved for Vet Training. MAIL COUPON NOW!

TYPEWRITER REPAIR SCHOOL, Dept. 310-087, Little Falls, New Jersey 07424  
Send FREE BOOKLET about opportunities for Typewriter Repairmen. No obligation. No salesman will call.

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Check here for Veteran Information





**Thirst come.**



**Thirst served.**

**Beer after beer—the choicest product of the brewers' art.<sup>®</sup> Everywhere.**

Материал, защищенный авторским правом



# RARE FIRST EDITION FREE

- Want to know how to build a PM 38 — or Hydroplane?
- Planning your dream castle? \$35.00 gets you the plans for building POPULAR MECHANICS' own "House of Imagination" — a scientifically designed house of the future with kitchen, three bedrooms, 2½ baths, living room, family room, laundry and workshop area.
- Interested in bicycle boats? Children's furniture? Chairs? Booklets and plans are available from POPULAR MECHANICS.
- These and hundreds upon hundreds of interesting, educational projects are available through POPULAR MECHANICS CATALOG OF PUBLICATIONS AND PROJECTS. This illustrated catalog will be a rare addition and a rare edition.

**SEND FOR YOUR FREE CATALOG TODAY. FILL OUT THE COUPON BELOW:**

**POPULAR MECHANICS, PUBLICATION AND PROJECTS CATALOG  
575 LEXINGTON AVE., NEW YORK, N.Y. 10022  
PLEASE SEND ME YOUR FREE CATALOG**

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

Zone \_\_\_\_\_

State \_\_\_\_\_





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

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

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

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 turning 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-JT  
CHICAGO, ILLINOIS 60626



# CLASSIFIED ADVERTISEMENTS

Rate: \$1.50 per word payable in advance each insertion. Capitalized words—75¢ per word additional. Minimum insertion ten words. To be inserted under the proper classification, copy must be in our office by the 15th of the second month preceding date of issue. The next available issue to place an advertisement in America's No. 1 Classified Section is October. The closing date is August 15th. Send remittance and order to C. A. Martin, Popular Mechanics, 575 Lexington Avenue, New York, New York 10022.

## POPULAR MECHANICS



## AUTOMOBILES, MIDGET CARS

**AUTOMOBILE** Literature, antique, classic. First Ford V-8 catalog. Hobby Club, free information. Enthusiast, Box 451B, Mt. Clemens, Mich. 48043.

## AUTO SUPPLIES AND EQUIPMENT

**Jeep Owners**—V8 conversions. Read Jeep Owners ad, page 20.

**CROSLEY** New, used parts. Service Motors, 616 Burnside, Inwood, L.I., N.Y. 11696.

**FOREIGN** Car parts, Discounts. Service Motors, 616 Burnside, Inwood, L.I., N.Y. 11696.

**ANTIQUE** Ford parts, auto books, restoration supplies. New 124 page illustrated catalogue. \$1.00. Mark, Layton, New Jersey 07851.

**FREE** Information on building or buying Capacitor Discharge Ignition Systems under \$25.00. SYDMUR, Dept. 25 Midwood, Brooklyn, N.Y. 11230.

**REVITALIZE** And save your Transmission with a Tonic. Guaranteed. \$2.50 postpaid. Weldite Conditioner. 120-C North Fourth Street, North Wales, Pennsylvania 19454.

**COMPLETE** Guaranteed stock, used, new, rebuilt. All model cars and trucks, and front axle drives, Jeep and GI. Pioneer, 734 W. 13th Ave., Denver, 80217.

(SAVE \$150) Ring-Valve Job while driving. \$6.00 postpaid. Works where others fail! Money-back guarantee. Motaloy, Grantham, Penna. 17027.

**BATTERY TROUBLE?** VX-6 will add new power to old batteries, make new batteries last longer, give brighter lights. Money back guarantee. Only \$2.98. Hazelwood House, 1011 Jaques Ave., Rahway, N.J. 07065.

**CONVERTIBLE** Vinyl rear windows replaced in minutes. Easy installation without tools. \$9.95 complete kit. Clearview Industries, 1321 Arch, Phila., Pa. 19107.

**PERSONALIZED LICENSE PLATES.** Custom made, details, Comley, Box 544, Morgantown, W.Va. 26505.

**SPEED**—Cruise control, excellent, ingenious. \$10.00. Every car should have one, you should know about it. Free literature. Cruise-master, 3807 44th St., San Diego, Calif. 92105.

**RUST REMOVER.** New, safe to handle. Effective on tools, guns, parts, hardware, fishing tackle, etc. Cannot attack base metal. Four gallon size \$4.95 postpaid in USA. SEND TODAY. Bill Tyrrel, Box 114, East Northport, New York 11731.

**ADD** The exciting new gage which continuously glows ignition condition. Free details. Q-Arc, Box 47876, Los Angeles, Calif. 90047.

**ANTIQUE** Car pistons, gaskets, gears, valves, etc. Catalogue \$1.10. Antiques Auto, Milwaukee, Wisconsin 53204.

## AUTO TRAILERS

**PICKUP** Camper, Trailer or Pickup-Cover . . . Build yourself. Save! Complete plans \$3.95 each. Cover plans \$2.00. Econoline Bus or Van, Foldout Trailer, Bus conversion drawings, \$2.95 each. Satisfaction guaranteed. Equipment catalog \$1.00 (refundable). Details 10¢. Viking Camper Supply, 94-F Glenwood, Minneapolis, Minn. 55403.

**WILD** Life decals, full color, large. Free folder. Dealer inquiries invited. Washington Poster Co., 16824-PMC Pacific Highway So., Seattle, Wash. 98188.

**CAMPER** Plans. Compact buses, Vans—Volkswagens, Econoliner, Dodges. Build yourself—Save! Details—Dot Campers, Box 2115M, Culver City, California 90230.

**BUILD** Aluminum pickup camper over-cab, hi-boy, lo-boy, blueprints, material, list. 3 models included. \$3.50. Blance Custom Campers, Wolflake, Indiana 46796.

**BUILD** Your Pickup Camper. Pre-cut kits. Blueprints, Supplies. Literature 10¢. Comstock Trailers, Dept. 664, Parsons, Kansas 67357.

## MOTORCYCLES, BICYCLES, MOTORSCOOTERS AND SUPPLIES

**HONDA** 50 to 90-S big bore & stroker kits. Columbia Engineering, 2105 E. 37th, Los Angeles, Calif. 90058.

**BUILD** Your own minibike! No welding required. Plans \$1.00. Westate, Box 537-PM 8, Campbell, California 95058.

**HONDA**, \$25. Other bargains. Send 50¢ to Motorscooter, B443/1837 Harriman, Bend, Oregon 97701.

**HARLEY** - Davidsons — Used bargains. New, used parts, accessories, all models. Bulletin 35¢. Knuth's (Factory Dealer), 1753 Muskego, Milwaukee, Wis. 53204.

**BUILD** Motorbike from bicycle! Plans . . . \$1.00; go-cart or motor-scooter plans . . . \$2.00 each; Go-Byk Industries, Rothsay, Minn. 56579.

**MOTORCYCLE** \$15. Kart \$15. Minibike \$30. Moped \$35 complete. Minibike frame \$5, less engine. Gasoline engines \$3 up. (Mailorder only.) Send 25¢ (35¢ for first class mailing) for Directory-Catalog Number 134 listing these and hundreds of other bargains, plans, parts etc. Midget Motors Directory, Athens, Ohio.

**SNOW VEHICLE & GO KART CATALOG.** Hop up accessories—speed and performance equipment—manifolds, engine mounts, exhaust systems. Send 25¢ G.E.M. PRODUCTS, 436 Roosevelt Rd., Glen Ellyn, Illinois.



## AVIATION

**AIRBOAT** — Snowsled — Hovercraft — Autogyro Propellers. Plans, Supplies, Hoovercraft, drawings, engines, 6-blade fans. Catalog drawings, photographs. \$1.00. Esco-M, Box 1520, Bradenton Beach, Fla. 33595.

**PROPELLERS.** Plans, kits, supplies for airboats, snowplanes. Gauges, spark plugs, gas-oil hose, oil coolers, primers, wrenches, switches, propeller hubs, engine mounts. Corvair-Volkswagen conversion parts. 125-190 Lycoming engines, manuals, gaskets, parts, Catalog, \$1.00. Banks-Maxwell, Box 3301E, Ft. Worth, Texas 76105.

**HOMEBUILT.** Real enclosed helicopter, 24 pages ideas, information. \$2.00. Build "executive" helicopter, drawings, specifications, \$1.50. Helicopter Development, Box PM147, Washington, New Jersey 07882.

**BE A** Government licensed aviation mechanic. Practical training. Free information. Aero Mechanics School, Municipal Airport, Kansas City, Missouri 64116.

**FLY** Your own helicopter. Information 25¢. 3-view drawings and photos \$1.00. Plans \$15. Kits \$40. Compco, Box 1267B, Redwood City, Calif. 94064.

**FREE** Catalog 950 aviation/space books. Aero Publishers, 329 PM Aviation Road, Fallbrook, California 92028.

**BARTLETT FLYING SAUCER.** Amazing machine hovers 200 lb. man over land/water, powered by ordinary lawn mower engine. Easy to build. Fun to fly. Complete Plans. Kit Brochure and Photo Review \$3.00. Write: Herb Bartlett, Box 3234-C, Scottsdale, Arizona 85257.



## BOATS

**BUILD** Your own boat from our large-scale blueprints. Books of plans give how-to-build help. Hundreds of professional designs—motor, sail or auxiliary—for amateur builders. Free catalog. MoToR Boating, 959 Eighth Ave., Dept. RS, New York N.Y. 10019.

**KAYAKS**—One-man \$19.50; two-man \$24.50; Sailboat \$44.00. Exciting Sitka Kayak Kits known world wide for speed and safety. Assemble in one afternoon. Free pictorial literature. Box 78-P, Brecksville, Ohio 44141.

**PLANS.** Kits, hulls. 24-page 20th Anniversary catalog. All class racing boats. Flatbottom to Drag Hydros. Midget to 7 Litre, 50¢. Champion Boats, Box 9215A, Long Beach, Calif. 90813.

**BOAT** Plans—Full-Size Patterns—Frame Kits specially prepared for amateurs. New 88 page catalog of over 72 designs including Sail, Jets, Inboards & Outboards . . . Cruisers, houseboats, "hotboats," catamarans . . . all types from 8' to 36' "plus" boat trailers. New 1967 catalog only 50¢. Glen Designs, 9152 Rosecrans, Bellflower, Calif. 90707.



**FIBERGLASS Cloth and resin.** World's finest cloth and non-run resin, at direct mill prices. Flotation foam. Complete line of plastics, silicon bronze and brass screws save 60%. No sales tax. Boat Plans, Catalog 25¢. Freight prepaid. Stiles Boat Supply, Box 11P, Linden Ave., Mantua Hts., N.J. 08051.

**FIBERGLASS Canoes.** Three exciting models. Easily assembled kits. \$39.95 up (factory direct). Free literature. Riverside Canoes, P.O. Box 5595BP, Riverside, California 92507.

**BOAT KITS.** Save money—assemble yourself. Factory molded fiberglass or pre-assembled plywood. 12' to 32' Cruisers, Runabouts, Houseboats, Sail Boats. Big line accessories, motors, trailers. Easy terms. Free catalog. Luger, Dept. BC-67, 9200 Bloomington Freeway, Bloomington, Minnesota 55435.

**FREE Plan catalogue—canoes, kayaks, accessories.** Bruce Clark, 115 McGavock Pike, Nashville, Tenn. 37214.

**SPORTSCRAFT Canoes,** factory direct. Four canvas hulled models, from \$18.95. Streamlined appearance, unsurpassed performance. Also, canvas, paddle supplies. Free literature! Sportscraft, Box 8393-P, Columbus, Ohio 43201.

**BUILD It yourself plans, prams, skiffs, runabouts, cruisers, 8' to 32'.** Prices, \$2.50 to \$25.00. Send 10¢ for folder. Claude Horst, 6515 Earl Avenue, N.W. Seattle, 98107.

**FULL Size, cut-to-shape boat patterns, blueprints.** Send 60¢ for big new illustrated "Build a Boat" catalog includes fishing boats, garvies, cruisers, catamarans, houseboats—outboards, inboards, sailboats—7½ to 38'. "How to Build a Boat," booklet, \$2.50. Cleveland Boat Blueprint Co., Box 18250, Cleveland, Ohio.

**FOLDING BOAT.** Free data. MCW-PM, 709 W. Atlantic, Phila. 19140.

**PLANS, Kits, hulls, 24-page 20th Anniversary catalog.** All class racing boats. Flatbottom to Drag Hydros, Midget to 7 Litre. 50¢. Champion Boats, Box 9215A, Long Beach, Calif. 90813.

**BOAT PLANS, PATTERNS, FRAME KITS, BOAT KITS.** World's largest catalog—over 200 proven designs including 40 new complete boat kits, fishing boats, cruisers, sailing, ski boats, house boats, inboard and outboard hydroplanes. Send \$1.00 for large plan catalog or \$2.00 for catalog plus boat building handbook. Kit catalogue—Send \$1.00 or \$2.00 for catalogue plus boat building handbook to: Clark Craft, 1709-P Niagara Street, Buffalo, New York 14207.

### MARINE EQUIPMENT AND SERVICES

**"FLEET" Liquid Plastic Boat Finish** seals water out! Unsurpassed for rich, gloss finish. Wears longer! 28 colors. Use on wood, metal, fiberglass, canvas. Send for "Free" color card and introductory offer. Stay-Tite Products, Box 20130, Cleveland, Ohio 44120.

**MARINE Kits—Instructions for converting automotive engines to inboards—inboard/outdrives—jet, save!** Free catalog. STAR MARINE ENGINE WORKS, Berkeley, California 94710.

**WEATHERCASTER®—Portable radio receiver for U.S. Weather Bureau's new instant weather channel (162.55 MHz).** New York, Chicago, Honolulu, Kansas City and Miami now broadcasting. Inquire at other local Weather Bureaus before ordering. \$39.95. Shaw Electronics, Roper Building, Miami, Florida 33131.

**NEW, Used, rebuilt marine motors.** Marine conversions, fittings. Free catalog. Stokes Marine Supply, Dept. 24, Coldwater, Michigan 49036.

**CONVERT Auto engines to marine.** 68 Page Catalog, 50¢. Lehman Manufacturing Company, 800 Elizabeth Avenue, Linden 4, New Jersey 07036.

### ATHLETIC AND BODY BUILDING COURSES

**"COMPLETE Body-Building Course," "Gain Weight Easy," "Barbell 3-week Speed Course," "Super Karate,"** Complete combination offer—\$5.00, to: Duro-Stress, Dept. P.M.-8, 1226 Michigan Blvd., Michigan City, Indiana 46360.

**"GIANT Arms." Dr. Young's, D.C. revolutionary discovery.** \$2. Satisfaction or refund. Gaucho, Box 9309 - S7, Chicago 60690.

**FEAR No bully! Master authentic Chinese Kungfu unbeatable techniques!** Defeat within seconds any attacker including giant Judo-Karate experts. Free details by air. Write Asia's greatest master, Leongfu (M/25), 119, Anderson Road, Ipoh, Malaysia.

**KARATE—Complete instructions, illustrated,** only \$1.25. Bales Co., Box 5050, Rt. 2-PM, Escondido, Calif. 92025.

**INDIVIDUALLY Designed courses.** Free preliminary course, questionnaire. American, Box 2374, Salt Lake City, Utah.

**POWERFUL Muscles fast!** Free brochure! Universal Bodybuilding, Box 4327-C, Northeastern, Dearborn, Michigan 48126.

### SPORTING GOODS AND EQUIPMENT

**NEW—Binoculars, boats, cameras, guns, scopes, mounts, reloading tools and supplies—at best prices.** Hoagland Hardware, Hoagland, Indiana 46745.

**FREE . . . Wholesale catalog.** Arrow shafts, broadheads, fletchings, fisharrow parts, tools, bows. Finnsports (22G), Toledo, Ohio 43614.

**HUNDREDS Of Army - Navy surplus items, camping, hunting, fishing equipment, gun accessories, etc.** Write for free catalog. P&S Sales, Box 155, Tulsa, Oklahoma.

**BIG Money raising crickets and 12 inch African fishworms.** Free literature. Carter Ranch, Plains, Georgia 31780.

**SILENCERS: Pistol, rifle details, diagrams.** (Includes new design for .22s)—\$1.00 Aluminum Crossbow plans—\$1.00 (Both—\$1.75) "Twin," Box 192-A, Dunellen, New Jersey. Free fuse with plans!

**HUNTING Slingshot, powerful,** \$1.50 postpaid. Columbus, 717 East Pike, Seattle, 98122.



### FISHING, TACKLE, LURES

**FREE . . . Wholesale catalog.** Beads, Spinners, Lure parts, Sinkers, Jigs, Reels. Finnsports (ME), Toledo, Ohio 43614.

**FREE! Newest edition famous Corcoran catalog.** Largest selection hunting, camping, fishing equipment. All items field tested. Boots, clothing, fishing tackle, tents, gun cases, sleeping bags. Dozens of specialties. Zip code, please. Corcoran, Dept. PM-87-B, Stoughton, Massachusetts 02072.

**OVER 5,000 HARD-TO-FIND FISHING SPECIALTIES and kits galore.** Send for free 170 page catalog. Netacraft Co., Dept. PM, Toledo, Ohio 43613.

**TRAP Turtles easy way.** Goodwin's new collapsible wire trap. Literature. Traps, R4, Owensboro, Ky. 42301.

**MOLDS For fisherman's sinkers, jigs, squids, casting and spinning lures.** Free catalog. Sweets Molds, Tonawanda 1, New York 14150.

**MOLDS—For casting your own fishing sinkers.** Free illustrated booklet. Reading Instrument Co., Box P78, Reading, Pa. 19603.

### EARTHWORMS, LIVE BAIT

**BIG Money growing fishworms, giant African Crawlers, crickets.** Free Literature. Fain's Hatchery-31, Edison, Georgia 31846.

**SUCCESS FOR YOU! Raise Carter's Pure-bred hybrid red wiggler fishworms, crickets, and 12 inch African worms.** "Known All Over the World." Write for Free Literature and our Success Story in Life Magazine. Carter Redworms, Plains, Georgia 31780.

**TOUGHNER Conditioner enlarges worms overnight.** Generous sample, \$2.00. Soilless formula literature. Three Oaks Ranch, Dresden, Tenn. 38225.

**EARN Money raising fishworms for us!** Exciting details free! Oakhaven—56, Cedar Hill, Texas.

**HYBRID Redworms 3000 \$5.75, 10,000 \$14.00, Bedrums 20,000 \$18.00.** Postpaid with raising instructions. Brazos Worm Farms, Route 9, Waco, Texas 76705.

### FROGS, FISH, REPTILES

**GIANT Jumbo frogs.** Brochure frog raising \$1.00. Valley Frog Farm, Box 682, Placena, Calif. 95365.



### HUNTING, GUNS, DECOYS

**FREE: New Lyman catalog of shooting accessories.** Forty-four pages showing latest Lyman scopes, reloading tools, dies, sights and bullet casting equipment. Write Lyman Gun Sight Corporation, Dept. CPM 7-8, Middlefield, Connecticut 06455.

**SPORTSMAN'S Gamebird Handbook \$1.50.** 70 maps, 275 color pictures—Mallards, Canadian Honkers, Partridge, Quail, Pheasants, Shangri-La Waterfowl Paradise, Cross Lake 25, Minnesota 56442.

**FREE! Newest edition famous Corcoran catalog.** Largest selection hunting, camping, fishing equipment. All items field tested. Boots, clothing, fishing tackle, tents, gun cases, sleeping bags. Dozens of specialties. Zip code, please. Corcoran, Dept. PM-87-C, Stoughton, Massachusetts 02072.



### DOGS AND KENNELS

**VETERINARY Dog Health Book \$2.95;** 285 picture brochure 35¢. Stromberg's Pets Unlimited, Fort Dodge 25, Iowa 50501.

**BRITTANY SPANIELS: Started dogs and puppies from choice hunting stock.** Reverend Busby, Lamont, Kansas 66855.



### GAME BIRDS

**YOUR Ad in this space will be read by more than 1,550,000 active mail order buyers.** Join the march to greater profits, place your products and services in front of them today with a small low cost classified ad. For further details, write: C. A. Martin, Dept. 15N, Popular Mechanics, 575 Lexington Avenue, New York, New York 10022.

### RABBITS—FUR BEARING ANIMALS

**EARN \$10,000 Yearly raising Angora rabbit wool for us.** Particulars 25¢ coin. Angora, Malta 12, Montana 59538.

**MAKE Money raising chinchillas, mink, rabbits, cavy for us.** Free catalog. Keeny Brothers, New Freedom 2, Penna. 17349.

**RAISE Rabbits successfully by knowing facts.** 48 page illustrated book describing 25 breeds. Housing, breeding, feeding, markets, marketing etc. 25 cents. American Rabbit Association, 36 Arba Building, Pittsburgh, Penn. 15217.

**RAISE Rabbits for us on \$500 month plan.** Free details. White's Rabbitry, Mt. Vernon, Ohio 43050.

**BEGINNERS Books: 50¢ each—Chinchillas, Guinea Pigs, Chipmunks, Hamsters.** 285 picture brochure 35¢. Stromberg's Pets Unlimited, Fort Dodge 25, Iowa 50501.

### PETS—BIRDS, CATS, HAMSTERS, ETC.

**HAWKS, Reptiles, raccoons, skunks, squirrels.** Catalogue 25¢. Trails End Zoo, St. Stephens, S.C. 29479.



LIVE Traps, all sizes, mouse to dog. Collapsible and rigid. Carrying Cages. Free literature. National Live Traps, Tomahawk, Wisconsin 54487.

MONKEY'S, Ocelots, birds, reptiles, free list of exotic pets, reasonable prices. Exotic Animal Importers, Box 632, South Miami, Florida 33143.

285 PICTURE Brochure 35¢. Fascinating—everything—you name it. Stomberg's Pets Unlimited, Fort Dodge 25, Iowa 50501.

PET IDENTIFICATION metal tags. Send pet's name, address and phone number. Only \$1.00. Lifetime Products, 3645 Congress Court, Fremont, California 94538.

## CAMPING EQUIPMENT AND TENTS

SAVINGS Plus dividends! Campers-fishermen-outdoorsmen cooperative. Free 56-page catalog. Recreational Equipment, Inc., 1525-P 11th, Seattle, Washington 98122.

CAMPING, Tents. Giant catalogue. Send 25¢. Morsan, 810R, Route 17, Paramus, New Jersey 07652.

FREE! Newest edition famous Corcoran catalog. Largest selection hunting camping, fishing equipment. All items field tested. Boots, clothing, fishing tackle, tents, gun cases, sleeping bags. Dozens of specialties. Zip code, please. Corcoran, Dept. PM-87-A, Stoughton, Massachusetts 02072.

## EMBLEMS, BRASSARDS, PATCHES

NAZI Flags! Large 2X3 Souvenir \$3.00. Postpaid. W.W. = 2 Products, Box 2063, St. Louis, Missouri 63158.

## TRAVEL AND RESORTS

HOLIDAY Bargain! 4 days, 3 nights, in sunny Florida \$8.00 for two. Additional information 25¢. Post Office Box 66259, Chicago, Illinois 60666.

## ELECTRICAL SUPPLIES

METERS—Surplus, new, used, panel and portable. Send for list. Hanchett, Box 5577, Riverside, Calif. 92507.

LAMP Parts. Catalog, prices, wiring instructions. 50¢. Refunded first order. Gyro, 5218P N.W. 35 Ave., Miami 42, Fla. 33133.

## BATTERIES, GENERATORS

COMPLETE Rebuilding Manuals!!! Batteries \$3.00. Hydraulic Jacks \$3.00. C.O.D. Accepted. Write Today! Bayer Publications, 938FT Betty Avenue, Neenah, Wisconsin 54956.

BATTERY Recondition Kit, includes Molds, Material, Instructions, Battery Shop, Box 878, Palm Desert, Calif. 92260.

## ENGINES, MOTORS, DYNAMOS

FREE Catalog, Motor rewinders supplies. Modern, Box 10025, Kansas City, Mo. 64111.

WINDING Data. 275 motors, single and three phase \$1.10. Data Company, 512 Kensington, Kansas City, Mo. 64124.

DIESEL Injector parts and fuel pumps wanted. GM51-53-71-110. Bares, 2093 East 19 Street, Cleveland, Ohio 44115.

## MACHINERY, TOOLS AND SUPPLIES

COMBINES. Amazing device cleans screen and radiator during operation. Causes cooler engine. Cheapest protection for engine. Tested on thousands of machines. Guaranteed 100% effective. Free information, no obligation; No salesman. Freeman Company, 402 Plaza, West Helena, Arkansas 72390.

MACHINISTS Toolmakers wooden chests. Circular free. Cepuder, 4715 Spencer, Lisle, Illinois 60532.

## WELDING, SOLDERING, PLATING

CHROME Plating equipment, supplies. All other finishes. Home workshop and production sizes. Send \$1.00 (refundable) for formulas, operating data, equipment guide and catalog. HBS Equipment Division L50, 3543 East 16th, Los Angeles, Calif. 90023.

ARC Welder. Don't pay \$14.95 to \$18.95. Plans \$1.00. Kit \$5.00. I.D.E. Electric, 3859 Hartford, St. Louis, Mo. 63116.

"WELDING TRICKS OF THE TRADE" A new manual by C. B. Simmons offering short cuts, time savers and helpful hints in welding is now available. This handbook tells how to do lead welding; how to pierce heavy plate; how to weld galvanize steel without burning the galvanize coating; a short cut in welding 16 gage steel with a 1/4" gap and many other "tricks." Containing 420 pages and filled with numerous "How To's," it sells for \$7.50 and is available from Shamrock Press Inc., Box M357, Vermilion, Ohio 44089.

A.C. WELDERS. 150 Amperes, \$49.50. Morris, 1070 Inner, Schenectady, N.Y. 12303.

## GOVERNMENT SURPLUS

GOV'T. Surplus. How and where to buy in your area. Send \$1.00. Surplus information. Headquarters Building, P.M., Washington, D.C. 20036

SURPLUS Army, Navy store illustrated catalog. Ruvel & Company's Mail Order Division. Send 25¢ stamp or coin (refundable with first \$5.00 order). Ruvel, 707 Junior Terrace, Dept. 9-J, Chicago, Ill. 60613.

SURPLUS. How & where to buy Gov't. Surplus. Directory of surplus offices—send \$1.00 to Nolan Enterprises, 10280 Vicksburg, Cupertino, Calif. 95014.

JEEPS Typically from \$53.90 . . . trucks from \$78.40 . . . boats, typewriters, airplanes, sporting equipment, used, 100,000 bargains direct from Government nationwide. Complete sales directory and surplus catalog, \$1.00. Deductible first \$10.00 order. Surplus Service, Box 820-A, Holland, Michigan 49423.

## HOBBIES AND COLLECTIONS

TESTED Witch Hazel divining rod for locating water \$3.00 plus instructions. Clyde Blakley, Greenfield, N.H. 03047.

50 JUNGLE Butterflies \$2.00. Giant nature hobbies catalog 25¢. Collectors Wonderland, Box 1170, New York 10008.

U.S. ARMY SHOULDER PATCHES. Fascinating hobby for collectors. Decorations for dens, bars, game rooms. Official patches from every major Army and Air Corps unit. Ten assorted patches, price list and catalog, \$2.00. Catalog and price list only, 25¢. SPRINGER'S-PM, P.O. Box 577, El Paso, Texas 79944.

LINCOLN CROSSWORD MANUAL. Classified clues and questions WITH answers from professional puzzle publications. \$4 ppd. Lincoln Academy, Box 5362, Long Beach, California 90805.

"BUTTERFLIES" Save! \$\$\$\$\$\$. Discount Center, 9425 Merton Way, Seattle, Washington 98118.



## STAMP COLLECTING

U.S. Overrun countries complete mint. \$1.00, approvals. Stamper, 2013 San Salvador, Fairfield, California 94533.

FREE 1966 U.S. list, mint #704-15 \$4. #740-9 \$2.10, #859-99 \$6, #909-21 \$1. Simmy & Co., 40 Court St., Boston, Mass. 02108.

TEN Different nudes: 20¢. Approvals. Stamp Farm, 4M7, Oxford, Wis. 53952.

PENNY! Approvals! Regardless catalogue! Kloster, 4164 52nd St., San Diego 5, Calif. 92105.

500 DIFFERENT Stamps, \$1.00. Smith, 508-A Brooks, College Station, Texas 77840.

FREE 100 World wide stamps with request for mint pictorial approvals. Dept. PM, K & B Stamp Co., Box 70, Brooklyn, N.Y. 11223.

NEW African Stamp Collection—including Burundi, Guinea, Mali, Rwanda, Togo and others. A colorful addition to your collection. 10¢ with approvals. Capital Stamps, Dept. #57B, Ferrysburg, Michigan 49409.

UNITED States commemorative collection containing 33 different—10¢. Approvals. White, 516-A Avenue L, Brooklyn 30, New York.

FIPEX—Tipex-Cipex-Ashville. Four miniature sheets used for \$1.00 if you ask for our bargain priced U.S. approvals. Yorkboro, 38 Park Row, New York, New York 10038.

BEAUTIFUL Topical collection — includes Olympic sports stamps, wild animals, bicolor triangles, colorful birds, outer space stamps, Poland kitten stamp, and others. 10¢ with approvals. Sunny Stamps, Dept. #57-A, Fruitport, Michigan 49415.

AMERICANS On foreign stamps—Presidents Kennedy, Roosevelt, Lincoln, U.S. spaceman, Princess Grace & others. 10¢ with approvals Roseland Stamps, Dept. #57, Spring Lake, Michigan 49456.

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, New York 11229.

50 YEARS Old, fifteen different United States, over fifty years old—10¢ with approvals. Jaxon, Box 145-P, Brooklyn, New York 11230.

50 DIFFERENT Old U.S. Revenue stamps 50¢. Winchester stamps, Box 1592, Mansfield, Ohio 44907.

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 13316.

PENNY Stamps! 1000 Mounted in book at 1¢ each. Trust Stamp Company, P.O.B. 132-P, Jamaica, N.Y. 11435.

40,000 DIFFERENT. Amazing new plan builds your collection systematically, country by country. As low as 50¢ weekly. Ware, Monroe, Conn. 06468.

FREE Sample. Interesting, illustrated, informative National Stamp News, Anderson, South Carolina 29621.

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 13316.

"INVERTED Error." Dag Hammerskjold 5¢ with Approvals. Belmont Stamps, Washington, D. C. 20015.

FREE Surprise collection sent with approvals. Gould, 1784 Union, San Francisco 94123.

U.S. Bargain. 50 different 10¢, with beautiful worldwide approvals. Stamps, Kennebunk, Maine 04043.

GERMAN Commemoratives, 10¢ with approvals. Schaefer, Box 1704, Washington, D.C. 20013.

MILLION Foreign stamps! 2¢ each! Send for thrilling, giant approvals! ABC Stamps, Box 6000-MB, San Francisco, Calif. 94101.

FREE 50 Worldwide. Request approvals. University Stamps, P.O. Box 326, Pompano Beach, Florida 33061.

U.S. Approvals Low prices. Eagle, 2221 Romine Ave., Pittsburgh, Pa. 15226.



**RUSSIAN Space set 10¢.** Russian approvals. Snedco, Box 68-P, Waldwick, N.J.

**NEW Issues — Free weekly illustrated list.** Brooks, 2601N Avenue "U," Brooklyn, N.Y. 11229.

**65 DIFFERENT United States stamps only 10¢.** Approvals included. Shelron, Box 187, Hempstead, New York 11551.

**64 PAGE U.S. and U.N. catalog 10¢.** Stone, 260 Washington, Boston 8, Mass.

**ONE Pound value Geo. VI Bermuda, plus 100 worldwide 10¢ approvals.** Stevens, Box 105A, Homecrest Sta., Brooklyn, N.Y. 11229.

**U.S. Mint specials! Flag set, complete \$1.00.** 1¢, 2¢, 3¢ famous Americans (21 different) \$1.00. Free list. Brooks, 2601 Avenue "U," Brooklyn, N.Y. 11229.

**FREE Wonderful new United States catalog!** Postage and airmails complete. 786 illustrations. Special offers, bargains galore—everything! Send today. H. E. Harris, Dept. FC-1, Boston, Mass. 02117.

**ONE-Penny Approvals.** All Singles priced at 1¢ each. Absolutely nothing higher. Bargain sets also included. SFC, 868 West Street, Mansfield, Massachusetts 02048.

**1000 \$1.00.** United States or foreign, large variety. Missions Distributors, Box 386, St. Petersburg, Florida 33731.

**WORLD'S Largest stamp 25¢.** Gift Set included. Daufeldt, Atalissa, Iowa 52720.

**WOW! 110 All Different Germany 10¢ Commemoratives.** Airmails, High Values. Big catalog, bargain lists also, fine stamps from our approval service, which you may return without purchases and cancel service at any time. Jamestown Stamp, Dept. A87PM, Jamestown, N.Y. 14701.

**GIGANTIC Triple offer! \$10.00 Stamp Packet!** Exact replica world's rarest stamp! Full years membership International Society! All for \$1.00. Cochran, 558PM Oakey Boulevard, Las Vegas, Nevada 89105.

**ABSOLUTELY Free 25 different United States Commemoratives** when requesting United States Approvals. K & B, Box 70, Brooklyn, N.Y. 11223.

**BREATHTAKING.** 50 Mint Monaco pictorials. \$1.00. Approvals accompany. Stamp Exchange, Box 103, Fairfield, California 94533.

**215 STAMPS—10¢.** Approvals. Stampmaster, Box 284D, Foresthill, California. 95631.

**500 DIFFERENT Stamps \$1.00.** Fain's Stamp Agency, Box 56C, Edison, Georgia 31746.

**33 DIFFERENT Colorful Triangles.**—only 10¢ with approvals. Valley's, Box 414PM, Spring Valley, California 92077.

**REWARD! Free stamps and literature** for your address. Generous bargain lot \$1. High value packet \$3. Persile, 436 N.Y. Ave., Brooklyn, N.Y. 11225.

**1500 Foreign \$1.00; 5000 \$3.00. 9000 \$5.00.** 200 giant size only commemoratives and pictorials—foreign or USA—\$1.00; 700 \$3.00; 1250 \$5.00. 5000 USA—commemoratives, airmails, revenues, 19th Century, high values, presidentials \$3.00. 300 USA commemoratives, dating from 1893 to 1939 only \$2.00. 50 USA revenues \$1.00. No approvals. Meyers, 5321 Fleming, Richmond, California.

**UNITED STATES stamps!** Enjoy this challenging hobby more by using our approval service. Just starting, or advanced, you will find our material of great interest. 10¢ buys 65 different, when applying. Engle, Box 8, Lowell, Michigan 49331.

**VATICAN Xmas Set 60¢.** Approvals. Barricks, Box 7154, Detroit, Mich. 48202.

**COLORFUL Set free!** Request approvals. Gorliz, Drawer 388PM, Park Ridge, Illinois 60068.

**TRIANGLE and Diamond Collection!** Includes exotic birds, insects, flowers and animals. Plus 20 large US commemoratives. 5¢. Approvals accompany. Hamilton, 7150 Cyril, Chicago OE8, Illinois 60649.

**600 STAMPS 25¢.** Approvals. Eric's Stamps, 287 Bedford, Kitchener, Ont., Canada.

**FREE! Big Bargain Catalog—New Edition** listing thousands of bargains including U.S. & B.N.A. stamps, packets, albums, accessories and supplies. Also, fine stamps from our approval service which you may return without purchases and cancel service at any time. Jamestown Stamp, Dept. E87PM, Jamestown, N.Y. 14701.

**NEW United States Sipex souvenir sheet, only 10¢.** Free list. Bedrin, 250R Fulton, Hempstead, New York 11550.

**2¢, 3¢ APPROVALS.** Other bargains. South, Box 22092, Memphis, Tenn. 38122.

**DIRECT From exotic Siam stamp set \$2.00.** No approvals. JMC 3/1 Mookhamontri Road, Udorn, Thailand.

**DEALERS—Wholesale stamp list.** 5¢. Frank, 5031 Queensberry, Baltimore, Maryland 21215.

**AUSTRALIA 50 Different 5¢.** approvals. Hijop, Box 505, Norristown, Pa. 19404.

**OLD U.S. Seconds at bargain prices.** Karl Swartz, Malden Bridge, New York. 12115.

**STAMPS Free!** New issues, new countries, triangles, rockets, Olympics, Scouts, birds, flowers, animals. Also old Canadian and U. S. stamps. Plus complete illustrated Canadian stamp catalog. Send 10¢ for mailing. Gray Stamp Co., Toronto, Canada.

**CLOSEOUT Stamp packets used as premium** by large oil company. 20 Prepaid \$1.00. Dale Walters, 1959 Clays Mill Road, Lexington, Ky. 40503.

**FROM War torn Vietnam 50 scarce pictorials \$1.00.** Approvals accompany. Merriam Stamps, PO Box 50, Somerville, N.J. 08576.

**SENSATIONAL Free Offer.** 20 Outer space stamps, selected approvals. Louis Morrison, 1027 Maryland, Cape May, N.J. 08204.

**MINT Centennial assortment \$2.00** postpaid. Box 52, Brampton, Ontario, Canada.

**FREE 25 Different large size United States commemoratives** with low priced United States or foreign approvals. Elbert Rhoades, 217 9th Street, North Wilkesboro, N.C. 28659.

**500 DIFFERENT.** Includes pictorials 35¢ (approvals). Knopp, Box 1703, New Port Richey, Fla. 33552.

**25 DIFFERENT Canada free.** Approvals. Joseph Myers, Route 5, Coldwater, Michigan 49036.

**MONACO, Latest 1967 "Grand Prix Racing Autos"—Free!** Approvals plus 101 Bonus Sets. William Deems, 226 Race, Ravenswood, West Virginia 26164.

**SCANDINAVIAN: 60 Different 20¢** (payment mint stamps). Kimber, Hagersten 6, Sweden.

**FREE Mint Africa set.** Approvals. Litho, Box 51, Canoga Park, Calif. 91305.

## COINS, TOKENS, CURRENCY

**SIXTY-EIGHT Page current listings COIN BARGAINS only 25¢.** RARCOA. 31-A Clark, Chicago 60602.

**U.S. List plus 54S cent 10¢.** Schultheis, (Devonshire) New Hyde Park, New York 11040.

**40 PAGE Illustrated United States and Canadian coin list 10¢.** Stoney, 260 Washington, Boston 8, Mass.

**EAGLE Cent \$3.90; Ten Indianheads \$2.90;** (all four \$9.90) Nelson Exchange, 346-R, Rye, New York 10580.

**SPECIAL, Scarce Date Jefferson Nickels.** All V.G. or better. Satisfaction guaranteed. 1944S—1946S—1948S—1958 30¢ each. 1942D—1949S—1950 50¢ each. 1943D—1951S—1955 75¢ each. 1938D—1939S—\$1.40 each. 1938S—\$3.00. 1939D—\$5.00 1950D—\$14.50. Dates not listed 20¢ each. Bryson Inc., 612A White, Toledo, Ohio 43605.

**TRUNKFUL 25,000 Indian-Lincoln cents** from the 1920's and older, mixed "grab-bag" style. 150-\$10. Sample bag of 20-\$2. Mrs. Fischer, Box 5490-Y, Sherman Oaks, Calif. 91413.

**TEN WARTIME SILVER nickels, \$1.65.** 28 Lincolns 1909-1939, \$1.65. 22 "S" Lincolns, including 1955S, \$1.65. 10 "S" Jeffersons, \$1.65. 10 "S" Roosevelts (1946S-1949S complete), \$2.95. All Different. **GUARANTEED.** Buy four units, 1943PDS steel cents given Free. HARRIS, 4535-P, Stevenscreek, Santa Clara, California 95050.

**LINCOLN Cent 1943-S, 10¢ with free list.** Stevens, Box 212 F, Plainview, New York 11803.

**TEN Different Indianheads \$2.75.** Five V-Nickels \$1.25; 100 Different Lincolns \$4.85; 20 Different Buffalos \$3.95; Downeycoin, 7848-M Florence, Downey, California 90240.

**SILVER Dollar \$1.90; 2¢ Copper \$2.10; 3¢ Nickel \$2.25.** Terrific List! Fairway, 121-M Rye, New York 10580.

**SILVER Dollars, uncirculated rolls of twenty, \$41.50 each.** Circulated rolls \$33.50 each. Bill's Coins, 3166 16th St., San Francisco, Calif. 94103.

**LARGEST Coin magazine.** 200 pages, 50¢. Scrapbook, 7320-J Milwaukee, Chicago 60648.

**QUANTITY Discounts, fastest service, excellent grading.** Complete price list 15¢. Martin's, 36-M East Broadway, Tucson, Arizona 85701.

**BARGAINS: Crisp new currency—large \$1.00 bill \$12.95, large \$2.00 \$26.95, small \$2.00 \$2.95.** 1957 Proof Set \$7.95. Bebee's, Incorp., 4514 North 30th, Omaha, Nebraska 68111.

**3 LINCOLN Cents, 1929D, 1919, 1923** plus catalog only 10¢. Approvals. Littleton Coin Co., Littleton W1, New Hampshire.

**FREE Coin supplies! Giant coin list 20¢** (refundable). Economy Sales, Mansfield, Massachusetts 02048.

**SILVER Dollars uncirculated, 1878-79-80-81-82 S mint \$3.00 ea.** Illustrated Catalogue 50¢. Shultz, Salt Lake City, Utah 84110.

## ANTIQUES, RELICS, INDIAN GOODS AND CURIOS

**SELLING 20,000 Ancient arrowheads, spearheads, etc.** List free. Lear's Glenwood, Arkansas 71943.

**ARROWHEADS 10 For \$3.00.** Free list. Nowotny's, 8823 Kenney, San Antonio, Texas 78230.

**TONS Of antique gun parts and supplies.** All reproduction muzzle loading guns. Send \$1.00 for enlarged illustrated catalog No. 116-A. Dixie Gun works, Union City 12, Tennessee.

**10 PERFECT Arrowheads \$3.00.** George Smith, 9825 Conway Drive, Indianapolis, Indiana 46236.

**ARROWHEADS, 10 for \$3.00.** List free. Hyde's, Box 1788, Santa Fe, New Mexico 87501.

## MODELS—SHIPS, TRAINS, PLANES, ETC.

**SHIP Models.** Kits, fittings, plans, books, tools, engines, motors. Big illustrated catalog. 50¢. James Bliss & Co., Dept. SM, Route 128, Dedham, Mass. 02026.

**SHIP Model kits and fittings: clippers, frigates, etc.** Catalog paint-tool list, book list. 40¢. Model Shipways, Box 65, Bogota, N.J. 07603.

**SHIP Models catalog 15¢.** Scientific, Inc., 100 Monroe, Newark, N.J. 07105.

**ROCKETS: Real flying models—flights up to 2500 ft.** New illustrated catalog 25¢. Single and multistage kits, cones, engines, launchers, trackers, rocket aerial cameras, technical information. Fast service. Estes Industries, Penrose 2, Colorado 81240.



HO Flying Brakeman (TM) jumps on and off running train! Station, caboose, switches and brakeman, \$7.50 Prepaid. Herman Enterprises, 6604 N. Whipple, Chicago 60645.

FREE Complete catalog. Advance, 68 East Auburn, Ecorse, Mich. 48229.

18" RACING THREE-POINT HYDROPLANE. Really screams. Die-cut wood parts, gas engine, and hardware—Kit \$13.25. Satisfaction Guaranteed. Catalog of other boat kits, including boats for radio control—10¢. Model Boat House, Box 6312—PM87, Tucson, Arizona 85716.

MATCHBOX MODELS Checklist—1953 to date; lists major and minor varieties. \$1.00. Ladd Model Works, Box 1142-PM, Evanston, Ill. 60204.

STEAM Engines, castings, prints. Some machined, finished; miniature spark plugs, fittings, hexagon bolts, books, metal. Innumerable selection. Catalog \$1.25. Cole's Power Models, Ventura, Calif. 93002.

SHIP and yacht model fittings; Pine construction hull kits; blueprints. Send 50¢ for illustrated catalog. A. J. Fisher, Inc., 1002 Etowah Avenue, Royal Oak, Michigan 48067.

## GAMES, TOYS, NOVELTIES

TELL The more than 1,550,000 avid readers of Popular Mechanics about your products and services. It costs very little to place your classified message in front of these proven mail order buyers. For further details, write: C. A. Martin, Dept. 31N, Popular Mechanics, 575 Lexington Avenue, New York, New York 10022.

## MAGIC TRICK, PUZZLES, JOKER NOVELTIES

NEW EDITION. 1967 Catalog of 500 Tricks, only 10¢. Fastest same-day service to magicians for 40 years. Send 10¢ today DOUGLAS MAGICLAND, Dept. 21, Dallas, Texas 75221.

COMPLETELY Illustrated catalog. 84 pages, 25¢. Manhattan Magic, Box 334-M, N.Y.C. 10011.

FUN 'n Magic Catalog. 10¢. (1,500,399 tricks, jokes, novelties). Elbee, 7408-F, San Antonio, Texas 78207.

BE A Magician! Two booklets explaining sixty-eight tricks plus large professional catalog. \$1.00. Magic, Inc., 5082 Lincoln, Chicago, Illinois 60625.

MAGIC Catalog. World's finest. 3000 tricks. (340) pages \$2.50. Beginners, amateurs, professionals. Kanter's, A-200 South 13th St., Philadelphia, Pa. 19107.

WORLD'S Finest professional magic tricks. Joker's Novelties. Giant illustrated catalog 10¢. Top Hat, Evanston, Illinois.

TEACH Yourself the Art of Magic. Magicians secrets revealed. Send 10¢ for our catalog of tricks and gags. "Fabulous Tricks and Magic." 3319 E. Charleston, Las Vegas, Nevada 89104.

VENTRILOQUISM! Information free! Dummy catalog. 25¢. State age. Maher, Studio H, Box 8536, Kensington Station, Detroit, Michigan 48224.

42 PAGE Illustrated joke, magic, novelty catalog. 25¢. Joke, Box 7212 A, Chicago, Illinois 60680.

LATEST World famous giant surprise catalog!! 1000 Professional tricks, magic, jokers!! 164 pages!! 25¢. House of 1000 Mysteries, Dept. PM7C, Ft. Lauderdale, Florida 33308.

## BOOKS, PERIODICALS, NEWSPAPERS

"UNUSUAL" Books! Catalogue Free! International. (PM). Box 7798, Atlanta, Georgia—30309.

FREE Catalog. Self-help books. Write Wilshire, 8721 Sunset, Los Angeles 90069.

PROPHET Elijah coming before Christ. Wonderful book free. E. Megiddo Mission Rochester, New York 14619.

FREE List self help books. Spears, Box 7336-M, Jacksonville, Florida 32210.

FREE Catalog. Self-help books. Write International Enterprises, 440 S. Oxford, Los Angeles 18D.

CHALLENGING! Different! Unusual books! Free catalog. Ruby's, D-26, Paradise, Pennsylvania 17562.

BOOK Sale free list. Low cost books. Doyle Tye, D-2 P.O. Box 3356, Ft. Worth, Texas 76105.

NATIONAL Geographic Magazines, 1888-1967, any issue. Buxbaum, Box 465-PM, Wilmington, Delaware 19899.

PROGRAMMED INSTRUCTION BOOKS An effective new approach to self-instruction that makes it IMPOSSIBLE to get to the end of the book without understanding it. Send for free brochure listing titles available. New Learning Techniques, 1759 No. Edgemont, Los Angeles, Calif. 90027.

PUBLISH Your book! Join our successful authors: All subjects invited. Send for free appraisal and detailed booklet. Carlton Press, Dept. PMR, 84 Fifth Avenue, New York 10011.

DYNAMIC THINKING! Book reveals HOW! \$1.00. Paton, Box 2609, New York, New York 10017.

TURTLE Hobbyists and herpetologists! Yearly subscription \$5.00 U.S.A. = PM, International Turtle/Tortoise Journal, P.O. Box 45555, Los Angeles, Cal. 90045.

WATER WITCHING: My Experiences and Findings. 132-page illustrated book. Includes two fascinating chapters on how witching works. Based on 20 years successful experience. \$2.75 to Earl Shannon, Box 8764, Albuquerque, N.M. With complete witching kit \$3.75.

92 PAGES Of mailorder how, \$1.00. Kel Enterprises, B236, Rockaway, N.J. 07866.

BOOKS. Free general catalog. 60 pages. Text, vocational, educational, instructional subjects. Millions of volumes, new and used. Bargain prices. Books bought. Est. 1902. Long's College Book Co., Dept. P.M., Columbus, Ohio 43201.

## PLAYS, STORIES, MANUSCRIPTS

WANT Your book published? Learn how we publish, advertise, promote, distribute. Many successes. Free booklet PM, Vantage, 120 West 31, New York City.

## BUSINESS OPPORTUNITIES

ADDRESSERS And mailers needed. Send stamp for information. Lindbloom, 1508 West Erie, Chicago 60622.

SECRETS! Secrets! Mail order success revealed by internationally famous expert who discovered how to make home business fortunes. Beginners: Get free copy "How to Make Money in Mail Order." Discloses free advertising, profitable products, everything! No obligation. Write Mailco, 1554 Sepulveda, Dept. A708, Los Angeles 90025.

OPERATE Restaurant or diner. Free booklet reveals profitable plan. Write Restaurant Business School, Dept. EC-87, 1920 Sunnyside, Chicago, Illinois 60640.

IMPORT Export opportunity, profitable world-wide, mail-order business from home, without capital, or travel abroad. We ship proven plan, for no risk examination. Experience unnecessary. Free details. Mellinger, Dept. A708, Los Angeles 90025.

CLIP Newspaper items. \$1.60-\$5.00 each. Details free. Walter, Box 1360-PA, Erie, Pa. 16512.

FREE "Franchise Profit Letter" tells how unique NFR service is helping thousands seeking profitable businesses. Write today. National Franchise Reports, W-528, 333 North Michigan, Chicago 60601.

OPERATE Home mailorder business. Voicec Printing, 4444AI Ute, San Diego, Calif. 92117.

PIANO Tuning learned quickly at home. Tremendous field! Musical knowledge unnecessary. GI Approved. Information free. Empire School of Piano Tuning, Miami, Florida 33145.

BOOKKEEPERS Earn \$1000.00 month. Operate simplified Bookkeeping tax service. Universal, Box 664-M, Springfield, Missouri.

\$200.00 DAILY In your mailbox! Your opportunity to do what mailorder experts do. Free details. Associates, Box 136-A, Holland, Michigan 49423.

BUILD Custom cases at home for profit. Get orders by mail. We supply materials, instructions, everything. Free home business details. Customcase, 805CPN Sunset, Los Angeles 90012.

400,000 BARGAINS Below wholesale! Many free. Liquidations . . . closeouts . . . job lots . . . single samples. Free details. Bargainhunters Opportunities, Box 730A, Holland, Michigan 49423.

START Your own business on credit. Your own boss. Hundreds of dealers making \$100 to \$300 and more weekly. We supply stocks, equipment on credit. 300 home necessities. Sales experience unnecessary. Pleasant, profitable business backed by world-wide industry. Write Rawleigh, Dept. H-U-PPM, Freeport, Ill.

VENDING Machine big catalog. Rake, 523 A Spring Garden, Philadelphia, Pa. 19123.

SELL Advertising book matches. Write us today; we put you in business by return mail, handling complete line ad book matches in demand by every business right in your town! No investment; everything furnished free! Top commissions daily! Superior Match, Dept. MX-867, 7530 S. Greenwood, Chicago, Ill. 60619.

COPUBLISH "Mail Sale Advertiser." leading mailorder paper. Copy and details 25¢. Vanroy Shirk, Lebanon, Pa. 17042.

RAISE Rabbits for us on \$500 month plan. Free details. White's Rabbitry, Mt. Vernon, Ohio 43050.

READ Progressive Mailtrade, the magazine that tells how to make money by mail. Quarter brings sample and special offer. Mailtrade, P.O. Box 357, Sheboygan, Wis. 53082.

\$400.00 MONTHLY Raising giant fishworms. Soilless method. Charlie Morgan, Bushnell, Florida 33513.

EARN Money raising fishworms for us! Write: Oakhaven-38, Cedar Hill, Texas.

LEARN Landscaping and the growing of plants. Start a profitable business part or full time. Free information without obligation. Lifetime Career Schools, Dept. A-118, 2251 Barry Avenue, Los Angeles, California 90064.

FREE Catalogs. Repair air conditioning refrigeration. Tools, supplies, full instructions. Doolin, 2016 Canton, Dallas, Texas 75201.

BIG Money raising fishworms and crickets. Free literature. Carter Farms, Plains, Georgia 31780.

SAWDUST. Tin - cans, newspapers. 200 uses. Instructions \$1.00. Charles Company, 42-GPK, Norwood, Ohio 45212.

WORLD'S Largest wholesale supply. Buy from 8753 American, European, Japanese wholesalers. Hongkong clothes. 123 dropship catalogues. Rockbottom prices. Automobiles. Free details. International Buyers, 216-MM West Jackson, Chicago, Illinois 60606.

SELL Books by mail. 400% profit. Royal, Box 450-X, Cleveland, Ohio 44127.

\$70.00 WEEKLY—home, spare time. Simplified mail bookkeeping. Immediate income easy. Auditax, 34741A, Los Angeles 90034.

MAKE \$46 from square foot plywood; jigsaw or bandsaw necessary. Free details. Woodar, Bridgewater, Mass. 02324.

GIANT Mail. Folio, magazines, opportunities. Merchandise 35¢. Daufeldt, Atalissa, Iowa 52720.



**\$15.00 HOURLY PROFIT-OWN Business** with one serviceman. Quickly learned. Easy to do. Operate from home. Few hundred dollars builds your own nationally advertised business while continuing present job. Investigate immediately. . . . before your territory is taken. Free booklet explains everything. Send Today. Then decide. Duraclean, C7-164A, Duraclean building, Deerfield, Illinois.

**BIG profits—Operating your own plastic laminating business** with low cost equipment and supplies, money making methods included. Money back guarantee. Jiffy—Box 23485P, Los Angeles, Calif. 90023.

**CONCRETE FACTS:** Highly profitable home business. Experience unnecessary. Unlimited unique pottery designs easily made without moulds. Birdbaths, fountains, wishing-wells, benches, etc. Chemical coloring formulas, marbled glazing. FREE illustrated brochure. Hollywood Cementcraft, 602 Athens Street, Altadena, California 91001.

**BECOME Tax consultant.** Our students earn \$1,000—\$3,000 every tax season preparing returns evenings. Accredited. State approved. National Tax, Monsey 2EA, New York 10952.

**MAKE Money from old tires.** Operators clearing \$600 weekly. Equipment costs \$1000. Get facts. S&S Patents, Inc., 3911 N. Damon, Chicago 60618.

**MAKE Extra Money—show friends, neighbors—Gifts, Stationery, Christmas.** All Occasion Cards. Experience unnecessary. Salable samples on approval, free catalog, free name imprinted Christmas Card Album. Hedenkamp, 361 Broadway, Dept. PM-94, New York 10013.

**BUILT-IN Vacuum cleaning offers ground floor opportunity** in expanding, profitable new market. Sell and install VACUFLO . . . the industry pioneer. System easily installed in new or existing homes. Choice distributor and dealer territories still available. Build your own profitable business. Get the facts. Write: H-P Products, Inc., Louisville, Ohio. 44641.

**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, 1585 Howard, Chicago, Ill. 60626.

**MEDICARE—Social Security.** Earn top fees assisting clients obtain maximum benefits. Accredited. National Tax, Monsey, 302EA, New York 10952.

**HUGE Profits! Mail order importing.** Free information. ITIS-PM-8, Box 454, Hollywood, Calif. 90028.

**DOLLS MAKE BIG MONEY!** Start your own hobby-business dressing, making, repairing and selling dolls. Send for FREE booklet describing the excellent opportunities open to you. Doll Hospital School, Dept. D-322, 2251 Barry Avenue, Los Angeles, California 90064.

**MAILORDER Book publisher wants dealers.** Wonderful "drop-ship" proposition. Sample imprint circulars free. Neil H. Tasker, Shamokin, Pennsylvania 17872.

**MAILORDER IMPORTS.** Report reveals foreign drop-ship sources. World Trader's Digest. Ideal mailorder items. Send \$1.00. John W. Bennett, Dept. P-2, 10437 Lanark Street, Sun Valley, California 91352.

**MAILORDER—Cash business.** No merchandise investment. 65 products, drop-shipped. National Mdsrs., 3408 1/2 Motor, Los Angeles 90034.

**PROFITABLE.** Guaranteed mailorder business! Investigate! Long, 2501 Lippincott, Flint, Mich. 48507.

**MAKE Money, copublish "Profitable Selling".** Copy and details 10¢. Liberty Publishing, Desk 2, Box 576, Woodside, N.Y. 11377.

**HIGH Profits, operating home mail project.** Details free. Michael Boros, 311 Madison Avenue, Plainfield, New Jersey 07060.

**START Own profitable home import business.** Lowest price sources, free details. Aubrey, Box 84-PMB, Middletown, New Jersey 07748

**RADIO Mail order.** \$50,000 in one month possible. No cost percentage plan. Walthay Box 53 M-8, Los Angeles 90032.

**LIQUID Molding rubber also liquid plastic.** Free information. Chaney's, 5415-A San Jose Blvd., Jacksonville, Fla. 32207.

**LEARN To bronze baby shoes.** Instructions \$2.00. Don Brady, 433 Market, Topeka, Kan. 66607.

**MAILORDER—Start with Gifttime's fabulous dropship color catalogs** imprinted with name, address. Amazing bonus plan stimulates orders. Lists available. Free catalog, details. Gifttime, Dept. PM, 919 Walnut, Philadelphia, Pennsylvania 19107.

**IMMEDIATE Profits** with no capital or experience. Take orders for all magazine subscriptions. Friends and neighbors are your prospects. Write now for complete, free kit. McGregor Magazine Agency, Dept. GB8, Mount Morris, Illinois 61054.

**SPARE Time—Free big money making opportunity catalog.** Cleanbright, Dept. 608, 2206 Folin St., Bx., N.Y. 10457.

**\$6.50 ACTUALLY Puts you in home mailorder.** Details free. Enterprises, Box 5188-P8, Buena Park, California 90620.

**CASH In on the crime wave.** Install and service burglar and fire alarms. Highly profitable full or part time. Full line of equipment and easy to follow instructions. Free information. Camben Co., Box 53179, Houston, Texas 77052.

**NEW Hong Kong Directory.** 200 Hong Kong wholesalers. Only 25¢. Trade Magazine, 225 wholesalers, 38 countries. Latest issue only 25¢. Trade, Box 23, Winnipeg 8, Manitoba, Canada.

**BEAUTIFUL New Spanish Jewelry** sells itself! Free illustrated catalog! Linwood House, Box 11211-PH, Indianapolis, Indiana 46201.

**MAILORDER To \$100 weekly, sparetime.** Amazing details. Stauffer's, Box 3583, Dept. PM8, Hollywood, Florida 33023.

**HOW TO GET FINANCE CAPITAL.** Start or expand any business. Write: Counselor-17, Harlingen, Texas.

**MAIL ORDER WORKSHOP PLANS.** FREE Facts and material can help you to discover how easy it is to START AND MAINTAIN a profitable Mail Order business. NO INVESTMENT IN MERCHANDISE. No experience needed. Professional methods explained. Mail Order Workshop Inc., Box 703, Dept. 15, Garden City, N.Y. 11030.

**APPLY ALL Your talents.** Start your own business with little known moneysaving tips. Free information. Bell, Box A-2636, Charleston, S.C. 29403.

**HOW To obtain capital.** Details, \$1.00. Guaranteed results. L. E. Rodgers, P.O. Box 5653; Pittsburgh, Pa. 15207.

**BARGAINS Are our business.** Free details. The Robinson Co., 443 Encinitas Ave., San Diego, Calif. 92114.

**YOUR Own Auto Parts Business!** No Investment! Details Free! CBS, Tarentum, Pa. 15084.

**YOU CAN MAKE \$20,000 YEAR!** With "Insurance and Mail Order." Will show you how! And send actual letters, Men, women earning \$20,000 as proof. 17%, 20%, 52% Response! \$8,000.00 Net profits 3000 mailing! \$5000.00 Gross 1000 card mailings. Employ others, Invest nothing! Send age, \$1, good faith, (refundable). For complete confidential trade material package. Promotion Insurance, R7, Rome, Georgia 30161.

**100,000 PRODUCTS Wholesale!** Terrific bargains! Wholesalers, 1265-MF Broadway, New York, N.Y. 10001.

**SELL Lifetime, Metal, Social Security Plates.** Big Profits! Sample and Sales Kit Free. Russell, Box 286-PM, Pulaski, Tennessee 38478.

**DRAFTSMEN!** Operate own drafting service! Sure, independent income; Full, part time. Experience unnecessary; Details: Roberts Drafting, 1741 Circle Road, Baltimore, Maryland 21204.

**ARMED GUARD CAREER!** Contract private patrol duty in your city or locality. Details 25¢. National Private Patrol Service, Training Division, Box 327, Springfield, Oregon 97477.

**\$100 WEEKLY.** Home, spare time, by mail—easy! Nostab, Box 669A, Center, Texas. 75935.

**56 ACTIVE Franchise opportunities** available all over USA. Brochure details 56 franchise chances for you to have your own business tied with successful national companies. Send name, address to P. Stewart, 1085 Walnut, Des Plaines, Illinois 60016.

**EARN To \$7.65/HOUR EXTRA!** Operate your own tax consulting-accounting service. We train you, help you start. Rush name, address, zip for free book. Southwestern Academy, Dept. M87, Dallas, Texas 75220.

**\$80. DAY!** Selling books by Mail. Don-Kar, 1914A, La Cana Hacienda Heights, Calif. 91745.

**VENDING Machines.** No selling. Operate a route of coin machines and earn amazing profits. 32-page catalogue free. Parkway Machine Corporation, 715 PMB Ensor Street, Baltimore, Maryland 21202.

## MONEYMAKING OPPORTUNITIES

**EARN \$500.00 Monthly clipping ads** at home. No investment—experience. Free information, send stamp. American, Box 56, Muncie, Kansas 66057.

**RAISE Rabbits and fishworms** on \$500 month plan. Free details. White's Rabbitry, Mt. Vernon, Ohio 43050.

**MAKE \$100.00 Fast, assembling belts** for profit. Redikut's, Loganville 40, Wisconsin.

**\$200.00 FROM Sheet 1/4" plywood (scrap).** Details 25¢. Novellets, 610 So. 24th, Elwood, Indiana 46036.

**BIG Money raising fishworms and crickets.** Free literature. Carter Hatchery, Plains, Georgia 31780.

**WHOLESALE Magazine subscriptions.** Highest commissions. Bonus! Box 151 UA, Woodmere, N.Y. 11598.

**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, 1532 Howard, Chicago, Ill. 60626.

**VENDING Machines.** No selling. Operate a route of coin machines and earn amazing profits. 32-page catalogue free. Parkway Machine Corporation, 715 PPM Ensor Street, Baltimore, Maryland 21202.

**HOUSEHOLD And food products route.** \$25.00 or more daily profit. Larger repeat orders. Man, woman. Full, part time. McNess, Freeport 26, Illinois 61032.

**LEARN Junk Battery repairing secrets,** "Fabulous Profits" at home. Details. Batteryman, Box 878, Palm Desert, California 92260.

**MAKE Extra Money—show friends, neighbors—Gifts, Stationery, Christmas.** All Occasion Cards. Experience unnecessary. Salable samples on approval, free catalog, free name imprinted on Christmas Card Album. Hedenkamp, 361 Broadway, Dept. PM-96, New York, 10013.

**EARN Money Evenings,** copying and duplicating comic cartoons for advertisers. Adservice, Argyle (1), Wisconsin.

**BECOME Notary Public!** Free particulars. Stationers Exchange, Box 4120-PM, Evansville, Indiana 47711.

**CLIP Newspaper items.** \$1.00-\$5.00 each. Details free. Walter, Box 1360-P, Erie, Pa. 16512.

**INSTANT Money!** Plastics are the wave of the future. Big profits now! At home! Spare time! Materials costing 11¢ bring \$2.58 profits immediately! Free information! Rush name on postcard to: Warner, 1512 Jarvis, Dept. CL-2-HT, Chicago 60626.



**START BIG-PAY Business** at home in spare time. No experience needed to operate little table-top machine for bronzing baby shoes. Make \$7.32 profit on every pair. Full particulars free. Send postcard to: Mason, 1512 Jarvis, Room CM-2-HT, Chicago, 60626.

**OVER \$16.50 an hour.** Spare Time at home! Rubber Stamp industry needs small manufacturers. We furnish all equipment and know-how! Particulars Free! Write: Roberts, 1512 Jarvis, Room CR-2-HT, Chicago, 60626.

**MANUFACTURER** Offers quality line of automotive chemicals. High profits, repeat sales, choice territories open. Write for catalogue and details. **CLEANBRIGHT**, Dept. 208, 2202 Folin St., Bronx, New York 10457.

**WIN Contests, cash, merchandise.** Free details, Michael Boros, 311 Madison Avenue, Plainfield, New Jersey 07060.

**Make Big money fast!** \$1,000.00 in 60 days possible. It's easy taking orders for Dwarf, Standard fruit trees, roses, ornamentals, etc. Price earned \$7,118.90 first year! Color Outfit Free! Stark, Desk 30188, Louisiana, Missouri 63353.

**\$250.00 AVERAGE Commission** clipping items for us. Unlimited earnings possible. Only investment \$1.00 for complete information. Financial, Box 1451-PM, Natchez, Miss. 39120.

**WINDOW Trimming, step by step guide.** \$1.00, Box 557, Whittier, California 90608.

**"MAGIC Pyramid" Mailorder Plan** and 50% commission circulars free. Franchise inquiries invited. Vitamins, 2908-P Beverly, Los Angeles 90057.

**MAKE Money** with your camera. Sell your photos. Report tells how, where. Color slide markets. Only \$1.00. Settlement Enterprises, 306 Ann, Kannapolis, N.C. 28081.

**SWEEPSTAKES Contests, How To Win.** Write for free particulars. General Contests, 1609-18 East Fifth, Duluth, Minn. 55812.

**HOW To Make money** writing short paragraphs. Information free. Barrett, Dept. C-27-V1, 6216 N. Clark, Chicago 60626.

**WATCH REPAIRING.** Swiss and American watches. Develop skill step by step in spare time at home. Tuition \$5 monthly. Diploma awarded. Free sample lesson. Chicago School, Dept. YUA, Fox River Grove, Illinois 60021.

**MAKE \$5,000 yearly, sparetime, raising** mink, chinchilla, nutria, etc. Free booklet reveals proven plan. Write: Furs, Dept. R, Bewdley, Ontario, Canada.

**EARN Money** making signs. Free details. Lonnquist, Box 500, Bella Coola, B. C. Canada.

**FREE, 206 Easy ways** to make money taking orders for exciting new products—spare time. Send name, age, for 5 months free subscription. Opportunity Magazine, 850 N. Dearborn, Dept. 17-HM, Chicago 60610.

**LEARN Machine engraving!** Enjoy home business profits to \$5 hour. Engrave colorful formica plastic nameplates. Details 10¢. Desco, 3317-BG Alameda, Burbank, Calif.

**FREEDOM** from time clocks. Retire without money. Details free. Bradshaw's, Burgin 1, Kentucky.

**HOW I MADE A FORTUNE WORKING HOME.** "No-sweat" approach. Ventures-4, Harlingen, Texas.

**CIGARETTES 12¢ A pack—Improved** roller makes 20 filtertip or plain, king or regular for 12¢. Facts free. Moberly, Box 953, Owensboro, Kentucky 42301.

**TRUCKERS:** Best driving jobs—highest pay. Instructions, \$2.00. Sellers, Box 56, E. Moline, Illinois 61244.

**SPARE Time cash.** Sell Famous Hanover Shoes. Actual samples and sales kit Free. No experience needed. No age limit. Lowest prices for high quality makes selling easy. Every man a prospect. Big daily commissions. For full details, write Hanover Shoe, 317 Carlisle, Hanover, Penna.

**HOMEWORKERS Wanted!** New Information Directory on 200 companies seeking part-time workers. Save time—money. Send \$2.00. Quest Enterprises, Box 6029, Dept. 18, San Jose, California 95150. **SATISFACTION GUARANTEED.**

**\$200 A WEEK** possible in mail-order, details free. Knowledge, 30B West Washington, Chicago, Ill. 60602.

**BUSINESS Capital needed?** Free brochure where to obtain it. Shu-Rich, Box 128, Tesuque, New Mexico 87574.

**WORK AT HOME** spare time. \$100.00 month should be easy. **CULTURED PEARLS.** Send \$1.00 for information. Western Gem and Mineral Co., Box 861, A, Reseda, California.

**NEW! Factual moneymaking manual** \$1.00. Crest, Box 13M, Merrick, N.Y. 11566.

**AMAZING Successes** through franchises! Become exclusive franchise holder in your territory. Information rushed. National Franchise Reports, WP-528, 333 North Michigan, Chicago 60601.

**START A profitable subscription business** in spare time! We need men and women (young and 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 5-O, 250 W. 55th St., New York, N.Y. 10019.

## PROFITABLE OCCUPATIONS

**BECOME A mortgage broker,** earn \$10,000 to \$50,000 a year. Details free. United, Box 6284-C, Marietta, Georgia 30060.

**YOUR Own sign shop—Signs,** 1017 W. Mulberry, Springfield, Ohio.

**RAISE Rabbits** for us on \$500 month plan. Free details. White's Rabbitry, Mt. Vernon, Ohio 43050.

**AUCTIONEERING — Resident & home** study courses. Veteran approved. Auction School, Ft. Smith, Arkansas.

**CHROME Plating.** Instructions, equipment and supplies. Platers' Supply, P.O. Box 565, Lugo Station, Los Angeles, Calif. 90023.

**BIG Money raising** fishworms and crickets. Free literature. Carter Wormery, Plains, Georgia 31780.

**FREE Facts** and descriptive bulletin. Be an air conditioning, refrigeration, and heating serviceman. High pay. Jobs open everywhere, operate your own service business, no school or correspondence necessary. Write Doolin, Trouble Shooter, 2016 Canton, Dallas, Texas 75201.

**INVESTIGATE Accidents:** Average earnings of \$5 to \$8 an hour—full or spare-time. No selling. No previous experience necessary. Learn to earn in your spare time. Write for Free book. No obligation. No salesman will call. Universal Schools, CPM-8, 6801 Hillcrest, Dallas, Texas 75205.

**BUILT-IN Vacuum cleaning** offers ground floor opportunity in expanding, profitable new market. Sell and install **VACUFLO** . . . the industry pioneer. System easily installed in new or existing homes. Choice distributor and dealer territories still available. Build your own profitable business. Get the facts Write: H-P Products, Inc., Louisville, Ohio 44641.

**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, 1586 Howard, Chicago, Ill. 60626.

**HOW To Make Money Writing Short Paragraphs.** Information Free. Barrett, Dept. C-27-V2, 6216 N. Clark, Chicago 60626.

**SCIENTIFIC MASSAGE: BIG EARNINGS** uncrowded profession. Learn spare time at home. Diploma awarded. Free catalog. Write: Anderson School, Dept. J-1C, Princeton, Illinois 61356.

**MAKE Over \$200 a week** in your own business. Free franchise and training. Write to American Compute-A-Service, 1 N. La Salle, Chicago, Ill. 60635.

**INCOME Unlimited** in homework of your choice. Write: Williamsons, 9323 Spring Arbor Rd., Jackson, Michigan 49201.

**PAINT Signs, showcards.** Easy instructions, \$2.00. Nuart, Box 86A, Oscoda, Mich. 48750.

**SHARPEN Scissors, Pinkers.** Inexpensive equipment, tools, supplies. Blackhawk's, Sheldahl, Iowa 50243.

**START A magazine subscription business.** Earn generous commissions on Popular Mechanics, Good Housekeeping and all others. Best commissions, bonus, all material sent free. No experience needed. Write Popular Mechanics, Room 2-P, 250 West 55th St., New York, N.Y. 10019.

## SALESMEN—DISTRIBUTORS

**EARN Big Commission** full or part time. Show America's largest line low priced Business Printing and Advertising Specialties. Plus calendars in season. No experience. No investment. No collections or deliveries. On-the-spot commissions. **Big Free Sales Kit** samples hundreds items used daily by businessmen. Merchandise bonuses for you. Free gifts for customers. Build profitable repeat business. Start now. National Press, Dept. 70C, North Chicago, Ill. 60064.

**SELL Advertising book matches.** Write us today, we put you in business by return mail; handling complete line ad book matches in demand by every business right in your town! No investment; everything furnished free! Top commissions daily. Superior Match, Dept. M-867, 7530 S. Greenwood, Chicago, Illinois 60619.

**\$1,000.00 A MONTH** For making dramatic 3-second demonstration of amazing lightweight Presto Fire Extinguisher. Chemical used by Airforce snuffs out fires instantly. Only \$4.95. Terrific commissions. Millions want it. Free Kit. Merlite, 114 East 32nd, Dept. P-66-P, New York 10016.

**NEGRO People** buy on sight. **100% profit** Nationally advertised cosmetics. Free sample offer. Valmor, Dept. HD, 2411 Prairie, Chicago 60616.

**3 WONDER Money-Makers.** Auto Transmission Tonic, Softweld Solder, Self-Fluxing Aluminum Solder. Tremendous sellers, steady repeats. Free selling facts. Guaranteed. Weldtite, 120-B North Fourth St., North Wales, Pennsylvania 19454.

**NEW Car thief signal, Lightning seller.** Samples for trial. **NORTHWEST ELECTRIC**, Ave. 281, Mitchell, S. Dak. 57301.

**JOIN An established firm.** Over 30 years with Calendars and advertising specialties. Bonuses—prizes—free pens. Fleming, 6535-A Cottage Grove, Chicago 60637.

**SELL Hertel Bibles—Part time.** Finest reference bible available. Demonstrator and supplies furnished. Excellent commissions. Write International Book, Box 118 PM, Wichita, Kansas 67201.

**MAKE Extra Money!** Introduce new **MIRACLE CANTRECE** Nylons at 69¢ a pair. Guaranteed never to run. We show you how. Supply big outfit and sample stocking free. Spare-Time cash year-round. It's easy. Write American Mills, Dept. 148, Memphis, Tennessee 38101.

**LONG Needed Invention.** Man to contact service stations. Huge profits. Full or part time. Write Cyclo Mfg., 3816 Dahlia, Dept. 147, Denver, Colo.

**FREE, 206 Easy Ways** to make money taking orders for exciting new products—spare time. Send name, age, for 5 months free subscription. Opportunity Magazine, 850 N. Dearborn, Dept. 17-HS, Chicago 60610.

**100% PROFIT.** Sell to stores, stations homes. Free literature. Miller Enterprises, P.O. Box 677, Indianapolis, Indiana.

**\$200.00 WEEKLY.** Every business and professional man has No-pay accounts. Send them to us for collection. We pay you for each name listed. No collecting. Dept. PM-12 General Finance Company, Pickwick Bldg., Kansas City, Mo. 64106.

## AGENTS WANTED

**PRINTING, Advertising Salesmen—Excellent moneymaking** sideline selling Decalcomania Name Plates, small quantities. Advertising Specialties, sign letters. Free Samples. Balco XL, Boston, Mass. 02119.



## HELP WANTED

**MAKE Extra Money—show friends, neighbors—Gifts, Stationery, Christmas, All Occasion Cards, Experience unnecessary. Salable samples on approval, free catalog, free name imprinted Christmas Card Album. Hedenkamp, 361 Broadway, Dept. PM-94, New York, 10013**

**CHRISTMAS CARDS — Business and Personal. Customer's name imprinted. Earn unusually high commissions from this medium- and high-priced line. No investment. No inventory. Free sample album. Process Corp. (our 46th year), 3456 S. 54th Ave., Chicago, Ill. 60650.**

**MAKE \$50.00 Daily selling air-operated vacuum cleaners to service stations. Free details. Inka Industries, 2401 Crocker, Houston, Texas 77006.**

**YOUR Own business—Used suits \$1.50; overcoats 65¢; mackinaws 35¢; shoes 12½¢; ladies coats 30¢; dresses 15¢. Enormous profits. Catalog free. Nathan Portnoy Associates, 2109-AA Roosevelt Road, Chicago Ill. 60608.**

**EXCITING New product. Big profits! Exclusive! Test it yourself. Sample offer. Send no money. Just your name. KRISTEE, 116 Akron, Ohio 44308.**

**WANT TO MAKE UP TO \$100 A WEEK spare time, and get free shoes for life, too? No investment. Rush card for free details. MASON SHOES, K-578, Chippewa Falls, Wis. 54729.**

**EVERY Man a prospect. Refundable sales kit offer showing line belt buckles, tie clasps, money clips, cuff links, lapels, identification badges, individualized with customer's name and emblems. Cap badges for trucking, bus, taxi, police, firemen, also postal, letter carriers and heavy construction emblems. Choice 3000 emblems. Hook-Fast, Box 1088PM, Providence, R.I. 02901.**

**FREE, 206 Easy Ways to make money taking orders for exciting new products—spare time. Send name, age, for 5 months free subscription. Opportunity Magazine, 850 N. Dearborn, Dept. 17-HA, Chicago 60610.**

**ESTABLISH Your own business. Low prices on used clothing, shoes, household goods. Unlimited profits. Free catalog. Northwestern Distributors, 2129 No. Western Avenue, Chicago, Illinois 60647.**

## EMPLOYMENT INFORMATION

**AUSTRALIA Wants You! Government assisted passage. Unlimited Opportunities. Latest Government Information \$1.00. Austco, Box 3623-E, Long Beach, California 90803.**

**FOREIGN And USA Job opportunities available now. Construction, all trades. Earnings to \$2,000.00 Monthly. Paid overtime, travel bonuses. Write: Universal Employment, Dept. C-1, Woodbridge, Connecticut 06525.**

**FOREIGN Employment. Construction, other work projects. Good paying overseas jobs with extras, travel expenses. Write only: Foreign Service Bureau, Dept. PM, Bradenton Beach, Florida 33510.**

**VOCATIONAL Tests, charts—help discover where you'll fit, enjoy GREATEST contentment, success, security! \$3 COUNSELLAID, 1303 Fremont, Muskogee, Oklahoma 74401.**

**LUCRATIVE Employment. Send \$2.00. resume. Canadian National Placement Bureau, Box 52, Brampton, Ontario, Canada.**

**AIRLINE EMPLOYMENT OPENINGS. Includes necessary qualifications—application forms. \$5.00. Ace Aviation Services, Box 601, Tamiami Station, Miami, Florida 33144.**

**BOOMING Australia needs you! Government assisted passage. Details, \$1.00. News letter, 25¢. Heyer, 1117C-SW Columbia, Portland, Oregon 97201.**

**AUSTRALIA Wants You! Good pay. Adventure, government paid transportation allowance! Send \$1.00 for Australian opportunities Handbook, International Services, Box 12-A8, Greenfield, Indiana 46140.**

**OVERSEAS Jobs—Europe, South America, Far East, etc. 2,000 openings in all trades. Construction, Office Work, Sales, Engineers, etc. \$400 to \$2,500 month. Expenses paid. Free information, write Overseas Jobs, International Airport, Box 536-M, Miami, Florida 33148.**

**FOREIGN EMPLOYMENT—Australia, Europe, South America, Far East, etc. Openings in all trades and professions—\$400.00 to \$2,500. Monthly. Free information—Write Foreign Employment Mart, P.O. Box 2235, Airport Mail Facility, Miami, Florida 33150.**

**URGENT—California firms need experienced machinists. Details, Jarvis, 7010 Hood, Huntington Park, Calif.**

**GAS APPLIANCE SERVICEMEN: No experience necessary, will train. 52 weeks work guaranteed annually including paid vacations and holidays; insurance; opportunities for promotion; most manager started as servicemen. Apply manager, Baltimore, Boston, Chicago, Cincinnati, Cleveland, Columbus, Detroit, Los Angeles, Philadelphia, Pittsburgh, St. Louis, San Francisco, Washington, D.C. offices (we're in phone book). GAS CONSUMERS SERVICE.**

## FARMS—REAL ESTATE

**\$1 ACRE—Canadian Border—hundreds campsites, islands, farmlands, directly from tax authorities. (Non-profit). Lists, photographs mailed. Register, Room 303, 110 Church Street, Toronto 1, Canada.**

**FREE! Big 180 page Summer CATALOG! Thousands of properties described, pictured—Land, Farms, Homes, Businesses—Waterfront, Recreation, Retirement. Selected Best thruout the U.S. 67 Years' service, over 500 Offices, 37 states Coast to Coast. Mailed FREE from the World's Largest! STROUT REALTY, 60-RX E. 42nd St., NY, NY 10017; 7-RX S Dearborn St, Chicago, Ill. 60603; 521-RX E. Green St, Pasadena, Calif. 91101.**

**CANADIAN Vacation lands: Full price \$385.00. 40 acres, \$10 month. Suitable cottage sites, hunting, fishing, investment. Free information. Land Corporation, 3768-C Bathurst, Downsview, Ontario, Canada.**

**CENTRAL Ontario—Choice 640 acre Sportsmen's paradises still available—\$20.00 plus \$6.50 taxes yearly. Maps, pictures. \$2.00 (Refundable). Information Bureau, Norval 4, Ontario, Canada.**

**CANADIAN Lands, seized and sold for taxes. Our 50th annual series of lists, describe many choice properties, situated from coast to coast, acquired by us through Tax Sale. Priced as low as five dollars per acre, guaranteed perfect title, small monthly payments, no mortgage. Beautifully situated hunting and fishing camps, where there is real sport; summer cottage sites, heavily wooded acreages. Now is the time to invest in Canada's minerals, forests and farms. Write today for free twenty page booklet with full explanation. Tax Sale Service, Room 301D, 85 Bloor St., East, Toronto 5, Canada.**

**NORTH Florida lots \$69.00. Casper Corporation, 3970 N.W. 177th Street, Miami, Fla. 33054.**

**"THE Only 'No-Risk Land Purchase Plan' in America—10 year money-back guarantee on any Vacation, Retirement or Investment homesite in Boiling Spring Lakes—the multi-million, 14,000-acre development on the Carolina Coast. All facilities, electricity, roads, motel, golf course, country club, already in. Private ocean beach, 50 fresh water lakes. ¼-acre homesites as low as \$435.00; \$5.00 down. Write for free literature. (Not offered to residents of California, Florida, New York) Boiling Spring Lakes, Southport 1-K, North Carolina 28461.**

**GOVERNMENT Lands . . . Low as \$1.00 Acre! Millions acres! For exclusive copyrighted report . . . plus "Land Opportunity Digest" listing lands available throughout U.S., send \$1.00. Satisfaction guaranteed! Land Disposal, 222-PH Georgetown Building, Washington, D.C. 20007.**

**FREE!!!! Illustrated 168-page CATALOG! Describes hundreds of farms, ranches, homes, businesses, vacation, retirement and waterfront properties coast to coast! Specify type property and location preferred. Zip code, please. UNITED FARM AGENCY, 612-PM West 47th St., Kansas City, Mo. 64112.**

**GOVERNMENT Lands one cent an acre. For exclusive report send \$1 to: National Lands, P.O. Box 241-E, Massapequa, New York 11758.**

**40 TIMBERED ACRES \$1650 TOTAL PRICE, WASH.-IDAHO-MONT, \$50 Down—\$25 month, in Northern Idaho, North-eastern Washington, and Western Montana. In the heart of lakes and big game country. All covered with growing timber. Access, Title insurance with each tract. This is select land with natural beauty, recreational and investment values. Your inspection welcomed. Write us for free list, maps and complete information. We have tracts of many types and sizes from which to choose, including Waterfront property on Pend O'reille. Priest and Kettle Rivers and Hidden Harbor Bay of Pend O'reille Lake. Write to: Dept. PH, P.O. Box 8146, Spokane, Wash. 99203.**

**FREE! Real Estate Catalog! First edition! Farms, ranches, business, recreational and investment property. BANNER Adv., P.O. Box 3333 GS, 19A, Springfield, Mo. 65804. "Real Estate Our Specialty."**

## FARM AND GARDEN EQUIPMENT

**NEW REVOLUTIONARY GARDEN HOSE NOZZLE. At last—a guaranteed leakproof nozzle. Brass, powerful adjustable spray-mist to jet stream. \$2.29 PP. T-BAR, 5259 Cherry Ave., Long Beach, California 90805. DISTRIBUTORS WANTED.**



## FLOWERS, PLANTS and NURSERY SUPPLIES

**WANT Greatest cash crop working for you? Write Ginseng, Asheville 53, N.C.**

## HOME CRAFTSMEN

**WALNUT And Cherry tapered legs, lumber, gunstock blanks, picture frame moulding. Midland Lumber Company, Box 262, Savannah, Missouri 64485.**

**FREE! Big 80 page Leathercraft catalog, 100's of new items! MacPherson Bros., Dept. K, 730 Mission St. San Francisco, Calif. 94103. Please include your Zip Code.**

**SKIL-CRAFTS New 200-page '67-'68 Catalog. Largest selection of Leathercraft, Artist, Hobby and Craft Supplies from one source. Send 50¢ (refunded with first \$5 minimum catalog order). Skil-Crafts, Box 105-P, Joplin, Missouri 64801.**

**WOODWORKING Catalog and Manual 25¢. Plus free "101 Project Ideas." World's most beautiful veneers, lumber, plywood! Wood finishing, upholstery supplies. Cane, Lamp parts. Furniture hardware. Animal whittling blocks, 2,000 workshop products. Constantine, 2051-M Eastchester Road, Bronx 10461.**

**CABINETMAKING MADE EASY and "How to Make Formica Counter Tops." two excellent guides let you build kitchen cabinets and counter tops like professionals. Extraordinary guides bring master craftsmen's shortcut methods. Satisfaction guaranteed. Write: Japs, 126-P Seventh North, Hopkins, Minn. 55343.**

**HARDWOODS, Veneers, inlays, shop supplies. Power tools—discounts! 132 page color catalog 35¢. Crafts, Dept. 87-A, 2729 S. Mary, Chicago 60608.**



**101 PATTERNS** Of smart gifts, novelties, shelves, action windmills plus "Make Money Jig Sawing". \$1.00. Mastercraft, 58M, 7041 Olcott, Chicago 60631.

**FOUNDRYETTE** 2400 F. 1½ to 48 lb. capacity. Circular 10¢. Kansas City Specialties, Box 193, Middleton, Wisc. 53562.

**PLANS** For pool table with extra two-face top for table tennis and model railroad. Blueprints B1209 and building instructions \$3.50. Popular Mechanics Service Bureau, 575-M Lexington Ave., New York, N.Y. 10022.

**FREE!!!** Copyrighted, illustrated, document reveals 4 ways mitering picture frame moulding. Distinctive, original designs, moulding available. Inexpensive. Write. Expect the unexpected. Japs, 126-P, Seventh North, Hopkins, Minnesota 55343.

**FREE** Popular Mechanics 16 page illustrated catalog of publications, plans and projects. Booklet covers an extremely wide variety of do-it-yourself data on home remodeling, shop tools and machines, car repair, hobbies, crafts, boating, games, lawn and garden and hundreds of others. For your free copy write to Service Bureau, Dept. PE, Popular Mechanics, 575 Lexington Ave., New York, N.Y. 10022.

## UPHOLSTERY

**LEARN** And earn. New upholsterer's handbook in hard cover takes you step by step with easy to follow instructions and illustrations. Teaches you a profession in your spare time. Send check or money order for \$3.50 to Aanstac Inc., Dept. 27, 111 Harrison Ave., Harrison, N.J. 07029. Money back guarantee. Free supply catalog with order.

