Mr. and Mrs. America and their children are discovering that their dream boat is at last a reality... thanks to the outboard cruiser! Here is a cruiser to suit average circumstances. Not only is it easy on the budget. It is easy to care for, easy to store, to transport, to service, to operate. No special abilities are required, no unusual facilities. And you can use such a boat on most any waters!

JOHNSON’S contribution to outboard cruising has been exceedingly important. DEPENDable power, in a portable unit, separate, long range fuel system, remote control of throttle, shift and steering, and now—electric starting—all these provide the very basis of the outboard cruising idea. Wherever you look you’ll find Johnson Sea-Horses predominantly favored for this great new sport. Ask your Johnson Dealer. Look for his name under “Outboard Motors” in your classified telephone directory.


JOHNSON MOTORS, 400 Pershing Road, Waukegan, Illinois
In Canada: Mfd. by Johnson Motors, Peterborough

5 GREAT SEA-HORSES FOR 1954

ELECTRIC STARTING SEA-HORSE 25—25 hp. The “automatic” outboard.$498.00*

SEA-HORSE 25—25 hp. With Ready-Pull starting..........................$410.00*

SEA-HORSE 10—10 hp. The all-around motor—with terrific getaway.$397.00*

SEA-HORSE 5½—5½ hp. New! “Suspension Drive.” It’s quiet!..............$210.00*

SEA-HORSE 3—3 hp. A 32-lb. twin! With amazing Angle-unistic Drive.$145.00

SHIP-MASTER REMOTE CONTROL—For “5½,” “10,” both “25’s.” From $29.90

OBC certified brake hp at 4000 rpm.
Prices f.o.b. factory, subject to change.
*Includes Mile-Master Fuel System.
Get 67% More

STARTING PEP

and GO

— with this new
power-packed
Double Eagle 125 Battery!

Here's the answer to your car's power plant needs — a new super battery — the Dry Proof Double Eagle 125. Built to deliver 67% more starting stamina than standard batteries of its type and size (Group 1), Goodyear's new Double Eagle also has the deep power-reserve needed to operate radio, heater and all a modern car's many accessories.

What's more, because there's 3 1/4 times more solution above the plates, this Double Eagle 125 Battery is Dry Proof, too—needs filling only three times a year in normal use. And superior rubber and glass plate insulation makes it highly resistant to battery-killing acid, heat and pressure.

When it's time to replace your present battery, see your Goodyear Dealer about the plastic-cased, yellow and blue Double Eagle 125—the super battery with power to spare. Goodyear, Battery Dept., Akron 16, Ohio.

GOODYEAR

DRY-PROOF DOUBLE EAGLE BATTERY
Is it possible to guide an anti-aircraft missile so that it will track down and destroy a rapidly maneuvering target? No one knew the answer for sure when the U.S. Army put this question to Bell Telephone Laboratories in 1943.

The special skills and techniques developed to create the nation's communications network uniquely fitted Bell scientists to answer this question. They recommended a new system, Nike, and then worked to bring it into being with engineers from Army Ordnance, Western Electric Company and Douglas Aircraft Company.

The first Nike installation has been made, and more will follow. Thus, America's defenses grow stronger through a new extension of frontiers in the communications art. It is a proud achievement of the knowledge and skills first developed at Bell Telephone Laboratories to make the nation's telephone service ever better.

BELL TELEPHONE LABORATORIES
Improving telephone service for America provides careers for creative men in scientific and technical fields.
this month's cover

Roughing it deep in the North woods is like camping in the backyard for the Jim Kettell family. Now they enjoy the independence of both motel and restaurant in a compact, collapsible camping trailer that sleeps four. Craftsman Jim, who teaches machine shop at Oak Park High, Oak Park, Ill., tells how you, too, can rough it in style with a copy of his "motel on wheels"

next month...

It's one of the forgotten stories of human ingenuity—the logging of the biggest trees on earth, 50 years ago. With little more than a hand ax, how could you fell and move a tree 30 feet in diameter and 300 feet high? You'll learn how it was done in the story "When the Giants Fell"

Information not listed on articles in the index, starting on page 12, frequency 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.

Published monthly by Popular Mechanics Company, 200 E. Ontario St., Chicago 11, Ill.; R. H. Windor, Jr., President; Elmer L. Forbes, Vice-President; D. F. Winder, Vice-President and Secretary-Treasurer; H. H. Windor, III, Vice-President; Cleaver L. Perkins, Manager, Single copy in the United States and Canada, subscription price $1.00 per year, 12 numbers. Entered as second class matter at the Post Office at Chicago, Ill., under Act of March 3, 1879. Entered as second Class Matter at Post Office, Canada, Registered as Second Class Matter at the Post Office at Mexico, D. F., Mexico, January 25, 1916. Copyright 1854 by Popular Mechanics Company. Copyright under International Copyright Union. Copyright in France, All rights reserved under Pan-American Copyright Union. Printed in the United States of America.

Volume 101: MAY 1954

Managing Editor.......................... Roderick M. Grant
Assistant Managing Editor.................. Wayne Whittaker
Shop Notes and Crafts Editor.. James R. Ward
Radio-Television, Electronics Editor.. Frank L. Britton
Associate Editor, Aviation............ Aubrey O. Coakman, Jr.
Associate Editor......................... Clifford H. Hicks
Associate Editor, Automotive........ Arthur R. Ranilton
Associate Editor, Shop Notes and Crafts... Wayne C. Leckey
Assistant Editor, Shop Notes........ W. Clyde Lamnam
Assistant Editor, Crafts.............. Frank N. Stephony
Assistant Editor, Makeup.............. John C. Dalen

Automotive Correspondent.............. Leo Donovan
Art Director............................ Frank Beatty
Assistant Editors: Leonard F. Hills, Jay W. Hedden, Elliott H. McCleary, Eastern Editor, Richard F. Depewlowski
Empire State Blvd., Room 2906, New York City
Western Editor........... Thomas E. Stimson, Jr.
Suite 1010, 3460 Wilshire Blvd., Los Angeles 5, Calif.
London Manager............. Douglas W. Wedderspoon, Eagle House, Jermyn St., London S. W. 1, England
Director, Bureau of Information.... Allan Carpenter

200 E. Ontario St., Chicago 11

In This Issue...

HOW TO GUARD YOUR HOME AGAINST FIRE.................. 81
Prevent tragedy in your home inexpensively
EGG FOR AN ATOMIC ENGINE.................. 89
Building a power plant for the submarine Sea Wolf
THE OWNERS REPORT: MERCURY FOR 1954......... 102
Clippin records and costs of Merc owners
MEXICO BUILDS A GLAMOUR CAMPUS........ 113
Cancun, architecture south of the border
GUARDING THE GRAVEYARD OF SHIPS........ 128
Consigliardemen earn their pay here
RESTORING ANTIQUE CARS IS MY HOBBY..... 133
Frank Storer tells about a new, fast-growing hobby
IT'S MOVING DAY FOR WILDLIFE........ 154
Transplanting wildlife will mean better hunting for you

For the Craftsmen...

CARE AND USE OF PAINTBRUSHES........ 168
Your task will be easier if you take care of 'em
FAMILY CAMPING TRAILER—PART I........ 181
Jim Kendall tells how it's built
CRUSETTE—12-FOOT UTILITY OUTBOARD..... 190
Tom Riley and John Bergen come up with a good one
FROM TANK TO CARBUITER........ 197
How the fuel system of your new car works
HOW TO CUT COPED JOINTS........ 205
Sam Brown takes the mystery out of a puzzler
THE HOW OF STRAIGHT SHAPING........ 212
Make your own special moldings

Special Features

Vertical Take-Off.................. 96
New Tools for Your Lawn...... 110
Bathyscaphe.................. 118
Magic Boxes.................. 118
Firing Aluminum with Color....... 134
Lumber Cuts.................. 134
Auto Panne House......... 145
Boy's Room Goes Western...... 165
MGM in Mapje Party........ 179
Let's Go Fishin'......... 179

Regular Features

Detroit Listening Post........ 98
What's New for Your Home.... 146
Solving Home Problems....... 178
Plan of the Month........ 186
Shopping for Tools......... 218
Radio, TV, Electronics....... 217
First Aid for Radios........ 217
Tiny Transistor Receiver..... 217

Other Items and manufacturers of available products described are listed on pages 12, 14 and 15.
Quick facts about
Ford's new Ball-Joint Front Suspension

SIMPLER DESIGN
The kingpin on which each front wheel turns right or left in conventional systems has been replaced. Cone, too, are the "hinges" on which the wheel moves up and down. Two simple ball joints now take care of both motions.

LONGER LIFE
Ford ball joints (two for each front wheel) are completely sealed against dirt and water by a unique rubber-and-metal shield at each joint. This keeps wear at a minimum... aids in retaining that new-car "feel" longer.
It's the greatest riding and steering advance since independent front wheel suspension. It makes all handling easier ... absorbs road shocks far more effectively ... keeps wheels in line longer.
And only Ford in the low-price field has it!

**EASIER HANDLING**
In steering, each wheel turns on ball joints instead of on a conventional kingpin. Ford ball joints are self-aligning, can't stick or bind. They're spring-loaded, too, to compensate for wear and keep steering consistently easy.

**QUICKER SERVICING**
Ford's new ball-joint system eliminates 12 of 16 points of wear found in conventional suspensions. Thus, there are only four lubrication points. Rubber bushings at inner ends of control arms insulate chassis from road noises.

**IT'S JUST ONE OF FORD'S MANY "WORTH MORE" ADVANCES**
Ford's new Ball-Joint Front Suspension, teamed with Ford's all-new chassis, new springs and shock absorbers and builtight Crestmark Body, brings you the most comfortable ride ever in a low-priced car. And Ford's new 115-h.p. I-block Six and 130-h.p. Y-block V-8 are the most modern engines in the industry!

Your neighborhood Ford Dealer cordially invites you to Test Drive a '54 FORD

MAY 1954
HOW TO FIX ANY PART OF ANY CAR

QUICKLY--EASILY--RIGHT!

STERING GEAR
OIL FILTER
HUMMER
CARBURATOR
WHEEL ALIGNMENT
BRAKES
DISTRIBUTION

FREE 7-DAY TRIAL

When you're a beginner or an expert mechanic now you can "break through" any "fix-it" job from simple carburetor adjustment to complete overhaul. Just look up job in index of MOTOR'S Brand-New 1954 Auto Repair Manual. Follow simple step-by-step directions, clear pictures. Presto—the job is done! No guesswork! MOTOR'S MANUAL takes you from "actuated" to shows WHERE to start, WHAT tools to use. Covers EVERY job on EVERY car built from 1949 thru 1954!

Everything You Need to Know "Boiled Down" from 140 Official Shop Manuals

NOW, REVISED, ENLARGED, 1954 Edition contains the "maiden" from over 140 OFFICIAL shop manuals—simplified for YOU. 22,596 essential repair specifications on every car's engine models, chassis, brakes, steering, etc. 3,000 "how-to" pictures, 223,000 service hints, 210 complete "how to do it" manuals. Follow every step of the way. Time-saving factory trouble prevention for experts. Instructions and pictures so clear you can't be wrong. Used in U. S. Army and Navy.

Try Book FREE 7 Days

SEND NO MONEY Pay nothing nothing.

MAIL COUPON NOW FOR 7-DAY FREE TRIAL

MOTOR BOOK DEPT., Desk 1E, 250 W. 55th St., New York 19, N. Y.

Please send free copy of 1954 FREE TRIAL MOTOR'S AUTO REPAIR MANUAL. It will cost me $1.00 when shipped. I have enclosed 

Address... Age... City... State.

THE EDITORS

"Cat" Inspires "Kitten"

Walter G. Lamb, an engineering student at U.C.L.A., has designed and built a miniature catamaran powered by an outboard motor. Lamb's craft was prompted by Gar Wood's big catamaran Venturi (P.M., Oct. 1949). The designer of the miniature "cat"

 Gar Wood's 188-foot Venturi inspired Lamb to build a 20-foot catamaran powered by an outboard motor says he'll match her against any conventional hull of similar size, weight and power. The top speed for his craft is 25 miles per hour when powered by the 16-horsepower motor. There's a roomy cabin and a large open cockpit astern for fishing. Now Lamb is designing racing runabout versions of the catamaran.

Army Maps Fish

Servicemen serving in the American Occupation Zone of Austria are participating in a unique fish-reporting program. The goal is to restock the lakes, rivers and brooks in the Zone while enjoying good fishing. Every serviceman who wants to fish pays a small fee to the provost marshal for a license. The money thus collected is turned over to the Austrian government for the restocking program. The real novelty of the plan is the compulsory fishing (Continued to page 8)
This FREE SAMPLE LESSON will prove you can become an expert BOOKKEEPER...ACCOUNTANT or C.P.A.

FREE SAMPLE LESSON

We offer you this free sample lesson so that you can prove to yourself that you can master Accountancy—quickly, thoroughly—in spare time at home.

You will see exactly how LaSalle's famous "Problem Method" works...how you are led step-by-step through actual accounting work—learning by doing and not by study of theory alone. First you tackle easy problems, then gradually more difficult ones—until soon you master them all. And at every step you have the close personal guidance of LaSalle's large staff of C.P.A. instructors.

Nearly 10% of all C.P.A.'s in the U.S. have been trained by the LaSalle Problem Method

GOOD-PAY JOBS IN 5 BIG FIELDS

If you were an expert accountant right now, chances are you would find yourself among the highest-paid of all professional men and women. Surveys show that accountants earn more than those in other major professions.

There are five big fields of opportunity open to Accountancy-trained men and women...opportunities that are wide open and highly inviting, offering maximum income and job security in good times or bad. And under LaSalle's "Problem Method" you can start earning while still learning—either in spare-time or full-time employment...or in business for yourself with no capital required.

Get the latest information by sending for our free 48-page book, "Accountancy, the Profession That Pays"...plus free sample lesson. The coupon at right will bring both to you without cost or obligation. LaSalle Extension, 417 S. Dearborn St., Chicago 5, Ill.

If you have been envying the high incomes and good jobs enjoyed by thousands of men and women accountants today...incomes ranging from $4,000 to $10,000 and more per year...why not launch a career for yourself?

Do you doubt that you can?

Then let us send you—without cost or obligation—the same Lesson Number One with which LaSalle has started several hundred thousand men and women toward successful accounting careers. We want you to see for yourself how this remarkable method, originated by LaSalle, makes Accountancy simple, interesting, practical, and certain...how it leads you step-by-step to a complete mastery of Accounting—and on up to the coveted degree of Certified Public Accountant if you so aspire.

It doesn't matter whether you've had previous bookkeeping experience, or whether you don't know a debit from a credit. Whether you wish to qualify as an expert bookkeeper, advanced accountant, cost accountant, auditor, government accountant, income tax specialist, or public accountant...you'll find in LaSalle's "Problem Method" the exact plan to prepare you rapidly and inexpensively—in spare hours at home—without losing a day from your present job.

So right now, today...if you are an adult, employed, and earnestly ambitious for rapid advancement in this highest-paying of all professions...send your name and address on the coupon below. We'll send the free sample lesson—plus our 48-page book outlining today's career opportunities and how you can qualify for them. A coupon like this has started many thousands toward greater success. It can do the same for you. Mail it today!

Clip Coupon...Mail TODAY!

LaSalle Extension University...A Correspondence Institution Dept. 544M, 417 S. Dearborn Street, Chicago 5, Illinois

YES, I want to see how LaSalle's "Problem Method" works...how I can qualify for high-pay Accountancy positions. Send Free Sample Lesson...also your 48-page book, "Accountancy, the Profession That Pays"...all without cost or obligation.

Name. Address. Age.

City, Zone & State.

Present Position.
"Cake—not wood mellows your smoke"

and the exclusive honey lining cakes Yello-Bole imported briar far faster than any pipe at any price!

From the first puff, Yello-Bole's real honey builds up a healthy, protective cake. It mellows the smoke, absorbs tars and resins. The filter refines the rest. Yello-Bole smokes so clear, clean, cool and sweet you don't have to inhale to enjoy it. Treat yourself to a healthier-smoking, honey-lined Yello-Bole—handsome new shapes and finishes!

PROOF?
Yello-Bole is the world's largest selling pipe

YELLO-BOLE
$100
TO
$250

(Continued from page 6)

map. Each serviceman who has any luck must report his catch on a standard form, listing the species, length or weight and geographical area where the catch was made. On the back of the form is a map of the Zone with each fishing area numbered, so he can locate his catch geographically. By tabulating the information on the forms and plotting it on the map, military authorities can indicate to Austrian officials the areas that might become "fished out." This greatly simplifies the restocking program. The result: Better catches for servicemen while they're in Austria, and lakes and rivers teeming with fish when they leave.

To the Editor:

Scientists claim that at 300 miles from the earth's surface the temperature is 4000 degrees, increasing outward as a result of cosmic-ray activity. If this is so, there is no metal that could withstand disintegration in outer space. This seems borne out by the disintegration observed in the long trails of matter following comets. Meteors are reduced to relative pebbles when they reach the earth occasionally as meteor remnants. This condition never seems to be mentioned in the stories and speculations about interplanetary and space travel. Of course, if it is so, it would nip all such space fancies in the bud. Does this disintegration by cosmic rays constitute an insurmountable obstacle?

Alliston Cragg
Charleston, W. Va.

Individual molecules of air at 4000 degrees would strike the hypothetical spacecraft, but there would be so few of them that one authority says the heat in thousands of cubic miles of this thin air would not raise the temperature of a space ship by a thousandth of a degree.

(Continued to page 10)
The pressure is mounting. Competition for jobs is growing fast. Business and industry are tightening up. Every man or woman holding a good job is now, in effect, "on probation."

Are there "weak spots" in your training? Now's the time to get after them! Six months from now may be too late.

How can you fill the gaps—quickly? International Correspondence Schools can help you! There's no faster, surer way to get exactly the training you need!

You have 277 famous, spare-time I.C.S. Courses to choose from: trade, industrial engineering, office, executive, high school. Or you can arrange for "refresher" courses, advanced training or special instruction combining two or more specific business or technical subjects.

I.C.S. has the most complete line-up of job-related instruction you can find anywhere. Courses are tailored to fit your needs. This means you waste no time on subjects you can't use. You lose no time traveling back and forth to classes. You set your own schedule—no interference with business or social activities.

Find out for yourself how quickly, how thoroughly I.C.S. can fill the gaps in your training! No obligation. Just mark and mail the coupon!

2 FREE BOOKS
32-page, pocket-size gold mine of facts, "How to Succeed," plus catalog outlining opportunities in field that interests you!

For Real Job Security—Get I.C.S. Training!

(I.C.S., Scranton 9, Penna.)

INTERNATIONAL CORRESPONDENCE SCHOOLS

(Right side of the page contains a coupon for enrollment with various courses listed.)

MAY 1954
To the Editor:

The picture of the "Electrical Music Mentor" in the October, 1953, issue reminded me of the trouble encountered in learning to play a piano. To make this possible I designed a device which projects a moving score of music on a screen. The score appears in one of two forms, classical or simplified. Familiarity is acquired by running the machine at slow speed. It shows the player what to do and when. The picture shows the writer playing the piano with the aid of the device. Only one of them has ever been built.

F. Thannhauser
Royal Oak, Mich.

To the Editor:

A long time ago a certain saying rang through the households of this country: "What this country needs is a good five-cent cigar." Every time a woman gets into my small car she says, "Now this is what I need."

From hearing this so often it seems that this is the time for manufacturers to listen to the pleas of women as they proclaim: "What this country needs is a good small car."

This statement means a small car with excellent brakes and enough power to go down Main Street to the market, to clubs, to the library and to the children's schools.

(Continued from page 8)
You Practice SERVICING with Kits I Send You

Nothing takes the place of PRACTICAL EXPERIENCE. That's why NRI training is based on LEARNING BY DOING. You use parts I send to build many circuits common to Radio and Television. With my Servicing Course you build the modern Radio shown at left. You build a Multilinter and use it to help make $15, $15 a week. Solder sets in spare time while training. All equipment is yours to keep. Coupon below will bring book of important facts. It shows other equipment you build.

You Practice BROADCASTING with Kits I Send You

As part of my Communications Course I send you parts to build low-power Broadcasting Transmitter at left. Use it to get practical experience. You put this station "on the air" as part of your training. Chief Radio Engineer tests it. You are ready to call yourself a BROADCASTING TECHNICIAN. Our FCC Commercial Operator's License can be your ticket to a bright future. My Training PLUS opportunity is the PERFECT COMBINATION for job security, advancement. When times are hard, the trained man makes the BETTER PAY, gets PROMOTED. When jobs are scarce, the trained man enjoys GREATER SECURITY. NRI training can help assure you and your family more of the better things of life. Radio is bigger than ever with over 3,000 broadcasting stations and more than 100 MILLION sets in use, and Television is moving ahead fast.

Mail Coupon — Find Out What Radio-Television Offer You

Start Soon to Make $10, $15 a Week Extra Fixing Sets

My training is practical, complete, backed by 40 years of success training men at home. My well-illustrated lessons give you basic principles you need and my skillfully developed kits of parts "bring to life" things you learn from the lessons. I start sending you special booklets that show you how to do the sets the day you receive Multilinter. You build only my parts helps you discover and correct set troubles, helps you make money fixing neighbors' sets in spare time while training. Many make $10, $15 a week extra this way.

Mail Coupon Today—Tested Way to Better Pay

MAY 1954

11
WHERE-TO-BUY-IT INDEX
Source of supply appears after items commercially available

AUTOMOTIVE
Plymouth sport coupe has matched luggage... 88
De-Troit Listening Post... 98
Chevrolet's smooth-installed gas turbine... 86

Front-engine auto carrier mounts bunk under cab... 123
Air Force sergeant builds convertible for son at cost of $128. 123

AUTOMOTIVE ACCESSORIES
Nash low-cost air conditioner cools or heats by turning knob... 86
You can be your own highway diplomat with buzzing "speedometer" (Copley Industries, Inc., 625 S. Goodman St., Rochester 29, N. Y.). 99
Streamlined aluminum upper berth clamp to automobile roof... 108
Crankcase-oil-seal envelops fills engine automatically... 108
You can assemble your own four-wheel vacation trailer with kit (Heritage-Craft Corp., Algoma, Mich.)... 122
Inside windshield wiper, anchored to suction cup (Strong's, 4217 E. 14th St., Oakland, Calif.)... 144
Auto mechanic will sleep four (Maurice W. Reed between Landing (Lifeline Auto Accessories Corp., 1810 Boston Rd., New York 69)... 181
Hand-held portable torch turns fire head from ring (Rescue Bicycle Shop, 143 President St., Passaic, N. J.)... 244

AVIATION
Electronic system used by Air Force hands 120 planes per hour... 112
Midget gasoline survapers plane can fly 200 miles per hour... 118
Radio waves, hold robot helicopter in fixed hovering position... 222
"Tennis net" crash barrier halts jet planes at end of runway... 212
German pilot builds "windmill" for ground-ray travel... 183

BOATS AND BOATING
Airfoil, engine and propeller blow aluminum water... 137
Two-way plane, built to order for France... 181
Working model of Columbia River steamers complete to last detail... 233
Rolls of mast paper permits new look inside (Luise Papier... 246
Nylon boat cover (Piano Plastic Products, 6800 Cudahy Ave., Cleveland, Ohio)...

CONSTRUCTION
Mexican suspension bridge built in shape of basket handle... 231
House suspended in space rests on tapered beams... 245
Earth damper mounted on French filter packs automatically... 138
Self-contained electric heating system installed between studing (Electro-Products Corp., St. Joseph, Mich.)... 100

FARM AND GARDEN
Two-piece kit seals breaks in plastic garden hose (Res-Q Products Co., Box 211, Van Nuys, Calif.)... 99
New tools for your garden:
Staggered wheels on rotary mower (RPM Mfg. Co., Loma, Mo.)... 160
Lawn trimmer (Seymour Smith & Son, Inc., Oakville, Conn.)... 116
Leaf burner (Gardening Products Inc, 515 Forest St., Arlington, N. J.)... 160
Robot mower (Western Tool & Stamping Co., 2725 2nd, Des Moines, Iowa)... 100
Exhaust silencer (Maxim Stensiger Co., 65 Hampshire Ave., Hartford, Conn.)... 160
Selk aerator (Eugene Mfg. Corp., 1137 1st, Des Moines, Ia.)... 160
Rottoy Mower (Sensation Mower, Inc., Rutland, Neb.)... 160
Adjustable sprinkler (Soville Mfg. Co., Waterbury, Conn.)... 100
"Whip end" garden hose (Furnas Rubber Mills, 345 San Ildefonso St., San Francisco 11)... 100
Root seeder (Jens Mfg. Co., St. Matthews, S. C.)... 100
Root-cut spray prevents sprouting... 100
Barling grain bin (Bemis Bros. Bag Co., 408 Pine St., St. Louis 2, Mo.)... 158

INDUSTRY
Roller-welder unit does work of seven spot-welding machines (Solar Altractt Co., 2790 Pacific Hwy., San Diego 12, Calif.)... 148
Hydraulicake made on trailer cleans sugar cane from field... 154
Clay-extraction machine... 356

RECREATION AND HOBBIES
Tiny railroad with only 156 feet of track spans oceans... 120
Photic pinhole tally keeps changing record of name progress (W. E. Cline, Rt. 3, Box 1668, Hermitage, Wash.)... 127
Aluminum golf cart has numbered slots for 14 clubs (Meta- CJart, Inc., 102 E. Court St., Cleveland 2, Oho.)... 189

SCIENCE
Pin-size neon glow lamp aids timing of film... 96
Ten-foot X-ray picture reveals minute flaws in steel castings... 112
Electrons photograph stars to produce sharper and faster pictures (Thompson & Co...)... 121
K-bomb element may help war on cancer... 126
Silicon transistor... 127

(Continued to page 14)
INVENTORS

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.

CLARENCE A. O'BRIEN & HARVEY JACOBSON
Registered Patent Attorneys
41-E DISTRICT NATIONAL BUILDING
WASHINGTON 5, D. C.

MAY 1954
New Greaseless Way
To Keep Your Hair
Neat All Day

Vitalis Hair Tonic with V-7 makes even dry, unruly hair easy to manage.

Keeps hair neat with V-7, new greaseless grooming discovery that outdates messy oils. Never a gummy film or "oil-stick" look!

Prevents Dryness. What's more, new Vitalis maintains your hair's natural moisture balance better than any other leading tonic. Try new Vitalis with V-7—you'll like it.

VITALIS® with V-7
PRODUCT OF BRISTOL-MYERS

HOUSE AND HOME

What's new for your home—
Reservoir for steam iron (Sunbeam Corp., 5000 Roosevelt Rd., Chicago 30)...

Adapted converters black-and-white TV set to color for $400...

Ball bearing upper lounge...

Adjustable height of carriers in carriages...

Intricate detail in stairwell...

VITALIS with V-7
With a few simple steps, your hair becomes a rich, lustrous beauty.

A light touch of Vitalis ... plus a few simple steps, and you have a rich, lustrous beauty.

VITALIS is a hair conditioner

VITALIS with V-7

NEW POPULAR MECHANICS
Can you profit by their mistakes?

"Not getting enough education"
You needn't make that mistake. You can get that better job, those big promotions, the regular raises that so many I.C.S. students report. And you can do it without "going to school," without interfering with your present job or your social life.

YOU can study with I.C.S. at home, in your spare time!

"Wrong choice of career"
When you study with I.C.S. you have 303 courses to choose from. And part of our job here at I.C.S. is not only giving you instruction but making sure you pick the course that's right for you!

YOU get expert guidance FREE from I.C.S.!

"Failed to seize opportunities"
Your opportunity is right here on this page. Don't pass it by. Don't put it off. Write now and let us send you "How to Succeed" and full information on any of the fields listed below.

YOU get 2 FREE books if you mail the coupon today!

For Real Job Security — Get I.C.S. Training!

INTERNATIONAL CORRESPONDENCE SCHOOLS

I.C.S., Scranton 9, Penna.

MAY 1954
HOW I MADE MY HOBBY PAY OFF!

I've always been interested in cars, then one day I met Joe...

HI, JOE! SINCE WHEN ARE YOU IN THE AUTO REPAIR BUSINESS?

EVER SINCE I STARTED LEARNING AUTO MECHANICS AT HOME. I LEARN WHILE I LEARN, THE NATIONAL SCHOOLS WAY!

SOUNDS GREAT! I HEAR THAT TOP MECHANICS MAKE REAL MONEY THESE DAYS!

YOU SAID IT! I MAY EVEN OPEN MY OWN REPAIR SHOP WHEN I GRADUATE.

NATIONAL SCHOOLS SENT ME THIS SWELL AUTOMOTIVE TOOL KIT - IT'S PART OF MY COURSE!

WHAT A DEAL, I'M FINDING OUT ABOUT THIS AUTO MECHANICS COURSE TODAY!

SHOP-TESTED HOME TRAINING AUTO MECHANICS & DIESEL NATIONAL SCHOOLS

Technical Trade Training Since 1905

LOS ANGELES 37, CALIFORNIA

Address:

MAIL NOW TO OFFICE NEAREST YOU!

Send for famous illustrated FREE BOOK and FREE LESSON.

Mail in envelopes or post on parcel post.

NATIONAL SCHOOLS, Dept. DB-76

4000 S. FIGUEROA STREET

LOS ANGELES 37, CALIF.

ALSO IN CHICAGO 709

Please rush FREE BOOK "Your Future in Auto Mechanics" and FREE LESSON. I understand there is no obligation, no salesman will call.

NAME

BIRTHDAY 19

ADDRESS

CITY ZONE STATE

# Check if interested ONLY in Resident Training at Los Angeles.

VETERANS: Give date of discharge.

(Continued from page 14)

Lime-lime binding.

Milk cut with sand for doorstop.

Individual salt-cellars for picknicking.

Sealing envelopes with ice cube before closing.

Children can't lock themselves in bathroom.

Handy basement light.

Rubber pad for food-chopper clamp.

Getting canned goods off shelf.

Cup-and-saucer rack fashioned from brass or copper wire.

Inexpensive and decorative patio gate inners.

No more shell brackets modified for summer.

Water tank deodorate driveway.

Pop-furnace plug wires.

Stair tread protects window sill against flowerpot flashes.

Still-cook provides handy drinking fountain for children.

LAWN AND GARDEN

Protect knives when gardening with pads cut from inner tube.

Making handy office leading tool from ordinary table mat.

Tipping bird bath attracts songbirds and keeps cats away.

Garden watered from leaky hose.

Light attached to lawn mower powered by small generator.

Directed backflow block made into effective garden weeder.

Plant cuttings rooted easily in plastic wrapper.

MISCELLANEOUS

Redfinish metal name plates with lacquer and sandpaper.

Spray-painting irregular objects.

Glossy finish for model airplanes.

Wooden strip used as handle for small magnifying glass.

Flexible water-pipe joint from auto-radiator hose.

OFFICE, SHOP AND STORE

Yellow laundry soap on fingers aids rapid handling of papers.

Molded surfaces on stamps and memory marks easily.

Ash tray beside drawing board keeps work space clean.

PHOTOGRAPHY

Ornamental plastic switch plate makes photographic prints.

Ventilator for photo darkroom made from toilet paper roll.

Emergency darkroom safelight.

Mixing-spoon handle used to measure photo solutions.

Fluorescent film allowed film Italian treated film aging.

Speed Graphic operating steps noted on paraphernalia finder.

Keep prints from slipping.

Photo lamp from old parts.

Camera support improvised with two chairs and books.

Nose used as funnel holder.

Negative stored in file box.

Water color sheets taped to large board.

Print dryer

Curved tin reflector on tray permits uniform print-washing.

TOOLS

Soliders refills punch paper.

Notched jaws improve vice.

Wheel puller.

Sharpening for tools.

Hole saw (Erwood Inc., 1770 W. Berendo Ave., Chicago 13)

Mounting table (J. D. Wallace & Co., 134 S. California, Chicago 13).

Rolling tool rack.

Variable-speed drive (Logan Engineering Co., 4001 W. Lawrence Ave., Chicago 38).

Vibrating farm plow machine.

Angle anvil (Christensen & Rell, P. O. Box 284, McMinnville, Ore.).


Impact press (Hedrick-Nourse Co., 641 B. Third St., Los Angeles 13, Calif.).

WORKSHOP HINTS

Chrome kitchen chair converted to temporary youth seat.

Release clutch of bar clamp by using C-clamp.

How to cut taped joints.

Internal screw threads measured with aid of lead pencil.

Movable light over workbench slides along overhead wire.

Spring unwound on steel rod.

Left-hand thread on round stock cut with right-hand tap.

Angle-steel turning compressor for valve-in-head engine.

Fitted with universal joint for pipe wench.

Hydromagnetic gyroscope lubricates small electric motors.

Screwdriver holds small bolts to loosen rusted nuts.

Radio-Television, Electronics

Television today (Color TV sets in production: Admiral Corp., 200 W. Campbell, Chicago; Midland Television Corp., 160 E. Randolph, Chicago; RCA Victor, 1700 W. Roosevelt Rd., Chicago; W. R. Grace, 375 W. 7th St., New York.)

Tubes for color TV receivers: General Electric Corp., 700 1st Ave., New York 17, N. Y.; Nuteman Corp., 33 W. 42nd St., New York 18, N. Y.

First-aid hints for table-model radios.


POPULAR MECHANICS
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.

McMORROW, BERMAN & DAVIDSON
Registered Patent Attorneys
PATENTS • COPYRIGHTS • PATENTS
1352 VICTOR BUILDING, WASHINGTON 1, D. C.
Save $8.00
NOW!
$1.98

NOW! GET CLOSE-UP VIEWS ALL DAY WITHOUT FATIGUE!

Here for the first time—Germany's famous SPEKTOSCOPEs—a revolutionary concept in optics. Wear them like ordinary eye glasses—hour after hour—without fatigue. Feather weight—only 1 oz. You'll hardly feel them! Yet here is a new, truly powerful optical design that gives you greater range than many expensive opera or field glasses and a far greater field of view than some selling for many times more! Has INDIVIDUAL eye focusing for clear, sharp viewing, whether you're looking at a play in the first row or a seashore scene miles away! SPEKTOSCOPEs are ideal for indoors, outdoors or distant scenes or close-by viewing. Special low price—$1.98 a saving of $8.00 or more!

Enjoy at our risk for 5 days. You must be delighted! Otherwise your $1.98 will be refunded with no questions asked! Limited supply forces us to place a limit of 2 per customer. Send check or m.o. for prompt, free delivery. COD's sent plus COD fees. Use convenient coupon below!

5 DAY FREE TRIAL!

International Binocular Co., Dept. 6-E-90
352 Fourth Avenue, New York 10, N. Y.

RUSH...SPEKTOSCOPEs at 1.98 each (LIMIT—2) on 5 day home trial. You are to refund my 1.98 if I am not fully delighted.

☐ Payment enclosed. Send post free. ☐ Send COD plus post.

Name:__________________________

Address:________________________

Town:_________________________

State:_________________________

CANADIANS: Mail orders direct to our Canadian plant: Thorsons Co., Dept. 6-E-90, 45 St. James St., West, Montreal 1, Que.

This is the first time that this type of optical instrument has ever sold for less than $10.00. The favorable rate of exchange and Germany's need for dollars makes it possible. We have been chosen as the exclusive distributor for SPEKTOSCOPEs to the American public. Get yours now at our low, low introductory price of 1.98 tax & post paid!
GREAT OPPORTUNITY FIELDS
Conditions are changing. Many "one operation" jobs that have paid well 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.

YOU can TRAIN in great CHICAGO SHOPS
Train on real, full-size equipment at COYNE where thousands of successful men have trained for over 55 years—largest, oldest, best equipped school of its kind—established in 1899. No advanced education or previous experience needed. TRAINING APPROVED FOR VETERANS.

B. W. COOKE, President
COYNE ELECTRICAL SCHOOL
500 S. Paulina Street, Chicago 11, III., Dept. 54-72H
ELECTRICITY ★ RADIO ★ TELEVISION ★ REFRIGERATION ★ ELECTRONICS

The future is YOURS in TV-RADIO!
A fabulous field—good pay—fascinating work—a prosperous future! Good jobs galore, or independence in your own business!

Coyne brings you the first truly lower cost, MODERN—QUALITY Television Home Training; training designed to meet Coyne standards. Not an old Radio Course with Television "tacked on". Here is MODERN TELEVISION TRAINING including working knowledge of Radio. Includes UHF and Color TV. No Radio background or previous experience needed. Personal guidance by Coyne Staff. Practical Job Guides to show you how to do actual servicing jobs—make money early in course.

Don't pay for a lot of costly extras—pay only for what you learn! The extra "thrown in" may look impressive, but your teacher adds little to what you actually LEARN—but how they do add to the price! With Coyne Television Home Training you pay only for your training, no costly extras.

B. W. COOKE, President
COYNE ELECTRICAL SCHOOL
500 S. Paulina Street, Chicago 11, III., Dept. 54-HY2
ELECTRICITY ★ RADIO ★ TELEVISION ★ REFRIGERATION ★ ELECTRONICS

START NOW—PAY LATER—Finance Plan and Easy Monthly Payment Plan. Also part-time employment help for students.

Get FREE Book
Send coupon for 48 page illustrated book "Guide to Careers in Electricity and Television-Radio." No cost; no obligation; no salesman will call. Get vital facts now!

B. W. COOKE, President
COYNE ELECTRICAL SCHOOL
500 S. Paulina St., Chicago 11, Ill., Dept. 54-72H
Send BIG FREE book and details of your training offer. This does not obligate me and no salesman will call. I am interested in:

[ ] Electricity [ ] Television-Radio

Name ___________________________
Address _________________________
City ____________________________ State _______________________

SEND COUPON FOR FREE PICTURE FOLDER
and full details, including easy Payment Plan. No obligation, no salesman will call.

COYNE ELECTRICAL SCHOOL
Television Home Training Div.
500 S. Paulina St., Chicago 11, Ill., Dept. 54-HY2

Send Free Picture Folder and details on Television Home Training. This does not obligate me and no salesman will call.

Name ___________________________
Address _________________________
City ____________________________ State _______________________

MAY 1954
The small car also requires seat covers that can be washed with soap and water, stainless-steel trim or no trim and enough room for the children and market bags. This small car should be short and narrow. On the errands of a woman there are many parking problems.

A woman does not ordinarily buy a car in the way her husband buys one. He likes to buy the most powerful, shiniest, fanciest and longest. When a lady buys a car she looks at the dashboard and the upholstery. She then asks the salesman about the motor and brakes. He explains everything. Most of this she does not understand but she tries to look wise. She wants to know how many miles to the gallon. The salesman tells her the length of the car and he closes the front door so she can hear how solidly it is built. She asks again about the length. His statement will haunt her every time she parks this beautiful car. She asks him if he has anything shorter as she just wanted something in which to go to the store.

Eventually she wonders what she is doing in this powerful machine. She wonders why she averages only 15 miles a gallon. She wishes she had a small car but her husband said the big car was safe.

Every driver of a small car will vouch for its safety. When a woman drives a small car over 50 miles per hour she feels as if she is in a jet plane and slows down. She finds that when a driver wishes to pass her he will blow the horn. She can be as far over to the right as she can get—but he will still blow the horn. He is afraid he might hit the little thing and he does want her to see a big car go by. If the small car wiggles itself ahead in traffic—and it usually can—the driver to be afraid of is the one you just passed. He is going to show you when the light turns green. He almost hits another car to prove that his car has IT, and he smiles at you in his rear-view mirror.

The small car is a necessity to suburban living. Give women a car they can skip around in. Give it an all-steel body, a short wheel base and, if trim is necessary, stainless steel. Give it a washable interior, a four-cylinder motor, a small gas tank, excellent brakes and paint it a color which can be seen—no middle-value colors.

A few months ago you featured an article on the future of small cars in this country. The opinions of the three or four men discussing the situation resulted in the statement that there was not too much possibility of marketing such a car.

Nobody even asked the woman!

Marie M. Larsen
Baltimore, Md.
Now! Work over 300 practical projects with these parts...

5 INCH "SCOPE"

5 INCH "SCOPE"

21 INCH
Build and keep this BIG DTI Engineered TV set - easily converted to U.H.F. (DTI offers another home training, but without the TV set.)

TELEVISION

RADIO-ELECTRONICS Now... at home in spare time you can get BOTH the very training and subsequent Employment Service you need to help you start earning real money in America's thrilling, multi-billion dollar opportunity field of Television-Radio-Electronics. Now that Television is coming to almost every community, here is a chance of a lifetime to prepare to cash in on one of Television's great expansions.

DTI's amazingly practical home method enables you to set up your own HOME LABORATORY. You get many Electronic parts which you mount on individual bases with spring clip connectors. Taps for experimenting! Add or remove parts in a jiffy. No wasted hours of soldering and unsoldering for each project. You spend minimum time to get maximum knowledge of important circuits that really work. In fact, you get exactly the same type of basic training equipment used in our Chicago training laboratory — one of the nation's finest.

Build and KEEP This VALUABLE TEST EQUIPMENT Your home laboratory projects also include building and keeping a versatile 5 inch Oscilloscope and precision Jewel Bearing Multi-Meter. These quality commercial test instruments help you EARN WHILE YOU LEARN and will prove mighty valuable, should you later decide to start your own full time TV-Radio-service business. You also build and keep a quality 21 inch TV SET.

DTI Provides EVERYTHING YOU NEED to master TELEVISION In addition to your home laboratory and easy-to-read lessons, you even use HOME MOVIES — a wonderfully effective and exclusive DTI training advantage. You watch hidden actions... see electrons on the march. Important fundamentals... become "movie clear," helping you learn faster... easier... better.

Full-time Residential training in DTI's great Chicago laboratories also available. MAIL COUPON TODAY for all facts. (If subject to Military Service, you'll especially welcome the information we have for you.)

MAIL COUPON TODAY!

DeVRY TECHNICAL INSTITUTE DEPT. PM-5-K
1441 BELMONT AVE., CHICAGO 41, ILL.

DeVRY TECHNICAL INSTITUTE, INC.
CHICAGO 41, ILLINOIS

"ONE OF AMERICA'S FOREMOST TELEVISION TRAINING CENTERS"

DeVRY TECHNICAL INSTITUTE
AFFILIATED WITH
DeFOREST'S TRAINING, INC.
CHICAGO 41, ILLINOIS

I would like your valuable information-packed publication showing how I can get started toward a good job or my own business in Television-Radio-Electronics.

Name:

Address:

City:

State:

MAY 1954
Want more money? Steady employment? Clean, interesting work? Look into Drafting. You'll quickly see why there's real opportunity, more money in this prosperous professional-type work. Want ads show trained draftsmen are in great demand. Find out how you can qualify in a few months for a good job in Drafting.

**LEARN IN SPARE TIME—AT HOME**
(or at the College in Chicago)

A few hours of pleasant home study every week— that's all. All the tools you need to train at home; valuable drawing outfit included. For 50 years this nationally famous school has prepared men quickly for good positions in industry.

**FREE INFORMATION—SEND COUPON**

Find out how C.T.C. practical training has boosted the pay for hundreds, what it can do for you. Learn what Chicago Tech graduates say about their work, earnings, success. Don't wait! Investigate now. Send for this FREE TRIAL LESSON. No charge for this lesson, now or later. Fill out and mail coupon or send post card today.

**CHICAGO**
**TECHNICAL COLLEGE**
Chicago 16, Illinois

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

NAME ___________________ AGE ________
ADDRESS ____________________
CITY ________________________ ZONE ________ STATE ______

---

**100 YEAR OLD U.S. STAMPS**

We will send "On Approval" all United States stamps, even those over 100 years old. We will also send "On Approval" all foreign stamps in singles and sets, including such famous issues as Coronations, Roosevelt, etc. Our is the only stamp house able to render such service. Just send the for our introductory bargain of 56 different U.S. stamps and fascinating stamp literature.

GLOBUS STAMP CO.
268 — 4th Ave. New York 10, N.Y. Dept. 213

**A GOOD HAND HELPS YOU SUCCEED!**

Send for FREE SAMPLE LESSON.

"How to Become a Good Hand," or "What You Must Know About Handwriting." Complete set. 54 cents.

**TAMBLYN SCHOOL OF PENMANSHIP**
S. A. Ziter, 442 Ridge Bldg., Kansas City, Mo., U.S.A.

**WATCHMAKING**

Learn at home • FREE sample lesson • Approved for Vets.

CHICAGO SCHOOL OF WATCHMAKING
1930 W. MILWAUKEE AVE., DEPT. 154, CHICAGO 47, ILL.

**$750 BUILDS 4 ROOMS & BATH! WHY PAY RENT?**

For Seven Hundred Fifty Dollars and 30 days of your spare time, you can build yourself this Beautiful Home. Living Area 1,125 sq. ft. Two bedrooms, 12 ft. x 12 ft. Kitchen 9 ft. x 10 ft. Bath 5 ft. x 5 ft. Wind out steel casement windows, concrete floors, insulated. Simplified instructions, easy-to-understand print and material list 50c post card. Economic Home, Dept. C

**Get into Good Paying AUTO BODY and FENDER WORK**

Big Demand in Auto Body and Fender work. Start training now in your spare time today for good pay work. Practical shop experience included. U.E.I. Training covers metalwork, welding, painting, etc. Placement service— or we will show you how to start your own shop. Behind U.E.I. TRAINING is a large national organization founded 1923. Write today for FREE FACTS—No obligation. Write for Free Facts

**POPULAR MECHANICS**
How to banish the fear of Unemployment

I know the thoughts that go through the heads of men who work for others. I was in that spot myself. What if a depression comes? What if we have a strike? What if the boss turns against me? What would happen if I got sick — or hurt? These are the thoughts I had — the thoughts that must come to any serious minded man who has the responsibility of a family. My problem was solved the day I started in business for myself. Might that be your solution, too?

By Raymond E. Brandell

Years ago when new acquaintances asked me what I did, I used to reply with a laugh, "I'm a wage slave." Inside me I was pleased with my lot because I was started a little early in security to know that that same pay check was coming in every Friday, rain or shine.

"Rein or shine" was what I thought until the blow struck. I wasn't among the first to be laid off because I had been with the same job the longest years. Some of the "juniors" went first. But eventually my day came, too. For many weeks I looked for other work. Finally, one grim night, I sat down in my bedroom alone and faced the facts. I was a dependent. I was dependent on the vicissitudes of business. I was dependent on the whims of a boss. I was no more important than a tool that could be picked up or laid down. And when the foreman laid me down, it was no more important to industry or to the world than if a man had laid down a screwdriver. The joke about being a "wage slave" had turned on me.

That black night was the turning point. I decided then that my only salvation was to start a business of my own. Even if I had to half starve, at least I would accomplish two things: I'd free myself from the ups and downs of other peoples' businesses. And I'd be a slave no longer. I would taste the sweet nectar of independence. What I made would be my own. The hours I worked would be my decision. Suddenly, for the first time, I knew the fierce joy that comes to every small business man when he looks around his shop and says, "This is mine."

The decision was one thing. The accomplishment was another. And many and many's the time I thought, "Why didn't I do it years ago?"

Small business opportunities to fit the skills and leanings of almost anyone. There are many little businesses that can be started at home in spare time. Without risking the job or sacrificing the pay check. One of the liveliest of these is a particular branch of the Plastics business. And one of the most interesting, too.

When you think of Plastics, you probably think of the enormous plants that have sprung up around the magic of today's synthetics. Plant equipment alone calls for investments of millions of dollars. Obviously not a business for a beginner. But this one special branch of the business is one that will never be invaded by the big moguls of the trade. They can't touch it. And, fortunately, it's a branch of Plastics that can be fabricated on a small, inexpensive machine that can be set up in any corner of a room where your furnace or water heater or cold water faucet. Kitchen, garage, basement, even a spare room if there's a sink and an outlet. I have been a success in my business. What is even more important, I have been a happy person, because it worked out so that the business that made me independent was the business of helping others become independent, too.

I have a set of simple instructions. Not a correspondence course, but an instruction book that shows you in easy step-by-step pictures and directions how to do six things. 1) How to start on a shoestring. 2) How to operate the equipment. 3) What to make. 4) How to get others to sell the things you make so there is never any canvassing needed on your part. 5) How to get firmly established in spare time. 6) How to expand into a full time operation any time you feel you want to, or are ready.

The space here does not permit giving you the whole story. Let me send it to you in printed form without any charge and without obligation. Just your name in full is all I need. And since I haven't any salesmen, you won't be pestered with any calls or high pressure selling. I have a printed circular that I'll send you, and in the letter that goes with it, I'll give you the facts you need to decide in the quiet of your own home whether this is the time to make your decision.

I could have saved myself three years of hard struggle if I had prepared in advance. Doesn't it make sense — in the face of present rumors — to give this matter some serious thought, right now? Send me your name — no money. I think you'll be glad you read this page when you see the way in which I can open doors for you into the wonderful world of personal independence. Mail the coupon, today, or a postcard with your name and address. I'll do the rest.

RAYMOND E. BRANDELL
1512 Jarvis Avenue, Dept. L-10-E, Chicago 26, Ill.

Dear Mr. Brandell: Please send information showing how I can start a profitable manufacturing business in my home in spare time. All the information you send will be mailed to me free of charge and no salesman is to call on me. I am not under any obligation to go ahead with the business and there is no charge for this information nor are any other time.

Raymond E. Brandell, 1512 Jarvis Ave., Dept. L-10-E, Chicago 26, Ill.

MAY 1954
DO FALSE TEETH
Rock, Slide or Slip?

FALSETEETH, an improved powder to be sprinkled on upper or lower plates, holds false teeth more firmly in place. Do not slide, slide or rock. No gummy, gooey, pasty taste or feeling. FALSETEETH is alkaline (non-acid). Does not sour. Check "plate odor" (denture breath). Get FALSETEETH at any drug counter.

STUDY AT HOME

WITH AN EDUCATIONAL INSTITUTION

Courses in ARTS AND SCIENCES: Philosophy; Education; Letters; Public Health; Medical Jurisprudence; Psychology; Sociology; Physics; Chemistry; Geology; Pol. Science; Theology; Law; Business and Commerce; Accounting; Mathematics; Statistics; Agriculture; Engineering: Electrical; Civil; Mechanical; Drafting; Architectural; Steam; Diesel; Aeronautical; Radio; Structural; Mining; Industrial; Petroleum; Refrigeration; Chemical. Send for free catalog.

McKinley-Rousseau Incorporated, 4510-832, Sheridan Rd., Chicago 40, Illinois

Berman's Diamond Loan Bank
Dept. P — Berman Bldg., Baltimore 1, Md.

PUBLISHER'S MECHANICS

Copyrighted material
THOUSANDS FIND NEW INTEREST, NEW HAPPINESS IN LIFE!

See For Yourself How A Few Hours At Arthur Murray’s Opens The Door To Good Times And Popularity

Join the happy group who have found that dancing can lead the way to confidence and fun. Come to Arthur Murray’s. Hundreds of thousands of shy people have become gay extroverts almost overnight through learning to dance the Arthur Murray Way. You see Arthur Murray has so perfected his teaching methods that anyone, even a beginner, can go dancing after just a few lessons. Then, too, Arthur Murray combines lessons with parties so that you get real ballroom experience while you learn. So don’t miss out on good times any longer. Visit your Arthur Murray studio now. See coupon below for free offer.

HOW OTHERS HAVE FOUND POISE, NEW CONFIDENCE AT ARTHUR MURRAY’S

“I thought learning to dance would be hard and take forever. Was I surprised when I found I could actually dance after my very first lesson and that the lessons were fun, too. And what a wonderful time I’ve had ever since,” says Arthur Murray student, Martha Stone.

“I never danced and was too shy to learn. Just a few lessons at Arthur Murray’s changed all that,” says Paul Chauvin, Arthur Murray graduate. “Now I have more confidence and really enjoy myself at parties.”

Send this coupon to your nearest ARTHUR MURRAY STUDIO (Consult your telephone directory)

Gentlemen:
Send me the new “Murray-Go-Round”, 64 pages of dancing hints, news and studio information. I’m sending this coupon in right away so that I will get a certificate for 2 FREE half-hour dance lessons.

NAME ______________________________ PHONE NO. __________________
ADDRESS ____________________________________________
CITY ________________________ STATE _______

May 1954
$5 per hour
14

Chiu

hnrwf rua» pmt uphn-

ratf

ilrry ''In tlm Unmn",

lQ 4 Lll. 11 -

AiTl.-r,

1nn It niiq- nupbaTKl.iiiaEuiepH'Uc
in -iiaru tiiia suul IiijIIiI 3 LfTmintnl
ful l-lldlt Lmib'Kii.
1

1

r

Ali-rL

ri.li
jr
!S.‘i
n
st-rvlot Lliry tciiikr phii Sit
in,
lirplb
altiCL vrrd. F.i:J lu IrAbm

ik-ulfrj:

cq

prullr
iin

I

each wrrLv™

Ircln
r

liulrkll"

r

Ei'ii

E-ll till

PURaCLEAN
1

sinJsh
nr:

I

V

.

LAW

1

vrvU-t-

.1

.

rvilrti- ranliu milI cnriral irfdlrs.
n' il by ui J ni l --up.!
.iimiLy

W3TTr,"ll',
C.r

1

t.vpkJnlQt

L*

1

nur

rji.uiTi

Mil

Tat

md EASY TERMS.

DUHACLEAK 1LDG.
41U

ICS

CC..

in

TCTDAV

itaLiLli

A-

DlfRACLEM

—

hthiiii

Ttri™.

1

liiii

inili'i fiuniEh n
LliVAi.'in+IU.
J5i&5

1

,.| 1.1

lot

J.nRuKe’u fiLim.ii.iJi Tjlw Libmry- used !L? referenrc an mimy L-lit libnuic* mid Luw offices-—
has enabled thousands to master Law siu^.
priwiiijily fast, in spare h-nura at homo, for busi-

H^in. I3rn« flu

Uhf'.t

% I rnr

k

Wu

wights At hombi
L L.B* DEGREE

Sm KHt'

by AfiMEplUllI

nr iKTlnkiiuHi I'lrl mil
imil if'] pile rlsti . . rolvre

.

nl i|pr

.

.:

111-

1

IllHJ.

•rSfriru

nuRUPBijoF

can
acquire

EjffffPS-FIPLE?,

LEARN LOCKSMBTH NG
1

Learn, this fiiiciaiJitinH. arofitatilc trade
front u* carts ill yeur teftrs time- at hompl

mud u j-ofoi+rtLotiatl advancement,

jie^H

.

"I

Wu

il. I:.L.:

.

i

Age

Thu.'* 14 remarkable volumes,, compiled by
!l-;llLli3k prefi'Uwija and lawyete, cover (lit whdla
Ihassc field of TjivV in rjn:uj<!j:ii!il, Cnlerly, sinipUfied miuincr.
You advance rapidly with this ETeat library p
plus six-cial lectures fumislusd. Wo guide you
fclend for two
iS-pago booklets, "Law
1 '
TnLLiiiiiE for Leadership/’ and ‘'Evidence,
answering questions about, Law and its value
to you. and ell; up. huw Liiftalli: Law gi- ad llii Lea

nr pbyalcu,! nauu>e*p cut ilStadfantiiLiK. Year
j’.«Atir inpamp. FuiL or pa,rt tlnna. Fractlitr: ml ad iqhiju. Yuli can r.'.n'cr zncaury
even uhllu lttimitk All nn.ii: Hale r.nd .sp: svLLbcut oxcin -liutKk,
ftlAl
tccCr- luppliud

a»uTvd.
alftal.

I

INSTITUTE OF IDCK SMITHING, niipl. P-54
11 PARK AVENUl
RUT« I HT DRD, H. J.
ilc. Py N.J. SJnf* Hnofit of fWttaUttit
J
.

,

rnroLirJ

/or t'ctcra^j

YOUR

FREE

1

VOUK

pfnrvirrilTip

ltniT*ftrt

LLrii tv

n iii:i r;

i

pohhc

I

If li.

j'lL^hid

Midi

mlY-ani'LlitLiKutin chI-Jih'Sh

<!ui:;>iin Ijulyiv,

No

and

*'°! r'r
I
1

Q7MEH7 a4
mrrrGirr

S.

U<u
». st.upuib, massoiiMi

3000 Novelties ioc

A

41?

Qc Far in
in v
t«lcnt|lp< lUnDl'**
r

5,

IN:

Send

lTiK>

.V-flHW,

>

Jrrjilf

FRETS

Irn

riv,c:

mr

——

rad mi.

AflEL^. .... *
turn,

*»*(.

....

-

ENGINEERING

DECREE

imMn

27

AarnaLJiLns

ilirrmcii,

l..™-r.5lL«.
nsbT*-

an

hL»'4 uff
QL|’d
nr

Bjut'ljo™,

PLC.

,

«
Q^pt. 7W,

CO, r

,J

si-vn
u!|

puzElbd, forrtu r
m-luriir itrl.
prim «n ibti,-

*V

marts. t»kJ,

,

?,

ha

OmJ. He

Mitvt.

H

Mncbfgan

Ha rliutt Hu

«4npi,

lociicaiiVr. «cca Uf Itpilu

im-

-IT

ciT

iioi
OEIPT.
PM.

HAND-LOCK. PRODUCTS

['JTnrrit,

P.' rj. L#^

l~LL.ir.~l II: I

FBEiTOH.

CJW,

PUT.,

CARTOONING!
F» Nn #nd

nm

—

With

In

]

Near Arran.
prol4Uldn*l

rlr|'.

1m

Lcun
Q.*r

WICHHiy
™Hik Kadi

Uil,

pr(i4l|

milhied.

IdAM

dtdiliuI npv.n: ic'.i Tie— tcrnzj start quarterly. Many PLtuqAat?
pan: m matoT part ol lli tJr tulkur ejovcjgr to ihin lurpr lr.dupirirtl eent*F
Low tolUcn. PcaipbtcDt leal mctLiiD. TIiarjagT.. Li:i il-h.
urtvtaic Matli-rp. Well -equipped Inberaturlcs
-pr nr tit*
rJiidiric dp* phvr-i«p lat»tJilcTv uric
wind tunneli

tiiH(«Kl,

1

SMIT H t

Aeronpytical.. Chemical, Civit, llcrlrlcal, Mgihgnlcil
ansi Radio irigi nee ring fine- TV and IFb-iItbilIciI'
itnlu-d:- jr T.-Dui:r m«n ire- CDinLn; E. a. EHfilNETRRiiq
nir
DEGK£E£ antilHlfr In Chi! tvOvKnlVd iMlJCdCivn

modem

nvi^-llEdb,

to-lm,

il-inipi-

iinriir,

b kr

i

HIIPTIJRED?

IN

MONTHS
Big Demand for Graduates

I

I»l4™ni*nil.

bank!.
ui'I'iili. J'Hlill' (u ppNK L
mc-lar*. (hDcBarp, Inlwn. b|llfpMr1 rJSlH,
plinlli Civ P*nd "dine. Iddrtii
Ic-: IsJ

JOHNSON

Zom b* Stole

r-imiwas,
Jvwplrj-- rrl'p 7111

luck>>

it4>
auln 4.
1

i " ,H j 1 1-

A Mill,

vnviuil llMii liin.
prnjKl
ppujictiini
tjitlci,l
ann.ll,

nrl ilii.

Id-Kp

lirM4M>4r4|

atl

ttrik-vts tleaczlbeia abovi;,

J

>SlLKJCiiy,

Elfij

+1*4.

,,

ll,llu:iLlllZl.

nr navrlLivi, llm
lui'm*h*r*. tlinrs

Jlalapi

I

111 ic

WttlldlLt

fOUTUNE’
.FREE/,

flr'

vDyf

LASALLE EXTENSION UNIVERSITY
Cerru^dMl*nt« rnsFdufroJl
Pr-nrbarri ft
P-npf, 5WI
Chkpgfr

ir’iLJVifd in 3 hpqes.

my

tiif- uirlh

obligation.

tno bp

t O-cCuf Sfltufcctla- in LQ

i

In Lin

m

Ms tjUrf

pr4-:Ficdl

diem

33*1 blN imn'iq
|rur 3 41 n|4 ChM
l44klba ‘-*Hnan

Or. If

CARTODN-CR AFT

SlSItmotlea rtnutu
Qa -rri .r'.'.AiLL appi-aved Cut Q.l.'i. Er-gmttr.r.a prt1p4.r1.tacy
emuns, fiLUdduLJ 1 h;ni 16
ini JL IoteIed d
CQLULtrjEI.
RilIal
June, SipltniL:;. Decamber, Uaneit. 3-r.iiJ or’" pun,
rot L:::- enmi-ug mid lull intcrrriDilcu Email naif.

5964 HeNyxebd

IrkrttlsiWl

Of

it"
ill
1

Ccmp

IN Jilrdllr ni.
,

Cl.pl,

jl.W

IM

HjllynaiaJ 10,

5.lvd

i

POWER MOWERS &

1

-

—

—SIND COUPON

TOBflT

|

1
I

I

!

(
,

5i-S

E.

Waihlnglon lovbyanl

Wayne 2 Indiana
P1eu« md ms l:u mlmirbcian on E.S. En-gLimTlJiif
Irmsitli* in rhjEi=te<l
TNfpjrer hi
Chcir.lcal. n ClcU. 0 HlwtrLcil,
Atrcjinuikp:.
M4Cfl 4P.HH. C R?4ni-Tpl#Wjt(m

]

Flam

£3

diiklltz

*:r

gn Jilc

j

!.OW

n™

m*i»i..

fstl.,
uu. n

iml 4

KJt?
nravLiswn ftnli! uiL
Wtiv-:

I

p-«tr. nrti
twAily Ic IHL WrJta
far 1‘rrp Ftuil, tAir Ivins.
EbKi CJn anrt OuBEanrct-.

tire:

Whirl
v..

r

TODAY

.

::
Li'i
niMl J
n .4
jr 'I In, rL rtr|,:d_ L II" arvi Ju" r.lir-i.
Nmlfii-J -J' knnwn
mak? nkllQV l.itdiL
BivrQ'jliltlJ-

,

I'

Punn..

:

I

1

1

1 1 i

:

I

1

r IL

lrESf.rt.L't.1

in J
A.ddtEEl.

H.wr,, c4MptvU-

i.TUF.ca'i PiM-at P-.j^Ar
I

I

wn

u-illi

Cost kite,

INDIANA TECHNICAL COLLEGE
Farf

nur

jplld
rnJurJ

*

In

muoiT

rolnr
"I nr

MPrip !’.-aii>.c-a-:LI';-i
go
h.v-.T-.Tii—: ful !y tirscrfaQj

rvu'^rvi,
Sit.-rk
:,Krk
.

fnl-i
fnl-rlp-T.

iVr-irr-

-

tadtiT.

aTKWHGLE M ANUFi rTLH

I

lt&

w.

r

B«I

nW
t

_
Fort

kuH,

hjlttll

POPULAR MECHANICS


Premium Performance! Increased Mileage!

TCP NOW IN CANS!!!

ADD IT TO YOUR GAS YOURSELF AND START SAVING MONEY TODAY!

TCP (Tri-cresyl Phosphate) is the sensational new gasoline additive. Field tests prove that TCP gives more power and increased mileage in poor cars. But until now, you could buy TCP only blended with high-priced premium gas. Now you can get TCP in cans in concentrated form ... add it yourself to your favorite brand of regular gas ... get premium performance — more mileage, greater power, longer engine life — with lower-cost regular gas and save money on every tankful.

How does TCP give these marvelous results?

These cars were designed to run on regular gas: Chevrolet, Chrysler, De Soto, Dodge, Ford, Hudson, Mercury, Nash, Plymouth, Pontiac, Willys, Kaiser, Buick (Special). Most ear owners know a new car soon loses its "pep" — has less power, gives poorer mileage. Expensive high octane "premium" gas is necessary to obtain the same performance which regular gas gave when the car was new. This phenomenon, called "increase in octane requirement," was a mystery to automotive engineers for many years.

