

ANC

# POPULAR MECHANICS

## MAGAZINE

WRITTEN SO YOU CAN UNDERSTAND IT

REG. TRADE MARK GREAT BRITAIN NO. 410425

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DRESS PARADE ON RAILS  
PAGE 97



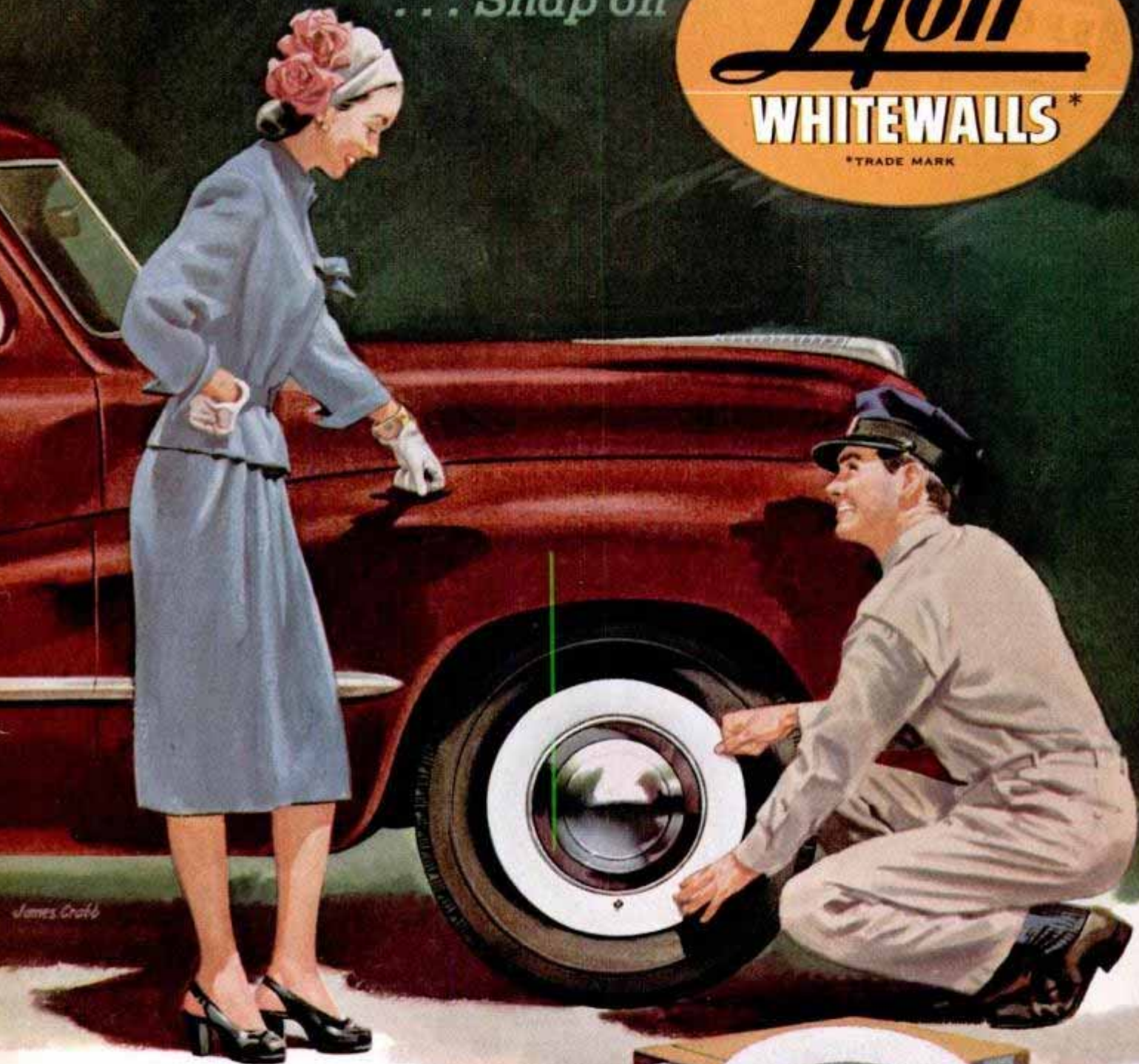
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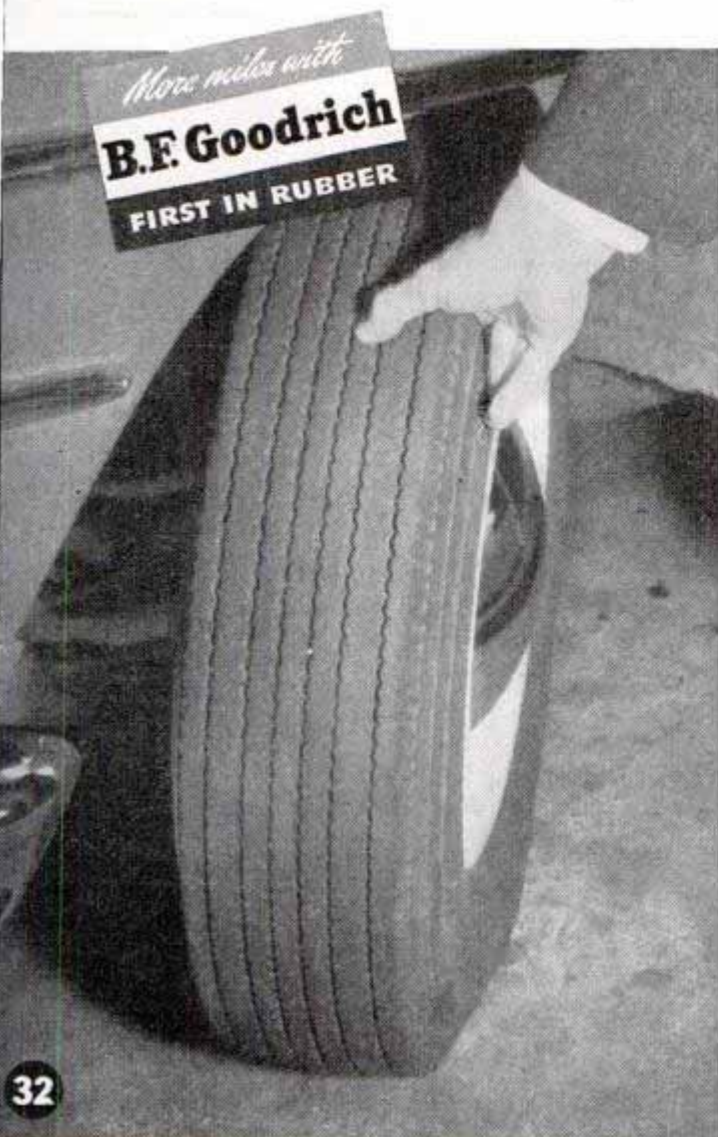
When you snap on a set of gleaming Lyon White- walls, you have more than your eyes to tell you you're right in style. You have the recommenda- tion of leading designers whose aim is to make tires look larger and wheels smaller than ever before to get smarter car appearance. Only Lyon Whitewalls achieve this appearance-effect so well. That's why thousands of dealers of leading tire

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## TYPICAL EXAMPLES: THE B. F. GOODRICH TIRE THAT OUTWEARS PREWAR TIRES

*Typical example No. 32.* "I equipped my new car with five B. F. Goodrich Silvertowns," says Raymond Harris, Chester, Pa., and started on a trip to California and return. I traveled all types of roads and in all weather-conditions. Did not make a single stop because of tire trouble. These tires have now covered 18,054 miles and, as you can see from the picture, show but very little wear."

*Typical example No. 39.* "In my opinion the new B. F. Goodrich tire is 50% better than any prewar tire used on my cabs," says "Tex" Martin, owner of a fleet of

taxicabs in Pelly, Texas. "A set of these tires to date has been driven approximately 55,000 miles. The tire in the picture is one of these 55,000-mile tires, and I estimate it is good for another 10,000 without recapping."

*Typical example No. 27.* "The speedometer has registered 34,112 miles since this B. F. Goodrich tire was installed," states Ray Anderson, General Manager of the Western Automobile Leasing Co., Los Angeles, Calif. "Indications are that it will deliver over 15,000 miles more before center tread will disappear.

This tire used in rental service—including special delivery, mail, and emergency runs—in a city which is practically all signal-operated heavy traffic."

If you need tires for your car, it is probably good news to you to know that your B. F. Goodrich dealer now has most sizes right in stock. You can probably get tires right off his rack without waiting. *The B. F. Goodrich Company, Akron, Ohio.*

**B.F. Goodrich**  
FIRST IN RUBBER



# Long-distance Television is twenty years old



*At the 1927 demonstration, Dr. Herbert E. Ives explained the television system developed in Bell Telephone Laboratories.*

APRIL 7 is a notable day in communication history, for on that day in 1927 was the first demonstration of television over long distances. Large-scale images were flashed from Washington, D. C., by wire and from Whippany, N. J., by radio to a demonstration in New York City. "It was," said a newspaper, "as if a photograph had suddenly come to life and begun to smile, talk, nod its head and look this way and that."

That was the first of many public demonstrations, each to mark an advance in the television art. In 1929 came color television, and in 1930 a two-way system between the headquarters buildings of A. T. & T. and Bell Laboratories. When

the first coaxial cable was installed in 1937, television signals for 240-line pictures were transmitted between Philadelphia and New York and three years later 441-line signals were transmitted. By May, 1941, successful experiments had been made on an 800-mile circuit.

End of the war brought a heightened tempo of development. Early in 1946 began the regular experimental use of coaxial cable for television between New York and Washington, and a few months later a microwave system for television transmission was demonstrated in California.

Transmission facilities will keep pace as a great art advances to wide public usefulness.

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*Exploring and inventing, devising and perfecting, for continued improvements and economies in telephone service*



# Popular Mechanics Magazine

Registered in U. S. Patent Office and Canada

H. H. WINDSOR, Founder

H. H. WINDSOR, Jr., Editor and Publisher



SOUTH of the border, thousands of eager Spanish speaking neighbors are reading the first issue of MECANICA POPULAR, Spanish edition of our magazine

which is being printed in Mexico City. Fifty thousand copies of *Mecanica Popular* are now being distributed throughout Mexico, Central America, and all the way down to Argentina. Senor Samuel Melo, Jr., who served with the U. S. Army in a hard-hitting Ranger battalion, is general manager of the Spanish edition, and Rafael Reynoso y M., a director of the Mexican Chamber of Industry and noted as a brilliant editor, is technical director. As in the case of our French edition, *Mecanique Populaire*, published in Paris, the cover painting, text and illustrations are flown by air express from Chicago. Our publisher and staff proudly regard *Mecanica Popular* as a friendly hand extended to our southern neighbors.

NEXT month a feature on light seaplanes should fire the imagination of anyone with "itchy wings." Other July headlines: "School for the Big Cats" and "Ammunition for the War on Disease."

PRACTICAL features in the July Craftsman section include an article on home refrigerator servicing, and one on making fluorescent lighting fixtures for your home. For those who will bend their backs to save a little money, there's a feature telling how to lay a concrete walk.

RADIO builders will find a handy trouble shooter in the dual-purpose signal generator featured in the July Radio section.

Volume 87

JUNE 1947

Number 6

Managing Editor.....Roderick M. Grant  
Assistant Managing Editor.....Wayne Whittaker  
Shop Notes and Crafts Editor.....James R. Ward  
Radio and Electronics Editor.....Frank L. Brittin  
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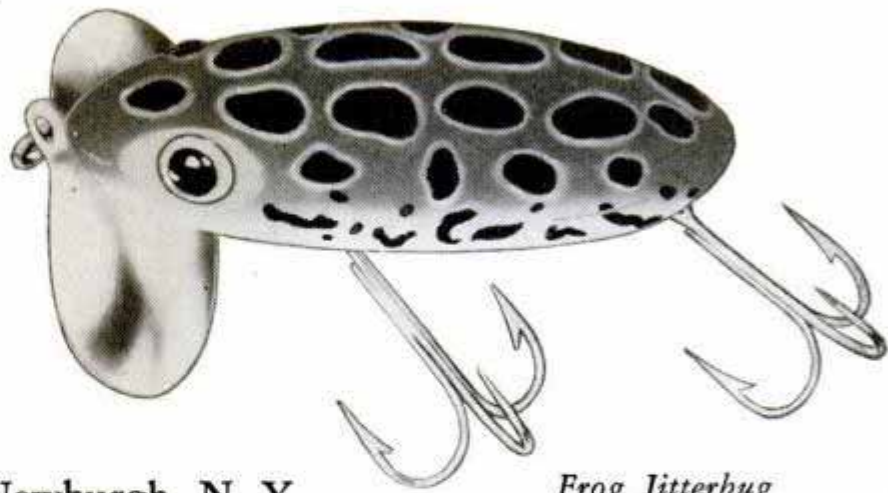
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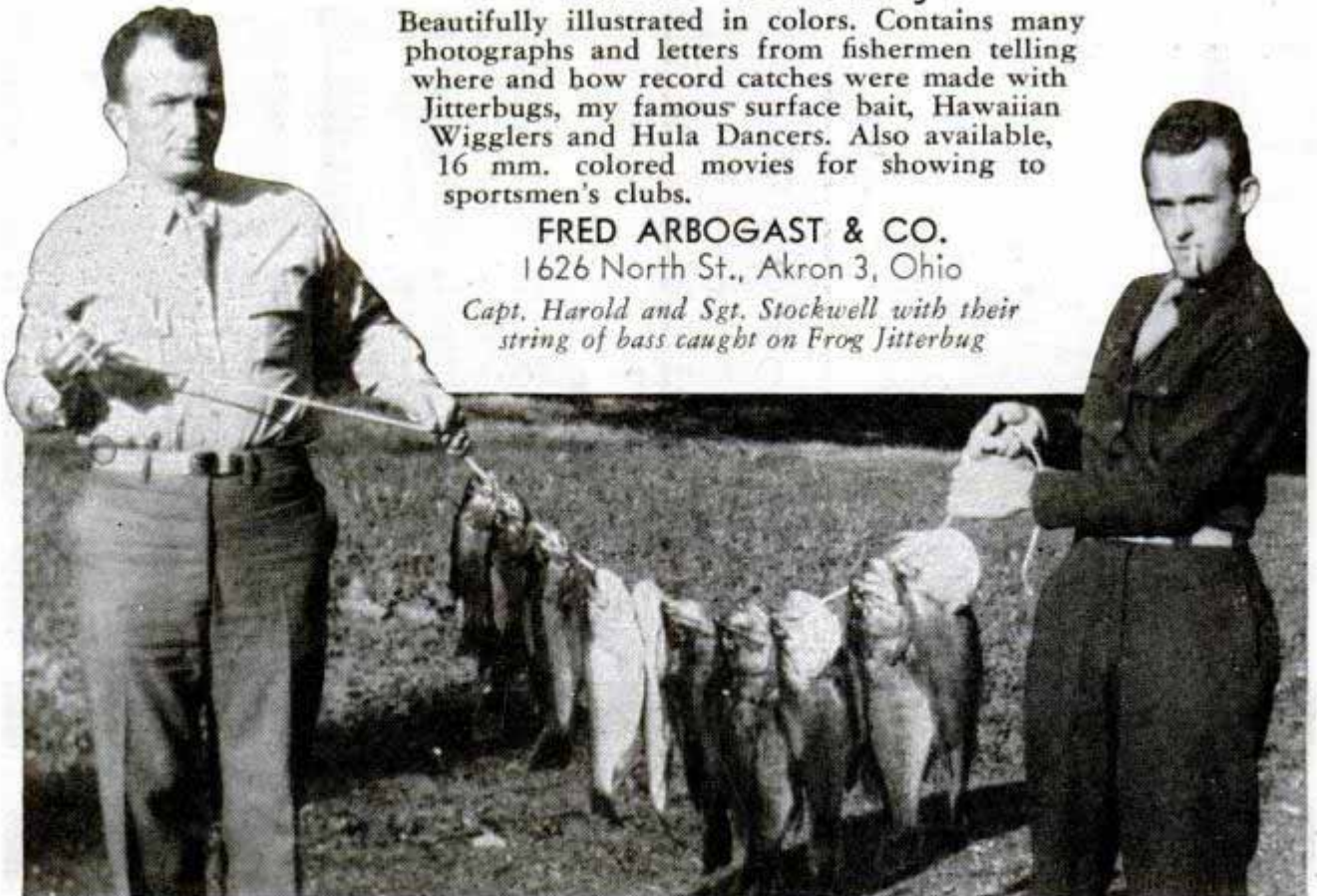
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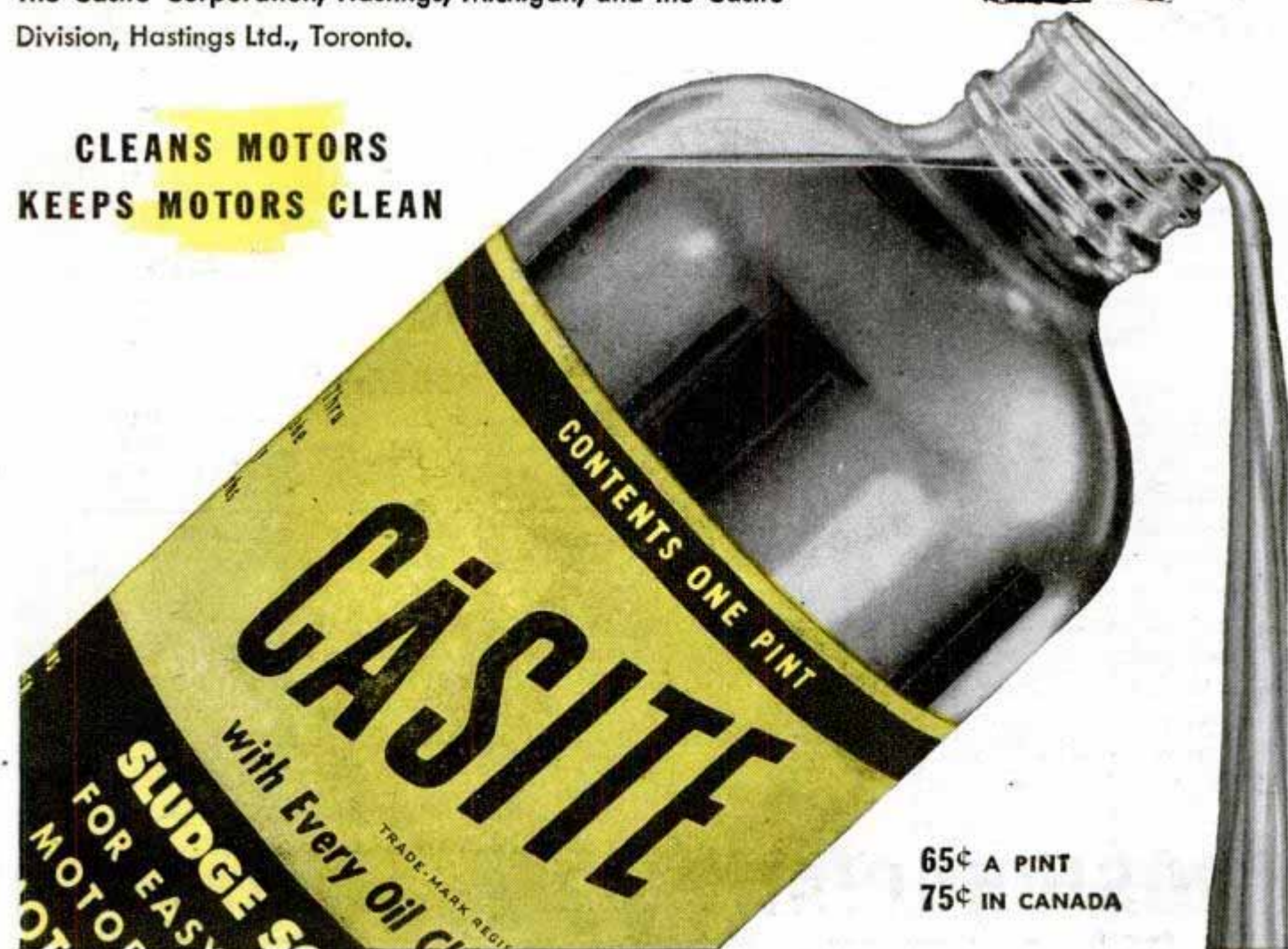
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that I haven't got?"**

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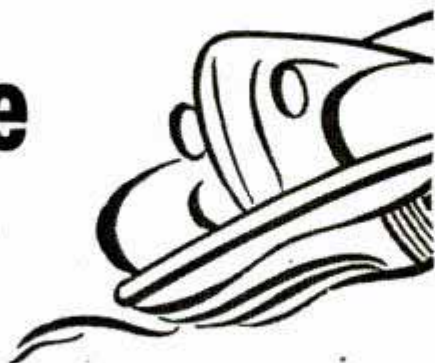
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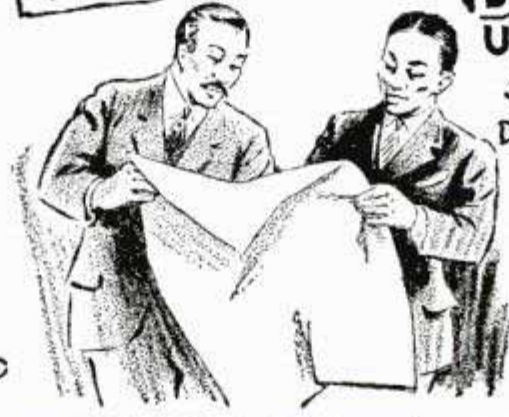
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 Jackknife is handy candlestick.....200

**FARM**

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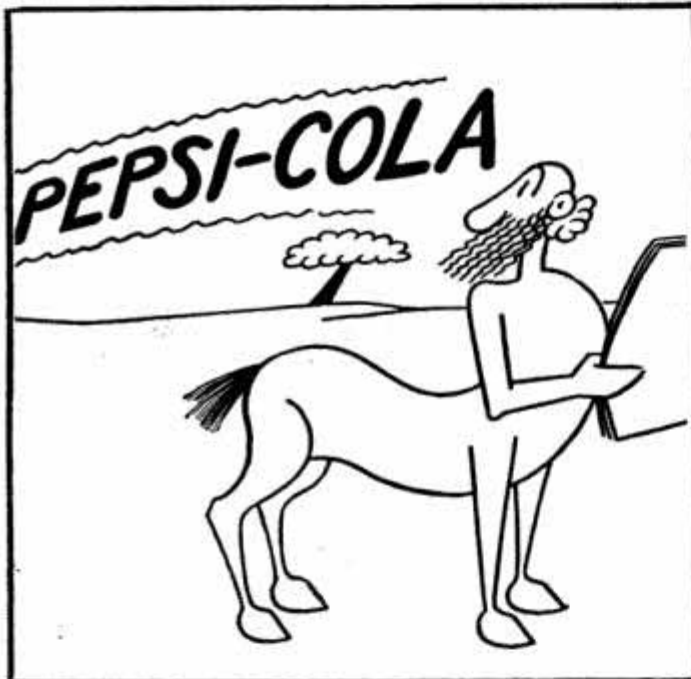
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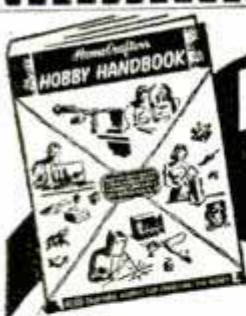
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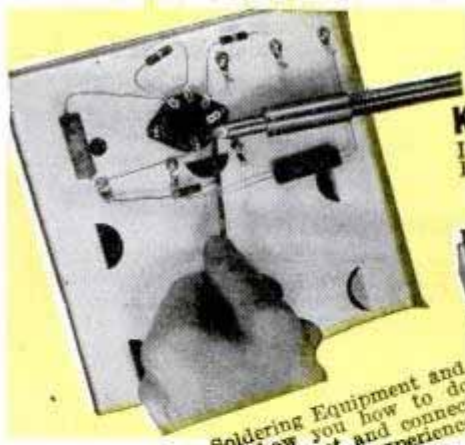
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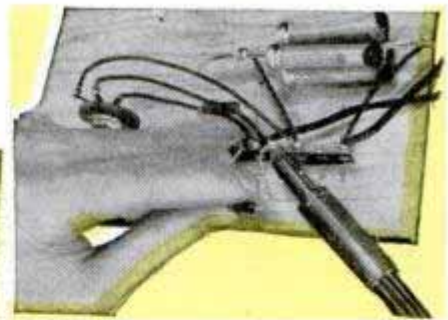




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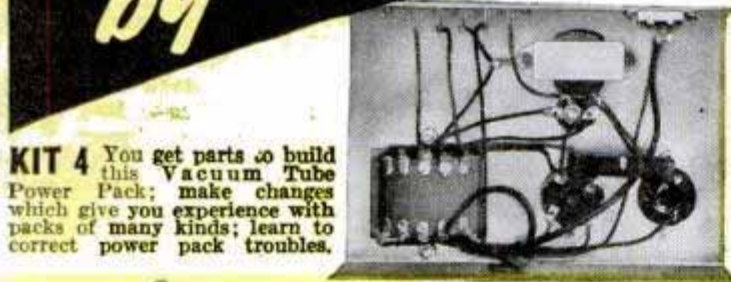
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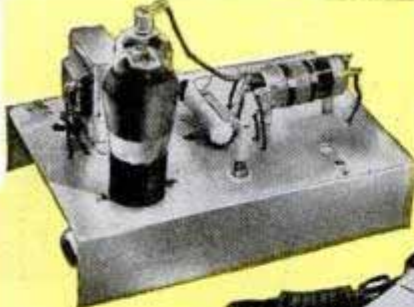
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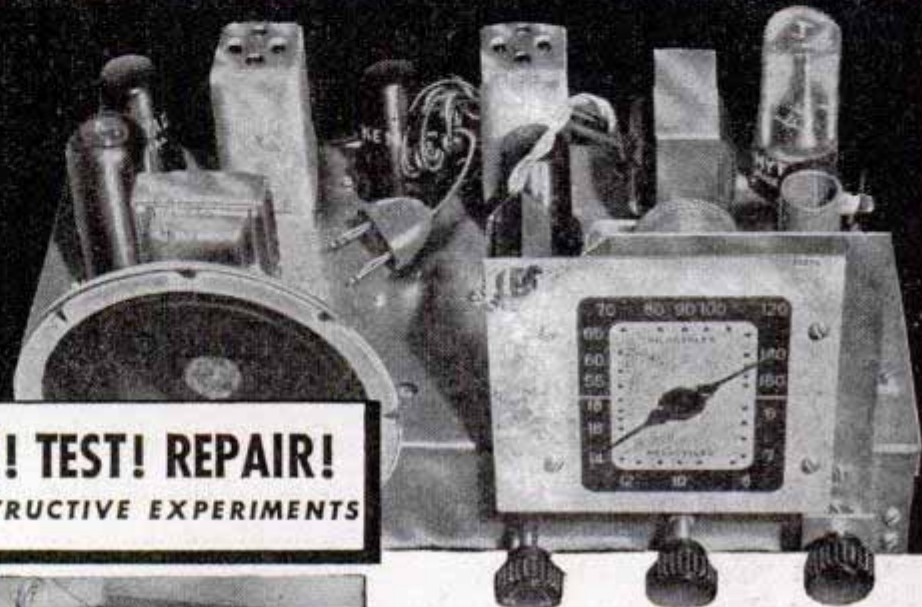


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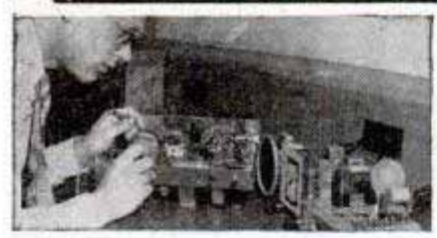
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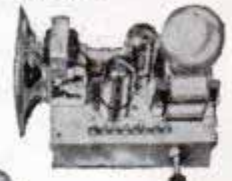
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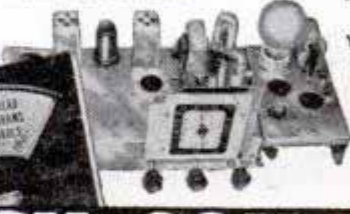


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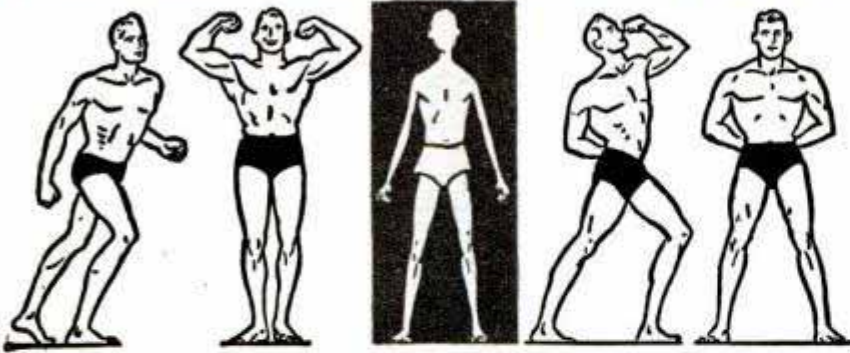
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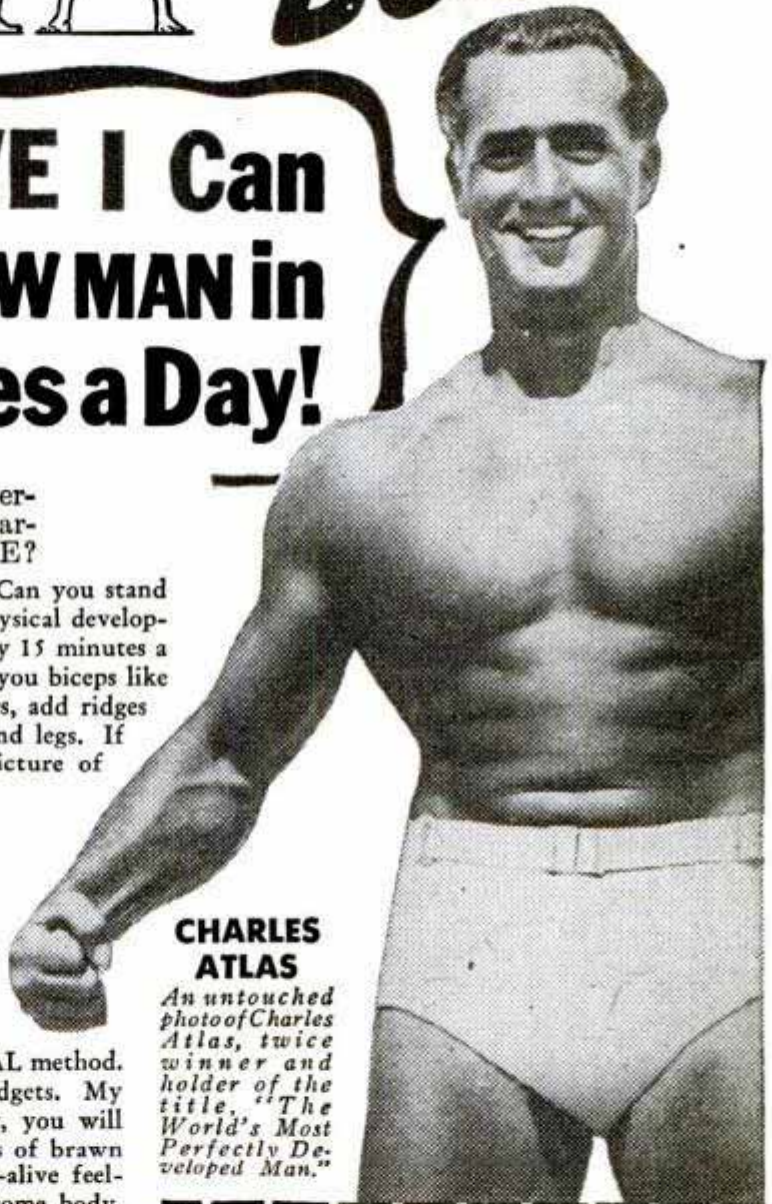
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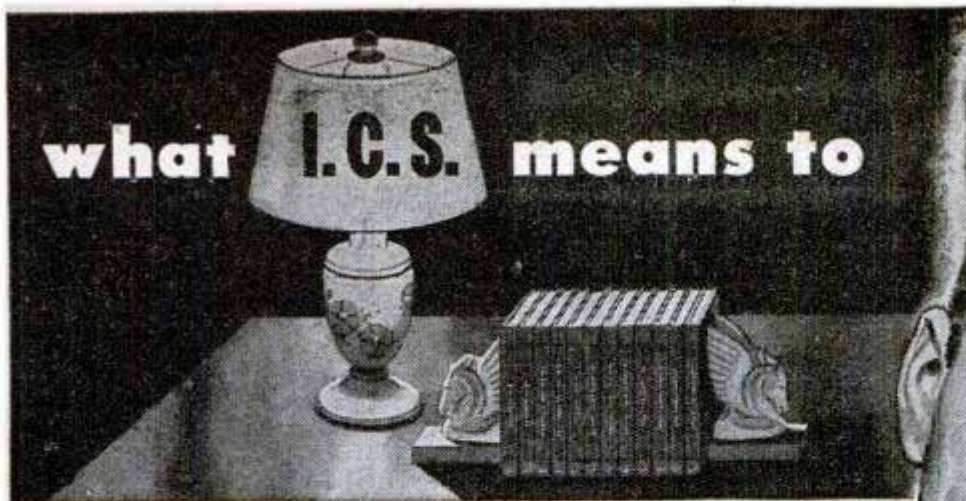
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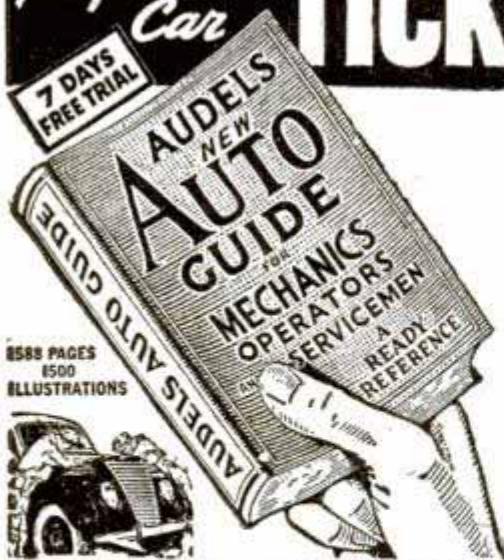
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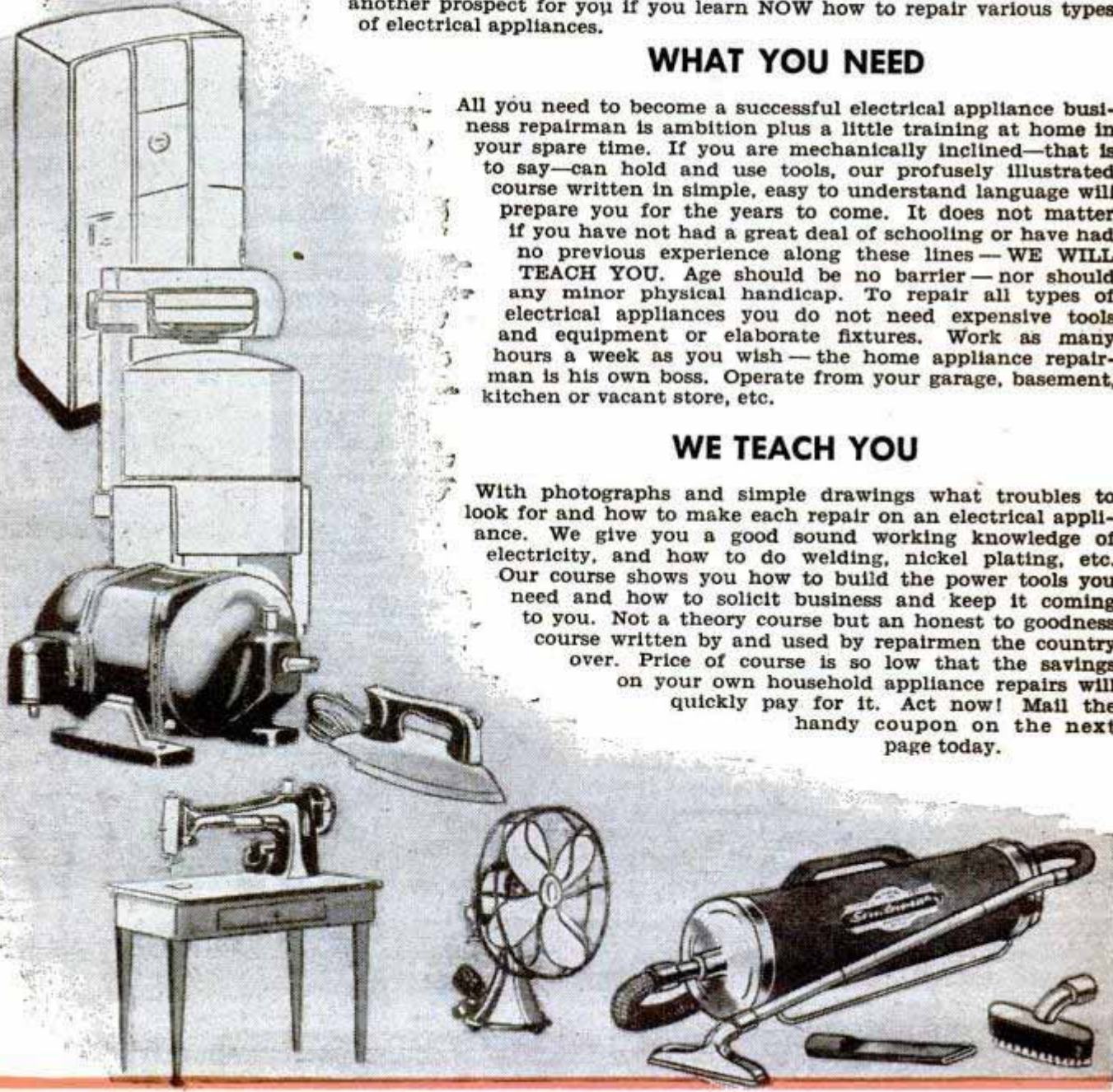
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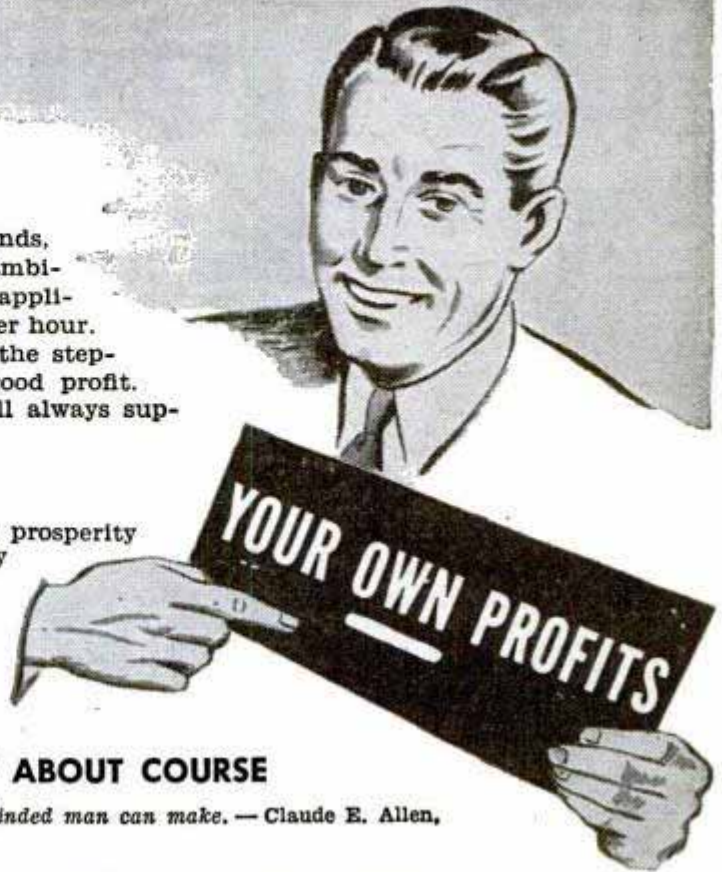
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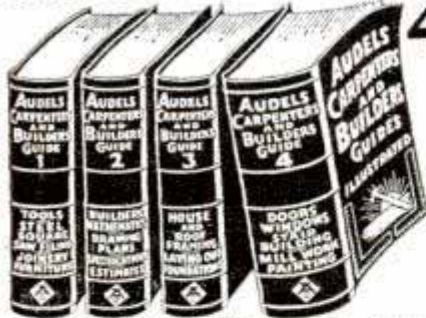
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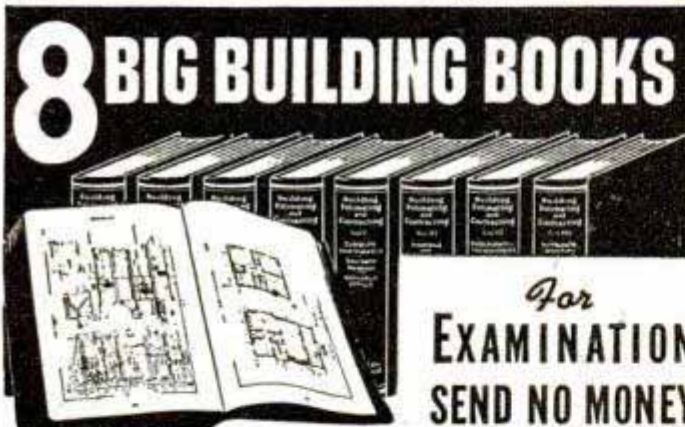
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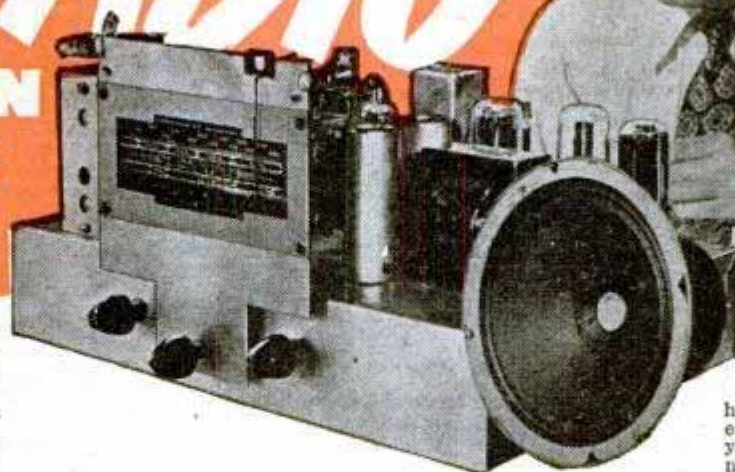


