

OCT. 1957

BRITISH FORD — HOW GOOD?

35 CENTS

# POPULAR MECHANICS

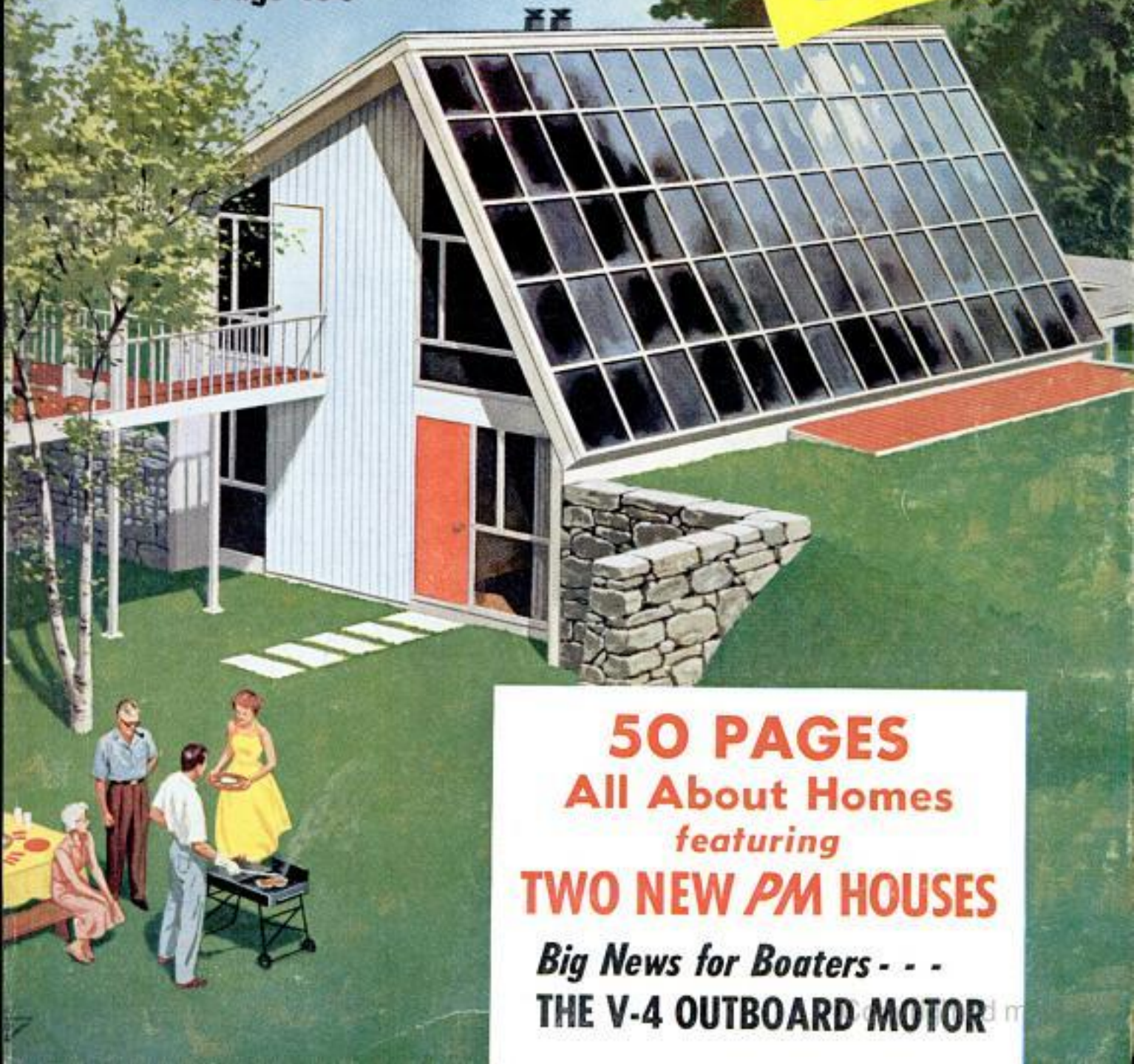
## MAGAZINE

WRITTEN SO YOU CAN UNDERSTAND IT

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**BIG ANNUAL  
HOME  
SECTION**

**M. I. T. Solar House**  
—Page 158



**50 PAGES**  
All About Homes  
*featuring*  
**TWO NEW PM HOUSES**  
*Big News for Boaters - - -*  
**THE V-4 OUTBOARD MOTOR**



*it's Evinrude's  
revolutionary*

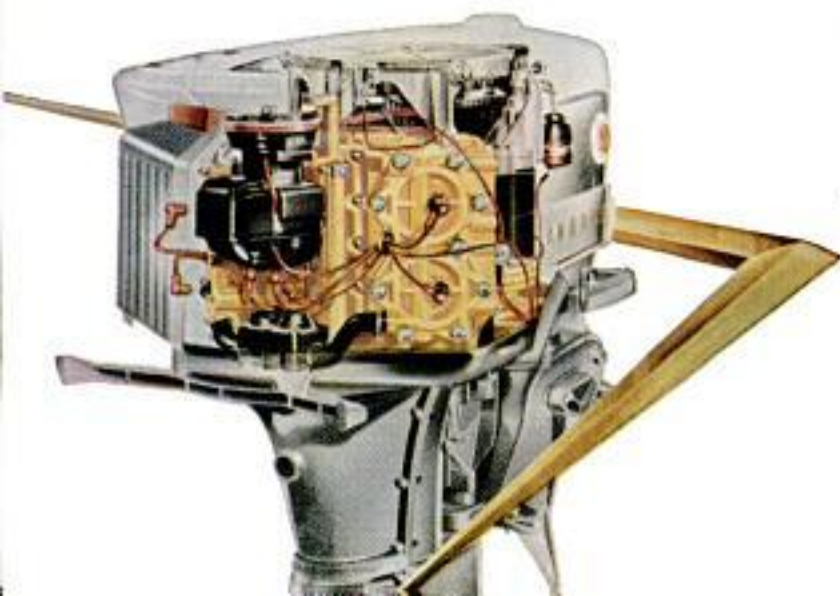
# STAR

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outboard motor  
ever built

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OCTOBER 1957

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## Next Month...

ONE YEAR AGO PM's Detroit Listening Post predicted:

A battle rages between those who want dual headlights vertical and those who want them horizontal. The obvious compromise is diagonal. Don't laugh—one company is playing with oblique dual lights.

We won't brag, but diagonal headlights are here. You'll see them (and others) when we present 14 new 1958 cars in November.



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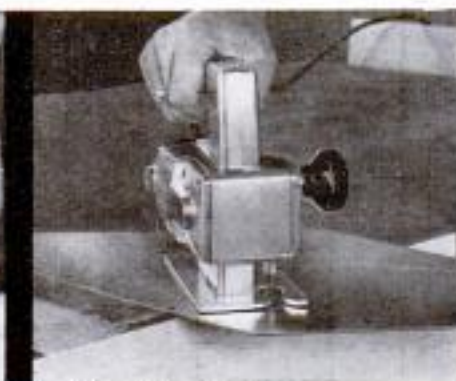
(Handy wall kit with accessories, \$5 extra.)

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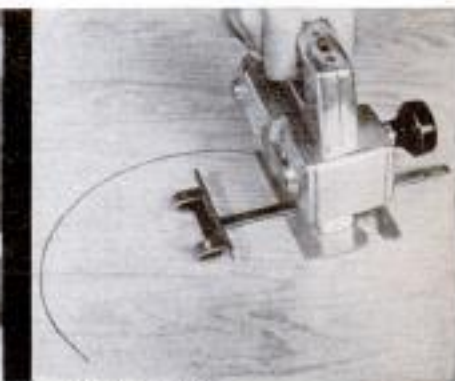
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## ACROSS THE DESK



### To the Editor:

In the August issue, page 162, illustration 1 is an object for which the magazine states that its identity is unknown. It is quite similar to a smoothing-iron heater my mother used to use. It is placed on top of a coal or wood-burning stove and the



irons are placed inside with the handles sticking up through the slots; the lid with the slots in it helps keep the handles cool and also keeps the heat in. The one my mother had held two irons that slipped in slots with a door on the end, all made of cast iron.

Lt. Comdr. George W. Bedford,  
Remo, Va.

### PM's House Planners

Gerald A. Perkins, Charles F. Norris and Miles F. Mulloy (left to right), the congenial architects who designed the beautiful PM Traditional House on pages 145-146, are not without honor in the Chicago suburb where they toil. They can



(Continued to page 8)



To those who want to enjoy  
an ACCOUNTING CAREER



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

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

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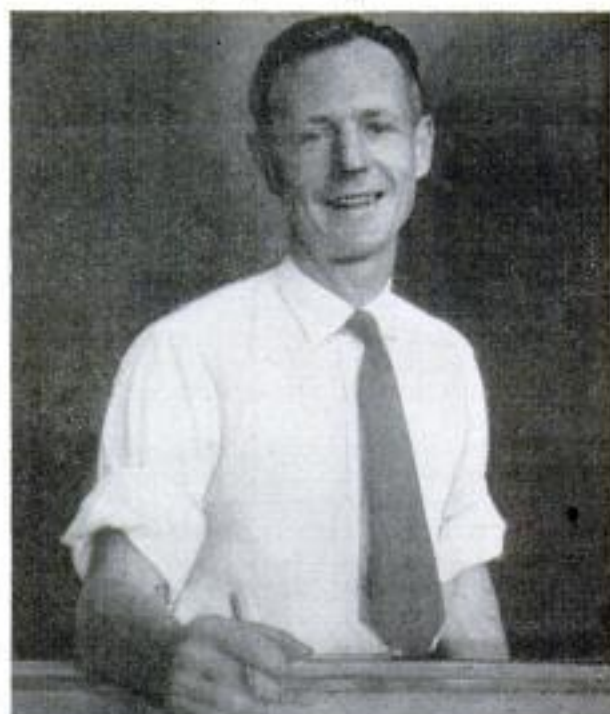
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(Continued from page 6)

boast that they take care of their fellow villagers from cradle to grave with buildings of their design that include a medical-professional building, scores of homes, a church, new fire station and an Old English style utility structure in the cemetery of Glen Ellyn. Although their firm is only six years old and its members are all in their 30s, the lights in their offices burn far into the night keeping ahead of clients' demands. A glance at the PM Traditional shows why. They also do modern designs. Perkins is the design expert, Norris looks after structural engineering and Mulloy the mechanical equipment. "Of course, we all overlap in the other fellow's field," said Perkins, "but nobody seems to mind."

John Ridley (below), the well-known



architect, who did the striking PM Modern House, works alone. He is a graduate of the University of Toronto where he won the R.A.I.C. silver medal. If his house has an international flair it's because he has studied in Sweden, England, France and Italy and worked in architectural offices in London and Gothenburg. He has been in Seattle since 1946. Among his awards and prizes is an Honor Award for 1953 from the American Institute of Architects.

## To the Editor:

After reading the article "Our Outboard-Boating Boom" by Don Wharton in the July issue, we would like to point out that the implication and myth that Ole Evinrude, after his row for ice cream across a Wisconsin lake, founded the outboard

(Continued to page 10)

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# BY 35



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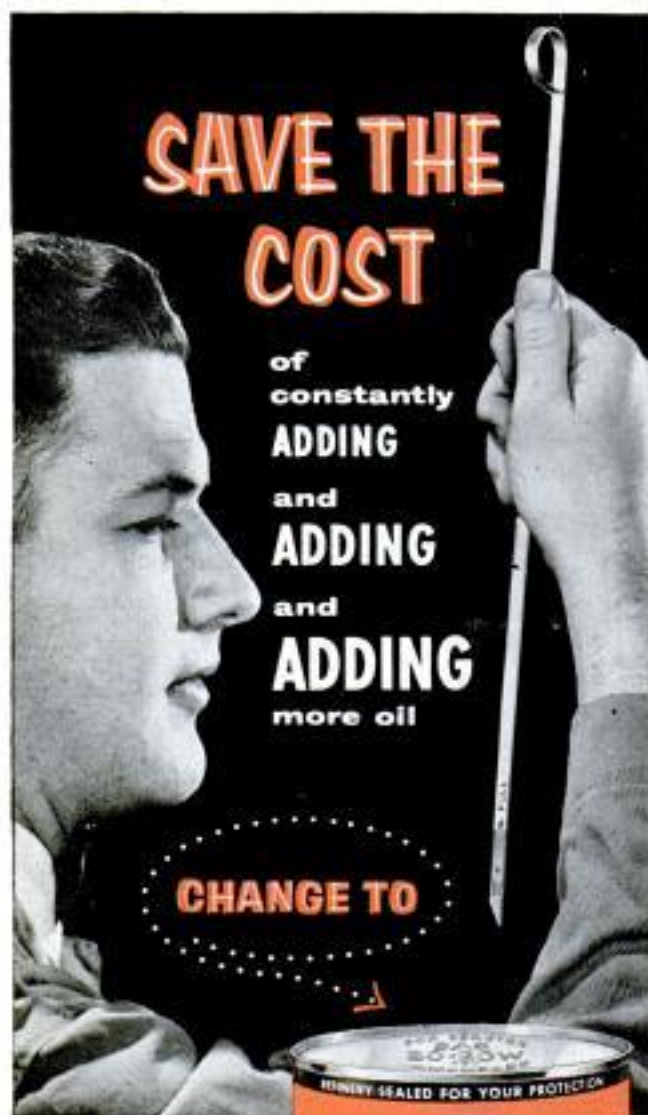
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| <p><b>ARCHITECTURE and BUILDING CONSTRUCTION</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Air Conditioning</li> <li><input type="checkbox"/> Architecture</li> <li><input type="checkbox"/> Arch. Drawing and Designing</li> <li><input type="checkbox"/> Building Contractor</li> <li><input type="checkbox"/> Building Estimator</li> <li><input type="checkbox"/> Carpentry and Millwork</li> <li><input type="checkbox"/> Carpenter Foreman</li> <li><input type="checkbox"/> Heating</li> <li><input type="checkbox"/> Interior Decoration</li> <li><input type="checkbox"/> Painting Contractor</li> <li><input type="checkbox"/> Plumbing</li> <li><input type="checkbox"/> Reading Arch. Blueprints</li> </ul> <p><b>ART</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Commercial Art</li> <li><input type="checkbox"/> Magazine &amp; Book Illus.</li> <li><input type="checkbox"/> Show Card and Sign Lettering</li> <li><input type="checkbox"/> Sketching and Painting</li> </ul> <p><b>AUTOMOTIVE</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Automobiles</li> <li><input type="checkbox"/> Auto Body Rebuilding and Refinishing</li> <li><input type="checkbox"/> Auto Engine Tuneup</li> <li><input type="checkbox"/> Auto Technicians</li> </ul> | <p><b>AVIATION</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Aero-Engineering Technology</li> <li><input type="checkbox"/> Aircraft &amp; Engine Mechanic</li> </ul> <p><b>BUSINESS</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Accounting</li> <li><input type="checkbox"/> Advertising</li> <li><input type="checkbox"/> Business Administration</li> <li><input type="checkbox"/> Business Management</li> <li><input type="checkbox"/> Cost Accounting</li> <li><input type="checkbox"/> Creative Salesmanship</li> <li><input type="checkbox"/> Managing a Small Business</li> <li><input type="checkbox"/> Professional Secretary</li> <li><input type="checkbox"/> Public Accounting</li> <li><input type="checkbox"/> Purchasing Agent</li> <li><input type="checkbox"/> Salesmanship</li> <li><input type="checkbox"/> Salesmanship and Management</li> <li><input type="checkbox"/> Traffic Management</li> </ul> <p><b>CHEMICAL</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Analytical Chemistry</li> <li><input type="checkbox"/> Chemical Engineering</li> <li><input type="checkbox"/> Chem. Lab. Technician</li> <li><input type="checkbox"/> Elements of Nuclear Energy</li> <li><input type="checkbox"/> General Chemistry</li> <li><input type="checkbox"/> Natural Gas Prod. and Trans.</li> <li><input type="checkbox"/> Petroleum Prod. and Engr.</li> <li><input type="checkbox"/> Professional Engineer (Chem)</li> <li><input type="checkbox"/> Pulp and Paper Making</li> </ul> | <p><b>CIVIL ENGINEERING</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Civil Engineering</li> <li><input type="checkbox"/> Construction Engineering</li> <li><input type="checkbox"/> Highway Engineering</li> <li><input type="checkbox"/> Professional Engineer (Civil)</li> <li><input type="checkbox"/> Reading Struc. Blueprints</li> <li><input type="checkbox"/> Structural Engineering</li> <li><input type="checkbox"/> Surveying and Mapping</li> </ul> <p><b>DRAFTING</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Aircraft Drafting</li> <li><input type="checkbox"/> Architectural Drafting</li> <li><input type="checkbox"/> Drafting Machine Design</li> <li><input type="checkbox"/> Electrical Drafting</li> <li><input type="checkbox"/> Mechanical Drafting</li> <li><input type="checkbox"/> Sheet Metal Drafting</li> <li><input type="checkbox"/> Structural Drafting</li> </ul> <p><b>ELECTRICAL</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Electrical Engineering</li> <li><input type="checkbox"/> Elec. Engr. Technician</li> <li><input type="checkbox"/> Elec. Light and Power</li> <li><input type="checkbox"/> Practical Electrician</li> <li><input type="checkbox"/> Practical Lineman</li> <li><input type="checkbox"/> Professional Engineer (Elec)</li> </ul> <p><b>HIGH SCHOOL</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> High School Diploma</li> </ul> | <ul style="list-style-type: none"> <li><input type="checkbox"/> Good English</li> <li><input type="checkbox"/> High School Mathematics</li> <li><input type="checkbox"/> Short Story Writing</li> </ul> <p><b>LEADERSHIP</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Industrial Foremanship</li> <li><input type="checkbox"/> Industrial Supervision</li> <li><input type="checkbox"/> Personnel-Labor Relations</li> <li><input type="checkbox"/> Supervision</li> </ul> <p><b>MECHANICAL and SHOP</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Diesel Engines</li> <li><input type="checkbox"/> Gas-Elec. Welding</li> <li><input type="checkbox"/> Industrial Engineering</li> <li><input type="checkbox"/> Industrial Instrumentation</li> <li><input type="checkbox"/> Industrial Metallurgy</li> <li><input type="checkbox"/> Industrial Safety</li> <li><input type="checkbox"/> Machine Design</li> <li><input type="checkbox"/> Machine Shop Practice</li> <li><input type="checkbox"/> Mechanical Engineering</li> <li><input type="checkbox"/> Professional Engineer (Mech)</li> <li><input type="checkbox"/> Quality Control</li> <li><input type="checkbox"/> Reading Shop Blueprints</li> <li><input type="checkbox"/> Refrigeration and Air Conditioning</li> <li><input type="checkbox"/> Tool Design</li> <li><input type="checkbox"/> Tool Making</li> </ul> <p><b>RADIO, TELEVISION</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> General Electronics Tech.</li> </ul> | <ul style="list-style-type: none"> <li><input type="checkbox"/> Industrial Electronics</li> <li><input type="checkbox"/> Practical Radio-TV Eng'g</li> <li><input type="checkbox"/> Practical Telephony</li> <li><input type="checkbox"/> Radio-TV Servicing</li> </ul> <p><b>RAILROAD</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Car Inspector and Air Brake</li> <li><input type="checkbox"/> Diesel Electrician</li> <li><input type="checkbox"/> Diesel Engr. and Fireman</li> <li><input type="checkbox"/> Diesel Locomotive</li> </ul> <p><b>STEAM and DIESEL POWER</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Combustion Engineering</li> <li><input type="checkbox"/> Power Plant Engineer</li> <li><input type="checkbox"/> Stationary Diesel Engr.</li> <li><input type="checkbox"/> Stationary Fireman</li> </ul> <p><b>TEXTILE</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Carding and Spinning</li> <li><input type="checkbox"/> Cotton Manufacture</li> <li><input type="checkbox"/> Cotton Warping and Weaving</li> <li><input type="checkbox"/> Loom-Fixing Technician</li> <li><input type="checkbox"/> Textile Designing &amp; Dyeing</li> <li><input type="checkbox"/> Textile Finishing &amp; Dyeing</li> <li><input type="checkbox"/> Throwing</li> <li><input type="checkbox"/> Warping and Weaving</li> <li><input type="checkbox"/> Worsted Manufacturing</li> </ul> |
|---|--|--|--|--|

Name \_\_\_\_\_ Age \_\_\_\_\_ Home Address \_\_\_\_\_  
 City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_ Working Hours \_\_\_\_\_ A.M. to P.M. \_\_\_\_\_  
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(Continued from page 8)

industry is incorrect. The first practical production outboard motor was invented by Cameron B. Waterman in 1905, four years prior to Evinrude. Waterman had worked on the motor development since 1903, and placed the Waterman Porto on the market in 1906. Twenty-five motors were produced in 1906; 3000 in 1907; 3000 in 1908 and 6000 in 1909.

Evinrude put his first motor on the market in 1909, and continued in business until the Evinrude Company was sold out to Christopher Meyer in 1913. Waterman Motor Company, however, was not sold by Mr. Waterman until 1916.

These companies were the first two in the outboarding business, but the inventor of the first practical outboard and the first mass-produced outboard was Waterman. In fact, Waterman coined the name "outboard motor."



Enclosed is a photo of the first Porto Motor in use.

Thomas B. King,  
Director of Public Relations,  
Kiekhaefer Corp.,  
Fond du Lac, Wis.

### To the Editor:

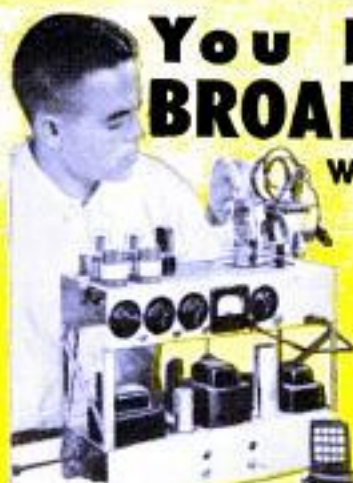
In the August issue of PM, Don Hoppe got his facts somewhat confused in the article "He Dreamed Up His Own Narrow-Gauge." The H. T. & W. really exists at this time, the tunnel is not the "Hoosiac," but is the "Hoosac," and it is in both Massachusetts and Vermont, but not in Maine. This railroad is owned by Sam Pinsley who also operates the Sanford & Eastern, Concord & Claremont and Barre & Chelsea, among others. All of these are short lines in New England.

Lindsley Williams,  
Lexington, Mass.



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"Fix sets part time in my shop. Made about \$500 first three months of the year. Could have more but this is about all I can handle."—**FRANK BOBER**, Lorain, O.



"I've come a long way in Radio and Television since graduating. Have my own business on Main Street."—**JOE TRAVERS**, Ashbury Park, New Jersey.

"Before finishing the NRI course I was employed as Studio Engineer at KSMJ. I am now announcing."—**BILL DELLELL**, Grand Island, Nebraska.



New electronic products are boosting the need for more and more trained TV-Radio Technicians. Offices, plants, homes everywhere—are obliged to buy their knowledge and services. For instance, transistor Radios, Color TV, Hi-Fi, were unknown a few years ago. Guided missiles, computing machines, automation would not be possible without this miracle science—Electronics. Police, Aviation, Mobile Two-Way Radio are expanding. The military services reward qualified Technicians with higher rank and pay. To ambitious men everywhere, here is rich promise of fascinating jobs, satisfaction and prestige, increasing personal prosperity.



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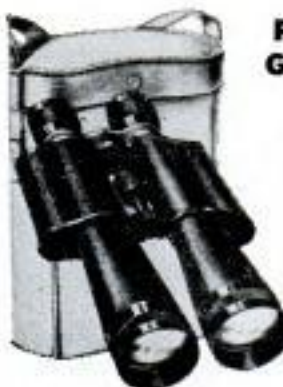
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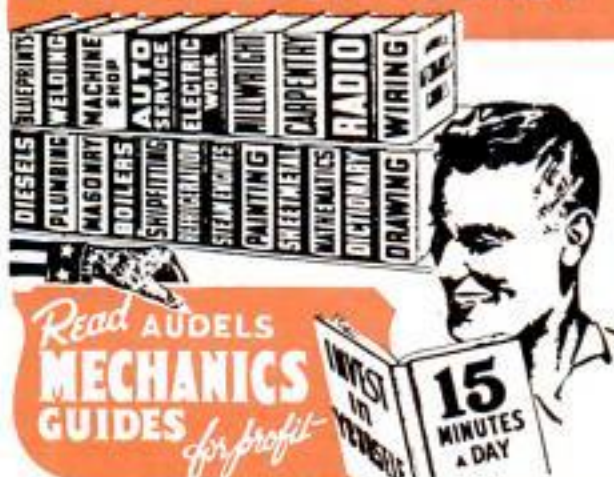
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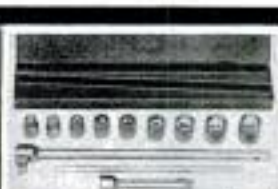
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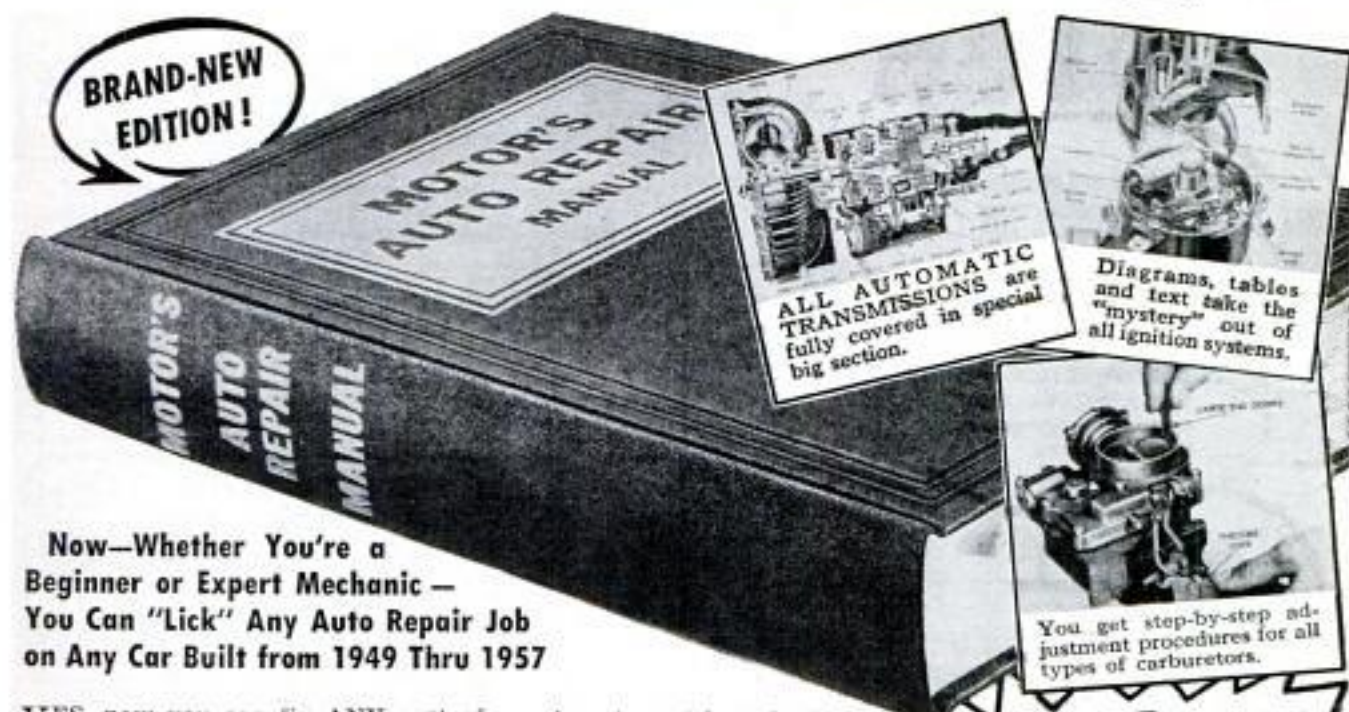
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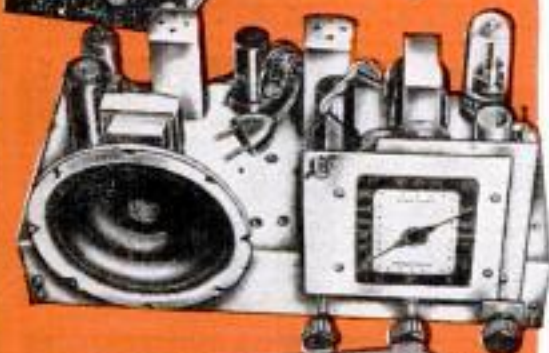
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- Plastic Toy GUNS, 2c each!
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- Double edge razor blades, \$1.50 per 1000!
- LADIES APRONS, 6 1/4c each!
- \$2.50 WALLET, 30c each!
- \$1 val. BILLFOLDS, 15c each!
- \$1 Kiddies handbags, 3c each!
- CIGARETTE HOLDERS, 1c each!
- BUTTONS, 144 for 25c!
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- 69c Insect Repellent, 5c each!
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- Famous brand \$18.75 perfume, \$1 each!
- 49c Xmas window decorations, 10c per set!
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- \$200.00 Surplus typewriters, \$23.00 each!
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- \$1.95 Men's Silk Ties, 12 1/2c each!
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- 39c Under arm deodorant, 2c jar!
- \$1 Automatic card shufflers, 9c each!
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- Christmas Seals, 25c per 1000!
- \$2.98 Horse race game records, 30c each!

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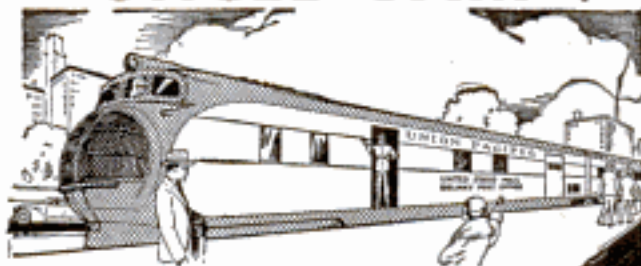
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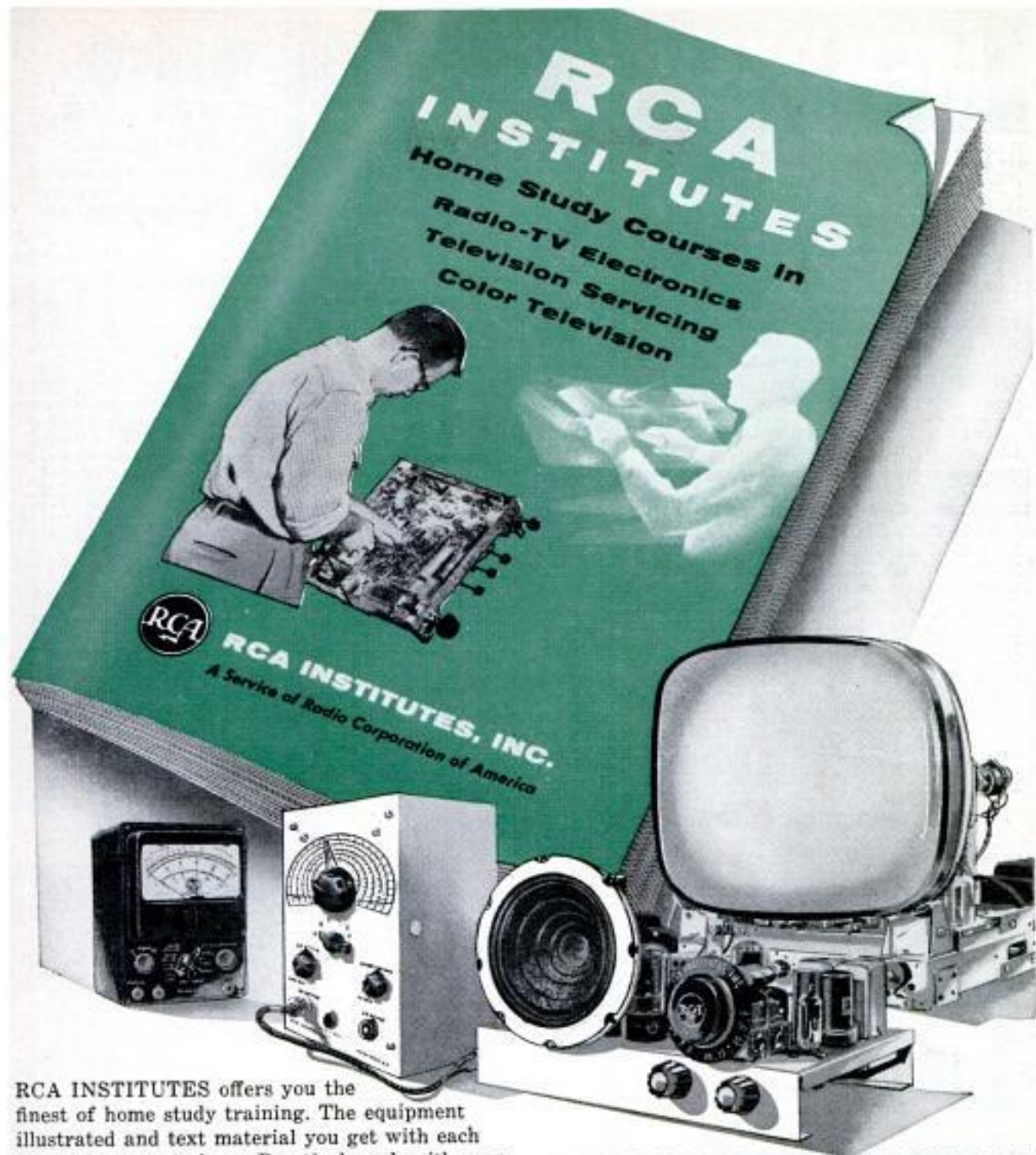
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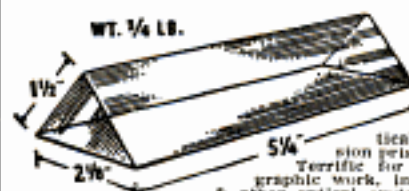
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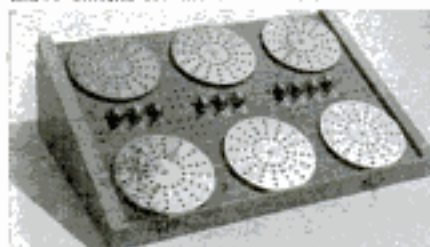
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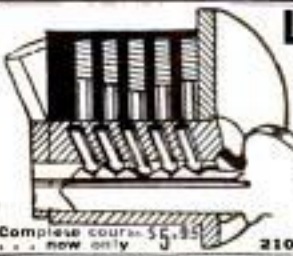
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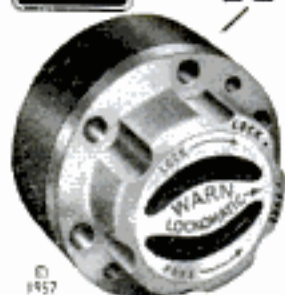
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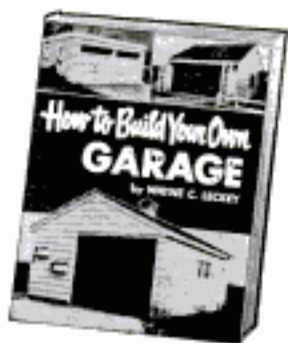
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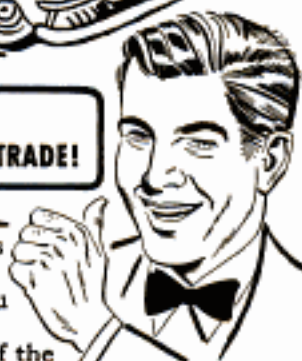


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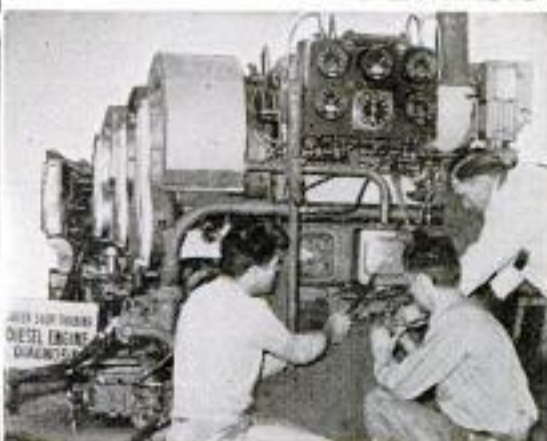
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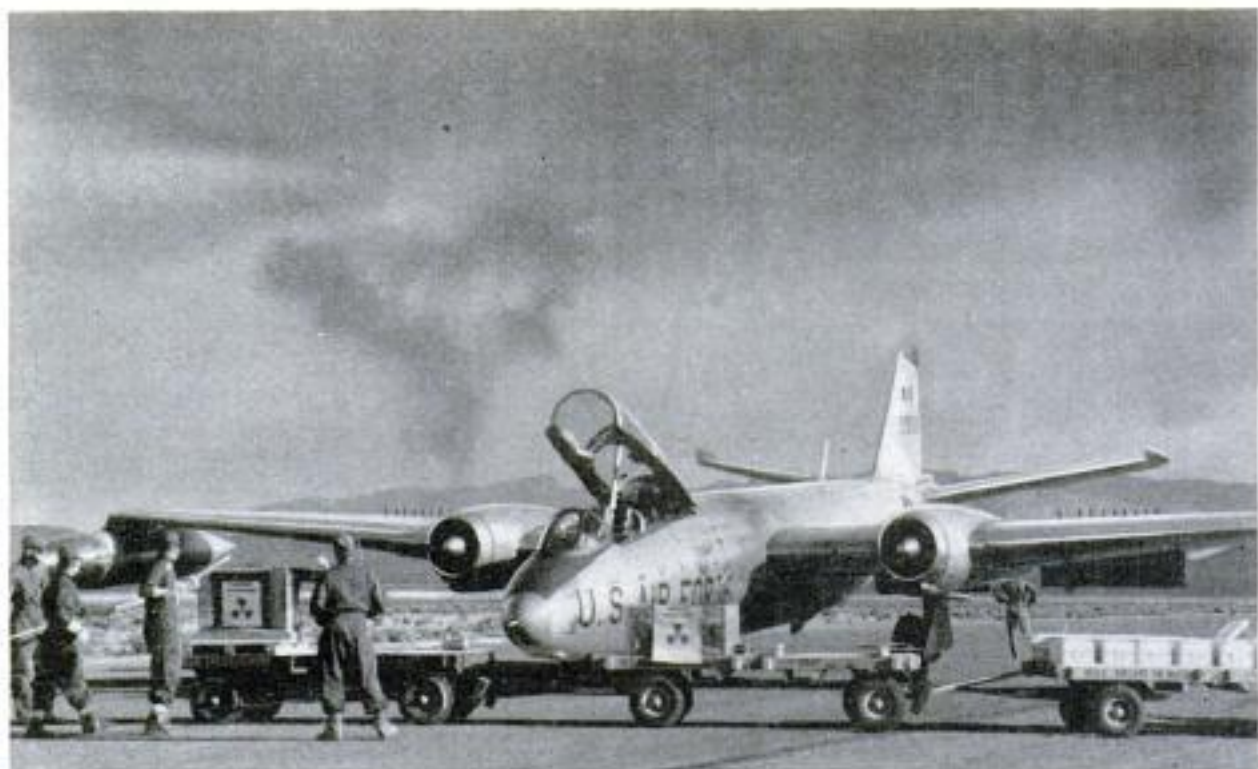
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B57 flew into atomic-bomb cloud collecting "hot" samples. Crewmen handle material from safe distance

*Daring Air Force pilots wait for the spreading "mushroom" of an atomic explosion. When the red ball of flame disappears, they dive into the cloud as*

## They Sample "Hot" Clouds

Jet is washed four times to remove radioactive residue. Men wear special equipment, receive minute amount of radiation



**F**LYING JET airplanes through "hot" atomic bomb clouds is the dangerous assignment of an Air Force squadron in Nevada. They collect highly radioactive samples for important studies by the Atomic Energy Commission.

The 4926th Test Squadron (Sampling) at Indian Springs Air Force Base uses specially equipped F84G and B57 jets. Over the AEC atomic test site in Nevada, these courageous pilots dive into nuclear clouds shortly after A-bombs are detonated. Filters in the airplanes collect atomic particles, while tubes gather gaseous samples.

Elaborate care is taken to prevent overexposure to radiation by both the aircraft and ground crews. When the airplanes return from a mission, fork-lift trucks remove the crews to avoid human contact with contaminated surfaces.

The radiation-laden filters are taken from the planes by long-handled tools, rolled into cylinders and put in lead "pigs" for shipment to an AEC laboratory. The gaseous cloud samples are transferred under pressure to lead spheres.

Both the airplanes and the crews receive extensive decontamination. The extent of the precautions are dependent on the size of the atomic blast and the amount of residue collected. Film badges and dosimeters worn by crews, and radiation-detection instruments on planes provide this information.

Since the surfaces of the planes receive the most contamination, they are washed down with different solutions four times. Jet engines present surprisingly few contamination problems. The tremendous rush of air passing through them provides an almost self-cleansing action.

The decontamination ground crews wear special clothing, masks, gloves and shoes. The "hot" material is never handled without the men being a safe distance away, and wearing gloves.

Personnel of the 4926th Squadron receive "scheduled" doses of radiation in performing their work. This is accomplished by rotating their assignments to avoid too much exposure.

A pilot gets one tenth to one roentgen in flying through a "hot" cloud. A roentgen is the measure of the ionization caused by gamma radiation. To be on the safe side, the preferred total radiation exposure allowed sampling pilots is five roentgens per year. No more than 3.9 roentgens of exposure is permitted in any three-month period. Some of the Squadron members have participated in every atomic test since 1950, and have accumulated a total of 35 roentgens. ★ ★ ★



"Pig" on a pole is lead container for atomic cloud samples. Material is shipped to Atomic Energy Commission lab for study



Airman monitors pigs to test radioactivity. Jets catch gaseous samples as they fly through A-clouds

Atomic particles are gathered in filters, which are rolled into cylinders and stored in lead containers



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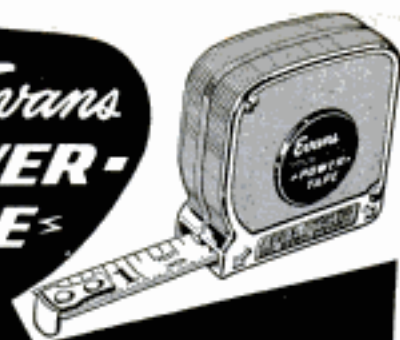
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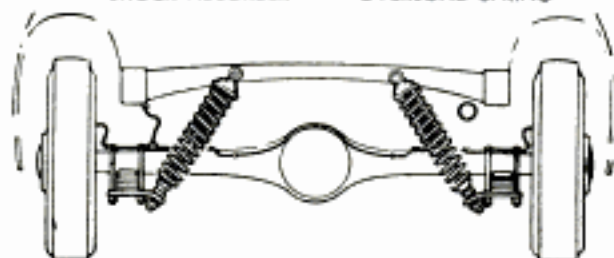
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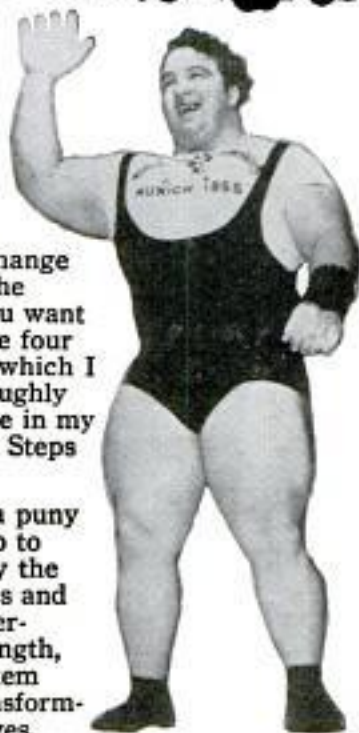
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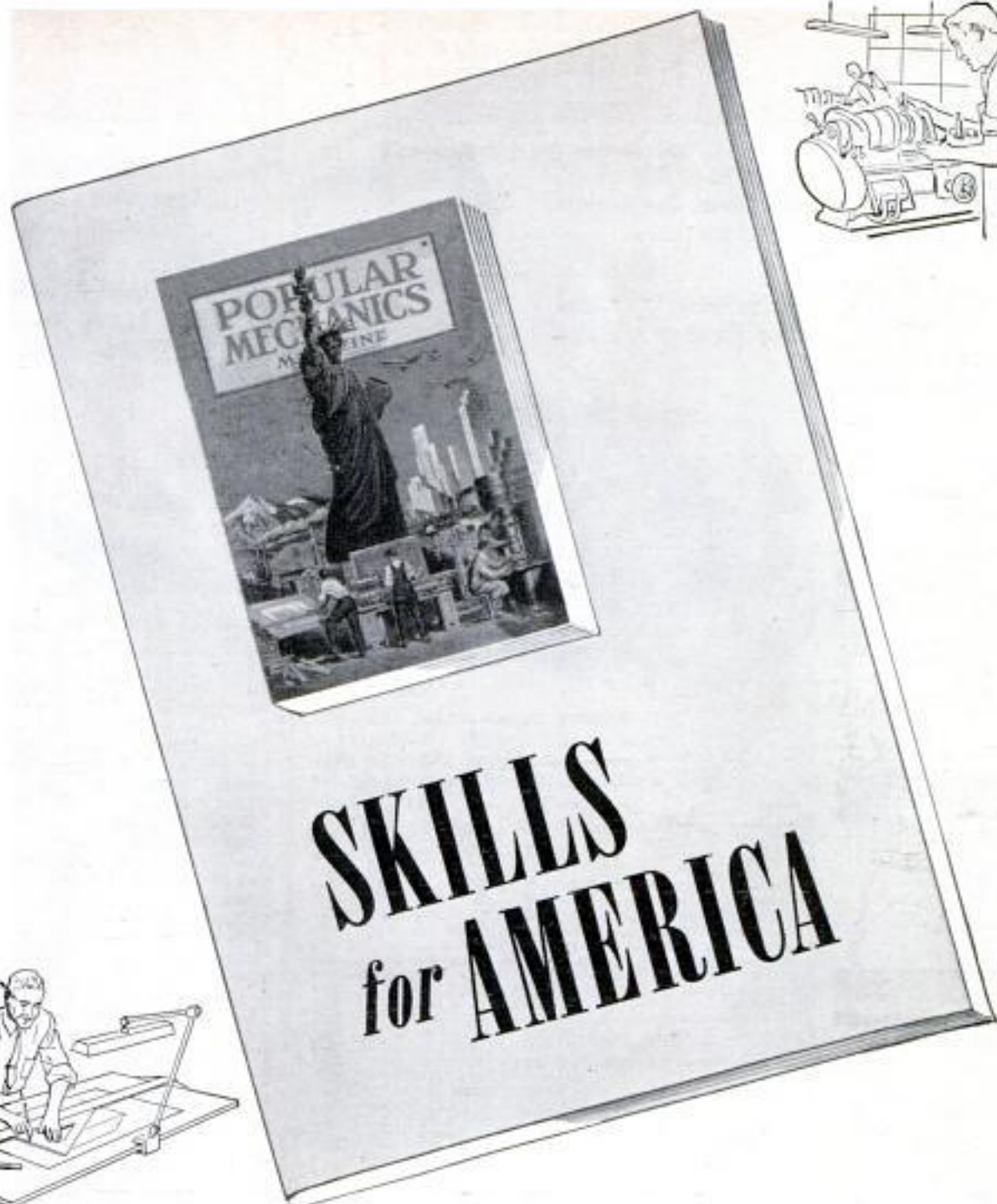
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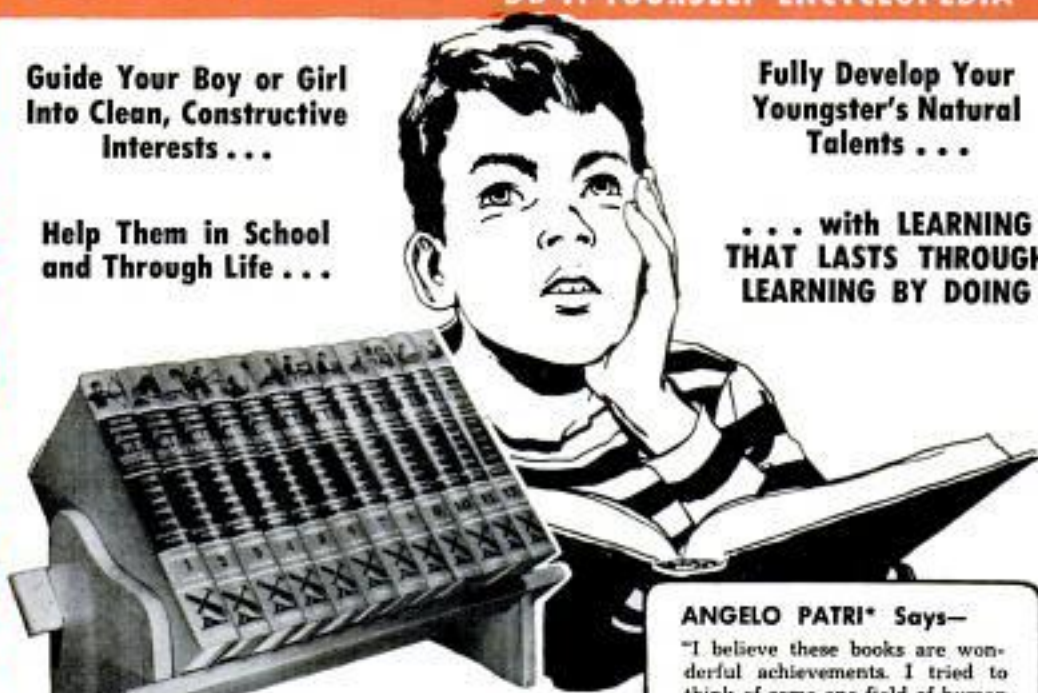
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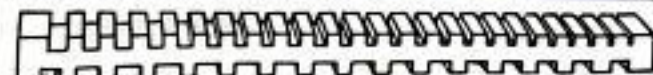
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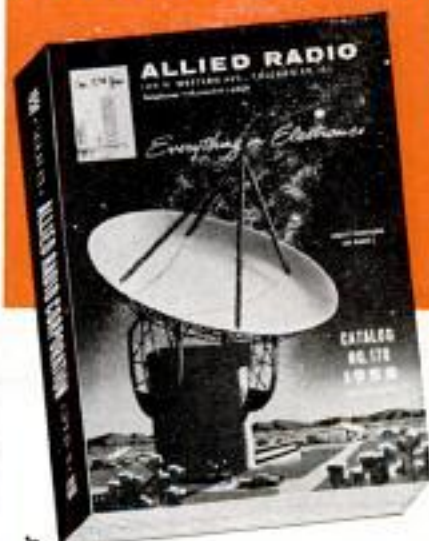
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U.S. Stamps. Giant bargain catalog—10¢. Raymax, 35-VZ Maiden Lane, New York City 38.

50 U.S. Commemoratives \$1. N. Hurst, R.D. #1, Murrsville, Penna.

313 DIFFERENT Worldwide 25¢. Exotic pictorials, approvals. Edgar, Box 437M, Punxsutawney, Penna.

77 DIFFERENT U. S.—25¢. approvals. Utechs, 1143D North Keeler, Chicago 51.

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ONE Hundred stamps plus beautiful pictorial mint set only 10¢. Approvals. Robdal, Stamp Department, Riverside, Connecticut.

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135 DIFFERENT U.S. commemoratives \$1.00. 50-25¢. Request approvals. Harold Holub, 18 East 196th Street, New York 68, N. Y.

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**NESTLE'S** Coffee, hot chocolate vending. \$149 starts you. Send 25¢ for samples. Solapak Co., 1620 Plymouth No., Minneapolis 11, Minnesota.

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**97 WAYS** To make a million. Start from scratch. Grow big. Others have. You might too. Dime brings details, fast. Woodward, 1221 Edgewood, Haverton 3, Penna.

**FREE** Folder describing 137 money making plans. \$100 weekly reported. Dover, 9 Chase Ave., Lexington 73, Massachusetts.

**PROFITABLE** Hobby. Handmade glass figurines. Free literature. Adams, 18724-A Martha, Saratoga, California.

**CASH** From sawdust, seventy methods. Tin-cans, thirty methods. Newspapers, eighteen methods. Instructions 50¢ each. All three \$1.00. Charles Company, 12-XAN, Norwood, Ohio.

**STATUARY** Molds! Super quality liquid rubber. Ajax Products, 734 East 234th Street, Cleveland 23, Ohio.

**LEARN** Real estate thoroughly and enjoyably in your easy chair by listening to records. Excellent profitable profession, full or part-time. Many successful graduates. Lee Institute, Brookline 46, Mass.

**EARN** \$15,000 Yearly. Independent non-competitive business. No merchandise to handle. No traveling. 3 to 6 months work yearly. Start in spare time. Alvin Survey, Box 769-B, Alvin, Texas.

**BUSINESS** Opportunities. Over 1,500 people in one state alone make additional income at home. For free information address, Mail-Towne, 9 Murray St., New York 7, N.Y.

**MANUFACTURE** Perfumes, cosmetics, cleaners, polishes. Work home. Catalogue free. International, 6347 Parnell, PM107, Chicago 21, Illinois.

**UNIQUELY** Different postcard projects bring avalanche of mail order cash. Powerful advertising copy furnished. Revealing information free. Craft-Horizon, 2694 So. 10th, Fresno 25, Calif.

**WORK** Home. Pleasant, profitable mail-order business. Own hours, independence. Expert guidance. Masters, 5145 Norwood, Arlington, California.

**10% BELOW** Wholesale! Thousands of nationally advertised lines! Details, Bard, 4138 Bailey, Cleveland 13, Ohio.

**EARN** Money writing features, fillers. Write to: Underhill, Beebe, Arkansas.

**EARN** Money at home. Learn invisible reweaving at home. Licensed, approved school. Free details. Eastern School of Reweaving, 73 Main Street, Dept. P107, Hempstead, N.Y.

**SELL** By mail. Tested methods. Alfano, 19 Pine Street, Closter, New Jersey.

**BUY** Wholesale, thousands nationally advertised products at big discounts. Free catalogs. United Wholesalers, 1265-F Broadway, New York City.

**\$34.70** TWO Hours. Manufacturing. No selling. Carlsberg Castings, 1803 Fremont, Rapid City, South Dakota.

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**SHARPEN** Lawnmowers. Home business. No expensive equipment needed. Big profits. Free literature. Grind-Rite Lawn Mower Service, 4543 Roswell Rd., Atlanta 5, Georgia.

**EXCEPTIONAL** Mailorder opportunity! Write: George Lenhoff, Box 201, Lincoln 1, Nebraska.

**IMPORT-Export!** Mailorder opportunities. Details. Warner, Box 6, Fort Scott, Kansas.

**ULTRA-Modern** sofa. Buy it for \$250 or make it for about \$30 including 4 inch foam cushion. Benko, 400 East 66th Street, New York City 21.

**SELL** Razor blades, spare time. 500% profit. Free sample, details. Home Ideas, 204P, Short Hills, N.J.

**FOUR** Color mail order catalogs—Fifty fast-selling items. Orders filled for you. Big profits. Sample, details free. Associated, Box 53-A, Boston 22, Massachusetts.

**\$26,500** BY Mail order in two weeks! Amazing radio-mail order method using powerful stations. Start fabulous business on low capital. Product sources supplied. Free details. Broadcast Service, 1412-C2 Great Northern Bldg., Chicago 4.

**WHOLESALE:** \$50,000 Items. Supply source directory 25¢. Idealer, Park Ridge, Illinois.

**RESILVERING** Mirrors, formula 50¢; Two-way lookout mirrors, 50¢; coppered mirrors, 50¢. All \$1.00. Nelko-Mir, Box 3462-P, Chicago 54.

**YOUR** Secret gold mine. Fabulous profits. Free details. Locate relics, artifacts, antiques. P. Putnam, 465 Hull Avenue, Jerome, Arizona.

**CASH** Income collecting local information. No selling. Free details. Dorco, Box 494, Muncie, Ind.

**"EVERYBODY** Likes candy" — Make professionally home. (Our 47th Year.) Regalade Candies, B107, East Orange, New Jersey.

**ENGRAVING,** Carving attachment for hand motor tools, "Dupliscaler" creates new opportunities. Details, sample 25¢. Desco Distr's., 5262-P Van Nuys, Van Nuys, Calif.

**EXCLUSIVE** Distributors. Amazing crushed, aromatic, redwood cedar! Add water, brushed on. Makes permanent cedar closets! Terrific seller stores, homes, trailers, builders, hotels, schools! Low cost, big profits. Free kit. Plant, 90-A Summit Ave., Brookline, Mass.

**TERRIFIC** Selling illusion. Arrow, dagger and sword thru head novelty. Unger Supply, 655 South Wells, Chicago 7.

**START** Your own business with Rollit knife sharpener. Sells easily to stores, homes. Good profit item, easy to use, safe, effective, attractive, guaranteed. Sell full-time or part-time. Territories protected. Write now. Alden Spence's Sons Co., Dept. P-107, 130 Sixth Street, Cambridge, Mass.

**FREE.** We'll set you up in your own mail order business free. We supply you with complete mailing package. You just mail. 30 years of successful dealings are your guarantee. K. Glass, Ellwood City, Penna.

**LET** Me sell your products nationally. I'll send you free information on how to establish spare-time-full time Cascraft business. You build! We sell! Everything supplied. Abarni, 807-SB Sunset, Los Angeles 12, Calif.

**"HOME** Business Digest," published since 1899; home, part-time, mail-selling tips, methods, newest products. Copy 35¢, year \$2.00, 2 years \$3.00. Distributors wanted. Send \$1.00 for information. M. R. Brown, 618 N. Cayuga St., Ithaca, N.Y.

**TAKE-OUT** foods. Your own business using successful proven methods. Complete details \$1. Alamo Take-Out Foods, Inc., 1832 Tyler, Hollywood, Florida.

**FREE** "How to Start Your Own Mail Order Business." Exclusive franchise! Your own catalogs. We ship hundreds of top mail order items for you. Write now! Mail Order Associates, Rochelle Park 39, New Jersey.

**MAILORDER** Envelope business. No investment. Omaha Envelope, 4721-E California, Omaha 3, Nebr.

**SELL** Books by mail. Details free. Berryman, 153 Victoria, Northlake, Ill.

**OUR** Complete plan puts you in business for yourself, part-time or fulltime, manufacturing household necessity used by every housewife. Free details. Room 217, 30 Huntington Ave., Boston 16, Mass.

**MADE** \$10,000.00 Typing at home. Guaranteed profit. Amazing information 10¢. Lenore Felgen, Box 1125-PM, Oak Park, Illinois.

**GROW** A living miniature forest or orchard (only inches high), that bears tasty tiny fruit at home. Learn amazing dwarfing secrets! Sensational fascinating hobby, profitable home-business opportunity. Free details! Miniature Nurseries, Dept. OR, Gardena, California.

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**BRUSH** Plating outfits for plating articles in the home and shop. No tanks necessary, silvering mirrors, spare or full time. Free particulars. Gunmetal Co., Ave. H, Decatur, Illinois.

**BUY** Wholesale! Over 10,000 nationally advertised products. Appliances, cameras, sporting goods, housewares, watches, typewriters, tools, clothing, etc. Send postcard today. Buy-Rite, Box 258, Hawthorne 1, New Jersey.

**EXCLUSIVE** Distributorship available in most areas for world-famous Cadmium battery guaranteed to outlast your car. Tremendous profit opportunity. Investment for merchandise only. Free franchise. Cadmium Battery Corporation, Dept. 102, El Segundo, California.

**START** Your own business with our sample kits. Newest idea in selling. Reorder merchandise as you need it. Write today for full particulars. Division Sales, 3341 W. Roosevelt Rd., Chicago 24, Illinois, Dept. K.

**MAILORDER.** Learn to sell by mail. Complete course. Low cost. Ranso, Box 1719-A, Richmond 14, Virginia.



**HIGHEST Profits** all magazines. Sure success plan. Free catalogue, supplies, prizes. Subscription Service Co., Box 2070, Birmingham, Ala.

**THEY Hand him \$100!** Free packet. "Secret Journal." 919 secrets-plans! Work home. Publicco, Oceanside, Calif.

**OPERATE Easy-to-start, profitable home mailorder business!** B. Mann, Woodcliff Lake, N. J.

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**EARN To \$100.00 per hour** snow-flocking Xmas trees, centerpieces, etc. Flocking, 7051 Belmont Avenue, Chicago 34, Illinois.

**\$60.00 WEEKLY** Sparetime. Start home Venetian blind laundry. Protected territory. Interesting information free. Burtl, 2434EP, Wichita 13, Kansas.

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**NEW Snow cone machines.** All prices. P.O. Box 7803, Dallas, Texas.

**IMPORTING—Exporting.** Modern dropship method. Profitable. Details free. The Hansen Company, 6601-8th Ave. N., St. Petersburg, Fla.

**WHOLESALE—Thousands** nationally advertised products. Buy, sell. Amazing profits. New, free plan. Associated Wholesalers, 1016-D Starr, Burlington, Iowa.

**OPERATE Mailorder folio business!** Free details. Ballard's, 425 East Catherine, Louisville 3, Ky.

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**NATURAL Molding** rubber, extra thick. Free sample. W. Wooley, 1016-A Donald, Peoria, Illinois.

**BIG Money** raising fishworms and crickets. Free literature. Carter Farms, Plains, Georgia.

**START Home business** making statuary, plaques, novelties, garden furniture, artificial marble flooring, liquid marble. Make your own flexible molds. Amazing profits. Only \$1.98. Free literature. Popular Mechanics Press, 631 No. St. Clair St., Chicago 11.

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**HOME Workshop books.** Free catalog. Popular Mechanics Press, 631 N. St. Clair St., Chicago 11.

**MONEY In saw and lawnmower** sharpening sparetime at home. Free book. Virgil Poley Company, Columbia Heights, Minnesota.

**\$70 WEEKLY—Home, spare time.** Simplified mail bookkeeping. Immediate income—easy! Auditax, 34737A, Los Angeles 34.

**TO \$100.00 Weekly.** Sparetime, home operated mailorder business. Successful beginner's plan. Everything supplied. Lynn, 10420-M National, Los Angeles 34.

**BRED Rare tropical fish** at home. Earn big money! Learn secrets! Help fill huge demand. Amazing opportunity! Free plan. Tropical Fish Breeders, Los Angeles 61, Calif.

**MINK Raising** information free. Complete. Lake Superior Mink Farm. Superior, E.E.I. Wisconsin.

**BE Appointed state notary public** now. Write. Stationers, Boerne, Texas.

I want to send you proof of the wonderful pulling power of Popular Mechanics classified pages. What's your proposition? Write me today. Include literature if possible. F. W. Johnson, Manager Classified Advertising, Popular Mechanics Magazine, 200 E. Ontario St., Chicago 11, Ill.

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**FREE "Franchise Profit Letter"** describes nationwide opportunities. Exclusive distributorships, dealerships, agency operations. Write today. National Franchise Reports, 333 North Michigan, Chicago 1.

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**YOUR Own name brand business.** No investment; no inventory. Part time or full time. Sell famous brands of appliances, housewares, silverware, radios, vacuum cleaners, lamps, tools, clocks, watches, jewelry, etc., etc., over 1000 items. Join thousands of successful independent dealers. Send for free catalog and dealer price list. H. B. Davis Corp., Dept. 11, 143 W. 13 St., New York City.

**11,000 NEW Prospects** daily. Baby record books, shoes, albums. Sell mailorder. Use our literature. Write: No-Co-Ro, Capitola, California.

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**BAKE New greaseless doughnuts** in kitchen. Sell stores. Free recipes. M. Ray, 3605 South 15th, Minneapolis 7, Minnesota.

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**MONEY For you! Big profits!** Cast plaster figurines, bookends, plaques at home with XL rubber molds. No experience needed! Write for illustrated, 40-page catalog, only 25¢! Plastic Arts Studios, 3403 So. Madison Street, Department 5, Muncie, Indiana.

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**FREE Catalog.** Contains hundreds of businesses, farms and income properties throughout U.S., Canada. Specify type and location desired. Deal direct with owners. U. I. Buyers Digest, 1608 Hillhurst, Dept. PM-3, Los Angeles 27, Calif.

**LIQUID Rubber.** Make flexible molds. Free sample. Chaney, 1907-A East Road, Jacksonville 11, Florida.

**START Home mimeographing business.** Pays amazing profits. Literature free. Housel, Lanoka Harbor, N. J.

**BOOKKEEPERS, Accountants.** Operate a bookkeeping service. Part or full time. Amazing simplified system. Wonderful money-making opportunities. Complete information free. National Bookkeeping Publishing Co., Suite 307, 3435 Broadway, Kansas City 11, Mo.

**WE Pay \$3.50 lb. dried.** Grow mushrooms. Cellar, shed and outdoors. Spare, full time, year round. We have 25,000 customers. Free book. Washington Mushroom Ind., Dept. 172, 2954 Admiral Way, Seattle, Wash.

**\$250 WEEK Cleaning** venetian blinds. Patented machinery. Free literature. Robinson, 7213B, Indianapolis 1, Indiana.

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**ADVERTISING Executive** now reveals tested, authentic mail order instructions offering amazing profit opportunities at home. Write Holiday Publications, 2301 Greysohn Road, Duluth, Minnesota.

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**INTERNATIONAL Mailorder business.** Complete setup service—Not just instructions. Hermes, 152 West 42, New York City 38.

**PLASTERCRAFT** Molds, liquid rubber, plasters, floccs, candle supplies. Catalog and manual free. Blue Rapids Supply, Blue Rapids, Kansas.

**"MAILORDER Laws and Regulations,"** \$1.00. Explains necessary licenses, different taxes, legal requirements, etc. "Mailorder Rules for Beginners," \$1.00 additional. Tasker, 1603 Peach Street, Alexandria, Virginia.

**FREE Folio "45,000-\$45,000, Unlimited Vacations."** No merchandise. Unknown! Work home, sparetime! Haylings, Carlsbad, Calif.

**MARY-Mac agency—motorized vibrator.** Cushions, chairs, tables, belts. Mary-Mac Factory, 1012 Powhattan, Dallas, Texas.

**FREE Folder, "How to Make \$3,000 Yearly.** Sparetime, Backyard, Raising Earthworms!" Onkhaven 38, Cedar Hill, Texas.

**BOOKLETS—\$1.00.** How to sell by mail order. 1957 business cycle advertising chart. Economist, 343 Fairfield Avenue, Bridgeport, Connecticut.

**UNUSUAL Opportunity.** Free literature. Quill Industries, 3607 South Hamilton, Chicago 9, Illinois.

**CASH Paid for boxtops!** Some, 25¢! Inquire: Bostops-AK, Cedar Hill, Texas.

**MAKE \$46 From square foot plywood;** jig saw necessary. Free details. Woodart, Bridgewater, Mass.

**\$3,000 YEARLY.** Spare time at home. Nothing to buy. No local selling. Dignified. Guaranteed. Home Harvest, Rt. 3, Box 3491-A, Albuquerque, New Mexico.

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## MONEYMAKING OPPORTUNITIES

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**\$1200.00 MONTHLY Proved!** Rid homes, farms, businesses of termites, rodents, pests. New shortcut methods! Learn everything two weeks! Free success plan. A.P.C.O.A., Dept. 1B, 429 South Western, Los Angeles 5, California.

**OFFICE Men.** Good money year after year, preparing income tax returns spare time at home. No lessons. Only fourteen hours study evenings. Amazingly simplified. Write: Reynard, Box 1265-B, Peoria, Illinois.

**MAKE \$5,000 Yearly** sparetime raising mink, chinchillas, nutria, etc. Free booklet reveals proved plans. Write Furs, 588 Mt. Pleasant Road, Toronto 1, Canada.

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**"HOME Business Digest"** has money-making opportunities galore. Sample 25¢. Donovan, 79-PM Greenbelt, Levittown, New York.

**\$59.95 BABY Shoe** bronzing machines. Mountings. Foster, 1520 Ardmore, Chicago 25.

**"50 NEW Home-Business Ideas"** booklet free. Coast Industries, B10C, Los Angeles 51.

**HOTTEST Mail order plan ever!** Sell photos, films, art novelties. Huge proven profits! Free details! A.M.P.R.O., Dept. 1B, 429 South Western, Los Angeles 5, California.

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**BUY Wholesale!** 30-80% discounts! Appliances, gifts, typewriters, tools, watches, sporting goods, jewelry, cameras, housewares, etc. Consolidated Distributors, Clifton 28, New Jersey.

**ADS Running** under this heading sell printing. Ask me for proof. I'll gladly send you amazing facts. Ask for Folder "P." F. W. Johnson, 200 E. Ontario St., Chicago 11, Ill.

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**GENERAL Contest Bulletin.** Lists contests monthly. Sample, 25¢. 1609½ East 54th, Duluth, Minn.

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

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**EARN Money** evenings copying and duplicating comic cartoons for advertisers. Adservice, Argyle 1, Wisconsin.

**SELL Titania gems.** Far more brilliant than diamonds. Catalog 10¢. Diamondite, 2420-M 77th, Oakland 5, California.

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**FREE Book** "505 Odd, Successful Businesses." Work home. Pacific, Oceanside, Calif.

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**THEY Hand him \$100!** Free packet. "Secret Journal." 919 secrets-plans! Work home. Publicco, Oceanside, Calif.

**\$60.00 WEEKLY Sparetime.** Start home Venetian blind laundry. Protected territory. Interesting information free. Burts, 2434ER, Wichita 13, Kansas.

**FREE Literature,** big money mailorder opportunity. Lairocraft, Box J-5008, Detroit 35, Michigan.

**WE Pay \$3.50 lb. dried.** Grow mushrooms. Cellar, shed and outdoors. Spare, full time, year round. We have 25,000 customers. Free book. Washington Mushroom Ind., Dept. 173, 2954 Admiral Way, Seattle, Wash.

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**\$100.00 WEEKLY Spare time** with a tape recorder! Fabulous new business. Entire country wide open! Record weddings, parties, sports events, stereophonic sound, sound-on-sound multiple recordings. Make radio commercials, sound effects. Have fun and make big money in the glamorous business of tape recording. Money-making facts free! Dixieland Publishers, Asheboro 2, N. C.

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**MEN And women** wanted to start home business in spare time with little table-top rubber stamp machine. Easy to earn up to \$9.80 an hour without previous experience. Full particulars free by mail. Send postcard to Roberts, 1512 Jarvis, Room CR-2-L, Chicago 26, Ill.

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**MAKE Money** raising birds. Send 25¢ for instruction booklet, price list and details. James Crosley, Box 61131, Los Angeles 61, Calif.

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**MAILORDER!** Succeed with professional material. Winter's, 221 Edson, Lombard, Illinois.

**CASH In** on contests now! Get facts that help. Write Sanders & Co., 1762 Euclid, Lincoln, Nebr.

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**EARN At home.** Free details. Catalina Enterprises, Box 5095, Tucson, Ariz.

**NEWLYWEDS** Mail plan 50¢; details two other profit-makers. Press, Portage, Ohio.

**BIG Offer** and opportunity mail 10¢. Palma, Box 1221, Baton Rouge, La.

**TYPISTS:** Mailing list. Business of your own. Free lifetime service. Folio \$1. Vans, 728 Rector, Hot Springs, Arkansas.

**MAKE Money,** mailing sample business cards. Vocacek Printing, 4444AI Ute, San Diego 17, Calif.

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**LIFETIME Income,** heirs too. Guaranteed product everyone needs daily the year 'round. Mail or agent operated. Perpetual triple bonus. Two automatic details and starter \$2.00. Refund if dissatisfied. Econoart, Dept. PMA, P.O. Box 444, Iowa City, Iowa.

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**\$25-\$50 WEEKLY** For forty minutes work per day at home. Free details. Jo-Ca Electrolater, 7840 Northwest Sixth Court, Dept. D, Miami 50, Florida.

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**CHEMICALS,** Supplies catalog, 25¢. Laboratory Sales, Box 161-A, Brighton, Mass.

**CHEMICALS** And apparatus for industrial, analytical, and private laboratories. Catalog 25¢. Dept. M-50, Biological Supply Co., 1176 Mt. Hope Ave., Rochester 20, N. Y.

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

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**NEW Liquid casting plastic,** clear, colors. Embed real flowers, coins, photos. New manual shows fine things you can make at home and sell at big profit. Send 25¢. Castodite, Dept. L-101, Woodstock, Illinois.

**PLASTIC Casting** and mold supplies. Liquid glass, steel, rubber. Catalog 25¢. Gel. Box 261, Union, N. J.

**FLEXIGLAS.** Square foot cost, 1/16", \$1.20; 1/8", \$1.52; 3/16", \$1.86; 1/4", \$2.21; 5/16", \$3.33; 3/8", \$4.36. Colors add 10%. Send 15¢ for postage. Aristocrat Plastics, 23 Sussex Avenue, Newark, N. J.

**LEARN** Plastics fabrication for spare time income. Low cost home training now available. Write for free booklet. Interstate Training Service, Dept. D-3, Portland 13, Ore.

**LAMINATING Supplies.** Free price list. Solomonson, 46 Cornhill, Boston 8, Mass.

**PLEXIGLAS**, Fiberglass, polyester, epoxy, acetate, vinylite, styrofoam, acrylite. In-structive wholesale-retail catalog, free. Gem-O-Lite, 5329 Cahuenga, North Hollywood, Calif.

**BOXES**, Plastic. Free list. Althor, 170 Bay 23 Street, Brooklyn, N.Y.

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**WHOLESALE** Catalog! Clothing, linens, housewares. Write Bostonian, 14 Dock Sq., Boston 8, Mass.

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**BEAUTIFUL** Feather pictures. 200% profit! Free details; sample 20¢ stamps. Sylviak, Apartado 9036, Mexico City.

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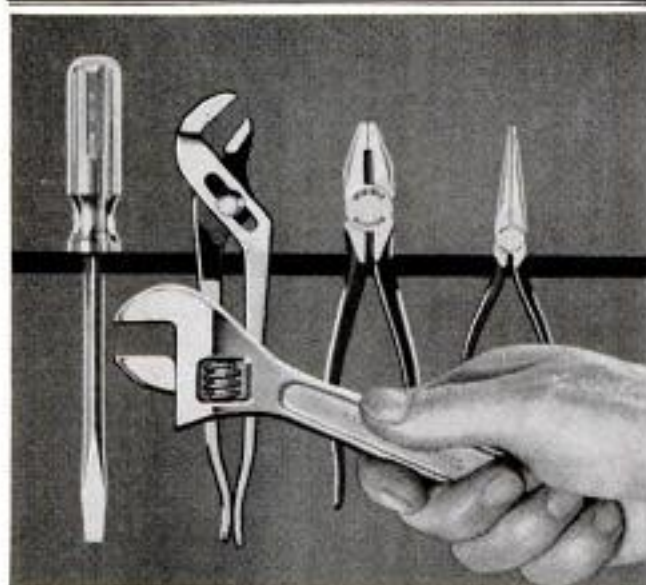
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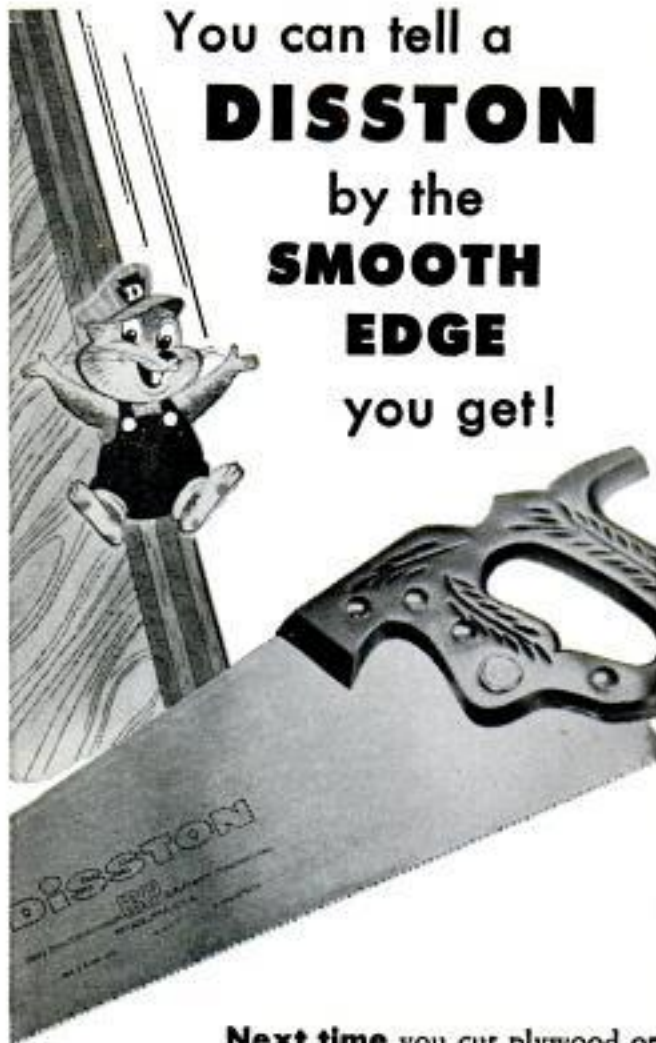
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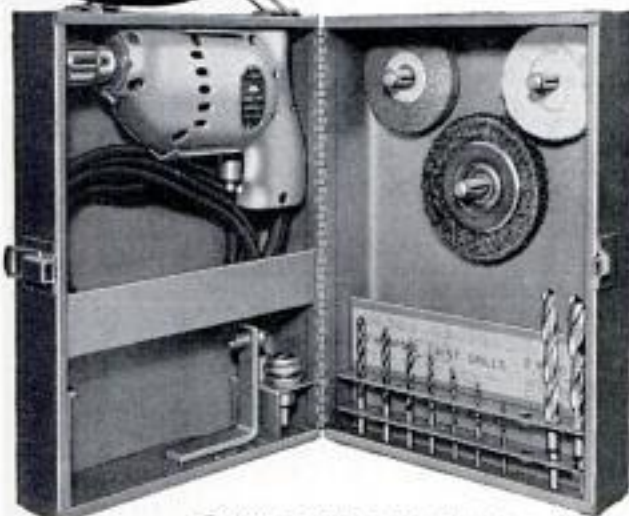
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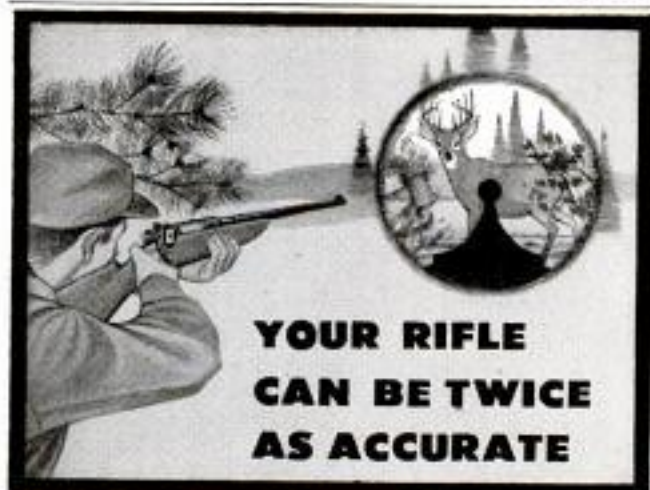
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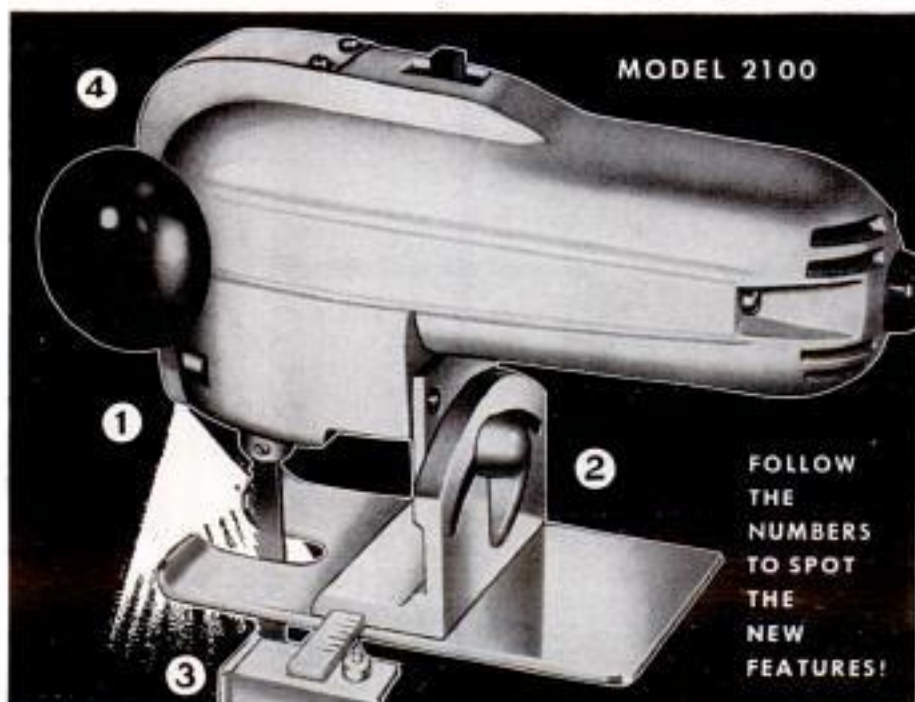
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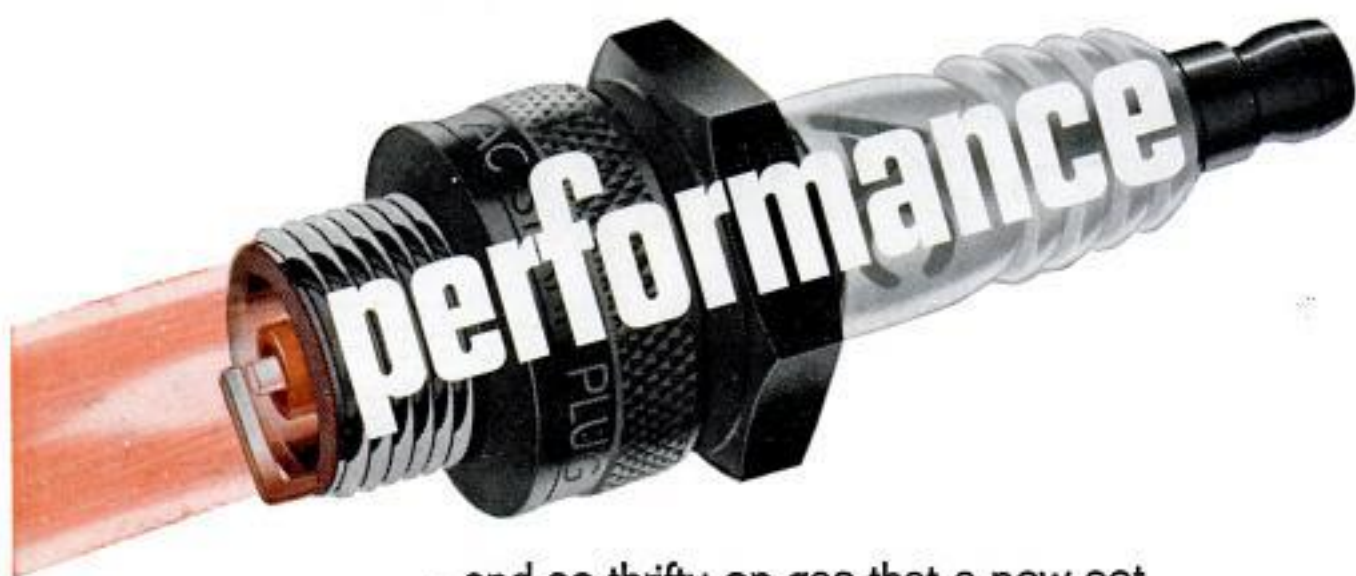


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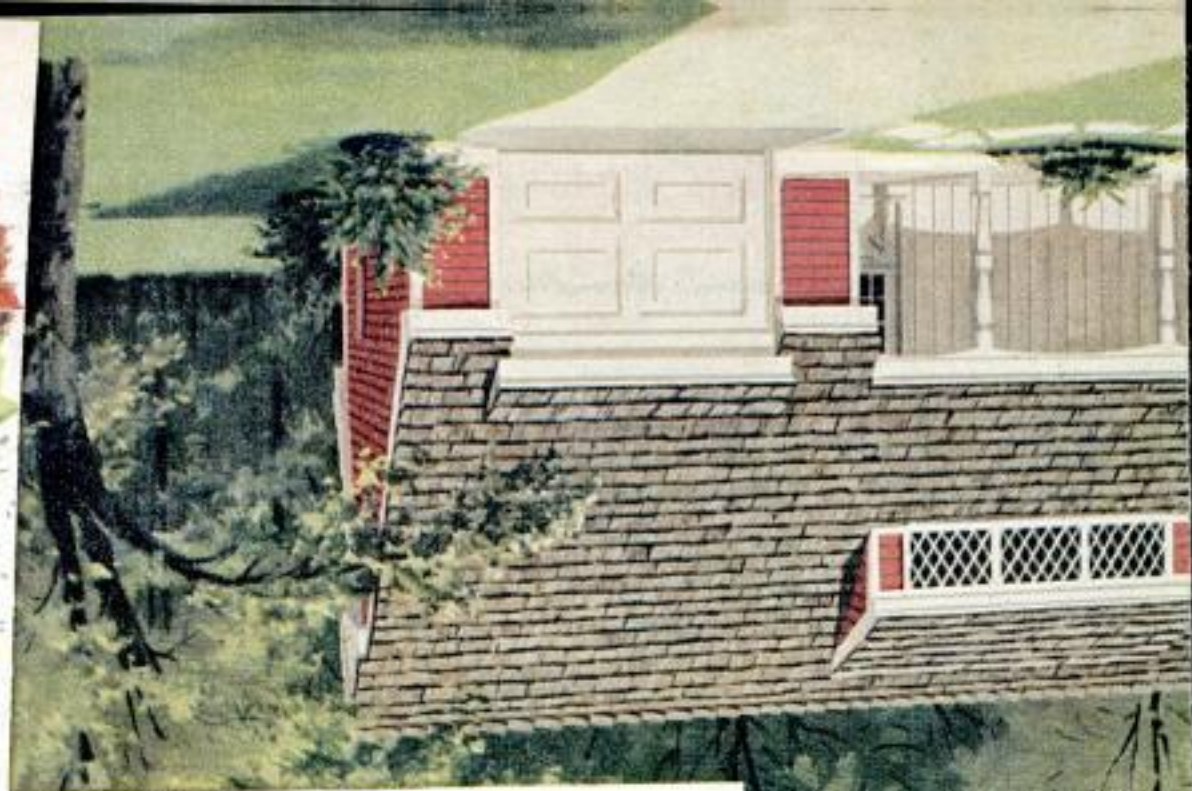
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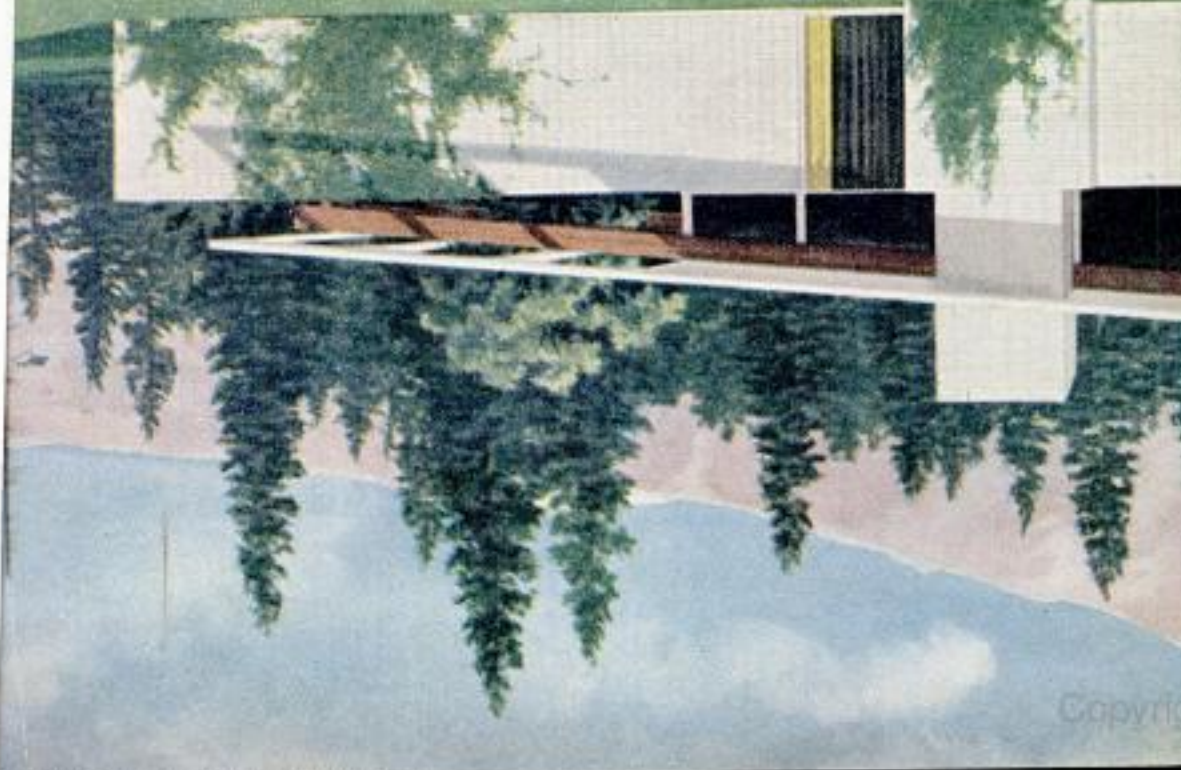


Picturesque and inviting is this modified Cape Cod farmhouse design. It has 1850 square feet of living area with three bedrooms on the second floor. Modern touches include family room

## the PM Traditional

This contemporary home with low-slung roof and sweeping lines provides 1344 square feet of living area. It has three intriguing courts. The facade gives no hint that it is a split-level home

## the PM Modern





## PM Traditional

Hooded fireplace is center of attraction in the family-TV-dining-all-purpose room. Front door and the double doors to parlor are shown in rear. Kitchen is at left.

## PM Modern

Glass walls of living room give it an indoor-outdoor look with the adjoining entrance court and outdoor-living area. Studio ceiling also adds size to the room. The davenport is built-in.



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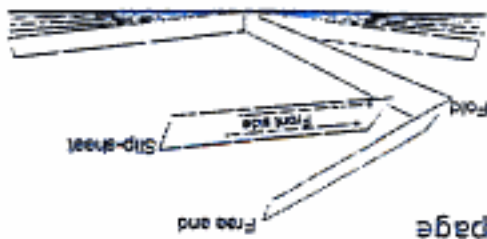
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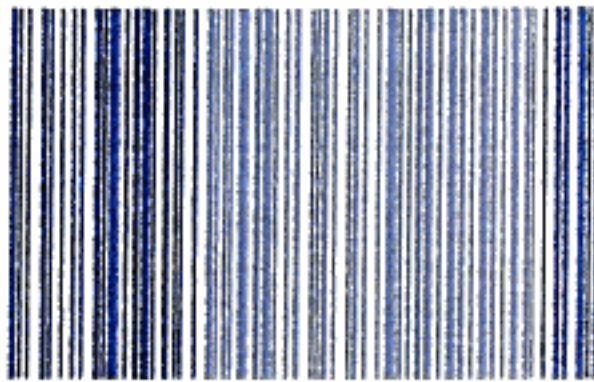
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Inverted Back



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Back

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**S**CIENCE HAS TAMED the two top bugbears in aviation radio—lightning and precipitation static. These weather gremlins rank as “minor” nuisances that rarely become serious hazards. Still, they disrupt airline schedules and hinder air defenses that can't relax vigilance when foul weather brews.

Modern all-metal aircraft are inherently well-protected against lightning. Strokes of 100,000 amperes commonly go in one wing tip and out the other, leaving small holes, but bypassing passengers and equipment. Yet even minor structural damage can be costly. And lightning frequently knocks out radio and electronic gear just when it's needed most.

“Precip” static is a more serious and annoying hazard. This is hissing radio interference caused by flight through rain, snow or ice crystals. Through friction, an aircraft may pick up 300,000 volts of static electricity, spraying it off wing tips and propeller blades as St. Elmo's fire. This weird glow is harmless in itself, but the resulting “corona pulses” block long-wave reception, disabling navigation aids.

Today's near-sonic speeds have greatly aggravated precip-static problems. Air Force tests show that when speed doubles, noise may increase 64 times. And experts agree that large, high-speed aircraft, operating at certain high altitudes, are especially susceptible to lightning strikes.

Happily, electronics experts have now devised protective devices that grant virtual immunity from both hazards.

Spearheading this development is Lightning and Transients Research Institute, a Minneapolis study group working under industry, Air Force and Navy contracts. L and T has worked out modern lightning arresters for radio antennas, plus a “diverter-discharger,” an ingenious glass-fiber lightning rod for aircraft. An electronic “blinker” invented by Morris M. Newman, the Institute's director, supplies the *coup de grace* for precip static.

Laboratory lightning bolt, with energy enough to lift 500-ton weight 140 feet, passes through B-29 model without damage

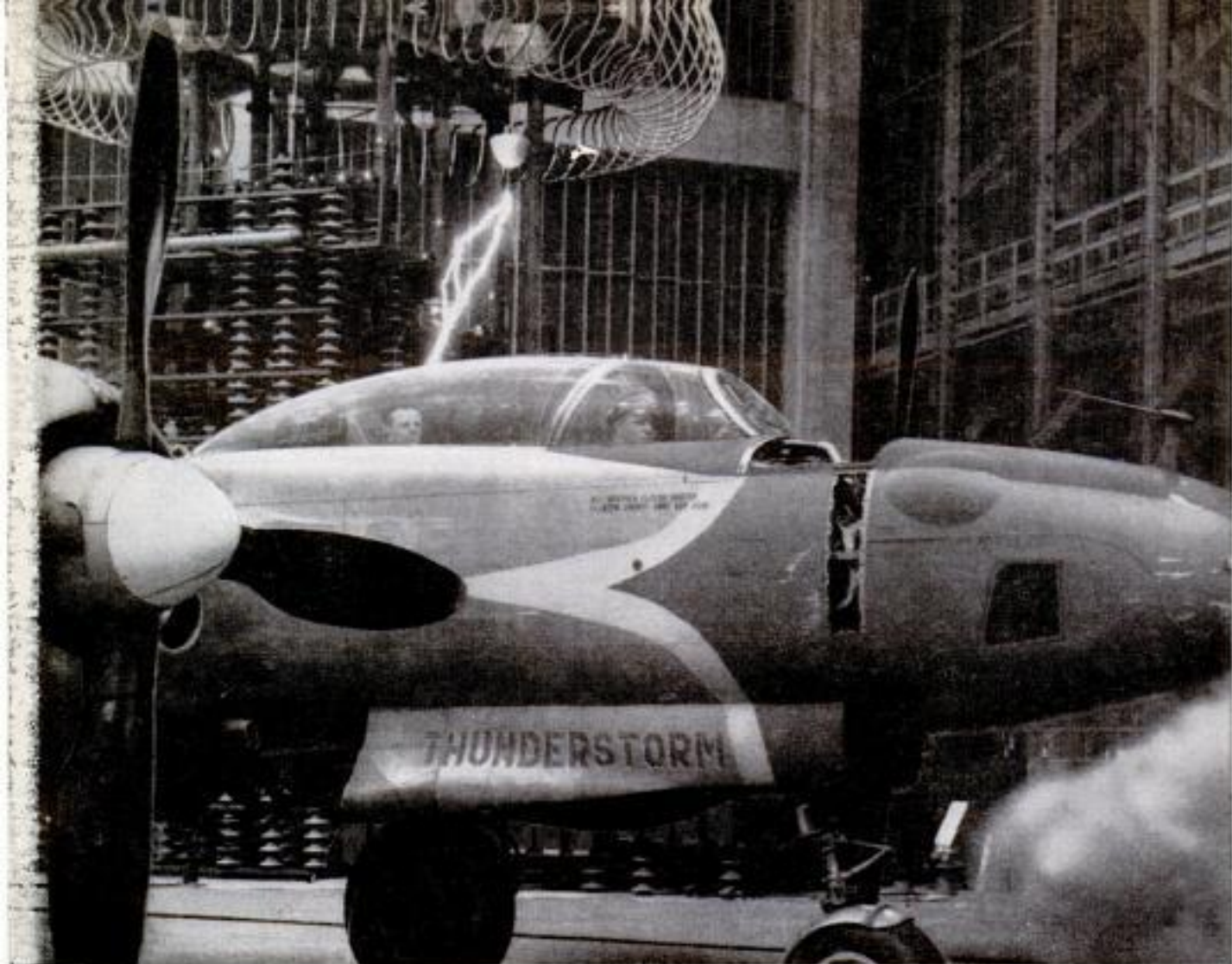
# POPULAR OCTOBER 1957 MECHANICS

WRITTEN SO YOU CAN UNDERSTAND IT  
VOL. 108 NO. 4

## *Lightning Tamers of the Airways*

*By  
Ted Dutton*





Night-fighter plane takes high-intensity stroke to protective strip on canopy but occupants are not harmed

Hole about the size of a dime was drilled in this jet-trainer tail cone by bolt of natural lightning



How well do they work? Airline electronics engineers, witnessing demonstrations in Minneapolis recently, can testify to their potency.

First, the experts crowded onto a catwalk in the Institute's lab, a former power company substation. Before them stood an up-ended aircraft-wing section, a whip-like diverter-discharger extending two feet from its tip. Overhead loomed the business end of a six-million-volt lightning generator, one of the world's largest.

"Ready?" called the operator from his booth. The engineers squinted and poked fingers in their ears.

"Three, two, one—fire!"

The lab flared white. A terrific crash, like the muzzle blast from an antiaircraft gun, split the silence. For a fraction of a second, a one-million-volt discharge zipped down and sizzled along the lightning rod. Then it vanished, leaving the spectators blinded and deafened.

"No damage at all," commented John Robb, an L and T researcher. The rod has a conductive coating, he explained. Graduated resistances channel the stroke safely to the airframe, localizing burning and pitting on a disposable shank at the base.

For a demonstration of what happens when you don't use lightning arresters on aircraft, Robb led his guests to another section of the lab. Here three generators hummed faintly, charging up for a demonstration shot of so-called "hot" lightning—the long-duration, low-voltage kind encountered in cloud-to-cloud flashes. Hot lightning burns. "Cold" lightning—a briefer, high-voltage variety—has shattering effects.

For safety, the spectators watched from a steel-and-glass enclosure. Came the count-down, then—Wham!

