

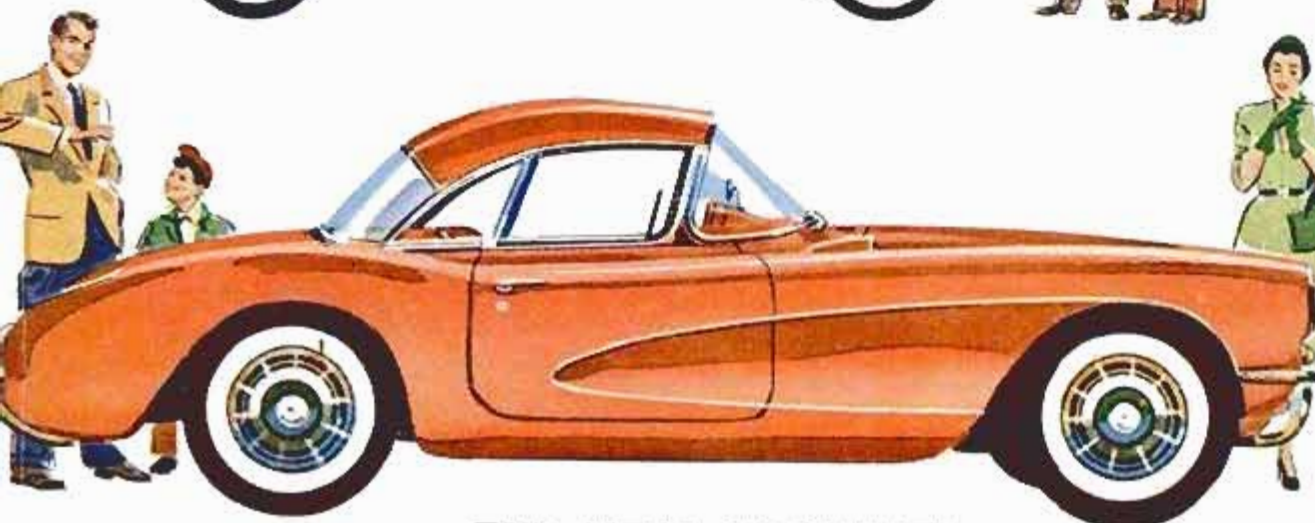
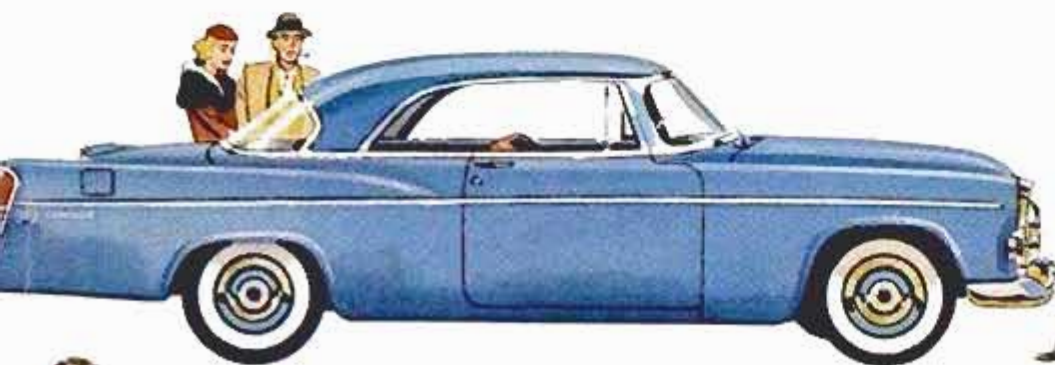
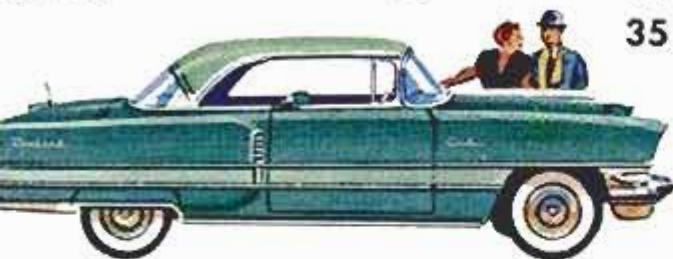
POPULAR MECHANICS

MAGAZINE

WRITTEN SO YOU CAN UNDERSTAND

**49-PAGE SPECIAL
AUTO
SECTION**

FEB. 1956
35 CENTS



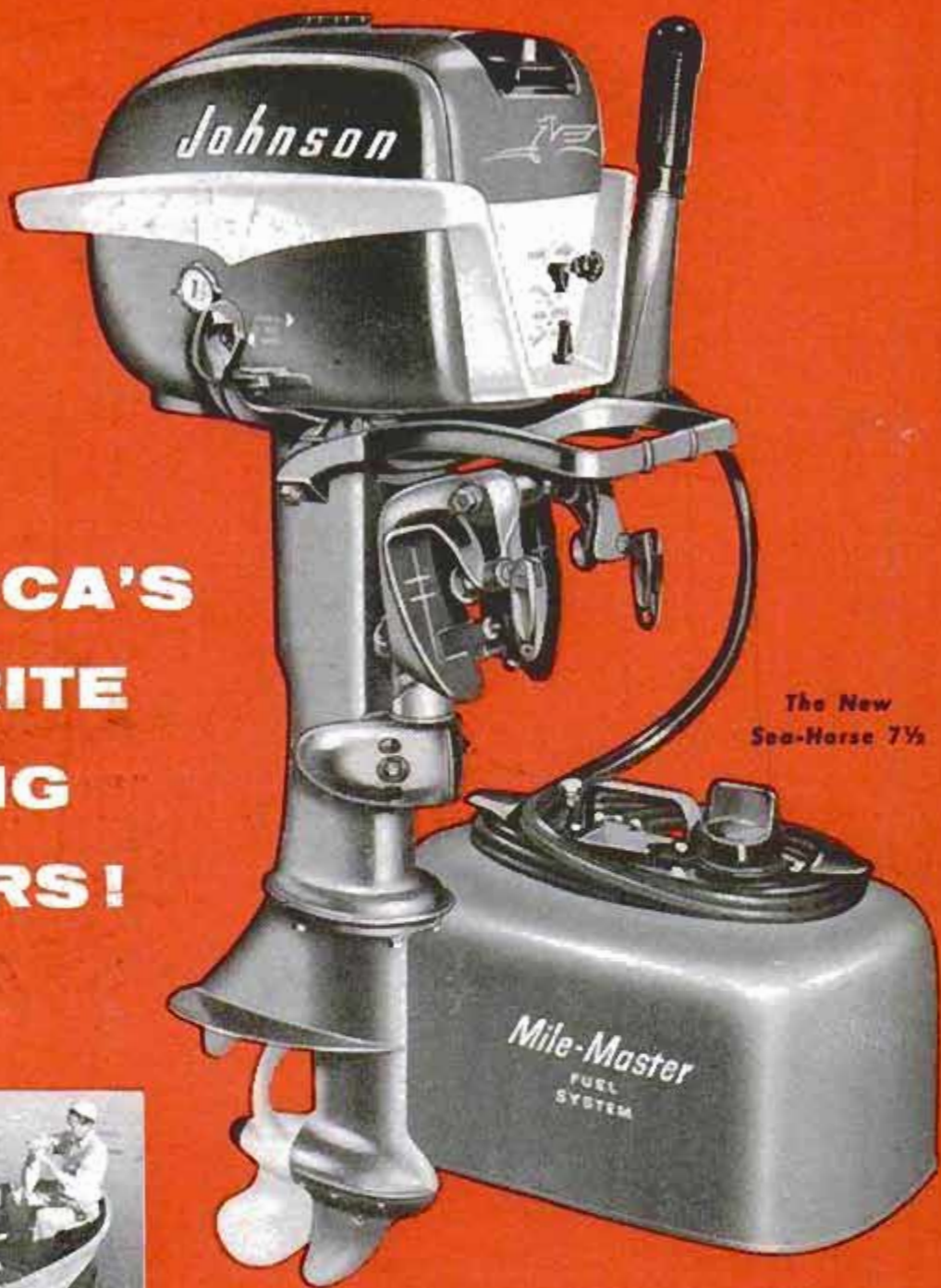
ALL ABOUT THE '56 MODELS

World's leading **SPORTS CARS**
in full color . . . How to win a
stock-car championship

**WHY DO PEOPLE BUY
THE CARS THEY DO?**

BONUS!
HANDY INSERT
for your wallet -
Specification Chart
of all '56 cars

**AMERICA'S
FAVORITE
FISHING
MOTORS!**



The New
Sea-Horse 7 1/2



JAVELIN®	30 hp ..	\$582.00
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*Electric Starting... Prices f.o.b. factory, subject to change... Mile Master Fuel System included with all models except the "3"... OBC certified brake hp at 4000 rpm (30's at 4500).

More fishermen use Johnson Sea-Horse outboard motors than any other make. Because they are **DEPENDABLE**... Now **NINE** models—from 3 to 30 hp—all styled in beautiful Holiday Bronze! See your Johnson Dealer. Look for his name under "Outboard Motors" in your classified telephone directory.

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A DIVISION OF OUTBOARD, MARINE & MANUFACTURING COMPANY
In Canada: Manufactured by Johnson Motors, Peterborough

Johnson
SEA-HORSES
FOR DEPENDABILITY

PACKED WITH POWER
...and ready to prove it!



The secret of Pontiac's *blazing go* is in the teamwork of *two* engineering masterpieces . . . the mighty Strato-Streak V-8 . . . and the revolutionary new Strato-Flight Hydra-Matic*!

It's the sort of power and go you dream about. But this time it's real.

Behind the wheel of the flashing '56 Pontiac you command an engine virtually alive with spirit . . . and a terrific urge to be on the move. A cubic displacement of 316.6 inches gives you terrific take-off! A whopping big 8.9 to 1 compression ratio squeezes the last ounce of *go* out of every drop of gas. *That's power . . . blazing 227 horsepower!*

You purr along peacefully, completely unaware of the other half of Pontiac's great power team . . . the fluid-smooth Strato-Flight Hydra-Matic. There's perfect harmony here (it was carefully engineered that way) . . . for this great new automatic transmission takes the tremendous thrust from the engine and utilizes every ounce of it, passing it on, smooth as silk, to the rear wheels. An amazing new controlled fluid coupling combined with the efficiency of gears does the trick!

Test the flashing new '56 Pontiac yourself. But hold on to your hat, you'll be piloting the greatest "go team" on wheels.

**An extra cost option.*


PONTIAC

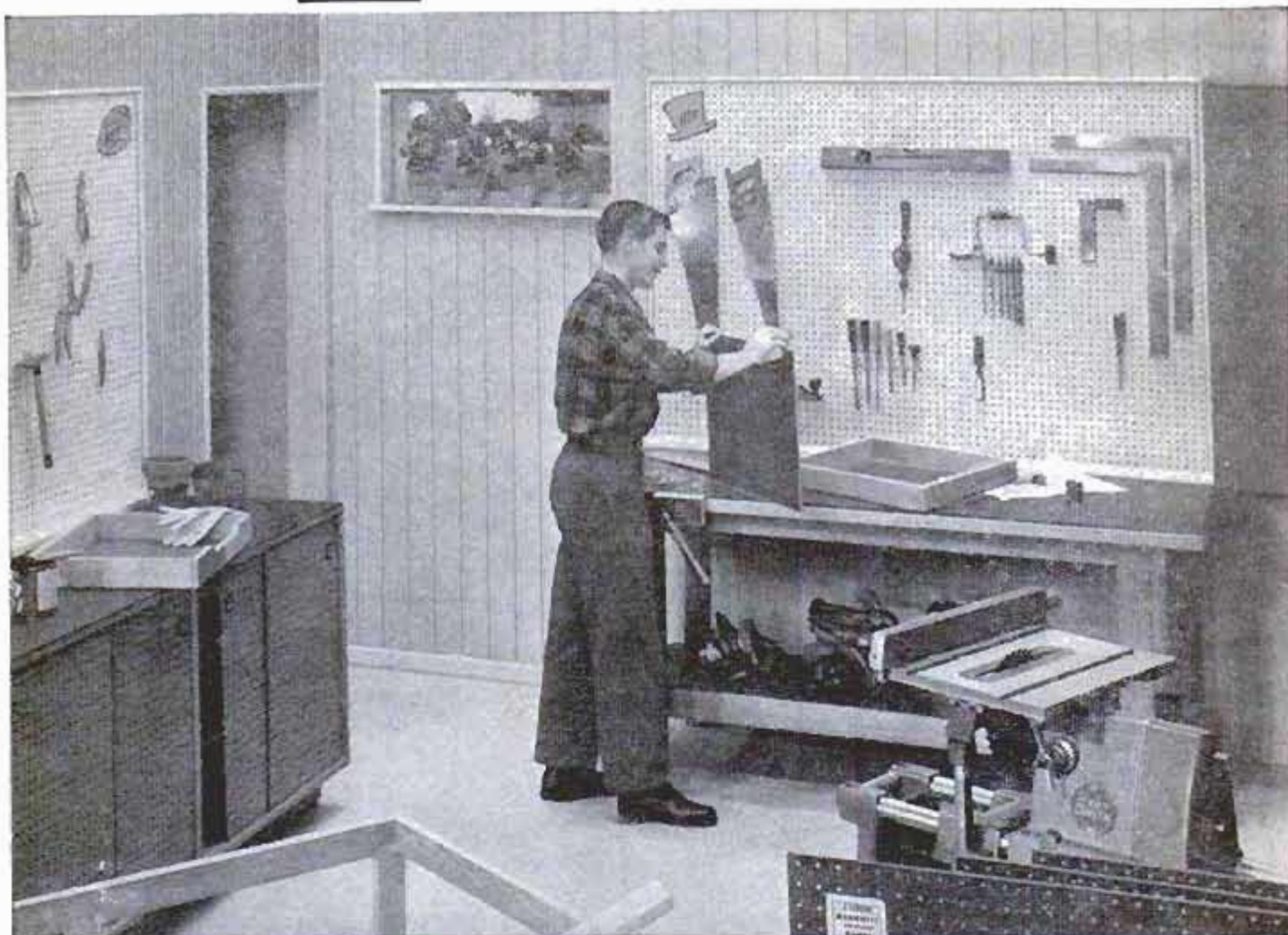
This One



F6DZ-KY3-NL2B

and the price won't stop you!

Look for  the man who makes the difference



Build This "His and Hers" Workshop— Free Plans from Masonite Show How

A workbench that the beginner will find easy to build...and will please the most experienced wood craftsman.

A separate area for the lady of the house. A place where she can putter with plants and paint the projects she makes.

Everywhere—plenty of storage room. For most-used tools. For once-in-awhile supplies.

That's just an introduction to the brand new plan for a "His and Hers" workshop, now available without charge. It's jam-packed with ideas, including applications of Masonite Presdwood®. This sturdy, smooth

and grainless panel material is economical, durable and easy to work with.

The tough, dent-resisting, splinter-free bench top and cabinets are Tempered Presdwood. The Masonite® Peg-Board* panel that keeps tools at your finger tips is a Presdwood product, too. Even the wall shown here is a Presdwood product—Masonite Panelgroove, the low-cost, high-style panel that goes up quickly.

For any project that calls for a panel, ask your lumber dealer which Presdwood to use.

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*Reg. T. M. U. S. Pat. Off. B. B. Butler Mfg. Co., Inc.



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H. H. WINDSOR, JR., Editor and Publisher



Next Month

ONE OF THE MOST dramatic weapons of the postwar years is the Terrier guided missile pictured above. This ground-to-air missile, which rides a radar beam to its target high in the sky, is the principal armament on the Navy's two new guided-missile cruisers, the rebuilt USS *Boston* and USS *Cannberra*. As these vessels join the Fleet, a whole new concept of naval strategy is in the making. When searching radars pick up unknown planes far over the horizon, electronic instruments take over and launch the Terrier. Enemy planes in the radar beam will be destroyed in the time it would take a World War II lookout to pass the word: "Bogey at three o'clock!" In the March issue, a Navy commander gives an exciting account on how "Guided Missiles Go to Sea"

Information not listed on articles in the index, starting on page 106, frequently is listed in the WHERE-TO-FIND-IT LIST, which is available to readers without charge. A copy may be obtained by writing to the Bureau of Information, Popular Mechanics, 200 E. Ontario, Chicago 11, Ill.

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Volume 105

FEBRUARY 1956

Number 2

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SPECIAL
AUTO
SECTION

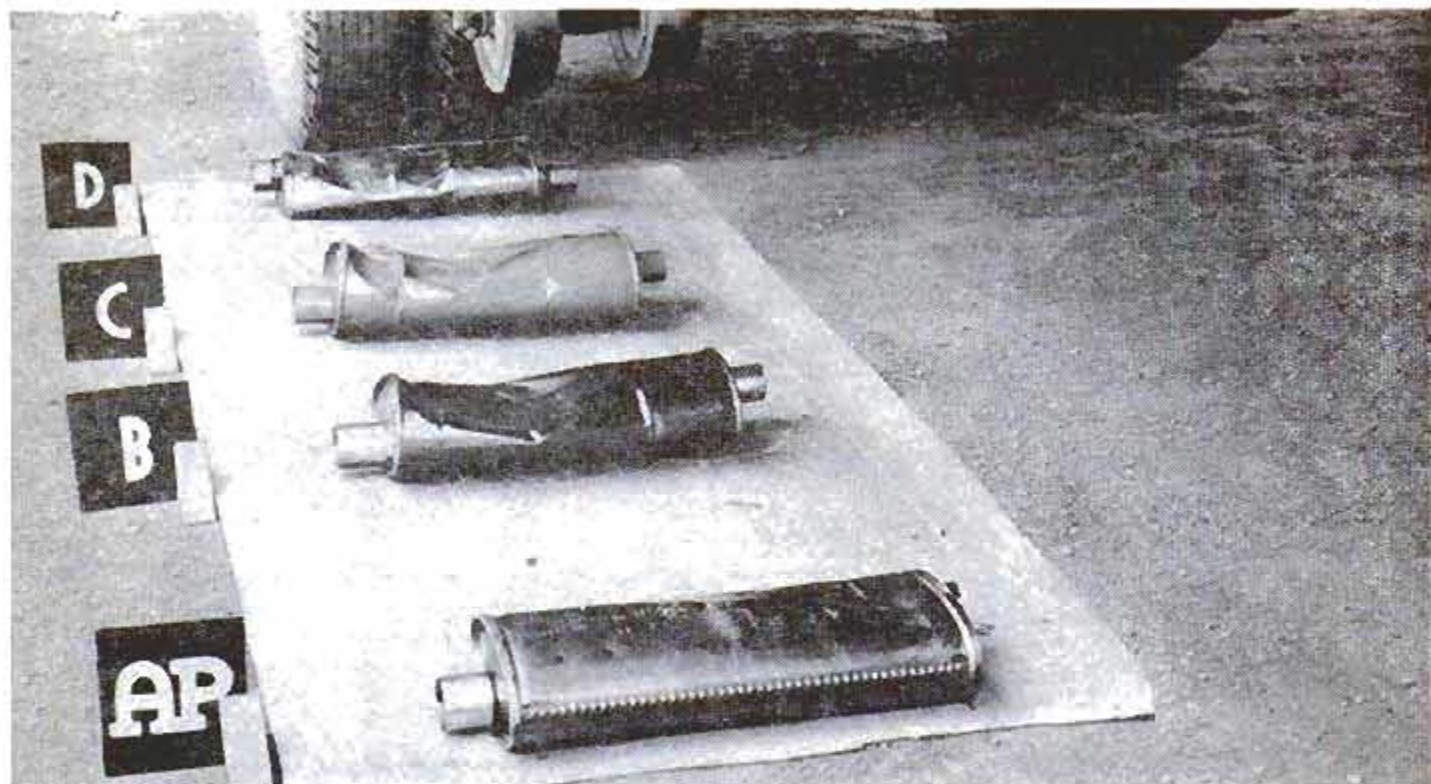
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for other items and manufacturers of available products



In recent comparative tests made by Motor Vehicle Research, the AP passenger car muffler (foreground) withstood this crushing 4720 lb. wheel load far better than other leading makes.

AP MUFFLERS WILL GIVE YOUR CAR MORE POWER MORE GAS MILEAGE... LAST $\frac{1}{3}$ LONGER

Dual exhaust systems are being featured this year by the big majority of car manufacturers on their new models. Without them they couldn't deliver their increased power, because powerful engines put tremendous demands on mufflers. This fact points up the vital need of having the best muffler on the market—especially if your car has only one muffler. The dramatic tests illustrated on this page were made by Motor Vehicle Research, an independent testing laboratory. They recently won AP the coveted MVR "Certified Test Award" and help explain why AP, at no extra cost, is your best buy.

An ordinary muffler builds up excessive back pressure—puts a strain on an engine—and robs you of horsepower, gas mileage, pick-up and acceleration. It will even cancel out the effects of a motor tune-up and all the high-test gasoline you buy.

The advance-design AP muffler has up to 40% heavier steels, lasts $\frac{1}{3}$ longer. Its superb inner construction makes it practically clogproof. AP's patented double "Air Liner" shell creates sound-deadening chambers that insulate against both heat and noise. You can count on this muffler to give you the power, silence, mileage and longer life you want—plus better protection against carbon monoxide gas.

Make sure you get AP, the longer-lasting muffler. See the AP Muffler Specialist in your neighborhood today. You'll find him a good friend to your car.

THE AP PARTS CORPORATION

14-O AP Building, Toledo 1, Ohio

Mufflers and Pipes •  Miracle Power • dgf 123



The AP and its 3 leading competitive makes have been soaked in corrosive acid like that found in actual operation. Compare the results!



The big trend to dual exhaust systems to prevent engine-stifling back pressure proves the need of the AP muffler for single systems.



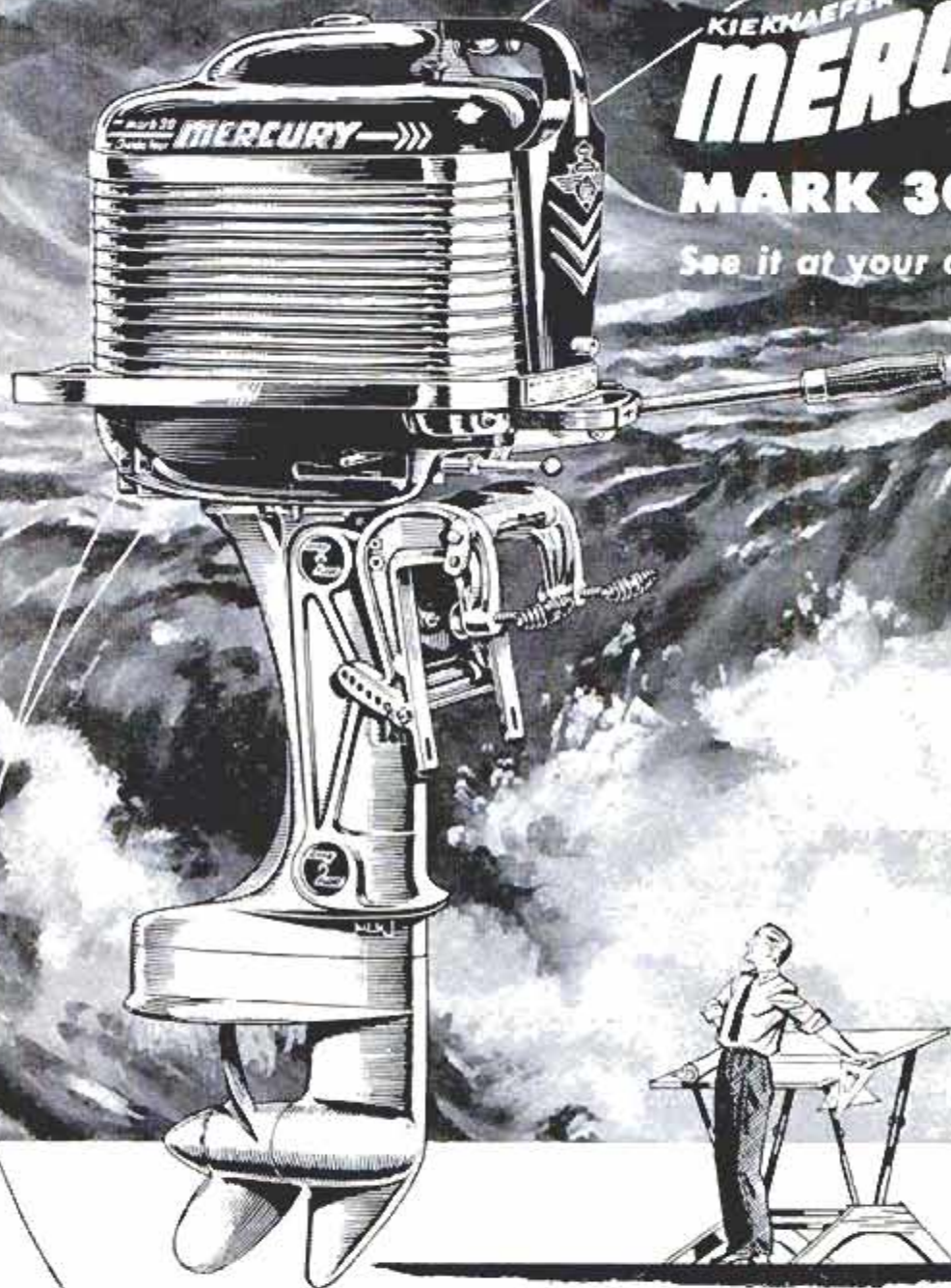
See your AP Muffler Specialist today. He will TAP, LOOK and LISTEN for signs of power loss and leaking carbon monoxide gas.

NEW! *the motor you asked for...*

KIEKHAEFER
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MARK 30 turbo 4

See it at your dealer's now!



A 30 h.p. Alternate Four, weighing only 110 lbs. . . the exclusive Mercury carrying handles actually make it seem lighter . . . available with 12-volt electric starter and generator . . . all the quality Mercury features.

Proved by years of brutal field testing, backed by experience only Mercury has from building more than two million horsepower of famous 4 cylinder Thunderbolt engines! The finest, smoothest, most powerful engine in its class . . . fully qualified to wear the Mercury trade mark.

MERCURY . . . THE MOST POWERFUL NAME IN OUTBOARDS
REMEMBER . . . A FOUR IS BOUND TO BE BETTER

6½ gal. remote fuel tank
standard equipment

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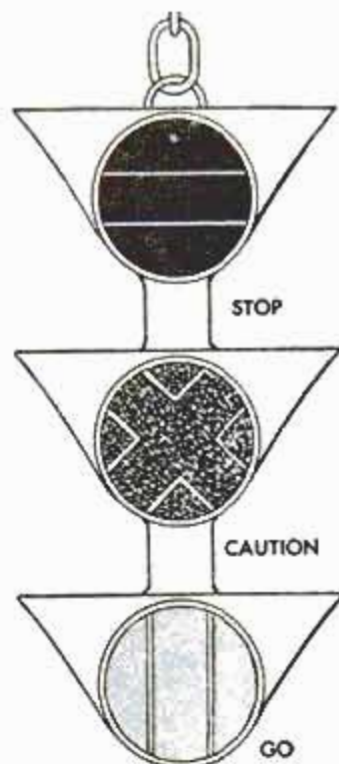
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ACROSS THE DESK



To the Editor:

There are a great many partially color-blind people in the country who can't pass the driver's color test but could drive safely, if the plain signal lights were changed to bar lights, as shown in the accompanying drawing. This would make it possible for any driver, color-blind or with perfect eyes to observe the signals.



The signal lights should be of larger diameter and have the two parallel bars in different directions to be of the greatest value. A circle of light would be a help to distinguish them from surrounding lights.

See accompanying drawing.

The stop light (red) should have two parallel bars running horizontally.

The caution (amber) should have two parallel bars running diagonally.

The go light (green) should have two parallel bars running vertically.

W. G. Fletcher, M.E.,
218 Linwood Ave.,
Bogota, N. J.

Correction

An account in our December issue describing a "mobile animal clinic" of New York's Speyer Hospital erred in stating that the "ambulance" cost \$84,000. Speyer Hospital authorities state that the truck cost about \$9000 and is not an emergency unit to be called by individuals but gives a regular service through several youth organizations.

Tidings from "Down Under"

I wish to express my appreciation of your fine publication which, among other things, keeps me informed ahead of progress in various industries . . . often ahead of the

(Continued to page 8)

GOOD SALARY

FINE CAR

**To the man who wants to enjoy
an ACCOUNTANT'S CAREER**

A NICE HOME

BANK ACCOUNT

FREE SAMPLE LESSON

IF you're that man, here's something that will interest you.

Not a magic formula—not a get-rich-quick scheme—but something more substantial, more practical.

Of course, you need something more than just the desire to be an accountant. You've got to pay the price—be willing to study earnestly, thoroughly.

Still, wouldn't it be worth your while to sacrifice some of your leisure in favor of interesting home study—over a comparatively brief period? Always provided that the rewards were good—a salary of \$4,000 to \$10,000 and up?

An accountant's duties are interesting, varied and of real worth to his employers. He has *standing!*

Do you feel that such things aren't for you? Well, don't be too sure. Very possibly they *can* be!

Why not, like so many before you, investigate LaSalle's modern Problem Method of training for an accountancy position?

Just suppose you were permitted to work in an accounting firm under the personal supervision of an expert accountant. Suppose, with his aid, you studied accounting principles and solved problems day by day—easy ones at first—then more difficult ones. If you could do this—and could turn to him for advice as the problems became complex—soon you'd master them all.

That's the training you follow in principle under the LaSalle Problem Method.

**Over 4,200 Certified
Public Accountants among
LaSalle alumni**

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You cover accountancy from Basic Accounting right through Accounting Systems and Income Tax Procedure. As you go along, you absorb the principles of General Accounting, Auditing and Basic Cost Accounting. Then you may choose Commercial Accounting, Industrial Accounting or Public Accounting and prepare for the C. P. A. examinations.

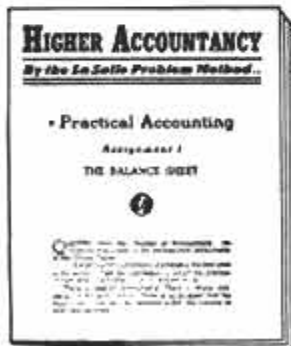
Your progress is as speedy as you care to make it—depending on your own eagerness to learn and the time you spend in study.

Will recognition come? The only answer, as you know, is that success *does* come to the man who is really *trained*. It's possible your employers will notice your improvement in a very few weeks or months. Indeed, many LaSalle graduates have paid for their training—with increased earnings—before they have completed it! For accountants, who are trained in organization and management, are the executives of the future.

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Address.....

City, Zone & State.....



(Continued from page 6)

daily newspapers. I find often I am in possession of information from *Popular Mechanics* that is unique in my group of friends (except a couple who also subscribe).

Secondly, I thought you may be interested in my 1928 Chrysler which, according to American standards, is almost a vintage car. It is still as sound as a bell and can haul both long distances and heavy loads. I can cart about 15 cwt. of sand with ease (for terracing my new home) and I recently completed a 550-mile tour of the southwest on all sorts of roads with no more trouble than a broken fan belt—average speed 30 to 35 (you see the country better, also less rattles), average consumption of petrol 26 m.p.g., Australian measure. Current market price of a job like mine is about 50 pounds Australian, but I wouldn't sell; she's good for years yet and it's very handy for me.

R. Clark,
41 Pier St.,
E. Fremantle,
West Australia

To the Editor:

We wish to point out a correction on your article "Across Four Continents on Two Cylinders" by Jacques Cornet in your

December 1955 issue, centering on the remark: "at Tehuantepec we ran out of hard-surface highway and never saw any again until Oran, 20,000 miles later."

The Pan American Highway from Tumbes to Nazca, which is the stretch they took along the Peruvian coast, the highway from Santos to Rio de Janeiro and the road from Bahia Blanca to Buenos Aires are all very well asphalted and can compare favorably with the best of American highways. The combined mileages of the above mentioned highways is about 2000 miles and we are quite sure we have missed quite a few other good highways in South America.

Adrian Reti (Argentina),
Geraldo Abdo (Brazil),
Allen Novak (Peru),
Alberto Velaochaga (Peru),
Alberto Dumas (Argentina),
Massachusetts Institute of Technology,
Cambridge, Mass.

To the Editor:

On page 138 of the December issue it is stated that the *Graf Spee* was sunk by British warships. I think you will find that after running battle with the British warships *Ajax*, *Achilles* and *Exeter*, the *Graf Spee* took refuge in Montevideo harbor.

(Continued to page 20)

New greaseless way to keep your hair neat all day



TV sportscaster Bud Palmer and friend

Prevents dry, unruly
"gorilla hair"

New Vitalis keeps hair in place and prevents dryness with V-7, the *greaseless* grooming discovery.

You never have an overslick, plastered-down look. Try it. You'll like it.



ANOTHER FINE PRODUCT
OF BRISTOL-MYERS

New VITALIS® Hair Tonic with V-7®

POPULAR MECHANICS



When the other kids ask...

WHAT DOES YOUR DAD DO?

How does your boy answer them?

Sure... you're his hero. You *know* that. But sometimes it can get kinda tough if the other kids don't seem to understand about the "old man."

It's not that you *like* to be chained to the same old job. Maybe you just *had* to leave school too soon. Maybe the war inter-

fered. Anyway, here you are, stuck because you just don't have enough formal training.

Well, Mister, You Can Still Make the Grade!

It isn't easy. You've got to have grit and determination and the will to succeed. As long as you have

these, I.C.S. can put you on the road to real prestige, advancement and security. Your family can really be proud of you!

Spare-time I.C.S. Study Pays Off!

I.C.S. gives you practical, dollars-and-sense training — the kind that pays off. You choose from 277 courses. You get personalized, sympathetic guidance. You advance as rapidly as your time and ability permit. Does it work? Thomas Dyke was a coal miner with no high school education. He studied with I.C.S., worked his way up to licensed engineer. Today, his income is above the average for college trained engineers. *And this kind of training can work for you!*

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A gold mine of helpful job tips.

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Blueprints</p> <p>ART</p> <p><input type="checkbox"/> Cartooning</p> <p><input type="checkbox"/> Commercial Art</p> <p><input type="checkbox"/> Fashion Illustrating</p> <p><input type="checkbox"/> Magazine Illustrating</p> <p><input type="checkbox"/> Show Card and Sign Lettering</p> <p><input type="checkbox"/> Sketching and Painting</p> <p>AUTOMOTIVE</p> <p><input type="checkbox"/> Auto Body Rebuilding</p> <p><input type="checkbox"/> Auto Elec. Technician</p> <p><input type="checkbox"/> Auto-Engine Tune Up</p> <p><input type="checkbox"/> Automobile</p>	<p>AVIATION</p> <p><input type="checkbox"/> Aeronautical Engineering Jr.</p> <p><input type="checkbox"/> Aircraft & Engine Mechanic</p> <p>BUSINESS</p> <p><input type="checkbox"/> Advertising</p> <p><input type="checkbox"/> Bookkeeping and Accounting</p> <p><input type="checkbox"/> Business Administration</p> <p><input type="checkbox"/> Business Correspondence</p> <p><input type="checkbox"/> Public Accounting</p> <p><input type="checkbox"/> Creative Salesmanship</p> <p><input type="checkbox"/> Federal Tax</p> <p><input type="checkbox"/> Letter-writing Improvement</p> <p><input type="checkbox"/> Office Management</p> <p><input type="checkbox"/> Professional Secretary</p> <p><input type="checkbox"/> Retail Business Management</p> <p><input type="checkbox"/> Sales Management</p> <p><input type="checkbox"/> Stenographic-Secretarial</p> <p><input type="checkbox"/> Traffic Management</p> <p>CHEMISTRY</p> <p><input type="checkbox"/> Analytical Chemistry</p> <p><input type="checkbox"/> Chemical Engineering</p> <p><input type="checkbox"/> Chem. Lab. Technician</p> <p><input type="checkbox"/> General Chemistry</p> <p><input type="checkbox"/> Natural Gas Prod. & Trans.</p> <p><input type="checkbox"/> Petroleum Engineering</p> <p><input type="checkbox"/> Plastics</p> <p><input type="checkbox"/> Pulp and Paper Making</p>	<p>CIVIL, STRUCTURAL ENGINEERING</p> <p><input type="checkbox"/> Civil Engineering</p> <p><input type="checkbox"/> Construction Engineering</p> <p><input type="checkbox"/> Highway Engineering</p> <p><input type="checkbox"/> Reading Struct. Blueprints</p> <p><input type="checkbox"/> Sanitary Engineering</p> <p><input type="checkbox"/> Structural Engineering</p> <p><input type="checkbox"/> Surveying and Mapping</p> <p>DRAFTING</p> <p><input type="checkbox"/> Aircraft Drafting</p> <p><input type="checkbox"/> Architectural Drafting</p> <p><input type="checkbox"/> Electrical Drafting</p> <p><input type="checkbox"/> Mechanical Drafting</p> <p><input type="checkbox"/> Mine Surveying and Mapping</p> <p><input type="checkbox"/> Plumbing Drawing and Estimating</p> <p><input type="checkbox"/> Structural Drafting</p> <p>ELECTRICAL</p> <p><input type="checkbox"/> Electrical Engineering</p> <p><input type="checkbox"/> Electrical Maintenance</p> <p><input type="checkbox"/> Electrician <input type="checkbox"/> Contracting</p> <p><input type="checkbox"/> Lineman</p> <p>HIGH SCHOOL</p> <p><input type="checkbox"/> Commercial <input type="checkbox"/> Good English</p> <p><input type="checkbox"/> High School Subjects</p> <p><input type="checkbox"/> Mathematics</p>	<p>LEADERSHIP</p> <p><input type="checkbox"/> Foremanship</p> <p><input type="checkbox"/> Industrial Supervision</p> <p><input type="checkbox"/> Leadership and Organization</p> <p><input type="checkbox"/> Personnel-Labor Relations</p> <p>MECHANICAL AND SHOP</p> <p><input type="checkbox"/> Gas—Electric Welding</p> <p><input type="checkbox"/> Heat Treatment <input type="checkbox"/> Metallurgy</p> <p><input type="checkbox"/> Industrial Engineering</p> <p><input type="checkbox"/> Industrial Instrumentation</p> <p><input type="checkbox"/> Industrial Supervision</p> <p><input type="checkbox"/> Internal Combustion Engines</p> <p><input type="checkbox"/> Machine Design-Drafting</p> <p><input type="checkbox"/> Machine Shop Inspection</p> <p><input type="checkbox"/> Machine Shop Practice</p> <p><input type="checkbox"/> Mechanical Engineering</p> <p><input type="checkbox"/> Quality Control</p> <p><input type="checkbox"/> Reading Shop Blueprints</p> <p><input type="checkbox"/> Refrigeration</p> <p><input type="checkbox"/> Sheet Metal Worker</p> <p><input type="checkbox"/> Tool Design <input type="checkbox"/> Toolmaking</p> <p>RADIO, TELEVISION</p> <p><input type="checkbox"/> Industrial Electronics</p> <p><input type="checkbox"/> Practical Radio TV Eng'ng</p> <p><input type="checkbox"/> Radio and TV Servicing</p> <p><input type="checkbox"/> Radio Operating</p>	<p><input type="checkbox"/> Television Technician</p> <p>RAILROAD</p> <p><input type="checkbox"/> Air Brakes <input type="checkbox"/> Car Inspector</p> <p><input type="checkbox"/> Diesel Locomotive</p> <p><input type="checkbox"/> Locomotive Engineer</p> <p><input type="checkbox"/> Section Foreman</p> <p>STEAM AND DIESEL POWER</p> <p><input type="checkbox"/> Combustion Engineering</p> <p><input type="checkbox"/> Diesel—Elec. <input type="checkbox"/> Diesel Eng's</p> <p><input type="checkbox"/> Electric Light and Power</p> <p><input type="checkbox"/> Stationary Fireman</p> <p><input type="checkbox"/> Stationary Steam Engineering</p> <p>TEXTILE</p> <p><input type="checkbox"/> Carding and Spinning</p> <p><input type="checkbox"/> Cotton, Rayon, Woolen Mfg.</p> <p><input type="checkbox"/> Finishing and Dyeing</p> <p><input type="checkbox"/> Loom Fix'g <input type="checkbox"/> Textile Des'ing</p> <p><input type="checkbox"/> Textile Eng'g <input type="checkbox"/> Throwing</p> <p><input type="checkbox"/> Warping and Weaving</p> <p>MISCELLANEOUS</p> <p><input type="checkbox"/> Domestic Refrigeration</p> <p><input type="checkbox"/> Marine Engineering</p> <p><input type="checkbox"/> Ocean Navigation</p> <p><input type="checkbox"/> Professional Engineering</p> <p><input type="checkbox"/> Short Story Writing</p> <p><input type="checkbox"/> Telephony</p>
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Name _____ Age _____ Home Address _____

City _____ Zone _____ State _____ Working Hours _____ A.M. to P.M. _____

Occupation _____

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

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As part of my Communications Course I send you parts to build low-power Broadcasting Transmitter at left, and other equipment. Use it to get practical experience. You put this station "on the air," perform procedures demanded of station operators. An FCC Commercial Operator's License can be your ticket to a bright future. My Course trains you to get your license. Mail Coupon now!



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Television now reaches from coast-to-coast. More than 25 million Television sets are already in use and require servicing: thousands more sets are being sold every week. About 200 TV stations are now on the air with hundreds more being built. This means new jobs, more jobs, better pay for trained men. The time to act is NOW! Start learning Radio-Television servicing or communications.

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Nothing takes the place of PRACTICAL EXPERIENCE. NRI training is based on LEARNING BY DOING. You use parts I send to build many circuits common to Radio and TV. You build the modern radio at right. Use Multi-tester you build to make money fixing sets. Many students make \$10, \$15 a week extra fixing neighbors' sets in spare time, starting soon after enrolling. All equipment I send is yours to keep.



I Trained these Men at Home



Thanks
NRI for
Wonderful
Start

"Right now I am doing spare-time repairs on radios and television. In the near future I intend to go into full-time servicing."—C. Higgins, Waltham, Mass.



Switched
from Studio
Work to
Service

"I switched from studio work and am now holding a position as TV service technician. Enjoy my work more and more."—Norman Ward, Ridgefield Park, N. J.



Paid for
Course
Before
Graduation

"By the time I graduated I had paid for my course, a car and testing equipment. Can service toughest jobs."—E. J. Streitemberger, New Boston, Ohio.



\$10 to \$15
Week
Spare Time

"Four months after enrolling, was able to service Radios . . . averaged \$10 to \$15 a week spare time. Now have full time business."—W. Weyde, Brooklyn, N. Y.



Employed as
Transmitter
Operator

"A former employer recommended NRI training to me. Now employed as transmitter operator in Harrisburg."—Albert Herr, New Cumberland, Penna.

AT HOME for Good Jobs in TELEVISION

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DO YOU want good pay, a job with a bright future, security? Would you like to have a profitable business of your own? If so, find out how you can realize your ambition in the fast-growing RADIO-TELEVISION industry. Even without Television, the industry is bigger than ever before. Just think, over 115 million home and auto Radios, 3000 Radio Broadcasting Stations, plus 25 million Television sets and about 200 Television Broadcasting Stations. Expanding use of Aviation and Police Radio, Micro-wave Relay, Two-way Radio for busses, taxis etc., are making opportunities for Servicing and Communications technicians and FCC Licensed Operators.

Find Out What Radio-Television Offers You

What will YOU be doing one year from today? Decide now that you are going to know more and earn more. **ACT NOW.** Send the coupon below NOW for my **FREE DOUBLE OFFER.** You get Actual Servicing Lesson. Also my 64-page Book, "How to Be a Success in Radio-Television." Read what my graduates are doing, earning, see equipment you practice with at home. Mail coupon now. Send in envelope or paste on postal. J. E. SMITH, President, Dept. 6BA, National Radio Institute, Washington 9, D. C. Our 40th Year.

NRI Training Leads to These Jobs in RADIO-TELEVISION

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Chief Technician
Chief Operator
Power Monitor
Recording Operator | GOVERNMENT RADIO
Operator in Army, Navy, Marine Corps
Always Operator
Forestry Dispatcher |
| SERVICING
Home and Auto Radios
Television Receivers
P.A. Systems | AVIATION RADIO
Transmitter Technician
Airport Transmitter Operator |
| MANUFACTURING
Design Technician
Service Manager
Tester
Research Assistant | TELEVISION
Pick-up Operator
Television Technician
Remote Control Operator
Service and Maintenance Technician |
| SHIP AND HARBOR RADIO
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My Training Includes Television

You get practical experience by working on circuits common to both Radio and Television. My graduates are filling jobs, making good money in both Radio and Television. Many NRI trained men start their own Radio and Television servicing business with capital earned in spare time. Let me show you how you can be your own boss; earn \$10 to \$15 a week extra even while still learning. Now is the time to get ready for success in Radio-Television. Coupon below brings you Actual Lesson and 64-page book.

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The ABC's of SERVICING

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MR. J. E. SMITH, President, Dept. 6BA
National Radio Institute, Washington 9, D. C.

Mail me Sample Lesson and 64-page Book, FREE. (No salesman will call. Please write plainly.)

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VETS write in date of discharge

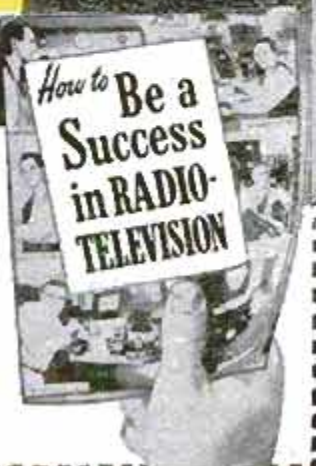
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Chief Engineer with Station

"I received my License and worked on ships. Am Chief Engineer at WARA, Attleboro, Mass. I am grateful to NRI for preparing me for this position."—R. D. Arnold, Rumford, R. I.

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The AEROMAT fountain spray attaches to your garden hose—washes your car in minutes. 3-foot telescope handle. Special built-in suds chamber. Detergent supplied. Soft, silky Durostyrene brush head. Sold for up to \$5—**NOW 99c.** Order by No. 444.



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Please rush me the items listed below on 5-day free home trial. I must be absolutely satisfied with the merchandise or I will return it in 5 days for full refund. Payment enclosed. Send prepaid. Send C.O.D. I'll pay charges. (NOTE: C.O.D.'s sent ONLY on orders for 2.99 or more.)

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ADDRESS _____

CITY _____ STATE _____



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Learn how to protect your invention. The U. S. Patent Laws provide that any new and useful art, machine, article of manufacture, or composition of matter, or any new and useful improvement thereof, may be patented if the act of invention is involved. Therefore, every inventor with a valuable invention should take advantage of the Patent Laws and proceed for patent protection in order to safeguard his rights.

A patent gives the inventor the exclusive right to prevent others from making, using, or selling the invention claimed in the patent for a period of seventeen years.

The Patent Laws were enacted for the benefit of the inventor to give him protection for the features of his invention which are patentable. These features must be properly and concisely set forth and claimed in a formal application for patent, in order to comply with the requirements of the Patent Laws. For that reason, unless the inventor is familiar with patent matters, he should engage a competent registered patent attorney or agent to represent him. We are registered to practice before the U. S. Patent Office and are prepared to serve you in the handling of your patent matters.

A specially prepared booklet entitled "Patent Guide for the Inventor", containing detailed information with respect to patent protection and procedure, together with a "Record of Invention" form will be promptly forwarded to you without obligation upon request.

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Registered Patent Attorneys

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"OWN a Business" CouponStart Now . . .
while employed**DURACLEAN CO., 6-162 Duraclean Bldg., Deerfield, Ill., U.S.A.**

Without obligation to me, send booklet and letter giving full details. Tell me how I may OWN a growing business of my own built upon satisfied customers.

Name _____

Address _____

City _____

Zone _____ State _____



Are You The Man?

If you have longed for the prestige and financial independence of YOUR OWN business, you can now realize this desire . . . if you can qualify for a Duraclean dealership. We are now enlarging this 26-year-old chain of independently-owned service dealerships which has rapidly grown to a world-wide service.

You must however be reliable, honest, diligent, and able to make a small investment in a business of your own . . . a profession for which we will personally and quickly train you. If needed, we will help finance you.

We want to assure your success. A Duraclean dealer will train and assist you. He'll reveal his successful plan of building customers. He will work with you. This business is easy to learn . . . quickly established.

This is a sound, lifetime business that grows from REPEAT ORDERS and customer RECOMMENDATIONS. Alert dealers can gross an hourly profit of \$5.00 on own service plus \$3.00 on EACH service man at National Price Guide charges. Mail coupon today for full details.

You are Trained in a New Profession . . . to Revive, Clean, Protect Home Furnishings

You have the opportunity to steadily increase the income for your family month after month and year after year without waiting for a raise. Duraclean dealers enjoy unusual profit on both materials and labor . . . after paying servicemen or salesmen. Service is rendered IN the home . . . some have shops or offices . . . others operate from their home with no overhead expense. No experience is needed. We show you 27 ways to bring customers to you.

Our **MUTUAL COOPERATION** program gives you many unique and continuous advantages: National Advertising in Life, McCall's, House & Garden, MacLean's (Canada) and a dozen others. Copyright and trademark protection. Certificate approves equipment and materials. Products Insurance. Six-year Warranty. Pocket Demonstrators. Sales Book. Advertising Folders & Cards. Tested Ads. Ad Cuts & Mats. Store Display Cards. Radio & TV Musical Commercials. Home Show Booth Display. Publicity Program gets Free Local newspaper stories. Prizes. Laboratory research and development. Duragram bulletins. Resale Service. Annual Conventions. Behind all this is a headquarters interested in YOUR personal success.

Almost every building houses a customer needing one or both services. Furniture stores, department stores, interior decorators, upholsterers and carpet stores, develop Duracleaning and Duraproofing jobs from their customers. Auto dealers take orders and have used cars Duracleaned. You have a high hourly income from the day you start . . . even while still employed.

Duraclean Revolutionizes Old Methods

Duraclean's growth to a world-wide service resulted from customer convenience plus its many superiorities over ordinary cleaning. Housewives, clubs, hotels, offices and institutions deeply appreciate not having furnishings out of use for days and weeks.

They are thrilled to see their upholstery and floor coverings cleaned and revived with a new consideration for its life and beauty. Duraclean doesn't merely clean . . . it restores natural lubrication to wool and other fibers. Colors revive. The re-enlivened rug and carpet pile unsmats and rises.

Aerated foam created by the electric Foamovator (right) banishes dirt, grease and many unsightly spots . . . without scrubbing. Customers tell friends how Duraclean has eliminated customary soaking, shrinking and breaking of fibers from scrubbing . . . how the mild quick action foam, lightly applied, provides safety from color runs and roughened fabric they have previously experienced . . . how fabrics look fresher, brighter, cleaner . . . how convenient it is not to have furnishings gone.

They appreciate the courteous, personalized service of Duraclean craftsmen. Such service is NEWS . . . it spreads to friends and neighbors. Customers become your best salesmen.

The companion Duraproof service not only kills moths and carpet beetles . . . it is WARRANTED to make fabric repellent to both. Damage to household goods and wearing apparel is greater from moths than fire. This modern treatment (illustrated above) PROTECTS rugs, carpets, upholstery, furs, clothing, blankets, piano-felts, auto-interiors, etc.

EASY TERMS: A modest payment establishes your business . . . pay balance from sales. We furnish everything from electric machines to introduction slips including enough materials to return TOTAL investment.

FREE Booklet . . . Send for it NOW

Our first letter and illustrated booklet will explain everything . . . modern services, waiting market, how business grows, your large profit and PROTECTED territory. You can have your business operating in a very few days. Mail above coupon today while you can still get a dealership in YOUR location.

DURACLEAN® CO., 6-162 Duraclean Bldg., Deerfield, Illinois

What Dealers Say

W. Abbott: "In past 7 months I've grossed over \$12,000 almost entirely from cleaning auto interiors."

T. Komari (Japan): "Have 1,000,000 yen contract Duracleaning for U. S. Army."

W. Lookiebill: "We've had 20 years of pleasant dealings. I'm 65 but am setting my sights for 20 more years."

P. Freidinger: "Had a big moth-proof business last year; one job was \$322.25."

R. Kimbrough: "Finished First White House of Confederacy and am to Duraclean the Governor's Mansion."

L. B. Hayes: "My first month I grossed \$770.17. I am now a full time dealer."

E. Schenk: "The customers I had on House and Garden ads were very pleased. Their furnishings came out beautiful."

Earl Davis: "Our sales increased \$17,600 this year over last."

L. Johnson: "Each customer leads to 3 or 4 more. One job two of us cleaned \$125 worth in 5 hours."

More quotations in our literature.

OWN a Growing BUSINESS



**FREE
Booklet
tells
how!**

Mail
Coupon
TODAY

A Duraclean dealer will
work with you in your town.

Train in Big
COYNE
Shops

GREAT OPPORTUNITY FIELDS!



Instructor helping students check the wiring and trace the circuits of television receivers.

This big fire-proof building is occupied entirely by Coyne.

Instructor explaining operation and testing of a large Motor Generator.

YOUNG MEN AND OLDER MEN— PREPARE FOR A CAREER WITH A FUTURE!

Conditions are changing. Many "one operation" jobs will not last. Don't be satisfied with a "no future" job. Whether 17 or up to 45 years of age, train the Coyne way for a better job and a real future in **ELECTRICITY** or **TELEVISION-RADIO**, fields that offer a world of opportunities.

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Here at Coyne you're trained for Television, Testing, Trouble-Shooting on Radio, Public Address, F. M. Sound Units, etc. Many Coyne trained men in good jobs or own well paying Television-Radio businesses of their own.

Big future in Power Plant Work, Motors, Industrial Electronics, Armature Winding, Home and Factory Wiring, Appliances, Refrigeration, Maintenance, Illumination, etc. Lifetime job service to Coyne graduates.

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Enroll now, pay most of tuition after graduation. Special plan for men of draft age. We'll help you get part-time work, if you need it to help pay living costs while at Coyne.



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steady work and
a way to make
extra money?**

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To build a better future, get into a field where there's much important work and the security that comes from knowing a good trade. Servicing electrical appliances offers that OPPORTUNITY. Every wired home has an average of 8 electrical appliances. Up to 10 million new appliances are sold every year and owners pay well to keep them in repair. That's making a fast-growing need for trained men.

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Start soon to fix electric toasters, clocks, fans, vacuum cleaners and other appliances for neighbors and friends. Work in your basement, garage or spare room. Pick up \$3 to \$5 an Hour *extra that way*. It's easy to increase your earning power—to pay for this training many times over with your spare time earnings.

Learn and Earn with Multi-Use Tester Built with Parts We Send

This course includes the parts to build a portable, sturdy Appliance Tester that helps you locate electrical defects quickly and easily. You use it to learn and do actual electrical appliance repair jobs. If you want better pay learn this good

trade. No need to give up your present job. You can train at home in your spare time for only \$2.50 down and \$5.00 a month. A small price to pay for increased earnings, a more secure future. Paste coupon below on a 2c postal or mail in envelope for free book and sample lesson. Address National Radio Institute, Dept. AB6, Washington 9, D. C.

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COUPON MAY START
YOU TO SUCCESS
LESSON AND BOOK
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(No salesman will call.)

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City _____ Zone _____ State _____

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INVENTORS

If you believe that you have an invention, you should find out how to protect it. The first step is to have a search made of the prior pertinent U. S. patents. If a report on this search indicates that the invention appears patentable you can apply for a patent, and the specifications and claims should be prepared.

The firm of McMorrow, Berman & Davidson, with offices in Washington, D. C., is qualified to take the necessary steps for you. We can make a preliminary search on your invention, advise you whether we think it can be patented, and prepare your application for patent.

Unless you are fully familiar with the U. S. Patent Laws, we recommend that you engage the services of a Registered Patent Attorney to protect your interests. The patent laws are *your* laws. A patent gives you the right to prevent others from making, using or selling the invention claimed in your patent for a period of 17 years.

Use these patent laws for your protection. Investigate whether your invention can be patented. If you have what you believe to be an invention, we suggest that you have this firm make a search for you.

Send for a copy of our Patent Booklet entitled "How To Protect Your Invention," containing information about patent protection and patent procedure. Along with this we will also send you an "Invention Record" form, for your use in writing down and sketching details of your invention. We will mail them promptly. No obligation. They are yours for the asking.

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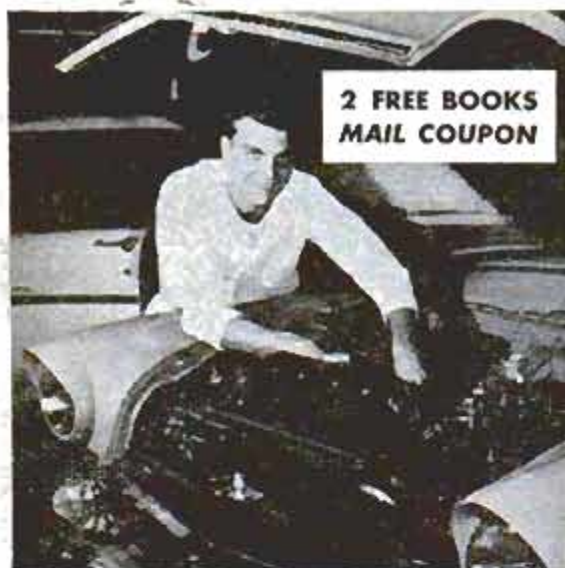


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PATENTS

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Make Big Pay-Feel Secure-Work Steady

New Shop-Method Way To Learn AUTO MECHANICS At Home In Your Spare Time

A NATIONAL MAGAZINE reports that an auto mechanic has the "brightest future" . . . that his prospects for success are "very good" . . . that he has "opportunity to open his own shop." This is no surprise because Auto Mechanics ranks as America's No. 1 trade. *It offers you good pay, lifelong security and steady work.* Here's why: There are 600,000 auto repair shops and supply stores in the U. S. These shops need thousands of trained mechanics to keep the 50 million cars and 10 million trucks on the road in operation. As a leading automotive magazine said: "About two-thirds of all cars in use are in the heavy repair age classification." It adds, "Aside from the prosperity generated by the huge flood of new cars, the service potential they create is tremendous." If YOU are a man of action—if you want to earn up to \$125 a week and more—we suggest you mail coupon below for two new, free books. These books tell you about the good jobs now waiting . . . show you how to qualify at home in spare time in just a few months.

Start Earning Spare Time Cash Soon After You Start Training



CTI Shop-Method training is so practical you take on repair jobs with confidence long before you graduate. After just a few lessons, many students do repair work in their communities. Their earnings often pay tuition, buy equipment, and start some in a full-time business. You, too, can make up to \$5 an hour while training, and get valuable experience besides.

You Get Practical Experience Using Tools and Tune-Up Kit

YOURS—THIS FINE SET OF MECHANIC'S TOOLS

As part of your training, CTI sends you this set of fine quality mechanic's tools. You'll soon be using these tools—getting practical experience and earning spare time dollars, just as many students do. Tools make you proud of your craft, keep your interest high, develop your skill. CTI's illustrated, easy-to-understand lessons show you when and how to use your tools. You will put action into your training—see your knowledge "come alive."



Start A Business - Be The Boss

If you like independence, Auto Mechanics can make your dream come true. Start in your own back yard as you train and rent a building when you have a large enough list of satisfied customers. Or, work in a local repair shop, make friends, and in time begin "on your own." Graduates have opened shops with just a few hundred dollars.



Diesel or Body-Fender Training Also

So complete is CTI training in Auto Mechanics that you become not just a mechanic but a specialist in tune-up; overhaul; automatic transmissions; power steering; power brakes; clutches; electric, cooling and lubricating systems; etc. And that isn't all: If you wish, CTI will send you instruction on either Diesel Mechanics or Body & Fender Rebuilding at no extra cost.

High Praise From Industry

One of the largest auto trade associations in America said: "CTI has the best school in the U.S.A." Another association reported: "Your graduates are making excellent progress . . . are highly thought of."

FREE BOOKS TELL HOW

COMMERCIAL TRADES INSTITUTE Dept. A-238
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Mail me your book *Big Money In Auto Mechanics* and Lesson Sample. Both FREE.

Name _____ Age _____

Address _____

City _____ Zone _____ State _____

Member: National Home Study Council



MAKE GOOD LIKE THESE CTI MEN



"Without CTI training, I would not have the job I hold today. When I showed my CTI diploma, I was given a chance to work as a mechanic."
—W. O'NEIL, PA.

"Went to work in a garage repairing generators, starters, other electrical equipment. Training is complete and thorough."
—J. EDWARDS, ILL.

"After completion of training, I started as a full-fledged mechanic in a Buick garage."
—W. CARTWRIGHT, IND.

"Have bettered myself nearly 100%. Am in partnership with another fellow and we have 24 cars of our own."
—A. H. CATES, MR.



"Have had 3 pay raises in 8 months. Before I took the course, I knew very little about a car engine."
—W. LONG, PA.

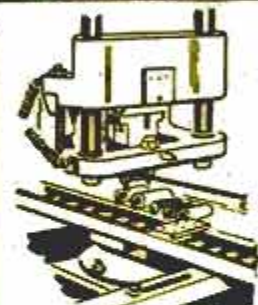
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FOR YOU!



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PREPARE AT HOME FOR A
PROFITABLE CAREER IN
AUTOMATION
ELECTRONICS*



Making Electronic devices



Recording and billing



Anti-aircraft gun control



Traffic control signals

**Get in on the Ground Floor of this
Fast-Moving Field**

Want a better job? . . . more money? . . . better working conditions? These are the things that can come to a man when he has a skill to offer . . . especially when that skill is in a newer field where ground floor opportunities often lead to well-paying positions. Such a field is the Electronic applications to **AUTOMATION** — and what a field!

Many plants, large and small, in various parts of the country are looking for ways of using automatic electronic control equipment to help turn out a better product and at lower cost. This equipment must be designed, installed and maintained — calling for well trained men. That's where **YOU** may come in!

You need no special technical experience . . . no previous knowledge of Automation Electronics . . . to prepare for a future that can be bright and more secure. For now there is a proved way to get this important know-how. Mail coupon for complete details. Men 17 to 55 preferred.

***WHAT IS AUTOMATION ELECTRONICS?**

Simply stated, this refers to the marvelous electronic controls that will help regulate the much talked about "automatic factory" — as well as other amazing automatic equipment in plants, offices and elsewhere. It is a gateway to some of the most desirable opportunities in the amazing, newer field of Automation.

ONE OF AMERICA'S
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TRAINING CENTERS



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As one of the leading organizations of its kind, the DeVry Technical Institute has years of experience in teaching Electronics, Television and Radio. So it is only natural for this training institute to develop a new program to prepare men for good jobs in instrumentation — as well as in the design, installation and maintenance of Electronic controls — as applied to Automation.

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46-page

"CARBURETOR HANDBOOK"

GUMOUT DIVISION
 Pennsylvania Refining Co.
 2671 Lisbon Road
 Cleveland 4, Ohio



(Continued from page 8)

There she was scuttled by her own crew. The model shown is very fine.

William L. Fisher,
 Racine, Wis.

To the Editor:

I'm enclosing three snapshots of my float on which I have applied for a patent.

James E. Davis,
 Huntsville, Tex.



Editor on 17-Hour Shift

Art Railton, our Automotive Editor, probably will tell you he spent a good many 17-hour shifts putting to bed the Annual Automobile Section in this issue. But right

(Continued to page 34)



L. C. Lane, B.S., M.A.
President, Radio-Television
Training Association,
Executive Director, Pierce
School of Radio & Television.

VETERANS! NON-VETERANS!
Study AT HOME in your SPARE TIME to be a TELEVISION TECHNICIAN

**YOU LEARN MORE
because I GIVE YOU MORE!**



Super-Het
Radio Receiver



C-W Telephone Transmitter



Public Address System



Combination Voltmeter-
Ammeter-Ohmmeter



AF-RF Signal Generator

LEARN BY DOING

Every one of my students gets enough equipment to set up his own home laboratory. You learn to be a television technician by actually doing what a TV technician must do on the job. With the equipment I send you, you build and keep an Electromagnetic TV RECEIVER designed and engineered to take any size picture tube up to 21-inch. (10-inch tube furnished. Slight extra cost for larger sizes) . . . Also a Super-Het Radio Receiver, AF-RF Signal Generator, Combination Voltmeter-Ammeter-Ohmmeter, C-W Telephone Transmitter, Public Address System, AC-DC Power Supply. Everything supplied, including all tubes. No experience is necessary . . . My practical, easy-to-understand lessons have brought success to hundreds of men, many with no more than a grammar school education.

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My Courses cover all phases of radio, FM and television.

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You learn by practicing with the professional equipment I send you. Many of my graduates now hold down good paying technician jobs with such firms as RCA, NBC-TV, CBS-TV, DUMONT TV and numerous other TV studios and plants.

2 FM-TV Technician Course
(Previous Training or Experience in Radio Required)

You can save months of time if you have previous Armed Forces or civilian radio experience! Train at home with kits of parts, plus equipment to build BIG SCREEN TV RECEIVER. ALL FURNISHED AT NO EXTRA COST!

EXTRA TRAINING IN NEW YORK CITY AT NO EXTRA COST!

After you finish your home study training in Course 1 or 2 you get two weeks, 50 hours, of intensive Laboratory work on modern electronic equipment at our associate school in New York City, Pierce School of Radio & Television. THIS EXTRA TRAINING IS YOURS AT NO EXTRA COST WHATSOEVER. My courses are complete without this extra training, however. It is just an added opportunity for review and practice.

3 TV Cameraman and Studio Technician Course
(Advanced Training for Men with Radio or TV Training or Experience)

I train you at home for an exciting high pay job as the man behind the TV camera. Work with TV stars in TV studios or "on location" at remote pick-ups!

An optional 30 hour one-week course of practical work on TV studio equipment at Pierce School is offered upon completion of Course 3.

EARN WHILE YOU LEARN

Almost from the very start you can earn extra money while learning by repairing Radio-TV sets for friends and neighbors. Many of my students earn up to \$25 a week . . . pay for their entire training from spare time earnings. . . start their own profitable service business.

FCC COACHING COURSE!

Important for BETTER PAY JOBS requiring FCC License. You get this training AT NO EXTRA COST. Top TV jobs go to FCC-licensed technicians.

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My school fully approved to train veterans under new Korean G. I. Bill. Don't lose your school benefits by waiting too long. Write discharge date on coupon.

YOU GET THESE FREE

MAIL THIS COUPON TODAY!



Mr. Leonard C. Lane, President
RADIO-TELEVISION TRAINING ASSOCIATION
Dept. M-2C, S2 East 19th Street, New York 3, N.Y.

Dear Mr. Lane: Send me your NEW FREE BOOK, FREE SAMPLE LESSON, and FREE aids that will show me how I can make TOP MONEY IN TELEVISION. I understand I am under no obligation.

(PLEASE PRINT PLAINLY)

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Address _____

City _____ Zone _____ State _____

- I AM INTERESTED IN:
- Radio-FM-TV Technician Course
- FM-TV Technician Course
- TV Cameraman & Studio Technician Course

VETERANS!
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IT'S TRUE! Now you can get the breath-taking acceleration . . . jack-rabbit starts . . . blazing new power that you've dreamed about for years—*simply by harnessing the raw, unburnt gasoline that your engine is wasting today!*

You can get performance from your present car that will make your friends gasp with astonishment—and you can save \$25, \$50, even \$75 a year on gas bills alone doing it!

Yes! You, yourself, can fit this amazing GASOLINE ATOMIZER onto your car in as little as 20 easy minutes! And it is guaranteed to pay you back your full purchase price, in gas savings alone, in the first 3 to 4 short months that you use it.

By RICHARD JOHNS

Mr. Car Owner! How would you like to have the driving thrill of your life next weekend?

Picture this yourself! Next weekend go down to your car—the same tired car you've been driving for years. You've made one simple change to that car, so easy your 16-year-old son could do it! But now, when you turn on the ignition, a modern miracle of engineering science comes to life under your hood.

From the very first moment, you'll see and feel the difference in that engine. That engine will hum with new, throbbing power. When you release the emergency brake, your car will glide out of its parking space . . . roll down the street with your foot hardly touching the pedal. Every 30 or 40 seconds, give that car an extra shot of gas . . . feel it spurt ahead . . . test the new power that's singing under your foot!

We ask you to pull up to another car at the stop light, of approximately the same year and make as your own! Wait until the light changes to green. Let the other car start first. Wait till the other car gets half way across the street. And then slam your foot down on the gas pedal!

Before that other car has even crossed the street, you will have caught up with him. For one brief second, you and that other car will race fender to fender. Then you will flash away from him . . . you will leave him a full block behind . . . you will look in your rear view mirror and see the startled look of amazement in the other driver's eyes!

FREE!

UP TO \$3 RETAIL VALUE! UP TO 2 TO 4 MILES MORE PER GALLON INSTANTLY, SAY THOUSANDS OF USERS.

THIS is probably the most widely sold piece of automotive equipment in the world! OVER HALF A MILLION DRIVERS have paid up to \$3 a set to put these amazing Air Bleed Needles on their cars! But we bought out an entire factory at a sacrifice price! For this one advertisement only, we can offer you these exact same needles as a FREE gift, even if you return the MINI-SUPERCHARGER!

1. They fit onto the carburetor of your car, where they replace the standard Idling Adjustment Screw. Six-cylinder cars need only one Air Bleed Needle (regular price \$1.50). Eight-cylinder cars need two needles (regular price \$3.00). In either case, you simply unscrew the old needle and put in the new. THAT'S ALL THERE IS TO IT! Even if you never looked under your hood be-



fore, you can do it in 60 seconds . . . without touching a tool, without even getting your hands dirty!

2. The purpose of these Air Bleed Needles is to STOP YOUR CAR FROM WASTING GAS IN STOP-AND-GO DRIVING . . . and to save you up to 2 to 4 miles a gallon. And at the same time it can give you easier, quieter performance and pick-up and smoother, more economical idling!

REMEMBER, THIS IS PROBABLY YOUR ONLY CHANCE TO GET THESE AMAZING AIR BLEED NEEDLES AS A FREE GIFT—and a gift that is yours to keep even if you return the MINI-SUPERCHARGER!

But our supply is limited! We can make this offer only once in this magazine. Simply send us the make and year of your car, and this gift is yours! BUT ACT TODAY!

WE GUARANTEE YOUR GAS SAVINGS!

Save this guarantee section. It authorizes you to try this amazing new MINI-SUPERCHARGER for a full four months ENTIRELY AT OUR RISK! This device must save you — on gas alone — EVERY SINGLE CENT OF THE MONEY THAT YOU PAID FOR IT — OR YOUR FULL MONEY WILL BE REFUNDED! This offer is good for a full four months! It is probably the most amazing offer in car history! You have nothing to lose! ACT TODAY!

Eugene Stevens, Inc.

TEST THIS NEW POWER A HUNDRED DIFFERENT WAYS!

But this is just the beginning! Test this equipment for one full month—entirely at our risk! Use it to flash away from other cars . . . spurt up the steepest hills . . . actually pass other cars in 2, 4, 6 and even 8 seconds LESS than you could have done formerly!

See the enormous gas savings it gives you at high speeds! Prove to yourself that at 50 . . . 60 . . . even 70 miles an hour, your foot is still half-way up on the pedal—you still have all the reserve power you need to get out of any emergency on the highway!

Yes, and test it in stop-and-go city driving! Prove to yourself that it gives you the instant acceleration you need to get out in front of the crowd . . . with far less gas than you're using today! Prove to yourself that it can actually save you \$25 to \$50 to \$75 on your gas bills each year . . . that it actually pays back its full cost, in gas savings alone, during the first three or four months — or your full money back!

HOW DOES THIS PRODUCT GIVE YOU SUCH TREMENDOUS NEW POWER?

And you get all this performance—and more—from a small, polished machine of bronze and aluminum that you can hold in your hand! Here's why:

Gasoline in its liquid form is



YES! THIS AMAZING "MINI-SUPERCHARGER" GIVES YOU AS MUCH AS 20 MORE HORSEPOWER FROM YOUR ENGINE! Gives you the gas economy you've dreamed about for years! This Power Booster works on exactly the same principle as superchargers selling for as high as \$600. Its whirlwind propeller (A) breaks up the raw, unburnt gas that your engine is wasting today . . . gives you blazing new power from every drop! Its emergency breather valve (B) forces huge quantities of fresh air into your engine . . . forces that engine to breathe deeper . . . push harder . . . pile up more mileage from every gallon you buy! No won-



der dozens of leading car magazines call this the "money saving discovery of the year." Test this amazing gas-saver yourself — without risking a penny! THE THRILLING FACTS ARE ON THIS PAGE!

not explosive. If you accidentally drop a lighted match into a bucket full of gasoline, the chances are 10 to 1 that that gasoline will actually put out that match. But simply mix that same bucket full of gas with the proper amount of air, and you will have enough explosive power to drive a ten ton truck!

This machine SUPER-MIXES SUPER-VAPORIZES . . . SUPER-ATOMIZES your gas in exactly that way! Squeezes the hidden power out of that gas! Mixes that gas with much greater volumes of air! Makes that gas more explosive in your engine!

Men have paid up to \$600 for Superchargers! This is a MINI-SUPERCHARGER — easier to install — less expensive! But still the only power product you can buy with all these tremendous advantages:

1. Install it yourself, in just 20 minutes, even if you never picked up a tool before in your life!
2. Never needs further adjustments, for the life of your car!
3. Takes up no room in your car, makes no "souped-up" noise!

SO EASY TO INSTALL THAT EVEN YOUR 16-YEAR-OLD SON CAN DO IT!

Step 1. Locate Air Cleaner and Carburetor on top of your engine. Take an ordinary wrench, and loosen the two or three bolts that hold the carburetor to the engine!

Step 2. Lift up the carburetor. Put MINI-SUPERCHARGER in place. What could be easier?

Step 3. Replace carburetor. Now turn on your engine! Then get in and take the most thrilling drive of your life!

TRY IT ENTIRELY AT OUR RISK

This MINI-SUPERCHARGER (U.S. Patent No. 2,409,937) sells for only \$11.95 for most cars or \$14.95 if your car has a special four barrel carburetor. This is your total cost—there is no installation fee! And, most important of all, we guarantee that you will save this full purchase in gas bills alone—in the first 3 to 4 months that you own this device.

You have nothing to lose! Try it entirely at our risk. You must get a whole new world of driving pleasure and economy or your full money back! Act today!

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Be Sure Coupon Is
Completely Filled In.

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- \$11.95 (My car does not have a four barrel carburetor).
 \$14.95 (My car is equipped with a special four barrel carburetor).

I understand that it must do everything you say or my full money back! Also send me as your Extra Gift Premium, the Free Air Bleed Needle Set. I may keep the needles even if I return the MINI-SUPERCHARGER.

MAKE OF CAR _____ YEAR _____ Please Print

MODEL _____ 4 DOOR OR 2 DOOR _____

6 CYLINDERS _____ STRAIGHT 8 _____ V-8 _____

STANDARD TRANSMISSION _____ AUTOMATIC _____

ADDRESS _____

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No wonder OVER 900,000 PEOPLE all over the world have turned to the U.S. School of Music method to make their dreams of playing music come true! No special "talent" is needed. And you learn right at home, in the spare time of YOUR OWN

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Why not let this famous home-study method bring the many pleasures of music into YOUR life? Popularity! New friends. Gay parties. Good times. Career. Extra Money... understand, appreciate, converse about. Learn lives and compositions of modern and great masters. Relax! Banish worries and frustrations. Satisfy self-expression, creative urge. Gain self-confidence.

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—Mrs. J. L. Newton, Louisville, Ky.

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—Mrs. J. P. Perry, Princeton, W. Va.

Friends Astonished
"I bet friends I could learn piano quickly. They didn't believe me—because I am slow learning. Imagine their surprise last night when I played. One said, 'Sounds like you've played for years!'"
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If you have trouble with plates that slip, rock and cause sore gums—try Brimms Plasti-Liner. One application makes plates fit snugly without powder or paste, because Brimms Plasti-Liner hardens permanently to your plate. It relines and refits loose plates in a way no powder or paste can do. No need to pass up your favorite foods. With plates held firmly by Plasti-Liner, **YOU CAN EAT ANYTHING!** Simply lay soft strip of Plasti-Liner on troublesome upper or lower. Bite and it molds perfectly. Easy to use, tasteless, odorless, harmless to you and your plates. Removable as directed. Money back guarantee. At your drug counter. Only \$1.50.



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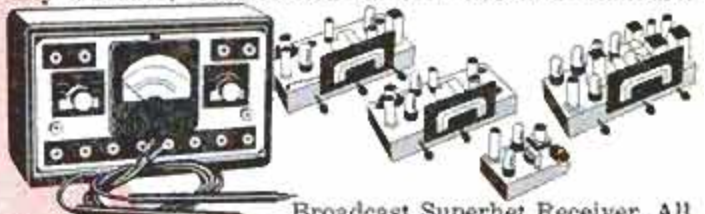
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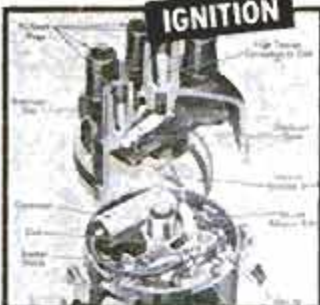
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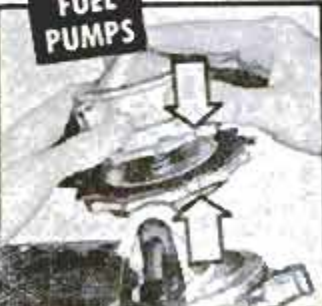
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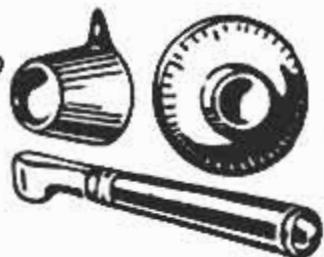
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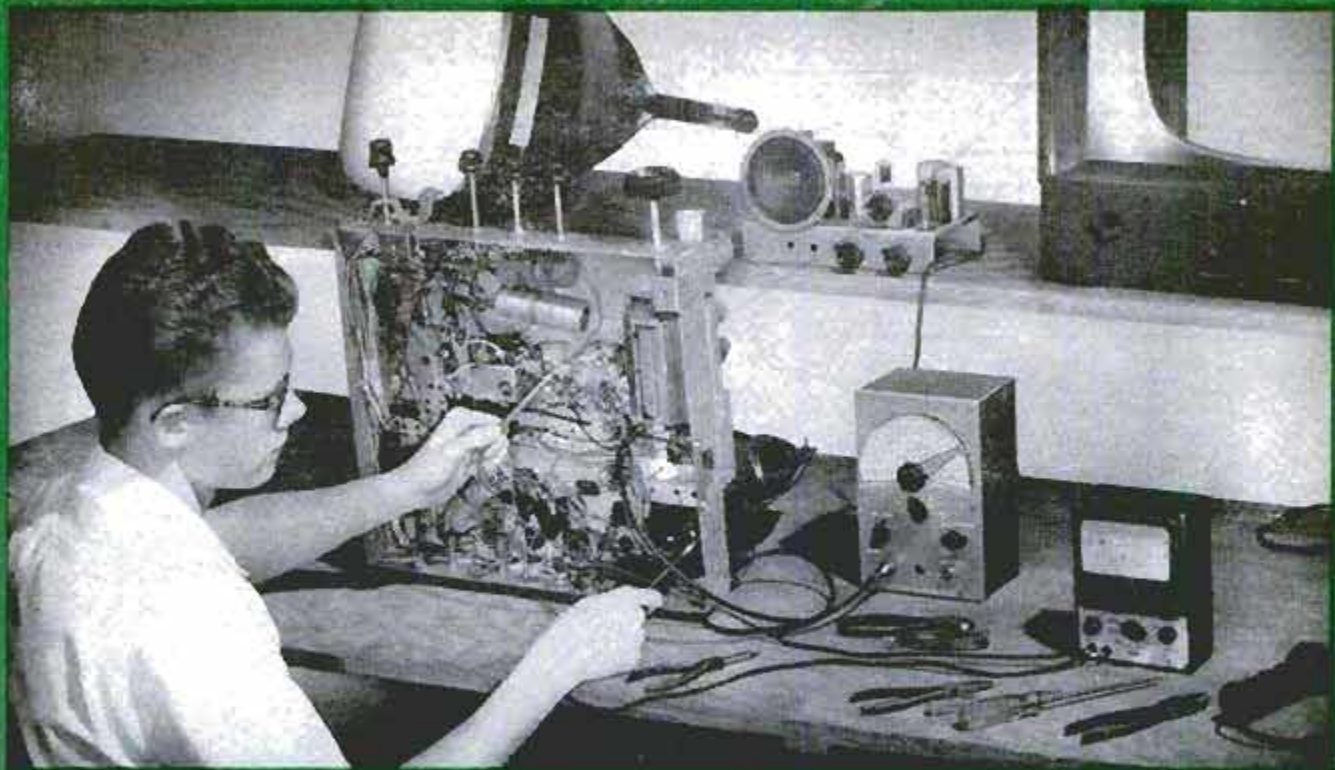
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(Continued from page 20)

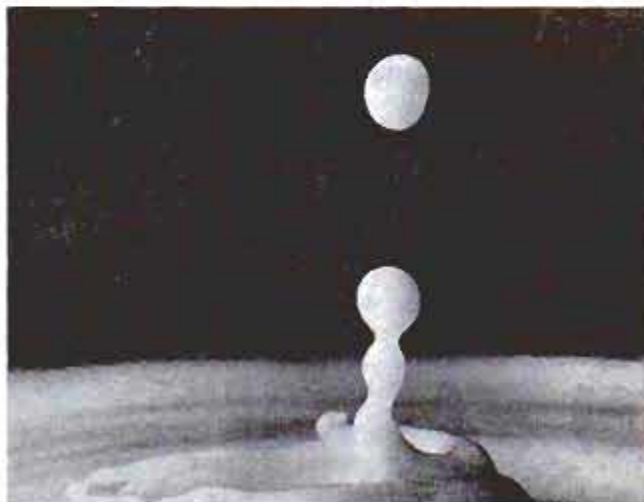
here is where he spent one 17-hour shift—perched on a stepladder in the Nash assembly plant at Kenosha, Wis., supervising the photographs and writing the diary of "The Building of a Car" (see page 196) as a new Rambler moved from beginning to end of the assembly line.



To the Editor:

You've heard of "teardrop" streamlining? This picture (below) tends to prove there is no such thing. It shows a perfectly round drop of milk falling into a cup full of milk. Directly beneath it is a column rising from another drop that has just hit the surface. I took the picture to test the action-stopping characteristics of an electronic flash unit I built. Its speed, I estimate, is 1/10,000 second.

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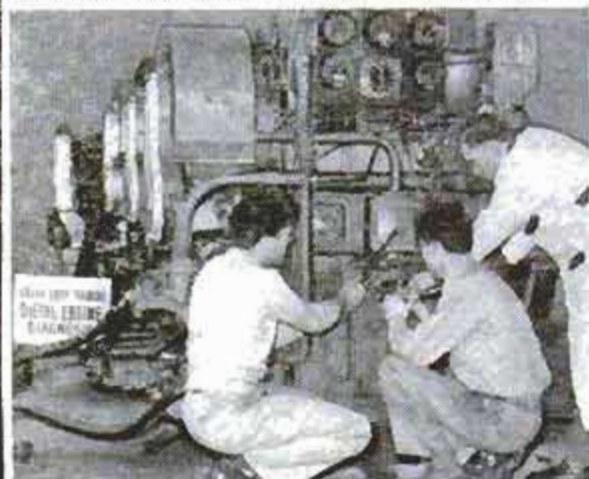
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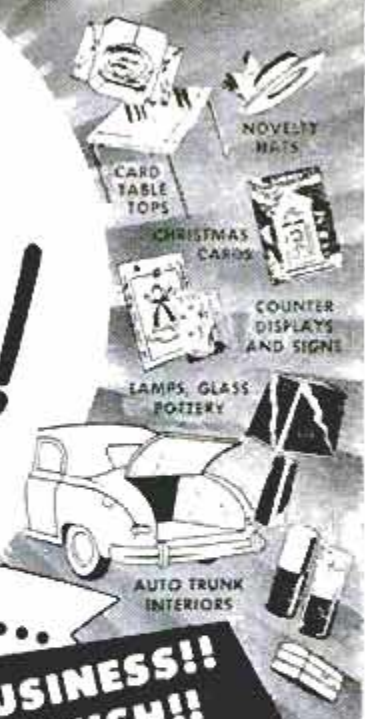
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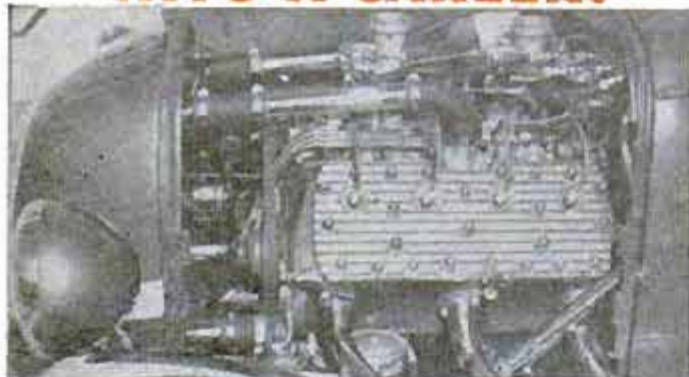
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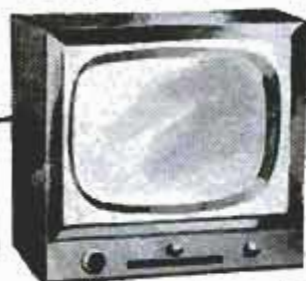
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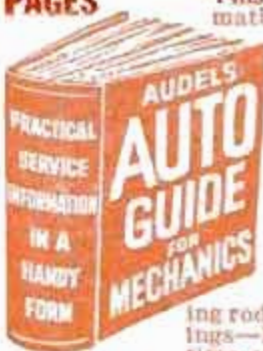


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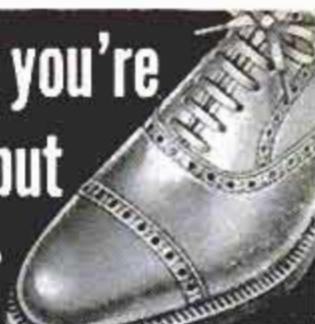
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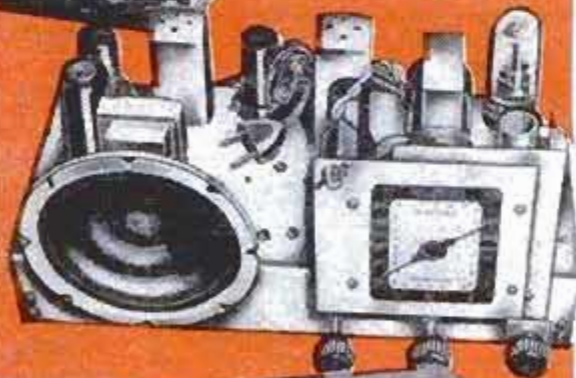
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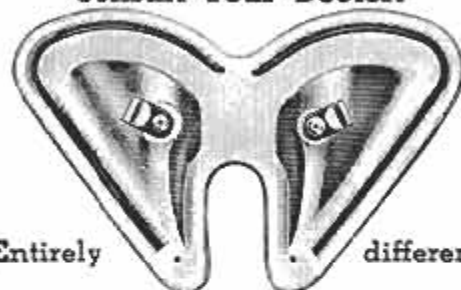
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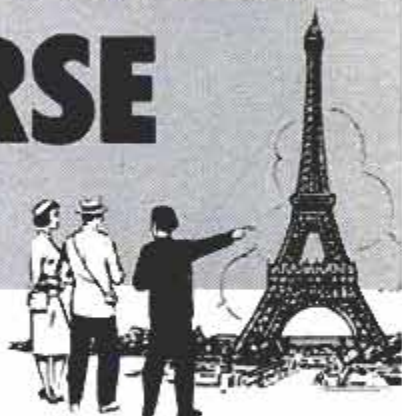
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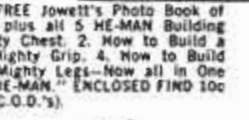
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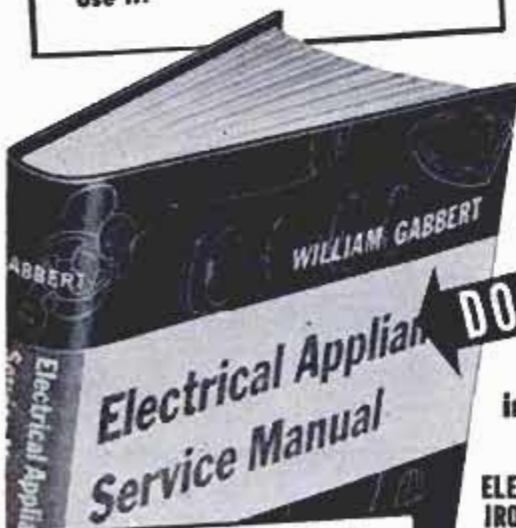
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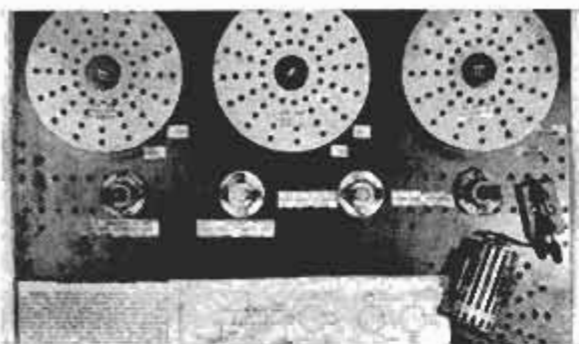
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by D. W. Craighead

You and I and thousands of other Americans are being robbed of \$600,000,000 every year by an army of check forgers, and most of us don't even realize we're being taken! Why?—because the check forger, or "raiser" is not always a professional crook. Your check can be altered by any of the 5 to 8 people who will probably handle it before it clears the bank.

ANY CHECK CAN BE ALTERED

Most of us don't examine our statements too closely, and the methods these amateur penmen use to swindle us are ridiculously simple. The illustration shows how an easy stroke of the pen can mark up the amount of your check from six dollars to sixty.

<i>Sixty</i>	6 TO 60	<i>60⁰⁰/100</i>
<i>Eighty</i>	8 TO 80	<i>80⁰⁰/100</i>
<i>Fifty</i>	10 TO 50	<i>50⁰⁰/100</i>
<i>One Hundred</i>	100 TO 400	<i>400⁰⁰/100</i>

Eight dollars readily becomes eighty, and one hundred can be "upped" to a whopping four hundred! There is hardly any amount that the careful forger cannot alter, and unless the "mark up" causes an overdraft, the crook rarely gets caught. American Banking Association statistics show that over 90% of these losses come out of the pockets of small depositors, the very people who can least afford it!

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Frank Williams



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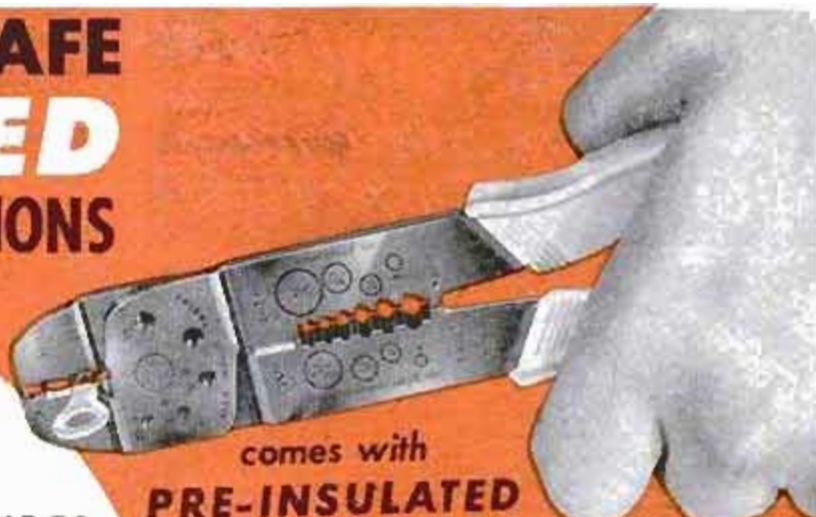
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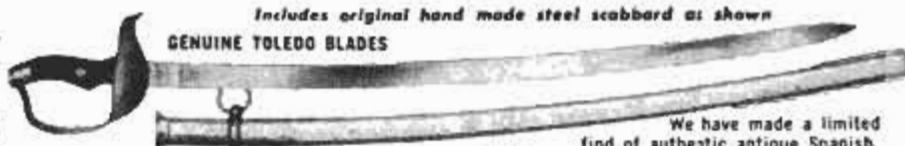
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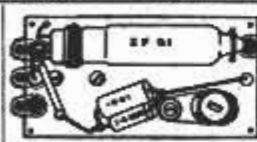
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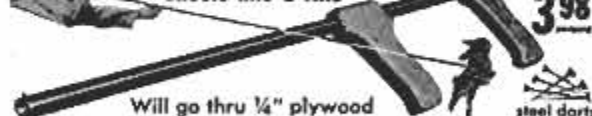
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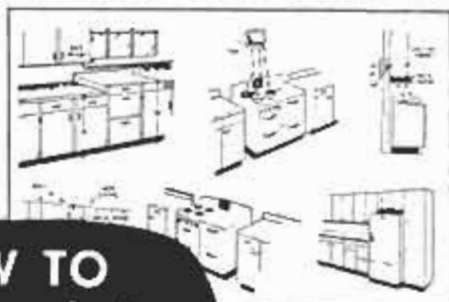


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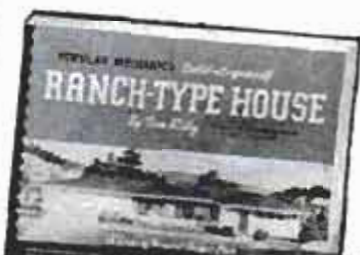
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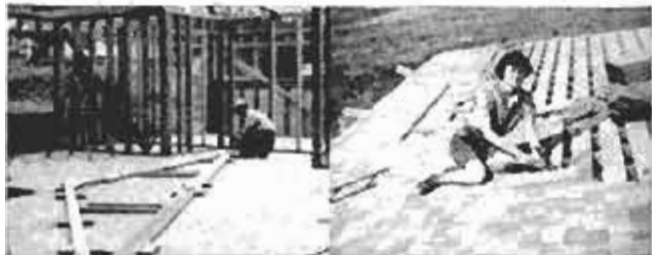
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Here is a dream home that can become a reality without too much worry about money. Build this beautiful Ranch Type Home yourself. Simply follow the Popular Mechanics RANCH TYPE HOUSE BOOK AND PLANS. You can save \$7,000 to \$10,000 and have one of the most desired homes of these times. You can build it all now—or part of it—and add garage, breezeway and another bedroom later on without affecting the basic house.

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Reduced size illustrations from book. Building roof truss on floor for easy construction. Mrs. Tom Riley, Portland, Oregon, shingles the roof on her Popular Mechanics Ranch Type House



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- Remittance enclosed Send C.O.D. (postage extra)
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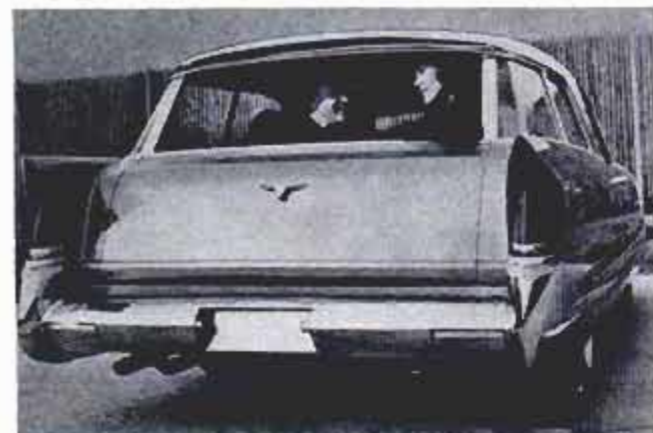
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Roof has a stepped-up cantilever design. Gap between the two roof levels is louvered to ventilate interior

IS THIS TOMORROW'S FAMILY CAR?



Rear-facing passengers have observation-car view. Retracted steps are visible at each end of bumper

CHRYSLER'S newest "idea car" is a novel station wagon, the Plainsman (see page 186 for more dream cars). Some experts believe the six or eight-passenger station wagon will be the family car of tomorrow. The four-door sedan will soon be an under-slung four-seater, too small for many families, they say.

Features of the Plainsman include: The third seat (in extreme rear) faces backward and is entered via power-operated steps that retract in the bumper, cantilevered roof requires no thick pillars in rear, spare tire stands vertically behind right rear wheel hidden by a hinged wheel flap.

Spare tire is carried upright behind rear wheel. A built-in elevator lowers the spare for effortless handling



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WORTH \$2,456.65!

EARN BIG PROFITS
In Your Spare Time!

WOW!

—AND YOU BREED THEM IN YOUR SPARE TIME—IN YOUR HOME

If you have a little space in a SPARE ROOM, PORCH, BASEMENT, GARAGE ... ANYWHERE. Investigate this "chance of a lifetime" opportunity of breeding rare tropical fish for profit. The tropical fish "BOOM" IS JUST BEGINNING and here's your opportunity to cash in on it now. Experts estimate \$780 MILLION DOLLARS will be spent on tropical fish within next ten years. Investigate now—Rush coupon below.

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NO—ONLY A FEW DOLLARS, A LITTLE SPACE AND MY SPARE TIME AND THE LITTLE KNOWN BREEDING SECRETS ARE ALL YOU NEED TO START. IF YOU'RE INTERESTED—LEARN THE FACTS TODAY!—THE "BIG BOOM" HAS STARTED SO CASH IN ON IT NOW!

Join others that are saying: "Business prospects amazing," J. K., Ga. "Dealers want all I can breed," J. P., Ore. "Pays off large dividends," R. D., N. Y., etc.

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supply the circulars you mail to bring back cash and orders. Don't waste a minute. Rush your name. We'll send you **FREE** and postpaid, pictures, prices, details, and all the facts you need to start. Mail coupon or send name on postcard. No charge. **Warner Electric Co., 1512 Jarvis Av., Dept. L-102, Chicago 26, Ill.**

Make Thousands of Beautiful Art Creations

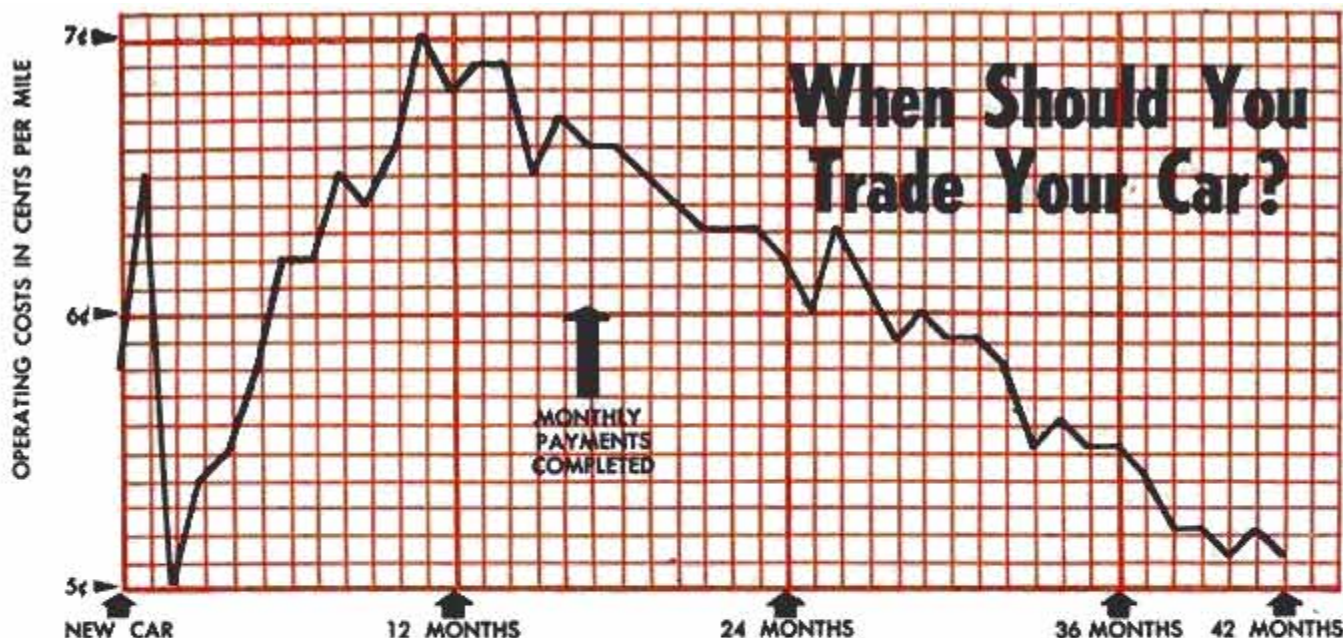
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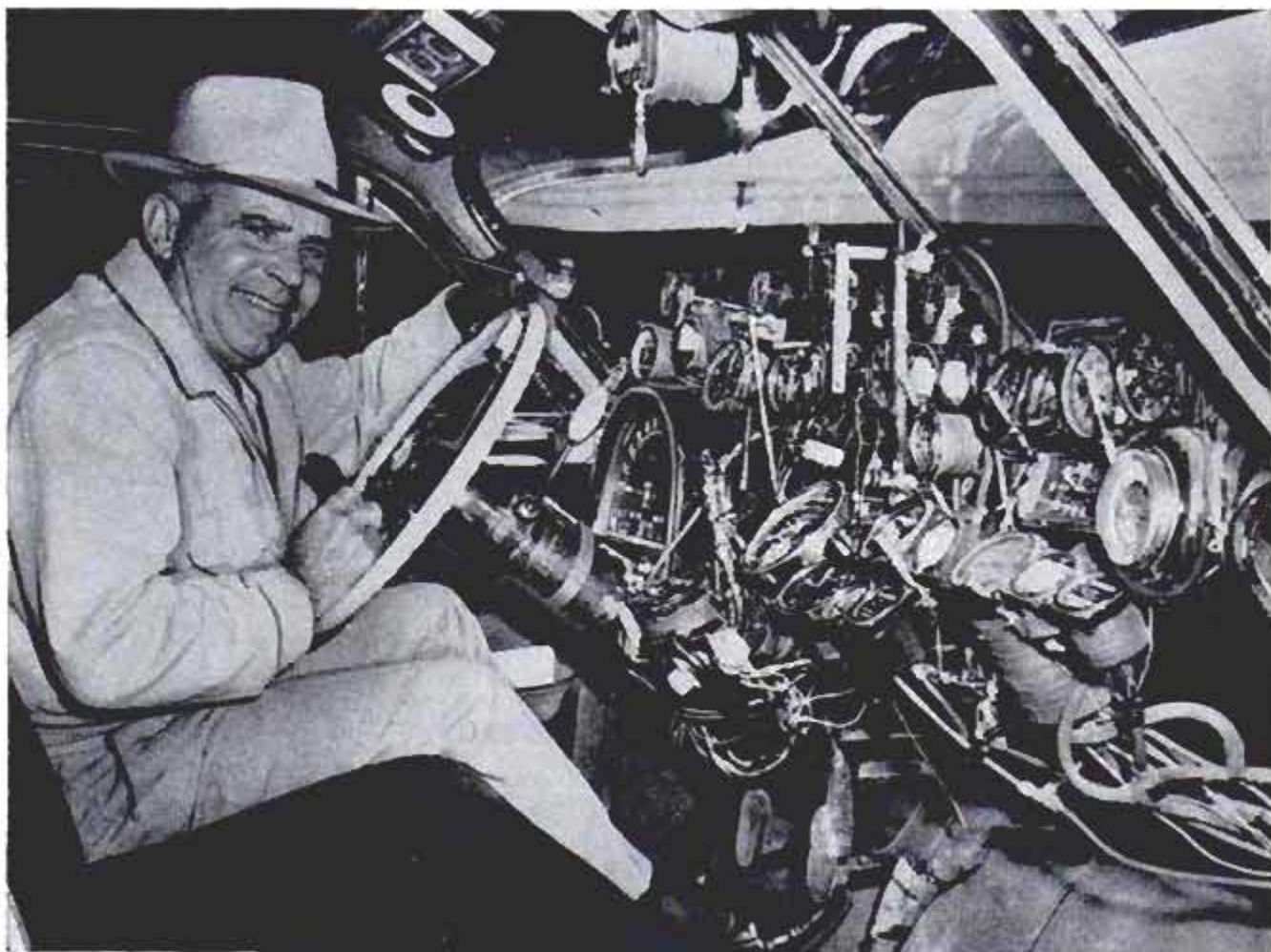


Every month, A. B. Kennerly of College Station, Tex., draws a short line on a graph to help him decide when to buy a new car. He plots on the graph the cost per mile of operating his car. At the end of each month he totals his expenses (he pays all car bills by check for convenience in record keeping) and divides the amount by the number

of miles traveled. The resulting figure is plotted on the graph. Not included is depreciation because he believes it would affect monthly variations little. It would merely raise the whole line on the scale. Costs leveled off at about the 38th month. If they begin to climb again, he plans to consider trading for a new car.

\$9500 Worth of Instruments on Hobbyist's \$5600 Automobile

Instruments on dashboard on car of Ralph E. Davis, Port Arthur, Tex., tell everything about car except blood pressure of passengers. The 53 gauges took eight years to install, even reveal tire temperatures



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Salesmen urgently needed to fill big demand for new **FUTURELINE** Safety Belts. 3 average sales in a day can bring you up to \$45.00 cash profit. Big opportunity open for you introducing newest, safest 100% nylon Safety Belts. We give you everything you need to start earning quickly. Write for all details **TODAY!**

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I make a product that has made a name for itself—and I'm proud of it. What's more, I'm always working to make it better. That's my responsibility *and* my satisfaction—to manufacture *quality* that will always satisfy those who buy my goods

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The best way I know to make my customers my *friends* is to sell brands that have made a name for themselves. A shopper just naturally feels more comfortable buying a brand that has known quality, proved value. And *I* feel more comfortable letting her walk out with it. I know she'll be satisfied—and be back again."

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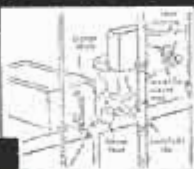
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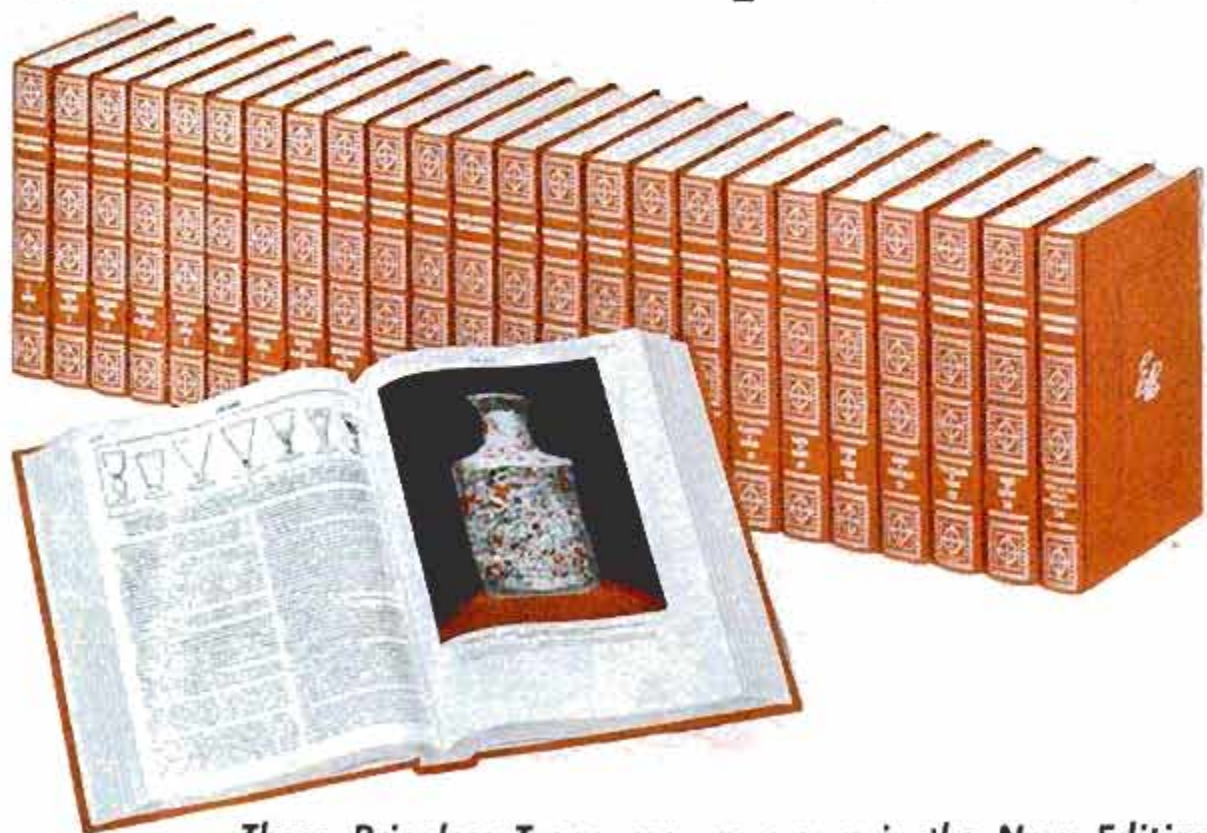
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SAPPHIRE, Topaz, tourmaline, garnet, peridot. Five uncut gem specimens, \$1.00. Ten polished gems, baroque shaped, \$1.00. Free big bargain list jewelry, gems, profitable, easy "do it yourself" projects. O'Brien's, 1116M Wilcox, Hollywood 38, Calif.

20 COLORFUL And basic U.S. mineral specimens, attractively boxed. Descriptive folder included. \$1.00 prepaid. Rock Haven Mineral Co., Whitefield, N. H.

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WANTED—Cigarette, tobacco cards. Write Charles Bray, East Bangor, Penna.

50 ARMY Insignia \$1.00. Insignia Mart, 703A Broadway, New York 3, N. Y.

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KLONDIKE Novelty jewelry findings assorted, beads, pearls, jewels, 5 lb. lots \$7.50; sample \$2.00 lb. Merchandise, 19-A 16th St., New York City 3.

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FREE Book "505 Odd, Successful Businesses." Work home. Expect something odd! Pacific, Oceanside, Calif.

BRONZE Baby shoes. Instructions, equipment and mountings for genuine electroplated process. Free catalog. Hollywood Bronze Supply, Dept. B-3, 1624 East First Street, Los Angeles 33, Calif.

YOUR Own name brand business. No investment; no inventory. Part time or full time. Sell famous brands of appliances, housewares, silverware, radios, vacuum cleaners, lamps, tools, clocks, watches, jewelry, etc., etc., over 1000 items. Join thousands of successful independent dealers. Send for free catalog and dealer price list. H. B. Davis Corp., Dept. W, 145 W. 15 St., New York City.

LIQUID Rubber. Make flexible molds. Free sample. Chaney, 1130 E. 16th St., Jacksonville 6, Fla.

GOOD Paying business silvering mirrors, plating articles in the shop and home by late method. No tanks or shop required. Free booklet. Gunmetal Co., Ave. H, Decatur, Illinois.

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GROW Orchids at home—Profitable, fascinating. Year 'round, Maine to California. No greenhouse. Gorgeous cactleys, cymbidiums, etc. Successful home grower shows you how. Full details free. Flowerland, 4622 Wilshire, Los Angeles 5.

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HUGE Sparetime home profits. It's easy! Details free! Stommel, Box 104, Detroit 31, Michigan.

A Monthly repeat business which you can operate in your own community. For free details write Grasak, Dept. A-101, P.O. Box 494, McKeesport, Penna.

SELL From your own large wholesale catalog. Rush name! C-S, Box 9091, Kansas City 18, Missouri.

\$20,250 PROFIT Selling stamps by mail. How we did it book; send only \$2.00. Free details. Fahsing, Atascadero, California.

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BIG Money! Take orders religious articles. Illustrated 1956 catalog. Write Pette Co., 1554A W. 11th St., Brooklyn 4, N. Y.