## DO-IT-YOURSELF

**LAMP MAKING**—Parts list; basic instructions for lamp making, repair. Also wiring Kerosene lamps. \$1.00, no stamps. Craftsmen's, Box 2276-P, Loves Park, Ill. 61111.

**HOME** Refrigeration and Air-Conditioning. First lesson free. Little Giant Study Course, 5885 Cates, St. Louis, Mo. 63112

**FIRE** And burglar alarms, easy and inexpensive. Copyrighted instructions \$1.00. Fred Ondo, 2453 Ridgewood, Highland, Indiana 46322.

**REFRIGERATOR** Door gaskets. Send make and model for cost. Box 5145, Hamden, Conn. 06518.

**AUTOMATIC** Washer repair manuals any make, model. 13 Different manuals, \$2.75 each postpaid. Dryer repair manuals for G.E. Kenmore, RCA Whirlpool, \$2.75 each postpaid. Major Appliance, 13108 Caine Ave., Cleveland, Ohio 44105.

**WATER!!** Drill your own well with amazing new \$175 machine. Depths to 200 feet. Information \$1.00. DeepRock Drilling Company, 111 Trafco, Opelika, Alabama 36801.

**PICNIC** Benches—camp style. Adult and child size, both easy to follow plans. 50¢ P.O. Box =3, East Lynn, Mass. 01904.

**BROKEN** Plastic radios rebuilt (not glued). Common material, skill. Instructions, \$1.00. Litson, 3640 South Knoxville, Tulsa, Oklahoma 74135.

**FREE** Buffing manual. Black-Cottle Company, Box 121M, Clinton, New York 13323.

**NYLON NUTS** Fit ANY bolt thread. Noncorrosive, reusable, 30 piece assortment. \$1.00 Postpaid. Satisfaction guaranteed. BLACK-COTTLE, 121M, Clinton, N.Y. 13323.

**EXERCISE** At home on build-it-yourself physical fitness equipment, including bicycle exerciser, rowing machine, belt massager, and abdominal board. Send \$2.50 for blueprints B1208 and instructions. Popular Mechanics Service Bureau, 575-K Lexington Ave., New York, N.Y. 10022.

## ARTS AND CRAFTS

**FREE** Book—How to make gold charms and rings. 25¢ Handling. Sedco, Box 291-A, King of Prussia, Pa. 19406.

**MAKE** Figurines, plaques, lawn ornaments. Molds, plastercraft kits, liquid rubber. Sample and catalogue 10¢. Wooley Company, Box 29-B, Peoria, Illinois 61601.

**LIQUID CASTING RESIN.** Large stock of supplies for making lamps, desk sets, ash trays, art objects, jewelry, embedding. Fun for entire family. Sell for big profits. Illustrated catalog and instructions shows how. Send 25¢ Dept. 67-8B, Taylor & Art Plastics Inc., 1710 E. 12th, Oakland, Calif. 94606.

**2500 DIFFERENT** Plastic molds, figurines, crafts. Catalog 25¢. Steece Bros., Box 177-PM, Sioux Falls, So. Dak. 57101.

## BINOCULARS, TELESCOPES, MICROSCOPES, MAGNIFIERS

**REFLECTOR** And refractor telescopes, kits, tripods, etc. Free catalog. Suffolk Science, Mattituck, New York.

**SCIENCE** Bargains! Lenses, telescopes, binoculars, microscopes, kits, parts, war surplus. Send \$1.50 for beginner's 10-lens kit with instruction booklet. Order Stock 2-CH. Request free 148 page Catalog CH. Edmund Scientific Co., Barrington, New Jersey. 68007.

**BINOCULAR** Sale! Free color catalog 100 models \$9.95-\$250.00. Write, United, 9043 So. Western BCAT-7408, Chicago 60620.

**WORLD** Famous "DynaScope" Telescope. Build your own reflector telescope; mirrors, eyepieces, tripods, accessories. Request free brochures. Criterion Manufacturing Dept. PP 9, Hartford, Connecticut 06101.

**BINOCULARS** Direct from manufacturer. Finest quality, tremendous savings! Request catalog. Koyu, 3860 Crenshaw Blvd., Los Angeles, Calif. 90008.



## CAMERAS AND EQUIPMENT

**CAMERAS FOR SALE?** Photographic Equipment? Popular Mechanics readers take pictures—lots of them, too. Your ad here will reach more than 1,550,000 avid photo bugs. Write for details: C. A. Martin, Dept. 49, Popular Mechanics, 575 Lexington Avenue, New York, N.Y. 10022.

## PHOTO FINISHING

**FREE** Film! Quality service, custom finishing, rapid! Send for bags. Quality Photo, Box 212, Downingtown, Penna. 19335.

**CAMERA** Fans! Expert photo finishing and free film returned: 8MM Kodachrome \$3.10; 8 Exp Kodacolor \$3.10; 8 exp black & white 90¢. We give you free photo stamps to redeem for gifts. Satisfaction guaranteed. Send exposed film or request mailers and complete price list. Direct Mail Photo, Box 8352-PM, Pittsburgh, Pa. 15218.

**FAST,** Hi-quality finishing. Kodacolor rolls: eight jumbo prints \$1.98. Twelve \$2.49. Twenty \$3.49. Reprints 15¢. Also low B&W prices. Custom Quality Studio, Box 4838-PM, Chicago 60680.

**A FREE** Kodak roll returned with each black and white or Kodacolor developed and printed, fast service, lowest prices, guaranteed quality send for free mailers. Economy Photo Service, Dept. P.M., Box 1111, Albany, N.Y. 12201.

**PHOTOGRAPHY** For pleasure or profit. Learn at home. Practical basic training. Long established school. Free book. American School of Photography, 835 Diversey Parkway, Dept. 674-018, Chicago, Illinois 60614.

**SPECIAL** WITH THIS AD—Kodacolor developed 8 prints \$1.75; 12 prints \$2.25. Black & white developed 2 prints each Jumbo size—8 exposures 50¢—12 exposures 70¢. Enclose ad. Lens Photos, Dept. J-4, Janesville, Wis. 53545.

## COLOR SLIDES

**35MM COLOR SLIDE CATALOG.** Newest worldwide coverage in depth. Thousands exclusive. 10¢. Wolfe, Dept. 14-87, Los Angeles, Calif. 90025.

## MOTION PICTURES AND SOUND EQUIPMENT

**16MM** Sound films features and shorts. Bedner, 5300 So. Talman, Chicago.

**FREE** Catalog! Save on 8/mm.-16mm. film and supplies. Superior, 448 N. Wells, Chicago 60610.

**16MM** sound-projectors, films, new, used for sale. Free catalog. National Cinema, 333 W. 57 Street, New York City, N.Y. 10019.

**5,000** 8-16 MM. Movie films. Free catalogues. International, Greenvale, N.Y.

**FREE** Lists 8mm 16mm movies. Film Classic, 1926 South Vermont, Los Angeles, California 90007.

**8MM. MOVIES**—2"x2" Color Slides—biggest selection anywhere! Hollywood classics, great comedians, railroads, automobiles, trolleys, wars, travel, wild life, circuses, many others! 16mm. films also. Big catalog free! Blackhawk Films, 86 Eastin-Phelan Bldg., Davenport, Iowa 52808.

## RADIO, TELEVISION AND HAM EQUIPMENT

**GOVERNMENT** Surplus receivers, transmitters, snooperscopes, parts. Catalog, 25¢. Meshna, Nahant, Mass. 01908.

**POLICE** RADIO. Hear all police calls, fire departments, Sheriffs, taxis, ambulances, Highway Patrol. New 5 band portable radio and direction finder. Free Booklet. Nova Tech, Dept. 253, Redondo Beach, Calif. 90278.

**BRAND** New tubes. World's lowest prices on radio, TV-industrial, special purpose tubes. Write for free parts catalog. United Radio, Newark, N.J.

**TV "Blab-Off"** Remote Control: Don't Get Up! Turn Sound Only. (Off or On) during commercials. Attaches to any TV. \$3.98. Gerstner, Box 6515, Minneapolis, Minn. 55420.

**33¢** RADIO & TV tubes. Free list. Cornell, 4213-17 University, San Diego, California 92105.

**EXCEPTIONAL** Value in Sonar Portable Monitor Receivers. Details: Griffin's, 322 West State, Ithaca, N.Y. 14850.

**POLICE—FIRE—AIRCRAFT—CALLS** on your broadcast radio with TUNAVERTER. Tune The Band! Economical! Guaranteed! Free Catalog. Salch Company, Woodsboro P8, Texas 78393.

**BE** A Radio Announcer . . . Dee-Jay. Full information free. Airt, Box 160, Collingswood, N.J. 08108.

**FREE** Electronics catalog. Tremendous bargains. Send postcard. Electrolabs, Department, C-666B, Hewlett, New York 11557.

## HIFI, RECORDS AND ELECTRONICS

**TAPE** Recorders, hi-fi components. Sleep learning equipment, tapes. Unusual values. Free catalog. Dressner, 1523C Jericho Tpke., New Hyde Park, N.Y. 11040.

**EXCLUSIVE** Free catalogue: extraordinary hard to find hobby party records. Record Suppliers, 300 Chelsea, Louisville, Kentucky 40207.

**SCOTCH** Recording tapes. Stereo tapes. Catalog 5¢. Tower, Lafayette Hill, Pa. 19444.

**RECORDS!** Discounts on all LP's. Free details. Citadel Record Club, 545 Fifth Ave., Dept. 2, New York 17, N.Y.





## MUSIC AND MUSICAL INSTRUMENTS

**GUITAR, Banjo Making books Plans, woods, necks, tools, List 20¢. Satinwood, 510 East 11th Street, New York, N.Y. 10009.**

**ACCORDIONS, GUITARS, BAND INSTRUMENTS!** Save to 50%. Famous makes. Easiest terms. Trades accepted. Free home trial. Free discount catalog. Mention instrument. **INTERNATIONAL MUSIC MART, 5535-R Belmont, Chicago 60641.**

**VIOLIN** And guitar makers, send for latest Free catalogue of woods & accessories. **International Violin, PM-8, 414 East Baltimore St., Baltimore 2, Md.**

**POEMS** Wanted for new songs and records. Send poems. **Five Star Music, 6M Beacon, Boston, Mass. 02108.**

**CONCERTINAS.** New and used. Tuning, repairing and remodeling of all makes. Write for brochure. **Star Concertina Mfg. Co., 2351 Milwaukee, Chicago 60647.**

**SONGPOEMS.** Songs for recording wanted. Royalties, copyright, publishing secured. **SONG ARCADE, INC. 1472 Broadway, New York, N.Y. 10036.**

**USED** Fender, Gretsch, Ricken Backe Guitars, Amplifiers. Many others. **Bulletin, 25¢. Hills, 3526 California, Peoria, Ill. 61603.**

**ACCORDION** Top brands. Buy direct. Tremendous discounts. Trade accepted. Free brochure **PM. Accordion-O-Rama, 874 Broadway, N.Y.C. 10003.**

**DRUMS.** Electric guitars, amps, organs. Free catalog **M: A.L.A.S. Import Company, 31 East 18th Street, NYC. 10003**

**ACCORDIONS.** Tuning and repairing, remodeling of all makes. **Star Accordion Mfg. Co., 2351 Milwaukee, Chicago 60647.**

**SONG** Ideas wanted. Write with active professional songwriters with publisher contacts. Records made. Share royalties. Send ideas—free examination. **Songwriters' Associates, 236 W. 55th, N.Y. 10019-P.**

**"SWISS** Musical Movements. Mechanical-Electrical. **Spielman, 131 West 42nd, New York 10036.**

**INCOME** Guaranteed two years for songpoems. Free releases! **Castle's, 203-P West 46th, New York City 10036.**

**GUITAR-AIDE—168** enlarged, numbered finger position chord diagrams. All chords. \$3.00. **McDowell's, 904 N. Minnesota, Sioux Falls, So. Dakota 57104.**

**POEMS** Wanted for new song hits and recordings by America's most popular studio. **Tin Pan Alley, 1650-PM Broadway, New York 10019.**

**ACCORDION** Manufacturing. 6343-P South Ashland, Chicago, Illinois 60636. Concertinas, Hohners, Chromatics, Guitars, Drums. New, Used, Tuning, Repairing. Wholesale Catalogues Free.

**PLAYER** Piano books. Free catalog. **Vestal Press, Vestal 11, N.Y. 13850.**

**30% DISCOUNT** on any Name Brand musical instrument. Write for our low price. **Freeport Music, 127 West Sunrise Highway, Freeport, N.Y. 11520.**

**SONGPOEMS** Wanted. Send poems for offer. **Nashville Music Institute, Box 532-PM, Nashville, Tennessee.**

**WE** Pay all recording costs on accepted material! Need new song material for immediate recording! Free examination! **Grand Recording, 835-PM Dorchester Ave., Dorchester, Mass. 02125.**

**POEMS WANTED** For new songs. Recordings available. All poems reviewed. **J & J Song Creations, 190 Massachusetts Ave., Boston 02115.**

**POEMS** Wanted for new songs and records. Send poems. **Crown Music, 49-C West 32, New York 10001.**

**YOUR SONGPOEM COULD HIT!** Nashville composers need new ideas. Free music. Songs recorded. Try: **True Talent Enterprises, 209 P.M. Stahlman Building, Nashville, Tennessee.**

**PIANO Self-Teaching Book.** Includes popular, classical, harmony, theory, chords, scales. Price \$5.00. **LaPont Publishing Company, Box 606-P, Franklin, Michigan 48025.**

## EDUCATION AND INSTRUCTION

**OWN** Collection agency. "Little Gold Mine!" **Franklin Credit, Roanoke, Virginia 24004.**

**PASS** Civil service examinations. **Alena, 1513 64th Street, Brooklyn, New York 11219.**

**PIANO** Tuning pays. Big money in spare time. Learn at home. No musical knowledge necessary. Phonograph, records, tools and instructions furnished. Electronic tuning also taught. Free catalog. **Capital Tuning School, 3160 S.W. 16th Court, Ft. Lauderdale, Fla.**

**DETECTIVE** Training—for free information write to: **1917M, North Kenneth Ave., Chicago, Illinois 60639.**

**COMPLETE YOUR HIGH SCHOOL** at home in spare time with 70-year-old school. Texts furnished. No classes. Diploma. Information booklet free. **American School, Dept. XC45, Drexel at 58th, Chicago, Illinois 60637.**

**BOOKKEEPERS.** Operate your own "Dollar-A-Week" system. **Ellis, Box 200, Cedar Grove, North Carolina.**

**MEN** Wanted. Earn \$125 a week and up. 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 \$125 a week and up. Write for free bulletin: **Dept. 256, Auto Diesel College, Nashville 3, Tenn.**

**PIANO** Tuning quickly learned with home study course. Diploma granted. **American Tuning School, Gilroy, Calif. 95020.**

**DETECTIVE** Course. Free information. **Universal Detectives, Box 8180-F, Universal City, California 91608.**

**MISSOURI** Auction School. Free catalog! **1330-03 Linwood, Kansas City, Mo. 64109.**

**HIGH** School diploma at home. Licensed teachers. Send age, highest grade completed for free detail. No salesman will call. **Southern States Academy, Professional Bldg., Dept. 16, Decatur, Ga.**

**BE** A Real Estate Broker. Big earnings. Free catalog. **Weaver School of Real Estate, 3519-P Broadway, Kansas City, Missouri 64111.**

**SWEDISH** Massage and physical culture pays big profits. Learn at home. Diploma. Free catalog. **National Institute, Dept. E87, 307 North Michigan, Chicago 1.**

**USED** CORRESPONDENCE courses and books sold and rented. Money back guarantee. Catalog free. (Courses bought.) **Lee Mountain, Pisgah, Alabama.**

**PRE-PATENT IDEA WRITING:** Editing service. Details \$1.00, self-addressed-stamped envelope. **Clifford Johnson 1345 4th Avenue, PM, Rockford, Illinois 61108.**

**GET** A British degree. Divinity, Philosophy, Radionics, 35 courses. Prospectus free. **Brantridge Forest School, "Lodge" Brantridge Forest, Balcombe, Sussex, England.**

**USED** Courses! Books! List 10¢. **Smith's, 124 Marlborough, Salem, Mass. 01970.**

**AUTOSUGGESTION.** Sleep-learning headquarters! Tapes, records, books. Gigantic catalog free. **Research Association, Box 24-PM, Olympia, Washington.**

**FREE** Bible course. Degree. **PM, 143 South Gregg, Charlotte, N.C. 28208.**

**PENMANSHIP** Corrector. Improve poor penmanship quickly. Details free. **Ozment, Box 665-34, St. Louis, Mo. 63188.**

**PIANO** Technology—Electronic organ servicing, learned easily at home. **G.I. Approved. Free booklet. Niles Bryant School, Dept. P. 3631 Stockton, Sacramento, California 95820.**

**LEARN** Asleep or awake! Records, tapes, equipment! Free catalog! **Drawer, PM-400, Ruidoso, New Mexico 88345.**

**MINISTERIAL** Extension courses. Send for entrance examination. **Soms, 887 West Spruce, Ravenna, Ohio 44266.**

**BECOME** A Detective. Modern home training methods. Diplomas awarded. Men and women urgently needed in industry and government positions. Write: **Alabama School, Box 185-P, Fairfield, Alabama 35064.**

**LEARN** Auctioneering. Term soon. Free catalog. **Reisch Auction College, Box 850, Mason City, Iowa 50401.**

**SWEDISH** Massage. Foot technique. Post graduate. Home study. Residential. Diploma. **Dr. Swanson's Illinois Licensed School, 3809-PL Alta Vista, Chicago 60613.**

**FREE!** "Learn fast as geniuses!" **Castle's, 203-Q West 46th, New York City 10036.**

**EARN** College degree at home. All subjects. **Ohio Christian College, 1156 Striebel Road, Columbus, Ohio 43227.**

**PENMANSHIP** Improver: Ornamental writing. Improve poor writing quickly. **Tevis, Chillicothe, Mo. 64601.**

**FCC** First Class License in six weeks—nation's highest success rate—approved for Veterans Training. Write **Elkins Institute, 2603D Inwood Road, Dallas, Texas 75235.**

**LEARN** Civil and criminal investigation at home. Earn steady, good pay. State age. **Institute Applied Science, 1920 Sunnyside, Department 168, Chicago, Illinois 60640.**

**THIEVES** NEVER SLEEP. Do and don't hints how to keep your home safe while away. 25¢ coin to **Pro-Tech, 13 Chesnut Street, No. Tarrytown, N.Y. 10591.**

**PROFITABLE** National Camera Repair School training at home! **PM8, Englewood, Colorado.**

**AUTOMOTIVE** Electronics and Mechanics Course. Free Aptitude Test. No Obligation. **Delta Automotive Institute, 2313 N. Causeway Blvd., Metairie, Louisiana 70001.**

**DETECTIVE** Course. Free information. **Criminology Institute, Box 201, Geronimo, Oklahoma 73543.**

**WORLDWIDE** Correspondence school directory including degree-granting institutes. **Aureas, Allenhurst, New Jersey.**

**MASTER** WATCHMAKING at home. Free sample lesson. **Chicago School, Dept. YU, Fox River Grove, Illinois 60021.**

**HOW TO BE A CRAFTSMAN.** Improve your job capability and earning capacity by raising yourself above the average. Book describes tried and proven method. Satisfaction or money refunded. \$2.00. **MacGowan, 9260 E. Wrightstown Road, Tucson, Arizona 85715.**

**"STAMMER—Stutter—no more."** (Dr. Young.) Write: **Gaucha, Box 9309-S7, Chicago 60690.**

**BECOME** Automotive tune-up specialist. Write. Sales, **1425 Park, Plano, Texas 75074.**

**PROFESSIONAL** Engineering, electronics. Free prospectus. **CIST, Suite 805, 263-A Adelaide Street West, Toronto, Canada.**

## FOR INVENTORS

**PATENT** Searches including Maximum speed, full airmail report and closest patent copies, \$6.00. Quality searches expertly administered. Complete secrecy guaranteed. Free Invention Protection forms and "Patent Information." Write **Dept. 15, Washington Patent Office Search Bureau, 711-14th, N.W., Washington 5, D.C.**

**IMMEDIATE** Cash, for patent applications. Free patent searches. Write for details. **Universal Patents, 184-D, Marion, Ohio.**

**PATENT** Searches, including copies of related U.S. patents, \$6.00. Inventors, attorneys, manufacturers use my "worldwide" airmail service! "Invention Record" form and "Information Every Inventor Needs," sent free! **Miss Hayward, 1029P Vermont, Washington 5, D.C.**



**INVENTORS:** Your ideas and inventions (patented; unpatented) expertly searched, developed for commercial appeal and cash/royalty sales to manufacturers by professional Invention Developer with excellent record of experience. B.S., Industrial Engineering; United States Patent Office former Patent Examiner. United States Government former Patent Advisor. Second decade reliable service! Member: United States Chamber Commerce. Free "Invention Record" and "Recommended Protection Procedure." Airmailed! Write: Raymond Lee, Invention Developer, 230-P Park Ave., New York City 10036.

**PROFESSIONAL** Patent searches, \$6.00 including official U.S. Patent Office copies of related U.S. patents! Prompt, dependable service. Certified, airmailed! For free "Invention Record Folio" and important patent information every inventor should have, write: United States Inventors Service Company, 501-P Thirteenth Street NW, Washington, D.C. 20004.

**INVENTORS:** Assistance with any problem. Searches. Applications prepared. All types. Design, chemical, mechanical. Time payment plan. Free information. Write: International Invention Service, Dept. 25; 160 Broadway, New York, N.Y. 10038.

**INVENTORS!** Get your "Little Piggy" to market via tested, most direct route. Highest cash or royalties. Financial assistance available. New York Invention Service, Dept. 1, 160 Broadway, New York, N.Y. 10038.

**PATENT** Searches complete and thorough. Related copies Air Mailed with maximum speed \$6.00. Free "Protection Forms" and "Patent Information." Write American Patent Search Company, Dept. 27, 711 14th St., N.W. Washington, D.C. 20005.

**U.S. Patent Office** Searches, 234 Broadway, Room 3615, New York. Free invention certificates.

"**INVENTOR'S Manual**" sent postpaid. Written for inventors by a professional with 30 years successful experience. Packed with tips, methods, information and ideas, any one of which you may find worth many times the price. How to protect ideas without a patent; cut costs on model development; get publicity for inventions; how to interest manufacturers; choose the right attorney; licensing; royalties; etc. Practical, down-to-earth explanations and examples. Soft bound. Satisfaction guaranteed. No C.O.D. Send \$4.95 to N. H. Stark Corporation, 10087 S. Washington, Cedarburg, Wisconsin 53012.

**PATENT** And invention development, by licensed professional patent engineer and U.S. Patent Office former examiner, and engineering specialists. Your inventions and ideas engineered for patent protection and commercial value. Inventions developed by us negotiated for cash or royalties with our nationwide contacts. Send for free protection "Invention Certificates" and further interesting, valuable patent information. George Spector, Licensed Professional Patent Engineer, Woolworth Building, New York.

**INVENTORS**—Do you want to sell or license your invention on cash or royalty basis? Write: Kessler Corporation C-58-FI, Fremont, Ohio.

**FREE Patent facts!** Refreshingly clear! Dick Vance, Route 4, Franklin, North Carolina 28734.

**INVENTORS**—Parts made for your inventions to your instructions. Confidential, reasonable, fast service. Lewis, Box 764, Rt. 2, Plaistow, N.H. 03865.

**INVENTIONS** Wanted immediately. Highest cash royalties paid. Adams, Invention Broker, 15 Park Row, New York City.

**PATENT** Application Financing. Free patent search plan. Global Patent Division, 2420 77th, Oakland, Calif. 94605.

## INVENTIONS WANTED

**INVENTORS!** Don't sell your invention, patented or unpatented, until you receive our offer. Eagle Development Company, Dept. H, 79 Wall Street, New York 5 N.Y.

**WE** Either sell your invention or pay cash bonus. Write for details. Universal Inventions, 298-E, Marion, Ohio.

**INVENTORS** Wanted: Manufacturers need new items! Your inventions, ideas developed for cash royalty sales. Free "Invention Record": Information, Raymond Lee, 230-P Park Ave., New York City 10036.

**INVENTORS: PROTECT YOUR IDEAS!** FREE "RECOMMENDED PROCEDURE." Washington Inventors Service, 422F, Washington Building, District of Columbia 5.

**INVENTORS!** Thousands have gone from "Rags to Riches" this safe, sure way. Custom-tailored, personalized program. Contact the organization with "Know-How." Pioneer Invention Service, Dept. 83, 150 Broadway, N.Y. 10038.

**INVENTIONS** Wanted immediately by blue-chip companies. Top cash or royalties. Do nothing 'til you hear from us. Write, wire, phone: Wall Street Promotions, Inc., Dept. 42, 99 Wall Street, New York, N.Y. 10005. (212-425-2280)

**INVENTORS!** We will develop, sell your idea or invention patented or unpatented. Our national manufacturer-clients are urgently seeking new items for highest outright cash sale or royalties. Financial assistance available. 10 years proven performance. For free information write Dept. 47, Wall Street Invention Brokerage, 79 Wall Street, New York 5, N.Y.

**INVENTORS!** Outright cash sale or royalties for your inventions. Patented, Unpatented. Active demand from our client manufacturers. Financial assistance available. Write Dept. 36, United States Invention Brokerage, 78 Wall Street, New York, N.Y. 10005.

**INVENTIONS** Wanted, Patented: unpatented. Tremendous manufacturers lists. Global Marketing Service, 2420G 77th, Oakland, California 94605.

**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-58-IW, Fremont, Ohio.

**INVENTION** Marketing for industrial and consumer markets. **TECHNOLOGY MARKETING SERVICE**, 2255 Rand Tower, Minneapolis, Minn. 55402.

**INVENTORS!** Sell your invention for cash or royalties! Our client manufacturers eagerly seek new items. Patented, Unpatented. Financial assistance if needed. 25 Years proven performance. For free information, write Dept. 15, Gilbert Adams, Invention Broker, 80 Wall St., New York, N.Y. 10005.

## PATENTS FOR SALE

**YOUR** Ad in this space will be read by more than 1,550,000 active mail order buyers. Join the march to greater profits, place your products and services in front of them today with a small low cost classified ad. For further details write: C. A. Martin, Dept. 59A, Popular Mechanics, 575 Lexington Avenue, New York, New York 10022.

## MANUFACTURING

**MODELS** — Small lot manufacturing. Metals, plastics, etc. Milburn, Burlington, Kentucky 41005.

**INVENTORS** Ideas developed. Research models, manufacturing, sales. Free brochure. William Parker, 32 Westminster, Worcester, Mass. 01605.

## BUY IT WHOLESALE

**NEW 6-Color Deluxe** below wholesale catalog. Automobile catalog and others. Housewares, clothing, suits, furs, shoes, furniture, rugs, appliances, refrigerators, washers, dryers, polishers, dinnerware, teflon, cookware, radios, televisions, stereos, phonographs, records, cameras, projectors, recorders, musical instruments, organs, typewriters, books, vitamins, shavers, wigs, binoculars, luggage, sporting goods, golf, bowling, game tables, guns, power tools, rider mowers, tractors, boats, motors, scooters, bicycles, watches, diamonds, jewelry. Huge discounts on thousands of name-brand products. For free list (factory prices) postcard: Selbyco-5, Decatur, Illinois 62522.

**BARGAINS!** Buy wholesale and below. Name brands. Appliances, furniture, sports equipment, televisions, cameras, watches, jewelry, thousands more. Huge discounts to \$1,000.00 on new automobiles. All makes. Free details. Write today: Worldwide Bargainhunters, Box 730-A, Holland, Michigan 49423.

**TREMENDOUS** Wholesale bargains. Half-million nationally known products. Rockbottom prices. Closeouts, bankrupts. Dropship merchandise. Automobiles. Worldwide imports. Hongkong clothes. Free details. International Buyers, 216-M, West Jackson, Chicago, Illinois 60606.

**BUSINESS** Cards (embossed) \$3.99 '1.000. Free samples. Wagner Company, 6200PM, Whitewood, Library, Pa. 15129.

**100,000 BARGAINS!** Wholesale! Imports! Closeouts! Wholesalers, 1265-MP Broadway, New York, N.Y. 10001.

**BUY WHOLESALE** 25,000 item catalog \$1.00 (refundable). Fidelity Mail Order, Box 172, St. Joseph, Mo. 64502.

## EXPORT-IMPORT

**JAPAN:** 1200 Products Directory, Illustrated. Manufacturers' names, addresses: \$3.00. Mail-Order Catalog, Novelties, \$1.00. Send Cash. Yamagata Office, 814 Tugin Bldg., Marunouchi, Tokyo.

## FOR THE HOME

**DOOR** Or window burglar alarm—no tools or wiring needed. \$3.49 ppd. Foreign Imports, P.O. Box 6112P, St. Petersburg Beach, Florida 33736.

## OF INTEREST TO WOMEN

**FREE** Make 'Em and Save Leathercraft Idea Manual. Tandy Leather Co., 1001 Foch, F61, Fort Worth, Texas.

**MAKE** Extra Money—show friends, neighbors—Gifts, Stationery, Christmas, All Occasion Cards. Experience unnecessary. Salable samples on approval, free catalog, free name imprinted Christmas Card Album. Hedenkamp, 361 Broadway, Dept. PM-95, New York 10013

**HOME** Typing—\$95, weekly possible. Instructions with employers list, \$1.30. Eaton Company, 543-A, Hopland, California.

**MAKE** Extra money! Show new seamless, runless Cantreze nylons, 69¢ pair. Perfect fit. Guaranteed wear twice as long or replaced free. Extra profits with slips, bras, girdles, etc. Big outfit, sample stocking free. Write American Mills, Dept. 147, Memphis, Tenn. 38101.

**WOMEN!** Make big money at home. \$10.00 profit in an hour possible with invisible mending. Make holes, tears disappear from clothing, fabrics. Steady year-round demand from cleaners, laundries, homes. Details free. Fabricon, 1533 Howard, Chicago, Illinois 60626.

**\$50-\$100 WEEKLY** Possible home typing. Complete moneymaking instructions, \$1.00. Consolidated Services, Box 593, PM78, Bettendorf, Iowa 52722.

**HOW** To make money writing short paragraphs. Information free. Barrett, Dept. C-27-V3, 6216 N. Clark, Chicago 60626.

**\$100 WEEK POSSIBLE!** Assemble our products. United, Box 55392-D, Indianapolis, Indiana 46205.

**DRIVE** New car, wear new clothes, buy color TV. Get daily cash income. Put spare hours to work. Write for 5 months free subscription Opportunity Magazine; see hundreds easy ways to make money. Opportunity, Dept. 17-HO, 850 N. Dearborn, Chicago 60610.

**HOME** Typing. Immediate earnings. \$50-\$100 weekly spare time. Instructions and employer's list, \$1.00. Summithouse, PM8, Box 1762, New York 10017.

**FASCINATING** Gift catalog. Sewall, Dept 278, Box 3024, Glendale, Calif. 91201.



**\$45.00 THOUSAND.** Home addressing! complete instructions \$1.00. Emerson's, 113-PM8, Middle, Santa Barbara, California 93103.

**RAISE Rabbits** for us on \$500 month plan. Free details, White's Rabbitry, Mt. Vernon, Ohio 43050.

### GIFT SHOPPING

**FREE Charm catalog.** Discount prices. National Laboratories, Box 1531, St. Petersburg, Florida 33731.

**INEXPENSIVE Gifts!** Free catalogues. Mandarin International, 214 Shaws Building, Hong Kong.

### WATCHES, OLD GOLD, JEWELRY

**WATCH** And clock repairing books. Free catalog, North American, Box 77-AH, Fox River Grove, Illinois 60021.

**CASH** Immediately for old gold, jewelry, gold teeth, watches, diamonds, silverware, spectacles, platinum, mercury. Free information, Rose Industries, 29-A East Madison, Chicago 2.

**WANTED,** Gold, silver, platinum, scrap (any form), coins. Information free. Wilmoth's, 1067-D Bridge St., Grand Rapids, Michigan 49504.

**USE Wrist, Pocket Watches** 5—\$25.00. Free list, Southern Watches, 5-PM South Wabash, Chicago 60603.

**USED** Pocket watches — as is — 5 for \$25.00. Joseph Bros., 5 South Wabash, Chicago 60603.

**HIGHEST CASH** for Gold, Jewelry, Gold Teeth, Rings, Diamonds, Watches, Silver, Platinum. Mail Articles Today. Free gift with information. Chicago Gold & Precious Metals, 6 E. Monroe, Dept. 1258, Chicago 60603.



### SCIENCE AND CHEMISTRY

**FREE** Periodic classification of elements and conversion tables with catalog 25¢. Chemicals, apparatus, biology. Mid-States Scientific, 7053 N. Clark, Chicago, Ill. 60626.

**CHEMICALS** And apparatus for industrial, analytical, and private laboratories. Catalog 35¢. Dept. M-50, Biological Supply Co., 1176 Mt. Hope Ave., Rochester, N.Y. 14620.

**ILLUSTRATED** Catalog: Chemistry, mineralogy, biology 25¢. Tracey Laboratories, Evanston, Illinois 60204.

**SKYROCKETS,** Firecrackers, fireworks—Make your own! 60 simple formulas \$1.00; 30 smoke formulas, 15 colors \$1.00; 10 fuse formulas 50¢. Paloma Pyrotechnics, Box 247, Auburn 5, California 95603.

**PERCUSSION Bombs** — Explode when thrown down. Complete, non-commercial manufacturing procedure, formula, only \$1. Chemicals available. Technitome, Box 22, Berlin, New Jersey 08009.

**ROCKETS:** Real flying models—flights up to 2500 ft. New illustrated catalog 25¢. Single and multistage kit, cones, engines, launchers, trackers, rocket aerial cameras, technical information. Fast service. Estes Industries, Penrose 7, Colorado 81240.

**FIREWORKS** — Explosives — detonators. New manual reveals formulas, preparations, only \$2. Free with order. \$2 certificate for fuse. Pyrochem, Box 169, Berlin, New Jersey 08009.

**PROFESSIONAL** Fireworks fuse, burns underwater, 75 feet, \$1.00. Edcolabs, Box 99, Berlin, New Jersey 08009.

**SEARCHING** For economically priced chemicals and apparatus? Gifts with catalog, 25¢. Starr Scientific, Manitowoc, Wisconsin 54220.

**AMAZING** New book of science experiments, formulas, and catalogue of laboratory supplies. Only 35¢. National Scientific Co., 18 S. Park Avenue, Dept. PM-8, Lombard, Illinois.

**FREE!** \$6.00 Worth of pyrotechnic and fireworks formulas with purchase of 55 cent catalog. To get hundreds of additional free formulas, see details in our catalog! Franks Scientific Co., P.O. Box 156, Martelle, Iowa 52305.

**CONTACT** Explosive—Explodes with touch of feather. Handled safely wet. Powerful. Ideal for jokes. Applies like paint. Made from household chemicals. Results guaranteed. Complete instructions for making both kinds only \$1.25. Free! \$8.00 worth of explosives formulas and fireworks formulas with every order. Franks Scientific Co., P.O. Box 156, Martelle, Iowa 52305.

**HAND** Grenades, Booby traps, contact explosives. Formulas \$1.00. Hilco, P.O. Box 71, Pottsville, Pennsylvania 17901.

**M-80's, SKYROCKETS,** Firecrackers, torpedoes, fireworks supplies, commercial and display fireworks. Huge illustrated catalog \$1.00. Carton of 25 assorted samples, \$2.00. American Fireworks, Box 10868, Fairfield, Connecticut 06430.

**FIREWORKS** Chemicals and laboratory apparatus catalog, 35¢. Sheard Science Supplies, Columbus, Wisconsin 53925.

**ROCKETS!** Flight kits, testing equipment. Catalog 25¢. Rocket Development Corporation, Route 3, Seymour, Indiana 47274.

**MAKE** Phosphorescent smoke. Skyrockets, match bombs, trick matches, Mini-pistol, from ordinary matches. Complete plans \$1.00. Free! 75 explosive and fireworks formulas, including the famous putty explosive formula, with order. Franks Scientific Co., P.O. Box 156, Martelle, Iowa 52305.

**FREE** Chemicals, MONORAILS, Rockets, FIREWORKS, Explosives, COMPLETELY HOMEMADE. Pamphlet 92-A, \$1.00. PYROTECHNICS, 679 Forest, Glen Ellyn, Illinois 60137.

**LASER PISTOL**—\$1.00. How to build Laser Rifle, Electronic Laser, Helium-Neon Laser—\$4.95 each. New project on FLYING SAUCERS—\$4.95. Complete Project Catalogue—25¢. Roy Davis Lab., Dept. PM, Drawer 17067, Jacksonville, Florida 32216.

**CHERRY** Bomb fuse, water proof 25 feet with formulas, instructions \$1.00; 125 feet \$4.00 Postpaid. Free catalog. Zeller, Box 638, Hudson, Michigan 49247.

**FLYING SAUCERS**—Build "Detector" inexpensive, instructions \$1.00. Box 45855, Los Angeles, Calif. 90045.

**ROCKETS!!** Real flying models—2500 feet altitude with powerful motors. Tubes, cones, parachutes, launchers, igniters. Exciting new catalog—rocket-data—diagrams—25¢. Rush delivery. Centuri Rockets, Box 1988, Phoenix, Arizona 85001.

**SELLOUT!** Explosive, looks acts like flour. TNT Power. Self-igniting Incendiary Grenades. Nerve Gases, Blasting Powder, Mustard, Laughing Gases. Complete formulas plus "Secrets," \$1.00. Bylina's, 5115 South Campbell, Chicago, Illinois 60632.

**FREE** PYROTECHNIC Formulas with catalog 35¢, all science supplies. SPECIAL! Elastic water kit, tubeless siphon, flows backwards. Send \$1.00: Dissect-A-Kit, Box A55, Wantagh, N.Y. 11793.

**NITROCELLULOSE!** Explosives! Thermitite, water, ten powerful formulas plus 100 formulas for making smokes, flares, explosives, and fireworks. All for only 75 cents. Why pay more elsewhere? Franks Scientific Co., P.O. Box 156, Martelle, Iowa 52305.

**FIREWORKS,** 50 Assorted formulas \$5.50. Sprengkraft, 5701 Jackson =1409, Houston, Texas 77004.

**MAKE** The most effective, but harmless coin cleaner ever, from ordinary household materials. Complete plans \$1.00. Franks Scientific Co., P.O. Box 156, Martelle, Iowa 52305.

**TRISECT** Any Angle—0 to 180 Computer designed tool instantly locates precise 1/3 or 1/2 angle without moving tool nor "fitting" it! Accuracy surpasses compass! Fast as st. line—two points! \$2 per tool, C.V.A. Programmer, 4276 Brunswick Ave., Los Angeles, Calif. 90039.

**FIREWORKS:** Giant new 28 page catalog of chemicals, tools, kits, casings, books—25¢ 110 feet of safety fuse plus catalog only \$1.25. Lowest prices anywhere. Send now to: UNITED PYROTECHNICS, 12421 S. Throop, Chicago, Illinois 60643.

**FIREWORKS!** Rocket fuels! Explosives! Easily prepared formulas \$1.00. U.S. Pyrotechnics, Box 0234, Cedarhurst, N.Y. 11516.

### FORMULAS, PLANS, ETC.

**LATE.** Modern manufacturing formulas. List free. Moon Chemical, Martville, New York 13111.

**ENCYCLOPEDIA** Of formulas, processes. Details free. Cassill, Box 1535, Eugene, Oregon 97401.

**CHANGED** Rates—updating formula literature & plans \$1.00. Kit \$2.00. Ready assembled weighing scale \$4.50. C. C. Bologh, 83 Ford Ave., Apt. 7, Highland Park, Michigan 48203.

**PRODUCT** Formulations, Catalog \$1.00. Refundable. Millicent Chemist, 5540 Hollywood Blvd., Hollywood, California 90028.

### PLASTICS

**PLASTICS** For arts & crafts, fun & profit. See how easy it is to work with liquid plastics. Turn your plastics hobby into \$ for you. Send 50¢ for catalog to PMI, 1644 20th, Santa Monica, California.

**LIQUID CASTING RESIN.** Large stock of supplies for making lamps, desk sets, ash trays, art objects, jewelry, embedding. Fun for entire family. Sell for big profits. Illustrated catalog and instructions show how. Send 25¢ Dept. 67-8B, Taylor & Art Plastics Inc., 1710 E. 12th, Oakland, Calif. 94606.

**PLASTIC** Embedders, jewelry workers. We have everything. Findings, moulds. New catalog 25¢. David Co., 861 Broad St., Dept. M, Providence, R.I. 02907.

### TREASURE FINDERS

**PROVEN SENSITIVE M-SCOPES** locate coins, relics, gold, silver, etc., Guaranteed. Terms. Free fascinating booklet. FISHER RESEARCH, Dept. PM-8, Palo Alto, California 94302.

**TREASURE.** Find gold, silver, relics with super, powerful Detectron locators. Free information. Detectron, Dept. PM-8, P.O. Box 243, San Gabriel, California 91778.

**TREASURE.** Gold, silver, relics. New 1967 detectors now available. Free information. Rayscope, Box 715, North Hollywood, California 91603.

**FIND** Buried coins, treasures, relics. New supersensitive, low priced detectors for land or underwater use. Free information. Sensitronix, 2225-C Lou Ellen, Houston, Texas 77018.

**FREE** 84 Page detector catalog. General Electronic Detection Co., Box 67, Bellflower, Calif. 90706.

**SAVE!** Build transistorized treasure finder. Details free. Del Research, Dept. B, West Barnstable, Mass. 02668.

**URECON** Metal finder, 8" head, transistorized, \$37.50 delivered. Urpa, 6304 Beechwood, Sarasota, Fla. 33581.

**TREASURE Hunters! Prospectors!** Relco's new instruments detect buried gold, silver, coins, minerals, historical relics. Transistorized, Weighs 3 pounds. \$19.95 up. Free catalog. Relco-A40, Box 10839, Houston, Texas 77018.

**NEW** For '67! Goldak Treasure Locators. Find coins, gold, silver. A profitable yet fun hobby. Goldak, Dept. PMC, 1544 W. Glenoaks, Glendale, California 91201.

**POWERFUL** Metrotech locators detect gold, silver, coins, relics. Moneyback guarantee, terms. Free information. Underground Explorations, Dept. A, Box 793, Menlo Park, California 94205.

**FREE** Literature describing guaranteed \$59.95 detector. Finds coins, jewelry, relics. Esco, Box 292, Hallandale, Florida 33020.



**METAL** Locator kits and assembled models from \$39.90. Terms. Transistorized models available. Free catalog. Electronic Applications Dept. M Box 6095, Alexandria, Virginia 22306.

**THE Treasure Hunter!** Sample copy 25¢. Box 188P, Midway City, Calif. 92655.

**PRACTICAL** Metal locator for prospectors, treasure hunters \$5.00. Money back guarantee. Detectit. Box 772, Medford, Oregon 97501.

**NEW** Revolutionary analytical transistorized metal detector. Push button tuning, automatic tuning, etc. Many models. Free catalog. Gardiner Electronics Co., Dept. 9, 4729 N. 7th Avenue, Phoenix, Arizona 85013.

### PRECIOUS STONES AND MINERALS

**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-12, 1633 E. Walnut, Pasadena, California 91106.

**EARTH** Science Rockhound Magazine. Subscription \$2.50. Sample 35¢. Box-550-PM, Downers Grove, Ill. 60515.

**SEMI-Precious** uncut gems. Ten different for \$1.00. Request list 30. Prospectors Shop, 201 San Francisco, Santa Fe, New Mexico 87501.

**100 COLORFUL**, Polished gemstones, \$1.00. Tumblecraft, 5401 James North, Minneapolis, Minnesota 55431.

**400 POLISHED GEMSTONES** \$2.75. Beautiful crystals, 6 different \$2.00. Lists with order. Sering, 1705 E. Michigan, Indianapolis, Indiana 46201.

### CARTOONING, COMMERCIAL ART, SHOWCARD & SIGN PAINTING, TATTOOING

**YOU** Can entertain with chalk talks. Catalog 10¢. Balda the Cartoonist, Oshkosh, Wis. 54901.

**LEARN** Profitable fascinating tattooing. Illustrated information \$1.00—Zeis, 2220 P Delcy Drive, Rockford, Illinois 61107.

**LEARN** Sign painting at home. Free talent test. Ben Kerns, Box 812-PM, Greenville, S.C. 29601.

**HOW TO MAKE MONEY WITH SIMPLE CARTOONS**—Everyone who likes to draw should have this book; FREE. Send name, zip code. Cartoonists' Exchange, 98 Pleasant Hill, Ohio, 45359.

**SIGN** Painting. Fascinating system. Straley, 410 South Western, Springfield, Ohio.

**CARTOONERAMA** Teaches you cartooning in a 24 lesson course. Free brochure. CFA, Box 263-6D, Brandford, Connecticut 06405.

**STUDENTS!** Amateurs! Professionals! Reap in \$\$\$ with portraits! JRM Enterprises, Box 20208, Cleveland, Ohio 44120.

**COMPACT** 23 Lesson Cartoon Course and Cartoonist's Magazine, \$1.00. Hartman, Box 30367, Lincoln, Nebraska 68510.

### ADVERTISING AGENCIES, ADV. SERVICE, MAILING LISTS

**ADVERTISING** Ratebook leading newspapers, magazines, free. Chicago Advertising Agency, 28-E Jackson, Chicago 60604.

**MAILING** Lists most all kinds 1000 \$5.00. Free folder. Your circulars mailed \$4.00 1000, Dixie Mailers, King, N.C. 27021.

**MAILORDER** Record Book, 30 pages. Records inquiries, orders, advertising expense, etc. Most complete. Just send dime for postage and handling. C. A. Martin, Popular Mechanics, Dept. RB8, 575 Lexington Ave., New York, N.Y. 10022.

### TYPEWRITERS, DUPLICATORS, OFFICE EQUIPMENT

**FREE** Plan. Start printing, lettershop. Offset Presses, Mimeograph Copy machines, DixieGraph, King, N. Car. 27021.

### RUBBER STAMPS AND OFFICE SUPPLIES

**FREE** Catalog—Rubber stamps, labels. Biltmar, 11117-Ewing, Minneapolis, Minnesota 55431.

**FINEST** Quality Stamps, three lines, \$1.00. Dee's, Box 14004, Phoenix, Arizona 85031.

**FREE** 32 Page rubber stamp catalog. Signature stamps \$3.50. Youngers Stamp Shop, Princeton, Iowa 52768.

**QUALITY** 3 Line rubber stamp \$1.50. Gamer, Box 356, Syosset, New York 11791.

**SIGNATURE** Stamp \$2.80. Free illustrated catalog. Carol's, Avoca, Ark. 72711.

### PRINTING, MULTIGRAPHING, MIMEOGRAPHING, GUMMED LABELS

**EMBOSS** Business cards, \$2.99—1000, free samples. Gables, 405A Clifton, Glenshaw, Pa. 15116.

**1000 GUMMED** Address labels, \$1.00. Walt's, Box 966-A, South Bend, Indiana 46624.

**OFFSET** Printing 100 copies \$3.49. Parks, 1879 Dover, Wantagh, New York 11793.

**FREE** Pocket mirror of our late and beloved President John F. Kennedy with order for 1000 gummed name and address labels for \$1.00. A. B. Jones, 556 W. McMurray, Canonsburg, Pa. 15317.

**1000 ZIP** Code, gummed address labels \$1.00. Coy's, 2005 North Ninth, Springfield, Ill. 62702.

**1000 HOLLYWOOD** Style photo address labels, \$1.50. Send photo to Hall's Mail-order Supplies, Box 72146, Los Angeles, California 90002.

**AMAZING** Business printing values. Samples, Print Shop, Box 576, Greenville R.I. 02828.

**OFFSET** PRINTING—8 HOUR SERVICE—25 to 5,000 copies. Free booklet "Secrets of Cutting Printing Cost." 305 S. 4th, Springfield, Illinois 62701.

**LETTERHEADS**, 4 lines 8 1/2 x 11, \$3.95 for 200. A-1 Printing, Box 60p, St. Louis, Mo. 63166.

**FREE** Catalog. Letterheads, business cards, envelopes. Youngers Printing, Princeton, Iowa 52768.

**QUARTER** Century fine printing: Lowest prices—satisfaction guaranteed. Oscar Linneman, 84 Harding Avenue, Runnemede, New Jersey 08078.

**1000 GUMMED** Address Labels 75¢, 3000 for \$2. Anthony Products, Box 164P, Walnut, Calif. 91789.

**8-PAGE** Catalog, 1000 lots—1 1/2¢ each. Samples, Printers, Box 13020, St. Louis, Mo. 63119.

**FREE** List: Quality Offset—Letterpress. Dowling Press, Pittstown, N.J. 08867.

**FREE** Literature: 1000 address labels \$1.00, 1000 business cards \$4.95. Printing, rubber stamps. Jordan's, 552 West O'Connor, Lima, Ohio 45801.

### PRINTING & RUBBER STAMP OUTFITS—SUPPLIES

**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 06450.

**TYPE** Cases, cabinets, Manufacturer. Catalog. King McKay Company, 23179 Telegraph, Southfield, Michigan 48075.

**MAKE** Rubber Stamps, Complete outfit, 119.95. Duckman, Avoca, Arkansas 72711.

**PRINTING** Presses, type, supplies, Lists, 5¢. Turnbaugh Service, Mechanicsburg, Pennsylvania 17055.

**RUBBER** Stamp presses, mounts, supplies. Martin, 1425S Major, Jefferson City, Mo. 65101.

**TYPE** And supplies for rubber stamp makers. New wholesale price list No. 4 free. Star Stamp Supply, 732 Federal, Chicago, Ill. 60605.

**RUBBER** Stamp presses, hydraulic operated, electrically heated. Sizes 5" x 8", 8" by 12", 10" x 15". Starting outfits, supplies. Printing Presses. Orders presses, supplied shipped day received. 1966-67 catalog low supply prices. Custom Manufacturing, 406 East Elm, Springfield, Missouri.

**TYPE** Catalog No. 11, 96 Pages. Send One Dollar. Deductible First Order. Acme Type, 732 Federal, Chicago, Illinois 60605.

### REMAILING SERVICE

**MIAMI** Remails 25¢. Monthly rates. P. Marle, Box 1266, Coral Gables, Florida 33134.

**FROM** Fabulous Las Vegas, Unexcelled, fast, dependable, confidential service. Remails 25¢. Monthly rates. Colorful cards. Ruthie, 558 Oakley Boulevard, Las Vegas, Nevada 89105.

**SO. AMERICA** Registered re-airmails, \$1.00. Confidential. Genaro, Box 360, Guayaquil, Ecuador.

**NEW YORK CITY**—REMAILINGS 25¢—Confidential mailing address—monthly \$3.00—Worldwide Remailings \$1.00. Established 1946. R. J. VALLES, 3450 Broadway, New York 10031.

**TAHITI, Fiji, Australia, New Zealand** letters. 1.00 cards 50¢ Jeanne, Box 201, Pioneer, Calif. 95666.

**LOS ANGELES, Hollywood, San Fernando Valley**—25¢ single; \$3.00 monthly. Confidential. 10437 Lanark Street P. Sun Valley, California 91352.

**STAMPEDE** City remails, 25¢; monthly \$3.00. Halford Enterprises, Box 28, Calgary, Alta., Can.

**TIMELY** Remailing 25¢. Unlimited Monthly \$3.00. Confidential Postcards. Schoen, Box 1963-P, Chicago, Illinois 60690.

**CANADA CONFIDENTIAL** Remails, fast, 25¢. Monthly \$3.00. Wanless, 923 Selkirk, Victoria, B.C.

**CHICAGO** Remailing 25¢ each. D. Palermo, Box 50348, Cicero, Illinois 60650.

**YOUR** Personal secret mail address. Receiving and forwarding. Fast dependable confidential. \$3.00 per month. ReMail Service, Box 3014, Glenstone Station, Springfield, Mo. 65804.

**REMAILED** Same day! Confidential Letters 25¢ each, 320 Rockland Road, Wayne, Penna. 19087.

**SECRET MAIL SYSTEM**, 406-M South Second, Alhambra, California 91802. Phone 213-281-4218.

**LOS** Angeles, confidential remailing, 25¢ single. Marco, Box 65612, California 90065.

**PROMPT** Remails 25¢. Monthly \$3.00. Hargraves, Box 702, Daytona Beach, Florida 32015.

**GLAMOROUS** Palm Beach, Florida remails 25¢, 1422 West Drew, Lantana, Florida 33460.

**INDIANAPOLIS**—RE-MAIL 25¢; monthly, \$3.00 plus postage. Kniptstine P. M., 8442 E. 42 St., Indianapolis, Ind. 46226.

**FT. Lauderdale**, Where the action is. Remails 25¢. Box 932, Ft. Lauderdale, Florida 33302.

**BALTIMORE, MARYLAND, WASHINGTON D.C.** Confidential remailings, 25¢. \$3.00 monthly. King Services, 23 East 22nd St., Baltimore 18, Maryland.

**REMAILS**, Forwarding, receiving. Since 1958. Ellis, 407-PM Washington, Fairfield, Illinois 62837.



## REPAIRS AND SERVICING

**TELL** The more than 1,550,000 avid readers of Popular Mechanics about your products and services. It costs very little to place your classified message in front of these proven mail order buyers. For further details, write: C. A. Martin, Dept. 79N, Popular Mechanics, 575 Lexington Avenue, New York, New York 10022.

## SPECIAL SERVICES

**INFORMATION** On anything. Ferguson Research Specialists, 83-45 Vietor Ave., Elmhurst, N.Y. 11373.

**RESEARCH** Services, P. Tolliver, 329 Shepherd St., N.W. Washington, D.C. 20011.

**PERSONALIZED** Newspaper HEADLINES 2 lines, 20 letter lines maximum. 3 same copy \$2.00. Rapid Printing, P.O. Box 31, Whitestone, N.Y.C. 11357.

**FOOTBALL** Fans—fast, accurate weekly predictions. All games. Details \$1.00 (refundable). Williams, Box 612, Clearfield, Pa. 16830.

**RESEARCH** Comprehensive. Specialist 20 years. International scope. Also information any subject \$2.00. Knight Company, Suite 306, 927 Fifteenth Street N.W., Washington, D.C. 20005.

**AUSTRALIA:** Remailing, souvenirs, coins, special assignments, business representation. Professional Services, Box 38, Northbridge, N.S.W. Australia.

**EYEGLASSES!** Wholesale laboratory established 25 years. Mail eyeglasses or prescription for quote. Global Opticians, 16 East 23 St., New York, N.Y. 10010.

## TOBACCO

**YOUR** Ad in this space will be read by more than 1,550,000 active mail order buyers. Join the march to greater profits, place your products and services in front of them today with a small low cost classified ad. For further details write: C. A. Martin, Dept. 81N, Popular Mechanics, 575 Lexington Avenue, New York, New York 10022.

## WANTED—MISCELLANEOUS

**MERCURY,** Gold, Silver, Platinum; Ores assayed. Wholesale Terminal, Norwood, Mass. 02062.

**STAMP** Collections, accumulations. Eagle Stamp Co., 2221 Romine, Pittsburgh, Penna. 15226.

## PERSONAL

**SUBCONSCIOUS** Conditioning remakes personality while you sleep. Free details. Sleep-Learning, Box 24N, Olympia, Washington 98551.

**INVESTIGATORS.** Free brochure, latest miniature electronic surveillance equipment. Ace Electronics, 11500-P NW 7th Ave., Miami, Florida 33168.

**BLITZ** Reducing! 5 pounds overnight! Guaranteed! Bijou, Box 1727-BM, Hollywood, California 90028.

**MUSIC** Lovers, continuous, uninterrupted background music from your FM radio, using new inexpensive adaptor. Free literature. Electronics, 11500-T NW 7th Ave., Miami, Florida 33168.

**BIBLE** Questions answered. Stamped envelope. Bylon, 17167 Bentler, Detroit, Michigan 48219.

**NEED** Money? Your debts too big? Solutions to all financial problems. Amazing results. Consolidate debts. Non-Lending Service. Free details. Write Financial Consultants, 28 E. Jackson, Suite 1204-PM, Chicago 60604.

**WILL** You be saved by Christ? Learn truth of true christianity—Sent free to any part of the world. Chester Kelley, 948-18th St., Des Moines, Iowa 50314.

**BORROW** \$1,205 AIRMAIL! Repay \$47 for 36 months. State licensed. Postal Finance, Dept. 17-N, 200 Keeline Building, Omaha, Nebraska 68102.

**RETIRE** Where costs are low, book covers many world paradises—send \$2.00 to Nolan Enterprises, 10280 Vicksburg, Cupertino, Calif. 95014.

**4 VOL.** High School subjects self-taught \$19.95. Remit to: Robert Belka, P.O. Box 9171, Alexandria, Va. 22304.

**PAY** Bills! Have cash left over. \$39.65 repays \$1000 in 36 months. Write for details. American Loan Plan, Dept. LA-010B, City National Bldg., Omaha, Nebraska 68102.

**NEED** Money? Borrow \$100—\$1000 by mail. Confidential. Repay in 36 months. Free loan application. World Finance Co., Dept. LW-010A, 620 Symes Building, Denver, Colorado 80202.

**BORROW** With confidence! Over 50 years of experience. Loans by mail from \$100 to \$1000. Budget Finance Co., Dept. LB-010C, 317 South 20th, Omaha, Nebraska 68102.

**RELAX.** Nervous, tense, irritable and on edge? Dr. Gutwirth's 114 page book tells how to relax. Simple exercises. Learn quickly. Book #119, only \$1.00. Martin's Enterprise, 406 South Second Street, Alhambra, California 91802.

**BILL** Problems? Poor credit no trouble. Not a loan company. Send for free application. Automatic Acceptance, 318PM Broadway Blvd., Reno, Nevada or 307PM Pocatset Ave., Providence, R.I.

**POWER!** Send stamp for details. Meditation, Box 37012, Los Angeles 90037.

**FEDERAL** Law wipes out all debts! Immediate relief. Free details. Counselor-7, Harlingen, Texas.

**AMAZING** Infant of Prague Novena booklet, \$1.00. Jordan, 16 James Ave., Sanford, Me. 04073.

**SURVEILLANCE** Equipment. New high performance models. Free details: Security Electronics-PM, 11 East 43 Street, N.Y.C. 10017.

**POPULAR** Mechanics famous prints—suitable for framing. Racewatchers Guide to Competition Cars 35 X 23" \$1.50; U.S. War Planes in Viet Nam 18 X 24", \$1.25; U.S. Helicopters in Viet Nam 18 X 24", \$1.25. All in full color. Send remittance to: Popular Mechanics Service Bureau, Dept. 67, 575 Lexington Ave., New York 10022.

## MISCELLANEOUS

**WINEMAKING** . . . Grape, Elderberry, Dandelion, Frozen Juices, etc. Brewmasters' secrets revealed! Powerful methods! Instructions, recipes, and supplies catalog. \$1.00. Continental, Box 26034-PH, Indianapolis, Indiana 46226.

**WINEMAKERS.** Free illustrated catalog of yeasts, equipment. Sempex, Box 7208, Minneapolis, Minn. 55412.

**BIRTH** Certificates, Marriage Certificates, Diplomas! 2 blank forms \$1.00. Sample 10¢ Standard Forms, Box 482-M Washington, D.C. 20044.

**HOW TO BUILD A STILL.** Humorous, factual, illustrated. 50 pages. Includes distillation, fermentation, wine, homebrew, taxes, etc. Over 25 recipes, \$2.00. Buze, Box 490A, Norman, Oklahoma 73069.

**HEARING** Aid batteries wholesale. Free list. Habs, Box 51, York, Penna. 17405.

**WINEMAKERS** Catalogue—Samples—Recipes—25¢. Kraus, Box 451-L, Nevada, Missouri 64772.

**ZIP** Code directory. Sell—huge profits! Sample \$1.00. BEAN, 377, Port Orford, Ore. 97465.

**KNOW** Mexico—free specimens Guana-juato town sketches. Victor H. Gil, 25 Oriente 216, Puebla, Pue. Mexico.

**FREE** For life! Write: Hall's Mailorder Supplies, Box 72146, Los Angeles, California 90002.

**SIMPLIFIED** HANDICAPPING. Racing profits possible in 9 of 10 plays. Details. Howard, Box 507, PM-8, Carroll, Iowa 51401.

**MAKE FIVE GALLONS OF REAL BEER** Send \$1.00 to—EASY, Box 1181, Vernon, B.C. Canada.

**EVEREADY** Hearing aid batteries at discount prices. List sent free. Thomas, Box 822, Omaha, Nebraska 68101.

**ORNAMENTAL** Iron designs. Book of 1600 beautiful, practical designs for railings, columns, etc. Free literature. Cunningham, 3881 South 3200 West Salt Lake City, Utah 84119.

**SILENCERS**—For pistols and rifles. Complete details for construction and operation, \$1.00. Gunsmith, Box 185-C, Fairfield, Alabama. 35064.

**WINEMAKING.** Beer, Ale, Brandies. Strongest methods. Illustrated. \$2.20. (Supplies, Hydrometer Headquarters.) Eaton Company, 543-A, Hopland, California.

**WINEMAKERS!** New illustrated supplies catalog . . . Free! Write today! Winemakers, Box 11211-PG, Indianapolis, Indiana 46201.

**YOUR** Name sent to 1000 importers, publishers, mailers, wholesalers, etc. on our mailing list. Year \$1.00. Dixie Mailers, King, N. Car. 27021.

**KILL** Mosquitoes, crop destroyers. Electrically. Free information, Box P374, Royal Oak, Michigan 48068.

**GENUINE** Tigar Leopard skins with heads. Pricelist, catalog \$1.00 (refundable). Kusick, 463A Main, Boston, Mass. 02129.

**ZIP** Directory—75¢ (send dollar—change returned!). . . Co-Publish "Timely Tips"—Copy, details: 10¢. . . 3-month subscription—"Mail Sale Advertiser": 10¢. . . Free Gift Catalog (send 10¢—get certificate worth \$1.00! against purchase). . . Sell your photographs! Report reveals how/where!—\$1.00. Robert Gross, D-AAD, 137-75 Geranium, Flushing, N.Y. 11355.

**RECREATIONAL** Vehicle parts and equipment catalog. Everything for building, remodeling campers, trailers, covers, including aluminum skin. Only \$1.00 ppd. (refundable). Plans to build. Details 10¢. Viking Camper Supply, Inc., 94-FA Glenwood, Minneapolis, Minn. 55403.

**YOUR NAME,** initial on 48 book matches, special \$3.00. FREE CLOCK catalog. Clockshop, 1200 Jay, Sacramento, California 95814.

**WINEMAKERS** —Proven winemaking techniques. Easy-to-follow instructions, recipes, supplies catalog. \$2. Wisconsin Winemakers Guild, P.O. Box 193, Elm Grove, Wisconsin 53122.

**LEAVE** A will, 2 forms \$1.00. Wy-Co, Box 292, Pasadena, Texas 77502.

**SUPER** Memory overnight! Success guaranteed! Bijou, Box 1727-M, Hollywood 28, California 90028.

**CIGARETTES** 12¢ A pack—Improved roller makes 20 filtertip or plain, king or regular for 12¢. Facts free. Moberly, Box 954, Owensboro, Kentucky 42301.

**PENCIL,** \$1.00. Pencils, 274 Norman Drive, Ramsey, New Jersey 07446.

**NEW** National zip directory. 35,000 zip codes, 50 states, District of Columbia, U.S. possessions. \$1.95. A&K Enterprises, P.O. Box 1402, Plainfield, N.J. 07061.

**BEEF** Jerky—USDA Inspected. Half pound \$2.95 Postpaid USA. Gourmet Distributors, Dept. PM, Box 9456, Denver, Colo. 80209.

**RELEASING** August 15th, world's tiniest lighter. Sample, \$1.00. C & C Enterprises, 6110 So. Washtenaw, Chicago, Illinois 60629.

**BEGINNERS** Falconry Bulletin \$1.00; 24 Hawk, Falcon pictures suitable for framing \$5.00. Stromberg's Pets Unlimited, Fort Dodge 25, Iowa 50501.

**PAINT** Remover cheap; wash off with water. Information \$1.00. Box 1037, Springfield, Oregon 97477.

**WINEMAKING.** Easy recipes, illustrated instructions, \$2.00. Garden House, Box 67R, East Longmeadow, Mass. 01028.

**LOG** Cabins; Ship anywhere 35 plans, specifications and prices. Send \$1.00. Write Bloch Brothers, Waterford 4, Michigan.





**DAN AND HIS 1967 ALL-AMERICAN RACERS EAGLE** pose in famed Gasoline Alley at Indianapolis Speedway before start of final practice. Dan led piston-engine cars as rain halted race on the first day

## DRIVIN' WITH DAN

*(Continued from page 42)*

sponsors—in exchange for wanting a decal stuck on my car—are willing to help ease the load, then I'll even wet the glue for them.

**Q.** *As a Gurney fan of long standing, I was disappointed you weren't at the wheel when your car took the checkered flag at Le Mans. Were you?—Buster Baines, Grand Rapids, Mich.*

**A.** Thanks for your thoughts, but I assure you victory was no less sweet because A. J. Foyt happened to be driving when the car won. We worked together well as a team and the car did everything we asked of it. And this, I suppose, is what racing is all about.

**Q.** *I'm due for new tires on my '66 Chevelle and I'm thinking about radials. What's your opinion?—Harvey Jameson, Biloxi, Miss.*

**A.** Tires, regardless of what method of construction is used, should be bought with an eye on what kind of driving you do. Radials are long wearing, they stick well on corners, and tests would seem to indicate they boost overall gas mileage. However, they give a slightly stiffer ride than conventional bias-ply tires and they're somewhat noisier. I think

you have to decide first what you want from a tire, and then go after it.

**Q.** *What happened to you at Indy?—Nils Olsen, Minneapolis.*

**A.** Initially, or eventually? Actually, both are related. Initially, a fuel transfer valve stuck and, while I was trying to unstick it, I was running on a lean mixture. This, in turn, burned an engine valve, which left me with only seven cylinders. And this, of course, led to all sorts of problems and I eventually went out on the 160th lap.

**Q.** *Have you ever tried drag racing? If so, what did you think of it?—Jimmy Fuller, Duluth, Ga.*

**A.** Yes, and I enjoyed it very much. Drag racing was in its embryo stage then. In fact, I participated at the first organized strip in the country, the Orange County (Calif.) Airport, just a few miles from where our All-American Racers shop stands today. ★ ★ ★

---

*If you have questions on racing, high-performance and everyday driving techniques, send them to "Drivin' with Dan," c/o Popular Mechanics, 575 Lexington Ave., New York, N.Y. 10022. Questions cannot be answered by individual letters. Questions on maintenance and repair should be addressed to the Auto Clinic (see page 22).*

---



**Even if you went all-out to get your XK-E 2+2,  
you still don't need the most expensive motor oil.**



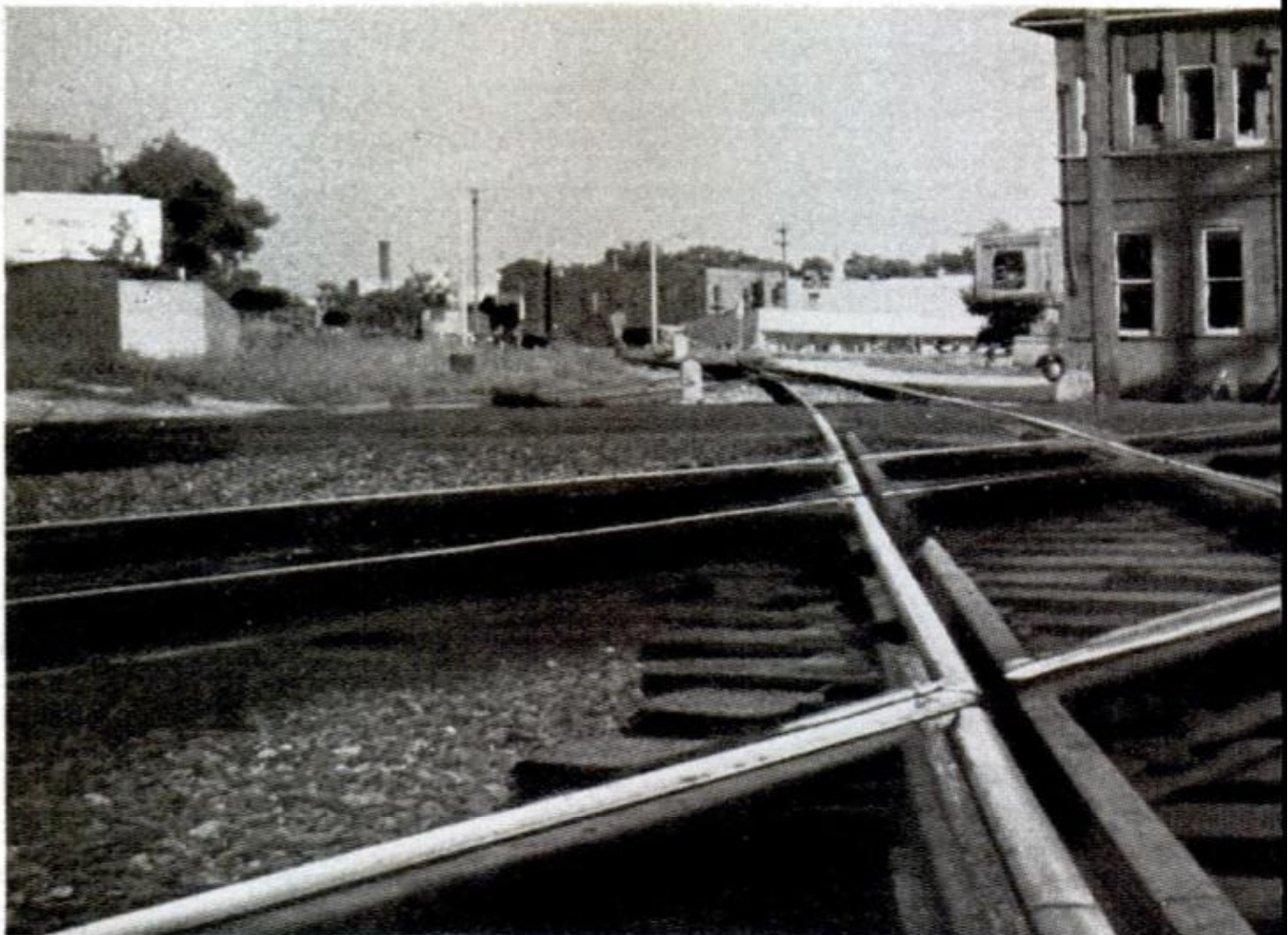
**Just the best.**

Now that you've put yourself behind the wheel of this luxurious cat, you'll want to give it extra loving care. This means picking a really fine motor oil. Like ours. Gulfpride® Single-G. Using tests established by auto makers, we constantly check Gulfpride Single-G for its ability to protect against wear, scuffing, rusting, deposit formation and clogging. Gulfpride far surpasses the requirements of car makers in these tests. Recent tests show Gulfpride Single-G performance equals or exceeds that of four leading competitive premium motor oils. (And one of them costs 25¢ a quart more than Gulfpride.) Get the best protection for your engine. Get Gulfpride wherever you see the Sign of the Gulf Orange Disc.



Gulf Oil Corporation





Some vans sway and bounce across tracks because they have a very short wheelbase. GMC's new Handi-Van is different. It has a longer 108" wheelbase. We didn't give in to the temptation of tacking on more metal back of the rear axle. We didn't try

to fool you by stretching out the body to give you more loading area. We refused to give you the excessive rear overhang and exposed seams you find on some makes. Instead, GMC's Handi-Van gives you a tremendously stable ride. (You'll feel the big

# If you think all vans are our new one over some







difference the first time you load up.) V-8 power is available. Safety equipment includes a padded dash, pushbutton seat belts and more. You'll have to go some to better our features. And you'd probably expect to dig a lot deeper into the budget to get a truck

that could even equal GMC features. Yet the prices of all vans are pretty close. If you still think vans are pretty much alike, there is only one thing to do. Go see your GMC Truck dealer. What a difference he can make on your whole attitude toward trucks.

# pretty much alike, run railroad tracks.



The Truck and Coach Division of General Motors

# GMC

**What a difference a name makes**





**FIX IT  
WITH  
PLASTIC WOOD...  
IT WILL  
STAY FIXED!**

That chair won't keep coming "unstuck" when you use the great little fixer-upper: PLASTIC WOOD. It's *the* way to fix anything made of wood...because when it hardens, it's just like wood. Handles easy as putty. Does a "pro" job on busted furniture, loose screws, filling nicks, gouges—you name it! Great outdoors...resists weather. 5 colors, so you can match the job you're working on. Don't be without PLASTIC WOOD!



**A repairman can cost  
\$15 a shot.**



**3-IN-ONE costs  
1¢ a shot.**

You can head off many unnecessary repair bills, with a few drops of 3-IN-ONE Oil! Cuts down wear on moving parts...things last longer. Also

3-IN-ONE can keep rust from getting started. When you spend good money for a sewing machine, power drill, bike, etc....shouldn't you spend a few cents to protect them? Regular. Electric motor oil. Or handy new spray can. 3-IN-ONE...it's wise insurance.

BY KEVIN V. BROWN  
**AVIATION**  
JETSTREAM

**GENERAL AVIATION** accounted for 80 percent of the fatalities caused by aircraft accidents in the last year—four out of five.

Surprisingly, the agency that reported the figures—the National Safety Council—didn't use them as evidence of the current safety of airline and military flying, but as a plea for the future safety of business and private flying.

Other agencies—notably the Aircraft Owners and Pilots Assn.—have been making the same plea, only with a different villain.

The Safety Council cites the lack of training and required skills on the part of the average general-aviation pilot, especially the man who flies just for fun.

The AOPA cites the lack of government support, specifically the federal government, for more modern facilities for the general-aviation airports.

The Safety Council suggests better flight instruction, more built-in safety in the aircraft, as well as more and improved airports.

The AOPA trained its guns on the lack of financial support, notably by the Federal Aviation Agency, for private airports. It claims the FAA has spent less than 14 percent of the aid money available on the 1200 general-aviation airports in the country, while spending more than 70 percent on the 240 airports serving commercial airlines.

**Council figures**

Some of the Safety Council figures are interesting. They show that the safest kind of general-aviation flying is flight instruction, where there is usually just an instructor and a student in the plane. The next safest is business flying, where the pilot usually has more training than the average. Business flying accounts for 65 percent of general-aviation mileage, or about two-thirds.

The most dangerous kind of flying is "personal flying." It accounts for only 20 percent of the mileage, but more than half the deaths.

The council says the most critical points in a private pilot's career are when he tops 300 hours or 40 years. In the first instance, he tends to become overconfident and sloppy in his flying habits. In the second instance, his reflexes, vision and reaction time begin to deteriorate.

In either case, safety suffers. ★★★





Life begins at 125...



Meet the Rapido—Harley-Davidson's surprise package of the year. It's 125 cc's of pure excitement on a lightweight frame. And you're on top of the action all the way with a new four speed foot shift. Add bold new styling and Harley-Davidson's legendary craftsmanship and you've got nothing in front of you but the open road. Come alive in a hurry! Your Rapido 125 is ready and waiting. Get acquainted at your Harley-Davidson dealer. Try the Yellow Pages... Meet Rapido.

**HARLEY-  
DAVIDSON**

Материал, защищенный авторским правом



# HOMEOWNERS' CLINIC

BY W. CLYDE LAMMEY

## Digs and gouges

*I have tile-faced hardboard wall paneling in a powder room. Two of the "tiles" have been accidentally damaged. The digs, or gouges, don't go all the way through, but both tiles must be replaced. Can I do this, or must I install a new tile-board?—F.D., Ga.*

If, as you say, the board has not been broken, it may be possible to make a repair by spackling, over which a white or matching enamel can be applied after the spackle is dry and has been lightly sanded flush with the surrounding surface. Carefully remove all loose material from the damaged areas, making sure you remove all loose chips or pieces of the original finish. It may be a good idea to drill several small holes clear through the board within the depression so that some of the spackle will be forced through to provide an anchor.

Then press spackle into the depression with a wide putty knife, taking care to strike the surface of the patch smooth and flush with the surrounding surface. Use sufficient pressure on the putty knife to make sure the spackle is forced into all irregularities. Then allow the patch to dry thoroughly, mask around the edges of the affected tile with painter's masking tape and finish with a semigloss enamel, coating the whole tile and taking care to avoid any brush marks. A second coat may be required to obtain a good, smooth finish. Strip off the masking before the enamel is entirely dry. Treat the other affected tile in the same manner.

## Sealing up storms

*I have old wooden-frame storm sashes. In the past, you've mentioned that these should be sealed before winter arrives to prevent leakage of cold air into the space between the outer and inner sashes later. But how?—H.H., S. Dak.*

There are several suitable weather-strippings which are quite easy to obtain. Some are self-adhesive, or pressure-sensitive, and can be attached to the inner face of the sash frame along the edge at the top, sides and bottom. On some window framing it is necessary to attach the stripping to the bottom edge of the sash.

There is also a felt stripping about 1/8-in. thick and 1/2 to 3/4-in. wide that is attached with small tacks or a stapler. Tacks or staples should be spaced uniformly about 4 to 6 in. apart and the felt strips should be "mitered" at the corners.

After being stripped the sashes must be held in place with turnbuttons rather than hangers. Large sashes usually require three turnbuttons on each side and, if the sashes are exceptionally wide, one more turn-button at the top.

## Screening basement sashes

*I have steel basement sashes which tilt inward to open and tilt upward to be removed. I'd like to install screens on at least two of the sashes but I haven't yet figured out a way of attaching the screen frames to the sash frames. I can make screen frames of wood, but can you suggest a way to attach the two?—N.F., N.Y.*

Usually steel sash frames provide some means by which you can attach screens. Have you examined the frames closely for any small holes through which screws may be inserted from the inside? Or possibly there's some other means of attaching you may have overlooked. If not, it should be possible to drill holes through the frames, one centered on each side, in such a position that the screw heads will not interfere with full closing of the tilting sash. If the basement walls are of the poured type, the chances are you won't have much latitude in fitting the screen frames. Only careful measurements will assure the close fit necessary.

## Another clock problem

*I have an old spring-driven clock that won't run unless it's tilted nearly 10°. In this position it runs perfectly. What could be wrong?—E.N., Tex.*

It's hard to say with no description of the clock except that it's spring-driven. But if it refuses to run unless it's tilted, then it must be a type having a pendulum. Remove the back or the dial, whichever is necessary to expose the escapement, and you will see the pendulum rod—ordinarily a length of wire in old clocks—and a second shorter rod, or wire, the lower end being looped around the pendulum rod and the upper end being joined to the pallet which engages the escape wheel. Bend this rod, (known generally in old terminology as the "crutch") slightly, lower the clock to its normal level position and try it. If it still refuses to run, or runs only a short time and stops, bend this same rod a little more in the same direction and try again. ★★★



# It's Like Having Auto Factory Experts Right Beside You...

when you use this famous illustrated step-by-step  
guide that shows you

## HOW TO FIX ANY PART OF ANY CAR

Now—Whether You're a Beginner or Pro  
Mechanic—You can "Breeze Through" ANY  
Repair Job on Any Popular-Make Car—1959-1967!

**M**OTOR'S AUTO REPAIR MANUAL shows you in step-by-step words and pictures all the factory-approved repair procedures you'll ever need for fixing practically ANY part of ANY car listed here—1959-1967.

Over 1,250 BIG PAGES —  
3,800 PICTURES!

This NEW, REVISED, ENLARGED Edition covers everything you need to know to fix almost any car model from 1959 thru 1967. Over 1,250 giant pages, 3,800 "This is How" pictures, 457 "Quick-Check" charts, 55,000 essential repair specifications. Over 225,000 service and repair facts.

PLUS Adjustment Tables, Tune-Up Charts, Tables of Measurements and Clearances, Overhauling and Replacement Facts, Carburetor Overhaul Guide, General Engine Service Section, etc. Special Trouble-Shooter Section helps you pinpoint the cause of any of 2,300 car troubles in a jiffy.

Same FREE 10-Day Trial on  
Motor's New 1967  
TRUCK REPAIR MANUAL

Covers 98% of all trucks, 1955-1967, including all new economy models. Over 2,000 illustrations: 300,000 facts. Covers all major gas engines & diesels. Over 1,000 big pages. For FREE Trial, check box in coupon.



No guesswork! 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 profit from the time-saving and work-cutting procedures you'll find.

MOTOR'S MANUAL makes every operation on any car—from Volkswagen to Cadillac — as easy as A-B-C! Eliminates trial and error — saves you time, work and money.

OVER 5  
MILLION  
COPIES SOLD

SEND NO MONEY  
Try Manual at OUR  
Risk — FREE

See for yourself why U.S. Armed Forces, Schools, and garages everywhere "swear" by MOTOR. Just mail the coupon. TRY Manual for 10 full days—FREE! If it doesn't pay for itself in those 10 days, just return it and pay nothing, owe nothing. Mail the coupon AT ONCE to MOTOR Book Dept., 250 West 55th Street, New York, N.Y. 10019 (SCHOOLS, BOOKSTORES: Write for Discounts.)

TRY BOOK  
FOR TEN DAYS  
FREE

### New Edition Covers All These Cars, 1959-1967

American	Ford
Barracuda	Fury
Bronco	Imperial
Buick	Jeep
Buick Special	Lancer
Cadillac	Marlin
Fwd. Cad.	Mercury
Chevelle	Mustang
Chevrolet	Oldsmobile
Chevy II	Olds F-85
Chrysler	Plymouth
Comet	Pontiac
Continental	Rambler
Corvaire	Scout
Corvette	Tempest
Camaro	Thunderbird
Dodge	Toronado
Fairlane	Valiant
Falcon	Volkswagen



MOTOR'S

AUTO  
REPAIR  
MANUAL

TRUBLE-SHOOTER Section  
Spots 2,300 Causes of Trouble

Quickly pinpoints trouble spots in engines, ignition, brakes, transmissions, axles, power equipment, etc. Gives reasons for slow starting, knocks, stalling—much more!

### MAIL COUPON NOW FOR 10-DAY FREE TRIAL

MOTOR BOOK DEPT., Desk 718  
250 W. 55th St., New York, N. Y. 10019

Rush to me at once MOTOR'S New AUTO REPAIR MANUAL. If O.K., I will remit \$2 in 10 days, \$3 monthly for 2 months and a final payment of \$1.95 (plus delivery charge and sales tax, if any) one month after that. Otherwise I will return the book postpaid in 10 days.

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

Address.....

City & State.....

ZIP CODE ZONE NO.

Also send me for 10-day Free Trial MOTOR'S TRUCK REPAIR MANUAL. If O.K., I will remit \$12, plus delivery charge and sales tax, if any, in 10 days. Otherwise I will return book postpaid in 10 days.

Check box and save shipping charge by enclosing WITH coupon in envelope entire payment of \$9.95 for Auto Repair Manual (or \$12 for Truck Repair Manual) plus sales tax, if any. Same 10-day return-for-refund privilege applies.





## Happy combo! Racy and rugged. Holy Toledo, what a car!

Leave ordinary, garden-variety driving behind...in this 'Jeepster' Convertible. The rugged rascal only Toledo could build—because that's where 'Jeep' ruggedness comes from.

Settle back in those bucket seats. Take the wheel. And go!

You'll be noticed...thanks to snazzy features like that continental spare. Now, hit the highway and open 'er up! What a smooth performer...specially if you choose that hot new V-6 with automatic transmission.

Then flip one lever...you're in 'Jeep' 4-wheel drive! You've got excitement ...and safety, too...you just won't find with ordinary sports cars. What's your idea of fun? This baby will get you there!

Or, maybe you'd rather choose from the 'Jeepster Commando' models. Roadster. Station wagon. And the sportiest pick-up ever!

The 'Jeepster' family. It's tough. Terrific! You've

got to drive it to believe it! See your 'Jeep' dealer. Check the Yellow Pages.

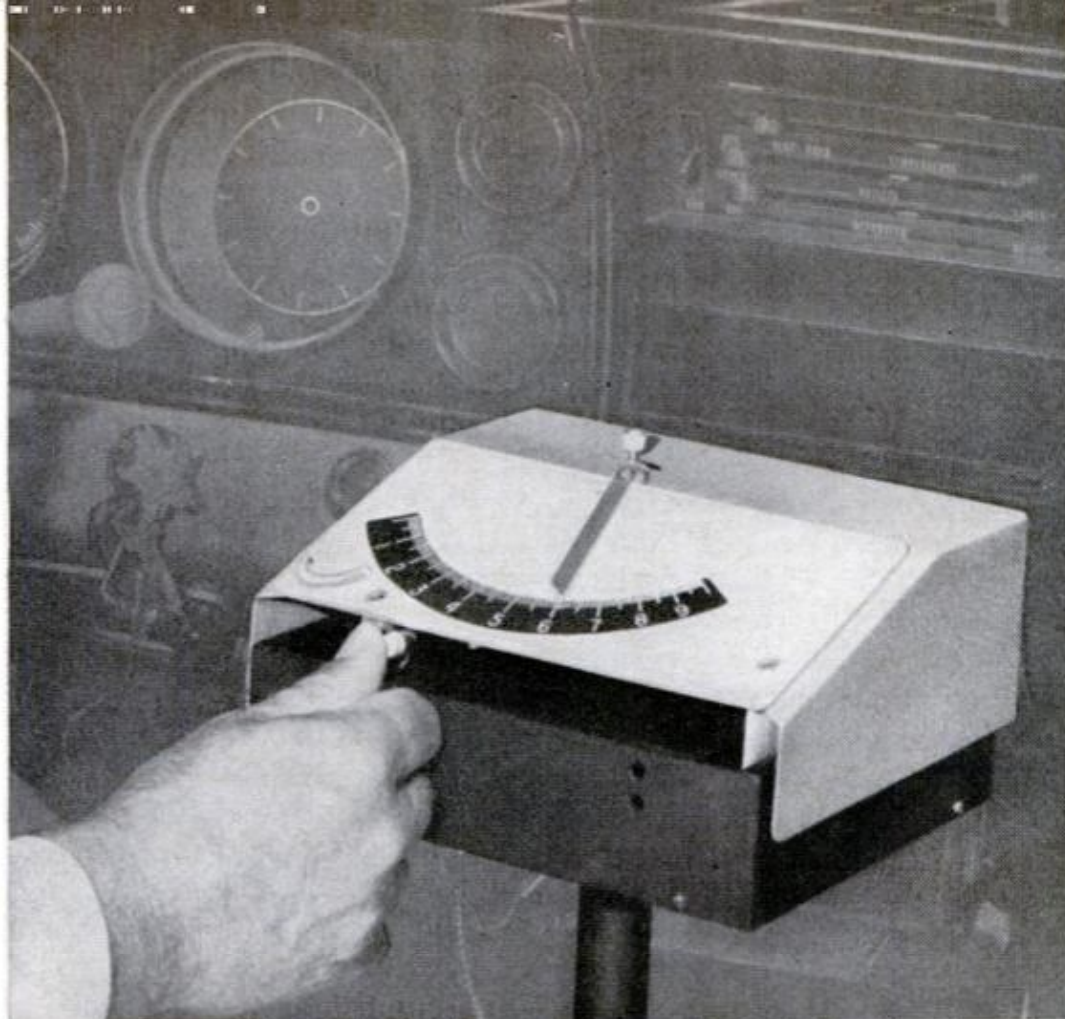
**KAISER JEEP CORPORATION** TOLEDO, OHIO 43601.



# Jeepster<sup>®</sup>

Family of fun cars





# WATCH IT, SPEEDERS!

Now They've "Gotcha" Coming or Going

By Marshall Lincoln

**T**HE FLASHY SPORTS CAR was tooling along the turnpike at a blazing pace, passing cars and speed limit signs in a blur.

A state police car coming from the opposite direction didn't worry this driver. "He can't clock me without turning around," the speeder smugly thought to himself.