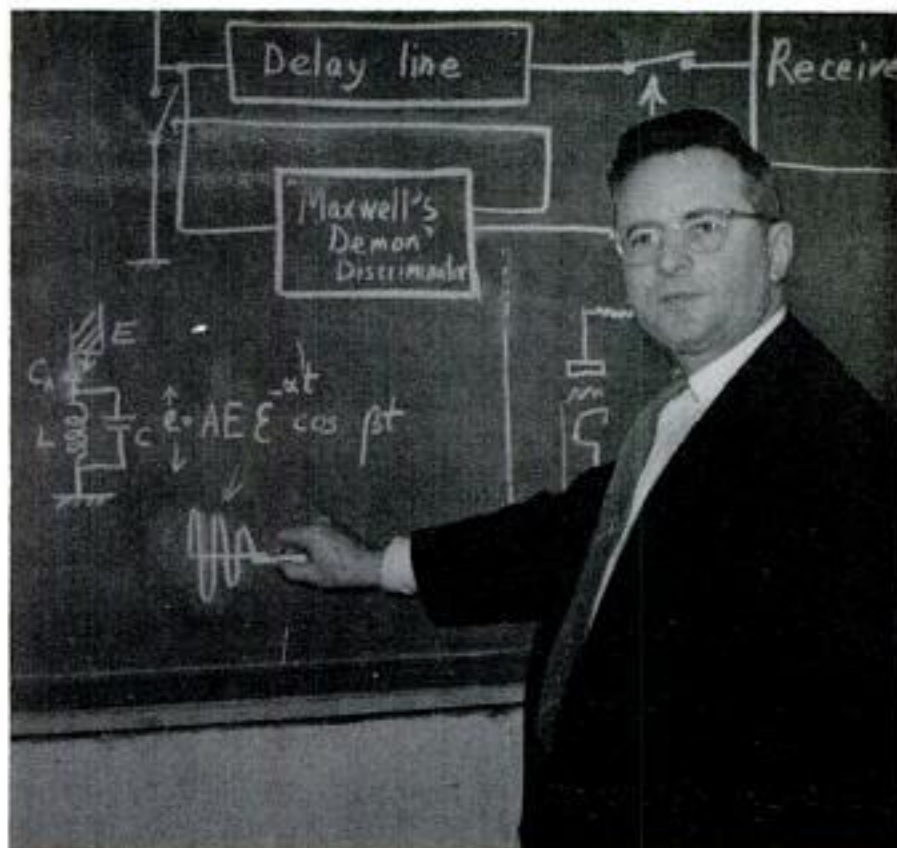
A yellow flash leaped down to an aircraft antenna stretched between terminals on the concrete floor. White smoke filled the room. Molten metal showered in all directions, like a bursting napalm bomb.

"There goes your receiver!" said Robb. He climbed down from the booth and retrieved the wire. It had vaporized in its polyethylene insulation. You can get the same explosive effect even with an arrester, Robb commented, if it's installed inside the fuselage, with ordinary antenna wire used as a lead-in. Cockpit installation requires a heavy inside insulated conductor to guard against explosion and possible fire.

Finally, Robb led the visiting firemen to a copper-sheathed radio shack. Here James Stahmann, a static expert, demonstrated the latest electronic blanker for automatic radio direction finders. The blanker, technically an "interference-rejection circuit," weighs three pounds but costs \$600. It chops out corona pulses 200,000 times per minute, permitting man-made carriers to pass during the comparatively long noise-free periods between noise "peaks."

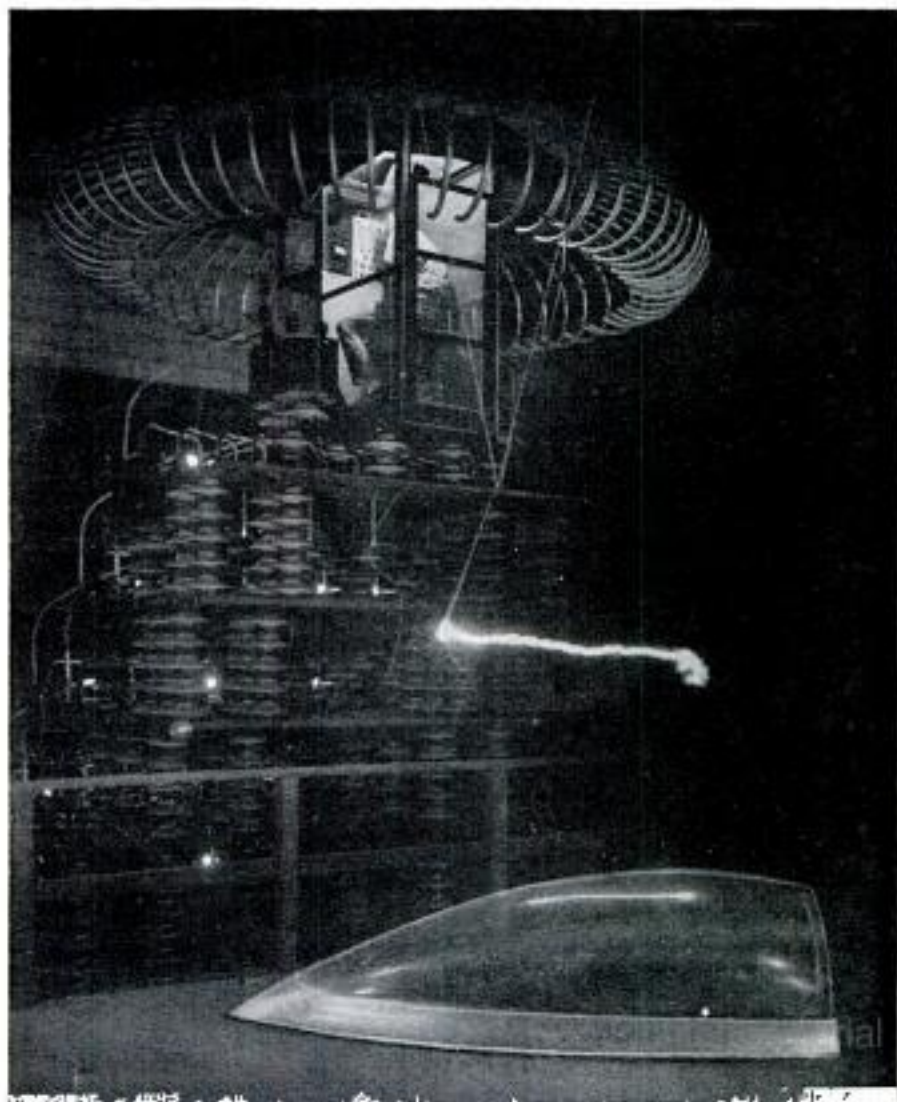
Stahmann switched on the automatic direction finder. A radio range "beam" and voice weather forecast came from the speaker. "Now for static," said Stahmann. He cut in a corona-pulse generator which simulates interference such as might be encountered by a jet flying in a thunderstorm's ice-crystal anvil top. Deafening static blared from the speaker, blotting out the carrier.

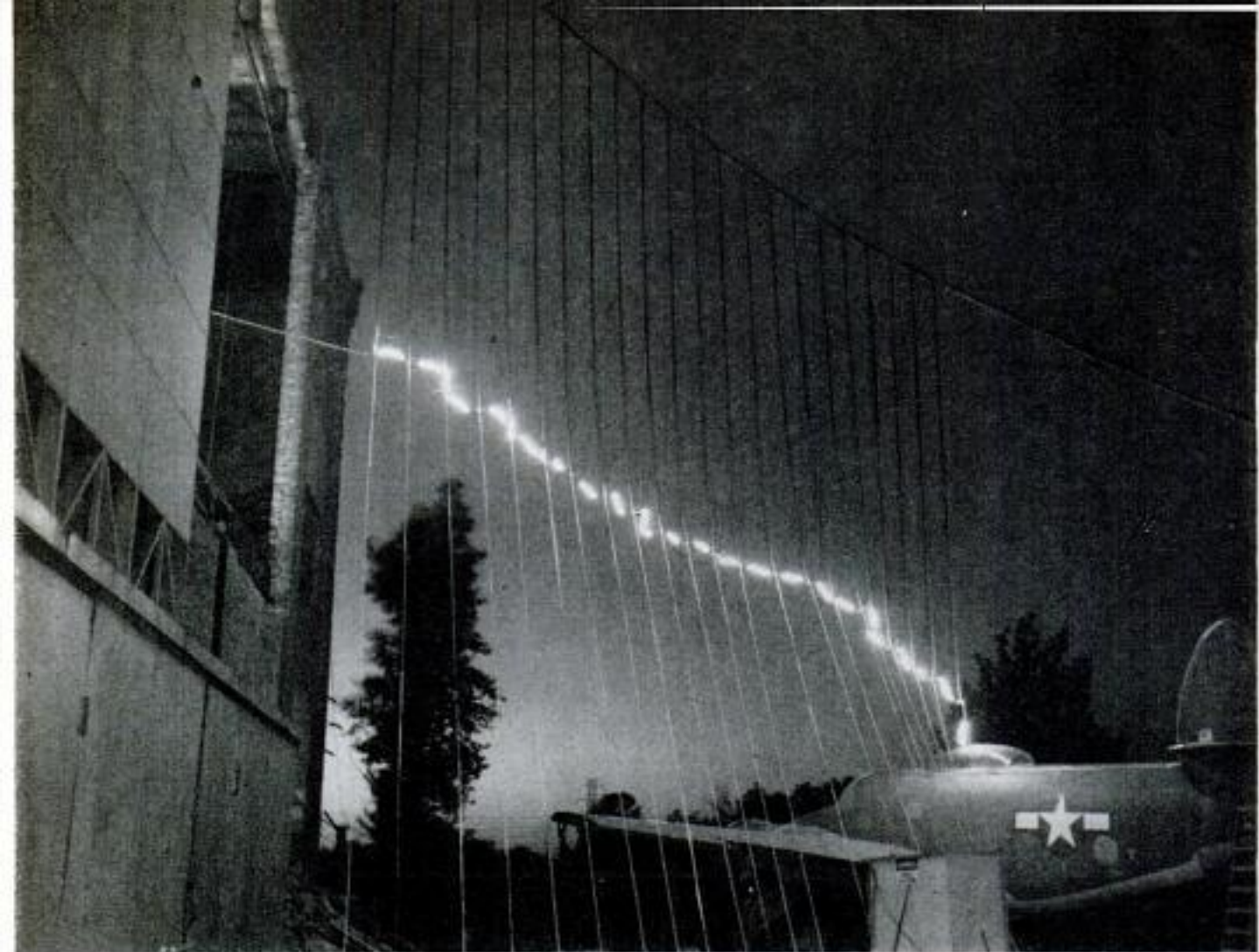
"Now the blanker," said Stahmann. He flipped a switch. Now



Morris M. Newman, considered world's top expert on lightning protection for aircraft, explains how static "blanker" works

Glass-fiber lightning rod mounted on the jet-fighter canopy channels high-intensity electric stroke safely to the airframe





Water-filled hoses guide a 40-foot manmade lightning bolt from laboratory generator to airplane canopy

the signals came in loud and clear.

There followed an equally impressive verification of the blunker's capabilities when used with the compass indicator. With the blunker off, the homing needle shivered, then flopped through a 180-degree arc. Stahmann cut in the blunker. The needle swung obligingly back to zero, the normal homing bearing. There it froze, unperturbed by the static.

The blunker is no laboratory curiosity, but has proved itself in flight, said Stahmann. On B-29 Arctic missions recently, blunkers gave virtually 100 percent

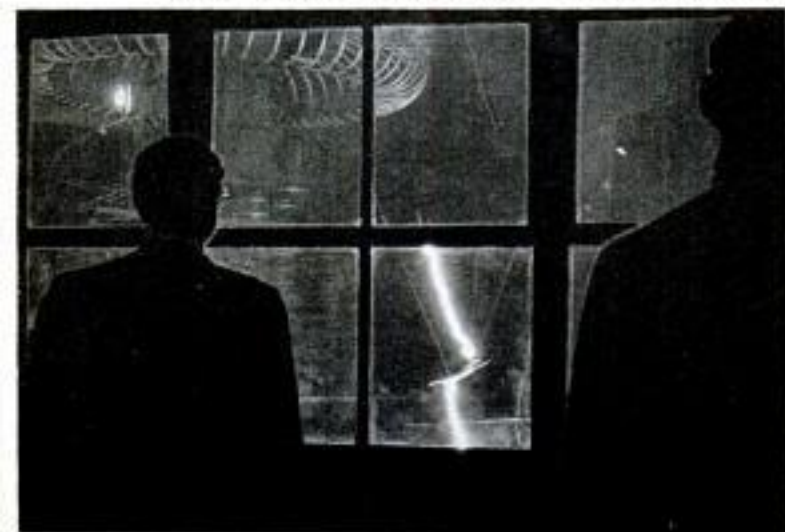
freedom from static with liaison and loran sets. Near Wright Field, in snow, a blunker-equipped F-86 read Indianapolis Radio clearly, 200 miles away. A wing ship, using an unprotected set, couldn't make out Dayton, directly underneath.

This sort of howling success is typical of the results L and T scientists get when they really sink their teeth into a problem. Now, with precip static in hand, they're turning their energies loose on lightning. The blunker has small effect on lightning-produced static. Also, the lightning peril to aircraft is growing as fast as the jet age advances.

For one thing, modern high-speed aircraft get struck far more often than their smaller, slower ancestors. Higher operating altitudes are largely responsible. Lightning hits aircraft most often when the air temperature is 32 degrees or slightly higher. In summer, when most strikes occur, the freezing level stays high—at the flight altitudes of modern pressurized airliners.

Additionally, high-speed aircraft are making increasing use of plastic housings for electronic gear. Plastic, a poor conductor, often gets punctured by lightning, and vital search devices get put out of action. As protection, the Institute is experiment-

Three, two, one—fire! Scientists behind steel-and-glass enclosure watch flash of four million volts



ing with conductive paints and metal grids that won't interfere with radar patterns, but will divert lightning harmlessly from the housing to the airframe.

Other stumblers command L and T attention, including the vital matter of safeguarding volatile new fuels and integral tank systems now being designed for military jets. The diverter-discharger is one answer, but it's insufficient. For one thing, how can you be sure lightning will strike just where you've placed the rod?

Before anyone can solve puzzlers like this, we need to know a great deal more about lightning—its generative process, mechanics and electronic characteristics. To this end, L and T scientists are firing manmade charges approaching four million volts at aircraft parts in the lab. And they've launched a survey calling for all airline pilots to report in detail all lightning hits on airplanes.

#### Boat Will Chase Storms

For more intensive study, they've purchased and equipped history's first "lightning ship," the bronze-hulled, three-masted schooner, *Azara*. On Lake Superior, the *Azara* will chase thunderstorms. Her crew will fire conductors into the air with rockets, and study the natural strokes thus invited. During fair weather, they'll manufacture their own lightning with the ship's lightning generators.



Researcher makes adjustment on electronic blander, which virtually eliminates aircraft radio static

There's small danger in this, Morris Newman contends, and there are vital advantages. Lightning traps, such as the one the Institute maintains atop 447-foot Foshay Tower in Minneapolis, don't get struck often enough. And, with the *Azara*, natural static can be studied far from man-made interference.

With such ambitious aims, the Institute, already considered the world's top authority on flight electrical hazards, stands to make a monumental contribution to aviation safety. And its efforts are materially strengthening our air defenses, now sorely hindered by bad weather. Weatherproof radio and electronic gear could save our bacon, should enemy A-bombers attack during darkness and storm. ★ ★ ★

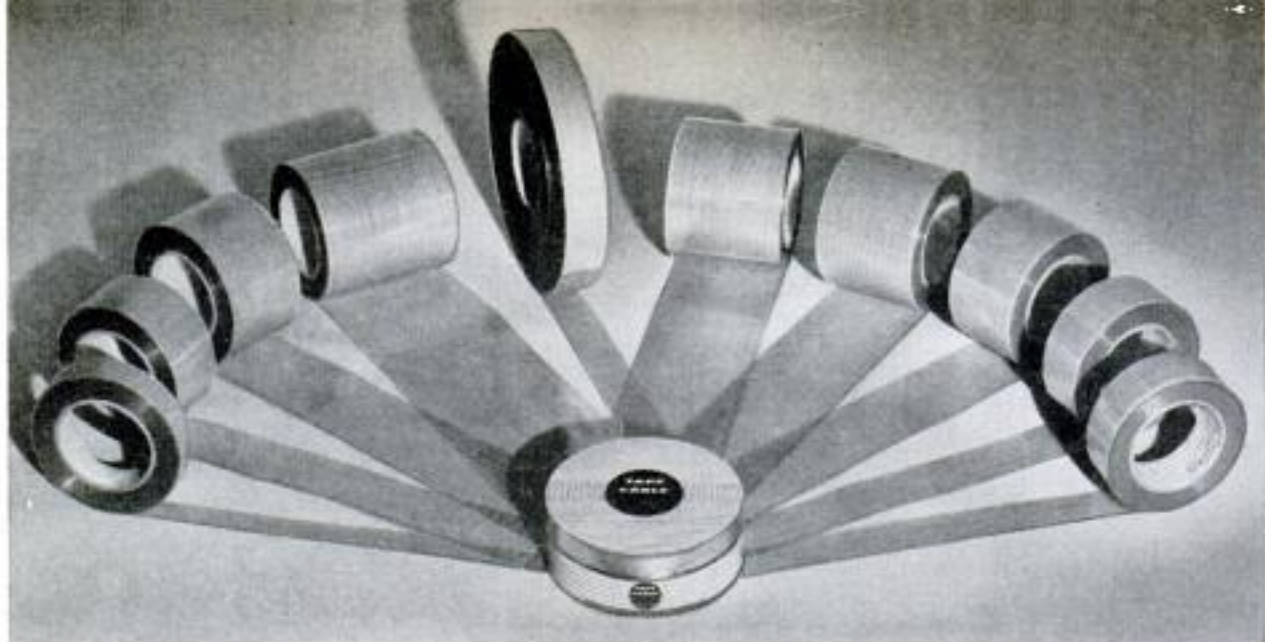
## Evinrude Announces Its Version of the V4 Outboard



Highlight of Evinrude's line of outboard motors for 1958 is a new V4. Information on the new motor arrived too late to be incorporated into the article on the V4 on page 140 of this issue. Basically the Evinrude and Johnson V4s are the same 50-horsepower motor, with different shrouds and certain other styling differences. Evinrude has two models of the new motor. The Starflite is the deluxe model with electric starting and the finest of styling features. The Four-Fifty is the standard rope-start version of the same motor. This is the first time Evinrude has brought out a production motor of more than 35 horsepower. There are 12 motors in the complete Evinrude line for 1958. The biggest change is in the Lark, the deluxe 35-horsepower motor. The same principle of noise suppression developed for the V4s has been adapted to the Lark. Old-time boosters of the Evinrude line will note one other change: A deep, rich blue is the predominant color of the '58 motors, replacing the paler blue that has been virtually a trademark of Evinrude for many years.

### Manmade Flames Rival Sun's Heat

Scientists now burn chemicals, such as ozone, hydrogen, cyanogen and other gases, to produce flames almost as hot as those on the sun's surface. These lab-made flames are being used to test ceramics and other high-temperature materials.



Like rolls of ribbon, newly developed electrical cable in plastic insulation comes in a variety of sizes

## Low-Current Electrical Cable in Tape Form Invented

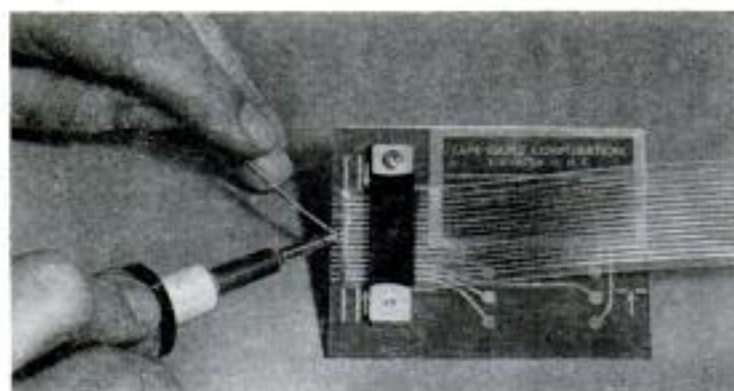
HAIR-THIN electrical cable in flat ribbon-like rolls has been developed for use in industry and research. Called Tape Cable, it is designed for equipment containing large quantities of low-current cables and wires, and where weight and space are important factors. This includes airplanes, missiles, telephone equipment, electronic computers and other electronic and automation devices.

The cable, only .0015 inch thick, is embedded in a transparent-plastic insulation. It saves up to 85 percent in the use of copper compared to conventional cable with round conductors. It is made in nine sizes, with cables numbering from 9 to 50, in rolls up to 1000 feet long.

Tape Cable is flexible and is said to have high tensile strength, resistance to heat and chemicals and to have a low inter-conductor capacitance. It can be cut with scissors or in an automatic-dispenser machine.

The insulation can be removed from all or part of the cables anywhere on the tape using a special stripping device. The manufacturer reports splices are easy to make, hand soldering is fast and with dip soldering all the connections can be made in one time-saving operation.

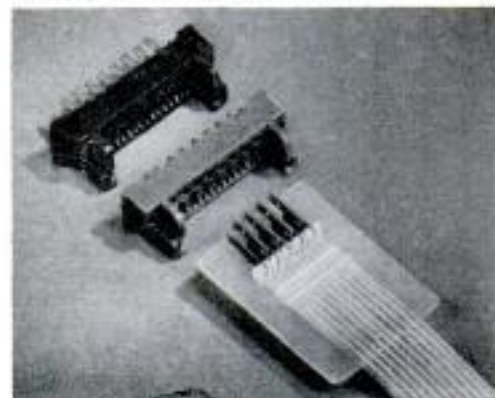
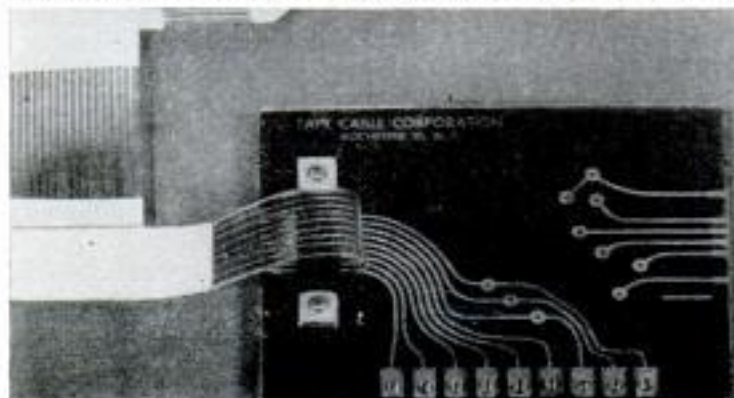
The inventor of the new product is William Richter, president of the Tape Cable Corporation, Rochester, N. Y.



Hand soldering of electrical cable, above, is fast and easy. In dip soldering, all connections are made in one operation

Used with printed wiring, tape's tensile strength is 80 pounds per inch of width—more than in the soldered connections

Simultaneous joining of cables to connectors saves time, eliminates color coding



**FORD DENIES IT**—and it does sound almost too fantastic to be true. But there are several 1958 Fords (that's right, 1958) driving 'round the world right now.

For the first time in history, natives in the dark jungles of Burma are seeing a new-model American car before natives of civilized Dearborn, Mich.

The highly secret promotional stunt (known as Project X) will be disclosed with suitable fanfare at the 1958-Ford announcement early in November.

Incidentally, these Fords are having troubles—not mechanical, though. Bangle-fancying natives are prying loose hub caps, trim parts and other miscellaneous pieces to save as family heirlooms. They are keeping the factory busy shipping handmade replacements to remote parts of the world.

This 'round-the-world stunt (and it may be in 80 days, like the movie) is indicative of what the industry will do now that it can't talk about speed, horsepower and performance. Reliability and comfort will be the big sales pitches—plus styling, of course. Who knows, maybe even economy will get a mention?

Just because you can't talk about power doesn't mean you can't make engines more powerful. But, engineers claim, they are more economical, too. Bigger displacements, they argue, allow use of economy rear-axle ratios. The result: Better gas mileage. We await proof, however.

#### Give 'em Air

Air suspension may be common even faster than the optimists predicted. At extra cost, of course. But after all, the automatic transmission costs extra and it's virtually standard today. Experts predict 20 percent of one low-price car will be air-suspended in 1958.

The air system is expected to cost at least \$200 extra, perhaps more. Is it worth it? In a rough-and-tough "blindfold test" of a 1958 air-suspension car and an identical 1958 steel-suspension car, this reporter had to concentrate long and hard to pick out the air ride. If it is that difficult to detect the difference, air suspension may be tough to sell after the gotta-get-the-latest sales are over.

Under normal operating conditions with partial loads and on a good highway or a city street, even engineers admit they can't easily tell the difference.

But air's side advantages may make it worth the premium price. Biggest of these is its constant-height feature. Regardless of load, the car remains level and at a constant height. Bottoming is impossible, even fully loaded. Headlights aim correctly at all times. Driveway scrape is gone.

On long trips, fatigue is noticeably less,

# Detroit Listening Post



By Art Railton

advocates say. The ride differences on good roads are subtle, but the human body relaxes more and is less tired after a long day's drive atop air bags. In a 10-mile test drive, you may not notice much difference, but on a long trip you will, engineers say.

Incidentally, conventional shock absorbers will be obsolete when air suspension is fully developed. With four separate shocks eliminated, cost should come down fast.

#### Double-Duty Headlamps

Presently the industry is talking about adding another filament to the high-beam lamps of four-headlight systems for use as turn indicators. Such an addition would eliminate separate high-intensity turn-signal bulbs in the front of the car. It might even be possible to add a park-light filament and further simplify the stylist's job by getting rid of the fussy small lights that "mess up" front-end designs.

Pontiac did it last year and now it's Buick's turn. The old "trademarks" (port-holes) are gone. The three and four-holers, with all their social connotations, are no more.

In the past (recently, too) cars retained certain visible trademarks to maintain identity despite annual style changes. Packard had its arched radiator shell, Pontiac its chrome streaks, Cadillac its up-turned tail, Ford its taillights and so on. But all of these have gone.

Then along comes Edsel with its vertical grille which seems to be a similar trademark. It remains to be seen if the grille will continue through the years.

At last somebody's admitted it—you can't sit comfortably on a drive shaft. The 1958 Thunderbird has four separate seats, two in front and two in back. The drive-shaft hump is styled into a neat console that contains various push buttons and controls. There's no way to seat three in the front. It will not endear T-Birds to young lovers, but the family man will like it more. This could change the whole concept of the car. ★ ★ ★



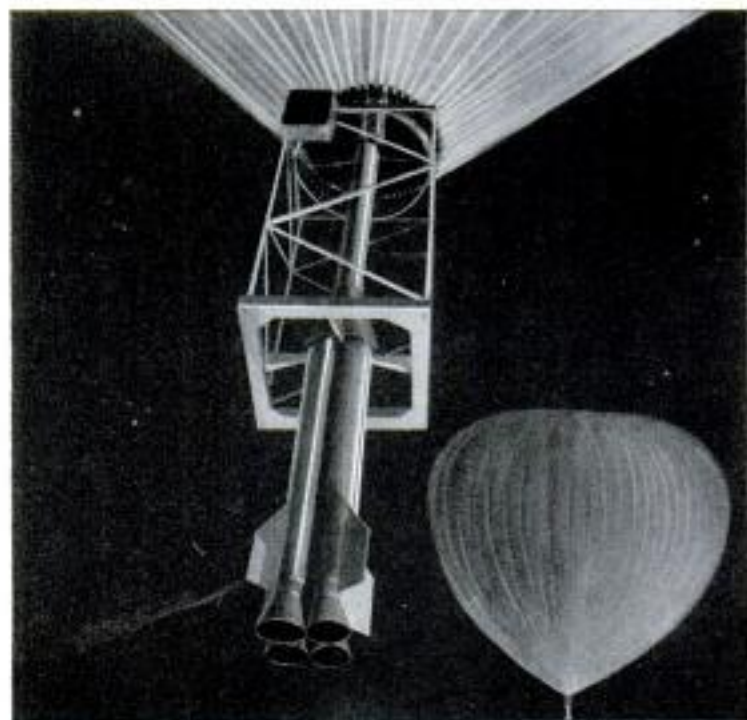
Mobile carrier holds 1900-pound rocket in its "cradle," which is attached to polyethylene balloon ready for 100,000-foot trip

## Rocket Platform in the Sky

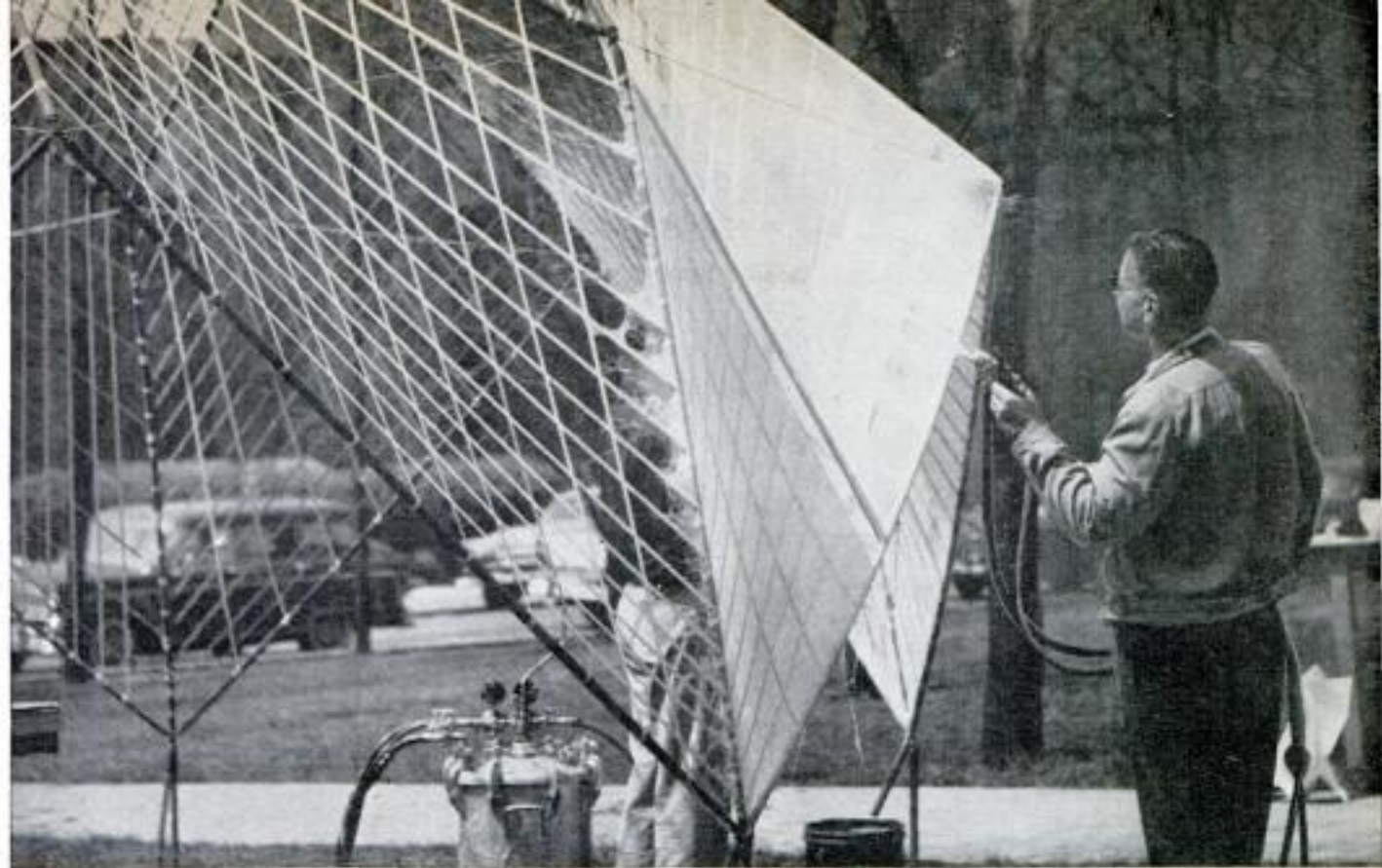
**CARRIED BY BALLOON** 100,000 feet above the earth, a rocket is to be launched and travel several thousand miles high at a top speed of 17,000 miles per hour. The fourth stage of the rocket will contain complex instruments that will transmit atmospheric information back to earth. Ten solid-propellant rockets will provide 26 seconds of flight, and the last stage will continue into space as a free projectile until it falls back to earth. The balloon is said to be larger than any previously launched, and it is the first time one will be used as a high-altitude rocket platform. The project is sponsored by the Air Force through a contract with Aeronutronic Systems, Incorporated, Los Angeles, Calif.

Left, rocket fires through balloon, is expected to travel several thousand miles high at top speed of 17,000 miles per hour

Balloon is largest ever built, 200 feet in diameter with 3,750,000 cubic feet of helium. It is first air-platform firing attempt



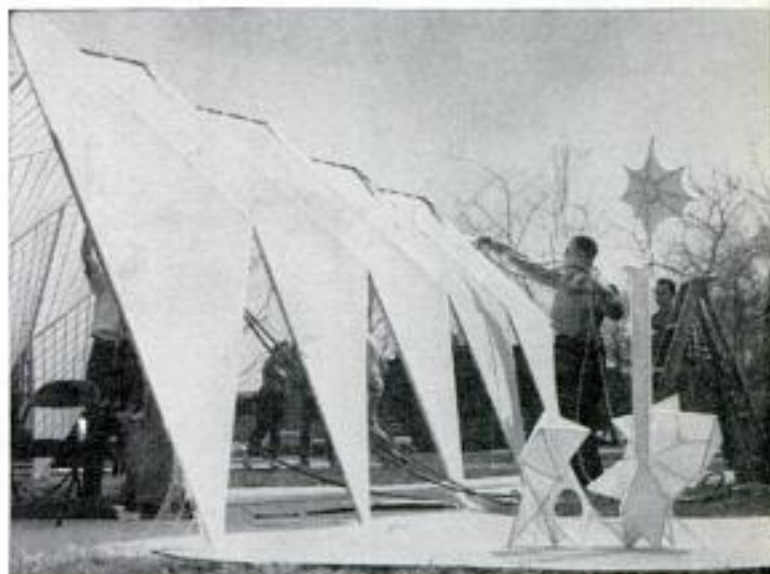




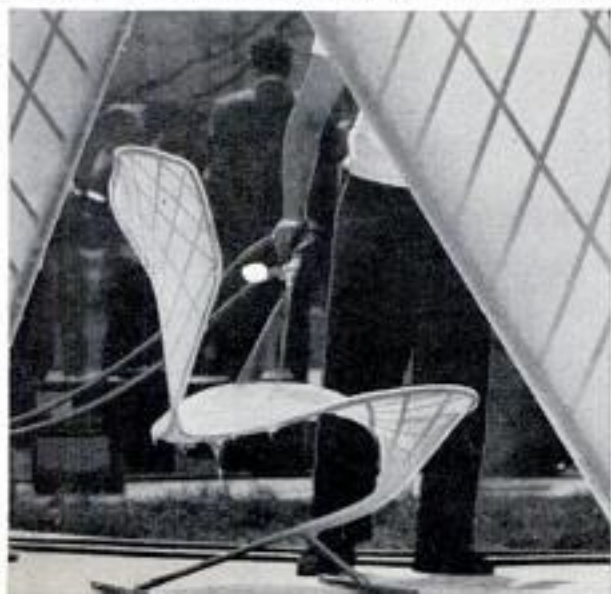
## Shelters of Sprayed Plastic May Be Houses of Future

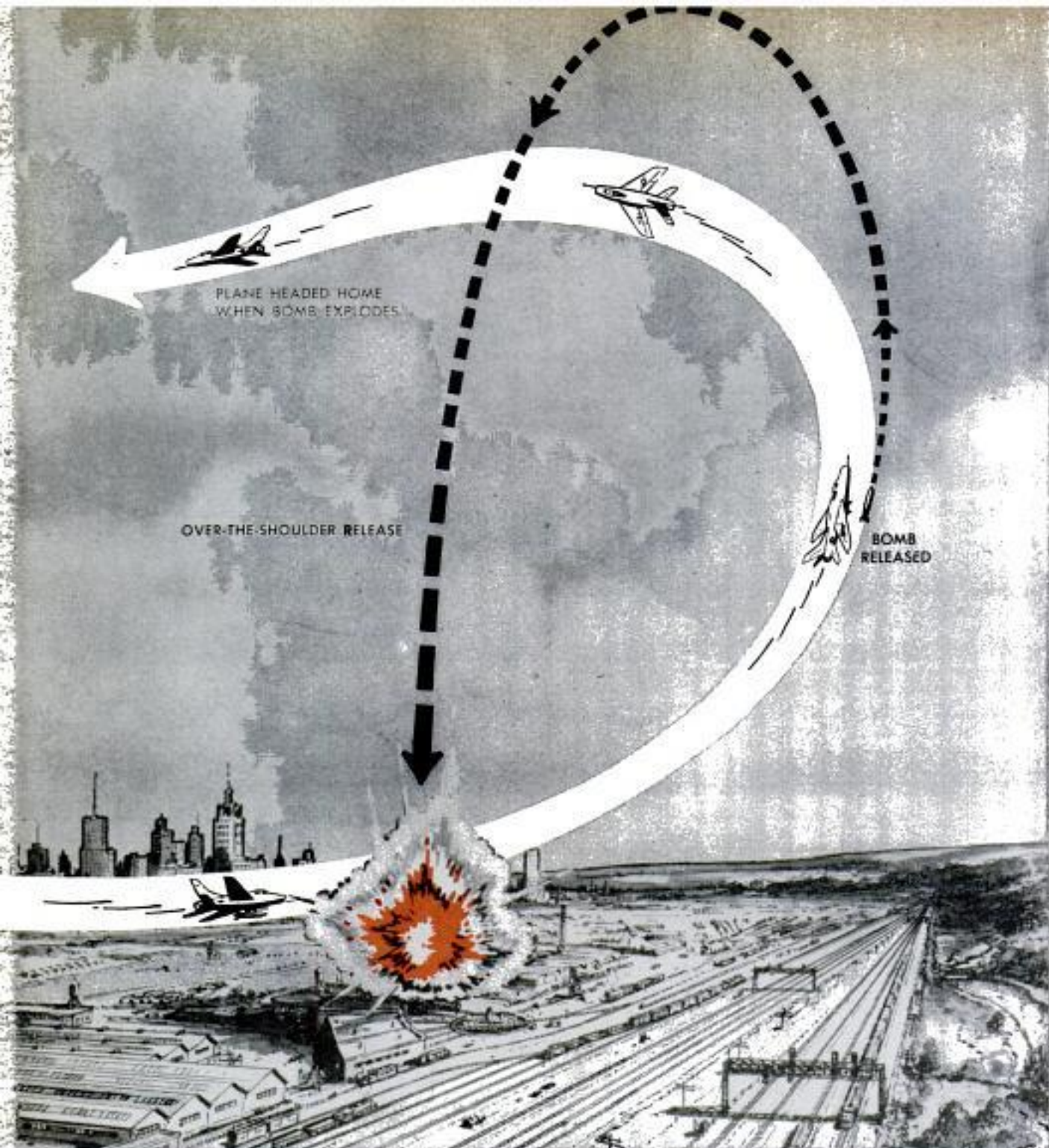
HOME BUILDERS of the future may be able to erect a house in less than a day, using only steel tubing, cloth tape and a quick-drying plastic spray. The technique, developed to "mothball" ships, is being applied to housing by students at Illinois Institute of Technology. The cloth tape, meshed at six-inch intervals, is sprayed with vinyl fibers, as shown in the photograph at the top of the page. A second coat of vinyl, with white pigment added to keep the sun's rays from deteriorating the plastic, is then applied. As the vinyl hardens, it shrinks, making the structure prestressed.

Chairs and other furniture to match the house can be produced with the same techniques and material



Objects in foreground, above, indicate versatility of plastic spray first used to mothball Navy ships. Finishing touches are applied, below, to a vinyl shelter completed by students in about 15 hours





Prompted by electronic device, pilot swings up, releases bomb "over his shoulder," then rolls out and is homeward bound at a safe distance at moment of explosion. Low-altitude approach fools radar defense

*Here is the inside story of a U. S. Air Force "first"—the electronic brain that made possible our*

## **Over-the-Shoulder Bombing**

*By Delmer J. Trester, Ph.D.*

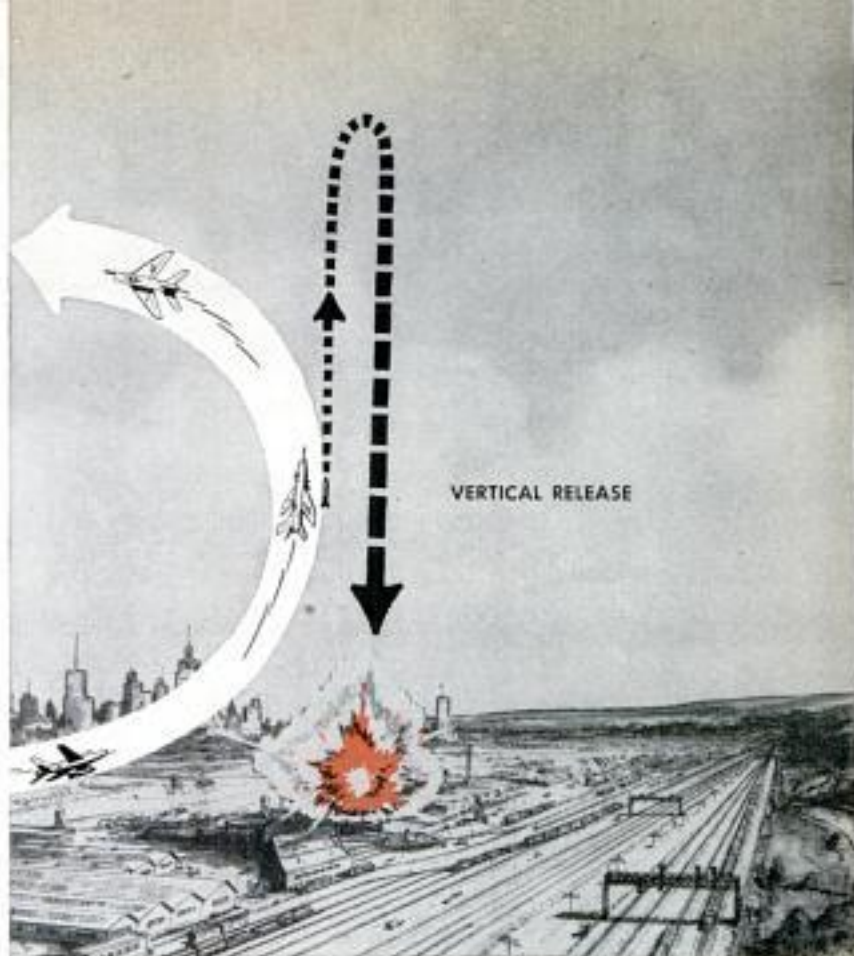
**THE AUTHOR:** Doctor Trester is chief of the Historical Division at the Air Force Special Weapons Center, Albuquerque, N. Mex. A Ph.D. graduate of Ohio State University, he has been an Air Force historian since 1951. He gathered information for this article from a report he wrote, "Atomic Weapon Delivery Developments for Fighter Aircraft."

**H**ERE'S A GLIMPSE of a future war right after hostilities had gotten under way. A U. S. Air Force F-100 Super Sabre fighter-bomber, loaded with an A-bomb, took off and winged its way toward enemy territory. Target: An enemy airfield.

Soon the F-100 pilot spotted a tanker aircraft lazily orbiting over a position previously selected for the refueling rendezvous. The pilots of the two aircraft identified themselves to each other, made the refueling connection, and soon the fighter-bomber pilot disconnected from the tanker.

Changing direction slightly, the fighter-bomber soon dropped to a low altitude and skimmed over the waves to evade detection by enemy coastal radar installations. Suddenly and swiftly he passed the coast and hedgehopped over the enemy countryside, carefully noting his navigation landmarks. Getting closer to the target area, he checked several gadgets on the instrument panel. This was his first low-altitude delivery of a "live" atomic bomb, although he had flown many such missions with dummy atomic weapons.

A last-second check of his position indicated he was on course. Then he began his bombing run. He crossed a railroad track and bridge network and pushed a button which set into action the low-altitude bombing computer and turned on an instrument-panel light. The F-100, still flying at only a few hundred feet altitude, made a beeline directly toward the airfield until a predetermined time had elapsed. Then the signal light went out and the pilot pulled his aircraft up into a tight Immelmann maneuver: A half loop with a roll-out at the top. During the pull-up, the bomb was released at a preset angle and was tossed in a high arc toward the target.



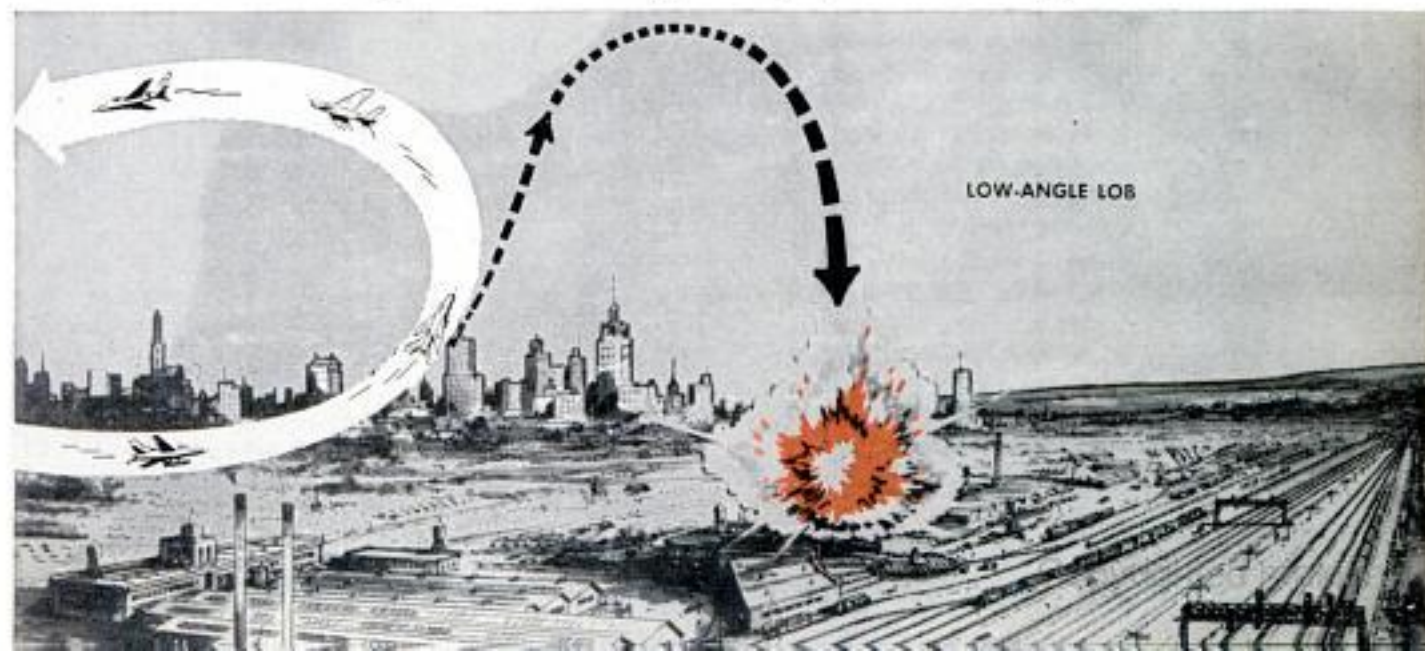
In this maneuver pilot releases bomb vertically over target

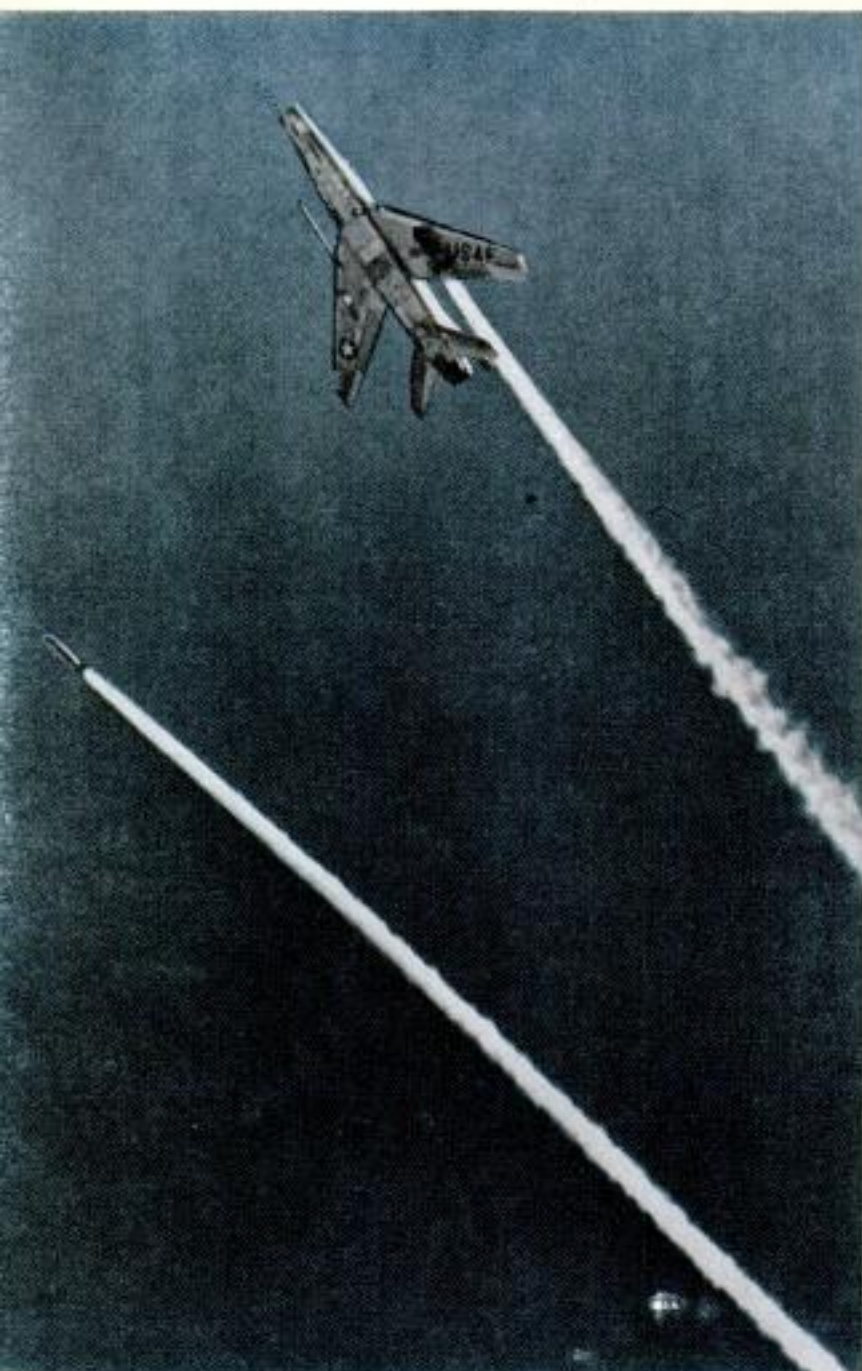
The pilot continued his maneuver and when the bomb exploded he was rapidly leaving the target area in the same direction from which he came.

The bomb detonated a few hundred feet over the airfield with a force equal to that which had unleashed such great destruction on Hiroshima and Nagasaki. The airfield's hangars, runways and aircraft were completely destroyed. The F-100 retraced its path and soon was back at its home base, ready to carry out another mission.

Such was a hypothetical retaliatory attack against a hypothetical enemy. But in 1957 the public's concept of the delivery of atomic weapons usually brings to mind

A third method calls for low-angle lob of the bomb as pilot swings up short of his target, turns homeward





Super Sabre jet demonstrates a bomb toss. The bomb is just beginning its low arc toward target as pilot prepares to pull away

a large bomber, of the B-36, B-47 or B-52 variety, which can drop a high-yield atomic or thermonuclear bomb from an extremely high altitude. Although the Air Force has released information stating that fighter-bombers can carry and deliver A-bombs, that information has neither indicated the extreme importance of this capability nor the revolutionary nature of the delivery methods which the Air Force now has.

The existence of tactical aircraft capable of delivering A-bombs has been and is of overwhelming importance to the protection of Western Europe, the United States' prime military commitment. Should a future enemy prove to be Russia, the Air

Force fighter-bombers can provide a knockout blow to immobilize Soviet air bases and possibly cripple Russian airpower—one of the biggest headaches for the western powers' commander. Destruction of enemy communications and isolation of the battle-field area ranks as the second most important tactical task.

Back in the summer of 1953, Gen. Alfred M. Gruenther, chief of staff for the Allied armies, testified to the key role of fighter-bombers and atomic weapons in the defense of Western Europe. He told the Senate Foreign Relations Committee that the North Atlantic Treaty Organization expected to use its ground forces solely to squeeze enemy troops into concentrated areas, so that they would become suitable tactical atomic-bomb targets.

Fighter-bomber aircraft, such as the F-84, F-86 and F-100 enjoy certain operational advantages over heavy bombers which make them particularly well-suited for tactical bombing raids and which even allow them to reach targets normally limited to the strategic heavy bombers. Fighter-bombers can operate more easily and quickly from short runways and emergency-runway installations. It is easier for fighter-bombers to navigate at low altitudes for penetration of enemy outer defenses and radar installations. And, of course, such aircraft have greater maneuverability and can attain higher speeds than present bomber aircraft. Thus they would be able to take evasive action either in their approach to the target or on the trip back to their home base.

In the past, one of the great shortcomings of fighter-bomber strikes was limited range. But the development of in-flight refueling techniques has erased even this restriction and theoretically allows the fighter-bomber pilot to replenish his fuel tanks so he can equal the range of the heavy bomber.

The conventional method of tactical delivery—before World War II—was the dive-bomb maneuver. It's not certain who was the first pilot to employ the dive-bombing technique, but one of the earliest on record was Leonard W. Bonney, an American aviator who participated in the Mexican Revolution during the years 1913 to 1915. Using spherical dynamite bombs of



In addition to this F-100, the F-84, B-47 and B-57 have all demonstrated ability to toss bombs in various maneuvers. The B-47, however, cannot perform a complete loop without risking the loss of its wings

Mexican design, Bonney carried out his dive-bombing exploits with a Moisant plane in and around Mexico City, Yucatan and Tampico.

Although not used extensively during World War I, many dive-bombing missions were conducted by England, France and the United States. Brig. Gen. "Billy" Mitchell became very familiar with the tactic, understood its implications in warfare and predicted that great strides would be made in dive-bombing.

In the summer of 1921 during joint Army-Navy bombing tests off the Virginia Capes, captured German naval vessels, including the battleship *Ostfriesland*, were sunk to prove the potentialities of air power. However, the maneuver which the pilots employed could probably be more accurately termed glide-bombing than dive-bombing.

The true dive-bombing technique received added emphasis in 1924 and 1925 at Kelly Field, Tex., where Army pilots experimented with the technique in dive angles up to 60 degrees. Subsequent to 1925, both Navy and Marine pilots gave many exhibitions of dive-bombing. Some aviation experts thought one such exhibition at the Cleveland, Ohio, air races inspired Maj. Ernst Udet of the German Air Force to further refine and perfect the operation for the famous Stuka (JU-87) aircraft. This dive bomber received its baptism of fire in the Spanish Civil War when the insurgent forces used it to great advantage in 1938 during their drive to the Mediterranean coast and during the Catalonian offensive. During World War II, the Stuka's tactical operations were extensive and effective, contributing in large measure to early German victories.

Meanwhile, the United States Navy, in the 1927-1928 period, came out with the original Curtiss Helldiver, the first American aircraft specifically designed for dive-bombing. During World War II, of course, the Army Air Forces, the Navy and the Marine Corps used many types of air-

craft in their widespread dive-bombing operations.

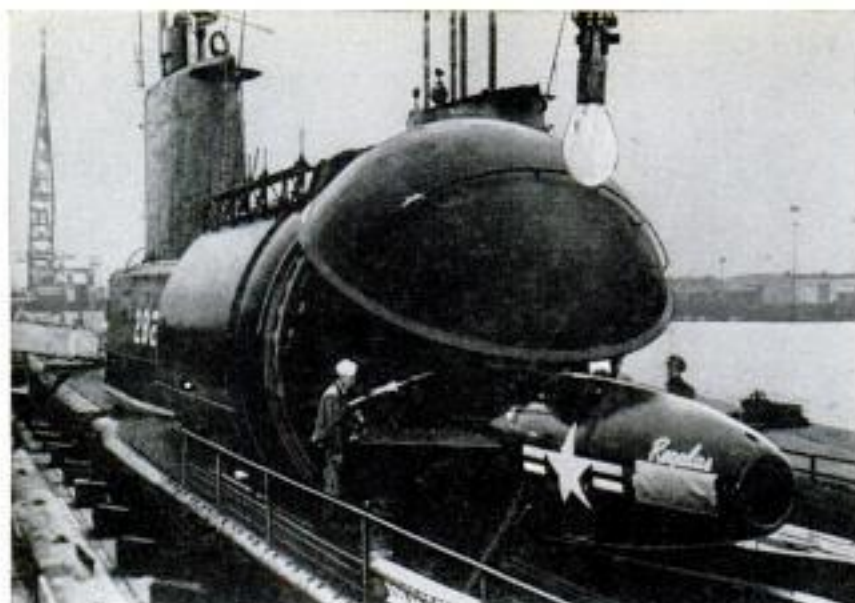
In general, such a bombing technique was fairly accurate. But to be accurate, the bomb drop had to be made at low altitude while the aircraft was still in its dive. In the standard dive, the pilot used sights having a depressed sight line, and in tracking the target with such an instrument he had to fly a path which eventually became tangent to the bomb trajectory. The ever-steepening dive caused the pilot difficulty in tracking the target. Modern high-speed aircraft reached a point in the dive where lift forces were at a minimum and the aircraft did not easily respond to its controls. This condition meant a lengthy recovery and a sluggish escape maneuver which served to inflict on the pilot a serious physical as well as psychological hazard. The advent of atomic weapons, moreover, imposed the additional danger of weapon effects.

There was an even greater limitation to dive-bombing which meant serious operational restraints. Close examination of atmospheric and weather conditions surrounding Iron Curtain cities in Germany revealed the alarming fact that there was a three-tenths cloud cover at 6000 feet for 60 percent of the year. An Air Force study showed that a minimum cloud ceiling of 15,000 feet was needed to deliver an atomic bomb of nominal yield and allow the pilot to escape safely.

The obvious answer to this tactical dilemma was the development of a bombing system for fighter-bomber aircraft which would function at extremely low altitudes while providing surety of pilot and aircraft survival.

An urgent requirement was sent to the Air Research and Development Command headquarters at Baltimore, Md. This extremely important segment of the Air Force has as one of its missions the development of new and improved devices and systems for the conduct and support

(Continued to page 298)

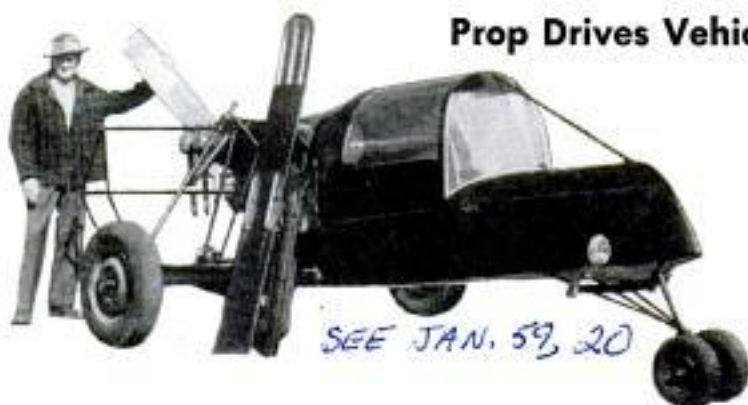


## Sub's Missile Stored in Tank

Safe and dry until needed, the Navy's surface-to-surface guided missile, Regulus, is stored in a huge capsule, shown at left mounted on the aft deck of the submarine, USS *Tunny*.

## Broadside Jolts Ship

Recoil of a full broadside fired by a battleship will push the ship over about two feet.



## Prop Drives Vehicle 100 Miles Per Hour on Ice

Powered by a 65-horsepower airplane engine, the vehicle in the photograph, left, travels almost anywhere. The builder, Maynard L. Popp of Okauchee, Wis., claims it can move at 100 miles per hour on ice, a bit less on land or water. Runners are attached for snow and ice travel and pontoons for water. Lack of proper brakes keeps it off the highways.

## Motorboat Is Its Own Trailer With Built-in Retractable Wheels



With built-in, retractable wheels your motorboat will be its own trailer. Singlehandedly, you can push the boat-and-trailer unit into the water, then hop into the craft's front seat and operate hydraulic controls to raise the wheels and float the boat. When you're ready to go home, just drive the boat onto a ramp or beach and, using the same controls, lower the wheels for locking into the trailer position. Connect the special hitch between the boat and your car, and drive away. Built for 14 to 16-foot craft, this trailer system consists of pneumatic-tired wheels mounted on a retractable frame and axle. When retracted, the wheels serve as fenders or floats.



VW fanatics may not like it, but the new model has a flat gas pedal, replacing the bug's unique roller

# Volkswagen Gets More Glass



Dotted oval is the old window shape. New rear glass is 45 percent larger. License "pocket" is reshaped

WHO SAYS some things, like the Volkswagen, never change? The new VW is different, although to the nonenthusiast it still looks like the same little bug.

Major change is an enlarged rear window. Its area is 45 percent greater, most of it being in width. (It is interesting to recall that in the *Popular Mechanics Owners Report* on the VW the most frequent complaint was limited rear vision.)

Also larger, although by only eight percent, is the windshield, a result of narrowing the front pillars considerably.

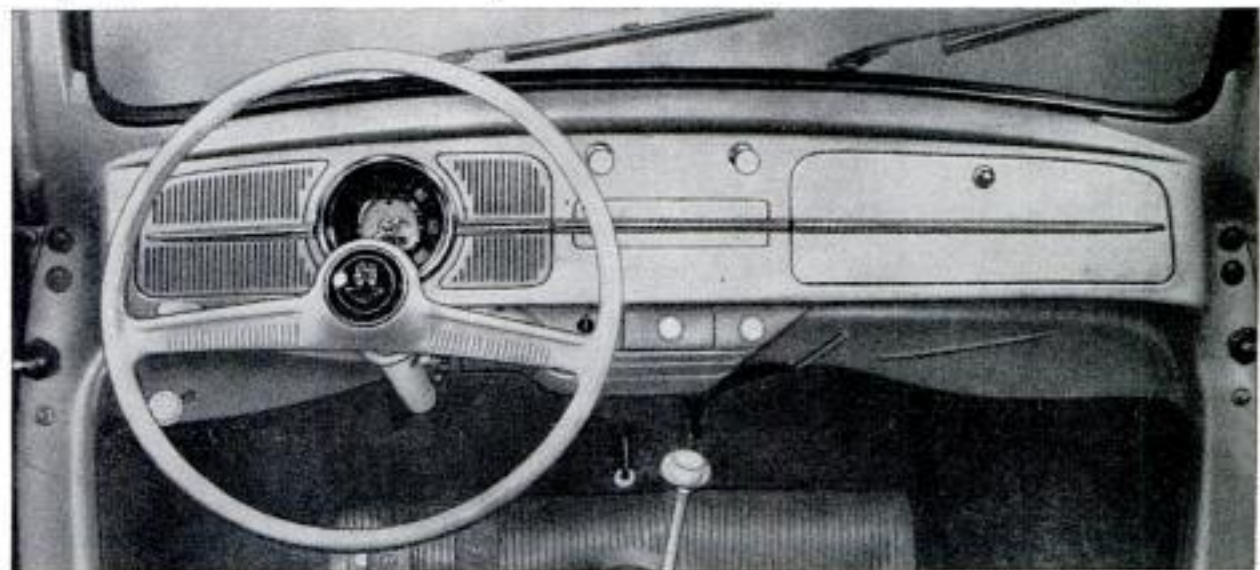
Other changes: An organ-type accelerator pedal (replacing a roller-type pedal that many women found awkward to use), more widely separated brake and clutch pedals, faster wipers and a redesigned dashboard with a much larger glove box.

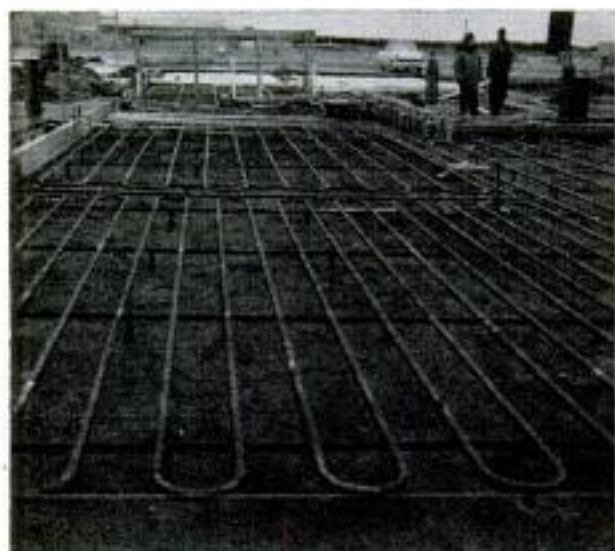
What about the engine? It is unchanged except for a slightly different air cleaner.

Windshield is larger, too. Wipers are relocated and wipe a greater area. Blade speed is 50 percent faster



Completely new is the dashboard. Radio speaker mounts behind grille to the left of unchanged speedometer





## Steam-Heated Runway Melts 10 Feet of Snow

Looped patterns of steel piping in various designs (above), painted on concrete, show the result of a successful experiment to melt heavy snow from airport runways by steam heat. First, as shown in the photograph at left, different sizes of piping were installed at varying depths and spacings to find the best combination. The experiment was conducted by the American Hydrotherm Corp., and the U. S. Air Force at its Loring Base in Maine, where up to 10 feet of snow falls and the temperature is around 40 degrees below zero F. during an average winter.

## Automatic-Brake Device Stops Truck at Loading Dock

Cargo handler in the photograph, below left, prevents the truck from pinning him against the dock by pressing an arm attached to the rear of the vehicle. The pressure against the arm activates a switch,

sending current to a valve assembly that instantly applies the truck's brakes. Besides saving lives, the device prevents damage to docks and trucks by stopping the truck when the arms touch the dock.





## Copter Carrier For French Navy

Designed primarily as a training ship for French Navy cadets, the vessel shown as a model at right also will be France's first helicopter carrier. In peacetime, the 10,000-ton ship will carry 200 cadets and eight helicopters. In wartime, it can be converted quickly to accommodate 12 heavy copters as well as 700 "helitroopers" for convoy duty or amphibious invasions.

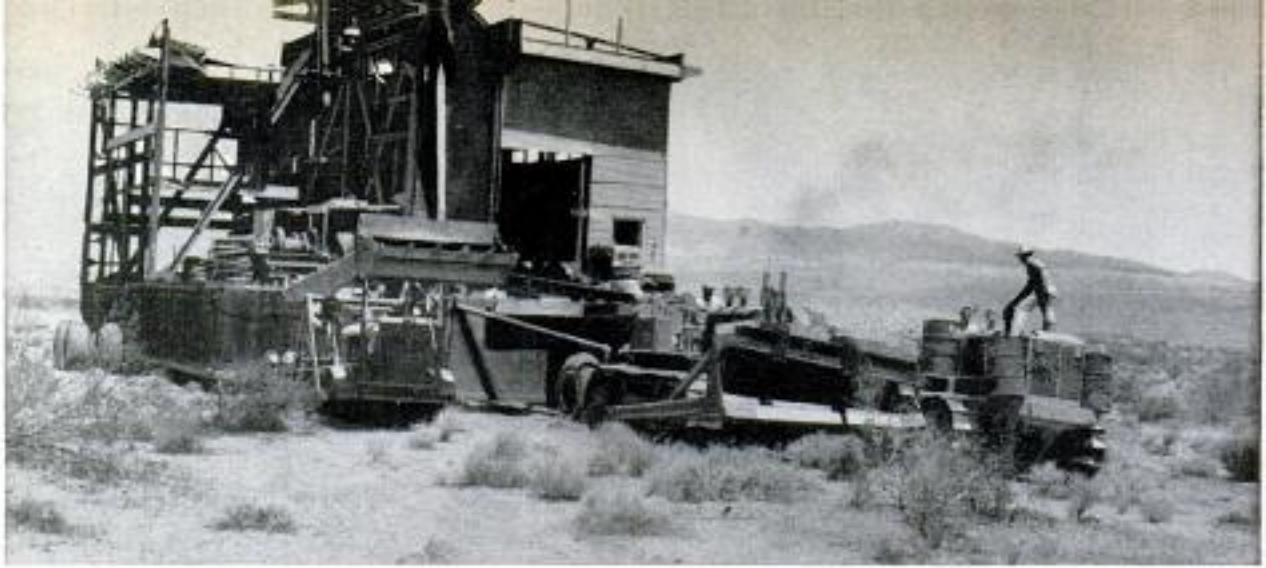


## Hydrofoils Lift Soviet Boat Hull Above Water at High Speeds

Russia recently announced development of its first "winged motor ship" which moves like a conventional boat at low speeds. But at speeds over 35 miles per hour, the wings, or hydrofoils, push the hull above the surface of the water. As a result, water resistance is reduced and less fuel is needed. The photograph above was taken during trial runs when the craft de-

veloped a speed of over 40 miles per hour. One man operates the boat from centralized controls. The Soviet boat is 88 feet long, has a beam of 14 feet and a 700 to 750-horsepower diesel engine. (Editor's note: This may be news to the Russians, but *Popular Mechanics* reported in July 1951 a "winged" boat with similar design and performance developed in Sweden.)





Tractors haul 400-ton dredge across the desert on B-17 wheels. Auto tires pave the way over soft sand



## Dredge Moves on B-17 Wheels

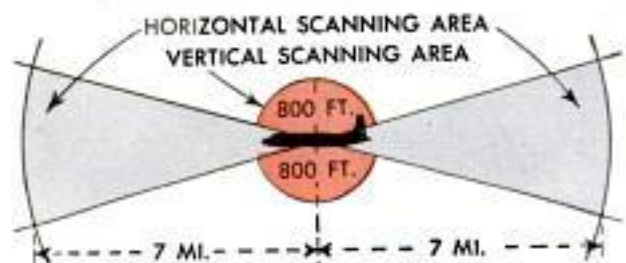
How would you move a 400-ton gold dredge across a range of desert hills from one valley to another? Mining engineer R. A. Naylor developed an ingenious method when contractors wanted a fortune for the 22-mile hauling job. He mounted the dredge on 10 war-surplus B-17 aircraft wheels and tires, then towed it behind three tractors. To avoid plowing the wheels into the ground, Naylor mounted two wheels on the front of the dredge and attached two pairs of wheels at each side. One wheel of each pair was placed six inches in front of its mate to serve as a "pathfinder." Each wheel had its own axle. Today the dredge is resting in its own pond near Red Mountain, Calif., and is mining tungsten ore from a buried placer deposit.

## Anticollision "Eyes" on Plane Warn Pilot of Approaching Craft



Infrared "eyes" have been developed to tell an aircraft pilot that another plane is approaching. The system includes one horizontal and two vertical scanners connected to a cockpit instrument. When the scanners detect infrared, or heat waves from the engines of a dangerously close airplane, an earphone buzz alerts the pilot and the instrument shows its location.

At left are infrared instruments that detect a nearby airplane and tell the pilot how to avoid collision. Drawing shows warning system's effective range



POPULAR MECHANICS

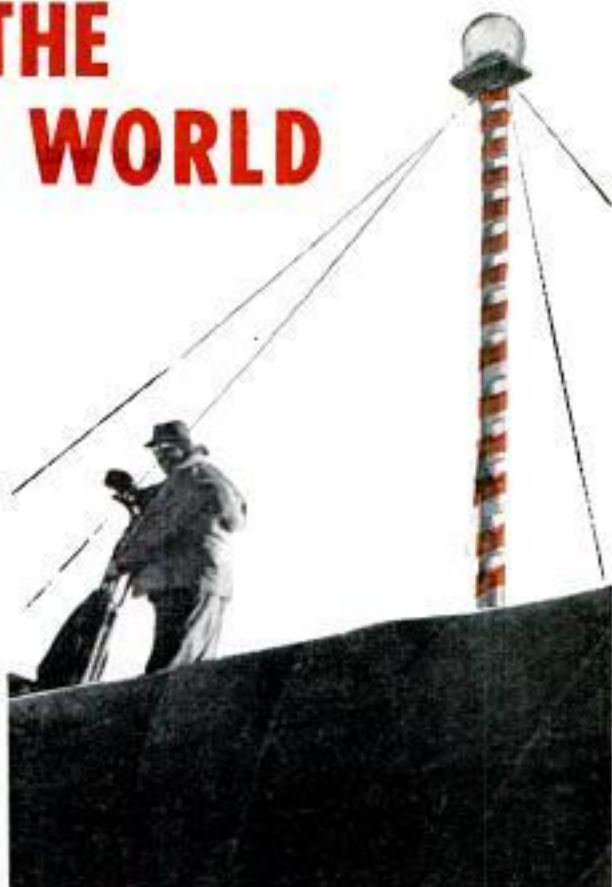
# OUR HOME AT THE BOTTOM OF THE WORLD

By E. H. Hubel

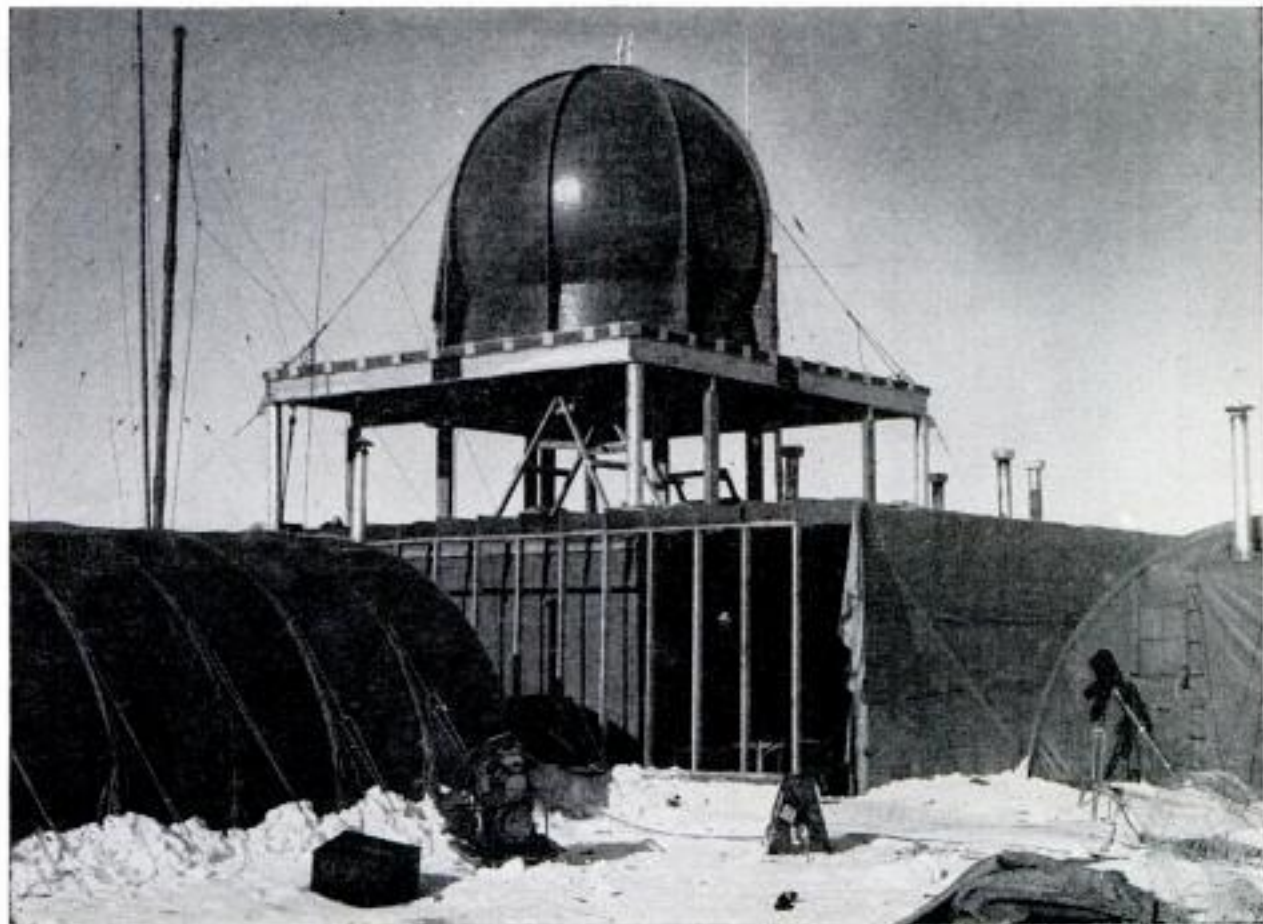
Utility Man's Chief, U. S. Navy

**O**UT ON ANTARCTICA'S 10,000-foot icecap, eight scientists and eight Navy Seabees are sitting out the bitter six-month Polar night—smack-dab on the South Pole. For nearly a thousand miles in every direction Polar storms drive granular snow across the white "desert" with stinging force. Temperatures read in the 120 degree-below-zero range. Shifting auroral draperies emblazon an onyx sky. The silence, when the wind is still, is the silence of outer space.

Until now, no living creature has dared face the rigors of winter night on the South Polar plateau—much less the high frigid region near the Pole, itself. The men living there, led by Dr. Paul A. Siple, senior scientist of our "Deepfreeze" expedition, are trained, hardened Polar experts comprising the United States' International Geophysical Year South Pole team. Their camp, which I helped to build last November and December, is a snug system of buildings and tunnels largely covered by



Red-and-white-striped shaft marks the location of the South Pole. Atop the pole is an inverted fish bowl. Big dome on stilts, below, houses radar for tracking weather balloons released twice daily



drifting snow. Inside temperatures are nearly as warm as your own home. Hot and cold running water (produced from blocks of snow), showers and recreation facilities provide comforts never heard of in that bleak ice wilderness.

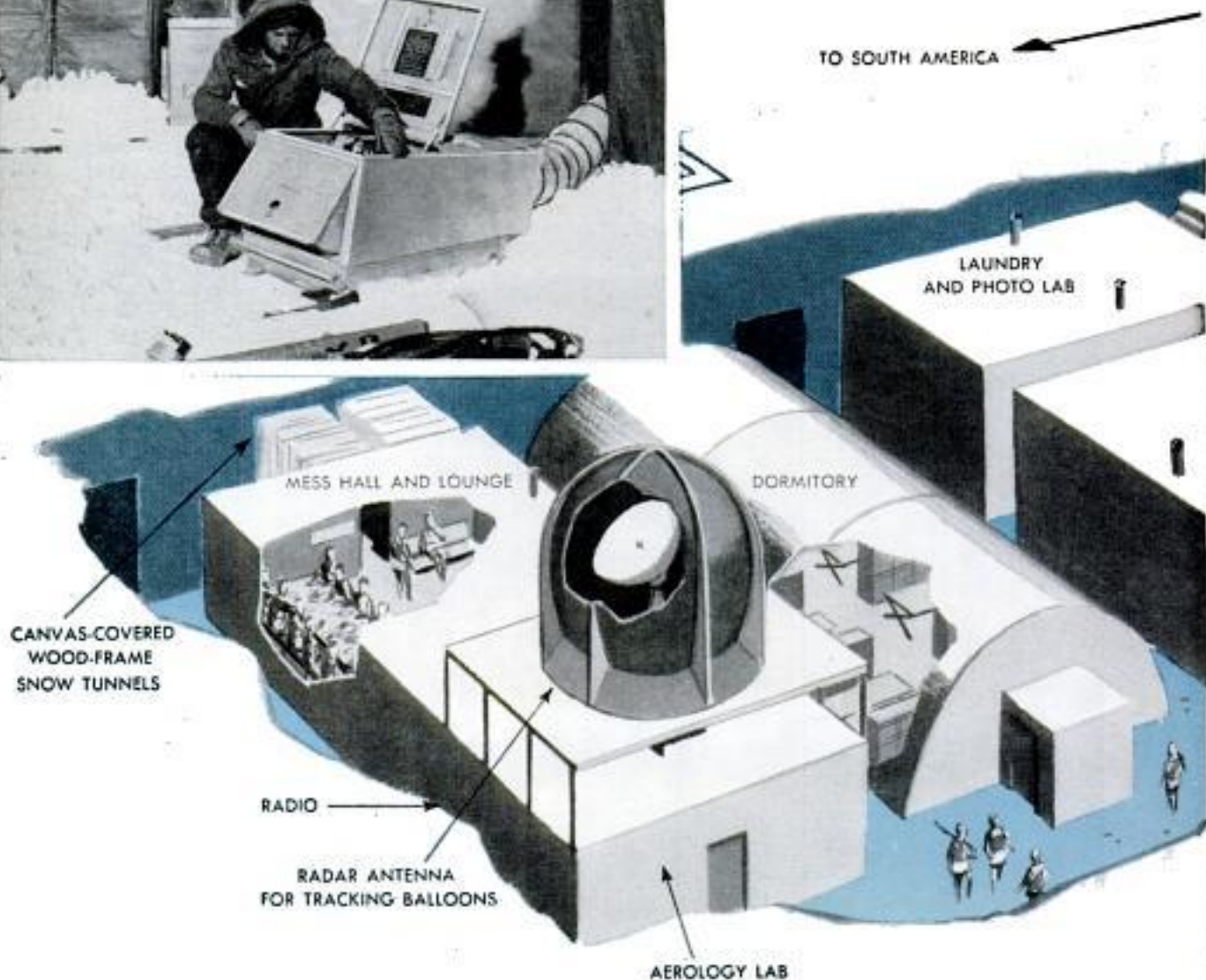
Until Admiral George Dufek, Commander of Task Force 43, landed on the icecap, no one was sure that a base could be built on the South Pole. Five hundred tons of material including a 17-ton D2 tractor, a weasel, nine big prefabricated buildings, plus 10 tons of food and 15,000 gallons of fuel to last 16 men more than a year, had to be moved 700 miles up from sea level to the two-mile-high center of the continent. Hauling that amount of material up the heavily crevassed ice of the Great Beardmore Glacier—which provided a gateway ramp to the Polar plateau for old-time ex-

plorers like Scott and Shackleton—was out of the question. It was doubted, too, that heavy ski-planes could take off or land on the deep, soft drift up there. No one knew what to expect. Plans called for air-dropping everything—including men if it became necessary—from huge Air Force C-124 Globemasters.

As it developed, Antarctica's central crust was solid enough to support our ski-equipped R4Ds and P2Vs, and these became taxis for men and light materials, ferrying back and forth between the ice runway at McMurdo Sound and a smoothed-out strip of snow that we called "Ike's Pike" at our Pole base. It was tough going. Temperatures at the Pole, even during Antarctica's "summer" months of November and December ranged from 30 below to 8 above zero. Skis froze solidly to



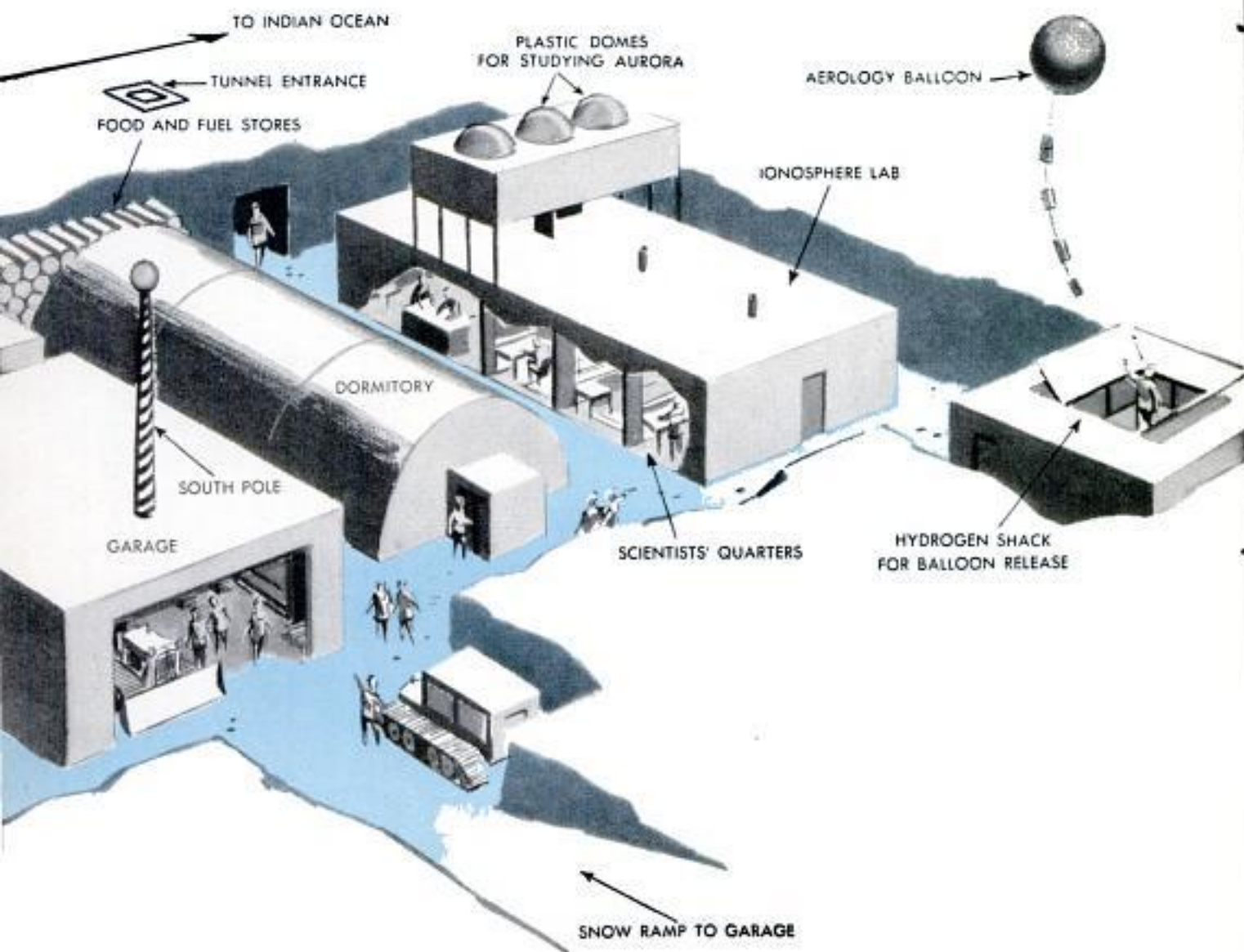
Navy Seabee at left is working on portable heater used to warm one of the Jamesway huts in which party lives. Drawing shows South Pole "community"



the surface when the planes sat still on it for a few minutes. Huge batteries of JATO bottles lashed to the fuselage were needed to blast them loose and up into the rarefied air. Weird Polar phenomena resulted from these take-offs. Long, white contrails of vapor streamed away behind the planes. These particles quickly froze into ice spicules, accumulating more vapor until, within five minutes after a take-off, billowing surface clouds would roll across the wastes, swallowing everything in a dense ice fog. In half an hour, the sky would be overcast from horizon to horizon, and a complete "whiteout" would have settled in—all from one plane. The sun, shining dimly through the blanket, gathered around it interlocking rings of refracted light, which Doctor Siple called "the five suns."



Navy radioman, above, works on the party's short-wave transmitter, their only link to outside world





Supplies were flown to South Pole camp when glacier crevasses in these mountains blocked ground travel

Though a spectacular sight, this man-made whiteout condition made our airlift a rugged operation. Planes couldn't land under such conditions. Airdrops had to be directed by ground crews "talking" pilots over the drop area by walkie-talkie radio. These men judged where the planes were simply by the noise of engines high in the overcast. "You are approaching drop area dead ahead," they'd tell the pilot. "You are over the drop area . . . drop now . . ." Seabee crews, lined up to retrieve the gear, would start running when the first speck

of cargo dropped through the overcast.

The first job after landing at the Pole was to pinpoint the position of the earth's southern hub. Eight Seabees were landed on that lift, and for eight days a whiteout made it impossible to "shoot" the sun. When the sky cleared, they discovered they were eight miles from the Pole itself. In a few hours it had been narrowed to  $\frac{1}{2}$  mile. After 120 sun readings they were on it. The rest of the crew, myself included, flew in that day and work began in earnest.

The roar of Globemasters from McMur-

Parachutes billow over the South Pole as a Globemaster drops tons of food, fuel and building materials



do filled the icy wastes. Explosions of snow soared skyward as great bundles of free-dropped lumber hit the plateau. Parachutes bloomed over the South Pole. Small packages drifted down under 24-foot chutes. Sixty-five footers lowered one-ton bundles. Cushioned corrugated platforms we had built under outdoor lights at McMurdo Sound during the previous Polar night floated down laden with 24 fuel drums—each weighing 523 pounds—under three 100-foot canopies. These loads buried themselves three feet in the snow when they hit. One had to be dug out of a 15-foot hole. On windy days chutes dragged their cargoes up to 2½ miles before we could cut them loose.

Running after a multiton cargo skittering around on a 10,000-foot-altitude snow plateau is tough even for conditioned men. All during the past Antarctic winter, our men had hardened up at McMurdo by taking three-day hikes each week across the ice through the frigid night. Living in small tents, eating nothing but pemmican, these 20-mile treks primed us for the survival techniques we'd have to use if it became necessary to walk back from the Pole during an airlift failure. In spite of this toughening up, nearly everyone at South Pole base was sick with anoxia—altitude illness caused by lack of oxygen. Meals wouldn't stay put, exhaustion came quicky and all of us developed heavy coughs. We lost between 20 and 30 pounds in a few weeks. Even robust Dr. Siple, heaving a bag off the plane on his arrival, lugged the



Seabee with frost-covered beard recovers food that buried itself in six feet of snow during airdrop

load halfway to the camp and calmly passed out in the snow for a minute. Before it was over, two men had to be taken out.

Trickiest airdrop was the 17-ton D2. Starting its big diesel engine in the frigid atmosphere might have taken days, so it was dropped—under an elaborate canopy of 100-foot parachutes—with its tracks removed and its motor running. The roaring monster hit with a thud and turned over

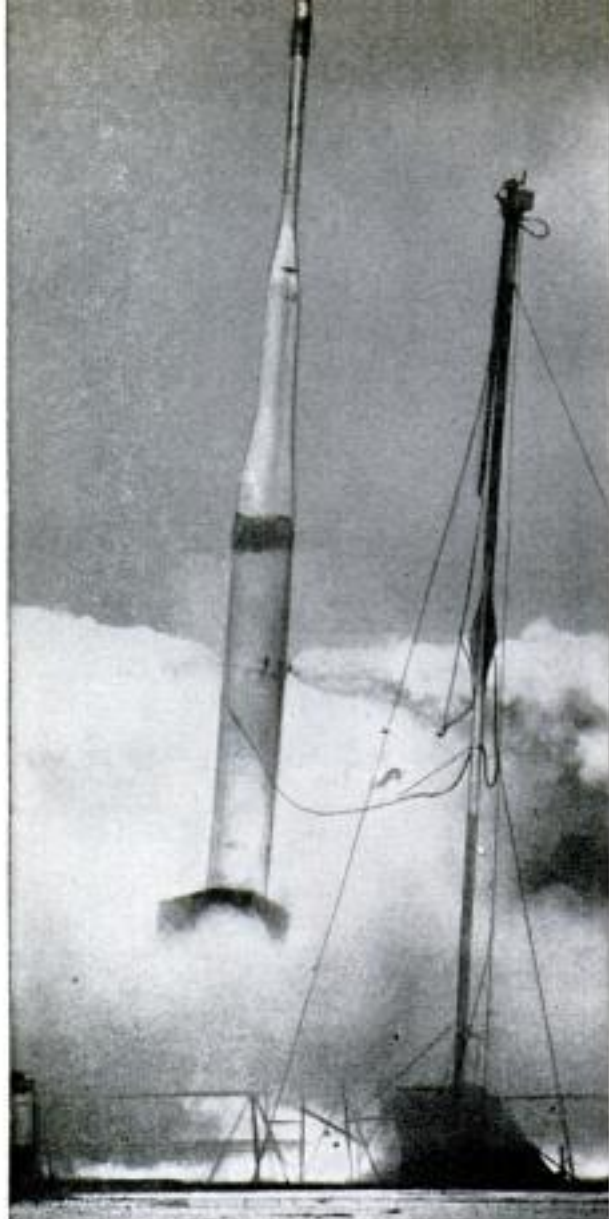
(Continued to page 288)

Interior of a Jamesway hut provides snug sleeping quarters for men who live at the bottom of the world



## Four-Story Missile Helps Solve Re-Entry Problem

TALLER than a four-story building, the Lockheed X-17, an Air Force research rocket, has reached the highest speed ever attained by any instrumented missile. It is designed to help solve the most baffling puzzle in the missile field—the re-entry problem. This is the problem of preventing the missile from burning up as it plunges back into the earth's atmosphere. The X-17 subjects test materials and shapes to these conditions. Another Lockheed missile, the X-7, is flashing through the stratosphere to test ramjet engines. The missile is "flown" from a ground command station, and responds to a control similar to a plane's.



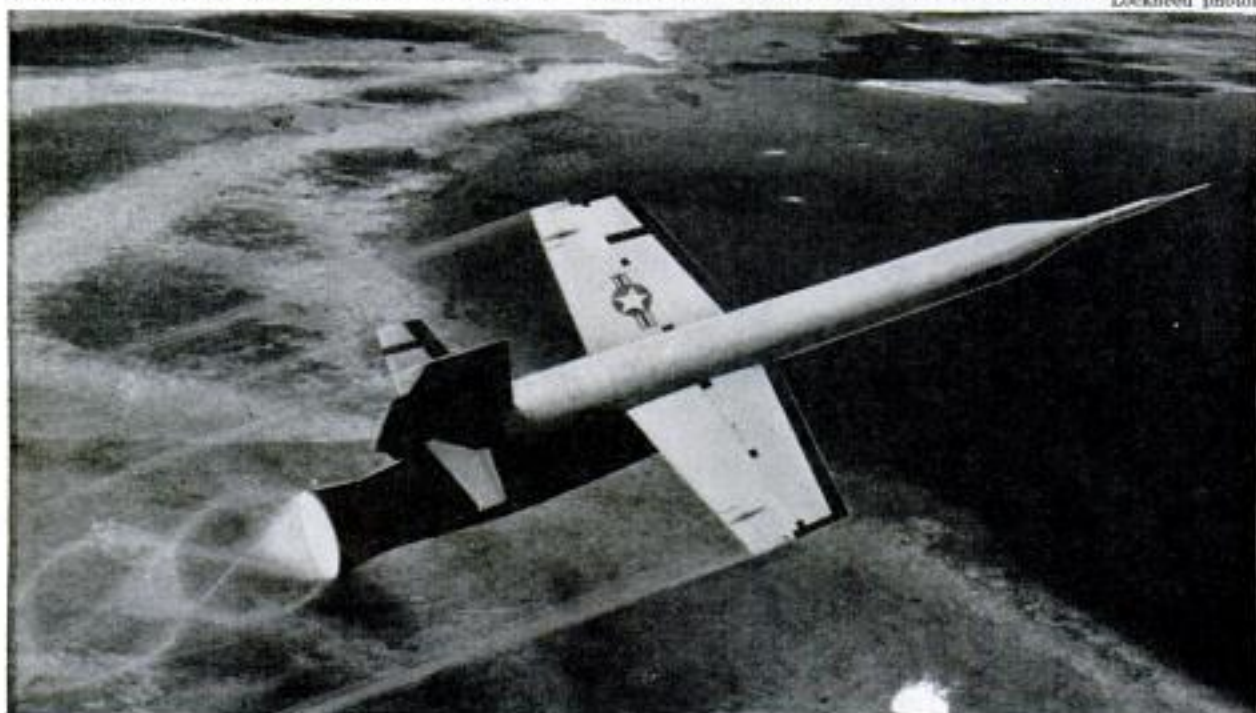
As X-17 blasts off, spin rockets on its side give it a stabilizing twirl. They drop off in a few seconds



Engineer manipulates small stick at a control panel to fly the supersonic X-7 missile by remote control

Exhaust makes a definite pattern as the X-7 flashes through the stratosphere to test ramjet engines

Lockheed photos







## "Operation Second Sight" Puts Local News on Records for Blind

Stories from community newspapers are provided blind persons in the Bergen County, N. J., area by transcribing the news onto phonograph records. The stories are first read into a tape recorder by volunteers

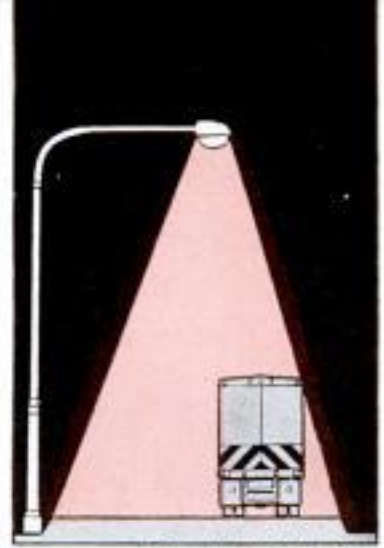
who are, themselves, handicapped. The stories are transferred from the tape to the disks by means of a dictating machine. The project is sponsored by the Paramus, N. J., Rotary Club.

## Lighted Canopy Protects Berlin Air Passengers

More than 400 fluorescent tubes recently were installed in the ceiling of the passenger-loading platform at Germany's Berlin-Tempelhof airport. Each of the 65-watt tubes is approximately five feet long. They

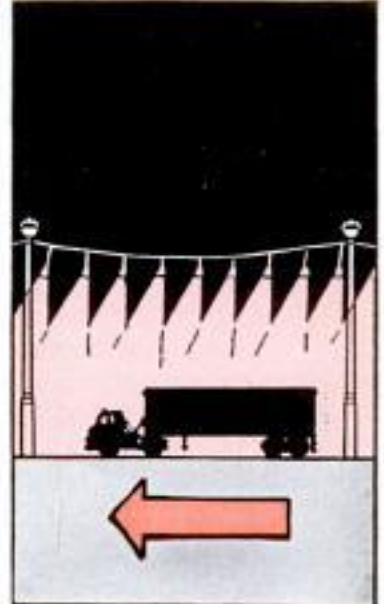
are arranged in the ceiling so that brightness of the light does not hamper normal vision of passengers and workers. Berlin-Tempelhof is the only airport in Europe with a roofed passenger-loading area.