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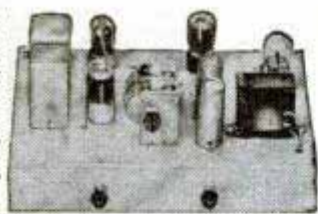
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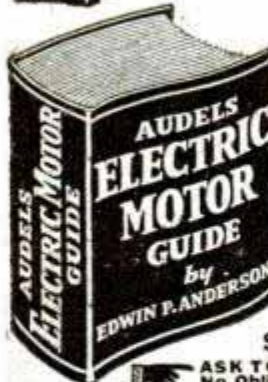
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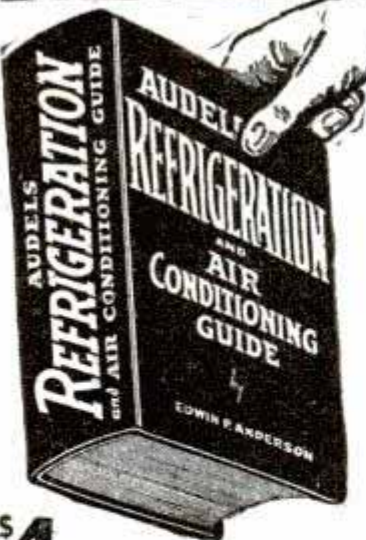
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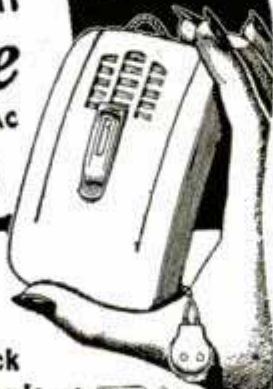
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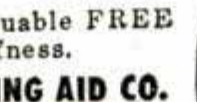
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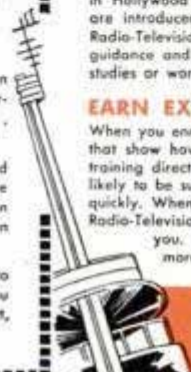
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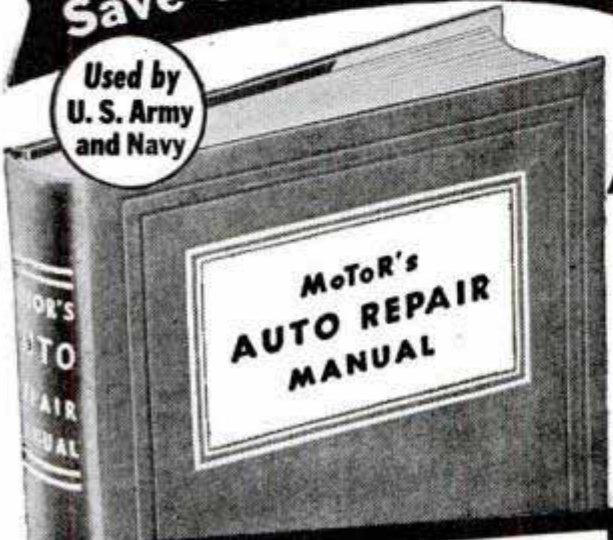
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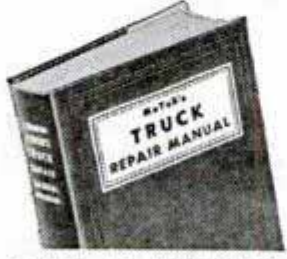
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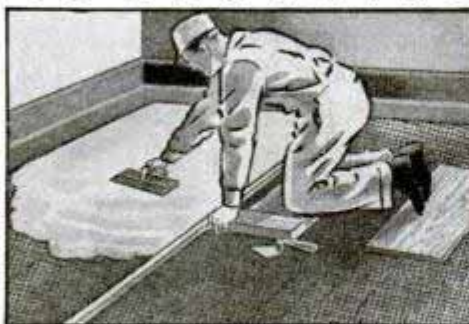
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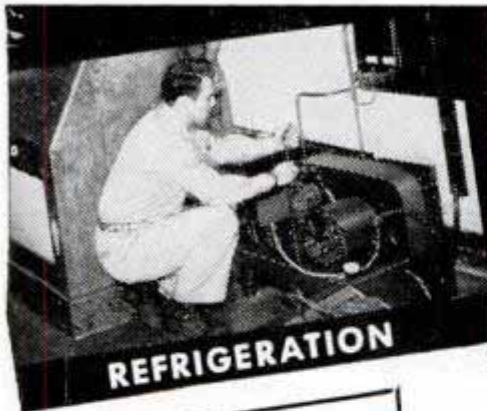
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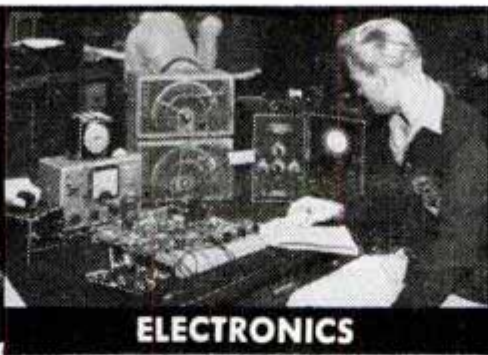
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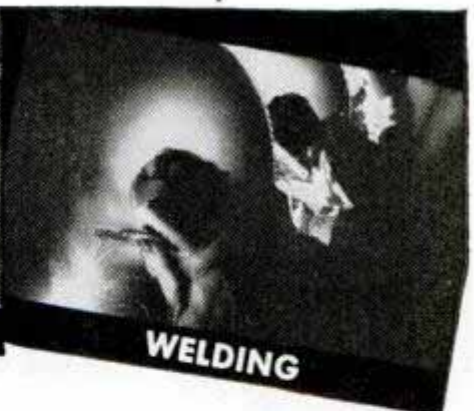




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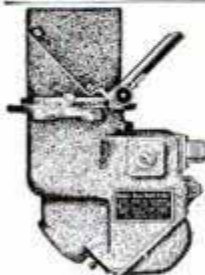
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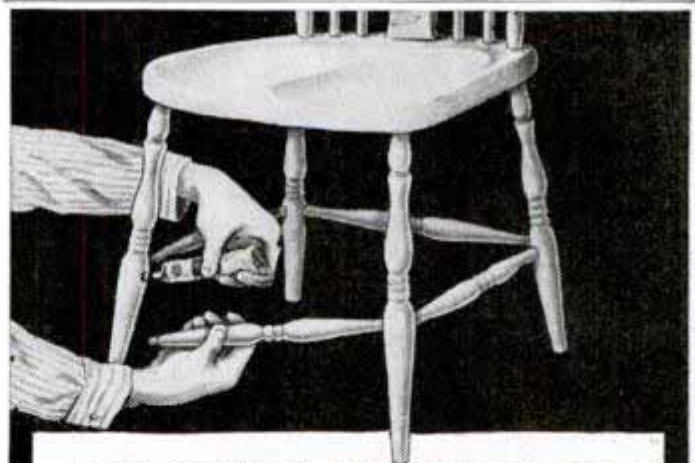
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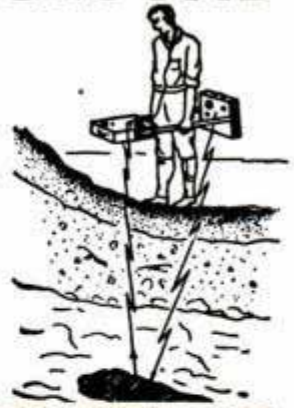
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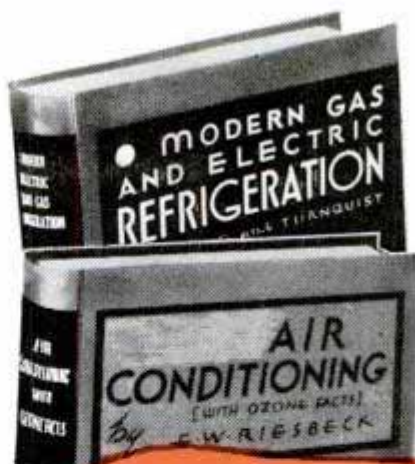
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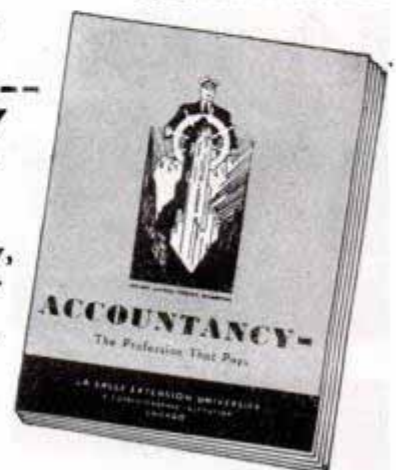
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**2 BEAUTIFUL** Hi-Gloss prints each good negative and enlarging coupon with each 6 or 8 exposure roll developed 28c. Owlphoto Co., Weatherford, Oklahoma.

**GLOSS Finish** enlargements, 4 5x7 from negative 50c. 3 5x7 from photo 50c. Robert Renshaw, Jr., P.O. Box 478, Chester, Penna.

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**TITLES** Of quality. Technicians, 3964 Ames St. N. E., Washington 19, D. C.

**16-35MM.** Silent-sound films, projectors. Bedner, 5300 So. Talman, Chicago.

**FREE Booklet** "Ten Simple Rules Making Titles." Westwood Company, 635 Victoria St., San Francisco, Calif.

**16MM.** Motor driven projectors, \$16.00 up. Selco Products, Danvers, Massachusetts.

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**SOUND Projectors**, films, close out. "Cameramen," 542-5th Ave., New York 19.

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**SOUND Screens**, used, good condition, 6'x6', \$12.95, 5'x4', \$9.95, 39"x50", \$5.95. Films, sales, exchanges, details free. Simons & Hunt Film Exchange Club, Oak Park, Box 166, Flint 5, Michigan.

**PROJECTORS**—35 mm.-16 mm. sound-silent. Nusslock, 4614 Green Tree, Milwaukee 9, Wis.

**400 FT. 16MM.** motor projectors \$17.50. Send stamp for 8mm., 16mm. lists. Sterling's, 679 Northampton, Easton, Penna.

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**HOME** Movies since 1929. No-Wat-Ka, 257 Main Ave., Passaic, N. J.

**DEVELOPING** Units for movie film with instructions. Literature. Duro Movie Products, 1519 Eggert, Eggertsville 21, N. Y.

**8MM., 16MM.** Features. Lists. Sams Electric Shop, Passaic, New Jersey.

**UNUSUAL** 8mm.-16mm. movies. Catalogue free. Fine Arts, Box 2084-X, San Antonio 6, Tex.

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**LEARN** Professional motion picture technique at home. Approved for veteran training under G.I. Bill. Free catalog. Motion Picture Institute, Birmingham 4, Mich.

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MOVIE Camera films, 100' 16mm. \$2.50. 25' double 8mm. \$1.25. Free developing. Better Films, 742 New Lots, Brooklyn 7, N. Y.

LEARN Movie projection, management. Free catalog. Theatre Institute, Elmira, N. Y.

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**SLASHED**—Our Plexiglas prices. For June only. Send for free listings. Novaltic Plastic, Box 106-SL, Brooklyn 19, N. Y.

**LUSTROUS** Formalin, quick-setting liquid plastics. Complete line casting supplies. Literature free. Sample kit \$3.00 f.o.b. Formalin Works, Box 199, Romeo, Michigan.

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**MAKE** Thirty beautiful Plexiglas household gadgets. Kosto Plexikit number one contains new materials cut to size; seventy-two page brand new fully illustrated handbook—All other materials to finish fifteen crystal clear and colorful projects. Rush order today, \$5.00 in U. S. Kosto, Washington 7, D. C., Dept. M5.

**PLASTIC** Injection machines, three sizes, toy, industrial, commercial. Full line jewelry findings. New low prices. Plexiglas, dyes and supplies. Tenite, Polystyrene rods, kits, etc. G. Baker Company, River Edge, New Jersey.

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**PLASTICS**—7 Colors sheets and rods. Send stamp for price list. Hanson Plastics, 7625 South Parkway, Chicago 19.

**LUCITE** Sheets, rods, dyes, cements, cheap. Free price list. Thomas Cavaliere, 2141 So. Beechwood St., Philadelphia 45, Penna.

**KITS**: \$1.50 Each. Plexiglas tie-rack 18", 5"x7" picture frame or bud vase. Send for free price list. Free gift with each kit. Heah Mfg. Co., 5115 N. Neenah Ave., Chicago 31, Ill.

**PLEXIGLAS** Masked sheets 12"x12"—1/16"—\$1.00, 1/8"—\$1.25, 3/16"—\$1.55; 1/4"—\$1.85. Include 10% postage. Dyes, rods, cements, shells, buffing compounds, jewelry findings, tools. Free listings. Craft Plastics, Box 129-P, Somerville, New Jersey.

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**SPECTROSCOPE** For quick chemical analysis \$3.00. Cutting Co., Box 457, Campbell 1, Calif.

**THE** House of Winn, home of supplies for amateur chemists. See Winn's New Idea chemical kits and apparatus outfits for home experimenting. Send 10c for retail catalog. Established 1931. John H. Winn, Dept. 506, 124 West 23rd St., New York 11, N. Y.

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**LABORATORY** Supplies at wholesale prices. Chemistry, biology, physics, geology. Catalogue 10c. National Scientific Company, Established 1908, 2204 W. North Ave., Chicago 47, Ill.

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**CHEMICALS** And apparatus for industrial, analytical, and private laboratories. Complete supply service for correspondence school students. Send 3c for catalog. Dept. M-43, Biological Supply Co., 1176 Mt. Hope Ave., Rochester 7, New York.

**APPARATUS**, Chemicals, ounce quantities, catalog 5c. Fleischer's Laboratories, Everett 49, Mass.

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**WOOD** Finishers beginners contact Satin Wood Products Co., 42 LaBelle St., Dayton 3, Ohio. Information free.

**MAKE** More money selling individualized buckles, belts, tie holders, cap badges. Choice of 2000 emblems. Quick profits—repeats. Special outfit offer, write Hook-Fast Products, Dept. A, Columbus 6, Ohio.

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**ECUADOR** Native handwork brings 500% profit. Sample collection \$2. Money-back guarantee. Estrella, Box 537, Quito, Ecuador, S. A.

**VETERANS**, The honorable service emblem in shining yellow on a chromium-plated ring, to be worn with honor and pleasure. No changing from one coat to another; no hiding under an overcoat. Agents and dealers wanted. Mail \$1.00 for sample, postage paid. Retail \$2.00. Special discounts for quantity orders. Fuller & Co., 517 E. 44th St., Indianapolis, Ind.

**DISTRIBUTORS** Wanted to call on taverns, roadstands, etc. with complete line of five and ten cent nut meats, also five cent boneless herring card. Write Royal Nut and Candy Co., Inc., 1015 Grand Street, Hoboken, New Jersey.

**IT'S** New! Every auto owner will want one or two. Opportunity to really make money. Over 100% profit for you. Send \$1 for sample, details. Peerless Sales, 913-Q Main, Kansas City, Mo.

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**BIG** Profits with products that sell like an atomic blast. You can't beat our offer. Write us at once. KaBe Bros. Inc., 4823 Denison Ave., Cleveland 9, Ohio.

**PROFITABLE** Business! Demonstrating sensational water saver nozzle in your own community or traveling. When hose is dropped flow is stopped. Car washers, service stations, homes, farms, factories, greenhouses, nurseries, gardeners, golf courses buy on sight. Send postcard. Water-master, 19465-P Ward, Detroit 21, Mich.

**MAKE** a bigger profit! Let us tell you where to buy 800,000 articles direct from 1200 factories. Details free. Glass Publishing Co., Ellwood City 11, Penna.

**TAKE** Orders for solid brass nameplates. Immediate commissions. We deliver. Metro Engraving Co., 362 Cross Street, Malden, Mass.

**MILLIONS** Want foot comfort! Amazing daily profits. Sensational new arch support body-balancer for men, women selling like hotcakes. Experience unnecessary. Complete outfit free. Special deal to distributors, crew managers. Write: Colt Shoe Company, 244-D6 Purchase, Boston 10, Mass.

**PLASTIC** Tablecloth covers, curtains, drapes, baby pants, bowl covers and other plastic articles selling like wildfire! Make big money now! Free details. Write Plastics, Dept. 58-F, 206 N. Fourth, St. Louis, Mo.

**WHOLESALE** Ball point pens to stores. Price list free. Sample pen \$1.00. Friendly, 17 South Penn Avenue, Philadelphia 11, Penna.

**SELL** Guaranteed refrigerator deodorizer 65c. Cost \$4.00 dozen, sample 35c. Borland, Box 9699, Station S, Los Angeles 5, Calif.

**AT** Home—Your own business making, selling, popular \$1.00 novelties. Cost you 3c to 15c. Everything supplied. Write So-Lo Works, Dept. U-6003, Loveland, Ohio.

**HOUSE** Numbers that glow in the dark. Luminous pictures, etc. Large mfr. wants factory representative. Wonderful new product. Fast seller. Free samples. Madison Mills, 303 4th Ave., New York City.



**AMAZING** Daily profits. Big repeat business. Sell top-quality, lowest-priced men's, women's hosiery, full, part-time. Experience unnecessary. Take orders. We deliver. Complete outfit free. Write Colt Shoe Company, 242-D6 Purchase, Boston 10, Mass.

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**AMAZING** New rust remover! Whirlwind seller. Agents make 100% profit. Free details. Arch Macdonald, Box 21, Winnetka, Illinois.

**MEXICAN** Feather pictures. Unusual novelty. \$1.00 (stamps) brings \$2.00 worth samples, details. Refunded if unsatisfied. Aztec Art-P, Apartado 762, Mexico City.

**LADIES'** Genuine alligator handbags, 12"x9", \$24.95 postpaid. \$204 dozen. Moises Rodriguez, Apartado 2497, Havana, Cuba.

**BIG Demand**—power mowers. Drop shipments. Catalog free. Rotacut, M2005, Excelsior Springs, Mo.

**MAKE** Quick clean-up selling perfume beads, sachets, incense. Mission Factory, 2328 W. Pico, Los Angeles 6, Calif.

**WHOLESALE**—New item for women. Free particulars. Renee, 8 Cumberland St., Boston, Mass.

**FINGER** Nail clips. Tool steel cutting edges stay sharp. Bright nickel. Retail 50c, sample 15c. Twelve on display card, \$1.80 dozen plus postage. Fast seller. Kearney, 180 Seventh Avenue, New York 11, New York.

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**BIG** Money selling large rubber and wool sponges. Inman and Inman, 135 So. Second St., Highland Park, Ill.

**AGENTS**, Dealers, distributors. We have the fastest-selling item on the market today. 100% profit. Steady repeater. No competition. Rush \$2.98 for complete set-up, or write for details now! Morrison, Box 9312, Station S, Dept. 12, Los Angeles 5, Calif.

**WANT** To be a successful salesman? Get our practical sales formula and plan. It tells you how. \$1.00. Steinbraker, 1910 Newport, Chicago 13.

**WHY** Need money! Our product offers excellent profits with thousands of prospects. Free information. Atlas Products Company, Dept. 17, Box 388, Oklahoma City, Oklahoma.

**JOKERS** Novelties and tricks. Agents earn quick return. Request details. Delrose Magic Products, 536 Sixth Avenue, New York City 11.

**GREETING** Cards: Easy money, quick. Free literature tells all! Evers, Elmhurst, N. Y.

**BIG** Profits with plastic floor finish good for linoleum, wood, asphalt tile. Small investment in stock. Credit arranged. Thrifty Products, 1650 Ocean Ave., Brooklyn, N. Y.

**IMMEDIATE** Profits! Collection 137 business plans. Booklet free. Twin Parks Z, Box 4696, Dallas.

**AGENTS**: All ages, earn \$30 to \$50 weekly selling for yourself, fibre brooms, mops, and floor dusters, start now. Write Burtz Fibre Broom Co., Columbia, Penna., Dept. A.

**EXCELLENT** Sideline for printing and advertising salesmen. Decalcomania name plates in small quantities. Great demand. Also, make money with our line of automobile initials and sign letters. Free samples. "Ralco" XL-Roxbury, Boston 19, Mass.

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**AGENTS**. Substantial profits. Repeat order products. Not mere "job" but opportunity establish steady income. Additive lubricant. Limitless field. Factories, autoists, service stations, fleet owners buy big. Write Kidder Oil Company, LaCrosse 1, Wisconsin.

**WONDER** Cleaner, free sample! Other producers: unusual bubble bath—Glas-Klean. Sell homes, stores. Circulars furnished. Courier, 3829-I Delmore, Cleveland Heights 21, Ohio.

**REFLECTING** Signs, lawn and house numbers. Carl Sign Co., Wooster, Ohio.

**SELL** Personal Initialed individualized belts, buckles, cap badges, tie holders. 2,000 emblems to choose. Fast profits. Repeats. Write today special outfit offer. Hookfast Specialties, Box 1425, PM, Providence, Rhode Island.

**AMAZING** Discovery. Miracle glaze puts brilliant glass-like surface on cars. Free sample, information. Big profits. Miracle Glaze Company, 9714 S. Austin Ave., Oaklawn, Illinois.

**AGENTS**—Distributors \$28.00—\$140.00 daily. Flo-Glo plastic linoleum finish. Write, Acme, Box 404, Mount Vernon, N. Y.

**JUST** Out! History of World War II. Huge volume. Popular price. Authentic text. Official photographs. Big profits. Riverside Book Company, Iowa Falls, Iowa.

**MAKE** Money in your spare time! Helps furnished. Easy sales. Voluntary repeat orders. Liberal commissions. Write for free wholesale price list today! McGregor Magazine Agency, Dept. P.M.-7, Mount Morris, Illinois.

**MAGIC** Cleaner—Hotter than a fire-cracker. Saves soap—Big profits—Sample free. Bestco, 5007 Irving Park, Chicago.

**BIG** Bargains for big profits. Over 100 sensational values. Men's used suits \$2.00, pants 35c, topcoats \$1.25, overcoats \$2.00, shoes 20c. Experience unnecessary. Free wholesale catalog. Superior, 1250-B Jefferson, Chicago 7.

**GREETING** Card agents, "line up" with "Pines" for bigger, better, quicker profits. Rush name, address on postcard today. Box 32, Flushing 5, New York.

**90c PROFIT** Each \$1 sale. Sell positive mothproofing solution to housewives, stores, agents. Experience unnecessary. Postal brings details. Kinford, Wayne 3, Penna.

**AGENTS**: Stamping names on pocket-key protectors. Sample check with your name, address, 25c. Stamping outfits. Emblem checks, check-fobs, name plates. Hart Mfg. Co., 303 Degraw St., Brooklyn, N. Y.

**137 COMPLETE** Plans for starting own business: local—mail order. Particulars free. Elite Co., 220 Grand St., New York 13.

**AGENTS**—300 % Profit selling genuine gold window letters; stores and offices. Free samples. Metallic Letter Co., 438-B North Clark, Chicago.

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**FREE** Water and our concentrates, makes flavors, lotions, shampoos. 72 products, labels, bottles furnished. Qualco, E-20030 Russell, Detroit.

**GOLD** Lacquered window sign letters. Large sizes penny each. New foils. Absolutely beautiful. Free samples. Atlas, 544 W. 79th, Chicago 20.

**SELL** Personalized soap. Name on every cake. Ideal for gifts. Get sample offer. Dunbar Soap, New Brunswick, N. J.

**AGENTS**—Big line including food products. Fast selling premium and bargain deals. Low prices. Send card for big profit offer with gift. Ho-Ro-Co, 2796 Dodier, St. Louis 7, Mo.

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**DISTRIBUTORS**, Salesmen — Patented cigarette case holder for automobiles, trucks. Fine seller. New. 200% profit. Samples \$3.00 per doz. Literature free. Little Giant Holder Company, 919 South Vermont, Los Angeles 6, California.

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**STATE** Distributors to sell simplified bookkeeping system small stores and public accountants. Sells \$13.50. Your commission \$8.50. Exclusive franchise. Send \$5.50 for sample set. Hawthorne Sales Co., Decatur, Ala.

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**ORANGE** Concentrate direct from our Florida groves. One quart bottle makes six quarts delicious natural orange drink simply by mixing with five parts cold water. Groceries, foodmarts, hotels, restaurants, taverns, roadstands, soda fountains, hospitals, resorts, camps, farmers, big buyers. Money-back guarantee. No investment. Protected territory. Salesmen earn \$100.00 to \$200.00 repeat commission weekly. Sunset Valley, 3357 N. Clifton, Chicago 13, Ill.

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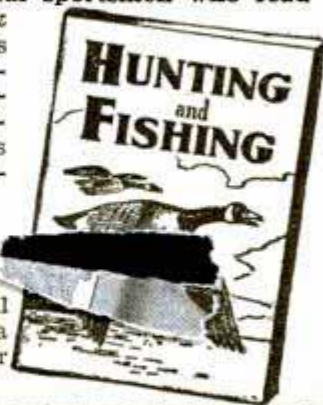
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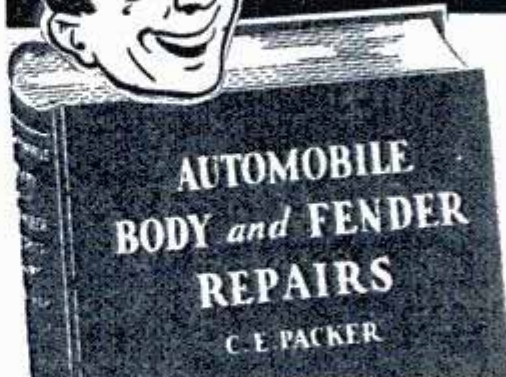
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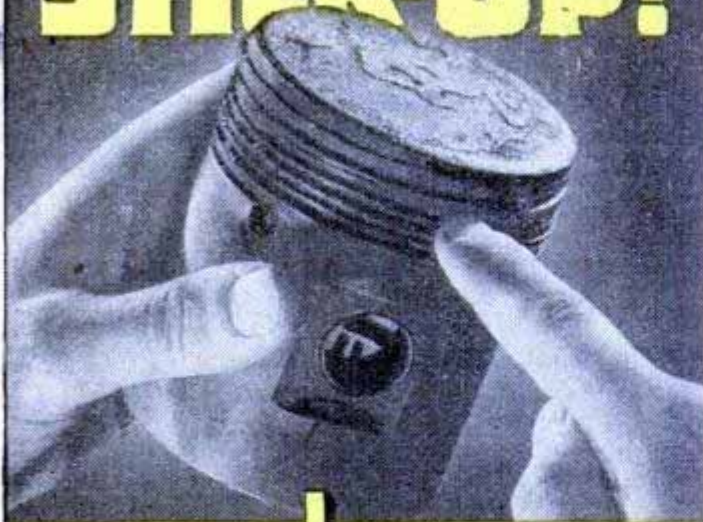
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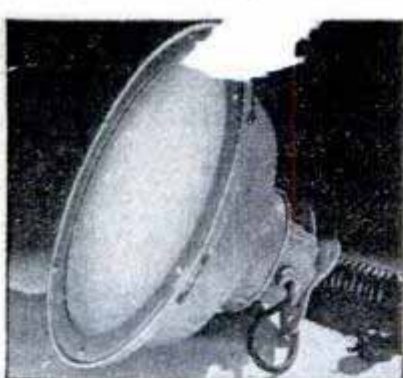
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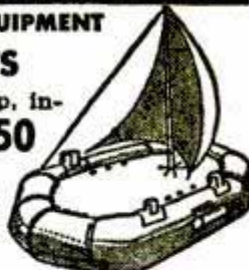
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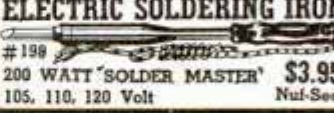
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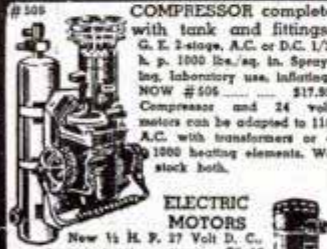


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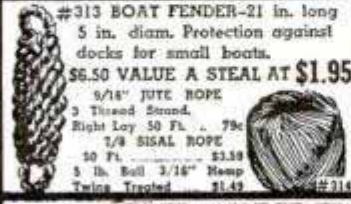


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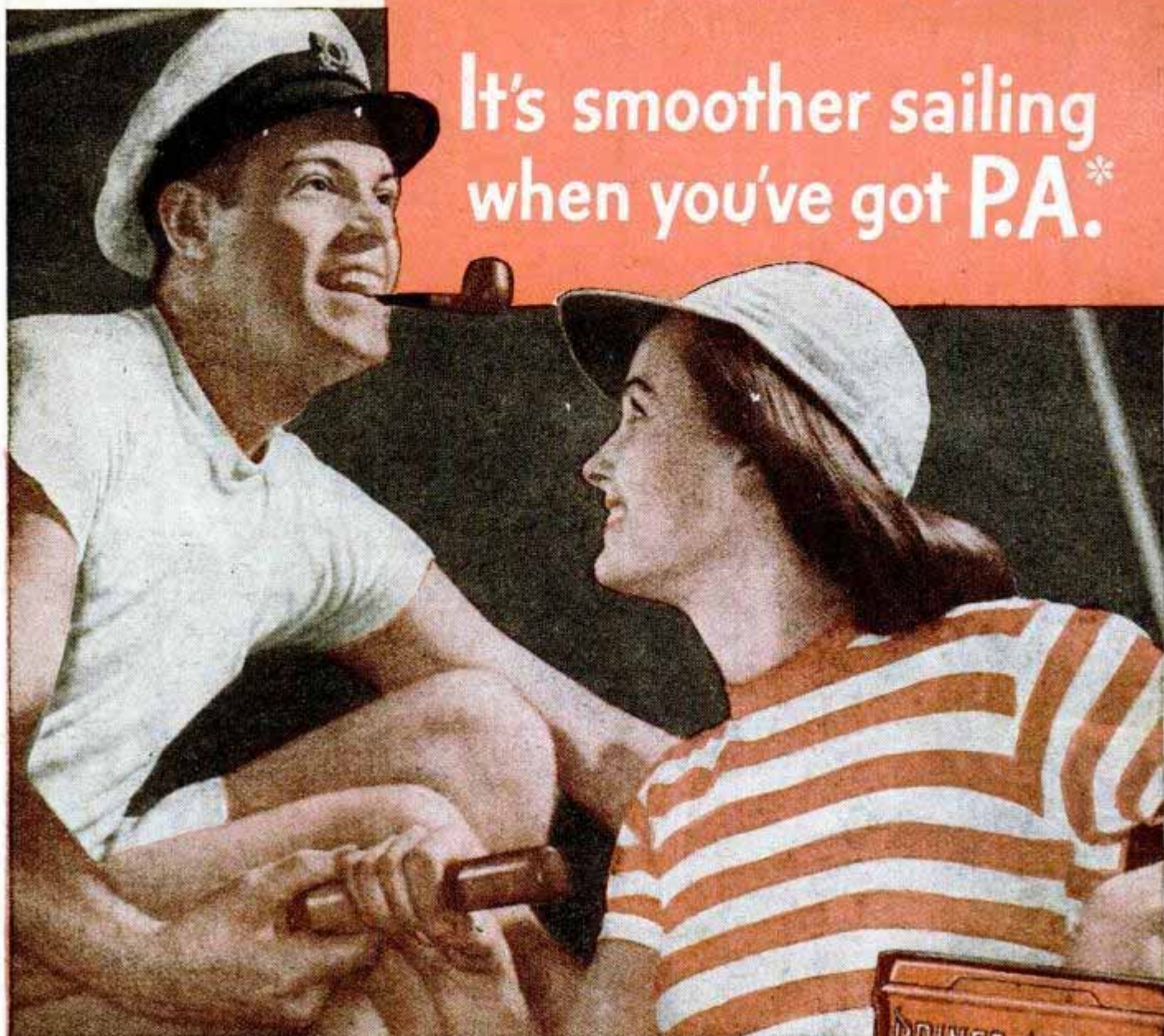
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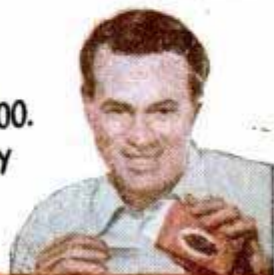
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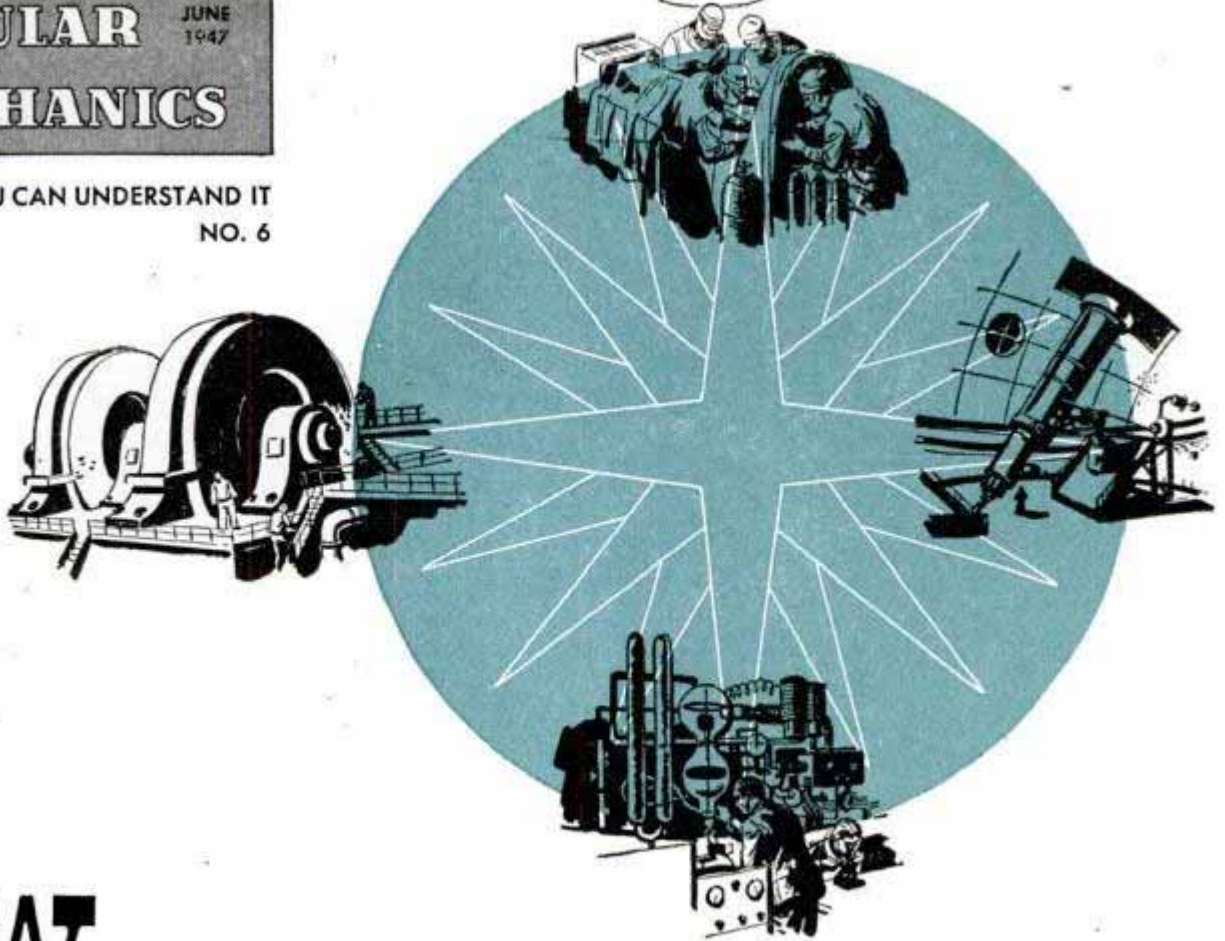


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NOTHING LIKE P.A. FOR FAST, EASY  
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# Where are our **new** frontiers?

**C**RYSTAL gazing is a fascinating but perilous business—and especially so when we are dealing with a rapidly changing technology. If it were really possible for us to foresee tomorrow's inventions and discoveries, we would not need to wait for tomorrow—we would start using them today. But even admitting our inability to predict specific developments, it may still be possible to determine something about our probable future course by recognizing such trends as are already available to us.

Since 1860 there have been four broad eras of industrial development in the United States. Each has covered a span of roughly twenty years. The first, from 1860 to 1880, might be called the Railroad Era—a period of great geographical expansion, of bridges, tunnels and other mammoth civil engineering works.

From 1880 to 1900 was an Electrical Era: the period of the telephone, the electric light, the polyphase AC system, and countless developments in electrical machinery. It was the period of the electrical engineer.

From 1900 to 1920 was, by and large, a Mechanical Era. The automobile and the airplane were its dominant developments.

From 1920 to 1940 was, I believe, largely a Chemical Era. High-octane fuels, plastics, synthetic fibers, chemical agriculture and other chemical developments were among outstanding products.

What shall we say of the period from 1940 to 1960—the period in which we are now engaged?

The first thing we should notice about this period is that it is an era of expanding research. According to figures recently published by the National Research Council, the number of scientific personnel in industrial research laboratories has nearly doubled since 1940. It is interesting to observe that the greatest increase has been in the number of industrial biologists and bacteriologists, although these are still a relatively small group compared with the enormous number of chemists, engineers and physicists employed

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in industrial research. Chemists, engineers and physicists have also increased to a considerable extent. Metallurgists have increased only slightly over 1940.

Since industrial research laboratories are the "cradle" of most new technological developments, these figures on the relative growth of various professional groups engaged in industrial prospecting have a special significance for any "look ahead" at probable future developments.

Of equal significance to the scientific crystal gazer is a knowledge of the trends of present-day research. New developments are always evolutionary rather than revolutionary. A hundred years of steam development preceded James Watt's invention of the successful steam engine. Still another hundred years were required to bring the internal combustion engine to a state of relatively high perfection. The airplane was "in the air" for some forty years before the Wright brothers finally achieved mechanical flight. Always new developments take shape progressively, step by step. Never do they make their first appearance in their final form. Consequently, if we know which fields are advancing most rapidly today, we may gain an insight into what the future holds for us.

Probably the most dramatic and active field of scientific research today is the release of energy by atomic fission. The same tremendous energy that was so devastating as a weapon promises to have valuable applications in our normal peacetime endeavors. This is such a new field that one would be reckless indeed to make dogmatic predictions regarding it. There is still a great deal to be learned about controlling and utilizing atomic power. Some of these factors are being investigated in the government's atomic power pilot plant at Oak Ridge, Tenn. Whatever the outcome of these investigations, we may be sure they will have an important bearing on tomorrow's developments.

Another field which is developing with great rapidity is petroleum refining. A few years ago refining involved only two relatively simple processes—distillation and thermal cracking. Then, as a result of in-



industrial research, it was discovered that differences in molecular structure have an important effect on the knock quality of automotive and aviation fuels. The refining processes which had served the petroleum industry for so many years would no longer do—they produced gasolines containing the wrong kind of molecules. Consequently, one of the main efforts of petroleum research during the last decade has been to develop new processes which would yield special molecules of the proper shape and size. As a result, the old processes have been largely superseded by these new processes—hydrogenation, catalytic cracking, isomerization, polymerization, alkylation, hydroforming, and so on—insofar as the production of high-octane fuels is concerned. The petroleum industry is still spending millions of dollars annually on this kind of research.

Despite a background of development extending back even to prehistoric times, metallurgy is still one of the most active fields of industrial research. It is likely to continue so, because our requirements from metals are growing ever more critical. Loads are becoming heavier and heavier, speeds are increasing, service conditions generally are becoming more severe. At the same time, we expect metals to satisfy a growing multitude of conditions with respect to machining, drawing and working in mass-production processes. These facts, coupled with the equally important fact that we are only now beginning to acquire a real understanding of the complex structure of iron-carbon-alloy solutions, point to a very promising future.

As yet man has not been able to satisfy his appetite for speed—nor is it likely that he ever shall. Among the main efforts of the present-day aeronautical research is the raising of aircraft speeds into the supersonic range, that is, in excess of the speed of sound (about 760 miles per hour). One of the difficulties inherent in such extremely high speeds is the rapid increase in drag, due to the compressibility of air, as moving objects approach sonic speed. This difficulty has been overcome to the extent that





aircraft have recently been clocked at over 600 miles per hour; further increases may be expected as a result of continuing improvements in airfoils and power plant. Whatever we learn about aircraft performance and characteristics when we finally penetrate the so-called "sonic barrier," and it appears likely that this may be accomplished in the near future, we may be sure



that it will have a profound effect on the whole future of aviation.

There is a great deal of confusion in the mind of the average person regarding the place of synthetic resins, or plastics, in the hierarchy of present

day materials. Plastics, like all other materials, have their advantages and their limitations. While it is not likely that we shall have all-plastic automobiles, or similar visionary products such as so often have been predicted, we shall undoubtedly see an increasing use of plastics in those applications for which plastics are uniquely adapted. There are certain jobs that plastics can do better than any other widely available material; one of the first large-scale uses of plastics, ignition apparatus for automobiles, is a typical example. Another more recent example is the use of silicone resin, a new plastic possessing resistance to temperatures ranging as low as  $-75$  degrees Fahrenheit and as high as 500 degrees Fahrenheit,



in gaskets for turbosuperchargers and in conjunction with Fiberglas as insulation for electric motors.

In any "look ahead" at our new frontiers, we should not overlook television. Since the first electronic scanning device for modulating a carrier wave with video signals was developed in 1923, television has made rapid strides toward commercialization. Authority to begin television broadcasting was, in fact, granted by the Federal Communications Commission on July 1, 1941, but American participation in the war prevented its fulfillment at that time. Now we should see a tremendous expansion of this potentially important industry.

Electronics has made tremendous strides in recent years, particularly in the ultra-short-wave regions. One of the most spectacular recent applications of electronics

is the electron microscope, a development certain to have an enormously stimulating effect on many fields of industrial research. Making possible visual magnifications as great as 30,000 diameters, compared with 2000 diameters for the optical microscope and 3000 diameters for the ultraviolet microscope, the electron microscope makes it possible to "see" large



molecules. The usefulness of this new research tool in the study of viruses, colloids, catalyzers, surface chemistry, pigments, ceramics, plastics and many other fields will be immeasurable.

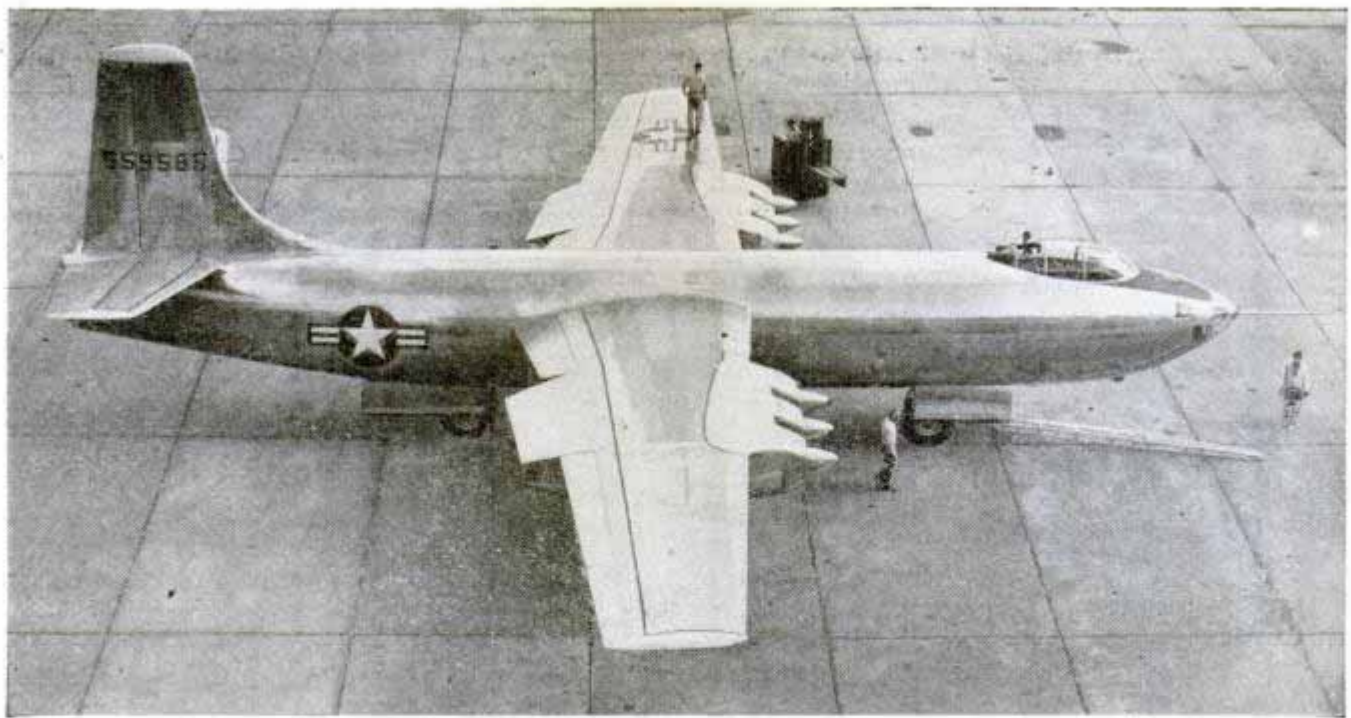
There is one field of development which probably merits our attention and encouragement more than any other—that is man's fight against disease. Sulfa drugs, penicillin and synthetic antimalarials are only a few of the outstanding new pharmaceuticals which have been brought to clinical usefulness during the last decade or so. There is no reason to believe that we have yet scratched the surface of the ultimate full usefulness of these new materials. While there are, for example, five well-known sulfa drugs at present, there are actually some 2000 possible compounds of this type, many of which are under active investigation. In the case of penicillin, a product of the green mold *penicillium notatum*, we have recently discovered the existence of four distinct



active principles—penicillins F, G, X, and K—but there are undoubtedly many others among the 50,000 or more known molds and fungi. In the case of synthetic antimalarials, over 14,000 different compounds were investigated during the war, leading to several new and important drugs for the treatment of malaria, and yet our conquest of this disease has only begun. This is an important field—one which will keep doctors, bacteriologists, biologists and chemists busy for many years.