Sure enough, the police car did turn around, but the speeding driver instantly dropped to a legal 65 mph, confident he could not be arrested. He was startled and puzzled to see the trooper turn on the flashing red light and point for

him to pull over to the side and stop.

After both cars had stopped, the trooper stode forward and commanded, "Come back to my car. I want you to see something."

When seated beside the trooper, the driver was shown a metal box mounted on the transmission hump of the police car. An indicator arm on the dial atop the box pointed accusingly at 95, the sports-car driver's speed *as he was approaching the police car*.

Another driver had been caught by VASCAR.

VASCAR is an ingenious new device



being placed in the hands of more and more of the nation's policemen to help them catch speeding motorists. It may soon make the police car speedometer obsolete and could replace radar as well.

VASCAR stands for Visual Average Speed Computer And Recorder.

It's a mechanical device for measuring the speed of moving objects and can be used with astounding accuracy under a wide variety of conditions. Its versatility makes it ideal for use by policemen in clocking suspected speeders.

The unit possesses a number of advantages over such other familiar devices as the police car speedometer, radar and the road timer that uses a pair of sensing tapes stretched across the pavement.

There are many ways to use VASCAR. They all boil down to this: With it, a policeman can accurately measure speeds of other vehicles on the road, whether they are moving in the same direction or the opposite direction from him, and whether they are ahead or behind his car. It also can be used when the police car is parked alongside the road, and it is usable in daylight

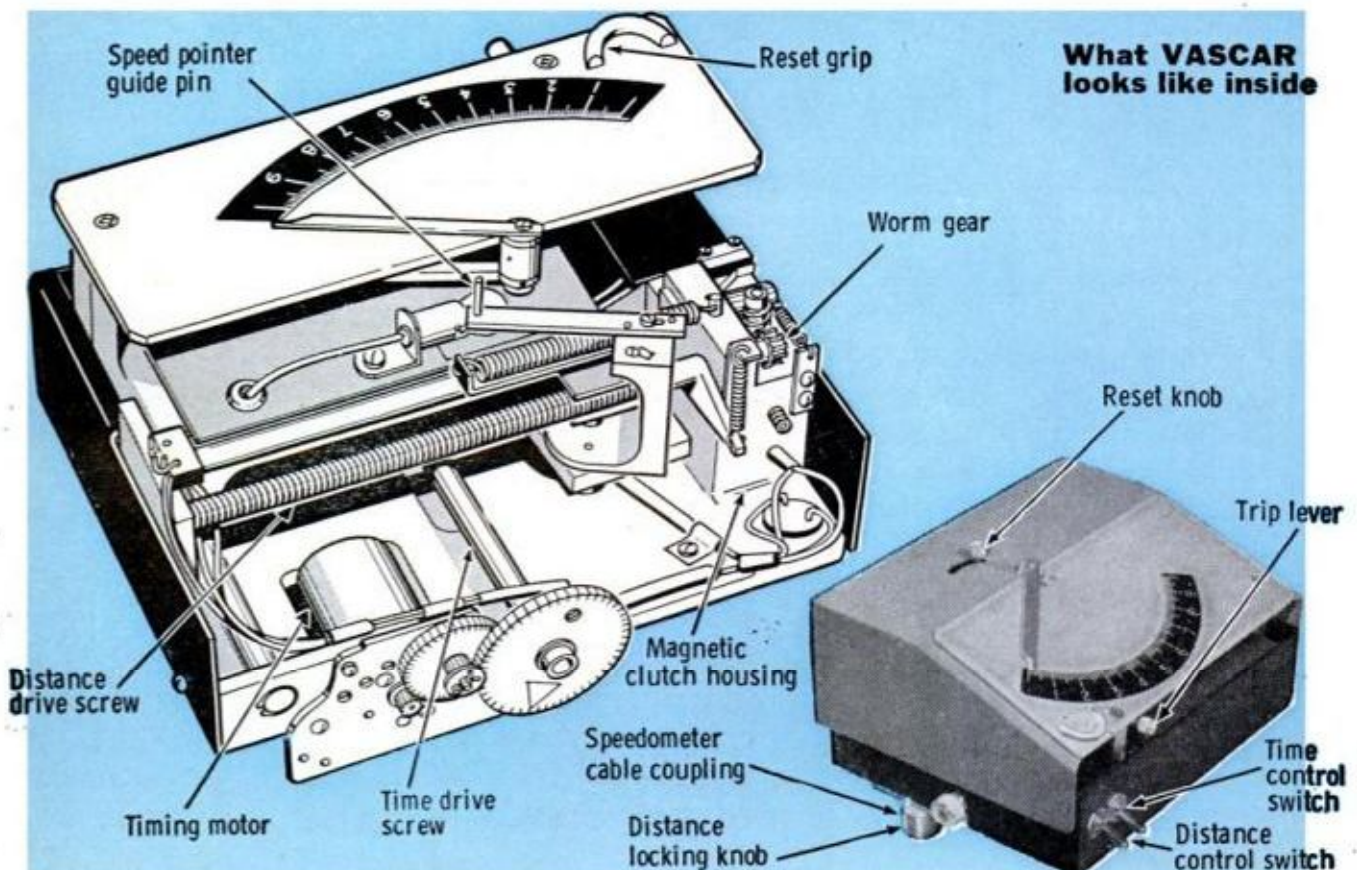
or darkness and in wet or dry weather.

This amazing versatility makes it possible for the policeman to measure instantly the speed of virtually any car he sees on the highway. The officer need not park, as he must do when using radar, and he need not set up any equipment in advance, as he must do when using a road timer. He can continue on routine patrol, devoting his attention to all the dozens of other details that occupy an alert officer, yet be ready instantly to measure the speed of any car he sees.

Also, he does not need to chase a suspected speeder at high speed, sometimes zigzagging dangerously through dense traffic, to get close enough to clock the car with his speedometer. With VASCAR, the speed of the police car when the "target vehicle" is clocked is unimportant.

The policeman may be driving fast or slow, he may be driving in the opposite direction, or he may be parked beside the road!

What does this mean to you, the "average driver"? Simply that *any* police car you see (not to mention the





ones you don't see!) may contain a VASCAR unit which is measuring your speed!

How does this device work?

There's really no magic involved, merely the clever application of a simple scientific principle: The speed of a moving object is determined by the *time* required for the object to travel a given *distance*. If you have a means of measuring this time and distance, you can compute the speed of the moving object. This, in a nutshell, is what VASCAR does. It measures a given distance along a road and the time it takes for a "target vehicle" to travel that distance, then instantly computes the speed of that vehicle and puts it on a dial.

The VASCAR unit is coupled to the police car's speedometer cable, so the police car is used to feed distance information into it. Time is measured with a governed electric motor inside the unit. Once time and distance information are both in the unit, a simple mechanical linkage controls the movement of a pointer which indicates the speed on a dial on the face of the machine.

We'll get into the mechanical details shortly, but first, let's watch VASCAR in operation.

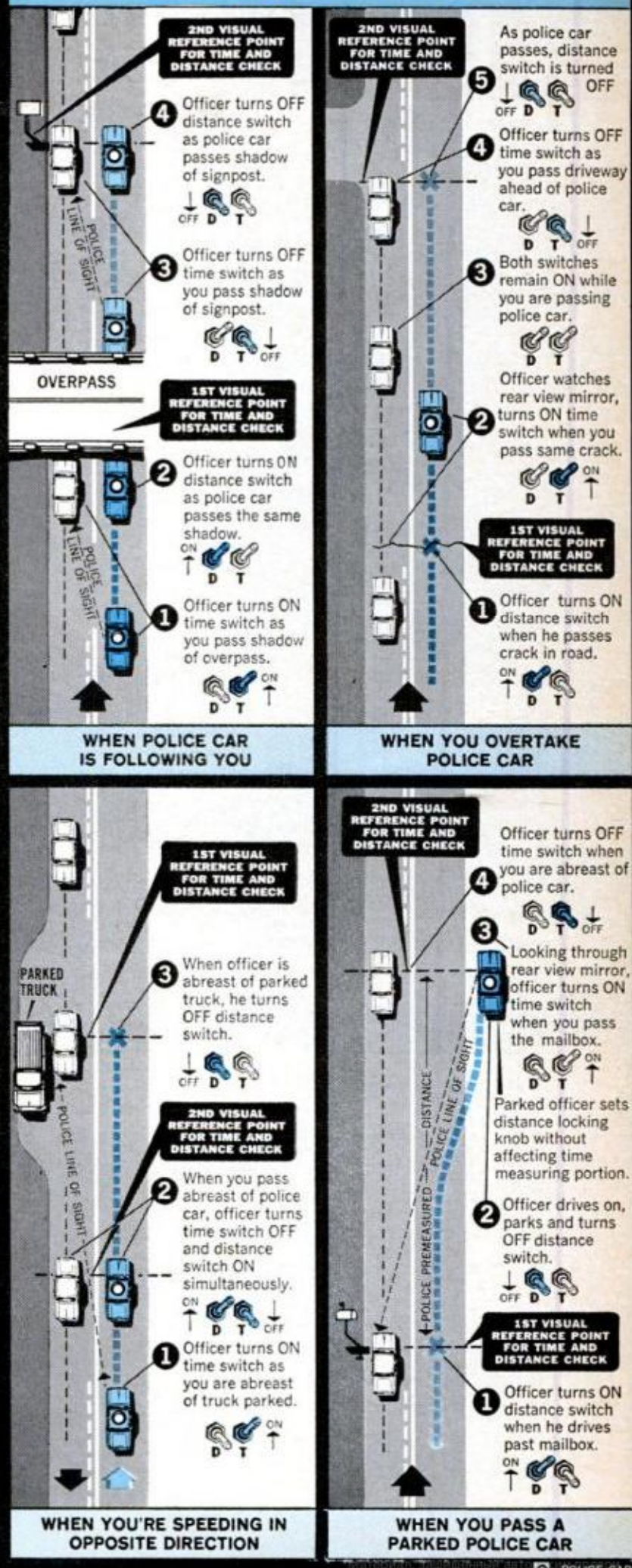
I rode with Patrolman George Schuck of the Arizona Highway Patrol. Here's what happened:

North of Phoenix on Interstate 17 traffic was light, but moving briskly, with most drivers close to the 70-mph speed limit. Far ahead, George spotted a green Chevy coming toward us at a fast clip. George did not prepare to turn around to follow the suspected speeder, as he would have done if he was going to clock the driver with his speedometer. Instead, he continued northbound,

(Please turn to page 181)

AUGUST 1967

## HOW POLICE USE VASCAR TO COMPUTE YOUR SPEED



POLICE CAR



# LIGHTNING IS AS DEADLY AS EVER

POSITIVELY  
CHARGED  
RETURN STROKE

*Each square mile of the United States is hit 30 to 40 times a year; 500 people are killed and 1500 maimed. Lightning never strikes twice in the same spot? That's a dangerous myth.*

*By James R. Berry*

*Illustration by Ed Valigursky*

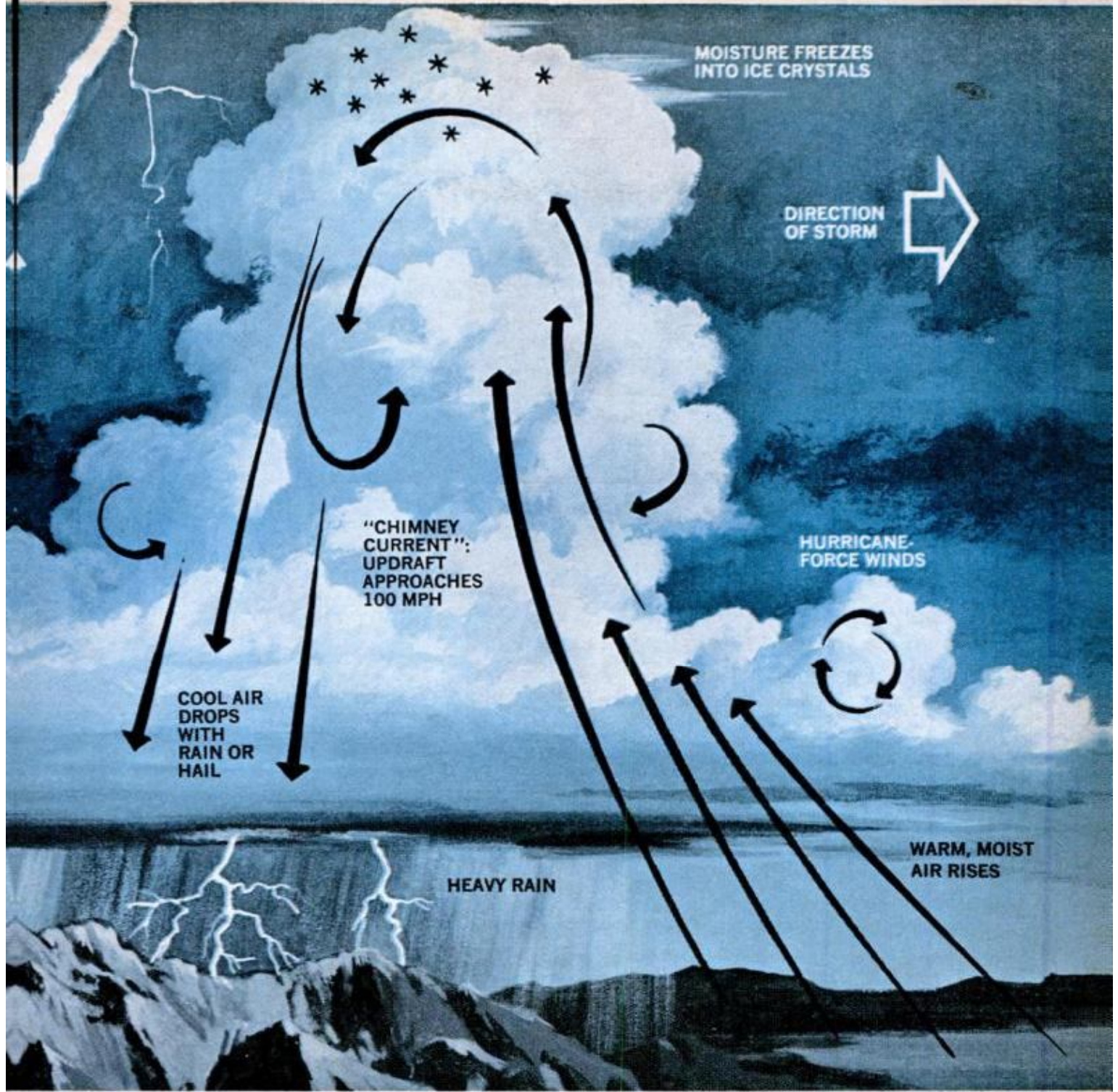
**T**HE FOUR MOUNTAINEERS reached the tip of British Columbia's Bugaboo Spire just as the raging thunderstorm struck. Suddenly, an eerie blue fire crackled from their fingertips and the heavy, sweet smell of ozone spread through the air. Then, accompanied by a deafening roar, a lightning bolt stabbed down among them. Final toll: two killed, one seriously burned, one stunned.

• Horrified, Mrs. Barney Conway, an

Illinois farm wife, watched as a grapefruit-sized luminescent orb floated out of her fireplace and hovered over the kitchen floor, glowing like the arc of a welder's torch. The fireball wafted out an open door, climbed a stone wall, and entered the barn. There, it exploded with a cannonlike crack. Later, when Mrs. Conway doubted what she had seen, she took another look at the burned ruins of the barn.

• With a blinding blue-white flash, the





**HOW MANY LIGHTNING STROKES WILL HIT YOUR LOCALITY THIS YEAR?**

DIFFERENT PARTS of the country are struck more often by lightning than others. The zone map (right), based on U.S. Weather Bureau figures, shows the number of storms per year in any region. If you're halfway between one zone line and another, take the average of the two to calculate how many thunderstorms hit your area.

In general, the number of lightning bolts to strike each square mile a year averages out to one or two times the number of storm days as shown on the map. For instance, if you live in Denver, you're subject to 50 storms a year. So, each square mile of your territory will be rapped with from 50 to 100 lightning strokes yearly.





lightning bolt exploded a tree, plowed a two-foot-deep furrow to the house 50 feet away, punctured a saucer-sized hole through the 13-inch concrete foundation, sped along the house wiring and shot out of the TV screen of Mr. and Mrs. Conrad Larsen of Lubbock, Tex. On its way to the fireplace across the room—where it followed the brickwork to the ground—the stroke passed into Mr. Larsen's chest and out his back, killing him instantly.

These incidents are just three among thousands that demonstrate the destructiveness of what is among nature's most awesome and capricious forces—lightning. Each day an estimated 44,000 thunderstorms rage over the earth, bombarding it with about nine million lightning strokes. On the average, each square mile of the United States is yearly rapped with 30 to 40 strikes that, all told, kill about 500 people, maim 1500 more, set hundreds of forest fires, and destroy \$100 million worth of property. These figures make lightning nature's worst natural calamity.

The origins of a lightning stroke can be traced to billions of tiny ice crystals. On a hot summer day, powerful thermal

updrafts carry tons of water into the sky. This moisture condenses, then freezes, often forming billowing thunderheads that sometimes stretch 50,000 feet into the air. From afar, such clouds present a serene picture of quiet, majestic beauty. Inside, they're swept with hurricane-force winds that include a violent updraft, or chimney current, that rips aloft at speeds approaching 100 mph.

This powerful chimney current is what separates positive and negative charges. Theories about the exact method differ, but one explanation is that countless splinters of positively charged ice crystals are swept to the cloud's top. Negatively charged hailstones remain or fall to the cloud's base. When thermal updrafts are weak—during a day-long drizzle and winter months, for instance—few ice splinters are hoisted aloft and the cloud produces little or no lightning.

As the cloud's negatively charged base scuds across the sky, a corresponding positive charge on the ground follows it like a shadow, creeping up trees, houses, church steeples and other objects, then flowing out again as the

**CHARGED CLOUD** often releases more than one bolt at a time. But one stroke usually carries most of charge

**SPECIAL CAMERA** reveals that this huge bolt—seen by eye as single flash—contains seven distinct strokes





## HOW TO PROTECT YOURSELF DURING A THUNDERSTORM



### AT HOME

If your house is equipped with lightning rods, there's little danger of a stroke demolishing it. However, lightning can side-flash to wires or pipes and reach you through these routes. Stay clear of ranges, sinks, telephone and electrical equipment and open windows and doors during storms. If the house lacks lightning rods, stay out of the attic and away from fireplaces. Chimneys and TV antennas invite bolts. If your TV antenna isn't grounded, at least get this done.

### OUTDOORS

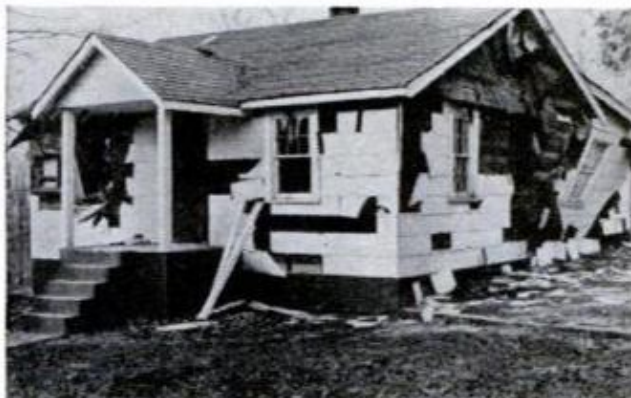
The safest shelter in a storm is a car; it's grounded. Good protection is afforded by large structures—houses and large barns. A grove of small trees in which larger ones are growing offers fair protection, but stay near small trees. Don't get near isolated trees, poles, small sheds or small barns. If no shelter is available, stay off hill-tops and out of open fields. Look for a gully or base of a cliff. When lightning begins to strike nearby, fall flat. Better muddy than dead.

### ON WATER OR AT SEASHORE

Get out of water when a thunderstorm nears. A lightning stroke 500 yards away can electrocute swimmers. Seek shelter away from the beach, where you are likely to be the highest object around. If you're in a small boat, head for the shore. Larger craft equipped with lightning rods are safer provided you get off decks and into the cabin. In an emergency, any boat can be protected by connecting a copper wire to the highest piece of metal and letting the wire trail overboard.

cloud continues on. If this positive charge is strong enough, it may break down molecules of air, causing a bluish halo to glow and crackle over the tips of trees, spires, wind vanes, ships' masts and even blades of grass and fingertips. Technically, this halo is called a corona discharge; it's more popularly known as St. Elmo's fire. Planes winging through a charged cloud often experience St. Elmo's fire around their wing, tail and propeller tips.

**COLD LIGHTNING** blasts trees and buildings with explosive force. Hot lightning destroys by setting fires



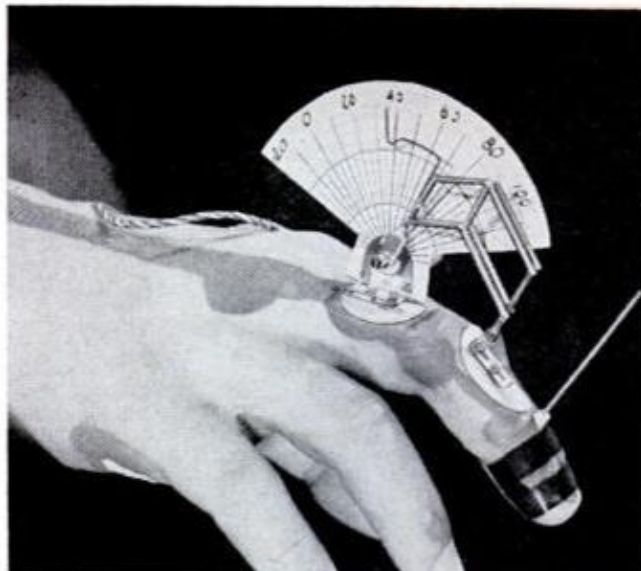
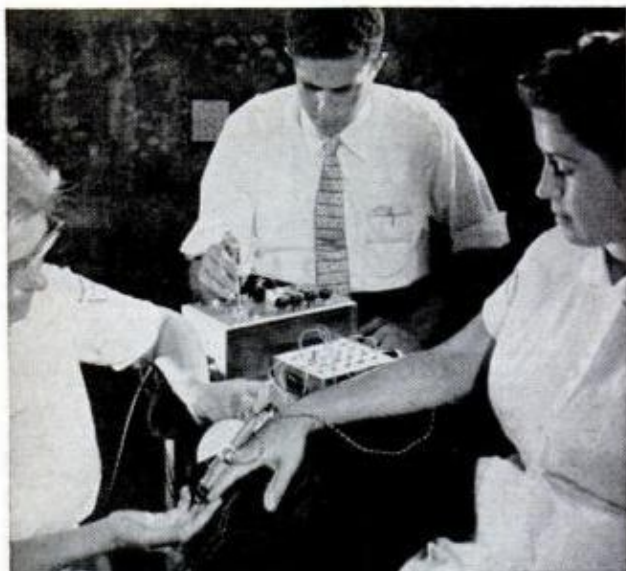
Lightning strikes when the electrical potential between top and base of cloud—or between cloud base and earth—reaches 10 to 50 million volts. In the tropics, where thunderheads somehow form higher off the ground than elsewhere, about 90 percent of lightning bolts occur within the clouds; in the United States, intra-cloud lightning accounts for only 40 percent of all bolts. In the remaining cases, the stroke heads toward earth, starting as a thin arm of a charge called a stepped leader that, like a serpent's tongue, flicks down 30 to 100 yards from the cloud's bottom.

There, the stepped leader hesitates about 50 millionths of a second while more negative charges drain into it, then darts down again. Descending in hesitating, zigzag jumps, the stepped leader branches out, probing for the easiest electrical path to earth and leaving a channel of conductive, ionized air in its wake. Positive ground charges as far as 10 miles away begin to concentrate under the descending stepped leader, often erupting in thin, 5 to 50-yard-high corona discharges called streamers. About three or four hundredths of a second after it first dipped out of the cloud, the stepped leader touches either a streamer or the ground. When it does, all hell breaks loose.

Like a torrent from an opened flood-

*(Please turn to page 186)*





## 'Wiggle meter' explores the workings of a hand

By understanding muscle activity in a healthy hand, doctors can learn what's gone wrong in a hand crippled by arthritis, polio, or a stroke. The wiggle meter, officially called an electrogonometer (ELGON for short), records muscle movement in a good hand and fingers. Tiny electric impulses, generated by muscle movement, are transmitted to charts through very fine wires that are inserted into the muscles of the hand for the tests. Comparing these responses with those of a deformed hand, doctors hope to pinpoint the problems. Three researchers at Case Institute of Technology designed the wiggle meter.



## Helicopter sight

Through this periscope, which is stabilized by a gyroscope, an observer in a helicopter can scan the ground, zero in on a target and direct missiles. Manufactured in France, it's called Gyrostabilised Visor 260. Nonmilitary uses include land-sea searches and helicopter control of ground traffic. The periscope can be fitted with two lenses—2½ and 10 power.



## Moving chair

A power-operated chair can carry its occupant almost anywhere—upstairs, downstairs, across the room and along a sidewalk. Developed by Alois Steiner of Union City, N.J., the stair-climbing chair is powered by two 12-volt batteries. It weighs 150 pounds and is 19 inches wide and 58 inches long. The seat levels automatically no matter what the terrain is.



TURBINE POWER awes both fans and rival drivers as Parnelli Jones charges by on the outside seconds after the start of this year's Indianapolis "500"

AUTOMOTIVE



# The 'Big' Engine That Almost Did

By BILL KILPATRICK, Auto Editor

HERE WAS A. J. FOYT, apparently three laps from a frustrating second-place finish, sweeping out of No. 4 turn and into the main straightaway. Ahead and to his right the mob was on its feet, roaring. Foyt glanced left and grinned like a winner.

Parnelli Jones, at the wheel of the revolutionary STP-Paxton Turbocar that had leisurely dominated the race all the

way, was coasting slowly into the pits — done, finished, out of it.

Foyt shot his right red-gloved fist aloft and waved it like a lasso as he slammed down the straight. It was all his, his third "500," and victory was never sweeter.

He dodged through a last-minute four-car pileup and went on to take the checkered flag, adding still more grist to the



Foyt legend mill. Yet his victory—with a plot rivaling the corniest melodrama—isn't what railbirds will be telling their grandchildren about when they describe the 1967 Indianapolis 500-mile auto race. Aging voices will repeat to the point of boredom tales of being on hand the day a magic car made Tootsie Toys out of the competition and a shambles of 70 years of racing tradition.

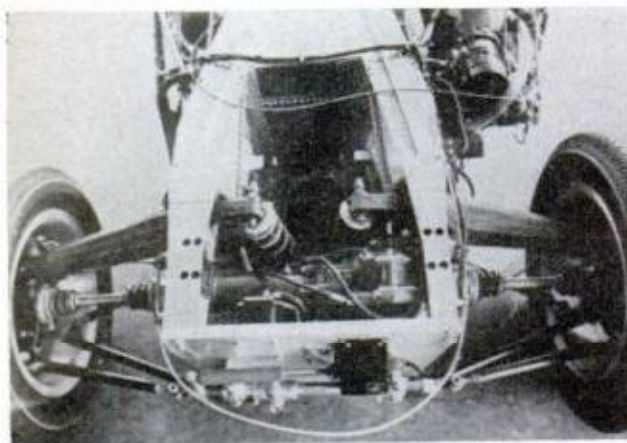
For Jones's turbine-powered STP Oil Treatment Special did just that. Rules, arbitrary and makeshift at best, may keep turbocars off racetracks for a year or so, but the eventual domination of the turbine engine is a certainty.

Starting on the outside of the second row, Jones swept by leader Mario Andretti coming out of No. 2 turn. Andretti later told reporters that when Jones whooshed by, his only thought was, "Parnelli, what took you so long?"

Weeks before, Andretti had said that if the turbocar held together, "... the rest of us will be racing for second place." And, with the exception of Foyt taking over the lead for a few laps while Jones was either in the pits or thereafter catching up, that was the story of the race. Like the kingdom lost for want of a nail, only the failure on the 197th lap of a \$6 ball bearing in the drive train kept Jones and STP's Andy, Vince and Joe Granatelli (of bug-plagued Novi Indy fame) from making a walkover of the whole show.

Key to the car's dazzling perfor-

*Photo, page 69, by Bob Doeppers*

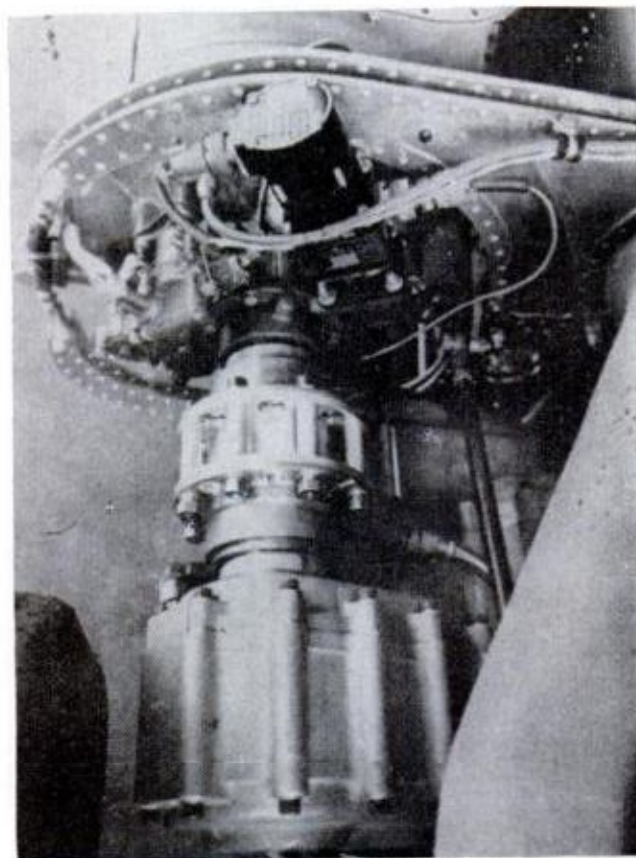


**COIL SPRINGS** of STP-Paxton Turbocar are located inboard of monopost frame. Suspension A-arms have airfoil cross sections designed to reduce air drag

mance is, of course, its Pratt & Whitney ST6B-62 gas turbine engine, made by United Aircraft of Canada, Ltd. The engine, designed for industrial use, develops 550 shaft hp at slightly over 6200 rpm, giving the 1750-pound car tremendous acceleration, particularly out of the turns and at the top of the stretches. Jones himself, winner of the 1963 "500" and no stranger to speed, expressed surprise at the car's hustle.

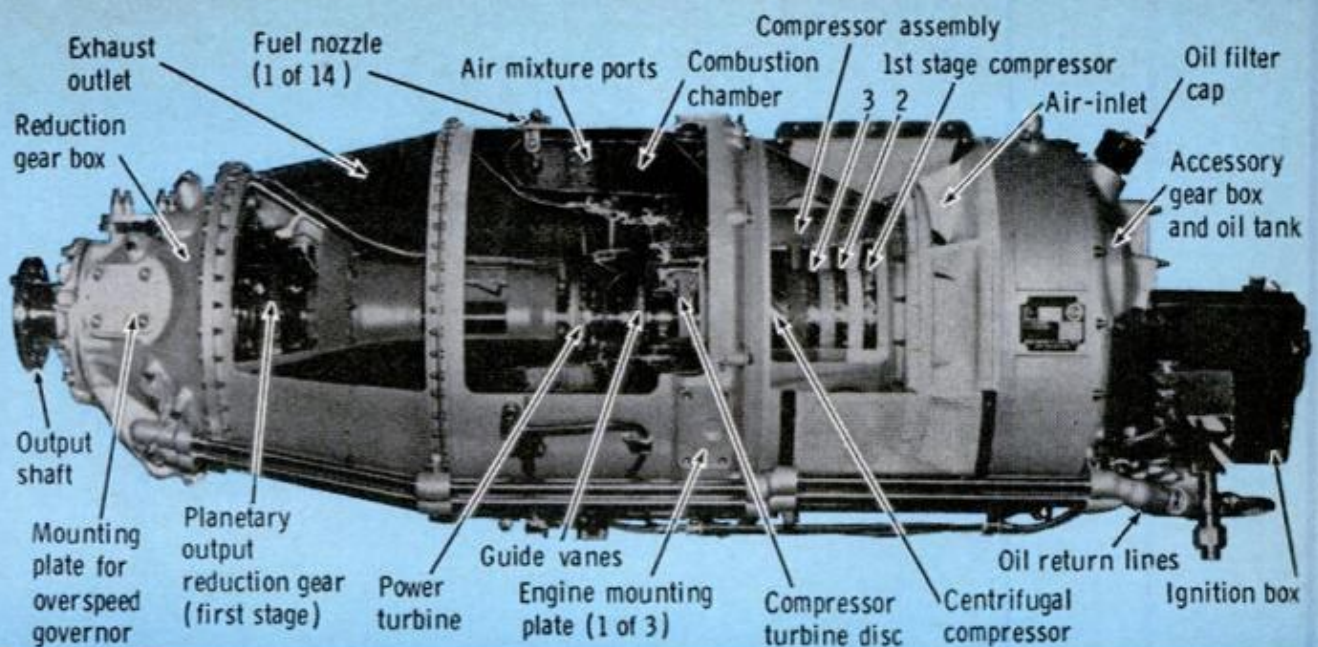
"I honestly had no idea it would be that easy," he said after rain halted the race at the end of the 18th lap. (It was resumed under sunny skies the next day, the cars starting the 19th lap single file and in the same order in which they were running when it was stopped. During the course of what Jones called the rain-shortened "first heat," he hit a record lap speed of over 164 mph. Throughout the race, the Speedway public-address system kept announcing that yet another Indy record had fallen before the car's onslaught.

In operation, a gas turbine takes the exhaust gases of a jet engine and con-



**GEARBOX** is coupled to turbine output shaft just in front and inboard of left rear wheel. Box splits torque, provides limited slip action to all wheels



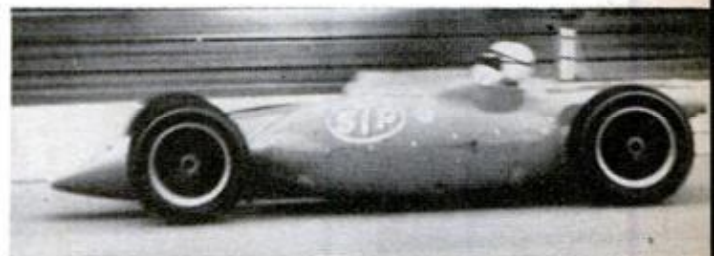


**CUTAWAY OF ST6B-62** gas turbine shows simplicity of construction. Air inlet duct is screened all around to prevent intake of track debris. Engine has comparatively few moving parts, can run at speed for hours

verts them to energy to drive a turbine wheel connected to an output shaft. In the turbocar, this shaft goes into a transmission from which power is fed to either two or four drive-wheels. Air enters the engine through an intake duct and goes through four stages of compression, much like a supercharger. The air is highly compressed, has fuel injected into it, is ignited by a glow plug, and the resulting combustion drives the output turbine, the output shaft, the transmission, and—eventually—the wheels. Only “eventually”—as Jones proved whenever he chose to tromp on it—can be *right now!*

In addition to instant acceleration, lack of which, incidentally, was one reason why Chrysler abandoned its turbine-car program, the STP car offers relatively trouble-free operation. There is little if any work to be done on the engine—no plugs to foul or burn out, no valves to break or swallow, no need for delicate carburetor adjustments or fussy fuel formulas, no ignition to break down once the engine is started. In fact, in the aircraft version from which the ST6B-62 is adapted, the 262-pound engine is certified to run 1000 hours between overhauls.

With the turbocar’s many obvious advantages and its track-proven ability



**AT SPEED,** turbocar creates little noise, passes by with a soft “thoomp.” Drivers wisecrack car should have a horn that Jones could toot as he zips by

to leave its competition in the dust, it would seem the handwriting is on the wall for the time-honored Offys and the Johnny-come-lately Fords. Despite the present expense of such a car and the possibility (as this is being written, one day after the race) of it being outlawed, you can bet Indy-minded car and engine builders—including Ford—have engraved on at least one part of their dreams the motto, “Think Turbine.”

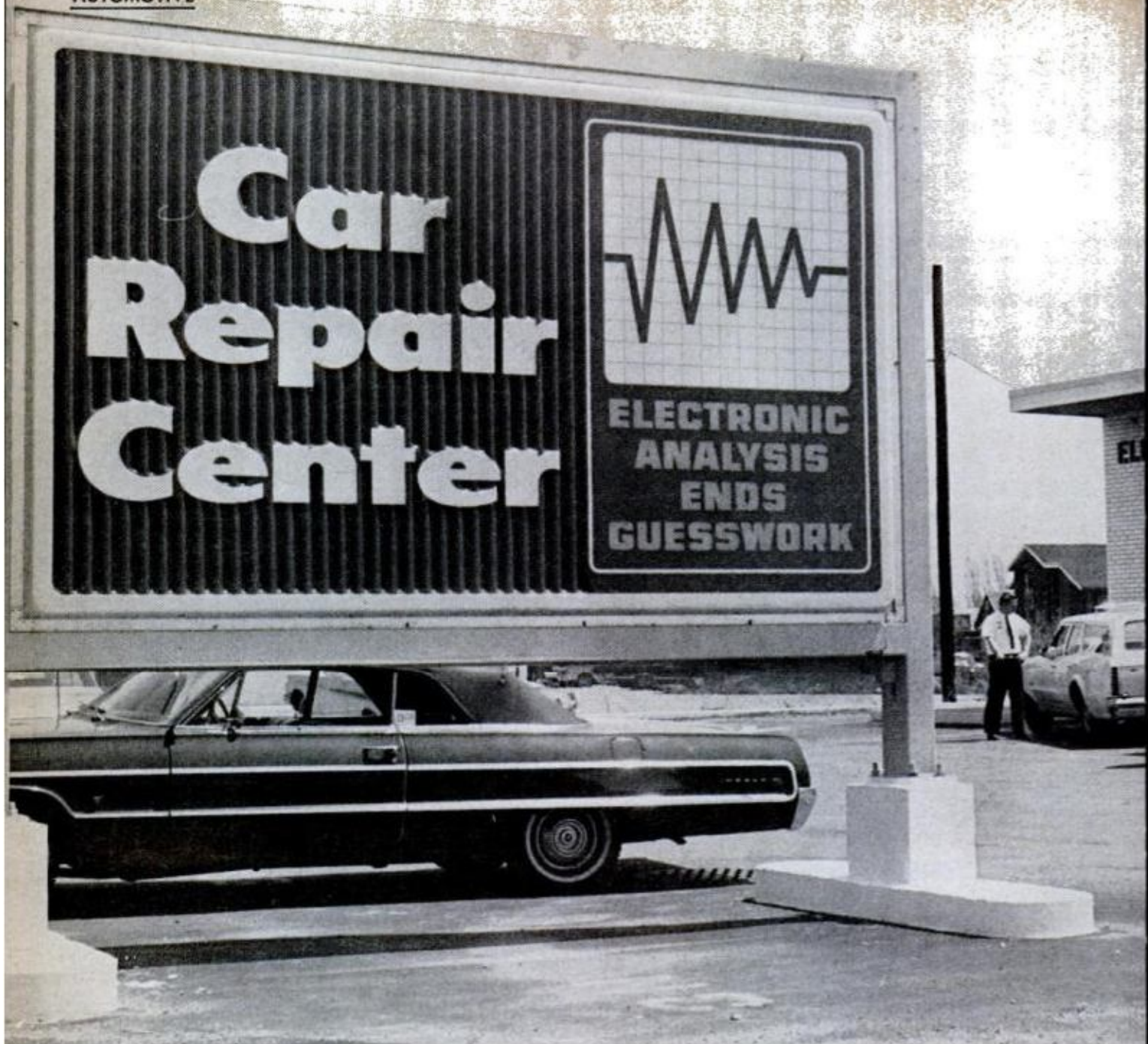
Drivers, too, will fall in line as turbine-powered thinking begins to dominate race-car planning.

What may have been the wriest comment on the turbocar was made by Dan Gurney, in a comfortable second place when rain halted the race at 18 laps. (The next day, Dan went out with an ailing engine on the 170th lap.)

“Well,” he said, “at least I’m leading my class.”

★★★





# Those Fancy Diagnostic Centers: are they really better than Joe's Garage?

By E. D. FALES JR.

Photos by Robert Borst

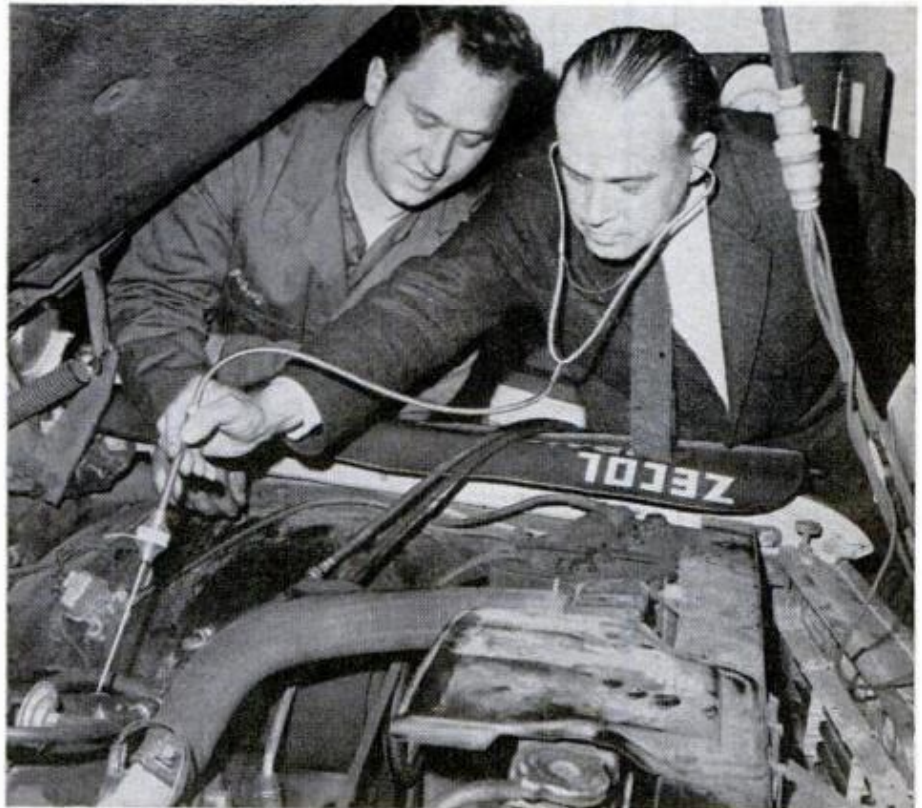
**C**AN THOSE NEW CAR DIAGNOSTIC CENTERS really do a job for you? Should you consult one before you buy that used car? Can they find bugs a dealer can't find? If there's trouble in your present car, can they do a better job than your corner mechanic? Or are all those dynamometer rollers and gauges, oscilloscopes, stethoscopes and





**ON THE MOBIL ANALYSIS LANE**, Bob Borst's Pontiac is tested with wheels turning at 60 mph. One technician operates control while a second reads meter

**LISTENING TO AN ENGINE WITH STETHOSCOPE**, the author learns to distinguish the sound of valve tappets and pump bearings from sound of the engine



electric meters just a lot of come-on that dazzles but does little else?

To find out I spent several weeks visiting diagnostic centers—from little fellows who have only a few gadgets to huge ones like those run by Mobil, Shell and Humble. I visited a bustling J. C. Penney center and the splendid new Ford center in Dearborn. I even found a VW place that offers periodic free diagnoses conducted by visiting specialists.

I didn't "bug" any engines or set any traps. But for several days photographer Bob Borst brought along his ailing '64 Pontiac (30,000 miles) to see what the men in white coats could tell him that his corner mechanic couldn't. I even took my brand new F-85 wagon, in near-perfect condition (4500 miles), to see if they'd find anything wrong that wasn't. To my surprise, it took one diagnostic center only 25 minutes to run up a list of \$29 worth of things wrong—small things and *really* wrong.

So right off the bat I made two discoveries: The diagnosticians can find things you don't even suspect are wrong. So expect to spend money





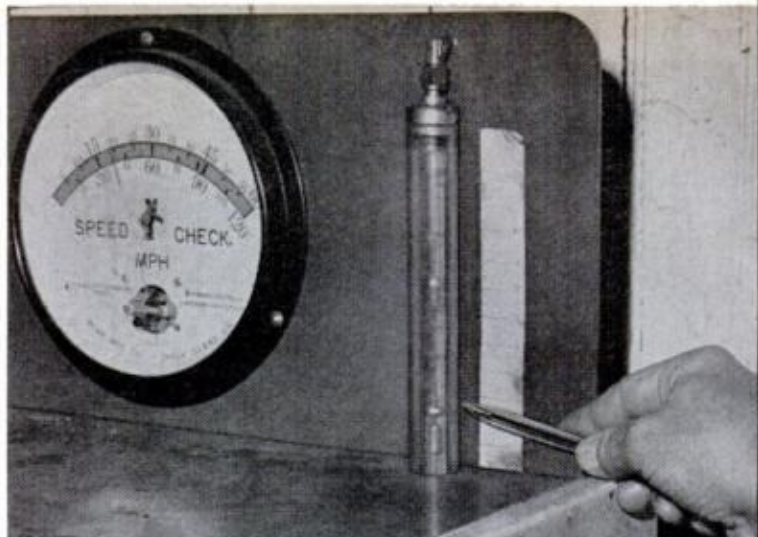
**CHECKING SPARKPLUGS** can be done at all speeds while the car stands still. Oscilloscope, above meters, indicates the plugs' firing characteristics

if you visit a diagnostician, but more on this later.

There are now 100 big centers coast-to-coast and more coming. Even department stores are getting into the act. In addition, there are big independent centers, and probably several thousand small garages, that are adding one or two bays and calling themselves diagnosticians.

You may pay from \$6 to \$15 for an engine analysis, and \$9.50 to \$25 for a 30-minute clinic on the whole car. For \$9.88 J. C. Penney gives you a "225-point check," even finds rattly windows.

So great is the demand—due to the

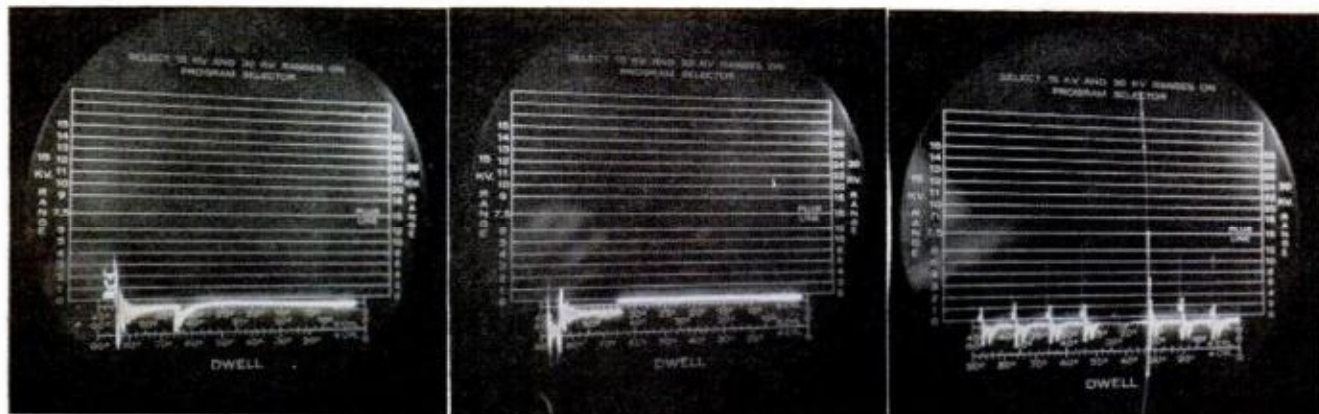


**TO CHECK GAS MILEAGE** at any speed, tester revs up the engine, reading speed on the meter and mpg on scale (by ball lifted by the fuel flow)

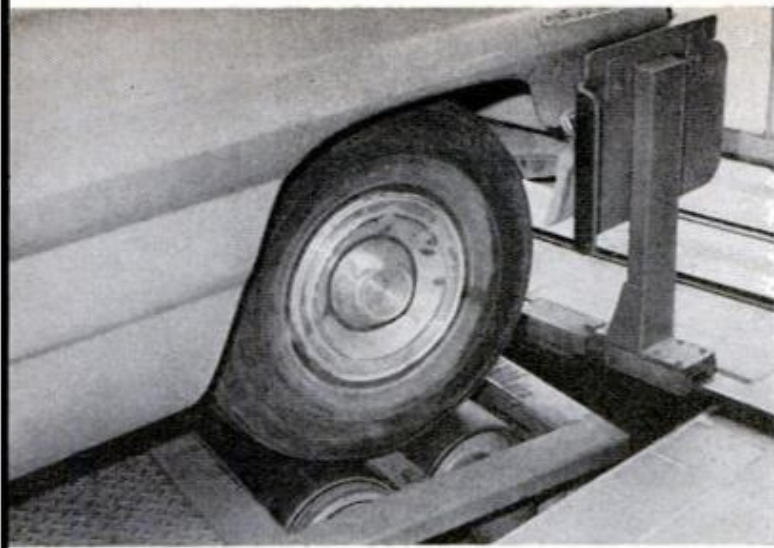
shortage of good mechanics—that most centers now work "by appointment only." How long before you can get an appointment? Even though the huge Mobil Center at East Meadow, L.I., works from 7:00 a.m. to midnight you'll wait eight weeks! Others have long lists, too. I expected to learn (and did) that many customers are people with new cars who say they can't get good mechanical work from their dealers. But what astonished me was the discovery that some dealers themselves, unable to get good mechanics, now secretly take the customer's car to a diagnostic center, then bring it back and fix it!

And many used-car buyers now spend \$9 or \$10 to check a car before they buy. One garage man himself recently took *four* used cars to a diagnos-

**READOUT ON OSCILLOSCOPE** shows weak plugs indicated by the fuzzy firing lines (left), good dwell angle indicated by the sharp horizontal line (center) and shorted or cut wire by the vertical streak (right)







**FRONT-WHEEL ROLLERS** check car's front-end alignment. Any problems in toe-in, camber or caster can be detected for each front wheel individually

tecian before he found one he wanted.

The first center we visited was small, but busy. It served no coffee, had no palm lounge with hi-fi, no receptionist to hear your troubles like an admitting nurse. This was Emil Polce's old and trusted neighborhood garage in Hartford, Conn. Emil put in two electronic bays—one for engine, one for wheels, brakes — and now he's swamped with drivers from 100 miles around.

Young Tom Polce, smiling, businesslike, took charge of photographer Borst's ailing car. Bob had driven 120 miles to get here and at times he thought he wouldn't make it. His engine bucked and smoked. To get up hills he had to race it. I tried it. The transmission felt shot. Even to start on the flat I had to rev up hard. Oil spurted out of the fill pipe and smoked on the manifold.

Tom Polce nursed it inside the big garage and put its rear wheels on a couple of steel rollers. He raised the hood, reached in with a handful of test wires and clipped them to eight points. He detoured the gas line through a special testing cabinet and back to the carb. Everything was hooked to ammeters, voltmeters, pressure meters and an oscilloscope.

When he started the engine he began pressing different buttons on two

AUGUST 1967



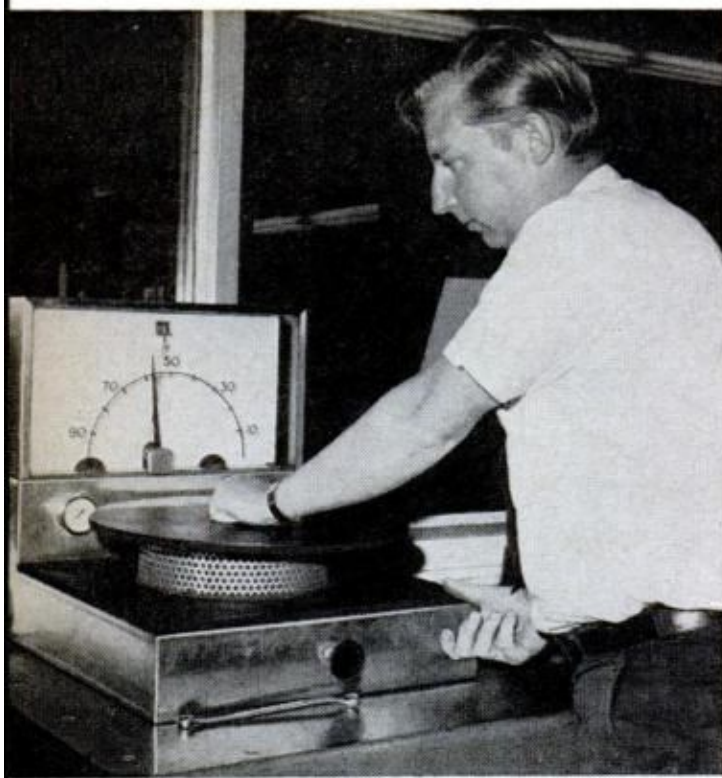
**DIAGNOSTIC-CENTER TECHNICIAN** records meter indication of front-end alignment information. Such readings make an accurate cost estimate possible

test consoles. Various electric meters sprang to life. A steel ball bounced around in a glass gauge and told how many miles per gallon Bob gets. A livid green line flashed across the oscilloscope, reading the voltage waves for

**REAR WHEELS** are brought up to rpm equivalent of 60 mph on the road, and the rear hub is "felt" for excessive vibration at the Polce garage







**QUICK CHECK OF AIR CLEANER** is performed on a device that pumps air through it and gives a pressure reading indicating efficiency of the cleaner

plugs, cylinder balance, distributor, coil, condenser, primary and secondary system wires. Tom kept looking for *bad* waves that showed where resistance was too high, and found a few. He made notes.

Then he got in and tramped the gas pedal hard. The rear wheels spun on those steel rollers at 40, 60 and then 90 mph. I sat in the car with him. It shook and roared. Tom shouted: "The trouble with the average garage is they can't test *under load*. That's when things change. But I can run up hills and down at all speeds." He held a remote-control button. He pushed it. "That puts brakes on the rollers. Now she's *really* working." At this, some of the waves on the oscilloscope changed, showing that cylinders seven and five weren't putting out under load.

The oscilloscope lighted up. When points are badly burned, a certain green spot flashes on the scope. None appeared. So Bob's points weren't badly burned. If the distributor had a bad cam, the bright green line—the dwell line—would move around uncertainly. It held firm. If the high-tension line

and coil were in trouble, one green line would lose its curve. There was no indication here of line trouble. But each cylinder *did* check in with a different test pattern, indicating different performance.

Then Tom put on his stethoscope like a doctor and listened to the patient's murmurs. He needled a metal listening probe against the engine head near valves, tappets, lifters. He let me listen. I heard for the first time the wonderful inner music of a working engine. The valve tappets made a loose musical sound like marbles. We began checking bearings. They made different sounds. "If anything's wrong you'll hear one banging," Tom said. But the distributor throbbed musically with a beat like a heavy truck engine. "You're hearing the points turning on the cam," Tom said. The power steering front bearing went "chumm-chumm-chumm." Nothing was banging. I sensed that Bob still had, basically, a darn good engine.

Forty minutes later Tom handed us a check sheet and told us his diagnosis:

"Wash your air cleaner. Clean carb. It's sending unevenly to the two sides

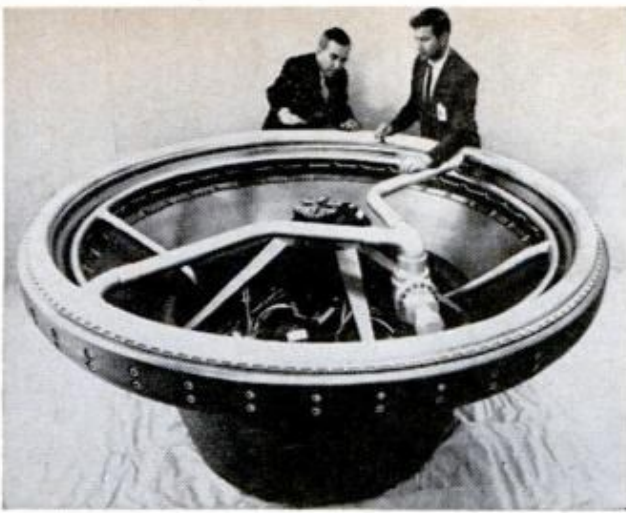
*(Please turn to page 192)*

**POST-CLINIC CONFERENCE** between car owner and diagnostician reviews the car's condition and the cost estimate for necessary repair and adjustment



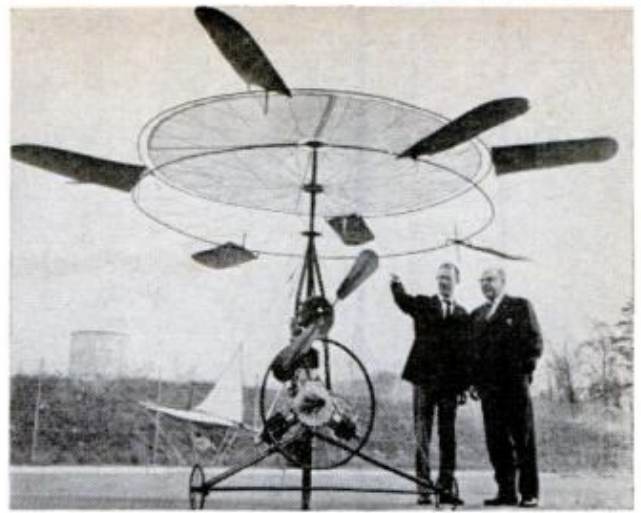
**POPULAR MECHANICS**





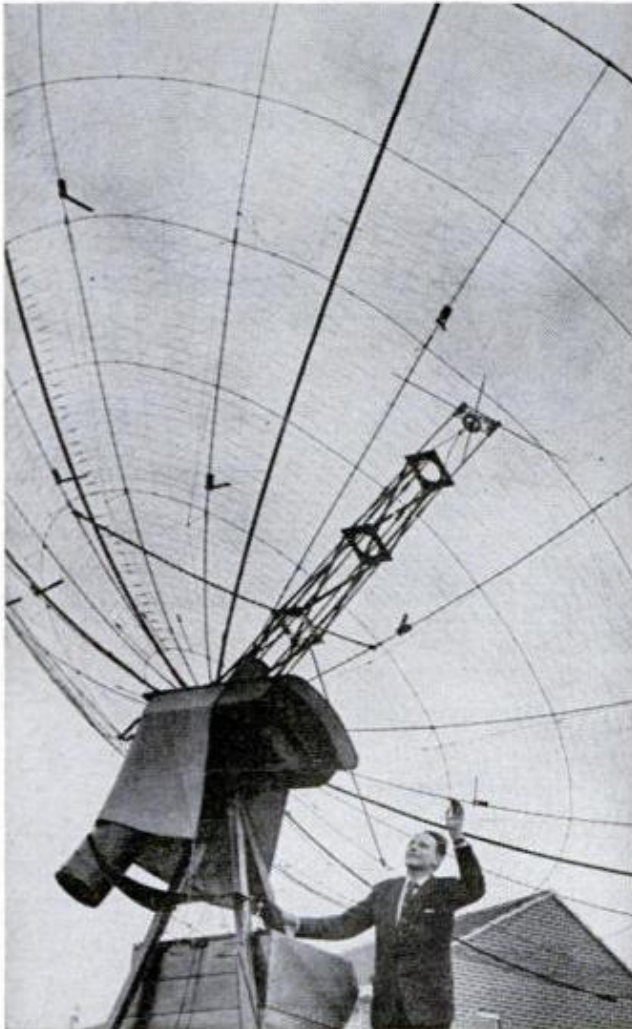
## Ring of fire

The doughnut-shaped combustion chamber of a new rocket engine concept—the Aerospike—sends a ring of flame downward around a center cone. The model is of an engine expected to produce 250,000 to 400,000 pounds thrust.



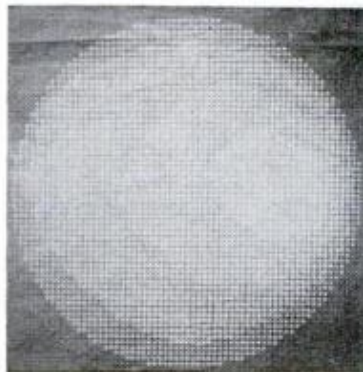
## Oldest helicopter?

The Danes claim it is. A recently opened exhibition in Elsinore, Denmark, featured this coaxial helicopter which Danish designer Jacob Ellehammer is said to have flown a few feet off the ground in 1911.



## Constructs radio telescope in his back yard

An amateur astronomer in England, at a cost of less than \$2000 plus 7000 hours of spare time, has constructed a radio telescope that measures the energy level of an area of the sky, translates the meter readings into a series of spots, then photographs them to create a picture. The two smaller photos above show one of his radio telescope photos (left) in comparison with an optical telescope's picture of the moon.





# TEST YOUR MECHANICAL APTITUDE

By Mort Schultz

**J**OHAN C. WAS ON HIS WAY to the top. His boss, president of one of the country's largest banks, said so and was about to back up his prediction with a promotion.

That's when John quit. After four years of financial education and a few years of on-the-job training, John finally faced facts: He hated banking.

He sought help from the Human Engineering Laboratory, an organization that tests people to uncover their latent talent and natural abilities. After a few sessions, he was told he had very high structural visualization and a subjective personality.

Huh? Well, it sounded like a page from Freud to John, too. Actually, all it means is that he possessed traits that were 180° removed from those which most successful (and happy) bankers possess; that his talents and aptitude were ideally suited for a profession in which he could use mechanical skills.

Only in his mid-20s and without the responsibility of a family, John returned to college and acquired a degree in engineering. He now holds a top position in a profession that challenges his abilities.

What about other people who find themselves in similar circumstances? How about you? Do you, for example, possess mechanical ability which you don't know about? Or, do you consider yourself a hot-shot mechanic because you can accomplish some do-it-yourself household chores?

You may be a young man in high school or college who is searching for a vocation. Maybe you now hold a job but don't feel particularly satisfied or challenged.

Whatever the case, if you have mechanical aptitude and can do something



**WIGGLY BLOCK TEST**, one of several that measure structural visualization, consists of several oddly shaped parts that will fit in only one way

about it, the world could be your oyster. There is a shortage of architects, surveyors, auto mechanics, plumbers, carpenters, machinists, electricians—in fact, there are openings in all fields requiring mechanical aptitude.

The tests in this article have been specially designed for *Popular Mechanics* by Johnson O'Connor, director of the Johnson O'Connor Research Foundation and the Human Engineering Laboratory. They will indicate whether you possess mechanical aptitude by testing you for a measure of structural visualization.

Structural visualization is the ability to visualize things in three dimensions—for example, the ability to look at a blueprint and picture the lines as three-dimensional objects. It is the one



ability that people who enter a field requiring mechanical aptitude should have.

However, let's make one point absolutely clear. Doing well in the tests offered in this article does *not* mean you should immediately switch your school curriculum or quit your job. It indicates you have a degree of mechanical ability. How much you possess cannot be determined by paper and pencil testing. And even if it could, there are many vocations and professions that require mechanical aptitude. Which one are you going to pick?

In other words, doing well in the tests presented here may encourage you to probe further. There are many organizations throughout the country which test people to uncover their abilities and recommend suitable positions.

You may find such a testing agency in a university in your area. There are also many private institutions. For example, as a guide, the locations of 11 Human Engineering Laboratories directed by O'Connor are listed at the end of this article.

Each testing organization has its own method. Under the O'Connor system, you would be tested for 19 separate and distinct aptitudes, among them, primarily, structural visualization and personality.

In seeking structural visualization, the Human Engineering Laboratory gives two tests: wiggly block and cube.

The wiggly block consists of oddly shaped, exactly machined parts that fit together in only one way. The person being tested is first given a six-part block. If he shows structural visualization, he is then given a nine-block test, and finally a 12.

This is a test against time. Putting the six scattered parts together correctly within 1½ minutes demonstrates a high degree of structural visualization—mechanical aptitude.

I was in for a shock. As the staff member put the assembled block on

(Turn page for test; more text on page 176)

## INSTRUCTIONS FOR TEST

On the following pages are four straight-line drawings. You are to try to make an exact copy of each, devoting 1½ minutes to each. You can refer to the drawing whenever you like and may erase. Use the worksheet adjoining each drawing. When you draw, every straight line may or may not pass through other dots on the way.

You will notice that one line has been drawn in on the worksheet. This is a reference line and appears on each of the straight-line drawings. This line is the only clue you have as to the size you're to make the drawing. The other lines of the drawing must be *in proportion* to the reference line. It is recommended that you use the reference line as a starting point to make your exact copy.

## GETTING YOUR SCORE

Note that there are four tests and each test consists of drawing eight lines. Thus, there are a total of 32 lines.

After taking all the tests, allowing 1½ minutes for each, add up the *number of lines* you drew absolutely correctly. Check this number against the table below. A perfect score is 32. Note from the table that aptitude varies with age. When young, aptitude begins to increase. It hits a plateau in the mid-20s and 30s; then, as you get older, it begins to decrease.

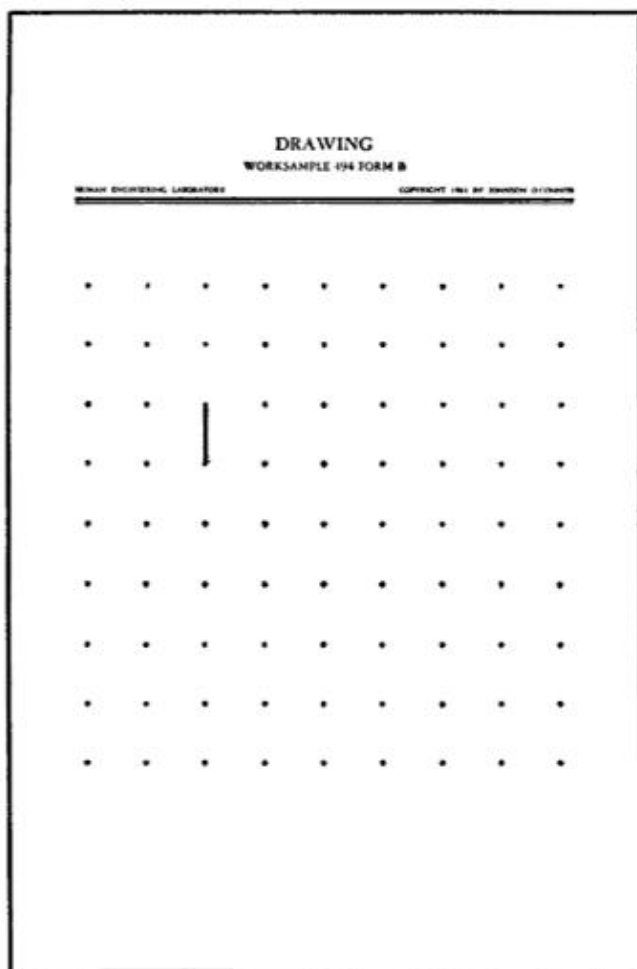
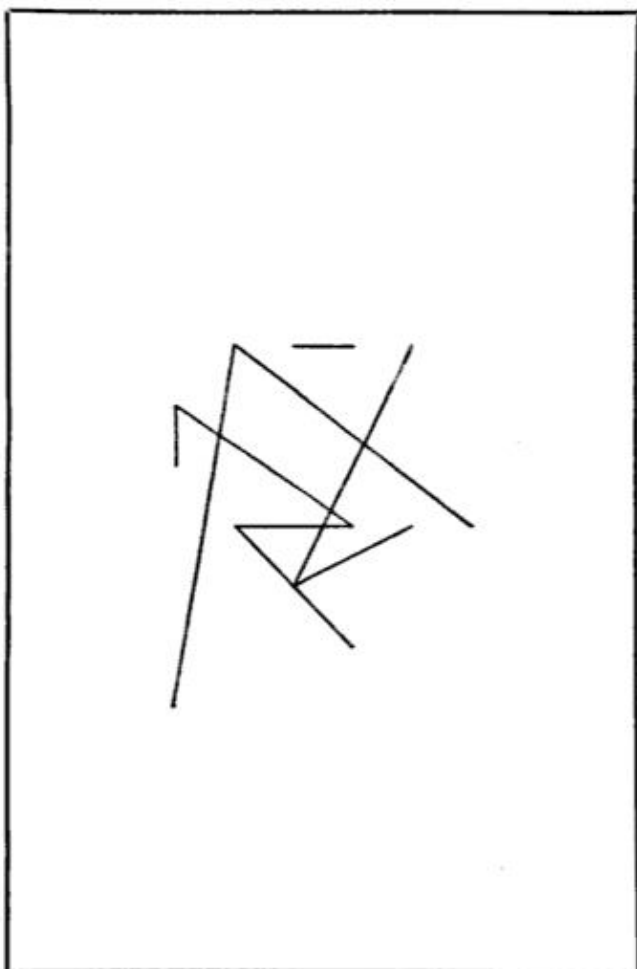
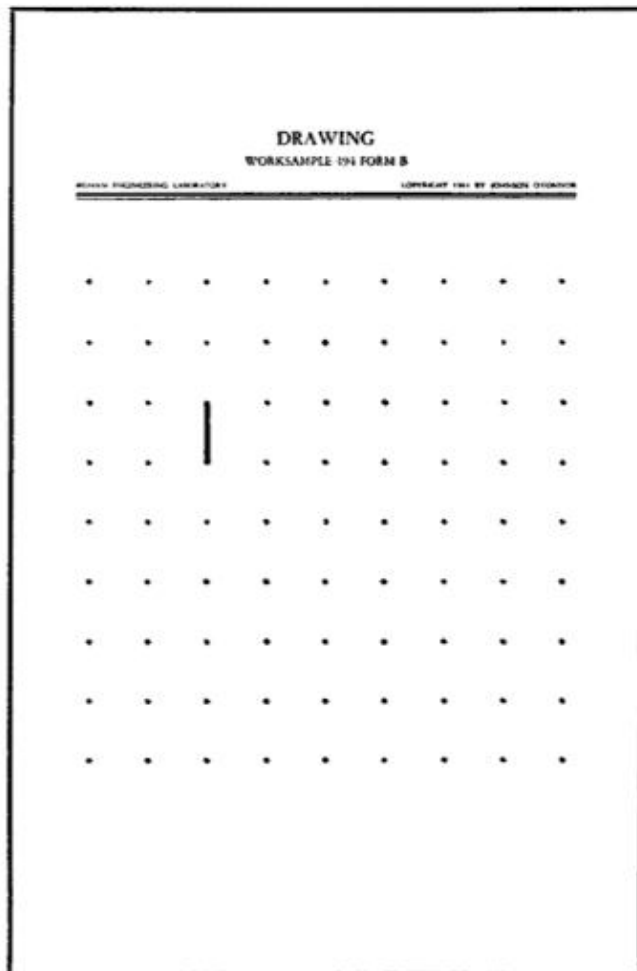
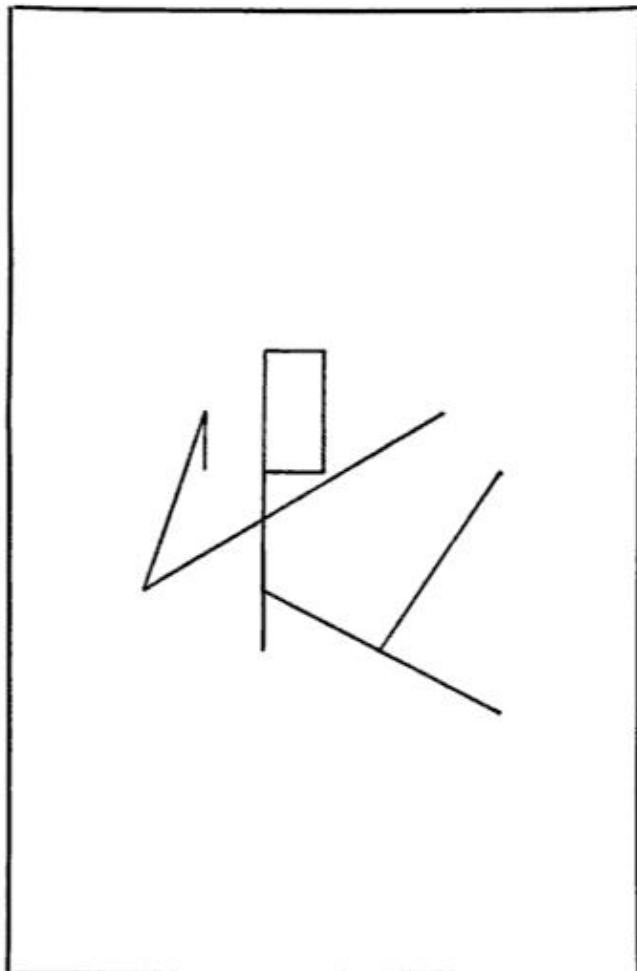
If your score falls under category A, you are in the top group insofar as structural visualization is concerned. Category B is above average and category C is below average. Winding up in category D signifies very low structural visualization ability.

## SCORE SHEET

AGE	A	B	C	D
13	17+	7-16	3-7	0-3
14	18+	10-17	5-9	0-4
15	19+	11-18	5-11	0-5
16	20+	12-20	6-12	0-6
17	22+	13-21	7-13	0-7
18	23+	14-22	8-13	0-7
19	23+	15-23	9-14	0-8
20	24+	15-24	9-15	0-8
21	25+	16-24	9-15	0-8
22	25+	16-24	9-16	0-8
23	25+	17-25	9-16	0-8
24	25+	17-25	9-16	0-8
25	26+	17-25	9-17	0-8
26	26+	18-25	9-17	0-8
27	26+	18-25	9-17	0-8
28	26+	18-25	9-17	0-8
29	26+	18-25	9-17	0-8
30	26+	18-25	9-17	0-8
31	26+	18-25	9-17	0-8
32	25+	18-25	9-17	0-8
33	25+	18-25	9-17	0-8
34	25+	18-25	9-17	0-8
35	25+	18-25	9-17	0-8
36	25+	17-24	9-17	0-8
37	25+	17-24	9-17	0-8
38	24+	17-24	9-17	0-8
39	24+	17-24	9-17	0-8
40	24+	17-23	9-17	0-8
41	23+	17-23	9-16	0-8

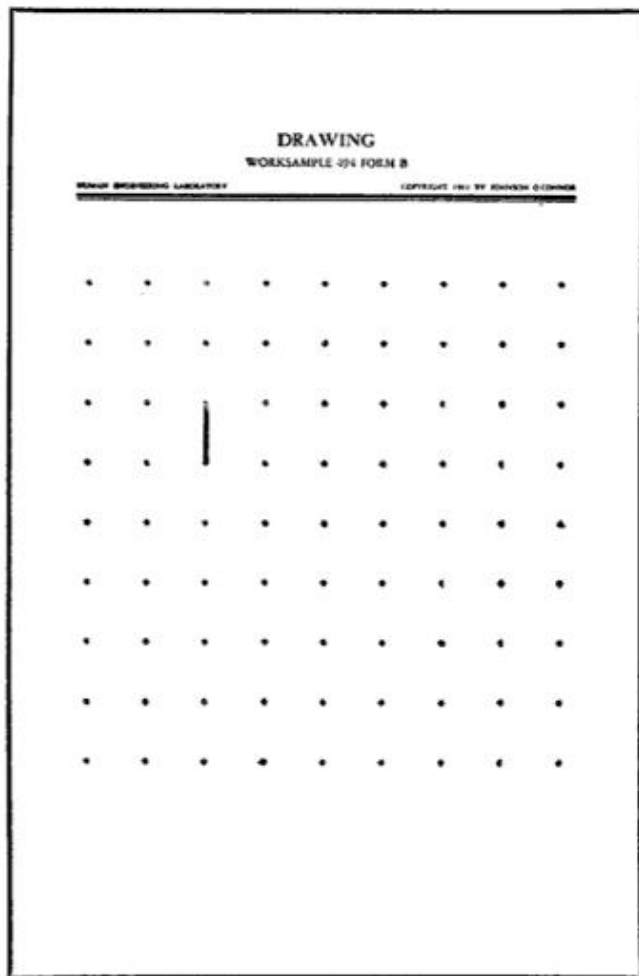
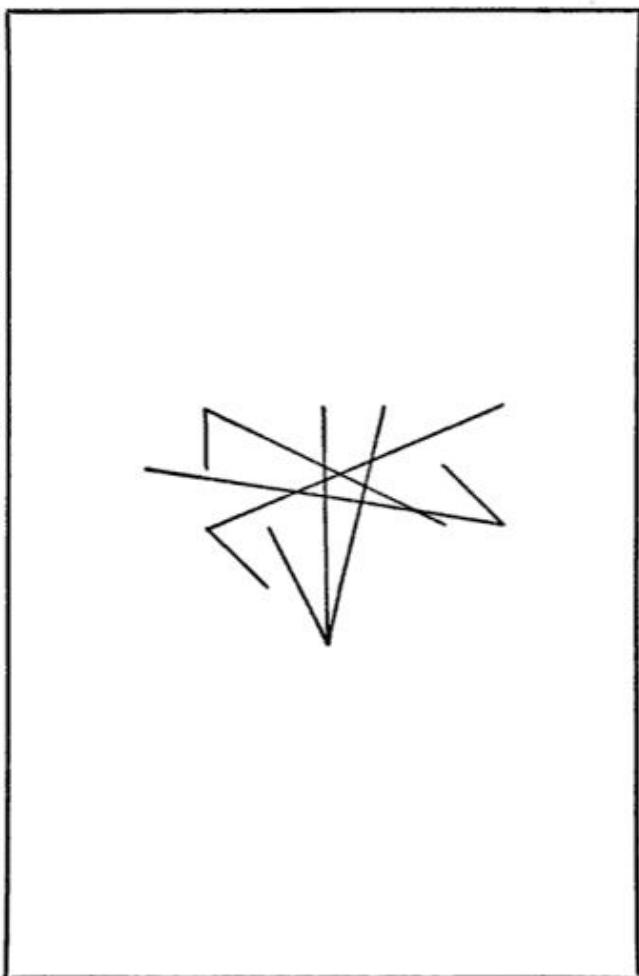
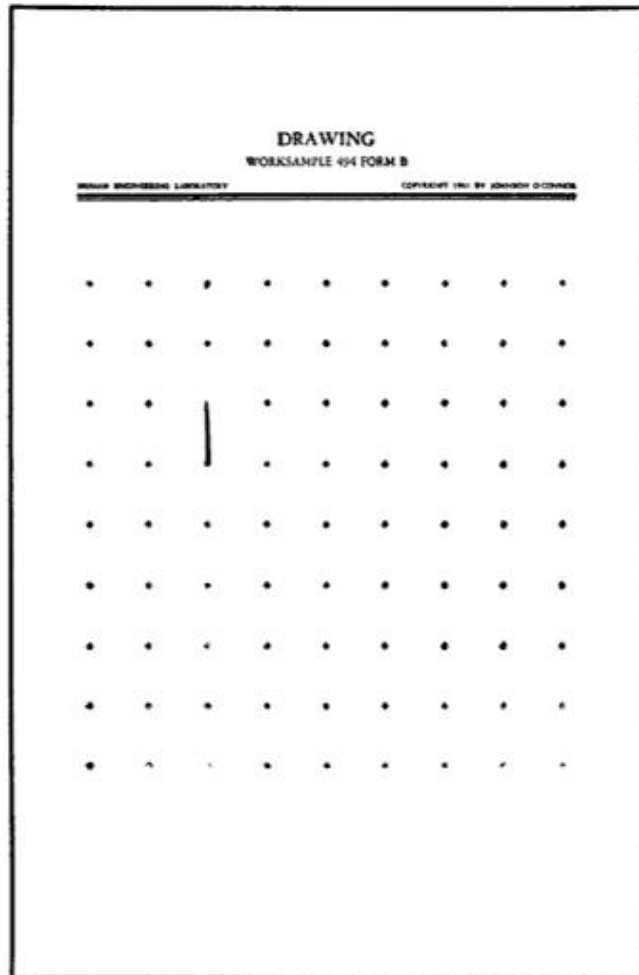
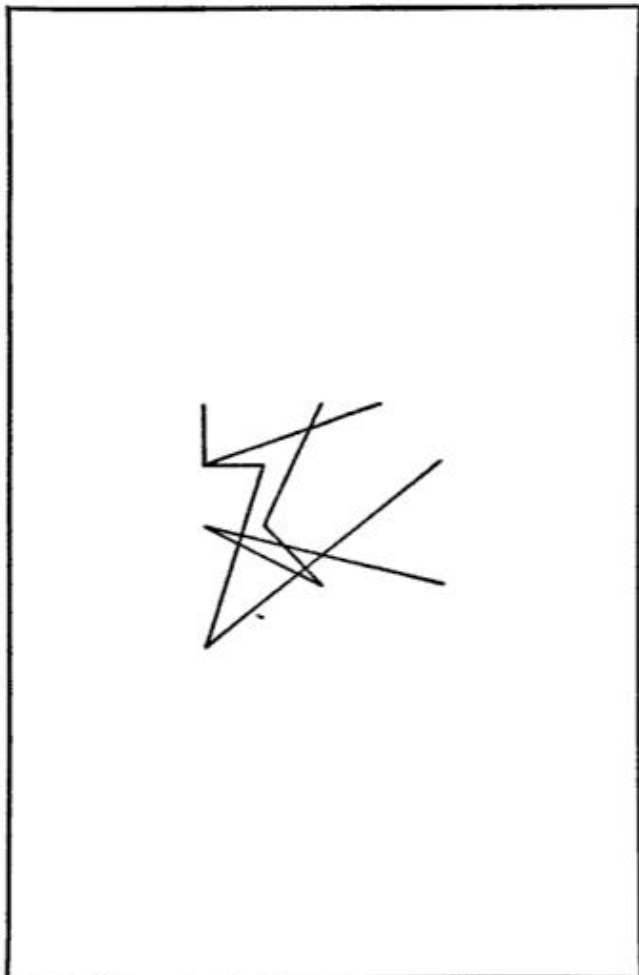


# TAKE THIS TEST: MEASURE YOUR





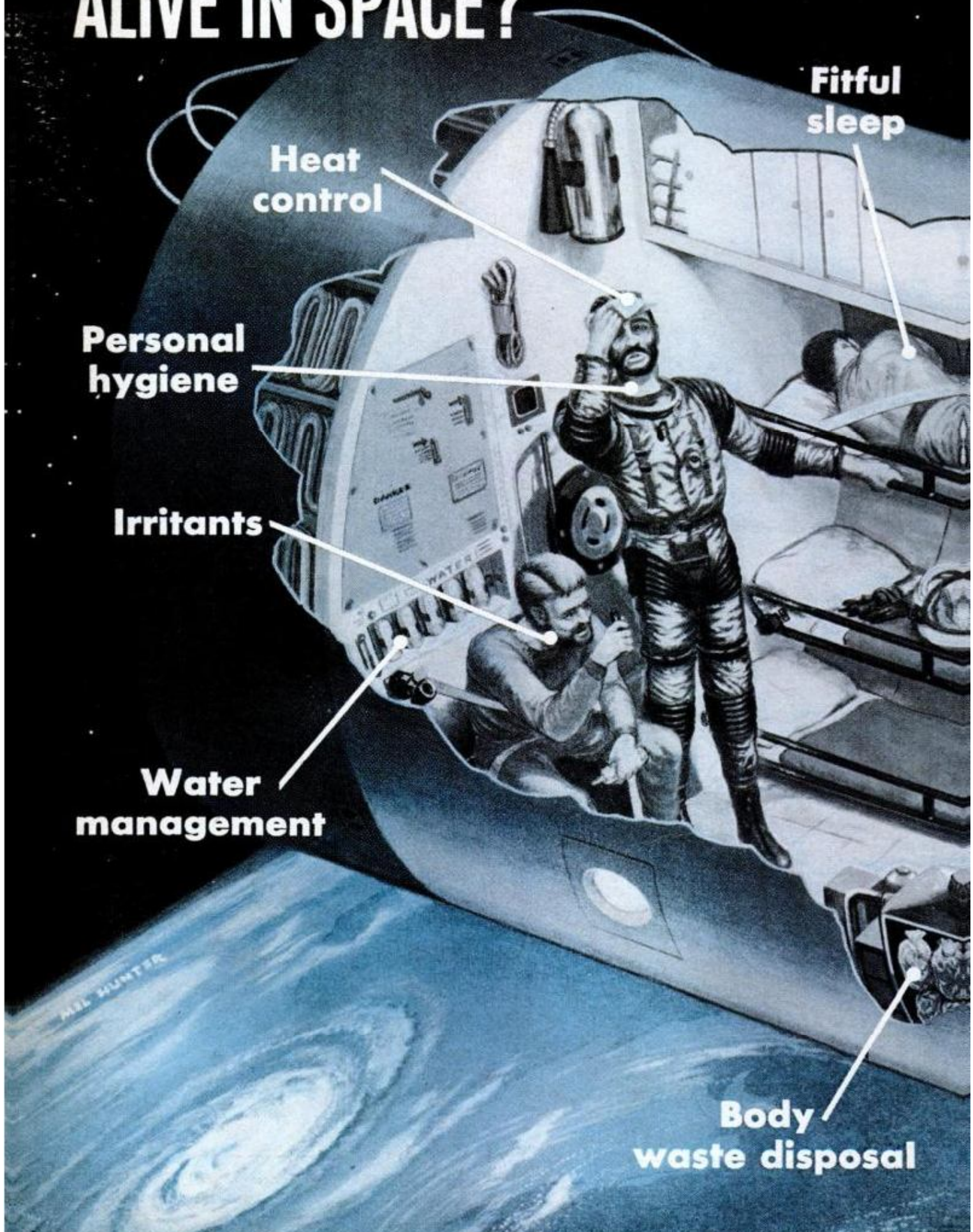
# MECHANICAL APTITUDE





# CAN WE KEEP OUR ASTRONAUTS ALIVE IN SPACE?

By KEVIN V. BROWN



Heat control

Fitful sleep

Personal hygiene

Irritants

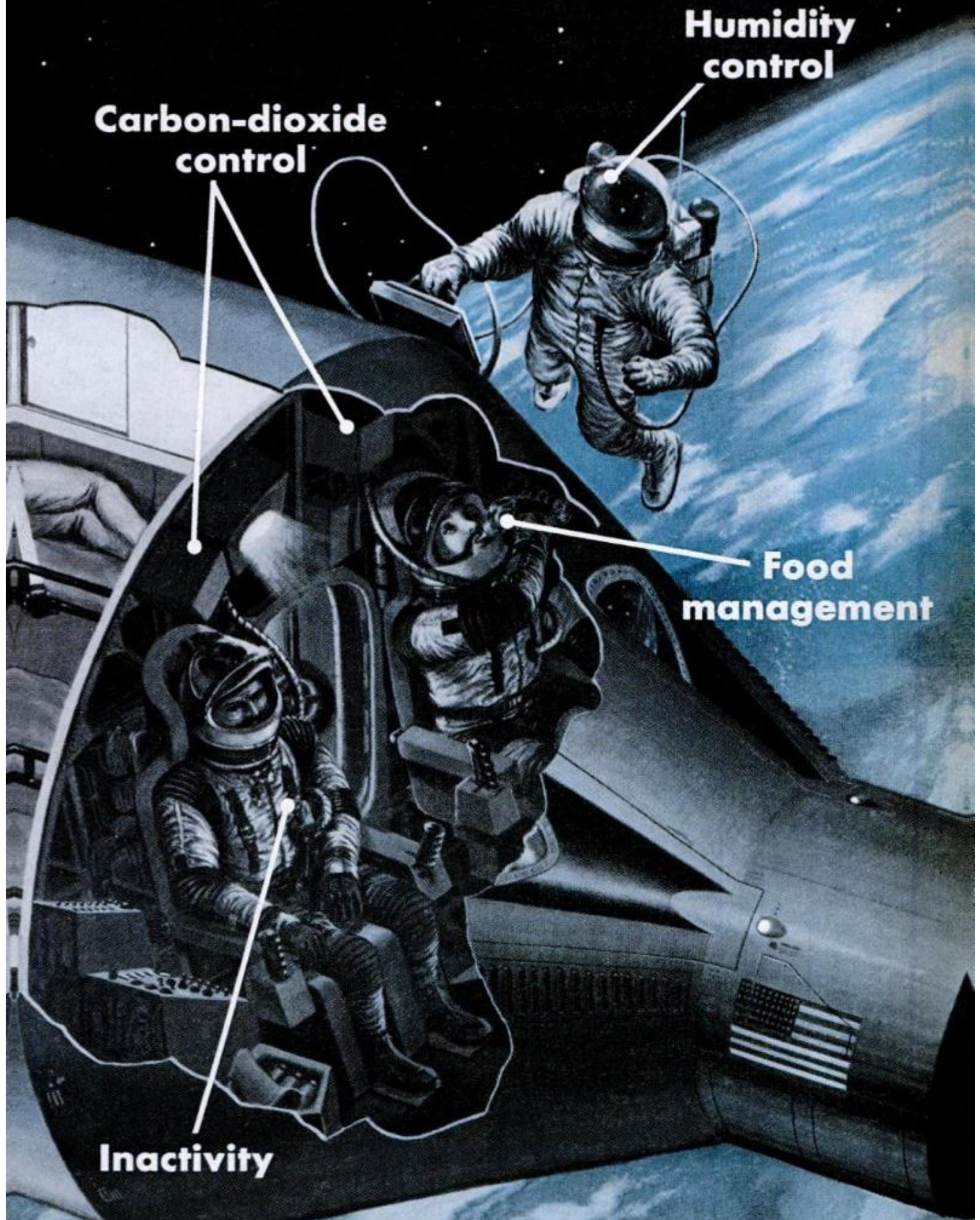
Water management

Body waste disposal

MEL HUNTER



Here, indicated on an artist's concept of a future spaceship, are 10 unsolved problems our life-support scientists must solve



**Carbon-dioxide control**

**Humidity control**

**Food management**

**Inactivity**

FOR SOLUTIONS TO SOME OF THE PROBLEMS TURN PAGE



# CAN WE KEEP OUR ASTRONAUTS ALIVE IN SPACE?

**T**HE U.S. AIR FORCE, at this writing, is planning the longest-duration space flight ever undertaken—30 days in a Manned Orbital Laboratory (MOL). The first flight is scheduled for sometime around 1970. Although the Air Force has selected and is training its own astronauts, it has worked closely with the National Aeronautics and Space Administration through the latter's Mercury and Gemini space flights on the problems and solutions of keeping man alive and healthy in space.