U.S. AIR CORPS RESEARCH

During World War II, research by the Air Corps and private industry established that increase in octane requirement results from lead deposits in the cylinder. These deposits cause "pre-ignition" — premature explosion of the gasoline-air mixture before it is ignited by the spark plug. When pre-ignition occurs, the piston is still moving in a direction opposite to that in which the exploding gases have to push it. Thus there is a great loss of power and efficiency — and a great waste of gasoline — not only because the exploding gases have to work against the motion of the piston, but also because the gas-air mixture is not fully compressed when explosion occurs.

Without TCP Pre-ignition

With TCP

In correct ignition, compression raises the temperature of the gas mixture to a very high point, but never above the temperature at which it explodes. Lead oxides and halides reduce the temperature at which the air-gas mixture explodes, thus causing premature ignition and consequent loss of power and gasoline waste. Automotive engineers have now found that cars operated in the field have driving increase from 5 to 15 numbers in octane requirement in a few thousand miles because of the formation of combustion chamber deposits.

TCP eliminates pre-ignition

TCP converts the lead oxides and halides into lead phosphate, an insubstantial high melting point compound which does not stick to the surfaces of the cylinder. Instead, the microscopic particles are swept out of the cylinder with the exhaust gases.

Field tests with TCP confirmed laboratory findings. In cars operated on ordinary commercial gasoline, pre-ignition became evident shortly before 100 hours and progressed to a severe state at 150 hours. Within a short time after introduction of TCP at the 150 hour mark, pre-ignition ceased completely.

Other advantages of TCP

TCP not only prevents pre-ignition, but is an excellent solvent for gums and resins, which cause sticky valves. Because of its solvent properties, fuel injection systems are kept cleaner and inquiring of engine parts is decreased. For the same reason, use of TCP also reduces deposit of carbon up to 50%. TCP has also proved effective as an upper cylinder lubricant.

Another important result of the removal of harmful lead deposits is a great decrease in spark plug fouling which causes spark plugs to misfire with consequent poor engine performance.

While the use of many fuel additives must be carefully controlled since an excess will produce extremely corrosive products, this is not true of TCP. In fact, an excess of TCP provides better anti-rust protection and upper cylinder lubrication as well as increased cleaning action.

GET IT TODAY!

TCP concentrate is cans is now on sale at most automotive supply dealers. If your dealer does not have it yet, send in the coupon below, and begin to get premium performance at regular gas prices!

AMERICAN TCP CORPORATION
342 Madison Ave., New York 17, N. Y.

PM 5

Please send me __________ quart cans of TCP concentrate at $2.00 per quart can. Enclosed is check or money order for $_____________________.

NAME:_______________________________________

ADDRESS:_____________________________________

CITY:_________________________STATE:__________

MAY 1954
Shrinks Hemorrhoids Without Surgery

Science Finds Healing Substance That Relieves Pain—Shrinks Hemorrhoids

Science has found a healing substance that shrinks hemorrhoids, stops pain promptly, ends bleeding — without surgery. Doctors report actual shrinking of hemorrhoids. Sufferers say, "Hemorrhoids have ceased to be a problem." The secret is Bio-Dyne® — already widely used for healing injured tissue. This substance is now available in a hemorrhoid ointment called Preparation H®. Ask your druggist for Preparation H. Money back guarantee.

*Straight Mark

Learn to MOUNT BIRDS
Tan SKINS, make up FURS
In Taxidermy. Double your hunting fun! We teach you at Home. Money Back Guarantee if not entirely satisfied. Just $3.50 postal. Write TODAY.

Hills BUSINESS UNIVERSITY AND EXTENSION SCHOOL
619 W. MAIN ST., OKLAHOMA CITY 2, OKLAHOMA

BUILD LUGGAGE AT HOME WE SELL YOUR PRODUCTS!
ONLY NEW HOME-MONEY-MAKING PLAN IN YEARS!
Make Luggage and cases for traveling, photographers, musicians, salesmen, electronics, tools, portables, 1,001 other items. Also repair Luggage. No special equipment needed. BIG Profits. We supply complete instructions—everything. Write for free details and Business Plan, ARASRI CASECRAFT, Dept. HG 805 W. Sunset Blvd., Los Angeles 12, Calif.

Ball-Bearing SPEED WHEELS

JUVENILE WHEELS

(No bearing, solid tires)

5" $4.50 6" $5.95

(Semi-pneumatic tire, ball bearing)

R1 1.75 $1.85 1011.25 $2.20
R1 1.95 1011.75 2.30
R1 2 $2.50 1012.75 3.45
R1 2.5 $3.50 1014.00 4.90
R1 3 $4.50 1015.25 6.90
R1 3.5 $5.50 1016.25 9.20
R1 4 $6.50 1017.75 12.00

INDUSTRIAL WHEELS

(Large Semi-pneumatic tire)

6x2 SW $3.45 1010.00 .60.10
6x2.00 $4.45 1014.25 $5.15
6x2.50 $5.40 1015.00 6.30
6x3 $5.50 1015.25 6.90
6x4 $6.50 1016.25 9.20
6x5 $7.50 1017.75 12.00
R1 3 $10.00 10103.50 3.50
R1 4 $12.00 1014.50 5.50
R1 5 $14.50 1016.00 8.50
R1 6 $15.00 1017.75 11.50

CASTERS—Now Available

JIM BROWN TOY COMPANY
1065 HOME AVENUE
AKRON 10, OHIO

Write for circulars on all wheels. Prices to school, clubs, youth groups.

88. Popular Mechanics
Spa-Time Income from Gardencrete

Wherever there's pride of house, there's a place for Gardencrete. That's why the sates field is so broad, and so rich in profits potentially.

Gardencrete is basically made of cement and sand, then Coloredglass in a choice of 30 attractive colors that stay new. Easily washed or scrubbed. Add beauty to every lawn and garden.

On a small investment for molds and Coloredglass you can develop a line of products that sell for two or three times your cost of materials and labor. Easily made in shed or garage. We supply full instructions.

Write for book "Make Money." Describes equipment and gives figures on costs and selling prices on dozens of different items.

CASTING SECRETS REVEALED

Big money Cast 1000's of plaques, figues, etc., with Coloredglass color. Little capital req. L-E. rubber plats. $15.00. 64 (postage extra). Models. Ref-"Pierce" for full details.

PLASTIC ARTS STUDIO, Dept. 2, 3403 S. Madison St., Moniicag, Ill.

Learn LANDSCAPE GARDENING

A thorough, interesting home study course for those who wish to become Landscapers, Gardeners, Designers, etc., for profit or pleasure. Write today for FREE INFORMATION: "THE NATIONAL LANDSCAPE INSTITUTE" Dept. P-5, 310 So. Robertson Blvd., Los Angeles 28, Calif.

SHORTHAND IN 6 WEEKS

Famous SPEEDWRITING shorthand. 120 words per minute. No outlines to memorize, just ABC's. Explicit to learn, write and transcribe. Low cost. 25.00,000 taught by mail. For business and Civil Service. Training available, 31st Year. Schools in over 400 cities. Write for FREE booklet to:

Speedwriting

Dept. 1505 A
35 W. 42nd St., N.Y.

ACCORDIONS AT LOWEST WHOLESALE PRICES

"PAY AS YOU PLAY" Small Down Payment As little as $10 per month

ACCORDION MANUFACTURERS & WHOLESALEs OUTLET
2003 West Chicago Ave. Dept. R54, Chicago 22, II.

Get into RADIO-TELEVISION ELECTRONICS by Shop-Method Home Training

GOOD JOBS AWAIT THE TRAINED RADIO-TV TECHNICIAN! Business of Your Own • Broadcasting • Radio Manufacturing, Sales, Service • Telecasting • Television Manufacturing, Sales, Service • Laboratories: Installation, Maintenance of Electronic Equipment • Electrolysis, Call Systems • Theatre Sound Systems, Police Radio • Garages: Auto Radio Sales, Service • Sound Systems, Telephone Companies, Engineering Firms, etc. WE BRING NATIONAL SCHOOLS TO YOU! There is a place for you in the great Radio-Television-Electronics industry when you are trained as National Schools will train you at home! OUR METHOD IS PROVED BY THE SUCCESS OF OUR GRADUATES SINCE 1905.

YOU RECEIVE AND KEEP Signal Generator, T.R.F. Receiver, Audio Oscillator and Superheterodyne Receiver, plus professional Multimeter shown above. No extra charges. EARN WHILE YOU LEARN—we show you how!

APPROVED FOR G.I. TRAINING

MASHER ALL PHASES! Get Master Shop-Method Home Training from an Established Resident Technical Trade School with its own Training Shops, Laboratories, Studios—almost 50 Years of Successful Experience in Training Ambitious Men.

NATIONAL SCHOOLS

Technical Trade Training Since 1905

LOS ANGELES 37, CALIFORNIA
In Canada: 811 West Hastings Street, Vancouver, B.C.

BOTH HOME STUDY AND RESIDENT COURSES OFFERED

MAIL NOW TO OFFICE NEAREST YOU!

(Nail in envelope or post on postal card)

NATIONAL SCHOOLS, Dept. RB-56
4000 S. FIGUEROA STREET
LOS ANGELES 37, CALIF.

4323 W. FOLK STREET
CHICAGO 7, ILL.

Please rush FREE BOOK & FREE LESSON. I understand there is no obligation, no salesman will call.

NAME
ADDRESS
CITY ZONE STATE

VETERAN: Give date of discharge

MAY 1954
EXPANDING AMERICA
Needs DRAFTSMEN
Now

LEARN AT HOME AND GET ON THE SURE ROAD TO BIG MONEY

Today more than ever Draftsmen are needed. America must produce better war and peace time equipment if America’s well-being and prosperity is to continue. Draftsmen command big part or full time wages … own tremendous money earning businesses.

VALUABLE EQUIPMENT SENT TO YOU

Everything you need to train at home supplied. Professional set of drafting instruments, all drafting equipment needed and portable drafting table all furnished on PAY AS YOU LEARN PLAN. RUSH name today for FREE Book.

CHRISTY TRADES SCHOOL, 4804 N. Kedzie, Dept. 98-2703, Chicago

OWN YOUR OWN BUSINESS! EARN UP TO $75 A DAY CLEAR PROFIT IN YOUR BACK YARD OR BASEMENT!

MAKE CONCRETE BLOCKS With Amazing New LOW PRICED GENERAL BLOCK MACHINE

NOW! Big Building Book
Profits Within Your Reach
You don’t need much cash to cash in on the building boom! New high speed, low cost General Block Machine produces up to 1,000 concrete blocks a day for homes, schools, garages, etc. Priced right, this General Block Machine can make any size from 4” x 8” to 12” x 24”. These superior 3-tone blocks meet all building code requirements for foundation, chimneys, curbing, wall and many other types of blocks. Works indoors or out. Sand, cement and water available anywhere. Simple operating instructions and mixing formula for cement and other blocks supplied FREE. Get full details, no obligation!

EXTRA!

Amazing illustrated book gives floor plans for 6 sensational concrete block homes. Tells how to lay blocks, lay out building lines, mix concrete, build steps and much more. Worth $1 refund if you buy machine.

R.I.T. at New York City Reports: “My General Block Machine Paid for Itself in 1st 2 Weeks!”

Thousands now use in the world over!

Write for FREE details TODAY!

GENERAL ENGINES COMPANY
Dept. M-51, 307 Hunter Street, Gloucester, N. J.

RUPTURE

RELIEF… OR YOUR MONEY BACK

Original, patented Web, copied but never matched. Users say it’s beat ever. Relief or no cost to you. Write:

WEB TRUSS CO. Dept. M-5, Hagerstown, Md.

POPULAR MECHANICS
YES, actually build a valuable TV Set right at home. At the same time learn all about TV training, installing, servicing—and get ready for a Big Pay Job in America's fastest-growing, most exciting industry. The Cut TV Train-at-Home Plan is preparing hundreds for bigger pay TODAY—and a brighter, future TOMORROW. No experience necessary. We supply easy-to-understand instructions—made clear with hundreds of charts, diagrams, photos—plus TWENTY KITS of parts, Professional Equipment and Tools. Get a TV Set to Enjoy. Get set to enjoy a TV Future. Make money in spare time while taking course. THOUSANDS SUCCEEDING! So con you, Send today for big FREE BOOK, "You Can succeed in Television." 

COMMERCIAL TRADES INSTITUTE
Dept. 72-5
1400 Greenleaf Ave., Chicago 26, Ill.

MAKE $5 PER HOUR WITHOUT A PRINTING PRESS

REVOLUTIONARY NEW SCREEN METHOD
PRINT colorful pages, posters, banners, fabrics, wall paper, show cards, ANYTHING; Print on any surface. NO printing press or special equipment is needed with this amazing "approved" new printing press. 3,000 profit on nearly every job. Easy to learn—NO EXPERIENCE—or art ability necessary. Complete illustrated detailed plan and color-ful samples mailed.

SCREEN-PRINT COMPANY, Dept.2-5
1810 So. Los Angeles St., Los Angeles 15, Calif.

REAL ESTATE

PAYS BIG BONUS FOR FREE, BIG, ILLUSTRATED CATALOG NOW! Graduates report making substantial incomes, many running their own business quickly. Men, women of all ages. Earn easily. Course covers sales, property management, appraising, mortgage, and related subjects. STUDY AT HOME or in classes. Floorings teaching cities. Write today. Write FRIDAY for free booklet. No obligation.

ARCHITECT FOR WORLD WAR II AND KOREAN VETERAN

WEAVER SCHOOL OF REAL ESTATE (Est. 1926)
Suite 300 Law Bldg. Dept. FM Kansas City, Mo.

STUDY AT HOME FREE LAW BOOK!

PREPARE FOR THE BAR

Write today for your copy of our FREE book, "THE LAW TRAINED MAN," which describes the famous Harcourt house study course in bar and business law. All needed instruction material furnished including the 16-volume law library. Bachelor of Laws (L.L.B.) degree awarded. Moderate tuition; easy monthly terms. Write today.

Blackstone School of Law
225 N. Michigan Ave.
Founded 1897
Dept. 55. Chicago 1, Illinois.

MADE $106 his FIRST WEEK

Thanks to NYI TRAINING in PHOTOGRAPHY

NYI Graduate
N. C. Bucherer
Tulsa, Oklahoma

"$106 the first week in my own business. NYI training has certainly paid off fast."

Practical, personal guidance by experts and famous local men. LEARN-DOING method train you quickly, easily at home as you learn to make money 100 ways with a camera—for a high-pay job, prosperous career. FREE catalog gives exciting details. Our 44th year. Also Resident Courses. G.I. approved.

N. Y. INSTITUTE OF PHOTOGRAPHY
Dept. 49, 10 W. 33 St., New York 1, N. Y.

MAY 1954
MEN WANTED!
Make $15-$20 in Few Hours
Spare Time—up to $210.00 a Week FULL TIME — with Amazing D-FROST-O-MATIC!
Millions of housewives want this sensational new Automatic Refrigerator Deformer! No more messy hand Detective! Just plug in D-FROST-O-MATIC and refrigerator is defrosted automatically every night! Sales easy, sure when you leave D-FROST-O-MATIC on FREE TRIAL—housewives won't let you take it out! Saves money, food, time, work! Big profits for you—up to $110.00 a week full time—$15 to $20 in just a few spare hours! Start spare time and build big, prosperous business...quickly, easily!

Rush Name Today for Profit Details and FREE TRIAL PLAN!
More than 25,000,000 prospects waiting! Rush your name and address today. We'll air mail exciting facts, proof and sure-profit Free Trial plan. No obligation. Write today.
D-FROST-O-MATIC, Dept. P-8
173 W. Madison Street, Chicago 2, Ill.

FREE GET THE WORLD'S LEADING TV & RADIO CATALOG
ALLIED'S 1954 ELECTRONICS BUYING GUIDE

FREE PACKED PAGES

SAVE ON EVERYTHING IN TV AND RADIO

Everything for Experimenters, Builders, Amateurs, Servicemen, Engineers and Soundmen...

Get ALLIED'S big 268-page Catalog featuring the world's largest selections of latest top-quality electronic equipment at lowest, money-saving prices. See the newest in custom TV chassis, TV accessories, FM and AM radios, High-Fidelity sound, Amateur equipment, P.A. systems, recorders, test instruments, builders' kits, industrial electronic supplies—plus thousands of parts, tubes, tools and books. Get more for your money—send today for your FREE 1954 ALLIED Catalog!

NEW HOME OF ALLIED RADIO
ultra-modern facilities TO SERVE YOU BEST

ALLIED RADIO
SEND FOR FREE CATALOG

ALLIED RADIO CORP., Dept. 5-EE-4
100 N. Western Ave., Chicago 80, Illinois

Rush FREE 1954 ALLIED 268-Page Catalog

Name ____________________________
Address __________________________

City ____________________________ Zone State

MAY 1954
Here's the Kind of Men I Build!

Will You Let Me PROVE I Can Make YOU a New Man?

CHARLES ATLAS

I don't care how old or young your present physical condition may be, I can make you a new man. Every day, for three months, for three years, I'll improve your physical condition. With a tape! I can broaden your chest, develop your entire muscular system. With training you can add inches to your chest... give your body more definition and your legs powerful... help you to full of strength, tone and vitality. Send today for FREE BOOK, 32 pages, about how "Henry Tenney" channelled his energy, breathing into real-life the newly Developed Man... and what he proved can do for Charles Atlas, Dept. 911 E. 23 St., New York 10, N. Y.

Name. (Please print or write plainly) Address. City... State.

Combination Stethoscope

Surplus—Never Used

High Chrome Finish

$2.95 Postpaid
Reg. $12.00

A professional instrument for detecting delicate mechanism defects.

No C.O.D.'s. Send Check or Money Order to Dept. PM 5

job lot trading 53 Vesey St. N.Y.C.

Breed - Tropical Fish

Earn $5555 at HOME DURING SPARE TIME. Wonderful new Home-Business opportunity! HELP US FILL HUGO DEMAND from 250 million hobbyists. Some Rare beautiful multi-colored species sold for $75.00, and more. It's easy! It's fun! WE SUPPLY EVERYTHING YOU NEED. Write for FREE plan, reprint, folder and all the details. Please state your age. TROPICAL FISH BREEDERS OF AMERICA, Dept. 135, Los Angeles 15, Calif.

Genuine DuPont Plastic New False Plate

From Your Old, Loose Plate No Impression Needed. New, revolutionary Dupont Plastic System actually transforms any rigid, loose, cracked, chipped plate into a new fine, professional Plate... Doubles Your Value. Dupont Plastic Plate with same teeth or new, natural material teeth. ONLY ONE REASON—to keep your money. Send NO MONEY—just your name and address for FREE details. Save at our fair price! Satisfy prices at the end of your trial.

WAVE LENGTH LABORATORIES, 22 W. Madison, Dept. 437, Chicago 2.

Please send me

for the

time checked.

I am enclosing . . .

[ ] 1 year $3.50
[ ] 2 years $6.00

name

address

city

state

P.O. Box

Hand this order to your newsdealer or send it to

Popular Mechanics

200 East Ontario St.

Chicago 11, Ill.
FOR YOUR

TECHNICAL EDUCATION

COME TO THE

UNIVERSITY OF HOUSTON

(LOCATED IN FABULOUS HOUSTON, TEXAS)

FOR SUCCESS . . . Select one of these fascinating technical fields:

☐ Air conditioning and refrigeration technology
☐ Diesel technology ☐ Electrical technology
☐ Drafting technology ☐ Electronic technology

TRAIN NOW for the job you want . . . a job with a good income and security. Train at the University's College of Technology . . . rated one of the best in the country:

- Beautiful 250 acre campus
- Air conditioned classrooms and Residence Halls
- Graduate placement
- Short or longer programs
- University television and radio station
- Opportunity to extend your education and earn a college degree
- Accredited curricula
- Modern, extensive equipment
- Part-time job while in school
- Co-educational
- G.I. approved — V.A. on campus
- Open to high school graduates or equivalent
- Aptitude testing and vocational guidance
- June, Sept., Feb., semesters

EZEKIEL W. CULLEN BUILDING

UNIVERSITY OF HOUSTON—COLLEGE OF TECHNOLOGY

DEPT. 154 — HOUSTON 5, TEXAS

SEND FOR FREE Illustrated brochure Now.

Mark X before your choice of subject.

Name: ____________________________ Age: ____________________________
Address: ____________________________
City: ____________________________ State: ____________
Inventors

The following are the usual preliminary steps to take toward patent protection.

Make a disclosure of your invention; sign, date and have this document witnessed by two or more people who understand your invention; authorize your registered patent attorney or agent to conduct a preliminary search among previously granted U. S. patents for similar types of invention; secure a report on the probable patentability of your invention and a recommendation of the further course to take.

We shall be glad to send you without obligation our instructive booklet, "Patent Protection for Inventors" and our "Evidence of Invention" disclosure form.

EVICTOR J. EVANS & CO. Merlin M. Evans REGISTERED PATENT ATTORNEY 930-2 MERLIN BUILDING, WASHINGTON 6, D. C.

UP TO 6 MILES MORE PER GALLON
\[\text{MIRACLE ACTION TUR-B-LIZER}\]

Carburetor specialists say Tur-B-izer is best patented improvement they have seen. Tested in millions of miles of driving in cars, trucks and tractors. Easily installed, Send $3.00 for full cylinder type, $4.50 for eight cylinder type. Try Tur-B-izer for 30 days. If you are not completely satisfied, return it for full money setting and installation. Write for full facts.

UNIVERSAL TUR-B-LIZER CO.
621 E. STATE ST.
MILWAUKEE 2, WISCONSIN

Be Your Own MUSIC Teacher

LEARN AT HOME THIS QUICK MONEY-SAVING WAY

Simple as A-B-C. Your lessons consist of real sheet music, instead of time-saving exercises. You read real lyrics—no "numbers" or trick music. Some of our 900,000 students are band LEADERS. Everything is in print and pictures. First you are told what to do, then a picture shows how. Then you play it yourself and hear how it sounds. Soon you are playing your favorite music. Mail coupon for Free Book and Lesson Sample. Mention your favorite instrument. U. S. School of Music, Studio 305, Port Washington, N. Y.

U.S. SCHOOL OF MUSIC Studio 305, Port Washington, N. Y.
Please send me Free Booklet and Lesson Sample. I would like to play this instrument.

Instrument: (Please print)

Name: (Please print)

Address:

Say You Saw It in Popular Mechanics

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS

INVENTORS
Become an Electrical Engineer
with Bachelor of Science Degree
in 36 months

Major in Power or Electronics at Milwaukee School of Engineering

Over 50% of the nation's industrial leaders began their careers with engineering training. Today the need for Electrical Engineers and Technicians is growing rapidly...the opportunities great! Prepare now for your future at Milwaukee School of Engineering.

Plan Your Career — Eight Courses
Give You Wide Range of Study

ENGINEERING COURSES
Electrical Engineering-Bachelor of Science Degree
Save a valuable year through optional on-the-job training, Electronics major

Power major ........................................ 36 months
Technician Courses
Electronic Technician ................................ 12 months
Radio Technician .................................... 12 months
Radio and Television Technician .................. 18 months

SERVICE COURSES
Electrical Service .................................... 6 months
Radio and Television Service ...................... 12 months

Terms open July, September, January, April
Approved for veterans.

Prior Military, Professional or Academic training evaluated for advanced credit. Faculty of specialists.
50,000 former students. Annual enrollment from 46 states and 23 overseas countries. 51st year. Non-profit. Residence courses only. Send handy coupon today.

MECHANICAL TECHNOLOGY COURSES — Also available, Service and Technician courses 6 to 18 months — Heating, Refrigeration, Welding, Air Conditioning and Mechanical — 8 1/2 Degree in Mechanical Engineering with a major in Design, Metal Fabrication, or Plant Engineering. Also, general 3-month preparatory course.

MILWAUKEE
SCHOOL OF ENGINEERING

Send five illustrated career booklets: Electrical Technology, Mechanical Technology, Radio-Television.

If interested in—

Name: ____________________________
Address: _________________________
City: __________________ Zone: ______ State: ______

If veteran, indicate date of discharge.

MILWAUKEE SCHOOL OF ENGINEERING
Dept. PM-23, 1025 N. Milwaukee St., Milwaukee, Wis.

Copyrighted material
Glide
LIKE AN
INDIAN GUIDE

Down the twisting streams, across the ruffled lakes, your Old Town Canoe is your dependable friend for fishing and hunting. Sturdy and strong for long trips, yet light and easy to carry. Perfectly balanced. An Old Town is designed like a birchbark, but built for many years of adventure and sport. Easy to own.

FREE CATALOG shows all kinds of canoes and outboards, sailboats, dinghies, rowboats.

OLD TOWN CANOES
Old Town Canoe Co., 145 Middle St., Old Town, Maine
PLEASE SEND ME FREE CATALOG

Name
Address
City State
**Start Spare Time Business**

**MAKE UP TO $10 an HOUR**

Do-it-yourself on your own house
Then EASILY SELLS Neighbors & Friends

You Pay Only
$6.65%
(buy glass & screen locally)

You Sell For
$22.00

Better Than
100% PROFIT

Assemble and Install
Buckeye Combination
STORM WINDOWS

- Factory-To-You In
Knock Down Form
- Easy Assembly
- Redwood
- Glass and Screen
- Interchangeable
- Each Size Packaged

No extra cost to ship. Bound
bulletin business opportunity.
No special tools to buy. No risk
necessary to buy. Order as needed.

Can be FHA Financed

 priced to sell. A few Dealer
Territories Still Available

WRITE FOR DETAILS TODAY

BUCKEYE SCREEN & WEATHERSTRIP Co.
1380 S. 22nd Street, Columbus, Ohio

**Benjamin SUPER CO2 GAS CARBINE-$16.50**

NEWEST TARGET

RIFLE - 22

IDEAL FOR

SMALL GAME

Benjamin CO2

Gas Filled Cartridge

Also Available

**Look Better**

**Feet Better!**

**USE A VibroSage**

**ELECTRIC MASSAGER**

- Professional-Type
- A Scientifically Designed
Application
- Sanitary

A few minutes daily use of VIBROSAGE gives that stimulating, healthful aid to circulation...relief from aches and pains.

Four applicators assure maximum effectiveness for scalp, face and body. Operates on 110 volt, 60 cycle A.C. Five day trial—money-back guarantee! If your dealer cannot supply you, send $8.50 cash or check or order, for prepaid shipment. Or, send $2; pay postman balance when package is delivered.

BEAUTY APPLIANCIE CORP., Dept. Y524-E, RACINE, WIS.

**Electroplate**

with METAL
NO TANKS USED

EVEN SMALL ELECTROPLATING BUSINESS

NOW, using this NEW
plating kit it's easy for anyone to electroplate any object for himself.

A DRYER

Box 5527-P, Chicago 80, Ill.

**Electroplate**

with METAL
NO TANKS USED

EVEN SMALL ELECTROPLATING BUSINESS

NOW, using this NEW
plating kit it's easy for anyone to electroplate any object for himself.

A DRYER

Box 5527-P, Chicago 80, Ill.

**Free! "The Truth About Learning to Draw"**

Revealing true cause of most disappointing results. Don't enroll for any "Art Course" before

**PRINTS OF ART ASSOCIATES, 918 F**

St. Paul Street, Baltimore, Maryland.

**Locksmithing & Key Making**

PRACTICAL UP-TO-DATE COURSE—ONLY $4.95

Training for Locksmiths, Locksmithing. How to make and install keying systems for your home (including the making of keys). How to work on locks, doors, windows, and general lock mechanisms. How to make and install keying systems for your business. How to make and install keying systems for your banks, insurance companies, and other commercial establishments.

**Men and Women Trained At Home for Prosperous Business in Upholstering**

Tools, supplies, everything necessary to get started sent. Illustrated training shows how—progress rapidly. No previous experience necessary. Make over old furniture, sell for many times cost to you. Established firm or part-time money making business. Free booklet explains plan. Send name, address to

**Commercial Trades Institute**

1400 Greenleaf Ave., Dept. U.S.G., Chicago 26, Ill.

**Say You Saw It in Popular Mechanics**

**Telephones**

Desk Stand Style

Slightly used but in excellent condition

Many Valuable Uses

- Inter-House Phone
- Phone in Barn, etc.
- Lead Speakers
- House Purpose, Toys, etc.
- Ome complete, ready to use
- No damage or defects included

**Microphone**

Dept. X-1402, 1760 W. Lunt Ave., Chicago 26, Ill.
I call this machine "my little money maker"

You can put it anywhere—kitchen, attic, basement. It makes money for you while you're at work, asleep or at the movies. It turns out a product that sells for $6.00. Materials cost you only 54c. So you make more than $5.00 on each one. No house to house selling. I show you how to get orders by mail or through neighborhood stores. Millions of mothers everywhere want their baby's first shoes "Bronzed." The demand is increasing all the time. And it's so easy to metalize baby shoes at home, in spare time, while you keep your present job. It's the kind of work the whole family will have fun doing. The information I send you tells how you can get one of these "little money makers" too. There is no cost or obligation. So send a note or a postcard to me, John J. Mason, 1512 Jarvis Avenue, Chicago 26, Illinois and I'll send all this money making information by return mail, free and postage paid. Write to me right away so I can show you how to get started making as high as 10½ an hour in your spare time.
 Goes by World’s Standard Conversation Method

French Spanish German Italian Russian Japanese Portuguese

Are interesting job, travel, armed services cultural opportunities passing you by because you speak only one language? Learn another language at home the easy way. before you want or need to

29 Vocabulary Book: FREE. "Passport to a New World of Opportunities." Free language sample. WRITE TODAY.

LINGUIPHONE INSTITUTE, 143-05 RCA Building, N.Y., N.Y.

name

address

Send me your FREE book, I want to learn another language.

City, Zone & State

Hand this order to your newsdealer or send it to

POPOULAR MECHANICS

200 East Ontario St.  Chicago 11, Ill.
The Most Fascinating Book About the Automobile Ever Printed!

Popular Mechanics

AUTO ALBUM

The Motor Car in Picture and Story from 1769 to 1952

You'll Find...
The Answers...the Fascinating Stories...
in the AUTO ALBUM

Who built the first horseless carriage?
Who obtained the first U.S. patent on an automobile?
Where did the name "automobile" come from?
Are you familiar with the workings of the Stanley Steamer...the "electrics"...the famous Ford Model T?
Do you know the story of the first Indianapolis race was won...by whom...at what speed?
Do you know the story of Henry Ford, Barney Oldfield, Random Olds, Walter Chrysler, W. C. Durant and other automotive giants?

166 Illustrations Including 94 Old-Time Cars - 22 Auto Ads of By-Gone Days!

Here is a book you can't help enjoying and wanting, whether or not you have, or ever will own an automobile. It is the fascinating, entertaining and informative story of the horseless carriage from the first gasoline-propelled bus to a forecast of the atomic car of the future.

Popular Mechanics AUTO ALBUM by Thron and Crenshaw presents America's first cars and the pioneering men who made them; the scramble started and the development of the fabulous auto industry; the story of automobile racing; the growth of the nation's highways. It is a book that just had to be published.

To Read...to Enjoy...to Remember!

More than one-half of the book is pictures, most of them actual pictures, from photos of old-time cars in operation. Other pictures show race cars from 1911 to 1951; early auto advertising, picturing 32 cars priced from $375 to $6000; tri-cycle autos; wind wheels; auto-cycle and other automotive oddities. A roll call of horseless carriages is included — the names of more than 2000 cars made in the United States.

Gift Book of the Year
Get the fascinating AUTO ALBUM for yourself today. Send it as a gift to friends and business associates. Order on coupon below. Money refunded if you are not entirely pleased.

Use Coupon to Get AUTO ALBUM

POPULAR MECHANICS PRESS, 200 E. Ontario, Chicago 11

Send at once postpaid - 1 copy of Popular Mechanics AUTO ALBUM at $3.00 each. □ Remittance enclosed. □ Send COD. I will pay postage plus charges. I understand books are returnable in 7 days for full refund if I am not pleased.

Name ____________________________
Address __________________________
City ____________________________ Zone ______ State ________

MAY 1954
Here at amazingly low cost is the practical help and information you have always wanted. Articles in previous issues of Popular Mechanics have been classified according to subject and are now available in these handy reprint booklets.

Check titles wanted, clip ad, mail today.

**HOME WORKSHOP**


**HOME IMPROVEMENTS**


**CRAFTWORK & HOBBIES**


**WELDING & SOLDERING**


**AUTOMOBILE BOOKS**

**BUILD YOUR OWN MOTOR SCOOTER!**

**PRICE** $39.95 F.O.B. ST. LOUIS, MO.

The Hurricane Scooter Kit comes to you complete as illustrated, ready for the motor. This scooter will perform beautifully with a motor from 1 b.p. to 1½ b.p. with speeds up to 25 miles per hour. Will carry a 200-lb. load. Not a toy, but a sturdy, medium-sized all-steel scooter. Kit includes everything except motor.

Send post card for descriptive folder.

ST. LOUIS PRODUCTS CO., BOX 24 PE, NORMALDY 21, MO.

**High School at Home**

Many Finish in 2 Years

No classes. No time wasted going to and from school. Progress as fast as your time and abilities permit. Standard H. S. texts supplied. Thousands enroll each year in this 57-year-old school. Send for FREE descriptive booklet.

AMERICAN SCHOOL, Dept. H545
Drexel at 55th St., Chicago 37, Ill.

Without obligation, please send FREE descriptive booklet.

Name
Address

**FAMOUS DAN LURIE**

**BARBELLS**

with 4 courses—low factory prices
50 lb. set... 8 40 lb. set... 52.98
100 lb. set... 13 98 200 lb. set... 25.98

Write for folder by Mail. 50% with order. Web. 5 C.O.D.

Free Catalog. Extra wts. 150 lb. Ill., P.91. Plant

DAN LURIE BARBELL CO.
1701-M S. Pulaski Ave., Dept. 493-E, Brooklyn, N. Y.

**Say You Saw It in Popular Mechanics**

**NEW!**

**ALL ABOUT TELEVISION**

Service Your TV Set Yourself and Save Hundreds of Dollars... Save on the Purchase of a New Set!

Here's the brand new book that tells and shows you how 9 times out of 10 you can service your TV set yourself and save the $25 to $25 fee charged by professional repairmen for service calls.

**Make Most Repairs Yourself**

Here are famous step-by-step instructions by John Derby, famous television engineer, which make it possible for you to locate trouble quickly and repair it in the matter of minutes. Hundreds of "show-how" photos, drawings and diagrams actually show you just how to go about making most TV repairs.

**Actual Photos Show You How**

A special illustrated section contains actual photographs of imperfect TV pictures. By comparing the picture on your set with those in the book you immediately identify the trouble and then by following Derby's instructions you make the adjustment or repair which will give you perfect reception once again.

**Order on this Handy Coupon**

POPLAR MECHANICS PRESS
200 E. Ontario Street, Chicago 11, III.

Rentances for $1.98 enclosed, Rush postpaid my copy of "All About Television." Unless it is entirely satisfactory I may return it within seven days for a full refund.

NAME
ADDRESS

CITY ZONE STATE

☐ Send C.O.D. (Postage extra)
Operation "EASY STREET"
Take the Red Comet road to Big Profits
Earn up to $10,000 or more per year!
Nothing to invest! Full or part time!
Make your round profits selling famous Red Comet automatic fire extinguishers. Easy to sell! Everyone home, farm, business a prospect. Advertised Post, Collier's, Country Gentleman. Priced to sell quickly—a sales 'heartbreaker'!

FREE SALES KIT
Demonstration unit, sales literature, etc., furnished you FREE. Hand-tanned leatherette kit. Hit and proved over 21 years. It will make you an independent fireman. Someone in your community will be appointed soon. Write for details today!

RED COMET, Inc.

FREE BOOK CATALOG
Everything—shop tools, hunting, fishing, making money at home, concrete work, welding, mail order, plastics, painting, carpentry, photography, boat building, gardening, auto repair, hobbies, home building—it listed in the new 49-page 1953 catalog of easy-to-understand Popular Mechanics books. Write for your free copy today! Dept. CTZ.

Popular Mechanics Press, 200 E. Ontario, Chicago 11
more jobs than graduates

Demand for our engineering graduates exceeds supply. E/exit placement study in this world-famed college established.
186 New term starts quarterly. Approved for
Korean Vet.

Bach. Sc. degree in 27 months
Bachelor of Science in Mechanical, Civil, Electrical, Chemical, Aeronautical Radio (Telecommunication), Administrative Engineering, Business Administration and Accounting. Also 36-week certificat-
courses in Surveying, Drafting, Secretarial Science, Intern-
ship program: technical fundamentals accepted.
Small classes: personalized instruction. For earnen, mature
students whose time and budget require accelerated courses
and modest costs. Preparatory courses.

Beautiful campus in friendly college town. Well-
equipped new and modernized buildings and labs.
Enter June, Sept., Jan., March. Write John McCarthy,
Director Admissions, for Catalog and View Book.

TRI-STATE COLLEGE
454 College Avenue
Angola, Indiana

STAMP COLLECTORS!
317 STAMPS - 25c
plus FREE Stamp Encyclopedia

Special imported collection includes STALIN
DEATH STAMP! New Zealand QUEEN VICTO-
RIAN 85-year-old proof (val $5 at auction)
plus hundreds more from all over the world! 317
different stamps total $2.39 value—"all yours for
25c with Bargain Appearance. Fascinating book in-
cluded, free.

SEND 25c TODAY
ASK FOR LOT PO-15
ZENITH CO., 11 Willoughby St., Brooklyn 1, N. Y.

MAKE BIG MONEY
RAISE PARAKEETS
Tremendous Cash Market. No experience needed. FREE Illustrated Book. WRITE TODAY
PARAKEET BREEDERS ASSN. OF AMERICA
Dept. 14, 4529 West 7th, Kansas City, Mo.

WARNING! VETERANS DISCHARGED
must be IN TRAINING by Aug. 20, 1964, or lose G.I. Rights
to free education under NEW G.I. Bill. Train at home to
become a TV Technician! Time is short. Send for FREE LIT-
ERATURE RADIO-TELEVISION TRAINING ASSOCIATION,
Dept. M-18, 816 1st St., New York 2, N. Y.

PORTABLE GARAGE
$6.75 (Former Price $10.00)
USE IT ANYWHERE
a) Folks come from a long time, or from the crowd, or from the crowd, or from the crowd.
... recycled paper... benefits of volcanic plastic... plans all drawn by you... direct from S.P.O., 2 free postcard, 6 free postcard, 6 free postcard.

EXTRA HEAVY GARAGE $8.05 (Formerly $12.00)

MARDI SALES
406 LEXINGTON AVE., DEPT, B-12, NEW YORK 17, N. Y.

DO YOU LIKE TO DRAW?

See HOW EASY IT IS
Step by Step!

Enjoy drawing, painting, advertising art or cartooning at home in your spare time. No previous drawing lessons. Step-by-step method helps beginners quickly. Low tuition. 10th year. Send coupon for free booklet. No salesmen.

Send free "Art for Pleasure & Profit."

Name.

Address.

City,

State.

Washington
School of Art
Washington 5, D.C.

Washington, D.C.

City, Zone, State.
THAT'S YOU UP THERE

where

the living's good!

That's YOU, elevated to the world's best living by the proven brands of products that never let you down—and for a very down-to-earth reason: each manufacturer has to live up to the highest standard set by his competitors. His product has to be good to survive—it's as simple as that. So if he changes it at all, you can be sure he's aiming at something better.

That's why you can shop so confidently, so profitably, so easily, by buying products with responsible names. Living on top of the world?—you bet! But you're on ground as safe and sound as your own back yard.

*Easy to keep up on what's good: just read the ads in this magazine.*

BRAND NAMES FOUNDATION
INCORPORATED
A NON-PROFIT EDUCATIONAL FOUNDATION
37 WEST 57 STREET, NEW YORK 19, N. Y.

WANT CONFIDENCE? PATRONIZE THE DEALER
WHO PROVIDES YOUR FAVORITE BRANDS

POPULAR MECHANICS
This Gadget is Worth $320,000,000
...and I Discovered it by Accident!

by Albert Wells

IT ALL STARTED the day I got the bill: $214.36 for an engine overhaul—and I had only 28,000 miles on the car!

I told my troubles to a neighbor—a lubrication engineer—told him how I'd always changed oil every 1500 miles, changed filters every 5,000 miles. His answer floored me.

"You've been wasting your money," he said. "We've spent millions developing oil additives that keep carbon, gum and abrasives from damaging your engine. Your oil costs about 15¢ more a quart because of these additives. Yet oil filters on the market today are made of rag or paper—they soak up additives like a blotter. The more often you change oil filters the more money you waste!" "But don't I need a filter to take the impurities out of the oil?" I asked.

He took a deep breath. "This will really shock you. Engine damage is done by abrasives 10 to 40 microns in size (a micron is .000039") Your oil filter can't take them out because rags or paper can't be packed tight enough without stopping oil flow when the filters soak up oil and expand! Isn't there any kind of filter that does the job it's supposed to do?"

"No, except for the porous bronze filters they're making for supersonic aircraft. And you can't buy a filter like that for your car."

I asked myself: "Why not?" Next day, I tracked down the outfit that was making the filters for aircraft and got the answer. These porous bronze filters were made by fusing together millions of tiny bronze balls. Non-absorbent, they didn't remove additives, yet they removed abrasives in the 10-40 micron danger zone. Could they be made for automobiles? Again, the answer floored me.

LIFETIME FILTER TESTED IN CARS, TRUCKS, BOATS

Test models had already been used in cars and trucks for millions of miles, proving the porous bronze filter:
1. Never needs replacing.
2. Saves the quart of oil thrown away with ordinary filter packs.
3. Increases engine life.

Trouble was, almost the entire production was being absorbed by military and industrial users.

That day I went to work on the biggest job of my life: setting up production of the Lifetime porous bronze permanent filters for cars and trucks (an estimated $320,000,000 replacement industry).

HOW TO GET A LIFETIME FILTER FOR YOUR CAR

Try the Lifetime filter on your car for 2 weeks: if it isn't all I say, you get your money back; if you keep it, you're through buying filter packs—the Lifetime filter is guaranteed for 10 years, actually will last many times that long.

For complete unit, including case and fittings (install on any car in 10 minutes), send make, year and model of your car and $12.95 (we pay shipping).

For conversion kit, which replaces your present filter pack with Lifetime bronze, send make and number of filter and $6.95 (we pay shipping).

Or send only $2 deposit, pay C.O.D. charges on arrival. But do it today—don't waste another cent on filter pack replacements!

Permanent Filter Division, Dept. FPM-5
CONTINENTAL MANUFACTURING CORP.
Washington Blvd. at Motor Ave., Culver City, Calif.
Ship □ complete unit □ conversion kit
Make, model, year of car: ________________________________
Present filter make (if known): ___________________________
I enclose □ $12.95 for complete unit ($18.95—chrome)□ $6.95 for conversion kit
□ $2.00 deposit; send C.O.D.
Name: _______________________________________________
Address: _____________________________________________
City_________________________Zone________State________

MAY 1954
LIFE Batteries are Guaranteed for the Life of Your Car

Here's why you will agree LIFE is your best battery buy. There are no tricks or gimmicks, such as pro-rated replacement costs or time limits hidden in the unusual LIFE guarantee. LIFE BATTERIES are guaranteed for the life of your car. A LIFE Battery ends replacement costs for as long as you keep your car. If ever found defective, your LIFE Battery will be replaced free of any cost.

LIFE BATTERIES have been tested under the most rigorous conditions by a leading independent research laboratory before this revolutionary guarantee was offered to you. Before you buy any battery, check with your LIFE representative, or write direct for complete information.

**IMPORTANT DISTRIBUTOR FRANCHISES**
Valuable LIFE Distributor Franchises are available in some key territories. Write, wire or phone Franchise Division.

LIFE BATTERY CORPORATION
12909 Venice Boulevard, Venice 44, Calif.
Classified Advertising

Advertisements in this section $1.00 per word, each insertion, minimum 10 words, payable in advance.

To be inserted under proper classification, copy must be in our office the 20th of the second month preceding date of issue.


You'll Profit

By reading and answering the classified ads in this section. Hundreds of opportunities for you to make and save money.

AUTOMOBILES, MIDGET CARS


ANTIQUES: Automobile color slides, 2x2, illustrated catalog free. Universal Slide Co., 2886 South Los Angeles, Los Angeles 6, Calif.

SPEED Shangri-La racing, roadster, truing requirements. All Price. 64 Arion, FM-6, Richmond 13, N. Y.

Hi-Mileage-speed equipment from the world's largest supplier. Dual manifold, finned heads, electric doors, lowering sets, fuel saver, thousands of items for all cars. Stage catalog 25c (illustrated literature free). Wholesale to garages. New Age Automotive Industries, Los Angeles 28.

NON-ProFIT Organization offers automobile literature—Gas new and foreign; dealer books, service manuals, glossy photographic; free motor magazine. Write today. Free trial mailing list. Auto Manuals, Stockbridge, Mich.


AUTO SUPPLIES AND EQUIPMENT


GENUINE Motor treatment, Lachapelle's. (Patented) Only $1.00 delivered. Restores compression, power. Saves gas, oil, repairs. Motor repairs you can't lose. Free circular. Write Joe Dillion, Author, 2564 8th Ave., NEW YORK 1, N. Y.

SENSATIONAL Free trial offer! Surplus stock of famous Dale hull automotive instruments, brand new, original cartons! Try at your risk for seven days—then send payment or return merchandise! Professional commission freaks, originally $2.00 each, only 35c. Write to: Mr. E. S. Adams, 4725 Main St., New York 92, N. Y.

ECONOMY: Guaranteed or money back. Every component book in the fleet. Know the non-mechanic. Save on repairs, gas, oil, $1.00 postpaid. Auto, 6666 Glenridge, Miami 4, Fla.

RESTORE That fresh delight! New car smell! Mistakenly completely on. Scale make, model, year, and color, $1.50 plus 50c per copy. Auto Best, 254 Brown St., Waltham, Mass.

ECONOMY. Guaranteed or money back. Every component book in the fleet. Know the non-mechanic. Save on repairs, gas, oil, $1.00 postpaid. Auto, 6666 Glenridge, Miami 4, Fla.

BUY Wholesale nationally advertised auto supplies, thousands other products at 60% discount. Free 'Wholesale Plan, American Buyers' 620-D Linda, Buffalo 14, N. Y.


AIR Conditioner, save $50! Equip your car for $164.79 with complete kit. Free literature. Smith Kelley, Belmont, Chicago 9, Ill.


SAVt} Money on maintenance, gas and oil. Many useful features for car, truck, bus. Write Box A-117, Richfield, Minnesota.

SUPER High thefts with Kap-Lok (patented), $1.00 set of four locks. K.A.W. Sales Company, 8500 Sixteenth South, Chicago 13, Ill.


CRUMBLISS Super coil—Literature. Also automotive tool catalog. White's, Canada, Penna.


AUTO ACCESSORIES, for free trial! Write Neher Industries, LaVerne, Calif.

AUTO Radios wholesale. Send year and make of car, type of radio. $1.00 postpaid. F. O. Box 424, Pleasant Valley, Calif.

LACHAPPELLE'S. Treatment. Makes any gasoline motor better, even a brand new motor. Also genuine Walnut Dr. $1.00 in small, $2.00 in large. Los Angeles 1, Calif. Free data.

RESTORE Power! Compression! Save $20! (Glycol) Ready to ship, 2.00. Box 12503, Los Angeles 64, California.


IGNITION Improved will increase ignition voltage up to 500 volts, easier starting, higher r. p. m. Jumper cable and instructions $1.00. Moore-Devlin, Batavia, Ohio.


COMPLETE automobile complete—$300. Complete guaranteed parts service for all makes and cars and trucks. Late of old. Large stock in the world. Write for list. No catalog—Write for quotations. Past work, prefer one auto and truck parts. 7818 W. 13th Avenue, Denver, Colorado.

FORD-T Parts—Engine and chassis. Parts for other old models too. Special order made to order. We buy supplies. 93 S. Wisconsin, Milwaukee 7, Wisconsin.

CUSTOM Accessories headquarters. Electrics, mirrors, wiper motors, taillights, back up lights, custom grilles, speed-dash-up equipment, telephone, radio, motorized car. 3159 South Grand, Los Angeles 7.

ELECTROPLATE Auto parts, novelties. Mirrors, plates, inexpensive home processes. Free booklet. Troy Metal, Box 153251-8, Houston 19, Texas.


BRUSH Fasting curettes connect to a brush. For less money than others. For you, your family, and your pets. Cut down on your bills. One for the price of two. McKee's, 1470 S. Main, Salt Lake City, Utah.


AUTO TRAILERS


MOTORCYCLES, BICYCLES, MOTORSCOOTERS AND SUPPLIES

WHISPER Motorcruiser $30.00; two-speed Champion motorcruiser $12.00; Invincible Husdon motorcruiser $15.00; homemade motorcruiser $8.00. Send 25c (10c first class mail) for catalog that describes many types of automobile in wheels, motors, motorcruisers, midget cars, sidecars, trailers, and many other items. etc. Gallu, 1213 Jefferson, Toledo, Ohio.

MIDGET Auto 45. $150. Midget motorcycle only. $150. For use with small motors. 35c. Motorbikes $35. Whizboy motor 45. (Mail order). 35c. For all and anyone over age 9, any kind of Mower, Fencing, and many other items. 35c. By first class mail. Midget Motors Directory, Athens, Ohio.

MOTOR-Cruiser replacement parts, assembly—American Motos-Co., Chicago 28, Ill.

MAY 1954 55
SOUTHERN California—Save your vacation, health, retirement and investment money. This magnificent region—nine years this area has grown from 44 persons to a population of nearly 2,000. Our area is a good investment. The land is alone is approximately $2,900,000.00 per year. The rich water and the abundant influences are tremendous. Only residential, one bedroom, one sense, 10 acres of water and electricity; in and paid for. Please write today, Box 462, Blythe, CA. 92225 and no interest. Offer definitely limited. Write at once. Free details mailed.

"California" Real Estate
Dept. D, Los Angeles 5, California.

BIBLICAL, TELESCOPES, MICROSCOPES, MAGNIFIERS


GIANT 100X day and night telescope. Complete assembled with extra eyepiece.

TELECO TELESCOPE MODEL 25

Giant 100X Day and Night telescope. Tube construction $4.00. Other telescopes and binoculars. Available in many sizes. Contact us for prices. A. Ball, Middletown, Maryland.


RAISING CHINCHILLAS For Profit.$1

Chinchillas, pet, fur, wool, meat, etc. Free Illustrated,ильно, Ellsworth, 4B, San Mateo, Calif.

RABBITS—Amazing home enterprise. Free illustrated, Bailey, California.

WE RAISE chinchillas in our basement, your profitable sideline. We furnish complete equipment and instruction. Merrill Hendrickson, Franklin, Ind. 1444A Jones, San Francisco, Calif.


SELF-CLEANING, sanitary, precision bulk rabbit equipment. We ship quick, Williams, 354 Canal Blvd., Indianapolis, Indiana.

HAMSTERS. Full grown stock at $1 each. Free information. Oething, Nashville, Tenn.

NATURALIST Catalog 20c, Chamberlai St. Allister 42-15. Hamsters $2.50 pair. Quilici's Specialty, Topeka 31, Kansas.


START Big by knowing facts about rabbit raising. Illustrated booklet describing all breeds, housing, feeding, breeding, marketing. 8 pages 10 cents. American Rabbit Breeders Association, 30 ARBA Building, Pittsburgh, Penna.

FREE: This is free, Address, Armstrong, Shiohk, Missouri.

FARM-LANDS. REAL ESTATE

FLORIDA—Beautiful retirement resoure. Excellent location, fishing in 6 deep and salt water rivers. 11 beautiful miles from New Orleans. Complete literature, V. M. Mathews, Box 1400, Miami, Florida.

CANADIAN Tax sale lands for three dollars an acre and up. Small monthly pay- ments. Canadian Western Farm Lands. Limited number of properties. Please write for literature, Mr. L. W. Fisher, Tax Sale Service, Room 106, 120 Bloor St., W., Toronto 5, Canada.

FREE: On request, this is free, Address, Armstrong, Shiohk, Missouri.


FLORIDA'S Choicest Cattlefront lots. Delorcia, Palm Beach. Lots, beautiful, without interest. Free literature. Roepke, 3355 South Dixie Highway, West Palm Beach, Florida.


PLANTS, SEEDS, NURSERY AND GARDEN SUPPLIES


MAY 1954 57
GAMES, TOYS, NOVELTIES

BINGO Games and latest equipment.
Wholesale. Warwick Press, Warwick, R. I.

FULL Cross toy balloons only 24. 54 postcards each. 50¢
Newest and best variety, color, etc., but all in full color. Assorted characters. Illustrated list.
C.O.D. Williams Sales. 4958 East Strong, Chicago.

MAGIC TRICKS, PUZZLES,
JOKER NOVELTIES

FREE Magic and novelty catalog.
Includes 14 wonderful magic tricks fully illustrated and described. Send only 10¢

VENTRILOQUIST

Coat and Jacket. 75¢ to 80 days. Most fascinating show. Send 10¢ today to secure your coat. C.O.D.

VENTRILOQUIST

Catalogue. $1.00 in advance. Reach your audience in 10¢-

SENSATIONAL U. S. Confederate states catalog.
Includes his 45 Bromfield, Boston 8, Mass.

BARGAIN Gallows. Low priced approvals.
Catalogue. 10¢ in advance. C. M. 6, Chicago, Ill.

DIFFERENT Uruguay

DIRECTORY OF 155 bondholders, mattresses (100¢), 15¢. Miracol, Detroit 3.

DIFFERENT commemorative, etc.

BARGAIN

DIFFERENT Foreign stamps 1.00.
Personal Stamp, 612 Washington Ave., New York 32.

FREE: 3 Mozambique butterfly stamps to new approvers A.ujln, New York.

DIFFERENT With approvals. 1.00.
Jubal, 429-A Broadway, New York 32.

ISRAEL UP 35c. High quality approvals.
Marks, 2, Broadway 12, New York.

WOODEN Nickels. catalog trick. 25¢
Furth's Mint, 434 N. St., San Antonio, Texas.

REAR View mirror attachment for glasses. Fee.

SHELL COMPANY

Supplied every noted magician.
Large price list. Send 10¢ today.
C. 100 North Dearborn, Chicago 2.

TRICKS

500 TRICKS, Douglas famous 150-page catalog.
Includes 3500 cards, pocket and stage tricks 25c. Mme.
C. O. D. North End, Baltimore, Md.

FREE - 105 Different British Colonies.
Available by mail. Includes catalog; pictorial, Approvals. Send 10¢ for mailing.
Millford St. N. H.

FREE - Sharpie stamp newspaper, valuable information on stamps to any 15¢.
Lillenton Stamp Co., Lillenton 11, Minn.

FIRST U. N. set. Among world's pres-

1,000 STAMPS FOR YOU to look at! Big

FREE - Mint British colonies from

FREE - Goodyear Tires, 10¢ each.

FREE - Complete set of famous

FREE - Odd fellows, Knights

FREE - Complete set of public,

FREE - Complete set of U. S.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.

FREE - Complete set of 15c.
BREEDER'S CATALOG No. 30

FREE Wholesale catalogue! Make up to 400 steel tags in one day. Promote your business! Get 2 oz. galvanized metal tags at low cost. Write for Free Catalogue. E. Catlin, Box 23, Boston, Mass.

MAKE Perfumers, other products. Home. Careless, 1914 Chouteau-PM, St. Louis, Mo.

SILK By mail to job owners—Every-
thing in furs, western, in lots, Eastern, Box 1467, Dor-
chester 22, Mass.

FREE Wholesale catalogue! Make up to 400 steel tags in one day. Promote your business! Get 2 oz. galvanized metal tags at low cost. Write for Free Catalogue. E. Catlin, Box 23, Boston, Mass.

MAKE Perfumers, other products. Home. Careless, 1914 Chouteau-PM, St. Louis, Mo.

FREE Wholesale catalogue! Make up to 400 steel tags in one day. Promote your business! Get 2 oz. galvanized metal tags at low cost. Write for Free Catalogue. E. Catlin, Box 23, Boston, Mass.

MAKE Perfumers, other products. Home. Careless, 1914 Chouteau-PM, St. Louis, Mo.

FREE Wholesale catalogue! Make up to 400 steel tags in one day. Promote your business! Get 2 oz. galvanized metal tags at low cost. Write for Free Catalogue. E. Catlin, Box 23, Boston, Mass.

MAKE Perfumers, other products. Home. Careless, 1914 Chouteau-PM, St. Louis, Mo.

FREE Wholesale catalogue! Make up to 400 steel tags in one day. Promote your business! Get 2 oz. galvanized metal tags at low cost. Write for Free Catalogue. E. Catlin, Box 23, Boston, Mass.

MAKE Perfumers, other products. Home. Careless, 1914 Chouteau-PM, St. Louis, Mo.
INVENTORS: If you have an invention for sale, patented or unpatented, write for free information catalog. 3397 W. 30th St., Chicago 10, Ill. 

INVENTORS: You can invent, or help others invent. 1051 K St. N.W., Washington 4, D. C.

INVENTORS' Guides and "Record of Invention" forms are free. Write for them. James P. Grafton, 4411 S. Western Ave., Chicago 37, Ill.

INVENTORS don't sell your invention, patented or unpatented, until you receive your fee. Write Cowgill, Box 384, Marion, Ohio.

MAKE Money from your ideas, gadgets, patents. Get "Inventor's Guide." Helpful book tells you how. Send $1.00, in- cluding list of needed inventions. We have buyers. Inventors Creative Service, Box 345, Cincinnati 1, Ohio.

INVENTORS Wanted. Patented or un- patented. Established 1871, W. Adam Company, 5418 Idaho St., St. Louis, Mo.


INVENTORS Wanted. Patented or un- patented. View 23 years experience with national advertising agencies. Box 322, Kenosha, Wis.

PATENTS FOR SALE


INVENTORS: Test the commercial value of your patented inventions quickly and inexpensively. Write for Free Invention Service. Embry, 40-4, 631-E St. N.W., Washington 4, D. C.

MANUFACTURING

MODELS—Small lot manufacturing. Metals, plastics, etc. Millburn, Kentucky.

MODELS, MODEL SUPPLIES


LIVE Steam engine, 1016 high, ready- to-run; $15.00. Dept. FM-18, 2230 Haddon, Chicago.

GET Your copy of Modeler's Design Data $1.00. Box 318, Fort Worth, Texas.

HOBBIES. One-airplane, no railroad, ships, interacting crafts, catalogs 10c. J. B. Rasmussen, 1913 9th Ave., Minneapolis, Minn.


BUILD Historic ships, vehicles, 50c to $6.00 kits, illustrated catalog 10c. Model Airplane News, 51 Madison Ave., New York 10, N. Y.

STEAM Locomotives, 1\12", 1", 1\4", 1\8" scales. Castings, rail, steam fittings! Model Locomotive Supply, 3455 Division St., Los Angeles 10, Calif.


SHIP and other scale models. Most complete line in New England. Kitis, fitted up, ready to put together. Illustrated catalog 50c, John Mills & Son, Box 54, Atlantic Ave., Boston 1, Mass.

BALSAM Wood, Grade AAA. Free sample, price list. Big Mills Co., Montesano, Iowa.

HOME CRAFTSMEN

VENNER'S, Single ply: Walnut, maho- soy, birch, on your own set, or from stock. Minimum 50 sets. Resale. No c.o.d.'s. Furniture Wood Supply, Box 855, Milwaukee, Wis.

METAL-Bounds, slats, sheets. Small orders inquire. Cincinnati Sheet Metal Co., 5149 Pershing St., St. Louis, Missouri.

IRON-COVERS, Supplies. Pre-cut kits, tools, etc., last kits ordered $1.00 each. Reason- found first order. Whitfield Saddle Mfg. Co., 1125 Powers St. S.E., Cincinnati 2, Ohio.


LAMP Site Cypress Keg, nipped installed $2.00, CY Products, Dept. 2B, Lafayette, Ind.

16 NEW Lawn chairs, 22 picnic tables, benches, trellises, etc. All 80 plans with necessary full size patterns. $1.00, Master- craft 554, Yolo, Chicago 31, Il.


COMPLETE detailed information on the requirements, design, installation, operation, maintenance and repair of home playground equipment. Special emphasis on the use of tools and materials is given in the last section. "Playground Equipment" is the first book for the layman in its field. Written for the use of anyone interested in playground equipment. Write W. C. R. Data today. Popular Mechanics Press, 200 E. Ontario, Chicago 11, Ill.


The FINNEY Company

Sport and Professional Diving Equipment

"If it's for diving, Desco makes it!"

World's Largest Manufacturer of Diving Equipment. Literature on Request.

Diving Equipment & Supply Co.
Dept. P, 234 N. Broadway
Milwaukee 2, Wisc.

Build your own JET ENGINE!

Order these plans today
1. JET PROPELLED BICYCLE. Assemble a bicycle with 3 jet engines for a wind-up, jet engine bicycle. Plans and instructions. 60c
2. JET BOAT MOTOR. Plans and instructions for the complete jet engine motor. Seven sheets with instructions 50c.
3. JET OF ABOVE in use order 65.60c.
SEND NO MONEY. Order blank at once.

J. HOUSTON MAUPIN, Dept. 55, Tipp City, Ohio

Aluminum Screen Patches with the only patented hooks
4 for 25c
HUSH-A-DOOR stops door slam on screen door or storm door. 60c

Screen Patch Co., 1620 Callowhill St., Philadelphia 30, Pa.

WIN A NEW CAR ...

One of 251 BIG PRIZES in Crosman's Big Contest. TV sets, outboards, radios, cameras. Easy to Win! Senior and Junior Divisions. Ask any sporting goods dealer for FREE entry blank and contest rules.

CROSMAN ARMS CO., FAIRPORT, N. Y., Dept. 45
MAY 1954

Perfect TV Pictures - ON ALL CHANNELS

WRITE TODAY FOR Interesting Free LITERATURE.

Perfect Pictures - ALL CHANNELS — UHF and VHF

Perfect Pictures - TESTED AND PROVED RIGHT HERE IN TOWN — IT'S THE BEST!

Perfect Pictures - ONE TRANSMISSION LINE, NO SWITCHING!

Perfect Pictures - ALL YEAR 'ROUND - WEATHERPROOF, ALUMINUM CONSTRUCTION!

Dept. PM-5 • 4612 St. Clair Ave. • Cleveland 3, Ohio

Say You Saw It in Popular Mechanics

U-MAK-IT BOAT KITS

30 OUTBOARD & INBOARD MODELS to choose from:
ROWBOATS • PRAMS • RUNABOUTS • CRUISERS

Now you can build your own boat with simple hand tools and no previous building experience. It's easy—you save half the cost. Each part of the famous U-Mak-It boat kit is precision machined—frames, stem, transom, keel, and planking, etc., are ready for assembly. Kits are complete in every detail. Only the finest materials are used. For high performance, safety and durability investigate U-Mak-It boat kits, today!

SEND FOR BIG ILLUS. CATALOG
Shows complete U-Mak-It line: construction details, incl. everything to build your own. Engines, conversions, hardware, paint and color chart. SEND 35c COIN TODAY!

U-Mak-It products
763-P Whittier St. - Bronx 59, N.Y. City
SURE THEY'RE GOOD!

...you set the standards yourself

Products with brand names that you call for again and again are literally just what you order, because you yourself are constantly dictating their quality standards.