Photos by Elizabeth Marsh

Conventional street light (diagram at right) forces the driver to look into the beam, the worst possible arrangement, says Marsh. Barely visible in the glare is the rear of a truck. The road is almost invisible



Road lighting in fog is improved by turning off regular street lights and using many spotlights (diagram). This system is being tried on one turnpike. Existing poles and wiring can be used, reducing installation cost

Best of all are low-mounted side lights with sharp horizontal cutoff. The driver looks across the beam, not along it. Fog in all these photos is same density. Sign, obscure in other lighting, is clearly seen here





Professor Marsh loads family car with all types of lights and spends foggy nights field-testing his theories

## Here's How to See Through Fog

*A Pennsylvania State professor creates artificial fog in his own back yard to learn how to fight this highway killer. Here is his prescription.*

By Arthur R. Railton

**F**OG STILL BLINDS man. When its white opaqueness rolls in, traffic snarls and the accident rate mounts.

Six percent of the accidents on the New Jersey Turnpike occur in fog. One fog-

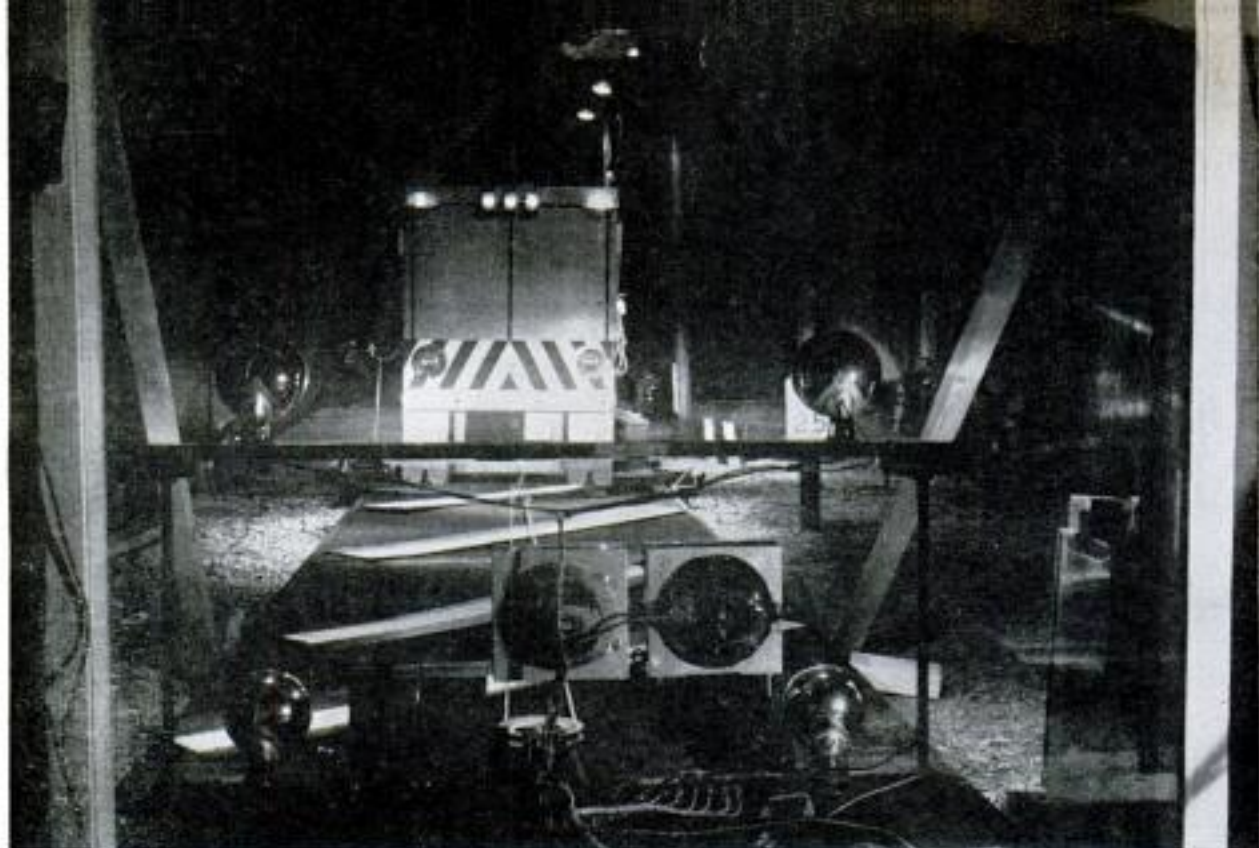
Mounted at bumper height, a powerful spotlight does a good job of piercing fog. Headlights are turned off

caused accident in California involved 54 cars.

Aggravating the problem is the fact that lights which are most efficient in clear weather are less efficient, often downright

Same light, same fog, but spotlight is polarized and driver uses a polarized filter. Less scatter results





Marsh built a quarter-size mockup of a highway in a tent. Lights in foreground simulate those on a car

hazardous, in a dense night-time fogbank.

But there is hope. Man is beginning to see through fog, thanks to the experiments of Prof. Charles R. Marsh of The Pennsylvania State University.

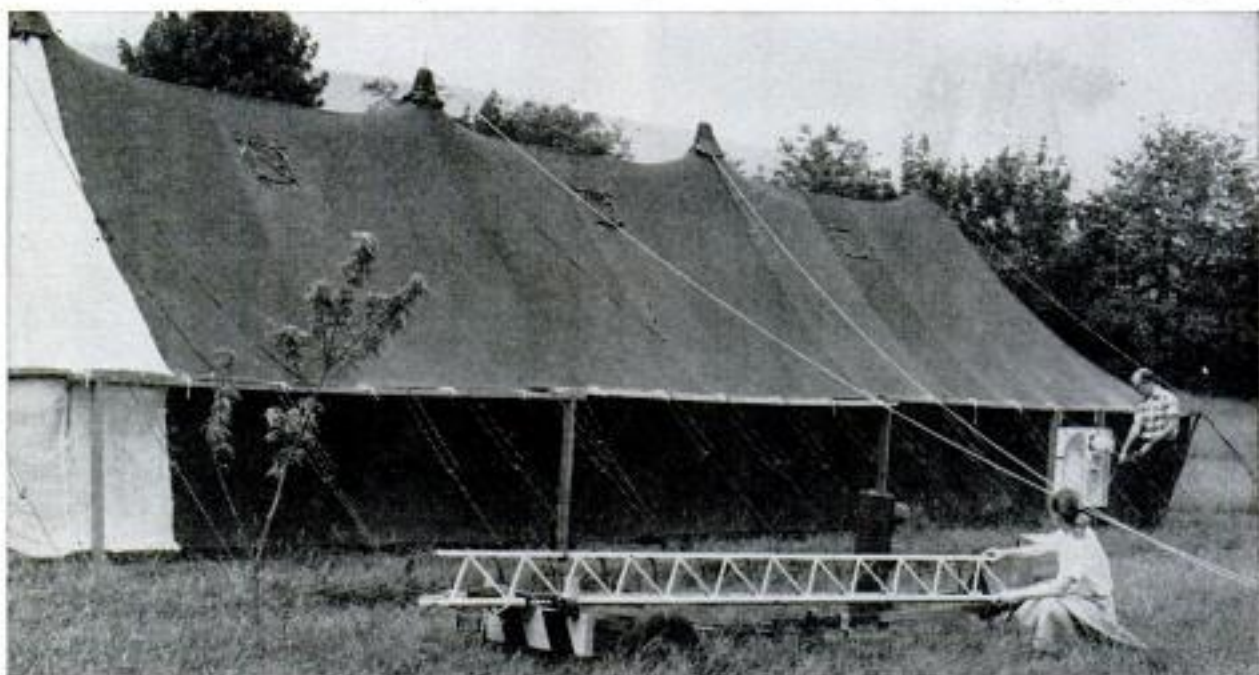
Eastern turnpike authorities asked Marsh to tackle the fog-lighting problem. As a result of his work, some changes have already been made in turnpike lighting and more will be made in the future.

To find the answers, Marsh built himself a test chamber from an Army surplus tent and inside it he is producing fogs that

exactly duplicate nature's own. He learned that to be effective in a fog, lights must be placed so the driver does not look along the beam. This important principle is valid whether it's a set of headlamps or an overhead highway light.

Unfortunately, most lights violate this principle. Headlights are mounted only slightly below the driver's eyes and he must look right down the light beam into a blinding hot spot of light which obliterates the road completely. Overhead highway lights spread illumination as widely

Inside this 50-foot tent, Marsh duplicates nature's fogs. Mrs. Marsh, foreground, is project photographer



as possible and, as a result, the driver faces a brilliant white cloud, the worst possible arrangement. It is no wonder that fog blinds us, Marsh says: We do all we can to help it.

How would he correct the situation?

He would install special highway lights at places where fog occurs. These lights would be used only in fog and would be controlled by an electric eye that continuously measures fog density. When the fog lights go on, the regular highway lights go off.

One type of fog lighting hangs overhead and consists of small lamps which project a narrow beam sharply downward on the road at right angles to the flow of traffic. The driver does not look along the beam and consequently he sees more highway and less blinding fog.

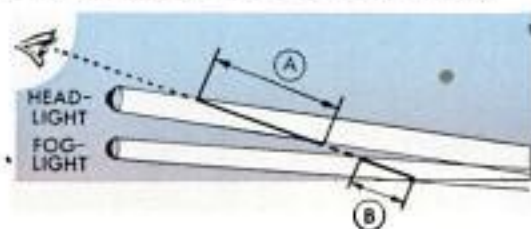
Another highway light that Marsh developed is mounted low on the shoulder of the road (on a divided highway it would be mounted in the median strip) and it projects light at right angles to the traffic flow. This system, Marsh found, is the most efficient method of highway lighting in fog-bound areas.

For vehicles, Marsh has two recommendations. One is the mounting of special fog headlamps beneath the bumper. This, of course, may be impractical on some cars because of the vulnerable position, but by revising front-end styling the lights could be protected.

More practical is the mounting of a clear-lensed, powerful spotlight at about bumper height. This spotlight should be equipped with a polarizing filter for maximum results and the driver should look through another filter on the windshield. These filters must be oriented at right angles to each other, one polarized horizontally,

(Continued to page 290)

Driver looks through less scatter with a low light (B) than with a high light (A). Fog in all these photos is same density



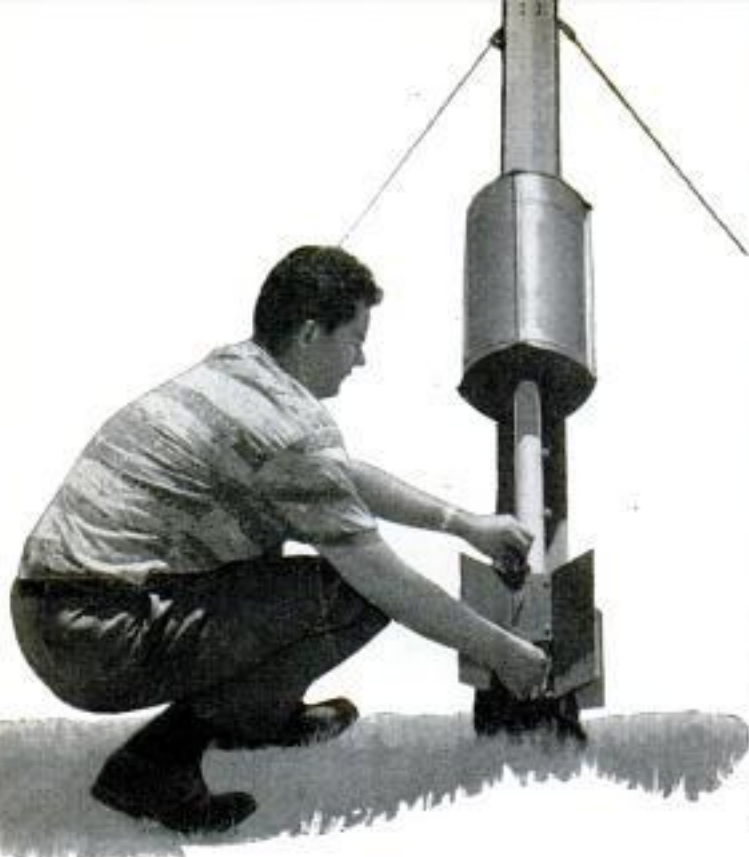
Behind standard headlights, driver faces blinding night fog that makes road invisible and the truck only faintly visible in the distance. Light scattered by fog droplets obscures view



Vision improves sharply when the lights are mounted low, reducing back scatter. Diagram at bottom of page explains why

Vertical-polarized spotlight and horizontal-polarized filter for the driver are the best combination for seeing through fog





Man at left is attaching igniter wires to rocket which will propel 8½-gallon container of fire extinguisher. Above is a rocket on its way to a fire

## Rockets Hurl Fire Extinguishers

USE OF ROCKETS for fighting forest fires may be an outgrowth of experiments being conducted on the West Coast. The rocket consists of a cardboard container filled with 8½ gallons of water-borate solution that is propelled by a small rocket motor to which stabilizing fins are attached. Range is 400 yards, and with two rocket motors distances of up to 1200 yards can be obtained.

Upon impact the cardboard container is smashed and the extinguishing material is thrown over a wide area. One of the rockets can be assembled, mounted on a wooden launcher, aimed and fired in little more than five minutes.

The rockets were invented by the Grand

Central Rocket Company of Redlands, Calif., builders of the third stage of the Vanguard satellite, for knocking out brush fires in its test area.

Another fire-fighting device perfected by the rocket company is a sturdy 28-inch cardboard tube or "wand" containing ¾ gallon of extinguisher. The material is propelled as far as 40 feet away by liquid gas contained in the bottom of the tube.

The company has also developed a tool to help increase production from oil wells. The device consists of a cylinder filled with gas-producing material. This is lowered down the well and ignited. The effect is that of a single-stroke pump generating 5000 hydraulic horsepower.

Cardboard "wands" propel extinguisher into brush fire. Drawing shows rocket as powerful oil-well pump



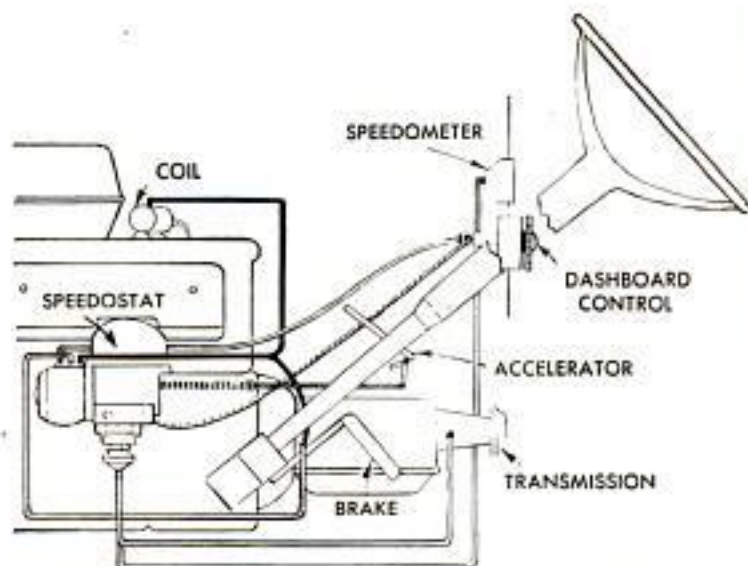


Diagram shows how Speedostat is hooked up. It is expected to cost under \$100. Right, the dash control knob

## Speed Control Makes It Easy and Economical to Obey the Law

It's relaxing to obey the speed law when your car has a mechanical conscience that makes you work harder to go faster than you should. The speed control, called the Speedostat, has a "muscle" that pushes the gas pedal back against your foot when you exceed the preset speed, which you control by a dashboard knob. The pedal pushback serves as an adjustable footrest. You depress the pedal until the added resistance is felt and have no worry about driving too fast. Gasoline economy increases because

the control minimizes accelerator-pedal movement. When more engine power is needed to maintain speed, as in climbing hills, the pedal pressure backs away until the preset speed is reached. If you wish to exceed the preset speed for passing, you can push through the barrier. The device also has a hold button with which you can maintain any preselected speed automatically. You press the button, remove your foot from the gas pedal and car maintains speed uphill or on level highways.

## Automatic Loading Machine

Drop a sack of coal on the platform of a new hydraulic loader and the machine automatically lifts the coal to the desired height. When the sack is removed, the hoist drops back to ground level. A counter stops the machine when a preset number of sacks have been lifted. This English device can be powered by motor or engine.

## Animal-Bone Grafts for Humans

Doctors at the Naval Medical Research Institute, Bethesda, Md., report a way has been found to transplant animal bones to human bodies. The animal bone is treated with a chemical that dissolves all material subject to decay. The bone is then ground up into particles which are packed into the defect in the human bone. Tiny new blood vessels develop in the area, and eventually the grafted material is replaced by new bone growth.

Modern fighter planes require 23,000 feet of electric wiring, as compared to 1500 feet of wiring in the average World War II fighter aircraft.





### **"Elevator" Truck Lowers to Ground**

With a built-in "elevator," a new truck body can be lowered right down to street level for easy loading and unloading. Hydraulic controls move the body up and down. The height can be adjusted to conform to a loading dock of any height up to 54 inches. Railway Express has ordered the first of the units in the expectation that they will cut loading and unloading time materially. The truck has a front-wheel drive, making it possible to eliminate the rear axle and drive shaft so the body can be lowered to the ground.



### **Hawk Missiles Destroy Low-Flying Planes**

Slim and deadly are the new Hawk guided missiles which are used with radar to find and destroy low-flying enemy airplanes. They are designed to operate in the "blind" zone of conventional ground radar equipment. The missiles, 16 feet long and only 16 inches in diameter, will be used in conjunction with the Army's high-altitude air-defense system provided by the Nike missiles. The combination launcher-trailer can be used by fast-moving combat troops, or as a fixed installation. The Hawk missiles are being manufactured by the Raytheon Manufacturing Company.



### **Portable Steel Cabin For Vacation Trips**

Whether you need a small trailer for family vacations and week-end hunting and fishing trips, or as a mobile office or workshop, the rolling cabin in the photograph, left, may answer your needs. It's available either as a do-it-yourself kit or as a completely finished trailer. It is constructed of zinc-plated steel, including the body framing, and the wheel suspension system eliminates the axle—for better road clearance. When not being used for camping trips, this cabin on wheels can be used as a backyard playhouse for the children.





## Air-Supported Dome Extends Swim Season

Here's a way to enjoy your outdoor pool in near-freezing weather. The air-supported plastic dome in the photographs, above and right, adds at least four months to the swimming season in northern climates. A small blower, powered by a one-sixth-horsepower electric motor, maintains the air pressure needed to keep the building rigid, even in high wind and heavy snow. The base is anchored to the concrete walk around the pool. Completely installed in less than two hours, the dome can be folded up and stored in the garage during the hot summer months.



## Radio Transmitter in Capsule Sends Medical Research Data

Broadcasting signals on a frequency of approximately one megacycle, a pill-sized FM radio transmitter may help medical researchers study the human intestinal tract. An FM radio antenna, in the lower left photograph, is used to receive signals from the electronic capsule, which has a broadcast range of about 12 inches. The data is recorded on an oscillograph. The "pill" and

its parts are shown in the lower right photograph. The FM oscillator changes frequency as pressures in the intestinal tract vary. A tiny storage battery, which has a life of 15 hours, supplies the power. After the device is swallowed, it can be manipulated by magnetic forces outside the body and its course can be traced through the body by fluoroscopy.



OCTOBER 1957



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# OWNERS REPORT:

British Ford owners in the states shown in color on the map tell you about their cars in this article



## WHY DO AMERICANS BUY FOREIGN CARS?

*"American cars are beautiful but impractical."*

CALIFORNIA SALESMAN

*"More and more people are aware that chrome and fins are not everything."*

NEW JERSEY HOUSEWIFE

*"People are tired of wasted gas and needless horsepower."*

VERMONT STUDENT

*"Economy. Sensible approach in design. Easy handling in traffic."*

NEW YORK TECHNICIAN

*"Foreign cars help the pocketbook and have a snob-appeal value."*

NEW YORK OFFICE WORKER

*"Foreign cars will eventually help solve parking problems in downtown areas."*

TEXAS MECHANIC

Another load of British Fords docks in Chicago. Sales of it (and all foreign cars) are increasing rapidly





Its 34-foot turn circle permits the Anglia to complete a U-turn in this street with a few feet to spare

## Cheap to Operate, Easy to Handle and Park, Say Owners of English Fords

*By Ford Anglia Owners*

**W**HY ARE SMALL European cars selling so well? What is their appeal?

To find out, *PM* asked hundreds of owners of the British-built Ford about their cars. As you might expect, the feature they like most is economy of operation. But let's hear from the owners themselves. Here are

the best-liked features as they describe them:

*Economical, say 63.4%*

"My old car cost me around \$35 a month for gas and oil. The British Ford costs only \$15 a month including lubrication and oil

Some owners say that the British Ford has been Americanized enough so they do not feel conspicuous in it



# OWNERS' OPINIONS of the BRITISH FORD

## Had trouble with engine?

No trouble .....83.3%  
Some trouble .....15.1%  
Considerable trouble .... 1.6%

## Would like faster acceleration?

Yes, would .....39.9%  
No, would not .....58.3%  
Undecided, no answer.... 1.8%

## Would like more top speed?

Yes, would .....11.2%  
No, would not .....81.3%  
Undecided, no answer.... 7.5%

## Would like more interior room?

Yes, would .....19.6%  
No, would not .....80.4%

## Would like more trunk space?

Yes, would .....13.3%  
No, would not .....86.7%

## Is ride better than U.S. car?

Yes, it's better.....14.0%  
No, it's worse.....30.7%  
About the same.....55.3%

## Is it a second car?

Yes, it's second car.....50.6%  
No, it's only car.....49.4%

## OVER-ALL RATING

Excellent	Average	Poor
68.8%	28.4%	2.8%

## How is dealer service?

Excellent .....39.8%  
Average .....42.7%  
Poor .....17.5%

## Would buy from him again?

Yes, would .....54.4%  
No, would not.....20.9%  
Undecided, no answer....24.7%

## Why did they buy this car?

Gasoline economy .....38.9%  
Initial price .....15.0%  
Small size .....9.4%  
Exterior styling .....9.4%  
American backing .....8.0%

## What should be changed?

Nothing at all.....31.3%  
More power in high.....12.1%  
More comfortable seat... 9.4%  
Four-speed transmission... 9.4%  
Better interior ventilation 5.6%  
Move gearshift ..... 5.3%

## How should U.S. cars be changed?

Make them smaller.....44.5%  
Less horsepower .....20.0%  
Less glamour .....19.6%  
More gas economy.....18.1%  
Lower price ..... 9.8%

## What make car was traded?

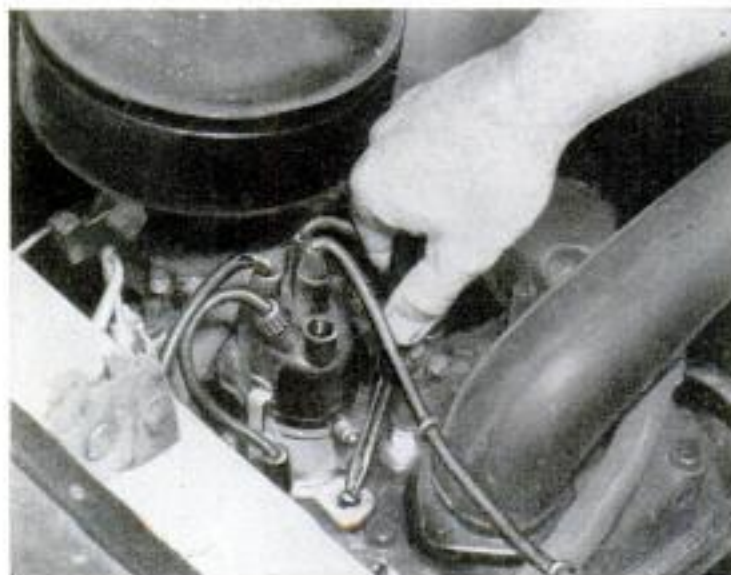
British Ford ..... 3.8%  
Other foreign car..... 7.8%  
U.S. Ford product.....16.5%  
Other U.S. make.....45.1%  
No trade, no answer....26.8%

## What car will buy next?

British Ford .....37.6%  
Other foreign make.....16.8%  
American make .....12.9%  
Don't know, no answer..32.7%



Above, although it has no door, the glove compartment extends across entire dash. With radio installed, ash tray comes out. Below, the engine is small and accessible. Scale shows spark setting. Ignition wires screw into cap and can't work loose



change."—California waitress.

"We made a 6422-mile trip and our car expenses were only \$59.26."—California machinist.

"This car is the answer for the \$5000 to \$6500-a-year family. We can afford to buy and operate this kind of car."—Oregon traffic manager.

### Easy to handle, say 50.9%

"After driving this, my American car feels like a truck."—California owner.

"We have a '57 Cadillac, a '56 Chevrolet and the '57 Anglia. Everyone in the family runs for the small car. No one wants to be bothered with the larger ones."—Florida housewife.

### It's easy to park, say 44.9%

"I go into parking spaces frontwards. Do not have to back into them."—Georgia commercial reporter.

"I like the joy of parking in spaces not big enough for regular cars."—California building inspector.

### Styling is attractive, say 14.0%

"I like its looks although I dislike the looks of most economy foreign cars."—California assistant controller.

### Smallness is good, say 12.1%

"It is small, a decided advantage in many ways."—West Virginia professor.

"I'm an old lady, 74 years old.

The car suits me perfectly. Plenty of room for it in the garage." — Florida retired owner.

**It's comfortable, say 9.4%**

"Not as soft or silent a ride as in big cars, but seating and wheel position are more comfortable for me than my U.S. car."—California field representative.

"Ride is worse than U.S. cars, but this is relative. In some respects, it is better. Ride improves with added weight such as luggage in the trunk. Thus over good highways with the family and some luggage in the car, the ride is surprisingly good."—California warehouse manager.

**Fine visibility, say 8.3%**

"Has square front and you can see both fenders." — New York I.B.M. operator.

**Price is best, say 6.0%**

"What I like most is its low purchase price."—Texas aircraft mechanic.

**Has good interior room, say 5.6%**

"Plenty of legroom. Can easily wear a hat. I am six feet tall."—Massachusetts sales manager.

**Like solid body best, say 5.3%**

"Over-all I think body construction is superior to American cars. My car after 5000 miles of hard driving has no squeaks or rattles."—Michigan salesman.

**There Are Complaints, Too**

Although 26.0 percent of the owners make no complaints at all about their British Fords, others are not so content. Little cars, like big cars, are not completely perfect. Here, in order of frequency of mention, are what owners complain about:

**Needs more power, say 17.4%**

"Although I'm very well pleased with the car, I do feel it is slightly underpowered for today's freeway driving."—California serviceman.

"Lack of power, especially on relatively steep grades and against a strong headwind." — Oregon state employee.

**Seat's uncomfortable, say 9.1%**

"Front seats not comfortable. They curve away from normal position."—California accountant.

(Continued to page 272)



For those who want more room, there's the two-door station wagon. Built on the Anglia chassis, it has same compact body



Above, about 11½ feet long, the wagon is shorter over-all than the sedan. Below, with the rear seat down, the floor is 45 inches long. Rear-door opening is 27 inches high. Rear seat in the wagon is not very comfortable for adults, say some owners



# An Engineer Analyzes the British Ford

By Dale Kelly SAE, Registered Professional Engineer

**MODEL TESTED:** Anglia, two-door sedan with four-cylinder, L-head engine of 71.55 cubic inches.  
Rear-axle ratio: 4.43 to 1. Wheelbase: 87 inches.  
Tires: 5.20 by 13.  
Weight: 1700 pounds with the gasoline tank half full

(56 percent on the front wheels, 44 percent on the rear).  
Mileage on car at time of test: 450 miles. Barometer: 28.96 inches. Temperature: 88 degrees F. Pay load: 200 pounds.



## ACCELERATION TIME FROM STANDING START, IN SECONDS

	0 to 20	0 to 40	0 to 50	0 to 60	¼ mile
Ignition timed for regular gasoline (90 octane Research)	5.1	15.0	23.0	34.5	26.3
No improvement noted when premium fuels used					
<b>Top speed: 68 miles per hour.</b>					



## FUEL ECONOMY IN MILES PER GALLON

	Steady 30 m.p.h.	Steady 50 m.p.h.	Steady 60 m.p.h.	Traffic Route
Ignition timed for regular gasoline	36.5	29.2	25.0	22.0
No improvement noted when premium fuels used				

**ESTIMATED AVERAGE ANNUAL GASOLINE BILL: \$97 for 10,000 miles**  
Based on the exclusive use of regular gasoline



## SPEEDOMETER ERROR (miles per hour)

Speedometer reading	20	30	40	50	60	70	80
True speed	19	28	39	50	61		

## ODOMETER ERROR

Odometer correct within ½ of one percent.



## DRIVER'S VISION (for the average driver—5 feet, 9 inches tall)

Distance at which part of road in front of car could be seen (A in sketch)	10 feet
Distance at which full width of road in front of car could be seen (B in sketch)	15 feet



## GROUND CLEARANCE (unloaded car)

Radius of worst dip that could be crossed (solid line)	15.5 feet
Radius of worst hump that could be crossed (dotted line)	8.0 feet
Deepest rut car could be driven in	7 inches
Curb clearance for door opening	15 inches

## STEERING

Wheel turns from straight ahead to steer outside front wheel in a 100-foot-diameter circle: 0.35 turns

Diameter of smallest circle within which the wheels could complete a circle (curb-to-curb): 32.5 feet

Diameter of smallest walled circle within which the entire car could complete a circle (wall-to-wall): 34.0 feet

Steering-wheel turns, lock-to-lock: 2.1 turns

Steering-wheel diameter: 16 inches

## TRUNK CAPACITY

Number of standard cartons (1 cubic foot each) that could be packed into trunk: 6 cartons

## CENTER OF GRAVITY (unloaded car):

23.9 inches

## WATER RESISTANCE

Good. In splash-pan test the brakes and ignition were not affected. No water entered the body and virtually none entered the trunk. The car could not be put through the high-pressure car wash because the wheel tread would not span the conveyor system.

## MISCELLANEOUS OBSERVATIONS

**Body:** By American standards, headroom is excellent in front, not too good in the rear. Rear-view mirrors, far forward on front fenders, give a good view on both sides. The back windows do not open. To get into the rear seat, you must tilt the entire front bucket seat up and forward; the seat back does not fold down. This makes access to the rear seat almost impossible when someone is sitting in front. A shelf under the dash will hold a narrow parcel 30 inches long. Heater recirculates the air in the car and does not draw in any fresh air. If the gas gauge is suspect, a slightly flexible stick can be pushed through the filler neck to the bottom of the tank.

**Instruments:** The speedometer has been designed as an instrument and not as an ornament. Legibility is excellent. Unfortunately, it is mounted at such an angle that a tall driver has difficulty seeing the grad-

uations between 30 and 50 miles per hour. Both speedometer and odometer are more accurate than those on most American cars, but the odometer lacks a "tenths" dial. Signal lights are used for oil pressure and ammeter.

**Windshield wipers:** Areas swept by the blades overlap so there is no unwiped area in center. Vacuum wipers have no booster pump and when the accelerator is flat to the floor (as it often is) the wipers slow down and stop. A vacuum reserve tank does keep them going on a hill (or any time the accelerator is floored) for about 15 seconds.

**Engine:** Because of its accessibility, the engine should be a joy to the Saturday-afternoon mechanic. Ignition timing is particularly easy to adjust. A scale permits minor adjustments to be made without a timing light. (A few years ago most American cars had such a scale.) The distributor has no vacuum-advance mechanism and has little need for one. Ignition timing for maximum gas mileage at constant speed is almost identical with that for maximum acceleration at full throttle. (American cars with large, lightly loaded engines need extra spark advance for good cruising mileage and this is provided by a vacuum advance.)

**Transmission:** A floor-mounted shift lever controls the conventional three-speed gearbox. Gear ratios are well suited to driving in traffic. For cross-country driving a fourth gear would be a big help. With a piston displacement almost identical with that of the Volkswagen, the Anglia, in high gear has an engine speed and gas consumption slightly less than the Volkswagen in third, but considerably more than the Volkswagen in fourth gear.

**General:** Gas tank holds 8.5 gallons. After the gauge read "empty," the car went about 25 miles before actually running out of gas. This is about what one should expect as a safety margin. Foot brakes were good. Hand brake held on a 14-percent grade.



# DRIVING THE BRITISH FORD ANGLIA

By Floyd Clymer

THIS LITTLE CAR, with an 87-inch wheel-base and a four-cylinder L-head engine of less displacement than a big Harley-Davidson Twin motorcycle, cruises nicely at 55 to 60 miles per hour.

It has excellent suspension and corners well without much roll.

In the mountains I found it had surprising power in second and low. On the toughest test hill in Los Angeles, the little job would do 12 miles per hour over the top. Not bad, when many more powerful cars top it at less than 20 miles per hour. It is geared quite high in top speed for economy reasons and, while it cruises smoothly, I cannot say it is overpowered in high gear. The engine has to be revved up to get its best power on hills as it is not a "lugger."

It has a three-speed transmission of standard shift, the lever extending up through the floorboard. Any person unfamiliar with the car will have no trouble finding the gears. The car is so simple you can loan it to your best friend and he can't abuse it much, even if he tries.

The radiator capacity seems unusually

So practical is the British Ford car that you will find two small cans of touch-up paint in the trunk

small (only 1.8 gallons) but only once in the desert heat of 110 degrees did I notice any tendency to overheat and then for only a short distance.

The hood opens from the rear, a safety feature. Its release lever is located far under the instrument panel — completely out of sight in a most unhandy place. It is very difficult to find.

Below the dash there is a full-length shelf which the British call a package tray, extending to a depth of about 12 inches.

Doors have a solid feel and the handles operate easily. The all-steel body has an integral construction that reduces squeaks and rattles. No water leaks developed during the high-pressure test.

Brakes are excellent. I found little fade even in the mountains. There was no tendency for the car to veer when brakes were applied at any speed. I rate the brakes excellent.

The hand brake is of the pull-up type and is located between the two front bucket seats. The throttle pedal is well located and has a desirable long range of travel. The headlight-dimmer switch is mounted on the flat portion of the floor at the extreme left side. They couldn't have selected a more awkward location for this important switch.

Driver's seat position is good. The car has good legroom in front, not so good in the rear. The front seats can be individually adjusted, being separate. Exceptional rear vision is provided by two mirrors mounted far forward, one on each front fender. These mirrors, once set to suit the driver, are self-aligning even when knocked away. The driver can see along each side of the car for long distances to the rear.

Altogether, the Anglia is an efficient, economical car with good handling characteristics. Besides the Anglia, there are the Prefect (a four-door version of the Anglia), the Consul (a larger four-cylinder model) and the Zephyr Six in the family of British Fords now sold in this country.





When professor releases heavy ball, first in line, its light bump sends lighter ball on other end flying



Ball fired straight up from a moving cannon moves forward with the cannon, drops back into muzzle

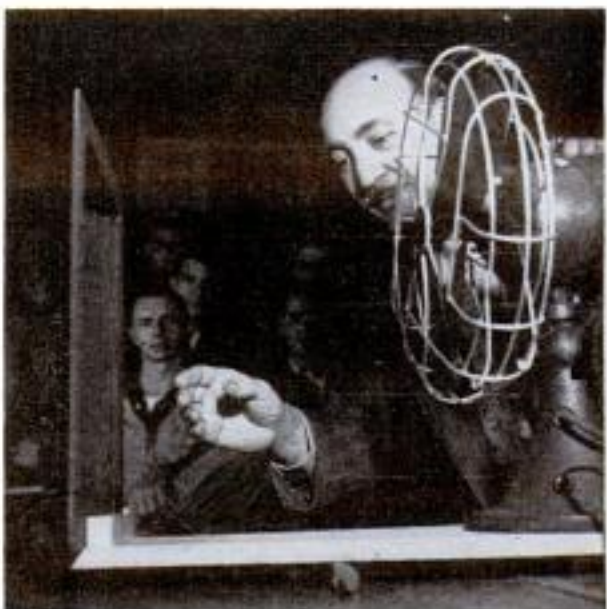


Two-foot pencil, viewed partially through slab of plastic, appears broken, demonstrating light refraction

Student holds weights in outstretched arms and whirls on stool. As he pulls in his arms, he whirls faster



Can you sail a boat by blowing air into sail from a fan attached to boat? No, as demonstration proves







Students duck when he cuts string holding whirling rock. The rock sails harmlessly across in front of class

## Science Showman

**S**TUDENTS OF PHYSICS at Rutgers University see a stage show in the classroom. Their professor, Dr. Ira Freeman, believes that physics can be fascinating. To prove his point, he uses weird, outsize demonstrations which attract student interest and drive home the principles of physics. Doctor Freeman, for example, doesn't ask his students to take the principle of light refraction on faith. Even the most myopic student gets the point when the professor "breaks" a pencil two feet long by holding an oversize slab of plastic in front of it. He fires a ball straight up from a moving cannon, and the ball plunks right back down into the mouth of the cannon. He whirls a rock around his head on a string and suddenly cuts the string when it is straight out toward the audience. Students may duck, but they get the point that an object moving in a circle has a motion tangential to the circle. Science showmanship! ★ ★ ★

Stream of water and hanging wires demonstrate trajectories. The water stream continues to graze the tips of the wires regardless of the angle of the supporting rod and nozzle





## Cologne Theater Has Four Stages

Contrasting with the architecture of the ancient Cologne Cathedral in the background is a newly completed opera house in the German city. Besides its giant main stage, the ultramodern structure has three movable side stages to permit a change of stage settings in the shortest possible time.

### Biggest Balloon Lift

With a volume of 3.75 million cubic feet, the world's largest helium-filled balloon recently lifted the heaviest balloon load—nearly two tons of military equipment—to an altitude of approximately 20 miles.

### Destructive Wood-Rotting Fungi May Have Several Practical Uses

Wood-rotting fungi, which destroy tons of timber annually, may have several practical uses, it was discovered at Syracuse University. When applied to sugar cane or

asparagus stalks, it converts the cellulose into organic acids used by industry. The fungi reproducing rapidly in this process can be used as an animal-feed supplement.

### Amplifiers Give Directional Hearing Through Eyeglass Frames



Directional hearing is made possible for those with hearing difficulties by an amplifying system installed in the earpieces of eyeglasses. Powered by a single battery smaller than a dime, this system has one microphone with independent volume controls for each ear. The microphones are connected to amplifiers and other miniature radio apparatus built into each earpiece. From 10 receivers available, the system offers 100 combinations of hearing to users of the instruments.

### Secret of Life May Be Near

Are scientists on the verge of duplicating life synthetically in the laboratory? The answer may lie in the "DNA" (desoxyribonucleic acid) molecule which recently has been more precisely defined and strongly suggests a self-duplicating mechanism, according to Dr. William S. Beck of the University of California. Thus, an explanation of life in terms of physics and chemistry may be close at hand, he says.



### Vertical-Take-off Jet Has Diverter Vanes Behind Engines

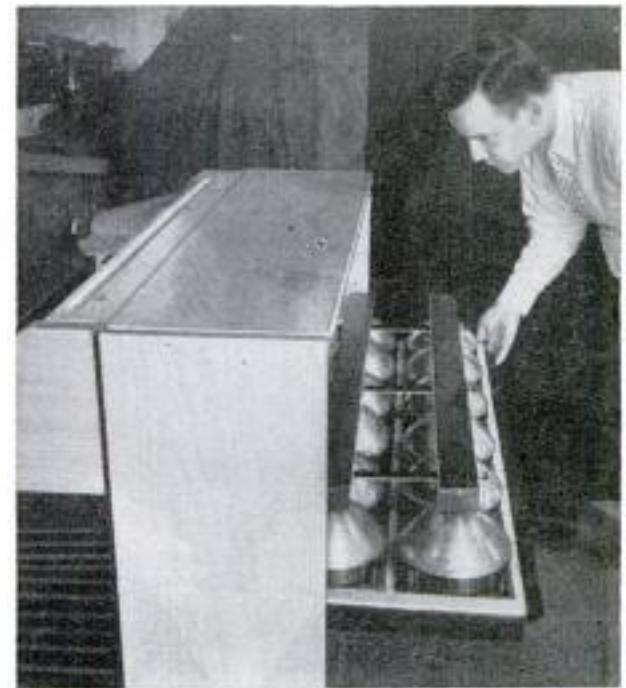
After taking off straight up into the air, helicopter-fashion, an experimental jet then flies forward by changing the position of diverter vanes behind the two engines. These vanes direct the thrust toward the ground for take-off and landing. To fly forward, the vanes are positioned to permit thrust toward the rear of the plane. Con-

pressed-air nozzles in the craft's wing tips and tail control its direction during hovering and slow forward speeds. This is because conventional control surfaces, such as elevators, rudder and ailerons, have no directional effect at such speeds. Called the Y-14, the plane was built by Bell Aircraft Corporation for the U. S. Air Force.

### Electronic Organ Makes Sound From Pictures

Changing patterns of sound waves into musical notes, the electric organ in the photograph, lower right, makes music in much the same way that voices are produced from a motion-picture sound track. In the back of the organ are 12 generating units, covered with aluminum caps. One of the units is shown in an exploded view in the lower-left photograph. When a player

presses a key of the organ, a light bulb flashes a beam of light through a block of lenses. Each lens is shaped to form a special organ effect. The light continues through a picture of the sound wave pattern to a photoelectric cell which translates the pattern into the sound desired. Some of the "sound pictures" are shown on the wall behind the generating unit.



V4 has power to spare for the bigger family boats. Emphasis in styling has been placed on the rear, which is the view of the motor usually seen by others



## BIG NEWS FOR BOATERS! THE V4

By Clifford B. Hicks

**I**T WAS INEVITABLE. The V-type engine has proved so popular with motorists that someone was bound to tempt boaters with a V-type outboard. Both Johnson and Evinrude, in their 1958 lines, will make a big splash with a brand-new and radically different outboard motor, a 50-horsepower V4.

It's a big motor in keeping with the trend toward more power for larger boats. Shown here is the Johnson, but the Evinrude is the same basic motor with a few exterior differences to maintain the identity of the two lines.

The engine has a 70.7-cubic-inch displacement—exceptionally large for an engine of this horsepower. This minimizes strain on the essential parts. A good guess is that it will also give engineers an opportunity to boost the en-



gine's power in the future through relatively minor changes, without major alterations to the basic power head.

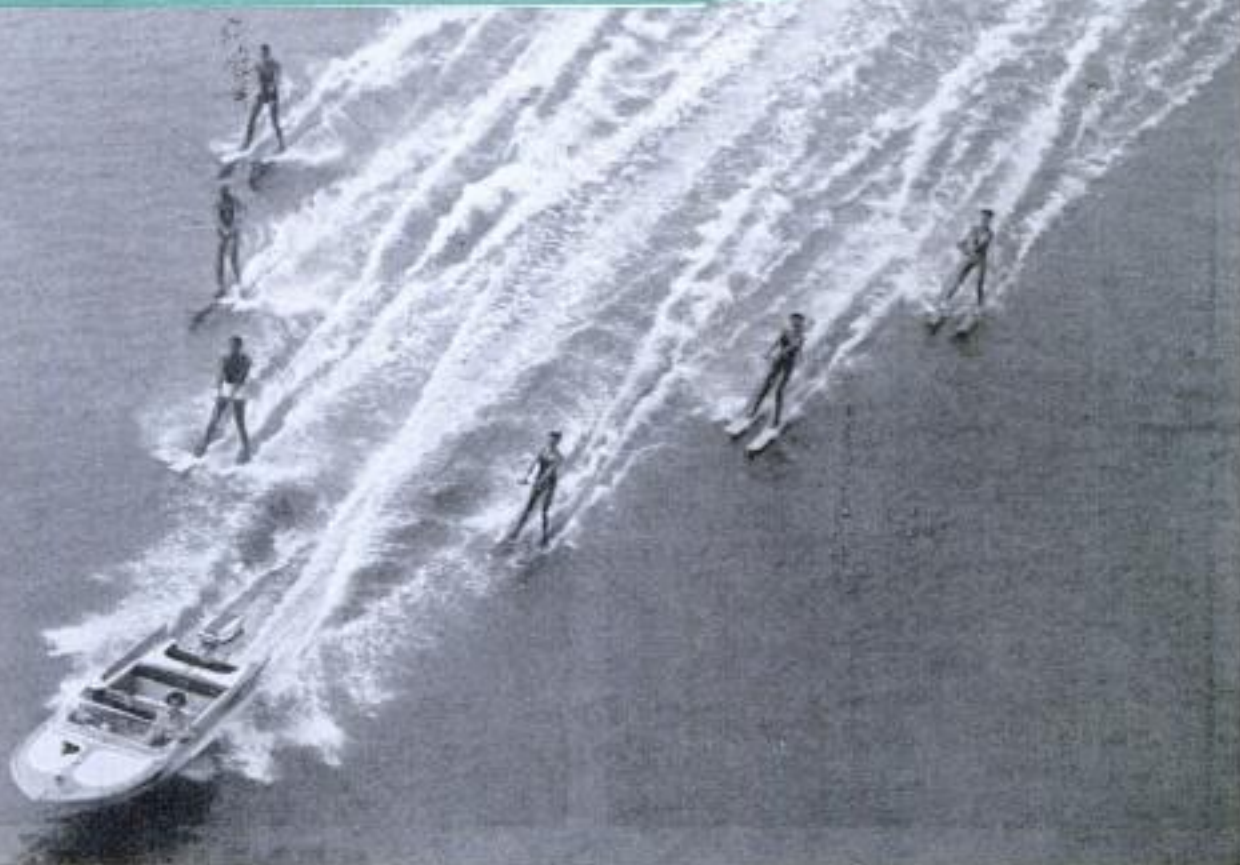
Firing impulses of the new motor occur every 90 degrees of rotation of the crankshaft. The big advantage of the V-configuration is that the crankshaft can be shortened. This makes the motor lower in silhouette than an in-line motor of comparable horsepower, but because the cylinders are spread into a vee, the motor is considerably wider. To mount the motor, Evinrude and Johnson are persuading boat manufacturers to go to a standard transom height of 20 inches. However, the V4 can be installed on a 15-inch transom.

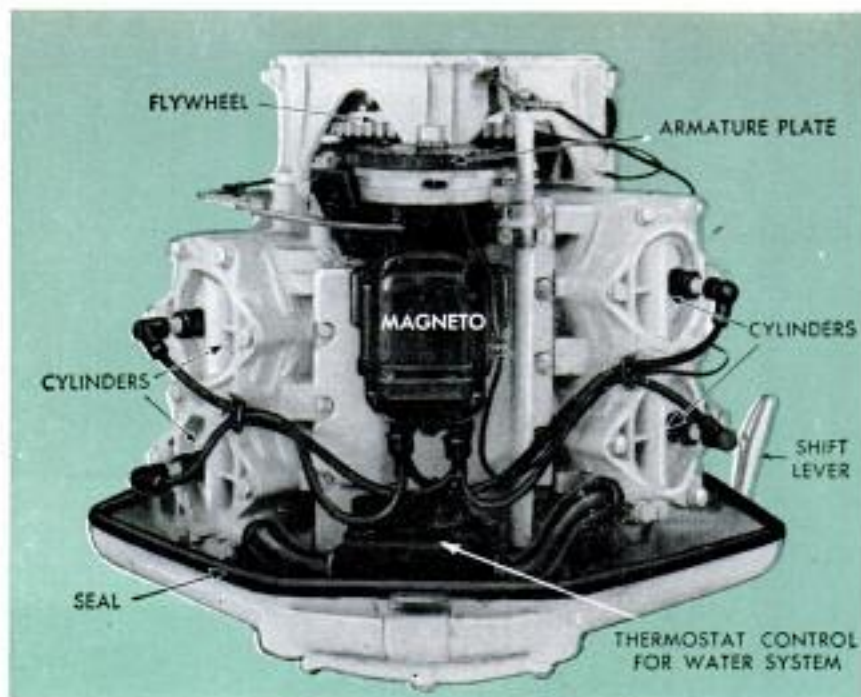
Novel features of the V4 are a twin-barrel, downdraft carburetor and a water cooling system controlled by a thermostat. Water is recirculated in the cooling system and cold water is drawn in only when needed. Thus the



The 50-horsepower V4, biggest motor of the line, meets the smallest, a three-horsepower job. The V4 weighs about 200 pounds, has a lifting ring and a tilt-assist spring. Below, the all-new motor has sufficient power to pull six water skiers simultaneously

# OUTBOARD





From shroud to propeller, V4 has sleek but powerful lines. Shroud is airtight except for one baffled air-intake port. Left, parts are easily accessible when shroud is removed

motor continually runs at the proper temperature for peak efficiency.

The high-styled motor has a shroud with four holes that appear to be exhaust ports. Actually they serve no function and are styling features. The spark plugs and carburetor are accessible through small rubber-sealed doors.

One of the big innovations is the silencing system. Current motors depend upon rubber pads and springs to reduce vibration and noise. In the V4, the motor cover and all outside parts above the gear case are mounted rigidly to the transom, with the

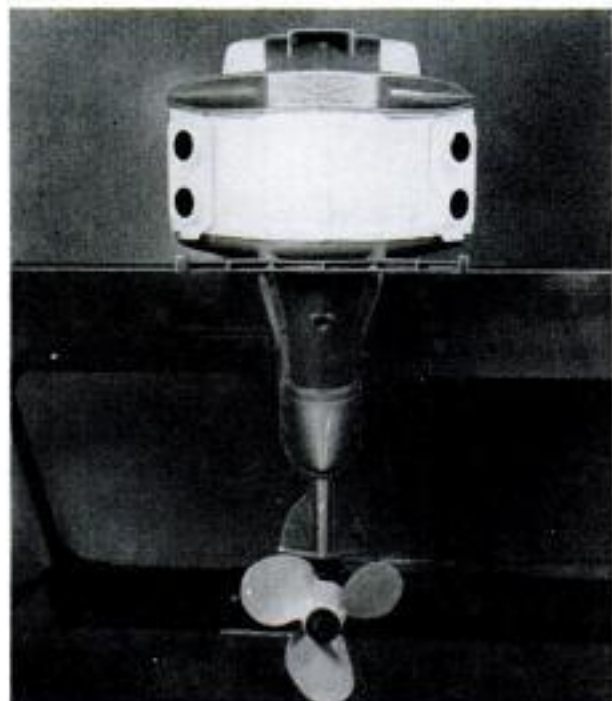
engine itself completely separated from the cover and mounted to the transom independently. The motor cover thus becomes a silencer, airtight except for a baffled intake port.

The V4 weighs about 200 pounds. To make it easier to handle, it has a built-in lifting ring that folds back out of the way. A tilt-assist spring helps tilt the motor out of the water and a lock keeps it out.

When you spot one of the new V4s, it's worth a close look. It's an attractive package, representing years of work by a good many engineers. ★★★

Motor has one access port in front for carburetor adjustments, two in the rear for servicing plugs

Shot from rear shows the squat but wide silhouette. Low center of gravity is a safety feature of the V4





## Eight-Horsepower Engine Runs Midget Sports Car



Four-cycle, single-cylinder air-cooled engines power the new midget sports cars shown in the photographs, above. Bore of the  $8\frac{1}{4}$ -horsepower engine is 3 inches, the stroke is  $3\frac{1}{4}$  inches and the piston displacement is 23 cubic inches. The tiny vehicle has an automatic transmission. A short shift lever under the front edge of the seat

has forward drive, neutral and reverse positions. Steel disk wheels are 5.50 by 8 and tires are 18 inches high. The car makes a 360-degree turn in a circle of only  $13\frac{1}{2}$  feet radius.

### Prehistoric Principle Moves Paddle Pusher

Using two paddles copied from the fins of reptiles that lived millions of years ago, Friedrich Budig of Offenbach, Germany, claims he can maneuver his boat with only one fourth the effort needed with ordinary hand paddles. Each stroke of the twin fins, downward as well as upward, propels his craft smoothly along the Rhine River. He supports the rowing movements with his arms.



### Small Diesel Trains Haul European Passengers

Trans-European express trains which carry 122 passengers in air-conditioned comfort now clip along at 85 miles per hour through Belgium, France, Italy, Luxembourg, Holland and Switzerland. Pulled by a diesel-electric engine, each train usually has four cars including the diner. Seats are available in one "class" only. Extra fare is charged on these special trains which save many hours of time.



PRESENTING THE POPULAR MECHANICS

# ANNUAL HOME SECTION

The next 50 pages are devoted to homes and ideas pertaining to the home. Here you may find an answer to a special need, whether it be a remodeling job, a new fireplace or a full-fledged dream home. This is our fifth annual Home Section.—Wayne Whittaker

Introducing—

## Two Homes for 1957:

### the PM Modern

JOHN RIDLEY, the noted Seattle architect who designed the inviting PM Modern House for 1957, likes both glass walls and the open plan—as well as privacy. In fact, he is such a strong advocate of privacy in his personal life that he and his family live on a picturesque island serviced by ferry boats. Although everybody cannot live on an island, privacy can be assured in a contemporary home by other means such as walls and fences. Ridley believes that the three-bedroom brick and wood PM Modern House—presented on these pages—proves this statement. The home offers well-planned use of glass walls, doors and, of course, windows, to provide beauty and indoor-outdoor livability

(Continued to page 151)

### the PM Traditional

WHEN IT COMES to taste in houses, there are two definite kinds of people: Those who like modern or contemporary architecture and those who don't. It is for the latter group that the PM Traditional House presented on these pages was planned.

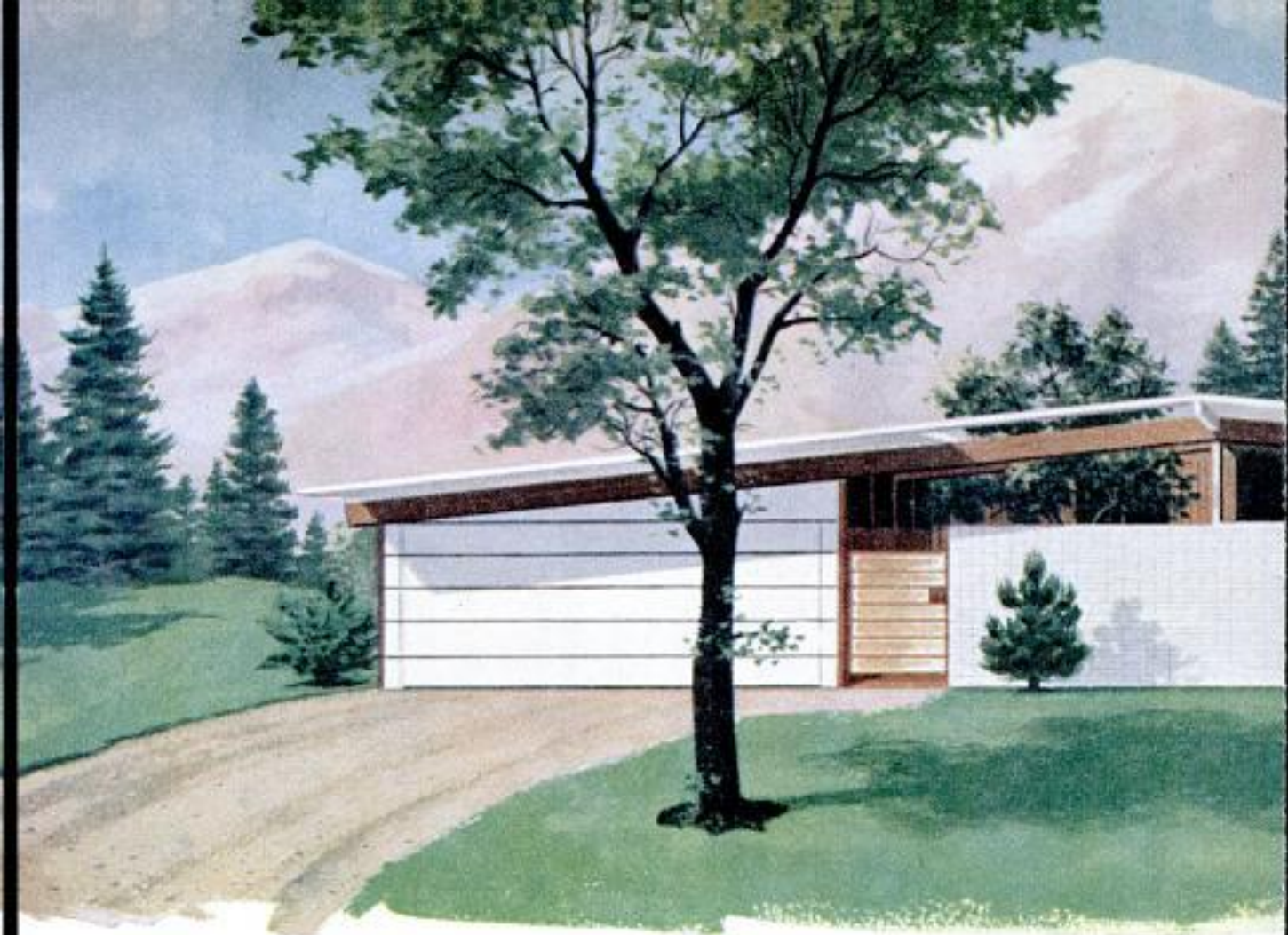
Despite the thumbs-down attitude toward traditional homes by the leading schools of architecture—not one in the United States offers a course in such traditional designs as Cape Cod or Georgian—there are millions of people who still prefer the quiet beauty of this type of home.

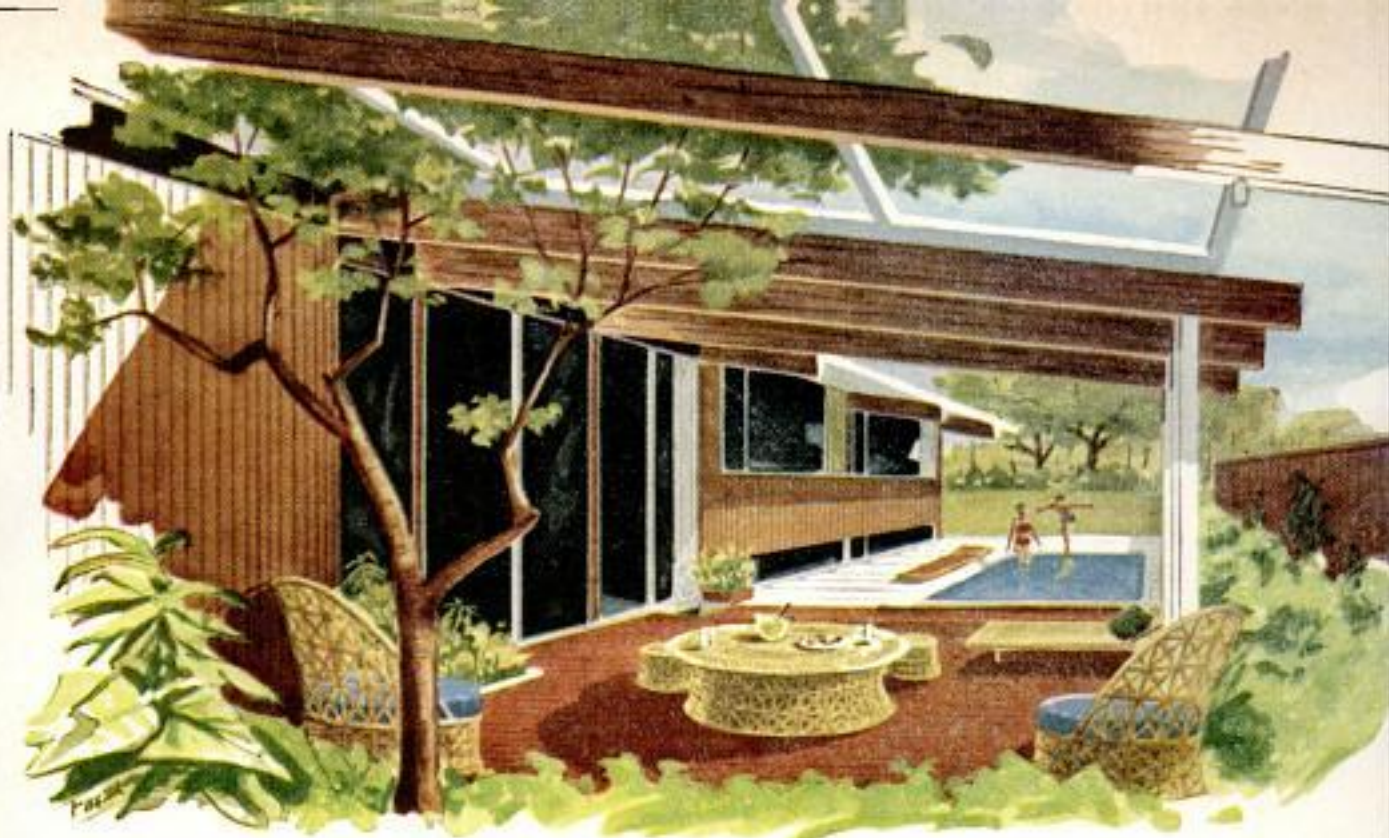
When we decided to present a PM Traditional House—in contrast to the outstanding contemporary home also shown on these pages—our

(Continued to page 151)

Blueprints for both the PM Modern and PM Traditional houses are available. Write: Plans Department, Popular Mechanics Magazine, 200 East Ontario St., Chicago 11



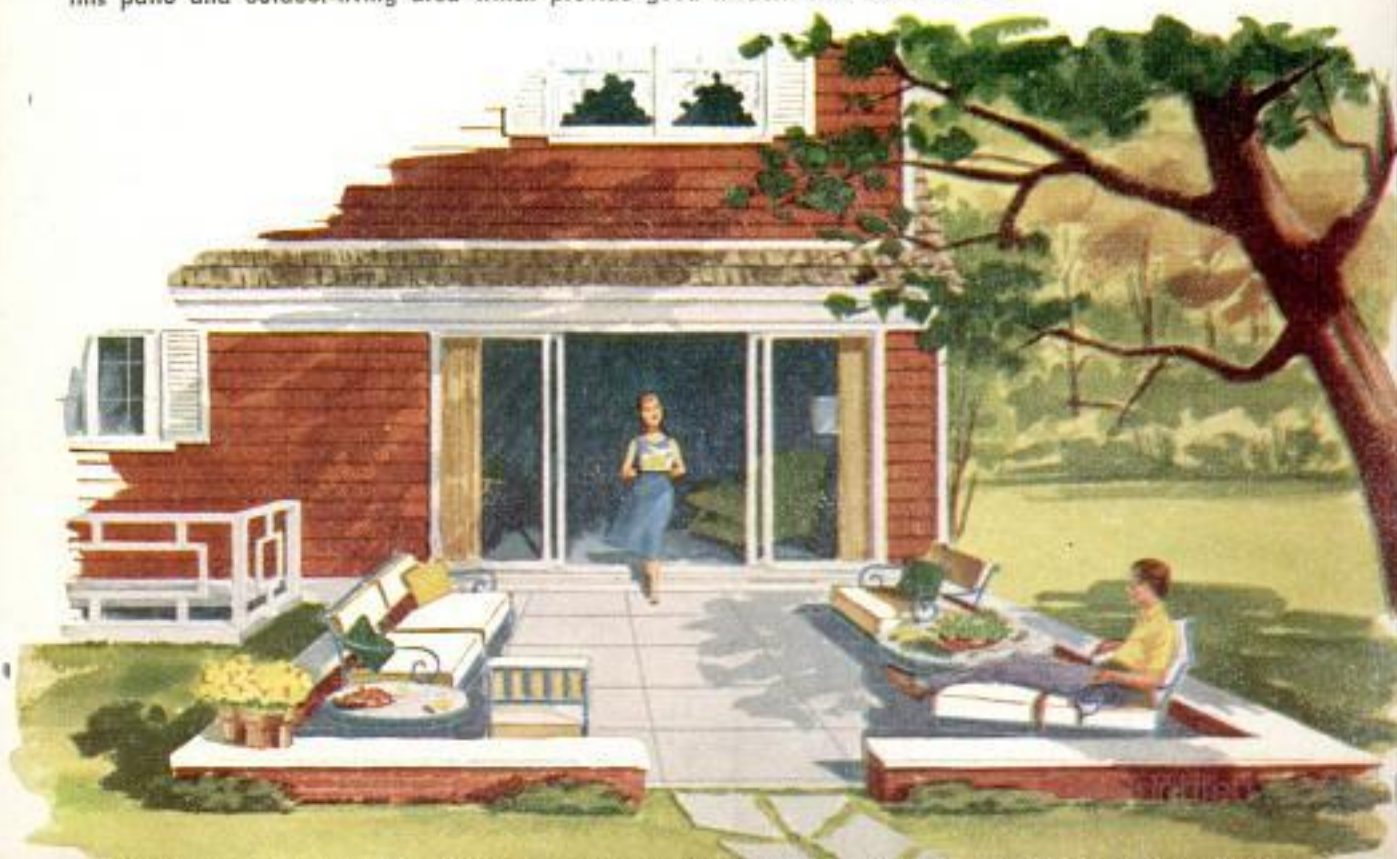


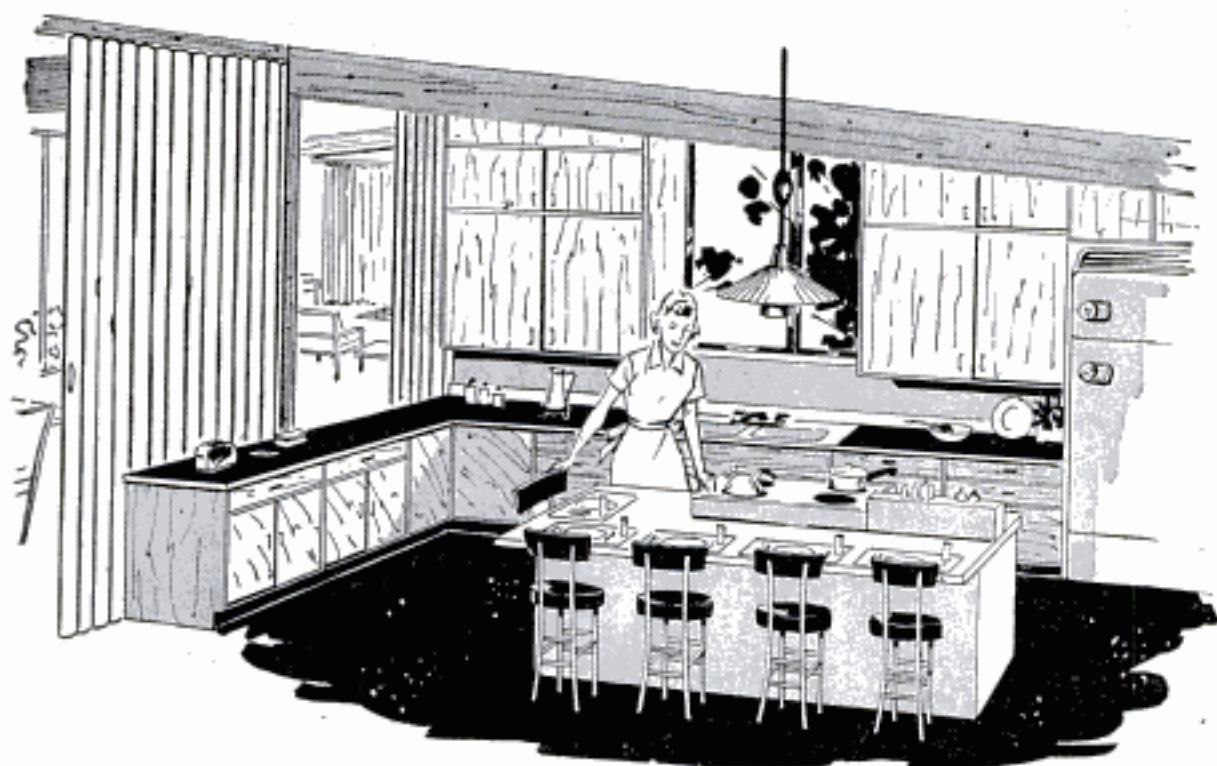


This partially roofed outdoor-living area is one of the delightful features of the PM Modern house. The patio floor is brick set in sand, and the deck around the pool is scored concrete. Pool space may be used for garden. Glass doors are to living room

*Interiors for both homes by  
Marshall Field and Company's  
Home Planning Bureau*

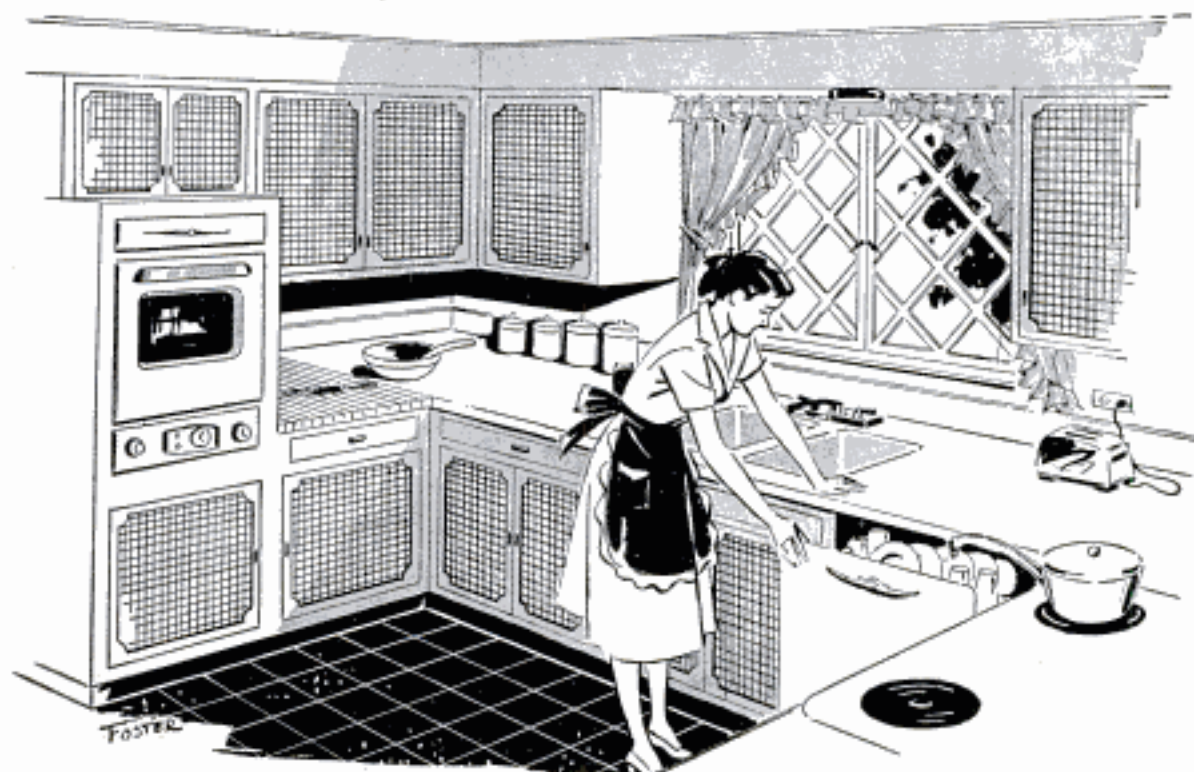
Sliding glass doors at one end of the family room (just across the page) open on this patio and outdoor-living area which provide good modern flair to the house

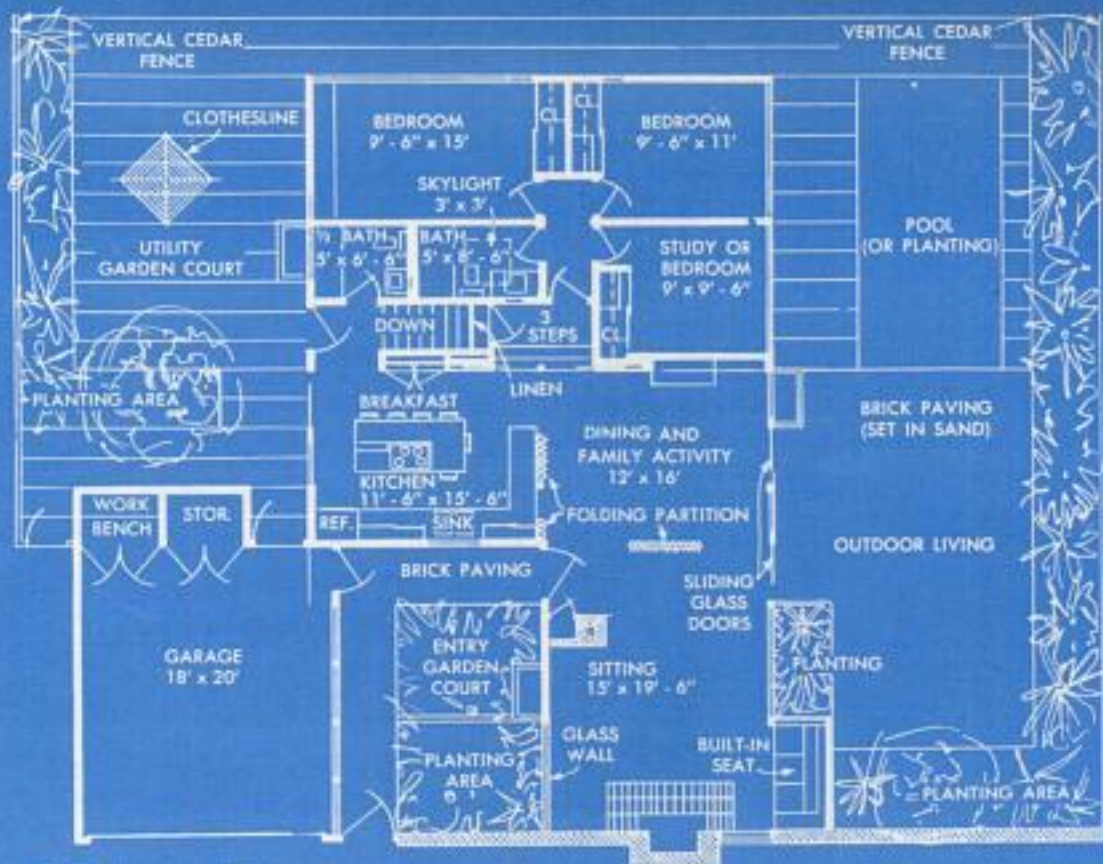




Kitchen of the PM Modern features an island breakfast bar and range. Windows over sink look out toward entrance court. Folding partition (left) opens to family room

PM Traditional kitchen has wickerwork cabinet doors and raised oven. Diamond-paned windows look out to rear yard. Across the room are a dining nook and planning desk





*the PM Modern*



*the PM Traditional*



without condemning the family to a gold-fish-bowl existence. The same applies to the home's open plan (minimum use of solid room partitions). This affords needed versatility for modern informal living. Kitchen, breakfast, dining and living areas adjoin each other with little feeling of separation. However, folding partitions are provided for occasions when the family desires the privacy of a separate kitchen, dining or living room.

"I use accordion-type partitions to achieve indoor privacy," says Ridley, "and on the outside the same effect is obtained with wing walls, enclosed courts, screen fences and landscaping."

The enclosed garden-court entrance at the front of the house "protects" the partial glass wall on one side of the living room. A wing wall, extending beyond the house proper, provides both shelter and privacy for the outdoor-living area. The glass side of the living room and dining area opens onto this secluded outdoor-living space. The wing wall and extended roof give this medium-sized home—1344 square feet of living area, not including the two-car garage—a luxurious big-house look. Beamed

(Continued to page 264)



Workshop in the PM Modern House is located in sunny end of the basement under raised section of house

Floor plan copyright 1957, John Ridley

problem was to find a top-notch firm of architects to do the job. Among those considered was the firm of Perkins, Norris and Mulloy, who practice in the Chicago area.

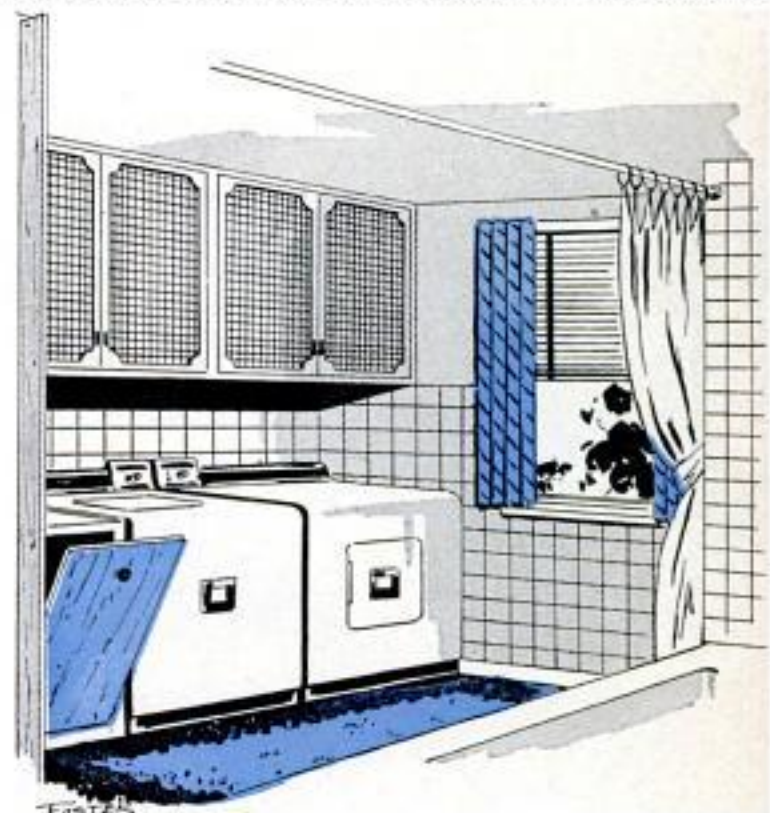
Our first glimpse of the building which houses their offices—low, sleek and modern with big slabs of glass and rough-textured brick in the suburb of Glen Ellyn—was discouraging. This building of their own design is about as traditional as the plastic House of the Future in Disneyland.

Three alert young architects—all in their sunny thirties—greeted this writer in their smart contemporary reception room. This room has walnut-paneled walls, cork floors and a low-slung aquamarine davenport against one wall.

"A traditional house?" repeated Gerald A. Perkins, the 34-year-old senior member of the successful firm. His glance met those of his partners, Charles F. Norris and Miles F. Mulloy. Both Perkins and Norris are graduates of the justly famed School of Architecture at the University of Illinois. Mulloy learned his profession as he says "the hard way, in night schools, in architects' offices and on building projects."

Norris lifted a thoughtful finger to his

(Continued to page 268)



Ingenious upstairs laundry in the bathroom (washer and drier) is a modern feature of the PM Traditional House. There is also laundry space in basement. Cabinets above utilities have doors of wickerwork

# PAPER Your Rooms With CLOTH

By Ralph Treves

**B**ESIDES BOASTING an array of new modern patterns and colors, coated-textile wall coverings have been made easier for the do-it-yourselfer to apply. Now the material comes trimmed ready for hanging and in a 24-in., easy-to-handle width. Unlike wallpaper, coated textile, despite its weight, will not tear when coated with paste, and it can be worked by stretching and contracting the cloth so adjoining patterns line up perfectly. Regular wallpaper paste is used, but to make it hold better, wall sizing is added to the paste in the proportions of one small package of sizing to each pound of paste.

Wall preparation is important. While the cloth may be applied to a painted wall and will satisfactorily cover hairline cracks, deep cracks in the plaster should be filled with a patching compound, such as Spackle. In covering a high-gloss paint, it is best to score it deeply with coarse sandpaper and then coat it with glue sizing. New plaster walls, of course, should be sized, too.

Before cutting strips, check position of matching pattern. Number strips and pile in consecutive order



Cut the strips about 1 in. longer than actual ceiling measurement to allow enough for final fitting

As with wallpaper, proper placement of the starter strip is important. This is assured by dropping a plumb line from the ceiling line 23 in. from a corner, placing the first strip to this line and running a wooden ruler down the corner to mark the cloth. The edge of the cloth is cut accord-

Apply heavy coating of paste. Wall sizing is added to give greater bond to hold heavy textile to wall

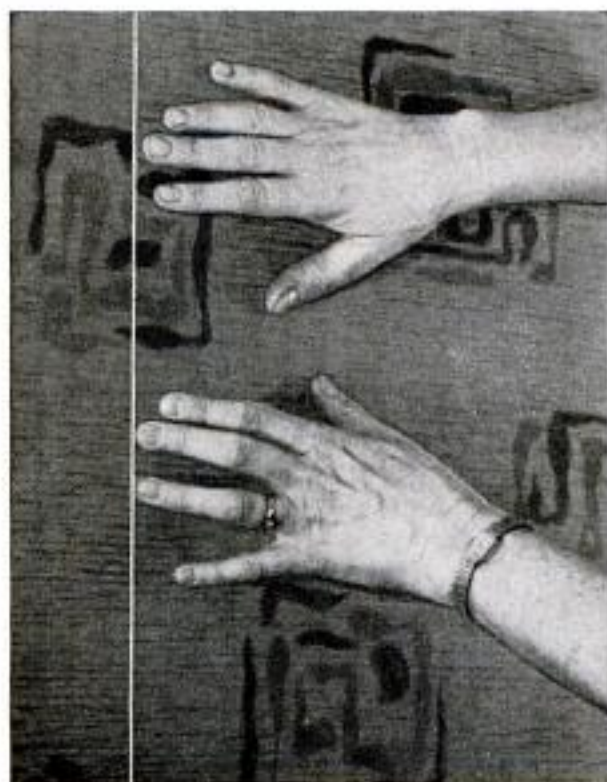




Plumb line is dropped 23 in. from corner. This tests trueness of corner and provides guide for first strip

ingly and a new plumb line is made to allow the trimmed edge to turn the corner about  $\frac{1}{2}$  in. Avoid running a full-width panel around a corner as it will not adhere properly. Instead, cut the panel lengthwise so it extends a short distance on the adjacent wall. Then apply the remainder of the strip

Work each strip with finger tips to merge corresponding sections of pattern. Watch for any air bubbles



OCTOBER 1957



Brush out strip to smooth it, working from center outward to remove wrinkles. Damp cloth can be used

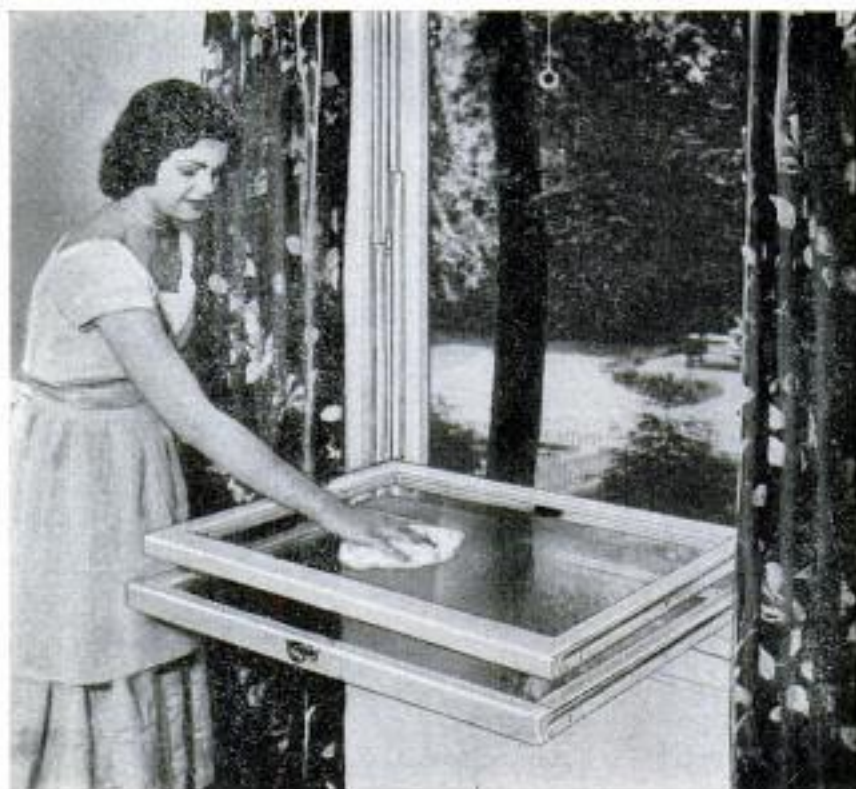
to the cut edge to make the pattern continuous. From here you proceed the same way as you would in hanging wallpaper, cutting the strips about 2 in. longer than necessary and making sure the patterns match. Apply a fairly heavy coat of paste, carefully brushing out all lumps. ★ ★ ★

Trim top and bottom edges by pulling fabric away from wall and cutting with scissors. Smooth back on



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# IDEAS FOR HOME PLANNERS



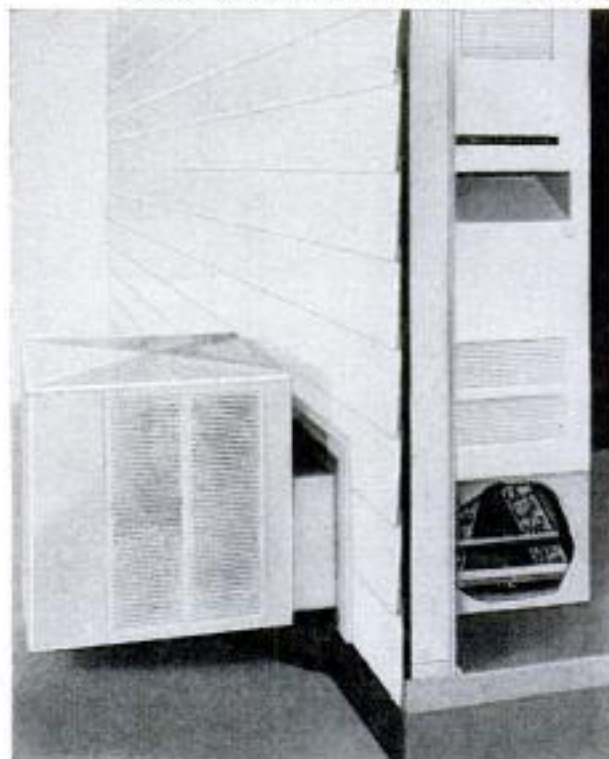
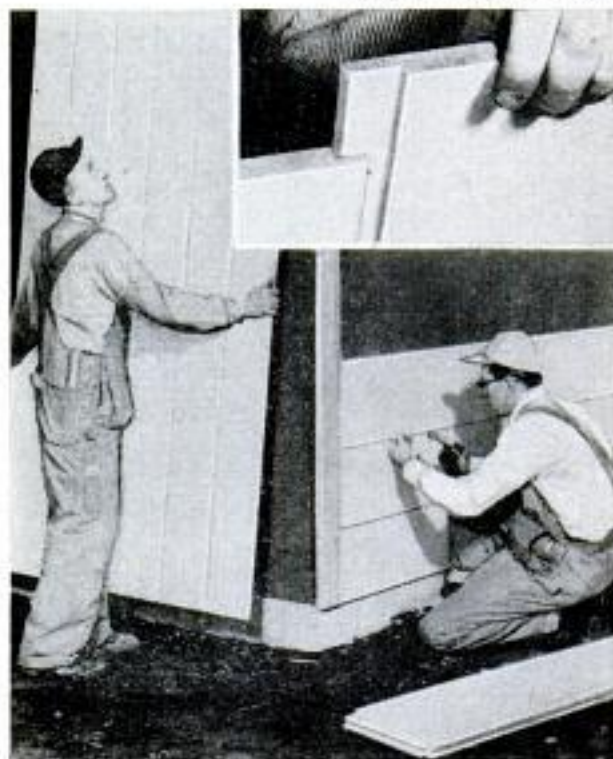
**TILTING WINDOWS** swing inward to any desired angle for easy cleaning. No part of the sash projects outdoors to interfere with the screens. Both upper and lower sashes are hinged at the bottom and both can be moved up and down in the usual way. Insulating glass with a  $\frac{1}{4}$ -inch airspace, is optional  
Brown-Graves Co., Akron 1, Ohio

**PRIME-COATED SIDING** made of hardboard is available in 12-inch-wide boards and 4-by-8-foot grooved or plain panels. Each piece is prime-coated at the factory on the face, back, ends and edges. Angle-cut edges on the horizontal siding keep side walls dry and clean by carrying moisture to the outer edge

Insulite, Minneapolis 1, Minn.

**EXPERIMENTAL AIR CONDITIONER**, below, is part of a heating-cooling package installed next to an outside wall to eliminate long, complicated connections. Cooling coils from the condensing unit run through the wall to a plenum under the furnace. The cooler has two-ton capacity; furnace is down-flow gas type

Frigidaire Div., General Motors Corp., Dayton 1, Ohio





**CORNER DRAWERS** that help solve storage problems are made in a wedge shape of welded steel. They revolve about a vertically positioned rod inside the cabinet and make use of about 90 percent of the corner space that usually is wasted. A unit of three or four drawers can be installed in about two hours without the need for special tools. They're adaptable to any decorating scheme.

Home Steel Products, Inc., 1528 Vassar Ave., N.W., Canton, Ohio



**MARBLE TILE**, right center, is a half inch thick and comes from quarries in Vermont for use on walls, floors, fireplaces and countertops of homes. Like other tiles, they are applied with an adhesive and can be cut or shaped to fit around pipes or corners. They are relatively light in weight. Three sizes, 8 by 8, 8 by 12 and 12 by 12 inches, are available in 18 natural patterns and colors.

Vermont Marble Co., Proctor, Vt.

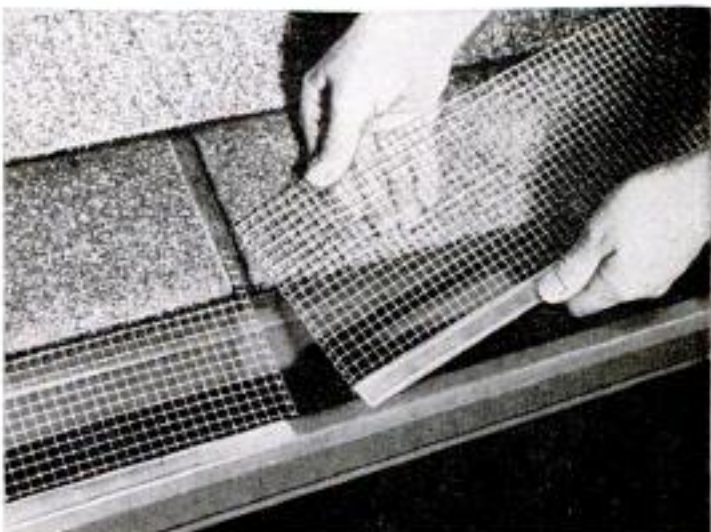
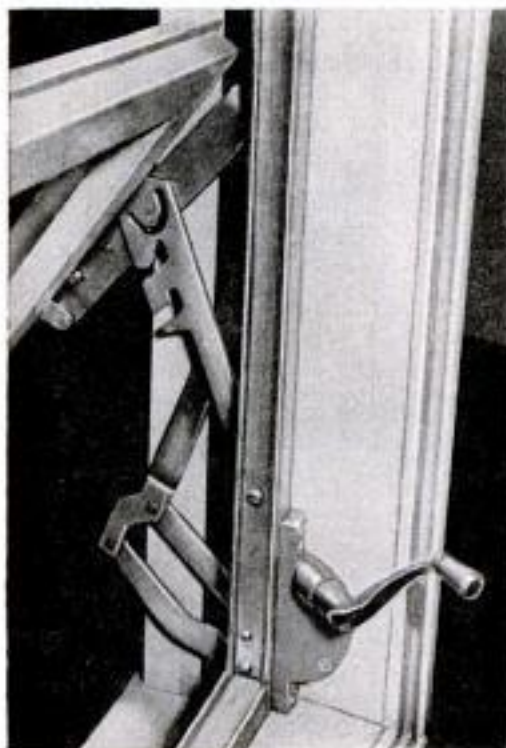
**GUTTER GUARDS**, lower right, protect against clogged gutters and downspouts. They are supplied in two-foot lengths and are easily installed. An aluminum molding snaps on the outer lip of the gutter while the galvanized wire cloth tucks under the shingles. Guards for copper gutters are produced with a plastic film over the molding to prevent electrolytic action of the metals.

Lockhart Manufacturing Corp., 6350 E. Davison, Detroit 12, Mich.



**AWNING WINDOW CRANK**, below, eliminates the need for a separate locking mechanism. When the crank is turned, the vent moves outward until it clears the weather seal. Only then does it swing upward. When vent is open, the mechanism holds it rigid. The closing procedure reverses the action with the vent locked when closing is completed. Vents can be removed from the inside.

R.O.W. Sales Co., Freeland, Mich.





National Concrete Masonry Association photos

Cinder block adapts to long, low look of professional golfer Lloyd Mangrum's home in Apple Valley, Calif.

## Concrete Block Goes Modern

By Kenneth Anderson

**V**ERSATILITY IS THE KEY WORD for modern concrete masonry. If you have been thinking of concrete blocks only in terms of the traditional three-core stretcher units used in commercial buildings, it's time to take a fresh look. Manufacturers today are producing concrete blocks in a multitude of shapes and sizes. The new types of blocks have the same advantages of strength, permanence and economy. But they can now be used in a variety of textures and patterns limited only by the imagination of the builder.

Modern blocks are especially adaptable to modern home design and the outdoor-living trend. The long, low look of golf champion Lloyd Mangrum's home at Apple Valley, Calif. (top of page), is achieved with the use of eight-inch cinder-concrete blocks for all the exterior walls. Most of the interior walls, also, are cinder block. With the exception of the bath and dressing-room areas, the interior concrete-block walls were left exposed but painted.

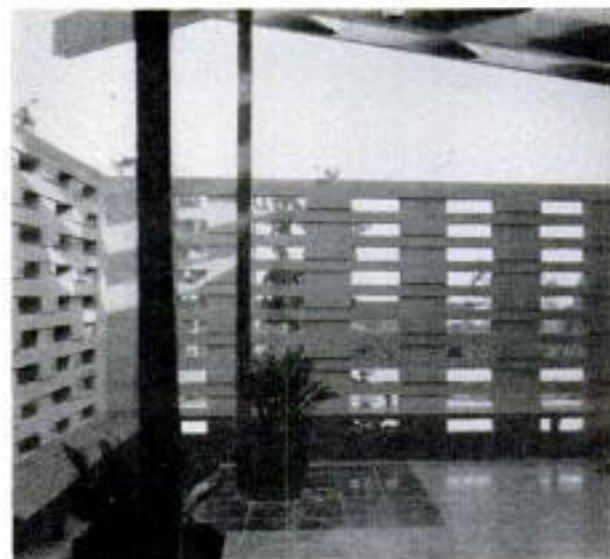
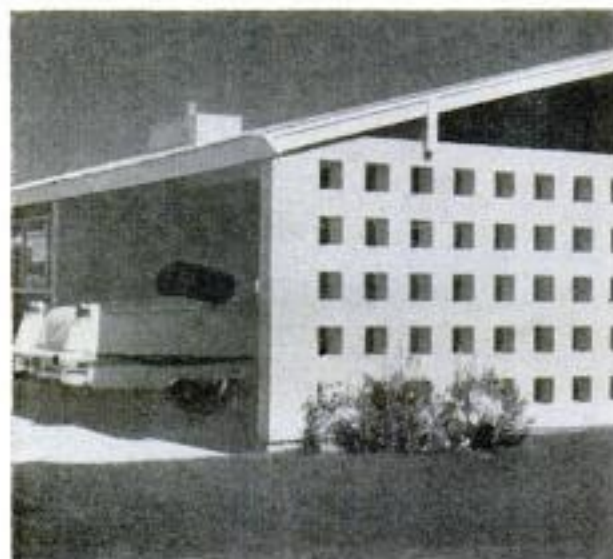
Distinctive yet economical use of concrete block produces a latticelike outside wall for carport

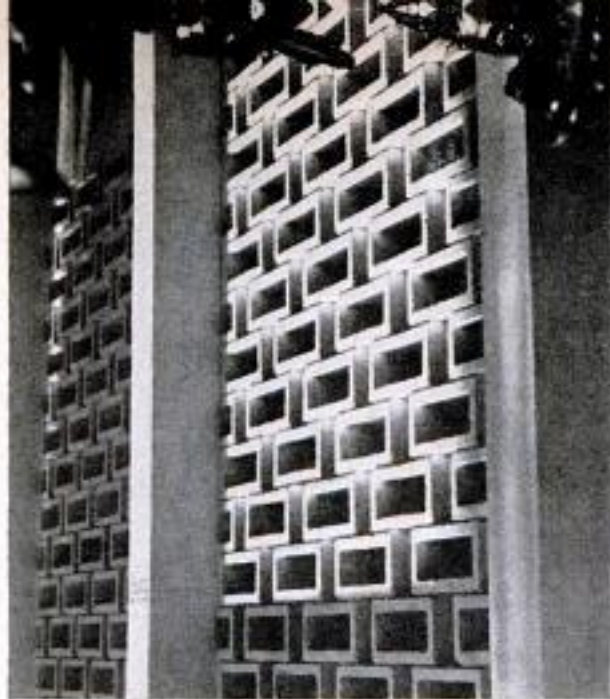
The entire house area was built on compacted dirt fill with a four-inch-concrete floor slab. Ducts running under the slab link a central heating-and-cooling plant with perimeter-type diffusers in the various rooms. All doors and windows are of the steel sliding type and the entire house has a six-foot-wide overhang.

Concrete block is versatile enough to meet the building needs of homeowners in any part of the country. It withstands the blazing sun and sand of the arid Southwest as well as the subzero winter winds of the far North. In the hot and humid Gulf area it has the added advantage of being termite-resistant. Concrete block can be tinted to blend with natural surroundings and it can be combined with other building materials for special effects.