As space flights become longer and go farther, the problems increase and the solutions become more essential. Some of those problems, minor now, could become major then. So solutions must be found now, not then.

In this exclusive interview with *PM* at the Air Force's Aerospace Medical Div. Headquarters at Brooks Air Force Base, Tex., Lt. Col. John Ord, chief of space crew test and evaluation, describes some of these problems and their possible solutions.

## Personal hygiene

So far, no astronaut has washed or shaved in space. As flights get longer, crewmen are going to get gamier and become good candidates for television commercials.

In at least one Gemini mission, because the men were in their space suits so long, their top layer of skin peeled off. If the astronauts scratched, the skin came off in a cloud of dust particles. On other missions, whenever they had a choice the astronauts were happy to take off their space suits.

Aside from the gamey aspects, poor hygiene can be an irritating health problem, leading to soreness, itching and even infection.

Some steps have already been taken, including preflight bathing with surgical soap and wearing sterilized underwear beneath the space suit. Other helps have been suggested, including "wet wipes" for use while in space.

Theoretically, they can keep a man clean for days. And a vacuum razor, which sucks whiskers up as they're cut so they won't float around in the cabin, has been tested. Scientists hope that something like a vacuum shower ultimately can be built.

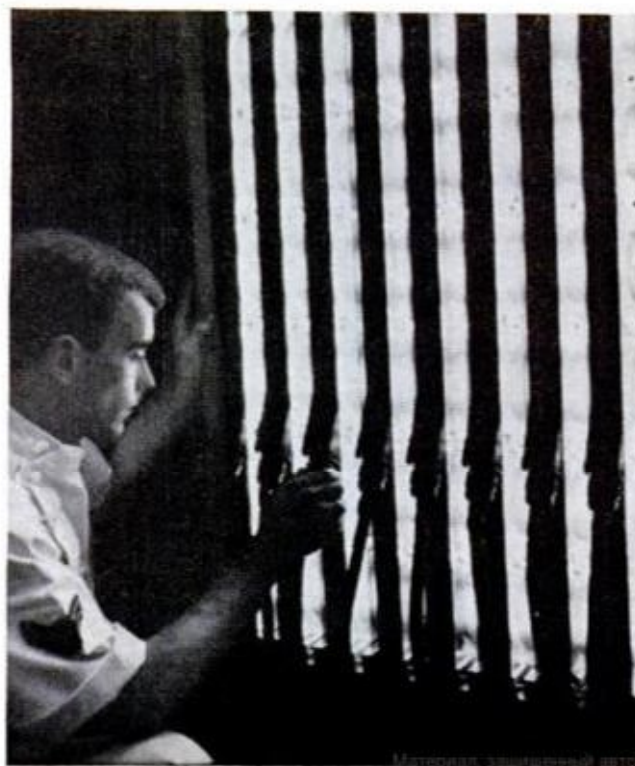
## Irritants

Several astronauts have complained of odors and eye irritation, possibly from some toxic contaminant in the spacecraft hardware or equipment undetected on earth. This could become serious. Some toxics can affect the lungs and liver and other body systems.

The best cure is prevention. All equipment used in spacecraft should be tested in a vacuum to duplicate the environment of space. To date only industrial standards have been used to test the hardware — i.e., standards based on a 40-hour work week, which control toxics that may affect factory workers. These won't do in space. Also, a detection instrument could be placed in the spacecraft to warn whether toxics were present or above a safe level.

The Air Force is now running toxic tests on animals under simulated space conditions at Wright-Patterson Air Force Base, Dayton, Ohio.

**ALGAE PLANTS** absorb carbon dioxide, give off oxygen





## Heat control

Sometimes, it's either too hot or too cold. It's especially vexing when one astronaut is in his space suit, and too hot, and the other is in his shirtsleeves, and too cold. The problem is to regulate the heat inside the cabin and inside the spacesuits to reach a balance.

The suits are generally too hot. The problem is in carrying off body heat. Astronauts seemed to have no trouble in a shirtsleeve environment.

The solution is twofold: better control systems, especially in removing heat, and larger spacecraft. The Gemini flights were generally more comfortable than the Mercury flights, because the cabins were larger, with more room for free air space.

## Humidity control

This is tied closely with heat regulation. If water-vapor content in the air is constant, humidity goes up as temperature goes down, and vice versa.

However, in a confined space like the space suit, perspiration raises the vapor content and, consequently, the humidity. One extra-vehicular activity (EVA) was aborted because the high work load made the astronaut sweat so much it fogged his faceplate.

With low humidity, the skin and mucous membranes can dry up. One of the Gemini astronauts had to use

**VACUUM SHAVER** may allow astronaut to shave



AUGUST 1967

cream on his nose to relieve the chapping caused by dryness.

This is an inherent problem in spacecraft. Engineers like to keep the humidity down, because it's easier on the hardware. But man, basically, needs it up. So, it's a compromise.

Again, the solution will be in larger spacecraft, which will relieve the regulation problem somewhat, and also in reducing the EVA workload to keep the body temperature down.

## Inactivity

Another inherent problem. The astronauts are not only in cramped quarters for days at a time, but they are weightless throughout. This has a deteriorating effect on the body because, without gravity, motion becomes effortless. It's like lying in bed for days at a time.

Then, when they go EVA, the workload goes way up, with increased heart rate and breathing and consequent fatigue.

Larger spacecraft, again, may partially solve the cramped quarters, but some form of exercise may become mandatory to keep the body in condition. And it isn't easy when you're weightless.

The Air Force has been experimenting with two types of ergometers, devices on which any astronaut would work against a force fed into the machine. One is a stationary bicycle and the other a total-body ergometer on which he could exercise his arms as well as his legs.

In either case he would be strapped in place, thus eliminating the problem of weightlessness, and the exercise would condition not only the muscles but his lungs and heart and entire circulatory system.

## Fitful sleep

Weightlessness, so the astronauts report, is the ideal medium for sleep. The body floats, you don't have to turn over and there are no pressure points

*(Please turn to page 190)*

85



# We'll never be No. 1!



**We're old No. 72. We hope we stay there. But we have our fingers crossed.**

**We thought of trying harder. Even tried getting tough with No. 71. We hired their lumpy counter girl. But she was no mechanic. We're still**

**No. 72. We lease a 1940 Packard and a Reo. You want something else?**

**You've heard of No. 1 and No. 2? You ought to know more than that about renting cars.**

**By Clifford B. Hicks**

**Y**ES, THERE IS A LOT TO KNOW. Did you realize that there are three broad categories of car-rental agencies? That by careful shopping you may find the best deal for you? That there's a wide variation in contracts and insurance protection? That even some department stores are renting automobiles? Most agencies are knocking themselves out to get your business.

But beware. Cut-raters, shady operators and genuine shysters are now



trying harder than ever to put you behind the wheel. Low rates and discounts are the order of the day. Without question, you *can* save money renting a car from a cut-rater if you know the many angles that are employed to cut leasing costs.

First, you need to know the three main types of rental agencies:

- **The Big Three:** Avis, Hertz and National. Their rates vary from city to city, but average \$11 per day plus 11 cents per mile. For this you get a low-mileage Ford Galaxie, Chevy Impala, Plymouth Fury, or equivalent, "free" gas and oil and topnotch insurance.

- **The Economy Group.** These also are national chains, but they offer lower rates. Their cars are smaller and usually kept in service longer. The rates in this group vary considerably, dipping as low as \$3.95 per day plus 5 cents a mile, gas included, for a Volkswagen.

- **The Neighborhood Group.** These are small lessors, usually unaffiliated, with anywhere from one to a dozen cars available. In general, their rates are the lowest, and the quality of their service (including insurance) varies from best to worst.

Knowing the agency categories, you should remember that there are 10 factors that may affect rental rates:

1. Do you pay for the gas? Usually it's cheaper if you do, because the daily rate and mileage rate are reduced. If you do pay for the gas, figure that it will cost you an additional two cents for every mile you plan to drive.

2. Is liability insurance coverage included in the basic payment? Some neighborhood renters offer enticingly low rates, but then you pay through the nose—extra—for liability insurance.

3. Is there an additional charge for pickup and delivery? If a cut-rate agency is located in South Clamshell and you want the car in North Clamshell, 20 miles away, the mileage you pay usually starts *the moment the car leaves the agency*. After being picked up, you then have to return the deliveryman to his headquarters. Thus you are paying for 40 miles of service before you ever get the car. I've had cut-raters "forget" to inform me of an additional pickup and delivery fee until I was settling the bill.

4. Is there a special rate available, patterned to your needs? The national chains offer batches of specials, but you won't be told about them unless you ask. And specials vary greatly from city to city, within the same company, because of local patterns of use. Hertz, for example, offers a weekend rate in Cleveland that's just about half the weekday rate. In New York Hertz charges more on the weekend than on a weekday. Always ask to see the *entire* rate schedule before signing a contract.

5. Will the "free-wheeling plan" save you money? It probably will if you plan to rent for several days. Under this arrangement, you pay about \$100 for the use of the car for

**The Economy Group:  
Cars are smaller  
and kept  
in service longer.**

**It's cheaper  
if you pay  
for the gas.**

**You have to ask  
about specials.  
They won't  
volunteer  
information.**



a full week. Upon delivery, the tank is full of gas. You can put as many miles on the car as you wish at no extra charge, but you pay for the additional gas.

6. Will a compact or foreign car meet your needs? You can slice your bill approximately in half by renting an American compact or a VW instead of a full-sizer.

7. Where can you get the best drop-off rates? This applies when you are driving from here to there, but not back again. The Big Three companies charge, at most, \$15 if you surrender a car in another city. Some neighborhood agents charge up to 15 cents per mile; this drop-off rate can really clobber you if you rent a car in Chicago and drop it in New York. Even if you rent from the Big Three, always ask if the agency has a car that must be moved toward your drop-off point; if, for example, you're traveling from New York to Toledo, and the agency has a car on hand that has to be moved to Chicago, there'll be no drop-off charge whatever. You are providing *them* a service.

8. What does a "day" mean? Some cut-raters offer a day rate as low as \$3.97, but when you read the fine print in the contract you discover that a day is defined as a 12-hour period. You can save a wad of money if you need the car for only a few hours; otherwise you must double the advertised day rate in projecting your costs.

9. Can you reduce the cost through freebies? Don't laugh. "Extras" can help out, if you want to take advantage of them. National, for example, offers S&H Green Stamps. If you reserve a Budget Rent-a-Car in Hawaii for a week, the company throws in three free meals at excellent restaurants, a stack of tickets to local tourist attractions, and a free round of golf. That adds up to a sizeable sum of money which, in effect, you can deduct from your rental fee.

10. Can you save money on discounts? The Big Three offer a standard 20-percent discount if your company's name is on an approved list. You, as an employee, are entitled to this discount even if you are renting the car for personal reasons. The discount, incidentally, drops to 10 percent in some Canadian provinces and zero in others. If a travel agent reserves your car for you, *he* pockets 10 percent of the discount and you get the remainder.

Airconditioning will cost you about two bucks a day in the northern states, but is free in the deep South.

In lieu of a deposit on a car, all the major companies will accept any well-known credit card, but if you deal with a neighborhood agent you may have to plunk down as much as \$100 in cash before you can drive away.

If your rental car breaks down in Whitefish, Mont., a national agency will have an office close by. Not so, a neighborhood agency. Furthermore, you're less likely to have a breakdown if you rent from the Big Three. With the exception of sports cars and station wagons, the Big Three turn over their entire fleets once a year. The average mileage

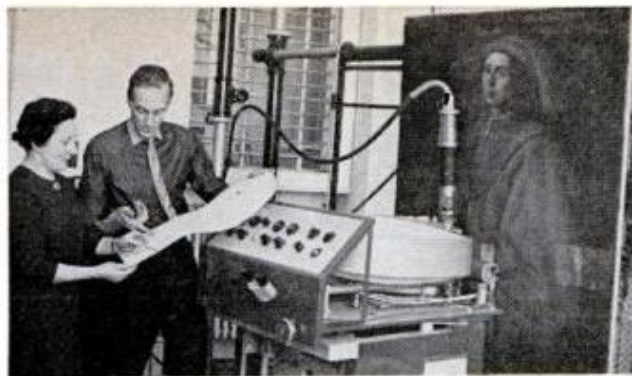
*(Please turn to page 178)*

**The drop-off rates  
can really  
clobber you.**

**What about  
airconditioning?  
Breakdowns?  
Deposits?**

**Some cut-raters  
cut costs  
on insurance.**





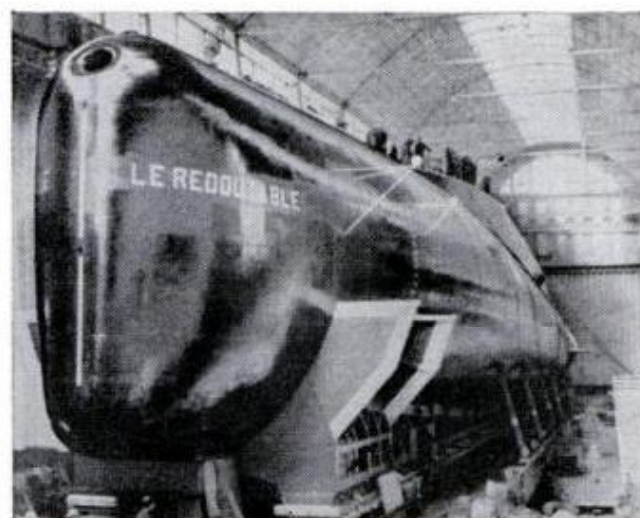
## Pigment prober

Tiny X-ray beams reflected from a painting and analyzed by computer at London's National Gallery tell age and composition of the paint.



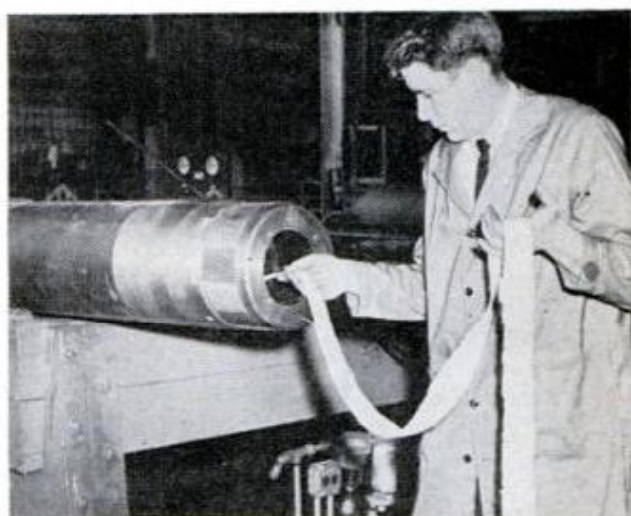
## Man sled for dogs

Swiss Alps rescue dogs now ride to disasters in a basketlike sled pulled by skiers, which keep them from becoming exhausted in snow.



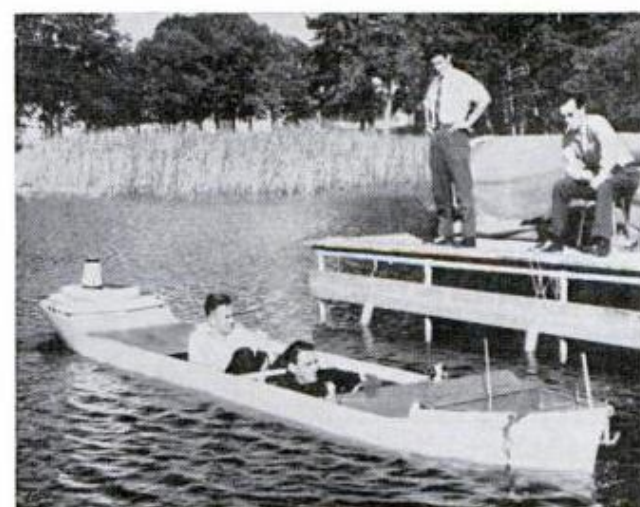
## French atom sub

France recently launched its first nuclear submarine, the 7900-ton *Redoutable*, which will be equipped with 16 French-built Polaris-type missiles with nuclear warheads.



## Fingerprints gun barrels

Erosion in large gun barrels can be accurately determined by "fingerprinting" the inside with liquified rubber. Solidified and removed, the rubber shows pits and fissures.



## Model maneuvers

An exact scale model of ocean-going tankers is used at an Esso training center to teach masters and pilots the handling characteristics of ships before they go to sea in them.



## Ski lots

"Parking lots" for skis have been installed at ski lodges in the Swiss Alps. Each coin-operated unit holds 10 sets of skis. Maximum time for parking is 24 hours.



# HOW TO

By **KENNETH A. ANDERSON**

*Illustration by Dana Rasmussen*



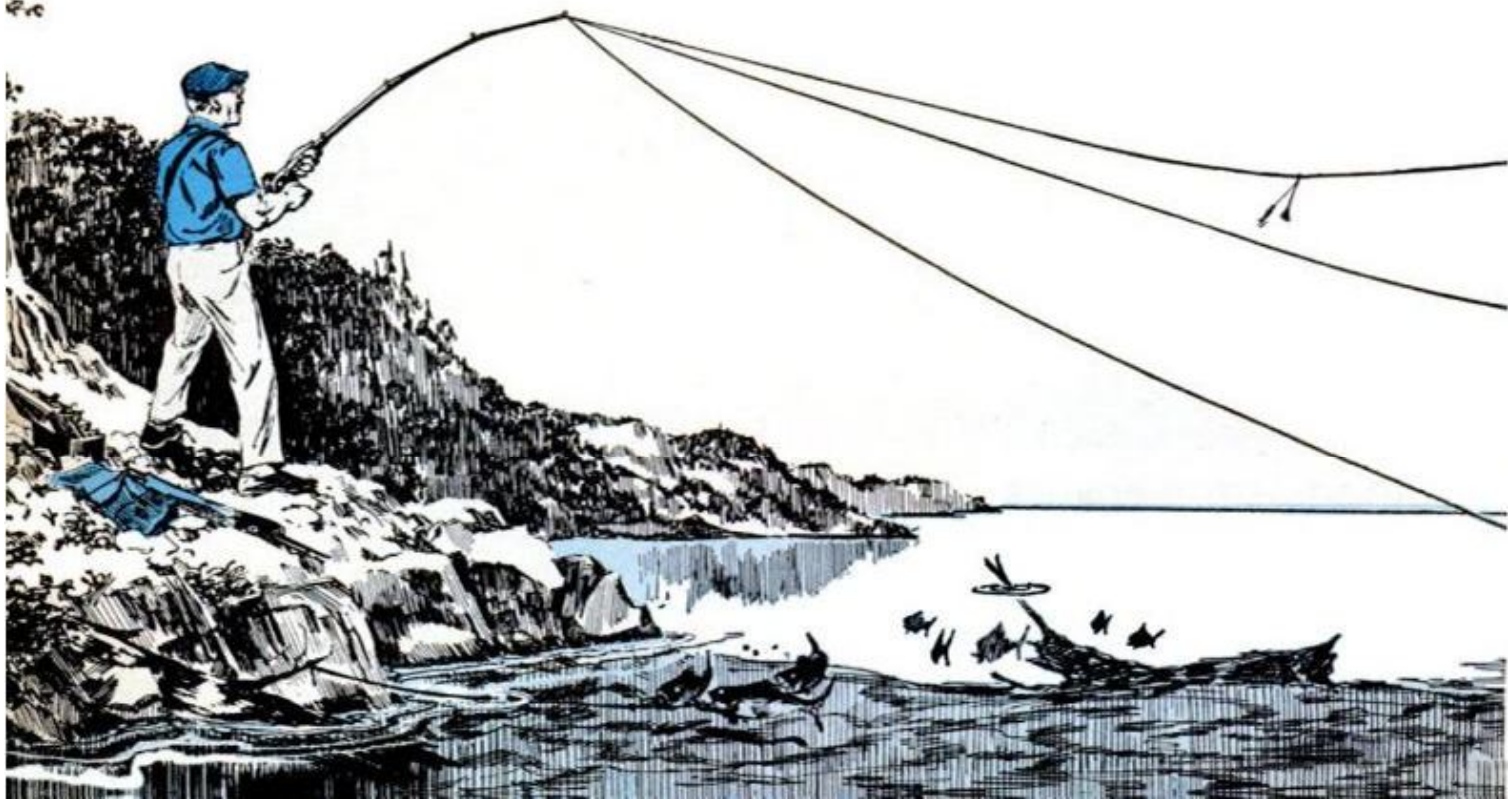
**H**AVE YOU EVER STOOD helplessly at the edge of a lake watching bass pop the surface about 100 feet beyond your casting range? Or maybe you know where big catfish lie beneath inaccessible rocks offshore. Then kiting may solve your problem. Tie a leader to your kite string and fly the lure to the fish.

You'll need a bait-casting outfit, some rather stout line, a few weights, live bait or artificial lures and a kite. Almost any kite will do. But since it may get wet it's better to choose a kite with plastic or cloth covering, rather than paper. A paper kite usually has had it if it goes in the water.

Kite area or size is an important factor. As a general rule, figure on about one square foot of kite surface per pound of fish you expect to catch. Put 20 to 40-pound-test monofilament or nylon line on the reel. That's your kite



**YOU CAN USE** any kind of kite as long as it will fly. Once kite is in the air, tie a long leader to kite line. Weights and lure will loop the line to the water





# FISH WITH A SKY HOOK

Kite fishing is an ancient Asian art that's catching on here. With kites you can 'cast' as far as you want—if the wind's right

string. Some kite fishermen do quite well with big spools of heavy kite cord. But it's easier to launch and control the kite with strong fishing line on a bait-casting reel mounted on a rod.

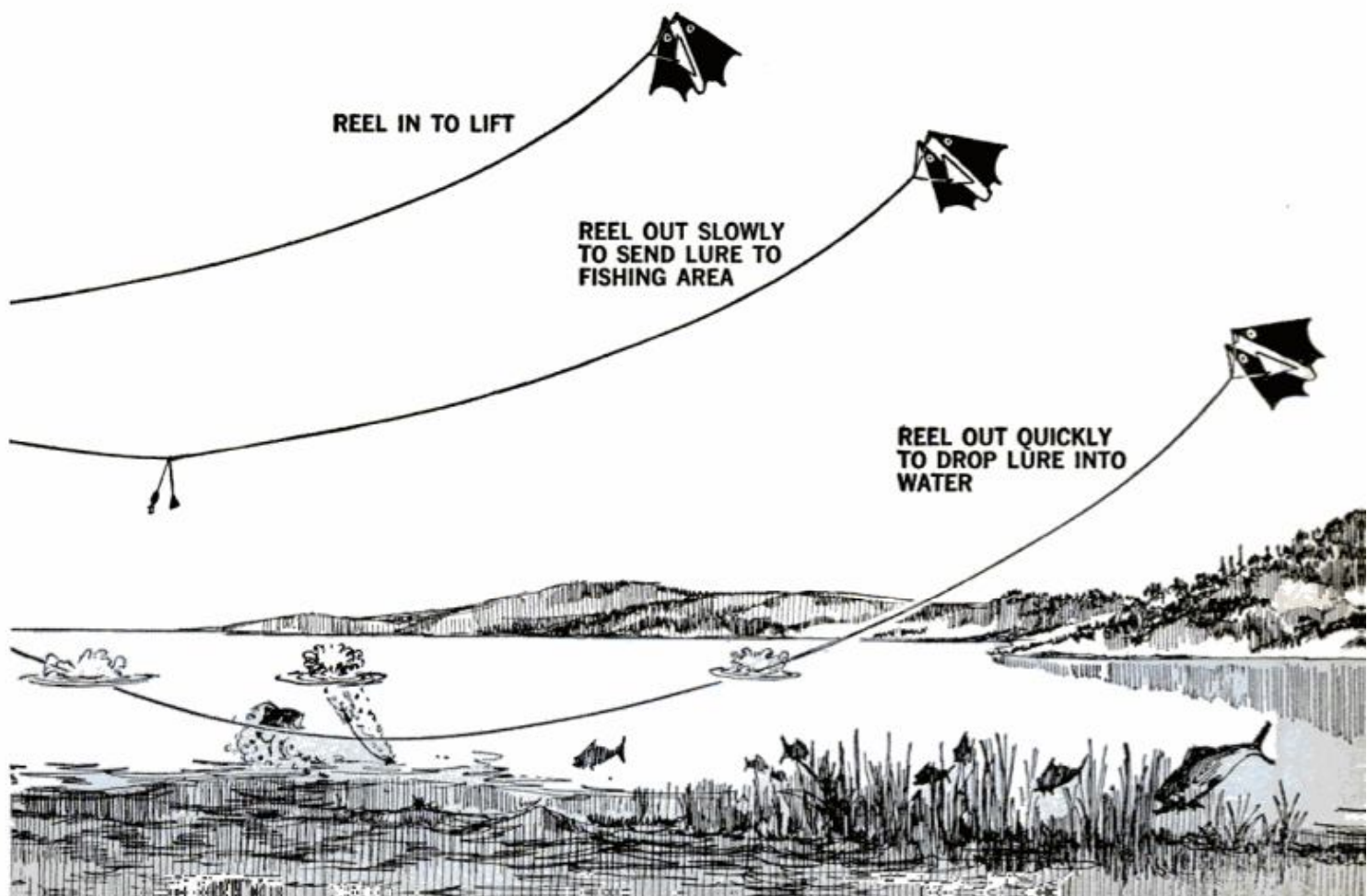
After tying the kite to the end of the line, send it up about 200 feet. Usually air currents around large bodies of water make this easy. With the kite stabilized in the sky, lock the reel. Pull in line from the tip of the rod so you have enough slack to tie on the leader. The leader should be long enough to troll or skip the lure on the water. An assortment of sinkers in one-fourth-ounce increments should be on hand to hold the lure near the water. The fishing rod will give you some control because you can raise or lower the tip to lift or drop the lure. You can also drop the lure by quickly reeling out the kite line.

Once the kite is airborne, with

weights and lures positioned, the rest is a matter of remote-control trolling. You troll out by releasing kite line; troll toward shore by reeling in.

A bite is as easy to feel through this rig as it is with conventional tackle. Once the fish is hooked, simply reel in the line. If the fish has enough fight to pull the line sideways, the kite may dip sharply. Watch out for this maneuver. Generally, the fish is held firmly by the rod at one end and the kite at the other.

Nearly any kind of fish can be caught from a kite. Will Yolen, world-champion kite flyer, has landed a 40-pound striped bass off Cape Cod. Down in the Gulf Stream, seven-foot sailfish have been taken with kite-towed lures. Many kite fishermen claim there's an advantage to this method because the lure is supported from above with little tackle visible to startle shy fish. ★ ★ ★





# HOLY TOLEDO, A DAZZY JEEP!



The most recent go-anywhere offspring of the ubiquitous Jeep offers pleasing performance, a dash of comfort, a touch of breadbox style and a versatile pack of driving fun

By ALEX MARKOVICH

**I**T'S A TWO-WAY kind of car—part civilized, part brute. And the emphasis tends to be on the latter.

True, the Jeepster Commando convertible offers concessions to comfort not found on the popular old Jeep Universal. For example, our test car had, of all things, an automatic transmission (a \$308 option). Other niceties included roll-up side windows, padded dash, op-

tional two-tone finish and floor carpeting. You can even get airconditioning.

On the other hand, with that hefty suspension, your posterior has to serve as an extra shock absorber. No power assist is available for the steering; in spite of a relatively slow steering ratio of 24:1, turning that big wheel at low speeds takes muscle. If you opt for the dash-mounted clock, don't expect to





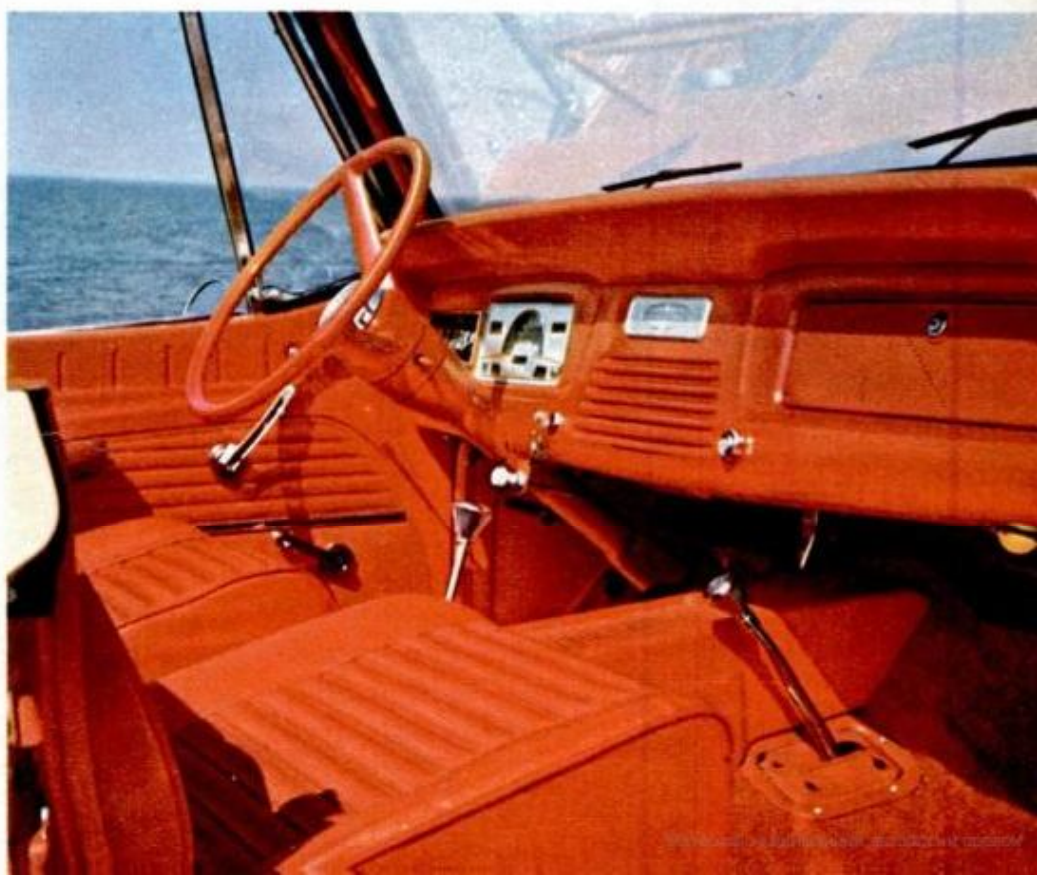
**CONVERTIBLE TOP** can be raised easily by one man, is tight and weatherproof when in place. Dash (below) is neat and to the point. Legroom and headroom are good, but may prove bit cramped for six-footer plus

hear it tick; the engine sounds a throaty note, and in four-wheel drive there's gear whine. And body styling follows the breadbox school of thought.

But there's good reason for all this. The Jeepster is a specialized vehicle built for utility. It's meant for bad driving conditions, particularly for off-the-road work, and that it does exceptionally well.

My only real complaint concerns some of the hardware. For one

AUGUST 1967





thing, a pin in the door-retainer linkage of our test car came loose, allowing the door to open a full 180°. And the glove-box door was sluggish; even when unlocked, it had to be pulled open with the key. Before driving the convertible, I had a crack at the Jeepster station wagon. It, too, had a balky glove-box door, as well as a jammed parking-brake handle and a rear tailgate window with a defective lock. And a small dash panel holding switches for the two-speed wipers, lights, heater and defroster was loose. The base price of the convertible is \$3185; our test car, loaded with options, was \$4079. At these prices, all the little pieces should stay put.

Generally, the Jeepster is finished neatly and tastefully, though not lavishly. Areas of the doors and side panels that lack upholstery are finished in crackle paint that resembles leather. All body panels fit perfectly. The convertible top is easily raised by one man (a power top is optional); once in place, it's snug and weatherproof.

#### **A climb to get aboard**

Let's climb aboard and see what it's like to live with this car. And I do mean *climb*; the floorboards are raised for the sake of ground clearance.

The Jeepster looks massive, but this illusion disappears once you're inside. Actually it's only 4.6 inches wider than the Volkswagen and 7.8 inches longer. The high seating position and vast expanse of window glass give excellent visibility. The front is squared off, making it easy to judge width in tight spots.

Front legroom is adequate for me—I'm five-eight—but a six-footer might feel cramped. Headroom is good in front, adequate in back. There is no floor hump in back, but the wheel wells intrude on the rear seat, leaving just enough hip room for two passengers. The rear seat and front passenger seat fold not-quite-flat for a station wagon-like luggage area.

The dash is well laid out and unpretentious, with a legible semicircular speedometer, temperature and fuel



**OFF-ROAD FUN** is key to new Jeep's appeal. When shifted from two-wheel to four-wheel drive, car can make duck soup of soft sand, mud, steep inclines

gauges, and warning lights for oil pressure and amps. The glove box is small, but a compartment in the optional console holds additional clutter. Our test car also had padded visors, inside and outside mirrors, backup lights, cigar lighter, ashtray, seat belts, windshield washer, four-way flasher and a dual, self-adjusting brake system, all standard equipment.

Twist the key and the engine starts instantly. Ours was the optional 225-cu.-in. V6 made by Buick, which develops 160 hp at 4200 rpm. (For \$193 less you can have the standard valve-in-head Four, rated at 75 hp at 4000 rpm.) Coupled with the GM three-speed Turbo Hydra-Matic, our V6 did 0-60 in under 13 seconds.

To check out the four-wheel drive, I drove onto a sandy beach. When the car began bogging down, I pulled back the transfer-case shift lever at the right of the floor hump; this splits engine torque between the front and rear differentials. The car immediately regained its traction. Even the soft goo along the water's edge was no problem. The shift from two-wheel drive to four-wheel-drive High and back can be made at any speed.

My next test area was tougher—cow paths and rough, hilly open fields running to a spot being gouged by bulldozers for road construction. No trouble until I reached a muddy, roughly 50-percent slope. Time to stop the car and push the transfer-case lever to the right and forward for all you're worth, while

*(Please turn to page 191)*





## Red giant visits England

Like a giant mosquito, the Russian MI 10, world's largest helicopter, straddles a bus at left and then lifts it into the air (above). The giant chopper can lift 25 tons, and its landing gear can straddle a load 60 feet long, 18 feet wide and 10 feet high. The machine was photographed at Gatwick Airport, England, where it was shown to possible buyers in industry and airlines.



## Nozzle-driven gunboat

Scheduled to be launched this year, the *Tucumcari*, a sleek hydrofoil gunboat, may be the first of the new class of Navy craft. Capable of speeds over 40 knots, the 71-foot Boeing craft uses a jet system of propulsion. Water is drawn through the aft struts into a centrifugal pump and discharged at high speed through nozzles above the water line.

AUGUST 1967

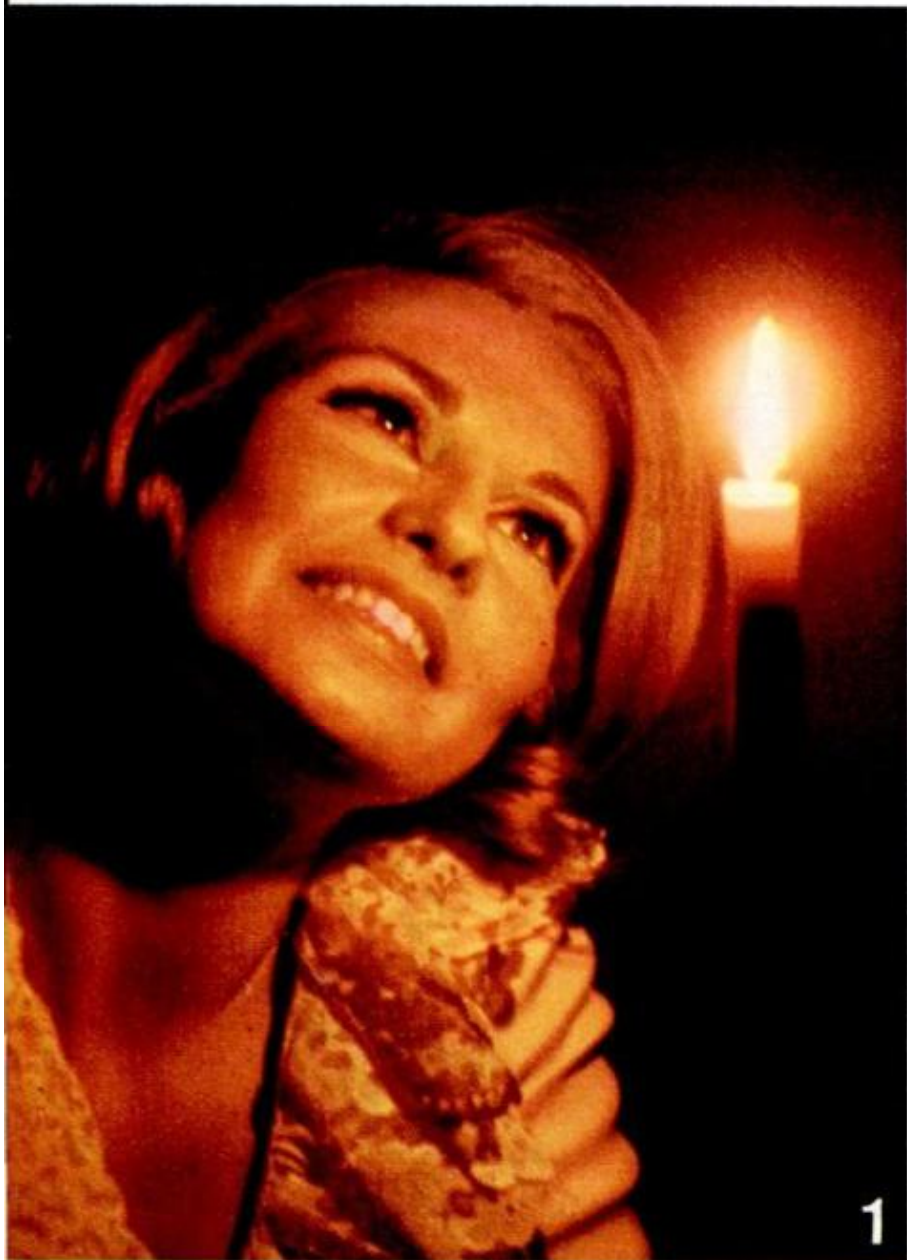


## Snowmobiles go abroad

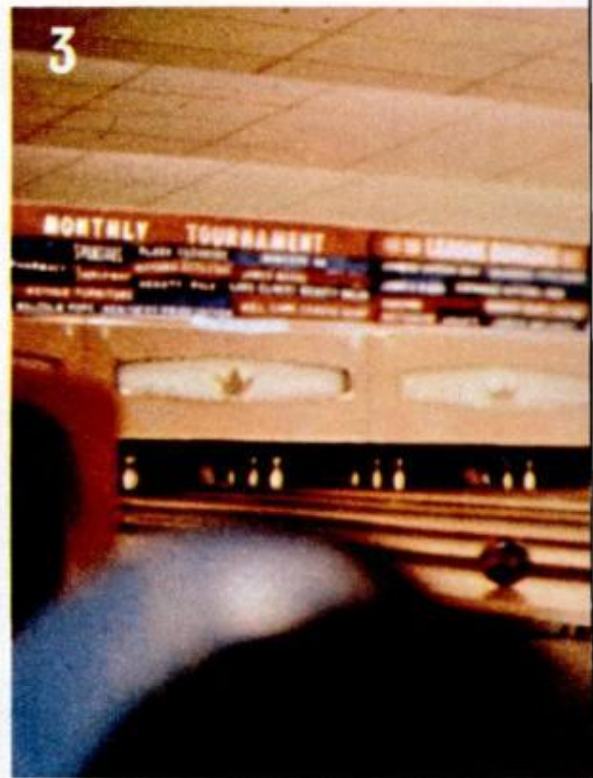
Now snowmobiles have been added to the rescue equipment of European mountain patrols—joining forces with helicopters, which are used in particularly difficult situations, and leg power, which is used most of the time. In the photo, an injured skier is hauled on a sled behind the snowmobile while two patrolmen carefully guide the sled.



# World's Fastest Color



1



3

**1. FLICKERING CANDLE** was only source of illumination for the dramatic portrait of the girl at left. Shot was made at  $f/2.8$  and  $1/30$  second with 100-mm lens. Tones are warmish but not objectionable

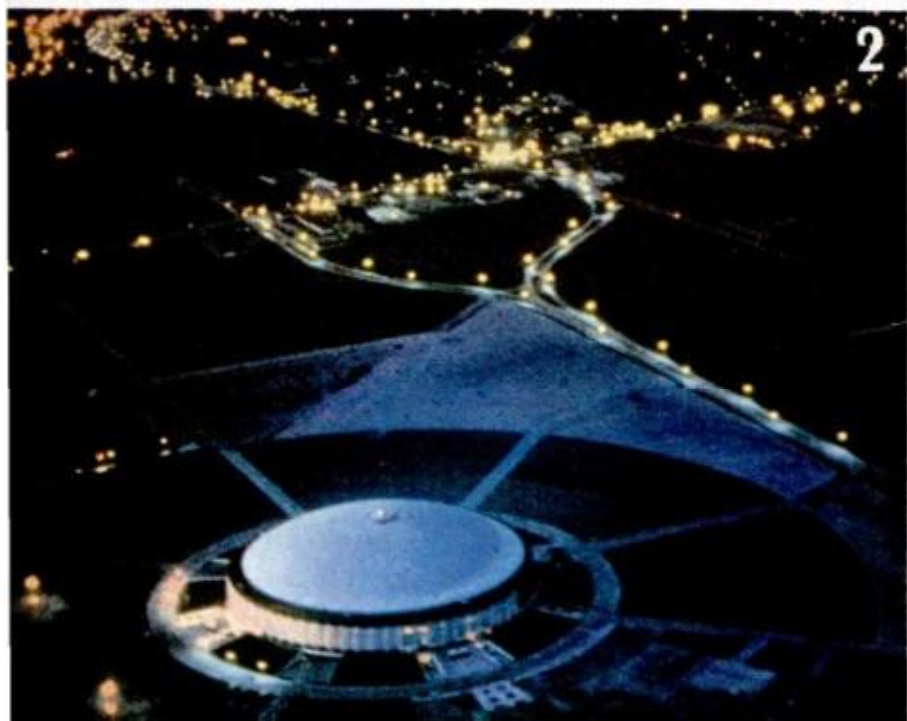
**2. AERIAL NIGHT SCENE** at left below—an impossible shot with conventional color film—shows Houston's famed Astrodome from a helicopter. It was made with standard 50-mm lens at  $f/2.8$  and  $1/30$  second

**3. INDOOR SHOTS** under existing light—like the bowling scene above—are easy with the new film. Here a speed of  $1/60$  second at  $f/2$  was fast enough to stop the bowler's movements despite lack of flash

**4. FROZEN SPRAY** in this action-stopping water scene was caught at  $1/1000$  second. Even with this high shutter speed, photographer was able to stop down to  $f/11$  to insure good depth and sharpness

**5. POLE-VAULTER** at right, shot at  $f/11$  and  $1/1000$  second, is another good example of stopped action. Small aperture insures maximum sharpness where fast-moving subjects make precise focusing hard

**6. FISH PORTRAIT** at far right looks like underwater shot, but was actually made through an aquarium tank. Only illumination was from regular tank light inside. Exposure was  $f/2.8$  at  $1/30$  second

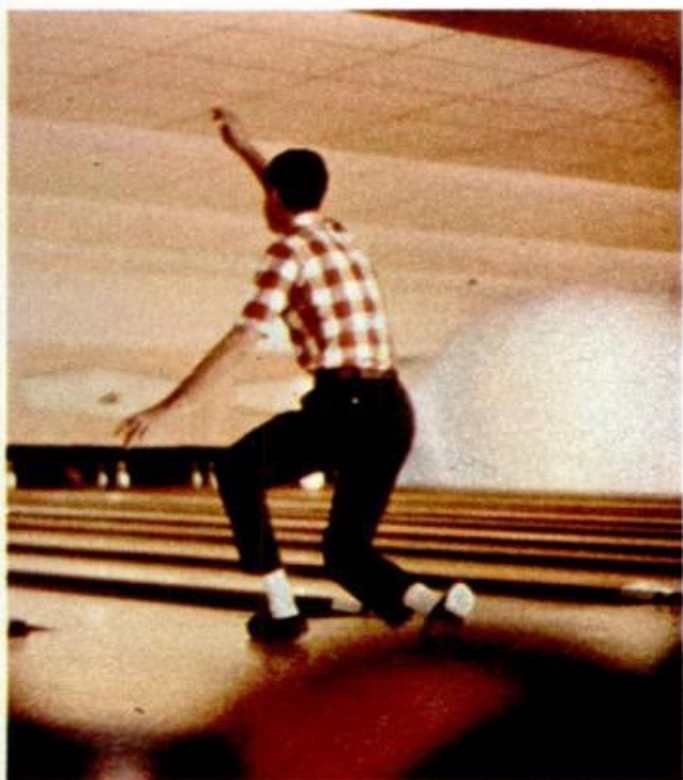


2

POPULAR MECHANICS

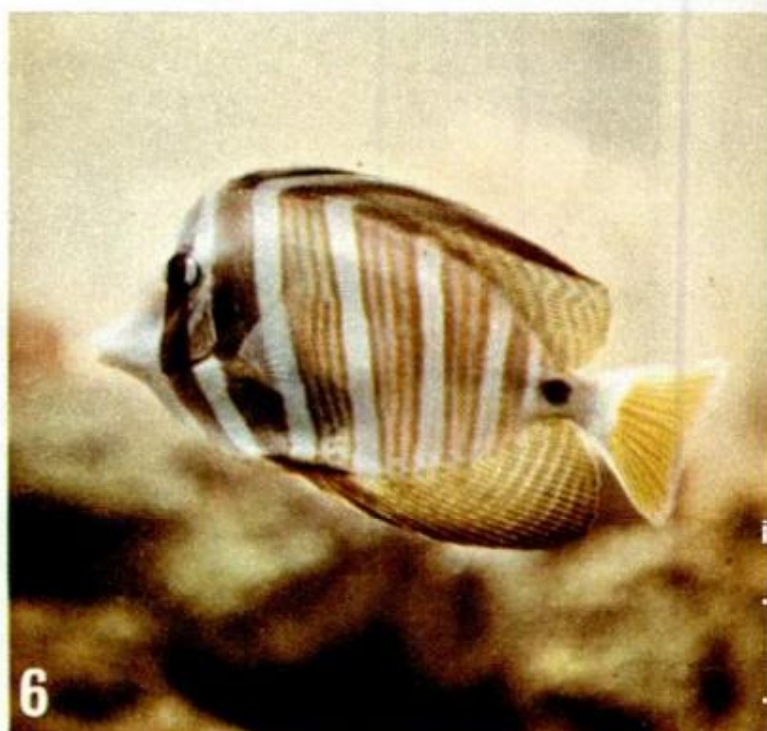
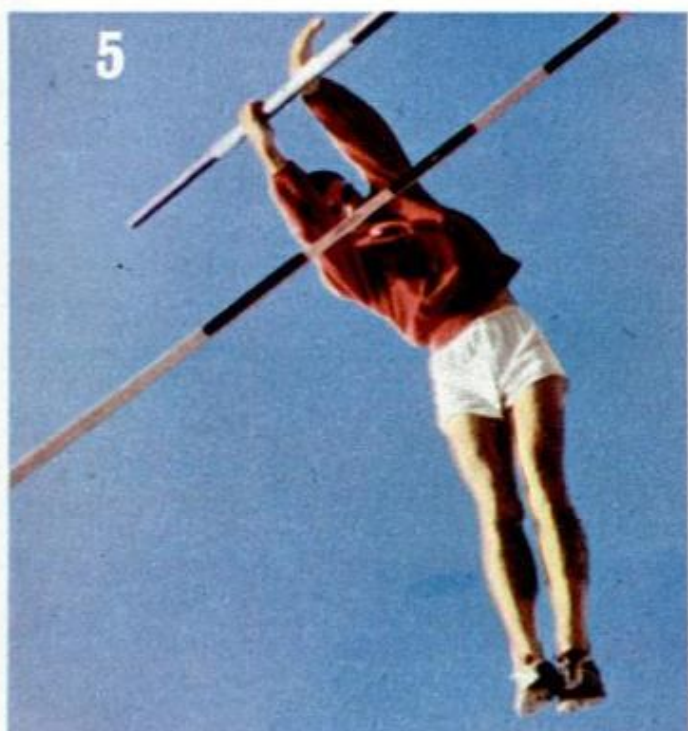


# Film *by Paul Wahl*



New super-high-speed Anscochrome—rated at a sizzling ASA 500—is so sensitive you can practically shoot in the dark. Here's what it can do for your 35-mm slides

*See story on the following page*





# World's Fastest Color Film

(Continued)

**N**OW THERE'S a color film that's as fast or faster than most currently available black-and-white films. It's new Anscochrome 500, rated at an almost unbelievable ASA 500. At this speed, it is two and a half times faster than the fastest previously available color film. Technically, it is even faster than high-speed black-and-white Tri-X film, rated at ASA 400.

What this means is that you can now take good color pictures, without flash, under just about any conditions where there's any light at all—if you can see it, you can probably photograph it. The

for maximum sharpness over a broad depth of field. This is particularly helpful when you're grabbing action shots on the fly and can't be sure of exact focusing.

Telephoto lenses, tele-converters, bellows extensions, polarizing filters and similar devices have always been a problem with color film because they call for increased exposures that, with a slow film, often aren't possible. With Anscochrome 500, you'll be able to get more use from such accessories.

Because of the film's much higher guide numbers, the effectiveness of electronic flash and flashbulbs is greatly increased. Also, shots that would normally call for time exposures with a slow film can be made at instantaneous shutter settings, eliminating the need for a rock-steady camera support and a motionless subject.

## Speed can reach ASA 1000

If ASA 500 isn't fast enough for you, the new film can be boosted to an effective speed of ASA 1000 with special processing. Latitude—the film's margin for error—is about one stop over or under. This is par for modern color-slide films. Used indoors without the 80A filter recommended for tungsten lighting, the film gives results that are on the warm side but usually not objectionably so—most people like the golden flesh tones you get. With the 80A filter, effective speed is cut to ASA 125.

Anscochrome 500 is processed exactly the same as other Anscochrome films. The GAF Anscochrome Processing Laboratory at Binghamton, N.Y., will process, mount, and return your film by mail for \$1.85. GAF doesn't handle special processing, but there are custom processors that do.

Anscochrome 500 should be used only in cameras having a full range of apertures and shutter speeds. In fact, in very bright sun, unless your camera goes up to 1/1000 second or down to f/22, you have a problem of *too much* speed. It's a nice problem to have. ★ ★ ★



**SOLD IN CARTRIDGES**, Ansco's new super-fast color film can be used in any adjustable 35-mm camera

film is so sensitive that the light from a single candle gives an exposure of f/2.8 at 1/30 second.

Anscochrome 500 is a daylight-type 35-mm transparency film that produces color slides. It is available in 20-exposure cartridges for \$2.95.

Even when there's plenty of light, the film's high speed in many cases produces better pictures than would normally be possible because it lets you take advantage of the camera's most efficient settings. A typical exposure in bright sun is 1/500 second at f/16 or f/22. This means you can use a high shutter speed to stop action and to eliminate camera shake on hand-held shots. At the same time, you can stop way down



## NEW PAINT WONDER:

# Water-Thinned Enamel

No longer must you switch in mid-job to an oil-base paint to do woodwork. New water-base glossy finishes not only save the fuss, but—and here's the surprise—they even outshine and outwear the old standbys

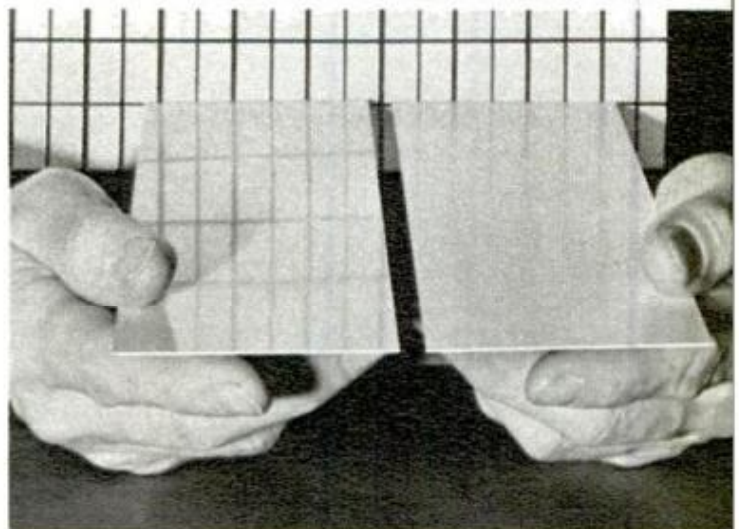
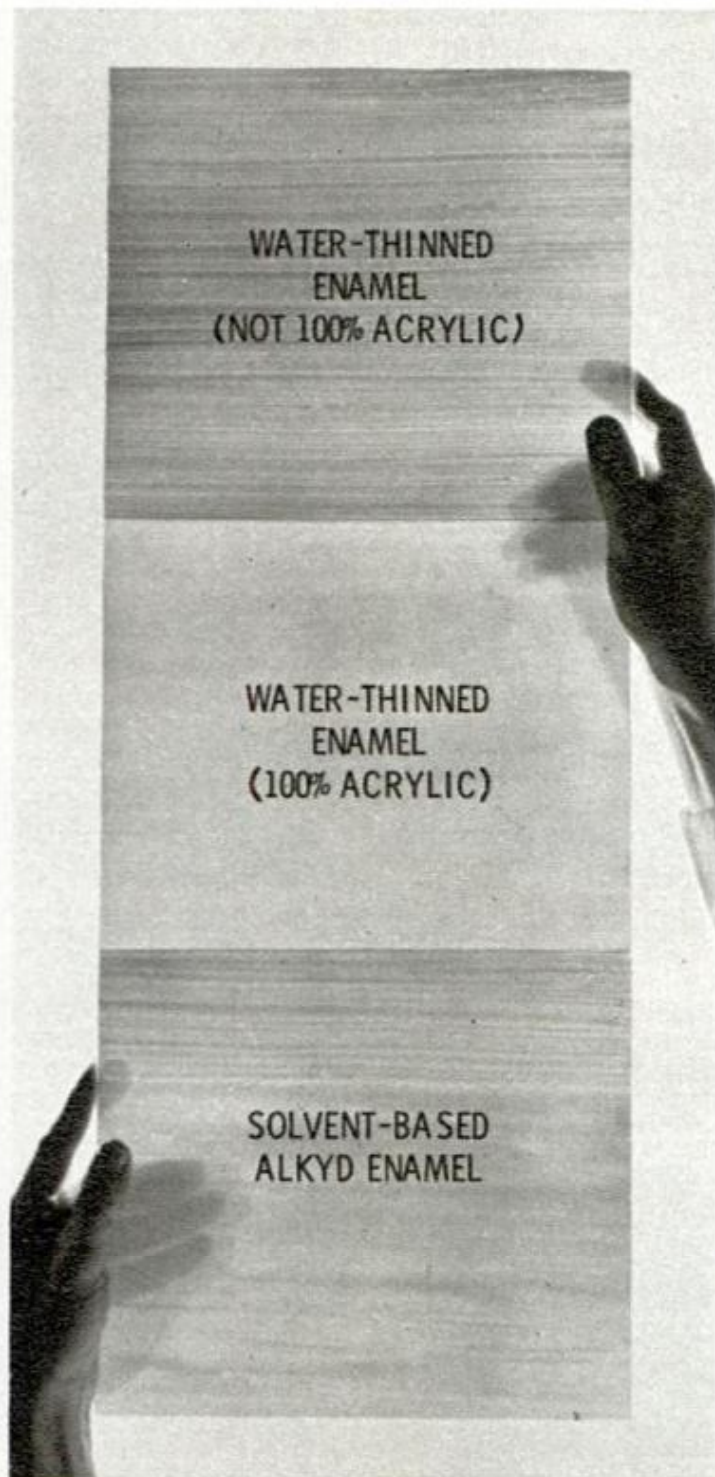
By STEVEN J. HOWARD

**W**ATER-THINNED ENAMELS have arrived. If you've had any doubts about trying them, you can put them aside. The creamy, lustrous, lusciously colored paints are a breeze to apply and a sheer joy when it comes to cleanup time.

Actually, water enamels aren't strictly new. In an earlier form, they've been on dealers' shelves for more than a year. But they've had their problems. The chief complaint against them was that they lost much of their gloss shortly after drying.

But things are different now. Almost

**SMOOTH AND STREAKLESS**, new water-thinned enamel with 100 percent acrylic emulsion (center panel, left) wins hands down against other paint samples in crucial test. Paints were applied to clear plastic, then back-lighted to show up flaws. Below, reflections in the test panel at left indicate that the new enamel has a higher gloss than equivalent solvent-based alkyd enamel on sample panel at right



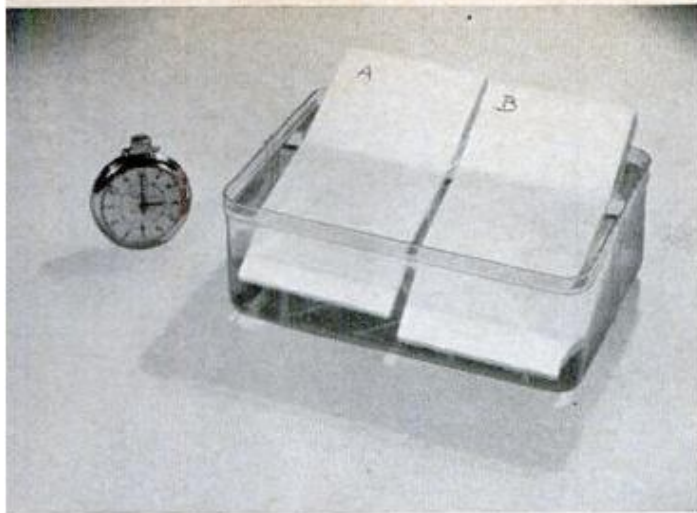




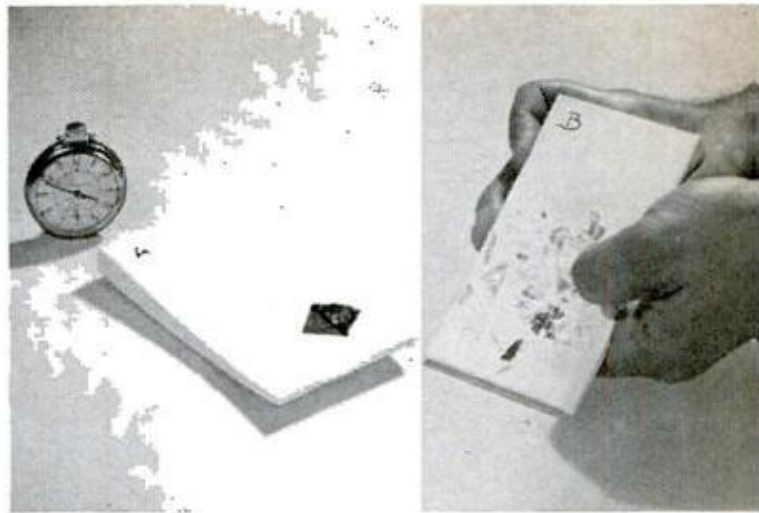
*An enamel-soaked brush gets a fast rinse under a faucet*







**IT STICKS ON BETTER, TOO.** Samples of water-thinned acrylic enamel and a conventional latex enamel are soaked in water for 45 minutes (left, above) to check their resistance to moisture. At



end of test, latex sample (held in hands at right) is badly blistered, while acrylic paint has peeled in only one small spot. Samples were scratched before dunking to let water penetrate their skin

overnight, a change has occurred. Recent tests conducted by members of the National Paint, Varnish and Lacquer Assn. indicate that the new water-thinned glossy paints show a remarkable improvement. They hold a gloss at least as well as, if not better than, oil-base enamels. In other qualities, they are also as good or better than oil paints.

Why the sudden switch? The reason has been the use of a 100-percent acrylic emulsion as the paint's binder. Before this, other emulsions were employed that didn't stand up.

Now you can have the convenience of using water-thinned paints throughout your entire house. You no longer have to switch over to a solvent-based paint to do woodwork or kitchen or bathroom walls. The finish you get is a soft, rich semi-gloss, suitable for use wherever you'd apply a conventional oil-base semi-gloss.

One of the biggest advantages of the new enamels is that they have tremendous resistance to moisture and alkali. Kitchen grease, soap scum, and marks and stains are easily removed with soap and water. Rubbing can't hurt the paint film and won't dull the gloss.

Other features of water-thinned enamels include excellent flow and leveling properties, great hiding power, and good resistance to sag.

All white paints yellow somewhat

with age, but water-thinned enamels hold their whiteness much longer than oil-base paints. And tinted water-thinned enamels retain their original shade without dulling or fading. Water-thinned enamels also have fantastic adhesion powers. Not only do they hold on enamel surfaces, but they also adhere to both new and painted surfaces of virtually every type in your house—plaster, concrete, brick, cinder block, wood, wallboard and metal.

### Two coats in one day

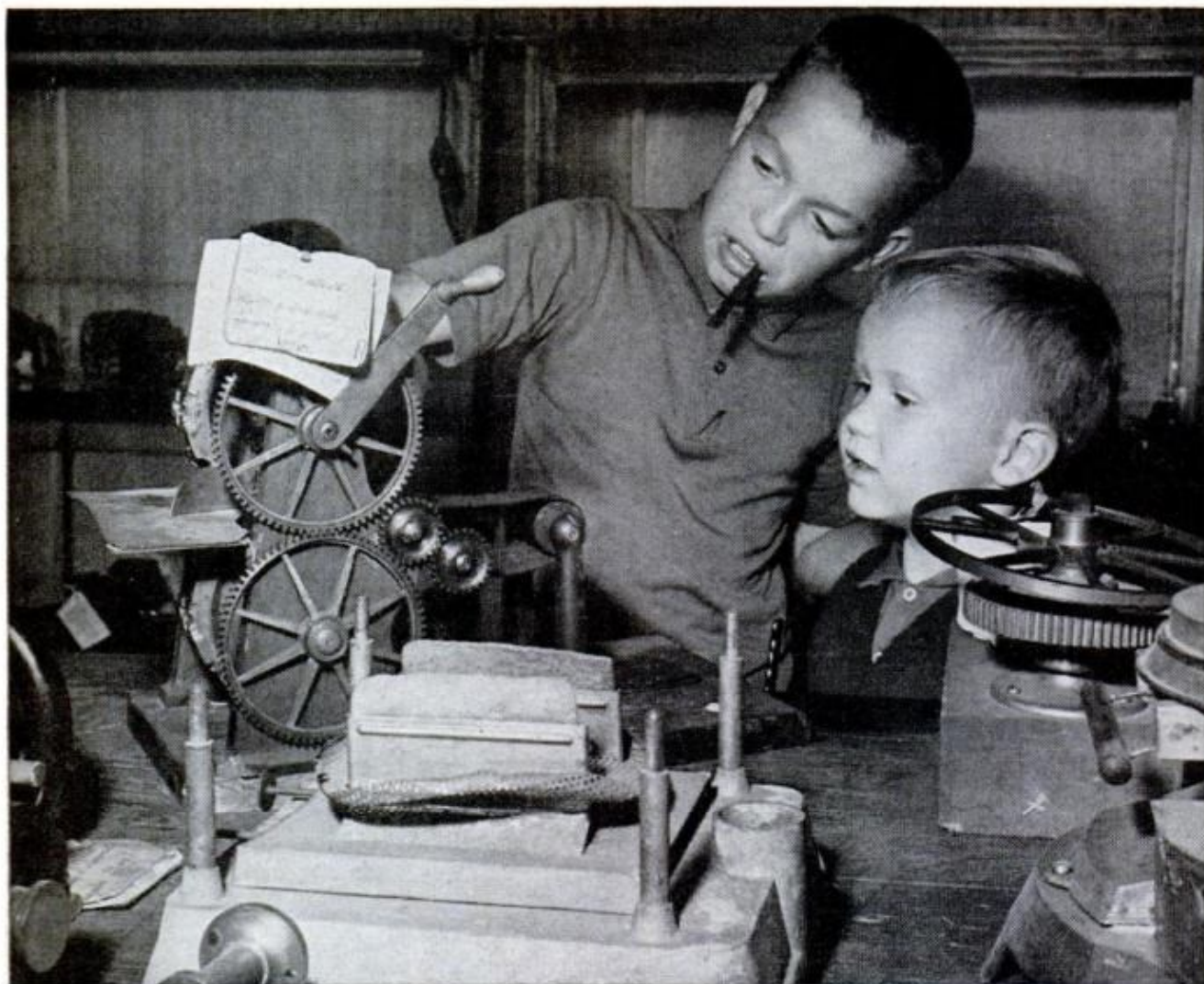
Naturally, other advantages that apply to any water-thinned paint also apply to the new enamels. They dry fast, and cleanup is a snap. Paint drops are washed away, and paintbrushes are cleaned with plain soap and water.

For most purposes, the paint should not need thinning unless you're using spray equipment. In this case, use a *small* amount of water as the thinning agent—one pint to a gallon of paint.

The paint will dry to the touch in two to three hours. If a second coat is desired, wait about six hours before applying it. The surface will reach maximum moisture resistance in 30 days. To play safe, don't attempt to wash off stains any sooner than this.

Most major paint manufacturers produce water-thinned enamels. In selecting a brand, make sure the label says "100-percent acrylic emulsion." ★★★





LICORICE STICK at the ready, young visitor explains model candy-making machine to even younger visitor

# NEW HOME FOR

Thousands of models of inventions once jammed government corridors. Now you'll see them in a converted hospital

By LUCIEN AIGNER



COUNTY HOSPITAL in Plymouth, N.H., was converted into a museum to house 5000 early invention models

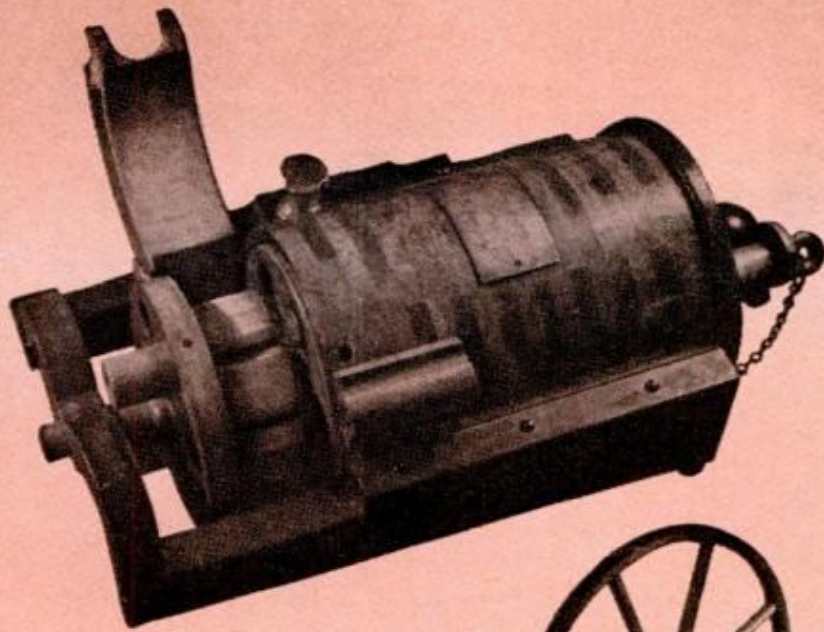
**T**HOMAS JEFFERSON started it. When he was secretary of state, he ruled that applications for patents must be accompanied by a working model.

Fine. But what Mr. Jefferson, as bright as he was, didn't realize was what a monster he had created. Thousands of models came in yearly, and, as they accumulated, harried caretakers at the Patent Office ran out of storage space. Finally, just before the turn of the century, the government rescinded its rule requiring models.

The flow stopped, but the models on

POPULAR MECHANICS





**GATLING GUN**, in wood (above), consisted of cluster of breech-loading rifle barrels mounted parallel to central shaft, according to patent granted in 1862. Portable ladder (right), complete with basket, was patented for picking fruit



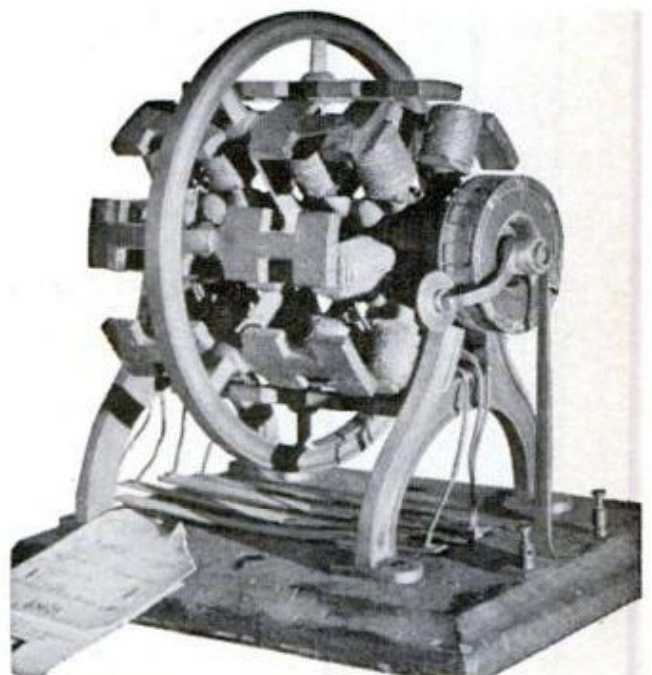
# OLD INVENTIONS

hand—about 200,000—were still a handful. So, in 1908, the Smithsonian Institution was given a few of the good ones, and the rest were offered for sale.

Ha! Nobody wanted them. It wasn't until 1925 that they found a buyer. They passed through several hands after that, until in 1941 an auctioneer, O. Rundle Gilbert, saved them from the scrap heap. Fires and piecemeal sales had reduced the total to 150,000, and of these, 5000 now are on display in a converted county hospital in Plymouth, N.H. The Patent Museum was operated by Gilbert's son, Lisle, until a recent fire closed it. However, a community group plans to reopen it soon.

*(Please turn the page for more photos.)*

AUGUST 1967

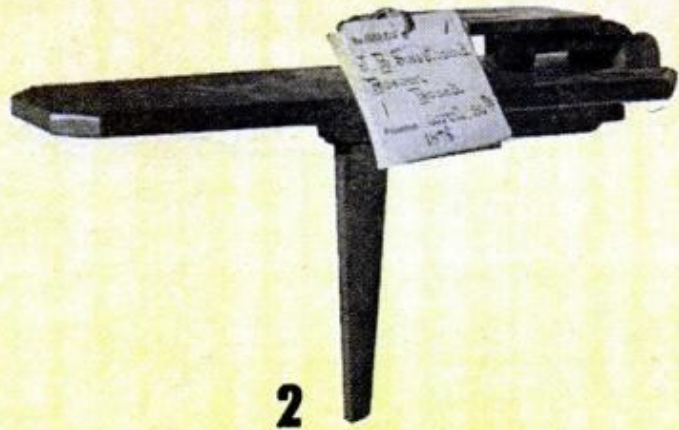


**MAGNETIC ENGINE**, bulky as it is, was forerunner of motors that revolutionized household appliances

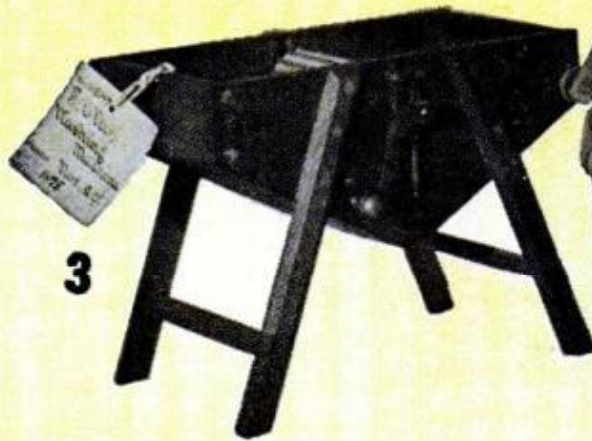




1



2



3



4

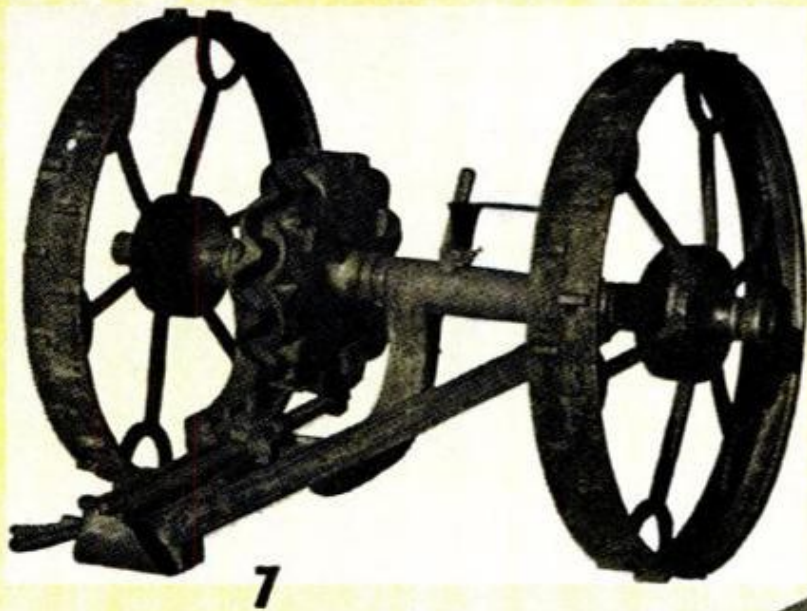


5



6





7

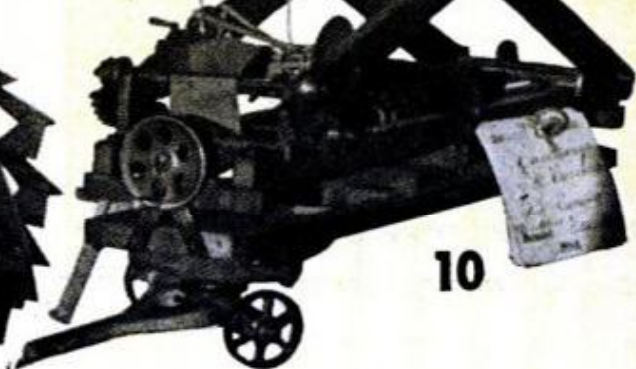


8

1. CLOTHES DRYER, patented in 1860, resembles those still being used today, more than 100 years later
2. IRONING BOARD, called "bosom board," made one of housewives' weekly chores just a little easier
3. WASHING MACHINE duplicated scrubbing action by rubbing two corrugated washboards together (1875)
4. ANOTHER WASHING MACHINE used similar rubbing mechanism but also included wringer for squeezing
5. ORNATE METER was carried on early trolley cars to record number of passengers cars were carrying
6. EARLY "REFRIGERATOR," with lazy-Susan trays, was really just another fancy, but practical, icebox
7. RATCHET ON WHEELS of farm machinery was intended to prevent them from rolling away if untended
8. EARLY LEVER SCALE (1878). Tag, put on models by museum, carries brief description and dates
9. ENDLESS CHAIN SAW, patented in 1880, was intended for use in forestry, although very primitive
10. THIS, believe it or not, is a ladder meant to rescue victims trapped in tall burning buildings



9



10



# HOW TO SPOT A GOOD USED GUN

**When you buy a secondhand firearm, you'll get more gun for less money if you follow these tips from an expert gunsmith.**

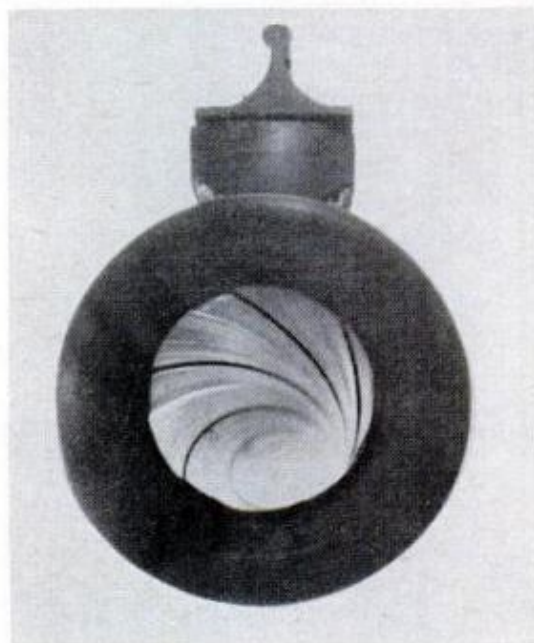
By **JUDSON S. DARROW**

**Y**OU CAN'T KICK TIRES to find out the condition of a used gun. Buying a secondhand firearm takes a bit of know-how, but it's not hard to learn.

Unlike cars, guns can hold their value for decades if properly handled. But like cars, a number of things can go wrong—things you may overlook.

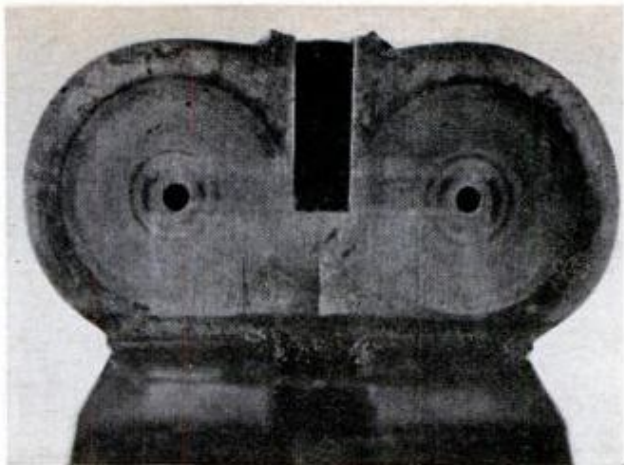
Select the type gun you want. Remember, some models are outdated. Spare parts and ammunition may be hard to find.

Once you've selected the type, give each gun you find a thorough inspection. What follows are basic pointers to help clear up the confusion on used-gun buying.



**RIFLING**, magnified here eight times, should be well defined, not rounded or washed out. Pitting or rusting can cause roughness in grooves or on lands in a neglected barrel. This can be corrected, if not too bad. But bulging in rifle or shotgun barrel is a sure sign of ruin. A high-velocity barrel, ending its accuracy life, will have rounded rifling at the breach, even though the muzzle may show but little wear





**ROUND SHELL-HEAD MARKS** on the breech face of this double-barrel shotgun indicate a lot of use. Bulges, when present around firing-pin holes, mean extensive dry firing without protection of snap caps. A pitted ring right around hole can mean much use with corrosive or leaky primer cartridges. Leaky primers can also cause locking mechanism to corrode and weaken

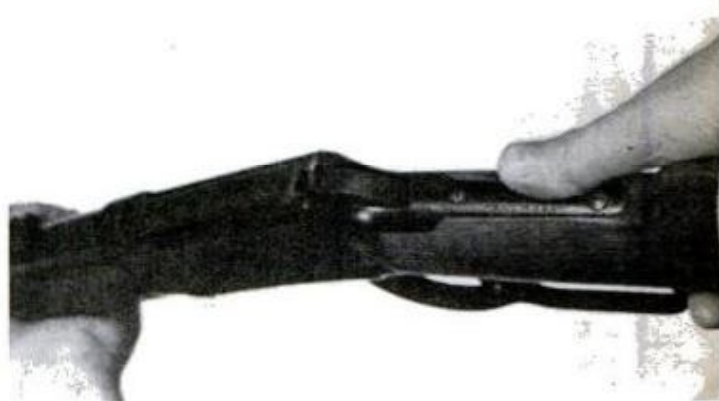


**BURRED SCREWHEADS**, scratches and pits are always giveaways to unskilled tinkering—especially when a gun has been refinished. Sometimes it's better and cheaper to get an undamaged gun with worn but original finish. A good gunsmith can always refinish a piece properly, and he will probably charge you less than for repairing an amateurish refinishing job



**MANY BARRELS**, rifle or shotgun, are so attached to the receiver that you can't point one end at a light and look through the other to inspect barrel. So to get enough light in the barrel, take a piece of white paper, insert it in breech and reflect light off paper down barrel while looking through open end

**DO NOT USE** smokeless-powder shells, like this one, in barrels that have fancy patterns. Shotguns with patterns like the Damascus barrel of this old Parker are not safe for modern factory or hand-loaded smokeless shells. Even lightly loaded smokeless powder shells are unsafe in old iron barrels. Only black powder shells can be used in barrels with patterns



**INSPECT STOCKS** for tightness. Place thumb on tang so as to touch both wood and metal. Twist gently back and forth. If there's any play, you may find the through-stock bolt only needs tightening. Or you may find that the stock is cracked or split at the tang. If this is the case, it could require stock repair or the complete replacement of the entire butt stock

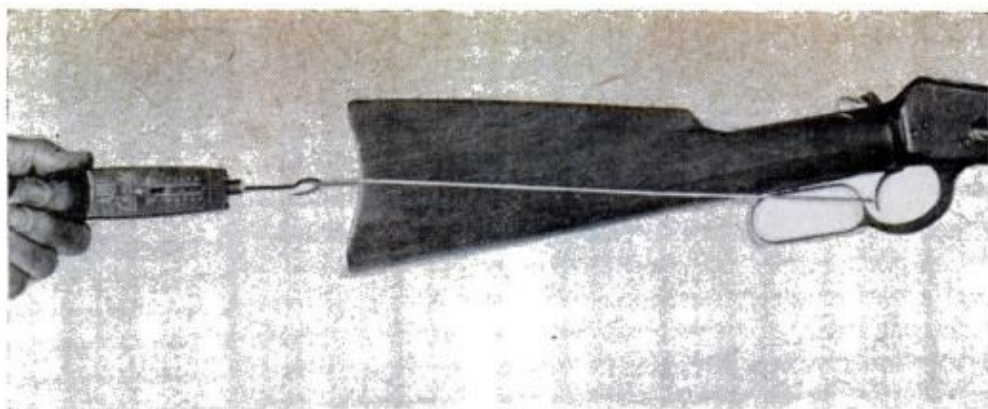


**INSPECT BARREL** for tightness. A gentle twist-and-bend motion will let you know if there's any give between barrel and the receiver. If there is play, determine if it can be removed by taking up on the adjustment found on most models. If not, there may be a serious fault with the particular firearm you are considering at the time. Tightness here is important





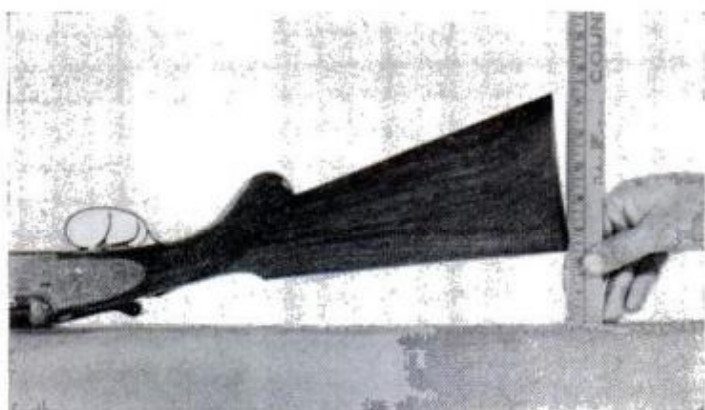
**THE SAFETY** on most hammer guns is with the hammer half cocked. With the hammer in that position, the trigger should be able to withstand a hard pull. When hammer is out of safety and fully cocked, it should not fall forward if given a hard push. Make sure when you're making this test the gun is unloaded



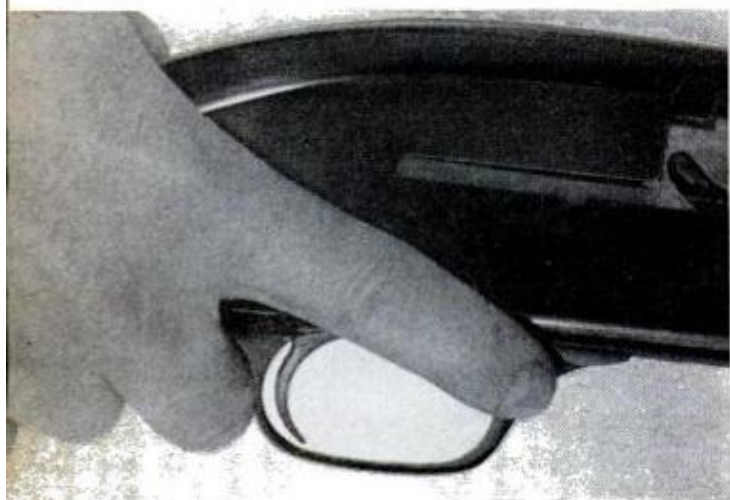
**CHECK TRIGGER PULL.** It's unsafe to have a trigger pull that's too light, and it's difficult to shoot with one too tight. A good average weight for rifles and revolvers is three pounds. Most semiautomatic rifles and shotguns should have a 4½-pound minimum pull. Check pull with string tied to a fish-weighing scale



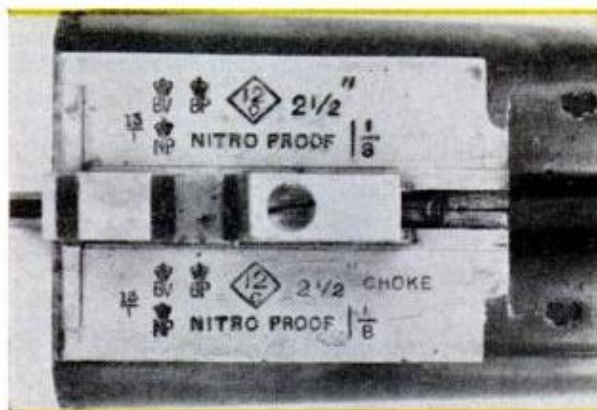
**SAFETIES** of this type are best because they actually lock the firing pin. Failure of this safety to work smoothly means that parts of either the trigger mechanism or the safety need adjustment or replacement. Test this by turning the safety lever to "safe" and pulling the trigger. Relax pressure on the trigger and push safety to "fire." Firing pin should not fall



**MEASURE STOCK HEEL DROP** by laying gun on a table. Stock fit is more important to shotgun shooters than riflemen, but if drop is too much, it will cause undershooting and increased recoil effects to both. Today, it's felt that an average stock of 1½ by 2½ by 14 inches with a 1½-inch drop instead of 2½-inch shown here will fit most people. Most older American-made guns have an excessive stock drop



**SHOTGUN SAFETIES** of the cross bolt (shown here) or top tang variety only lock the triggers and are less safe than those that lock firing pin. These safeties should move freely between "on" and "off" positions, but stay in position they're placed. Test by putting safety "on" and pulling trigger. Relax pressure and switch safety to "off." Firing pin should not fall



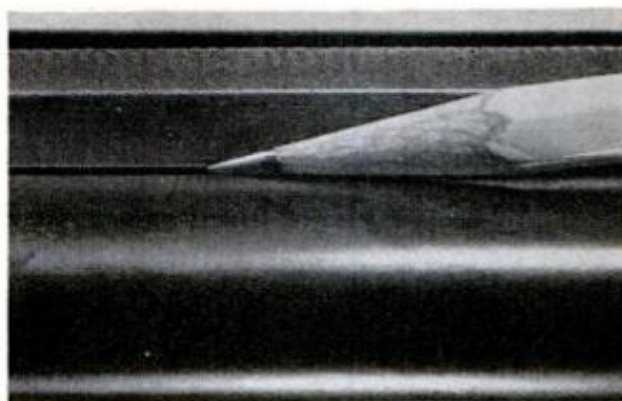
### FOREIGN PROOF MARKS

**SEVERAL FOREIGN COUNTRIES** require government testing of guns made in that country. The guns are checked then fired to see if they meet standards. American-made barrels are proofed by each company with necessary information stamped on exposed surface. But some foreign





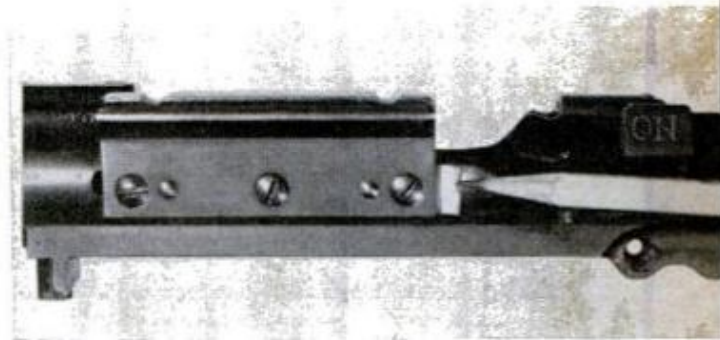
**IN ANY REPEATING** or semiautomatic gun, check the operation of the various systems. Using dummy shells, make sure that feeding, fire, extraction and ejection are normal. Always, if possible, fire the gun to test out the actual operations before you buy it. A side-light to remember—it is against the law to have any gun that has had the name or serial number changed or removed. So don't get involved with such guns



**A LOOSE SIGHTING RIB** on a shotgun is expensive to repair. An overheated barrel or salts found in some blueing processes can cause deterioration of solder that holds the rib to the barrel. Note pencil pointing to such a crack in this photo. Any gun that has the shiny black finish characteristic of blue containing salts should be examined very carefully for this defect. A loose rib may also be a sign of harsh gun treatment



**THE AUTOMATIC EJECTORS** of double-barrel shotguns should be tested with empty shells. Many of these ejector systems are selective—only the fired shell will be ejected while the unfired shell will be withdrawn sufficiently for you to grasp with your fingers. Both ejectors should trip at the same time. Fired shells should be thrown in the same direction. Malfunctioning ejectors are not easy to adjust. Repair is costly



**A RIFLE WITH A SCOPE** is no better than the scope mount. Pencil points to blotting paper shim found under one end of this side-mounted base. Shims are an indication of a botched mounting job, costly to repair. Where mount holes are drilled directly into barrel, there's always the possibility that the drill went into the bore. If this happened, the barrel's worthless

makes, like this English Web'ley & Scott, have marks concealed. This shotgun was manufactured before 1954 when there was a recodification of symbols. Here's what each symbol means.