Your approval is the measuring stick that manufacturers go by. You decree how a seam will be sewn, an edge ground, a design balanced. You say if a flavor will be sharpened, a fragrance tempered, an angle softened, a color heightened. Products stand or fall on your acceptance...so their makers keep quality up, up to the point that keeps you buying.

Man, you're the boss. And lady, you couldn't be closer to quality control if you sat in the manufacturers' collective lap.

Guide to good buying: the ads in this magazine.

BRAND NAMES FOUNDATION INCORPORATED
A NON-PROFIT EDUCATIONAL FOUNDATION
37 WEST 57 STREET, NEW YORK 19, N.Y.

WANT QUALITY? PATRONIZE THE DEALER WHO PROVIDES YOUR FAVORITE BRANDS

POPULAR MECHANICS
STOP WASTING GAS
SAVE AS MUCH AS 25% ON GASOLINE BILLS ALONE WITH THE ATOM BUSTER

Why pay for gas your car never uses? During every mile you drive, your car blows high-cost, raw, unburnt gasoline out the exhaust. Gas you bought, but never used. That's why the ATOM BUSTER, the precision-built, patented atomizer, can pay for itself in one month of normal driving. Simply installed between carburetor and manifold, the wire mesh and steel balls churn the mixture of gas and air into a highly volatile mass of gaseous vapor that's ready to explode with full power. There's no waste! You get greater engine efficiency, more money-saving mileage for your car. You start Big-Savings the minute you install the fully tested and guaranteed ATOM BUSTER. If not available at your auto supply store, send check or money order for only $4.76 direct to manufacturer giving make and model car. ATOM BUSTER will be sent Post Paid by return mail.

Dept. PH-4 CLARKSDALE, MISS.

ELECTROPLATING
BY SIMPLE TANKLESS PROCESS!

A FASCINATING HOBBY OR BUSINESS OF YOUR OWN!
Course of instruction with each kit. PLUS many money-making formulas: Plating brass, base, silverware, jewelry, auto parts, plumbing fixtures, bicycle parts, coins, rug hooks, hardware, etc. BIG MONEY fast or spare time. Gas stations, garages, jewelry stores, dealers, institutions. Demands everywhere. START $4.76. SEND NO MONEY. Ka, Stannus and Formulas sent COD. Or send $4.76 and receive full pasteur. Money refunded within 7 days if not satisfied.

CAPITOL PLATING CO. • 4213M Queensbury Rd. • Hackettville, Md.

DRAFTING — DESIGN — MATHEMATICS — SURVEYING

Sewell, Mechanical, Electrical, Architectural, Structural, Building, Construction Estimating, Blueprint Reading, Mathematica, Refrigerator & Hopper, Physics, Outdoor Jobs, etc. Also Photo, Model Making. MOUND INSTITUTE, 230 WEST 41ST ST., NEW YORK 18, N. Y.

"Building Beautifiers" CAN EARN HIGH INCOMES

Colorcrete, a cementitious plastic, gives lifetime beauty and protection to drab, dirty masonry — concrete, stucco, etc. — on all kinds of buildings. Tough, colorful, un-dating. Easily cleaned. Helps to daylight dark interiors. Choice of gleaming white or 30 colors. Applied under pneumatic pressure to form an inseparable bond.

More Colorcreteors are needed to supply the ever-increasing demand. Low investment appeals to men of limited capital. Work is easy, fascinating, high-ly profitable. Broad opportunity to develop a lifetime business. No special ability or experience needed because we supply full instructions and sales cooperation. Colorcrete machine is simple to operate, easy to move around. Write today for Opportunity Book.

Colorcrete Industries, Inc. COLORCRETE

MAY 1954

another

RUDGE

BRITAIN'S BEST BICYCLE — SINCE 1889

special

$69.75 Prices FOB Boston
Dynamo Hub lighting additional

the

SPORTS LIGHT COASTER

with the

TRI-COASTER HUB

It’s almost like a car! It’s the newest, safest, most exciting Rudge of them all—the Sports Light Coaster with the Tri-Coaster Hub. This handsome bicycle combines in one amazing Tri-Coaster Hub, safe foot brake, three-speed gear, plus the Rudge hand brake.

Available in Rudge’s traditional black. Also for women in Mediterranean blue, for men in Burgundy red.

Write for more information to:

Raleigh Industries of America,
Dept. M • 687 Boylston St. • Boston 16, Mass.
Completed Popular Mechanics Ranch Type House and exact scale pictorial room and suggested furnishing layout. To right of dotted line is BASIC HOUSE. Expansion to the left. Designed for easy building in two convenient steps.

Build the Basic House First

Add
When You
Need More
Room

When expanding you add garage and breezeway, and car port becomes third bedroom. About $2500.

Get this Newest Popular Mechanics "Build-It-Yourself" Book and Building Plans and Save Many Thousands of Dollars

Book gives complete step by step instruction in simple language. Hundreds of pictures, actual photos and diagrams, showing every phase of construction, guide you from start to finish. Ten working size blueprints give floor plans, elevations, notes on construction, framing, lumber list specifications, plumbing and wiring diagrams.

Read How and See How - Simplified Instruction
You read, "how-to-do-it" in the book. You see how it looks in actual pictures. You follow the plans for dimensions and details. You make use of labor-saving kinks and special methods developed especially for the project.

No Previous Building Experience Required

Any ordinary handy man, using only simple tools can build this house with little or no assistance and enjoy every part of it. And at the same time, save in labor costs, more than he spends for material.

Order Book and Plans Now
Use the handy coupon below to order your copy of the RANCH-TYPE HOUSE BOOK AND PLANS. Read the book, study the plans and then you will be prepared to go right ahead when you are ready to build. Even if you have the house mainly built by others, you can still enjoy tremendous savings by using the instructions and blueprints from Popular Mechanics.

Use This Handy Order Coupon

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

Send at once my copy of the Ranch-Type House Book and Plans as checked below:
   □ Remittance enclosed   □ Send C.O.D. (postage extra)
   □ Ranch Type House Book $3.50
   □ Set of 10 Blueprints 13.50
   □ Book and Blueprints 15.00
   □ Duplicate Set of Blueprints 5.00

Name:

Address:

City Zone State

PRINTED IN U.S.A.
Take your vacation with you wherever you go

KLEPPER

UNINSINKABLE AERIUS FOLDING BOAT

EASY TO SET UP: A child can do it!

STURDY: Tough, resilient hull of multi-plex rubber tire construction on rugged frames of seasoned mountain ash and plywood. Superior in quality, workmanship to any similar product. No tools needed, no bolts. New snap-back fittings.

UNINSINKABLE: Air tubes around the gunwales keep it always above water.

See the KLEPPER FOLDING BOATS at
1472 Broadway, New York 18, N. Y.

Write for FREE Catalogue

Say You Saw It in POPULAR MECHANICS

Say You Saw It in POPULAR MECHANICS

MAY 1954
Now—caulk cracks and crevices around your home this modern easy way!

**DICKS-PONTIUS**

**WHITE Caulking Compound in a giant tube!**

- Dozens of home maintenance uses.
- No gun—no mess! Just squeeze the tube!
- Collapsible tube comes ready-loaded with 1/10 gal. of highest quality, white D-P Caulking Compound.
- Tube has built-in applicator tip—and cap screws over it for storage.

Get it now! On sale at leading hardware, paint and building supplies stores. D-P products are easier to use! Always ask for them by name.

The Dicks-Pontius Company • Dayton, Ohio
Alexandria, Va. • Decatur, Ga. • Dallas, Texas

**FREE 100 WAYS TO MAKE EXTRA MONEY**

Rush postcard for FREE Opportunity Magazine 1,000 ways to make extra money without leaving home or your job. Many make $100 to $500 monthly and more without experience. Nothing to buy. No obligation. No matter where you live, no matter what your age or occupation, send postcard now for FREE copy.

**OPPORTUNITY**

28 E. JACOBUS, DEPT. PM-1
CHICAGO 4, ILL.

---

**DRIVE 500,000 MILES**

Without Need of A Major Overhaul

ENGINEERS HAVE PROVEN THIS POSSIBLE. They have shown that any recommission process produces more than a gallon of water in vapor or steam for every gallon of fuel burned. Some of these vapors make crack cases cause rust, varnish, carbon and sludge.

INSTILL, POWER VENTILATION—

GET UP TO 2 OR 3 MORE MILES PER GALLON—

CUT ENGINE WEAR UP TO 40%—

Increase the overall operating efficiency of your car with amazing Moto-Vent. Positive Power Ventilation removes water vapors, lubricant and other corrosive materials that enter crack cases. Not a “gizmo” or “gadget” but a precision engineered instrument designed to give better engine performance, up to 2 or 3 more miles per gallon and cut engine wear up to 40%.

Get and water vapors are fed back into combustion chambers where they give you water injection and overhead lubrication. No extra oils or additives needed.

**EASY TO INSTALL—DO IT YOURSELF.** Fits all cars, trucks, tractors—old or new. Install Moto-Vent between oil breather and intake manifold in less than half hour. Will soon pay for itself.

**FREE 30 DAY TRIAL OFFER.** Moto-Vent complete with all fittings and easy to follow installation chart only $1.75 postpaid, or C.O.D. plus charges. Try for 30 days. If you are not completely satisfied return for full refund. Send order or write for further FREE particulars. Look for:

**PRECISION PRODUCTS CO.**

Dept. 15, HARVARD, ILL.

---

**TAP JAW**

ADAPTS DIE STOCK TO TAP WRENCH. Needed in Machine Shops. Garages. Home Workshops. Everywhere Tap Wrench are used, makes it possible to use your old stock as a tap wrench. Easy to place, head of tap wrench is is held in the opening. No slip and unnecessary hand work. One size fits all.

**Top Wrench, Tap Jaw, same in 14 sizes.**

**$1.80**

$3.15
great tool for the craftsman and home shop. Includes 1/4" to 1/2" pipe taps and 24" and 1/4" pipe taps.

$4.15

MURRAY BROTHERS MFG. CO., 1625 N. Elston Ave., Chicago, Ill.

---

**HELPFUL BOOKS**

Send post card asking for FREE catalog
**Popular Mechanics** Press, 300 E. Ontario, Dept. 601, Chicago 11

---

**YES! SEND**

directly to my door every month

I am enclosing

$3.50 for 1 year

$8.00 for 3 years

name

address

city state
zone

Hand this order to your newsdealer or send it to

**POPULAR MECHANICS**

200 East Ontario St.
Chicago 11, Ill.

---

POPULAR MECHANICS
YOU PLAN IT
YOU BUILD IT
YOU SAVE
UP TO 35%

How can they do it? That's what your friends will ask—that's what will surprise you about Pagemaster's "know-how". After you build this gracious ranch-style home at a savings on today's building costs of up to 35%. Add a garage now or later and the gracious lines of the No. 542 James will be even more enhanced.

Imagine receiving a complete house in one "package", all ready for you to erect. What's more, your new home will be planned just the way you want it. Don't delay! Get the complete Pagemaster story, and see how easy it is to own the house of your dreams—at a price you will be glad to pay. Highest quality materials throughout, Pagemaster homes meet and exceed FHA and VA financing requirements.

Write TODAY! Many excitingly new models to choose from. Send 25¢ in coin for full-color catalog. Let Pagemaster help you from there!

Pagemaster HOMES
300 PIERCE ST., SHAKOPEE, MINNESOTA
"Panelized for Easy Erection"

FROM MOWING TO TILLING...

IN LESS THAN 1 MINUTE WITH Triple-M QUICK-HITCH LOCK

For all-around, year-around ease, utility and economy, see Triple-M garden and yard equipment. In less than a minute, you can attach tiller, mower or snow thrower to your Multi-Purpose Power Unit, and you're ready for any kind of work. You just release the QUICK-HITCH LOCK to remove one unit; then roll in another; couple it; tighten lock by hand and you're ready to go. No shoving, no heavy lifting, no tools needed.

The powerful Triple-M Unit does the hard work. One-Spot Control from behind the handles gives complete command of all operations—mowing lawns or high grass or trimming close to borders... mulching leaves... tilling or cultivating... clearing snow.

Triple-M equipment costs less and takes less storage space than separate single-purpose tools. You can buy what you need now, add others later. See your Triple-M dealer and have him show you the year-around, all-around values of Triple-M, or write us for illustrated folder.

Triple-M PRODUCTS DIVISION
The Mott & Merryweather Machinery Co.
55409 BRICHAM ROAD, GATES MILLS, OHIO
STOP RUST FROM MOVING IN WHEN ANTI-FREEZE IS DRAINED OUT!

WITH PERMATEX WATER PUMP LUBRICANT and RADARATOR ANTI-RUST

All types of permanent Anti-Freeze contain a rust inhibitor. When you drain your anti-freeze for warm weather driving and refill with clear water—look out—that's when the rust moves in. Prevent this rust from forming... protect your engine and water pump... add a can of Permatex Water Pump Lubricant and Radiator Anti-Rust. It keeps water crystal clear and lubricates the pump... stops squawks and squeals, prevents wear.

Send for free illustrated catalog

LOOK FOR THE DISTINCTIVE PERMATEX LABEL at your service station or garage. It's been your guarantee of quality for over 45 years.

OVER FIFTY CHEMICAL PRODUCTS FOR BETTER AUTOMOTIVE MAINTENANCE

PERMATEX COMPANY, INC., Brooklyn 35, New York

SAVE 1/2 on WATER SKIS

Simply assemble and finish our new water ski kit and you have a pair of skis worth twice the price of the kit. Skis are 7 ply moulded ply wood, 67½" long, 7½ wide, 0/10° thick. Sturdy rubber foot pieces. All parts plus instructions included—$15.30. Order from your Michigan dealer or MICHIGAN WHEEL CO., Dept. P-95, Grand Rapids, Michigan. C.O.D. orders accepted.

NEW! No. 4 HAWAIIAN WIGGLER

WRITE FOR BIG FREE CATALOG

Weighted, flexible, woodless sponsor type... casts like a bullet, sinks quickly, runs deep. More flash for trolling. Won't twist line or hang up. 1/4 oz. or 3/8 oz. = $1.15 each.

FRED ARBOGAST CO., INC., 2205 W. North St., Akron 2, Ohio

Say You Saw It in Popular Mechanics

4 WHITE WALLS $9.95

EASY TO PUT ON!

Turn your present black tires into custom white side walls, with these thick, natural rubber WHITE WALLS. Absolute perfection and satisfaction assured. Everything furnished for all four tires. Mail check or money order NOW. Introductory price for complete kit; only $9.95 postpaid. Sold coast to coast.

CUSTOM SIDEWALLS

P.O. Box 11758
Wagner Station
Los Angeles 47, California
YOU CAN HAVE THIS RIDING TRACTOR FOR ONLY... $99.50

RIDE-TRAC Makes Fun Out of Your Lawn and Garden Work!

For the FIRST TIME you can have a COMPLETE KIT and ASSEMBLE YOUR OWN RIDE-TRAC in a FEW HOURS...
SAVE OVER $150.00!

A POWERFUL RIDING TRACTOR AT LOW COST!

Make all your lawn and garden chores easier with the new, sturdy RIDE-TRAC. Equipped with a draw bar hitch, your RIDE-TRAC will suit standard attachments for lawn and garden. It can be as powerful as you need. Safe for the whole family to use — so simple you need never worry about breakdowns or repairs.

Now kids really enjoy doing more work around the home. Regardless of age, you can count on a lot of help after you get your RIDE-TRAC. Your children will jump at the chance to do those yard and garden chores. Your RIDE-TRAC is completely safe for the youngsters and very easy to operate. They will learn driving safety in your own back yard.

ONE SATURDAY AFTERNOON CAN SAVE YOU $150.00

The RIDE-TRAC Kit is so easy to assemble — you can do it in one afternoon — let the whole family help, it’s lots of fun. No machining — no welding — no holes to drill — assemble the RIDE-TRAC with your own hand tools. Simple step-by-step picture plans. All materials are furnished and guaranteed. You don’t need to be a mechanic or have any mechanical experience to assemble your RIDE-TRAC. Order RIDE-TRAC Now; Save Over $150.00...

USE ANY 1 1/2 TO 3 H.P. GASOLINE ENGINE

We furnish the engine mounts so that you will have no trouble putting the engine on. You can use any low-cost 1 1/2 to 3-H.P. engine.

THE COMPLETE RIDE-TRAC KIT COSTS YOU ONLY $99.50

Your RIDE-TRAC Kit gives you a rugged, all-steel chassis, completely guided belt drive with differential action for short turns, heavy duty rubber cord wheels, all-steel deck and double seat, built-in steering assembly, starter engine mounts for fast, easy filling of 1/2 to 3 H.P. engine, throttle control, rear draw bar hitch and front end mounting holes for standard lawn and garden tools, all nuts and bolts furnished. RIDE-TRAC is completely in every detail. To kit no machinery — no welding — no holes to drill — all materials are furnished. Buy nothing else but the engine. With the RIDE-TRAC Kit you get simple picture plans that anyone can follow. All parts are guaranteed.

USE COUPON BELOW TO ORDER YOUR RIDE-TRAC KIT

You can order your complete RIDE-TRAC Kit now or, if you prefer, send $1.00 for the Plans only and order your complete RIDE-TRAC Kit after you see how easy it is to build. Use the coupon below to order your complete RIDE-TRAC Kit on 30-day Money-Back Guarantee. Send $75.00 with order and your RIDE-TRAC will be sent to you E.D.D. for $14.50 plus freight charges. The entire RIDE-TRAC Kit weighs only 155 pounds. You will receive your RIDE-TRAC about 10 days after your order.

ORDER YOUR RIDE-TRAC TODAY

BELSAW RIDE-TRAC DIVISION 9001 Field Bldg., Kansas City 11, Mo.

Please send me the RIDE-TRAC Kit on 30-day guarantee.

Enclosed find $25.00 (check or money order). I will pay balance E.D.D.— plus freight. [ ]

Enclosed find $39.50 (check or money order). I will pay balance E.D.D.— plus freight. [ ]

Send the RIDE-TRAC Kit by PREPAID FREIGHT. [ ]

Please send me the Plans Only for the RIDE-TRAC Kit. [ ]

Enclosed find $1.00 to be credited against your later order for the RIDE-TRAC Kit. [ ]

NAME

ADDRESS

CITY

STATE

MAY 1954
Which is hotter?

Answer: When combustion occurs, the temperatures within the cylinders of an automobile engine frequently go as high as 4800° F... more than three times as hot as flowing volcanic lava!

The advantages of chrome plated top piston rings in this area of intense heat, highest pressure and poorest lubrication have been recognized by automotive manufacturers everywhere... and 34 out of 36 engine manufacturers installing chrome rings use Perfect Circles!

For replacement, Perfect Circle 2-in-1 Chrome Sets offer solid chrome plating on both top and bottom rings... for thousands and thousands of extra miles of sustained power and oil economy. Perfect Circle Corporation, Hagerstown, Indiana; The Perfect Circle Co., Ltd., Toronto.

Perfect Circle
2-in-1 Chrome Piston Rings
The Standard of Comparison

Solid chrome plating on top and bottom rings gives wear protection throughout entire area of ring travel. Rings are lapped-in at factory, eliminating tedious break-in.
Here's advice from the experts on fire extinguishers and detectors

FIRE-PREVENTION experts are appalled by one startling fact: there is less protection against fire in the average home than in any other building in which people spend a portion of their days.

Every year, fire safeguards reach new heights in factories, schools, churches, business institutions and hotels, but the home—the place closest to the heart of mankind—remains neglected in millions of cases. The experts believe the reason for this is the old and faulty psychology of: "It can't happen to me."

The tragedy is that it does happen. There is an average of 1100 home fires every day in the United States, according to the National Fire Protection Association. The toll in lives per day is 30 persons (a high percentage are children) and the property loss runs into millions.

The causes of home fires are so varied that they emphasize the uncomfortable fact that a home without fire protection is a dangerous place. The careless use of matches and smoking materials is responsible for 30 percent of home fires from known causes over a 10-year period. Other causes on the list are: Accumulations of rubbish
Homefires are wrong if they think they have to spend a lot of money to get a minimum of fire protection for their homes,” says John J. Ahern, director of the department of fire protection and safety engineering at Illinois Institute of Technology. “In fact, a great deal of protection can be had without spending a cent or the use of materials and equipment found in every home.”

Here are some safeguards suggested by Ahern: The knowledge by every member of the family (old enough to use the telephone) of how to call the fire department; family fire drills with and without the use of ordinary exits from the home — this is important in an emergency; strategic placement of fire buckets that can be filled with water to be tossed on a fire; availability of the garden hose for putting out fires the year-round; the storage of a plentiful supply of ordinary baking soda in the kitchen for putting out grease fires.

Ahern stresses the importance of keeping the garden hose handy and ready for use. If attached to the outside of the house in summer, some arrangement should be made so it could be pulled quickly through a window. In winter, the hose should not be put away in some remote corner, but attached in basements and attics, faulty wiring, defective chimneys and furnaces or other heating equipment, careless use of combustibles such as flammable cleaning fluid and roofs which are not fireproof. Ninety percent of home fires are due to carelessness or negligence and could easily have been prevented or checked in an early stage before much damage was done.

Class A Fires
Paper, wood and similar combustibles. Extinguishers: Bucket spray pump, hand-operated pump tank, soda-acid, foam.

Class B Fires
Flammable liquids or greases requiring smothering effect.
Extinguishers: Foam, vaporizing-liquid, carbon-dioxide, dry-chemical.

Class C Fires
to a basement connection awaiting an emergency.

The second step in fire protection requires a small outlay of money—especially small in proportion to the protection it will afford. This is the purchase of a bucket spray pump or a portable extinguisher. The spray pump, familiar to most gardeners and owned by many, is a handy and inexpensive gadget (from $8 to $12) for putting out a small blaze. All you have to do is fill a bucket with water, stick the pump in the bucket and start to pump. The bucket can be refilled by a helper without diminishing the 20 to 30-foot spray of water.

There are scores of portable fire extinguishers on the market, certainly more than enough to confuse the average homeowner. His problem, however, is simplified by studying the kinds of fires he may encounter in the home and the half-dozen basic types of extinguishers and what they can do. Good portable extinguishers range in price from $20 to $40.

A preliminary "must" in the purchase of any extinguisher is that it bear the label of approval by Underwriters' Laboratories or Factory Mutual Laboratories. These labels are a guarantee to the buyer that the product has been carefully tested and approved for a specific use. The National Fire Protection Association and other such organizations highly recommend that homeowners purchase only approved equipment. They report that numerous extinguishers on the market are no more effective than a can of warm beer would be if it were shaken up and punctured.

In the language of the fire experts there are three classifications of fires: A, B and C. Class A fires are confined to ordinary combustible materials such as paper, wood or cloth where the quenching and cooling effects of quantities of water, or solutions containing large amounts of water, are of major importance. Class B fires are defined as fires in flammable liquids or greases where a blanketing or smothering effect is essential. Class C fires occur in live electrical equipment where a nonconducting extinguishing agent must be used. The use of water on a Class C fire

MAY 1954

Copyrighted material
Experts test dry-chemical extinguisher in lab.

Here are two means of fire protection at low cost—bucket spray pump, garden hose.

is dangerous and not advisable.

Most home fires are in Class A or B, but most extinguishers which are effective on Class B are also useful for Class C. The basic types of extinguishers are the hand-operated pump tank, soda-acid, foam, vaporizing-liquid, carbon-dioxide and dry-chemical.

For ordinary home use the most highly recommended and inexpensive type is the 2½-gallon hand-operated pump tank. A five-gallon size is also available, but the smaller tank is more desirable because it is easier to carry around and can be refilled by a helper while in use. The tank is filled with plain water or a nonfreezing solution. It produces a stream that will travel 30 to 40 feet. The experts like this tank for its simplicity of operation and ease of maintenance. A variation of this model is the stored-pressure tank with an attached carbon-dioxide cylinder which saves pumping. The gas is released into the cylinder by pressure on the handle. For adequate protection, a two-story home should have two extinguishers of this type with one kept on the second floor.

Another favorite for Class A fires is the 2½-gallon soda-acid extinguisher. It contains water in which bicarbonate of soda has been dissolved. A bottle in the top of the tank holds sulphuric acid. When the extinguisher is turned upside down the chemicals mix to form a gas which forces the water out.

The foam extinguisher closely resembles the soda-acid type. It contains a metal cylinder filled with aluminum sulphate. When
A whistle-type detector goes off when the temperature climbs. Sketch shows the best locations.

Whistle-type detector goes off with blast when the temperature climbs. Sketch shows the best locations.

The extinguisher is tipped over, the aluminum sulphate mixes with the soda water and a foam-making ingredient. A 2½-gallon tank expels about 20 gallons of foam. The foam smothers Class B fires, but due to the water content is also used for Class A.

The vaporizing-liquid extinguisher is available in both hand-pump and stored-pressure models. Recommended for both Class B and C fires, it contains carbon tetrachloride under pressure. The most common size contains a quart of liquid and the stream will travel 20 feet or more for about 30 seconds. The gas formed by the vaporization of the liquid is toxic and this extinguisher shouldn't be used in confined areas.

Also recommended for both Class B and C fires, is the carbon-dioxide extinguisher. It has a hornlike nozzle through which carbon-dioxide gas escapes when a valve is opened. The extinguisher has a maximum range of about eight feet, but it should be held as close to the fire as possible.

The dry-chemical extinguisher is available in several styles, all depending on a small cartridge of carbon dioxide pressure. The dry chemical used is ordinary bicarbonate of soda which is expelled in a cloud that travels 20 to 25 feet. It is effective for Class B and C fires.

Safeguards that reach into the realm of superior home protection are the fire detectors. Many families are suffocated by smoke before they ever have a chance to use an extinguisher. One simple and inexpensive detector ($12.50) is a whistle that gives forth a shrieking blast when the temperature rises to 136 degrees F. The cylinder attached to the whistle is filled with a harmless gas held back by a link of fusible metal. The manufacturer recommends the placement of these whistles in areas where heat would gather in case of fire such as the top of the basement stairs, the ceiling of the stairwell in a two-story house and in the attic at the peak of the roof.

Another fusible-link type of detector sets off a bell alarm when the temperature climbs to 133 degrees F. This simple and effective alarm is wound like a clock.

Most other types of detectors are connected with the electrical system. One consists of small thermostats ($1.25 each) placed against the ceiling of every room and installed with a closed-circuit system on a series loop using a relay with a dry battery for current supply or a trickle-charger wet battery. On an open-circuit system a direct connection can be made to the electric source of supply or a dry or wet-cell battery.

Another simple detector is formed by two thinly insulated wires. When the insulation melts, the wires complete a circuit to set off an alarm. Then there are rate-of-change detectors which set off an alarm when there is a rapid rise in temperature.

Other elaborate and expensive electronic smoke detectors can "smell" flammable gases in the air or "see" smoke in the space between a lamp and a photocell.

All the experts agree that adequate safeguards are available to suit every home and pocketbook. The hardest part is to convince the average homeowner that "it can happen to me."
Nash Low Cost Air Conditioner Cools or Heats by Turning Knob

Nash, the company that pioneered the heater that brings in air from outside the car, now offers the industry's first combination heater and air conditioner. The entire system mounts forward of the dashboard. There are no parts in the trunk. Pricewise, it is the lowest in the industry, selling for $395 factory installed or almost $300 below competitive combinations. One knob controls both heating and cooling. Fresh air enters the cowl intake, passes through a filter to remove dust and pollen and is intermixed with air from within the car (ratio: 30 percent fresh air, 70 percent interior air). The air then passes through a cooler (or heater in winter) and out two dash outlets.

Pin-Size Neon Glow Lamp Aids Timing of Film

No bigger in diameter than a pinhead, a tiny neon lamp developed by Westinghouse will be used to time pictures taken during guided-missile tests. It also can be used for similar camera work in laboratories where space is cramped. The neon bulb is 1/50 of an inch in diameter and an inch long, and generates a 1/60-watt glow between two electrodes spaced 1/25 of an inch apart. Fifty of the tiny lamps are to be situated along a strip of 35-mm. motion-picture film to provide the timing data needed. According to Westinghouse, the lamp is the smallest in the world. It has only 1/8 the diameter of the grain-of-wheat lamp, previous holder of the world's smallest-lamp title since 1932. It can be powered by hearing-aid batteries.

Plastic Shield for Police Offers Protection From Bullets

Light enough to be held in one hand (11 pounds), a plastic shield for police and other law-enforcement officers stops bullets fired from as close as 20 feet. Made of laminated glass fiber, the shield effectively stops slugs fired from a 12-gauge shotgun, a .38-caliber pistol and a World War I Mauser. The shield is fitted with a small, bulletproof glass window that allows observation while giving protection. As a bullet plows through the various plies of the plastic shield, its velocity is spent by the absorption of energy.

Visitors to national parks in 1953 totaled 46,224,794—a new high.
SITTING IN A WELTER of wavering needles and spinning dials as he hurtles through space, the harried jet-fighter pilot has no time to sit around casually plotting positions with pad and paper. Newest aid for the supersonic “flyboys” is an electronic wizard that continually plots the plane’s position—on the wing and without any ground contact whatever. Two sets of rotating numbers that look just like the mileage and trip totalers on the speedometer of your car tell the pilot his exact latitude and longitude at any given instant. Developed by the Ford Instrument Company for the Air Force, the new “ground-position indicator” is a compact, 45-pound set of four little black boxes: Indicator (which the pilot reads); computer control (where information is fed in); computer (that does the calculating) and an amplifier (to supply power). Before taking off, the pilot dials his wind speed and direction, and magnetic variation, on the knobs of the computer control. On the indicator he sets in his take-off longitude and latitude. The robot does the rest. From the plane’s compass and air-speed indicator, changes in the speed and direction are fed into the computer.
**Plymouth Sport Coupe Has Matched Luggage**

Chrysler stylists have given the experimental Plymouth sport coupe a forward-sloping grille and recessed headlights. One of the newest so-called dream cars which Detroit turns out with regularity these days, the Explorer was built on a standard Plymouth chassis. The power plant is the 110-horsepower Plymouth engine, Ghia of Turin, Italy, made the body and it is recognizably Italian in character. No production plans are contemplated, Chrysler says. The interior is especially luxurious. Two individual seats, upholstered in white leather, are separated by a leather-covered compartment for maps and other items. The ash tray is there also. Behind the seats are two pieces of matched luggage with tie-down straps. Unusual also are the combination taillight-tail pipe assemblies. The twin exhaust pipes end within a chrome housing that also encircles the taillights.

**Adapter Converts Black-and-White TV Set to Color for $100**

Converting your black-and-white TV set to color may cost less than $100 with a system developed by electronics engineer Robert P. Benjamin. The adapter converts the color signal to a system which can be used with a three-color wheel. The wheel rotates before the black-and-white tube and is synchronized with the color signals so that the appropriate filters pass before the screen as the successive color information is transmitted. The only modification of the black-and-white set is the addition of four simple connections to the base of certain tubes in the receiver. The converted receiver works well under the present compatible-color television system, in which color signals are broadcast with black-and-white signals, but are not picked up by standard receivers. Benjamin used a five-year-old set in a recent demonstration to bring in a full-color network program. The device is not yet in production.
Egg for an Atom Engine

By Richard F. Dempewolf

When the Blunt-Nosed Nautilus, world's first atomic-powered submarine, skidded into the Thames River at New London, Conn., last January, an even more curious hull was being readied for an even more curious ride this spring. No cheering, fanfare or champagne was to mark the strange new "skidding," however. There would not be a splash, either, because the nearest open water is 20 miles away.

MAY 1954
Cutaway drawing of sphere, hull and fuel-service section shows water-filled tank (1) to shield the reactor, and cell (2) that holds liquid metal used as heat-exchange fluid. Also shown are the control panels (3), reactor section of hull (4), with the atomic pile (5). Molten sodium passes through the pile and heats water to steam in the boiler (6). The steam drives turbines (7) enclosed in the end section of pressure hull (8). Lead container for uranium rods (9) rides dolly to service cell. Near by is the fuel storage pit (10) and above is the traveling crane (11) for refueling and servicing. On the opposite page the fuel storage tunnel is shown below the fuel-element service cell which has massive concrete walls. Until needed the uranium rods are stowed in a heavy lead container (12) and pulled out of the tunnel through a hatchway by a mechanical hand (13) which passes them to cleaning station (14) where tons of water wash the rods. At scanning station (15) electric eyes examine them for flaws. Next stop is the inspection and measuring area (16). Robot hands (17) pull them apart and the rods pass to the sample cutting station (18) which chaps off a chunk. At the adjoining station (19) "burned up" portion of rod is canned for shipment to a reprocessing center. Also shown are decontamination area (20), concrete walls (21) six feet thick, and shielded monitor station (22).
But, a few months ago, against a backdrop of empty land and sky, the odd hull rumbled slowly on steel rollers. It slid about 200 feet, through a hole in the curving wall of the world's biggest manmade ball—a $2,000,000, 225-foot shell of steel that had been built close by to receive it. Welders swarmed in to seal up the hole, and a mantle of secrecy dropped over the great egg.

Inside the giant sphere, where during construction hollow echoes bounced 'round and 'round off the curving wall until they merged with an incessant background roar, General Electric Company scientists from KAPL (Knolls Atomic Power Laboratory) will install a new kind of atomic engine in the ribbed-hull section. A vast tank for water will be built around the reactor portion. "This," explains one scientist, "is not a big bathtub to simulate 'ocean conditions,' as many folks like to imagine. It's additional shielding to absorb any stray radiation from the reactor."

Uranium rods are serviced for shipping in fuel-element service cell. Number references are on opposite page.
One day this year, the atomic furnace will "go critical," or begin its self-sustained chain reaction. Cranes, dollies and elaborate controls inside the huge globe will enable men to service their "hot" power plant remotely, and to eliminate the "bugs" in it. Sometime in 1955 or 1956, if all goes well, a similar atomic engine will be installed in the completed 300-foot hull of the Sea Wolf, now on the ways of the General Dynamics Corporation in New London.

Like the Nautilus, the Sea Wolf will be a revolution in underwater craft. Both of the submarines will reportedly burn about a pound of uranium fuel (a chunk the size of a golf ball) each month. Since atomic engines need no air to keep them going, as diesels do, these subs will be able to cruise below the surface without snorkels for weeks or months—limited only by the ability of their crews to "take it." "Around the world submerged" is the hopeful phrase you hear. The Nautilus' engine reputedly will drive her over 30 knots. Although both
have the same horsepower, rumor puts the Sea Wolf as high as 60 knots (destroyers make only 35 knots under ideal conditions).

Interior design of the atom-age underwater ships will raise the eyebrows of old submariners, accustomed to deflating their chests and sucking in their stomachs when passing each other in companionways, to whamming shins and foreheads against the rims of hatches made for midgets and to sleeping in crannies between and around live torpedoes.

Though a third of each sub's football-field length is occupied by atomic engine and propulsion gear, they'll have more and better use of precious space than any undersea craft known. They'll be the first subs with a full-fledged staircase for two-way traffic. They'll abound with unique design tricks. Crews will sleep in tiered, built-in bunks with foam cushions that convert to lounges when not in use. Each man will boast his own fold-away, Pullman-type lavatory with fluorescent lighting, built into his locker side. After chow, mess tables will fold away overhead. Behind a sliding panel in one bulkhead will be hidden movie projectors, TV, radio, record player and other equipment to make a recreation room. Bright-red leather seat cushions, yellow walls, soothing tans, greens, browns and soft lighting will replace the hospital-white enamel and glaring bulbs of the standard underwater fleet.

One of the trickiest features in the atom subs—besides their engines—is the fact that the helmsman will "fly" his ship like an airplane. In the control room of ordinary

A welder works on circular opening in which one of the entrance locks to sphere was placed. Another opening for emergencies is in the background.

An inch-thick 20-ton steel plate is hoisted into place to form sturdy shell for giant egg. Dangling projections beneath are built-in supports for catwalks that were later removed. Below, future atomic sailors study system that carries hot liquefied metal from atomic reactor to boilers.
subs during diving or surfaced operations, you'll find one man handling the bow diving planes, another at the stern plane controls and a third at the helm. Now these three positions have been linked to "single stick" control like an aircraft. The positions can, however, be handled individually in emergency, and ballasting is still a separate operation.

So much for similarities between the two new subs. What's different about the engine that will drive the Sea Wolf? And what's the idea of the gigantic egg from which it will be hatched?

"The Nautilus," explains Dr. Kenneth H. Kingdon, technical director of KAPL, "has what we call a 'thermal reactor.' The speeding atomic particles that create heat by collision with other atoms are slowed down by water. It might be called a 'slow' reactor, in contrast to the atom bomb, which is the 'fastest' reactor of all. The atomic pile that powers the engine for the Sea Wolf, on the other hand, will produce fissions by means of particles that have been only partly slowed down. It's called an intermediate reactor."

That, incidentally, is where the Sea Wolf's atomic power plant gets its project name, "SIR"—for Submarine Intermediate Reactor.

There's another difference, too. The Nautilus' power plant uses water to carry heat from atom pile to machinery. In SIR, the atomic pile will produce heat, but molten sodium metal will be used to carry heat to the boilers, where it will pass through a shielded exchanger to nonradioactive steam that can spin the turbines that turn the sub's propellers.

Instead of using regular pumps to push the radioactive fluid metal through the closed system, SIR's builders can use electromagnetic pumps with no moving parts that might break down. The metallic liquid can be pulled through the system by magnetic pulses from outside the pipes.

If air or water gets to sodium, it will erupt in violent flame. Hence, SIR's plumbing will have a super leak-detection system as a safety backstop. And for a superbackstop while the tricky engine is being constructed; General Electric built the giant sphere to house it.

"We believe nothing can possibly get out of hand," one of the GE project men points out. "—certainly nothing serious. But we're fooling with materials that are radioactive and flammable. So, to play extra safe, we decided to put our engine in a powerhouse that could be sealed up tight—like a big pressure vessel—to prevent anything from escaping."

That's just what the 3850-ton sphere does. Billowing out of the earth like a satellite come to rest, the vast steel ball enclosed 5,800,000 cubic feet of space. But you could pump an extra 8,000,000 cubic feet of air inside, and nothing would happen. The 682 plates of one-inch steel are built to withstand an inside pressure of 20 pounds per square inch (about what you put in your car tires).

You get some idea of the colossal proportions of the structure when Gordon Harman, one of the field engineers engaged in putting it together, leads you in through one of the two tiny entries. Both are small steel tunnels piercing smaller spheres that are inserted in the shell of the big sphere—like globular gun blisters in the side of a bomber. "Two spheres intersecting make the strongest kind of opening," Harman explains.

Ship-type hatches slam shut behind you with a resounding clang that booms back a dozen times from the interior of the giant orb. High overhead, the black steel dome is lost in blue haze. Harman reels off

(Continued to page 262)
Dome Car Has Upper Lounge

FULL-LENGTH DOMES top a set of new coaches designed for Santa Fe’s Chicago-Los Angeles and Chicago-Oklahoma City runs. Each of the streamlined lounge cars will seat 103 passengers—57 in angled seats on the upper deck, 18 in an upper lounge and 28 in a club lounge on the lower level.

Features of the car include fluorescent lighting, a public-address system for music and announcements, finger-tip-controlled doors and a solar control that automatically regulates dome temperature in relation to the amount of sunlight. Decoration is in bright colors.

MAY 1954
Landing and taking off, the Lockheed XFV-1 stands upright, using four fins as “feet.” Right, Popular Mechanics’ July 1949 cover forecast vertical take-off craft, with an article by helicopter manufacturer Stanley Hiller, Jr., explaining how they would operate. Hiller proposed rocket-powered ascents.

**Heads-Up Fighters**

TWO EXPERIMENTAL fighters, built to fly straight up from standing starts on their tails and then level off for conventional high-speed flight, are now being tested by the Navy. The Convair XFY-1 and Lockheed’s XFV-1 both land by backing straight down onto a plot of ground the size of a tennis court, or even onto the deck of a ship. The former has a delta-wing shape and the latter a modified straight wing. Each has been under construction for nearly three years and they are equipped with specially designed contra-rotating propellers, powered by twin-turbine Allison engines. A tilting seat permits the pilot to be semiupright while the aircraft is vertical and in his normal position during level flight. Because both planes land in an upright position, extra strength and weight were built into their tails. This also prevents them from being blown over when parked in a high wind. They rest on steel landing legs projecting down from shock absorbers. Convair’s plane, nicknamed the “Pogo Stick,” has undergone tethering tests inside a 200-foot-high hangar, climbing and descending on a steel cable stretched from floor to roof.

Initial thrust power of delta wing Convair XFY-1, below, almost equals that of four Sabre Jets at take-off.

---

\*\*\*
Special scaffolding in place for work on the Lockheed plane. Pilot will have to use a ladder to get in and out of cockpit.

High, old-style landing gear will be used on the XFY-1 during its first test flights and then discarded.
THAT FORD FX Atmos, the "dream car" with no engineering but lots of styling including pistol grips instead of a steering wheel, may not be such a flight of fancy after all. Edward R. Dye of the Cornell Aeronautical Laboratory believes that the steering wheel and its post may be replaced by aircraft-type levers.

Dye believes that cars eventually will be designed so the occupants will walk away from crashes occurring at 50 or 60 miles per hour. This will require car-body material that will absorb much more crash impact than today's steel does.

A psychological obstacle to sales has been public reaction to the dream cars and the promised beauty of next year's models, say some dealers. At the auto shows, the customers look at the dream cars and decide that the 1954 production models look mighty dull. So they decide to wait for next year.

"Putting the advertising so far ahead of the current models has sort of backfired," says one sales executive.

Chrysler has been so plagued with rumors that it will come out very early with 1955 models that it is issuing firm denials. It definitely will not happen, says Tex Colbert, Chrysler president.

Foreign-Car Sales Down

In 1953 imports of European-made cars declined one percent from 1952 after a series of annual increases. The decline began last June and continued gradually through December. Total European-car imports for 1953 were 29,178. The MG was the most popular, the Hillman Minx second, the Jaguar third, the English Ford fourth and the Austin fifth. The Volkswagen doubled its sales over 1952, but still didn't make the top five.

Detroit gossip about further mergers often includes some truck manufacturer. Actually, Nash has been doing development engineering on trucks for quite a while. Packard has in the works a V8 engine which could be the power plant for several cars should there be a further merger with American Motors (Hudson and Nash). One reason for the consolidation of independents is the economies that result from interchangeable components.

Chrysler surprised everybody (including itself) with the sudden success of its Plymouth-installed gas turbine (see page 107). Even the most optimistic engineers at Chrysler expected there would be delays due to minor operational problems once the turbine was installed in a car. But the whole power unit worked like a charm.

The company claims to have solved both the exhaust-heat and fuel-economy problems, but at this writing won't give definite figures about economy. Previous turbines have been extremely wasteful of fuel at low speeds and while idling.

The wonderful characteristic of the turbine is its high torque and power over a large speed range as compared with an internal-combustion engine. It may be that future cars will operate with only one gear ratio, the transmission being used merely for reverse operation. Other advantages include light weight, fewer parts (about a tenth of those in a conventional engine), no cooling system needed, electric ignition needed only for starting and a wide choice of usable fuels.

Be Careful of That Plastic Top

Ford advises new owners of the Skyliner with the transparent plastic top not to dust it with a dry cloth because the rubbing action sets up an electrostatic charge which attracts more dust. Also the top scratches easily if wiped while dry. Grease spots may be removed by rubbing lightly with a kerosene-dampened cloth, then washing with soap and water. Don't use acetone, carbon tetrachloride, alcohol, benzine or gasoline as they may soften the plastic.

Brake manufacturers contend that price-cutting tactics in the brake-replacement business have resulted in inferior materials showing up on the market. This includes both linings and hydraulic fluids. Apparently, you get what you pay for.

Of course, some original-equipment brakes offer more, or at least different, safety features than others, but the cold fact is that in the Daytona stock-car race almost all the cars suffered brake troubles at some time during the contest.

Another big problem is lubrication of the new high-compression engines. Valve springs are stiffer and caps lift higher in the new engines creating more friction, which means more wear unless the oils stand up under the terrific pressures. Factory engineers say no single oil has been produced to accomplish the results they seek.

POPULAR MECHANICS
Variable-Pitch Propeller for Outboard Motor

You change the pitch of a new outboard-motor propeller with a simple control lever. The variable-pitch propeller gives the boat a wide range of power and speed variations, both in forward and reverse. For example, you can set the motor to run at its most efficient speed, and use the propeller to cut down the boat speed for trolling. The control lever, mounted on the motor cowling, enables the operator to change the blade pitch without lifting the propeller out of the water. Various models of the propeller are available to fit standard motors from 3 1/2 to 10 horsepower.

You Can Be Your Own Highway Patrolman With Buzzing "Speedometer"

You will have no excuse for breaking the law when you equip your car with an audio "speedometer." The device attaches to the present speedometer cable and notifies you by intermittent buzzing when you exceed a preset speed limit. Of course, this limit is under your control. You set it into the machine at any time. To set in a speed, you merely drive your car at the desired speed and then turn a dashboard knob until you hear an intermittent buzzing. After that, whenever your car exceeds the speed, the buzzer warns you—the greater the excess, the louder the buzzing. It is designed to help you stay within the speed law in busy traffic areas where you can't take your eyes off the road to look at the speedometer. Also available is a dash-mounted light that flashes when you exceed the self-imposed speed limit.

Two-Piece Kit Seals Breaks in Plastic Garden Hose

Plastic garden hose is quickly repaired with a simple two-piece kit. The hose is cut in two at the leak, dipped in hot water and reconnected with a brass nipple that fits inside the hose. A rustproof steel clamp fits over the joint and snaps into place to form a permanent seal.

Computers Use Costly Metal

Metal that costs $2,000,000 a ton now goes into the small memory cores of high-speed electronic computers. But the individual sheets of metal have only 1/2 the thickness of a human hair. The metal is 79 percent nickel and four percent molybdenum, combined with steel.
1. **STAGGERED** front wheels of rotary power mower allow contour cutting on hilliest lawn. Handle brackets permit the handle to be removed easily for storage.

2. **LAWN TRIMMER** powered by electricity is operated from a standing position and is easy to maneuver. Slip clutch prevents damage to rotary cutting blade.

3. **ROBOT MOWER** is operated from a simple remote-control panel attached to a 40-foot cord. Motor is electric. Carrying arm keeps cord out of way when mower turns.

4. **LEAF BURNER** on wheels lets you burn leaves anywhere in the yard, ends piling and carrying. Shielding prevents heat damage to rubber tires or to the lawn.

5. **EXHAUST SILENCER** for four-cycle gasoline motors quiets power mowers, garden tractors, pumps, compressors and generators. It will not plug up with carbon, cause overheating or result in loss of power.

6. **SOIL AERATOR** replaces roller on power lawn mower, punctures turf with star-shaped spikes. The spikes leave small holes in the lawn which prepare the soil for seeding, aerate turf and hold moisture.

7. **ROTARY MOWER** that picks up its clippings blows grass and leaves into a lightweight catcher mounted on the chassis. Air blast compacts the load of cut grass, doubling the normal capacity of catcher.

8. **ADJUSTABLE SPRINKLER** can be set to cover any area between 10 and 50 feet in diameter. The double-headed sprinkler rotates on 22 ball bearings, assuring smooth sprinkling even at low pressures.

9. “**WHIP END**” garden hose connecting faucet with main hose saves wear and tear on the longer length, is inexpensive to replace. The short length, if left on the faucet, aids connection of the main hose.

10. **ROOT SOAKER** can water five widely separated shrubs or plants at once with multiple tubes. Soaker attaches to faucet or garden hose and consists of three nine-foot lengths and two twelve-foot lengths.
The OWNERS REPORT:

The true test of a car begins when the owner takes the wheel. Popular Mechanics asked Mercury owners from coast to coast about their cars. Here is what they say.

**New Overhead-Valve Engine**

"Very good. Idles rough at times, but may need a carburetor adjustment."  
Overhead Valve, North, dealer.

"I like the extra horsepower, but don't like the overhead valves. Noisy."  
Sanford, S.C., businessman.

"Good. I like solid valve lifters, but they are a bit noisy. Engine slow to start when hot."  
New Orleans, La., contractor.

**Ball-Joint Front Suspension**

"I like the cornering qualities."  
Klamath Falls, Ore., truck driver.

"I like it. No tire noise on curves."  
Boston, Colo., policeman.

"Seems to handle better on rough roads."  
New York, N.Y., farmer.

**Transparent Plastic Roof**

"Needs a curtain at times."  
Oxford, Kansas farmer.

"Excellent. A convertible without the wind."  
New York City Aviator.

"A very weird sensation to be driving through a snowstorm. Makes the car seem colder."  
Minneapolis, Minn., used car dealer.
MERCURY'S NEW V8 ENGINE
RATES HIGH WITH THE OWNERS

By Floyd Clymer

BIGGEST NEWS at Mercury for 1954 is its overhead-valve V8 engine, an all-new design that develops 161 horsepower. What do the owners think of it? Let's look at the results of our survey of 1000 Mercury owners.

More than half (56 percent) of the owners responding are enthusiastic about the power plant—have nothing but praise for it. About a third (30 percent) like the engine but with minor reservations. Only a small fraction (3 percent) state that the engine is disappointing. The other 11 percent are reserving judgment until later, they say.

"My '54 Mercury really has get-up-and-go over last year's model."—Greentown, Ind., bookkeeper.

"Wonderful pickup. Easy on gas. Doesn't take a back seat to competition."—Buxton, N. D., contractor.

"Reserve power of engine at high speeds is really tremendous."—Jacksonville, Fla., sales engineer.

"The way it performs from 50 to 80 miles per hour is what I like best. It will get you around a car and back on your side of the road with the best of them."—Silicoos, Ore., sawyer.

"I think it is going to hold up fine as I have already driven it hard for 8000 miles."—Richland, Ind., plant superintendent.

"I drove my 1954 Mercury at 105 miles per hour with five adults in it. It felt as safe at 105 as at 55."—Salem, Ore., lineman.

"Power is perfect for weight of car."—Oakridge, Ore., engineer.

What are the factors that make the engine just a little less than perfect, according to 30 percent of the owners? Valve noise and poor gasoline economy lead the list.

"A very powerful engine, but makes too much noise."—Brooklyn, N. Y., plasterer.

"Should get better gas mileage. Hydraulic valve lifters should be used to silence tappets."—New Orleans, La., fireman.

"Gas economy sacrificed for performance to too great a degree."—Newark, N. J., attorney.

Owners Report No Bugs in Engine

One of the frequently heard warnings to new-car buyers is to beware of a new engine in its first year because of possible bugs in production. Prospective buyers don't have to worry about this in the 1954 Mercury, according to the owners. There doesn't seem to be any chronic fault in the engine. Ninety percent of the owners have had no trouble at all. There were 10 percent who reported that engine work had been done, but in most cases it involved minor jobs like tightening down valve covers to stop oil leaks. Another fault among the 10 percent of engines that had to be worked on was automatic-choke trouble.

"Automatic choke sticks a lot and you
Owners in 21 states from Atlantic to Pacific report on the new Mercury's performance

Percentages from PM Poll of 1954 Mercury Owners

<table>
<thead>
<tr>
<th>OVER-ALL RATING OF THE MERCURY</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>by the owners</td>
<td></td>
</tr>
<tr>
<td>excellent</td>
<td>56%</td>
</tr>
<tr>
<td>good</td>
<td>36%</td>
</tr>
<tr>
<td>average</td>
<td>6%</td>
</tr>
<tr>
<td>poor</td>
<td>2%</td>
</tr>
</tbody>
</table>

Structural rigidity
- excellent 54%
- good 41%
- unsatisfactory 5%

Acceleration from 0 m.p.h.
- excellent 66%
- good 30%
- unsatisfactory 4%

Acceleration from 30 m.p.h.
- excellent 71%
- good 27%
- unsatisfactory 2%

New overhead-valve engine
- good to excellent 56%
- good with reservations 30%
- poor to fair 3%
- no comment 11%

BEST-LIKED FEATURES
- Engine performance 47%
- Styling and appearance 37%
- Ease of handling 36%
- Riding comfort 35%
- Roadability 23%
- Economy of operation 6%

MOST FREQUENT COMPLAINTS
- Body fitting and assembly 33%
- Low gas mileage 18%
- Engine—noise and carburetor trouble 7%
- Poor dealer service 7%
- Lack of interior room and comfort 5%

Owners with no complaints at all 11%

REASON THEY BOUGHT MERCURY
- Previous satisfactory Mercury ownership 25%
- Styling and appearance 23%
- Engine performance 21%
- Trade-in and resale value 9%
- Reputation and recommendation from other owners 9%
- Ball-joint front suspension 3%

Engine Faults Mentioned

But, overwhelming as the praise is, there were some owners who reported troubles. "Have had both heads blow gaskets and the transmission go out because of lack of dealer service." — Hermiston, Ore., truck driver.

"Just had a new block assembly installed (at 1200 miles) due to cracked piston which ruined the block. Both cylinder-head gaskets were leaking." — Gibsonville, N. C., service-station operator.

"Had a porous block. This defective en-

can't start the engine for a while." — Newark, N. J., chauffeur.

"Oil leak in valve cover. Gas leaks from carburetor on hard right turns." — Stillwater, Minn., physician.

There was no evidence of unusual oil consumption—a fault that sometimes shows up in our surveys of new engines. Only 5 percent of the owners state that they add more than one quart in each 1000 miles; 71 percent add no oil between changes; 5 percent add one quart. The other 19 percent did not answer the question.
Clymer says of the new Mercury suspension: "Corners can be taken at high speeds with little body roll."

gine replaced immediately with a new one. Car is now in good shape." — New York technician.

"Until I had different jets put in the carburetor, my best mileage was 13.1. Now it is 15.3. Spark plugs gave out at 3000 miles. Must use premium gasoline to keep engine from knocking." — Ellerbe, N. C., parts manager.

Among the tiny minority of owners registering dissatisfaction with the new engine, some claimed performance was little, if any, improved.

"Does not seem to have more than average power. Not as much as advertising claims lead one to believe." — Essex Falls, N. J., engineer.

"Takeoff and acceleration only slightly increased, though it does seem to climb hills with more ease." — Cleveland, Tenn., technician.

"Can't see where increasing horsepower to 161 has increased pep and speed at all over the old engine." — Atlanta, Ga., aircraft inspector.

Average Gasoline Mileage

There is no question but that many owners are disappointed in the gasoline economy of the new engine. It was second only to poor body assembly in the list of most-frequent complaints, with 14 percent saying gasoline mileage is too low. Average mileage of owners reporting was 13.4 miles per gallon in the city and 16.8 miles per gallon in the country (both figures for cars equipped with automatic transmissions). The owners of overdrive and conventional transmissions reported slightly higher averages. (See Percentage Table, page 104, for details.)

"I like everything about it except the gas mileage. I think I have a bum carburetor." — Clarksville, Tenn., club manager.

Clymer admires the new overhead-valve engine. Arrow points to power-brake unit available on Mercury.
“Surprised at low mileage obtained in city driving. Actually 4 miles per gallon less than a 1950 Mercury owned by my parents.”—Chicago truck driver.

“Got very good gas mileage on my ’50 and ’53, but am very much dissatisfied with mileage on the ’54. Had it back for service several times. They either cannot do anything about it or don’t know how.”—Tampa, Fla., contractor.

**Transparent-Plastic Top**

Mercury was the first production model to offer a transparent-plastic roof insert. It accounts for only a small percentage of the total ownership, but it is different and, therefore, of interest. Of the owners reporting, only 10 percent have the plastic-top model, the Sun Valley.

Generally, the reaction was enthusiastic. Most owners were happy that they bought the Sun Valley.

“You have the advantage of a hardtop, the next thing to a convertible.”—Johnson City, Tenn., owner.

“Excellent. A convertible without the wind.”—New York Naval aviator.

“Sure beats convertibles in this climate.”—Cary, Ill., railroad agent.

“Fine now, but in July and August?”—Flushing, N. Y., distributor.

“A lot of glare at high noon.”—Newington, Conn., pharmacist.

“It’s just a novelty. I would not buy this model again.”—Prospect Heights, Ill., salesman.

“A very weird sensation to be driving through a snowstorm. Makes the car seem colder.”—Minneapolis, Minn., used-car dealer.

**Ball-Joint Suspension**

General approval of the new ball-joint front suspension system was registered by the owners, with 79 percent stating that they like it, only 3 percent disliking it, 2 percent stating they could see no difference, and 16 percent making no comment.

“Greatest improvement in years. Steers and handles on curves at 60 as if only doing 35. Absorbs great deal of road shock.”—Irvington, N. J., law student.

“Like it due to no tire noise on curves.”—Boulder, Colo., salesman.

The 3 percent who dissented complained that the suspension is noisy at times.

“Knocks over rough roads.”—Detroit, Mich., repairman.

“Okay except when turning into a drive where there may be a small break in pavement at the curb. There is an extreme jerk on the steering wheel.”—Clearwater, Fla., manufacturer.

“I haven’t noticed any difference from

(Continued to page 250)
CHRYSLER ENGINEERS have done the "impossible." They built a gas-turbine engine that fits in a Plymouth without changing anything but a few brackets and, even more amazing, they have eliminated the bugaboos of high fuel consumption and high exhaust temperatures.

Secret of the new turbine is a regenerator or heat exchanger that uses hot exhaust gases to preheat the compressed air before it enters the combustion chamber, cooling the gases and, at the same time, increasing fuel economy. The trick was to make a regenerator that would be efficient and yet occupy little space.

The engine will burn a wide variety of fuels. In tests, unleaded gasoline was used and economy equaled that of a piston engine. Being pistonless, it has no knock problem, making unnecessary high-octane fuels.

Power output is 120 horsepower, but its torque equals that of a 160-horsepower piston engine. Having some characteristics of a torque converter, the engine could be used without a transmission. It is 200 pounds lighter and has one fifth as many parts as a piston engine.

Noise seems to be no problem. There is a noticeable hiss or whine, most of which comes from the front end, not from the exhaust. It is the sound of huge volumes of air being compressed by the whirling blades.

Production will depend upon the availability of strategic materials needed to withstand the high temperatures of the engine. Other big problems include costs of machining and fabricating these metals.
Streamlined Aluminum Upper Berth Clamps to Automobile Roof

Sportsmen, salesmen and vacationists can now add a comfortable upper bunk to their automobiles. A streamlined aluminum unit that fits firmly on any hardtop car roof serves as a weather shelter, a bed and an extra storage compartment. The metal top springs up to expose a canvas shelter with watertight Zippers on both sides, a screened window and a 48-inch-wide mattress. A light but sturdy snap-on ladder gives easy access to the bed. The unit is both dustproof and waterproof.

Crankcase-Oil Reservoir Fills Engine Automatically

You throw away the dipstick when you install a crankcase-oil reservoir system in your automobile. The system consists of a large jar that mounts on the firewall behind the engine. Two lengths of tubing run down into the crankcase through the dipstick hole. A third tubing hooks into the intake manifold for a vacuum supply. Whenever the crankcase level drops below the proper mark, oil from the jar is introduced to bring it back to the correct level. To check the oil level, you simply look at the jar. If there is oil in it, you have the proper amount of oil in the engine. When the oil level drops in the jar, you add a quart in the normal way and the excess oil is drawn up into the reservoir for storage until needed. Because the motion of the car keeps the oil level going up and down continuously, there is a constant interchange of oil between the crankcase and the reservoir, so you can also tell the condition of the oil in the system by inspecting the jar.
Models Replace Surveyors in Planning New Jersey's Highways

Using a method developed during World War II, the New Jersey Highway Authority has replaced the slow and expensive surveying method of highway planning with models based on aerial photographs. A 2000-foot-wide strip along the proposed route is photographed from an airplane using stereoscopic cameras. Contour maps are made from the three-dimensional photographs. Contours are traced on wallboard, cut out like a jigsaw puzzle and assembled as a scale model of the terrain. With the model, engineers determine the best route for the new highway, computing average elevation of the roadbed, plotting bridge sites and planning drainage systems.

Heart-Lung Machine Does Both Jobs During 26-Minute Surgery

For what is believed to have been the first time, a machine took over the functions of both the heart and lungs of a patient during surgery. The apparatus pumped an 18-year-old girl's blood and oxygenated it while one of the inner walls of her heart was sewed up. The operation took 26 minutes. Dr. John H. Gibbon, Jr., of Jefferson Medical College, Philadelphia, the inventor of the machine, performed the surgery.

Root-Crop Spray Prevents Sprouting

Potatoes and onions won't sprout in the storage bin if they are sprayed before harvesting with a new chemical. Absorbed by the leaves, the growth inhibitor works down into the bulbs, stopping further cell division. The spray, maleic hydrazide, is the same solution used to retard the growth of grass along lawn edges. Properly stored potatoes are kept from sprouting for up to 12 months, Spanish onions up to eight months.
13,000 Feet Under the Sea
In the French Bathyscaphe

Science reached new heights—or, more properly, depths—of exploration a few weeks ago when two French naval officers, manning one of the weirdest vessels ever constructed, plunged to a record depth of 13,284 feet under the sea. Called a bathyscaphe, it resembles a crude sub.

At midmorning the two men, Lt. Comdr. Georges Houot and Lt. Pierre Willim, dropped down through the conning tower and disappeared into a metal sphere fastened beneath the superstructure. Closing the hatch after them, they started the slow, vertical descent into the depths of the Atlantic off Dakar. No cable connected the vessel with the surface. About three hours later a guide rope beneath the bathyscaphe bumped the ocean floor, and the two men had set a new depth record for underwater exploration. Approximately two hours later they bobbed to the surface, determined to make other dives as soon as possible. The bathyscaphe is designed primarily for deep-sea research, and not just as a means of setting a new depth record.

Actually the vessel is a free balloon in reverse. The only watertight portion is the steel sphere, designed to withstand a pressure of 5,676 pounds per square inch. Most of the superstructure consists of tanks filled with gasoline. An opening connects these tanks with the sea water, so the inside and outside pressures are virtually the same. Since the gasoline is lighter than water, it remains in the top of the tanks and provides buoyancy for the vessel.

When the men are ready for a dive they enter the sphere through a vertical lock. The lock then is filled with water, causing the bathyscaphe to sink. The farther it sinks the faster it descends because the gasoline is compressed by the sea water.

Aboard the vessel are four containers filled with iron shot. This ballast gives the men a means of controlling the rate of descent and also of returning to the surface. They throw magnetic switches which cause the iron pellets to pour slowly out of the containers, slowing the descent. When the divers are ready to leave the ocean bottom they dump more ballast until the bathyscaphe becomes lighter than the sea water (because of the gasoline) and begins to ascend. In this way the state of near equilibrium between the weight of the vessel and the buoyancy of the gasoline can be controlled.

The greatest known ocean depth is 35,435 feet, and the men believe that depth can be reached in a bathyscaphe.

Popular Mechanics

Ten-Foot X-Ray Picture Reveals Minute Flaws in Steel Castings

Just to show how big an X-ray picture they could take, technicians at an Allis-Chalmers laboratory in Milwaukee used a single film 10 feet long and 40 inches wide. Subjects of the picture were two big-game rifles which were suspended eight feet above the film and four feet below the X-ray source to magnify the image three times. A 22,000,000-volt betatron swept an X-ray beam back and forth along the length of the rifles to produce sharply defined images of both guns. The film lay on a fiberboard platform and was covered with a sheet of 16-gauge steel which absorbed secondary radiation and served as an intensifying screen. After the exposure, the film was developed and fixed in three 90-gallon rectangular tanks. The experiment demonstrated the ability of the method to reveal minute flaws in steel castings.