These are only a few representative examples of our new frontiers. There are dozens more which could be mentioned if space permitted. But incomplete though the list may be, it should give us assurance that we have by no means reached the end of our progress—we have only begun to explore the limitless frontiers before us.





Martin Aircraft photos

First trials of the bicycle-type landing gear developed for the jet XB-48 were made on a Martin Marauder

## BOMBER RIDES "BICYCLE" LANDING GEAR

Wings too thin to house conventional landing gear have made it necessary to develop a new bicycle-type gear for a six-jet AAF bomber. The XB-48's wheels, one behind the other, are drawn up into the fuselage instead of into the wings or engine nacelles. One is far forward and the other is aft of the bomb bay. Two smaller and thinner wheels mounted near each

wing tip prevent the plane from tipping when it taxis or halts. Martin engineers ran lengthy tests of the gear on a Marauder before installing it on the high-speed long-range bomber. The XB-48 has a wing span of 108 feet 4 inches, length of 85 feet 9 inches and is 27 feet 6 inches high. Three General Electric gas turbine engines are grouped in each wing.

## Beetles "Tagged" With Radioactive Disks to Study Their Migratory Habits

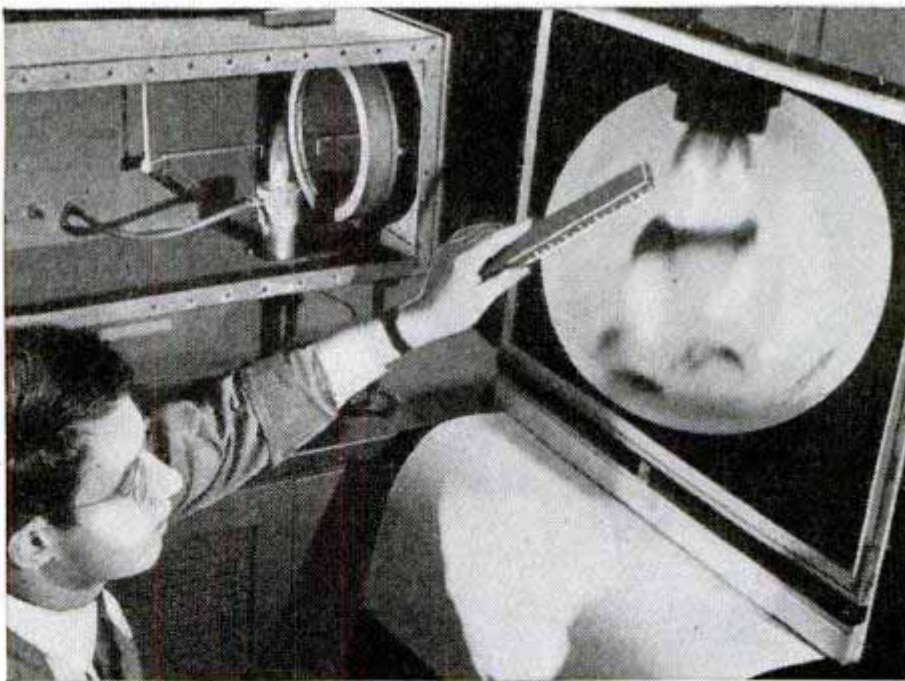
Migratory habits of beetles are studied in England with the aid of a Geiger-Muller counter, the radiation-detecting instrument used in atom-smashing experiments. Seeking new ways to combat crop pests, British scientists glue tiny disks of radioactive ma-

terial to the wings of captured beetles which are then turned loose. A Geiger-Muller counter, carried a few inches above the ground, makes a ticking noise when it comes close to a "tagged" beetle. It even spots beetles four inches underground.



## Flame Projector

Engineers, using a flame projector, are studying the private lives of different types of flame as an aid in improving the design of jet engines for aircraft. The actual flame is reflected by a series of lenses and the magnified image is thrown on a screen. By measuring the cone in the center of the flame Westinghouse engineers can determine the speed at which fuel is converted into heat. This information is vital in the design of aviation and turbine engines.



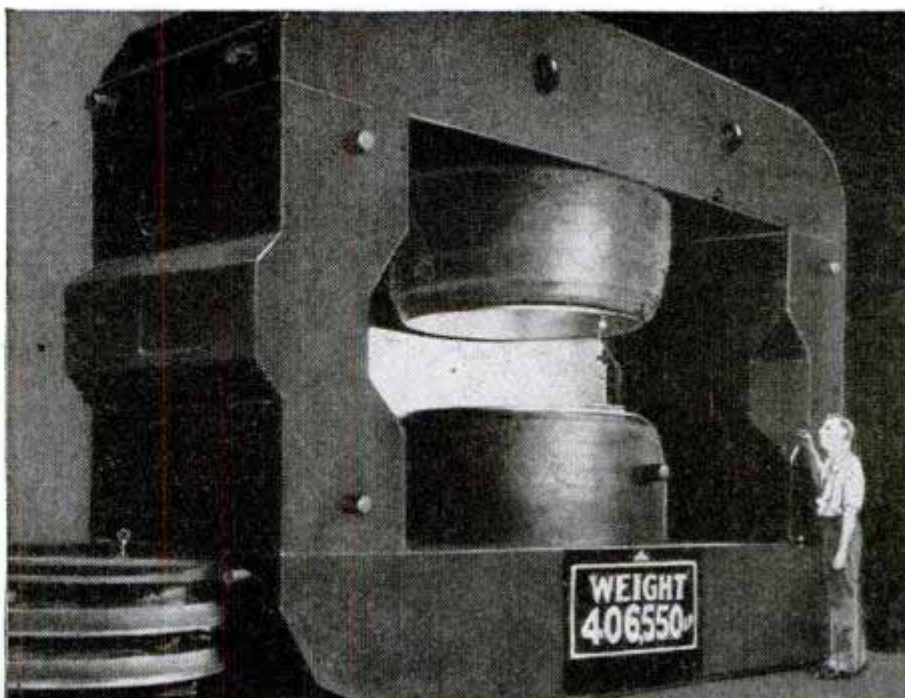
## Flash-Gun Shield

With a light-diffusing shield for flash guns that swings up out of the way it is not necessary to remove the shield to insert new bulbs. Use of the shield helps to prevent "burned out" and "chalk-white" pictures. The shield is a spring-tension hoop attached to the flash-gun reflector. The spun-glass diffuser disk is held in the hoop and is easily replaced if broken. Heat of the flash bulbs will not discolor the disk.

## Giant Electromagnet

More than 200 tons of steel went into a giant electromagnet built for Carnegie Institution's new atom-smashing cyclotron. The powerful magnet was cast in six pieces of flawless steel, then machined.

Popular Mechanics is always ready to supply further information to readers about various products described in any issue. Just write to Bureau of Information, Popular Mechanics Magazine, 200 East Ontario Street, Chicago 11, Ill., for a prompt reply

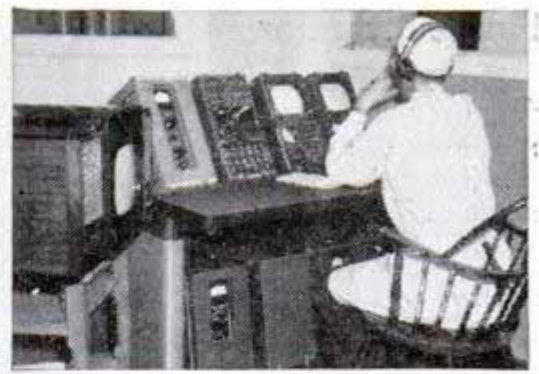






Photos by Sy Friedman, NBC

Television camera (above) records an actual operation at Johns Hopkins Hospital and transmits the action pictures to receivers viewed by medical students (below). Upper right, control units



## Televising an Operation

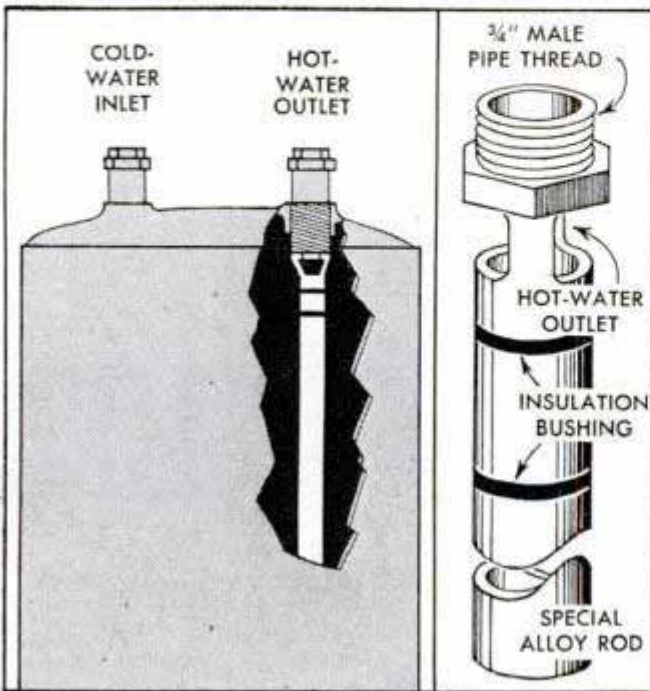
Five surgical operations were televised recently by Johns Hopkins University and Hospital and RCA to test television as a means of teaching medical students. Two supersensitive cameras were used. One was mounted on a light fixture 4½ feet directly above the operating table. The second camera, equipped with telephoto lens, was set up in the gallery of the operating room. The camera over the operating table was preset and controlled automatically. A microphone above the table carried the surgeon's voice as he commented on the operation. Ten receivers permitted the operations to be viewed by 300 doctors. Television lifts the physical limitations of operating room amphitheatres which restrict the visibility of medical students.





## Electrochemical Rod Prevents Rust

To prevent rust from forming in hot-water tanks, a rodlike attachment made of special alloy can be installed in the hot-water outlet. Made in one-inch and  $\frac{7}{8}$ -inch-diameter sizes, the rod produces an electrochemical reaction that inhibits the formation of rust.



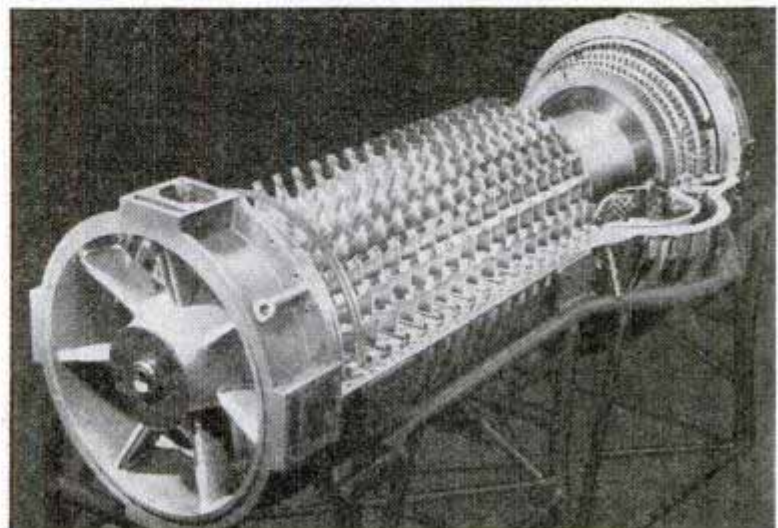
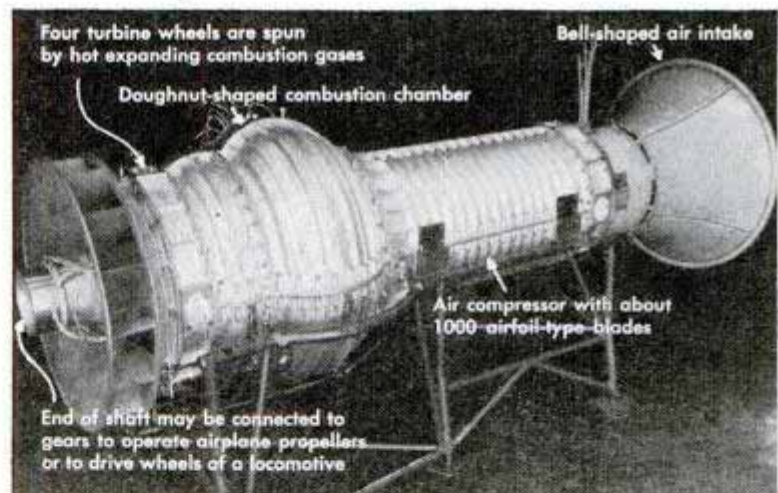
## Toy Cars Are Built With Plastic Kit

Young automotive engineers can build a roadster, coupe or sedan with a Lumarith plastic car-building kit. Changing the superstructure on the 10-inch chassis produces the different models. A geared, spring-wound motor drives the car. The kit includes separate metal axles, wheels, hub caps, exhaust stacks and bumpers.

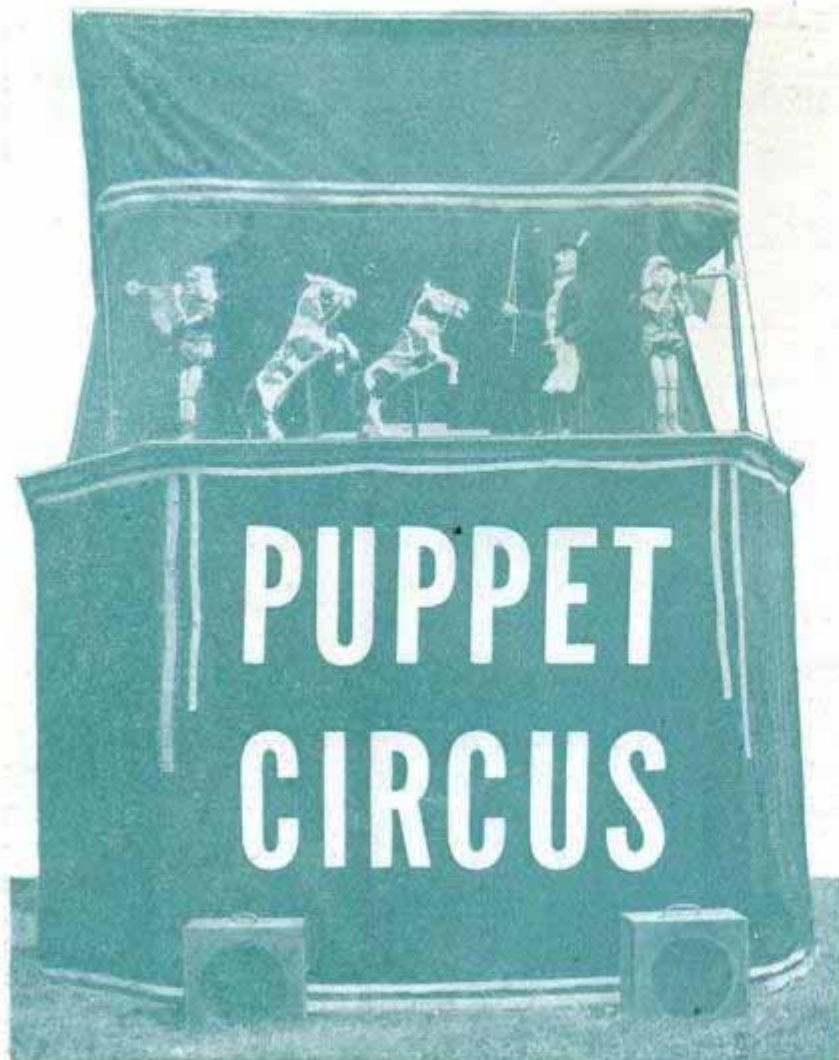
## Plane or Locomotive Engine

Hailed as a possible power plant for aircraft, high-speed locomotives, trucks or ships, a Northrop-Hendy "turbodyne" gas turbine is undergoing extensive tests. Developed for the B-35 Flying Wing, the turbodyne differs from ordinary jet engines in that virtually all of its power is used to drive the built-in turbine. It is designed to operate conventional propellers through gear trains instead of serving as a jet-type power plant. Paralleling aircraft experiments, the engine is being installed in the chassis of a Union Pacific Diesel-electric locomotive from which the original power plant was removed. By operating at slightly less than top speed it is expected to obtain about 10,000 hours of operation between overhauls. Present models can be operated for only about 500 hours. The relatively cool exhaust is to be dissipated through the locomotive roof. Pulverized coal will be used in the locomotive installation and liquid fuels for the other tests.

View of compressor blades; turbine at end







All photos copyrighted by British Combine

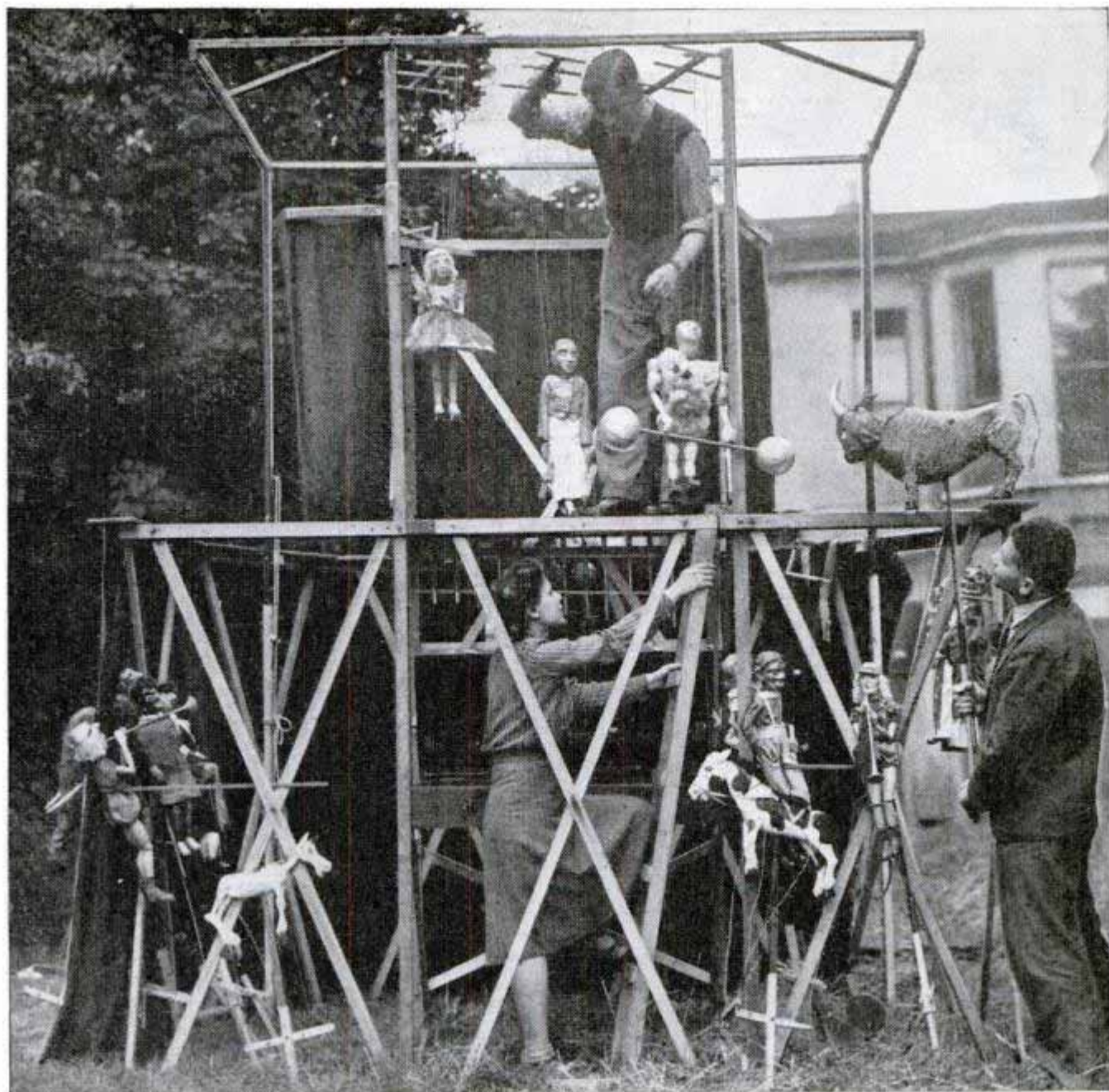
Three dozen two-foot-high characters perform with sound effects in an English puppet circus. Archie the Accordionist, above, is a yodeler. His "voice" comes over speakers in front of stage

↓ Trick cyclist is balanced on the tightrope by a long rod which the operator manipulates from underneath the stage

↓ It takes a lot of skill to keep Leslie the Acrobat from getting all tangled up in his act







All performers and props must be placed carefully in advance so the show can keep moving at a fast pace. The folding stage is designed so that it can be set up or packed quickly for hauling to the next circus lot

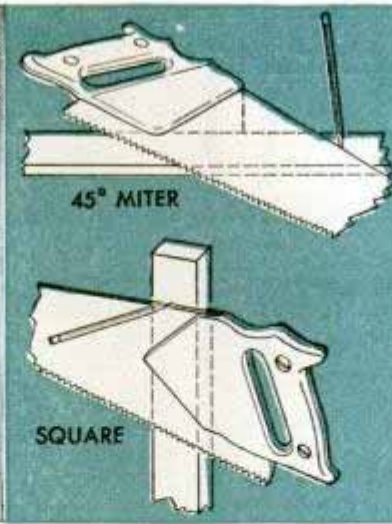
Wire ribs are wound around a wooden skeleton to form body of the puppet



The show's comics are Tim Turnover the Clown and Walter the Wonder Horse. Both of them "talk" over the circus loudspeaker system





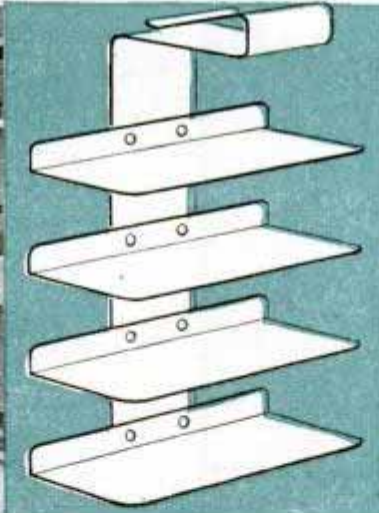
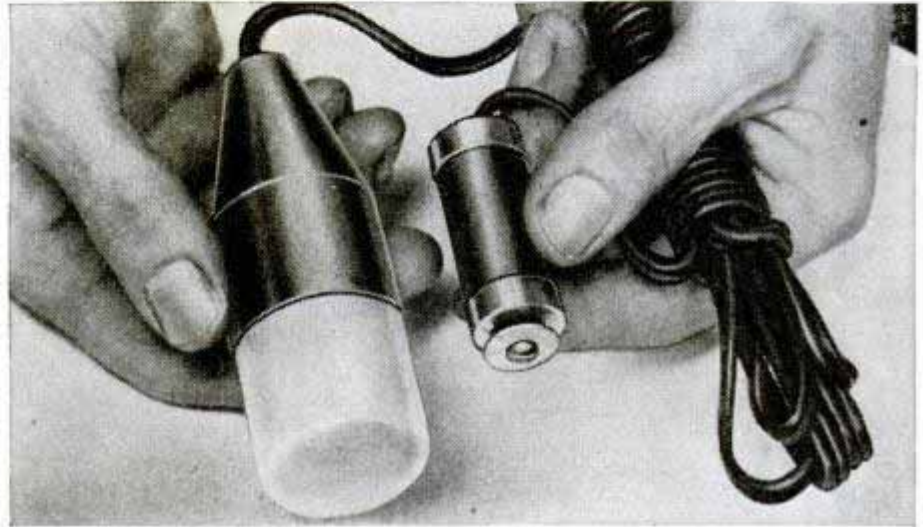


## Plastic Saw Handle Is Miter or Square

Three functions are performed by a plastic handle designed for use with straight-back saws. Besides serving as a handle, it can be used as a 45-degree miter or as a square. To attach, the square half of the handle is drilled and secured to the saw. Then the other half of the handle is fastened to the square half.

## Safety Auto Light

Emergency auto lights are protected against breakage by a durable Plexiglas hood which covers the bulb. The hood minimizes the possibility of fire caused by sparks from a bulb shattering near gasoline or alcohol fumes. The hood also provides a flood of light instead of a focused beam. The light is plugged into the cigarette lighter outlet.



## Small Clip-On Shelves Fit Medicine Cabinets

Extra space in medicine cabinets is provided by four small shelves attached to a metal arm which clips onto a regular cabinet shelf. The clip-on shelves are suitable for holding shaving brush and cream, tooth paste, lipstick and other small articles. The shelves are finished in ivory enamel and are easily cleaned.

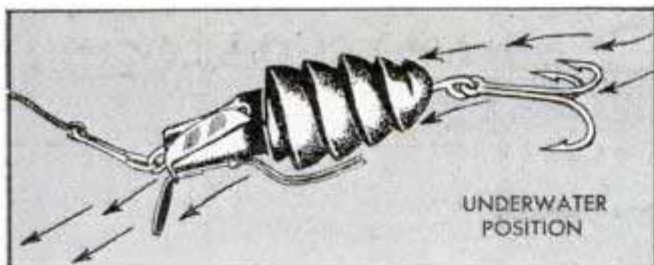
## "Double-Stroke" Electroplating

Like a painter moving his brush back and forth, a new electroplating process flows plating onto an object in one direction and removes surplus metal with an electrical "backstroke." Developed by Westinghouse, this method eliminates the need for polishing away excess metal coating piled on by conventional one-direction electroplating. In two-direction plating, current is reversed periodically in the plating tank by low-voltage contactors.

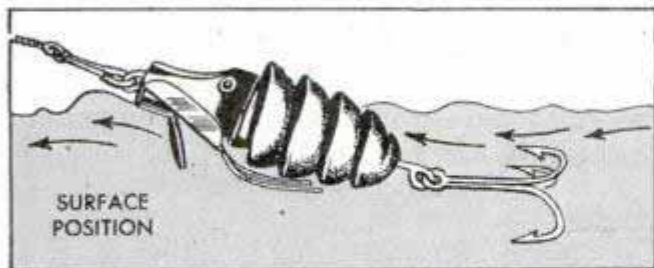
## Plastic Tubes Replace Arteries

Lucite plastic tubes an inch long have been used successfully to replace segments of the aorta (big artery) in animals. In reporting his experiments to the American College of Surgeons, Dr. C. A. Hufnagel of Boston said the tubes were held in place by stitches of specially braided silk. The artery with its plastic tube section functioned satisfactorily in carrying blood; no drugs, such as heparin or dicoumarin, were needed to prevent blood clotting.





UNDERWATER POSITION



SURFACE POSITION

### Double-Duty "Diving" Lure

By adjusting the diving fins on a fishing lure the angler can use the same plug for both deep-water fishing and surface bait casting. For underwater fishing the darting fin is forward and the diving fins slant down, pushing the lure deep into the water. To convert the plug to a surface bait the darting fin is rotated so that it slants to the rear and the forward edges of the diving fins are pushed upward.

### Combination Fish Tape and Scale

Fish can be weighed and measured by a combination 24-inch tape and scale which handles up to eight-pounders. The instrument weighs only 2½ ounces and folds to fit a fisherman's tackle box or pocket. The manufacturer calls it a fisherman's "deliar."



JUNE 1947

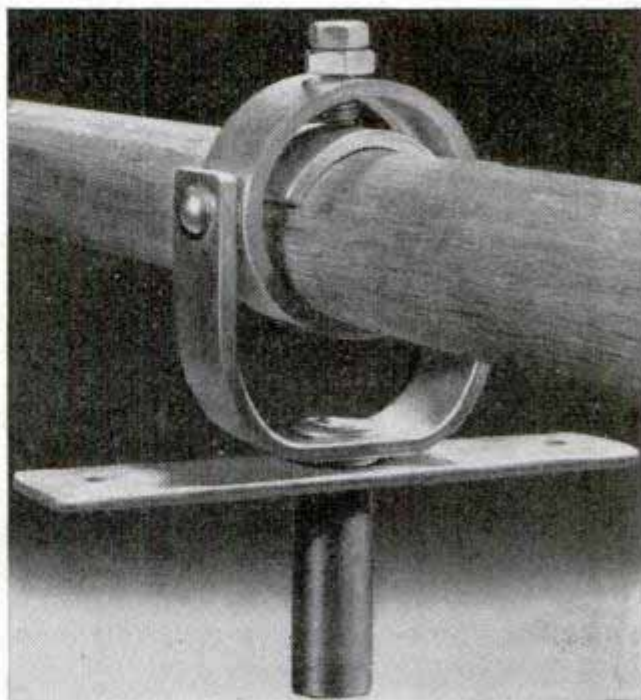


### Silent Reel Lowers Boat Anchor

Lowering anchor from a small fishing boat is accomplished silently and easily by a reel within reach of a seated fisherman. An outside control lever releases the anchor at low speed, with no spinning of the handle to frighten fish away. The anchor is brought up by turning the handle. If the handle is released, the anchor automatically is locked at that level.

### Lock Clamps Around Oar

Oarlocks that clamp around the oars eliminate the need for drilling holes and thereby weakening the oar. The clamp is a steel spiral through which the oar is inserted. A bolt on the top of the clamp tightens the spiral to hold the oar firmly in place.





# GERMS PUT THE SQUEEZE ON OIL

Latest wonder of the petroleum industry is the use of bacteria to free droplets of oil from sand, shale and limestone

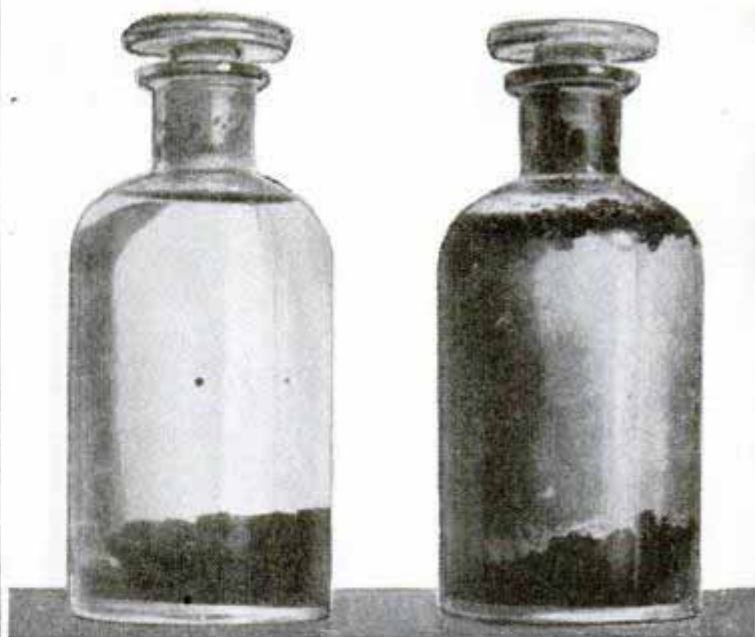
By Andrew Hamilton

**A** NEW PROCESS for boosting oil production has hard-headed petroleum engineers and oil executives talking to themselves. It may increase the production of exhausted wells by as much as 35 percent. It may unlock vast reserves of oil from tar sands and oily shales in which production is now too costly.

The new process was developed by Dr. Claude E. ZoBell, associate professor of microbiology and expert on bacteria at the University of California's Scripps Institution of Oceanography. Oil wells and oil sands are inoculated with microscopic bacteria  $\frac{1}{5000}$  inch long. These tiny organisms migrate through oil-bearing sediments in all directions and free droplets of oil from sand, shale and limestone.

At a time when the world's resources of oil are said to be running low, the process offers a new way to squeeze petroleum out of the earth's crust. This is big news in a nation that consumes oil at the rate of 5,000,000 barrels a day.

The ZoBell process is by no means the



Dr. Claude E. ZoBell checks water sampler he designed. The bottle at right, above, shows oil scum from bacteria; bottle at left contains oil shale, no bacteria



first time that science has put bacteria, and their cousins, the molds, to work for mankind. These microscopic organisms, more like plants than animals, are used in the making of cheese and pickles, the manufacture of certain plastics and explosives, the preparation of penicillin and streptomycin and the production of many other food, industrial and medicinal products.

The particular bacteria used in inoculating oil wells are new ones, discovered several years ago by Dr. ZoBell. They are types of sulphate-reducing bacteria and bear the jaw-cracking name of *desulphovibrio halohydrocarbonoclasticus*. They are about medium sized as bacteria go and it would take 5000 of them, stretched end to end, to cover one inch. In general, they are shaped like miniature bananas. Often two or more are linked together to produce a corkscrewlike shape.

In March 1943, Dr. ZoBell was working in his laboratory at the Scripps Institution of Oceanography at La Jolla, Calif., investigating the bacteria of sea bottom muds and the ways in which they may turn organic matter into hydrocarbons of oil. This project was a study sponsored by the American Petroleum Institute.

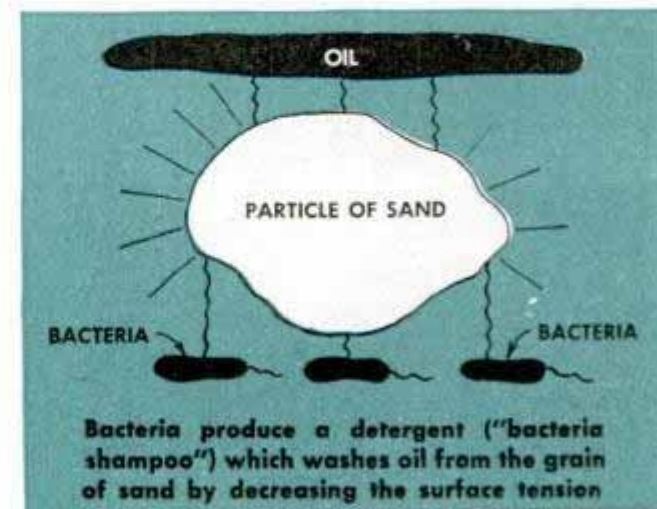
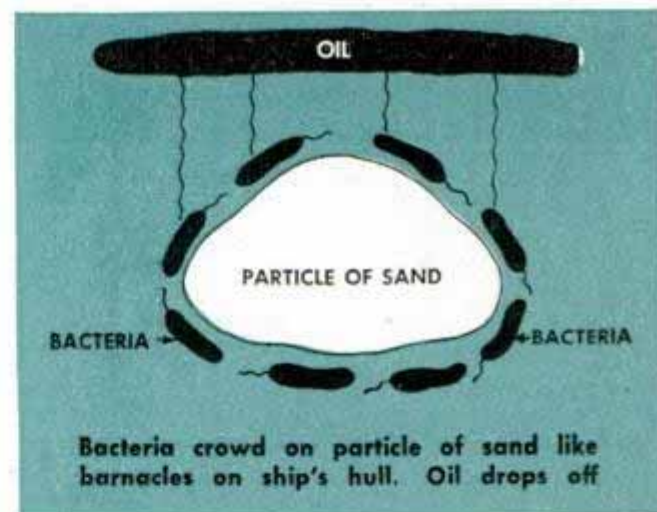
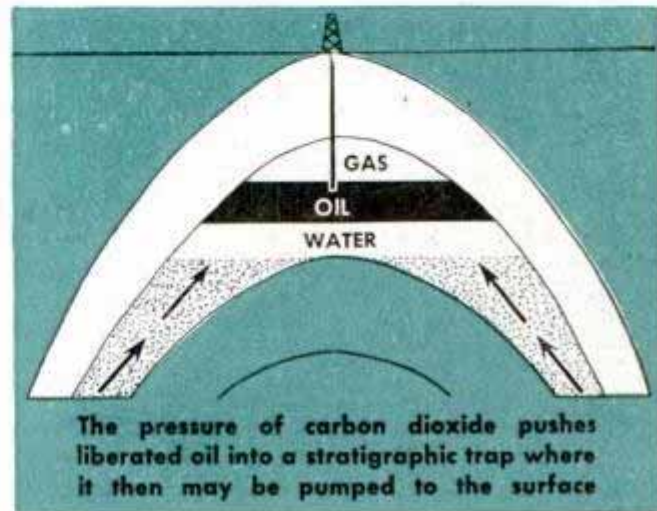
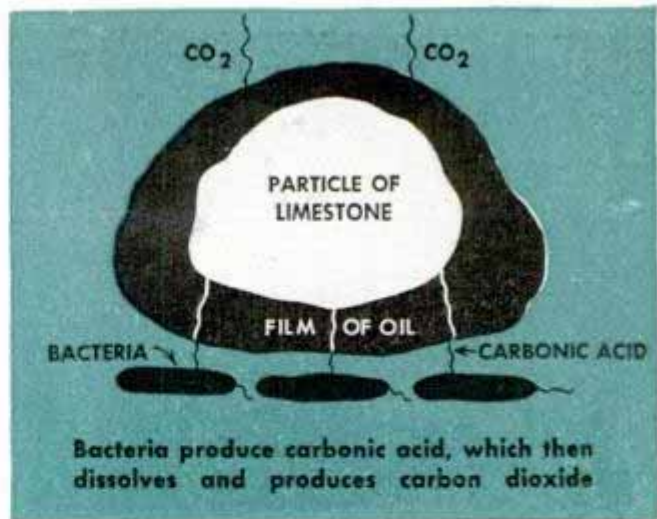
One day he placed cultures of the new bacteria in a chunk of oil sand, dropped the whole thing in a test tube and filled it with water. In a few days he noticed a scum of oil on top of the water and gas bubbles slithering up from the sand below. In three or four weeks the sand had been pretty well cleaned of oil. He recorded this fact in his laboratory journal as an interesting phenomenon of considerable scientific significance—but didn't think of it in terms of producing oil in the field.

The following month Dr. ZoBell reported his findings to the committee on the occurrence and recovery of petroleum of the American Petroleum Institute during a meeting of the Association of American Petroleum Geologists in Dallas, Tex. The oil men immediately saw the practical value of the experiment.

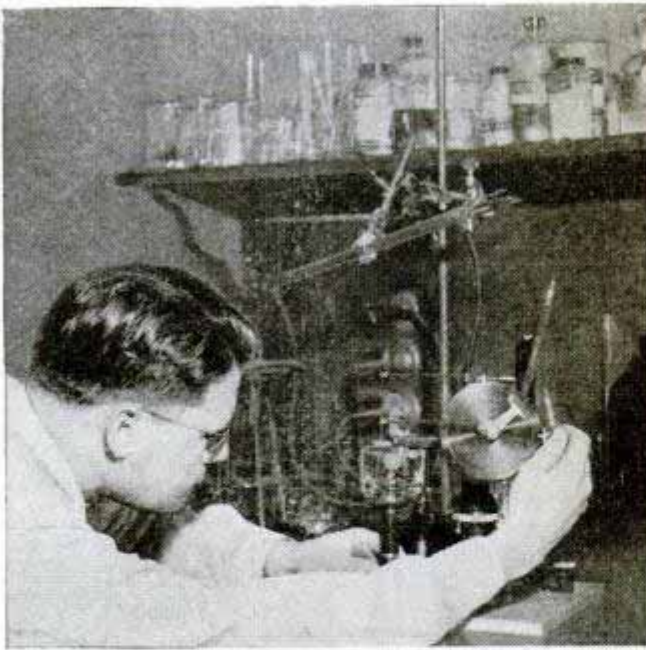
A flood of questions came from the committee members: "How are the bacteria produced?" "Is it possible to produce them in 5-gallon lots?" "How much will it cost?" "How much oil will be liberated?"

An official of one company was so impressed by what he heard that he offered Dr. ZoBell \$100,000 outright for the complete report of his experiments and exclusive rights to develop it. Another promised the bacteria expert a \$10,000-a-year job for life if he would work on the process exclusively for his organization.

But Dr. ZoBell turned down all offers and returned to his University of California laboratory on the shores of the Pacific







Pennsylvania Grade Crude Oil Assoc. photos

Laboratory "surface tension" test reveals new bacteria dissolve shale without destroying valuable oil. Below, released oil rises to top of bottle in test



Tubular object (below) is diamond-cut core from an oil-producing sand encased in Lucite. Bacteria will be forced through core to release oil locked in sand



to find the answers to many questions that had been raised by the initial discovery.

In three years of experimenting he learned that the new bacteria release droplets of oil from sedimentary materials in four different ways:

(1) They produce carbonic and other organic acids which dissolve particles of limestone and other calcareous (containing calcium carbonate or carbonate of lime) material. When this material is dissolved, the oil that was attached to the particle becomes free to move around.

(2) Respiring bacteria produce carbon dioxide. Carbon dioxide is also produced when calcareous materials are dissolved by acids. This gas makes oil flow more readily and its pressure pushes oil into areas where it can form pools. In such stratigraphic pockets, oil can be pumped to the surface more easily.

(3) The bacteria have a physical attraction for grains of sand or sediments. They fasten themselves to a particle like barnacles on the bottom of a ship—thus crowding off the oil. The bacteria will settle on almost any surface unless it is coated with some poisonous substance such as copper or arsenate. This action occurs in about four hours' time in the ocean, about two hours in the laboratory.

(4) Bacteria produce a detergent (similar to the substance in soapless shampoos). This decreases the surface tension of oil and allows it to slip off the grains of sand. Because this substance is produced in such minute quantities, scientists have not been able to determine its chemical composition. They do know that such "bacterial shampoo" exists and removes oil in somewhat the same manner that you wash grease off your hands.

Dr. ZoBell says that one or all four of these actions may be going on at all times to create greater concentrations of oil. In fact, there is reason to believe that desulphovibrio halohydrocarbonoclasticus bacteria or some of its near relatives may have contributed to the formation of the world's great pools of oil in California, Texas, Pennsylvania, the Near East, Venezuela and other areas.

Because of the tremendous implications of this discovery, Dr. ZoBell decided to take out a patent on the process. It is a basic principle of the University of California and the American Petroleum Institute that all information resulting from its sponsored research projects shall be made available to the public without charge. Patenting the process, and making it obtainable to all, prevents the wildcatter and get-rich-quick promoter from exploiting it.