Modern concrete block is becoming popular as a material for building carports and garden fences. It can form a solid wall for privacy or be used in an open grille-type pattern for ventilation. ★ ★ ★

Enclosing paved patio with concrete-masonry units gives you some privacy without blocking breezes

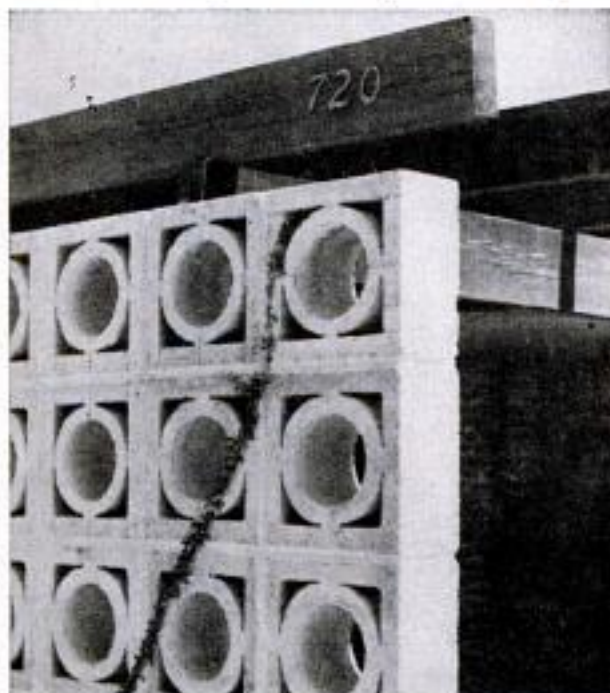




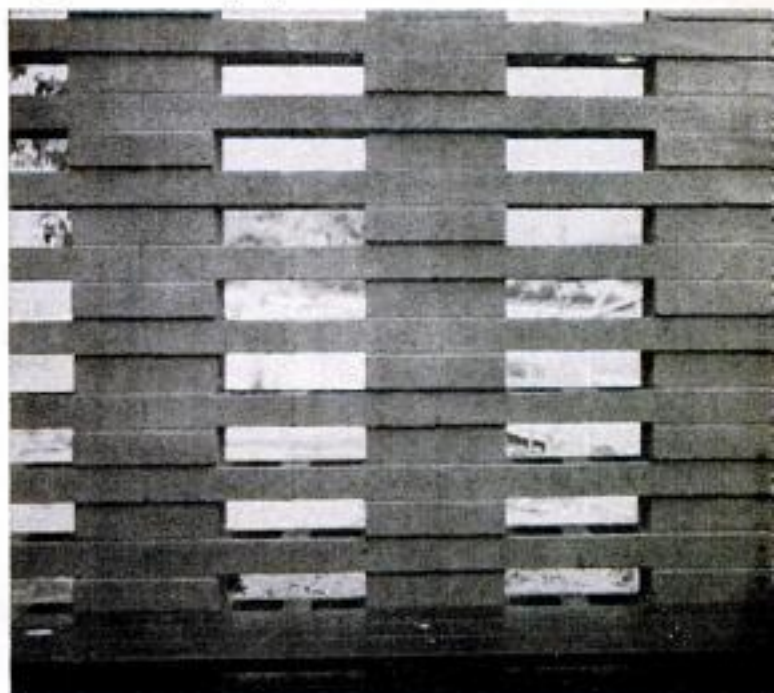
Custom-made single-core units produce this grille



Single-core blocks project from standard-block wall



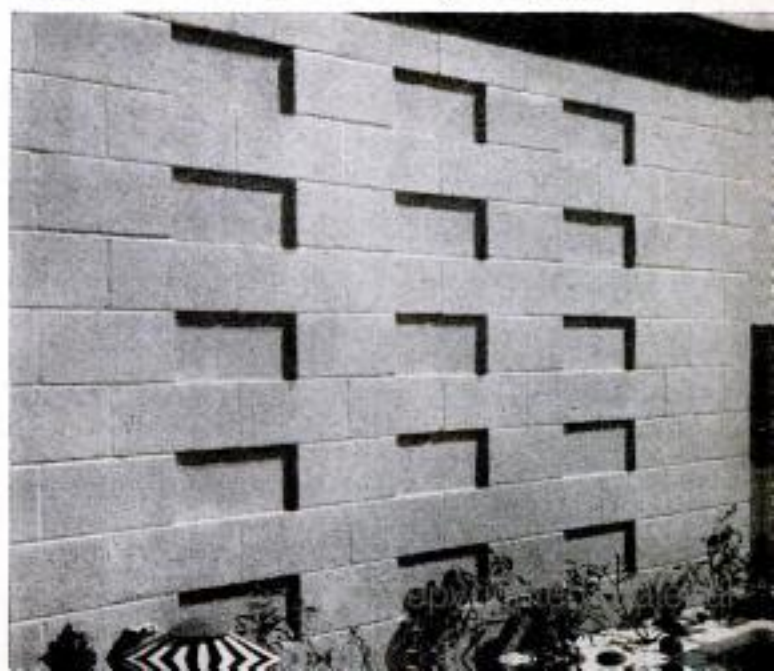
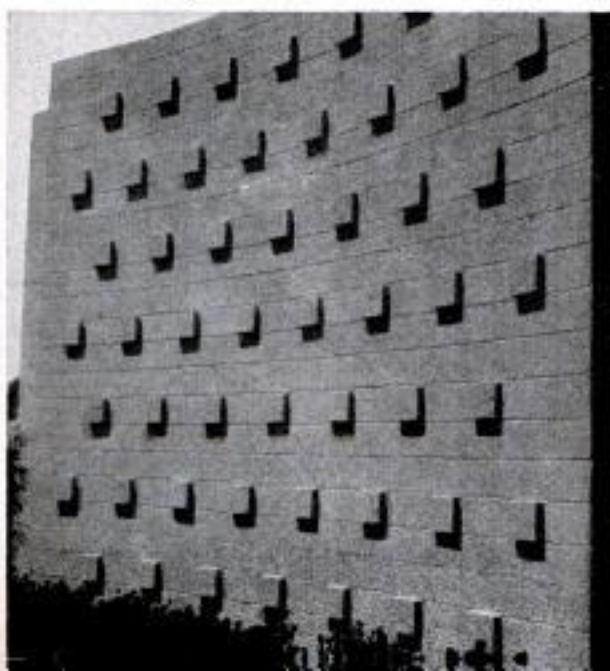
Regular chimney block, above, comes in many sizes



Half-height two-core units, above, form patio wall

Endwise blocks produce 3-D effect on curved wall

Recessed standard units in a running-bond pattern



(see MAY 62, p. 178)

# The HOUSE THAT STORES THE SUN

Heated in winter and cooled in summer by solar radiation, this house is the culmination of 19 years of special research at M.I.T.

By Richard F. Dempewolff

**H**OW WOULD YOU LIKE a slick, modern home that—even in the northern part of the country—runs an annual heating bill of only \$50?

That's about what it will cost to provide year-round hot water, 72-degree comfort during New England's cold winters, plus air conditioning on hot summer days for a house completed this year in Lexington, Mass. Sitting high on a ridge with sweeping view, the eye-catching, two-story modern dwelling has several curious features that set it apart instantly from more conservative neighbors. Its long, paneled and nearly windowless side walls are half buried in the earth so that solid terraces extend from the second floor. The end walls, with intricate glass areas, reach down to grade level. In effect, the house snuggles in a "ditch." The living room, accessible from the terrace, is on the second floor along with the master bedroom. Dining room, kitchen and two more bedrooms are on the ground level.

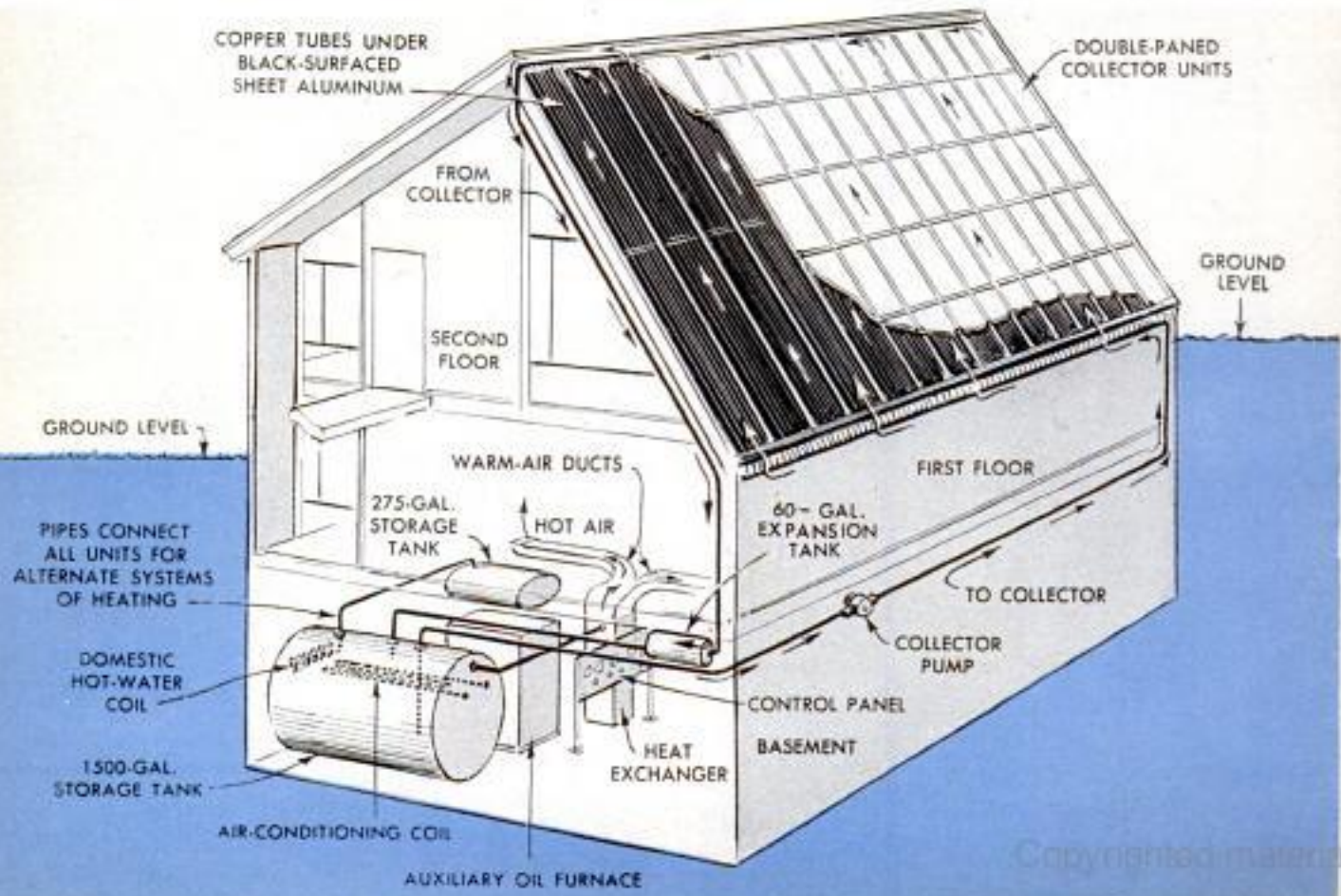
Most startling, however, is one vast,

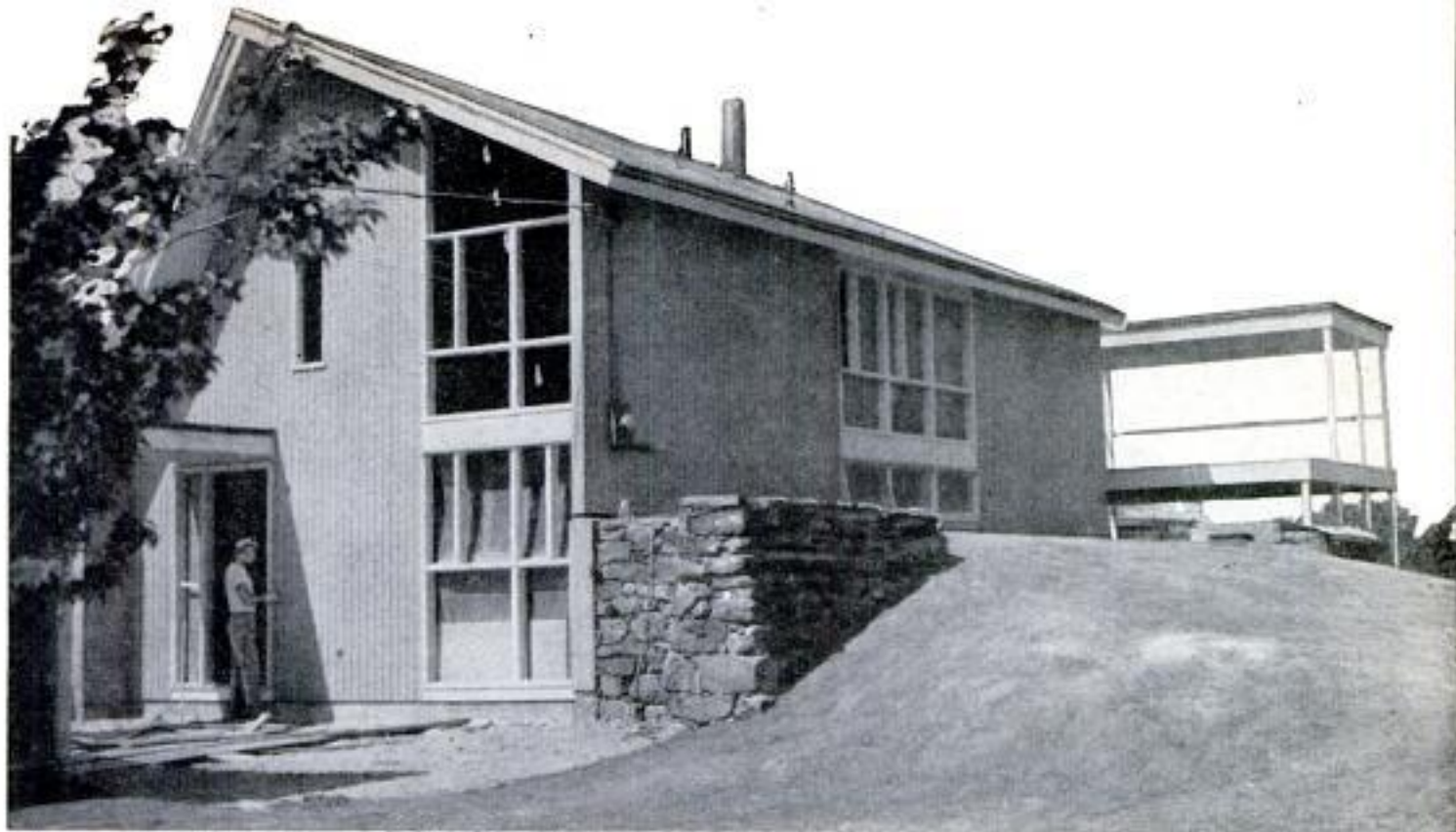
steeply sloping side of the roof entirely of glass panels that glint in the sun. Oddly, this is neither glass wall nor roof—but serves a little as both. Behind that 640-square-foot expanse lies the real secret of the house. This is the heart of a heating system that collects heat from the sun, stores it in the cellar and uses it in measured quantities to keep the house warm and comfortable in winter.

For nearly 20 years, the intriguing prospect of harnessing the sun to supply home-heating requirements has kept the builders of this unique dwelling busy. They are known as the Space Heating Committee of the Solar Energy Conversion Project. Established under a fund left by Godfrey L. Cabot, this team of scientists and engineers from Massachusetts Institute of Technology, in Cambridge, began in 1938 to study ways of trapping the sun's energy so it could be put to work.

"Space heating, hot-water supply and absorption-refrigeration air conditioning are an especially fertile field for solar-

Diagram of the new M.I.T. solar house at Lexington, Mass., shows in detail how the system will function

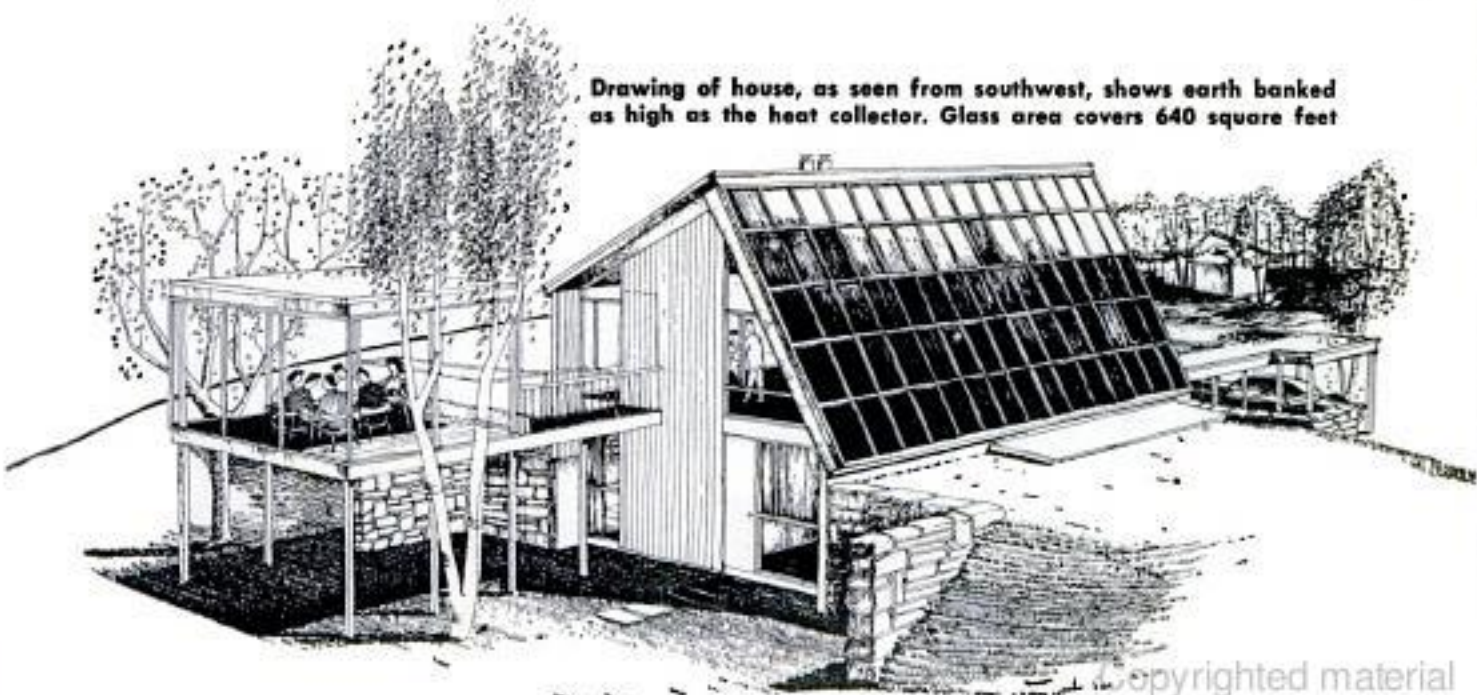


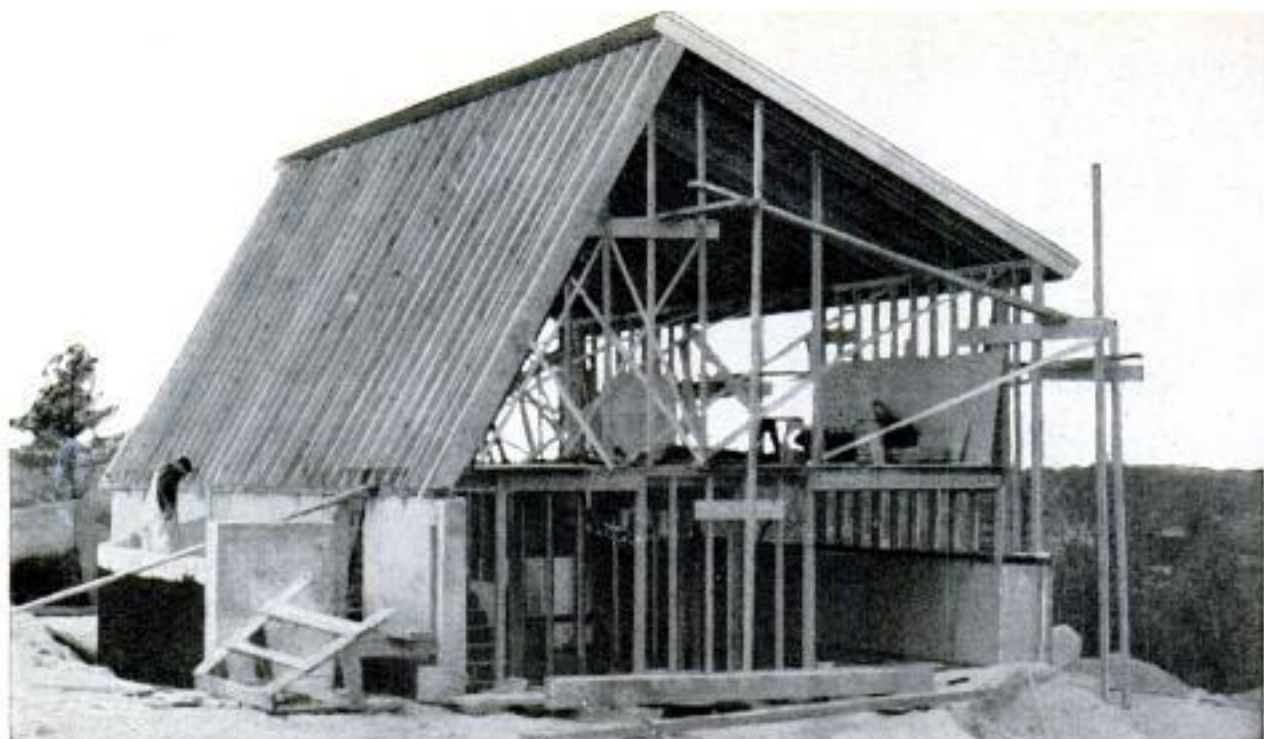


View from northeast, with side away from sun partly buried in hill to cut heat loss. Floor plan is below



Drawing of house, as seen from southwest, shows earth banked as high as the heat collector. Glass area covers 640 square feet





Construction stage of solar house, above, shows steeply sloping rafters that will hold 75 collector units

energy use," explains one of the engineers, "since the fossil fuels normally used for these jobs deliver much higher temperatures than are needed. So this was an area where we concentrated effort." Today, under Chairman Lawrence B. Anderson, their efforts are on the verge of paying dividends.

Robert J. Pelletier, research associate on the project, can show you stacks of blueprints and sketches in M.I.T.'s school of architecture testifying to the early studies that were made with various types of collector panels to absorb the sun's rays. Three experimental houses were built. "The first," recalls Pelletier, "was just a two-room laboratory for testing various collectors."

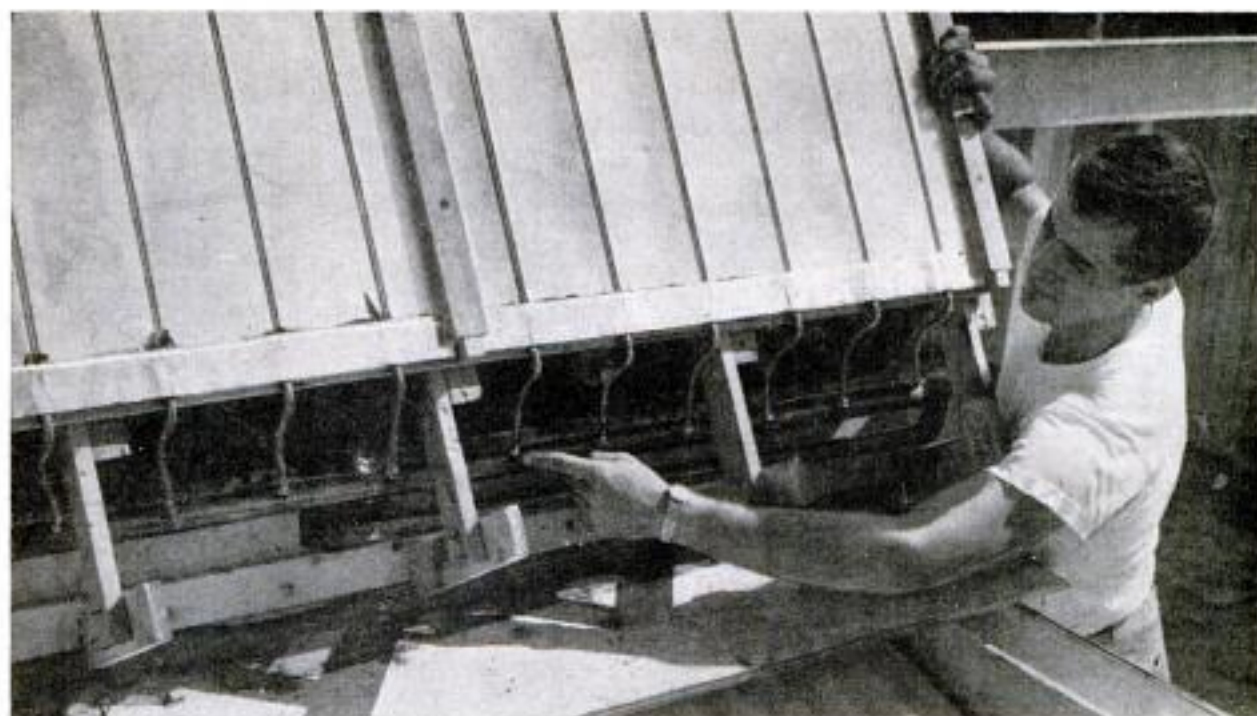
The second solar house at M.I.T. was a

row of cubicles with a triple-glazed south wall. Experimental water-tank heat-storage systems were tested in it. Ten years ago, this became the committee's third house—but its first real solar home—when a collector and storage tank were installed, and a small student family moved in. That house was purposely underdesigned to require auxiliary heat. But from it came the know-how that went into the construction of the latest experiment in Lexington.

The solar experts' "dream house" looks like a uniquely conceived modern home in the \$18,000 to \$20,000 price class, although this hand-built prototype cost much more. The big collector surface extends the entire length of the building. Tilting skyward at



Workman on ladder, below, is putting black paint on aluminum heat-absorbing material



Photograph above and diagrams below illustrate method of circulating water through heat-collector units

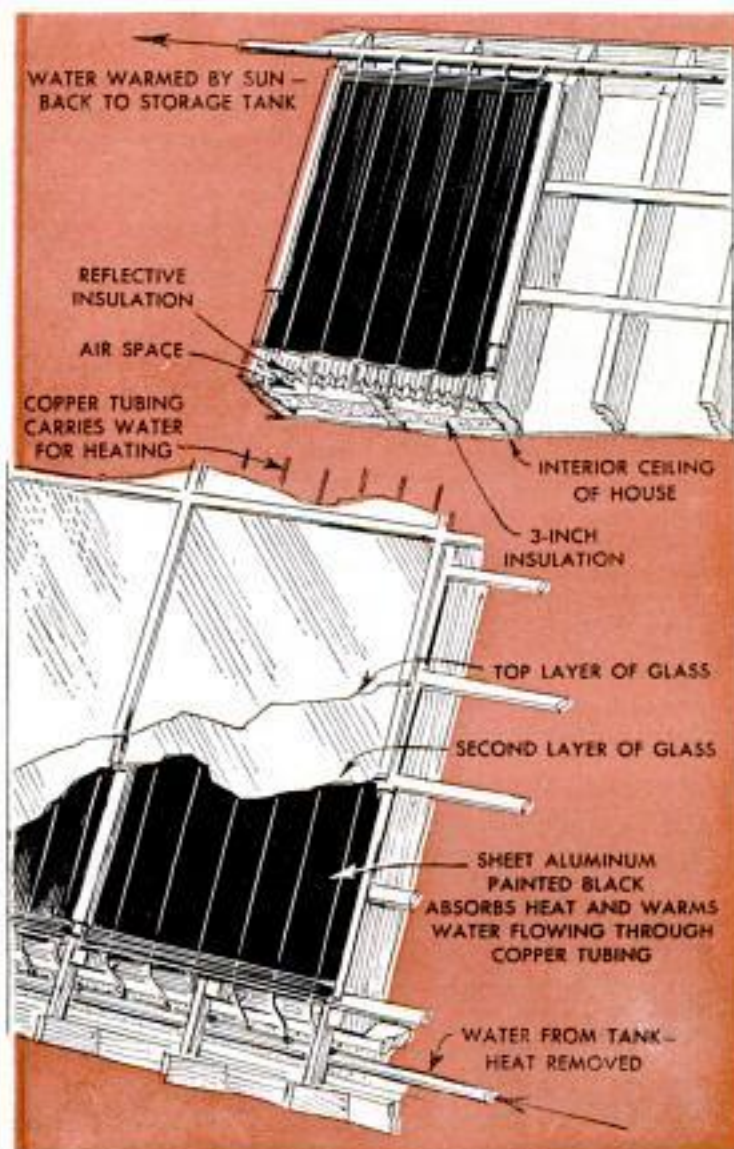
an angle of 60 degrees, it resembles the extended side of a salt-box-type roof that some imaginative artist might have designed as a tremendous studio window. Instead of facing north light, however, it looks to the south so it can catch optimum sunshine.

### Many-Celled Collector

The collector, measuring about 16 by 40 feet, is made up of many individual cells. Each is a glass-covered insulated box, about 2½ by 16 feet, in which the sun's heat is absorbed by a black-surfaced aluminum sheet. "The sun's short-wave radiation easily penetrates two layers of glass," explains Pelletier. "But the heat radiation from the metal is long-wave, and glass will stop it. So, the heat is trapped in the insulated box."

Water, pumped through a grid of piping fastened to the underside of the aluminum sheets, picks up the heat and, warmed to about 150 degrees, circles back to a 1500-gallon storage tank in the cellar. This massive cylinder—about five feet in diameter and nine feet long—is hidden in a huge box of loose insulation that keeps its cargo hot. From this big reservoir of "canned sunshine," the heated water is pumped as needed through a heat exchanger. Here, the warmth is transferred from the water to air,

(Continued to page 276)



# Is It a Good Buy?

## BUILDER'S REPUTATION



Does the builder take pride in his product or is he more interested in the money he can make? Talk with owners of other homes erected by the builder. Was a qualified architect consulted in planning the house? Have storm sewers, other extras been provided?

## NEIGHBORHOOD

Is it a new neighborhood with a future or an old area on the decline? Is it near slums or factories, or close to heavily traveled streets? Check the zoning laws—they may allow a rendering plant next door. Proper location can be most important in buying a house



## KITCHEN AND BATH



Are the kitchen and bath up-to-date? Does the kitchen have adequate light and ventilation? There should be enough counter space and room for new appliances. The kitchen floors should be grease-resistant. Do you have to climb stairs to reach a bathroom? Is lavatory lighting adequate?

## STORAGE

Are the closets and cabinets designed for your needs? You may want separate storage areas for out-of-season clothing and clothes for current use. Are the closets lighted or do you have to grope in the dark? Will you need closets for toys or for household tools?



## LANDSCAPING



Good lawn and shrubs add to the resale value as well as the appearance of a house. But shrubs should not be of the nuisance varieties that attract insects or make a mess of the yard. Yard should be adequate for fun and graded to drain water from house

## BASEMENT



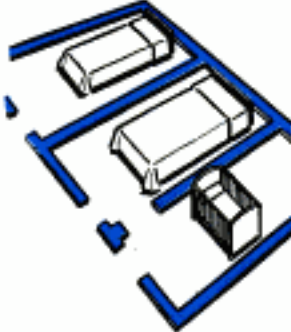
Does the basement have proper drainage? A good basement can be converted to a workshop, a rainy day playroom or a storage area. But be sure the basement isn't damp or easily flooded. Are the walls sealed against water? The stairway should be safe and well-lighted

## TRAFFIC PLAN

Where do the doorways lead? Can the bedrooms be isolated from areas where other members of the family may be entertaining? Is the kitchen close to an outside entry or do you carry groceries through the living room? Study a copy of the floor plan of the house



## BEDROOMS



Nearly three fourths of all home buyers want at least three bedrooms; some prefer four. Bedrooms should have adequate ventilation and privacy. Space for the bed should not be broken by doors, windows, heat ducts or closets. Not more than two persons should sleep in same bedroom

## HEATING

Ask a heating contractor whether the furnace will be adequate for the size of the house and the climate. Also, will it be big enough if you add a room? Are heating ducts insulated? Trend is toward central air conditioning, so check the cost of adding a cooling unit

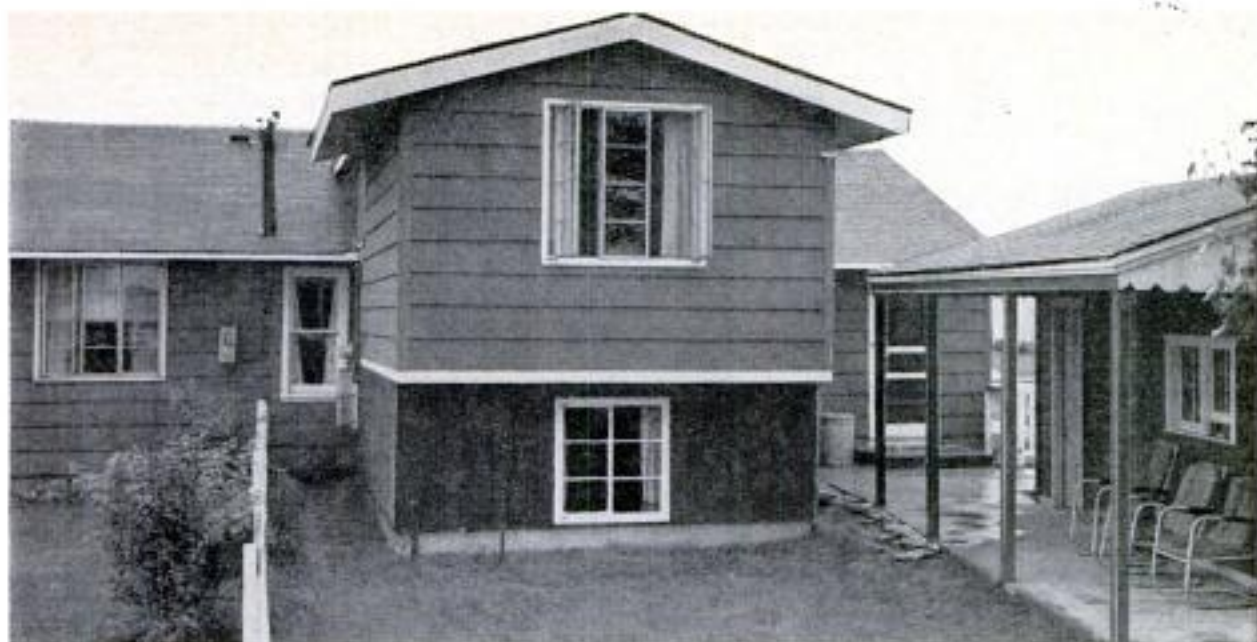


## COST TO BUILD



Bargains in real estate are rare but you may get more floor space per dollar in a bigger and older house. Find out what it would cost to build a new house to suit your personal needs. Then figure the cost of buying an older house and remodeling it to suit your taste





Here's the split-level addition that added 448 square feet of living area at a total cost of about \$1820

## *Because We Needed a Third Bedroom We Changed Our* **RANCH HOME TO A TRI-LEVEL**

*By Bob and Merry McShane*

**T**HE DECISION to add a room to our duplex ranch house was forced upon us. We liked our town and our neighbors and we liked being close to schools and shopping, but we had real space problems. Our lot is not large and we could only build to a maximum of 30 percent of the lot area—an ordinary room addition would give us one more bedroom, but no more. The children still would have no place to play indoors and our four girls were becoming more and more of a strain on that one bathroom. Somehow, the idea of building a split-level addition was born.

When the idea first came, we dismissed

it as impractical. The Hometown, Ill., building code is strict and we felt we'd never get permission to build our house higher than the neighbors' houses. Besides, we were afraid that such an addition might look odd and ungainly in the midst of 1700 long, low ranch homes. Then solutions started arriving. Why not start at the depth that we'd have to go with the footings? That would leave more space above. After a few weeks of drawing and figuring, measuring and replanning, we came up with a workable plan. The two new levels could be built without going any higher than the existing ridge—and we still wouldn't have

The addition can't be seen from front of the house. Its peak is no higher than the original ridge line





Above, interior of recreation room. New rooms appear on floor plan, below, as tinted areas. Original bath is now stairway



to risk building a deep basement that would be damp and dark. Most important, the plan gave us an additional half bath, a larger full bath, two extra closets, a big bedroom and a playroom which could be reached directly from the kitchen. With crossed fingers, we submitted the plan for our building permit. We received not only approval but congratulations and best wishes from the architects who comprise our Building and Zoning Department.

We soon found out, of course, that it's a long way from a beautiful plan to the finished product. Our troubles started right away when we found that we'd have to dig the excavation by hand — no machinery could work well in that tight space. Surprisingly, the job moved right along, thanks to the help of a good neighbor who appeared almost every evening saying he just wanted to "get in shape again." By the time we had dug 35 cubic yards of dirt out of that hole, we were all in shape!

We poured a concrete slab in the excavation with broad, deep footings all around and a line of drantile around the perimeter draining into a sump located beneath the stairs. Concrete blocks were laid in a horizontal stack bond, 11 courses high, painted on the inside and covered with siding on the outside to match the existing house finish. About the time the walls were at ground level we resisted the urge to make it into a swimming pool—despite the wails of our crew of juvenile sidewalk superintendents.

The job of moving our whole plumbing system was more than we had anticipated. It was at least two weeks before all the

fixtures in the house were in operating condition at one time. We have this advice for any amateur who has to move a bathroom: Don't even try to reuse the basic plumbing system. Just build the new one, at least one complete bathroom all ready to hook up. Then salvage whatever you can when you tear out the old system. The extra cost would be well worth it — and would save you a great deal of aggravation.

A long four-by-six beam, reinforced with steel angle bars, enables us to maintain full ceiling height in the bedroom. The rafters rest on the beam and on the top plate of the outside walls.

We taped and sanded all the wallboard joints, installed plastic wall tile in the baths and paneled the end wall of the recreation room with rustic cedar siding—the same material that is used on the lower part of the outside walls. The upper siding material is 1/4-inch hardboard which we ordered from a factory that produces it as prime-coated siding and furnishes a rabbeted shadow strip to build up the bevel. It's easy to install and holds a coat of paint beautifully.

The lower room is 12 by 18 feet and the upper room projects 16 inches beyond the 18-foot length. Our basic house was only 720 square feet and the addition of 448 square feet brings the total to 1168.

Here's the approximate breakdown of material costs: Plumbing and sewerage, \$310; masonry and concrete, \$240; heating materials, \$145; electric supplies, \$210; millwork and doors, \$140; lumber, siding, roofing, insulation, paint and tile, \$775. The total cost was about \$1820, or \$4 per square foot for two extra rooms. ★ ★ ★



Rear view of home before split-level addition was started. Earthmoving machines couldn't operate in small space so excavation was by hand



Concrete-block walls are started, above, on concrete-slab floor. The white lines on the photograph below indicate the framing for the upper level and location of a new window for one of the original bedrooms





Fleetside Window photos

Exterior and interior views show how porch was converted into a year-round family room. Window walls combine a fixed picture window with jalousie panels

## The Easiest Way to Add Space

*By Clifford B. Hicks*

**W**HEREVER YOU LIVE or whatever the climate, there's a potential extra room in your home if you have a porch or breezeway.

Enclosing a porch is the easiest and least-expensive way to add space for one reason—the roof, floor and one or more of the walls already are in existence. All you have to do is add the remaining climateproof walls and provide heat for the resulting room.

In years gone by it was difficult to convert a porch into a satisfactory year-round room. Old-fashioned windows wouldn't lock out the cold and old-fashioned furnaces wouldn't deliver the extra heat.

Today the heating problem is easily solved. Many forced-air furnaces will provide adequate heat for an additional room, so all you need is another outlet to the



porch. If you can't solve the problem this way, you can heat the extra room with one of the new high-styled space heaters. Some fit between studs with little projection into the room.

By far the easiest way to add walls is simply to add windows. Modern windows are available in an amazing array of types and sizes. When you find the right width in the right type, you can simply stack up the windows to the height you wish. All the modern types, including jalousies, are weatherstripped and virtually airtight. The resulting window walls will keep out winter winds almost as efficiently as existing walls.

These three pages show ideas for converting porches into family rooms and bedrooms, but each porch presents its own problems. You can give your porch enclo-



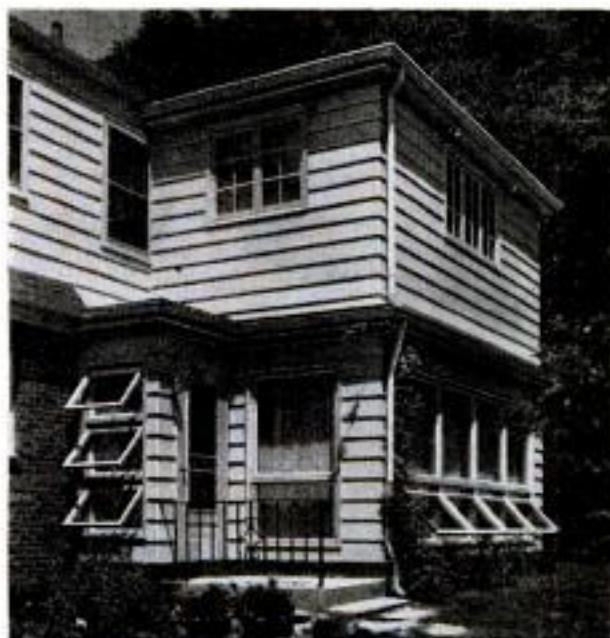
Andersen Corp. photos

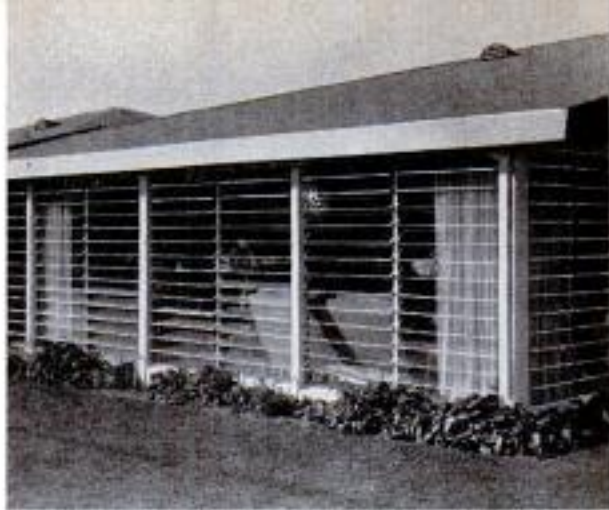
Beautiful room shown above started out as the unimpressive open porch at right. In this case awning-type windows were used to provide full ventilation whenever desired. The strong horizontal lines of the windows make the enclosed porch appear larger

sure your own distinctive touch through choice of type and size of windows and doors. Most important, the completed room should conform with the existing architecture, whether it be modern or traditional in style. (Photographs of outstanding projects are continued on next page.)

Screened porch below served as the basis for a two-room addition to this two-story house. Porch was permanently enclosed and additional room built above it. Corner posts of the original porch were covered with siding to match the second floor of the home

Bolacreen Co. photos





Sun-Sash Co. photos

This project started with a roofed patio. With the roof, floor and one wall already in existence, the homeowner only had to add three climateproof walls. He selected modern jalousie windows, giving him three walls of glass. Because of the continuous roof line, the resulting room seems part of the original home



Andersen Corp. photo

Modern windows stack to form window walls. In many cases windows fit together and need no framing members between them. There are sizes to fit any need



Western Pine Assn. photo

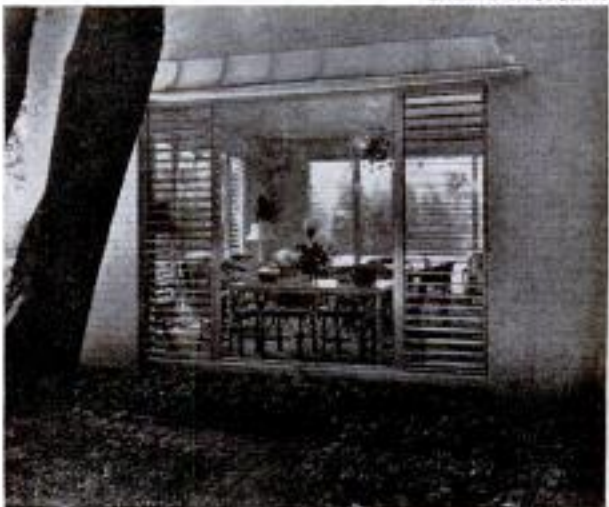
Feature of this all-purpose room, converted from a porch, is the big sliding glass door—in effect a movable wall—which closes off or opens up the outdoors

Jalousie windows give complete ventilation even when it's raining. During the winter months, the inside screens can be replaced with storm sash if desired

Ludman Corp. photo

More formal is a porch area enclosed with picture windows and jalousies. This provides excellent view of the garden without sacrificing good ventilation

Ludman Corp. photo



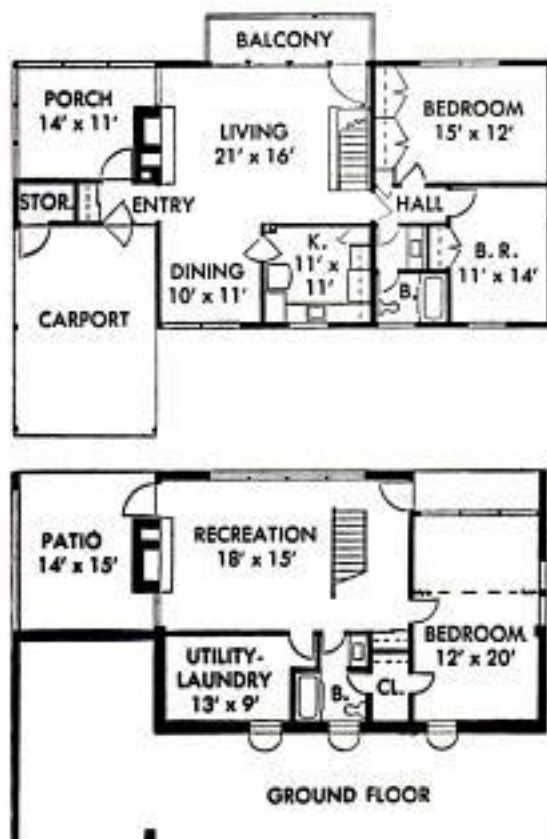
# PARADE OF HOMES

*Good design and construction, livability and price were the basis for the selection of these outstanding homes across the country.*



MARYLAND

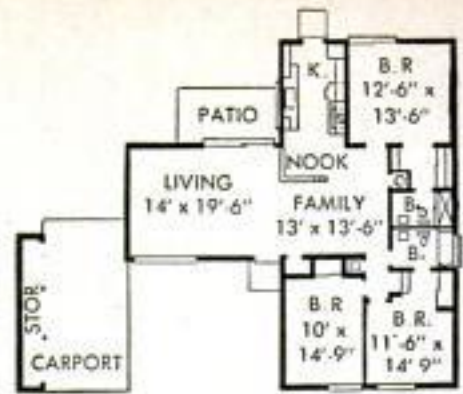
Three bedrooms, two baths  
Floor area—1900 square feet  
Price—\$22,000 (without lot)



Ideally located on the top of a hill looking across a wooded ravine toward the Potomac River, this home was designed by Francis D. Lethbridge, A.I.A., of the firm Keyes & Lethbridge of Washington, D. C. It was built by the Bennett Construction Company, Bethesda, Md., in the suburb of Glen Echo Heights. The front of the house (below) is one story and the rear two, due to the hillside site. It is actually a two-story house with no basement. Big windows, porch and patio across the back take full advantage of the view. A balcony outside the living room adds interest. The foundation is concrete slab; framing, Douglas fir; exterior, brick and textured-redwood plywood; roof, built-up white crushed coral; floors, oak, vinyl and ceramic tile; extras, range, refrigerator, disposer; heat, gas-fired furnace, forced warm air

Photos by Fred J. Maroon









## ARIZONA

Three bedrooms, two baths  
Floor area—1240 square feet  
Price—\$10,950 (including lot)

Markow photo

One of the best buys in the country is this sleek modern house built by John F. Long in Glendale, Ariz., and designed by Ragnar C. Qvale. The layout of this glamorous house exemplifies the best in open planning and indoor-outdoor living. Living, family room, kitchen, eating nook and rear patio form a free-flowing center for family activity. Around this are the bedrooms, two with dressing rooms. Foundation is slab; floors, asphalt tile; exterior, concrete block; roof can be flat or gable; many extras



## NEVADA

Three bedrooms, two baths  
Floor area—1200 square feet  
Price—\$13,950 (including lot)

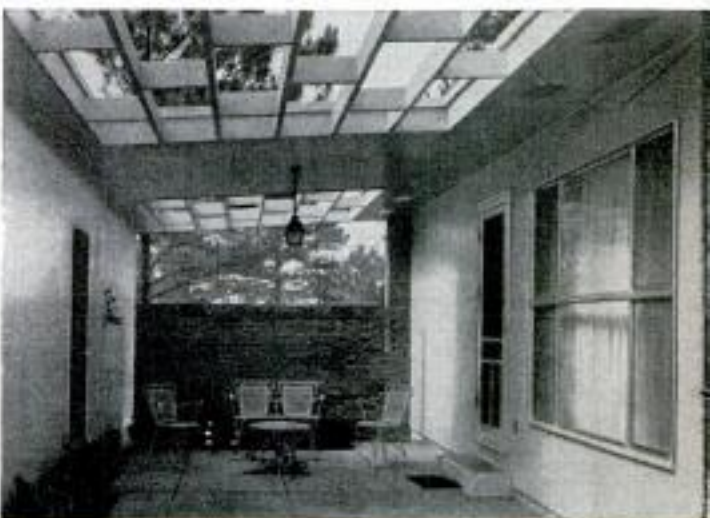
The price of this house includes a complete air-conditioning system, dishwasher, disposer and a paved patio. It was built in Las Vegas, Nev., by McKellar and Associates of Menlo Park, Calif. It was designed by Rombough, Inc., Oakland, Calif. The plan features a big garage at the front of the house which can also be used as a porch, a patio with access to the master bedroom and family room, and a good traffic pattern for everyday living. Foundation is slab; exterior, stucco and board-and-batten; roof, built-up



## MISSISSIPPI

Three bedrooms, two baths  
Floor area—1275 square feet  
Price—\$17,000 (without lot)

Combination living-dining and family-room-kitchen areas give this house built by Carter & Fly of Jackson, Miss., a feeling of spaciousness. The architect is Edward I. Welty. Foundation is concrete with crawl space; exterior, grooved hardboard; roof, marble chip; floors, hardwood, vinyl and cork; all lighting, valance type; windows, aluminum; baths, ceramic tile; heating-air conditioning, underfloor system; extras, built-in range, dishwasher, disposer, landscaping

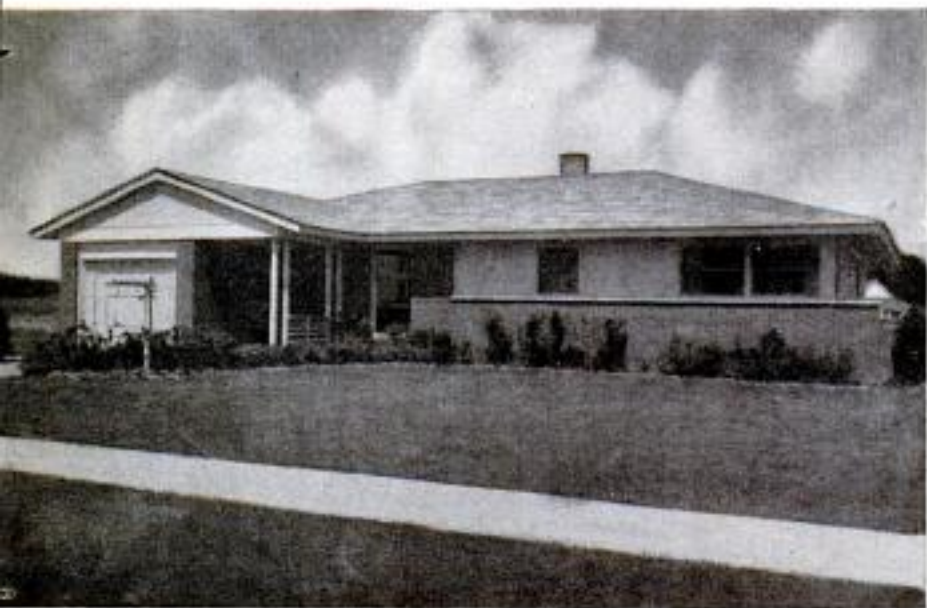
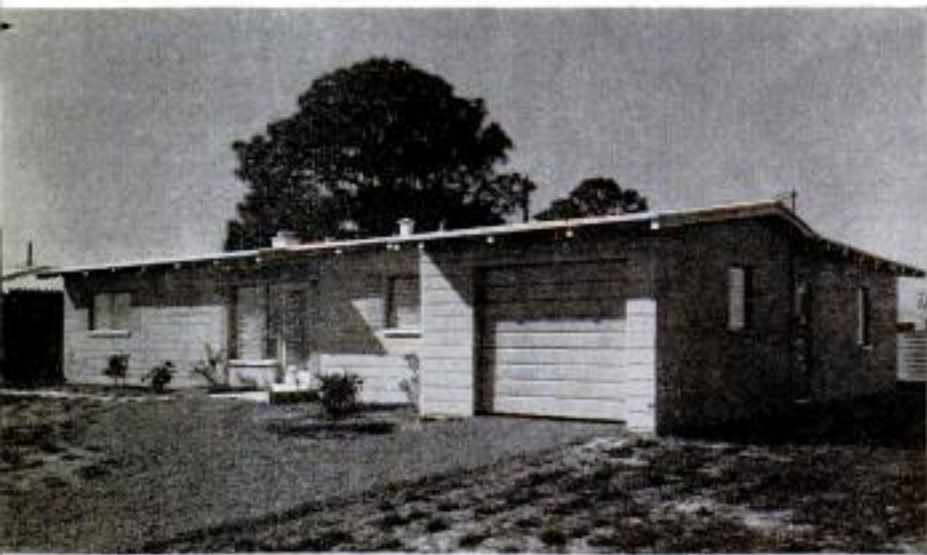
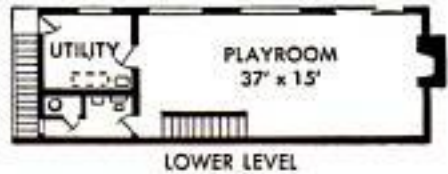
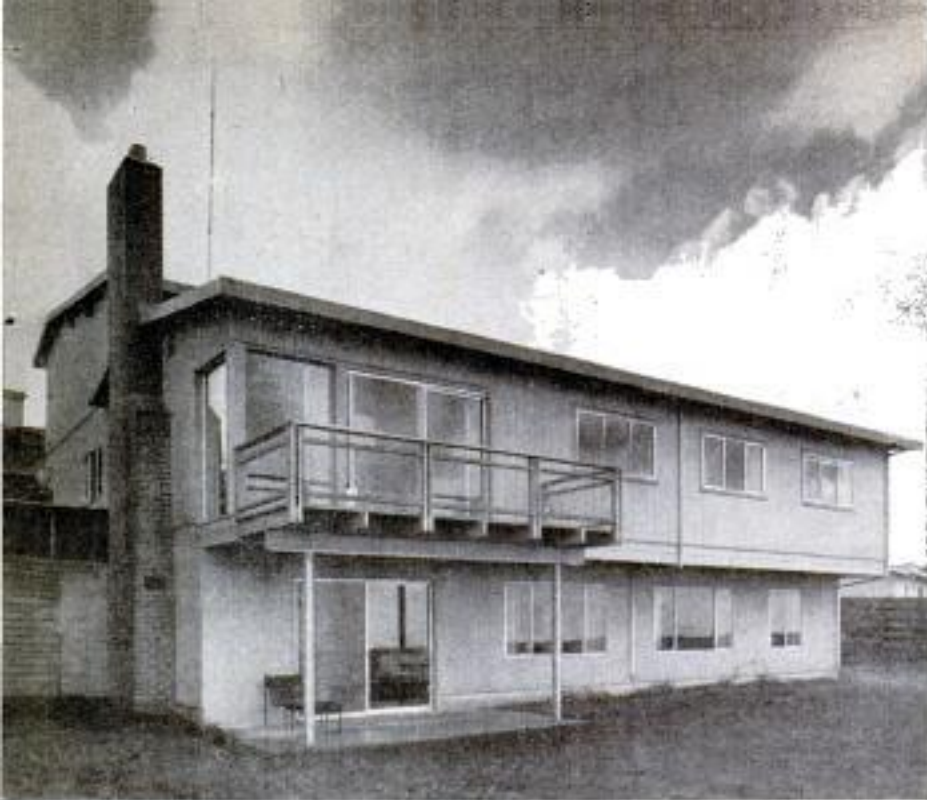


## CALIFORNIA

Three bedrooms, two baths  
Floor area—1180 square feet  
Price—\$15,230 (including lot)

Outdoor-living areas are integrated in the open-plan arrangement of this pleasing home designed by Palmer & Krisel of Los Angeles and built by the Larwin Company in Buena Park, Calif. It is zoned for adults and children. Foundation is slab. House won National Association of Home Builders' design award





Photos by Frank Fritz

POPULAR MECHANICS

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Photos by F. R. Parsons

## CALIFORNIA

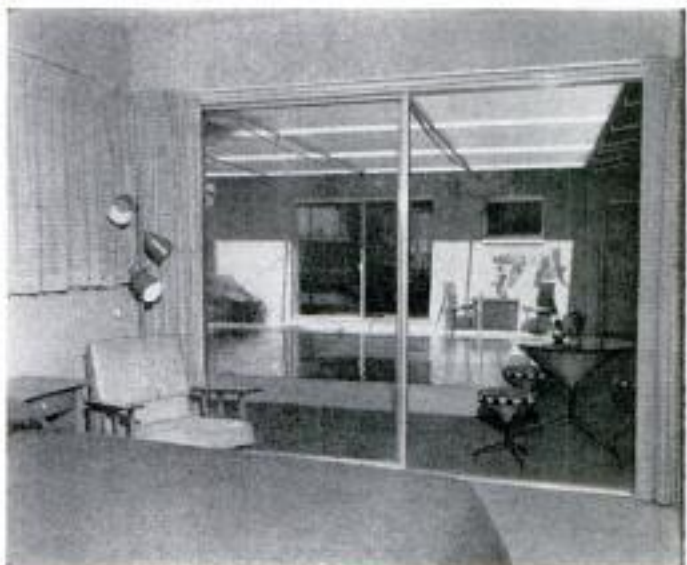
Three bedrooms, 2½ baths  
 Floor area—2032 square feet  
 Price—\$25,300 (including lot)

Designed for a hillside overlooking San Francisco Bay in Oakland, Calif., this imaginative house with the garage in the "attic" was built by Oddstad Homes, Inc., Redwood City. Special feature is the big family room on lower level. Exterior is stucco and wood siding; interior, dry-wall; roof, built-up. Extras include built-in range, front landscaping, finished patio and complete fencing. Main level has a balcony outside living room at rear of house

## FLORIDA

Three bedrooms, two baths  
 Floor area—1170 square feet  
 Price—\$15,400 (including lot)

Florida Builders, Inc., of St. Petersburg, feature this home as being designed around a swimming pool and patio. Both pool and patio are enclosed in glass-fiber screen set in aluminum framing. Foundation is concrete slab; exterior, concrete block; roof, built-up and fully insulated. The heat is forced air; floors are terrazzo and the baths are tiled. Sliding glass doors open on to the patio. Extras include a G-E counter-top range and oven and—the 14½ by 21-foot enclosed swimming pool in the rear



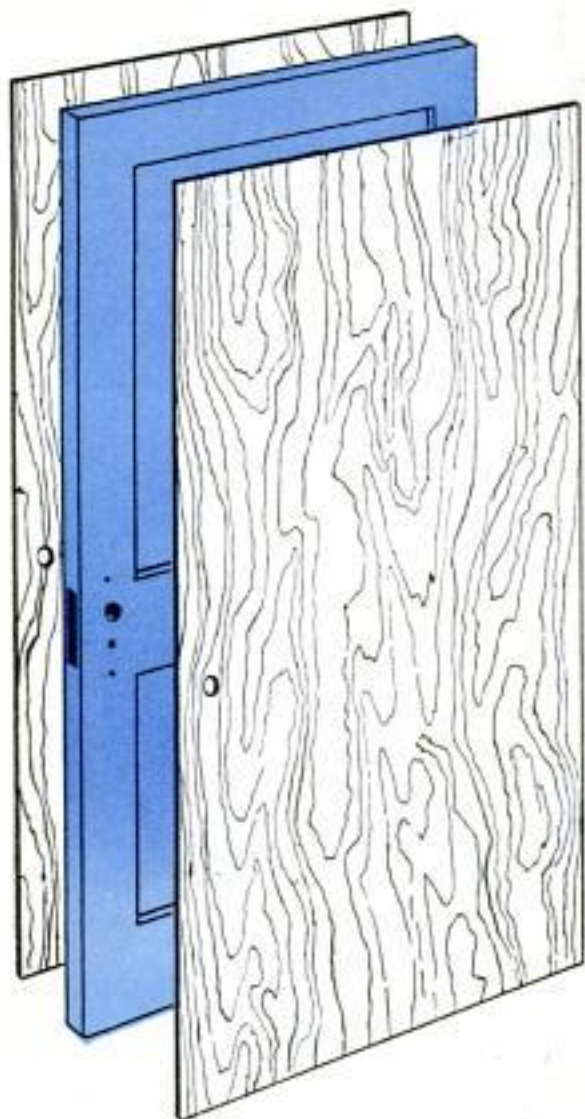
## ILLINOIS

Three bedrooms, two baths  
 Floor area—1320 square feet  
 Price—\$19,950 (including lot)

Features of this house are the big living room with sliding glass doors opening on a rear patio, eight closets, large storage space in garage and a washer-drier laundry that comes with the house. It was built by the Centex Construction Co., of Dallas, Tex., in their newly created Chicago suburb of Elk Grove Village. Architects are A. J. Del Bianco and Associates. Exterior, brick and hardboard; interior, dry-wall; floors, oak parquet and vinyl; extras; range, washer-drier combination, and disposer



# UPDATE THOSE OLD **PANEL DOORS**



**W**HEN REMODELING and modernizing an older home, don't let old-fashioned paneled doors stand out like sore thumbs. Like the rest of the room, they too, can be remodeled and converted to modern flush doors at moderate cost, and the choice of materials is wide, up to, and including, rare hardwoods.

The method of remodeling the doors is to cover each side with a solid sheet of material. Hardboard, plain or perforated, wood-grained plastic laminate and thin hardwood-faced plywood are a few of the materials that can be used. In the case of plastic laminate, the recessed panels of the door should first be filled with plywood to make them flush. The first step in remodeling is to remove all door hardware. Next, a piece of plywood is cut to fit the door, allowing about  $\frac{1}{8}$  in. extra all around for trimming. The surface of the

Below, after door hardware has been removed, and a piece of plywood cut slightly oversize to fit the door, mastic is spread over stiles and rails. At right, plywood sheet is dropped onto the door over the mastic





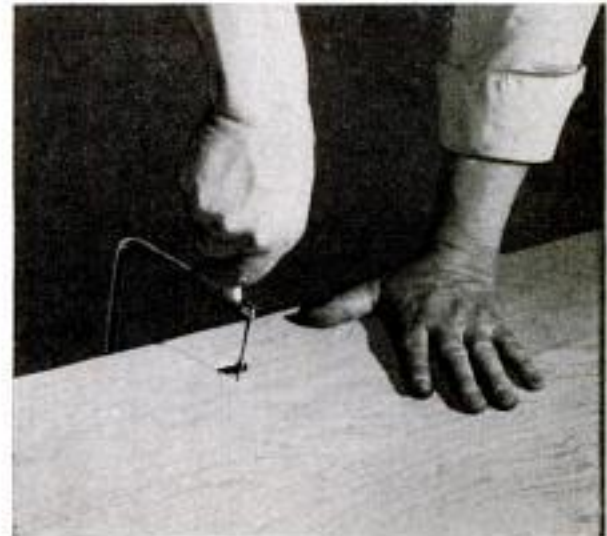
Plywood is pressed firmly into mastic at all points, weights are applied and mastic allowed to dry 24 hr.



After plywood has been attached to both sides and mastic has set, wood is sanded with fine-grit paper

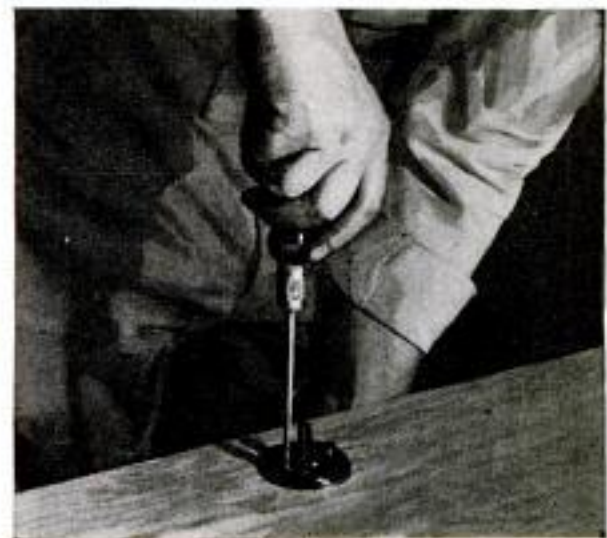
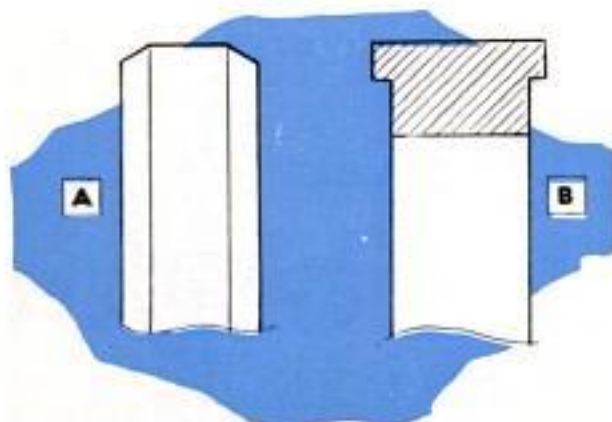
rails and stiles is coated with mastic, then the plywood is dropped onto the door and carefully pressed into contact at all points. Weights now are placed on the plywood and the mastic is allowed to dry for about 24 hr. The opposite side of the door is treated in the same manner. The edges of the plywood then are beveled and sanded as shown in detail A. A second method of protecting the edges of the plywood is shown in detail B. Here, a rabbeted strip has been screwed to both edges of the door. First, a strip is ripped from each edge of the door to compensate for the thickness of the strip. A light sanding with fine-grit paper is necessary on hardwood-faced plywood. Rough sanding has already been done at the factory. Doorstops in the frame must be removed and moved back the thickness of the added material.

A pilot hole is drilled through the plywood to locate the lock opening, then a scrollsaw is used to enlarge the hole to accommodate the knob-and-lock assembly. The final step is to reinstall the knob and hinges and rehang the door. ★ ★ ★



Pilot hole drilled in plywood locates lock opening, scrollsaw then is used to cut opening full size

Final step in making flush door out of paneled door is to install the lock assembly and other hardware



# We Call it "OUR"

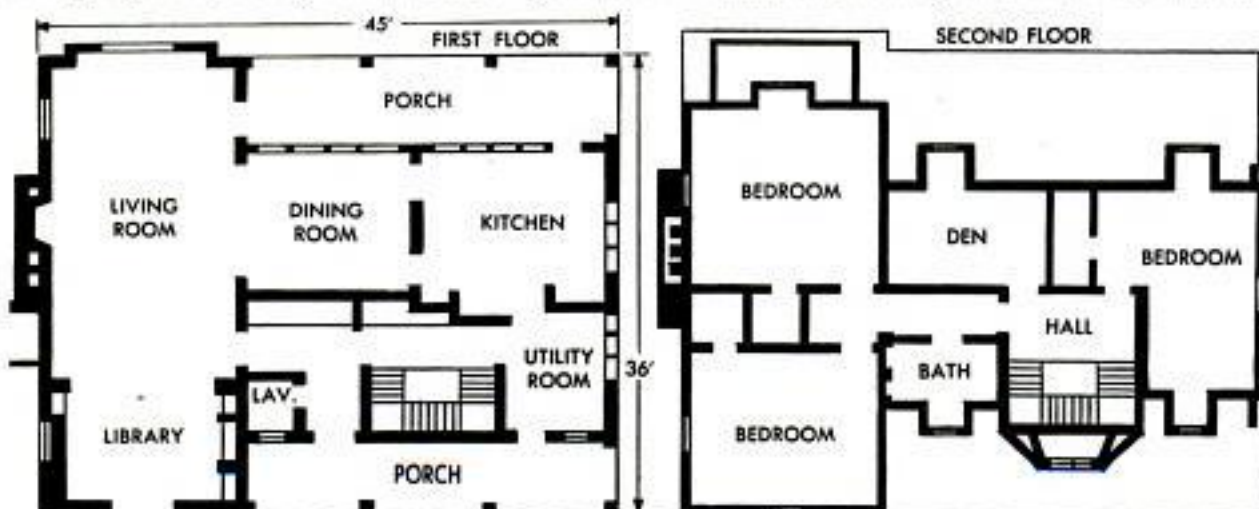
*It took ambitious Les and Gail Bakken of Minneapolis five years to build this \$45,000 home themselves. It cost them \$21,000 for materials and the extra labor they had to hire.*

**By Gail Bakken**



Every stone and shingle on this house was personally tailored by the Les Bakkens. It has nine rooms

Floor plan provided family with a house to "grow into." A finished three-room apartment is in the basement



# ROCK OF GIBRALTAR"

**WE WERE IN LOVE** with our lot. A wooded two acres four miles north of Minneapolis, it overlooked a lively stream as it emptied into the Mississippi. It is the kind of spot where one would be content to spend a lifetime.

Too often we had seen families putting much money and effort into building a small house within their present means, only to outgrow it in a few years. Then they would have to go through all that work and worry again—the back-breaking job of landscaping, expensive new draperies and furnishings, the cost and wear and tear of moving. After doing this several times, and after their families were grown, they would finally blossom into a pretentious house they didn't need any more.

We wanted *the* house now, on this lot we loved, and while our family was young enough to enjoy it with us. We wanted a house to grow "into," not "out of." The only way we could do this on our average income was to do much of the work ourselves and to sacrifice present comforts for something really good in the future.

The Bakkens hauled 50 tons of rock ("just the kind we wanted, rugged and varicolored") in small trailer



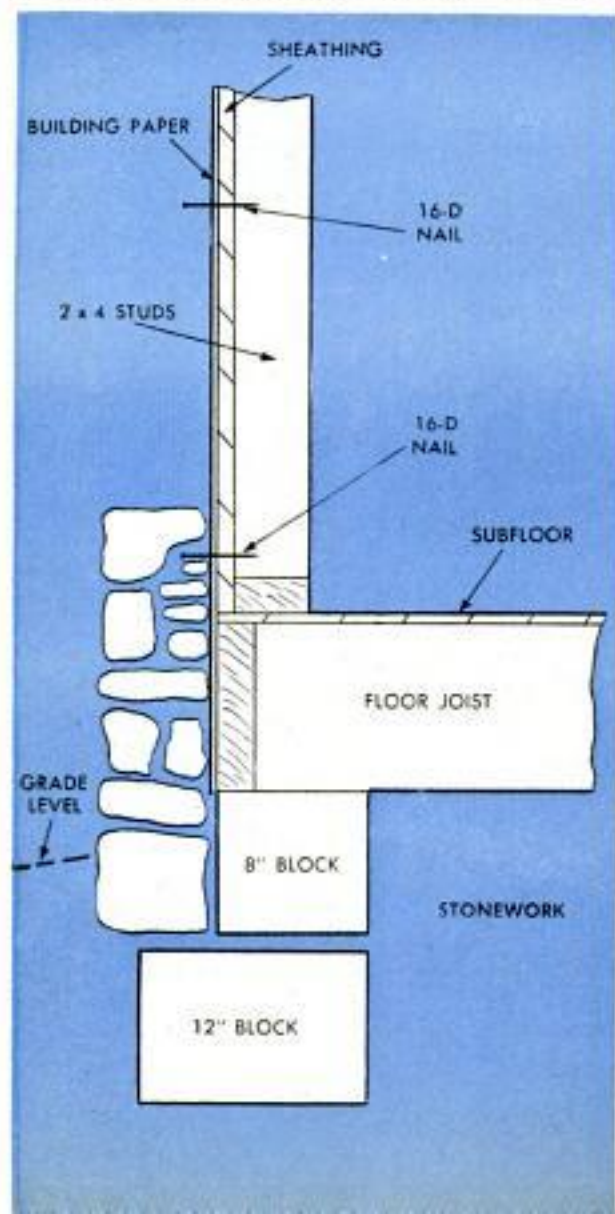
This is how house looked during what Mrs. Bakken calls "the hopeless stage." Below, open side of basement gives three-story effect





Stone-fireplace wall of living room has authentic rustic look. Mantel was made from plank found in river

Drawing shows how Bakkens applied stonework. "We worked this all out ourselves," says Mrs. Bakken



As our home was to be Early American, in the pioneer spirit, we decided to make these sacrifices and to live the part. A \$400 prefabricated garage was erected temporarily on the property and converted to living purposes. The next two years were spent roughing it, while we worked on our house.

A wood stove was our only source of heat. There was no telephone, and for the first year, no electricity. Our electric refrigerator served an unusual purpose. Instead of keeping the food cold, on the coldest nights when the wood fire went out, this well-insulated box kept the food from freezing!

Only when looking back, do we realize there was nothing to sit on in that cabin but three hard straight-backed chairs. At the time, we were either on our feet working, sitting on the hard chairs eating or so tired from our active life we were flat on our backs in bed! Not until later did we realize we didn't have such a thing as an easy chair.

Wanting a house good to look at, as well as substantial in size, we engaged Hans Larson to draw our plans. A top Minneapolis specialist in Early American architecture, he was willing to work with us in doing as much of the work ourselves as we could. He charged a 7 percent fee for drawings and supervision. Instead of coming out to the site to oversee, he told us, step by step, what should be done, and we did it ourselves, or supervised on subcontracted jobs. His final price was on a cubic-foot



basis. It came to about \$1500, but we feel it was well-spent. He saved us from making many foolish steps, and the basic layout has proved its worth. The house has 2256 square feet of floor area, not including the basement, and would cost about \$45,000 to have built today by a contractor. The materials and extra labor cost us \$21,000.

As we studied the blueprints, sometimes the size of the undertaking and the maze of details it involved threatened to overwhelm us. But Larson said to take one problem at a time and the project would gradually unfold.

As we could not start the actual building until spring, we spent that first winter hauling limestone from quarries and old foundations. Friends asked if we were building a "Rock of Gibraltar" and we said, "Yes." With our trailer we hauled over 50 tons of rock—just the kind we wanted, rugged and varicolored, ranging from rusty orange through yellow and into the grays. This whole amount cost \$74. Stiffly cut commercial stone we did not like as well would have cost \$20 per ton delivered. Approximately \$1000 for the same amount! Although this was an unusual saving, it is an example of the economies we enjoyed by doing the work ourselves and scouting around for materials. We also made shakes for the siding and shingles the first winter. Our first tussle with the cedar butts from which we were going to cut our shakes laid the groundwork for the building of the rest of the house. It proved the truth of what Larson had told us and showed us what we could do if we put our minds to it.

My husband, Les, had planned to do the shake splitting all by himself, as it naturally seemed to be a man's job. But his work as lunchroom manager required long hours. On the other hand, I had only five-year-old Sally and a one-room cabin to take care of. Instead of waiting for my already-busy husband to do everything, it seemed I could hasten the time we would move into our house by doing some of the work, too.

At first those huge cedar stumps, obtained from a local pole yard, seemed terribly formidable squatting there in the snow. But I placed my wedges in the center of one of them and gave them a few blows with the wooden mallet. To my surprise, it cracked neatly open! Quartering it was easier. And shaving off one-inch shakes with a froe made to order by a blacksmith was fun. I had not only won a victory over the cedar stump, but found that I might be able to do many other "impossible" things toward building our house.

That spring we started the actual building. Les sacrificed his two-week vacation. We made our own forms, rented a cement

(Continued to page 258)

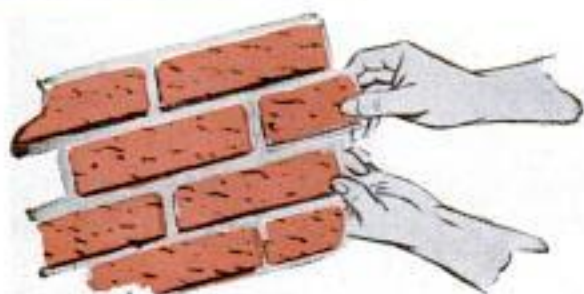
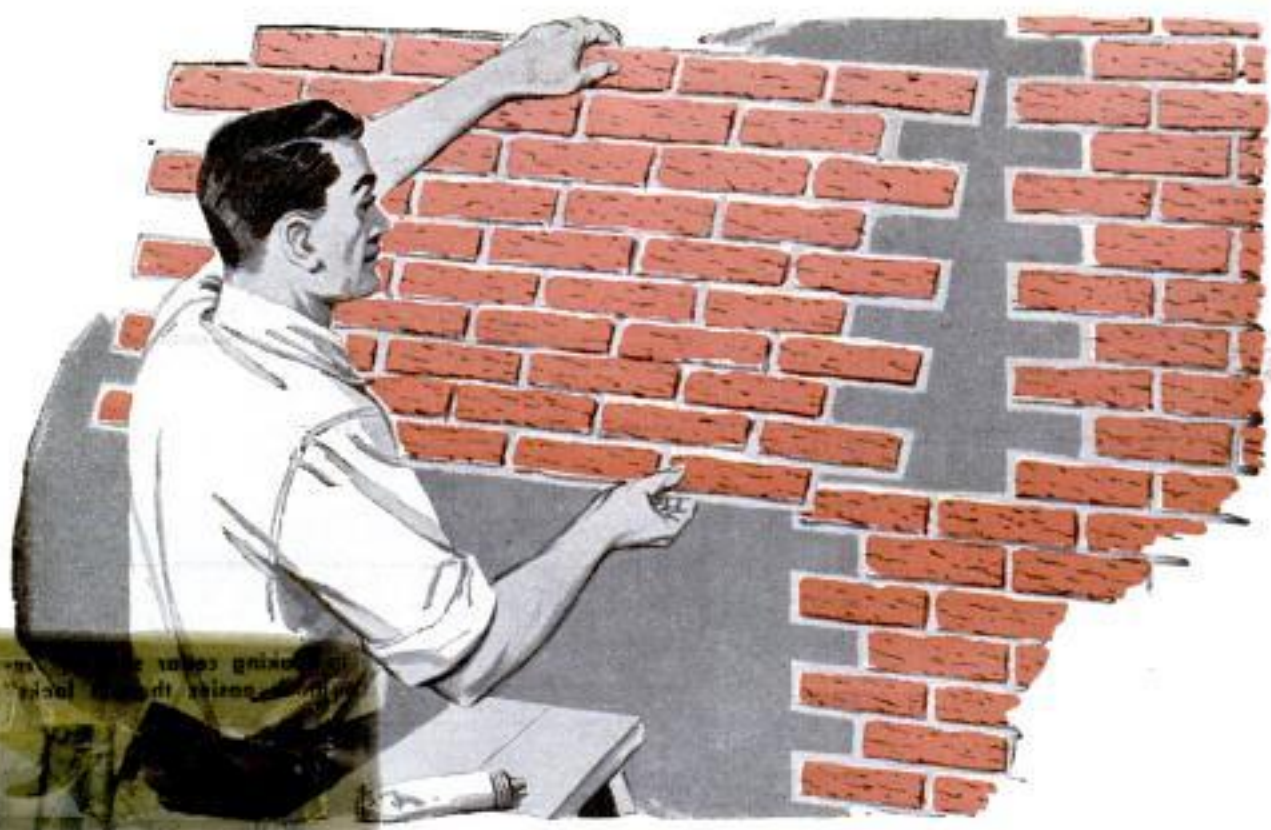


"This is the first step in making cedar shakes," reports the author. "It's much easier than it looks"



Les takes his turn at splitting shakes as the pile grows. Below, solid-stone wood box on outside of living-room wall can be filled from the outside. Stonework is tied into the wall and corner of chimney





Ends of brick panels are precut so half bricks can be snapped out to form interlocking mortar joints



Bead of adhesive is applied to the mortar lines on back of panel. Both vertical and horizontal are coated

# Look What's Happened to "BRICK"

By Wayne C. Leckey

**M**MORTAR HAS GIVEN WAY to glue and nails in the laying of an array of simulated brick and stone products that are made to order for the do-it-yourselfer. Closely resembling actual brick and stone, many of these new home-modernizing materials are so simple to apply that anyone can be his own "bricklayer."

There are at least a half-dozen brands that are recommended for interior-wall

application and of these you have a choice of vinyl, cork and nonceramic. There are others of fired clay that can be used inside and out which are merely nailed on. Still another permits the "stone" to be molded directly on the wall with special forming molds.

The brick and stonelike paneling shown on these two pages is Decro-Wall—a vinyl product which is embossed to give an



How Decro-Wall can be used in kitchen to add a brick accent. Being of plastic, brick can be washed to clean it

The Decro-Wall Corp. photos

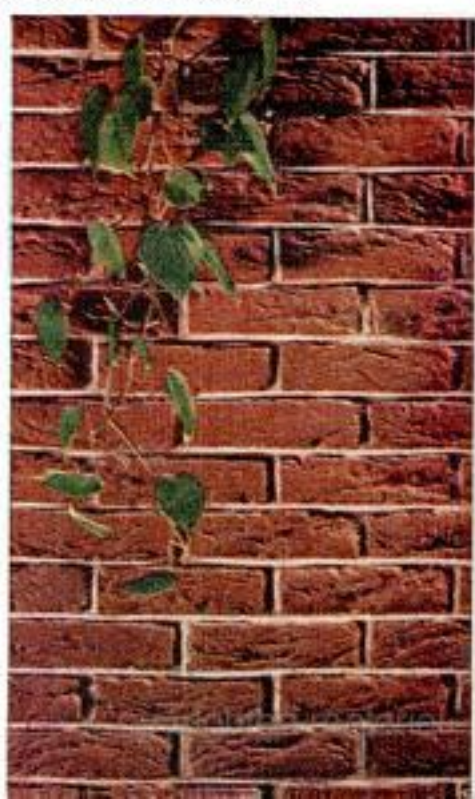


Brick is easily cut with scissors, knife or razor blade for fitting at sills, casings and wall ends



Electric corner-bending iron does neat job on inside and outside corners. Iron softens brick in seconds

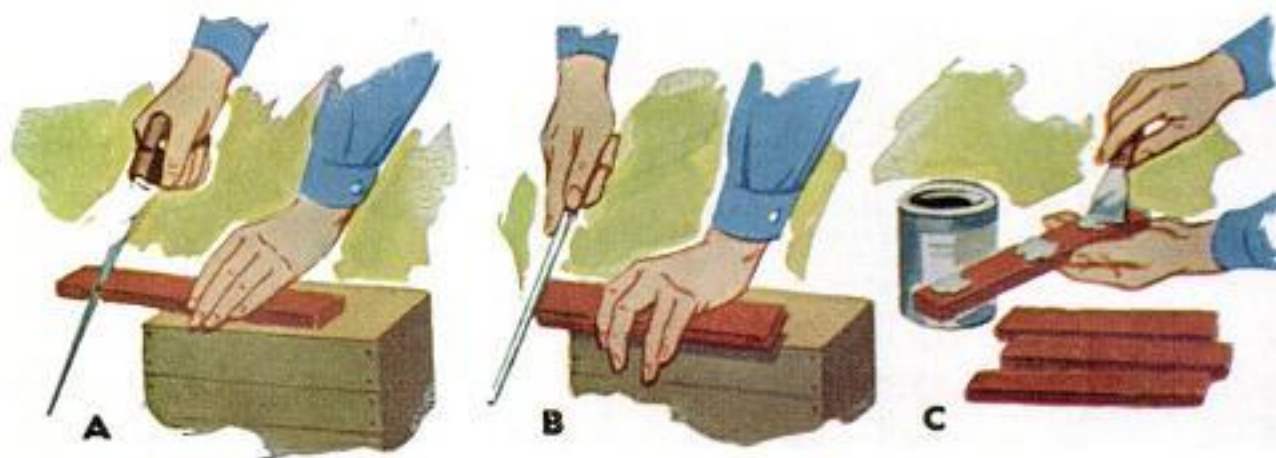
Three of many Decro-Wall stone and brick patterns available. Material also can be painted special color



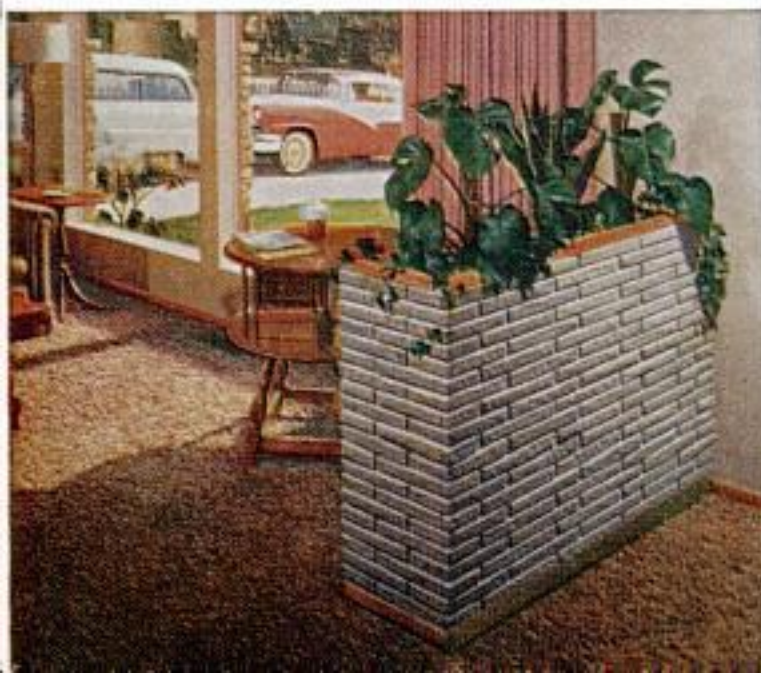


Vermiculite Mfg. Co. photos

Fireplace wall, and planter below, show what can be done with Z-Brick to add accent to uninteresting walls



A. Lightweight brick saws like wood. B. Mortar joint is restored on sawed end with round file. C. Only three dabs of adhesive on back affix brick firmly



authentic three-dimensional appearance. It can be applied to any wall surface—concrete block, wood, papered or plastered—and, when cemented, becomes exceptionally rigid and durable. It comes in some 23 different colors and patterns and in panels of about seven square feet. The ends are die-cut to simplify notching so the panels will interlock in joining them. A special adhesive in tube form is run along the back of all simulated-mortar joints, after which the panel is pressed against the wall and the mortar joints rubbed with a blunt tool to insure proper contact. The material is



Cork Specialties, Ltd. photo

Above and right, this material is called Bricork. Bricks stand in relief in a solid slab of real cork

easily cut with scissors, and a special bending tool is available for creasing the panels when fitting to inside and outside corners.

Z-Brick is another decorator brick and two of the many smart brick accents it can add to modern interiors are pictured at the left. This noncombustible product, which has a texture similar to Roman brick, is made in the form of individual bricks, but measures only  $\frac{7}{8} \times 1\frac{1}{2} \times 12$  in. Here again, no mortar is used in facing a wall with them, each brick is cemented in place with a special mastic-type adhesive. Made of Vermiculite, pigment and cement, the material cuts about as easily as wood, detail A, and weighs about as little. Where it is necessary to cut the brick, the mortar joint is restored at the end with a round file, detail B. You have a choice of three decorator colors, red, green and gold.

Three of the popular brands in cork are Bricork, Corbrik and E-Z Brick. Bricork is made of solid cork, 1 in. thick and in panels  $12 \times 36$  in. Mortar joints  $\frac{1}{4}$  in. deep make the brick pattern stand out in relief. The porous texture of cork makes the over-all effect amazingly realistic. It cuts like wood and is applied with nails or waterproof mastic. It can be readily painted any color and sells for less than \$3.00 per panel.

Corbrik differs in that it consists of  $\frac{3}{8}$ -in.-thick cork bricks affixed to a tough paper backing. Panels interlock and overlap to form an unbroken pattern and are applied like wallpaper, using regular wallpaper paste. You can buy it in white, red, and red and black, as well as buff. Retailers for a little over \$4.00 per panel which measures about  $26 \times 33$  in.

E-Z Brick are thin pieces of cork the size of a brick which are applied to the wall individually with adhesive. A template is furnished to help space and align the brick courses. A kit for \$5.95 buys enough for 10 sq. ft. Comes in neutral gray, ready for painting the desired color.

Brick-It offers a novel application in that the brick or stone pattern is first worked out on the wall with a series of horizontal



Below, spacing-and-aligning template simplifies laying of E-Z Brick— $\frac{3}{8}$ -in.-thick bricks of painted cork



Courtesy: Mastercraft Products

Below, another cork-type brick is Corbrik which consists of  $\frac{3}{8}$ -in. brick bonded to a paper backing. Comes in red, white, with contrasting mortar joints

Courtesy Corbrik Co., Inc.



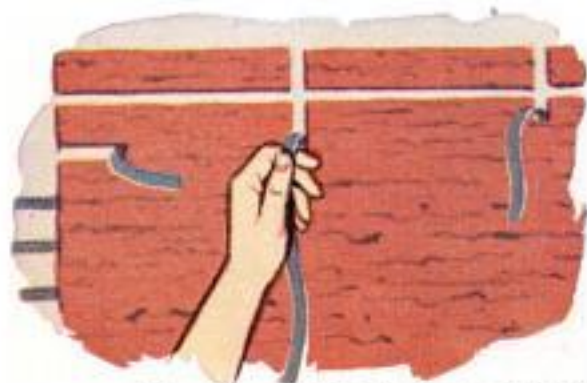


In laying Brick-It, brick pattern is laid out on wall with horizontal and vertical strips of sticky tape



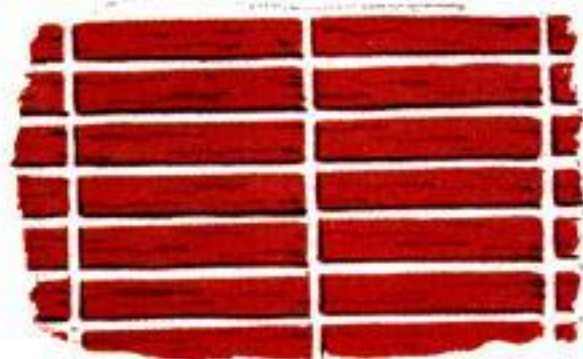
Next a cementlike coating is troweled over the tape to a specified thickness and allowed to set 5 min.

Courtesy Nash Mfg. Co.



The tapes (left sticking out at edges) are peeled off to produce mortar lines which separate the bricks

and vertical strips of tape. A special troweling mixture is applied over the tape and then after a 5-min. setting interval, the strips of tape are carefully peeled off to form mortar joints. The completed job hardens overnight. May be had in brick red or white and, of course, can be painted



Finished job has realistic 3D appearance. May be left as is or painted over with any flat-type wall paint

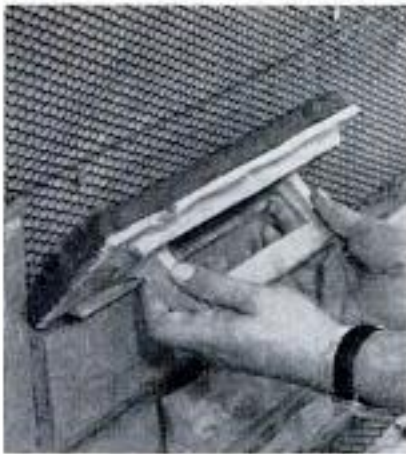
any color with flat wall paint; 80 sq. ft. can be covered for less than \$10.00.

A new colored-concrete mix, called Bondstone, which does not require a base coat, provides a low-cost simulated stone for old and new construction alike. Shallow metal pans embossed with a cut-stone pat-

Bondstone differs from similar products in that no base coat is necessary to bond it. Works on inside walls, too

Emco Cement Products, Inc. photo

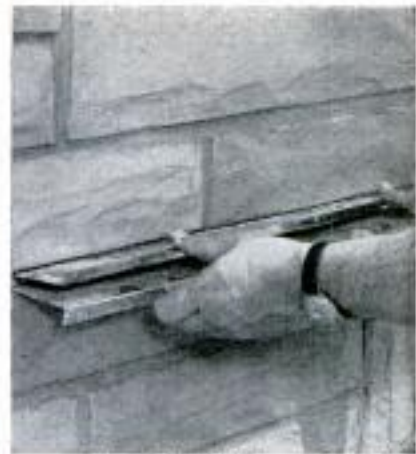




Special "cake pan" molds are filled with nonsagging-concrete mixture



"Stone" mold is pressed lightly to embed it in metal-lath surface



"Stones" are aligned with special tool, excess cement is brushed off

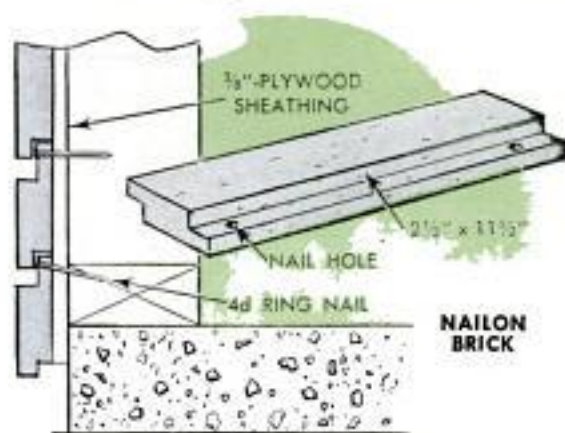
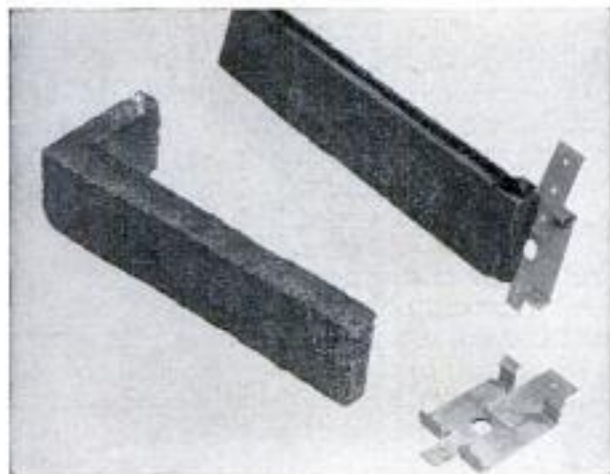
Emco Cement Products, Inc. photo

tern are filled on the job and then pressed against a wire-mesh-covered surface. Nonsagging mixture keeps stones from falling off as they are individually formed. Bond-stone provides an excellent stone facing for an old-fashioned fireplace.

Two new clay products aimed at the do-it-yourselfer are Nailon brick and SCR Re-Nu-Veneer. Both are of fired clay,  $\frac{3}{4}$  in. thick, and designed to be surface-mounted with nails or clips. The detail at the right shows how Nailon brick is applied, and how the rabbeted edges of the brick partly conceal the nailheads. Mortar in a calking gun can be used to fill the joints between the bricks. Corner bricks are end-rabbeted to overlap the others and produce a water-tight corner when calked. In the case of the SCR brick, the clips are attached to the bricks first, after which nails are driven through the clips to anchor the individual bricks of each course. After the units are nailed on, the joints are filled with a pressure-type gun and pointed as in conventional masonry.

More complete information pertaining to any of the products mentioned can be had from the manufacturers. ★ ★ ★

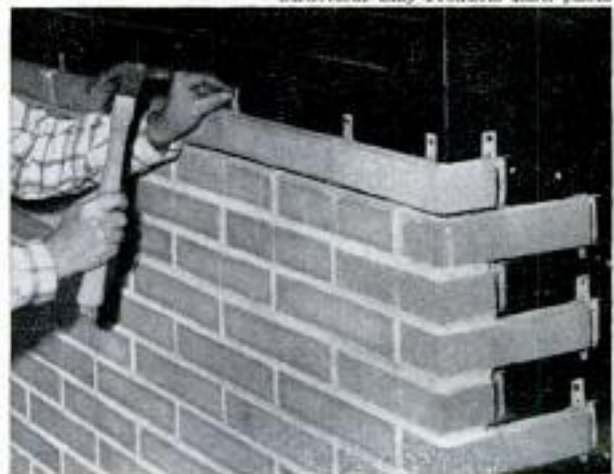
SCR Re-Nu-Veneer brick is held with special metal clips. Comes in regular and L-shapes for corner use



Ludowici-Celadon Co. photo

Above, quick way of filling joints in Nailon brick without mess, is to put mortar in regular calking gun

Structural Clay Products Inst. photo



WTM 59



Door on closet above has been widened so that every inch of storage space is readily accessible. Added space for storage of off-season footwear is provided by well built between floor joists under the closet

Aromatic Red Cedar Closet Lining Mfg. Assn. photo



Aromatic red cedar for lining closet is available in tongue-and-groove strips, nails in place quickly

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## **BUILDING S-P-A-C-E IN YOUR CLOSETS**

**W**HETHER YOUR HOME is an old or new one, it is quite likely that your family feels there is not enough closet space. Fortunately, in most cases the actual problem is the lack of access to all parts of a closet. The answer to this problem is a moderately simple remodeling job that will permit full utilization of existing closet space. Primarily, the remodeling consists of widening the closet door to the full width or length of the closet by removing the wall between the closet and the adjacent room. This single operation will, in most cases, almost double the usable space in a

POPULAR MECHANICS

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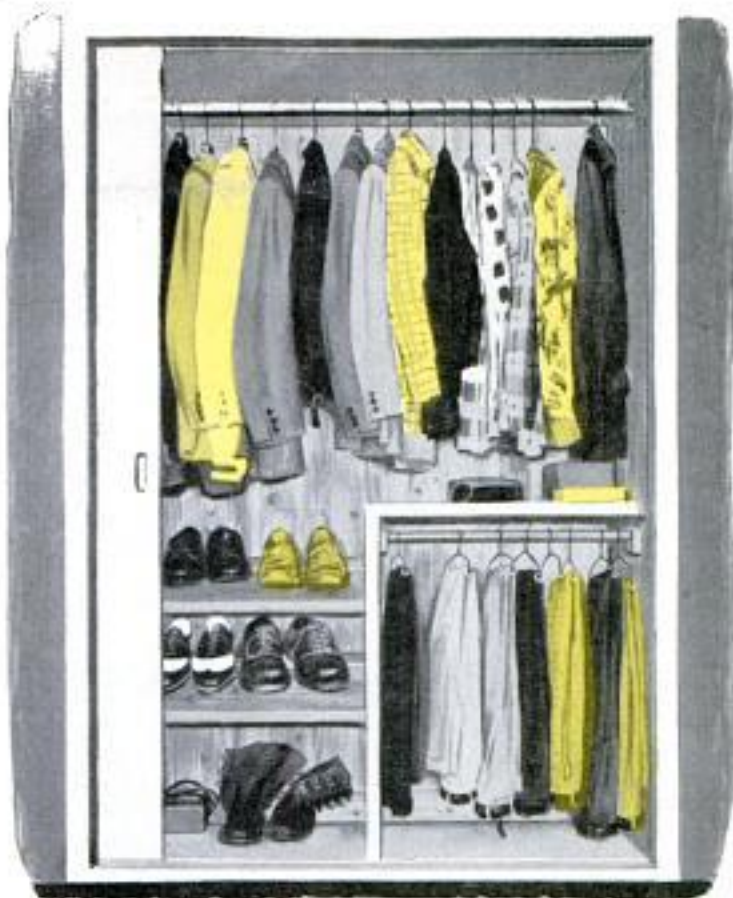
closet. All closets shown in this article have this feature of a full-width door.

Generally, a closet wall will not be a load-bearing one, but this should be checked before any wall studding is cut. If the wall is a load-bearing member, use a jack and post against a piece of plywood on the ceiling until the removed section of the wall is replaced by a header consisting of two 2 x 4s on edge supported by double 2 x 4 studs under each end.

Where possible, sliding doors should be installed in the new opening, so that floor space in the room is conserved. Sliding doors need not be recessed into the wall, as are the doors shown on the closets in the illustrations in this article. Doors slightly wider than half the width of the door opening can be used. These doors run on overhead tracks so they bypass each other, thus either half of the closet is accessible by moving both doors to the opposite end. Folding doors, consisting of two or more sections for each door, also are spacesavers. This type door has an overhead track, as well as one on the floor, and when open, projects only half the distance required for a one-section solid door. Even one-section hinged doors can be used to advantage for additional storage space in a closet. Racks are available that clip over the top edge of the door and project from the door far enough to support quite a few garments on hangers. When hinged doors are reinforced by having three or four hinges instead of the usual two, they can be fitted with shelves or racks for shoes and socks, tie racks, small drawers for jewelry, cosmetics or other light-weight objects, and even mirrors, as shown in the illustration at the top of page 188.