Electronic System Used By Air Force Lands 120 Planes Per Hour

Called "Volscan," a new automatic control system developed by the Air Force can handle 120 incoming aircraft per hour, compared with a top of about 40 which can be brought in by manual systems. It was designed to avoid the "stacking up" of jet aircraft at busy bases since their rate of fuel consumption increases rapidly as soon as they lose altitude. At Fort Dawes, Winthrop, Mass., the control room is in an underground concrete bunker, hundreds of yards from the radar truck and antenna.

"Volscan" radar truck and antenna are hundreds of yards from control room, right, in underground bunker.
ONE OF THE strangest buildings ever constructed, it stands on stilts, its thin concrete roof pulled taut around the entire structure like the canvas of some ultramodern covered wagon. Beneath the roof, ionization chambers and automatic neutron counters keep a 24-hour watch on the cosmic rays that strike through the thin concrete with virtually no interference.

The building is the Pavilion of MAY 1954
Cosmic Rays at the University of Mexico. In a way, it symbolizes the rest of the campus, for here, blazing with color, are some of the most unique school buildings ever to welcome a student.

"Magnifico! Fantastico!"

This year tourists and educators from many parts of the world are echoing those words as they visit the new campus.

Recently housed in an assortment of ramshackle structures, North America's oldest university has just moved into the brand-new group of buildings conceived by Mexico's greatest architects and engineers and dedicated to the proposition that school buildings can be beautiful as well as useful.

The results are so spectacular that most visitors feel a real envy for the 25,000 students who will be studying literature or engineering, architecture, medicine or other courses on the new campus.

The university traces its history back to 1551 when the "University of New Spain" was granted a charter by the King of Spain. Shortly afterward the name was changed to the "Royal and Pontifical University of Mexico" and was supported by endowments from Mexico's gold mines. The school was abolished during various revolutions, and in recent years has operated on funds from the sale of land grants. The present campus consists of more than 1500 acres of ancient lava flows, called the Pedregal, at the southern edge of Mexico City.

The new campus represents the largest...
single construction project in Mexico since ancient times and was built at record speed. It was started in 1950 during the regime of President Miguel Aleman, and a huge statue of him stands at one end of the main esplanade. Most of the buildings are of the modern “international” style. The stadium and some of the sports facilities are deliberately styled to resemble Mexico’s volcanoes and her ancient Indian pyramids.

About $25,000,000 has been spent to date and a similar sum is being used for furnishings and equipment. The whole project is so vast that it is known officially as “Ciudad Universitaria” or “University City.” Eventually a civic center complete with stores, markets and theaters will be erected for the convenience of students and professors.

The magnificent new stadium is suitable for football and for all track and field events. Authorities hope Mexico will be chosen as host for one of the future World Olympic Games. Some coaches don’t believe their seal-level athletes could put on a good show in the 7500 foot elevation of Mexico City, but Mexicans explain that almost anyone becomes acclimatized after about 10 days in the thin air. Most Olympic teams spend that much time in practice at the scene of the games. Next year the Pan American Games, comparable to a regional Olympics, will be held at the university.

In designing the stadium the engineers noted that everyone likes to sit near the 50-yard line, so they created a structure that is low at each end and has a high sweep along each side. This puts more than the customary

Huge Olympic Stadium was designed to resemble the crater of a volcano. High sides are opposite the mid-field marker, giving more of the spectators seats on the 50-yard line. Seating capacity of the stadium is 103,000
Entire end of one science building is a painted mural which depicts the combining of knowledge from various civilizations. Bas-relief by famed artist Diego Rivera decorates side of stadium. It is made of thousands of pebbles stained with acids number of spectators in the most desirable zone. Seating is in two tiers, with a capacity of 108,000.

The stadium was shaped by scooping out soil and lava rock from the middle and using this material to build embankments along the sides. Not only did this method cut ordinary construction costs by more than half, but it provided a desired craterlike resemblance to Mexico's volcanoes. Very little steel or concrete was required except for facing the compacted dirt fills and for the cantilevered balcony and the 48 access ramps and tunnels.

The stadium has a complete floodlighting system, a public-address system that reaches all areas, a 200-foot-long press box and outlets for television cameras at strategic points in addition to telephone, telegraph and typewriter facilities.

On another part of the campus are an eight-lane Olympic championship swimming pool, a huge practice pool and a championship diving pool. All three pools are connected by water channels spanned by low bridges. Casual swimmers can wander from pool to pool.

The water is heated, chemically purified and automatically circulated. The championship diving and swimming pools have underwater lighting and underwater...
Mounted on stilts, the Pavilion of Cosmic Rays houses automatic neutron counters and ionization chambers windows from which the coaches can watch the form displayed by their students. Spectators were seated on a few rows of stone steps when the pools were first used. After the first big water meet was held it was found necessary to add a spectator stand.

Other sports facilities on the campus include a baseball stadium with seats for 3000 spectators, a practice stadium for field and track with bleachers seating 4000 people, three practice fields for soccer or (Continued to page 242)
SLEEPLESS NIGHTS and sweltering days don't have to be a part of the "good old summertime," as more Americans are finding out every year. Air-conditioner sales are skyrocketing. Many people, because of cost or a radiator-heating system that can't be converted to central air conditioning, are installing room air conditioners. The 1954 units not only chill a room, but dry and filter the air, and can be set to bring in fresh air or exhaust stale air. Some are regulated by thermostat and some can be run at reduced speeds for quiet night operation. Optional features include heating coils and heat pumps for spring and fall and a device that switches the unit on at a preset time. Costs range upward from the $200 price of the smallest unit.**
Carrier's portable, designed originally for hospitals, is also handy for anyone who wants his bedroom cooled at night and his living room air conditioned during the daytime.

Diagram shows how a unit soaks up heat on one side, blows it out the other. Heat pump—now on many models—just reverses flow with valves. Compressing refrigerant releases heat.

Fabric-covered International Harvester blends with decorating scheme, can be covered with any drapery material. General Electric, below, offers increased cooling and dehumidification, quiet, gentle air flow.

Flush-mounted Mitchell projects only two inches into room. Special insulation muffles sound. Coils supply heat for fall and spring. Fedders has lift-out glass-fiber filter, grille that is turned to direct air flow.
Midget Pusher Sports Plane Can Fly 200 Miles Per Hour

Less than six feet high and only 18 feet long, a midget pusher-type aircraft has made its initial trial flights at Los Angeles. The builders, Hugh Crawford and Roger Keeney, estimate the 85-horsepower Continental engine will provide a top speed of 200 miles per hour and a cruising speed of approximately 165 miles per hour. The tiny sports craft, identified as the Serra S-1, has a wing span of 20 feet.

Portable Chest Unfolds to Provide Table for Drawing or Drafting

All the supplies for drawing or drafting can be packed away in a portable chest that opens to provide a convenient working surface. The chest has adjustable drawers for holding bottles of ink and paints, brushes and paper. It may be placed on a table or self-supported on three legs which unfold.

Tiny Railroad With Only 156 Feet of Track Spans Oceans

Though its route length is only 156 feet, one of the world’s most unusual railroads has been operating between Korea and America for more than a year. It is an HO-gauge type, owned and operated by crew members of the aircraft carrier USS Lake Champlain. The model railroaders operate their colorful handmade engines and cars in a space about 70 square feet. An elaborate electric block system, employing 21 electrically operated switches, is used throughout the trackage. The control panel, mounted on red Plexiglas, is entirely homemade. The layout includes a passenger terminal, a freight yard and a village.

POPULAR MECHANICS
Aircraft Engine and Propeller Blow Aluminum Craft Along Water

Literally blown along the water by an aircraft engine and propeller, a homemade aluminum boat skims the surface at speeds up to 40 miles per hour. Albert A. Johann and his son Jack, both of Milwaukee, Wis., built the boat in their spare time. More than 5000 rivets went into the construction. Power for the craft is supplied by a four-cylinder airplane engine which turns a five-foot propeller.

Electrons Photograph Stars to Produce Sharper and Faster Pictures

Clearer and faster pictures of the stars are made by a new method that combines electronics with photography. In the usual method, light from a star is focused through a telescope on a photographic plate. In the new method, developed in France, the light strikes a light-sensitive plate which gives off electrons. On the average, the plate emits one electron for every four photons, or units, of light. The electrons are focused on a target photographic plate by a potential difference of 30,000 volts to produce the picture. When light falls directly on a photographic plate, only about one out of every 200 light units causes a reaction, so the new method has a 50-to-1 advantage over the conventional method. Its advantages resemble those of the electron microscope.

Transparent Plastic Boat Passes Tests in France

Completely transparent, a plastic boat built by Jacques Joham of Paris has been successfully tested in France. It is 13 feet long and weighs 390 pounds. It seats four comfortably, and is powered by outboard motor.
Radio Waves Hold Robot Helicopter in Fixed Hovering Position

Remotely controlled by radio signals and an automatic pilot, a helicopter has been held in a hovering position over a selected point to an accuracy of better than five feet. The aircraft was controlled with equal precision at both low and higher altitudes, and was landed several times within two feet of the central point. Four ground-relay stations using Raydist, a continuous-wave radio-location system, were used for the demonstration with a twin-rotor helicopter. A transmitter was installed in the helicopter. Signals from two Raydist stations were compared in one instrument to indicate longitudinal movements of the helicopter, while signals from two others were compared in a second instrument. Any deviations from the preset control pattern caused the autopilot to reposition the craft.

You Can Assemble Your Own Four-Bunk Vacation Trailer With Kit

Following the trend started by the motorboat industry, vacation trailers are now being sold in kit form. You buy the trailer as a collection of precut parts, some of which are partially assembled, and put it together yourself. Birch paneling for the interior is supplied as well as aluminum exterior sheets, door and windows. Everything needed to assemble the trailer is included except tires and tubes. Once assembled, the trailer has ample headroom as well as space for a dinette, kitchen area, a closet and bunks to sleep four persons. Interiors are furnished by the owners.

Information not listed on articles in the index, starting on page 12, frequently is listed in the WHERE-TO-FIND-IT LIST, which is available to readers without charge. A copy may be obtained by sending a postcard to the Bureau of Information, Popular Mechanics Magazine, 200 East Ontario Street, Chicago 11
Rear-Engine Auto Carrier
Mounts Bunk Under Cab

Instead of an engine, a sleeping bunk for relief drivers is mounted beneath the cab of a snub-nose auto carrier. The 200-horsepower horizontal-type diesel engine is located low in the frame midway between the front and center wheels. The unusual design allows an additional car to be carried above the cab. The motor has two radiators located just behind the front wheels; the vent at the front of the truck is a fresh-air intake for the bunk. Clearance height of the loaded unit is 12½ feet. Cost of the custom-built carrier: $21,000.

Mexican Suspension Bridge Built in Shape of Basket Handle

Slender arch ribs shaped like the handle of a basket support with cables a 250-foot bridge spanning the Rio Blanco River near Vera Cruz, Mexico. The all-welded bridge was built by Mexicans from an American design. Strength and safety factors are as high as conventional constructions. The bridge flooring is a diagonal gridwork. As striking as its design is the bridge's color scheme—bright orange and cherry red.
A NEW LOOK for offices and homes of the future is promised by a process of fusing brightly colored porcelain enamel to aluminum.

Edward Winter, a pioneer craftsman in the field of enameled metal, is conducting a test of the new process in Cleveland.

In three months he designed and completed a full line of dinnerware attractive enough to hang on the wall and so durable that it can be dropped on concrete without denting or scratching. Another Winter product is an enameled aluminum panel that may some day be used to surface the interior walls of offices and homes. Finished plain or with a design, in one or several colors, the panel could also be used in lawn furniture, stoves or table tops.

Winter starts with sheet aluminum, cutting it to shape and molding it to form on lathes. The metal is dipped in dilute sulfuric acid and rinsed in a hot alkali bath.

Pieces are baked in a huge box-type furnace, receiving four six-minute firings at 1000 degrees Fahrenheit

By William Dinwoodie

Winter exhibits brightly colored bowls, plates, tumblers, plaques, trays and panel of fired aluminum. Designs are cut through the enamel or consist of gold-leaf decoration.
Spraying with colored enamel base follows. A dentist's sharp-edged prober is used to scratch out the design in the enamel. Then, after a 30-minute drying period at 350 degrees Fahrenheit, the article is fired at 1000 degrees for about six minutes in a large furnace, and this step repeated three or four times. Exposed parts of the design are polished, and the edge polished and stoned.

Prior to decoration bare aluminum bowls are stacked in dipping rock and pickled in dilute sulphuric acid with a dental tool Winter cuts design in opaque enamel surface of mixing bowl to expose aluminum beneath.
Train for Turkey Has Compact Diesel Engine Built Into Truck

Virtually the entire diesel engine of a new European train is built into the truck. The train, built in Germany for the Turkish Railways, has three articulated coaches. The compact 12-cylinder diesel engine is installed between and above the two axles of the front truck. Both axles are drive axles. Above the engine is the cooling system and the fuel supply. The three coaches are made of lightweight alloys to reduce weight and thereby boost the horsepower per ton. There are two engines in the complete train, each developing 550 horsepower at 1500 revolutions per minute.

H-Bomb Element May Help War on Cancer

Cancerous tissue cells may soon become the most important targets of hydrogen-3, or tritium, which has gained such ill fame as the main constituent of hydrogen bombs. According to Dr. Dietrich E. Beischer of the U.S. Naval School of Aviation Medicine, its radioactivity may be used to remove cancerous cells without damaging normal cells. Tritium, now available in quantity, has an extremely short range of radiation, making it particularly suited to the selective destruction of cancer cells. Certain chemical compounds are taken up by cancer cells more readily than by healthy cells. If these compounds are "tagged" with tritium, the short-range rays will reach only the cells which take up the compound, leaving other cells undamaged.
"Tennis Net" Crash Barrier Halts Jet Planes at End of Runway

Similar to an aircraft carrier's arresting gear, a new "tennis net" barrier keeps airplanes from rolling off the end of the runway after landing. It was developed by the Air Force for use on tiny airstrips in Korea, primarily to halt crippled jets after emergency landings. When the nose of a plane touches the nylon net it triggers an arresting cable that engages the main landing gear. The cable drags heavy chains along the sides of the runway to slow the plane's roll.

Plastic Pinochle Tally Keeps Changing Record of Game Progress

Score, trump, bid and meld information are recorded on a flat plastic pinochle tally that fits in the hand. As the game progresses, numbered wheels inside the double card are rotated to expose the proper number combinations. An automatic locking mechanism prevents rotation of the disk when the device is placed on the table.

Information not listed on articles in the index, starting on page 12, frequently is listed in the WHERE-TO-FIND-IT LIST, which is available to readers without charge. A copy of this list may be obtained simply by sending a postcard to the Bureau of Information, Popular Mechanics Magazine, 200 East Ontario Street, Chicago 11, Illinois.

MAY 1954
IT'S MIGHTY ROUGH tonight." The young seaman of the U. S. Coast Guard's Triumph looked worried. But John Cathers, stocky chief boatswain's mate and skipper of the motor lifeboat, grinned reassurance. "Plenty rough—and that's good. None of these fishing boats will try crossing the bar till flood tide ... I hope."

The bar was one that seafaring men from 'round the world have talked about—respectfully if sometimes profanely—since 1792. That was the year Captain Gray, a Yankee fur trader, sailed his ship Columbia—after many frustrating attempts—across the bar. It lies at the mouth of the Columbia River, which gathers strength for 1210 miles through seven western states, and smites the sea between Washington and Oregon shores. At crest periods, a million cubic feet of water per second rushes against the sea. And the mightier sea pushes back with its tremendous force.

This then—with the linked coastal areas—has been called the "graveyard of ships." More than 150 ships lie buried there. But ship deaths have been few in recent years, due in good measure to the rugged men of the U. S. Coast Guard and their rugged craft such as the Triumph—Semper Paratus, "always ready."

"Look, skipper ... that crabber ... she's heading in. Somebody aboard must have a heavy date in Astoria."

Cathers didn't bother with reply, but ordered full speed ahead. Soon both Triumph and crabber were being smashed by waves that shivered timber and men. Roaring...
GRAVEYARD OF SHIPS

down upon the crabber came a 15-footer. When the crabber nosed clear, its engine was dead.

"We'll have to get a line aboard her," said Cathers.

And get a line aboard they did. The crabber, with soaked crew of two, was towed back out to sea.

"You fellows all right?" megaphoned Cathers.

"Yeah. We got plenty of time to get the engine started—now."

"Just routine" is the way this incident was described to us as we sat in the snug warmth of the Coast Guard station at Point Adams near the mouth of the Columbia. But it's just such routine as this—along with expert shepherding by members of the Columbia River Bar Pilots Association, millions of dollars spent in jetty construction and channel maintenance, and modern technical equipment—that has cheated the graveyard of many a corpse.

Most persons think of the bar as merely a thin strip to be crossed to safety. But, at its mouth, the Columbia is more than five miles wide, and the bar area, where fresh and salt water come to grips, extends out about six miles. Millions of tons of shifting sand have been deposited at the mouth of the river and it has been a continuing engineering problem to keep clear a main channel—about 40 feet deep and some 2000 feet wide.

If there were headstones for the buried ships they would carry many distinguished names—Tonquin, Isabella, Desdemona, Great Republic, Peter Iredale, Peacock... The Peacock—now, there was a sturdy craft. She was a United States Navy ship, an 18-gun sloop of war, which started across the bar July 18, 1841. Missing the main channel, she plowed into sand, and was fast at the mercy of pounding waves. Desperately, the crew pitched all cargo overboard. Cannons and shot went, too.

Then the anchor chain broke, and the Peacock twisted broadside to the waves. The pounding grew more intense, pumps clogged, crew members struggled on the gun deck in water to their waists. The ship's launch—last hope of escape—was washed away. Then riding high, came a huge Indian war canoe. In two trips, the natives aboard paddled all seamen to safety, but the Peacock was gone.

Then there was the Mindora, 400-ton coastal freighter, noted for her long wait—28 days—to cross the bar in the winter of 1853. Food and water ran low, mutiny threatened...

By Rafe Gibbs

MAY 1954

Lighthouse on Tillamook Rock, a little "Gibraltar" 18 miles south of river mouth, helps warn ships
threats high. On Jan. 12, a temporary calm prevailed, and the Mendora tried the crossing that was her last. Crew members escaped in a lifeboat.

Tragedy marked the crossing of the trader Industry in 1865. When she cracked up in a storm, some crew members and eight passengers set off in two rafts. Six of the passengers, including a 12-year-old girl and four crew members, were swept overboard. A fifth crew member died of exposure.

On Jan. 19, 1947, the steamship Drexel Victory struck an obstacle that cracked her hull and eventually sent her down. It is believed the obstacle may have been the iron skeleton of an early wreck.

The Coast Guard's Triumph helped rescue the crew during the night of the Drexel Victory's demise. But it is the prevented wrecks in which the Coast Guard takes particular pride. "Cheating the graveyard," they call it.

We asked Chief Boatswain's Mate Cathers to tell us of a day with the Triumph. But he insisted first on talking about the Triumph herself—for good reason. There is only one more like her in the entire Coast Guard, and this sister craft also plies Northwest waters, working out of Grays Harbor, Washington.

Nonsinkable, noncapsizable, the Triumph is a 52-foot motor lifeboat, double-planked with mahogany and teakwood for sturdiness. Her frames are of bent oak. Her electronic equipment, including
Coast Guard crew from Port Adms struggles to pull a pleasure craft from rocks and cheat the graveyard depth and direction finders, is the last marine word. She is powered by an eight-cylinder, 170-horsepower diesel engine. In her are seven watertight compartments—any two of which will float her. On the keel is fastened a seven-ton piece of bronze as a counterbalance.

"She's rolled over 100 degrees in the curl of a breaker—without capsizing," said Cathers.

A day with the Triumph?

"Well, I'll try to make short a day that turned out to be a long one," nodded Cathers, downing coffee that would—and did—scald your correspondent. "Early one morn-

broken and twisted lumber schooner lies aground in the turbulent waters near mouth of Columbia River

ing we went out to Tillamook Rock to service the lighthouse there. There were southeast storm warnings, but not too serious—then. Heading back we got a distress signal from the fishing craft San Antone.

"A 70-foot dragger, the San Antone was disabled 10 miles northwest of the Columbia Bar. We took her in tow, and started across the bar on the first of the ebb tide. Then the winds came—60 to 70 miles per hour. Gusts up to 80. For three hours all we did was hold our own. We rode out swells ranging up to 40 feet in height. It was 3:30 a.m. when we towed the San Antone into safe harbor. We didn't have a

MAY 1954
dry stitch on us for more than 13 hours. Say, the coffee tasted good—when we finally got a cup."

Commercial-fishing boats—and there are hundreds which work out of Astoria—give the Coast Guard the most business. Bigger craft can stand rougher water, and they are usually under the guidance of Columbia pilots who know the bar like an old friend

or treacherous enemy, as the case may be.

Probably the most red-faced fisherman was the one who got lost in the fog recently while coming into the river on a strong ebb tide, and happily sighted a big vessel ahead of him. For hours, the fisherman kept his boat just behind the other ship. Came the sun, and the fisherman saw what he had been "following"—the Coast Guard’s lightship Columbia, which stays anchored the year-round out in the mouth of the river. The current had been just strong enough for the fisherman to think he was moving.

Then in the summer comes Astoria’s famed Salmon Derby. Several thousand boats a day clog the mouth of the Columbia as fishermen seek the biggest of king salmon.

"A man could almost cross the Columbia by leaping from boat to boat," said Chief Boatswain R. C. Van Hiene, commander (Continued to page 230)
Air Force Sergeant Builds Convertible for Son at Cost of $125

Powered by a motor-scooter engine of four horsepower, a miniature convertible was built by M/Sgt. Charles E. Robinson of Nashville, Tenn., for his eight-year-old son. Total cost of parts was $125. The frame of the car is made of two-inch pipe, the body of galvanized sheet metal and the radiator grille of heavy wire mesh. It has a 53-inch wheelbase. Top speed is 20 miles per hour, but a governor holds it down to 10 miles per hour when the boy is driving. The gasoline tank holds one gallon, making a full tank cheap even at today's prices.

Working Model of Columbia River Steamer Complete to Last Detail

When George Young of Seattle saw a picture of the Harvest Queen in Tom Riley's article, "The Sternwheeler Still Rules the River" (PM, June 1948), he started work on a six-foot replica of the famous Columbia River steamer. After 13 months he produced an exact model scaled at 1:32 with tiny gangplanks, fittings, berths, boiler and engine. In the ship's lounge are armchairs, tables and lamps—even a grand piano. Lights go on in the cabins and artificial smoke pours from the stack. An electric motor drives the paddle wheel which can push the craft along at 18 miles per hour. The boat is "moored" before a replica of the old-time Astoria, Ore., wharf.
A SELF-SERVICE lumberyard in Van Nuys, Calif., makes it easy for home-workshop enthusiasts to pick out just the materials and tools they need for any job. It's one example of a new kind of business that is springing up around the country.

All types of lumber are stored in open racks, with each kind and grade of wood clearly marked on a placard, together with the price per foot or per piece. On a busy Saturday afternoon (the yard does 60 percent of its business on week ends) you'll find stars of radio, television and the movies mingling with other customers who may have driven 50 miles to make purchases.

The idea got its start three years ago when Ed Goldsmith was placed in charge of retail sales. One of the first things he did was to dress up the small area in the yard office where building sundries were on display. Since then the whole building has twice been doubled in size to accommodate sales that have increased up to 100 per-
Yard employee cuts lumber to exact specifications of customer. Another employee will itemize materials that you need to install a shelf or build a house.

Retail store includes thousands of items displayed in self-service racks and bins. Decorators' corner includes paint, supplies, even adhesive wallpaper.

Customers can find the details of almost anything they want to build from Popular Mechanics do-it-yourself books and other publications in library.

MAY 1954
cent every few months. The whole yard has been revamped to cater to its home-workshop trade. Now Goldsmith finds that space is running short once more.

If you visit Neiman-Reed you'll find an attractive retail store with thousands of items displayed on self-service racks and bins. Complete lines of electrical and plumbing supplies are on view, as are paints, garden equipment, power and hand tools.

Out in back, near the racks on which lumber is stacked, is a "bargain pile" of scrap wood that once had to be burned. In it you may find just the small piece you want, priced at a few cents. Out in back, too, is a big table saw on which a yard man will trim your purchases to the exact size you need.

Ed Goldsmith attributes the fantastic growth of the self-service lumberyard to three kinds of service in particular. One of these is the library corner where Popular Mechanics do-it-yourself books and similar publications are loaned and sold. Here a customer can find necessary construction details.

If he needs still more advice he can get all he wants, free, from a builder who is on duty every weekend. The third service concerns hours. The yard is open on Saturdays until 5, on Sundays until 2.

It is estimated that home-workshop enthusiasts spend half a billion dollars a year on their hobby, and Ed Goldsmith is ready to believe it.
TV Links Bank and Branch To Speed Operations

Closed-circuit television, a telautograph, and an intercom system link a branch office with the New York Savings Bank. Bank officials say that the hookup cuts personnel requirements, 25 percent of the operating costs and half the floor space that would ordinarily be needed by the new branch bank. The telautograph allows you to write your name at the branch office and have it duplicated by a writing machine at the main bank. Signatures and balances recorded at the main bank are photographed with a television camera and the picture sent by coaxial cable to a receiver at the branch bank for checking.

Quickly Erected Portable Grandstand Will Seat Nine Spectators

For field trials and events held where there are no stadiums, a portable grandstand devised by an English family may be the answer. Nine persons can be seated on its three levels. The device can be carried in a station wagon and erected in a few minutes.

Silicon Transistor

Silicon instead of germanium is used to make a transistor that should solve a pressing heat problem in airborne electronic equipment. Germanium transistors can't resist the heat of conventional vacuum tubes in such compact installations. Silicon is also far cheaper than germanium, which costs $500 a pound. Not yet in production, the indium-coated silicon transistor, developed by Philco, must wait until improvements can be made in silicon refinement.
RESTORING ANTIQUE CARS
IS MY HOBBY

By Frank Stokes
As told to Andrew Hamilton

AS THE OWNER of a small orange grove in Covina, Calif., just about 25 miles east of Los Angeles, I do a lot of swapping with other citrus growers. One day in 1944, while trading some farm equipment, I acquired four 30 x 3 1/2 tires. I couldn't use them, so I advertised them for sale.

Next day when a man bought them without haggling over price, I was curious.

“What are you going to use those skinny little tires on?”

“Got a 1910 Brush,” he replied. “These will fit perfectly.”

I didn’t realize it, but the antique-car bug bit me right then. A couple of weeks later, I found a 1906 two-cylinder Buick for sale in a Claremont garage for $150. It was in pretty bad shape, but I hauled it home on a trailer. During the next few months I found a good radiator, had some fenders made and replaced the tires. I was hooked — good.

Since the end of World War II, the hobby of owning and restoring antique cars has snowballed. (“Antiques” are usually considered of pre-1915 vintage.) Today there
are about 3000 old-car fans in the United States and 300 in southern California where I live—perhaps the most active center in the country.

It used to be that antique-car collectors were mostly well-to-do personalities but today you'll find them on all social and economic levels.

Most antique-car fans belong to one or more of the three largest clubs—the Horseless Carriage Club, the Antique Automobile Club of America and the Veteran Motor Car Club.

These clubs are valuable because they publish magazines with information about old cars and parts suppliers and sponsor meetings at which you can get acquainted with other hobbyists and hear talks by old-time auto builders. In addition, they sponsor trips in antique cars.

The Horseless Carriage Club each summer runs at least one long week-end trip—to San Francisco, to San Diego or to Riverside and Long Beach. Our club also meets once a year for an annual field meet—where cups are awarded for the best restored cars and races are held.

But the biggest thrill I get out of the hobby is fixing the cars up—nursing an old piece of junk back to the proud status it once enjoyed. In the past 10 years, I've had about 25 old cars—including some dimly remembered names like Pope Hartford, Flanders, Metz, Overland, Burtnett-Brunell and Saxon, and more famous ones like Model-T Ford, Stutz and Pierce Arrow.

One of my most interesting cars was a 1911 Cadillac that I picked up for $400 along with a 1917 Franklin. I traded the Franklin to another collector but the Cadillac I kept. Then, the Cadillac wasn't the prestige car that it is today, being out-ranked by Locomobiles, Pierce-Arrows and others. But with a coat of Brewster Green paint, the upholstery refurbished, brass lamps polished, a new set of tires and a new top on it, the Cadillac was a Queen of the Highways.

Another interesting antique of mine, believe it or not, is a Tucker. This one was built about 1900 by J. O. Tucker of Santa Clara, Calif., and it bears no relation whatsoever to the ill-fated Tucker car of the post-war years.

J. O. Tucker built exactly six Tucker-mobiles and the curator of the Los Angeles County Museum has helped me to establish the fact that mine is No. 2. It looks like a
Two hobbyists discuss the restoration of a 1904 Cadillac

There's no crowding when the family goes for a drive in a 1911 Winton

The author and his wife, wearing the styles of the year, pose in front of their 1911 Cadillac

Model T Fords, like the 1914 model, are popular with collectors because so many are still around
real “horseless carriage”—with a 5-horsepower, two-cylinder opposed engine under the seat, a tiller instead of a steering wheel and a crank on the side. It passed through several hands before I bought it from a dealer in Long Beach for $350.

A recent trend in old cars is the sudden popularity of what are called “classic cars”—roadsters or touring cars built in the period approximately 1925-1942. They include such proud old names as Rolls Royce, Pierce-Arrow, Lincoln, Cadillac, Duesenberg, Stutz. The Classic Car Club of America was organized recently and already has nearly 1000 members.

About three years ago, I picked up one of these “classics”—a 1929 Rolls Royce Ascot Sport Model Phaeton, which originally sold for $25,000. The previous owner had spent $1500 trying to get it back into good running shape, but he hadn’t realigned the brakes properly, had left some parts out of the carburetor so that it coughed and sputtered and couldn’t make more than 45 miles per hour. He had put the steering assembly together wrong so that it turned only to the left.

After I’d taken this Rolls off his hands, I tore it apart and reassembled it. I had been afraid that the aluminum head was pitted (it will do that unless you use distilled water), but it wasn’t. The motor was in excellent shape. But I did have to write to the Rolls Royce headquarters in England for new parts and exploded views of the carburetor. The one-shot lubrication system was fouled up. But all that was wrong with the steering assembly was that the Pitman arm was hooked up wrong. It now runs perfectly.

When you fix up an antique or classic car, you can figure on putting out up to $1000 or more—depending, of course, on what shape it’s in and how much of the work you do yourself. But most antique-car hobbyists look upon this not as an expense but as an investment. You can realize much if not all of your money out of the deal any time you want to sell or trade— and antique-car fans do a lot of both.

An antique-car fan usually specializes in one or two kinds of car restoration. My particular bent is mechanical and I like to repair motors. Some like to do the leather-upholstery work, some like to cast hard-to-find parts, some like to paint. Very few are skilled in all phases of restoration. So when one of my cars needs painting or upholstering, I send it to a member of the Horseless Carriage Club who specializes in that sort of thing. A hobbyist himself, he’ll take infinitely more pains with the job than a regular commercial outfit with no knowledge of or love for ancient cars.

Here’s a rough idea of some of the prices you’ll have to pay for having old cars restored: Motor overhaul, at least $200; new upholstery in the diamond-shaped, tufted-leather patterns of bygone days, $200-$250 for a roadster; new top, $100; tires, $200-$250; new radiator, $100; body work and fenders, $50-$100; painting and stripping, $150 or more; miscellaneous items like brass acetylene lights, rubber-bulb horn, etc., $50-$75.

An antique or classic car will be in better shape after a complete overhaul than the day it first rolled out of the factory. Why? Because the parts will be made out of better metal, the motor will be dynamically balanced, it will be using better grade oil, the paint, upholstery and tires will be of better quality. Because today’s gasolines just don’t digest well with the old-type carburetor and manifold, many antique-car hobbyists put modern carburetors and heated manifolds on the old cars. This is considered “ethical” if you bolt them on so that the original parts can be easily put back whenever desired.

How good a rebuilt antique can be is
illustrated by what happened at Corona, Calif., not long ago. This little community, surrounded by a three-mile circular track (now a paved street), was once the site of some famous road races in which Barney Oldfield, Ralph DePalma and other racing greats competed.

In a recent reenactment of these races, some ancient cars were being paced around the track by a 1903-vintage police car. One of the drivers, at the wheel of 1908 custom-built race car, just couldn’t resist the urge. He stepped on the gas and roared ahead of the police car. It never did catch him.

Because of the recent popularity of restoring old cars, the antique buggies are getting scarcer. But you can still find rare specimens of the 2700 models that have been manufactured by American auto makers since the turn of the century, some of them in surprising places—on old estates or on farms where storage space exists. And there’s nothing that excites an antique-auto fan like the rumor of a stored car.

Why do people become antique-car hobbyists? The reasons are many and varied: Some people get a creative kick out of breathing life into a chugging, clanking monster; some like the fascinating history that is wrapped up in these old buggies; some enjoy the attention it brings them when, clad in goggles and linen duster, they proudly drive a 50-year old car down a modern highway.

You’ll find that the general public is keenly interested. On the highway, you’re a marked object. Cars give you plenty of room even though some of them shout good naturedly, “Get a horse!” You can’t leave an antique car parked for one minute. People will steal your horns or headlights, kids will get their sticky fingers all over the brass and nickel work and there’s one species of human being that loves to give your hood a resounding whack with his fist and announce, “They don’t make cars like this any more!”

Every antique-car hobbyist has a gleam in his eye—like the mountain climber contemplating an unscaled peak, the fisherman who knows about a pool where the “big ones” lie, or a garden enthusiast who has just planted a new species of dahlia. The lure of any hobby lies in work yet undone.

In my barn I’ve got the remains of an old Pope Hartford with a custom speedster body. It cost $3000 new in 1913 and is just like the Pope my Dad had for his first car. I hope to pass it on some day to my son (now three years old). He’ll have a car that will speed down the highway at 80 miles per hour and make other drivers sit up and take notice!
Carriage body lifts out and is carried by strap handles. Bottom can be folded or loaded with heavy packages.

Two-Part Baby Carriage Divides to Carry Groceries or Parcels

Versatile is the word for a German baby carriage that separates into two parts for special uses. The carriage body can be lifted out of the frame and used as a market basket. The carrying frame can be folded or used to carry bags and cases.

Atomic By-Product Gauges Irrigation

Radioactive rubidium—an atomic by-product—tests the efficiency of irrigation on Hawaiian sugar plantations. Rubidium is introduced into the irrigation lines and is carried by the water to all parts of the irrigated area. A radiation counter is used to determine the amount of rubidium absorbed by the soil at any one point in the field. The method, by determining how much irrigation water is absorbed by the soil, also measures the distribution of fertilizers introduced into the irrigation system.
Bedside Air Conditioner Purifies, Cools and Dries Air

Wheeled to the side of a patient's bed, an air conditioner for hospital use feeds air directly into a transparent-plastic canopy about the patient. In addition to supplying extra oxygen to seriously ill persons, the machine relieves the distress of various kinds of respiratory cases. Temperature, humidity, purity and oxygen content are controlled. Fully automatic controls maintain a steady supply of clean air or oxygen, which is waterscreened as it passes through a sealed cleaning chamber. A sturdy refrigeration unit keeps the air at a constant temperature, and a specially designed evaporator unit removes excess moisture from the air. Transparency of canopy prevents a shut-in feeling.

Inside Windshield Wiper Anchored to Suction Cup

If you've ever wished for a windshield wiper that cleans the inside of your windshield of mist or steam, a California manufacturer has the answer. It's a hand-operated wiper with the arm attached to a suction cup. Only seconds are required to take the wiper from the glove compartment and attach it to the windshield. The metal parts of the wiper are chrome-plated; its total length is 12 inches. The wiper squeegee can be detached and used to clear back and side windows inside and out.

Airborne Baby's Berth Suspended From Wall

Comfortably situated in a wall berth next to his mother, the infant tourist aboard a trans-Pacific airliner finds that traveling isn't much different from nursery life. Two sturdy hangers on one side and an overhead arm supporting the opposite side hold the airborne cradle firmly against the wall. Result is a more pleasant trip for both mother and child. Installation or removal of the cradle is easy.

Antibiotics added to the fillings of tooth cavities help prevent further decay, according to a report given before the American Dental Association.
Auto Penthouse Will Sleep Four

YOU DON'T have to be rich to live (temporarily, at least) in a penthouse that perches atop an automobile. Designed to sleep four in comfort, the canvas-sided cabin folds into a unit low enough so you can drive into your garage without having to take it off the car. Opened up in five minutes or less, it has four bunks, storage space for bedding and clothing and four screened windows for light and ventilation.

No great strength or skill is required to fold and unfold the cabin and, according to the maker of the cabin, a woman can operate it as easily as a man.

The two ends of the cabin are of lightweight water-resistant plywood. The bunks are of canvas. The two sides are also canvas. When opened up, the unit has considerable rigidity. There is a ring on each corner of the top to which guy ropes can be secured in case of a severe windstorm.

The forward end of the cabin is supported on the roof by nine suction cups. The rear end is held up by tubular brackets that clamp to the bumper. They do not interfere with access to the trunk.

A canopy is available to be attached to the rear of the cabin at ground level to provide a cooking and eating enclosure.

You can drive into your garage with the cabin in place on roof. When you store it, it hangs from the garage rafters above car.
2. PICKUP CORD permits children to retrieve cups and toys they have tossed away. Two-foot cord anchored to suction cup checks toy's fall just short of floor.

3. HAT HOLDER protects shape of hat when it's not being worn, prevents the rim from becoming dented or curled. Pocket in center of the plastic rack holds gloves.

4. FEED-DOWN RACKS in door of vertical home freezer store various-width food packages like bars in a candy machine. As bottom box is removed, next drops into place. Door holds 96 packages of food, 20 cans of juice concentrates.

5. ELECTRIC FRYING PAN cooks foods at exactly the right heat with aid of thermostat. Proper dial settings for various foods are listed on handle. Pan can be set on the table.
6. **ADJUSTABLE GLIDE** levels tilted furniture, allowing jammed drawers and doors to open easily. Upper shaft is driven into leg and the proper height obtained by twirling an adjusting nut.

7. **WALL REFRIGERATOR** stores food at handy height, has magnetically sealed doors, partial thin-wall insulation. Refrigeration mechanism is in the top. Model is experimental, not in production.

8. **KNIFE SHARPENER** also buffs tarnished silver. Pressure on lid of motor spins shaft on which are mounted sharpening and buffing wheels. Plastic guard covers one wheel when other is used.

9. **PLUNGER** clears drains entirely by suction instead of forcing stoppage further down in pipe. Rubber cup rests on plate with hole in center. Valve drops over hole when cup is depressed.

10. **CANDLE CARBURETOR** assures a steady, smokeless flame. Coil around wick causes air turbulence for maximum efficiency. Glass guard stops drafts and dripping, smother flame in candle stub.
Roller-Welder Unit Does Work of Seven Spot-Welding Machines

While the work remains stationary, a specially designed roller-welder zips around the work to make circular welds at greatly lessened cost and time. Built at a cost of $14,000, the device replaces seven spot welders costing $49,000 and cuts the cycle time from 4 hours to 45 minutes in welding seams on an exhaust cone for a jet engine. It requires only one operator against the seven needed for the spot welders. The upper electrode, carrying 14,000 amperes, revolves around the work; the lower electrode is mainly an air-operated clamp.

House Suspended in Space Rests on Tapered Beams

William Alexander, California architect, solved the problem of his sharply sloping hillside lot by building a studio-home with no vertical supports. The house is suspended in space and supported by three steel I-beams that taper from three feet to six inches. Tail ends of the beams are bolted and welded to steel plates set in 22-foot-deep rock-cut caissons filled with concrete. Almost a third of the beams are buried underground. A 60-foot retaining wall of reinforced concrete braces the hill from which the beams protrude. Floor supports made of 2 by 16-inch wood joists span the girders and extend eight feet on each side. Interior finish includes cork floors and plywood walls and ceilings.

Four tons of earth must be moved for every carat of diamond mined.
If you like to work in the woods and have the patience to wait for cash-producing trees to mature, then the business of growing and managing a forest is the business for you.

An excellent market is waiting for you. The pulpwood industry alone needs more than 14,000,000 cords of pulpwood every year to keep paper plants supplied in the South. Everything points to an increase in the need for pulpwood in the future according to Southern Pulpwood Conservation Association. In fact the pulp and paper industry now ranks among the leading businesses in the South.

Forest managers can make a good living from the sale of products from the forest, especially with the start of a good timber stand. Many operators have set aside a tract of timber from which they expect to derive college funds for their children.

You can make a start by acquiring and developing a timber tract. Earnings will start the first year if you can afford to buy a tract with merchantable trees. Your alternative is to buy abandoned farm land to start a new forest.

The minimum acreage you will need depends on whether or not you will work in the forest yourself, and what profits you expect from it. A safe minimum from which to figure is about 160 acres per man. Since one man can hardly work in the forest alone, but needs a helper for sawing and other kinds of work, the smallest tract should be 320 acres.

The other factor in determining the size of your operations is the amount of return you expect. You can safely figure a net return of three to four dollars per acre per year. Two sections (two square miles) are not unusual in forest holdings and could return as much as $5000 a year.

Patience required is borne out by figures which reveal the rate of growth of saw logs. From time of planting to age of 25 years, pine trees will grow to a diameter of 10 inches and will contain about 32 board feet of lumber. But during the next six years these same trees will grow to 12 inches in diameter, and will contain 60 board feet of lumber, or just about double the yield. Obviously, it would not be good business to cut the tree at 10 inches, then wait another 25 years to accomplish what could be done in another six years by waiting.

The surprising thing in timber management, however, is that by waiting still
another six years, the number of board feet will again be doubled. Trees that had 32 board feet of lumber at 25 years will now have four times that amount or 125 board feet at 37 years, according to the Texas Forest Service.

Since the average operator cannot or is unwilling to wait so long for returns, the obvious thing to do in good timber management is to sell some and save some. This calls for partial cutting in the timber tract every few years. "Partial cutting of timber is like making withdrawals from a savings account," suggests the Southern Pulpmass Association. "A portion may be withdrawn whenever needed, and the remainder continues to bear interest in the form of growth."

It doesn't pay to harvest trees for only one product. The tallest and straightest trees usually bring the most money when sold for poles. It would be foolish, therefore, to sell them for pulpwod. The next in quality sell for saw logs and veneer blocks, and the remainder for ties, pulpwod and fence posts.

The value of the pulpwod market is mainly for cash income from what otherwise would be a waste product. During the development of a forest it is necessary two or three times to thin the stand in order for trees to have room for growth. It does not pay an individual to grow timber altogether for pulpwod. The price it brings does not offset the cost of bringing it up to a pulpwod stand. But with the main income being derived from poles and saw logs, the sale of thinnings and saw-log tops for pulpwod brings income from parts of the forest that could not be sold before pulpwod markets were developed.

The more processing the timber owner can do to his harvest, the greater will be his profit. Many owners of timber land rig up small sawmills to cut the logs into boards. The boards then are air-dried and either processed still further by planing, or they are shipped to big mill operators and lumberyards.

Small trees cut from the timber tract in thinning can be sold as fence posts. Such posts usually are shipped to a commercial treat-
Hinged Wings on Automobile Mirror Increase Rear Vision

Two hinged wings that attach to the existing rear-view mirror provide the driver with a wide-angle view to the rear and eliminate dangerous blind spots in that direction. The hinged principle enables the driver to adjust the two smaller mirrors for maximum view, not only to the rear but also on each side. No tools are required to install the device. It is also said to be a boon for the driver who is trying to watch the actions of children in the back seat.

Africa's first television station, opened in December, is located at Casablanca, Morocco.
Los Angeles Bus Loaders Use "Pogo-Stick Fare Boxes"

Popularly called "Pogo-stick fare boxes,* a new type of collection box is being used by traffic loaders for Los Angeles buses. Traffic loaders are at busy stops to collect fares from riders before the buses arrive. Strapped to the waist and supported by a steel post, the unit consists of a fare receiver box that empties into a sealed safe, and a money changer. It has separate compartments for transfers and zone tickets.

Balloon-Type Seat Cushion Folds to Fit Shirt Pocket

You can tuck a new inflatable seat cushion into your shirt pocket for carrying. No larger than a pack of cigarettes when deflated, it is blown up like a toy balloon to form a comfortable, attractive, full-sized pillow. Sport fans, tourists, automobile drivers and servicemen find it suits their many needs. The pillow is made of tough, durable plastic for long wear and is available in solid colors or plaids.

Pressured Fluid Forms Tight Seal Around Supersonic Wind Valve

Tremendous air pressures and extreme temperatures ranging from minus 65 degrees to 750 degrees Fahrenheit make the job of sealing valves in supersonic wind tunnels doubly difficult. A new 108-inch butterfly valve solves the problem with a continuous stressed-steel band welded to the inside of the valve body. When the valve is closed, the flexible steel band is inflated by a pressured fluid until it contacts the disk edge and prevents air leakage.

Algae "Seasoning"

Food is improved in taste when enriched with high-protein algae, according to a recent report. Chlorella, the one-celled plant that promises to be a low-cost food source, was added to soups, breads, jelly rolls, noodles and ice cream. Tasters found that all the foods were improved in taste and that the enriched breads and ice cream were particularly good.

POPULAR MECHANICS
German Pilot Builds "Windmill" for Ground-Sky Travel

Flight at up to 110 miles per hour and ground travel at 45 is expected of an "air scooter" patented by a former German fighter pilot. Resembling a helicopter, it will have five seven-foot rotors revolving over the cabin at 200 revolutions per minute. Inventor Walter Wierske, who has been testing a model with eight rotors, believes full-scale production models will sell for approximately $1000. American, Canadian and Australian firms have indicated interest in the versatile vehicle.

Lamp Mounted on Typewriter Floods Paper With Light

Eye strain is reduced for typists by a new light that attaches directly to the typewriter. Made of 1/8-inch aluminum tubing, the tubing folds back with the paper holder.

Fatalities per 100 million passenger miles on U.S. scheduled airlines have dropped from 15 for the five years 1932-36 to 1.7 for the five years 1947-51.

MAY 1954 153
IT'S MOVING DAY FOR WILDLIFE

A MOUNTAINEER with fire in his eyes recently bearded some Kentucky wildlife specialists in their offices in Frankfort. "First you fellows passed a law to make the kids go to school," he said. "Then you turned deer loose to eat the gardens so the kids wouldn't have anything to eat. Then you turned bear loose, and panther and other varmints to eat the kids on the way to school. This," he thundered, "has gone fur enough!"

The game managers couldn't deny that they released deer and even bear in the mountains, for this transplanting of wildlife has become one of the favorite and one of the best ways of improving hunting. There is widespread belief among professional game managers that, contrary to the old mountaineer's opinion, this big manmade game migration still hasn't gone "fur" enough.

By George Laycock

Above right, little deer tied in burlap bag is "weighed in" before trip to new home. Below, crates are hauled in to move trapped bison.
Game technicians in every part of the country are gathering up everything from bobwhites to bighorns. Then they're hauling them across the state, and sometimes halfway across the country and dumping them where there is food and cover but a scarcity of game. Because they've learned to fit the animal to the environment they can thin out game surpluses and build up thin populations all in one operation. They've developed this live-trapping and transplanting into an art, for experience has shown that this method can mean quick build-ups in game population and better hunting for the license buyer.

Man now knows a great deal about a game animal's needs. As one wildlife expert explained it, "We've changed the complexion of the land. We're going against nature. The game and the people are both living under artificial conditions, and the laws of the wilderness no longer apply."

"Eager beavers," destined to restock an Oregon area where there is a scarcity of game, are loaded aboard truck.
Practically every type of game in the country has been trapped and moved. Bobwhite, raccoon, grouse, rabbit and deer have been transplanted by the hundreds. During the winter of 1947-48 Wyoming game specialists trapped and moved eight moose. By 1939 Colorado had trapped and moved 152 mountain sheep, plus another 16 which she traded to Montana for eight mountain goats.

Texans have used airplanes to help round up more than 2600 antelope and chase them into long funnel-shaped traps. This technique has made a big change in the national antelope population in the past quarter century, for 25 years ago there were plenty of people willing to predict that the antelope was doomed to extinction. Today the antelope is secure and it's largely because wildlife experts have learned how to fit the animal to his environment.

In the early days of antelope trapping they were herded into traps made of wire fencing. But when they dashed against the fences and broke their necks in large numbers, the game technicians searched for a better way to trap them. This led to a funnel trap in which the smaller areas at the rear of the trap are made of six-foot fences of three-inch cord mesh. The antelope still dashes crazily against the traps but now he bounces back like a trapeze performer who missed his partner. At the back of the traps the antelope herders drive their catch into narrow crowding pens darkened by canvas curtains. From there they go into net loading chutes one or two at a time, where they're caught by hand, crated and hauled off to new range.

And what Texas and some other states have done for antelope, Arizona has tried with bison. Two thriving herds in that state started with 42 of the lumbering animals trapped and moved a few years back.

Nine states have trapped and moved wild turkeys; Texas alone has transplanted some 3000 of the
big birds. Seventeen states moved 8470 beaver, some of which were even parachuted into isolated waters from bush-hopping planes.

In the winter of 1940-41 South Dakota trapped and released in better range some 8500 ringnecks. The Wildlife Management Institute said of the project, "Each of these wild-wise ringnecks is worth a half dozen of the pen-reared innocents. In these moves, however, the first step is to size up the landscape and only release game where it has a chance of success."

Kentucky learned this lesson well when she imported game-farm pheasants and turned them loose in her rather meager river bottoms. These birds soon left their Old Kentucky Home to the bobwhites and the grouse. The pheasant has steadfastly refused to live in the hill lands, although pressure from sportsman's groups sometimes forces the technicians into making another try at an experiment that has consistently failed. One of the Kentucky immigrants left the river bottom where he was released and headed straight for the Ohio River and the corn fields of the Midwest. He flew more than 40 miles and in a careless moment crashed through a schoolhouse window in Louisville.

Kentucky has done other jobs of wildlife moving to the satisfaction of everyone. "Since 1945," Don Strode says, "we have released 570 deer, 92 turkeys, 70 beaver and 10 black bears."

Bear are generally taken in boxlike traps. The big difference between a bear and deer trap is the strength of the box, for a self-respecting bear could tear his way out of a wooden deer trap. The sides and ends of bear traps are generally reinforced with

(Continued to page 258)
Earth Tamper Mounted on Trench Filler Packs Automatically

No operator is needed to control an earth tamper which is mounted on a trench filler and packs the earth down as fast as the back filler dumps it. From the machine projects a boom supporting a bucket, or “hoe,” which scoops the earth into the trench. Mounted on a frame behind is the automatic tamper, powered by its own gasoline engine, which packs the loose dirt into the ditch as the machine rolls along. The rig was developed by a Cleveland firm for laying pipe.

Burlap Grain Bin For Outdoor Storage

King-size gunny sacks holding 600 bushels each are serving as economical outdoor-storage bins for surplus grain. The mammoth sacks are made of waterproofed burlap and lined with paper. Each bin is about 18 feet across at the base and 14 inches in diameter at the top. A 30-inch neck that facilitates loading can be folded down against the side for sealing. Grain stored in the burlap bin brings up to 30 cents more a bushel than grain stored on the ground—and storage in the bin costs only about 10 cents a bushel.

Hydraulic Rake Mounted on Tractor Clears Sugar Cane From Field

Sugar cane remaining in the fields after harvest is recovered on a Hawaiian plantation with a spring-tooth rake mounted on the rear of a crawler-type tractor. The tractor moves across the field back end foremost, allowing the operator an unobstructed view and making it possible to discharge the accumulated cane directly into the loading windrow. The driver’s seat, driving mechanism and controls are repositioned for backward driving. Hydraulically operated, the oversize rake is raised to discharge its load and elevates itself automatically when an obstruction is encountered.

Three tons of industrial diamonds worth $50,000 were imported by the United States in 1953.
Locust Carousel Checks Duration and Speed of Insects' Flight

Flying locusts hitched to an improvised merry-go-round tell scientists at the Anti-Locust Research Center in London's Natural History Museum the insects' speed and duration of flight. Suspended from a circular wire frame that turns on a central pivot, the insects instinctively beat their wings and start the frame going. As they fly about the circle, they are carefully watched by scientists engaged in a detailed study of the insect.

Titanium Plentiful in Hawaii

Much sought after as a jet-engine material, titanium may be more plentiful in Hawaii than in Brazil, where the United States now gets most of its supply. More than 80 percent of the soil in some areas consists of the ironlike material, according to Dr. G. Donald Sherman of the University of Hawaii's soil department. Closeness of the ore to the surface and its density will make it an easy material to mine.

Aluminum Golf Cart Has Numbered Slots for 14 Clubs

Fourteen golf clubs have individually numbered slots in a cart that eliminates the need for a golf bag. Balls, shoes, tees and other items are carried in a Zippered bag attached to the handle. The clubs rest head down, putting the weight over the wheels where it is easier to move. The clubs cannot rattle or become marred. A metal plate on the cart's aluminum frame serves as a seat between shots. Weighing 12 pounds, the complete unit can be folded for storage in an automobile or locker.
Self-Contained Electric Heating Shaft Installed Between Studding

Economical and efficient electric heating is the purpose of a built-in wall unit that extends from floor to ceiling. Air enters the top and is discharged from the bottom of the self-contained heating shaft, which mounts its own fan, thermostat and heating coils. Even distribution of heat is the reason given for the economy of the unit; each shaft takes about the same amount of electricity required by a flatiron—a total of about 7400 watts is needed for heating a small five-room basement home in northern climate. One or more units is installed between the studding of each room, but as there is no connection of ducts and no central furnace, installation cost is low and space is saved. The units may also supplement present heating systems when extra rooms are built into a house or when garages are to be heated. The heating element may be turned off in the summer when only ventilation is required.

Rolling Mast Platform Permits Easy Loading of Long Cargo

Extremely long loads may be lowered directly into the hold of the Dutch freighter Muphrid N by simply rolling the mast forward, out of the way. Raised up on four wheels which travel in grooves along the side of the hold, the mast platform is pulled aft or forward with the aid of one of the diesel-driven winches mounted on either side. Rolled completely forward, the platform clears 72 feet of the 90-foot hold.

Chemists Synthesize Sugar

Two Canadian researchers have solved a classical chemical problem—the synthesis of sugar. Since all the energy of the sun which is used by nature starts out as sugar, formed in plants by photosynthesis, the feat is a chemical milestone. Knowledge gained during the project promises to aid in the synthesis of many substances. Malt sugar and trehalose as well as sucrose—common table sugar—were synthesized for the first time. Glucose, the central compound in nature, forms a portion of the sucrose molecule.

Chemists Synthesize Sugar

Two Canadian researchers have solved a classical chemical problem—the synthesis of sugar. Since all the energy of the sun which is used by nature starts out as sugar, formed in plants by photosynthesis, the feat is a chemical milestone. Knowledge gained during the project promises to aid in the synthesis of many substances. Malt sugar and trehalose as well as sucrose—common table sugar—were synthesized for the first time. Glucose, the central compound in nature, forms a portion of the sucrose molecule.

[Image of a person working with a self-contained electric heating shaft between studding]

[Image of a rolling mast platform being used to load long cargo]

[Image of a Dutch freighter Muphrid N with a rolling mast platform]

[Image of a scientist with the names Dr. Raymond Lemieux and Dr. J. W. C. MacLean]

160 Dr. Raymond Lemieux
Dept. of Chemistry
Univ. of Ottawa
Ottawa, Ont., Canada

Copyrighted material
PRIVATE-WIRE television systems are now being demonstrated in salesrooms of electronic-parts distributors throughout the country. These midget “TV Eye” cameras, shown in photo A, are in production at the RCA Victor Division in Camden, N. J. The operator is shown inserting the Vidicon pickup tube which is the heart of the simplified 4-pound TV camera. Any home-type TV receiver can be used without modification as a monitor, the system connecting through the set’s antenna terminals by means of a cable. Applications include remote observation in hospitals and factories; promotion of products and services in stores and hotels; also detailed demonstrations in classrooms.

Manufacturers of color-television receivers are giving special attention to provisions for easy access to chassis for picture tube and other service adjustments. The top of the Admiral color-TV set lifts off as illustrated in photo B. The main controls from left to right are as follows: Tiny knob at extreme left adjusts color intensity; the large knob controls volume and contrast. The dial knob at the right tunes the various channels, the same as on standard black-and-white television sets. Photo D shows a subassembly area in the Admiral plant where inspectors are checking power-supply units and video components.

One of General Electric’s newly developed receiving tubes for color-TV sets is displayed by the young lady in photo C. This tiny tube will regulate the average brightness of the three primary colors on the picture screen. The large color wheel is televised in test transmissions.  

** **
OWNERS of table-model radio receivers often have several around the house that are in need of slight repairs. Many times you can save dollars—and have fun—by making such minor repairs yourself. If you are an average radio-set owner you probably do not know much about the various components and circuits, so this does not mean that you should tamper with a valuable console radio. Even an inexpensive table model is a complicated device for the beginner and it is subject to damage.

However, if you are careful and can restrain the urge to experiment, the accompanying photos will show you several simple dollar-saving repairs that anyone can easily make at home. First, never attempt to repair a set with the power connected. As with a lamp, or any other electrical device, even though it is turned off, the switch terminals carry 110 or 115 volts, ready to “bite” unwary fingers. So the first thing to do is to pull the power-cord plug out of the wall receptacle. With the radio turned “on,” high voltages are present in the set, so do not take a chance even though you are only replacing tubes or a pilot light. Never plug in a radio set to test a repair without first sliding the chassis back into the cabinet; this is a simple precaution against shock. Also, never attach an external ground wire to an a.c.-d.c. set. Most table-model radios are of this type. The use of any kind of external antenna wire is okay, but do not connect the wire to anything that makes metallic contact with the earth. This means radiators, water pipes, gas pipes or similar earth-connected metallic bodies.

To function properly, radio tubes should make good contact in their sockets. The tube prongs sometimes corrode slightly and make poor contact. They may be dusted off and cleaned with carbon tetrachloride as illustrated in photo A. Remove the
tubes one by one to be sure you get them back in their proper sockets. If each socket is not identified with its tube number, and there is no tube-position chart on the inside or underside of the cabinet, mark the tube positions on the chassis with ink or scratch the numbers on with an ice pick or similar sharp tool. This is important if you take all the tubes out to have them tested. Any tube that is not making good contact in the socket will cause set noises, and may even make it inoperative. A good stiff brush and a little carbon tetrachloride, applied as shown in photo A, is recommended when servicing old sets.

Bent tuning-condenser plates are a frequent cause of trouble. These may be straightened with a knife blade as illustrated in photo B. Unless the plates are actually touching, do not try to straighten them as some manufacturers bend the plates deliberately. A loose dial cord is shown in photo C. Tighten the cord and retie the knot if possible. Unless the cord is too loose, a simple method is to use some of the "no slip" preparations which increase the friction of dial cords and pulleys. These are to be found in all radio-parts house catalogs.

If volume is lacking in a set of the type using a built-in loop antenna, add a 15 or 25-ft. length of small insulated wire. If the set has no external antenna post marked A or ANT., wind two turns of similar wire around the edge of the antenna loop, see photo D, to provide greater pickup. Connect one end to the outer end of the main loop winding, or anchor it at some convenient point for inductive pickup. Then run the wire around the room or connect it to an outside antenna.

Contacts on a short-wave band-changing switch should be kept clean with a brush and a little carbon tetrachloride, as shown (Continued to page 228)
LABORATORY technicians have fun in demonstrating some of the new transistor-operated radio devices that are being developed in the David Sarnoff Research center at Princeton, N. J. One demonstration that recently attracted attention in Times Square, New York City, was made by an engineer walking along the street with a radio blaring away full blast from an inside pocket. The experimental 6-volt receiver weighed one pound.

This vest-pocket model shown in photos A and C employs eight new high-frequency-type junction transistors which would probably cost about $80.00. Other parts, which include a 2-by-3-in. speaker, are all standard. The receiver measures 5½ in. long, 2¾ in. wide and is only 1¾ in. deep. It will probably not be in production for nearly two years and by that time these expensive transistors will no doubt be reduced in cost by mass production.

The chart in photo A indicates the greatly increased scope of future applications for these new h.f. transistors which amplify at frequencies up to 10 megacycles. The working area is thinner than the human hair; a comparison cross-section, illustrated in photo B, shows a "well" drilled in the center of a germanium crystal wafer leaving an extremely thin layer of crystal 1/200th of an inch thick. This is done with a drill vibrating at supersonic frequencies. Wire connections are embedded in each of the two gray "dots." The dots form junctions for transistor action. A larger experimental receiver using the new transistors also appears in photo C. In photo D, Dr. C. W. Mueller of the research staff is shown checking one of these new h.f. transistors that operate on tiny batteries.

POPULAR MECHANICS
A BOY’S ROOM GOES WESTERN

If you have some gun-totin’ cowboys in the family, you can make their make-believe world a near reality by converting their room into a TV ranch house, complete with built-in bunks. Such a transformation need not be costly. False beams of second-grade knotty pine added to the ceiling and stained to give a rustic effect, a photomural of a western scene applied to a wall, hooked throw rugs and an old-fashioned, lantern-type fixture all add to the over-all atmosphere of the old West. Imitation knotty-pine paneling of gypsum can be used to treat the walls, and a few pieces of pine or maple furniture will provide the final touch.

Photomurals can be obtained in black and white or tinted. You can even have them made from your prize negatives. Unmounted prints are attached to plastered walls with ordinary wallpaper paste. Usually, the print is moistened on both sides with a sponge and then paste is applied to the back. The print is hung like wallpaper, wrinkles being smoothed out quickly with a soft brush. Excess paste is wiped from the face of the print with a dampened sponge. When the print is made up of several sections, the sections are usually marked from left to right and matching edges are lapped ¼ in.

Knotty-pine gypsum paneling, which is 16 in. wide and 8 ft. long, is exceedingly easy to apply. Applied vertically, the individual panels are cemented in place and held at top and bottom with a single nail, which is later concealed by a baseboard at the floor line and a molding at the ceiling. The panels come prefinished.

The built-in bunk beds pictured in the photo at the top of the page are not difficult to make. Featuring a dual headboard, the two bunks are an integral unit which can be permanently fastened to the floor or left free to pull out. For added convenience in making the beds, the headboard can be an individual unit permanently fastened in place, with each bunk being a separate unit. This is hinged to the dividing headboard at the front to permit each bunk to be swung...
out on casters. The bunks are built for either a standard 30 or 39-in. mattress. The headboard consists of 1 x 10 lumber, rabbed along the edges to receive ¾-in. plywood panels flush. Where you do not have a means of cutting a rabbet, the latter can be formed by adding cleats to the three inside faces. The same-size stock (1 x 10) is used for the side and end boards of the bunks. Note that triangular corner blocks are used to strengthen the mitered corners and to attach the side members to the headboard. Rigidity is added to the side members by two longitudinal cleats, the upper ones serving also to support three or four 1 x 3 bed slats. You'll note that the corner blocks are kept even with the upper cleats. The lower cleats provide a means of fastening the bunks to the floor with a couple of screws. Finally, sections of quarter-round are added to the lower edges of the side and end members. The completed job should, of course, be stained dark to blend into the room’s Western atmosphere.

**Refinish Metal Name Plates With Lacquer and Sandpaper**

Metal name plates having raised lettering, such as the data plate on a motor or the shutter-speed chart on a reflex camera, can be refinished easily. First, the surface is cleaned with lacquer thinner or other solvent, then an even, not-too-heavy coat of dark-colored lacquer is brushed over the entire surface. After the lacquer has dried, use small block of wood wrapped with fine sandpaper or abrasive cloth and polish the raised portions of the plate. This will make the lettering stand out brightly against the dark background. Finally, spray a protective coat of clear lacquer over the plate, or wax and polish it.