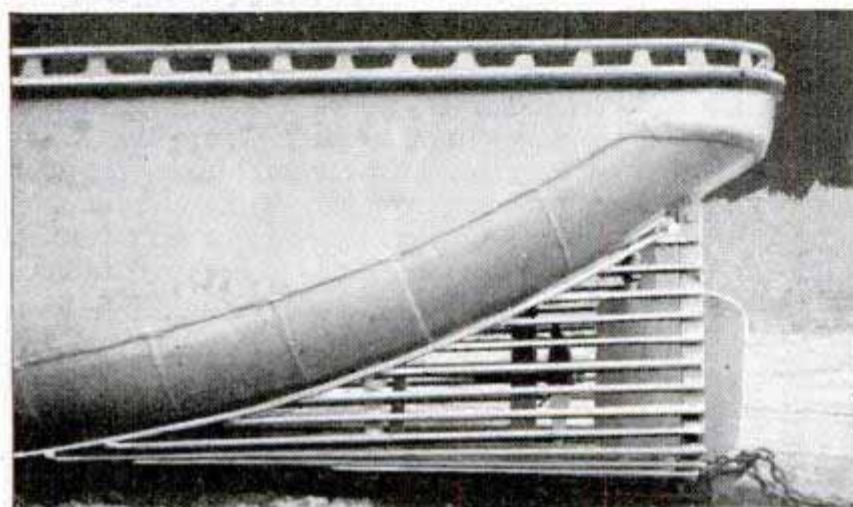
If you are interested in the patent, don't

(Continued to page 236)





Caterpillar Tractor Co. photos

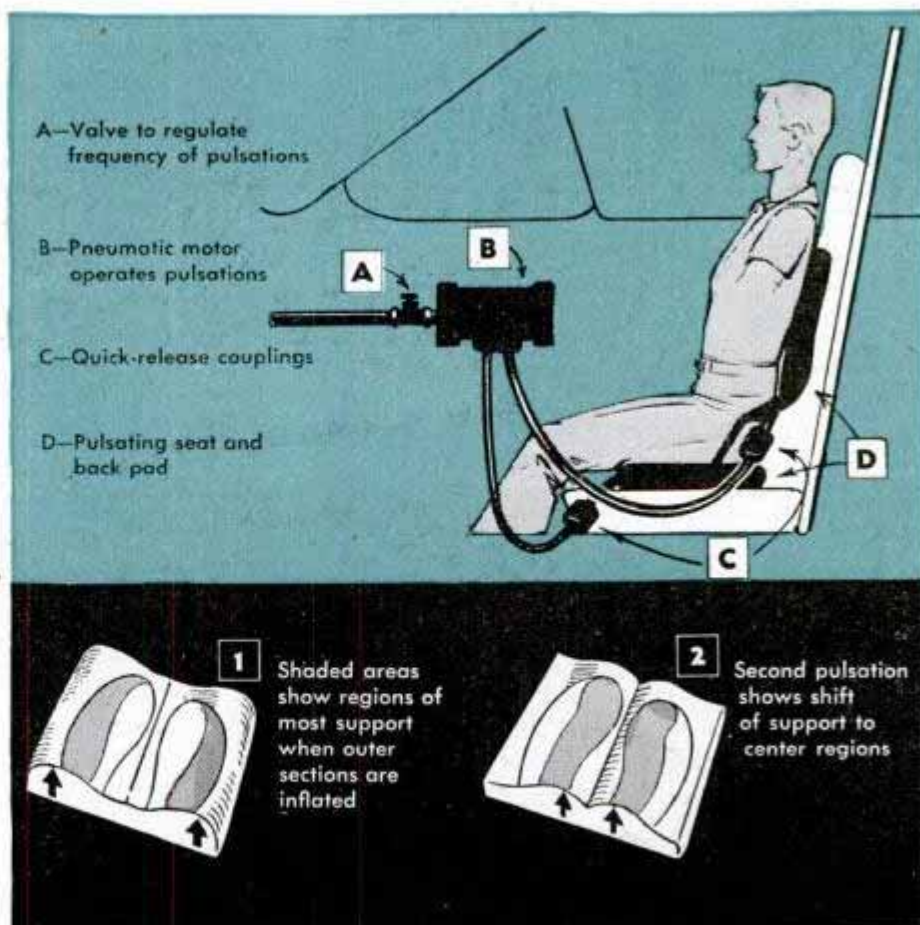


### CAGE FOR RUDDERS

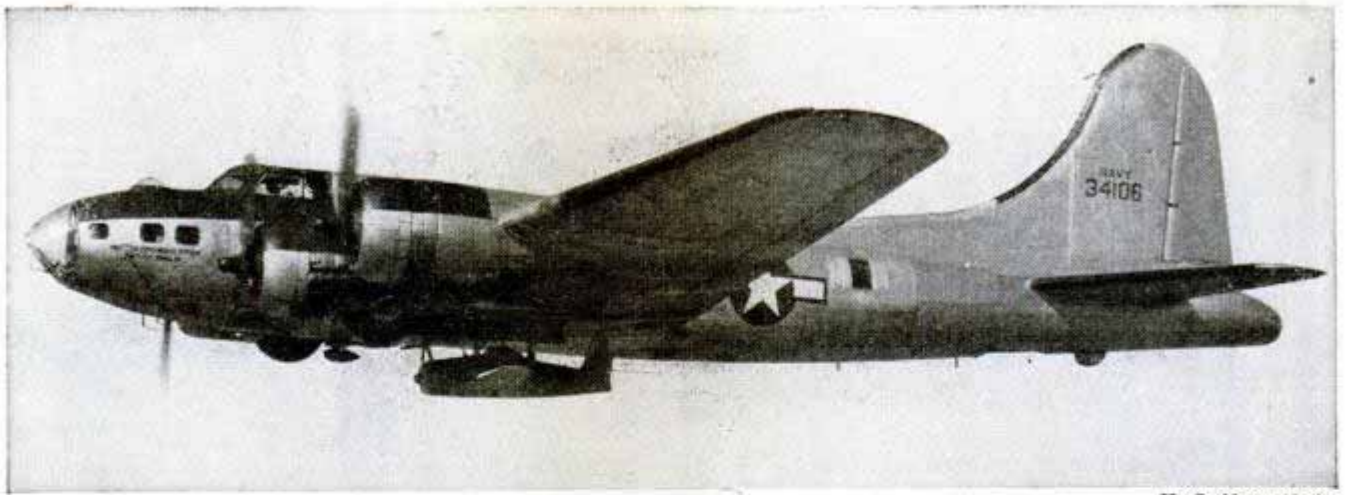
To reduce hazards to tugs working in streams filled with floating logs, propellers and rudders are placed inside a steel cage welded to the hull. Steel skids, molded to the bottom of the craft, permit skidding the boats across logs or even across land. The boats were designed by Price Bros., Ltd., a Canadian company that uses the tugs for logging and paper-mill operations.

### "Breathing" Seat

Pilot fatigue on long flights is lessened by a "pulsating" rubber cushion and a pad for the lower part of the back now being tested by the Army Air Forces. The cushion and pad consist of multiple-celled rubber bladders sandwiched between two layers of foam rubber. These cells are connected with a "breathing" apparatus so that air passes from one to another to create a pulsating or massaging action which fights fatigue. "Lung power" for the seat and back pad is provided by an 11-ounce pneumatic motor drawing pressure from the plane engine's vacuum pump. It was first tried on the 5051-mile Honolulu to New York flight.





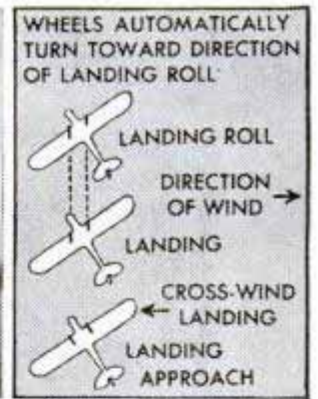


U. S. Navy photo

## MODEL PLANES DIVE AT TRANSSONIC SPEEDS

Wooden models, which fall from bomb racks at speeds over 600 miles an hour, are used by the Navy to obtain transsonic flight data. They have no propulsive unit, but carry 500 pounds of lead in the nose and attain speed solely by diving. Automatic controls within the model pull it out of the dive, parachuting it down for recovery and reuse. Radio telemetering equipment in the forward section sends information to ground receiving stations during

the dive and pull-out. Radar tracking traces the trajectory and automatic radio transmission permits evaluation of behavior in flight. Only  $\frac{1}{10}$  full size, the models are replicas of F8F Bearcat fighters and are dropped at high altitudes from the Navy version of B-17s. The technique makes possible transsonic speed tests without the correction of data necessary in wind tunnel experiments, due to the "blocking" effects in a tunnel at extremely high speeds.



Goodyear Aircraft photos

## PIVOTING WHEELS PERMIT CROSS-WIND LANDINGS

All the castoring action is built directly into the wheels of a gear developed for cross-wind landings. It will permit the plane a yaw of 25 degrees to either side and still maintain a straight-ahead landing or

take-off roll. The pivoting action comes from a kingpin, placed at a 30-degree angle to the ground, in the wheel assembly. It may be applied to any standard airplane landing gear without adding much weight.



British Official photo

## British Transport

England's 40-passenger Airspeed Ambassador is being built for medium-distance operations between the islands and Europe. It will have a cruising speed of 280 miles an hour and a range of over 1000 miles. Except for a high wing, it closely resembles the larger Lockheed Constellation.



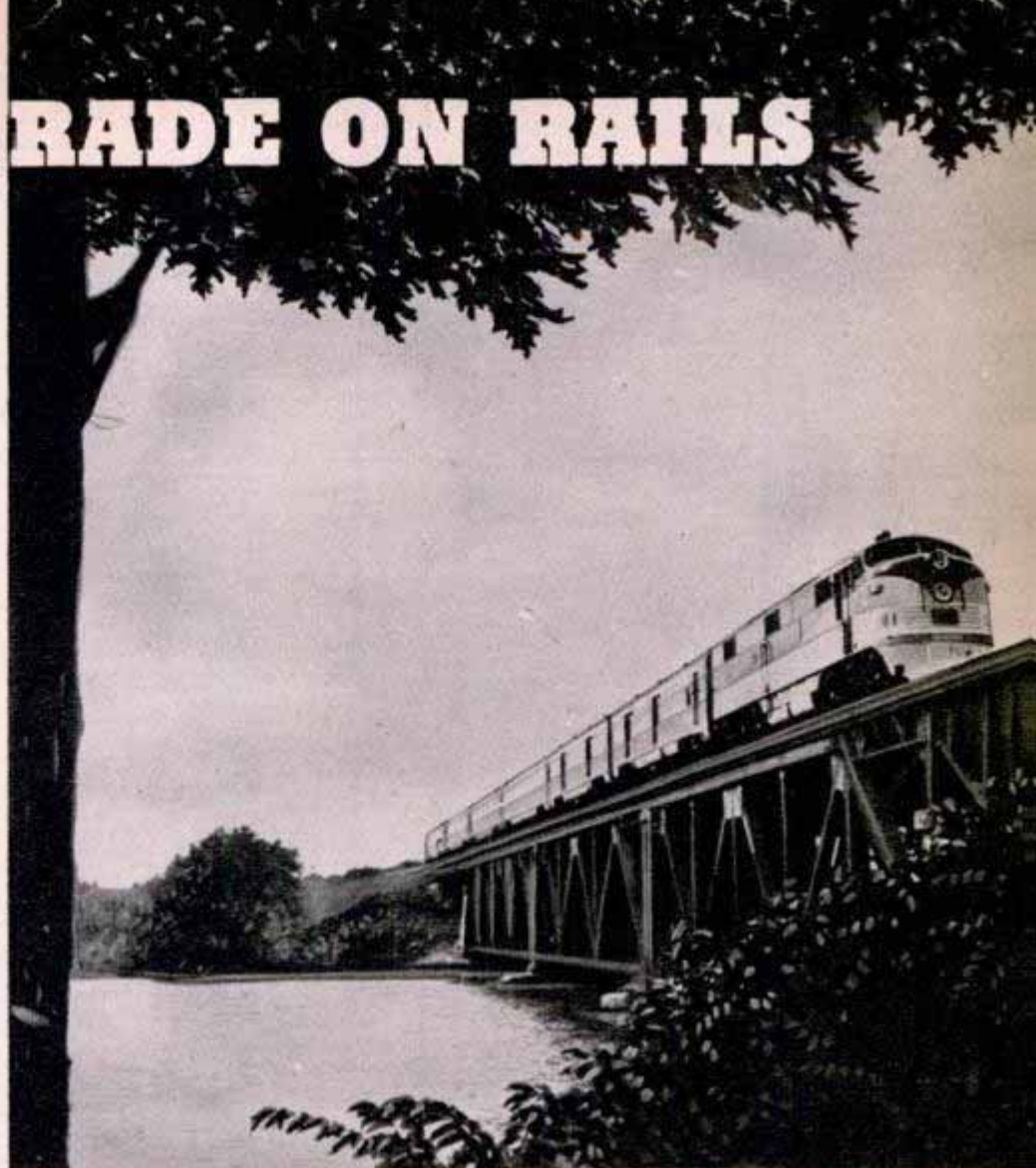
# DRESS PARADE ON RAILS

By Clifford B. Hicks

You're zipping across the country on a streamlined train making 80 miles an hour. You want to reserve a hotel room at your destination so you pick up a phone and call a number a thousand miles away while you gaze out the window at the flashing scenery.

After you've hung up the phone you decide you need a haircut. You walk through a couple of cars to the barber-beauty shop. While in the chair you ask the barber what movie is to be shown that night in the theater car.

That's a rough idea of the rail travel just around the bend. More than 100 new streamliners soon will roll between the nation's cities. Many are on daily schedules already. They're more than just superfast trains—



↑ Luxury-packed Pere Marquettes whisk passengers between Detroit and Grand Rapids thrice daily, making the 152-mile run in 160 minutes

↓ Individual fluorescent lights in many new coaches ease eyestrain of reading while riding. This coach also has a public address system

New York Central photo







↑ Modernized by streamlined jacket, Chesapeake and Ohio locomotive actually began service in 1926. Drawing at right, reproduced from our cover, shows sky-view observation car of Milwaukee Road's Olympian Hiawatha

they're luxury liners on rails. Since the end of the war, 3285 luxury cars have been ordered, cars that are eye-openers.

There are double-deck "Vista Dome" cars with glassed-in tops. On some trains you may flip a switch to turn on an individual radio built into the cushion of your

seat; your neighbor won't mind because he won't be able to hear it. You'll borrow books from the train library and pick up the latest news on a ticker tape.

You won't find all these luxuries on any one train. But the \$7,000,000 fleet of Empire Builders offers a preview of streamliners that will be rolling the rails within a few months. The five trains, operated by Great Northern and Burlington, will run a daily 45-hour schedule between Chicago and Seattle, clipping 13½ hours from the old time over the northern route.

Coach passengers can tip back their seats, fold down an upholstered leg rest from the seat ahead, and relax on a chaise longue that's almost as comfortable as a bed. If you want to look at the scenery, you can turn your entire seat around until you are gazing out the huge picture window.

Venetian blinds control the glare when the sun's on your side and you have an individual reading lamp that spreads a cone of light just to the edge of your seat. If you want a quick snack instead of a dinner there's a coffee shop where you can get a sandwich and malted milk. Sleeping-car passengers have a wide choice of accommo-



↑ Engineer's fingertips control 6000 horsepower in this new locomotive. Below, Diesel-electric engine can be geared for heavy freight or fast passenger run

General Motors Electro-Motive Division photo





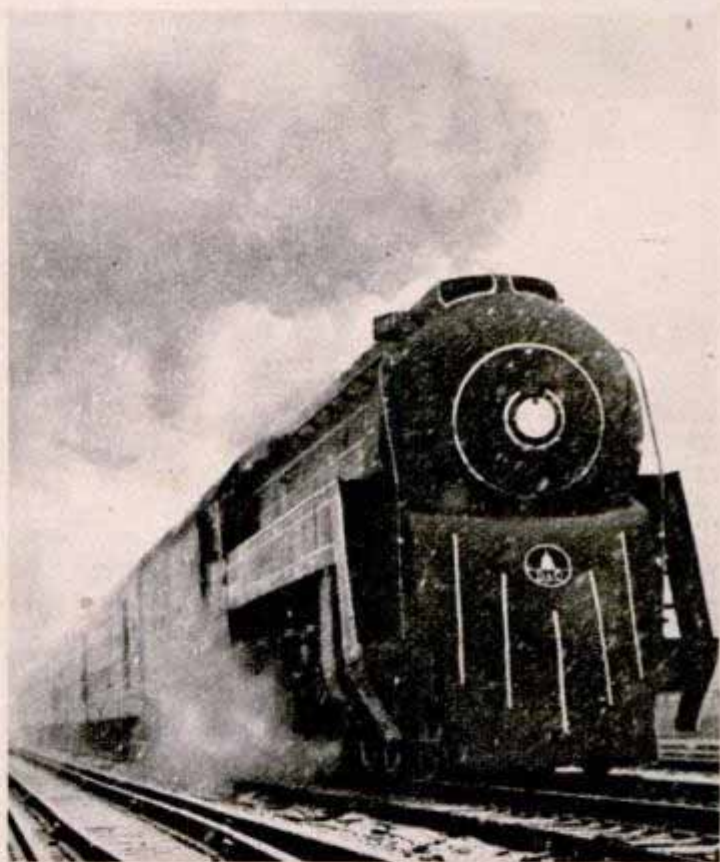


Postwar Empire Builders are pulled by two-unit 4000-horsepower locomotives with twin cabs

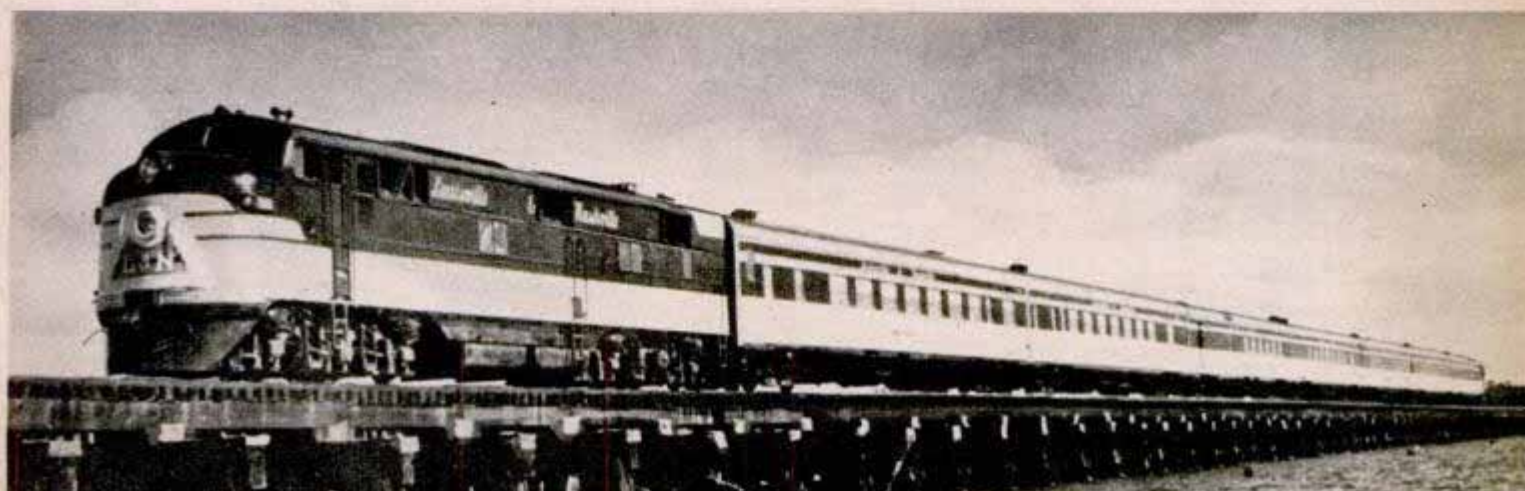
dations including duplex roomettes—private rooms at a price barely above the cost of a lower berth.

Luxury is the keynote on all the new trains and the railroads have good reason for emphasizing it. Much of their equipment was recalled from retirement to roll up their unbelievable war record and a great deal of it made a final run with discharged troops and headed for the pasture. Air lines are competing for the travelers who want to get from here to there in a hurry. Automobile production has been boosted so there'll be an increasing number of motor tourists. The railroads are building new trains by the score, depending on luxury and comfort to sell tickets.

Last January, Baltimore & Ohio's Cincinnati cut the time between Cincinnati and Washington to 11½ hours. Just a few of the special features of this 100-mile-per-hour top speed train are fluorescent lamps, a loud-speaker and radio in every car, nonfogging windows and an intercommunicating telephone system. The



Speedy Cincinnati roars through a snowstorm on its trial run to Washington, D. C. Below, new Humming Bird between Cincinnati and New Orleans clicks across Biloxi Bay







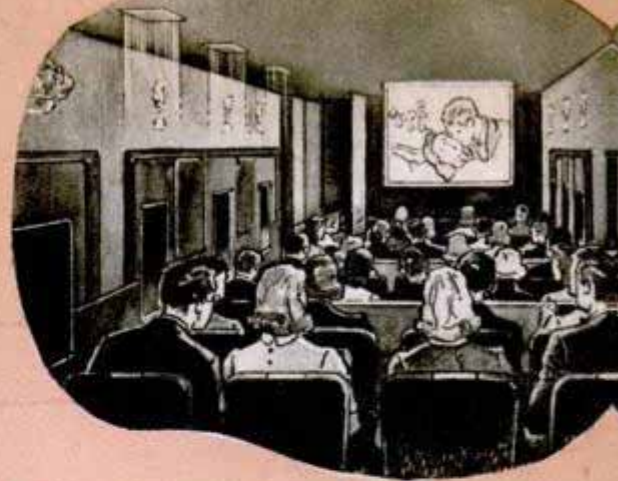
Chesapeake and Ohio photo

stewardess-nurse's room has a sofa-bed, heating equipment for baby bottles and walls that are soundproof to baby wailing. Of a total of 244 seats on the train only 176 are sold, leaving ample room for relaxation in any of the combination cars. It's not an extra fare train—you can ride it at regular coach rates.

The Humming Birds, Louisville & Nashville's new streamliners on a fast day run between Cincinnati and New Orleans, emphasize the trend toward combination cars. There's a tavern-lounge and a coach-lounge on each train. Other features include in-

Coach passengers sink into tilt-back seats, flick down the soft leg rests and relax on a chaise longue

Great Northern photo



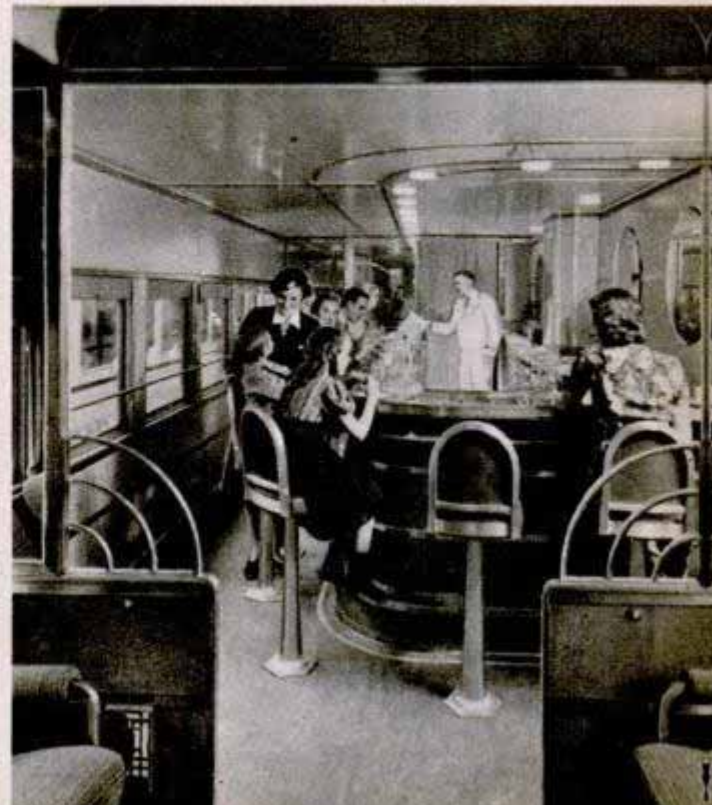
↑ In some new diners, tables fold into walls, screen is dropped and regular movies shown.  
← Spacious lounges with extra seats provide plenty of room for relaxation and amusement

dividual heating units, folding arm rests between the double seats, and a self-emptying ash tray for each seat. Incidentally, several of the new streamliners have efficient air-conditioning systems that permit smoking throughout the train.

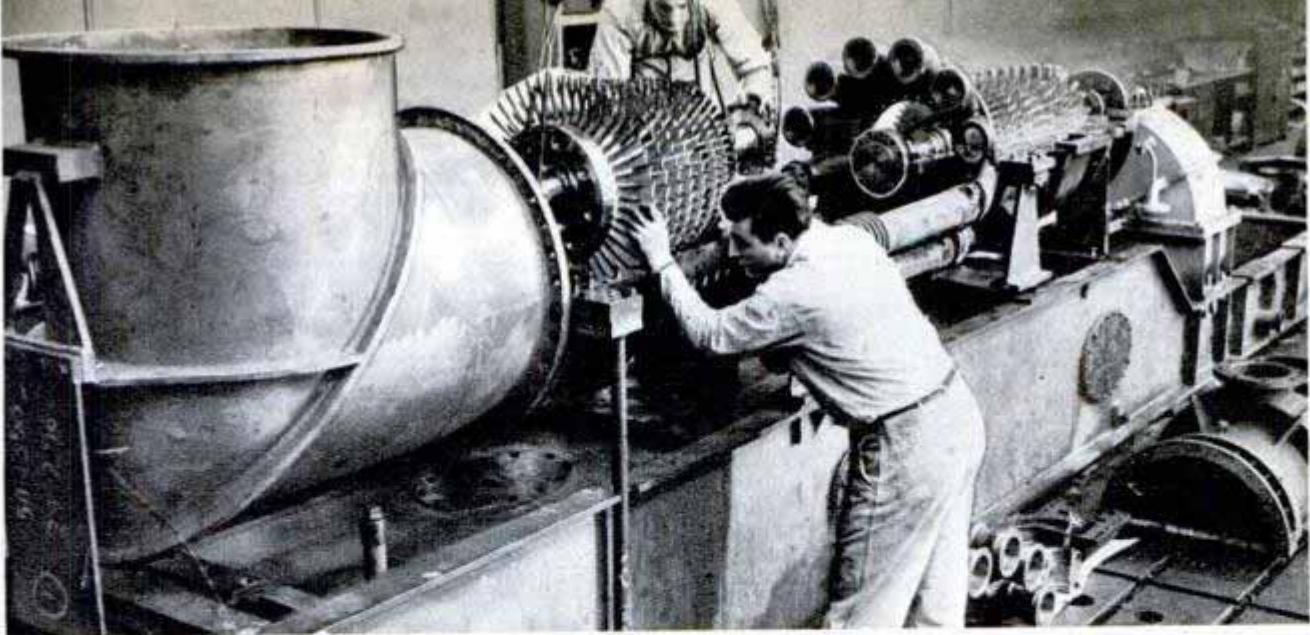
Chesapeake and Ohio's fleet of Pere Marquette shuttles three times daily between Detroit and Grand Rapids, making the 152-mile run in 160 minutes. Dining facilities are spotlighted on these streamliners. The tables are rectangular and triangular in shape and fit diagonally into the wall so each passenger has a complete side to himself. No more bruised shins, either; the tables are supported by wall brackets instead of legs. Attractive waitresses have replaced the traditional waiters, and the railroad emphatically discourages tipping.

Other dining car features soon to come

Coffee shop of North Western's 400 offers sandwiches and soft drinks for travelers who want only a snack

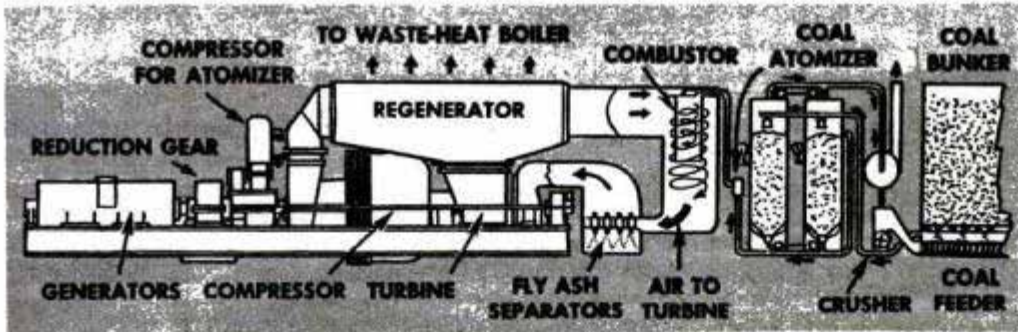
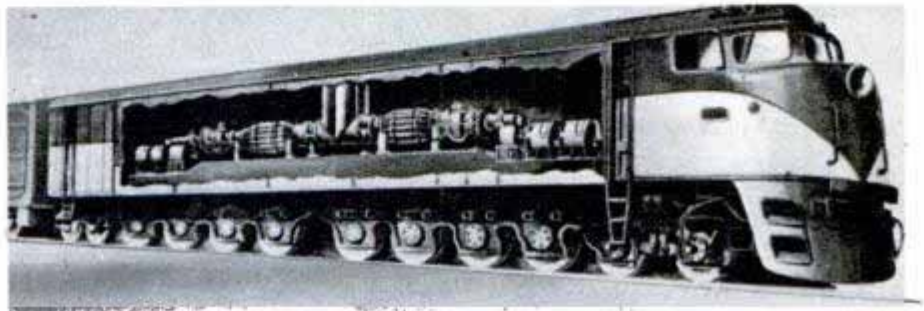






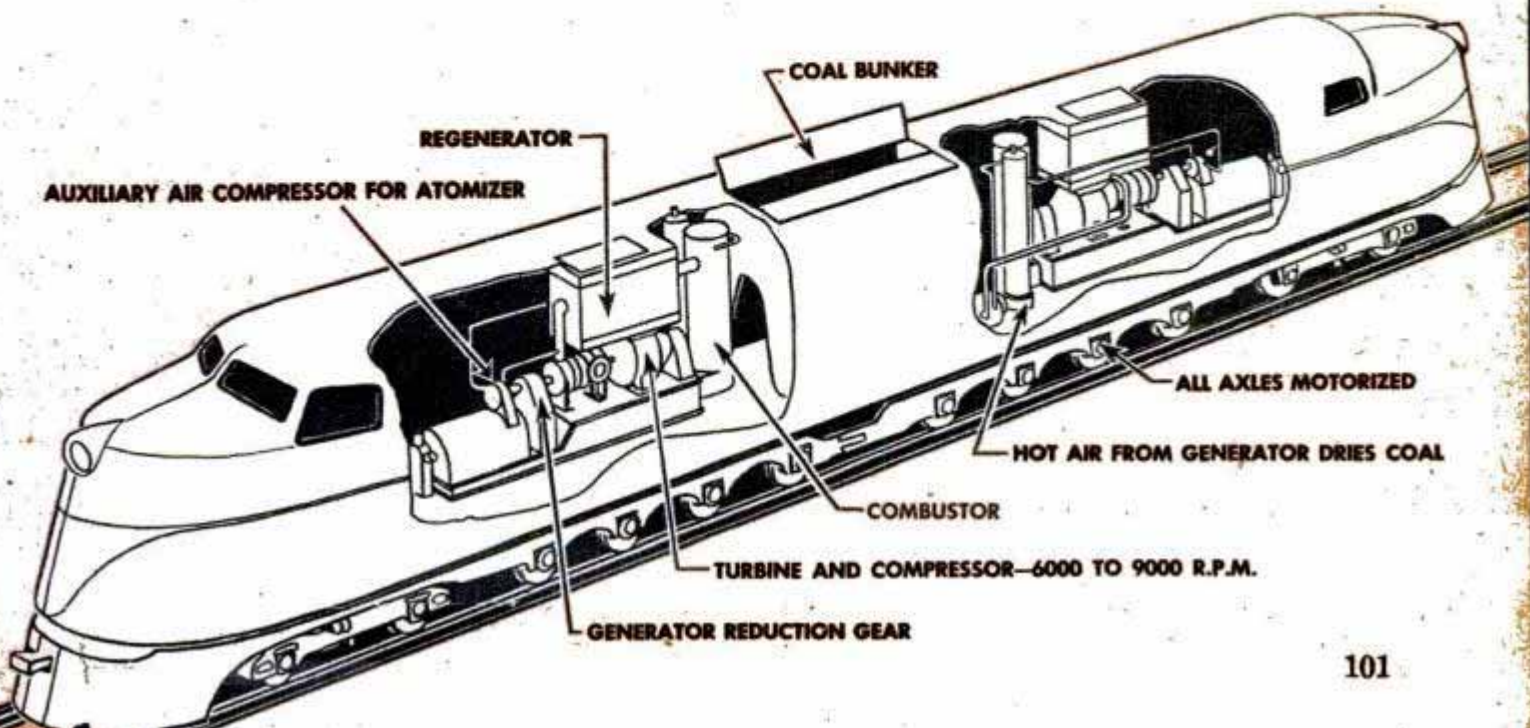
Westinghouse photo

Workmen fit blade-bristling rotor into gas turbine that will burn low-cost fuel oil to compete economically with coal-burning engines. Unit is so compact that four can be fitted into a locomotive half the length of comparable Diesel-electric. Right, artist's sketch shows how turbines probably will be installed in a locomotive for testing



← Diagram of the revolutionary new coal-burning gas turbine. Coal is atomized, then "exploded" in combustor to provide expanding gases which turn rotor blades. Sketch below shows how turbines could be fitted into the engine

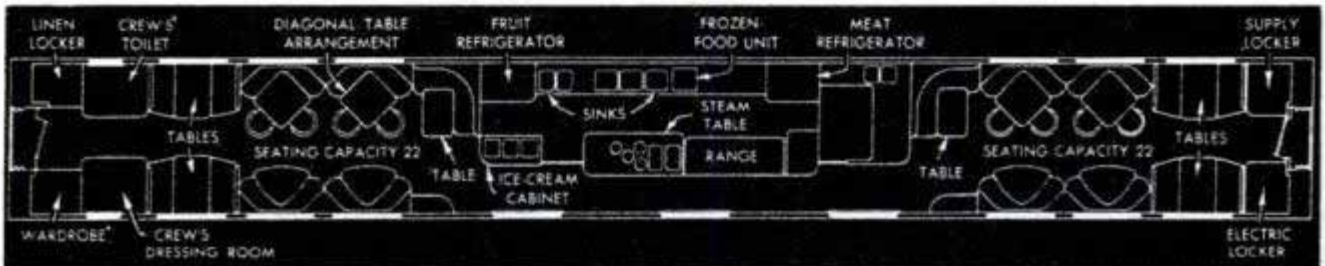
Bituminous Coal Research drawing







**Pere Marquette's diagonal table arrangement gives each passenger a side of the table to himself. Waitresses replace waiters and railroad discourages tipping. Diagram shows how dining sections are separated by kitchen**

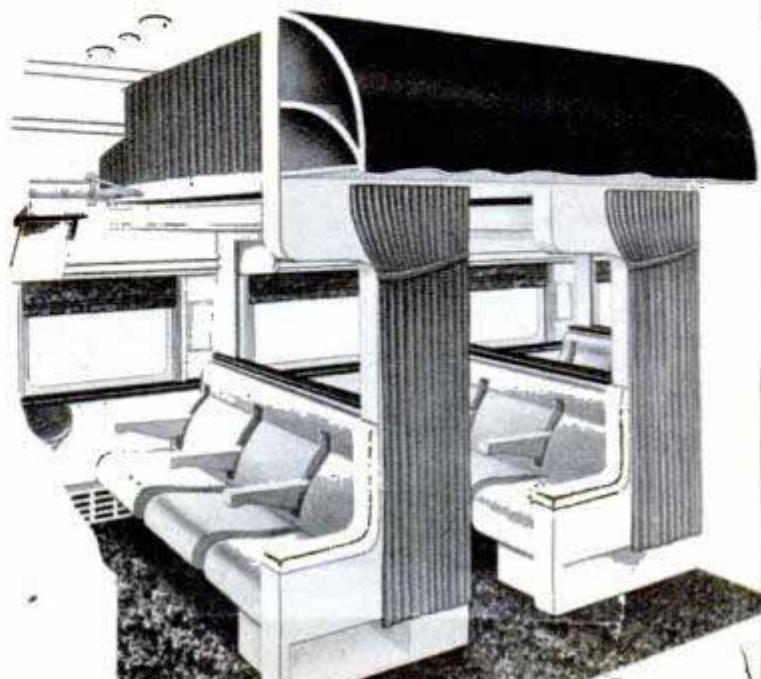
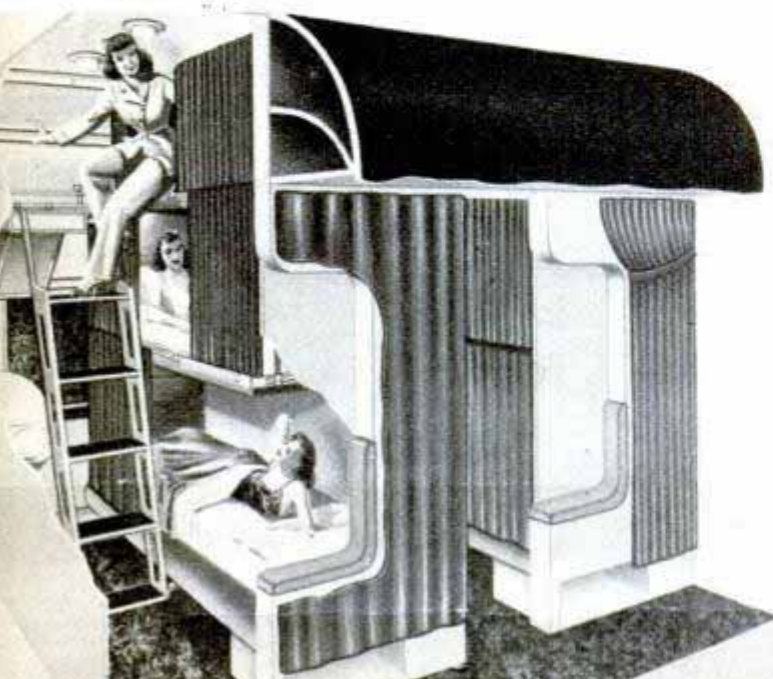


will spike most of the complaints about eating aboard train. The Southern Pacific Shasta Daylights will have a diner-kitchen-coffee shop arrangement built into three cars. And Pullman-Standard has designed a cafeteria that may eliminate the long wait for a meal.

Most of the seats on these trains are cush-

ioned with foam rubber; some have leg rests that pull out from beneath your seat, others from the seat ahead of you. Overnight coaches are designed for maximum sleeping comfort with reclining chairs and several inches more leg room—many of the cars have only 44 chairs compared to 56 in older coaches. On the rear of some seats

**Three-high berths in new Pullman give three passengers privacy of an individual room with lavatory. There is plenty of space during the day, too. Berths fold away to make room for an arm-rest seat for each occupant**







One luxury car will have an illuminated goldfish bowl stretching to the ceiling

are coat hangers with elastic bands at the bottom to prevent your clothes from swinging with the motion of the train.

You were measured for many of these new seats; at least someone your size was consulted. The Harvard Department of Anthropology measured the sitting postures of exactly 3867 people—male and female, tall, short and medium. The seat was designed to fit the hypothetical average person discovered from the measurements. Don't worry, though, if you're tall, short, fat or lean—the same seat is much more comfortable for anyone than the older type.

Chesapeake and Ohio soon will introduce a temperature control system with thermostats outside the skin of the car. These robots "feel"  $\frac{1}{10}$ -degree temperature change in the outside air, reporting their discoveries to a team inside the car that reacts instantly to provide the necessary change. Budd has developed an electronic device that draws the finest particles of



Travelers find that a radio, what-not shelf, draperies and growing plants give Panama Limited's observation car a homey air

dust, pollen and cigarette smoke from the coach. An electrical charge ionizes the particles, making them adhere to the filter.

Wrestling with heavy doors can be crossed off your list of complaints. A metal bar runs completely across the automatic doors of the new Pennsylvania coaches. Whenever a passenger touches any part of the bar the door opens for five seconds, then closes automatically. Under light tension the door can be held open as long as desired.

Pullman-Standard's new wrinkle in overnight accommodations is a sleeper stacking the passengers three high, an arrangement that gives the passenger more privacy. The berths run crosswise with a car-length aisle along one side. This, in ef-

Left, designers have budgeted every inch of space in a single room that costs little more than an open section berth. Right, double-deck Vista Dome cars have glassed-in tops to give travelers a broad view of the scenery

Budd Company photo

Burlington photo







↑ Air conditioning-heating outlet is in the ceiling of Pennsylvania coach. After air is circulated it returns through tiny perforations in baggage rack. Right, door swings open automatically as soon as bar is touched

fect, makes each stack of berths a small compartment with the passenger's privacy shared by only two others. You won't have to plod the length of the car in the middle of the night to get Junior a drink, either, as there's a lavatory built into each section.

The traditional argument over uppers and lowers soon may be a thing of the past. The Budgette costs little more than today's lower berths, yet it gives the traveler a small room to himself. Through an arrangement of rooms cleverly staggered on two levels the car can carry a lot of passengers and rates are kept correspondingly low.

Most of the more expensive rooms have

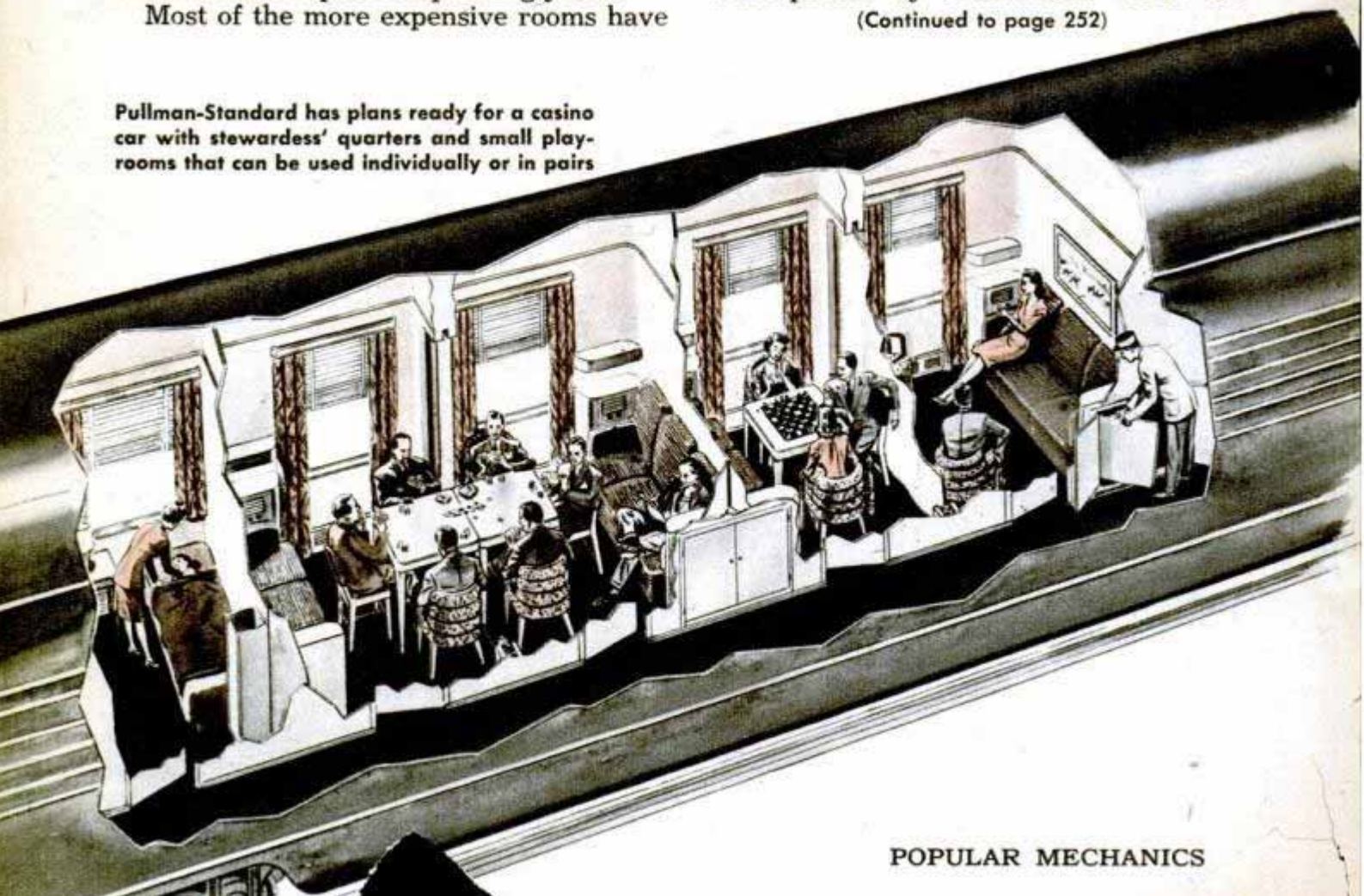
private radios. Many of the sleepers have premade beds that swing down when the traveler pushes an electric button. A few are even piped for shower stalls.

In the near future the most revolutionary changes will be in locomotive power. Of the approximately 200 streamliners now in service or on order, 178 are to be pulled by Diesel-electric power. Diesels are coming to the front in passenger travel now, but other types of locomotion may give them the squeeze play soon.