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\$150 WEEK—Easy! Start home Venetian blind laundry. Revealing book free. A. T. Co., 101 S. 44th, Philadelphia 4, Penna.

MAKE \$50 Week to \$1000 month in own business. \$15.00 invested, in four months was making \$2000 monthly. Our step by step plans will show you. Opportunities plentiful if you know how. Business can be operated by men and women. Mail \$1.00 today for complete plans. Edward O. Burns, Box 54, Dept. 111, Dallas 21, Texas.

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LEARN Sharpen scissors. Complete instructions. Leiser, Box 85, New York 51, N. Y.

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MEN And women wanted to start home business in spare time with little table-top rubber stamp machine. Easy to earn up to \$9.80 an hour without previous experience. Full particulars free by mail. Send postcard to Roberts, 1512 Jarvis, Room 72, Chicago 26, Ill.

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OPERATE Profitable magazine subscription service. New telephone plan. Handle renewals for all magazines. No experience or investment needed. Rush name; send no money. McGregor Agency, Dept. 500-C, Mt. Morris, Illinois.

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\$5,199.90 WAS Paid to John Betts, in few weeks. Grow mushrooms. Cellar, shed. Spare, full time year round. We pay \$3.50 lb. Free book. Mushrooms, Dept. 173, 2954 Admiral Way, Seattle, Wash.

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PRINTING, Office supplies wholesale. Save 50%. Royal, Box 368-A, Cleveland 27, Ohio.

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EARN \$50.00 Daily making mats, shoes and mud guards from old tires. S and S Patents Inc., 1307 North Clark St., Chicago 10, Ill.

GENERAL Contest Bulletin. Issued monthly. Sample, 25c. 1609 1/2 East 5th, Duluth, Minn.

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READ Progressive Mailtrade, the magazine that tells how to make money by mail. Dime brings sample and special offer. Progressive Mailtrade, Box 357, Sheboygan, Wisconsin.

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SCHOOL Seniors—Sell classmates America's most beautiful graduation name cards. Largest selection. Highest commission. Outsell all others. Free sample kit. Printcraft, Dept. M, 1509 Maple Street, Scranton 5, Penna.

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YOU Can win prize contests. New manual only \$1.00. Hans Kaufmann, 273-4 Lake Drive, Berkeley 8, California.

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CATALOG! Profitable opportunities. Rush 35c! Ridsen, 3468 Cass, Detroit 1, Michigan.

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MAKE Your own wheel of fortune! Here's where and how to win your share of cash, cars and merchandise awards! Send your name and address today for free details. Vernon, (7-II) Box 449, Junction City, Oregon.

MAKE Money in mail order. Send for free profit facts. Whitecomp, Box 74635, Los Angeles 4, Calif.

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PLEXIGLAS. Lucite. Square foot cost 1/16", \$1.10; 1/8", \$1.30; 3/16", \$1.65; 1/4", \$1.95; 3/8", \$3.23; 1/2", \$4.38. Colors add 10c. Send 15c for postage. Aristocrat Plastics, 23-25 Sussex Avenue, Newark, N. J.

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FREE! Uranium detector and chemical puzzle (worth \$2.50) with first five lessons of diploma course on practical chemistry! Big package of chemicals, filtering equipment, charts, etc. Only \$1.00. National School of Chemistry, P.O. Box 606-G, Redwood City, Calif.

HOME Laboratory and apparatus kits, laboratory supplies. Catalog 25c. John H. Winn, 124A West 23rd St., New York, N. Y. Established 1931.

NEW. Used apparatus, chemicals. Catalog 25c, refundable. Laboratory Sales, Box 161-E, Brighton, Mass.

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ILLUSTRATED Catalog: Chemistry, mineralogy, biology 20c. Tracey Laboratories, Evanston, Illinois.

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60 PAGE Booklets! "Chemistry," "Physics," "Relativity," "Atomic Theory," "Scientific Oddities," "Light," "Sound," "Heat," "Electricity," "Radio," "Astronomy," "Botany," "Zoology," "Weather," "Useful Tables," "Geometry," "Mechanical Problems," "Nautical Dictionary," "Mathematical Oddities," "Scientific Terms." (Order by titles.) 10c each. Franks, 3121 South Racine, Chicago 8.

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RUN A spare-time greeting card and gift shop at home. Show friends samples of our new 1956 all-occasion greeting cards and gifts. Take their orders and earn up to 100% profit. No experience necessary. Costs nothing to try. Write today for samples on approval. Regal Greetings, Dept. 59, Ferndale, Michigan.

GOLDMINE Of 600 money makers. Copy free. Specialty Salesman Magazine, Desk 5-B, 307 N. Michigan, Chicago 1.

MAKE Money at home as renewal headquarters for all magazines. Liberal commissions. No experience-capital needed. Supplies furnished. Write for free catalog. McGregor Magazine Agency, Dept. 500-A, Mount Morris, Illinois.

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PROFITS To 150% selling finest everyday greeting cards. New 21 for \$1 tall cards, unusual gifts, 129 fast-sellers. Valuable gift bonuses. Assortments on approval, stationery samples free. \$1 gift free for promptness! Creative Cards, 4401 Cermak, Dept. 525-C, Chicago 23.

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MAKE \$100 Up weekly—Demonstrate, take orders. Sensational new product. Prospects everywhere, part-full time. Campbell Company, Rochelle 53, Illinois.

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USED And new watches \$2 up. Free list. Southern Watches, Gray, Georgia.

YOUR Ad in this space will get some good agents for you. Yes, I'll prove it. Write for Folder "A" right now. F. W. Johnson, Classified Advertising Manager, Popular Mechanics Magazine, 200 E. Ontario St., Chicago 11, Ill.

MAKE Up to 100% profit in your spare time! Sell over 600 exciting, unusual gifts, gadgets, greeting cards, gift wraps. Send for sensational money-making plan and brand new free catalog at once. Samples on approval. Hurry—get in on big profits now! North Star, Dept. 362, 251 E. 5th St., St. Paul 1, Minn.

PROFIT With your own wholesale, name brand catalog. Appliances, watches, jewelry, gifts, tools. Imprint your name on cover. Full or part-time sales. Details free. Robel Sales, Dept. P.M., 487 Broadway, New York 13, N. Y.

IF You want to earn money fast, I'll send you free sample stocking of newest stretch duPont nylons to sell at only \$1 a pair. American Mills, Dept. 482, Indianapolis 7, Ind.

WAXES Floors without "wax." New invention. No more floor wax to buy. Sensational seller. Samples sent on trial. Kristee 83, Akron, Ohio.

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MEN, Women, make money spare time plus new car as bonus for encouragement. Amazing hosiery guaranteed to wear without holes, snags, and runs, or replaced free. For example, lovely 60 gauge nylons guaranteed for as long as 1½ years, or replaced free. Write Wilknit, 1762 Wash., Greenfield, Ohio.

FREE! Beautiful feather pictures, 200% profit! Apartado 9036, Mexico 1, D. F.

IS \$50 A day worth a postcard to you? Urgently need salesmen to fill big demand for new Futureline auto safety belts. We give you everything needed to start your earning quickly. Write Futureline, Dept. W-16, 173 W. Madison, Chicago 2, Ill.

SHINE Cars without polish. New invention. Lightning seller. Cars gleam like mirror. Samples sent on trial. Kristee 85, Akron, Ohio.

GREETING Cards—\$50.00 cash from 40 boxes sensational all-purpose assortment. Big money all year from special occasion cards—Mother's, Father's Day, birthdays, Eastern Star. Best all-occasion assortments, stationery, gifts. Bargain specials. Color catalog. Samples on approval. Midwest, 1113 Washington, Dept. 699-J, St. Louis 1, Mo.

MAKE Money selling outstanding line of regular ties, square ends, reversibles, feather, pleated, bows, knitted, kerchief sets. Free catalog. Philip's Neckwear, 20 W. 22nd, Dept. 415, New York City 10.

CLEANS Windows without mess. Strange dry cleaning-cloth. Replaces liquids. Windows gleam. Samples sent on trial. Kristee 82, Akron, Ohio.

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MONEY in minutes! Even beginners scoop up big earnings with Elmira—the greeting line so beautiful, it sells by itself! Friends, neighbors—even perfect strangers want to see and buy from Elmira's exciting array of all-occasion greeting cards, personalized stationery, napkins and gift wraps. Look no further—Elmira gives you everything to make your extra-money dream come true! Send today for free samples, catalog, assortments on approval. Request Elmira's fund-raising plan for churches and clubs! Elmira Greeting Card Co., Dept. 160, Elmira, N. Y.

BUY Wholesale thousands nationally advertised products at big discount. Free "Wholesale Plan." American Buyers, Hertel Station, Buffalo 16-A1, N. Y.

FREE! Sunshine's petite everyday assortment—Special introductory offer to big profits available selling exclusive everyday cards, imprinted stationery, gift wraps, deluxe 21 card assortment, etc. Free catalog. Send postcard today for sample kit on approval. Sunshine Art Studios, Inc., Dept. PM-2, Springfield 1, Mass.; Pasadena 1, California. (East of Rockies address Springfield).

CUCKOO Clocks, 5"x11". Drop-shipped. Demonstrator \$3.25. Amick's Imports, 2440 Kinnickinnic, Milwaukee 7, Wis.

EASY Handwork makes fast-selling articles. Sample free. Sunmade Company, Brockton 64, Massachusetts.

START Your own business on credit. Your own boss. 1135 dealers sold \$5,000 to \$30,000 in 1954. We supply stocks, equipment on credit. 200 home necessities. Sales experience unnecessary. Pleasant profitable business backed by world-wide industry. Write Rawleigh's, Dept. B-U-PPM, Freeport, Ill.

BIGGER Profits, better service, most famous brands from investigated list of 30 lowest priced wholesale catalogs in the world. Rush \$2.00. Ruman Investigating Co., 573 Sheridan, Niles, Ohio.

FREE Deodorizer. 100% profit showing Odor-Zone the new disinfectant to homes, restaurants. Write Norwich Chemical Company, Dept. 6, Norwich, Conn.

SELL World famous documents. Declaration of Independence, Bill of Rights, U. S. Constitution, Lincoln's Gettysburg Address, on genuine aged parchment. Free information. Four samples \$1.00. Sherry's Ltd., Dept. 202, 2126 Boyer, Seattle 2, Wash.

NYLONS—Lowest prices! Essential Products Co., 210 Fifth Ave., New York 10, N. Y.

BUY Wholesale, 25,000 items, catalog 25c. Matthews, 1472-B5 Broadway, New York City 36.

MAKE Money introducing world's cutest children's dresses. Big selection, adorable styles. Low prices. Complete display free. Rush name. Harford, Dept. R-3341, Cincinnati 25, Ohio.

KEEP 60c Out of every dollar. You make as high as 60% profit on famous, nationally advertised Studio Girl Hollywood cosmetics. No experience necessary. I teach you at home, free, in a few pleasant hours how to be a beauty advisor. Then demonstrate to friends and neighbors correct way to use these cosmetics to appear more glamorous. Make up to \$5.00 an hour or more for spare time—\$25.00 a day full time. Then hire others and double your earnings. Write today and I will include actual usable samples free. Send name on postcard to Harry Taylor, President, Studio Girl Cosmetics, Dept. 1262-L, Glendale, Calif.

EXCLUSIVE Sales plan. New profitable field. Immediate, permanent, growing income. Full, spare time. \$1.00 brings samples, details. Cerco Products, Salem, Conn.

EARN \$30 A day! Sell Dab-It, amazing pocket-size, stick-form, "no ring" spot remover. Works like magic! Guaranteed! M & M, Dept. PM-22, 842 Third Ave., New York City 22.

\$18.75 NATIONALLY Advertised perfume. Closeout price 60c. Sell for \$3. Profit \$2.40. Sample \$1. Details, advertisement reprint free. Essef 73-14L, 175 Flushing 66, New York.

GIVE Away plan pays you to \$5 hour! Your customers receive choice of wonderful gifts (silverware, hosiery, electric shavers, etc.) free with purchases! Show huge line with famous brands like Westbend, International Silver, Melmac unbreakable dinnerware, hosiery, shirts, underwear, etc. Nothing for you to buy. Just write orders. We deliver prepaid and collect. Also weekly payment club plan. Pocket advance cash plus big cash bonuses. Opportunity become manager appointing salespeople. Experience unnecessary. Full or spare time. Nothing to pay now or ever. Postcard brings you complete money-making outfit free. No obligation. Kenmart, Dept. 13, 108 Lawrence St., Brooklyn 1, N. Y.

GENEROUS Commission selling personalized cast aluminum estate and mail box signs. Write Doucette Foundry, Worthington, Mass.

INDUSTRIAL Floor brushes. Branded, with your name. Pirring Mfg. Co., 1918 Larrabee St., Chicago 14, Ill.

SELL Miniature spy cameras. One of the world's smallest, \$18.50 per dozen, samples \$2.95. Harold Bell, 246 N. Broadway, Lexington, Ky.

EARN To \$50 per day! New, amazing chemically-treated Foam-O-Cel sponge cleans rugs, upholstery like new. Fast \$1 seller, big profits. Free details, M & M, Dept. PM-2, 842-3rd Ave., New York City.

SELL Sick call crucifixes. Big commission. The James Company, North Attleboro, Mass.

A Dress shop in your home. No investment. Good selling. Commissions. Write Modern Manner, Hanover YS, Penna.

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BUY Surplus wholesale. Catalogue 25c (refundable). Box 22-87, Thomasville, Penna.

BUY Wholesale! Nationally known merchandise. Catalog \$1.00. (Refundable.) D'Auria, Box 355-M, Jackson, Michigan.

WHOLESALE Catalog! Appliances, cameras, watches. Postcard: Selbyco, Decatur 253, Illinois.

THOUSANDS Nationally advertised brand name products, including new 1956 automobiles—Discounts to 80%. Meder, 550-PM Fifth Avenue, New York City 36.

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RAILROADERS Get 1956 catalog-reference manual. O gauge scale, tinplate 50c. HO 50c. Terminal Hobby, 247 Erie, Milwaukee 2, Wis.

SHIP Models. Most complete line in New England. Kits, fittings, plans, books, tools, engines, motors. Illustrated catalog 25c. James Bliss & Co., Inc., Dept. 8M, 342 Atlantic Ave., Boston 10, Mass.

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ALL Crafts, supplies. Large free catalog. National Handicraft, 199 William Street, New York City 38.

FREE "Do-it-yourself" leathercraft catalog. Tandy Leather Company, Box 791-M13, Fort Worth, Texas.

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SURPRISE! Your letters remailed post-marked London, England. I affix British airmail stamp. 50c, three \$1. Major Kroger, 7th Air Division, A.P.O. 125, New York City.

LETTERS Reairmailed 25c. Receiving-forwarding address, \$2.00 monthly. International Courier Service, Box 6480-PM, Los Angeles 55, California.

LETTER Remailing, receiving-forwarding address for rent. McLaughlin, 800 Stewart, Columbus 6, Ohio.

LETTERS Remailed from Phoenix, Arizona. Lilart Co., Box 965, Scottsdale, Arizona.

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FOR Beautiful engraved name plate send \$1.00 and name. Mail-N-Post, Wapping, Conn.

I call this machine "My Little Money Maker"



It can be put anywhere in the house—in the kitchen, the basement, or the attic and it goes on making money for you whether you're there or not. Three times a day—while you're at work, while you're asleep, or at the movies—it turns out a product that sells for \$6 and the cost of raw materials is only 54c. It will make 6 a day, and the profit on each is more than \$5.00. I'll be glad to tell you how to get one of these little money makers working for you.

What a fellow makes in his regular job today is hardly enough to make ends meet. Higher taxes, higher costs of food and rent and almost everything else raise hob with the savings account. And I say that what a fellow puts away is even more important than what he makes. It would worry me sick if I couldn't save a little against a rainy day.



And that makes it almost necessary to make some extra money. There are lots of ways to do it, too. The magazines and newspapers are full of ads for agents to sell things. But if I had to make a living by selling, from house-to-house, I'm afraid I'd starve to death. I like to make something with my hands and

either sell it by mail or let the stores sell it for me. There are lots of people like me.

Another thing: Lots of men—and women; too—don't want to get mixed up with something that might hurt them on their jobs. They want a plan they can operate at home—in spare time—one that they can work at any time they please and one that doesn't need any rented store or hired help. And that's where my little money maker rings the bell.



Let's say you're like me. You want to make some extra money but you don't want to do any selling. All right—take a look at what you can do with this machine. I'll give you some facts that I discovered and your own common sense will tell you they're true.

If you're going to make something, it ought to be something that lots of people want—something that lots of people buy. It shouldn't be something that sells at just certain seasons—but all year round. And, it shouldn't be any flash in the pan. It's got to be steady—year after year—something that's not here today and gone tomorrow.

Well, give a thought to this: What's more permanent than babies? Ever since I can remember there's been more and more babies born every year. Last year three and a half million. This year more. Next year, more yet. Then answer this question and tie it in with your thinking: What's stronger than mother's love for her baby? And what is more powerful than love or sentiment in making people buy things. Now you've got the idea.

Every year millions of mothers want their babies' first shoes preserved as mementos. These mothers have the shoes "bronzed" as they call it—by electroplating. Electroplating coats the shoes with copper and preserves them forever. And there's no big company that has a corner on the business of metalizing baby shoes. Almost all of this work is done by little fellows in their kitchens



or basements. Lots of orders come to you by mail when you send out circulars letting mothers know you can do the work. Lots of stores take orders, but they have to turn the work over to you. There are six or seven ways to get orders without making any house-to-house calls. The big job is keeping up with them.

You see, you can clean up six pair shoes in a few minutes. In a few minutes more you can dip them in the hardening solution like you see in the picture. Then you spray them with a conductive coating and hang two pair in the tank on copper wires. Just turn the switch and walk away. The machine does the rest. Eight hours later those shoes are ready to take out of the tank, burnish and mount and ship or deliver. Two pair every eight hours, whether you are asleep, awake or at the movies. The materials cost 54c a pair.

The retail price you get for electroplating is \$6.00—so the profit is more than \$5.00 a pair. Since you can do six pair a day you can see what the profit is, and the beauty of it is that the machine doesn't cost much. Almost anyone can afford the equipment. The book tells how to run the machine and how to get orders without house-to-house selling.

If you'll just put your name and address on the coupon and mail it to me, I'll send you all the information right away by mail. After you have read all this you will know what you want to do. It will be easy to decide whether you would like to have a "Little Money Maker" of your own. Everything I send you now is free. There is no catch to it and nobody will call to try to sell you anything. I'll send everything free and postage paid. All you have to do is mail the coupon, get the facts and then decide. Mail the coupon right away so I can help you get started making money!

CARL A. MASON, 1512 Jarvis Ave., Chicago 12, Ill.

CARL A. MASON

1512 Jarvis Ave., Chicago 26, Ill.

Please tell me about the seven different ways to make money at home in spare time with your "Little Money Maker." It is understood that no salesman will call and it is up to me to decide what I want to do. Everything you send me now is free and will not cost me a penny now or ever.

Name

Address

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

Parade of Station Wagons

IF YOU NEED MORE ROOM in your car (room for children, lumber, trash or fertilizer), you'll probably look at station wagons. Owners find them handy for doing the week-end jobs common to the suburbs.

Here, for you to look over, are three pages of 1956 wagons. Eleven companies offer this body style, ranging in price from Rambler to Chrysler New Yorker.

Remember that while you do gain room, you lose certain advantages to get it. Wagons are noisier than sedans because the rear end is directly below the passenger compartment, not muffled under a trunk. A wagon is slow to heat because it has

more space. It has no trunk for hiding valuable (or embarrassing) cargo from curious pedestrians. On trips you either put luggage inside and lose the extra space you bought the car to get or you put it on the roof where it must be covered against weather—a nuisance if you have to get at it daily. Wagons are heavier, cost more to run. No company has yet solved the fume problem. With the rear transom open (desirable in hot weather), suction drags exhaust fumes inside the car. Finally, if you expect the wagon to solve the problem of obstreperous children, it won't. It just gives them more room to be obstreperous in. ★ ★ ★

Buick Special
Four-door Estate Wagon



Chevrolet Bel Air
Four-door Station Wagon

Chrysler New Yorker
Four-door
Town and Country



(Continued to page 102)



Catalog of 3,100 Novelties, Gadgets, Jokes & Tricks

Send 10c for amazing catalog of novelties, joke articles, funmakers, tricks, gadgets, live animals, scientific supplies, hobbies, planes & boats, unusual seeds, time-savers, cameras, optical goods, projectors, movies, lucky jewelry, religious goods, disguises, masks, musical instruments, stamps, coins, puzzles, fortune tellers, radios, auto & bike accessories, telescopes, magnifiers, compasses, banks, smokers' items, artist supplies, printing sets, engines, motors, shockers, knives, billfolds, guns, rifles, sports, books, games, plants, pennants, emblems, etc. Send name, address and 10c to:

JOHNSON SMITH & CO.
Dept. 295 Detroit 7, Mich.

Here's 10c. Rush me New Catalog!

Johnson Smith & Co., Dept. 295, Detroit 7, Mich.

Name _____

Address _____

**New
1956 Issue**

Build This Beautiful Corner Table

**Full-Size Pattern
Now Available**

To make this attractive table, you merely trace the design on wood, saw, smooth the edges and assemble. It's so easy it takes all the guesswork out of furniture building. Designed as a companion piece for the step and cocktail tables detailed in Full-Size Patterns Nos. 103 and 104, this table can be used alone or with any grouping of contemporary furniture.



Other Patterns In This Series

There are 14 other full-size patterns in stock. These include a 12-foot boat, a work bench and toys for the children. For details, send coupon.

Guaranteed to Please

Designed by John Bergen, noted furniture designer, this table will be a handsome addition to your home. If, however, you are not thoroughly pleased with the pattern, you may return it within 7 days for a full refund. The price is only 50c.

Order on this Handy Coupon

POPULAR MECHANICS PRESS, 200 E. Ontario St., Chicago 11

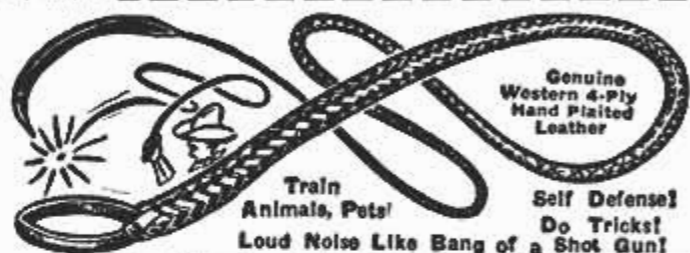
Please send postpaid the Full-Size Corner Table Pattern. If not satisfied, I will return it within 7 days for a full refund of the purchase price.

- Send the Corner Table Pattern (I enclose 50c)
 Send information on other full-size patterns

Name _____

Address _____

City _____ State _____



PLAITED LEATHER BIG BULL WHIP

Experts knock ashes off cigaret, run out of hand, yank people off feet, etc. Used by trainers, ranchmen, etc. Grip lightly (pressure is on loop), then crack or coil; snake out or back; overhand, underhand, side-arm. Neat's oil finished for pliability & long life. "Cracker" or tongue on end. Solid grip handle with loop.

6-ft. Whip \$1.98; 8-ft. Whip \$2.69.

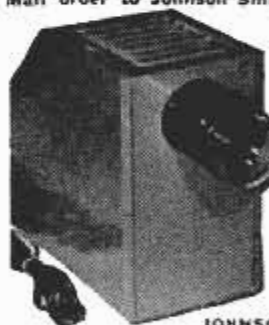
JOHNSON SMITH & CO., Dept. 295, Detroit 7, Michigan POWERFUL ELECTRIC GENERATOR

Cost Over \$20.00 New; While They Last, \$3.95

Generates Up To 75 Volts. Use to generate electricity, to ring bells, light up lights, as a medical battery, deliver terrific electric shock as joke, many electrical experiments, classroom uses, etc. Cost over \$20 new. Used but excellent operating condition. Hand crank or gear wheel drive. Made by leading electrical companies. Each has 3 or 4 five-inch 1-lb. bar magnets (alone worth more than total cost), generating armature, wire leads, gear crank, ready for use. Originally used in crank phones. Complete unit weighs over 5 lbs. Each Postpaid \$3.95 (Over 1000 miles from Detroit, send \$4.95, otherwise shipped express charges collect). Telephone Mike \$1.75. Mail order to Johnson Smith Company, Dept. 295, Detroit 7, Mich.

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— Enlarges Pictures, Printing, & Objects! — Full Color!



NEW! Electric Magna-Vue Optical Instrument projects & enlarges clippings, pictures, sketches, objects in full natural color, correctly & readable. Project on wall, screen or table, **MAGNIFIES 100 AREAS.** Enlarges any material up to 3 1/2 x 4 in. to 32 x 40 in. For home, school, class, business, shop use. Also make signs, sketches easy from any copy. Enameled steel, 10x7 1/2 in. high. Quality 2" focusing lens. Operates on standard 110 volt current. Money back guarantee. Price Postpaid..... **\$4.98**

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Low down-payment. Pay as you weld. Money back guarantee. Send for details. Complete outfit.

Only \$38.50

F.O.B. Factory

PARADE OF STATION WAGONS (Continued from page 100)



De Soto Firedome
Four-door Station Wagon

Dodge Sierra Custom
Four-door Station Wagon



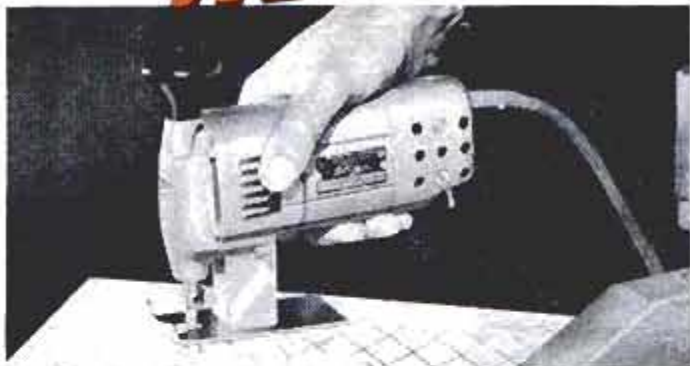
Ford Parklane
Two-door Station Wagon

Mercury Custom
Four-door Station Wagon



(Continued to page 104)

THEY'RE **NEW!**



FASTEST-CUTTING JIG SAW MADE! This powerful new Millers Falls tool is a jig saw, hack saw, coping saw, ripsaw, crosscut and keyhole saw all in one. Makes curved, straight or irregular cuts in wood, metal, all kinds of material—in places often inaccessible to other saws! Exclusive design features and special blades result in far greater cutting speed than any similar saw.

No. 480 Dyno-Mite Electric Jig Saw — \$44.95

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No. 580 Dyno-Mite Orbital Sander — \$44.95

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Millers Falls

Finest Power Tools Made



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Open a ZIP PACK Rub on STAPO—wipe off—your hands are... **CLEAN**

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CLEANS GRIMIEST HANDS QUICKLY and EASILY

DISPENSER CARTON CONTAINS 40 ZIP PACKS

STAPO (pronounced STAY-POE)—the original waterless hand cleaner especially compounded to remove stubborn grime and grease from the hands without the need of soap and water. Sold since 1933 to industry and known to be the

finest and most effective product of its kind wherever it is used. To answer an increasing demand, we have developed a new Dispenser carton containing 40 aluminum-foil ZIP PACKS of STAPO—a full 6 month supply for average user.

Carry this Dispenser carton of STAPO ZIP PACKS in the car—hang one in your garage or home shop. Keep a few STAPO ZIP PACKS in your tool box or in your office desk and be sure you always have a quick, easy and effective means of really cleansing your hands even though soap and water are not available. STAPO actually dissolves grease and grime and floats it off the skin—removes it from the creases in knuckles—from under fingernails and around the cuticle—STAPO removes grease that ordinary soap and water won't touch. This wonderfully efficient product in its handy modern package will be doubly appreciated for that difficult clean-up job after roadside auto repairs or when working around your car on your day off. Nothing beats STAPO for fast and easy and complete removal of grease, paint, tar, plaster, printers ink, gasket cement, and other stubborn grimes from the hands.

STAPO not only cleans with tremendous effectiveness but conditions the hands with repeated use—it is soothing to the skin.

You don't need to send money to try STAPO. Just fill out the handy order coupon below and we will forward your Dispenser carton of 40 ZIP PACKS of STAPO at once. Pay the postman only \$1.79 plus small postage and C.O.D. charge upon arrival. If you prefer, send \$1.79 plus 21 cents for postage and your STAPO Dispenser carton will be shipped postpaid. The purchase price will be cheerfully refunded if you are not completely satisfied the first time you use STAPO. Order one or more STAPO Dispenser cartons today.

STAPO Chemical Co., Dept. 12, 2710 So. Indiana St., Los Angeles 23, Calif.

ORDER TODAY send no money

STAPO Chemical Co., Dept. 12, 2710 So. Indiana St., Los Angeles 23, Calif.

Please rush me _____
Dispenser carton(s) of STAPO in ZIP PACK foil containers.

Send C.O.D. I will pay postman \$1.79 for each carton ordered plus small postage and C.O.D. charge.

I enclose \$1.79 plus 21¢ for postage for each carton ordered. You will ship PREPAID.

I MAY RETURN IT FOR REFUND OF MONEY PAID YOU IF I AM NOT SATISFIED AFTER USING MY FIRST ZIP PACK

NAME _____
STREET _____
CITY _____ ZONE _____ STATE _____

PARADE OF STATION WAGONS (Continued from page 102)



*Plymouth
Sport Suburban*
Four-door Station Wagon

Pontiac 870
Four-door Station Wagon



*Rambler
Cross Country*
Four-door Station Wagon



*Studebaker
Pinehurst*
Two-door Station Wagon



♦ For the newest idea in station wagons see page 76.

DO IT YOURSELF DEGREASER!

engine shampoo



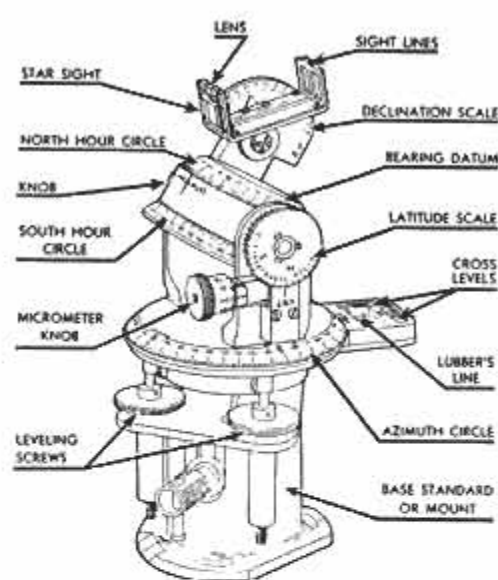
QT. SIZE CONCENTRATE
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SPRAY OR BRUSH ON . . .

Takes cling out of oil and grease . . . emulsifies it . . . so that all dirt may be hosed off as easily as you rinse hands under water faucet. Launders engines faster, more completely, and safer than steam cleaning (warm the engine). Self scouring action brings out factory new appearance . . . provides accurate visual inspection . . . Gunked engines run cooler. Genuine Gunk is sold in BULK sizes at better automotive wholesalers everywhere. Retail sizes sold at WESTERN AUTO STORES and ASSOCIATE STORES. TRY IT TODAY!

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HIGH SPEED DRILLS WITH 1/2" SHANKS
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NEW SLITTING SAWS WITH MANDREL
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Free Catalog — Hundreds of Electrical, Mechanical & Tool Bargains
PRACTICAL ENGINEERING CO. 707 N. Sheridan
Tulsa, Okla.

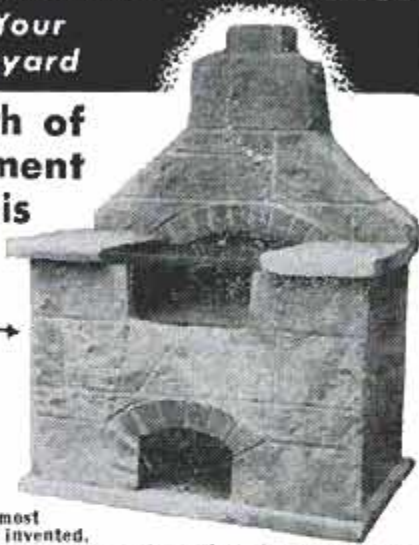
MANUFACTURE THIS BEAUTIFUL CONCRETE OUTDOOR FIREPLACE

Right In Your
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\$4.00 Worth of
Sand & Cement
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Attractive
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Easy to start your
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Business.

The General Fireplace
Molds and Process are the most
amazing and foolproof ever invented.
Simple to operate. Two men can produce five fireplaces a day.



BIG DEMAND!!

Sell all you produce to Department Stores, Homeowners, Parks, Nurseries and Picnic Groves. Fireplaces sell on sight. No experience necessary. We supply full operating instructions and equipment plus the know-how that spells BIG PROFITS. This is an outstanding opportunity for men of vision and small capital to get into a busy rich paying field. Don't delay, be the only exclusive manufacturer in your own home town. Mail coupon at once for full details as to how you can reserve your territory. **Molds sold only on exclusive franchise.**

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Name

Address

City Zone

State

For the Man who "TREATS 'EM ROUGH" Parker's new H-75 Tubular Frame Hack Saw

The most rugged Hack Saw on the market

Steel handle covered with tough, unbreakable plastic formed into full-size comfort grip.

Extra strong, 4" deep, shockproof frame of heavy steel tubing — double plated chrome finish.

Adjusts for both 10" and 12" blades.

Adjustable thumb rest for easier, truer sawing.

Exclusive, patented, forged blade holders lock in four sawing directions.

Wherever good tools are stocked

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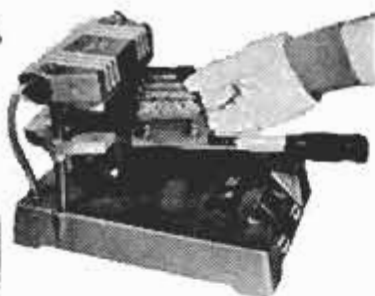
Manufacturers of World-famous Trojan Saw Blades and Frames

Buy the **Parker** Line

PARKER MANUFACTURING CO.
WORCESTER 1, MASS., U. S. A.

Break into the profitable RUBBER STAMP BUSINESS at home in spare time

with this
**INEXPENSIVE
TABLE TOP
MACHINE**



Home operators now **MAKE \$9.20 AN HOUR**
in business once controlled by a few big companies

Amazing new rubber molding invention puts you in business for yourself. Now, for the first time, the profitable rubber stamp industry is open to individuals. Here is an opportunity to start small in spare time in your own home. Keep your job until you're making enough to be independent of time clocks and bosses.

At one time only big companies could make rubber stamps because it required expensive machinery. People who wanted special stamps had to send cash in advance, wait days, or even weeks, and still run the chance of disappointment. This sensational invention changes all that.

Today, home operators like yourself can make rubber stamps. You take 27 cents of material, run it through this machine, and come up with a perfect stamp worth \$1.80. That's a \$1.53 profit on every stamp. Anyone can do it—it's not hard at all. This machine runs on an ordinary electrical outlet and it will fit your kitchen table top. You can make special stamps like the ones for people's names and addresses, the ones offices use to mark packages, identify products—in fact, any kind of stamp at all.

Now, the big manufacturers still use expensive machines costing as much as \$3,000. They set the high prices for rubber stamps, ranging from \$1.80 up. You can make these stamps much cheaper with this inexpensive machine. So your profit is much greater—as much as \$9.20 every hour.

Act quickly to take advantage of this offer. Get a head start. Just fill out the coupon below. We'll mail you free information without obligation. We tell you all about this machine, how to get started in spare time, how to get orders coming in eight different ways—everything you need to know to succeed.

Here is your chance to get out in front and stay there in a fascinating new branch of an old, established highly profitable business. Mail this coupon for free facts today.

**RUBBER STAMP DIV., 1512 Jarvis Ave.
DEPT. R-22 CHICAGO 26, ILLINOIS**

MAIL COUPON TODAY!

**RUBBER STAMP DIV., Dept. R-22
1512 Jarvis Ave., Chicago 26, Ill.**

Please rush free information. Tell me how I can get into the profitable rubber stamp business in spare time on very small investment. Mail all information, Free. No salesman is to call.

Name.....
Address.....
City..... Zone..... State.....

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...before it TALKS

...is the way our doctors put it—"Our chances of curing cancer are so much better when we have an opportunity to detect it *before it talks.*"

That's why we urge you to have periodic health check-ups that *always* include a thorough examination of the skin, mouth, lungs and rectum and, in women, the breasts and generative tract. Very often doctors can detect cancer in these areas long before the patient has noticed any symptoms.

For more life-saving facts phone the American Cancer Society office nearest you, or write to "Cancer"—in care of your local Post Office.

American Cancer Society 

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

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3 PERMANENT COLORS
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THEY FLOAT

ORDER DIRECT

FROM FACTORY... AND SAVE!

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"Sturdy" model 6 1/2 ft. long
Other models and lengths available

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ORDER TODAY for immediate shipment or write for **FREE** folder

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 Please ship _____ pr. Sturdy model, _____ color, 6 1/2 ft. @ \$15.95 pr.
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NAME _____

ADDRESS _____

CITY _____

STATE _____

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1956 ALLIED

ELECTRONIC SUPPLY CATALOG

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value-packed
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in TV and Radio
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Rush FREE 1956 ALLIED 324-Page Catalog

Name _____

Address _____

City _____ Zone _____ State _____

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IMPORTANT NOTICE—It is the intention of this magazine to provide its readers with information regarding the latest developments in the mechanical arts. We take no responsibility as to whether the disclosures contained in our articles are covered by patents and advise readers to investigate this subject before making, using, or selling any of the products, machines, or processes described in order to avoid possible liability for patent infringements.

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Supersonic Wind Tunnel Discloses New Heat Problems

University of California researchers, working with a new supersonic wind tunnel, have discovered an aeronautical heat problem not previously suspected. Projectiles traveling at 760 miles per hour, they learned, get hotter at altitudes above 20 miles than when flying low. This was surprising because it had been thought that the friction caused by dense air at low altitudes produced greater heat. Now they find that the thin air is actually more viscid and that the heat generated in the stratosphere cannot be dissipated as easily, causing a high-flying object to heat up more than a low-flying one.

Sweden's State Power Board last July began construction of a 150,000-kilowatt steam-power station in a bombproof chamber being hewn out of solid granite nearly 300 feet below the surface.

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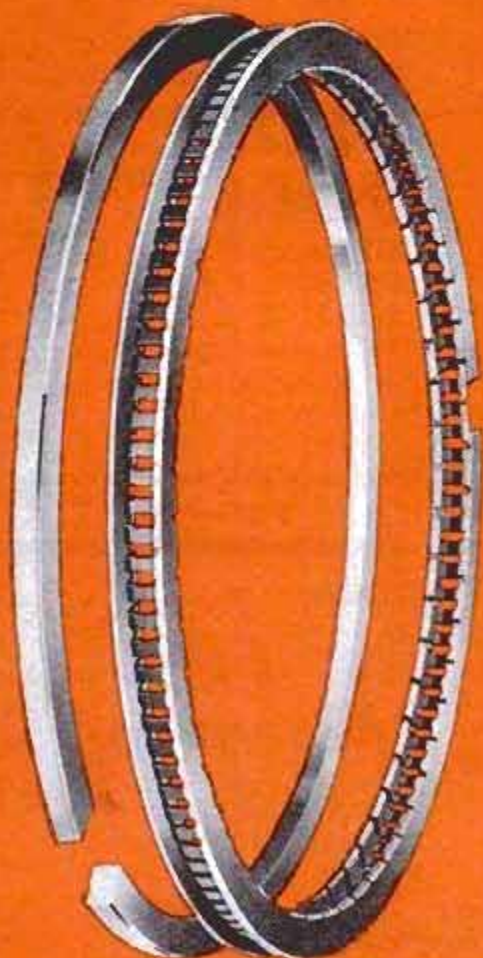
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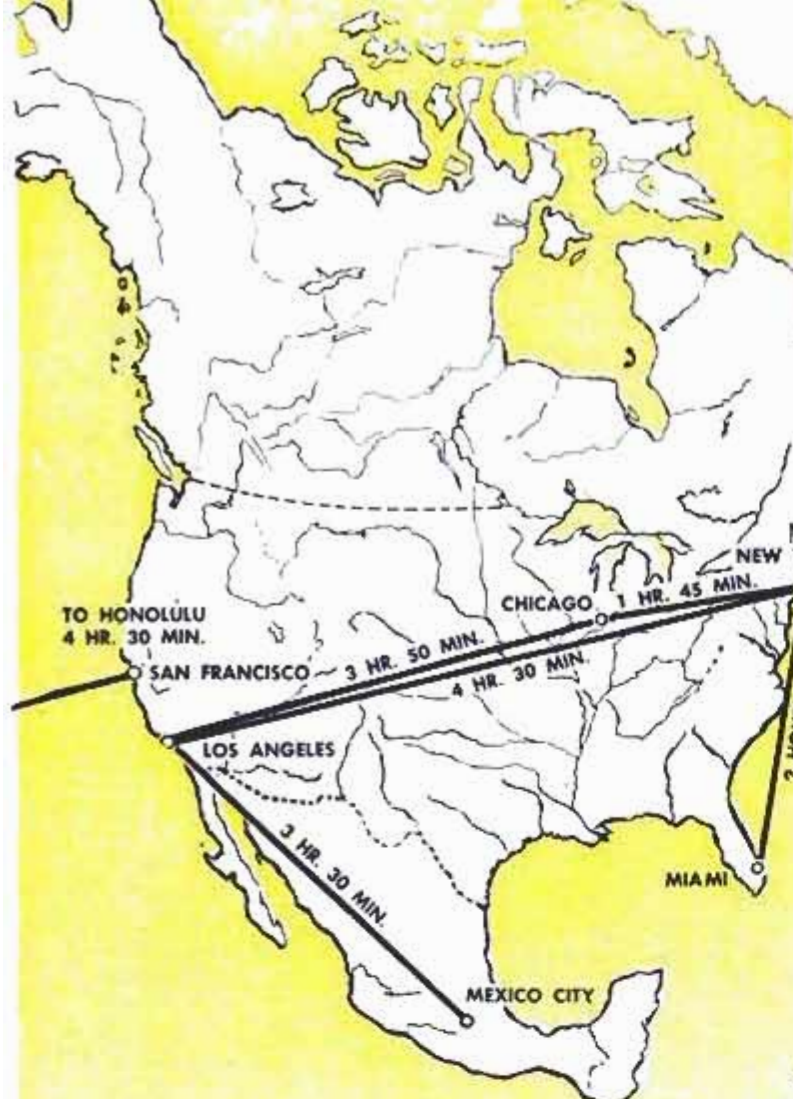
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	JET	1 HR. 45 MIN.
HONOLULU TO SAN FRANCISCO	TODAY'S TIME	9 HOURS
	JET TIME	4 HR. 30 MIN.

The Race of the Airliners

By Thomas E. Stimson, Jr.

MR. AVERAGE AIR TRAVELER has become pretty tired of dawdling across the United States in 10 hours or more. He proved it by grabbing every seat when the airlines began their 7½ to 8½-hour nonstop flights that chopped more than two hours from the old coast-to-coast schedules.

But he isn't satisfied. "Waste most of a

day from New York to Hollywood? Ridiculous!" he snorts. "Put me on a plane that will get me there for lunch!"

And that's what the airlines are preparing to do.

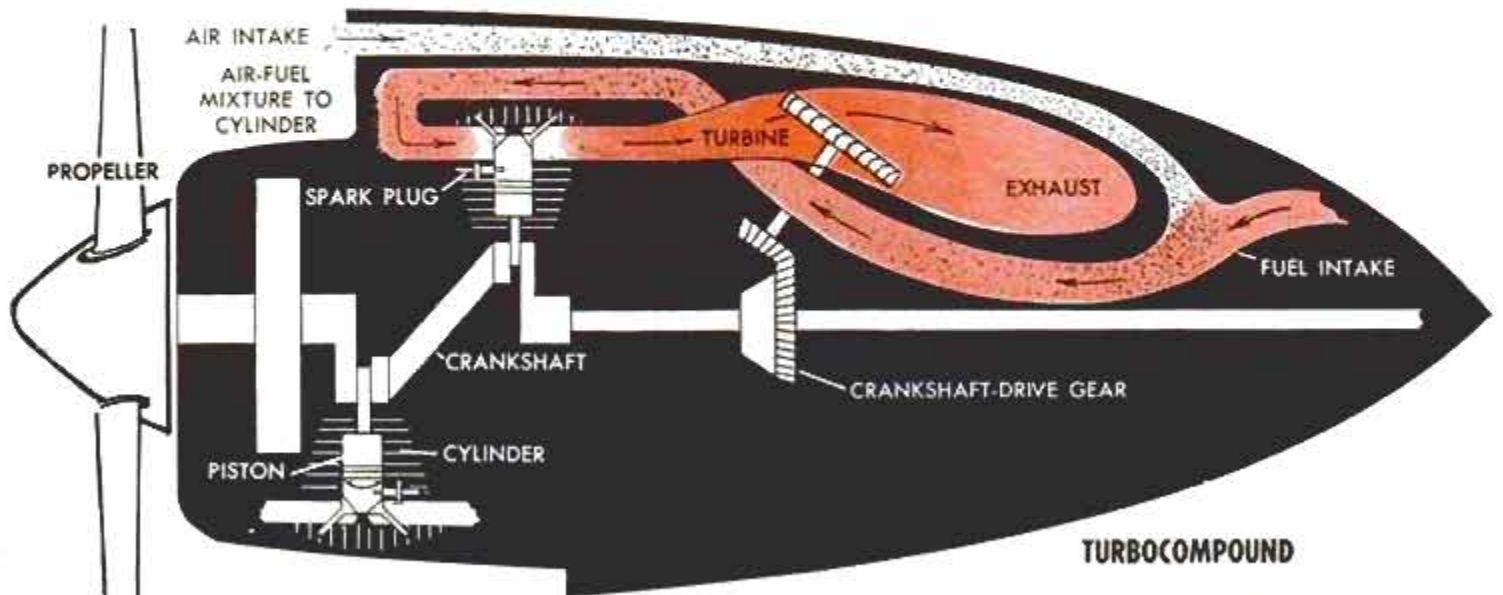
Speed is their business and they are ordering new aircraft that will carry you across the country or around the world faster than ever before. New jet airliners,

Passengers at Los Angeles boarding DC-7 for non-stop transcontinental trip, typical of new service





Turbocompound engines are now in use on many airliners, such as the Douglas DC-7B at the left and the Lockheed Super Constellation below



The turbocompound actually is a piston engine with a turbine added. Exhaust gases turn the turbine as they leave the engine. Geared to the crankshaft, the turbine passes extra horsepower along to the propeller



turboprops and vastly improved piston-engine transports are under construction.

Some 33,000,000 passengers traveled on domestic airlines in 1955. When final totals are added up it may be that American Airlines will have displaced Pennsylvania Railroad as the world's leading passenger-transportation concern, disregarding short commuter trips. Of the six leading passenger carriers in the United States, four are airlines. Air travel is growing by fantastic leaps and bounds.

Already in service are three new large airliners of advanced design, better than the best transports of a couple of years ago. One of these is the English-built Viscount, used on this continent by Capital Airlines and Trans-Canada Airlines. The Viscount has four turboprop engines and carries some 40 passengers at 355 miles per hour for distances up to 1500 miles.

The other new big transports are the

Lockheed Super Constellation and the Douglas DC-7, each larger and faster than earlier models. Each cruises at about 335 miles per hour; each carries a comparable number of passengers (up to 97 in aircoach service). Each is powered by four Wright turbocompound piston engines developing a total of 13,000 horsepower. Range of the DC-7 is 4430 miles, while that of the Super Connie is 5580 miles.

In this newest Lockheed you can fly nonstop from New York to Paris in 12 hours, as against the two-stop, 19-hour trip of only a few years ago.

Even newer and longer-range versions of these two aircraft will be flying soon. The DC-7C "Seven Seas" for continent-to-continent travel is scheduled for delivery in 1956. It will carry up to 62 passengers for distances up to 5000 miles at a cruising speed of 350 miles per hour. British Overseas Airways Corp. has ordered 10 of

them for various routes, including a one-day, one-stop service between Los Angeles and London.

In 1957 the "1649" series of Super Constellations will go into service. Comparable to the DC-7C in accommodations and speed, this super long-range transport will be able to cruise nonstop for 6500 miles, about a quarter of the way around the globe.

For the first time, airlines will be able to schedule nonstop flights between such points as New York and Rome (4281 miles), Seattle and Tokyo (4793 miles), and Honolulu and Lima (6070 miles).

In the turboprop field Lockheed is building the 64-passenger Electra transport that will cruise in excess of 400 miles per hour for distances up to 2000 miles. American Airlines and Eastern Air Lines have ordered a total of 75 Electras for delivery beginning in 1958. These will be the first domestic turboprop airliners although Lockheed and Convair, Boeing and Douglas all have built turboprop transports for the military.

The "blue ribbon" airliners, the jets, will

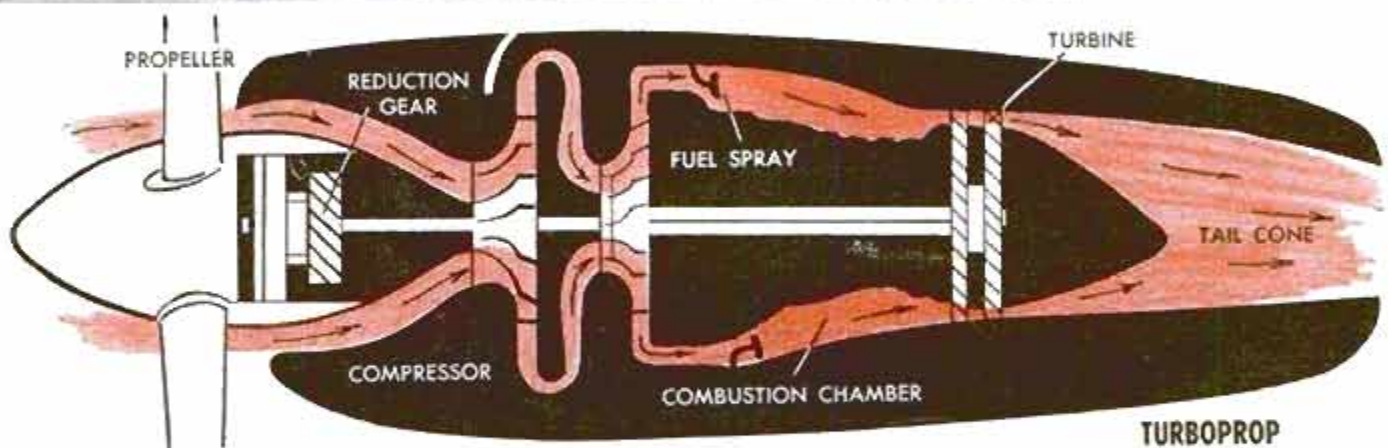
be introduced to the public in 1958. Boeing already has more than 200 hours of flight time on its jet airliner prototype, the 707, that recently flew from Seattle to Washington, D. C., in less than four hours. Douglas is now building and testing complete sections of its jet airliner, the DC-8. Pan American World Airways has ordered 20 of the Boeing jet airliners, 25 of the DC-8s. In addition, United Air Lines is purchasing 30 DC-8s with deliveries to begin in 1959. American Airlines has ordered 30 of the Boeings for 1959 delivery.

The jets will be large, heavy, fast transports. The DC-8, for instance, will have a span of 134 feet, a length of 140 feet. With 18,000 gallons of fuel aboard to feed its thirsty jets and carrying 125 passengers, it will weigh more than 127 tons. This compares with the less-than-70-ton weight of the DC-7.

Both planes will cruise at about 550 miles per hour at altitudes of about 35,000 feet. Each will literally race the sun on westbound trips. The five-hour flight from New York to San Francisco will be cap- suled into a two-hour difference in the



The turboprop is a gas-turbine engine. Air is drawn in at front, compressed, and then forced into the combustion chamber where it is mixed with fuel and ignited. The burning mixture drives a turbine which is geared to the propeller shaft. Fuel used is kerosene. Extra power is gained by jet action of exhaust

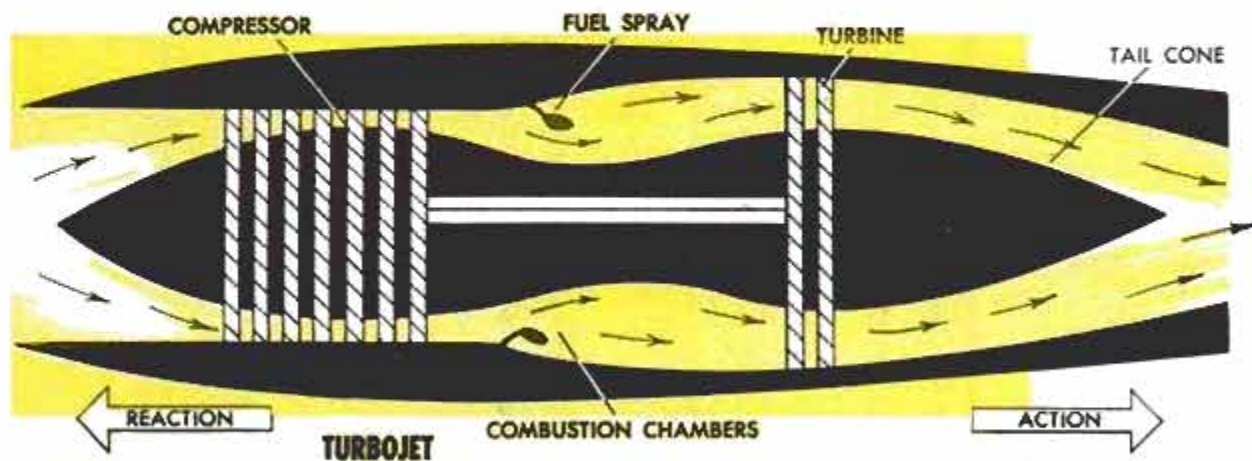


Above, the Lockheed Electra, a turboprop liner ordered by American Airlines for delivery in 1958. At the right, Capital Airlines is now flying the Vickers Viscount Turboliner on its U. S. routes





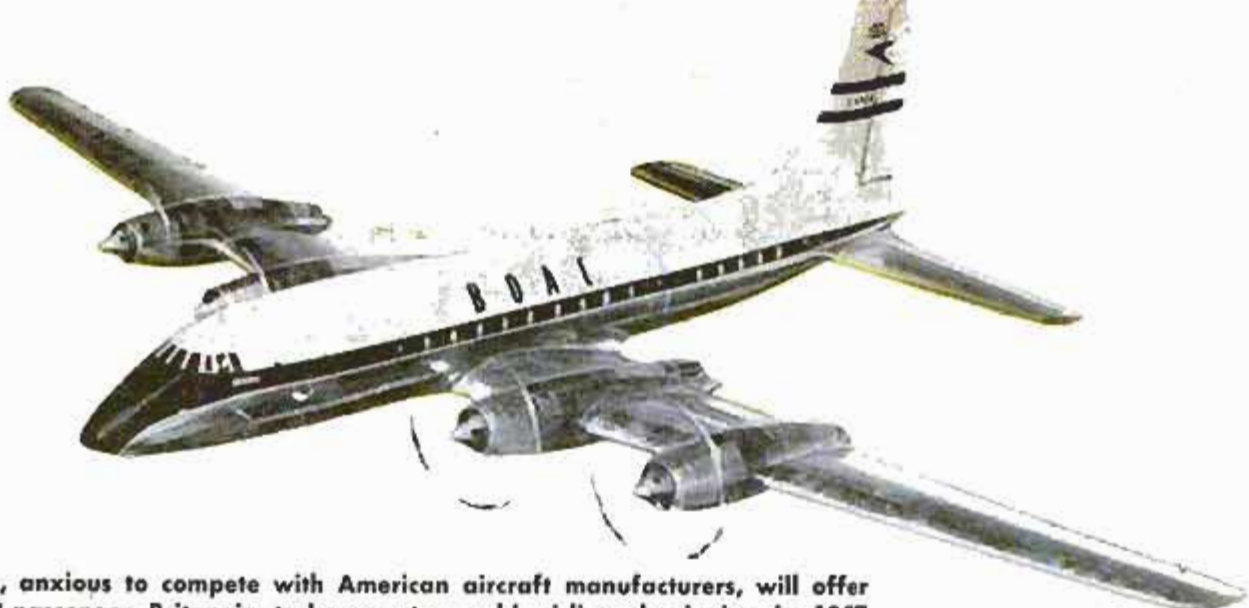
Two new jetliners due for service in 1958 are the Boeing 707 and Douglas DC-8. Both have engines suspended under wings



A turbojet is a jet engine with a turbine added to operate a compressor. Air enters at the front, is compressed and forced past fuel nozzles into combustion chambers where it is ignited. Hot exhaust turns the turbine as it passes. The sole purpose of the turbine is to operate the jet's compressor section

AIRLINER SPECIFICATIONS

AIRLINER	Engine Type	Number of Passengers	Cruising Speed (M.P.H.)	Range (Miles)	Cruising Altitude (Feet)	Engines (4)	Total Thrust	Wing-span (Feet)	Length (Feet)	Gross Weight (Pounds)
DOUGLAS DC-7 (In use)	Piston	64-97	335	4430	15,000	Wright Turbo-compound	13,000 HP.	117	108	122,000
LOCKHEED SUPER CONSTELLATION (In use)	Piston	47-94	335	5580	12,500	Wright Turbo-compound	13,000 HP	123	116	137,500
VISCOUNT (BRITISH) (In use)	Turbo-prop	44	320	1500	20,000	Rolls-Royce Dart	6,200 HP	98	81	60,000
DOUGLAS DC-7C (1956)	Piston	62	350	5000	20,000	Wright Turbo-compound	13,600 HP	127	112	140,000
LOCKHEED SUPER CONSTELLATION, 1649 Series (1957)	Piston	58-64	350	6500	N.A.	Wright Turbo-compound	13,600 HP	150	120	156,000
BRITANNIA (BRITISH) (1957)	Turbo-prop	93	360	5350	30,000	Proteus 705	14,800 HP	140	114	165,000
LOCKHEED ELECTRA	Turbo-prop	64	414	2000	25,000	Allison T-56	15,000 HP	95	101	98,500
BOEING JET STRATOCRUISER (1958)	Turbo-jet	104-125	575	5000	30,000	Pratt & Whitney J-57	44,000 LB.	136	135	230,000
DOUGLAS DC-8 (1958)	Turbo-jet	108-131	575	5000	30,000	Pratt & Whitney J-57	44,000 LB.	134	140	257,000
COMET 4 (BRITISH) (1958)	Turbo-jet	58	500	2870	35,000	Rolls-Royce Avon	42,000 LB.	N.A.	N.A.	152,500



Britain, anxious to compete with American aircraft manufacturers, will offer the 93-passenger Britannia turboprop to world airlines beginning in 1957

time zones. The eastbound trip will be made in $4\frac{1}{2}$ hours instead of 5 because of prevailing winds. Paris will be only $6\frac{1}{2}$ hours away from New York. Passengers boarding the new jets in London after breakfast will be able to take a coffee break in New York, have lunch in San Francisco, and still have time for a swim before dinner in Honolulu.

Some have wondered why America has been "slow" in going to jet transportation when the British flew jet airliners several years ago. There are some very good engineering reasons for this.

Our own aircraft builders have been designing jet passenger liners for years. As far back as 1945 Douglas made a drawing-board study of a jetliner that would be powered with the best engines available at that time. It was an excellent aircraft with only one fault: Its maximum range was about 400 miles. It would need to refuel every hour or less.

Since then Douglas has made almost 700 studies of a jet airliner. Each study was complete to block speed, passenger accommodations, and operating costs. Each time a new jet engine with greater thrust and reduced fuel consumption became available, the paper airliner acquired greater speed and longer range.

Other manufacturers were doing similar research, all shooting for the same goal. They wanted a safe aircraft that would carry a lot of passengers across the United States in less than five hours or across the

Atlantic in a little more than six hours.

Meanwhile England went ahead with its Comet jet airliners and got into trouble. Metal fatigue slowly weakened the fuselages until two Comets finally exploded in mid-air. They weren't strong enough to hold comfortable cabin pressures in the thin air above 30,000 feet. American manufacturers continued to wait for a jet engine that would give their more-rugged construction the high performance they desired.

The engine finally materialized in the J-57, a Pratt and Whitney twin-spool turbojet that develops 11,000 pounds of thrust. It is called a twin-spool engine because one group of its compressor blades and one group of its turbine blades are fixed to a shaft that rotates freely inside a shorter, hollow shaft to which the rest of the compressor and turbine blades are attached. Specific fuel consumption is less than single-spool types and take-off performance at high-altitude airports is better.

The J-57 with afterburner powers four different supersonic Air Force fighter planes. With it, the F-100 recently set a new world speed record of 822 miles per hour, well above the speed of sound. The huge and fast 650-mile-per-hour B-52 jet bomber is powered with J-57s. Still partly secret, the engine has been in military use for more than three years.

Both the DC-8 and Boeing's Jet Strato-cruiser will use these power plants. The DC-8 and the 707 have much in common.

Comet 4 will be Britain's bid for the jet-transport market. Completely redesigned after earlier Comets developed metal fatigue, it will be ready in 1958





Present-day airliners, like the Convair above, are being tested for operation with turboprop engines

To a casual eye, they are practically identical. Each has a swept wing. Each has a fuselage that is longer than the wingspan, indicative of the trend toward longer, narrower aircraft. Each will carry its four jet engines outboard instead of burying them in the wing. This safety feature is a characteristic of all American multijet aircraft.

It is noteworthy that when two different groups of competent engineers (Boeing and Douglas) were given the same engines and the same airline requirements, and then were asked to design the best jet airliner, both groups came up with essentially the same answer.

The Boeing 707 was fully described in the August 1954 issue of *Popular Mechanics*. Like it, the DC-8 will be as conventional as possible to avoid the unknown hazards of untried design.

The DC-8 will have two passenger entrances instead of the usual single door. This will speed the loading and unloading of passengers at terminals and cut the

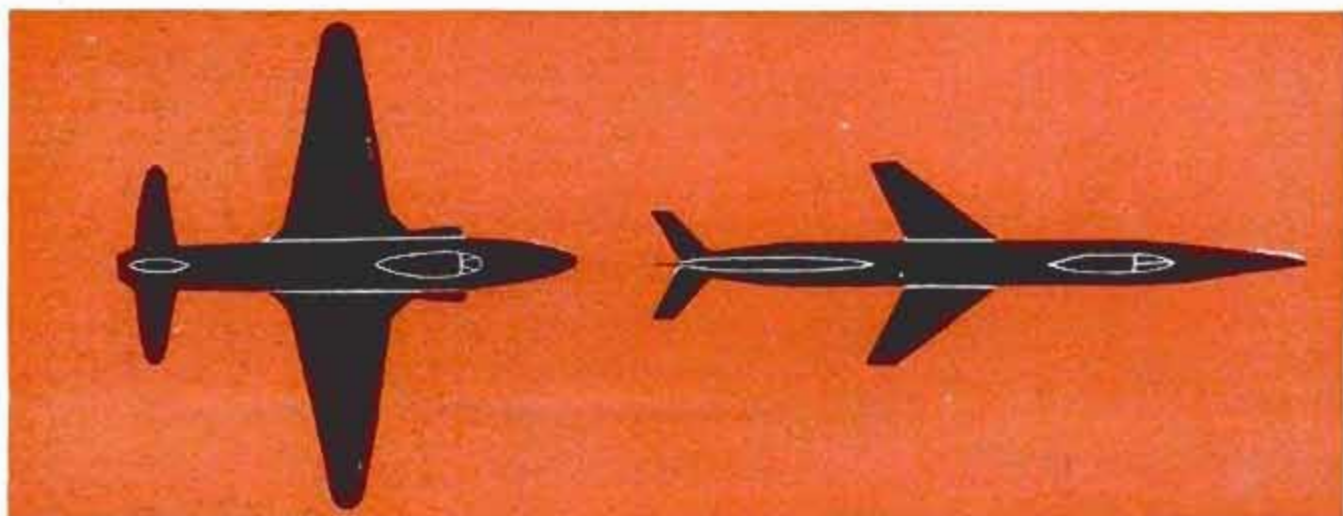
time required for stops. A high-pressure underwing fueling system will fill all fuel tanks while the passengers are boarding.

To avoid any chance of explosive decompression in the high altitudes at which it will operate, the DC-8 has small windows that structurally are stronger than large windows. New knowledge about structural fatigue is being used in the design. The fuselage will be beefed up with a "stop rip" type of construction in the window areas. In effect, the passenger cabin becomes a spaceship. All doors and other closures are of a plug type that effectively seal themselves when cabin pressure becomes greater than the pressure outside.

Meanwhile England is about to return to the jet-airliner field after having made exhaustive studies of its Comet failures. Already being tested is the Bristol Britannia, a 93-passenger turboprop airliner due to go into service in 1956. Too, jet prototypes are being used in studies of the

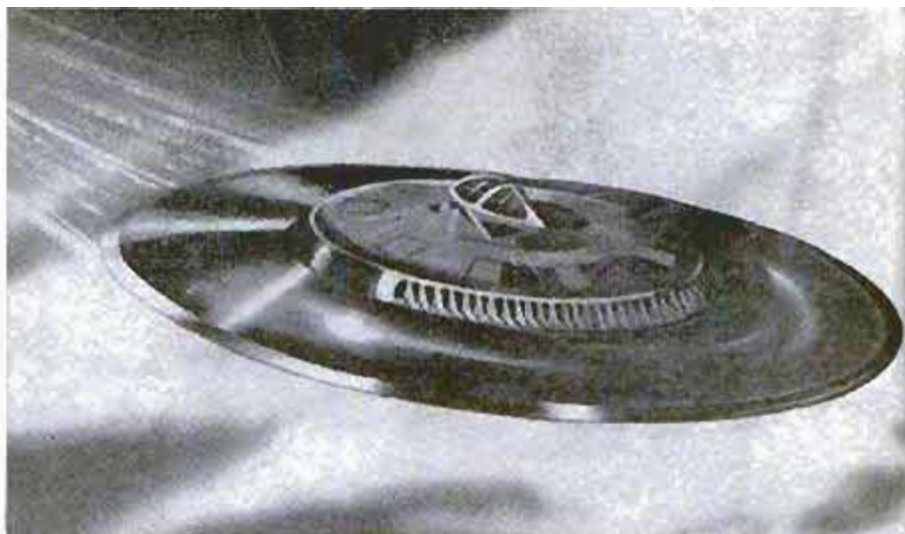
(Continued to page 306)

The current trend in aircraft design is toward longer, narrower fuselages and shorter, swept-back wings



REAL Flying Saucer?

According to the U.S. Air Force, flying saucers just don't exist—but they soon will. The Air Force has under development several vertical-rising, high-speed aircraft. One of these, it says, will have a true disk or saucer shape. An Air Force artist's conception of the craft looks like popular notion of a flying saucer.



Air Force drawing



Tire-Sealing Compound

Punctureproof tires are said to result when the inside of the tube or tubeless tire is coated with a sealing compound. The coating becomes activated when a break occurs and permanently seals the puncture with little loss of air. The coating contains no rubber and will not clog the tire valve. It is applied by attaching an air hose to a pastry-tube-type metal gun and shooting the compound through the tire valve to coat the inside of the tire. Four tires can be processed in 15 minutes and the maker claims that tires run cooler when treated than when untreated.

Mississippi "Mattress" Holds River Bottom in Place

Covering $3\frac{1}{2}$ acres, a "mattress" woven of willow trees has been towed into position and sunk to the bottom of the Mississippi River at New Orleans. The mattress is being used to prevent scour of the river

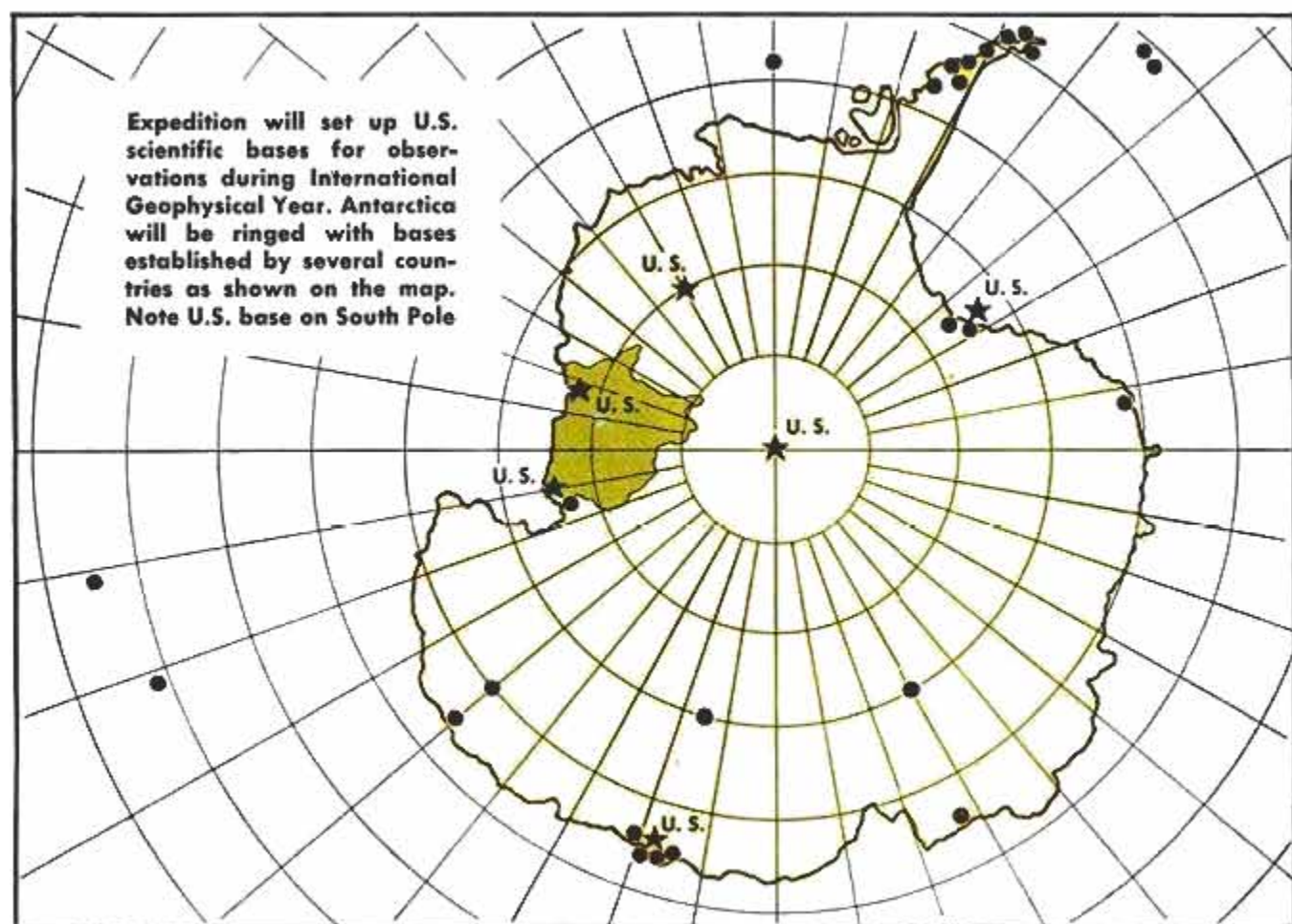
bottom during construction of a huge pier for a \$65,000,000 bridge. The 300 by 500-foot mattress was ballasted with rock so it would sink. Without it, the current would wash mud from around the pier.

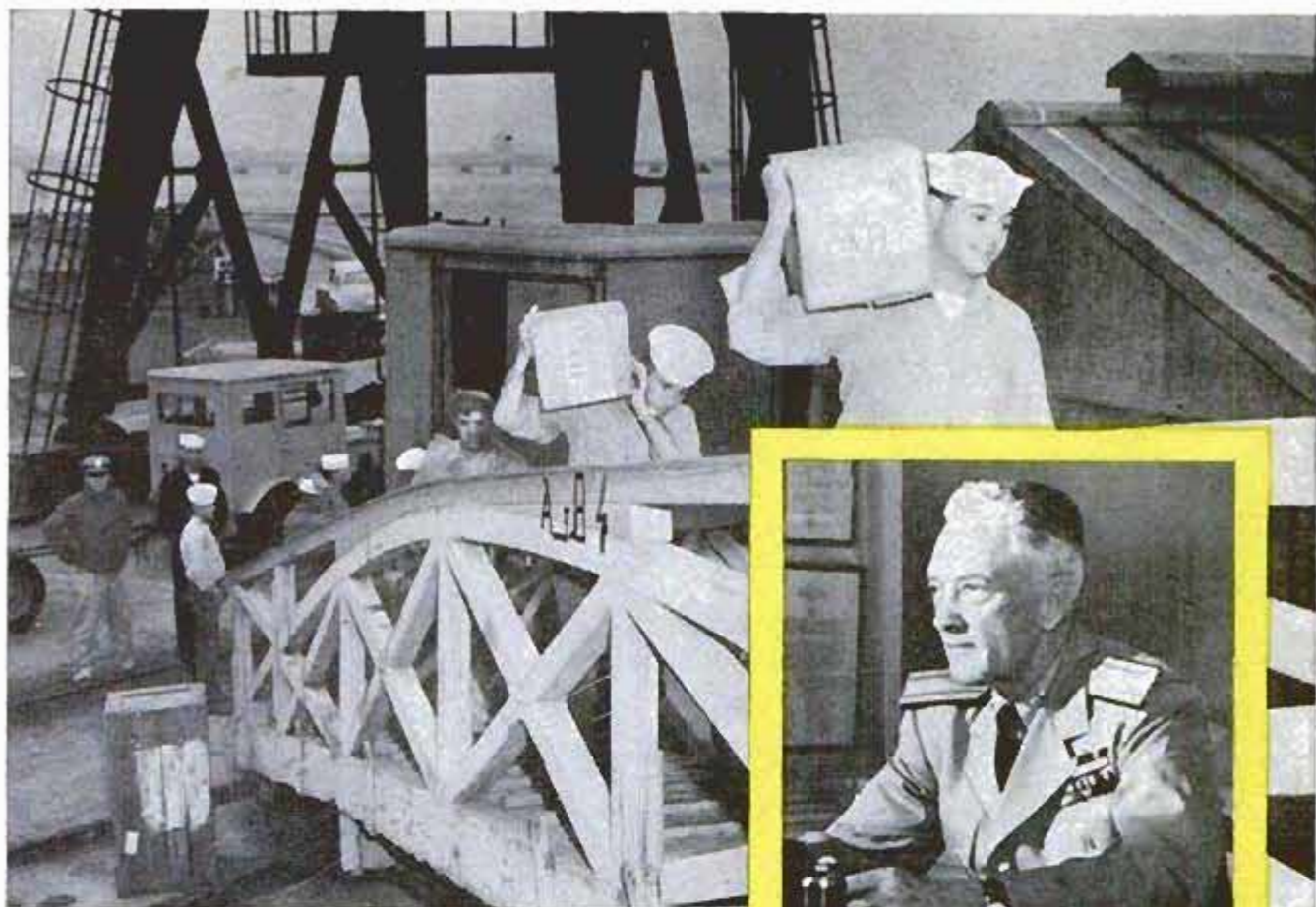




Bower Hills, bleak and snow-covered, rise out of Antarctica. In some places the glacial ice is two miles thick

We'll Plant a Village on the





Sailors load food prior to ship's departure for Antarctica

South Pole

By Rear Adm. Richard E. Byrd, USN (Ret.)

BY THE TIME THIS is printed, I will have disembarked in Antarctica for the fifth time since 1928, when I first looked out over this immense continent of ice and snow, scarred by crevasses and punctuated by jagged 15,000-foot mountains. A fleet of about a dozen ships—more than half from the United States—will have breached the Antarctic Circle at many points. In the lead, broad-brimmed icebreakers with angular bows of heavy, reinforced steel plate will have heaved up on 10-foot ice and, by sheer weight and power, broken through to form passages of open water to the mysterious white continent at the bottom of the world.

In addition, if the elements do not interfere with our plans, a squadron of ski-equipped medium-range planes will have made the first nonstop flight from another country (New Zealand) to Antarctica, along a flight path of picket ships strung out on the polar seas beneath them. They will have landed on a specially prepared snow-

and-ice runway constructed in Antarctica.

After the landing of the aircraft, the ships will have rendezvoused and proceeded to the antarctic, and there a fantastic array of vehicles and machines will have rumbled ashore. Ponderous orange-painted tractors with five-foot-wide "snowshoe" tracks, towing sled trains laden with knock-down buildings, supplies and crews dressed like overpadded "space men," will have roared away through the subzero cold in blinding swirls of drift kicked up by their own spinning grousers. Out ahead of them, foot parties and heated Weasels will have crisscrossed the snowy wastes, scouting and marking trail with orange flags to guide the heavy trains around the bottomless

crevasses that lie concealed by their deceptive roofs of thin, drifted snow. In a race against the lowering antarctic night, with its months of star-studded darkness, temperatures down to 80 degrees below zero and breathtaking auroral displays, the rugged

Popular Mechanics has joined the U.S. Antarctic expedition in the person of Richard F. Dempewolf, Eastern Editor, who sailed with Admiral Byrd from New Zealand aboard the USS *Glacier* early in December. His first-hand reports will bring you vivid pictures of this greatest American adventure on the ice-clad antarctic continent. Watch for his articles in forthcoming issues.



Officer makes a last-minute check of helicopter destined to hover over the thick glacial ice of Antarctica

crews will have begun to erect part of a series of historic bases for what may be one of the most remarkable international projects of all time.

Expedition Has Double Purpose

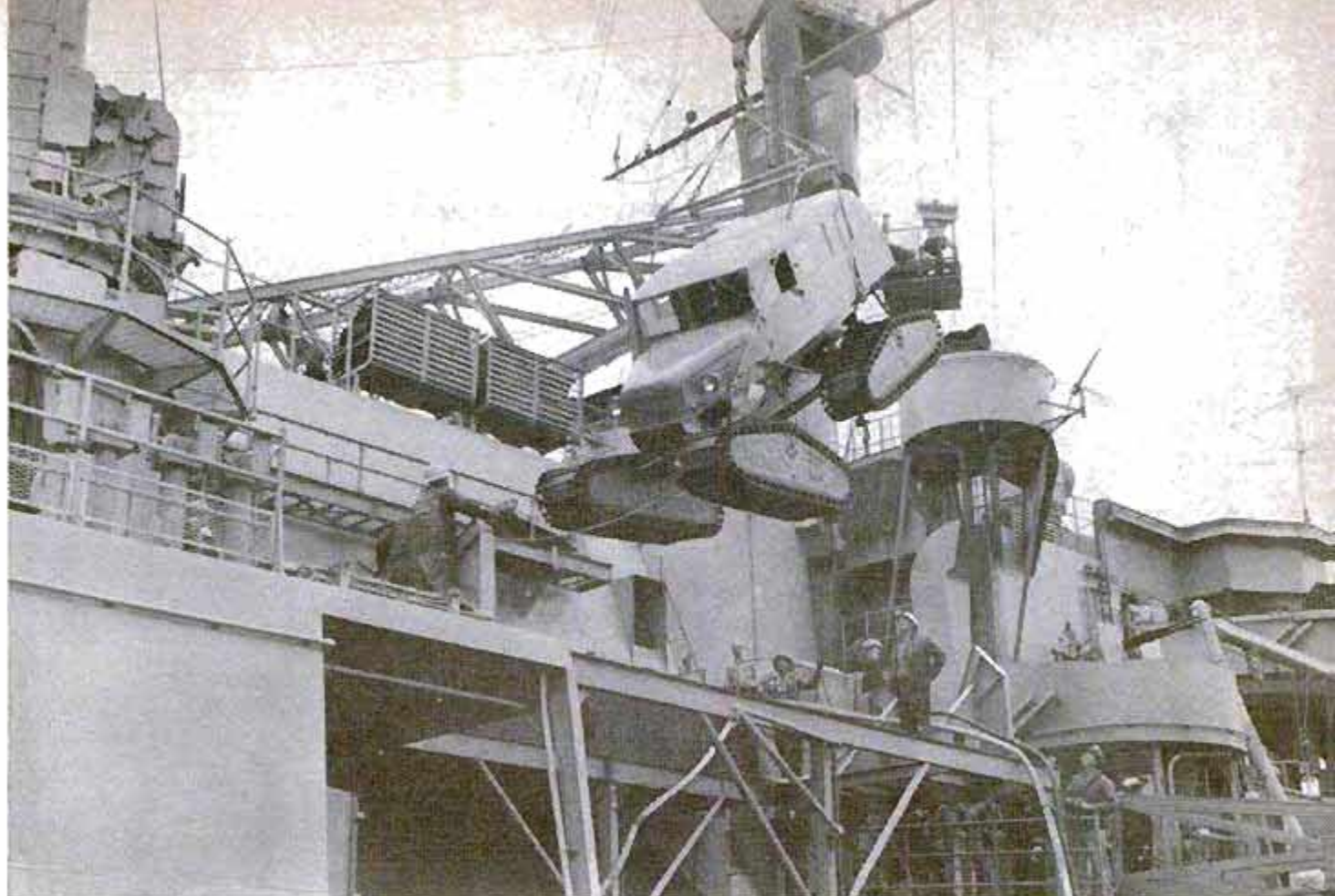
The new United States antarctic undertaking will be the first operation to be set up within the framework of the United States antarctic program, of which I was

Bound for polar seas, the USS *Glacier*, the Navy's newest and most powerful icebreaker, leaves Norfolk



recently designated officer in charge. The purpose of the expedition, in the first place, will be to carry out the antarctic phase of the total United States program for the International Geophysical Year (1957-58) in cooperation with the other participating nations. The second purpose will be to carry forward the work of exploration initiated by previous American expeditions.

The IGY (*Popular Mechanics*, Nov. 1955) is a worldwide program of scientific research involving, as of the present count, 39 nations. Actually it will get under way in 1956 when, all over the globe, from the arctic to the antarctic and at every latitude, scientific groups from participating nations will man observation stations in cities, remote wildernesses and at sea. Some will manipulate telescopes, complex all-sky cameras, intricate geomagnetic and seismographic instruments. Others will launch rockets laden with electronic gear far into the outer atmosphere. The much-publicized space-satellite project is part of this vast program. At given radio signals or at prescribed times these scientists will make simultaneous observations of such natural phenomena as weather, auroral activity, air glow, sun flares, ionospheric disturbances, cosmic rays, geomagnetism, glaciers, earthquakes, gravity, ocean currents and many other things that will help man to understand better the world in which he lives. To complete the network of IGY sta-



Sno-Cat, a tracked vehicle designed for polar wastes, is hoisted aboard. Right, Admiral Byrd, accompanied by Dr. Paul Siple (left), senior scientist of the expedition, and Richard F. Dempewolff, Eastern Editor of *Popular Mechanics*, departs by air to join ships

tions, at least 11 nations will establish more than 20 bases on Antarctica. Apart from our own bases, stations will be built and manned by Argentina, Australia, Chile, England, France, Japan, New Zealand, Norway, Russia and South Africa. Belgium and Spain may come into the program, too.

Navy Task Force

The new United States expedition will have two distinct operational parts. One is United States Navy Task Force 43, consisting of some 1800 men, three icebreakers, three cargo ships, a tanker and two towed YOGs, or small tankers which, as you read this, will be ready to freeze in the ice, thus providing us with a 400,000-gallon fuel farm. Commanded by Rear Adm. George J. Dufek, who accompanied me on two previous antarctic expeditions, the Task Force will construct and maintain an air-operating facility at McMurdo Sound and three United States bases for the IGY—one at Little America, another some 600 miles distant in Marie Byrd Land and the third, we hope, on the geographical South Pole itself. Bases may also be placed in the Weddell

(Continued to page 286)



Pan American World Airways photo



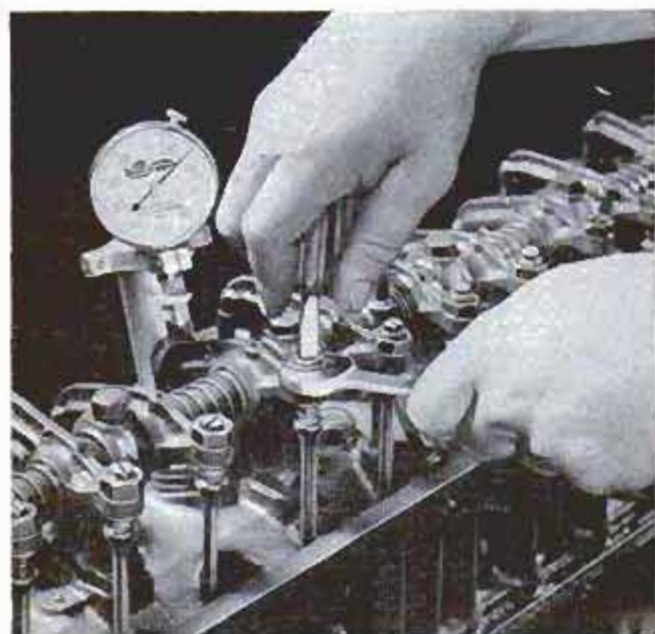
Famous photo was taken in shack at base where author lived alone for six months and almost perished



Sharp Teeth on Bulldozer Blade Bite Through Thick Trees

Full-grown trees are sliced off at ground level by the notched edges of a V-shaped cutting blade that is mounted on a bulldozer. A contractor using the blade to clear woodland in the Red River Valley of Texas is able to cut eight to ten acres per

day. Most of the trees in the woods are under a foot in diameter, but trees with diameters of three feet can be cut by alternately slicing the sides and pushing the trees with a long beam that projects from the point of the blade. The fallen trees are pushed into piles with a special rake blade. Because the trees are cut flush with the ground, they don't impede disking and sowing equipment.



←Dial Shows Valve Clearance

Overhead valves can be adjusted in half the usual time and with greater accuracy when using a dial indicator that measures rocker-arm clearance. The valve gapper leaves both hands free to make adjustments and indicates valve clearance before, during and after the adjustment is made. It can be used to locate weak or noisy valve lifters and shows when hydraulic lifters are sticking or need replacement. Fuel injectors may be timed with the gapper and fuel racks on diesel engines may be balanced with it. Adapters fit it to most passenger and truck engines.

Navy Tests First Midget Submarine As Close-In Weapon

Built in an airplane hanger, the Navy's first midget submarine, the X-1, took to the water recently for a series of tests and shakedown cruises. The tiny sub is 50

feet long and 7 feet in diameter, and will be manned by a crew of five. Displacing 25 tons, it was designed to test harbor defenses and for close-in attacks.

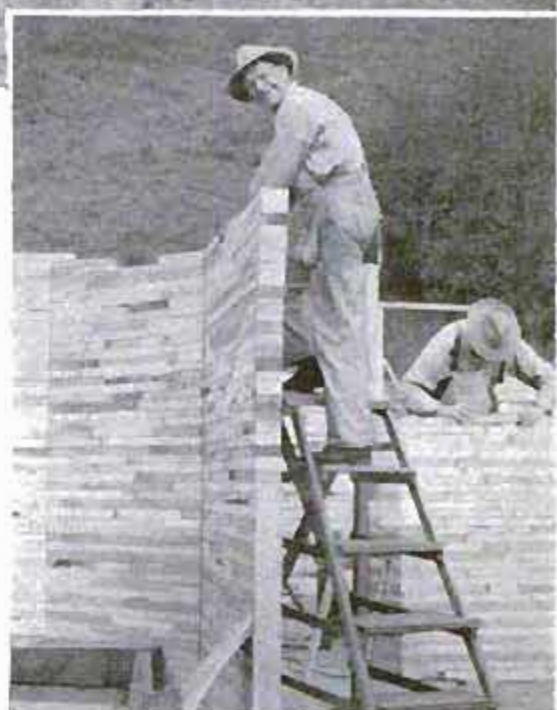




Shell of the house was made of scrap two by fours pinned together with nails. Right, interior walls were the same

Home Built From Waste Lumber

JESS STIENER of Kamiah, Idaho, built his five-room home almost entirely of scrap two by fours from six inches to six feet long. The finished home cost him only \$1700. Heavy eight-by-eight fir timbers were bolted to the top of the concrete foundation and the odd-length two by fours were laid on the timbers like brick. They were fastened together with 10-penny nails. At each corner every other piece was cut short for tight interlocking. Inside partitions were also made of the two by fours. Due to the tight construction of the exterior walls, Stiener reports that a minimum amount of fuel heats the house.



Finished house, covered with conventional siding, gives no clue to the unique construction of building





Manhattan Bridge, like Brooklyn Bridge in background, spans East River to link Manhattan with Brooklyn



Here's what happens to tired suspender cables. Uneven load on bridge has broken some cable strands. Cable is as thick as a man's arm

Manhattan Bridge will have to take a hitch in its suspenders. Every time a subway train rolls across, one side of the span sags three feet. Under way is a \$30,000,000 job —

FIRST AID FOR AN AILING BRIDGE

By Edward Edelsberg and Philip Cane

Colored arrow points to top of Williamsburg Bridge in background. Only the top half is visible . . .



LIKE MORTAL New Yorkers the Manhattan Bridge is working under strain. This melancholy news came to light in the recent report on New York City's youngest East River suspension bridge. There is cause enough. Ever since it opened on December 31, 1909, it has vibrated to the heightening tempo of modern life. The original trickle of autos across its back has grown to a flood of cars and giant trucks. But the most painful burden has been the subway train.

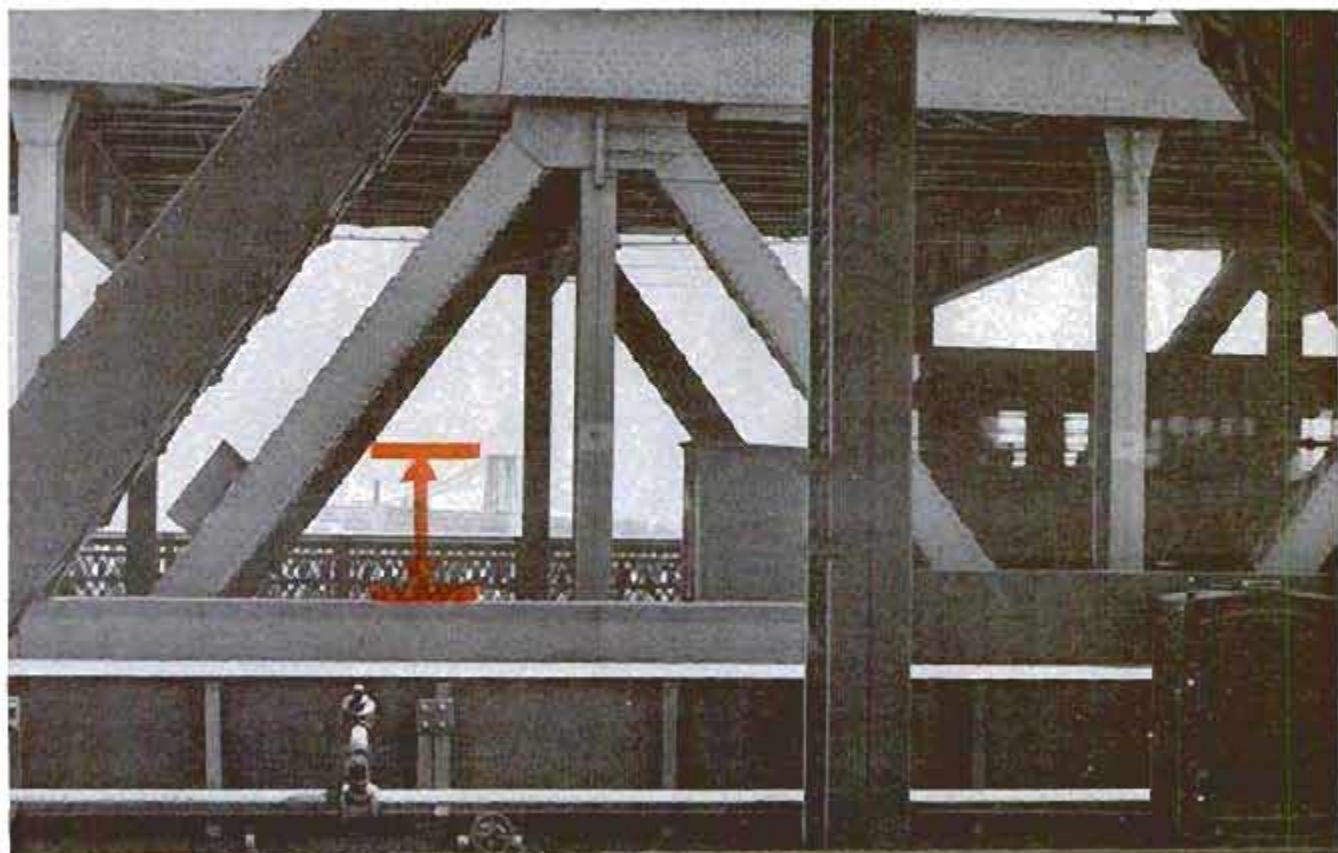
For 39 of its 45 years, the bridge has groaned under the daily exodus and homecoming of 400,000 people by BMT train. Because of the unusual arrangement of tracks at the Manhattan end, almost all trains use one side of the bridge and have been as hard on the steel structure as they have been on the straphangers. Now a \$30,000,000 operation is indicated for the world's hardest-working suspension bridge. The bridge will work while the operation goes on.

Looking west from the center

Men, right, install test cable bands before squeeze test of main cable



But when a train comes, Manhattan Bridge dips three feet. Entire roadway of Williamsburg Bridge appears





Investigators measure elongation of band bolts under stress, to determine maximum allowable stress in bolts

Workmen testing strength of the Manhattan Bridge tighten bolts of cable band in squeeze test of main cable





Automotive traffic rides on two decks of roadways. Double subway tracks flank each side of lower level

of the promenade, the Gothic towers and web of cables of Brooklyn Bridge seem only a long stone's throw away. Beyond them stand the granite towers of lower Manhattan and, farther still, the Statue of Liberty. Off to the east, Williamsburg Bridge, just up the river, links slum area to slum area.

If you stand on the west promenade and look across the 120 feet of Manhattan Bridge to the outer railing on the other side, you will see that it lines up with the roadway of the Williamsburg Bridge in the distance. Then, like the rolling deck of an ocean liner, the railing starts dipping, showing more and more of the East River near the Williamsburg Bridge and the land behind it.

This is a sure sign that a train has come onto the bridge. By the time the first car blocks your view, the easterly side of the bridge (called also "heavy side" because of its train load) has dipped almost three feet. When the last car passes, the railing starts its strained rise, and in about 30 seconds regains its level. The Manhattan Bridge bows to the Williamsburg Bridge hundreds of times each day.

That's a lot of movement, but does it make the bridge unsafe? J. Frank Johnson, who as director of the Division of Bridges rides herd over the city's 49 bridges, says: "There's no reason for the public to be scared. What's happening is this: Only two of the four cables are doing the work. Cables are flexible, and when the two on the heavy side stretch under the weight

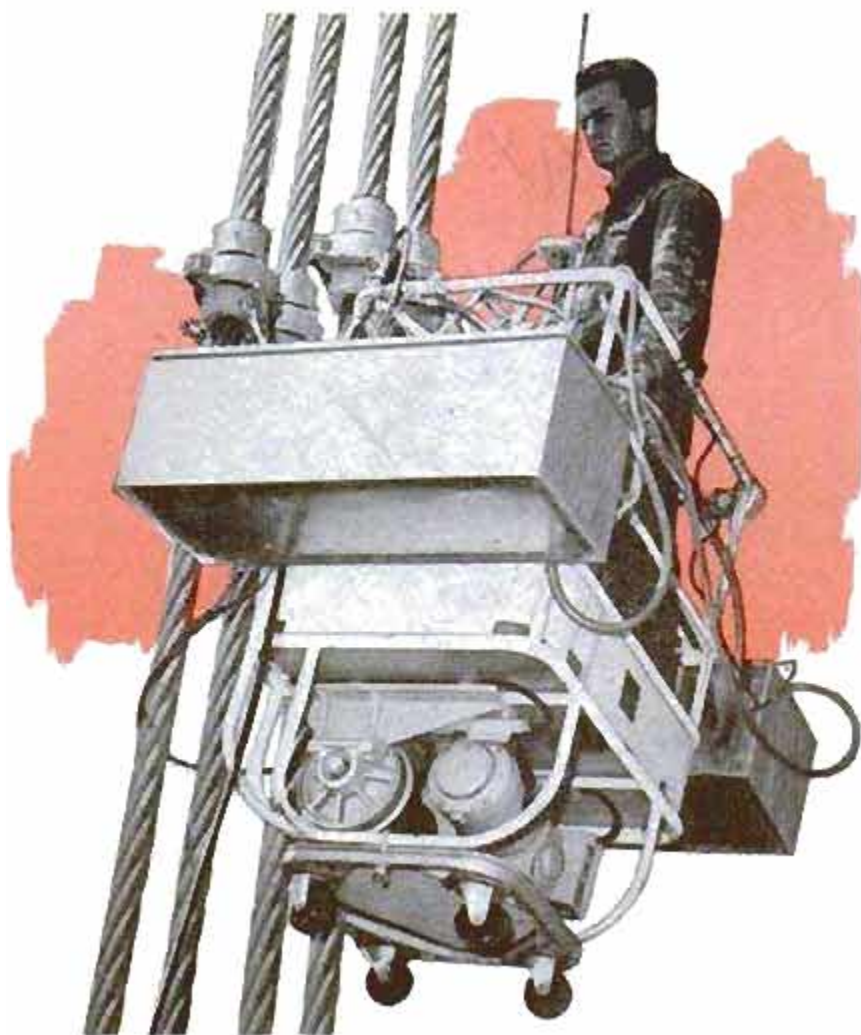
of a train, the cables on the light side hold up their side of the bridge. That puts a strain on the steel girders spaced every 20 feet and running the width of the bridge."

Forrest Cowan, who heads the Office of East River Bridges and inspects the bridge daily, explains that the dipping could go on for years without any danger to the public.

It's a rare suspension bridge that takes a dive, for this type of span is one of man's greatest engineering achievements. Just what is a suspension bridge? Suppose that New York's East River were a narrow stream, and you nailed long planks of wood together to stretch from Brooklyn to Manhattan. This "bridge" would sag in the middle. But if there were a tree on the Brooklyn side and a tree on the Manhattan side, you could tie the ends of a long rope to each tree and it would hang above the planks in a long arc. Then, using short pieces of rope, you could connect the long rope, at intervals, to the bridge of planks. If there weren't too much "give" in your rope, the bridge would be firm, and able to hold a lot of weight.

Now your stream becomes the East River, so you substitute steel for the rope, and steel and concrete for the planks and trees — and you have the Manhattan Bridge's 1470-foot span.

The Manhattan Bridge was built during the years 1901-1910. Its steel towers rise 321 feet above the water and are based in rock 62 feet below the river bottom. They are designed to move a little under



Bridge painter rides spider staging that carries him up and down. Below, plate is bolted into position to repair break in truss. Work is done at night to avoid disrupting traffic. The total revamping will take 2½ years and will cost \$30,000,000



different weights and temperatures; when they do, they shift some of the load to the massive bulwarks behind them.

The two anchorages look like medieval battlements standing at the water's edge. Each consists of 115,000 cubic yards of masonry. There is enough concrete in one anchorage to build a sidewalk four feet wide stretching from New York to Chicago. Each weighs 232,000 tons (twice the weight of the Chrysler Building).

The backbone of the Manhattan Bridge, like any suspension bridge, is its cable system. How do you transport a 3000-foot cable weighing almost 2000 tons to a bridge and lift it in place atop its tower? You don't. The cable is spun in place. First a footbridge is hung on wire ropes tied to the towers. Wheels with grooved rims (sheaves) shuttle between the two ends of the bridge tirelessly stringing one wire next to another. The wires are arranged in neat bundles and a giant "squeezer" makes one great package of them all. Huge clamps are put on to hold the cable firmly and connect it with the small vertical cables (suspenders) that hold up the roadways. Finally, the cable is greased, wrapped with steel wire and ready for its debut.

Each of the Manhattan Bridge's four main cables is almost two feet in diameter and has almost 10,000 wires. It would take a load of 30,000 tons to break one. (Golden Gate Bridge has only two cables, but each totals 27,572 wires.)

The cables ride over "saddles" atop the towers and then descend into the massive masonry of the anchorages. Here each bundle of wire in the cable goes around a steel structure called an eyebar, and the 37 eyebars holding one cable are connected to steel girders embedded deeply in the concrete. The system of eyebars distributes over a wide area the great demands being made on a cable. If a cable had only one connection in an anchorage, it would increase the danger of pulling itself loose.

It is hard to believe those threadlike cables in the New York sky hold up Manhattan

(Continued to page 278)



Okinawa's fireman at the controls of his "tankdozer" puts out brush fires by smothering them with earth

OKINAWA'S FIREMAN IN ARMOR

By SFC Joseph T. Hargrave

SUMMER IS THE BUSIEST TIME of the year for Okinawa's "armored fireman," SFC Philip R. Moody, Lexington, Ky., who answers local fire alarms in a 35-ton medium tank equipped with a scraper blade. Moody, who operates his fire station in the RyCom Ordnance Service Ammunition Facility at Chibana, north of the Kadena Air Base, answers at least two fire calls a week. Sometimes he gets several calls in a single day.

Surrounding the ammunition facility is a 100-acre abandoned area which is covered with deep matted grass, bamboo and scrub pine. Here on July 5, 1945, a huge fire destroyed a big ammunition stock pile being prepared for the assault on the Japanese mainland. The resulting explosions scattered thousands of high-explosive and white-phosphorus projectiles, grenades and rockets across the area.

For 10 years now, the torrential rains and blazing sun have been rusting the casings of this ammunition. The most dangerous are the thin-shelled white-phosphorus projectiles and grenades. When one of these is rusted through, oxygen in the air contacts the white-phosphorus charge and a trickle of white smoke rises. In a matter of minutes a full-fledged brush

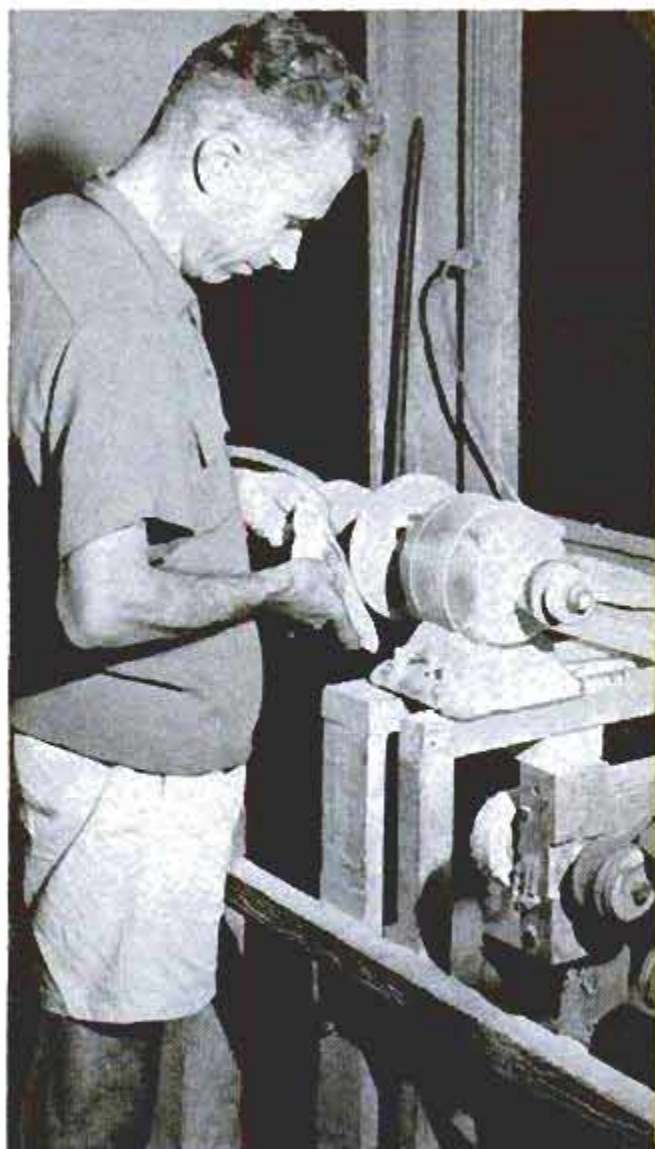
fire is blazing and other shells and grenades start exploding from the heat.

Because of the danger, Moody's "tankdozer" is the only equipment authorized to enter the area. The armored hull protects him as he first circles the fire, cutting wide firebreaks to keep it from spreading.

This year for the first time, members of the overworked 5th Explosive Ordnance Disposal Squad found time to follow Moody into the restricted area after a fire. In one small section, they picked up 750 pieces of unexploded ammunition. Now a new plan has been formed, in which Moody will cut firebreaks through the area, dividing it into small plots which will be burned off one at a time with controlled fires. Then the explosives will be cleared and the land returned to normal use.



Exploding ammunition is so dangerous that no vehicles other than Moody's tank can enter



Working with hand tools he made himself, artist carefully carves shell away to form his own designs. Light beneath shell helps gauge thickness
 ←Bouvier uses an electric grinder to remove the encrusted coral and rough exterior of the shell, leaving only iridescent mother-of-pearl

Tahiti Artist Carves Pearl Shells

By Lyn Harrington
 Photos by Richard Harrington

Pendant is carved in "Tiki" design representing a lesser native god



EVEN IN TAHITI, most artists can't live on what they make from their paintings. Ask Henri Bouvier, who was lured to the South Sea Islands by the books written about them. An artist, Bouvier left Paris for Tahiti 23 years ago and says he's there to stay. To support himself, he has developed a unique craft which turns his talent to good use. Bouvier carves pearl shells.

Pearl shell is fairly abundant in the Society Islands, the best of it found in the Tuamotu group east of Tahiti. Some pearls are found, but they are only a by-product of an industry chiefly interested in the iridescent mother-of-pearl lining the shell.

Bouvier buys the shell in its natural state from the divers, then grinds, polishes and carves it into objects of art. Most of the shells found in the area are about seven inches in diameter. Bouvier incorporates the natural shading of the shell into his own designs to achieve an interesting play of light and shadow.

In shallower waters, divers bring up the less-valuable Trochus shell, a cone-shaped univalve which is widely used for inexpensive pearl buttons. Because of its shape it is easily made into bracelets, which Bouvier carves and sells for \$20 apiece.

Polynesian Designs

An enthusiastic student of Polynesian art, Bouvier works native designs into his carving. Each piece he makes is unique; he produces no two items that are alike.

Bouvier made all his own carving tools, using tough native wood for the handles. The tools must be strong to withstand the pressure exerted in carving the shell, which Bouvier says is about as hard as stone. Handles of the tools are flattened on one side for a better grip.

Using Papeete's regular power lines, he rigged up his own grinders and buffers.

Shell Is Transparent

With a light bulb fastened under the edge of his bench, Bouvier can see through the shell as he works. Often he has a design on an easel in front of him.

Most of his work is sold to tourists or visiting yachtsmen. Brooches, slides for belts and ash trays sell well, the latter bringing \$8 apiece. A pendant frequently will bring \$20 to \$30.

Since pearl shell is abundant and inexpensive, why don't more South Pacific craftsmen work with it? Probably because of the tedious hours involved. Bouvier's prices are relatively high compared to the price tags on pearl-shell costume jewelry now featured in shops in this country. But each of Bouvier's pieces is a work of art which he will never duplicate. ★ ★ ★



Pearl shell, brought from ocean floor by Polynesian divers, has a colorful and beautifully shaded lining



Here are examples of Bouvier's art. Bracelets are made of Trochus shell, brooches and pendants of pearl shell. Below, a Tahitian beauty wears a beautiful shell collar carved with Polynesian designs





Old Locomotive Makes Last Trip on Low-Slung Truck Trailer

Moving old No. 1673 was the problem. She weighed 159,700 pounds and had outlived her usefulness. On the 75th anniversary of railroad service to Tucson, Ariz., the Southern Pacific Railroad presented the venerable old loco to the Arizona Pioneer Historical Society, and she had to be moved from the railroad yards to the society's museum. It was a big moving job, one of

the biggest in the city's history, and was finally accomplished by bringing a giant lowboy truck trailer alongside the ancient locomotive and then moving up one of the Southern Pacific's big wreckers. The wrecker first lifted the front of the engine onto the trailer and then, with a couple of mighty tugs, hoisted the back up. Old No. 1673 was ready for her last trip.

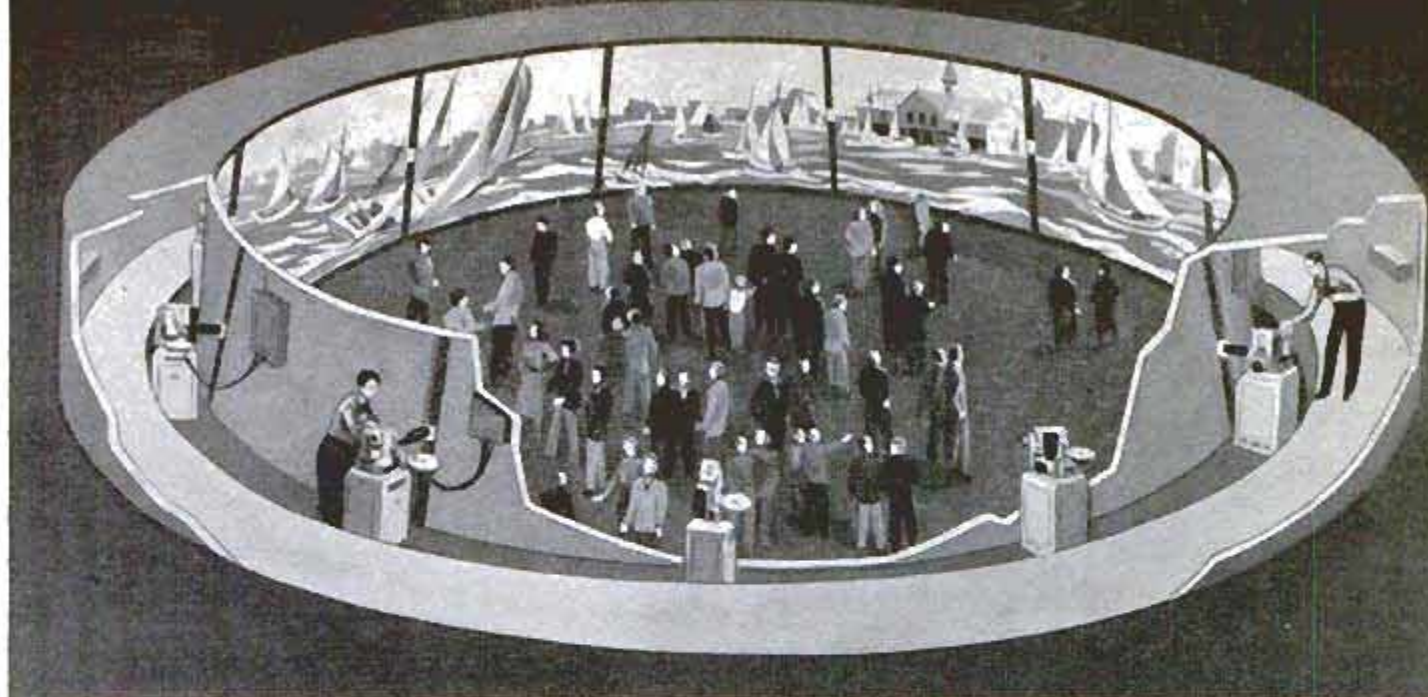


← German Camping Trailer

No bigger than a small luggage trailer, a German trailer opens up to reveal two beds, a cookstove and a wardrobe. During the day, the beds convert into seats for five persons. There is even a small dining table. Telescoping pillars raise the roof to a convenient height and a fabric curtain, equipped with plastic windows, provides waterproof side walls.