Walter E. Burton, Akron, Ohio.

An easy way to remove corrosion from inside the ferrule of a fishing rod is to wrap a small wad of medium-fine steel wool around a dowel chucked in an electric drill and carefully run it into the opening.
Protect Knees When Gardening With Pads Cut From Inner Tube

To protect your knees when working on wet or rough ground in the garden, you can cut neat, lightweight protectors from a length of inner tube. Cut the back of the section so that two straps are formed, as shown in the detail. These should be spaced so one strap grips the leg above the knee and the other below it.

W. P. Barenz, Milwaukee, Wis.

Dip-Painting Irregular Objects

Time and money may be saved by dip-painting irregular-shaped objects with enamel or oil-base paints floated on water. Dip-painting saves time and trouble, as compared to brush or spray, because it thoroughly coats all hard-to-reach surfaces. By floating the paint on water in a fairly deep container, the necessity for a large quantity of paint is eliminated. The objects to be painted are dipped beneath the surface through the film of paint, then slowly lifted. The excess paint is allowed to drain.

Henry G. Borchardt, Chicago.

Hand Grip for Dairy Brush

Split sections of corrugated garden hose nailed to the opposite edges of a scrub or dairy brush will provide grips to ease hand strain. The grips will be appreciated especially when the brush is used for long periods and the hands are wet and slippery, requiring a tight grip.

G. E. Hendrickson, Argyle, Wis.

Porcelain Insulator Converted Into Clothesline Clamp

A simple clamp that will eliminate tying knots when tightening a clothesline is made by using a porcelain insulator of the type shown. A 3/8-in. roundheaded bolt with wing nut and washer converts the insulator to a clamp. If the head of the bolt turns when tightening the wing nut, place a sharp-tooth lock washer between the bolt head and the top of the insulator.

Arthur Trauffer, Council Bluffs, Iowa.

Black Tape on Automobile Antenna Stops Reflected Spotlight Glare

A chromium automobile antenna won't reflect the glare of your spotlight if you put a narrow strip of black masking tape along the side of the antenna facing the driver's seat. The momentary blindness resulting from such glare, if you are driving with the spotlight on, can be a serious hazard. Masking tape used in this manner has the advantage of being easy to put on and take off.—Ken Murray, Colon, Mich.

(Except providing a handy "pincushion" for preventing tacks, brads and small nails from being lost on the job, a cake of household soap also lubricates the points, making them easier to drive.)
PAINTBRUSHES

Will do a better job and last longer if you know how to select, use and care for them

By Bernard Gladstone

IN PAINTING, as in other types of work, the quality of the finished job depends to a large extent on whether or not you use the proper tools. Economy when purchasing a paintbrush is no substitute for quality, as an inferior brush cannot possibly turn out a good job. And a top-quality brush, when properly handled, will produce a smooth, streakless finish and will outwear several of the cheaper variety.

The best paintbrushes are made of 100 percent pure Chinese hog bristles which have been carefully selected and blended. There are also nylon brushes of excellent quality on the market, which wear well on rough surfaces such as raw lumber. However, they should never be used with shellac, as the alcohol in the shellac will soften the bristles. The bristles can be restored by immersing for 30 min. in boiling water and then drying thoroughly.

To compare brush values, run a pencil through the bristles at the heel of the brush next to the ferrule. Carefully separate the bristles to expose the setting, which is a block set into the ferrule to separate the bristles and to provide a well for the paint. In a good brush this is no wider than absolutely necessary, and is often split into 2 or 3 dividers. This will provide the user with a fully stocked brush and cause the bristles to lie together at the tip to form a good cutting edge. If the block is too thick, the edge of the brush will split lengthwise.

Grasp the brush as for painting and press down with moderate pressure on a flat surface. A good brush will form a sharp chisel edge. Now hold the brush up to the light and examine the bristle tips. Little split ends or "flags" can be seen on a good brush. Without these "flags," a brush will leave streaks in the finished job. A fine brush has flagged bristles in staggered lengths, so that a new set of bristle ends is presented as the longer ones are worn down.

You want not only a good quality brush but also the right brush for the job. The most common types are shown in the accompanying illustration to help in determining your needs.

Having purchased a new brush, it's important to break it in properly. Unwrap
the brush and, holding firmly in one hand, slap the bristles vigorously across the other hand. Then hold it up to the light and remove any loose bristles you see. Spin the handle rapidly between the palms and again remove any loose bristles. Then comb the bristles straight to remove any curl. Now wrap the bristles in heavy paper and suspend the brush in linseed oil for at least 24 hrs. The oil should overflow the top of the wrapper and saturate the bristles. Nylon brushes do not need to be soaked, but this is very important with hog bristles, as they are porous. Soaking in linseed oil seals up the bristles, helping to keep them flexible, and makes the brush easier to clean. Remove most of the oil by dragging the flat of the brush against a wire fastened across the top of the can. Take out the remaining oil by twirling the handle between the palms, with the brush held well down into an empty can. Then wash in two rinses of clear turpentine and spin dry again. Finally, comb out any kinks.

To use a paintbrush properly, dip about 1/2 to 1/2 the length of the bristles into the paint. Dip it slowly to allow time to soak up the maximum amount of paint. When removing the excess paint, draw the brush flat across a wire fastened across the top of the can. Never draw it edgewise, as this...
Above, a wire stretched across the paint bucket offers a double advantage. Excess paint is removed by drawing brush across it, and when brush is not in use wire acts as a rest.

Proper procedure of dipping brush is shown at the left. One-third to 1/2 of bristle length is dipped slowly, so that brush can absorb maximum amount of paint. Paint with end of bristles.

Never paint with the edge of a brush, as this will cause "fingering." For sash and other narrow places, use a sash brush, which is made to be used edgewise.

When washing out a brush after painting, work it vigorously against the sides and bottom of the solvent container. Change the solvent several times.

The photo above shows a badly "fingered" brush which has been used edgewise so often that its normal brushing characteristics have been ruined.

Use the thumb and forefinger to help remove all of paint. Squeeze from the ferrule down toward the tip of the bristles, dipping in the solvent each time.
will cause it to "finger" or separate into clumps. Professional painters often prefer to tap the tip of the flat side of the brush lightly against the inside of the can, which leaves the brush more fully loaded.

Brushing varnish, enamel and lacquer calls for a fully loaded brush and a minimum of brush strokes. Brush out the paint in smooth, parallel strokes, and then cross it once to smooth out any brush marks. On vertical work, finish up with long light strokes running the length of the work. Keep checking back for 15 or 20 min. to catch any runs. Hold the brush at a 45-deg. angle and brush with 1/2 to 1/4 of the bristle length. Don't press down hard, as you will then be painting with the sides of the bristles instead of the ends, causing a streaky job. Never use a brush edgewise, because it will "finger," ruining its good brushing characteristics. If you have narrow surfaces to cut in, use sash brush, which is made to be used edgewise. If occasionally you have to use the edge of the brush always finish up with a few flat strokes to remove the fingering.

When painting up into a corner, never poke the brush into it. Start the brush a little way from the joint, apply moderate pressure to fan out the bristle, and gradually work the cutting edge into the corner.

If brush cleaning is done immediately after use, it is a comparatively simple task. First wipe off as much of the excess paint as possible and then wash thoroughly in the appropriate solvent by working the bristle vigorously against the container sides and bottom. Squeeze the bristle out with the thumb and forefinger, working from the ferrule to the tip. Repeat the process several times, using fresh solvent each time. Then spin the brush dry, between the palms and comb out. If the brush is to be used again in a day or so, wrap in heavy paper, saturate in linseed oil and lay it flat. If the brush is being stored for a longer time, after using the solvent wash thoroughly in warm water and neutral soap. Clean carefully around the ferrule and heel of the brush. Separate the bristles to expose the block and scrape the plug clean of any paint. A wedge of hardened paint will cause the brush to bulge at the ferrule and flare at the tip, making it difficult to spread paint evenly. When the brush is clean, rinse in running water, spin dry and comb out. Then allow it to dry thoroughly. Never dip a paintbrush that is damp into oil or paint, as this will cause the bristles to lose their spring. After the brush is dry, wrap in heavy paper, soak in linseed oil and lay flat in a cool, dry place. If the brush is stored for a lengthy period, unwrap it occasionally and resaturate with linseed oil.

A wire brush can be used to scrape dried paint from the handle, around the ferrule and from the heel. In stubborn cases, wire brush is used on bristles.

Before storing a paintbrush for a long period, separate bristles as shown above and clean paint from the well with a screwdriver or narrow putty knife.

Sometimes a badly-caked brush can be salvaged but it will never be as good as a brush which has been well cared for, and reclaiming it is a lot of work.

* * *
Chrome Kitchen Chair Converted to Temporary Youth Seat

By modifying one of the chrome-tubing chairs from the kitchen set, one father improvised a practical "youth chair" for his young daughter. The chair seat was removed from the tubing frame and two lengths of 2 x 4 were cut to the width of the seat. Holes were drilled and countersunk in the 2 x 4s which were then fastened to the chair bottom with long flatheaded wood screws. Next, the 2 x 4s were fastened to the tubing frame by using the wood screws that originally held the seat to the frame. The youth chair matches the kitchen furniture, and can be quickly changed to its original size when the child outgrows it.

Mrs. C. A. Anderson, Port Huron, Mich.

Emergency Plug for Small Leak Cut From Sheet Rubber

A pinhole leak in a pan or pail can be plugged in an emergency by using a wedge-shaped sliver of rubber cut from sheet rubber or an inner-tube. Force the point of the wedge into the hole and pull it through from the other side. When you release tension on the wedge, the rubber will expand and fill the hole.

W. F. Schaporst, Newark, N. J.

Ornamental Plastic Switch Plate Masks Photographic Prints

To give an unusual border to small photographic prints, mask them with an ornamental plastic switch plate of the type available in most hardware and dime stores. Lay the switch plate over a 5 x 7-in. sheet of enlarging paper and print the picture in the 2½ x 4-in. opening. Thus, when the printing is completed, the picture will be framed by a white ornamental border in the shape of the switch plate, and the edges of the enlarging paper will be black. Similar frames can be cut from ¼-in. plywood if special patterns are wanted.

H. Leeper, Canton, Ohio.

Cord Shortened Without Cutting By Taping Inside Lamp Base

Pulling the extra cord inside the lamp base and taping it in flat loops will solve the problem of shortening an excessively long lamp cord. Besides permitting a neat appearance, the hidden loops can be quickly unwound, should the lamp be moved to a location that requires a longer cord to reach a receptacle. Twine also could be used to hold the loops.

Hugh Lineback, Stillwater, Oklahoma.
BAS-RELIEF CARVING OF LINCOLN BUST

By I. M. Fenn

A hand-carved bas-relief of Lincoln, complete with matching rustic frame, makes a unique wall decoration and will add to your reputation as a skilled craftsman. Actually, however, more patience than skill is required to carve it. The carving can be made smaller or larger, but the original was carved on a piece of \( \frac{3}{4} \times 14 \times 16 \)-in. mahogany. Any close-grained hardwood, suitable for carving, may be used. The figure can be transferred to the wood by drawing \( \frac{1}{2} \)-in. squares on the work and then copying the drawing from this page. Or, a suitable picture of Lincoln may be traced onto the wood with carbon paper. Although the carving can be done with an ordinary pocketknife, three wood-carving chisels — a straight, a V-shape and a rabbet — will make the work easier. Clamp firmly to workbench and use both hands on the chisel, guiding with one hand and pushing with the other. The direction of cut should be away from you. Start from the outside of the figure and work in. When removing larger pieces of waste wood, cut across the grain, not with it. To get a better idea of the proportions and curves of the face, have someone pose for you. The finished carving is framed with matching wood, the corners being half-lapped as shown above. Both the frame and the carving are rabbeted on all four sides so the backs of the frame and carving will be flush. The completed job is rubbed with boiled linseed oil, then polished with wax.

Ventilator for Photo Darkroom Made From Stovepipe Elbows

Assembled in a plywood panel cut to fit a window in a photo darkroom, two stovepipe elbows will provide a novel lightproof ventilator that is inexpensive and easy to install. Fastened together at one end, the elbows are turned in opposite directions to prevent as much light as possible from passing through them. If some light is reflected through the opening, the addition of semicircular baffles of light plywood or hardboard wedged into the ends of the pipe will prevent this. They should be placed opposite each other about 2 in. apart. The panel may be mounted in the window permanently or secured in such a way that it may be removed whenever desired.

Hugh Linebach, Stillwater, Oklahoma.

Grease stains on a rug can be removed with carbon tetrachloride and a clean cloth.
ENTERTAINING MAGIC can be made the theme of your next party if the stunts shown on these pages are used as games. Explain to the guests that each stunt is based on simple physical principles and let them try to figure out how they work. For example, a coin dipped in water and placed over the mouth of an empty bottle will lift when the hands are used to warm the air inside the bottle. The expanding air forces its way out. A full glass of water will hold quite a few small nails or pins before running over, surface tension permitting the water to rise above the rim of the glass. A burning match dropped into an empty tumbler consumes the oxygen, thereby reducing the volume of air and creating a partial vacuum if the hand is placed tightly over the glass before the match burns out. This allows the tumbler to be lifted with the palm of the hand. Sugar normally does not burn when a match is applied to it, but it will burn if white cigarette ash is dusted on the cube beforehand. Break a yardstick in half with a single sheet of newspaper as pictured on the opposite page. The yardstick is slipped under the paper, atmospheric pressure on the paper holding down one end of the stick while the other is struck. For the final stunt, a match is frozen to an ice cube to permit lifting it out of water.

The young lady below lifts a heavy water tumbler by placing her palm flat across the top. Flame of a match dropped into the tumbler consumes oxygen, thus reducing gas volume. A partial vacuum results.
Cube of sugar burns readily when heated with a match flame. But your guests won't be able to do it

Add pinch of white cigarette ash to sugar cube before heating. Invisible ashes will assure a flame

Break a yardstick in two with a sheet of newspaper. Place the paper flush with the edge of a table, slip yardstick halfway under paper and strike it a quick blow. Air pressure on the paper holds yardstick

Using just a paper match, lift the ice cube from the water. This one is a real fooler. Drop a pinch of table salt on the ice and hold the match against it. Ice melts and refreezes to "cement" match to cube

MAY 1954
Make Handy Offset Weeding Tool From Ordinary Table Knife

An ordinary table knife makes an excellent weeding tool, especially around low-growing shrubbery. An offset is bent in the steel blade by clamping it in a vise. The offset allows the gardener to get beneath the weed roots to lift the whole plant out. Friction tape is wound around the handle to provide a better grip.

Hi Sibley, Nuevo, Calif.

Steel Angle on Stairwell Railing Prevents Dangerous "Perching"

A steel angle bolted to the pipe railing around a stairwell will discourage the dangerous practice of sitting on the rail. The angle is bolted with the heel up to assure an extremely uncomfortable seat for anyone trying to sit on it.

Replace Venetian-Blind Cord By Using Old One As Guide

The worn cord in a Venetian blind can be replaced in a few minutes' time if it is done before the old cord breaks. Butt the end of the new cord against the old one and fasten it with staples or by sewing. Then wrap the joint with cellulose tape to make a smooth connection that will not snag in the slats or over the pulleys. When the cord is pulled through to the side of the blind, be sure to allow enough cord to make the loop as long as the blind is high.

Ed Packer, Chicago.

Tags Attached to Young Trees With Split Section of Hose

Damage to newly planted trees from the wire with which the name tag is attached may be avoided if the tag is first wired to a split section of rubber hose. It is sometimes desirable to leave the tags on young trees, but the wire eventually will cut into the tender bark as growth takes place. However, the section of hose slipped over the trunk or branch of the tree will expand with the growth and cause no damage.

Mirror Used for Emergency Notes When Paper Is Not Available

A vanity mirror of the type carried by many women in their handbags, makes an excellent emergency "memo pad" when pencil and paper are not available. A lip-stick or eyebrow-pencil message can be readily erased from the glass with cleansing tissue.—Wm. I. Todd, Burbank, Calif.

Before refinishing any wooden surface, the old finish should be completely removed down to the raw wood.

POPULAR MECHANICS
Let's Go FISHIN'

By Russ Jenkins

Good fishing doesn't depend on expensive equipment. Sometimes a little homemade lure will get the bigger ones when fancier varieties won't. This lure consists of a number of brightly colored sequins threaded on the shank of the hook, with a bit of bright-red rubber as a tail or wiggler to attract attention. Most notion stores have sequins.

Red worms often are more gray than red by the time they are put on a hook as bait, which may make them less effective, since the color is a part of their attraction. To get that bright color back again, paint the worm with Mercurachrome, using a small water-color brush. With these bright worms on your hook, watch the number of strikes increase.

Most fish get hooked because of curiosity. They will investigate almost anything that catches their eye and, for that reason, flashing baits are good fish-getters. Here is one you can add to your collection with only a few moments of labor. Bend a paper clip as shown, to form a loop and two small hooks. Put it through the eye of the fishhook and wire it in place. Then slip polished bits of metal over each hook of the clip and bend arms to hold.

The colorful plastic handle of an old toothbrush can be transformed with very little effort into a fine wobbling minnow to fool even the worst of pan fish. Cut off the end of the handle as shown and notch it. Then embed the hook in the notch and hold it in place with a pin through the handle. The leader is attached to the handle eye.

Here's another kind of wiggler that you can use to disguise your hook. A number of small rubber bands are fastened to the shank of a hook with fine wire, and then the lower ends are trimmed off. If they are available, use red or other colored bands. This is simple to make, yet seems to get the attention of even wary big-mouth bass.

MAY 1954
SOLVING HOME PROBLEMS

Curtain Rod

CURTAIN ROD is easier to push through hem of curtain if a safety pin is inserted in end of the rod to serve as a guide. Simply open safety pin and wedge its arms between sides of the rod.

Linoleum-Binding Tape

LINOLEUM-BINDING TAPE purchased in roll form can be straightened before use by means of a thread spool and screwdriver. Slip spool over screwdriver blade, as at right, and pass tape under the spool against the direction of curl.

Milk Carton

MILK CARTON filled with sand provides door-stop for holding screen door open when carrying packages or furniture through doorway. Use a quart-sized carton and tape closed after filling.

Individual Saltcellars

INDIVIDUAL SALTCCELLARS for picnicking are had by using either metal or paper milk-bottle caps. Just wash and dry bottle caps, and then store so you'll have a number of them for picnics.

Sealing Envelopes

SEALING ENVELOPES for a large number of greeting cards or letters, below, is speeded and made more pleasant by moistening flaps with ice cube wrapped in clean cloth. The ice normally will melt fast enough to keep the cloth damp while using.

Children Can't Lock

CHILDREN CAN'T LOCK themselves in the bathroom if screw is used to keep lock bolt from engaging strike plate. Drive screw through slot in plate and into doorway so head of the screw is flush with the surface of the plate.
HANDY BASEMENT RACK for work gloves and notec or receipts can be improvised from several ordinary mousetraps. Wooden bases of the traps are cut to length and screwed to scrap lumber. Rack is mounted in convenient spot.

RUBBER PAD for food-chopper clamp assures nonslip grip on table top. The pad is made by cutting a disk from a piece of old inner tube and cementing the disk to the underside of table-top overhang, positioning disk so clamp will tighten over it.

STORING CANNED GOODS in unusually small amount of space is possible by installing these sliding shelves in kitchen base cabinet. Shelves sides are of 1 x 2 and bottoms of hardboard or plywood. Cleats fastened to sides of cabinet serve as guides, and the shelves are spaced varying distances to suit can sizes.
Cup-and-Saucer Rack Fashioned From Brass or Copper Wire

Fashioned of bright brass or copper, this twisted-wire rack will display a prized cup-and-saucer set to excellent advantage. Two lengths of 16-ga. wire, one 68 in. long and the other 24 in., are looped double and twisted in a vise, as shown. Allow the ends of the short length, which forms the hook, to extend about 2½ in. These ends are used to tie the hook to the base section. The required dimensions may, of course, vary.—Roberta L. Fairall, La Crescenta, Calif.

Tipping Bird Bath Attracts Songbirds and Keeps Cats Away

If you want to put a bird bath in your yard to attract song birds, and at the same time save the birds from being molested by prowling cats, this tipping bird bath will serve both purposes. A 5-ft. length of soil pipe is set in the ground so that 3 ft. of it projects above the surface. The bowl of the bath, which is a cover from a garbage can, is held on the base by a sash weight tied to the handle and suspended inside the soil pipe. When a cat attempts to get at birds in the bath, the cover tips and spills water on him. The sudden loss of support, plus the water bath, will discourage even the most persistent cat. The cover will right itself as soon as the weight is removed, because of the sash weight. The soil pipe and garbage-can cover could be painted a bright color, or stones and colored bits of pottery might be cemented around the soil pipe as decoration.—Jerry Dunham, Chicago.

Solder Refaces Punch Anvil

The useful life of a leather punch can be effectively increased by refacing the worn surface of the anvil with solder. The solder should be applied heavily, keeping the soldering iron on the anvil until the solder flows into a smooth surface. After this re-facing, future repairs are easily made by reheating the solder until it melts into a smooth surface.

Mixed nails, screws and other small parts may be sorted easily if they are dumped on a sponge-rubber pad, such as a chair cushion or kneeling pad. The resilient surface permits the parts to be picked up easily, and prevents rolling or skidding.

POPULAR MECHANICS
LIKE SO MANY outdoor-loving Americans, my family thoroughly enjoys spending its vacations and long week ends camping out—roughing it, so to speak—while exploring the many lakes and back trails of this great U.S.A. After having roughed it several summers in true Boy Scout style, we decided to design and build a camping trailer that would incorporate “all the comforts of home” in a compact, two-wheel job capable of being trailed safely at highway speeds.

Having two boys, Bruce and Craig, I knew that the trailer would have to sleep at least four. It would have to be small enough to park in my two-car garage, and it would need a roomy ice chest to handle an ample food supply. It also would have to afford adequate protection in bad weather and, preferably, be collapsible, which meant finding a way of erecting and dismantling it without a lot of work.

In short, a fold-away “tent” on wheels was what we needed. The trailer you see pictured below fulfills all these requirements. And, after having put it through a tour of the West last summer (a grueling test of some 5000 miles), we found the trailer towed beautifully, provided all the comforts we had hoped for and caused a mild sensation wherever we set up camp or pulled stakes. When open, each overhanging wing of the trailer to which the tent is permanently attached, accommodates a full-size air mattress to provide comfortable sleeping for four. The deep insulated ice chest at the front of the trailer is easy to reach both when the trailer is open or closed. The boys found this feature especially convenient for getting Cokes and other treats while on the road. Likewise, two lock-fitted

Independent of motel and restaurant, the Kendall family are enjoying camp life at its best with their trailer.
compartments in the nose of the trailer permit quick access to items that might be needed on route without opening the trailer itself. Two persons can easily erect the canvas top in a few minutes, and a full-length screen door keeps flies and mosquitoes outside. The center portion of the trailer interior affords space to store aluminum tubing and hairdressing, as well as a camp stove. The screen door stows away in a trap door in the floor, and built-in compartments with sliding doors provide plenty of room for cooking utensils, bedding and clothing.

Down to the last nut and bolt, the trailer cost me $457.31 to build. However, we later found we could have saved as much as $30 on the cost of the canvas top ($133) by having the awning makers sew it together during their slack season. If materials can be salvaged and a second-hand running gear purchased, the cost can be reduced considerably.

I made the bed of the trailer body from lengths of 3-in. channel iron and 1-in. angle iron, and welded the 18 separate pieces into a rigid framework. The channel stock is used for the main members of the bed and the tongue, these parts being shaded in the plan drawing, Fig. 5. Note that the forward ends of the two center members are cut at a 13-deg. angle to match the slant of the two front members of the bed. I laid out the members squarely on my garage floor to assure a flat assembly when welding the joints. The various members are placed in position, with the flat side of the channel facing outward. The two center channels are spaced 36 in. apart and butt-welded to the front and rear members. Two short lengths of channel, 16¾ in. long, are butt-welded to the center members on each side of the bed to form the wheel wells.
Weather stripping provides a seal for ice-box cover.

1-1/4" X 3/4" X 3/4" STEEL ANGLE ACROSS TOP OF DOOR

CAR-DOOR LATCH

1/4" FLANGE

FOOD TRAY

ICE COMPARTMENT

1-1/4" STEEL ANGLE

ICE CHEST

30"

5/8"

2-1/4"

DRAIN COPPER TUBING

EDGE RABBETED FOR SPONGE-RUBBER SEAL

GLASS WOOL

SCREW

26 OR 28-GA. SHEET METAL

STANDARD ICE-CHEST HARDWARE

26-GA. GALVANIZED SHEET METAL

3/4" X 37-1/4" X 83" MARINE PLYWOOD

SPONGE-RUBBER SEAL

1" PIANO HINGE

TUBULAR LOCK

3/4" STEEL PLATES

SUNNING GEAT [fiftCP-AXLE

WHEEL

MONTGOMERY WARD TRAILER

RUNNING GEAR (DROP-AXLE TYPE) 16" WHEEL

SPRING CLIP

LID SUPPORTS SWING DOWN

MONTGOMERY WARD TRAILER

RUNNING GEAR (DROP-AXLE TYPE) 16" WHEEL

SPRING CLIP

1 1/4" STEEL ANGLE

A- A

LIDS

SECTION THROUGH A-A

PIECE X

ICE CHEST

ICE CHEST LID

SIDE PANEL, INSIDE FACE

CONTINUOUS HINGE

LID

9

7

8

REAR VIEW
Three pieces of angle iron, marked A on the drawing, are cut 39 in. long and welded to the underside of the two center channels. These pieces provide support for a 3/4-in. plywood floor. Lengths of angle iron also are welded along the center channels and along the outer edges of the bed at the sides as indicated in section B-B, Fig. 5.

You can use any suitable two-wheel running gear, Fig. 4. I purchased a 58-in., drop-axle type having 16-in. wheels from Montgomery Ward for about $60. Spring-mounting plates, 3/4 x 6 x 8 in., are welded to the bed on the underside at the points shown and drilled for the shackles bolts.

The locations of the angle-iron posts to which the sides of the body are bolted, are spotted on the plan drawing. These are cut from 1-in. angle iron. A total of 24 are needed, ten of these being 27 in. long, two 29 in. long and twelve 14 in. long, the latter ones being located at the wheel wells, B in Fig. 5. All posts are merely butt-welded on end at their respective locations. If you study the plan carefully, you can see the way each post faces. Holes for bolting the plywood sides to the posts should be spotted and drilled before the posts are welded in place. Drill six holes for 3/16 x 1 1/4-in. carriage bolts in each 27-in. post, spacing them about 5 in. apart. The two 29-in. posts are butt-welded to the edge of the 1-in. angles along the sides 13 1/2 in. back from the front corner posts. These particular posts support the plywood bulkhead, marked X in Fig. 10. Note that this piece is rabbeted along the top edge to engage a groove on the underside of each trailer lid to give a watertight joint. Looking at the end view, Fig. 5, you'll notice that the 1-in. posts at the rear-door opening have a second post of 1 1/4-in. angle iron welded to them. These are set in 3/4 in. and provide a bolting surface for attaching the frame of the screen door to be described later. Finally, lengths of 1-in. angle iron are welded across the tops of the 14-in. posts and between the posts at the rear of the bed. Study section A-A, Fig. 5, and the end view. These members form a shelf on each side which is covered with hardboard.

The outside is covered with 3/4-in. marine plywood. Figs. 1, 8 and 10 give the sizes for the various panels. Exact lengths should be taken directly from the trailer bed, adding 3/4 in. to the length of the side panels to lap the plywood applied to the back. Before the side panels are permanently bolted in place, the wheel wells first are lined with plywood and then fitted with a sheet-metal liner. This is soldered and riveted as in Fig. 2, the cut-out edge being serrated to form tabs for nailing the liner to the edge of the plywood side panel.

Figs. 6 and 7 detail the ice chest and its cover. You'll notice that the plywood part of the cover is rabbeted around the edges to bear against a length of sponge-rubber weather stripping applied around the opening in the bulkhead cover board. Standard ice-chest hardware is used to hinge the cover and provide a positive seal. The ice chest itself hangs in the opening by flanges, and glass-wool insulation is packed solidly around it. The lids, or doors, which overhang the sides when the trailer is open, are hinged with lengths of 4-in. continuous hinge which I bent in a sheet-metal brake, as indicated in Fig. 9. I could buy this hinge only in 6-ft. lengths so I made up the difference by adding a section to it. Fig. 3 shows how the pipe supports for the lids are installed. These pivot in brackets located in the wheel wells and swing up from spring clamps to engage bolt-head studs projecting from the top surface of the lids. Pipe extensions are stowed separately.***(To be continued)
PLAN of the MONTH...

- REMOVABLE MAPLE TOP 3/4" X 14 3/4" X 22 1/2"
- TOP FRAMES 16" X 22 1/2"
- 1/4" X 1" DRAWER GUIDE
- 1/4" TEMPERED HARDBOARD END PANELS 12 1/2" X 28"
- 3/8" X 3/4" DRAWER GUIDE
- 3/8" X 2"
- 3/8" PLYWOOD SHELF 13" X 23 1/2"
- NOTCH SHELF AT CORNERS 1/4" X 1/4"
- 3/8" TEMPERED HARDBOARD BOTTOM 13 1/4" X 23 1/2"
- 3/8" X 1/4" DEEP RABBIT CUT ALL AROUND OUTSIDE EDGES OF END PANELS
- 1" DIA. KNOB
- BACKING STRIP ON FRONT DOOR ONLY
- CUT THROUGH FOR FINGER GRIP
- 1" X 1 1/4"
- 1/2" X 2 1/2"
- 3/4" X 3 1/4"
- 33 1/2"
- 1/4" X 1 1/2"
- 9"
- 1/4"
- 1/2"
- 3/4"
- 1 3/4"
- 20 1/2"
- 1 1/2"
- NOTE: SLIDING DOORS ON FRONT AND BACK, DRAWER CAN BE OPENED FROM FRONT OR BACK
- 15/16" DIA. WHEEL
- 14" HANDLE
- 16"
Mounted on casters and with the drawer and cabinet accessible from both sides, the kitchen caddie also provides a portable work surface. When the maple top becomes scarred from use, it can be easily reversed or replaced.

**MATERIAL LIST**

**Maple**
1 pc. - 3/4" x 14 1/2" x 22 1/2" - Top

**Tempered Hardboard**
2 pcs. - 1/4" x 13 1/2" x 28" - End panels
1 pc. - 1/4" x 15 1/4" x 22 1/2" - Bottom
4 pcs. - 3/4" x 10 1/4" x 19 1/2" - Doors
2 pcs. - 3/4" x 11" x 12 1/2" - Door strips
4 pcs. - 1/4" x 11 1/2" x 4 1/2" - Door finger-grill backing
1 pc. - 3/4" x 15" x 19" - Drawer bottom

**White Pine, Basswood or Poplar**
4 pcs. - 3/4" x 31 1/4" x 13 1/2" - End-frame tops and bottoms
4 pcs. - 3/4" x 11 1/4" x 33 1/4" - End-frame uprights
4 pcs. - 3/4" x 11 1/4" x 33 1/4" - Side-frame uprights
2 pcs. - 3/4" x 11" x 20 1/4" - Top-frame facing strips
2 pcs. - 3/4" x 6 1/4" x 20 1/4" - Bottom side panels
2 pcs. - 1 1/4" x 13 1/4" x 22 1/4" - Top door slides
2 pcs. - 1 1/4" x 14" x 22 1/4" - Bottom door slides
2 pcs. - 1 1/4" x 2 1/4" x 14 1/4" - Top-frame ends
2 pcs. - 3/4" x 13" x 22 1/4" - Top-frame sides
2 pcs. - 3/4" x 12" x 14" - Drawer-frame ends
2 pcs. - 3/4" x 11 1/4" - Side drawer guides
2 pcs. - 3/4" x 1 1/4" - Shelf cleats
4 pcs. - 3/4" x 1 1/4" x 18" - End drawer-filler strips
4 pcs. - 1 1/4" x 4" x 4" - Caster blocks
2 pcs. - 3/4" x 3 1/2" x 20 1/4" - Drawer fronts
2 pcs. - 3/4" x 3 1/2" x 15 1/2" - Drawer sides
2 pcs. - 3 1/2" x 2 1/4" x 14" - Handles

**Plywood**
1 pc. - 3/4" x 13" x 23 1/2" - Shelf
1 pc. - 3/4" x 1 1/4" x 19 1/2" - Drawer partition
4 pcs. - 1/4" x 2 1/4" x 10 1/4" - Drawer partitions
Antproof Docking Facilities Improvised for Cabin Cruiser

Ants won’t be able to board a cabin cruiser if the boat is kept away from the dock by 2 x 4s driven into the mud about 18 in. from the dock. The lines, water hose and electric cable that must run from the boat to the dock are wrapped for several inches, between the dock and the boat, with friction tape, and a tree-banding compound is smeared on the tape. The tree-banding compound will stop all crawling insects from coming up the lines and each application will last for two or three months even under a hot sun.

Emergency Darkroom Safelight

A simple, inexpensive darkroom safelight that can be put up quickly for emergencies can be made by covering a 10-watt bulb with an ordinary kraft-paper bag. The bag should be fairly heavy and fit over the bulb without too much play. This type of safelight is good only for use with photographic printing papers and should not be used when loading film. The paper bag also presents a fire hazard.—Robert C. Florian, Chicago.

Garden Watered From Leaky Hose

A leaky garden hose that seems worthless can be used to irrigate gardens and flower beds. With a leather punch, make holes all along that section of the hose which will lie in the garden when it is stretched out. Then turn on the water at low pressure.

Plastic Food Boxes Protect Film When Stored in Refrigerator

If you store photo film in the family refrigerator to protect the emulsion against deterioration, store the film in regular plastic food containers. The containers will prevent possible food spillage from damaging the film and are available from most stores that handle household accessories.

George B. Harran, Westfield, Mass.

Dip the end of a tube of shaving cream into water, after removing the cap, and you will find that the cream has less tendency to adhere to the end of the tube.
Inexpensive and Decorative Patio Gate Insures Privacy

To assure privacy in his patio, and yet have an inexpensive door of neat appearance that would permit quick identifying of callers, one homeowner designed and built the one shown. It is made of shiplap or tongue-and-groove boards assembled on 2 x 4 braces. The irregularly jigsawed bars of the window grill are installed between cleats and decorative molding as in the sectional detail. The gate may be painted a bright color, or perhaps treated with a dark stain to simulate an antique door.

Speed Graphic Operating Steps Noted on Parallax Finder

The letters OPACSF, printed on a piece of masking tape and stuck on a parallax finder, serve as a reminder of the steps to be taken in operating a Speed Graphic camera. It is necessary then only to memorize that the letters stand for the following: O, open focal plane; P, parallax set; A, aperture set; C, cock shutter; S, slide withdrawn; F, focus. This method of learning routine operations in their proper order can be applied to many other jobs in photography.—A. M. Wettsch, Mt. Pleasant, Iowa.

Inner Tube With a Sail Tows Heavy Fishing Line Offshore

When no boat is available, an inflated inner tube rigged with a sail will carry a heavy fishing line out into a lake or river beyond where it could be cast by hand. Fastened to each side of the sail, a yoke, to which the fishing line is tied, keeps the sail facing the wind. The line is supported by floats spaced about 10 ft. apart, between which leaders and hooks are tied. The depth of water and type of fishing will determine the length of the leaders. With an offshore wind blowing the inner tube away from the beach, the fishing line is played out the desired distance. This method also could be used to keep a youngster busy fishing from the shore, thus eliminating the hazards of the child using a boat alone. In some states "trotline" fishing, as this method is called, requires a special license or is prohibited by law, therefore carefully check your own state's game laws before using.—H. M. Springstun, Corpus Christi, Texas.
CRUSETTE is an ideal 12-ft. utility outboard for those who want a seaworthy craft for fishing and family outings, plus a hull that is capable of an occasional burst of speed. With clean bow, V-bottom hull and high sheer, Crusette can be trusted in rough weather, and her 4½-ft. beam and sharp chines give unusual stability. She is powered satisfactorily with a small motor, although a more powerful motor (10 to 15 hp.) will give her real speed when wanted.

The plywood hull is built easily on a 2 x 10 strongback, locating the frames as in Figs. 2 and 8. The side and bottom panels may be cut from two 4 x 14-ft. sheets of ¼-in. waterproof fir plywood. On the original craft, ¾-in. marine plywood with the outside surface of vertical-grain fir was used. Oak or mahogany should be used for the outer stem, outside keel, spray rails and

Crusette is built upside down on a strongback which is later removed. Legs hold boat at working height.
half-round moldings, while frames, seats and floorboards can be of any clear boat-building lumber. If softwood is used for these parts, the boat can be "dressed up" with a mahogany-plywood foredeck, sheer battens and upper moldings.

To build the boat, first cut the strongback from a length of 2 x 10, as detailed in Fig. 2. Screw the transom brace to the stern end of the strongback and notch the bow end roughly to receive the finished stem. Set up the strongback on a fairly level surface, Fig. 1, attaching the legs with screws.

Next lay out the frames and stem full-size on wrapping paper, laying out all the frames, one over the other, on the same sheet of paper. This is done by using a different-colored pencil for each frame. In this way, errors can be detected quickly. Cut the frame members to size and assemble with waterproof glue and screws. Rough out all the notches for the chines and sheer battens. Assemble the transom frame similarly, Fig. 3, and then glue and screw the frame to the 3/4-in. plywood transom. Do not notch the plywood transom: the chines, sheer battens and keelson butt against it.

Set the completed frames in the notches of the strongback and attach the transom, clamping it to the transom brace. Then make the stem, Fig. 3, and clamp it to the strongback, using a C-clamp and two plywood gussets, as in Fig. 1. The gussets are nailed only to the strongback so it can be

-Stem is held to strongback with two plywood gussets and a C-clamp. Gussets nailed only to strongback

-Outer stem is faired into outer keelson. Metal half-round screws onto stem and keelson, extending 5 ft.
Alternate methods of cutting transom knees and finishing edge of plywood decking. Waterproof deck seam removed easily from the completed hull.

To prevent frames No. 2, 3 and 4 from warping as the battens and plywood are applied, clamp or screw boards across the gunwale ends of the frames. Also, install both of the chines, side planks, etc., at the same time to equalize strain. Attach the keelson to the transom first; then work forward, screwing it to each frame with two 1½-in. screws. Next, add the chines and sheer battens and fair down all the surfaces with a plane so the planking will rest properly at all points. Cut the plywood side pieces first and install them together, beginning at the transom. Drive a ¾-in. flat-headed screw every 2 in. along the chines and transom, 1½ in. along stem and every 3 in. along the sheer battens and frames. Attach the plywood bottom panels, spacing the screws 2 in. apart, except on the frames where the spacing should be 3 in. Screw the outer keel in place and then the outer stem which is faired into the keel (Fig. 3, profile view, and Fig. 5). Attach the half-round molding at the chines, turn the boat over and remove the strongback. With the hull rightside up, install the seat risers, the deck and the transom knees, Figs. 4 and 7. Mahogany plywood makes the most attractive decking, Fig. 6. * * *
Marine plywood:
2 pcs. — ⅛" or 5/16" x 48" x 14" — Bottom and sides
1 pc. — 3/4" x 21" x 3" — Transom
1 pc. — ½" x 36" x 43" — Deck (or use waste)

Mahogany or oak:
1 pc. — ⅛" x 1" x 12" — Keel
2 pcs. — ⅛" x 1 1/2" x 54" — Spray rails
1 pc. — ¾" x 1" x 48" — Outer stem
1 pc. — ¾" x 5" x 30" — Knees
4 pcs. — ½" x 1 1/4" x 14" — Half-round moldings

Mahogany, oak, spruce, pine, cypress or fir:
2 pcs. — ⅛" x 1 1/2" x 14" — Sheer bottens
2 pcs. — ⅛" x 1 1/2" x 14" — Chines
2 pcs. — ¾" x 1 1/2" x 10" — Seat risers
1 pc. — ¾" x 1 1/4" x 36" — Deck bottens
1 pc. — ½" x 2 1/2" x 12" — Keelson
3 pcs. — ¾" x 3" x 12" — Frames
2 pcs. — ⅝" x 6" x 12" — Frames
1 pc. — ⅛" x 9" x 10" — Motor board
1 pc. — ⅛" x 12" x 12" — Seats
1 pc. — 3/16" x 18" x 48" — Rear seat
1 pc. — ⅛" x 6 1/4" x 24" — Stem

1 pc. — ⅛" x 5" x 24" — Stem
8 pcs. — ⅛" x 2 1/2" x 8" — Floorboards
4 pcs. — ⅛" x 2 1/2" x 8" — Floorboards

Common lumber:
1 pc. — ⅛" x 9 1/4" x 10" — Building form
1 pc. — ¾" x 2 1/4" x 21" — Transom form

Miscellaneous
1 lb. Waterproof resin or marine glue
1 pt. Emulsified rubber joint sealer or "C" quality marine glue
1 pr. 6 1/2" ears
Primer coal and paint or varnish

Brass or galvanized hardware:
5 gross 1" No. 8 flat-headed screws
1 gross 1 1/4" No. 8 flat-headed screws
1 gross 1 1/2" No. 8 flat-headed screws
1/2 gross 5/8" No. 6 oval-headed screws
1 lb. 1/16" Shingle nails
5 fr. ⅝" Metal halfround (stem)
1 Bow lifting handle
1 pr. Oarlocks
Water Tanks Decorate Driveway

Old hot-water tanks can be used as sturdy, decorative corners for a driveway entrance. They are set in the ground in the same manner as a post, and then painted. To lengthen the life of the tank, fill it with a watery cement after setting it in the ground.—Walter Shutok, Uniontown, Pa.

Yellow Laundry Soap on Fingers Aids Rapid Handling of Papers

A bar of yellow laundry soap is an excellent substitute for glycerine often used by printers and others whose work requires the rapid handling of sheets of paper. Occasionally rubbing the fingers over the soap will coat them with a rosin-like substance which the soap contains. Single sheets of paper may then be quickly picked up from a stack.

Light Attached to Lawn Mower Powered by Small Generator

When rainy weather and overtime hours kept one man from getting his lawn cut in full daylight he added a generator-powered bicycle light to his power lawn mower. He clamped the headlight to the handle so the beam of light would shine over the motor and onto the lawn ahead of the mower. The bicycle generator used is the type having a friction drive wheel that runs against the bicycle tire. The generator was mounted so the drive wheel would bear against the drive belt of the mower.

Metal Shelf Brackets Modified For Use as Temporary Supports

Temporary shelf supports that are easily removed can be made by filing the screw holes in standard metal shelf brackets to a keyhole shape. The brackets then can be hung on screws that project slightly from a wall. When the temporary shelf is no longer needed, the brackets are removed by lifting them slightly so the screwheads will pass through the larger part of the keyhole.

Keep Prints From Slipping

The annoyance of having prints slip when cut on a trimmer can be eliminated by applying rubber cement along the edge of the board as shown. The cement should be allowed to dry before beginning the cutting operation. One application lasts for months.—Clyde Allison, Cadillac, Mich.

The Luxury of a Porch...

To be outdoors in a refreshingly cool breeze yet shaded from the hot sun and insects, lounging in downright comfort, is a luxury any homeowner can enjoy by adding a porch or breezeway to his home. Read the detailed story in next month's issue that tells how to do it yourself.
Economy and efficiency in the operation of your car depend largely on your fuel system. You should know how it works.

FROM TANK TO CARBURETOR

Before gasoline, the lifeblood of your automobile engine, is utilized as heat energy, the fuel system must provide several definite and necessary services. A typical passenger-car fuel system, shown in the phantom drawing above, consists of a tank, pump, carburetor, fuel line, air cleaner and a manifold-heat control valve. The fuel line runs from an outlet at the bottom of the tank to the pump. The outlet generally is fitted with a strainer and sediment trap to keep the fuel as clean as possible. The pump in the majority of modern passenger cars is of the diaphragm type and is actuated by a rocker arm which is moved by an eccentric on the engine camshaft. The pump is located as near to the carburetor as possible, but away from the manifold heat. In some cases it is necessary to install a metal shield between the pump and manifold to prevent vapor locks from manifold heat.

Electric fuel pumps, although sometimes more expensive than the diaphragm type, have advantages over the latter. An electric pump can be installed near the tank itself or in any comparatively cool spot, thus minimizing vapor locks. Also, the electric pump starts supplying gasoline as soon as the ignition is turned on. The starter is not required to turn over the engine several times before gasoline is pumped to the carburetor. However, a diaphragm-type fuel pump, if properly serviced, will give years of good service.

Quite often the fuel pump contains a secondary unit, which is the vacuum-booster pump, operated by the same rocker arm that actuates the fuel pump. Three views of a combination fuel-pump vacuum booster are illustrated. The booster serves to increase the vacuum needed to operate the windshield-wiper motors when the engine manifold vacuum is low, as when the engine is being accelerated rapidly. All fuel pumps, with or without a vacuum booster, have a filter and sediment bowl at the bottom, which collects dirt and other foreign matter. The sediment bowl is easily removed by loosening the bolt that passes through its center. When the bowl is removed for cleaning, the gaskets should be replaced if they are not in good condition.

Operation of a typical fuel-pump vacuum booster combination can be followed by reference to the lettered sketch. Rotation of the camshaft eccentric actuates rocker arm A, pivoted at B, which pulls link C and diaphragm D upward against spring pressure E. This creates a vacuum in pump chamber F. This suction stroke of the pump causes fuel from the tank to enter sediment bowl H through inlet G. The fuel passes through strainer I and enters pump chamber F. On the return stroke, spring pressure E pushes the diaphragm D downward, forcing fuel from chamber F through outlet valve J and out through discharge K to the carburetor. When the carburetor bowl is full, the carburetor-float valve is closed.
Below left, is exploded diagram of combination fuel pump-vacuum booster. Above left, assembled unit is shown with parts named. Drawing, above right, is cross section with oil parts lettered for reference.

Thus setting up a back pressure in pump chamber F. This pressure holds diaphragm D upward against spring pressure E. Thus, the fuel pump is inoperative until the carburetor float valve opens and the back pressure is released. Spring L simply serves to keep the rocker arm in constant contact with the camshaft. Hard starting or a "flattening out" of engine speed in highway driving indicates that the fuel pump should be tested.

Operation of the vacuum booster, which is actuated by the same arm as the fuel pump, is as follows: Rotation of rocker arm A, pivoted at B, pushes link M and diaphragm N upward. This expels the air in the chamber O through the exhaust valve P and out Q to the intake manifold. On the return stroke, spring R pushes diaphragm N downward, creating a suction in chamber O, thus drawing air through inlet S from the windshield-wiper motor. When the windshield wipers are not being used, manifold vacuum holds diaphragm N upward against spring pressure R so that the diaphragm does not make a complete stroke for every stroke of rocker arm A. When manifold vacuum is greater than the vacuum created by the pump, air will flow from the windshield wiper through both valves of the vacuum pump and the operation of the wiper motor then is the same as if the pump were not connected. Sluggish windshield wipers or a sudden excessive oil consumption calls for a check of the vacuum booster.

The carburetor receives the fuel from the pump, mixes it with the proper amount of air and distributes the vaporized mixture in the correct proportions to the engine. The carburetor and choke were discussed in the July, 1953 Popular Mechanics and require no further description in this article.

An air cleaner is clamped to the top of the carburetor. A typical cleaner is pictured. Air entering the carburetor first passes through oil-soaked wire mesh to remove dust and impurities. The oiled mesh also quiets the rushing sound made by the air as it enters the carburetor. In extremely dusty areas, a heavy-duty type air cleaner which contains an oil bath is used. Air entering the cleaner is first directed
against a pool of oil which removes the heavier particles of dust. The velocity of the air also causes a small amount of oil to be carried up into the mesh strainer, thus keeping it lubricated.

A representative type of manifold heat-control valve is shown in the sketch. The heat-control valve permits hot exhaust gases to heat the incoming cold fuel-air charge during starting and warm-up periods. The action of the valve is automatically controlled by a thermostatic spring, assisted by a counterweight. When the engine is cold, all exhaust gases are directed against the intake manifold at a point just below the carburetor. Sometimes this area is part of the intake manifold casting, and the intake and exhaust manifolds are bolted together with a gasket used to prevent exhaust gases escaping. In other types, such as the one shown, the manifolds are open to each other, but a heat-riser tube extends down into the exhaust manifold from the intake, thus preventing the exhaust and intake gases from mixing. The heat-riser tube is simply a one-piece cylinder with the bottom end sealed. The cold-air-and-gas mixture drops into this tube, is heated and then drawn into the engine cylinders. When the engine reaches operating temperature the thermostatic spring and counterweight close the valve so that heat no longer contacts the heat-riser area. Do not use oil on the shaft of the manifold heat-control valve. It will cook to a gum and jam the shaft. Occasionally apply a small amount of baking soda mixed with kerosene to the shaft of the valve.

Shown above, left, is a sketch of one type of electric fuel gauge. The motion of the tank float causes the movable contact to slide over a rheostat. The tank unit is grounded out of the gauge circuit when the tank is empty and the float is at its lowest position. Current then passes through only the coil on the empty side of the dash unit because the coil on the full side is of a higher resistance. The pointer is attracted towards the energized coil which causes the dial to register an empty tank. When the tank is filled and the float rises, the rheostat is placed back in the circuit by the movement of the tank-unit contact. The rheostat places resistance in the circuit which causes current to flow through the coil on the full side of the dash gauge. The indicator on the dash gauge then moves toward the full side in direct ratio with the amount of current running through the coil. Compensators are wired into the circuit to allow for changes in air temperature and fluctuations in voltages.
Small Doll's Bed Is Assembled Quickly From Two Cigar Boxes

Small but attractive, this doll bed is made from two matching cigar boxes and their tops. First the tops are removed and then the sides are cut with a coping saw as shown in the drawing, any desired design being used. The head and foot of the bed are made from the tops of the boxes. Finally the bed is assembled with glue or brads and given a suitable coat of enamel or lacquer.

Junked Walking-Plow Beam Supports Rural Mailbox

An excellent rural mailbox support that is especially suitable for erection on a sloping roadside bank can be made from the steel beam of a junked walking plow. A steel flat is bolted to the top of the beam to support the mail box, and the beam is set in concrete.

Pencil Ferrule Pits Cherries

The chore of pitting fresh cherries for pies and other desserts is less arduous when a simple cherry pitter made from a common lead pencil is used. The eraser is carefully removed from the brass ferrule of the pencil, and the ferrule cavity is cleaned and sterilized either by boiling or by holding for a few moments over an open flame. Pushing the ferrule through each cherry quickly removes the pit.

Harry Lawson, Pulga, Calif.

Discarded Hacksaw Blade Made Into Effective Garden Weeder

This handy weeder and cultivator for use in the flower garden can be made from a 10-in. hacksaw blade by bending the blade and attaching it to a handle as shown in the photograph. The handle is made of 1x3x5-in. hardwood. To fasten the blade to the handle, two screws are put in each side.

Stair Tread Protects Window Sill Against Flowerpot Stains

Cut to fit a window sill on which potted plants are placed, a rubber or plastic stair tread will protect the paint or varnish from stains and discoloration. It also will prevent warping of the wood, caused by water which is spilled from the watering can, or which seeps through the drain holes in the bottoms of the flowerpots.

H. Radzinsky, New York City.

Wooden Strip Used as Handle For Small Magnifying Glass

A small magnifying glass that is difficult to hold between the fingers will be much easier to handle if attached to a wooden strip such as a tongue depressor. A thin strip of adhesive or masking tape is used to bind the lens to the strip. To make it even more convenient to use, determine the height above the printed page at which the glass is in focus. Then measure this distance on the strip and tape the glass to it at that point.
UTILIZING common household items which normally are discarded after serving their purpose, you can assemble a practical photo lamp in a single evening. The body, or housing, of the lamp is made from a potato-chip can. This is supported on a telescoping drapery rod, the lower end of which is attached to a heavy wooden block. A metal base also can be used; the round cast-iron base from an old hot-water tank is just the thing. Several holes are drilled through both sections of the drapery rod so that a pin can be inserted to hold the lamp at the desired height. A hole cut in the bottom of the potato-chip can (housing) takes the two-piece porcelain lamp socket as in the two photos at the right. After the socket is in place it is protected by a small can cut in half, leaving two short ears, or tabs. These are bent outward for attachment to the bottom of the housing with sheet-metal screws. A number of small holes are drilled in a pattern through the top of the housing to permit heat to escape. A No. 1 photoflood bulb gives the proper amount of light. By cutting a 3-in. hole through the lid of the can and using this as a “lens,” as in the lower right-hand photo, a fairly sharp spot will be obtained.
Camera Support Is Improvised With Two Chairs and Book

In the event a tripod is not available when taking pictures requiring steady support for a camera, a couple of straight-backed chairs and a book or length of board can be combined to do the job. Place the chairs at an angle and set the book across them as shown to form a platform.

Negatives Stored in File Box

Negatives can be stored in standard card file boxes to preserve them and to keep them readily accessible. Index cards made for the file box are used as dividers, and the negatives are indexed according to subjects or to the date a picture is taken, whichever is most convenient. To make finding of the exact negative easier, the subject and date of each can be marked in the margin in white ink. Then the negative is stored with that margin up so that it can be read at a glance and without removing it.—Blanche Campbell, Las Vegas, Nev.

Hose Used as Funnel Holder

Photographers and others who use glass funnels in their work will find that there is less danger of breakage if a short piece of radiator hose is used to support the funnel in a jug or bottle. The hose should be notched at both ends to permit air to escape from the container when liquid is poured through the funnel. The hose should be just long enough to support the funnel slightly above the neck of the bottle, as shown in the sketch.

Hot Water Softens Sponge For Wiping Photoprints

When used on films or for wiping down prints, the new viscosé-type sponge may prove a little too coarse. One way to make the sponge soft is by immersing it in hot water—which won't damage the sponge in any way—and the hotter the water is the softer the sponge will become.
PRINT DRIER

By Harry J. Lance

WITH LIMITED SPACE available, drying a large batch of photo prints can become a real problem, especially if time also is limited. To overcome the difficulty, one photographer designed and built this unusual print drier. It consists of 8 muslin or mosquito-netting "shelves" 36 in. wide and wound on adjustable rollers so that tension can be maintained. The supporting frame is made collapsible by means of bolts and wing nuts, permitting it to be disassembled and stored when not in use. As detailed, the unit provides space for nearly 200 prints in the 8 x 10-in. size. It can be made larger or smaller to suit individual requirements. Details below show the construction. Four uprights are joined to four stretchers as in the left-hand detail, and the joints are blocked in two directions to provide the necessary rigidity. Drill bolt holes in the two pieces, then bolt together and screw the blocks in place. A few spots of glue under each block will help to strengthen the joint. Now clamp the uprights together and locate holes for the dowels 8 in. apart, measuring from one end. Note that the right-hand detail below specifies ⅛-in. dowels. For greater rigidity drill the uprights for 1-in. dowels. Reassemble the frame, cut the dowels to length and fit them in the holes. Then drill small holes from the edge of each upright, each hole located so that it passes through the center of the dowel. These holes should be slightly larger in diameter than an 8d nail. The latter serves as a key to prevent the dowels from turning. Cut the muslin or netting in 9-ft. lengths, making sure that the ends are square. Tack the ends to the dowels, spacing the tacks about 1 in. apart. Then remove the nail keys at the ends of the dowels and wind the fabric equally on each dowel. Number one end of each dowel so that they may be replaced in the proper order when the unit is reassembled after being stored.
**Sill-Cock Unit Provides Handy Drinking Fountain for Children**

When the hot-weather thirst of two small children kept their parents busy providing drinks, their father made this outside drinking fountain which attaches to the sill cock. The parts are obtainable at most hardware stores and can be assembled in a matter of minutes to produce the fountain. The L-shape swivel connector is the type used to prevent kinking the hose at the faucet. It is screwed onto the faucet, then the automatic nozzle is screwed onto it. The filter is the slip-on type, usually used on kitchen faucets to aerate the water. The automatic nozzle has a spring-loaded handle and can be adjusted as to amount of flow. A pan may be placed beneath the fountain if no drain is present. This also assures the family dog of a supply of water.

Darrel Ward, Topeka, Kans.

**Curved Tin Deflector on Tray Permits Uniform Print-Washing**

When washing prints, some amateur photographers simply arrange a developing tray beneath a water tap so the water strikes one of the slanted sides and is deflected along the bottom of the tray. With some trays, this creates enough turbulence to keep the prints off the bottom and in continual motion. However, a more dependable method which can be used with practically any kind of glass or enameled tray, pan or small tank is to bend a piece of tin so it hooks over the edge of the tray, with the remainder bent in a curved shape inside the tray as shown. Due to the broad curvature of the sheet metal, the stream of water is deflected uniformly along the bottom of the tray, thus creating sufficient turbulence to keep even large prints in continual motion.

**Plant Cuttings Rooted Easily In Plastic Wrapper**

Plant cuttings can be rooted easily by starting them in wrappers cut from thin sheet plastic. First cover the end of the stem with damp sphagnum moss and then wrap with the sheet plastic, binding it around the stem with string or a rubber band. If sealed tightly, the wrapper will retard evaporation of moisture from the moss sufficiently to allow roots to develop in a few weeks.—John Krill, North Lima, Ohio.

**Release Clutch of Bar Clamp By Using C-Clamp**

The use of a C-clamp to loosen the jammed clutch leaves of the adjustable pad of a bar clamp will prevent cracking or breaking the casting of the pad. Forcing the leaves with hammer blows is definitely not recommended because of the danger of breaking the casting. A C-clamp, used as shown, will provide a strong, even pull.
How to Cut COPED JOINTS

By Sam Brown

A COPED JOINT is made by cutting the reverse shape of the molding on one end of a piece of molded stock and then joining this to another piece at right angles, as in the corner of a room. The resulting joint has the same appearance as a mitered joint on identical pieces of molding but, in addition, has the advantage of not showing a crack between the joining members should the wood shrink after installation. Two common applications of the coped joint are the cornice mold and base shoe shown in the photo and detail, Fig. 1.

Basic procedure: Figs. 2 to 6 inclusive show the procedure in making a coped joint. First it is necessary to fix in mind the differentiation between the base and back of the molding. In the shoe mold shown in the detail, the narrow, flat side is the base and the wider, flat side the back. When the miter is cut, Fig. 4, the base is always down as indicated. In the crown molding, Fig. 7, the base is the flat side that fits against the ceiling. After cutting the miter on the shoe mold, the cope cut is made by following the miter line with a coping saw, the molding...
Ahou-tf, making +ha cOpt tiU <4t?mjtfftng ih-of end of fhi itm-llding. Mit^r cut it guide for tf>* Ape <Ul- Below, freqirig the ntcvr-PCV of iho toiril after c&p-fn, When imping tW stofk k slightly nndercul resting on the back as in Fig. 6. Care must be taken to follow the line of the miter precisely as otherwise the joint will not fit snugly when the parts are placed at right angles. The edge will be somewhat easier to follow if blackened by rubbing with a carpenter's pencil. Use a fine-toothed blade in the coping saw as it is easier to control.

Coping crown molding: Typical crown moldings are shown in Fig. 7. Many shapes and sizes are available. One of the most common applications of the crown mold is that of room trim, Fig. 1. Generally, such cornices consist of one molding, but in some cases the cornice may be built up of several moldings of varying sizes. If the job is new to you and if you are working with moldings of fairly large size, then it's well to keep in mind that as a rule the predominating curve of the cornice molding generally gives the best appearance when placed at the top. The three sections in the upper detail, Fig. 7, are examples of this basic rule. However, the rule applies more specifically to one-piece molded cornices. Also, identifying two of the three flat surfaces as base and back is simply a convenient way of keeping the parts in order on a given job. The terms do not in any way designate the type of moldings used. It's good idea to mark the moldings before you begin fitting as this will help to eliminate the possibility of error. After marking all pieces, follow the basic procedure in cutting—hold the base side down for the miter cut and place the molding with the back down for the cope cut. Note the cope and miter positions in Fig. 7, also Fig. 8. Cutting is done generally in a miter box as pictured, the molding being supported by a stop nailed or clamped to the bottom of the
Moldings can be mitered and cope on power tools, using the circular saw for the miter cut and the bandsaw and simple jig for the cope cut box. If a power saw is used a stop is clamped to the crosscut guide as in Fig. 10. Coping cuts also can be made on a bandsaw by making a simple jig as shown in Fig. 11. When fitting, it is best to make the first cope cut on a short piece of waste molding so that the fit can be carefully checked as in Fig. 9. The accuracy in following the guide line formed by the miter cut determines the fit when the parts are placed together in their proper relation. Because of this, carpenters and interior trimmers usually undercut very slightly when coping, although some workmen prefer to do this as a separate operation, using a rotary file, or burr, driven by a flexible shaft or hand grinder as in Fig. 14. On some types of moldings the rotary file is suitable for undercutting.

Order of fitting: Although experienced carpenters and trimmers often fit moldings on the two long sides of a room and then cope both ends of the two shorter pieces to fit, less experienced workers usually will find it easier to fit the pieces successively around the room. Figs. 12 and 13 show how to proceed in this manner by coping one end of each piece and fitting mitered joints at outside corners. Fig. 13, details A to D inclusive, shows how to cope the molding in a square or rectangular room. Fig. 12, details A to F inclusive, shows how molding is fitted when an offset in the wall is involved. One thing to keep in mind while carrying out the installation in any room is that the molding has a "long" and "short" side after mitering, Fig. 5. When fitting the lengths of molding that have square-cut ends, avoid forcing into the corners as the pressure may break the plaster. If a piece must be coped and at the same time cut to length, the initial miter cut is made to the same length as would be required were the joint a simple miter. It's a good idea to make careful measurements of the walls before cutting stock.
Movable Light Over Workbench Slides Along Overhead Wire

To provide a good light for the entire length of your workbench, attach a bench light to a spool that slides on an overhead wire as shown in the illustration. The wire is extended the length of the bench at a convenient height. The slider can be made from either a large thread spool or from a porcelain insulator. The electric cord just in back of the socket is wrapped once around the spool and taped in place. To keep it from getting in the way, the cord is supported along the wire by several small hooks or loops.

Richard Somerville, Corona, Calif.

Internal Screw Threads Measured With Aid of Lead Pencil

To measure internal screw threads that are in an awkward location or are difficult to see, use a short length of dowel or a round lead pencil to take an impression of the threads. Press the pencil firmly against the threads to make a sharp indentation in the wood, then use a center gauge to determine the number of threads per inch from the impressions. As a rule, the hardwood dowel will give a cleaner, sharper impression than the softwood of the pencil.

E. J. Gilkerson, Columbus, Ohio.

High-Pressure Insecticide Sprayer Utilizes Gear-Type Pump

Because his low-pressure, tank-type insecticide sprayer was slow and inefficient, one farmer built his own high-pressure unit utilizing a gear-type pump purchased as war surplus. A relief valve, set to open at 85 lb. pressure is installed in the line to the spray head. When the line pressure goes over 85 lb., the relief valve allows insecticide under pressure to pass through the return line to the supply pail, where it keeps the insecticide solution mixed thoroughly. A ¾-hp. electric motor is used to drive the pump. The original spring valve on the spray-head pipe was replaced by a high-pressure air valve. The higher pressure required a small orifice in the spray head, so the original hole was brazed shut and a No. 60 drill was used to make the new orifice. Air-hose couplings are used on the hose lines.—F. Clements, Seattle, Wash.

Clothes can be hung on nails which have been driven through corks without danger of tearing.