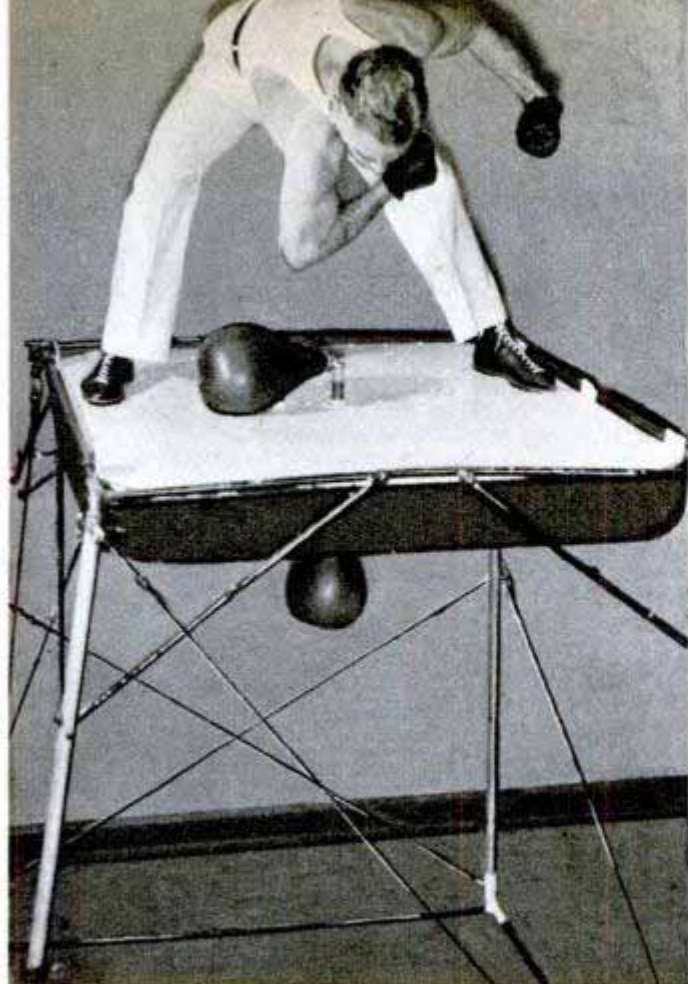
The new coal-burning gas turbine under development by Bituminous Coal Re-

(Continued to page 252)

Pullman-Standard has plans ready for a casino car with stewardess' quarters and small play-rooms that can be used individually or in pairs



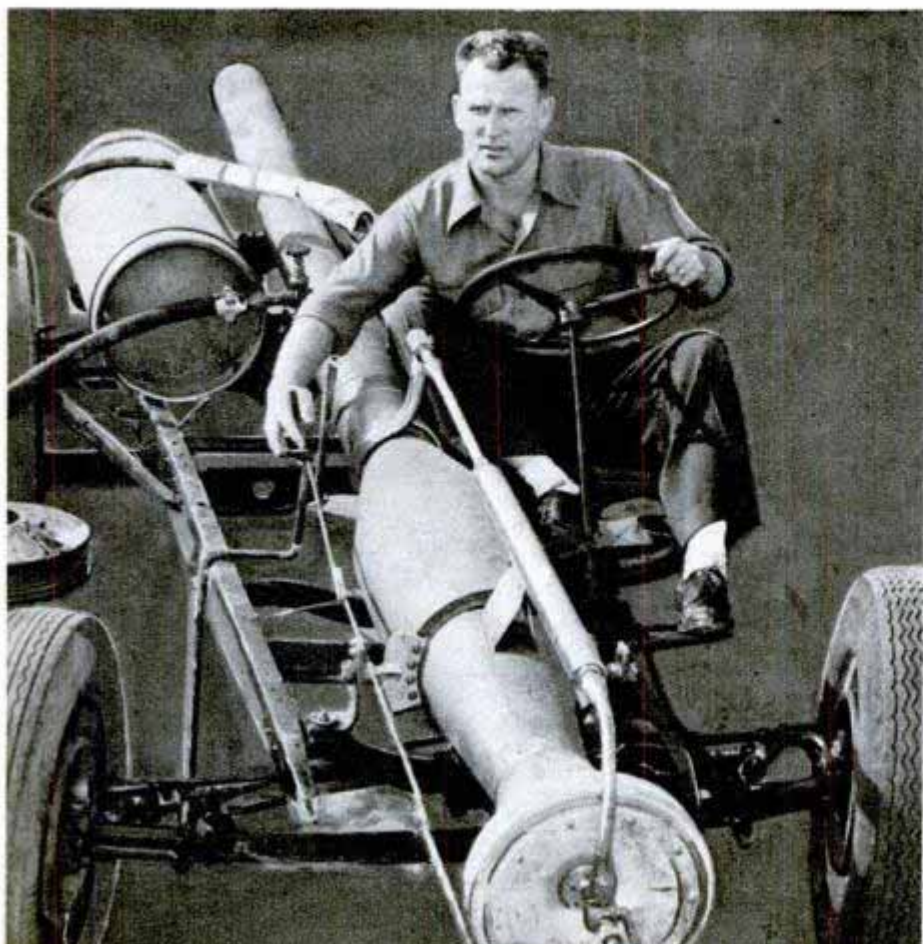




Two rhythmic fists earn a living for 54-year-old Labe Safro of Minneapolis whose profession is beating punching bags. He performs before theater, night club and sporting event audiences and recently received a bid from the USO for a tour of Japan. Safro can punch a bag while standing, sitting, or lying flat on his

## BAG PUNCHER

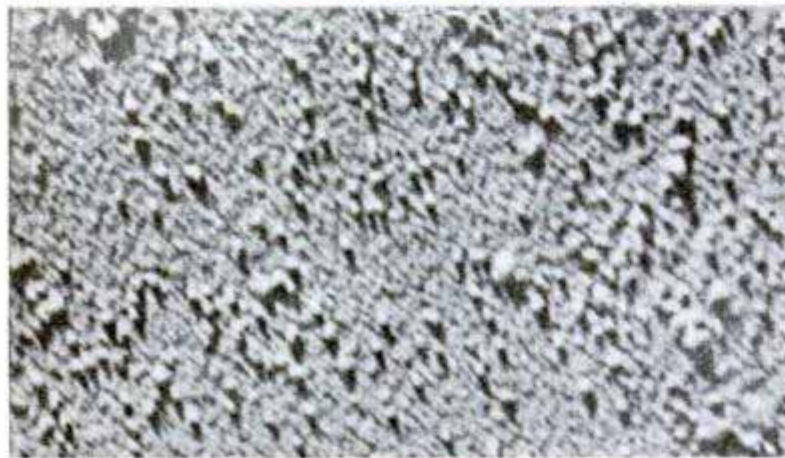
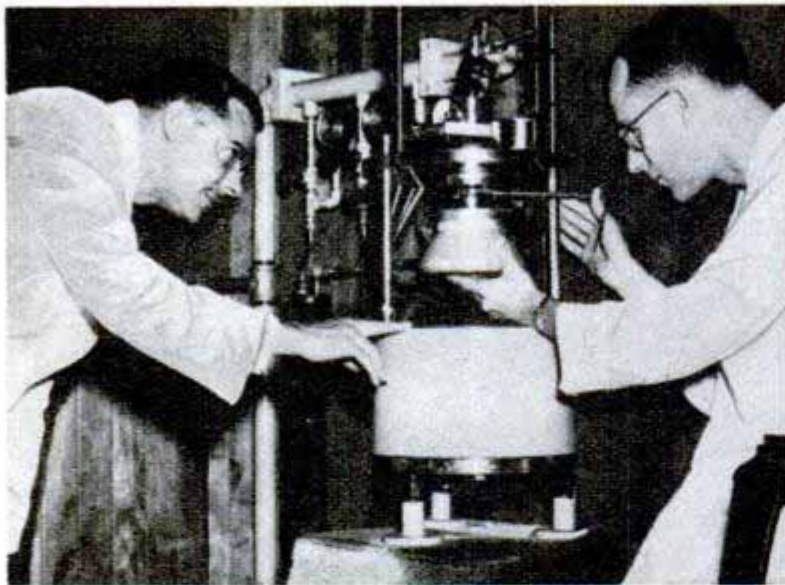
back and using his forehead as a third fist. He does part of his act blindfolded. An electric timer once counted Safro's two gloved fists hitting the bag eight times a second. Safro has a collapsible steel-legged stage to which he attaches the bag. The former amateur fighter took up bag punching for exercise.



## Jet Automobile

Under test at Rosamond, Calif., Dry Lake, is America's first jet-propelled automobile, built by Bob Yeakel of Los Angeles. The jet engine operates on propane fuel. While driving the car Yeakel wears an asbestos suit and sits sideways because of the heat generated in the jet tube.





## New "Tool" to Fight Polio

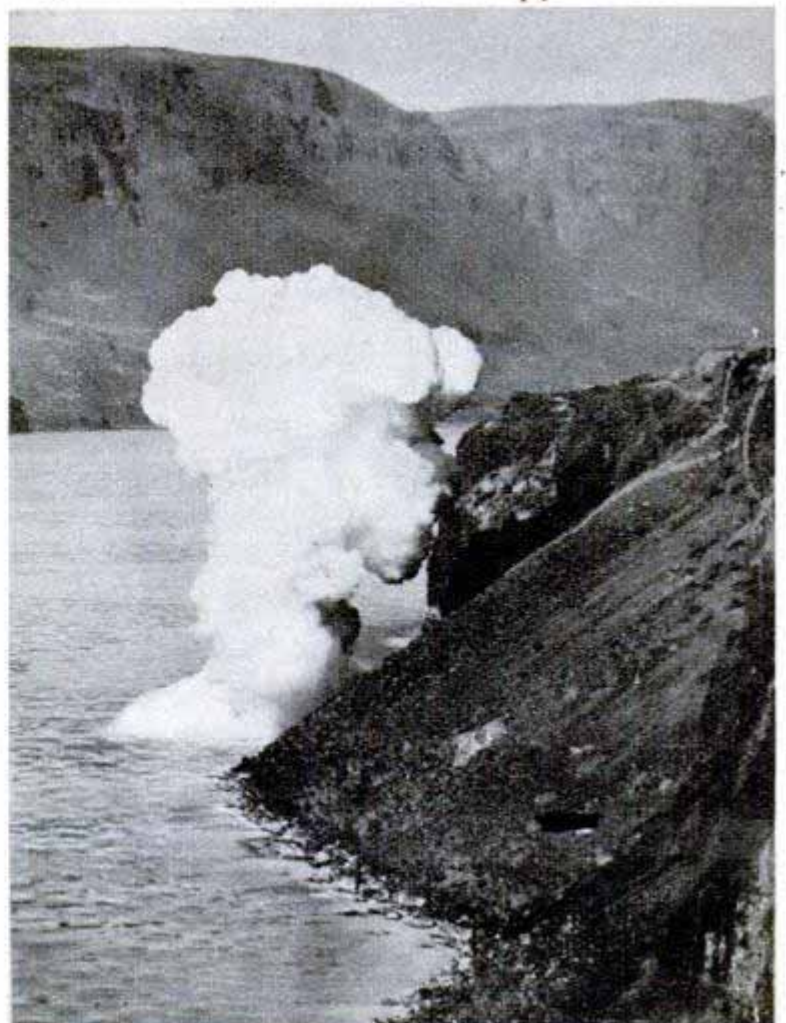
After years of effort science has succeeded in producing nearly pure polio virus, an important step in what up to now has been a futile laboratory struggle to produce a vaccine effective against infantile paralysis. Dr. Hubert S. Loring and Dr. C. E. Schwerdt of Stanford University are responsible for this latest development. Laboratory tests, including photographs taken through an electron microscope, indicate that the virus isolated by the two scientists is 80 percent (or more) pure. With a relatively pure virus available, Dr. Loring points out, the scientific door is open to render this virus noninfectious by chemical or physical treatment to produce a concentrated vaccine free of the impurities which have plagued previous polio vaccine experimenters. Much more research work is necessary, the scientist cautions, before an effective vaccine can be produced.

Drs. Loring (top left) and Schwerdt at the centrifuge used to isolate nearly pure polio virus, magnified 30,000 times at left

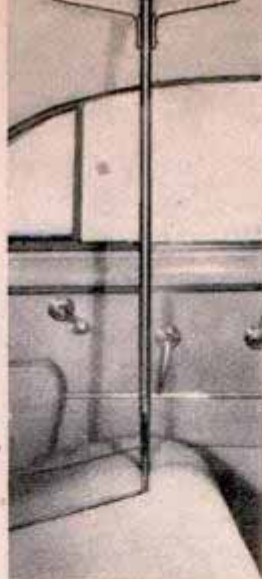
## Sodium Makes Lake Boil

Great clouds of water vapor boiled from Lake Lenore in Washington when 10 tons of war-surplus metallic sodium were dumped. The violent reaction of the sodium and water added 17 tons of lye to the lake and decomposed nearly eight tons of the water, releasing oxygen and hydrogen. The burning hydrogen joined with oxygen in the air to create more than seven tons of water vapor which formed heavy clouds that mushroomed hundreds of feet into the air and were visible for miles. The metallic sodium was dumped because it could not be shipped to industrial consumers.

Every day new products for homes and workshops are appearing on the nation's markets, and every month you'll find them described in *Popular Mechanics*. For additional information about these products, write to Bureau of Information, *Popular Mechanics*, 200 East Ontario Street, Chicago 11, Illinois







Automobile travelers can carry as many as 16 extra garments without wrinkling by hanging them on a rack that fits into the back seat. Two arms slip under the cushion of the rear seat to hold the device upright



Verandalike visibility is a distinguishing feature of the new Volmer VJ-21. The three-place pusher has a top speed of 120 miles an hour and a 500-mile range. A low, auto-style door permits easy entry to the cabin



Designed to prevent slipping, feared by all crutch users, is a safety steel tip that can be quickly adjusted for use or nonuse by a simple quarter turn

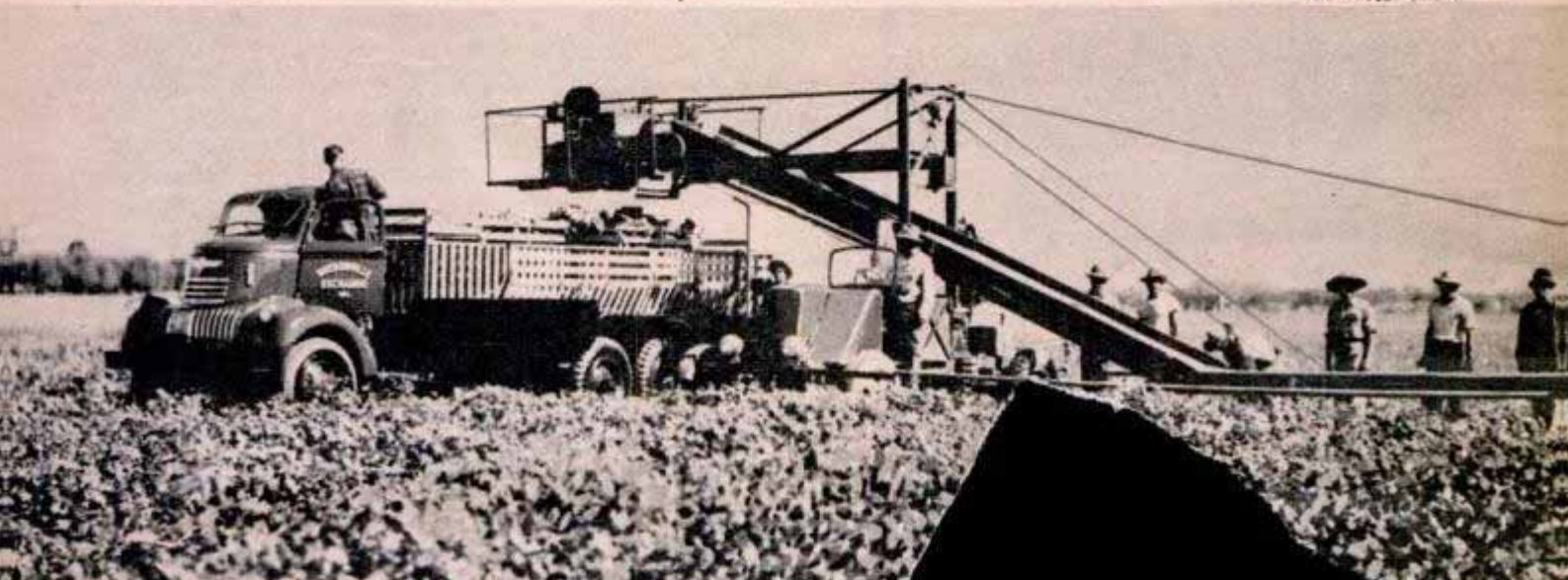


Shell Oil Company photo

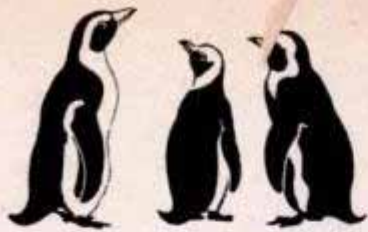
Its originators claim underwing fueling is three to four times faster than the present wing top method. In test a plane took on 14,000 gallons in 15 minutes

To speed highly perishable lettuce to market, a 40-foot conveyor has been designed that loads heads directly on waiting trucks. The vehicle has a tread of 82 inches, which allows the wheels to travel between rows of lettuce

Chevrolet photo







# REPORT from ANTARCTICA

## PART III

By Tom Henry

(Correspondent with the Byrd expedition)

**O**N BOARD the USS Mount Olympus (By Navy Radio)—The greatest naval antarctic problem is ice navigation. Most of the continent is surrounded by a ring of open water a few miles wide. North of this ring is a belt of pack ice from 50 to 400 miles across, almost reaching the Antarctic Circle. The open water ring is created by heavy winds from the pole that push ice floats northward.

Even in midsummer, when partially disintegrated with numerous pools, this pack forms an impassable barrier to most ships. Naval craft are in constant danger of having their hulls punctured or crushed by blizzard-driven ice fields containing bergs weighing millions of tons, propelled by the inexorable force of deep undercurrents.

The most obvious answer is to break paths with the new type 6000-ton icebreakers that have a 10,000-horsepower push. These "toughest" ships in the world cut

**Snow clearance was a constant problem for Byrd's party. Blinding swirls can cover an air landing strip again within five minutes after it has been cleared off**

U. S. Navy photos



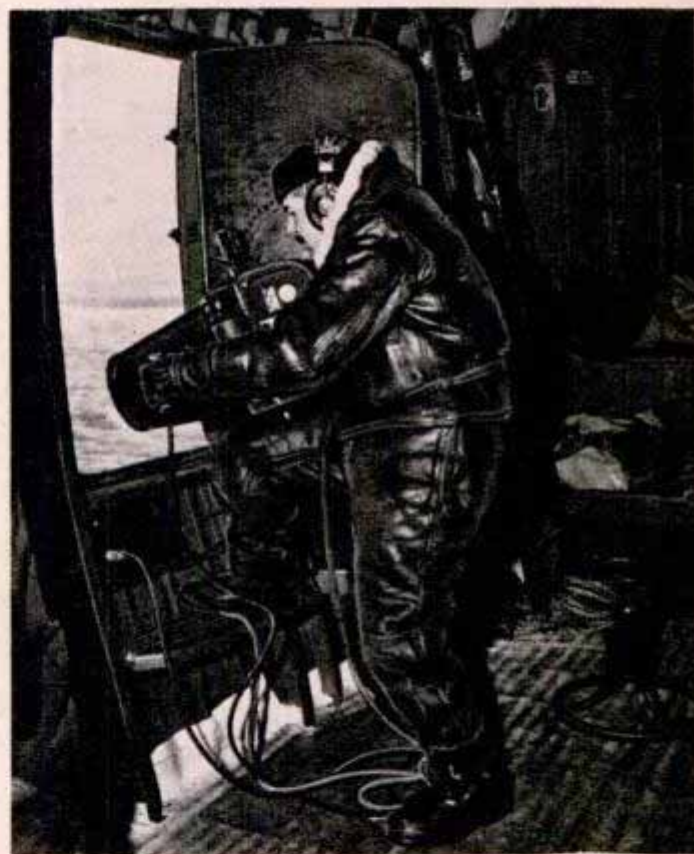
their way easily through ice packs 10 feet thick. For experimental purposes this year's pack was the worst ever recorded in the Antarctic, extending nearly 700 miles into the Ross Sea.

The voyage of three thin-hulled ships, led by a Coast Guard icebreaker, from near the Antarctic Circle into the Bay of Whales was an epic of modern navigation. It established principles on which ice travel science of the future may be based. Ships arrived battered but intact in two weeks, after several tight squeezes. Ice navigation requires an ability to judge varying thickness of the pack by observations from a helicopter at about 100 feet altitude and 10 to 25 miles ahead of the ships. Much also depends on the ability of skippers to read the horizon where ice formations are reflected in fantastic designs. Ross Sea is like a gigantic hall of mirrors for even experienced ice sailors, of whom there are very few extant, and it is the easiest path to the continent. Its summer pack is usually looser and thinner than anywhere else, due to favorable prevailing winds. It brings ships within about 800 miles of the pole and is the best known section of Antarctica, with the excep-





Robot recording units were vital in collecting first accurate data in "world's weather factory"



Aerial cameras mapped thousands of square miles of virgin territory. Below, pads were devised to protect the dogs' feet during training runs

tion of far northern Palmer Peninsula. In most other places the pack is too thick even for icebreakers alone.

Despite snow and ice transport means developed in the war, such as the weasel, tractored counterpart of the jeep, antarctic land exploration is still exceedingly hazardous, requiring almost superhuman effort. A relatively short path from the end of the Bay of Whales to the pole is blocked in several areas and so deeply crevassed that it is impenetrable for anything but dog sleds. Further knowledge of the interior of this mysterious continent depends almost entirely on air observation. Sea and carrier-based aircraft are able to get only a few hundred miles beyond the continental shores, due to the many miles of ice pack which they must cross. Admittedly, land-based planes, preferably with wheeled landing gear, are essential for systematic long flights across the South Pole from different angles.

Successful use of these requires adequate landing fields. Building an experimental air strip on neve, a curious sand-like snow that covers everything, was







Land travel was slow without tractors, like this one assigned to the photographers

the second major military objective of the expedition. Naval engineers are testing several methods of laying down such a strip—a problem akin to landing planes on the finest and deepest beach sand imaginable. Landings can also be made on skis, but details of these methods are military secrets.

Surface transport has been the nemesis of south polar exploration in the past and only dog teams have proved entirely reliable. This is the most far-reaching experiment ever made with motorized vehicles on antarctic ice. They were very unsatisfactory on previous expeditions led by Admiral Byrd and, even while hundreds of tons of supplies were hauled over a 60-foot-high slope to barrier ice from the Bay of Whales, weaknesses developed.

The greatest difficulty is that neve does not pack down, become hard and develop

a hard surface like ordinary snow. It degenerates into "sand" in which tracks sink deeper with every turn. Motorized vehicles have proved too heavy to cross deep crevasses in the ice, sometimes a thousand feet deep, which have been bridged over and hidden by wind-blown snow with a thin crust on the surface. Dogs and men can often cross such bridges with little risk, but heavy equipment breaks through. This is the great drawback in all proposals for a motor convoy to the South Pole.

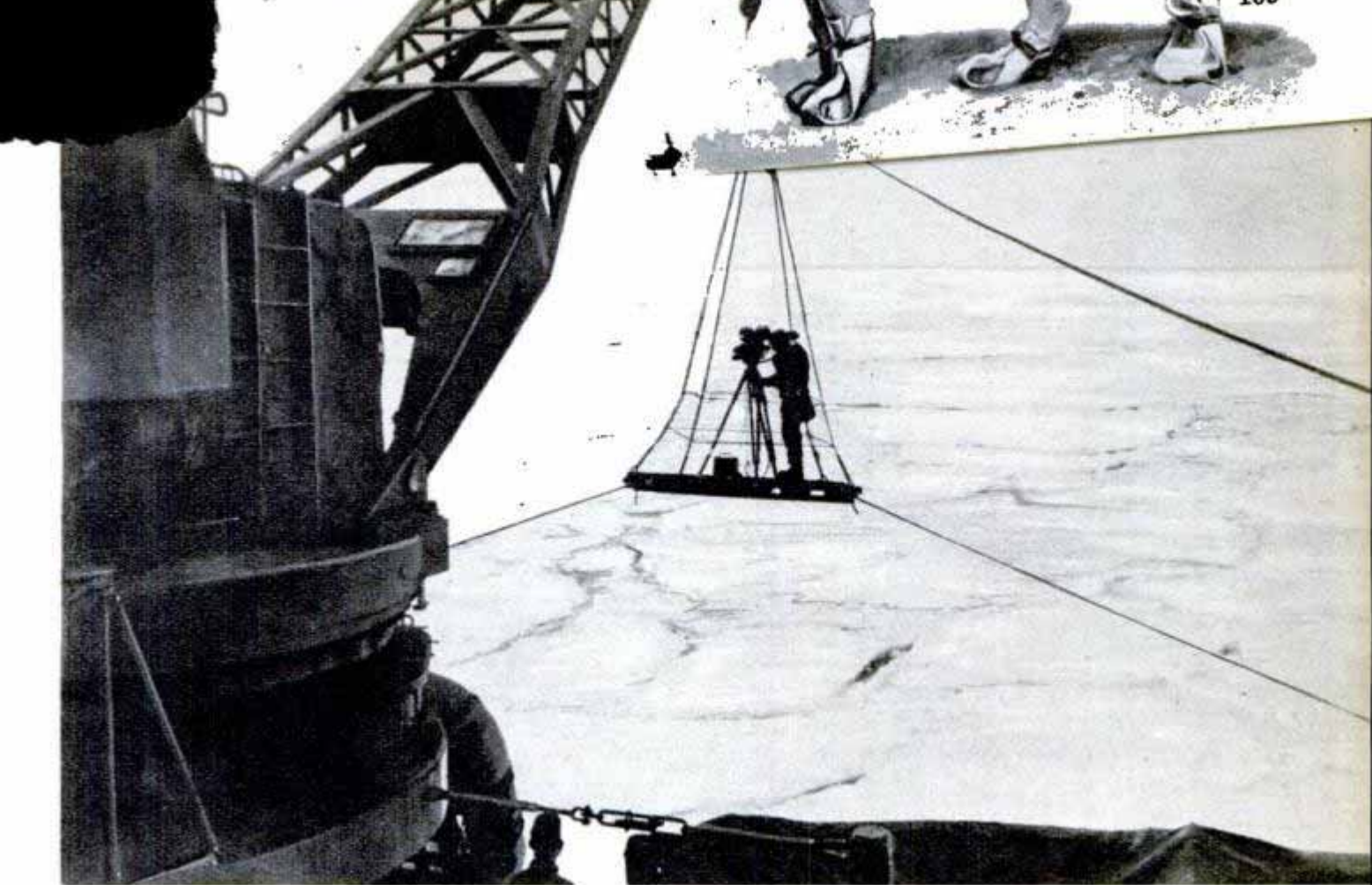
However, great advances have been made over past expeditions. Heavy tractors have been equipped with "snowshoes" and the most important vehicles are light motorized cargo carriers with surface pressure less than two pounds per square inch.

Calculations before the expedition started showed that any such transport must

Metal airstrips devised in wartime facilitated landings and take-offs of heavy planes with wheeled gear



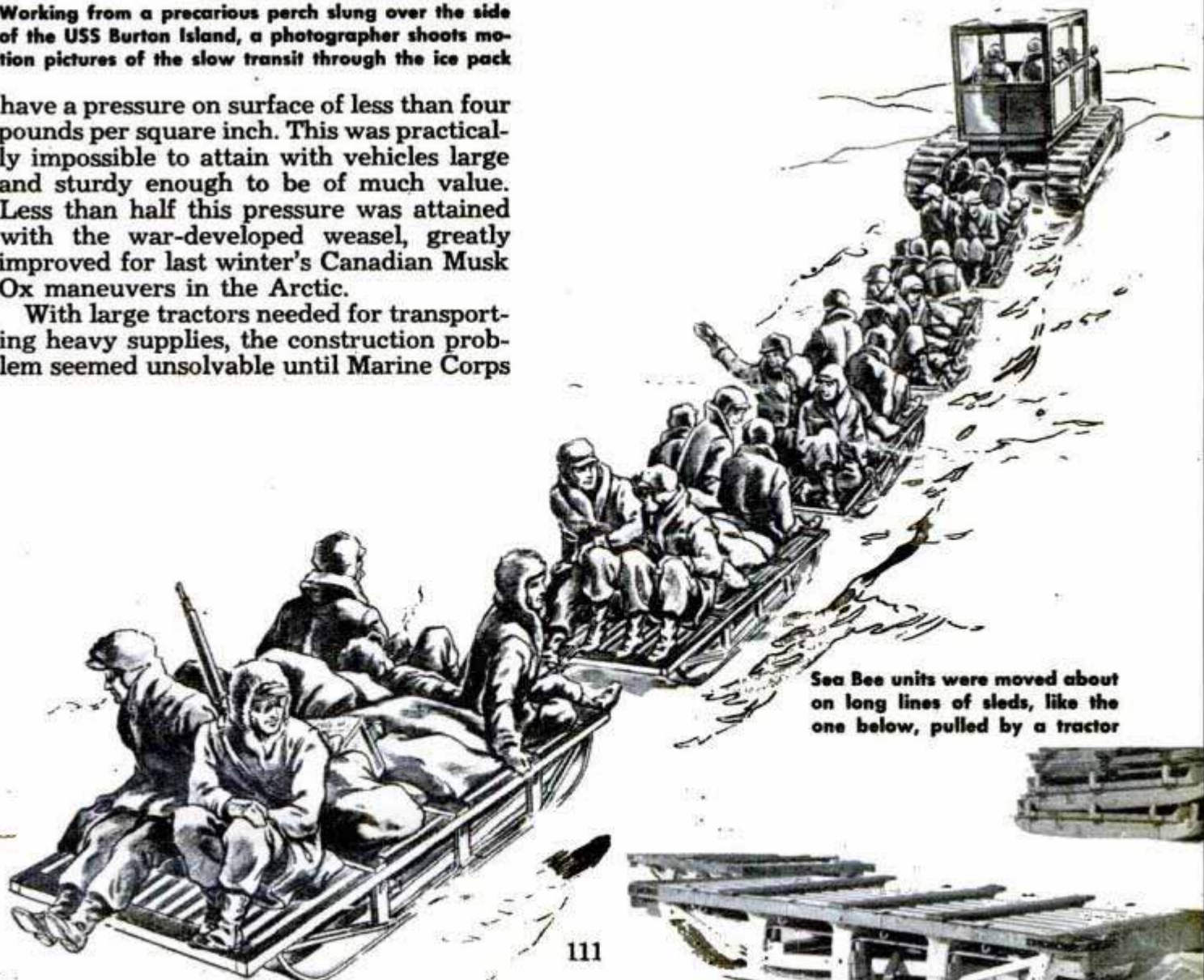




Working from a precarious perch slung over the side of the USS Burton Island, a photographer shoots motion pictures of the slow transit through the ice pack

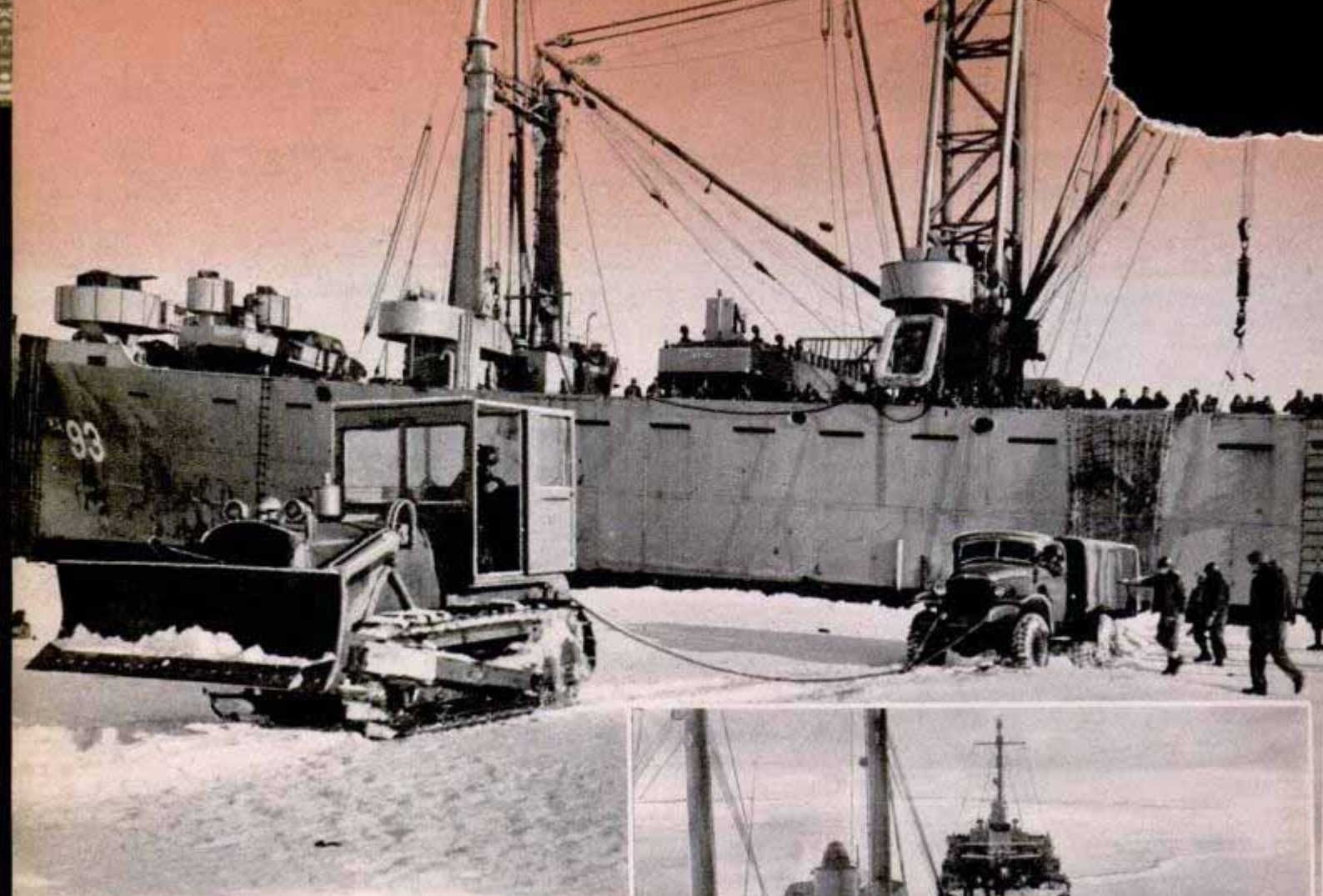
have a pressure on surface of less than four pounds per square inch. This was practically impossible to attain with vehicles large and sturdy enough to be of much value. Less than half this pressure was attained with the war-developed weasel, greatly improved for last winter's Canadian Musk Ox maneuvers in the Arctic.

With large tractors needed for transporting heavy supplies, the construction problem seemed unsolvable until Marine Corps



Sea Bee units were moved about on long lines of sleds, like the one below, pulled by a tractor





Wheeled trucks had their troubles. Here a tractor tows a 6 by 6 stuck in the ice. Right, breaking a path through the Ross Sea. One theory advanced by the exploration is that Antarctica's peaks are missing links in a chain, bottom, that once ringed the Pacific



Captain Vernon Boyd evolved his snowshoe idea. Such a tractor ordinarily has a pressure of about nine pounds per square inch. This is greatly reduced by attaching oak planks to the cleats on both sides. These planks distribute the pressure over a much wider area.

What use to anybody—except for weather stations and as a possible training ground for polar warfare—is a continent that will not support life? The answer lies with the expedition's geologists, who roped themselves together in exploring parties to traverse some of the most dangerous areas of the world. Last fall there were persistent rumors that the chief motive of the five expeditions from five nations into the "white desert" this year was to prospect for large uranium deposits. This idea is silly. Even if uranium is here, as it quite probably is, there is no way of locating or mining it. Ice

(Continued to page 260)





U. S. Navy photos

Modified for aerial mapping, a Navy R4D transport gets take-off boost from jato. Below, with a ground pulse navigation radar unit it was possible to keep track of all aircraft in 30-mile range

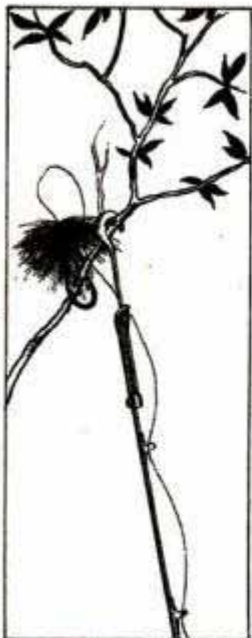


U. S. Navy photos

In icy tests only long underwear was worn under one-piece rubber swim suits. Right, huskies slept in blizzards with only noses visible. Note deep crevasse, below, in shelf ice at Bay of Whales





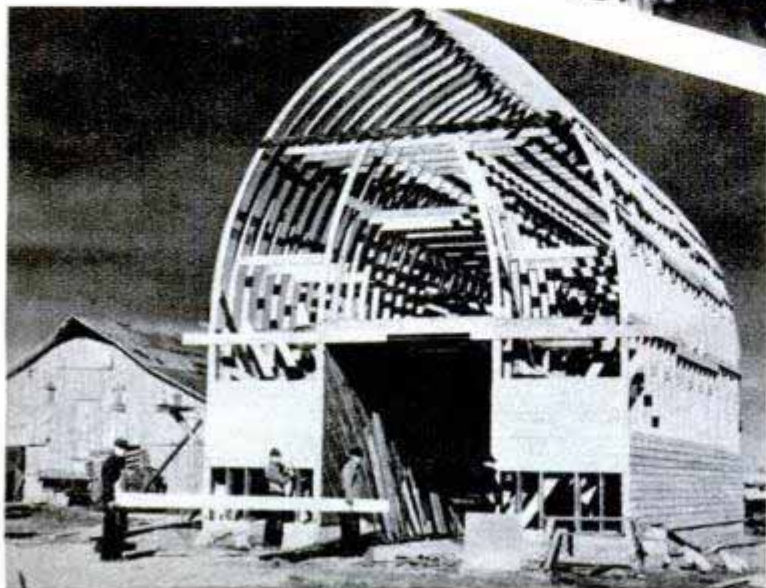
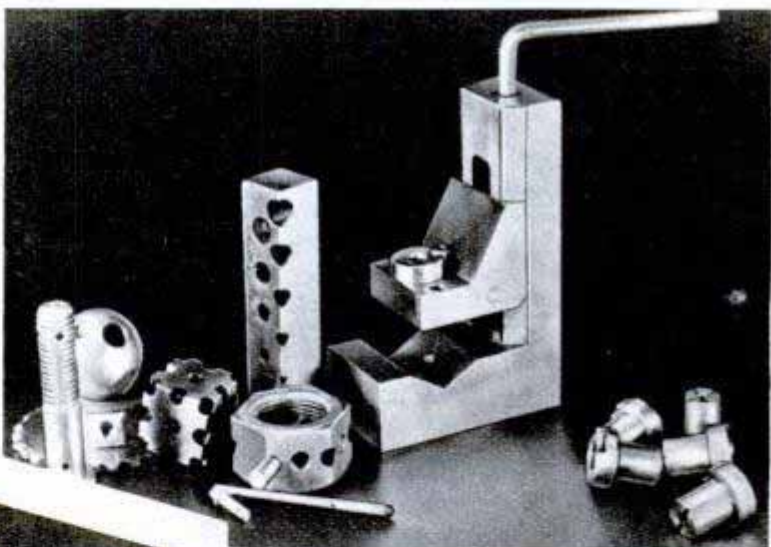
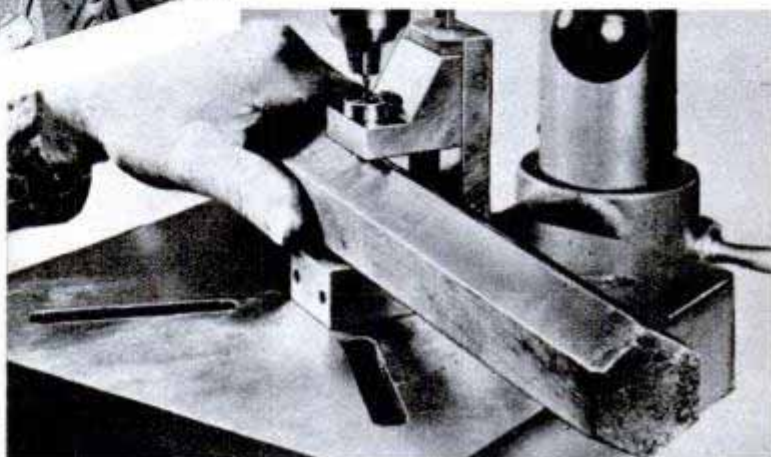


## Miniature Scythe for Anglers Cuts Loose Snagged Lures

Attached to the tip of a fishing rod, a curved knife resembling a miniature scythe aids the fisherman in retrieving a lure that has become hooked in a tree. The knife slides through the line guide at the tip of the rod and is fastened securely to the rod with a spring clamp. The fisherman uses the extension knife to cut the twig or branch holding the snagged lure. The knife may be attached or removed quickly.

## Jig Holds Odd-Shaped Parts For Drilling at Any Angle

Accurate holes can be drilled at any angle with a drill jig which will accommodate such diverse shapes as flat stock, balls, cubes, hexagonal nuts, gears and rods. It is possible, for example, to drill directly into one corner of a rectangular metal part. The part to be drilled is placed between the jaws of the jig and clamped in position by tightening a screw. Construction of the jaws prevents springing or binding. The jig takes stock up to two inches in diameter and will accommodate drills up to  $\frac{1}{2}$  inch in diameter. Drilling may be done from either side. Bushings are quickly interchanged in the jig jaw. The jig including six bushings and two wrenches fits into a rustproof metal box.



## Precut Parts of Corncrib Bolted Together on Site

Precut parts were quickly assembled into a corncrib that looks like a small aircraft hangar on a farm near Macon, Ill. Parts of the framework were ready to be bolted together upon delivery. The walls were not assembled but individual pieces were cut to the proper length and easily joined. The streamlined crib has a capacity of 5500 bushels of ear corn plus 2700 bushels of small grain.





Elephants suffer from complicated ailments, too. The contraption wrapped around the bewildered animal's trunk is an electrotherapy unit put there to treat "fibrositis" of the trunk. Six performing elephants in an English circus were affected by the disease, two so badly they couldn't flex their trunks to eat. After two treatments the animals improved greatly.



Three times daily Patient X in a London hospital is "strung up" and left to hang in mid-air. This is the unconventional treatment devised to cure him of partial paralysis in one arm and side, which was brought on by a displaced neck cartilage. When suspended by the chin, with his feet dangling nine inches from the floor, the patient says he feels fine, despite his awkward position.

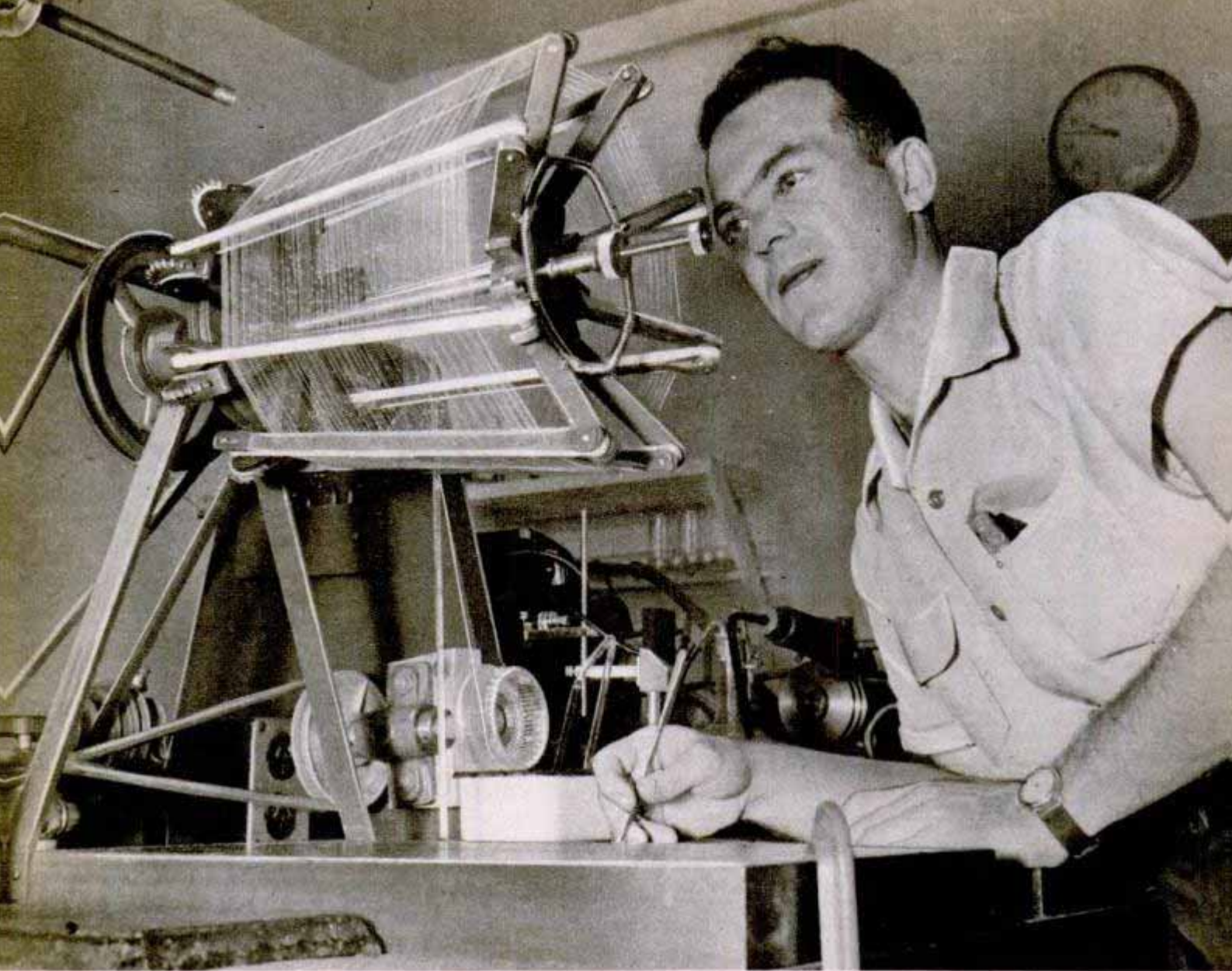


Pending completion of a new generating plant, Eureka, Calif., draws part of its electric power from the 6700-horsepower steam-electric turbine engine of a beached former Russian tanker. The engine is in the stern half of the SS Donbass III, which cracked

### Beached Tanker Powers City

apart in February 1946. The Pacific Gas and Electric Company bought the stern half of the ship from the U. S. Maritime Commission for \$125,000. Transformers installed on the dock alongside the ship feed the power directly into the transmission line.