Plastic Golf-Club "Woods"

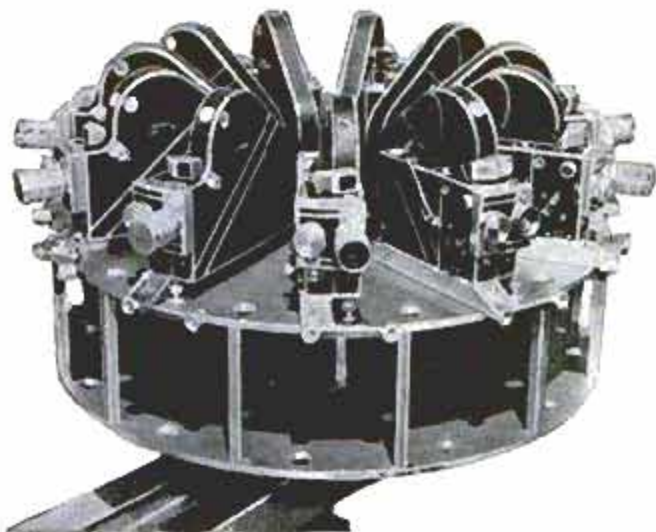
Golf-club "woods" with plastic heads are now available. The heads, said to be stronger than wood, will not change shape or weight because of moisture. The uniform nature of the plastic permits precise manufacture of the head, so that every club in a set has the same feel and timing.



Eleven projectors are electrically synchronized to show one continuous picture on the "Circarama" theater screen

"Circarama"

HOW WIDE can a wide screen for motion-picture projection get? According to Walt Disney, the screen eventually will encircle the audience and, to demonstrate this, his engineers have designed and installed "Circarama" at Disneyland in Anaheim, Calif. The Tomorrowland section attempts to show what life will be like in 1986, with Circarama, sponsored by American Motors, as the theater of the future. Eleven cameras film Circarama, and 11 projectors screen the films.



Above right is the mount and boom for the 16-millimeter Eastman Cine-Kodak Specials used to film Circarama





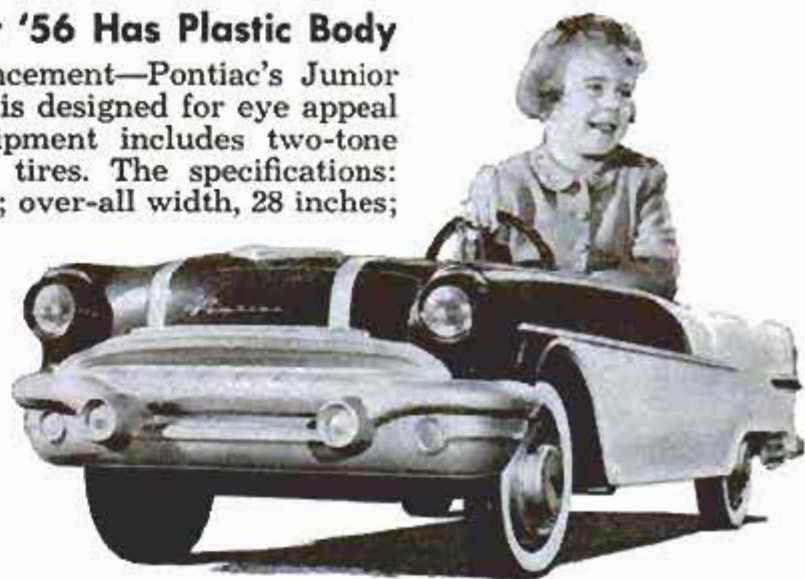
Sailboat "Stilts" Boost Speed

In trial runs recently, a sailboat achieved the phenomenal speed of 30 miles per hour in a moderate wind. This is nearly double the best speed of the American Cup boats, and about 50 percent faster than the all-time clipper-ship record. The new boat literally sails right up and out of the water, riding on hydrofoils. As the boat picks up speed, the hydrofoils lift the hull clear of the water in the same way an airplane wing produces lift. The boat is being used as part of a Navy research project.

Pontiac Junior Star Chief for '56 Has Plastic Body

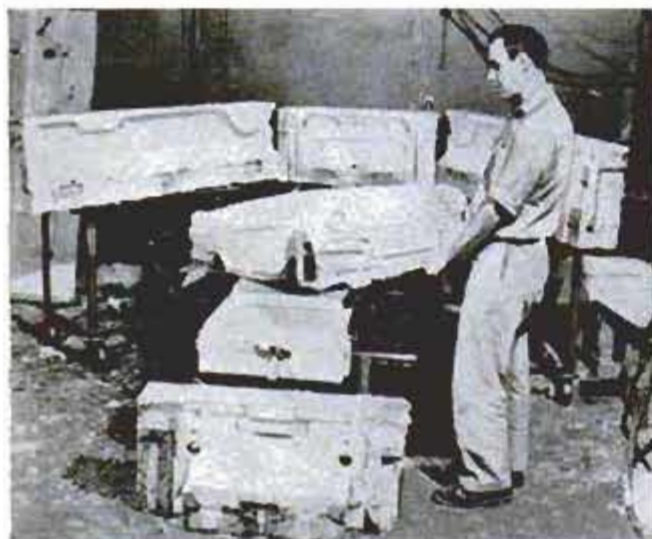
Here's another new-car announcement—Pontiac's Junior Star Chief. A convertible, the car is designed for eye appeal to young drivers. Standard equipment includes two-tone body styling and white sidewall tires. The specifications: bumper-to-bumper length, six feet; over-all width, 28 inches; empty weight, 150 pounds. No Owners Reports are available on this new model as yet.

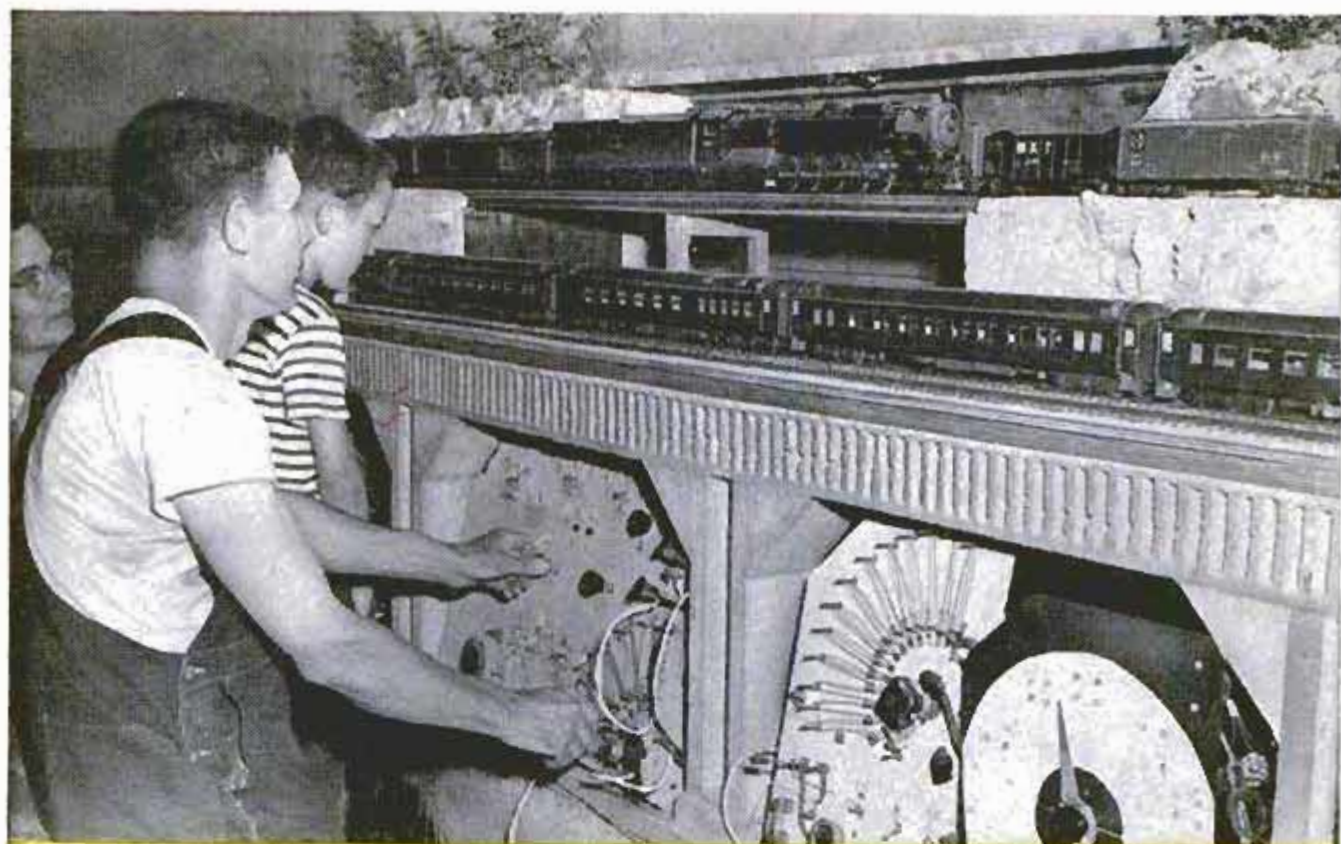
The Junior Star Chief, designed for the sidewalk set, is a one-third size replica of Pontiac's 1956 Star Chief convertible. It is complete with a real motor, brakes, gearshift, head and tail lights. The tot-size car has a maximum speed of eight miles per hour and is powered by a Pontiac starting motor running on a 12-volt auto battery. A trickle charger is supplied with the little auto. The body is



molded in plastic, shown in pictures below.

Pontiac dealers are using the miniature cars for promotion only, not for sale.





Gail operates his homemade control system. Panel at right contains color indications for block signals

Model Railroad in a Chicken House

By Louis Martin Reitz

REINHARD GAIL of Leasburg, Mo., a rugged individualist, is the sole owner and builder of perhaps the biggest $1\frac{7}{64}$ -inch-gauge model railroad in the land.

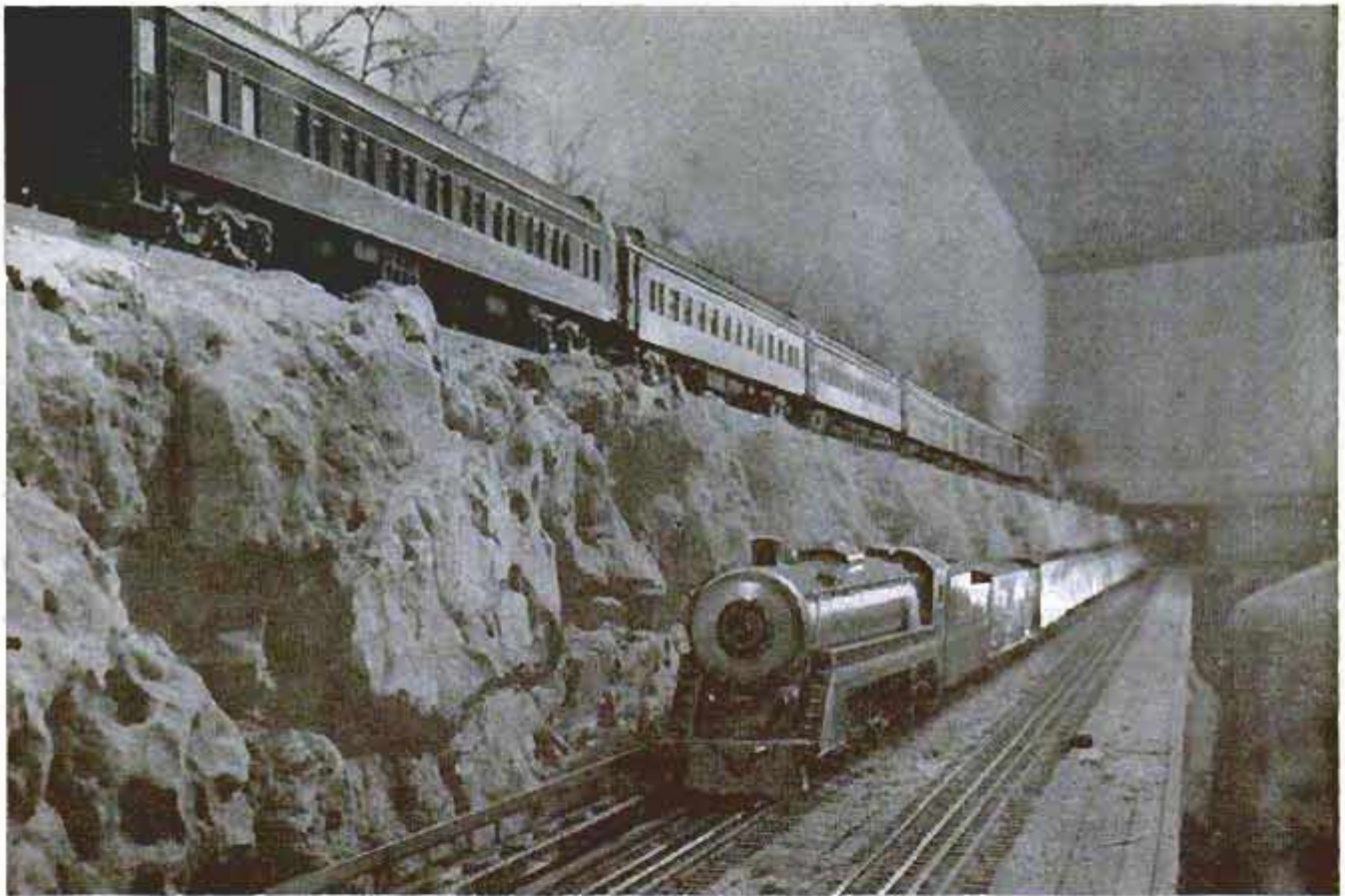
The majority of model railroaders build from kits. Some few claim to be "scratch" builders even though they buy such items as couplers, wheels and side frames. But Gail is a true scratch man. Perhaps this comes from being in the chicken business for almost 25 years. The only "store bought" items in his chicken-house layout

are the brass rails, paint and a few decals.

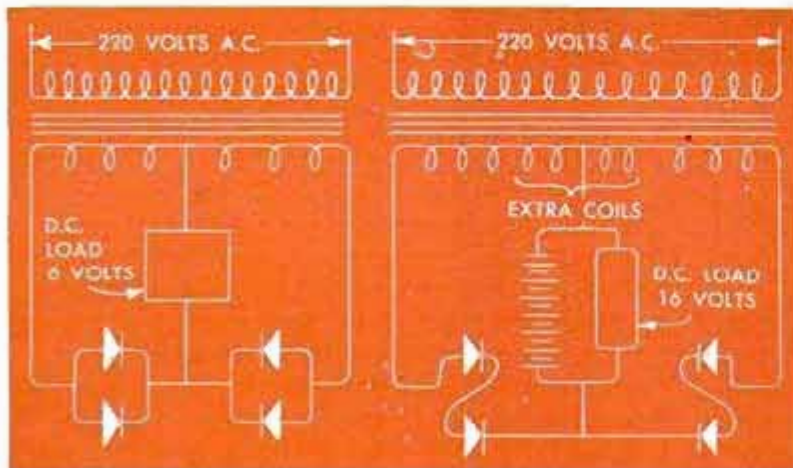
Gail built his railroad with the idea of watching it run and did not try to achieve the jeweler's precision seen on some fine models. He attached more importance to overcoming another problem that stumps most model railroaders: How to get close coupling of cars approximating that found on the prototypes. Ever look at a beautifully built model and notice that there is a void between the engine and tender big enough to run a scale-model car through?

Trains run outside on this long trestle. Guard rail protects them from falling off in case of derailment

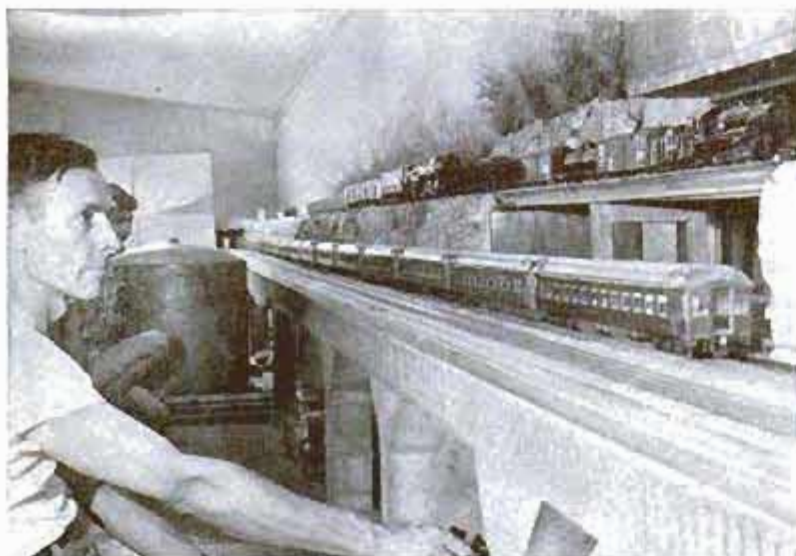




Inside tracks run alongside and on top of genuine rock "bluff." At far end is simulated signal bridge



Battery charger, shown left above, was modified, right, to give more voltage to power model trains. Below, full-length view



The reason is that on a model that runs you need large-radius curves and this means plenty of space. Gail had lots of room, so he used 15-foot-radius curves (30 feet across) and ran most of his track outside. The only part inside the building is the tangent (straight track) on one side of the oval. This part runs along the outside wall of a special building he erected on one side of the brooder house and is some 42 feet long. Visitors are startled when they stand at one end and look down the length of a train that usually consists of 17 passenger cars, each some 21 inches in length.

Layout All at Eye Level

The two curves and the other tangent are outside and are mounted on a framework made of 1½-inch iron pipe. When you stand in the observation pit and look across the inside track, out through the window and over to the track on the far side, the latter is also at eye level. You don't see any of the supporting members but only the trains with the natural scenery for a background. This gives the illusion of looking at a real train in the



Cars, including engines and tenders, are closely coupled. Size of layout permits this detail to be scale

distance, especially at night when the lights are on in the coaches and the dim blue nighttime lights are on inside the layout room.

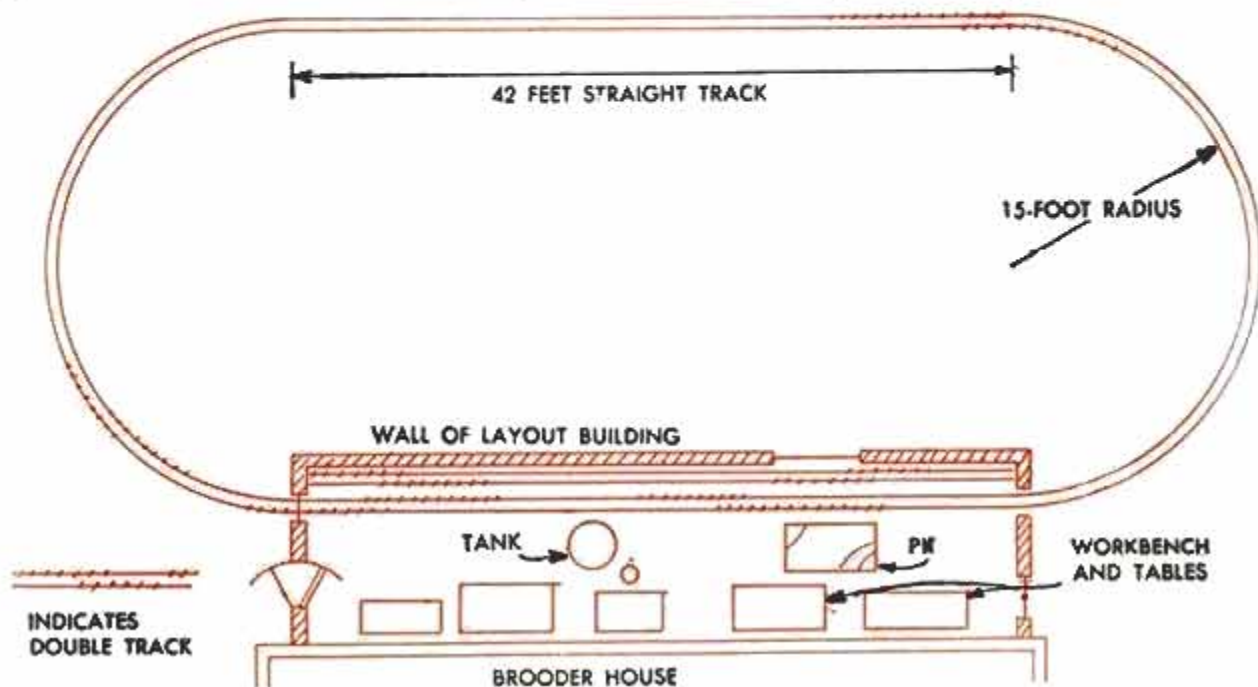
There are no switches or crossovers on the tracks—just the double-track oval running outside and the upper-level double track that is inside the building in addition to the other track. To most model railroaders, this simple oval is known as a “fool’s delight,” which indeed it can be in

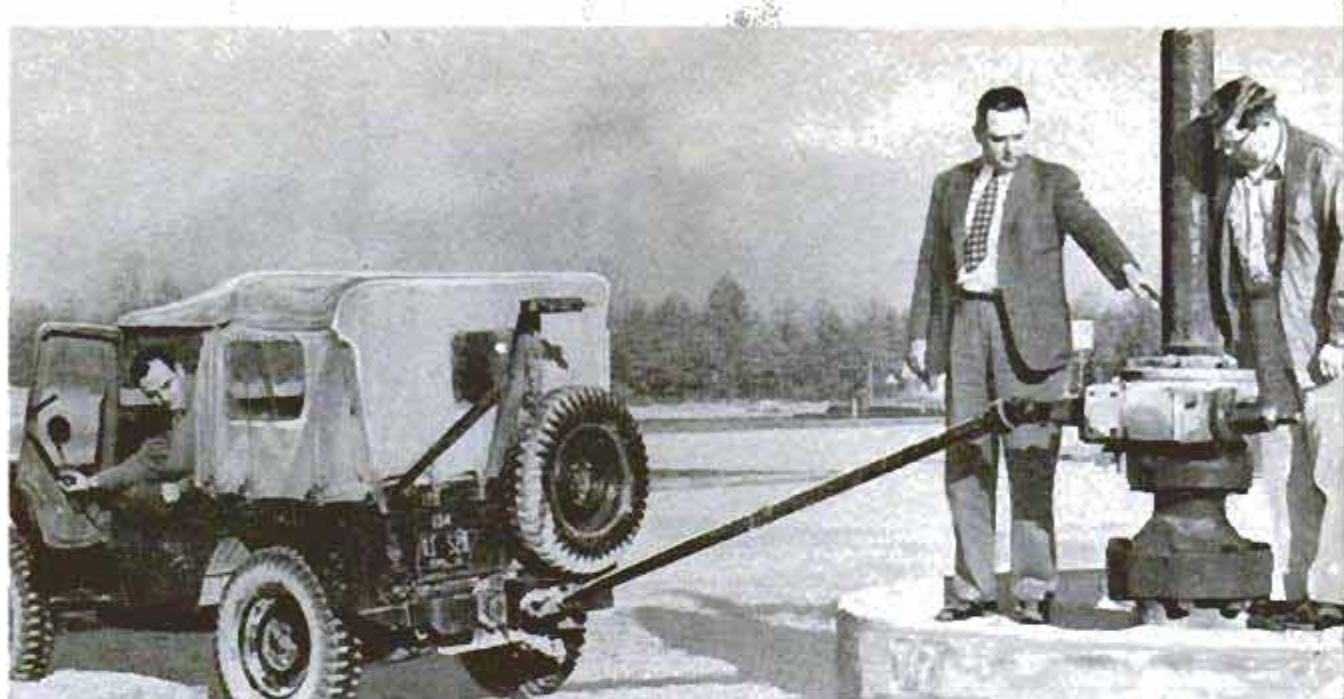
an 8 by 10-foot layout. But on one as big as Gail’s and with three or more detailed trains running at one time, each with sound effects, light flashing in the firebox of the “oil burner” and the appearance of the completely finished car interiors, the impression is anything but that.

Gail started construction on his road during the last war and built most of it right after, when materials were still hard to get.

(Continued to page 300)

Diagram shows dimensions of the track layout. The track is mostly outside. Only one stretch is inside

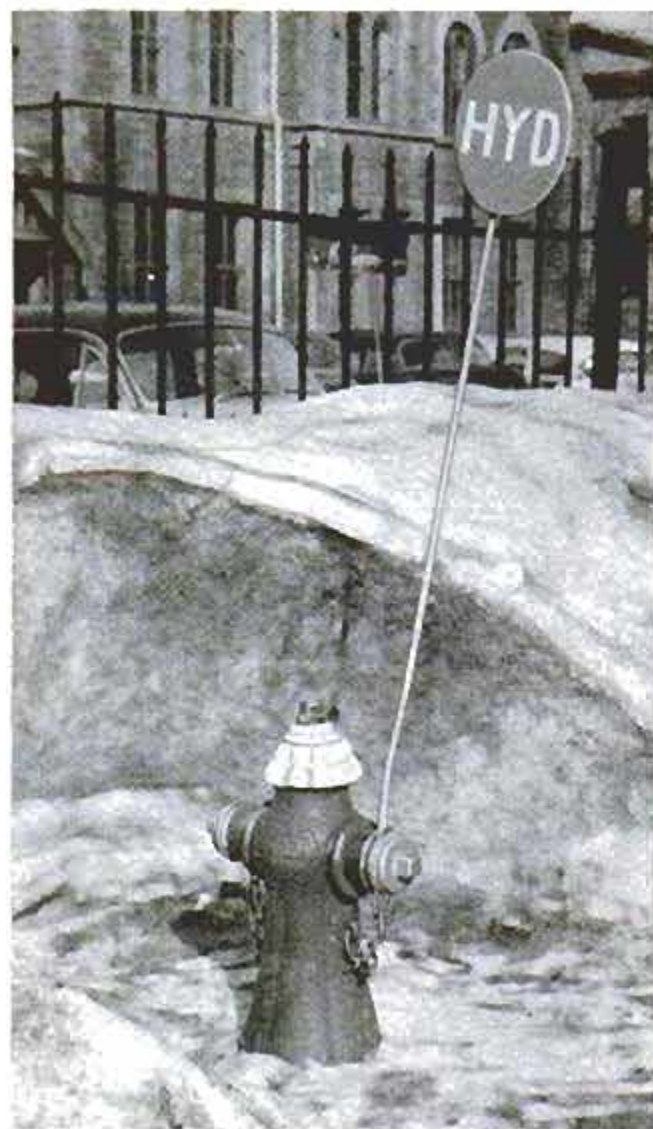




Jeep Turns on the Faucet to Cool Jet Engines During Test

Jeeps can do just about anything and to prove it the Air Force has put one to work turning a faucet on and off. The faucet, actually a giant valve, controls the torrential flow of cooling water required in tests of jet engines. The master valves can be turned by hand, but since 4980 turns are

needed to open or close one of them, the job would take eight hours. Instead, the power take-off on the Jeep is connected to the valve by a telescopic shaft and in less than 11 minutes the valve can be opened or closed. The giant valve controls the flow of 125,000 gallons per minute.



Tall Signs on Buried Hydrants Locate Them in Snow

Plowed or drifted snow can easily hide fire hydrants, making them difficult for the fire department to find and liable to damage from plowing bulldozers or other snow-removal equipment. Faced with the hidden-hydrant problem, the city of Ottawa came up with a simple, practical solution. Round hardboard signs were mounted on 54-inch steel rods terminating in rings that could be fastened to hydrant lugs. The signs were clearly visible above all but the deepest snows.

Hawaii Was Once North Pole

Hawaii 600,000,000 years ago was the bleak, frigid North Pole of the world, says Dr. S. K. Runcorn of Cambridge University and the Museum of Northern Arizona at Flagstaff. By plotting the directions of the "north" poles of magnetic rocks buried in the earth through the ages, Doctor Runcorn has been able to trace the rambling and irregular but constant shifting of the magnetic North Pole. It reached its present site 80,000,000 years ago, he has found. Evidence that the earth has shifted on its axis is the presence of fossil remains of tropical life in Greenland and Alaska. Runcorn believes jet streams and swirling currents in the earth's fluid core may account for the earth's magnetic-field changes.

Stern-Wheeler Plies Lake

Well-loaded houseboat churns through the water of Lake Tainter. It cruises above five miles per hour

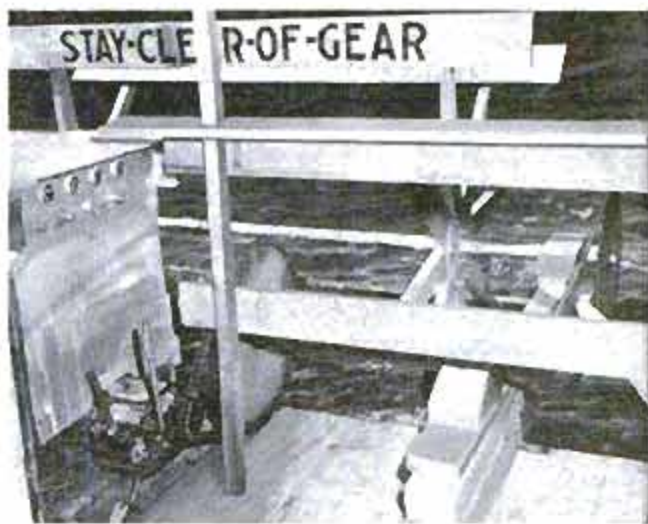


Stern-wheelers are scarce these days along the Mississippi, but there's one on little Lake Tainter in northern Wisconsin. A 16 by 30-foot houseboat built by retired businessman Leo Williams of Menominee, Wis., it features an eight-bladed wheel six

feet in diameter and ten feet wide. A Jeep motor turns the wheel to give a speed of five to six miles per hour. The 10 by 16-foot cabin houses complete living and sleeping quarters. Ten sealed oil drums built into the hull aid buoyancy.

Owner and builder Leo Williams, retired Menominee, Wis., businessman, backs boat out for a cruise

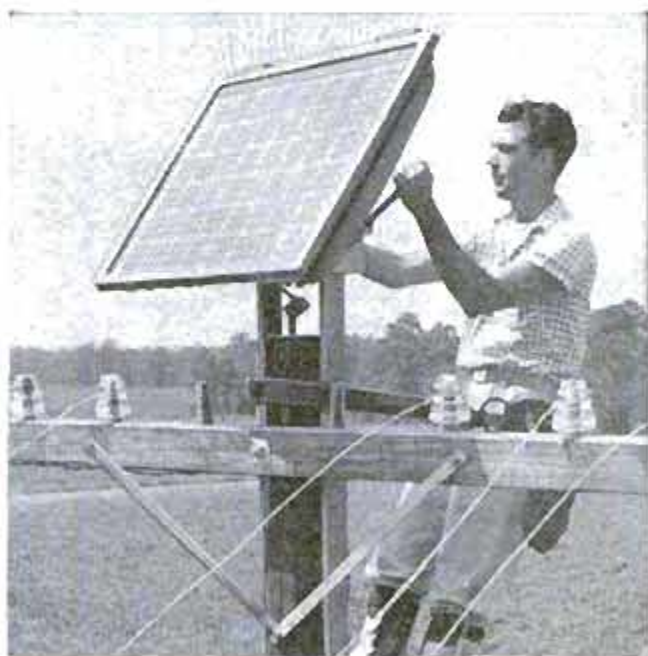
Jeep motor with chain drive turns the paddle wheel. Wheel is six feet in diameter and has eight paddles

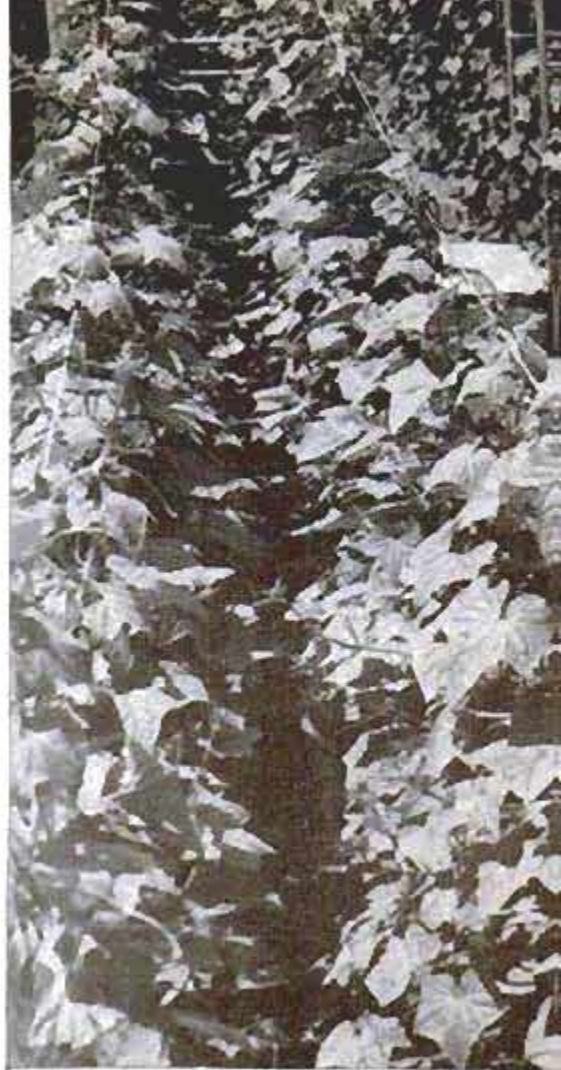


Sun Powers Telephone Line

Electricity from the sun powers a rural telephone line near Americus, Ga., in the first use of the Bell solar battery. The unit, mounted atop a telephone pole, contains 432 silicon cells which produce electricity when they are struck by light. The inch-diameter wafers, cushioned in oil and covered by glass, are linked together to produce at the rate of 100 watts per square yard of effective surface. Excess current feeds into a storage battery that provides power at night and on dark days.

ⓁPaper impregnated with an insecticide is being sold for lining home drawers and shelves by a Dallas, Tex., firm.





Soilless

By Elliott H. McCleary

GROWING FOOD without soil is not just a scientific stunt but a commercial reality on a little farm in Miami, Fla.

The farm, which has no barn or silo, no tractor or plow, is only four fifths of an acre. Yet its cash crop is equal to that of a truck farm of 20 acres.

The farm consists of 3 by 100-foot concrete beds filled with moist gravel, from which sprouts a luxuriant profusion of

Mrs. Deatrick hauls in a load of cucumbers grown during summer season on the hydroponic farm





Cucumber vines climb strings supported by pipe structures. Eventually they stretch as high as a man can reach

Farm on a City Lot

tomato and cucumber vines. The plants receive all their nourishment from mineral-enriched water which is pumped through the gravel.

Over a score of such hydroponic (soilless) farms exist in southern Florida, where the warm climate permits controlled bumper crops to be harvested the year 'round. All are commercial farms, started in the belief that the age of hydroponic farming has arrived. According to Arthur Deatrick, owner of the Miami farm, much of the na-

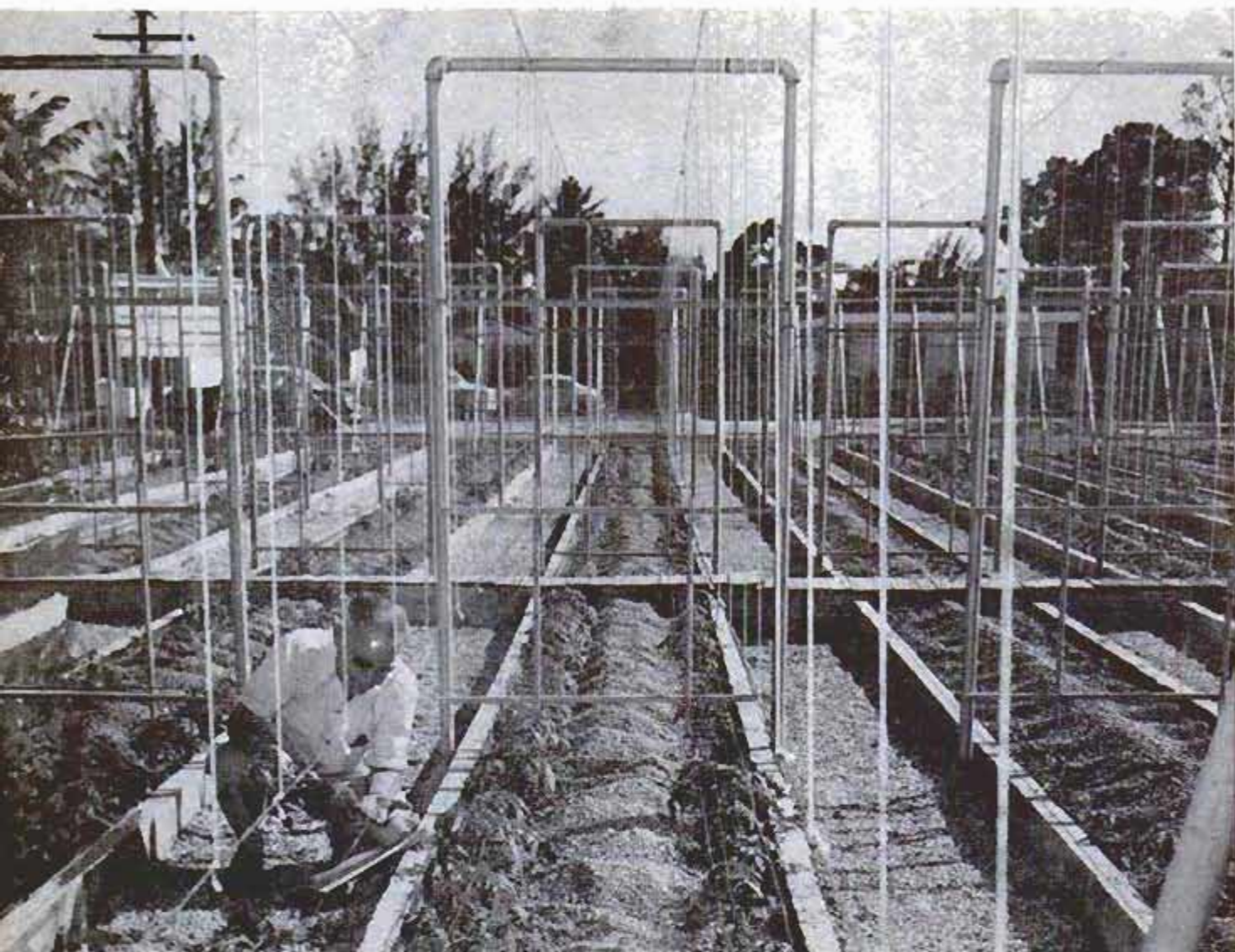
tion's garden produce could today be produced profitably by means of hydroponics.

Deatrick mixes 12 different minerals, in various chemical combinations, with the water which is pumped into the beds. The minerals include virtually all the soil elements which have been proved necessary to growing plants and animals: Calcium, phosphorus, potassium, nitrogen, magnesium, boron, zinc, manganese, copper, iron, sulphur and molybdenum.

The core of the Miami operation is a

Represented below are elements fed to plants: (in beakers) calcium, phosphorus, potassium, nitrogen, magnesium; (on pads) boron, zinc, manganese, copper, molybdenum and iron. Many elements are in compounds

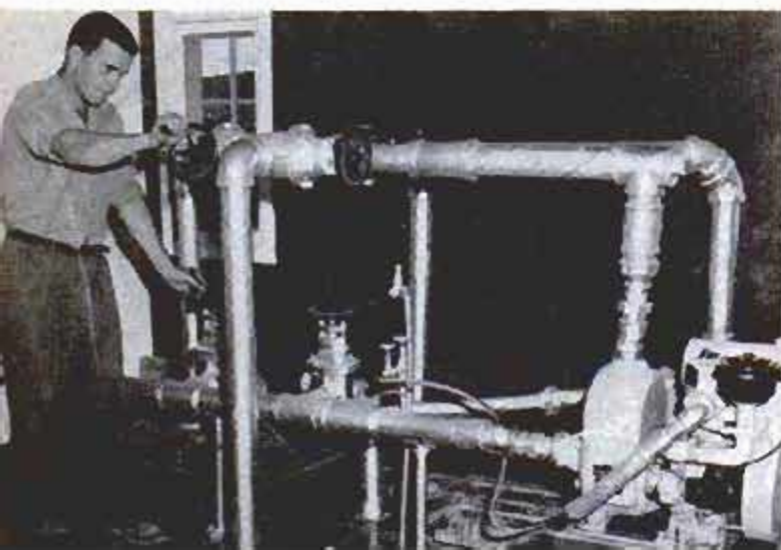




Deatrick inspects five-week-old tomato plants in one of the 3 by 100-foot beds. The gravel contains no soil

pump house, where water is pumped up from an underground stream, where it is mixed with minerals and where the water-control equipment is located. Every day the plants get a "breakfast," a "luncheon" and a "dinner" of enriched water. In between feedings, the gravel in the beds stays moist and the plants absorb the dissolved food.

Valves in pump house are turned to regulate water supply. Minerals are dumped into hole in the floor



Twice a week, Deatrick mixes his plant food and pours it into a tank that supplies an agitator. The agitator thoroughly mixes the minerals with the water, which is then pumped into water mains that feed into the beds. On a typical sunny day, the plants will consume 1000 gallons of water and 28 pounds of plant food.

Water is carried through the shallow, gravel-filled concrete beds in sloping V-troughs covered with half-round tiles. The tiles keep the gravel out and permit the water to escape around their edges into the gravel, which is several inches deep.

HYDROPONIC NUTRIENT SOLUTION For 50 Gallons of Water

Potassium Nitrate (pure)	Potassium Sulphate (fertilizer grade)	Triple Superphosphate	Calcium Sulphate
3.6 oz.	3.2 oz.	4 oz.	3 oz.
Magnesium Sulphate	Iron (pure)	Copper Sulphate (pure)	Zinc Sulphate (pure)
2 oz.	2 grams	.1 gram	.1 gram
Boric Acid	Manganese Sulphate (pure)	Molybdenum trace	
1 gram	.3 gram		



Picking is fast when vines are loaded like these. A 3 by 100-foot bed yields three tons of tomatoes a season

Tomatoes in the winter and cucumbers in the summer are the chief crops of the Deatricks farm. One tomato crop lasts for eight months, one cucumber crop for three months. Once a year, in between crops, the beds are sterilized with a sulphuric acid solution to kill root diseases. The beds are then washed clean. Insecticides and minerals which have accumulated during the year are rinsed away.

The advantages of hydroponic farming are many, according to Deatricks. The plants get all the moisture and food they need, in controlled amounts. The Deatricks farm does not have to depend upon the weather, so a bumper crop of vitamin-and-mineral-packed vegetables is always being produced. Because plantings are staggered and more plants are grown in a given area, only one man is needed to take care of the farm, which grosses at least \$10,000 a year and contains equipment worth \$20,000. Occasionally, an extra helper is called in when peak yields reach as much as 54 bushels per day. All of the produce is sold from a stand on the edge of the farm, to customers who willingly pay premium prices.

Instead of throwing away a large part of their crop in culls, the Deatricks are able to market practically all of their produce. According to Deatricks, vegetables grown in the soilless plots are "more nutritious, have less disease, keep and taste better than normal vegetables. A hydroponic tomato," says Deatricks, "will last three weeks at room temperature—three to five times as long as a standard tomato."

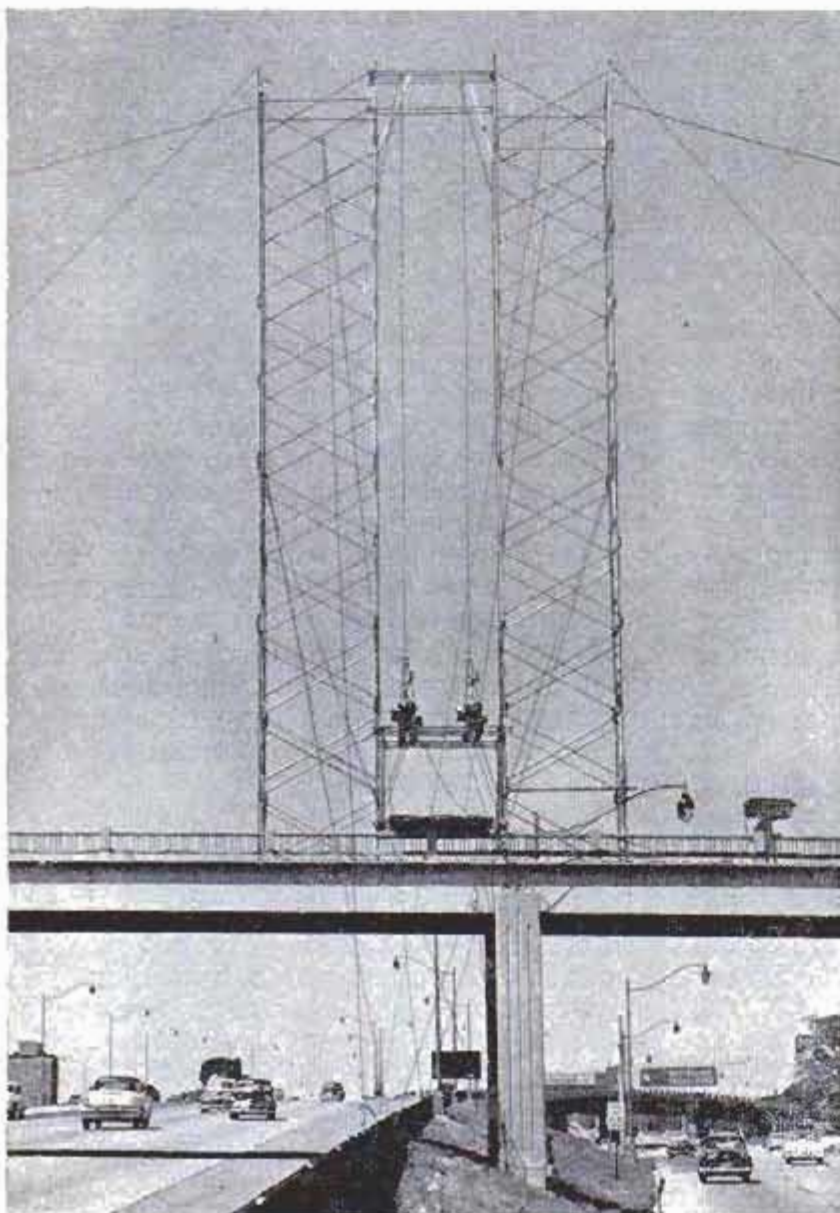
Worms and other crawling parasites can't get into the concrete beds, thus decreasing damage to the plants. Frequent sprayings, of course, are needed to control airborne insects and diseases.

"Plant growth is speeded," Deatricks says. "Hydroponic tomatoes start to bear 70 days after the seed is planted. Conventional growers get a yield 120 to 130 days after tomato slips—not seeds—are put into the ground. Cucumbers grown hydroponically start to produce 36 days after the seed is planted. Under conventional methods, the time would be 62 days. Once the tomato vines start producing, they yield months longer than do ordinary vines. Time-consuming replantings are not necessary."

★ ★ ★



Above, a traffic engineer watches the screens of two television monitors, prepared to direct emergency operations the moment an accident or slowdown occurs. Below, in the tests cameras were mounted on towers to determine best height for observing Freeway traffic

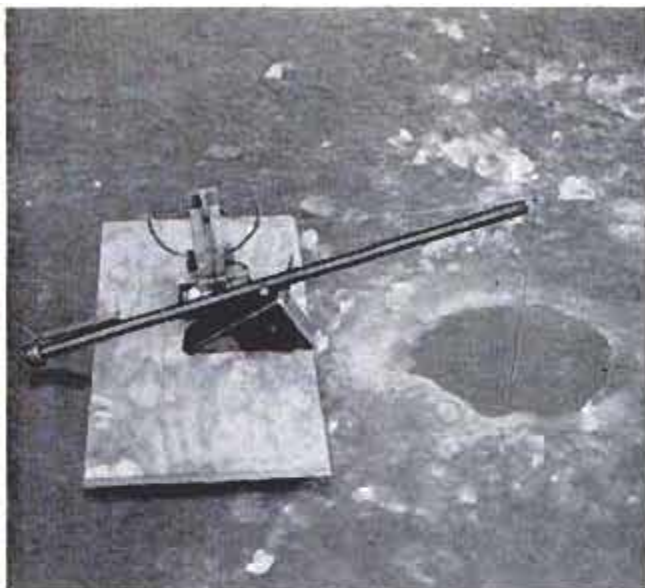


Test TV Traffic Control

AT 5:07 P.M., as the rush-hour traffic sings along the Edsel Ford Expressway in Detroit, there is a sudden squeal of brakes and a metallic crash. Two cars involved in a collision careen across several lanes and the traffic behind them comes to a halt. In a few moments the traffic jam has built up for blocks. On most major highways it would be a half hour or more before the damaged cars could be removed and traffic restored to its normal pace. But on the Ford Freeway things are different. A traffic engineer sitting in a control booth peers at a television screen. He spots the collision as it happens and, before the cars have come to a standstill, he reaches for his phone. Two minutes later, its red light flashing, an emergency tow truck arrives at the scene of the accident and begins towing operations. At the same time, police guarding the entrance ramps to the freeway are alerted to slow down or stop all cars approaching the jammed-up section. By 5:11 p.m., four minutes after the crash, traffic is once again flowing normally—thanks to the closed-circuit TV monitors that keep a constant watch on the speeding cars. Not only are the engineers alerted to accidents through the TV circuit, but they also can spot traffic overloads and slowdowns as they begin to build up. By shunting traffic away from the expressway soon enough, they can prevent jams.

Test Closed Circuits

The closed circuits are being tested in Detroit on two one-mile stretches of high-speed highways. If the tests show the system to be as successful as traffic engineers believe, a traffic-control pattern will be set for the future.



Battery-powered motor raises and lowers bait to attract the fish while angler takes life easy on a chair

Motor Moves Fish Bait While Angler Relaxes

When John T. Larou goes ice fishing, he relaxes in a chair while his bait moves realistically to attract the fish. Larou, of Detroit, Mich., mounted a small motor (formerly used to move an animated sign) on

a board. A flashlight battery powers the motor, which raises and lowers the bait $\frac{3}{4}$ inch twice each second. The moving bait attracts the fish beneath the ice while Larou relaxes above.

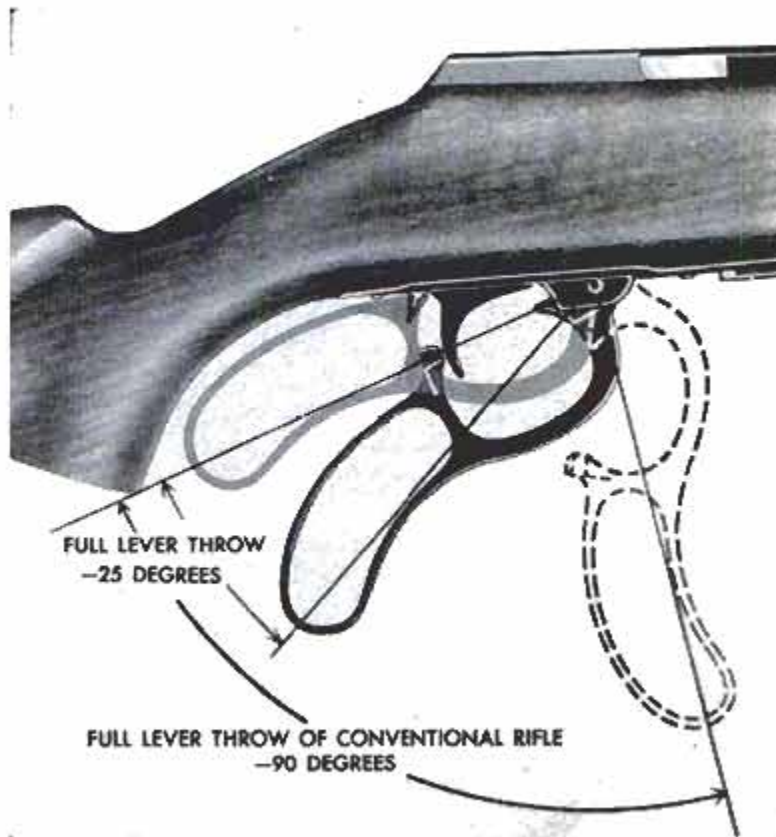
Fiberboard Shelters Keep Out Poison Gas and Radioactive Dust

Poison gas, disease-laden particles, and atomic fall-out are stopped by fiberboard developed at the U. S. Forest Products Laboratory. With the material, says the laboratory, shelters can be built to protect troops and civilians from some of the worst effects of modern war. Oxygen, carbon di-

oxide given off in breathing and respiratory vapors pass through the board, so there is no danger of suffocation in a closed shelter. But secret chemicals in the fibers screen out deadly gases and particles. Developed for the Army Chemical Corps, the fiberboard is undergoing extensive tests.

Marlin .22-Caliber Rifle Has Short Lever Stroke

Sportsmen have a new .22-caliber lever-action rifle—the Marlin 56-Levermatic. The throw of the lever is so short that the hunter's hand need never leave the pistol grip. The lever moves only in a 25-degree arc compared to the 90-degree arc of most lever actions of the past. The new model has a seven-shot clip and will handle all standard and high-velocity rim-fire ammunition.



Automatic Backup Horn

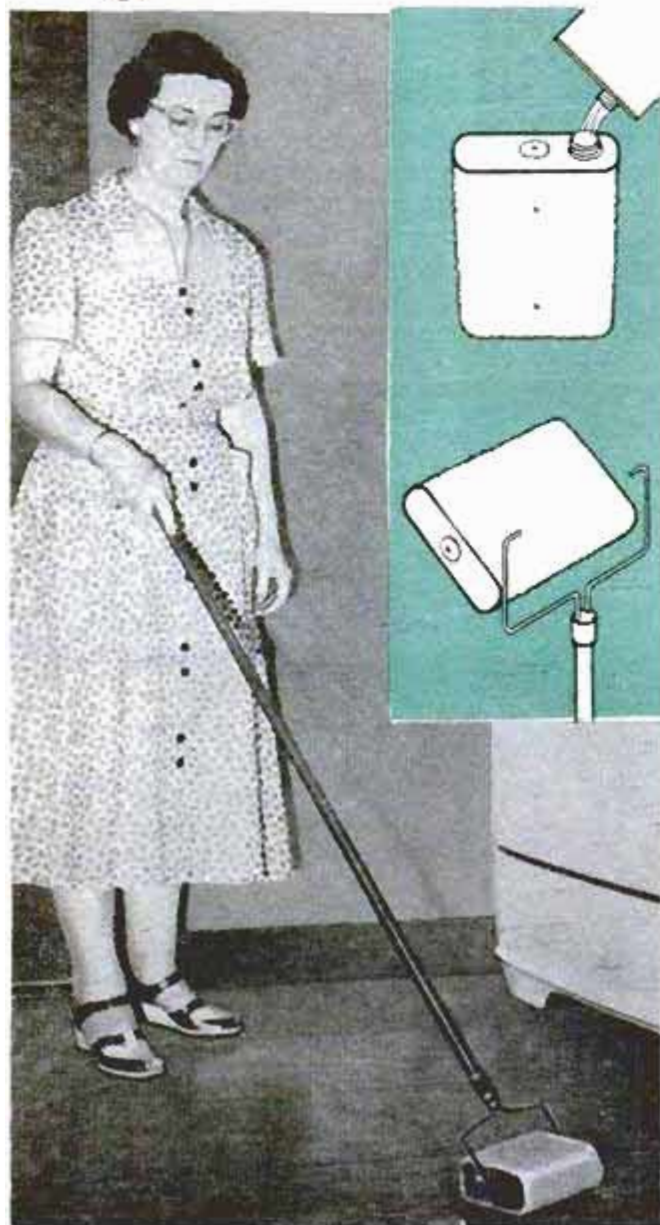
Installed in the car trunk, an automatic horn warns pedestrians that the driver is backing up. Installation takes less than a minute and is accomplished without stripping any wiring. The horn, a loud buzzer, hooks into the backup-light circuit.

WHAT'S NEW FOR Your Home



CREEPER is for baby too young to use a walker. Ball-bearing casters allow him to scoot around the house while keeping off the floor. Baby can't fall out or tip over. Height adjusts to fit infants of six weeks and older. Seat and chest rest are padded.

Fridell Mfg. Co., P.O. Box 721, Galveston, Tex.

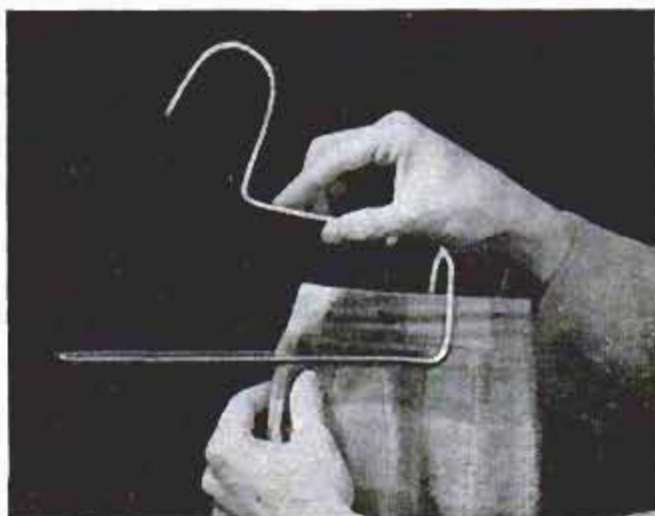


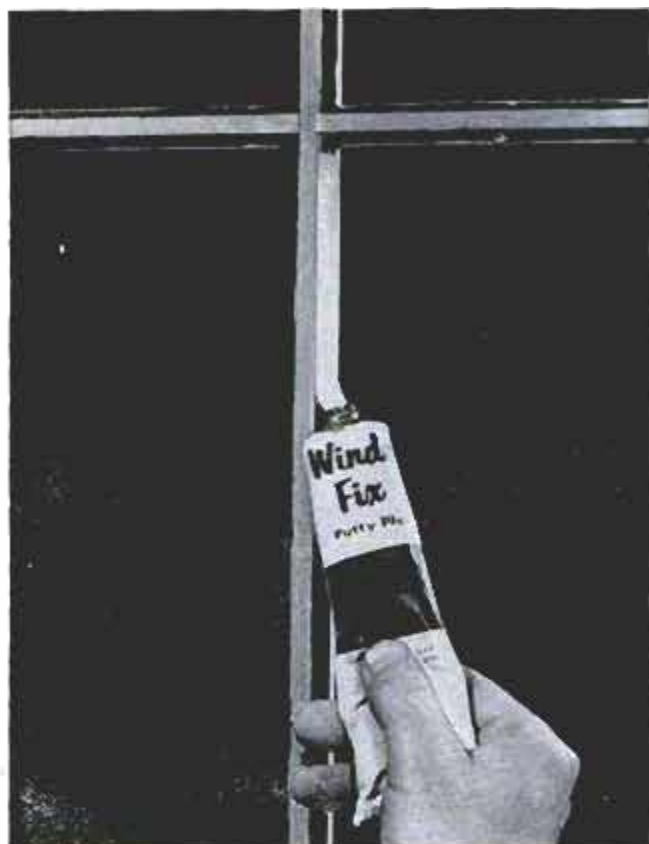
FLOOR WAXER is a can of liquid wax attached to a long handle. Wax flows out through two holes in one side of can to soak the cloth. Can is flipped over and other side used if too much wax is flowing out. Can is easily filled. The cover is washable.

Master Waxer, Inc., 4419 Troost, Kansas City, Mo.

HANGER for trousers and skirts is an L-shaped steel loop that firmly grasps the garment which is slipped into it. Pants are hung from the cuff and skirts by the waist. Despite its off-center appearance, the unit hangs evenly and does not tip or lean.

Slip-On Hanger Co., 7315 N.E. Glisan, Portland, Ore.





GLAZING PUTTY is squeezed out of its tube in a continuous triangular strip that fits exactly into angle between pane and sash. Tube holds 150 feet
Goodell Co., Antrim, N. H.

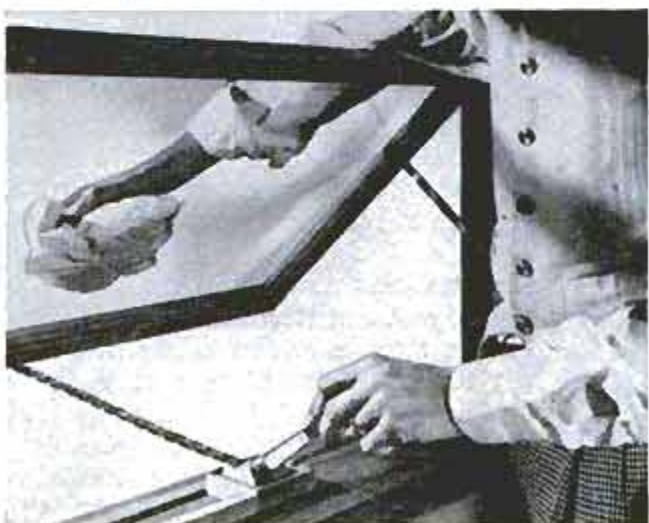


LAUNDRY CART that goes upstairs, downstairs, indoors and outdoors has a wrought-iron frame that acts as a pair of skis to let it slide on stairs
Leisurehouse, Inc., P.O. Box 492, Wichita, Kans.

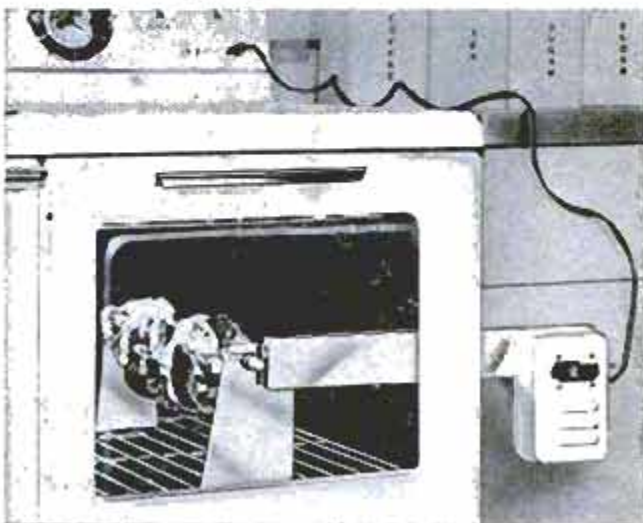
BOOK HOLDER for students, typists and those who like to read while eating keeps pages in place but frees hands for other uses. The lightweight metal holder accommodates a small pocket-size book, a magazine or an encyclopedia. It folds for compact storage and is sturdy
Maymac Co., Dept. PM, 79 West Grand St., Mount Vernon, N. Y.



OPENER for awning-type windows is cranked to reel out rigid chain that acts as firm support in any open position. Special hinge drops sash for washing
H. S. Getty & Co., Inc., 3348 N. 10th St., Philadelphia 40, Pa.



MOTORIZED SPIT makes barbecuing possible in oven of any range. Two thumbscrews fasten unit to oven rack. Oven door shuts against arm holding motor
Party-Q Corp., 218 Sullivan St., New York City 12



Impromptu Aerial Circus



Completely unrehearsed, a group of pilots who had never flown together before took their jets up at a French national air meet at Metz and did precision acrobatic maneuvers. Aerobatic teams from Britain's Royal Air Force, the Royal Canadian Air Force and the U. S. Air Force had performed at the meet. Members of these

teams made up the impromptu aerial circus. USAF Capt. Richard Immig, serving with the RAF, led the group in a Hawker Hunter. His wing men were Flying Officers L. N. Eisler and B. R. Campbell, of the RCAF "Sky Lancers," flying Sabre Jets. Capt. R. W. Jellison, of the USAF, flying a Lockheed T-33, completed the formation.



Pivoting Lamppost

Old-time lamplighters, who had to raise a long pole or climb a ladder to do their work, would have liked a modern arrangement that brings the lamp down to the ground. A lamppost that swings on a pivot in its base is supported by a rope as the trouble shooter strolls up the post to adjust or change a bulb. It is in London.

Miniature Exhaust Fan For Navy Suits

Rubberized suits worn by Navy decontamination squads are vented of moist air by a tiny fan attached to the back of the suit. A midget battery powers the 18-ounce, 1 by 1 $\frac{3}{8}$ by 1 $\frac{1}{2}$ -inch unit for as long as 24 hours. As it can reduce humidity inside a suit from 90 to 50 percent in three minutes, it is used for only short periods. When perfected, it may be used to ventilate other types of clothing, such as fire-fighting suits and arctic wear.

Balloon Wheel Dumps Leaflets

RAZOR BLADES, alarm clocks and a bicycle wheel went into the first model of a unique device that's being used successfully to drop millions of leaflets from huge balloons behind the Iron Curtain.

The balloons, launched in Western Germany by the Free Europe Committee, Inc., drift across Red-held Europe with the prevailing winds, dropping packets of leaflets at fixed intervals.

Chief feature of the leaflet-carrying device attached to each 34-foot plastic balloon is the wheel. Nine-pound packets of leaflets suspended by cord are attached to the rim at regularly spaced points. An alarm clock causes two motor-powered razor blades to move slowly around the rim of the wheel and cut off cords that were holding the packets at fixed intervals.

Formerly, a small cannon was used on the balloons to explode the cord loose. But word came back from Europe that the Communists were using the cannon device for counter propaganda. Residents of Iron Curtain countries where the leaflets were dropped were told that the cannon units were deadly.

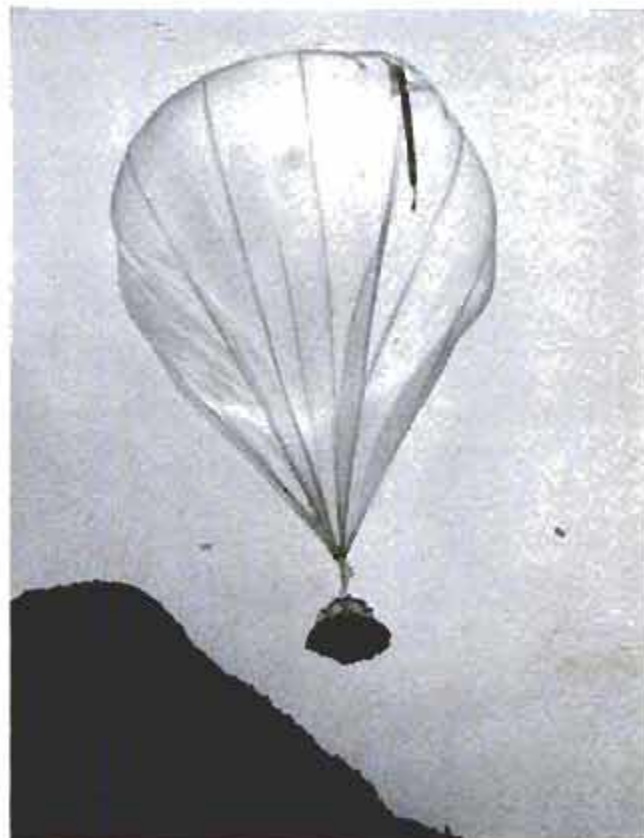
Workers in Germany ready a balloon for take-off. Each 34-foot balloon can carry 100,000 leaflets

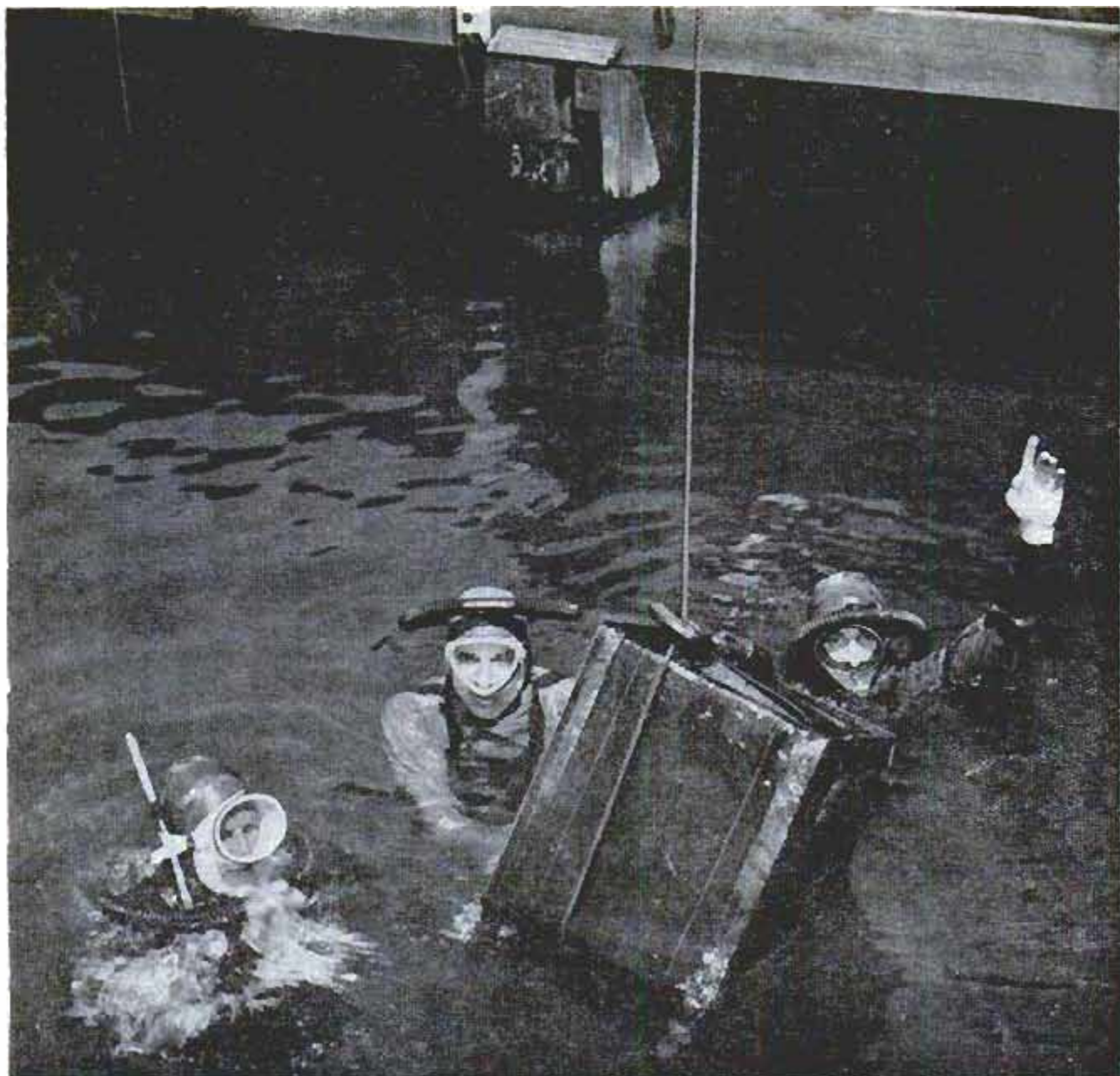


Yost and Macgowan examine their creation. Alarm clocks are encased in box below wheel. Pamphlets hang from rim of wheel

A new unit had to be developed—quickly. Two engineers of General Mills in Minneapolis were assigned to the job on a Friday. By Monday Paul Yost and John Macgowan had developed a working model of their unusual unit. To date, several hundred of the units, each capable of dropping 100,000 pamphlets totaling 450 pounds, have been wafted over Red Europe.

Balloon laden with leaflets soars away. It will reach 25,000 feet as it drifts over Red-held Europe





A stolen safe that robbers thought was hidden for all time is brought to the surface by police frogmen

SEATTLE POLICE PATROL

By Rafe Gibbs

PATROLMAN RON FAIRES of the Seattle Police Department moved slowly through the enveloping darkness to the automobile, yanked open a rear door and shot the beam of his flashlight inside. There they were—stacked on the floor—the stolen Army rifles from Spokane.

All this would have been pretty routine for a police officer, except that the car happened to be under 30 feet of water in Hicks Lake. Faired was in uniform, but an odd one for a patrolman . . . a frogman diving outfit.

Two young men had stolen both car and rifles in the eastern Washington city, then raced across the broad and flat expanse of

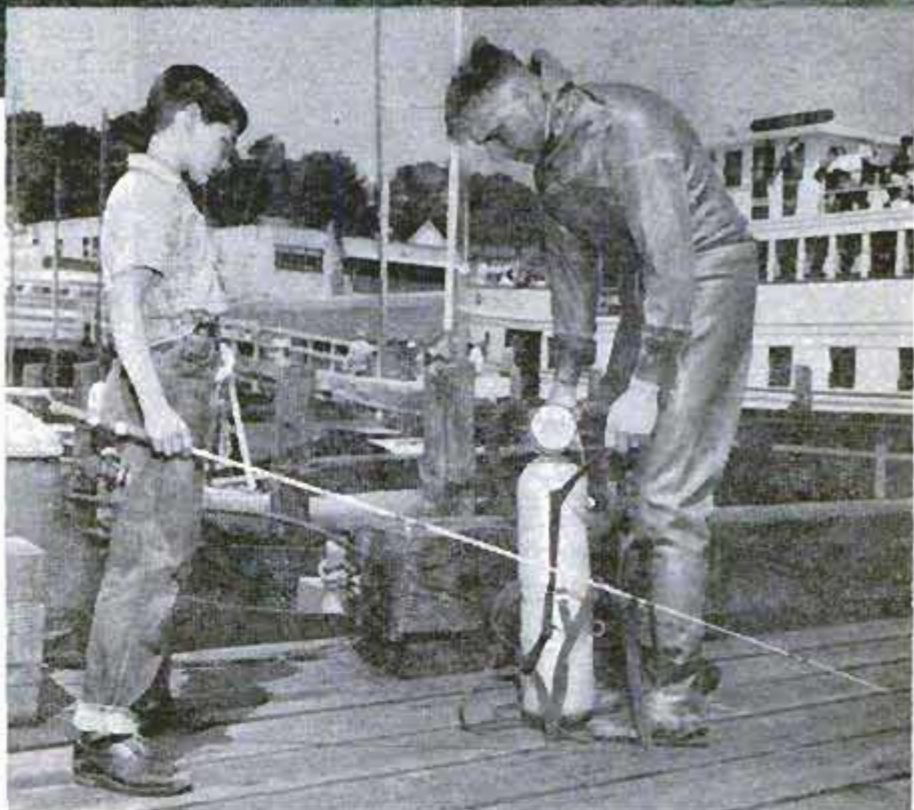
the Columbia Basin and up the winding highway over the Cascade Mountains to Seattle. There the heat was on, and the fleeing thieves decided to "cool off" the car with its arsenal by running it into the lake.

A report that a driverless car had been seen plunging into the lake brought police to the scene, then a call for Seattle's frogman police unit. Result: Recovery of the sunken loot and jail for the looters, who were later picked up.

The frogman unit drifted into the Seattle Police Department like a stranger looking for a berth for the night. At first the diving activities were just an off-duty hobby of Patrolman Faired. Then Patrolmen Ted



Frogmen frequently dive from a harbor-patrol boat. Members of the police department have 200 miles of shore line to patrol. Frogmen, however, are confined to land duty most of the time. Their services are also available to other towns



Seattle's police methods on the water front intrigue the youngsters. Patrolman Theodore Yerabek, equipped with oxygen tank and rubber suit, prepares to go below. Frogmen are all expert swimmers and divers, started as boys

AN UNDERWATER BEAT

Yerabek and Ed Francis became interested, and there were three frogmen looking for opportunities to don rubber suits, masks, lead weights and air tanks.

The opportunities came fast—so fast that Chief of Police H. J. Lawrence decided to make the frogman duties official. The unit—Underwater Search and Recovery—is now part of the Patrol Division, of which Captain Jack Porter is chief.

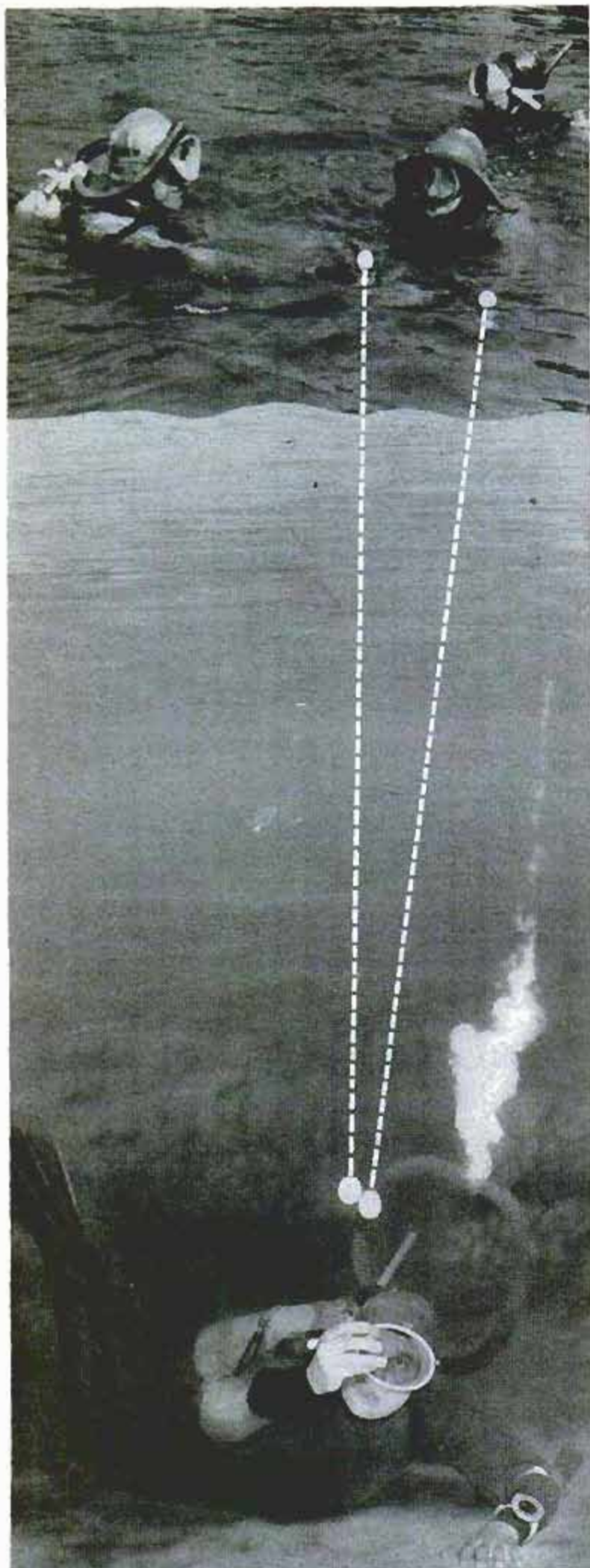
"With all the shore line we've got to patrol around here—about 200 miles—it's not hard to guess where a killer is going to toss the murder weapon," said Porter, "or where yeggs are going to dump a safe after they have looted it. The water is handy for getting rid of the evidence—like the bottom of a theater seat for parking chewing

gum. But, once we can determine the general vicinity, the frogmen more often than not can do the rest.

"The murder weapon may be wet, but the fingerprints are likely to be still there. The cash may be gone from the safe, but valuable records may be recovered.

"Then there are the drownings—with the grief-stricken members of the family. They search. They wait. They know that death has come, but they don't start to readjust their own lives until the body is found. Nothing is definite without the body.

"There's a woman who has been coming out here each summer for the last seven years from Tennessee—3000 miles—to search in the mountains for the body of her son, a Navy pilot who cracked up his plane



somewhere. Relatives of drowning victims feel about the same way. Usually, the frogmen can find the body quickly and, if for no other reason than aid in drownings, the frogmen are worth their diving weight to the police department."

The frogmen are now used to recovering bodies of drowning victims; that is, as used to sudden death as one can get.

"When I find the body down there in the blackness," said Officer Faires, "I switch off my light and come up without seeing. You've got to be impersonal about death, or it will get you."

The frogmen just don't sit around headquarters playing pinochle and waiting for a waterfront call. All of them have other duties. Faires rides a prowler car, and Yerabek and Francis walk beats. But take a night like this one. . . .

It had started in a routine fashion for Faires and his partner in their prowler car . . . a speeder ticketed . . . a sidewalk-sleeping "wino" prodded into wakefulness and told to go home . . . a drunk in a tavern threatening other customers.

The drunk was carted off to the station and booked for disorderly conduct. Faires was just getting back into the prowler car when the loudspeaker intoned:

"Drowning at Lake Union Dock. Man fell into water stepping from boat to dock. Frogman job . . . Faires. . . ."

Whine of the siren as the prowler car raced to Faires' home . . . there Faires transferred to his own car, its trunk compartment always loaded with complete diving equipment.

At the dock, the Harbor Patrol was already on the job, but its grappling hooks had become fouled in old cable at the bottom of the lake. Cable . . . it can embrace and trap a diver sometimes like the tentacles of an octopus.

Wary of what he might run into below, Faires slipped into the black water with his diving outfit. At 28 feet, he touched bottom, and

Diver in trouble signals his mates above by releasing Ping-Pong balls, which float to the surface and bring a quick rescue

began to move in a pattern designed to cover every foot of the designated area.

His light showed him a snarl of cable dead ahead. Carefully, he circled. Then he came to a tangle of barbed wire . . . as treacherous as that placed before a war trench. More so for a frogman, because the barbs can tear holes in the rubber suit.

Faires felt for the pouch at his side to be sure it was loaded. This is an innovation of his own—a pouch with Ping-Pong balls. If he should become trapped, he would release the balls, and when they floated to the surface the people above would know he was in trouble.

The Ping-Pong balls were in the pouch all right, and Faires glided over the wire to resume the pattern. An old piece of piling, one end stuck in the mud, loomed up. The other end seemed to point. The drowning victim lay just a few feet away. Faires grasped the body around the waist, turned off his light, and groped upward.

Standing alone on the dock as he struggled out of his clinging, dripping rubber suit, Faires heard someone say:

“. . . father of seven children.”

Then there was the week before Christmas . . . cold with traces of snow on the

sidewalk as Officer Francis walked his beat on upper Pike. A Santa Claus jingled his bell beside a money pot, and a young punk loitered beside the pot with his eye on the money. Francis told the loiterer to move on, then checked with headquarters at a call box.

Detective Homer Tipton wanted him for a frogman job . . . Duwamish River . . . cold or not . . . now. Francis grinned. He had a special outfit for diving at this time of year. It was a heated Air Force pilot's suit. That is, it was once electrically heated, but all the wires had been pulled out. Still, it provided a comforting shield of warmth between body and rubber suit.

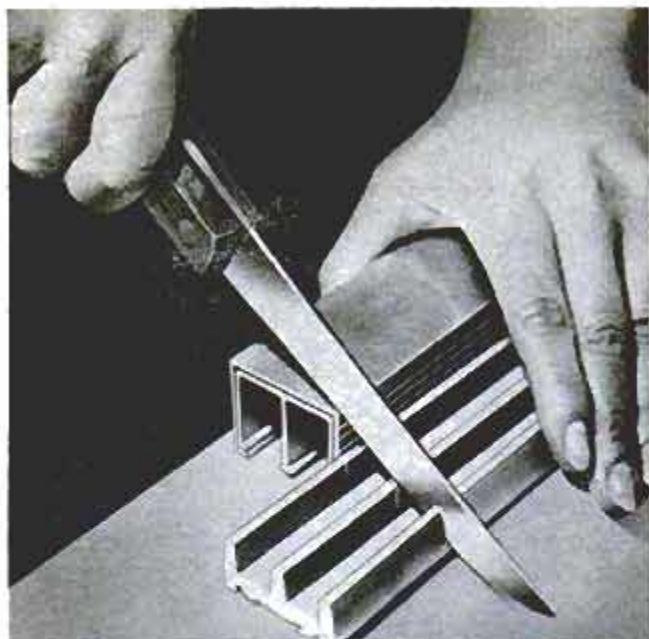
Burglars had stolen a safe from the Vance Cafe, and Detective Tipton had a tip that the safe was at the bottom of the Duwamish River. The cold, swirling waters of the stream did not look too inviting when Frogman Francis stepped in. But he moved with the determination of a patrolman on duty—underwater duty.

He had not been long beneath the surface when some slowly moving object bumped him, knocked him down. Francis turned his light, and what he saw was the

(Continued to page 302)

A revolver pitched into the water is picked up carefully by trigger guard to avoid smudging fingerprints 318





Plastic track is trimmed to length of aluminum track



Screwdriver tightens adjustable track for snug fit



Assembled aluminum frame keeps plastic panel taut



Plastic panels are easy to clean, keep bathroom neat

Sliding Plastic Panels Assembled From Kit Enclose Bathtub

In a short time, using a kit, you can custom-fit and install sliding plastic panels to enclose your bathtub. The panels consist of flexible vinyl stretched between aluminum frames. They slide in an overhead rail of aluminum and a plastic base rail that is cemented to the tub rim. The

overhead rail telescopes and is locked with a screw to fit snugly between brackets cemented to the walls. The lower plastic track is cut with a kitchen knife to match the length of the overhead rail. A knife and screwdriver are the only tools needed to install the unit.

Tests Show Antibiotics Can Be Used to Preserve Food

Antibiotics may soon be used to preserve food, according to staff scientists of a leading drug manufacturer. In tests, minute traces of an antibiotic like terramycin lengthened the life of pasteurized milk

from two days to several weeks. Dipping mixed salad greens in a solution of terramycin or streptomycin before packaging doubled their shelf life. Aureomycin is being used to preserve poultry.



Pyro, Ltd. photos

Picture of the moon taken with TV equipment shows craters in sharp detail. Right, monitor used in process

TV Camera on Telescope Provides Better Image

Television is extending the range of a 12-inch and a 25-inch telescope at England's Cambridge University. A TV camera in the base of a telescope "shoots" a faint image which is greatly boosted in strength by electron multipliers. The picture passes through an image-storage tube and appears on a TV-picture screen. The image can then be photographed for future reference. Results indicate that similar electron telescopes may someday extend man's view of the universe. The nature of light is such that sensitive receivers like the human eye or film plate are capable of responding to only a fraction of the light particles, or photons, reaching them. The new technique has been used in photographing the moon, Jupiter and Saturn.

TV equipment is mounted directly on the telescope, a 12-inch reflector. A 25-inch scope is also used



Wasplike Glider Wins World Championship for German Builder



Winner of the glider event of the 1955 model-airplane world championships in Mainz, Germany, is Rudolf Lindner (at right in photo, holding winning glider). The 24-year-old Bavarian took 886 points out of a possible 900 with his wasplike glider. Lindner also was the 1954 champion.

☐ Nature has simplified uranium hunting on the Colorado plateaus where mineralized zones, exposed by erosion on steep cliff walls, can be detected without costly drilling.



Hughes works on small version of snow sweeper that once ran on New York City's Third Avenue trolley line

He Keeps the Trolleys Alive

By Albert Pione

TROLLEYS were in their heyday when Alfred L. Hughes of Wilmington, Del., was a young man.

His favorite week-end sport consisted of riding swaying, wheel-clacking interurbans to the end of connecting lines after exhausting all transfer possibilities.

In the 1920s, Hughes' trolley ramblings took on a "requiem" air as line after line suspended operations.

For a time Hughes consoled himself by making the last run and preserving a souvenir of the sad occasion. Lights, straps, bells and destination signs—the makings of a potential museum of trolley lore—are stored in his basement.

Then, one day in 1947, Hughes decided his favorite but fading form of transportation deserved a more fitting memorial.

He decided to build trolley models. His

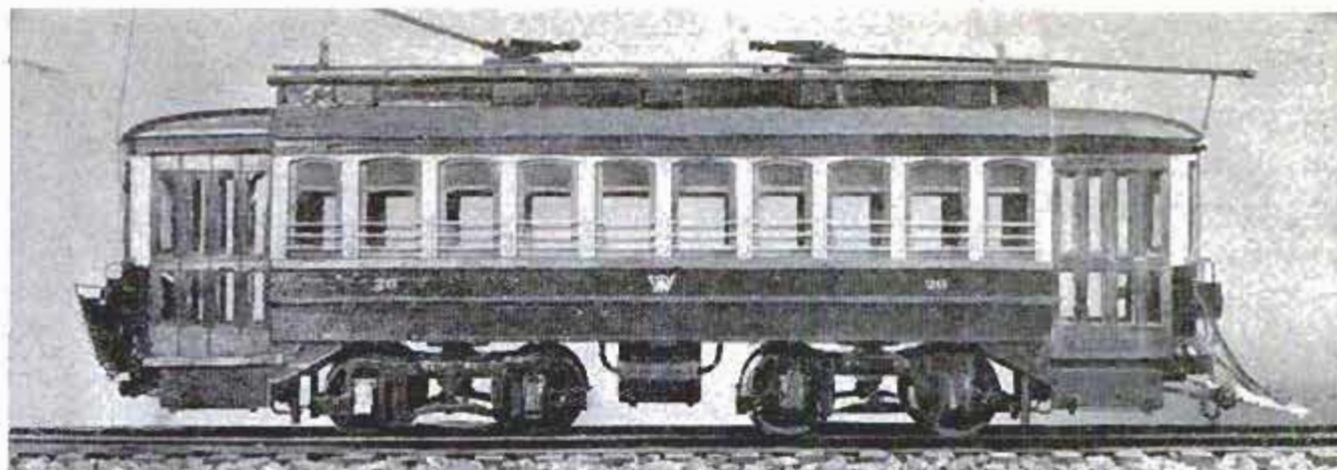
first was a Wilmington trolley—scaled $\frac{1}{2}$ inch to a foot, as are 6 subsequent models.

The car was equipped with reversible seats, signs, fare collectors, windows, brakes and couplings. Wheels, trucks and axles were turned on a lathe.

Bodies were fabricated of wood and metal and painted with original colors, names and destination signs. Old snapshots, visits to former trolley-car operators, pilgrimages to remaining trolley cars and Hughes' memory provided working plans.

The models take Hughes a year each to construct, working several hours a night—but he's in no hurry.

Hughes is devoted to his mission of constructing accurate reproductions. Through them he hopes to preserve memories and to show today's youngsters how Dad used to travel. ★ ★ ★



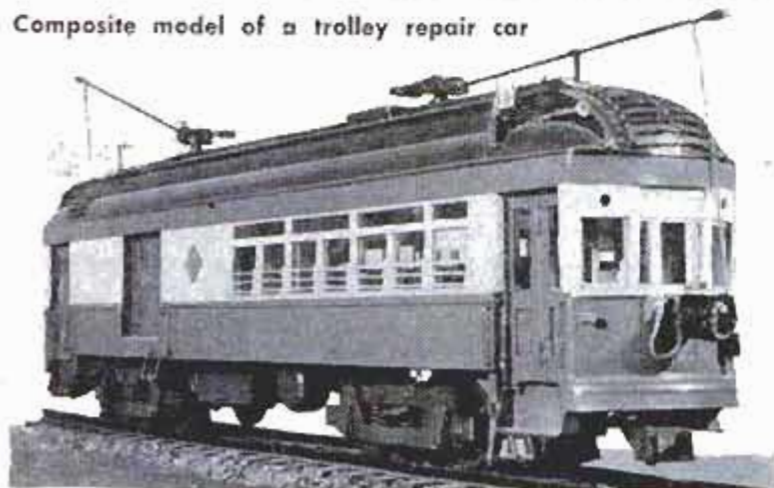
First model made by Hughes was this trolley from the Wilmington and Philadelphia Traction Co., which last ran in 1941



Composite model of a trolley repair car



Model of a typical car used on the Southern Pennsylvania Traction Company's line



Streamlined car from the Philadelphia Suburban Co. went 80 miles per hour

Above is a typical interurban baggage and passenger car. At the right, an open-air summer trolley that was once used in Wilmington by the Wilmington and Brandywine Springs Railway Co. for excursions and outings. This is Hughes' favorite



THIS IS YOUR YEARBOOK of automobiles for 1956. On these 49 pages *Popular Mechanics* presents its Annual Auto Section, the story of the industry in a package. The story begins with an eight-page portfolio of paintings depicting the outstanding sports cars of the world in full color, shown against authentic backgrounds of great sports-car events. This special section brings you also photographs of all the 1956 cars, engine specifications, body dimensions and prices. Other features cover stock-car racing, a picture story of a car on the production line, and a survey telling why motorists choose the cars they buy.

THE 10 MOST REPRESENTATIVE



By **ARTHUR R. RAILTON**, *Automotive Editor*

WRAP UP THE FEELINGS of a thousand sports-car fans—and they are a worshipful, fanatic lot!—in one neat paragraph and you have this:

“A sports car is an uncomfortable, hard-riding, magnificently made hunk of iron with acceleration, cornering ability and positive control.”

You can say it in a thousand different ways, and a thousand sports-car owners have done just that. But this one definition wraps up the subject fully and finally.

In a motor-mad land, the sports-car folks are a race apart and, as a special feature of this Annual Automobile Section, *Popular Mechanics* presents a portfolio of paintings of the most representative sports cars of the world. They were chosen by the owners themselves—not as the most popular, or the most powerful, or the fastest or best. Simply the most representative.

We put that question by ballot to several thousand owners of the glamorous breed of automobiles and

asked them at the same time to give us their definition. What is a sports car?

The 10 most representative sports cars are portrayed on these pages. Here is the way the enthusiasts of the cult ranked them, based on the frequency of listing on the ballots:

1. Jaguar
2. Porsche
3. MG
4. Ferrari
5. Austin-Healey 100
6. Mercedes-Benz 300SL
7. Triumph TR2
8. Aston Martin DB2-4
9. Lancia
10. Alfa Romeo

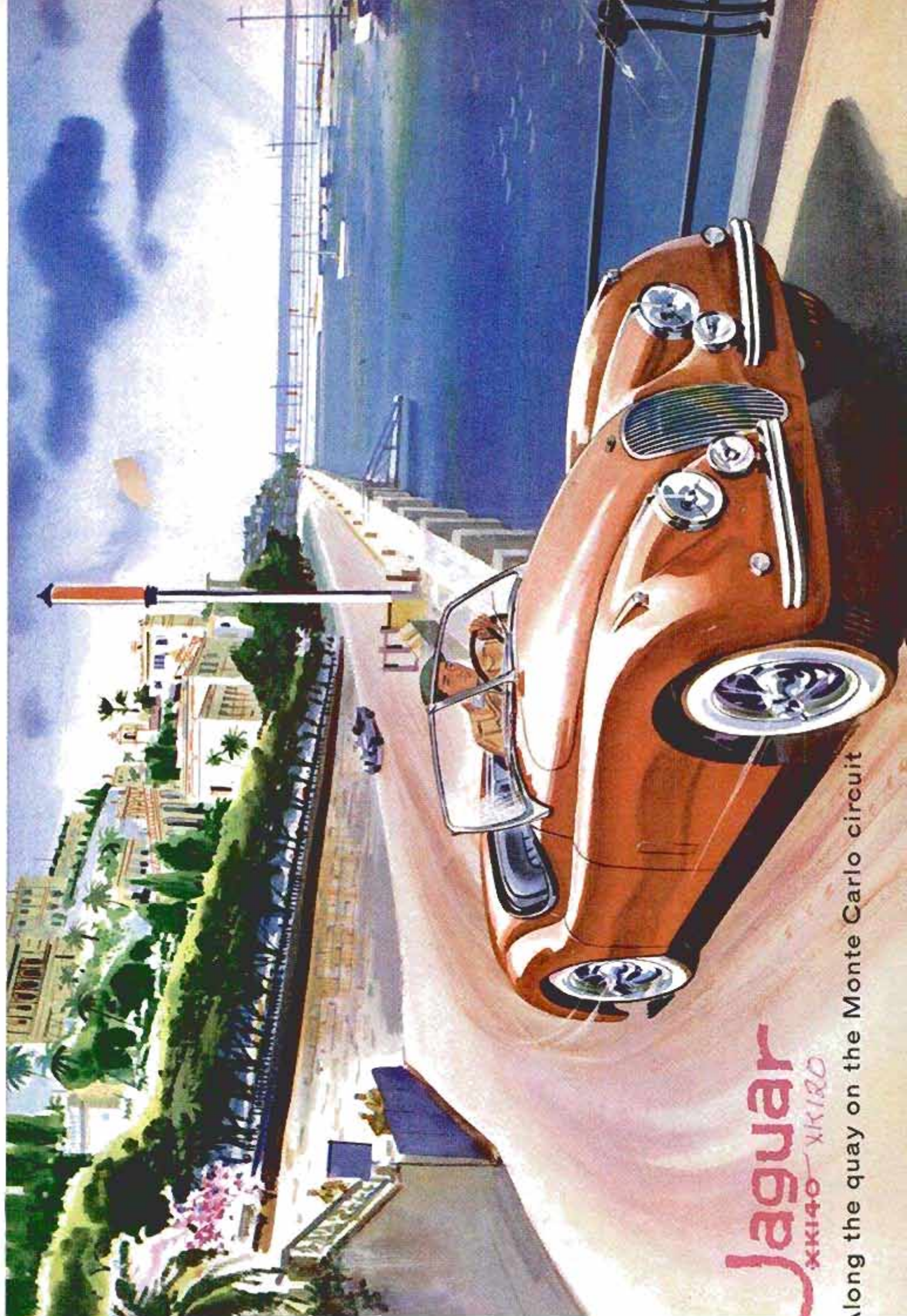
Here are the second 10 cars in order:

Cunningham, Bugatti, Allard, Morgan, Thunderbird, Siata, A.C. Ace, Frazer-Nash, Corvette and Pegaso.

Popular Mechanics commissioned artist Paul Hamlin to paint portraits of the

(Continued to page 169)

Reprints of these sports-car paintings printed on one side only and suitable for framing are available (as long as the supply lasts) for 25 cents in coin to cover costs. Address your request to Bureau of Information, Popular Mechanics, 200 East Ontario St., Chicago 11, Ill.



Jaguar
XK140 XK120

along the quay on the Monte Carlo circuit



Porsche
CONTINENTAL COUPE

Ordo Pass, Italy, in the Alpine Rally

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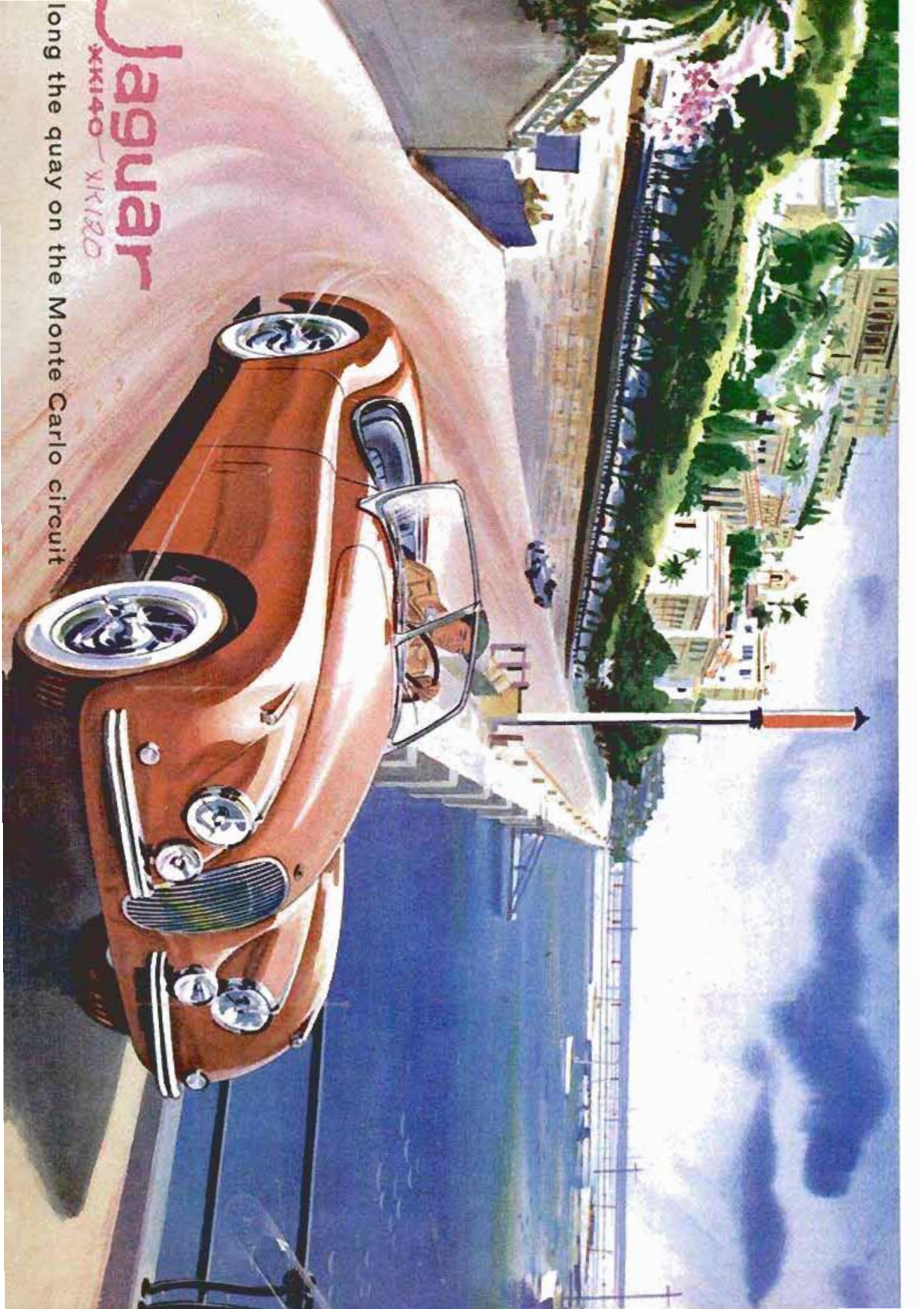


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Streamlined car from the Philadelphia Suburban Co. went 80 miles per hour





Jaguar

XK140 — XK150

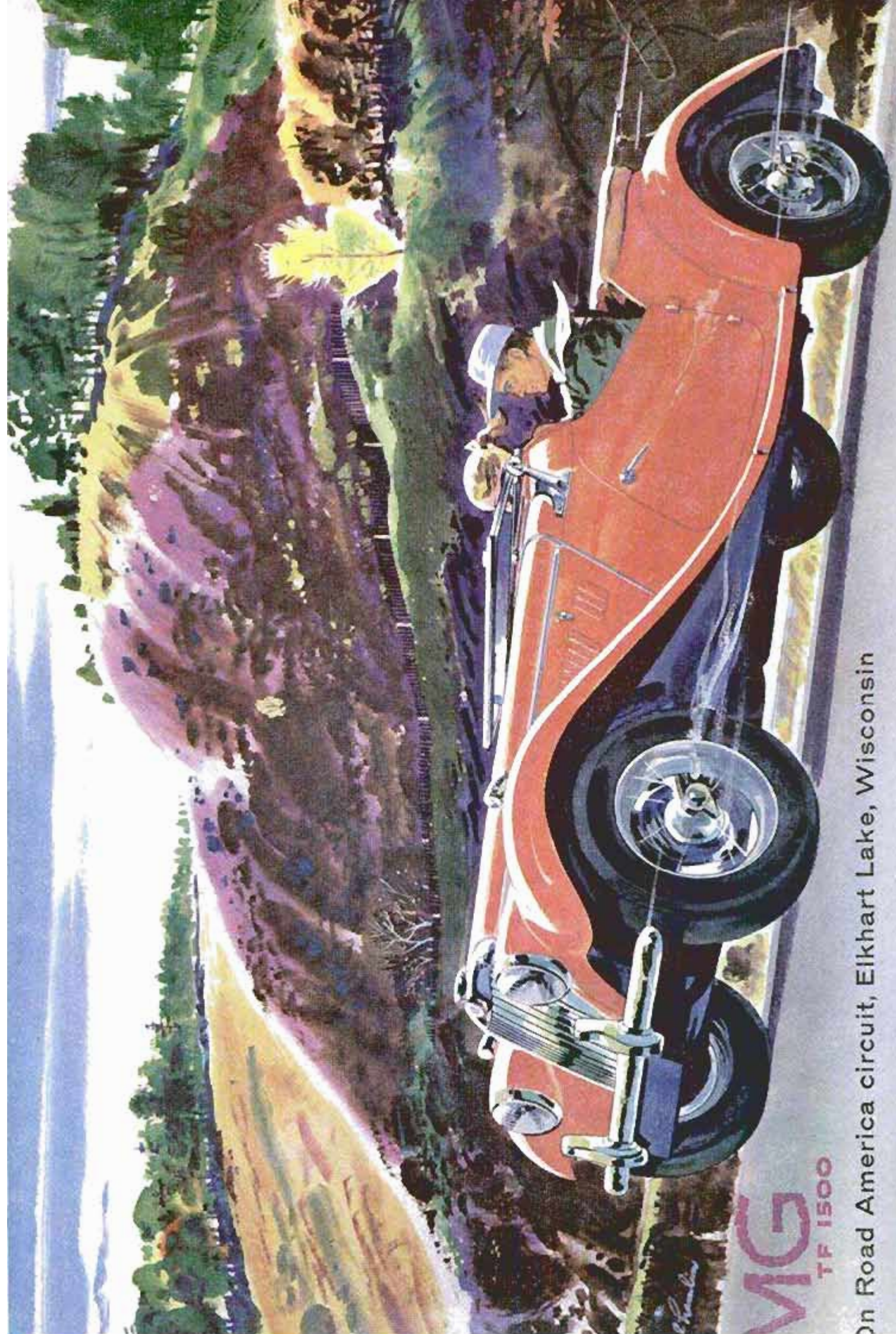
long the quay on the Monte Carlo circuit

Porsche

CONTINENTAL COUPE

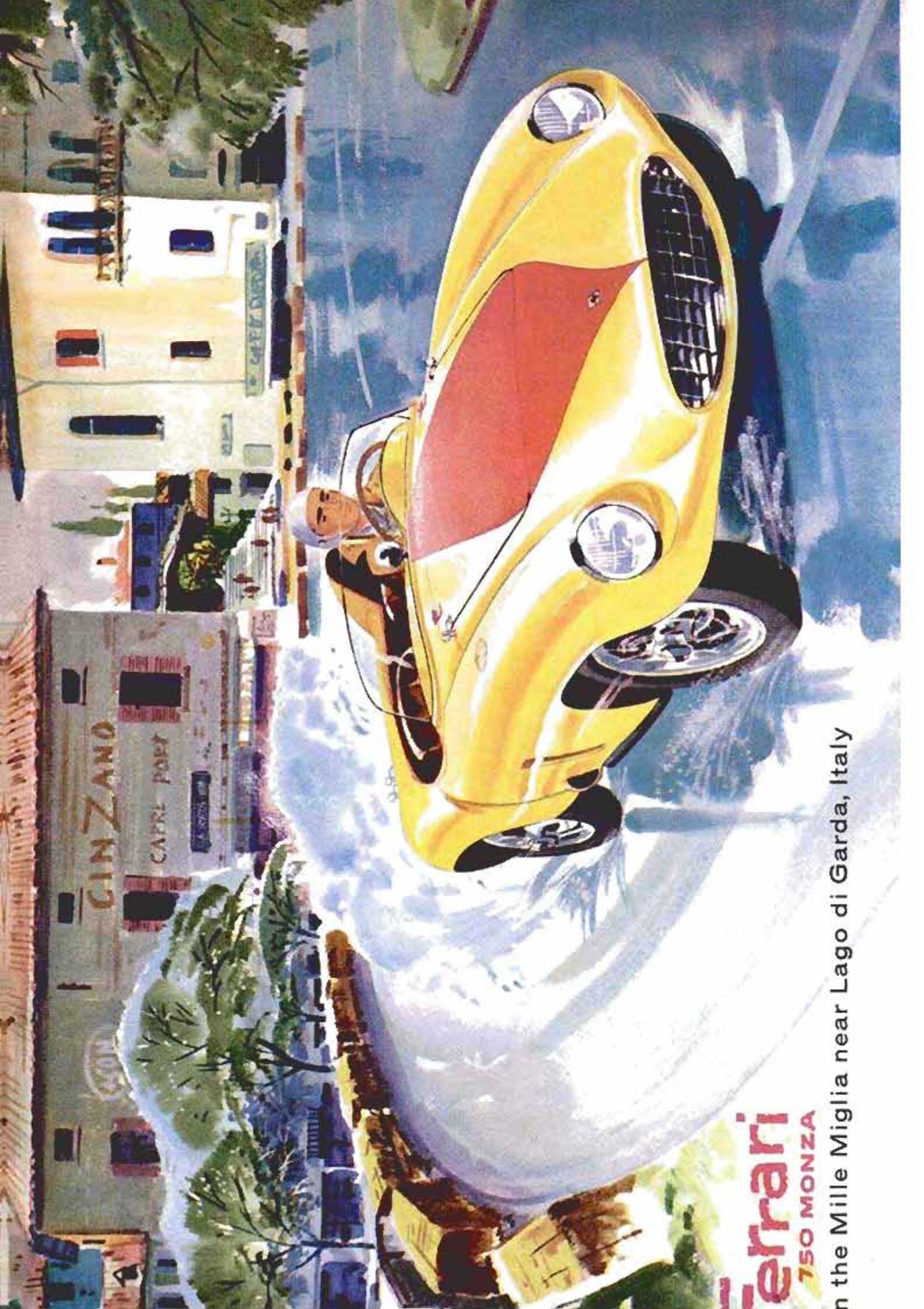
at Pordoi Pass, Italy, in the Alpine Rally





MG
TF 1500

On Road America circuit, Elkhart Lake, Wisconsin



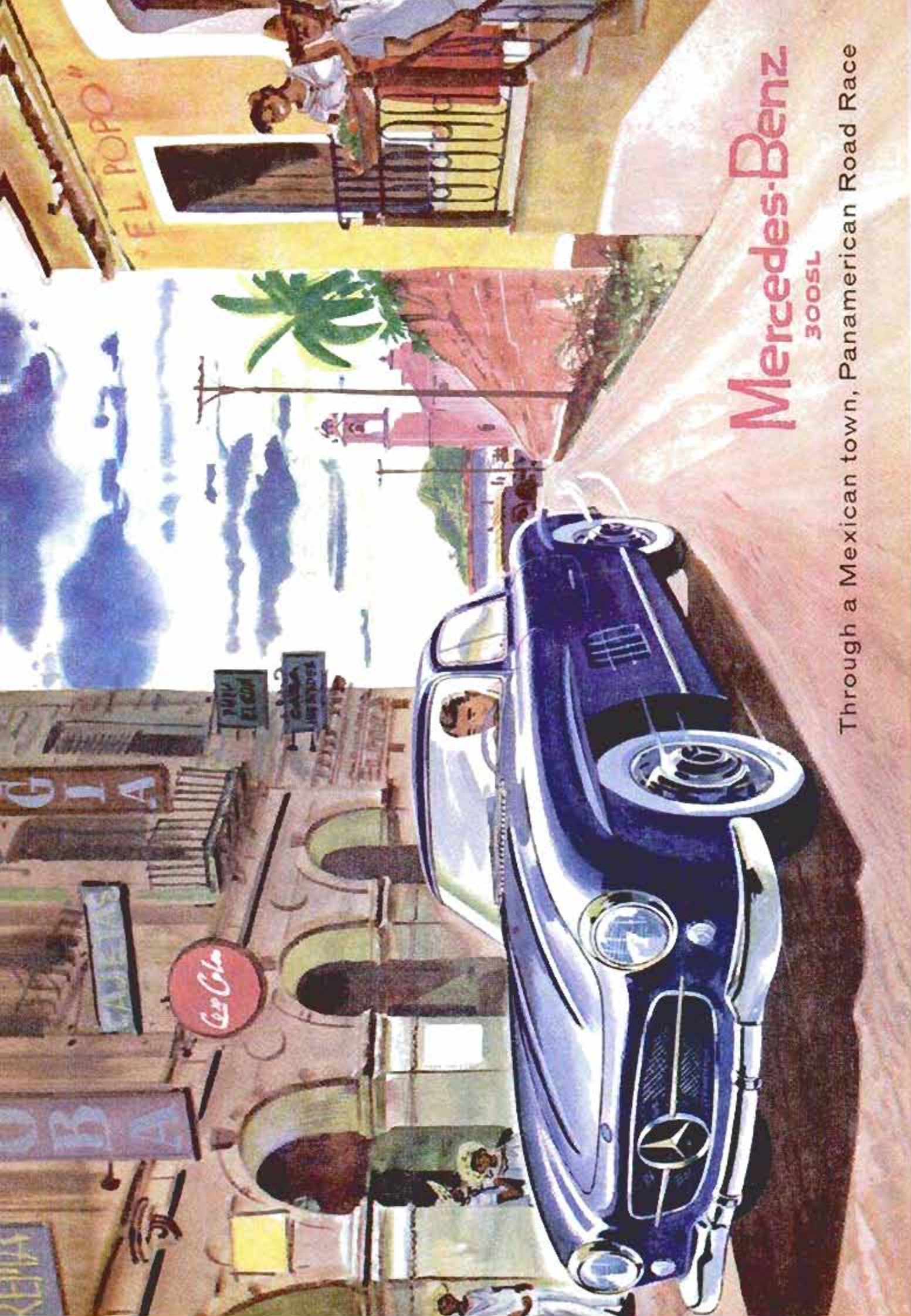
Ferrari
750 MONZA

in the Mille Miglia near Lago di Garda, Italy

Austin-Healey 100

the Mulsanne Straight, Le Mans, France





Mercedes-Benz 300SL

Through a Mexican town, Panamerican Road Race



Triumph
TR2

Aston Martin
DB2-4

Passing the stands on England's Aintree circuit



Lancia
SPYDER

Cornering on the hilly Targa Florio in Sicily

Alfa Romeo

GIULIETTA SPRINT

Sport Cars of the World

(Continued from page 160)

first 10 cars. He has pictured them in settings appropriate to the sport.