POPULAR MECHANICS
NOTCHED JAWS IMPROVE VISE

By Walter E. Burton

REGISTERING SLOTS cut into the jaws of a small vise from the top greatly widen the range of its usefulness, especially in the home shop. Small vises of the clamp-on type having solid jaws are the most suitable for altering. Vises having hardened jaw inserts can be altered by substituting inserts of mild steel. The two photos below and the upper detail at the right show how the jaws are slotted. The width and depth of the slot are not given as they are determined from the size of the vise at hand. Note in the upper detail that the slot is cut to a depth that brings the rounded bottom of the slot just below the lower inside corner of the jaw. When the slot is cut to this depth, the vise can be used for clamping operations such as that pictured, in the lower right-hand photo. By fitting a flanged pad, the vise will serve as an arbor press for a considerable range of work. In order to drill and slot the jaws it usually is best to dismantle the vise so that the jaws can be drilled separately. Drill 3/8 or 1/2-in. holes through the jaws to form round-bottom slots. Then cut out the waste by sawing down from the top of the jaw with a hack-saw. Two cuts will be necessary to form the sides of each slot. Then smooth the sides with a file. Reassemble the vise and check the register of the slots. For such an operation as that in the lower left-hand detail it is important that the corners of the slots register. If this is off when the jaws are tightened, it can be corrected by filing.

Slotted vise jaws aid in making certain complicated bends in sheet metal. Bending a tab as in the photo below is an example. Note depth of slots in jaws by using length of chain as in photo below and detail above, pipe or tubing can be held securely. Pins passing through chain links engage vise jaws.
Ashtray Beside Drawing Board Keeps Work Space Clear

A draftsman who smokes finds it is difficult to place an ashtray where it will be convenient to use, yet out of the way when using the drafting tools. A small ashtray riveted to an offset strip of light sheet metal solves this problem. The sheet metal is thin enough to slip under the linoleum top without interfering, and the offset allows using the T-square without danger of knocking the cigarette off.

L. E. Reichenbaugh, Tulsa, Okla.

Left-Hand Thread on Round Stock Cut With Right-Hand Tap

When left-hand dies are not available, a left-hand thread can be cut on round stock for emergency use, by turning the stock against a right-hand tap. Select a tap of the same diameter as the rod to be threaded, then drill two overlapping holes through a block of hardwood to take the tap and the rod. The holes should overlap a distance approximately equal to the depth of the threads. Insert the tap in one of the holes in the wooden block and lock the squared end securely in a vise. Break, or chamfer, the sharp corner at the end of the rod with a file so that the tap will start easily. Then insert the chamfered end of the rod in the hole adjacent to the tap and turn slowly to the left.

L. M. Lefler, Abilene, Texas.

Flexible Water-Pipe Joints From Auto-Radiator Hose

Leaks from broken joints, often experienced when a temporary water line is laid above ground, can be avoided by using lengths of automobile radiator hose as flexible joints. A garage or service station often has a scrap pile of discarded hoses, available without charge. If the hose is slightly too large for the pipe, regular radiator-hose clamps can be used.

Roughened Surface of Triangle Takes Pencil Marks Easily

Accurate reference or comparative-measurement marks may be penciled on the edges of a draftsman's plastic triangle if the surface is slightly roughened with fine emery cloth or sandpaper. The triangle will remain transparent enough for all practical purposes and the pencil marks are easily erased.

To loosen rusted screws, hold a nail set with the point near one end of the slot so that striking it with a hammer will break the rust seal and start the screw in a counter-clockwise direction.

Battery Cable Quickly Attached By Using Grip-Type Pliers

Tow-truck operators have found that on emergency calls when they must attach cables to the battery of the stalled car, the cables are much easier to attach and detach if they are soldered to grip-type pliers. The pliers quickly clamp to the battery post, making a good connection.
IT TAKES ONLY 1 minute to change pulleys on motors or other shop equipment when you have this wheel puller handy. It does the trick without any damage to the pulley or shaft. As dimensioned in the details at the right, the unit is suitable for small pulleys or gears, 3 in. or less in diameter. By simply making the bar longer the tool can be made of sufficient size to handle pulleys up to 6 in. in diameter without increasing the sectional size of any of the parts. Slots in the crossbar are formed by drilling adjacent holes and then filing out the waste. The slots permit a range of adjustment on the hook bolts for pulleys of varying diameter. Hook bolts are made by filing or grinding away the square head of a machine bolt, leaving a lug as shown in the lower right-hand detail. The pressure screw is shouldered to \( \frac{3}{4} \) in. for a \( \frac{1}{4}-10 \) thread. This is standard practice but is not essential. Where a lathe is not available you can simply thread a length of \( \frac{1}{2} \) in, rod, grind one end to a sharp point, at an angle of about 60 deg., and then drill a hole transversely near the other end for the sliding handle. Ordinarily, sliding handles are made of drill rod with machined end caps drilled and reamed to a drive fit over the ends of the rod. The caps can be eliminated and punch marks made near each end of the rod to prevent it from sliding out of the hole in the pressure screw. When removing a pulley, especially one of larger diameter, be sure that the lugs engage the rim of the pulley correctly so that pressure is exerted in line with the shaft.
The How of STRAIGHT SHAPING

STRAIGHT MOLDINGS in a variety to suit almost any requirement can be run on a small spindle shaper. Practically any molding shape required in ordinary cabinet joinery can be made if a suitable set of cutters is at hand. Cutterheads and knives are available which incorporate several shapes on a single cutting edge. This enables the operator to combine the cuts on one strip of stock to produce the molding shape desired. Combination cuts made with the knives running on the upper and lower edges, or corners, of the stock are detailed in Fig. 11. Some moldings made in this manner will require the use of two or more knife shapes. The same knife shape also can be used to produce different sizes and types of moldings. Note, for example, the use of the knife A in Fig. 11. Then compare with the use of the same knife in Fig. 47. The letter designations in Figs. 11, 14, 17 and 18 are intended merely as a convenience in comparing the various setups in which the same knife, or knives, are used. The letters are not in alphabetical order. Nearly all machines are supplied with a guard. In the accompanying photos, guards have been removed for clarity.

The standard shaper fence, Fig. 2, is used to guide the stock in common straight-shaper cuts running with the length of the material. Where a cut must be run across end grain on narrow pieces the stock is guided by a miter gauge as in Fig. 3. On certain cuts it is necessary to use a stop block as in Fig. 4.

Cutter equipment: For use on small machines the most popular are the two and three-wing cutters, Fig. 1. These are solid cutters having integral knives. The industrial type of shaper head consists of two collars and two separate knives as in the lower two details in Fig. 1. The edges of the knives fit in grooves milled in the collars. On some heads of this type the grooves are milled with the bottoms at only a slight angle as shown. On others the grooves...
are V-shaped with one side vertical, the other milled at an angle. Cutters are milled with corresponding bevels. Some collars of this type are fitted with a pin as in the lower detail, Fig. 1. The pin engages a hole drilled in one edge of the cutter as indicated. This feature is valuable in that it returns the cutter to the same position each time it is removed for sharpening.

**Work feed:** Normally the work is fed from the right with the cutter rotating counterclockwise. Adverse grain in the wood may make it necessary to reverse the shaper spindle or the cutter and feed from the opposite direction, Fig. 21. However, spindles on late-model machines are driven at high speeds and this makes it possible to feed against the grain with comparatively little danger of tearing or splintering the wood. Wherever practical, the cut should be made with the cutter running on the underside of the stock, Fig. 5. Top cutting, Fig. 6, is always avoided by careful operators whenever possible as there is danger of damaging the molding should the
stock tilt slightly on machine table.

**Auxiliary fence:** Many shaper operators make an auxiliary straight fence with a pressure shoe, or hold-down, for use when shaping straight work. Such a fence can be used on all molding cuts which do not remove all the stock from the edge. Figs. 11, 14, 15 and 18. When all the stock will be removed in either the first or second cuts, Figs. 12 and 13, it is necessary to use the adjustable fence with which the machine comes equipped. This fence is set for the cut as in Figs. 8, 9 and 10. Note that it is set to support both the cut and uncut wood.

**Bevels and chamfers:** Such cuts are run with the auxiliary table, or guide, shown in Fig. 19. A straight cutter is commonly used. The table is supported against the outfeed fence and the adjustment of the fence itself determines the depth of cut. This should not exceed 1/8 in. for each pass.

**Crosscuts:** These are run with the stock supported against the miter gauge, Fig. 3, or a backing block, Fig. 20. When the crosscut also is a face cut, the use of an auxiliary guide, or fence rider, is necessary. Figs. 22 and 23. The job can be done as in Fig. 24 but the method shown is not always satisfactory except on stock wider than 6 in. This is due to the poor support across the fence opening. Another method is to support the stock vertically against an auxiliary fence patterned after that detailed in Fig. 7. This type of fence spans the shaper cutter and permits facemolding narrow stock. Use a wooden spring, or hold-in, as in Fig. 24.

**Door-lip molding:** This type of molding is run with the setup
Running a door-lip molding in two operations is best practice on small machines. Sectional detail shows setup shown in Figs. 25 and 26, the latter showing a special door-lip cutter which runs the shape in one pass. In the first method, which is the most reliable on small machines, the rabbet is run first with a straight cutter, Fig. 25. Then a guide is clamped to the shaper fence and adjusted to a height that will permit the lip of the stock to slide under it as in the sectional detail. The lip is rounded with a second pass of the stock, using cutter A or D, Fig. 11. This type of setup also works well when running the stiles and rails for square-mold panel doors, Fig. 16. The combined guide and hold-down strip clamped to the fence prevents the stock from lifting through warp or manipulation which, of course, will result in a wavy cut.

Strip moldings: Short runs of narrow strip moldings are usually carried out by shaping the edges of wide boards and then ripping off the strips to the required width or thickness, as the case may be. On longer runs the use of precut strips is faster. Using a hold-in and hold-down as in Fig. 27 the job is simple and safe. Stock to be precut should be carefully selected for straightness of grain and freedom from knots.

Where a number of strip moldings are to be made, the job is worked with the setup detailed and pictured below.
Angle-Steel Spring Compressor for Valve-in-Head Engines

Because his valvespring compressor did not furnish enough leverage to compress the springs on a valve-in-head engine easily, one home mechanic made his own with \( \frac{3}{4} \times 3\) in. angle steel. A wooden block \( 1\frac{3}{4} \times 3 \) in. was cut from 1-in. stock and bolted to the narrow end of the compressor, with the 3-in. measurement in line with the angles. A 2\( \frac{1}{2} \)-in. length of the angle then was bolted to the wide end of the compressor frame, which was thus a closed triangle. In use, the narrow end of the angle frame is slipped under a length of \( 1 \times 3 \) in. oak which is bolted to the head on the side opposite the valves. With the angle frame adjusted to clear the keepers, a light pressure will compress the spring. Support the head at each end when replacing the valves, so they can be held in place.

Perry W. Trout, Kansas City, Mo.

Rack Formed With Sawhorses Aids in Cutting Fence Wire

To overcome the tendency of poultry wire to curl back toward the roll as it is being unrolled for cutting to the lengths required, one farmer assembled a rack from lengths of pipe laid across two sawhorses as shown. With the roll mounted to turn on a pipe rested across bracing members of the sawhorses, the end of the wire is drawn up over a second pipe laid across top members and then pulled back sharply to bend it in the opposite direction. This usually is sufficient to cause the wire to lie flat for cutting. The second pipe is held in place by means of a stop formed by a \( 2 \times 4 \) clamped to the sawhorses, which also prevents the horses from moving apart.

Trailer-Mounted Cornsheller Driven by Tractor Take-Off

A light, cylinder-type cornsheller is easily adapted to power take-off drive by mounting it on a low-wheeled trailer and fitting it with a jackshaft mounted on the shelter frame as pictured. The power take-off shaft is connected to the jackshaft by means of a splined sleeve and universals. The jackshaft runs in self-oiling bearings and is flat-belted to the cylinder shaft of the shelter, the size of the flat-faced driving pulley being determined by the regular speed of the tractor take-off. An idler pulley running on a spring-tensioned shaft automatically maintains belt tension.

A. M. Wettach, Mt. Pleasant, Iowa.
3. HOLE SAW is adjustable to any diameter from 1½ to 2½ in. Calibrated dial indicates settings of the three cutting blades. Cuts circular disks, washers, gaskets and plugs with clean, sharp edges, in metal, wood and plastics. Can also be used as wood planer.

4. MORTISING TABLE for hollow-chisel mortising, routing and planing operations on drill press or mortising machine. Fits table of any small drill press and provides horizontal table travel of 12 in. Work is clamped securely in position against a steel fence.

5. VIBRATIONLESS FILING MACHINE for hand finishing operations, die filing, profiling and all delicate operations where close work is necessary with a handheld tool. Gives both reciprocating and rotary motion to special files, burrs and various grinding cones.
6. ANGLE GAUGE has movable circular dial, one side showing all angles in degrees while the reverse side of dial translates degrees to inches-per-foot drop, carpenter-square measurements and percentages of grade. Saves time when figuring roof framing, leveling floors and foundations. Degree meter also is used to survey rough ground, grade ditches and roads.

7. DOUBLE-CUT LINOLEUM KNIFE utilizes two cutting wheels with overlapping edges instead of the conventional blade. Overlap of the cutting edges keeps them sharp, due to the honing action as they rotate. Oil-impregnated felt disks, or wipers, keep the cutting edges clean. Knife frame is made with an offset which aids in guiding the knife along guide line.

8. IMPACT PRESS gives positive uniformity of impact force and speeds up to 10,000 complete cycles per hour. Press is air-operated; handles uniform work with a clearance of as little as .005; delivers an impact which can be varied from 30 to 30,000 lb.
Fence Opening for Farm Dogs Provided by Suspended Tire

To eliminate the risk of possible injuries to his dogs whenever they jump over a barbed-wire fence, one farmer rigged up an old tire as shown at a point where they most frequently attempted to traverse the barrier. The tire was slotted so that two adjacent strands of wire could be spread apart and caught over and under it, suspending the tire in the air while at the same time providing a cushioned opening through which the dogs could jump.

Burned Distributor-Cap Contact Causes Misfiring of Engine

Here's one to think of when your auto or tractor misses regularly on acceleration and all the ordinary checks fail to locate the trouble. Uniform clearance between the rotor arm and the contacts in the distributor is important. Remove the cap and examine it carefully for arc streaks which look like shallow scratches. These generally lead away from a badly burned contact, which may be the cause of excessive clearance. More rarely, the offending contact has been damaged by other causes or is slightly misplaced in the cap. Check for excessive clearance by placing a small piece of wax on each contact in the cap, then turn the engine over with the cap in place. The rotor arm will cut through the wax and thus indicate the variation in clearance. A damaged cap should be replaced, but engine performance can be restored by placing a drop of solder on the contact having the widest clearance and filing to the correct spacing.

Hayrake Teeth Divide Trough

Permanent dividers on a hog trough make it difficult to clean. To avoid this, one farmer made dividers by setting hayrake teeth in the concrete feeding floor, spacing them the proper distance apart. For unobstructed cleaning it is only necessary to slide the trough out through the row of dividers.—G. E. Hendrickson, Argyle, Wis.
Weep for poor Willie, who thinks he's done fine if he gets nothing more from car polish—but shine...

So when it starts raining, this well-meaning fella has to let his wife drive while he holds an umbrella.

But look at Joe Robust! His sagacious selection is an easy-on wax that gives rock-hard protection!

For Bodygard wax holds off nature's barrage and his paint jobs as safe as if in a garage!
(He feels extra breezy, 'cause the job is so easy)

MORAL: Use New Liquid Bodygard—the first, easy wipe-on wax that protects your car with this rock-hard finish. Protects 9 times longer than skimpy-shine polishes.

YOU CAN'T SHINE DIRT, SO CLEAN YOUR CAR FIRST.

Every car must be cleaned before it's waxed.
Simoniz Liquid Kleener cleans better, faster.

True Simoniz Quality in a Liquid Car Wax. Only 98¢
Here's the inside story on Kodak carrying cases

by A. E. Lechleitner
Supervising Design Engineer
Eastman Kodak Company

We buy the best top-grain leather obtainable—and even then only 70% passes our inspectors

When people visit our factory, they are surprised to see how particular we are about the quality of our carrying cases.

Here you see the inside story on a camera case (this one is for the Kodak Signet 35 Camera). And opposite are highlights in the production of a "hard" case for a Kodak movie projector. There's a fine Kodak case for nearly every Kodak camera and projector. At Kodak dealers.

Stylists design new models
When Kodak engineers create a new camera, the next step is for stylists to take over and fashion a carrying case. A new case must not only protect; it must also add to operating ease and complement the camera's beauty.

40 operations for average case
It's hard to believe, but a leather case like the one for the Kodak Signet Camera goes through 40 precise manufacturing steps. The final product is unsurpassed for quality and what we call "hidden values."

Only top-grain leather
We buy only the best top-grain cowhide. And even then, 30% is rejected in final tests as not being quite good enough to meet our high standards.

Vegetable-tanned for moisture-proofing
The primary function of a leather case is protection. Each piece of top-grain leather that eventually goes into a Kodak case has been vegetable-tanned. This process interlocks the leather fibers to provide maximum durability. This is the mark of leather processing. We never sand or fill-in cracks either. In the long run these flaws would show up and weaken the whole case.

Many rigorous laboratory tests
Kodak has one of the most extensive research labs for testing leather. There are literally dozens of tests that all leather samples must pass before being accepted for use. On the right you see the bursting-test machine that subjects the leather to a pressure of several hundred pounds per square inch. We know that leather passing this test will withstand hard knocks and will take plenty of abuse for years.

We also test for ability to withstand flexing in cold weather. The picture at left shows finished leather cases in a refrigerator room where the temperature is 0°F. If the leather shows no cracks after exposure to this test, it passes.

And so it goes. It's a matter of test after test. Sample leather is tested for finish, fading, and aging. At right you see leather cases being tested in an aging oven. Inside this oven, sample cases are left for long periods of time. Terrific heat simulates years and years of deterioration. This severe test subjects a case to the most rigorous conditions it might meet during a lifetime.
Machines cut leather to perfect pattern
The approved leather is now ready to be cut into bottom, top and side pieces. Precision tools (right) insure a perfect fit for each model.

Skilled workers sew with long-staple cotton thread
Durable thread is used for joining the pieces of leather to form the case. Corners are lock-stitched.

Metal reinforcements are rustproof
In cases for some camera models we insert metal reinforcing for extra support. This metal is rustproofed to insure long-lasting protection. And the leather lining is finished smooth for better wear and appearance. Also makes it scuffproof.

You get top value for your money
As you can see by now, there's no compromise on quality of materials or smartness of design when Kodak makes a carrying case for your camera. Even in our simulated-leather cases for inexpensive models, the materials and workmanship are of the best. These cases also are tested for aging, peeling, fading, cracking.

With all this "to-do" about building a carrying case, you might expect the price to be exorbitantly high. Not at all! Over the years we have been able to introduce new economies all along the line. The end result is absolutely top value in camera cases.

A Kodak "hard" case for projectors will support a 180-pound man
You'll never do it, most likely, but you could safely stand on top of our projector cases—those for both movie and slide projectors. They're that strong and rugged. And a good thing too, because optical systems and lamps are fragile at best. They deserve the utmost protection—a Kodak carrying case.

Carefully select materials
Shockproof plywood—and a product called heavy chipboard—are our best materials today for these cases.

Lock corners for long life
The simplest way to make a box is to take pieces of wood, slap them together, and glue or nail. But that's not the way we do it (see picture above).

Fine-quality hardware
We find customers with cases that are 20 years old and older getting the same good service out of them as when they were first made.

Sanforized® linings won't shrink
Our research lab learned that ordinary cotton lining shrunk too much. Now all Kodak hard-case linings are shrinkproof (shrinkage will not exceed 1%).

Wide assortment of Kodak hard cases
We make all our own cases for our slide and movie projectors. The next time you're in the market for a projector, check the quality of the cases you see. And when you look at the Kodak cases, remember the inside story of "hidden values."

Eastman Kodak Company
Rochester 4, N.Y.
Satin Luminall

With Satin Luminall the job is done when common paints have just begun. Thanks to exclusive concentrated formula, one coat primes, seals, undercoats and finishes! No thinners, wall-dopes or solvents to buy! Scrubbable!

FREE! 50 REAL PAINT CHIPS IN "MATCH-A-CHIP" BROCHURE...COLORS EVERYONE LOVES

Luminall Paints
Chicago 9, Newark 5, Los Angeles 1
Luminall Paint Dealers Throughout the U.S.A. —See Yellow pages Phone Book

MILLIONS OF HAPPY USERS KNOW THE LUMINALL LABEL IS THE FINEST GUARANTEE IN PAINTS

Finishing Problem

Q—I have an old oak dining set, both chairs and table having rope-turned legs. The filler appears to be almost black. However, all the pieces are in very good condition. I'd like to remove all the old finish back to the bare wood and finish in the newer limed oak. Can you advise and give the correct procedure?—R. Y., Vt.

A—Lack of space will prevent us from giving you complete instructions. Remove the surface coatings of the old finish with varnish remover. The remover will take off the surface finish quickly but will not hit the filler. This must be scraped off with a cabinet scraper on all flat surfaces. On the curved surfaces use a coarse sandpaper to get back to the bare wood. Finish up with fine sandpaper. Then apply a white filler (some finishers apply a thin wash of white shellac as the first coat) and before the filler sets, wipe off to expose the grain of the wood. Use a coarse cloth such as cheesecloth or burlap, and rub across the grain until all excess filler has been removed. Follow with the finishing coats. This method removes all the filler from the surface of the wood, leaving it only in the pores of the grain pattern. Much of the wood is exposed in its natural color. Some finishers prefer a lighter color and use white lead as a filler. Paste white lead is reduced to the consistency of heavy cream and brushed on the wood. After partially setting it is rubbed off lightly to expose only a small proportion of the wood in the natural color. We suggest that you try test panels.

Removing Oil Stain

Q—My garage has stucco walls. Some time ago I had the misfortune to spill a quantity of crankcase oil on the stucco making a stain spot which is about 2 ft. wide and approximately the same height. At the time I wiped off the excess oil but the discoloration so far has defied all efforts at removal. Have you any suggestions?—C. M., Ohio.

A—Usually such stains yield to a vigorous scrubbing with a brush and a strong solution of trisodium phosphate. Several separate applications may be necessary, especially if the stain is old and the

(Continued to page 226)
on car care

How to help keep your brake system in safe condition

Your car's hydraulic brake system is your No. 1 safety guard while driving. To keep it in good operating condition, see your nearby Texaco Dealer for inspections. He will check brake lines, making certain there are no leaks. He will check the fluid level in the master cylinder. If necessary, he will add fluid. Your Texaco Dealer's know-how helps make your driving safer—and more enjoyable.

How to wear-proof your engine

Nature's best motor oil couldn't keep up with today's high-compression engines. So Texaco engineers developed a motor oil that actually wear-proofs your engine for the life of your car—Advanced Custom-Made Havoline. With its Balanced-Additive formula, Havoline keeps your engine clean, free from harmful sludge, rust and acids. Notice the difference between these two piston pins after a tough 21 hours of stop-and-go tests. Pin "A" shows rust deposits even with a good heavy duty motor oil. But pin "B" remained clean and rust-free—proof that today's best motor oil is made... not born. Drive in for Advanced Custom-Made Havoline today! See your Texaco Dealer... the best friend your car has ever had.
Care and Feeding of Engines

ENGINE TUNE-UP
A thorough engine tune-up, to bring all working parts up to standard performance, should follow this order:

- Clean Air Cleaner
- Check Carburetor
- Adjust Fan Belt
- Check Water Hose and Thermostat
- Check Generator and Voltage Regulator
- Check Ignition Circuit

1. Tighten cylinder head bolts to engine specifications.
2. Remove spark plugs and test cylinder compression. Reading on first stroke should be 75% of total reading.
3. Test fuel pump. It should deliver 5 to 6 ounces in 15 strokes, or 1 pint in 45 seconds at idle speed.
5. Check carburetor with vacuum gauge, a tachometer for engine speed, and a combustion meter for correct fuel- and-air mixture. Adjust idle speed to specifications indicated. Compression should be equal on each cylinder.
7. If battery won’t stay charged, drinks too much, check charging circuit, adjust fan belt, check generator output and calibrate voltage regulator.
8. Check ignition system for high resistance through poor connections or burned contacts. Test coil and condenser to see if they are up to specifications.

Test fuel pump. It should deliver 5 to 6 ounces in 15 strokes, or 1 pint in 45 seconds at idle speed.

Clean gas line filters. Free up and lubricate manifold heat control valve. Clean and refill air cleaner with engine oil.

Check carburetor with vacuum gauge, a tachometer for engine speed, and a combustion meter for correct fuel- and-air mixture. Adjust idle speed to specifications indicated. Compression should be equal on each cylinder.

This is a must for cars with automatic transmissions.

Inspect water hose connections and water pump. See that thermostat is assuring correct engine temperature.

Make final road test. Engine should operate smoothly from idle speed to top speed, and accelerate without hesitation, to assure your summer driving pleasure.

FREE MANUAL ON CAR CARE

Sealed Power PISTON RINGS

(Continued from page 224)

Staking Tomatoes
Q—Several friends have suggested that I stake my plants to obtain larger and more perfect fruit. However, others say that this causes what they call sunburn, I'm afraid that staking materially reduces the yield from each plant. What are the advantages and disadvantages, if any? What type of materials are best for staking?—M. H., Ind.

A—As you have suggested, there is considerable difference of opinion among home gardeners on whether or not to stake, or otherwise support, tomato vines. A practical reason for staking the plants is the lack of space in the average home garden. This alone usually is sufficient reason for recommending the practice. There are different methods of staking. Some gardeners train individual plants to a single tall stake; others set four plants equally spaced two ways so that the plants are about 2½ to 3 feet apart. A stake is driven close to each plant and the upper ends of the stakes are bent inward and tied or wired together, forming a tepee like structure or framework. This arrangement has much to recommend it as each vine can be individually trained (tied) to its own stake. Any common variety of plants can be staked.

Removing Concrete Spatters From Flagstones
Q—Recently I had some remodeling done on my home and in the course of the work, concrete was spattered on the smooth flagstones of a walk that passes near one wall. So far these spatters have defied all my efforts at removal. Is there any other way?—S. B., Mo.

A—Dilute muriatic-acid solution usually does the trick but we would hesitate to recommend its use due to the danger of etching the smooth surface of the stones. A safer way, although it involves more time and labor, is to wet the flagstones thoroughly and then rub the concrete spatters with the coarse side of an ollstone (emery stone). Use plenty of water to prevent the emery stone from glazing. When nearly all the spot has been removed, turn the stone over and rub with the fine side. The coarse side of the emery cuts finely and fast and care should be used to prevent "grooving" of the surface of the flagstone.

Cleaning White Tile
Q—I have a ceramic-tile floor in the bathroom which is discolored after many years of use. Scrubbing in the usual way does not remove the discoloration. Is there any way to clean it thoroughly?—W. T., Pa.

A—One way to clean white tile is to make a thick paste, about the consistency of thick cream, of white Portland cement and water. Apply the mixture with a brush or cloth and then rub with a coarse cloth or a piece of burlap. When the paste fills the crevasses and all the rough places, wash it off with a brush. Then wipe dry with a clean cloth, preferably burlap. This treatment not only cleans the tile but brightens the joints between the tiles.
Motorola CAR RADIO

Lowest Price Ever

only $39.95

Powerful! Rich Superior Tone

Razor-Sharp Selectivity

Powerful! Rich Superior Tone!

Razor-Sharp Selectivity!

Drive to your authorized Motorola dealer and get this spectacular radio buy! The powerful, top-performing Model 404 radio at the low, low price of $39.95! Rugged! Shock-resistant! Has five tubes plus rectifier and superheterodyne receiver. Automatic volume control reduces fading. Heavy-duty vibrator power supply for low battery drain. Hear it today—installed while you wait!

Better See Motoroal Golden Voice Radio

MAY 1954
First-Aid Hints for Table-Model Radios

(Continued from page 163)

in photo E, to insure good reception. Crackling noises heard while tuning are often caused by dust between the variable-condenser plates. A simple way to solve the problem is to blow it out, using a short length of rubber tubing as shown in photo F; a pipe cleaner also may be used for this purpose. Loose speaker cones cause rattles which can often be eliminated with a little household cement under the rim as indicated in photo G. Tears in the paper cone can be patched with cellulose tape. A few drops of carbon tetrachloride applied with a medicine dropper, as illustrated in photo H, will sometimes quiet a noisy volume control. Photo I indicates something that a novice should never attempt. The adjustment of small screws in the tops of i.f. transformers. They must be set in proper relation with each other and such adjustments should be made by a radio serviceman as they require special equipment. To repair a broken dial cord, use strong fishing line. Before removing the broken cord see if you can trace out the winding method used. Make a sketch of the pulleys and the cord-winding details. Now remove the old cord. In most cases there will be three turns around the tuning-dial control shaft. Use the same tension spring and the station-indicator pointer that were attached to the old cord. Now tune in a station of known frequency, preferably at the high end of the broadcast band. Hold the dial-tuning shaft firmly with one hand as illustrated in photo J, and then fasten the station-indicator pointer on the dial cord so that it points to the proper frequency for that station.

When replacing the chassis in the cabinet, see that all control shafts are lined up with their respective front panel holes. If the dial opening is provided with a clear plastic window, clean this first. After the chassis is in position, replace the chassismounting screws on the underside of the cabinet. If these screws are provided with soft-rubber mounting bushings do not fasten the screws down tight.

If your set is an a.c.-d.c. type and it does not operate when you plug it into the wall receptacle, merely reverse the line plug in the wall socket. Some table-model sets tune to both the broadcast and short-wave bands. Servicemen are often called because the set will not tune in the broadcast band only to find that some member of the family has tuned the band-selector switch to short-wave bands.

POPULAR MECHANICS
You can do the whole job with a
MONTA MOWER

The MontaMower smoothly cuts a full 16" swath of grass, cleanly cutting all the dandelions and tall lawn weeds which the reel-type mower leaves standing ... no more going back over the lawn with a whipper!

The MontaMower "Trims-As-It-Cuts" right up close to fences, trees, buildings, walks, shrubs, flower gardens and cement walls. Practically eliminates all hand trimming!

The MontaMower is so light (9½ lbs.), so sturdy and responsive that even women and teenagers can mow steep terrace banks up, down, or across, with scarcely any effort!

ONLY MONTA MOWER TRIMS AS IT MOWS -- IN ONE EASY OPERATION

The versatile MontaMower is actually "Two-Tools-In-One" ... an efficient lawn mower and a very fast lawn trimmer. Due to its unique, patented design, it is the only machine that does the whole job of lawn cutting and trimming in one easy operation. Its live, precision mechanism first gathers, then smoothly cuts a clean 16" swath through grass, dandelions and tall lawn weeds as evenly as a pair of keen-edged shears. It cuts right up to trees, walls, fences and borders ... "Trimming-As-It-Cuts" ... leaving practically no back-breaking, time-consuming work to be done by hand. Enthusiastic owners throughout the world tell us the MontaMower

is the most practical hand lawn mower ever designed! Even power mower users say it's a "Must" for close-quarter mowing and all the trimming. — SOLD WITH OUR WRITTEN GUARANTEE!

HERE'S HOW IT WORKS

Eight pairs of newly designed, Self-Cleaning and Self-Sharpening, precision made and fitted, tool steel cutting discs revolving toward each other gather the grass and cut it cleanly with a new shearing action at the intersections of the discs.

TRY THE VERSATILE MONTA MOWER ON YOUR OWN LAWN ... ON APPROVAL

An actual trial on the lawn where it is to be used is the most convincing proof of the exclusive advantages of a MontaMower and its superiority to conventional mowers. We have, therefore, developed a most attractive "TRY IT ON YOUR OWN LAWN ON APPROVAL OFFER" for those who are definitely in the market for lawn mowing equipment of one type or another. Don't miss this opportunity to see for yourself how invaluable the MONTA MOWER would be to you! Act NOW! Fill out the coupon below ... Mail it today!

MontaMower Distributing Co., Sales and General Offices
PM-45 KEELER BLDG., GRAND RAPIDS 2, MICHIGAN

Gentlemen: Kindly send me (FREE OF CHARGE) completely illustrated, descriptive literature, price, guarantee information, and full details of your attractive "TRY IT ON YOUR OWN LAWN ON APPROVAL OFFER."

NAME

ADDRESS

CITY ZONE STATE

MAY 1954
Many gardeners, like Merton, don’t realize what goes on underground is every bit as important as what meets the eye.

In fact, the development of deep, foraging roots is the real key to gardening success. Thus, the popularity of Vigoro.

For Vigoro feeds the entire plant—roots, stems, leaves, blades and all! That’s why Vigoro-fed lawns and gardens come up sound and healthy and stay that way far longer. Vigoro actually helps increase the humus of your soil in lawns because it encourages new roots to replace old.

There are now two kinds of Vigoro. Regular and new water soluble Instant Vigoro. Both will make plants grow and thrive even in the poorest soils.

*Vigoro is the trade-mark for Swift & Company’s complete, balanced plant food.

Guarding the Graveyard of Ships

(Continued from page 132)

of the Points Adams Lifeboat Station. “The fishermen are safe enough as long as they stay in the river, but we have to keep herding back 200 to 300 strays a day. The fishermen show up in every type of craft you can imagine.”

Two small boys probably came up with the most novel—and dangerous—craft. Lashing together two telephone poles and attaching an outboard motor to them, the boys were fishing their way well out to sea when the Coast Guard caught up with them.

During the derby, a transient fishing village springs up on the Washington bank of the Columbia. It is called appropriately Derbyville.

One day two fishermen, long on fishing enthusiasm but short on navigation knowledge, set out from Derbyville. They figured they would have no trouble if they hugged the Washington shore. Six hours later, however, they hailed a commercial troller. Much to their surprise, they were 20 miles up the coast from the Columbia. The troller signaled the Coast Guard, advising that it had customers.

Various navigational aids are used in cheating the graveyard of ships. To get first-hand information on them, we called on Lieut. C. D. Eubanks, commander of the Coast Guard Base at Tongue Point on the Columbia, which has the major job of keeping the navigational aids in top shape. He took us to the shop where buoys were being sandblasted.

“Used to have to scrape off old paint, rust and barnacles with a wire brush before repainting them,” he said. “Now the buoys are made slick and clean in a hurry with sandblasting, and their life in the water has been extended considerably.”

You don’t get an idea of the size of a buoy until you see one up for repairs. In the water, not much of a buoy protrudes. Some we saw on the Tongue Point dock seemed as big as a house—well, at least cabin-sized. Buoy varies from 7 to 38 feet in height, weigh from 1095 to 20,616 pounds. An electrically operated bell buoy, when loaded with huge batteries weighs 25,000 pounds. The largest buoys carry 72 batteries. Bell buoys in the Columbia are electrically operated because the swell of the water is not enough—except at the bar when the water is acting up—to ring the bell.

Eubanks pointed to old No. 8 up for repairs. It rides the thrashing waters of the bar and, to keep it in position, it must be anchored with two huge concrete blocks.

(Continued to page 232)
NOW IS THE TIME TO INSTALL
FULL-FIRING CHAMPION SPARK PLUGS
TO TUNE-UP WINTER-WEARY ENGINES!

Quickest, surest way to wake up your engine for increased summer activities is to install a set of new Champion Spark Plugs.

Champion's full-firing spark—delivered through the finest insulator known to ceramic science to special alloy electrodes—turns every drop of gasoline into power. No unburned fuel remains to build up harmful deposits and thin your crankcase oil. That means you can drive longer, and harder this summer and still enjoy better performance and economy.

Now is a mighty good time to see your nearby Champion dealer and start getting all the power you're paying for!

CHAMPION SPARK PLUG COMPANY, TOLEDO 1, OHIO

MAY 1954
F. D. Thiel: and evtn on "the nor'ii'.

IT OFFERS ALL THESE IMPORTANT FEATURES

B. F. Goodrich Koroseal is the ONE floor tile that combines these 4 desirable features:

NEVER NEEDS WAXING! Minimum care — stays bright with an occasional washing and light buffing.

DEFIES DESTRUCTION! Super-resistant to oils, fats, greases . . . even cleaning fluids and alkalies.

ANTI-SLIP SURFACE! Safe to walk on, always!

MAXIMUM WEAR! The same material from top to bottom — no coating, no lamination.

You increase the value of your home when you install beautiful B. F. Goodrich Koroseal Floor Tile . . . and you can do the job yourself! The 80 gage thickness, made especially for homes, is easy to install when you use the B. F. Goodrich Installation Kit. Ask your dealer for guidance.

Send for FREE full color folder.
B. F. Goodrich Co., Dept. P.M.S.
Flooring Div., Watertown 72, Mass.

Name__________________________
Address________________________
City___________________________ State__________________

each weighing nine tons, 36,000 pounds in all.

Not only are there different types of buoys, including those with whistles, but the buoys have different colors. The color of a buoy indicates the side of the channel to take. Lighted buoys have different characteristics, varying from 15 to 75 flashes per minute. Then there are short and long flashes. The idea in entering the Columbia is to know what particular buoy is where. That's where the professional river pilots come in.

On July 27, 1953, occurred an historic event. A tender, working out of the Tongue Point Base, placed in the mouth of the Columbia the first buoy with a radar reflector. Others were to follow. A radar-equipped ship approaching such a buoy receives a big "pip" on its radar screen.

In the early part of World War II, radar reflectors were placed on permanent structures to warn ships. These were known to the layman as "echo boards." Aiding navigation at the Columbia's entrance was radio. Then came loran—long-range navigation aid. Ships equipped with special loran receivers can pick up electromagnetic waves far out to sea.

But, with all the scientific developments in recent years, men of the sea coming to the Columbia still count heavily on the lighthouses that have served them for many decades in good weather and foul.

Patriarch of the lighthouses serving the area is that on Cape Disappointment, whose craggy slopes jut out from the Washington shore. Completed in 1856, the tower light—more than 200 feet above the sea—casts a beam of 58,000 candlepower for many miles. Then, in 1881, came the light at Tillamook Rock—75,000 candlepower, and in 1898 the one at North Head—260,000 candlepower.

Tillamook Rock stands at a strategic point 18 miles south of the mouth of the Columbia. A little "Gibraltar," the rock rises 86 feet above sea level.

"It's 131 feet from the sea to the lantern," said A. E. Anderson, civilian supervisor of aids and navigation at Tongue Point Base, who did duty on the rock as a young man. "The book says 130 feet, but I measured the distance, and know better. Sometimes measuring was the most exciting thing a man had to do in his spare time."

In fierce storms, waves break over the light. Wire mesh shields it on the seaward side to keep rocks from breaking it.

In 1948, when Coast Guard funds ran low, the Tillamook light almost went out. But commercial fishermen howled like a nor'easter. The light is still burning.

Three days after the Japanese plummeted bombs on Pearl Harbor Dec. 7, 1941.
INTRODUCING...

An entirely new concept in power tools... a change so significant that it outdates all former standards for judging tool performance. Imagine the very finest power shop you could buy, engineered into a single unit and delivered complete, ready to plug in... with a built-in ¾-hp. motor... a revolutionary method for changing speeds without changing belts... plus many, many more exciting features.

Copyrighted material
advanced engineering makes it the only power tool to put precision woodworking within the reach of everyone!

SHOPSMITH Mark 5 IS COMPLETE! It’s delivered to you ready to plug in. And like your automobile, it comes factory assembled, factory adjusted, factory tested. No bench, motor and switch to buy. No belts, pulleys and wires to attach. No rust worries — rods and tubes are hard-chrome plated! Everything is an integral part of the compact unit plus all you need to make it a 9” circular saw, 12” disc sander, 34” wood lathe, 16½” drill press, horizontal drill. The price complete............. $269.50

For six years, SHOPSMITH® has been the unchallenged leader in power tools. Over 150,000 owners enthusiastically acclaim the SHOPSMITH principle as the only truly practical basis for multi-tool operation.

And now comes the second great revolution in power tools — an entirely new SHOPSMITH! Here are standards of design you’ll recognize as so advanced, you know it will take years to match them — standards of versatility, precision, convenience and safety so new and different, you’ll appreciate why SHOPSMITH Mark 5 is the one tool for modern living—why it alone is the tool for you and all the things you want to do.

SHOPSMITH Mark 5 is built for hairline accuracy!

MITER GAUGE. It’s accurate to the exact degree of angle. Locks in table slots as handy sanding and drilling jig.

RIP FENCE. Squares and locks front then back with single handle. Easily set off-square for special operations.

TABLE HEIGHT. Quickly, accurately set by lever-operated double rack and pinion. Faster than other methods.

POPULAR MECHANICS
SHOPSMITH Mark 5 HAS GREATER CAPACITY than any power tool at any price! Its ¾-hp. motor has ample power for the toughest operations. 9" circular saw cuts 4" x 8" panels in half either way. Lathe has 16½" swing... 12" sanding disc has big 14" x 18¾" table... drill press drills to center of 16½" circle... horizontal drill capacity is unlimited!

SHOPSMITH Mark 5 HAS SPEED-DIAL. By itself, Speed-Dial is the most significant power tool advance in years. It automatically selects the correct speed for the job at hand—does it with a twist of the dial. No more guesswork. No more belt changing. No makeshift operations with one-speed or wrong-speed spindles. Simply turn the dial to the place marked saw, jointer, sanding, jig saw, dadoing, etc.—or make infinitely variable settings from 700 to 5200 rpm.

SHOPSMITH Mark 5 HAS POWER MOUNT. Add a jointer, bandsaw, bandsaw, etc.—with one twist of a handle, one turn of a set screw. Set up useful tool combinations in seconds—saw-jointer, jig-saw-sander, bandsaw-jointer, lathe-grinder, many others! Power mount tools take no extra floor space—can be operated at optimum speeds.

9" CIRCULAR SAW
12" DISC SANDER
16½" DRILL PRESS
16½" LATHE
HORIZONTAL DRILL

Quill depth stop. Simple dial setting: 0-4½". More accurate drilling, saw settings, duplicate sanding.

Now! Shop showing of SHOPSMITH Mark 5 at leading hardware and department stores, and Montgomery Ward retail stores.

Magna Engineering Corporation
Dept. 261-8, at factory nearest you:
12819 Colt Rd., Cleveland 8, Ohio, OR
Menlo Park, California.
I want to know more about the new SHOPSMITH. Please rush me your free, new 20-page catalog with illustrations, data, complete specifications.

Name:
Address:
City State
all lights at the mouth of the Columbia were ordered off—and their value was proved in a costly way. The steamship Maua Ala, loaded with a $750,000 cargo of 60,000 Christmas trees, turkeys and other holiday goods, was en route to Honolulu. Ordered back to the nearest port, she tried to enter the mouth of the Columbia in the blackout, and went down to a watery tomb in the graveyard.

In cheating the graveyard today, millions of dollars have been spent, particularly for jetty improvements. But the investment is considered a good one, because some 2000 ships annually carry heavy cargoes up river, mostly to Portland, Ore.

"When I first came to the mouth of the Columbia in 1917 as a ship's radio operator we had nothing to guide us except visual aids," said Edwin Lamb, base storekeeper at Tongue Point. "We had no depth finders on the ships, no radar, no loran. Now crossing the bar is not so tricky—that is, in the summer. But come winter with its bad storms—well, a skipper still better watch his Ps and Qs or his ship will be pushing up barnacles in the graveyard." ★★★

Clay-Extrusion Machine

Simulated chrome strips, instrument panel trim, door and window moldings are extruded like spaghetti from a machine used by clay modelers at Ford design laboratories. Clay used in building experimental designs is forced through a tube capped by an aluminum disc. A slot punched in the disc determines the shape of the continuous clay ribbon which emerges.

BUILD BETTER FOR LESS!

 Builders and buyers know that R•O•W windows offer the best in construction, materials, and beauty—plus the lift-out feature. Yet, R•O•W windows usually cost LESS than other quality wood windows WITHOUT the removable feature.

See your local lumber dealer or write R•O•W, SALES CO., 1330-80 ACADEMY AVENUE - FERNDALE 20, MICHIGAN

R•O•W is the registered trade-mark of the R.O.W. Sales Co.
THEY CAN'T RUST if you keep them in 
DRIY VAPOR PACKVELOPES® with VPI*

YOU NEED NO OIL, NO GREASE, NO FUSS OR MUSS • Just pack them and forget them.

Send for Berlin & Jones' big no-rust miracle package containing a dozen assorted VPI* envelopes, large size to protect circular saws, others for tools and small parts—plus a big 12 x 36 sheet of VPI* coated Kraft paper, enough to protect an average power tool or to line a large tool chest and drawers. You get the same rust protection used by the U.S. Government and leading industries in this no-rust miracle package for only $2.

Included free is a handy booklet of practical proven VPI* uses. Money back if not satisfied.

*Vapor Phase Inhibitor

INDUSTRIAL USERS
Cut costs away down on handling and packing of ferrous materials. Get same rust protection as used by U.S. Government. Write for Technical bulletin on VPI to: Engineering Department, Berlin & Jones, 601 W. 26th St., N. Y. 1, Dept. P.

HARDWARE JOBBERS
Every hardware store can sell VPI packages on sight to their trade with our self-service, self-selling kit. Makes money for you and the retailer without effort. Write for complete details to Berlin & Jones, 601 W. 26th St., New York 1, N. Y., Dept. P, Wholesale Division.

HERE'S positive RUST PROTECTION for circular saws • chisels • drills • auger bits pruning shears • steel rules and tapes planes • compasses • dividers • calipers hunting knives • marine and fishing gear hooks and flies • spark plugs • auto parts and accessories • micrometers • files • taps dies • golf clubs • any steel tools

No oil, no grease, no goo, no dirty degreasing job, no clean-up necessary—thanks to this miracle paper which turns destructive moisture into protective VPI vapor . . . giving you years of positive protection from rust.

HUNTERS • PROTECT YOUR GUN FROM RUST
Just slip it into a specially made PACKVELOPE GUNBOOT with VPI. Will keep it rustproof for years. No oil, no grease, no cleaning. Only $2. Satisfaction guaranteed or money refunded.

SHELL OIL invented VPI
MONSANTO makes VPI
BERLIN & JONES brings you VPI
Established 1843

USE THIS MONEY BACK GUARANTEE COUPON

—BERLIN & JONES CO., INC., Dept. PM
601 West 26th Street, New York 1, N. Y.

Send me______ (through my dealer) no-rust miracle package(s) of VPI envelopes and paper at $2 per pkg.

Send me______ VPI Gunboots @ $2 each.

Name________________________________________________________

Address_____________________________________________________

City________________________ Zone________ State___________

My dealer's name is__________________________________________

Address_____________________________________________________

Enclosed check □ money order □
It's Moving Day for Wildlife

(Continued from page 157)

metal and are sometimes made with iron bars like a miniature jail cell. These are covered with brush and baited with such delicacies as honey or cooked bacon. The bears trip them when they go in for a snack. Such traps are sometimes used in the national parks to remove bears that threaten tourists. The bears are taken, traps and all, back to the interior of the park areas and released and since the average black bear has little wanderlust, they settle down as though nothing had ever happened to them.

One reason the game specialists prefer live-trapped animals to game-farm stock is the fact that those reared in the open survive better when released. They usually expect a high rate of survival of live-trapped and transplanted game if it is put in habitat similar to the type it came from. The losses then are mostly limited to trapping mortality, for usually a few are lost in trapping and transit. One fall, Kentucky lost a couple of deer to poachers who killed them right in the traps. Another deer was killed by the trapdoor and a couple of antlered bucks did each other in when they were housed together in a holding pen. The trappers now eliminate this type of death battle by sawing the antlers off before moving bucks from traps to the holding pen.

It's a guiding rule in moving live game from one place to another that you take only surplus animals and always leave plenty of "seed" stock to furnish good hunting and adequate breeding for the future. The game managers keep a sharp eye on these things. If a wildlife census shows an overabundance of rabbits, deer, pheasants or coons they begin to worry. They know that overcrowding can lead to plenty of trouble usually in the form of starvation or an outbreak of disease. Even if there is no disease outbreak few hunters want to walk all over the country tracking down a lot of game so thin you can "slit open the hide and shake out the bones."

For every surplus of game they can find the game managers usually know of several localities suffering shortages. If a state has depleted areas and no surpluses within its boundaries it will often buy stock from outside the state and release it where it will do the most good.

Fred Hardy, Kentucky's "grouse man," traps about 50 grouse a year in the course of his research work. He uses a small wire-box trap with a mirror fastened in one end. He sets the box on a drumming log. The strutting cock bird takes his position on the
Don’t let that old truck drive you into a rage or into the “red”...drive away in a brand new ’54 REO. Thanks to Reo’s Gold Comet power and more pay-load-design, you’ll enjoy the lowest cost miles in trucking. And all the while, you’ll be luxuriating in that comfortable new cab with increased head and leg room—full 30” doors—new steering wheel angle with unobstructed driver viewing—dependable wide angle electric windshield wipers...foam rubber seat available on all models. Get the facts, better yet, get the feel by taking the wheel of that outstanding ’54 Reo.

**It’s Time**
**You Had a Look at the New ’54 REO**

**REO MOTORS, INC.**
LANSING 20, MICHIGAN

Manufacturers of Commercial and Military Trucks • Buses • Power Lawn Mowers • Children’s Wheel Goods & Playground Equipment • Inboard Engine Kits for Small Boats • Replacement Engines for Trucks • Industrial Engines

MAY 1954
Quit driving an oil-burner—
get new piston rings!

Oil pumping is just the start of expense and trouble—
the first danger signal from worn-out piston rings. The
longer you let those old rings stay in, the more oil you'll
use, the more power you'll lose, and the bigger your
repair bill will be.

As your engine gets older, it runs hotter because of
accumulations in the cooling system. The cylinders
wear tapered and out-of-round—need more oil on the
walls.

It requires a special type of piston rings—replacement
rings—to deliver this extra oil, under full control,
without waste.

Hastings makes replacement rings exclusively, devotes
all its research on the highways and in the labor-
atory, to the particular replacement problems of each
make and type of engine.

That's why Hastings Rings stop oil-pumping, check
cylinder wear, restore engine performance—in re-ring,
re-bore and re-sleeve installations.

So go to your motor specialist at the first sign of
oil-pumping or performance drop-off. If rings are the
trouble, ask him to install a Hastings Steel-Vent re-
placement set. Truly the best money you can spend
on your car! Hastings Manufacturing Company,
Hastings, Michigan; Hastings Ltd., Toronto; Piston
Rings, Spark Plugs, Oil Filters, Casite, Drout.

**HASTINGS**

**STEEL-VENT PISTON RINGS**

Regular or Chrome

Tough on Oil-Pumping
Gentle on Cylinder walls

drumming log and starts beating the air
with his wings and setting up his peculiar
low-pitched music. Then he finds he's not
alone and he enters the cage to do battle
with his image.

"Live-trapped birds are worth a good
price," says Don Strode. "Take turkeys,
for instance. We figure every bird trapped
and released is equal to $1000 worth of
game-farm turkeys. Turn a game-farm tur-
key out near a barnyard and first thing you
know he's eating with the chickens. You've
lost a turkey." A grouse may cost $25; a
turkey, $50 to $100.

This transplanting of wildlife is one of
the most effective wildlife-management

techniques the specialists have yet found
for improving hunting. That's why the big
wild-game move goes on year after year in
practically every state of the nation. ★ ★ ★

**Transparency Viewer**

**Carried in Vest Pocket**

Color photographers no longer have to
carry bulky equipment around to show off
their slides. Now available is a tiny pocket-
size viewer that can be carried in the pocket
of a vest, shirt or jacket. It accommodates
two-by-two-inch cardboard mounts and
glass slides. The polished optical lens gives
a four-times magnification and the grained
plastic screen provides over-all illumina-
tion. Folded, the viewer is less than three
inches long and approximately two inches
wide. It uses transmitted light for illumi-
inating the transparencies.
Now in the famous MOUNTIE too!
REVOLUTIONARY NEW MARLIN MICRO-GROOVE RIFLING*

20% to 25% more accurate than small-game or plinking rifles with conventional barrels!


CHECK! Two typical 10-shot patterns fired at 100 yards by a noted gun editor and marksman. Note (at left) tight group from a Marlin .22 with revolutionary new Micro-Groove Rifling— exclusively Marlin's. Note wider dispersion of group at right, fired from new .22 of famous make with regular rifling. Two years of intensive firing shows Micro-Groove increases accuracy 20% to 25%!

THE REASON: Note that Micro-Groove Rifling (left) has SIXTEEN ... SHALLOW ... grooves as compared to regular rifling (right) with SIX ... DEEP ... grooves. Easy to see why Micro-Groove means faster, more even dissipation of heat through the barrel ... far less gas leakage, too— a major cause of bullet "flipping" at the mouth of the barrel. Far less barrel erosion, too.

- See Marlin Micro-Groove at your dealer now. Available in all Marlin bolt actions and semi-automatics, too. Same models also may be had with Marlin's long-famed Ballard type rifling. Sold in U. S. A. and Canada.

*Trademark and Patent Pending

39-A MOUNTIE, $60.85. Straight— not pistol-grip (for swift removal from scabbard) and 20" barrel. Weight only 6 lbs. (approx.).

Regular 39-A with pistol-grip and 24" barrel also available, $60.85. Other Marlin .22's from $24.95. Prices slightly higher west of the Rockies.

THE NAME FOR GAME
Marlin FINE GUNS SINCE 1870

VALUABLE COUPON—MAIL TODAY!

The Marlin Firearms Co., Dept.5-PM, New Haven, Conn. Send me catalogue with information and photo-illustrations of Marlin Guns, plus new cartoon booklet, "More Fun with Your .22 Rifle," Also send me a pack of (please check preference) ☐ single or ☐ double-edge Marlin Razor Blades. I enclose $ for handling.

Name
Street
City Zone
County State

MAY 1954
Mexico Builds a Glamour Campus

(Continued from page 117)

American football, and an indoor court for the fast Latin-American game of jai alai.

Also on the campus are two softball diamonds, a dozen tennis courts, a dozen outdoor basketball courts that also are suitable for volleyball, eight courts for the game called handball fronton, and eight larger courts for a Latin-American game similar to squash. The exterior walls of these courts are sloped like Mexico's ancient pyramids and are faced with rough volcanic stone taken from the site. An enormous gymnasium in which indoor basketball may be played will be built later this year.

Academic buildings on the campus are arranged in groups. Some are large enough to contain all the facilities for such subjects as dentistry or chemistry. This arrangement allows a student of dentistry, for example, to go from class to class without rushing from one part of the huge campus to another. Some of the classroom buildings are glass-walled skyscrapers, others are long and low, and still others rest on platforms that are supported above the ground on concrete pillars.

Near the Pavilion of Cosmic Rays is the Institute of Nuclear Physics with an adjoining "Garden of Radiation" surrounded by stone walls to absorb the rays from atom-smashing machines.

One outstanding building is the central library. From a distance it looks like a huge, oblong, intricately decorated cake. The structure is 116 feet tall, 190 feet long and 45 feet wide, and each of its exterior walls is ornamented with mosaic murals depicting stages in Mexico's history. Each mosaic consists of millions of bits of rock ranging from black obsidian to brown and pink marbles painstakingly cemented in place.

The two lower floors of the library contain reading rooms with windows of thin, translucent sheets of white marble. The 10 upper floors of the structure have no windows and contain storage stacks with a capacity of 120,000 volumes in addition to microfilm files.

Mexico is a center of mural art, and murals of various kinds are used for ornamenting large areas on many of the buildings. Some murals are painted in vivid plastic paints and others are composed of small glass tiles that were fired especially for the university. Still others, as in the case of Diego Rivera's ornamentation on the stadium walls, are made up of stones.
An easier, better way to fine natural wood finishes

The full story of REZ—a remarkable group of products which actually become part of the wood! While they help you achieve beautiful natural-grained finishes, they also give you real protection against moisture—prevent swelling, warping, weather-staining.

No matter what you're working on—from new exterior siding to cabinets or furniture—you can get handsome finishes with all the warmth and rich beauty of natural wood far easier—with Rez.

Developed in the same Monsanto laboratories which serve the great West Coast lumber industry, Rez is made from a synthetic resin which has unusual properties beneficial to wood.

Penetrates the pores of wood
Instead of merely putting a layer of glossy material over the surface—instead of just penetrating lightly—the first coat of Rez sinks deep into the pores and bonds with the wood. Then a quick and easy finish coat of Satinwood (or High Gloss) Rez completes the job.

Result: Not just shiny surface beauty—but all the depth and gleam of hand-rubbed wood. Beauty that lasts, too, because it's moisture-sealed.

When you use wood—use Rez
Use CLEAR REZ first in finishing any type of wood interior walls; on the inside and outside of drawers and cabinets to prevent swelling, warping, drawer sticking. Use it, too, as the best undercoat for paint.

Use WHITE REZ: for an easy 2-step way to achieve blonde finishes so hard to create any other way.

Use REZ COLOR TONES: for distinctive color finishes that do not conceal the grain—indoors and out. In redwood, mahogany, sage, driftwood and cedar; can be intermixed to create special effects.

Use REDWOOD REZ: for true redwood color that doesn't darken with years. The pigment in Redwood Rez creates a barrier against the sun's rays, prevents weather-staining.

VALUABLE BOOK—"How to Create the Finest Wood Finishes." Complete step-by-step instructions; many illustrations. Mail this coupon with 25¢ to:
MONSANTO CHEMICAL COMPANY
Merchandising Division
1700 South Second St., St. Louis 4, Mo.

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

MAY 1954
cut to shape and stained to the desired colors by means of acids.

It was a happy coincidence when Mexico decided to erect its new center of knowledge on the Pedregal. More than 80 centuries ago a strong civilization flourished there. Then a succession of lava flows from a near-by volcano buried all evidence of human existence except one pyramid-like temple that still projects up through the volcanic rock. Known as Cuicuilco, this temple is judged to be the oldest thing built by man that exists on the American continent. On the site of this ancient civilization now stands the newest campus in the world.

Hand-Held Pneumatic Tool Forces Tire Bead From Rim

Flat tires are forced off their rims with a small tool that is attached to a service-station air hose. A hooked plunger on the bottom of the tool is inserted between tire and rim. Air from the hose pushes the plunger down, forcing the bead off the rim. Stepping on the tire and pulling up on the wheel completes the job.
Advanced Chevrolet Engineering brings
LIVELIER, THRIFTIER PERFORMANCE
with a "stepped-up" Automatic Power Team

Thrilling new performance is yours, when you command Chevrolet's stepped-up Automatic Power Team. There has never been a Chevrolet that responded so eagerly to your touch on the accelerator. At the green of "go," its automatic getaway moves you ahead smoothly and positively. The automatic passing range gives you new safety in city traffic. You ease up hills almost as if they weren't there. Yet you obtain this spirited performance with money-saving gas mileage. In one extra-cost option, "Blue-Flame 125" valve-in-head engine, Powerglide automatic transmission and Econ-o-Miser rear axle are teamed to provide the finest, most responsive no-shift driving you have ever experienced in a car of such low cost.

The deep breathing valve-in-head engine—the most powerful Chevrolet passenger car engine ever built—develops 125 horsepower. And its 7.5 to 1 compression ratio, the highest in any leading low-price car, squeezes more work out of gasoline. In the transmission, the highly efficient, three-element hydraulic torque converter makes torque multiplication and cruising oil-smooth. Automatic Low provides swifter, safer getaway and pickup at a touch. Shifts to Low and Reverse are made through planetary gears. The Automatic Power Team is available in every Chevrolet model. See your Chevrolet dealer and try it. Discover how lively yet thrifty a car can be. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

EVER FINER ENGINEERING

EVER FINER CHEVROLET

MAY 1954
Add new beauty to your car with these top quality Wizard Country Club Plastic Seat Covers. Beautiful Saran plastic panels with harmonizing trim, top cap, sides and back. Stay lovelier longer. Wide choice of patterns and colors sure to please. All car sizes. Plastics from $26.95

Wizard Quality Chamois adds new sparkling luster to auto, furniture, windows, silverware, glassware. Highly absorbent. Strong and durable, yet soft and pliable. Will not scratch finest surface when used wet or dry. Can be washed over and over again. 21" x 27" (69823) Ea. $2.65

Wizard De-Sludge-Er oil filter cartridge has new filter agent of 100% cellulose. Out-filters either paper or cotton. Removes sludge-forming elements from oil. Won't clog channel or by-pass. For all cars, trucks, tractors with full-flow or by-pass systems. Chev. 1937-53 (910814) $1.59

New Power...New Beauty...

Over 40 Years...Headquarters

Gleaming chrome exhaust deflectors and extensions give lasting beauty to your car. Keeps exhaust off bumper. Easy to attach and styled to fit your car. Western's Exhaust Deflector. Simple, flared design. 920060 49c Exhaust Extension. (8" x 2½") Straight-tube type. (920069) $1.09

The one-step cleaner-polish! New Simoniiz Bodysheen cleans and polishes, in one easy simple step. Wipe Bodysheen on, then wipe it off and see your car gleam. Brings out natural brilliance, enriches colors. Gives your car a tough, long-lasting, weather-resistant finish. (71111) $0.98c

Here's the quick easy way to replace brakes—Stop-Rite lined brake shoes, ready to slip right into drum. Wire-backed lining permanently bonded to shoe for positive "non-grab" braking, long quiet service. Trade-in allowance. All popular cars. Front or rear, as low as $3.75 each.

FREE: Mail post card today for folder explaining how to get more horsepower
Drednaut Hydraulic Jack takes work and danger out of tire changing. Easy wrist-action lifts any car. Twist—it’s down, safely and smoothly. Precision built to meet most severe passenger service requirements. Raises from 7” high to 14⅞”. Pumping handle included. $9.95

“Reddi-Rok” Car Top Carrier—new advanced design, complete, assembled, ready to install. Adjustable—mounts on any car top in a minute. Big 3⅜” suction cups can’t slip. Heavy web straps anchor to rain guard—hold big load safely. Heavy gauge steel. Pumping handle included. $7.95

Why risk worn brakes? Reline with Stop-Rite Brake Linings. Designed for individual braking requirements of all cars. Pressure molded. Wire backed for extra strength. Will not absorb grease or moisture. With rivets and instructions. Easy to install. All popular ears from $3.45

New Safety For Your Car At Western Auto
For Top Quality Auto Supplies.

Deluxe magnetic dash tray keeps sunglasses, pencils, pad, maps, etc. conveniently within reach. Large enough to hold sandwich and drink, compact—fits any dash. Removable chrome-finish ash tray. Hidden compartment. Colorful plastic. Velvety-soft inside finish. $1.59

Wizard “Twin-Fire” spark plug gives top performance twice as long as single electrode plugs. Each electrode fires one at a time while the other “rests”, stays accurately gapped up to twice as long. All chrome shell prevents rust. Guaranteed 18,000 miles. Each, in sets $0.75

Why risk an overhaul? Replace your worn-out engine with a Wizard-ized Engine—get up to 3 times the miles! All moving parts brand new or fully remanufactured like new. New-car engine guarantee. Installation arranged. For Ford, Chev., Plym., and others. As low as $149.50

from your car. Write Western Auto, Dept. 200E, 2107 Grand, Kansas City, Mo.
BUY THESE NEW
DO-IT-YOURSELF BOOKS
AT YOUR NEWSSTAND
Only 25c Each!