## *New Wealth from Waste*

**By John R. Kinsey**

Fibers from chicken feathers are collected on automatic reel. Below, mannequin wigs made from feather fibers  
Western Regional Research Laboratory photos

Paintbrushes from skim milk, medicines from asparagus butts and buckwheat, wigs from chicken feathers, motor fuel and engine cleaning material from corn cobs.

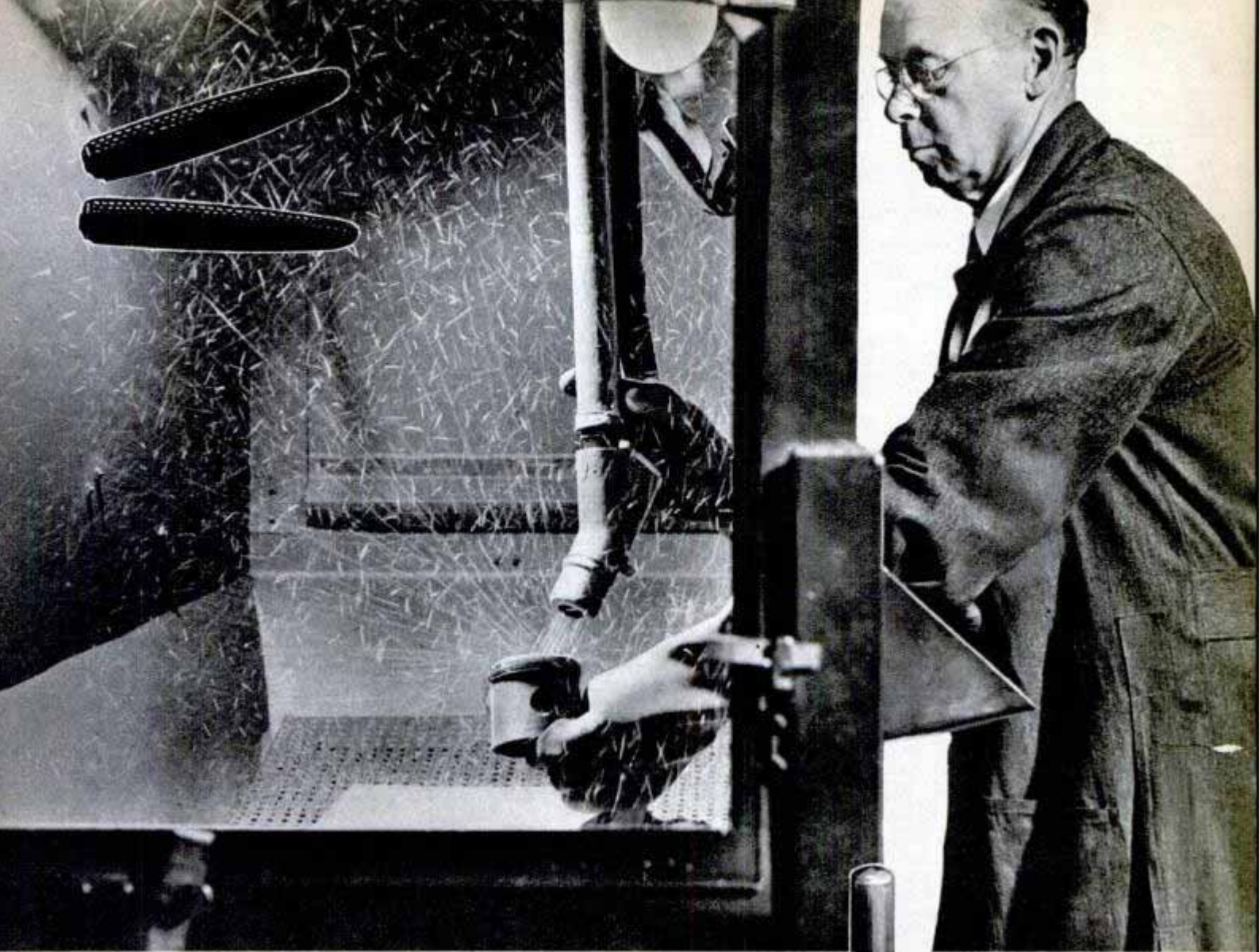
Strange things are being made from farm products, particularly residues. New markets are bidding for the farmer's wares.

The research work of a thousand U. S. Department of Agriculture scientists is beginning to show results. These chemists, industrial engineers and fermentologists started searching seven years ago for new industrial uses for farm products.

They went to work in four huge new laboratories equipped with the latest research tools and pilot-plant facilities to develop and test new materials for industrial uses. The laboratories are at Peoria, Ill., New Orleans, Philadelphia, and Albany, Calif.







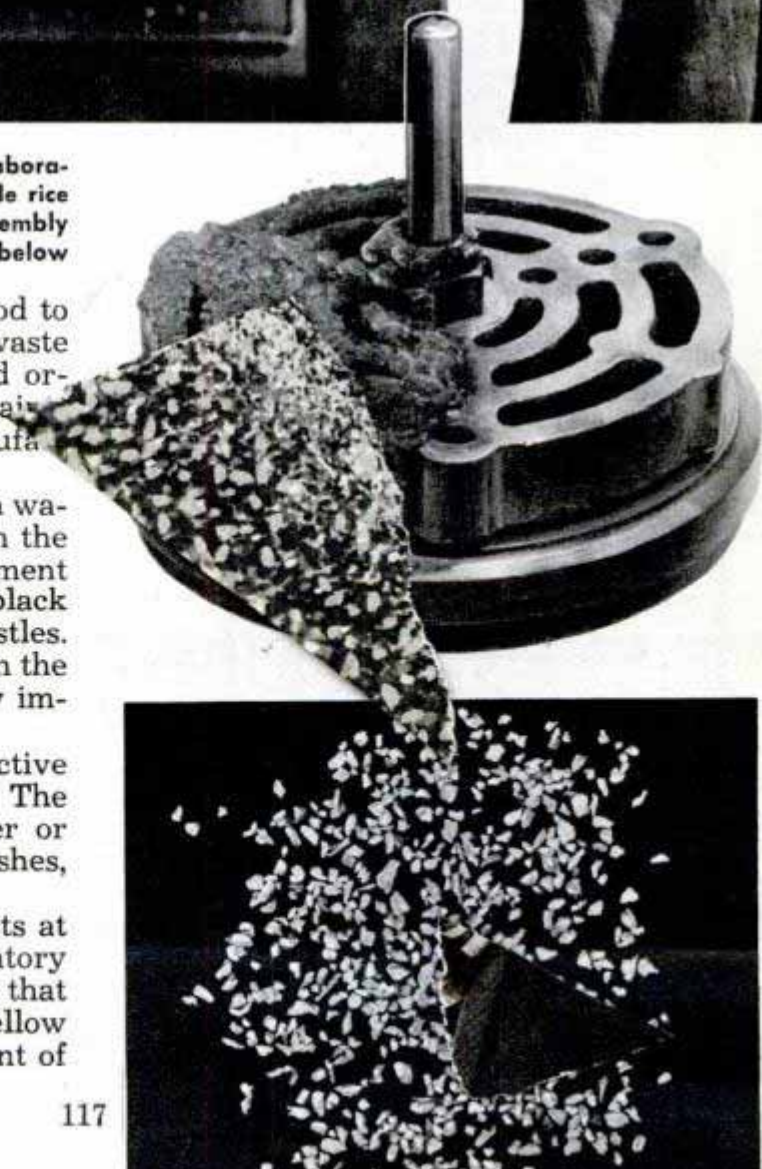
Dr. E. C. Lathrop, Northern Regional Research Laboratory, uses mixture of ground corncobs and whole rice hulls to blast-clean a piston. Right, valve assembly after half is cleaned by ground corncobs shown below

At Philadelphia they found a method to make tough, durable bristles from waste skim milk. The bristles resist oils and organic solvents and make excellent paintbrushes. One company has been manufacturing them since last November.

Casein from skim milk is mixed with water, heated, then drawn or extruded in the form of long fibers. Chemical treatment transforms the fibers into stiff, black bristles similar to horsehair or pig bristles. Research on casein bristles began when the war cut off our supply of high-quality imported pig bristles.

Casein bristle paintbrushes are attractive and have good painting qualities. The bristles can be made in any diameter or length and may be used for hairbrushes, buffers and clothesbrushes.

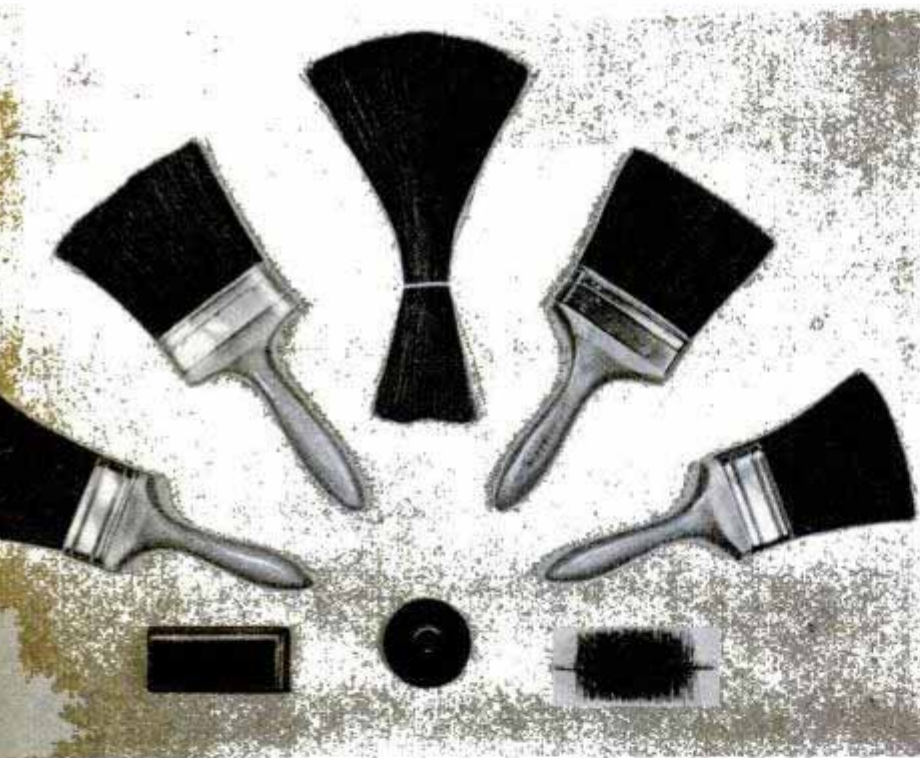
Another accomplishment by chemists at the Eastern Regional Research Laboratory (Philadelphia) was the discovery that buckwheat contains rutin. This is a yellow pigment used in medicine for treatment of







Extruding textile fiber from skim milk casein. Casein is mixed with water, heated, then extruded or drawn into long fibers



U. S. D. A. photos by M. C. Audsley

Paintbrushes and other types of brushes are fashioned from the stiff bristles produced by chemically treating casein fibers. Below, samples of fabrics, fibers and plastics made from skim milk



high blood pressure and apoplexy. Rutin reduces the tendency of capillary blood vessels to rupture and cause hemorrhages.

Prior to the discovery that buckwheat contains rutin, tobacco plants were the only source and the yield was quite small. The effectiveness of rutin led to a search for an extended supply. Buckwheat leaves and flowers offer a plentiful supply, containing about four percent. Several large drug companies now rely on buckwheat as their sole source of the drug.

At the Western Regional Research Laboratory (Albany, Calif.), chemists discovered a medical use for the tons of asparagus butts thrown away by canneries. Experiments revealed that the juice from asparagus butts is a good culture medium for growing subtilin, a drug that shows promise in the treatment of farm animal and plant diseases.

Juice is squeezed from asparagus butts in a hydraulic press, then heated to 122 degrees Fahrenheit and filtered. This process produces a soupy solution with high nitrogen content, which is essential to growing subtilin.

One of the strangest farm research developments which may have a medical application is the starch sponge. It is being used as an absorbable surgical dressing in experiments on animals.

Cornstarch is transformed into a soft, pliable, spongelike material by freezing it, letting it thaw, and squeezing out the excess water.

Starch sponges have one characteristic in particular which interests medical men studying new types of surgical dressings. Starch is converted by body enzymes into simple sugars which are absorbed by the body. Consequently, a med-





U. S. D. A. photos by M. C. Audsley

Cutting buckwheat to extract from it a yellow pigment called rutin, which is used to treat high blood pressure and apoplexy. Rutin crystals are pictured at right

icine-soaked starch sponge in a wound or incision would not have to be removed.

Chemists at the Northern Regional Research Laboratory (Peoria) point out that anyone can make a starch sponge in a home refrigerator. Detailed instructions are listed at the end of this article.

Working alongside the Peoria chemists who developed the starch sponge process is a group of fermentologists who had a lot to do with increasing the production of penicillin during the war.

They developed improved strains of the molds that produce penicillin and perfected the culture medium in which the molds grow. They discovered that yields of the drug were greatly increased by adding corn steep liquor (by-product of corn starch manufacture) and lactose (milk sugar) to the culture medium.

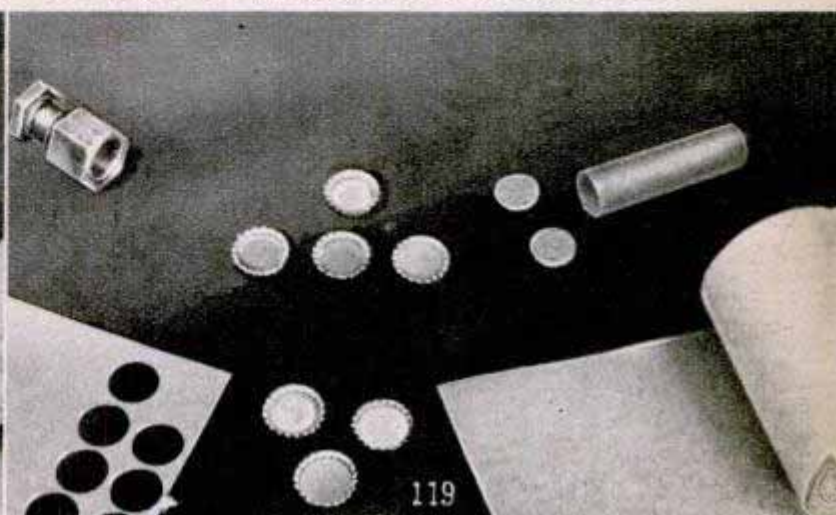
From penicillin to wigs is quite a jump, from a research or any other standpoint. But farm products are used in the production of both—corn for penicillin and chicken feathers for a new type of wig.

Noreseal, substitute for cork, is made from cornstalks, peanut shells or sugar cane bagasse. Mixture is heated, beaten to incorporate air, and a setting agent added

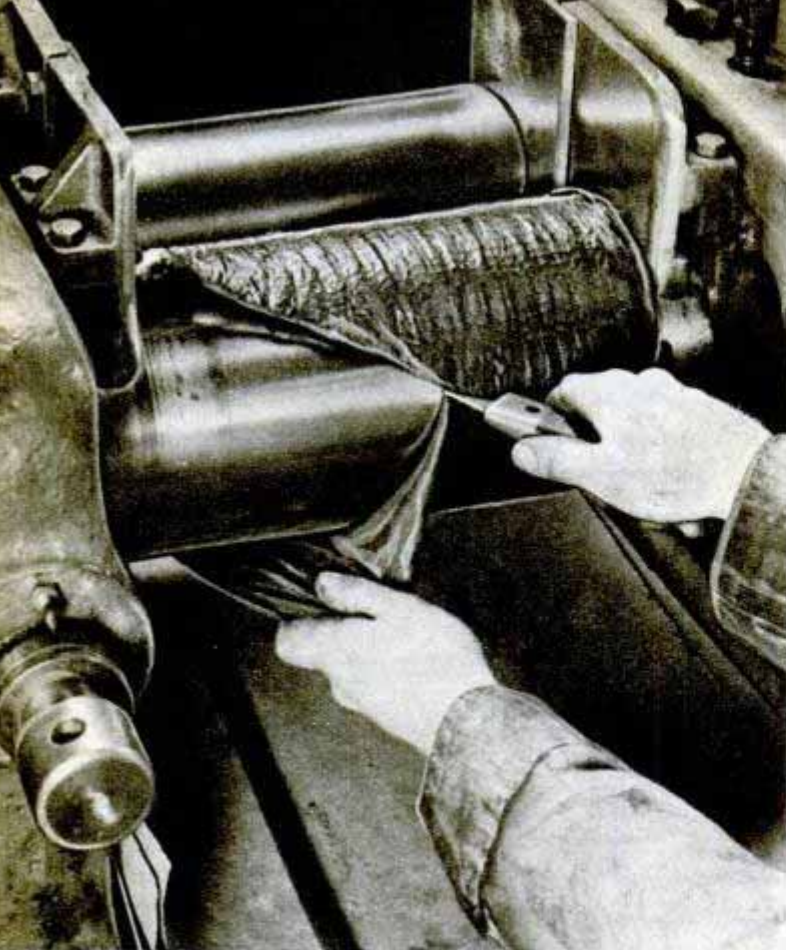


The Department of Agriculture figured that new uses should be found for the 75,000,000 pounds of chicken feathers that farmers throw away every year. So far, chemists at the Albany, Calif., laboratory have found that chicken feathers can be converted into dyed hair wigs for manne-

During the war cork shortage, Noreseal was used experimentally to line caps for beverage bottles. Liners are stamped from flat sheets or cut from rod stock







Lactoprene, a synthetic rubber made from whey, is cut from compounding rollers at Philadelphia laboratory

quins and theatrical use, paintbrush bristles, plastic ash trays, carpets, absorption pads and coatings to resist certain chemicals.

Like chicken feathers, the corncob is another farm residue that used to be considered useless. Now, thanks to science's never-ending search for things unknown,

the corncob has a number of important uses. It is effective as a soft-grit blasting material to remove hard carbon deposits from cylinders and pistons of aircraft and automobile engines. Engineers at the Northern Regional Research Laboratory found that ground corncobs, mixed with rice hulls, can be used in standard sandblasting machines to remove rust, paint, grease and dirt from metals.

The corncobs are ground in an attrition mill, air-sifted to get rid of dust, then screened to produce the right size of pellets. Ground cobs remove carbon without scratching or marring metal surfaces and without causing any dimensional changes in the parts being cleaned.

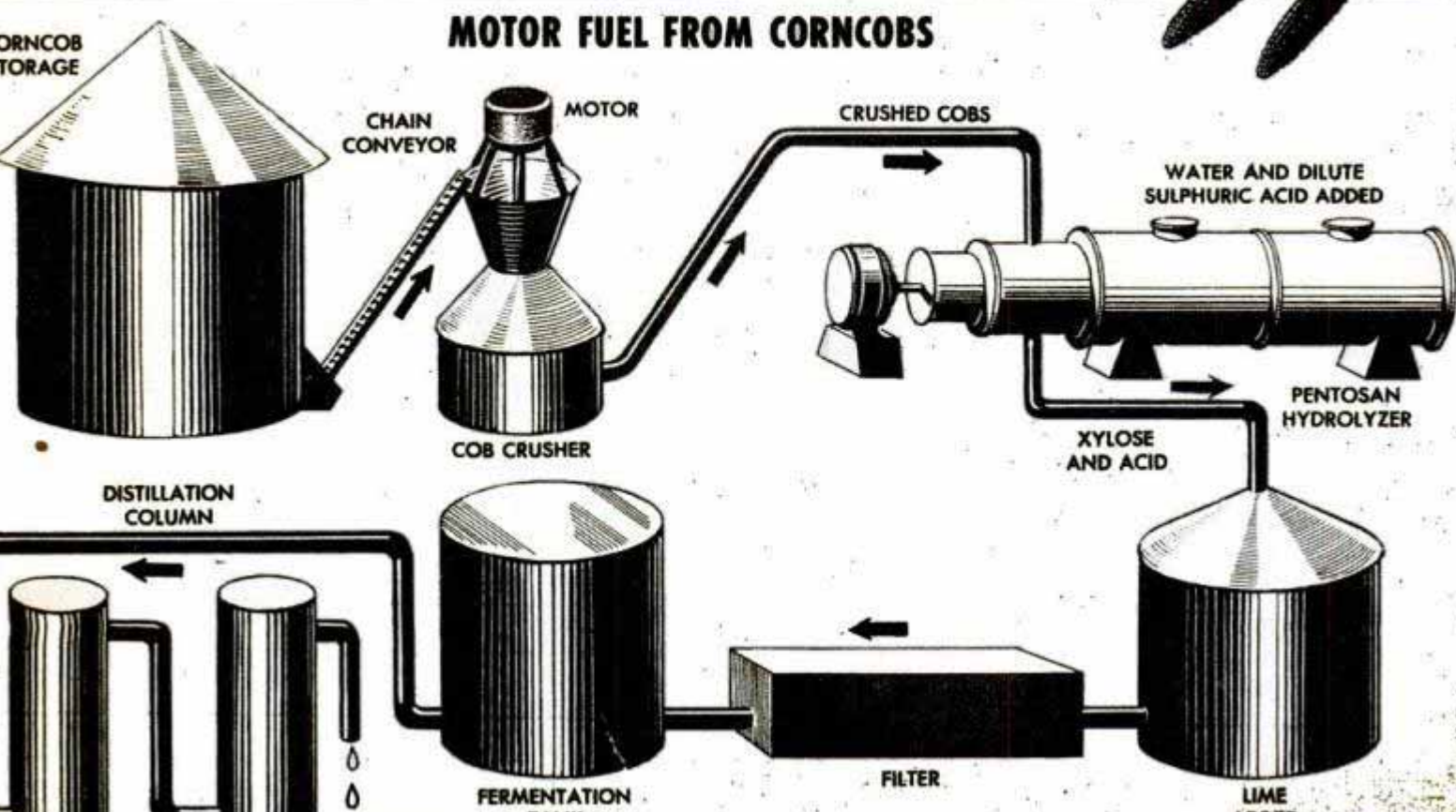
The glass and rubber industries use ground corncobs for air-blasting to clean molds; automobile repair shops use the material to clean engine parts; foundries use it for cleaning mold cores and boxes; tire recappers use it to clean carbon from aluminum matrices without the corroding action caused by strong acids.

The lowly corncob can even be converted into motor fuel to run automobiles. This fuel is being produced daily in a plant adjoining the Peoria laboratory where conversion processes are studied in an attempt to lower the production costs. No figures on production costs are available at present.

Chopped corncobs are fed through a long tank while dilute sulphuric acid is forced through in the opposite direction. The acid converts part of the cob to xylose sugars which are fermented to form butanol, acetone and ethyl

(Continued to page 244)

Diagrammatic flow sheet shows the process which converts corncobs into motor fuel











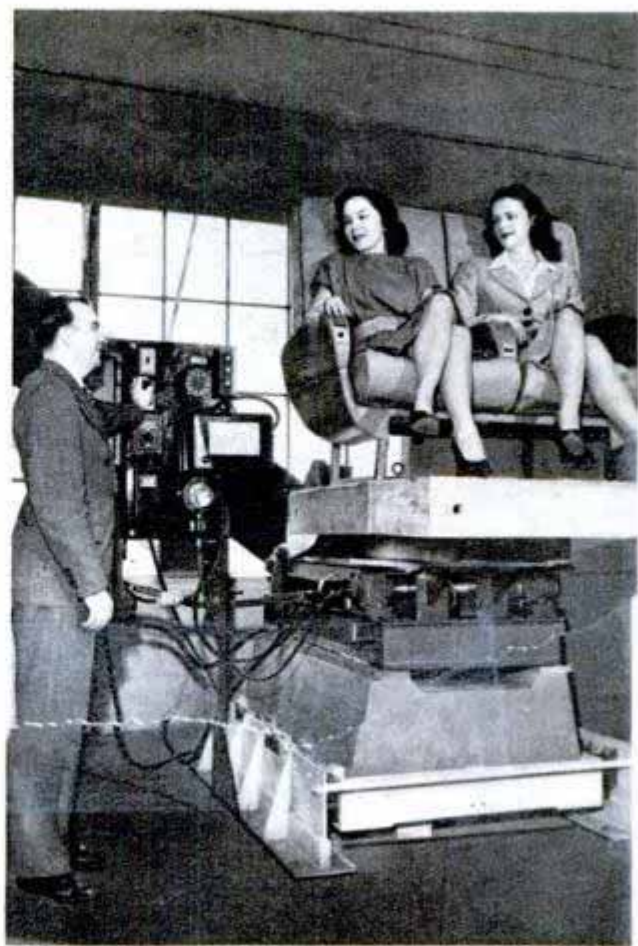
Courtesy of Admiral Corporation





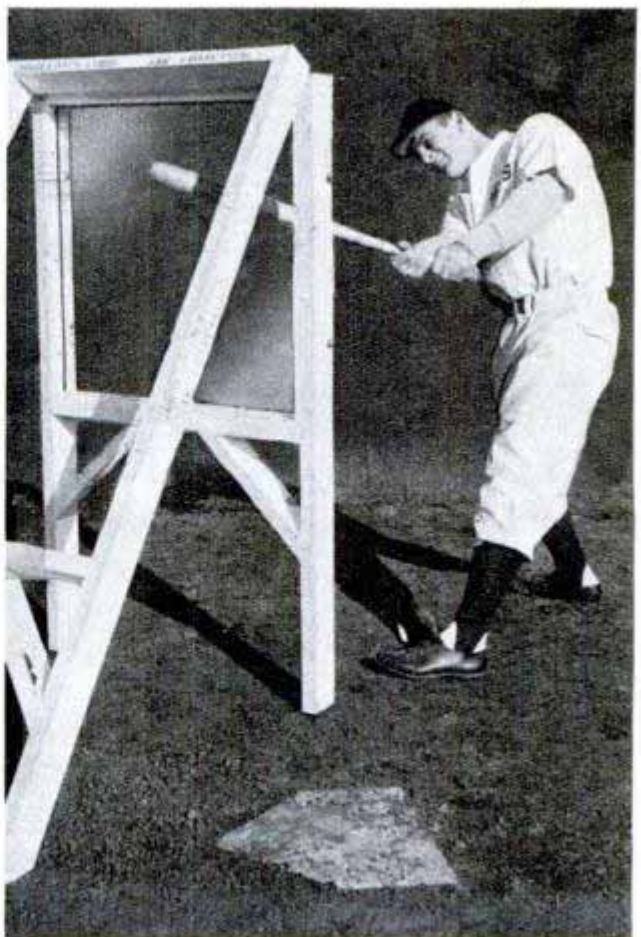


**TOWERING TAIL** of the Lockheed Constitution being built for the Navy is so high that crews must use a bosun's chair for inspections of the rudder



**SEAT JIGGLER** used by Boeing to test the vibrations in airplane seats caused by propeller "blast" led to development of chair mounted on live rubber

**ROCKET RADIO** installed in test-fired V-2 transmits 28 separate items of information each 1/35 second  
General Electric photo



**BATTER UP!** A sheet of special plate glass withstood healthy cuts by a ball player in recent tests

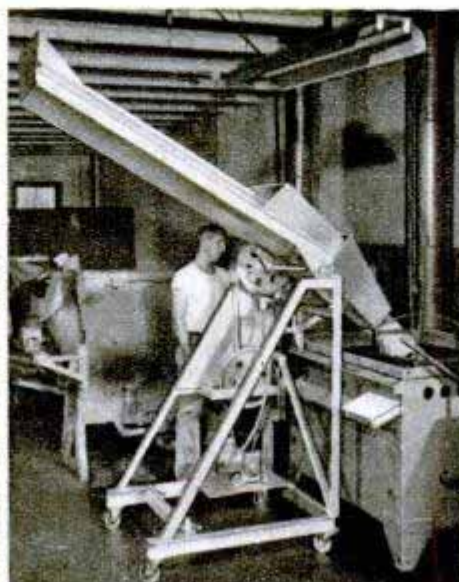
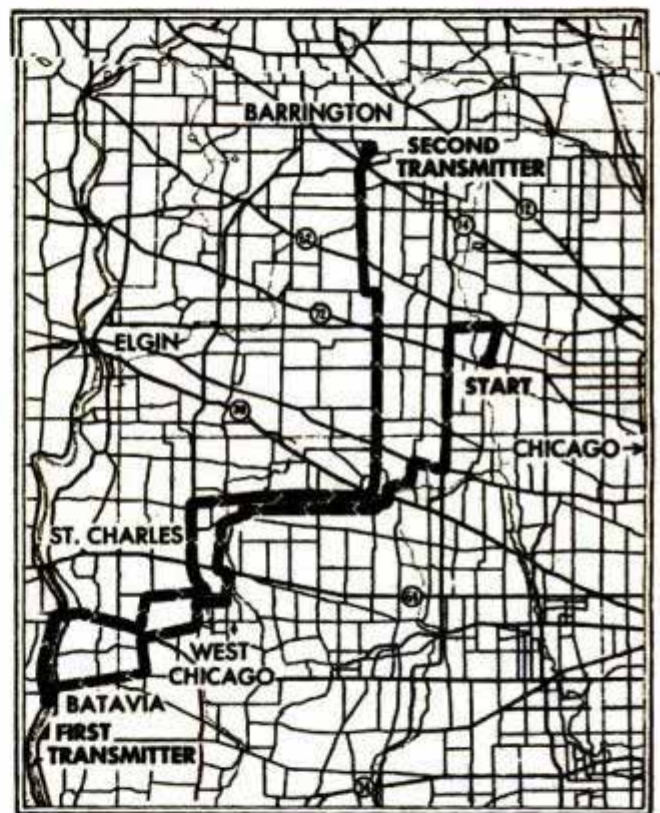




Courtesy of Admiral Corporation

## Radio Treasure Hunts

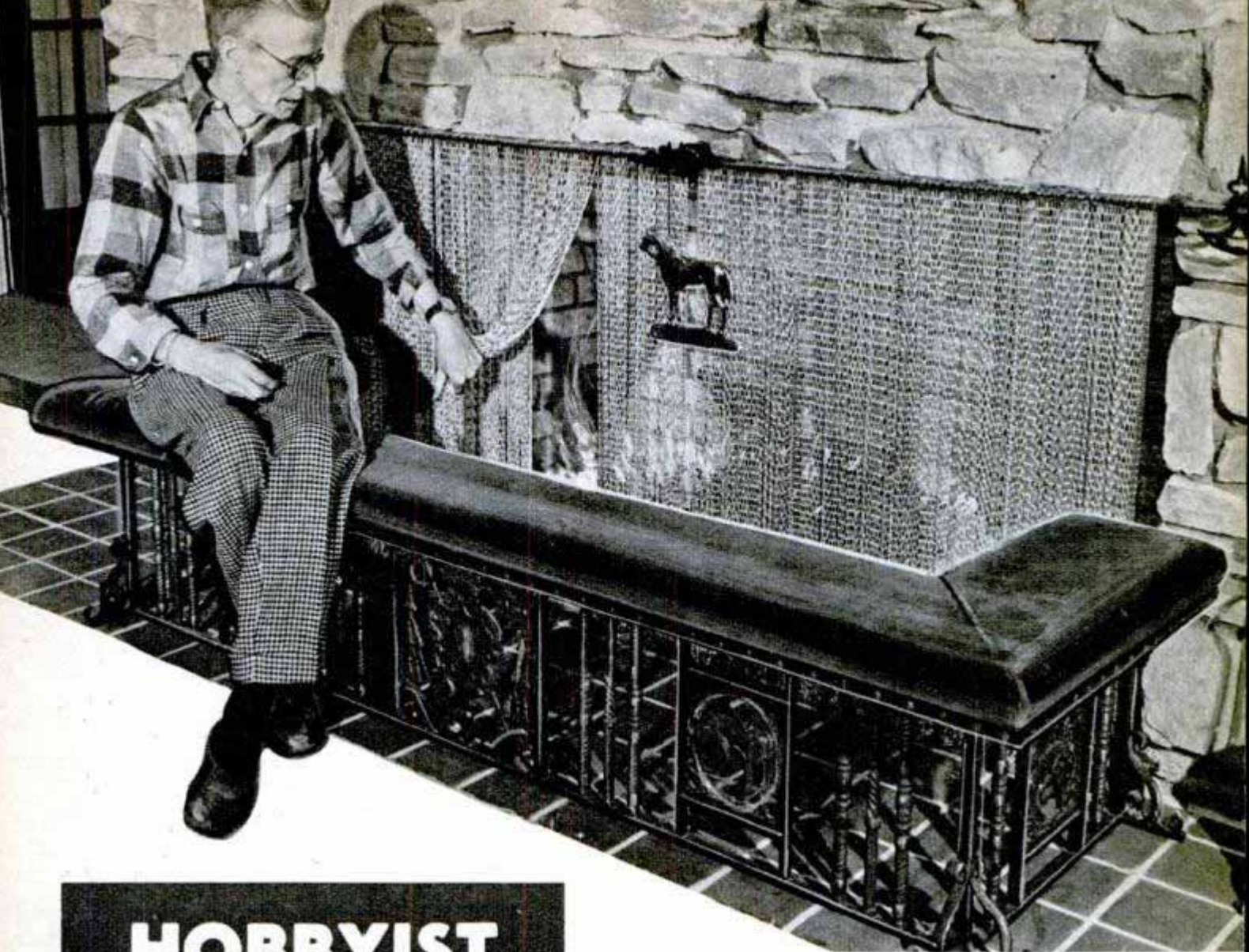
Amateur radio operators in the Chicago area have developed a new twist to treasure hunts. The contestants—riding in autos equipped with radio direction-finders—search for a hidden radio transmitter. Three men in a car make up a team, with one driving, a second operating the direction-finder, and the third keeping bearings on a road map. All teams start at a central point, and at a specified time the transmitter starts sending code. For participants not familiar with radio code, a simple series of Rs is also sent at intervals. The first team to arrive at the transmitter—location of which is unknown to the contestants—wins. The automobiles are equipped with special antennas, receivers, remote control boxes and tuning controls to help the radio sleuths track down the hidden transmitter. In a recent hunt, two transmitters were used, the second going on the air as soon as the first one was located.



## Machine Dumps Bags

Lifting and emptying sacks—an arduous hand job—is accomplished easily by a small power machine which does both jobs. Bags up to 300 pounds can be handled by the dumper. Two removable spikes puncture the bag and a pin holds it open for emptying. A pouring funnel prevents waste. The entire unit is mounted on wheels and is suitable for emptying any free-flowing materials.





## HOBBYIST OF THE MONTH

*Tom Howard*

By Bill Reiche

Though other stars of show business may find fun and relaxation in night clubs, Tom Howard, veteran trouper and radio comedian, has a design for living that keeps him away from the bright lights.

When Howard is not rehearsing or broadcasting his nonsensical half-hour CBS program, "It Pays to Be Ignorant," you'll probably find him in his large, well-equipped workshop at his fine new home in Red Bank, N. J.

Here he turns his back to a lifetime of show business, and his raucous voice—known to millions via radio, vaudeville, musical comedy and the movies—yields to the whirr of the drill, the rasp of the grinder and the whine of the power saw.

Amid a mass of fine and varied tools he

Veteran of stage, screen and radio, Howard spends leisure hours in his workshop where he turned out this fireplace screen made of 1000 feet of polished chain. Below, he mixes his own tobacco in flour sifter after cutting it in coffee grinder shown on bench

and his son, Tom, Jr., a musician, composer and arranger, frequently put in almost a 40-hour week of making, mending and just "messing around." Tom, Sr., devotes his time to making useful objects, sound and functional, while his son leans toward decorative and entertaining projects.

As the owner of a new house, Howard







Howard drills a pipe bowl with his new drill press

finds plenty of opportunity to put his shop-work to good use. When a cabinet is needed to fill an odd corner, or some shelves need alteration, these demands get priority.

But given a free hand to do just what he wants, Howard will turn out pipes of his own design. He and his son are habitual pipe smokers, and if any of their men friends are not, it isn't the Howards' fault; they've made scores of pipes and given practically all of them away.

Howard buys briar roots by the bag and rubber bits the same way—in quantity and of assorted sizes. Out of this large assortment he makes pipes of various shapes, sizes, weights and style of decoration.

He can turn out a finished pipe in three or four hours. First he cuts the hunk of briar into a rough approximation of the shape of the pipe's bowl and stem. Then the briar is turned and shaped before the bowl is drilled.

This last step is performed with the greatest of satisfaction by Howard, who gets a thrill from using his shining new drill press. From the press the embryo pipe returns to the shaping and turning machine for its semifinal contouring. Then if any rough spots remain they are removed with a hand file after the briar has been placed carefully in a vise and protected with aluminum shields. After sanding and polishing, the briar is ready to be joined to the rubber bit.

Any pipe smoker will note at once that Howard's pipes are devoid of filters, goo

traps, cleaners and all other devices calculated and alleged to produce a cooler, sweeter smoke or a drier, sweeter pipe. Howard has no use for such gadgets and considers them a direct affront to the dignity of an honest pipe.

"There should never be any plumbing in pipes," he growls. "It just doesn't work."

He has shown a fine flair for inventiveness in his favorite field of craftsmanship.

In 1939 he built a pipe through which a pipe cleaner could be drawn from mouth-piece to base of bowl, thereby providing a more thorough cleaning through the entire length of the smoke channel. The hole in the bowl was neatly plugged with a plastic or metal screw. Howard also devised a pipe that had an orthodox flint and wick lighter in the leading edge of the bowl. After removing the lighter's cap and flicking the wheel the smoker holds the pipe stem up; the flame flows over the bowl and ignites the tobacco.

But there is another lighter-pipe that he considers more practical, and this, too, is a Howard idea. A metal "match" with steel striking surface and fuel supply is snugly assembled under the bowl—providing a constant source of fire for the often matchless pipe fiend. The match also enables the



↑ Cleaner is drawn all way through one of his pipes

↓ "Metal match" lighter fits compactly under the bowl to provide fire for proverbially matchless pipe smokers.





smoker to light a partially filled pipe, which the lighter-on-the-rim does not.

Howard's first successful workshop project was a cabinet for a home recorder. This proved to be a serviceable object, as he recently sold it after using it almost 10 years.

His workshop boasts 22 motors in stationary, installed tools alone and a good many more in portable tools. Around its walls and on an "island" workbench in the middle of the floor are a drill press, three cloth buffers, two wire buffers, a grinding wheel, wood lathe, metal lathe, disk and belt sander, bandsaw, jigsaw, small belt sander, jointer, power hacksaw and a bench circular saw.

He is quick to adapt machines to his special needs. Following through on his pipe-making, he mixes his own blend of tobacco. To reduce the coarser tobaccos to smoking size he rigged an electric motor to an old-fashioned coffee grinder. To mix the final blend thoroughly he uses an old flour sifter.

Shortly after moving into his magnificent new home—a converted barn and carriage house—he saw a fireplace screen made of hundreds of strands of dangling chain. Upon pricing it he found that the screen cost \$150 and he was sure he could make one for less than that.

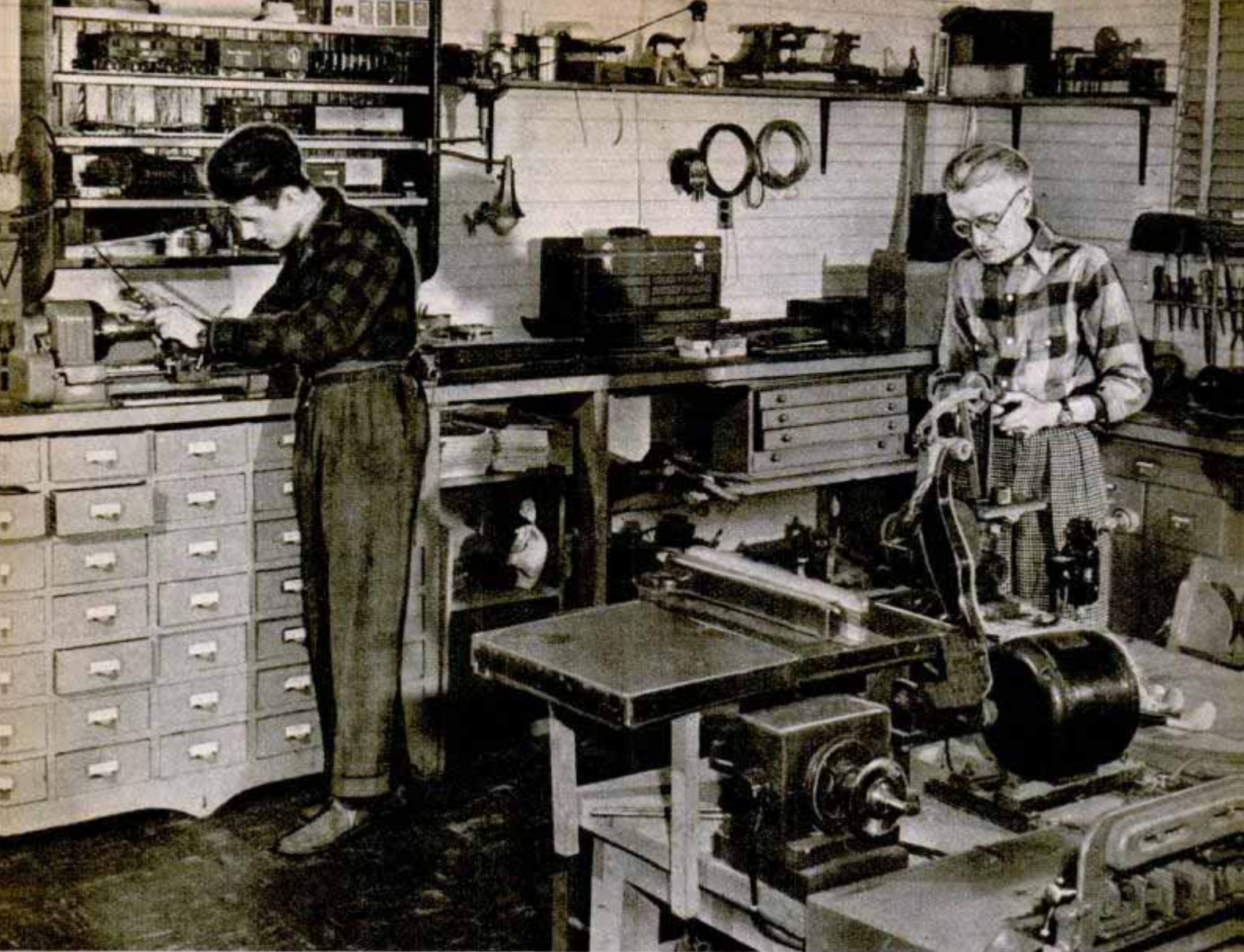


↑ One of Howard's ingenious pipes has a conventional flint lighter fitted to the rim of the bowl. Below, in his hands he holds the biggest pipe he ever made

CBS photos







CBS photos

Father and son work together in this shop; Tom, Jr., specializes in boats, planes and cars like models below

For his fireplace he needed 1000 feet of chain, which he finally obtained for three cents a foot. He bought brass pipe from a plumber, cut the threads in his shop, found a decorative metal horse and the spears for the ends of the pipe in his "junk box" and Eureka! he had a screen. Net saving: about \$115.