Each of the eight settings is a famed sports-car racing circuit. All are European except for the newly opened Road America course near Elkhart Lake, Wis., and the PanAmerican course in Mexico.

What Is a Sports Car?

Definitions sent in by the enthusiasts range from terse statements of mechanical formulas to lyrical paragraphs of poetic praise.

Most enthusiasts look upon the sports car as more than a machine—although it must be a fine piece of machinery first of all. It is more than steel, rubber and glass, it is something to be experienced. Like a good dancing partner, it seems to anticipate the driver's actions. Yet it demands something of the driver. It is not, and must never be, automatic. Together, the car and driver are a team—like a polo player and his pony.

A sports car is a vehicle that makes driving fun. It is not, as many persons think, a car that must be driven fast to be fun—although driving fast is certainly part of the fun. But it's a car that makes you a bit reluctant to get out when you arrive at your destination. After you have driven from A to B, you are likely to find yourself wishing you were back at A so you could make the trip over again.

It's a car that makes driving on crowned, winding, narrow roads an adventure rather than a chore. Sports-car drivers don't head for the straight-as-string super-highways. They prefer the back roads, the winding, hilly roads. This preference may help explain why sports cars are less popular in the flat lands of the mid-continent than on the coasts.

The more turns—corners, the enthusiast calls them—the better; the sharper the corner, the better. Because it is in cornering that the sports car excels. The corner is to the sports-car driver what Hamlet is to the actor—it provides a stage to display his talents.

But if any single word defines the sports car, that word is probably *fun*. A sports car is fun—fun to own, fun to drive and fun to take care of.

And, say the enthusiasts, fun is something that has disappeared from the family car of 1956. The family car has performance (many will out-accelerate and out-run most sports cars). The family car has speed and comfort, but the fun is gone.

And it is that one commodity, fun, which makes addicts of the sports-car owners, despite the inconvenience of size, the discomfort of leaky side curtains and the stony silence of outraged wives.

It is an odd man indeed who, after an hour at the wheel of a sports car, isn't a bit regretful as he turns back to his comfortable, fast, roomy family car.

Enthusiasts' Definitions

The most common definition by the owners in our survey stresses the dual qualities of the sports car: the fact that you can race it on Saturday, take it to church on Sunday and to work the rest of the week. Here are some quotations from the ballots:

"A car which can be used both for everyday driving and racing."—Westport, Conn.

"A car capable of running a closed circuit and of being used daily. It must accelerate from 0 to 100 and stop in under 60 seconds."—Houston, Tex.

The one sports-car characteristic the owners mention most frequently is roadability—all sports cars must have plenty of that. Excellence of handling is the second most important attribute, owners say.

Here are some more quotations from the sports-car enthusiasts:

"A car that through acceleration, braking and suspension puts the sport back into driving."—Salt Lake City, Utah.

"A car whose characteristics make it outstandingly fun to drive because it becomes a part of one's own reflexes."—Albuquerque, N. Mex.

"It starts, stops and corners when the driver commands."—Kansas City, Mo.

"An uncomfortable, hard-riding, magnificently made hunk of iron with acceleration, cornering stability and positive control."—Waukesha, Wis.

"You don't define it, you feel it."—Buchanan, Mich.

"A love on wheels."—Buffalo, N. Y.

"When you can't wait for the next hairpin curve you're driving one."—Scranton, Pa.

"Applied economy of terse motions."—Detroit, Mich.

"A car which you drive instead of the car driving you."—Geneva, N. Y.

"Fun to drive. Becomes an extension of your arms and legs."—St. Louis, Mo.

"Quick. Firm in its ride. And quite safe even at extremes in driving conditions."—Sheboygan, Wis.

(Continued to page 298)

Parade of '56 Cars

THIS IS a face-lift year, in the vernacular of the industry. The alternate year in the two-year cycle is a year devoted mainly to minor modifications in appearance and performance. Cynically, some of them might be termed simply corrections of last year's mistakes.

But 1956 is the year of at least four uniform changes in the industry: License-plate sizes were standardized to 6 by 16 inches, all cars have the new sealed-beam headlamps and directional signals, and the industry is wholly on a 12-volt-battery system.

(Continued to page 328)

WHAT IS A **Spec**Rating?

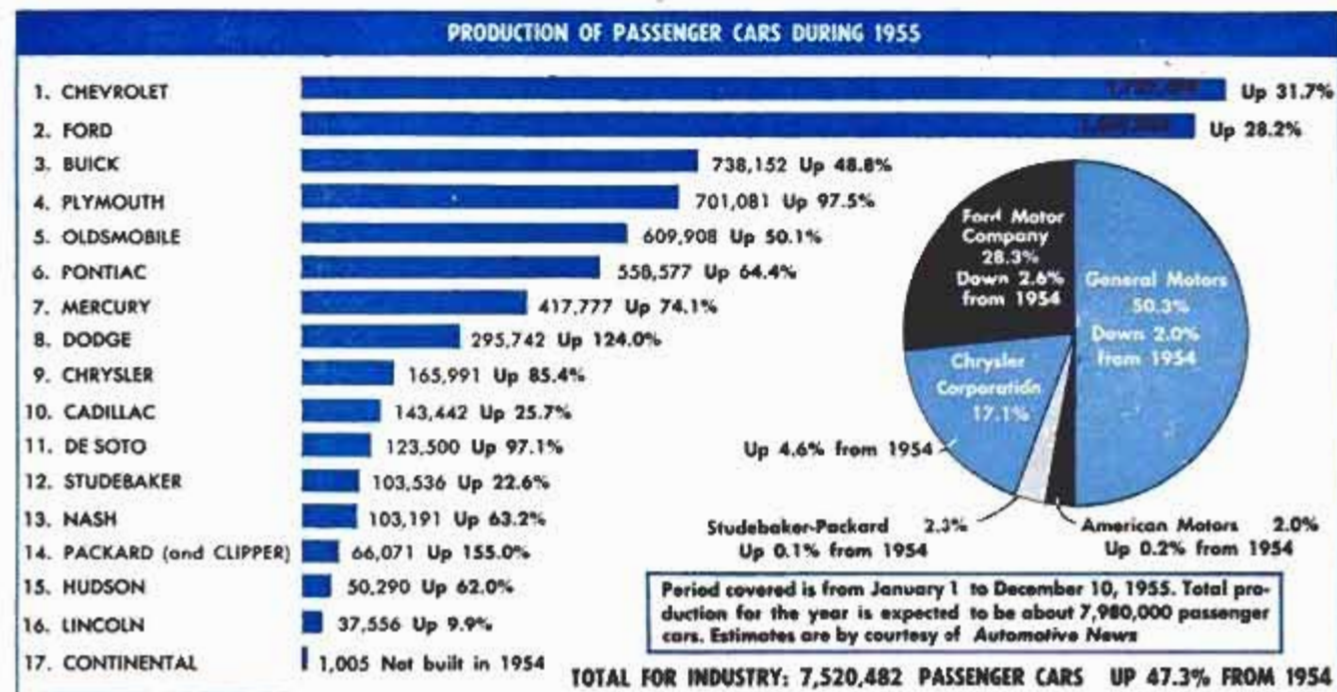
To help you decide which car is most suitable for you, *PM* offers a system of ratings by specifications. Here is what it consists of:

Interior—the total inches (front and rear) of headroom, legroom, hiproom, shoulder room, seat height and clearance between the steering wheel and front seat. The larger the total, the more room you will find inside the car.

Exterior—the sum, in inches, of the over-all length and over-all width. The larger the number, the more room the car will take up on the street or in your garage.

Power factor—a mathematical indication of performance. It is the shipping weight divided by the horsepower. The smaller the number, the faster the car should respond to the throttle.

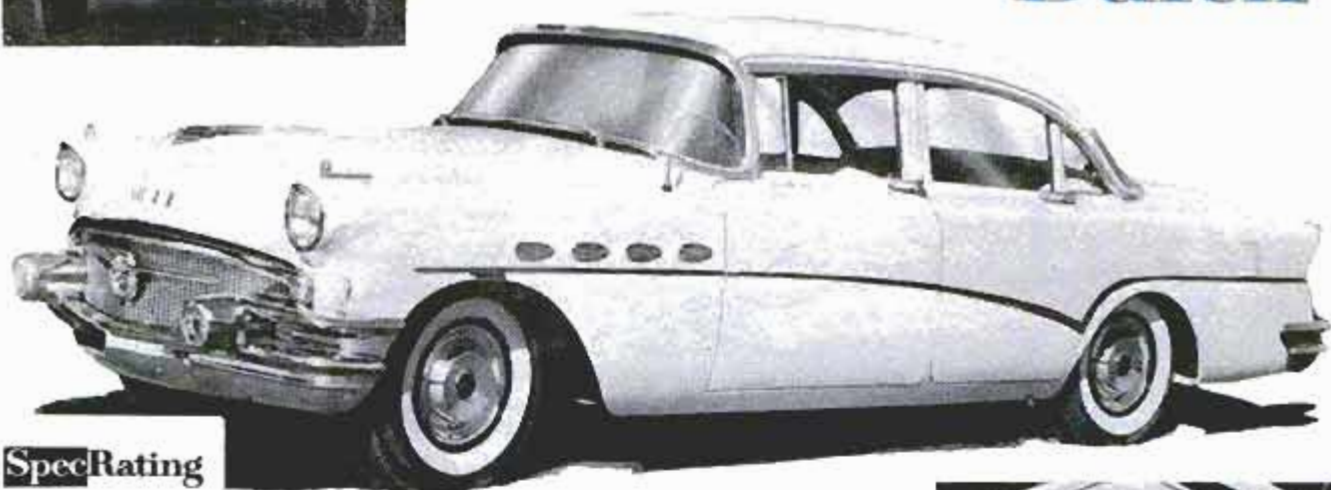
All ratings and prices are for four-door sedans only, except in sports-type cars and the Continental. For a listing of cars as they are grouped in price classes see page 328.





Most that's new at Buick is in the chassis: 352-cubic-inch V8 engine in all series, new rear axle, new front suspension, direct-acting shocks in the rear, a second-stator in Dynaflow transmission

Buick



SpecRating

Interior: Special V8: 422.4 inches, 8th roomiest of 10 in Class B
 Century V8: 422.4 inches, 8th roomiest of 9 in Class C
 Super V8: 440.3 inches, 3rd roomiest of 9 in Class C
 Roadmaster V8: 442.6 inches, 2nd roomiest of 9 in Class D

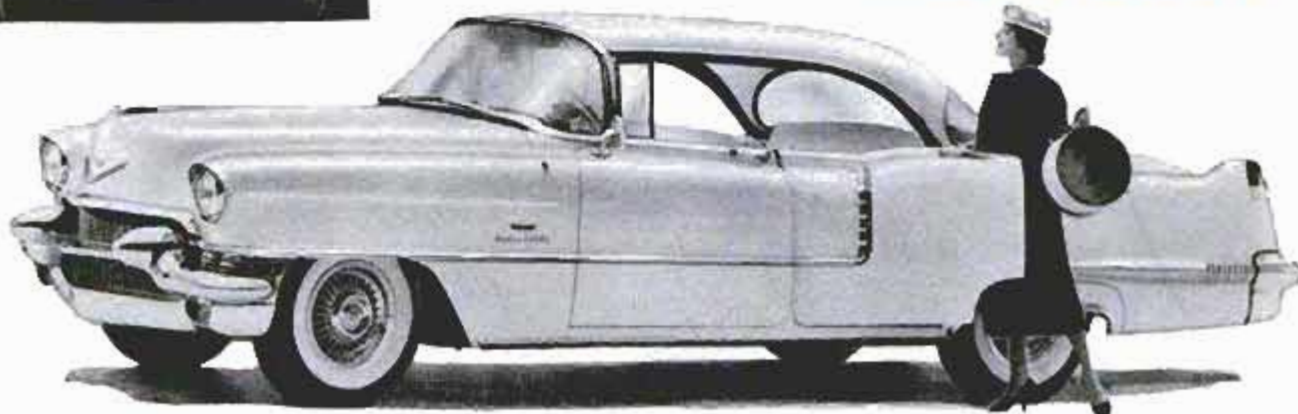
Exterior: Special V8: 280.6 inches, 9th largest of 11 in Class B
 Century V8: 280.6 inches, 9th largest of 9 in Class C
 Super V8: 293.6 inches, 3rd largest of 9 in Class C
 Roadmaster V8: 293.6 inches, 10th largest of 10 in Class D

Power factor: Special V8: 17.2 pounds, 16th best of 25 in Class B
 Century V8: 16.1 pounds, 7th best of 13 in Class C
 Super V8: 16.5 pounds, 8th best of 13 in Class C
 Roadmaster V8: 16.8 pounds, 8th best of 10 in Class D



As at Buick, most of the Cadillac story this year is out of sight. Styling changes are minor, but under the hood is a new engine and a re-engineered Hydra-Matic that shifts with the help of a dump-and-fill clutch

Cadillac



SpecRating

Interior:
 62 and 60 Special V8: 440.9 inches, 3rd roomiest of 9 in Class D
 75 V8: 470.5 inches, roomiest of 9 in Class D

Exterior:
 62 V8: 294.9 inches, 9th largest of 10 in Class D
 60 Special V8: 305.9 inches, 4th largest of 10 in Class D
 75 V8: 315.7 inches, 2nd largest of 10 in Class D

Power factor:
 62 V8: 15.6 pounds, 5th best of 10 in Class D
 60 Special V8: 16.2 pounds, 6th best of 10 in Class D
 75 V8: 17.8 pounds, 9th best of 10 in Class D



Packard is grooming a superprestige line of Caribbeans. Initially just a convertible, it now has added a hardtop. Featured are reversible seat cushions (fabric on one side, leather on the other) and 310 hp.



Caribbean



SpecRating

Interior: 418.2 inches, 3rd roomiest of 5 in Class E
Exterior: 296.5 inches, 3rd largest of 5 in Class E
Power factor: 14.0 pounds, 4th best of 10 in Class E

Once a car for conservative Charlies, Chevie is now a bomb! With power pack, it has the top horsepower-weight ratio in its field. Gone this year is its plain, compact grille. Now it's bigger, more conventional



Chevrolet



SpecRating

Interior: 426.1 inches, 2nd roomiest of 5 in Class A
Exterior: 271.5 inches, 4th largest of 5 in Class A
Power factor:
One-Fifty V8 with pack: 15.5 pounds, best of 16 in Class A
Bel Air V8: 19.5 pounds, 10th best of 16 in Class A
Two-Ten V8: 19.7 pounds, 11th best of 16 in Class A
One-Fifty 6: 22.9 pounds, 13th best of 16 in Class A



For the first time, Chrysler has given its Windsor series a different grille treatment from the New Yorker. Left is the Windsor; below, the New Yorker. New styling trick at Chrysler is the upswept tailfin

Chrysler



SpecRating

Interior: Windsor V8: 436.4 inches, 4th roomiest of 9 in Class C
 New Yorker V8: 436.4 inches, 4th roomiest of 9 in Class D
 Exterior: Windsor V8: 298.7 inches, largest of 9 in Class C
 New Yorker V8: 302.2 inches, 6th largest of 10 in Class D
 Power factor:
 Windsor with pack: 15.6 pounds, 4th best of 13 in Class C
 Windsor V8: 17.3 pounds, 11th best of 13 in Class C
 New Yorker V8: 14.7 pounds, best of 10 in Class D



With two championships behind it (see page 188), the Chrysler 300 offers a new version, the 300B. At this writing, horsepower is unannounced, but informed and conservative opinion is that it will be a big 330

Chrysler 300



SpecRating

Interior: 422.2 inches, 2nd roomiest of 5 in Class E
 Exterior: 301.5 inches, 2nd largest of 6 in Class E
 Power factor: 12.3 pounds (estimated), 3rd best of 10 in Class E



On its own this year, the Clipper is no longer billed as a small Packard. It features torsion-bar suspension, push-button shift and electric door locks—you press a button and lock all four doors at one time

Clipper



SpecRating

Interior: 427.4 inches, 6th roomiest of 9 in Class C
Exterior: 292.8 inches, 4th largest of 9 in Class C
Power factor:
Custom V8: 14.1 pounds, best of 13 in Class C
Super V8: 15.3 pounds, 3rd best of 13 in Class C
Deluxe V8: 15.3 pounds, 2nd best of 13 in Class C

Retaining the flavor of the original Continental, the Mark II has an important extra—engineering. It is no secret that the original was weak under its handsome body. Mark II is a thoroughbred all the way

Continental



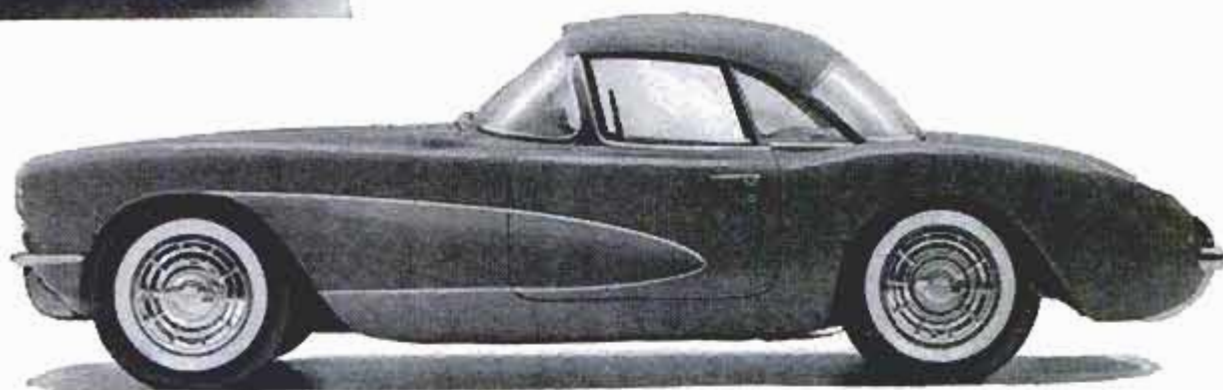
SpecRating

Interior: 408.5 inches, 9th roomiest of 9 in Class D
Exterior: 296.0 inches, 8th largest of 10 in Class D
Power factor: unknown due to undisclosed horsepower



After taking a beating from the Thunderbird in sales during 1955, the Corvette is coming back with a Sunday punch. Loaded with power and comfort features (page 193), the '56 model aims to cut into its rival's market

Corvette



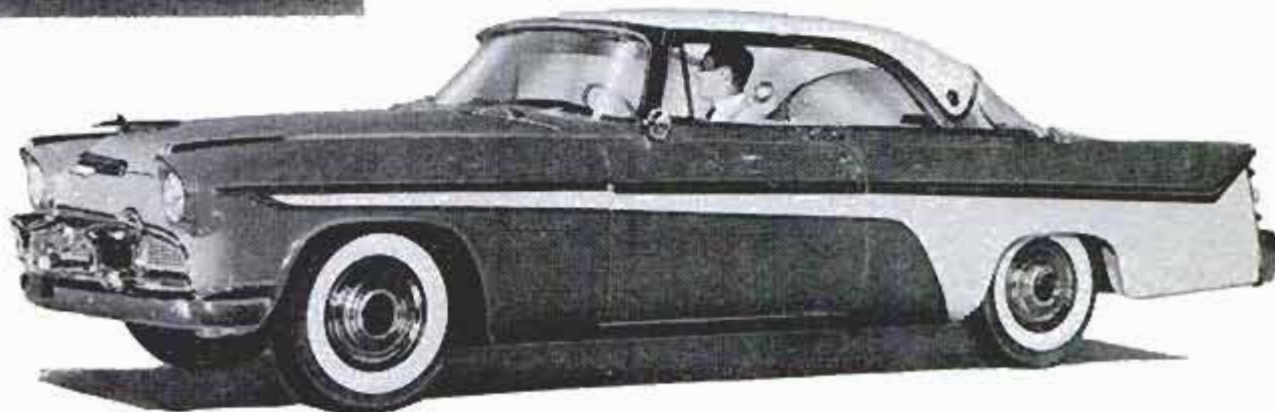
SpecRating

Interior: Not available
Exterior: 238.5 inches, 6th largest of 6 in Class E
Power factor: 11.9 pounds, best of 10 in Class E



For the first time in years, the De Soto appears in public without its front teeth! The new front grille has a simple mesh pattern that makes the car seem lower and wider. De Soto also has four separate taillights

De Soto



SpecRating

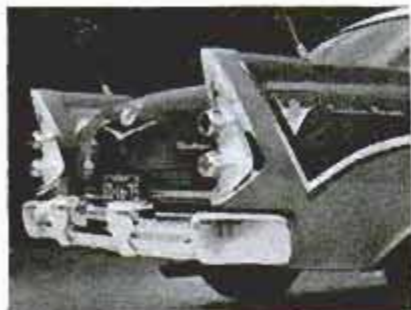
Interior:
Firedome V8: 436.4 inches, 3rd roomiest of 10 in Class B
Fireflite V8: 436.4 inches, 4th roomiest of 9 in Class C
Exterior:
Firedome V8: 296.2 inches, largest of 11 in Class B
Fireflite V8: 296.2 inches, 2nd largest of 9 in Class C
Power factor:
Firedome V8: 16.8 pounds, 13th best of 25 in Class B
Fireflite V8: 15.7 pounds, 5th best of 13 in Class C



With jutting rear fenders and an emphatic color sweep along the side, Dodge looks like an airplane. And it almost went like one on the Utah salt flats when it covered the flying mile at a record 114.05 m. p. h.



Dodge



SpecRating

Interior: 432.6 inches, 4th roomiest of 10 in Class B

Exterior: 286.6 inches, 5th largest of 11 in Class B

Power factors:

Super Royal V8 with pack: 15.2 pounds, best of 25 in Class B

Custom Royal V8 with pack: 15.4 pounds, 2nd best of 25 in Class B

Super Royal V8: 16.1 pounds, 6th best of 25 in Class B

Custom Royal V8: 16.3 pounds, 8th best of 25 in Class B

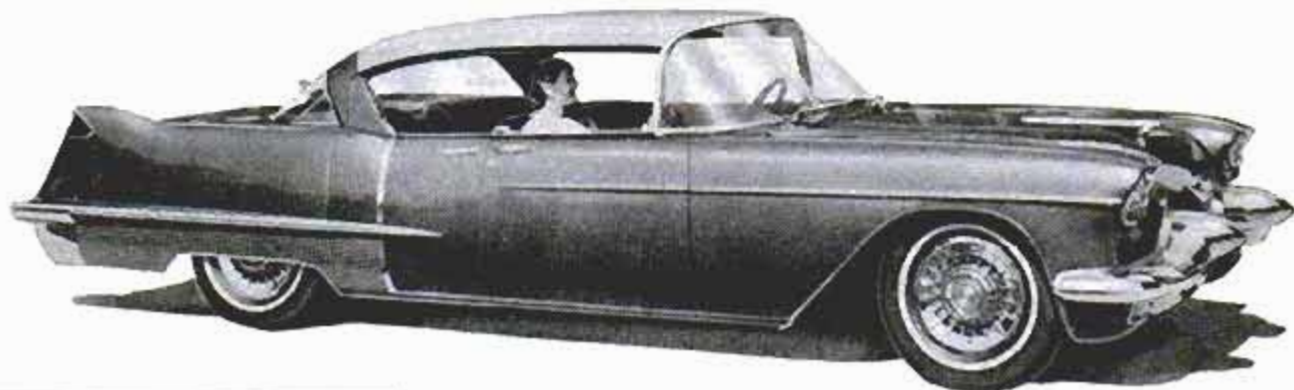
Coronet V8: 18.3 pounds, 17th best of 25 in Class B

Coronet 6: 25.4 pounds, 23rd best of 25 in Class B

Now a "mere" souped-up Cadillac with fins (right, bottom), soon the very elegant Eldorado Brougham (center) will vie with the swank Continental



Eldorado



SpecRating

Interior: 424.9 inches, roomiest of 5 in Class E

Exterior: 302.2 inches, largest of 6 in Class E

Power factor: 15.3 pounds, 6th best of 10 in Class E



Styling changes on the Ford are minor. Emphasis this year is on safety (door latches, concave steering wheel, interior padding, seat belts) and increased performance from its big 292-cubic-inch V8 engine

Ford



SpecRating

Interior: 420.7 inches, 4th roomiest of 5 in Class A

Exterior: 274.4 inches, 2nd largest of 5 in Class A

Power factor:

Fairlane V8 with pack: 16.3 pounds, 3rd best of 16 in Class A

Fairlane V8: 16.5 pounds, 4th best of 16 in Class A

Customline V8: 18.7 pounds, 9th best of 16 in Class A

Mainline 6: 22.8 pounds, 12th best of 16 in Class A



Even in the all-new front grille, Hudson stresses the "V" of its styling theme. It will bring out its own American Motors V8 shortly—specifications are as yet undisclosed. Its V8 engines now come from Packard

Hudson



SpecRating

Interior:

All 6s: 440.9 inches, roomiest of 10 in Class B

Hornet V8: 440.9 inches, roomiest of 9 in Class C

Exterior:

All 6s: 287.3 inches, 3rd largest of 11 in Class B

Hornet V8: 287.3 inches, 6th largest of 9 in Class C

Power factor:

Hornet V8: 17.6 pounds, 13th best of 13 in Class C

Hornet 6 with pack: 20.2 pounds, 18th best of 25 in Class B

Wasp 6: 27.3 pounds, 25th best of 25 in Class B



Longer by five inches than in 1955, the Imperial, Chrysler's prestige car, retains its distinctive taillights atop larger rear fenders. Sales in 1955 totaled about 12,000. Sights are set on selling 16,000 this year



Imperial



SpecRating

Interior:

Imperial V8: 433.9 inches, 5th roomiest of 9 in Class D

Crown Imperial V8: 433.1 inches, 6th roomiest of 9 in Class D

Exterior:

Imperial V8: 308.4 inches, 3rd largest of 10 in Class D

Crown Imperial V8: 322.7 inches, largest of 10 in Class D

Power factor:

Imperial V8: 16.2 pounds, 7th best of 10 in Class D

Crown Imperial V8: 18.4 pounds, 10th best of 10 in Class D

One of the few all-new cars in 1956, the Lincoln is longer, lower and lusher. Horizontal lines, in front and rear, make it appear even lower than it is. The Premiere is the name of the top-price model in the line



Lincoln



SpecRating

Interior: 429.4 inches, 8th roomiest of 9 in Class D

Exterior: 302.7 inches, 5th largest of 10 in Class D

Power factor:

Capri V8: 15.0 pounds, 3rd best of 10 in Class D

Premiere V8: 15.3 pounds, 4th best of 10 in Class D



Mercury is introducing a new body style in midseason. It is the four-door hardtop model shown below. Also new this year is the Medalist, left, an austere, two-door sedan priced to compete with the low-price field

Mercury



SpecRating

Interior: Montclair V8: 416.7 inches, 9th roomiest of 9 in Class C
 Other models: 421.0 inches, 9th roomiest of 10 in Class B
Exterior: Montclair V8: 282.8 inches, 8th largest of 9 in Class C
 Other models: 282.2 inches, 6th largest of 11 in Class B
Power factor:
 Montclair with pack: 15.7 pounds, 6th best of 13 in Class C
 Montclair V8: 16.9 pounds, 9th best of 13 in Class C
 Monterey V8: 16.8 pounds, 11th best of 25 in Class B
 Custom V8 with pack: 15.7 pounds, 4th best of 25 in Class B



Nash has given its front end a sharper look by enlarging and slanting the parking lights. Headlights are inboard again. Taillights are larger. Still available is the convenient around-town two-seater, the Metropolitan, left

Nash



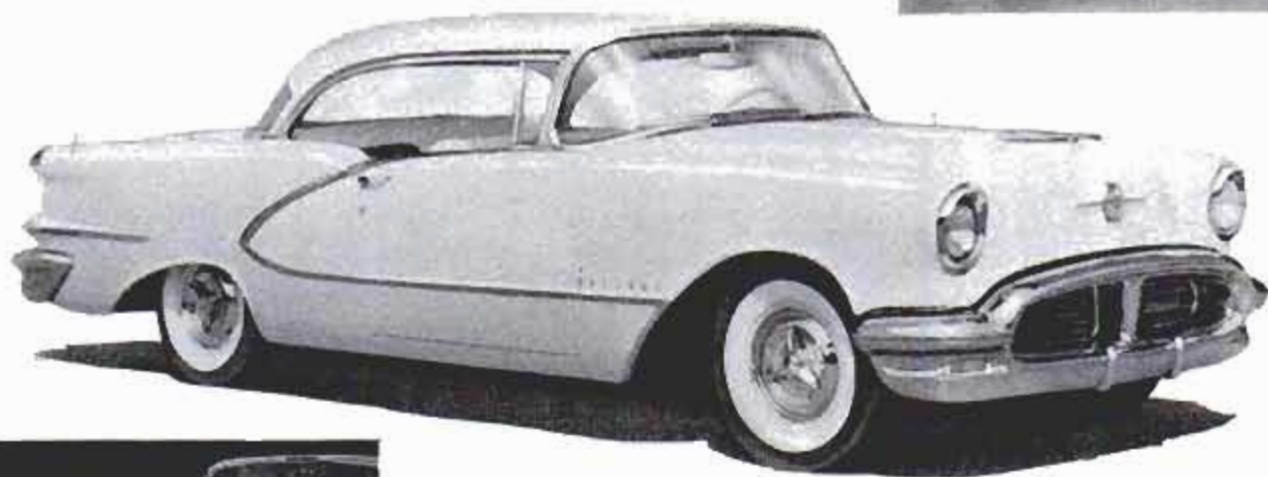
SpecRating

Interior: 440.9 inches, roomiest of 10 in Class B
 Ambassador V8: 440.9 inches, roomiest of 9 in Class C
Exterior: Ambassador 6: 287.3 inches, 3rd largest of 11 in Class B
 Statesman: 280.3 inches, 10th largest of 11 in Class B
 Ambassador V8: 287.3 inches, 6th largest of 9 in Class C
Power factor: Statesman 6: 24.4 pounds, 20th best of 25 in Class B
 Ambassador 6 with pack: 24.6 pounds, 21st best of 25
 Ambassador 6: 26.4 pounds, 24th best of 25
 Ambassador V8: 17.4 pounds, 12th best of 13 in Class C



Top gainer in sales of the GM family, Oldsmobile continues its simple grille treatments in 1956. New is the re-engineered Hydra-Matic transmission, which combines four-speed performance with smoothness

Oldsmobile



SpecRating

Interior: 88 V8: 426.6 inches, 5th roomiest of 10 in Class B
Super 88 V8: 424.7 inches, 7th roomiest of 10 in Class B
98 V8: 424.9 inches, 7th roomiest of 9 in Class C

Exterior:

88 and Super 88 V8: 281.9 inches, 7th largest of 11 in Class B
98 V8: 290.9 inches, 5th largest of 9 in Class C
Power factor: 88 V8: 16.4 pounds, 9th best of 25 in Class B
Super 88 V8: 16.2 pounds, 7th best of 25 in Class B
98 V8: 16.9 pounds, 10th best of 13 in Class C

Packard has some important firsts this year. It offers a 10:1 compression ratio, a figure engineers have been aiming at for years. It also has a nonslip differential to keep you from getting stuck when one wheel is on ice

Packard



SpecRating

Interior: 432.5 inches, 7th roomiest of 9 in Class D
Exterior: 296.5 inches, 7th largest of 10 in Class D
Power factor: 14.7 pounds, 2nd best of 10 in Class D



Hoping to continue its spectacular sales rise of 1955, Plymouth has restyled its rear fenders to give them an aerodynamic look. Also has a push-button transmission control and a dash-mounted long-playing phonograph

Plymouth



SpecRating

Interior: 431.0 inches, roomiest of 5 in Class A

Exterior: 279.4 inches, largest of 5 in Class A

Power factor:

Belvedere V8 with pack: 16.6 pounds, 5th best of 16 in Class A

Belvedere V8: 17.8 pounds, 6th best of 16 in Class A

Savoy V8: 18.2 pounds, 7th best of 16 in Class A

Plaza 6: 25.1 pounds, 15th best of 16 in Class A



Along with other General Motors cars, Pontiac has a four-door hardtop sedan. It still retains its trademark, the Silver Streaks that run down the hood. This year they are recessed so they are flush with the surface

Pontiac



SpecRating

Interior: 426.4 inches, 6th roomiest of 10 in Class B

Exterior: Star Chief: 287.7 inches, 2nd largest of 11 in Class B

860, 870: 280.7 inches, 8th largest of 11 in Class B

Power factor:

Star Chief V8: 15.7 pounds, 3rd best of 25 in Class B

860 V8: 17.0 pounds, 14th best of 25 in Class B

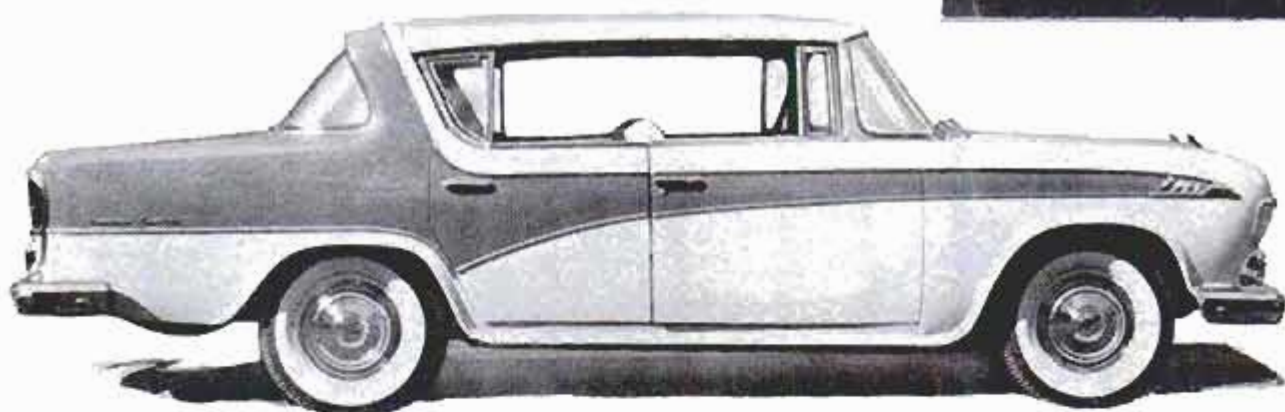
870 V8: 17.0 pounds, 15th best of 25 in Class B



Distinct and different, the all-new Rambler can be recognized at any angle from its wide-open competition-type grille to the pronounced arch over rear window. It has four coil springs and torque-tube drive this year



Rambler



SpecRating

Interior: 421.8 inches, 3rd roomiest of 5 in Class A
 Exterior: 262.4 inches, 5th largest of 5 in Class A
 Power factor: 23.6 pounds, 14th best of 16 in Class A

One of the big stories of the year is the speed with which Studebaker stylists reshaped the body without dropping the basic shell. New also is the President Classic, four inches longer, much lusher than the others



Studebaker



SpecRating

Interior:
 All except Classic: 412.9 inches, 5th roomiest of 5 in Class A
 Classic V8: 414.9 inches, 10th roomiest of 10 in Class B
 Exterior:
 All except Classic: 272.1 inches, 3rd largest of 5 in Class A
 Classic V8: 276.1 inches, 11th largest of 11 in Class B
 Power factor:
 President V8: 15.7 pounds, 2nd best of 16 in Class A
 Commander V8: 18.5 pounds, 8th best of 16 in Class A
 Champion 6: 28.1 pounds, 16th best of 16 in Class A
 Classic V8: 16.5 pounds, 10th best of 25 in Class B



First American company to offer a full line of sports-type cars, Studebaker has named its low-slung models the Hawks. Bombshell of the line is the Golden Hawk which has the second best power factor in the industry

Studebaker Hawk



SpecRating

Interior: 401.2 inches, 4th roomiest of 5 in Class E

Exterior: 274.3 inches, 4th largest of 6 in Class E

Power factor:

Golden Hawk V8: 12.2 pounds, 2nd best of 10 in Class E

Power Hawk V8: 18.2 pounds, 8th best of 10 in Class E

Skyhawk V8: 18.9 pounds, 9th best of 10 in Class E

Flight Hawk 6: 27.5 pounds, 10th best of 10 in Class E



After its initial success (and with 16,155 of them sold it certainly was!), Ford made only minor styling changes in the Thunderbird. Most obvious is mounting spare tire outside the trunk to increase luggage space

Thunderbird



SpecRating

Interior: 203.6 inches, 5th roomiest of 5 in Class E

Exterior: 256.4 inches, 5th largest of 6 in Class E

Power factor:

Handshift V8: 15.8 pounds, 7th best of 10 in Class E

Fordomatic V8: 14.6 pounds, 5th best of 10 in Class E

Note: Interior dimensions are for front seat only



SPECIFICATIONS OF THE 1956 CARS

	RETAIL PRICE 4-DOOR SEDAN	SHIPPING WEIGHT	WHEELBASE	OVER-ALL LENGTH	OVER-ALL WIDTH	OVER-ALL HEIGHT	TURN-CIRCLE DIAMETER	DISPLACEMENT	MAXIMUM HORSEPOWER	COMPRESSION RATIO	MAXIMUM TORQUE	BORE AND STROKE	
RAMBLER Deluxe Six	\$1795	2891	108.0	191	71	58.0	38	195.6	120	7.4	170	3.125x4.25	RAMBLER Six
CHEVROLET 150 Six	\$1835	3205	115.0	198	73	60.5	41.5	235.5	140	8.0	210	3.563x3.938	CHEVROLET 150 Six
210 V8	\$2020	3190	115.0	198	73	60.5	41.5	265.0	162†	8.0	257	3.75 x 3.00	210 V8
*Bel Air V8	\$2223	3310	115.0	198	73	60.5	41.5	265.0	170†	8.0	257	3.75 x 3.00	*Bel Air V8
FORD Mainline Six	\$1858	3127	115.5	199	76	60.4	41.2	223.0	137	8.0	202	3.62 x 3.60	FORD Mainline Six
Customline V8	\$2051	3258	115.5	199	76	60.4	41.2	272.0	173†	8.0	260	3.62 x 3.30	Customline V8
*Fairlane V8	\$2322	3377	115.5	199	76	60.4	41.2	292.0	200†	8.0	285	3.75 x 3.30	*Fairlane V8
PLYMOUTH Plaza Six	\$1893	3143	115.0	205	75	60.1	41.1	230.0	125†	7.6	200	3.25 x 4.63	PLYMOUTH Plaza Six
Savoy V8	\$2095	3296	115.0	205	75	60.1	40.5	270.0	180†	8.0	260	3.63 x 3.256	Savoy V8
*Belvedere V8	\$2362	3371	115.0	205	75	60.1	40.5	277.0	187†	8.0	265	3.75 x 3.13	*Belvedere V8
STUDEBAKER Champion Six	\$1993	2834	116.5	201	71	60.0	38.5	185.6	101	7.8	152	3.00 x 4.38	STUDEBAKER Champion Six
Commander V8	\$2121	3139	116.5	201	71	60.0	39.0	259.2	170	7.8	260	3.56 x 3.25	Commander V8
*Pres. Classic V8	\$2674	3371	120.5	205	71	60.0	40.5	289.0	210	7.8	292	3.56 x 3.63	*Pres. Classic V8
Flight Hawk Six	\$1982	2780	120.5	204	70	56.3	40.5	185.6	101	7.8	152	3.00 x 4.38	Flight Hawk Six
Power Hawk V8	\$2097	3095	120.5	204	70	56.3	40.5	259.2	170	7.8	260	3.56 x 3.25	Power Hawk V8
Sky Hawk V8	\$2473	3217	120.5	204	70	56.3	40.5	289.0	210	7.8	292	3.56 x 3.63	Sky Hawk V8
Golden Hawk V8	\$3057	3360	120.5	204	70	56.3	40.5	352.0	275	9.5	380	4.00 x 3.50	Golden Hawk V8
DODGE Coronet Six	\$2229	3323	120	212	75	60.3	42.9	230.0	131	7.6	203	3.25 x 4.63	DODGE Coronet Six
Coronet V8	\$2336	3465	120	212	75	60.6	42.3	270.0	189	8.0	266	3.63 x 3.256	Coronet V8
*Custom Royal V8	\$2771	3542	120	212	75	60.8	42.3	315.0	218†	8.0	309	3.63 x 3.80	*Custom Royal V8
PONTIAC 860 V8	\$2259	3496	122	206	75	60.5	42.4	316.6	192	8.9	297	3.94 x 3.25	PONTIAC 860 V8
*870 V8	\$2579	3601	122	206	75	60.5	42.4	316.6	205	8.9	294	3.94 x 3.25	*870 V8
*Star Chief V8	\$2693	3681	124	213	75	60.5	43.0	316.6	227	8.9	312	3.94 x 3.25	*Star Chief V8
NASH Statesman Six	\$2345	3174	114.3	202	78	61.8	42.8	195.6	130	7.5	175	3.125x4.250	NASH Statesman Six
Ambassador Six	\$2644	3520	121.3	209	78	62.3	44.3	252.6	135†	7.6	220	3.50 x 4.375	Ambassador Six
*Ambassador V8	\$3394	3690	121.3	209	78	62.3	44.3	352.0	220	9.6	320	4.00 x 3.50	*Ambassador V8
MERCURY Custom V8	\$2370	3522	119	206	76	60.6	43.2	312.0	210†	8.0	312	3.80 x 3.44	MERCURY Custom V8
Monterey V8	\$2515	3536	119	206	76	60.6	43.2	312.0	210†	8.0	312	3.80 x 3.44	Monterey V8
*Montclair V8	\$2935	3690	119	206	76	58.8	43.2	312.0	210†	8.0	312	3.80 x 3.44	*Montclair V8
BUICK Special V8	\$2372	3790	122	205	76	60.4	41.6	322.0	220	7.6	319	4.00 x 3.20	BUICK Special V8
*Century V8	\$2980	4000	122	205	76	59.8	41.6	322.0	255	9.5	341	4.00 x 3.20	*Century V8
*Super V8	\$3205	4200	127	214	80	62.5	43.0	322.0	255	9.5	341	4.00 x 3.20	*Super V8
*Roadmaster V8	\$3458	4280	127	214	80	62.7	43.0	322.0	255	9.5	341	4.00 x 3.20	*Roadmaster V8
HUDSON Wasp Six	\$2380	3235	114.3	202	78	61.8	39.3	202.0	120†	7.5	158	3.00 x 4.75	HUDSON Wasp Six
Hornet Six	\$2729	3505	121.3	209	78	62.3	42.6	308.0	165†	7.5	264	3.813x4.50	Hornet Six
*Hornet V8	\$3444	3804	121.3	209	78	62.3	42.6	352.0	220	9.6	320	4.00 x 3.50	*Hornet V8
OLDSMOBILE 88 V8	\$2443	3761	122.0	203	79	60.5	42.0	324.3	230	9.3	340	3.875x3.438	OLDSMOBILE 88 V8
Super 88 V8	\$2595	3897	122.0	203	79	60.5	42.0	324.3	240	9.3	350	3.875x3.438	Super 88 V8
*98 V8	\$3253	4047	126.0	212	79	60.5	43.0	324.3	240	9.3	350	3.875x3.438	*98 V8
DE SOTO Firelane V8	\$2632	3875	126.0	218	78	60.6	43.8	330.4	230	8.5	305	3.72 x 3.80	DE SOTO Firelane V8
*Firelite V8	\$3074	4005	126.0	218	78	60.6	43.8	330.4	255	8.5	350	3.72 x 3.80	*Firelite V8
CLIPPER Deluxe V8	\$2731	3670	122.0	215	78	62.0	43.0	352.0	240	9.5	350	4.00 x 3.50	CLIPPER Deluxe V8
Super V8	\$2866	3680	122.0	215	78	62.0	43.0	352.0	240	9.5	350	4.00 x 3.50	Super V8
*Custom V8	\$3268	4155	122.0	215	78	62.0	43.0	352.0	275	9.5	380	4.00 x 3.50	*Custom V8
CHRYSLER Windsor V8	\$2825	3900	126.0	220	79	60.6	43.8	331.0	225†	8.5	310	3.81 x 3.63	CHRYSLER Windsor V8
*New Yorker V8	\$3728	4110	126.0	221	81	60.9	43.8	354.0	280	9.0	380	3.94 x 3.63	*New Yorker V8
300B V8	N.A.	4050	126.0	223	79	58.6	43.8	354.0	N.A.	9.0	N.A.	3.94 x 3.63	300B V8
LINCOLN *Capri V8	\$4157	4289	126.0	223	80	60.2	45.5	368.0	285	9.0	402	4.00 x 3.66	LINCOLN *Capri V8
*Premiere V8	\$4546	4362	126.0	223	80	60.2	45.5	368.0	285	9.0	402	4.00 x 3.66	*Premiere V8
PACKARD *Patrician V8	\$4160	4275	127.0	219	78	62.3	45.0	374.0	290	10.0	405	4.125x3.50	PACKARD *Patrician V8
*Caribbean V8	\$5495	4355	127.0	219	78	61.7	45.0	374.0	310	10.0	405	4.125x3.50	*Caribbean V8
CADILLAC *62 V8	\$4241	4430	129.0	215	80	62.0	43.4	365.0	285	9.8	400	4.00 x 3.625	CADILLAC *62 V8
*60 Special V8	\$4992	4610	133.0	226	80	62.0	45.0	365.0	285	9.8	400	4.00 x 3.625	*60 Special V8
*75 V8	\$6558	5050	149.8	236	80	63.9	51.7	365.0	285	9.8	400	4.00 x 3.625	*75 V8
*Eldorado V8	\$6501	4665	129.0	222	80	59.8	43.4	365.0	305	9.8	400	4.00 x 3.625	*Eldorado V8
IMPERIAL *V8	\$4780	4565	133.0	230	79	61.2	45.2	354.0	280	9.0	380	3.94 x 3.63	IMPERIAL *V8
*Crown V8	\$7551	5145	149.5	244	79	61.8	52.0	354.0	280	9.0	380	3.94 x 3.63	*Crown V8
CONTINENTAL *Hardtop V8	\$9507	4825	126.0	219	78	56.0	45.3	368.0	N.A.	9.0	N.A.	4.00 x 3.66	CONTINENTAL *Hardtop V8
THUNDERBIRD Handshift V8	\$3102	3186	102.0	185	71	52.2	38.5	292.0	202	8.4	289	3.75 x 3.30	THUNDERBIRD Handshift V8
*Fordomatic V8	\$3317	3294	102.0	185	71	52.2	38.5	312.0	225	9.0	324	3.80 x 3.44	*Fordomatic V8
CORVETTE V8	N.A.	2680	102.0	168	71	51.0	36.8	265.0	225	9.3	270	3.75 x 3.00	CORVETTE V8

NOTES AND EXPLANATIONS

All specifications (except Studebaker Hawks, Chrysler 300B, Packard Caribbean, Cadillac Eldorado, Continental, Thunderbird and Corvette) are for four-door sedans. All dimensions are in inches except turn-circle diameter (feet). Prices include all charges except freight to your city, state and local taxes (federal tax is included) and optional equipment.

† Power packs: Chevrolet 205 hp., Ford 176 hp. and 202 hp., Plymouth 131 hp. and 200 hp., Dodge 230 hp., Nash 145 hp., Mercury 225 hp., Hudson 130 hp. and 175 hp., Chrysler 250 hp.

* Price quoted includes automatic transmission.

FRONT-SEAT HEADROOM	
Hudson (in.)	37.5
Nash	37.5
Buick Roadmaster	37.4
Crown Imperial	37.0
Buick Super	36.6
Cadillac 75	36.5
Studebaker	36.5
Clipper	36.2
Packard	36.2
Plymouth	36.1
Rambler	36.0
Pontiac	36.0
Average: 35.9 inches	
Cadillac 62, 60	35.8
Chevrolet	35.6
Buick Special	35.6
Dodge	35.5
Oldsmobile	35.5
Lincoln	35.4
Buick Century	35.3
Mercury	35.2
Chrysler	35.1
De Soto	35.1
Imperial	35.1
Ford	34.9
Mercury Montclair	33.8

REAR-SEAT HEADROOM	
Crown Imperial (in.)	36.3
Hudson	36.0
Nash	36.0
Pontiac	35.9
Buick Roadmaster	35.7
Chevrolet	35.6
Studebaker	35.5
Plymouth	35.4
Buick Super	35.2
Cadillac	35.1
Imperial	35.0
Rambler	35.0
Dodge	34.9
Packard	34.9
Average: 34.8 inches	
Oldsmobile 88	34.6
Chrysler	34.5
De Soto	34.5
Clipper	34.5
Buick Century	34.4
Lincoln	34.1
Buick Special	34.0
Ford	33.9
Mercury	33.9
Olds. Super 88, 98	33.8
Mercury Montclair	32.5

DISPLACEMENT	
Packard	374.0
Continental	368.0
Lincoln	368.0
Cadillac	365.0
Chrysler	
New Yorker	354.0
Imperial	354.0
Clipper	352.0
Studebaker	
Golden Hawk	352.0
Hudson V8	352.0
Nash V8	352.0
Chrysler Windsor	331.0
De Soto	330.4
Oldsmobile	324.3
Buick	322.0
Pontiac	316.6
Dodge	
Custom Royal	315.0
Mercury	312.0
Thunderbird	
(auto. trans.)	312.0
Hudson Hornet 6	308.0
Ford Fairlane V8	292.0
Thunderbird	
(handshift)	292.0
Average: 290.2 cubic in.	
Stude. Pres. Classic	289.0
Stude. Sky Hawk	289.0
Plymouth	
Belvedere V8	277.0
Ford Customline V8	272.0
Dodge Coronet V8	270.0
Plymouth Savoy V8	270.0
Chevrolet V8	265.0
Corvette	265.0
Stude. Commander	259.2
Stude. Power Hawk	259.2
Nash Ambassador 6	252.6
Chevrolet 6	235.5
Dodge Coronet 6	230.0
Plymouth 6	230.0
Ford 6	223.0
Hudson Wasp 6	202.0
Nash Statesman 6	195.6
Rambler 6	195.6
Stude. Champion 6	185.6
Studebaker	
Flight Hawk 6	185.6

FRONT-SEAT LEGROOM	
Chrysler (in.)	45.7
De Soto	45.7
Imperial	45.7
Lincoln	44.8
Dodge	44.5
Oldsmobile 88	44.4
Ford	44.3
Plymouth	44.0
Mercury	43.8
Chevrolet	43.7
Mercury Montclair	43.7
Average: 43.6 inches	
Cadillac 75	43.4
Pontiac	43.4
Cadillac 62, 60	43.3
Clipper	43.3
Buick Roadmaster	43.2
Buick Super	43.1
Olds. Super 88, 98	43.1
Packard	43.0
Rambler	43.0
Buick Special	42.9
Buick Century	42.8
Crown Imperial	42.5
Hudson	42.5
Nash	42.5
Studebaker	42.5

REAR-SEAT LEGROOM	
Cadillac 75 (in.)	81.9
Crown Imperial	52.5
Packard	48.8
Cadillac 62, 60	46.3
Buick Roadmaster	46.3
Buick Super	45.8
Imperial	45.7
Dodge	45.0
Average: 44.8 inches	
Chrysler	44.7
De Soto	44.7
Clipper	43.8
Plymouth	43.6
Mercury	42.8
Oldsmobile 98	42.8
Chevrolet	42.6
Olds. Super 88	42.6
Oldsmobile 88	42.5
Lincoln	42.5
Pontiac	42.0
Rambler	42.0
Ford	41.9
Stude. Pres. Classic	41.0
Buick Special	40.9
Buick Century	40.6
Mercury Montclair	40.6
Hudson	40.1
Nash	40.1
Studebaker	39.0

HORSEPOWER	
(standard equip. only)	
Chrysler 300B	
(est. hp.)	330
Packard Caribbean	310
Cadillac Eldorado	305
Packard	290
Cadillac	285
Lincoln	285
Chrysler New Yorker	280
Imperial	280
Clipper Custom	275
Stude. Golden Hawk	275
Buick Century	255
Buick Super	
Roadmaster	255
De Soto Fireflite	255
Clipper Super, Deluxe	240
Olds. Super 88 and 98	240
De Soto Firedome	230
Oldsmobile 88	230
Pontiac Star Chief	227
Chrysler Windsor	225
Corvette	225
Thunderbird	
(auto. trans.)	225
Hudson V8	220
Nash V8	220
Buick Special	220
Dodge Custom Royal	218
Stude. Pres. Classic	210
Stude. Sky Hawk	210
Mercury	210
Average: 209.4 horsepower	
Thunderbird	
(handshift)	202
Ford Fairlane V8	200
Pontiac (handshift)	192
Dodge Coronet V8	189
Plymouth Belv. V8	187
Plymouth Savoy V8	180
Ford V8	173
Stude. Commander	170
Stude. Power Hawk	170
Hudson Hornet 6	165
Chevrolet V8	
(handshift)	162
Chevrolet 6	140
Ford 6	137
Nash Ambassador 6	135
Dodge Coronet 6	131
Nash Statesman 6	130
Plymouth 6	125
Hudson Wasp 6	120
Rambler	120
Stude. Flight Hawk 6	101

FRONT-SEAT HIPROOM	
Hudson (in.)	65.0
Nash	65.0
Buick Roadmaster	64.9
Buick Super	64.9
Cadillac 75	64.4
Cadillac 62, 60	64.3
Crown Imperial	63.5
Chrysler	63.3
De Soto	63.3
Clipper	62.8
Packard	62.8
Average: 62.8 inches	
Buick Special	62.5
Buick Century	62.5
Dodge	62.5
Imperial	62.5
Plymouth	62.5
Oldsmobile	62.4
Chevrolet	62.0
Pontiac	61.9
Lincoln	61.7
Mercury	60.6
Ford	60.5
Rambler	59.8
Studebaker	59.5

REAR-SEAT HIPROOM	
Buick Super (in.)	65.7
Buick Roadmaster	65.7
Cadillac 62, 60	65.2
Hudson	64.5
Nash	64.5
Chrysler	64.0
De Soto	64.0
Lincoln	63.8
Pontiac	63.1
Chevrolet	63.0
Dodge	62.8
Plymouth	62.8
Buick Century	62.6
Buick Special	62.4
Olds. Super 88	62.4
Oldsmobile 98	62.1
Average: 62.1 inches	
Clipper	62.0
Imperial	62.0
Packard	62.0
Mercury Montclair	60.5
Ford	60.3
Mercury	60.3
Rambler	60.1
Cadillac 75	59.1
Studebaker	59.0
Crown Imperial	54.5

POUNDS PER HP.	
(standard equip. only)	
Corvette	11.9
Chrysler 300B (est.)	12.3
Stude. Golden Hawk	13.3
Packard Caribbean	14.0
Clipper Custom	14.1
Thunderbird	
(auto. trans.)	14.6
Chrysler N. Yorker	14.7
Packard	14.7
Lincoln	15.0
Cadillac Eldorado	15.3
Clipper Super	
Deluxe	15.3
Stude. Sky Hawk	15.3
Cadillac	15.5
Buick Century	15.7
De Soto Fireflite	15.7
Pontiac Star Chief	15.7
Stude. Pres. Classic	15.7
T-Bird (handshift)	15.8
Olds. Super 88	16.2
Imperial	16.3
Dodge Custom Royal	16.3
Oldsmobile 88	16.4
Buick Super	16.5
Ford Fairlane V8	16.5
Buick Roadmaster	16.8
De Soto Firedome	16.8
Mercury	16.8
Oldsmobile 98	16.9
Buick Special	17.2
Chrysler Windsor	17.3
Hudson V8	17.3
Nash V8	17.4
Plymouth Belv. V8	17.8
Pontiac (handshift)	18.2
Plymouth Savoy V8	18.2
Stude. Power Hawk	18.2
Dodge Coronet V8	18.3
Crown Imperial	18.4
Average: 18.4 pounds	
Stude. Commander	18.5
Ford V8	18.7
Chev. V8 (handshift)	19.7
Hudson Hornet 6	21.2
Ford 6	22.8
Chevrolet 6	23.0
Rambler 6	23.6
Nash Statesman 6	24.4
Plymouth 6	25.1
Dodge Coronet 6	25.4
Nash Ambassador 6	26.4
Stude. Flight Hawk	27.5
Stude. Champion	28.1

COMPARE

The 1956 CARS

HIPROOM

HEADROOM

LEGROOM



MERCURY Turnpike Cruiser is only 53 inches high. It seats four. Roof sections lift when doors open. Stoplights are recessed into edge of roof above the full-wrap side windows

This Year's Crop of DREAM CARS

THERE ARE varied opinions about dream cars. Some say they forecast designs of tomorrow; some say they are more ballyhoo than science, designed for publicity, not performance; others claim they must be the discarded doodlings of frustrated stylists. Whatever they are, they come out every year at this time and here, for your reaction, is the current crop. ★ ★ ★



CADILLAC Eldorado Town car has roofless chauffeur's seat. Rear interior is as lush as a boudoir. When you lock one door, all windows go up, other door locks itself. When car is moving, rear doors are always locked for owner's protection

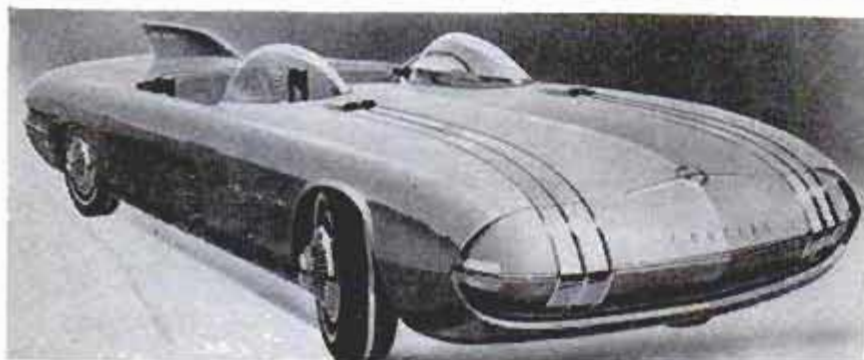
PACKARD Projector has stylized version of famed Packard radiator as vertical bar in front to act as grille guard, eliminating line-breaking bulges on bumper. Lights retract to enhance clean look. No chrome is used, not even around glass. Roof rolls back as door opens



CHEVROLET Impala, right, seats four, is closest of GM cars to what you may see on street. It has brushed aluminum top, receding-hairline windshield



PONTIAC Club de Mer, left, is one example of sports-car styling. It's a two seater, has small tailfin for high-speed stability, say stylists. Front-end assembly pivots, bringing lights outward when you flip switch



OLDSMOBILE Golden Rocket is also a two seater. Open the door, the roof raises electrically, then the seat swivels toward you and lifts up. Get in, close the door (you have to do that yourself) and the seat pivots back, lowers itself and the roof swings shut. As the name implies, it's gold colored



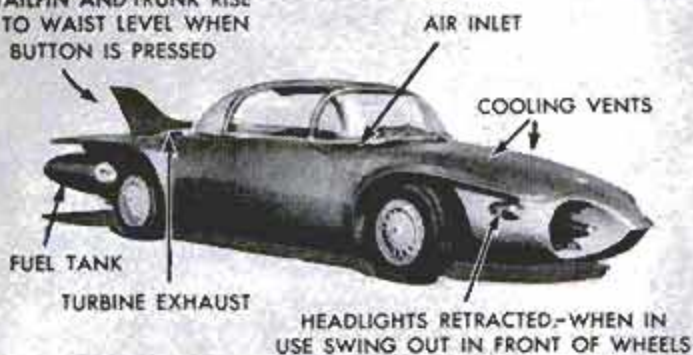
BUICK Centurion is a four seater with a transparent roof. There's no rear-view mirror. A TV camera in trunk lid scans the view behind and driver sees it on a screen in dashboard—just in black and white, however. Steering column is in center of car; wheel is cantilevered over to be in front of driver. Taillights are in chrome-appearing cap on end of conical tail



FIREBIRD II

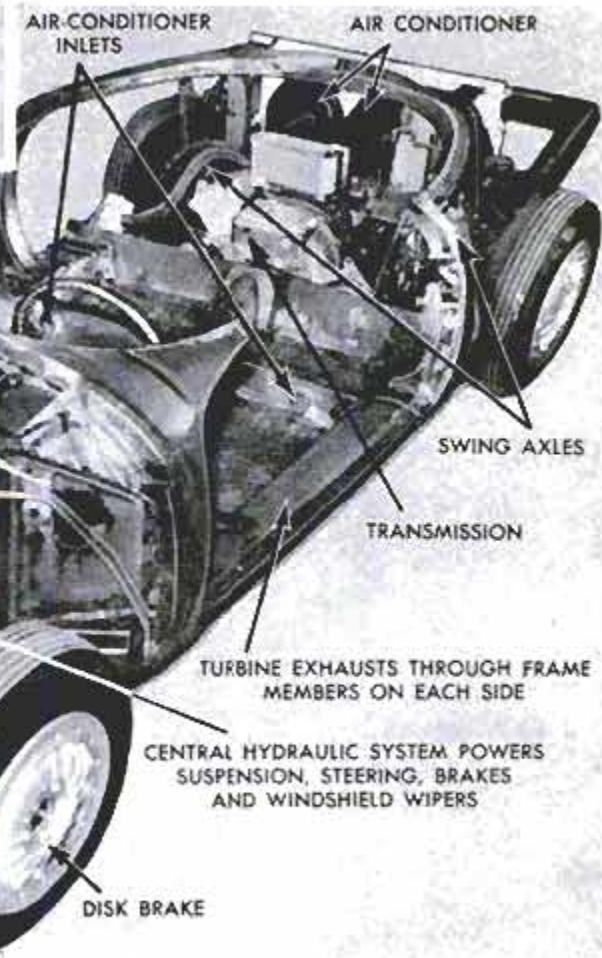
Suited for the highway, Firebird II is even air conditioned. Its features: Transmission at rear between swing axles; central hydraulic system with air-oil suspension (see page 192 for a similar system); plus, of course, its gas-turbine engine with fuel-saving regenerator that makes it as cheap to run as your car—only hitch being high cost of making the blades.

HYDRAULICALLY POWERED
TAILFIN AND TRUNK RISE
TO WAIST LEVEL WHEN
BUTTON IS PRESSED



AIR CONDITIONER
INLETS

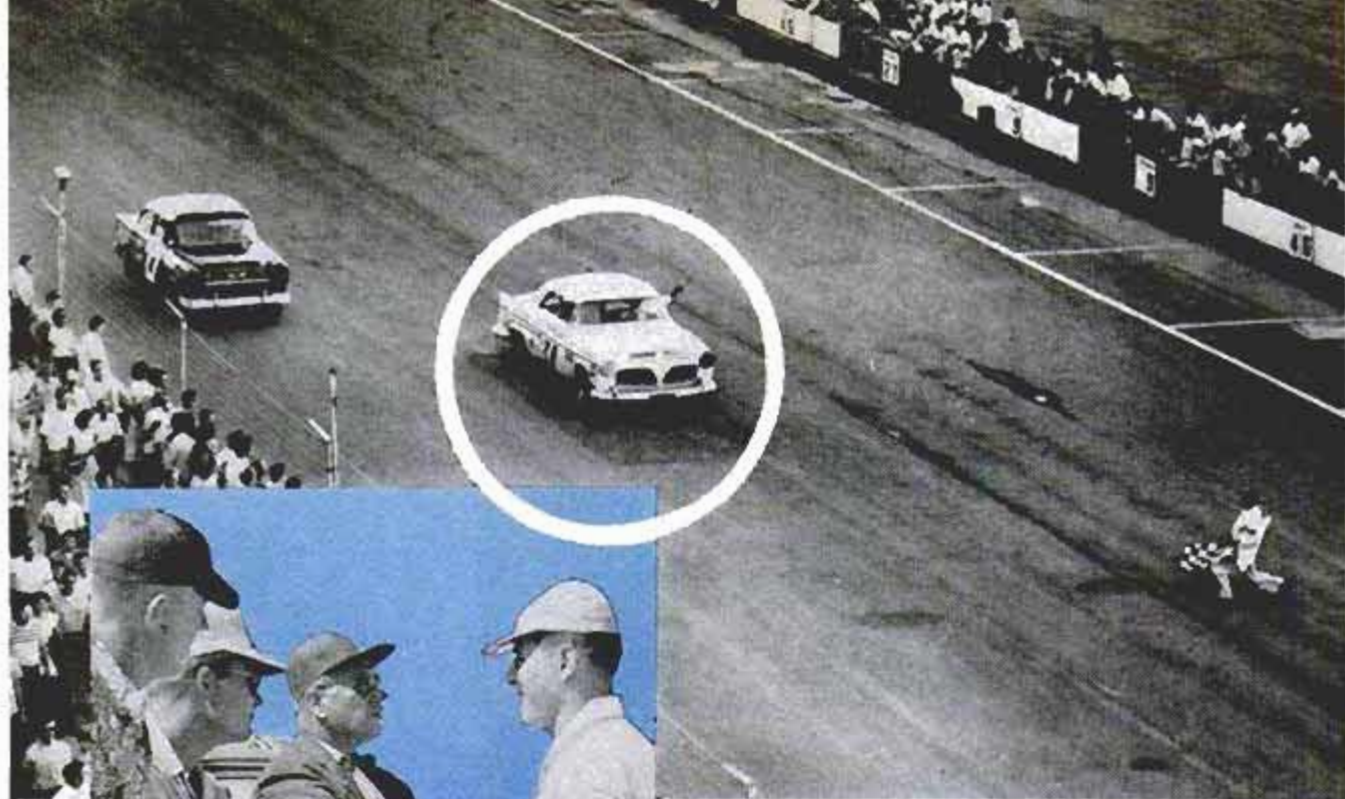
AIR CONDITIONER



AIR-OIL SUSPENSION UNITS

REGENERATOR HOUSING

TURBINE INTAKE



It takes more than good driving to get the checkered flag on the track. There must be plenty of prerace work by experts, one of whom is the author, shown at left (with cigar) talking to a few of his crew

By Carl Kiekhaefer

How to Win Stock-Car Races

MOST OF THE STOCK in stock-car racing is financial, not mechanical. It is the stuff the race promoter pays dividends on. There is much less that is stock in the cars!

We should know. We, at Mercury Outboard Motors, since 1951 have sponsored

various stock race cars including makes such as Chrysler, Chevrolet, Ford and Lincoln.

In 1955, our Chrysler C300s won both stock-car championships: Tim Flock winning NASCAR and Frank Mundy winning AAA. Together, Flock and Mundy won 37

Kiekhaefer poses with the two champions: Flock at left and Mundy at right, amidst their cars and trophies





Each car rides to the track in its truck. There's no point in wearing them out by towing, says the author

racers with their Chrysler C300s in the '55 season.

At this writing in the '56 season, these same cars have been in the first two NASCAR races with Tim Flock winning one and Fonty Flock, his brother, winning the other.

But we never would have won a race if our cars had been strictly stock in the sense that the public thinks of stock.

No race car can be stock if it is to win a race. A stock car would be as out of place at a "stock car" race as a midget on a college basketball team. We found that out very early.

Actually, our cars, the Chrysler C300s, are closer to stock than others on the track because the C300 engine is designed for high performance. It is a competition engine when it leaves the factory. It does not

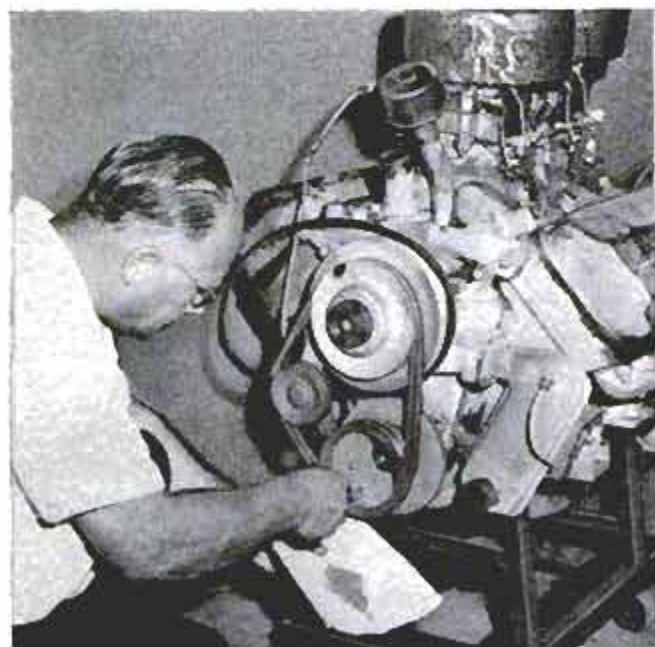
need to be souped-up. We put it in top tune with a few minor adjustments. Even the chassis is rugged and it has exceptional handling qualities. That's why we chose the C300. Mathematically, it looked like it had the best chance.

Many other cars, especially the lighter makes, not only have to have the entire running gear completely stripped and replaced with stronger, more rugged and special parts, but have to have special engine parts installed to "hot them up."

All this is considered legal and is common knowledge in the business, or sport, if you prefer. I am not trying to say that setting-up is illegal. That would be self-incrimination! Kiekhaefer cars are the best set-up in the business. Our record proves that.

Setting-up is officially sanctioned. Cars

Kiekhaefer scraped dirt samples from engines after each race, analyzed them, came up with new air cleaners



NASCAR INSPECTOR

BYSTANDERS
WATER BOY HANDS
DRIVER FLOCK A DRINK

BRINGS UP FIRE
EXTINGUISHER

STARTS TO
UNLOCK HOOD

KIEKHAEFER
TROTS UP

CHECKS FRONT TIRE

TWO-MAN FUEL TEAM

HOOD LATCH
GIVES TROUBLE

KIEKHAEFER
TALKS TO FLOCK

SECOND CAN OF GAS

JUST CLEANED
WINDSHIELD

KIEKHAEFER CHECKS
ENGINE

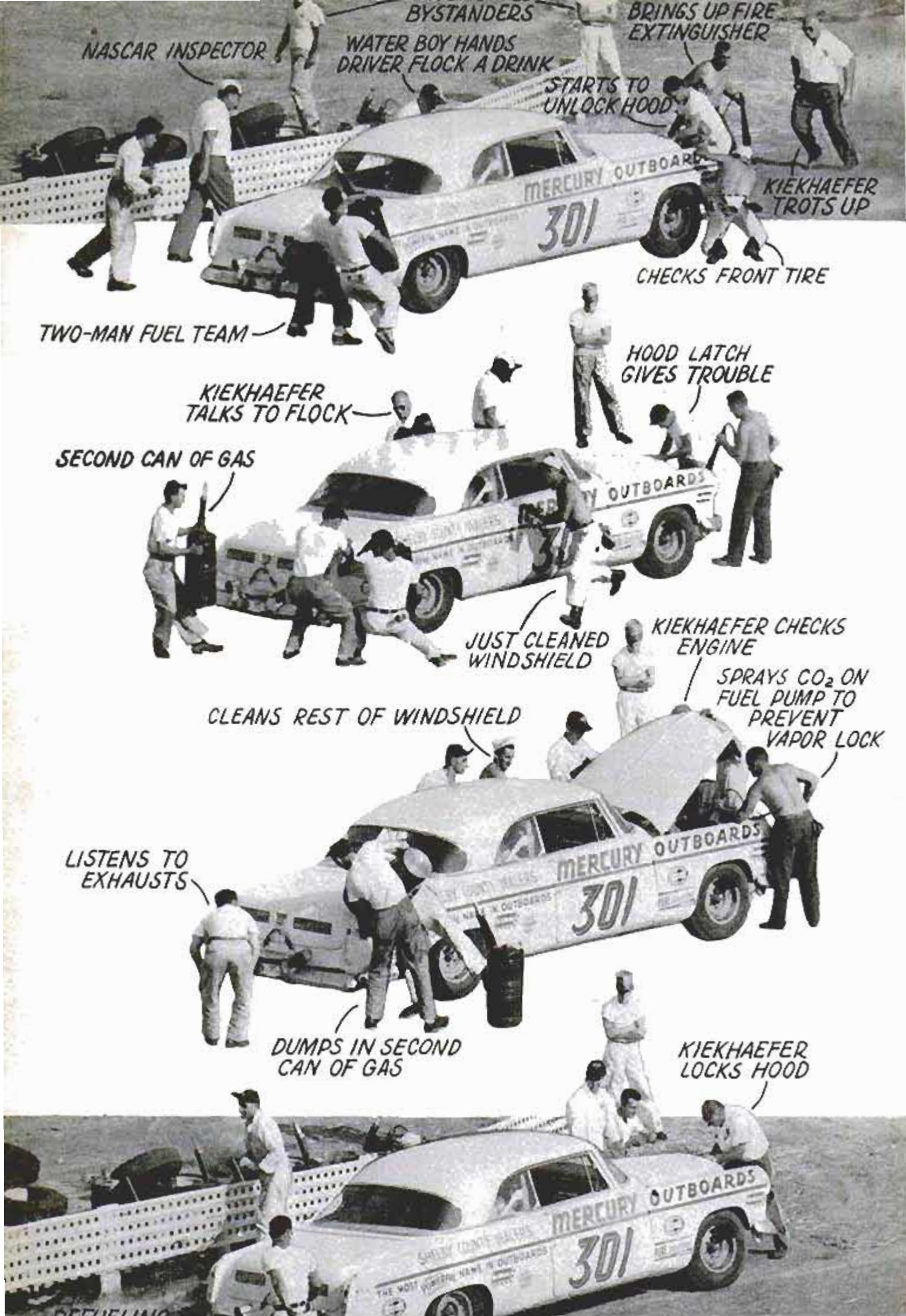
CLEANS REST OF WINDSHIELD

SPRAYS CO₂ ON
FUEL PUMP TO
PREVENT
VAPOR LOCK

LISTENS TO
EXHAUSTS

DUMPS IN SECOND
CAN OF GAS

KIEKHAEFER
LOCKS HOOD



◀ Races are, as drivers know, often won and lost in the pits. These five sequence shots show precision with which the Kiekhaefer crew handles refueling

must pass inspection before or after each race, except when races are held so close together that it is impractical. Winning cars must be okayed before prize money is paid to the drivers.

However, inspection is rapid and superficial at best. Inspectors are not usually engineers. Most of the inspection consists of pulling one cylinder head and inspecting the combustion chamber, bore and stroke. There is a lot the inspectors don't (and can't) see. After all, you can't look inside a casting, nor is there time to degree the cam on all winners.

And, anyway, it is impossible to be certain what is stock, now that the auto-factory teams have arrived and are in racing for keeps.

A car manufacturer can make any part "stock" simply by notifying race headquarters that the part is available for his cars. In this way, any manufacturer who is out to win races can put a "stock" car on the track loaded with high-performance parts. Such a car is almost entirely unlike the cars his dealers sell the public. But it will win races and that makes good advertising copy. And the ads don't always list specifications.

Something else confuses the matter even more: You can make modifications that mean increased safety. So you add all sorts of bracing to the chassis in the interest of safety. You use the biggest-available tires, brakes, axles, spindles, springs and shocks, all in the interest of safety. Of course, these parts help win races. After all, you can't win a race if you break an axle or if a wheel fails due to structural inadequacy.

Let me describe the things we do to set-up our Chryslers. Much of this is standard procedure for all makes.

We reinforce the rear-axle housing by welding three angle irons along its length. We install new draglinks which we make of strong aircraft tubing. We use a front sway bar of our own manufacture. It is formed of heavier stock than the original. We inspect every factory weld we can see in the frame and reweld any that appears to need it. We reinforce the pads under and

(Continued to page 302)



Top, Ford tailpipe crossover lets the driver hear the exhaust of troublesome right bank of cylinders. The Chrysler tailpipes run straight back through trunk



Rules require safety rollbar. Kiekhaefer adds three braces to stiffen frame and make car corner better

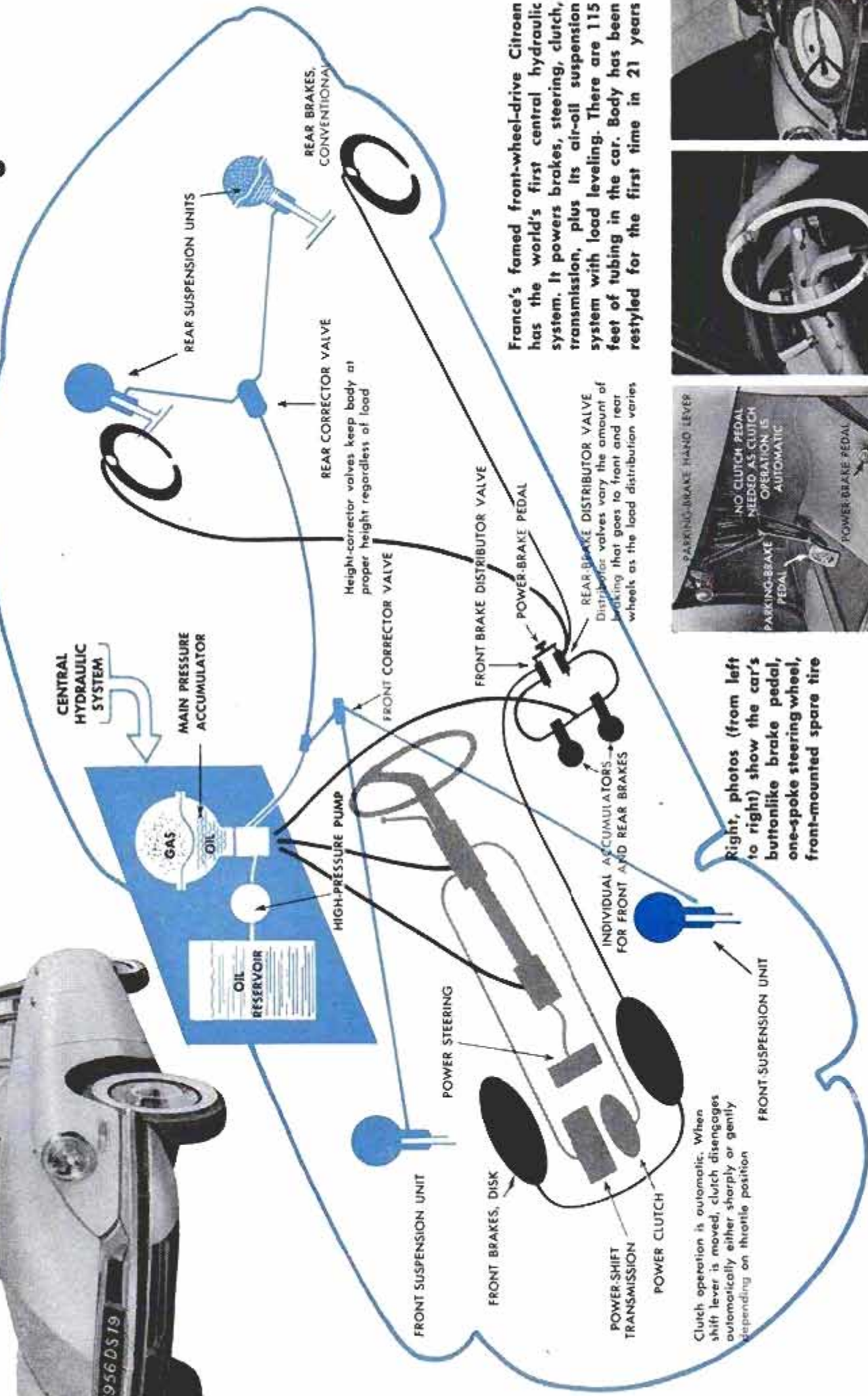
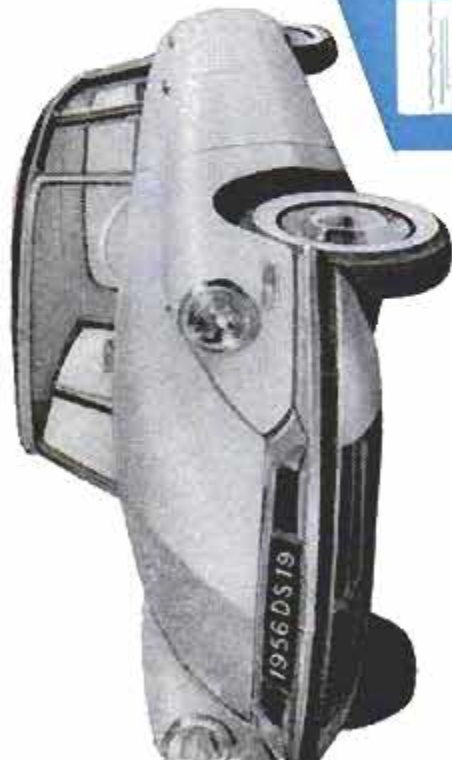


STILL-INTERESTED BYSTANDER

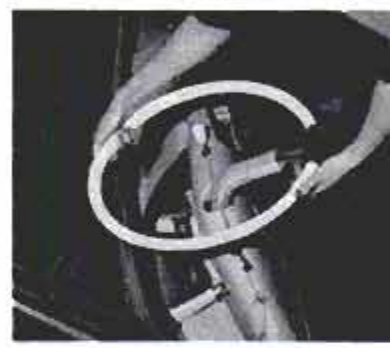
KIEKHAEFER WAVES
FLOCK AWAY

FLOCK WENT ON TO WIN.
MEMPHIS, TENN.
AUG. 14, 1955

Citroen DS19—The Year's Most Original Car



France's famed front-wheel-drive Citroen has the world's first central hydraulic system. It powers brakes, steering, clutch, transmission, plus its air-oil suspension system with load leveling. There are 115 feet of tubing in the car. Body has been restyled for the first time in 21 years



Right, photos (from left to right) show the car's buttonlike brake pedal, one-spoke steering wheel, front-mounted spare tire

Clutch operation is automatic. When shift lever is moved, clutch disengages automatically either sharply or gently depending on throttle position

THEY'VE ADDED COMFORT TO THE CORVETTE —



AND **POWER** TOO!

THREATENING RAIN clouds won't worry the 1956 Corvette owner. He simply presses a button and the power-operated top comes up from its hiding place under the rear deck. Pushing another button or two rolls up the power windows, making the sportster as snug as a luxurious sedan.

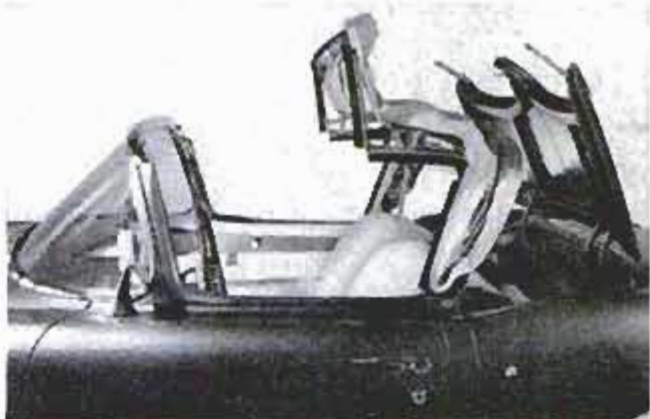
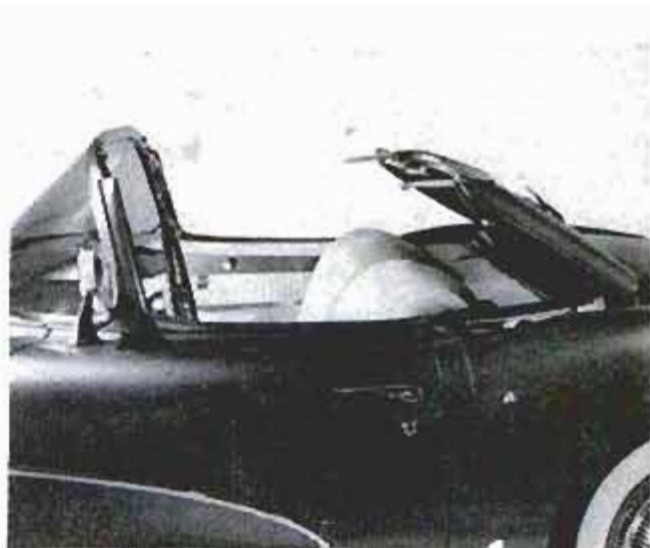
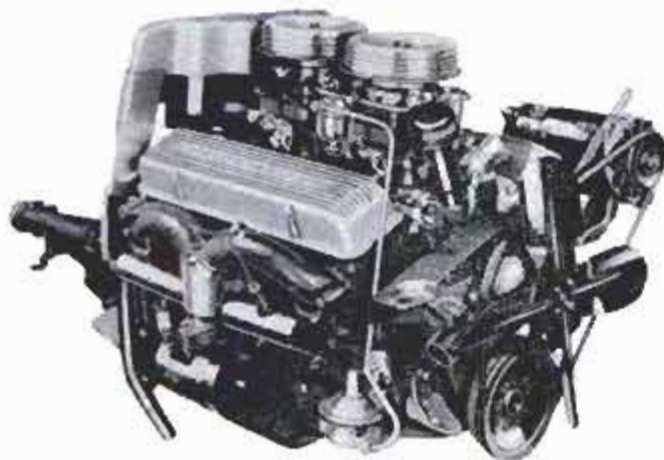
But all this comfort hasn't made a sissy of the plastic bomb—no, sir! It now has 225 horsepower and, coupled with a weight of only 2680 pounds, that makes the best power-to-weight ratio in the industry—a mere 11.9 pounds per horsepower.

You can now get it with a three-speed handshift transmission, if you don't care for the Powerglide automatic unit. The V8 engine has a special high-lift cam and two four-barrel carburetors. Performance is still a secret, but it's a safe bet that it'll do 0 to 60 in a whisker under nine seconds!

For winter driving, there is an optional plastic hardtop that has fixed quarter windows and a wraparound rear window for good backward vision.

Side panels on the plastic body have been made concave in a style reminiscent of the Biscayne dream car of 1955. For other photographs of the Corvette turn to page 175.

With a 9.25:1 compression, the V8 develops 225 hp. Metal seen at rear shields radio from ignition noise



Top operation is automatic: First, the lid lifts up; next, up comes the top; finally, the lid closes itself

Steering wheel of the Corvette is a functional competition type, unadorned by chrome embellishments



HOW WAS THIS SURVEY MADE?

Questionnaires were mailed to 10,000 buyers of 1955 cars of all makes. The names were chosen at random from registration lists all over the country.

From the thousands of questionnaires that were returned to us, we made up a 1000-owner sample. This sampling was done at random with this exception: Geographical distribution was controlled to match the nation's car-population areas to be sure the sample was representative of the whole country.

The 1000-owner sample was then analyzed to make this report.

Why Do People Buy

✓ Who are the people who bought new cars in 1955?

<i>Income</i>		<i>Family</i>	
Under \$5000 a year.....	30.2%	Married.....	85.7%
\$5000 to \$10,000.....	54.9%	No children at home.....	29.6%
Over \$10,000 a year.....	14.9%	One child at home.....	19.0%
<i>Age</i>		Two children at home.....	21.8%
18-21 years.....	1.6%	Three children at home.....	9.5%
22-30 years.....	23.2%	Four children at home.....	4.4%
31-40 years.....	32.7%	Five children at home.....	1.1%
41-50 years.....	22.5%	More than five children.....	.3%
51-65 years.....	16.5%	Not married.....	14.3%
Over 65 years.....	3.5%		

✓ Why did these people buy new cars in 1955 anyway?

Income under \$5000 a year

Previous car no longer dependable.....	42.5%
Previous car all right but just wanted a new car.....	41.5%
Previous car used too much gasoline, oil.....	13.8%
Previous car all right but looked out of style.....	8.6%

Income from \$5000 to \$10,000

Previous car all right but just wanted a new car.....	42.0%
Previous car no longer dependable.....	41.1%
Previous car used too much gas, oil.....	8.6%
Previous car had too many miles on it.....	7.9%

Income over \$10,000 a year

Previous car all right but just wanted a new one.....	45.1%
Previous car no longer dependable.....	31.4%
Previous car looked shabby.....	10.5%
Previous car all right but looked out of style.....	8.6%

Only when the income level climbs to above \$10,000 a year is there any important difference in the reasons the owners give for buying a new car. And even then the differences are less than you might expect. Apparently people buy new cars for pretty much the same reasons, regardless of income. (Percentages above total more or less than 100 because some gave more than one answer and because only the four top reasons are listed.)

✓ Once they have decided to buy a new car, what is the most important factor the buyers consider in making their choice?

Previous experience with the make.....	25.3%
Trade-in allowance on old car.....	14.3%
Exterior styling of the new car.....	13.6%
Price of the new car.....	12.1%
Operating cost of the new car.....	10.6%
Handling ease of the new car.....	10.0%

OWNERS REPORT

the Cars They Do?

✓ What is the second most important factor in making their choice?

Exterior styling of the new car.....	16.2%
Trade-in allowance on old car.....	14.0%
Operating cost of the new car.....	12.0%
Handling ease of the new car.....	11.9%

Buyers are apparently more concerned about the looks of the car than its performance. A very small number (less than one percent) mentioned horsepower or top speed as either the first or second most-important factor. Acceleration was mentioned more frequently, but it was still far down on the list with only 2.0% listing it as most important and 2.7% listing it as the second most-important factor. It is interesting that handling ease is the most frequently mentioned performance characteristic, far exceeding speed and acceleration in popularity.

✓ What was the average age of the cars traded in?

Under \$5000 a year income.....	Car traded was 3.9 years old
\$5000 to \$10,000 a year.....	Car traded was 3.6 years old
Over \$10,000 a year.....	Car traded was 3.4 years old

Income status does affect the frequency of car buying, but not so much as you might think. In all three income groups, for instance, the most-frequently traded year-model was the same—the 1953 model. Also of interest is the fact that in the low-income group 8% traded 1954 cars (only one year old), in the middle-income group 9% traded 1954 cars, and in the high-income group 12% traded 1954 cars.

✓ Does the make of car Dad owns (or owned) influence the make of car selected?

When father owns a General Motors car:		Sons buying a Chrysler Corp. car.....	18.0%
◆ Sons buying a General Motors car.....	56.6%	Sons buying other makes.....	7.1%
Sons buying a Ford Motor Co. car.....	21.8%	When father owns a Chrysler Corp. car:	
Sons buying a Chrysler Corp. car.....	14.2%	Sons buying a General Motors car.....	46.4%
Sons buying other makes.....	7.4%	Sons buying a Ford Motor Co. car.....	19.6%
When father owns a Ford Motor Co. car:		◆ Sons buying a Chrysler Corp. car.....	28.1%
◆ Sons buying a General Motors car.....	38.8%	Sons buying other makes.....	5.9%
◆ Sons buying a Ford Motor Co. car.....	36.1%		

There is considerable evidence here that the make of car the father owns influences the son in his choice of car. And this seems to be true regardless of age group or marital status.

✓ Does the make of car the Boss owns influence the make selected?

When the Boss owns a General Motors car, employees buy:		When the Boss owns a Chrysler Corp. car, employees buy:	
◆ General Motors cars.....	49.8%	General Motors cars.....	35.1%
Ford Motor Co. cars.....	22.4%	Ford Motor Co. cars.....	20.9%
Chrysler Corp. cars.....	18.9%	◆ Chrysler Corp. cars.....	38.8%
Other makes.....	8.8%	Other makes.....	5.2%
When the Boss owns a Ford Motor Co. car, employees buy:		Another example emphasizes the influence of the Boss:	
General Motors cars.....	42.7%	When the Boss owns an Oldsmobile:	
◆ Ford Motor Co. cars.....	31.5%	◆ Employees buying Chevrolet.....	18.7%
Chrysler Corp. cars.....	18.9%	Employees buying Ford.....	12.1%
Other makes.....	7.0%	Employees buying Plymouth.....	2.2%

(Continued to page 310)



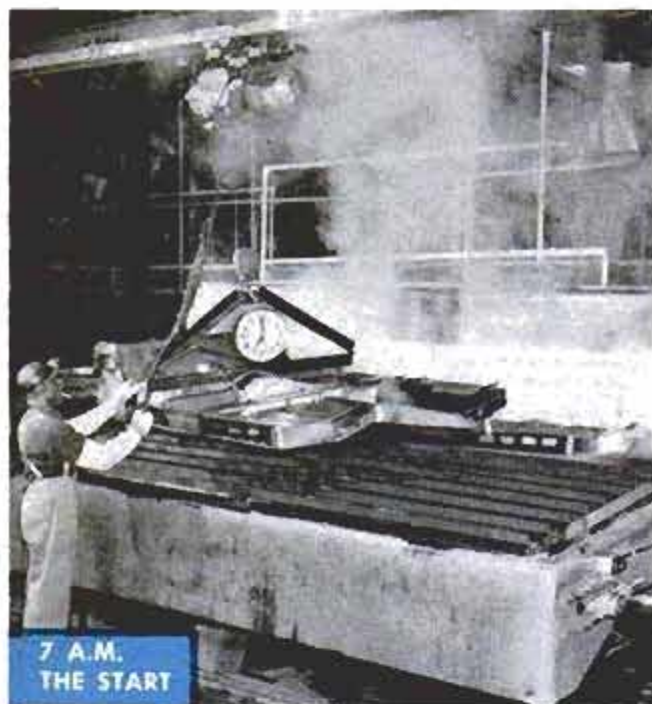
From 7 a.m. to midnight a *PM* camera followed the assembly line in an automobile factory. Here is its picture story of

The Building of a Car

HOW LONG does it take to build a car? At 7 o'clock one morning a clock was hung on an underbody as it was lowered onto the assembly line at Kenosha, Wis. A *PM* photographer took a picture, marking the start of a 1956 Rambler. One minute before midnight, 17 hours and

many, many pictures later, the clock and underbody (the latter hidden under a shiny Rambler body) were photographed for the last time on a conveyor, leaving the plant en route to a new owner. The following pages show what took place in those 17 hours.

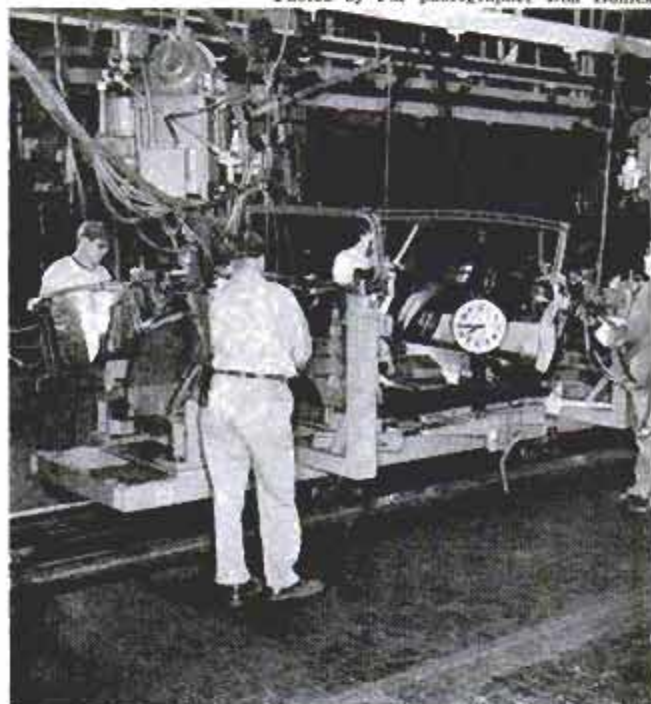
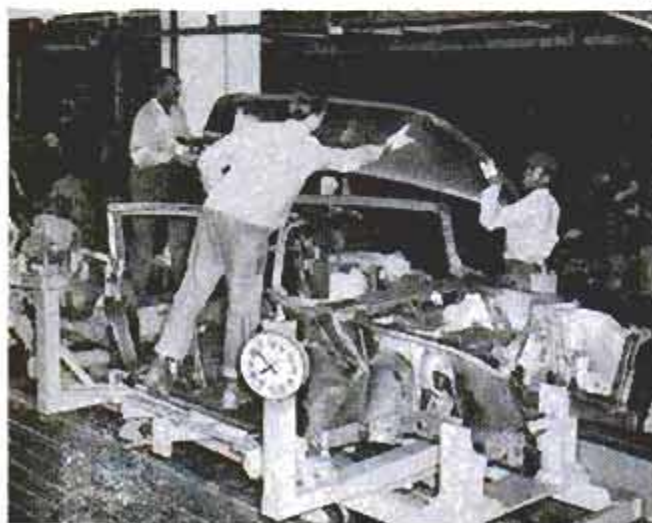
Photos by *PM* photographer Don Honick



7 A.M.
THE START

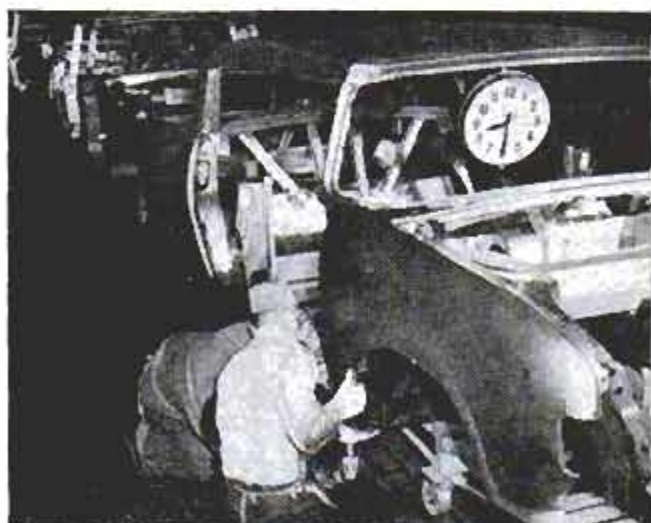
7 a.m. First step in the assembly of the Rambler. Underbody goes into the wash tank to be degreased

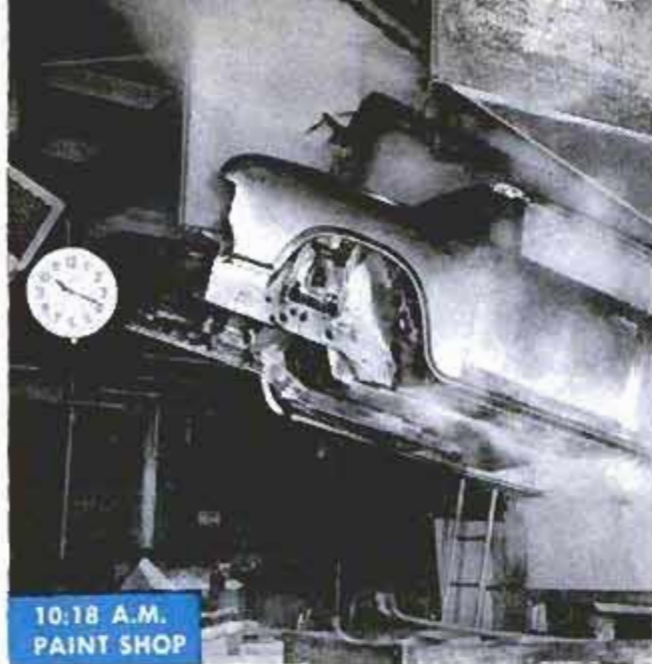
7:52 a.m. On goes the roof. There are about 6000 welding operations in the Rambler's unitized body



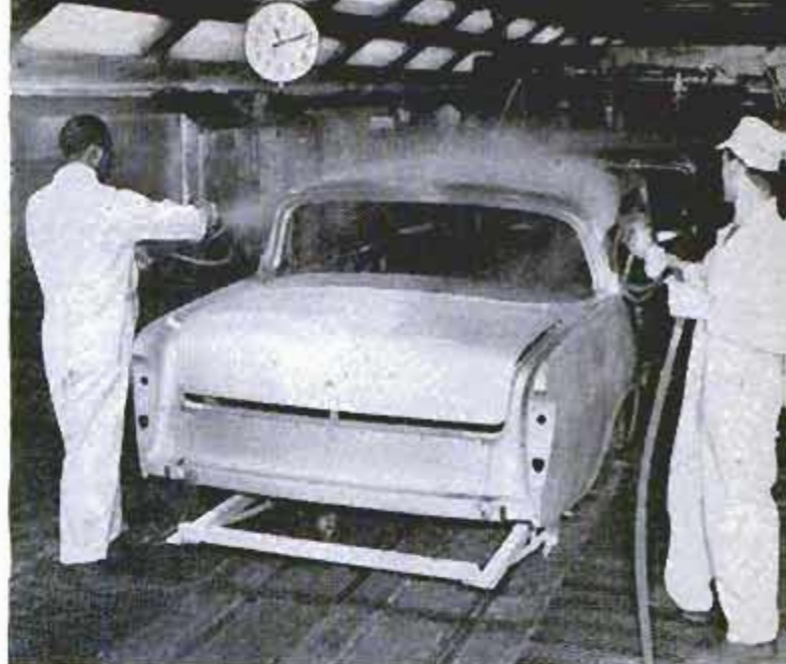
7:44 a.m. Sides are welded to underbody. Rambler is held together by welds, virtually no bolts are used

8:30 a.m. Front fenders are installed. These go on with bolts, the only major parts that aren't welded





10:18 a.m. Metal work done, body backs into steaming tank of Bonderite to be cleaned before painting



11:11 a.m. On goes the prime coat. The painters do hard-to-reach spots, machines paint the big areas



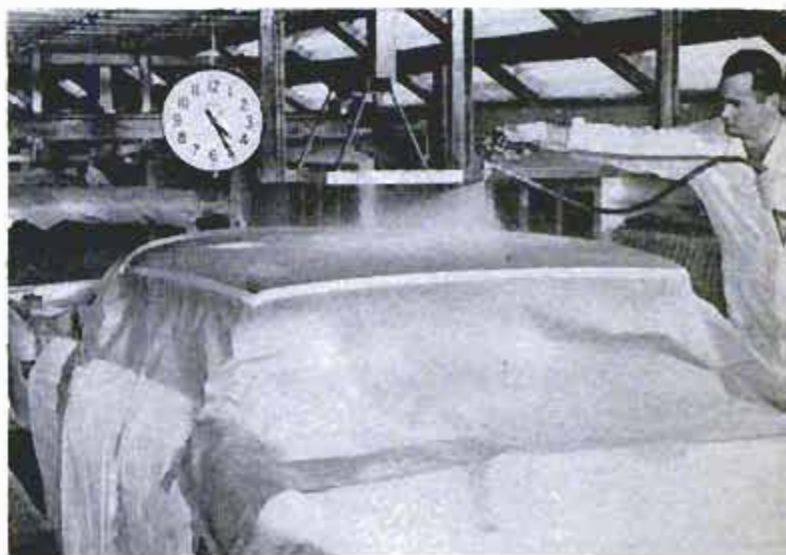
12:50 p.m. As body leaves drying oven after prime coat, it is sanded down to ready it for first color

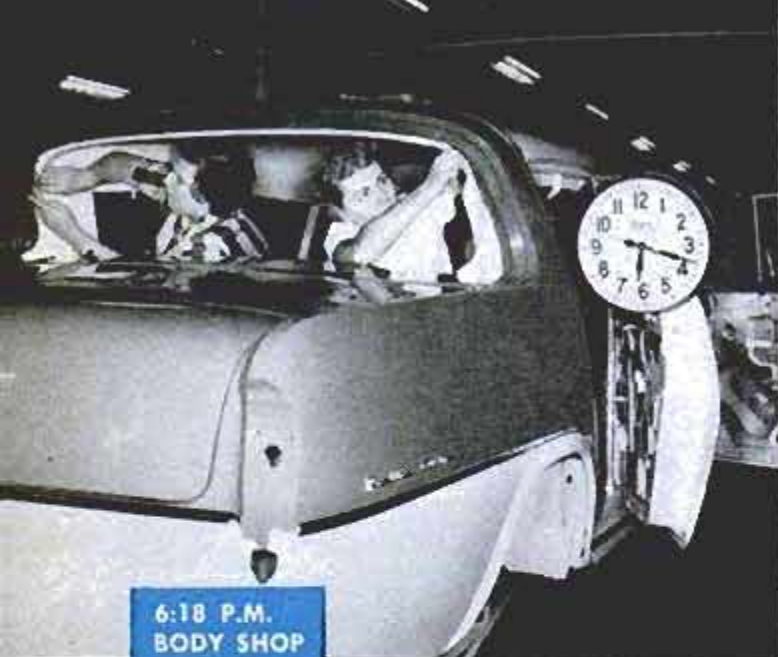


12:58 p.m. First color (dark green) goes on. Arch in background is an automatic paint-spraying machine

1:58 p.m. Masking for second color (light green). This is a big operation now because of two-tone fad

4:25 p.m. The third color (white) is applied. All the body except roof has to be masked for this coat





6:18 P.M.
BODY SHOP

6:18 p.m. Interior work is under way. The girls fit headlining to the roof as body moves along the line



6:35 p.m. Dashboard goes in as a unit. It has been assembled elsewhere in plant, delivered by conveyor



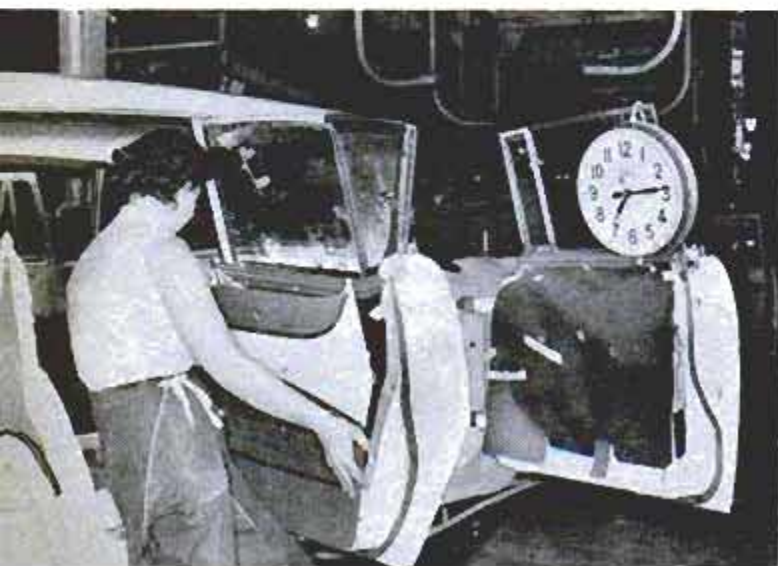
6:46 p.m. Installing windshield. Girl pulls on two strings to lift the lip of gasket over metal bead

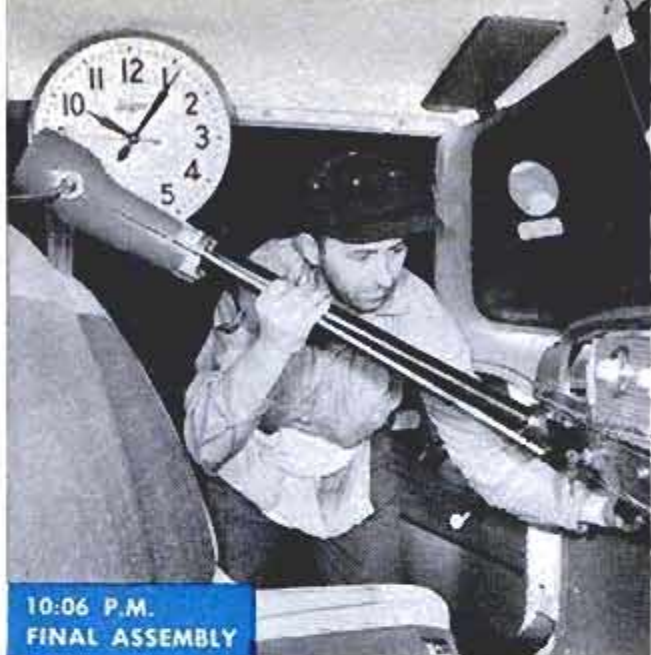
7:14 p.m. Door panels go on. Body rides on wheeled frame and moves continuously as work is being done



7:08 p.m. Steaming headlining. All wrinkles vanish when headlining is shrunk tight by the steam bath

7:41 p.m. Door latches are pounded to give precise fit. Seats are in body. Interior is almost finished





**10:06 P.M.
FINAL ASSEMBLY**

10:06 p.m. Now the running gear is added. Steering column is first of mechanical parts to be installed



10:23 p.m. Gas tank is strapped on. Body is carried along by big hooks, suspended over well-lighted pit



10:29 p.m. Front suspension is installed. Blanket draped on fender keeps workers from marring paint

10:51 p.m. Grille is bolted to fenders. Workers roll on castored seats at same speed as line moves



10:35 p.m. Engine mount. Entire drive train (engine, driveshaft, rear axle) is lifted and bolted to body

11:12 p.m. Wheels go on. Precise timing brings the matching wheels to this spot at moment body arrives





11:20 p.m. Wheels touch down for first time. Tank gets first taste of gasoline—five gallons of it



11:26 p.m. Hood is bolted on. It must have proper color, must wear the right emblem, Hudson or Nash



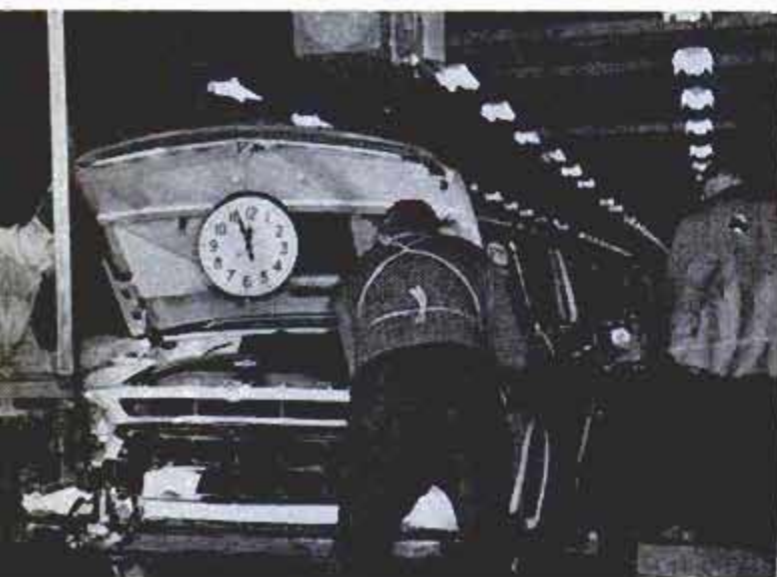
11:35 p.m. First time it moves under own power. It is now run through gears with rear wheels on rollers

11:57 p.m. End of line! Front wheels are aligned; headlights focused and another Rambler is set to go



11:48 p.m. Final inspection. Any tiny blemishes in paint are touched up as car moves toward end of line

11:59 p.m. One minute under 17 hours from the start, the complete Rambler rides up conveyor for shipment





MORE MILES TO THE GALLON

By Dale Kelly

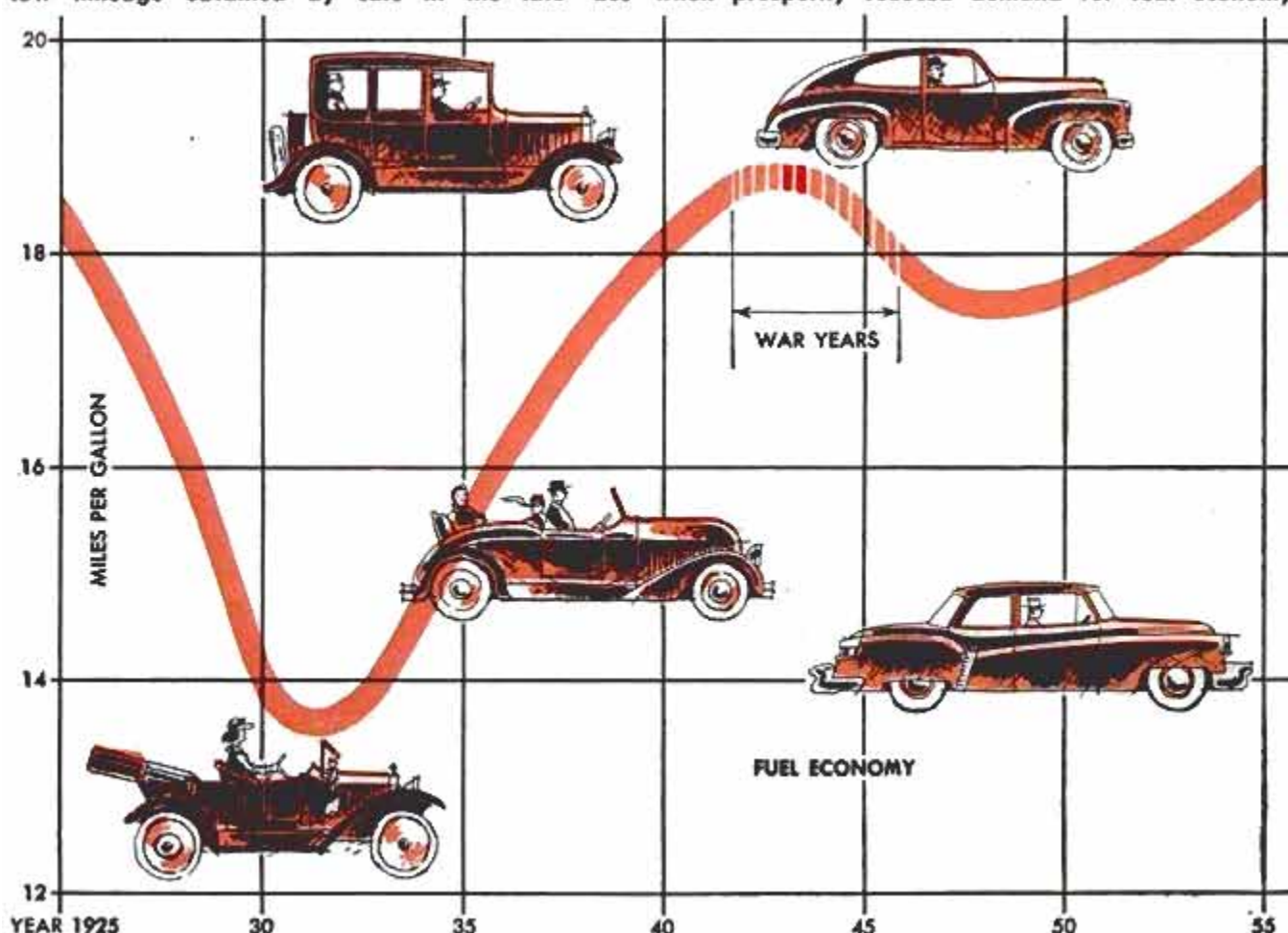
THIRTY YEARS AGO the average United States motorist was getting about 15 miles per gallon of gasoline. Today he is getting close to the same mileage, but with engines that have several times the horsepower and a total mileage potential of many thousands of miles more than cars built thirty years ago.