In one instance, a homeowner increased closet capacity for off-season footwear by cutting an opening in the floor and building a box between the floor joists. Flooring was used to make a lid for this compartment, which is ideal for overshoes and rubbers, and can also accommodate sporting footwear, such as waders, baseball spikes and football shoes. If the box were made long enough, it would be perfect for storing golf clubs and other sports equipment.

OCTOBER 1957



One arrangement for efficiently utilizing all available space in closet is illustrated above. Note that door is full width

In closet below, original clothes pole has been moved up, a second pole installed lower down, so closet capacity is doubled



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Built under roof, adjacent to attic rooms, this closet represents maximum utility of available space

Another simple means of increasing closet storage space is to move the original clothes pole up to a point within a couple of inches of the ceiling, then install another pole just low enough so that it will clear garments hung on the upper pole. Coats, trousers and jackets can be hung on the upper pole, while most topcoats, overcoats, raincoats and dresses can be hung on the lower pole without touching the floor.

If a closet is used by only a man or a boy, an arrangement such as shown at the top of page 187 is ideal. The clothes pole has been moved up from its original position, and shelves for shoes, plus a compartment for hanging trousers, have been installed in the lower part of the closet. A somewhat similar arrangement could be used for a girl's closet, the shelves and compartment being redesigned to accommodate skirts, sweaters and blouses.

When bedrooms are built into attic space, the area under the eaves on each side of

the rooms offers almost unlimited space for closets. Such a closet is shown above. Drawers built into the wall of the closet, plus a mirror on the closet door, make it unnecessary to have a dresser or vanity table in the bedroom itself, thus saving floor space.

In all cases of remodeling a closet, it is suggested that aromatic red cedar be used to line the inside. Tongue-and-groove cedar planking is easy for anyone to apply, eliminating the need for patching or plastering, and produces an attractive surface that requires little maintenance. The fragrant aroma of the wood will keep the closet fresh-smelling and moth-resistant for many years. Another practical feature that should be included in any closet-remodeling job is a bright light. For greatest convenience, install a door-operated switch, so that simply opening the door will turn on the light and make everything in the closet clearly visible. ★ ★ ★

### **Steel Washers in Glass Gliders Prevent Damage From Weight**

When glass gliders are used under the legs of heavy furniture, casters on the legs concentrate the weight in one spot, and will cause the glider to break. To minimize this possibility, slip a large steel washer between the glider and the caster.

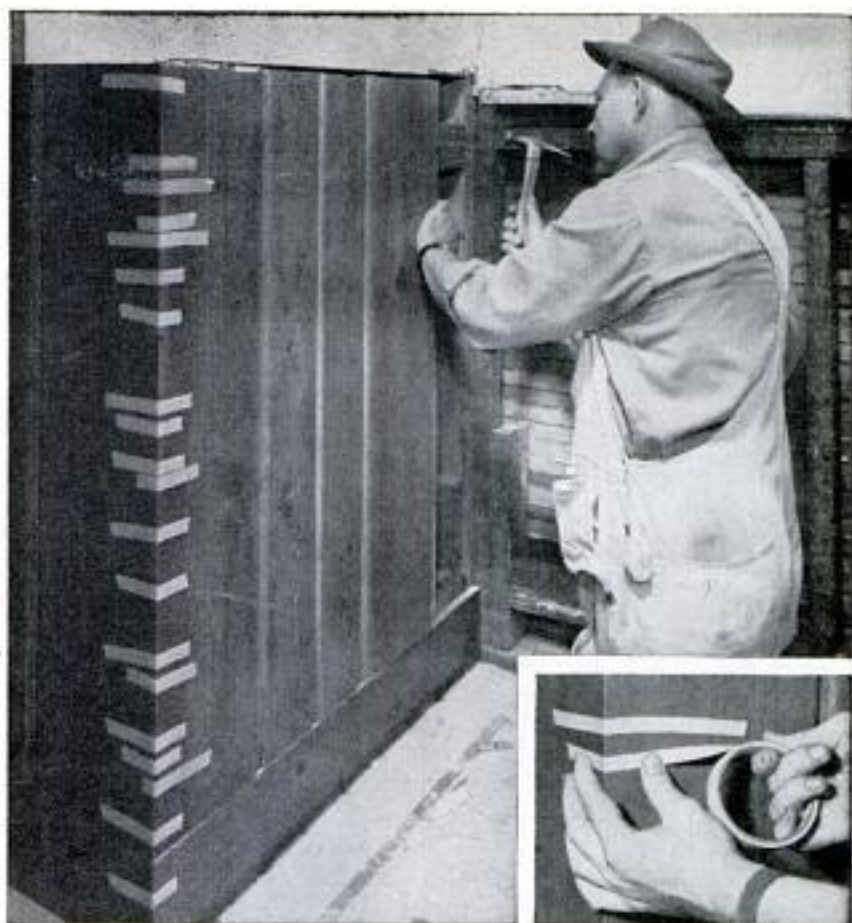
J. Metford, Hyde Park, Ont., Can.

### **Tip of Calking Gun Heated To Remove Dried Compound**

To clean the tip of a calking gun when the calking compound has been allowed to dry and set hard, heat the tip with a torch. The compound will soften and can be ejected from the gun by working the trigger in the usual manner. If the cartridge tip is plastic, dip in hot water.

## Tape-Clamping Miter Joints

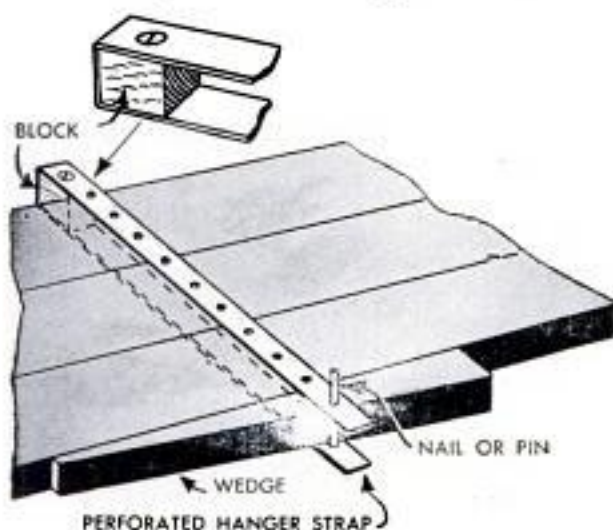
Mitering solid-pine paneling around an outside corner can be done without the necessity of surface nailing the cornering boards. Rip the edges of the boards to 45 deg. and plane lightly to a true fit. Trial fit the boards in position, then spread a thin film of glue on the joining surfaces. Replace the boards and tack in position, driving the nails at the edges as you would in nailing tongue-and-groove flooring. Then tape the mitered joint with  $\frac{3}{4}$ -in. masking tape, drawing the tape tightly and spacing the strips as indicated in the photo. The strips of tape will hold the joint until the glue sets, making nailing unnecessary. Use as many strips of tape as necessary.



Western Pine Association photo

## Serviceable Wedge Clamp Made From Pipe Tape

If the width of the panel you are gluing up exceeds the reach of the bar clamps at hand, improvise wedge clamps from perforated steel pipe tape, or hanger strap. Bend a length of the tape to a U-shape so the holes register. The legs should be about 4 in. longer than the width of the panel. Fit a block of hardwood between the right-angle bends as detailed. Then slide the clamp over the panel, drop a nail or pin through one pair of holes and drive a hardwood wedge between the pin and stock.



OCTOBER 1957

## Making Clean Breaks In Scored Glass

If you attempt a clean break across a large pane of glass by tapping the underside directly under the score, you may end up with an irregular edge due to the tendency of the break to wander. Try this procedure: Pad the bench top with several thicknesses of newspaper. Lay the glass on the paper pad and make the score with one continuous stroke of the glass cutter. Move the pane so that the score is directly over the edge of the bench. Raise the pane about 1 in. and bring it down sharply.



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X283

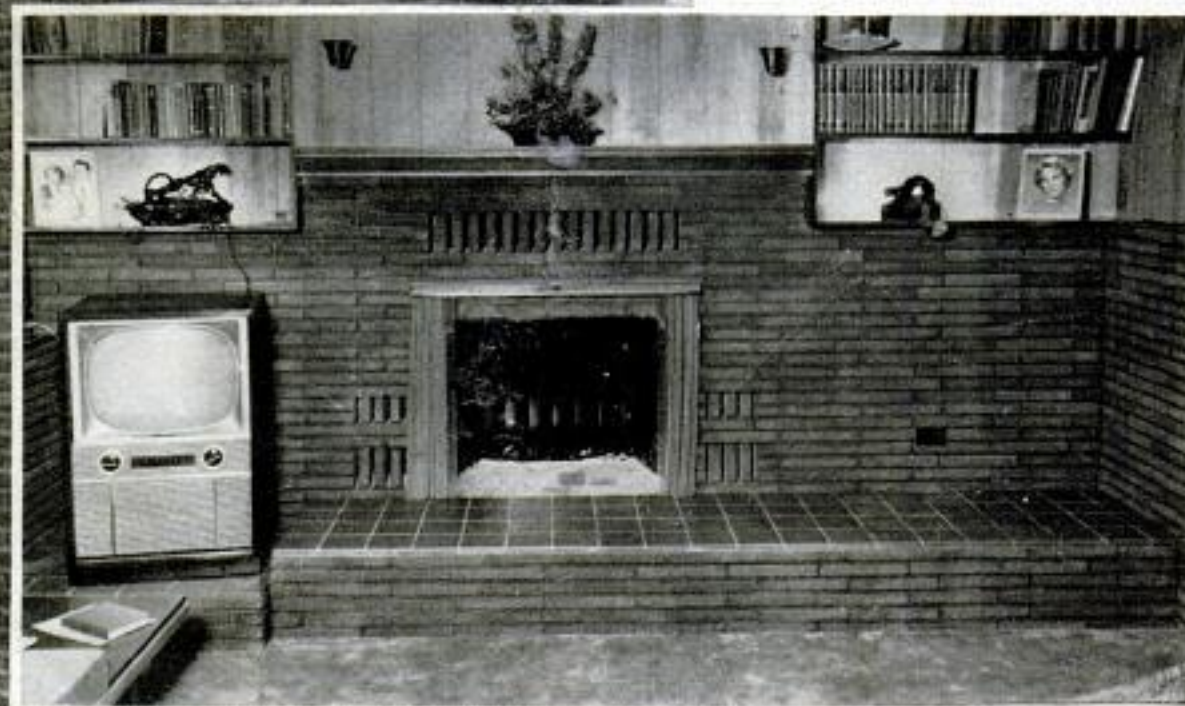
# FROM THE GROUND UP

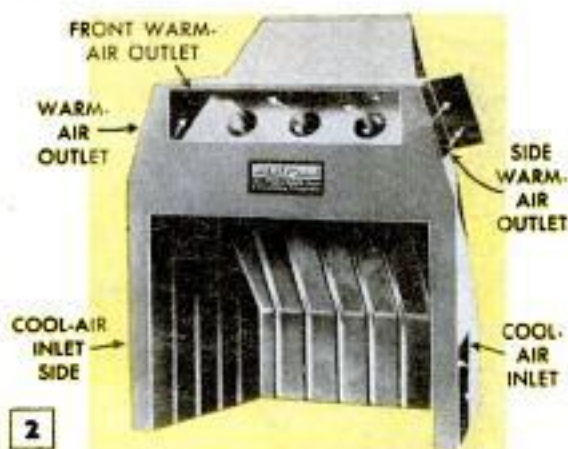
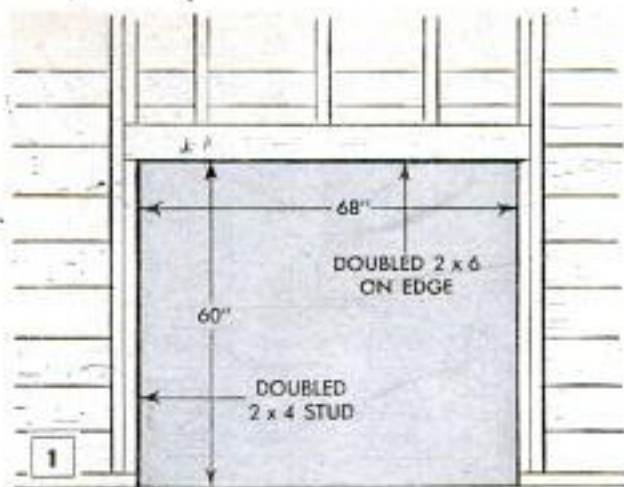
brick by brick you can have  
the fireplace you have  
always wanted

By John O. Bull

## PART I

WHAT WAS ONCE considered taboo for even the most capable handy man to touch, fireplace building is no longer a "hands off" project. Now, steel fireplace liners, which guarantee a proper-drawing fireplace, make it possible for the ambitious homeowner to do the job without fear of smoking himself out. The skill once required to brick





Superior Fireplace Co. photo

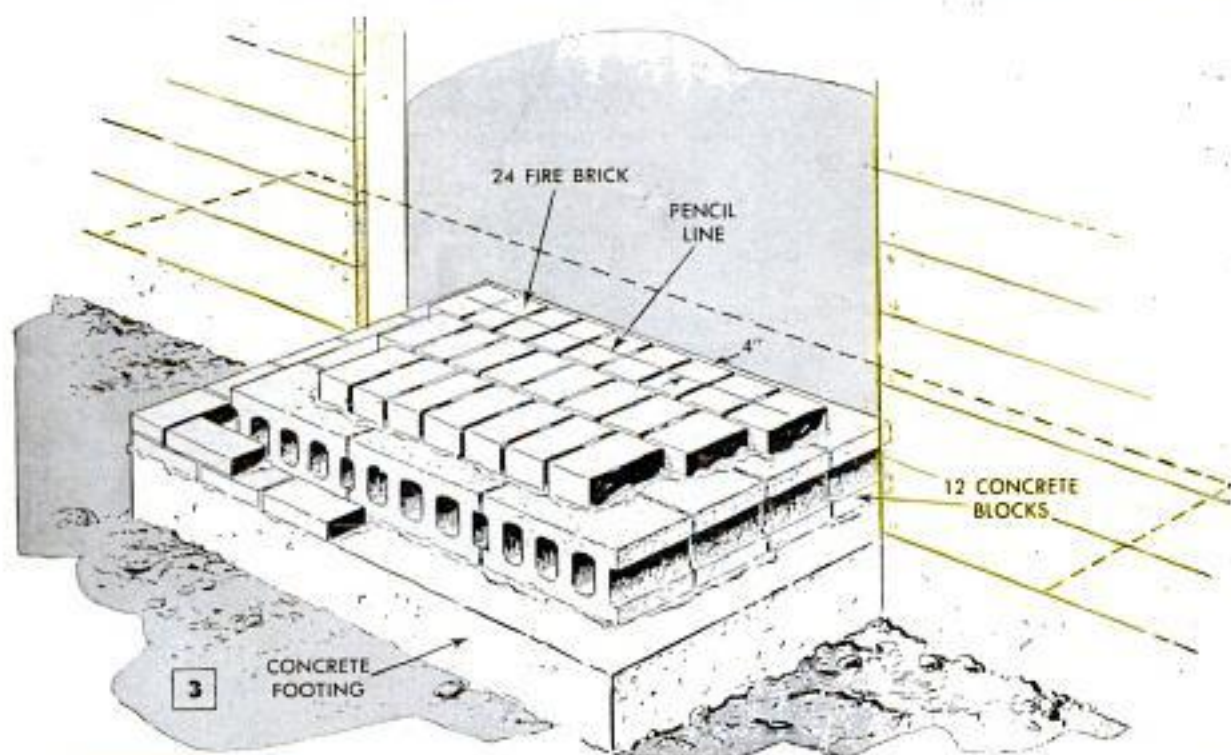
This is the heart of the fireplace, the steel liner, which assures amateur builder a proper-drawing unit

up the working innards of a fireplace has been lessened considerably by having this vital part (the smoke chamber) already preassembled within the liner itself. Essentially, you merely brick up around it. As for laying the bricks, it's not as difficult as you may think. By working slowly and carefully, and keeping the corners plumb, you'll wind up surprising yourself.

This, the first part of a two-part article, takes you through the steps of building a fireplace around a Heatform liner, Fig. 2. The steps are essentially the same even though you may prefer to change the interior hearth treatment used in the original. In this particular installation, the dwelling has a slab-type floor which affords ample support for the hearth. Where the structure has a crawl space or a basement, the flooring members should be strengthened by doubling the joists and adding crossheaders where necessary to safely carry the load.

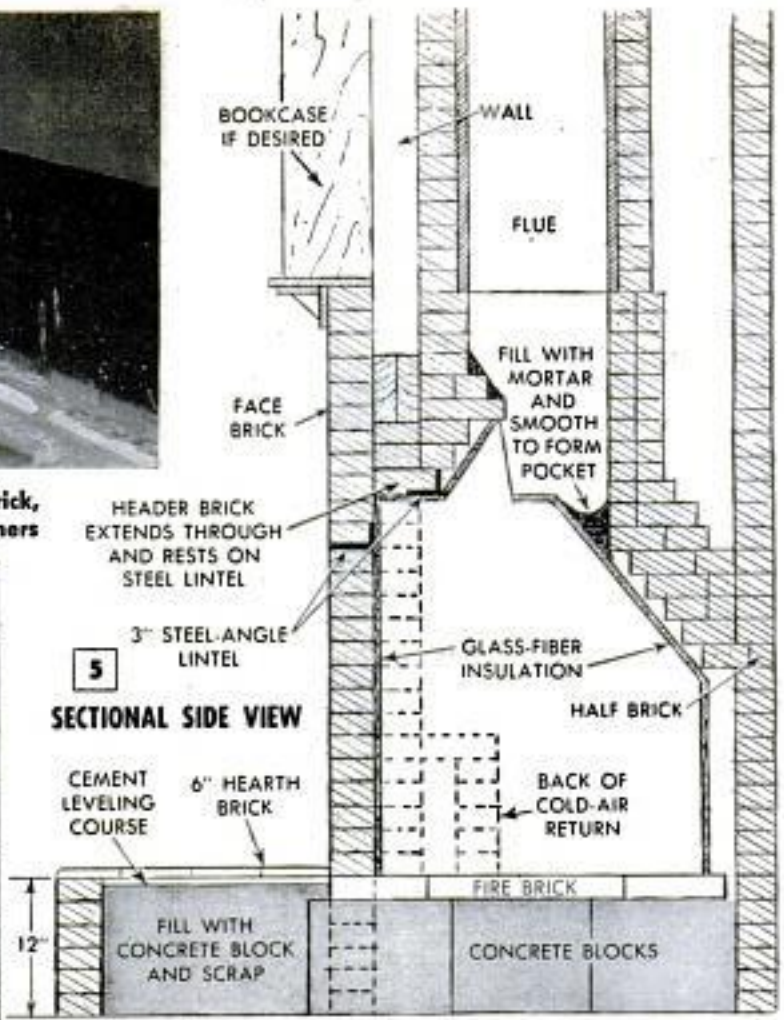


Here the steel liner is being set in a bed of mortar on top of concrete, blocks and brick base. Note that liner is placed to bring front about  $\frac{1}{2}$  in. back from a line drawn flush across the inside wall





Because of rough texture of Roman brick, side of level is used to check corners



**5**  
**SECTIONAL SIDE VIEW**

Outside wall of fireplace is anchored to framed opening with corrugated sheet-metal ties which are placed between every six or eight courses and nailed. Side-view drawing shows proper placement of common brick

Layer of glass-fiber insulation, which is added to steel liner, is held in place with coating of mortar

Besides acting as insulation, glass fiber also serves as spacer to keep common brick from touching liner

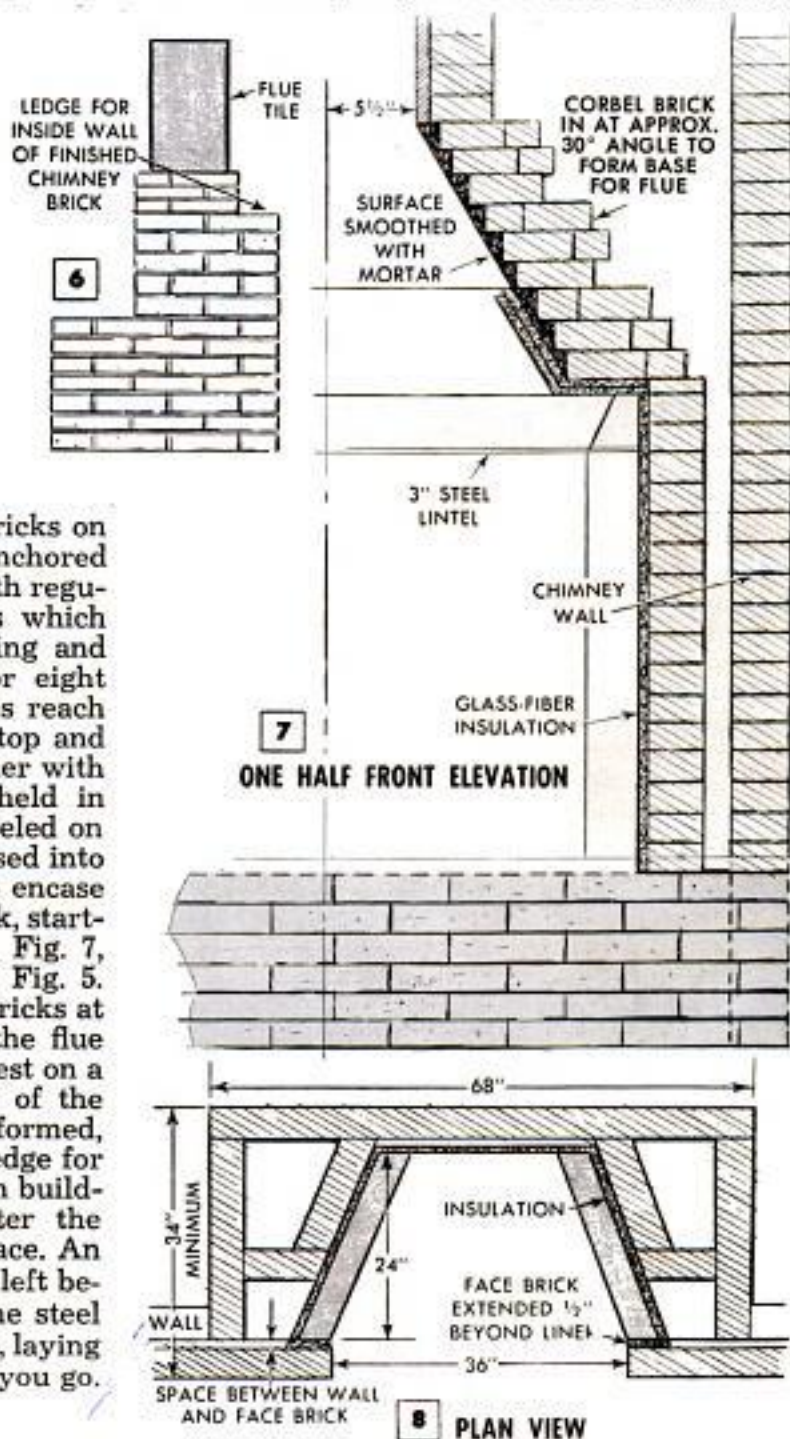




Left, steel liner is encased with common brick. Cross-row of brick in background forms back of cold-air duct. Center and right, brick is corbeled 30 deg. to form 12 x 12-in. flue opening. Inside is buttered with mortar

Fig. 1 shows the size of the rough opening required in the wall and the manner in which it should be framed. The outside chimney and the steel liner rest on a concrete foundation consisting of a concrete footing, concrete blocks and firebrick, mortared in the arrangement shown in Fig. 3. The steel liner sits on top of this in a bed of mortar. Footing for the concrete foundation should go to a depth of at least three feet and the overall size should be large enough to provide room for a wall of bricks on three sides. This outside wall is anchored to the house wall at each side with regular corrugated sheet-metal ties which are nailed to the framed opening and mortared between every six or eight courses. When the brick courses reach about a foot high, you should stop and cover the outside of the steel liner with glass-fiber insulation. This is held in place with mortar which is troweled on the liner and the insulation pressed into it. With this done, you begin to encase the liner itself with common brick, starting at the bottom on the sides, Fig. 7, and at the back 16 courses up, Fig. 5. Note the arrangement of these bricks at the front, which help support the flue tile and how the header bricks rest on a 3-in. steel lintel across the top of the liner. Notice, too, how a shelf is formed, Fig. 6, to provide a supporting ledge for the inner wall of Roman brick. In building up the corbel brick, plaster the inside to produce a smooth surface. An airspace of about 1 in. should be left between the common brick and the steel liner. Continue to work to the top, laying an inside and an outside wall as you go.

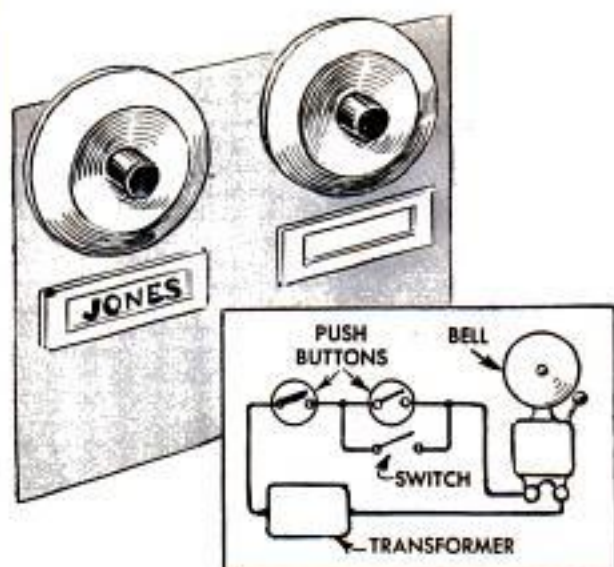
(To be continued)





### Rack for Drying Vacuum Bottles Tilts out of the Way

A good way of drying vacuum bottles is to invert them over dowels fitted in a tilting rack such as the one shown. The rack is mounted on a shelf with enough clearance above to permit tilting the bottles against the wall so that they are out of the way when drying.



### Dual Doorbell Buttons Fool Unwanted Callers

If you are bothered by too many salesmen or children ringing your doorbell, try the hookup shown above. Your bell will ring only when both push buttons are pressed simultaneously. Of course, it is necessary to inform wanted callers of the change.—Frank Shore, New York City.

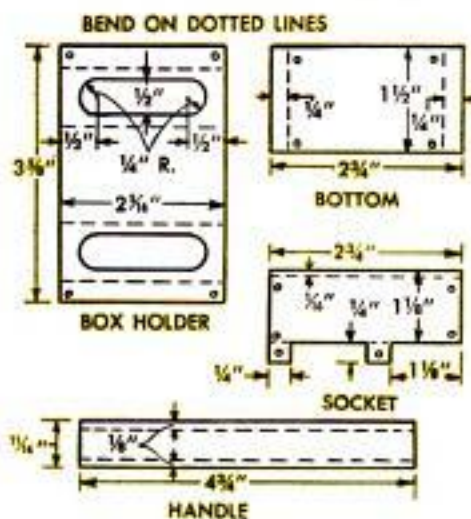
### Tape Provides Waterproof Label

Waterproof labels for your photochemical bottles can be made by writing or printing the desired information in ink or china-marking pencil on the back (gummed side) of a strip of cellulose tape as in the drawing.



### Slit Paper Holds Slip Upright

Plant slips are kept upright in a glass of water by one housewife by placing a sheet of paper with a slit in it over them as shown. After pulling the leaves through the slit, the paper is secured with a rubber band.



### Candleholder Has Matchbox in Base

Here is a sheet-metal candleholder and matchbox holder with a hammered finish you can make in one evening. The one shown was made of aluminum, but brass or copper can be used as well. After shaping and peening the various members on a wooden block or dowel as required, they are riveted together with cigar-box nails and felt is glued to bottom.





## HUNTER— SPARE THOSE ANTLERS

By Lewis J. Fish



LACK OF CASH or—even worse—lack of your wife's consent to mount the head of the buck you shot, does not mean that the trophy need be discarded. The antlers, most important part of the head anyway, can be made into many useful and ornamental items, such as the modernistic lamp, the rustic book ends, novel ink-

well and woody knife handle pictured in this article.

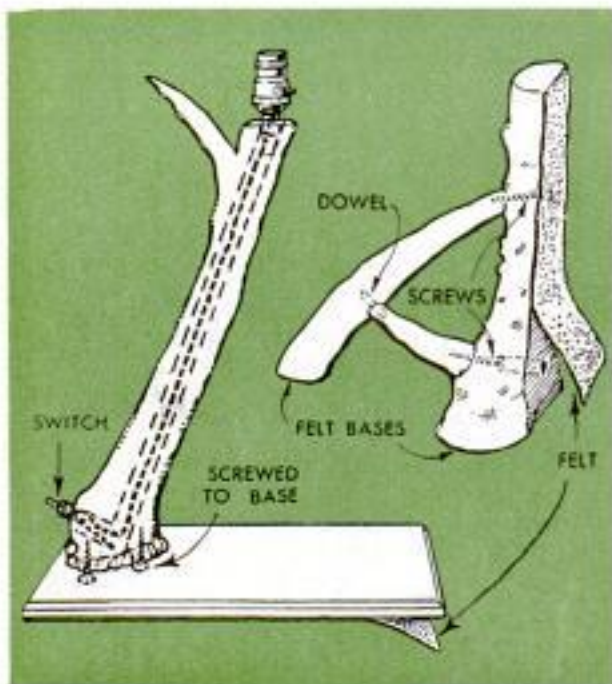
Antlers can be sawed, drilled and sanded as shown in the photos at the top of the next page, much the same as wood. The bony material is extremely tough and has almost no grain to invite splintering or splitting as when working with wood. The

Below, natural grooves on length of deer antler made into handle for hunting knife, provide positive grip





Left, when removing branch at base of antler used for lamp, leave gnarled base for strength and beauty. Center, to retain good looks of antler used for book end, remove as little material as necessary. Right, after selecting and cutting antler of proper diameter for knife handle, drill hole to accommodate shank



variety of shapes and gnarled formations found on these bony projections on the heads of the male members of the deer family, afford unlimited possibilities for custom crafting objects of your own design. Only a few are mentioned here, but the methods of working with this material, as given in succeeding paragraphs, will apply to any project undertaken.

When driving a screw in an antler, a hole nearly as large as the screw must be drilled first. The material is so tough that

### Drill Holes in Concrete Faster

When using a portable power drill with a carbide-tipped bit to drill into concrete and the bit contacts a piece of aggregate, use a star drill to break the hard material. This will give the carbide-tipped bit a fresh bite for faster, easier drilling and reduce wear on the bit. Avoid overheating the drill bit or motor.—Ted Fenn, Skokie, Ill.

you will break the screw when trying to drive it into an undersized hole in a large piece. If driven into an undersized hole in a very small piece, such as the tip of an antler, the screw will split the material. Drilling the length of an antler can be accomplished with a piece of stiff wire after a hole has been drilled through the hard section at the base. The wire will follow the line of least resistance—the porous core of the antler.

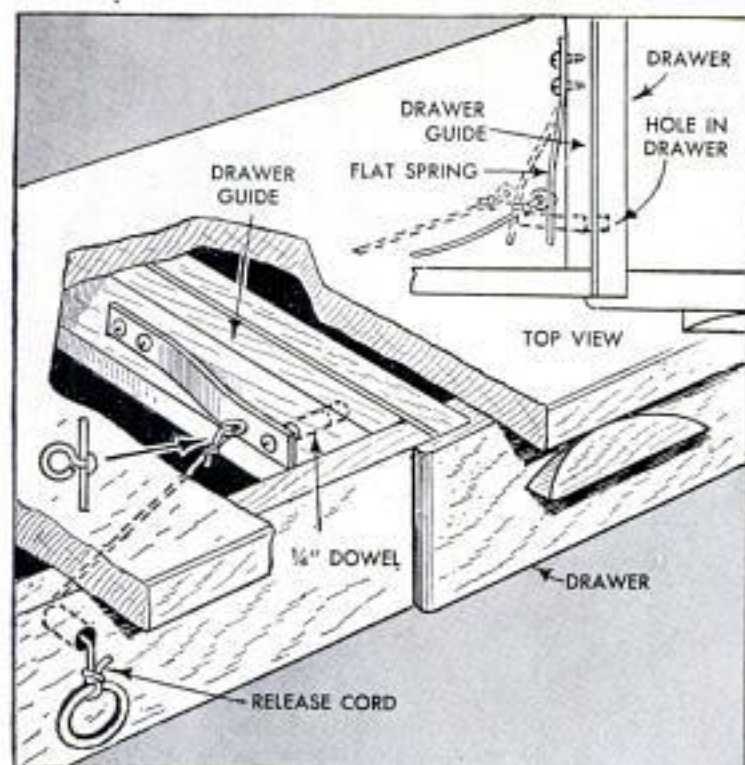
A stain that will blend with the color of the antlers is made by mixing one part mahogany stain, one part raw umber (tinting pigment for oil-base paints), with one part linseed oil. A coat of lacquer over the stain will add luster and protect the finish from moisture. Felt glued to the flat surfaces of objects that are placed on furniture, as the lamp and book end shown in the drawings, prevent them from scratching the finish and add a professional touch to the pieces.

When it is necessary to install electrical parts in an antler, as the switch in the base of the lamp shown in the photo at the upper-left corner of this page, the bony material is removed by drilling and cutting with a carving knife. Then, the switch is positioned in the hole as desired and sealed in place with a wood filler of matching color. Plaster of paris, household-type cements and other sealing materials may be used on other installations where applicable. Varnish stain applied on the filler, helps to blend it with the antler. ★ ★ ★

### Aid for Installing Door Pulls

An easy way to determine the correct points at which holes must be drilled for installing door or drawer pulls, is to measure the distance between the mounting holes with a pair of dividers. Then, punch the points of the dividers into the wood at the desired location and drill the holes for all the screws.

## Hidden Catch Prevents Child From Opening Drawer



To prevent a small child from opening drawers in your home, install a self-locking hidden catch, like the one shown, on each drawer. The catch consists of a short length of spring steel which is fastened at one end to the outside of the drawer guide and fitted with a dowel on the other end. To install the catch, first drill a hole for the dowel through the drawer guide and partly into the side of the drawer. Then screw the spring-and-dowel assembly to the drawer guide so that the dowel passes freely through the hole. If there is access to the catch from below the drawer, no release mechanism is necessary. Otherwise, fasten a cord to the catch as shown, running it out through the front panel. When engaged, the dowel automatically locks the drawer. A small knob can be attached to the release cord instead of the ring.

## Plastic Bag Keeps Camera Dry During Underwater Shots

High cost of waterproof camera containers didn't keep Homer Groening of Portland, Ore., from taking underwater photos. He found that by placing his camera in a bag formed of clear sheet plastic and tying it tightly shut with a length of surgical tubing, he could keep the camera dry and still operate the controls and wind the film. Moisture that might form and condense on the lens was absorbed by placing a small bag of silica-gel crystals inside the plastic bag. The amount of air inside the bag determines the safe depth to which the camera may be taken, although it has been found safe at depths up to 20 ft.



## Equal Spacing of Parallel Lines Assured With T-Square Pointer

Rapid ruling of parallel lines of a given spacing can be done with a pointer stuck to the underside of your T-square. The pointer can be cut to the shape shown from stiff cardboard, light sheet metal or colored celluloid and is held in place with a tab of cellulose tape. Set for the desired spacing, the pointer is simply aligned with each previously drawn line in ruling each succeeding line. Width of spacing is varied by repositioning the pointer.

☛ Nylon thread is ideal for sewing raincoats or shower curtains, as it will not shrink when wet.



# Solving HOME PROBLEMS



**WHEN HANGING RUGS** on a line to beat them, or dry them after washing, use clamp-type trouser hangers. The hangers grip strongly and leave no marks, as clothespins may do



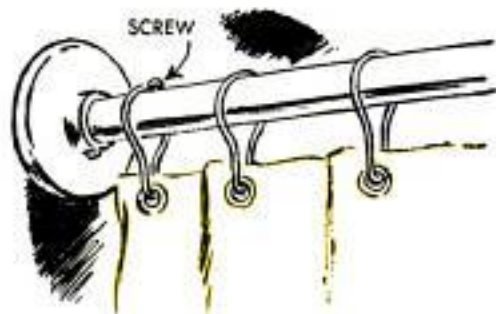
**"ROOM FOR RENT" SIGN** taped to a wire coat hanger is made convenient to remove or hang in window. Hanger merely hooks on center rails

**HOLD END OF SHOWER CURTAIN** so it does not pull away from wall by driving self-tapping screw into rod to hold end curtain ring

**DUST COVER FOR PHONOGRAPH** turntable can be lid of hat-box or disk 1 in. oversize cut from cardboard. Edge of disk is notched, bent down to form a 1/2-in. flange which is taped



**IMPROVISED ICE BAG**, when none is available for a sudden emergency, can be made from a rubber glove. Fill it with ice, then twist the end shut and tie it securely. Wrap the glove in a cloth before it is applied

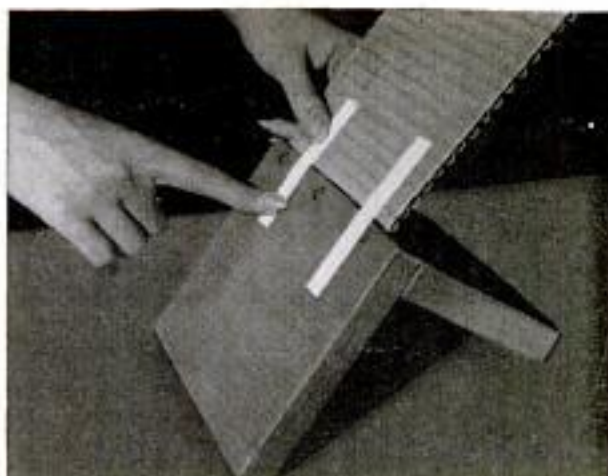


**RAZOR-BLADE TWINE CUTTER** is made by sandwiching double-edged razor blade between two pieces of plywood cut to shape shown. Minimum of blade projects for safety





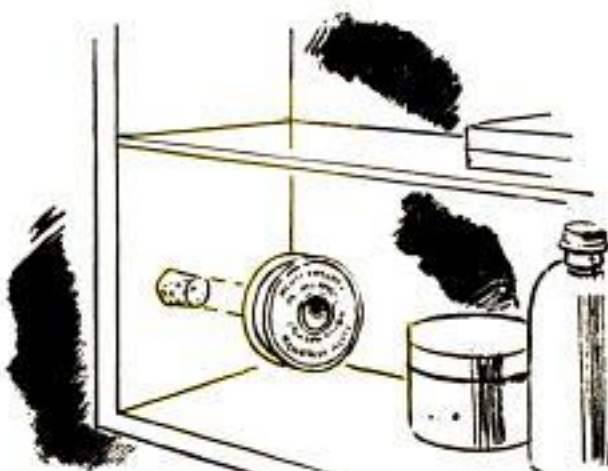
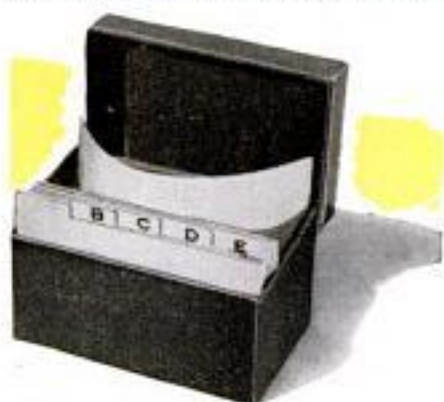
**FRUIT-JAR RUBBER** slipped over glass tumbler used by baby acts as a dribble catcher to prevent liquids from running to bottom of tumbler where they could stain the cloth when tumbler is placed on table



**TO KEEP BOOK ENDS** from sliding apart when weight of heavy books falls against them, tape a piece of corrugated cardboard to each book end. The weight of the books now will hold the book ends in place

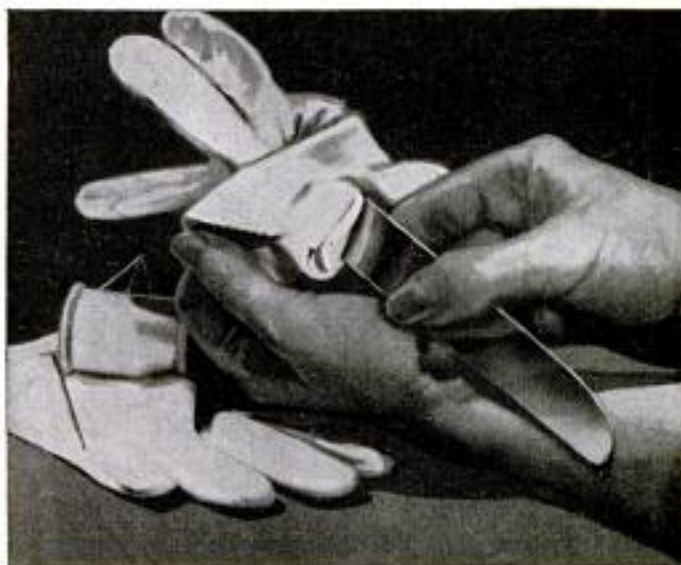
**KEEP FILE CARDS STRAIGHT** when there are only a few in the box by springing a piece of light cardboard between cards and back of box. Cardboard should be about 1½ in. longer than the file box

**SPOOL OF ADHESIVE TAPE** is kept in plain sight when it is fitted over a bottle cork cemented to the inside of a medicine cabinet. Tape spool should fit snugly on the cork so it will not drop off accidentally



**CLEAN** ironing board is assured when the end is covered with plastic or fabric bag that prevents it from being soiled by floor

**MENDING THE FINGERS OF GLOVES** requires a long, slender darning egg. Ideal for this task is the handle of a silver dinner knife. A plastic-handled knife also is good



SLIPOVER BAG OF PLASTIC OR FABRIC

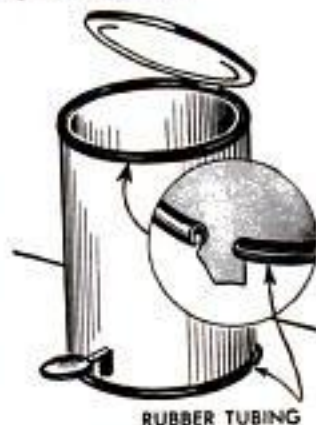
## Level "Doweled" to Straightedge for Easier Handling



To simplify the job of holding a wooden level on a straightedge when plumbing vertical surfaces, such as doorframes, fit the straightedge with projecting dowels. Holes drilled in the bottom edge of the level fit over the dowels, permitting level and dowel to be handled as a unit.

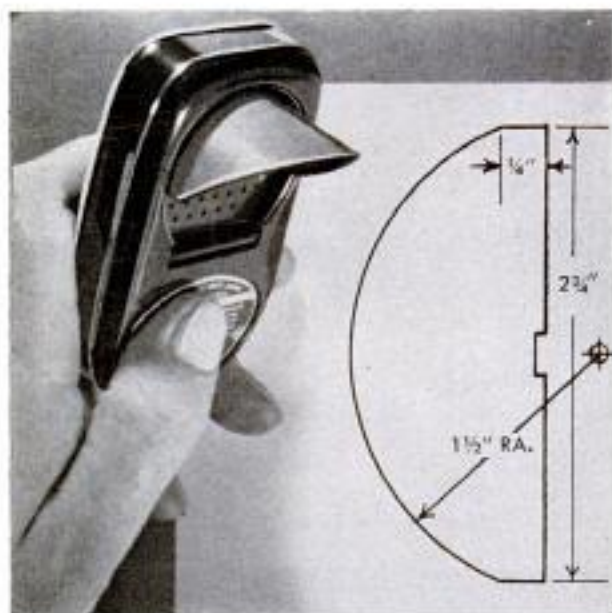
## Tubing Quiets Step-On Can

Closing the lid of a kitchen step-on can will be less noisy if a length of rubber tubing is fitted over the rim. Likewise, tubing applied to the bottom of the can will keep it from skidding about and prevent marking the floor. Simply slit the tubing.



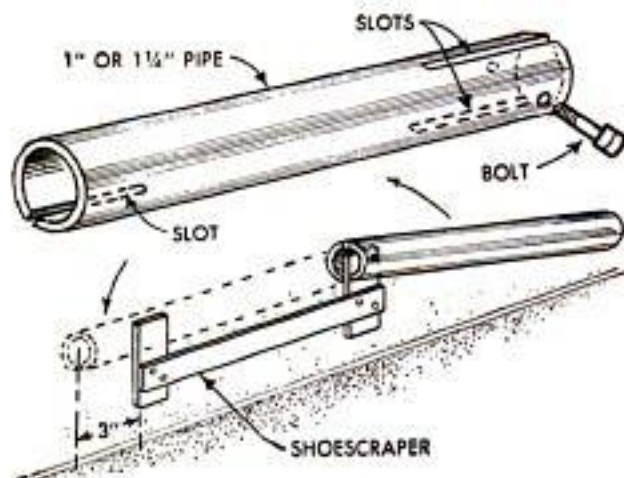
## Sunshade Fitted on Light Meter Helps Prevent False Reading

If your light meter is fitted with a sunshade as indicated, overhead sunlight will not reach the photocell to cause a false reading, the main factor in many underexposed shots. The shade permits the meter to be directed at the subject, rather than the ground, which is the method generally used to avoid getting a reading of direct sunlight. When the meter must be located at the camera position, as with a movie camera, the sunshade is especially advantageous. Light sheet metal is used to make the sunshade, brass or copper being more easily worked than steel. The spring of the metal should be sufficient to keep the shade in place. Paint the underside of the shade a dull black to prevent light reflections.



## Pipe Guard for Foot Scraper

Possible injuries from a sharp-edged foot scraper can be avoided by fitting it with a guard. The guard consists of a length of 1-in. or 1 1/4-in. pipe, slotted as indicated and pivoted on one end of the scraper. To permit the guard to be lifted off with the foot, make it about 3 in. longer than the scraper as in the illustration.

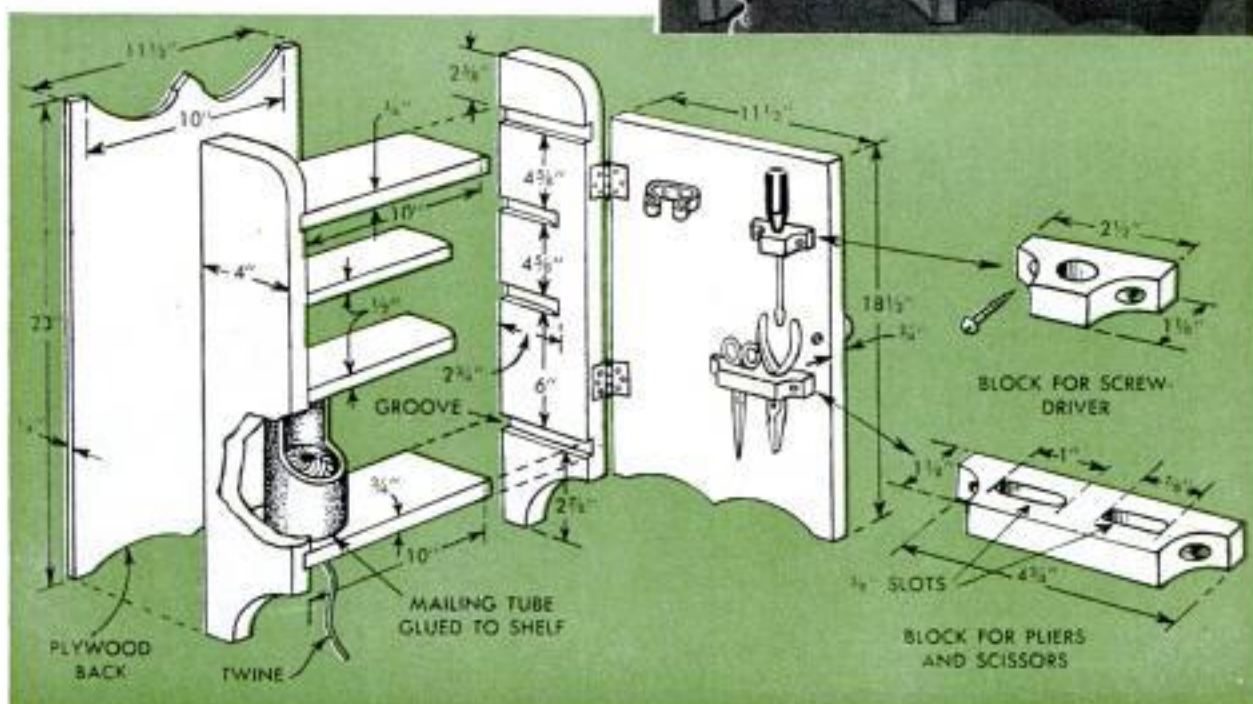


When wearing roller skates on shoes which permit the skate clamps to slip off the soles, fit a heavy rubber band over the toes of the shoes and the ends of the skates to help hold the latter in place.

## Kitchen Tool Cabinet Stores Those Frequently Used Items

Tools and materials needed by the housewife for simple repair jobs are kept in this neat little cabinet attached to the kitchen wall. Made of plywood and pine lumber, the cabinet has holders on the inside of the door for a hammer, screwdriver, pliers and scissors. Holders for the latter three are made from blocks of wood as in the details, and a broom clamp is used for the hammer. For a twine dispenser, a length of mailing tube with part of it cut away is glued to the bottom shelf over a  $\frac{1}{2}$ -in. hole.

Dick Hutchinson, San Gabriel, Calif.



## Cans Provide Soil Bands

You'll find open-end tin cans much better than paper soil bands since they won't come apart like paper ones and disturb the root system when handling seedlings. Start the seedlings by standing the metal sleeves in shallow trays or cake tins. When ready to be transplanted, dampen the soil and push the root ball out the bottom with the thumbs.



OCTOBER 1957

## Flashlight Reveals Uneven Floor

When a floor is not to be sanded before laying linoleum or tile, a flashlight can be used to check for unevenness. Simply play the beam of light over the floor as shown, and watch for shadows cast by raised edges of boards. These can be planed to provide a level surface. An underlayment should be used over a badly cupped floor.



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## ***Fancy Candles are Easy to Make***

**W**HETHER YOU PREFER the type wrapped in a flowering vine, or the kind wound with a spiral sash, you will find these gay and festive candles ideal for centerpieces or wherever an unusual decoration is needed. Despite their expensive appearance, the candles cost little to make and, although they seem complicated, actually are simple to create. No artistic skill is required; just follow the step-by-step instructions in the photographs on these pages. ★ ★ ★



Flower-entwined candle requires small artificial flowers that have fairly long stems, so that they can be wound spirally along full length of candle

Dip the flowers in the hot wax. It may be necessary to dip them several times to assure a heavy coating. Place the dipped flowers on a sheet of wax paper



Finished pairs of candles are admired by young lady who made them. One pair is entwined with flowers, other pair has spirally wound, gold-flecked sash



White candles now are melted down to provide wax. Use low heat to prevent igniting it. Remove from heat and let cool until it has cloudy appearance

Place lower end of colored candle on wax paper and rotate it slowly while letting wax from lighted white candle drip on its full length as shown below







Wrap waxed flowers around the colored candle and hold them in place with staples. Do not use staple gun, as it may damage either the flowers or candle



Other candle for pair is treated in same manner with drippings of white candle and wrapped with flowers. Cover staples with wax drippings from white candle



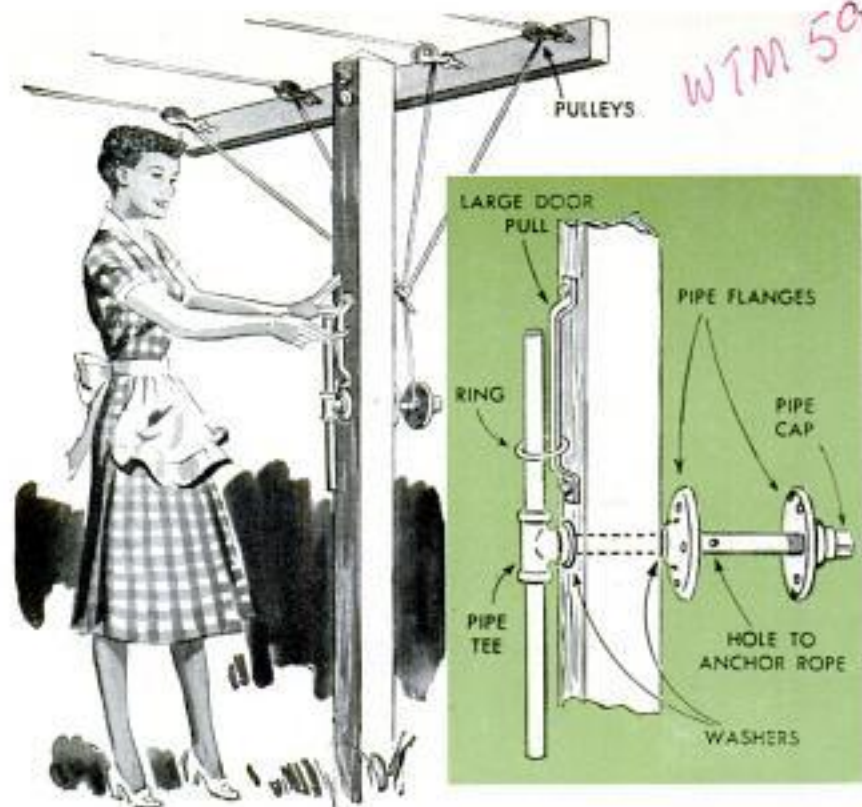
Brush the candle drippings with touches of gold or silver paint. If you have no small brush, such as shown, use one from a discarded bottle of nail polish



Sash for second type of candle is piece of soft cloth twice the length of candle. Twist this into a rope and dip it into melted wax several times

Below, while rope is still hot, wrap it around candle, cut off excess length. Below, right, pour melted wax, same color as candle, over candle and rope





## Line Tightened By Handy Reel

Keeping a multiple clothesline taut is no problem if this reel is used. Made of  $\frac{3}{4}$ -in. pipe and fittings, including two floor flanges to provide a drum for the line, the reel rotates in a hole bored in one post. A large washer on each side of the post provides bearing surfaces. To hold the reel handle after the lines have been tightened, a large door pull is screwed to the post and fitted with a ring that drops over the handle. All lines run over pulleys mounted on the crossarm with eyebolts so they pivot freely, and terminate in a single line anchored to the reel.

## Better Paintbrush Cleaning

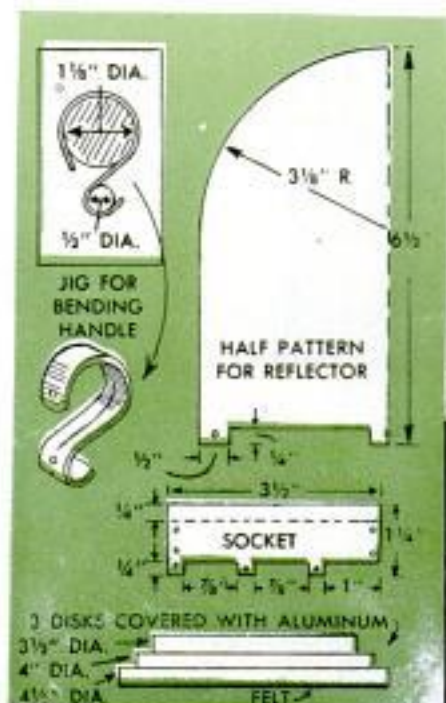
For a more thorough cleaning of paintbrushes, spread the bristles laterally with a pencil or splinter of wood so that a toothbrush or other similar cleaning tool can be used to remove paint from the inside of the brush where it tends to accumulate and resists removal by ordinary methods. Also, to assure longer useful life, a paintbrush should always be suspended by the handle when it is stored, to prevent damage to the bristles.

## Stuffed Owl Is "Scarecrow"

If you are troubled with sparrows roosting in your garage, follow the example of one homeowner who mounted a stuffed owl in a conspicuous location inside the garage. Because sparrows are deathly afraid of an owl, few of them will stop long enough to investigate whether or not the bird is real. And because the stuffed owl so closely duplicates in appearance its natural, motionless pose in life, it is not likely to reveal the deception.

## Candleholder Adds Charm

This decorative candleholder will add a touch of charm to your home, yet can be useful in the event of electric-power failure. The base is three plywood disks covered with sheet aluminum and nailed together. Reflector and socket are cut from aluminum, using the patterns in the detail, and bent to shape. Tabs on the reflector are nailed to the underside of the top disk. A handle is shaped as shown. If embossed aluminum is not used,peen the metal, then polish with steel wool.





## MAKE A

# "CRAZY JUG"

During the period of austerity following the Civil War, "crazy jugs" were an inexpensive method of expression originated by teen-agers of that era. As much a conversation piece today as when first conceived, the jugs require imagination, rather than skill, to produce the most interesting results. The jug can tell a story with a series of related items, or simply be a random collection of odds and ends, such as arrowheads, brightly colored beads, odd-shaped buttons, sea shells, dice, coins and similar objects. Coat a 1-gal. clay jug with a ½-in. layer of putty, leaving the handle clear, and press the objects into it. Then set the jug in a cool, dry location until the putty hardens. For added effect, touch up open areas of the putty with gold or silver paint.

Grover Brinkman, Okawville, Ill.

Needed for "crazy jug" are: Clay jug, enough putty to coat it completely and collection of bric-a-brac

After jug is coated with putty, objects are pressed into it, then jug is set aside until putty hardens



### Wet Window and Slow Speed Improve Wiper Performance

A windshield wiper will do a better job and last longer if the wiper is not turned on until the windshield is thoroughly wet and the wiper operated at the slowest speed possible. Turning on the wiper full speed, particularly when the window is partly dry, causes dust particles to abrade the rubber blade. A fast-moving blade tends to skip, too.—R. C. Hansell, Philadelphia, Pa.

### Cloth Clamped in Clothespin Serves as Small Paint Brush

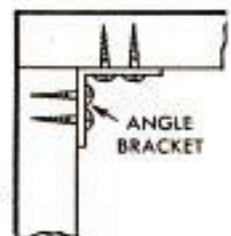
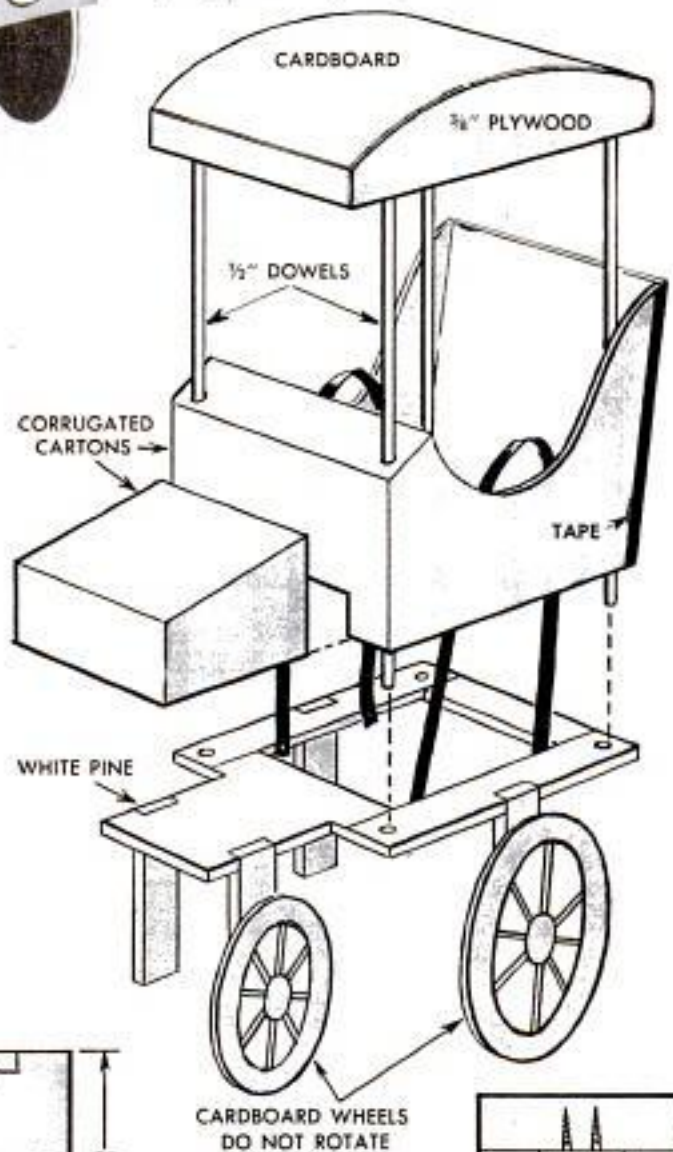
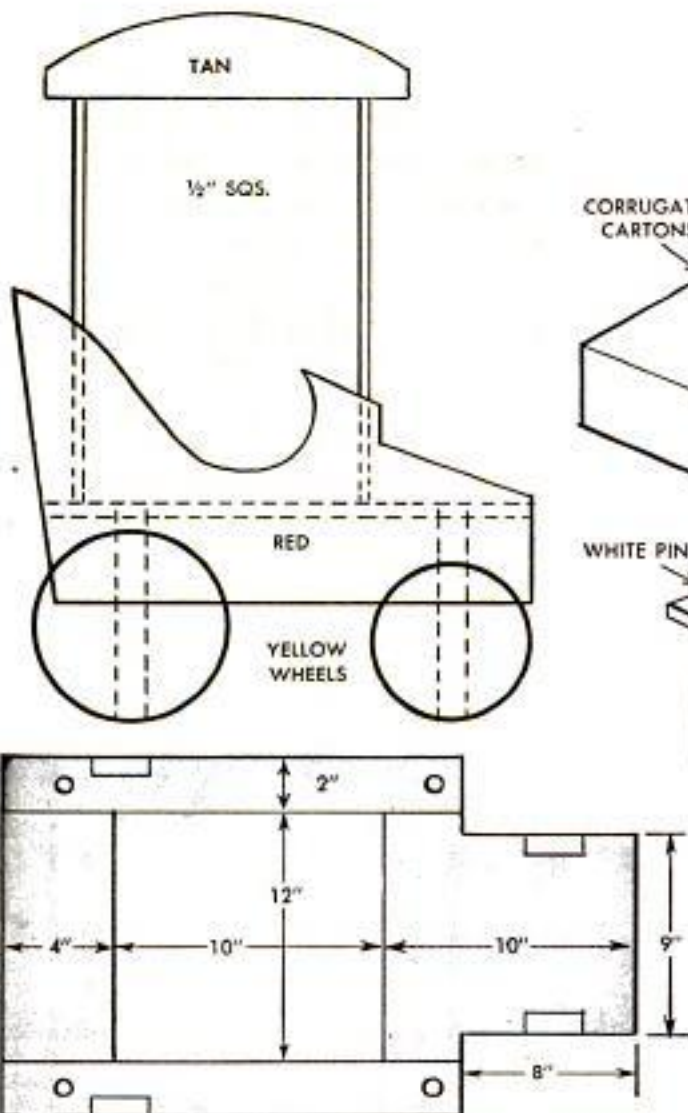
The next time you have a small paint job to do and don't have a suitable brush, try using a small roll of cloth clamped in the jaws of a spring-type clothespin. Any size of cloth roll can be used, depending upon the requirements of the job, and the cloth can be secured in the clothespin at an angle that is most convenient for the work.—Robert L. Sargisson, Berwyn, Ill.

# Fun for

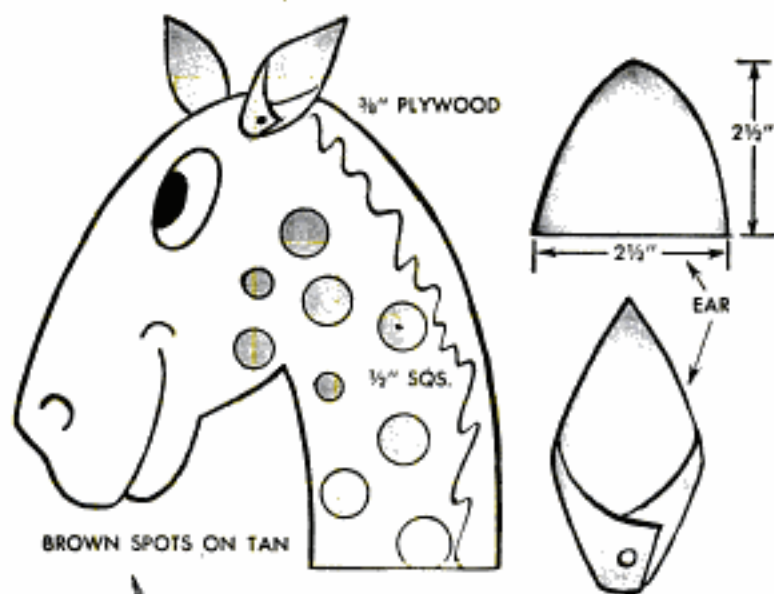


**C**LEVER COSTUMES and interesting games are what make a Halloween party fun. Here are three costumes that are bound to provoke comment and laughter, and a game called the "spook race" that fits right into the witch-ghost-goblin atmosphere of this October celebration. Dimensions for the costumes can be changed to accommodate youngsters of different ages. ★ ★ ★

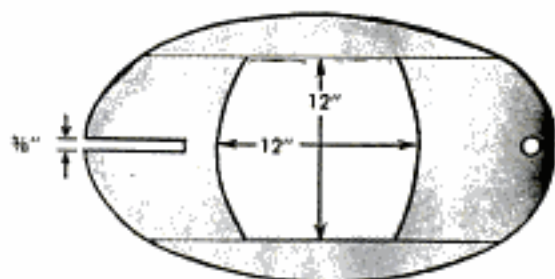
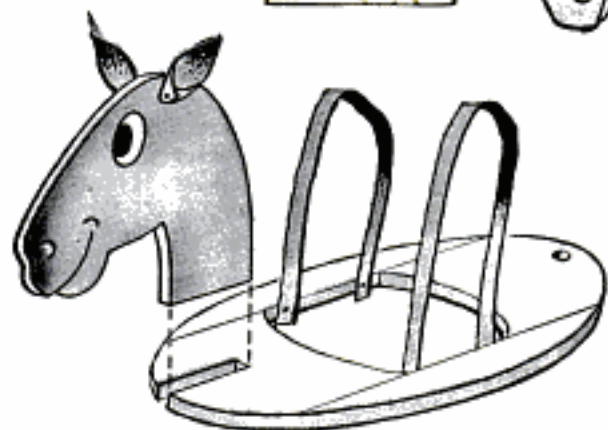
Antique automobiles are always attention getters, and when a youngster arrives at a party "wearing" one, he's bound to have fun



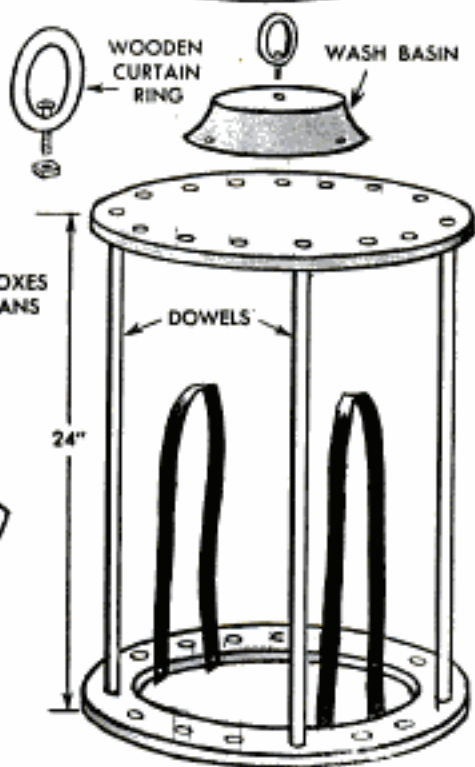
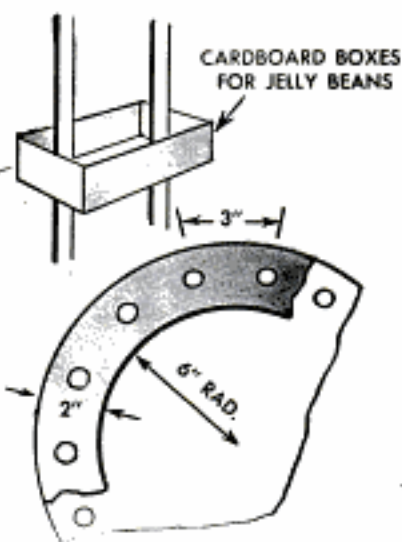
# Your Halloween Party

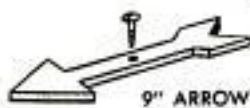
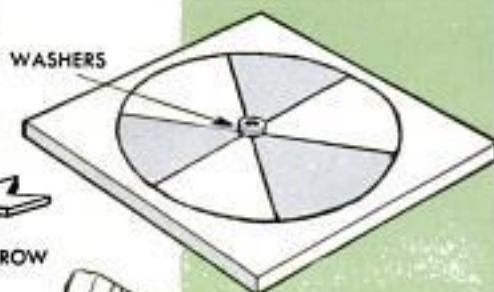
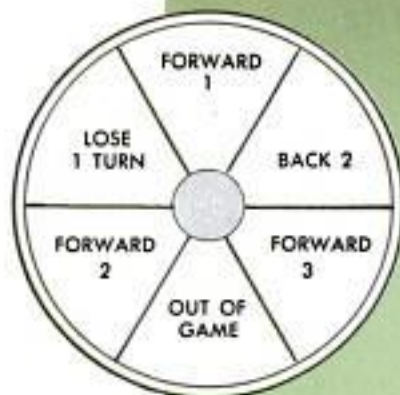


Horses and the wild West have appeal for all youngsters. After the Halloween party this sturdy bronco probably will see service as a cow pony on the backyard ranch. Ears for the horse are cut and folded from leather or plastic; the tail is a whisk broom



Mask from costume shop is worn by "bird in gilded cage." If the bird can't eat the jelly-bean "bird seeds," the other guests at the party can and will enjoy them





Fast elimination of players in the "spook race" is assured by the "out of game" space on the spinner board, thus permitting all guests at the party to participate. Prizes should be wrapped in unusual shapes so that winners do not know what they have won until their package is unwrapped completely



CARDBOARD CONES FILLED WITH MARBLES

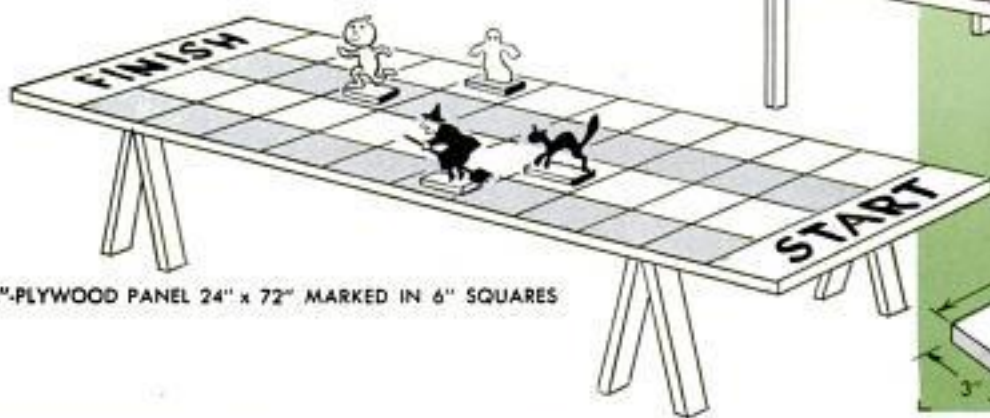


WRAP HALF DOLLAR IN SMALL BOX

ORANGE RESEMBLES BASEBALL



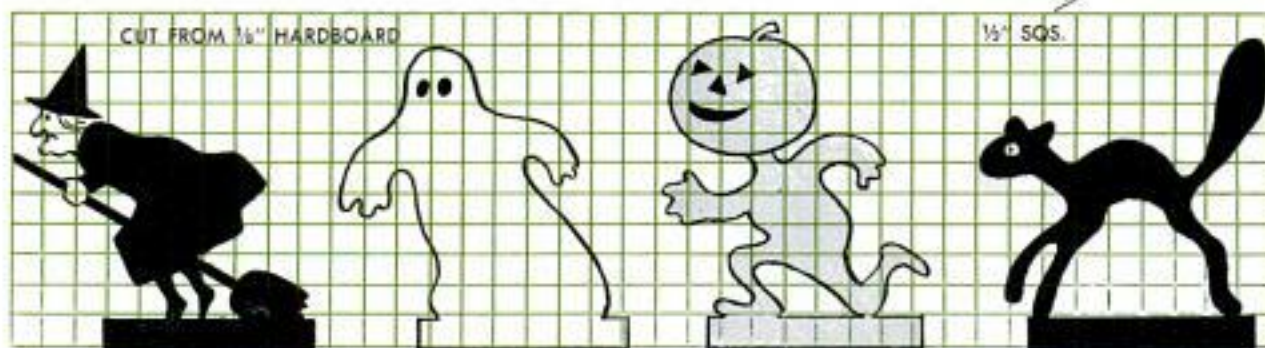
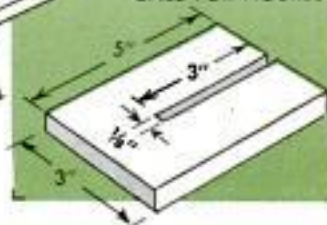
PACKAGE RESEMBLES GUN, SMALL GIFT INSIDE



$\frac{3}{4}$ "-PLYWOOD PANEL 24" x 72" MARKED IN 6" SQUARES



BASE FOR FIGURES



CUT FROM  $\frac{1}{2}$ " HARDBOARD

$\frac{1}{2}$ " SQS.

## Pouring Milk From Gallon Bottle Made Easy

Pouring milk or distilled water from a gallon bottle is much easier for housewives and children when the bottle is placed in a tilting holder such as the one shown. Plywood or pine lumber  $\frac{1}{2}$  in. thick can be used for making the holder as shown in the drawing. When cutting the sides, be sure the edges that are to form a part of the base are at right angles to the back for a distance equal to two thirds of the diameter of the bottle for proper stability and easy tilting. A slot in the upper end of the back provides a hand hold, and two coats of spar varnish, or a good grade of enamel, are applied before decorating with decals.

Enno R. Haan, Evanston, Ill.



## Bleach Removes Print Emulsion For Recording Photo Data

When you wish to write data on the front of a snapshot, the glossy emulsion is easily removed with full-strength liquid bleach. To do this, cover the lower portion of the print with masking tape as shown in the photo. Then, swab the exposed area with bleach and wipe off the emulsion with a dry cloth or tissue.—Ken Murray, Colon, Mich.

## Glove Fingers Prevent Knife Cuts

Fingers from old rubber gloves slipped on the thumb and index finger of your right hand, will prevent knife knicks in your thumb when cutting fruits and vegetables with a paring knife. Also, they will keep the knife from causing roughness or a calloused spot on the index finger.

## Tie Rod on Gateposts Better Than Braces

Using a tie rod between gateposts produces a neater appearance than braces, and usually is more effective. Use extra-long posts and tie them together at the top with a  $\frac{1}{2}$ -in. steel rod. Thread it at both ends so that nuts and washers can be used on each side of each post. Cedar posts that have been treated against rot are best suited for gates. If pine 4 x 4s must be used, set them in concrete, or bolt them to flat steel pieces set in concrete to project several inches above ground.

C. F. Marley, Nokomis, Ill.





WTM 59

**REPAIR**

## DON'T JUNK BROKEN CHINA

**M**AYBE ALL THE KING'S HORSES and men couldn't reassemble Humpty Dumpty, but the chances are, if he were to stage his falling act today, modern adhesives could do a pretty good job of putting him together. Thanks to materials now available, successful china repair is within the ability of the home craftsman.

Several types of cement are used for repairing ceramic materials, one of the newest being a two-part catalyst adhesive. Selection of an adhesive or cement is determined by the function of the piece that is to be repaired, whether it merely will be displayed for ornamental purposes, or will be used for holding hot food or drink, etc.

Before attempting to repair a broken ar-

ticle, it is important that joining surfaces be clean and dry. Often a piece to be repaired, such as the china-doll leg shown in Fig. 4, will have been glued previously with an adhesive that did not hold, or it may have been badly assembled so that the glued joints were out of alignment. Before repairing the piece again, every trace of the old cement should be removed. Joints made with water-soluble cement can be opened by soaking them in hot water and the softened cement removed with a brush. The distributor of a resin-type cement suggests that, while joints sealed with a resin cement may withstand repeated washings with soap and water, they can be loosened by prolonged soaking in hot water.





After both parts of catalyst-type cement are mixed, solution must be used at once

For stubborn cases, a special "china washing" powder is available at your local hobby shop.

When cementing pieces of china, some brands of adhesives require clamping of the joint to produce a good bond, but others do not, according to the manufacturers. The mere supporting of a damaged piece when repairing it can be a problem. A device used by some repair shops consists of a small box of dry sand in which the object is partly buried. For simple holding of glued parts in proper alignment, cellulose tape or adhesive tape can be used as in Figs. 4 and 5. Other materials that are useful for clamping or applying pressure to joints are rubber bands, elastic cord, strands of rubber and small-diameter steel springs. In some cases, weights can be strategically placed to exert pressure on a joint, or special "presses" improvised, such as the one shown in Fig. 3. To effect a good repair of broken china, it is important that the surfaces of a joint be in alignment. A good test for this is to rub a fingernail across the joint. You should be able to move it in either direction without catching the nail on a sharp edge. Excess cement can be scraped or wiped off. If left to harden, the remaining adhesive is scraped off with a knife, after which a solvent is used for final cleaning.

Hardening of most cements used on ceramic material can be hastened by moderate heating up to 200 degrees F. This may be helpful during humid weather when it might otherwise not be the best time for repair work. Some materials, such as alabaster and marble, should not be subjected to heat in excess of 100 degrees F.



Above, catalyst-type cement is applied to both edges of saucer pieces with toothpick. Two largest pieces are coated first and cement allowed to set before assembling smaller pieces



Above, pressure is applied to saucer by rubber band pulling on felt-padded lever. Rubber tubing on nails protects saucer

Below, adhesive tape and elastic cord bind doll-leg pieces



### Types of Cement

Of the hundreds of adhesives on the market, most can be classified in one of the following types: Solvent-type household cement, synthetic-resin emulsion and two-part catalyst cement.

Solvent-type cements generally harden by evaporation of a solvent. They may be marked "waterproof," and characteristically are clear and colorless. Some are opaque or, if clear when applied, tend to turn yellow or brown with age. The usual procedure for cementing china, crockery, etc.,



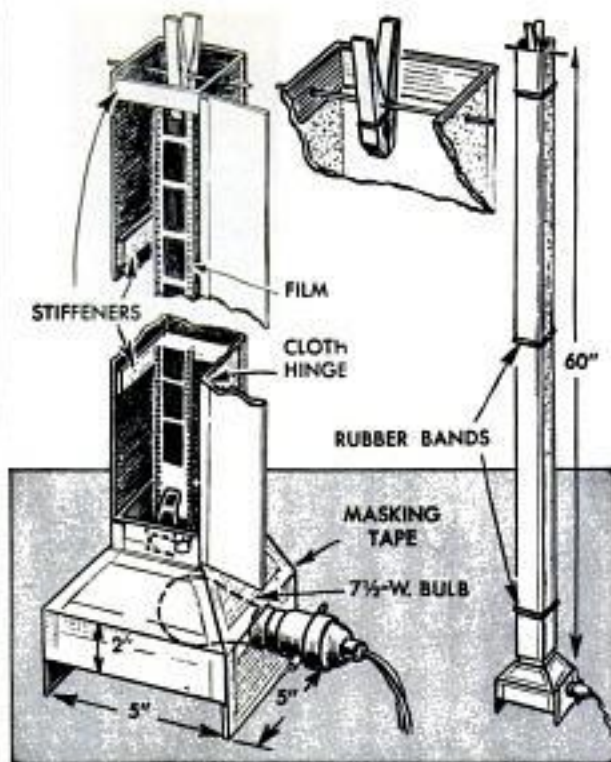
China horse is held in proper position for easy gluing of broken legs by burying part of body in dry sand. Tape applies sufficient pressure for good bond

is to allow some of the solvent to evaporate from the applied cement before pressing the pieces together. Because the solvent must evaporate from the edges of joints, developing maximum strength may take days or a week.

A typical cement of the synthetic-resin type is described as being suitable for the special requirements of antique repairing, and to be satisfactory for gluing practically every material except metal. Application conditions require priming of very porous surfaces with cement, which is allowed to dry 5 min. Then, the joints are recoated and assembled. After a week of "curing," usage has shown that repaired pieces can be washed with soap and water. While joints are water-resistant, they are not necessarily waterproof.

Two-part catalyst cements are the latest type of adhesives covered in this article to appear on the market. The cement base, or glue, will not undergo hardening, which is by chemical action, until the catalyst has been added as shown in Fig. 1. Mixed cement must be used rather quickly—within 20 to 45 min., depending upon the brand used. For small jobs, it is possible to mix only a small portion of each part, but it is important to measure exactly the proper proportions of glue and catalyst to develop maximum bonding strength. The mixed adhesive is spread thinly on each surface to be joined and the pieces assembled immediately. The repair resists alcohol, boiling water and the chemical action of foods.

When repairing a broken object, the usual procedure is to assemble the largest pieces first as in Fig. 2, allowing the cement to set before adding the next piece. This prevents moving previously cemented pieces out of position when subsequent ones are pressed into place. ★ ★ ★



### Drier for 35-mm. Film Made From Scrap Photomounting Board

This chimney-type 35-mm. film drier permits forced drying of film with a minimum amount of heat that is supplied by a  $7\frac{1}{2}$ -watt bulb. The 5-ft. chimney and base are made of photomounting board cut to size and joined with masking tape. Stiffeners, cut from strips of mounting board and glued to the inner wall of the chimney as shown, provide reinforcement. The full-length door swings on a cloth hinge glued to the door and chimney and is held in a closed position by three rubber bands. A wire pin fitted in the top of the chimney, with a clothespin attached as shown, permits hanging the film in the drier.

### Lock Your Power-Tool Switch

To prevent unauthorized persons from using power tools or other machinery fitted with toggle switches, locate a screw eye on each side of the switch and lock it with a bicycle lock as shown.



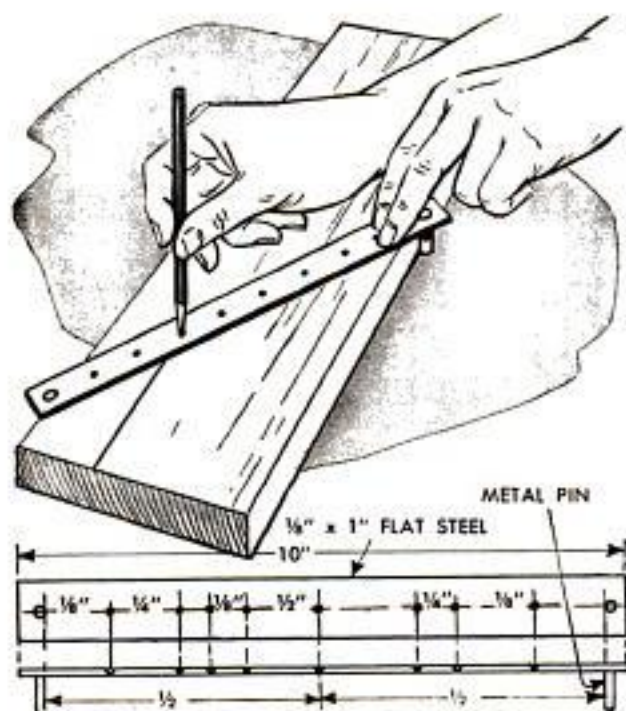
## Kitchen Cabinet Provides Space for Built-in Dog Kennel

If you are an owner of a small dog like Buck, he will love this novel kitchen kennel which is built right into one of the compartments in a cabinet sink. Matched lumber is used for the sides, and the floor is covered with linoleum of the same pattern used on the kitchen floor. A square of 1-in. foam rubber, placed on the floor at the rear of the kennel, provides a comfortable mattress that is easy to clean. To protect the front edge of the linoleum, a length of  $\frac{1}{2}$  x  $\frac{1}{2}$ -in. metal angle is nailed over the exposed edge.—Elsie L. Stebbings, San Francisco, Calif.



## Tool Permits Quick Marking Of Boards Into Equal Parts

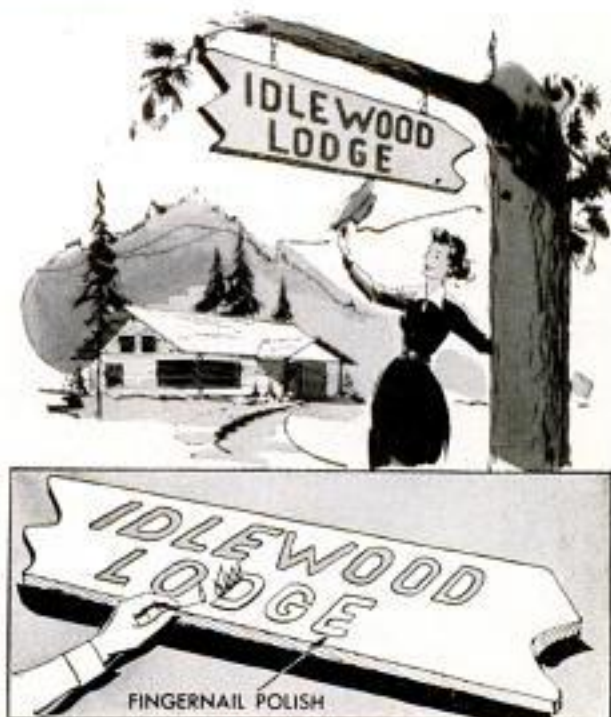
Laying out a board into equal divisions is a simple matter with this tool. Pins at the ends are held firmly against the edges of the board so that a sharp pencil point held, for example, at the midway point between the pins will always mark the center of the board as the tool is slid along. Also, the tiny countersunk holes permit marking a board so that it can be cut into thirds, quarters and eighths. The tool can be made longer than shown if desired.



OCTOBER 1957

## Letters Burned on Name Plate With Fingernail Polish

It's no trick at all to make a neat signboard or cottage name plate which will last indefinitely. Simply print or write the letters with fingernail polish and then ignite them. If one application of polish and burning does not burn deeply enough, repeat the process. After the lettering has been finished, two coats of spar varnish on both sides of the signboard will not only improve its appearance, but will also provide added protection.



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## THE SEA CAPTAIN'S DESK

*By following the construction in all details you can build a copy of this valuable antique*

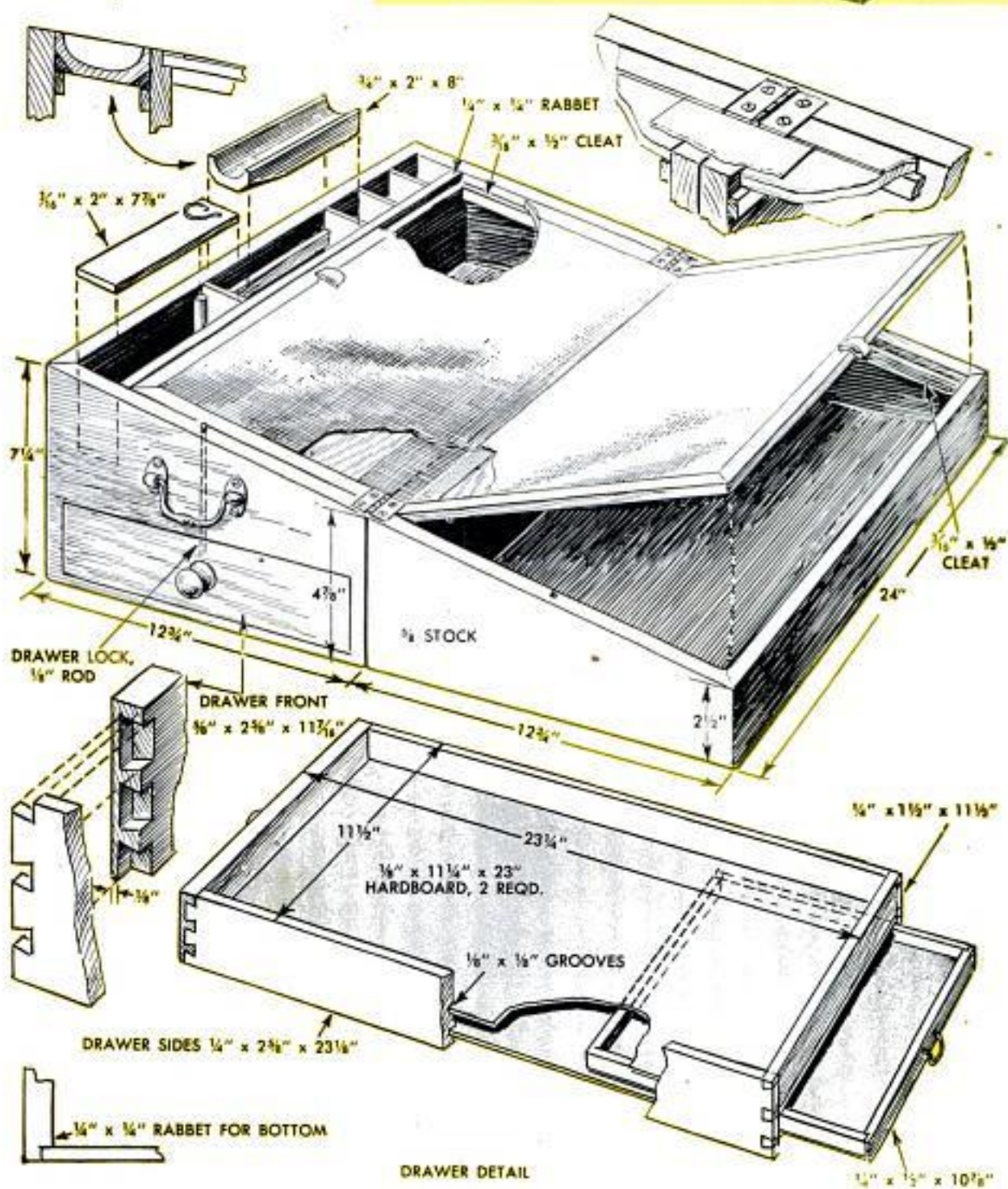
**W**HEN PLACED ON A TABLE and opened, as pictured below, the desk provides inkwell, penholder and a padded writing surface. Closed and locked, it is carried like a chest. The original, shown closed in the photo on the opposite page, is made of pine and veneered on the sides, ends and top with figured mahogany. You can simplify the job of assembly by using solid mahogany for sides, ends and top.

Assemble the desk as a solid box, then cut it apart on a circular saw. The upper section of the desk—upper when it is

The desk is shown opened and ready for writing



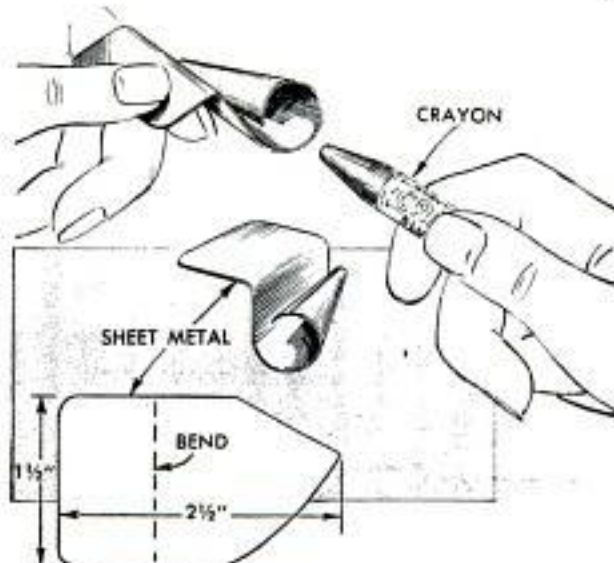
closed—requires only the installation of cleats to support the velvet-covered writing surface. The lower section of the desk has the drawer installed first, complete with a secret drawer at the back, then the inner bottom and vertical partition are fitted in place. On one side of the partition, the desk is divided into three sections. One section is fitted with a lid, one is divided into three spaces for inkwells and the one in the center is fitted with a grooved block to hold pens. The lower corners of one end of the block are beveled; pushing down on that end tips up the block to allow it to be removed to disclose another secret compartment. On the opposite side of the partition, cleats are attached to the inner surfaces of the desk to support the  $\frac{1}{2}$ -in. panel that forms the writing surface. A  $\frac{1}{8}$ -in. rod is dropped through a hole drilled into one edge of the desk and part-way through the drawer front to "lock" the drawer. The rod projects slightly so it can be grasped. All hardware should be solid brass with antique finish. ★ ★ ★





### Auto Visor Extended By Manila Envelope

An easy way of "stretching" the sun visor on your car to provide more shade is to slip a heavy Manila envelope over the end of it as shown. If an envelope of the required size is not available, one can be made from heavy wrapping paper. A rubber band stretched around the envelope will prevent it from being blown off the visor when driving with open windows.



### Wax Crayons Repointed Quickly With Improved Sharpener

This improvised crayon sharpener is a handy gadget for supervisors of children's play groups, nursery schools and other groups using wax crayons in quantity. Pointed crayons are necessary for delicate shading and tend to encourage better work. The sharpener is cut from heavy sheet metal and formed as shown. The cutting edge is bent inward to provide a "bite."

## Do-It-Yourself MATERIALS GUIDE

for the Homeowner and Handyman

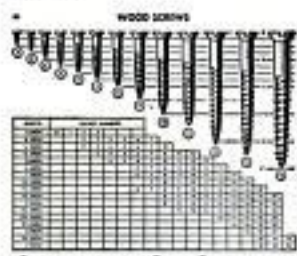
### Cross Indexed for Easy Use

If you've ever walked into a hardware store without knowing exactly what you need (and walked out without being sure of what you'd bought), you'll want a copy of this new guide that lists *all* the specifications for *all* Do-It-Yourself materials. With this book, you'll know exactly what to look for, and how to save money when you buy.



Need to know how long a 50d (penny) nail is? In the Do-It-Yourself Materials Guide, charts like the one at the left (4½ times larger in the book) will show you it's 5¾ inches.

The chart at the right, of common wood-screw sizes and gauges, is typical of the dozens of illustrations (all much larger) in the book. Now you'll know how to choose and where to use building and hobby materials.



### A Key to Buying and Using:

- |             |          |          |
|-------------|----------|----------|
| Adhesives   | Fuses    | Plumbing |
| Bolts       | Glass    | Plywood  |
| Bricks      | Hinges   | Roofing  |
| Conduit     | Locks    | Siding   |
| Doors       | Millwork | Tile     |
| Glass fiber | Paint    | Wiring   |

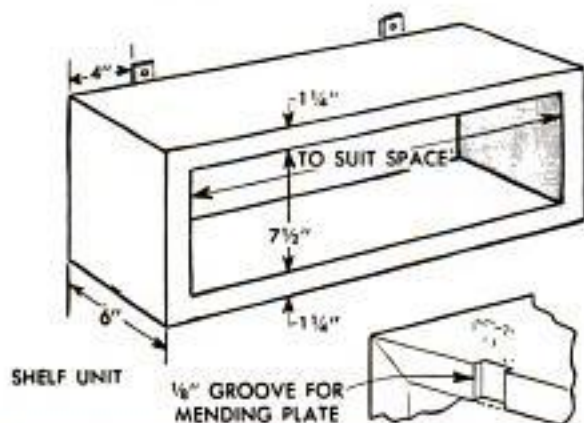
... Plus 31 other basic products. For only \$2.95 you can get this 160-page guide that will *save you time and money every time you buy supplies*. So send your order today to:

**POPULAR MECHANICS PRESS, 200 East Ontario Street, Chicago 11, Illinois**



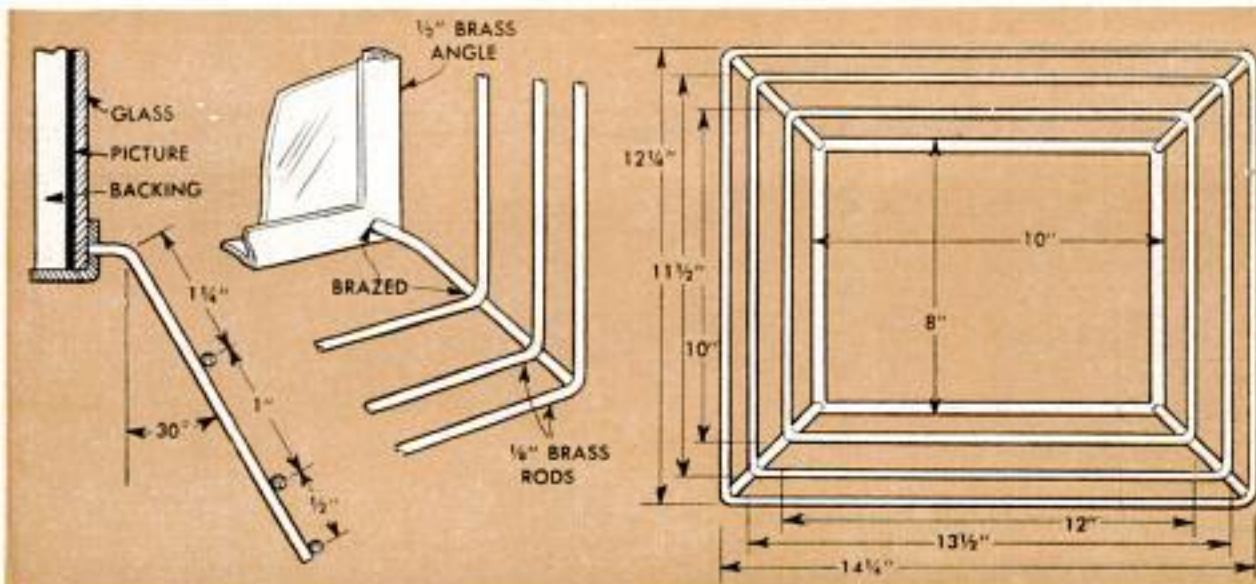
## Shelf and Picture Frame for Modern Home

WTM  
59



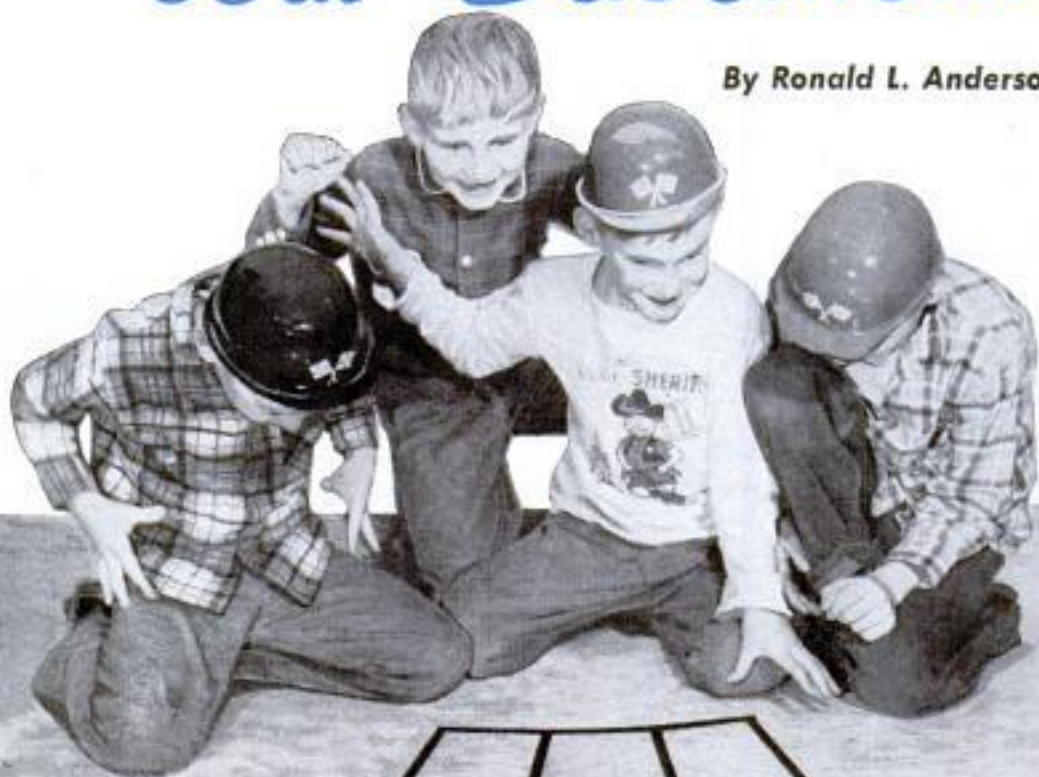
A PLEASING EFFECT is achieved in this individual shelf unit by using thicker-than-usual lumber and enclosing the ends. The shelves were made as shown of 1 1/4 x 6-in. redwood but other woods and thicker stock may be used with equal effectiveness. Pieces are mitered at corners.