HOW TO PAINT INSIDE AND OUT: Complete instructions for all interior and exterior painting using all types of finishes. Covers every phase of painting technique, handling brushes, preparation of paint, painting metal, spraying, masking, importance of primers. Enables the amateur to do a professional-looking job the very first time. Also covers all necessary materials. 25c

HOW TO LAY LINOLEUM AND TILE: Tells and shows you how to lay all types of tile including rubber, asphalt, etc., as well as linoleum and similar floor coverings. Complete instructions for the use of plastic wall tile. Step-by-step directions plus many show-how photographs, drawings and diagrams make it easy. 25c

HOW TO REMODEL YOUR BASEMENT AND ATTIC: Transform wasted space into additional bedrooms or game rooms. Book covers dormer construction, unusual wall coverings, insulation, weatherproofing, installation of doors and windows, use of glass block, installation of plasterboard, and other approved building methods and materials. 25c

HOW TO TAKE CARE OF YOUR LAWN: Be sure to buy this book if you want to have a better lawn this summer. Complete instructions for the establishment of a new lawn or the maintenance of an older lawn including fertilizing, raking, rolling, watering, mowing, weed removal, destruction of trees and stumps, various types of grass, etc. 25c

HOUSE WIRING AND ELECTRICAL REPAIRS: Everything you have ever wanted to know about making household electrical repairs. Tells how to locate shorts, install fluorescent fixtures, rewire for modern living, repair electric irons and other everyday household appliances plus many valuable hints and kinks for every homeowner. 25c

SMALL BOATS YOU CAN BUILD: Build your own boat and save! Complete step-by-step instructions plus diagrams and photographs for building the boat of your choice. Choose from a 10-foot plywood dinghy, a 16-foot plywood sailing scow, 13-foot sailing knockabout, 6-foot duckboat or a “marine mustang.” Also contains many helpful hints for every boating enthusiast. 25c

These books are now available at your favorite newsstand and will soon be on sale at your local IRHA Hardware store.
Sees No. 1 wish come true!

Television Tape Recording by RCA Opens New Era of Electronic Photography

In 1956, RCA's General Sarnoff will celebrate his 50th year in the field of radio. Looking ahead to that anniversary, in 1951 he asked his family of scientists and researchers for three gifts to mark the occasion: (1) A television tape recorder, (2) An electronic air conditioner, (3) A true amplifier of light.

Gift No. 1—the video tape recorder—has already been successfully demonstrated, two years ahead of time! Both color and black-and-white TV pictures were instantly recorded on magnetic tape without any photographic development or processing.

You can imagine the future importance of this development to television broadcasting, to motion pictures, education, industry and national defense. And you can see its entertainment value to you, in your own home. There the tape equipment could be used for home movies, and—by connecting it to your television set—you could record your favorite TV programs.

Expressing his gratitude for this "gift," General Sarnoff called it the first major step in an era of "electronic photography." He said it was only a matter of time, perhaps two years, before the finishing touches would bring this recording system to commercial reality.

Such achievements as this, stemming from pioneering in research and engineering, make "RCA" an emblem of quality, dependability and progress.
Get Out of the "Snapshot Class"!

There's no trick to making fine portraits ... action shots ... and extra money, too, in your spare time when you shoot with a Pacemaker Graphic. These great cameras are as easy to use as less versatile cameras, yet can give you the large, clear pictures editors want. Have your Graflex dealer show you why the rugged Graphics are the favorites of 93.9% of America's press photographers. See both the Pacemaker Graphics - Speed and Crown — each in three sizes. And be sure to see the amazing Century Graphic, now only $122.50 with coated f/4.5 lens.

YOU CAN OWN A GRAPHIC PRESS OUTFIT FOR AS LITTLE AS $29 DOWN!

Here's everything you need to start earning money with your photo skill! Complete outfit includes Pacemaker Graphic, lens and shutter of your choice — plus a sheet film holder; coupled rangefinder (installed); and a Graflex Flash with connecting cord. Ask your dealer about time payments.

GRAFLEX®

For FREE Illustrated booklet on how to choose a modern camera, write Graflex, Inc., Dept. PM-21, Rochester 8, New York.

The Owners Report on the Mercury

(Continued from page 106)

the old suspension."—Hialeah, Fla., pilot.

When asked to rate handling and road-ability, both of which are influenced by the front suspension, the owners were virtually unanimous in praise of the Mercury. Slightly less than 1 percent rated handling unsatisfactory, while 2 percent said road-ability was unsatisfactory. In fact, many owners (36 percent) gave ease of handling as the feature they liked most about their cars. And 13 percent gave roadability as the best-liked feature.

Most-Frequent Complaints

By far the most-frequent complaint was that assembly and workmanship were poor. There were 33 percent of the owners who mentioned this weakness and some were very outspoken about it.

"Delivered practically 'knocked down' and had to make repeated trips to dealer to get things to work. Door troubles. Leaks badly around windshield. Merc-O-Matic growls when standing still." — Nashville, Tenn., executive.

"Too many adjustments to be made after delivery, unable to tell who owns the car, you or the garage. Have added four spark plugs, new battery, reworked fuel pump, greased speedometer cable, new radio and have had in garage constantly for oil leaks." — Chattanooga, Tenn., executive.


"The car would be perfect if the doors wouldn't shake. Whole car rattles. I would love to talk to a broad-minded factory man who didn't think I was another crab." — Clearwater, Fla., motel operator.

Low gasoline mileage, engine noise and carburetor trouble and poor dealer service were the next most frequent complaints.

When asked about the quality of their dealer service, the owners were not very flattering. Only 39 percent said it was excellent; 20 percent said good; 22 percent said average; and 19 percent rated it poor.

A rather frequent specific complaint involved the front seat (not the four-way power seat but the manually adjusted type).

"Front seat slides forward momentarily when you make a quick stop." — Hickory, N. C., millwright.

"Front seat seems loose on track." — Nashville, Tenn., lawyer.

Comparatively few owners had absolutely no complaints at all to make about (Continued to page 252)
Animals Protect Themselves

Swans protect their young by beating off their enemies with powerful wings—and by striking them with horny beaks at the end of long, muscular necks. Small enemies find swans very formidable opponents.

CAR ENGINES NEED

THE EXTRA PROTECTION OF AC ALUVAC

Small but vicious enemies attack your car engine, too—a dozen kinds of dirt and metal bits carried in your engine oil could do great harm unless taken out of circulation. AC Aluvac traps them all—the dirt and sludge that clog rings and valves—the abrasives that wear down and damage finely engineered precision moving parts.

Therefore, millions of motorists now use Aluvac Replacement Elements regularly—and more new cars are protected by AC Aluvac Elements than by any other brand of oil filter element. Aluvac's large filtering area and small filtering pores make it the finest engine protection available to motorists.

Standard Factory Equipment on

Cadillac

Standard or Optional Factory Equipment on CHEVROLET, BUICK, OLDSMOBILE and GMC

AC SPARK PLUG DIVISION GENERAL MOTORS CORPORATION

MAY 1954
their new cars. Only 11 percent wrote "none" in the section labeled "Here are my specific complaints."

Best-Liked Features

Performance of the new overhead-valve engine was the best-liked feature among owners with almost half (47 percent) listing it.

Styling and appearance (both inside and out) were also among the best-liked features with 37 percent listing them.

<table>
<thead>
<tr>
<th>1954 MERCURY SPECIFICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ENGINE</strong></td>
</tr>
<tr>
<td>Type</td>
</tr>
<tr>
<td>Horse and stroke</td>
</tr>
<tr>
<td>Piston displacement</td>
</tr>
<tr>
<td>Brake horsepower</td>
</tr>
<tr>
<td>Torque</td>
</tr>
<tr>
<td>Compression ratio</td>
</tr>
<tr>
<td>Transmissions</td>
</tr>
<tr>
<td>Overdrive or Mere-O-Matic torque converter with planetary gears optional.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>GENERAL</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Steering ratio (over-all)</td>
</tr>
<tr>
<td>Steering wheel</td>
</tr>
<tr>
<td>Lock-to-lock</td>
</tr>
<tr>
<td>Turning radius</td>
</tr>
<tr>
<td>Brakes</td>
</tr>
<tr>
<td>Tire size</td>
</tr>
<tr>
<td>Recommended tire pressure</td>
</tr>
<tr>
<td>Shipping weight (4-door)</td>
</tr>
<tr>
<td>Wheelbase</td>
</tr>
<tr>
<td>Tread, front</td>
</tr>
<tr>
<td>Tread, rear</td>
</tr>
<tr>
<td>Height, overall</td>
</tr>
<tr>
<td>Width, overall</td>
</tr>
<tr>
<td>Length, overall</td>
</tr>
<tr>
<td>Road clearance</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>CAPACITIES</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil</td>
</tr>
<tr>
<td>Water</td>
</tr>
<tr>
<td>Gasoline</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>INTERIOR DIMENSIONS</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Front-seat width</td>
</tr>
<tr>
<td>Rear-seat width</td>
</tr>
<tr>
<td>Front headroom</td>
</tr>
<tr>
<td>Rear headroom</td>
</tr>
<tr>
<td>Legroom, front</td>
</tr>
<tr>
<td>Legroom, rear</td>
</tr>
</tbody>
</table>

"Its smooth lines and fine exterior trim and color schemes are tops."—Livonia, Mich., salesman.

"My bittersweet-and-black Monterey hardtop is the best and most beautiful car I have owned of seven new ones since World War II—all of them in the same or higher price levels."—Grosse Pointe, Mich., housewife.

Equally popular with the Mercury's good looks are its fine handling characteristics.

"Steering is very good and car is excellent in holding the road around curves."—Cicero, Ill., tool and die maker.

"Excellent handling and roadability. Rides firm and not too soft."—Boonville, N. Y., power-station operator.

"It holds course on any kind of road at all speeds."—Klamath Falls, Ore., tractor operator.

However, there were a few dissenters.

"Still too much roll to body, coupled with..." (Continued to page 256)
Try it yourself and get a chance to win $1,000.00

Get a demonstration of this wonderful new saw at your Utility dealer. Then fill out a free entry blank, describing the features you like best— and you may win $1000 in Black & Decker's Big Saw Contest!

Bob Davis says:
Send 25c for my "Handy Tips" booklet, full of home repair ideas plus information on patterns for projects like sample below. (No stamps, please). *T. M. Reg. Real-Bild Pattern Company

For address of your nearest dealer see "TOOLS-ELECTRIC" in the Yellow Pages of your telephone book.

Need more living space? Do-it-yourself materials let you convert your attic or basement at far less cost than you ever dreamed! And the new Black & Decker Utility 6" Adjustable Saw takes the back-breaking work out of the job!

This new saw makes angle cuts, bevel cuts—every cut you need to add a beautiful room to your home, or make bookcases, cabinets, etc. You can get information on plans and patterns by mailing the coupon below, and your dealer will advise you on materials. When you visit him, ask to try the new Adjustable 6" Saw—as well as the larger 7-, 8- and 9-inch Heavy-Duty Utility Saws!

Black & Decker

$64.50
B&D Utility 6"
Heavy-Duty Adjustable Saw
COMPLETE WITH BLADE

Fully adjustable for every depth and angle cut from 2" at 90° to 15° at 45°.

Powerful B&D-built motors take the toughest spots without overheating or slowing.

New lever arm permits safe retraction of lower guard to make pocket cuts.

B&D saw-grip handle is always at natural sawing angle. Rugged, king-size shoe gives better balance.
Traffic laws say: "Full Stop at Stop Signs."

If you always stop, it can help you...

save up to 40% on your auto insurance!

Read why careful drivers get top-notch protection at rock-bottom rates with

STATE FARM MUTUAL

If you drive carefully, like the man in the picture (and his small friend on the sidewalk)...you're already well on your way toward reducing the cost of your auto insurance.

Now, all that's left to do is contact your State Farm agent. He will tell you how we seek to insure careful drivers only...how we save money on their accident-free driving...how we pass this saving back to our members in the form of rock-bottom rates.

If you qualify, he will quote you rates that are as much as 40 percent lower than the cost of equivalent protection from other good companies.

More than 3 million car owners (more by far than any other company insures) already save on our "careful driver" insurance. They buy it on a convenient semi-annual payment plan. If they do have an accident, they get prompt, courteous "round the clock" service from State Farm's 7000 agents and 700 claim expediters.

Want more information? Call the agent listed under "State Farm Insurance" in your classified directory, or write: State Farm Mutual, Dept. J-9, Bloomington, Illinois.

Can you qualify?

State Farm aims to insure careful drivers only. Drivers who can be counted on to:

☐ Make full stop at stop signs
☐ Heed crossing signals
☐ Obey speed laws
☐ Be extra careful on slick pavements
☐ Keep car in good shape
☐ Avoid passing on hills or curves
☐ Avoid mixing alcohol and gasoline
☐ Yield pedestrians the right of way

STATE FARM MUTUAL

"the careful driver insurance company"

State Farm Insurance is written only by the
State Farm Mutual Automobile Insurance Co.
and its wholly owned affiliates:
State Farm Life Insurance Company
State Farm Fire and Casualty Company

Home office: Bloomington, Illinois. Field claim offices in 300 principal cities. 7,000 agents in 40 states, District of Columbia, and Canada

Check local radio listings.

MAY 1954
Hunter Attic Fan pulls in cool air through open windows, exhausting hot stuffy air through attic louvers. On hottest summer nights it circulating cooling breezes through every room. Cost of operation is only a few cents a night. Hunter’s 67-year experience assures carefree performance. Sizes are available for small or large homes, with prices starting at $139.95 including automatic ceiling shutter.

You can easily install a Hunter Attic Fan in your home. No special wiring is required. Compact unit requires only 18" to 26" attic clearance. Look in your classified directory and phone the Hunter dealer to enjoy cool comfort in your home at lowest cost. Mail coupon for copy of free booklet.

COOL YOUR ENTIRE HOUSE

For as little as $139.95

Hunter Attic Fan

MAIL FOR FREE BOOKLET
Hunter Fan and Ventilating Company
Box 2818-BK, Memphis 7, Tennessee
Send a copy of “Change Your Home from Hot to Cool” to:
Name __________________________
Address _________________________
City & State ______________________

HUNTER ATTIC FANS

the many turns due to high steering ratio. You can still get into trouble at speeds motor will deliver, although new suspension is a vast improvement over earlier models.” — Jackson, Tenn., plant manager.

Miscellaneous Comments

There are always many interesting, although sometimes not significant, comments from owners. Some of them are quoted below.

“Dislike dealers putting name plates on rear of car.” — St. Augustine, Fla., buyer.

“Hunter controls very poorly constructed. Reflection from instrument panel on windshield. Nearly impossible to reach ashtray from the driver’s seat.” — Hammond, N. Y., insurance man.

“Sloshing noise in gas tank when it is full.” — Jacksonville, Fla., welder.

“On crooked roads gasoline is slopping someplace and inside of car smells. Dealer cannot seem to correct it.” — Yachats, Ore., manufacturer.

“Angle of accelerator pedal makes right leg uncomfortable on long drives. Low gas mileage.” — Atlanta, Ga., minister.

“So far the ’54 has been okay except for a fuel pump. Service on new cars no good until the guarantee has expired.” — Foley, Fla., welder.

“Changing over to automatic transmission as all overdrives in this area have a definite roar at about 70 that nothing could solve.” — Clarenda, Iowa, professional man.

“When you open the doors in the rain, the seats get wet because of the narrow top.” — Oak Ridge, Tenn., inspector.

“Sports coupe is too low for tall people. Must remove bats in car.” — Cazenovia, N. Y., machinist.

“Not enough room inside car.” — Bismarck, N. D., salesman.

“Should have a decent-size glove compartment. Why is ignition on left side for right-handed persons?” — Old Forge, N. Y., insurance man.

We asked the owners if they would buy another Mercury. Only 4 percent said they would not; 70 percent said they definitely would; and 26 percent said they might.

When asked to give the Mercury an overall rating, 56 percent of the owners called it excellent, 36 percent good, 6 percent average and only 2 percent described it as poor. For additional details and percentages see the Percentage Table on page 104.

And now for my own test: I drove a 1954 Sun Valley (plastic top) Monterey coupe from the factory at Wayne, Mich., to Los Angeles via Kansas City and Denver — a distance of 2685 miles.

(Continued to page 258)
All Crescent Snips are forged of selected steel and blades ground on special grinding machines. They are hardened by Crescent's own selective induction process to insure long, satisfactory service. These easy-cutting, well-balanced snips are made in four patterns; standard, circular cutting, combination and heavy duty. Sold by Industrial Distributors and Hardware Dealers everywhere.

Crescent Standard Pattern Snip, No. S412, 12". Also in seven other sizes 7" to 14".
Wherever stops were made, the plastic top attracted attention. A filling-station attendant remarked, "Whew, more glass to clean." One important driving advantage I found was that it permits you to see overhead-hanging traffic lights easily. Everyone seems to think the plastic top will mean more heat inside the car in summer. My test was made in winter, so I cannot comment on it. There is considerable glare when driving against the sun—a sliding shade would eliminate this objection. The plastic is tinted and Mercury claims that even in hottest weather, it gets only two degrees warmer inside than in a conventional model.

It is fascinating to drive and, during storms, it is strange to see it being splashed by rain or snow. I noticed at night I could see the reflection of the instrument panel in the top, a distraction that you must get used to.

Mercury changed from the old L-head V-8 to the new overhead-valve design. The new engine has slightly better acceleration, power, top speed and gasoline mileage than the 1952 Mercury I previously tested. I found regular gasoline satisfactory, although I would use premium gas if I were a Mercury owner.

The compression ratio has been increased to 7.5:1 and horsepower from 125 of last year to 161. Torque rating is 238 pound feet between 2200 and 2300 revolutions per minute.

In the first 500 miles I drove many miles in a heavy snowstorm. Later, on long open stretches of the West, I drove at extremely high speeds. Top speed by speedometer was 102. Like most speedometers, it was fast by about 8 percent.

(Incidentally, at Daytona Beach Speed Week, a stock Mercury averaged 96.665 miles per hour on the flying mile to win the 250-299 cubic-inch-displacement class.)

Roadability and maneuverability are extremely good. The car cornered far better than the average 1954 automobile. The ball-joint front suspension is definitely an advanced design of which I approve. It makes for ease of operation, both in turning and up-and-down movement of the wheels. Mercury steers easier than any other car of its weight. Power steering is optional, but I see little need for it on a car that steers so easily. Corners can be taken at high speeds with little body roll because of the excellent suspension. It is very hard to make the car hit bottom on hard bumps at any speed.

I found little brake fading, regardless of speed or constant use on winding mountain highways in the Rockies.

(Continued to page 260)
Learn how homeowners everywhere save money by installing their own

MATICO

TILE FLOORING

MATICO's New Improved Install-It-Yourself System
Makes It Easy!

Yes, you can enjoy colorful, durable MATICO Asphalt Tile Flooring in your home at amazing low cost by installing MATICO yourself. You can't buy a more economical type of luxury flooring than MATICO. It lasts for years...is easy to keep sparkling clean and comes in 32 striking decorator colors that can't wear off because colors and marbleization go clear through the tile.

It's a cinch to install, too, with MATICO's tested install-it-yourself instruction booklet...tile calculator...and special tool kit. Why, you can finish a room in just a few hours.

Why put up with a dingy, worn-out floor when it costs so little to install a MATICO tile floor yourself.

See your classified telephone directory for the name of your MATICO dealer.

MASTIC TILE CORPORATION OF AMERICA
Joliet, Ill. · Long Beach, Calif. · Newburgh, N. Y.

Manufacturers of:
AristoTex · Confetti · Parquetry · Asphalt Tile · Cork Tile · Plastic Wall Tile

MASTIC TILE CORPORATION OF AMERICA
Dept.M2-S, P. O. Box 986, Newburgh, N. Y.

Please send me MATICO's money-saving install-it-yourself instruction kit and complete color chart.

Name ........................................................................................................
Address .................................................................................................
City .................................................. Zone ............................................ State ..........
Service station proprietor, William Vasey, Greenwich, Conn., says: "If your filter's clogged like this, better put in a Purolator Micronic Filter right away!"

"Right here, in the book that came with your car", it says—

Change your Oil Filter every 5,000 miles"

*17 out of 18 leading car makers recommend oil filter changes at least every 5,000 miles, on the average, depending on car and driving conditions.

Grit and sludge in the oil can ruin any engine . . . run up expensive repair bills. A regularly changed Purolator Oil Filter traps them and keeps them from damaging delicate engine parts.

If you've driven 5,000 miles since changing your oil filter, it's probably clogged. Install a new Purolator Micronic Filter—fast! Costs as little as $1.80. Takes a few minutes. More car makers specify Purolator than any other oil filter.

PurOlarator

World's finest OIL FILTER

"Remember—there's a Purolator engineered for every make of car," says Mr. Vasey. "We recommend them for all the cars we service."

Mere-O-Matic drive operates smoothly and without jerk. At speeds below 58 miles per hour, intermediate ratio (passing gear) is brought into use by depressing accelerator pedal to the floorboard. The drive is constant through the torque converter, there being no lock up or positive drive such as there would be with a clutch. There is a parking lock with a lever indicator and this is good.

The interior finish is above average. Driving position is good, with plenty of arm and legroom even for a tall person. Mercury has thrown away the useless upper portion of the horn ring. No car of any make has better instrument vision than Mercury. The starter is operated by a twist of the key. I am right handed and dislike the awkward key location at the left of the steering column. Right-handed persons far outnumber "southpaws" and Mercury should relocate the key switch for right-hand convenience.

Front vision is good (see Visibility Chart page 106), although the hood is rather long and high. A shorter, or more sloping, hood would give closer ground vision in front of the car. Rear vision is adequate.

The body is tight and I found no rattles, squeaks or leaks during the test. Doors fit tight, but require too much pressure or slamming for closing.

The wide hood ornament is attractive and gives the impression that air is admitted through it. Unfortunately, I think, Mercury does not take advantage of this ornament. It should be slotted to let fresh air flow in over the top of the engine. This would increase performance and afford better hot-weather cooling.

I tested the Mercury Sun Valley under more varied weather conditions than usual, from bitter cold to desert heat (but not hot enough to test summer use of the plastic top). On gray, cold days, it felt colder inside the Sun Valley than in conventional cars, but it was only an illusion. **

"Atomic" Microscope

With a new microscope which uses atomic particles as "eyes," scientists can "see" how a living or metal structure fits together. The microscope, developed at the University of Michigan, will help researchers discover where the atoms of one component of an alloy are located in the metal. The specimen to be examined contains some radioactive atoms which emit beta rays. The microscope discovers the area of greatest activity. The researcher then converts to an ordinary microscope-lens system for a visual examination of that section.
Proved by rigid tests!

NEW ONE-COAT HOUSE PAINT

saves you ½ the time, nearly ½ the cost!

Unretouched photo, above, shows how Glidden Endurance Imperial gives gleaming 2-coat whiteness in one stroke over siding with 15 years' accumulation of dirt and grime. Once around the house is all it takes with Glidden Endurance Imperial.

"TORTURE CHAMBER!" One-Coat Imperial outlasts other paints, regardless of coats, when exposed to continuous artificial sun and rain in the Weatherometer.

"BODY" MEASURING MACHINE! Imperial's formula leads the field with 90% pigment and vehicle solids. These ingredients—not thinners—give you protection.

Write now for a FREE copy of "How to Paint," the perfect guide for do-it-yourself painters.

The Glidden Company
Department PM-5, Cleveland 2, Ohio
In Canada: The Glidden Co., Ltd., Toronto

Glidden ENDURANCE IMPERIAL

(C)opyright 1954, The Glidden Co., Cleveland 2, Ohio
Egg for an Atom Engine

(Continued from page 96)

facts and figures that make your head spin: "It sits in a bowl-shaped concrete foundation like an egg in a cup," he says. "Thirty-eight feet of the underside is below ground level. The first soars 5 stories higher than Niagara. It measures 706 feet around the equator," he adds, as though discussing another world. "It's so big that the barometer records 25 inches less mercury at the 'north pole' than at the 'south pole.' There's so much surface that queer things could happen if we didn't allow for them. Ordinary New York weather—a warm sun on one side and a polar wind on the other; a sudden low-pressure storm in midsummer—might create pressure differentials capable of pushing a mammoth dimple in the steel hide. Actually, size for size, the sphere is much thinner in proportion than the shell around an egg. We fixed all that by putting strain gauges on all the columns. They tell us when stresses are too great at any point. We equalize them by jacking procedures."

Erection of a building as unorthodox as the giant sphere called for plenty of American ingenuity. First, 26 tubular steel columns, each 76 feet high and two feet across, were set on the foundation rim. Then 78 big steel plates were welded to the column tops in a vast circle, forming the sphere's midriff. "Until the last gap was closed," Harman reveals, "everyone had his fingers crossed. You don't think of one-inch plate steel as something you bend or twist into odd shapes with ease. But those big plates flapped and twisted in the wind like limp sails. Once the circle was completed, of course, they formed a rigid belt."

So accurate was the engineering that only 3/8 inch separated the last two plates raised into position. With the equator anchored, the bottom of the sphere was hung from it, and the dome raised on it, tier by tier. Each tier was held in place until welded by long steel arms reaching out from the derrick mast like spokes of an umbrella.

Then, one of the strangest operations of all took place. Section by section, welds over the entire ball were smeared with a soapy solution. Air was pumped into the tightly sealed sphere until 20 pounds' pressure was reached. Workmen peered over every inch of weld—looking for telltale soap bubbles that would indicate a leak. Not one was found in all the five miles of welded seams.

Once that was done, some 30,000 tons of fill cascaded into the sphere's bottom, bringing a flat, interior floor right up to

(Continued to page 264)

POPULAR MECHANICS
You apply clean PENTA to wood in minutes, get extra years of use and satisfaction

When you spend a few minutes in treating your gate and lawn furniture with a clean PENTA® solution, your final satisfaction with the job is multiplied many times over. Almost any wood article you can build lasts years longer with a PENTA® treatment, because this modern preservative works in the grain to give effective protection against termites and decay. Simply flood clean PENTA on with a broad brush, or dip individual pieces before assembling. PENTA® itself leaves a natural appearance, but does not interfere with finishing—leaves wood pleasant to handle and work.

Dow's free booklet, "Handyman's Guide to Home Wood Preservation", gives valuable information on how to use PENTA® for protection of storm windows and screens, porches, fence posts and other decay-danger areas. Send for your copy today.

Your local lumber dealer or hardware store stocks brand-name preservatives containing *PENTACHLOROPHENOL in both regular and water-repellent types. Look for the name PENTA® on the label. THE DOW CHEMICAL COMPANY, Midland, Michigan.

you can depend on DOW CHEMICALS

MAY 1954
ground level. This is the floor on which the strange, new engine will be built and tested—inside the biggest air-conditioned globe in existence. Most of its secrets will be sealed up tight. There's only one airtight globular entrance through which human traffic will pour. The other is reserved for the dolly on which rods of U-235 will ride in a gigantic lead container. Even atomic submarines must be refueled occasionally, and this is where the job will be done—in a unique concrete building called the fuel element service cell, right alongside the sphere.

In KAPL's laboratories, on an intricate cutaway model, you can see the process for handling the "hot" rods carried out in miniature. The machine that pulls the partially burned uranium rods from the reactor core in the sub is a sort of immense cap that is picked up by a 40-ton overhead traveling crane in the sphere and set down snugly over the reactor section of the hull. Under this heavily shielded "hood," the rods are pulled by robot mechanisms inside. No one will tell you how this is done or exactly what the rods are like. But when they're hauled out, they are dropped immediately into a ring of small tubular holes in a solid lead container five feet across and eight feet high. This case rides a tiny railroad, on the back of the dolly.

The tracks weave out through the sphere wall and into the fuel element service cell. Here, behind six-foot concrete walls, the uranium rods are handled by an army of robots, controlled by men looking at them through six-foot-thick windows filled with dense liquid to shield them against the deluge of atomic particles. An overhead crane outside the cell reaches down, lifts the multiton container off the dolly and drops it through a hole in the floor to a deep tunnel, onto another dolly where the hot material can be stored. One by one, the fuel rods are brought up by a robot arm. Once in the cell, a big manipulator that can grasp and lift one ton in its crushing steel grip, or pick an egg off the floor without cracking the shell, passes the fuel rod through a complex series of automatic machines. A long rod is seized in steel fingers and placed into a rack, where torrents of water wash it down. The arm grabs it and inserts it into a "scanning station," where radiation-sensitive eyes examine it minutely and record what they see. A third robot inspects and photographs it. Out comes the big arm again, to move the cylinder along to the disassembly station. Actually, only part of the rod is a fuel section. The dissembler removes this and pulls the rest of the rod apart. Most of it can be re-used.

(Continued to page 268)
Double Savings!

Save on Price / Save on Installation

Duo-Matic

"Do-It-Yourself" TRIPLE-TRACK All-Aluminum Storm-Screen Windows

$29.95 $15.95 Value

Easily Installed By Anyone!

Lowest price ever for any comparable window! Rugged, all-aluminum construction ... triple-track design means glass and screen inserts are always in place, ready for immediate use.

At leading lumber and hardware dealers everywhere — or write

the weather-proof CO. Dept. PM
1407 E. 40th St., Cincinnati 3, Ohio

NEW!

OIL MIST SPRAY!

3-in-one's Oil-Sprays protects tools with fine mist of oil! Press button for penetrating oil spray! It's so easy to use!

"3-IN-ONE®" OIL

SAY YOU SAW IT IN POPULAR MECHANICS

The NEWEST and FINEST: Buck's 400 Series

CHROME EDGE CHISELS

You get: * The Finest Cutting Edges 
* Tough Tinite II Handles with Inserted Steel Caps 
* Rust Proof Tool

Plastic pocket Kit: 4 Sizes $9.90

Metal complete line of Chisels, Gouges and Carving Tools
Cataloq Available!

Buck Bros. Inc.
RIVERSIDE WORKS, WELLSBURY, MASS.

ANNOUNCING

AMERICA'S GREATEST "DO-IT-YOURSELF" SANDER!

New!

900' OFFERS MORE THAN ANY OTHER SANDER REGARDLESS OF PRICE!

ONLY $39.95

The ONLY Portable with ALL These Features!

1) Motor guaranteed against burn-out during ownership or replaced free. (2) Removing more material with less horsepower than any other sander at any price. (3) Over 1000 hours of continuous running without breakdown in laboratory endurance trials. (4) Work-Light standard equipment — a Symron "first" for portable sanders of its type. (5) Vibration-absorbing handle floats in rubber (Pat. Pending). (6) Easy to use, hand operated, positive paper holding clamp. (7) This hand operator—no jammer, twisty tennis ball flight. (8) Most powerful recipro- scribing sander motor (Patented). (9) Sooting power unit floats in rubber — no roots, bushings, belts or gears to wear out.

PRESENT, PROSPECTIVE SANDER OWNERS! This new 900" SYNCRO is the best portable for home use—costs less than many others! Try this superior, powerful tool on "do-it-yourself" jobs — save many times its cost! Because "900" is so new—your dealer may be sold out—do this: Send $25.00 and your dealer's name with coupon—we will ship "900" to you—will pay your dealer profits from your purchase. Then use your "900"—see how it saves before, quicker, easier, smoother unhandled than "bucket" torque-knobbed "two-handed" portables do! If not 100% satisfied—return "900" prepaid, undamaged, within 10 days of receipt—we'll refund $25.00. Period. OC write for FREE Facts Today! Dealers—See Your Jobber!

WITH BUILT-IN LIGHT

NEW '900' SYNCRO SANDER INDUSTRIALLY RATED

Send Coupon for Trial Order or Free Circular:

SYNCRO CORP., Dept. 1-54, OXFORD, MICHIGAN

Trial Order: I enclose $25.00 for No. 900 — $35.00 for No. S04 — $45.00 for No. 508-D — $55.00 for No. S04. Send money order, cash, or check. No C.O.D.'s.

C.O.D. ORDER: I enclose $25.00, Send money order! With accessories, on 10 Days Money Back Trial.

FREE CIRCULAR: Send new free Syncro Sander Circular.

Dealer's Name, Address

WRITE YOUR OWN NAME, ADDRESS BELOW!

MAY 1954

265

Copyrighted material
**FISH AND CAMP SPECIAL!**

**CERTIFIED**

**$58.25 VALUE**

**$29.95**

**101 Pc. SPINNING OUTFIT!**

**CORN & TRAVEL**

**3 for $26.85**

**6 for $47.70**

**12 for $89.95**


Buy 3 Complete 101 pc. outfits and save a $5.20 addition! Only 101 pc. outfits the available. Included.

**BADGE**

- [Image of badge]

**BRAND NEW, FIRST QUALITY! $24.50 VALUE! GENUINE DUPONT NYLON AIR MATTRESS**

**$9.95 EACH**

- [Image of air mattress]

Nylon Air Mattress with the extra-fine nylon fabric and special plastic laminations you are everywhere. Every air mattress made to U. S. Army Quartermaster Specifications. The tough, durable nylon fabric is rubber impregnated to lock in the air and take lots of abuse. Width only 14 lbs. Balls to small compact size. New type air valve permits easy filling without pump. Ends are slightly curved to fit all sleeping bags. Big 59 x 79 inches. New, fresh stock. Great for camping comfort for camping and outdoor use, ideal for campers, outdoorsmen and surfers.

**AIR MATTRESS AND ARKTIK SLEEPING BAG**

**America's first sleeping bag value! Famous Arktik quality throughout! Air Corps Balloon Cloth top covering. Water resistant ground cloth. Warm to fantastic filling. Full 18" heavy duty zipper. Filled with 4 lbs. of new Klapp. 54" x 79" inches. Balls to compact bedroll. Big 59 x 79 inches. Nylon Air Mattress. Don't compare these materials.**

**Refer to the image for complete details.**

**SEND $1.00 ADDITIONAL ON EACH OUTFIT IF YOU WANT THE MASTERELR ARKTICATR WITH FULL RAIL LINE PICKUP.**

**SEND $1.00 ADDITIONAL ON EACH OUTFIT IF YOU WANT THE MASTERELR ARKTICATR WITH FULL RAIL LINE PICKUP.**

**NYLON BOAT COVER**

Boat owners can protect their craft and motors from rain with a new boat cover made of treated nylon. The cover fits snugly down over the gunwales and the motor. Arched steel ribs prevent water from standing in pockets on the cover. The chemically treated nylon repels water and won't mildew. The cover simply is unrolled over the boat. In the event of a sudden rain it can be installed while the boat is out in the lake, protecting the occupants and their equipment. The cover is available in sizes to fit craft up to 22 feet long.

**TELEPHONE TRANSISTORS**

Several telephone conversations can be carried on one rural party line with a system using transistors. Eavesdropping is impossible. The tiny battery-powered transistors, mounted on the telephone poles, place different calls on different frequencies. The conversations are sorted properly at the line's terminal. Bell Telephone, which plans an experimental installation at Americus, Ga., says the transistors should prove to be economical on telephone lines as short as five miles.
Linings are specially designed and compounded for long life. They are also counter-bored and drilled with precision equipment to provide positive assembly to shoe. Because you can be sure that they are manufactured to Ford's close tolerances and rigid specifications—you can be sure of top braking efficiency.

Get the Brake Lining that's made right for your FORD

Every single Genuine Ford Part—like the brake lining shown above—is made right!
...to the same specifications set by the men who originally built your Ford!

With fair-weather traffic "just around the corner," it's great to know your Ford will stop safely, smoothly, and surely. That's why now is the time to have worn brake linings replaced—and with Genuine Ford Brake Linings! They're made of materials specified by the men who built your Ford . . . given 3,250 Track Tests before approval for manufacture. And they're made right to work right to last longer in your Ford.

"TRADE" WHERE YOU SEE THIS SIGN

May 1954
The fuel section is then passed to the shearing station, where a punch and die separate the last bits of extraneous material from the portion that will be processed. What's left is grabbed by the robot arm again and passed to a mechanical gadget that puts each fuel section into a container and seals it. These are dropped into a bigger lead container, dollied out of the service cell, and put on board a railroad car for shipment to some atomic center where the potent material will be renewed and made into fresh rods that can make the cosmic fire to drive the Sea Wolf—or any sub like her—for another 30,000 miles or so.

Needless to say, no ordinary crews can be expected to walk aboard a submarine like the Sea Wolf and run it. "Everyone, from cook to captain," explains Commander Neymark, project engineer formerly in charge of the crew at KAPL, "must learn how to work in the brand-new environment of radiation. It's safe enough if you know about it. The cooks must learn problems associated with long submergence. Certain cooking fats, combining chemically with other gases that have accumulated in the tight spaces after weeks of cruising below the surface, might poison the air faster than it could be replaced by new equipment said to separate oxygen from the sea water and bring it into the sub. All hands must be thoroughly informed on such things as radiation tolerances, and what to do if the pipes containing the incendiary, radioactive molten metal should spring a leak. Sodium will burst into flame on contact with air—or water. Every man must know exactly how to fight sodium fire."

A core of 40 men and four officers has been boning up on all the facts about the Sea Wolf. By the time she's launched, they'll have had three years of training. They will train the other 40 who come aboard to man the big sub—and they should be able to do a superb job. The handpicked enlisted men were high-school graduates who have already logged a B average in a college cram course on atomic physics, which they recently completed near-by Union College. After touring KAPL and GE to study every phase of their reactor in production, they plowed through a half year of college math, thermodynamics, electrical engineering, reactor engineering, metallurgy and electronics. They helped fabricate reactor parts, and worked with the designers and engineers actually assembling the experimental engine at KAPL. They studied the reactors at Hanford and Arco, spent weeks aboard destroyers studying design and operation of

(Continued to page 270)
25 TON CAPACITY HYDRAULIC CYLINDER

- ALL STEEL CONSTRUCTION
- 8" BOKE-12" STROKE
- DOUBLE ACTION

ITEM 2185 $3,900.00

- UP TO 70% CAPACITY ON INTERRMITTENT SERVICE
- SOLID STEEL 24" PISTON ROD
- 1" PORTS
- OVERALL DIAMETER-120"
- DISTANCE BETWEEN CENTERS-24-1/4" CLOSED-OPEN

IDEAL FOR:
- HYDRAULIC PRESSES
- PUMP DISCHARGE FROM BOTH ENDS
- INTERNATIONAL HARVESTER DISC GRINDERS AND CRADLES
- LEVELING RAMS
- INDUSTRIAL MACHINERY
- ROAD MACHINERY
- FARM MACHINERY
- HYDRAULIC TAIL GATES

Shipping Wt. 1,850 lbs.

F.O.B. Chicago...

...95.00

...7-1/4" BORE-15-1/2" STROKE

ITEM 2181 $1,375.00

- 30,000 Lbs. PRESSURE WITH W/C. P.U. PUMP OUTPUT

NOW...SAVE $16.00 on this

$259.00 VALUE

35 CU. FT. PORTABLE ELECTRIC LIGHT PAGING

A. C. ELECTRIC GENERATORS

Power these electric generators with your own gasoline engine, take-off, or direct drive, and save the different, or electric, motor, and engine cost. Use as outlined below:

ITEM 50-79 - 3000 Watts, 24 Volt, 75 Foot Cycle, 1200 RPM.PRICE $199.50. DIMENSION 159-1/2 x 35 x 16 - 1/2 lbs. Price @ 49.50.

ITEM 50-75 - Electric generator, 3000 Watts, 24 Volt, 75 Foot Cycle, 1200 RPM. single and three phase engine at 2 or 1 cycle, double half-bearing construction, 1-3/4" shaft, equipped with "new" and included at no extra price, 5 groove six inch pulley for belt drive, four inch diameter rubber foot mount. Incl. 1.40. Address...

Shipping Wt. 296 lbs.

F.O.B. Chicago...

...155.00

FREE SUMMER EDITION

1954 CATALOG...50 PAGES...CHICAGO AUCTION...EQUIPMENT LITERATURE FOR FARM, INDU.

GROBAN SUPPLY CO., INC.
1139 S. WABASH AVE., CHICAGO, ILL.

MAY 1954
steam machinery. Meanwhile, other Navy men spent a month sealed up in the submarine Haddock, tied up alongside a dock in New London—in an endurance "submersion" test designed to simulate problems that will be faced by crews who may cruise around the world without ever seeing the sky.

Not all the problems are technical. It isn't natural for man to seal himself in a container with 80 fellow men for weeks at a stretch. "The effects of long submersion on a man's ability in his job is something we don't know much about," explains one human engineer involved with the problem. Under normal circumstances, the way a fellow next to you sucks at a tooth, taps his fingers or butters his bread may not even be noticed. But after 50-odd days of having to watch or listen to your bunkmates' nervous habits, such small things have a way of grating on temperaments and becoming almost intolerable.

None of these things has been overlooked in training and screening the crews for the two new subs. By the time the Sea Wolf's crew completes training at West Milton and takes off for New London to help put their ship together before taking it over, they'll be one of the most highly trained groups of men ever to move in on a piece of Navy equipment—the likes of which no Navy man has ever had to run. These new subs are among the most formidable weapons in world history.

"Brief Case" Camp Kit
Totes Shovel, Ax and Water

One wooden handle serves for both the ax and the shovel of a 71/4-pound camper's kit that can be carried like a brief case. The waterproof carrying case doubles as a two-gallon water bag. The metal-capped end of the handle is secured to the ax head or shovel by a bolted metal clip. The kit fulfills the legal requirement for tools required of campers in national parks and forest areas.
Here’s Why . . .
Anacin® is like a doctor’s prescription. That is, Anacin contains not one but a combination of medically proved active ingredients. Anacin is specially compounded to give FAST, LONG LASTING relief. Don’t wait. Buy Anacin today.

Try the new Bronson “Spirit”—the only American made spinning reel that doesn’t twist the line when the drag slips—the spool never turns in either direction.

And new Spirit geared-action drag works on the crankshaft, not the spool—you always get accurate, steady tension. New oversize button can be adjusted with a fingertip while you play the fish.

See the Bronson Spirit at your sporting goods counter—only $17.95. Other Bronson and Bronson-made J. A. Coxe reels are priced from $2.95 to $33.00.

BRONSON REEL CO., BRONSON, MICHIGAN
(Div. of Hughes Mfg. Co.)
Trims Grass
Edges Lawns
Trims Hedges
Trim Master
Patented

The most versatile electrical trimmers in the low price field. Does all three lawn care jobs with professional precision—an hour's trimming in 5 minutes. So light, so easy to operate, anyone can use it! See them at your hardware or garden supply dealer.

Trim Master Jr.
for heavy duty
lawn care...$44.95

Trim Master Bantam
priced for every
home owner...$27.95

Write for complete literature
—E. F. BRITTEN CO., INC.—
27 South Avenue W., Cranford, New Jersey

BE YOUR OWN BOSS!
Make Up to $50 Daily As a Floor Surfacing Contractor

BE INDEPENDENT! You can be free of bosses and layoffs and earn as high as $50 a day sanding floors with Clarke equipment. A small investment will start you off in the growing building field. Get ready now for good pay and a big future. Start the way hundreds of successful contractors have by mailing this coupon today.

CLARKE SANDING MACHINE CO.
455 Clay Avenue
Muskogee, Mich.

I'm interested! Send me complete free details on how to be a floor surfacing contractor.

NAME
ADDRESS
CITY
STATE

SEND FOR OUR NEW CATALOG
SAVE ON SURPLUS TOOLS & EQUIPMENT!
Choose from many hundreds of new and used Gay, and industrial surplus tools, equipment, and supplies at a fraction of their normal cost! Write today—send 1c with your request for Catalog B 10

T&T TOOL CO. 7667 GRAND RIVER DETROIT 4, MICH.

EARN YOUR OWN KING MIDGET! We want riders who are determined to demonstrate that the World's Lowest Priced Toy Passenger Automobile. Fully assembled or bolt together parts. If there is no dealer near you send $25 for detailed literature with wholesale dealers price or $1 (refundable first order) for this plus actual assembly book and service manual. MIDGET MOTOR MANUFACTURING CO., Alliance, Ohio

ECONOMY MFG. CO.
STONE MOUNTAIN, GA.

FREE CATALOG
3669 Maldrum
Detroit 7, Mich.

CUT BUILDING COSTS 2/3
Make Your Own Concrete BLOCKS and BRICKS
To Use or Sell
New superior moulds make absolutely square, true, easy-to-lay blocks which will pass any building code. Production is fast...easy. One durable 350 machine will make 900 9"x10" blocks per minute—1,000 a day. Pays for itself in one day! Sell blocks for big profit...or save in building cost for yourself. POST CARD BRINGS FREE FOLDER.

SHEET METAL BRAKES
Angles, flanges, Pittsburgh locks, 24-G. steel, heavier aluminum, Cam locking, indexed, punch, punch or hand. Also 15 ft., 8"x15", 4"x15", 2"x15" cartoon, 24, 19, 15, 12, 8, 6, 4, 3, 2, 1. Also 5 ft., 8"x15", 4"x15", 2"x15" cartoon, 24, 19, 15, 12, 8, 6, 4, 3, 2, 1. Also 5 ft., 8"x15", 4"x15", 2"x15" cartoon, 24, 19, 15, 12, 8, 6, 4, 3, 2, 1. Also 5 ft., 8"x15", 4"x15", 2"x15" cartoon, 24, 19, 15, 12, 8, 6, 4, 3, 2, 1. Also 5 ft., 8"x15", 4"x15", 2"x15" cartoon, 24, 19, 15, 12, 8, 6, 4, 3, 2, 1.

Now complete...sent by

WYKE BRAKE CO., P-2439 15th St., Denver 11, Colo.

POPULAR MECHANICS
ARE YOU MISSING THE BIGGEST THRILLS IN RADIO?

Get a hallicrafters Short-Wave and Hear it All!

You don't know how exciting radio can be until you've listened to today's short-wave. You hear stations from all over the world—broadcasting in their own languages and English mostly, if you're lucky. You hear ships at sea, planes in the air, police and military broadcasts that trigger tomorrow's headlines. You hear London, Paris, Rome, Rio—Moscow propaganda and our answers to it on the Voice of America. And plenty more!

Hallicrafters is by long odds the leader in the short-wave field. An unmatched record of dependability with amateurs, plus 20 years' experience in producing vital military radio communications equipment, stand back of every receiver sold under the Hallicrafters name. See your dealer today. Hear a Hallicrafters—and you'll choose a Hallicrafters!

FAMOUS HALLCRAFTERS 5-38C—Most popular communications-type receiver in the world! Has electrical bandwidth tuning to separate crowded stations. High gain circuit pulls in stations from all over the world. You hear five wave-bands. Regular broadcast plus 340 kc to 32 mc. Operates on regular 110 V AC/DC.

Only $49.95

hallicrafters
The Name Is Famous
Radio • Television • High Fidelity

4401 West Fifth Avenue, Chicago 24, Illinois • Hallicrafters Ltd., 51 Camden Street, Toronto, Canada

MODERN
LAWN MOWER
SHARPENER

Service departments of leading lawn mower manufacturers use the Modern Lawn Mower Sharpener. One man can sharpen your lawn mower in minutes! A precision knife grinding machine—no extra grinder to buy, imitated but never equaled. If it isn't a Modern it can't be Modern! (Prices subject to change without notice)

MODERN MFG. CO.
150 N. Fair Oaks • Pasadena, Calif.

LOOK-


DELTA ELECTRIC CO.
Marion, Indiana

DELTA-RAY SEALED BEAM
Electric Lantern

May 1954

Famous Modern Mower Sharpener

$263.00

with motor

P.A.D. PASADENA

BUILD YOUR OWN ROOM DIVIDER!

Save money! Build this room divider—desk with strong, grainless Masonite Preswood® and plan #AE-295. Works like wood. 33 types and thicknesses at your building-materials dealer's. Send for "Idea Book." Lists free plans.

NATURALLY STRONGER WITH LIGNIN

MASONITE CORPORATION

Here's a dime to cover expenses of sending "Idea Book" and plan #AE-295.

Name

Address

Town

County

State

Zip

Masonite® signifies that Masonite Corporation is the source of the product.
More Power for TOUGH JOBS!

Gravely Rotary Mower attachment makes the toughest mowing jobs easy. Lawn or weeds, cut 30-inch swath fast and clean with suction-tip, file sharpened knives.

Gravely does jobs other tractors won't... because the 5-HP Gravely has the extra power that makes tough jobs easy.

Let us show you the advantages of the Gravely's extra power... all-gear drive... power reverse... your choice of 21 tools to do every mowing, gardening or upkeep job... faster, better, easier!

Write for FREE Booklet
"Power vs Drudgery"

GRAVELY TRACTORS, INC.
BOX 563 DUNBAR, W. VA.
WHEREVER you need it!
Hunting and fishing lodges, camps, cottages—wherever lights and power are needed away from main lines, Winco Portable Power Generators have belted construction for peak efficiency. Sold with standard 4-cycle engines.

WHENEVER you need it!
You can keep power tools, lights, all essential electric equipment going during power failures with a Winco power Generator. Models available from 700 to 12,000 watts. Write today for complete descriptive literature or contact your nearest dealer.

Winco WINCHARGER CORPORATION 2001 CITY 2, IOWA Subsidiary of ZENITH Radio Corp.

GET THIS STRAIGHT you can't beat an EMPIRE LEVEL
For improved accuracy, better visibility, less breakage, use the new Empire 9" Aluminum Torpedo pocket level with machined bottom groove and protected, easy-reading vials. See your dealer today for all-purpose Empire Levels.

EMPIRE LEVEL MFG. CO. 10930 W. Potter Rd., Dept. PM Milwaukee 13, Wisconsin

PUMP WATER FAST!
DRAIN WASH TUBS, CELLARS, GISTERNs IRRIGATE—FILL TANKS—DRAW WELL WATER

MOORE MANUFACTURING CO. SWEDISHBO I NEW JERSEY

REPLACE LOOSE FAUCET HANDLES
...QUICKLY! EASILY! AT LOW COST!

WITH NUWAY TAMP-ON REPLACEMENT FAUCET HANDLES!

Are guaranteed to delight you or your money back

Type "A" per pair postpaid $2.00 Type "B" per pair postpaid $1.00


MAY 1954

Save money DO IT YOURSELF with SPEEDY RIVETS

Bind Reports Repair Luggage

Fix Footwear Mend Clothes

Do jobs you never thought you could do yourself...fasten leather, cloth, paper, plastic sheeting...ideal for craftwork, too...quick, secure, permanent. Simply punch a hole in each part to be fastened, push rivet together through holes, place on firm surface and swat with a hammer. Gilt, nickel, black, brown finishes. Large (6 to a card) or small (10 to a card) sizes.

AT HARDWARE COUNTERS EVERYWHERE 15¢ per card

THE DOT LINE

3229 South Ashland Ave., Chicago 8, Illinois
Because

WHIZZER

Can and Brush

Holder

NO MORE PAINT DRIP!

Smooth, durable plastic pistol grip, spring steel hand
holds all quart cans firmly. Brush clip eliminates drips, mess and
brush handles, smears paint and brushes easily, safely,
comfortably, even while climbing ladders. Guaranteed.

WHIZZER PRODUCTS CO., 338 S. SANFORD, PONTIAC, MICH.

A third hand
for painters!

AMAZING, PERMANENT MAGNETS—WILL NOT WEAKEN NON-ELECTRIC

Retrievers, guns, tackle, tools and other steel items from lake, river,

potting tanks, steel or other hard-to-reach spots. Hurry while

supply is limited. Order now. All steel items. Prices are

posted. Send for free information now.

MAGNETS

NEW WAY TO CUT PERFECT

GROOVES WITH CIRCLE SAW!

Just dial any of 40 cuts. Parallel, clean, no sawing!

Outfit your saw for regular cuts, for 1 3/4", 1 1/2" and

1" spacers. All diameter and order direct.

Send money order or check. We pay postage. No C.O.D.'s.

WARREN DADO WASHERS CO.

MAGNET COMPANY, 3200 N. W. 27th Ave., Miami, Fl.

SUMP PUMPS

2,400 GALLON CAPACITY

1 1/2 outlet — No screen to clog — fool proof

The time tested Lomona sump pump is shown in the illustration — has a special foot
proof trap at the intake, online seating at the bottom. made of aluminum castings.


Whickert Co. MICH.

CLEANS BATTERY PLATES

WHILE IN USE

DUBLE Power

ONLY

50 at your

service

station

or garage

UNCONDITIONAL 10-DAY MONEY BACK GUARANTEE!

Send check, cash or M. O. and we'll ship postpaid — direct

from factory to you.

Dubre Power

puts new life
in old batteries!

Batteries "slow down" due to sulfation. DUBLE
power removes sulfation, makes your battery efficient
again.
Planning to build, remodel or repair?

This Spring let SKIL tools do your work!

...while they pay for themselves with the dollars you'll save!

Want to improve the value of your home by many, many dollars at the cost of a very few? SKIL Home Shop Tools are the way to do it!

A SKIL Saw is the world's finest portable saw for remodeling your home, cutting plywood panels, sheeting, siding. You can even cut stone, metals or compositions with special blades. With a SKIL Saw and Sander-Shaper Kit, you can have the beautiful table saw combination to do precision sawing plus the shaping and sanding necessary in building cabinets, furniture—all projects of this kind with professional results!

SKIL Home Shop and Builders Saws are available in six models. 6", 7¼", 8¼" blade sizes. From $43.95.*

*Prices subject to change without notice.

SKIL ¼" Drill Meets Every Handy Man and Hobby Need.
SKIL 2¼" Belt Sander

To save you time and work, there are more than 22 SKIL Home Shop Tools. Visit your hardware dealer, appliance or department store.
Sturdy 1 1/2 to 5 H.P. Walking Tractor
Best for all around garden and lawn work. Variable speeds, adjustable wheel widths, individual gang tool controls. 3 speed and reverse automatic gears on 3 and 5 H.P. models. Superb traction, deep plowing, easy handling. All wanted tools and attachments.

Rugged, Low Cost 2 1/2, 5, & 8 H.P. Streamliner. Powerful, practical, streamlined, comfortable. Pulls 10, 12 inch plows, cultivates between 38" rows, bulldozes, mows lawns, operates belt attachments. 3 speeds and reverse automatic transmission. Friction brakes. 3 to 7 M.P.H. Nothing else like it in a tractor that will get the work done.

Inexpensive New Tiller...Lawn Mower
Nine inch rotor pulverizes 12 inch swath 6 inches deep. 1 1/2 H.P. Extremely low cost. Rotor quickly replaced with single wheel for lawn mowing, hauling, etc.

Also larger 8, 12 H.P. riding tractors with 3 speeds and reverse automatic gears.

SHAW MANUFACTURING CO. 4905 Main St., Goeburgh, Kansas 6886 N. 4th St., Columbus, Ohio

BUILD YOUR OWN FAN
One-piece cast aluminum propellers for cooling and ventilating.

Size

Polished Unpolished

Inches
5
6
7
8
9
10

5.00
6.50
7.50
8.50
9.50
10.00

Write for price list on larger sizes. Wire mi.

KLOPPENBURG ALUMINUM TOY., Dept. PM-54, Davenport, Iowa

WELDER $19 95 FOR QUINCY

Complete with everything. Ready to plug in. 110 volts AC. 50-50 Amps. 3 leads. Welds metal from 1/16" to 1/4" using 1/16" to 3/32" standard rods. Guaranteed unconditionally. 10-day trial. No C.O.D. Does everything welder costing up to $75.00 do. Buy direct and save.

ESSAY MFG. CO., INC., Dept. 51, Quincy 69, Mass.

FOR SMOOTHER PAINTING
USE THE FINEST BRUSH
FREE BOOK—"How to Do a Good Paint Job"
Send card (and name of your retailer, if you wish) to Baker Brush Co., Inc., 33 Grand St., New York City 13

Brushes by Baker
AMERICA'S FINEST PAINTING TOOLS

The lure with the
Built-in Flash!

Send for FREE Fisherman's Log with color "How to Use" insert.
Record trips—know lures to use.

The I & S BAIT Co., Bradley 22, Illinois

HUNDREDS OF USES
IN HOME AND SHOP

Here's just the material for your special projects and odd jobs—steel bars in handy, standard lengths. Inexpensive, and readily available, too.

Made by Makers of popular REDI-BOLT Threaded Steel Rods

Ask Your Hardware Dealer, or write
REDI-BOLT, INC., 5330 Indianapolis Blvd., East Chicago, Ind.

TREASURE - $10,000

New locator detects metals, valuable minerals and buried treasure. Money-back guarantee of superiority.

Also house numbers. Give reward of $10,000 for survey discovery. Write for FREE information.

THE BOLDAC COMPANY 1520 W. GLANDERS BLVD. GLENDALE, CALIF.

TRANSFORMER $19 95 FOR QUINCY

COMPLETE WITH EVERYTHING. READY TO PLUG IN. 110 VOLTS AC. 50-50 AMPS. 3 LEADS. WELDS METAL FROM 1/16" TO 1/4" USING 1/16" TO 3/32" STANDARD RODS. GUARANTEED UNCONDITIONALLY. 10-DAY TRIAL. NO C.O.D. DOES EVERYTHING WELDER COSTING UP TO $75.00 DO. BUY DIRECT AND SAVE.

ESSAY MFG. CO., INC., DEPT. 51, QUINCY 69, MASS.

MIRRROLURES

The lure with the
Built-in Flash!

Send for FREE Fisherman's Log with color "How to Use" insert.
Record trips—know lures to use.

The I & S BAIT Co., Bradley 22, Illinois

POPULAR MECHANICS
WITH Jiffy SAWHORSE BRACKETS

ALL WELDED construction. Use any 2x4's for legs and cross bar.

SET UP OR knocked down instantly. Easy to move from job to job, and easy to store.

FOR SALE IN most hardware and lumber stores. If your dealer cannot supply you, write us direct.

GRAND HAVEN STAMPED PRODUCTS CO.
GRAND HAVEN, MICH.

ALSO
CHILD'S
2 PASS.
MOTOR
CAR
For Kids
5 to 15

FREE BOAT KIT CATALOG
12 ft. Runabout

LAWN ORNAMENT-NOVELTY PATTERNS
25 Lawn Ornament Patterns, 25c. Other Patterns: 15-20" high: Dutch Girl, Dutch Boy, Pirate, Bull Terrier, Mexican Girl, Mexican Box, Dwarf, Penguin, Flower Girl, 15c each. 25 Novelty Patterns, 50c. All 62 Full Size Patterns, $1.00.


BUILD your own SMITH AIR COMPRESSOR

Operates spray guns, rock drills, tampsers, paving breakers, sandblasting . . . . Uses only 1 gallon of gas on hour. Famous the world over! Capacity 60 cu. ft.; pressure up to 100 lbs. per sq. inch. Just order the Smith Compressor Head and Accessories with complete instructions for assembling. All you need is a Ford Motor and shop facilities. Head equipped with high speed compressor valves; automatic unloading and idling.

Write for complete information
GORDON SMITH & COMPANY, Inc.
410 College Street • Bowling Green, Ky.

Look what you can do with these ready-to-install Curtis Cabinets

You can have the most modern kitchen in town—because Curtis wood cabinets bring you the 53 kitchen features women want most. Curtis cabinets are easily fitted together for any size or shape of kitchen. They are available in beautiful natural birch—or can be painted, if you prefer.

You can have a storage wall—here's the answer to getting more storage space in bedroom or utility room.

More room for playthings—they can easily be stored in easy-to-reach cabinets in basement or child's room. Sold through retail lumber dealers everywhere.

Curtis Companies
Service Bureau
200 Curtis Building
Clinton, Iowa

Please send Curtis kitchen idea book. I enclose 10 cents.

Name
Address
City State

MAY 1954
**SKAN Quick Exposure Meter**

**Instant Reading!**

No computing needed!

Correct camera settings at a glance for all color or black & white photography!

New color setting in hand—same "Sportsman-Gray" with bright metal trim and smart black and red accents. A full size meter, weighs only 4 oz.

Complete with neck cord in "jewel-case" Gift Box...

Every-ready Case...$1.95

Complete computer dial on back—for special films and light conditions other than normal. Read correct camera settings in 1/stop from 1/2 to 1/22 and speeds from 1/30 to 1/250. Covers entire color film range in 1/stop and has special marks for movie settings.

**SKAN**

a product of G-M LABORATORIES INC.

428 N. KNOX AVE., CHICAGO 4

---

**NOW EASY TO APPLY YOURSELF ALUMINUM MOULDINGS**

Twelve Foot Turns any home- made or factory made aluminum, brass, copper, bronze, glass, etc. into a beautifully finished mold. Each kit contains twelve foot coil of heavy gauge die cast aluminum counter-edge molding with countersink finish guaranteed not to rust off black. Order by mail.

**WELDER**

**SOLDER**

**BRAZE**

**CUT**

WELDER

Four-Way Welder Co., Dept. F2-E

1810 S. Federal St. * Chicago 16, Ill.

**FREE CRAFT CATALOG**

120 PAGES...Craft Supplies, Tools, Designs, Instruction Books from America's Largest, Most Complete Handcraft Stock.

Send for your free copy NOW!

Griffin Craft Supplies

5023 Telegraph Ave. * Oakland 9, Calif.

---

**FREE CRAFT CATALOG**

FREE today for your big free arborgast color catalog—full of pictures of catches

**Say You Saw It in Popular Mechanics**

DON'T SETTLE FOR LESS!

SEND FOR THE STORY OF THE WORLD'S MOST ADVANCED MOWER

**GEORGE**

Self-Propelled Rotary Mower 20" Widen your horizons with GEORGE. See your nearest GEORGE Garden Tools Dealer or write for illustrated brochure.

**FREE COUPON**

Use the coupon below to get more information on the products advertised in this page.
IN VIOLINS IT'S Stradivarius

IN SAWS IT'S ATKINS SilverSteel

ATKINS SAW DIVISION
BORG-WARNER CORPORATION
INDIANAPOLIS 9, INDIANA

MAY 1954
OWN YOUR BUSINESS

Start in Spare Time with a FOLEY SAW FILER

Here is a steady repeat CASH business you can start at home in your basement or garage, while you are working at your regular job. No experience is necessary to turn out perfect cutting saws—"the first saw I sharpened came out 100%. I think the Foley Saw Filer is a marvel of perfection," writes Clarence E. Parsons. Every saw you sharpen will bring you new customers. You will find you can make up to $5 or $4 an hour — $20 to $30 a week in your spare time as a starter.

With a Foley Saw Filer you can file all hand saws, also band and cross-cut circulars. It is easy to operate—simple adjustments—no eye-strain. Patented jointing principle even up all irregular teeth and makes an old saw cut just like new.

This Free Book Shows How to Start

"MONEY MAKING FACTS" shows you how to get plenty of saws to file without canvassing, and how you can develop into a general repair shop that will be your own business. This is a helpful, practical book that tells just what to do—send for your free copy today. No salesman will call.

Send for FREE BOOK

FOLEY MFG. CO., 516-4 Foley Bldg.
Minneapolis 18, Minn.
Send me free book "MONEY MAKING FACTS."

Name:
Address:

HARGRAVE HAND SCREWS

Ideal for craftsmen in home shop or factory. Hargrave Hand Screws are strong and durable, have refinements of construction found in no other Hand Screw. Spindles are cold-drawn with Jougler wearres "Arms" thread. Jaws are of selected maple. Openings in a complete range of sizes down to 2 inches.

Ask for Hargrave at your Hardware Dealer

Write for Catalog of Complete Line
1907 Waverty Ave.
Cincinnati 12, Ohio

THE CINCINNATI TOOL CO.

COMPLETE SET $1.25

of 12 Post Paid Only
Vanadium steel drills. 3/32" shanks. Assorted No. 1 to 12 or all the same (state within). Easily worth more than double our low price. Send check or money order to Dept. M.

GENERAL AIRE CO.

MAKE MORE MONEY!

Dealers or Representatives Needed
for nationally advertised line of Spark Plugs — Oil Filters — Auto Specialties — Liberal Proposition — Full or Part Time — Experience Not Necessary — Write Today

ENGINE PRODUCTS MFG. CO.
5201 E. Beverly Blvd., Dept. 160
Los Angeles 22, Calif.