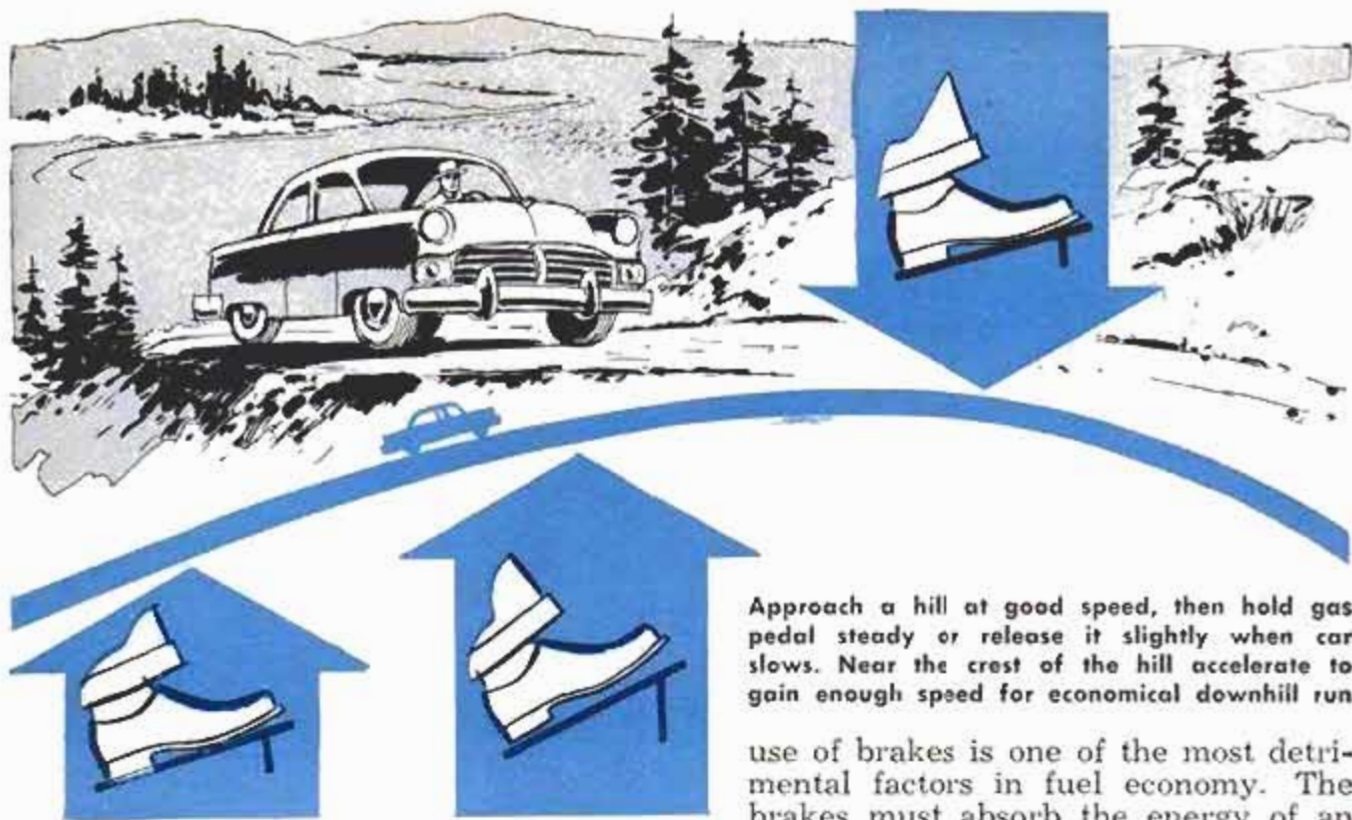
But increased horsepower and perform-

ance require more gasoline, despite greatly increased efficiency in engines and tremendous improvements in the quality of gasoline. Therefore, any increase in gasoline economy is up to you, the driver.

Correct driving habits, proper maintenance and the use of quality petroleum products are the three main factors in gasoline economy. A fourth factor is optional

As can be seen by graph below, gasoline mileage has improved only slightly in 30 years. Note the low mileage obtained by cars in the late '20s when prosperity reduced demand for real economy



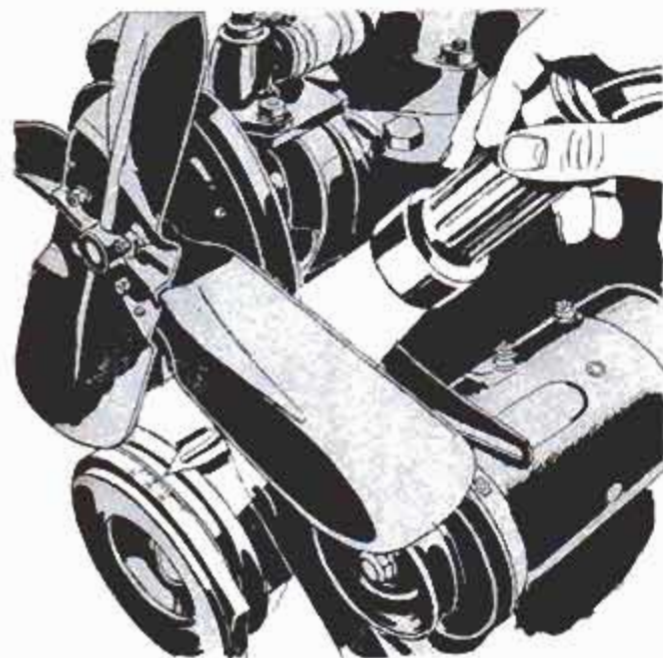


equipment that provides economy through mechanical assistance.

When starting your car from a standstill: If the car has a manual-shift transmission, shift into high gear as soon as practical without causing the engine to "lug" or labor. If your car has an automatic transmission, keep a light foot on the throttle and the transmission will quickly upshift. An easy start keeps down engine r.p.m. A slowly rotating engine uses considerably less fuel than one turning over at high speed.

Drive the road ahead: Avoid sudden stops at stoplights and time your speed to drive through on the green light. Heavy

Correct ignition timing permits using regular instead of premium gasoline, saves 2 or 3 cents a gallon



Approach a hill at good speed, then hold gas pedal steady or release it slightly when car slows. Near the crest of the hill accelerate to gain enough speed for economical downhill run

use of brakes is one of the most detrimental factors in fuel economy. The brakes must absorb the energy of an automobile in motion and, in effect, you are running the engine with a brake on each time you stop suddenly.

Climbing a hill: Approach a hill at a fairly good speed, then as the car slows down hold the accelerator steady, or release it slightly. When near the top of the hill, accelerate to build up speed for the downhill run which is made with the throttle closed. Most automatic transmissions coast free to some extent, even when left in gear, so the closed throttle on the downhill run will more than save the amount of fuel required for driving up the hill. In the Mobilgas Economy Run, some cars made 100 miles per gallon on a downhill run, definitely compensating for the 7 miles per gallon required when going uphill.

It is not suggested that techniques used in economy runs be adopted in full by the average motorist. However, variations of the techniques can successfully be used to improve economy.

Steady foot on the accelerator: A comfortable posture with the right leg held in a relaxed position is important. The leg should be supported in such a manner that your foot will not bounce up and down on the throttle when the car is driven over bumps. Frequent changes in throttle position have a definite adverse effect on gasoline mileage.

Automatic transmissions: Generally speaking, automatic transmissions are at a mileage disadvantage when running at low speeds. A torque converter or fluid coupling is more efficient at higher r.p.m. This is the reason some automatic transmissions seem to downshift at fairly high speeds.

They are engineered to provide peak performance and economy, and the shift speeds cannot be changed without adversely affecting both. Engineering improvements in the latest automatic transmissions have given them an economy potential equal to manual-shift transmissions. As an example, with some automatics, at an engine speed of 2000 r.p.m., the road speed is 55 m.p.h. At 2000 r.p.m. with a manual-shift transmission, the road speed is only 40 m.p.h.

A principal cause of poor gasoline economy is a rich mixture in the carburetor. In modern carburetors any air-fuel mixture for engine speeds above idling speeds cannot be adjusted from outside the carburetor. If your carburetor is running rich, it should be cleaned and overhauled, or smaller jets or larger metering rods should be installed. Only an expert carburetor man should be allowed to change carburetor calibration.

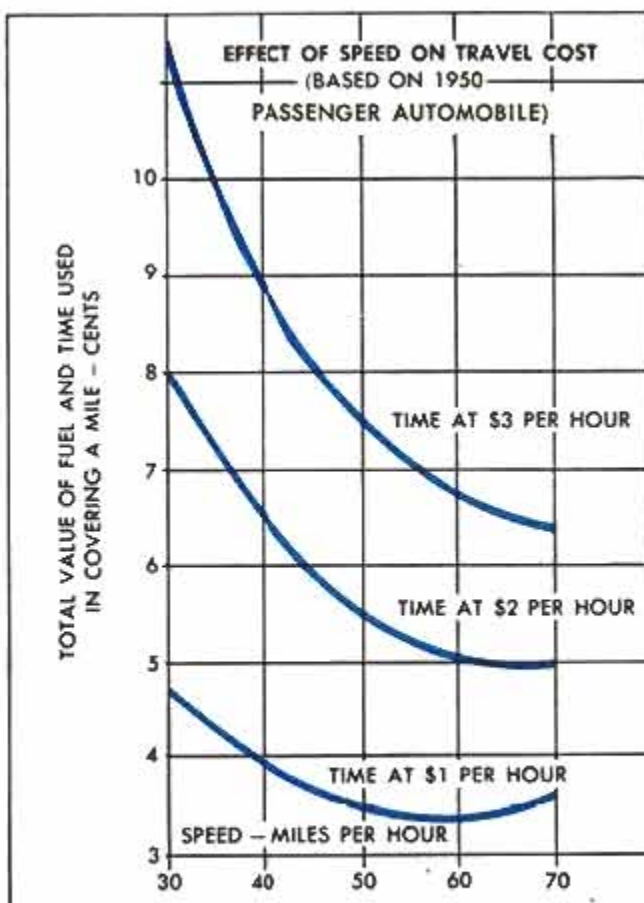
Air filter: A dirt-clogged air filter, because it reduces the air supply to the carburetor, produces the same effect as oversize jets. The air cleaner should always be cleaned when the engine is tuned.

Faulty ignition: An engine with faulty ignition wastes gasoline. A single spark plug not firing properly increases gasoline consumption by about 3 miles per gallon. To forestall ignition trouble, have the engine tuned periodically. When the engine is tuned, have it timed to match the grade of gasoline you are using. Simply changing the timing often will permit savings of a couple of cents a gallon since regular grade instead of premium can be used. On many cars, timing marks indicate settings for both regular and premium-grade gasoline. As a rule of the thumb: if your car is a 1948 model or older, or has a compression ratio of 7.5 to 1 or less, it can use regular. If the compression is 8 to 1 or higher, use premium-grade gasoline.

There is, of course, more to gasoline than octane number. However, United States Government reports show that in all respects but octane number, regular gasoline is substantially equal to premium.

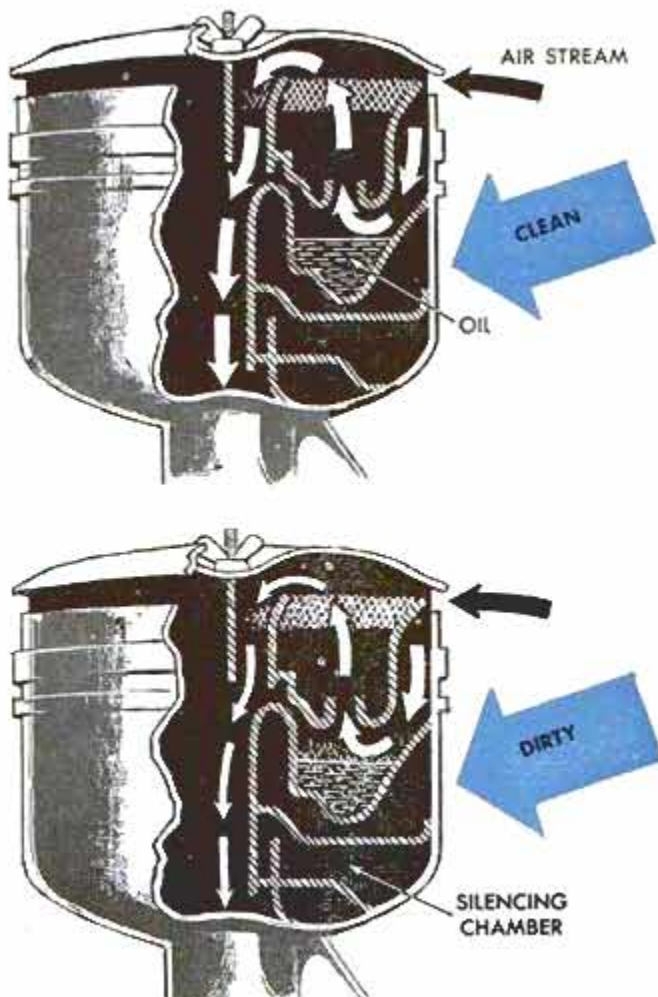
Other causes of poor mileage: All other causes of poor mileage can be lumped under the heading of excessive friction or resistance to motion. This includes such defects as dragging brakes, misaligned front wheels, soft tires and, less frequently, lack of lubrication. With any of these conditions present, the throttle has to be opened more than normal to develop enough engine power to move the car at a given speed.

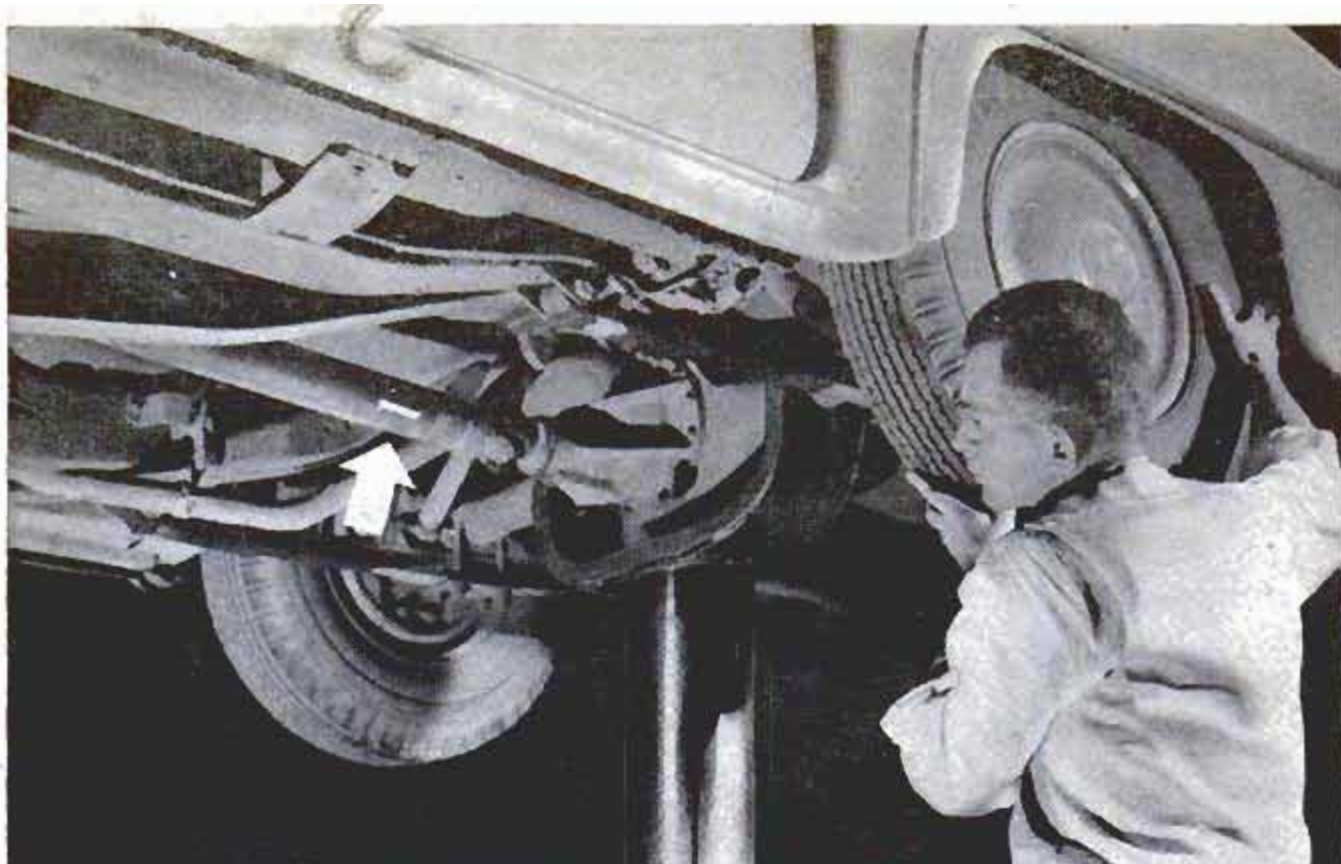
Within certain limits a gasoline engine develops a given horsepower on the least gasoline when it runs slowly and pulls



Graph above shows that when cost of time is considered, higher speeds may be more economical

Below, unbalance in fuel-air ratio caused by dirty air cleaner results in excessive gasoline consumption





To check rear-axle ratio, rotate rear wheel twice, note number of times chalk-marked driveshaft rotates

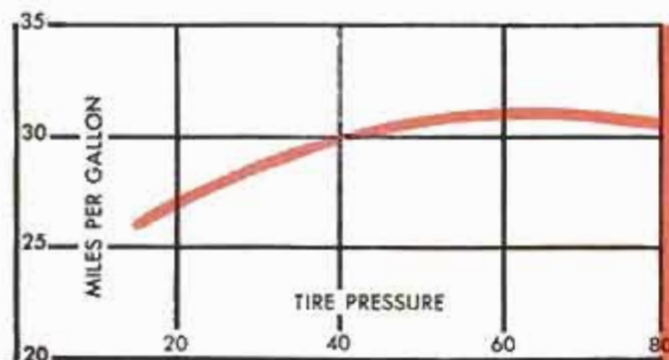
hard. This is the reason an engine will give its best mileage when its r.p.m.s are kept low by an overdrive or low-ratio rear axle. A properly installed overdrive unit will permit approximately a 30 percent reduction in engine revolutions for a given road speed, and at low and medium speeds will produce about 24 percent reduction in gasoline consumption. At higher speeds economy drops off, because the engine becomes overloaded and starts to labor. For this reason, when a car is used to haul a trailer, or is heavily loaded, an overdrive unit should be locked out.

Some of the economy potential of overdrive usually is sacrificed because of the desire for smoothness in high gear when the car is running at fairly low speed. This is accomplished by using a rear axle with a higher gear ratio than is used with a standard transmission. If the same axle ratio that is used with a standard transmission is installed in an overdrive-equipped car, almost 34 percent reduction in gasoline con-

sumption can be realized over a standard transmission. This latter setup will save gas and oil, prolong engine life and reduce engine noise. The only disadvantage is the increased need for shifting gears at lower speeds or when climbing fairly steep hills.

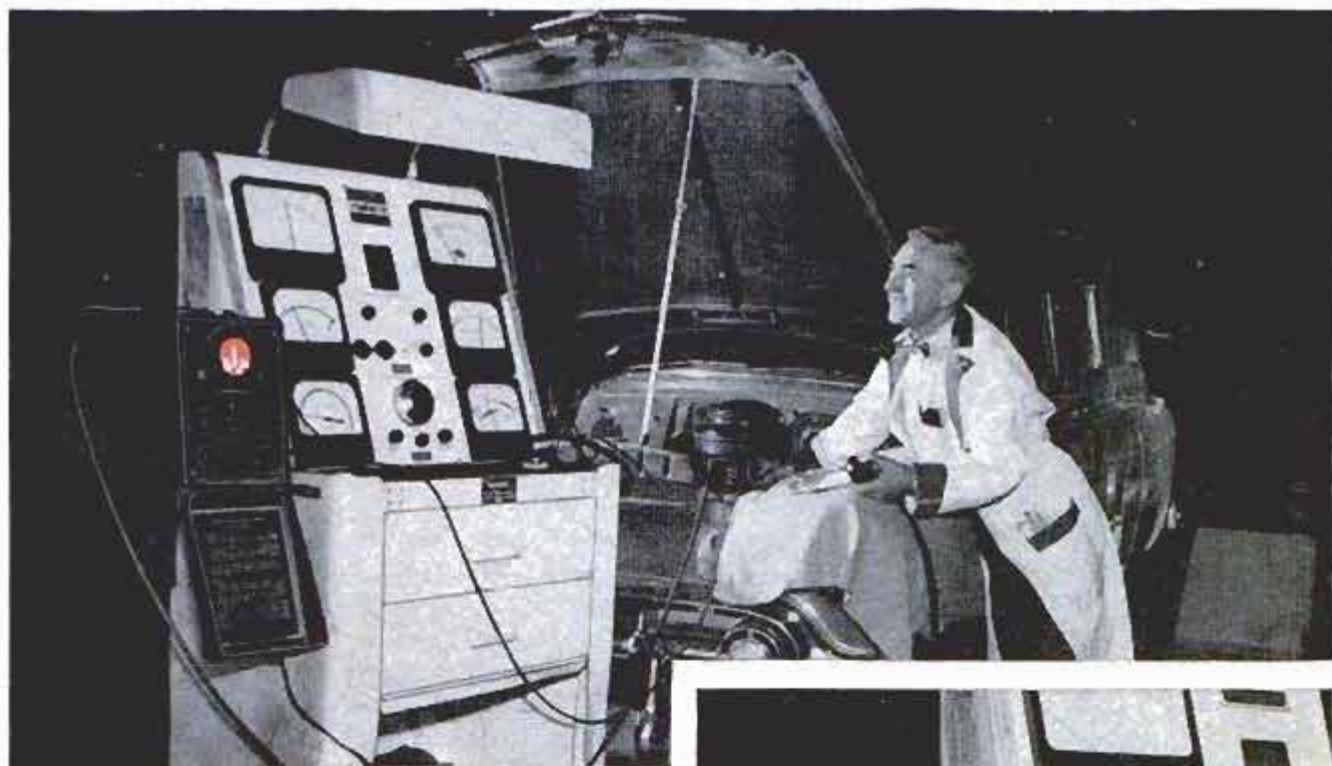
If you order a special rear-axle ratio and want to check to see if it was installed, raise the car on a hoist of the type that permits the wheels to rotate. Make a chalk mark on the driveshaft and turn one wheel through two complete revolutions. (Because of differential action, two revolutions of one rear wheel are equal to one revolution when the wheels rotate simultaneously.) The number of times the driveshaft rotates, to one, is the rear-axle ratio.

Although speed increases gasoline consumption, other factors must be considered when a driver uses his car for business. The examples shown in chart at top of page 203 demonstrate that when cost of time also is figured, it sometimes is less expensive to drive at higher speeds. ★ ★ ★



FUEL ECONOMY INCREASES IN ALMOST DIRECT PROPORTION TO THE INCREASE IN TIRE PRESSURE UP TO ABOUT 60 LB. PER SQ. IN., THEN LEVELS OFF HOWEVER, DUE TO THE GREATER ROADHOLDING QUALITIES OF A SOFTER TIRE, AND IN CONSIDERATION OF PASSENGER COMFORT, LESS PRESSURE IS RECOMMENDED IN A PASSENGER-CAR TIRE.

Power Tune-Up for Peak Performance

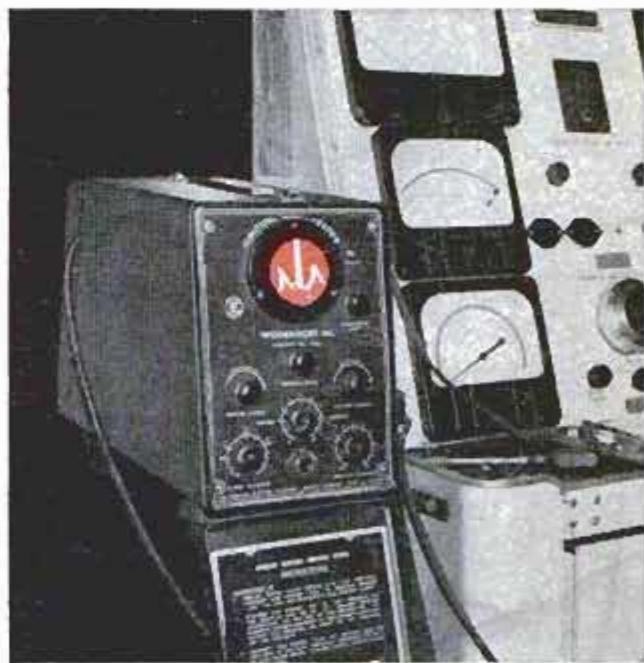


1. Willys power-tunes an engine on dynamometer

By Jay W. Hedden

MY NEIGHBOR'S CAR is the same make and model as mine, but the general performance of his car is better. It has greater pickup and is faster on the highway. What's the matter with my car?"

Similar questions are asked of automobile mechanics every day. To get the answers, *Popular Mechanics* went to George R. Willys, a man who has built a business on knowing the answers. Mr. Willys has tuned record-breaking, stock-engine cars, is a member of the S.A.E., and is the founder of a school in Blue Island, Ill., where experienced mechanics are taught advanced techniques in engine

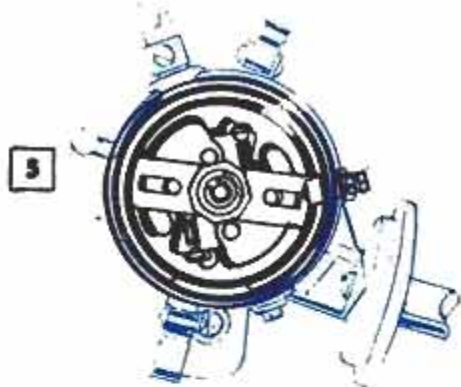
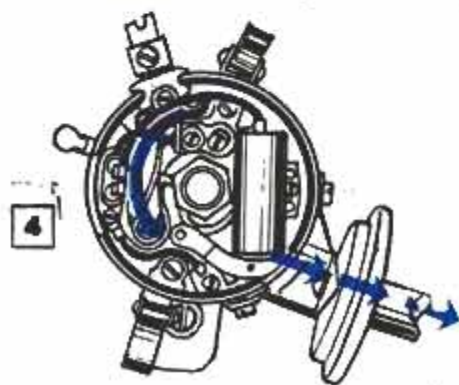


2. Upper photo, oscilloscope used with dynamometer gives picture of condition of ignition system. Below, key to image shape and two images which result when condenser leaks and contact points are dirty

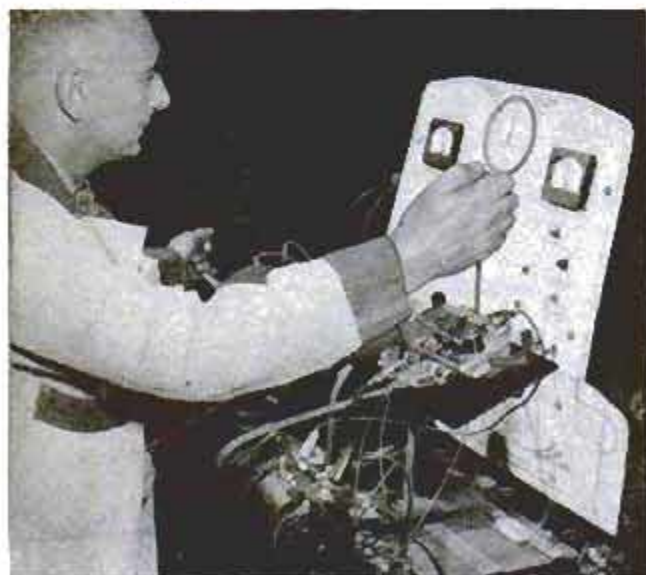




3. Calibrating distributor on tester synchronizes spark so it reaches each cylinder at right time



6. Below, recalibrating voltage regulator on tester



7. Tune-up includes cleaning and reoiling air cleaner. Cleaner has direct effect on carburetor efficiency

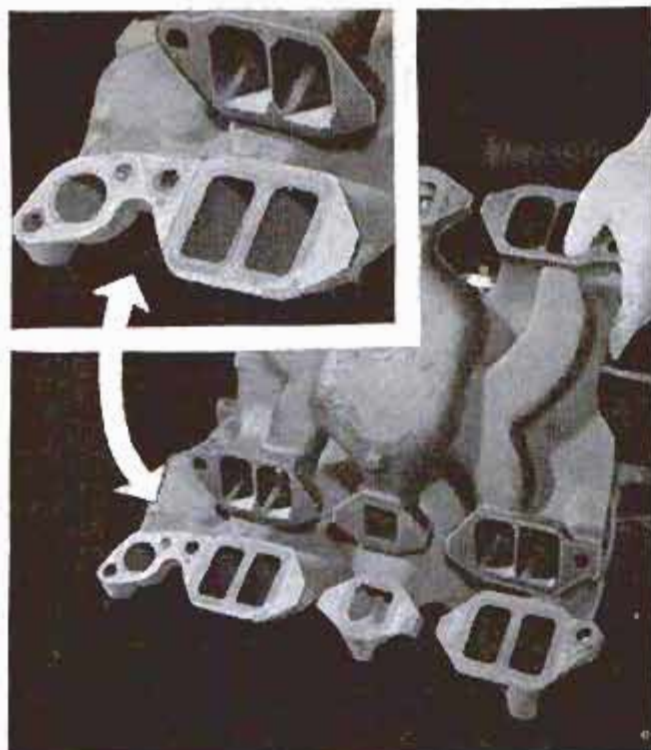
trouble shooting and the use of a dynamometer for power tuning.

To obtain peak performance, Willys told us, an engine first should be tuned as close to factory specifications as possible. After the tune-up, other performance-gaining adjustments can be made.

When you take your car in for a periodic engine tune-up make sure that in addition to the usual cleaning and regapping of the spark plugs and installation of new points, the following tests and adjustments are made: A complete check of the ignition system, a compression test of each cylinder, readjustment of the tappets if nonhydraulic lifters are used and readjustment of the carburetor. Also, the air cleaner should be cleaned thoroughly inside and out and reoiled. The air cleaner, especially if it is the oil-bath type, seldom is serviced properly. Generally, too much oil of too light a weight is used. The excess oil spills over into the carburetor when the car starts or stops quickly or turns a sharp corner. Lightweight oils tend to vaporize and are drawn into tiny carburetor openings which quickly become clogged.

Another mechanism that has a direct effect on engine performance, and often is overlooked, is the heat-riser valve. Have your tune-up mechanic operate the valve manually to make sure it rotates freely and that the thermostatic spring is not broken. The valve not only assures faster engine warm-ups, but maintains the proper heat under the carburetor to help vaporize gasoline entering the intake manifold.

For a regular tune-up, generally a timing light is the only instrument required, although a vacuum gauge may be used to adjust the carburetor and a dwell-angle meter sometimes is employed to set the distributor-point gap. The latter instrument permits more accurate spacing of



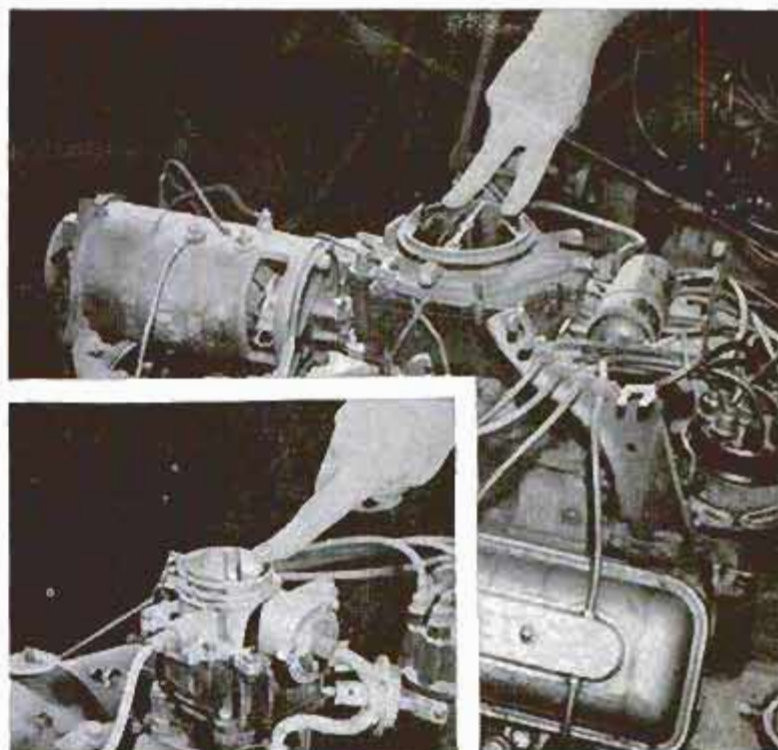
8. Stock and filed manifold compared to show size increase. Inset is close-up of end intake ports

the points than the use of a feeler gauge, since it indicates the length of time the points dwell closed on each lobe of the distributor cam. Point dwell is a specification listed by auto manufacturers.

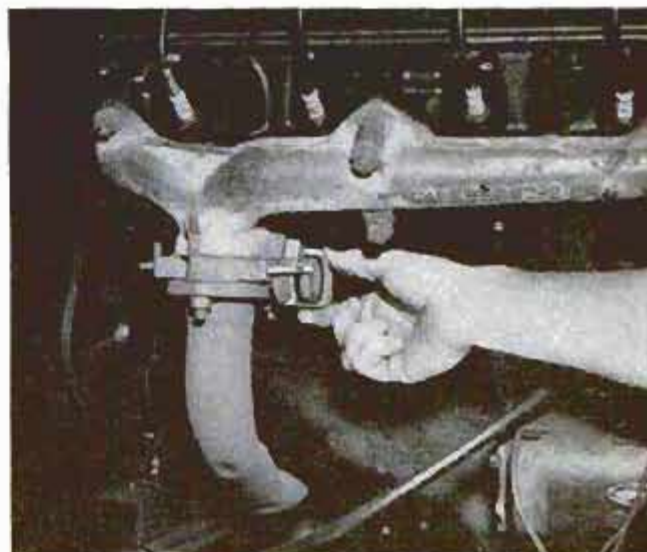
A tune-up that includes all the above assures that the engine is in top condition, and any malfunctioning of the ignition system will be found by the checks and tests. The compression test will indicate any valves that are not seating properly, or rings that are not doing an efficient job of sealing in compression.

For true power tuning, however, when the last fraction of horsepower is to be squeezed from an engine, a dynamometer should be used. A chassis dynamometer, the type used in tune-up shops, is basically a set of rollers onto which the back wheels of the car are driven. The engine is started, the car put in gear and the rear wheels then rotate the rollers. Gauges connected to the rollers translate their rotation to "road horsepower," or the actual amount of power transmitted to the rear wheels of the car at any definite engine r.p.m. Any changes in horsepower that occur when adjustments or modifications are made to the engine show immediately on the dynamometer gauges.

In conjunction with the dynamometer, an oscilloscope also may be used. When this instrument is connected to the ignition system of the engine, it projects an image on a cathode-ray tube which can be interpreted to indicate the condition of the spark plugs, points, condenser and coil. Charts furnished with the oscilloscope



9. Replacing one or two-throat carburetor with four-throat results in appreciable horsepower increase



10. Heat-riser valve must rotate freely to assure fast starting and aid vaporizing of gasoline in manifold

show pictures of the way the image should look when the ignition is functioning properly, and what ignition malfunctioning will cause the image to change shape.

For example, the oscilloscope image may indicate that the distributor shaft is wobbling. This condition causes variations in distributor-point setting. To correct this, depending on the type of ignition system used, the distributor is either repaired or replaced. Some types of distributors can be renewed by replacing the shaft bushings, which eliminates the shaft wobble. The distributor then is calibrated on a distributor-testing machine.

While the distributor is out of the engine, the vacuum chamber is tested to make sure it is airtight. A disk-shaped object



11. Timing light flashes each time No. 1 spark plug fires, showing mark on flywheel or vibration dampener

screwed to one side of the distributor housing, vacuum chamber is connected to the intake manifold by copper tubing. A spring-loaded metal diaphragm inside the chamber flexes in direct proportion to the vacuum in the intake manifold. An arm fixed to the side of the diaphragm opposite the vacuum side is pivoted to the distributor plate. When the diaphragm flexes, it rotates the distributor plate to advance the spark. When the engine is running at cruising speed, the vacuum is high and the diaphragm arm holds the distributor plate in an advance position that provides maximum economy, but relatively low power. When the throttle suddenly is opened, as when accelerating, manifold vacuum drops and the diaphragm is forced back by its spring; the centrifugal-advance mechanism, which functions at all speeds, now takes complete control of spark advance. The latter mechanism is connected directly to the cam of the distributor and rotates it to provide spark advance. Both the vacuum and centrifugal-advance mechanisms work independently of each other, but both advance the spark according to engine needs under different conditions.

When the distributor is reinstalled in the engine, the dynamometer can be used to recheck both advance mechanisms. The engine then is "power timed," as well as "power tuned." After an engine has been tuned to peak horsepower, on the dynamometer, what does Willys suggest be done for added power?

One method of gaining horsepower on an engine equipped with a 6-volt ignition system is to have the voltage regulator recalibrated so the generator charges 8 instead of 6 volts and at a lower amperage. The regulator has to be calibrated with a regulator tester. The higher voltage provides stronger spark to the plugs, and the

lower amperage requirement reduces the horsepower needed to rotate the generator. The disadvantage of this arrangement is that the headlights and other lamps burn out more quickly.

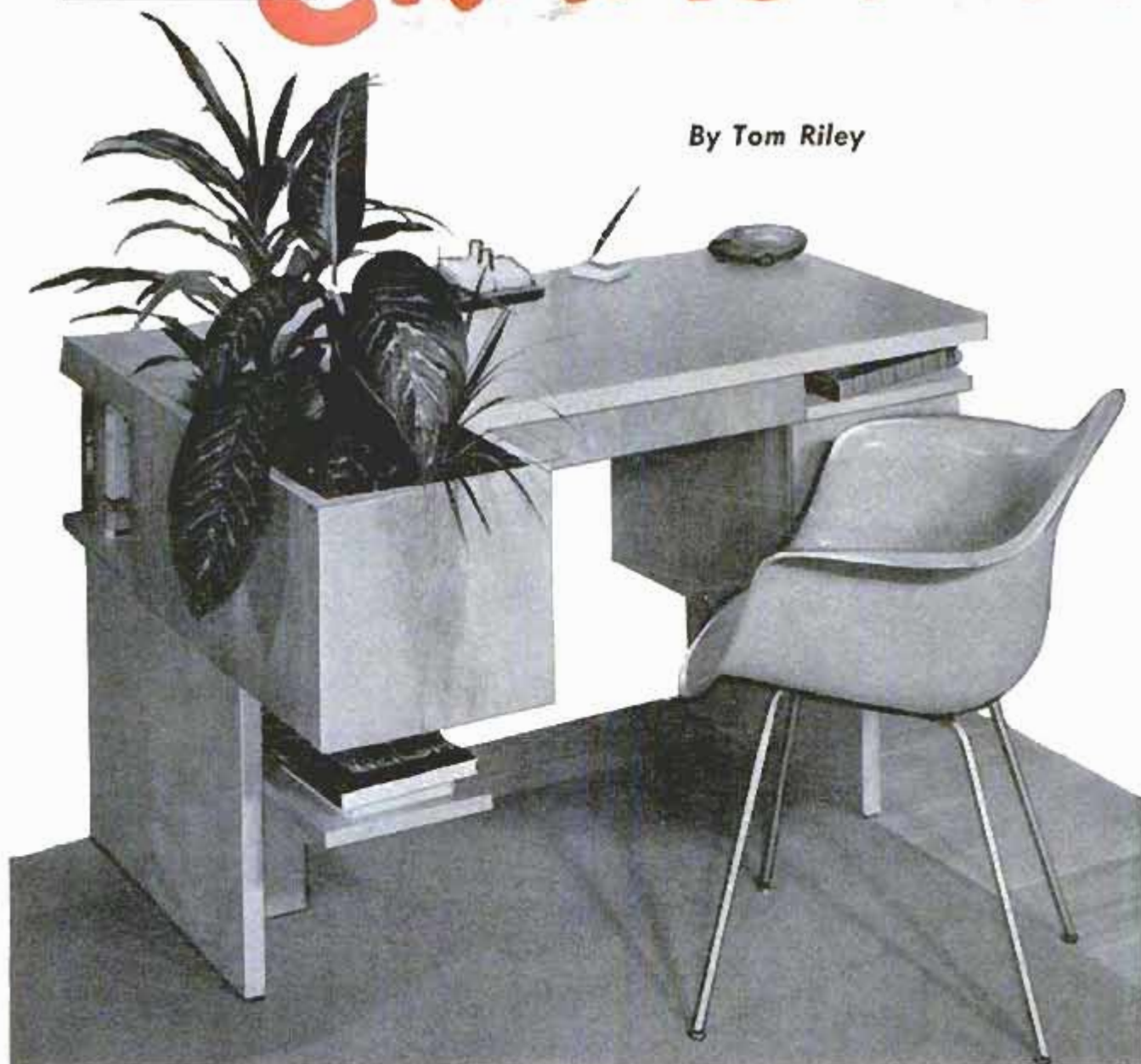
The simplest and least expensive way of gaining added horsepower from engines before 1956 is to mill the cylinder heads. The amount of metal that can be removed safely varies from about .050 to .090 in., depending on the engine. On an overhead-valve V8 engine, the intake manifold also would have to be milled since the ports in the milled heads would be located in a lower position in relation to the manifold. After the heads are milled, the engine no longer is stock and the original factory specifications do not hold true. Your tune-up man would install spark plugs with a different heat range and recalibrate the distributor to match the compression.

Multiple carburetion is another means of increasing horsepower. Dual carburetors can be used on in-line engines, while a 4-throat carburetor can be used on V8s to replace the usual single or double-throat carburetor. In all cases, linkage should be arranged so that half the number of throats do not open except at full throttle. The reason for this is that when the number of carburetor venturis is double, the air velocity in each is reduced by half. The lowered air velocity results in sluggish engine response at low speeds.

Multiple carburetion is more effective when the intake manifold is enlarged. This can be done with a rotary file chucked in an electric drill. Ports in the engine or heads and manifold can be aligned at the same time. Port misalignment is readily checked by examining the impressions on the manifold gasket. Most of the filing should be done on the manifold. If a mistake is made, it can be repaired for much less than an engine head or block.

An operation that produces startling results is to tune the tail pipe. First, cut a length of tubing about 23 in. long that will slip inside the end of the tail pipe. If a tachometer is available, hook it to the engine and run the engine at 2000 r.p.m. Slide the tubing in and out of the tail pipe while a partner tells you at what point the tachometer shows the highest reading. Usually 200 to 300 r.p.m. can be gained. If no tachometer is available, run the car on a hoist that permits the wheels to rotate. Have your partner put the car in high gear and run the engine so a steady 40 m.p.h. is indicated on the speedometer. Repeat as with the tachometer to get the highest reading. The correct length of pipe extending beyond the tail pipe then can be cut off and clamped or welded to the tail pipe. ★ ★ ★

By Tom Riley

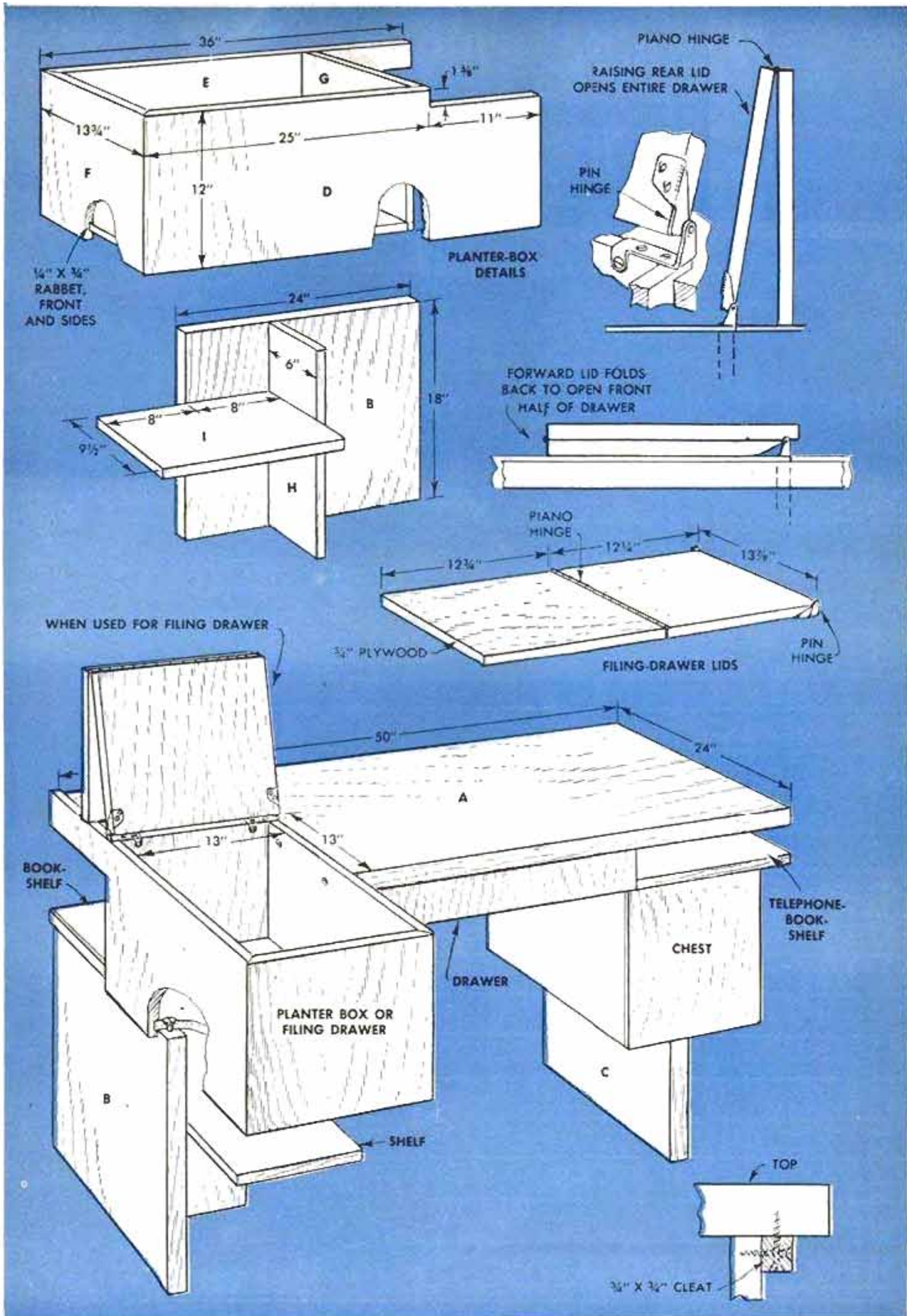


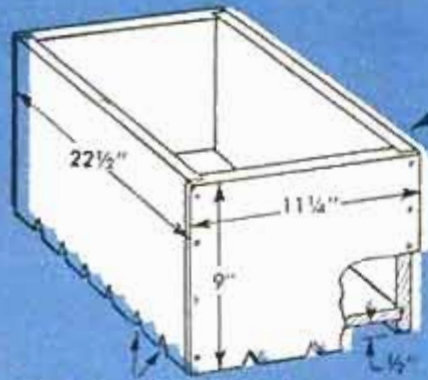
PLANTER- DESK

FOR THE PROBLEM of a desk in the living room, family room or bedroom, this modern design presents a new answer—a planter box which lets a desk add to a room's appearance and which screens the study area to give a bit of seclusion from the rest of the room. The design includes a handy place for the telephone book or dictionary and a bookshelf on the side for the miscellaneous. The planter box is dimensioned so that it can be converted into a desk-height filing drawer at any time by simply adding the lid as shown at the right.

If you prefer to use the planter as a filing drawer, the well is fitted with double-hinged lids as shown below. Special pin-type hinges are used to attach the lids to the desk. Note that the top of the planter well extends $\frac{1}{4}$ in. above the writing surface

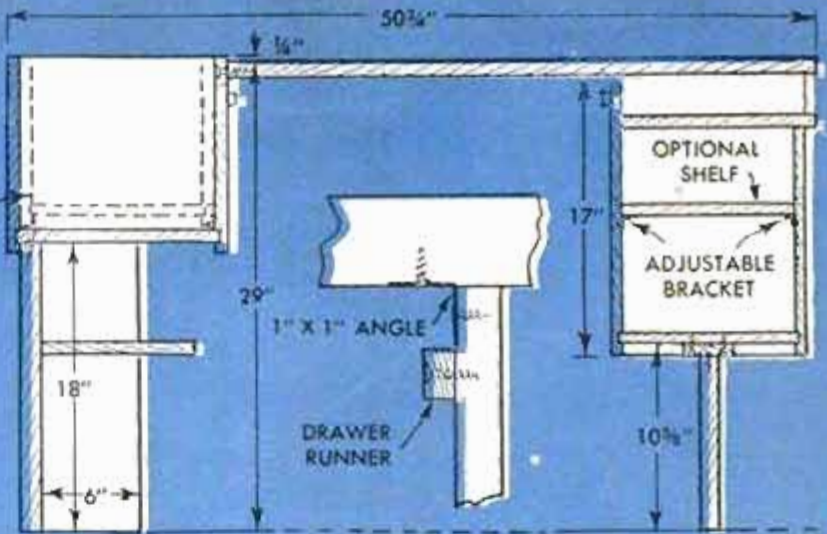




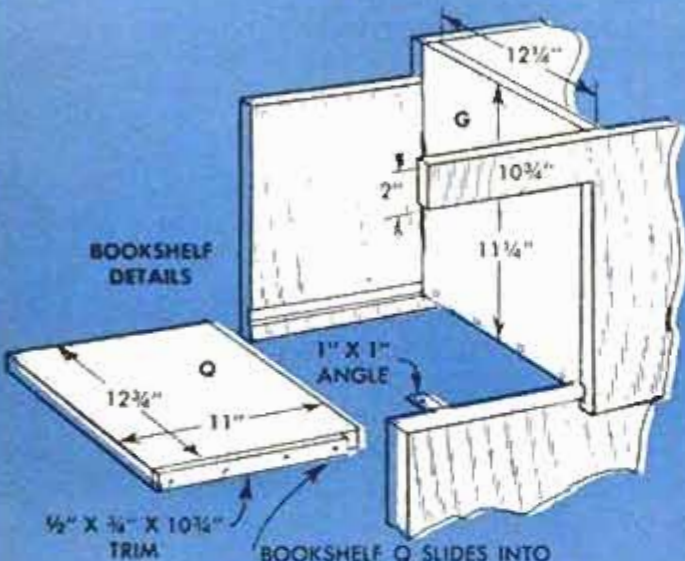


NOTCH ALL FOUR SIDES FOR VENTILATION

INNER BOX IF USED AS PLANTER

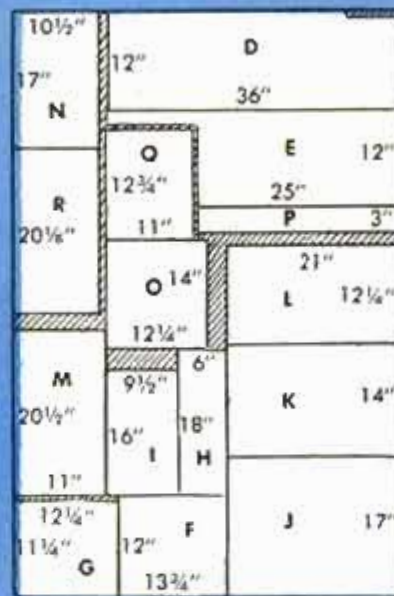


SECTIONAL VIEW

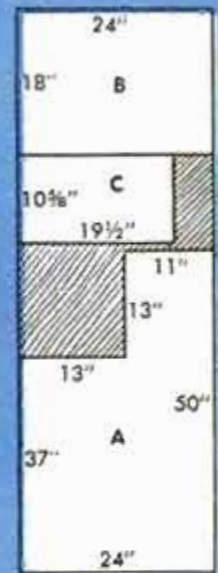


BOOKSHELF DETAILS

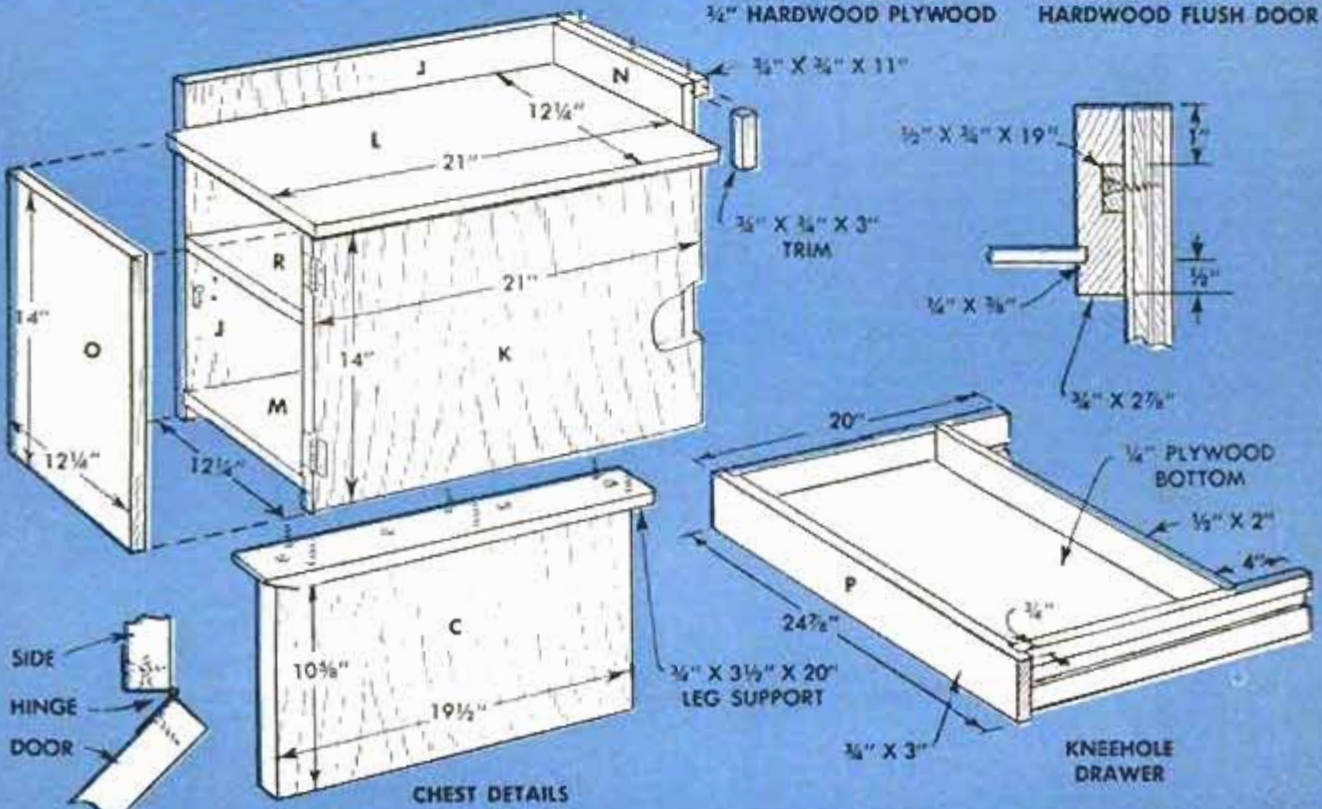
BOOKSHELF Q SLIDES INTO SAME RABBETS AS BOX BOTTOM



4 X 6-FT. PIECE OF 3/4" HARDWOOD PLYWOOD

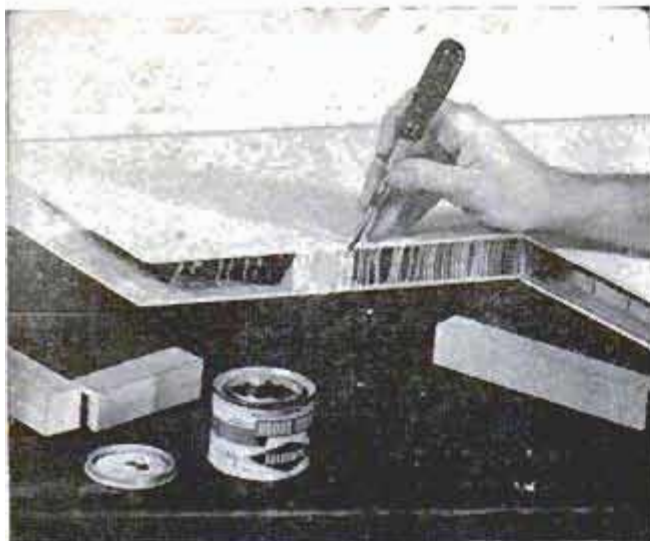


STANDARD 1 1/8" X 24" X 80" HARDWOOD FLUSH DOOR



CHEST DETAILS

KNEE-HOLE DRAWER



Wood putty is used to fill spaces between the cores along the lengthwise cut in the hollow-core desk top

A 24 x 80-in. interior-type flush door provides the desk top and both legs. All other major parts are obtained from a 4 x 6-ft. panel of $\frac{3}{4}$ -in. hardwood plywood. The flush door and the plywood should be of matching hardwood. By asking for a door with hardwood edges, which is no more expensive, you can eliminate any need for trim along the edges.

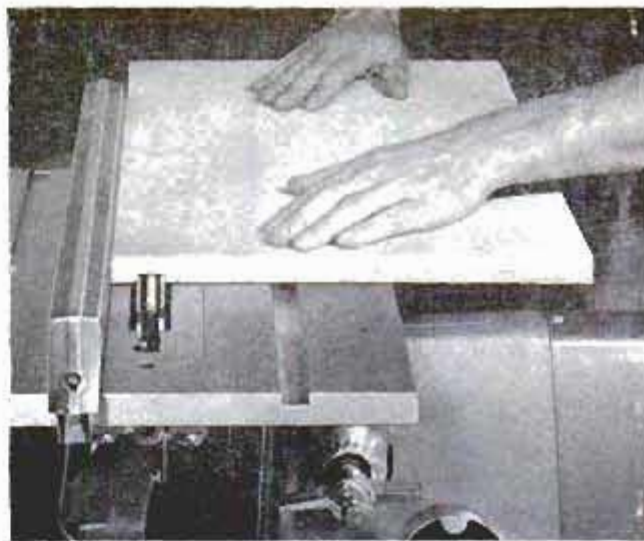
How to Start

Begin by marking out all the parts on the 4 x 6-ft. plywood. Dimensions for these parts are given in the cutting diagram which shows how the parts can be laid out with the least amount of waste and still have the grain running in the proper direction. Allow enough space between pieces for the saw cuts and use a planer or fine-tooth crosscut blade on your saw. Note that all parts on the cutting diagram are keyed alphabetically with the assembly drawing.

After cutting the door you will be able to see its hollow-core construction which may vary from thin wood strips to rings of cardboard tubing. Whatever type it may be, chisel or snip out enough of the core to provide space along the edges for $1\frac{1}{8}$ -sq. wooden blocking. The blocking is glued into the cut edges to reinforce them. Wood putty is used to strengthen the crosscut coring of the one lengthwise cut in the desk.

A study of the drawings will show how each separate unit of the desk is put together. Using a dado blade, cut $\frac{1}{4}$ x $\frac{3}{4}$ -in. grooves $\frac{3}{4}$ in. up from the bottom edges of sides J and K and back N of the chest to house the bottom shelf. Then groove parts F, D and E of the planter box for its bottom. Back G is simply butt-fitted. Note that the grooves run full length on D and E to also hold the bookshelf. The planter bottom is a $12\frac{3}{4}$ x $24\frac{1}{2}$ -in. piece of $\frac{3}{4}$ -in. plywood.

If exposed edges are to be finished with-



A dado or wobble saw is used to cut the $\frac{3}{4}$ -in.-wide grooves in the planter box and chest where indicated

out hardwood facings, fill any small voids in the plywood layers with wood putty before sanding. Use glue and No. 5 finish nails to assemble the chest and planter, filling all nail holes carefully with wood putty.

Leg B below the planter box and parts H and I are assembled before attaching to the box. Use 1 x 1-in. angle brackets and sheet-metal screws to attach H and I to part B. Fasten the assembled leg to the bottom of the box with glue and No. 12 $1\frac{3}{4}$ -in. screws. The inner shelf R of the chest is optional and can be omitted. Note that the upper shelf L is the same length as side J and extends $\frac{3}{4}$ in. past the side. The chest door overhangs one side $\frac{1}{4}$ in. to provide an edge to grip. A magnetic or ordinary catch holds the door shut.

Making the Kneehole Drawer

The sides of the kneehole drawer are made $\frac{1}{8}$ in. narrower than the drawer front, to provide clearance for the angle brackets. After the rest of the desk is completed, attach the drawer runners to the planter box and chest with screws, not nails, since they may need trimming or thickening with washers to position the drawer precisely.

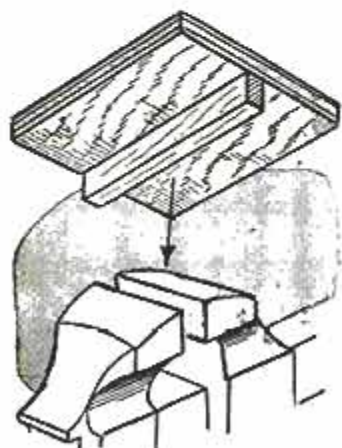
Finishing the exposed plywood edges of the shelves, planter-box top and chest door is a matter of choice. It is preferred to face the exposed edges with matching hardwood strips, sliced off $\frac{1}{16}$ in. thick on your saw and glued to the edge. A new wood tape expressly made for this purpose and which is applied with the heat of a pressing iron, also may be used to cover the laminations of the plywood. A sheet-metal liner should be made to fit the planter box. Finally add furniture glides to the legs. Special easy-to-install pin hinges are suggested for hinging the lids when the planter box is used as a file drawer. ★ ★ ★

Hand Tools Used to Make Coffee Table of Hawaiian Woods

Only hand tools were used in constructing this attractive coffee table, including the use of a hand plane to fit the center joint of the top. Rain-tree wood is used for the top and the legs are of bugac wood. Neither of these woods is native to the United States, but can be obtained from some hardwood suppliers who import rare woods for woodworking hobbyists.

Hi Sibley, Nuevo, Calif.

Elevated Coping-Saw Table

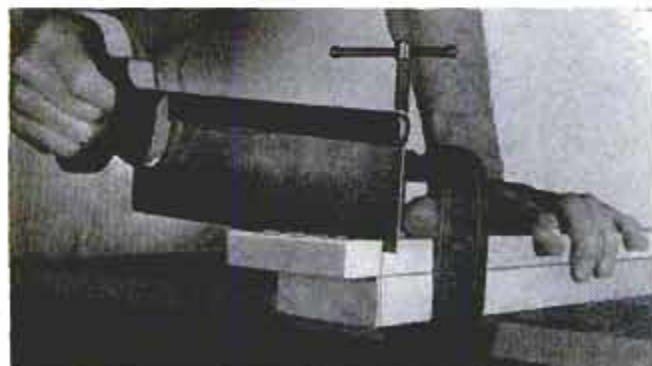


Use of a coping saw will be found more convenient when the work is held flat on an elevated table clamped in a vise. Not only is the work brought to a handy working height, but the setup gives more freedom in manipulation of both the

work and the saw. The table consists of a square piece of $\frac{3}{4}$ -in. plywood with a wooden cleat screwed to the underside which is gripped by the vise jaws.

Trimming Board End With Saw Aided by Scrap Lumber

When it is necessary to trim only $\frac{1}{16}$ or $\frac{1}{8}$ in. from the end of a board, the saw can be kept from slipping by using a piece of scrap wood. Clamp the scrap on top of the work piece, allowing it to project a couple of inches, as shown in the photo. When starting the cut, hold the saw horizontal to assure a straight cut, then lift the handle to about a 45-deg. angle. The angle will assure that the saw remains aligned with the cut by sawing through both the scrap wood and work at the same time. Because of its inherent rigidity and fine teeth, a backsaw of the type shown should be used, if available.

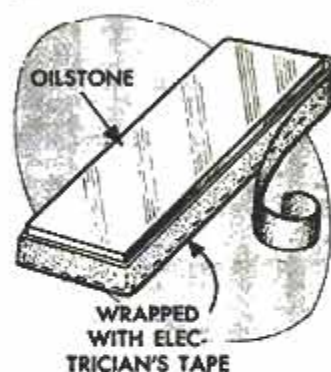


Children's Construction Blocks Improved From Lumber Scraps

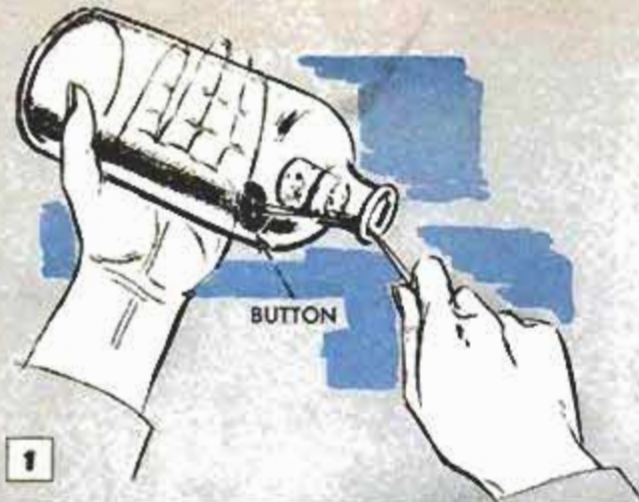
Building blocks for youngsters can be improvised from scraps of lumber usually found around lumberyards and at places where construction is in progress. These small pieces of assorted sizes and shapes are sanded smooth and can be left unpainted or finished in several colors. Painted or plain, they will provide hours of enjoyable and constructive play.—Mrs. George H. Tucker, Minneapolis, Minn.

Rubber Tape Over Oilstone Edge Reduces Chance of Breakage

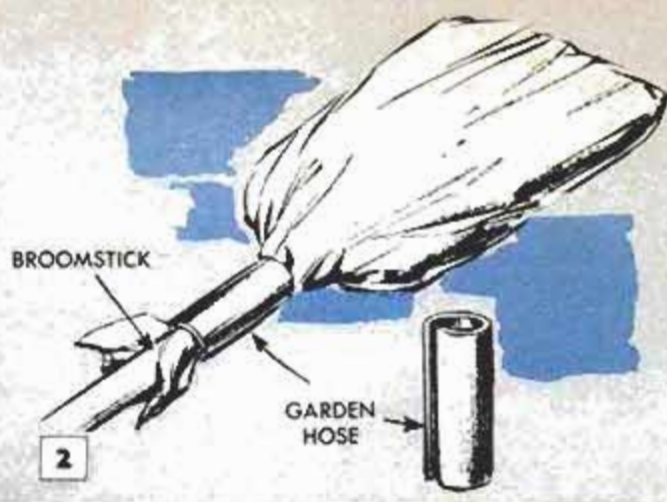
To minimize the possibility of breaking an unprotected oilstone in case it is pushed off a bench top or dropped accidentally on a concrete floor, wrap it with three layers of rubber tape as shown. Narrow strips cut from an old inner tube also can be used. After applying the rubber tape, bind it in place with a single layer of friction tape. If the rubber is too wide it can be trimmed flush with the oilstone surface with a pair of tin snips.



□ A rubber mat of the type used on a kitchen-sink drainboard, placed on a car seat for tiny tots to stand on, saves wear and tear on upholstery and seat covers. The mat is easily cleaned with soap and warm water.



1. A CORK which has been pushed into a bottle can be removed with the aid of a button threaded on strong cord as shown. Lower the button into the bottle and manipulate the cork into position near the neck. A quick pull will usually remove it intact



2. DUSTCLOTH IS WRAPPED around a broom and clamped in place quickly when a short length of radiator hose is used to secure it. Simply slit the hose and slip it over the loose ends of the dustcloth, which have been twisted around the handle

Solving

HOME PROBLEMS

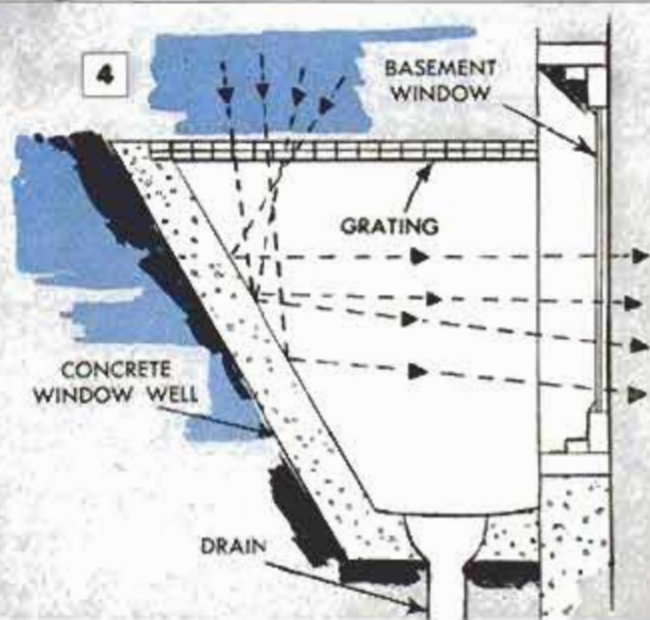
3. RINGS ON VARNISHED TABLE caused by hot utensils are removed by applying a paste of olive oil and salt. Leave for few minutes, wipe off and polish

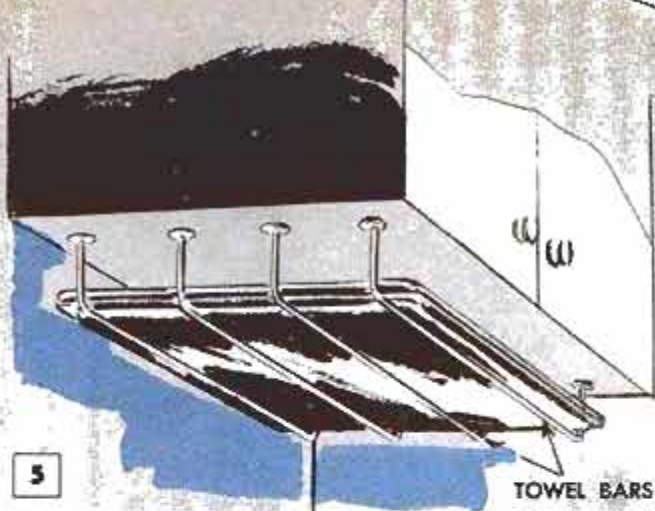
4. MORE DAYLIGHT is admitted to basement when wall of well parallel with window is slanted. Paint well walls white to increase reflection of light



5. TRAYS AND COOKIE SHEETS are stored on underside of wall cabinet by attaching four towel bars as shown. Same idea is used to store trays on side of cabinet with a length of wood fastened under lowest bar for a bottom

6. AIRTIGHT SEAL ON JAR is assured by depressing the lid with a wooden drawer knob while tightening the band as shown. When vacuum keeps the lid depressed, after releasing the knob, the jar has an airtight seal





TOWEL BARS



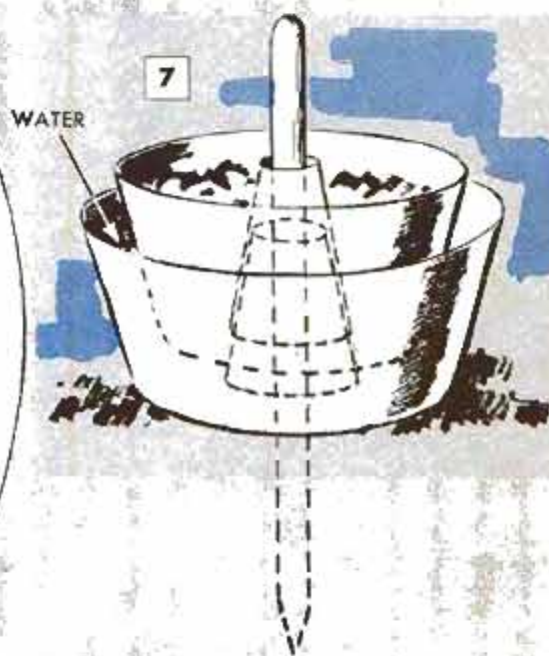
6



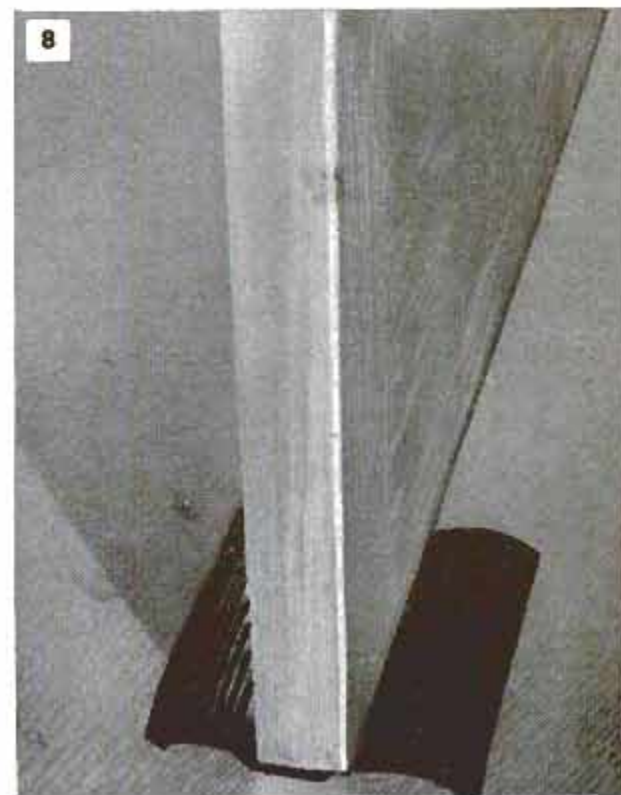
7. DOG-FOOD DISH can be anchored and the food kept free of ants if small angel-food tin used as dish is placed inside large one. The tins are slipped over a broomstick stake driven in the ground and the outer one is filled with water

8. TWO-WAY DOOR WEDGE made from a length of heavy rubber hose holds door open at desired position while preventing it from swinging in either direction. Slit the hose, open flat and wedge it under the bottom edge of the door as shown. If there is unusual clearance at the bottom edge of the door, use another length of hose of the same size on top of the first length

9. NOTE FOR THE MILKMAN can be displayed so that it will not be overlooked or blown away, by placing it in a heavy glass tumbler inverted over an empty bottle as shown. Prominent display of note also prevents error in delivery

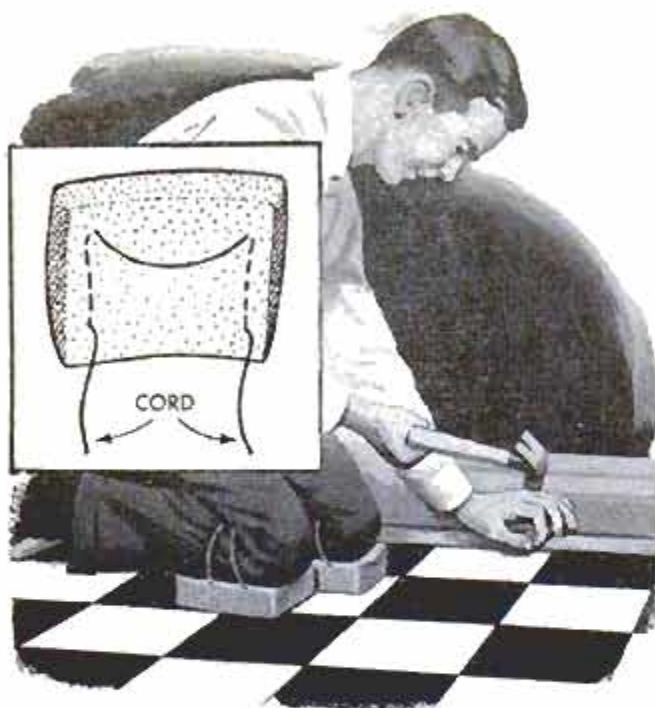


8



9





Kneepads for Working on Floors Made From Synthetic Sponges

The discomfort associated with kneeling on a floor for long periods can be avoided by wearing a pair of kneepads improvised from foam-rubber sponges. A cord is threaded through one side of the sponge as shown, leaving a loop and two free ends which are used to tie the pad to the knee.

Oil-Treated Concrete Forms

Forms will slip from hardened concrete more easily if they are painted with a mixture consisting of equal parts motor oil and kerosene. The oil repels the moisture and prevents the concrete from sticking to the forms. For better results, forms should be treated each time they are used.

Slots Sawed in Paint Paddle Speed Mixing Operation

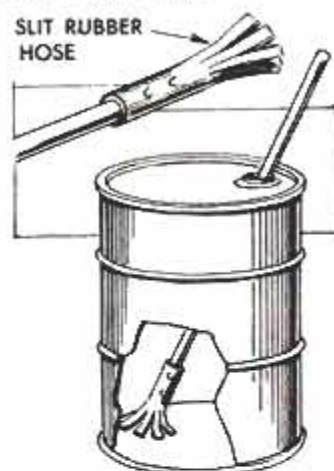


Mixing a large can of paint is a slow and tedious process when a plain wooden paddle is used. To speed up the job, make a stout wooden paddle and saw several lengthwise slots in mixing surface. The slots

will not weaken the paddle to any extent but will permit the paint to flow through the open spaces for a more thorough mixing. Before mixing the paint, pour most of the linseed oil off the top into a pail. Then slowly pour it back as the paint is mixed.

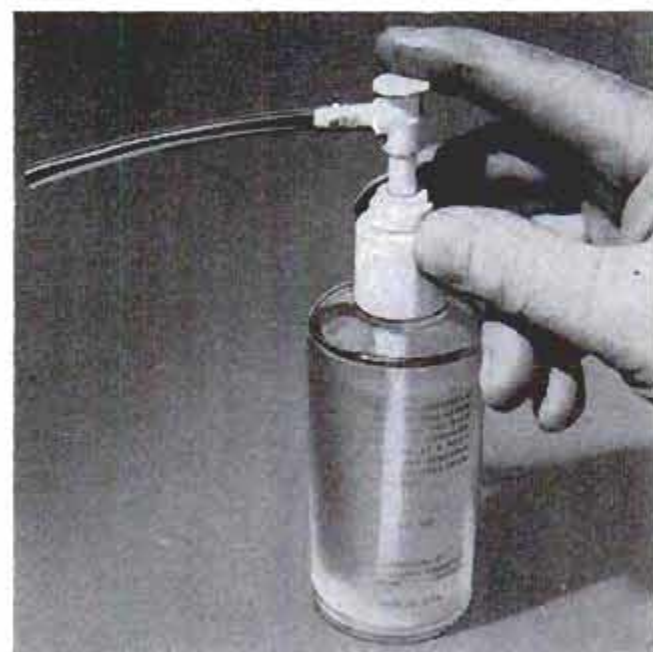
Sludge Cleaned Out of Oil Drums By Slit-Rubber-Hose "Broom"

Attached to the end of a broom handle, a length of rubber hose, slit on one end, makes an excellent implement for loosening sludge that has settled on the bottom of an oil drum. The end of the handle with the hose attached is inserted through the large bung on the top of the drum and agitated vigorously against the bottom until all the dirt is freed. Then the drum is tipped over and allowed to drain. For a thorough cleaning the drum should be rinsed with gasoline one or more times, observing the usual precautions when working with a flammable liquid.



Dispenser Bottle Provides Oiler

An empty lotion-dispenser bottle filled with oil is ideal for lubricating an oil burner and other motorized equipment that has difficult-to-reach oil cups. One press on the dispensing button provides sufficient oil for most jobs, and the bottle holds enough to last a long time without refilling. The plastic pump nozzle should be heated and straightened to a horizontal position. A length of plastic tubing then is slipped over the nozzle to extend its length.



When installing seat covers in a car, first fasten one side, then moisten with a sponge and fasten the other side. As the cover dries, it will shrink and fit snugly.

HAND-CARVED MIRROR FRAME

By John Bergen

HAND CARVING on furniture built in the home workshop gives a definite personal touch to what might ordinarily be a run-of-the-mill woodworking project. This hand-carved mirror is an excellent example of this type of work, being made in four pieces which first are carved, then assembled. It is much easier to handle and carve the individual pieces.

All stock used in the frame is $1\frac{1}{8}$ in. The top piece is $4\frac{5}{8}$ in. x 26 in., the sides are $1\frac{3}{8}$ in. x $29\frac{7}{16}$ in. and the bottom cross-piece of the frame measures $3\frac{5}{8}$ in. x 26 in.

Before doing any carving, the ends of side members are cut to form a tenon as indicated in the detail. The upper and lower crosspieces of the frame then are grooved to receive the tenon, so that a "half-lap tenon joint" results.

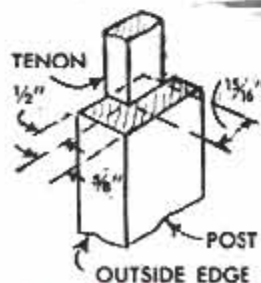
Use a Pattern

The next step is to make a pattern for the carving by drawing a copy of the squared pattern on a sheet of paper with 1-in. squares. After tracing the pattern onto the wood, cut out the areas that are marked with an "x" in the top crosspiece. A jigsaw or hand coping saw can be used for this. At least two sizes of wood chisels and a gouge are required to do the carving, although with much patience, an ordinary pocketknife and a straight wood chisel will give the same results.

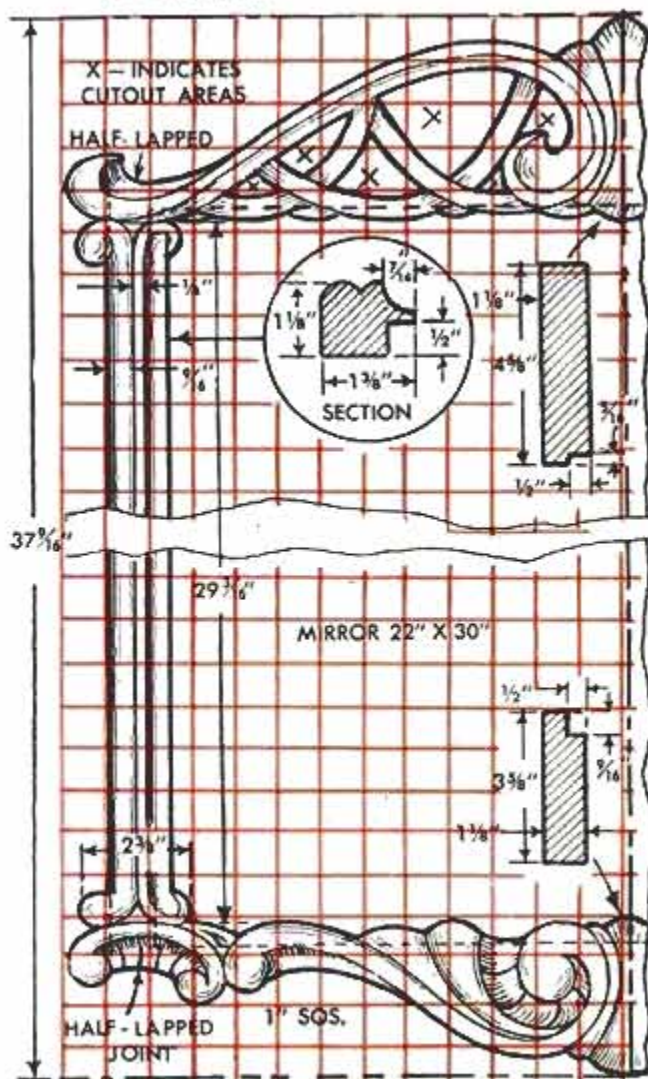
Do not worry too much about slight mistakes or irregularities in the carving. Such irregularities are what give hand carving its personality, setting it apart from machine-made work.

Finishing the Frame

When the carving is completed, assemble the frame before applying a finish. Only glue should be used in assembly, and the frame should be clamped or held firmly until the glue is well set. The finish to be used on the frame is strictly a personal matter, which might be influenced by the type or style of furniture used in a home. An antique finish, however, is most appropriate. Wipe-on oil stains are available to produce almost any type antique finish. In some cases, it might be desirable to accentuate the carving, which can be done by wiping a light-colored pigment over the frame, allowing it to dry slightly, then wiping it off with a soft cloth. Finally, apply one or more coats of varnish.



Tenons are cut on the ends of each side rail as indicated at left. They then are fitted in grooves cut in the top and bottom pieces of mirror frame to form "half-lap tenon joints"



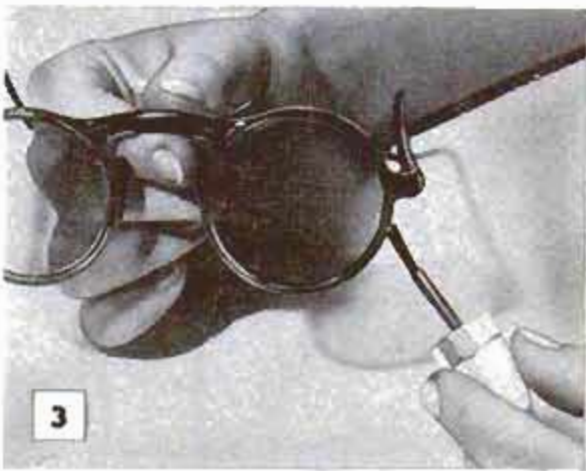
NAIL POLISH DOES IT



1. Personalize children's drinking glasses by painting initials on them with nail polish. Same idea is handy for an adult party. Clean off initials with polish remover



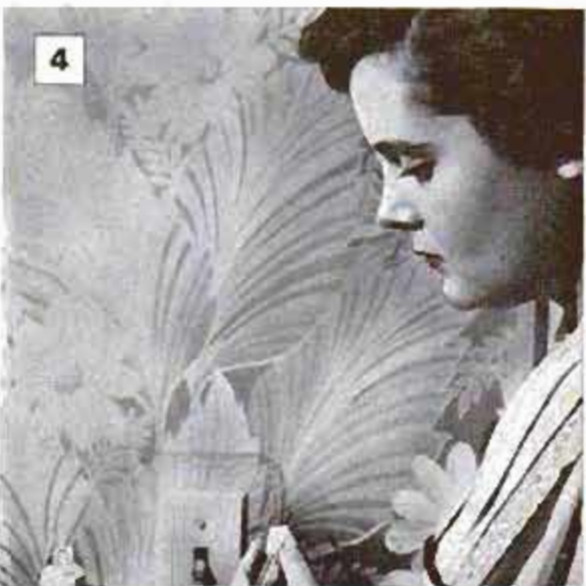
2. Emergency repairs on pots and pans are made by painting holes with nail polish, and drying at low temperature. Utensil cannot be used over flame or near heat

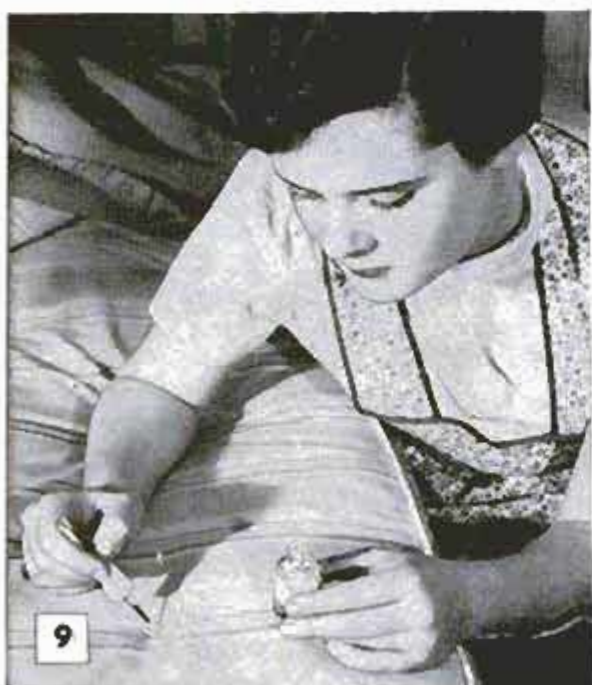


3. Streaked and faded frames of sunglasses can be renewed and made colorful by painting with bright-colored nail polish. The hard finish of the polish easily wipes clean

4. Finger marks and grease stains around light switches often show through new wallpaper. To prevent this, paint stains with nail polish before applying the new paper

5. Wooden coat hangers that have sharp-edged joints or rough spots that may damage clothing can be kept usable by coating the rough areas with clear nail polish





6. Buttons that have become dimmed by many washings will regain luster when painted with clear nail polish. To avoid staining clothing, use paper under the buttons

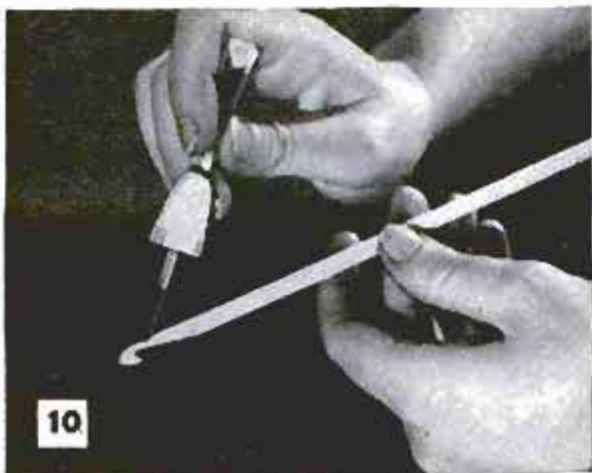
7. To prevent upholsterer's nails on chair backs from making marks on walls when the chairs are rubbed against them, coat the nailheads with clear fingernail polish

8. Painted wooden handles of mixing spoons and other kitchen utensils will retain their color even after repeated washings if they are coated with clear nail polish

9. Clear fingernail polish brushed over worn mattress buttons will eliminate the possibility of the buttons ruining good bed sheets by tearing or discoloring them

10. When a wooden crochet hook has become roughened so that it snags the yarn, don't discard it. Sand it lightly and coat with clear nail polish to restore its usefulness

11. To prevent tipping the bottle when using nail polish, fit bottle in a stand made by cutting a hollow rubber ball in half. Bottle fits in hole cut in ball half as shown.



Linseed Oil in End of Hammer Handle Preserves Wood Fibers



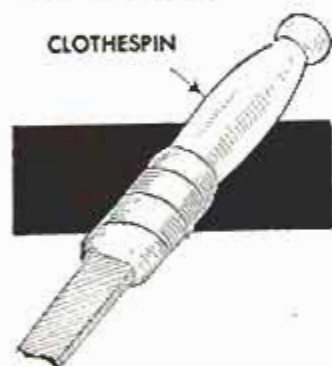
One craftsman keeps his hammer handles in good condition by treating them periodically with linseed oil. A small hole drilled into the end of a handle to a depth of 2 in. and fitted with a plug is filled with linseed oil, which permeates the wood to keep it from drying out and becoming brittle. Other wooden tool handles can be given the same treatment for longer service.

Aluminum Foil is Reusable

Aluminum foil need not be discarded after being used only once to wrap food. Simply wash it in warm, soapy water to remove food stains and odors, rinse in clear water and pat dry. Smooth it on a flat surface and it is ready for use again.

Helen Kay Harris, Show Low, Ariz.

Clothespin is Handy File Handle

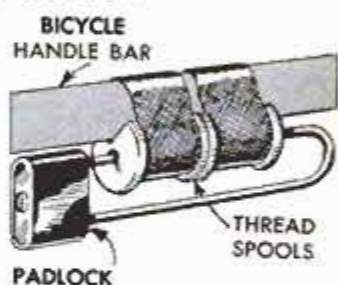


Wooden handles can be made for your files by fitting a round clothespin over each of the tangs. To do this, drill a small hole through the center of the clothespin. Saw the tips of the legs off, insert the file

tang and tape the two units together as shown. For a larger grip, slip a length of garden hose over the handle and wrap tape around the ends to fasten it in place.

Thread Spools Provide Holder For Long Bicycle Padlock

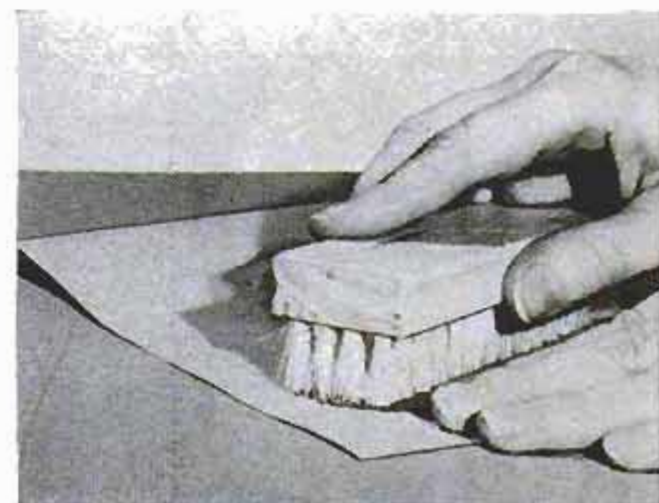
Taped to the handle bars or frame of a bicycle, two large thread spools provide a holder for a long padlock. Aligning V-notches are cut in the spools before taping them in place. For a more-permanent installation, use sheet-metal clamps, such as are used for auto-radiator hose. Locate clamp screws so they are clear of the rider's legs.

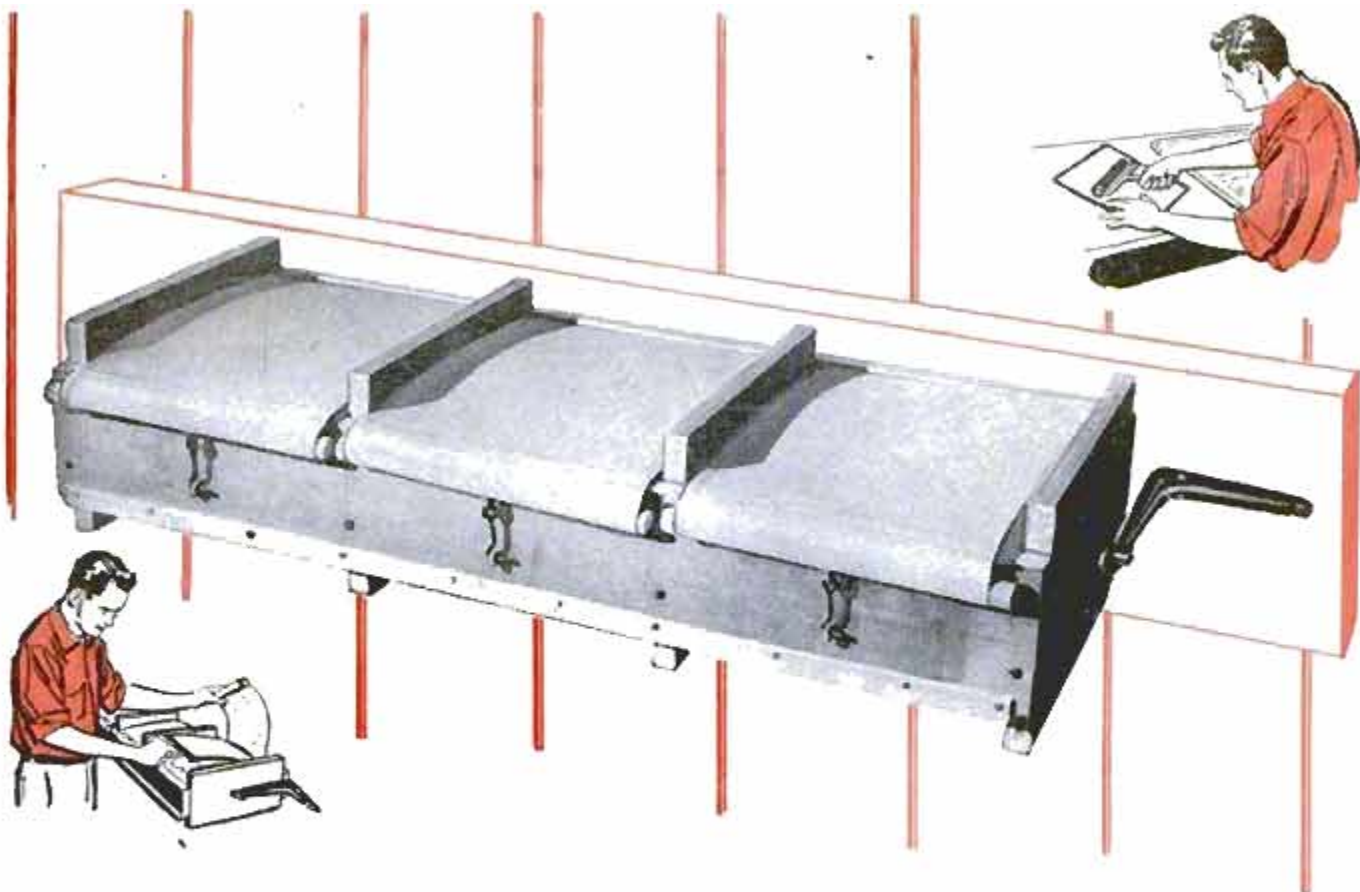


D. H. Jones, Sault Ste. Marie, Can.

Whale Modeled From Shrub

This unusually shaped lawn shrub is a 25-foot whale fashioned from a growth of Australian pine. Since it wouldn't be a whale without spouting water, a home-made mechanism squirts a column every few minutes as reliably as Yellowstone's Old Faithful.—Donald Carr, Sarasota, Fla.





High-Speed Print Drier

By Ron Anderson

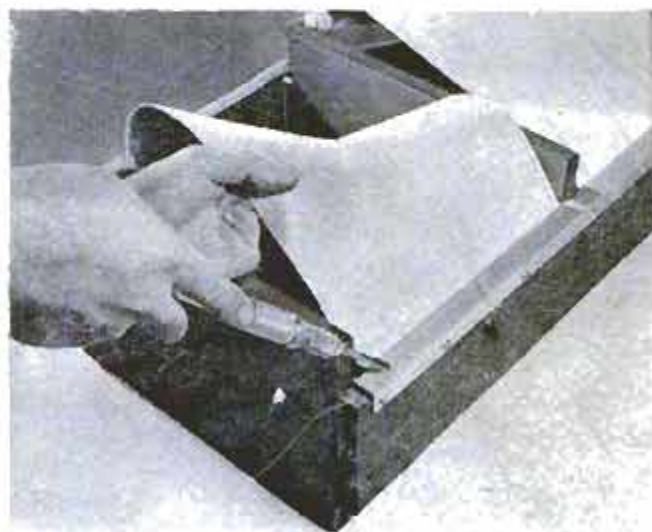
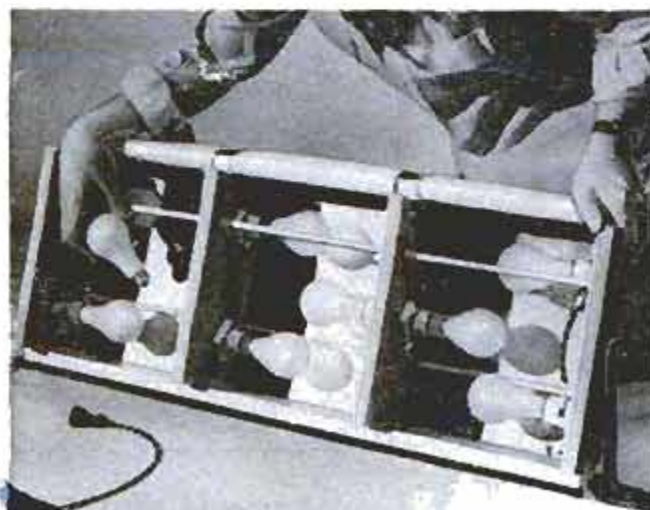
UP TO 50 PHOTOPRINTS per hour can be run through this "flop over" drier that is designed to hold standard 10 x 14-in. ferrotype tins. Heat is provided by nine 100-watt lamps held in porcelain sockets as indicated in the lower left-hand photo. A $\frac{1}{4}$ -in. stove bolt is centered in each end of the drier to provide an "axle" on which it rotates. Sockets on the ends must be located accordingly.

Heat supplied by nine 100-watt lamps fitted in porcelain sockets assures rapid drying of photoprints

The ends and partitions of the drier are $7\frac{1}{2}$ x $33\frac{1}{2}$ -in. pieces of $\frac{3}{4}$ -in. plywood with $\frac{3}{8}$ -in. holes drilled in opposite corners as shown in the lower right-hand detail on page 222.

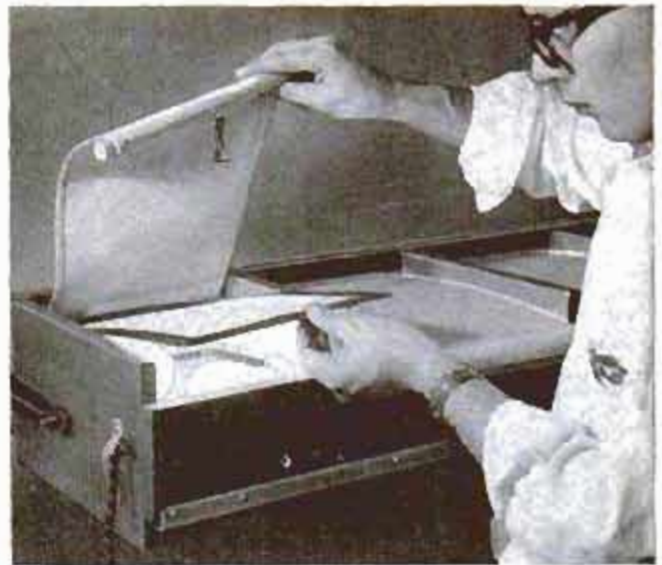
To begin construction, the front and back, which are $4\frac{1}{2}$ x $33\frac{1}{2}$ -in. pieces of 1-in. stock, are screwed to one end. Two 36-in. lengths of $\frac{3}{8}$ -in. dowel are inserted in the holes, and the two partitions and

Canvas aprons are stretched over ferrotype tins to obtain correct tension, then clamped with angle





Drier rotates on "axles" consisting of $\frac{1}{4}$ -in. bolts. Axles fit in slotted holes in metal shelf brackets

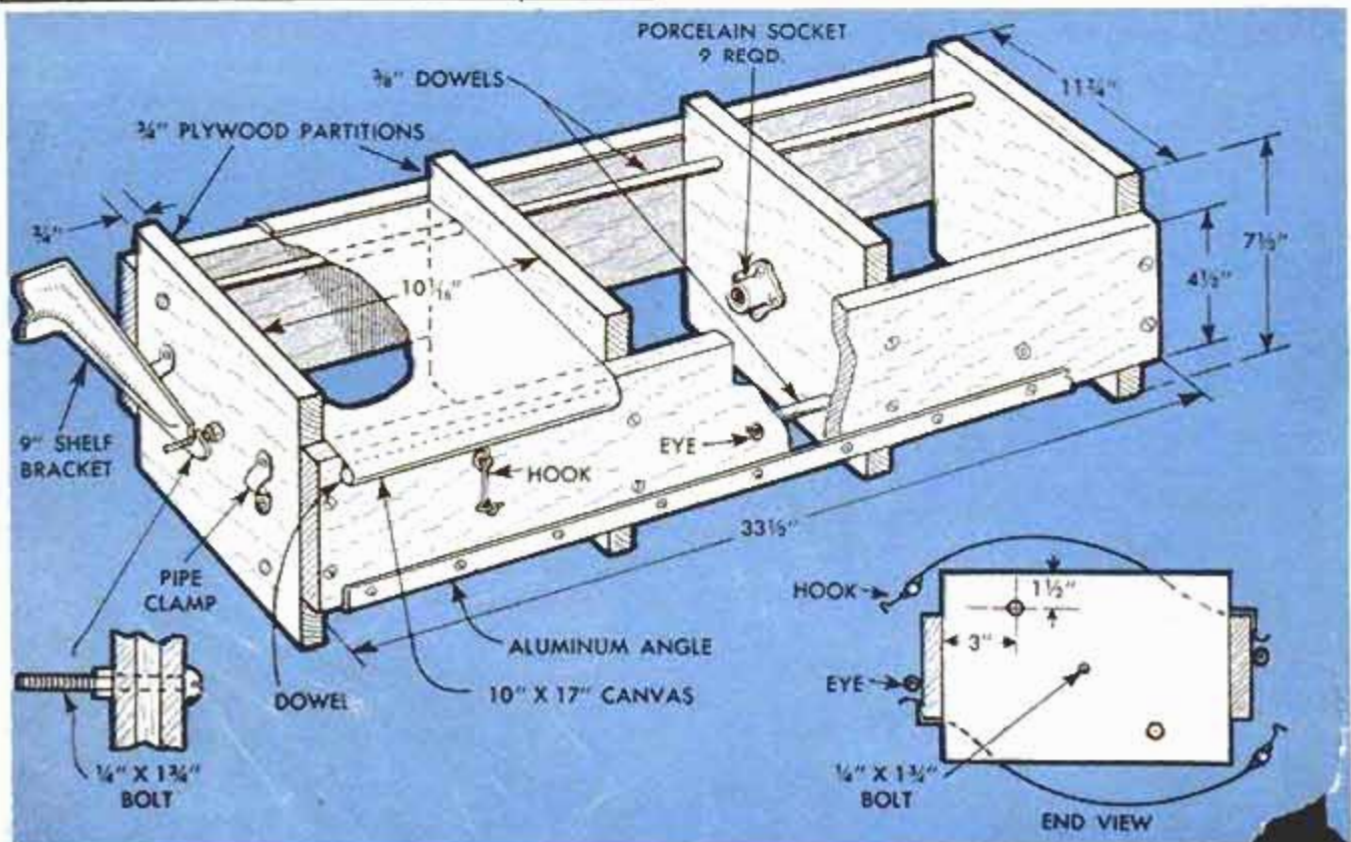
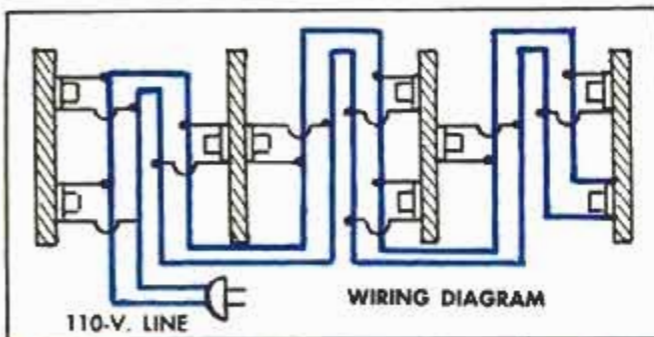


Single-weight 8 x 10s dry in 6 to 8 minutes. Metal or asbestos lining of drier protects wood against heat

end are fitted on the dowels. Hold a ferrotype tin between the fixed end and the first partition to determine the correct spacing, then screw the partition in place. Repeat this operation with the other partition and end. When finished, cut off the projecting ends of the dowels.

Next, install the $10\frac{1}{2}$ x 17-in. canvas aprons. A wide hem in the bottom of each apron permits inserting a 10-in. length of $\frac{3}{4}$ -in. dowel into which is screwed a screen-door hook that fits in a screw eye driven into the drier frame. Pull each apron over a ferrotype tin in the drier to obtain the correct tension, then tack the end to the frame. When all aprons are in place, screw aluminum angles to the frame for a permanent clamp, as in the lower right-hand photo on page 221.

Two shelf brackets are used to support the drier on a wall, the screw hole in one arm of each bracket being slotted so the drier can be lifted. Two pipe clamps, each held by a screw, act as stops. ★ ★ ★



"Roll-a-Ball" Game Utilizes Egg Carton, Plywood

A game that will provide hours of fun for the youngsters requires only an ordinary papier-mache egg carton and a few scraps of wood to build. The lip at the front edge of the carton is tacked to a piece of plywood that forms a ramp. Support for the ramp and rigidity for the carton are provided by a wooden strip under the end of the ramp. A similar strip is attached under the lip of the carton lid. Bevel the end of the ramp so the ball rolls smoothly onto it from the floor. Number the carton indentations from one to twelve for scoring. Landing the ball in the cover may be considered



an out. Bottom parts of two cartons can be fastened together, for additional scoring. Ben Ollman, Milwaukee, Wis.



Perforated Hardboard Used For Eaves Boxing

Adequate roof ventilation is easily accomplished when perforated-hardboard panels are used for boxing material. The panels are nailed on the exposed rafters in 8-ft. lengths which permits considerable saving of labor over the more conventional method of installing lumber and screen vents. The Masonite Corporation recommends $\frac{1}{4}$ -in. material for this use. To keep out insects, window screening is stapled inside the perforated hardboard on the framing members and facing strip.