The novel picture frame shown in the photo and the drawing below is easy to make. Any size picture can be accommodated simply by making the brass-angle frame the size desired and increasing the lengths of the brass rods proportionately.



# "Drag Strip" in Your Basement

By Ronald L. Anderson



1



2



**A**DDING POWER to plastic scale-model cars built from kits brings the thrills and excitement of real-car racing to what ordinarily is a shelf-model hobby. Racing is done on a "drag strip" a couple of feet wide painted on a basement floor, Fig. 1. Length of the track will vary with the size of a basement, but should be as long as possible to let the little cars reach top speed.

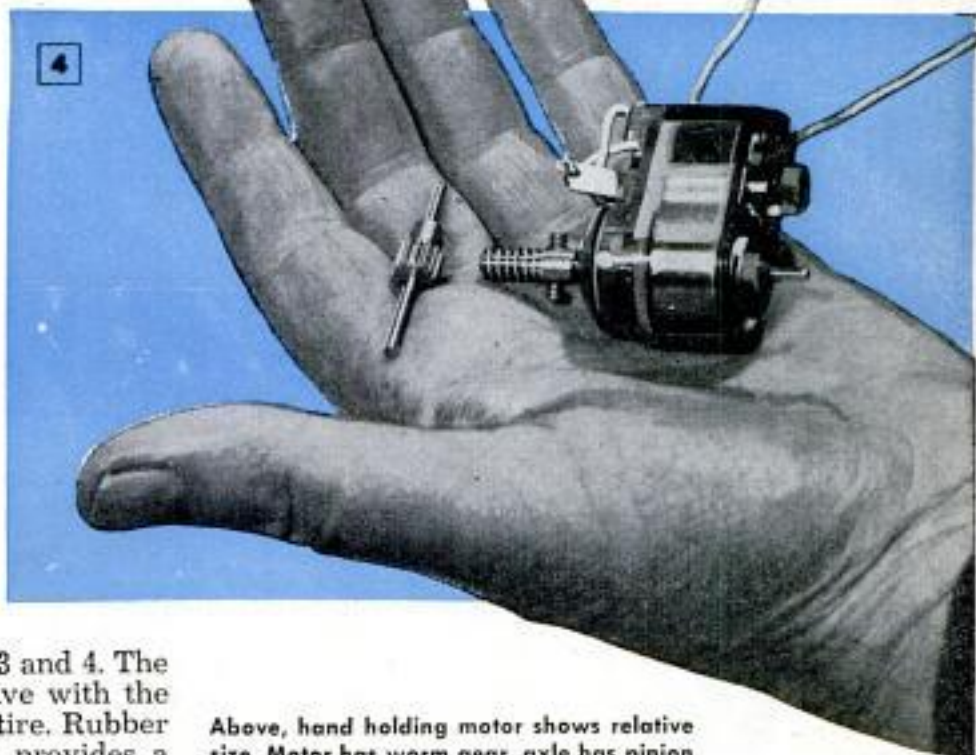
"Engines" for the cars are tiny electric motors, Fig. 4, powered by flashlight dry cells. Costing about \$2.00, the motors are available at most hobby shops. Because different types of these motors vary in power output, cars should be raced in "classes" so that cars with equal power will compete. The winner in a particular class will be the one that is "tuned" the sharpest. Such tuning consists of making the car as light as possible, and reducing friction to a minimum. Using extra dry cells, detail, Fig. 7, will make a motor run faster, but there is the possibility of burning the brushes due to excess voltage. Check the name plate of a motor to determine its maximum capacity.

One manufacturer of the miniature electric motors provides a complete line of accessories, including several types of reduction gears, motor shafts, pulleys, belts and mounting brackets. The shape and size of a car will determine the type of drive system to use, three being available, but in most cases a 15-to-1 speed reduction is necessary. The first drive system uses a worm gear on the motor shaft and a pinion gear on the driving axle, Figs. 3 and 4. The second system is a friction drive with the motor shaft rotating against a tire. Rubber tubing slipped over the shaft provides a more positive drive. A plastic wheel should be replaced with one that has a rubber tire. The third drive system consists of pulleys on motor shaft and axle, driven by a spring belt, similar to the type used on movie projectors.

First step in constructing a powered car is to assemble it according to directions, leaving out the dummy motor, seat and any other interior units. Sedans, because of more inside room, provide easier installation of the motor and batteries, see left-hand cars, Fig. 2, but racing roadsters and convertible coupes, right-hand car, Fig. 2, and cars in Fig. 5, can be used, although they require more careful planning for the location of the motor and batteries. A



Above, after car is assembled and pinion gear is on axle, hold motor in position to check mesh of gears



Above, hand holding motor shows relative size. Motor has worm gear, axle has pinion

Below, "souped up" convertible has four dry cells for added power. Pencil indicates friction drive





Discarding dummy engine and seat when assembling car provides room for electric motor and dry cells

worm-and-pinion-gear drive installation in a roadster-type body is shown step-by-step in Figs. 3, 6, 7 and 8.

After the car has been assembled, in this case with a 14-tooth pinion on the front axle, which meshes with a worm on the motor shaft to provide a 15-to-1 reduction, the upper half of the car body is removed. Hold the motor in place with your thumb, Fig. 3, and check the positioning to make

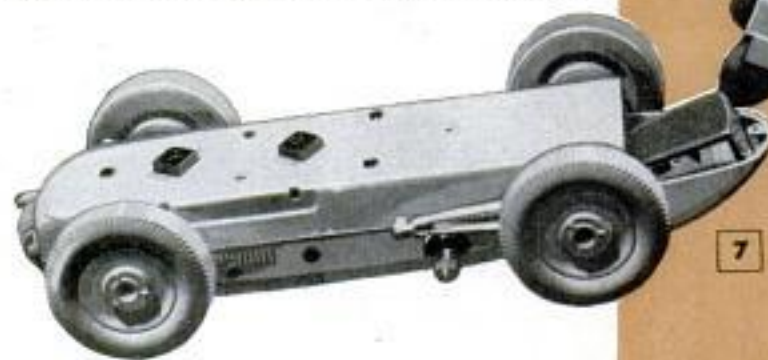
sure the gears mesh smoothly. Mount the motor in place with machine screws and an aluminum strip  $\frac{3}{8} \times 2\frac{1}{4}$  in. long. A pad of foam rubber,  $1 \times 1\frac{1}{2}$  in., cushions the motor. Insulate the mounting screws with tape to prevent them from contacting the wires.

Next, wire in a canopy switch and drill a mounting hole for it in a convenient location. Be sure it will not interfere with the dry cells, Figs. 7 and 8. Now, with a fine-bladed jigsaw, cut off the bottom of the rear deck of the car so two pen-light dry cells can be slipped into the car. Standard-battery boxes may be trimmed to fit, or the dry cells can be taped together. To "hop up" the car, a second set of dry cells can be placed near the center of the car. Wiring is shown in the details in Fig. 7.

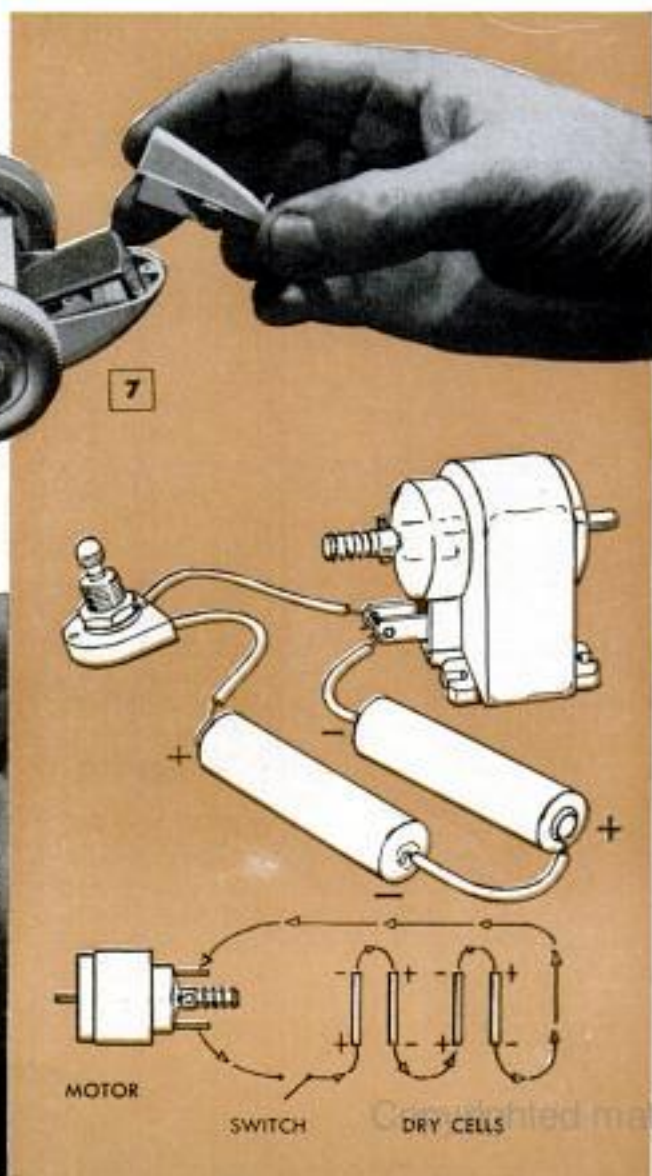
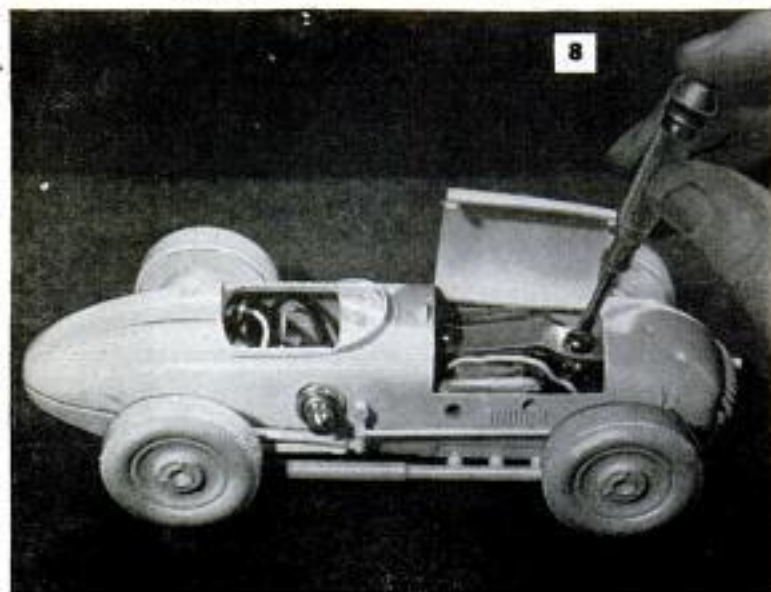
Now the car is ready to run. Place a few drops of oil on all gears and bearings and turn on the switch. Adjust the front mounting screw, Fig. 8, until the motor turns its highest r.p.m. Place it on the starting line with several other cars, snap the switches and watch them rush down the track. To eliminate a scramble for the speeding cars at the end of the race, and to prevent damage, use a padded 2 x 4 for the finish line.

★ ★ ★

Dry cells are inserted in opening cut under rear deck of car. Wiring diagram is shown in details



Car is "tuned" by adjusting gear clearance with front screw of motor mount while motor is running



MOTOR

SWITCH

DRY CELLS

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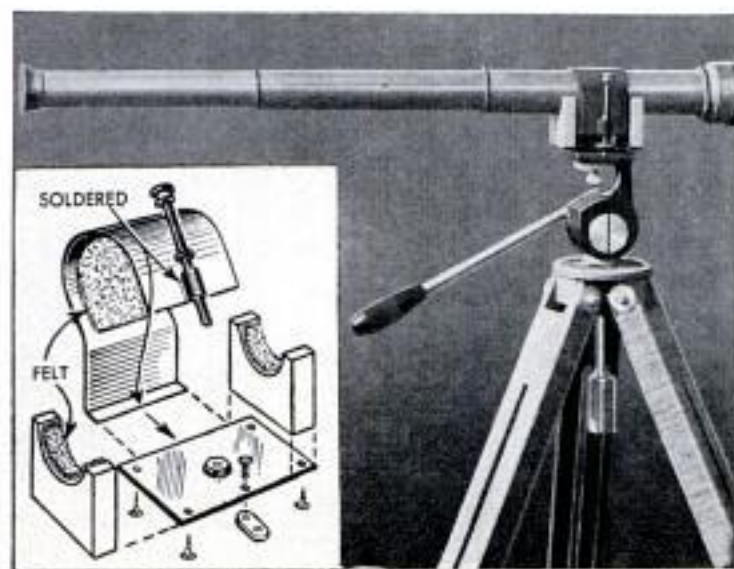
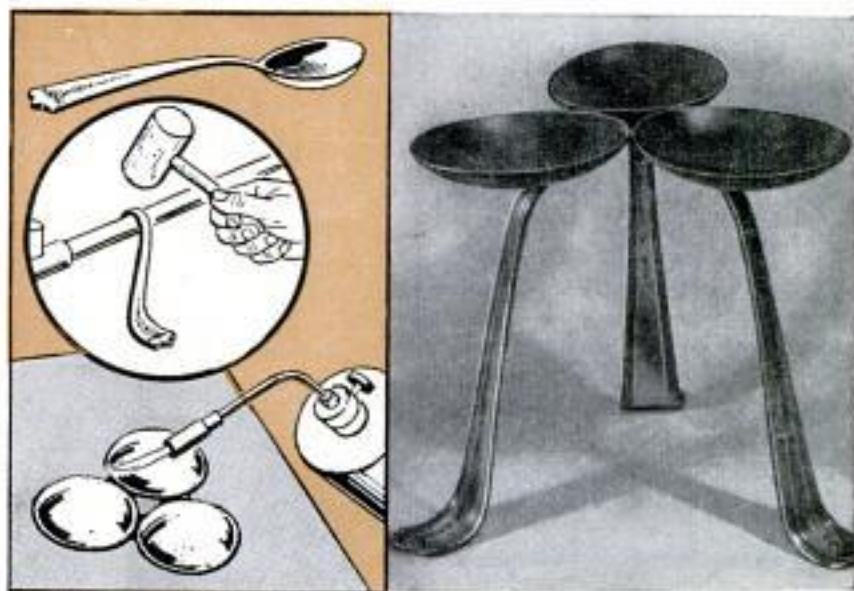


## Ball and Chain on Collar Slows Car-Chasing Dog

If your dog has the dangerous habit of chasing automobiles, and scolding and punishment do not seem to do any good, try this device worked out by Maurice Peacock, Radnor, Pa. It consists of a solid-rubber ball drilled to receive an eyebolt to which a short length of chain is attached. A snap swivel on the other end of the chain permits it to be attached to the dog's collar. The chain should be of a length that positions the ball a couple of inches above the ground. When the animal runs, the ball strikes his front legs and the chain wraps partly around one of his legs, throwing him off stride. The dissuader will work equally well on large or small dogs.

## Spice Dish Made From Three Spoons

Three round-bowl soup-spoons are used to make this interesting spice dish. The handles are cut off the spoons and the bowls soldered together as indicated. "Legs" for the dish are formed by shaping the handles over a length of pipe or dowel with the aid of a soft-faced mallet. Use stainless-steel spoons when possible, as soldering heat may cause plating to peel.—S. S. Palestrant, Bronx, N. Y.



## Tripod Supports Telescope With Aid of Adapter

Any camera tripod can be used as a telescope support with the aid of this adapter. No dimensions are given as they will vary with each telescope. The base, cut from heavy sheet metal, has a  $\frac{1}{4}$ -20 nut soldered over a  $\frac{3}{16}$ -in. hole to accommodate a standard tripod screw. Hardwood is used for the cradles, light sheet metal for the clamp. A short length of tubing soldered to the clamp receives a locking screw that turns into a tapped hole in a bracket screwed to the base. The screw has a dry-cell terminal nut soldered to it.



### Hose Is Pail-Rim "Bumper"

Lengths of small-diameter hose, slit open and placed over the rims of galvanized pails and metal wastebaskets, prevent the containers from damaging kitchen cabinets and walls when accidentally knocked against them. Once the hose is slipped in place, it will remain on the rim until removed for cleaning.



Attached to a telephone directory, a small magnifying glass will make the fine print easy to see.

### Magnet-Type Knife Rack Holds Tools on Ladder

A magnetic knife rack screwed to the back edge of the top step of a stepladder provides a convenient place for keeping tools and metal material needed on a job. It will be found especially handy for holding small screws and other tiny parts that might be used in applying hardware.

### Backing Sheet Prevents Cards From Slipping in Typewriter

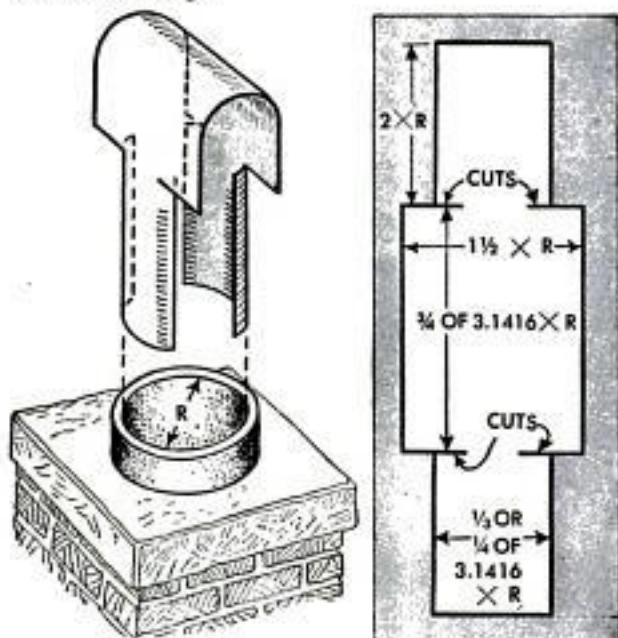
Small cards or labels can be prevented from slipping out of position when typing on them if they are secured on a sheet of paper as shown in the drawing. To do this, simply cut diagonal slits in the sheet of paper



so that the corners of the cards or labels can be inserted. The slits must be made carefully so that the cards lie parallel with the top of the sheet.

### One-Piece Chimney Extension

Cut from a single piece of sheet metal and bent as indicated, this chimney extension can be installed in a few moments. Its lower end slips into the flue tightly so it will remain snugly in place even when subjected to considerable wind pressure. Yet, when necessary, it can be removed without difficulty.



Do not allow sawdust to accumulate on the workshop floor. It is considered a fire hazard.

# DENSITOMETER

## Speeds Photo Enlarging

By E. H. Leftwich

FOR THE amateur photographer who prefers to do his own photo enlarging, here is an inexpensive, easy-to-build electronic unit that will save darkroom time and cut waste of enlarging paper. The unit simply measures the degree of contrast between the lightest and darkest areas of a negative so that it can be classified in one of the five groups shown in the sample negative-contrast ratio table, Fig. 5, and a proper exposure time determined.

The exposure time listed opposite each of the five contrast ratings in Fig. 5 applies to a specific type of enlarging paper, developer and the developing time recommended for the developer. However, it takes only a few minutes to determine these values for the type of paper and developer you use. To do this, the following procedure is recommended:

1. Place the negative to be classified in the enlarger, focus and set the aperture of the enlarger lens at f:11.

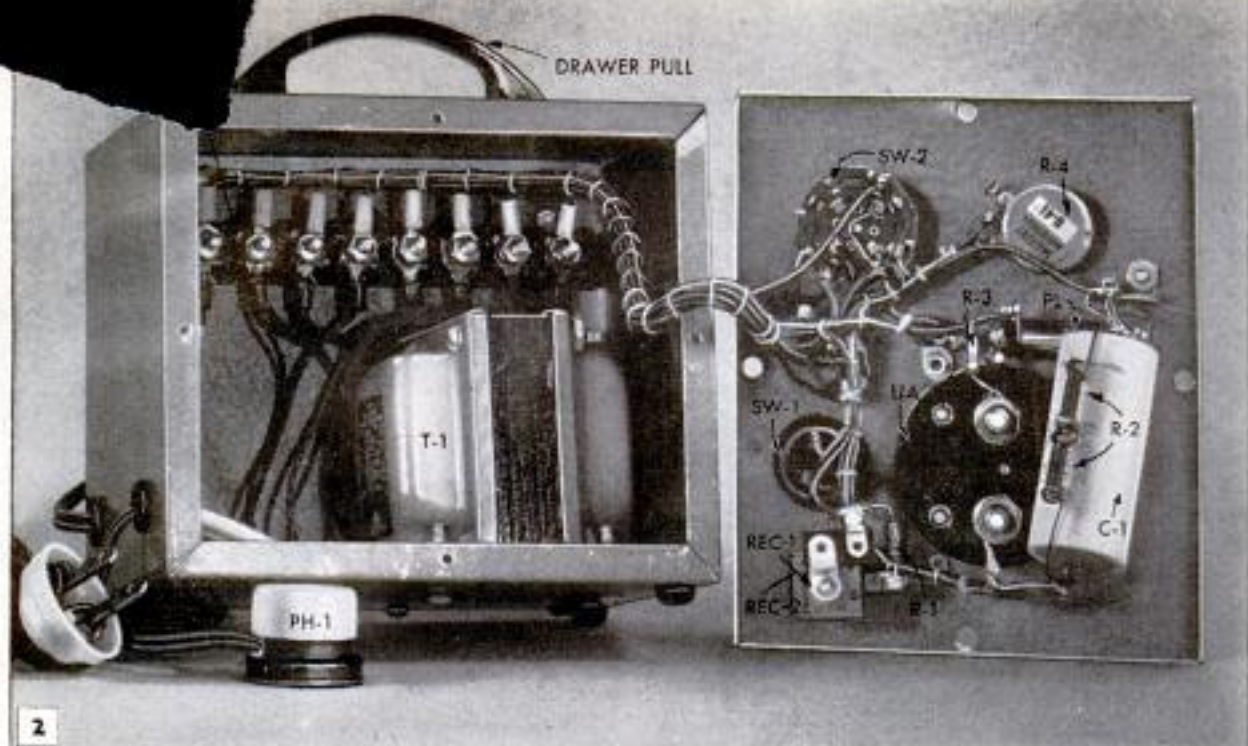
2. Remove the protective cap from the photocell (PH-1, Fig. 2) and hold the latter on the easel in the lightest area (shadows) of the projected image. With the power button, Fig. 1, (SW-1, push switch, Fig. 4) depressed, set the sensitivity control so that a reading of 40 is obtained on the microammeter as shown in the illustration at the upper right.



Below, plastic bottle cap is used to cover "eye" of photocell when latter is not in use to protect it from dust



1



All parts are mounted on front panel of utility cabinet except transformer and terminal strip, which are bolted to the bottom and back respectively. Four metal screws secure the front panel to the cabinet

3. Then, move the photocell to the darkest area (highlights) of the projected image and take a reading for that area to determine the contrast ratio between the lightest and darkest areas: e.g., a "lightest" reading of 40 and "darkest" reading of 10 would result in a contrast ratio of 4:1 and a contrast rating of "normal."

4. After checking the negative-contrast table, Fig. 5, for the recommended contrast number of enlarging paper to be used, test strips are made to determine the exposure time required to produce a good print. It is necessary to follow all of these steps exactly as outlined for the first negative processed in each of the five contrast ratings. When processing subsequent negatives, it is necessary only to determine the contrast ratio, as in steps 1, 2 and 3, and provide an aperture setting that will give a microammeter reading of 40 when the photocell is placed in the darkest area of the negative. The same type of paper, same developer and development time must be used for processing negatives as were used for establishing the negative-contrast ratios and accompanying exposure times. Also, the same procedure applies when determining a table of ratios for processing color negatives, except that only one contrast number of printing or enlarging paper will be listed.

#### Building the Densitometer

Layout and construction of the densitometer are shown in Figs. 2 and 3. To

prevent cluttering of the cabinet-layout diagram, Fig. 3, only the most important dimensions are given. All components are mounted and wired as shown in Figs. 2, 3 and 4, using the parts and materials recommended in the materials list on the opposite page. *Caution:* Observe proper polarity of rectifiers when wiring them.

The photocell body is made from an a.c. attachment plug by disassembling the plug and drilling a 1/2-in. hole in the center to accommodate the cell. Then, the cell wires are pushed through the bottom slots in the plug and a 1/4-in. hole drilled in the side of the plug near the bottom to admit the photocell cord. After the cell wires are joined to the cord, cold plaster is poured around the cell, being careful not to touch the leads, which might cause current leakage and result in a false reading. Finally, a fiber disk is cemented to the bottom of the plug and the photocell is ready to be connected to the proper leads in the cabinet. A plastic bottle cap can be used to cover the photocell when the unit is not in use, as shown in Fig. 1.

If a terminal strip is not used, hookup wires are run directly to the components. After the wiring is completed, check it against the schematic diagram, Fig. 4, to make sure that no errors in wiring have been made. To insure accurate meter readings, the unit should be used at about the same time each day. If there is considerable fluctuation of the line current, a voltage regulator should be used. ★ ★ ★

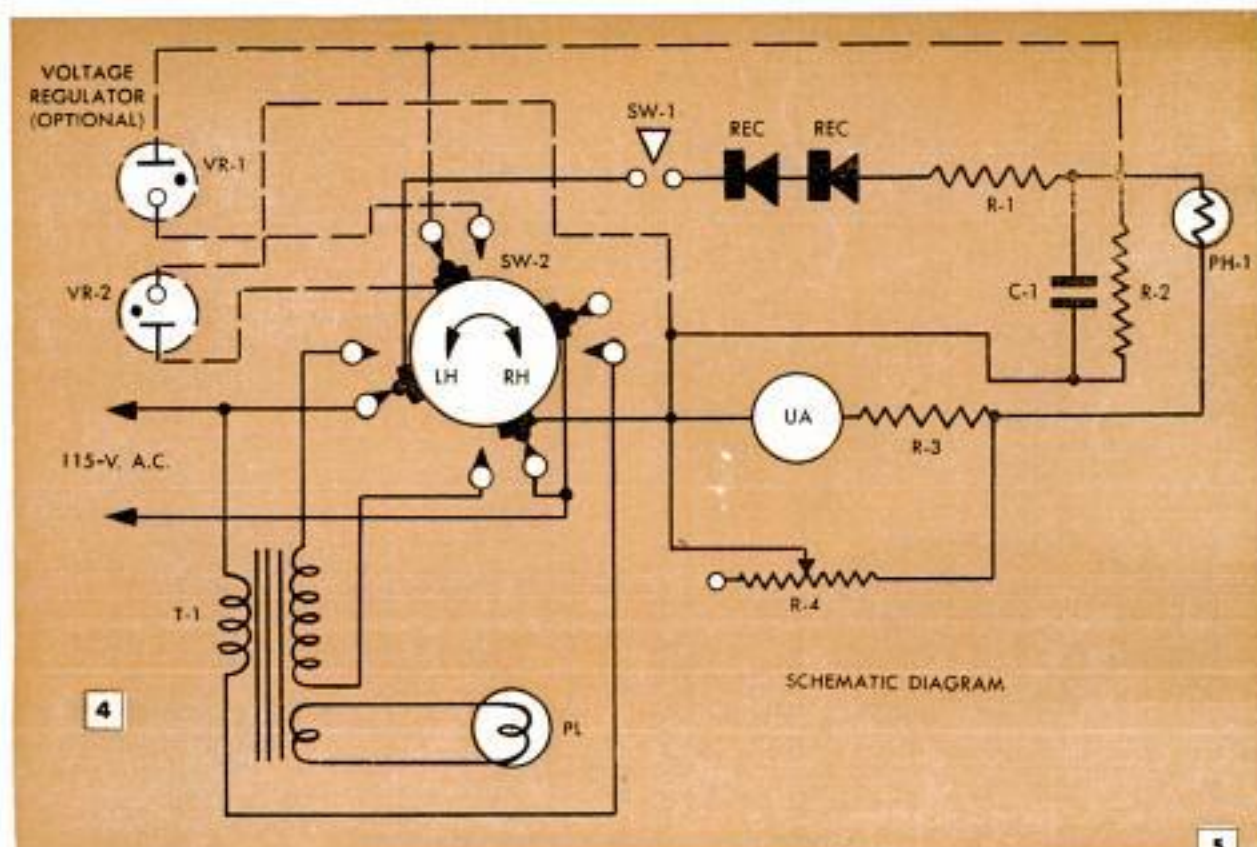
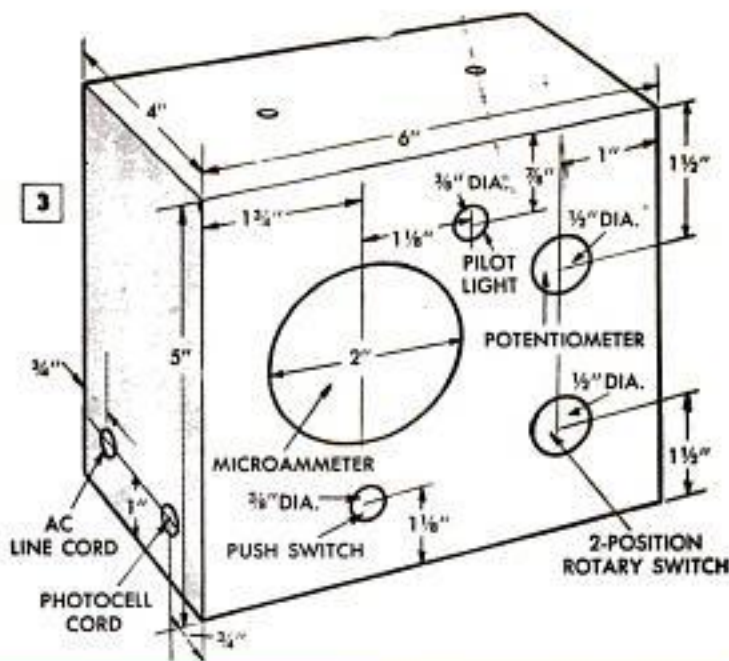
## LIST OF MATERIALS

**RESISTORS**—all  $\frac{1}{2}$ -watt (K=1000 ohms) R-1=22K; R-2=1 meg.; R-3=12K; R-4=100K potentiometer, Mallory type linear taper, U-41.

**CAPACITORS**—C-1=1 mfd., 400-volts, Cornell-Dubilier.

**MISCELLANEOUS**—T-1=Power transformer, sec. 500 volts-20 ma. and 6.3 volts-2 amp. Triad-type R-3A (use one half of rated 500 v.); UA=microammeter, 0 to 50 microamperes, GE or equivalent; REC, REC=(two) selenium rectifiers, Federal miniature-type 1263A, 65 ma.; SW-1=push-button switch, Grayhill-type 4001; SW-2=2-position rotary switch, Mallory-type 3142J; PH-1=photocell, Clairex-type CL-1; VR-1, VR-2=voltage-regulator tubes (optional), Mallory-type 6308; PL=pilot lamp, 6 or 8-volts.

**HARDWARE**—terminal strip, 9-terminal, chassis mtg.; utility cabinet, ICA-type 29812; dial plate and pointer knob for R-4; 10-ft. line cord; 10-ft. No. 18-7 tinned copper hookup wire; 2 rubber grommets,  $\frac{3}{8}$  x  $\frac{1}{2}$ -in.; 1 pkg. single tie points; handle for utility cabinet.



## NEGATIVE-CONTRAST RATIOS

LOW READING *	PAPER NUMBER	EXPOSURE (SECONDS)	CONTRAST RATIO	CONTRAST RATING
2.5	1	8	16:1	VERY HIGH
5	2	12	8:1	HIGH
10	2	8	4:1	NORMAL
20	3	9	2:1	LOW
30	4	8	1.33:1	VERY LOW

\* With potentiometer dial set for microammeter reading of 40 when taking all low readings.



## Rolled Drawings Held Flat By Slotted Cardboard Tube

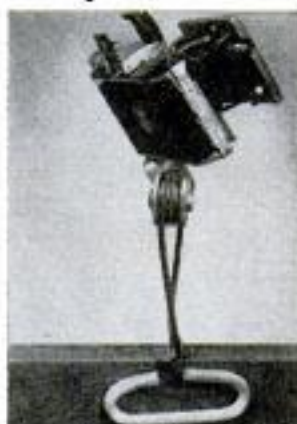
To hold a rolled drawing flat while it is being checked, slip a slotted length of 2-in. cardboard mailing tube over it as indicated. The slot should run the full length of an 8 or 10-in. tube and be about  $\frac{1}{2}$  in. wide.

## Timer Controls Outside Light

Hooking an automatic timer into the wiring circuit of his outdoor floodlight was the method used by one homeowner to save footsteps and to make sure the light would not be left on accidentally. He estimates the time it will take to do some job outside, sets the timer for that duration, then goes to work. A few moments after he walks into the house, the light turns off.

## Flash-Gun Clamp Modified For Use as Camera Tripod

Spring clamps from flash-gun extensions can be adapted for use as tripods on light-weight cameras by removing the light reflector and attaching the camera with a regular tripod screw. To hold a darkroom safe-light on the clamp, use a knurled nut.



## Glass Jug Dries Photoprints

When no ferrotype plates are available, photographic prints can be dried smoothly and quickly by using a large glass jug. Coat the outside of the jug with wax, preferably ferrotype wax, to prevent the prints from sticking. To speed drying, the jug can be filled with warm water.



## Special Concave Sanding Block Rounds Corners Accurately

Rounding the corners of a piece of work by hand without leaving flat spots is no problem with this concave sanding tool. It is jigsawed from a scrap of 2-in. wood to the shape shown, after which the handle end is rounded to give a comfortable grip and a strip of garnet paper is glued to the concave edge. In use, the tool is held horizontally at all times as it is pushed back and forth across the corner of the work. This imparts a rolling action to the tool as it rises and falls with each stroke so that the point of contact is always at right angles to the radius center. Thus the corner is quickly cut down to form a perfectly rounded corner. Of course, the size of the concave radius in the tool limits the size of the radius that can be sanded and must be made to suit the work at hand.

Robert L. Sargisson, Berwyn, Ill.



Canvas paint applied to fiber rugs will protect them against wear and prolong their usefulness.



# SHOP NOTES SN 59



Photo courtesy Skil Corp.

## PORTABLE POWER SAWS

speed up work of professionals, stretch those spare-time hours in your home workshop

By Tom Riley

**YOUR PORTABLE SAW** is probably the most versatile of the one-hand power tools. It will perform almost any operation that can be done with a handsaw. In addition, it cuts grooves, dados and slots in wood and drives an abrasive wheel through metals and masonry. It tilts for cutting stock at an angle and the blade raises and lowers to adjust the depth of cut. When remodeling or building, Fig. 2, you carry the saw to the job. Or, turn it upside down and attach to the bottom of a specially designed table, Fig. 3, and you have an efficient stationary saw for the shop.

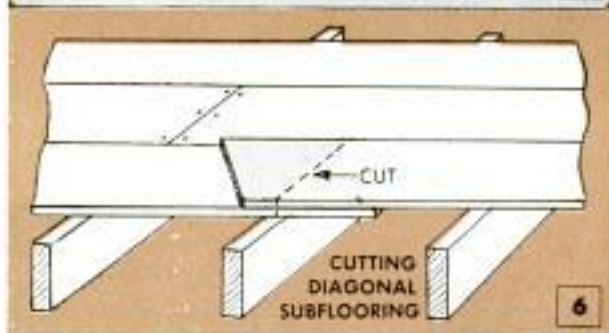
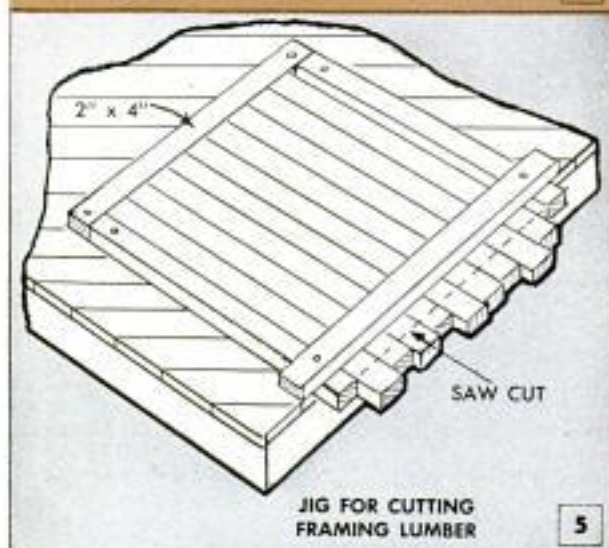
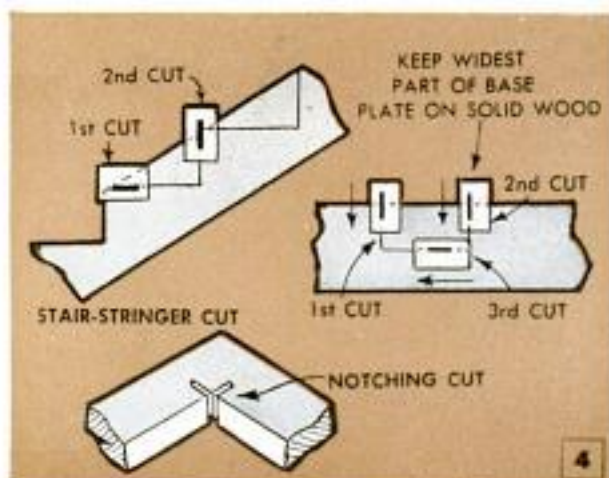
Blade diameter is used to determine the size of portable saws, as 4, 6, 8-in. and so on to those larger sizes which are not commonly used by builders and home craftsmen. The 6, 7 and 8-in. saws are perhaps the most popular as they are comparatively light and easily handled. Saws in the three sizes are designed to cut through 2-in. stock (nominally 1 $\frac{3}{4}$  in.) when the blade



Photos courtesy Black & Decker Mfg. Co.

Above, portable saw is used freehand or mounted under table, below, and used as a stationary saw





is set to cut to the full depth. The smaller sizes are usually best-suited to the uses of the home craftsman. On small construction and remodeling jobs where cabinet accuracy is not necessary, most of the typical cuts are made freehand to a penciled line. On most of the smaller saws, the base plate is notched or otherwise marked on the center line of the blade. This makes it easy after a little practice to follow a penciled line.

Figs. 1 and 2 picture typical freehand cuts, Fig. 1 showing the method of making a pocket cut in a board or panel without sawing in from an edge. The size of the opening is marked on the stock. Then the saw is placed with the blade on the line and after closing the switch the tool is lowered slowly. After cutting through, the tool is moved forward until the cut reaches a corner. Then the process is repeated on the remaining side and the ends of the opening. In Fig. 2, the operator is trimming the projecting ends of roof boards.

One basic rule followed by all experienced operators of portable saws is that of keeping the widest part of the base plate on solid stock, Fig. 4, as the cut is made. The main reason for this is that the saw is easier to control. If the saw is supported only on the narrow part of the plate as the cut is made, there is always the chance that the portion of the stock being cut off will spring away, or break off before the cut is finished. This can cause the saw to tilt unexpectedly and either bind or damage the work.

Another point to keep in mind in connection with operating technique is the distance the blade projects below the work when a cut is being made, Fig. 12. If you adjust the blade to the first position with the teeth just cutting through the stock, the

Photos courtesy Stanley Electric Tools

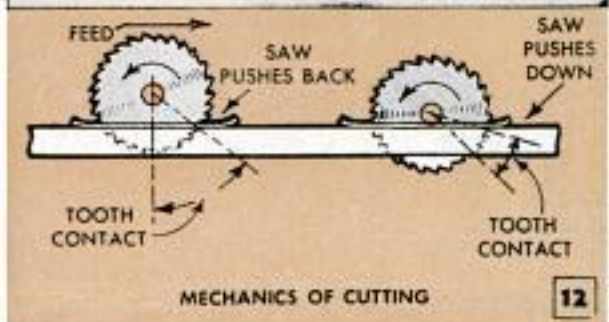
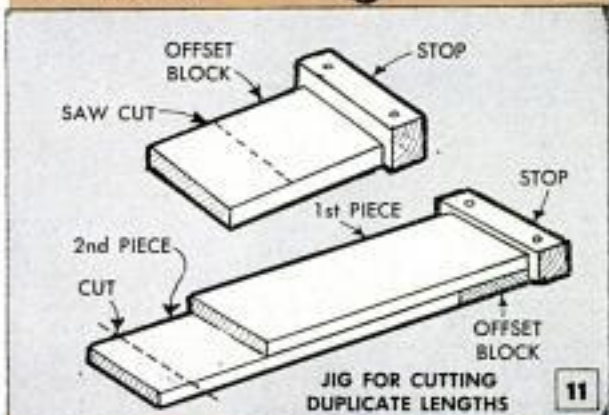
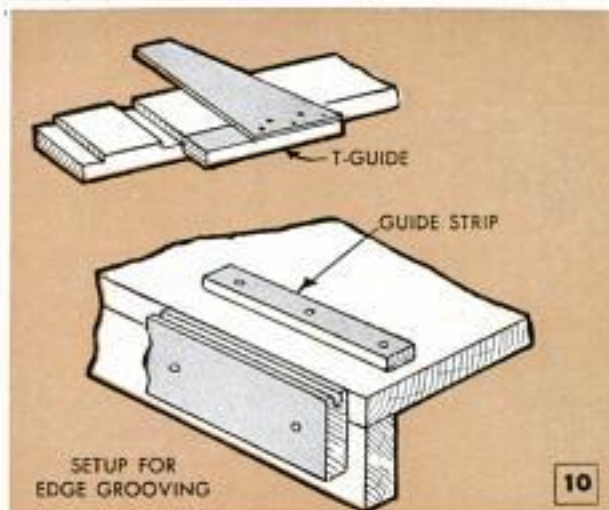


cut will be somewhat smoother but you will have to apply some pressure to keep the blade cutting uniformly. If the blade is adjusted to the second position, Fig. 12, with the points of the teeth running well below the bottom face of the stock, the angle of tooth contact will be greatly reduced and the saw will require very little hand pressure to move it through the wood. However, the cut will be less smooth and there will be a tendency of the wood to splinter along the kerf on the top face of the stock. When this is objectionable, turn the stock over and mark dimension lines on the bottom face. As a rule, adjusting the blade to run about  $\frac{3}{8}$  to  $\frac{1}{2}$  in. below the lower face of the stock will give best results.

Builders speed up the job of cutting studs to length by building the jig detailed in Fig. 5. They nail 2 x 4s to the subfloor of the structure in the manner shown. Then the required length of the studs is determined, and the guide, also a 2 x 4, is nailed across the open end of the jig to serve as a guide for the baseplate of the saw. Care must be taken to see that the jig is square and that the guide is correctly located. Then the studs to be cut to length are placed in the jig with the ends against the backstop. One pass of the portable saw does the trick.

Cutting angle butt joints when laying diagonal subflooring is done with a portable

Photo courtesy Porter-Cable Machine Co.,



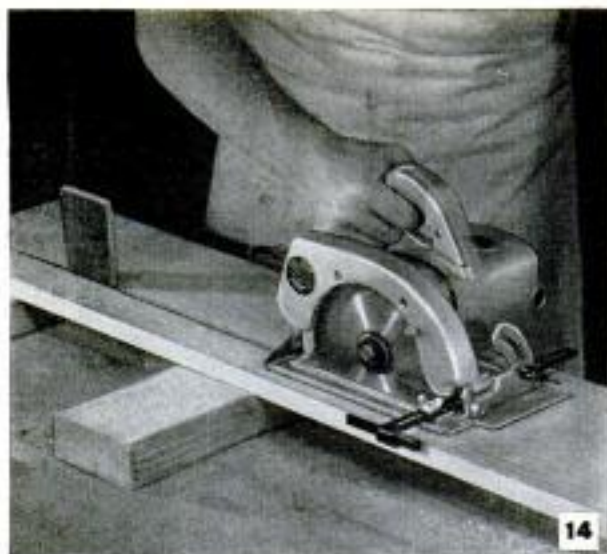


Photo courtesy Stanley Electric Tools



General purpose combination blade crosscuts, rips hard, soft wood and comes in 6 and 8-in. dia.

Planer blade runs without set, is used in cabinet joinery where a smooth cut is first requirement

Crosscut blade designed for crosscutting hard and soft wood. Gives a cleaner cut across the grain

Nail cutting, or flooring blade, is used in reclaiming used lumber and in cutting through flooring

Carbide-tipped blade cuts wood and composition materials faster with less frequent resharpening

Abrasive disk cuts masonry units, slate, tile, cement boards, metal. Exceptionally fast, efficient

saw as in Fig. 6. Just lay the boards one on top of the other, line them up and cut through both on the center line of the joist.

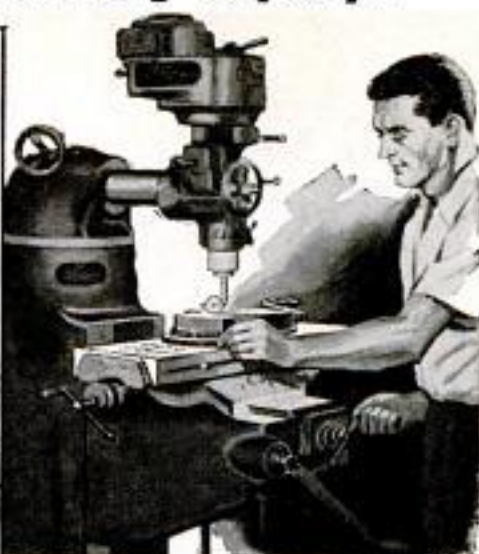
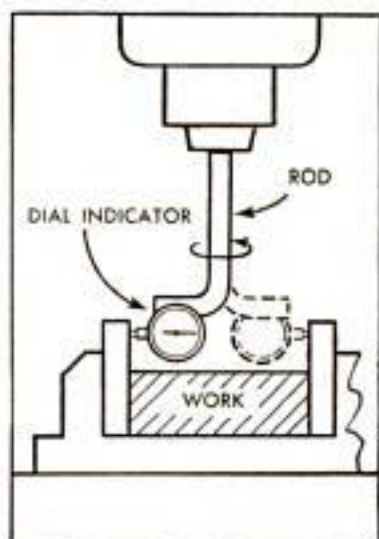
Figs. 8, 9, 13 and 14 picture various guided cuts with portable saws. Fig. 8 demonstrates how a cut rafter can be used as a guide for the saw when cutting a number of rafters to length and to the proper angle. A small, straight strip clamped across a plywood panel guides the saw, as in Fig. 9, when you need a true cut. The panel is laid on three square pieces of stock to raise it above the bench top. In Fig. 13, a compound-angle cut is being made with a guide designed specially for use with portable saws. The guide adjusts from 0 to 45 deg. either right or left and by adjusting the base plate on the saw almost any compound angle desired can be cut. Nearly all small portable saws have accessory ripping guides, Fig. 14.

Either the T-guide, Fig. 10, or the angle guide, Fig. 13, can be used for dadoing or rabbeting. For this work you use a dado head instead of the saw blade. The dado head cuts the dado or rabbet in one pass. Grooving can be done with the setup shown in the lower detail, Fig. 10. If nail or screw holes are objectionable in the work, both the guide strip and the work can be clamped in position. To cut off a number of pieces to duplicate lengths, nail or screw a stop to the bench, or a board. Then cut an offset block as in the upper detail, Fig. 11, running the base plate of the saw against the stop. Then use the offset block in the position shown in the lower detail.

Cutting masonry and tile units with a portable saw usually is done with a flexible abrasive wheel, or disk, as in Figs. 7 and 15. In cutting tile, Fig. 7, the work must be supported to prevent it from turning as the cut is made. Although the work usually is done freehand, special care must be taken to prevent the disk from drifting. ★ ★ ★

## Centering Device Aligns Work for Milling Keyways

When cutting keyways with a vertical miller the work can be centered by fitting a dial indicator on a rod which is chucked in the spindle. The fixed jaw of a vise clamped to the machine table is set parallel to one direction of table travel to obtain a zero reading. Then clamp the work in the vise and rotate the dial indicator to contact each jaw alternately as shown. When identical readings are obtained against both jaws, the work is centered.



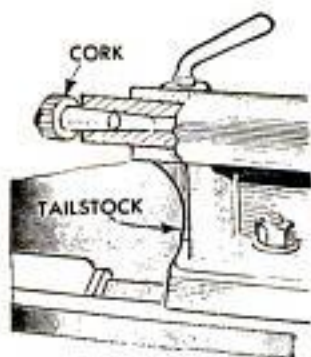
## Auger Bit Fits Power Drill



A standard auger bit cannot be used in a power drill as the screw tip penetrates the wood too rapidly and jams the tool. However, it is a simple matter to adapt a bit to efficient power-tool use. To do so, grind off half the

screw tip, remove one of the starting spurs, and cut off the square taper at the top, leaving a round shank. The half screw permits retraction of the bit if it feeds too fast, removal of one spur reduces the power required to turn the bit in the work, and the round shank fits the chuck of the power drill.

## Cork Seals Tailstock Sleeve Against Entrance of Chips

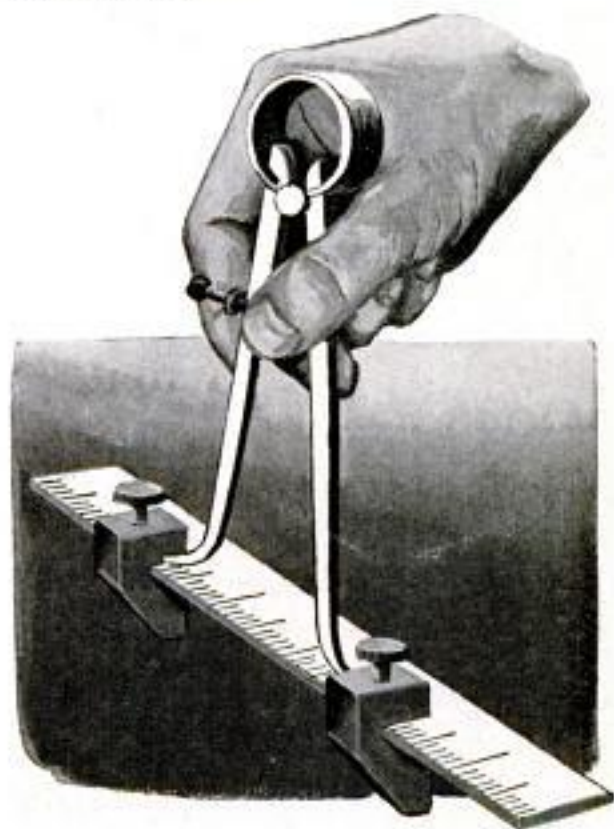


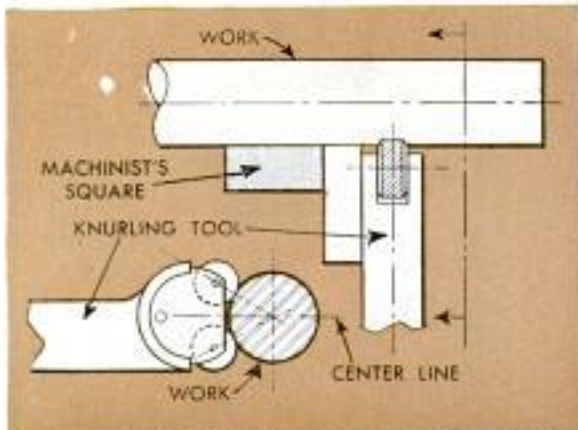
When the tailstock center is removed for re-grinding, or for any other reason, careful operators always plug the tapered sleeve with a cork to prevent metal particles and chips from entering. The smallest metal

chip will prevent the center from seating properly and may cause inaccuracy of the work and possible tool breakage.

## Calipers Set With Keyseat Clamps

Two keyseat clamps mounted on a scale simplify the accurate setting of calipers. Since both sides of the standard keyseat clamp will be perpendicular to the surface of the scale or ruler they can be used to set both inside and outside calipers. Set the inside edges flush with the desired measurement marks on the scale and then adjust the caliper jaws until they touch the sides of both clamps very lightly. A metal scale should be used so that the screws in the clamps cannot leave indentations or scores which will prevent accuracy in future settings.





## Lathe Setup for Running a Long Knurl

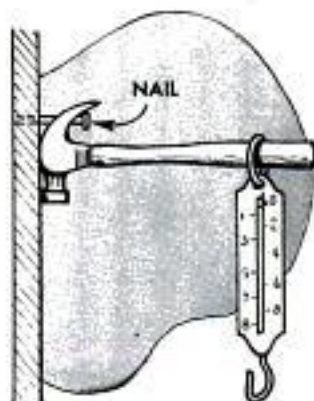
Running a long knurl, such as that on a handle, calls for a careful setup. The work should be mounted between centers and driven by a dog rather than by the chuck. If the stock is to be shouldered, then the knurl should be run before the shoulder cut is made. Otherwise the work may have a tendency to spring away from the knurling rolls. After the work has been mounted between centers, set the lathe for the slowest speed through the back gears and square the knurling tool with the work as pictured. For clarity in the photo, the knurling tool is shown farther forward than its normal working position. Also make

certain that the tool is set on the center line of the work as in the detail. Then, after starting the lathe, run the carriage to the right to the starting position at the end of the stock. Position the carriage so that the knurls cut about half their width when engaged. Then bring the knurls up to the work, engage them and run the cut to a depth of about  $\frac{1}{64}$  in. for a medium knurl. Apply cutting oil, engage the longitudinal feed of the carriage and run the first cut. Reverse the carriage, force the knurling tool to cut about  $\frac{1}{64}$  in. deeper and allow it to feed back to the starting point.

F. L. Rush, Columbus, Ohio.

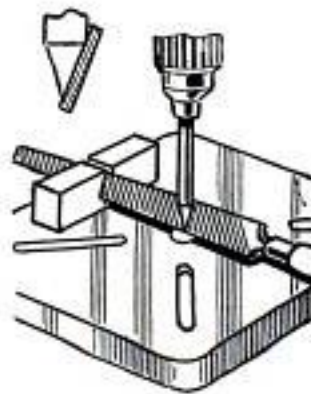
## Emergency Bracket

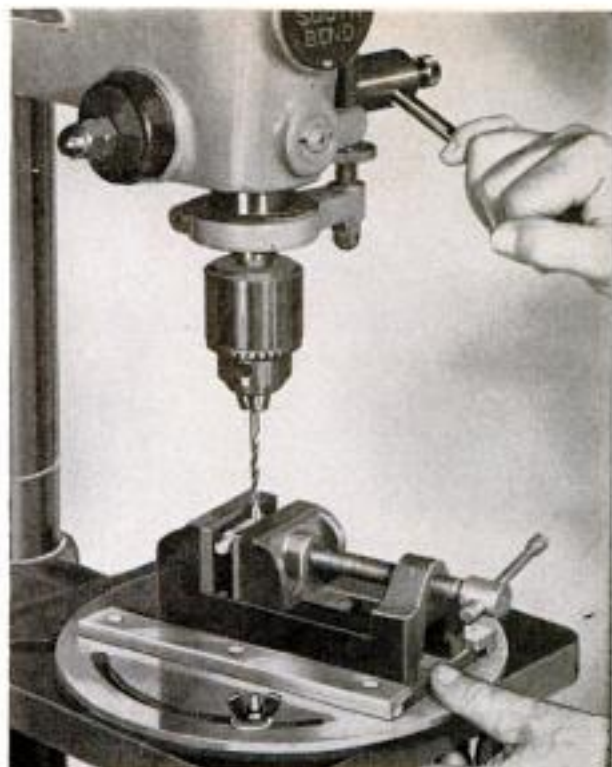
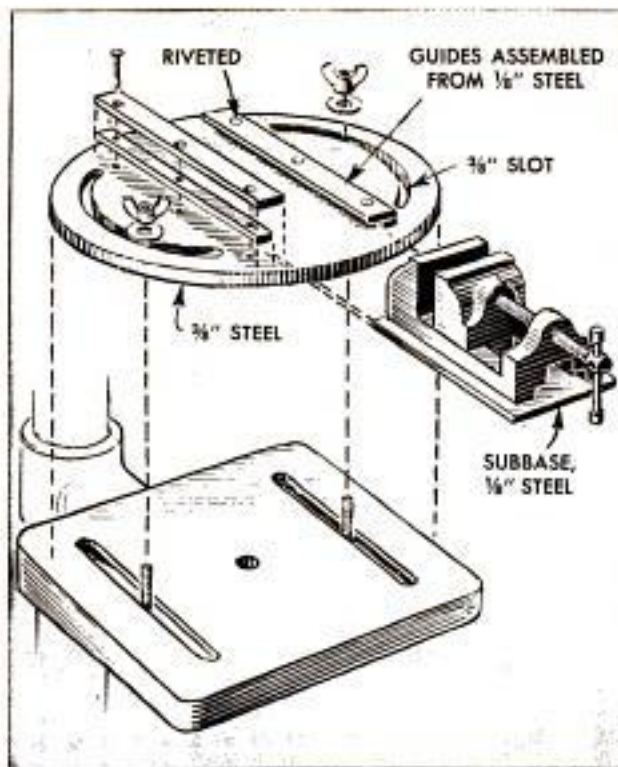
Drive a nail into a tree or post, hang a hammer on it as pictured and you have a bracket for supporting a spring scale, lantern or plumb bob. Bracket will support a fairly heavy weight if large nail is used.—S. Clark, E. Bradenton, Fla.



## Steel Rods Pointed With File

Using the setup detailed you can point small metal rods perfectly. Slot a block of hardwood to take the file in a tight fit. Chuck the rod, place the file so that it contacts the rod and move it back and forth as the rod rotates.





## Swiveling Plate Permits Accurate Positioning of Drill Vise

Where precise angle drilling is not required, this swiveling plate, or holder, permits the drill vise to be positioned for handling a wide range of work. Although the detail specifies  $\frac{3}{8}$ -in. steel for the plate, it will give satisfactory service on small drill presses when made from  $\frac{1}{4}$ -in. stock. The diameter of the plate should be

just slightly less than the width of the drill-press table. The slots are milled or cut with a hacksaw. A subbase of  $\frac{1}{8}$ -in. steel screwed to the bottom of the drill vise fits between guides assembled from strips of  $\frac{1}{8}$ -in. flat steel and riveted or screwed to the plate as indicated.—Alfred T. Bullock, South Norfolk, Va.

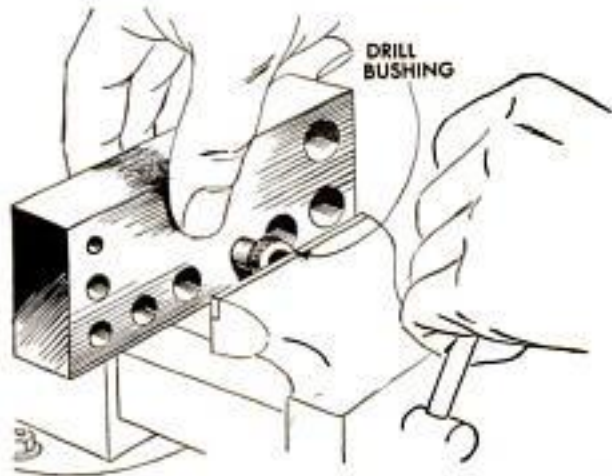
## Vise Aids in Loosening Collar

Split collars of the type tightened with a screw often are difficult to loosen or adjust due to pressure against the screw. To avoid damaging the screw slot or socket if a socket-head screw is used, place the collar in a vise and close the jaws with light pressure. With just the right pressure on the collar the screw generally will loosen.

Frank LaSaracina, New York City.

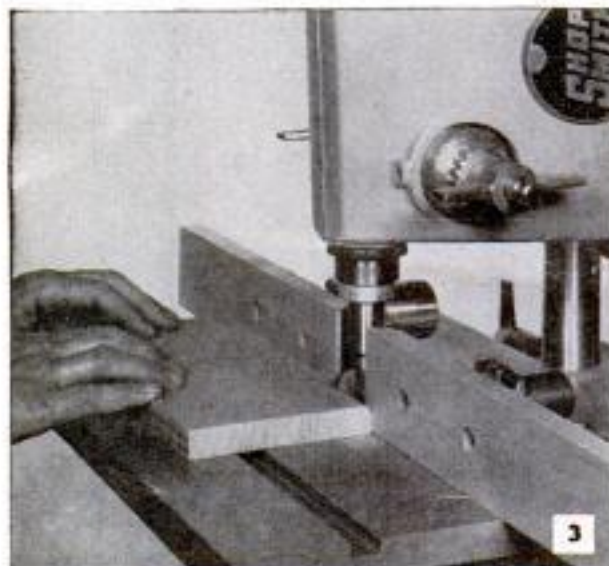
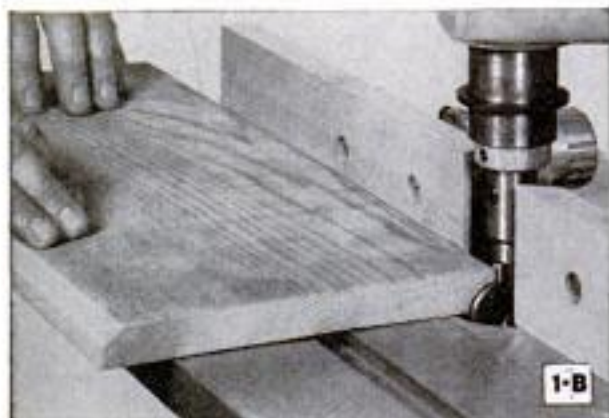
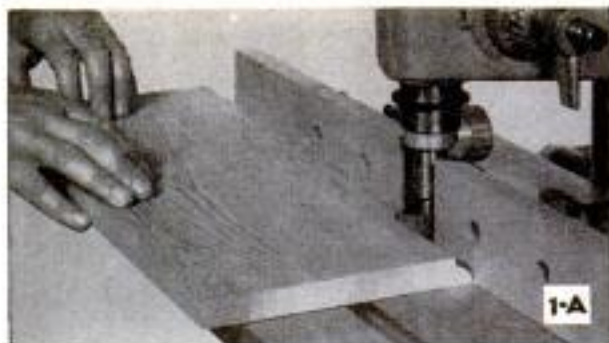
## Inserting Drill Bushing in Jig

When inserting drill bushings in a jig made up in the shop for some special job, it's essential that the bushing be pressed into the hole in the jig in a straight line. Lacking an arbor press for this job, use the bench vise, applying light pressure to start the bushing. If the holes in the jig have been reamed, break (bevel) the corners very slightly with a countersink.



# HOW WOULD

By Chris Nelson



**1-A, 1-B. Q—How is a drop-leaf-table joint cut accurately on a shaper?**

A—Use the straight shaper fence as in photos 1-A and 1-B. The joint consists of two matching moldings, a quarter-round molding (sometimes referred to as a "thumb" mold) and a cove molding. Two cutters are required, both ground to the same radius so the finished cuts will match. The quarter round is run on the table top and the cove cut on the drop leaf

**2. Q—How is splintering at the corners avoided when running moldings with and across grain?**

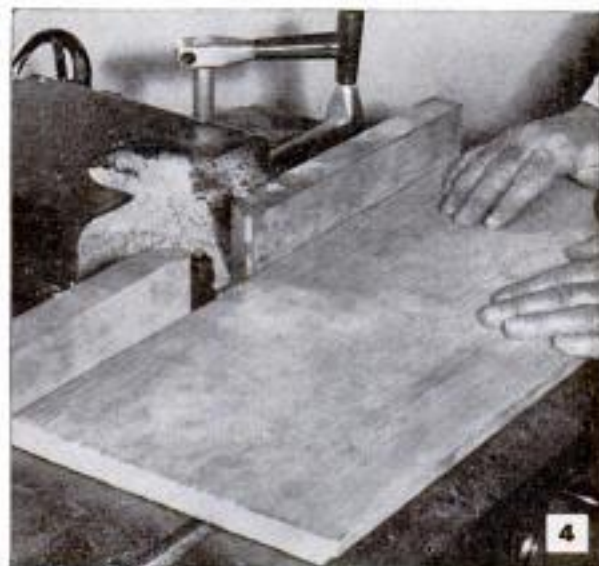
A—When molding the edges of a table top, or any type of work that requires moldings run on three or four edges, make the first cuts across the grain. Then when the final cuts are run with the grain any splinters at the corners will be removed. Molding cuts made across grain will be smoother if the cut is run slowly in two or more passes of the work

**3. Q—How can a single shaper cutter be made to run two kinds, or shapes, of moldings?**

A—The cutter in Fig. 1-B is the same cutter as that shown in Fig. 3. It has two cutting edges, or shapes. In Fig. 1-B it is making a cove cut while in Fig. 3 it has been raised to make a quarter-round, or in this case, a rounding-over cut. By combining the shapes several different moldings often can be made with a single cutter. Use care in making the settings

**4. Q—When the molding cutter removes only a part of the edge how is the guide fence adjusted?**

A—The two members of the shaper fence must be adjusted so that they are in line, that is, in the same plane. In this way the fence will guide the stock past the cutter in a straight line, giving it full support for the entire distance of its travel. Always check this setting with a straightedge and lock the shaper fence before starting the machine





# YOU DO IT?

## 5. Q—How are narrow moldings, such as picture moldings, made safely on a shaper?

A—Don't attempt to run strip moldings on a spindle shaper. Run a molding of the desired shape on the edge of a wide piece of stock, then rip off the molded edge. If you are making a picture molding, run glass rabbet before ripping the strip from wide stock. When running several moldings be sure shaper fence is locked to prevent it from shifting during operation

## 6. Q—What guides the stock and holds the cut to a uniform depth when making a curved molding?

A—Shapers and shaper accessories for drill presses usually are furnished with spindle collars and a starting pin. A collar of the correct diameter is placed on the spindle under the cutter. The stock bears against this collar as the cut progresses. Starting pin guides the stock at the start of the cut

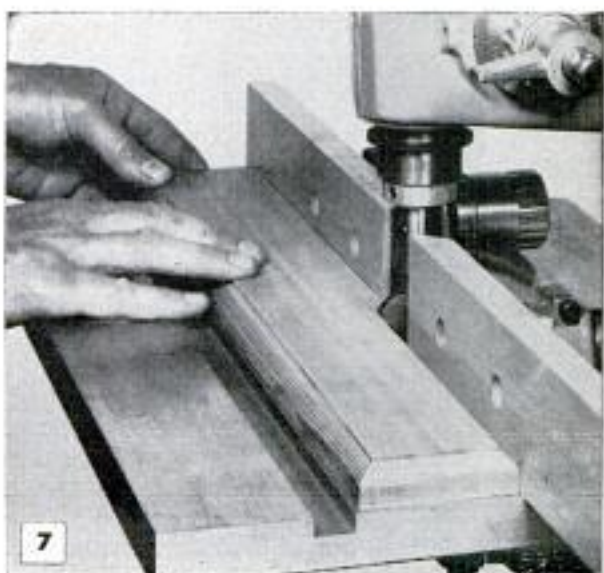
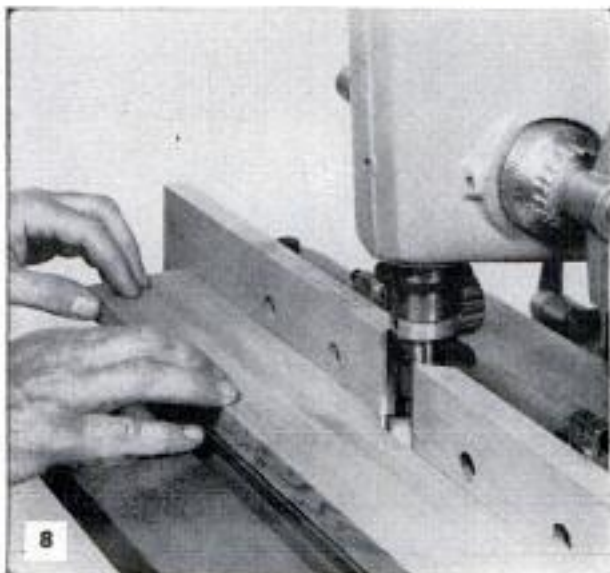
Caution: In Fig. 6 the ring guard is shown in the raised position for clarity. When making curved cuts always use the guard in the lowered position.

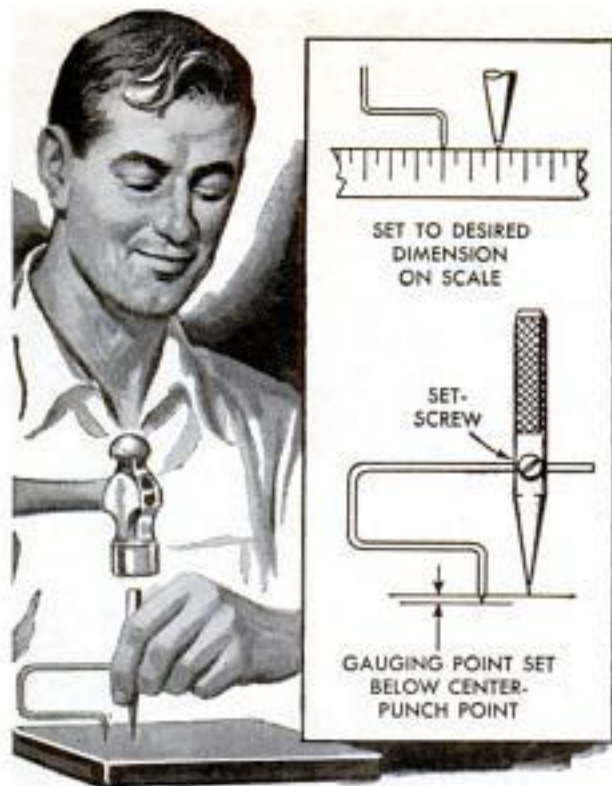
## 7. Q—When molded edges are required on comparatively narrow stock, what is the best procedure?

A—Adjust the two members of the fence so that they are in line. Check with straightedge. Then make cuts across the grain first, using a miter gauge to guide the narrow stock. Make these cross-grain cuts in two or more passes. This will assure a smooth molding and the stock is more easily held in position. Finish by running the cuts with the grain as shown

## 8. Q—What type of molding cuts require offsetting the shaper fence?

A—The shaper fence must be offset whenever you use a molding cutter that removes material from the entire edge of the stock. The offset should be equal to the depth of cut at its shallowest point, except in the case of a straight cutter where offset should equal depth of cut. Offset in this manner, the fence supports the stock along full length of cut



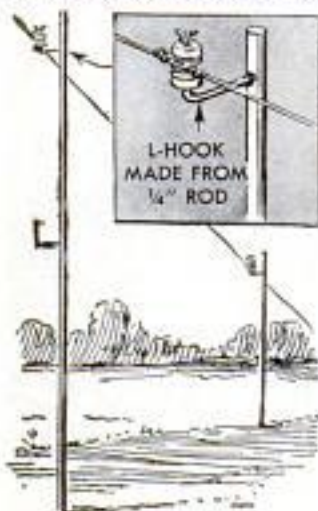


### Simple Center Punch With Gauge Locates Equidistant Points

With this space-gauging center punch you can make a layout for a series of equally spaced holes without having to measure the distance between holes. To make the tool, drill and tap a hole in a center punch to receive a setscrew that will hold the gauging rod. Use  $\frac{1}{8}$ -in. drill rod for the gauge, bending it so the point is slightly below the point of the punch. After setting the gauge to the desired dimension for the distance between the holes, punch the center of one hole. Position the point of the gauge in this hole for spotting the location of the next center point.

H. J. Gerber, Stillwater, Okla.

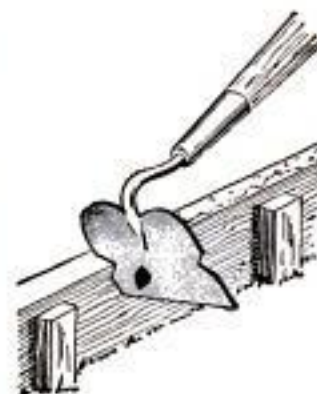
### Portable Electric-Fence Posts



Posts for supporting one or two strands of electric fence were made by one farmer from lengths of steel rod on which L-shaped hooks were welded. The ends of the hooks were slotted, then slightly spread to hold the insulators snugly. The posts are lightweight, portable and easy to drive with a hammer.

### Notches Cut in Mixing Hoe Clean Concrete-Form Boards

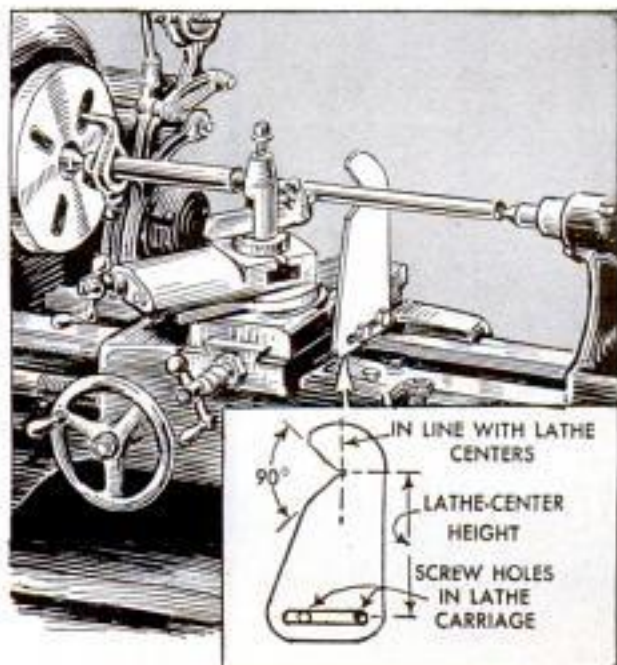
To permit quick removal of dried concrete from the upper edges of form boards, one construction worker ground two V-notches in the sides of a mixing hoe. After the boards have been staked in place, the hoe simply is pulled along them as indicated, thus permitting a level and straightedge to be placed across them for accurate alignment.

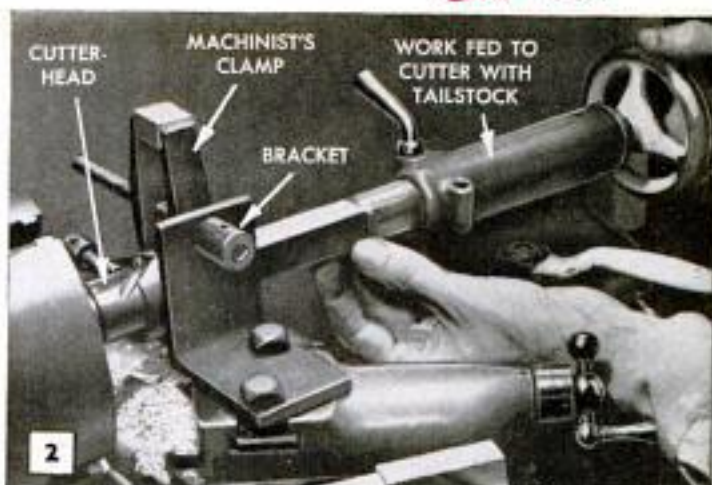


### Follower Rest Travels With Lathe Carriage

A follower rest that supports the work near the cutting point is necessary when turning work to small diameters between centers. This one is shop-made from  $\frac{1}{4}$ -in. flat steel, the materials being sawed and filed to the general shape indicated. Before cutting the vee, care should be taken to locate it by measuring accurately the lathe-center height from the tapped holes in the carriage mounting pad. After the vee has been thus located and cut, the edges should be filed and ground at right angles to the faces. File a chip-clearance groove at the bottom of the vee. Cut a slot near the lower end to permit horizontal adjustment of the rest for work of varying diameters.

C. W. Woodson, Chicago.





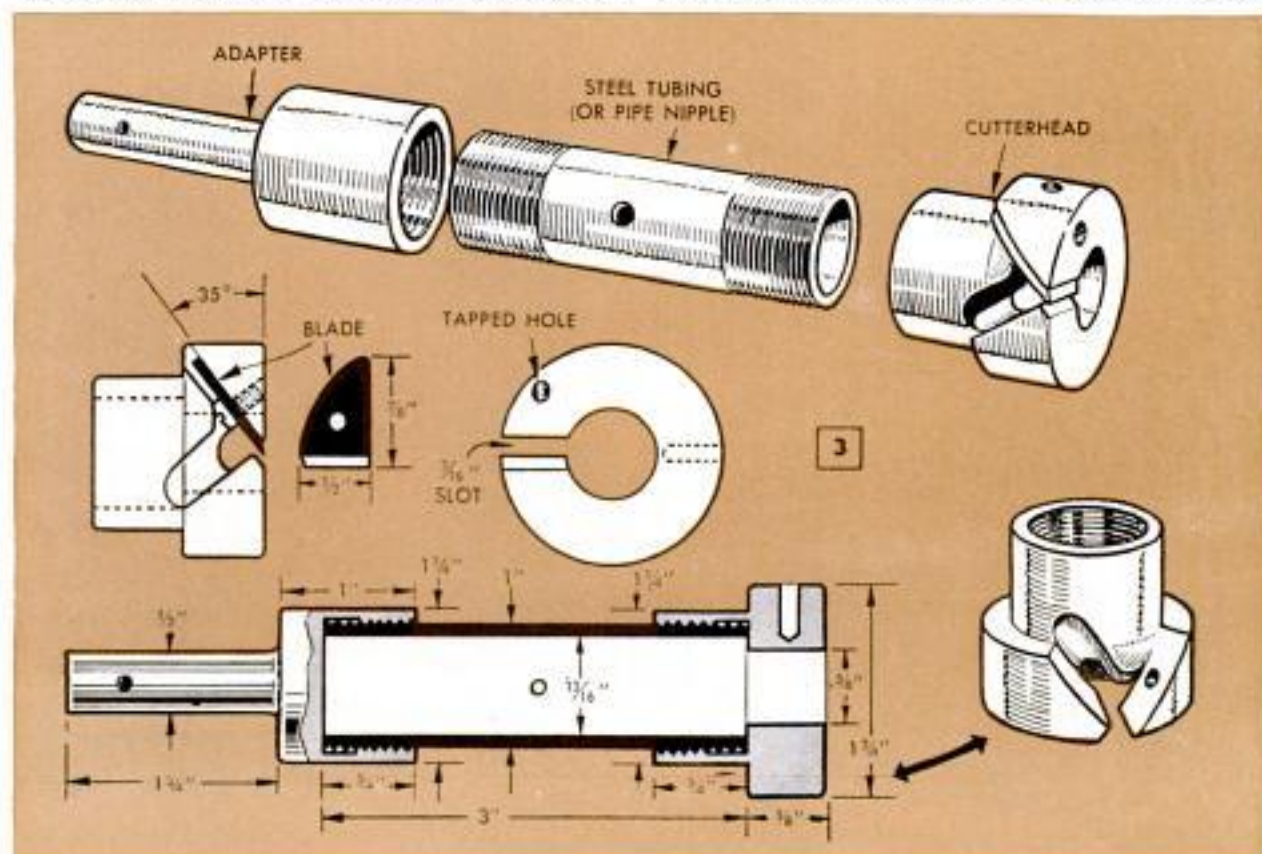
# CHUCKING ARBOR CUTS ROUND TENONS

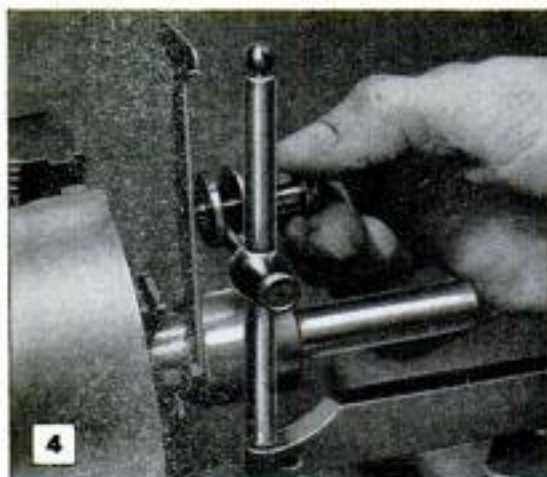
By Walter E. Burton

**E**VER TRY to cut a round tenon on square stock by hand? If you have, then you can fully appreciate this chucking arbor which does the job accurately in a fraction of the time needed to do the trick by other methods not utilizing power equipment. In Fig. 1, you see the arbor set up in the drill press, the tenon partially cut. In Fig. 2, the cutterhead is shown mounted on a short sleeve and set up in a metal-turning lathe. The arbor also can be used in a wood lathe, Fig. 7.

As detailed in Fig. 3, the complete arbor consists of three parts: The cutterhead, the

sleeve, or spindle, and an adapter. The dimensions given are intended only to suggest the relative sizes of the parts. The cutterhead is shouldered, counterbored and internally threaded in the lathe, Figs. 4 and 5. It then is V-slotted with a hacksaw as in Fig. 3. After slotting, a part of the waste must be removed with a cold chisel. Both faces of the vee are then smoothed with a flat file and a round-bottom clearance groove is cut into the counterbore with a round file. Next, a hole is drilled and tapped at right angles to one face of the vee to take a screw holding the cutter, or blade.





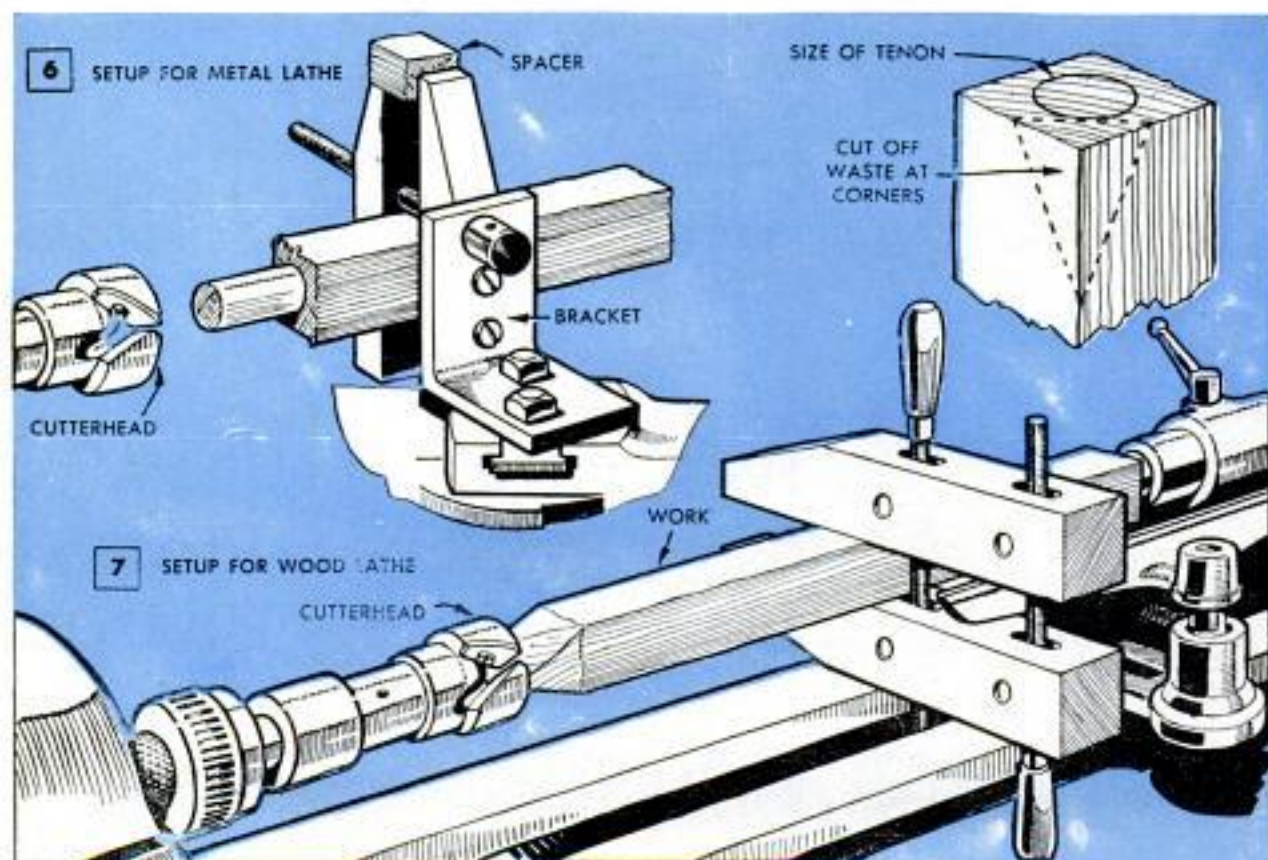
File the cutter seat to an angle of 35 deg. with the face of the head, Fig. 3.

The adapter is shouldered, bored and internally threaded in a manner similar to the cutterhead. If the arbor is to be used exclusively in a lathe the sleeve length can be reduced to 1½ in. and only one end need be threaded. The adapter, which is necessary only for use in a drill press or a wood lathe, can be omitted entirely. Steel tubing with a fairly heavy wall is best for the sleeve, Fig. 3. A pipe nipple is second choice. When the adapter is used it will be seen from the lower detail, Fig. 3, that the length of the sleeve determines the maximum length of the tenon that can be cut. A tenon length of 4 in. is about the maximum length practical. If the arbor is made much longer the overhang becomes so

great that it may cause the cutterhead to drift offcenter.

A suitable cutter, or blade, can be made from a short length broken from a discarded machine-hacksaw blade. Grind off the teeth, shape to the contour required to fit the blade seat on the cutterhead, and grind and hone to a keen cutting edge.

Fig. 6 shows a typical setup on a metal lathe. The machinist's clamp is not tightened on the stock. It only serves as a guide for the stock being fed to the cutterhead of the chucking arbor. In the setup for a wood lathe the clamp rides on the tool rest and serves only to prevent the stock from turning. Before starting to run the tenon, cut the waste from the four corners of the stock as shown in Fig. 7, the upper right-hand detail. ★ ★ ★



## Dairy Feeding Cart Made From Old Fuel-Oil Tank

Cutting a large oil tank in half lengthwise and dividing it into compartments provided an ideal feeding cart for one dairyman. The partitions were welded in place, after which wheels were added, two in front and a pivoted one at the rear. These can be of any convenient size, preferably wheels fitted with rubber tires.

Charles L. Stratton, Windham, N. H.

## Paint Thinner Removes Pitch From Circular-Saw Blade

Gum and pitch that collect on your circular-saw blade, also dado blades, reduce tooth clearances to such an extent that the blade no longer cuts smoothly. A frequent wiping with a cloth dipped in paint thinner will keep the blades gum and pitch free.

Frank A. Javor, Newark, N. J.



## Protect That Pocket Rule

Carrying a 6-in. steel rule, or scale, loosely in your pocket with coins or other small tools can round the edges and scratch or dent the graduations. Protect the rule by carrying it in a special individual pocket of leather or plastic. A discarded leather or plastic comb case is just the thing as it usually is provided with a clip for attaching to the shirt pocket.

☐ To protect exterior plywood, seal the edges properly, prime the panels before they are put into place, and use quality exterior paints. For edge sealing, use a heavy coat of lead and oil paint. Prime the back of the plywood panels in advance when used in areas that are unusually damp.



## Altered Screwdriver Blade Removes Broken Spark Plug

Removing the threaded portion of a spark plug that has broken off in the cylinder head usually is done with a tool made specially for the purpose. When this tool is not at hand you can do the trick with a screwdriver. Grind bevels on the edges of the blade as detailed. Use care in grinding not to draw the temper of the blade. Insert the altered blade in the open end of the broken portion of the plug and tap the handle lightly to engage the beveled edges. Apply a few drops of penetrating oil to the threads. Hold the handle of the driver and turn the blade gripping the flat portion with a small wrench.

C. E. Packer, Oak Park, Ill.

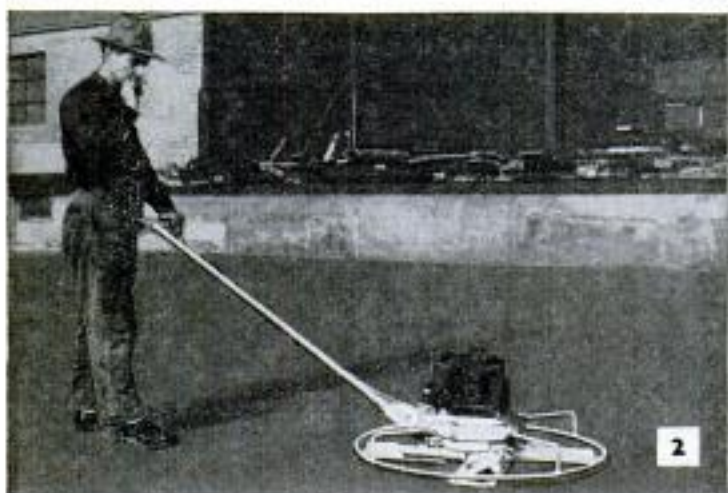


# SHOPPING FOR TOOLS



**1. DRILLS FOR SHEET METALS** cut from the outside in, produce clean holes in thin stock without burring and without distortion of material. Also drill clean holes in plastic, nylon, laminate and hardboard. Available in individual sizes or as a kit of 10 drills. Drills are guided by a tapered point, or pilot, which is spring-loaded

Jancy Engineering Co.,  
508 S. Pine St., Davenport, Iowa



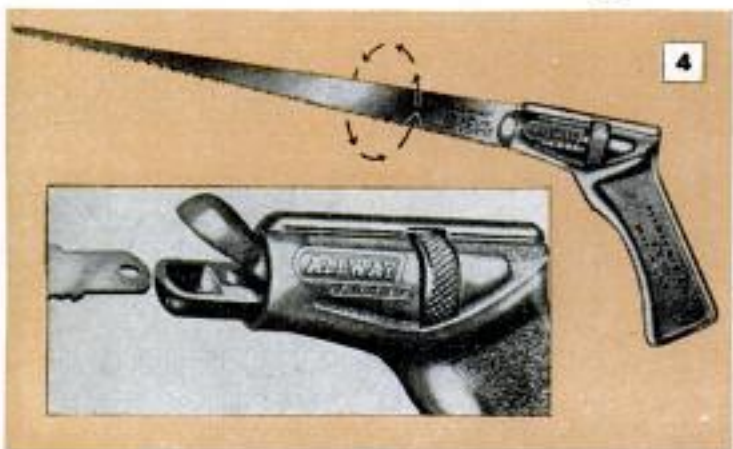
**2. POWER TROWEL** reduces time and labor required to finish large concrete slabs. Blades are power-adjusted to any position for floating and finishing. Trowel, which consists of four adjustable blades, or "trowels," is 34 in. in diameter and is gear-driven from engine. The engine idles when the operator releases the handle

Master Vibrator Co., 167 Stanley Ave.,  
Dayton 1, Ohio



**3. TUBING CUTTER** is designed for cutting plastic tubing, as well as thin-wall conduit. Handles tubing varying from  $\frac{1}{8}$  to  $1\frac{1}{8}$  in. in diameter. The wide, flat face of rollers makes a smooth, straight cut without crushing or distorting the tubing. An attached reamer is pivoted so that it will be out of the way when not in use

Erie Tool Works, Erie, Pa.



**4. BLADE** on this multipurpose saw pivots to eight positions in relation to handle position. Blade is held in a hinge-type chuck which locks with a camming action, holding blade securely in any one of the positions. Pistol-grip handle is designed for a comfortable handhold for sawing in a normal position or work overhead

Allway Mfg. Co., 1513-33 Olmstead Ave.,  
Bronx 62, N. Y.



POPULAR MECHANICS

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**5. TRANSFORMER-TYPE A.C. WELDER** is especially designed for operation on rural electric power lines. Controls provide five-step coarse adjustment for conventional a. c. welding, as well as for certain inert-gas welding operations. The 180-amp. (at 25 v.) a. c. transformer is the diverter-path type with magnetic control for safety

Hobart Bros. Co., Troy, Ohio

**6. GEAR-JOINT PLIERS** has a novel five-position gear-locking joint which holds without slipping in any of the five positions. Alligator-type jaws open to 1½ in. and remain parallel throughout entire opening range. Shape of handles and angle of jaws give an interlocking action. Jaws have heat-treated wire-cutting slots

H. R. Basford Co., 235 Fifteenth St., San Francisco 3, Calif.

**7. MEASURING WHEEL** for use on maps and blueprints can be set to any conventional scale, will give distance or dimension readings when used in accordance with instructions which come with unit. Measuring wheel actuates a pointer which travels along a graduated scale as wheel rotates. Scale adjusts to different values

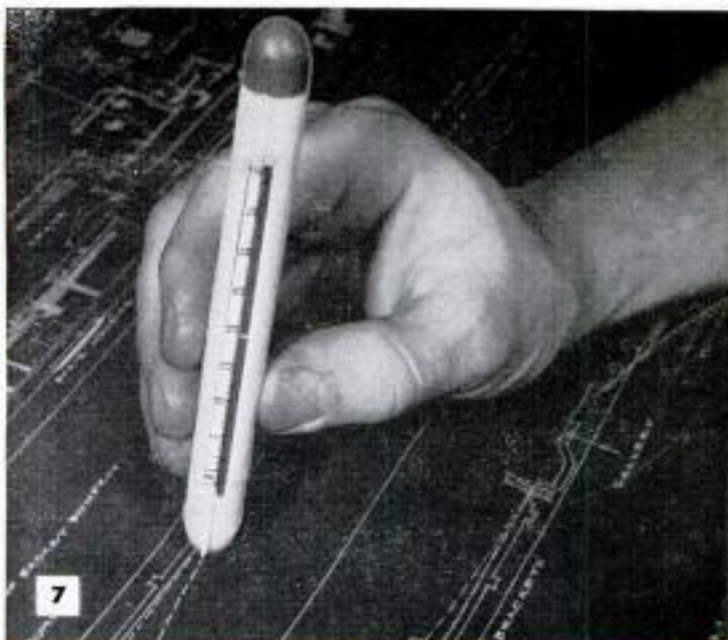
RidgeWood Sales Co., 64-16 Palmetto St., Ridgewood 27, L.I., N. Y.

**8. QUICK-CHANGE PRECISION CHUCK** has runout tolerance of .00039. Specially designed inserts permit tool changes without stopping machine spindle. Operates horizontally or vertically; will rotate clockwise or counterclockwise without any mechanical change. Several sizes of inserts and sleeves available for each toolhead

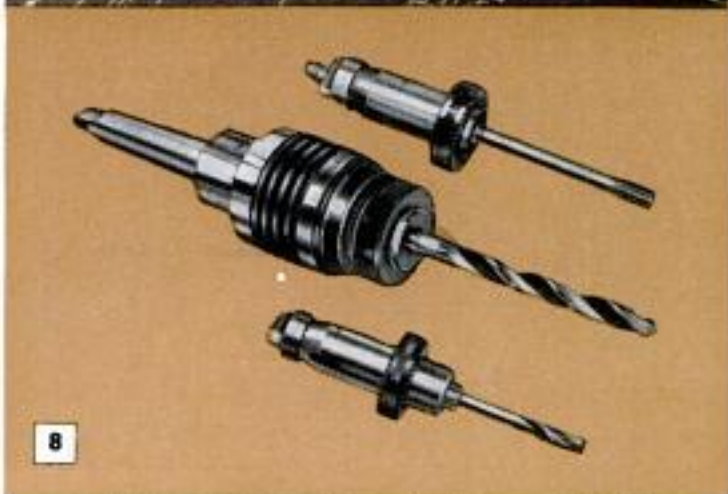
Karl A. Neise, 404 Fourth Ave., New York City 16

**9. ACCESSORY JIGSAW** works as a portable unit when driven by an electric drill, or as a stationary jigsaw when set up in a drill press. Drill-press depth stop is inverted and lower end inserted in handle to steady jigsaw and free both hands for guiding work. Cuts wood or metal, makes pocket cuts, curved cuts, rips and crosscuts

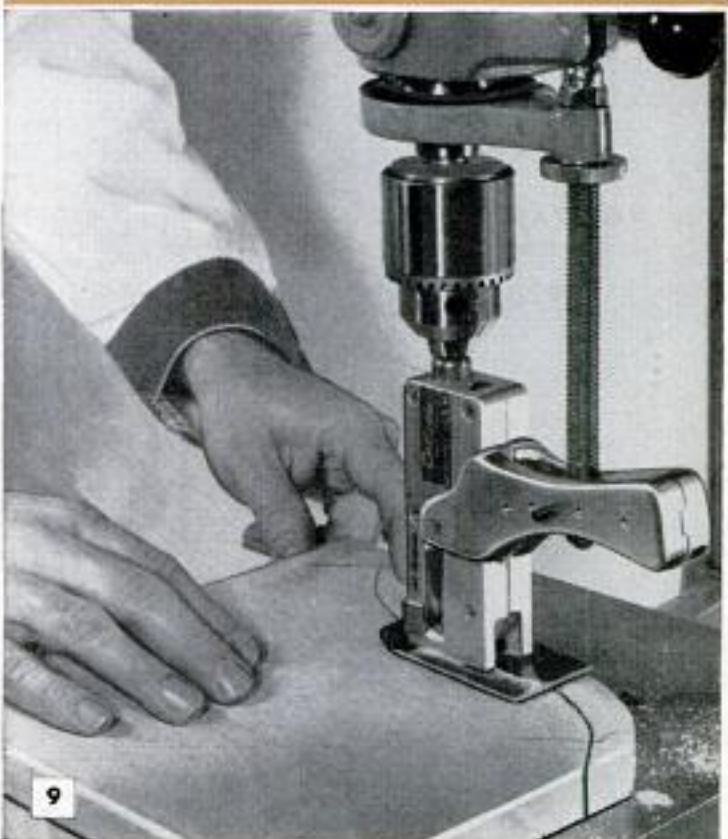
Delisaw, 2632 Prospect Ave., Kansas City 28, Mo.