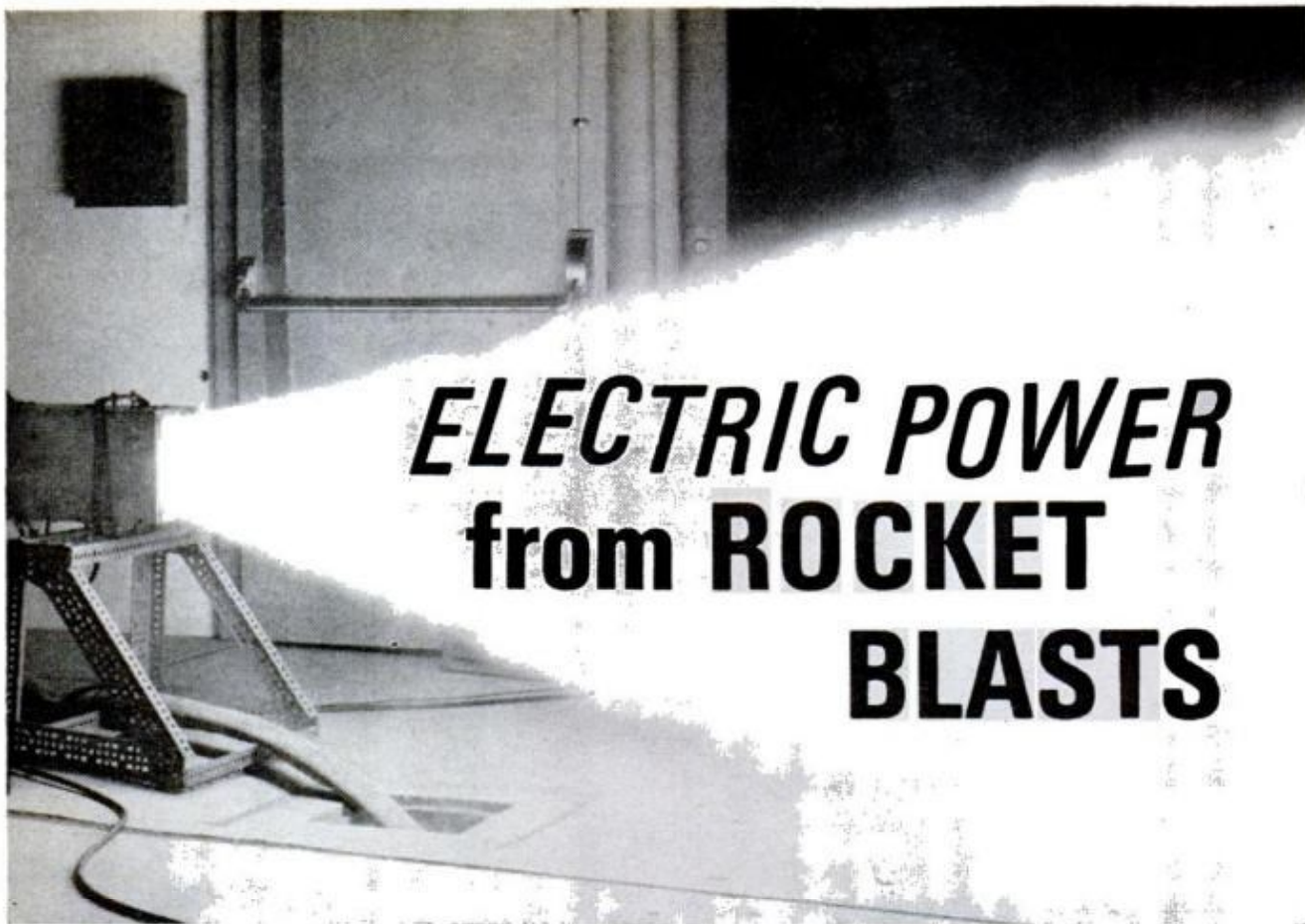
The "13/1" indicates size of bore for nine inches from the breech face. This test assures proper bore diameter for specified gauge. The "BV" under a crown means the barrel has passed visual inspection by the Birmingham proof house. The "BP" means it has passed firing (proof) tests. The diamond enclosing a 12 over a C indicates a 12 gauge barrel with a chamber less than three inches long. The "2½" means the chamber will take nothing longer than 2½-inch shells. (Note: these shells are hard to come by in this country. Most shells made here are 2¾-inch or 3-inch.)

"NP" under a crown means the barrel can handle smokeless powder, while the "Nitro Proof" shows that smokeless powder shells have been fired in the barrel. The "1½" indicates the weight in ounces of pellets fired through the barrel. "Choke" on the bottom barrel means there's a .004-inch restriction. Word on the top barrel means no choke. This choke-no-choke arrangement is normal on double barrels.



**TRUE CUSTOM RIFLES** or sporterized models can be the best bargain on the market. In many cases more care is taking in customizing than is taken at the factory. But beware. Many so-called custom or sporterized models are but poor imitations. Poorly bedded stocks or faulty workmanship hurts accuracy. Thoroughly inspect custom guns





# *ELECTRIC POWER* from **ROCKET** **BLASTS**

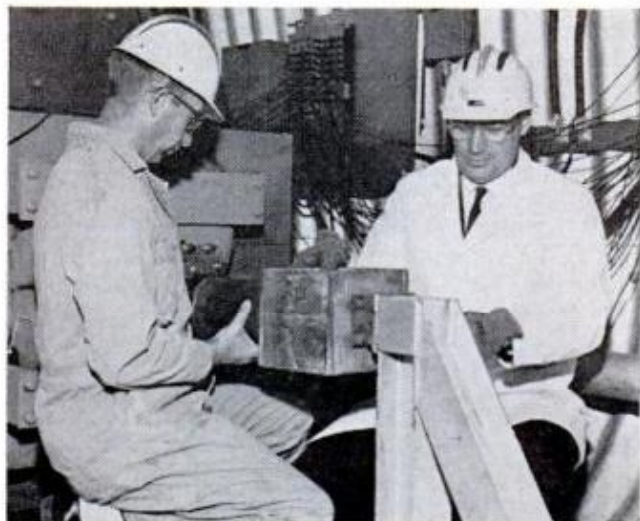
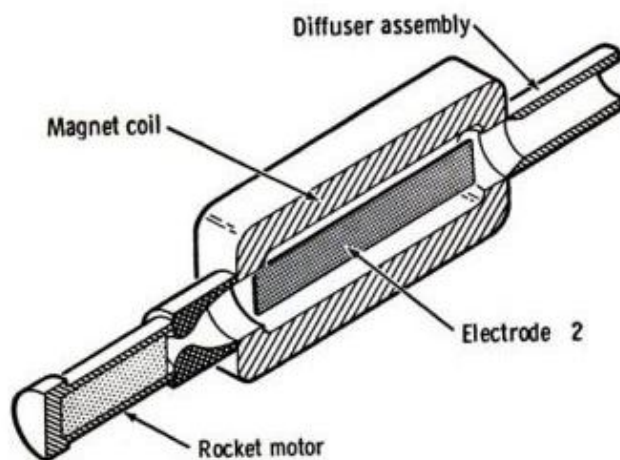
**S**OLID-FUEL ROCKET BLASTS have recently produced extremely high bursts of electrical power, and the applications seem extensive

The hot gas, traveling at more than a mile a second, is first seeded with an alkali metal to make it conductive. Then the gas is directed through a tunnel surrounded by a dense electrical field—a four-ton magnet creates the field in these tests. So the stream of gas, in effect, replaces a cumbersome spinning armature. Graphite electrodes in the tunnel carry off the electricity produced.

The tunnel, although only about five feet long, generated 1½ million watts of power for about one second with 10 pounds of solid fuel.

In actual applications of this system, engineers envision burning 250 pounds of fuel per second for as much as several minutes. Such blasts would generate about 300 million watts of power.

Suggested applications include laser bursts (already tried successfully), particle accelerators, or power sources for space travel. ★ ★ ★

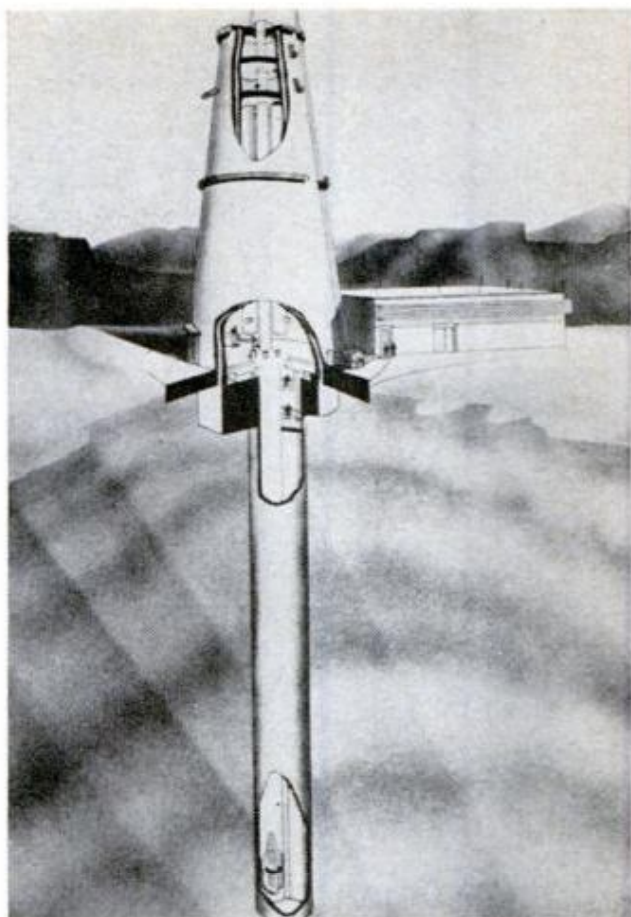






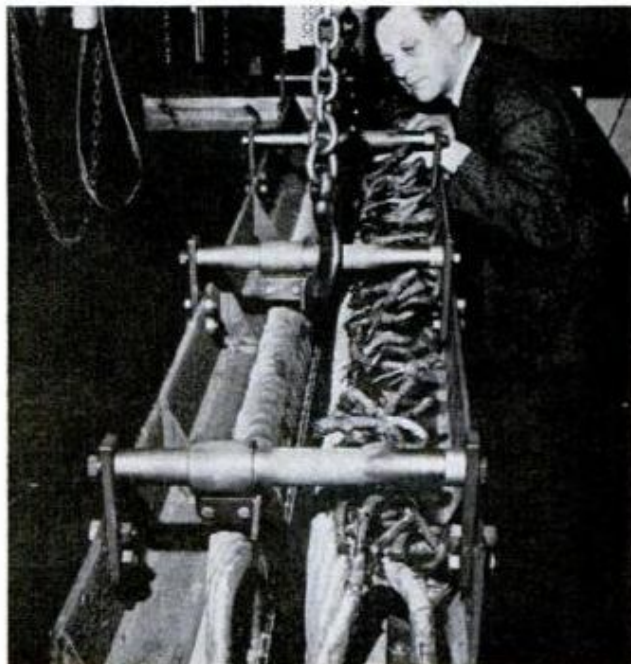
### Tricycle bed

Made from an antique bedstead, this custom-built tricycle is the work of a St. Petersburg, Fla., hobbyist who specializes in unusual vehicles including cars made from bathtubs.



### Vacuum telescope

Built in a vacuum to eliminate air turbulence and dust, a solar telescope will be used to study sunspot activity and other solar phenomena. It's now being built in New Mexico.



### Linear motor may move train up to 150 mph

At London University, Prof. Eric Laithwaite has built a working model (left) of a rail car driven by a linear motor. The motor uses no moving parts but propels a vehicle by fitting an electromagnet over an endless metal rail and constantly changing the electromagnetic field. The train can accelerate as fast as the passengers' comfort will allow, and the motor (shown in large scale, right) can generate twice as much power, weight for weight, as an ordinary motor.



# TREASURE FINDERS: Do they really work?

By ERIC JENSEN



**ELECTRONIC SNOOPING** with a modern metal detector can be an exciting treasure hunt as history seems to come alive in the form of old coins, Indian tools, Civil War relics and other long-buried artifacts of past generations. Here an amateur prospector probes the ground around an abandoned mine dating back to Frontier days. Such mining sites are often rich hunting grounds for old tools, guns, even real nuggets of gold. Detectors like the one shown at left are light, easy to handle and operate anywhere on batteries. They start at less than \$100, and often pay for themselves quickly in locating valuable objects that can be sold to collectors

**Y**OU'LL HEAR A LOT of tantalizing claims about the wonders of electronic treasure finders. "Locates any metallic object of value!" promises one enthusiastic maker, citing a happy customer who dug up a cache of forgotten coins. "Will detect buried treasure, placer deposits, etc." Some claims proudly boast that you'll be able to detect paper money, blissfully ignoring the fact that the detector will do an equally good job on any heavily inked piece of trash.

What's the real lowdown on these tempting gadgets? "Oh, I found a lot of scrap—junk, mostly," reports one dissatisfied user. "It sure doesn't work the way they claim in the stories."

"Treasure?" grins another. "Well, I call it that. I've found old pistols and curling irons—things I could sell if I wanted to. But that's not the point. The fact is, I've had more fun with this gadget than anything in years!"

Obviously, there is a lot of well-founded dissatisfaction with some



claims made for treasure finders, but the fact is that they have probably made history real and provided outdoor fun for more people than any other recent invention. In addition, genuine treasures *have* been found with their help—along with much hard work.

Actually, electronic snoopers are anything but new. It has just taken time, today's abundant leisure, and transistors to bring them into popular use. The first real detectors were bulky, vacuum-tubed affairs hardly suitable for beachcombing. During World War II, they served well in ferreting out mines and unexploded shells.

Today, smaller units, better in every way, have rightly captured the market and the public imagination. Two main types of detectors are commonly used, both operating on the principle of establishing a normal electromagnetic field and then signaling any distortion of that field. To detect this distortion, one employs a "beat-frequency" setup of two oscillators or an induction balance arrangement between two coils. This horizontal-loop detector is read-

ily recognized by the saucerlike search coil dangling on the end of a handle and held close to the ground.

The other common unit is a combination of a low-powered transmitter and a sensitive receiver looking like two cigar boxes on opposite ends of a pole. The lower-priced beat-frequency detector should cost less than \$100 and can be put together by a good home craftsman for less than half this amount. It consists simply of two oscillator circuits, one with a stable frequency and the other variable. Oscillations from both are fed into a transistor that detects any difference in their frequencies and feeds the difference to an amplifier. Say this difference is between 1000 and 1009 kilocycles. The difference thus becomes an audible beat of nine per second.

What makes the one oscillator vary in its frequency and thus generate this alarm so dear to the heart of the treasure hunter? A search coil contained in the horizontal saucer generates an electrical field. This field becomes part of the circuit. If metal, mineralized soil, water or anything else enters this field and changes its character, the in-



**RADIO-TYPE DETECTOR** has a loop at each end of a pole. Signal broadcast from one loop bounces off metal objects and is received by the second loop



**BEAT-FREQUENCY DETECTOR** has a single loop at the end of a pole. It sets up an electromagnetic field that indicates the presence of metallic objects



ductance of the coil likewise changes. The resistance of the circuit also changes, which affects the frequency of the oscillations. A transistor picks up the difference between this and the stable oscillator, the signal is amplified and—bingo!—off goes the alarm.

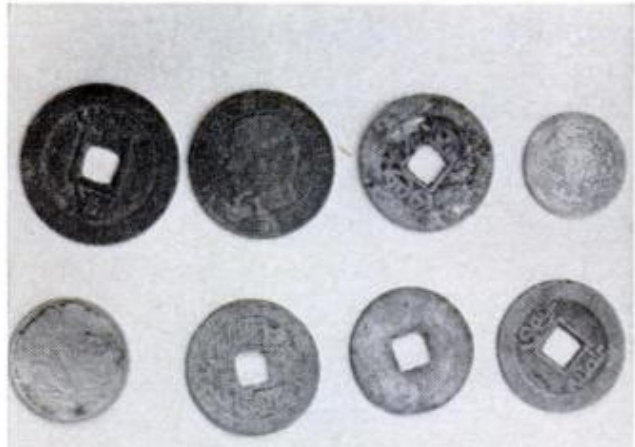
The somewhat more sophisticated induction-balance detector picks up any disturbance of the search coil's field by means of a "balanced bridge"—two coils, one shielded, whose induced currents are compared. Many of the major manufacturers have turned to these units as being more reliable. Prices here should start where the "beat-freak" models leave off and go to \$150 to \$175.

It bears repeating that almost anything will affect the search coil's field, however slightly, if the coil's sensitiv-

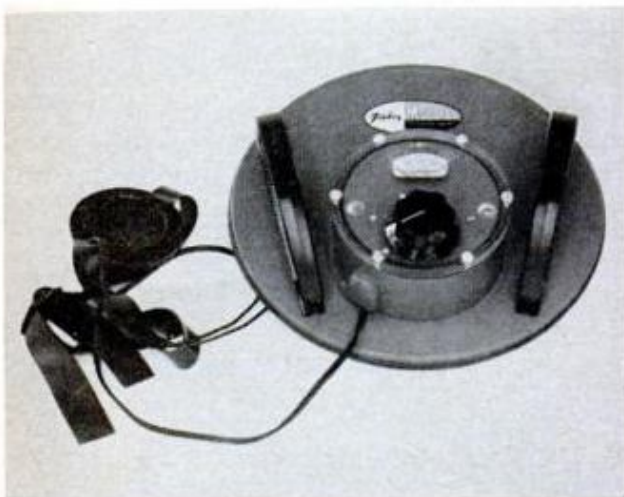
ity down somewhat, it wouldn't register at all.

Obviously, a critical factor here—perhaps most critical—is the tuning

*(Please turn to page 174)*



**OLD COINS** like these are a common find in abandoned western towns. Coins with holes are Chinese



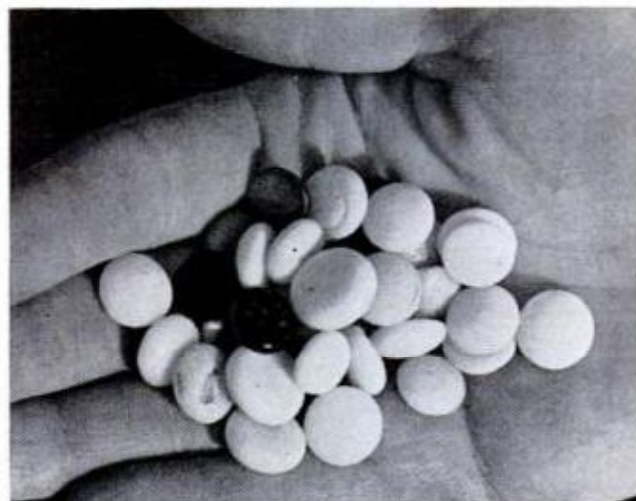
**SPECIAL UNDERWATER DETECTOR** can be used by divers as much as 100 feet deep in a lake or ocean



**RARE CHINESE OPIUM BOTTLES** were found along with old metal objects that triggered a detector

ity is sufficiently high. One salesman demonstrating a "money-meter" drops a five-dollar bill on the floor, tunes his detector and, sure enough, as the coil passes over the bill, a distinct change in the frequency of the beat is heard!

"Sensitive to any kind of money," the operator beams, failing to mention that the gadget would react in much the same way to a copy of *PM*, a Confederate dollar, or a heavily inked court summons. Also, if that paper were buried or even just lying in an area of strong background disturbance requiring you to tune the locator's sen-



**THESE POLISHED PEBBLES** used in Chinese games turned up along with old coins in the Utah desert





## Largest, fastest helicopter enters Air Force rescue service

Designed for long-range rescue missions, the new Sikorsky HH-53B helicopter will be the largest and fastest in the Air Force inventory. It has a normal gross weight of 17½ tons, including seven tons of useful load, and can reach speeds of 195 mph. The nose boom is for mid-air refueling from standard tanker planes on long over-water flights.



## Plug-in sleep

Put on like spectacles, with one set of electrodes on the eyelids and another behind the ears, a sleep inducer sends weak pulses to the brain so that the patient gradually relaxes, his breathing slows down and deepens and he eventually drifts off into sleep. The device is being tested in clinics in London as an answer to sedatives.

## Stereo sofa

Two channels with three seats is the latest furniture design from Italy. The new sofa has built-in FM stereo as well as built-in ashtrays and cigaret boxes, so you can sit, smoke and listen. The 10-foot-long three-seater retails at \$1500, complete with wheels to roll it from one room to another.







# DODGE Polara: Thirsty diamond in the rough

By Bill Hartford, Associate Auto Editor

**T**HERE'S A MAN in Newport News, Va., a designer, who owns a 1967 Dodge Polara. During hot weather he's very unhappy with his car. Whenever he reaches for the ashtray to flick the burned ashes off his cigaret, cool air from the strategically placed airconditioner ducts beats him to it and blows them all over the car. It's a humorous and small design point, but an annoying and potentially dangerous one.

On the nuts and bolts side of things, he adds this about workmanship:

"Overall, very good. Lot of small items overlooked or rushed through by factory, however."

Otherwise—as far as handling, comfort, ride and style are concerned—he feels he's got a gem of a car. He doesn't have any dissatisfaction with his 12 miles per gallon around town with the 383-cu.-in. engine, even though other owners in the same boat (219.6 inches stem to stern!) are so unhappy about their engines' thirst that economy logged in as the number one complaint from Polara owners.

Couple this fact with the number two dissatisfaction, poor workmanship, and contrast them with lots of praise of handling, comfort, ride and style, and you've got a car that the majority of



Polara owners feels has basically fine qualities, but is somewhat lacking in the fine polish of careful workmanship and a bit rough on their fuel budget—truly a thirsty diamond in the rough.

The economy complaints receive additional validity if we can apply the variously researched and reported correlation of driver age with acceleration away from traffic lights. The highest percentage (19.1) of Polara-owning respondents was between 45 and 49 years of age, and as every traffic study will tell you, drivers in this age group are more disposed to driving as if they were in an economy run rather than in a run for the money.

Mileage averages for the 318-cu.-in. V8 were 13.3 and 16.5 mpg, around town and on long trips, respectively. With the 383-cu.-in. V8, figures were 12.5 and 15.2 mpg, respectively. Not enough respondents (1.5 percent) had the 440-cu.-in. engine for us to tally mileage figures on it. The 383 engine was ordered by 80.0 percent of owners and the 318 by 17.7 percent. (The Polara isn't available with a Six.)

Remarks from owners about the amount of gas they're burning up were mostly ones of surprise. (The boldface asides are mine.)

"I expected much better gas mileage."—Maryland insurance man.



**LARGE TRUNK** gets 100-percent vote of praise from Polara owners. But design of taillights and high trunk ledge that results received some complaints

►He's getting 11 mpg around town and 14 on the open road.

"Bad on gas. I plan to try and get it corrected; the dealer said this is pretty good but I wanted about 14 mpg."—Georgia telephone company employee.

►He, too, is getting 11 mpg around town.

"Uses more gas than the dealer said it would use."—Florida minister.

►Chances are he's not a member of your congregation, reverend, but if he is, raise his pledge the difference!

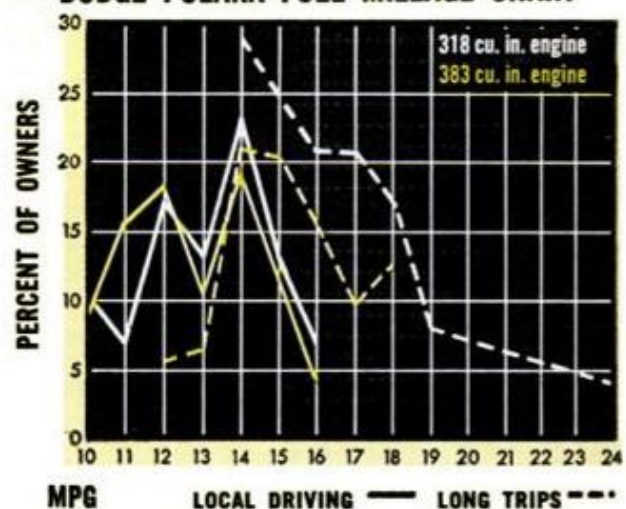
A Massachusetts chemical engineer, getting 12 and 15 mpg around town and



**VERY COMFORTABLE CAR** was opinion of almost all owners. Random criticism focused on size of glove compartment, dash design and glare from horn ring

AUGUST 1967

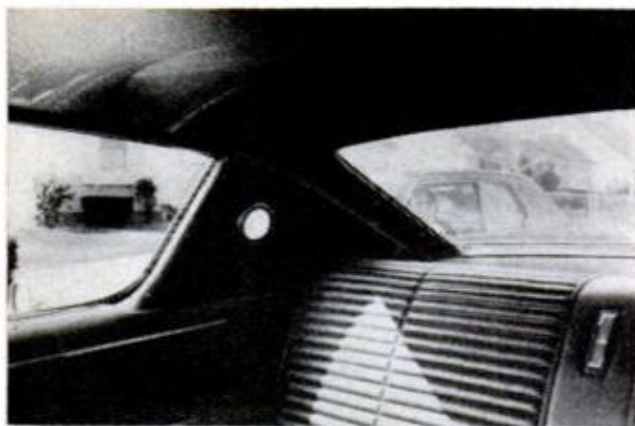
#### DODGE POLARA FUEL MILEAGE CHART



**MILEAGE FIGURES** for most popular 383-cu.-in. V8 and 318 V8 engines were biggest source of complaint from owners, most of whom expected more

117





**REAR VISIBILITY** was one of the things owners would like to see improved on the Polara. Part of the problem results from roof line at rear quarter panel

on long trips, respectively, with a 383 V8, sums it up again: "Poor gas mileage—at least, poorer than I expected."

Somewhere along the line Polara owners, and car owners in general for that matter, are being misled as to the mileage that they can expect from their new car. If they didn't expect more than they're getting, they wouldn't be so critical of economy. Maybe because a car is new, they optimize the miles they'll be able to stretch out of a gallon; perhaps friends with similar-sized engines exaggerate the mileage they're getting (a most interesting psycholo-



**WORKMANSHIP** could be greatly improved, according to owners. Complaints include out-of-line and poorly fitting doors, moldings; rattles and poor paint

ical phenomenon). Whatever the reason, most of us, even "economy" car owners, are too optimistic about mileage figures and are consequently disappointed when we start filling up.

On the plus side, handling is the thing owners like best about their Polaras. Of course, a look back at the '67 model year cars surveyed by the *PM Owners Report* over the last seven months reveals that handling was almost exclusively the best-liked feature of every one. This is only by way of saying Detroit engineers have arrived

*(Please turn to page 188)*

## Summary of Dodge Polara Owners Reports\*

<b>Total miles driven</b> ..... 1,106,258	Carburetor ..... 11.8	Plymouth ..... 13.0
<b>Average mpg:</b>	Air conditioner ..... 8.4	Rambler ..... 8.7
318-cu.-in. engine ..... 14.9	Electrical (general) ..... 6.7	Polara (another) ..... 7.0
383-cu.-in. engine ..... 13.8	Transmission ..... 5.9	Volkswagen ..... 6.1
<b>Specific likes:</b>	Windshield wiper ..... 4.2	Pontiac ..... 4.3
Handling ..... 46.3%	Accelerator pedal (stuck) ..... 4.2	Chrysler ..... 3.5
Comfort ..... 39.9	Muffler ..... 4.2	Valiant ..... 3.5
Ride ..... 34.6	Wheel alignment ..... 4.2	Triumph ..... 2.6
Style ..... 33.5	Faulty gas gauge ..... 4.2	Mercury ..... 2.6
Performance ..... 21.3		Ford pickup ..... 2.6
Power ..... 19.1	<b>Dealer service satisfactory?</b>	
Economy ..... 10.6	Yes ..... 67.0%	<b>Got front disc brakes?</b>
Roadability ..... 9.0	No ..... 27.0	No ..... 75.0%
Interior room ..... 8.0	So-so ..... 3.5	Yes ..... 25.0
	"Not back yet" ..... 2.6	<b>Power options:</b>
<b>Specific dislikes:</b>	<b>Why the Polara?</b>	Steering ..... 98.6%
Economy ..... 32.9%	Past experience ..... 41.0%	Brakes ..... 72.8
Workmanship ..... 22.9	Price/value/trade-in ..... 26.5	Seats ..... 6.1
Brake action ..... 11.4	Style ..... 18.0	Windows ..... 0.9
Dealer service ..... 9.3	Size ..... 15.0	Rear window (wagon) ..... 70.0
Road noise ..... 8.6	Engine performance ..... 9.0	<b>Age distribution of owners:</b>
Wind noise ..... 7.9	Comfort ..... 6.5	Under 20 ..... None
Brake noise ..... 5.7	Weight ..... 5.5	20-24 ..... 1.9%
Power steering ..... 5.7	Referral/reputation ..... 5.5	25-29 ..... 7.2
<b>Had mechanical trouble?</b>	<b>Buy another Polara?</b>	30-34 ..... 9.6
Yes ..... 57.1%	Yes ..... 85.4%	35-39 ..... 12.4
No ..... 42.9	No ..... 14.6	40-44 ..... 12.0
<b>What kind of trouble?</b>	<b>Other cars owned?</b>	45-49 ..... 19.1
Brakes (general) ..... 13.4%	Dodge ..... 23.5%	50-54 ..... 14.3
Brake drums ..... 11.8	Chevrolet ..... 19.1	55-59 ..... 7.7
	Ford ..... 14.8	60-64 ..... 7.2
		65 and over ..... 8.6

\*Where applicable, percentages may not add up to 100 percent due to rounding and/or insufficient sample.





### First aid for burns

A sheet of polyurethane foam is being used as a first-aid dressing for burn victims in Britain. Wrapped around the patient and pinned in place, the sterilized Roehampton dressing protects the burned areas and helps reduce the danger of infection. The blanket has only minimal adherence to the body.



### Tree does a headstand

This tree is upside down. Why? Well, it used to grow right-side up, but it got in the way. They sawed the top off and dug it out by the roots. Then they changed their minds and stuck it back in the hole with the roots up. And that explains why it's upside down. It's in Salzburg, Austria.



### Jacket with flashing lights protects wearer

Four flashing lamps—two on the front and two on the back—make the wearer of the Flashjac highly visible at night. Two 4½-volt batteries inside the garment (one battery pocket is shown at right) give six hours of continuous lighting. The four lights flash in sequence, sending out a total of 240 flashes per minute. Policemen are already using the jacket in Britain. Other possible users are signalmen at airfields and railway workers.







## NOW WE CAN TEACH

**I** FLEW THE OLD ONE, and I flew the new one and, believe me, the new one is better.

The old Link Trainer, the bane of every World War II pilot's existence, was a good old bird in its day, but I never knew a man who could master it. I couldn't.

Its controls were sluggish. It took lots of nudging to maneuver it, often too much, so that when it finally responded it would overmaneuver, while the three-wheeled "crab"—the mechanical recorder that crawled over a map on a table—faithfully traced your every mistake.

The new one is much more sensitive to the touch, so that any mistakes now are much more likely to be your own.

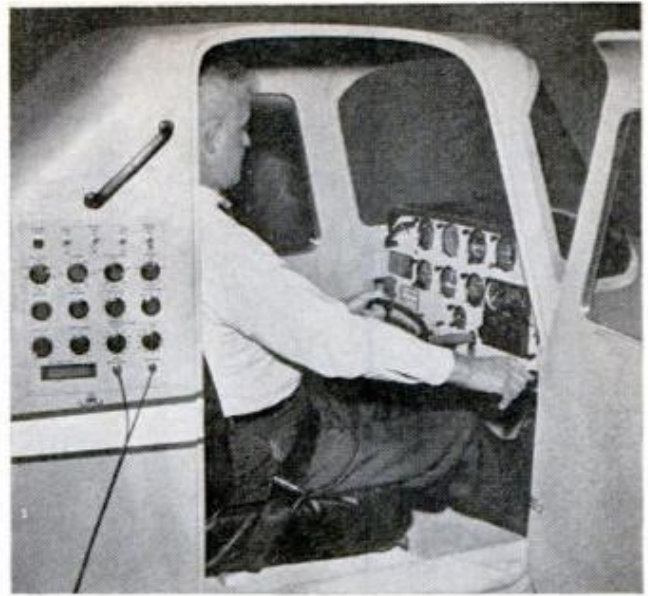
The new GAT-1 (for general aviation trainer) is other things, too, mostly real-

istic. Where the old one was primarily an instrument trainer for "blind" flying, the new one is an all-around trainer that can teach just about all phases of flying without ever leaving the ground.

Its instrument panel is complete with all the instruments found in a standard single-engine plane, and their readings are true. Pull the nose up, the altimeter and rate-of-climb indicator go up and the air speed goes down. In fact, if you pull the nose up high enough and long enough, the GAT "stalls," complete with shudder.

A second set of dials outside the cockpit door allows the instructor to take out normal effects or feed in abnormal effects. For instance, if he were teaching turns, he could turn off pitch control so the student pilot could make his turns straight





AT THE CONTROLS OF THE GAT-1 (right) is the author. Instrument panel is a direct copy of those in standard single-engine plane. Engine and prop sounds add to realism. Dials at left of cockpit door are used by instructor to adjust normal flight or instrument characteristics, or feed in abnormal ones to test student's reaction to emergencies. Stand-up recorder (left) traces flight path on realistic air map

# FLYING IN HIGH SCHOOL

PM's aviation editor checks out in a new, low-cost trainer that provides a basic flight course, including instruments, on the ground

By KEVIN V. BROWN

and level without the confusion of gaining or losing altitude.

Or, when the student has advanced, the instructor could feed in rough air, bouncing the trainer and forcing the student to make corrections to stay on course.

Other realistic effects include the noise of the engine and propeller, the airstream and even the screech of tires as they hit the runway. All are electronically reproduced. Finally, although early instruction can be done with the door open, the instructor can later communicate via a two-way radio system, just as at airports.

The biggest breakthrough, however, is the price: \$7880 for the basic unit, about half that of any trainer used today, plus low maintenance. Just plug it into an ordinary wall socket, and it burns about the

same electricity as a 300-watt light bulb.

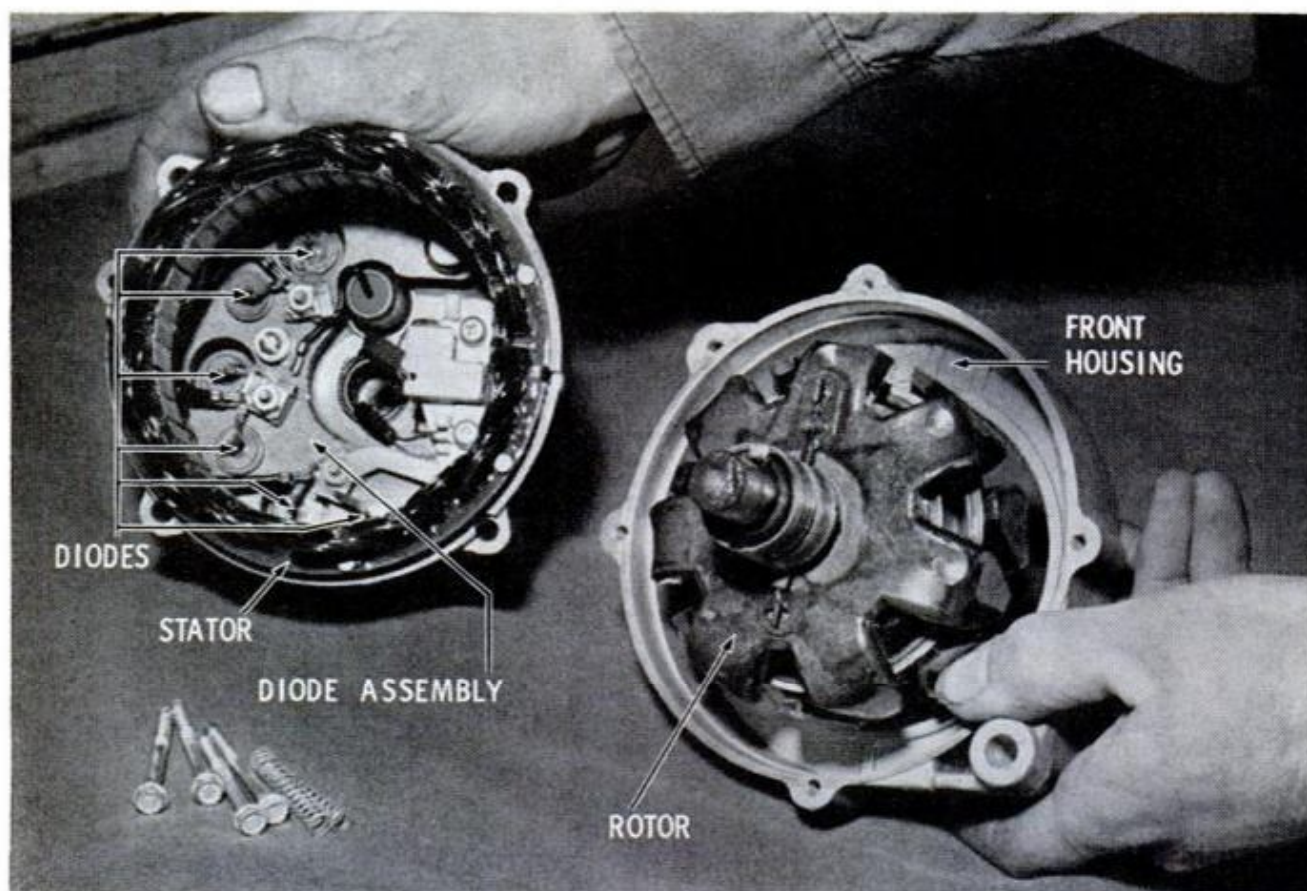
The maker, the Link Group of General Precision, Inc., says the low price is due entirely to the miniaturization of electronic equipment inherited from our space technology. Its programs are on printed-circuit cards. If one breaks down, a replacement card can be sent through the mail. Just plug it in.

Link, after equipping flight schools at airports, readily admits it is going after the school market, especially high schools, where low cost and low maintenance should make the GAT-1 attractive.

"We think it will catch the potential dropout," a spokesman told me, "the kid who, even though he may never fly, will be fascinated by the chance to handle the nearest thing to a real airplane." ★★★



# How to check out



OPENING THE ALTERNATOR reveals the stator and diode assembly, left, and rotor and front housing right

## Know how to spot the electrical problems that originate in your generating system

By MORT SCHULTZ

**T**HE ALTERNATOR is one of the most reliable and efficient parts of your car. So reliable that when you develop trouble in your electrical or generating system, chances are the cause lies with an associated part of the system, such as a drive belt, battery, or a cable or wire.

But even if there is trouble inside the alternator, don't think you have to replace the entire unit. Every alternator can be stripped down and parts replaced individually.

To start on the right foot when you do have a problem, refer to the troubleshooting chart that follows. It points out the first things to check before you go on to the alternator itself.

A loose, worn or glazed drive belt causes more problems than one would imagine. If

the belt doesn't turn the alternator at the proper speed, the alternator can't put out the current it's supposed to. A belt should be inspected and tightened as often as recommended—once every 6000 miles.

It's not tough and doesn't require special tools to look at a belt and replace it with a new one if it is worn or glazed. Neither is it difficult to tighten a belt.

You must, however, know the tension specifications for the belt. This information you get from your car's service manual. And you should keep in mind that there are often two specs given for belts. One figure is for a used belt that's seen action, and one is for a new belt that you've just put on the pulley.

And keep this important point in mind when tightening belt tension: Apply pry



# your alternator



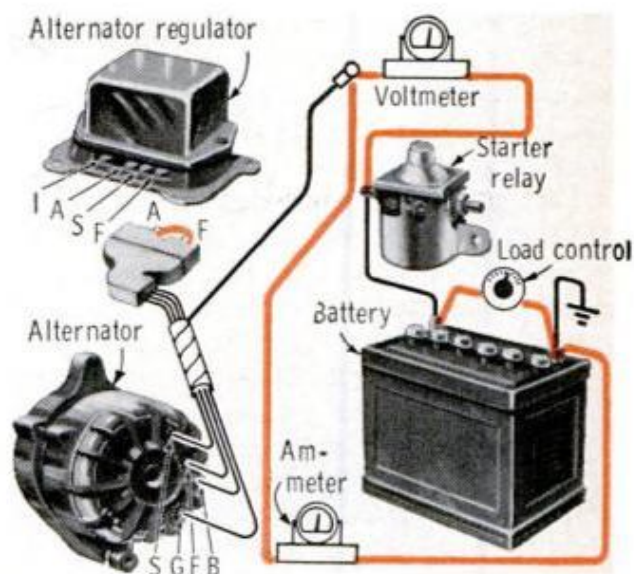
**ALTERNATOR DRIVE BELT** is tightened by bringing leverage to bear on center of alternator housing. Tighten bolts while holding alternator in position

bar pressure in the center of the alternator; never against either end frame. You could crack or otherwise damage the frame.

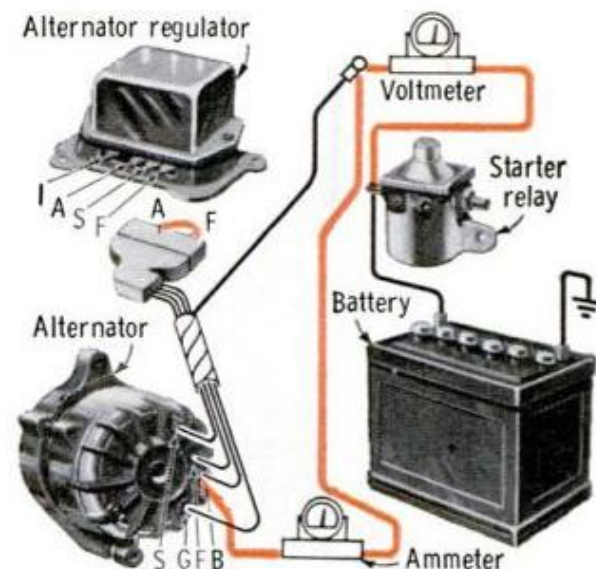
It's all well and good to have a peak performing alternator. But if little or no juice gets to the battery because of bad cables or wires, everything the alternator is doing can be lost. And, like the fan belt, battery cables and wiring are among the most neglected parts of a car.

When you begin checking out what seems to be a charging-system problem, you do *not* start at the alternator. You start with the battery and its cables. More often than not, the trouble will be found and cured here.

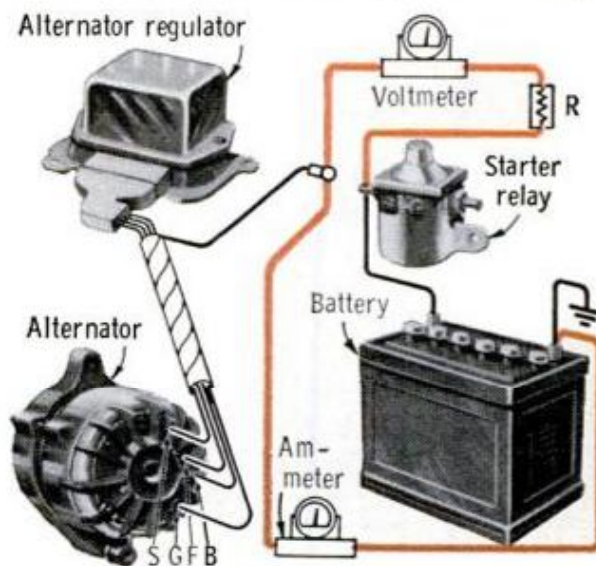
When it comes to the battery, it should suffice to say that you should check state of charge (specific gravity) and capacity (also referred to as the variable-load test or high-rate discharge test). The purpose



**OUTPUT TEST** meter hookups for Autolite alternator



**RESISTANCE TEST** on insulated side of Autolite system



**MECHANICAL REGULATOR CHECK** on Autolite circuit



of the capacity test is to determine whether the battery is meeting the specified demands of the starting motor.

The high current requirements of the starting system demand that as little current as possible be lost when traveling through cables and wires. Cables and wires can severely cut down on delivery of current from alternator to battery (via the alternator regulator) and from battery to starter.

For example, corrosion on cable connection, erosion of the cable itself or a loose cable will cause starting problems. I know some guys who have helter-skelter ripped apart an alternator to the tune of \$20 or so, when all that was needed was a simple cleaning of a cable connection.

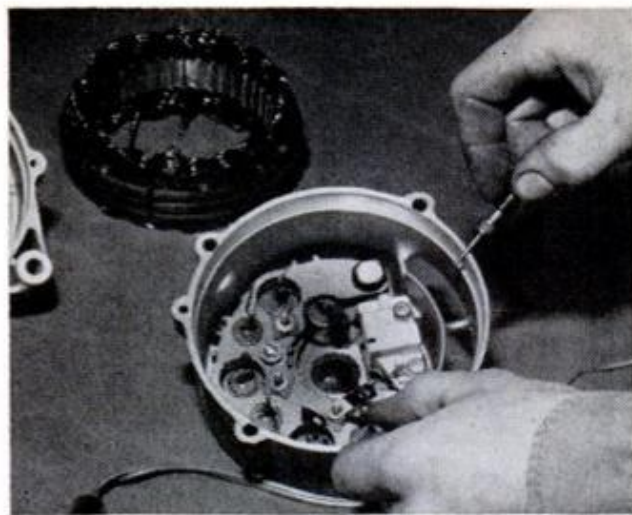
Generally, it's a good idea to replace battery cables with new ones every 12,000 miles. A lot of drivers who do this avert starting headaches. When making the replacement, make sure connections at battery, at ground and at the starter or starter switch are perfectly clean. And this means scraping paint and dirt off of ground areas, such as where the battery ground cable connects to the engine block.

New cables are cheap enough, costing but a couple of dollars. Make sure you get the right size recommended by the manufacturer for your car. Usually, a No. 4-gauge cable is recommended for a 12-v. electrical system, and a No. 0 or No. 1 gauge for 6-v. applications.

A battery that is discharged does not necessarily denote a problem in the charging system. Such things as excessive use of lights and accessories with the engine off or at low idle, corroded battery terminals and connectors, low water level in the battery, prolonged disuse of the battery that permits self-discharge—all these are possible causes of a run-down battery. Check these out before the alternator.

Six major makes of alternators are produced for today's cars: Autolite (Ford), Chrysler, Delco (GM), Prestolite, Leece-Neville and Motorola. Each has variations that you must be familiar with when troubleshooting. A service manual, therefore, is an indispensable part of test equipment.

Don't assume that you have an Autolite, Chrysler or Delco alternator in the car simply because you have a Ford, Chrysler or GM vehicle, respectively. In 1966 Fairlanes, Fords, Mercurys and Lincolns, for example, you will find an Autolite alternator. But in 1966 Fairlanes, Fords, Mer-



**TESTING DIODES** in this Delco alternator is done without disconnecting them using Delco test light. If you use ohmmeter, first remove them from circuit

curys and Lincolns, you could also find Leece-Neville alternators.

To determine specifically which alternator is used in your car, check the nameplate on the unit. If there is one, it will usually tell you the manufacturer. If not, check with a dealer's service department.

The following tests are standard for all alternators. The procedure and test equipment do vary from manufacturer to manufacturer, however. Connections for the Autolite system are shown on page 123. If you have a different system, follow the appropriate service manual.

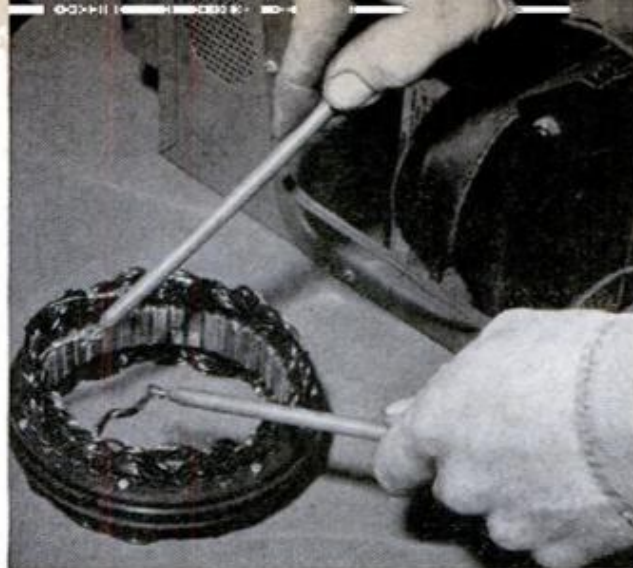
- *Alternator output test.* This test is done with the alternator regulator taken out of the circuit, thus permitting the alternator to operate in an unimpeded manner. An output less than that specified by the manual usually indicates a poor connection in the wiring harness or a fault inside the alternator, such as an open or shorted diode.

- *Circuit resistance test.* This tells you whether a problem exists because of excessive resistance in the charging circuit. Both the insulated and ground side of the circuit should be tested.

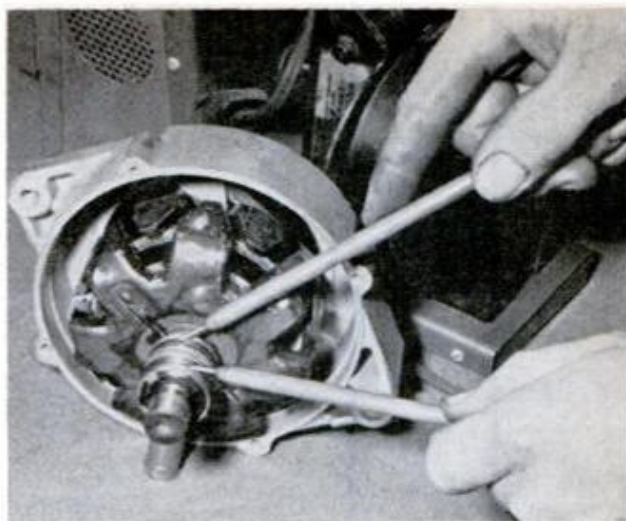
- *Voltage limiter (regulator) test.* If the alternator tests show the unit to be up to par, results of the regulator test tell you whether a fault exists in the regulator. The only function of the regulator is to control the voltage output of the alternator. One indication that the regulator is allowing too much voltage to pass is if the battery uses an excessive amount of water. An indication that the regulator is not permitting enough voltage to pass is a

*(Please turn to page 196)*





**CHECKING STATOR WINDINGS** for continuity is done with either test lamp or ohmmeter. At the same time, check all three windings for grounds



**CHECKING ROTOR FOR CONTINUITY** is done with test lamp or ohmmeter. Probes are touched to the slip rings which are mounted on the shaft of the rotor

## Alternator Troubleshooting Chart

Types of Trouble	Causes	What to Do	Special Tools
Battery low in charge; headlights dim at idle (Note: Recurring discharge of the battery, which cannot be explained, suggests need for checking and testing the complete charging system.)	Alternator drive belt	Adjust or replace	None
	Battery cables, charging system wiring	Clean battery cables and terminals, tighten loose connections, replace if necessary	None
	Electrolyte	Test specific gravity	Hydrometer
	Battery capacity	Test capacity	Ammeter, voltmeter, load control
Indicator light stays on; ammeter registers constant discharge; battery doesn't hold charge; alternator output low; no alternator output	Broken, loose or slipping drive belt	Adjust or replace, as required	None
	Battery cables, charging system wiring	Clean battery cables and terminals, tighten loose connections, replace if necessary	None
	Alternator output	Test alternator and regulator	Ammeter, voltmeter, load control
Lights and fuses fail prematurely; short battery life; battery uses excessive water; distributor points burn; resistor wire burns; coil damage; high charging rate	Charging system wiring, including regulator ground wire	Tighten loose connections, replace wiring if necessary. To be sure, test circuit resistance	Ammeter, voltmeter for test
	Regulator contact points damaged	Replace regulator	None
	Regulator contact points improperly adjusted	Adjust to specification	Air gap bending tool for some
Alternator noise (Note: water pump noise is sometimes confused with alternator noise. A sound detecting device, such as a stethoscope, will allow you to pinpoint the noisy part.)	Alternator drive belt (squealing noise)	Adjust or replace or try belt-dressing	None
	Alternator bearing (squealing noise)	Replace if found to be out-of-round, worn or causing shaft scoring	This is practically an overhaul
	Alternator diode (whining noise)	Test	Diode Tester
Indicator gauge fluctuates or indicator light flickers	Charging system wiring	Tighten loose connections, replace wiring if necessary. To be sure, take circuit resistance test	Ammeter, voltmeter for test
	Regulator contacts	Check for oxidized or dirty contact. Replace regulator if necessary	None
	Alternator brushes	Check for tightness and wear. Replace brushes if necessary	None





**Five-inch bike needs an agile rider**

"I'm afraid to use it in heavy traffic as it is difficult for motorists to see me when I'm so low down," explains Alfred Tabb as he lists disadvantages of riding a five-inch-high bicycle. But that's not the only problem; not many people can even sit on the two-wheeler without falling over. Tabb, of Kidderminster, England, has been making small cycles for 35 years and says he can travel eight mph on one. He is 82 years old.



**Long look at accidents**

A 35-mm camera equipped with a "fish-eye" lens is poked 30 feet above accident sites in South Africa to record the entire scene (photo, below). The pole on which the camera is mounted (left) also has flash equipment for night photography. The photographs are being used in an all-out effort to cut down traffic fatalities in South Africa, where more than 6000 persons died last year.







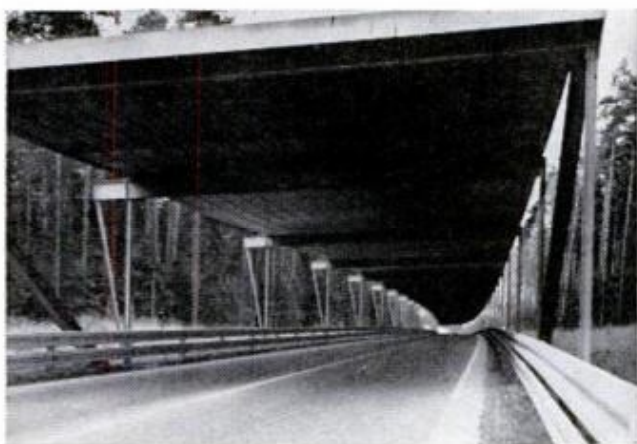
## 21-knot lifeboat

Unsinkable and speedy, a new British lifeboat recently underwent its first sea trials. The 18-foot craft will do 21 knots. Its hull is divided into watertight compartments.



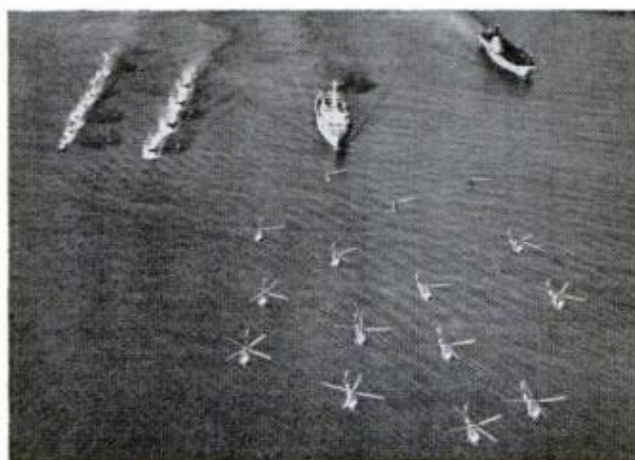
## Russian travel's a Breeze

The Veterok (Breeze) is a Soviet-built, two-passenger air sled designed for use in northern Russia. Driven by a 38-hp engine, it travels about 45 mph on its fiberglass runners.



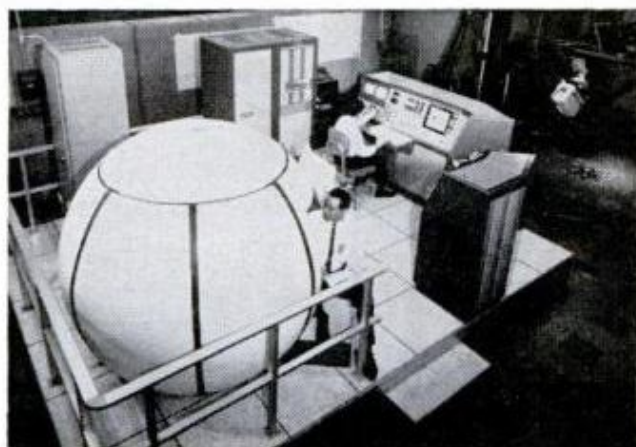
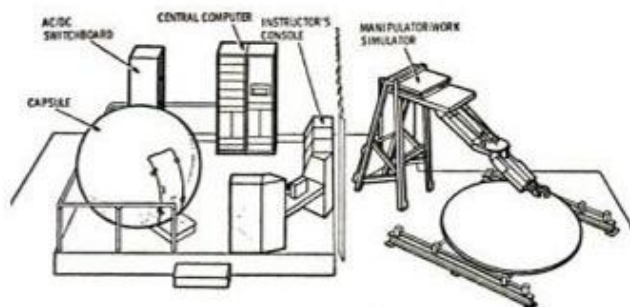
## Cover-up for motorists

Motorists on Germany's Federal Street 4 drive under a steel protective roof along a section of the highway near Bamberg. The shelter protects them from shell splinters that fall when American troops have artillery practice.



## Group portrait

Britain's Amphibious Group appears here in full strength near Singapore. In the foreground are RAF and Navy helicopters; in the background, landing craft, HMS *Fearless* (assault ship) and HMS *Bulwark* (commando ship).



## Deep-sea pilots get realistic training on land

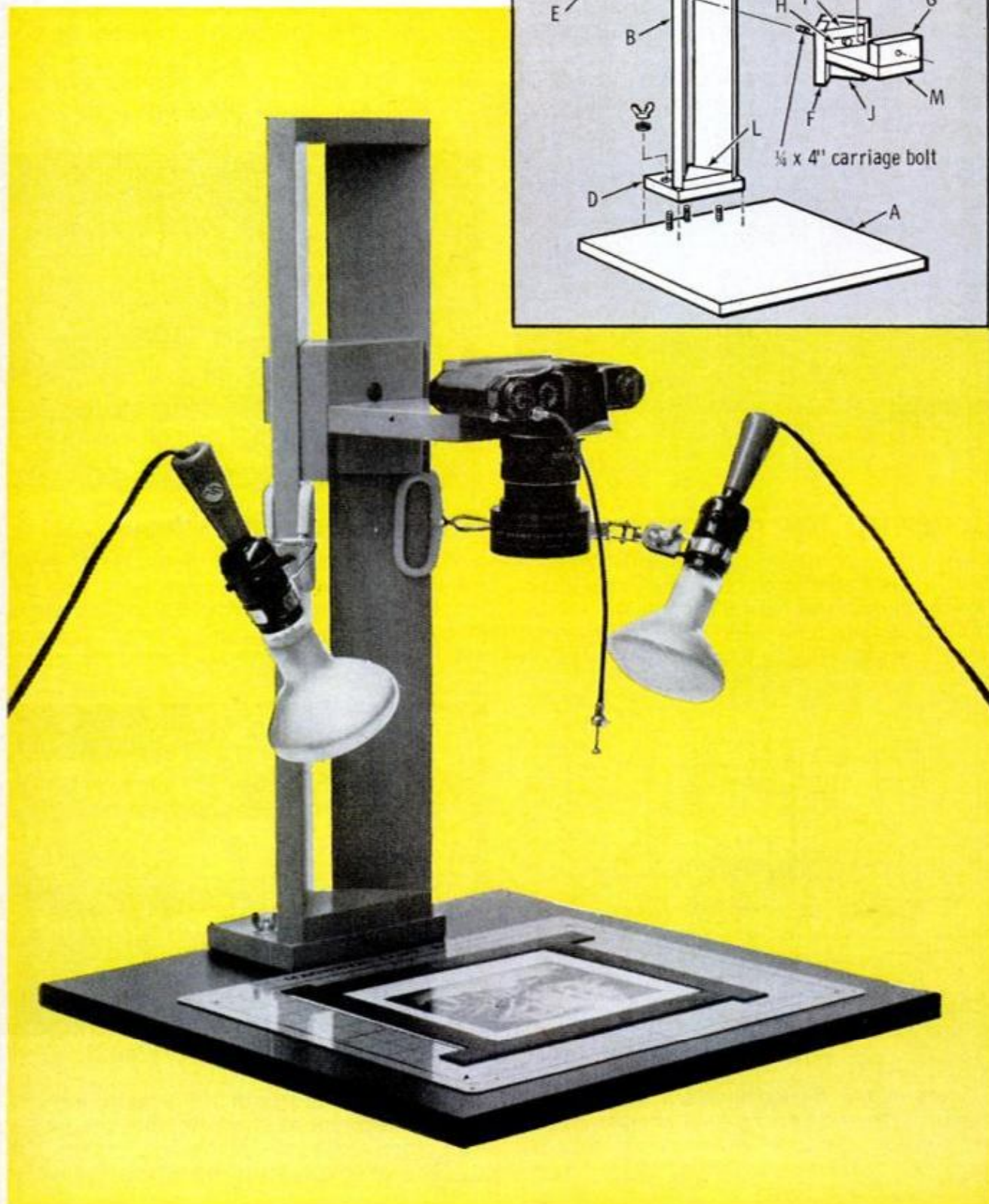
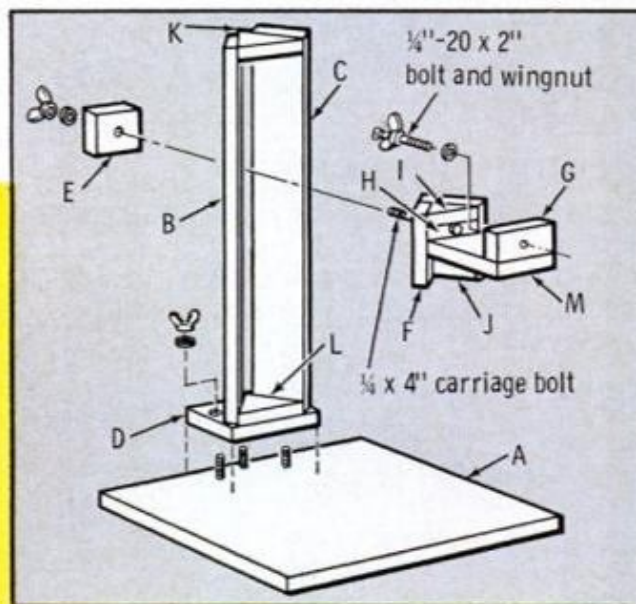
Pilots of the Navy's deep-sea submergence vehicle, the *Trieste II*, will get realistic training ashore in the new operational simulator built by Sperry Piedmont at Charlottesville, Va. Inside the capsule, the pilot receives, via television and other electronic gear, signals from the computer that simulate actual mission conditions. The pilot can manipulate the simulated vehicle by ballast and propulsion command signals.



# Quickie Copying Stand

All you need is a 24-in. square of stock to make this your own title scenes for slide shows, copy important

**SIMPLE V-SHAPED SLIDE** lets you position the camera at any desired height. Special photographic lights aren't needed. Those below are ordinary 75-watt, mushroom-type bulbs in spring-clamp holders





# from Plywood Scrap

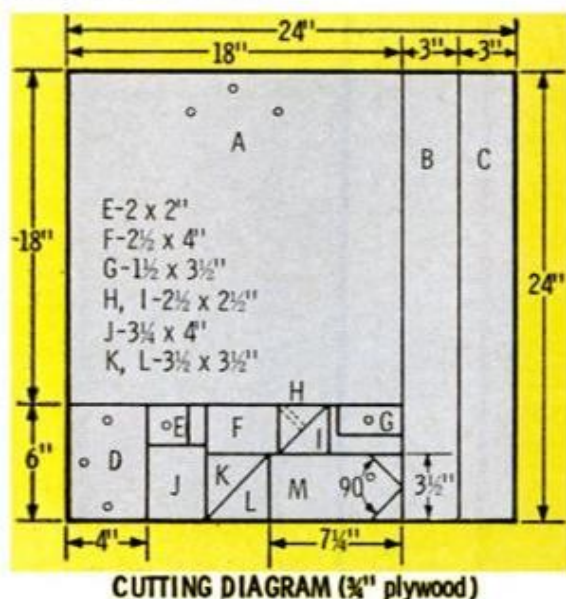
sliding mount for a camera. With it, you can create documents, or make close-up pictures of small objects

Technical art by Donald Evans

**I**F YOU HAVE a piece of  $\frac{3}{4}$ -in. plywood two feet square, you can assemble this versatile copying stand in an evening's time at practically no cost. It's the perfect answer for those who would like to do some occasional close-up photography but feel it isn't enough to warrant the purchase of a costly commercial stand. With this homemade rig, you can copy pictures and documents, make your own title slides and photograph small objects such as coins, stamps and rocks.

The stand was designed by experts at Eastman Kodak to be sturdy, yet simple to build. All you have to do is follow the cutting diagram and assemble the parts as shown in the exploded view. The column consists of two vertical pieces that form a V-shaped track. The camera carriage slides up and down in this track and is locked at any height with a wingnut. Three bolts with wingnuts permit the column to be detached for easy storage. Use glue and nails on all other joints.

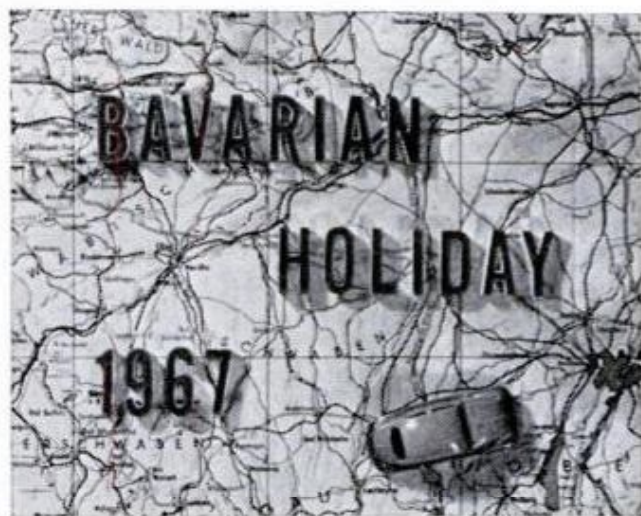
Any camera with a tripod socket can be mounted in the stand. With inexpensive supplementary close-up lenses, you can focus to within a few inches of the base. For fixed-focus and rangefinder cameras,



**LAYOUT OF PARTS** shows how everything you need can be cut from a 24-in. square of  $\frac{3}{4}$ -in. plywood

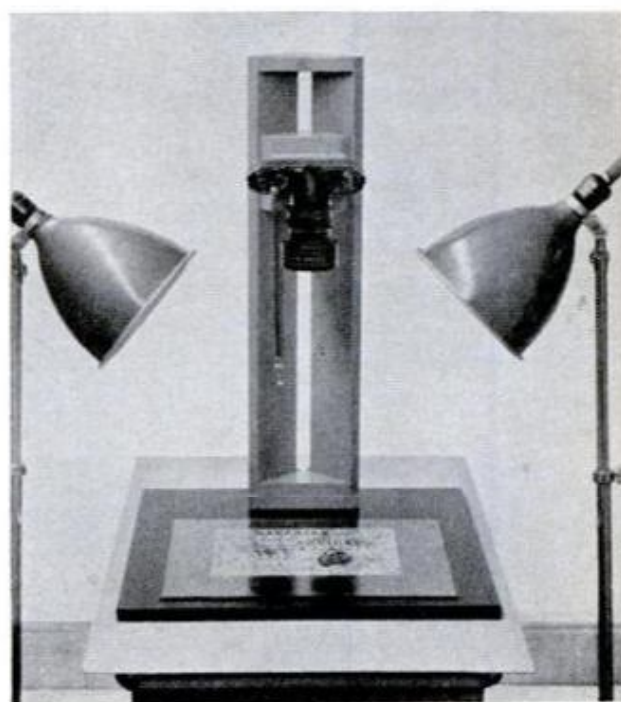
simply follow the lens-to-subject distances supplied with each lens.

For most setups, two ordinary 75-watt reflector-flood bulbs will provide ample illumination. These can be clamped right to the column, as shown on the facing page. You can also use photoflood bulbs. Paint the base flat black to minimize light reflections.—Paul Wahl



**CLEVER TITLE SLIDE** for pictures of an auto tour through southern Germany consists of a map, a toy car and self-sticking titling letters. Setup for shooting the slide is shown at right. In this case, two photofloods in reflectors were used. Titling letters are sold in many sizes and styles by photo stores

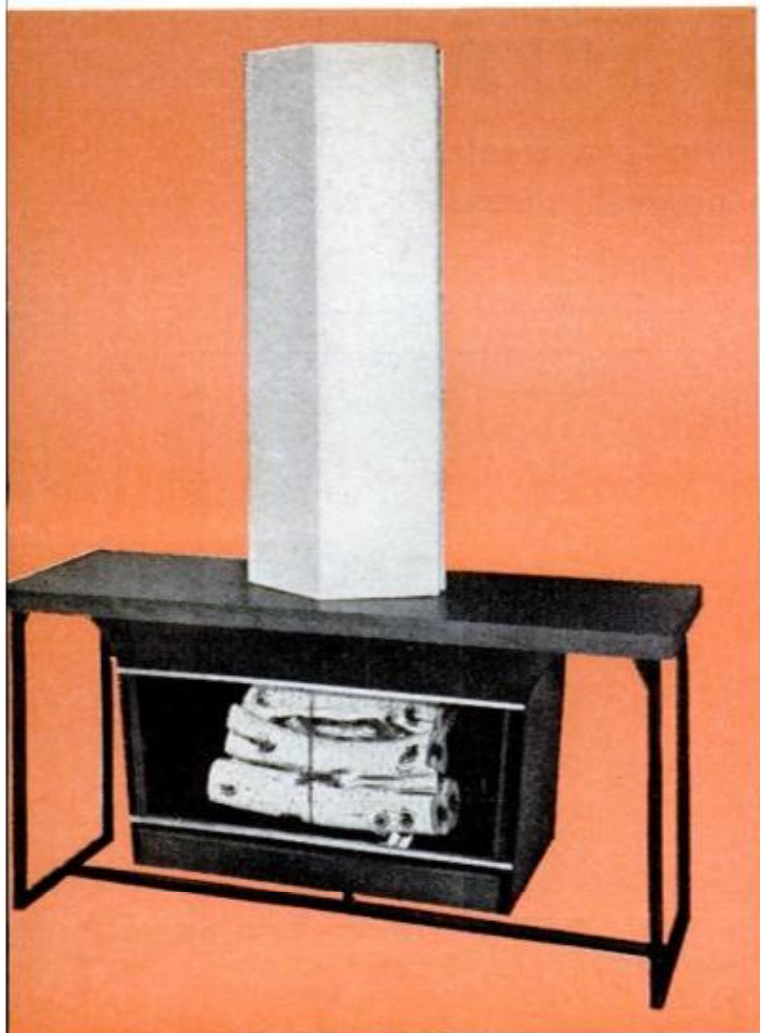
AUGUST 1967



129



EXCITING  
**NEW PRODUCTS**  
By CAROL SCHULTZ



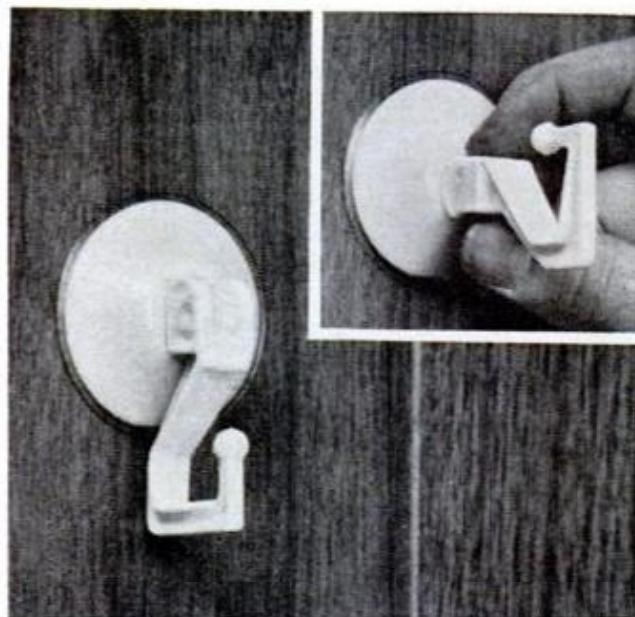
**WOOD-BURNING FIREPLACE** can be free-standing or built into a wall. Features a fire chamber suspended from a five-foot, wood-grain mantle. \$695.95 complete. The Donley Brothers Co., 13900 Miles Ave., Cleveland, Ohio.



**SHOWER FIXTURE** mounted at shoulder height within the shower conveniently holds soap, shampoo bottle and a washcloth. Fits any corner. \$7.95 postpaid from E. M. Litzaw Mfg. Co., P. O. Box 332, Livermore, Calif.



**BEVERAGE HOLDER** with gyrosopic action prevents spilling while traveling, even during sudden stops. It's useful in cars, boats and campers. Sells for \$2 from Nicolas Enterprises, 8500 Garibaldi St., San Gabriel, Calif.

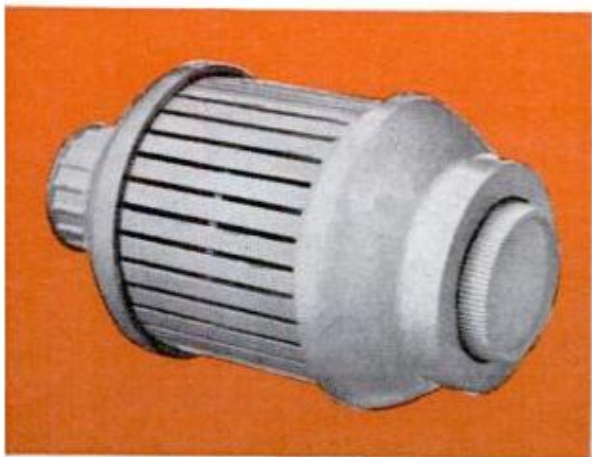


**SUCTION HOOK** can be installed quickly on any smooth nonporous surface without tools. Adheres securely but it can also be removed. The 15-lb.-test size retails for 79 cents. Korlist Ltd., 10 Humphrey St., Englewood, N. J.



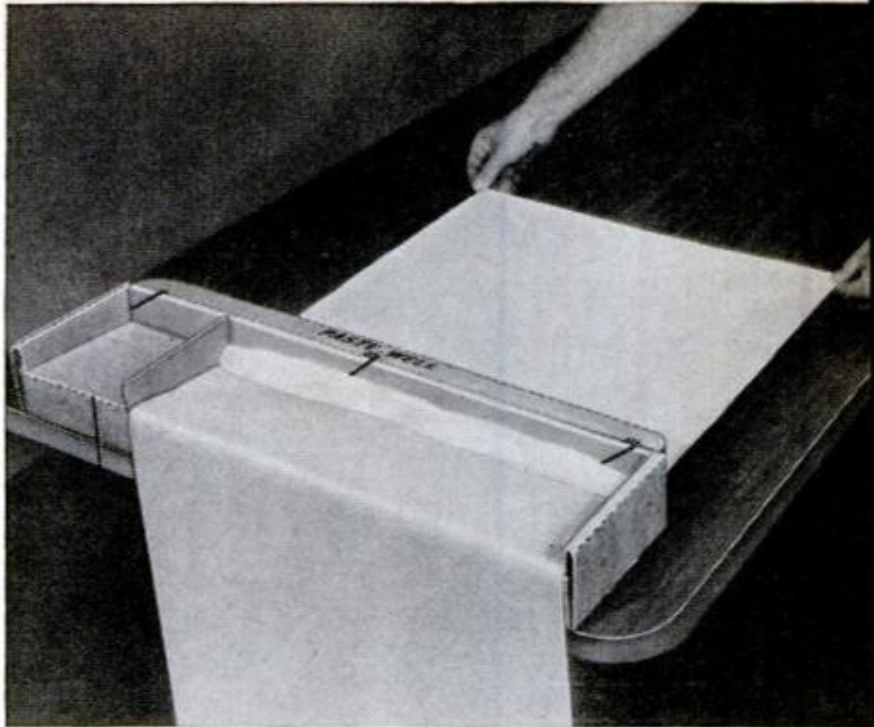


**FIBERGLASS DROP CURTAIN** resists sun, moisture, rot and mildew, and lets in natural light. Fabric won't stretch out of shape, and also offers flame resistance. Comes in 31-in. widths, and costs from \$2.50 to \$3 per yard. Manufactured by Owens-Corning Fiberglass Corp.



**GARDEN SOAKER** with a flow-control valve attaches to any hose to cut the force of water pressure—also protects plants and prevents the washing away of topsoil. \$1.95. H.B. Sherman Mfg. Co., Battle Creek, Mich.

AUGUST 1967



**PASTING KIT** automatically applies a layer of adhesive evenly and cleanly as strips of fabric-back wall covering are pulled through it. In short, it takes the mess out of wallcovering. Kit comes with hanging instructions and special squeegee. Costs \$2.89. By Paste-Wall Corp., P. O. Box 116, San Gabriel, Calif.



**OUTDOOR VINYL TILE** is unharmed by rain, snow or sunlight. The only maintenance required is sweeping and hosing. Comes in red, green, beige or gray. About 70 cents per square foot. Made by Armstrong Cork Co.



# Weekend projects for your home

Technical Art by ZIK Associates, Ltd.

## SWING-DOWN PATIO TABLE

**W**HY GIVE UP a big chunk of your precious patio space to a standard picnic table which is actually needed only at mealtimes? The wall-hung table shown here swings up out of the way when not in use, yet provides perfect accommodations for spacious outdoor dining whenever required. Between meals, the matching benches serve as utility patio seats to accommodate extra guests.

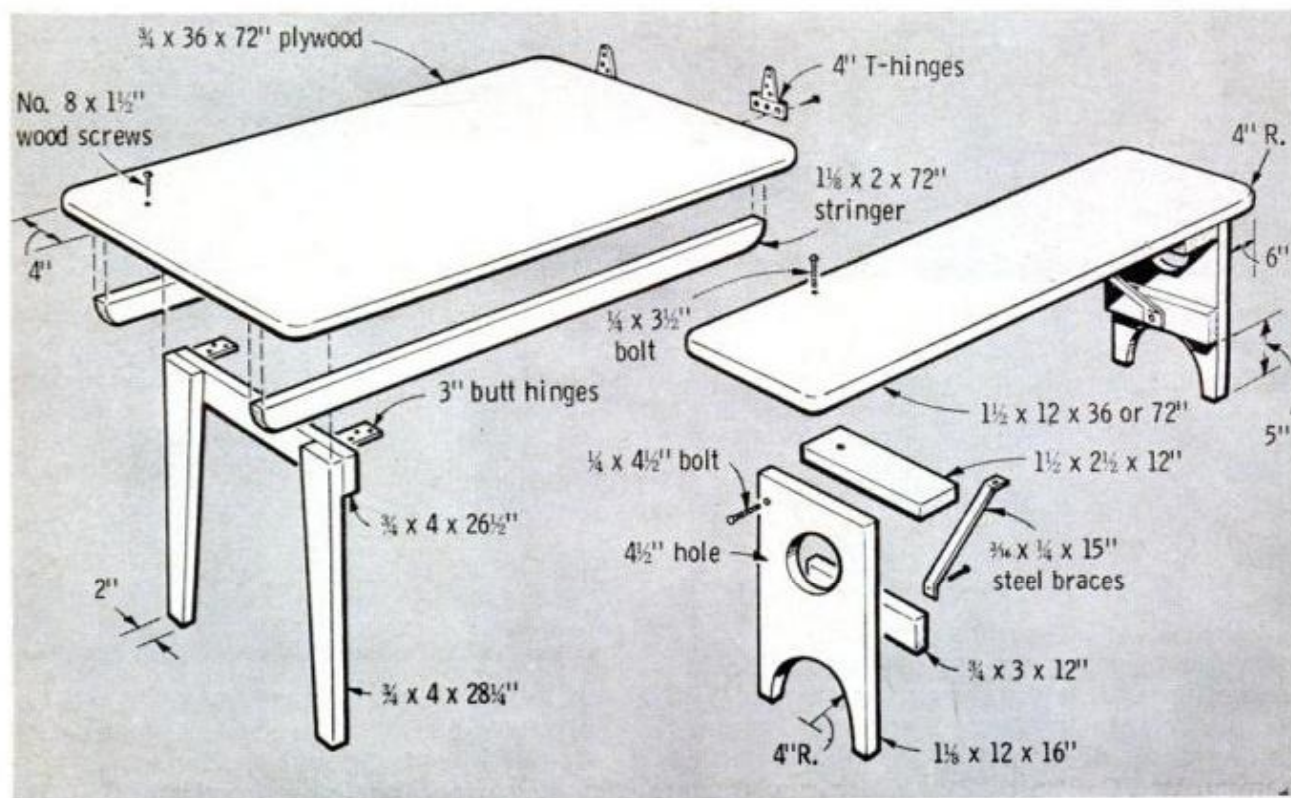
The 3x6-ft. table detailed in the plans below will seat eight, allowing for two at the end. Of course, you can make a wider or longer table simply by varying the dimensions, provided you have the available wall height and necessary amount of floor space.

Construction is quite simple. The  $\frac{3}{4}$ -in. plywood table top rests on  $1\frac{1}{8}$ x2 stringers. (Incidentally, be sure to buy a grade of

plywood "good both sides," since the bottom of the table will show when it's folded up against the wall.) Secure the plywood to the stringers with glue and screws, countersinking the heads in the tabletop and masking the holes with wood putty.

The  $1\frac{1}{8}$ -in. legs are tapered from 4 in. at the top to 2 in. at the bottom. These are glued and screwed to a 2x4 crosspiece which fits between the stringers. To hold the folded table against the wall, use two casement sash fasteners mounted on small blocks the thickness of the tabletop. The blocks should be secured with bolts reasonably high on the wall.

The benches are made of 2x12 spruce or pine and should be dimensioned to match the length of the table as you plan to build it. Use a fly-cutter to cut the  $4\frac{1}{2}$ -in. holes in the legs and shape all edges to a







$\frac{1}{2}$ -in. radius before you assemble the benches.

For extra strength, the benches are put together with bolts. As with the screws in the tabletop, counterbore bolt holes in the benchtops and fill them with wood putty before sanding.

Seat braces bent from  $\frac{3}{16}$  x  $1\frac{1}{4}$ -in. steel assure that those benches will remain perfectly rigid, no matter how heavy the load.