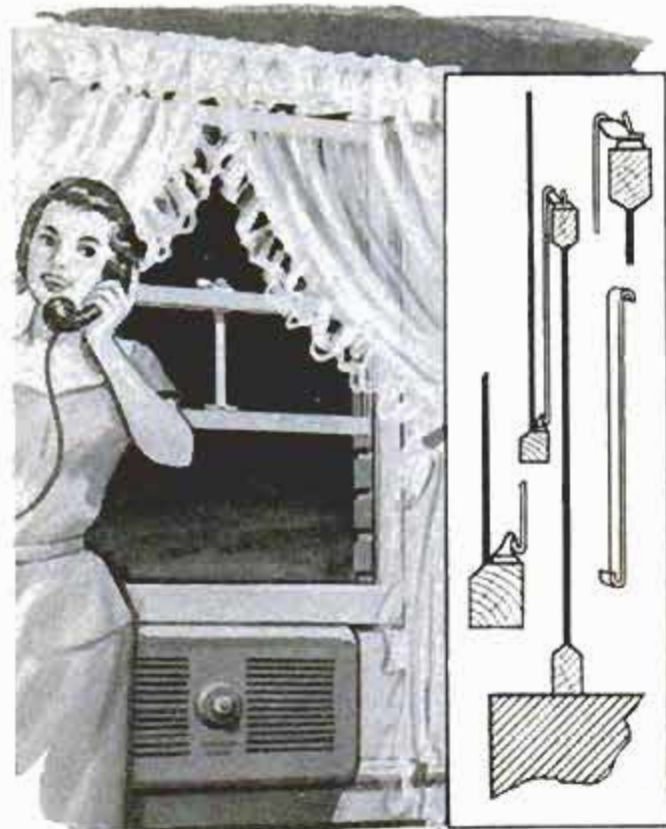
Broad-Line Lettering Pens Cut From Bamboo Strips

Pens for lettering packages, tags and labels can be made from bamboo strips. Use strips which are about $\frac{1}{4}$ in. wide and 5 in. long. Form a penpoint on one end of each strip by shaving the inside surface to a thickness of $\frac{1}{32}$ in. at the very tip, and tapering the sides for a distance of $\frac{3}{8}$ in. back from the tip. Then drill a $\frac{1}{16}$ -in. hole about $\frac{3}{8}$ in. from the tip and make a slit extending from the hole to the tip. Several such pens having points of various widths can be made to give a good range of sizes for future use.

☛ To skidproof his icy walk, one homeowner uses sawdust, which is cleaner to handle and easier to obtain than ashes. If tracked into the house, sawdust will not damage floors and rugs and it is easy to pick up with a vacuum cleaner.



Metal Extension Arm Locks Window Over Air-Conditioner Unit



A double-hung window can be locked when an air-conditioning unit is mounted on the sill if a flat of steel $\frac{1}{2}$ in. wide and $\frac{3}{32}$ in. thick with a short hook bent on each end of it, as shown in the detail, is fitted on the window locks to serve as an extension. The over-all length of the device is determined by measuring the distance between the members of the lock with the top half of the window closed and the bottom half resting on the air conditioner, and adding $\frac{3}{8}$ in. for each bend.—M/Sgt. M. E. Welty, Harlingen AFB, Harlingen, Tex.

Small Seeds Are Easy to Plant With Moistened Matchstick

If you find handling small seeds difficult when planting them, moisten the end of a matchstick so the seeds will cling to it. Then, push the stick into the soil to the desired depth and twirl it between your fingers. When the stick is withdrawn, the seeds will remain where they have been deposited.—Arlene M. Schultz, Cicero, Ill.

Boards Aid Tire Changing

If three short boards are carried in your car trunk you will find them useful when it is necessary to change a tire. One can be used under the jack to give it a firm foundation, another provides a clean, dry place on which to kneel where it is graveled or muddy and the third one serves as a tray, keeping the tools, nuts and other parts together out of the dirt until the tire is changed.—Mrs. M. Fey, New York City.

Gateposts Braced Underground



An excellent method of bracing wooden gateposts without interfering with the design of the fence is to use an underground brace or "sleeper" between the bottoms of the posts as indicated in the drawing. It is recommended that the gateposts be at least 4 x 4s that have been treated with a chemical preservative, such as creosote. Material for the sleeper can be either a 2 x 4 or a 1 x 6, and should be treated with preservative.

Ted Otsu, Vancouver, B. C., Canada.

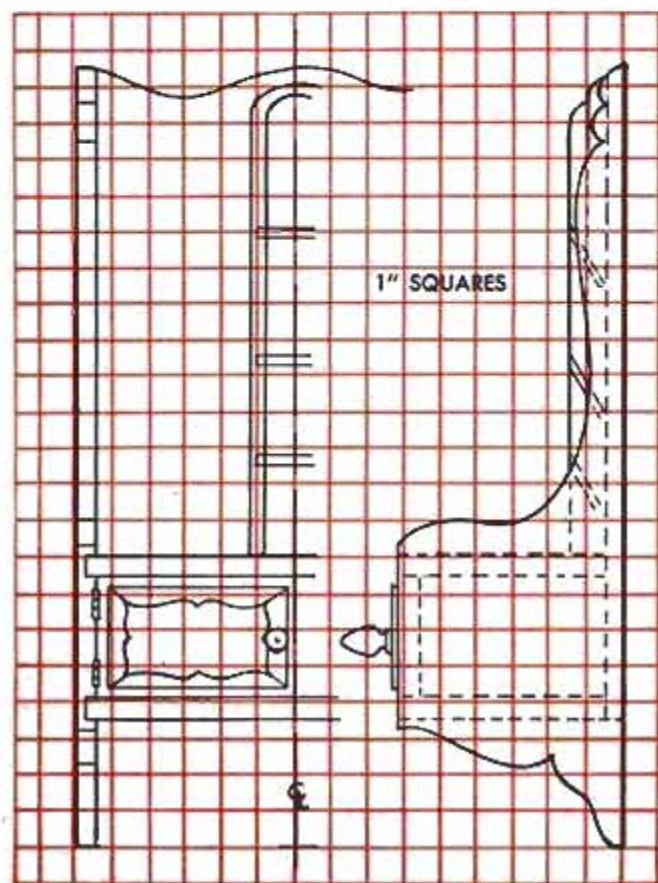
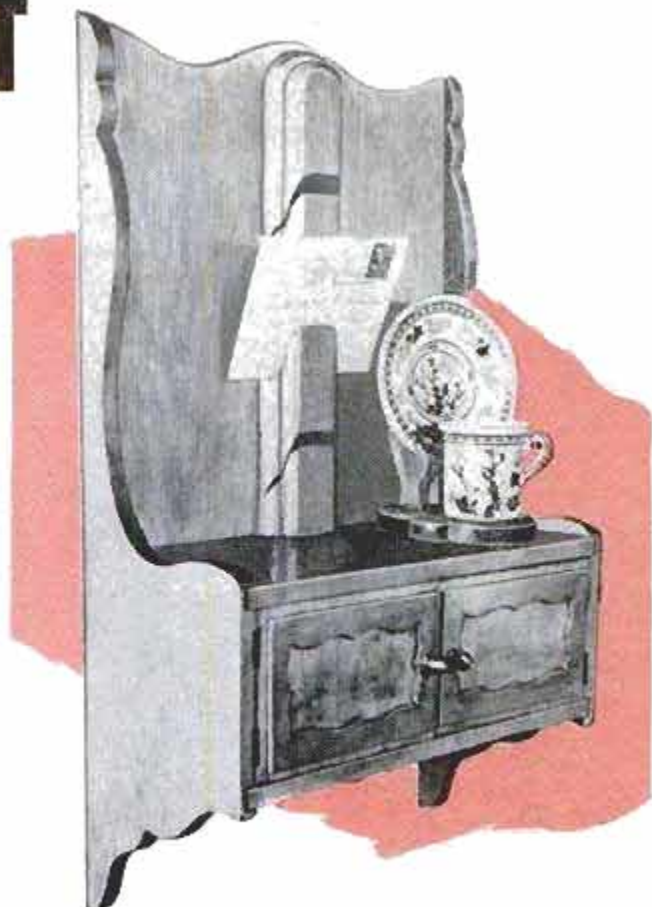
Glue Treatment Renews Mallet Faces

When the faces of his wooden mallet became worn and uneven, one craftsman gave them a tough, new surface with polyvinyl-resin glue. First, the faces were sanded down, after which two turns of masking tape were placed around the circumference of the one face as a retaining form. The glue was then poured on in a thick layer, which dries to a smooth, slightly resilient material that lasts under repeated hammering. When the glue has set, remove the tape and repeat the process on the other striking surface.



WALL CABINET

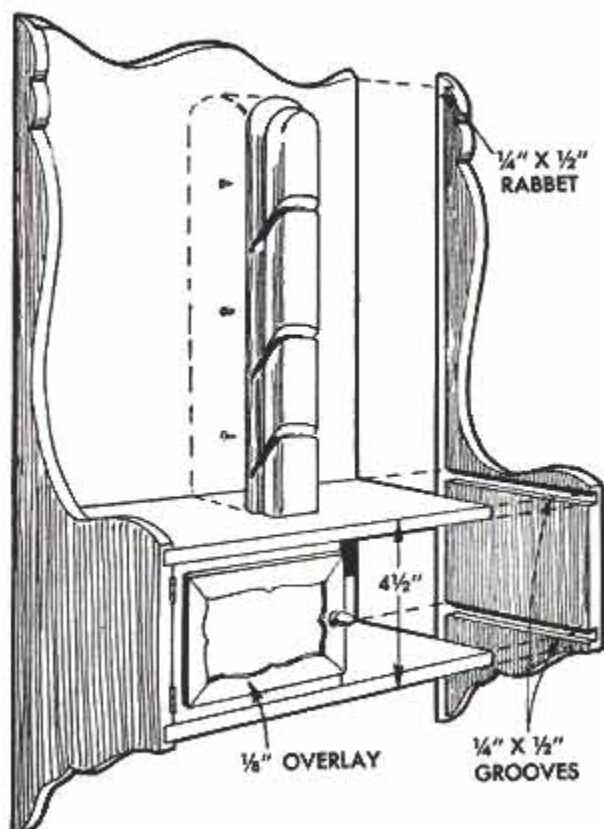
Has Mail Rack



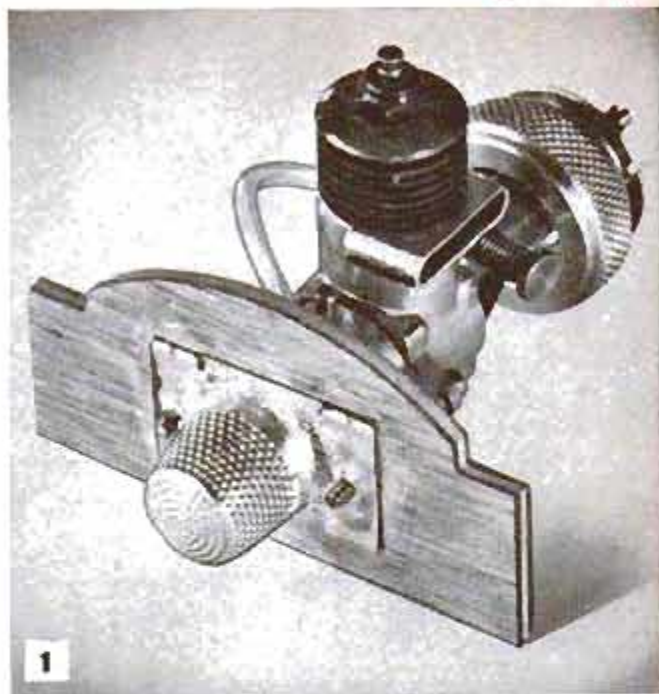
THIS MULTIPURPOSE cabinet offers a handy storage place for playing cards, score pads, cigarettes, mail and other miscellaneous items when fastened to a living-room wall. All of the members can be cut from $\frac{1}{2}$ -in. solid lumber or plywood and assembled by means of grooves, glue and wood screws. The mail rack consists of two lengths of wood glued together and fastened to the back of the cabinet with screws as shown. When cutting the mail slots, use a rip saw with a wide kerf. An ornamental overlay is cut from $\frac{1}{8}$ -in. wood and glued to the doors.

Bertram Brownold, Cedarhurst, N. Y.

While the glue is drying hold the work in a clamp improvised from scrap wood and two threaded rods



W T M '57 + Book for Boys



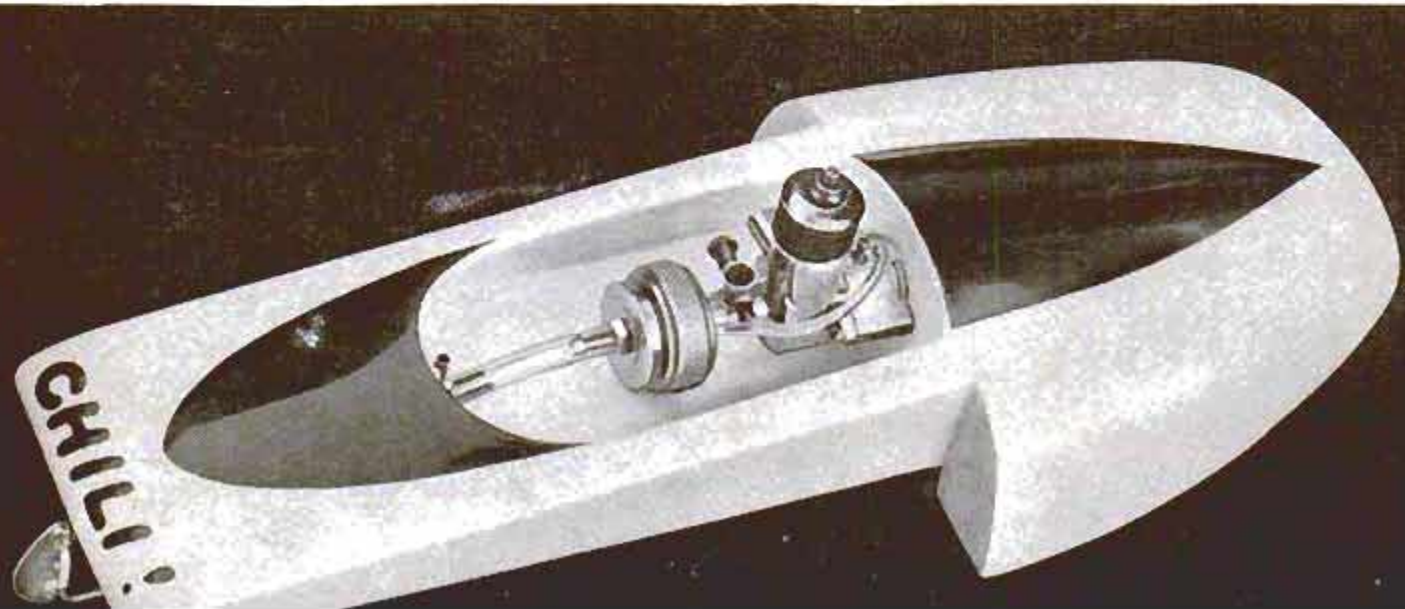
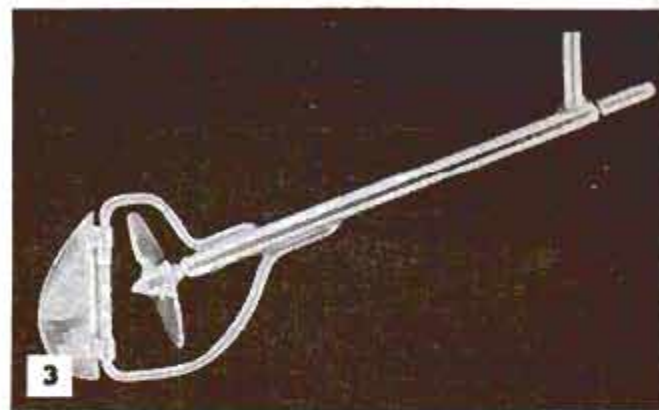
CHILI

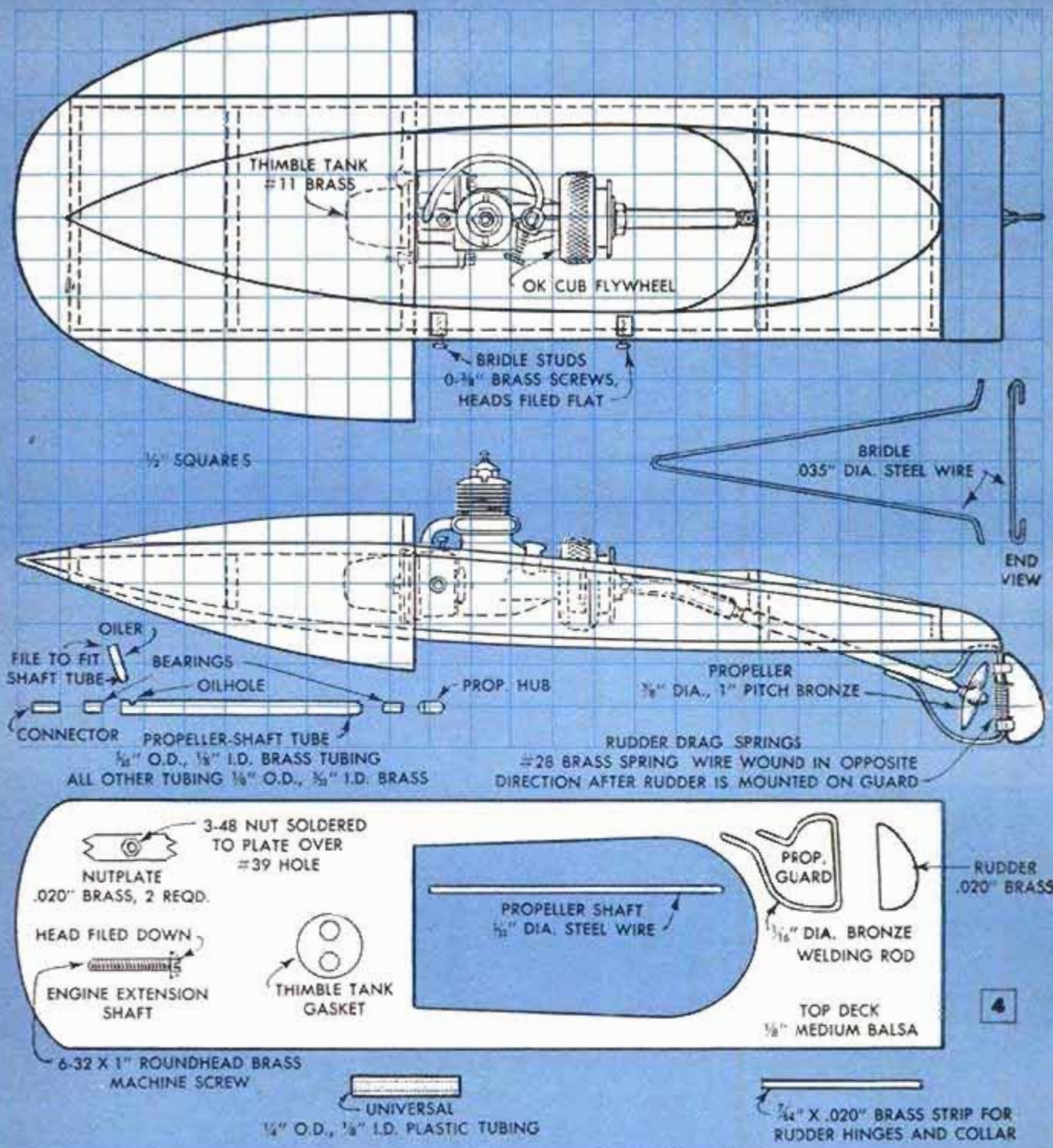
Superhot Midget Hydroplane

Chili classes with the fastest midget spray burners—more go than you ever saw before packed into a 6-oz. hull

By Jack Wilson

CHILI'S A SHARP PERFORMER with the $\frac{1}{2}$ -A model-plane engine, sufficiently sleek and light for the tiny .020 engine and rugged enough to ride out the full power of the .049 without doing flips. Clean outline and a low center of gravity are obtained by mounting the engine with the shaft horizontal. A simple drag-spring arrangement holds the rudder setting, eliminating the unsightly tiller





ordinarily used. Fuel capacity is doubled by adding a fuel-tank extension made from a No. 11 thimble and attached to the back of the fire wall as in Fig. 1. This added capacity ordinarily gives a full-speed run of about three minutes.

Building the Hull

The hull structure is built up in a simple box form with no bending or difficult fitting, Fig. 2. Sponsons and stern block do not involve complex curves. Jigsaw the fire wall from 1/8-in. aircraft plywood and cut the other bulkheads and the sides from 1/8-in. medium-hard balsa wood. Before as-

sembling the hull, trial-mount the engine on the fire wall, fitting the thimble auxiliary tank and cementing the nut plates, Fig. 4, in place. The latter are pronged strips of .020 brass to which the engine-mounting nuts are soldered. Bevel the sides of the hole to take the thimble in a snug, press fit with the rim projecting slightly so that the rear-cover gasket will make a leakproof seal when the engine is in place. Punch two 1/4-in. holes in the engine-cover gasket to permit the passage of fuel and air. Engines other than the .049 pictured will require a smaller thimble tank, and engines without integral tank



mounts will require the use of a separate model-airplane tank that can be mounted in the cockpit.

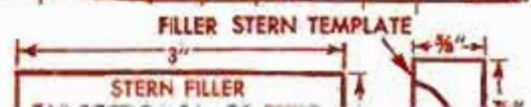
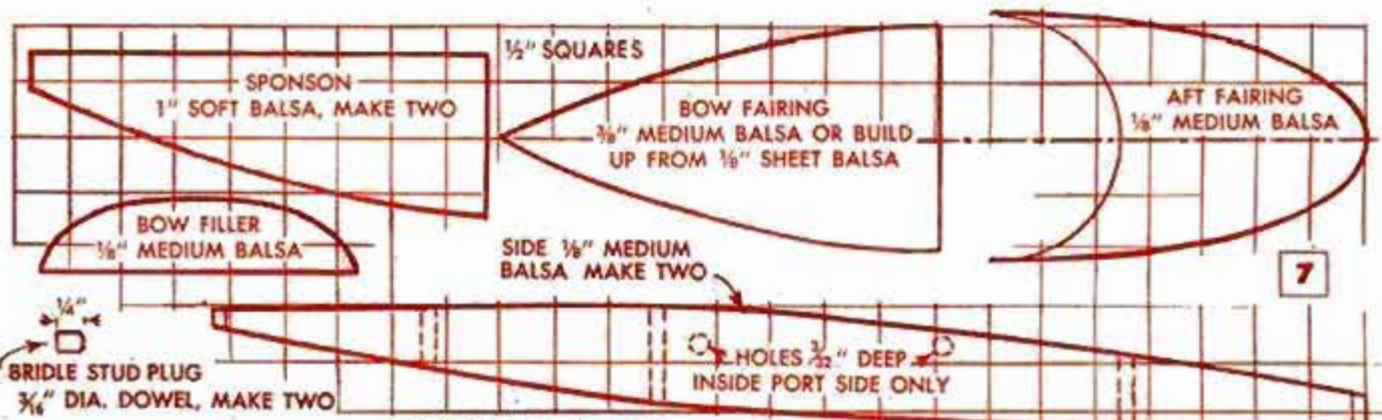
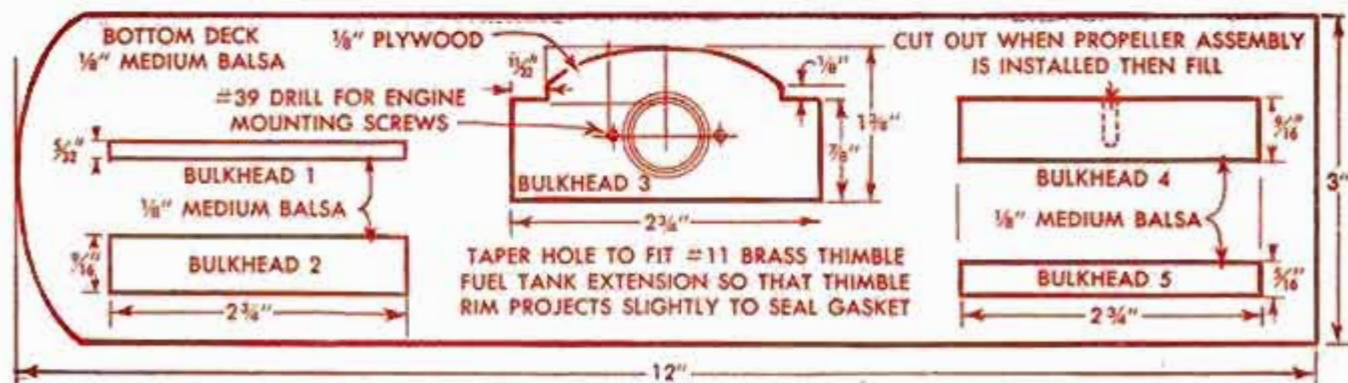
To aid in obtaining a square assembly of the hull draw a $3 \times 10^{19/32}$ -in. rectangle on a sheet of paper as in Fig. 2, cover with wax paper and cement the sides, bulkheads and fire wall together. Position the parts, Figs. 2 and 7, over the penciled lines and hold with pins until the cement is dry. Cut top and bottom panels from $1/8$ -in. medium-hard sheet balsa. Cement and pin the bottom panel in place.

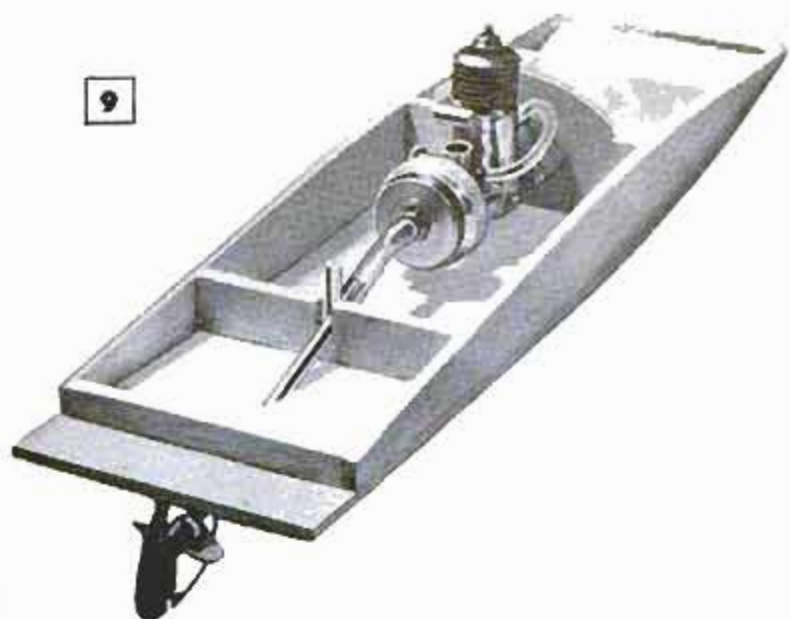
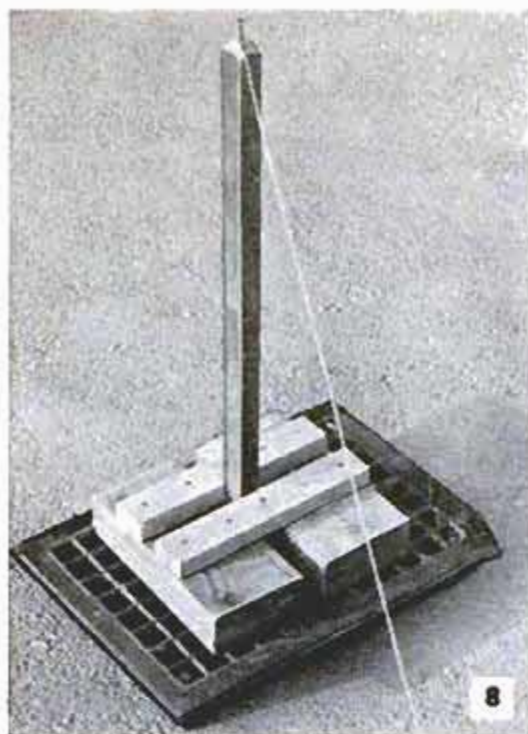
Propeller-and-Rudder Assembly

This is shown completed in Fig. 3 and detailed in Fig. 4. Cut the propeller-shaft tube to length and sweat-solder the bushings in the ends. Then solder the oiler tube in place, taking care to keep the oil passage clear of solder. Insert a $1/16$ -in. drill in the oiler tube and drill through the wall of the propeller tube and the bushing. It is necessary to bush the $1/8$ -in. hole in the propeller hub down to $3/32$ in. to fit the prop shaft. Cut the rudder, the

strip for the rudder hinges and the collar from .020 brass. Tin the inner side of the collar strip with solder and form the hinges and collar around a $1/16$ -in. rod. The prop guard, Figs. 4, 6 and 10, is bent from a length of bronze welding rod to the shape indicated on the crosshatched detail, Fig. 4. Before making the final bend slip the collar and hinge loops over the rod. Solder the rudder to the hinge loops and sweat-solder the collar in position. The collar keeps the rudder from sliding down when the drag springs are installed. The latter are made from No. 28 brass spring wire. Wind sufficient turns on the guard to fill half the space between the collar and the bottom hinge loop. Then cut the wire, leaving a $1/16$ -in. projection to prevent it from unwinding. Wind the second spring in the opposite direction in the same manner. Solder the propeller-shaft bushing onto the propeller shaft and then sweat-solder the propeller in place, making sure that it turns true before soldering.

Solder the rudder guard in place after inserting the shaft in the tube. Horizontal





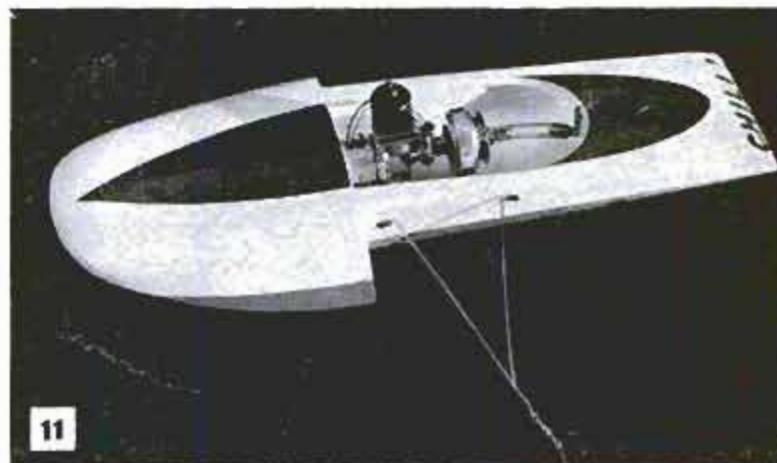
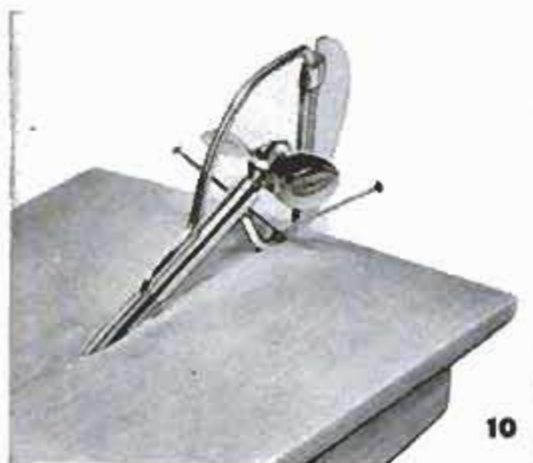
8 Above, Chili with power plant in a temporary mounting. Left, tether "island" made from discarded warm-air register

mounting of the engine in the cockpit requires use of a universal coupling which is made from a 1 $\frac{3}{8}$ -in. length of plastic fuel-line tubing. An engine-shaft extension is necessary to hold the flywheel and also form a projection to take the end of the universal coupling. For most engines, this can be made from a 6-32 brass screw, 1 in. long. Grind the head down to the diameter of the screw body. Thread a brass nut onto the screw, insert the screw through the flywheel and tighten. Lock the flywheel by tightening the nut. Note in Fig. 9 how the bulkhead is slotted for the propeller-shaft housing, also how the shaft is inserted through an elongated hole in the bottom. After the shaft has been fitted the slot is filled with a piece of balsa cemented in place and sanded smooth. The opening in the bottom is sealed watertight with cement after the shaft has been installed and aligned. Mounting the engine temporarily will aid in checking the alignment.

Cement the $\frac{1}{8}$ -in. bow filler to the forward bulkhead and follow with deck panels, stern filler block and the sponson

blocks, Figs. 4 to 7 inclusive. Carve the sponsons and stern filler, then add bow and afterdeck fairing. Sand the entire hull smooth, rounding corners and edges on the top but leaving sharp edges on the bottom of the hull and sponsons. If the boat is to be operated on a tether, install the bridle studs, Figs. 4 and 11. The $\frac{3}{8}$ -in. screws are anchored in hardwood plugs cut from $\frac{3}{16}$ -in. dowel and cemented into blind holes drilled into the port side of the hull. After insertion file or grind off the screwheads as indicated in Fig. 4. The bridle is made from .035 steel wire as in Fig. 4. When the completed boat is suspended from the bridle it should hang horizontally. With a different engine or flywheel it may be necessary to readjust the bridle.

Finish the hull with two or more coats of balsa filler and fuelproof dope, sanding lightly between coats. For operation from a tether, a center-post "island" can be made as in Fig. 8 by forcing a 1 x 1-in. center post into the grille of a discarded warm-air register. Brace the post with wooden blocks as shown. ★ ★ ★



Glass Fragments Picked Up With Modeling Clay



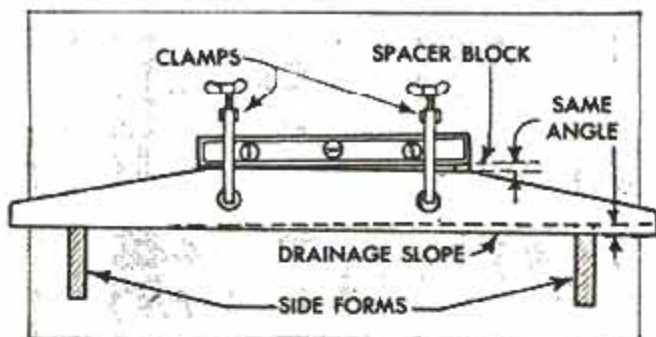
Fine bits of broken glass may be removed safely from the deep nap of a rug by using a lump of modeling clay. First run a vacuum cleaner over the rug to lift the nap and remove small pieces that cannot be picked up with the fingers. Then pat the modeling clay over the area. The finest bits of glass will cling to the clay, which should be discarded.

Improved Tool Gauges Slope Of Concrete-Sidewalk Forms

A tool for accurately setting concrete forms to provide drainage slope when pouring sidewalks and driveways can be improvised from a straightedge and a level. The straightedge should be long enough to span the full width of the forms. As shown in the diagram, the level is clamped to the straightedge with a small block under one edge of the level. The angle between the straightedge and the level will determine the angle of the drainage slope. In use, the straightedge is placed across the forms which are adjusted until the bubble in the level is centered.

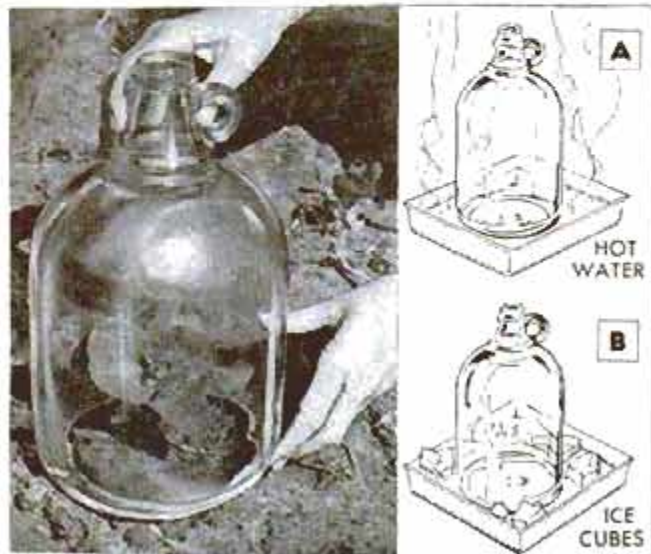
Individual "Greenhouse" From Jug

Portable "greenhouses" for single plants can be made from 1-gal. glass jugs. To remove only the bottom yet leave the curved lower edge for extra support, use the following method: Remove the cap and place the jug in a shallow pan. Pour boiling water into the pan to a depth of $\frac{1}{4}$ in. and let the jug stand for 2 or 3 min. to heat the bottom of the jug. Remove the jug and immediately place it in another pan which contains ice water. The bottom of the jug will fracture and drop out. Because the open mouth of the jug acts as a vent, there is no problem of condensing moisture.



Paint-Roller Cover Protected By Cellulose Wrapping

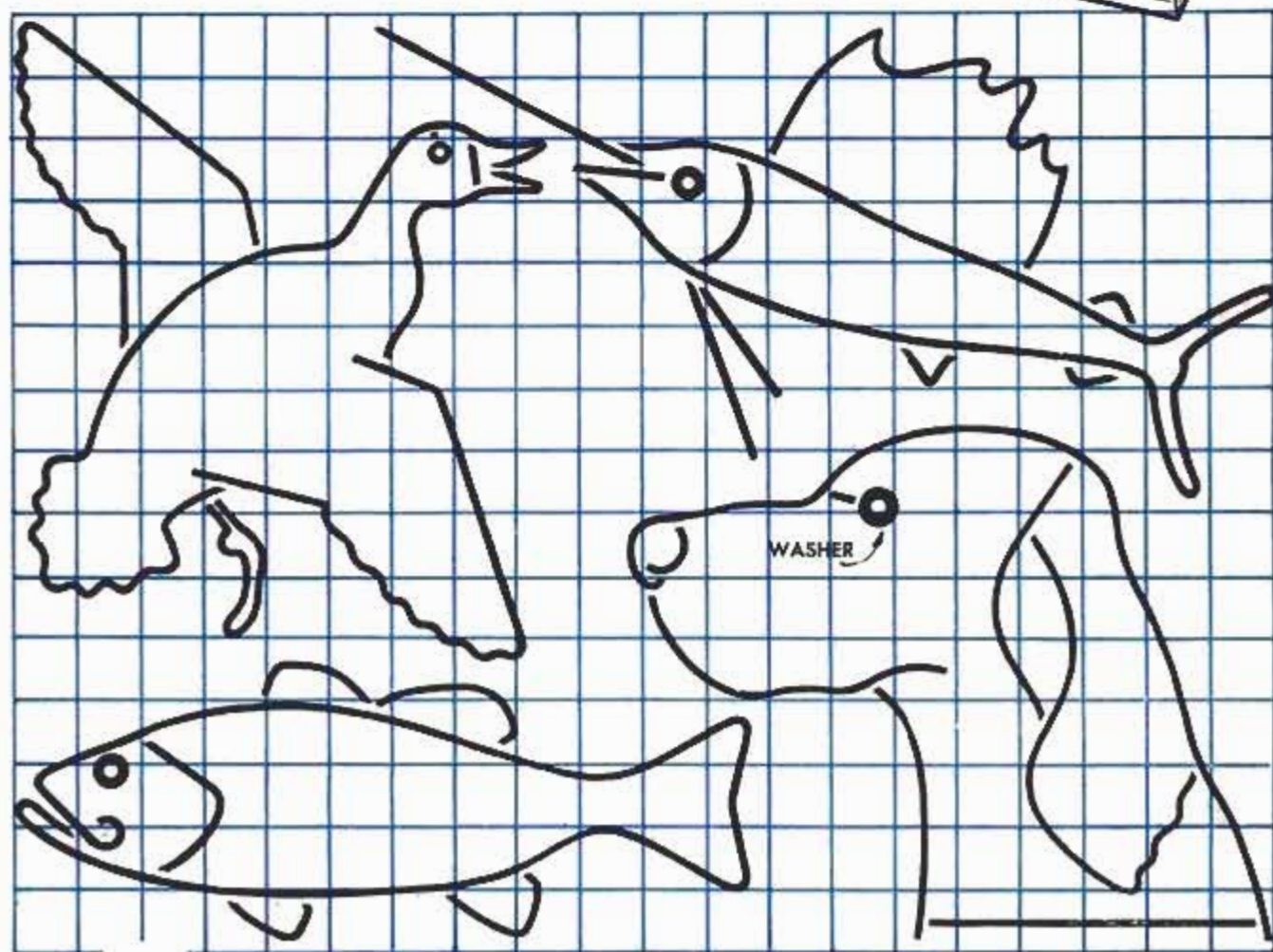
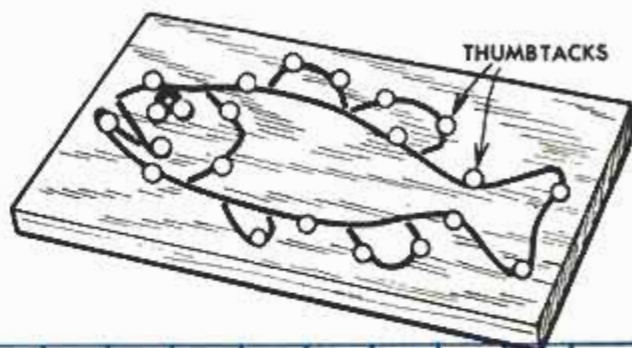
One homeowner keeps his paint roller in good condition from one job to the next by storing the covers in a dustproof cellulose wrapping, after they have been thoroughly cleaned. The entire roller assembly and tray should be cleaned with a thinner that is recommended by the paint manufacturer. If the cover is cleaned in water, it should be dry before wrapping.

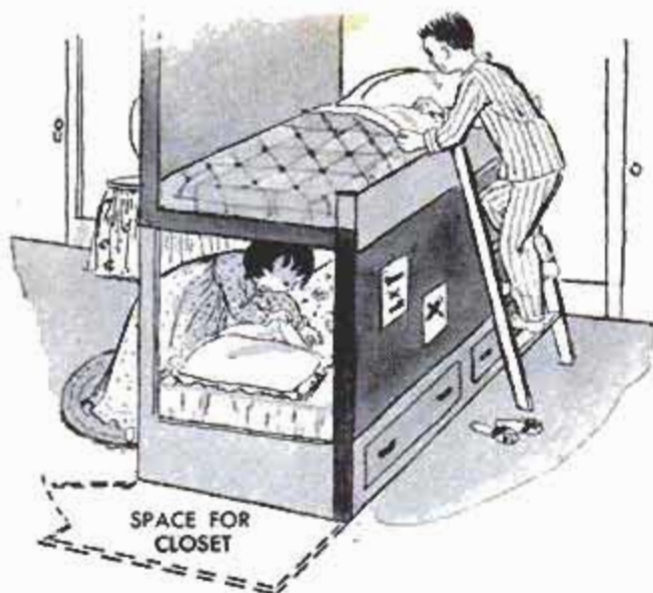


Wire Animals For Your Den or Cabin Walls

WITH A FEW FEET OF WIRE, solder and black paint you can make these decorative figures or others that are representative of your favorite sport and fasten them to the walls of your den or cabin. Draw an outline of each figure on a sheet of paper, indicating each segment as shown below. Then bend and cut the wire to duplicate the segments, assemble them on a board with thumbtacks, solder the joints and remove the board. Remove excess solder with a small file and coat each figure with dull-black paint applied with a camel's-hair brush. Use 12-ga. wire for figures of average size, heavier wire for larger ones. Steel wire is suitable, but copper is easier to work with.

Clifton Morris, Albuquerque, N. Mex.

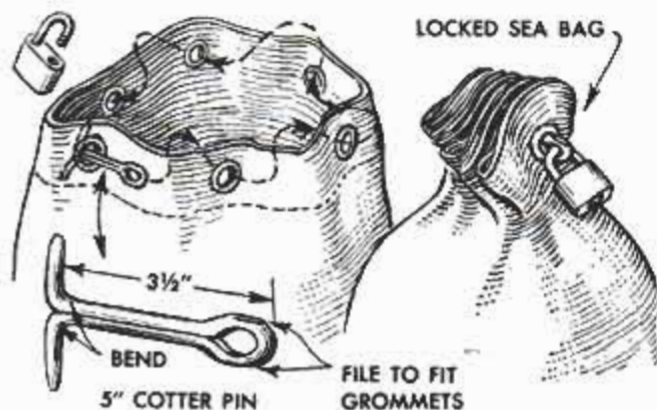




Bunk Beds Built Into Partition Used to Divide Large Bedroom

When a large bedroom used by children must be divided for greater privacy as they grow older, the partition can be combined with a double-decker bed, an arrangement that saves considerable space. One side of each bunk, as well as the deck between them, is closed by suitable framing and wallboard. Drawers are easily installed under the lower bunk and space between the foot of the bunks and the opposite wall of the room can be utilized for closet space as shown. An entrance door to the closed part of the divided room completes the accommodation. Bunks and partitions can be finished to suit the individual decor of the rooms.

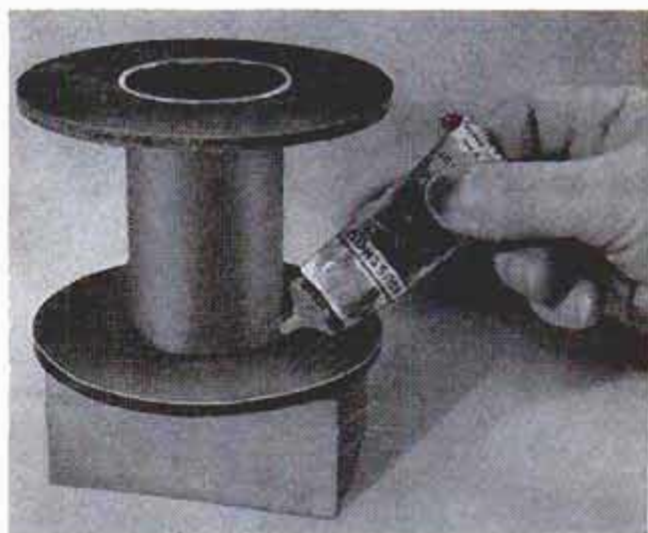
Cotter Pin Provides Means Of Locking Sea Bag



Sea bags that are shipped by express must be locked before they can be insured. A good way to do this is to use a 5-in. cotter pin with $1\frac{1}{2}$ in. of the ends bent at right angles. The eye of the pin is threaded through each grommet and then secured by passing the open end of a padlock shackle through the eye and closing the lock as shown.

Reel for Long Extension Cord Made From Can and Hardboard

Long extension cords of the kind used with electric lawn mowers, hedge clippers and home appliances can be kept in good order on this homemade reel. Cut two disks 6 in. or larger in diameter from $\frac{1}{4}$ -in. hardboard or plywood and drill or saw a 2-in. hole in the center of each one. Cut a notch in one of the disks to secure one end of the cord on the reel. Force the disks over a small frozen-juice can after cutting the rim from the opened end. Peen over the cut edge of the can so the disk on that end cannot slip off, then fix both disks in place with household cement and paint the entire unit.



Colored Drawing Inks Used as Wood Stain Touch-Up

Colored drawing inks are good substitute wood stains when only small amounts are needed to touch up marred furniture or woodwork. The small bottles of ink are less expensive than whole cans of wood stain and are available in a variety of colors, which can be mixed to produce an exact match of the work. A short-bristle paintbrush, of the type shown, should be used to apply the stain.



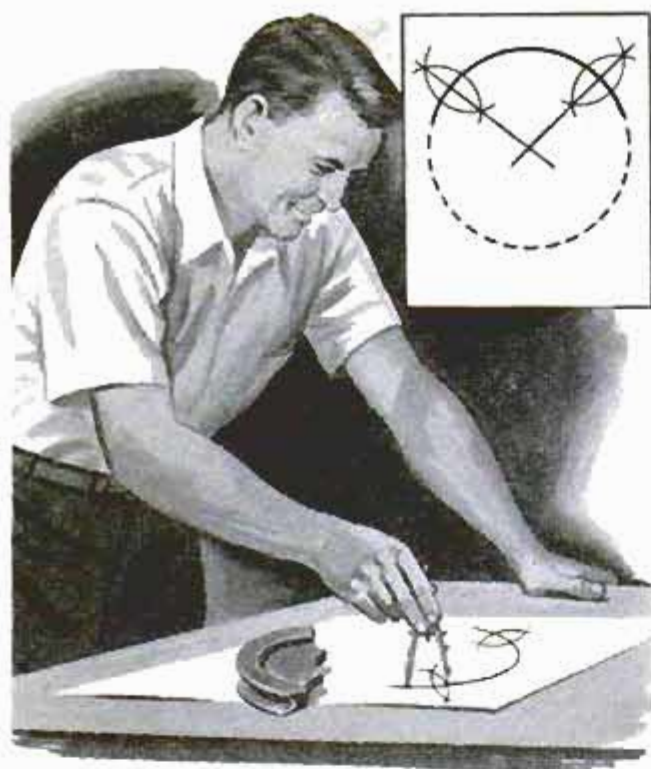
RUSTIC NAMEBOARD

FAMILY NAMES, such as Carr, Fish, Stone, House and others which are suitable for pictorial representation can be worked into a pictograph and incorporated in a rustic silhouette design for a gatepost nameboard similar to the examples shown. Trace an outline for a silhouette appropriate for your family name, if you possess a suitable one, on a piece of sheet metal as indicated in the illustrations. Make the cutouts on a scroll-saw that has been fitted with a metal-cutting blade.

Fine details and small openings can be worked into the silhouette with a three-sided file. Letters for the name are cut into solid areas of the board as the individual design permits. House number may be included also, if there is sufficient space available. When copper is used as a material, and left unpainted, the metal will "weather" into a greenish-black finish,

which will add to the rustic effect. Other metals should be painted black or a very dark color. An iron bracket, from which the nameboard is suspended on two chains as shown, can be made from lengths of flat steel bolted together. Scrolls and other decorative lines are bent into members of the bracket as desired. The chains for hanging the board should be short.





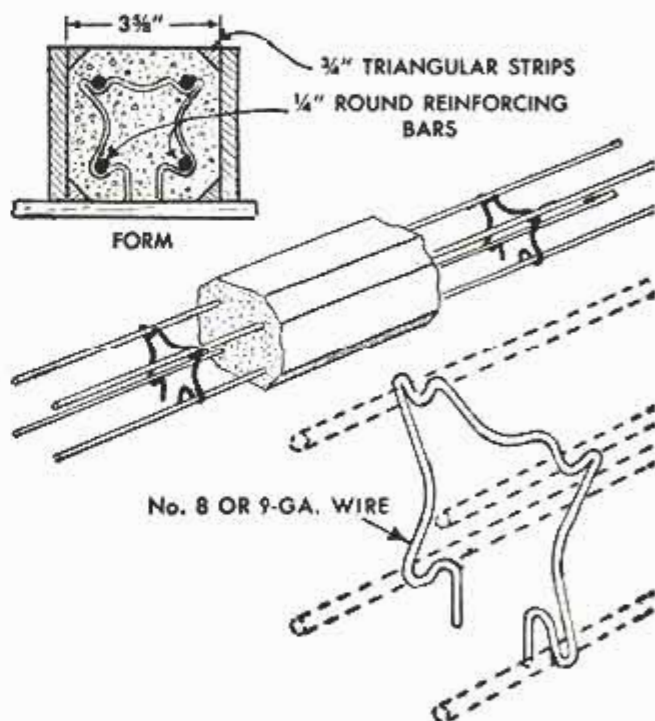
Determining the Center Of a Circular Segment

To determine the center of a broken pulley, gear or sprocket when you have only a segment to work with, trace an outline of the outer circumference on a sheet of heavy paper. Then, adjust a small compass so that its span is less than the radius of the work, swing two pairs of arcs across the circumference and draw a line exactly through each pair as shown in the drawing. The point at which the two lines join is the center of the circle, and marks the distance from the axis of rotation to outside circumference of the work, or the radius. For greater accuracy, the arc described by the two radii should be as close to 90 deg. as the segment of the broken part will permit. Now, you have the measurements necessary for rebuilding the broken part or ordering a replacement.

Arthur F. Lirot, Meriden, Conn.

Reinforcing Rods in Concrete Held by Wire Supports

When casting concrete posts the reinforcing rods or wires can be held in position by means of wire supports of the kind shown. They are bent from No. 8 or 9-ga. wire, three or four being required for each post. The two lower reinforcing rods are pressed into the loops of the wire supports and the two upper rods are laid in the U-shaped bends. For greater rigidity, the legs of the supports may be set in holes drilled in the bottom of the forms. When the latter method is used, the ends of the wire that extend from the posts must be cut off after the concrete has hardened. Four $\frac{1}{4}$ -in. steel rods should be used for heavy-duty fence posts. Reinforcing rods or wires should be buried in the concrete no less than $\frac{3}{4}$ in. from the surface.



Automobile-Chrome Polish Useful For Cleaning Household Items

Automobile-chrome polish, generally used to clean rust and corrosion from bumpers and other chrome-plated parts of a car, can be used equally as well for metal-polishing jobs in the home. Any metal-plated surface which has lost its shine or become corroded, such as trim on a range or refrigerator, can be cleaned and shined with the polish. Because the polish contains some silicones, which are heat-resistant, metal ash trays cleaned with it stay clean and shiny much longer.

☐ A large cotton handkerchief used as a washcloth when traveling dries quicker and folds more compactly than terry cloth.



Photos by Eleanor Gilman

YEAR-ROUND USES for weed burner

By William Gilman

ALTHOUGH KILLING WEEDS is the main purpose of a flame-throwing weed burner, it has several other practical year-round uses. For example, its 2000-deg. flame will melt snow and ice in a driveway almost as fast as you can walk. That's something to think about when you have to get the car rolling early on a cold winter morning. Burning brush, leaves and trash, splitting rocks, eradicating tent caterpillars, sterilizing soils and thawing frozen water pipes are only a few of the other ordinarily difficult jobs easily carried through with the aid of the intense heat from the burner. The unit can even serve as an improvised farm forge in a pinch.

Take Special Precautions

One thing to keep always in mind is that the 2000-deg. flame heats flammable materials to the ignition point in a hurry. If you have to work near a building, as in sterilizing soil in a given area or thawing a water pipe, take special precautions. Combustible materials must be effectively shielded, not only from the flame itself but from the blast of intense heat beyond the tip of the flame. Protect wooden siding and any shrubbery nearby with sheets of asbestos and clear away all loose trash from the area where the flame is to be applied.

Never touch off a grass or leaf fire with



Above, winter uses for a weed burner are clearing snow and ice from driveways and walks and thawing the frozen water pipe you forgot to drain the night before. Below, flame-girdling kills unwanted shrubs





A single colony of tent caterpillars can completely defoliate a valuable shrub in no time at all. But you can effectively dispose of the pests with a single sweep of flame without injuring the small twigs



Orchardists use the burner to ignite green trimmings from trees. Note fire extinguisher close at hand

the burner on a windy day. A ground-running fire with even a moderate wind behind it can get out of hand in seconds. Always have portable fire-fighting equipment handy and be sure it's in working order.

Thawing that frozen water pipe you forgot to drain the night before takes only a minute after you get the burner going. But again there are precautions to be observed if you are to do the job safely and effectively. First open the faucet or valve that drains the pipe line. Be sure that it's clear of ice. Then, if it is impossible to determine precisely where the pipe is frozen, begin at the faucet or valve and play the flame along the length of the pipe, continuing the procedure until water runs at the faucet. If you can determine the point at which the pipe is frozen, begin by playing

the flame near one end of the frozen portion and work back along the length. Don't apply the flame at the center of the frozen portion as the heat will melt the ice quickly, may turn the water to steam at this point and burst the pipe. While carrying out this job, take full precautions against igniting any flammable material.

Many Other Uses

Orchardists and estate owners use weed burners to kill sprouts and set fire to piles of green trimmings from fruit trees after spring pruning. Unwanted saplings up to an inch in diameter growing in fence rows can be killed by flame-girdling in early spring. Just play the flame on the trunks near the ground level until the bark scorches and peels. Large rocks can be broken up to handling size by playing the flame from the burner along the seams, or "grain." After heating in this manner, a blow from a sledge usually will break the rock into several pieces. One quick sweep of the flame, as in the photo above, generally will dispose of a colony of tent caterpillars. Keep the flame moving rapidly or you may seriously damage the tree or shrub. ★ ★ ★

Dust Caps for Oilholes

Brass paper fasteners inserted into small, open oilholes on motors and machines prevent entry of foreign material. Simply cut off the fastener about a quarter of an inch from the head and expand it to fit snugly in the oilhole.

Howard E. Moody, Upper Jay, N. Y.

"Shadow Box" Stair Rail and Partition Add to Basement Beauty

Basement steps that formerly presented a rather plain appearance now add to the over-all beauty of an attractive basement when fitted with a "shadow box" railing. The shadow-box motif is included in a partition that separates the dining nook from the rest of the basement. Both railing and partition are built of 1 x 6-in. stock spaced on 12-in. centers. Both projects can be painted to harmonize with the color scheme in the basement. A second color inside the boxes will provide contrast.



Taped Linoleum-Knife Edge Prevents Dulling

When a linoleum knife is stored in a toolbox or drawer, cover the cutting edge with masking tape to protect it against being damaged by other tools. Masking tape, which is rubberized, also seals out moisture that would cause the blade to rust.

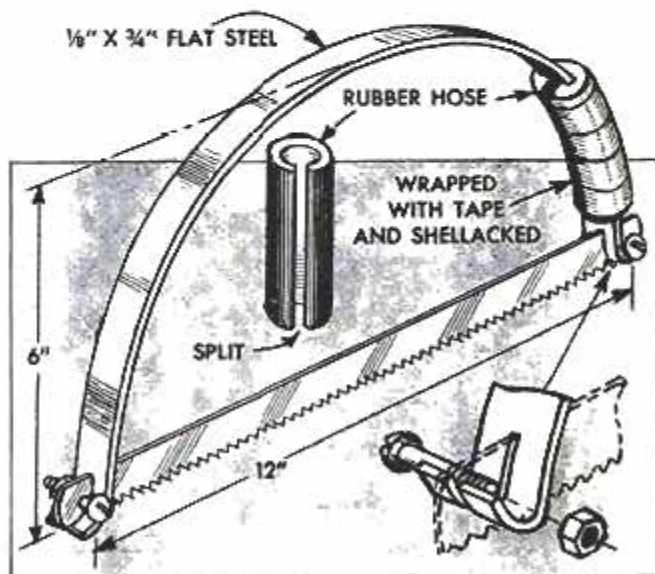


Planning a fireplace . . .

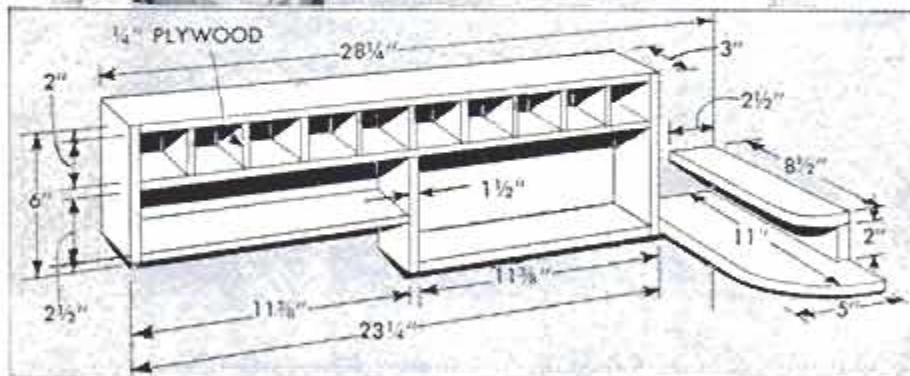
for your home? You'll be shown the latest in fireplace design, including both window-wall and island-wall types, as well as the popular raised-hearth models, in a four-color feature next month. Read "Build Your Home Around a Fireplace"

Saw for Home-Freezer Owner Cuts Meats and Bones

If the ownership of a food freezer has presented the problem of cutting ice-hard meats taken directly from the freezer, this easily made meat saw is what you need. The saw frame is a length of $\frac{1}{8}$ x $\frac{3}{4}$ -in. flat steel, long enough to bend into a U-shape at least 6 in. deep. Both ends of the frame are slotted. The front end is bent upward slightly and the handle end is bent upward to a full U-shape as indicated in the lower detail. A handle is formed by fitting a split length of hose over the frame and wrapping it with adhesive tape. The tape is shellacked to assure a moistureproof and slip-proof handle. An ordinary hacksaw blade is used, the ends being hooked into the frame by means of machine screws and nuts. The saw is equally useful for cutting the bones in hams and other pieces of meat.



Corner Spice Shelf Saves Kitchen-Cabinet Space



This shelf will accommodate a large number of condiments and still lend a modern decorative touch to the kitchen. It is made of $\frac{1}{2}$ -in. white pine throughout except for the partitions of the top shelf, which are $\frac{1}{4}$ -in. plywood held in place by casein glue. An additional shelf or two can be added on top of the partitioned one if desired. When completed, the shelf may be painted a color which harmonizes with the rest of the kitchen and attached to a wall at a convenient height with wood screws or small metal brackets. — Ray Long, Riverside, Conn.

Plastic "Squeeze" Bottle Used As Paint-Solvent Dispenser

Before you start your next painting job, fill an empty plastic "squeeze" bottle with turpentine or other paint solvent. When it is time to clean up, simply spray a small amount of the solvent on hands and arms to remove paint splatters. The solvent dispenser also can be kept handy for removing paint splatters from floors and trim when painting walls and ceilings. Fill the bottle with the solvent in the same way that you would fill a syringe.

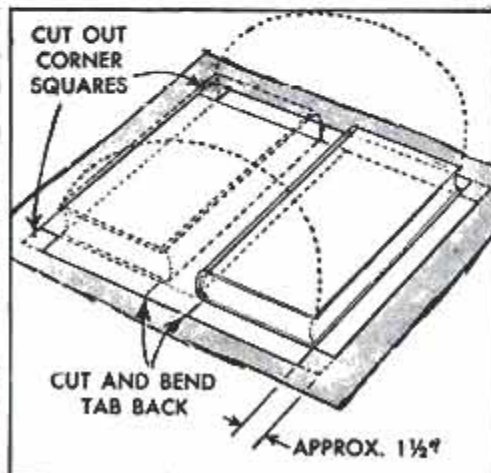
Mark C. Fleming, Pittsburgh, Pa.



Unusual and Attractive Book Jackets Made From Seat Covers

Material to make unusual and attractive book jackets can be salvaged from automobile-seat covers. Usually the cover of the back seat will provide the largest area

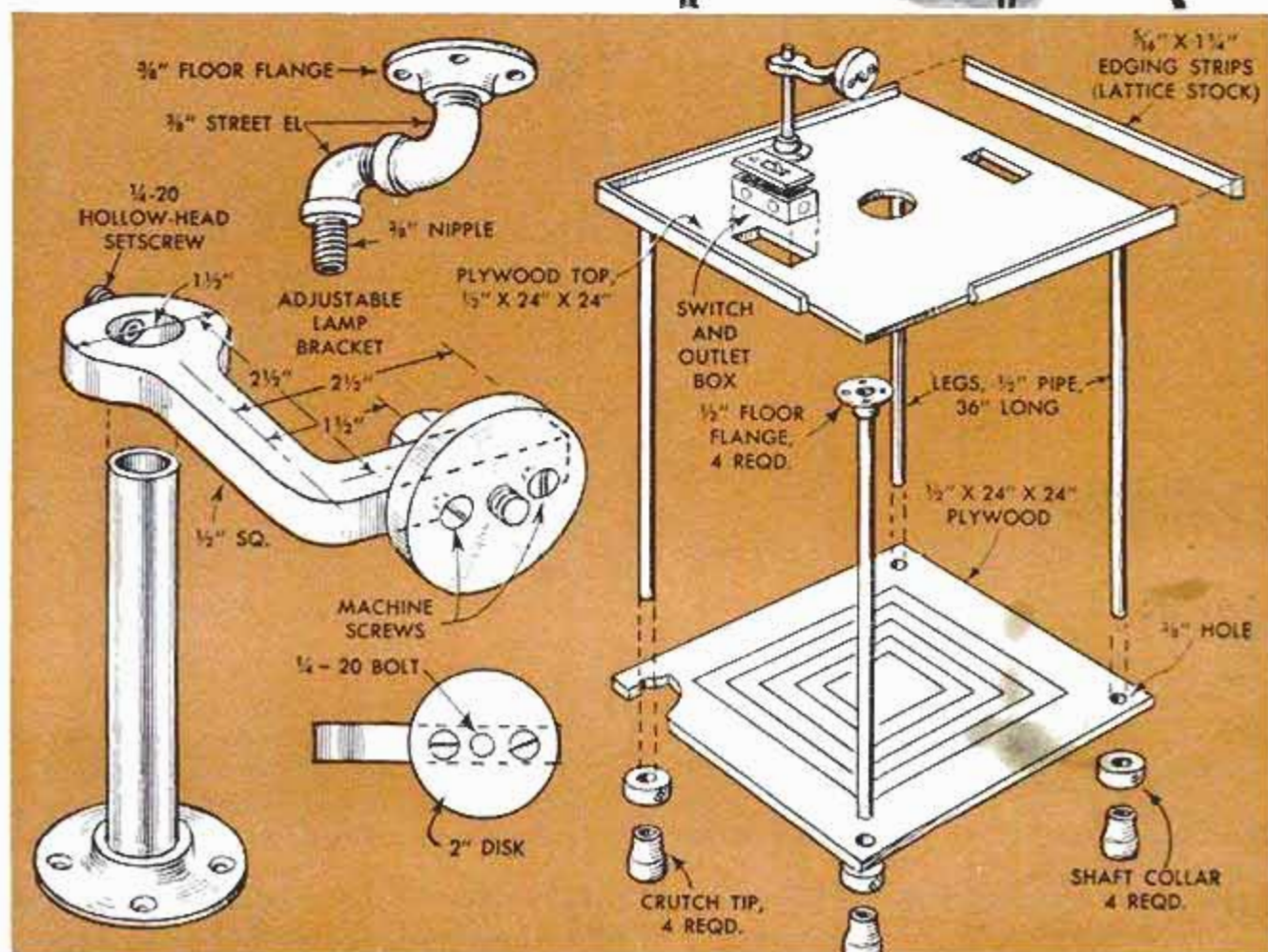
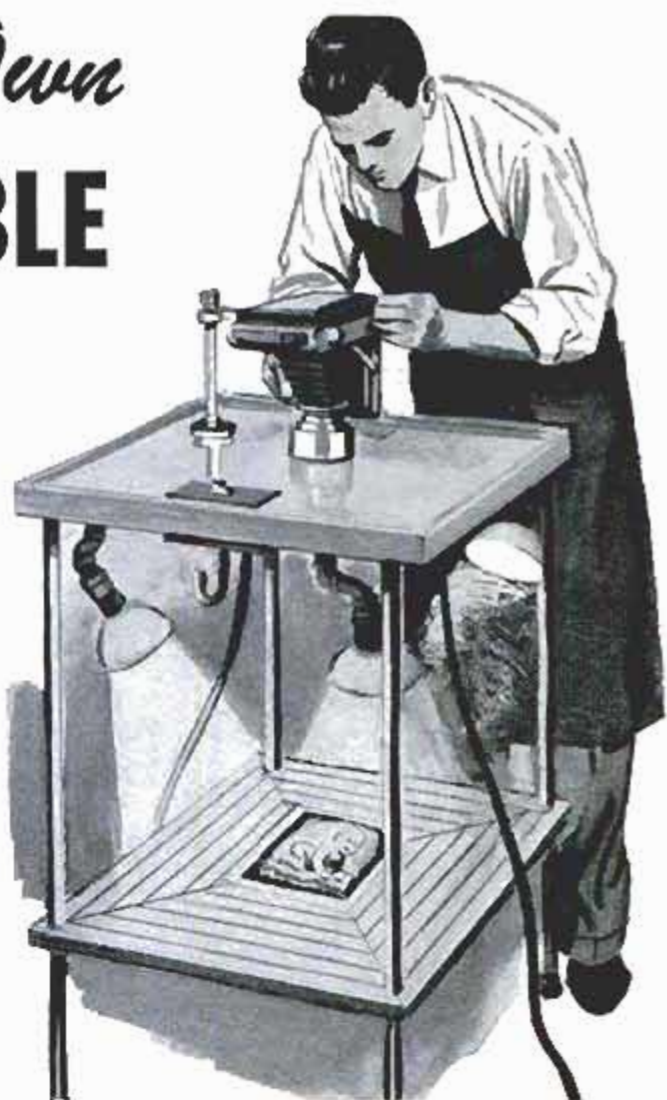
of clean, unworn material. Nylon or plastic-coated fabrics are preferable to fiber because they can be scrubbed with soap and water whereas the fiber cannot. To



make the book jacket, place a piece of material on a flat surface and locate the back of the closed book in the center. Lay the book over, first to right, then to the left, being careful not to let the back slip from its position. Mark the outline of the book on each side, add $1\frac{1}{2}$ in. all around and cut out the shape. Notch the corners as shown in the detail, and glue or rubber-cement jacket to book.

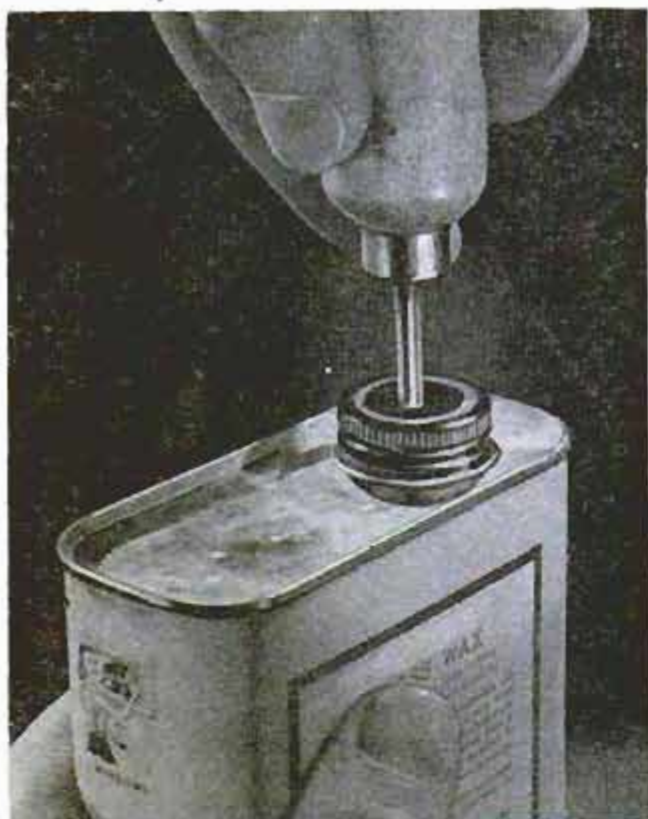
Make Your Own COPYING TABLE

SIMPLE TO CONSTRUCT, this photo-copy table features three adjustments and can be used with any focusing-back camera. One adjustment is at the lens barrel, the second in camera-support height, and the third in the height of the shelf. Two 24-in. squares of $\frac{1}{2}$ -in. plywood form the top and shelf, lattice strips being nailed to the edges of the top to form a $\frac{1}{4}$ -in. lip. Four $1\frac{1}{16}$ -in. holes drilled in the shelf permit it to slide on legs of $\frac{1}{2}$ -in. pipe turned into floor flanges screwed to the underside of the table top. Each leg is fitted with a shaft collar so the shelf can be locked at any desired height. Adjustable lamp brackets, made from $\frac{3}{8}$ -in. pipe fittings as indicated, are fitted in floor flanges also screwed to the underside of the top, and each two lights are wired to a separate switch. The camera-support arm, cut from wood or metal, slides on an 8-in. length of $\frac{1}{2}$ -in. pipe. Size of table-top opening is determined by camera size.



Punched Hole in Container Cap Avoids Window-Cleaner Waste

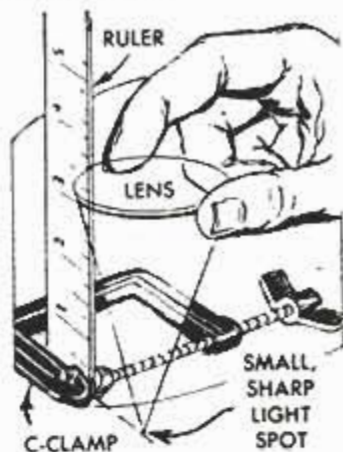
When you want to control the quantity of window-cleaning wax dispensed from the can, punch a hole in the cap with an ice pick. The can then may be inverted and the sides squeezed to deliver the exact amount



of cleaner needed. To seal the can, cut a disk of cardboard and insert it in the lid to cover the punched hole.

Focal Length of Lens Determined By Using Clamp and Ruler

Before putting a lens to some practical use, its focal length must be known so that the lens can be mounted the correct distance away from a plane on which it is desired to focus an image. With a small lens, the focal length can be determined by moving it up and



down along the edge of a ruler clamped vertically to a flat surface such as a table. When the spot of light under the lens, produced by a bright lamp located several feet above it, is as small and as sharply defined as possible, the focal length can be read on the ruler. The shorter the focal length of a lens, the greater will be the magnification of the lens.

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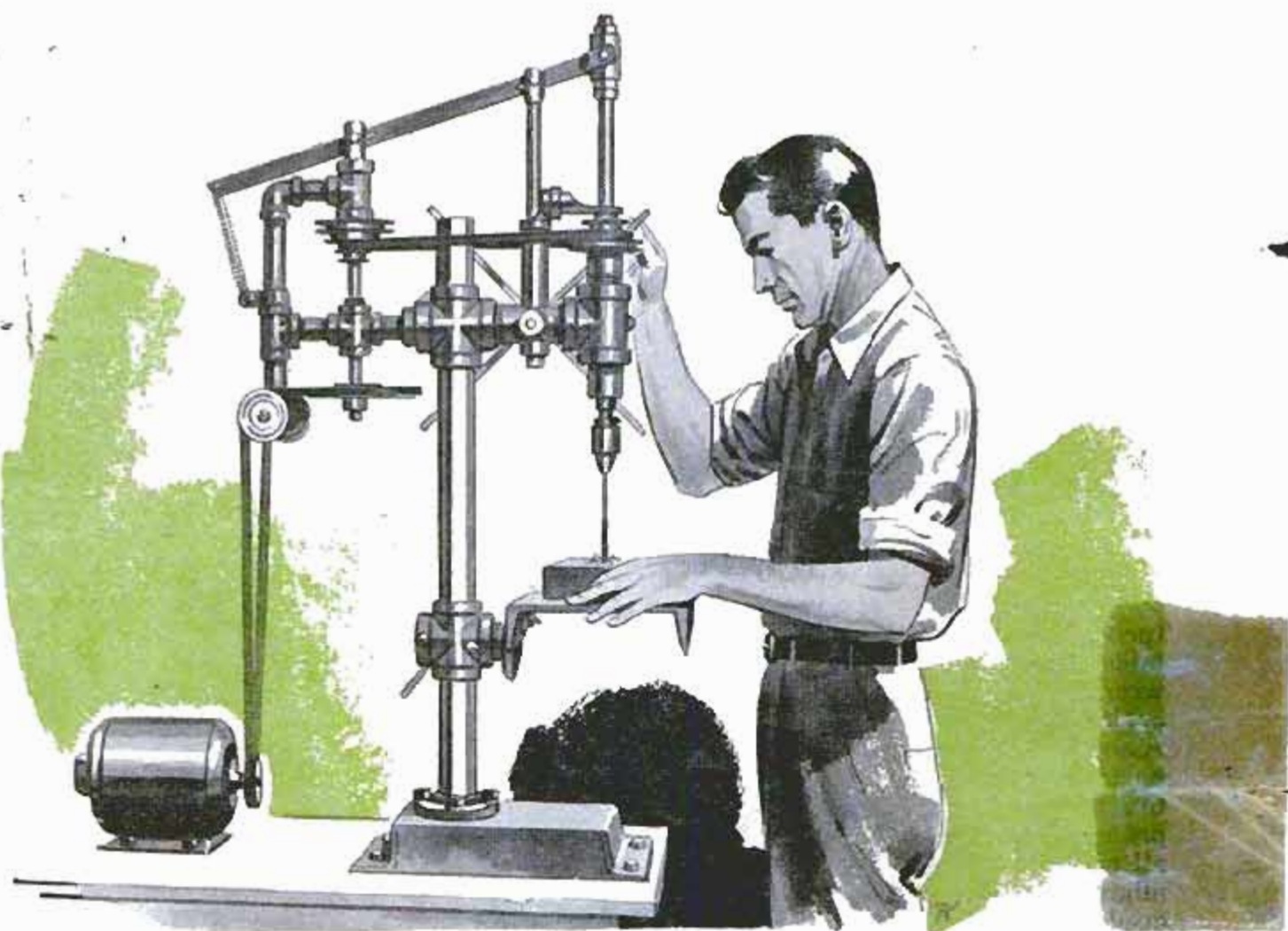
Features of Expensive Homes are included: built-in furniture, unusual amount of closet space, adaptability to various interior arrangements, and materials designed especially for amateur builders. The book is \$2.50 and a complete set of 10 blueprints \$12.50 (a duplicate set is \$5.00). You can place a C.O.D. order or mail your remittance in full.

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HEAVY-DUTY DRILL PRESS

By Arthur B. Farwell

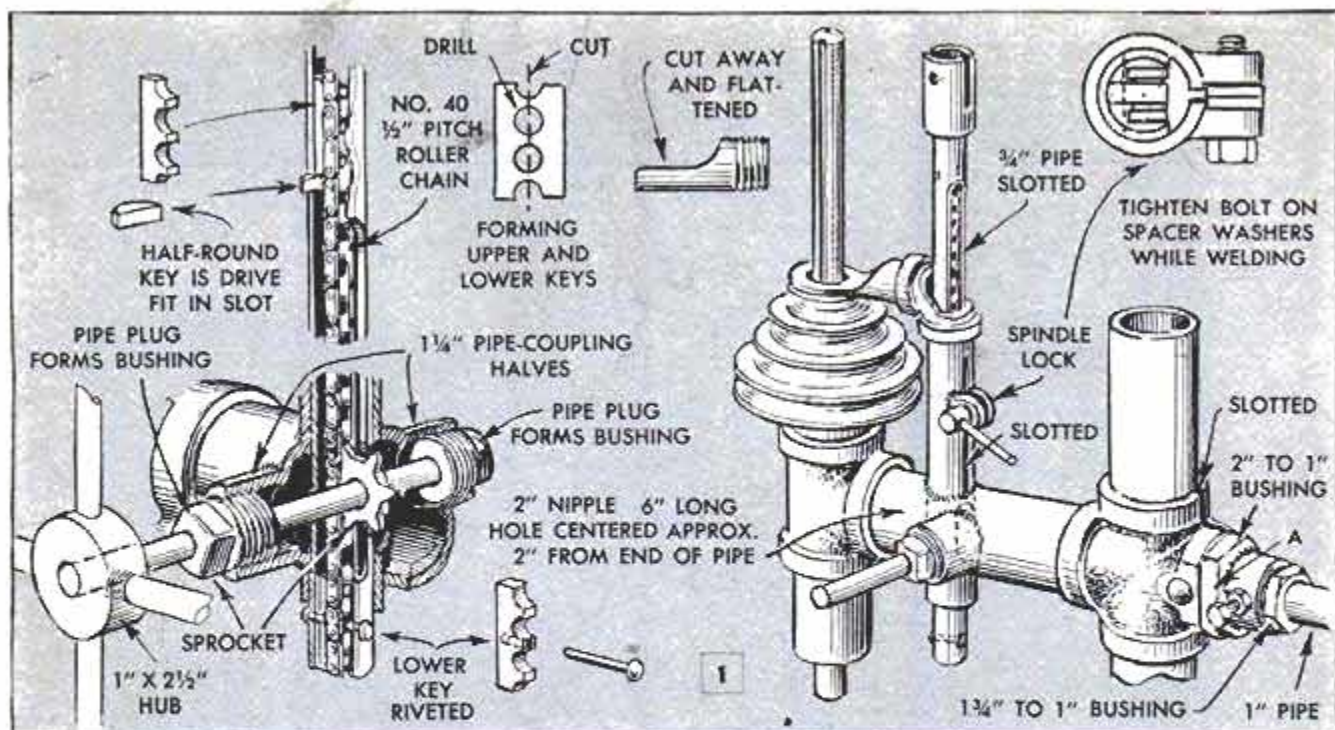
SPECIAL BUILT-IN FEATURES adapt this heavy-duty drill press to a wide range of shop work. The 7-in. vertical travel of the spindle permits deep drilling and reaming and the slow-speed jackshaft drive and 0 to 1-in. capacity provide power for heavy drilling in metals and wood. Any type motor can be used as it is mounted horizontally rather than vertically.

Frame Construction

The frame is constructed of extra-strong pipe and fittings of the wide-flange type. At the outset it should be kept in mind that there are allowable variations in the manufacture of standard pipe and fittings. This makes it necessary to determine certain dimensions by trial assembly. Some filing must be done when fitting the spindle and spindle-lowering mechanism, also the

column must be draw-filed and smoothed with abrasive so that the pipe crosses will slide easily. Threads in the crosses are reamed out in the lathe to give an easy, sliding fit over the column. Both crosses are slotted and fitted with clamping bolts. Note particularly the assembly of the parts indicated in A in Fig. 1, also shown in detail A in Fig. 2. This assembly permits the jackshaft frame to slide, thus providing a means of adjusting the belt tension. Note also that the distance between the flats filed into the jackshaft and drill spindle is not specified. These flats provide space for the setscrews holding the shaft collars and the spacing must be determined when the parts are assembled.

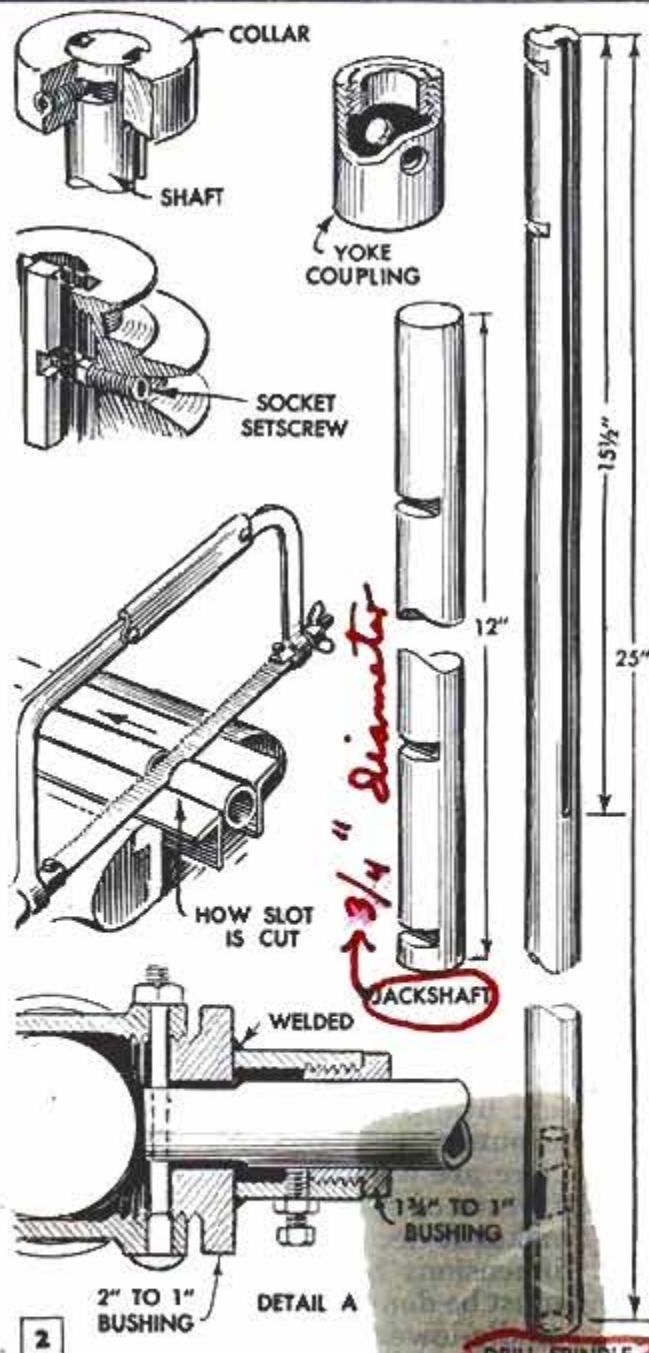
Usually it's best to begin with the base and column and then assemble the spindle and jackshaft frames as separate units. Fit

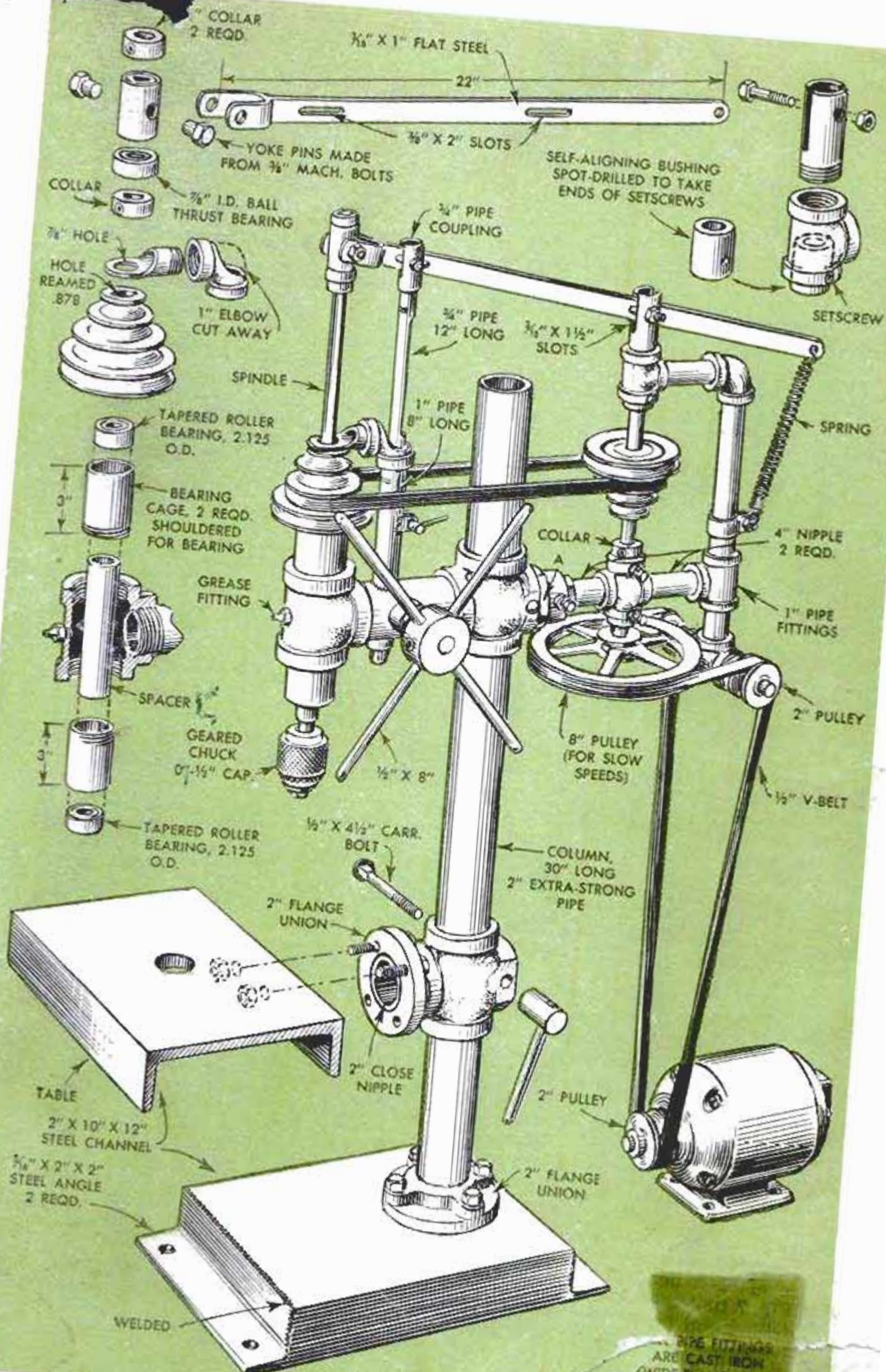


the sliding crosses on the column, bolt a flange union to the base and screw the second flange union onto a close nipple turned into the lower cross. Attach the table. Draw the column tight with a strap wrench (borrowed from your local plumber) to avoid marring the polished surface. Assemble the jackshaft frame and the parts A, Figs. 1, 2 and 3. Then assemble the spindle frame. The purpose of this preliminary assembly is to make sure that all pipe and fittings fit together in correct alignment when drawn tight. Before proceeding, note the assembly of the spindle raising-and-lowering device shown cut away in the left-hand detail, Fig. 1. Mark the location of the hole for the slotted pipe sleeve which passes through the hole in the arm and serves as a guide for the raising and lowering rack. The sleeve is 1-in. pipe, 8 in. long, and only the top end is threaded. A length of 3/4-in. pipe, 12 in. long, telescopes inside the sleeve and carries the roller-chain rack. This length of pipe is slotted with a hacksaw as in Fig. 2 to permit travel of the sprocket, which is carried on a 1/2-in. horizontal shaft turning in bushings made from solid pipe plugs. The bushings are mounted in pipe-coupling halves welded to the frame arm as indicated in Fig. 1.

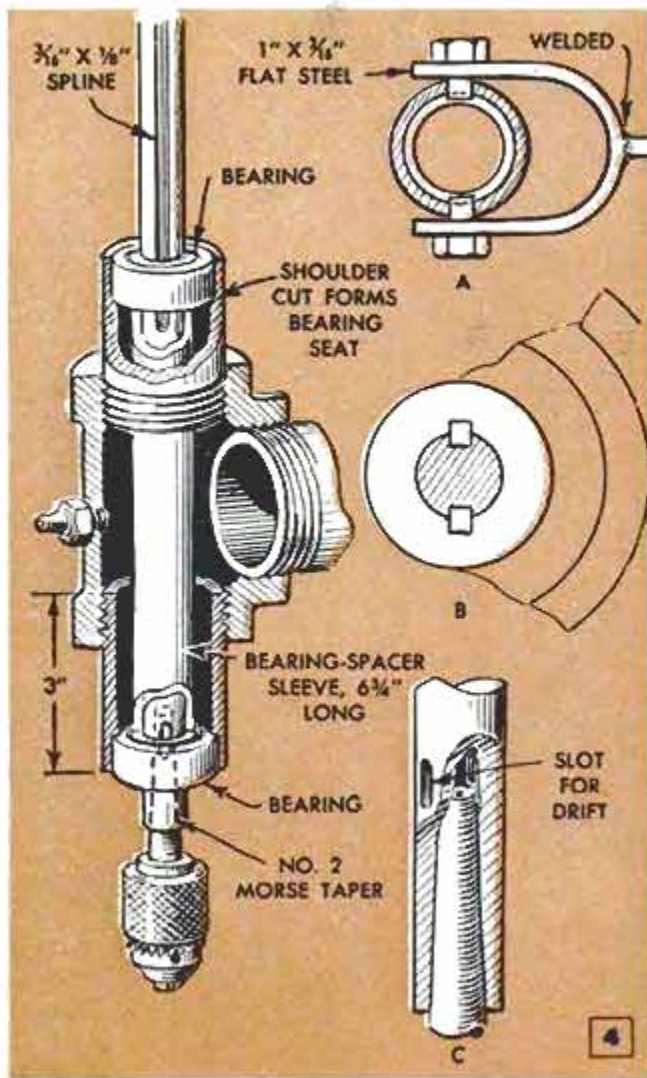
Spindle-Lowering Assembly

As shown from the left-hand detail in Fig. 1 the roller-chain rack is pinned at the lower end and supported at the top end by a toothed *rag* of key held in place in the pipe by a standard half-moon key. Care must be taken in the location of the slot for the half-moon key to assure that the chain is supported inside the slotted





PIPE FITTINGS ARE CAST IRON (WIDE-FLANGE TYPE)



pipe without slack. Drive-fit the key in place and grind flush. The slotted-pipe carrier should be an easy sliding fit inside the sleeve. The sprocket is pinned to the 1/2-in. shaft and on completion of the assembly the sleeve is tack-welded to the arm. Two lugs are welded to the sleeve, one tapped, the other drilled with a body hole for a locking screw.

Spindle Assembly

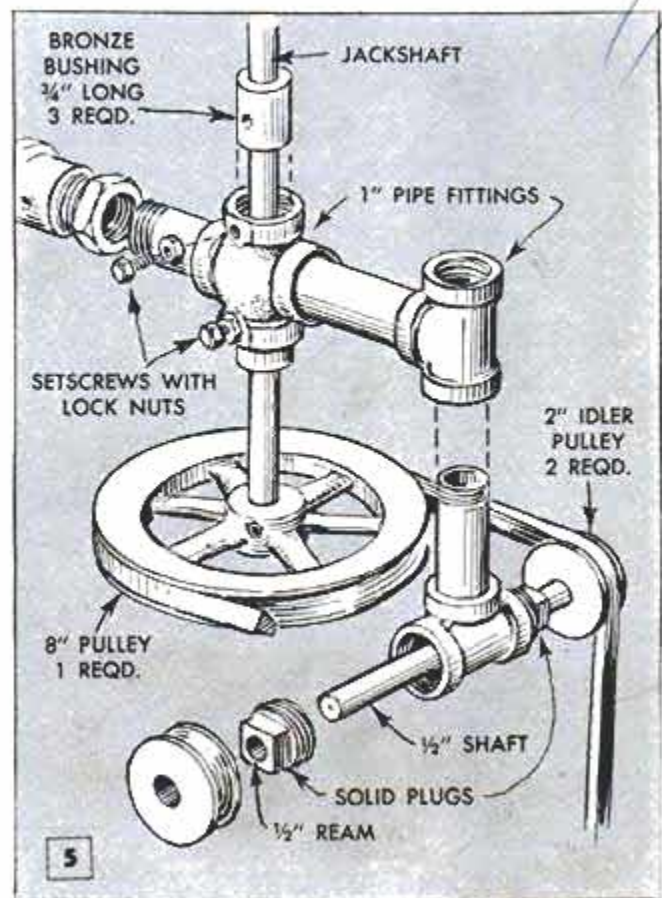
Details of the spindle assembly are shown in Figs. 2, 3 and 4. The pulled-apart view shows quite clearly the relationship of the parts. Matching 4-step V-pulleys are used on the spindle and jackshaft, but the hole in the pulley used on the spindle must be reamed to a sliding fit and it may be necessary to file the keyways deeper. The tapered roller bearings carrying the spindle are mounted in "cages" made by turning a shoulder into the plain ends of 3-in. lengths of pipe to receive the outer race of each bearing in a press fit. Note in Fig. 2 that the lower end of the spindle is drilled and taper-reamed to take taper-shank drill bits, detail C, Fig. 4, or a chuck fitted with a No. 2 Morse-taper adapter, Fig. 3. The two milled splines (have this job done at a machine shop) in the drill

spindle take notched sliding to the pulley and held in place with socket setscrews as in the lower of the two upper left-hand details in Fig. 2. Note also the detail B in Fig. 4. The keys should be drawn-filed so that they slide freely in the splines throughout the full length. Note also that the spindle assembly includes the yoke bearing, or coupling, Fig. 3, and the upper-center detail in Fig. 2.

Jackshaft Assembly

The jackshaft, Figs. 2 and 5, is fitted with self-aligning bushings spot-drilled as indicated in Fig. 3 to take the pointed ends of setscrews held in position with locknuts. The idler shaft turns in bushings made by drilling solid pipe plugs and turning them into a pipe tee. The idler pulleys turn freely on the shaft and are held by washers and cotter pins. The lowering yoke, Fig. 3, pivots on the top end of the jackshaft frame. Location of the slots in the yoke arm must be determined at the time of assembly. The yoke pins, Fig. 3 and detail A in Fig. 4, should be a drive fit.

Note that before the lowering arm is placed in final position the hold-down, which consists of a short length of pipe and an elbow, must be made and placed in position. This part bears against the top of the spindle pulley and is shown in place in the right-hand detail in Fig. 1, also in Fig. 3. Assembling this part in position and adding the lowering wheel, or spider, completes the job. ★ ★ ★

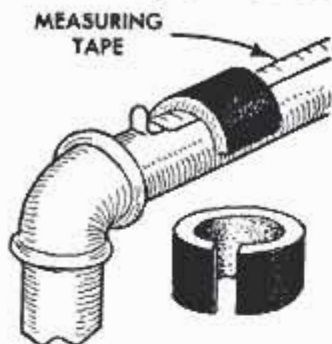


Belt-Driven Auto Transmission Powers Portable Elevator

An automobile transmission, belt driven by a one-cylinder gasoline engine, is used as the power unit for a portable hay and grain elevator. A constant engine speed is used, the speed of the elevator being changed by shifting gears in the transmission. The controlled speeds are especially useful when the elevator is used for soy beans. The power unit is mounted on wooden skids so it can be towed easily when the elevator is moved. The man in the photograph is standing astride the motionless tumbling rod to illustrate a common but hazardous practice around farm machinery. If the power unit were running, he would stand to one side of the tumbling rod and the rod would be enclosed in a guard.



Clamps Made From Radiator Hose Hold Tape Measure

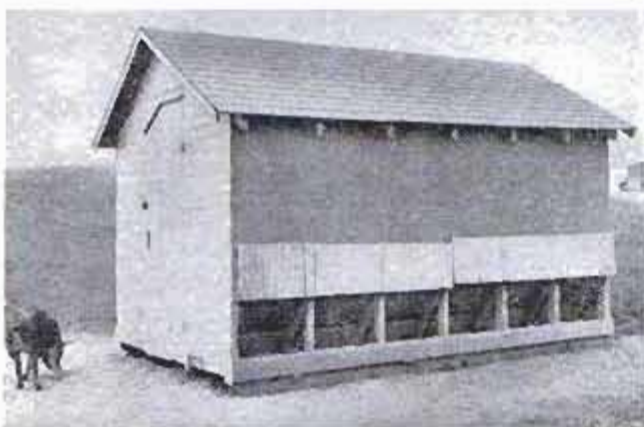


A helper is unnecessary when using a long measuring tape if clamps are provided to hold the free end of the tape on the work in a manner similar to that shown. The clamps are short sections

of discarded hose slit along one side, garden hose or radiator hose being used depending on the diameter required.

Combination Hog-Feed House

This walk-in combination hog-feed house and self-feeder can be used for self-feeding of grain or ground feed, or hand-feeding supplement when new corn is fed off the wagon. Utilizing wood materials the outside feeding doors are hinged along the sides, which allows the supply of feed to be shut off from the hogs at will. The building is constructed on skids for easy moving from one field or lot to another.

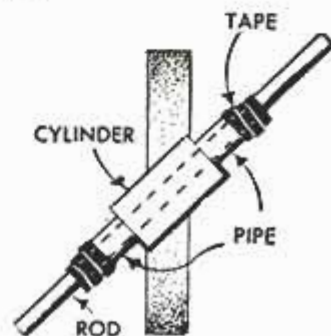


Cleaning Tall, Slender Vases

Stains in the bottom of a tall, slender vase that is difficult to clean can be removed by using tea leaves soaked in vinegar. Drop the moistened leaves into the vase and shake until the stains have disappeared. Then wash and rinse the vase.

Diameter of Cylinder Reduced With Bench Grinder

Where accuracy is not important, a bench grinder may be used in place of a lathe for reducing a cylinder's outside diameter. A rod is slipped into the cylinder and fitted with two short pieces of pipe taped in place to prevent lateral movement. Hold one end of the rod in each hand and press the cylinder against the wheel, with the rod parallel to the grinder shaft. When the cylinder begins to turn, tilt the rod at an angle, so the wheel will start cutting. Do not tilt the rod too much or the cylinder will stall and cause a "flat." After the correct angle has been found, move the cylinder slowly from side to side across the wheel until the desired diameter is ground. A cylindrical, rounded or conical surface may be ground by varying the pressure and lateral movement.



Ray S. Brown, Columbus, Ind.

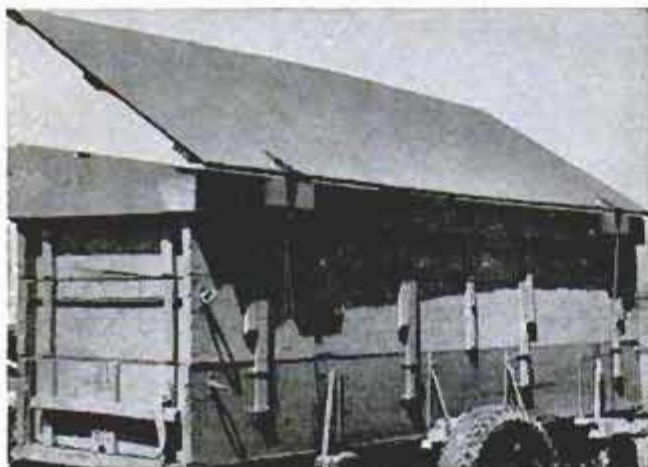


Working Drawings Kept Flat On Board Under Bench Top

Working drawings and sketches that quickly become wrinkled and soiled when used in a workshop can be kept clean and flat by thumbtacking them to a paddle board fitted in slides under a workbench top. When working at the bench, the board can be pulled part way out, as indicated, so a drawing can be studied. A hole drilled in the paddle-board handle permits hanging the board on a nail driven into a wall, when such a location is more convenient to the work.

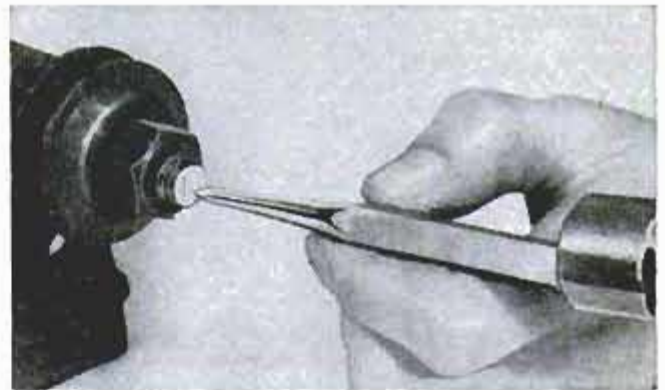
Cover Over Feed-Lot Wagon Box Protects Feed From Weather

A wagon box used for feed-lot purposes offers the most protection for the feed it contains when it is equipped with a waterproof hinged cover elevated on one side to permit rainwater runoff. The cover is hinged on one side and has a chain brace to allow it to be tipped back when feeding or filling. As a safeguard against wind a hinged hasp can be fitted to the lid and the corners wired to the wagon bolsters.



End of Shaft Marked With Letter Indicates Left-Hand Thread

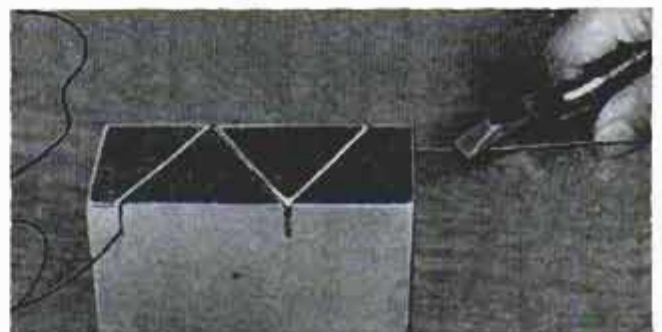
On arbors, mandrels and other machine parts that have left-hand threads, it is advisable to provide an identifying mark to aid in preventing an attempt to remove the nut by turning it the wrong way. One method is to mark an "L" on the end of the threaded shaft. This can be done by using a letter die or by using a fine-pointed center punch to outline the letter in small punch marks.—R. Hanscom, Elmhurst, Ill.



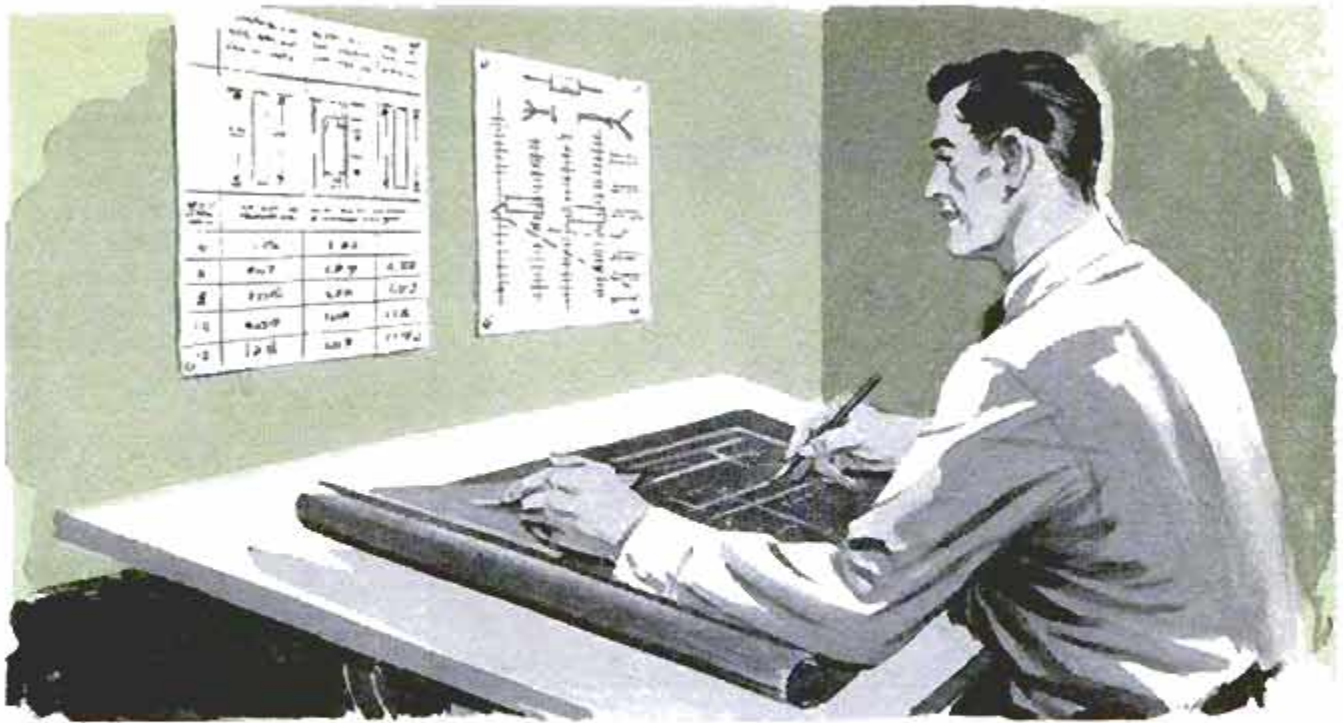
Simplify Engine Maintenance

To simplify maintenance on an automobile engine, when installing the head, first thoroughly clean the studs or head bolts, and the bolt holes in the block or head. Best results are obtained by using a tap and die and a wire brush. When all parts are cleaned, and before head installation, wipe graphite grease on all bolts and in bolt holes. The grease will provide lubrication to permit turning the bolts to even tension and, since graphite grease is not affected by heat, will keep the bolts corrosion-free to permit easy removal at a later date.

How to Straighten Wire Quickly



When working with small-diameter wire in modelmaking, keep it straight for easier handling. One way to straighten it is to use a block like the one shown. This is merely a short piece of 2 x 4 having a Z-shaped saw slot $\frac{1}{2}$ in. deep in the narrow side. Thread the wire through the slot and pull with pliers.—Phil McCafferty, Stanwood, Iowa.



Alignment Chart Calculator for Lumber

By J. B. Mullen

Table below is used in conjunction with alignment charts to figure number of identical timbers needed

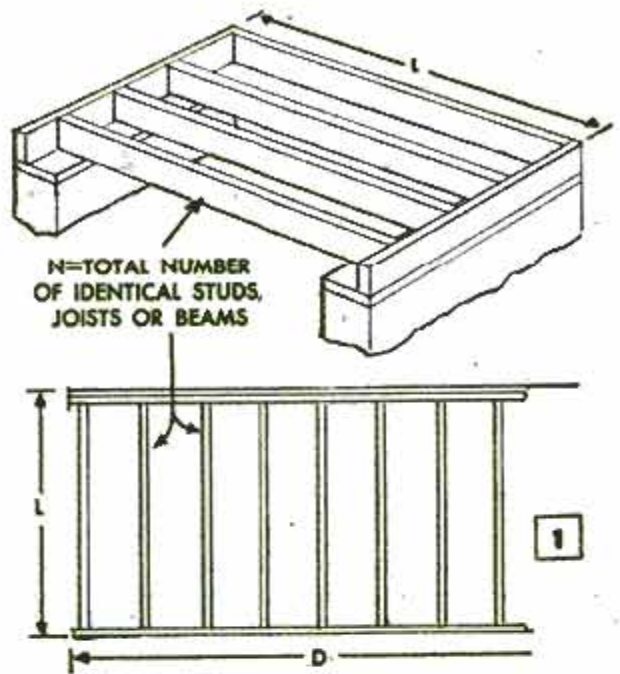
THE USE of alignment charts will reduce the ordinarily time-consuming job of figuring the amount of lumber needed for a construction job to a simple matter of holding a straightedge across the correct figures on the charts.

Because lumber generally is sold on the basis of so many dollars per thousand board feet, the alignment charts permit converting building dimensions and lumber sizes into board feet. It then is a simple matter to convert board feet to dollars and cents.

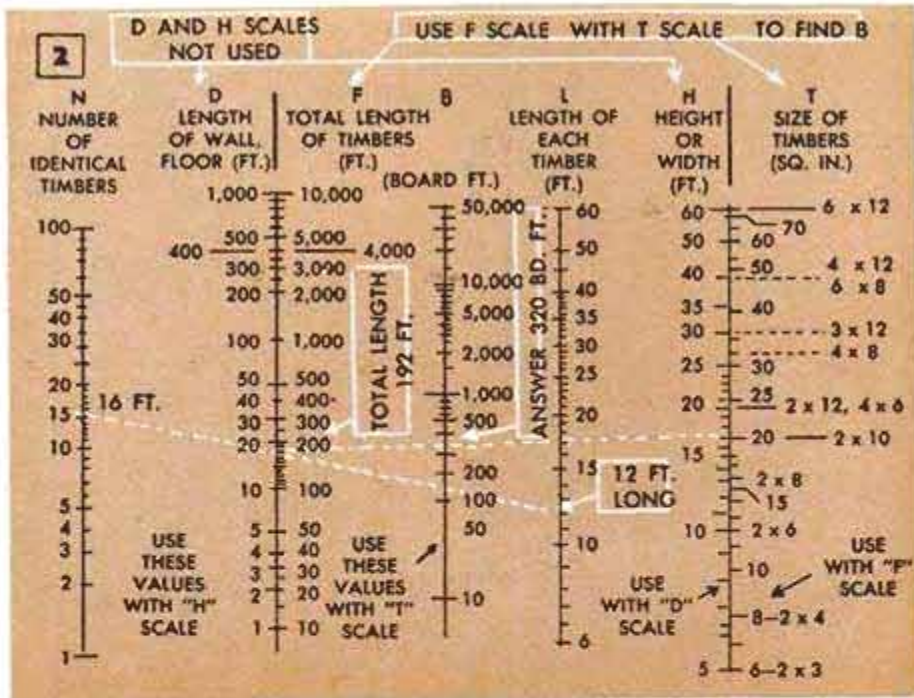
When using the alignment charts, it is necessary to know the number of identical timbers. Use of the table in Fig. 1 permits doing this quickly. The formula used in the table is: N, the number of timbers, equals D, the length of the wall or structure, multiplied by S, which represents the spacing used, plus 1, plus X. The X factor must include 2 for each door or window opening, plus 2 more if double studs or beams are used in the ends of the structure.

Lumber requirements fall into two general categories. One covers "dimensioned lumber" used for framing, such as 2 x 4 studs and 2 x 8 joists. The second includes 1-in. lumber, commonly used for sheathing, siding and flooring.