7



8



9

## T-Handled Chisel Holder Cushions Hammer Blows

A handle, assembled from pipe fittings and sponge rubber, cushions the shock of the hammer blows when cutting metal with a cold chisel. A rod passing through the pipe nipple forming the handle holds the chisel in place when the pipe cap on the end of the handle is tightened.



## Plastic Cosmetics Case Converted to Drill Holder

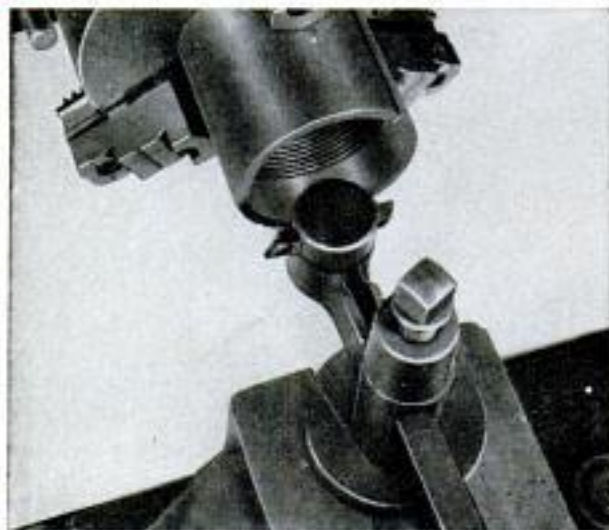
A cosmetics case having a screw-type base makes a good holder for small drills. Wind a short length of corrugated cardboard into a roll and press into the case to form individual compartments for the drills. Oil the drills to prevent rust.

Frank A. Javor, Newark, N. J.



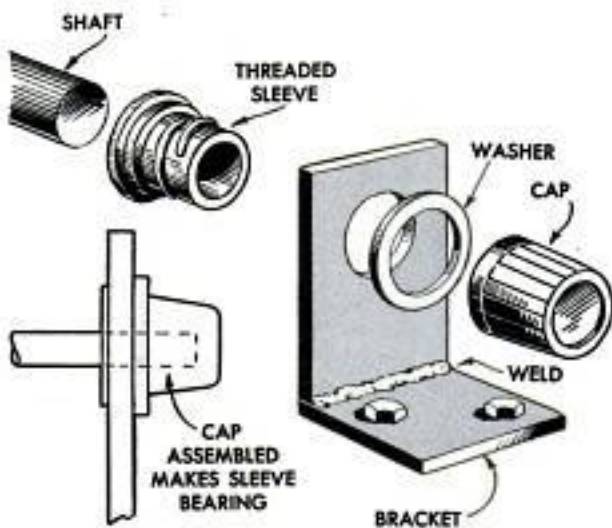
## Two-Station Lathe Toolholder

Lacking a multiple-station toolholder for the lathe you can adapt a shaper toolholder to this special purpose. In the setup pictured, a shaper holder is fitted with a tool bit ground on each end to perform two operations with the lathe spindle reversed. The first cut, using the rear end of the cutting tool, bores to diameter. The second cut, with the cross slide moved forward, runs a relief groove. Such a set up can save time in the job shop.



## Improved Jackshaft Bearing

Serviceable bearings for a light jackshaft can be made by using plastic caps of the type frequently supplied with detergent containers. These are two-piece, consisting of a cap and a threaded sleeve. Make brackets of the required height as suggested in the detail, insert the threaded sleeve and screw on the cap. Smooth the end of the shaft with a fine abrasive. Lubricate with light oil. — Chas. Grener, La Porte, Ind.





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**MARKET**  
*for Do-It-Yourselfers*

**WALL PLANKING** (right), in random widths, consists of a wood-grained plastic laminated to a base of 1/4-in. hardboard. Planks are attached to furring strips  
Woodall Industries, Inc., 3500 Oakton St., Skokie, Ill.



**PLUG LOCK** (above) fits over prong of an electric plug, prevents unauthorized use when locked with the key supplied. Prevents accidents, protects equipment  
Riverside Mfg. Co., Woodstock, Va.

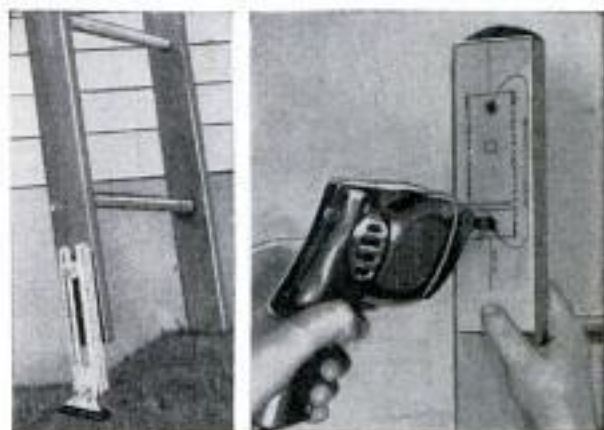


**ELASTIC COATING** specially compounded for protecting inside surfaces of gutters and making repairs to breaks in the metal. Comes as a complete kit  
Best Home Finishes, Box 4037, Euclid 23, Ohio

**GLASS-FIBER "BLANKET"** helps to prevent water pipes from freezing, also eliminates condensation during summer. Kit contains 50 ft. of wrapping, 3 in. wide  
Fibreglass-Evercoat Co., Inc.,  
7220 Vine St., Cincinnati 16, Ohio



OCTOBER 1957



**ADJUSTABLE LEG** provides a means of leveling a ladder on uneven ground. Comes with pattern for drilling attachment holes. Adjusts flush when not in use  
Bolas Products Corp., 60-73 Summit St., Newark 4, N. J.

**GARDEN SPRAYER** handles any sprayable insecticide. Pressure is supplied by cartridge which is good for 1/2 hr. on-off spraying. Takes one quart of liquid  
Van-Ren Industries, 2464 Morris Ave., Union, N. J.



243

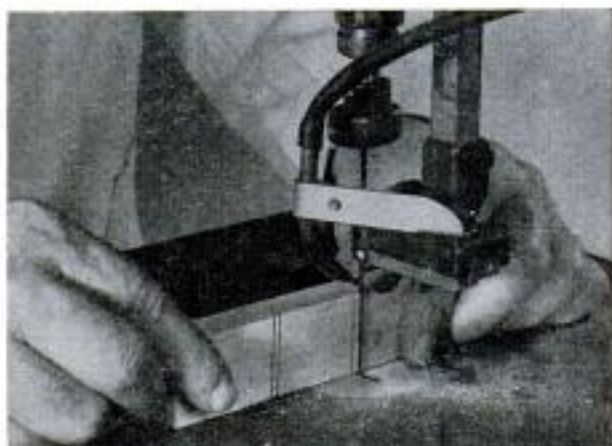
## Notched Plate Scraper Spots Drill Bit on Vertical Surface



A rubber plate scraper with a notch centered across the width makes a good holder, or guide, for starting a drill bit on a vertical surface. Saves the time necessary to make a punch mark.

## Jigsawed Slots in Block Check Table Alignment

Checking the alignment of the jigsaw blade with the table is done by cutting two adjacent slots in a piece of waste stock. After making the first shallow cut, reverse the stock and make another shallow cut about  $\frac{1}{4}$  in. from the first. If the slots are parallel, the table is aligned with the blade.



## Furnace Fan Removes Loose Husks

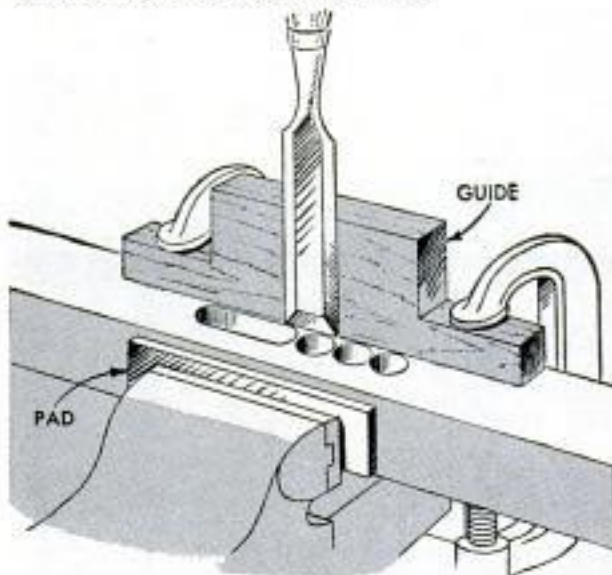
Most of the loose husks can be removed from ear corn at the elevator by mounting a furnace-blower unit so that the air blast is directed across the elevator hopper. Some experimenting may be necessary in the placement of the blower to assure that the full blast of air catches the ears as they roll from the trailer box into the hopper.

A. M. Wettach, Mt. Pleasant, Iowa.



## Chiseling an Accurate Mortise

After scoring the outline of the mortise on the stock and drilling adjacent holes to remove most of the waste, take time to make the squaring guide detailed. True one edge of the block, notch out the ends and clamp to the stock with one edge flush with the mortise. In this position the block serves as a guide for the vertical chisel cuts used in squaring the mortise.



POPULAR MECHANICS

## Prescriptions for Common TV Troubles

By Lothar Stern

TAKE AN ORDINARY television set, place it in a small apartment in a crowded neighborhood, add a couple of amateur transmitters and perhaps a strong FM station and you have all the ingredients needed for a king-size headache. For no matter how good the receiver may be, conditions are ripe for any number of troubles which can mar the picture beyond the point of comfortable viewing. Many of the troubles are caused not by the receiver itself, but by external conditions which no amount of set adjustment will remedy. Yet, they can often be corrected merely by using the proper antenna, or by the simple installation of an inexpensive TV accessory.

Take, for example, the case of the shrinking picture, Fig. 1A. During the day the set may provide a perfectly good picture, but just as you settle down for an evening of watching your favorite programs the picture starts to shrink, leaving dark bands along one or more edges of the screen. Such a situation is rather common in large apartment buildings and in older homes where electrical wiring is inadequate to meet the demands of today's electrical living. During daylight hours, when the electric current drawn from the power line is rather small, the voltage at the various wall outlets is approximately 115 volts. But in the evening, as lights are turned on and more appliances are put to work, a portion of this voltage (sometimes as much as 10 or 15 volts) is lost in the power line due to the excessive current drain. This loss can seriously impair the performance of a television receiver, causing small picture size, reduced brightness and even an annoying loss of synchronization.

The solution to this particular problem is illustrated in Fig. 2. It consists of a simple switch-type voltage regulator installed between the wall outlet and the TV line cord. When the line voltage drops, a mere flick of the switch restores proper operating conditions and a normal picture.

### Chasing the TV Ghost

The ghosts and goblins which in the past have limited their activities to haunting old and abandoned houses are getting bolder. Today, in search of entertainment, they are invading our cities and towns and may settle down in any home where a television set is installed.

While the modern ghost is no longer a frightening apparition, he is certainly a vexing reality. For ghost is the name given to reflected TV signals which can cause two or more identical images to appear on the television screen at the same time (see Fig. 1B).

The illustration in Fig. 3 shows the reason for these ghosts. A transmitting antenna sends out its signals in all directions. Part of this signal travels directly to the receiving antenna and causes a picture to appear on the screen. Signals traveling in other directions, however, may strike reflecting objects such as large buildings, water tanks,

*Patterns courtesy Motorola, Inc.*

1

A

B

C

D

E

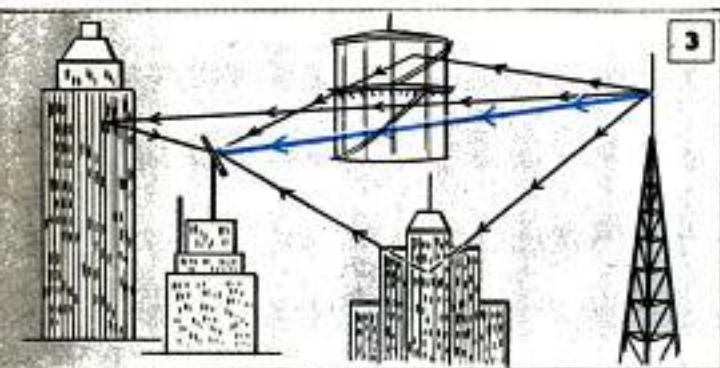
F

G

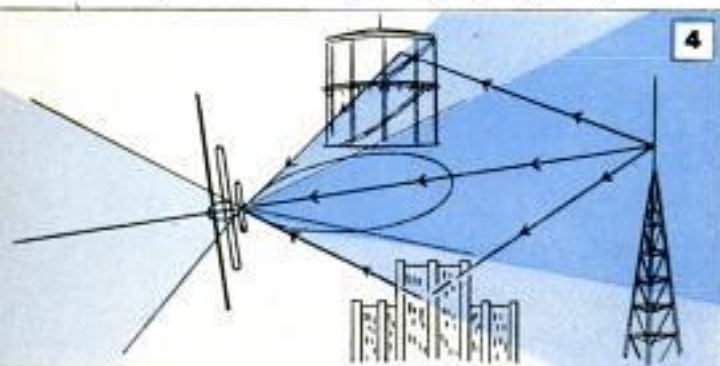




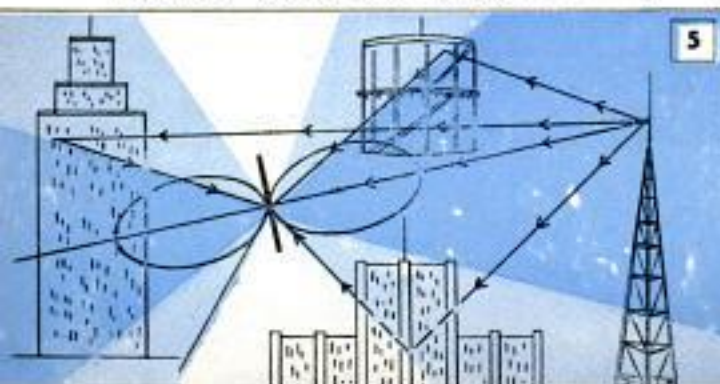
Appearance and installation of a typical voltage regulator transformer. Three-position switch may be adjusted for high, low or normal line voltage



Reflected signals added to direct signal, shown in blue, result in multiple images, or ghosts, on screen



Directional pattern of typical in-line antenna, above, compared with indoor unit, below. Heavy blue areas indicate direction of maximum signal pickup, light blue—poor pickup, white—negligible or no pickup



etc., and be deflected towards the receiving antenna. These deflected signals reach the receiver a short instant later than the direct one, causing additional images to appear on the screen. Due to the time difference between the arrival of the signals, the various pictures on the screen do not coincide, giving rise to the annoying ghost images.

Getting rid of the ghosts often requires nothing more than a slight rotation of the receiving antenna. The reason for this is shown in Fig. 4, where the directivity pattern, or loop, of a simple roof-mounted in-line antenna is superimposed on the foregoing drawing. All antennas, from the simplest dipole to the most elaborate multi-channel yagi, have some sort of directivity pattern although the number and shape of the loops may vary considerably for the different types. Since an antenna will pick up signals only from the direction encompassed by these loops, the unit in Fig. 4 can easily be positioned to reject all but one of the signals which may be headed in its direction.

Compare the pattern of the in-line antenna with that of an indoor or built-in type, Fig. 5, and you can readily see why the latter are often useless, even in strong-signal areas where they can extract enough energy from a passing wave to provide a normally good picture. No matter how such an antenna is turned, it will still pick up at least two signals, causing a minimum of one ghost to appear on the screen.

A properly positioned directional antenna will usually keep out the ghosts, but in some cases, particularly where the signal is very strong, a ghost image may be picked up by the antenna lead-in rather than by the antenna itself. Rerouting the lead-in, relocation of the antenna to permit the use of the shortest possible lead-in or, in extreme cases, the use of shielded coaxial cable with suitable matching transformers to replace the customary twin-line will eliminate this condition.

#### Excessive-Signal Troubles

In general, the greater the number of elements in a particular antenna, the more pronounced is its directional effect, and at the same time, the more energy it will extract from a passing signal. These two characteristics, which go together, make a highly directional antenna especially well-suited for fringe-area reception. But in urban locations where the directional effect of a good antenna may be needed for ghost elimination, the associated high gain of such a unit can be a decided detriment.

Fig. 1C shows what can happen when the signal is strong enough to overload the receiver. The picture bending, coupled with

excessive contrast and, often, an associated rasping buzz in the sound makes it impossible to watch the program. Of course, not all overload conditions are as severe as the one illustrated, and milder forms are sometimes tolerated rather than corrected. But the simplicity of the remedy makes it unnecessary to put up with even a minor annoyance of this type.

The solution consists of the installation of an attenuator switch between the lead-in and the antenna-input terminals of the set, Fig. 6. With such a switch the signal applied to the receiver can be reduced in strength by varying amounts, to eliminate any overload condition.

Installation of a directional antenna for ghost reduction in urban areas may cause another problem. Obviously, if the antenna discriminates against unwanted ghosts, it is also insensitive to desired signals from stations located in a different direction. Where a receiving antenna is surrounded by a number of stations, the use of an antenna rotator which, at the touch of a control lever, turns the antenna in any direction represents the ideal solution.

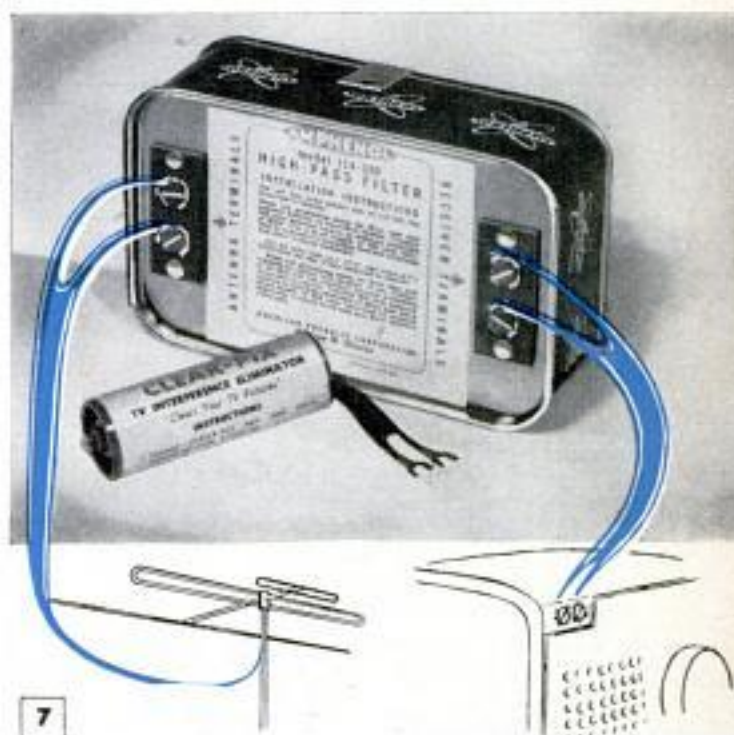
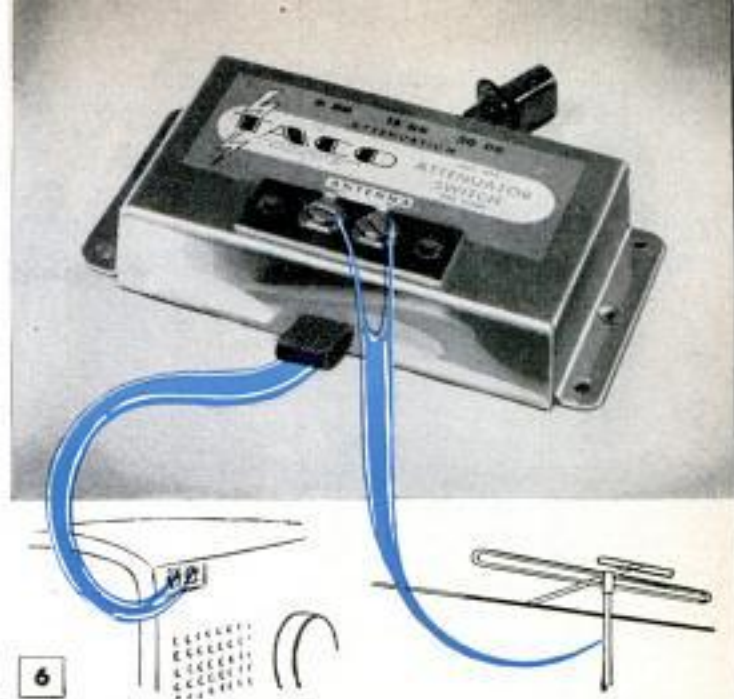
#### Reducing Interference

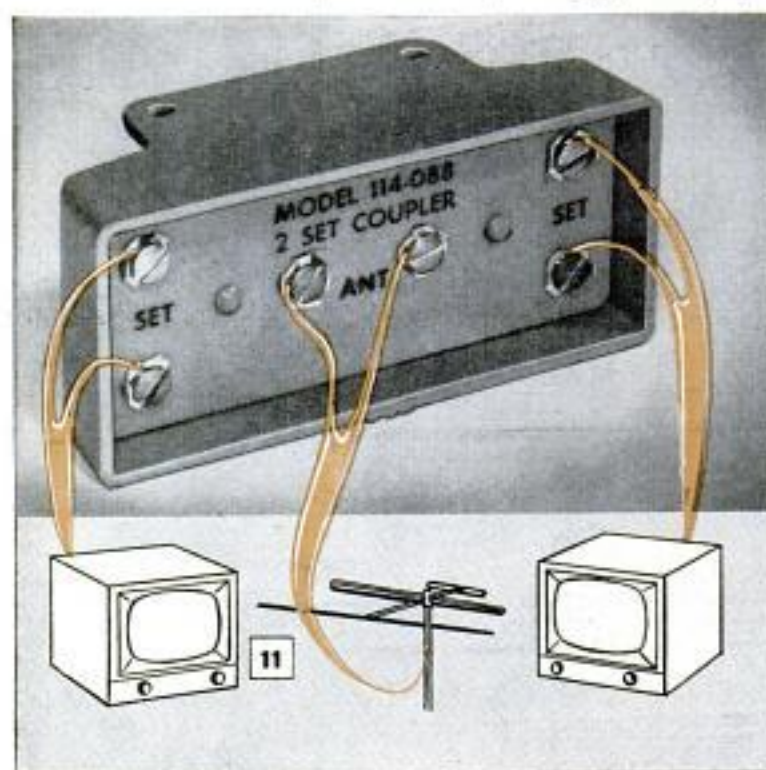
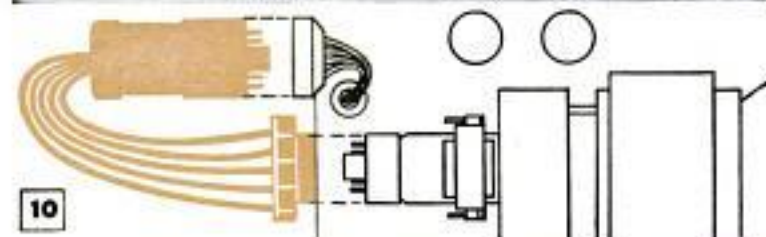
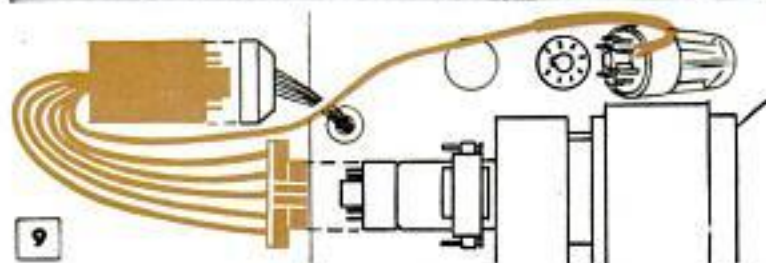
Interference has been a source of annoyance ever since the invention of radio. While we have learned to live with many of the extraneous sounds and noises that tend to mar radio reception, the interference to television sets is usually far more objectionable.

Television interference can take many forms and be caused by many different factors. Yet, by the proper installation of a suitable antenna and through the use of a filter or combination of filters, most forms of TV interference can be greatly reduced, if not entirely eliminated.

There are two general types of television interference: The kind caused by broadcast equipment such as used by radio amateurs, FM stations and other communications services, and pulse-type interference caused by automobile ignition systems, electric appliances, fluorescent lights and diathermy equipment. The former results in a number of vertical or diagonal lines which may be stationary, see Fig. 1D, or may wiggle across the screen in a particularly annoying fashion. The latter will show up as random horizontal streaks as in the case of ignition interference, Fig. 1E, or as a partial obliteration of a small section of the picture as with diathermy interference and that of certain other electrical appliances, Fig. 1F.

Most interference due to communications and industrial equipment, diathermy and ignition noise reaches the receiver via the antenna system. The frequencies of such





interference are usually below 50 megacycles and these can be kept out of the receiver through the simple installation of a high-pass filter as shown in Fig. 7. The filter requires no adjustment and automatically eliminates any and all interfering signals below the TV-band frequencies. Television signals, however, are permitted to reach the receiver unattenuated.

Interference due to FM stations can often be cleared up through the proper orientation of a directional antenna, as in the case of ghost elimination. But, if the offending FM station lies in the same direction as the TV transmitter, an adjustable filter, shown unattached in Fig. 7, must be employed. Such units are designed to eliminate specific frequencies near the TV band, and careful adjustment usually permits the interference to be tuned out.

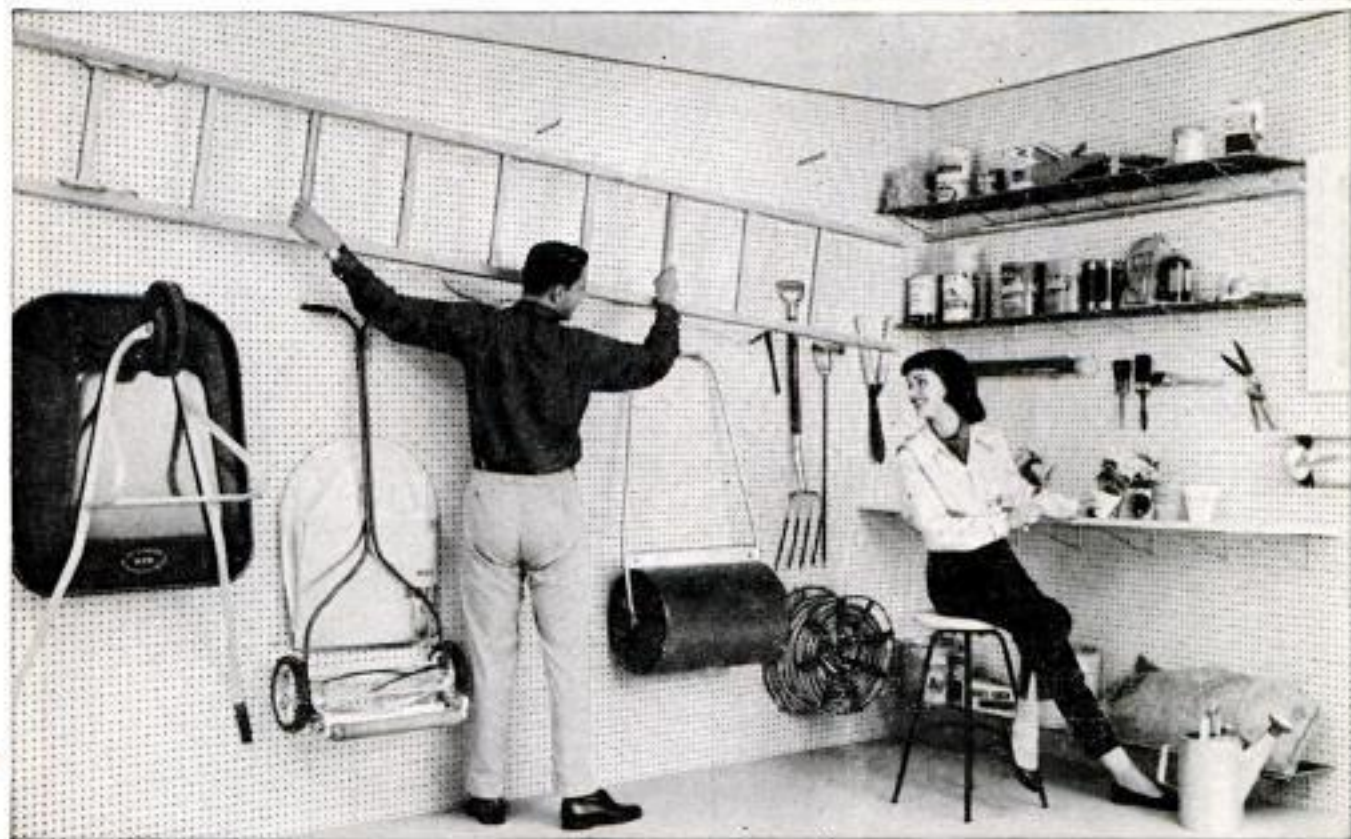
Electrical equipment and appliances, such as cash registers, shavers, fluorescent lights and the like, often transmit their interfering signal by means of the power line. Against this type of annoyance a low-pass filter (line filter), Fig. 8, will prove highly effective. If the interfering device is known, the filter should be installed directly between the a.c. wall outlet and the line cord of the device. In this way, the interference is kept out of the power line entirely and cannot affect any receiver. Where the interfering device is unknown, the filter can be used between the outlet and the receiver line cord. In such cases, an additional high-pass filter is sometimes required since some of the interference may be radiated by the power line and picked up by the receiving antenna.

#### Eliminating Retrace Lines

During daytime televiewing a high degree of picture-tube brightness must be used to prevent a washed-out appearance of the picture. But advancing the brightness control often causes the appearance of fine white diagonal lines on the screen. In newer sets these

(Continued to page 254)

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to this tough storage problem**



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You can have 33% more storage space with 1/4" heavy-duty Peg-Board panels and accessories for as little as \$27.00.\* Clever slip-in-a-hole fixtures support just about anything—your heaviest garden tools, shelves and equipment, bench top and hand tools—and

there you have it, a Working Wall! Enjoy a neat, attractive garage, and quickly, too; just ask your building materials dealer about heavy-duty Peg-Board panels and fixtures. Mail the coupon below for other interesting ways to use Peg-Board products.

\*Wall area 8' x 12'. Heavy-Duty 1/4" Peg-Board Panels \$24.60. Accessories \$1.96

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Dept. PM-10, Box 777, Chicago 90, Ill.  
In Canada: Masonite Corporation, Gatineau, Quebec  
Please rush me a copy of the "Home Owners' Guide to Masonite Peg-Board Panels and Fixtures."  
Name.....  
Address.....  
City.....State.....  
Zone.....County.....

Prevent oil waste—  
even under  
high vacuum!



## Sealed Power KromeX Piston Ring Sets

Sealed Power's new Stainless Steel\* Oil Ring is now in KromeX ring sets which require super oil rings for top performance. This oil ring permits performance never before possible in modern, high compression engines (1952 models and later). This oil ring is already being used in every new car and truck built by a million-car-a-year manufacturer.

### PAYS OFF IN ECONOMY AND PERFORMANCE

No smoking under high vacuum conditions. Will not corrode or sludge. Your engine continues to perform as manufacturer intended it to.

Sealed Power Stainless Steel holds full tension at engine operating temperatures. This assures more than double the ring life you're accustomed to. Judged by either your pocketbook or car's performance, Sealed Power's KromeX Ring Set with the Stainless Steel Oil Ring is your best buy.



### INDISPENSABLE MANUAL

An illustrated manual on engine care—free, yours for the asking. "Care and Feeding of Engines" is highly informative, could save you a lot of maintenance expense. For your free copy, write Sealed Power, Dept. G-10, Muskegon, Michigan.

\*U. S. Patent No. 2,789,872

# Sealed Power

## PISTON RINGS

BEST IN NEW CARS! • BEST IN OLD CARS!

## Clinic for Homemakers



As a service to our readers in solving the hundreds of problems pertaining to a home—inside or out—the editors of *Popular Mechanics* invite you to present your problems to The Clinic Editor for help and advice. Address your questions to The Clinic Editor, *Popular Mechanics Magazine*, 200 East Ontario Street, Chicago 11, Ill.



### Lumber Warps

**Q**—I keep a small amount of hardwood lumber on a rack in my basement workshop. It is stored on the rack the year 'round and I add a few pieces occasionally to replace those used. Some of the wider pieces have warped. Why? They were flat when placed on the rack. How can I straighten them?

N. D., Pa.

**A**—When you received the stock from the dealer it probably had been kiln-dried to a moisture content of 7 to 10 percent. Storage conditions which bring about a variation in the moisture content of the stock may cause the wood to warp. In a basement, humidity would be reduced to a very low level during the winter months, and would reach a comparatively high level during the summer when the heating equipment is not in operation. Hardwoods stored under such varying conditions would be likely to warp, except those pieces which have been quartersawn. We think it likely you would do better to store your hardwood stock in the garage, not an ideal place, but better than the average basement where temperature and especially humidity vary widely and over such long periods of time. It is not practical to attempt to straighten, or flatten, stock as thick as  $\frac{3}{4}$  in. by wetting or applying pressure. Of course, you can take it to the mill and have it planed flat, reducing the thickness to perhaps  $\frac{1}{2}$  in. or less. Another way is to rip wide boards that have warped, or cupped, and joint the edges square. In this way you will preserve the original thickness and the strips can be edge-glued to build up to whatever width is required.



### Watering Evergreens

**Q**—My evergreen planting consists of several varieties, both the tall and low-growing types. My neighbor tells me that these should be thoroughly watered in the fall, preferably just before the ground freezes. He says the ground should be soaked to a depth of 4 or 5 ft. to be sure of reaching the entire root system. Why is this necessary?

J. L., Del.

**A**—Your neighbor has given you the correct instructions, although, of course, he is undoubtedly thinking of carrying out this procedure only when

(Continued to page 252)



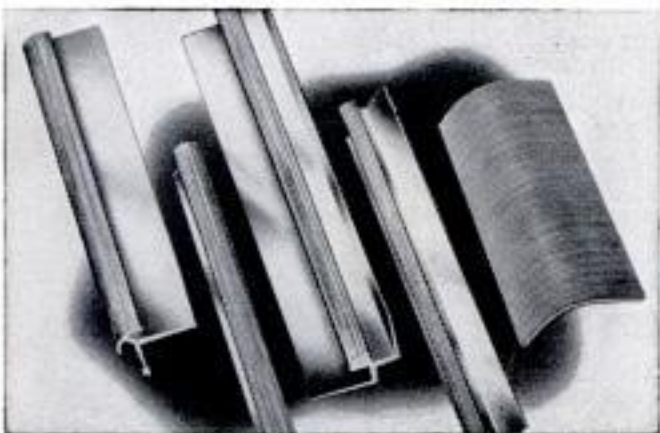


**BRIGHTEN ANY ROOM** with luxurious Weldwood Paneling. This cheerful birch V-plank paneling gives a random-plank effect, yet comes in 4' x 8' sheets that are prefinished to save you hours of labor . . . and costs only \$65 for a full 12' x 8' wall.

## Make an old room new again with easy-to-install Weldwood paneling



**INSTALL PANELS** with nails concealed in V-grooves, or with Weldwood Contact Cement, on furring strips over studs, or over old walls. Bonds permanently, on contact, without clamps.



**EMPHASIZE JOINTS** with Weldwood Veneer-Faced Aluminum Moldings to match panel wood. Also available: Weldwood Hardwood Trim, in a variety of woods and styles.

You can enrich a room with wood paneling easily and less expensively than you may think.

Weldwood Prefinished Paneling comes in a handsome variety of woods and finishes, all ready to install. Each panel is factory sanded, waxed, and rubbed like fine furniture to bring out the true wood beauty and protect its surface. Or, you may buy Weldwood Paneling unfinished at lower cost.

Weldwood Paneling's beauty grows as time goes on . . . and with hardly any care. It's guaranteed for the life of your home! See Weldwood Paneling at your lumber dealer's, or at any of our 87 offices.



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PM10-57

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 Please send me a copy of the full-color, 20-page decorating book, "Beautify Your Home with Weldwood Paneling." I enclose 10¢.

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STREET.....

CITY.....STATE.....

## How to select a paintbrush



*A good brush performs better... wears longer... saves you money*

In selecting a good paintbrush, the first thing to look for is (1) a full head of bristles in a firm setting.

Then, look closely at the individual bristles. They should be (2) finely tapered with slightly curled tips.



Make sure a generous portion of the bristles have tips which are (3) split—"flagged."

Your final assurance of a brush which will give excellent painting performance is bristles which (4) vary in length.



A brush with these qualities has a greater working and paint-holding capacity—eliminates excessive dipping. It will (5) release a finish smoothly and evenly on any surface. You save time, paint with ease, do a professional-looking job.

### Now, better performance with improved TYNEX® nylon bristles

When buying a paintbrush, look for (6) the trademark TYNEX on the handle. Quality paintbrushes made with bristles of TYNEX nylon give you better performance. They pick up a full load of paint



at every dip and lay on a smooth, streak-free coat. And brushes bristled with TYNEX have durable bristles that (7) clean easily... rinse thoroughly... dry quickly—are always ready for re-use.

**FREE**—additional facts everyone should have on choosing and using a paintbrush.

To get this valuable information without cost or obligation, just send your name and address to E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Dept., Rm. 6510, Du Pont Building, Wilmington 98, Del.

TYNEX is the registered trademark for Du Pont nylon bristles.



**TYNEX®**  
NYLON BRISTLES

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

rainfall is a little less than normal. Unlike deciduous trees and shrubs, which shed their leaves in the fall and become dormant, your evergreens do not cease growth entirely at the onset of cold weather. To maintain growth during the winter months it is necessary that moisture be available to the root system below the frost line. This is the main reason for making sure that the soil around the roots is kept moist during a dry fall, the precaution being doubly important when the planting is in a sandy or gravelly soil on a slope where the subsurface water drains away more rapidly than in heavier soils. A mulch of peat moss conserves the moisture.

### Concrete-Floor Cracks



**Q**—My basement floor is badly cracked, actually broken into sections over nearly the whole area. I moved here less than a year ago, so don't know just what happened. I lifted a broken section and dug down about 2 ft. below the floor. There appeared to be sand all the way down to this depth. Would this be a cause of the floor breaking up?

W. D., Ohio

**A**—Possibly, although to us it would seem there are several unknown factors. How thick was the section of the slab you lifted? What is the present condition of the foundation walls? You do not mention water seepage and for this reason we assume you are located on a rise where there is better than average drainage in all directions. Going further on assumption alone we can guess that the floor slab was laid directly on the sandy subgrade without tamping and that the slab was troweled much too thin to withstand normal use. It also is possible that a faulty concrete mix was used. Just what to do to remedy the defect is rather difficult to suggest at such long range, but it would seem reasonable to suppose that a standard procedure should produce a satisfactory repair. It might be permissible to leave the original floor as it is and use it as a part of the fill, but we think it would be best to remove it entirely and place a new fill of coarse gravel or crushed stone to a depth of 6 in. or more. Measure the ceiling height to be sure you are allowing sufficient clearance, or standing room. The fill should be thoroughly tamped, covered with a 1½-in. grout coat. When the latter has set, follow with a waterproof membrane, wire reinforcing and finish with a poured slab at least 2 in., or better, 3 in. thick. Provide expansion joints along all four walls. These should be sealed with hot asphalt after the concrete sets.

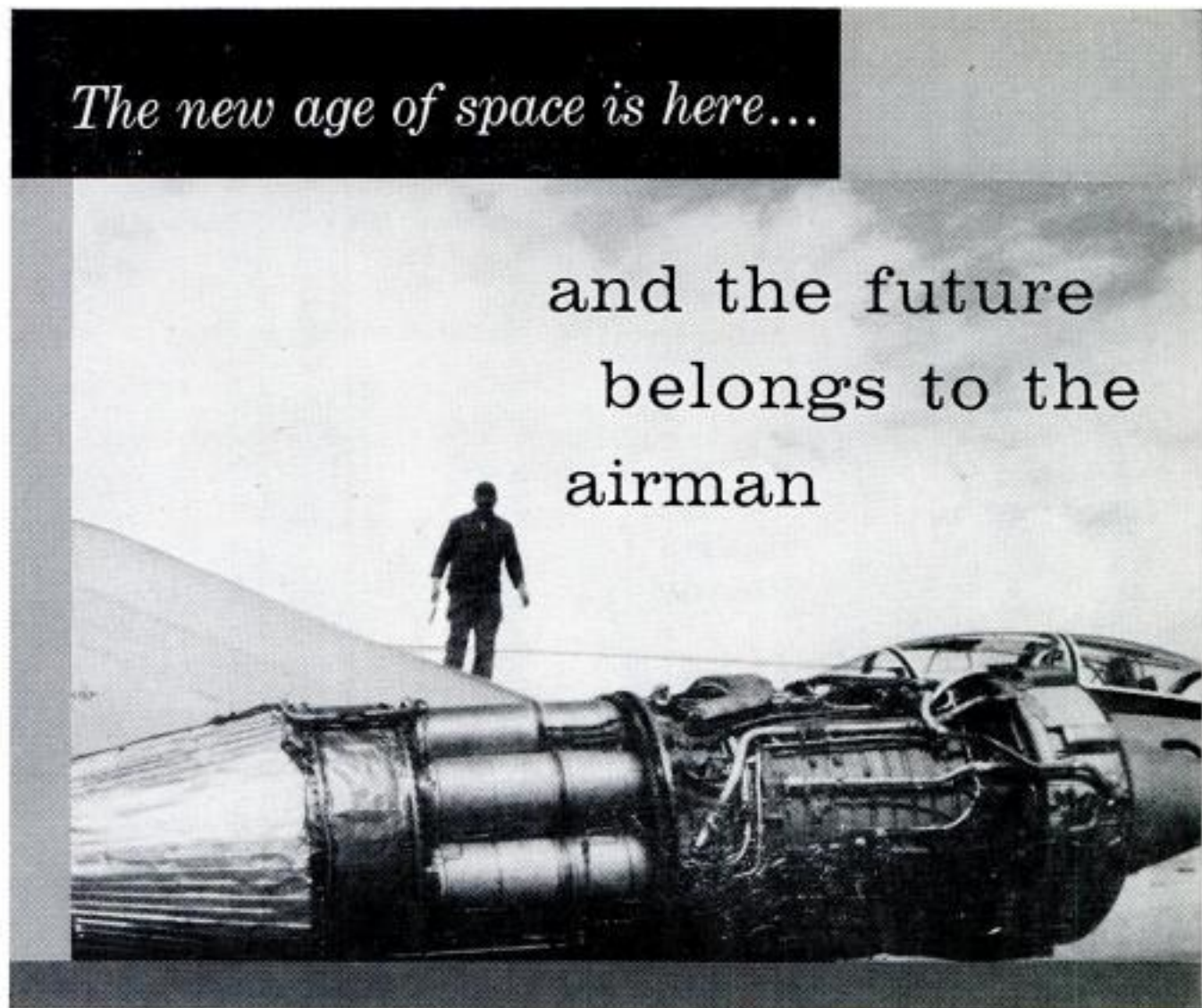
### Concealing Metal Posts

**Q**—The center beam in my basement is supported on round metal posts, or columns. I want to divide the basement into rooms and one wall is at the center directly under the center beam. I had thought of replacing the metal posts with wooden ones. Would this be practical?—C. S., N. J.

**A**—Why not consider boxing in the posts? Judging from your description, this would be the recommended procedure. Replacing the metal posts supporting the center beam would be a rather extensive undertaking, as the structure would have to be supported on jacks while the change was being made. Then, of course, there is the additional problem of adequate concrete piers. By boxing in the existing supporting posts you would avoid the extra labor involved, and by selecting the wood used in the square columns you would finish with an attractive job. A nailing base at the lower ends of the metal supporting posts is easily made by using two short lengths of 2 x 4 stock, each piece cut to the same length as the inside measurement of the proposed wooden column. Make a semi-circular cut in from the edge of each piece, the depth of the cut equal to half the diameter of the metal post. Then drill holes in each piece for bolts and clamp the two members to the column.

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Check **ELMER'S Glue Chart**  
for the right glue for the job.

IF IT'S **Borden's**  
IT'S GOT TO BE GOOD



The Borden Company, Chemical Division

## Prescriptions for Common TV Troubles

(Continued from page 248)

lines are eliminated automatically by circuits within the receiver, but many older models are not provided with such improvements. In these, the retrace lines can be blanked out easily and inexpensively through the use of a retrace eliminator, as shown in Fig. 9.

The eliminator is installed between the base of the picture tube and the picture-tube socket, with an extra wire going to the plate pin of the set's vertical output tube. This can be done in a matter of minutes with no tools other than a screwdriver with which to remove the back of the cabinet. The eliminator applies a blanking pulse to the picture tube which cuts off the electron beam during the time that the retrace lines normally appear on the screen. The picture itself is not affected in any way.

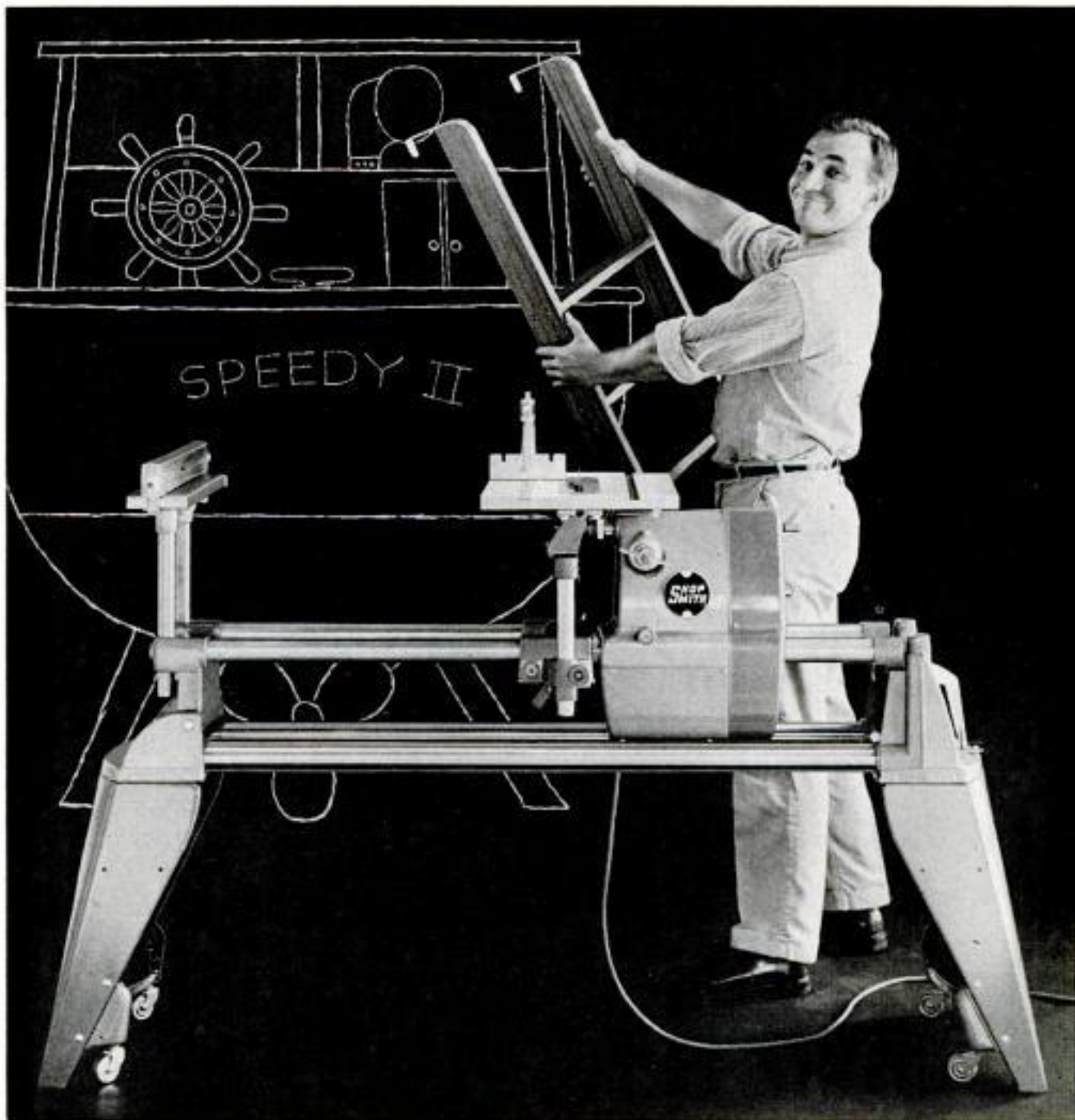
To purchase the correct retrace eliminator, you must know whether the picture tube in your set is grid or cathode modulated. If this information is not available, just tell your dealer the make and model number of your set, and he will be able to select the correct eliminator.

### New Life for Old Picture Tubes

There comes a time in the life of every TV set when the picture on the screen gradually becomes darker and darker, see Fig. 1G, until finally there is not enough screen illumination to permit proper picture contrast even at maximum brightness-control setting. A serviceman called to repair the difficulty is likely to pronounce those dreaded words, "It's the picture tube." Now, picture-tube replacement is not difficult. But, because this tube is the most expensive single component in the entire set, its replacement is costly even if you are able to do the job yourself. It is good economy, therefore, to obtain as much service as possible from such a tube before relegating it to the junk pile.

Loss of illumination is not an indication that the picture tube has reached the end of its useful life. It merely means that its cathode, when heated by the filament to the normal temperature, is no longer able to emit an adequate number of electrons. Increasing the filament voltage raises the cathode temperature and restores proper electron emission. In this manner, the useful life of the tube is often extended by many months. Fig. 10 shows a typical picture-tube booster, or brightener, which does just that. Like the retrace eliminator, this unit is installed between the base of

(Continued to page 256)



## It's amazing — the things you can build with SHOPSMITH!®

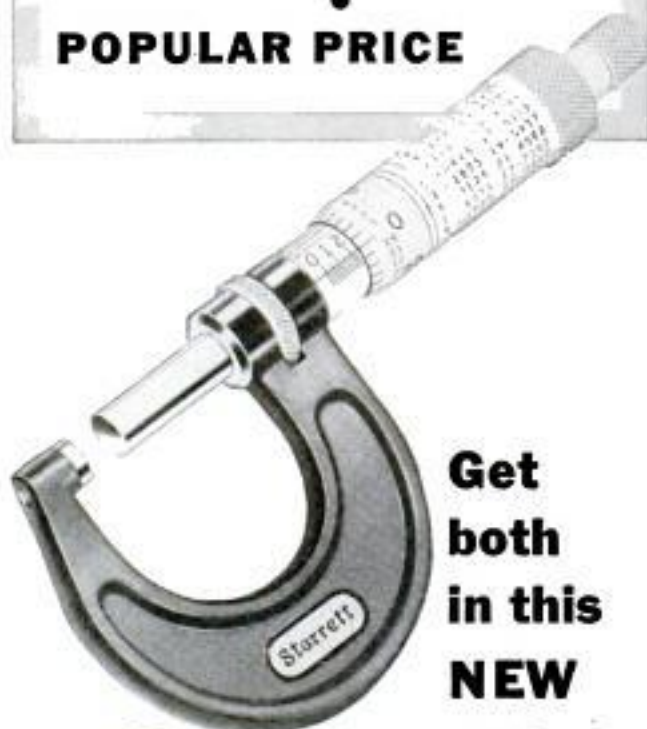
Maybe you won't begin by building a cabin cruiser—but you *could* with your SHOPSMITH! For boats, like most other projects, require a saw, drill press, sander, lathe and horizontal drill. Only SHOPSMITH gives you, in one magnificently engineered unit, all the tools you need to build *any* project from *start to finish*. Only SHOPSMITH is a complete power shop—no extra tools to buy. And unlike one-speed power tools, SHOPSMITH gives you exclusive Speed-Dial with correct, *safe* tool speeds for any woodworking operation. Visit your leading hardware or department store, lumber yard, or any Montgomery Ward; find out why over a quarter-million men now own SHOPSMITH. For two helpful free books on home workshops, write Dept. 301-M, Magna Power Tool Corporation: Menlo Park, Calif., or Box 2808, Ft. Wayne, Ind. ® T. M. REG.



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Balanced design, rugged construction, new specially forged tapered frame with deep throat, no-glare rust-resistant Satin Chrome Finish on thimble and sleeve, easy-to-clean black frame, quick-reading figures . . . these big Starrett features plus many more are yours at a very moderate price.

Models available with or without lock nut, ratchet stop or friction thimble. Graduated .001", .0001" or Metric. Also available in larger sizes up to 24 inches.

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**STARRETT TOOLS** are carried by leading Industrial Supply Distributors and Hardware Tool Stores.

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Please send my free copy of the big new Starrett Catalog No. 27.

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the tube and its socket. Boosters are available at prices ranging from about \$1 to \$6, depending on their flexibility; a small price to pay for extending the life of the far more expensive tube.

The more expensive boosters not only cause increased cathode emission, but also relieve the condition brought about by a cathode-to-filament short circuit within the tube. This common trouble causes the tube to operate at maximum brightness at all times, regardless of the brightness-control setting.

Most servicemen will be happy to install such boosters for a very nominal service fee. Some will even put in the booster on a rental basis, taking back the unit and subtracting its cost from the picture-tube-replacement charge when this finally does become necessary.

**Two Sets—One Antenna**

A single antenna can serve two or more TV sets if there is sufficient isolation between the sets to prevent interaction, and a good match is preserved between the antenna and the receivers. A multiset coupler serves both functions.

The installation of a typical 2-set coupler is shown in Fig. 11. Here, the lead-in from the antenna is connected to one set of terminals on the coupler while additional leads run from the end terminals to each of the receivers. Couplers for more than two sets are also available and are just as easily installed.

**Accessories Readily Available**

TV accessories for the purposes described are made by a number of different manufacturers. The ones illustrated can be found in catalogues of most major radio-parts distributors. The catalogues are available free of charge and you can obtain a list of some of the largest distributors by writing to the *Popular Mechanics* Radio, TV and Electronics Dept. and enclosing a stamped, self-addressed envelope. ★ ★ ★

**Ring of Wind Encircles Equator**

The earth is encircled by a ring of wind around the equator at an altitude of about 100,000 feet, reports Dr. Clarence E. Palmer of the University of California. It is a steady easterly wind that blows all the time approximately 73 miles per hour and extends several degrees on either side of the equator.

☛ A German inventor has obtained a U. S. patent on a false tooth which has a metal "filling" to make it appear more like a natural tooth with a filling.

# How many of these projects are you planning for your home?

- Installing ceiling tile
- Reupholstering
- Building furniture
- Installing insulation
- Making picture frames
- Making or repairing screens
- Installing low-voltage wiring
- Installing built-in speakers
- Tacking chicken wire to shelters, cages, storage bins



**The Bostitch T5 Tacker helps you do all these better and faster!**

Just aim and squeeze. A rugged staple gets a powerful grip exactly where you want it. Can't mar surfaces. Approved by leading makers of ceiling tile, used by professional craftsmen. Wonderful in tight places!

- Erecting tree and shrub shelters
- Laying roofing paper
- Re-canvassing lawn furniture
- Installing insulation
- Installing wooden under-course shingles
- Applying cornerite
- Applying felt and waterproof paper to exterior walls
- Installing flashing paper
- Laying underfelt for roofing
- Installing vapor barriers



**The Bostitch H2B Stapling Hammer helps you do all these better and faster!**

Use this high-speed, self-feeding stapling hammer on all these jobs—and wherever you want light tacking or nailing. Holds 160 staples. One-hand operation—other hand's free to position work. Lightweight with a long reach. Takes the fatigue out of drawn-out jobs.

- Building trellises or arbors
- Applying asphalt shingles
- Applying metal lath to studding
- Laying underflooring
- Applying metal discs for built-up tar and gravel roofs
- Applying corrugated paper for installing blown-type rock wool



**The Bostitch H4 Stapling Hammer helps you do all these better and faster!**

Big jobs go fast when you work with the H4. Every easy blow drives a staple  $\frac{3}{4}$ " deep. Staple legs spread inside work for more holding power than a nail. For roofing you need less staging, finish 4 times faster than with hammer and nails!

See these time-and-money-saving Bostitch Staplers at your Building Supply Dealer's—or mail the coupon.

**Fasten it better and faster with**

## BOSTITCH®

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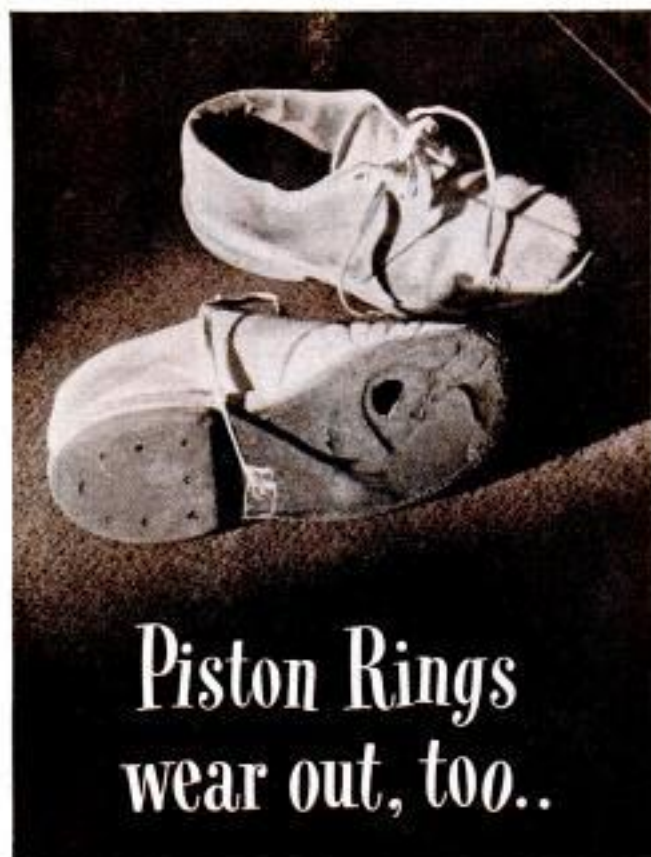
Please send me information on the following:

- T5 Tacker
- H4 Stapling Hammer
- H2B Stapling Hammer
- Ceiling Tile Installation Handbook

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At the first sign of oil-pumping, smoking exhaust or loss of power, ask your motor specialist for a ring check-up. If your car needs new rings, you'll be money ahead on gas and oil . . . and avoid big repair bills later on by installing new Hastings Piston Rings now.

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Piston Rings, Casite, Wear Reducer,  
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**TOUGH** on oil-pumping • **GENTLE** on cylinder walls

## We Call It "Our Rock of Gibraltar"

(Continued from page 179)

mixer and laid the footings ourselves. With the help of a friend experienced in concrete work, we laid the blocks for the basement. When we couldn't figure out the next step from the blueprint, we looked at other homes in the same stage of construction and asked questions of workmen and experts. If we still didn't know how to proceed, we could always call Larson, and he would explain the details.

Some of the more difficult or technical jobs we had done by professionals, such as laying the concrete floor, putting in the basic plumbing, installing the furnace and much of the electrical work.

We first planned to hire a stonemason to lay the limestone and the brick-veneer portion of the basement which our hillside location left above ground. But stonemasons were scarce and busy. Finally we coaxed a retired mason to spend a few days helping us get started doing it ourselves. As Les was usually away at work, the stonemason showed me what to do. After that, I did most of the stonework and brickwork myself.

### Amateurs vs. Professionals

Larson had complained that in a home of this type, done purposely rough (many pioneer American builders were actually amateurs themselves), it was hard to get professional masons to lay stone and brick uneven enough for the rustic effect desired. This was one thing we could do better than the professionals—lay bricks crooked!

Les would mix up a batch of mortar before going to work in the morning, and I would lay it up, while our daughter, Sally, played nearby. She seemed to be just as contented as if I had spent my spare time at coffee parties and embroidery. In fact, there are countless interesting things for a child to play with and observe around a building project. By noon, the mortar would be used up and I would still have time to do the little housework necessary.

The second winter swept down on us like a hawk, catching us and our uncompleted basement unprepared. We did manage, however, to get it closed in, and to cover it with what would eventually be the floor joists and subfloor of the main level. Over this we put a temporary waterproof layer of tar paper.

That winter was spent splitting shakes (a seemingly endless job), pine paneling parts of the basement living quarters that were not stone and in other inside jobs.

(Continued to page 260)



# A Craftsman Kromedge blade from Sears

will last up to 5 times longer than an ordinary blade!



## 1/2 PRICE INTRODUCTORY SALE!

Save 1/2 on CRAFTSMAN Kromedge 6 1/4-in. steel slicer blade—with purchase of any Kromedge Hollow-ground or Carbide-tipped Blade! It's the only blade of its kind on market, for cutting thin sheet metal up to 1/32-in. thickness. For bench or electric hand saw. Fits 1/2-in. round arbor; knock out bushing for 3/8-in. Offer good until October 30, 1957.

Regular Price 2.89  
Sale Price 1.45



Guaranteed All-Chromed Cutting Edge

**Recorded Tests Prove It!** CRAFTSMAN Kromedge saw blades—impregnated with hard chrome—cut up to five times longer than ordinary steel blades. Yet, Kromedge blades actually cost you less! These circular blades are built better from the start. They're tempered under pressure, heat-treated, evenly tensioned to run true. Accurately ground for better balance and surface finish. Kromedge hollow-ground combination blade (pictured above) for fine finish work, ripping, crosscutting, mitering. 8-inch size, **4.49.**

## AND HERE'S THE ULTIMATE! TUNGSTEN-CARBIDE BLADES LAST 20 TIMES LONGER!



Tipped with the hardest metal made by man!

**ACTUALLY YOUR BEST LONG-TERM BUY!** Tungsten-carbide—the hardest metal made by man—is brazed into the tip of each cutting tooth to provide 20 times longer blade life than untipped steel blades! They stay sharper, cut faster, use less power. Heat-treated in electrically controlled furnaces, teeth ground with diamond wheels to exacting tolerances. For ripping, crosscutting, mitering, beveling. 8-inch size, **9.95.**

### Sears has Kromedge Blades for every type and size of electric hand or bench saw!

See Kromedge Blades at the Craftsman Home Workshop display at your nearest Sears Retail Store... or order from Sears Catalog in your own home, by Mail, Phone or at your nearest Sears Catalog Sales Office.

Satisfaction Guaranteed or Your Money Back. SEARS, ROEBUCK AND CO.—In Canada at Simpsons-Sears Ltd.

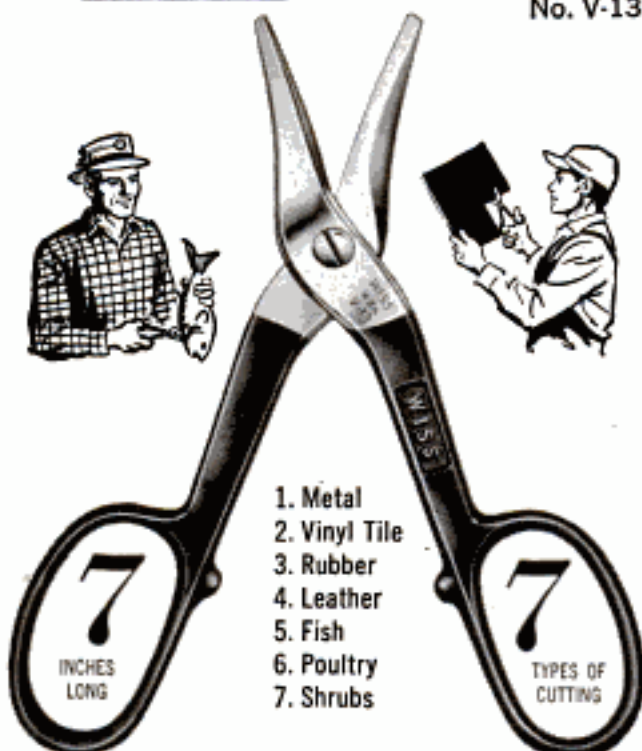
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STRAIGHT CUT**  
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The second summer, while still living in the cabin, we hired a carpenter to work with us at framing up the rest of the house. He set the window and door frames, made to order by a regular millwork firm. We did the sheathing and put on the roof boards. We covered the roof with heavy tar paper to shed rain and snow and were ready for another winter! (More shake splitting, painting and staining windows.)

The following October we took a big step. We moved into the basement, which, with one entire side above the ground and overlooking the river, was more like a comfortable three-room bungalow. Actually, this was our future recreation room and workshop. But after the primitive way we had lived for two years, it was a magic wonderland to us!

Instead of laboriously carrying water, hoarding it and eking it out a cupful at a time, we could now cause manmade hot and cold springs to flow forth at the touch of a faucet! A flowing stream underneath us carried away our waste! Clean, ash-free heat was kept within a few degrees of the temperature we wanted by a touch of the finger to the thermostat!

## Cabin Is Rented

That winter we rented the cabin to another young couple. The next spring they bought it and moved it to a lot of their own. Considering the rent received and the price we sold it for, our two years living in the cabin cost about \$200. The approximately \$1500 we saved by not having to pay rent those two years went toward buying materials for our house.

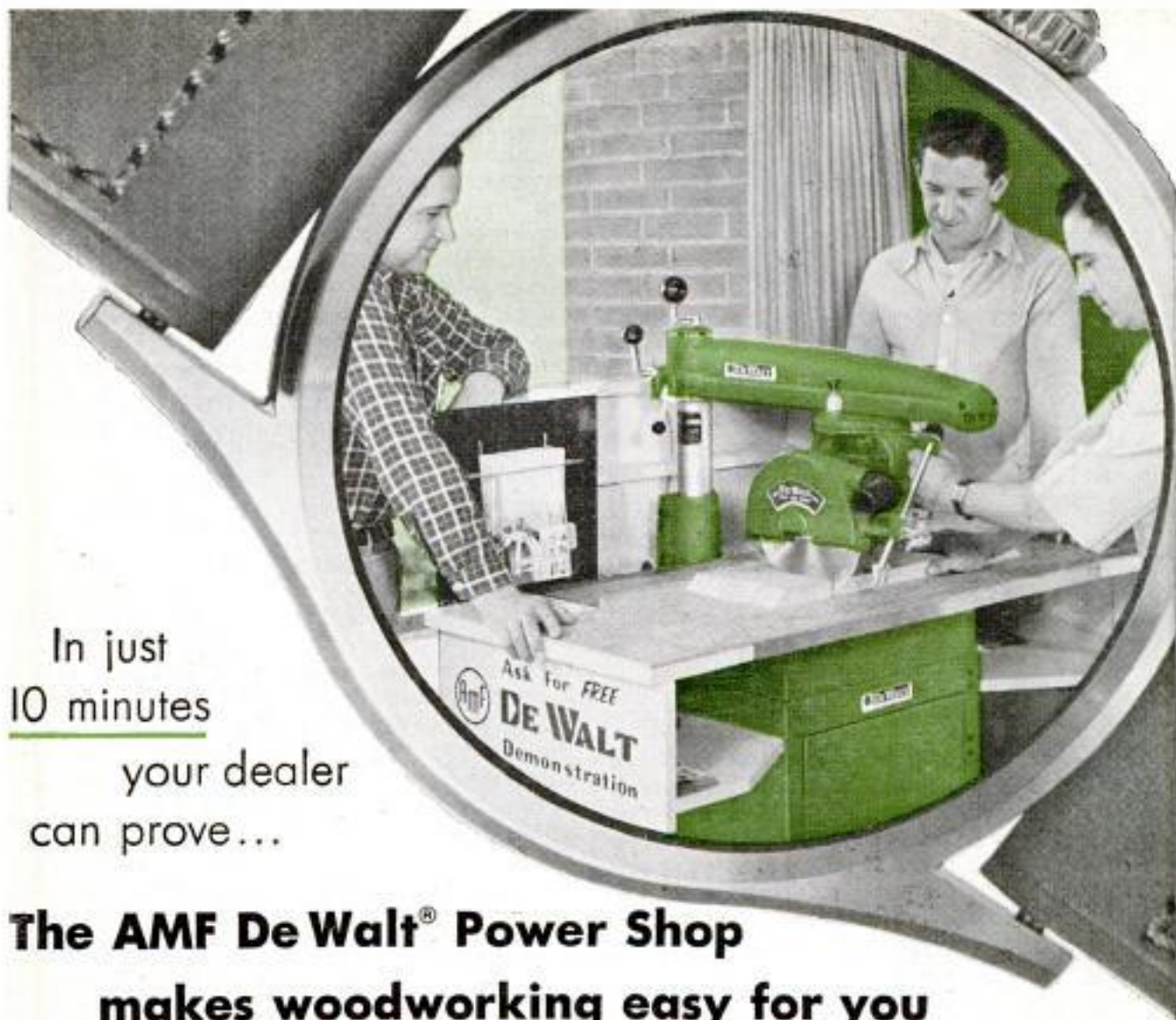
Two more years were spent in our basement while finishing the rest of the house and taking time out for the birth of our son, Bruce. During this period, we did our own insulating and finished the stonework and brickwork. The plywood floors we installed ourselves and had them covered with either linoleum or carpeting.

The main-floor paneling we wanted especially nice, so we had experts do this. We did, however, carve our own molding by hand and put it up. We also wallpapered and did much of the painting and finishing ourselves. The plastering and bathroom tilework was done professionally.

After two years in the basement, we were ready for the next big step—moving upstairs. As usual, in spite of all the work we did ourselves, the cost mounted higher than we expected. So we rented out the basement as an apartment. It is still being rented.

Usually a big house, even once it is up, is expensive to maintain. But here again

(Continued to page 262)



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\*ST. HIGHER WEST OF ROCKIES

# Mossberg

for accuracy

O. F. MOSSBERG & SONS, Inc.  
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we are glad to have enjoyed the services of a good architect. He planned so the upkeep would be kept at a minimum. The cedar shakes of the roof and second-floor siding do not have to be touched with paint or stain. They just continue to weather a silver gray, and should last as long as we do. The outside trim is treated with a dark-brown creosote stain. We will go over this ourselves every two or three years. It is much easier than painting. Specks of dirt on the trim just fall away once the creosote has soaked in. The stones and brickwork, of course, never have to be touched.

As for the interior, inexpensive handmade rugs and hand-painted secondhand furniture blend perfectly with the casual Early American decor. The pine paneling mellows to the nicks and scuffing of children at play.

Having built this way, we have grown with the house—learned to tackle a big job and see it through, no matter what the difficulties. It was hard, and there were times when we wondered why we ever started it. Much of the work is not perfect.

But it has given us a fuller meaning of the word "home." As long as we live here, the memory of the cool earth of the excavation that first hot summer, the scolding of the red squirrel as we invaded his kingdom, the golden autumn leaf swirling into our mortar, and the many people who helped us, will linger in its walls and enrich its meaning to us.

Even the discomforts of those first winters of pioneering had their purpose. For the comfort of our finished home is even more delicious in contrast. Even now, such a simple act as flicking on a light switch brings memories of filling kerosene lamps, trying to work by their flickering light and cleaning their blackened chimneys. Such a commonplace thing as a light bulb has become a great wonder to be treasured!

It is good, too, to know we will not have to move from the creek and river we love into something bigger and that the trees we planted and nursed along are now bearing fruit for us—not someone else. It is good to know that we will be here for many springs to come to enjoy the blossoms of the lilac bushes and bulbs we planted—and most of all—the home we built ourselves.

★ ★ ★

### Beans Are Booming

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## The PM Modern

(Continued from page 151)

studio ceilings within and the indoor-outdoor effect gained by the generous use of glass, give a feeling of spaciousness.

Let's take a look at the exterior of the house before stepping inside. The white-painted brick wall across the front is six feet high, broken only by a single glass panel and the fireplace chimney. Above the wall are fixed windows. A translucent plastic gate at one end of the wall leads into the entrance court. The house wall at the rear of the court is redwood. The low-pitched built-up roof covered with white marble chips is broken to provide sunlight for the entrance court and part of the outdoor-living area.

This outdoor-living space is one of the special delights of the PM Modern House. At one end of the partly shaded brick patio is the lounging area and at the other a swimming pool 10 by 20 feet. The pool is optional and the space it occupies may be used for shrubs or a flower garden. The fences (see plan) shown on either side of the house are also optional and probably would not be used on a big suburban lot. However, the PM Modern is designed for both suburban and urban living.

### Glamour Inside and Out

Let's open the gate and step into the entrance, or garden court. A brick-paved walk leads through the planting area to the front door. Here the visitor enters a section of the house that is between the dining-family-activity room and the formal living room. The glamorous outdoor-living area can be seen directly ahead through the sliding glass doors.

The combined areas of the dining-family-activity room and the living-sitting room occupy a space 15 by 31½ feet. An accordion-type partition sliding on overhead tracks can be used to separate the dining-family section (16 by 12) from the more formal living area, depending on the family mood. Sliding glass doors turn the dining space into a dining lanai if the weather permits.

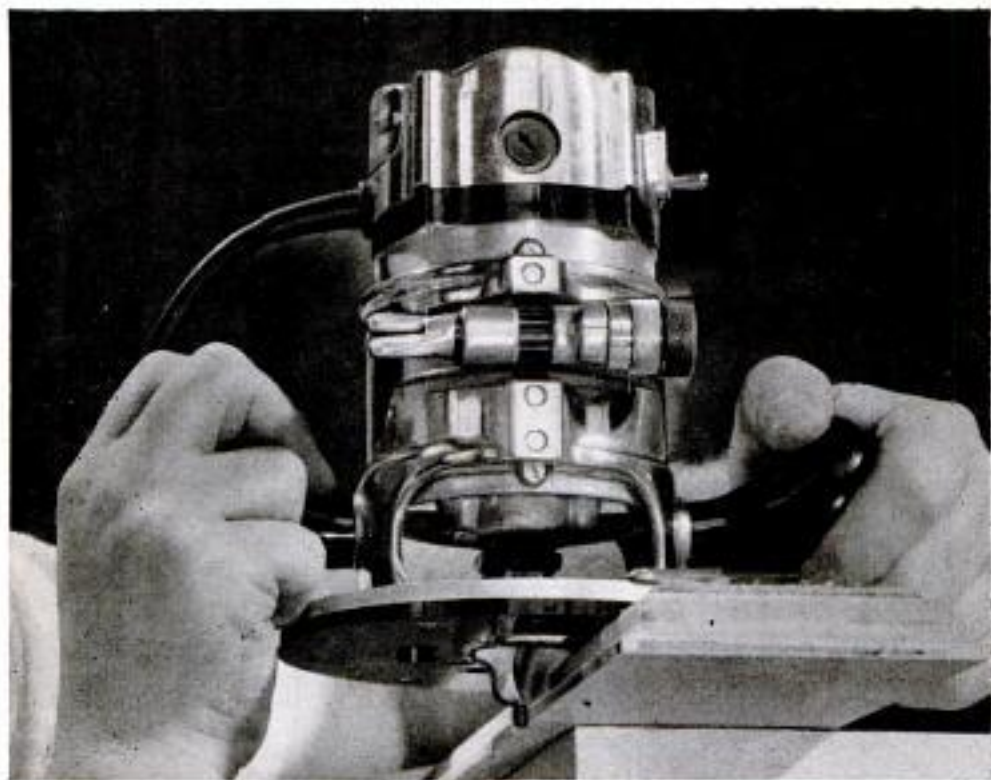
The core of the kitchen is an ingeniously planned breakfast bar. Cooking elements and a built-in oven are installed on the side nearest the L-shaped workcounter. When the island bar is not used for breakfast or snacks it becomes a convenient service counter. The sink is placed on the L-shaped counter below a window overlooking the entrance court.

"The circulation of the entire house is planned around the kitchen," says Ridley,

(Continued to page 266)

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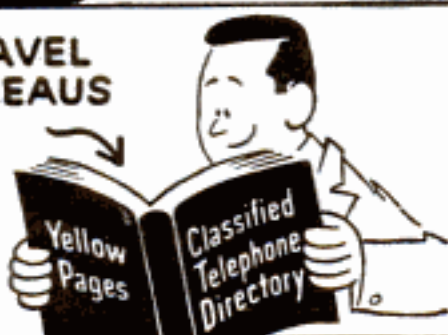


Inlay work

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"but the traffic patterns go around the work area, not through it. The placement of the kitchen saves steps as the family goes to the activity areas, the utility court off the kitchen, lavatory, the basement workshop and the three bedrooms and bath."

The bedrooms and bath are in a section of the house that is raised three steps, making the home a split level which is not apparent from the outside. This arrangement gives added privacy and quiet to the bedrooms and at the same time provides for a much lighter basement. The two rear bedrooms are divided by ceiling-high cabinets that may be shifted to meet changing family needs.

The family laundry may be housed either in the basement or (in the form of a combination washer-drier) in the lavatory near the kitchen. The heating system is warm-air, perimeter-type with closely spaced floor registers below the glass areas to provide a warm-air curtain which absorbs both cold and condensation. Provision is made for optional air conditioning. Ample storage space is provided in the basement.

### Place for Sunny Workshop

The basement space under the raised bedroom area, planned for a big workshop, is exceptionally sunny with windows on three sides. It would be possible to put two bedrooms here and an extra bathroom—making the house a five-bedroom, 2½-bath home.

The house construction is basically simple, a rectangle with a row of supports down the center supporting regularly spaced roof beams which extend to cover outer areas such as the outdoor-living section and the garage. This home can be built with a carport instead of a garage, at some saving of money. Ridley favors the carport which he says "enhances the pleasing appearance by eliminating the garage door and side wall."

"The PM Modern is my idea of an all-out contemporary (modified modern) house," says Ridley. "It is not a case of modern ideas worked into a traditional shell. The contemporary look of this house is the result of 'doing what comes naturally' all the way through. This requires the kind of planning that suits our modern way of living. We place things exactly where we want them, such as glass areas. In a traditional house you are restricted by a style derived from the days when glass could be made only in small panes. Today's wide range of construction methods allows us to do new and original things that provide more enjoyment, warmth and beauty in our daily living." ★★★



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## The PM Traditional

(Continued from page 151)

brow. "We occasionally do a traditional job. Do you have in mind something of about three bedrooms, a medium-sized home, bath and a half, something in the way of modified Cape Cod with maybe the flavor of a prairie farmhouse?"

Mulloy spoke up. "Possibly a barn-red paint job?"

"With white shutters and trim," added Perkins.

Norris produced a pencil and Perkins spread a big white sheet of paper on the low table before the davenport. Three heads bowed over the paper as it shifted from partner to partner. There were mumbled remarks:

"Got to have a shelter over the door... what's wrong with a family room in a traditional house?... and air conditioning?... No, let's make it L-shaped... just the place for a patio for the outdoor-living angle... cedar shakes of course, got to have cedar shakes..."

"We don't at all mind doing a traditional house," said Perkins, "as long as it is functional within and takes into consideration the way a modern family lives."

The PM Traditional—designed to be set on a minimum 60-foot lot—has 1850 square feet of living area on its two floors, 980 on the first floor and 870 on the second. The garage occupies 361 square feet of space. Located on the first floor are the kitchen, family-TV-dining and all-purpose room, the parlor and a lavatory. The parlor with its nine-foot beamed ceiling is located in the forward-projecting section of the house. This attractive room has a red-brick fireplace and five windows. The wall at the fireplace end of the room is wood paneling painted white. The other three are papered. This room, as a glance at the floor plan will show, is located well off the beaten path of family traffic and is also ideal for late entertaining because there are no bedrooms above it.

Back of the living room is the family and general-activity room. Alongside the wall nearest the kitchen is a gate-leg table which can be opened for dining. This room, too, has a fireplace but it is much more informal than the one in the parlor. It has a metal hood and barbecue grill which add to the relaxed atmosphere of the room. Beside the fireplace is a storage closet for folding tables, games and other paraphernalia. Sliding glass doors at the far end of the room open onto the patio. The decorators at Marshall Field and Company's Home Planning Bureau were entranced with this

room and planned a dozen ways to outfit it. (Their final result is shown in the color illustrations.)

The family room opens into the kitchen, which is 14 feet 4 inches by 11 feet. This room provides the usual facilities plus eating space in one corner and a planning desk. There is plenty of counter and cabinet space and two cheerful windows over the sink. An interesting up-to-date touch is the wickerwork on the cabinet doors. A door on the garage side of the kitchen leads to a small hall which affords access to the first-floor lavatory, the garage, steps to the full basement and the secondary front door. This house actually has the luxury of two front doors, one for family traffic and one for company. The architects have placed a convenient milk box beside the "family" door. Another handy feature is a large closet in the back hall. Stairs in this hall lead to the basement which also has an outside entrance, specially designed for lugging cumbersome objects in and out of the workshop.

#### Kitchen Is "Nerve Center"

Perkins points out that the kitchen in this house is set into the traffic pattern as the "nerve center" of the home. This room has easy access to all the vital activity areas. In the family room, just around the corner from the kitchen are the stairs that lead up to the three bedrooms, bath and storage areas on the second floor. There are eight closets on this floor alone (all with louvered doors) including the twin closets in two of the bedrooms, a single closet in the middle bedroom, and closets for toy, linen and utility storage.

An unusual feature of this floor is that the laundry is housed in the bathroom in the form of a washer and drier.

"Anybody who has a large family knows that a second-floor laundry makes sense," says Perkins. "We have also provided laundry space in the basement."

An especially pleasing aspect of the second floor is the lighting of the stair well and upper hall from a strip of diamond-paned windows set in a dormer which also adds a decorative touch to the front of the home. The cedar-shake shingles, barn-red paint and white shutters, the sheltered entrance and big brick chimney give this house an air of hospitality and warmth.

The construction of the house is conventional with poured-concrete foundation, beveled-wood siding, full insulation in side walls and attic space. The flooring throughout the house is hardwood with the exception of the family room, kitchen, bath and lavatory floors which are of attractive asphalt tile. ★ ★ ★

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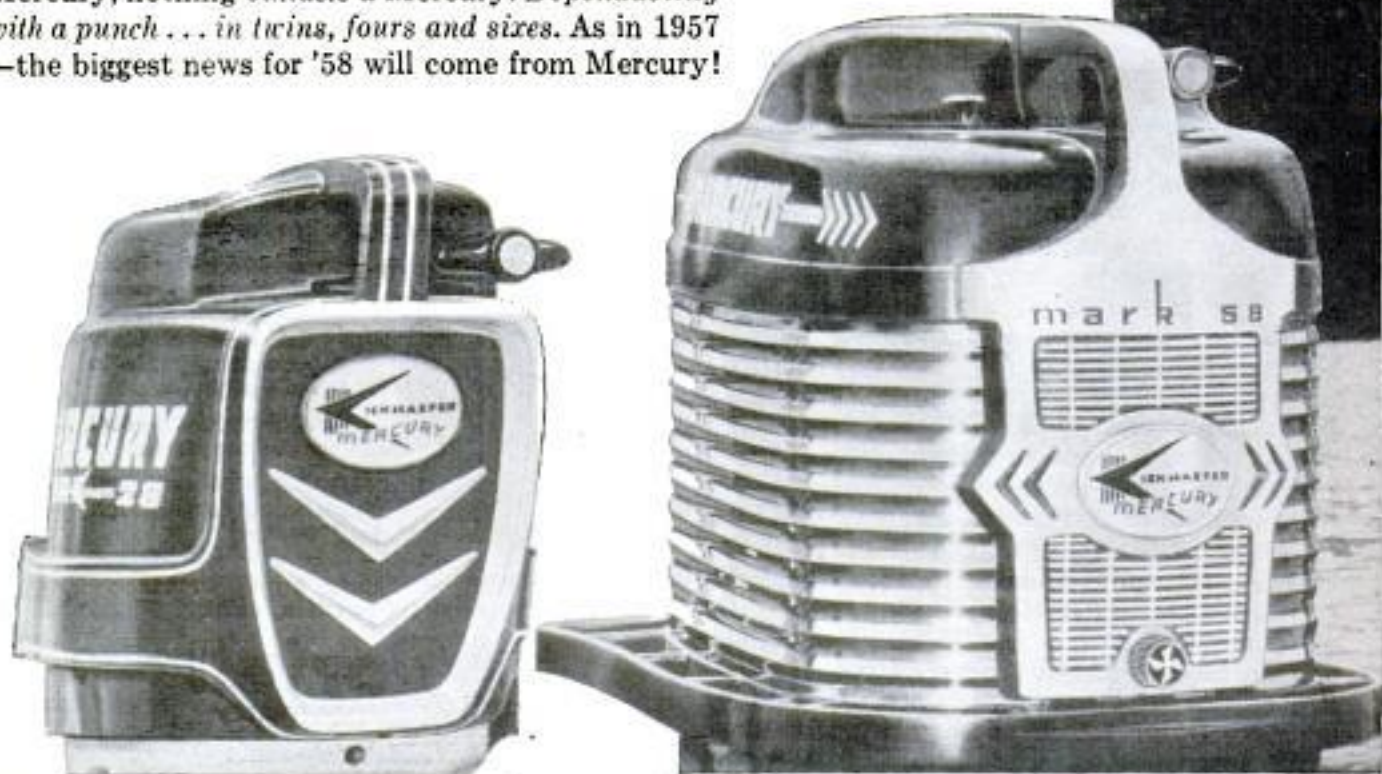
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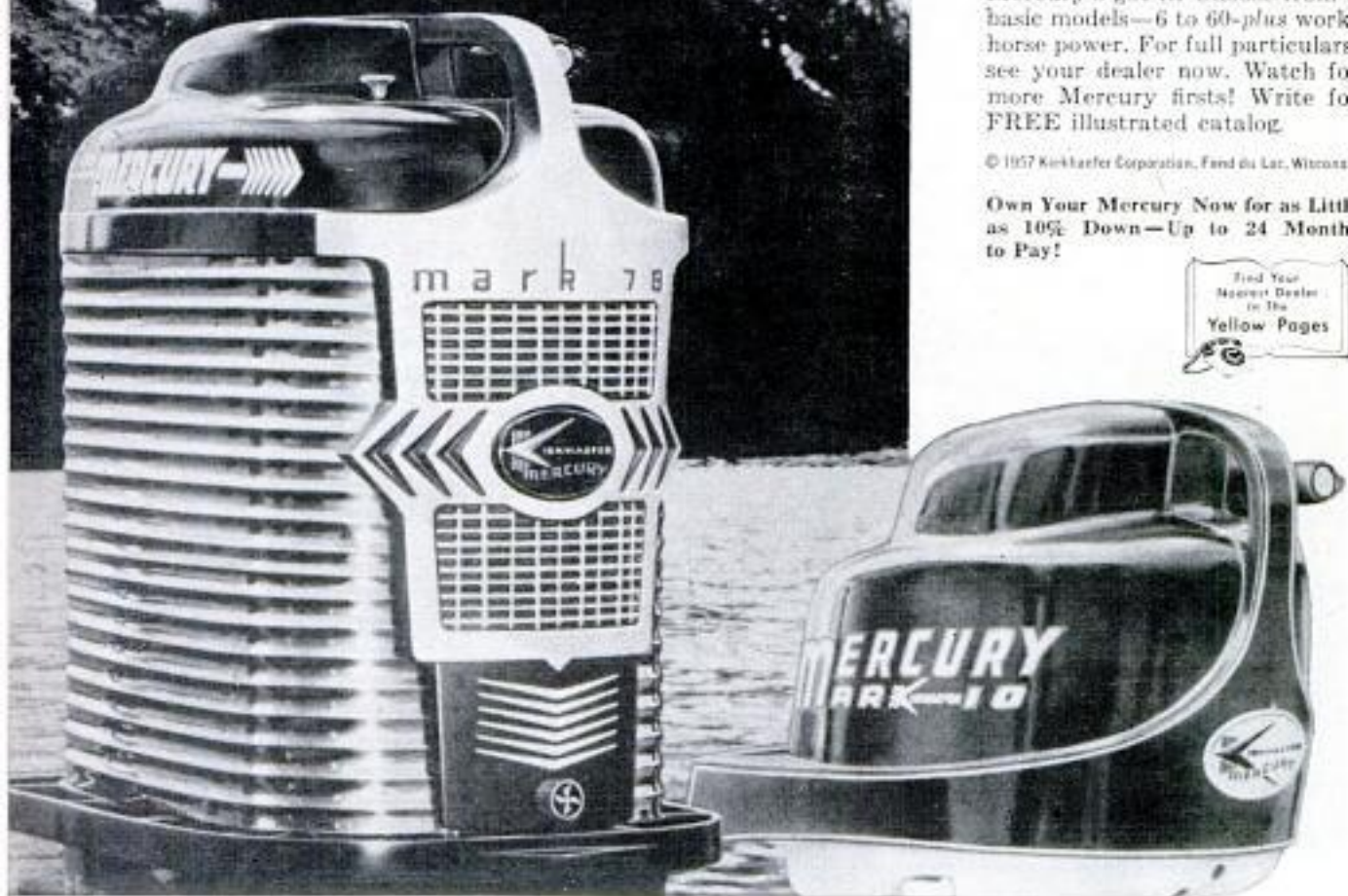
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## Owners' Opinions of British Ford

(Continued from page 133)

"Driver's seat not long enough from front to back to make a six-foot driver's legs comfortable."—California teacher.

"Seat should be redesigned so you sit in it, not on it."—California circulation manager.

### *Gas mileage not as advertised, say 8.3%*

"I get 30 miles per gallon on trips. I don't get the 40 miles per gallon I was told I would."—California apprentice.

### *Starter motor jams, say 7.5%*

"Starter should be improved. It jams too often."—District of Columbia economist.

### *Needs a four-speed transmission, say 7.2%*

"Could use a fourth gear for better mileage at high speed. Mileage drops to 25 miles per gallon at 70 miles per hour."—California minister.

"Gear ratios awkwardly spaced. Large flat space between second and third."—California tool designer.

### *Bothersome body rattles, say 6.4%*

"Rattles badly on bumpy roads and cobblestones."—New Jersey engineer.

### *Hard ride, say 6.0%*

"When you ride over expansion joints it feels the same as riding in a truck."—New York wire lather.

### *Shifting not easy, say 5.3%*

"Half the time it sticks in low and you hit reverse jamming it out on the way to second."—Florida teacher.

### *Parts are scarce, expensive, say 5.3%*

"Dealer does not carry sufficient stock of parts."—Texas Army officer.

"The largest Ford service in Memphis, Tenn., was not able to replace a broken carburetor cover and said there would be a seven-day wait for a new carburetor from Detroit. Also I have been waiting two months for new body parts to come from England."—New York teacher.

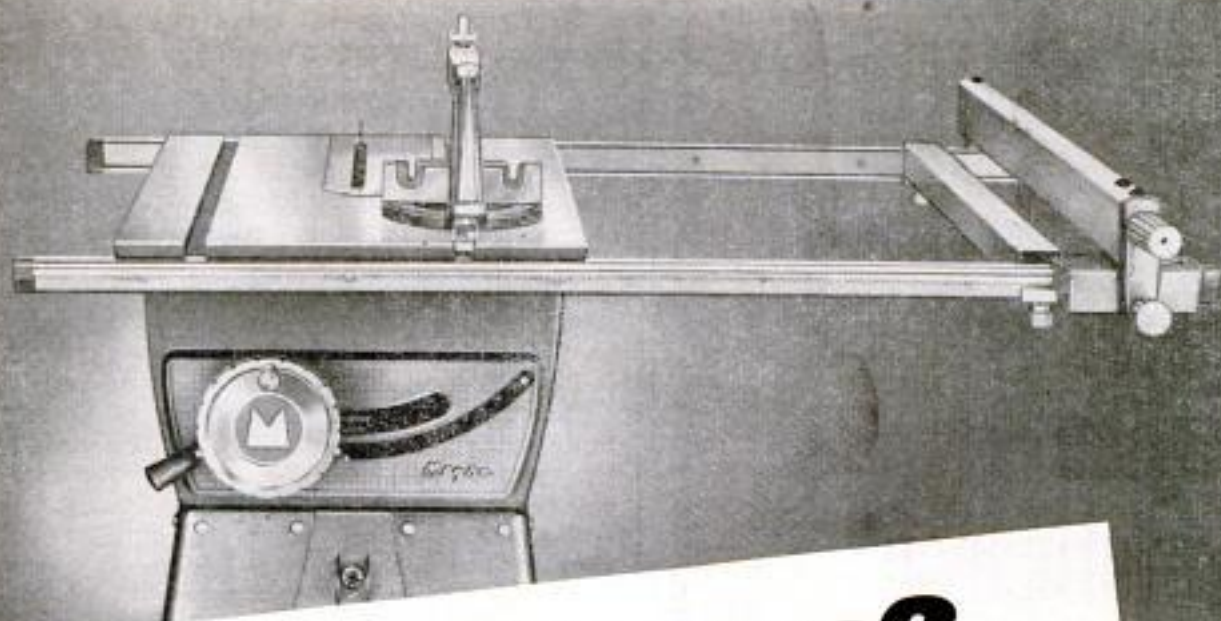
"Dealer does not yet have his own repair shop. This should not be allowed."—Oregon state employee.

"Must take it to foreign-car service station since it is too narrow for conventional ramp and I don't like their prices for servicing and parts."—Florida nurse.

### *Wipers give trouble, say 5.3%*

"Windshield wipers are no good if you accelerate or are pulling up a grade."—California plant operator.

(Continued to page 274)



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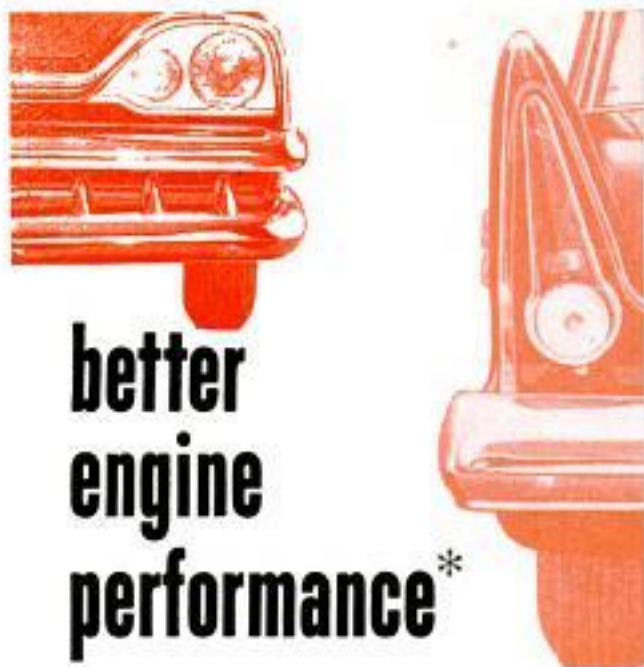


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**Starts hard when cold, say 5.3%**

"Difficult to start, especially in cold weather."—New York teacher.

#### **Will Sales Climb?**

We asked the owners of the British Ford if they felt sales of foreign cars would increase in this country in the next 10 years. Overwhelmingly, they say sales will increase. Only 3.4 percent feel that sales will not increase and many of these base their answers on what they feel is the certainty that American manufacturers would bring out small competitive cars.

Does owning a foreign-made car have any important disadvantages? We asked the owners that question and 67.0 percent say it does not, 26.8 percent say it does.

We asked them what one suggestion they would make to the American automobile industry in the light of their experience with the British Ford. Nearly half of them (44.5 percent) say Detroit should make cars smaller. Others (20.0 percent) say horsepower should be lowered and 19.6 percent say they should reduce the glamour, chrome or ostentation of the cars.

Surprisingly enough, costs of operating and buying cars rank only fourth and fifth with 18.1 percent asking for greater gas mileage and 9.8 percent suggesting a lower price for American cars.

Here are some quotations to illustrate the owners' suggestions:

"Reduce the size of the American car."  
—Connecticut technical writer.

"Produce a small, maneuverable, economical, easily serviced four-passenger car for city driving." — Virginia government worker.

"Stop the trend toward higher horsepower." — California border patrolman.

"Forget the crazy horsepower acceleration contest."—California teacher.

"Stop building big toys for overgrown little boys."—District of Columbia musician.

"Start all over with cars the size of the 1920 models. No gadgets." — Vermont lawyer.

"The American public, with its native good sense, will eventually reject the phony scheme Detroit has foisted upon them, based on initial price, annual restyling and high depreciation. I have purchased my last American car unless the present trend is reversed."—Texas engineer.

There you have the summary. The good and the bad, the reasons why and why not. For expert opinion of the way the British Ford performs turn to page 134 where Engineer Dale Kelly reports on his tests and page 135 where veteran driver Floyd Clymer gives his driving impressions.



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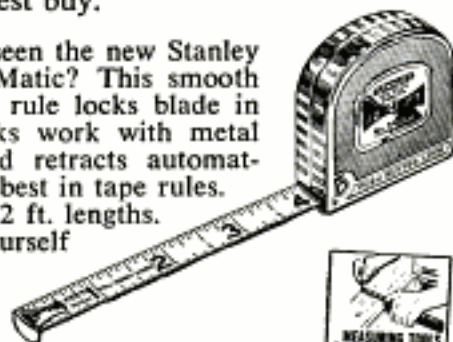


This rule has loose joints . . . they're weak and worn. It's ready to fold up forever. Don't call a doctor. Get a new one. This time, be precise . . . say Stanley, it's a good rule.



Take this new Stanley "100 PLUS" No. X226 6 ft. Extension Rule for example. No comparable rule lasts longer. It never gets "rule arthritis." Its joints have been permanently lubricated. They're young and springy. They can take it. The black, deep-cut markings with their protective plastic finish wear four times longer than those on thin-skinned rules that may suffer from "tired ink." Buy No. X226, and make a note of how long it measures up for you. You'll agree that Stanley Rules are your best buy.

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# STANLEY

The Tool Box of the World

## The House That Stores the Sun

(Continued from page 161)

via metal fins—like an automobile radiator in reverse. In the unit, whirring fans push the warmed air through ducts into various rooms of the house, while the water goes back to the collector to be heated again. A heating coil in the big tank supplies domestic hot water.

"The earlier house," Pelletier reveals, "had to have storage water at 110 degrees before its radiant-heating panels were effective. The Lexington system can squeeze heat from stored water that is only heated to 95 degrees, which makes it far more efficient in a cold climate."

What happens in summer, when broiling sun beats down on the glass? "Since the water is at atmospheric pressure in the system it can't get over 212 degrees," says Pelletier. "The collector is used chiefly for heating domestic water. The rest of the heat is dissipated to the outdoors through the collector."

What about bleak stretches of gray weather in New England's winter? "If the cloudy period were preceded by sunny days—not too cold—the storage system could carry over a maximum three-day period," Pelletier observes. "You'll always get some help from the solar system even when most heat is being supplied by the auxiliary furnace. The system is designed to collect the maximum feasible amount of energy from the same sun that shines on every house and use that energy to the maximum."

### Draperies Prevent Heat Loss

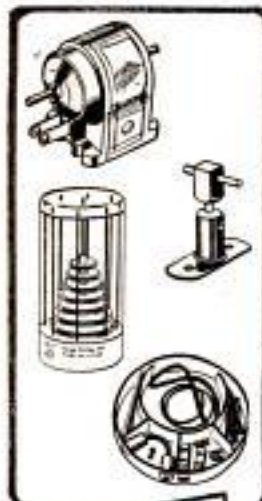
The sun alone, however, will provide some 80 to 85 percent of all heating requirements of the house. What about the rest? Down in the cellar, a small automatic oil furnace kicks in whenever the sun isn't doing its job well enough. This little furnace can throw enough heat to supply all the needs of the house during long, overcast periods—warming water in an auxiliary 275-gallon tank to do the job. The domestic hot-water system is also connected with this smaller tank. A motor-operated valve makes the change-over when the house thermostat senses that the water in the big tank is getting too cool.