BRONZE FOUNDRY

Schools and Home Workshops

Make your own castings of aluminum, copper, bronze, silver. Foundry sets are available in three sizes including 2400 Deg. F. blasts Furnaces, $25.00; $24.00 and $42.00. I.e.b. Kansas City, Free Circular.

KANSAS CITY SPECIALTIES CO.
P. O. Box 6033, Dept. P-S
KANSAS CITY, MO.

TRU-PERIMETER HEATING

The leading hot water baseboard heating. For new homes or old. Folder on request to Dept. PM5, Warren Webster and Company, Camden 5, N. J.
MAY 1954

with NON-STAINING ALCOA SCREENING

When you repair screens, do a job that will last for years. Do it with screening made from Alcoa® Aluminum. It won't stain or streak your sills and siding. It won't rot, sag or burn.

Hardware stores and building supply yards carry Alcoa Aluminum Screening. Look for the Alcoa label. Write for Folder that tells easy ways to Replace Screening. ALUMINUM COMPANY OF AMERICA, 1931-E Alcoa Building, Pittsburgh 19, Penna.
Do 5 gardening jobs in one operation

PLOW • DISC • HARRROW • AERATE • CULTIVATE

THE BOLENS M-1 MUSTANG

BOLENS M-E ROTARY TILLERS
do the work... You have the fun

Tines Guaranteed against Breakage

Till without toil! Completely prepare your garden for planting in one operation... then cultivate, weed and mulch. Plenty of power, and what a performer... turns on a dime. Budget priced for you to enjoy better crops and better soil.

A complete selection of work saving year round plug-in attachments available for BA Series.

6 H.P. BA 24W6

America's Finest Outdoor Power Equipment

MAIL COUPON TODAY!

BOLENS PRODUCTS DIVISION
Food Machinery and Chemical Corporation
265-5 South Park St., Port Washington, Wisconsin

I am interested in literature on:

☐ TILLERS ☐ POWER MOWERS
☐ TRACTORS ☐ CHAIN SAWS

Name:

Address:

City______ Zone______ State______

---

Protect your home against power interruptions with an...

ONAN Emergency ELECTRIC PLANT

Provides dependable standby electricity for heating systems, pumps, freezer, lights and appliances. Keeps home safe, livable. Automatic start and stop. Find out how little it costs! Write for folder!

D. W. ONAN & SONS, INC.
577 University Ave. S.E. • Minneapolis 14, Minnesota

SUPER DRILL GRINDER

Sharpen round shank drills from 3/32" to 1/2" in diameter, up to 6" long. Orinds old drills like new in 4 different point angles, using hand or power grinding wheels. Money-back guarantee, only $2.95.

A. D. MCBURY

KLEAN-STRIP

"Peels off Paint"

Heavy-Bodied Klean-Strip also available

The Klean-Strip Co., Inc., Memphis 6, Tenn.

SILVER SOLDIER TORCH & KIT 7 3/4

JOIN ALL METAL PERMANENTLY


AMERICAN PRODUCTS CORP., 422 S. Dearborn, Dept. 3-E, Chicago

3 CU. FT. MIXER

DIRECT FROM MFR.

Fills long, thin need for small mixer for concrete, fertilizer, seed, dry ingredients. Costly other material. Mixes up to 60 gal. of ready mixed concrete, pays for itself in first job. Combination belt pulley and cast for hard operation. Also powder mixers. Write for literature.

3-Qt. Drum-Mixer-3 Qt. Dr. Coarse... $2.00

5-Qt. Drum-Mixer-3 Qt. Dr. Coarse... $2.95


UNITED STATES KOKO AND FOUNDERS CO.
CONSTRUCTION EQUIPMENT DIV., PASadena NEW YORK

How to PAINT

With Brush and Spray

Covers All Painting Methods and Materials

You can do professional-like painting and finishing jobs yourself and save about two-thirds of the cost. Sam Brown, noted craft authority, makes it so easy for you in his book, How TO PAINT WITH BRUSH AND SPRAY. Order your copy now and enjoy this immediately saving. It reports decoration techniques, wall and ceiling painting, finishing wood and metal, covering cracks and holes, base painting—every type of painting with brushes, sprays, guns, roller and other methods. Tells when finish is best; what materials to use, etc. No previous experience needed. Fully illustrated. Order by mail, only $2.50. Money back if not pleased.

POPULAR MECHANICS PRESS, Dept. PMR8
200 S. ONTARIO ST., CHICAGO 11, ILL.
Provides the correct speed and power for larger drilling, reaming, tapping and boring on light presses. Easily installed in five minutes. Adaptable to all type machines. Spindle speed range approx. 45 to 3000 RPM. Made in 3 motor shaft sizes: $\frac{3}{4}$"—$1\frac{1}{4}$"—$1\frac{1}{2}$". Write for literature.

THE PULL-GEAR CO.
25427 Mound Road
Center Line, Mich.

X-acto
KNIVES * TOOLS
HANDICRAFT KITS

BUILD YOUR OWN
AIR CONDITIONERS
AND DEHUMIDIFIERS
FROM JUNKED REFRIGERATORS — FOR $15
FOR HOME OR AUTOMOBILE
Don't let your family suffer from the heat. Live and ride in cool comfort. Send 50c for instruction booklet (specify whether for home or car). SEELEY CO., DEPT. 90, CHICAGO 12, ILL.

When you wash your CAR...wash the MOTOR!

Just brush on Klanz and hose off...your motor shines like new!

MAIL FOR FREE LITERATURE
E. 1. Bruce Co.,
Box 397-F, Memphis 1, Tenn.
Send me complete information on Bruce Prefinished Oak Floors.

Bruce PREFINISHED Oak Floors
Product world's largest hardwood flooring maker

285
Guard NOW against summer overheating

1. Drain out winter-worn anti-freeze and clean with DU PONT COOLING SYSTEM CLEANSER

Do it before the first summer day can cause overheating! Du Pont Cooling System Cleanser gets rid of rust, scale, grease... works as you drive. Thorough, safe, simple.

2. Put in Du Pont Anti-Rust

Just pour it in and leave it in!

Just as you pour in anti-freeze for winter, pour in Anti-Rust for summer. Du Pont Anti-Rust protects against the most common causes of overheating. Its special rust-inhibiting action keeps water from rusting in the cooling system. And, at the same time, Anti-Rust keeps out acids and lubricates the water pump—helps prevent squeaking. Simple to use—just pour in liquid Du Pont Anti-Rust and forget it!

ASK ABOUT THE COMPLETE DU PONT SPRING DRAIN-OUT

Includes drain-out, clean-out, adding Du Pont Anti-Rust plus complete cooling system check-up. At garages, car dealers and service stations.

DU PONT NO. 7 PRODUCTS

From Chemical Research... For Easier Car Care

BETTER THINGS FOR BETTER LIVING... THROUGH CHEMISTRY
Unique European Discovery...
Cuts YOUR repair bills
HELPS ENGINES Stay HEALTHY!

NOW BEING INTRODUCED TO
THE U.S., SOLATONE has been
tried, perfected and proved in Europe, where gaso-
line and repairs are really expen-
sive. Solatone lets you drive
further between repairs!

INCREASES ENGINE LIFE
By catalytic action on the gaso-
line before it enters your car-
bruretor, SOLATONE prevents
the forming of hard abrasive
carbon in your engine. It also
prevents the formation of var-
nish and gum. A major cause
of engine wear is eliminated.

BETTER ENGINE
PERFORMANCE
Because it is clean, and stays
clean, your engine will per-
form better, give you all
the power it is capable of
delivering.

DEALERS WRITE FOR FREE CATALOGUE

ASSORTED MAGNETS with big list of handy uses
POWERFUL POCKET MAGNET ideal for testing metals
RETRIEVING MAGNET pulls tools, etc., from tank or lake
HOT PADS MAGNETS to insert in your own pot pads
BULLETIN BOARD MAGNETS to "pick-up" nails, etc.
SLENDER MAGNETS remove chips from drill holes
WE REFUND EVERY PENNY if not 100% Pleased

RONALD ERBICH. 1991 N. 48th St., MILWAUKEE 8, WIS.

Find Hidden Treasures

DO-IT-YOURSELF!
PAINT BRUSH KIT
A COMPLETE HOMEOWNERS KIT!
Contains 3 brushes for all home
painting purposes. All brushes
pure black bristle, ideal for pain-
ting Walls, Floors, Trim, Ceilings,
Furniture, etc.

All lacquer finished handles.
Enamelled in hard rubber, in
height tin metal ferrules prevent-
ing shedding.

You get all three for practically
all as the cost of one brush. No
C.O.D.'s.

DEALERS INQUIRIES INVITED

MAY 1954

3420 Vinalord, North Hollywood, Calif

Use These 3 Simple Steps to Get Expert Paint Jobs!

Step 1. Prepare surface. Remove all
chipped and peeling paint or varnish down
to bare wood. Do this
by "flowing out" deep-cutting Styrpooze .
stays wet longer,
elongs to upright surfaces.
Clean off with
scraper or #3 steel
wool. Won't sting
hands. Contains no benzol.

Step 2. Rebuild broken corners,
fill nicks and holes with
Savogran Wood Putty,
a powder-form real
wood filler. You can
form it, tool it ... and
it doesn't shrink.
(For cracks in plaster,
use Savogran Crack
Filler. It's the original
patented quick-hardening
water putty.)

Step 3. Start job with
clean brushes. Clean
old brushes before
painting. Clean all
brushes after paint-
ing and whenever
you change colors.
Savogran Kwikkee,
the Liquid Brush
Cleaner, softens hard
brushes in minutes...
cleans out fresh
paint instantly! An
excellent deglosser.
May be reused.

Whenever you're painting, you need

SAVOGRAN
REG. U.S. PAT. OFF.
PRODUCTS... at better paint & hardware stores
Write for free helpful literature


Copyrighted material
Carpenters, Home Craftsmen...

make nail pulling easy —

 Cata's Paw Nail Puller does the job faster, better!

If you use a hammer you'll want a CAT'S PAW Nail Puller. The new CAT'S PAW Nail Puller is indispensable to Home Craftsmen, Craftsmen, Builders. It removes nails easily and with a minimum of damage to wood. Spoon-shaped head gets under nailheads cleanly.

Large size 26" x 3/4" Wrecking Bar with exclusive CAT'S PAW Claw — $2.50 Delivered in U.S.A.

$3.00 SPECIAL OFFER

For set of both styles 277H, 15" long 277B, 10½" long, ¾" hex. Tempered DREWALLOY Steel. Delivered price $3.00 anywhere in U.S.A. only.

C. DREW & CO. KINGSTON, MASS.

FREE Plan To Build Your Own Self-Propelled POWER MOWER

Now you can save money by building your own Power Mower. Pulls itself—Steeeps itself. We furnish you any part or parts you need plus building instructions. Write for FREE PLANS... No Obligation.

T & H Mfg. Co., Dept. P-5
811 E. 31 St., Kansas City, Mo.

STARRETT "Tools and Rules" BOOK

Describes and illustrates the precision methods utilized in mechanics use. Only one dime. Write Dept. AP.

The L. S. STARRETT CO., Athol, Mass., U. S. A.

INTRODUCTORY OFFER

CARBIDE SAW SERVICE

REPAIRS AND SHARPENING FOR SEARS, WARD & SIMILAR SAWS

<table>
<thead>
<tr>
<th>NO. TIPS</th>
<th>SHARPEN</th>
<th>NO. TIPS</th>
<th>SHARPEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>$2.50</td>
<td>10</td>
<td>$2.10</td>
</tr>
<tr>
<td>8</td>
<td>2.80</td>
<td>12</td>
<td>2.40</td>
</tr>
</tbody>
</table>

Chipped and broken tips replaced—50c each. Correspondingly low prices for other uses. 24-hr. sharpening service, 48-hr. repair service. C. O. D. only. Expires 7-31-54.

C. R. S. CORP.
1705 A BERRY BLVD.
LOUISVILLE 15, KENTUCKY

C.A.R.B.O.R.U.N.D.U.M.® Silicon Carbide Hook Stone to keep the hook "catching" sharp. This ground, tapered stone is designed especially for sharpening fish hooks. Comes in a handy leather case... costs less than a dollar at your favorite hardware store. Makes a gift.

Housewife alone behind a boat on an aqua-board is fun — 'especially if your feet don't slip when you're in rough water. Glue two sheets of RED-1-CUT® Waterproof Paper where your feet are supposed to stay... and stay they will. Use waterproof glue to hold the paper. Of course, the conventional way to use CARBORUNDUM'S RED-1-CUT® Paper is fast, easy sanding of undercoats and finishes on everything from furniture to automobiles... isn't as glamorous, but it's mighty profitable. You'll find many uses for it around your workshop or home, so buy a good supply of various grit sizes. Be sure to look on the back for the distinctive red color, and the CARBORUNDUM® Brand name.

Quickest way to fix a drawer that rides in too far: drive wood screws part way into the back of the drawer... one near each corner... to act as "stops"... adjust each as required.

My next door neighbor's latest hobby is making things with the new aluminum that you can saw, plane, chisel, etc. — just like wood. I loaned him my MX® Aluminum Oxide Cut-off Wheel a few weeks ago to let him see what a slick job it does in cutting and finishing. He tells me it's wonderful — but nary a word about returning it! If your neighbor doesn't have one, buy it at your favorite hardware store or lumber yard. It's inexpensive... fits your bench saw, circular saw, or portable or台 tools steel, aluminum, brass, bronze, copper... as well as the new "do-it-yourself" metals. MX Aluminum Oxide Wheels are strong, safe... finish as they cut. You can use the sides of 'em to sharpen tools, too.

Get a pair while you're at it! The MX Aluminum Oxide Wheel (for metals) comes in a red envelope: the MX Silicon Carbide Wheel (for cutting non-metals such as plastics, fiberglass, hardwood, asbestos, etc.) in a green envelope.

Send for FREE PAMPHLET, "HOW TO SAND", Address a postcard to me—

"Handy" Sandy
CARBORUNDUM
Niagara Falls, New York

CARBORUNDUM®, RED-1-CUT® and "MX" are registered trademarks of the CARBORUNDUM Company, Niagara Falls, New York.

May 1954
Now you can afford the best!

**Porter-Cable Quality Electric Tools**

New Electric One-Man Chain Saw

Only **$115**

**NEW in every respect to provide the finest, lowest-priced chain saw you can buy—anywhere!**

- **New Advanced Design** — Exclusive V-shape gives greater leverage—keeps chain off ground when saw is at rest.
- **New Sawing Ease** — Exceptionally light (only 18 lbs.)—can be operated in any position on the ground or in a tree. Saw pulls itself into the wood. You can saw much longer—with less effort, less fatigue.
- **New Versatility** — Cuts everything from saplings to 28" trees. Use it for undercutting, bucking, brush cutting, notching, felling, limbing topping.
- **New Safety** — Specially designed log-gripping teeth grip firmly—prevent saw's bucking or jumping—eliminate pull to left or right.
- **New Power** — Plenty of power for the toughest cutting. Husky 115 V. Universal motor operates on standard AC or DC outlet.
- **New Economy** — Easy to start—impressive to run—nothing to get out of order. Never before a quality electric chain saw at a price so low!

See this remarkable new Chain Saw at your Porter-Cable dealer's. Or, mail coupon today for complete information.

**PORTER-CABLE MACHINE CO.**
2445 N. Salina St., Syracuse 6, N. Y.

---

CUT COSTS with ALLEN Punch Press

1-Ton Power Bench Type

Powerful, Dependable, Economical

For light work—stamping, forming, riveting, etc.—metal, fiber or other material.

- Overall height: 17 1/2".
- Overall width: 21 1/4".
- Overall length: 61 1/2".
- Knock-Out Size: 3/4".
- Weight: 215 lbs.

Required only 1/2 HP. Motor.

The machine is a thousand times more productive for many types of work than done on hand presses at less capital investment.

**ALVA F. ALLEN, Dept. PM, CLINTON, MO.**

---

**MONEY MEN ALL FREE**

**SURPLUS SALE**

**NEW TOOL POST GRINDERS**

**$39.50**

Regular Price $250.00

1-4 HP. MOTOR

EACH MODEL UP TO 1/4 HP.

**CARBIDE WHEELS**

**MONEY BACK GUARANTEE**

EDWARD J. MULLEN, PULASKI, NEW YORK

---

**"SNOOPER" GEIGER COUNTER**

Supersensitive! Only 1/2 tool. Fits pocket—uses flashlight battery. Find a fume in uranium. Order Now! Send $3.00, balance COD. MONEY BACK GUARANTEE. FREE CATALOG. Call South or larger uranium and metal dealers. DEALERS WANTED.

**WHOLESALE! TOOLS, CANS, CAMERAS!**

Get up to 40% off

---

**TRIPLE ELECTRODE**

**LUTHY AERO SPARK PLUGS**

with Aluminum Oxide Insulators

Longer Life... More Economy... High Speed Performance...

**Packed In Engineered Sets**

Luthy Aeronautical Sales Company

FACSIMILE, MICROCAP, Electric Valve, 150 East 25 St., New York, New York

Excelled! 150 East 25 St., New York, New York

---

Copyrighted material
SHARPNOW MOWERS

MAKE SUMMER MONEY SHARPENING LAWN MOWERS—AT A GOOD PROFIT

ROLAND JR. is designed to sharpen all real type home lawn mowers. Uses well known lap grinding principle. Sharpens old mowers like new.

IT'S EASY—TAKES ONLY MINUTES FOR A GRASS-CUTTING EDGE

You can establish a regular service for sharpening mowers several times a summer. You make a good profit for easy work. Full instructions included.

COMPLETE KIT

MOYEE BACK GUARANTEE

Send check or M. O. today

MARCUS MFG. CO.

10039 Marcus Ave., Detroit 13, Mich.

DINSMORE 
AUTO COMPASSES

Enjoy traveling with America's finest body compass. Always instantly visible, and conveniently mounted on any car. Always visible on a DINSMORE. It's the only compass approved for auto manufacturers. Send for Free Folder "Poinr, Ruler, Compass", and name of nearest dealer.

Guide Way $4.89
Non-Illuminated
1002-25 Kelvin St., Flint, Michigan Illuminated

MARCUS MFG. CO.

10039 Marcus Ave., Detroit 13, Mich.

Our 72nd Advertisement

REAL DIESEL ENGINE

$3.95
- for planes, boats, midget cars
- 75 HP (N.R.P.); 8.7 HP (n. 34a); 3 hp. 5 hp.
- precision machined for smooth operation

You just can't beat this price for a precision diesel engine streamlined, compact, ready to install. Thousands of satisfied users all over the world. Free delivery if you order TODAY! Send $3.95 post. 34a package.

GOTHAM HOBBY CORP.

Dept. P, 107 E. 136th St.

NEW YORK 3, N. Y.

"Do-It-Yourself" Begins With How

"How to Work With Tools and Wood" makes the basic do-it-yourself skill easy for handyman or homeowner. Fully illustrated, only $2.00 post. paid. Order from Stanley Tools, 354A Elm Street, New Britain, Conn., in Canada, write to Stanley Tool Co. of Canada 354A Stanley Street, Roxton Pond, Quebec.

THE TOOL BOX OF THE WORLD

Hardware - Electric Tools - Steel Strapping - Steel

STANLEY

NOW! USE YOUR WILLYS OR DODGE AS BOTH A 2 AND 4 WHEEL DRIVE

Give your 4-wheel drive Willys or Dodge 2-wheel pop, power, speed, extra mileage, passenger car performance—as well as 4-wheel power and traction! Change from 2-wheel to 4-wheel in seconds with flange-wheel control. Ward labs confirm wear on front axle gearing and front tires; eliminate shimmy, increase gas mileage 6 to 8 m.p.g., money back guarantee. For Willys $56.95, Dodge $74.95. Ward, Standard Hub for Willys $20.95 pr., Dodge $23.95 pr., and Ward Automatic Hub with 2-Wheel Drive, $29.95 pr. At Dealers or direct.

WARN MFG. CO., RIVERTON Box 6504-A3, Seattle 88, Wash.

May 1954

From the WIZARD'S WORKSHOP

by the Weldwood Wizards with Wood

WHAT'S YOUR "SHAVING"? Want your short cut or shop trick printed? Send it to United States Plywood Corp., Box 109, N. Y. 36, N. Y. If used, we'll send you a one year subscription to this magazine. All entries become our property. None can be returned. Keep 'em short—25 words or less.

CAN'T GET AROUND? A handy large-radius compass is made with a strip of wire screen cloth. Use a glass headed push pin for the center; a pencil or awl for marking or scribbling the circle.

A NATURAL FOR WOOD! Here's an easy way to get that handy hand rubbed look when you want a natural finish on wood. For a wizard job use Satinlac! Works fine on any wood—hard, soft, solid or ply. Protects and preserves the surface. Never looks "built-up"; never turns yellow or darkens with age.

PIN UP! Instead of plugging screw holes, try using brass countersink screws. Makes countersink shallow, so that screw slot is above wood surface. Screw work tightly (best to glue it, too) then file off head of screw flush with wood. Looks like a decorative brass pin.

HOW TO GLUE JOINTS TO STAY: You need never worry about a joint glued up with Weldwood Plastic Resin Glue. It makes a bond stronger than the wood itself. And it gets stronger as it ages. Always in perfect condition when you want to use it, because you mix it yourself from the powder, in a few seconds. Sain free, rotproof, highly water resistant, inexpensive.

America's largest selling wood glue.

QUICK CLEAN HANDS. A dab of cotton soaked with ordinary fingernail polish remover works fine to take paint, varnish, etc., off your skin.

PREFER BLONDIES? You can get those rich "woodsy" blond or pickled effects by using White Firizite on any wood: hard, soft, ply or solid. Or for pastel tones, tint White Firizite with colors-in-oil. It gives an easy, amazingly beautiful finish!

PAINTER'S SECRET: Just brush Clear Firizite on plywood to prevent "wild" grain. It's also a wonderful undercoater on any paint or enamel jobs.

WELDDWOOD® Plastic Resin Glue

Makes a bond stronger than wood itself. Highly water resistant.

FIRIZITE® White pickled or blond effects. Clear and wild grain on mran jobs.

SATINLAC® For exquisite natural wood finish. Enhances natural grain; preserves the surface.

At hardware, paint, lumber dealers.

United States Plywood Corporation

Dept. 109, 55 West 44th St., New York 36, N. Y.

Send me free leaflets on Weldwood Plastic Resin Glue, Firizite and Satinlac.

NAME

ADDRESS
Want a real finish?

Try WET SANDING

BETWEEN COATS OF VARNISH OR SHELLAC

in furniture finishing or primer coats in automobile refinishing, use fine grit TUFBAK® SPEED-WET® Paper, dipping it often in a pail of water. This lubricates the cut of the diamond-hard silicon carbide grains. Repeated immersion cannot harm BEHR-MANNING® TUFBAK for the tough paper backing and the bond which holds the grit are both thoroughly waterproof. Ask for TUFBAK at your hardware or paint store.

ON DRY SANDING WOOD IN THE WHITE, get that beautiful "silky" finish with BEHR-MANNING GARNET Paper. On power sanders use ADAFOX® Paper or Cloth—sizes for all popular machines. Excellent for sanding wood, metal or plastic.

TIPS ON SANDING in the 32-page, illustrated book, "Sandpaper—How to Choose and Use It." Send 100 for your copy to Behr-Manning Corp., Troy, N. Y., Dept. PM-5.

In Canada: Behr-Manning (Canada) Ltd., Brampton, For Export: Norton Behr-Manning Overseas Inc., New Rochelle, N. Y., U. S. A.

DRILL SAW INTERNATIONAL REAM CUT

DRILL, SAW, REAM — metal, pipe, wood, plastic, Transite, etc. Use with any electric drill, slow drill press, lathe or milling machine. Drills own starting hole—upper part of bit is used to cut, saw or ream circles, ovals, squares or slots. Easy to operate, ideal for carpenters, mechanics, electricians, plumbers, hobbyists, many others. Abrasive-resistant, high speed steel. Flutes prevent breakage. Reinhardened at no charge. Takes place of up to $35 in tools. 1/4" diameter, 2" cutting sections, total length 31/2". Available in three types—all Purpose, Wood, Heavy Metal. Specify type needed. Set of 3, $13.50. Details on request. Shipped same day. Money-back guarantee. Dealer-inquiries invited. ORDER NOW! SEND CASH, CHECK OR MONEY ORDER.

Manufactured and distributed by INTERNATIONAL TWIST DRILL CORP. 816 Wyandotte, Rm. 626, Kansas City 3, Mo.

FREE—BIG CATALOG
HOBBY—PROFESSIONAL
MICROSCOPES

100 to 2000 POWER—$8.25 to $319.40 pages of fascinating information on microscopes, micro-hobby materials, telescopes and binoculars. SEND POSTCARD.


WORLD'S BEST SMALL TRENCHERS

Portable DITCH-WITCH digs 2" to 6" clean, even ditches to 36" depth in all types of soil. Complete unit self-propelled—ships 8 men. Four rugged models. Write for illustrated literature.

TIME CHARLES MACHINE WORKS
1620 B Street Perry, Oklahoma

Say You Saw It in Popular Mechanics

MAKE YOUR OWN FOLDING TABLES

IN MINUTES . . .
AND SAVE MONEY!

WITH TABLECRAFTERS' TUBULAR STEEL FOLDING TABLE LEGS

You simply screw leg assemblies to your table top. They're sturdy & economical. Won't collapse—yet fold easily for storage. For banquet, buffet, hobby, work and game tables.

COMPLETE KIT $9.95 FOR ONE TABLE
Send check or money order and we'll pay postage.

ATTENTION! SHOW THIS AD TO THE COMMITTEE OF YOUR CHURCH, LODGE OR OTHER ORGANIZATION.
THEY'RE ENTITLED TO SPECIAL DISCOUNTS.

TABLECRAFTERS 6713 CASTOR AVE., PHILA., PA.
THE MOST EFFICIENT WRENCH ON THE MARKET

for AUTOMOTIVE - TELEVISION
RADIO - INSTRUMENTS
and ASSEMBLY WORKERS

Grip Spintite Wrenches

...it HOLDS (NUT OR BOLT)
...it STARTS and TIGHTENS
...it RELEASES!

FINEST QUALITY STEEL SHANK AND SLEEVE
BRIGHT PLATED FINISH
STRONG PLASTIC HANDLE
SPECIAL SIZES AND MATERIALS TO ORDER

Write for catalogue

MAKERS OF THE ORIGINAL
SPINTITE WRENCHES
OVER 150 STYLES AND SIZES

STEVENS WALDEN Inc.
400 SHREWSBURY STREET — WORCESTER, MASSACHUSETTS

and Polish with Speed Way

Do-it-yourself
POWER TOOLS

I'VE TRIED THEM ALL—
THERE'S NOTHING THAT
DOES THE JOB LIKE
PLASTIC WOOD!

Plastic Wood is stronger—resists weather. Sands
down to a smooth, hard finish. Professional
craftsmen have preferred Plastic Wood for more
than 50 years because it takes paint, varnish
and other finishes best. Will not chip, crack or
peel...won't pull away! In cans and tubes.

In natural, white and 8 wood colors

PLASTIC WOOD

SPEEDWAY MFG. CO.
Builders of Quality Power
Tools for Over 40 Years
1863 So. 52nd Ave. CICERO 58, ILL., U.S.A.

MAY 1954
5.3 C.F.M.
Maintains 40 to 65 lb. pressure for CONTINUOUS
spraying (no waiting till tank keeps building up)
• NORDIX WESTINGHOUSE Twin-cylinder compressor
• BRIGGS & STRATTON 5 HP, 4 cycle, 1250 r.m.p. crank engine
• TWO independent air-mist nozzles for \(250 \text{ lb.} \) pressure, one controlled by regulator from 0 to 150 psi.
• Large Free-Gauge safety release Yuvar
• Automatic governor and overload keeps pressure constant without stopping engine.
• Hollow frame acts as air reservoir ensuring large supply of OIL-FREE air with absolutely no pulsation!
ALSO AVAILABLE same unit with 1-HP Electric Motor, 110-220 volt, 60 cy.,...
ORDER DIRECT FROM THIS AD! Satisfaction Guaranteed!
Send for CATALOG of Motors and Electrical equipment
ROBERTS ELECTRIC CO., Dept. 175, 849 W. Grand, Chicago 22, III.

NEW HULL AUTO COMPASSES
ARE EASIEST TO INSTALL
Greater accuracy and a patented, more positive method of aligning against magnetic interference have long kept Hull Auto Compasses first with America's motorists. Now, with the advent of a new vacuum cup mounting bracket with special adhesive, or the original clamp type, gives greater-than-ever ease of installation.
Write for local dealer's name, free literature
HULL MFG. CO. P.O. Box 246, DES WARREN, OHIO

ASSOCIATED
DIVING LUNG
Your Own
We furnish the parts and equipment.
Complete units $35.95 and $49.95
Write for literature.

FREE CATALOG! Underwater Swimming equipment and supplies

COMPLETE PORTABLE
OXYGEN RESUSCITATOR
Ideal for Ambulance, Home, Emergency, Fire, Police, etc. ...
Write for Literature...

a) Air & Oxygen tank, For Diving Lungs, etc. 285 cu. in.
b) Oxygen Masks, 2, Hydrogen masks, current dating, 100
DATENUMERATIONS. Wt. 12 lbs. D.P. 440.25 cts.
ed) Ed. Aggie Trg. Co., Dept. 9, Box 4525 South St., St. Louis, Mo.

PARTS FOR MILITARY TRUCKS
and JEEPS 4 & 6 WHEEL DRIVE. WRITE FOR PARTS CATALOG STATING MAKES
American AUTO PARTS CO.
1830 LOCUST. DEPT. P.M.
KANSAS CITY, MISSOURI

8 in 1 WRENCH

1 Only $4.98

8 Different 12-Point Openings
Small Head: 7/16, 1/2, 9/16, 19/32
Large Head: 5/8, 11/16, 3/4, 7/8

DASTCO INDUSTRIES LTD. 4447 W. FULLERTON CHICAGO 44, ILL.
Make up to $5 an hour with
EASI SHARP

Sharpens in your spare time sharpening scissors. We show you how to start makin-
good immediately. This is your chance to have your own business-
you could be a sale to retailers in less
time two months. A useful
item operate it. Weight
only 1 lb. Every house
lifter, tailor, dressmaker
money uses scissors and all need sharpening two in four times
a year. Don't let some one else get ahead of you. Write immedi-
ately to
SERR-EDGE MACHINE CO., 9731 Lorain Ave., Cleveland, Ohio

All-steel
DRILL PRESS VISE
3 1/2" Hardened Axes
Free Circular Postpaid
B. M. SYPPER CO.
204 Cherry St. Toledo 4, Ohio

REGULEVER for REGULATORS
FOR WELDERS, PAINTERS,
DRUGSTORES, HOSPITALS

Replaces thumb screw. Turn in to pressure desired. Turn on or
off with a flick of lever. In some cases, save up to 50%
on gas and oxygen.

REGULEVER enables oper-
ator to turn gas on or off
in one second, eliminating tiresome turn-
ning of knobs, screws, and handles. After
pressure is selected it remains the same. If not at dealers,
sent postpaid for $3.45. No C.O.D.'s. Please give diameter
and thread size of thumb screw, also effective screw length.
Available sizes 3/8", 7/16", 1/2", 9/16", 5/8" in fine and
coarse threads.

DEALERS WANTED all over U.S. - Very Attractive
Discount. Supply is absolutely unlimited. Mail your
order NOW to:
STRONG MANUFACTURING CO.
P.O. Box 6175
Albuquerque, N.M.

Use good files on your
DO-IT-YOURSELF
PROJECTS

You really get the urge to make and
repair things when the files you use
are Nicholson or Black Diamond.
There's a rare crispness in their bite,
economy in their long-lasting
sharpness, satisfaction in knowing
that you have the world's finest.

The man in the picture is finish-
ing off a pair of hardwood book
ends, but even his modest assort-
ment of these good files can take
care of scores of jobs around the
house, garage and workshop.

It's worth while going out
of your way to get Nicholson or Black
Diamond files, but most good hard-
ware and tool-supply houses have
them ... because they know that
"once a customer, you're always
a customer."

FREE BOOK,
"File Philosophy,"
will help you on
your Do-It-Your-
self projects. It
has 48 illustrated
pages on kinds, use
and care of files.
Send for it.

Nicholson File Co.
22 Aspin Street
Providence 5, R.I.
(In Canada: Nicholson File Company
of Canada Ltd., Fort Hope, Ontario)

Nicholson Files for Every Purpose

NICHOLSON
U.S.A.

Nicholson File Co.
22 Aspin Street
Providence 5, R.I.
(In Canada: Nicholson File Company
of Canada Ltd., Fort Hope, Ontario)

NICHOLSON
Files for Every Purpose

MAY 1954 295

Copyrighted material
Use brushes with bristles of Du Pont TYNEX nylon

You'll find "Tynex" nylon bristles pick up a full load of paint every dip and brush it out easily in a uniform coat. Outside or in, brushes bristled with "Tynex" help you get work done fast. "Tynex" bristles simplify brush upkeep, too. They are quickly cleaned by any commercial cleaner and last up to five times longer than other bristles.

Send for free booklet on "How to Choose and Use a Paintbrush Bristled with "Tynex" Nylon." Write: E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Dept. PM-5, Wilmington, Del.

"Tynex" is the new trade-mark for genuine Du Pont nylon bristles.

Lighten work on outside jobs...

Pointers on painting exterior walls: Make sure surface is dry and temperature between 55° and 90°. Remove loose paint with scraper or wire brush. Fill cracks and holes. Dust thoroughly. Select brush 3" to 6" wide and always...

Make BIG SAVINGS with FACTORY-DIRECT PRICES!

Painters on painting exterior walls: Make sure surface is dry and temperature between 55° and 90°. Remove loose paint with scraper or wire brush. Fill cracks and holes. Dust thoroughly. Select brush 3" to 6" wide and always...

Use brushes with bristles of Du Pont TYNEX nylon
HOMEMADE MIRACLES IN METAL!
Make these and 101 other projects with amazing
REYNOLDS DO-IT-YOURSELF* ALUMINUM

No special equipment needed . . .
use standard hand or power tools
Who says the Age of Miracles is passed?
Right in your own home you can now perform miracles in metal that will simply amaze you. The secret is Reynolds Do-It-Yourself Aluminum. You can saw it, drill it, plane it, joint it just like wood, yet it's far, far easier to use.

There's a form of Reynolds's Do-It-Yourself Aluminum for almost every project. It comes in sheets, tubes, rods, bars, angles, storm sash and screen sections and handy fasteners. Use only Reynolds Do-It-Yourself Aluminum with the special Seal on every piece. Other types of aluminum may harm standard tools.

* T. M. Reynolds Metals Company
**T. M. Reg. Easi-Bild Pattern Company

REYNOLDS METALS COMPANY
2494 South Third Street, Louisville, Ky.
Please send me the following PLANS and free booklets (check as desired). I enclose $____________ in money order or coin (no stamps, please).

- Easi-Bild Pattern #550 for WINDOW VALANCE—25c
- Reynolds Plan #108 for TOY HOPPER—25c
- Reynolds Plan #102 for DRAWER-IN-A-DRAWER (includes plans for nine other projects) — 25c
- Instruction Folder for SCREENS, STORM SASH — FREE
- How-To Booklet—FREE
- Easi-Bild Pattern #541 for PLANTER-LAMP—50c

Name:__________________________
Address_________________________
City___________________________ Zone______ State_________________________

Reynolds Do-It-Yourself Aluminum is also available in Canada

MAY 1954 297
Favorite of home owners and craftsmen for 20 years! SPEEDY SPRAYER gives your work that professional paint finish everyone admires. Sprays paint, enamel, varnish, lacquer, etc. . . . 4 to 7 times faster than hand brushing! Lightweight, portable, uses any 1/4 HP motor. Improved diaphragm principle assures clean, oil-free air. You'll find dozens of time and money saving uses for SPEEDY SPRAYER, including spraying insecticides 2-4-D and DDT. Complete outfit, without motor, only $36.50.

At leading hardware, lumber, and auto supply dealers.

FREE write for handy booklet "How to Spray."  
W. R. BROWN CORPORATION  
2635 N. Normandy - Chicago 35, Ill.

New Big Barrel Micrometers Have 7 BIG Features

1. Easy-to-reach ratchet cap.
2. Big, sensitive direct-reading thimble.
5. Easy-to-read markings widely spaced on big barrel.
6. Rapid reading—big numbers mark every thousand.
7. Slip-proof black crankcase finish on frame.

Designed by Lufkin

for Faster, Easier, More Accurate Measurements

Send postcard for your own pocket micrometer and catalog of new Lufkin micrometers. Announcement of new micrometers.
Your most useful shop tool . . .

**DESMOND-SIMPLEX VISE**

Extra features . . . no extra cost

The Desmond-Simplex Utility Vise is the handyman's "third hand"—for easier, faster work—for sure results, smooth finish. At no extra price, Desmond has extra features: steel slide, enclosed screw, shoulder-fit jaw inserts, pipe jaws (replaceable on larger models), cut-off tool, anvils with horn, 360° swivel, non-pinching type handle. Ask your hardware retailer for a Desmond-Simplex Utility Vise. Write for folder showing vise applications in home, garage, or farm shop.

The Desmond-Stephan Mfg. Co.
173 Walnut Street, Urbana, Ohio

**Motor-Generator WELDER**

No Separate Motor or Engine Required

Just Plug it in! REG. VALUE $350.00

• WEIGHT: 140 AMPs.
• 85.00

For Heavy Work to Lightest Fine Job! on a PORTABLE roller stand, or can be attached to your job. "Braun" hand-crank General-Purpose Motor-Generator. Smart 1 HP. 250 to 350 amp. DC output current up to 150 amp. 500 amp. at 12.3 volts. 4-input terminals—Ground, Lead, Pigtail, and Pigtail. Welding range from 25 to 300 amp. Ability to handle 300 to 400 amp. of welding current. Has 3 welding ranges from 0 to 100 volts. Notice: requires power unit to Crowd Sound, Buff and Finish (with attachments included).

ACCESSORIES AT A BUY: Two 12" Cutters. Ground Column. 200 amp. electrode holder. Ampl. electrode holder. Helmut. Simplified Instruction. COMPLETE OUTLET (mfg. wt. 85 lbs.) only...$98.50 p-k-s. FULLY GUARANTEED! You can't go wrong. Send for our FREE Catalog of Motors and Electrical Equipment.

ROBERTS ELECTRIC CO., Dept 178, 849 W. Grand, Chicago 22, Ill.

**NEW! Every Electric Drill**

**A Powerful PORTABLE JIG SAW**

"ARCO JIG SAW" HAS SAME CAPACITY, CUTS AS FAST AS SAWD COSTING $50 & UP!

DOES WORK OF JIG, KEYHOLE, COPING, BAND, RIP, CROSSCUT, HACKSAW.

HAS EXCLUSIVE, BUILT-IN AIR BLOWER

Here for the first time is a Portable Jig Saw that attaches in ONE MINUTE to any 1/8" electric drill. It can handle any project from the smallest to the largest, cuts openings without a starting hole. Cuts intricate patterns, circles, etc. in wood, wallboard, plastics, metals.

"ARCO JIG SAW" is a powerful, lightweight tool that is easy to handle because of its Right Angle Drive. Strong Safety-Take & Wear Drive Clamp makes it a vibration-free unit.

No. 505—Saw extra blades for wood, metals, etc. . . . . . . $1.95

BUY THE BEST—save your hardware dealer now! If not available, try "ARCO JIG SAW" on our 10-DAY MONEY BACK GUARANTEE. Send it today. A clear guide-line to use in home or shop.

ARROW METAL PRODUCTS CO.

DEP. P.M.-4, 140 WEST BROADWAY, NEW YORK 13, N.Y.

---

**Pine panel your kitchen!**

**DO-IT-YOURSELF**

it's easy with Gold Bond Fireproof Grainboard!

---

**GIVE** your kitchen that warm, cozy pine-paneled look with Gold Bond Gypsum Grainboard. It has all the expensive beauty of fine wood paneling, at a fraction of the cost. Sturdy, fireproof Grainboard is available in two convenient widths—4 ft. panels or handy 16-in. planks—in Knotty Pine, Bleached Walnut and Dark Walnut. It's ideal for finishing off old walls or adding a den or game room.

Lightweight and easy to work, Gold Bond Gypsum Grainboard goes up fast—covers large areas at a time. A hammer and knife are the only tools you need. Cuts easier than wood—just score and snap to fit.

In new construction, Gold Bond Gypsum Grainboard can be nailed to the studs. Or, in remodeling, you can nail it directly to old walls or over furring strips.

Get your FREE Do-It-Yourself instruction folder. Send for it today! National Gypsum Company—Buffalo 2, N.Y.

**MAIL COUPON TODAY!**

NATIONAL GYPSUM COMPANY
Dept. PM-54, Buffalo 2, N.Y.

Please send me a free copy of your Do-It-Yourself Wallboard Application Folder.

Name: ___________________________

Address: _________________________

City: _____________________________

State: ___________________________

---

Copyrighted material
BUILD YOUR OWN POWER TOOLS

GILL-BILT 10-in. TILT/ARMB SAW

GILL-BILT 12-INCHE BAND SAW

GILL-BILT OVERRULED

Objections

Fish love the SILVERTROL, the Electric Trolling Motor. It's slow enough to give them a chance to catch your hook. No noise or exhaust to scare them away. The SILVERTROL is ideal on waters where gasoline outboards are prohibited. Operates on standard 6 or 12-volt automobile batteries.

LIGHT, EASY TO CARRY AND INSTALL.

1. Two Speed Switch
2. Tilt Grip
3. Transom Adjustment
4. Chromed-plated Steel Column
5. Fixed Steering Adjustment
6. 5-Adjustment Torsion Bracket
7. 2-Conductor Rubber Cable with Speed Clips

$74.50

SILVERTROL ELECTRIC TROLLING MOTOR

F R E E B o o k l e t...

Silver Creek, N. Y.

Please send me name of nearest dealer and a copy of your new illustrated booklet, "Your Guide to Good Fishing."

Name ____________________________
Address __________________________

GILL-OUM POWER TOOLS

you can improve... protect... beautify

... your home with everlasting

ALUMINUM WEATHER CONTROL PRODUCTS

Aluminum products never rust or rot—seldom need repair, always look beautiful. Once they're up—they're up for good—your good!

ALUMINUM COMBINATION WINDOWS

No chinking or storing with 3 TRACK operation plus Velgidades Insulate—protect year 'round.

ALUMINUM COMBINATION DOORS

Storm door in Winter, Screen door in Summer. Enduring privacy and protection for every home.

ALUMINUM AWNINGS and CANOPIES

Full ventilation, excluding "Foggy Lights" modern horizontal lines and bright rainbow colors! Aluminum products are easily and quickly installed.

ALUCRINT CORPORATION OF AMERICA

Dept. GF10, Milwaukee 14, Wisconsin

ALUMINUM at Canada, Ltd., Windsor, Ont.

301
NOW! Meet the Amazing turtle wax family!

turtle wax AUTO POLISH
TURTLE WAX, the World's Finest Auto Polish! Only TURTLE WAX cleans, polishes and protects your car with a brilliant HARD SHELL FINISH, all in one easy operation! Full year's supply, only $2
(Fair Trade)

turtle wax FURNITURE POLISH
Now! Transform old furniture into NEW in minutes, TURTLE WAX cleans, polishes and PROTECTS furniture with a rich, lustrous HARD SHELL FINISH. Full year's supply in the new NON-BREAKABLE Plastic Squeeze Bottle, only 98c
(Fair Trade)

tommy turtle BICYCLE POLISH
Tommy Turtle Cleans, Polishes and PROTECTS bicycles with an amazing HARD SHELL FINISH. Removes rust...protects all chrome surfaces. Full year's supply, only 49c
(Fair Trade)

Only Turtle Wax Products give you a HARD SHELL FINISH
Available at leading stores everywhere.

ace of Aces in LOW COST transportation
Cushman
is the top card in the transportation deck for speed, power—low cost.

operation. Ride it to work, for sport, school, any errands, deliveries. You're set to go! No traffic or parking worries either. And total operating cost LESS THAN A PENNY A MILE!

See your nearest Cushman dealer for FREE demonstration.

CUSHMAN MOTOR WORKS, INC.
819 No. 21st St., Lincoln, Nebraska

COMPRESSORS—PAINT SPRAY UNITS
CASH WITH ORDER WE PAY FREIGHT

PORTABLE COMPRESSOR UNIT
WITH 22 GALLON TANK
Hv. duty, 1/3 h.p., copper coil AC motor, 710x625x1325 in. gas capacity. Complete with rubber lared wheels, all valves, gauge, cord, plug, all tanks and tire clump. 100-800 lb. kits. Shipped wt. 86 lb.
UNASSEMBLED...$92.95 ASSEMBLED...$109.50

PORTABLE PAINT SPRAY UNIT
Hv. duty, 1/3 h.p. AC motor, 710x625x1325 in. Piston type compressor. Unit with all valves, but atom. gun, quart cup, 20 ft. hose, carrying handle. Complete ready to use. 100-800 lb. kits. Shipped wt. 66 lb.
UNASSEMBLED...$92.95 ASSEMBLED...$72.50

WELLWORTH COMPRESSORS
Model 800
As in above unit, except 1/4" stroke, 710x625x1325 in. gas capacity. 2.2 lb. air up to 1350 lbs. Use with 1/3 h.p. motor.
$20.50

Model 373
As in above unit, except 1/4" stroke, 710x625x1325 in. gas capacity. 4.4 lb. air up to 1500 lbs. Use with 1/3-1/2 h.p. motor.
$29.95

Ship wt. 14 lb.

FLOCK GUN & DUST SPRAYER
For dusting plants, etc. Rare to use, works off pressurizer. 14" in length. Sprays insecticides, powders.
$2.95

Also use for hub, gun, 2 lb.

V BELT CLUTCH
Takes starting load off engine or motor. "A" belt, 2 1/2" inside diameter. 500 lb. pull, 1 lb. 98c. S refute, 2 1/4" wide, 2 1/2" high, 6" long, 1 lb. 90¢. Blanking for 5" shaft 50¢

$8.00

ALL PRODUCTS CARRY 1 YEAR MONEY BACK GUARANTEE
SEND FOR FREE CATALOG DEPT. DS

WELLWORTH TRADING CO., INC.
1832 S. WABASH AVE.
CHICAGO 16, ILL.

POPULAR MECHANICS
The NEWEST PLIERENCH
The EIFEL...1000%...GEARED-PIVOT Plierench!

It has the FIRST and Only Scientific "OMNI-GRIP" that Holds Any Shape in Various Positions—gives Parallel and Near-Parallel grips in 7 Positions...has "Non-Vbe" for Kind-of-Split on Nuts, Bolts, screws, etc...has Extra Deep Thread, 1/4"...

Sets of Toothed-Vs of Various Widths and Angles give Universal grips with Changeable-Style Hold-down...Crossed-Vs to make SPRING, 1/2" to 3/4", of 0°-180°, 1/32" wire, and 2...for Other jobs Most Other tools just can't handle.

APPLIANCE & CIRCUIT TESTER
NEW SAFE TESTING WITH POWER OFF

KREST TESTER tests for shorts, grounded circuits, open circuits—safely with power off! Practical, safe, compact—ideal for home mechanic, hobby shop, workshop, garage.

SAVES YOU MONEY! Helps you "Do It Yourself"—repair your own home appliances, motors, generators, auto circuits, switches, etc.

HELPs PREVENT FIREs caused by faulty wiring—tests house wiring, lamps, fuses, etc. Dealer and agent inquiries invited. Only $2.95 ppd. Send check or money order today to—

KREST PRODUCTS CO. Chicago 7, Illinois

SENSATIONAL MOTOR VALUE BRAND NEW FACTORY INSPECTED—PERFECT CONDITION, built for home usage for use in Buffing and Grinding, Fans, Small Lathes and other Machine Tools, Compressors, Saws, Mixers, Work. Threading, and many other utility work. 1/2 HP, 25,000 RPM, 1/3 HP at 3000 RPM. Complete Kit includes Motor, Speed Control Box and Key. SPECIAL OFFER— ONLY $9.45

FREE 60-PAGE HANDBOOK—105 pages on everything you'll need to do the job right. Send for your copy today.

HOBART Brothers Co., Box M-54, Troy, Ohio Phone 21223
One of the world's largest builders of arc welders.

Say You Saw It in POPULAR MECHANICS

Low Cost "Husky Boy" Welds Anywhere! Earns BIG PROFITS!

Cash in on the profitable outside emergency repair jobs with the

Air Cooled, Engine Drive
"Husky Boy"

Lightweight, easily portable, "Husky Boy" 200 amp, Type A.C. welder. For in or out of shop welding you'll be years of dependable service at a low-investment cost. Welder, wheels and handles available at slight extra cost.

Build Your Own" A.C. welder, A.C. power. Operates away from power lines. Ask for details on generator only.

Mail this Coupon!

Mail Coupon today

This amazing pump SAVES you plenty

NO TANK

Goulds PUMPS, INC., SENeca FALLS, N.Y.

Mail this Coupon today

Goulds BALANCED-FLOW JET is a full-capacity, shallow-well water system—yet has no costly tank, fewer fittings to buy, costs dollars less to install. Exclusive self-adjusting capacity delivers exact flow of water wanted at all outlets at the same time, within capacity!

Costs less to buy...less to install

You save TWO ways—and enjoy performance found in no other pump at any price! Trouble-free, quiet, only one moving part—can't lose its prime.

Small and compact—is it any way easier and quickly? Send for facts...

MAY 1954 303
FASTEN FIXTURES QUICKLY EASILY!

U-S-E Golden "Lokite" Hollow Wall Fasteners are easy to use for fastening all types of fixtures to walls and ceilings. Drill hole, insert fastener with fixture attached (Fig. 1). Tighten with screwdriver (Fig. 2).

Assures a safe, secure mounting that will be sure to stay put.

For solid walls, ask for U-S-E Multi-Diameter Wood Screw Anchors.

Look for the U-S-E Display at your hardware store.

U.S. EXPANSION BOLT CO. DEPT. P.M. YORK, PA.
HOW often have you been stumped with pliers that wouldn't open wide enough? Then here's the answer. And the rib points on these are full forged to assure strength exactly where required. Jaw surfaces extra-hardened by electronic induction for longer wear.

Look for the name "UTICA® No. 507." Your dealer has them or can get them for you. Size 10", only $2.85.

U - Ti - CA
DRoP FORGE & TOOL CORP.
Utica 4, N. Y.
JOBS AVAILABLE FOR TECHNICALY TRAINED PERSONNEL

SAVE 4% 85% on GOVT. SURPLUS
NEW 7 to 1 HANDY HOIST
Small enough to hold in one hand, yet strong enough to lift 1000 pounds. Weights only 1 lb. Consists of 2 pulley blocks with self-lubricating bearings, 100 feet of NYLON cord, 2 NYLON slings and canvas carrying bag. Handy around the Farm, Home, Shed, etc. a Hunters' Gone Hoist, etc. Carry one in your car for anywhere.

FREE/Emergency Flashlight...1250
Navy Sound-Powered Phone Set
An Ideal emergency communication system because it requires no additional power supply. Originally used by NAVY for flight deck and gunnery control. Can be used for office-telephone, hospital, bank or garage. No batteries, no electricity, anywhere. Complete set includes 2 horn sets with a central power source and a battery and flasher. Price: $9.95.

ORDER FROM THIS AD — Pay by Money Order or Check, P.O.A. accepted from P.O.S. firms. 1/2 deposit with C.O.D.'s. Prices FOB Los Angeles.

WORLD'S MOST AMAZING BARGAIN CATALOG
320 PAGES FULLY ILLUSTRATED
Packed with sensational VALUES in WAR SURPLUS, FACTORY CLOSE-OUTS and GENERAL MERCHANDISE!
Thousands of items for the PROFESSIONAL, GADGETEER, etc., includes: stamping, Power Tools, Microscopes, Binoculars, Precision Instruments, On-and-Sport Equipment, Telephones & Cameras, Hardware, From Rubber, Industrial Tools, aircraft supplies such as: over 20,000 Hydraulic Cylinders in 61 sizes & types, plus Hydraulic motors, pumps, fittings, valves, vessels, etc., as well as hundreds of Standard Gaskets and parts.

To cover the cost of HANDLING & MAILING—
MONETARIED with your first order!

PALLEY SUPPLY CO.
2714 E. VERNON AVE., DEPT PM-S
LOS ANGELES 26, CALIF.

THE ONLY WOOD GLUE THAT'S WATERPROOF

For home craftsmen who want the best, a resorcin resin is the only cold-setting glue that meets U.S. government specifications for marine laminating. Defies cold or boiling water, mold, fungus, solvents, mild acids and alkalis, extreme heat or cold and continuous outdoor exposure. Use for boats, toys, outdoor furniture — wherever strongest possible waterproof bond is desired. Write for folder.

ELMER'S
OV.H.C. Resorcin Resin
WATERPROOF GLUE
THE BORDEN COMPANY, CHEMICAL DIVISION, DEPT.
PM-84, 350 MADISON AVENUE, NEW YORK 17, N. Y.

Darra-James POWER TOOLS
Better Than Ever
8" and 9" Tilting Arbor SAWs

More For Your Money!
Better in every way ... larger work tables ... sturdier frames ... newest mechanical improvements. Darra-James engineering department is constantly working to give you more for your money.

WRITE FOR CATALOGS
TOOLKRAFT CORP., SPRINGFIELD 1, MASS.

POPULAR MECHANICS
Here's proof that CORBIN padlocks are the safest, strongest you can buy!

Mr. Robert M. Cheeler, 10721
Tabor St., Los Angeles, Cal.,
writes: "Burglars placed two .45 cal.
bullets into my Corbin padlock at
vital points to force it open—
without success! My congratulations
to you on the production of such
high quality in a popular priced
article."

When YOU want to be sure . . .
safe . . . really secure, insist
on a CORBIN padlock.

55c up at better hardware stores everywhere.

Inexpensive
—but what a buy!

CORBIN CABINET LOCK
Division
The American Hardware Corporation
New Britain, Connecticut, U.S.A.

FREE! for every
Household
Handy man!

101 ILLUSTRATIONS
AND INSTRUCTIONS

Anything made of wood—and this folder illustrates 101 items—should have the water repellency, resistance against warping, swelling and shrinking—and immunity against termites and decay—made possible with Woodlife.

WOODLIFE is the original water repellent wood preservative that should be on every handyman's work shelf—along with this folder which shows how to apply Woodlife to 101 household wood-working projects.

Ask your lumber, paint or hard-
ware dealer for Woodlife and for
your copy of this informative "do it yourself" folder or write,

Protection Products MANUFACTURING COMPANY
Dept. O
Kalamazoo, Michigan

When you repair, remodel or build, ALWAYS ask for Woodlife treated lumber!

Simplest, Lowest-Cost
RADIANT HEAT REFLECTOR!

Shut out Summer Heat, Save Winter Fuel—with

REYNOLDS ALUMINUM
REFLECTIVE INSULATION

This low-cost, readily installed aluminum foil bonded to tough kraft paper in walls or attic provides real insulation. Keeps winter heat in, summer heat out! Costs only about $40 over ceilings of average 6-room house! Clean, odorless, pliable. Perfect vapor barrier, fire-re-
tardant. Readily tacked or stapled over ceilings, under rafters, between wall studs, under ground
floors. Rolls 250 sq. ft., 25" x 33", 36" wide. Makes
great reflectors for radi-
ators, photolights, etc.

Mail coupon for free
samples.

ALUMINUM GUTTERS

Easy to install, slip joints
—no soldering, Non-staining.
Cost much less than
other rustproof materials.

Aluminum Nails. Rustproof,
ever stain, stay tight.

See your Building Supplies or Hardware Dealer

REYNOLDS Lifetime ALUMINUM
BUILDING PRODUCTS

SEE "MISTER PEEPERS," starring Wally Cox, Sundays, NBC-TV.

Reynolds Metals Company
Building Products Division
2035 So. Ninth St., Louisville, Ky.
Send full information and FREE SAMPLES of Reflective Insulation. Also full details about

☐ Gutters & Downspouts ☐ Nails ☐ Flashing

Name
Address
City__ State__

MAIL THIS COUPON NOW!
**VISE-GRIP WRENCH**

DOES MORE JOBS EASIER THAN ANY OTHER TOOL!

True stories like this show why Vise-Grip is the HANDIEST tool of all! A squeeze of the hand locks these powerful jaws onto work with 70 percent less hand force than a screwdriver. No more hand fatigue, no more slipping. The tool you can't keep from running. What an all-around "tool kit" it is! — M. C.

**Wheelhorse**

Makes gardening easier — adds to your leisure!

FREE Catalog! Send now!

Only $149.50 2 h.p. model

You'll buy a Wheelhorse when you compare price, construction...design and ease of handling! Easy to change attachments help you plow, cultivate, harrow, haul, spray, mow, saw, cut, roll, plow snow. Guaranteed! 2%, 3% and 3½ h.p. models. Write:

POND COMPANY

2642-P5 Dixie Way North, South Bend 17, Ind.

**This Can Save Your Life**

THE FINEST SAFETY DEVICE EVER INTRODUCED TO THE AUTOMOTIVE INDUSTRY

TRACTION MASTER

- Eliminates Drive Line Snap
- Gives More Stability on Loose Ground
- Stops Your Car up to 40%
- Sudden Forward Weight Transfer in Quick Up To 50%
- Prevents Sudden Forward Weight Transfer in Quick Up To 50%
- Increases Braking Life
- Increases Tire Life by 50%
- Stabilizes Your Car if a Blowout Occurs
- Stabilizes Your Car on Rough Roads

**How Traction Master Works**

The rear wheels are the only things that hold the rear end under your car, and the flexible spring cannot cope with the torque demanded. Down the drive line is the Traction Master's power to move the rear forward the rear end wants. It rotates around its own axis. The rear wheels actually slide in the rearward half of the spring causing the rear wheels to spin. Result: Loss of power and increased tire wear. Traction Master PREVENTS THIS ACTION! When the brake is applied, the opposite happens. The rear end is thrown downward and its own axis causing the rear half of the rear tire to bend in the upward arc. The rear wheels become unlocked with weight, and move the rear forward. Result: More rear wheel alignment and excessive tire wear. Traction Master PREVENTS THIS ACTION!

**Eshelman Boat Trailer Only 79**

Write for Catalog

American, Shipwreck model with Hi-Speed winder, tire, length, color, etc. Write:

ESHELMAN CO., Dept. BT-105
114 Light St., Baltimore 2, Md.
333 N. Michigan Ave., Chicago 1, Ill.;
777 Hollywood Blvd., Los Angeles 26, Calif.

**DRAFTING FURNITURE FITS TIGHT BUDGETS!**

It costs less to buy the best when you buy direct! Select your exact equipment for any office, any space, any requirement — lovely to look at too! Free data.

**Easy Money For You!**

Sell the Wheelhorse.

Dealerships open! Write today.

**Equip Your Car With An AIR CONDITIONER**

BUILT FROM COMPLETE KIT FOR $164.70

Drive in cool comfort. Banish dust and noise. Easy-to-install kit includes 2-ton capacity compressor and all essential parts — FREE LITERATURE.

SLEE EY CO. DEPT. 100, CHICAGO 18, ILL.

**Make Your Own Fountains, Lakes, Rivers, Window Displays**

With New Miniature Water Pump

Here's a real asset for window displays, Xmas trees, lakes, or the home fount. Pump only 1/8" high-1/4" wide. Threaded for slip or sink, 1/16" rubber tubing. Operates in 2" of water. 1/8 HP. $6.00, 1/4 HP. $10.00. Per jr. Furred complete — Ready to use. Guaranteed or your money back. Ends. $9.75

MOORE MANUFACTURING COMPANY

Swedesboro, N. J.

**Say You Saw It in Popular Mechanics**

**Auto-Master Corporation**

165 Eleventh Street (3rd FL), San Francisco, California

**Make Your Own Lawn Mower**

**Power Lawn Mower**

With this DRIVE CUTTER ASSEMBLY

For those who desire to build their own power mower. Complete with 20" blade and double ball-bearing drive, Only $13.95.

Send check or M.O. Add 50c to cover handling and shipping.

**ATLAS KEEN MOWER**

229 Southwest Blvd., Kansas City 6, Mo.

**POPULAR MECHANICS**
SOUTH BEND 13" Precision Lathes

for accurate, low-cost machining

These lathes are popular in the toolroom, production shop, or wherever varieties of precision parts are machined. Users prefer them for their simplicity and practically effortless handling. Job set-ups and tooling changes are made so quickly and easily that down-time is held to a minimum. A very complete line of attachments simplifies tooling. Send coupon for complete information.

SPECIFICATIONS

Swing—13½" over bed and saddle wings, 8" over cross slide.

Distances Between Centers—28¼", 40½", 52¼" maximum.

Collet Capacity—1" maximum (Collets interchangeable with South Bend 10"-1" Collet, 14½", 16" and 16-24" lathes).

Spindle Bore—1½".

Spindle Speeds—Eight, 40 to 940 r.p.m., approximate.

Power Longitudinal Feeds—48 R.H. or L.H., .0015" to .0641".

Power Cross Feeds—48, .0006" to .0315".

Thread Cutting—48 R.H. or L.H. pitches, 4 to 224 per inch.

Send For This Book!
Every machinist needs "How to Run a Lathe." This helpful handbook contains 128 pages and over 365 illustrations and diagrams on all phases of lathe operation and care. Price postpaid 50 cents.
There goes the dawn fishing patrol! But this time not a soul was awakened to curse them on their way! The difference is Whispering Power, by Evinrude... and light-sleeping cottagers will tell you it's the greatest step forward in outboard design of our time. We'd like you to see, and hear, and TRY it—this new, quiet, vibrationless Fleetwin Aquasonic... for the biggest thrill of all is reserved for the man who holds the steering handle! There's no "wrist tingle"—no dancing tackle box—no hull quiver! And you find you can talk, at last, without letting the world in on your conversation! And there's so much more—big-motor features like Gearshift, and Cruis-a-Day Tank, and Auto-Lift Hood. And big-motor performance that planes your boat! 7.5* horsepower—only 49 pounds!

See your Evinrude Dealer—he's listed under "Outboard Motors" in the yellow pages of your phone book. Let him show you the complete Evinrude line for '54. Four great motors—smoothest, quietest in each power class—3 to 25 H.P.—the right motor for every boat! For free catalog write Evinrude Motors, 4353 North 27th Street, Milwaukee 16, Wisconsin.

In Canada, manufactured by Evinrude Motors, Peterborough.
"Yessir! the Ol' Redhead has changed to CAMELS"

(choice of many of his friends in the Major Leagues!)

I'VE TRIED 'EM ALL. I'VE CHANGED TO CAMELS FOR MILDNESS AND FLAVOR THAT AGREE WITH ME BEST. YOU TRY CAMELS, Y'HEAR?

Red Barber

RED BARBER, Famous Sports Announcer

MEL PARNELL, Red Sox pitcher, is a long-time Camel fan. "I'll never change!"

RED SCHOENDIENST, Cards' second baseman, says, "I'll take Camel's mildness!"

TED KLUSTEWKSI, Cincinnati Reds' slugger, says: "Camels are richer!"

WARREN SPANN, Braves' hurler says, "I'm for Camels' mildness!"

GRANNY HAMNER, Philadelphia Phils, says Camels have the "best flavor!"

Camels agree with more people than any other cigarette!

CAMELS FIRST IN SALES—NOW LEAD BY RECORD

50% 10%

Year after year, Camels increase their popularity—lead over the second-place brand! Listen to Major Leaguers—listen to smokers everywhere—and you'll know why more people get more pure pleasure from Camels' mild, flavorful blend of costly tobaccos! Try Camels for 30 days — and see!