Once everything is assembled, sand all surfaces smooth. Then give the table and benches a coat of primer and at least two coats of good-quality exterior enamel. Attach the table to the wall, and you're ready for guests.—*Arn Lambrecht*

AUGUST 1967







**PIVOT POINT** for this unit is in the center of the cabinet 8 in. back from front edge of the bottom shelf. Check clearance with cardboard template before you begin



**FIRST STEP** in the installation is to remove the existing center shelf. Then make template and rotate on a dowel to find the pivot point. Trim template as required



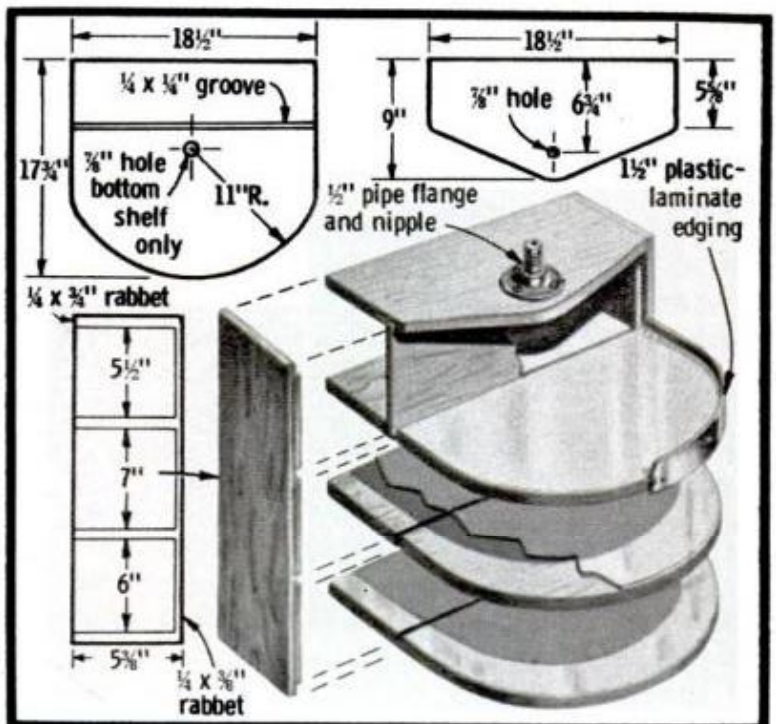
**WITH SHELF OUT**, you're ready to build the lazy Susan. Just follow the plans at right, modifying dimensions as necessary to fit the space available in your kitchen cabinet

## LAZY SUSAN FOR KITCHEN CABINET

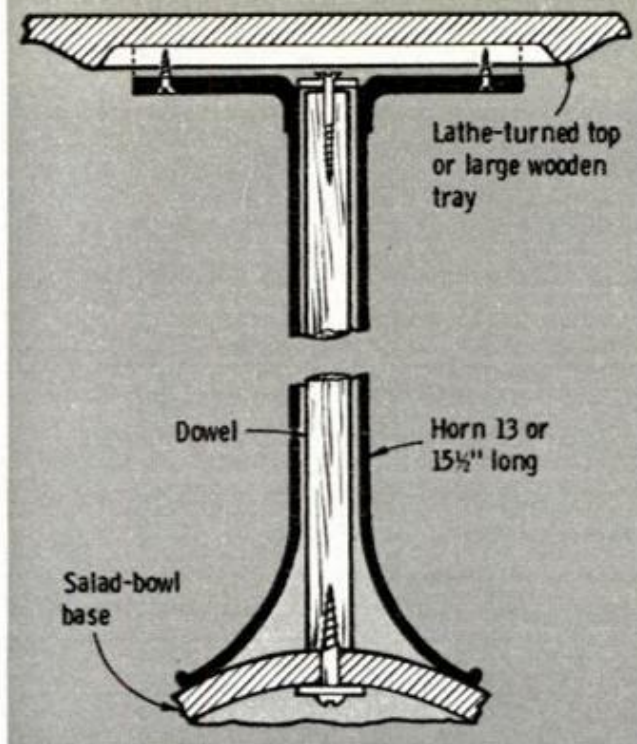
**DESIGNED TO FIT** a standard 26-in. base cabinet, this simple rotating shelf unit brings everything up front with a twist of the wrist. At the top, it's held in place by a  $\frac{1}{2}$ -in. pipe nipple which fits into a  $\frac{7}{8}$ -in.-dia. hole drilled in a 1x3 secured to the underside of the drawer slides. It rests on a ball-bearing and socket unit which is available in kit form at most hardware stores (C-40-2G Pivot Hardware by Amerock). Assembly is detailed in the drawing below.—C.L. Widdicombe



**LOPSIDED LAYOUT** of this lazy Susan provides shallow set of shelves for your canned goods in addition to large open shelves







## OCCASIONAL TABLE FROM ODDS AND ENDS

DEMONSTRATING how much can be done with junkyard materials, this high-style chair-side table was made from a scratched wooden tray, a discarded salad

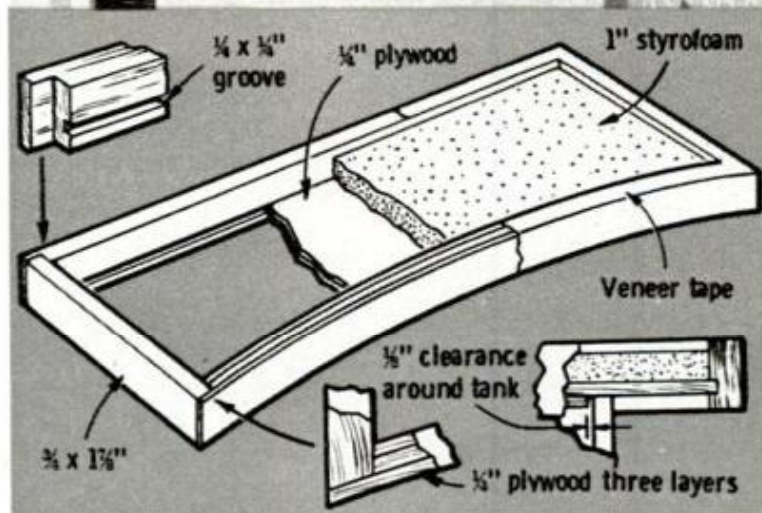
bowl and a discarded auto horn. Tray and bowl were given a natural finish. How about that for turning "scrap heap" into Swedish Modern?—*Jorma Hyypia*



## BATHROOM PLANTER

HIGHLY DECORATIVE but requiring almost no care, this attractive planter is actually just a shallow tray which replaces the tank's cover on the toilet. A sheet of 1-in. Styrofoam, cut to fit inside the planter, provides a base in which to stick plastic greenery. Note how the curved front is built up by gluing three strips of plywood together and then veneering the edges to hide the plies and joints. A second bottom cut to the tank's inside measurements and glued to the first, centers and holds the planter on the tank.

—*Eugene E. Florida*





# BUILD

JUST FOR





# A BAR THE FUN OF IT



Color Photos by Robert Borst

When the drinks are on the house, surprise your friends by serving them from one of these exciting hideaway bars

**PARKED OUT OF WAY**, closet bar waits for next party

**WHEN CLOSED**, bar looks like china corner cabinet





**PLAYING BARTENDER** from behind one of these classy home bars is bound to make your next party twice the fun. For not only is everything conveniently at hand for mixing drinks, but presto!—you're open for business in nothing flat.

One rolls out from behind "saloon" doors, while the other swings down in seconds from what appears to be an innocent-looking corner china cabinet.

Designed for use almost anywhere, the in-a-corner bar with its fancy panel facing is formal enough to be used in a dining room, while the bright and colorful closet bar is more at home in a carefree family room or basement recreation room.

Both bars, plus four other designs on page 140, were designed for *PM* by Franklyn Jacoby, noted New York industrial designer. We built the two you see here to be sure they worked.



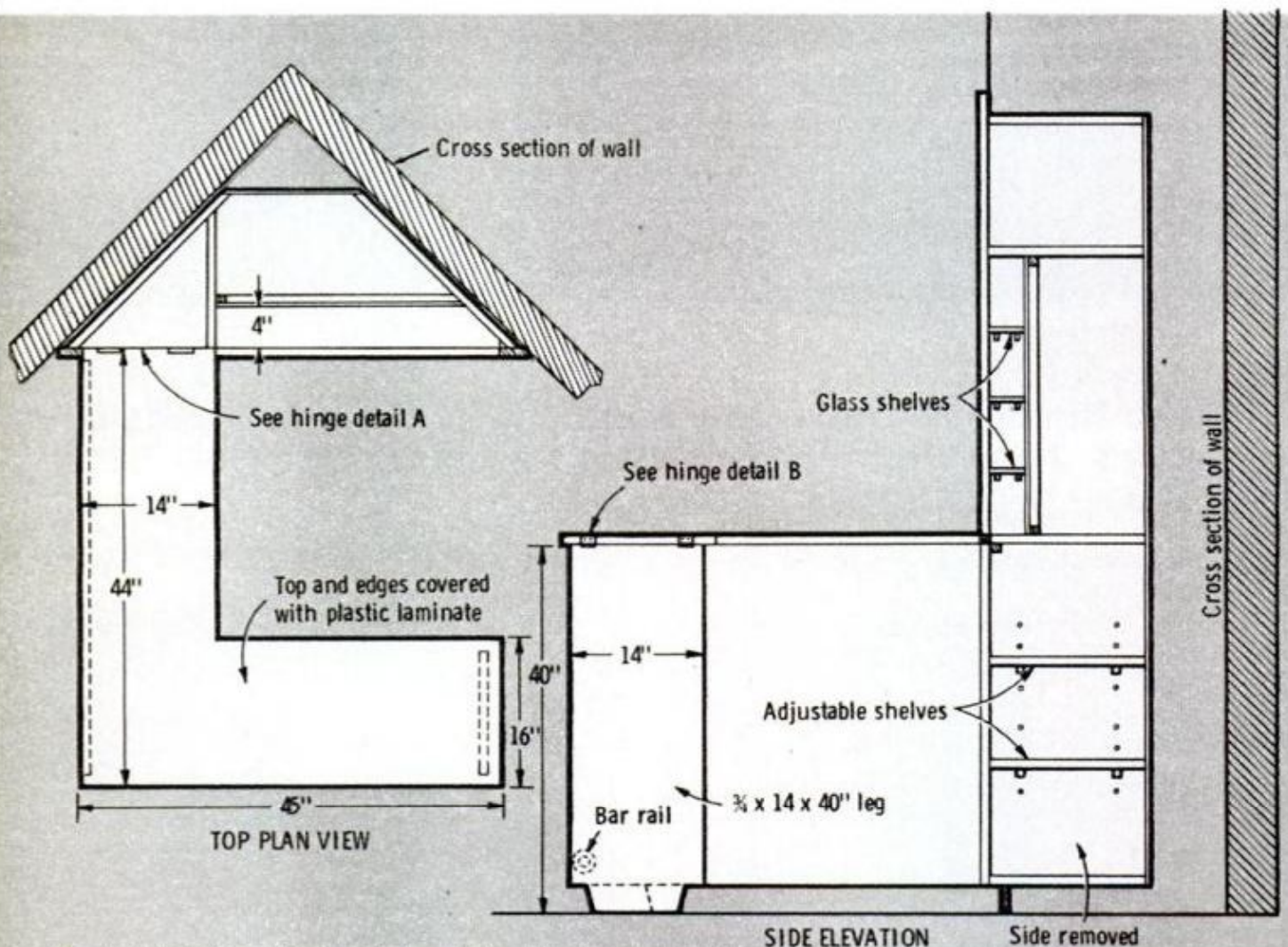
Our in-a-corner bar is most unique in the way it disappears into the

wall when the party's over. Its L-shape counter, supported at one end by a dummy door-and-drawer front and at the other by a flip-over leg, swings up flush in its cabinet like a Murphy bed and is held by magnetic catches. The "brass" rail, which snaps in place to hold the two legs together, stores in the bottom of the cabinet. When the bar is closed, only the glasses remain on display, the rest is out of sight.

The roll-out bar parks in its own shelf-lined closet which affords handy storage for a goodly supply of firewater and all that goes with it. It, too, has shelf space and is fitted with free-rolling ball casters so it can be wheeled to the center of the fun. This bar can be easily built into a wall partition of your recreation room, if you don't happen to have a closet to start with.

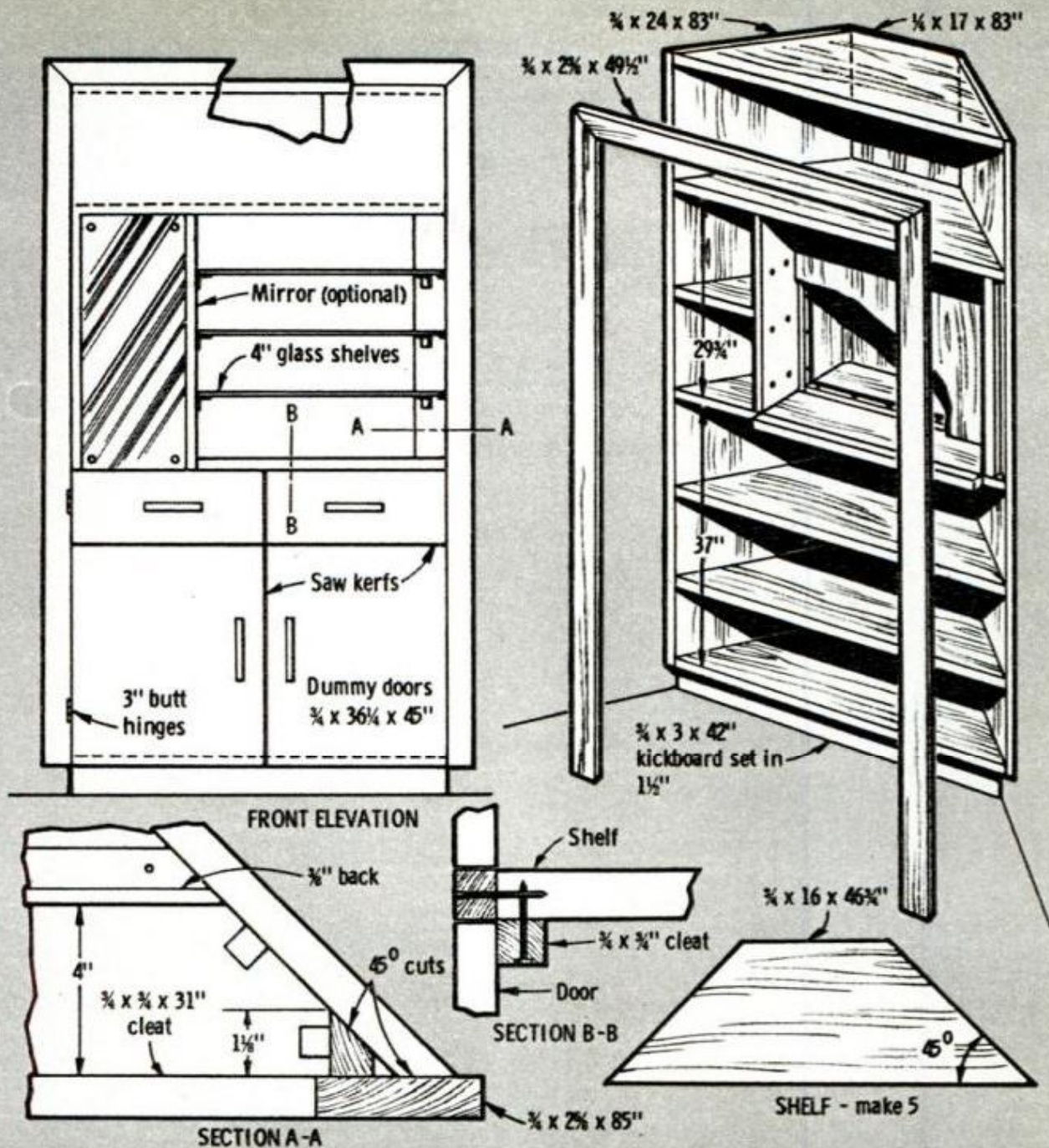
### Building the corner bar

Except for the casing that frames the front, plywood is used throughout. The two ends of the V-shape cabinet, plus its four shelves, are identical and measure 46<sup>3</sup>/<sub>4</sub> in. long and 16 in. wide. Cut one and use it to mark the others. Note that two of the



Technical Art by ZIK Associates, Ltd.





four shelves are adjustable. The cabinet sides are  $\frac{3}{4}$ -in. plywood, while the back is  $\frac{1}{4}$  in. Front and back edges of the side members should be beveled  $45^\circ$  so that when the ends are nailed in place, all edges will be flush. The center shelf is nailed 37 in. up from the bottom and the top shelf is nailed  $29\frac{3}{4}$  in. up from the center one.

When you have the ends and shelves nailed, nail on the  $\frac{1}{4}$ -in. back. This will hold the cabinet square. The  $2\frac{3}{8}$ -in. casing goes on next. You'll notice that it's slightly wider than the cabinet. This is done to compensate for any out-of-plumb and out-of-square walls you may encounter when placing the cabinet in a corner. Note, too, that the top casing laps the cabi-

net top  $\frac{3}{8}$  in. to provide a shoulder for the swingup counter to close against.

Next nail the divider between the center and top shelf. It's beveled to butt against the side of the cabinet and is nailed at a point 14 in. from the edge of the casing. See the plan view at the left. Blind holes are made in one side of the divider for brackets which support three glass shelves. These can be marked and drilled before the divider is installed if you wish.

The 4-in. glass shelves are square at one end and mitered at the other. Similar holes are provided to support the mitered ends by drilling them in a  $1\frac{1}{8}$ -in. filler strip, which is fitted and glued behind the casing, as well as in the slanting side of the cabinet itself. See section A-A. The



# Exciting Bar Ideas for..



The Gourmet Set



The Younger Generation

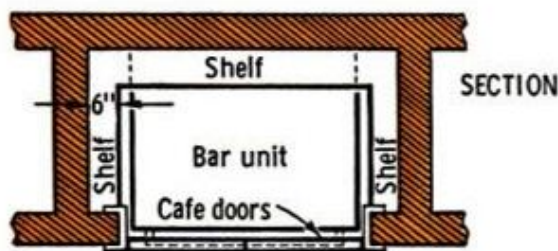
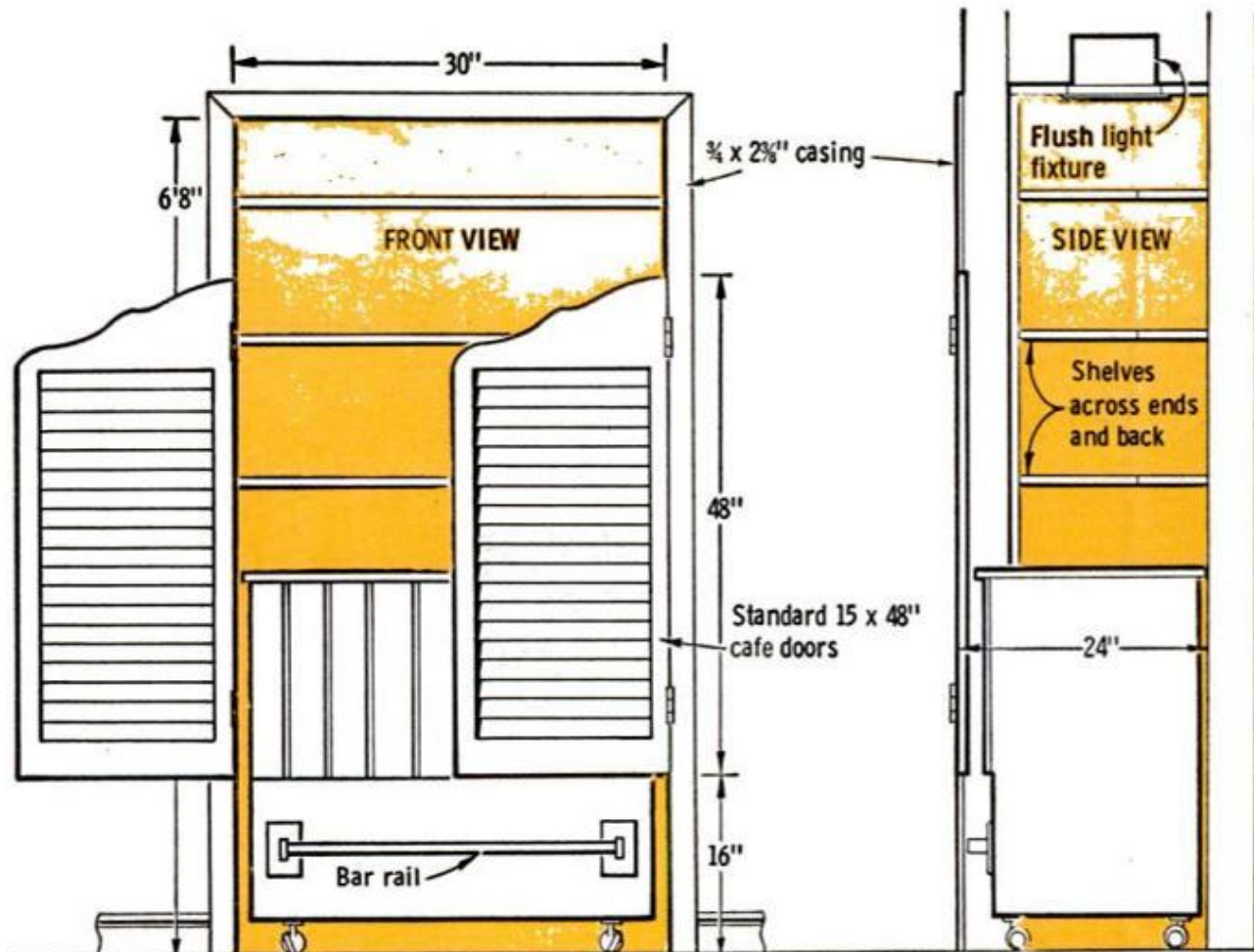


Grand Prix Buffs



The Music-minded



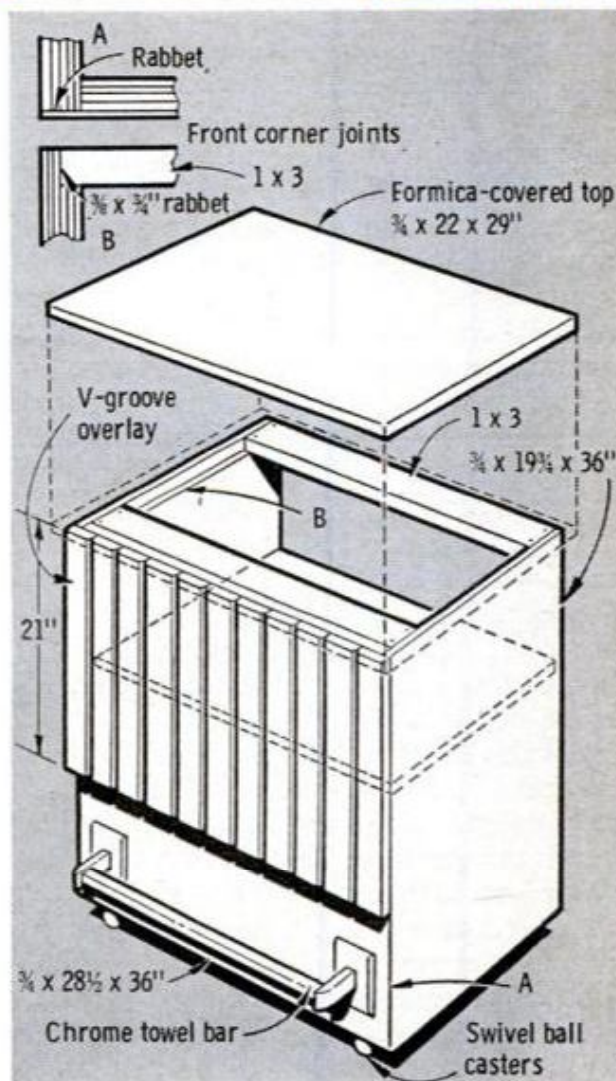


Glass-shelf compartment has a  $\frac{1}{4}$ -in. plywood back which is supported all around by  $\frac{3}{4}$ -in.-sq. cleats glued and nailed 4 $\frac{1}{4}$  in. back from the front.

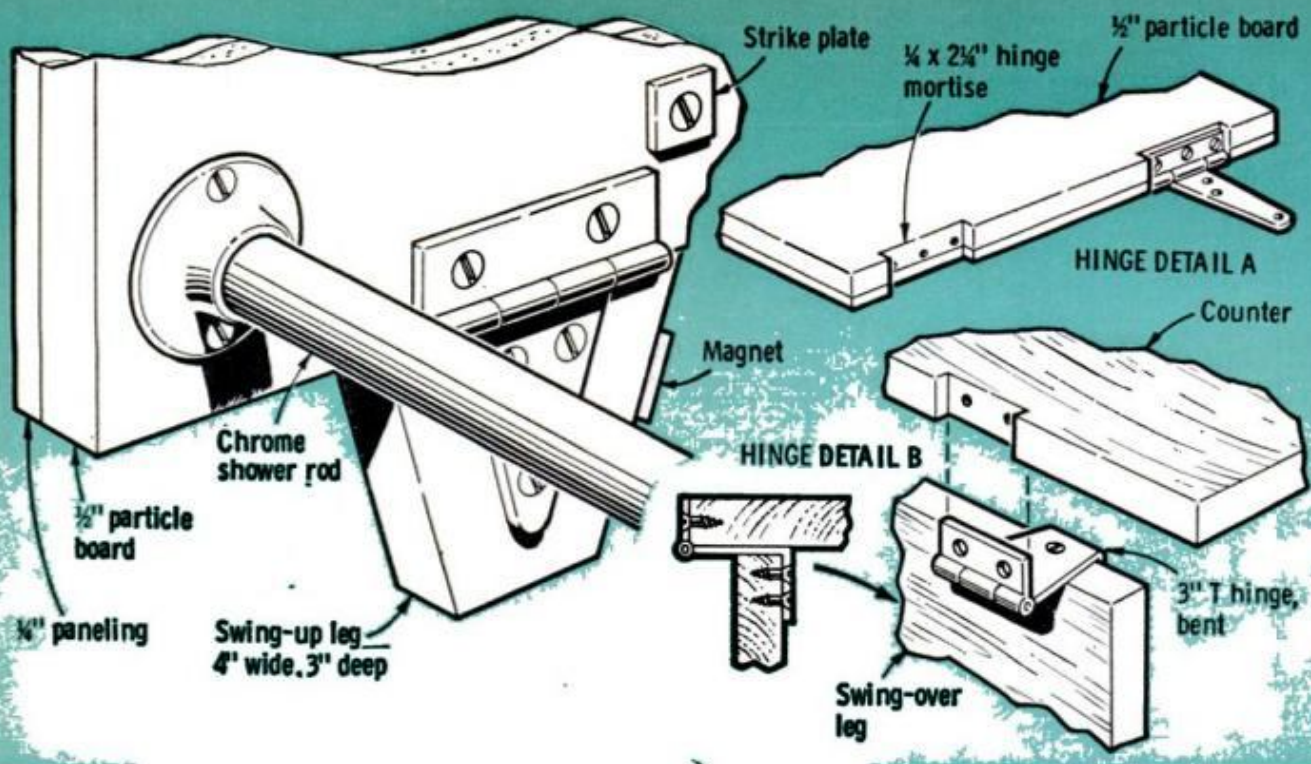
Finally, a fifth "half" shelf is installed to the left of the divider, midway between the center and top shelf, and a 3-in. kickboard is nailed to the bottom, 1 $\frac{1}{2}$  in. back from the front edge. When set in a corner, the cabinet rests on the kickboard and is held by a couple of screws turned into the studs through the cabinet sides.

Now a  $\frac{3}{4}$ -in.-sq. filler strip is nailed to the edge of the center shelf across the front of the glass-shelf compartment to bring the shelf flush with the casing. The

**FOR THE CRAFTSMAN** who needs but an idea to build a bar, Jacoby offers the four clever designs shown at the left. The canopy bar is right at home in a gay rumpus room; the others will appeal to hobbyists  
*Color Illustrations by Dale Gustafson*







section B-B shows this cleat, plus another which extends the full width of the cabinet. This second cleat is nailed to the underside of the shelf and provides a stop for the dummy front.

The dummy front is kerfed and fitted with handles to make it look like separate doors and drawers, but its real purpose is to serve as a gate leg which swings out to help support the counter. It's fitted, as you see, with a hinged foot which flops down to rest on the floor. A magnetic catch holds it up.

While the original cabinet was faced with 1/4-in. plastic-finished paneling (Marlite) which was cemented to 1/2-in. particle board, you may prefer to simply paint your bar. In this case, the dummy front, as well as the bar's counter, is cut from 3/4-in. plywood.

The L-counter is hinged to the center shelf with T-hinges set in gains cut in the end of the plywood so it will be flush with the shelf when the long leaves of the hinges are screwed to the underside. (See hinge detail A.)

Similar hinge gains are cut in the counter for a pair of T-hinges which are used to pivot the flip-over leg. Note in hinge detail B how these hinges are bent and re-drilled so they can be screwed to the inside face of the leg. Since the bar's surface is covered with plastic laminate which increases its thickness 1/16 in., you must remember this in bending the hinges so the leg will lie flat on the counter top

when it's flipped over for storing away.

The brass rail is a shower-curtain rod of the type that snaps into its flanges. You can leave it chrome or make it look the part by spraying it brass. Magnetic catches hold both the dummy front and the swing-up counter. When closed, the flip-over leg remains hidden behind the counter.

### Building the closet bar

The roll-out closet bar is far simpler to build, even if you have to frame a cubby-hole for it. The rolling bar itself is hardly more than a plywood box open at the back and fitted with four ball casters. V-grooved boards doll up the front and a chrome towel bar poses as a rail. A shelf inside keeps things handy and a plastic-covered top lets you wipe up drips and spills.

The closet part is framed wide and deep enough to permit shelves to be installed on all three sides and to let the rolling bar clear cafe-type louver doors hinged across the opening. Since the doors are hinged to fold back against the wall when open, you cannot use the double-acting hardware you normally get with them. Butt hinges are used instead and the doors are mounted so they are flush with the face of the casing. A recessed fixture in the ceiling of the closet lights the interior. Finishing in a riot of colors, such as those shown in the color photo, makes the bar right at home in a recreation room and puts it in a happy party mood. ★★★



## Make it shine in no time with polishing corks

ONE OF THE HANDIEST items for brightening tarnished metal objects is a polishing cork that you can make in almost no time at all.

A good polishing cork is simply a piece of natural cork (the kind used to seal wine bottles) cut to the desired configuration and then coated with an abrasive. The abrasive is usually bonded to the cork by means of an industrial-type adhesive, although for our purposes, a clear lacquer, nail polish or common household cement will do just as well.

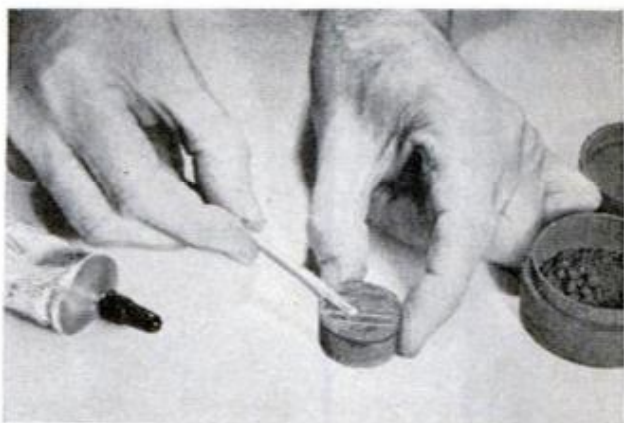
For most home and shop applications, ordinary kitchen cleansing powder makes the best abrasive. (It's cheap, too.) You might, however, consider purchasing a small amount of emery powder or jeweler's rouge for those extra-special jobs bound to pop up now and again.

To prepare a polishing cork, place a pinch of abrasive on the surface to be coated, and a drop or two of adhesive, and quickly mix them together with a flat stick or screwdriver blade until a fine paste covers the entire surface. Let it dry thoroughly and then try it out on the dulllest metal surface you can find. A light wiping action will suffice—*don't* rub with undue pressure.

Also, don't worry if the cork should appear discolored and shiny—it will retain its polishing quality for a surprisingly long time.—*Walter E. Burton*



**REMOVING TARNISH** from a curved metal surface is a cinch if you use the curved section of a cork with approximately the same diameter. To brighten the flat surfaces, apply the widest face of the cork



**MIX TOGETHER** a pinch of abrasive and a few drops of adhesive, then cover the entire area with an even coating of the paste. Let the cork dry thoroughly while you prepare polishing corks with other shapes

## Paint can sans rim makes a dandy paint bucket

DON'T RUN OFF to the hardware store the next time you need a paint bucket without first checking your "inventory" for an empty gallon paint can.

Having both a built-in handle and a convenient handling capacity, a gallon can does present one problem, however. The rim or lip makes it too messy to use.

Solution? Remove the rim by cutting it away with a putty knife or paint scraper. To do this, a stiff blade is required, as is a sharp blow or two to get the initial starting hole. But once started, the cutting goes quickly. Just use the knife or scraper blade like a can opener, prying away a bit at a time. Then, without the rim, the can will provide an unrestricted opening and smooth sides so you can slap or unload the brush after dipping.—*John Wild*





# Troubleshooting your

Don't turn a deaf ear when your engine tries to tell you something. Learn to understand its complaints and you can save a potful of money

By HENRY B. NOTROM

**L**IKE WAVES slapping the hull or wind whistling past the windshield, the quiet purr of a well-tuned outboard is a sound your ear tends to ignore. It's part of the normal background noise of boating. But let that engine start missing or knocking and suddenly it drowns out everything else. It's like a cry for help.

Being able to understand your engine's distress calls can save you time, trouble, money, or all three, depending on just how serious the problem happens to be. Often it's something minor—just a matter of tightening a bolt or resetting an adjustment—but it may be an early warning of critical malfunction.

"An outboard owner who can decipher unusual engine sounds has a head start in finding the problem," says Don Barone of D&R Boat Sales in New Jersey's Greenbrook Township. "Even if you can't do the repair job yourself, the information you pass on to the mechanic will allow him to zero in on the problem almost immediately, which saves his time and your money."

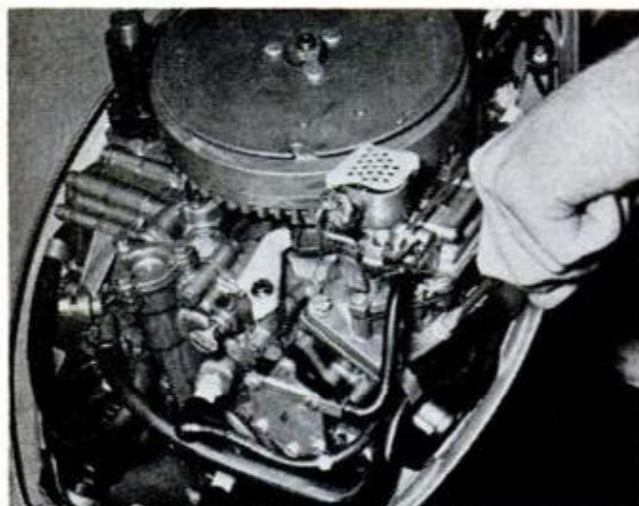
As an example let's take one sound

that's especially easy to detect because it's usually accompanied by engine vibration. It's what I call "hiccoughs," and it can happen at idle or running speed. Actually, of course, the engine is misfiring.

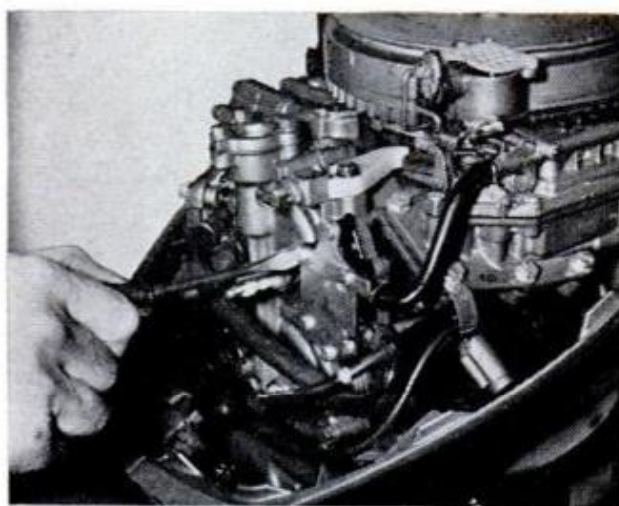
There are plenty of possible causes for engine hiccoughs at idle, and even more possibilities when the condition occurs at high speed. The most obvious are carburetor or ignition bugs. Some of these require only a visual check; for others, you may have to completely disassemble a component and use special test equipment to find what's wrong.

But suppose the engine is hiccoughing at idle, and the ignition and fuel system test out okay. Note from the chart that one other possibility, often overlooked, is an out-of-round magneto adaptor flange on the crankcase. This is the part to which the magneto adaptor plate attaches.

If misfiring is occurring at high speeds, the trouble could easily be poor compression or carbon buildup in the cylinder, which will reveal itself in a compression test.



**BACKFIRING** can be caused by loose carburetor mounting allowing air to seep in and dilute the fuel mixture



**ANOTHER ROUTE** by which air may enter fuel system is around a loose fuel-pump housing. Check as shown



# outboard by ear

## MISFIRING AT IDLE

### IGNITION PROBLEMS

- Incorrect sparkplug gap\*
- Defective or loose sparkplugs\*
- Sparkplugs of incorrect heat range\*
- Sticking breaker arm
- Incorrect breaker-point gap
- Breaker points not synchronized
- Loose wire in primary circuits\*
- Defective distributor rotor\*
- Corroded or pitted breaker points
- Cracked distributor cap\*
- Leaking or broken high-tension wires\*
- Weak armature magnets
- Worn cam lobes in distributor or magneto shaft
- Worn distributor or magneto shaft bushings
- Defective coil or condenser
- Defective ignition switch
- Spark timing out of adjustment

### CARBURETOR PROBLEMS

- Dirt or water in fuel\*
- Carburetor loose at flange\*
- Throttle shutter not closing properly
- Reed valve open or broken

### CRANKCASE PROBLEM

- Magneto adapter flange worn out-of-round

## MISFIRING AT HIGH SPEED

(Could be any of the above plus these)

### ENGINE PROBLEMS

- Excessive carbon in cylinders
- Poor compression

### IGNITION PROBLEMS

- Weak breaker-arm spring
- Coil breaking down
- Coil shorting out through insulation
- Breaker points improperly adjusted
- Poor breaker-point contact
- Spark advanced too much

### CARBURETOR PROBLEMS

- Dirty carburetor\*
- Lean carburetor adjustment\*

\*Can be checked without complete disassembly or special tools.

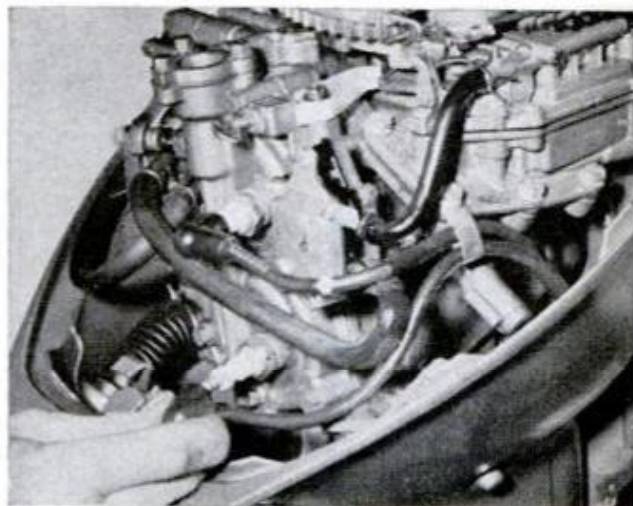
Before touching the ignition or carburetor, then, these possibilities should be checked out by taking a compression reading. A compression gauge will tell you if there is low compression in all cylinders or in just one. Since compression rating varies from engine to engine, you'll have to check the specs for your motor.

In taking a compression test, remove the sparkplugs, insert the gauge in one cylinder and crank the engine through at least four compression strokes. Record that reading and go on to the next cylinder. A variation of more than 15 lbs. per sq. in. between cylinders indicates a breakdown in one cylinder, possibly a scored piston or cylinder, or worn or sticky piston rings. There's no sense in testing carburetor and ignition, since you won't get rid of those hiccoughs without first repairing the damage in the bad cylinder.

An engine that "coughs" (backfires, to you) is one of the easiest problems to troubleshoot by ear. First, however, determine from where the cough is coming. Is it through the exhaust? Or is it through the carburetor?

If through the exhaust, the first thing to do is to make sure the engine isn't gulping excess air. Check for an air leak at the carburetor and intake deflector (if the engine is so equipped). Also, examine the sparkplug wires to assure that they aren't crossed.

Now, remove the plugs and inspect the



**CROSSFIRING**, heard as backfiring through exhaust, can be traced to sparkplug leads inadvertently mixed



porcelain. A crack in the porcelain will usually cause backfiring through the exhaust. At

this point, you may now have to remove the distributor cap or flywheel (to get at the magneto) to make sure carbon paths haven't formed on contacts or magnets. After all this, check the timing. It can also cause the problem.

Most often, backfiring through the carburetor results from a fuel problem—use of a poor grade of fuel, an air-fuel mixture that's too lean or rich, improperly seated or broken reed valves, or a carburetor that's not adjusted properly.

However, don't overlook the fact that backfiring through the carburetor can also result from improper timing and engine preignition. Finding out why an engine has preignition could be a bugger, because there are several factors. But keep in mind that an engine with preignition doesn't necessarily backfire.

Before getting to the roughest translation problem of all—raps, knocks and such from the powerhead—here's one that's quite simple because it's confined to one area. Suppose you get a clattering from the manual starter.

## BACKFIRING

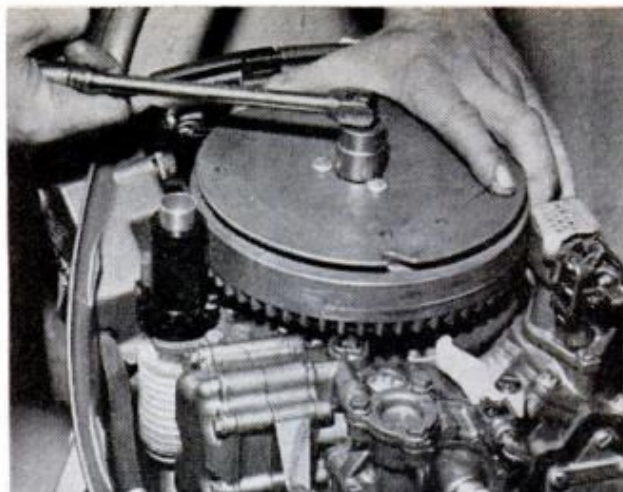
### THROUGH THE EXHAUST

- Cracked sparkplug porcelain\*
- Crossed sparkplug wires\*
- Air leak at intake deflector\*
- Carbon path in distributor cap or magnets

### THROUGH THE CARBURETOR

- Poor grade of fuel\*
- Improperly adjusted carburetor
- Air-fuel mixture too lean or rich\*
- Improper ignition timing
- Improperly seated or broken reed valves
- Pre-ignition, caused by:
  - Spark advanced too far
  - Incorrect sparkplug type\*
  - Burned plug electrodes\*
  - Excessive oil in fuel\*
  - Poor grade of fuel\*
  - Lean carburetor mixture
  - High engine temperature\*
  - Carbon deposits

\*Can be checked without complete disassembly or special tools.



**YOU CAN OFTEN QUIET** a chattering starter with a few drops of lubricant. Lube chart will tell you where

For this, there's only one course of action. First, lubricate the part to assure that noise isn't due to insufficient grease, then tighten down hard on the starter mounting. As a last resort, check the flywheel for broken or chipped teeth. Easy enough.

If the noise is still present after all this, you'll have to remove the starter from the engine and rip it down. Check for a defective starter drive, worn armature shaft bearings, a sprung armature shaft or a bent starter housing. Noise could also be

## OUTBOARD

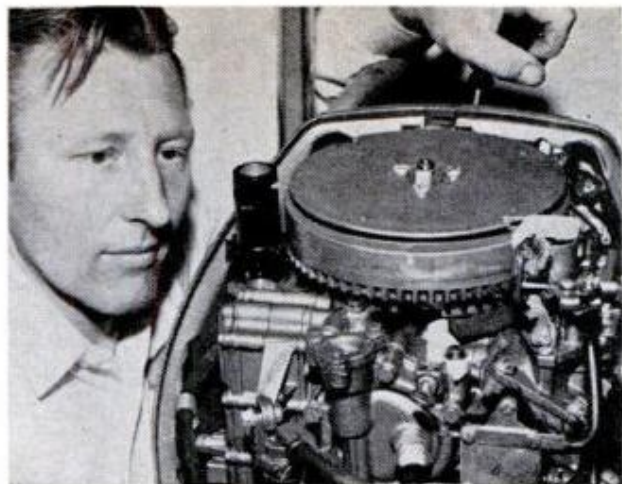
**Q.** What could cause an outboard engine to stop pumping water, although the impeller and its housing are brand new? I have this trouble with the cooling system of a 5-hp Sea King—R. B., Pa.

**A.** Two primary trouble spots other than the water pump are a blown head gasket (if the engine has a detachable head) and a hole in one of the cylinders.

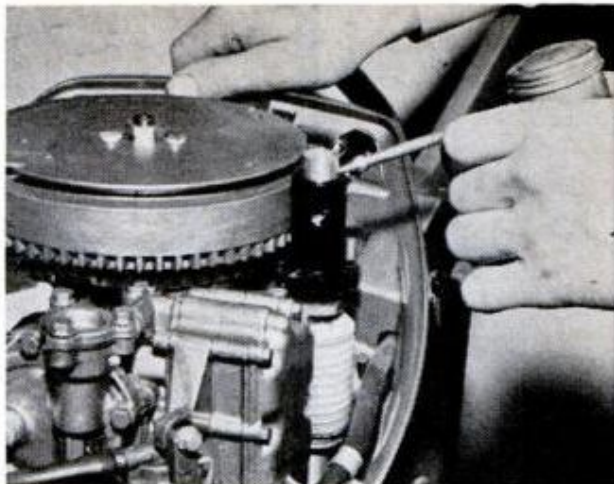
**Q.** Why is the low cylinder sparkplug of my engine always oil-fouled while the other plug is clean and dry? I've held plug leads to ground and get a hot spark, so I'm sure ignition is okay. Any ideas?—K. L. P., Mo.

**A.** If the problem isn't ignition—frankly, you can't be sure without checking both primary and secondary with a magneto tester—I would say that you may have a scored lower piston or a lower crankshaft seal which isn't properly seated.





**YOU'D CHATTER TOO**, if you had a broken tooth. Check the flywheel as a possible cause of starter noise



**POWERHEAD NOISE** may be caused by nothing more than a loose flywheel. Check before going into engine

caused by a friction spring that is bent or has a burr, or excess grease on pawls or springs.

Now for the big one. Any knock, click, rap or other noise from the powerhead or from the lower unit almost always signifies a serious problem. Your concern is not only to correct the damage, but to try and find out why it happened and make sure it doesn't happen again.

For example, if there is a clicking from the head, it could indicate a broken piston

*(Please turn to page 189)*

## CLINIC

**Q.** I keep losing oil from the transmission case of my 75-hp Johnson, but I can find no sign of oil leaking on the outside of the case. I'm stumped. Can you help?—J. D. F., Ore.

**A.** The problem is no doubt a bad seal, but one cannot determine which seal without checking the motor. You'll have to inspect the propeller shaft seal, shiftshaft seal and driveshaft seal. Apparently, oil is being lost when the engine is under load. This is the reason you can't detect it.

**Q.** What causes an outboard to keep busting shearpins? I'm sure I haven't been hitting objects and haven't become entangled in floating stuff.—T. B. G., Calif.

**A.** A good possibility for recurring shear-pin problems is a worn shear pin hole in the shaft. If this is the case, the solution is to replace the shaft.

## ASSORTED OMINOUS SOUNDS

### KNOCKING IN POWERHEAD

- Spark advanced too far
- Loose flywheel
- Excessive bearing clearance
- Excessive bearing end play
- Out-of-round bearing journals
- Bent crankshaft
- Broken crankshaft
- Connecting-rod problems

### SLAPPING PISTON

- Excess piston-to-cylinder-bore clearance
- Out-of-round cylinder
- Loose piston pin
- Carbon in top of cylinder
- Bent piston pin
- Excess clearance at ring groove
- Broken piston ring

### CLICKING IN POWERHEAD

- Broken piston ring
- Crankshaft hitting reed stops

### CHATTERING MANUAL STARTER

- Insufficient lubrication\*
- Loose starter mounting\*
- Broken or chipped flywheel teeth\*
- Defective starter drive
- Worn armature shaft bearings
- Sprung armature shaft
- Bent starter housing
- Bent or burred friction spring
- Excess grease on pawls or springs

### COMPLAINING GEAR HOUSING

- Prop hub running against gear-case cover\*
- Prop shaft worn or sprung
- Worn bearing
- Broken or bad gear

\*Can be checked without complete disassembly or special tools.

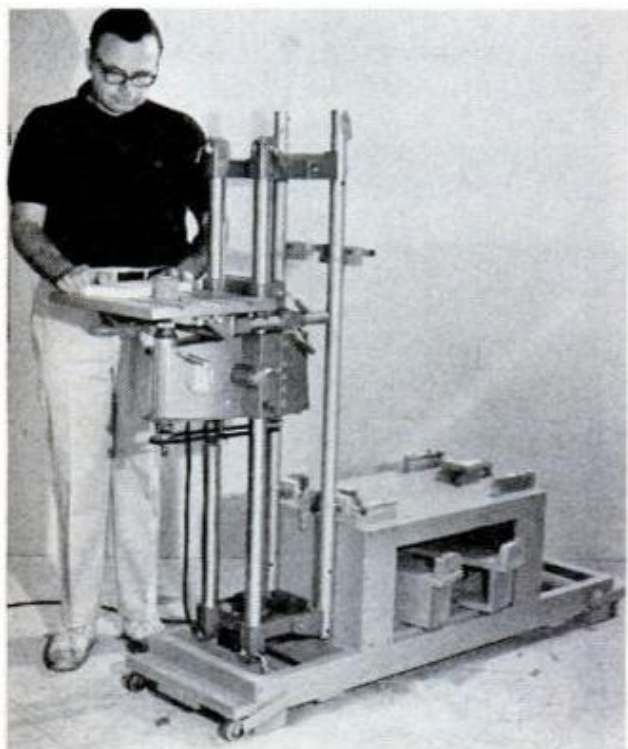


# UPDATE YOUR OLD SHOPSMITH

Replacing the original metal legs with a wooden stand lets your early-model machine do a double flip like its big brother, the Mark VII model

By Clifford K. Travis

Technical Art by Donald Evans

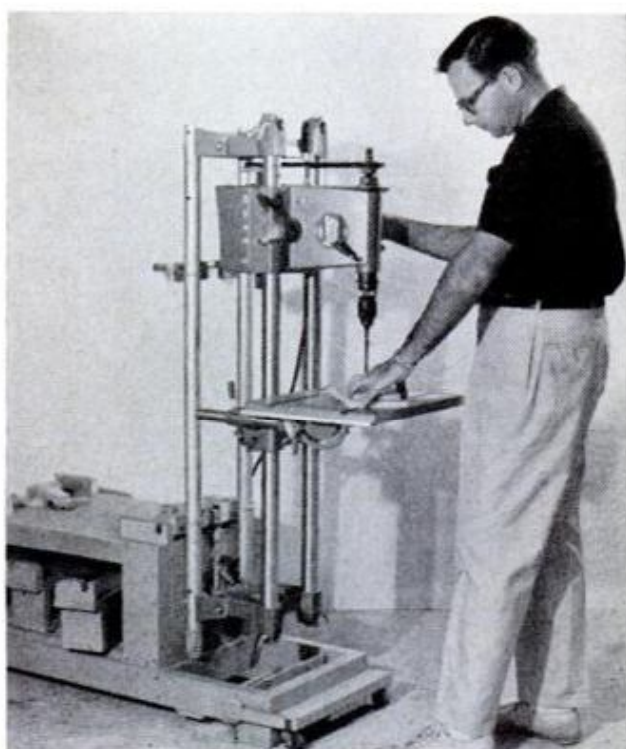


**FLIPPED ONE WAY**, the entire assembly can be used as either a sanding or a shaping table. The axle lock alone is sufficient to hold unit upright

**N**OT ONLY WILL this homemade modification equip your Mark II with nearly all the features of the newer Mark VII, it will, in fact, provide an important improvement.

This one feature alone should lend Mark II owners enough impetus to tackle the modification, inasmuch as it will permit those over 5 ft. 6 in. tall to raise the unit to a convenient working height. Only after stooping over a Mark II lathe for two or three hours can one *really* appreciate this additional provision.

Of course, all the features of the Mark VII (except the built-in shop vacuum) are also to be enjoyed when the modification has been completed. Flip the rails over at one end and you have an easily adjusted drill press. Flip the rails the other



**FLIPPED THE OTHER WAY**, unit becomes an easily adjusted drill press. In this position, a wingnut and a wooden block help to lock the unit vertically

way and you have an easily adjusted sanding or shaping table. Set horizontally for use as a lathe or circular saw, the unit can be used either at the height of the original stand, or at a more convenient elbow level.

Interestingly enough, all the operations required to complete the modification can be accomplished on the original Mark II. You may, of course, choose to substitute sturdy steel angle instead of plywood as shown, although wood actually seems to dampen most of the machine noise and vibration while still providing more than sufficient strength and rigidity.

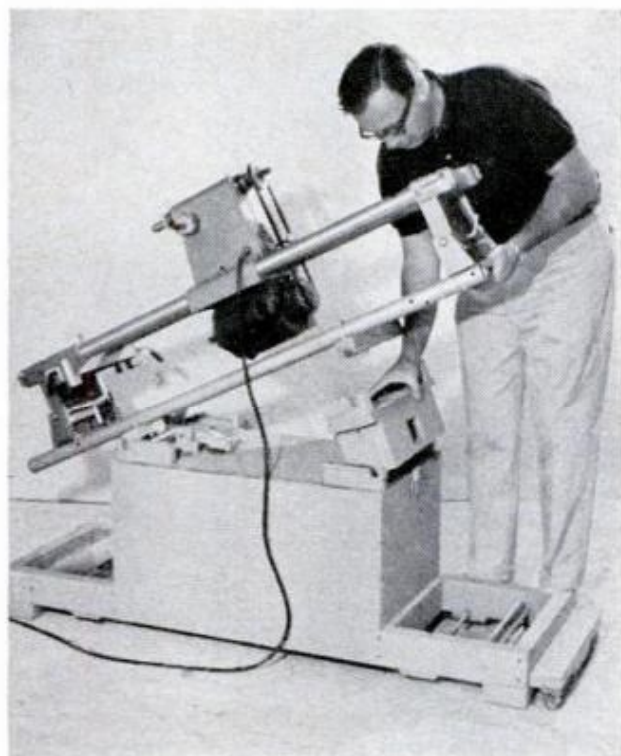
Carefully study the detailed drawing on page 150 before attempting construction of the stand. Note that small casters have been added for ease of mobility, although you may choose to simply add small rub-



# WITH THIS TWO-WAY STAND

ber wheels at one end and trundle the unit around somewhat like a wheelbarrow. Either way, mobility will prove an added asset, especially if workshop space is somewhat limited.

Each of the components for the locks and pivot assemblies should be made of a good hardwood such as maple or birch.



**RAISING THE MARK II** from wooden base is simply a matter of inserting an elevating platform under one end. Lock block in place, repeat at other end

Complete each piece before beginning the modification and then remove the Mark II from its metal stand.

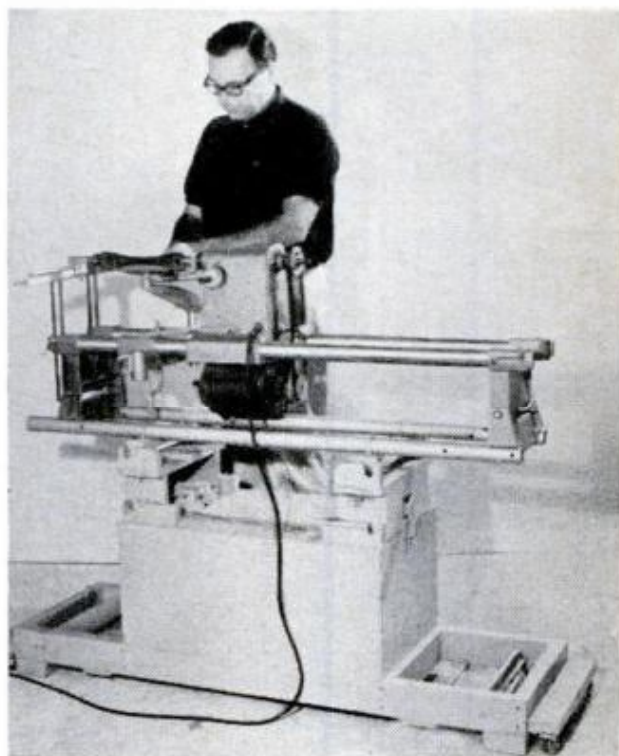
Attach the 15-in. axles to the lower rails of the machine with 2-in. U-bolts and the prefabricated mounting blocks. Do not, however, tighten the U-bolts yet. They should be left loose enough to slide along the length of the rails.

Place the entire assembly on top of the wooden base and slide a pivot block between the axles and the base at each corner. Check that the axles lie at right angles to the base and also make certain the pivot blocks are aligned with each other and with the base. Double check their positions and then carefully drill the mounting holes in the base, using the holes and slots in each of the prefabricated

pivot blocks as guides.

Insert the  $\frac{1}{4}$ -in. mounting bolts and secure each pivot block in place. Adjust the axle mounting blocks so the axles fit into the slots in the pivot blocks and then tighten the U-bolts securely.

Run a  $\frac{3}{8}$ -in. rod through the lock arm and the lock pivots to form the assembly



**ELEVATED** lathe will prove a boon to woodworkers over 5 ft. 6 in. tall. In this position, lathe need not be locked, but both platforms must be secured

that will secure the axles to the base. Fit the assembly on the base so the locking notch is centered over the axle. Bolt both of the lock pivot blocks in place and position the trunk-type latch so it holds the steel strap snugly on the lock arm.

Platforms to elevate the machine for use as a lathe are also made from  $\frac{3}{4}$ -in. plywood, screwed and glued together for maximum strength and rigidity. The pivot blocks that fit on top of the platforms are the same as those used on the wooden base, except that they are cut a bit shorter.

To elevate the machine, raise one end and slip the platform into place. Be sure to securely lock it by mating the notch in the lock arm with the wooden block on the inside of the platform. Then again use the trunk-type latch to securely lock the





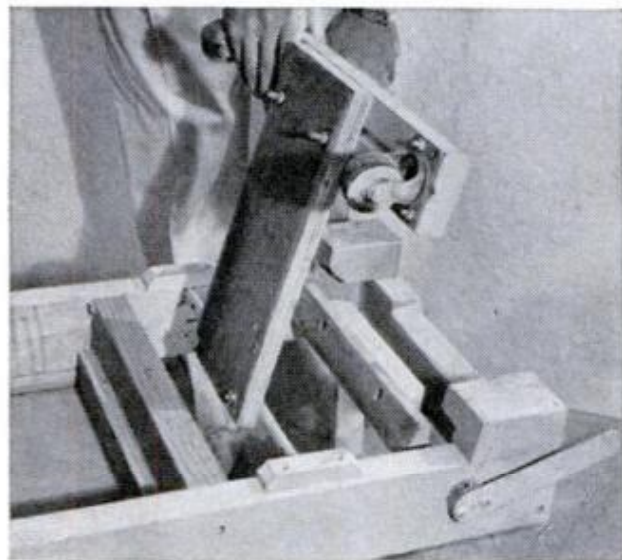


platform between the lower pivot blocks.

Lower the machine until it rests on the platform. Note that it doesn't fit into the slot in the pivot block yet.

Now carefully raise the other end of the machine and place the other elevating platform on the base. Lock it securely, lower the machine and both axles will fall into their respective pivot slots.

It's not necessary to lock the axles to the upper pivot blocks when the unit is used as a lathe. Just be sure the elevating



**CASTER ASSEMBLY** is simple but efficient. Note, however, that notches to hold pivot rod do not run through the frame. See drawing at left for details

platforms are locked and free of wobble.

Only one more step remains before the modification is completed—the fastening of the large wingnut and wooden block to lock the Mark II in a vertical position so it can be used as a drill press.

The location of the mounting bolt can best be determined if the machine is first flipped to its drill-press position. Then position the wooden block so its bottom section will hold the metal frame of the machine flat against the side of the base. Use a pencil and mark the outline of the block, lower the machine back onto the top of the base, and then reposition the wooden block within the marks just made.

Drill the hole for the mounting bolt through both the wooden block and the side of the base. Remove the block, insert the bolt into the hole from inside the base, and lock it in place with a matching nut and washer. Then just add the wooden block, thread on the wingnut, and your old Mark II has undergone its transformation into a current Mark VII. ★★★

AUGUST 1967

## RING NUTS AND WRENCHES

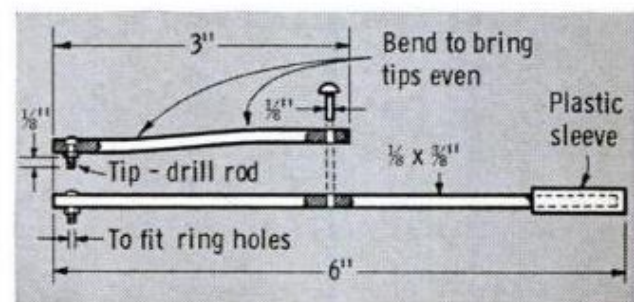


**SPARTAN-LOOKING** wrenches will fit most rings and perform as well as their chromed counterparts

**THERE'S NO DOUBT** that trying to remove a threaded retaining ring without a specially-designed (high-priced) wrench is almost as impossible as living on a budget. (But it is a shortcut to broken and jagged fingernails.)

Two inexpensive and adaptable solutions are thus offered. The first is a two-part wrench that will fit rings with holes drilled in the flat surface, and is detailed in the diagram below.

The other nail saver is simply a length of  $\frac{1}{8}$ -in.-dia. steel rod, bent to fit the rings you most often combat, and equipped with appropriate tips.—Walter E. Burton



151



# 18 Ways to get more from your portable drill

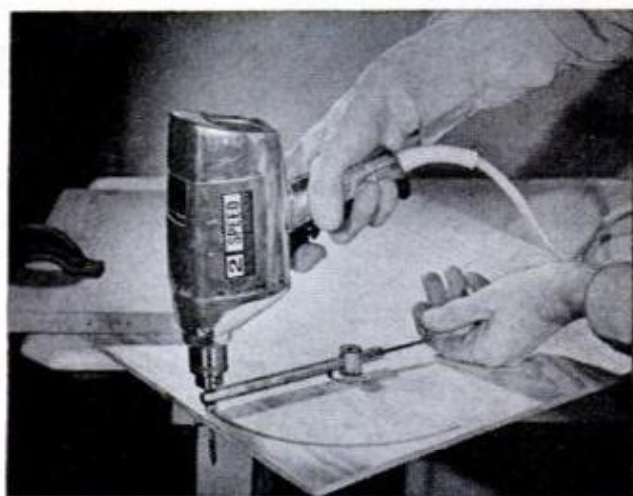
By WALTER E. BURTON



**PUTTING UP A TOWEL RACK?** Special masonry bits let you drill holes in hard, brittle ceramic tile. A variable-speed drill is especially handy here since you can start slowly and keep the bit from skittering off the mark.

**N**EW USES for that versatile jack-of-all-jobs, the portable electric drill, are being discovered every day. On this and the following three pages *PM* has rounded up 18 of the cleverest and most useful. Some may be familiar; some may not have occurred to you before. All will help to make your drill an even more valuable tool around your home and shop.

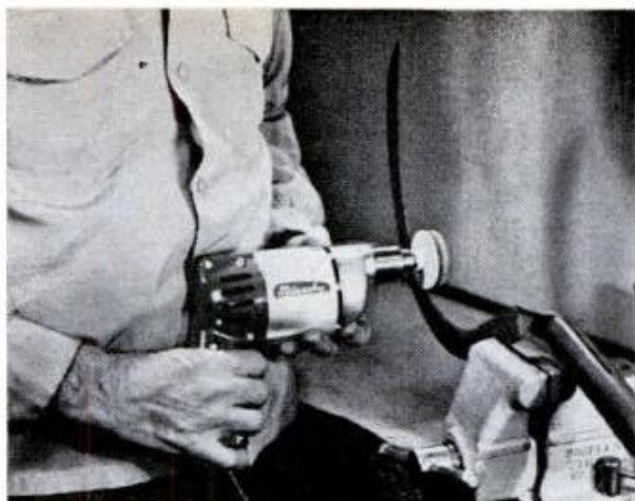
Some of the setups shown call for mounting a drill rigidly in a stand or holder. Most models have two or more threaded holes in their housings to accommodate removable handles. These holes take standard  $\frac{1}{4}$  or  $\frac{3}{8}$ -in. bolts, making it easy to anchor a drill in a homemade wood cradle. For a temporary mount, merely attach a bolt and tighten the bolt in a vise.



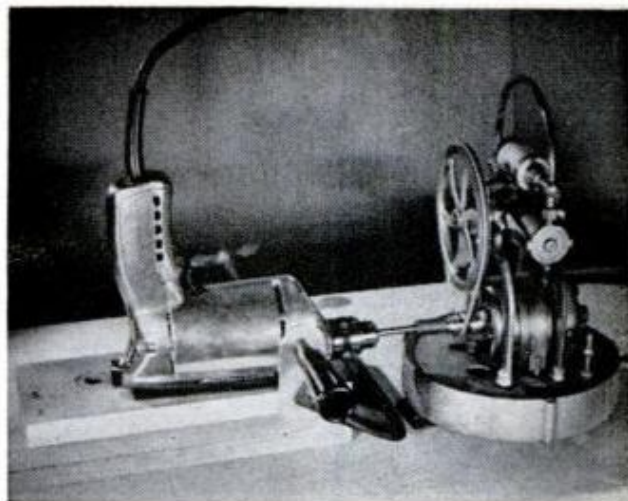
**LARGE HOLES OR DISCS** can be cut out with this ingenious accessory called a Compass Cutter. The drill turns a side-cutting bit while the pivoted arm is swung in a circle. The arm length is adjustable.

POPULAR MECHANICS

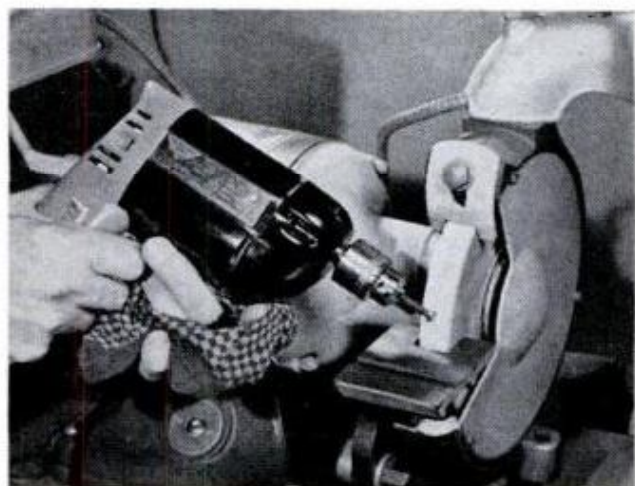




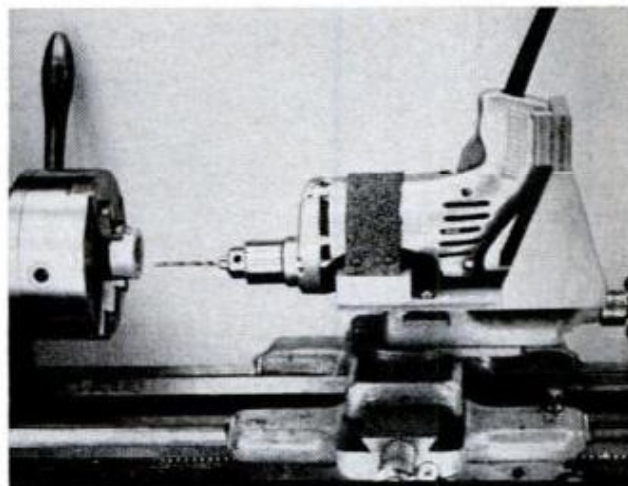
**A SHARPENING WHEEL** chucked in a drill takes the elbow work out of sharpening chores around the home and shop. Here a slope-sided mower sharpener has a thin disc added to it to form a guide flange



**NEED EMERGENCY POWER?** A drill can serve as a stand-in motor for a small shop or household machine that's ailing. Here a drill drives a pump shaft through a flexible coupling made of rubber tubing



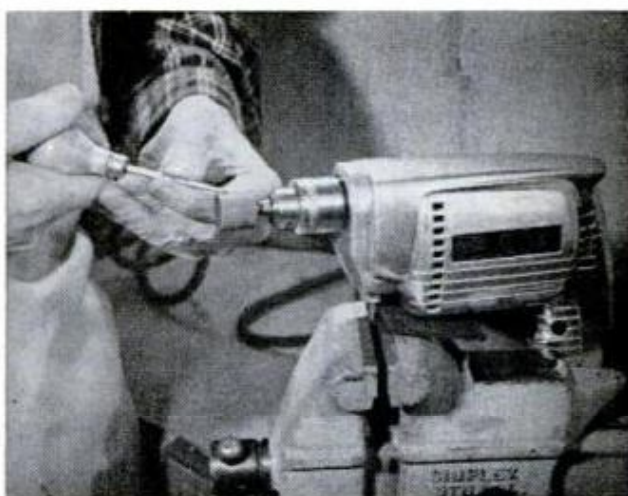
**TO GRIND SMALL PARTS** perfectly round, chuck them in a drill and apply a light pressure against the grinding wheel while the drill turns. The spinning action will give you a uniform grind on all sides



**MOUNT A DRILL** on a lathe carriage and you have a precision setup for drilling holes in a circle or along a radius or diameter. For angle drilling, put the drill on the compound slide and swing the slide



**A RIGHT-ANGLE DRIVE** enables a drill to turn corners and reach into normally inaccessible places, such as between narrow-spaced shelves. Here it's being used with a hole saw, another handy accessory



**SMALL ABRASIVE DRUMS** chucked in a drill give you a miniature bench grinder for pointing, sharpening and shaping jobs. Here a punch is being re-pointed. Always wear safety goggles for such jobs

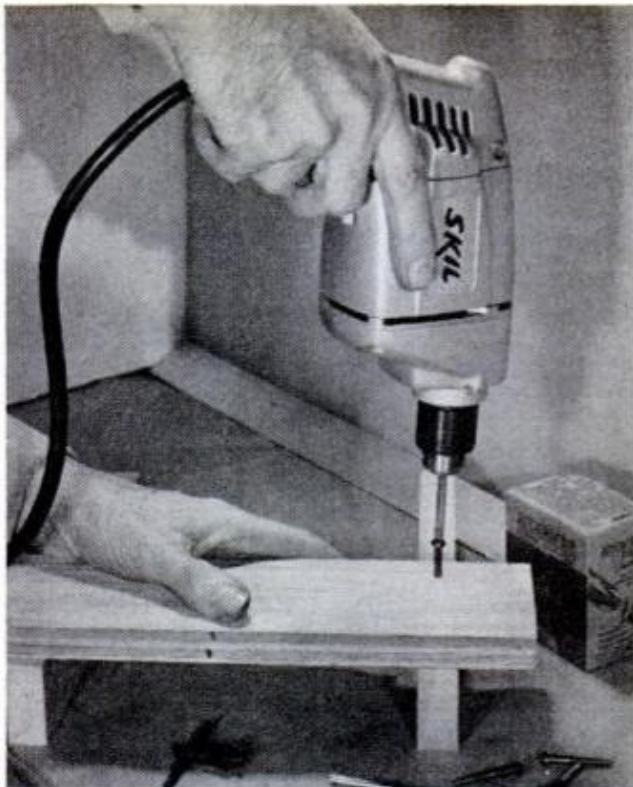




**USING A WOOD DOWEL** as a polishing tool is a handy trick to remember. Here a 1/4-in. maple dowel clamped in the drill chuck burnishes a glass-smooth finish onto a hardwood knob for a chest of drawers



**A TINY BUFFING WHEEL** for delicate polishing work can be made from an ordinary roundhead carriage bolt. Cement several layers of felt over the head to make a soft, rounded pad and chuck the bolt in a drill. The felt is charged by running it for several seconds against a block of polishing compound



**SCREWS GO IN FAST** when you drive them with a drill. For best control, use a variable-speed model on a slow setting. For fixed-speed drills, use a screwdriving attachment like the one shown on the facing page. Cut the power just as the screw head sinks flush and it will seat itself neatly and tightly. On big jobs, use cross-slotted Phillips screws and a matching bit—the bit won't slip out

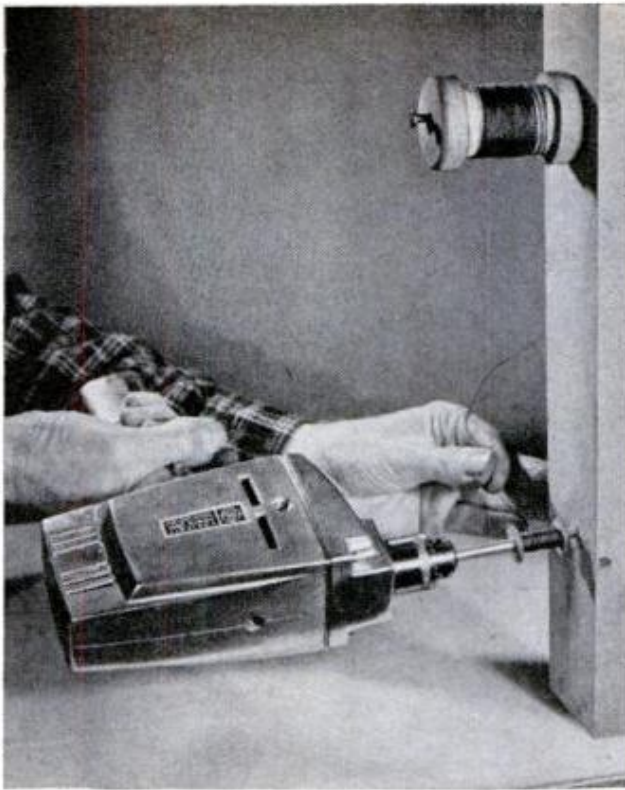


**YOU CAN DRILL GLASS** this way. Suspend the drill from a spring so most of its weight is off the glass, eliminating strain. Tape the glass to a smooth, flat surface. You can buy special glass-cutting bits or use short lengths of brass tubing with aluminum oxide abrasive powder and water for a lubricant

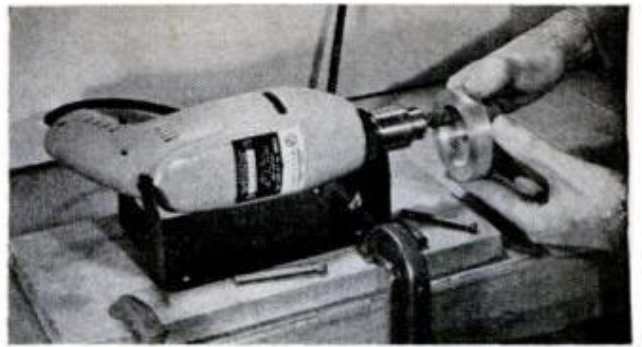


**SLICK WAY TO POLISH** rounded edges on plastic, metal shafts and similar objects is with a drill-driven belt like this. Belt is an old leather strap with ends taper-lapped and glued into a loop. Drive pulley is a small sanding drum with fiber discs for flanges. Belt is charged with polishing compound

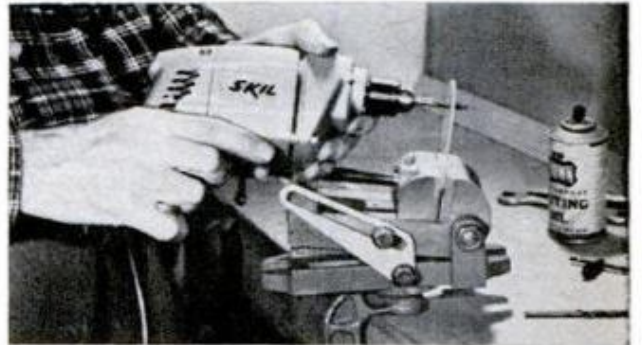




**WINDING COILS WITH A DRILL** speeds the work on jobs calling for hundreds of turns of very fine wire. Press the coil form onto a snug-fitting rod and chuck it in the drill. Insert the outer end of the rod into a hole in a wood upright to serve as a bearing and steady the rig. The spool of wire can turn on a nail above the coil. A variable-speed drill is best since it lets you start off slowly



**CLAMPED IN A BENCH STAND**, a drill can do many light machining and finishing jobs. Here a drill is fitted with a rotary file to touch up an aluminum disc. Such files and cutters come in many types

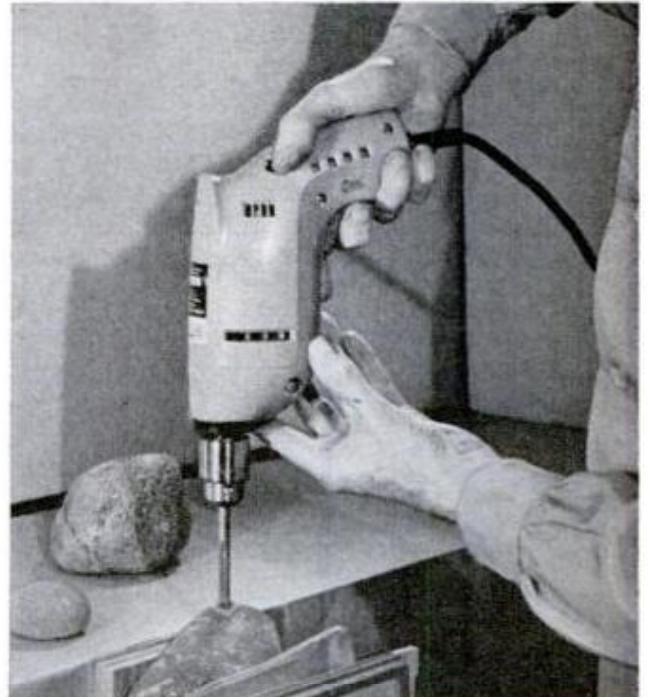


**TAPPING THREADS IN METAL** is quick and easy with electric drills that have both variable speed and a reversing control. Use a low speed and back the tap out every few turns in order to clear the chips out of the delicate threads. Apply threading oil, available in handy pushbutton spray cans, as you go



**A CLUTCH-TYPE ACCESSORY** can be used to drive screws with a drill that has a single fixed speed. Pressing down engages the screwdriver bit to turn the screw; lifting up disengages the bit to stop it. This lets you control the action. Such accessories sell for only a dollar or so at most hardware stores

AUGUST 1967

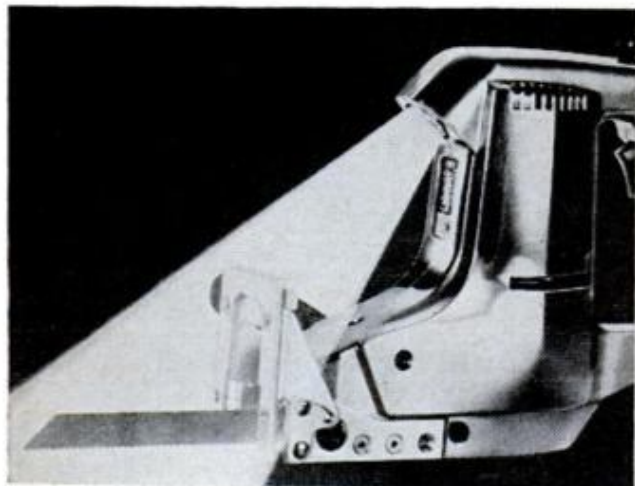


**LIKE TO DRILL A ROCK?** It's no problem if you use a carbide-tipped masonry bit. Here a stone, to be used as the weight for a self-closing garden gate, is drilled to take an eyebolt. The eyebolt, cemented into the hole in the stone with epoxy, makes it easy to attach the weight to the chain on the gate

155

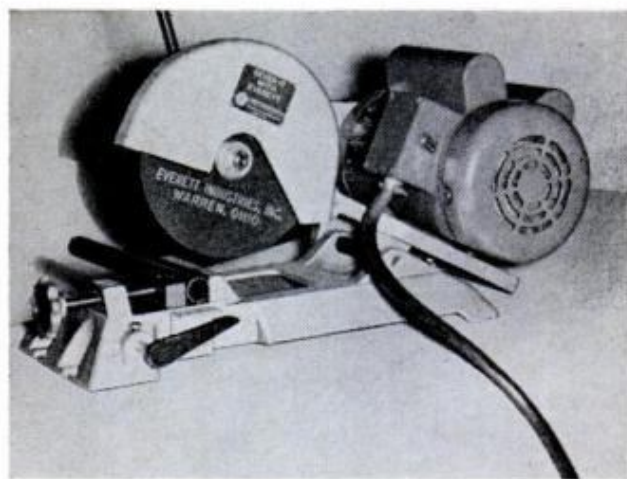


# New tools you should know about



## Blitz reciprocal saw

New from Portable Electric Tool Co., the 1816 multi-purpose reciprocal saw features a built-in light to illuminate the cutting area and a dial adjustment for speeds of 600 to 2000 strokes per minute. Powered by a  $\frac{5}{8}$ -hp, 6-amp. motor, the saw will cut through 10 in. of hardwood or 1 in. of metal. Has a  $1\frac{1}{4}$ -in. stroke and can be locked in any of six cutting positions, including those for flush cuts on horizontal or vertical surfaces.

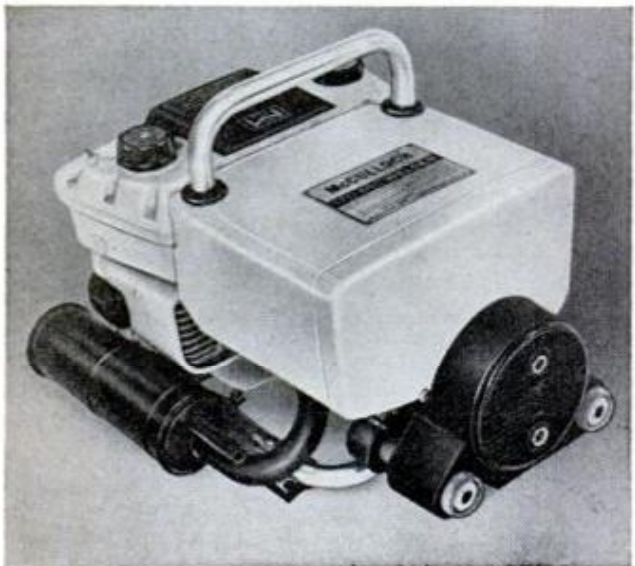


## Abrasive cutoff machine

Boasting a cutting speed of 1 sq. in. in four seconds, this rugged 8-in. abrasive cut-off machine by Everett Industries, Inc., will zip through drill rod, hardened screws and bolts, dowel pins and other tough materials with the greatest of ease. Powered by a fully-enclosed, 3-hp motor, the machine is available for either 110 or 220 volts. Standard machine with a single-phase motor retails for \$187.50 f.o.b. Warren, Ohio.

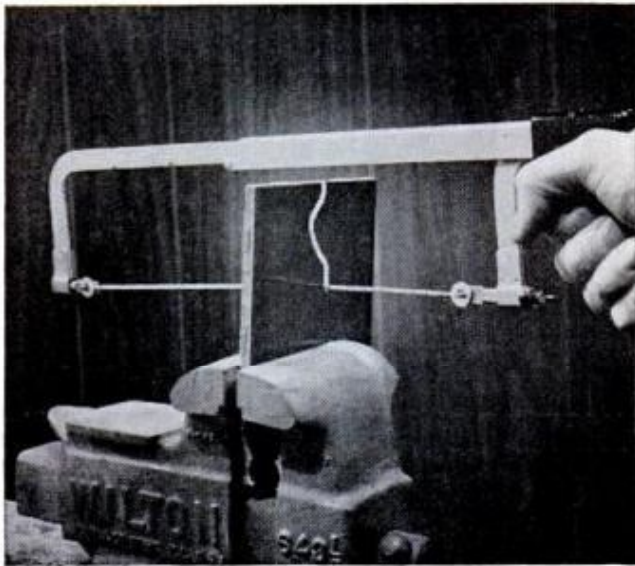
## Portable a.c./d.c. welder

From McCulloch Corp. comes news of a portable arc welder with both a.c. and d.c. capabilities, a decreased weight of 58 pounds and an increased duty cycle of 75 percent. Known as the 170, the welder incorporates a rectifier as an integral component, thereby eliminating the need for a separate power pack. (This rectifier can be adapted to older McCulloch 170-amp. arc welders.) User can select either a.c. or d.c. current any time the welder is running.



## Tungsten-carbide rod saw

When used like a coping saw, the Dillon rod saw will cut on forward and reverse strokes to slice through such exotic metals as titanium and stainless steel, as well as through pipes, tiles, ceramics and even glass. When the blade dulls, it can be turned to a new position and used again (each blade has four cutting positions). Available from Dillon Tile Supply, 158 11th St., San Francisco, Calif., the blades cost \$2.50 each and will fit standard 12-in. hacksaw handles.