Except for the change-over from winter to summer operation, and vice versa, the entire system is automatic. All the solar-house owner needs to worry about is to close the tight-fitting draperies on his windows each night to cut heat loss. These are the only visible interior items in a solar home that differ from any conventional

(Continued to page 278)

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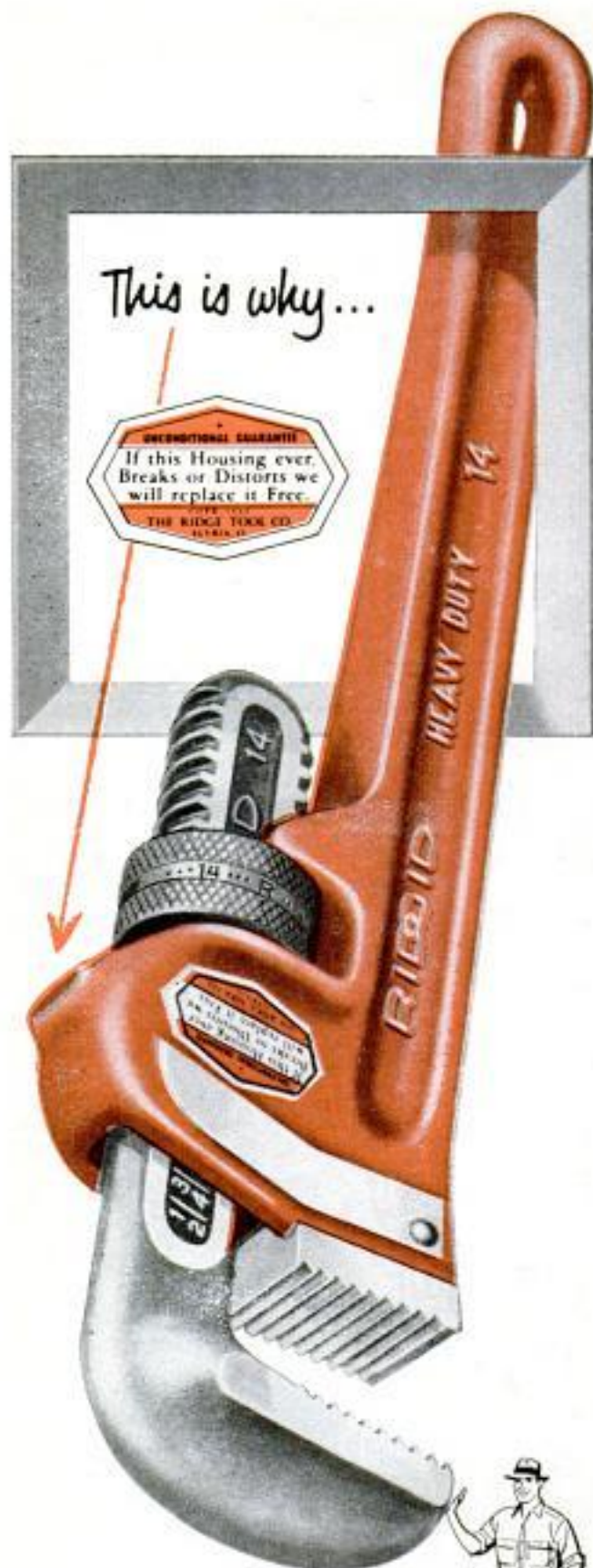
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home interior. "When spring arrives," explains Pelletier, "the solar-house owner simply flips a switch and turns a few valves. The switch shuts off the auxiliary furnace. The valves disconnect the big tank from the solar collector and switch the flow pattern. Sun-heated water then flows through the small tank where it provides domestic hot water only. In the big tank, a small refrigeration unit takes over, chilling the water to 45 degrees. The fans in the heat exchanger can now blow cool air through the house ducts, providing air conditioning, if desired.

#### Location Is Limited

The solar-house dweller has several options. He can keep his home cool or not cool in summer by flicking a switch control on the refrigeration unit. On cool days in early or late summer, he can cut in the auxiliary furnace to warm things up.

Building the house in Lexington wasn't easy. "You approach a project like this," says Pelletier, "with the researcher's maxim in mind: 'If anything can possibly go wrong—it will.'"

"First you must find a lot with proper exposures. Some developers were reluctant to sell us land for fear our building might affect other sales. Then, designing a solar house within a tight framework is tough. You'll have one blind, windowless side with an arbitrary slope where the collector goes. Location of rooms and windows is limited by the constant consideration of heat loss versus necessity for lightness and airiness."

The design chosen for the Lexington house combines the largest-possible living area with the smallest-possible collector area. By setting the building in a ditch and banking the side walls with earth to second-floor level, engineers were able to cut heat loss considerably. "A fact often overlooked," Pelletier points out, "is that a solar-house builder must go easy on big southern windows. On sunny winter days too much south window can make the house so hot you have to ventilate it, and heat is wasted."

#### Other Solar Homes

Great care must be taken in designing collector panels. Since they form part of the roof structure, they must be raintight. They must also be impervious to dust. One of the old solar houses at M.I.T. had panels that allowed dust and vapor to enter. So much "smog" accumulated that the glass fogged and heat transmission was cut back noticeably. The collector on the Lexington house was designed to be dustproof and slopes so sharply that it is self-cleaning. As a result, windows are mostly odd-shaped

(Continued to page 280)

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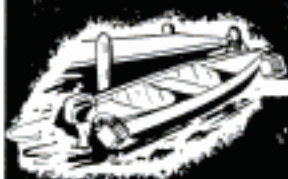
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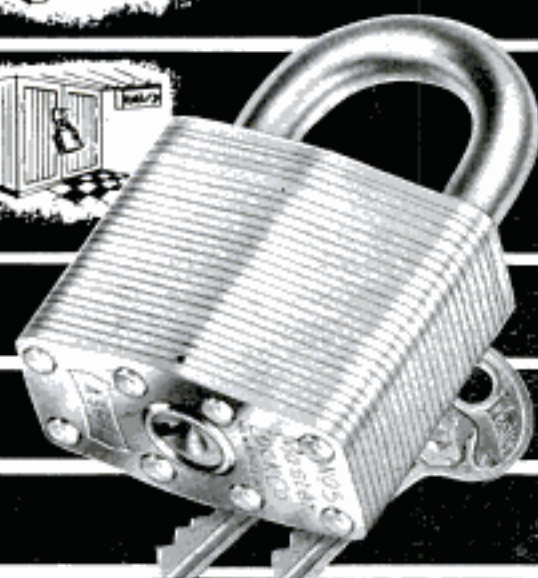


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affairs in the end walls, cut to conform with the sloping roof lines.

Actually, the new solar house is not the first attempt to make the sun heat a livable dwelling. At least three others have been built in recent years. A famous one, also in Massachusetts, used batteries of cans full of Glauber's salt to store the collected heat. In the process of crystallizing and melting, the salt took on or gave off heat as called for by the house. However, the system required considerable auxiliary electric heat during long, cloudy spells in Boston's climate.

Two other solar homes—one in Arizona and another in Colorado—store their heat in huge bins of crushed rock. Solar experts are watching these private experiments with great interest. The Lexington house is an attempt to produce a prototype dwelling that may some day be the basis for a solar home within reach of you and me.

Can you build one today at a price comparable to what we'd have to pay for a conventional house? According to Anderson, although the system employed in the Lexington house has been proved effective, it still is economically impractical for general use in a northern climate such as New England's.

"Solar heating," he points out, "is probably now economically feasible in areas where there is ample clear weather and where the cost of fossil fuels is abnormally high.

"It is true," says Professor Anderson, "that the cost of heating the Lexington house will be very low, but the initial cost of equipment will be too high to justify an installation by the average home builder in the near future." ★ ★ ★

## Water-Absorbing Plugs Protect Stored Engines



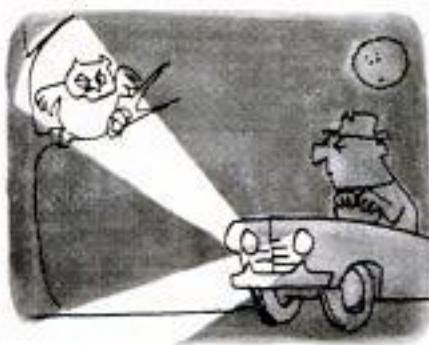
You can eliminate harmful moisture condensation on the inside of a stored engine by replacing its spark plugs with plugs containing water-absorbing crystals, according to the manufacturer. The plugs can be used year after year.

☐ A microwave relay system capable of handling more than 10,000 telephone conversations, or 12 television programs plus 2500 telephone conversations, has been developed by Bell Telephone Laboratories.

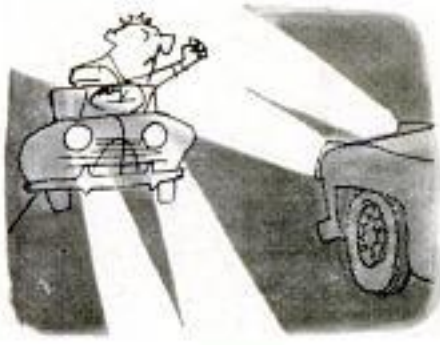
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3. Ever have oncoming motorists "flash" their lights...believing you were driving with your "brights"?—when it was your *lower beam*... aimed high!



4. When headlamps are aimed low, the beam is too short... and you might not see in time to stop in time.



5. Your dealer can tell if headlamps are mis-aimed, and he can aim them accurately in minutes, even in daytime.



6. So, to get *more light* where it is needed... from your present headlamps... have them aimed *today!*

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Take a look at your *unlighted* headlamps. If they look like those at right, even re-aiming won't give you all the light you need. They should be replaced with new G-E *All-Weather* Headlamps that are all glass... their reflectors always stay shiny. When driving on the *lower beam*, G-E *All-Weather* Headlamps let you see better in fog, rain or snow and against the glare of oncoming traffic. Their *upper beam* reaches far and wide for safer driving on the open road.



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Get a pair of G-E *All-Weather* Headlamps today—and have your dealer aim them when he puts them in. You'll see the difference tonight. General Electric Co., Miniature Lamp Dept., Nela Park, Cleveland 12, Ohio.



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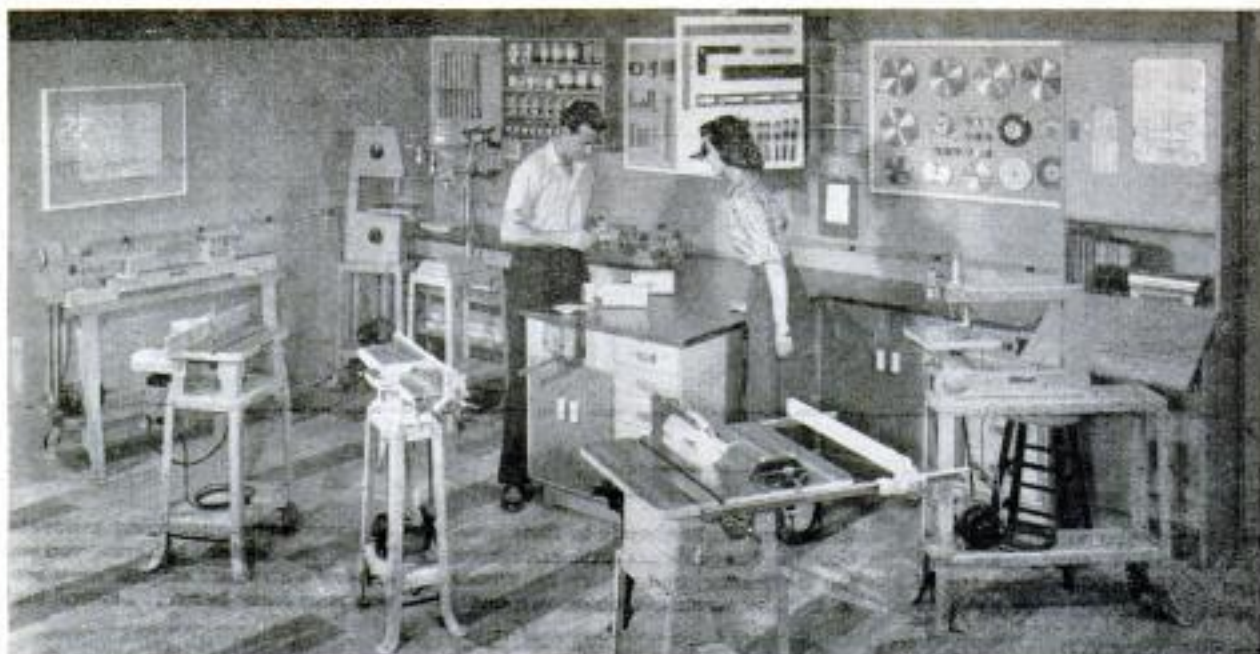


Photo courtesy Delta Power Tools Div., Rockwell Manufacturing Co.

## Dream Workshop Has Eight Tools Around T-Shaped Bench

Raymond Loewy, the noted industrial designer, has come up with a dream workshop for craftsmen. In the shop are eight single-purpose power tools and 30 square feet of workbench area. The bench itself is T-shaped and splits the shop into two areas so two members of the family can work on

different projects simultaneously. A swinging tool panel and a planning desk are other features of the shop. The eight streamlined tools, also styled by Loewy, are a lathe, band saw, scroll saw, drill press, tilting-arbor circular saw, jointer, shaper and grinder.

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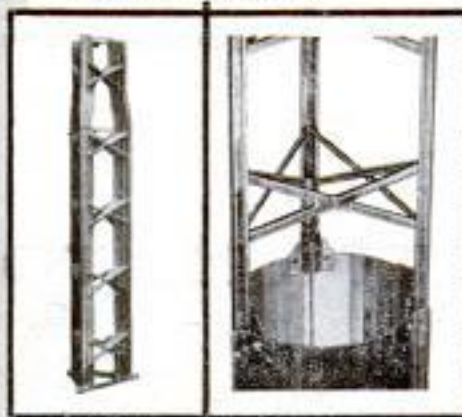
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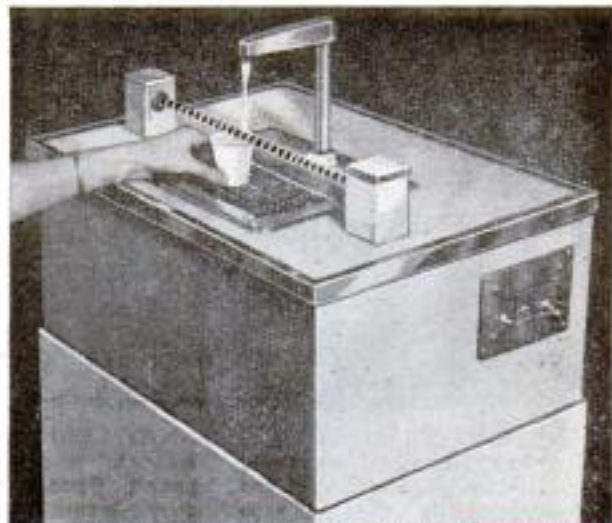
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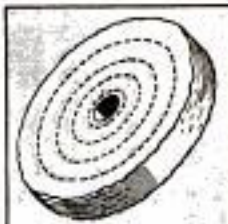
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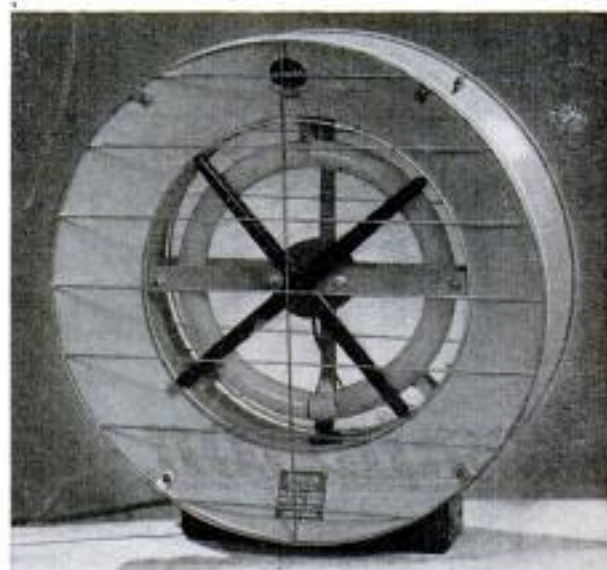


### Machine Makes Sauerkraut

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## Our Home at the Bottom of the World

*(Continued from page 119)*

on its side as wind caught the chutes. But the engine was still going strong, and in a few hours we had jacked it back on its feet.

More planes arrived with more materials and men. By the end of the eighth day, our working Seabee crew numbered 24 men. Out of the sky came sleds and dogs. A weasel floated down, broke its battery, so we had to use the dogs until a replacement arrived. By the end of my first day we had located and marked all the drops and moved many to the camp area. One of the big Jamesway huts was erected and fitted with space heaters, so most of us slept in heated quarters our first night on the South Pole!

The Jamesway is a neatly packaged affair, perfect for airdrop. Its box unfolds to make the floor. Its heavy, insulation-padded canvas cover drapes over curved beam sections to make a Quonset-shaped hut with a floor area of about 24 by 40 feet. The nonstandard foundation trusses we set it on were too long for dropping, so were cut in half and rebolted on the ground. Even so, 10 of us assembled it in eight hours. Two of these structures are now

permanent dormitories at South Pole base. The rest are insulated buildings on snowshoe foundations similar to the structures used at Little America and McMurdo Sound (see *Popular Mechanics*, April 1956 issue).

Days began at 9 a.m., erecting the buildings, and framework for the wire mesh and burlap that will form tunnels between buildings when drifting snows bury the camp this winter. By noon, the first airlift Globemaster usually arrived, followed by two or three more during the afternoon. All cargoes had to be retrieved the day they parachuted, but with the D2 and weasel to help, the job was easier. Between midnight and 3 a.m., we "hit the sack." All the while we were there, the sun circled the sky 24 hours a day.

It wasn't all work. At Christmas time, the Air Force dropped us Christmas trees flown in from New Zealand, plus ornaments, mail and gifts. Carols were sung around the space heaters in the finished buildings, and a big dinner with all the fixings was served.

South Pole base construction had a timetable of three months for completion. The job was finished in six weeks. Atop the garage and shop in the center of the cluster of buildings, Dr. Siple erected a genuine red-and-white-striped "South Pole." On



top of it was fastened an inverted fish bowl that Siple had had mirrored in New Zealand for special photographic effects. The day the base was completed, an American flag was run up the South Pole and flies there today. Beneath it, in their sub-snow network of tunnels and buildings, scientists conduct their IGY work. Twice daily, radiosonde balloons are released from a hatch in the inflation building, where aluminum chips, lye and water from melted snow produce the hydrogen gas. Under a 15-foot-diameter radome on stilts above the drifting snows, a big radar antenna tracks the balloons to 70,000 feet. Readings from the train of instruments are radioed back to earth, providing data on wind, barometric pressure, temperature and humidity. This is exchanged by radio with scientists at other Antarctic bases. From this data will come the first significant South Polar weather maps in history. Through a shaft leading up from the science building, ionosphere and aurora specialists climb to another building on stilts above the snow, where they can study the cold night sky through plastic viewing domes without going outdoors.

Facilities for magnetic studies and other scientific projects also are contained in this compact base. Dr. Siple, Antarctica's ice expert, is digging a hole 100 feet deep to

study the make-up of the ice plateau. When we left, the four-foot wide shaft was already down to the 20-foot level.

Until daylight comes again and planes can once more fly in to the bottom of the world, these men will remain completely cut off, except by radio contact with other bases nearly 1000 miles across the frigid wastes. But they'll be about as comfortably isolated as anyone can be at the South Pole. ★ ★ ★

*The views expressed in this article are the views of the author and do not necessarily reflect the views of the United States Navy.*

### Superfuels for Air Force

Semicommercial production of high-energy fuels for the Air Force has begun at Niagara Falls, N. Y. Olin Mathieson Chemical Corporation announced that full-scale production is expected by 1959. The superfuels will increase jet-aircraft range up to 50 percent and eliminate high-altitude engine failure. (See "Mystery Fuels for the Missile Age" in the July 1957 issue of *Popular Mechanics*.)

☛ Flying time without overhaul for a J-57 jet engine has been extended to 1000 hours, the equivalent of more than 20 flights around the world.

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DUO-GLIDE —  
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plant ... the ultimate  
in motorcycling!

## Here's How to See Through Fog

(Continued from page 125)

the other vertically. Yellow "fog" lenses are no more effective than clear lenses in illuminating the road, says Marsh.

Marsh cautions that any fog light must be used instead of, rather than in addition to, regular lighting. Don't burn headlights and fog lights at the same time.

In the absence of special fog-lighting equipment, Marsh offers these suggestions:

- Don't depend upon parking lights or taillights for protection. Oncoming or overtaking drivers usually see your car before they see these small lights. This is especially true in day fogs.


- In daytime fog, burn your headlights on the high beam no matter whether in city or country. Watch the mirror for overtaking cars. When one approaches, warn the driver of your presence by blinking your right-turn indicator or by lightly applying the brakes to operate the stop lights (by the way, Marsh and other lighting experts prefer the term "brake lights" because they go on each time the brakes are applied regardless of whether a stop is made or not).

- While experts cannot officially recommend it due to legal complications, most will admit that when fog gets thick enough, the driver can best protect his rear by continuous operation of the turn-signal lights. These high-intensity lamps pierce the fog much better than normal taillights.

- Truckers should not rely on amber marker lamps in day fog but should install higher-powered lamps. Where legal, truckers should add a switch to burn both rear turn indicators continuously for rear-end protection. Actually, steady lamps probably give better protection than flashing lamps in fog. In fact, Marsh believes all cars should have a special fog switch to operate both rear turn indicators steadily in a fog.

- White fog lamps mounted as low as is legal give more usable light than the new sealed-beam lamps in fog.

- If you must stop in the fog (and this is extremely hazardous) pull off the road as far as possible. Set warning flares 100 to 300 feet behind the car. Leave a piece of luggage or some other large object on the shoulder at least 50 feet behind the car to warn other drivers that they are off the road. Drivers often follow the lights of a parked car, thinking it is moving, and crash into it in fog. By putting a suitcase on the shoulder you will make them realize they are in the wrong lane. The suitcase may be ruined, but your car, and possibly your life may be saved. ★ ★ ★



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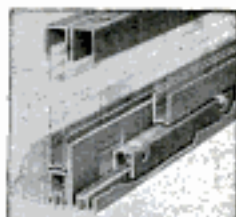
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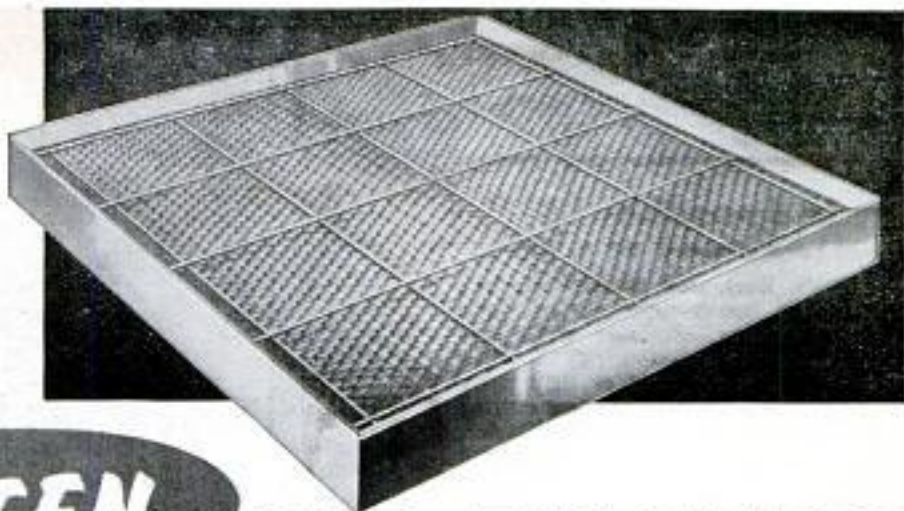
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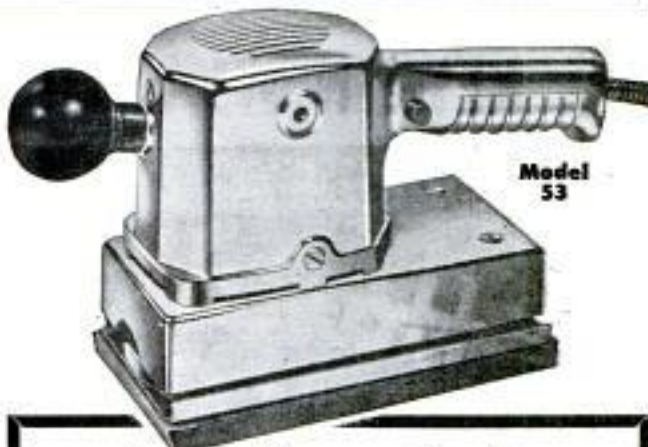
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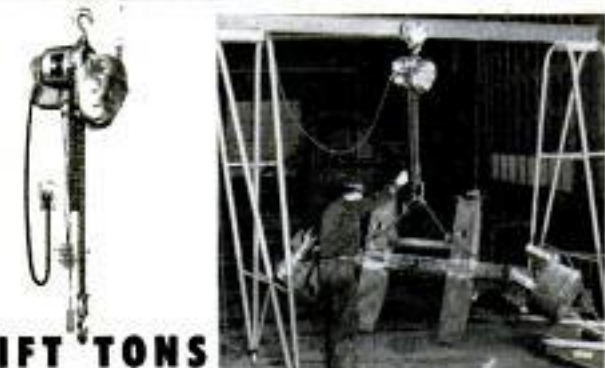
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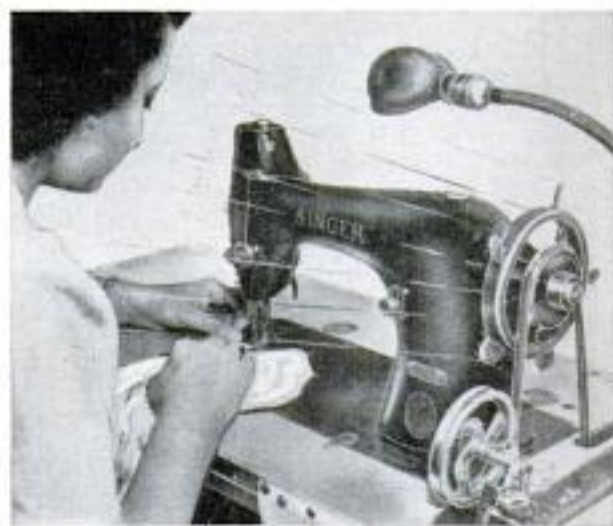
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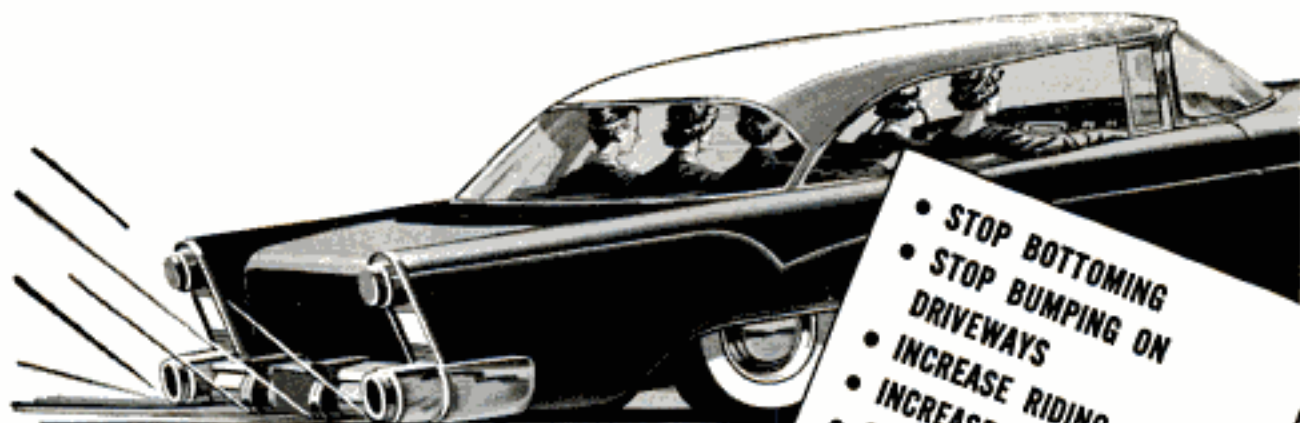
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## Over-the-Shoulder Bombing

(Continued from page 109)

of air warfare. Command officials shuttled the requirement to one of its centers, the Wright Air Development Center, in Dayton, Ohio, which has a long and distinguished history of aviation "firsts." One of the center's Armament Laboratory engineers, Lt. Col. John A. Ryan, studied the low-altitude bombing problem, cast out a number of possible solutions and came up with a brilliant idea which was a revolutionary departure from conventional fighter-bomber delivery techniques. First bearing the name of its inventor, the Ryan Toss-Bomb Computer, the device became known officially as the Low Altitude Bombing System. Subsequently, with the usual Air Force inclination for brevity and abbreviation, it became known simply as LABS.

### Upside-Down Bombing

LABS added to a rapidly growing list of what the Air Force likes to refer to as "black boxes"—small, compact units of electrical circuits and devices which supply aircraft, missiles and machines with electronic brains. The LABS computer, in effect, turned the dive-bombing maneuver upside down. Instead of approaching the

target from a high altitude and dropping the bomb vertically, the LABS computer made possible a low-altitude approach and a release which tossed the bomb in a high trajectory toward the target. To accomplish this release, the pilot flew an Immelmann maneuver. LABS added a circuslike acrobatic trick to the Air Force bomb-delivery techniques.

The story of the LABS computer, from its inception to an operational capability within a brief span of 16 months, is a noteworthy accomplishment of Air Research and Development Command teamwork. Soon after Ryan worked out the theory, he and Maj. John W. Hanlen, another armament laboratory engineer, incorporated some ideas for improvement and put together a "breadboard" model of the device and demonstrated the LABS intricacies to research and development officials at Air Force headquarters and the Air Research and Development Command. Everywhere it was well received.

Shortly afterwards, Ryan and Hanlen made contract arrangements with the Massachusetts Institute of Technology to fabricate a number of service test articles. The LABS computer was not a major "hardware" development task because most of the components were already in

(Continued to page 300)

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existence and needed only modification and assembly into one unit. Just as quickly as the Institute's engineers had inserted the last screw in the models, Major Hanlen dispatched the computers to Air Force testing agencies.

The Air Force Special Weapons Center, at Albuquerque, N. Mex., soon began test activities. These tests were the first the Air Force had formally undertaken with the toss-bombing technique. Because only theoretical studies of such tactics were available, the Center's 4925th Test Group (Atomic) initially used 500-pound practice bombs to gain fundamental pilot proficiency and prove general LABS computer suitability. Both objectives were quickly attained after relatively few drops at the Aberdeen Bombing Mission Precision Range at Edwards Air Force Base, Calif. Directly afterward, the test group started dropping atomic-weapon dummies at the Los Lunas Bombing Range, N. Mex., as well as at Edwards.

### Tests Were Encouraging

It did not take the Special Weapons Center long to submit an exceedingly encouraging report on its test operations. The LABS computer proved more accurate than expected. Furthermore, the test personnel estimated that a pilot could become accurate with the LABS delivery technique in a short period of time.

Not long after the development of the initial LABS computer, some of the engineers and combat-experienced pilots associated with the development and testing realized that from a practical standpoint there were possible restrictions to the system. What if the approach to the target were obscured by bad weather? What if the pilot were forced to seek "targets of opportunity?" Under these circumstances it would not be possible to fly a pre-planned or "canned" mission.

To correct this deficiency, Major Hanlen quickly introduced modifications. The new LABS model allowed higher angles of release. Under these conditions the pilot uses the same basic Immelmann maneuver. However, the weapon is not released until the aircraft is in a vertical position. Following release, the bomb continues going straight upward due to its initial velocity which the aircraft gives it. After the bomb loses this velocity its nose flips over and it falls directly downward toward the target.

The same modification allowed for still another delivery pattern—even more unique. Again the Immelmann maneuver is used, only this time after the pilot has

(Continued to page 302)

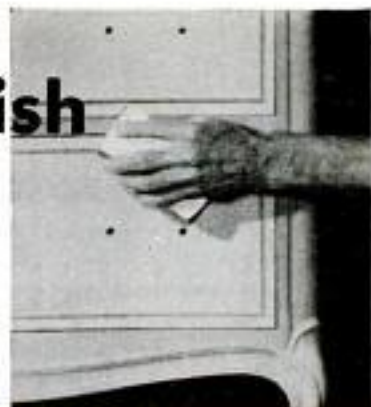
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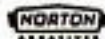
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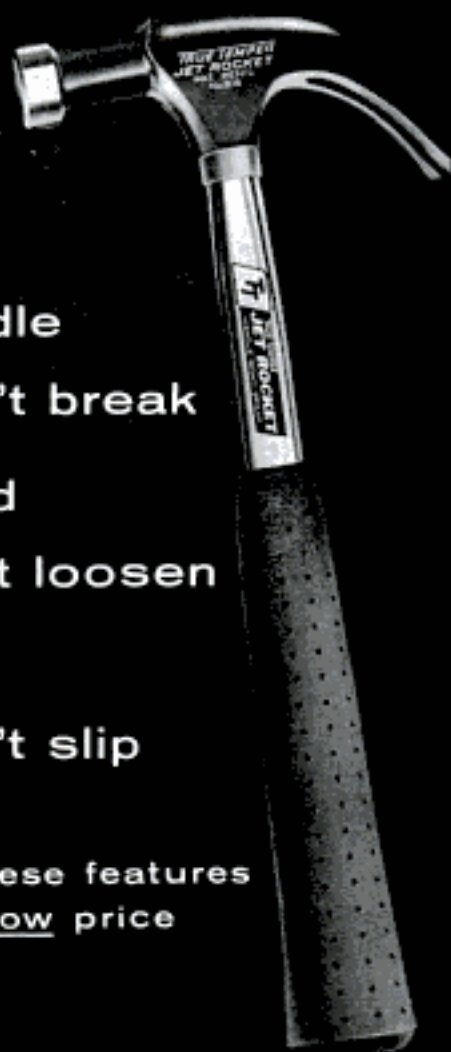
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passed directly over the target. The bomb is released at a still higher angle from the original flight path. In this manner the bomb goes *backward* toward the target in a high arc, the pilot again crosses over the target and at bomb burst he is headed in the same direction from which he came. In Air Force language this maneuver is referred to as the "toss back" or "over the shoulder" release.

These additional releases further increased the acrobatic repertoire of the basic LABS device and allowed considerable flexibility in its operational use.

Other than LABS accuracy, reliability and the new techniques, there were two vital secondary factors concerned with atomic-weapons size and weapon effects which played important roles in the LABS delivery.

#### Progress in Atomic Weapons

By the time LABS was under development, atomic weapons were already small enough to be carried by fighter-bombers. Following World War II the Atomic Energy Commission had pursued an intense development and improvement program on all parts of atomic weapons. This endeavor paid off handsomely in several extremely important areas—a more efficient use of fissionable materials, improvement of design, better reliability of ordnance components, and reduction in over-all bomb size. This progress lifted several atomic weapons from the aura of the laboratory and listed them for widespread active military duty. It was common knowledge that the bombs dropped on Hiroshima and Nagasaki were not far removed from laboratory gadgets.

By 1953 the Atomic Energy Commission had exceeded its original estimates on both the production and variety of atomic weapons. These facts prompted Maj. Gen. John S. Mills, then commander of the Special Weapons Center, to advance the theory that "new designs of atomic weapons are being developed to further our capability to permit economical use of atomic weapons against a wider variety of targets."

Noting the development of an entire family of weapons, General Mills asserted that the Air Force could "deliver varied kinds of atomic weapons against varied targets with varied aircraft types."

Granted that the Air Force fighter-bombers could carry A-bombs and deliver them from low altitudes, what assurance did the pilot have that he or his aircraft would survive the terrible holocaust he created? There are four phenomena of an A-bomb blast which have to be considered by mission planners—wind pressure at

(Continued to page 304)

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the blast-wave front, gust velocities following the wave front, thermal (heat) radiation and nuclear radiation. Taking data from atomic tests in the Pacific and the Nevada test sites, the Wright Air Development Center's engineers and mathematicians carefully combined all of the dangerous A-bomb effects on graphs and charts in terms of distance from the point of explosion. Against this data they figured exactly how far the aircraft had to be at bomb-burst time to escape the A-bomb's effects. Because of various bomb yields and because each aircraft had different flying capabilities, a large variety of combinations had to be calculated to suit all conditions. Exactly how large an atomic weapon can be safely delivered by fighter-bombers is still secret information.

#### Computer Ready for Production

Following the tests at the Special Weapons Center, the LABS computer was ready for production. The Wright Air Development Center, along with the Air Materiel Command, arranged for the negotiation of the computer contract with the Minneapolis-Honeywell Regulator Company of Minneapolis, Minn.

But Lieutenant Colonel Ryan and Major Hanlen did not consider their job finished upon securing production approval. After the computers rolled off the assembly line, these two men accompanied the computers to the operational aircraft, supervised installation, trained pilots and maintenance personnel in LABS operation and gave briefings to fighter-bomber commanders and crews in all aspects of the LABS capabilities.

To a large degree, as with most developments in the Air Force, the LABS computer was a team effort. In addition to the development of the computer itself, other engineers in the Air Research and Development Command contributed much intuition, ingenuity and industry on other facets of the fight-bomber atomic capability. There were many vexing problems associated with the carriage and release of the atomic weapons which had to be solved before the computer had a chance to operate. But the bulk of the credit for LABS rightly belongs to Ryan and Hanlen.

Without question, the ability of the Air Force fighter-bombers to toss atomic bombs at tactical targets has added another good strong punch to the fighting strength of the nation. ★ ★ ★

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Ultrasonic waves can be beamed into the human body like radar to detect early cancer, a group of medical researchers reported in the *Journal of the Acoustical Society of America*. They say different types of tissues give different echoes, which can be recorded on an electronic instrument. The strength of the echo indicates the diseased condition of the tissue. One examination provides medical information unobtainable by any other means, including X ray, the researchers said.

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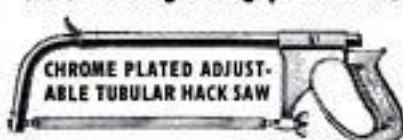


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### Scientists Create Element 102

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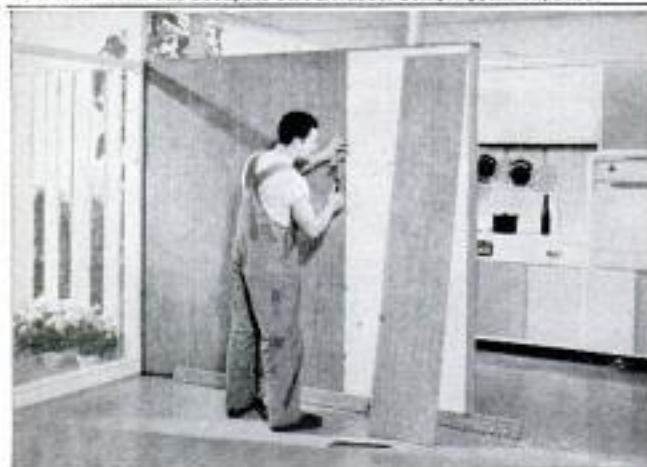
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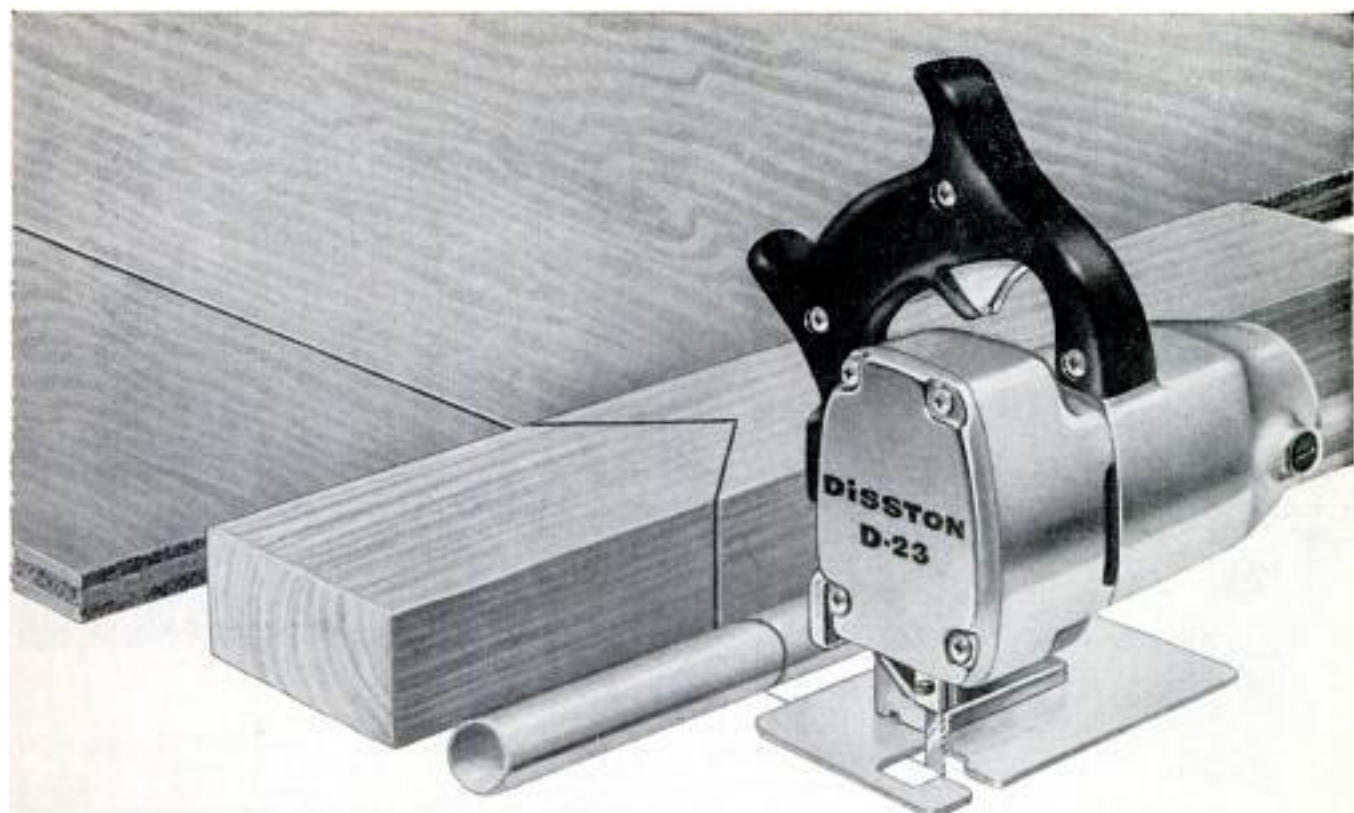


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**NEW HYDRAULIC SYSTEM KIT**  
 #400 R. Heavy duty Power Driven. Rated 14,000 lbs. lift. Consists of 2 D.A. hyd. cylinders, 3" bore x 24" stroke, each rated 7000 lbs. with 1000 P.S.I., 1 four way hyd. control valve with built in relief #821, 1 Vickers hyd. pump, 400 G.P.H., 100 P.S.I., 3750 RPM, 1 hyd. 2 gal. reservoir, 1 Purolator hyd. filter, 1 gauge 0-2000 P.S.I. all hose & fittings. Value \$184.10, save \$90.00. Kit price \$94.10. Kit with two #511 cyl. \$79.95

**BARGAINS FROM PREVIOUS ADS** (details free). Accumulators, 2000 P.S.I., 3" dia. \$5.50, 12" dia. \$15.50. Speed Reducer 10:1 ratio, 2 H.P. \$6.45. Peeco Hyd. Flow equalizer, 1500 PSI \$9.95. New Tachometer Indicator 0-10,000 \$7.50. New Weaver hyd. hand pump 2000 PSI, 20" handle \$9.95

**GENERAL SALVAGE CO. CHECK OR M.O.**  
 2022 E. 27 St., Dept. 81, Kansas City 27, Mo.

**SAW SHARPENING IS EASY**  
 Super Filer No. 11 joints and sharpens hand and circular saws 6" to 10" with all teeth correct in height, depth, pitch, bevel. When file hits steel roller, teeth are finished. Saw runs free with no side pull. Includes 8" file. **\$9.95 PPD.**

**"TRU-CIRCLE" saw set** automatically sets teeth at 10° or more. **\$2.95 PPD.**

**SUPER SAW FILER No. 6**  
 Automatically controls depth, angle, pitch for all saws. Precision made and calibrated. Use in any vise or clamp. Includes file. **\$6.50 PPD.**

**DOWEL CENTERS**  
 Centers inscribe exact location for opposite holes. Pairs for 1/4", 3/8", 1/2" holes. **\$1.00 PPD.**

MONEY BACK GUARANTEE—CATALOG FREE  
 A. D. McBURNEY, 5908 Hollywood Blvd., Hollywood 28, Cal., Dept. A-107

## DREMEL Electric MOTO-TOOL

**Handiest Tool You Can Own**  
 Grinds Carves Engraves Drills Routs Sharpens  
 Craftsman or hobbyist, you'll find a thousand-and-one practical uses in the home or workshop for the amazing Moto-Tool. Handles like a pencil. Saves time, makes every job easier—and gives your finished job a professional look.

Since 1936, the Dremel Moto-Tool has been widely used as a precision tool in industry. It develops 27,000 RPM—the fastest, most powerful tool of its kind.

Buy a Moto-Tool—it will pay for itself in no time.



**MOTO-TOOL MODEL NO. 2**  
 (wgt. 13 oz. shown above) **\$19.95**



**MOTO-TOOL MODEL NO. 1** **\$12.85**

**MOTO-TOOL KIT NO. 2 (as shown)**  
 Incl. Model No. 2 Moto-Tool, 23 accessories (high speed cutters, grinder, polishers, etc.) **\$27.50**  
 in a sturdy steel case **\$21.50**

**MOTO-TOOL KIT NO. 1** **\$21.50**

SEE YOUR DEALER or write for FREE catalog on the complete Dremel line of power tools.

Quality Power Tools since 1934  
**DREMEL MFG. CO., Dept. 117K, Racine, Wis.**

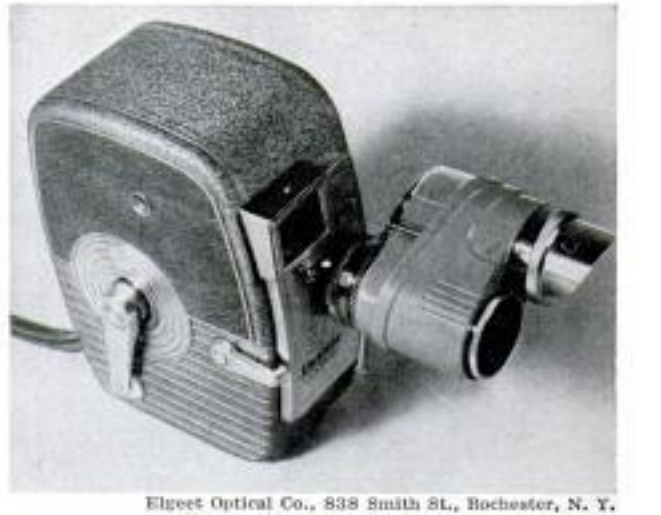
## GREATEST NEW DEVELOPMENT IN AUTOMOTIVE SAFETY!

TRACTION-MASTERS simply installed on your car assure a smooth, level ride—safe, short stops—faster starts! No dip—no dive—no sway! Improved traction in snow, ice or mud. Tremendous savings on tire, spring, shock and gear life! Blowout protection!

Only **\$42.45** pair

**MONEY-BACK GUARANTEE!**  
 Write Dept. PM-10 for FREE BROCHURE with full information.

**Traction-Master Co.**  
 2917 W. OLYMPIC BLVD.  
 LOS ANGELES 6, CALIF.



## Lens-Meter Attachment Improves Movie-Camera Accuracy

Home movies can be improved with a combination lens and exposure meter attachment. It fits any eight millimeter "D" mount camera. By turning a lever to match the lens-opening arrow with the meter's light-indication needle, the correct exposure is set automatically. The device is accurate because the meter is located close beside the lens and both receive the same amount of light. It is particularly valuable when using color film.

Elgect Optical Co., 838 Smith St., Rochester, N. Y.

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## NEW WEATHERSTRIP

*has unique pile that seals out costly drafts*

No home insulation job is complete until doors are tightly sealed with DraftTite, the weatherstrip built like the kind used in cars to seal out drafts at high speeds.

DraftTite traps millions of dead air cells in tightly packed "piles" anchored in rubber on aluminum strips. Cold and wind can't penetrate. Lasts a lifetime, won't mat, deteriorate, buckle, harden or waterlog. Costs only \$1.98 to permanently seal an average door frame, 69¢ for the bottom. Installs in minutes. At your hardware dealer's now.



\*Trade-Mark

*The Standard Products Co.* LEXINGTON, KENTUCKY

## Precision Grinder Brings QUICK CASH INCOME!

Make \$3 to \$5 an hour in your own spare time business. Low cost Foley Grinder sharpens circular saws, ice skates, rotary mower blades, also sands and polishes. No experience needed. Write today for free illustrated information and sample handbills that will help you start. No salesman will call.



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- FOLD THE LEGS AND HANG 'EM ON THE WALL
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- LIGHTWEIGHT, EASY TO CARRY, BUT STRONG
- LABORATORY TESTED FOR 2000 POUNDS

SPACESAVER FOLDING SAWHORSE KIT includes, metal brackets for 2 folding sawhorses, list of all materials needed, complete instructions for cutting and assembling your own FOLDING SAWHORSES only.....\$1.00

THE MARTIN COMPANY, 6604 Winnebago Ave., St. Louis 9, Mo.

OCTOBER 1957

## ?? SHOP QUIZ ??

Question 1 \_\_\_\_\_

What's the **EASIEST** way to drive wood screws?

Question 2 \_\_\_\_\_

What's the **EASIEST** way to remove wood screws?

Question 3 \_\_\_\_\_

What's the **EASIEST** way to run nuts or bolts on or off?

Question 4 \_\_\_\_\_

What's the **EASIEST** way to use heavy-duty cutting tools like hole saws, masonry and auger bits?



# ANSWER:

WITH YOUR ELECTRIC DRILL AND A

# Supreme Versamatic

Reversible speed reduction attachment that fits every power drill. Increases power 7 times. Reverses with one simple twist. A must for every drill owner.

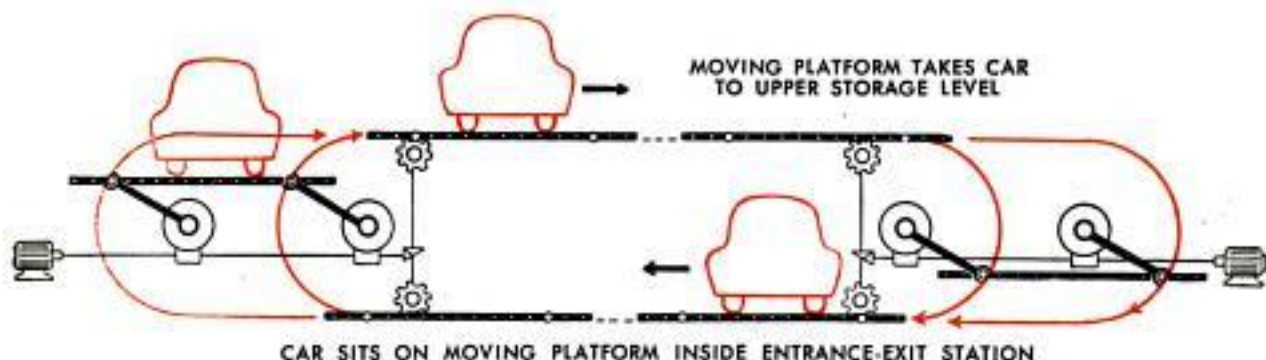
**\$14.95**  
AT LEADING  
TOOL  
COUNTERS

By the makers of SUPREME BRAND CHUCKS

**SUPREME PRODUCTS CORPORATION**

2222 S. Calumet, Chicago 16, Illinois

A Division of A-S-R Products Corporation



## Moving Platforms Park Cars on German Lot



German cars park on a mechanical assembly based on electrically driven moving platforms with a swing-around junction between upper and lower levels. The cars are held on individual platforms linked to form a continuous circuit. Each movement brings an empty space or car to the entrance-exit station.

Modern fighter planes require 23,000 feet of electric wiring, as compared to 1500 feet of wiring in the World War II fighter aircraft.

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Perfect  
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NYLON BRUSHES

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The amazing CIRCLE MASTER, a new patented attachment, will permit you to cut all circular shapes on any make bench saw. Simple to use, CIRCLE MASTER enables you to cut a perfect, clean and smooth circular shape. Cuts a diameter adjustable up to 30" on small saws, even bigger on large saws. You can make chairs, table tops, wheels, trays, lazy susans, stools, coasters . . . anything that calls for a circular shape. You can make cove cuts, beveled cuts, shoulder cuts, moulding cuts and many others depending upon blade used. You must be completely satisfied or your money back. Send Check or money order. We pay postage.

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GUARANTEED

**BRAND NEW**

**WALKER  
5-TON  
HYDRAULIC  
LIFT KIT**

FOR — • SNOW PLOWS • TO  
DUMP FARM WAGONS • ADJUST  
DEPTH OF PLOWS • HYDRAU-  
LIC PRESS • HYDRAULIC JACK.

THE COMPLETE KIT CONSISTS  
OF: 1—Walker Hydraulic Hand  
Pump—Rated 1500 lbs. per sq. inch  
with 2 gal. hydraulic reservoir • Re-  
lease valve • Filler plug and air vent

ITEM  
#KW-  
116

• 28" steel handle. Fine for hydraulic presses; snow plows, jacks.  
Dimensions: 6" Diameter, 29" long with 3/4" pipe  
thread port. Pump Assembly Item #P449..... **23.50**

1—6 Ft. length double wire braid rubber covered  
hydraulic hose—tested to 20,000 lbs.! Item #27H4... **3.95**

1—Hydraulic Cylinder, 3" bore, 6" stroke. Husky 3/4" solid steel  
shaft. Will lift 10,000 lbs. using 1500 lbs. of pump pressure.  
Clevis mountings that take 3/4" diameter pins. May be used for  
single or double action service. Overall length  
17 1/4"—retracted. Item #C419..... **12.50**

1-Gallon hydraulic fluid furnished free with each kit.  
Plus all necessary hydraulic fittings. Total ship. wt.—40 lbs.

**COMPLETE KIT PRICE**..... **38.95** F.O.B. CHICAGO  
(ALL OF ABOVE INCLUDED)

**1 1/2 H.P. HYDRAULIC SPEED REDUCER**

with FINGERTIP CONTROL



USE FOR: • Reamer Drives • Midget  
Cars • Feed Mills • Canning Machines  
• Conveyors • Lathes • Milling Ma-  
chines • Motor Boats • Cream Sepa-  
rators • Garden Tractors •

Variable output speeds from 0  
to input speed available by  
moving control handle. Locking  
handle maintains setting. Use in-  
put power of 1/2 to 1 1/2 H.P. Shafts 3/4"  
diam. Input rotation counter-clockwise  
facing shaft. Input speed 750 R.P.M.  
7 1/2" x 7 1/2" x 11 1/2". Output rotation

ITEM #115  
reversible. Ship. wt. 31 lbs. Complete with 2 qts. of  
oil and full instructions. F.O.B. Chicago..... **72.50**

**GROBAN FOUR-WAY OPEN CENTER  
HYDRAULIC CONTROL VALVE**



ITEM #126—Four-way open center control valve,  
with built-in adjustable relief valve factory set  
at 1000 P.S.I. Spring loaded neutral position.  
For use with one double acting cylinder. In neu-  
tral position cylinder is locked and pump un-  
loaded. Can be used as single unit or mounted in  
series. Has 3/4" pipe thread inlet and  
outlet. 1/2" pipe thread cylinder  
ports. Finger grip handle. Ship.  
wt. 10 1/2 lbs.

**AN OUTSTANDING BUY!**  
F.O.B. Chicago..... **23.50**

**A \$15.00 VALUE 37-PIECE  
METAL STAMPING SET**

MADE TO RIGID U. S.  
ARMY SPECIFICATIONS  
STAMPS NAMES, NUMBERS,  
ON WOOD OR METAL

FULL ALPHABET, A-Z. NUM-  
BERS 1-9, "0", and PERIOD.  
ITEM #390-B—PRECISION HAND  
SHIMMED, deep cut, hardened  
TOOL STEEL STAMPS—IN  
FITTED EASY ACCESS CARTON.



\$5.50 per Set

**2 FOR 10.00** PPD.

**BRAND NEW 1 H.P. 12 VOLT  
ELECTRIC MOTOR**

ITEM #308 — • For electric wheel  
chairs (Pop. Mech. design—Mar. 1953).

• For electric golf carts.

• For self-propelled scooters, children's  
midget cars.

Rated 1 H.P.—100 amps., 5600 R.P.M.,  
12 volts, D.C.—This double shaft motor of  
ball-bearing construction may be run on 6  
volts for lower horsepower requirements—Standard 3/4" shafts,  
flange mountings.—Dimensions: 9"x4 1/2"x4 1/2".



Ship. wt. 19 lbs. A real value at..... **12.50** F.O.B. Chicago

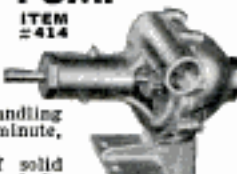
**2 H. P. ELECTRIC MOTOR**

ITEM #315—24 Volts, 90 Amps., 4000 RPM, Spline shaft both ends.  
Style similar to above. Mfgd. by Hobart or Diehl.

F.O.B. Chicago..... **13.00**

**HIGGINS BRONZE  
CENTRIFUGAL PUMP**

PUMPS ALMOST ANYTHING



ITEM #414

Fine for: — • Irrigation • Sump  
Pumping • Sewer Drainage • 75 gal-  
lons per minute @ 2400 R. P. M.

Higgins Type PNB, Model R, marine  
bilge pump. Open Impeller design for handling  
muddy water. Delivers 75 gallons per minute,  
30 foot head with 3/4 H.P. motor.

Pump body and impeller are made of solid  
bronze, with alloy steel 1/2" diameter shaft,  
1 3/4" long. Rotation of the pump is clockwise. Inlet has 1 1/2"  
pipe thread. Plain 1 1/2" outlet for hose connection. Di-  
mensions 12"x7"x8". Shipping weight 23 lbs.

F.O.B. Chicago..... **23.50**

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60 PAGES of unsurpassed War Surplus  
and new Equipment Bargains for farm,  
home, factory, workshop. Write today.

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WILL GET YOU THERE**

1. by getting a FALL TUNE-UP

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**HULL AUTO COMPASS**

\$6.95 AND \$5.50

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Weld, Cut, Brazo, Solder; Iron, Steel, Brass, Bronze, Aluminum and other  
metals safely and easily. Make your wrought iron furniture, porch railings,  
fences, knick-knacks and other metal specialties. With this fine equipment  
anyone can do professional-like work with little practice. Tool and equipment  
breakdowns are annoying and costly. Don't let them bother you. The Dynamic  
will pay for itself quickly in both time and money and is designed to  
operate from any properly wired 110 volt AC line.

Order your Dynamic Industrial type transformer Arc Welder  
for Workshop or Industrial use today. Order from this ad.

Literature on larger equipment available on request.

**DYNAMIC WELDER COMPANY, 1808 S. Federal Street, Dept. D2-K, Chicago 16, Illinois**

**EASY PAY PLAN**

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

**Only \$38.50**

F.O.B. Factory



**THE REACH IS RIGHT AND TIGHT**

**with KRAEUTER**

**LONG NOSE PLIERS**



#1781-7"

You can depend on reachability and cutting power with Kraeuter's #1781 Long Chain Nose Pliers. And your reach will be tight and sure for those hard-to-get-at jobs with the extra long milled jaws of these pliers.

Buy the right line. It's the Kraeuter line. Kraeuter tools are unreservedly guaranteed.

Send for catalog #25 illustrating complete Kraeuter line.

BUY THE FINEST  
BUY KRAEUTER  
BUY AMERICAN

MODERN AS TOMORROW

**kraeuter & co., inc**

FOR 100 YEARS THE FINEST IN HAND TOOLS 1860-1960 NEWARK, N. J.



### Atomic Lamp Burns 12 Years

Switch lamps for the New York Central System's new automatic yards will burn brightly for 12 years without maintenance or refueling. They are filled with a special gas called "krypton isotope 85" which reacts with a phosphor coating on the glass to produce a glow. When the brightness wanes the lamps can be restored to their original luminosity by refilling them with the krypton isotope. The krypton lamp in the photograph is being demonstrated by New York Central President A. E. Perlman. The railroad's atomic laboratory also is studying the possible use of tritium, another radioactive material, as a source of lamp energy.

### Enzyme Dissolves Blood Clots

Deadly blood clots may soon be dissolved by an enzyme injected into the blood stream. Yale University scientists report significant progress in purifying the enzyme, known as plasmin. Preliminary tests on human patients are under way. Judging from animal experiments, a blood clot should dissolve and the blood return to normal a few hours after injection. Existing drugs help prevent the formation of clots, but until now doctors have had no satisfactory means of dissolving a clot.

### Cold Engines Start With Spray

Any type of gasoline or diesel engine will start in extremely cold or damp weather when a flammable fluid is sprayed from an aerosol can directly into the air cleaner or intake air stream. The starting fluid is inert, making it safe to use and store, and is effective from 65 degrees below zero to 180 degrees above zero Fahrenheit.

Spray Products Corp., P.O. Box 584, Camden, N. J.

# SURPLUS SALE

• War Surplus  
• Excess Inventory  
• Bankrupt Stock

## PORTABLE POWER GENERATOR

• Genuine General Electric ball bearing 115-v 3000-w direct current generator. Ideal for powering portable saws, drills, contractors lights, sanders, etc.  
• Ready to use. Size 11"x11"x20". Wt. 160 lbs. Shaft 1"x3". Speed 2400 RPM. Govt. Cost \$195. . . . . **SALE \$49.47 FOB**



## WIND INDICATOR

• Finest Govt. wind direction and speed instrument. Attractive satin silver finish etched dial, opal lites show direction. Buzzer and lite indicates velocity. Operates on 110-v AC. Unit requires roof top transmitter. Easily constructed. Govt. cost \$97.50. **SALE \$14.95 Ppd.**



## GOLF CAR MOTOR

• Use for golf, boys, factory cars. Powerful, expensive ball-bearing, 140 to 1 gear reduction motor. Runs on 6 or 12-v storage battery. Easily reversible. Full instructions. Wt. 34 lbs. Govt. cost \$250. **SALE \$19.46 FOB**



## DIAL TELEPHONE

• Modern hi-efficiency attractive dial phone. Use for extension to main line on private systems. Use several for complete private system, etc. Complete with ringer, dial, etc. Govt. cost \$25.50. **SALE \$9.95 Ppd.**



## SURVEYORS LEVEL

• Accurate brand new latest model fully adjustable precision level with 14-power optically true telescope. Vertical focus. Sensitive spirit level. Use for land leveling, foundation work, surveying, etc.  
• Furnished complete with 8 1/2" graduated rod, polished case, tripod, etc. **SPECIAL \$54.75 Ppd.**



## AC-DC ELECTRIC GENERATOR

• Brand new 6-v suitable for light welder, battery charging, campers light plant, etc.  
• Generates 100 amps or 30-v DC and 1200-w 115-v 800-cycle AC. Marvellous buy! Govt. cost \$295. . . . . **\$13.91 FOB**



## HI-CURRENT TRANSFORMER

• Heavy duty 115-v AC transformer. Secondary 24-v at up to 30 amps.  
• Excellent for driving boys electric car, motors, other AC series type motors. Many applications. Wt. 11 lbs. Govt. cost \$19.50. **SALE \$11.29 FOB**



## BATTERY ELECTRIC WINCH

• Powerful, fully reversible ball bearing gear reduction winch. Runs on 6 or 12 volt truck or car battery. 1000-2000 lb. pull. Holds 40 ft. 1/4" cable. Use truck, boat, docks, etc. Govt. cost \$280. **SALE \$46.75 FOB**



## STEEL LETTER INDUSTRIAL STAMPS

• Finest steel stamp. Large size. 3/4". Mark on copper, steel, wood, leather. Reduce loss of tools by theft.  
• All letters of alphabet. Wood box 3x3 1/2 x 9 1/2". Govt. cost \$14.25. . . . . **SALE \$6.95 Ppd.**



## GIANT ARMY KITE

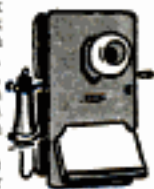
• Wonderful spectacular advertising unit. Will haul banners aloft (even a man), pull boats, etc. Made of strong silken fabric. Collapsible frame. Easy to set up or knock down. Will launch in ordinary breeze. Size 14'x 10'x3'. Wt. 25 lbs. Govt. cost \$125. **SALE \$16.99 FOB**



## SPECIAL OF THE MONTH!

### MAGNETO HAND CRANK PHONE

• Attractive light oak compact case, hand crank generator signal type with dry cell talking current. Use on rural phone line, for house-to-house, extension phone, etc. Latest craze is "old fashioned phone" in den or party room.  
• Will work on modern systems. An outstanding buy! Wt. 16 lbs. List \$26.50. **SALE \$8.97 FOB**



### ELECTRIC CLOCK TIMER

• Finest 115-v 60-c electric clock timer. Shows exact time. Will sound built-in alarm at any preset interval. Easy to read numbers. Fine for mounting desks, radio, TV, etc. 3 1/2" dia. Wt. 1 lb. List \$12.50. **SALE \$2.89 Ppd.**



### 5000 WATT POWER PLANT

• Wonderful buy! Army surplus plant 5000-w, 115/230-v, 60-c, 1-phase, 3-wire Hercules engine. Weather proof housing. Push button start-stop. Use emergency, stand-by, contractors, etc. Govt. cost \$1300. **SALE \$497.50 FOB**



### OTHER OUTSTANDING SURPLUS BUYS

• We have hundreds of other bargains including air compressors and accessories, etc. All styles power plants, hydraulic cylinders and pumps, electric equipment, etc. Typical specials are listed below:

- \$62 Irrigation Pump, 1 1/2" . . . . . \$24.61
- \$35 Stainless Steel Air Tank . . . . . \$16.95
- \$11 Fish and Worm Shocker . . . . . \$6.99
- \$21 Army Jungle Tent Hammock . . . . . \$6.95
- \$425 Hydraulic Cylinder Reducer . . . . . \$47.81
- \$64 Electric 12-v D-C Pump . . . . . \$9.95
- \$66 Gear Reducer, 80 to 1 . . . . . \$8.49
- \$195 Electric Car Motor 12-v . . . . . \$14.42

Order from ad or write for Free Catalog.



### BURDEN SALES COMPANY

812 "O" St., LINCOLN, NEBRASKA



## 10" TILT/ARBOR SAW BUILD-IT-YOURSELF from GIL-BILT KITS-PLANS

Sturdy wood, steel, and aluminum construction. NEW DEPARTURE ball bearings. Capacity and performance of floor saws selling for \$150.00 and up. Plans, all metal parts in kit with 10" comb. blade \$25.90, less blade \$22.98. P.O.B. St. Louis. Detail PLANS-PATTERNS only \$1.00 postpaid.

Build-it-yourself 12" and 18" Bandsaws, 6" Belt Sander, Shaper. Simplified plans, build easily with hand tools only. Advertised and sold for 10 years, over 33,000 units in use. Money back guarantee. **FREE CATALOG.**

**GILLIOM POWER TOOLS, Dept. 80-K, Lambert Field, St. Louis 21, Mo.**

Buy nationally advertised products. Ask with confidence for the brands advertised in POPULAR MECHANICS



# STOP

## ENGINE STALLS-VAPOR LOCK-LOW MILEAGE

INSTALL A **MILESMASTER**

## FUEL PRESSURE REGULATOR



Let Milesmaster help you enjoy better, more economical motoring. Sold everywhere . . . only \$6.95, plus installation.

Money Back Guarantee

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TOOLS, MATERIALS & SUPPLIES

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Constantine's latest catalog. 126 pages, many in color. Everything craftsmen need in hard-to-get hardware and supplies. Veneers, Inlays, Carvings, Mouldings, Upholstery Supplies, Plans. Sections on many Hand and Power Tools, How-to-do-it and wood finishing articles. 88 inlay designs and big wood identification panel of over 60 woods . . . all in natural color. Finest book ever offered. Send coupon for copy today!



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## CONSTANTINE'S National Woodworking CONTEST . . .

**CASH PRIZES**

America's leading supplier of woods and woodworking materials offers you the chance of national recognition for your skill and win one or more of 309 prizes. Nothing to buy, no entry fee. Contest closes March 31, 1958. Mail coupon for FREE details and entry blank today!

## MAIL COUPON TODAY!

Enclosed 25c (refunded on 1st order) Send Catalog and FREE "Chips and Chats".

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**ALBERT CONSTANTINE AND SON, INC.**  
2056D Eastchester Road • New York 61, N. Y.

OCTOBER 1957

317

# Johnson Red-Head Portable Air Compressor



## FOR

- HOME WORK SHOPS • HOME PAINTERS
- DO-IT-YOURSELFERS • BOAT OWNERS
- CHARCOAL CHEFS • GARDENERS
- FARMERS • KENNEL OWNERS

The Johnson Red Head Air Compressor is a powerful piece of equipment—not a play-thing. You can do a "professional" job with the Johnson Red Head. Can pay for itself many times over. Paint — Spray — etc.

### CHECK THESE "RED HEAD" FEATURES

- 100% BALL BEARING** and needle roller bearing construction.
- PISTON-TYPE UNIT.** Provides oil-free air. Built-in features eliminate pulsations.
- NYLON THRUST WASHER** keeps shaft in alignment. Neoprene seal tested through thousands of hours of trouble-free operation.
- LIGHTWEIGHT AND COMPACT.** 14" long, 8" wide, 10" high. Weighs less than 30 lbs. with motor. Easy to carry to any location.
- NO STORAGE TANK NEEDED.** Delivers 3½ cfm of free air and 50 psi pressure.
- FORCED AIR INTERNAL COOLING.** Aluminum die cast housing ribbed and reinforced for greater strength and maximum cooling.
- GUARANTEED PERFORMANCE.** Quality materials and advanced engineering. Simple, oilless, efficient.
- FOR USE WITH** any 1725 rpm ¼ h.p. or larger fractional horsepower electric motor. Power take-off or gas engine can also be used.

**\$44** LESS MOTOR



"Red Head" Compressor Kit includes: gun, 15 ft. air hose, fittings, 4" pulley on compressor, 26" V-belt, 3½" pulley for mounting on ¼ to ½ h.p. motor . . . weight less than 30 lbs. — easily portable.

FOR 75 YEARS  
Manufacturers of  
Pneumatic  
Temperature and Air  
Conditioning Control  
Systems.

Made by  
**JOHNSON SERVICE CO.**  
COMPRESSOR DIVISION  
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Write for Catalog on our Full Line of Compressors



Blu-Burn-R Products, Inc., Monroe, Wis.

## Portable Percolator

Completely portable, a percolator with a built-in burner will operate up to 12 hours and provide 200 cups of coffee from a disposable fuel can. It burns low-pressure butane gas, and the fuel can serves as a handle.

## Yankee Clam Meets Southerner— Result: Huskier Baby Clams

Curious biologists wondered what would happen if a clam from up north met a clam from down south. A boy clam and a girl clam, that is. After a three-year study at the Virginia Fisheries Laboratory, the answer is—the hybrid baby clams grow faster than their parents. More than 400 clams were planted in the experiments and marked for identification. During the period studied, the hybrid clams grew a half inch larger than the northern clams. The offspring of the southern clams did not survive the second winter. The biologists theorize that clam producers may be able to improve the yield and quality of their crop by hybridization just as farmers improve their land crops.

## Rings of Snow Circle Saturn

Using an infrared spectrometer, University of Chicago astronomer Gerard P. Kuiper has determined that the rings around the planet Saturn are composed of small snow crystals. Infrared light rays pierce haze and make water appear black and vegetation white on special films. The scientists said very little infrared light is reflected from the rings and they appear very dark on the spectrometer. He added that two of the moons of Saturn appear partly covered by snow.



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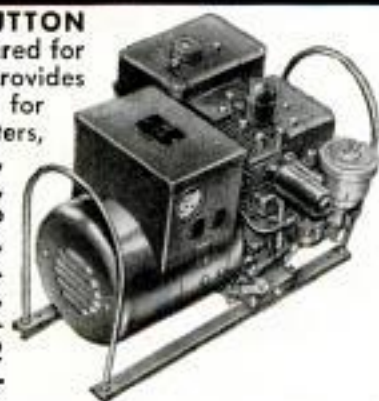
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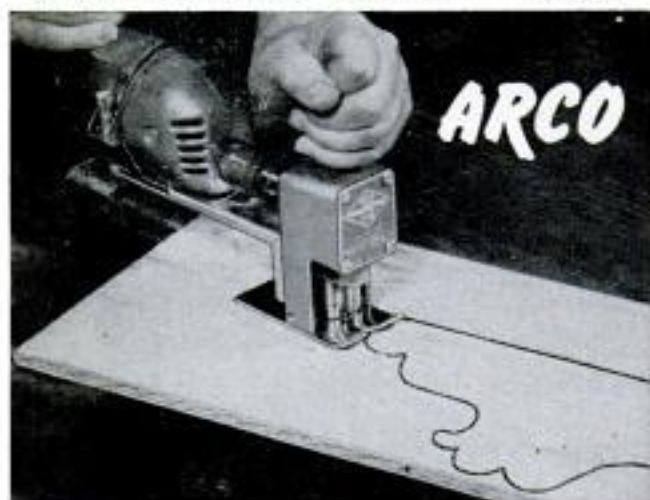
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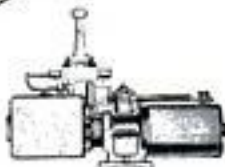
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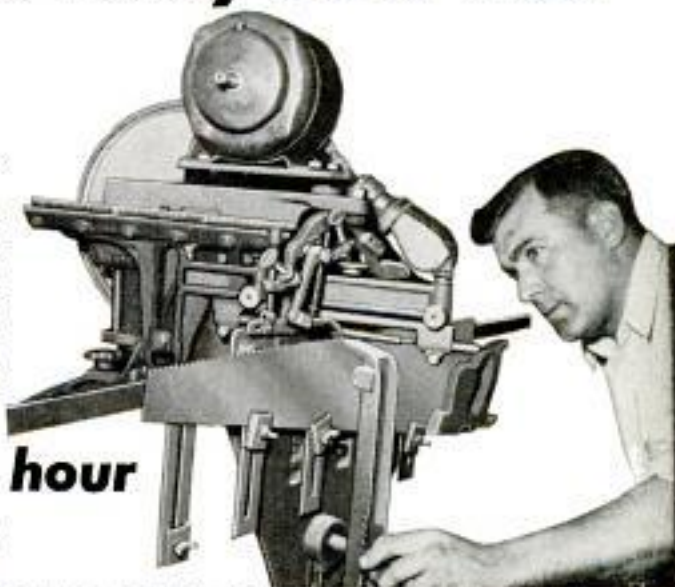


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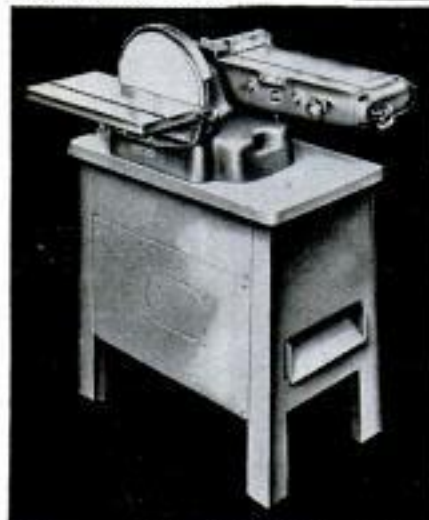
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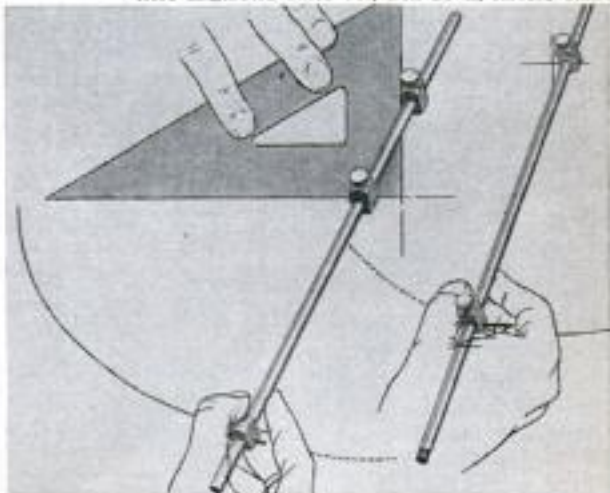
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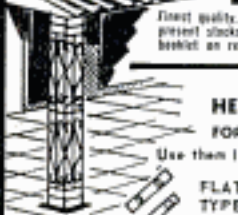
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Direct quality. Available in many widths and lengths. An excellent color selection in present stocks. Ideal for use in the home or office. **FREE SAMPLE** and instruction booklet on request. **85c Val. for 49c SQ. FT.**

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FOR PATIO ROOF SUPPORTS-DIVIDERS, etc. Use them INDOORS or OUTDOORS! Heavy 1-1/8", black tubular iron supports with a beautiful wrought iron filigree between them. 3 ft. high (can be cut to 7 ft.), 12" wide. In either flat or corner type. Mounting flanges included.

**SAVE 50%**

FLAT TYPE **995** EA.  
CORNER TYPE **1795** EA.

### DECORATE with this "LUAU" NET KIT

Transform your den, lounge, playroom or patio with this exotic South Sea Island decor. The 4' x 5' net contains 2 cork floats, star fish, sea fan, glass float, tiger covary & pink currens. Ideal for home, night club, etc. **495**

### SPECIAL 60 to 450 Power MICROSCOPE

With NEWLY DEVELOPED SUB-STAGE LIGHT which ELIMINATES NEED for ANY EXTERNAL LIGHT SOURCE. Take advantage of our tremendous foreign par chase. Ideal for use by the Amateur, Scientist, Student, in Home Laboratory for study of insect, tissue, minerals, microbes, liquids, etc.

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HAS 60, 120, 150, 180, 300 and 450 POWER MAGNIFICATION

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### 100 - 200 - 300X MICROSCOPE

A triple revolving, objective lens turret allows selection of 100, 200 or 300 POWER magnification. Has fine, ground and polished lenses and ALL METAL construction. This instrument is NOT A TOY! Right or left hand rack & pinions make smooth, precise adjustments. **NOW 695**



### SPECIAL MARINE TYPE REMOTE READING MAGNESYN COMPASS SYSTEM

Ideal for navigation of small to medium size boats. Complete system includes Remote transmitter, Remote Compass Indicator and Electric Inverter. Can be operated from 12 or 24 volt DC input. Inverter gives 26 volt, 400 cycle, 1 phase output required. **3995**

### B-16 FLOATING CARD COMPASS

Ideal for small boats, autos, aircraft, etc. Full flooring card, liquid damped, has internal compensating magnets. 2" diameter face with lighted dial. Rear panel mounting. Super Palley Bargain . . . . . **975**  
SAME type as above but with external compensating magnets and caging device . . . . . **1495**

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Standard navigational equipment on Army Aircraft. Rotating verge range ring. Calibrated in 1° increments 0 to 360°. Two parallel grid wires for N-S alignment. Rubber lined. Ideal for private planes, boats, etc. . . . . **1750**

### Special Electric AUTOMATIC PILOT SERVO UNIT

Ideal for reversible motion applications. Has a 1/20 HP, 24 VDC, 2270 RPM continuous duty motor. A 133 to 1 gear reduction train gives 17 RPM take-off speed. Twin, plate clutches are solenoid operated. A special galvanometer reads percent of rotation. Free wiring diagram. **1995**  
COST GOV'T APPROX. \$500.00

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Nylon cover with pure gum rubber inner liner. Inflated by CO2 cartridge or by mouth. Has adjustable web-strap harness & 2 pockets. **NEW 895**

### NEW ARMY CANTEEN & RISSUE CUP AND BELT

A one quart canteen and aluminum cup fit into the insulated canvas cover. Choice of web type pistol belt or cartridge belt with pockets. The canteen is new Korean War Surplus. **229**



**GENUINE NAVY FLEECE LINED WATERPROOF WINTER COAT**  
**ONLY 1995**

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Sheepskin Lined  
Has genuine leather uppers & rubber lowers. Soles have NON-SKID tread. Zipper front closure. Size: Small, Med., Large. . . . . **695**

### HYDRAULIC REMOTE CONTROL MASTER & SLAVE

When connected with 1/2" tubing and filled with oil they act as a precision remote control transmission unit. Moving Master handle causes Slave arm to respond in exact motion from 0 to 90°. Ideal for remote machinery controls, etc. Available in New and Used condition. No. H-EX-15U Both units used \$27.50 No. H-EX-15SU Both Units **NEW \$42.50**

### NEW 16 QUART OIL DRAIN

All metal construction. Top slants to receiving hole. Funnel sloped on end for easy pouring. Has two carrying handles. A removable handle fits either end. Size is 5 1/4" TD-1/4" x 18" long. **ONLY 249**

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5/32" Galv. carbon, 7x7 . . . . . 45c ft.  
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Yet anyone can operate this new Plumbers Flushing Gun which releases air pressure on a solid shaft of water cleaning the most stubborn stoppages up to 200 feet. TOILETS, SINKS, URINALS, BATHTUBS, FLOOR DRAINS, and HOUSE-TO-STREET SEWERLINES clogged with Grease, Rags, Sand, Roots, and paper melt away instantly when struck by the Hammer-like blow of this new unit.

There is no need to remove wall or pipe, or Grease Trap. A special attachment allows water to flow from the faucet through the Gun while air is released on the pipe. Vents or stacks are no obstacle, as force tends to strike wherever the water lays. But now, what is this Plumbers Flushing Gun worth in COSTLY PLUMBING BILLS SAVED? Tear this Ad out—and write your name and address beside it for FREE BOOKLET. Obey that urge. No agent will call. A postcard will do (Chicago Phone Kildare 5-1702) MILLER SEWER ROD CO., DEPT. PM-0, 4640 N. Central Ave., Chicago 30, Illinois.

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**PORTO-POWER 1750 Watt Plant**  
115/130 v. 60 cyc. AC.  
Push button start. Powered  
by a 4.5 HP Briggs engine.  
Combines com-

portness and easy portability with higher output for handling heavier starting loads. Ideal for operating oil burners, sump pumps, freezers, television, lights, communication systems, etc. Perfect for contractor's power tools. (Item 20), Wt. 146 lbs. Factory Special Price **\$279.50**

**MASTER-LITE 2500 Watt Plant**  
115/120 v. 60 cyc. AC. A power-

ful plant, ruggedly constructed and yet designed for easy portability. Can be started by rope or built-in 12 v. electric push button starter. Built-in windings to charge battery. Powered by a big 5.10 HP Briggs engine, complete with all accessories. Includes control box, voltmeter, ammeter, and handy plug-in power receptacle. An ideal plant for permanent or stand-by service. Wt. 226 lbs. Reg. price \$344.00 (Item 21) Factory Price **\$329.50**

**DUAL VOLTAGE 110/220 for Item 21—\$30 additional.**



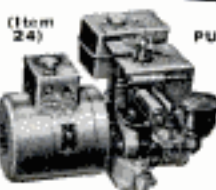
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**700 WATTS PUSH BUTTON START**  
115 v. 60 cyc. AC. Powered by a rugged 2.2 HP easy starting Briggs engine. No wiring necessary; just plug in and operate. Plenty of current for any oil burner, freezer, brooder, emergency lights, etc. which require up to 700 watts. Ideal for television and radios. Complete with Voltmeter and built-in winding to charge 6 v. auto batteries. (Item 24) Wt. 75 lbs. Easily fits in car trunk. Be prepared if storm knocks out power lines. Reg. \$270 value **\$143.50**  
**800 Watt Plant (Item 44)..... \$169.50**  
**1200 Watt Plant (Item 45) same as Item 24 but larger generator and engine with 50% greater output..... \$199.50**

## GIANT 2500 WATT PLANT

110-120 v. 60 cyc. AC. Absolutely the best made exclusive dynamically balanced armature; heavy windings developed up to 3000 watt overload for motor starting. Skid mounted—portable. Powered by an easy starting Briggs or Wisconsin 6 HP engine—complete with all accessories; engine easily disconnected for other uses. Big outlet box, voltmeter, no wiring necessary. Ample current for all purposes. Factory warranty. (Item 31) Wt. 210 lb. Reg. price \$585. Special at..... **\$299.50**  
Same plant with electric self starter (Item 31a)..... **\$359.50**



**DUAL VOLTAGE 110-220 available on any of above models for \$28.00 additional.**  
Generator only and control box..... **\$169.50**

We make every type and size of light plants—Write, giving us your requirements!

## CABLE HOIST



**2000 lb. CAPACITY.** Only a fortunate purchase from the Air Force enables us to offer these brand new 2000 lb. electric cable hoists at a fraction of their value. Perfect for material handling, as a boat hoist, an elevator, lift, on assembly lines, etc. Two separate 22 ft. lift cables with independent controls permit leveling the load and controlling it perfectly. Rugged ball bearing motors of geared down design are 110 volts AC-DC. Operate on the hi-line or use our Little Giant generator plant for portable field operation. A hoist of this quality would normally sell at \$495.00. (Item 847) **\$139.50**

of this quality would normally sell at \$495.00. (Item 847) **\$139.50**

## HEATING & VENTILATING FAN

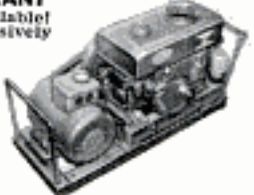
(Item 10) Easily installed in furnace pipes. Forces even heat to all rooms. Over range removes kitchen smoke and odors. Powerful, continuous duty motor, 110-120v. AC. Mount in wall or ceiling to ventilate any area. Quiet, super-efficient fan moves huge volume of air. 1400 to 500 CFM.  
8" Pipe, wt. 5 lb. .... **\$6.85**  
9" Pipe, wt. 6 lb. .... **\$7.85**  
10" Pipe, wt. 7 lb. .... **\$8.85**  
12" Pipe, wt. 8 lb. .... **\$9.85**

**HEAVY DUTY FAN.** Semi-enclosed motor, suitable for spray booths, restaurant exhausts, poultry houses, etc. 10" Fan, wt. 8 lbs. (Item 10E)..... **\$11.95**  
12" Fan, wt. 10 lbs. (Item 10B)..... **\$12.95**  
**HIGH SPEED BARN FAN** similar to above, but larger, high speed motor moves huge volume of air.  
12" Fan (Item 10F)..... **\$14.95**  
14" Fan (Item 10G)..... **\$17.95**



## EXCLUSIVE! NEW! LIGHTWEIGHT WATER COOLED DIESEL GENERATOR PLANT

Never before available! Now offered exclusively by Master Mechanic. A low priced, lightweight, continuous duty Diesel generator set. Powered by a super rugged, exceptionally smooth running, one cylinder Diesel engine. Operates at conservative 1750 r.p.m. and delivers full 1750-2000 watts of power. Operates on low cost fuel oil. Wt. only 240 lbs. representing a triumph of Diesel Engineering. Complete with fuel filter, oil pressure gauge, control box with duplex receptacle and voltmeter. (Item 830) **\$399.50**  
**DIESEL ENGINE only, as above described 3.5 HP (Item 830a)..... \$249.50**  
Wt. 116 lbs.



## FAUCET WATER HEATER

Instant hot water from any faucet for just pennies—sounds unbelievable—but it's true! You just slip MASTER MECHANIC'S new Faucet Water Heater over any water faucet, plug it in a wall outlet and you're got scalding hot running water instantly for dishes, shaving, washing baby's bottle, etc. Simple and safe—operates on ordinary 110v. house current—costs only 2 1/2 cents per hour for hot water. Ideal for homes, farms, cabins, trailers, etc. Easily regulates from lukewarm to full hot. Fully guaranteed! (Item 408) Wt. 2 lbs. Factory price F.O.B. Burlington, only..... **\$4.95**



## JET FLOW BLOWER

Tremendous air movement (1800 CFM) and quiet operation make this double inlet 10" turbine blower unbeatable for heating, cooling, drying and air conditioning. Ideal for attic or barn ventilation, converting gravity heating to forced air; spray booth exhausts, etc. Operates with any bearings. Includes variable speed motor pulley and belt. Dimensions 19" h x 18" x 16 1/2". Outlet opening 13" x 11 1/4". Wt. 45 lbs. Item 245. Reg. \$54.50. **Factory Special..... \$29.50**



## 9 TON HYDRAULIC PRESS

A tremendously powerful hydraulic press, capable of exerting 18,000 lbs. pressure. Pays for itself many times over—straightening bent connecting rods, king pins, crankshafts, axles, link pins, and bars—or pushing out frozen bearings and bushings. Developed pressure under precise control and visible at all times on accurate gauge. Complete with both large and small anvils and jigs to straighten any kind of curve or bend. (Item 464) Wt. 110 lb. Actual list price \$365. Our special close-out price..... **\$69.50**



**SCREW TYPE PRESS.** Nine ton capacity. See Sept. Pop. Mech.'s ad for details—or write. Complete, Wt. 150 lbs. (Item 797)..... **\$49.50**

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**MASTER MECHANIC MFG. CO., DEPT. 212 Burlington, Wis.**

## Double Acting Hydraulic Cylinder



A powerful cylinder mfr'd. by Massey Harris which develops both a pushing and a pulling action. Will push 8,100 lbs. with a 1000 PSI pump pressure. Cylinder is 3 1/2" dia. with 6 1/2" stroke—standard heavy duty clevis on both ends. Has standard 1/2" pipe thread openings. Can be used for lifting buckets or blades, raising or lowering implements, hydraulic presses, etc. Can also be used as an air cylinder. (Item 802) Wt. 17 lbs. Reg. \$68 value. Special..... **\$14.95**

**OTHER DOUBLE ACTING CYLINDERS**  
8" stroke — 3" bore..... **\$34.00**  
10" stroke — 3" bore..... **34.80**  
16" stroke — 3" bore..... **43.00**  
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We have all sizes of cylinders available.

**HYDRAULIC CONTROL VALVE**—4 way open center valve with built-in adjustable relief. Controls 1 double, or 2 single acting cylinders. Equalizing feature permits easy control even under heavy loads. 3/4" pipe thread on inlet & outlet, 1/4" on cylinder outlets. Easily mounted, finger tip control. Wt. 16 lbs. (Item 822)..... **\$21.95**

## HYDRAULIC KIT



Complete Hydraulic Kit consists of hydraulic hand pump with built-in 2 gal. reservoir and item 802 hydraulic cylinder described above. Pump has a built in relief valve and is rated at 20 tons. Kit is ideal for pressing D jacks, snow-plows, etc. Pump is 29" long—3" diam. with 3/8" ports. A terrific value! **\$39.50** (Item 836). Wt. 50 lbs. **Pump only (Item 836a) only..... \$23.50**

## GIANT METAL SHEARS



Nine inch cutting blade made of special high carbon alloy steel, perfectly aligned and ground. Easily cuts steel plate up to 12 gauge or 1/4" thick. Overall length 48". Wt. 23 lbs. (Item 156) Regular..... **\$14.95** 8-49.50. While they last.

## PORTABLE BOOM HOIST

Here is a big 3000 to 10,000 lb. capacity boom hoist at a fraction of the actual cost to the Gov't.—that can pay for itself on one job! Engine hoist is made of high strength alloy steel. Can be mounted as a stationary crane in yards or on buildings; or as a mobile crane on trucks for use as a wrecker. Massive telescoping steel boom is quickly extended from 10 to 20 ft. with a built-in winch. Ideal for erecting buildings, hoisting materials, loading machinery, unloading hill cars, lifting boats from water, laying in sewer pipe, etc. (Item 801) Wt. 650 lbs. Orig. cost over \$350. **Special..... \$89.50**



## MASTER DC ARC WELDERS

Now! a portable rugged type welder with terrific performance, yet at a price hundreds of dollars less than you'd expect. Senior model made for years of trouble-free, continuous service. High capacity DC welding unit enables you to tackle any job with confidence—easily welds anything up to 2" plate using from 1/16" to 1/4" rods. Built-in stabilizer and cooling system makes easy to strike and hold. Dual control provides low heat soldering, brazing and welding from 30 to 300 amps. Complete with instructions, guarantee and triple V-belt or flat pulley. Easy to hook up and easy to operate. **WELDER ONLY — DUAL CONTROL MODEL.** Same as above, but drive with rear tractor, seen or gas engine of 14 HP or more. (Item 88a.) Wt. 110 lbs. \$499 value. **\$119.50**  
**WELDER ONLY—INDUSTRIAL MODEL** same as above but with ceramic rotary type rheostat providing 74 different heat settings for all types of welding (Item 88b) **\$139.50** \$500.00 value.  
**COMPLETE POWER MASTER** (Illustrated above) powered by a 16 hp., air cooled Wisconsin engine. Wt. 480 lbs. (Item 280) Complete with welder costing \$1200. **Factory Special..... \$449.50**

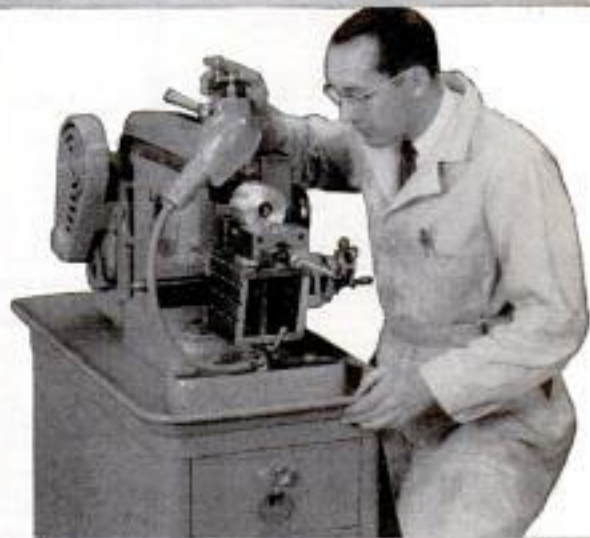


(Item 280)

**WELDING KIT** Two 10 ft. leads, welding helmet, electrode holder, ground clamp. Sold only with welder at... **\$10.50**

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Compare South Bend Machine Tools with other makes of similar size and capacity, regardless of price. It will be easy to see why they are a better value. Quality makes the difference: greater accuracy—dependability—versatility which pay off in higher efficiency and production. You get more for your money when you buy South Bend. Check coupon and mail today for more information.

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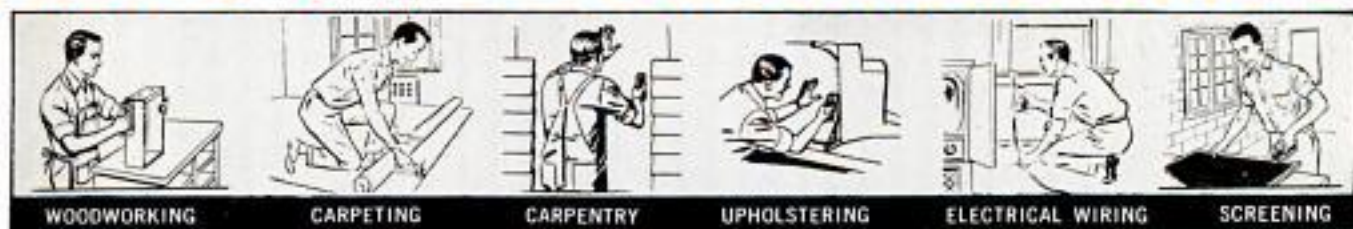
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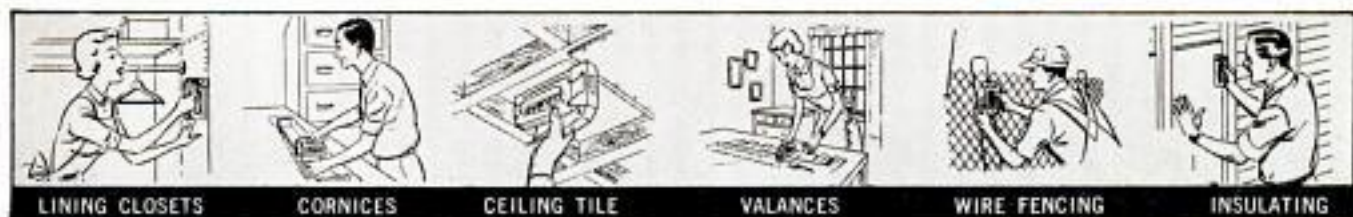
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# Arrow's T-50 automatic nailer



## does all these nailing jobs



## 10 times faster than a hammer!

Here's the tool no work bench should be without! Do hundreds of nailing jobs with this powerful chrome plated, all steel Arrow Automatic Nailer! Shoots a staple wherever you'd drive a nail! Easier! You always have one hand free to hold material! Faster! Shoots 100 staples a minute! Cheaper! 100 2 pronged staples cost less than 5¢. Same machine takes 6 different staples sizes from 1/4" to 9/16" leg.

**Price: \$12.50**

New! **ARROW'S CEILTILE STAPLE**... the only staple designed especially for ceiling tile! Guarantees freedom from hidden fractures!



T-50

Here are many more uses of the T-50:

carpentry • upholstery • woodworking • ceiling tile • wire fencing • wood veneer • decorations • metal lath • carpeting base • wire screening • bulletin boards • roofing felt • hi-fi insulation • electric & TV wire • wood siding • shingles • venetian blind tapes • leatherette • barbed wire • cornices • shelf lining • plastic covering • netting • weatherstripping • window shades • lining closets • mesh • linoleum flooring • display signs • cornerite • canvas covering • carpeting • insulation



### Ordinary Staple

Often fractures the unseen back of the tile flange.

Staple loses 50% holding power; often pops right out.

Sagging, wavy ceilings result... tiles buckle.



### Arrow's CEILTILE Staple

- Unique leg design locks into wood, drives flush, holds tight!

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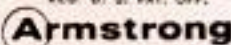
- Cementcoating provides extra holding power!

Supply of 5,000 CEILTILE staples, only \$3.50

Also packed 1,000 to a box.

Arrow's Ceiltile Staple — TESTED and APPROVED by:

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## WELLER SANDER

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**\$14.95**

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The Weller Power Sander and Polisher has more than twice the sanding area of any sander in its price class. It gets jobs done faster and easier. The straight-line action



sands satin-smooth with the grain and it goes all the way into corners. The low design is only 2 $\frac{1}{8}$ " high and

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UNDER LOW PLACES



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# Weller

ELECTRIC CORP., Easton, Pa.

Also available in complete sanding kit, including: all-metal case for carrying or storing, assorted sandpaper and polishing cloth. Weller model 700K \$16.95