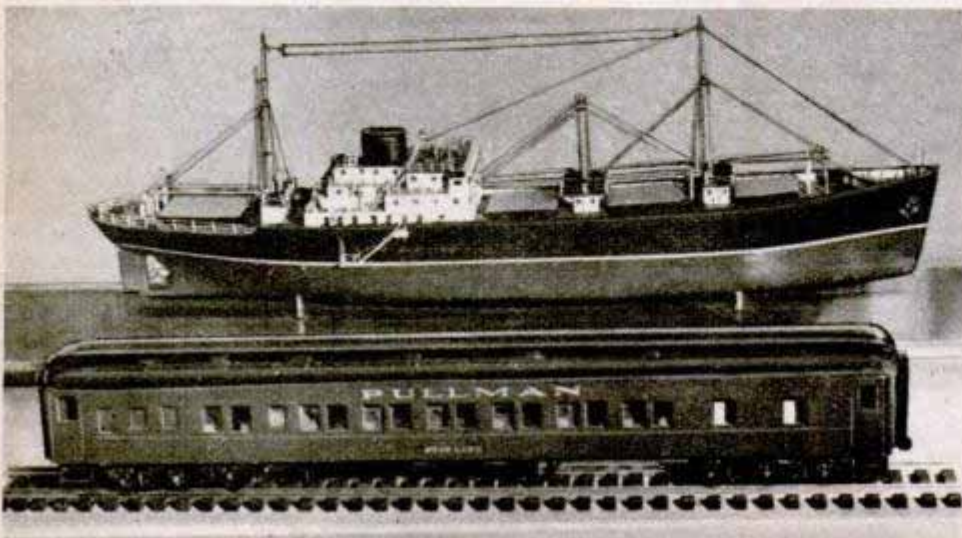
A coffee table was needed for one end of his enormous living room. So large was the area among the chairs that any ordinary

table would have looked like doll's furniture. He found an old-fashioned mahogany circular dinner table, cut off the center shaft to bring it down to good ash tray height and a most practical and handsome coffee table was the result.

Tom, Jr., specializes in model boats, trains, brass cannon and other decorative pieces. Some day he hopes to have enough room to set up a complete division of a mid-western railroad, entirely built to scale, but even the Howards' outsize home isn't big enough to accommodate that.

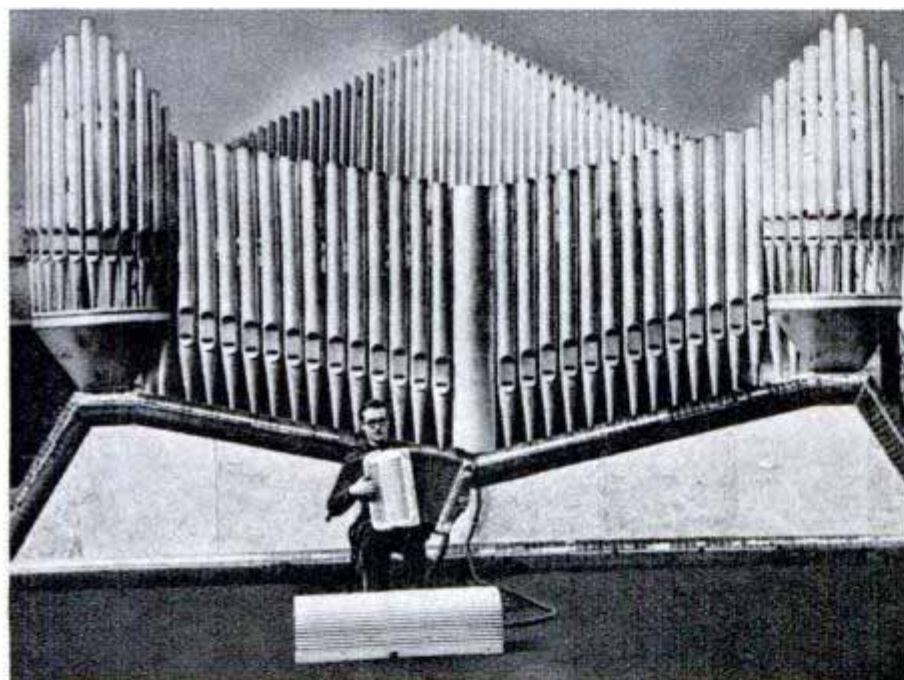
Since the day in 1937 when the senior Howard saw a display of shop tools in a department store—and received many of them from his wife for Christmas—it's been pretty clear what his hobby is.

The song says "There's No Business Like Show Business," but to Tom Howard there's no work like shopwork.



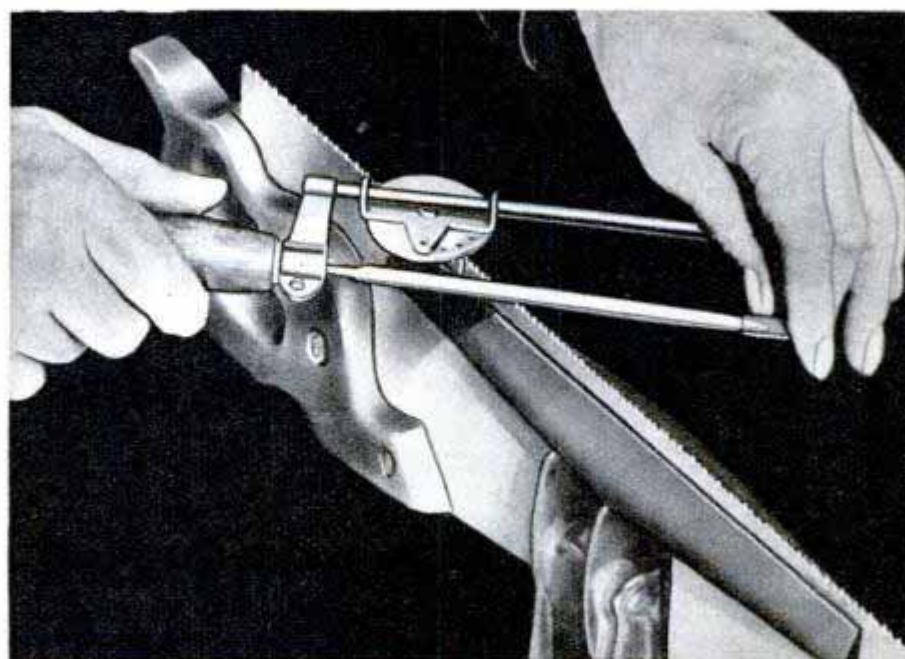


**Midget car** called the "Playboy", now in production, will go 35 to 45 miles on a gallon of gas in city driving, according to the manufacturer. The little car has a streamlined body with full-length fenders and a convertible top. Running boards have been eliminated from the midget, which has a chrome-plated grille, full-width bumpers and built-in headlights. Small-size tires are used on the wheels. The manufacturer hopes to mass-produce the little vehicle soon.



**"Accordionorgan"** can be played by anyone who can play a conventional accordion, but it's not so easy to carry the new instrument to concerts. It weighs more than a ton and is so big it must be hauled in a truck. To play it, the musician presses the keys of a regular accordion held in his lap. Electric wires connect the keys with the pipes of a large organ, which are actuated as the accordion is played. The young French inventor now is giving concerts on the instrument in Paris.

**File guide** holds metal files at the proper pitch and angle, enabling anyone to sharpen handsaws. The tool, which clamps over the saw blade, has a double arm through which the file guide slides. By adjusting the arm to the correct pitch and angle, the operator can sharpen the teeth of any handsaw with precision.



☐ America's rarest waterfowl, the trumpeter swan, increased its U.S. population last year by 60 birds to reach a new total of 361 for the flock.



## FOR PHOTO FANS



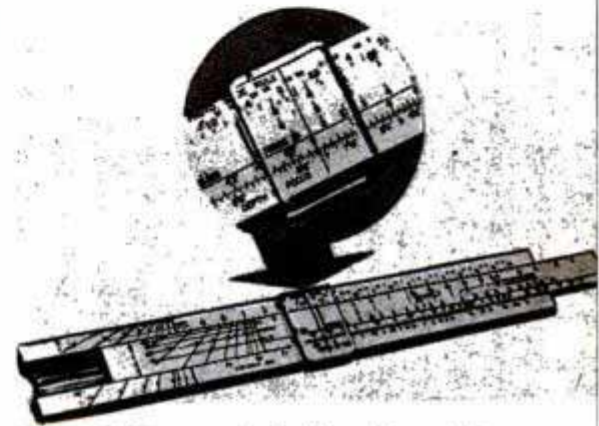
**HARNESS LIGHTS** invented by this newsreel cameraman move as he directs his camera, freeing both hands for taking the pictures



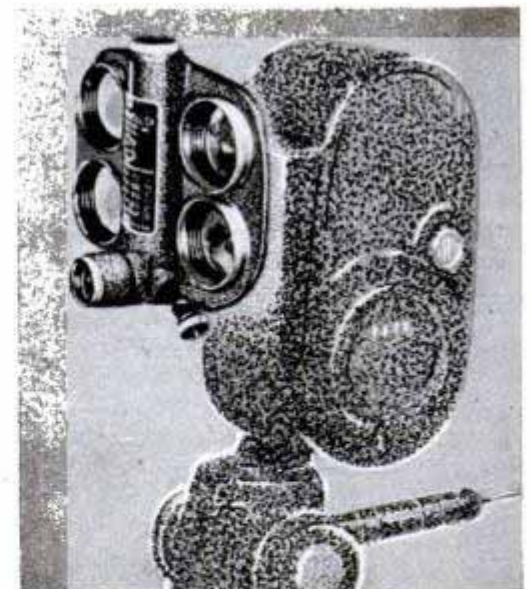
**ELECTRONIC FLASH UNIT** developed by Navy completely stopped motion in photo above. Attached to camera below, it fires 4000 flashes on same battery, 10,000 flashes on single repeating bulb



**PLASTIC SLIDE MOUNTS** hold 35-mm. transparencies firmly without cement. Film is slipped into groove, is replaced easily



**SLIDE RULE** automatically solves photographic problems including exposure, lens equations and depth of focus for taking pictures under any type of illumination

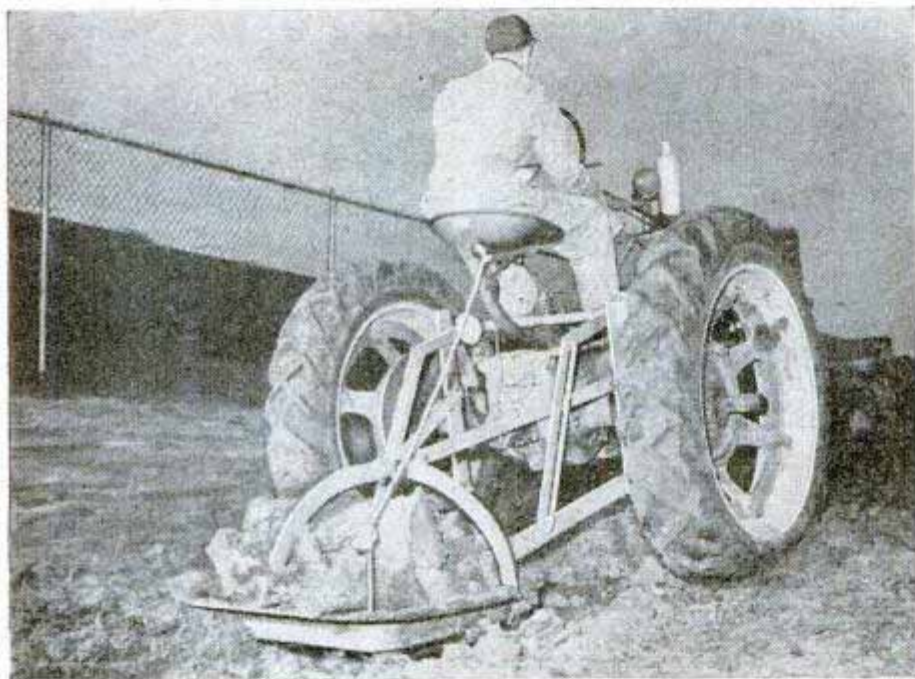
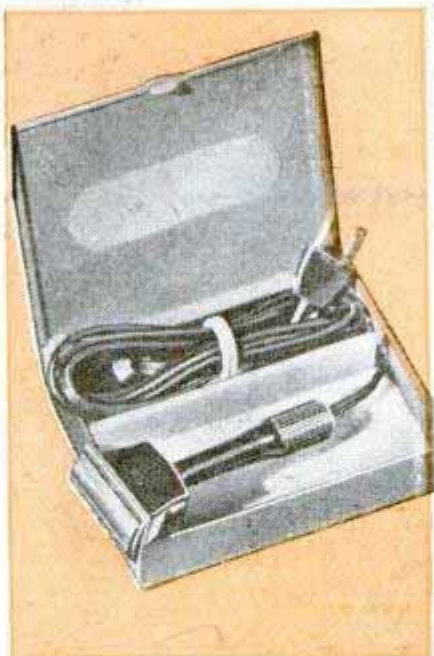


**FRAMING ATTACHMENT** for 8 and 16-mm. movie cameras shows exact field of view as close as six inches from the subject. Fastened to the camera lens, the attachment is equipped with an auxiliary lens and compensating view finder. Additional lenses are available for use in camera-to-subject distances up to 36 inches. It can be used in title making as well as close-ups



## Electric Safety Razor

Standard razor blades are used in an electric shaver that gives the blade 120 straight, edge-wise movements per second. This crosscutting action is said to duplicate the smooth shaving of a straightedge razor. The head of the electric shaver is patterned after a standard safety razor and the blades may be changed in the same way. The razor operates on 110-120-volt current, but it can be used as a regular safety razor if electricity is not available.



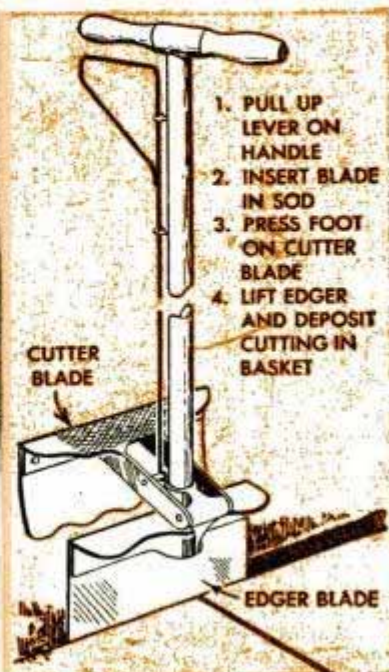
## Tractor-Rigged Scoop "Bites" 10 Cubic Feet

Excavating, ditching and leveling jobs are performed by an earthmoving scoop attached to the hydraulic lift of a tractor. A basement 20 feet by 30 feet can be excavated to a depth of six feet in less than a day. The scoop is raised and lowered by the hydraulic lift and is tripped and dumped by an easy one-hand movement. In less than 15 seconds it will scoop up a load of 10 cubic feet of dirt.

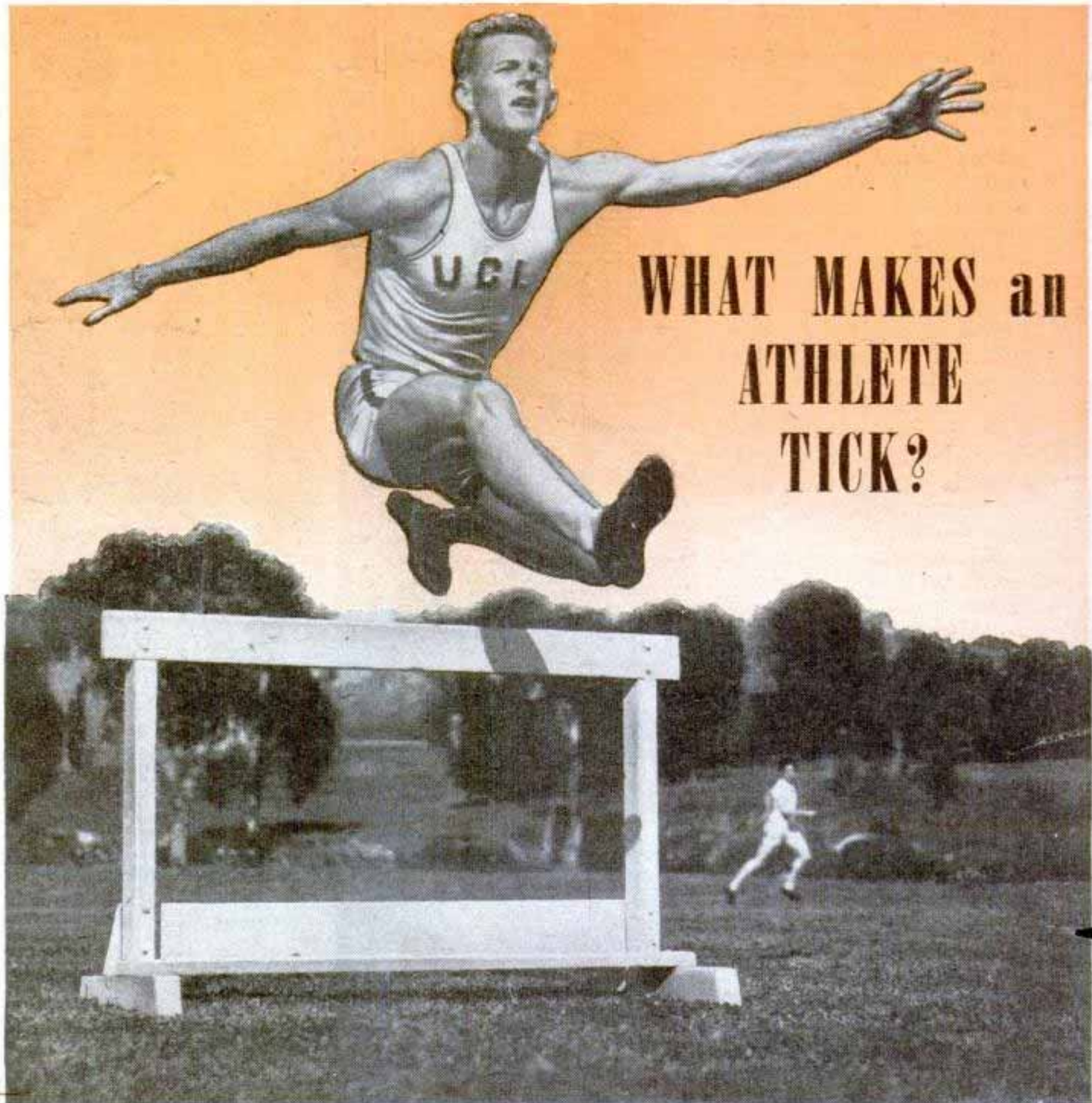
## Lawn Edge Trimmer

Lawn borders along sidewalks can be trimmed quickly and easily with a long-handled edging tool. The operator stands and inserts the tool in the turf alongside the walk. A foot lever operates the cutting blade which trims scraggly grass or shrubbery. The tool is also useful for work around trees or flowers as it will cut around irregular shapes.

☛ A blood bank for horses, cows and dogs is operated at the State College of Washington.







## WHAT MAKES an ATHLETE TICK?



Dr. Henry designs special apparatus to test the condition and potentialities of athletes

By Dr. Franklin Henry  
*University of California, Berkeley*

As told to Andrew Hamilton

**T**HOUGHTS of the sports world this summer are turning toward the 1948 Olympic Games and such questions as these naturally arise:

Can a man run the 100-yard dash in nine seconds? Can a pole vaulter top 16 feet? Will the four-minute mile ever be achieved? Will some future high jumper clear a seven-foot bar?

The answer seems to be, "Yes, with the help of science and smart coaching." Perhaps not this year, perhaps not next, but before long.



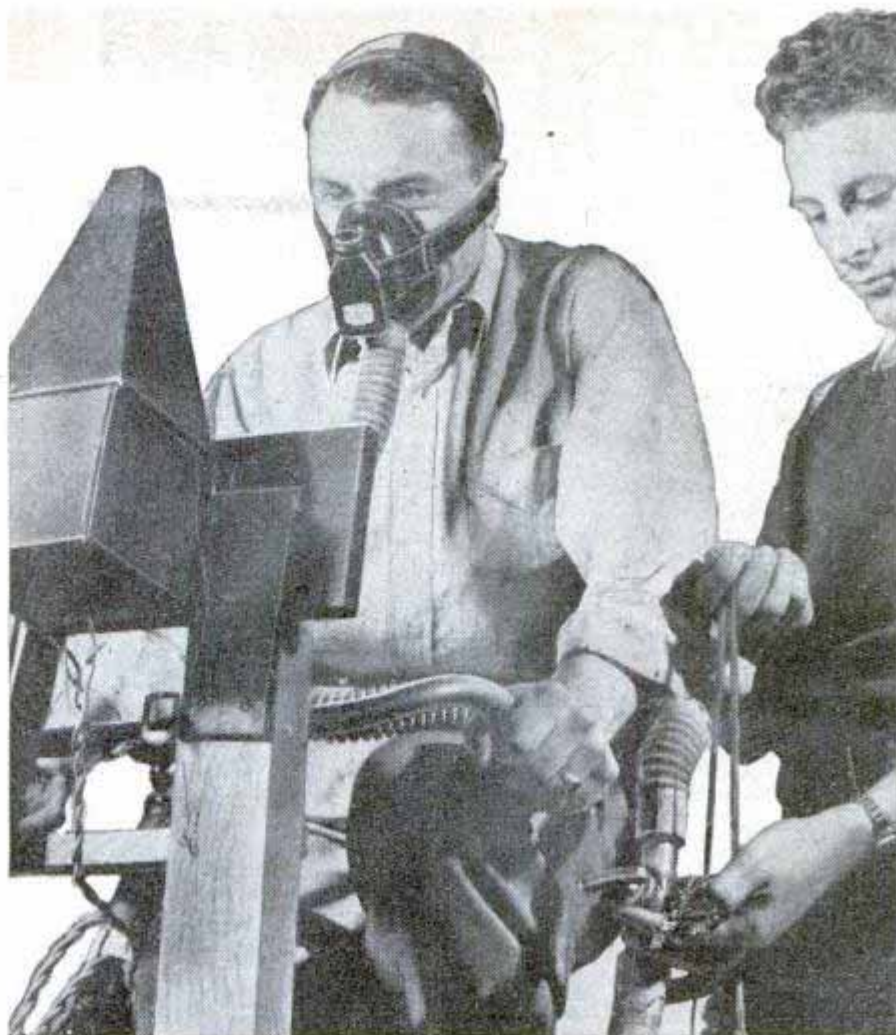
With increasing regularity, new world's records in track and field events have been hung up almost every year. In other competitive sports — football, basketball, baseball, ice hockey, tennis and skiing — individuals and teams are getting better and better.

Why? Probably because, as medical statistics indicate, the population of the United States is growing larger, stronger and healthier. And, more important, because better coaching has brought about more skillful individual and team performances.

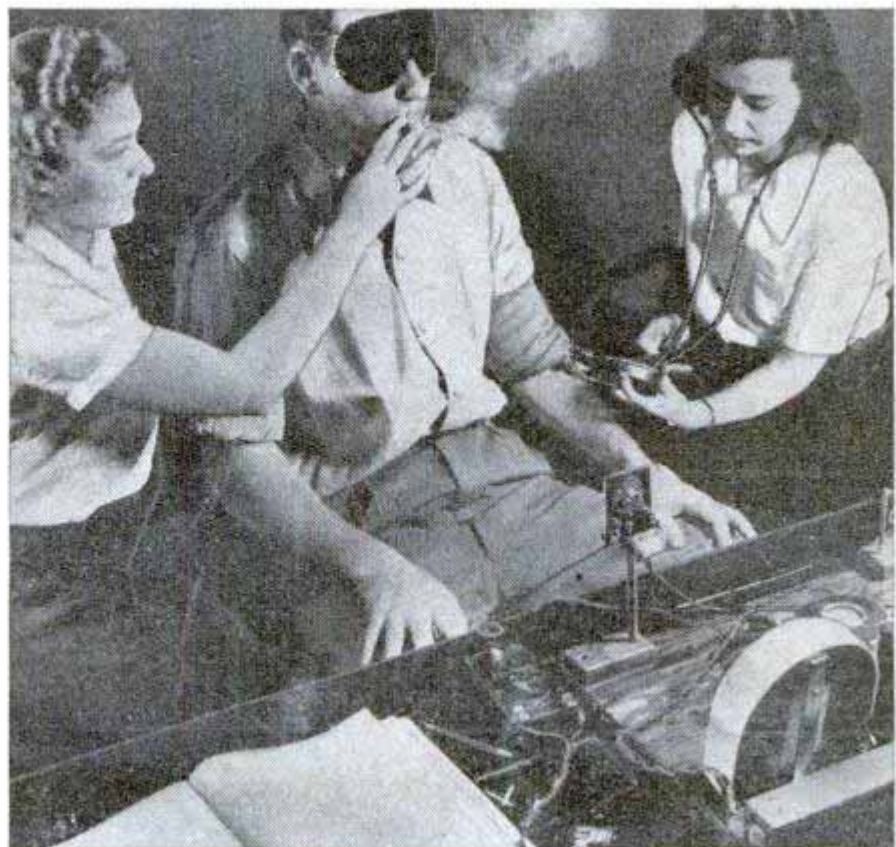
No longer does a track coach rely upon hearsay, superstition or "hunch" in training his men. When he tells a sprinter to leave the blocks in a certain manner, it's because exhaustive tests in the laboratory and on the running track have proved a certain technique to be most efficient for launching a man into motion from a crouching start.

Research in medicine, biology, physiology, psychology, chemistry and physics are giving us a better understanding of how the human machine works. The more a coach knows about the human body and the individual traits of the men under his direction, the better results he'll achieve.

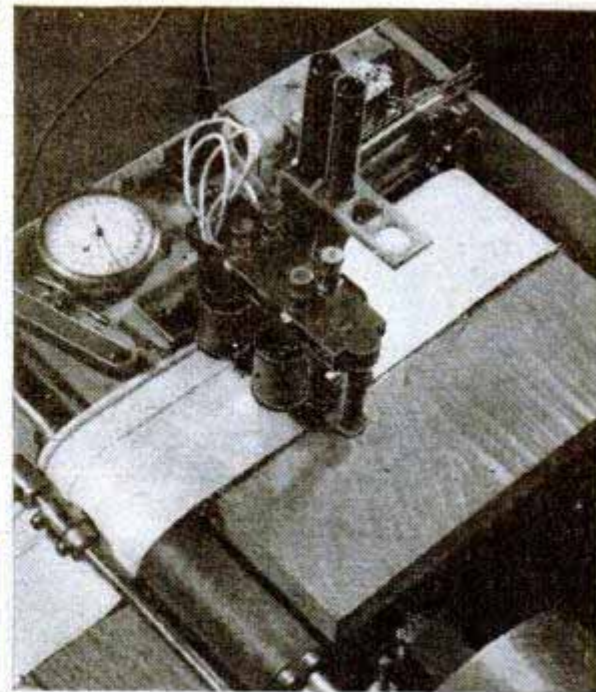
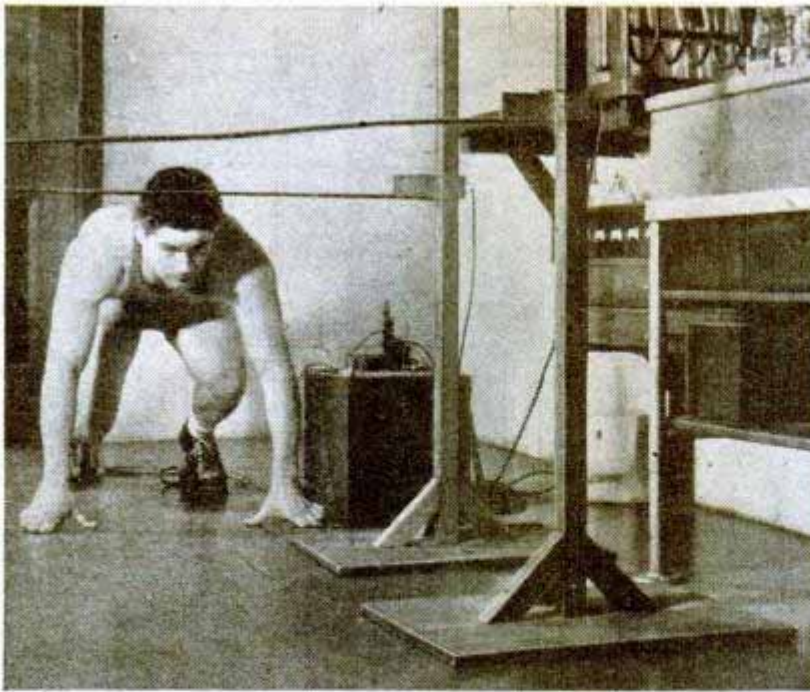
Much work has been done by America's scientists on how an average group of persons will react in a given situation. However, in the Department of Physical Education at the University of California, we are interested in how an individual will act. In addition to scientific facts about body functions we learn which physical and psychological traits spell the difference between a world's champion and an



Rigged up like a man from Mars, a physical education student takes a metabolism test. As he pedals a stationary bicycle, his exhaled breath is collected in the mask and tubed to a meter. Below, tests of this type demonstrated that smoking impedes a person's steadiness. After inhaling a few puffs, students found it difficult to hold a pencil in the center of a hole







Starting speed is measured by chronograph (right) which is set in motion electrically by bamboo gates (above) when struck by runner's chest. Drawing below demonstrates how apparatus works

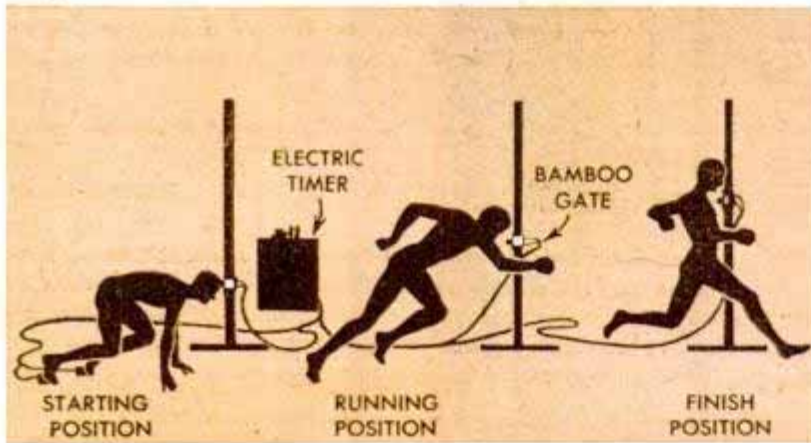
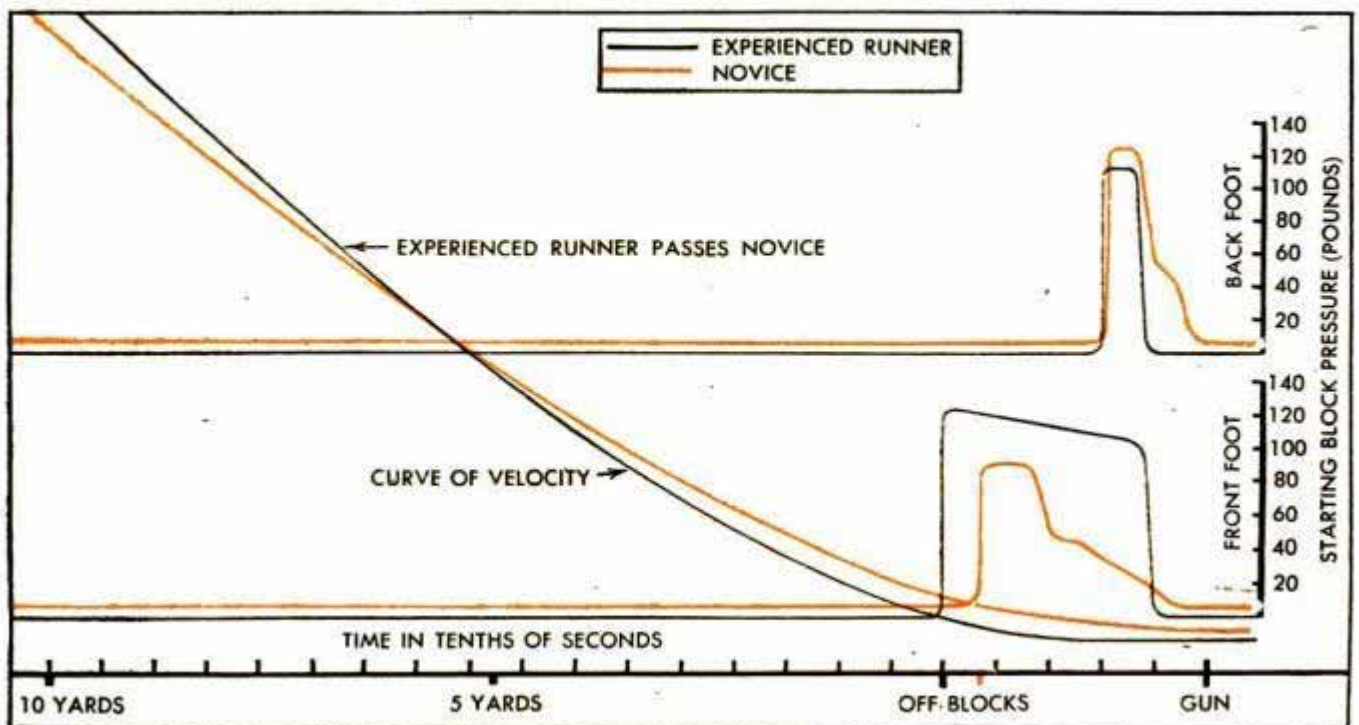


Diagram below shows that novice starts like a flash but soon is overtaken by veteran who runs 50 yards 1.1 seconds faster than opponent

ordinary competitor. If a lad with championship potentialities can be discovered at an early age and trained properly, he's the one who is going to set new records.

In this sort of human engineering, we explored many new paths. We built our own measuring devices. Our laboratory in the men's gymnasium is cluttered with equipment used to test athletes. In one corner of the room stands a model-maker's shop in which future devices will be constructed.

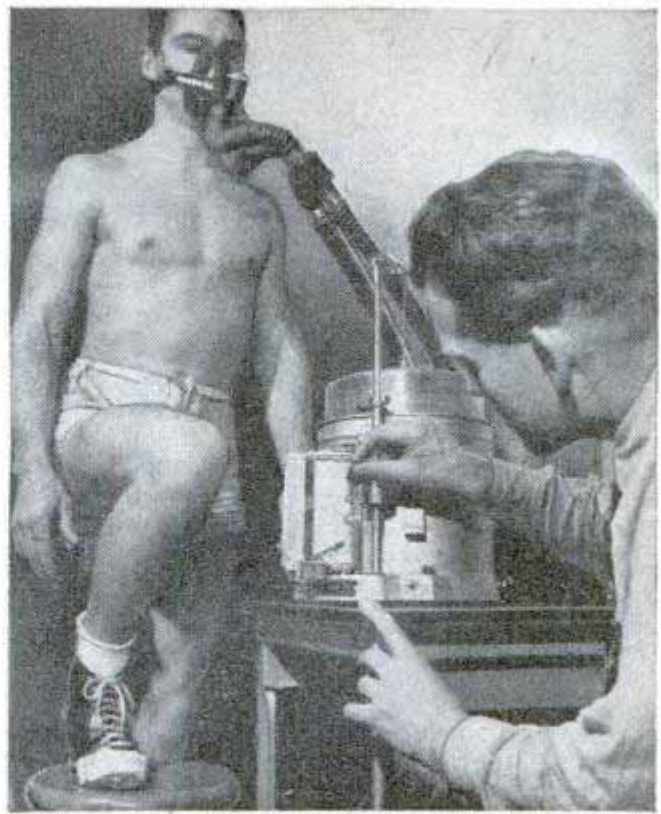
Much time has been devoted to studying the reactions of runners. Individual ability may







**Athlete takes centrifugal tilt test. If he "blacks out" he is given exercises to strengthen abdominal muscles**



**Measuring oxygen output as student steps up and down from stool tests endurance of long-distance runners**

indicate whether a man is best suited to run the 100-yard dash, half mile or cross-country steeplechase. It may also furnish the basis for selecting football players, tennis players or crew men.

To measure the dynamics of sprint running, a complicated device electrically records a runner's speed over short distances. It includes (1) starting blocks connected to a mechanism that records time and the force exerted, (2) light bamboo gates at intervals along the runner's path that automatically record when they swing open, (3) an electric timer which registers on ticker tape the speed of the runner. The mechanism is put into operation by the starter's gun. As a runner pounds down the track, with the light bamboo gates hitting his chest and swinging open, progress is recorded on the ticker tape. The results are interpreted to show how pressure was exerted by the feet, whether there was any variation in the speed of the runner and what his total time was at any point along the path.

A number of sprinters were clocked at full speed through the lane of timing gates. Curiously enough, those who took more time in leaving the starting blocks would usually overcome the handicap within the first 10 yards. This contradicts the generally accepted notion that the first man away wins a sprint race.

A smart coach would use this information by telling his dash men: "Get a good, fast start, yes, but be sure that your form

in leaving the starting blocks is as good as possible."

Endurance tests also are valuable. In the past, endurance was measured by determining how long a specific task could be performed efficiently—such as lifting a 50-pound weight or jumping up and down on one foot. Since this method measured endurance in only one type of exercise, a test of a more general nature was sought.

Extensive research had shown that the response of the heart to exertion was, to a certain extent, a reflection of a person's physical condition. The time required for the heart rate to return to normal is affected by fatigue, diet, smoking, etc. To test the predictive value of this fact, an endurance index was established by considering the time it took a man to run 220 yards, as compared to his time for 50 yards. A person in good physical condition is able to cover the longer distance at a speed more nearly proportionate to the time for the short sprint.

Through cooperation with California track coach Brutus Hamilton, 28 men of varied condition and training were enlisted for the first experiment. The runners were timed at intervals, and their index of endurance computed. This was compared with measures of their heart and circulation, which had been obtained by registering heart rates while the subjects mounted and dismounted from a footstool. These tests, when conducted again after a short

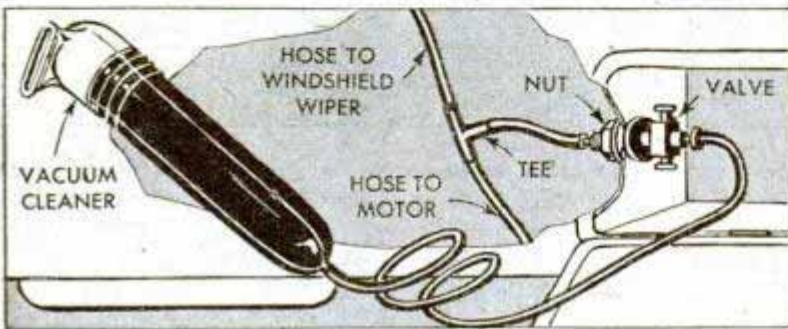
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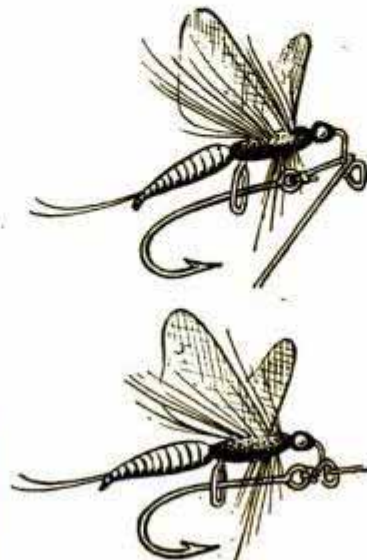
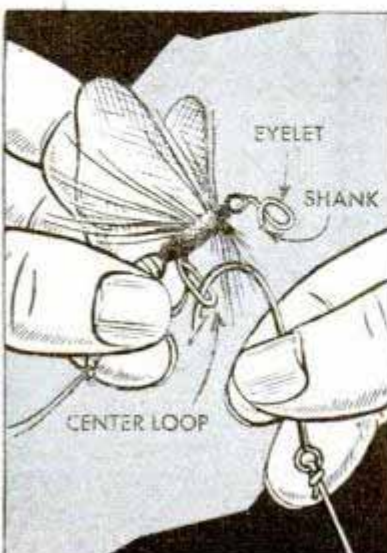
## Midget Vacuum Sweeper Cleans Interiors of Autos

Resembling a flashlight in size and shape, a vacuum cleaner for automobile interiors gets its suction from the windshield-wiper hose. The connection is made through a valve installed in the glove compartment. Equipped with a 12-foot nonkinking hose, the cleaner picks up dirt and dust while the car's engine runs at idling speed. The slender nozzle, which is designed to reach into crannies inaccessible to a whisk broom, unscrews from the plastic tube to permit emptying the canvas bag inside which catches the dust. The entire unit can be cleaned by wiping it with a damp cloth. After being used, the cleaner and its tube can be stored in the glove compartment.



## Swiss Transfusion Apparatus Employs Flexible Rubber Bag

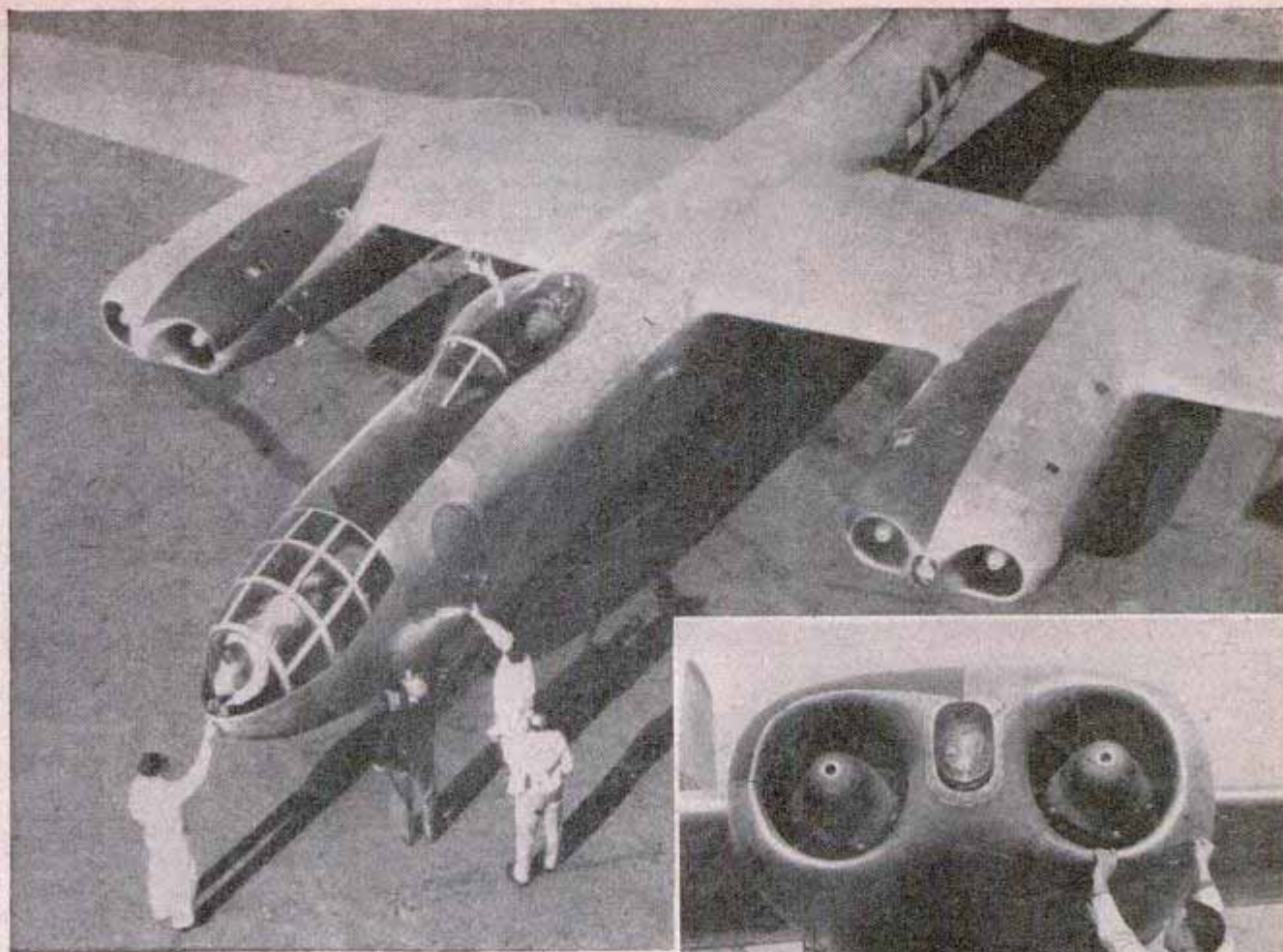
Instead of the usual inverted bottle to hold blood, a Swiss apparatus for blood transfusion employs a flexible rubber bag to contain whole blood or plasma. In addition to gravity, which controls the flow of blood from an inverted bottle, pressure can be applied to the rubber bag to increase the flow. This pressure is applied by squeezing a bulb to inflate a balloon inside the bag.