# HINTS FROM READERS

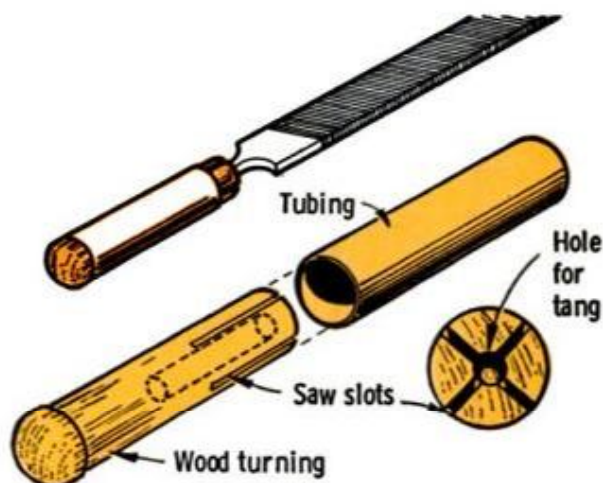
## Glass cutter 'scores' sheet metal

When you need clean, sharp bends in pieces of thin sheet metal, a straightedge and an old glass cutter will help you do an admirable job. Lay the work on a piece of softwood, align the cutter wheel with the layout line, and press down firmly on the cutter.—*Henry Mullen*



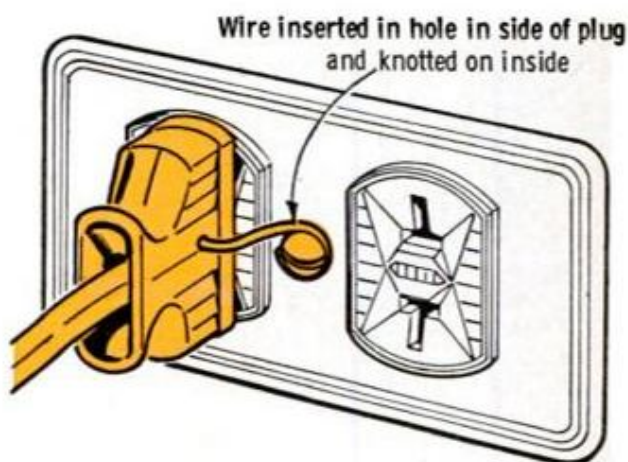
## Tube reinforces tool handles

Strong replacement handles for files, chisels and other tools can be made of hardwood turnings covered with brass or copper tubing. First turn the handle and drill the hole to accept the tool's tang. Then slit that end into quarters. To fit the tang and tube to the turning will require a bit of care, for unless the tube is larger than the tool body, both tube and tang must be fitted to the turning together and then driven home with alternate blows.—*Peter Legon*



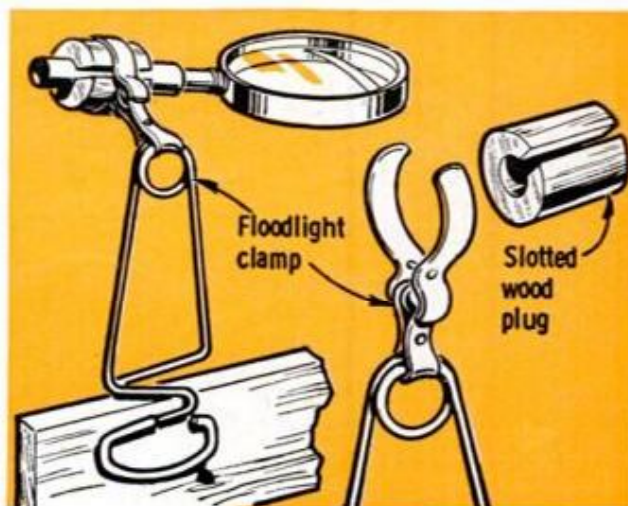
## Lock-wire for a.c. plugs

You can prevent pulling the plug accidentally on freezers, pumps and other critical appliances by "locking" their plugs in place. Disconnect the wires inside the body of the plug and drill a small hole through one side of the body. Thread a short length of thin, insulated wire through the hole and knot the end inside the plug. Reassemble the plug, stick it back in its socket, and anchor the other end of the wire to the screw holding the plate to the electrical box.—*Joseph Braunstein*



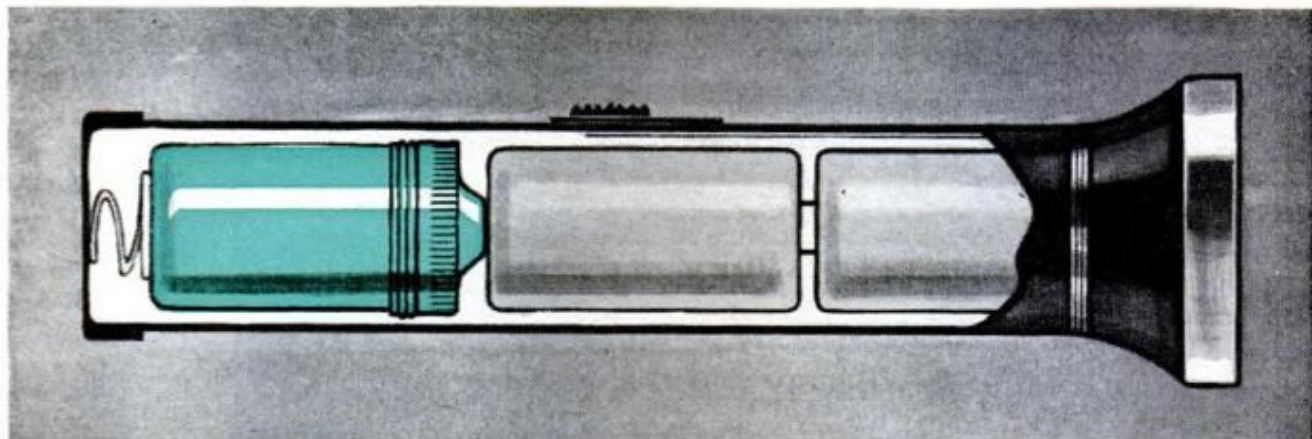
## Clamp holds magnifying glass

If you often construct small models or work on other items that require the use of both hands as well as that of a magnifying glass, make this simple but effective holder from a floodlight clamp and a wooden plug. Drill and slot the plug so it will just accept the handle of the glass. Then when the plug is gripped by the clamp, the slot will close enough to hold the handle securely. The other end of the floodlight clamp can be slipped over an easily moved wooden block.—*Peter Legon*





# Solving home problems



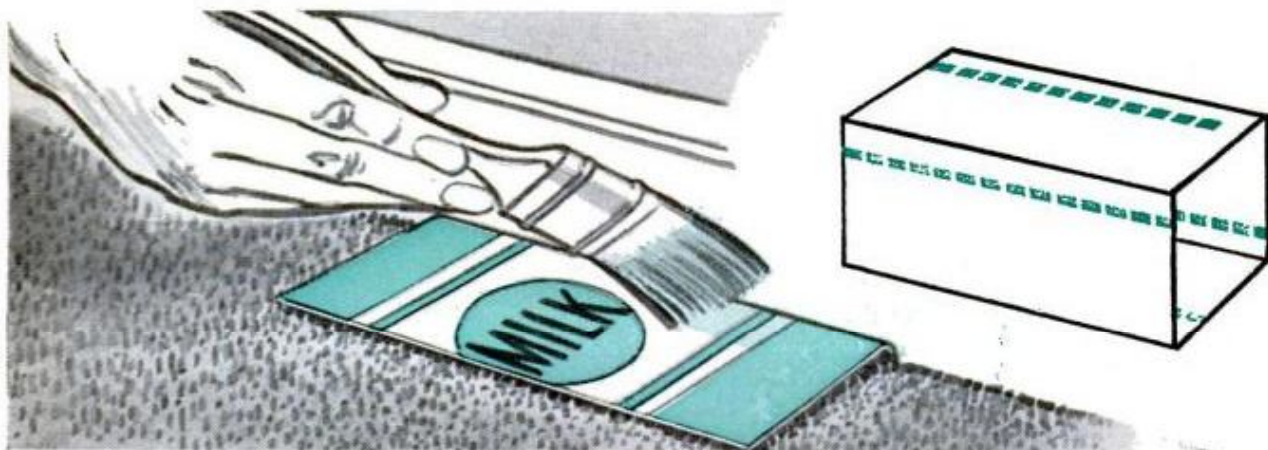
**SUPER-SECRET HIDING PLACE** for spare keys or other valuables can be made by removing one battery from a three-cell flashlight and replacing it with a 35-mm film canister. The flashlight will still operate fine



**EASIEST WAY** to remove a single asphalt tile without damaging adjoining tiles is to move a piece of dry ice slowly around the edge, then place it in the center. In a second or so, the tile will pop loose



**TO PREVENT** a wire-hung toilet deodorizer from being accidentally knocked into the bowl and flushed down, tie a string to the wire and tape it to the outside of the bowl. It could save a big plumbing bill

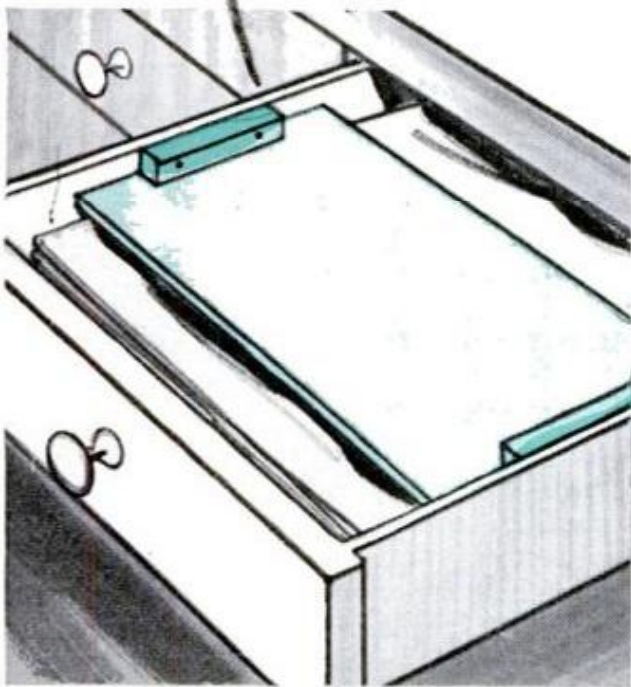


**WHEN PAINTING BASEBOARD** next to carpeting, use movable masking "strips" made by removing top and bottom from a milk carton and cutting each side  $\frac{1}{2}$  in. from one edge to form a shallow lip on each strip

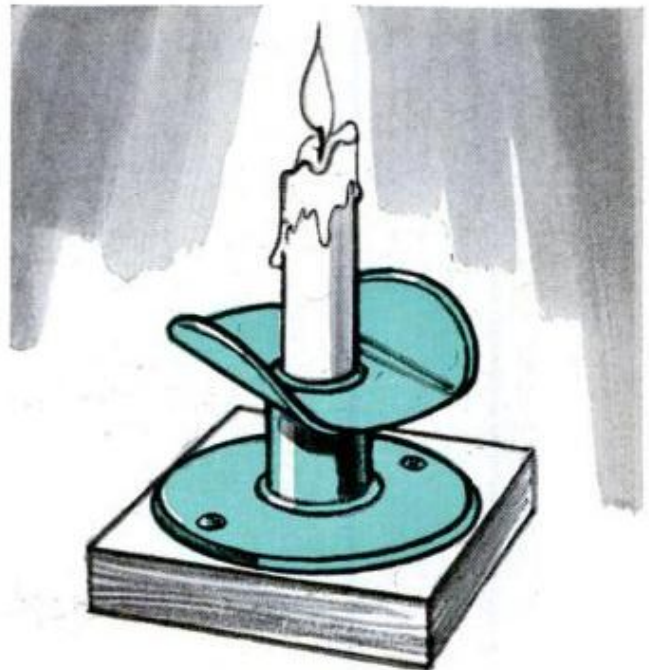




**HANDY HOLDER** for loose postage stamps is just an empty matchbook with wax paper stapled over it. Fine for pocket or purse, it protects the adhesive from moisture and dirt. Great for trading stamps, too



**TO MAKE A SPECIAL DRAWER** for storing grocery bags, nail a couple of  $\frac{1}{4}$ -in. retainer strips along the upper inside edge and cut a piece of  $\frac{1}{4}$ -in. plywood to the inside drawer width to hold bags down neatly



**IMPROVISED CANDLE HOLDER** for use around the shop is just an empty tape spool nailed to a scrap of wood. You'll find that nailing the spool down will be easier if you bend the top disc upward slightly



**FOR A HIGH-GLOSS SHINE** the next time you're polishing your shoes, try spreading a few drops of lemon juice on each one followed by a brisk rubbing with a soft cloth. It works especially well on smooth leather



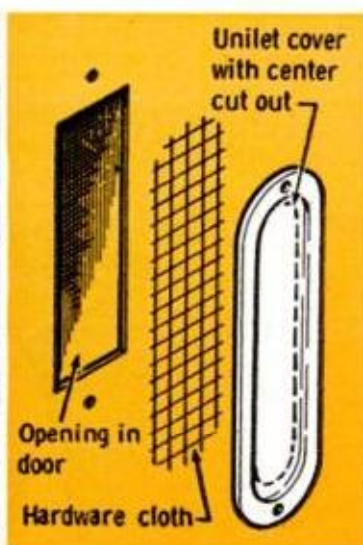
# Ventilating System for Your Car



**STALE AIR FLOWS** through grille in door panel into the door interior and out through small exhaust grille



**ONE-WAY VALVE** cut from inner tubing can be added to exhaust if you live in an especially cold climate



**CUT OPENING** in the rear edge of the front door to match the shape of the inner portion of the unilet

FOR LESS THAN \$5, you can add a simple ventilation system to your car which will rid it of stale air and cut down on window fogging without creating uncomfortable drafts. Basically, it's just a pair of grilles in each front door—an intake on the inside panel and an exhaust on the rear edge outside the weather seal. The old moisture-laden air is forced out by the action of the heater fan, plus the suction effect of the outside grille. The normal air leakage present in any car replaces this with fresh air.

Everything necessary can be purchased at your local hardware store and electronics supply store. You'll need two unilet (electrical-box) covers 4½ in. long, two small grilles designed for remote radio speakers, a small piece of hardware cloth and a section of inner tube, plus some plastic tape and nonhardening caulk.

The first step is to determine the location of open areas on the inside door panel, since you don't want to cut away any metal in order to mount the grille. At the same time, the grille should be mounted near the edge of such openings, so you can anchor it to the inner structure of the door with sheet-metal screws.

Cut the hole and seal the edge with caulk and plastic tape so moisture can't penetrate between the fabric and backing. Then drill mounting holes and install the grille, using small masonry anchors where you can't drive sheet-metal screws.

To make the exhaust grille, cut out the indented center area of the unilet cover. Cut a piece of hardware cloth to cover this area and extend to the screw holes (hammer the ends flat to keep the grille from protruding any more than necessary). Finally, cut a hole for the grille between the outside edge of the door and the weather seal in the vicinity of the latch, but in a location which won't interfere with the lock. Before installing the grille, give all components a coat of paint and, while you're at it, touch up the raw metal edges of the hole.—Henry T. Gurley

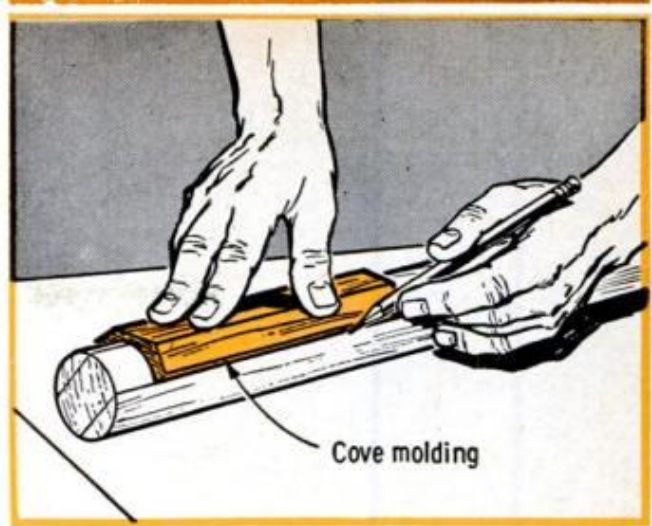


# HINTS

FROM READERS

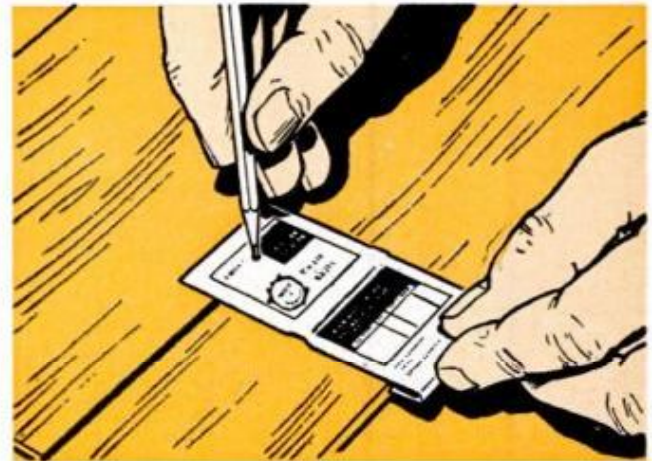
## Scribing large dowels

A length of cove molding can provide an excellent means of drawing parallel lines on large diameter dowels. When used as shown in the sketch at right, this method is especially useful whenever a long tongue or groove must be cut in the end of a dowel or pole. The molding automatically aligns itself.—*Victor H. Lamoy*



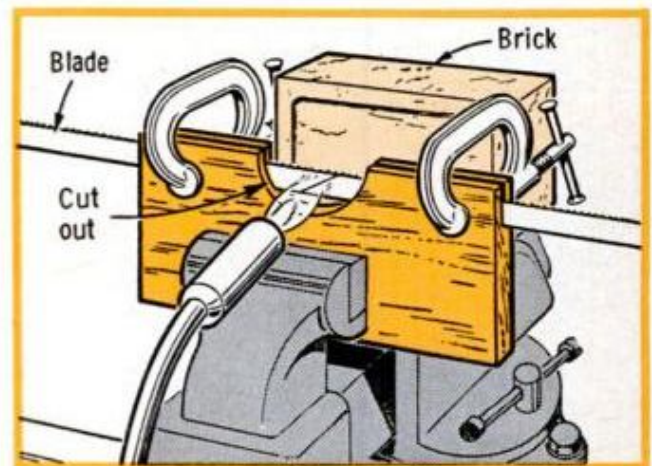
## Matchbook marking gauge

When the job suddenly calls for a marking gauge and there's none at hand, reach in your pocket. An empty matchbook will turn the trick if a small hole to accommodate a pencil is punched in the cover. Just be sure to make the desired measurement with the book on the board before punching the hole. If the book has matches in it, bend them back and use them as a guide in drawing pad along edge of work.—*William Swallow*



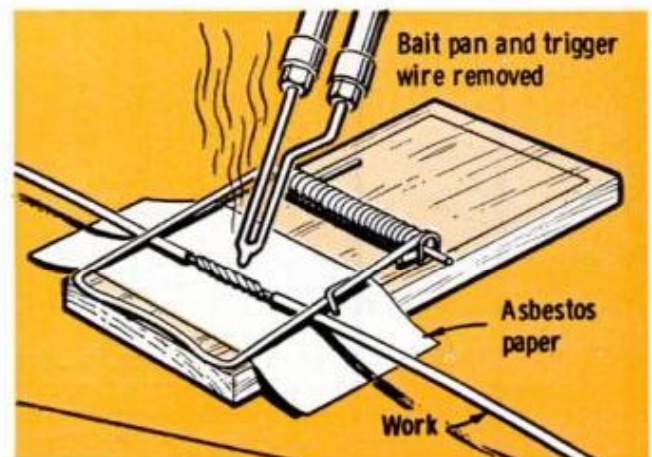
## Heat-retaining brazing jig

Bandsaw blades can be easily brazed if held in this simple hardwood jig that will also prevent the otherwise rapid dissipation of heat. Carefully align the ends of the blade and then firmly tighten the C-clamps. But before brazing, place an old brick or two behind the heated area. These will keep the flame from spreading and possibly charring the top of your workbench. Cut notch deep enough to clear torch flame.—*Victor H. Lamoy*

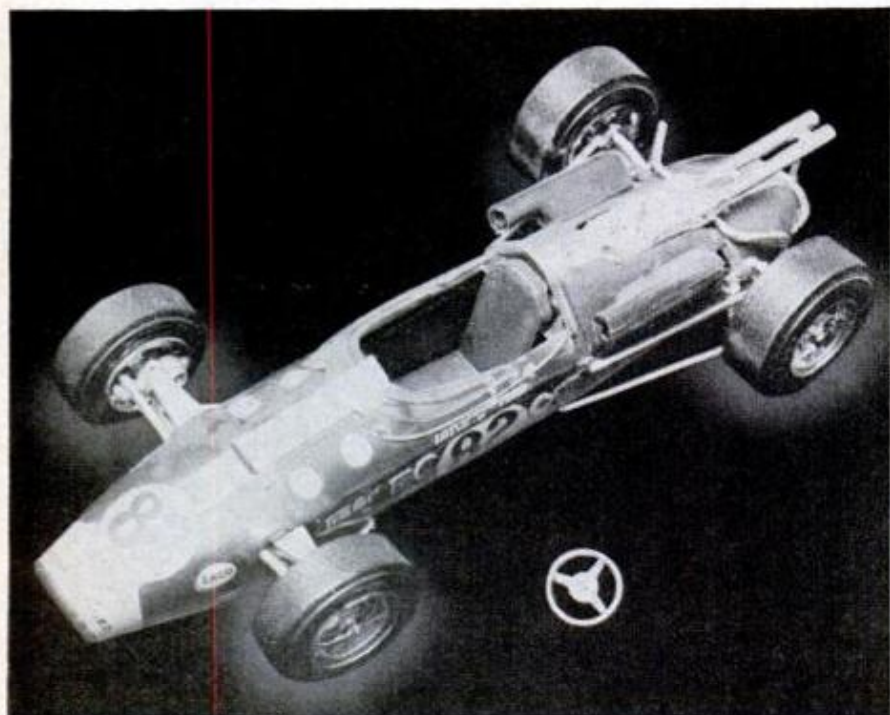


## Mousetrap soldering aid

If you frequently find yourself splicing small wires with the iron in one hand, the work in the other and the solder between your teeth, dig out a mousetrap. Remove the bait pan and trigger, glue or tack down a piece of asbestos and you've an inexpensive soldering clamp. It will hold work of many sizes, yet is compact enough to be carried in a toolkit, workbag, or even a back pocket. You'll also find it handy as a holding clamp for light work.—*Victor H. Lamoy*







**EQUIPMENT YOU NEED** for metal casting is shown at upper left. Main items are (l. to r.) a hand air pump, propane torch and electric burnout oven. Other supplies are powdered mold mix (in packets), metal tubes to hold the mold, blocks of carving wax, tongs, small metal ingots, wax sprues and a mixing dish, preferably of flexible rubber or plastic. Tiny steering wheel for the model racing car at lower left and charms and trinkets at right are examples of the many intricate shapes you can cast by lost-wax method



# MAKE YOUR OWN METAL CASTINGS

Like to make special parts for models? A shiny piece of jewelry? The ancient art of "lost wax" casting combined with modern equipment makes it easy to turn out just about any metal shape you want

By C. W. WESTRICK

**T**HERE'S A BIG THRILL in seeing a design you have created yourself turn almost magically into gleaming metal. But maybe you figure this requires special know-how and a lot of fancy equipment.

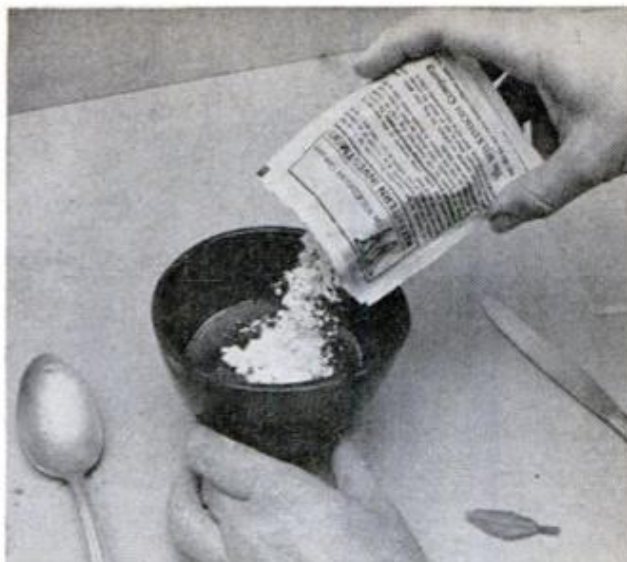
Not today. Hobby shops and lapidary supply houses stock everything you need to cast small model parts or pieces of jewelry in glittering gold, silver and other metals. The process, known as investment or "lost wax" casting, is the same as that used centuries ago by early Egyptians. You carve the shape you want in soft wax, embed the wax in a plaster-like material that hardens around it, then bake it in an oven. Under high heat, the wax vaporizes—is literally "lost"—leaving an empty mold. Molten metal forced into the mold then produces an exact copy of the original wax pattern.

You can make your own wax patterns using a special carving wax, or you can buy patterns ready to use. The latter come in a wide variety of ornaments, charms and small pieces of jewelry. You can also copy actual specimens, such as leaves and insects—anything that will vaporize at 1200° F., leaving little ash.

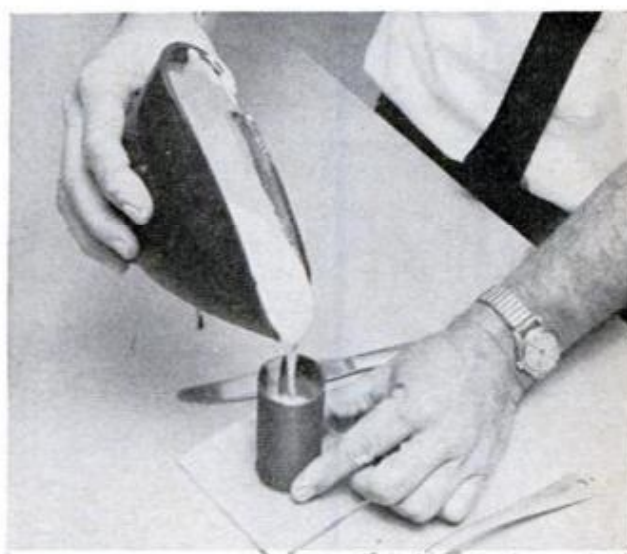
The equipment you'll need includes a small electric oven for burning out the wax, a propane hand torch for melting the metal, an air pump for forcing the molten metal into the mold, and a supply of metal tubes, called rings or flasks, in which the molds are formed. The rings come in a variety of diameters depending on the size of the pattern you want to copy. The mold material, called the "investment," is a white powder that's mixed with water to form a creamy paste.

Altogether, everything you need for investment casting can be had for \$100 or

AUGUST 1967



**POWDERED MOLD MATERIAL** is poured into a small dish and mixed with water to a creamy paste. Stir gently to avoid whipping up air bubbles in the mix



**A METAL TUBE**, called a ring or flask, serves as a container for the soupy mold mix. Fill it flush to the top. A flexible dish makes the pouring easier



**SPRAY THE PATTERN**—in this case a small leaf—with a wetting agent before embedding it. This lets the mold mix flow smoothly over the entire surface

163





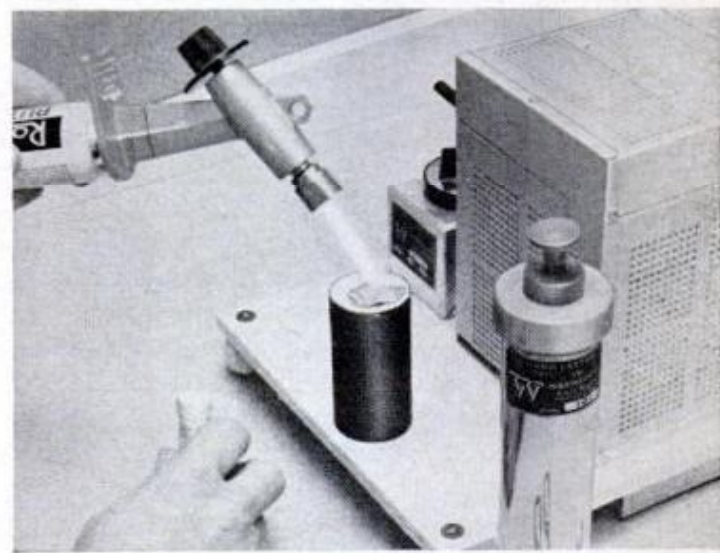
**ON INTRICATE OBJECTS**, it's best to coat the surface with the mold mix first, using a brush. This insures that the mix will get into all the crevices



**THE PRECOATED PATTERN** is now dipped into the ring containing mold mix. Be sure it is submerged and fully surrounded by the mix with no air pockets



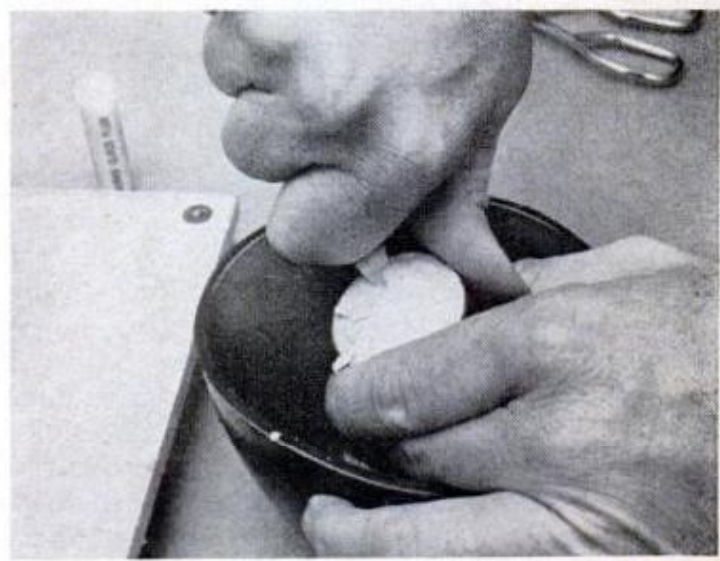
**PLACE THE MOLD IN THE OVEN** crater side down. Burnout takes 30 to 60 minutes for wax patterns. Less combustible materials may need several hours



**FILL THE MOLD'S CRATER** with several small metal ingots after the burnout. Play the torch flame over them until a ball of molten metal is formed



**PRESS THE PUMP** down over the mold ring without removing the torch. The pump's pressure forces the molten metal down in the mold, as the sketch shows

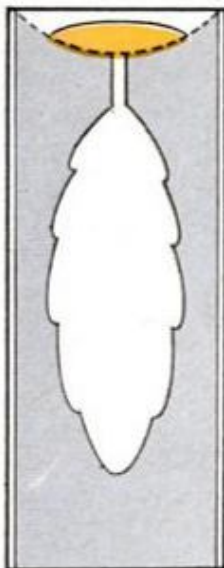


**SOAKING THE MOLD** in water loosens it and allows it to be peeled easily away from the casting. Remaining bits can be taken off with a toothbrush

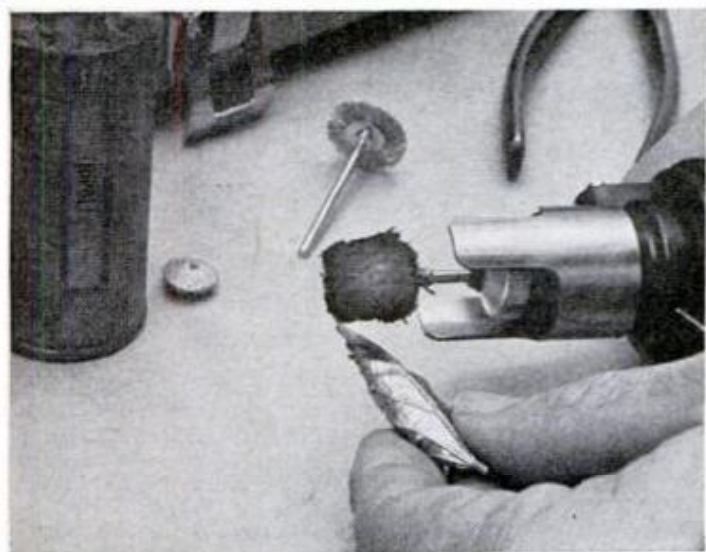




**LET THE MOLD HARDEN** for 45 minutes or so, then scoop out a shallow crater on top to hold the metal. Be sure that this exposes the sprue on the pattern



**ADD A DASH OF FLUX** to the molten metal. This reduces oxides that produce a crust. The sketch shows how the metal forms a puddle above the empty mold



**FINISHED CASTING** can be polished to a sparkle with a small buffing wheel like the one shown in this hand grinder. Use tripoli or jeweler's rouge

AUGUST 1967

so. In some areas, it may be possible to rent the burnout oven and casting pump.

One large supplier of casting equipment and materials is the Wilkinson Co., P. O. Box 303, Santa Monica, Calif.

It's important to use clean metal as dirt particles can result in an imperfectly formed casting. It's also important not to trap air bubbles around the wax pattern when embedding it in the mold. Tiny bubbles leave pockmarks in the mold.

The accompanying photos show the procedure for making a typical casting. Before the pattern is embedded in the investment material, it's necessary to add a small stem, called a "sprue," so it sticks up through the mold to the top. When the sprue, usually made of wax, melts away, it leaves a tiny hole in the mold. This enables you to get molten metal down into the mold cavity from the outside.

Note that the molten metal will not just flow down the sprue hole by itself—surface tension prevents it. You must actually force the metal into the mold under pressure, and this is what's known as "casting." The usual casting device is a small hand-operated air pump. Pressure is first built up in the pump by giving the plunger about 15 strokes. Then the pump is placed over the investment ring and pressed down. This releases the air, driving the molten metal into the mold.

Hold the pump over the mold 30 seconds until the metal has become completely solidified or "frozen." To remove your casting from the mold, place the mold in a bowl of water. Allow it to stay there until the water has completely soaked into the material. This should cause the mold to break away easily from the casting. Breaking renders the mold unusable a second time.

It's quite likely that the casting will appear discolored. This discoloration is a surface oxide and is easily removed by pickling the casting in an acid solution—two parts muriatic acid to one part water is usual.

After pickling, remove the sprue stem from the casting with a pair of wire-cutting pliers. Then grind or file off the remaining stub. The best method of polishing your casting is with some type of rotating polisher. The most common compounds used for final finishing are tripoli and jeweler's rouge, applied with a soft buffing wheel. ★★★

165



The lamp of yesteryear is back

# MAKE YOUR OWN



By LOUIS C. VIERNO

**P**OPULAR IN FASHIONABLE HOMES a half-century ago, the Tiffany lamp shade is making a strong comeback in today's decorating circles. One Tiffany original recently brought a price of \$1800, but for as little as \$20 worth of materials, you can *make* one of these beautiful conversation pieces.

It's relatively simple—small pieces of opalescent glass (a streaky translucent stained glass) are cut to size, framed with copper foil and then positioned against a form, where they're soldered frame to frame. Actually, it's not unlike the con-

struction of a miniature igloo where block is placed against block until the entire dome-shaped dwelling is completed.

The first step, obviously, is the casting of the form around which the shade will be built. Perhaps the easiest way to accomplish this is to use a wooden salad or mixing bowl as a mold in which to cast the form.

The mixture for the form requires two cups of salt, one cup of cornstarch, two cups of boiling water and five cups of sifted sawdust. Mix the first three ingredients thoroughly, let the mixture cool and add the sawdust. Then knead the mush until it has the consistency of baker's dough, place it in a plastic bag and set it aside to age for a few days.

Firmly press the sawdust mixture into the inverted mold, allow it to dry for two days, and carefully remove the form from the mold. Insert three 8d nails in the top of the form before setting it aside to air dry for another ten days. (The nails will hold the removable crown of the form in place later.)

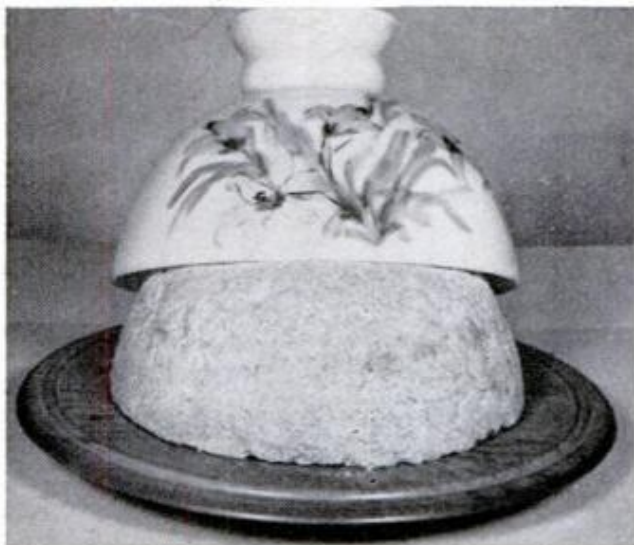
During this interim, prepare more mixture if necessary (this will be used to make the crown of the form). Also cut an aluminum template to be used to shape the crown to the desired configuration. Then center the dried form on a lazy Susan, placing rubber bands under the form to prevent skidding.

Cover the top of the form with the mixture, working it firmly around the finishing nails. Turn the lazy Susan and rough out the shape of the crown with your fingers before applying the template.

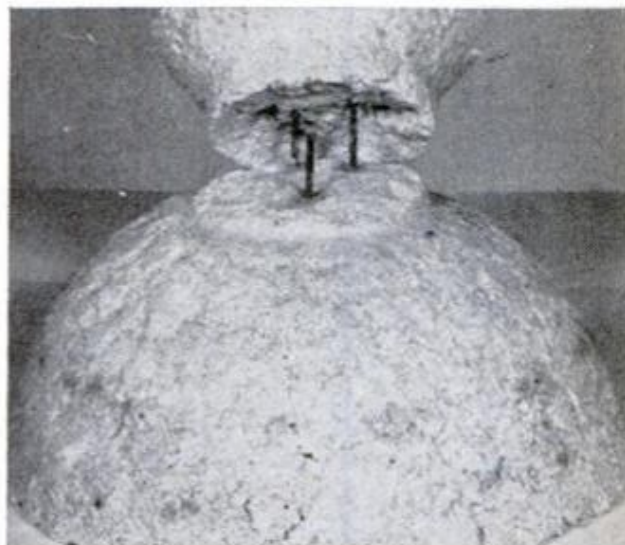
When the completed form is thoroughly dry, the patterns for



# TIFFANY SHADE



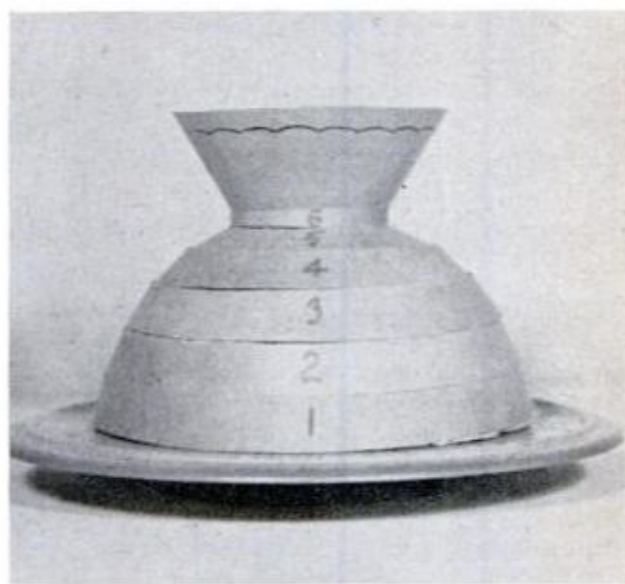
**BASIC FORM** around which the shade will be built is cast in a wooden bowl and placed on lazy Susan



**ROUGHLY SHAPED CROWN** is keyed to body of form by means of three irregularly spaced nails



**ALUMINUM TEMPLATE** is applied to spinning form until the desired configuration has been reached



**PATTERNS FOR EACH ROW** are made following the method described in text and shown on next page

the glass pieces can be made. This is a somewhat tricky task, for each piece of glass must be slightly tapered toward the top of the lamp to result in a symmetrical shade. Thus, while there are quite a few ways to develop the patterns, only one method will be described. Follow the instructions and you'll find it easy.

1. Measure the distance from the base of the form to its collar or neck and make a note of this measurement.

2. Divide this distance by the number of glass rows to be produced.

3. Mark each row by inserting small brads around its two circumferences. Space the brads at 3-in. intervals.

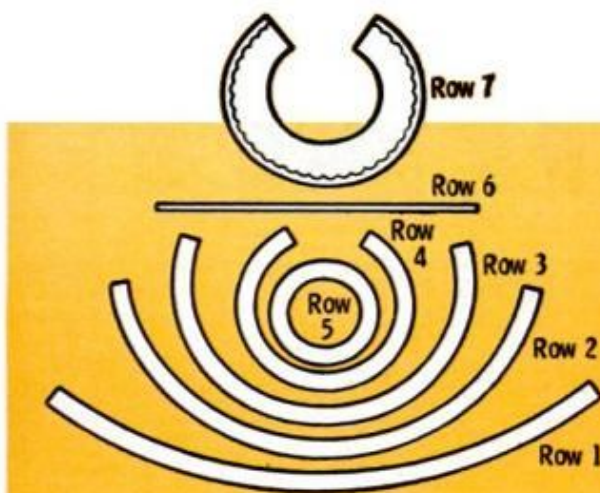
4. Measure each circumference, guiding a tape measure around the small brads.

5. Calculate each radius by dividing each circumference by 1.57.

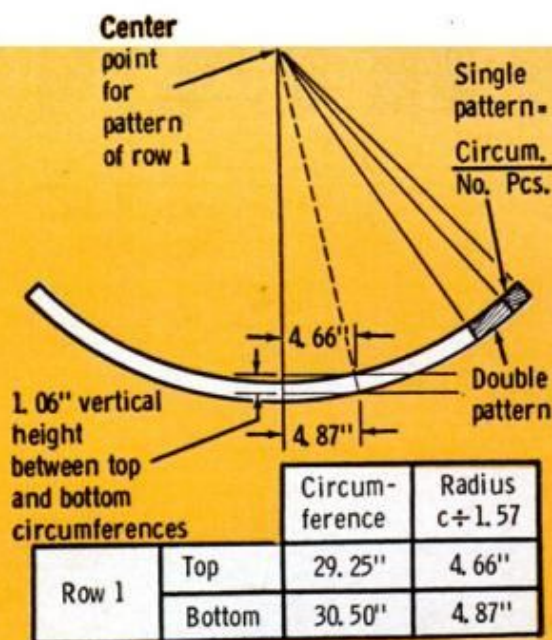
6. Measure the vertical height between each pair of circumferences.

Once all this information has been gathered, the vertices or center points for each pattern section can be found. (The procedure is best mastered if you sketch the





PAPER PATTERNS for each of the rows should roughly follow shapes shown above. All are easily developed once the center point for each pattern has been found (the method used is sketched at right). It's important, however, to test fit the patterns on the molded form before cutting the glass pieces



lines as they're mentioned. When completed, the diagram should look like that at the top of this page.)

First draw a vertical line on a large sheet of paper. At the bottom of this line, mark off the vertical distance between the top and bottom circumferences of any one row. Draw a horizontal line through each of the marked-off points. On each horizontal line, mark the calculated radii for both circumferences, placing the longer radius on the bottom horizontal line.

#### Center point is next

Align an accurate straightedge with each of the radius marks and draw a line from the bottom mark on through the top mark, continuing until the original vertical line is intersected. The point at which these two lines meet is the center point or vertex for the pattern of that row.

Position a compass at this point and draw an arc through each radius mark on the horizontal lines. The area between the arcs outlines the curve of the pattern. To find the actual size of the pieces for each row, first decide on the number of pieces you'd like to have per row, then divide this number into the greater of the two circumferences. The shade shown has 20 pieces per row; thus, if you measured a circumference of 60 in. and wanted 20 pieces per row, the distance across the lower arc of each piece would be 3 in.

From each end of this (3-in.) measurement, draw a line to the center point. The area outlined by the two arcs and the two

radial lines just drawn is the pattern for each piece of glass in that row.

Simple, wasn't it? Now all you have to do is repeat this entire procedure for each of the other rows. Actually, this method will seem easier as you cut the pattern for the second row, third row, and so on. It's worthwhile to note, however, that the cutting of the glass pieces will also seem easier and more accurate if you take time to make a double or triple pattern; that is, a pattern equal to two or three individual pieces of glass. This way, you can slice one curved piece from the sheet of glass and then use the single pattern to subdivide this into single pieces.

From this point on, the work should progress smoothly and quickly. Cut the required number of glass pieces for each row, storing them in a small box labeled with the appropriate row number.

#### Framing the pieces

Working with only one row at a time, coat the edges of each piece with D-C Stained Glass Adherent (available from Design Craft, Box 66, Cresskill, N.J.). While allowing about 15 minutes for the adherent to become tacky, prepare 6-in.-long strips of .001-in. copper foil,  $\frac{3}{16}$ -in. wide. Apply the foil to the glass edges, centering the strips so a border of  $\frac{1}{32}$ -in. overlaps both front and rear edges. Trim off any excess lengths of foil and lay the pieces aside until thoroughly dry.

After all the pieces have been edged or framed, test fit the pieces of the bottom



row against the form. It may be necessary to hold them in place with a large rubber band, but be careful not to damage the form. If the last piece doesn't quite fit properly, trim it to the required size and reline the edges with foil. If the pieces do fit nicely, remove all but two, tacking them together with a hot soldering iron and just a small amount of solder and flux.

Continue adding one piece at a time until the entire first row is tacked together. Then flux and fill all joints with solder, carefully remove the completed row and tin the upper and lower edges of the ring.

Replace the first row, repeat this procedure for the second row, and before you know it the lower section of the lamp will be completed.

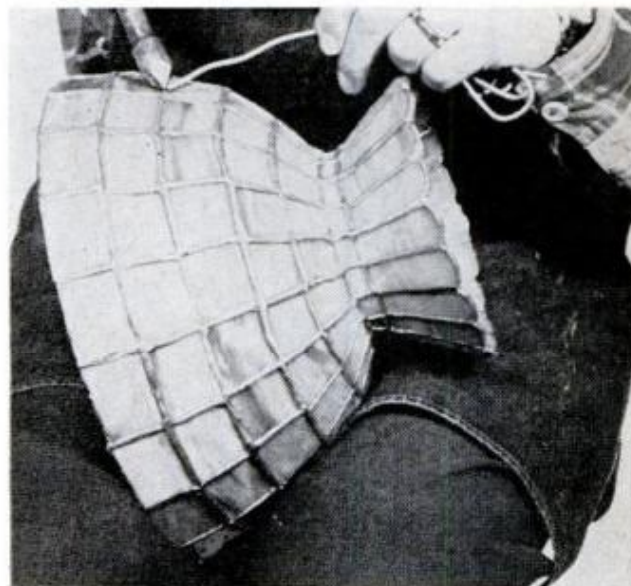
### Soldering the crown

The crown requires a bit more care because of its overhanging pieces. You can either prop the pieces in place while soldering or you can remove the crown portion of the form, turn it over and then solder the pieces in place. In the latter event, be sure to tin the neck thoroughly where the two sections are joined later.

Solder all joints inside the shade and you're ready for the final soldering operation—laying a bead on the outside joints. The trick is to work quickly, adding solder to a moving iron so a thin rivulet of solder flows onto the joint. All it takes is a bit of practice. ★★★



GLASS PIECES, framed in copper foil, are tacked to each other until one entire row is completed



FINAL SOLDERING involves the laying of a fine bead over all joints. The secret is to work quickly

## NEXT MONTH IN SHOP AND CRAFTS

**HOME-IMPROVEMENT BONANZA.** A jam-packed section, 40 pages in all, of ideas for improving the looks and convenience of your home, awaits you in the September issue. Includes three dual-purpose cabinets for additional storage in your home, complete plans for building the basic cabinets needed to remodel your kitchen, step-by-step instructions for installing your own built-in, vacuum-cleaning system, new building materials you'll want to know about, plus plans for converting your garage into living space.

**HI-FI CONTROL CONSOLE.** Simply speaking, it's nothing more than a clock-timer mechanism and a network of switches and pilot lights that turn on and turn off anything that's plugged into it. A main and remote stereo-speaker switching circuit is an added feature. The clincher is that you wire all the circuits into a walnut enclosure that you build to match the professionally made enclosure that houses your hi-fi components.

**TILTING BASE FOR YOUR ROUTER.** Straight-shank router bits serve also as "shaper" cutters when you're able to tilt your router. An auxiliary base which takes the place of the router's base, lets you bevel and flute work with regular router bits. An easily made shop item you'll want to copy when you see it.

**BETTER BUILDING IDEAS.** Dropping the top casing to cover the track for bifold doors, running baseboard molding up and over heating grilles and keeping quarter-round off the floor are three of a collection of clever stunts to give your home-remodeling project a better-built look. You will want to clip and save this feature.



# Shortwave—have you listened to it lately?

Any broadcast in the radio frequency spectrum is yours for the tuning. The long reach of shortwave radio gives you a direct tie line to any country under the sun.

By ROBERT HERTZBERG





**H**AVE YOU HAD enough of window-rattling stereo? Do you yawn at the tired old movies on TV? Are you ready to forsake electronic entertainment and take up bird-watching?

Hold off! You'll really be missing something if you don't consider shortwave radio listening. With a relatively inexpensive receiver, the world is literally at your fingertips. Day or night, summer or winter, there are without exaggeration thousands of transmitters on the air for you to tune in.

There are foreign broadcast stations beaming out curious propaganda programs in every known language. Even more exciting, there are countless police, fire, taxi, marine, aeronautical, industrial, Citizens Band and ham radio stations engaged in two-way communication. This is all in voice. If you brush up on the Morse code you once learned as a Boy Scout, you'll get an even bigger kick out of copying press reports and many other kinds of dot-and-dash traffic.

The shortwave game is certainly nothing new. It started during the depression days of the 1930s, waned during the war years of the '40s, was overshadowed by television in the '50s, and is now staging a surprising comeback. Boredom with the picture tube is one big reason, but there are others. Meteorologically, we are entering a cycle of intense sun-spot activity, and it is definitely known that shortwave transmission improves greatly during such periods. You just won't believe your ears the first time you hear Radio Moscow boom in loud and clear or you eavesdrop on *both* sides of a conversation between one ham operator in California and another in Nigeria!

### **The ranks keep growing**

Then there is the matter of mere station statistics. Before World War II there was no Citizens Band at all; now there are more than 750,000 licensees. The ham ranks have swelled to about a quarter of a million, and the various commercial services account for another half million. These figures represent the situation in the United States alone. Add in the foreign stations and you'll wonder how the air can accommodate them all. It can't. The interference on some bands is terrific, but this is all part of the fun.

No license of any kind is needed for the

purchase or use of a shortwave receiver. Electronic-supply firms offer an enticing variety of equipment to suit any pocket-book.

Receivers for personal listening, as distinguished from "communications" receivers used with transmitters by licensed operators, are known as "general coverage" and tune a minimum of four overlapping bands of frequencies. The starting point is the regular American AM (amplitude modulated) broadcast band of 550 to 1600 kilocycles. The range from 1600 kilocycles to about 30 megacycles is then divided among the other three bands.

Any band is quickly selected by a switch on the front panel. If the high bands are spread out among four or five switch positions, adjacent stations on crowded channels are easier to separate.

Some receivers have separate band-spread dials that permit any portion of any band to be pulled apart, so to speak, for precise tuning. This is a great operating convenience.

The three most important characteristics of a shortwave set are:

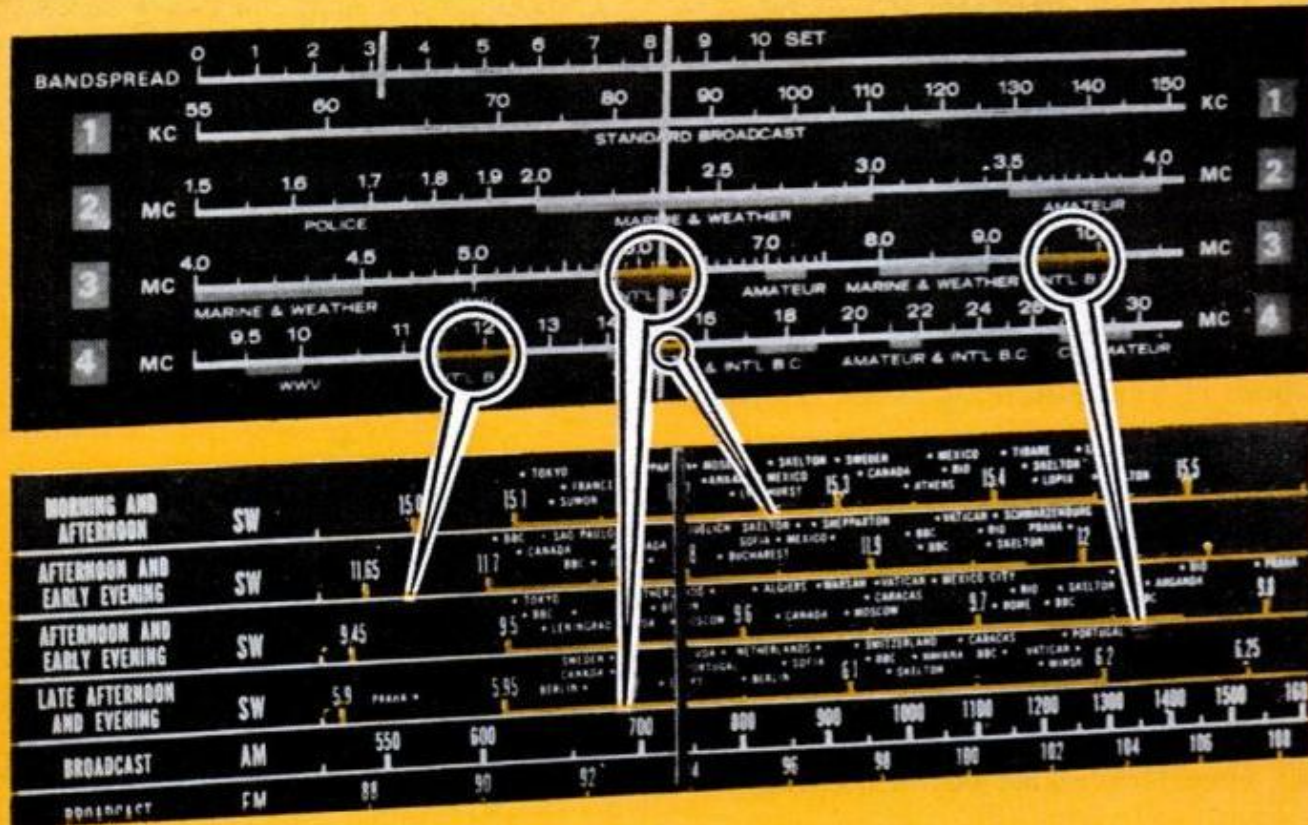
**1. Selectivity.** This is the ability to separate stations on very slightly different frequencies. It is of prime concern because of the crowding on practically all bands. It is achieved by the use of numerous tubes or transistors in conjunction with multiple tuning circuits. The more the better, and the higher the cost.

**2. Sensitivity.** This is a measure of a set's ability to respond to signals without introducing circuit noise of its own. Tubes generally provide higher sensitivity with less noise than currently available transistors and are therefore favored for non-portable a.c. receivers.

Sensitivity is desirable, of course, but it isn't as important as you might think. Why not? The answer lies in the nature of shortwave transmission. The signals span great distances because they are reflected around the earth by certain elusive, mysterious layers of electrified particles in the sky. These layers are energized by the sun, and their reflective action varies according to the hours and to the particular frequency of the transmission.

When the "skip" is right, even a moderately sensitive receiver will fill the loud-speaker with stations from everywhere. When skip conditions are unfavorable for a particular frequency, the signals go right





**SHORTWAVE RECEIVER TUNING DIALS** only look complicated. Often frequency allocations and best listening times are marked. EICO Space Ranger (top) covers frequencies from 550 kc. to 30 mc. including foreign broadcast bands circled. Hallicrafters S-210 (bottom) spreads foreign bands across entire tuning dial.

through the layers without being bounced back, and the best set made can't bring them in.

**3. Stability.** This is the ability of the circuits to keep a station in tune without requiring frequent touching up of the dial. Some slight drifting can be expected in all but the most expensive receivers. It is not serious, since a very small movement of the dial quickly restores the signal to maximum strength.

How much do you have to spend for a set that offers satisfactory reception? For about \$100 you can have a four-band, table-model a.c. set that will keep you busy for years. If you've had experience with electronic gadgets, you can save quite a bit by assembling the equivalent receiver from a kit.

In the \$200 to \$400 range, you will find deluxe sets with enough knobs, dials, meters, lights, switches and so on to make you think you're in the capsule of a space vehicle and you'll enjoy superior performance in all departments. If you've just come into an unexpected inheritance and don't know what to do with it, consider a super-duper job with a motor-driven tuning mechanism. Price: \$1200, and this doesn't even include the loudspeaker!

As a matter of fact, the loudspeaker is usually self-contained only in the lower-priced receivers and is a separate accessory in the bigger ones. The reason: the latter have more circuit elements to occupy space on the chassis. Actually, most shortwave listeners prefer to use earphones. These are much more sensitive than speakers and enable you to tune freely without annoying other members of the family who might still be entranced by Marshal Dillon and Kitty.

Several sets in kit form are available at about \$25. These are regenerative "squealers" of the type that was popular as far back as the 1920s. While they are easy to assemble, they are difficult to tune, and in built-up residential areas they can cause interference with radio and TV reception. For these reasons, they are not good investments.

For the best shortwave results, you should use an outdoor aerial. This need only be a clear stretch of wire from about 50 to 100 feet long. However, extraordinary reception is often obtained deep inside large apartment houses with 15 feet of bell wire just thrown across the floor. The short waves are that tricky!

*(Please turn to page 189)*



**New colored aluminum roof coating costs about \$8 per 100 sq. ft.**

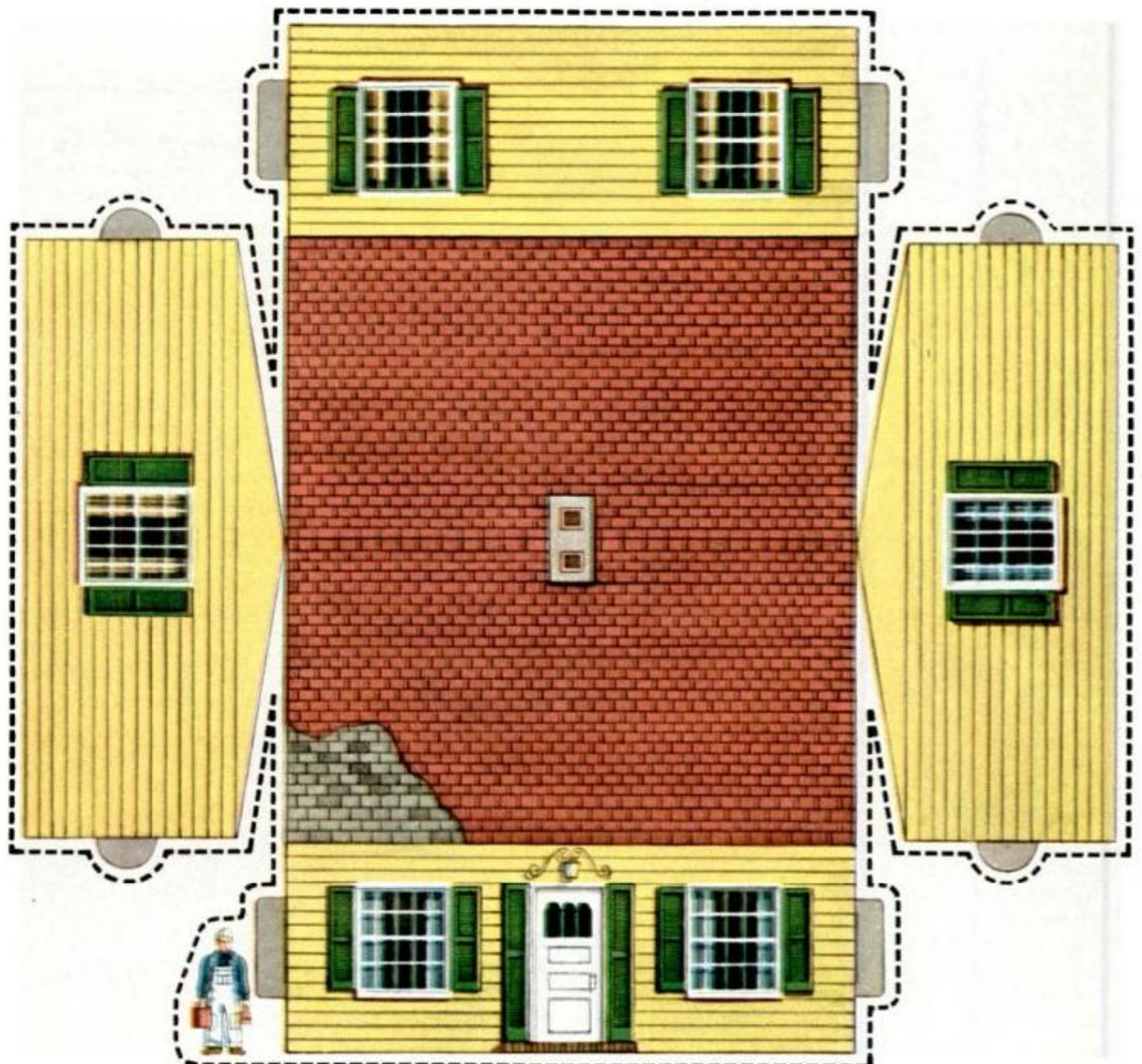
**Put it on yourself!**

Add 5-10 years to an asphalt shingle roof—for about a fourth of the cost of a new roof—with new colored aluminum roof coating made with Alcoa® Pigments. One coat weatherproofs. No special tools. If your dealer doesn't stock, send coupon.

Aluminum Company of America  
480-H Alcoa Building  
Pittsburgh, Pa. 15219  
Please send folder on colored aluminum roof coatings.

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Change for the better with Alcoa





## TREASURE FINDERS

*(Continued from page 114)*

of the detector to the normal background. A fine-tuning knob on most horizontal-loop units permits this adjustment, changing the frequency just enough to "balance" the set. This should be done at the highest possible gain or volume. Then the tuning knob is set just off the completely "null" or silent position so that some beat or tone is produced.

In addition to assuring the operator that the set is working, this sound makes the detector much more sensitive. The null position itself may be fairly broad and thus may fail to detect minor changes in the search-coil field.

Also, the disturbance in the field caused by some metals may create just the opposite effect from that anticipated, moving the tone into the null position rather than into a firmer tone. But if you start off with a firmly established tone or beat, any change in its nature can be readily noted.

Why not simply watch the needle? This is fine if you have four eyes or a helper. But using a detector over rough terrain, sweeping an area thoroughly, often means that your sight must be devoted to the course, and you may miss a sudden, brief deflection of the needle. The tone can be heard at any time, and if there is surrounding noise, a headset can be plugged into the detector.

### **They're light, easy to handle**

Modern horizontal-loop detectors weigh only six or eight pounds. Their circuits are designed to be as stable as possible, although frequent tuning is advisable. Generally speaking, the higher the frequency, the more sensitivity, but the less penetration.

Many detectors today come with two search coils, narrow and broad, which should be varied with the target. Since these are somewhat of a nuisance to change, several manufacturers have combined the two so that switching from one to the other is merely a matter of flipping a small toggle.

The second major type of detector uses a sensitive radio transmitter-receiver combination to signal the presence of metal and is more expensive. This type is mounted so the two loop antennas are at right angles to each other, thus minimizing direct reception. Tuned to "normal" position, the transmission of the unit can be pictured as dissipating in the background soil. Little of the signal is received by the carefully aligned loop at the other end of the pole.

Let a metal object enter the range of the transmission, however, and this receiver picks up the distortion. Another analogy is that the metal itself acts as a reflector, retransmitting the signal.

The typical transistorized unit sold today weighs about 10 pounds, is rugged, and requires little power. Both types, the horizontal-loop and radio transmitter, possess advantages that must be matched to the particular target. The radio transmitter unit, especially on lower frequencies, penetrates more deeply into the earth. The transmitter's penetration means it need not be used as close to the ground.

But remember, the more penetration, the less sensitivity. Thus this unit may miss a scattering of coins just below the surface. A horizontal loop with a narrow coil that penetrates from three inches to a foot would be a better tool for this purpose. Conversely, the transmitter would do better locating a deeply buried pot of coins.

### **Special-purpose detectors**

For pipe locating, many companies recommend a unit designed specifically for this purpose rather than depending on the treasure finders. Then there's water, beneath which many valuable objects lie hidden. Special units are made that can be submerged on the end of a line or carried as part of a diver's gear. A radio transmitter unit held above the waves may work, but is not usually satisfactory for prolonged searches.

Resort owners and beachcombers along the coasts have reported excellent finds with detectors—watches, rings, coins and other goodies buried by the surf. However, their success depends on how much salt and/or water is present in the search area. Treasure of this nature is usually found near the surface where a horizontal loop would work best. If your target is a deep-buried wreck or a chest, the radio transmitter type is your best bet.

### **There are pleasant surprises**

I recently took off with a moderately priced detector and wound up in the desert combing the remains of an abandoned railroad town. The first thing I discovered was what has discouraged so many similar ghost-town probers—the fact that buried metal is everywhere and almost none of it is worth digging for by itself. Tin cans, rusting bed posts—the longer these have been buried, the better signal they give to the detector since the soil around them has become mineralized.

But along with this metal other more valuable things are often found. We were



working a dusty area where saloons were figured to have stood. A few beeps from the detector, a careful scooping and sifting, and coins from gaming tables and bars gone 70 years came to light again.

Many real treasure finds are never reported, of course, but some detector successes are impossible to hide. One excavator, fearful of digging up city pipes, got some interesting beeps when he used a metal detector in front of his backhoe. Digging carefully, he turned up no pipe, but a bucket of rare coins stolen earlier from a jewelry store!

#### Rent before you buy

Renting a locator is an excellent idea, if only to find out whether your particular treasure can be found by it. Practice with various metals—buried coins, tools, the lawn sprinkling system—until you know exactly how the unit reacts under different conditions. The average detector rents at anywhere from \$5 to \$10 a day.

An excellent booklet, *Metal Detector Handbook*, by Art Lassagne, can be obtained from the Goldak Co., whose address is given below. Other books containing maps and treasure-hunting methods are obtainable through libraries. The following are manufacturers of detectors from whom further information can be obtained: Detectron, P.O. Box 243, San Gabriel, Calif.; Fisher Research Lab., 1975 University Ave., Palo Alto, Calif.; Goldak, 1544 W. Glenoaks, Glendale, Calif.; Gardiner Electronics, 4729 N. 7th Ave., Phoenix, Ariz.; Raytron, P.O. Box 715, North Hollywood, Calif.; Geo-Finder Co., P.O. Box 37, Lakewood, Calif.; Relco Industries, P.O. Box 10563, Houston, Tex.; White's Electronics, 1218 Main St., Sweet Home, Ore.; Edmund Scientific Co., 101 E. Gloucester Pike, Barrington, N.J.; A.M. Aircraft Parts Co., 307-309, W. Broadway, New York, N.Y.; Master Mechanic Mfg. Co., Box A, Burlington, Wis. ★★

Just Published . . .

#### HOW TO REMODEL WITH DRYWALL

A PM How-to-Do-It Library Booklet

Here's all the information you need to do a first-class job with drywall in refinishing a basement, attic, room or merely repairing a wall: estimating and pre-cutting timesavers; cutting and nailing techniques; ceiling and wall work, cutouts, bends; taping joints, filling cracks and holes; tools, supplies and predecorated boards. For your copy, send 35¢ for Booklet H103 to

Popular Mechanics Bureau of Information,  
575 Lexington Ave., New York, N.Y. 10022

## The second set is your first real choice.



### Don't boot it.

Get the Dunlop Gold Seal: the only popularly priced tire that's *certified safe* at 100 mph.

You won't ride at 100. But you will use the extra margin of strength and performance . . . the four full plies, wet hold, patented Safety-Shoulders, new low-profile design, and wider footprint of the Gold Seal.

All Dunlop tires meet or exceed every official specification for safe performance.

Upgrade when you replace. Dunlop quality costs no more. Find your nearest dealer in the Yellow Pages and let him prove it.

 **DUNLOP** Buffalo, N. Y.  
... means quality in golf, tennis, and tires



## YOUR MECHANICAL APTITUDE

*(Continued from page 79)*

the desk in front of me, it looked like a snap. Then he took it apart, scattered the pieces and asked me to put it together.

Seven minutes later, he said, "Don't be upset. Writers usually have poor structural visualization."

(A young man who followed me at the testing table did the six-block test in less than a minute.)

The cube test is another doozy. The object is to put blocks together so they end up as a cube—three blocks high, three blocks wide and three blocks deep.

Sound easy? There are a couple of catches. First, there are more blocks than you actually need. Second, the entire outside area of the assembled cube must be all black, while the inside area must be all yellow. (Each block has sides painted black and yellow, or all yellow.)

A person assembling the cube correctly within two minutes shows good structural visualization. It took me (gulp!) eight minutes.

How valid are these tests? The proof is in case histories. For example, William T. is a graduate engineer working for a large company. But William T. has been for many years and is destined to continue as a writer of technical reports.

He was, of course, far from happy in his work when he began the testing session, and the tests showed why. He tested extremely low in structural visualization.

He scored as a perfect musician and readily admitted that he always wanted to be one. But as a young man, he was prompted by his father, who was an engineer, to enter a mechanical field.

This led to a compromising situation for him to forego his engineering job and start a new career. So, to satisfy at least partially his inborn desire, he began taking music lessons. However, he has had to resign himself to continuing a career for which he has little liking.

Once the presence (or absence) of structural visualization is determined, further testing is conducted to zero the subject in on a specific area. The presence of structural visualization only indicates that the person has mechanical aptitude. It doesn't tell him what specific mechanical field he should pursue.

To help determine this the subject is given a personality test. It's a word association type in which the staff member calls out a word and the subject responds spontaneously with the first word that comes to mind.

The test reveals whether the man has a subjective or objective personality. If

subjective, it means that the individual will be happiest working alone, doing something constructive or creative—design engineering, scientific research, auto mechanics, for instance.

If objective, it signifies that the person will be happiest working with others, or using his abilities to supervise others. An individual demonstrating high structural visualization and an objective personality, then, would be suited for an executive position in a scientific or engineering firm (for example, chief scientist or manager of an engineering department), as a service manager in a new-car agency garage, as an owner of his own garage or as a chief supervising a public utility crew.

No doubt there is a question in your mind concerning what to do after taking the tests on page 80. Assuming you show a degree of structural visualization and are not now engaged in a mechanical field, where do you go from here?

You should probably probe the feasibility of being tested further. Afterwards you can make a decision. If you're a young man who doesn't intend to go to college, for example, you can train for work in such understaffed and challenging fields as auto mechanics, machining, plumbing or carpentry.

If you're older and can't afford to give up your job, you can utilize your talents in other ways, as demonstrated by William T.'s case history, cited above. For example, you may wish to learn outboard-engine mechanics, appliance repair, or home electricity. You can possibly take on jobs that can be done in a home workshop on a part-time basis.

Finally, there is one important point emphasized by testing experts. They state that no matter what field a person chooses, there is one ability he needs—vocabulary. And that can be acquired through study.

It's as simple as this, the experts tell us: If you can't communicate, your chances of success are reduced, no matter how powerful your inborn abilities and talents. And that's been proved during 50 years of testing and case study. ★ ★ ★

### LABORATORIES OF JOHNSON O'CONNOR

Johnson O'Connor Research Foundation  
11 East 62nd St., New York, N.Y.

2111 Woodward Ave., Detroit, Mich.

5721 Bayway Drive, Baytown, Tex.

Human Engineering Laboratory

347 Beacon St., Boston, Mass.

2012 Delancey Pl., Philadelphia, Pa.

161 East Erie St., Chicago, Ill.

721 South Guthrie Ave., Tulsa, Okla.

657 Fifth Ave., Fort Worth, Tex.

1349 West 5th St., Los Angeles, Calif.

530 Broadway, San Diego, Calif.

Fundacion de Investigaciones

Avenida Horacio 327, Dept. 204,

Chapultepec Morales, Mexico D.F., Mexico



# Can they depend on you to help keep them free?

Children come in all shapes and sizes. Wonderful, mischievous, charming. We wouldn't want them any other way.

And children grow up.

It's one of the unique marvels of our land that a child is free to grow up to be an individual.

You can help defend that freedom by joining the Air Force Reserve. It's an opportunity to continue to fly. Pilots, navigators and panel engineers are urgently needed. One weekend a month, plus two weeks a year.

You may find it a welcome change of pace from your routine job at home. The extra pay helps, too.

Every bit of the time you spend in the Reserve counts toward promotions and retirement.

America has gone very far in providing the freedom a child needs to grow up to be a unique individual. And of course, we still have a long way to go.

For further information contact the nearest Reserve unit or the Reserve Affairs Officer at the nearest Air Force base.

For information on the nearest Reserve unit, send in the coupon below.

Let's keep our children growing in the right direction.



CAC (PRP)  
Robins AFB, Ga. 31093

Please send me information about joining the Air Force Reserve. I was a member of the AIR FORCE ; NAVY ; COAST GUARD ; MARINES .

ARMY . My grade was: \_\_\_\_\_

My military specialty was: \_\_\_\_\_

Name: \_\_\_\_\_

(Please print)

Address: \_\_\_\_\_



## WE'LL NEVER BE NO. 1!

(Continued from page 88)

at the end of that rental road is 15,000 miles. Low-cost and neighborhood agencies don't turn over their cars as often.

It is in the field of insurance that the cut-rater manages to cut costs. Rental car insurance is expensive—so expensive that some big companies have gone to a self-insurance plan. In any case, the major companies blanket you, as a driver, with "\$100,000 and \$300,000" liability coverage; that is, if you are held liable for an accident, the insurance will pay up to \$100,000 for injuries to any one person, and up to \$300,000 for injuries suffered in any one accident. You also have \$25,000 coverage for property damage, and 100 percent coverage for theft and fire.

What about the extra insurance that the agent behind the counter always asks you to buy? It costs \$1 to \$1.50 a day. A surprising number of renters blithely pay the premium without even knowing what they are buying. It does *not* increase your liability coverage by even \$1. What it does is protect the rental car—and you—with total collision insurance. If you don't take it and if you damage the car, you pay the first \$100 of the repair bill.

### Check the fine print

In many cases the cut-rater can offer lower rates because he's not paying premiums for substantial liability and collision coverage. If you rent from an agency offering economy rates (and in many situations you *should*, if you want to save money), here's what you should check in the fine print of the contract:

1. No insurance at all. In this case, don't rent—or else pay the premium on the separate policy which the lessor will offer you.

2. Insurance that is void if you drive outside the state, or outside some other definite geographical area.

3. Insurance that is void if you violate a law. When an accident occurs (which is the only time you need insurance), somebody usually has violated a law.

4. Insurance that is void if you drive on anything but a hard-surface road. If you so much as turn up a gravel driveway, you leave your security blanket behind.

5. Insurance that is void if anyone but you drives the car. (In a standard contract, the following licensed drivers are permitted behind the wheel: you, your employee, your partner, your employer, and members of your immediate family.) If you're planning to split the driving with a companion, make special arrange-

ments to cover him with the rental agency.

6. Insurance that is void if you've been drinking—even one drop of beer.

7. Insurance that offers no third-party protection. The third party is any passenger riding with you.

8. Insurance that is void if you fail to return the car by the time stated on the contract.

9. Theft insurance that is void if you leave the key in the lock, the car door unlatched, or even a window open.

### Loopholes that help

No economy contract contains *all* the above loopholes. Furthermore, some loopholes may work to your advantage because they reduce insurance costs and therefore rental rates. If you're alone, if you don't drink, and if you plan to drive only in one state, then there's no reason to pay a higher insurance premium. You're ahead of the game.

In addition, you probably have protection which most people overlook—your family automobile insurance. Many family policies cover you for liability in any vehicle you may be driving, even a rented one. Over a period of time you may be able to save a substantial sum by renting at economy rates, and still have adequate coverage from your own insurance policy. *But check this with your insurance agent before relying on it.*

Even with the best of rental insurance, your personal auto policy could be of tremendous help to you. Your liability coverage is, in effect, "stacked" on top of the rental company's. Perish the thought, but if a judgment should be entered against you for, say, \$150,000 by one person as the result of an accident, the rental agency's insurance would pay \$100,000 of this, and your own insurance would pay the remainder.

### A 30-second check

Before you take the wheel of a rental car, take a few seconds to check out the car. Walk all the way around it once; if you see any damage whatever, ask to see the "inspection card" to make sure that the damage is marked on it. Check the seat for cigaret burns. Lift the trunk lid and see if there is a spare inside, along with tire tools; you can be charged for them if they're missing when you return. Check the odometer reading against your copy of the contract. You can make this quick survey in 30 seconds, and it may save you time, money and an ulcer flare-up later on.

*While you have the car, check the accuracy of the odometer with mileposts on expressways. According to the contract*



you've signed, you pay for the mileage registered on the factory-installed odometer, and there's no provision for inaccuracy. In practice, this condition of the contract is seldom invoked.

Recently I rented a car with an odometer that was a whopping 15 percent inaccurate in the lessor's favor. I hollered loud and clear, and was promptly given a 15-percent reduction in my total mileage bill.

#### Call if late

If you are delayed in returning the car, take time to inform the rental office. Some nonstandard contracts permit the lessor to call the police and have you arrested for theft if you are even one minute over your estimated time of return. Other contracts permit an additional day to be added to your bill.

*Don't just pay the bill.* Take time to check it carefully. Twice I've found substantial errors in bills. In calculating your bill, the lessor usually juggles figures representing two odometer readings, a daily rate (and sometimes an hourly charge), a mileage rate and a deposit. With this many factors involved, inadvertent errors occasionally do crop up. Check before you pay.

Never pull a trailer in a rental car, as it violates the contract and invalidates the insurance.

If your youngster wants to rent a car for a special occasion, most lessors require that you appear *in person* to sign the rental agreement.

#### Trucks for rent, too

And don't forget that you can rent trucks, too. In most states, your driver's license permits you to drive a rented truck weighing up to 6000 pounds; beyond that you must have a truck or chauffeur's license. Today you can rent anything from a half-ton pickup for about \$8 a day plus 10 cents a mile to a huge semi-rig for \$7 per hour plus 13 cents a mile.

So go ahead, rent some wheels and roll them, *as long as you know what you're signing.*

If you're thinking of buying a car, rent the same make and model to see if you like it. For a few bucks, you can get a good idea of performance before sinking thousands in it.

Rent a station wagon, van, or even a land yacht for a camping vacation. Rent a sports car just to show off. Varoooooooooom! Climb in, gals, let's go for a spin. ★★★

# Get your own full-color print of the **SATURN V**

THE WORLD'S  
BIGGEST ROCKET

Beautifully printed on heavy  
paper suitable for framing.

(Size: 19 by 25 inches)

\$1.25 postpaid



-----  
**Saturn V, Popular Mechanics, 575 Lexington Ave., New York, New York 10022**

Please send me \_\_\_\_\_  
copies of PM's Saturn V  
painting. Enclosed find  
\$1.25 for each.

Name \_\_\_\_\_  
Street \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_





**This is a GM Original:  
It gets you into "DRIVE"  
without a hitch.**



**This is a GM Replacement:  
It works  
the same shift.**

A GM Replacement Part does the same job as the original. With the same precision. Because it's the same as the original.

Which is nice to know if you ever have to replace something as important as this vacuum modulator valve. Because the replacement will keep your transmission just as quiet and smooth as the original did.

Another thing that's nice to know: Genuine GM Parts are available just about anywhere in the country. In GM and United Delco packages.

## **GENUINE GENERAL MOTORS PARTS**



CHEVROLET • CADILLAC • BUICK  
OPEL • PONTIAC • OLDSMOBILE

United  
Delco





## WATCH IT, SPEEDERS!

*(Continued from page 63)*

but dropped his right hand from the steering wheel to two toggle switches on the front of the VASCAR unit between us.

As the approaching car passed under an overpass ahead of us, George flipped up the right switch.

"That's the 'time' switch," he explained. "The unit is now measuring time."

When the approaching car passed directly opposite of our car, George snapped the time switch off and simultaneously snapped the other toggle switch on.

"The other switch is the 'distance' switch," George said. "I've just measured the time it took for that car to move from the overpass to where he passed us. Now I'm measuring the distance from where he passed us to the overpass."

As we went under the overpass, George snapped the distance switch off and pressed a button just above the switches. The long dial pointer flipped far to the right, stopping at 83.

"That fellow was traveling an average of 83 miles an hour over that stretch of road," he said.

George could have turned around to pursue the driver or radio for another car to stop him, then write up a speeding ticket, except for one thing: At the time of our private demonstration, the Arizona Highway Patrol was only testing the units, but had not started making arrests with them.

The Arizona officers are very impressed with VASCAR's performance, however, so by the time you read this, Arizona may be among those states using VASCAR measurements to make speeding arrests.

### Indiana first to use it

In Indiana, Kentucky and New York, troopers are making arrests right now with VASCAR. At this writing, states testing the units, besides Arizona, are North Carolina, Pennsylvania and New Jersey.

Indiana State Police troopers, the first in the world to put VASCAR into service on the highway, are enthusiastic about it. One of them commented, "It's simple to operate and has a safety factor. I can keep my eyes on the road at all times."

Drivers caught with VASCAR show respect for its capabilities, too. Typical is the motorist who said, "When speeding, I formerly didn't worry too much when I saw a trooper coming toward me. Now I do!"

Once a VASCAR unit has measured a vehicle's speed, its dial pointer remains set at that speed until the machine is reset for the next measurement. So, the officer who

stops a speeder can leave the pointer set at the indicated speed and show it to the driver. This usually carries a lot of weight with the speeders who are arrested. As one commented, "I'm impressed. I think it's a good idea to show speeders the speed as indicated on the dial. That way it's not just the cop's word against mine."

VASCAR is the brainchild of Arthur N. Marshall of Richmond, Va., a real-estate broker with no background as either a policeman or an inventor. In fact, he says, "I never saw the inside of a machine shop before I started on this thing." Yet today he has a small factory busy turning out VASCAR units for police department customers.

It all started one day when he saw a trooper in Virginia chasing a speeder.

"This officer had to drive like a demon to try to get close enough to clock the speeder with his speedometer," Marshall recalls. "He never made it because the driver slowed down before the officer got close to him. It seemed to me the speedometer was a poor tool to use to catch speeders. I got to thinking there should be a better way."

The "better way" which Marshall invented is VASCAR.

### How it works

The drawing on page 62 shows the basic principle of operation of VASCAR. A flexible shaft runs from the unit to the police car's speedometer cable—the same way a taxi-meter is connected to a taxicab's speedometer cable to measure the distance the cab travels.

When the policeman closes the "distance" switch on the front of the VASCAR unit, a magnetic clutch in the unit engages, coupling the flexible shaft to the VASCAR mechanism. Now a threaded rod (40 turns to the inch) in the unit turns as the police car moves forward. As this "distance drive screw" turns, it causes a matching nut to travel from left to right inside the unit. Attached to this nut is a metal arm which has in its opposite end a "speed pointer guide pin." This guide pin rides against an arm which is attached to the dial pointer on the top panel.

An identical threaded rod, called the "time drive screw," is mounted perpendicular to the "distance" screw and is driven through a gear train by a governed electric motor. This motor is controlled by the "time" switch on the front of the VASCAR unit. When the officer closes the time switch, the motor rotates the time screw, which in turn causes the frame on which the top panel carrying the speed dial and pointer is mounted to move slow-

*(Please turn to page 182)*



# Special effects. No special effort.



The KODAK INSTAMATIC M8 Movie Camera is for people who want special effects but don't want complicated settings. It loads instantly. Battery operated—never needs winding. Has four shooting speeds, from slow to fast motion. Plus 5-to-1 power zoom lens; go from wide-scene to telephoto smoothly, swiftly.

More M8 features. Reflex viewing through the lens. CdS electric eye also operates through the lens to get precise exposure. All this and bigger super 8 film format, too.

The superb KODAK INSTAMATIC M8 Movie Camera is less than \$225. See it and the complete line of super 8 KODAK INSTAMATIC Movie Projectors at your Kodak dealer's.

*Price subject to change without notice.*

**Kodak Instamatic® M8**  
**Movie Camera**

**Kodak**

## WATCH IT, SPEEDERS!

*(Continued from page 181)*

ly from front to back above the base of the machine.

The position of the speed pointer is determined by how far the speed pointer guide pin moved from left to right and by how far the top cover, carrying the dial and pointer, moved from front to rear. The combination of these two movements determines the dial position of the pointer.

A large amount of distance and a short amount of time fed into the unit will produce a high speed reading, for example. The opposite condition, a short distance with a larger amount of time, will produce a slow speed reading.

The police car is used to measure the distance, and the time it takes for the target to travel this distance is the time fed into the VASCAR unit. This means the police car may be traveling at any speed, slow or fast, and in either direction, as long as it travels over the same distance as the target car. The police car may travel this distance before, after, or during the time the target car is traveling this distance.

### Road objects assist

Any objects along the road may be used by the officer to mark off the distance he measures. The handiest are objects which cast shadows across the road, such as overpasses, tall signs or poles, or trees. With these, the officer watches for the instant the shadow strikes the target car and the instant the same shadow strikes his own police car.

The officer also may use other objects, such as a driveway, a rock beside the road or a mark on the pavement, and operate the VASCAR control switches as the target car and his own car pass these objects. The objects may be as little as a few hundred yards apart, or as much as a mile and a half apart. The chart on page 63 illustrates a few of the traffic situations in which a policeman may clock suspected speeders with VASCAR.

At night, distances may be measured as the target vehicle's headlight glare, reflected from roadside signs, suddenly darkens, indicating the vehicle is abreast of the sign.

Skeptics may say the officer could easily make a "parallax error" in judging when the target vehicle is abreast of a distance marker, but tests of trained officers have shown this error will be negligible.

Most make only a three to four-foot error in judging the position of the two cars with respect to the selected distance-determining objects by the roadside, with

*(Please turn to page 203)*



So luxurious inside, watch 'em overguess its price. GT version

# Ford's Model C.



The Model C is Ford's new Cortina. The sensible car with the winningest heritage in the world. And the interior on this GT breaks some records, too, for a car priced at just \$2,172\*.

Deep buckets in glove-soft vinyl. Full instrumentation—tach, ammeter, the works. Carpeting, cigarette lighter, coat hooks, armrest, courtesy light. Even an extra glove box and rear ash tray. Full comfort for 5 adults throughout.

Included in the price: Rally-proved 1500 cc 4-cylinder engine • 83.5 bhp @ 5200 rpm, 97 lb/ft torque @ 3600 rpm • Weber carb and tuned exhaust headers • Fully synchronized 4-speed gearbox • Front discs.

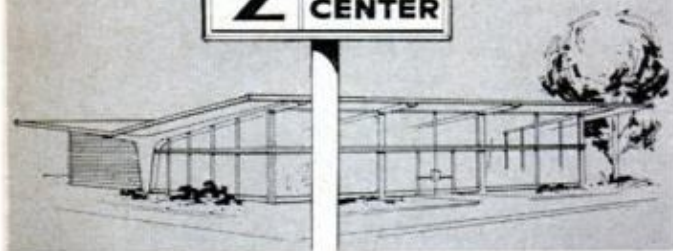
Other Model C's from \$1815\*. Check the Yellow Pages for your nearest Ford Cortina dealer.



\*Price quoted is manufacturer's suggested retail base price at East Coast P.O.E. The price includes Federal excise tax and suggested dealer delivery and handling charge. State and local taxes and transportation charges to your local dealer are additional.



Are you interested in a business producing a gross income of \$35,000 and more yearly?



## OWN YOUR OWN A to Z RENTAL CENTER

... the community rental headquarters supplying everything used in the home or business

The rental field is booming with the big "do-it-yourself" market . . . the camping/vacation market . . . plus the ever growing need for home nursing equipment. You'll be renting lawn and garden tools . . . plumbing tools . . . party needs . . . camping equipment . . . invalid and health needs . . . home entertainment needs . . . contractors' tools . . . floor and carpet care equipment and much, much more.

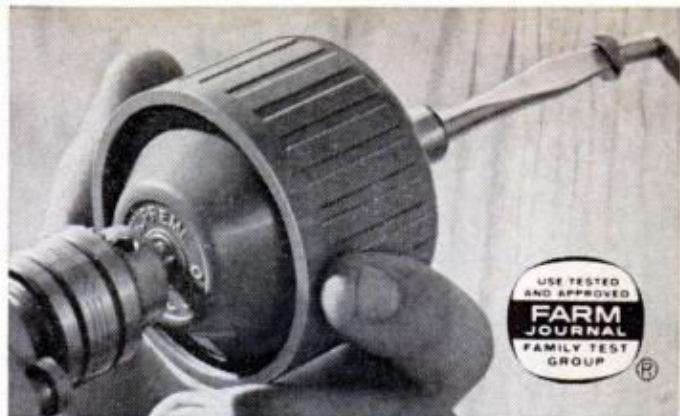
**Proved profits—over 200 A to Z Rental Centers in operation or ready to open. Choice, protected franchises available.**

Learn about your unlimited future in the rental field and how the continuing A to Z Full-Support Management Program means growth, security, profits and prestige for you. This program offers complete training at the A to Z Owner-Management School, site selection assistance, 100% rentable inventory, and powerful year 'round advertising and business building promotions plus other individualized, day-to-day services.

### Three basic Rental Center Plans available.

Your cash investment is only \$7,500 to \$18,750—depending on the plan most suited to your market. We make available initial and growth financing if you qualify. Want to get ahead, earn more, live better and provide a bright, prosperous future for yourself and your family? *Write—Wire—Phone today! No obligation.*

Warren S. Claussen, Vice-President  
A to Z Rental, Inc.  
Suite 1628-AG  
164 West Jackson Boulevard  
Chicago, Illinois 60604  
Phone: Area 312, 922-8450  
*A Subsidiary of Nationwide Industries, Inc.*



## To drive screws . . . use your power drill and job-tested **VERSAMATE**

Versamate is a speed reducer made exclusively for the blister-building business of screw driving. The secret is 7-to-1 speed reduction that boosts power seven-fold and slows down the drill speed until it's perfect for sinking any screw—large or small. See your tool dealer for this \$6.95 beauty.