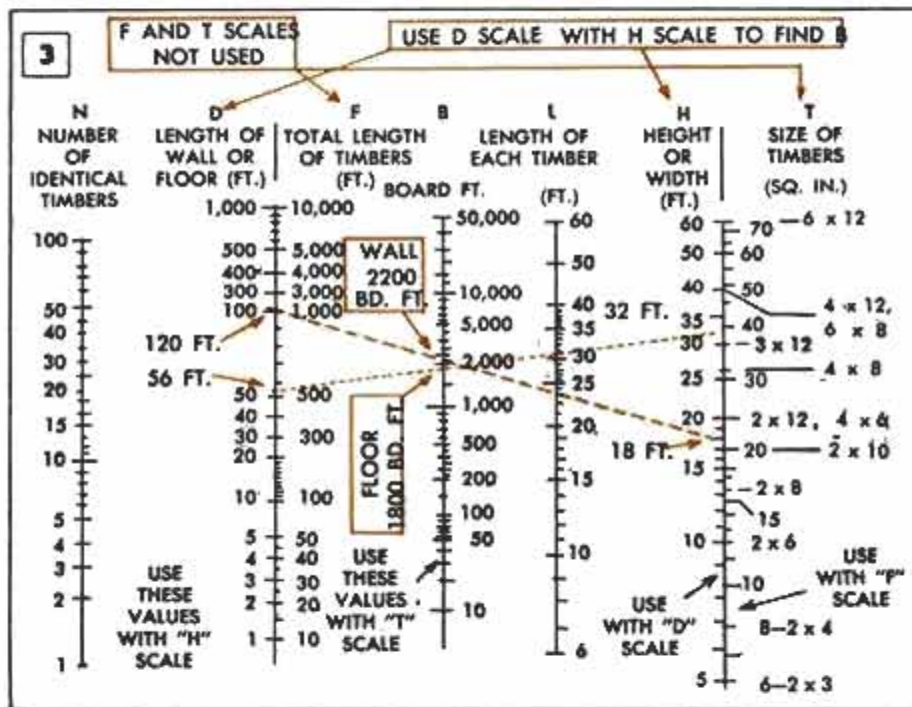
Fig. 2 shows an example of using the alignment charts to figure the board feet



FOR UNIFORMLY SPACED STUDS TO COVER A DISTANCE "D" $N = (D \times S) + 1 + X$		
SPACING CENTER TO CENTER	S	X
12"	1	2 IF ENDS ARE DOUBLE, PLUS 2 FOR EACH DOOR OR WINDOW OPENING
16"	$\frac{3}{4}$	
24"	$\frac{1}{2}$	



The example shown above indicates the required timbers in board feet



The board feet of siding that are needed is shown in the above example. In Fig. 4, below, is the factor table for finished 1-in. lumber shapes

4

	COMMON BOARDS	TONGUE-AND-GROOVE ROUGH FLOORING	BEVEL SIDING
	NOMINAL WIDTH ACTUAL WIDTH = (NOMINAL - 3/8")	NOMINAL WIDTH ACTUAL WIDTH = (NOMINAL - 1/4")	NOM. WIDTH ACT. WIDTH EXPOSED WIDTH = (NOMINAL - 1 1/2")
NOMINAL WIDTH	TRIMMING AND OVERLAP FACTOR		
4	1.10	1.23	
6	1.07	1.14	1.33
8	1.05	1.10	1.23
10	1.04	1.08	1.18
12	1.03		1.14

required when 16 joists 12 ft. long are needed, the joists to be 2 x 10s. The figure 16 (number of joists) is located on the N scale and a straightedge is placed from it to the number 12 (length) on the L scale. Total footage is indicated at the point the straightedge crosses line F, in this case 192 linear feet. Next, the straightedge is placed on 192 ft. on the D line and across to the T line on 2 x 10. The point at which the straightedge crosses the B line indicates the number of board feet required. If a 2 x 10 was not indicated on the T line, an equivalent cross-sectional area would be used, in this case 20 (2 x 10).

Fig. 3 shows an example of using an alignment chart to figure the amount of sheathing required to cover the four walls of a house. The house is 28 ft. wide and 32 ft. long, with a wall height of 18 ft. On chart D is 120 ft. (2 x 28 plus 2 x 32), and H is 18. When a straightedge is held between these points, board feet can be read directly from the B scale.

The nominal size of lumber is its unfinished size. Finished lumber bought at a yard is considerably reduced in dimension, for example a 2 x 4 actually measures about 1 5/8 in. x 3 5/8 in. The reduced dimension makes no difference in dimensioned lumber used for framing, but does affect sheathing, siding and flooring where a definite area must be covered. Fig. 4 shows the approximate amount lost in trimming and overlap for several lumber types. The number of board feet determined by using the chart must be multiplied by the proper trim or overlap factor to get the number of board feet of finished lumber. ★ ★ ★

Folded Magazine Used as Vise For Holding Pipe

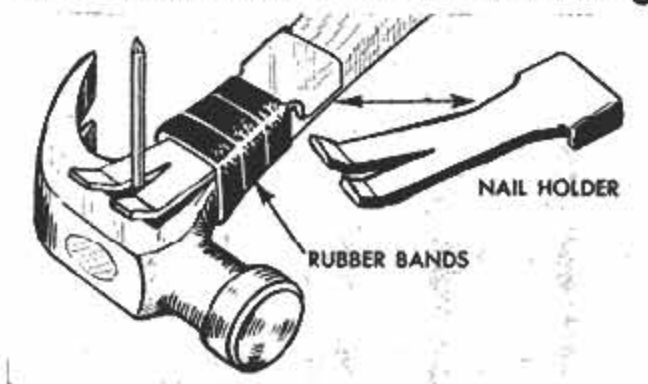


When it is necessary to drill a hole through a pipe or rod and there is no vise or clamp available, the work can be held firmly with a magazine. Simply fold the magazine around the pipe and hold it with one knee as shown. The same method can be used when cutting

pipe or rod with a hacksaw. If the work is of a small diameter, several magazine pages should be rolled tightly around the circumference before placing it in the magazine fold for drilling or cutting.

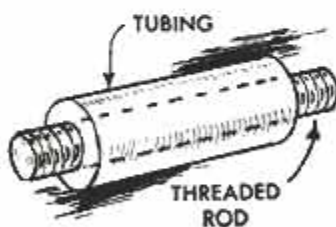
James Harris, Tucson, Ariz.

Nail Holder for One-Hand Starting



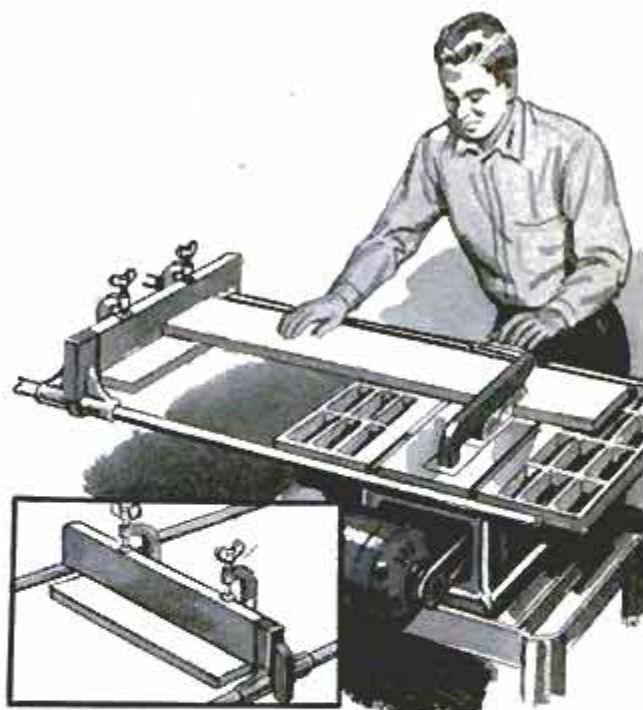
A nail holder cut from a strip of metal and lashed to the side of a hammer with rubber bands will permit starting a nail in a hard-to-reach place. There is the added advantage of not interfering with the normal use of the hammer if the holder is left attached. The rubber bands can be cut from a discarded bicycle inner tube.

Threaded Rod and Tubing Provide Stud Assembly



When making a stud bolt of the type used to space parts or members, some of the labor involved can be avoided by fitting a piece of tubing

over a length of threaded rod. Cut the rod equal to the over-all length of the stud required. Then cut a piece of tubing to a length equal to the required spacing and slip it over the rod.

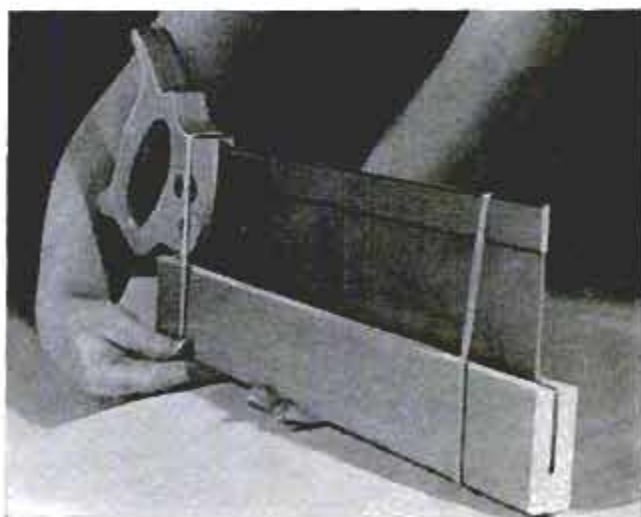


Modified Saw-Table Extension Assures Duplicate Cuts

Duplicate pieces of fairly long stock can be crosscut quickly and accurately on a table saw if the table is equipped with long ripping-fence guides. Clamp a short piece of scrap wood to the bottom of the ripping fence and allow it to project enough to support the free end of the work. Locate the fence so the end of the work just touches it as it is being cut. Hold the work firmly against the crosscut guide and keep the free end aligned so the saw does not bind. N. C. Dickie, Johannesburg, South Africa.

Teeth on Backsaw Protected By Wooden Guard on Blade

A wooden guard is used by one craftsman to protect the teeth of a backsaw when it is carried in a box with other tools. The guard is merely a grooved length of wood, which is held in place by a couple of rubber bands.



Knowing what pipe and fittings to use and how to measure pipe runs enables any homeowner to do simple home-plumbing jobs

Do Your Own Home-Plumbing Jobs

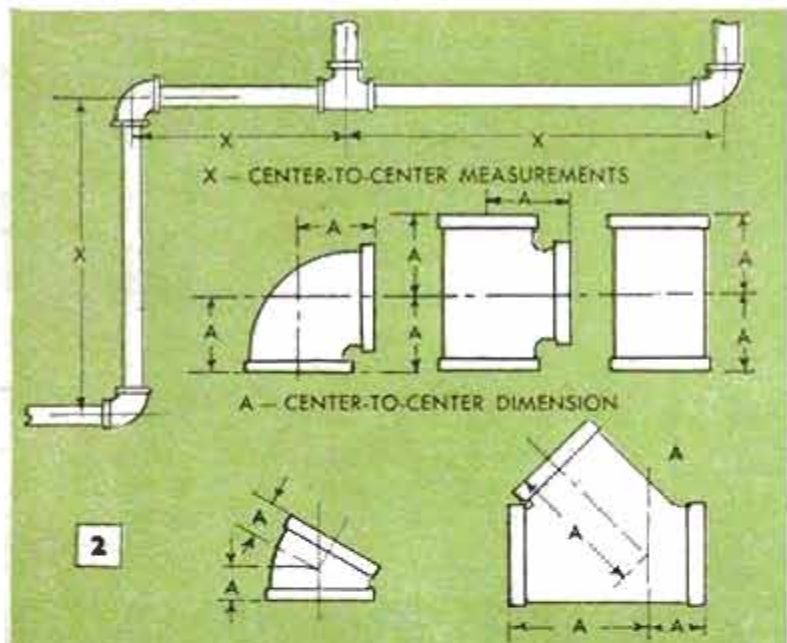


ARE YOU PLANNING to extend a water-supply or drainage pipe, or are you about to replace part or all of it because of tree-root invasion or general deterioration? In either case, you will want to know more about what type of pipe to select and how to install it properly.

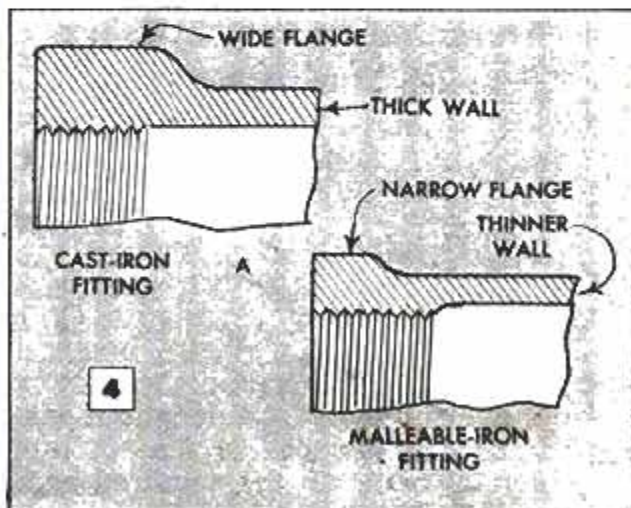
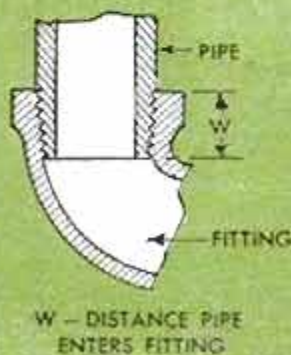
Water-Supply and Drainage Pipe

Threaded, galvanized-steel or wrought-iron pipe is used for water-supply lines, although brass or copper pipe will last much longer. Copper tubing and in some cases plastic pipe also can be used. For drainage lines up to 3-in. dia., wrought-iron pipe and special drainage fittings are used. For larger drainage lines inside the house, most plumbing codes require the use of bell-and-spigot, cast-iron pipe. You can use vitrified-clay, cast-iron, asbestos-cement or bituminized-fiber pipe for outside drainage lines such as a house sewer.

A pipe vise and two pipe wrenches are needed to handle threaded pipe. Cutting is done with a pipe cutter, and threading with a stock and pipe dies. Burrs left by the cutter on the inside of



NOMINAL PIPE SIZE (in.)	NORMAL ENGAGEMENT FOR TIGHT FIT (in.) (W)
1/8	3/4
1/4	5/8
3/8	3/4
1/2	7/8
3/4	1
1	1 1/8
1 1/4	1 1/4
1 1/2	1 5/8
2	2
2 1/2	2 3/4



the pipe are removed with a reamer. Cutting oil should be applied when cutting or threading.

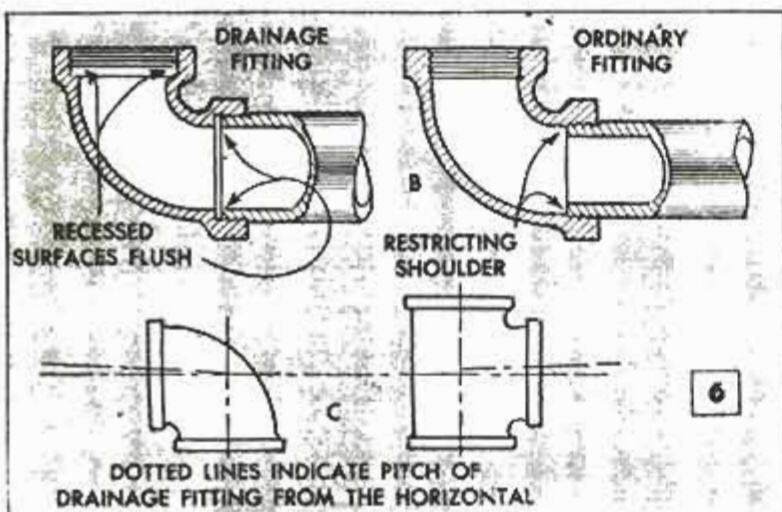
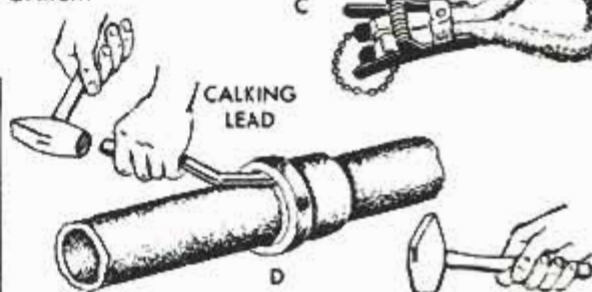
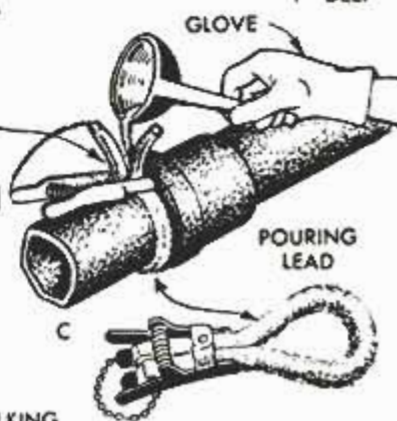
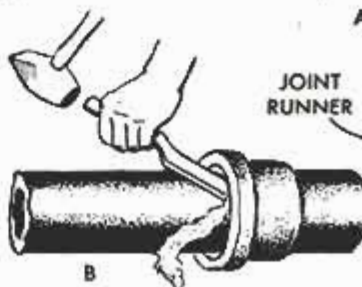
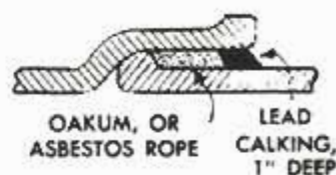
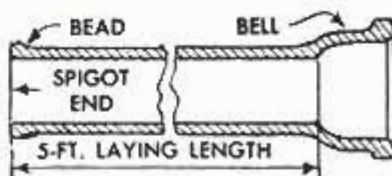
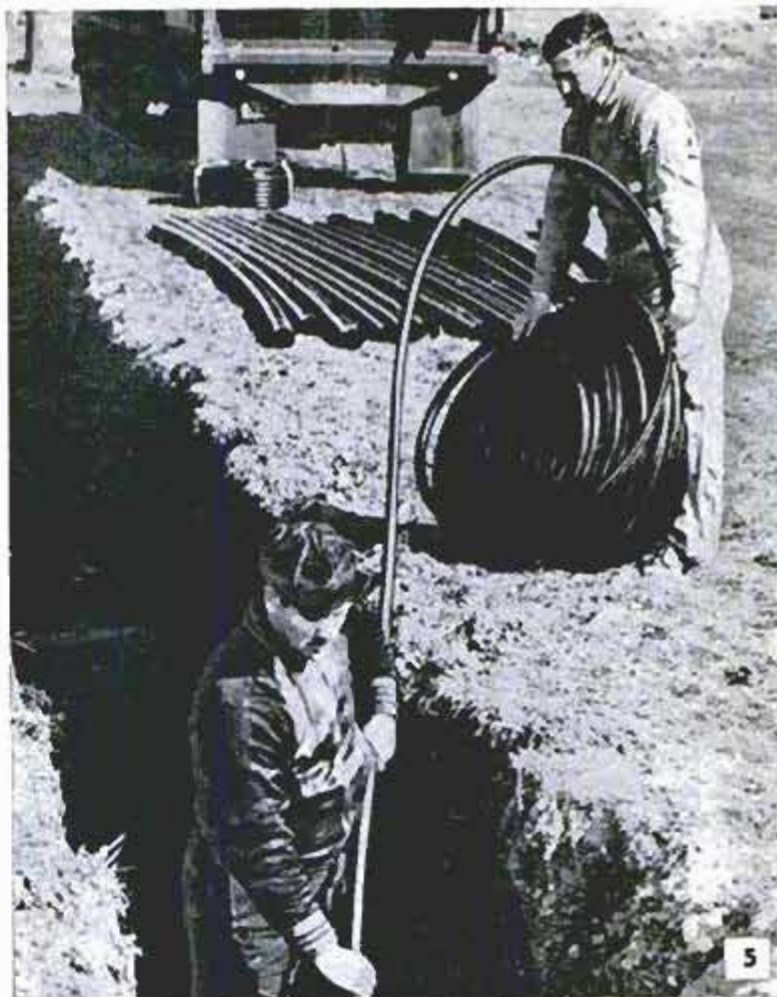
To measure lengths of pipe for an installation, take the dimensions as shown in Fig. 2. From each dimension "X" subtract dimension "A" of the fitting to which the pipe connects at each end. Dimension "A" is taken along the center line of the fitting and is the distance from the face of the opening to the point where two center lines intersect. Next, add the distance "W" at both ends of the pipe. This is the distance that the pipe will enter the fittings, and varies with the nominal pipe size as given in Fig. 3.

Assembling Threaded Pipe

Before assembling pipe and fittings, brush threads clean and apply joint-sealing compound on two or three of the outer threads of the pipe. Do not coat the inside of a fitting, since the compound might collect at the end of the pipe and obstruct the flow of water. Avoid excessive pressure on a pipe wrench, and apply it at least 2 in. from the end of a pipe to prevent bending the pipe out of round. When pipe is assembled with close return bends and there is not enough clearance to use a conventional pipe wrench, it may be necessary to use a girth wrench as shown in Fig. 1.

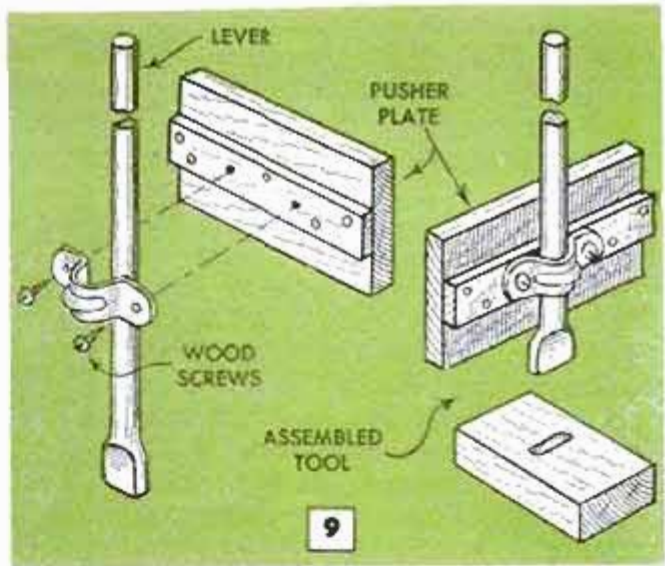
Threaded Pipe Fittings

Pipe fittings of malleable iron are preferred to cast iron generally, as they are tougher and less brittle. Fig. 4 shows the difference between the two types. Cast-iron fittings have thicker walls and wider bands and are used mostly





8



10



11

for house drains to sewer or septic tank.

Drainage fittings are recessed at the threaded portion so that the inside surface of the pipe will be flush with the inside surface of the fittings, which prevents solids from accumulating at a joint. Detail B, Fig. 6, shows the difference between regular and drainage fittings in this respect. Another important difference is that the latter has one or more slightly pitched outlets, as shown in detail C, to match the usual $\frac{1}{4}$ -in.-per-foot pitch of horizontal drainage pipes.

Plastic Pipe

For many applications plastic pipe has specific advantages. Its weight is $\frac{1}{8}$ to $\frac{1}{3}$ that of ordinary pipe of corresponding

size. It is rot and corrosion proof, and can be cut easily with a knife or saw. The material has been found highly satisfactory for jet wells and other cold-water installations. Most brands of plastic pipe should not be installed where the pipe is subjected to excessive heat. Some are vulnerable to rodent attack where exposed.

Available in nominal inside diameters from $\frac{1}{2}$ to 6 in., plastic pipe comes in rigid, semirigid and flexible form. The latter is used in trenches as shown in Fig. 5, and comes in 100 and 400-ft. lengths. Freezing water will not damage it. Rigid pipe is obtainable in 20-ft. lengths and is used for well casings, septic-tank lines, field drainage and irrigation lines.

Fittings for plastic pipe permit any type of connection, which may be of the insert type held securely with clamps, or a fitting which is attached to the pipe with cement. Threaded and compression fittings may also be used in some cases. Threaded joints are practical for low pressure or gravity lines but are not recommended for vertical runs. When threading plastic pipe, a mandrel should be inserted for support, and plain or soapy water applied as a cutting solution. Strap wrenches are used to assemble threaded plastic pipe. No joint-sealing compound is required.

Bell-and-Spigot Soil Pipe

Made of cast iron and coated with coal-tar pitch for protection, bell-and-spigot soil pipe (Fig. 7) comes in 5-ft. lengths. The 3 to 6-in. diameters (inside) are used generally. Lengths with a bell at each end also are furnished for economy when two short lengths are required.

When assembling this type of soil pipe the bell end of each length should face "upstream." Joining ends should be clean and dry, and in perfect alignment. The latter is checked by means of a taut cord held parallel to the axis of the pipe. Wrong

alignment will make it difficult to form a tight joint. To seal a joint, first tamp oakum, hemp or asbestos rope tightly and uniformly into the joint with a yarning iron and hammer as shown in Fig. 7-B. The packing should come to about 1 in. from the rim of the bell so that enough space is left for the lead, which is poured next.

For horizontal pipe a joint runner, as shown in Fig. 7-C, is needed to retain molten lead in the joint. Use calking lead only, obtainable in 3 to 5-lb. cakes. Melt it in a plumber's firepot and pour with a ladle when the lead is heated to a cherry-red color. Fill the entire joint at one pouring if possible. Since lead shrinks slightly upon cooling, it must be tamped with a calking iron, as in Fig. 7-D, to make it fit snugly.

Soil pipe can be cut with a cold chisel as shown in Fig. 7-E. After marking, score the pipe lightly, moving the chisel forward for overlapping cuts. Then set the pipe on wooden blocks or on a sandbag and deepen the score with increasingly heavier blows, until the pipe can be severed with a few sharp blows.

Fittings for cast-iron soil pipe have ends like the pipe and are joined similarly. The angle of a fitting is usually designated as a "bend," a $\frac{1}{4}$ bend being $\frac{1}{4}$ of 360 deg.

Asbestos-Cement Pipe

Asbestos-cement pipe also is used for outside drainage lines. The long lengths of the hard, strong pipe permit laying a line with fewer joints. The type used for house-to-sewer connections comes in 5 and 10-ft. lengths and has machined ends which take couplings of the same material. Durable rubber rings between pipe ends and couplings make slightly flexible and rotproof joints. Figs. 10 and 11 show a joint before and after assembling. Pipe and couplings are forced together with a simple tool detailed in Fig. 9. When short lengths are needed the pipe is cut with a handsaw. A variety of fittings are available. Machined ends are made with a special cutting tool.

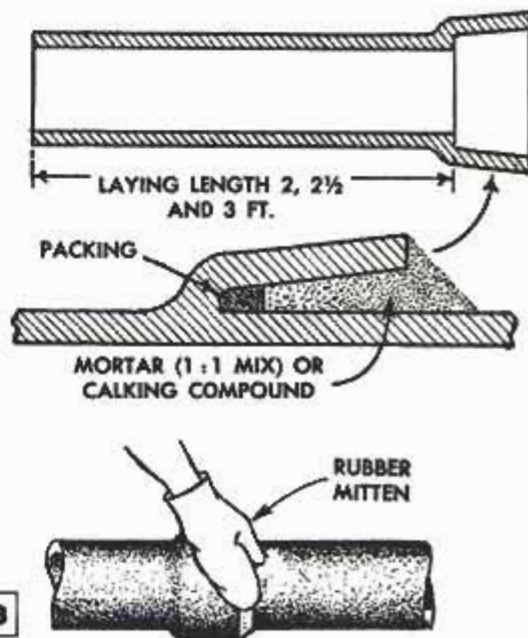
Vitrified-Clay Pipe

Vitrified-clay pipe, Figs. 12 and 13, is durable, comparatively low in cost and easy to install. It is available in straight and curved lengths, with numerous fittings. One end of each length or fitting is bell-shaped to fit over the end of the adjoining member.

While good joints can be made with mortar applied over a packing of oakum or jute, poor workmanship usually is responsible for entrance of roots. Once inside the pipe, the roots expand and often break it. To avoid this difficulty, clean the joints of dirt and grease so that the mortar will adhere properly. Then bring the pipe



12



13

lengths together snugly and seal the crack with a shallow layer of packing tamped down lightly. Follow with a layer of fairly stiff mortar consisting of equal parts of clean, sharp sand and portland cement. The surplus on the outside can be rounded off, using a rubber mitten as shown in Fig. 13. After the mortar has set, cover with sand to avoid too rapid drying, which would prevent it from attaining its maximum strength.

Each length of pipe should rest on compact earth for most of its length, with clearance under the joints only. The pipe



should not be moved after mortar joints have been formed.

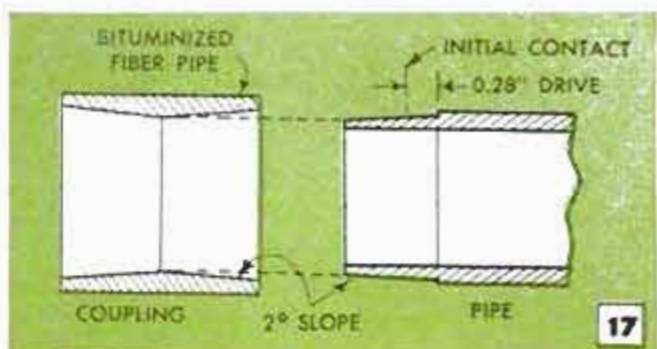
Asphalt-Base Joint-Sealing Compound

Asphalt-base joint-sealing compounds that provide tight yet slightly flexible joints generally are preferred to mortar where trouble is experienced from root penetration. Most of these compounds are poured hot into the joints over a base seal of oakum. A compound should be used at the temperature recommended by the manufacturer, since overheating makes it brittle and underheating allows the compound to harden before a joint can be completely filled.

To facilitate the work, several lengths of pipe can be joined into a long unit by stacking them in a rack as shown in Fig. 12, and assembling the units in the trench after the compound has hardened.

Bituminized-Fiber Pipe

In addition to its use for outside drainage lines as shown in Fig. 14, bituminized-fiber pipe can be used for downspouts, conductor pipes for irrigation, and also for gravity-type water-supply lines on farms and ranches. It is lightweight, noncorroding and semiflexible. Available in 5 and 8-ft. lengths, the pipe has tapered, machined ends which join couplings that are tapered internally as shown in Figs. 16 and 17.



Driven together with a block and hammer, Fig. 15, the joints are so tight that tree roots cannot enter. Bends and fittings of numerous types are available, and connections can be made to threaded or bell-and-spigot-type soil pipe by means of adapters. Joints to the latter are sealed with flexible-joint compounds or lead wool. An ordinary handsaw is used to cut the pipe. A special cutter is used to taper ends cut in this manner, although the ends also can be tightly sealed with a special coupling.

Installing Pipe

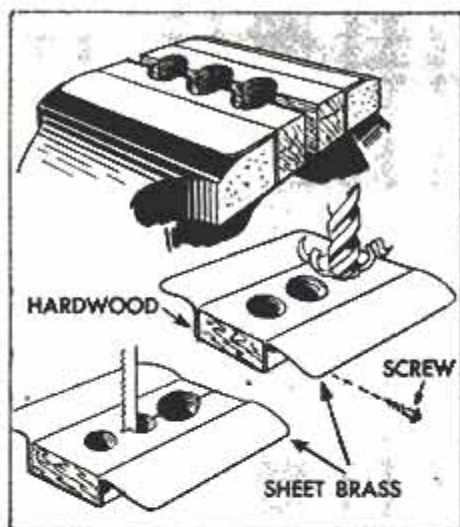
Water pipes should be installed so that they can be drained completely. Insulation should be used on pipes that are subject to freezing. All pipes must be adequately supported, but not so rigidly that they will be under strain when temperature changes cause them to expand or contract. Horizontal steel pipe should be supported by straps at intervals of not less than 12 ft., cast-iron soil pipe at intervals not over 5 ft. and as near the joints as possible. Risers should be held by collars or yokes which should be spaced not over 1½ stories for threaded pipe and not over 1 story for soil pipe. Drainage pipe requires a pitch or slope of ¼ in. per foot, so that the liquid inside will flow easily. Underground pipe should be laid on compact earth that will not settle. ★ ★ ★

Lengthening Chain-Hoist Life

One means of lengthening the useful life of a chain hoist is to remove the lower, movable sheave and fit it in the free loop of the chain. Since the action of the hoist now is reversed, wear also will be in the opposite direction on chain and sprockets.

Covers on Bench-Vise Jaws Protect Tubing

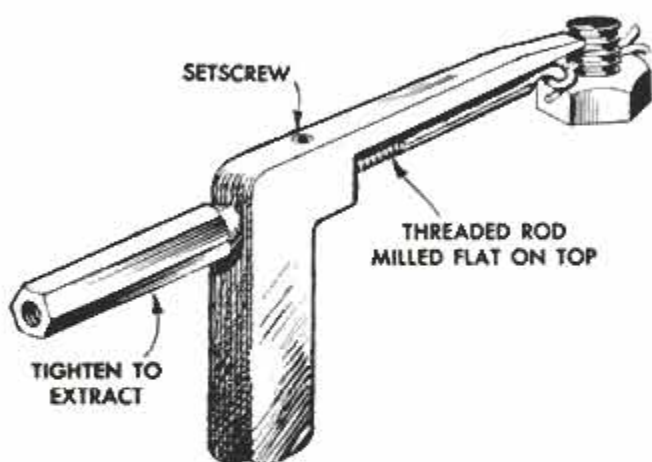
Wood or fiber covers fitted over the jaws of a bench vise will permit holding polished or chrome-plated pipe and tubing without damage. Two L-shaped sheet-brass flanges first are cut and bent to fit over the jaws of the vise. The vertical edges then are drilled and both flanges are screwed to a block of hardwood or fiber. Several holes, to accommodate various sizes of tubing, are drilled along the center line of the block which now is cut in half. The width of the saw kerf permits the two halves to grip the tubing when the vise jaws are



closed. Use of heavy material for the block will increase the holding power of the block, for a better grip on tubing in it.

Special Cotter-Pin Extractor For Use in Restricted Space

If your work frequently requires the removal of cotter pins in places where it is difficult to use the more common types of extractors, try this one. With it you can reach into restricted places and extract a pin merely by turning a long hex nut. The tool consists of a body cut from $\frac{5}{8}$ -in. steel plate to a rough pistol shape. A hole is drilled for the extractor rod which is a length of $\frac{5}{16}$ -in. drill rod, threaded for half its length. A flat is ground on the top of the threaded portion and a hook is formed in the opposite end of the rod. A setscrew



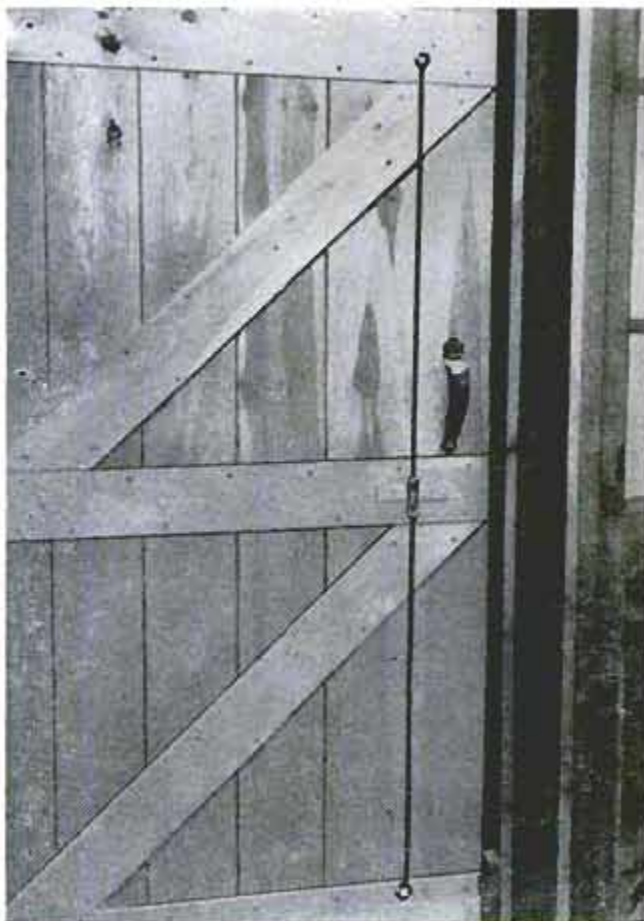
turned into a tapped hole on top of the extractor body bears against the flat on the extractor rod and prevents the latter from turning when the hex nut is tightened on it. The hex nut is a length of hexagonal steel bar, drilled and tapped to turn on the drill rod. When a cotter pin proves stubborn a wrench can be used on the nut to provide more power.

C. H. Willey, Penacook, N. H.

Warped Doors Straightened With Turnbuckle and Rods

Warped doors on his poultry houses are kept in proper alignment by one poultryman by utilizing heavy turnbuckle braces of the type used to correct sagging screen doors. The brace is located on the convex side of the warp. It may be necessary to tighten the turnbuckle at intervals of two or three days, until the door is straight.

Charles L. Stratton, Hollis, N. H.



Bushel Basket Used as "Persuader" to Drive Hog up Truck Ramp



A bushel basket was used by one livestock buyer as an aid in driving several hogs up a ramp into a truck. The buyer held the basket over the head of one hog, which caused the animal instinctively to back away and up the ramp. When the other hogs heard the first in the truck, they lost their reluctance to being driven in.

Sanding Renews Wiper Blades

To get better service and prolong the life of your auto windshield-wiper blades, give them a thorough cleaning with soap and water and remove oxidized rubber and hardened foreign material with an abrasive. After the cleaned blade is dry, rub its wiping edge across a sheet of fine sandpaper with a light, lengthwise movement until a continuous line of fresh rubber is exposed along the entire edge.

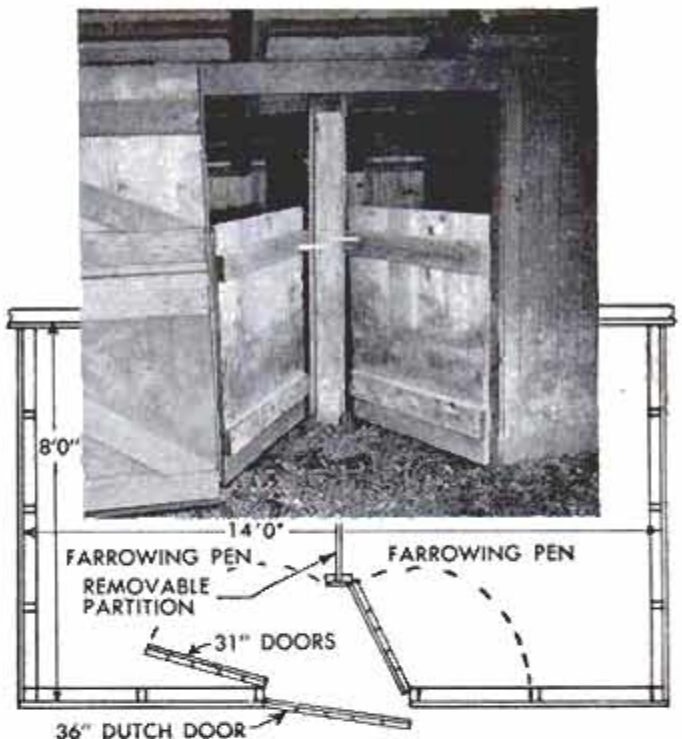
E. Carranza, Lodi, N. J.

Portable Concrete Platform Towed Behind Tractor

A portable platform of this type will have many uses on the average farm. It is ideal to prevent mudholes under temporary watering tanks, and is very handy as a portable feeding platform for hogs fed in the field. The reinforced concrete platform is 3 in. thick, 6 ft. wide and 8 ft. long. Steel rods cast in the concrete extend from opposite sides of the platform and are bent to form loops. A chain passed through the loops permits the platform to be towed by a tractor. Heavy objects are easy to load, because the loading surface is less than 3 in. off the ground, eliminating the need for a loading platform or a ramp.



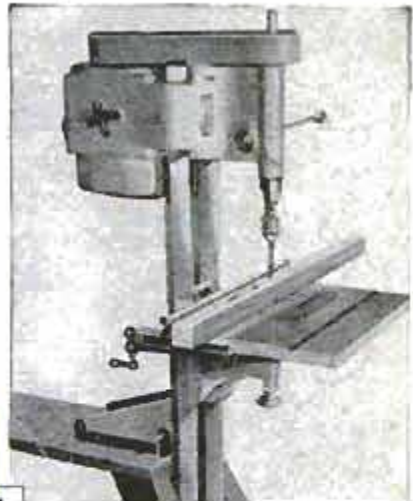
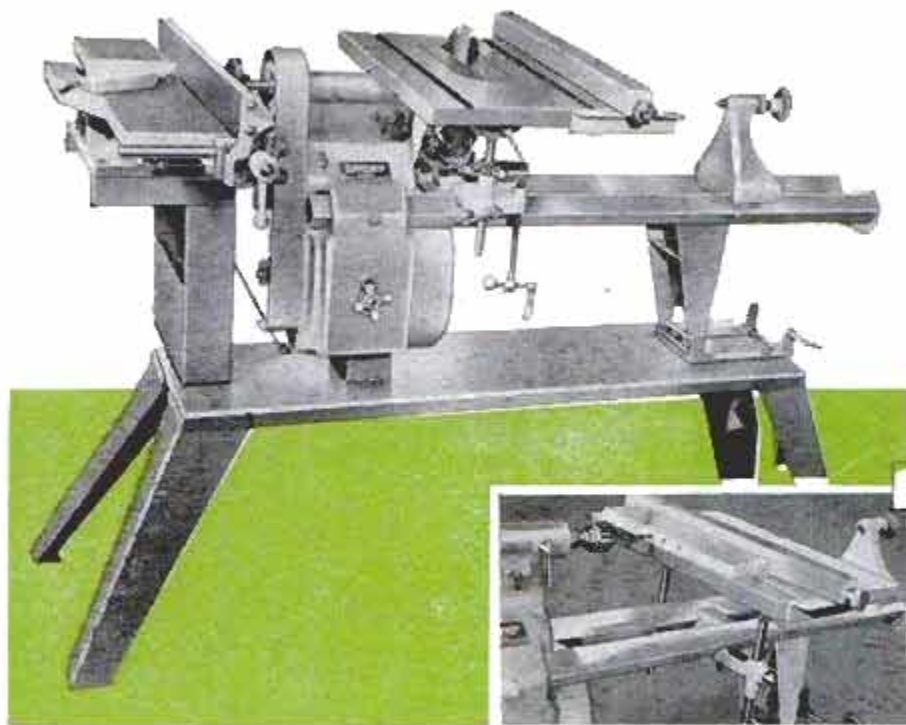
Farrowing-Pen "Entry Hall" Provided by Inside Doors



The removable partition in this farrowing pen is located so that two doors hinged to the pen wall on either side of the outside door divide the pen in half and leave a triangular-shaped area just inside the main door. The farmer can stand inside the shelter of the pen while observing the sows and pigs. A Dutch door is used for the outside entrance, so the upper half can be opened for light and ventilation when the partition is removed and the pen is used for pigs being readied for market.

George Laycock, Batavia, Ohio.

SHOPPING FOR TOOLS



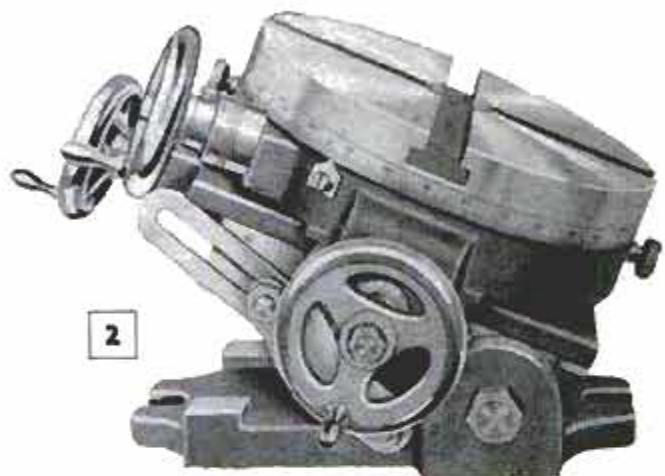
1. COMBINATION SHOP POWER TOOL is a lathe, drill press and bench grinder, and can be equipped with jointer-planer and table-saw accessories, all mounted on a 24-in. bench. The 30-in. lathe includes a spur center, tool rest, quill-action tailstock and steel spindle. Table saw is mounted on the lathe bed

and is fitted with an 8-in. blade which attaches to the spindle. The lathe converts to a drill press when a geared chuck is fitted to the spindle and the saw table is positioned on the bed as a unit. The jointer-planer accessory permits bevel, square taper and rabbet operations. All castings are aluminum

Power Tools, Inc., Beloit, Wis.

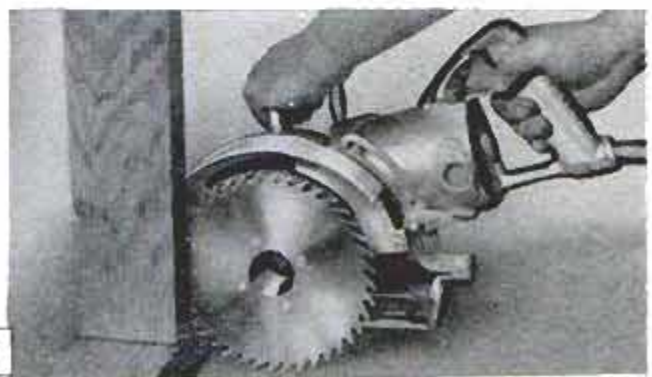
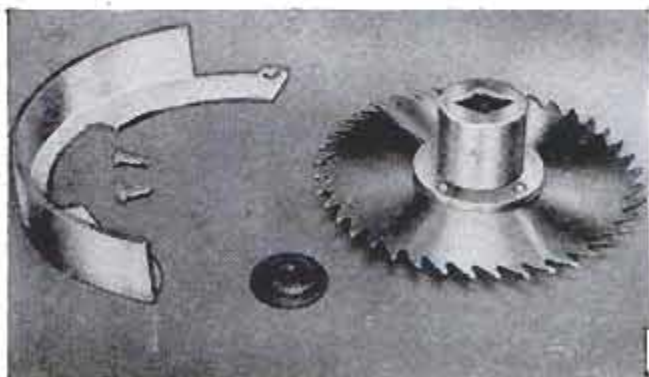
2. ROTARY INDEX MILLING TABLE incorporates rotary feed, two cross slides and a tilting feature which enables an operator to set the table at any angle from 0 to 90 deg. in a vertical plane. The dial is calibrated in 3-min. intervals, and the cross-feed dials are accurately graduated in thousandths

Chicago Tool and Engineering Co., 8383 South Chicago Ave., Chicago 17



3. PORTABLE POWER-SAW-BLADE ADAPTER permits flush cuts and cutting close to studding, rafters, etc. It is available with an attached guard and a 7 1/4-in. blade, which is riveted to a cadmium-plated hub. The diamond-shaped hole in the hub is broached for absolute accuracy in fitting it on the arbor

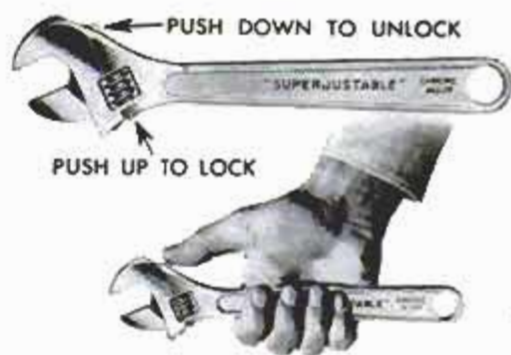
Barnes Blade Co., 16249 Colorado Ave., Paramount, Calif.





4. CHALK-LINE REEL features a flush rewind handle, a positive-action mechanical brake, and a combination hook-and-ring securing device. It is also designed to be used as a plumb bob, and is supplied with a 50 or 100-ft. line. Made of lightweight die-cast aluminum, the case is leakproof and shaped like a plumb bob. The refill cap is removed for refilling with chalk by a quarter turn to the left

Evans Rule Co., 400-416 Trumbull St., Elizabeth, N. J.



5. LOCKING ADJUSTABLE WRENCH offers rapid adjustment and a positive lock in a desired position without clumsy or unsightly obstructions or protrusions. The locking device eliminates a tendency toward loss of adjustment caused by involuntary rotation of the adjustment knurl on the movable jaw. Fumbling with the knurl to hold an adjustment is eliminated. A flick of the thumb or finger locks or unlocks the adjustment in any position. The wrench is now available in 6, 8, 10 and 12-in. sizes

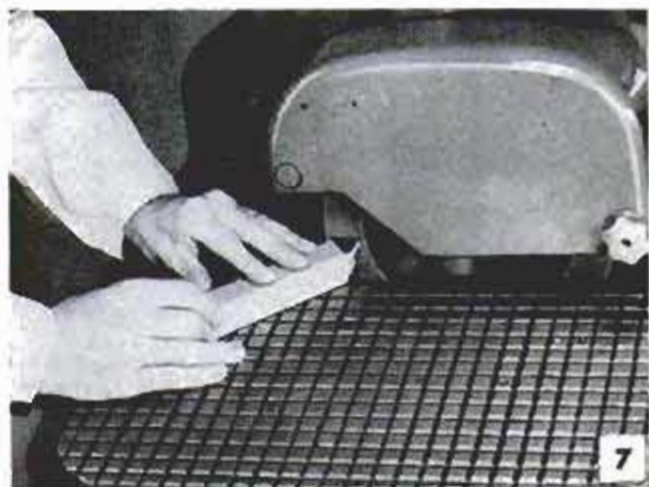
J. H. Williams & Co., 400 Vulcan St., Buffalo 7, N. Y.

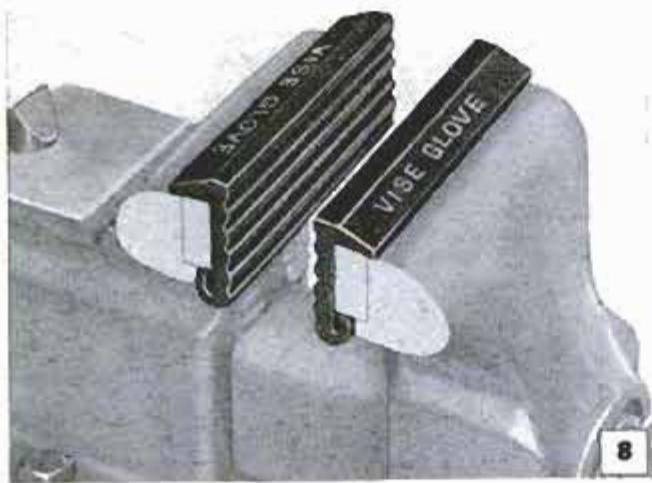
6. PRY BAR for metal-repair work on auto and truck-door panels, quarter panels, trunk lids and rocker panels enables a metal worker to pry out dented metal in areas that are inaccessible to ordinary tools. A flexible guide bar positioned over the pry-bar member permits the operator to locate an area that requires prying immediately, without unnecessary stretching of the metal by repeated bending. The pry bar is made of square stock, which prevents the metal from tearing as readily

Air Peck Distributors, N. 1619 Madison St., Spokane 17, Wash.

7. CARBIDE TOOL GRINDER removes metal from carbide and shank of tool being ground by an electrical process, with an average voltage between wheel and work of 1.5 volts. No physical contact need occur between the cast-iron grinding wheel (electrode) and the tool. Metal particles are removed from the tool by an electrical discharge crossing a gap between an electrode and the tool, which is maintained by a semisolid dielectric film. A roughing or finishing cut may be had by turning the selector

Firth Sterling Inc., 3113 Forbes St., Pittsburgh 30, Pa.





8. RIBBED RUBBER CAPS for vise jaws are new item intended as low-cost substitute for usual brass jaw covers. It is claimed that wood, glass and plastic can be held firmly in vise jaws and rubber caps will not mar materials as would brass. Called "Vise Gloves," the caps snap into place over vise jaws and are held by elasticity of rubber. Vise Gloves are available to fit all sizes of vise jaws, beginning with 3 in.

S. J. Williams, Inc., 4448 Soo Line Lane,
Schiller Park, Ill.

9. PRECISION-MACHINED PARTS are cleaned of foreign matter by "washing machine" that employs ultrasonic energy. Sound waves are passed through tub in which parts are submerged in solution of water and detergent or other cleaning fluid. Sound waves "cold boil" solution so millions of tiny bubbles literally blast material from metal. Cabinet contains ultrasonic generator and other necessary electronic circuits

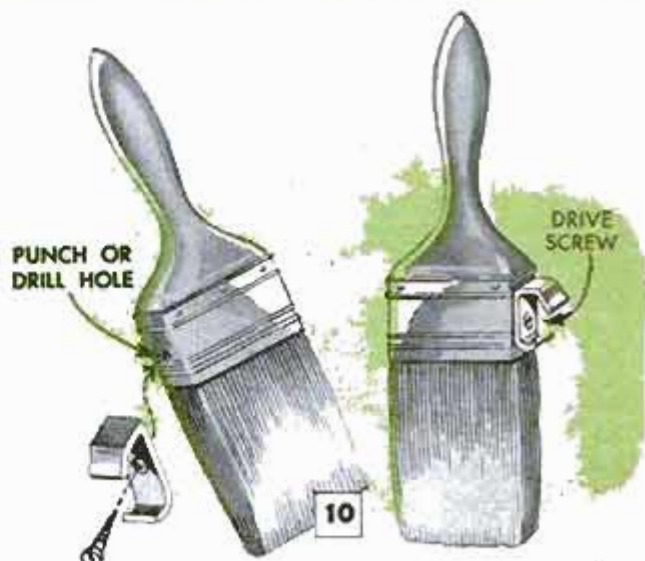
Pioneer-Central Div. of Bendix Aviation Corp.,
Davenport, Iowa.

10. PAINTBRUSH HOLDER is screwed to ferrule of brush in matter of moments. Brush then can be hung on side of paint pot or can so bristles do not touch, thus aiding in keeping brush in proper shape. Ideal for brushes stored in solvent, since it is simple matter to remove one brush without disturbing others. Holder does not in any way interfere with use of brush in normal manner. Fits any size or shape of paintbrush

Marsh Safety Equipment Co., North Andover, Mass.

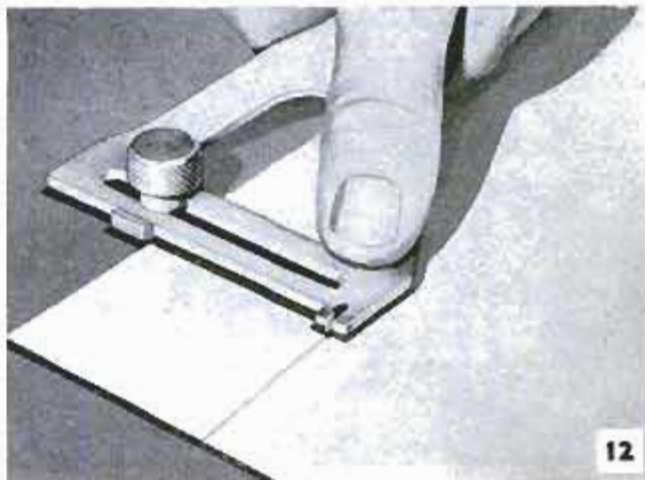
11. HIGH-TEMPERATURE CONTROL SWITCH for kilns is available in two models. One model is wired through relay so all electric current to kiln is shut off when temperature reaches desired point. Other model can be hooked to light, buzzer or other warning device to indicate when temperature is reached. Unit is then shut off manually. Switch is actuated by shrinkage of pyrometric cone held horizontally on probe

Edward G. Pierson Co., 2326 East River Rd., Grand Island, N. Y.



12. GLASS CUTTER for the home workshop has adjustable guide so glass can be cut on line exactly parallel to edge of piece being cut. Guide permits "self measuring" action when cutting narrow strips of glass. Heat-treated, high-carbon cutting wheel works equally as well on window or plate glass

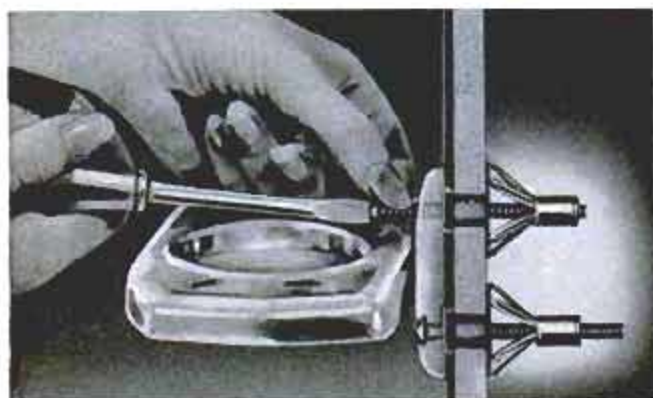
Arrow Products Co., Box 52, Dayton, Ohio.





On the MARKET

WALLPAPER CLEANER (left) removes oil-base stains caused by greasy foods, hair, hands, etc., without damage to the paper. Apply the cleaner, which is in paste form, on a stain and allow it to dry into a powder before brushing it off. If one application fails to remove stain, repeat the process
Inwood Products, 216 E. 125 St., New York City 35



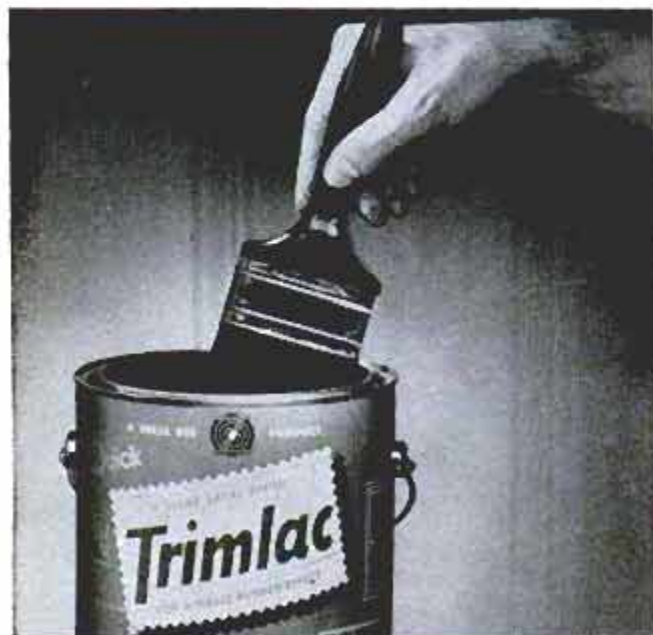
WALL-SCREW ANCHOR makes it possible to secure a bathroom fixture to a hollow wall. The metal anchor is designed to expand against the inside surface of a wall and hold a fixture in place on screws
Rocket Devices Corp., 142 Liberty St., New York City



LUBRICANT for wooden objects, such as drawers and doors, waterproofs wood and lubricates sliding surfaces. The liquid also can be used to remove grime, and is guaranteed safe on hands and furniture
Slide-Free Co., Orangeburg, N. Y.

NATURAL-WOOD-finishing material gives doors, paneled walls, wood trim and furniture a soft, lasting sheen without expensive hand-rubbing and waxing. Three coats can be applied in one day
William Zinsser & Co., 516 W. 59 St., New York City 19

PLASTIC-RESIN PAINT applied to cement, brick and other masonry interiors hardens to a porcelain-like finish which is waterproof, resists heat and staining and washes clean with soap and water
American Metaseal Corp., 607 65 St., West New York, N.J.



WHAT'S NEW IN ELECTRONICS

Personal Telephone Amplifier

for those who use telephones in noisy locations and for the hard of hearing. The ingeniously designed phone aid can quickly and easily be attached to any style of telephone. The amplifier, which consists of three transistor stages and reproducing unit, requires no warm-up time and is said to have a gain of approximately 49 decibels. A volume control permits adjustment of the output to any desired level. While the unit shuts itself off when removed from the phone, a separate off switch eliminates battery drain if it is to remain attached to the phone.

THIS NEW 3-ounce telephone amplifier, powered by dime-sized batteries, is now available



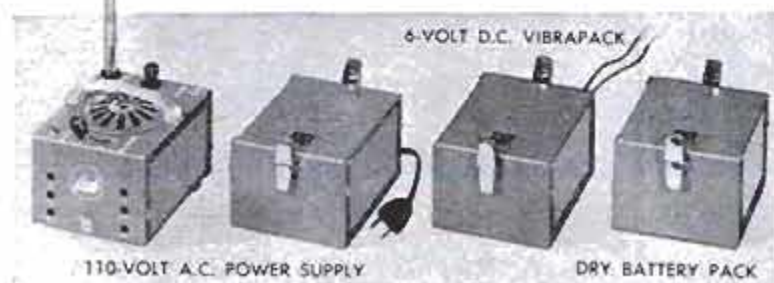
"Registered" Music

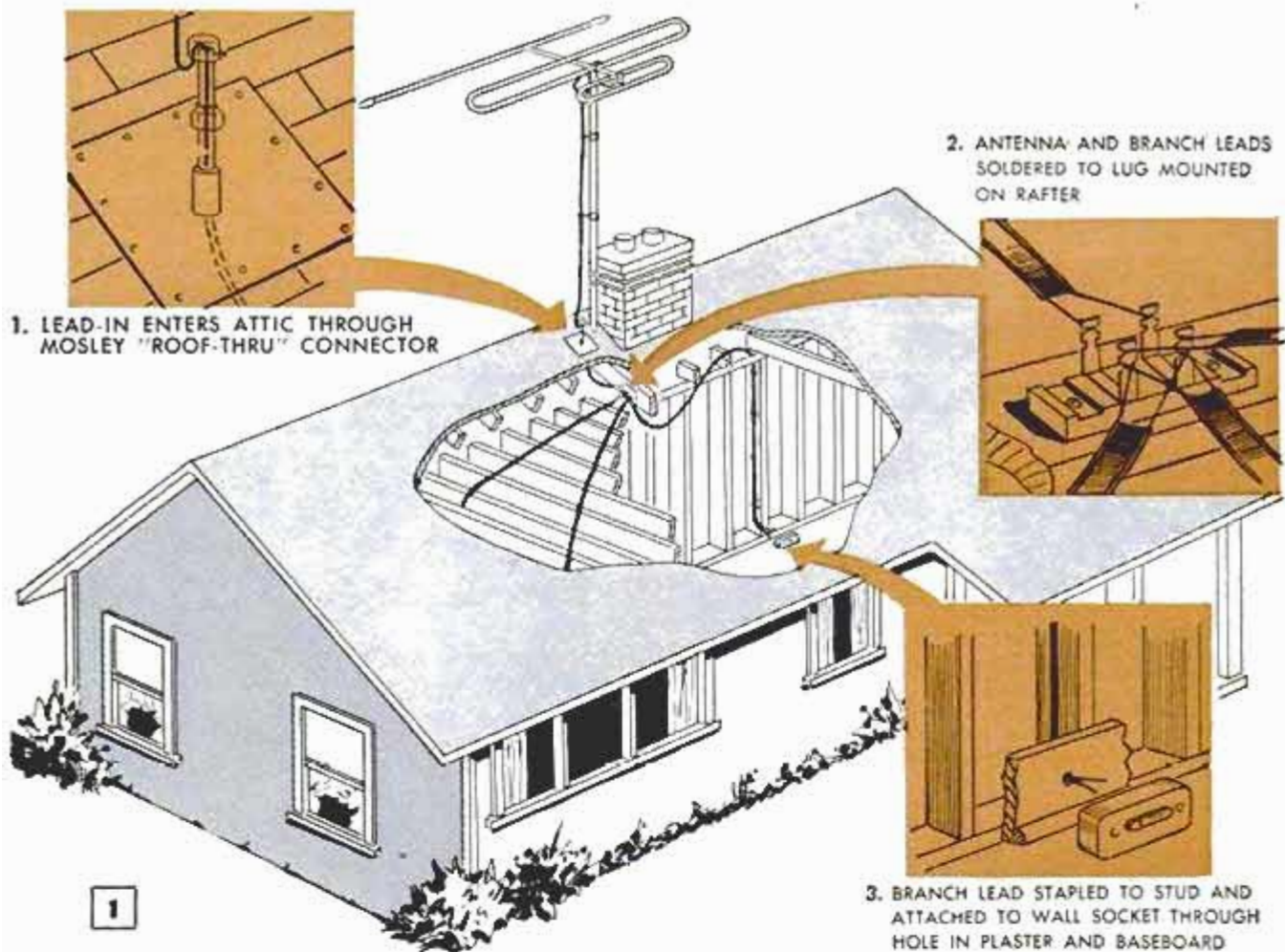
Here is a novel method for distributing music throughout the entire house that is adaptable to any home having a warm-air furnace or central air conditioning. The system can be easily installed without special tools. A specially designed steel case housing a waterproof, fungus and heat-resistant speaker and volume control is attached to the plenum chamber or "dome" of the furnace. The ends of a 20-ft. cord are connected with alligator clips to the speaker of the music system. The sound is carried throughout the house by means of the heating or cooling ducts.

All-Purpose Radio

An unusually styled radio, this unit features the utmost in versatility. Consisting of separate sections, the receiver is equally useful as a portable, mobile or home radio. The main unit contains a 4-tube superhet circuit including a 3½-in. speaker. Individually housed power supplies for various types of operation are quickly attachable to the main unit.

Universal mounting brackets permit separate mounting, if desired. A station selector switch mounted on the radio section permits instant reception from any of three pretuned stations.

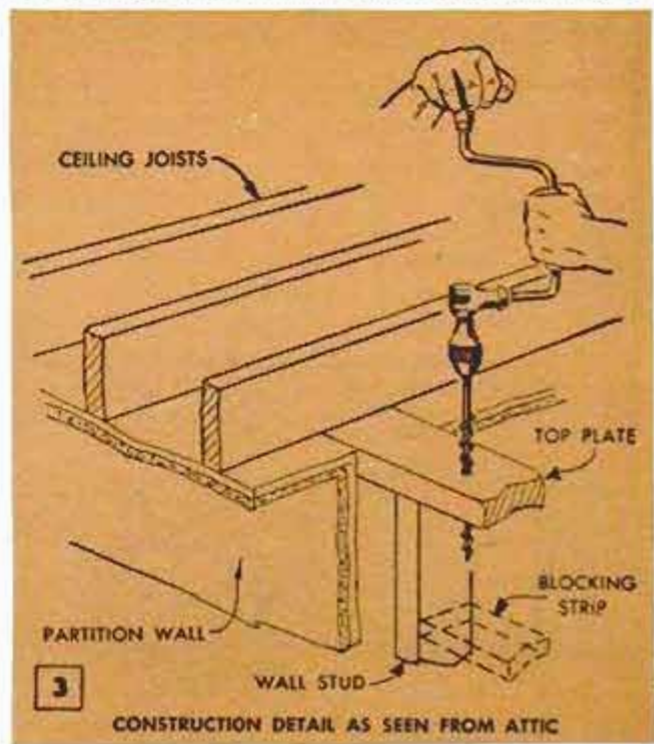
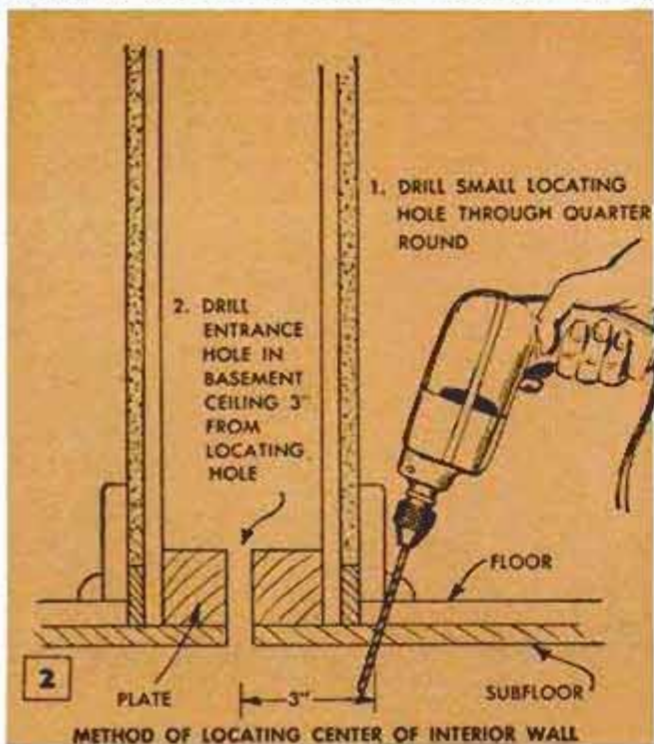




Versatile Installation "Unhitches" TV Receiver

IN MOST HOMES where outdoor antennas are needed for satisfactory TV reception, viewing is restricted to a single room of the house because the antenna lead-in is not long enough to permit movement of the set to another location. This,

however, need not be so. With some careful planning, and just a little effort, you can install your antenna system so that your receiver has all the versatility of a plug-in-type telephone. What's more, by following these installation suggestions, re-



ception is usually improved, and lead-in deterioration is greatly reduced.

The whole idea consists of running a number of lead-in lines through the walls of various rooms in which you may want to watch your set. These lines are terminated at the baseboard with special sockets so that a short lead from the set to any socket will make a direct antenna connection.

The installation is most conveniently done during the initial construction of the home. It takes only a few simple tools and an elementary knowledge of home construction, however, to adapt the method to existing homes.

Fig. 1 shows the principles involved in installing the antenna system during the construction of a home. The main lead-in from the antenna is brought into the attic by means of a "Roof-Thru" insulator, and connected to a convenient tie point. From there, individual leads run between the various wall studs to the locations where the sockets are to be installed. Small holes drilled through the baseboards permit the leads to be attached to the sockets.

For existing homes, the installation is somewhat more involved but not necessarily difficult. If you do not wish to bring the lead-in through the roof, you can make the entrance through an attic window, or through a basement or crawl-space opening. Since the main junction can be made in either the attic or the basement, the best location is determined by the construction of the house and by your own preference.

The most difficult part of an attic junction is locating the exact points where the leads must be dropped through the wall.

This involves careful measurements from two sides of the house, so that the lead will drop between the two specific studs where the socket is to be located. Since the studs are usually placed 16 in. apart, the measurements need not be absolutely accurate. However, it is easier to fish the lead through a small hole in the baseboard if it is dropped close to the hole.

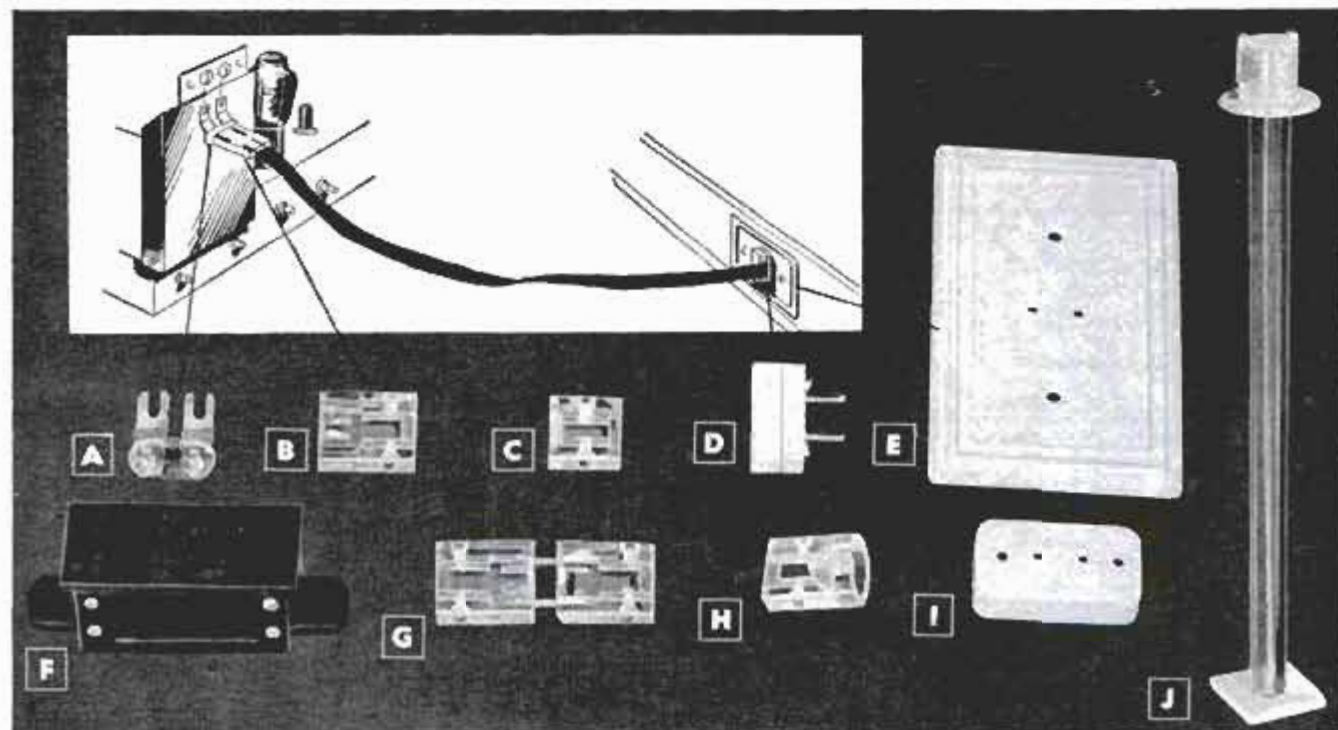
Fig. 3 shows a cutaway sketch of a typical uninsulated attic. The top plates of the various walls are visible between the ceiling joists. It is merely necessary to measure to the point of a particular wall where the hole must be drilled. Once this is done, the weighted lead can be dropped, and pulled through a corresponding hole in the baseboard with a bent wire clothes hanger.

Some homes are constructed with blocking strips running parallel to the floor between the wall studs, as shown by the dotted lines in Fig. 3. In such cases, the attic junction is impractical, and the antenna lead should be brought into the basement or crawl space and up through the wall. Locating the center of a particular inside wall is easily done by following the procedure shown in Fig. 2. A small hole is drilled through the quarter round and floor at the point where the socket is to be installed, and a wire is pushed through to mark its location. A $\frac{3}{8}$ -in. hole is then drilled up through the floor and wall plate at a point 3 in. from the protruding wire. This permits the lead to be pushed up through the center of the wall, and fished through a corresponding baseboard hole.

The installations described above are

(Continued to page 276)

Mosley lead-in accessories: A. Terminal connector; B. Socket; C. Line splicer; D. Plug; E. Wall socket; F. Two-set coupler; G. Plug and socket; H. Co-ax-to-flat line splicer; I. Socket; J. "Wall-Thru" connector



Recipe-Box Continuity Checker

Finds Open Filaments



WITH AN ever-increasing number of television sets, as well as most ordinary radios, using series-connected tube filaments, more troubles due to burned-out filaments will be encountered. When a single filament opens up, all other tubes of a series-connected filament string will go out simultaneously. Locating the defective one usually requires the services of a repairman.

With this handy little tester, even the inexperienced can quickly locate any tube with a burned-out filament. To do so, merely insert the line cord of the tester into any wall receptacle and plug the suspected tube into the proper test socket. If the tester bulb lights, the tube is good. If not, the tube must be replaced.

The checker will test all tubes used in modern radio and TV sets, including picture tubes, for open filaments. Picture tubes are tested by removing the socket from the end of the tube and connecting the test leads across pins 1 and 12 of the tube. If the tester bulb lights, the filament is good and the trouble is in the picture-tube socket, or elsewhere in the set.

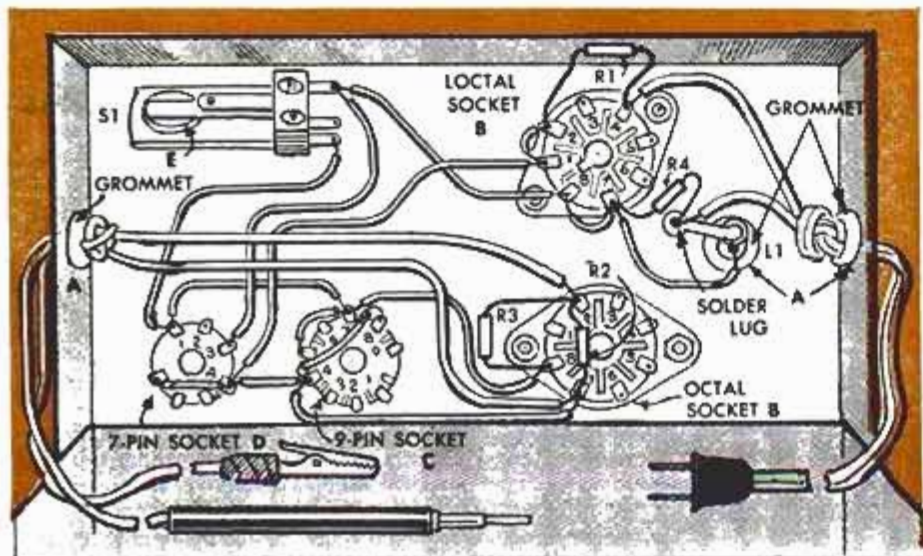
In addition to testing tube filaments, this unit can be used for checking fuses and pilot lamps, transmission lines from folded dipoles, power cords of electrical appliances and other items where a short or open-circuit indication is required. For such purposes, the test leads are connected across unit or circuit to be tested.

The little model was built into a recipe

box purchased at the dime store for 29c. However, any metal, wood or plastic container will serve the purpose. Neither the size or material of the container, nor the placement of parts, will affect the performance of the unit, so long as the simple wiring diagram is carefully followed.

The neon bulb is mounted by being pressed into a rubber grommet. A solder lug is "sweated" to the tip of the bulb, and the lead from resistor R4 as well as one line-cord lead is soldered to the other end of the lug. The wire from pin 7 of the octal socket is soldered to the side of the bulb. A bulb socket may be used, if desired, to prevent damage to the bulb from overheating.

A push-button switch is provided for testing those tubes whose internal wiring would cause a "good" indication even if the filament were defective. The following tubes are included in this list: 6AQ5, 6BF5, 12AQ5, 35B5, 50B5. For these tubes the switch should be depressed and the bulb should light in both switch positions. It is suggested that a typed list of these tubes be pasted near the switch for a quick and handy reference.



LIST OF MATERIALS

- R1—470 ohms
- R2, R3—270,000 ohms
- R4—330,000 ohms
- S1—S.p.d.t. switch, Switchcraft 1003
- L1—Neon bulb, NE-51
- Sockets—(1 each) octal, loctal, 7-pin, 9-pin. Rubber grommets for 1/2-in. holes, (3 reqd.). Line cord, test leads, recipe box, screws, nuts, wire and resin-core solder. Chassis hole sizes: A—1/2", B—1/8", C—3/4", D—5/8", E—3/8".



Tubeless Tires *can't** be safely repaired

*
*...unless your tire
repairman has proper
equipment and materials*

Many car owners have had "sad" experiences with tubeless tire repairs. This has been true because the repairman did not recognize that you cannot use old methods and materials for tubeless tire

repairing. It just can't be done that way. Remember, it's the tire that has to hold air now . . . not the tube and this means that new methods and materials had to be developed.

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look for the

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Repair Expert*



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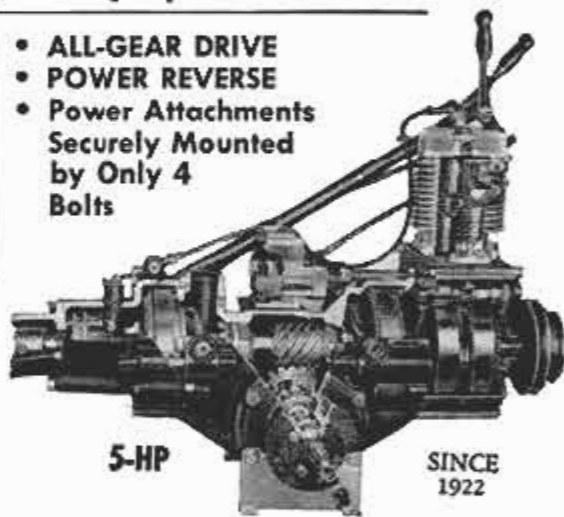
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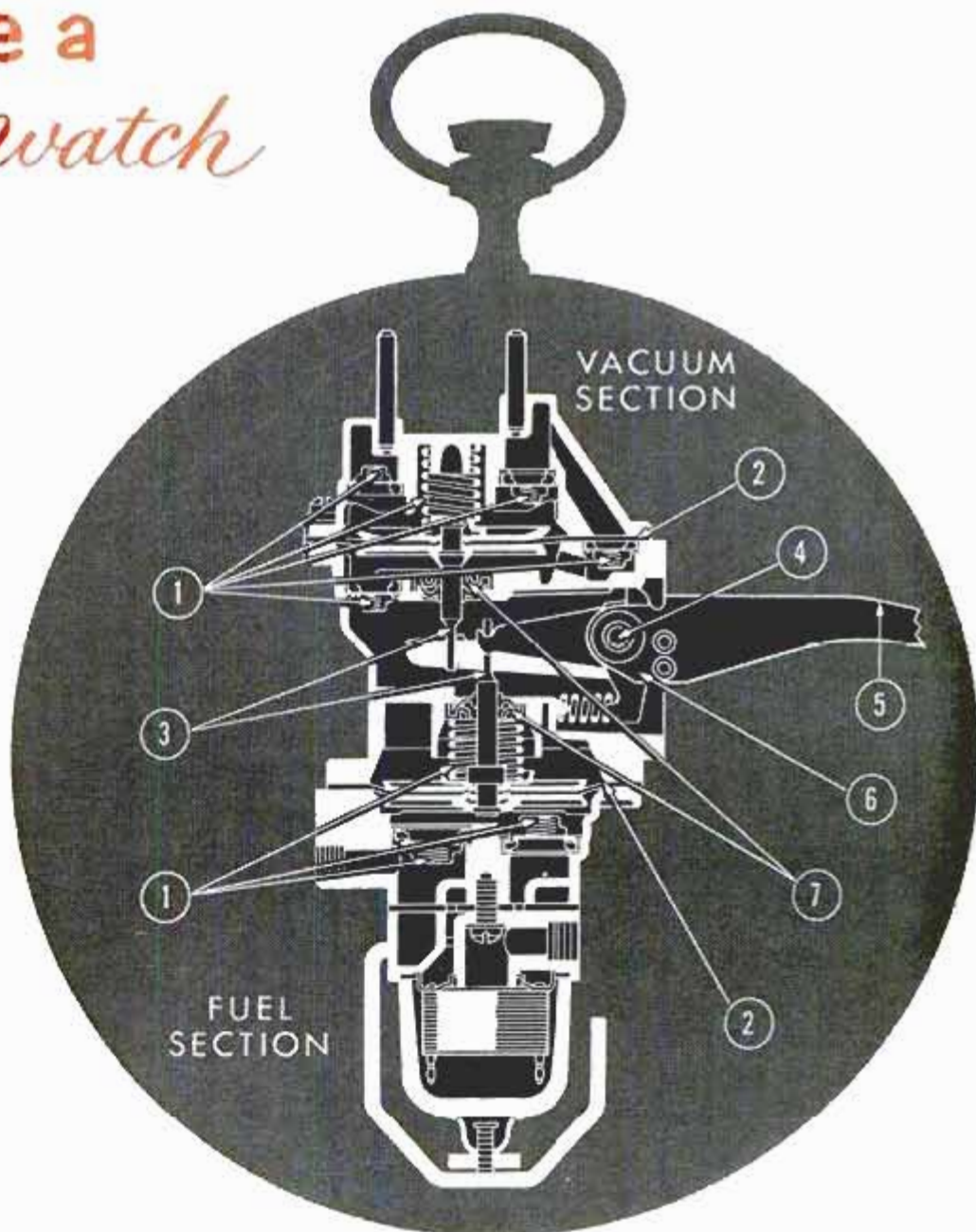
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you can carry in your pocket!

New Kodalite Super-M Flashholder

With a Kodalite Super-M Flashholder you can be truly ready to take flash pictures *any time, anywhere*. It's small enough, as is, to fit into your pocket. And when you're really pinched for space, you can slip off the 3-inch reflector, unscrew the bracket . . . and tuck the whole unit into a corner of your gadget bag. The Super-M accepts No. 8, 5, or 25 bulbs as well as low-cost M-2 bulbs—and is battery-condenser powered* to provide top flash dependability. A universal mounting bracket and interchangeable, flash-post connector tips (ASA and Continental-type) enable the Super-M to fit most any shutter-synchronized camera.

You'll like the Super-M's handling ease, too . . . the push-button bulb release, the sliding scale flash-calculator on the back, the natural-handle grip that assures steadiness. Smartly styled in your choice of brown or black, the Super-M is the most versatile miniature flash holder Kodak has ever built. Visit your dealer and see it soon. Only \$9.95 (battery extra).

***This is why we recommend B-C Flash . . .**

As you know, the batteries in a regular flash holder grow weak with usage. When this happens, a flashbulb is often slow to fire—or fails to fire at all. Result: you miss the picture.

With B-C (battery-condenser) powered flash, you needn't worry about "slow-fires" or misfires from a weak battery. A small photo-flash battery (a 15-volt battery in the Kodalite Super-M Flashholder) feeds current into a condenser which stores up energy

until needed. When the camera shutter is tripped, the condenser releases a bulb-firing surge of energy many times stronger than that produced by the usual 1.5-volt flashlight battery.

One of the nicest things about B-C is that besides prolonging the battery life, it also gives you positive, full-force voltage for hundreds of shots. Even when the battery begins to weaken, you get full voltage every time the shutter is tripped . . . Be certain with B-C!





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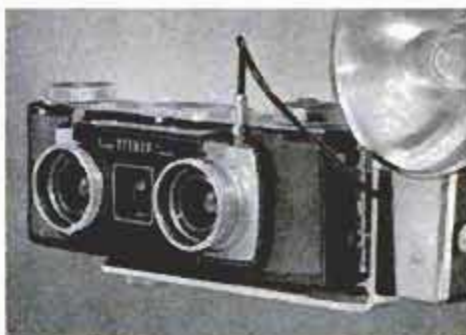
KODAK RETINA IIc CAMERA



KODAK CHEVRON CAMERA



KODAK TOURIST II CAMERAS



KODAK STEREO CAMERA

The Kodalite Super-M Flashholder fits all the flash-synchronized cameras on this page—and many others

ASA Bayonet Connector

Kodak Bantam RF Camera. Kodak Chevron. Kodak Flash Bantam. Kodak Pony. Kodak Signet 35. Kodak Stereo. Kodak Tourist. Kodak Medalist. Kodak Reflex. Polaroid Model 95. DeJur Reflex. Ricohflex. Stereo Graphic. Condor I. Mamiyaflex. Tower Reflex. Videon.

European Bayonet Connector

Kodak Retina IIIc, IIc, Ib, IIa. Retinette f/4.5 and f/3.5. Ansco Super Speedex, Speedex, Viking,

Karomat, Regent, Super Regent, Memar, Super Memar. Voigtlander Perkeo, Bessa, Prominent. Vito II, Vitessa Jr., Vito B. Zeiss Ikonta, Super Ikonta, Nettar, IkoFlex Ia, IIa, Contaflex I, II, Contina Ia, IIa, Ikonta 35. Konica. Minolta. TDC Stereo Colorist. Bower X. Bower 35. Dacora. Belfoca. Edinex. Edixa. Bolsey Explorer. Paxette. Super Dollina. Weltax. Welti. DeJur D1. Iloca Quick B. Futura S. Diax. Alpa 4, 5, 7. Minolta A. Nikon S-2. Baldix, Baldax. Baldalux. Baldina. Super Baldina. Baldi-

nette. Realist A—35mm. Realist B—35mm. Lordomat. Lordax Jr. Lordax I. Photrix B. Condor II. Solida. Rolfix. Iloca Stereo. Photrix Stereo. Wirgin Stereo. Edixa Stereo.

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Termites?

Q—Last fall, as I finished painting the cornices of my small home, I noticed what appeared to me to be large black ants coming from holes in the ends of several rafters, which are of the exposed type, that is, the cornices are not boxed in. A neighbor assures me that these insects are not termites and that they do comparatively little damage. But is he right?—R.N., Mo.

A—If we can judge correctly from your description you are host to a colony of carpenter ants. Your neighbor is not entirely correct in saying that they do comparatively little damage. Carpenter ants tunnel into wood, in your case the rafter ends, usually for the purpose of sheltering larvae. They do not consume the wood as food, as do termites. However, over a period of time carpenter ants may extend and enlarge the tunnels sufficiently to weaken wooden frame members infested. Usually it is possible to destroy a colony by forcing a solution containing an insecticide into the openings leading to the tunnels. Or it may be possible to reach the tunnel, or tunnels, by drilling small holes into the rafter along its length in the attic. A small amount of creosote poured into the tunnels through these holes should effectively eliminate the ant colony. Plug all holes with dowels, including those leading to the tunnels at the ends of the rafters.



Renewing Reed Furniture

Q—I have three old pieces of furniture of natural reed which have been painted several coats. I would like to refinish these pieces in the natural color with clear varnish. I applied a liquid varnish remover and although it removed most of the paint, enough remained to discolor the reed. What should I do?—C. F., N. Y.

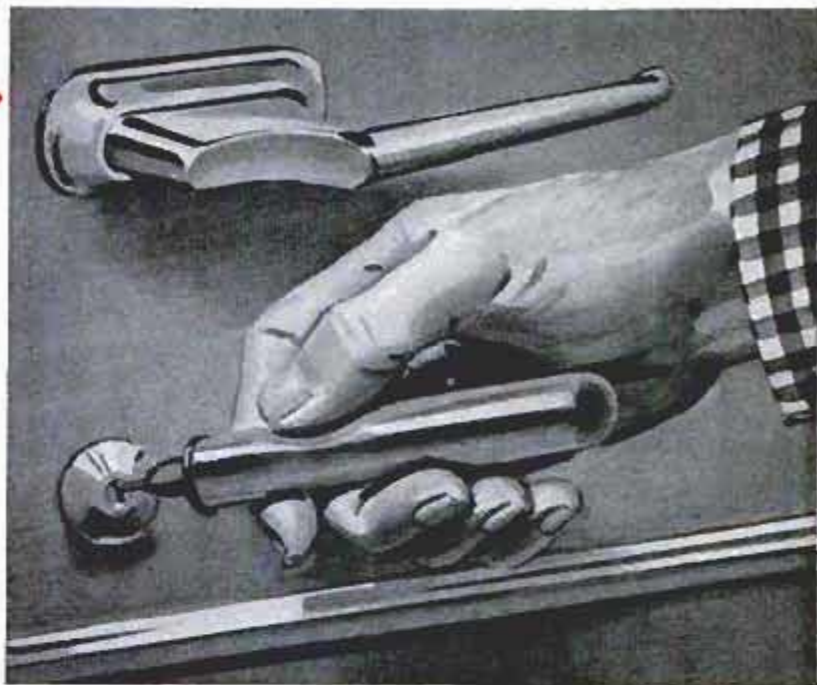
A—We're rather doubtful about the complete success of this project. However, there is one procedure that perhaps is worth trying. Remove as much of the old paint as possible with a varnish remover, brushing the reed thoroughly with a scrubbing

(Continued to page 274)

Texaco Tips On Car Care

How to prevent door locks from sticking

Occasionally, door locks on your car may tend to freeze up or stick, be difficult to open. Here's a simple way to keep them "easy to open." Squeeze powdered graphite in a tube directly into the keyholes. Also, in very cold weather, condensation inside lock may cause freezing—try heating your key lightly by match-flame, insert in lock and repeat if necessary to "soften" up jammed tumblers. Do not force key.



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Metropolitan Opera radio broadcasts Saturday afternoons, ABC. See newspaper for time and station.

(Continued from page 272)

brush while the paint is still soft from the action of the remover. This will get most of it off. Then rent a paint sprayer from your local paint dealer and use it to apply lacquer thinner in a fine mist coat. As a rule, the thinner will wash away the remaining traces of paint and leave the wood in its original color. *Caution:* Lacquer thinner, or reducer, is a fast-acting solvent, highly flammable and especially hazardous when applied as a spray. Remove the furniture from the proximity of buildings or other flammable material and take every other precaution against fire. Avoid inhaling the fumes from the reducer while it is in a container, or the fine spray from the gun while the sprayer is in operation.

Asphalt Driveway

Q—I have an asphalt-surfaced driveway from the curb to my garage at the back of the house. Each time I walk across the driveway I track loose material from it into the house. This is difficult, if not impossible, to remove from the kitchen floor. I'm told that I should have it resurfaced with cement. Won't this coating crack up in time?

—F. G., Iowa.

A—It will. About the only practical remedy in your case is to wait until the asphalt surface is softened by the sun on a hot summer day. Then sweep it thoroughly with a broom to remove dust and fine gravel. Spread washed white sand in a thin coating over the asphalt and roll it in with a weighted lawn roller. After one rolling which covers the entire surface of the driveway, brush lightly with the broom and roll again. In order to cover the surface effectively with embedded sand particles it may be necessary to spread a second coat of sand and repeat the rolling procedure. Another method that is said to be fairly successful is to dust the surface (when softened by the sun's heat) with portland cement and roll as described.

Plastered Concrete-Block Wall Shows Cracks

Q—I built an addition to my home of concrete blocks and applied a cement plaster to the exterior of the walls. Now the plaster has cracked along the joints, the cracks following the joints both vertically and horizontally. The widest cracks are not more than 1/8 in., but they are very unsightly. Is there some way to repair the defect?

—R. Y., Calif.

A—We assume the plastering was done immediately after the walls were laid up. Apparently the structure has settled appreciably and this raises the question of how much more settling is likely to take place before the building stabilizes at some point. It is possible that you can conceal the cracks with a thin wash of cement and water applied with a brush. Some use a half-and-half mixture of cement and clean, sharp sand mixed with water to an easy brushing consistency. Wet the wall before applying the coating.

Window to Shadowbox

Q—I have a small upstairs window in my home which I would like to close off and convert to a shadowbox, rather than remove it entirely. The sill is about 40 in. from the floor. How can I close it off and make an attractive shadowbox with shelves?

—D. F., N. Y.

A—Perhaps it would be a good idea to cover the outside of the window with shutters, although this is not at all essential. Inside, fit a piece of plywood into the opening and attach to the lower sash frame, using screws or small nails. Coat the plywood with a sealer and paint in a dark color. Fit shelves in whatever arrangement is desired and paint these white. After the paint is dry fasten the shelves in place. Paint the window trim white to match the shelves.

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Versatile Antenna Installation "Unhitches" TV Receiver

(Continued from page 263)

suitable only if a single TV set is to be used in various locations. If two or more sets are to be connected at the same time, a television set coupler should be employed to prevent an impedance mismatch and interaction between the sets.



Typical television set coupler for distributing the signal from one antenna to as many as four sets

The use of such a coupler does not change the installation procedure. The only difference is the replacement of the tie point shown in Fig. 1 with the set coupler. All leads are then attached to the coupler, which provides the proper isolation.

When a television signal is to be distributed between a number of sets, the signal strength at the antenna must be relatively high. In metropolitan areas, an ordinary antenna can usually supply more than one receiver with adequate signals. In fringe areas, however, special high-gain antennas and, in some cases, signal boosters may be needed to assure a satisfactory signal.

To provide proper protection against lightning, a lightning arrester should be installed at the point where the lead-in is brought into the house. Numerous types of arresters with various mounting brackets are commercially available. Some can be fastened directly to the antenna mast, while others may be mounted against the side of the building. Each arrester is supplied with installation instructions. Your selection can be governed by the mounting method which meets your needs. ★ ★ ★

Men with mechanical skills: measure yourself against this yardstick



Mechanics Creed



Upon my honor I swear that I shall hold in sacred trust the rights and privileges conferred upon me as a certified mechanic. Knowing full well that the safety and lives of others are dependent upon my skill and judgment, I shall never knowingly subject others to risks which I would not be willing to assume for myself, or for those dear to me.

In discharging this trust, I pledge myself never to undertake work or approve work which I believe to be beyond the limits of my knowledge; nor shall I allow any superior to persuade me to approve aircraft or equipment as airworthy against my better judgment; nor shall I permit my judgment to be influenced by money or other personal gain; nor shall I pass as airworthy aircraft or equipment about which I am in doubt, either as a result of direct inspection or uncertainty regarding the ability of others who have worked on it to accomplish their work satisfactorily.

I realize the grave responsibility which is mine as a certified mechanic, to exercise my judgment on the airworthiness of aircraft and equipment. I, therefore, pledge unyielding adherence to these precepts for the advancement of aviation and for the dignity of my vocation.

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*After minimum down payment. Small monthly installments include fire, theft and collision insurance; local taxes; freight and carrying charges.

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EXCISE TAX NOW OFF**

First Aid for an Ailing Bridge

(Continued from page 130)

Bridge. They support a solid stream of autos, trucks, trains (live load) besides the roadways (dead load). All this weight is hooked to the cables by steel "suspenders" that hang straight down from the main cables. These smaller cables, about as thick as your arm, are long near the towers, but become shorter as they descend the cables on both sides of the tower. It would take 100 tons of pressure on every square inch of the wire in a Manhattan Bridge suspender to break it.

Suspenders Slip

The Manhattan Bridge has an embarrassing problem of slipping suspenders. Usually, slippage occurs near the tower, where the cable incline is steepest. When a suspender slips, it ceases to hold up its part of the roadway and the suspender next to it has to take on more load, which may cause the second suspender to slip, too. Engineers can measure the amount of stress on each suspender and tell how much work it is doing. A suspected suspender clamp gets a ring of white paint at its high rim so engineers can measure the amount of slippage. The fault usually rests with the clamps. There would be no slippage if the clamps held fast.

The Manhattan Bridge boasts two levels of roadways. The lower level has three lanes for trucks and cars, flanked on each side by a pair of tracks for BMT trains. The upper roadway has four lanes for pleasure autos, two on each side of the bridge, directly over the tracks.

Trusses Gird Bridge

A system of trusses provides a rigid framework for the two levels. The bottom chord of the truss is connected to the steel network under the lower roadway, and the top chord helps support the upper roadway. A suspender is fastened to the juncture of truss and the steel network. Trusses run the length of the bridge. They distribute the live load and prevent too much bending or turning at any one point.

The truss also acts as middleman between suspenders. When one suspender loosens its hold on a truss, the truss passes the change in stress to the neighboring suspender.

Life under the BMT trains is not an easy one for the Manhattan Bridge, so every one of its steel sinews is needed. No other suspension bridge carries such a burden. In the average 24-hour period in 1952, the Manhattan Bridge carried 78,591 autos,

(Continued to page 280)

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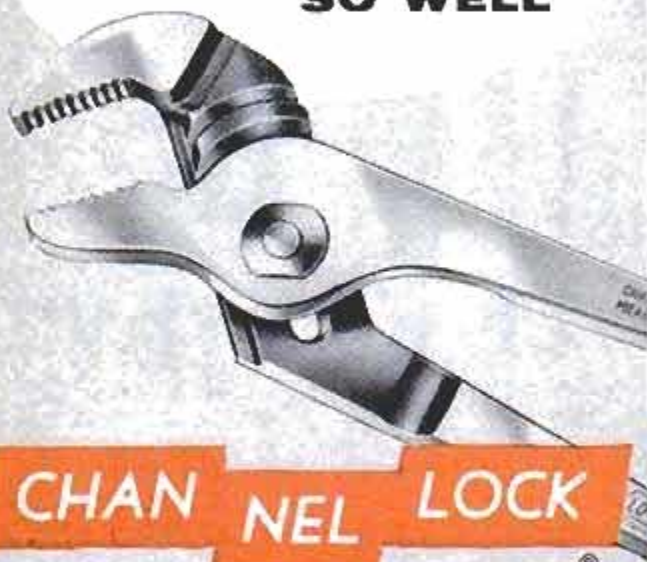
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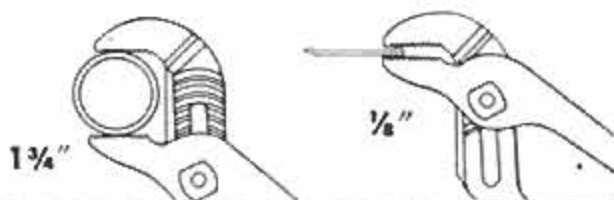
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17,772 trucks, 163 buses. And almost 200,000 people were along for the ride. Every year it carries more vehicles than the Triborough Bridge, 50 percent more than the George Washington Bridge, and as many as Holland and Lincoln Tunnels combined.

In that same 24-hour period, 892 BMT trains (6177 cars) carried almost twice as many people. Together, vehicles and trains transported the population of New Orleans, Buffalo or Minneapolis.

One-Sided Traffic

Today, 92 percent of the BMT trains going over the bridge use the two easterly tracks. The other eight percent use the westerly tracks. Some of those trains are whoppers, too—made up of Triplex cars (three units permanently coupled together) and weighing 211,042 pounds. Four Triplex units are as heavy as a standard train of eight 67-foot cars.

Transit Authority tests have shown that 300 passengers can be squeezed into one car. (Everybody who travels the BMT knows that he's been squeezed harder.) A single jam-packed train, as one would be during rush hour, throws a weight of 550 tons on the bridge.

Is that too much? No. The maximum theoretical loading of the bridge is more than nine tons for every lineal foot. This means that the big bridge could safely carry four continuous lines of trains packed with passengers, stretched from one end of the bridge to the other; trucks and autos, bumper to bumper, clear across, and the promenade packed with people.

But a subway train doesn't do it any good today. Every time one rumbles across the heavy side, it puts the pinch on the steel network under the roadways. The steel girders that run the width of the bridge every 20 feet, and play an important part in holding up the roadways, twist and groan under the load.

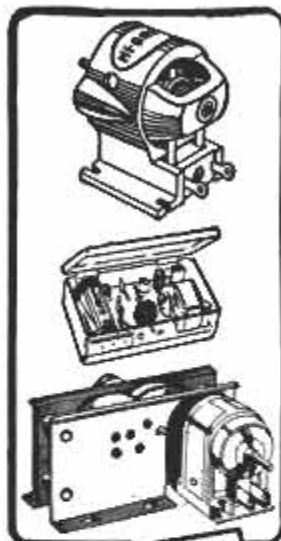
It's a Problem

What can be done for the Manhattan Bridge? City engineers can't run the same number of trains over both sides because the unequal routing of trains was built in with the tracks. Trains feeding over the "light side" run around a loop in lower Manhattan and return to Brooklyn through a tunnel. Those on the "heavy side" stream back and forth over a separate main line feeding midtown Manhattan.

How about reducing the number of trains using the bridge? Little can be done here. The only other route is the tunnel. On a rush morning, it is already handling its maximum of one train every two minutes.

(Continued to page 282)

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The answer is to move the tracks to the middle of the bridge so that all four cables will carry the load and strengthen the bridge where it needs strengthening. The job is worth doing because it would cost \$100,000,000 to build a new Manhattan Bridge today.

This has been the thinking of New York's Department of Public Works for some time. Now it has gained support from D. B. Steinman, an expert on suspension bridges, who was commissioned by the city to study the problem. Steinman is the man who cast the Brooklyn Bridge in its new role that began May 3, 1954: A six-lane roadway free of heavy traffic. The view from the new promenade is the same old magnificent one. The job took four years and \$7,000,000.

Revamping Begins

In his Manhattan Bridge assignment, Steinman analyzed all the asymmetrical loadings and deflections, and prepared preliminary plans to revamp the old warrior. The cost: \$30,000,000.

To date, the city has not put its final okay on the Steinman report. But already some preliminary reconstruction is under way. The Division of Bridges is busy hitching up the Manhattan's slipped suspenders. The old clamps that have grown tired of holding the suspenders to the cables are being loos-

ened, the suspenders are being pushed back into place, and new high-tension clamps of great gripping power are being put on. These clamps may play a large role in easing the bridge's strain even before the tracks are moved. With all the suspenders committed to holding up the roadways, the latter will take less of a beating. This job will take 12 to 18 months.

Operation Track Switch

Then, when the money becomes available, Operation Track Switch will begin. Truck traffic will be taken off the center roadways and diverted to the Williamsburg Bridge. The roadways will be reconstructed and railroad tracks put in. There will not be enough room for four tracks so they may be double-decked. Trains will continue to use the present tracks while new ones are installed.

The transition from old tracks to new ones will be made overnight. Trucks will use the space the old tracks had occupied. When the job is finished—about 2½ years after it is started—the Manhattan Bridge will be as good as new. ★ ★ ★

☐ An antibiotic chemical obtained from a common variety of mushroom has given encouraging results in treatment of typhoid-fever patients in a Calcutta hospital.

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burn hot and fast, bite the tongue.



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all right for cigarettes—
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gives you slow burning,
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ONLY EDGEWORTH IS "READY-RUBBED"

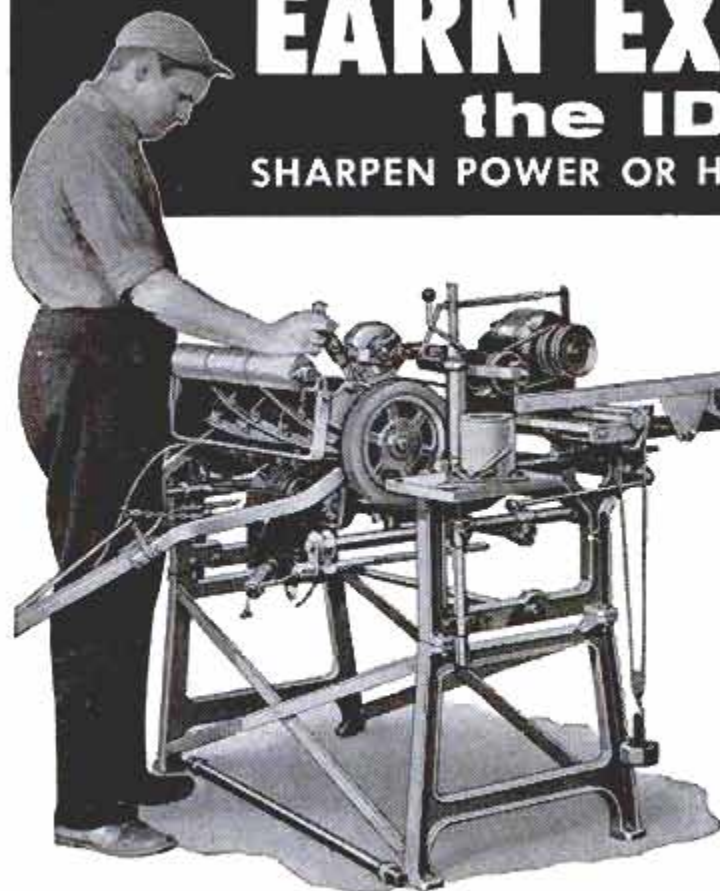
No other tobacco manufacturer can duplicate the Edgeworth cut—because it's actually "ready-rubbed" by an exclusive process. See in the picture what a difference this makes. Edgeworth is made of cool smoking white burley, and packed fresh in this heat-sealed wrap-around pouch. This is why Edgeworth smokes 8 to 10 degrees cooler by actual test.



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44 PAGES
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MODELS

FREE! Get yours today. Many models illustrated in color. Cartops*, Trailboats, other outboards, canoes, rowboats described fully. Catalog features amazing new no-soak, work-free, all-wood *Stripites*. Penn Yan Boats, Inc., 34th St., Penn Yan, N. Y.

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THAN RAKE AND HOE!**

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We'll Plant a Village On the South Pole

(Continued from page 123)

Sea and Knox Coast areas. In certain phases of this operation, and particularly the airlift required to set up the South Pole station, the United States Air Force will provide important assistance. The Air Force also gives auxiliary support to Task Force 43 in carrying out the American and exploratory programs.

The other part of the expedition—the IGY operational phase—will involve a body of some 70 scientists, all outstanding experts in their fields. They will have at their disposal the most modern instruments and equipment and they will be supported by a substantial technical staff, both Navy and civilian. The logistics for this operation, from the initial establishment of bases to the final removal of scientific personnel, will be the responsibility of the task force. But the direction of the scientific-IGY phase of the expedition will be in the hands of the United States National Committee for the IGY, which was created for this purpose by the National Academy of Sciences. The chairman of this committee is the celebrated physicist Dr. Joseph Kaplan; and the chairman of the Special Antarctic Com-

mittee is my old friend and expedition colleague Dr. Laurence Gould.

Unexplored Areas

In many respects, Antarctica will be one of the most exciting and important phases of the entire IGY program. Much will be added to what has already been learned; and much of value will be learned for the first time. This amazing part of the world is not, like the arctic, a monster raft of ice floating 10,000 feet above the ocean floor. It is a continent of solid land with barren mountain peaks jutting through a glacial icecap that is two miles thick in some places. This land mass appears to encompass 6,000,000 square miles. The entire areas of the United States and Europe, planted on it, would not touch its vast ice-covered perimeters. The great continent is the last large corner of the world containing huge "white areas" in its map, signifying that these areas have never yet been seen by human eyes.

The occasional glimpses of geological formations in Antarctica's hazardous terrain have only hinted at the great wealth that may lie beneath this mass of ice and snow—recently estimated by a slide-rule wizard to amount to six septillion (6,000,000,000,000,000,000,000,000,000) tons. On the wind-lacerated side of a jagged peak in the

(Continued to page 288)

IT SMELLS GRAND



SNIFF IT! YOU'LL SAY "THAT'S FOR ME!"

IT PACKS RIGHT



CUT TO PACK IDEALLY!

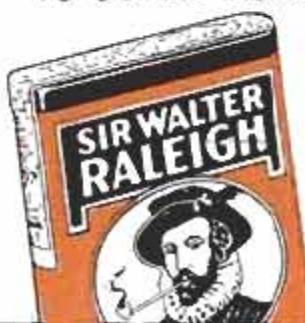
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- Measures A.C. and D.C. Voltages, A.C. and D.C. Current, Resistances, Leakage, etc.
- Will measure current consumption while the appliance under test is in operation.
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- Will test all TV tubes for open filaments, inter-element shorts, burned out tubes, etc.



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Queen Maud Range, less than 200 miles from the Pole, I have seen a great, black vein of coal. Evidence of valuable mineral deposits has also been brought back by other explorers.

Nature's Own Freezer

The incredible antarctic cold averages at least 40 degrees colder than the arctic. I have watched the wavering ink line on a thermograph in a snow-buried, fume-ridden shack slump through to the minus 83 degree mark, and I know that up on the two-mile-high plateau of central Antarctica, where no man has yet wintered, it may well skid to a shuddering minus 100 degrees in the long polar night. That kind of temperature may one day be put to use. Here, in nature's own freezer, an international stock pile of surplus perishable food might easily be stored and preserved indefinitely—and drawn against when needed by disaster or famine-stricken countries.

The preservative effect of antarctic cold has been demonstrated in more than one old camp, where foodstuffs left as long as 40 years ago were found as fresh and edible as the day they were stored. No bacteria and little oxidation can work in the sterile cold of Antarctica. On my last expedition one of my crews found a camp that had been abandoned 37 years before. Unpainted boards gleamed white and unweathered; nails showed no rust. A dog, outside, was whole in every pore and hair, but rigid in the frozen death that had immobilized him nearly four decades earlier.

With its fleet of powerful 35-ton "snowshoe" tractors, so light on their "feet" that they exert less pressure on a square inch of snow than a man on skis; its 19 airplanes, 16 electric generating stations, Weasels, wanigans, cargo carriers and "luxurious," roomy, insulated buildings—with all of these technical improvements and, with science represented in unprecedented strength, Operation Deepfreeze must inevitably produce historic results. It has all the advantages that recent cold-weather experimentation and the experience of many hard-fought polar expeditions, six under my command, have been able to give it.

When we first used tractors in 1933, the radiators froze and burst, metal parts snapped in the intense, structure-changing cold, and the machines coughed, sputtered and died several times in an hour, each "death" resulting in up to two hours of "road" repairs and in frostbitten appendages and torn flesh. Yet my old trail-mates, recalling earlier days of 1000-mile dog-sled runs, called it "limousine" exploring. The

(Continued to page 290)

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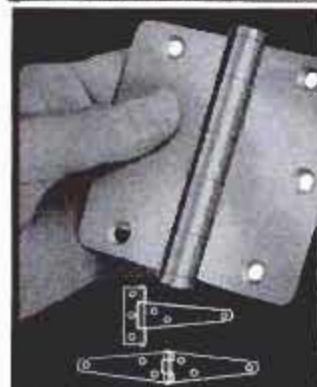


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tractors had cabs. The fact is that it was fancy for its day.

Against the tapestry of time, every expedition I led was the best-equipped, most modern and progressive that existing knowledge, material and equipment could make it. Some things worked, some didn't. Some were redesigned so they would work. Nearly every polar expedition that has ever gone out has helped the next one to beat back the incredible barriers of cold, darkness and hazard a little further, thus enabling men to penetrate deeper and snatch a few more fiercely guarded secrets from the frozen polar areas.

First Expedition to Antarctica

In 1928-30 I led my first expedition to Antarctica and we built the first United States base—Little America—on the great continent. The ski-equipped Ford Tri-Motor planes we used were the finest of their day, and our first operational experiment with ski-type landing gear proved a phenomenal success. Hauled five miles across the Ross Shelf from ship to Little America by a team of 100 huskies, the knockdown planes were assembled on the ice. They provided skyhooks from which we mapped with aerial cameras more antarctic territory than all previous expeditions together had been able to chart. On Nov. 28, 1929, one of those skyhooks airlifted a group of us over the South Pole on the first such flight ever made.

When my second antarctic expedition took off in 1933 we had an autogyro with us and a huge Curtis Condor. Our old Tri-Motors had wintered over for five years, but were still operable. On that expedition we learned a lot more about planes in the antarctic. The 'gyro crashed due to snow accumulation in the tail assembly. We did more pioneering with skis, and used floats successfully to explore large sea areas. During the winter of '33-'34 we set up an inland base 123 miles south of Little America to make the first interior weather observations and study the aurora australis. To this advance base we were able to freight by tractor-drawn sled and by plane enough supplies for one man, no more. So I manned the frigid outpost alone through the crackling antarctic winter in a tiny shack submerged to the roof in snow. With 800 feet of ancient ice beneath me and the vastness of the polar night above, I holed in for six months of meteorological observation. I had hoped to enjoy myself by reading and by examining my philosophy in this atmosphere of total solitude. Instead, my heater and generator-exhaust fumes backed up and poisoned me with carbon

(Continued to page 292)

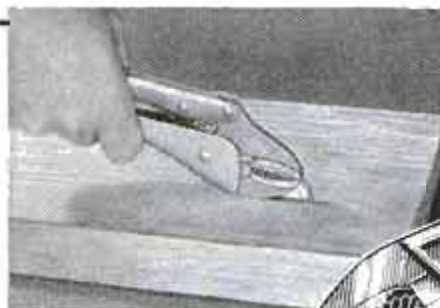
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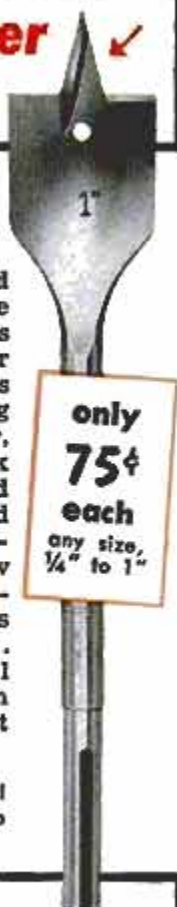
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monoxide. Temperatures dropped to 60 to 80 degrees below zero, for weeks on end, the transmitter generator went haywire—and I very nearly lost my life before the tractor party arrived to take me out in the cold dawn of an antarctic spring.

Back to Antarctica Again

In 1940 we were back again, this time under the aegis of the United States Antarctic Service which President Roosevelt had established and asked me to command. The expedition, shadowed by war clouds and hampered by a troublesome fleet of worn-out aircraft, was shortlived due to World War II. Even so, we built Little America II and made good use of the planes to obtain the first delineation of the Antarctic Coast in the Pacific quadrant.

Then came "High-Jump" in 1946—an expedition organized by the Navy, to which I was appointed officer in charge, with Admiral Cruzen as Task Force Commander. By now we were rolling. With 13 ships carrying 4200 men, four helicopters to help icebreakers scout passage, and 19 planes, we formed far and away the most formidable sortee ever made against the Antarctic Continent. Six of our R4D aircraft, equipped with new ski-wheel landing gear, roared off the deck of the aircraft carrier *Philippine Sea* to land on the ice barrier at Little America. Gone were the five-mile mushes with 100 dogs straining and tugging while everyone massaged his burning frost-bites. A seaplane tender filled in many missing outlines of the coast. We were still learning.

More information and knowledge resulted from the Lincoln Ellsworth trans-Atlantic flight, and from two expeditions which took place over 1947-48 under the respective leadership of Comdr. G. L. Ketchum and Capt. Finn Ronne.

Antarctic Airlift

With all this experience behind it, Operation Deepfreeze will be in a position to attempt the first antarctic airlift of materials and supplies for bases. Many of its specially equipped planes will fly in from New Zealand, marking the first such flight in history. A major airlift operation will be undertaken by the United States Air Force to establish the challenging South Pole base. By 1957 military air-commuting service may be established between Antarctica and the outside world. No more, we hope, will an expedition be cut off for months from all but radio contact.

I have stressed the advancements in aircraft for polar exploration because it is so dramatic in its vast strides. But Deepfreeze

(Continued to page 294)

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is a story of advancement on every front in polar exploration—all of which points to the gruelling trial and error of the past. The job we have to do this year and next could never have been achieved with the tools we had in 1933-34—good as they were for their time.

The tractor fleet is a phenomenon. Each has an ether-aided electric starting system which is expected to operate full steam when the polar wind is whistling across temperatures of 65 degrees below zero. Insulated cabs will really make it "limousine" exploring, for their independent heating systems will keep them warm even if the big diesel engines die. Their huge tracks return on wooden guides instead of idler-rollers to reduce the possibility of jamming with ice and snow. These are the engines that, under the guiding hands of a 100-man Seabee battalion, will help to create antarctic bases more elaborate and foolproof than any built before. "Cat" trains loaded with materials will head out to all sites from the Ross Shelf and McMurdo Sound barrier.

The big 20 by 48-foot buildings, in which each man will have 100 square feet to himself, are a far cry from the days in 1928 when eight men shared a 10 by 10-foot shack. The new houses, prefabricated in four by eight-foot panels, will be erected

with flat roofs flush at snow level, interconnected by tunnels and accessible via ramps to outdoors. Their metal linings provide vapor seal and radiation. Sitting on girders with timber footings, they will not sink. A 15-man crew can erect a shell complete in about six hours, even under antarctic conditions. Most of the parts go together with clips instead of nails. Antarctic carpenters can't hold nails in their mouths. In subzero weather, metal freezes fast to flesh.

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Toughest project of all will be the 15-man South Pole base. Dr. Paul Siple, senior scientist of the expedition, who has been with me on every antarctic trip I've made, will be in charge of bringing about this crowning achievement. A man of determination and great capability, even he cannot commit himself on our chances of success. Some 700 miles south of Little America, the Pole

(Continued to page 296)

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itself is located on a continental plateau 10,000 feet high. Even the powerful heated tractors could never make it alone—much less with sled trains to drag behind them over the difficult mountain ranges. Temperatures up there almost surely stagger to 100 degrees below zero in the antarctic winter, and are well below zero, with brutal winds, in summer. The unknown terrain, with crags and crevasses in the ancient glacial ice, may well be past coping with. So, the 18th Air Force, if conditions permit, will fly in and airdrop 15 men and 350 tons of material and equipment from planes. It will require 100 cargo flights to do the job—which will make the South Pole run almost as routine as the trans-Atlantic run was not so many years ago. Each plane will carry five tons of payload. The two biggest airdropped items will be a "Cat" and an electric generator.

As a result of our undertaking, a vast, new fund of scientific knowledge will be opened to the world. No matter what happens, the great Antarctic Continent, with its many potentialities for the future of mankind, will be opened up at last. By 1958 it will have a population of more than 2000 people. In early November, President Eisenhower issued a directive calling for the establishment of a new United States Antarctic Program and designating me officer in charge. Under this program, Deep-freeze will be only the beginning of an organized permanent program of United States antarctic activity.

Every American has a stake in the bottom of the world. To me, it is cause for deep gratification that our government has now recognized the importance of Antarctica to the future, and that it has taken this essential step in affirming the continuity of our national interest. ★ ★ ★

Sun, Oxygen and Water Ruin Car Finish

Dr. Roger L. Saur of General Motors' research laboratory has pinned down the three things which combine to ruin the lacquer finishes on cars—sunlight, oxygen and water vapor. It isn't the heat but the ultraviolet rays in sunlight which do damage, activating the breaking up of the lacquer by affecting the nitrate part of the cellulose nitrate found in lacquer. A chain of chemicals develops and, when the car is washed or it rains, these chemicals are sloughed off along with tiny colored particles in the paint, leaving a rougher surface behind. Larger white particles are thus exposed, and the result in time is a characteristic whitening, or "chalking" effect.

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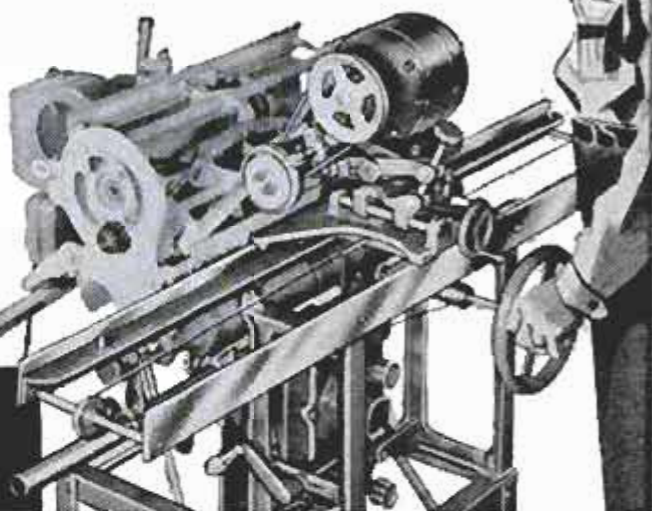
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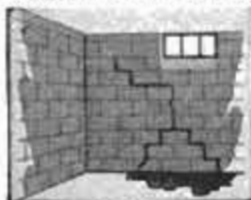
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"Our basement was so bad that we would have to pump out 4 to 5 feet of water. It was considered by contractors and builders as the worst basement in this area. After trying dozens of preparations, we tried Rox Masonry Paint. We followed the simple directions and the results have been amazing. For the first time in 13 years, the basement is usable."—Midland Furniture Co., Midland, Michigan.

PROOF! ROX Painted Exterior Still Good After Several Years

"After using several masonry paints on the walls of our block buildings, we found that within six months to a year the paints would blister and peel. A number of painters and paint experts all suggested Rox Masonry Paint because it was guaranteed not to blister or peel. Our buildings were painted with Rox several years ago and are still in perfect condition."—W. D. Andrews, V. P., Hazel Park Racing Assoc., Hazel Park, Mich.

Insist on Rox Masonry Paint in the blue and white can. Easy to use. Requires only water for mixing. No primer necessary. Odorless. In gleaming white and popular colors at authorized Rox dealers in U. S. and Canada. Write for free literature and name of your nearest Rox dealer. Rox Products Co., Department M2, Detroit 27, Michigan



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Sports Cars of the World

(Continued from page 169)

"Virile good looks and fun to drive because of fabulous steering and stability."—Cedar Rapids, Iowa.

"Uncomfortable, impractical, expensive, but lots of fun."—Lowell, Mass.

"Must cause hot feet, cold ears and a tired behind."—Omaha, Neb.

"An impractical, two-place, four-wheel luxury that is a lot of fun."—Delray Beach, Fla.

"A car that rides hard, burns your face and neck, takes you back to high-school days and lets you forget business completely."—Muncie, Ind.

"Mechanical excellence encased in the elegance of functional beauty."—USS Iowa.

"A car you can safely play with."—Dayton, Ohio.

"A very maneuverable, fast, sleek automobile, for which it is next to impossible to secure parts or service."—New Orleans, La.

"A car that can be maneuvered with the greatest amount of real security under highway or racing conditions without alterations for either."—Indianapolis, Ind.

"An automobile in which the driver sits closer to the rear axle than to the front axle."—Winston-Salem, N. C.

"An unreliable, uncomfortable toy; a testing ground for many good and some asinine automotive developments; a mobile hobby."—Scranton, Pa.

"A car which can be driven over the road to a race, can compete in the race and with luck return home under its own power."—Peterborough, N. H.

Probably the real definitions, though, are the simplest, like the following:

"A car that has its own personality and is a joy to drive."—U.S. Navy.

"A car that is fun to drive."—Gowanda, N. Y.

"To me a sports car is that automobile which puts the pleasure back in pleasure driving."—Harrison, N. J. ★ ★ ★

Freezing Water Protects Food

Freezing water is used by the Air Force to protect foods from freezing while being flown to subzero areas. The food, usually fresh fruits or vegetables, is placed in a cardboard box wrapped with waterproof material. This box is placed in a slightly larger box that is filled with water. At minus 65 degrees Fahrenheit it takes six hours for the water to freeze. Until then, the food inside remains at 32 degrees, slightly above its freezing point.

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This useful and decorative group of Western Pine* shelves and cabinets houses Hi-Fi equipment, records and books. Build one around *your* hobby, whether it's music, motion pictures, collection of pewter or ivories—even an aquarium of tropical fish!

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Quickly make accurate round, square, key, or "D" openings . . . in metal, bakelite or hard rubber . . . with GREENLEE Radio Chassis Punches. Simply turn with a wrench. Many sizes. Write for details. Greenlee Tool Co., 2102 Columbia Avenue, Rockford, Illinois.

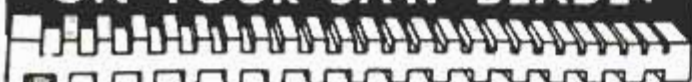


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**P & C HAND FORGED
TOOL COMPANY**
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Model Railroad in a Chicken House

(Continued from page 139)

He gathered up a few broken auto pistons and a couple of carburetors, together with some used fuel pumps and melted these items down. He cast his locomotive-wheel blanks out of the aluminum, using steel molds, and then trued them up in a home-made lathe.

He drew the temper from some wrist pins and turned his car-wheel rims and flanges from them. He poured his wheels and axles in one piece right into these rims which were enclosed in the molds.

The brass and steel dies and jigs were all made on the lathe or were carved, using a drill press, a hand power tool and finally a deal of hand scraping and filing. For the pressure to force the metal into the "corners," Gail used the weight of the metal in the sprue column and, in the case of the wheels, he rigged up a centrifugal jig. He cautions anyone trying this method to be sure to have a good heavy guard around the outfit.

Cars From Cans

The cars are made from large cans and some sections of tinned-iron furnace pipe. The boiler front of one locomotive and the front end of the diesel were cast in one chunk of aluminum and then sawed and filed into shape.

The power is transmitted by a three and four-rail system. There is a skilfully camouflaged series of humps along one side of the track. This supplies power to a separate shoe that works the solenoid-activated chuffing and smoke mechanism mounted in the engine boiler.

The power-supply rails are between the tracks and are of heavy copper wire stretched until straight as a string. Those on the outdoor portion of the track are under permanent spring tension so that they "give and take" with the wide variations in temperature.

A rebuilt rectifier is used to supply the 27-volt series-wound, war-surplus aircraft motors, used for traction. The separate light circuit is used for reversing by activating a polarized relay.

The motors are husky brutes and are mounted in the heavily lead-weighted tenders whose multiple wheels supply the necessary traction. It takes about all the strength in an average man's hooked finger to start one of these long trains rolling. This makes for a realistic slow start and eliminates the "jack rabbit" take-off many models have. The cars are weighted so that they give off a "solid" sound when running over the rails and joints. ★ ★ ★

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WOOD EFFECTS**
on **DARK** woodwork and furniture
without removing old paint or stain!

- goes right over old paint or finish!
- three easy steps!
- four colors

Bring old, dark woodwork, furniture and cabinetry up to date—get popular Blonde Wood effects—with O'Brien's Lite-Chrome. This amazing new product goes right over old finishes. No messy removing! No tedious sanding! Three simple steps. Apply Base Coat over old finish... a thin coat of Color Grain... Clear Coat that dries to a rich, satiny finish. Four colors—Satinwood, White Elm, Silver Birch, Honey Maple. Send only \$2.00 for enough Lite-Chrome for average chest.



NEW

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for 1/2 pt. of Lite-Chrome Base Coat, 1/4 pt. of Color Grain
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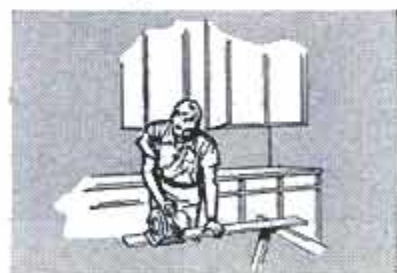
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It Becomes Something Special to Her Because You Built It Yourself



Convert SKIL to a tilting arbor table saw with optional SKIL table. \$39.95



Make cabinets, cupboards, closets, an easy weekend project with SKIL Saw!

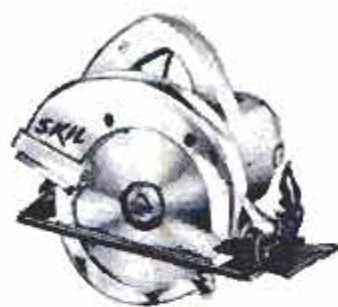


Extra rooms, extra storage space are easy to build with SKIL Saw!

There's a real thrill in finishing those big jobs you've dreamed of doing. There's an extra satisfaction that comes with the family's pride in your ability. Many projects you could never handle before are *easy* with SKIL Saw to help you!

This speedy, powerful 6" SKIL Saw has all the features professional builders demand for peak performance and efficiency. So simple and safe to operate, a boy can handle it. You'll do all kinds of home workshop jobs—from simple furniture-making to construction of a garage or porch!

What's more, this SKIL Saw is priced so low you can own it easily! Have your hardware dealer, appliance dealer or department store show you this outstanding SKIL Saw value today!



Model 526

Only

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Cuts through plywood, sheeting, siding, even stone and metals! Lightweight and easy to handle. Built-in bevel and depth adjustment for accurate cutting. Automatic blade guard and trigger-type switch for safety. Powerful motor; sturdy die-cast aluminum housing.

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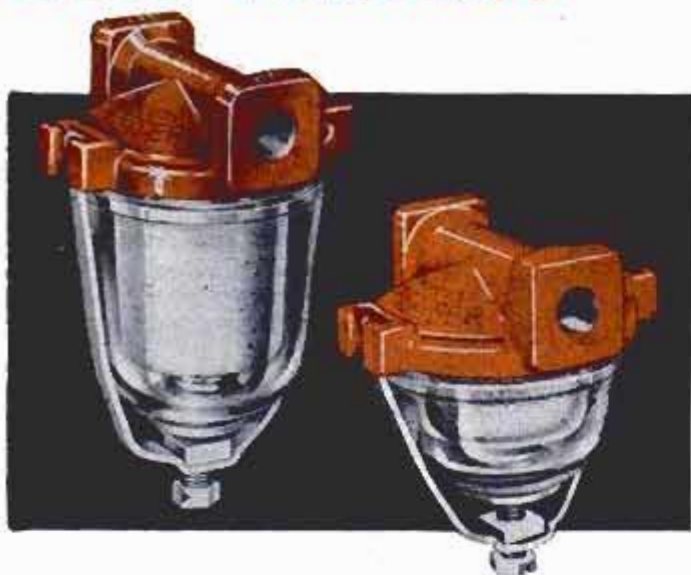
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See the CARTER dealer in your neighborhood... or ask your mechanic.

*T. M. Reg.



CARTER CARBURETOR CORPORATION

St. Louis 7, Missouri

Division of ACF INDUSTRIES, INCORPORATED

How to Win Stock-Car Races

(Continued from page 191)

over the front springs by welding steel bars to them. We beef up each front-spindle support arm by adding a U-bolt to it. Rear springs get extra leaves. We think of little things, too. For instance, we keep the gasoline tank from shaking loose by wrapping an additional metal strap around it. (We lost one race when our car hit a fuel tank that had dropped from a competitor's car, sending us into the fence.)

On the front wheels we use Chrysler's regular taxicab spindles plus heavier bearings of our own choice. We mount double shock absorbers on all four wheels.

Wheels are beefed up by welding two wheels together to make them twice as strong. We use extra-wide rims to increase tire life. Wheels are attached to the drums with special wheel bolts two sizes larger than the regular cap screws.

Steering is modified. We use Chrysler's power-steering Pitman arm, which is longer, and Plymouth steering arms, which are shorter, to give quick steering for quick-manuevering on the tracks. Conventional steering ratios are too slow for racing.

All these changes involve running gear, not the engine. We do almost nothing to the engine except put it in peak tune. We do use special air filters on the carburetors. We machine our own aluminum sediment bowls to replace the glass ones in the fuel-line filters (we lost one race when the glass bowl cracked.) We beef up throttle linkage to resist the rough treatment of heavy-footed drivers who keep trying to kick a hole in the floor.

These points I mentioned are a minimum. Others do much more. For example, Chevrolet uses mostly Oldsmobile parts in its running gear, Corvette parts in its engine. Ford uses Lincoln parts such as spindles and "A" frames, and had even gone so far as to authorize the use of the biggest Mercury interceptor police engine in its race cars. This stopped about the time that Chrysler threatened to put the Chrysler C300 engine in a Plymouth!

As an outboard-motor manufacturer, we are forbidden to take part directly or indirectly in outboard-motor racing. So we turned to automobiles. (Incidentally, in my opinion, the best thing that could happen to stock-car racing would be the adoption of a similar rule to keep out car manufacturers. This would help eliminate the present confusion as to what is and what is not stock. A manufacturer competing with his customers is unfair, if not unwise. It's poor public relations. Give it back to the drivers

(Continued to page 304)

Why wish and wait?
... We'll ship this beautiful home complete
YOU ERECT IT YOURSELF
... at amazing savings!



THE HAWTHORNE A compact, livable floor plan. Every foot of space put to good use. No wasted building dollars—more closet space than many larger homes. House above shown with carport and planter.

Only \$2775 (Without Basement)
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"We sharpened nearly 1000 mowers our first season and gained a reputation for the best work."—J. W. Kemper

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Sharpens any mower in ten to twenty minutes. Handles complete assembly of all reel types including 36 in. power mowers. Handle, wheels, roller, and engine are not removed.

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Even the sound a Disston saw blade makes as it cuts is something special.

That's because Disston craftsmen build special quality into every blade at every step—from the fine Disston-made steel to the finished product.

There's so much extra satisfaction in using good tools, remember to ask your hardware dealer to show you Disston

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- Band saws
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Please send me, free, illustrated 68-page booklet. It tells how to choose, use and care for tools.



Name.....

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

and their sportsman sponsors. It looks as though NASCAR is moving in that direction with its recent ruling that the racing group will establish its own specifications.)

At the start of the '55 season, our Chrysler C300s did not do well. They were fast enough. They usually took the lead and led for much of the race, but then they were apt to slow down or quit. We discovered why: Dirt was ruining our engines.

After the first Langhorne race, the air filters on our cars were completely loaded with dirt. The engines were just about to quit when, fortunately for us, the race was stopped because of a heavy rain.

At Winston-Salem, our two cars conked out almost simultaneously—so close together that an official accused us of willfully pulling out of the race, an infraction of the rules.

But we had not pulled out. The cars had just quit. We opened up the engines and there was no oil left in them. Just a cupful of stuff that looked and felt like lapping compound. The engines had no compression. The oil and dirt formed a grinding compound that wore out the rings. All the oil had pumped past the rings; the main bearings were shot and so were the rods.

Our 300s were susceptible to dirt. Their two four-barrel carburetors have eight holes to carry the abrasive stuff into the engine. Being a high-performance engine, it breathes faster and deeper, taking in more dirt per lap than other engines. Dirt was killing the 300's chances.

Back we went to our laboratory to get ourselves off the hook. We found that for racing, the conventional oil-bath air filter is inadequate. It actually collects dirt and dumps it in big gulps into the carburetor. At full throttle we would suck oil and dirt right out of the filters themselves. We'd be better off with no filter.

But you have to have filters in dirt-track racing. So we drew on our experience in building portable chain saws for the government during the war. We knew that dry paper filters had worked there under dusty conditions. So we tried paper.

We improvised a filter from the sawed-off bottom of a garbage can. We built one inside an aluminum saucepan. We were on the right track as our hurried tests showed. Finally, with the help of Purolator parts, we came up with the simple, but amazingly efficient dry paper filter that all racers use today.

It shows no power loss on the dynamometer, yet it keeps out all dirt particles over two microns in diameter. Dirt under two microns seems to do little or no damage.

With the dirt problem licked, the 300s

(Continued to page 306)

NEW! Make your own hi-fi speaker cabinet with Weldwood!



Model KD1
The Patrician IV



Model KD4
The Regency



Model KD7
The Baronet



Model KD2
The Georgian



Model KD5
The Empire



Model KD3
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Model KD6
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7 Electro-Voice models for single- or multiple-speaker high-fidelity units—kits start at \$24; Do-It-Yourself books including plans, \$1.00 (except Patrician and Georgian, \$1.50; Baronet, 75¢).

Here's why the new plans and kits by Electro-Voice, Inc., specify beautiful Weldwood plywood as ideal material for speaker enclosures.

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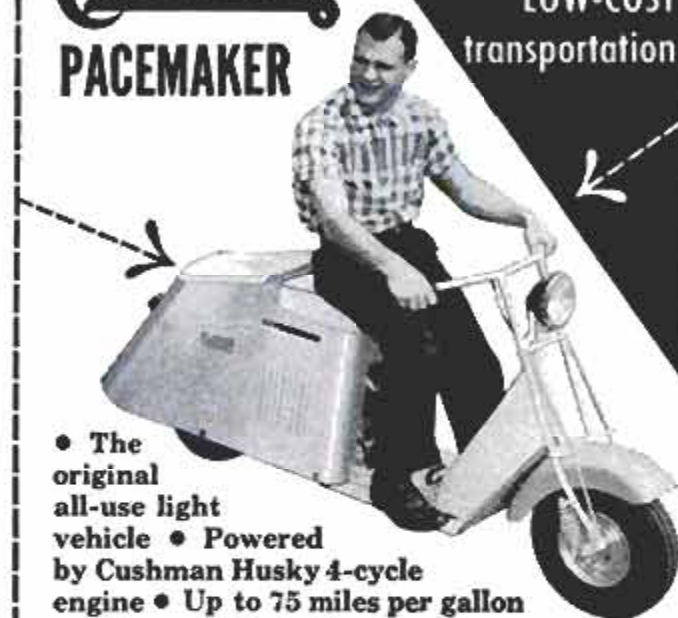
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this
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the World's Most Popular Pipe Wrench



Millions of users know it
out-performs,
out-lasts all others!

It's the "RIDGID" name that guarantees you everything you want in a pipe wrench—instant bite on the pipe or conduit, instant let-go—it can't lock because of patented hookjaw suspension . . . handy pipe scale, easy-spin adjusting nut, comfort-grip I-beam handle . . . and every one factory-tested before shipment! For your work, for your home, it's most for your money—buy it at your Hardware Store!



The Ridge Tool Company, Elyria, Ohio, U.S.A.

began to win races. Things looked good. Then at Raleigh, N. C., Herb Thomas beat us. He was driving the same Buick we had been outrunning all season. Something was changed, we knew. He finished the race without a tire stop. We were leading until we had to change tires and we never caught him again.

The next day at Milwaukee, we were beaten by Marshall Teague in a Chevrolet that went all the way on one set of tires—this same type of tire, again.

As we were given to understand, Thomas and Teague were running on special experimental tires given to General Motors and Ford by Firestone for test purposes. Somehow these tires got onto the two cars that beat us. As you can imagine, the tires caused many heated discussions. A pit stop for tires can mean the difference between winning or losing a race. This new tire meant that the races could be won or lost by the tire company.

We had been doing lots of work with tires. The 300 is hard on rubber, being the heaviest and fastest car on the track. You just can't get oversize tires for it. Largest racing tires made were 8:00 x 15. Smaller cars use the same tires we do (8:00 x 15) and, being lighter, go farther between changes. Sometimes these smaller cars win on the time they save in tire changes.

Our first move had been to install wide-base wheels. We have long been aware of the advantages of wide-base rims. Our distributor in New York had gone into the wheel business during the tire shortage of World War II. They proved to me that wide-rim wheels increase tire life sharply on cars, trucks and buses. (Watch for wide-base wheels on '57 cars and trucks!)

The wide-base rim allows the tire to hold more air. And more air means it runs cooler. Wide rims also increase load capacity and stability on turns. We now use 9½-inch rims, about optimum for our tires.

We also developed a tire-curing system. Every tire is broken in for 1000 miles on our station wagons before it goes on a race car. We never trust a new tire for high-speed driving.

We also inflate our tires with a dry gas—we use nitrogen. The humidity in air can increase pressure to 90 pounds when it becomes steam during the race. So we empty our tires before each race and refill them with dry nitrogen.

We thought we had the tire problem in hand when along came this fabulous new Firestone racing tire, the 170 Super Sports, that made it possible for Thomas and Teague to beat us twice in a row.

We and others put so much pressure on
(Continued to page 308)

New! Just \$99⁵⁰!

World's only orbital-action bayonet saw!

Now—the first *real* improvement since portable jig saws were invented! It's Porter-Cable's revolutionary new Model 148—designed around a wholly new principle, *guaranteed to outperform any other portable jig saw at any price.*

Orbital action makes the difference. Blade teeth are in contact *only* on the cutting stroke—*back away* on the relief stroke. Harmful "drag" is completely gone—and performance reaches a new high.

By actual test, the Model 148 cuts up to 4 times faster than the best conventional up-and-down saws. It has a full 2" capacity in wood— $\frac{3}{4}$ " in aluminum, $\frac{1}{4}$ " in steel. Its cool, comfortable grip and perfect balance make easy work of any job. Get the whole amazing story from your Porter-Cable dealer—or write today for full information and name of your nearest Dealer.



Exclusive
Orbital
Action!

Blade moves ahead on upward cutting stroke—moves back $\frac{3}{64}$ " on downward relief stroke. No harmful "drag"—blades run cooler, last far longer—cutting speeds increase up to 4 times!

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It's Truscon's Double-Hung Steel Window that will never stick or rattle. That's because steel will never rot, warp, swell or shrink. You buy these Truscon Series 138 Windows from your dealer ready to install. All hardware is factory-attached. Stainless steel weather stripping is built in. There are types and sizes for every home style—with storms and screens available, too.

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Free book shows how to install Truscon Steel Window in frame, brick veneer, masonry and concrete block construction. Clear pictures and complete step-by-step explanation are easy to follow—with helpful tips on professional methods. Send coupon below.

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race headquarters and the tire company about these special tires that Firestone went into accelerated production on its experimental molds. Just before Darlington, Firestone officials received a phone call every two minutes and all but went into hiding! Finally, we were able to get tires and we continued to win races, finishing the season well out in front of both circuits.

Obviously, there is more to winning races than setting-up the cars. There are also the pit crews and the drivers—we have the best of these. The transportation of crews, cars and parts, fuels, vapor lock and rainouts also add woes.

Our pit crews are new at the game with no previous race experience. But they have a great pride in our products, whether race cars or outboard motors. A favorite lunch-time diversion at the shop is practicing pit stops. The boys can complete a scheduled pit stop (gas, oil and four tires) in 48 seconds. That takes practice.

We have a 12-man team for three cars, the usual number we take to a race. Each car has its own truck to haul it around. The driver buys both the race car and the truck on a time-payment plan out of his winnings. We do all the set-up work and pay all racing expenses. The drivers get the prize money.

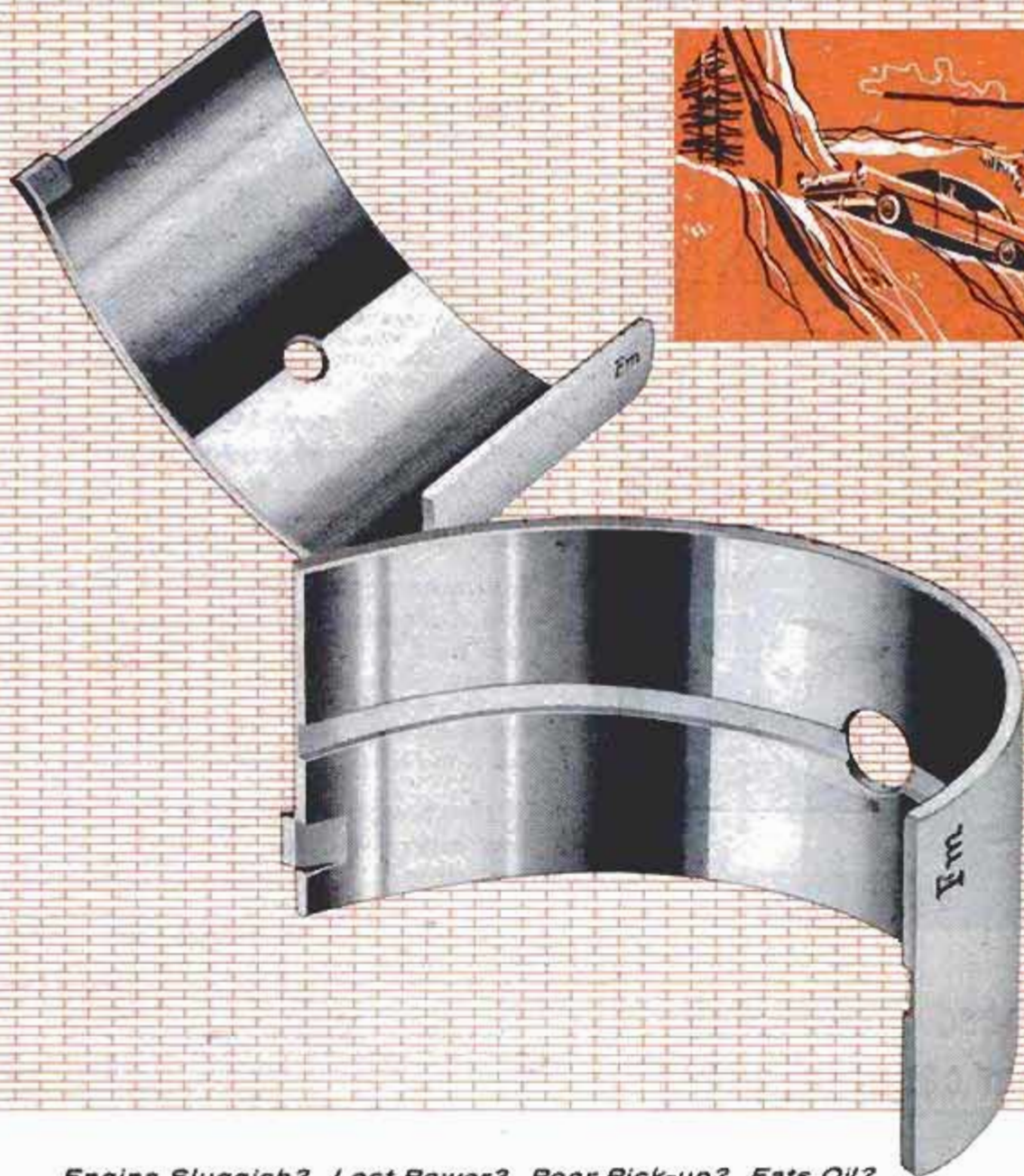
Some week ends we are in three races: Friday night, Saturday night and Sunday afternoon. They may be hundreds of miles apart. The crews drive at night and get the cars in shape for the next race the following morning. This hectic life continues for most of the year. There are about 45 races in the Grand National Circuit of NASCAR. To win the championship, you have to be in most of them.

Tim Flock was in 39 races, winning 18 for an average of .462. His nearest rival averaged only .236. In AAA we took 10 firsts out of a possible 13 with Mundy, Bettenhausen and Nelson driving for an average of .770.

That's a record we're proud of. We have never had a car disqualified. We never hurt a driver; in fact, we never turned over.

Here are some quick rules on how to win a stock-car championship:

1. Pick the best "horse" or chassis, a top driver and a hard-working pit crew.
2. Learn to be a good loser. Perpetual "bellyachers" get nowhere in the game.
3. Don't let name calling disturb you. Stock-car fans are rabid individuals.
4. Be a good winner. Don't let your drivers or crews lose their humility.
5. Respect your competitors. No one has all the answers.
6. Be willing to go for days without sleep to keep your cars in top condition. ★ ★ ★



Engine Sluggish? Lost Power? Poor Pick-up? Eats Oil?

Smooth Engine Power calls for Quality Bearings . . .

FEDERAL-MOGUL QUALITY!

Engine performance starts at the connecting rod and crankshaft bearings. These are the vital points where gasoline explosive force is converted to turning power. Bearings take the impact, carry the load of variable driving conditions. They meter oil and control the flow of lubrication for cylinder walls and rings. Replacing with Federal-Mogul QUALITY bearings restores lively traffic response, smooth power on highways and hills, gas and oil economy, freedom from power-stealing oil pumping!

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Years-ahead Quaker State keeps your car at full power



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Member Pennsylvania Grade Crude Oil Association

Why Do People Buy the Cars They Do?

(Continued from page 195)

When the Boss owns a Mercury:

Employees buying Chevrolet.....	12.5%
♦ Employees buying Ford.....	25.0%
Employees buying Plymouth.....	12.5%

When the Boss owns a De Soto:

Employees buying Chevrolet.....	14.8%
Employees buying Ford.....	14.8%
♦ Employees buying Plymouth.....	25.9%

These percentages make it obvious that the brand of car the Boss owns has an important influence on the brand an employee selects.

✓ How does the new 1955 car compare with the car they traded in size?

New car is larger.....	47.1%
Smaller.....	17.6%
Same size.....	35.3%

✓ How many could get along with a car of a different size from the one they now own?

Present car is right size.....	66.1%
Could use little smaller car.....	20.3%
Could use a lot smaller car.....	11.8%
Could use a larger car.....	2.7%

✓ Of those who could use a smaller car, how many will buy a smaller model next time?

Will buy a smaller car.....	17.7%
Will not buy a smaller car.....	82.3%

People seem to have a prejudice against a smaller car. Even those who admit they could get along with a smaller car are, as a group, not willing to buy one. When asked for a reason why they would not buy a smaller car more than half (51.9%) replied that they just like a large car. Another 22.0% said the smaller car is not as comfortable or as safe as the large car.

✓ How many persons normally ride in the car with the driver?

Drive alone most of the time.....	43.9%
With one other person most of the time.....	38.2%
With several others most of the time.....	19.2%

Even though most of the owners admit they do not need a large car most of the time, they bought and seem anxious to continue to buy large cars.

✓ If they had unlimited money to spend, how many would buy the same make they now own?

Income under \$5000 a year.....	24.1% would
Income \$5000 to \$10,000.....	22.6% would
Income over \$10,000 a year.....	35.8% would

Both extremes, the low-income group and the high-income group, seem to be more satisfied with their cars than the middle-income owners (although statistically the difference is small). Perhaps this may have some relationship to the added emphasis on "keeping ahead of the Joneses" that is felt in the middle-income brackets.

(Continued to page 312)



Professional, big-tool precision
at small-tool cost!

...in the new Yates-American Saw-Jointer-Sander Combination

Standing behind your choice of Yates-American is the experienced craftsmanship of a company that, for more than 73 years, has specialized in designing and building precision machinery for professional woodworkers.

You get instant change-over

and many other features that give you more for your money

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Manufacturer of woodworking machinery since 1883

A tool with a touch of tomorrow
\$274.50
complete with 1/4-hp. totally enclosed, dust-proof motor that runs everything
(Less saw guard and table extension)

Send coupon for free bulletin—and name and address of your dealer

----- Tear out coupon and mail today! -----

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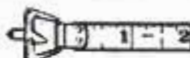
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Evans
TAPES

50 ft.-100 ft. long
At your hardware store
For building and gardening measuring.

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SPECIAL HOOK-RING ATTACHMENT FOR EASY ONE-MAN MEASURING

EVANS RULE CO., Elizabeth, N. J. 3050

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SUPER SAW FILER NO. 6

IT'S NEW! with Automatic DEPTH CONTROL ROLLERS

Automatically controls **DEPTH—ANGLE—PITCH**

Perfect bevel and angle maintained, and fool-proof depth control for all Rip, Cross-cut, and Handsaws. Precision made and calibrated for instant setting at desired angle. Can be used in any vise or clamp. Complete with file, only... **\$6.50 ppd.**

SAVE TIME AND \$\$\$

JOINT & SHARPEN CIRCULAR SAWS

Sensational new Super Filer No. 11 joints and sharpens both hand and circular saws 6" to 10" with all teeth the correct height, depth, pitch and bevel. Easy to use—when file hits hardened steel roller, teeth are finished. Saw runs true and smooth with no side pull. Complete with special 8" file **\$9.95 ppd.** "TRU-CIRCLE" saw set automatically sets teeth at 10° or more **\$2.95.**



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FEBRUARY 1956

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Why buy two
when one
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This compact unit with big 2 1/2 h.p. Clinton 4-cycle engine attaches in seconds without tools to a powerful 12 to 18 inch Rotary Tiller or to an 18 inch side-trimmer Rotary Mower with an efficient side discharge—everything you need for a beautiful garden and lawn.

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Food Machinery & Chemical Corp.
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Please send me full information re Bolens Power-Pak combination unit.

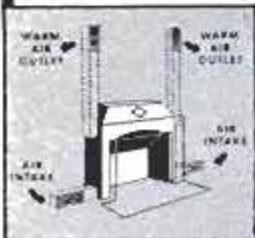
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This fireplace
 circulates heat, will not smoke,
 damper seals air-tight!



Here is the only fireplace especially designed for modern homes. It is the new Heatilator fireplace that gives you all 3 of these features . . .

Circulates Warm Air. Cool air from the floor level is warmed in the double walled firebox — then circulates gently to every corner of the room and even to adjoining rooms.

Will Not Smoke. A scientifically designed steel form, the Heatilator unit does away with guess-work and rule-of-thumb construction methods. It adds little to cost of finished fireplace.

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The Fireplace for Every Purpose. Ideal for homes, basement rooms, camps or cabins. Be sure you get the genuine. Look for the name Heatilator on the damper handle and dome. Sold by building material dealers. Mail coupon for free booklet.



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Send free booklet on new 3-Star Heatilator Fireplace.

Name

Street

City Zone State

✓ If they had unlimited money to spend, what make would they buy?

Under \$5000 a year:

Cadillac	35.6%
Oldsmobile	11.9%
Lincoln	9.9%
Chrysler	7.6%

\$5000 to \$10,000 a year:

Cadillac	39.5%
Lincoln	12.6%
Chrysler	9.3%
Oldsmobile	7.4%

Over \$10,000 a year:

Cadillac	41.2%
Chrysler	14.9%
Oldsmobile	9.6%
Lincoln	5.4%

In all income brackets, there is no doubt that Cadillac has a firm grip on the prestige market. It is a grip that gets stronger as the income bracket goes up. Another interesting point is the way Chrysler moves up from 4th in the low-income group to 2nd in the high-income group.

✓ When buying their new 1955 car how many bought the same make as the one traded in?

Bought same make	47.4%
Different make	52.6%

✓ When buying their 1955 car how many bought in the same "family" as the one they traded in?

Same "family"	67.2%
Different "family"	32.8%

There seems to be considerable shifting of brand-ownership with fewer than half the owners staying with the same make. But more than two thirds remained in the same family (General Motors, American Motors, etc.).

✓ How many owners say they feel loyal toward one particular make?

Feel loyal toward a make	47.5%
Do not	52.5%

✓ How many owners would look first at a different make from their present car if going out to buy a new car tomorrow?

Would look at same make	48.2%
Different make	51.6%

✓ Of those who would look at a different make, what is the most important factor in their choice of a new car?

Styling	20.3%
Engineering	10.1%
Cost of operation	8.5%
Price	6.1%

Once again it seems that styling or exterior appearance is the most important influence in the choice of a new car. Far down on the list come speed and performance with a combined total of only 3.0%. ★ ★ ★

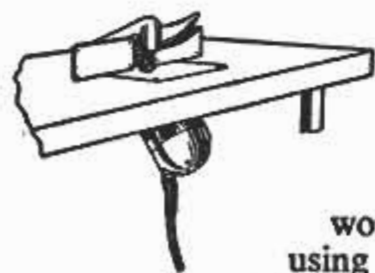
Look! Router At Work



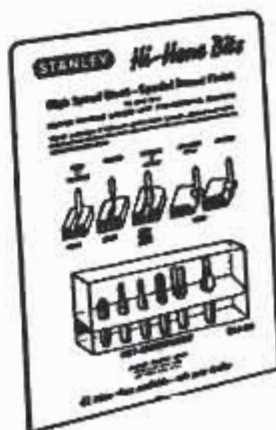
Those of you who have never used a router need only see one at work to be fascinated . . . need only try one to want it for your own shop.

The router shown here, cutting a decorative edge, is Stanley's No. H15. Its $\frac{1}{4}$ hp Stanley-built motor powers a wide variety of bits at a smooth cutting 27,000 rpm. For heavier duty we recommend the $\frac{1}{2}$ hp Stanley H45 Router.

Look Again! It's A Shaper



Now it's a shaper! The Stanley Router converts to a useful shaper when mounted on your work bench as above, using the special shaper adapter kit. Same router motor powers shaper. With H15 Router use Kit H127 . . . Kit H26 if you have H45.



You'll want a variety of bits for your router. This H27 Assortment of "Hi-Hone" bits gives you 6 of the most popular. Your dealer has a full selection of Stanley bits and cutters for router and shaper. Start with the H27 pack and add as you need.

Stanley Routers are on display at your favorite hardware store or building supply dealer's. Ask for a demonstration. For further details send for Catalog 400. Write Stanley Electric Tools, 622 Myrtle St., New Britain, Connecticut.



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Your Own Business

FILING SAWS



Saws come
from 20 and
30 miles

Files Thousands of Saws
in Spare Time

"I rented a two-car garage and have all the work I can do. Some days I start 6:30 in the morning. I get work 20 and 30 miles from my place of business."
—Charles H. Smith

"I have done 4 or 5 thousand saws in my spare time in the 4½ years since I got the outfit, and they are all coming back with repeat orders."
—Len Grego.

FOLEY FILED SAWS BRING NEW CUSTOMERS

Here is a steady repeat CASH business that pays up to \$3 to \$5 an hour, and you can start in your own basement or garage in your spare time. Every saw you sharpen with the machine accuracy of the Foley Saw Filer is an ad that brings more customers. S. M. Hollingshead wrote to us: "I am doing very well with my Foley Filer, and I am glad I invested in your machinery. It is very satisfactory and works very well in the small community in which I live."

You can file all hand saws, also band and crosscut circular saws on the Foley Saw Filer. The adjustments are simple—there is no eyestrain—and you can start right away to turn out perfect cutting saws. "The first saw I sharpened with my Foley Saw Filer came out 100%. I think it is a marvel of perfection,"—writes Clarence E. Parsons.

"**MONEY MAKING FACTS**" explains how you can get business from hardware stores, home owners, farmers, carpenters, schools, mills, factories, etc. Just think—with a modest investment, no overhead, no stock of goods to carry, you can start right in on a cash business that will help pay the rent, buy groceries, or a new car. Get the facts—send coupon today for this practical, money making plan. No salesman will call.



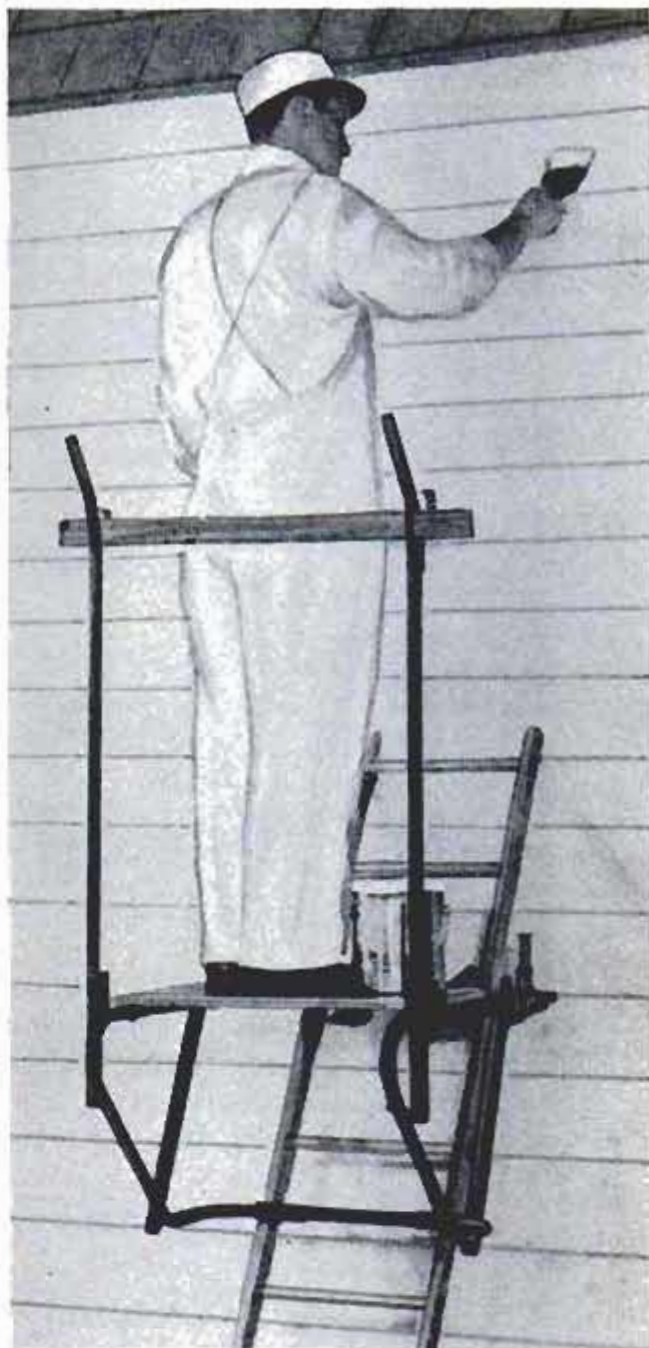
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Amateur painters can work rapidly while standing on a portable platform that mounts near the top of any ladder. The sturdy platform, made of lightweight aluminum, grips the side rails of the ladder with nonslip clamps. A guard rail prevents accidental falls. By combining two platforms and two ladders, a large scaffold is quickly formed.

Floating Roof for Fuel Tanks

Installation of floating steel roofs on conventional fuel-storage tanks is helping to cut huge evaporation wastage. Last year, oil companies lost 63,000,000 gallons of fuel through evaporation from fixed-roof tanks. The floating roof, which rises and falls with the fuel, gives it no chance to vaporize and seep out.

IF YOU WANT BETTER PICKUP AND POWER plus big gas savings...please read this ad!

**Amazing new gasoline pressure regulator,
pulsation dampener, lifetime fuel filter,
carburetor protector employs entirely new automotive
engineering principles, gives results never
before possible in new or old cars!**



Are you one of the hundreds of thousands of motorists troubled with rough idling, dying, vapor lock, jerky acceleration, difficult starting, traffic stalling, carburetor wear, poor gas mileage, excessive gasoline odors in the car?

Then you'll want to read this ad very carefully.

Whether your car is factory new or years old, Mileage Minder positively promises quick help.

Yes, Mileage Minder was developed to meet the urgent need for a continuous, clean, non-pulsating supply of fuel at the carburetor... to lick the serious fuel waste and performance problems of later model high-speed engines fed by present wasteful, pulsating types of fuel pumps.



1. Stops Flooding, Saves Gas—*Pressure Regulator*... maintains uniform fuel pressures, prevents flooding and gas waste and assures maximum economy and performance at high or low speeds.

2. Prevents Carburetor Wear, Improves Performance—*Pulsation Dampener*... and carburetor protector. When raw, unregulated gasoline pulsates violently into the carburetor, the needle is constantly hammered. Wear quickly results and gas is wasted, particularly in modern high-speed engines. Mileage Minder positively and continuously delivers smooth-flowing fuel economically to the carburetor at any speed.

3. Traps All Dirt and Metal Particles—*Perma-Life Fuel Filter*... the micro-porous sintered bronze filter disc removes ALL dirt, never needs replacement, and always assures clean, pure fuel. Tiny metallic particles dislodged from factory welded gas tanks, and other new parts, are trapped—they can't clog jets, can't jam carburetor needles—flooding, stalls and gas waste at high speeds are eliminated. A very important point!

4. Ends Vapor Lock... Vapor dome employs new principle to trap vapor-locking gasses.

5. Beautify your engine... Mileage Minder is a picture of proud polished-chrome engineering skill.

If you'd like a quick and positive power increase... and if you'd like to stop gas waste, flooding, stalling, vapor lock, carburetor wear...if you'd like to do all of these things for your new or old car, then fill out the no-risk coupon on this page, right now while this magazine is in your hand.

You'll find Mileage Minder simple and easy to install in a matter of minutes, with end wrench or pliers. Easy-to-follow instructions. Mileage Minder is fool proof for a lifetime of car service. No adjustments or worn out parts.

Remember, satisfaction is absolutely guaranteed, with no strings attached. If you aren't absolutely amazed and pleased, just return Mileage Minder and your money and postage will be promptly refunded, without question.

MR. DEALER AND WHOLESALE—Mileage Minder will quickly and easily solve many of your common tune-up and maintenance problems, such as flooding, poor gas mileage on both new and older model cars. Only one number to stock—for all popular cars including 1956 models. Free convincing displays. Write now!

MILEAGE MINDER

HERE'S HOW MILEAGE MINDER IS ABLE TO ABSOLUTELY GUARANTEE MORE POWER, BETTER PERFORMANCE, GREATER GAS MILEAGE:

- From fuel pump—gasoline surges in raw, unregulated hammering pulsations!

Within amazing new Mileage Minder, four steps take place:

- A.** Lifetime micro-porous filter removes all sludge-making dirt and metal particles small as .001".
- B.** Patented spring loaded neoprene diaphragm tames hammer-like pulsations, regulates fuel to even, full flow.
- C.** Vapor-locking gasses are harmlessly trapped in vapor dome.
- D.** A steady, clean, economical flow of gasoline is delivered to the carburetor.

©1956

What Engineers Say: "Mileage Minder has been thoroughly tested, and has gained my unqualified approval. It does everything claimed for it and more." **Edmund D. Carlson, A.E.E. Engineer**



MAIL NO-RISK COUPON TODAY!

PASER MFG. CO.
535 Turk Street, San Francisco 2, California
Please send Mileage Minder postpaid, with satisfaction guaranteed.
I enclose cash _____ check _____ money order _____ for \$4.95.
(Special, quick action offer includes postage)

Name _____
Address _____
CITY _____ STATE _____
Make, year, model of car _____

Coleman "OUTING PALS"

Add Hours of Fun
to Every Outing!

You'll have more fun, enjoy new comfort outdoors with Coleman Outing Pals. See them at your dealers.

New Coleman Portable Cooler

Keeps foods, beverages freezer fresh. Low "K-factor" (heat-transfer) holds the cold longer. Lid catch lifts easily, locks automatically. Inside corners rounded, stay clean, odor-free.



Coleman Folding Camp Stove



Lights instantly. Hot, homelike meals anywhere... in a jiffy! Burns low-cost Coleman Fuel or unleaded gasoline. Folds up, carries like small suitcase.

Coleman Carrying Case-Camp Table

Roomy, all-steel carrying case holds 4 folding stools, cooking utensils, food, hunting and fishing gear. Unfolds into strong, rigid picnic table, 28-in. square. Keeps food away from damp ground, insects, litter!



Coleman Floodlight Lantern



Brilliantly floodlights 100-ft. area. Safe, stormproof. Lights instantly. Gives 8 to 10 hours service on single filling. Burns inexpensive Coleman Fuel or unleaded gasoline. Coleman REFLECTOR converts it to a powerful spotlight.

Try new Coleman FUEL. Specially blended, clean burning. Has rust inhibitor. Won't gum up.



FREE

New Outdoor Book. Many useful tips for your hunting, fishing and vacation trips.

FILL OUT COUPON!

THE COLEMAN COMPANY, INC.
Dept. 11-PM, Wichita 1, Kansas

Please send me free copy of the new Coleman Book "More Fun on Every Outing."

Name.....

Address.....

City..... State.....



Plastic Flying Model Of Douglas Skyraider

With only scissors and cement, youngsters can assemble a flying scale model of the Douglas F4D-1 Skyraider, a foot and a half long yet weighing only three ounces. The model is launched with rubber bands, and flies and glides like its prototype. It is molded of high-impact styrene and shows fine detail, even down to the rivetheads. Half sections are quickly cut from the formed sheets and cemented together; then exterior parts are cut out and cemented on.



APPROXIMATELY

* 22

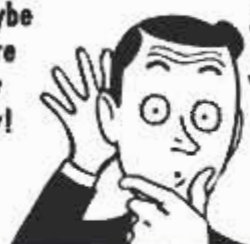
DIFFERENT BRANDS OF SANDERS TO CHOOSE FROM

15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

WHICH IS THE BEST SANDER FOR YOU...?

Professionals claim it's the sanding pad motion that counts in surface removal. Today's army of over 22 sanders use 1 of 4 different "motions"! Which motion will do that sanding job *best* in your home away from advertising claims and salesmen? We say exclusive Syncro MULTI-MOTION will *BECAUSE*—most wood grain being naturally crooked and irregular—only Syncro "Multi-Motion" sanding pad action can sand *with* such grain and completely *finish* the *whole* surface! See for yourself—accept our sporting offer shown below—and get your *next* home sanding job done *without* having to buy *any* sander!

* Maybe More Any Day!



"Mine is Best!"
"No—My Sander is Better!"
"Don't Believe Their Claims!"
"Ours Sands Perfectly!"
"X-Sander is Cheaper and Better!"

RENT—TRY THIS SANDER ON YOUR OWN JOB... RETURN FOR PROMPT RENT FEE REFUND... OR BUY IF IT SATISFIES YOU!



SEND NO MONEY

DO THIS: (1) Send coupon, your tool dealer name, address—we'll ship No. 900 Sander, Sanding Handbook, Sandpapers to you. (2) Pay postman \$20 (10 days rental fee). COD fee, postage charge, on arrival. (3) Use sander 10 days, return it prepaid—we'll refund your \$20 promptly. (4) To buy it, pay dealer (named on coupon) balance of \$19.95. Send us *receipt of purchase* from dealer, we'll ship you \$3 worth of sandpapers as our Gift!

Free

OF EXTRA COST

In addition to the Free Sandpaper included with your Rental 900 Sander, if you buy sander after trying on this offer—send us receipt of purchase from dealer, we'll ship you \$3 worth of sandpaper FREE.

DEALERS WRITE!

Dealers write on letterhead for complete Rental Sander details... for entirely different store-operated "Rent or Buy" Plan that can increase sander sales 60% at Full Dealer Profits!

"900" SANDER FACTS

Outlasts and outsands others. Jump-Free. Easiest of all to use. Exclusive Multi-Motion sanding pad action. Heavy-duty. Guaranteed against burn-out during rental use and ownership. Full 6 months Warranty. Retail Price only \$39.95.

SYNCRO POWER UNITS
GUARANTEED
AGAINST BURN-OUT DURING
YOUR OWNERSHIP OR
REPLACED FREE!

OFFER ENDS JULY 1, 1956

TO: SYNCRO CORPORATION
Dept. 1-26, Oxford, Michigan, U.S.A.

Send me Syncro #900 Sander COD on 10 Day Rent Fee Refunded Offer. Within 10 days after Rental Period I may either (1) return Sander prepaid to factory only (Syncro Corporation, Oxford, Mich.) for prompt \$20 refund! Or (2) I may pay dealer direct (named below) balance of \$19.95 and I will own Sander. Offer ends July 1, 1956.

Name of Hardware Store or Tool Dealer: _____

ADDRESS _____

MY NAME _____

ST. & NO. _____

CITY _____ ZONE _____ STATE _____

(Offer Good Only In Continental U.S.A.)

Just Mail This



© SYNCRO CORP. 1956

SYNCRO

SAWS AND SANDERS

SYNCRO CORPORATION, Dept. 1-26, Oxford, Michigan, U. S. A.

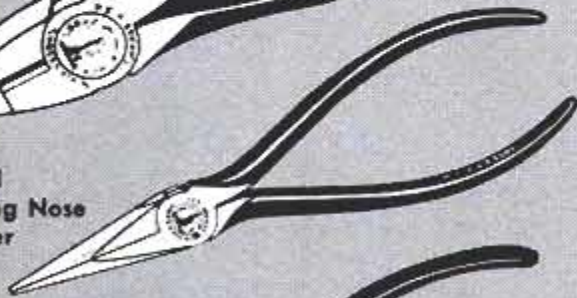
KLEINS

mean a better job

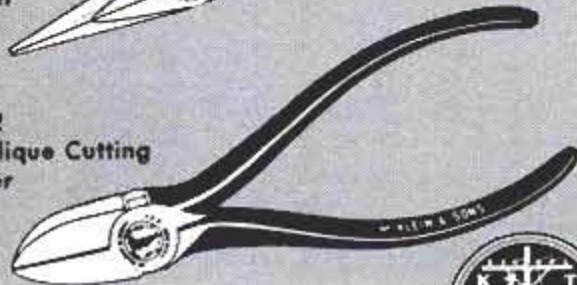
201-NE
Side Cutting
Plier



301
Long Nose
Plier



202
Oblique Cutting
Plier



Here are three pliers that will help you do a better job—three tools that should be in every workman's kit.

Klein pliers are recognized by electricians, linemen and good workmen everywhere as the standard of comparison by which other pliers are judged.

The work you do is only as good as the tools you use. Be sure the tools on your bench or in your kit include genuine Kleins, famous for quality "since 1857."



Your hardware store has Kleins in stock or can get them for you quickly. Look for this new display board. It shows the most popular items in the Klein line.

Seattle Police Patrol an Underwater Beat

(Continued from page 155)

most startling sight he has ever encountered under water. And Francis, mind you, grapples with octopuses in his off-duty hours, for sport and food. But staring at him now was a hairy face with long horns.

Then, within his mask, Francis chuckled. He was looking at a dead cow.

Minutes later he had the blown safe. Cash and checks were gone, but some important papers were still intact.

And Christmas can even loom up for a police-frogman in midsummer. Officer Yerabek, who ordinarily walks a beat in the Belltown district, got a call in the heat of the afternoon to dive for the body of a four-year-old boy who had drowned off the Salmon Bay Terminal.

When Yerabek went down he first found himself crawling along sunken logs. Then he drifted into a forest of evergreens. This was an experience that had not come even to Alive in Wonderland—walking through a forest beneath the water. But when Yerabek grasped a tree it moved. Then he knew. A Christmas-tree merchant had used the bay for dumping his surplus stock.

Just about everything ever found by charwomen cleaning up in a theater has been discovered by the police-frogmen while on diving jobs. One thing that puzzles them, however, is the odd places they have found lost golf balls such as off the West Waterway Bridge.

A 23-year-old man had turned Fagin in the "Oliver Twist" manner, and trained teen-agers as purse snatchers. When caught, a teen-ager talked. The looted purses were habitually tossed off the bridge by the gang's master-mind. Officer Faires went down into the water and retrieved the purse evidence—plus golf balls. Seattle, he figures, has some long-distance drivers.

Among other odd and incidental recoveries was the *Laura Lee*, a 29-foot cruiser which sank in Lake Washington in 1942 when, in a storm, she was blown against the Floating Bridge. The battered *Laura Lee* was not exactly a rich find, but Faires is hoping for better luck.

Chief Lawrence has offered the services of the Underwater Search and Recovery Unit to other police departments in the area, and that means the frogmen are likely to get assignments in a great many different waters. On the wall in his home, Faires has tacked up a coastal chart showing the more than 450 places where ships have been sunk. Under water, he is continually

(Continued to page 320)

Mathias **KLEIN** & Sons
Established 1857 Chicago, Ill., U.S.A.
7200 McCORMICK ROAD • CHICAGO 45, ILLINOIS



Mainstays of the Hertz rental fleet. Front row (left to right)—Buick, Ford, Chevrolet. Back row—Cadillac, Oldsmobile, Plymouth

Why does Hertz — world's largest rental fleet — use Champion Spark Plugs?

Operating 15,500 cars and 15,000 trucks, Hertz wants the most power and the most miles per gallon . . . so Hertz uses full-firing Champions!

You can bet that Hertz—world's largest rental fleet—knows all there is to know about spark plug performance and value!

In countries all around the globe—Hertz has put spark plugs through the world's toughest road test. And the fact that Hertz uses 5-rib Champions speaks for itself!

Whatever car you drive—Chevrolet, Ford, Plymouth or any of the

higher-priced makes—take a tip from Hertz . . . use 5-rib Champion Spark Plugs. When you install new Champions, you can immediately feel the difference in your car's response. You'll get quicker starts, faster acceleration . . . and more miles per gallon!

When you need spark plugs, don't settle for anything but the best. Get precision-made 5-rib Champions!

CHAMPION

LOOK FOR THE 5 RIBS



LUBRIPLATE

THE MODERN LUBRICANT



LUBRIPLATE Car Lubrication is different . . . it's better. **LUBRIPLATE** Lubricants make your car run better, last longer. Protect your car investment, cut your repair bills and parts replacements to an absolute minimum. If you want the very best for your car insist on **LUBRIPLATE** Lubrication.

LOOK FOR THIS SIGN!

It's Your Guarantee of the Finest in Car Lubrication. Consult your car dealer.



LUBRIPLATE H.D.S. MOTOR OIL—A heavy duty superior oil with high film strength. Fully detergent, keeps your engine clean, gives your car more power, faster starts, better fuel economy. *The oil that requires no additives.*

LUBRIPLATE IN TUBES

Packed in handy tubes. Excellent for lubrication of car door hinges, locks, hoods, fishing reels, guns, outboard motors and everything around the house. Available at sporting goods and hardware stores, marine dealers and all automotive outlets.



LUBRIPLATE DIVISION, Fiske Brothers Refining Company, Newark 5, N. J., Toledo 5, Ohio

on the lookout for those sunken ships.

Ask the three police-frogmen what their off-duty hobbies are, and you get one answer: Swimming and diving. Each began swimming before school age.

"My brothers took me out to Pier 91, gave me a pair of water wings and said, 'Swim,'" recalled Yerabek. "I started dog-paddling like mad."

Now he is an instructor in the police-school swimming and first-aid classes. So, too, is Faires, who used to be on the University of Washington swimming team. To augment his police salary—and keep in practice—Faires does commercial diving in his spare time.

For Francis, the police diving is more of the same that he had in a nine-year Navy stretch. During World War II, he served in the South Pacific with an underwater demolition outfit, and helped blow up a Grade-A Japanese sea wall to expedite an invasion. Besides wrestling octopuses in Puget Sound water now, Francis spear-fishes cod down where ordinary fishermen don't go. He tucks about 2000 pounds of fish in the freezer each year.

All three frogmen are sold on regular police work, but they can't get too much of the underwater stuff. Once a year, however, when Seattle holds its Seafair, the frogmen get full-time water duty. They are on the alert in Harbor Patrol boats or on docks to dive for anybody who goes overboard—especially during the Gold Cup speedboat trials and races. And usually somebody does—more often than not a small-fry spectator.

Faires had a particularly pleasant rescue job when one of the Seafair princesses was water skiing and, in a spill, hit her face on a ski. Semiconscious, she floundered in the water, and Faires dove. He swam back to the dock with her and shoved her onto it. The spectators were so startled by the scene, no one offered to help. So Faires climbed on the dock, picked up the girl, carried her to shore and gave her first aid. It was a one-man frogman show with a beautiful girl as the "prop."

But Faires says he got the biggest boot out of Seafair duty in retrieving a cannon. At the Corinthian Yacht Club an 18-inch cannon has long been used to start the sailboat races. Only this time the starter became overenthusiastic with his powder-pouring. The cannon went off—into the water. Faires dove down 36 feet, and quickly recovered it.

The frogmen will go deeper if they have to—more than 100 feet down. And the Seattle Underwater Search and Recovery Unit, one of the newest police organizations in the nation, will go far. ★ ★ ★

THERE'S A NEW YOU IN THIS PICTURE!

• **SHOPSMITH** gives you new skill!

You're bound to do better woodworking with SHOPSMITH. Its Speed-Dial automatically gives you correct tool speeds. Its built-in jigs give positive accuracy. Its changeability gives you exactly the right tool for any sawing, sanding, drilling or lathe job.

• **SHOPSMITH** gives you new satisfaction!

You'll have the satisfaction of seeing jobs through to completion with the one tool that can take you step by step—from the first saw cut to the finished sanding.

• **SHOPSMITH** gives you new versatility!

You'll be equipped for any job—from building toys and play-yard equipment to remodeling or adding complete rooms—at savings of 20-60% (more than enough to pay for SHOPSMITH).

• **SHOPSMITH** gives you new pride!

You'll be proud owner of the finest, most modern home workshop tool—a masterpiece of functional machine design (compare it with modern industrial tools). Its polished, precision parts are held to tolerances as close as .0002".

Now you can own **SHOPSMITH** for as little as \$3 per week on Magna's Tool-Time Plan

See the new SHOPSMITH® Mark 5 demonstrated at leading hardware or department stores or any Montgomery Ward store. See how it converts in less than 30 seconds from a 9" circular saw to a 12" disc sander, 34" lathe, 16" drill press or horizontal drill.

Power Mount makes it easy to add Magna's new 18" jigsaw or 4" jointer. See the Speed-Dial you simply dial to select the right speed for the job. SHOPSMITH comes ready to plug in, with built-in ¾-hp. motor, bench, chrome rustproofing — \$289.50



3 FREE BOOKS

1. "Project Digest," 36 project-packed pages.
2. "What to Look for When You Buy Power Tools," valuable shop guide.
3. Illustrated 20-page SHOPSMITH catalog.



MAGNA POWER TOOL CORPORATION

Dept. 317-B, at factory nearest you:
Box 2808, Fort Wayne, Ind., OR Menlo Park, Calif.

I'm interested! Please rush me the three free books and name of my nearest dealer.

Name _____
Address _____
City _____ State _____

(Continued from page 118)



WORLD'S TOUGHEST HAMMER

Now you can get a heavy-duty 20-oz. ripper in the famous ROCKET model. It's a brute-strength tool—the most rugged hammer ever made. The tubular steel shaft won't bend or break. The head, locked to the shaft, can't loosen. It's the perfect hammer for electricians, plumbers and for all heavy-duty work—crating, flooring, framing, concrete forms, etc.

The nonslip cushion grip absorbs shock. This is the sweetest feeling hammer you ever swung. See all the ROCKETS—and True Temper's fine wood-handled hammers, too. True Temper Corp., Cleveland 15, Ohio.



TRUE TEMPER.

Finest quality in Hammers, hatchets, axes • Garden, lawn and farm tools • Shovels • Shears • Fishing tackle • Golf-club shafts

10,500-pound-thrust engines and other equipment that will be installed on Comet 4, the new airliner now being designed. Comet 4 is intended to carry 58 passengers a distance of 2870 miles against a continuous headwind of 50 miles per hour with normal fuel reserves. It will be able to fly from London to New York in 9½ hours, including one fuel stop. It could fly from San Francisco to New York in 5 hours and 18 minutes.

De Havilland, manufacturer of the Comet 4, reports that no fewer than 3000 fatigue tests have been conducted on specimen assemblies during the designing of the new jet. These tests, combined with information and techniques gathered from earlier Comet models, indicate that the Comet 4 will have a fatigue life of 60 years—roughly six times the minimum flight life required of the aircraft.

With all these new aircraft, Mr. Average Air Traveler will soon be traveling faster than ever before and probably he won't have to pay a bonus for speed. Douglas engineers who worked out the economics of the DC-8 figure that on a seat-mile basis, operating costs of the DC-8 will actually be less than with some of our present transports. Mr. Average Air Traveler may find that he can go from New York to Chicago in less than two hours for the same price that he now pays for a much longer ride.

In the race to cut their schedules and supply faster and more comfortable service for their patrons, the airlines and the aircraft manufacturers are not waiting for the new designs to roll off the assembly lines. Many of the airliners flying today are being tested with new equipment to bring about these timetable revisions as soon as possible. For example, the Convair 340, a workhorse on short and medium-length hauls, is being tested with turboprops replacing the present Pratt and Whitney R-2800 piston engines. Preliminary research is being done for the Air Force, but if the conversion performs as expected, the airlines which use the Convair will be anxious to adapt their own equipment.

The rapid progress of the aviation industry is due to a large extent to keen competition. The airline company offering the fastest schedules and the newest equipment draws the larger share of the passenger and freight traffic. And the aircraft manufacturer who provides the airlines with the best equipment for their purposes gets the biggest share of the orders.

(Continued to page 324)



Hay-Bale Dump Truck Sets Its Load Down Quickly

Hay bales carried on a specially modified truck are stacked on the ground minutes after the truck backs up to the site. The bed is tilted like a dump truck's to a vertical position by a hydraulic cylinder. Two heavy steel-plate forks extend upward from the rear of the bed to prevent the bales from falling during the tilting operation.

When the bales come to rest on a framework of four-by-fours, the two steel forks are freed of their weight and the truck drives away. During unloading operations, metal legs on the ends of the frame beams drop down to rest on the ground. Bales can be loaded on the truck by reversing the procedure.

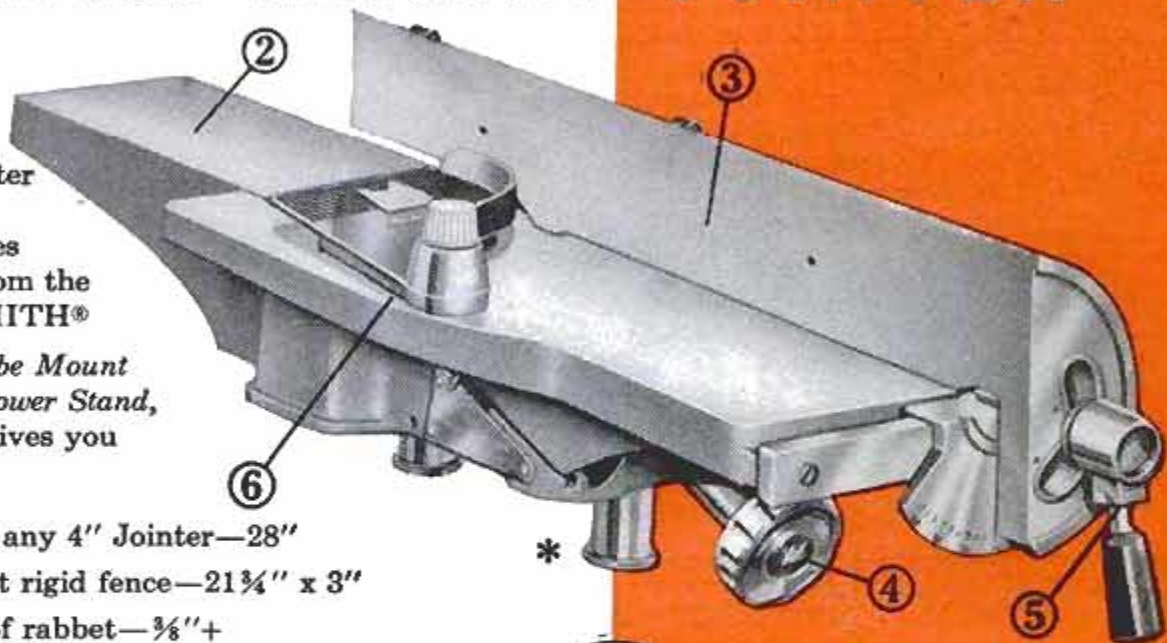
Here's that new **MAGNA** JOINTER

This big Magna Jointer has all the built-in precision and features that you'd expect from the makers of SHOPSMITH®

*Exclusive *Twin-tube Mount* for bench, *Magna Power Stand*, or SHOPSMITH. Gives you *Instan-Tension*.

- ① Longest table of any 4" Jointer—28"
- ② Largest and most rigid fence—21 3/4" x 3"
- ③ Greatest depth of rabbet—3/8"+
- ④ Single knob fence control—3 auto-stops
- ⑤ Safety-taper, Micro-Adjustable Knives

Only \$49.95. Ask your dealer about Magna-Tool-Time Plan. See the new Magna Jointer demonstrated at leading hardware and department stores or any Montgomery Ward store. For free literature write Department 319-B, Magna Power Tool Corporation, Box 2808, Fort Wayne, Indiana, or Menlo Park, California.

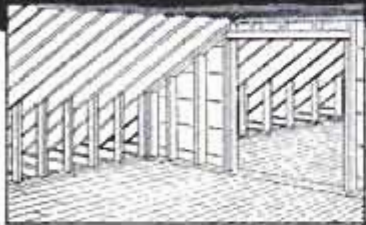


MAGNA

POWER TOOL
CORPORATION

Manufacturers of
SHOPSMITH

Add this BOY'S ROOM in your waste attic space!



Start this week end... with Gold Bond Building Products



It's easy to build your boy his own room right in your attic—with Gold Bond Add-A Room products. With framing in place, just staple up new, fireproof TWINSULATION . . . it keeps his room warm and cozy in winter, up to 15° cooler in summer. Next, nail up rugged Gold Bond Gypsum Wallboard for smooth, fireproof walls and ceilings. And, for a beautiful finish, roll on your favorite shade of Gold Bond Velvet paint. It dries in minutes and it's washable!



NATIONAL GYPSUM COMPANY
Buffalo 2, N. Y.

MAIL COUPON TODAY

NATIONAL GYPSUM COMPANY
Dept. PM26, Buffalo 2, N. Y.

Please send me my Gold Bond Add-A-Room Instruction Packet. Enclosed is 10¢ to cover mailing.

Name _____

Address _____

City _____ Zone _____ State _____

This fierce competition forces aircraft manufacturers to look far into the future. They are already planning planes for 10 and 15 years from now. In the Lockheed engineering department today is a concept of a future airliner that would blast from Chicago to Los Angeles in 1 hour and 23 minutes. It would have a block speed exceeding 1200 miles per hour.

No one knows when Lockheed will build an airliner like that, but you can be sure of one thing. Mr. Average Air Traveler will become impatient after a few flights. "When are we going to chop this time down to one hour flat?" he'll be demanding of the airline companies. ★★★

Instrument Counts a Million Objects per Second

With a new instrument, scientists can count up to a million objects of varying shapes and sizes within one second. The instrument, developed by Du Mont Laboratories, may be used to count blood cells, nuts and bolts, stars on astronomical photos, impurities in raw materials and other objects. The objects are placed within the unit's "counting house" compartment and are lighted by a cathode-ray tube, which has on its screen a pattern of light composed of 1000 individual lines. The tube scans the objects line by line, and the light reflected from them falls on a photocell, which generates an electrical signal corresponding to the light falling upon it. The signal is fed to a memory system and a computer, which determine how many objects there are in the "counting house."



QUIT "FUELING" AROUND.



Perfect partners in power! Rochester Carburetors are engineered for the newest high-compression engines.

No sense in playing "gas-ing" games! All fuels are fine—every one of today's high-octane gasolines delivers high-power, high-economy performance! But Rochester Carburetors are designed to really deliver the goods—to give you more performance, longer mileage between gas stops. So hop to it—specify Rochester when you're ready for a carburetor. Original equipment for Cadillac, Buick, Oldsmobile, Pontiac and Chevrolet cars.

CARBURETORS BY ROCHESTER

ROCHESTER
PRODUCTS
DIVISION OF
GENERAL MOTORS
CORPORATION
ROCHESTER N. Y.



How FORD'S new steering wheel soaks up impact



The statistics: 40% of all driver-injuries in accidents are caused by the driver striking the steering wheel assembly!

The problem: to develop a new kind of steering wheel that would have a high degree of energy dissipation upon impact . . . protect the driver from the steering post in the event of an accident.

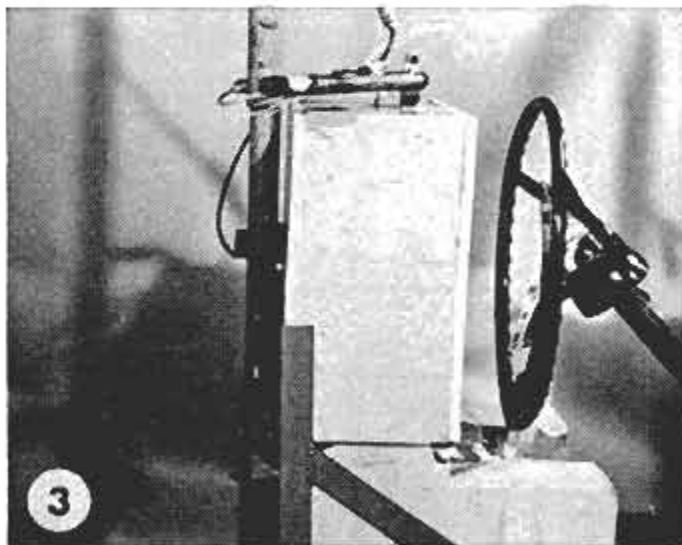
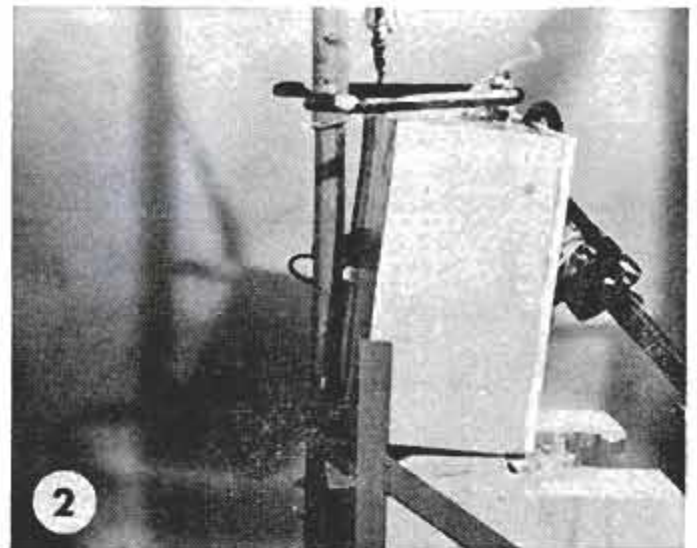
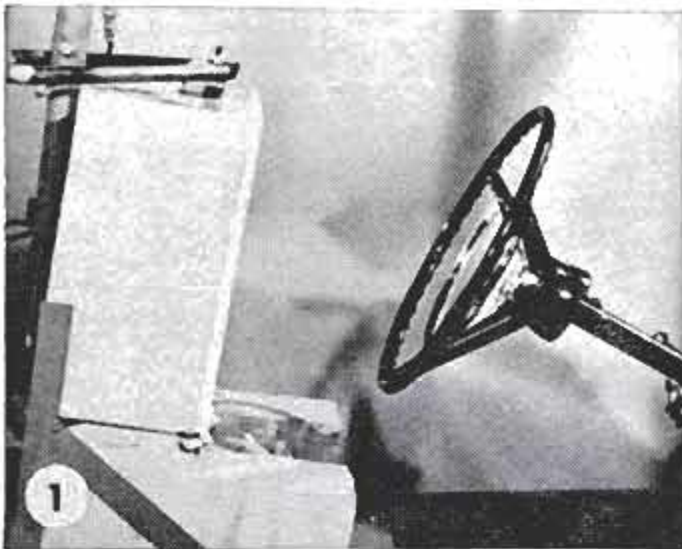
The solution: Ford's exclusive new deep-center Lifeguard steering wheel!

Ford's new Lifeguard wheel, standard on every '56 Ford model, is connected to the shorter steering post by three *equally spaced* spokes. Exhaustive tests show (see opposite page) that in case of impact, the spokes of this exclusive new Lifeguard wheel will bend away from the driver and at the same time, "soak up" force of impact. The driver, with his weight distributed over the rim of the wheel, is thus cushioned from striking the rigid steering post violently in an accident.

FORD Division of

POPULAR MECHANICS

After more than two years of testing and research, Ford comes up with an exclusive new contribution to driver safety!



1. Test equipment for impacting steering wheels is shown in illustration No. 1. A mass equal to the weight of the driver is dropped onto the wheel—in this case, Ford's exclusive Lifeguard deep-center design.

2. As block strikes deep-center Ford wheel, spokes yield under impact, absorbing energy as they do so. The force is dissipated before the block reaches steering post.

3. Note in illustration No. 3 the rim has not collapsed but rather the spokes have yielded following the *controlled* direction pattern that helps protect the driver from injury.

FORD MOTOR COMPANY

IN YOUR CAR RADIATOR...

GUARANTEED TO STOP RUST!

**WATER STAYS
CRYSTAL CLEAR
FOR OVER
ONE YEAR**

Just one can of
MAC'S NO. 13 re-
moves rust and scale
... prevents costly
repairs. Get MAC'S
NO. 13 today.



**AT SERVICE
STATIONS EVERYWHERE**

MAC'S SUPER GLOSS CO., INC.
Los Angeles 42, California

New HEAVY DUTY Tape Rule

makes measurement
easier and faster

$\frac{3}{4}$ "
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WHITE CLAD SUPER MEZURALL

CHECK THESE "SUPER" FEATURES—16-inch centers indicated. Wide $\frac{3}{4}$ " steel line is flexible, yet extends farther unsupported. Long lasting snow-white line has bold, jet black figures. Top edge graduated feet and inches, bottom edge consecutive inches. Long, wide adjustable end hook permits accurate measurement, hooks securely. Feather-weight Magic Metal case is light yet very strong. Packed in beautiful, two-color re-usable plastic box with hinged cover and snap fastener.

A Perfect Gift

for Craftsmen

BUY **LUFKIN**

334
TAPES • RULES • PRECISION TOOLS
AT YOUR HARDWARE OR TOOL STORE

THE LUFKIN RULE CO., Saginaw, Mich.

Parade of '56 Cars

(Continued from page 170)

This is the year, too, of the power pack to increase what engineers call maneuverability. It is also the year of the accentuation of the wedge shape which will lead to 1957's radically different rear fenders.

This is the year that Chevrolet offers 205 horsepower, Ford offers 202 horsepower and Plymouth 200 horsepower. Only five

SpecRating PRICE CLASSES

A. Low-price class (\$1795 to \$2231)

Rambler
Chevrolet
Ford
Plymouth
Studebaker, except the Classic

B. Low-medium price class (\$2229 to \$2760)

Dodge
Pontiac
Nash, except V8 models
Mercury, except Montclair
Buick Special
Hudson, except V8 models
Oldsmobile 88, Super 88
De Soto Firedome
Studebaker President Classic

C. High-medium price class (\$2731 to \$3444)

Nash Ambassador V8
Mercury Montclair
Buick Century, Super
Oldsmobile 98
De Soto Fireflite
Clipper
Chrysler Windsor
Hudson Hornet V8

D. High-price class (\$3458 to \$9507)

Buick Roadmaster
Chrysler New Yorker
Lincoln
Packard
Cadillac
Imperial
Continental

E. Sports-type class (\$1982 to \$6501)

Caribbean
Corvette
Thunderbird
Eldorado
Chrysler 300B
Studebaker Hawks

years ago, Packard and Cadillac alone offered as much as 160 horsepower. Now Packard advertises 310 horsepower and Cadillac's Eldorado has 305 horsepower.

Obviously, the manufacturers are catering to the motorist's passion for primacy at the stop lights. A significant drawback has been the declining economy of a tankful of gas. Higher horsepower has meant lower

(Continued to page 330)

Do *more jobs better* with a **THOR** home SpeedShop

ONLY
\$49⁹⁵



Only SpeedWay offers you a complete home workshop powered by a professional precision-engineered universal electric motor at such a rock-bottom price.

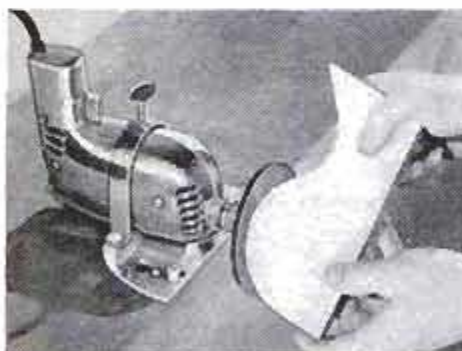
You can do a thousand-and-one jobs around your home or work-

shop. This 201-JTD SpeedShop will pay for itself in a few months. And you'll have satisfaction backed by SpeedWay's 40 years of volume production of quality electric tools.

Look! All this for only \$49⁹⁵

- ① Power saw table attachment
- ② Power drill press attachment
- ③ Power hand saw attachment
- ④ One 201-J 1/4" SpeedDrill
- ⑤ Geared, key-operated Jacob's chuck
- ⑥ Horizontal bench mounting stand
- ⑦ Combination steel wall box & carrying case

SpeedWay Manufacturing Co., Cicero, Ill. A division of Thor Power Tool Co., Aurora, Ill.



SANDING. All purpose sander. Finish furniture or use for fancy edge sanding. Equipped with ten 4" sanding discs.



DRILLING. There's power aplenty in this motor to drill 1/4" in steel, 1/2" in hardwood. Kit is equipped with 7 drill bits, 1/4" to 1/2".



POLISHING. 4 1/2" wool bonnet fits over rubber backer—shines anything. 3" buffing cloth, 3" wire brush for paint removal included.

TOOL OF 1001 USES!

"The Pocket-Size Machine Shop"

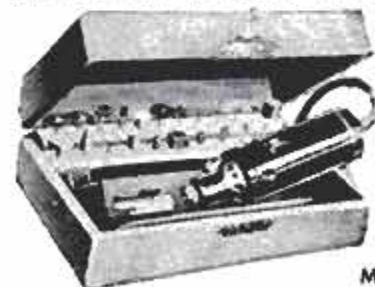
- GRINDS • CARVES • SHARPENS
- ROUTS • DRILLS • ENGRAVES

*Fastest, Most Powerful
Tool in Its Class*

You'll never run out of uses for the famous DREMEL Moto-Tool. Proved in hundreds of industrial plants, it works in metal, plastics and wood. It weighs only 13 oz., handles as easily as a pencil—yet it's so powerful and fast it's truly the "pocket-size machine shop!" Use it in your workshop—or to build a creative all-family hobby. Choose from two models and two complete kits!



27,000
R. P. M.



MOTO-TOOL NO. 1
For small bench work.
(6 oz. in weight.) With
1 emery wheel.....**\$10.85**

KIT NO. 1
Model 1 Moto-Tool plus 34
accessories. In steel case.....**\$19.50**

MOTO-TOOL NO. 2
More performance and features
for the money than any other
grinder! With emery wheel point.....**\$17.85**

KIT NO. 2
Includes Model 2 Moto-Tool and
23 accessories (high-speed steel
cutters, grinding wheels, pol-
ishers) in steel case.....**\$25.95**

FAMOUS DREMEL MOTO-SAW A TOOL ENJOYED BY ALL AGES!



CUTS SCROLLS LIKE MAGIC—SANDS AS IT SAWS

BLADE
FACES
4 WAYS

SAFE!
AS A
HANDSAW

**JUST
GUIDE IT!**

Only
\$6.85
with 3-1/2" blade

**Cuts 3/4" wood, plastics, light metal, tile, etc.!
No finer tool for beginning woodworkers!**

There's unbelievable capacity packed into this low-cost, electric wonder worker! Cuts scrolls smoothly—no sanding needed. Ideal for making toys, knickknacks, valances, shelves—a host of decorative and useful projects for the home. Best of all, the DREMEL Moto-Saw is priced so low you need no longer be content with hand coping saws. Start your family on a Moto-Saw hobby now!

SEE YOUR DEALER. If he cannot supply, order direct on 5-day trial, money-back guarantee. Remit in full for postpaid shipment. Or send \$2 now, pay postman balance plus COD fee.

DREMEL MFG. CO., Dept. 116-B, Racine, Wis.

miles per gallon. And gasoline prices have gone up in many states due to increased road taxes.

In the vital-statistics department, this year marks the end of Kaiser passenger cars and leaves Willys with only Jeeps and commercial vehicles. It hails the birth of the Continental Mark II and the resultant challenge by the Cadillac Eldorado Brougham. Also in the prestige area are the Chrysler Imperial and the Packard Caribbean.

American Motors is gearing its production and sales to the new Rambler which boasts a four-door hardtop and a four-door hardtop station wagon.

Throughout the industry the so-called hardtop models accounted for almost one out of four cars sold in 1955. With further emphasis on the four-door models this year, manufacturers expect this pillarless body style to supplant the conventional four-door sedan in two years.

Tabulations still are being made on Ford's new safety features and engineers believe it is still too early to determine the true demand. Door locks and safety steering wheels are standard on the 1956 Fords, but dashboard padding, seat belts and other items are optional. It is this optional material that should reflect the demand created by Ford's first annual safety conference.

Studebaker, with a major change in its basic models, is counting on the change to return it to a sales volume that will boost its share of the market. The aim is to sell at least 200,000 Studebakers and half as many Packard-Clippers. The new Hawk line of sports-type cars may give lots of competition to the Thunderbird and the Corvette.

Automatic transmissions, down in price, are expected to be ordered on more cars this year than they were even in the record production year of 1955. But car makers admit that power assists like power seats and power windows are not keeping pace with the demands for such practical aids as power steering and brakes.

General Motors, with a showcase filled with its own power packages plus a wide variety of station wagons, hardtops, engines and transmissions, has no intention of letting any business slip away to the competition. The 1956 Motorama suggests that its 1957 cars, some features of which are highlighted in this year's dream cars (see page 186), will continue the kind of consumer appeal that keeps it out in front in a most competitive market.

And after Ford introduces the new line of cars it will bring out in 1957 (still known as the Edsel and designed to fit pricewise between the Lincoln and Mercury), you can expect competition to get even rougher than it will be in 1956. ★ ★ ★

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SURPLUS & NEW MANUFACTURE
FOR HOME, FARM AND FACTORY **EQUIPMENT**

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Unconditionally
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**RUGGED!! 20 TON MASSIVE!!
CAPACITY
HYDRAULIC CYLINDER**

- ALL STEEL CONSTRUCTION
 - 7 1/4" BORE—15" STROKE
 - DOUBLE ACTION
- 
- ITEM #1715
• 41,300 LBS. PRESSURE WITH 1000 P.S.I. PUMP OUTPUT.
- UP TO 70,000 LBS.—CAPACITY ON INTERMITTENT SERVICE.
 - SOLID STEEL 2 1/2" PISTON ROD
 - 1" PORTS
 - OVERALL DIAMETER—10 1/2"
 - DISTANCE BETWEEN CENTERS—28 1/4" CLOSED—43 1/4" OPEN.

IDEAL FOR:
• HYDRAULIC PRESSES • DUMP TRUCK HOISTS • TD-18, TD-24 INTERNATIONAL HARVESTER DOZERS AND GRADERS • LEVELING RAMPS • INDUSTRIAL MACHINERY • ROAD MACHINERY • FARM MACHINERY • HYDRAULIC TAIL GATES

Replacement cost—\$260.00.
Shipping Wt.—15 lbs.
SPECIAL PRICE **80.00**
F.O.B. Chicago.

**GROBAN FOUR-WAY
OPEN CENTER HYDRAULIC
CONTROL VALVE**

ITEM #126 — Four-way open center control valve, with built-in adjustable relief valve factory set at 1000 P.S.I. Spring loaded neutral position. For use with one double acting cylinder. In neutral position cylinder is locked and pump unloaded. Can be used as single unit or mounted in series. Has 3/4" pipe thread inlet and outlet, 1/2" pipe thread cylinder ports. Finger grip handle. Ship. wt. 10 1/2 lbs. AN OUTSTANDING BUY!



F.O.B. Chicago **21.50**

**MULTI PURPOSE
HYDRAULIC PUMP
OR MOTOR**

ITEM #55 Silent, high efficiency. Helical Gear Type Ball Bearings. Hydraulic Pump or Motor, Rated 8 Gal. Per Min. At 1500 R.P.M.—Delivers 1000 P. S. I. Using 6 H.P. — Reversible Rotation — 3/4" Pipe Thread Inlet and Outlet Ports—3/4" Drain Port—3/4" shaft with keyway and flat for either direct or pulley drive. Dimensions—5 3/8" high, 7 1/4" long, 5 1/4" wide. Shipping weight 18 lbs.



F.O.B. Chicago **45.50**

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Purchase Order Today

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PORTABLE ELECTRIC
LIGHT PLANTS**



POWER TO OPERATE:
• Electric Saw, Electric Drills, Pipe Bender.
• Refrigerator, Deep Freezer, Incubator.
• Water Pump, Radio, Lights, Air-conditioner.

BRAND NEW 1956 ITEM #1008

COMPACT — FITS IN THE TRUNK OF YOUR CAR
1000 WATTS OUTPUT, continuous duty, 115 Volts A.C. 60 cycles, 9 amps. Powered by husky, easy starting Clinton engine. Engine and generator operate at 3600 R.P.M. for maximum efficiency at minimum weight. Both units are mounted on steel base, with heavy sheet metal belt guard. Generator is self regulating, and is equipped with outlet box containing fuse and 2 A.C. convenience receptacles. Cost only 5c an hour to operate. Dimensions: Length 20 1/2", Width 12", Height 16". Shipping wt. 100 lbs. F.O.B. Chicago.....

700 WATT-GENERATOR SET—same as above, slightly smaller—with Briggs-Stratton Engine—Model 708—F.O.B. Chicago..... **129.50**

149.50

**Brand New! 5-TON BLACKHAWK
HYDRAULIC LIFT KIT**

Now Only **38.95** Complete

The Complete Kit
For — • Dumping farm wagons • Adjusting depth of plow • Hydraulic presses • Hydraulic jacks • Snow plows.

KIT CONSISTS OF:

- 1—Brand new Blackhawk Model P-151—Hydraulic hand pump with built-in oil tank and release valve. Rated from 1200 P.S.I.—to 3400 P.S.I. 20" handle. Dim. 8" x 6" x 6"
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- Item #2784..... **3.95**
- 1—Hydraulic cylinder—2" bore, 6" stroke, husky 1" solid steel shaft, will lift 10,000 lbs., using pump pressure. Standard clevis mounting. May be used for double action service.
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- 2—Qts. non-foaming hydraulic fluid..... **1.00**
- All necessary hydraulic fittings.
- Total ship. wt.—40 lbs.


COMPLETE KIT PRICE **38.95**
ALL OF ABOVE INCLUDED F.O.B. Chicago



Brand New — U. S. Navy Cost \$146.00

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For: — • Water Pumping • Sprinkling • Insecticide Spraying • Sump Pump • Fuel Transfer — Rated Speed — 500 to 2000 R.P.M.—Perfect for P.T.O., Direct or Belt Drive. Output —63 Gal. Per Min., 150 P.S.I.—use 1/2 to 6 H.P.—1 1/4" Pipe Thread Ports, 2 Grease Cups included. 1" Solid Bronze Shaft—Shipping Wt. 38 Lbs. Save



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GENERATOR**

7 1/2 K.W. (7500 WATTS) single phase, 110/220 volt output, 3 wire system, 2 bearing construction. 5 groove 8" V belt pulley included. Self-excited. Foot mounted. Drive generator from tractor or stand by engine. Ample power for 6 room house. Dimensions: 34" x 11 1/2". Shipping Wt. 420 lbs.



ITEM #Q-75-D **295.00**
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12 Volt Electric Motor**

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Rated 1 H.P.—100 amps., 5000 R.P.M., 12 volts, D.C.—This double shaft motor of ball-bearing construction may be run on 6 volts for lower horsepower requirements.—Standard 3/8" shafts, nut and bolt electrical terminals, flange mounting.—Dimensions: 9" x 4 1/2" x 4 1/2". Ship. wt. 19 lbs. A real value at..... **12.50** F.O.B. Chicago

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Ideal for powering electric tools, oil burner, refrigerator, lights, or other appliances requiring up to 700 watts of power. 700 WATTS, 115 Volts, 60 cycles A.C. 3600 R.P.M. Compact, self-regulating generator with V Belt pulley and double outlet receptacle. Rotation counterclockwise. May be driven by tractor or auxiliary gasoline engine. Requires 2 HP minimum. Dimensions: 10" long x 8" high x 6" wide. Shipping wt. 27 lbs.



ITEM #700
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Model 1010 — 1000 WATTS
Same as above. **79.50**
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Use for small dryers, ventilators, drafts, heat boosters.



Squirrel cage blower Mfg. by WESTINGHOUSE. Intake 1 1/2" Dia., outlet 1 1/2" x 1/2". Rated 6700 R.P.M., 115 Volts A.C., 400 cycles. May be operated on 60 cycle current at reduced voltage. Overall size 4" X 3 1/2" X 4". Price Postpaid..... **5.95**

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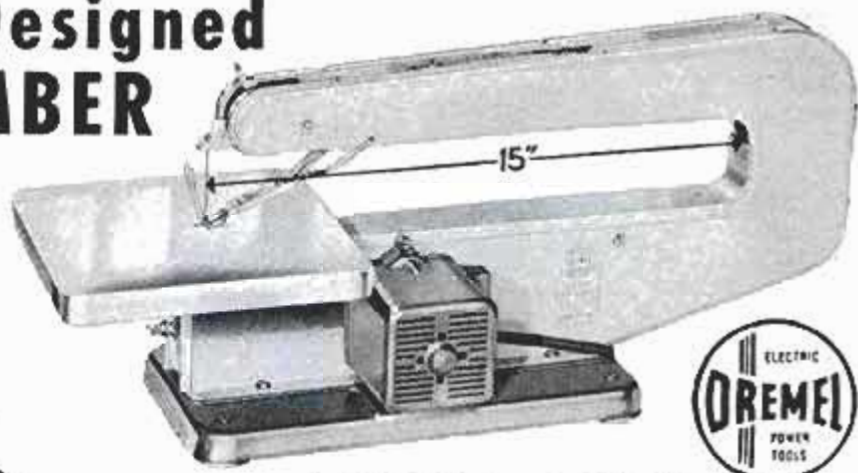
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Portable! Weighs only 12 lbs. Sets up anywhere! Makes any table a home workshop!
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Needed by every Mechanic in every Shop

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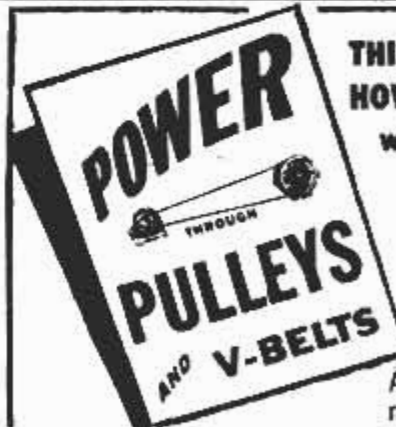
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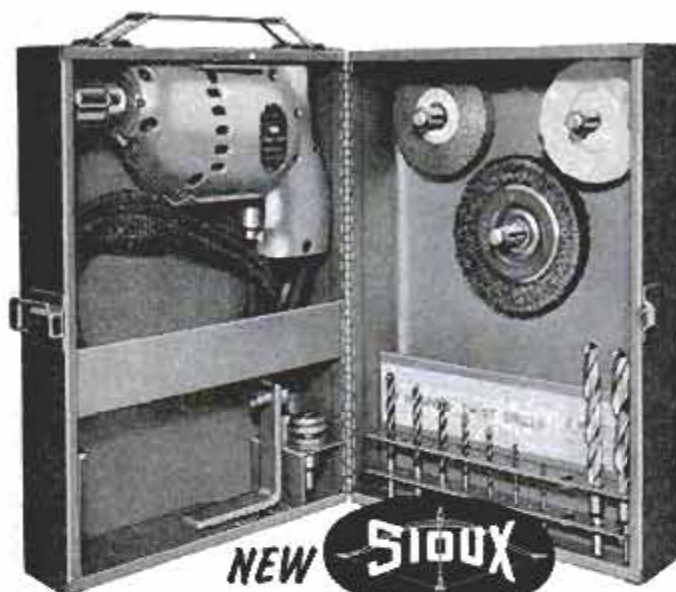
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8" TILT ARBOR SAW
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**ONLY \$29.95
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- Heavy, long lasting cast iron and steel construction
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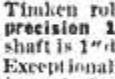
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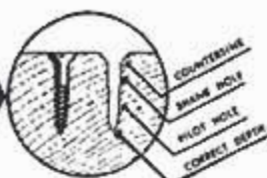
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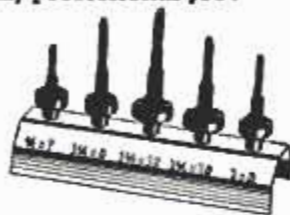
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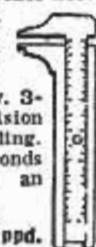
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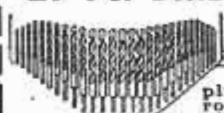
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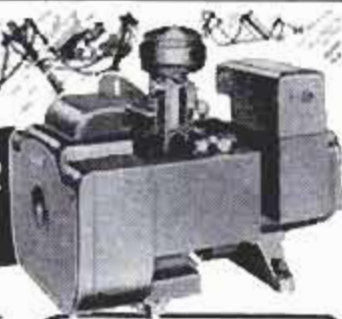
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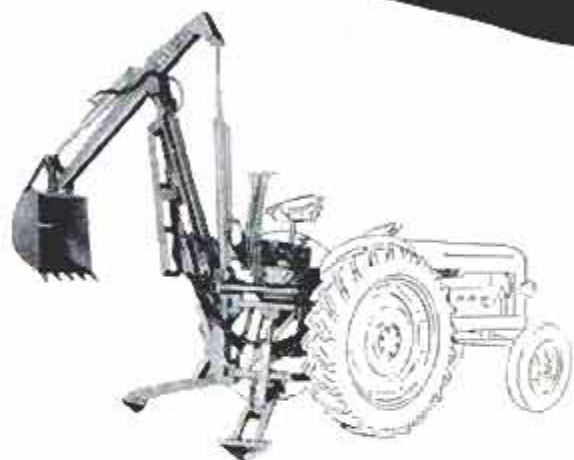
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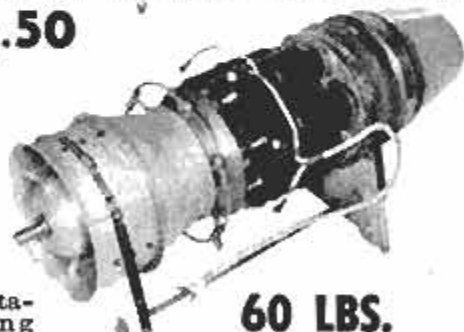
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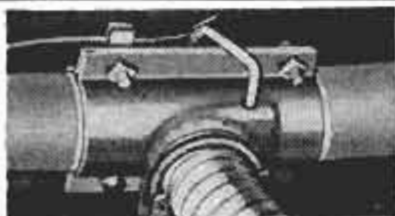


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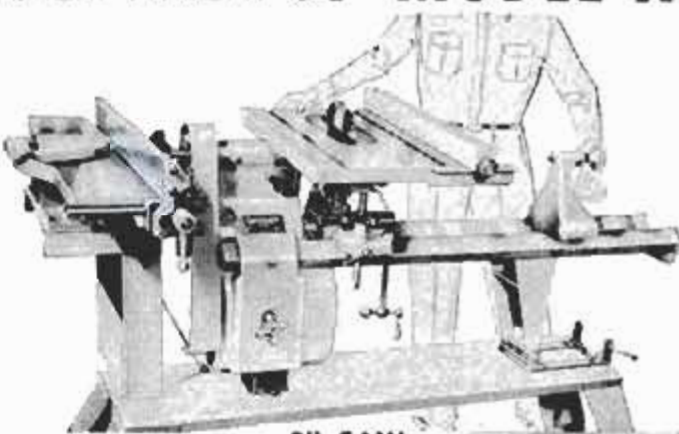
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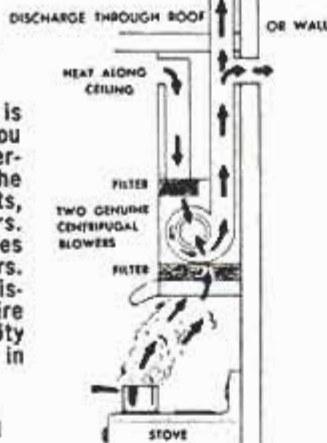
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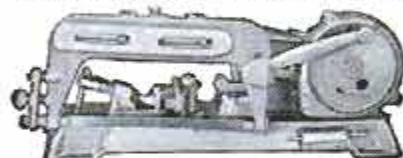
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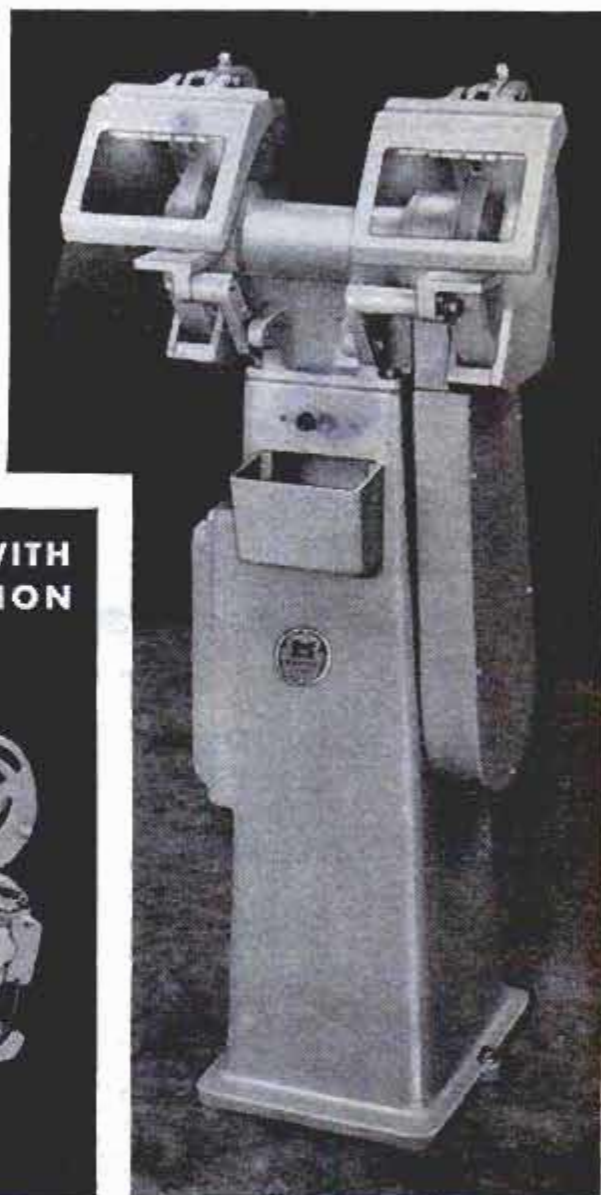
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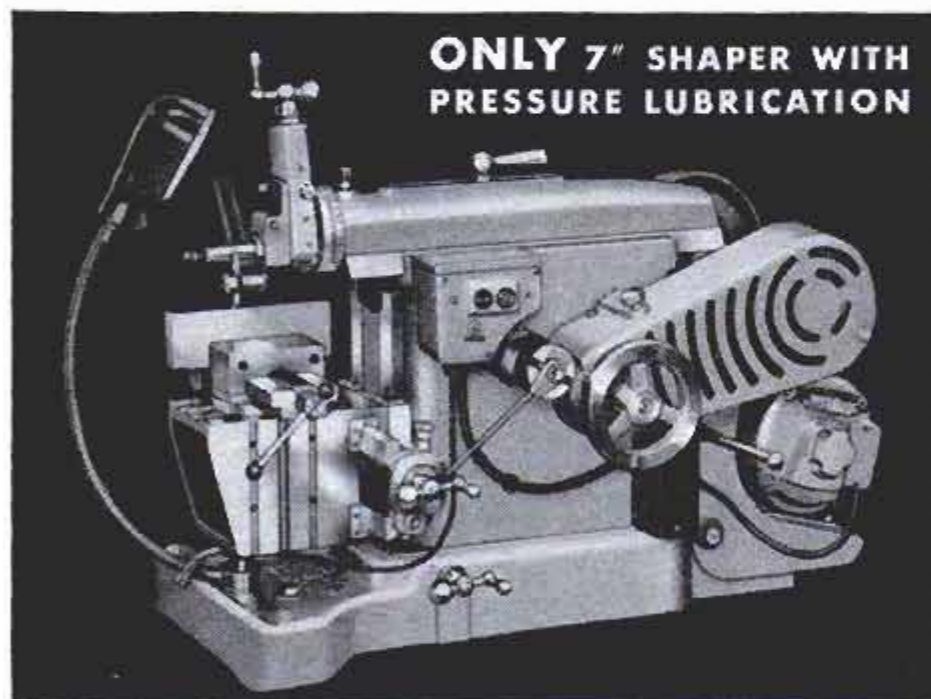
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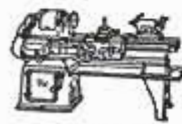





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