**RIDGID**  
**Supreme**

POWER TOOL EQUIPMENT

THE RIDGE TOOL COMPANY, ELYRIA, OHIO, U.S.A.

**EARN  
MONEY  
FAST!**

### REPAIR HYDRAULIC JACKS

Earn while you learn at home. Millions of jacks in gas and auto service stations, trucking firms, body shops, riggers, factories and farms need servicing . . . most of which you can learn to repair. We show you HOW. Start spare time in your basement or garage. Big opportunity for mechanics. **ACT NOW!**

Write for folder **PMB** and free bonus offer



**HYDRAULIC JACK REPAIR MANUAL CO., INC.**  
G. P. O. BOX 3 • STATEN ISLAND, N. Y. 10314

Nothing 'cut' with this **COUPON** except grass the way it should be!

Send it to Bridgeport

Read why Manco-Locke Handles  
Easier . . .  
Cuts Better . . .  
Costs Less . . .



Send me **FREE Literature** on **MANCO Locke Highwheel Mowers**

... and also on Locke reel and rotary mowers. I'd like the name of closest dealer too.

(name)

(street)

(city)

(state) (ZIP)



Manufacturing Cos., Inc.

1075-M Conn. Ave.  
Bridgeport, Conn.



## World's Fastest Boats!

CAN NOW BE YOURS

New, just released — 20th Anniversary, 24 page catalog — Will show you how to own, build, and drive all classes of Racing Boats. Plans, kits or hulls, loads of information with specifications mailed first class — 50¢

**CHAMPION BOATS**  
P. O. Box 9215Z  
Long Beach, California



### HEAVY DUTY BALL-BEARING PUMP

IRRIGATE • DRAIN • SPRAY • CIRCULATE • Famous all-metal, rust-proof XB pump with stainless shaft. Use 1/4 HP or larger. 1 HP for up to 5,200 GPH 60' high or 3,000 GPH from 25' well. 1 1/4" inlet. 1" outlet. For belt or direct drives. Only \$12.95

Famous Type P won't rust or clog. Bronze bearing. Hundreds of thousands in use. Up to 2,400 GPH. 1" inlet. 3/4" outlet. Only \$8.95

Postpaid cash with order. Money Back Guarantee.  
LABAWCO, Box 9, Belle Mead, N. J. 08502



PLEASE MENTION  
POPULAR MECHANICS  
WHEN WRITING TO ADVERTISERS

### Learn Profitable Profession in few months at Home

**MEN AND WOMEN, 18 TO 60**

\$4.00 to \$5.00 for 1-hour treatment is the established charge for a skilled operator. Easy to learn and do. Diploma awarded. Open your own office or earn good income from Doctors, Hospitals, Clubs and other health or recreational centers. Wonderful part-time profession. Low monthly payments. Write today for free Anatomy Charts and catalog. No obligation.

ANDERSON SCHOOL OF SCIENTIFIC MASSAGE  
Dept. J-1, Princeton, Illinois



# FREE!

BIGGER... BETTER  
THAN EVER!



## 40th ANNIVERSARY 1967 CATALOG



**YOUR BUYING GUIDE FOR:**

- Stereo & Hi-Fi Systems & Components.
- Tape Recorders.
- Electronics Parts, Tubes, Tools.
- Phonos & Records.
- Ham Gear.
- Test Instruments & Kits.
- Cameras & Film.
- PA.
- Citizens Band.
- Radio & TV Sets.
- Musical Instruments.

**SEND FOR YOURS TODAY!**

### BURSTEIN-APPLEBEE CO.

Dept. PM, 1012 McGee, Kansas City, Mo. 64106  
 Rush me the FREE 1967 B-A Catalog.

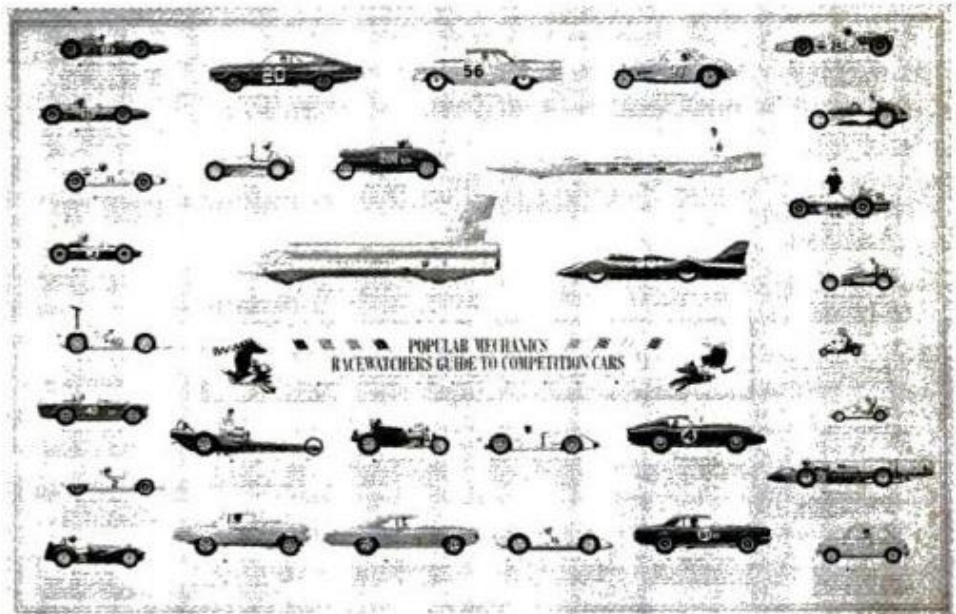
Name.....

Address.....

City..... State..... Zip Code.....

## RACE FANS! Get This Handsome, Full-Color Wall Chart— Your New PM Guide to Competition Cars

32 types of racing cars in 8 major classes—Championship, Stock, Formula, Sports, GT, etc. Beautifully painted. Printed on heavy paper, 35 x 23 inches, suitable for framing. \$1.50 each postpaid.



Racing, Popular Mechanics, 575 Lexington Ave., New York, N. Y. 10022

Please send \_\_\_\_\_ copies of Popular Mechanics Racewatchers Guide to Competition Cars. Enclosed find \$1.50 for each

Name \_\_\_\_\_

Street \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_



## LIGHTNING—DEADLY AS EVER

(Continued from page 67)

gate, an avalanche of negative charges gushes into the ground, following the best conductive path to deep earth. At the same instant, a positively charged return stroke blasts back up the stepped leader's path at a speed 30,000 times that of a bullet, progressively neutralizing the voltage difference between ground and cloud as it mounts. It's this return stroke—technically called a voltage discontinuity wave—that vaporizes wires, explodes trees, punctures walls and heats a 1 to 10-inch channel of air five times hotter than the sun's surface, creating both thunder and a ground-to-cloud spear of lightning. The fact that the eye sees lightning pass from cloud to ground is an illusion.

A single stroke may end the mayhem. But roughly 80 percent of the time what appears as a single lightning flash is actually three to five successive strokes hammering up the same path as the first, often making the flash appear to flicker. "Cloud charges are really in packets, not uniform layers," explains Frank Fischer, researcher at General Electric's High Voltage Laboratory. "After one stroke, other packets of negative charge may be tapped, resulting in yet more strokes."

Lightning strokes can be pigeonholed as either hot or cold. A bolt of cold lightning lasts only about one 10-thousandth of a second. But it carries a punch of anywhere from 10,000 to 200,000 amperes. This brief but powerful wallop instantaneously vaporizes moisture and expands air, exploding trees, houses, chimneys and causing thunder. The more amperes that burst along the stroke's channel, the more powerful the explosions and thunder. The majority of strokes are cold.

A blast of hot lightning delivers as little as 100 amperes, but lasts 100 to 200 times longer, giving combustible objects time to reach kindling temperature. "You can pass your hand rapidly through an acetylene torch and not get burned. That's cold lightning," says Edward Beck, graying, courtly lightning consultant to Westinghouse Electric Corp. "Cross your hand slowly over a lighted match and you'll get blistered. That's hot lightning." A multiple-stroke lightning bolt often includes both hot and cold strokes, guaranteeing maximum damage.

Sometimes, strokes of hot lightning build up so slowly that air doesn't expand rapidly enough to cause thunder. Last August, Tom Asrakan was ploughing a field of his Clinton Co., Michigan farm. His brother Lou was 100 yards behind, spreading fertilizer. Both kept working despite

a light rain from a passing thunderstorm. Lou turned his back to a sudden gust of wind—and saw his shadow outlined as the ground briefly flashed white. When he spun around, his brother lay slumped over his tractor, clothes burning. He had been hit by a thunderless stroke of hot lightning and died two days later.

A bolt of lightning—hot or cold—contains a fantastic amount of energy. An average stroke has enough force to lift the *Queen Mary* six feet into the air or win a tug of war with 80 straining locomotives. But lightning's power is concentrated in a few thousandths or hundredths of a second. When spread over kilowatt hours, a stroke may use up no more than a dollar's worth of electricity.

Among the most dangerous—and once popular—myths about lightning is that it won't strike the same place twice. Not true, as most people now realize. In fact, some evidence supports the existence of lightning nests, areas that are especially prone to hits because of underground streams, ore deposits, or other geological characteristics.

Even if lightning strikes some distance away, there's no guarantee it won't end up in your lap. Capricious, lightning's current often side-flashes to nearby structures or even leaves the ground as it searches out a good conductor to deep earth.

One now famous example of the tortuous path lightning often takes occurred when a stroke hit a tree 27 feet from a dormitory in a Montana CCC camp. From the tree, the bolt burrowed underground to the dormitory and flashed up through the floor to a steel cot. Next, it jumped to the ankle of a standing man and electrocuted him as it leaped from his chest to a 20-penny nail in the wall. From the nail, it arced to a power line feeding the dormitory and raced up the table lamp of a nearby cabin, side-flashing again to a telephone. It finally shot across the telephone wires and down a grounded cable. Instantly, the return stroke barreled back on the same path, blowing the tree to shreds as it streaked to the cloud above.

The different varieties of lightning reported—streak, sheet, ribbon, bead and heat—are really the same kind seen under different meteorological conditions. Streak lightning, the jagged spear of light stretching from ground to cloud, is the most common. Sheet lightning occurs inside clouds, blanketing them with a wide-spread, flickering light. Ribbon lightning is thought to take place when a strong wind blows the conductive channel of a multiple-stroke bolt to one side; the successive strokes rage upwards a few feet

(Please turn to page 204)



**Sure beats smoking!**



Enjoy Copenhagen: Place a small pinch between cheek and gum. No chewing.

United States Tobacco Company

**GUNK**

**ENGINE BRITE**



ENGINE CLEANER and DEGREASER

Just spray it on... hose it off!

GUNK LABORATORIES, INC.  
5629 W. 86TH CHICAGO, ILL. 60638

LOOSENS RUSTED NUTS, BOLTS, PARTS IN SECONDS

**LIQUID WRENCH**



RADIATOR SPECIALTY COMPANY,  
CHARLOTTE, N. C.

**SCOOT'R-BIKE**

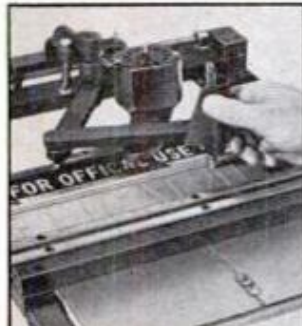
BUILD FROM BICYCLE FRAME

BIGGER, BETTER THAN A MINI-BIKE

Convert old bicycle frame for \$5.75, plus small weld job. Step-by-step photos show how. **PLANS, \$2**, refundable with order for wheels, engines, clutches, kits. Also Mini-Bike Plans, Kits. Discount Prices.

**GILLIOM MFG. CO., Dept. PM-8, St. Charles, Mo. 63301**






FOR OFFICIAL USE

**TURN A DIME INTO A DOLLAR**

Step into new income dimensions with your own engraving business. Engrave and market nameplates, door-plates, signs, badges. Every business a prospect. Full or part-time. Write Dept. PM-8.

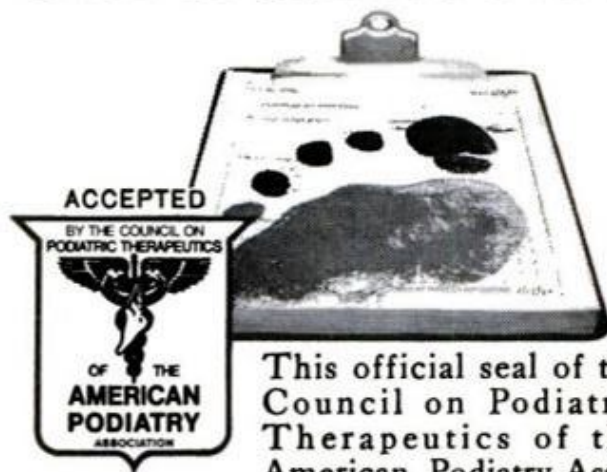


**SCOTT MACHINE DEV. CORP.**

215 PROSPECT AVE.  
WALTON, N. Y. 13856

Medical news from leading foot doctors.

# Now! Clinically-proved relief of athlete's foot.



This official seal of the Council on Podiatric Therapeutics of the American Podiatry Association has been granted to Quinsana Foot Products with this statement:

"Quinsana Foot Powder, Penetrating Foam and Foot Deodorant are effective foot health aids and of significant value when used in a consistently applied program of daily foot care and regular professional treatment."

The Council on Podiatric Therapeutics of the American Podiatry Association.

New studies supervised by some of America's foremost foot specialists confirm Quinsana's power to relieve athlete's foot. After hundreds of rigorous clinical tests at 5 separate colleges, Quinsana was granted this official seal.

**Quinsana Foot Powder**—for relief of athlete's foot and daily foot care.

**Quinsana Penetrating Foam**—for more stubborn cases of athlete's foot.

**Quinsana Foot Deodorant**—for long-lasting protection against foot odor.

Look for the seal of acceptance on every Quinsana package.



# Quinsana

Products of Mennen Laboratories.  
The Mennen Company, Morristown, New Jersey



## POLARA OWNERS REPORT

(Continued from page 118)

at the formula for amount of suspension stiffness, steering-wheel turns ratio and other engineering parameters, that, when coupled with power steering and brakes and smooth U.S. highways, makes for unbelievably easy handling and the most comfortable ride this side of a cloud trip on LSD.

Luxury-loving Polara owners overwhelmingly praise:

"Ease of handling on the road and especially corners; the smoothness of ride, quick response of motor; and the power steering and brakes."—Washington state assistant manager.

A Minnesota farmer who seems to use many back roads finds that his Polara "handles so nice and takes the bounces good. I think it's balanced real well."

Another Minnesotan, a furniture-store owner, not only likes the way it handles on the road, but likes the way it "sits very good."

►By this, I think we can rightly assume he's referring to the way he feels it leans forward on all fours, a picture of suspended motion, ready to glide off at its owner's command.

As far as "sitting" goes—in the sense of comfort, that is—the Polara rates high. One owner, a Washington aluminum-casting foreman, seems to have selected his car only after extensive "sit" testing, and he finds "the Polara is the most comfortable car in the Dodge line."

A Wisconsin machine-company employee uses his car in a car pool, driving with a full car 30 miles each way to work. He tells us that his "passengers say it has the best back seat of all cars they ride in."

►That's quite a compliment considering it's from the early-morning commuter who just manages to shave and dress before dropping into the back seat to resume his sleep.

Most comments on comfort didn't go into details, but just briefly stated "great!" or "very comfortable front and rear."

Of course the other side should have its say, too. Champion of the anti-Polara faction is a Maryland social security clerk:

"Could you be comfortable if you thought the thing was about to fall apart any minute?"

And a Washington claims representative, in a long note to us about his car buying history, gives comfort its due praise, but quickly goes on to tell us more:

"Dependability-wise and comfort-wise I think Chrysler (Corp.) is on the top, but, oh, the way they throw these Dodges together!"

What better way to lead into the workmanship complaint department than with those strong words. They're only topped by those of another owner, that Maryland clerk, who, when asked what he'd like to see changed on the Polara, replied, "Leave the four wheels on and change all the rest."

If you're wondering why he bought his Polara in the first place, he'll tell you: "I thought I needed a new car and I *thought* I had bought a good one." We wouldn't normally include these somewhat general remarks, but they're backed up with copies of nine pages of correspondence between the owner and Dodge Division representatives discussing the righting of many workmanship wrongs. Problems included inoperative inside light, cigaret lighter, seat-belt retractor and windshield washer, and missing right rear door armrest, among other things.

But things aren't all that bad. A senior citizen in Arizona finds the workmanship of his Polara "good, according to today's sloppy standards."

In a somewhat more positive vein, we should add that of all Polara owners questioned about their cars, 30 percent replied that they had no complaints whatsoever. And 85.4 percent indicated that they'd buy another Polara. Regardless of their opinion of today's automobile workmanship standards, they must agree with the owner from Arizona that their cars are put together rather well.

Wind noise was not a major complaint from owners, but was one that popped up often enough to focus attention on an annoying problem. The problem is not one of driving at 100 mph with an open vent pane which would make anyone feel as if he were piloting an open-cockpit WWI fighter. The complaints were mostly from owners of hardtops, which means they have flow-through ventilation as standard equipment. This system and its solution of the vent-pane problem is the greatest thing since the invention of the wheel, but the whole idea is being defeated—as a few owners with flow-through testify:

"Windows don't fit tightly, making whistling noise."—Louisiana sanitarian.

"Wind whistles at 50 mph—poor window-vent fit."—Alabama federal government employee.

"Wind noise around the front doors."—Kansas farmer.

Just a small problem in the design of today's complex machines called automobiles. But it's the small things that bug owners—like the Maryland lithographer who tells us he found someone's lunch under the air cleaner of his brand-new Dodge Polara. ★★ ★



## OUTBOARD TROUBLESHOOTING

(Continued from page 147)

ring. Assuming you find this to be so, you should also probe to learn why the ring broke in the first place. Some possibilities? The top ring was striking the ridges in the cylinder, the ring grooves are worn, the rings were sticking in the grooves because of a gumming situation, the cylinder walls have developed waves or the engine was overheating.

The first thing to do when your outboard develops a knock or rap, of course, is to pinpoint the source of the noise in either the powerhead or gear housing. If it's in the powerhead, the best course is to assume you're lucky and it isn't something really serious. Try tightening down on the flywheel; then check the timing, making sure it isn't too far advanced.

If this doesn't do a thing for you, I'm afraid you'll have to rip into the engine and check out the troubleshooting chart.

The same procedure applies to noise coming from the lower unit. First, check on things that are relatively easy to fix—a prop hub rubbing against the gearcase cover, for instance, or lack of grease in the gear housing. If the easy cures don't work, you'll have to take the lower unit apart to find and fix the noisemaker. ★★★

## HEARD SHORTWAVE LATELY?

(Continued from page 172)

General-coverage portable receivers are of solid-state design. They enable the shortwave fan to enjoy his hobby wherever he goes. The really small pocket-size models are not worthwhile; they just don't have adequate selectivity or sensitivity. However, the sets that are about the size of a small portable typewriter and cost between about \$150 and \$200 are real passports to global listening. Being independent of the power line, they are especially popular with travelers. At major airports around the world, the tourist with a camera bag over his shoulder and his precious radio set in his hand is an increasingly common sight.

There is a bonus in shortwave listening for the philatelist. If you send reports of reception to foreign amateur and broadcast stations, most of them send back colorful acknowledgement cards, called "QSLs," which naturally bear the stamps of the respective countries. Many radio fans become stamp collectors as a result of tuning in the world on their shortwave receivers and sending to the foreign broadcast stations they've heard for QSL cards. ★★★

# Best for Latex paint



## DAP® LATEX CAULK

Best for any paint. Guns like whipped cream. Takes paint faster than any other caulk. Won't stain, blush or bleed. Sets tough, rubbery. Stretches the life of the finest paint job. Sold at leading hardware, building supply, paint and specialty stores.

DAP INC., Dayton, Ohio 45401 • Subsidiary of Plough, Inc.

## MAKE YOUR OWN JEWELRY with low-cost Hand Caster® Kit

Contains all you need to make "lost wax" castings. For fun or profit cast model parts for trains, cars, boats; ornaments for guns, knives, etc., as well as cut stone mountings, jewelry. Portable, compact, easy to use. Kit includes Hand Caster, Burnout Oven, Ronson Vars-flame Torch — plus all necessary supplies, complete operating instructions. Order from your hobby or lapidary dealer, or write for details and FREE Wax Pattern Catalog to:



Kit Complete \$119

The WILKINSON Co. precious metal alloys since 1919  
Dept. PM, 1660 9th St., Santa Monica, Calif. 90406  
Export Div: Box 64302, Los Angeles, Calif. 90064

## SAVE UP TO 85% GOV'T SURPLUS and NEW EQUIP'T

Send 25c for Big Catalogs Showing  
Finest Bargains in U.S.A. On Surplus,  
Excess Inventory, Regular Factory Lines.  
SATISFACTION OR MONEY BACK GUARANTEE



\$6.90 F.O.B. LINCOLN

### DIAL TELEPHONE

(ITEM #715.P) — Same type phone used on all telephone systems. Use as extension to main phone or private system. Furnished with 4-prong extension plug. Excellent condition. Shipping weight 8 lbs.

\* Include money for postage and save on collection fees. Excess money refunded immediately.



Lowest Prices On...

HYDRAULICS COMPRESSORS  
SURVEYING INST'S  
WINCHES GEAR MOTORS  
CABLE POWER PLANTS  
WELDERS SPEED REDUCERS  
ELECTRONICS BINOCULARS  
TELEPHONES WEED SPRAYING  
PUMPS HOSE  
MANY OTHERS

SURPLUS CENTER PM-087

Lincoln, Nebraska  
Zip Code 68501



## ASTRONAUTS

(Continued from page 85)

—yet sleep has generally been fitful.

On the early Gemini flights, one man slept while the other one remained awake, just in case. But this system was abandoned. The nonsleeping astronaut kept the other semiconscious, rattling papers, whispering to communications stations and so on. Even when both men slept, there were still noises in the spacecraft, especially the crackling noises of expansion and contraction as the craft heated up or cooled off. And there was always the subconscious awareness of where they were, and the urge to stretch and move around.

Some astronauts didn't bother with sleep. As spacecraft grow in size, sleep stations will have to be provided, away from work stations, and shut off from light and noise. It's generally agreed that astronauts will maintain a sleep cycle identical to that observed at Cape Kennedy, that is on Eastern Time, so they can maintain normal body tempo.

### Water management

This is a problem of storage, and so far it's been under control. But as flights get longer, how can the great bulk of water needed, and the consequent weight, be justified? The spacecraft are heavy enough now.

It may be solved on flights up to a few months by fuel cells, whose primary function is electric power. When hydrogen and oxygen are combined to release electric energy, however, a by product is water and it is quite pure.

For much longer flights, however, say, to Mars, a recycling system may be the ultimate solution. It sounds unsavory, but it works. The astronauts will recycle their own urine after it has been made pure and potable, eliminating storage problems.

This system is tied in with food and waste management.

### Food management

Storage, again, is a problem, but so is palatability. Space food would never make it, for taste, at the Waldorf—or even Joe's Bar & Grill.

Most of it is bite-size, which takes a long time to consume, or reconstituted, which takes a long time to prepare. And weightless astronauts have to squeeze it into their mouths. One scientist described one diet as "a 13-foot-long Tootsie Roll."

There have been rapid strides made in this area, with some of the reconstituted foods becoming quite palatable, but the ultimate solution—if only to eliminate



"Why didn't you go before we left?"

weight—would be for astronauts to grow their own food in space.

This, too, is tied in with water and waste management.

### Body waste disposal

This is another unsavory problem, not often reported on. But astronauts, even in space, are human beings.

Thus far, waste disposal has been totally inadequate, not only esthetically, but also for the procedures and time involved.

The astronauts have done their best, taking drugs before their flights to reduce the number of bowel movements. On the 14-day Gemini flight, for instance, the two astronauts had seven and eight bowel movements, respectively. Also the reduced space diet reduces bulk.

But still there are bowel movements. Space or weightlessness doesn't affect the natural processes. So far the astronauts have been keeping their wastes in "baggies" and storing them. In one case there was urine leakage, and the astronaut finished the mission with a boot full of liquid.

One solution is to provide a suction commode—NASA already has one—to eliminate the "baggies," but the ultimate solution may be to bring an entire Earth environment into space, tying wastes in with water and food.

Here's how it would work. Man gives off carbon dioxide, urine and solid wastes. He takes in oxygen, water and food. So he would need to bring into space something that would use his waste material and convert it into the essential material he needs to survive. Such a system exists. It uses algae and bacteria, and it's called a closed ecological system.



This man/plant/animal relationship is the same as it is on Earth. Algae use man's carbon dioxide and give off oxygen; bacteria use wastes and return potable water. As the algae grow, man eats the excess for food, to complete the cycle. And the cycle can repeat in theory, to infinity, just as it is on Earth.

So the system would replace food, water and oxygen systems now used, eliminating storage problems for all three, and also the problem of waste disposal.

### Carbon-dioxide control

The ecological system, just described, would eliminate any problem with CO<sup>2</sup>. The algae would consume it.

Right now, however, traces of a problem exist. Man is the only producer of CO<sup>2</sup> in space, and thus far it has been neutralized by chemical means, specifically by *lithium hydroxide*. However, some "channeling" has been observed—small routes through the granules which, if magnified, would allow the CO<sup>2</sup> to pass without interference back into the cabin.

If it accumulates above a certain level in the cabin, it cuts down the space available for oxygen. The astronauts would begin breathing rapidly and deeply, conceivably diminishing the performance of their central nervous systems.

Carbon-dioxide control, while not dangerous now, bears watching. Ultimately, when space flights become more frequent and of longer duration, some other system may have to be employed. ★★★

### JAZZY JEEP

(Continued from page 94)

simultaneously jiggling the automatic transmission lever back and forth from Drive to Reverse. This and a few appropriate cuss words eventually got me into four-wheel-drive Low, which is geared down about 2:1. And I cleared that slope. In fact, the Jeepster can climb up to a 60-percent slope, according to its manufacturer.

The transfer case also provides a Neutral position for stationary power takeoff.

Some dealers are calling the Jeepster Commando, especially the convertible, a sports car. It's not, of course—at least, not in normal use of the term. Those live front and rear axles, with all their unsprung weight, aren't ideal for twisting race tracks. But if your sport is hunting, fishing, boating, camping, prospecting, exploring, you may want to stretch your definition. One thing's sure. This car will take you where the action is. ★★★

# Test your automotive I.Q.



When this buzzes, what's wrong?



What does this symbol stand for?

You forgot to turn off your lights when you shut off the ignition. And this alarm will buzz until you do. The symbol indicates your best engine life preserver, Quaker State Motor Oil. It's refined only from 100% Pure Pennsylvania Grade Crude Oil, the world's choicest. It keeps your car on the road, out of the repair shop and saves you money. To keep your car running young, always ask for Quaker State.



Quaker State Oil Refining Corporation  
Oil City, Pennsylvania



## DIAGNOSTIC CENTERS

(Continued from page 76)

of the V8. Or install a new carb. Overhaul auto choke with carb. Change fuel filter. It's dirty. Your fuel pump is borderline but still okay. You're getting 11.8 mpg." (Bob's own road figure: 12.)

On the bug sheet Tom marked "Go" on: belts, battery, crank, voltage, wiring, alternator, regulator, carb linkage, rear-wheel torque, driveshaft, universal, differential, axle bearings.

But he marked "No go" on: basic timing, advance timing, dwell angle—the vital angle between the points that feeds a nice fat spark at exactly the right time. Also "No go" were carb and rear-wheel balance (vibration). The sparkplugs were "borderline."

But what really worried us was the compression report. When an engine is good, all cylinders report in at near-equal pressure. But Tom's oscilloscope showed cylinders checking in at 100, 100, 130, 140, 100, 80, 90, 110. The 80, 130 and 140 were trouble alarms. Were valves and rings shot? Or was bad ignition to blame? Only then did we notice: There was no diagnosis at all for valves or rings, specifically, only the compression test which, by deduction and elimination of other minor troubles, leads you to suspect valves or rings.

Finally Tom checked the transmission. Under load, it was shifting badly, and blowing oil. "You've got slippage and it's bad," he said. "No diagnostician can tell what's wrong without opening it up. It could be the pump. You need a transmission overhaul and that, of course, would cost you \$225 maximum."

Tom also told us Bob's speedometer read 55 at 60 mph, 40 at 45.

Polce's wheel-and-brake-test bay was in use, and we were in a hurry, so we said thanks, settled accounts (engine diagnosis, \$6) and drove on.

So far we knew Tom Polce was an A-1 technician and honest. But we didn't yet know: Had he told us anything a corner mechanic—a good one—couldn't have?

### What Mobil did

Next stop was Mobil's glistening new center at East Meadow, N.Y., so clean you could eat off the floor. I remembered Ford's big new research diagnostic center in Dearborn—two bays of which may be a model for dealers to copy. Ford won't even put a car on the lane until it's been washed. (That's Rolls Royce fussiness, but it gives the technicians pride in their work.)

Mobil's center had men in white coats,

soft chairs for ladies, soft music and coffee. The price here: \$9.50 for a full 90-point check including wheels, brakes and lights.

Manager Bob Hamblet wore tie and jacket. He had searched high and low for top mechanics, prides himself that his are well-paid, high-production men. Right off the bat he told us: "Look, let's clear up some wrong ideas. Most diagnostic-center equipment is not new at all. It's the fast assembly-line use of it and the intensive use of trained technicians that's new. Please tell drivers that diagnostic centers have no crystal balls and they even have some troubles of their own now and then. And, let's face it, it's still hard to diagnose a transmission without tearing it down."

### Specs not always right

I also learned that the centers even have trouble with Detroit's specifications. When diagnosticians call for factory settings, cars don't always work better. A few owners bring them back and say, "Put it back on the bad setting." Even Detroit is still learning about specs, and often changes them.

We watched from behind picture windows while two men in white ran Bob's car into Mobil's long, four-station bay. Two diagnosticians, looking like college professors, took it in hand.

At Station No. 1, the Pontiac bounced sharply over steel bumpers to give the men in white the feel of the shocks. Then Bob's front wheels went up on a secondary-lift piston—just enough to unload the suspension. One wheel was yanked for brake and bearing checks while one man tested wipers, muffler, other small details. Then the car was rocked again to see how quickly it settled out. The entire front end was inspected. One man wrote: "Replace lower ball joints."

Then the patient went to Station No. 2 for the brake test. Front wheels were positioned on rollers. The wheels were spun at 45.5 mph, and then brakes were applied: a normal stop. Specs for Bob's car called for 180-pound brake pressure. Bob's car braked at 175. Good. Then came a panic stop. Bob checked in at 220 pounds. Also good. Furthermore, there was only a 10-pound difference between each front wheel. Specs allow 40 pounds. So pressure balance was excellent.

Holding the pedal down, the technician then observed: no brake fade, indicating no master cylinder trouble.

At Station No. 3 came the dynamic power test, as at Polce's. But here a hose was clamped over the tailpipe, for exhaust analysis at high speed.

(Please turn to page 194)





# WORRY PROOF!

Water proof, rust proof, cold proof, hot proof, just about everything but bomb proof. That's Lubriplate outboard motor Gear Oils. Tailored especially for your gear shift needs. They won't let you down. Lubriplate has been proven in the silence and isolation of outer space to be dependable, long lasting. Next time, be sure to cast off with Lubriplate, it's the silent service.

## LUBRIPLATE® MARINE LUBRICANTS

Lubriplate Division, Fiske Brothers Refining Co. • Established 1870 • Newark, N. J. • Toledo, Ohio

### "\$33,000 LAST YEAR" OPERATING AUTO RADIATOR SHOP

—Mercier Bros., Lowell, Mass.

START SHOP OR ADD TO BUSINESS. Market growing. More cars each year. Packaged radiator shop incl.: equipment, training, 98-page manual, initial supplies. Proven merchandising attracts business. Pay-as-you-profit plan. Write.



NEW 1-PIECE SHOP  
Tests • Cleans • Repairs

INLAND MFG. CO., Dept. PM-8, 1108 Jackson St., Omaha, Neb. 68102

## BILL TROUBLES?

NOBODY REFUSED UP TO \$15,000.00

Bad Credit ■ No Problem ■ Not a Loan Co.

● Send your name and address for FREE application to nearest office for faster service ●

● ATLANTIC ASSOCIATES, Dept. 54 ●  
146 Westminster St., Providence, R. I. ●  
● 3312 N. Central Ave., Phoenix, Arizona ●

## RECHARGE ALL BATTERIES

Only Everlite

- Charges 6 batteries
- Charges 3 times faster
- Charges all batteries



Including hearing aid, flashlight, lantern, radio, in fact any battery up to 12V. Save Money and have the convenience of fresh batteries always. Simple and 100% Safe. Plugs into any 115V. outlet. Guar. for one year. Send \$6.95 plus \$.65 for shipping

695

Model 75

MASTER MECHANIC MFG. CO., Dept. A-87 Burlington, Wis.  
Southern Customers write Dept. A-87, Box 65, Sarasota, Florida

## It seems, more people ask to borrow SHOPMATE Zip-Screw Drivers than any other brand!



100-to-1 gear ratio gives extra power, torque when needed. Divers and drivers of #4 through #12 slot or Phillips head screws prefer the powerful, compact 3.0 amp. Mod. 1895 Zip-Screw Driver—and it removes screws, too! Bits, finders included; 150 other useful accessories available. **\$34<sup>95</sup>**

Sug. Ret.

### MOD. 1805 DUAL ACTION SANDER

Finger-touch selector switch gives either straight line or orbital action, true flush sanding either way! 4.0 amp. motor, over 25 sq. in. sanding surface. **\$29<sup>95</sup>** Sug. Ret.



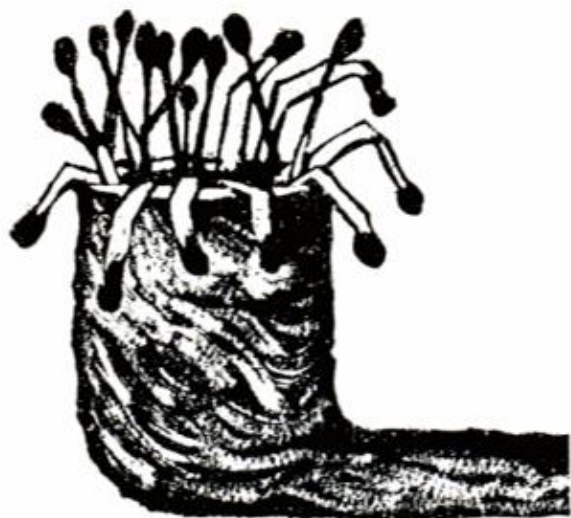
Product Improvement—a continuing process at  
**SHOPMATE**  
Portable Electric Tools, Inc.—Dept. D  
1200 E. State St., Geneva, Ill. 60134

Illustrated, informative  
**SHOPMATE**

"Power Tool Primer"—the real inside story, yours for only a dime! Write to Shopmate address above.







## Do you burn more matches than tobacco?

### Try Bond Street—the great-tasting pipe tobacco that stays lit.

When pipe tobacco tastes as good as Bond Street, you like to spend your time enjoying it. Not relighting it. So Bond Street has an Old English cut—a combination of flakes for

even burning and cubes for slower burning. You'll enjoy a whole pipeful of pleasure, on one match.



A product of Philip Morris Inc.

### SAFETY ACCESSORIES FOR YOUR CAR



#### SAFETY-LIGHT

Avoid rear end collisions due to tail, stop-light failures! New electronic monitor shows you those lights really work! Model SL-1 for cars with tail/stoplight fuses, Model SL-2 wires into others. 12 V, only. Easy to install. \$8.95 with money-back guarantee.



#### STOP-THIEF

Electronic anti-theft system prevents your car from being started, sounds loud alarm after any attempt to start engine or to open doors! Small, easy to install on 12 V cars and trucks. Only \$9.95 with our money-back guarantee.



#### FLASHOTRON

Easily installed to give you sequential turn signals like on T-bird and a few 68 models. You can be a year or more ahead of Detroit! 12V cars, for 4 stoplights: FLASHOTRON I, \$9.95; for 6 stoplights: FLASHOTRON II, \$16.95. Money-back guarantee.

available ONLY FROM **CORPORATION 87**  
THE INNOVATORS IN AUTOMOTIVE DEVICES  
BOX 473P • WEST HARTFORD • CONN. 06107

## DIAGNOSTIC CENTERS

(Continued from page 192)

Meanwhile, computer tape spewed a steady readout on the automatic transmission shift points. Linkage trouble was indicated. Next came the fast 2500 rpm test. Smoke filled the bay. A needle on the wall jumped to read 93 hp. "At 2500 rpm, when braked, an engine is supposed to turn up one-third of its rated horsepower," Bob said. Three times 93 is 279. We looked up Bob's engine in the book. It's rated at 240 hp. "That's fine," he said.

So the car went to Station No. 4. Here each front wheel was positioned on its own separate turntable. In each turntable were rollers that kept the wheels turning, as on the road. Any wheel out of line would try to pull sideways. This would twist the turntable, and the pull could then be measured. The Pontiac's left front kept twisting its table. "Twenty-five feet of side scuff per mile," Bob Hamblet said. "That wears tires. Get an alignment."

After it was all over, Borst was called into a little booth with a diagnostician. It was like a solemn conference with a family physician. Here Bob got his diagnosis—and repair list. It was quite similar to Tom Polce's. But as for the transmission the checklist said only: "Slipping!"

Then Bob got a whopping big repair estimate sheet: \$540.39, including \$250 for transmission. Even the diagnostician was shocked. "Might pay you to get a new car," he said. Polce's total estimate had been about \$307.25, but at Polce's we'd had only an engine check.

### Where the centers shine

In that \$540.39 lies the true story of the diagnostic centers. Bob's car was sick—very sick. What those men in white had done was tell Bob the whole truth—how he could, if he wished, make it whole again. He needed new tires and they said so. In spite of the good brake test, inspection had shown worn shoes. He needed a \$54.95 brake job, \$39.95 worth of ball joints and another \$39.90 for four shocks. The emergency brake needed adjustment (\$2); front-wheel bearings were nearly dry (\$5.20 to pack and reseal); headlights needed aiming (\$2.50). And so on.

And this brings me to the main point we found: The diagnostic centers—the good ones—are so thorough that they can and will tell you everything wrong with your car—even if you don't want to know.

Bob went in knowing he had engine and transmission trouble and came out finding a lot more. I went in with a new

(Please turn to page 198)



# FOX MINI-BIKES

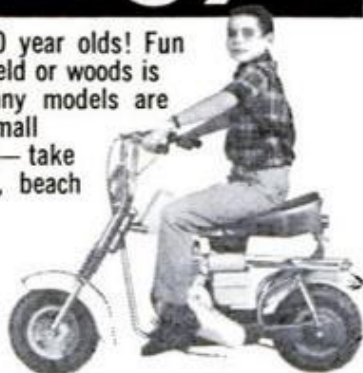
Do-It-Yourself or Fully Assembled

16 MODELS from \$59.50

2½ hp to 5 hp

Simple enough for even 10 year olds! Fun and easy! Any empty lot, field or woods is your playground. And, many models are licensable for street use. Small enough to fit in a car trunk — take it camping, to the cottage, beach ... anywhere!

**BIG CATALOG \$1**  
Shows Bikes, Plans, Parts, Access., Pictures



**FOX CORP.** Box 797PM • Janesville, Wis. 53545

## \$70 AIR-GUN only \$29.95

Complete with chisel this 3 lb. Air-Gun rips into metal, chips concrete, drives pins, etc. Delivers 5500 2" strokes a minute. Operates on 3 to 5 hp compressor. Made especially for govt. and manufacturer made too many. At only \$29.95 ppd. while they last, a \$70 value.



**Meredith Separator Co.**

Dept. PM8, 310 W. 9th St. KANSAS CITY, MO. 64105

## Build This 4 x 8 POOL TABLE for \$109.00 From our EASY TO FOLLOW PLANS

Complete Plans and Material List For.....\$3.00



ORDER FORM

Name \_\_\_\_\_ Address \_\_\_\_\_

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

Send Check, Cash or Money Order to:

**Rochester Bowling & Billiard Mfg. Corp.**  
500 Lyell Ave. Rochester, N. Y. 14606

Send 35c for Latest Billiard Supply Catalogue

Give your zip code when answering ads



Money Back Guarantee

## HEAVY DUTY-ARC WELDER

Life Time Guarantee

New Advanced Model 110 Volt Arc Welder. You cannot buy a better welder anywhere at this low price. **NO EXPERIENCE NEEDED.** With our easy-to-understand welding book, anyone can braze, solder, and weld any metal, even aluminum. **NOTHING ELSE TO BUY.** Comes complete, with rod-holder, helmet, ground clamp, generous supply of 1/16" and 1/8" welding rods, 1/4" carbons, flux and a special twin carbon torch which generates over 11,000 degrees heat for cutting or bending steel. **FREE.** If you order now we will send you free an extra \$2.00 supply of rods, flux, solder, and a pair of gloves. **LIFE TIME GUARANTEE.** Never a repair charge for parts or labor. **MONEY BACK GUARANTEE.** Try it for 10 days. If not completely satisfied, we will immediately refund your money without question. **SEND ONLY \$2.00** and when delivered pay postman \$16.95 plus postage, or send full price \$18.95 and we pay postage. (Remember: Order immediately for your free bonus gift of rods, solder, flux, and gloves.)

Order Direct from factory: NATIONAL ELECTRIC, Dept. PM-8, DELRAY, FLORIDA

SEND ONLY \$2.00



## PROCESS YOUR OWN 8mm B&W or COLOR HOME MOVIES

No Darkroom Required \$17.50

(Plus 50c postage & handling)  
Project your movies one hour after shooting them! Simple! Economical! **CINE TANK!** Entire developing process, INCLUDING LOADING, is performed in daylight without ever removing film from camera spool. Plastic Cine Tank holds 30 ft. rolls 8 mm B&W or Ansucolor. Less than 20 ounces of chemical fills tank. Complete instructions included. Satisfaction guaranteed or money back!

**B&W Chemical Kit**  
—\$2.50

**FREE! Write for 64 page Cine Manual**

**SPECIAL!** With this ad and purchase of Cine Tank—Regular \$2.35 8mm Film Slitter—hours **FREE!**

**SUPERIOR BULK FILM COMPANY**

448 N. Wells St. • Dept. PM-87 • Chicago, Illinois 60610

## Stop seepage in basements, garages with Adelphi Hyrdoblock Epoxy Rubber WATERPROOFING PAINT



Ready to use, dries in 2 hours, sold on 5-yr. moneyback guarantee. White, tints to any color. Seals, protects, beautifies. Fills pores in all masonry, seals most surfaces with one coat. Meets GSA resistance to wind-driven rain requirement in TTF-1098.

\$5.95 gal. p.p.

Add \$1 west of Mississippi

**FUTURE COATINGS,** Dept. 71, Jamaica N.Y. 11417

# 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 45 years. Get National training now. Pay your tuition in easy monthly payments after you graduate. Send coupon for **FREE 40 page school catalog—TODAY.** G.I. approved.

National School of Meat Cutting, Inc., Dept. 50-X, Toledo, Ohio 43604

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



**NEW** **80 AMP DYNAMIC MARK 88**  
**INDUSTRIAL TRANSFORMER ARC WELDER**

**IDEAL GIFT — EDUCATIONAL, ENJOYABLE, PROFITABLE**  
**ANYONE CAN WELD, BRAZE, CUT, SOLDER, HEAT STEEL, BRASS, ALUMINUM, AND OTHER METALS.**

Build and repair anything of metal. Save time & money with this **BRAND NEW, PROFESSIONAL ARC WELDER!** Rugged metal cabinet, baked Hammerloid finish. Ideal for home, shop, farm and industrial use. Expert work on **FIRST** job. **POWERFUL** glass insulated transformer welds 1/4" metals with 3/8" rods. 4 heat settings 20 to 80 amps. Operates on 110 Volt AC line fused for 30 amps. Complete with fibre glass helmet, electrode holder, ground clamp and cables, solder, assorted rods and simplified welding manual. **DOUBLE PROTECTION GUARANTEE.** 10 day money back trial plus full 5-yr. warranty. If inoperative return prepaid, we will repair or replace without charge.



**ORDER TODAY, ONLY \$59.50 COMPLETE (220 V. \$61.50)**  
**SEND ONLY \$6.00.** Pay balance plus C.O.D. charges on delivery or write for easy "PAY AS YOU WELD" Low Down Payment Plan. Welder details **FREE.**

**DYNAMIC WELDER CO.** 1808 SO. FEDERAL ST.  
 Dept. D2-H  
 CHICAGO, ILL. 60616

**CHECK OUT YOUR ALTERNATOR**

*(Continued from page 124)*

battery that doesn't hold a charge.

On occasion, a regulator may need a simple point air gap adjustment to correct a problem. However, if points are burned or damaged, replace the regulator.

Keep in mind that you can have a mechanical or transistorized regulator in the car. Each is tested differently.

If trouble is indicated inside the alternator, take it off the car for bench testing. Check the diodes with a test light or ohmmeter. Check the stator and rotor for grounded and open windings and short circuits.

**Safety precautions**

Here are 10 safety precautions you must follow to prevent damaging the charging circuit and danger to yourself:

1. Before making any meter hookups or doing any work on the alternator, disconnect the battery ground cable.

2. Double check meter connections and battery connections to make sure they aren't reversed. Then, reconnect the battery ground cable. Reversed connections will damage alternator diodes.

3. If you use a booster battery, the negative from the booster must be connected to the negative terminal of the vehicle battery, and positive to positive.

4. Before connecting a battery charger, disconnect the vehicle battery cables. This will prevent an accidental voltage or amperage surge, and safeguard the alternator in the event of a wrong hookup.

5. Switch off the ignition when working on or removing the alternator or regulator.

6. Never ground the field circuit between alternator and regulator. This will destroy the regulator and possibly burn out the wiring in the field circuit. Some alternator field circuits are protected by a fuse to prevent damage if the field circuit is accidentally grounded, but don't take the chance.

7. The output terminal of all alternators is always "hot." Never ground the terminal or flash it, whether the engine is running or not. Grounding will result in a direct short of battery current to ground.

8. Never try to polarize an alternator. It's not necessary anyway.

9. Make sure you use only tools insulated by plastic sleeves or tape to prevent accidental shorting.

10. Watch it when working with engine oil or coolant. Don't allow oil or coolant to spill into the air intakes of the alternator. This causes slip-ring brushes to lose contact with the slip ring. ★★

**DO-IT-YOURSELF HOME BARBERING WITH THE BEST!**



**WAHL HOME HAIRCUTTING SET**

KIT 9743

Motor driven clipper & complete kit, including illustrated instructions — **\$24<sup>95</sup>**

**WAHL** CLIPPER CORP • STERLING, ILLINOIS

**GO AHEAD! Ask Your Dealer to Demonstrate this BENJAMIN**

... then You'll Know Why Today's Oldest **AIR RIFLE** is Still the Most **DEPENDABLE** BB or **PELLET GUN** ever made!

This Single Shot Model isn't new. It's been around since 1908. In Performance and Popularity it has more than proved itself to be the Dominant Hi-Compression Air Rifle in the field. Does that surprise you? Probably if you owned one you'll find you agree it cannot be equalled, much less surpassed, in qualities which contribute to Better Shooting. A universal favorite for all uses — Indoors or Out. This gun combines such distinctive features as Genuine Bronze Barrels, Machined Brass and Steel Parts, Superior Workmanship with Modern Refinements and Styling to deliver Power, Accuracy, Dependability that rightfully put it in a class by itself. Choice of BB or 177 or 22. At Benjamin Dealers.

**\$32.50** No. 310 CAL. BB—No. 312 CAL. 22 PELLET—No. 317 CAL. 177 PELLET.

**BENJAMIN AIR RIFLE COMPANY**  
 896 Marion St., St. Louis, Mo. 63104

**FREE!**  
 Catalog Benjamin Single Shot and Repeaters—Cal. BB or 177 or 22. Write today!

You Can **DEPEND** on **BENJAMIN**





Handy  
companion.

**TRIM** TRIO KNIFE

Tempered steel, Combination  
knife, with bottle opener,  
screw driver, nail file.  
Look for the full line of  
TRIM implements in  
your favorite store.



50¢

The W. E. Bassett Co., Derby, Conn.

For a Complete Book of Professional Secrets

Plus Illustrations  
Of Products  
And Prices Of  
Over 300 Different  
Molds You Can Use  
To Make And Sell  
Ornamental  
Concrete Items . . .

SEND \$2.00

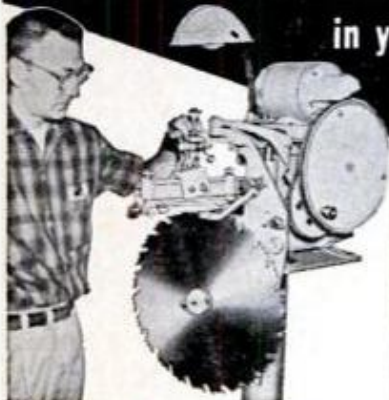
rushed to you by **FIRST CLASS MAIL**

CONCRETE MACHINERY COMPANY, INC.  
839 Lenoir Rd. - P. O. Box 99 - Hickory 2, N. C.



**START A BUSINESS**

in your neighborhood



Sharpen Hand or Power  
Saws with the

**FOLEY SAW FILER**



**MOWER  
SHARPENER**

Precision-grind all  
hand and power lawn  
mowers—a perfect job  
every time.

Start your business in sparetime and make **CASH PROFITS** right  
away. No stock to carry, no selling involved, no experience needed  
—the Foley Saw Filer does every sharpening job **automatically!**  
Earn \$3 to \$6 an hour sparetime in your own garage or basement.  
Profit 90¢ on every dollar.

Best of all, every saw you sharpen, will be resharpened again and  
again—watch your repeat business grow! Add cash to your income  
now, while you build retirement security with the Foley Saw Filer.

**FREE BOOK** shows how you can make money as  
thousands of others have. Send coupon today. There's  
no obligation, and no salesman will call—so write today!



Foley Manufacturing Co.  
816-7 Foley Bldg., Minneapolis, Minn. 55418  
Send for **FREE** book on Money-Making  
facts about the sharpening business.

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP CODE \_\_\_\_\_

**NEW**

*Cristy*

**Super Charge**  
ADDITIVE

**SOUP-IT-UP**

Does the  
job of most other  
fuel additives  
combined!



Use frequently to keep engine at  
peak performance

- Increase engine RPM's ● Increase torque and engine performance
- Cleans entire fuel system, removes moisture ● Keeps jets and throttle plates clean ● Reduces spark plug fouling ● Frees sticky valves ● Prevents vapor lock ● Reduces knock and ping ● Increases gas mileage
- Lubricates and protects upper cylinder area ● Prevents corrosion and rust ● Restores and prolongs engine life. By the makers of the famous Cristy Drygas — Cristy Chemical Corporation, Worcester, Mass. 01608

AUGUST 1967

197



## DIAGNOSTIC CENTERS

(Continued from page 194)

car, found that hitting chuckholes had thrown my front wheels out of line and other small troubles (a linkage adjustment for one) were just beginning.

You see, there are countless little things wrong or going wrong with all cars—things you don't discover until something breaks down. But the diagnostic centers tell you *everything*. The full truth hurts—and costs money. That's why I said: If you use a diagnostic center, prepare to spend money. But you'll have a lot better car, possibly less expense in the long pull.

### Can the corner mechanic do it?

Our last stop was Mike Valentine's gas station and repair shop in Stamford, Conn. Mike is one of the best mechanics I know. We showed him the reports from both diagnostic centers. He read them. "Except for the transmission trouble, which only a transmission man should touch, it sounds like nothing we wouldn't find on a good tune-up," he said.

He gave Bob a tune-up, new plugs, new condenser, new points and a carb cleaning. Cost: \$41. And Bob's car ran like new. He could have gotten the diagnosis

free from Mike, along with a tune-up in the first place.

Mike found what neither diagnostician had found: a loose wire to the points. The hot cable to the battery, too, was loose. Yet when he checked the cylinders with his standard mechanic's hand gauges he found—unlike Tom Polce's oscilloscope—*almost perfect compression!*

How could a diagnostician report serious compression troubles and a corner mechanic report none? I took that problem to still another good diagnostician, Frank Hermann of Hyde Park, N.Y. "Easy," said Frank. "The compression reading Mike took is *today's* compression. But the reading Tom Polce took with his oscilloscope shows what may happen tomorrow. The scopes are very sensitive, especially under power load. Trouble is just starting in Bob's five and seven cylinders—trouble that will show up later on."

Time will tell. Here's how the diagnosticians and corner mechanics stack up.

A corner mechanic—a *good* one—can still do wonders for your car. If you use him regularly, he comes to know your car. He can tune it, fix it, makes no charge for diagnosis and often throws in bits of free adjustment when you stop for gas.

But the diagnostic centers are a boon

(Please turn to page 202)

**You'll open up your world  
when you own the  
one with meaning!**

**TRIUMPH**

A Triumph is more than a motorcycle. To a rider it's an experience far beyond the ordinary. A Triumph's total performance ride gives you a spirit of adventure you'd never expect on two wheels. And the extra power of Triumph's famous OHV engine gives you a "take charge" feeling that can't be ignored. Open up your world by riding the one with meaning. See your Triumph dealer soon.



**NOW! Mail this coupon today for Free Catalog in color!**

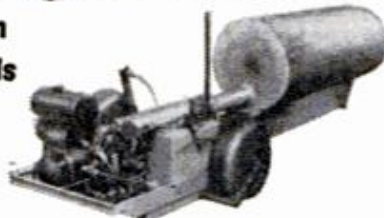
West JOHNSON MOTORS, INC. P. O. BOX 275 Duarte, Calif. 91010	East THE TRIUMPH CORPORATION Baltimore, Md. 21204
---	---

Name \_\_\_\_\_ Age \_\_\_\_\_  
(PLEASE PRINT)  
Street \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
Telephone Number \_\_\_\_\_ Dept. P \_\_\_\_\_



# LICKITY SPLITTER

**Splits Big Profits from toughest woods—Ends Splitting Drudgery with 18 ton hydraulic power!**



7 H.P. trailer unit squats under power to load logs without dead lift. Has 2 speeds, auto-shift, auto-stroke. 26" ram travel splits logs up to 34", any diameter—with extended frame and adjustable wedge splits up to 60". **NEW LOW COST** Economy model for farmers and small wood lots. Also ask about the 60L Series for logs up to 8½ ft. long—Details free.

Piqua Engineering Inc., Dept. P, Box 605, Piqua, Ohio

## I-N-V-E-N-T-O-R-S WE NEED INVENTIONS

Sell your invention for cash—need money for Patent?—Are technical problems holding you back? Universal Inventions has helped inventors all over the world—just like yourself—why not you? Inventions provide the magic spring-board to sudden riches. **REMEMBER**, we either sell your invention or pay you a cash bonus. Write for details.

UNIVERSAL INVENTIONS, Dept. 13, Marion, Ohio

### ENROLL—EARN YOUR DEGREE

of Bachelor of Bible Philosophy (B.Ph.B.), Master of Bible Philosophy (M.Ph.B.), Graduate of Bible Philosophy (G.Ph.B.), Doctor of Metaphysics (Ms.D.), or Doctor of Divinity (D.D.). Chartered by State, Correspondence Courses only. Please write for **FREE BOOKLET**.

#### AMERICAN BIBLE INSTITUTE

Dept. PM, 408A W. 75th St., Kansas City, Mo. 64114

### PROFIT IN YOUR SPARE TIME



#### SMALL ENGINE REPAIR PAYS BIG!

Outboard • Powermower • Chain Saw • Tractor

**MAKE EXTRA MONEY**—or fix your own engines and **SAVE!** Illustrated, easy-to-learn Home Study Course qualifies you as expert. Approved for Veterans. Write today!

**LINCOLN TECHNICAL INSTITUTE**  
SUITE 8-E, 427 MARKET STREET, NEWARK 5, N.J.

### POWERFUL NEW INVENTION, ONLY 2" LONG SHOOTS THRU 100 PAGES-THIS BOOK!



#### 'B-B SHOT'

**MAKE THIS TEST...** Load your 'BB Shot' and fire against this magazine. Notice that it drives BB's through more than 100 pages. Though only 2" long x 1" in diameter, this pocket-size device has amazing power and accuracy. Use it for targets, pests and hunting. Scientifically designed for high power, operating ease and safety.

**FREE!** Get the 'BB Shot' now—we'll include an extra Velocity Cone and **FREE** Target, BB's and Automatic BB Dispenser... all for only \$1.98 ppd. 3 for \$5.00 ppd. Money Back Guarantee. Not sold to N. Y. C. residents or minors.

GRAYSON CO. • Dept. C-71, 210 Fifth Ave., N. Y. 10

**MONEY-BACK  
GUARANTEE**

Name.....  
Address.....  
City..... State.....

**\$1.98**  
ppd.

AUGUST 1967

## GOVT. SURPLUS AND OTHER BARGAINS SAVE UP TO 90%



### MOTORIZED REDUCTION GEAR

110 to 1 reduction. ½ HP @ 62 RPM under load @ 24 V.D.C. Reversible. Also runs well on 12 V.D.C. at reduced rating.

Exc. as heavy door opener, sidewalk cart motor, winch or capstan. ¾" shaft, 12" L x 4" W x 4¾" H. GOV'T COST \$240. Gov't overhauled condition. Shpg. wt. 12 lbs. Special. **\$17.50**

### DC JET GENERATOR ARC WELDING KIT

complete with GE Type CM Gen (30 V. D.C., 400 AMP, 3000 RPM: ampere rating is for continuous duty, intermittent amperage is 500 to 600 amps). Also 2 rheostats, 1 voltage reg., 1 voltmeter, 1 electrode holder, 1 welder's mask, 1 toggle switch, 10 lb. vacuum packed ¼ in. welding rods, pair welder's gloves & spline coupling. All units guaranteed pre-tested. Wt. 110 lbs. Approx. GOV'T COST \$700. All items **\$64.50**



### "BIG 12" ARC WELDING & BATTERY CHARGING KIT

With deluxe accessories consisting of one R 1 300 amp generator, ground clamp, welders adjustable helmet, electrode holder, 300 amp ammeter, 300 amp shunt, rheostat, toggle switch, 300 amp reactor coil arc stabilizer, voltage regulator, battery charging relay, one pair heavy duty welder's gloves. All units guaranteed pre-tested. Approx. Gov't cost \$750. Most items new—all perfect. Wt. 82 lbs. Circuit diagram included. **\$49.50.**



### NEW! BIG! 1967 CATALOG

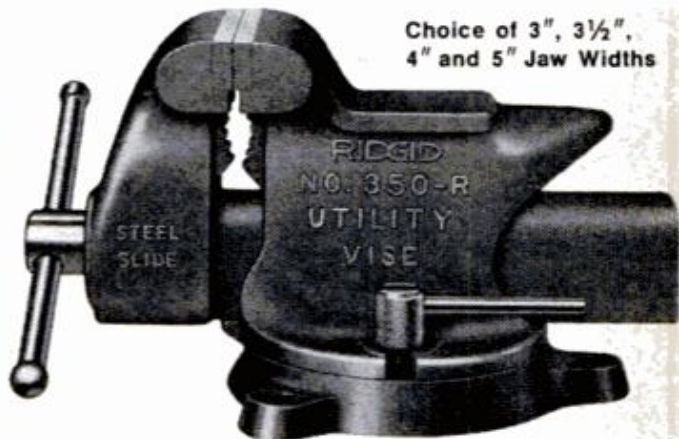
Send 25c for amazing catalog with 1000's of bargains in hydraulics; electrical, marine, automotive items, etc. Order from ad. Prices FOB 50% deposit for COD. Must include your zip code number. Satisfying mail order customers thru-out the world since 1945.

## AIRBORNE SALES CO. Dept. PM-867

8501 Stellar Dr. • Box 2727 • Culver City, Calif. 90230

## NEW RIDGID UTILITY VISE

gives you 7 extra-value features



Choice of 3", 3½",  
4" and 5" Jaw Widths

Swivel base swings full 360°. Base clamp gives solid support across full base. Clamp handle swivels on ball joint for fast adjustment. 3 jaws give slip-proof grip on pipe. Anvil surface is extra large. Large, strong slide-support-horn permits heavy-duty use. Hardened steel jaw inserts are easily replaced... assure positive grip. Buy these extra handy RIDGID utility vises at your Dealer's, he carries a complete stock of Work Saver Tools from The Ridge Tool Company, Elyria, Ohio 44035, U.S.A.

**RIDGID**





## Introducing the 6000 mile oil filter.

The Guardian Oil Filter is guaranteed for 6000 miles. Or we'll repair your car's engine free. At most stores.



## 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. Electronic Engineering Technology and Electronic Technology curricula both available. Assoc. degree in 28 mos. B.S. obtainable. G.I. approved. Start Sept., Feb. Dorms, campus. High School Graduate or equivalent. Catalog.

**VALPARAISO TECHNICAL INSTITUTE**  
DEPARTMENT D. VALPARAISO, INDIANA



## LAW FREE BOOK THE LAW TRAINED MAN

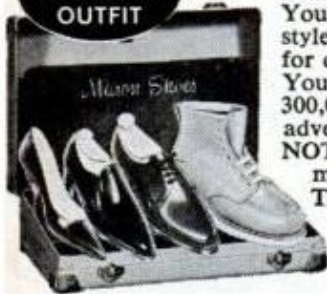
Write today for a FREE copy of illustrated law book, "THE LAW TRAINED MAN," which shows how to earn the professional Bachelor of Laws (LL.B.) degree through home study of the famous Blackstone Law Course. All necessary books and lessons provided. Moderate cost; convenient monthly terms. Write for FREE law training book today.

**Blackstone School of Law, 307 N. Michigan Ave.**  
Founded 1890 Dept. 50C, Chicago, Illinois 60601

MAKE UP TO  
**\$100 A WEEK**  
IN YOUR SPARE TIME WEARING  
**SHOES WE GIVE YOU!**

Imagine getting high fashion shoes without cost—and making yourself an easy \$5 to \$10 in an hour in your spare time! You can do it just by showing comfortable, latest style Mason Shoes to friends, relatives, neighbors. No experience needed. You start to take orders, make money, right away. You'll offer 275 different styles for men and women for dress, work and sports. You draw on our stock of 300,000 pairs. Nationally advertised Mason shoes are NOT sold in stores. Folks must buy from YOU! That means automatic repeat and referral business. Mail coupon today!

FREE  
STARTING  
OUTFIT



**FREE! EVERYTHING YOU NEED!** We send you everything you need to start a successful spare time business. No investment, no inventory, no overhead. You keep 100% of your profits. Mail coupon today and we'll rush you a FREE Starting Outfit with everything you need to start making big money right away. No obligation. Mail coupon now.

### Rush Coupon for Your FREE OUTFIT

The Mason Shoe Mfg. Co. Dept. G-780  
Chippewa Falls, Wisconsin

Please rush FREE and postpaid everything I need to start making money the very first spare hour in my own "Shoe Store Business" I can run from my home.

print  
Name \_\_\_\_\_

Address \_\_\_\_\_

Town \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
(If Known)

## BASEMENT TOILET FLUSHES UP



TO OVERHEAD SEWER OR SEPTIC TANK.  
NO DIGGING UP FLOORS. INSTALLS EASY. Write  
McPHERSON, INC. BOX 15133 TAMPA, FLA.

## BILL PROBLEMS? WE CAN HELP YOU

NOBODY REFUSED UP TO \$18,000  
Bad Credit No Problem • Not a Loan Co  
Send your name and address for FREE application

**NATIONAL ACCEPTANCE, dept. M-8**  
5133 N. Central Ave., Phoenix, Ariz. 85012  
or 119 Ann St., Hartford, Conn. 06103

## Now Possible To Shrink Hemorrhoids

And Promptly Stop Itching,  
Relieve Pain In Most Cases.

Science has found a medication with the ability, in most cases—to relieve pain, itching and shrink hemorrhoids. In case after case doctors proved, while gently relieving pain, actual reduction took place. The secret is *Preparation H*. It also soothes irritated tissues and helps prevent further infection. Just ask for Preparation H Ointment or Suppositories.





**This is the filter that won the race,  
that won the race, that won the race.**

Guardian Competition Oil Filters won 1-2 at Sebring, Daytona and Atlanta. Buy Guardian for your passenger car, too.



## Do FALSE TEETH Rock, Slide or Slip?

Many wearers of false teeth suffer embarrassment because their plates drop, slip or wobble at just the wrong time. Don't live in fear of this happening to you. Just sprinkle a little FASTEETH, the alkaline powder, on your plates. FASTEETH holds false teeth firmer so they feel more comfortable. Helps check denture breath. Dentures that fit are essential to health. See your dentist regularly. Get FASTEETH today at all drug counters.

Please Mention Popular Mechanics  
when writing to advertisers

## I Need People Who Want to MAKE BIG MONEY

• • • Every Business A Prospect.  
• • • \$20 per Hour—\$1000 to \$1500 per Month.

We will teach you every detail of our operation, give you our major contacts & show how to build a profitable, high-paying business of your own.

I am willing to share my experience with others; helping every step of the way, advising of my mistakes so you may build a profitable company EASIER & FASTER with practically NO cash investment. Age is no barrier. Get your order in immediately with \$2 to pay postage & trial registration.

This is a limited, one-time offer & is available to only one person in your district. Satisfaction guaranteed.

C. A. FROEDGE  
ENTERPRISES  
P.O. Box 11246  
Indianapolis, Ind. 46201

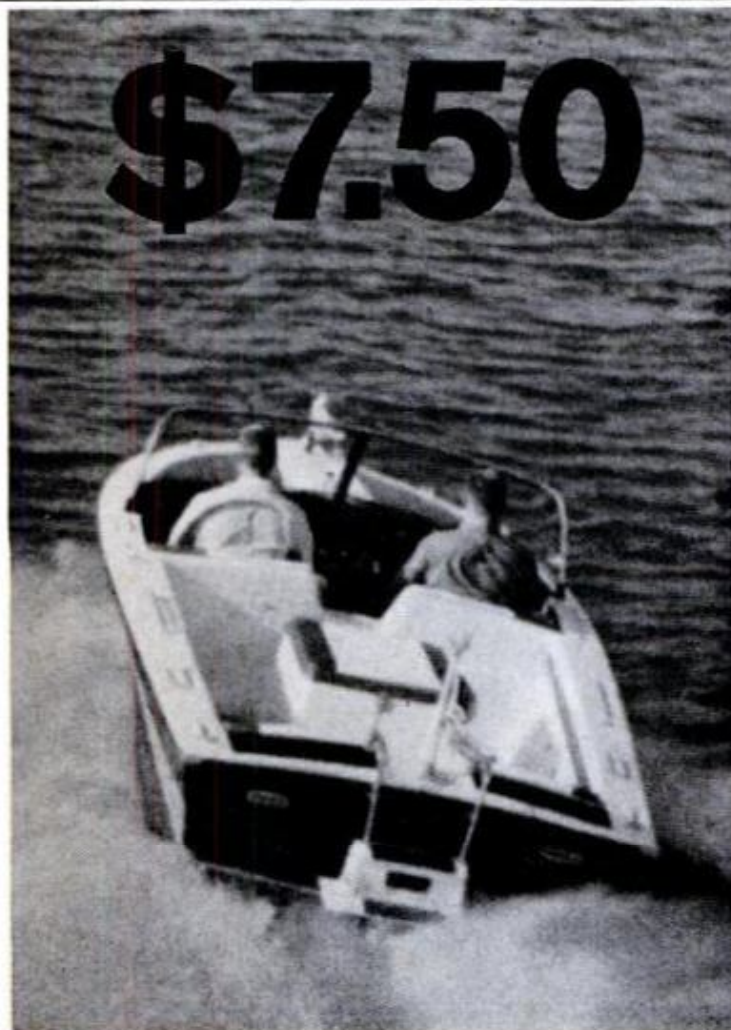


NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

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

# \$7.50



That's all you'll pay for the PM Jet. The first do-it-yourself boat designed for turbojet propulsion. And that's one of our most expensive designs.

For three dollars you can buy the PM38, a sleek 13 foot runabout. And for \$38.00 you can build it. We don't have to tell you what a great buy that is.

And that's not all we've got to offer. We've got El Gato, a 12 foot, twin hulled catamaran. But we're not about to sell this beauty for three dollars. It will cost you four.

There are eight other models in the PM line. Some are less expensive, others will cost you more. We even sell one model that costs as much as ten dollars.

If you'd like to order the PM Jet, PM38 or El Gato just complete the coupon below and return it to us. If you want to see the rest of the fleet there's a place on the coupon for that too.

BOAT PLANS  
POPULAR MECHANICS  
575 LEXINGTON AVENUE  
NEW YORK, NEW YORK 10022  
PLEASE SEND ME THE FOLLOWING

- Plans for the PM Jet at \$7.50 a set  
 Plans for El Gato at \$4.00 a set  
 Plans for PM 38 at \$3.00 a set  
 Please send me information about the rest of the PM fleet.

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

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



# FOUR-WAY

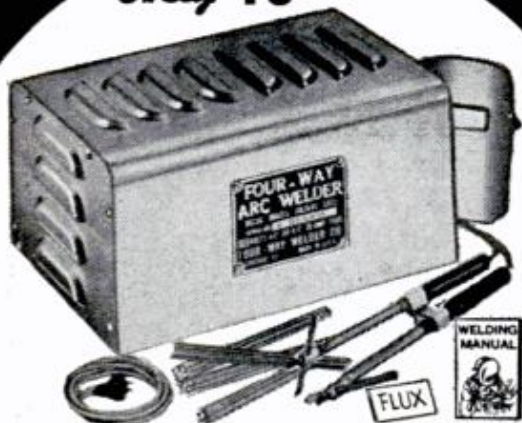
Best Low Cost  
Electric ARC WELDER  
MONEY CAN BUY

5 YEAR  
GUARANTEE

COMPLETE READY TO USE

10 DAY  
TRIAL

Only \$18.95 POSTPAID



WELD, BRAZE, SOLDER, CUT. Tops in performance and value. Ideal gift, educational, profitable, enjoyable. No experience needed. Use 1/8" welding rods and 1/4" carbons to make or repair auto bodies, fenders, trailers, boats, toys, furniture, farm equipment, garden tools, anything of metal, even aluminum. Operates on 110 V. line. Produces to 11,000". Complete ready to use.

**WORLD'S GREATEST WELDER VALUE. BRAND NEW. YOU CAN PAY MORE BUT YOU CAN'T GET A BETTER LOW COST WELDER.** Over 500,000 in use by home owners, farmers, hobbyists and mechanics. **5 YEAR UNCONDITIONAL GUARANTEE.** Simply return. We will repair or replace and ship free of charge. You Get: **FULL FACE SHIELD,** heavy metal cabinet, ground clamp, 12 ft. heavy cables, **SPECIAL** combination carbon arc torch & rod holder, carbons, welding and brazing rods, flux, solder, welding manual. **ORDER TODAY ON 10-DAY UNCONDITIONAL MONEY BACK TRIAL,**

**SEND ONLY \$2.00** and pay \$18.95 plus C.O.D. charges on delivery, or send only \$18.95 for postpaid shipment in U.S.A.

**FREE** Order from this ad & receive extra \$2.00 gift of rods, flux and solder. **FREE**

**FOUR-WAY WELDER CO.**

1810 S. Federal St., Dept. R2-H, Chicago, Ill. 60616

## DIAGNOSTIC CENTERS

(Continued from page 198)

for drivers who don't know a good corner mechanic and don't have confidence in their dealer. I met drivers who said with obvious relief: "At last I've found someone who can tell me what's wrong."

Must you have your repairs done at the diagnostic center? Not necessarily, although most centers hope you will and try to sell you. Some do no repairs at all but charge more—up to \$25—for diagnosis. And, of course, a hard-pressed diagnostic center could take advantage of gullible drivers by directing unneeded work to nearby garages, then taking a kickback. Guard yourself against such abuses. Use only a diagnostician who has a good name to protect.

And remember—no reputable diagnostician will claim to tell you *everything* about your car. Tom Polce admitted he couldn't say what was wrong with Bob's transmission. Another diagnostic center said, "Well, something may be plugged up."

As it turned out, both were wrong—as as they told us they might be. We took the car to the expert technicians at Lee Myles' Transmission Service in Maspeth, N.Y. They took it apart and found nothing was plugged up. Instead, a broken torus wheel was letting oil flow out. As for valves and rings, many centers simply won't attempt an electronic diagnosis. "If we suspect them," says Mobil's Bob Hamblet, "and if the customer asks us to, we will, for \$4.50 extra, make an old-fashioned check with a hand gauge. This," he says, "is still the only reliable way."

Someday soon all diagnosticians may be able to get an electronic readout on valves and rings. And very soon, I learned, they may even be able to look inside your transmission electronically. When that day comes they will be able to do even better than the remarkable job they're doing today. ★★★

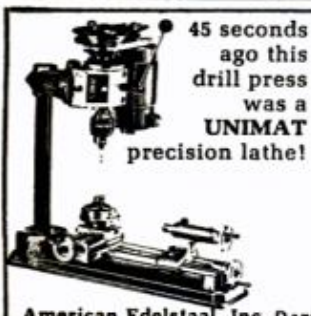
From PM's How-to-Do-It Library:

### Choosing and Using THE RIGHT PAINT

Just published, this 32-page booklet tells all about house paints, protecting metal from rust, spray techniques, handling the new epoxies and cures for moisture problems. Profusely illustrated and detailed.

Get your copy now by sending 50¢ for How-to-Do-It Library Booklet No. H101 to

Popular Mechanics Bureau of Information,  
575 Lexington Ave., New York, N.Y. 10022



45 seconds ago this drill press was a UNIMAT precision lathe!



UNIMAT is a vertical milling machine, surface grinder, polisher too—all in one compact unit. \$139.50! Write for free catalog, or send \$1 for 40 pg. handbook.

American Edelstaal, Inc., Dept. G-H7, 350 Broadway, N.Y.C. 10013

# GIANT



\$2.00

Guaranteed brand - new Gov't. surplus. Durable heavy-duty Neoprene rubber. Easily inflated with vacuum cleaner, auto air hose or fill with

locally available Helium. Fly adv. signs high in sky. Visible for miles—terrific for attracting crowds to Sales, Fairs, Roadside Stands, Sports, Gas Stations, etc. 2' beach-ball size, 5 for \$1 - 4' size, 2 for \$1 - 10' size, \$2 - 16' size, \$5 - 28' size, only \$10. Sorry, no COD's.

NOVEL PRODUCTS CORP.

31 SECOND AVE., DEPT. 209  
NEW YORK, N.Y. 10003



## WATCH IT, SPEEDERS!

(Continued from page 182)

15 feet an extreme case, Marshall says. He recommends officers check a suspect over at least a quarter mile, so that small errors in distance judgment will have virtually no bearing on the speed indicated by the dial.

This also points up another advantage he cites for VASCAR: It measures *average* speed, rather than *peak* speed as is measured by radar or speedometer clocking.

The Indiana State Police Department, which hopes eventually to have every trooper equipped with this device, has set up its own testing program for certifying its officers as qualified operators.

### Police training

A VASCAR-equipped trooper must use the unit to clock consecutively 25 vehicles, at different speeds and in different traffic situations, with no more than a two-mile-an-hour error, to pass the test. Even after passing this test, he must use the unit for 30 days to get additional experience and issue warning tickets only during this period before being allowed to make arrests with the unit. A similar testing program is being used in Arizona.

Before going on patrol, an officer may check the calibration of his unit in just a few minutes using a stopwatch.

First, he must drive his car, with the distance switch turned on, for exactly one-quarter mile. Arizona patrolmen have measured off these distances at convenient places along their patrol areas with steel tapes, then painted white lines on the pavement.

With one-quarter mile of distance in the unit, the officer starts his stopwatch and simultaneously turns on the time switch on the VASCAR unit. At 15 seconds, he stops the watch and turns off the time switch. The unit should indicate exactly 60 mph. If it does not, the cover is removed and an adjustment screw on the governed motor in the unit is turned, then the time measurement is repeated until the unit indicates exactly 60 mph. Additional checks may be made at 30, 45 and 90 mph, using 30, 20 and 10 seconds respectively. When all check out, the unit is calibrated and ready for use.

VASCAR appears destined to join the growing collection of scientific devices at the disposal of the police officer. While such techniques as fingerprinting and ultraviolet photography are used to catch more sophisticated law breakers, VASCAR may become the number one weapon against a growing menace on the nation's highways—the speed violator. ★★

# Bean's Free Fall Catalog

Ready Aug. 15

Hunters, Campers and Fishermen will find many practical items in our fully illustrated Fall Catalog. Shows hunting footwear, clothing and other specialties of interest to both men and women. Many items are of our own manufacture.



L. L. Bean, Inc.

345 Main St., Freeport, Maine 04032

Hunting, Fishing and Camping Specialties

NOT TO BE CONFUSED WITH IMITATION **\$5.95** Not Sold to Calif. or N.Y. res.

PLASTIC MODELS SELLING FOR LESS!!  
22 Cal. Blank Cart. 8 Shot Revolver  
No Permit Required  
Imported from ITALY

**"BLACK VENDETTA"**



Latest model, not a toy. Gun is of solid steel construction. Lightweight and perfectly balanced. Fires 8 rounds in 2 seconds! Double or single action. Precision crafted. 5 1/2 inches long. Ideal for stage, sporting events, boating, protection. Revolver \$5.95, deluxe leather holster \$2.25. Send cash, check or M.O. and save C.O.D. charges. \$1.00 deposit with C.O.D. orders.

BIG THREE ENT. INC. 1109 Sixth Ave., Dept. PM87, N.Y., N.Y. 10036

## TELLS HOW TO SELL YOUR INVENTION

If you have an invention that you believe has merit, write us at once for copy of copyrighted booklet "How to Go About Selling Your Invention." We work with manufacturers, and booklet reveals present markets, qualities of a saleable invention, current royalty rates being paid by manufacturers. Booklet is FREE, is offered to encourage new ideas we might submit to manufacturers. Just send name (no drawings, please) to Kessler Sales Corp., Dept. D-58, Fremont, Ohio 43420

## MINI-DOZER

Does All This & Much More!

- SNOWMOBILE
- BULLDOZER
- LAWNMOWER

— Complete line of Attachments —

CATALOG 50¢ - PLANS & PARTS PRICE LIST \$5.00

G. F. STRUCK CORP. CEDARBURG 1 WISC.



## SAVE ON WOOD

Imported & Domestic



CABINET HARDWARE - VENEERS - TOOLS  
EVERYTHING for the Wood Shop

**New 1967 Catalog Ready!**

OVER 1500 ITEMS at MONEY SAVING PRICES! Finest domestic and imported hardwoods . . . all dimensions. Hardwood veneers. Power tools at discount prices. Hardware, lamp parts, upholstery supplies, mosaic tile. Hard to find inlays, bandings, etc. Get new catalog . . . send name, address and enclose 35¢ to pay postage, handling.

**CRAFTSMAN WOOD SERVICE CO.** Dept. A-87  
2729 S. MARY ST., CHICAGO, ILL. 60608



Powerful, rugged, sleek Northrop  
F5-A "Freedom Fighter"

Powerful.  
Rugged.  
Sleek.  
Lightweight.  
Goes anywhere.

## New CB-21 "REACTOR II"

8-channel Solid State Transceiver

17 transistors and 6 diodes with audio output in excess of 4.0 watts. Dual conversion receiver. Provision for PA or hailing.

\$139.95



**hallicrafters**

A Subsidiary of Northrop Corporation  
5th & Kostner Aves., Chicago, Ill. 60624  
Export: International Div., Canada, Gould Sales Co.

DURO-PLASTIC's new Quick Set  
E. POX·E® Glue, the world's strongest,  
now dries in just 1 hour. Every-  
body else's takes 4. What'll we do  
with those 3 extra hours?



**DURO-PLASTIC**

**WOODHILL**  
CHEMICAL CORPORATION  
CLEVELAND, OHIO 44128

## LIGHTNING—DEADLY AS EVER

(Continued from page 186)

apart, giving the appearance of several ribbons of light. Bead lightning is probably streak lightning with the luminosity of the conductive channel varying enough to make it look like bulbous beads of light strung on a luminous string. Heat lightning occurs on the horizon and is thought to be the reflection of strokes too far away to be directly seen or heard.

Ball lightning, also known as a fireball, is a distinct sort. Eerily glowing orbs generally ranging in size from golf balls to coconuts have been seen to float through windows, pop out of ovens, shoot down chimneys, squeeze through keyholes, and skate along fences and telephone wires.

In one documented case, ball lightning entered the cockpit of a propeller plane, burned off the pilot's eyebrows, and then rolled down the aisle of the passenger compartment, exploding harmlessly in the plane's rear cabin. In another instance, a fireball drifted into an open house window, scorching the frame, then dived into a barrel filled with four gallons of water, sending it into an immediate boil.

Once, scientists shrugged off ball lightning reports with references to optical illusions. Today, some still do. Most don't. "I'm sure ball lightning exists and so are most researchers who have studied the problem," states Dr. Martin Uman, young, lanky physicist at Westinghouse's Research and Development Center in Pittsburgh. "Besides reliable eyewitness reports, there's evidence such as burn marks. But what it is and what causes it are still puzzles. There could be 10 varieties of ball lightning for all we know."

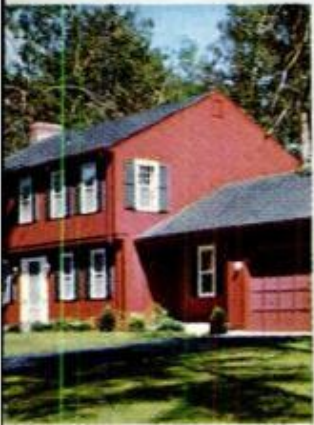
One popular theory explains lightning as a spot where electromagnetic waves caused by a lightning stroke crest together. Energy from these waves heats up and ionizes surrounding air, causing the glowing orb that hovers or darts erratically for its few seconds of life. If the electromagnetic waves suddenly disappear, the ball implodes with a loud report. If they gradually die out, the fireball fades away. This theory—as most others—is grossly inadequate, and today the phenomenon is being explored by several research teams who hope to provide a better explanation.

Yet more researchers are probing deeper into the nature of ordinary lightning. Questions about the frequency of strokes, current flow, charge formation and rate of stroke discharge still pose thorny questions that have experts baffled. Until these stumpers have answers, lightning will remain a beautiful but unchallenged enemy of life and property.

★ ★ ★



This 2 level house and garage were painted 4 years ago. The colors are so bright they look like they were painted last week. That's the superb color retention of Dutch Boy Latex House Paint.



A beautiful house with a beautiful paint job done in 1964. Dutch Boy Latex House Paint makes the difference—200 years of paint-making experience.

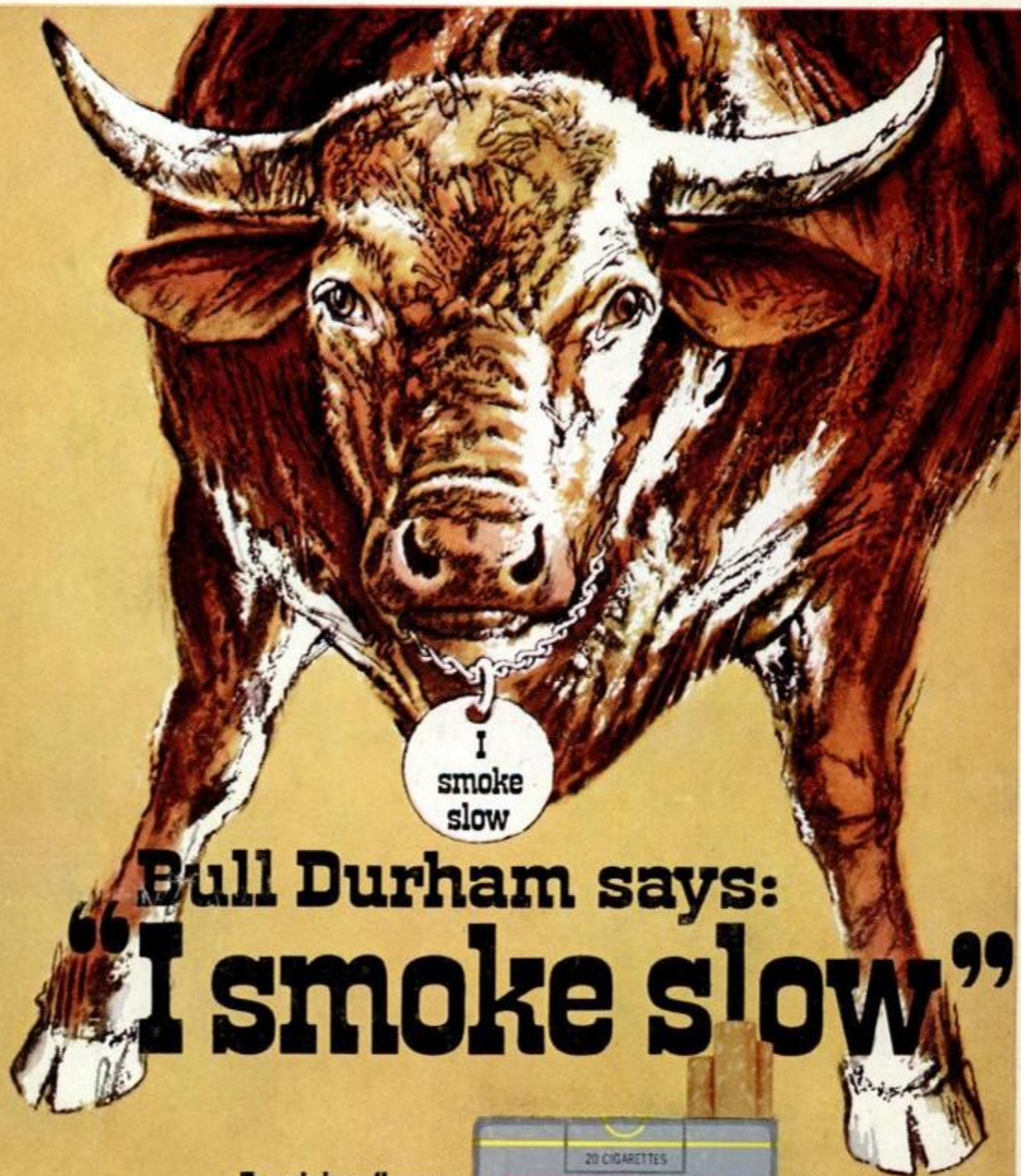
This house? Painted 6 years ago and not one sign of peeling! When used with PBL (Penetrating Bonding Liquid), Dutch Boy Latex House Paint is guaranteed against peeling from a sound previously painted surface for 5 years.



This can has it all! Exclusive formula with 100% pure acrylic latex. Plus 200 years' experience. Plus superior color retention. What more could you want from a paint?

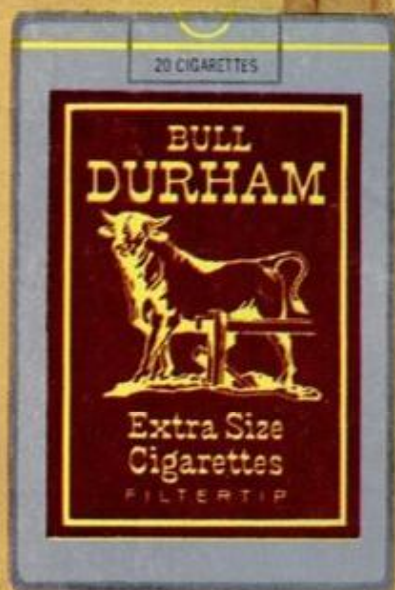
**All Latex House Paints  
are not the same.  
Dutch Boy<sup>®</sup>  
makes the difference.**





**Bull Durham says:  
"I smoke slow"**

For richer flavor.  
New Bull Durham's  
ready rolled. Filter tipped.  
Thicker. Made extra size  
to smoke extra slow.  
The slower the smoke,  
the better the taste.



*© The American Tobacco Company*