## Quick-Change Fishing Fly

Fishing flies which attach directly to a hook instead of the leader enable an angler to change flies in four seconds or less if he's having no luck. To attach, the hook is inserted through a loop at the bottom of the detachable fly and the leader is secured to an eyelet at the head. This fly also is available with one hook attached, making a double-hook bait possible when it rides pickaback on a hook tied directly to the leader. It can be attached or detached with the same speed.





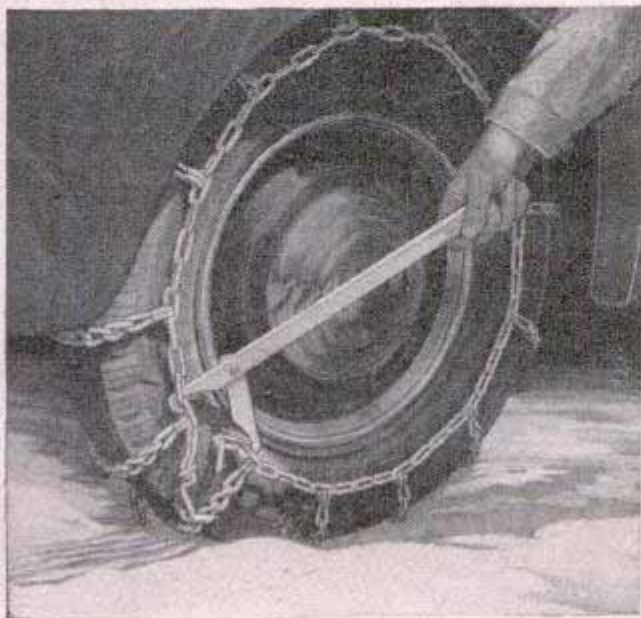
## "REFRIGERATED" BOMBER

Four turbojet engines are paired in single nacelles in the XB-45, described by the AAF as an "exceedingly high-speed" medium bomber. Among its innovations are an absence of external gun turrets and a refrigerating unit that lowers the temperature as much as 30 degrees below outside temperature when flying at low altitudes. The high-pressure tires have a very narrow tread to allow the landing gear to retract into the thin wings. It carries a



North American Aviation photo

four-man crew, has an 89½-foot wing span and is 74 feet long. Pilot and copilot sit tandem fashion beneath a plastic bubble forward of the leading edge of the wing.



## Tire Chain Tightener

No pulling or tugging is necessary to tighten tire chains when a double-hook tool is used. The motorist puts the hooks through two chain links and pulls up on the lever. The chain pulls together instantly, assuring a snug fit on the tire when the hooks are secured.

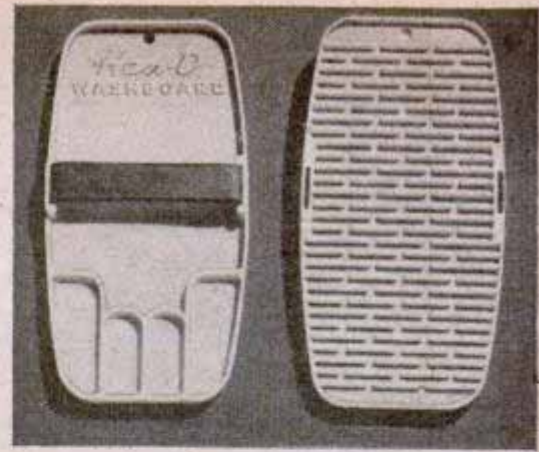
## Push Button Selects Film From Library

Push-button control simplifies removal of 8 and 16-millimeter film rolls from a film library chest. When a button is pushed, the selected roll of film is moved forward within easy reach. The door of the all-metal welded chest opens downward. Rolls are held in position inside by a self-aligning stacking system.





Midget water softening unit contains enough chemical to treat 50 gallons of water. To regenerate, two tablespoons of salt are added



† Plastic scrubbing board, designed for travelers, is held to user's hand by elastic band

## WHAT'S NEW *For Your Home*

Wire basket with spray-head cover, right, cleans fruit and vegetables quickly and thoroughly. Below, kernels are removed from ears of corn by four-bladed cutter operated by a plunger



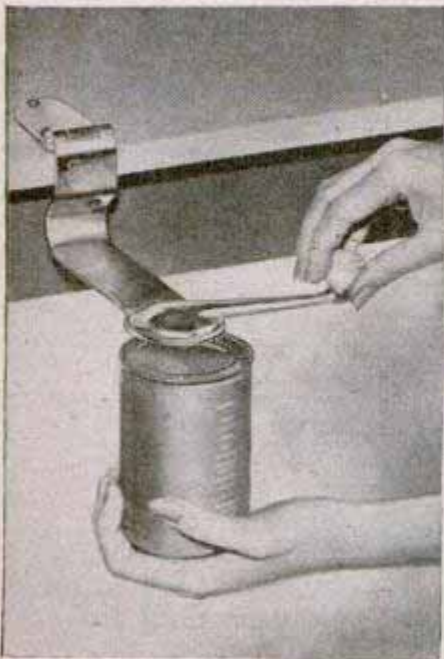




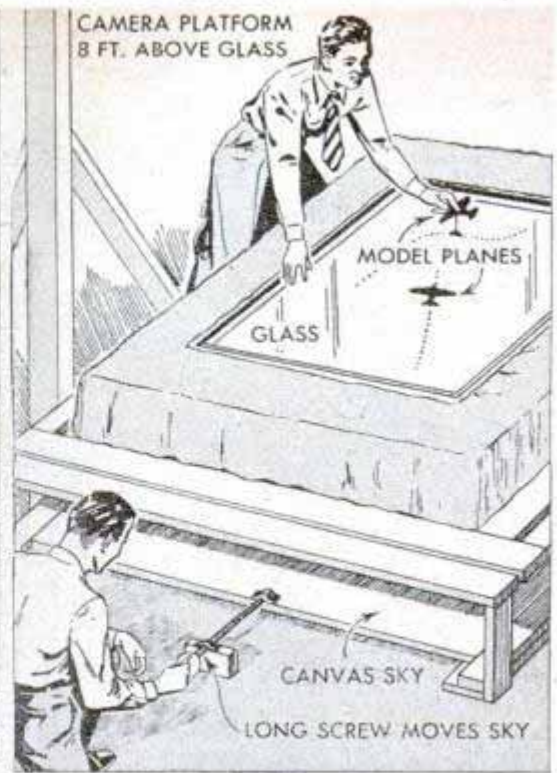
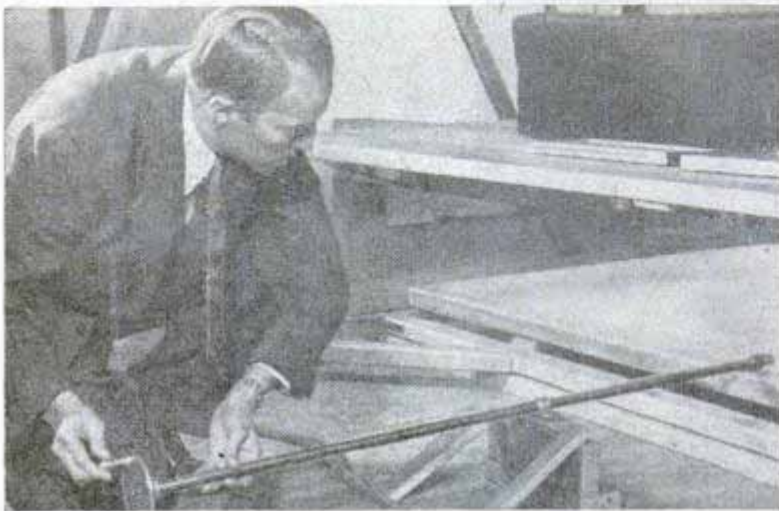
Ironing machine can be kept in kitchen, since it folds into cabinet 36 by 18 by 25 inches. Has fingertip and knee controls. Left, razor blade holder serves as paint scraper and cutting tool. Below, swing chair for porch or garden use has a nontip safety stop and posture control from upright to full reclining position



Can opener requires only slight touch to shear the lid from a can. It folds against wall when not being used







## AIR BATTLE "FOUGHT" ON GLASS

Tiny planes mounted on clear glass over a canvas sky give those seeing "The Secret Life of Walter Mitty" a realistic version of an aerial dogfight. The technique, devised by special effects director John Fulton, uses the stop camera method of filming animated cartoons. The planes are moved by hand a fraction of an inch after each frame is shot, follow-

ing a pinpoint path laid out in advance. Although shot upside down from eight feet above the glass set, the camera appears to be shooting upward because the planes are silhouetted against clouds which are painted on a lighted, blue canvas sky mounted two feet below the glass. The sky is moved slightly after each shot to complete the illusion. Tilting the wings makes it appear as if the planes were doing snap rolls, banks and other maneuvers. The planes' mountings are narrow and completely hidden under the fuselage when photographed from above the set.

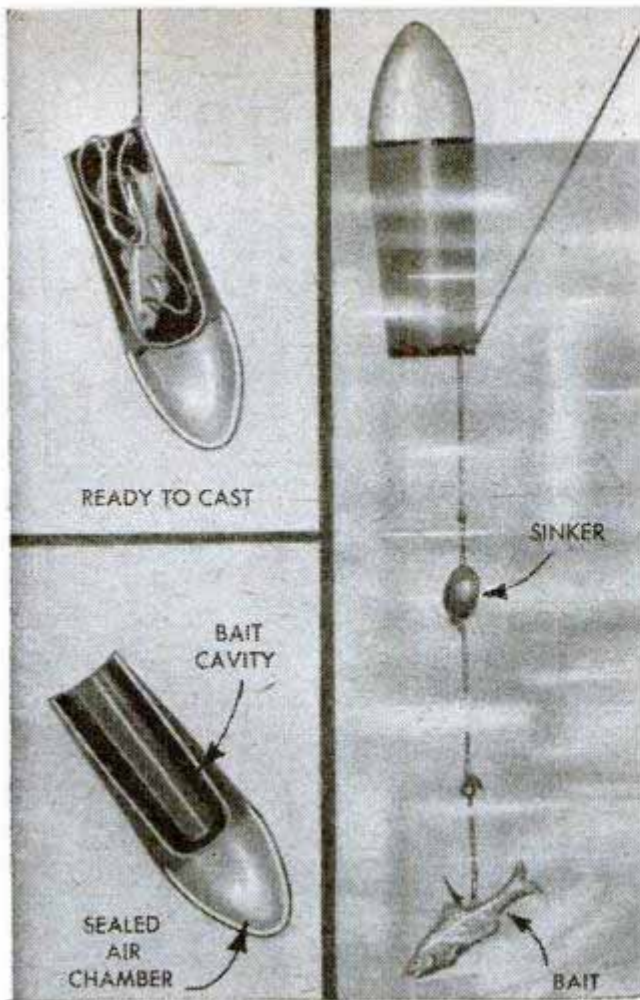


## Dog Stalls in Store

Shoppers in San Carlos, Calif., forbidden by law from taking their dogs inside stores, can park them in a row of stalls outside one of the markets. The stalls keep hostile canines a safe distance apart. There's even a special fountain where the dogs can get a drink.

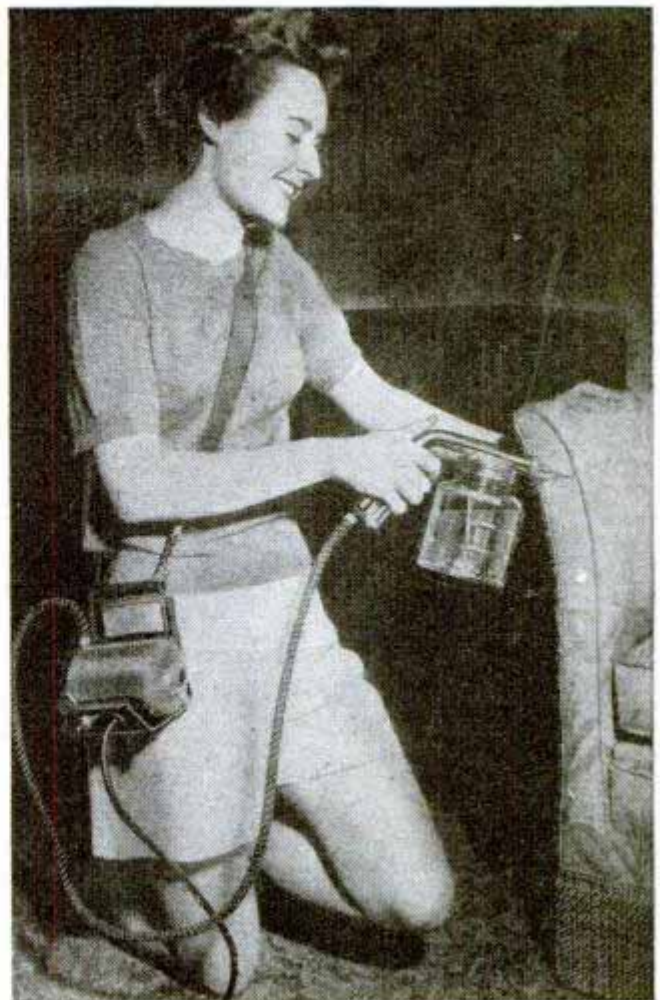
Red-filtered lights in cockpits enable a night-flying pilot to glance from his instruments to the outside without waiting for his eyes to adjust themselves, according to United Air Lines.





### Float Holds Live Bait for Casting

Fishermen cast live minnows without losing them with a special casting float. The float is a bullet-shaped plastic case with an air pocket in one end and a cavity for the bait in the other. The fisherman drops his minnow, hook and sinker into the cavity and casts as though he were using a plug. As the float strikes the water the sinker pulls the minnow to the desired depth.

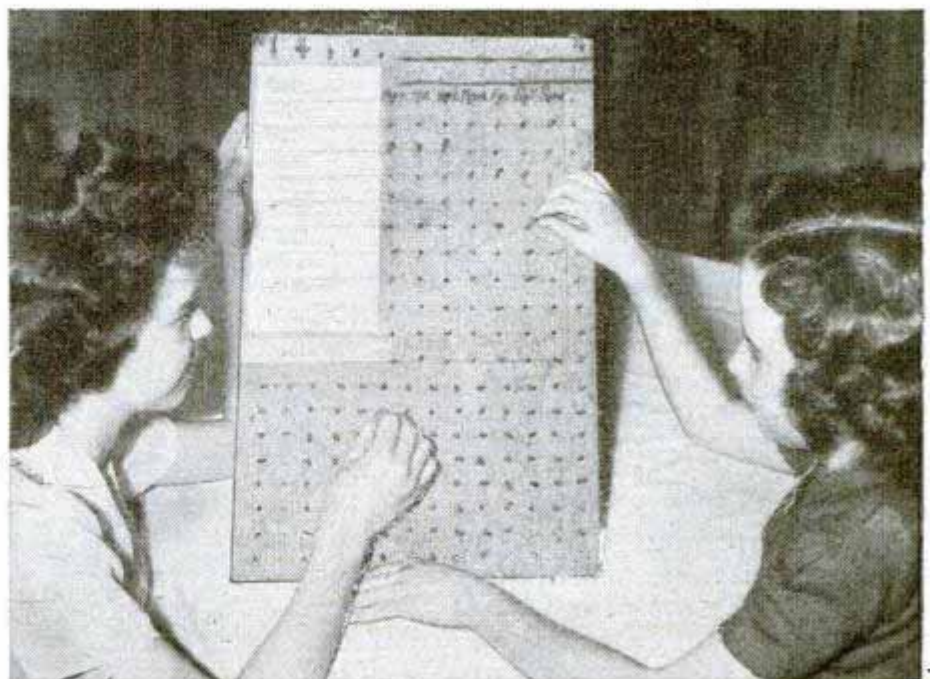


### "Hypodermic Needle" Moth Sprayer

Overstuffed chairs and sofas are protected against moths by an electric sprayer with a "hypodermic needle." By inserting the needle at the seams of furniture covering, spray is distributed beneath the surface. The sprayer is equipped with an electric motor, 10 feet of cord and a shoulder strap. It also has a saturating nozzle for spraying garments, rugs and other articles.

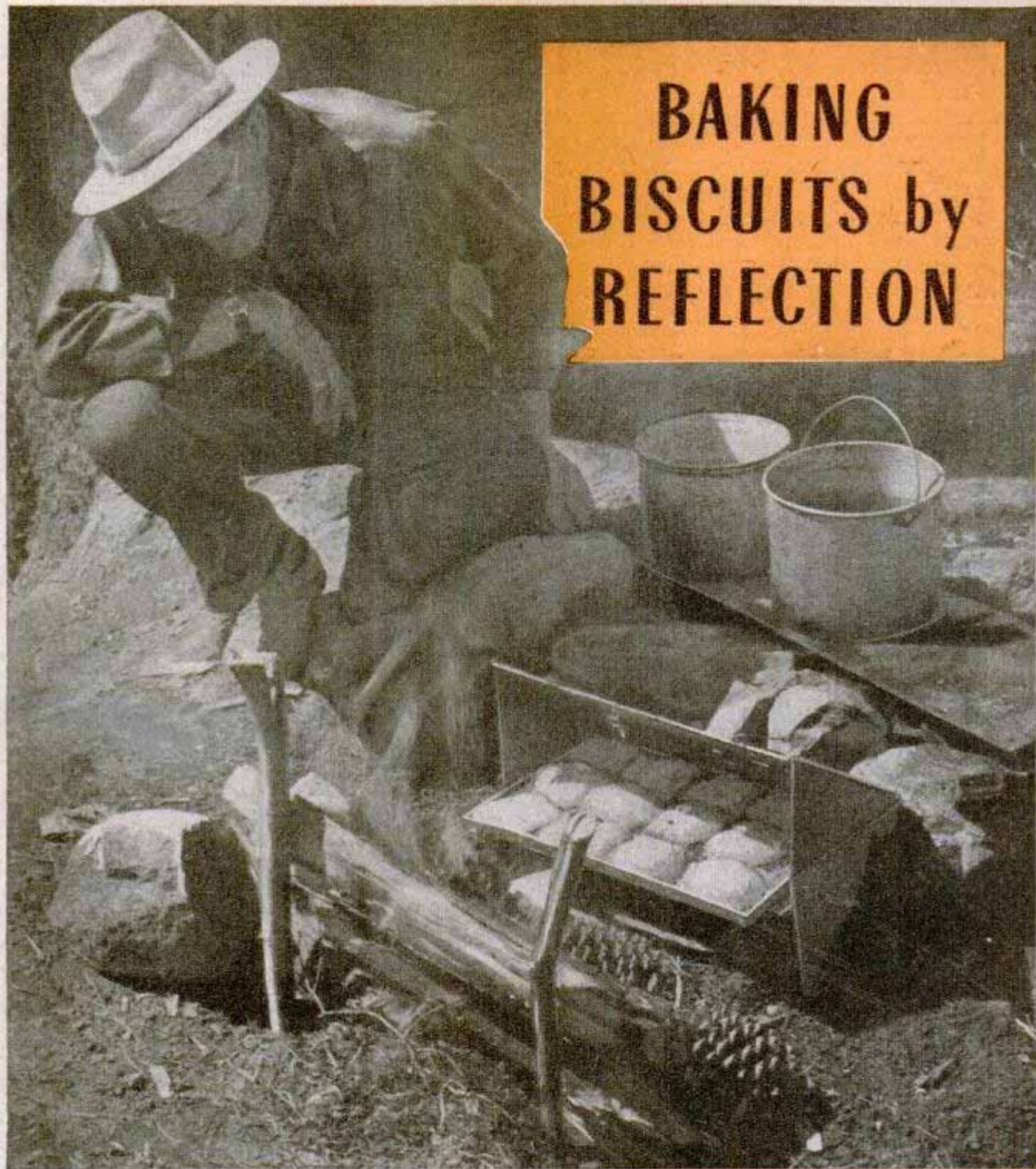
### Scoreboard for Tasks Helps Train Children

To teach her children the value of money with relation to daily tasks, Mrs. Inez Cole Curtis of Akron, Ohio, designed a scoreboard to determine weekly allowances. Under days of the week are listed such things as washing hands and face, eating everything on the plate, and helping with the dishes. For every task performed, a peg is inserted in the board. The pegs are in different colors to represent from one to ten cents.





# BAKING BISCUITS by REFLECTION



By Claude M. Kreider

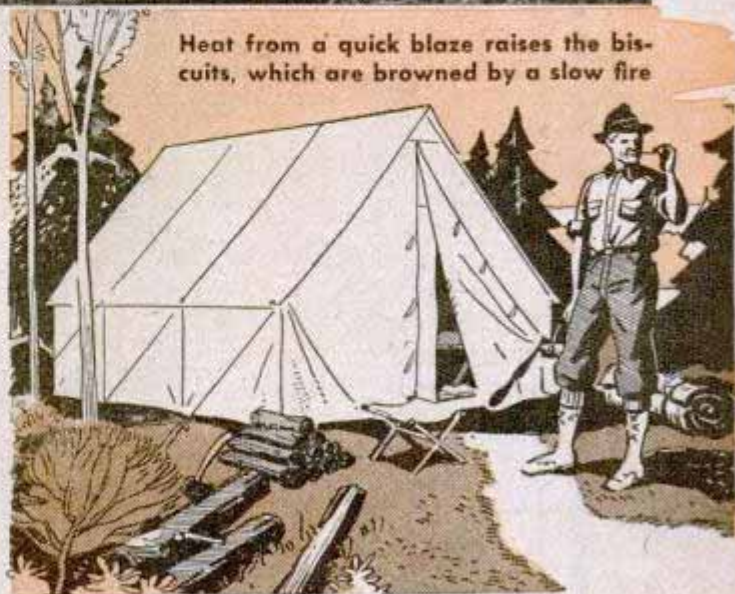
Photos by Ray Chapin

**I**F YOU'RE planning a camping trip this summer you may be puzzling over one age-old problem in preparing your grub. What can you do to provide good bread?

Bakery bread soon dries out and it's difficult to carry. Crackers and hardtack are a poor supplement to a piping hot camp dinner.

Take a tip from the old-timers and bake your own biscuits, easily and quickly, with a reflecting campfire baker. In this lightweight "oven" you can turn out biscuits and corn bread—always the delight of hun-

Heat from a quick blaze raises the biscuits, which are browned by a slow fire







Careful campers clear ground before building a fire

gry outdoorsmen. You can whip up simple camp cakes and pies for your companions.

You'll find the campfire bakers in sporting goods stores in a variety of sizes and materials. The baker shown here is a "four-man" size that will turn out a dozen large satisfying biscuits at a time. Made of medium-gauge aluminum alloy, it's only one inch thick and measures 11 by 17 inches when folded with the bread pan.

Heat from the fire is reflected evenly on the biscuits by the upper and lower surfaces. To raise the biscuits you'll need a high blaze from a stack of quick-burning wood. Then, as the wood burns down, a golden brown color will creep across the biscuits.

The ingredients? Light biscuits are easy to make from prepared biscuit flours which contain the necessary ingredients and need only to be mixed with water. Breadboards, rolling pins and other kitchen utensils can be left at home and the biscuits prepared "cowboy" style.

For a change you can have delicious corn bread made from another of the prepared

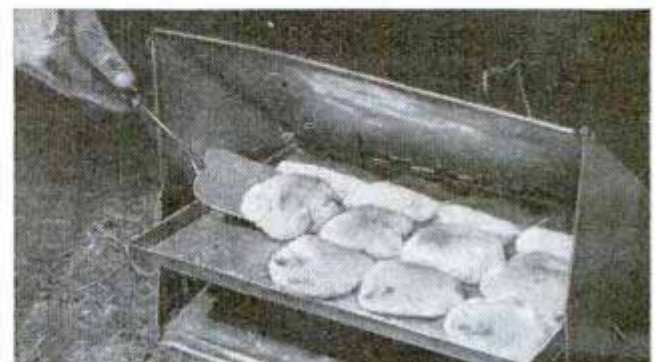


No fancy ingredients are needed—just mix prepared biscuit flour with water in a pan to make the dough



↑ Biscuits are patted flat on the pan "cowboy" style

↓ In about 15 minutes they bake to a golden brown





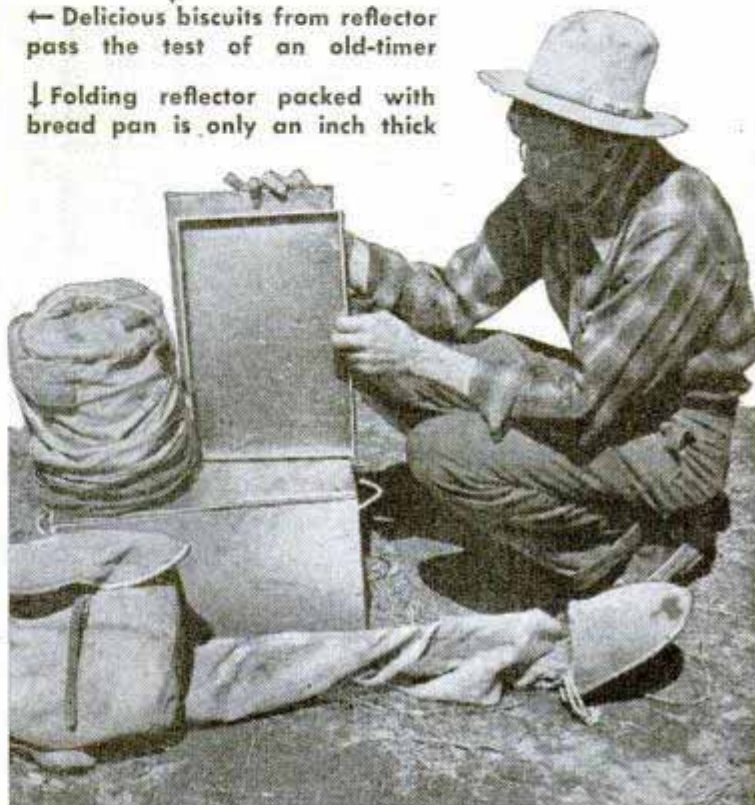


mixes. And if you like to experiment, surprise your companions with a simple camp cake. Just add a handful of raisins, an egg, canned milk and a bit of extra shortening to the biscuit dough and put the batter in a well-greased pan.

To make pies you need only white flour, shortening, water and salt for the crust, and canned fruit or fresh berries for the filling. With a little ingenuity on your part the reflecting baker will turn out any number of delicious baked goods.

← Delicious biscuits from reflector pass the test of an old-timer

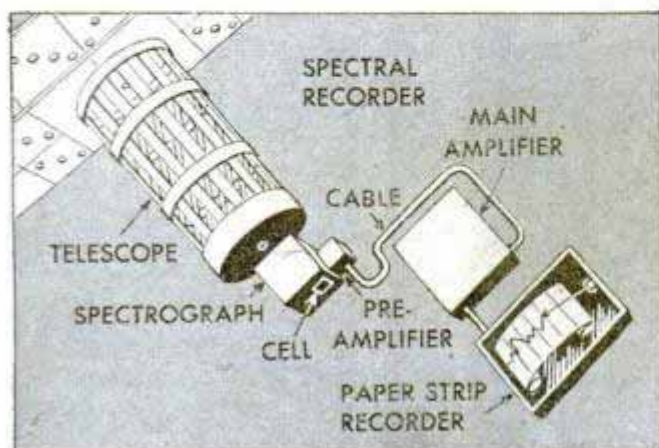
↓ Folding reflector packed with bread pan is only an inch thick



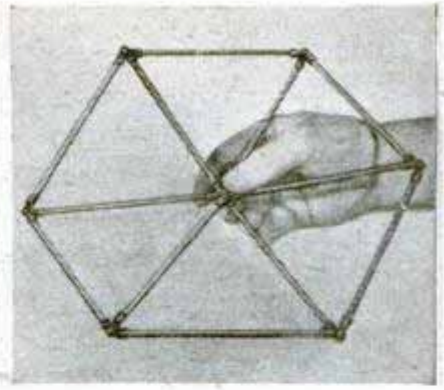
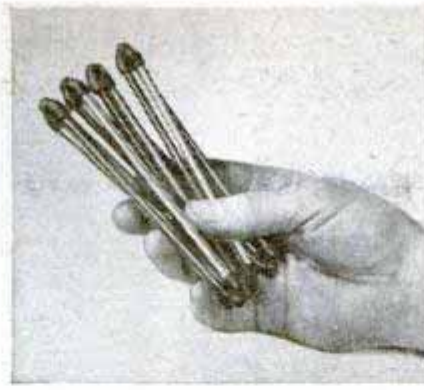
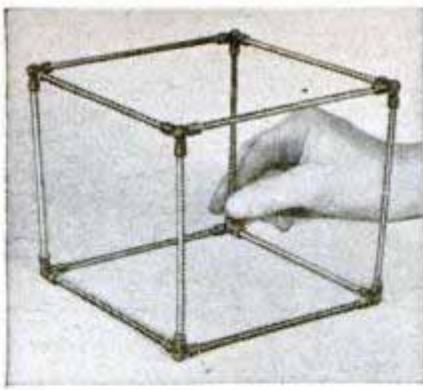
## Telescope Attachment May Determine Whether There's Life on Mars

With the aid of a telescope attachment astronomers soon may discover whether there is life on Mars. The attachment, called a spectral recorder, is activated by invisible infrared rays. These rays emanate from stars and penetrate clouds of "star dust," or particles of matter, through which ordinary light cannot pass. In the telescope

the rays are interrupted 1080 times a second by a rotating toothed wheel and the "chopped" light passes through glass prisms and is spread into a spectrum. A photoelectric cell in the instrument separates the infrared rays from the spectrum, translating them into an electrical current which varies with their intensity. An electronic circuit amplifies this current 10,000,000 times and the variations are recorded on a paper graph to give an accurate picture of the infrared emanations. Many astronomers have speculated that green spots on Mars may be vegetation, and the recorder will enable them to measure the intensity of infrared radiations from the spots. Scientists then can compare the rays with the infrared light reflected from plants. If the two recordings are identical it will be strong evidence that the spots are living vegetation. The recorder was developed by Professor Robert J. Cashman and Wallace R. Wilson of Northwestern University.





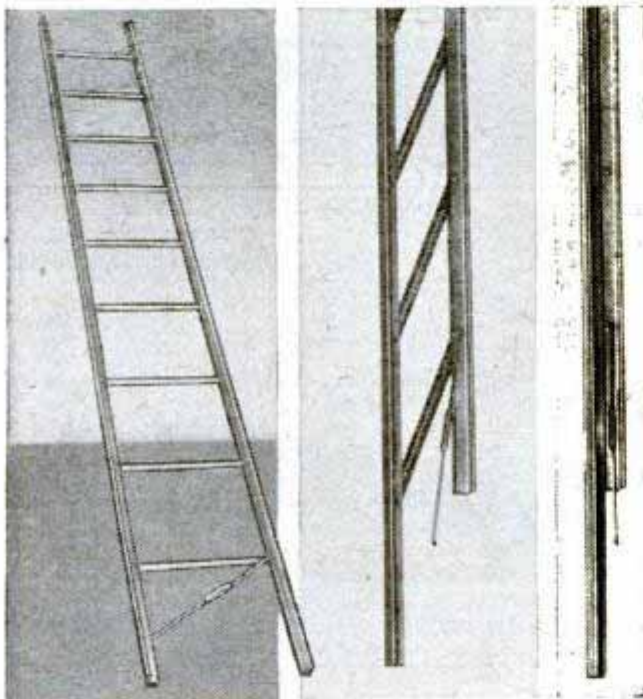


Efforts of a physics teacher to demonstrate the three-dimensional form of crystals led to the development of a flexible toy consisting of 12 sticks about 5½ inches long. Joined by rubber elbows, the sticks form a cube that can be transformed in shape to

### RUBBER ELBOWED TOY STICKS

resemble letters of the alphabet, numerals,

and crystal and geometric shapes. The stick cube can even be used by children in various games. For example, the sticks can be formed into a flat, six-sided figure to be tossed at a hook mounted on the wall.



### Collapsible Ladder

Weighing 40 percent less than conventional wood ladders, a collapsible ladder has rungs made of metal tubing and side rails made of extruded aluminum sections. When the ladder is not in use the side rails can be pivoted on the rungs and folded together with the rungs inside. The collapsed ladder requires less storage space than a two-by-four timber of comparable length. The ladder is locked in open position by a folding arm.

### Auto-Jack Plasterboard Lift →

Plasterboard is lifted and held in place for ceiling installations by metal arms mounted on a steel shaft which is raised by an automobile friction jack. By means of this device, which has 11-foot elevation capacity, one man can cover a ceiling with plasterboard. The boards are nailed in place while the lift holds them against the ceiling. The mechanism weighs 35 pounds and consists of a three-piece assembly which can be set up in a few seconds.



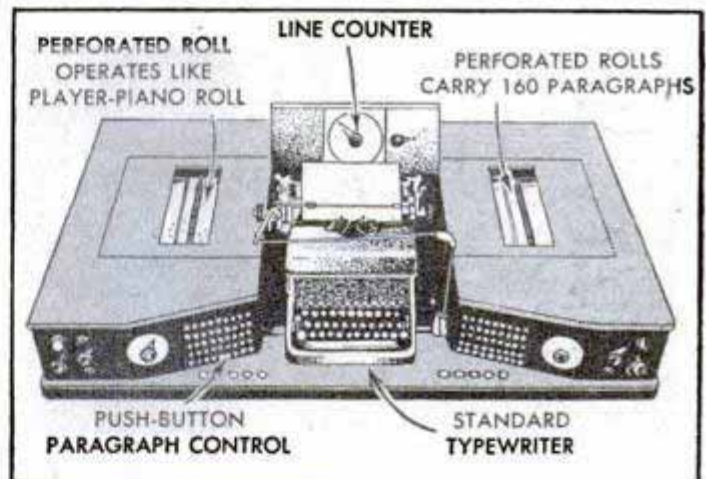
Many of the products described in this issue are already available or are ready to be marketed. For additional information on these products, including the name and address of the manufacturer or distributor, simply write to Bureau of Information, Popular Mechanics Magazine, 200 E. Ontario St., Chicago 11, Ill., for a prompt reply





## Push-Button Typewriter

Automatic typewriters, operating like a player piano from a paper record roll, write "personalized" letters made up of standard paragraphs to business correspondents. Messages written are not the usual form letters but can be varied to include any of 160 different paragraphs. The machine is used for typing answers to inquiries on products, typing credit and collection forms, bills and invoices, subscription and renewal correspondence and other standard subjects. "Stops" on the machine permit manual typing of names, addresses or other personalized material. The form paragraphs are written and cut into the record roll. Pushing control buttons causes the roll to move to certain sequences. Compressed air, escaping through slots in the roll, drives the keys.



## Doughnut Gun

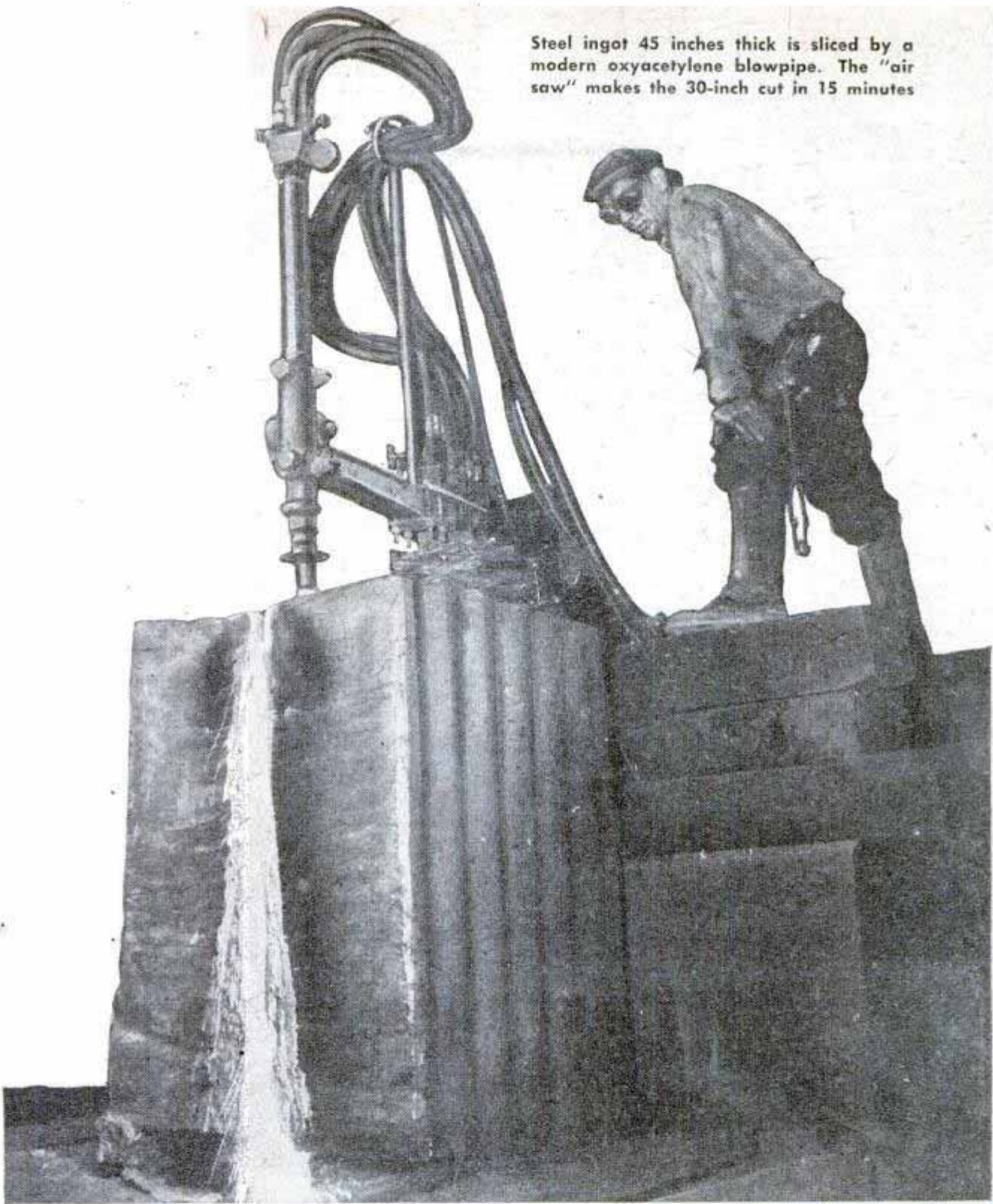
Almost as fast as you can count, perfectly shaped doughnuts ready for frying pop out of the barrel of a doughnut gun. Squeezing a side handle ejects the sinkers. The gun holds batter enough to make 22 to 24 doughnuts and turns them out at the rate of one per second. It can be taken apart for easy cleaning.

## Electronic Food Sterilizer

Food, medicines, whole blood and blood plasma are sterilized and preserved by an electronic instrument called a Capacitron. The preserving effect is produced by checking enzyme action with electrons released at millionth-of-a-second frequency at an intensity of 30,000 to 50,000 amperes.



Steel ingot 45 inches thick is sliced by a modern oxyacetylene blowpipe. The "air saw" makes the 30-inch cut in 15 minutes



## *Industry Also Breathes Oxygen*

**A** MERICAN industry inhales more than 90,000,000 cubic feet of oxygen a day. It's sucked through open hearth furnaces and welding torches, through metal-cutting machines and airplane cabins.

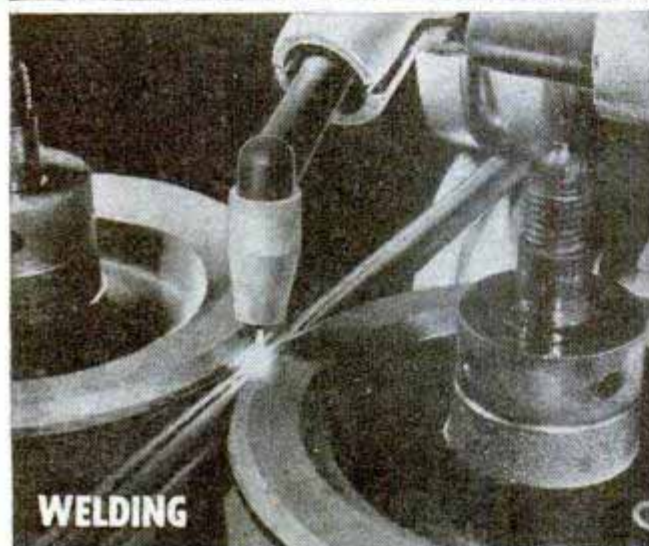
Each year we use 22,000,000,000 cubic feet just to breathe life into our metal-

**By Eugene W. Nelson**

processing machines. If you could put each cubic foot into a metal container you'd have enough building blocks to construct a wall 20 feet wide and 70 feet high across the United States.

Separating and using almost pure oxygen is a fairly new industrial process.





Here's a raw material that is available in huge amounts. The envelope of air around the earth contains millions of tons of oxygen. It's always been there. Yet pure oxygen wasn't discovered until Joseph Priestley, the English scientist, stumbled across it before the American Revolution.

Today oxygen is taken from the air in vast quantities. Air is compressed, then cooled in heat exchangers. Rapid expansion of the air after compression and cooling changes the gas into a liquid. This liquid air is then "cooked" at a carefully controlled rate. Each gas that forms a part of what we call air—nitrogen, oxygen, helium and others—boils away from the parent mass at a different, definite temperature. The trick is to catch each gas while the liquid is held steady at a particular temperature. Oxygen, for example, comes off at  $-297.2$  degrees F. under normal pressure.

Oxygen "manufacturers" have boosted the demand for oxygen and created new uses for the stuff by improving their methods of separation and passing the savings along to their customers. In 1921 only a little more than a billion cubic feet of the work-horse gas was used. Today, 22 times that amount flows through our machines.

The secret behind the demand for oxygen is that anything that burns will burn a lot hotter in pure oxygen. An oxyacetylene torch produces a flame tip that's hot enough to burn through metal. Recently the same torch has been overhauled and streamlined. Now it will make a 30-inch cut through a steel ingot 45 inches high in only 15 minutes, which is a few years faster than you can do it with a hacksaw.

Several uses for the oxyacetylene torch have become standard in industry. One is the slashing of large sections of scrap steel into pieces small enough to feed into open hearth furnaces. Obsolete ships, bridges,





skyscraper frameworks—all kinds of metal structures—are now sliced apart quickly with cutting “lances” to make the scrap from which shining new products come.

Slag-pot “skulls” once gave industry a costly headache. They are huge semi-spherical chunks left in the ladles from which metal is poured, so heavy they can be moved only with great difficulty. Blasting them apart means moving them to a safe area. Burying them is too wasteful. Today oxygen lances slice them into small pieces rapidly, and the skulls have become a profitable source of scrap metal.

Oxygen is hard at work in other tools besides the lance for cutting metals. For example, industry now has a machine that trims and bevels the edges of metal plates before they are welded together. The edges can be beveled at several angles simultaneously with an accuracy as great as that obtained with machine tools. Foundries use flame cutters to remove “gates” and “risers,” unwanted projections on castings.

Still another machine that breathes oxygen gouges metal in almost any pattern. In this process a “gouging nozzle” combined with hand-cutting blowpipes cuts a controlled groove in the surface without damaging the rest of the metal.

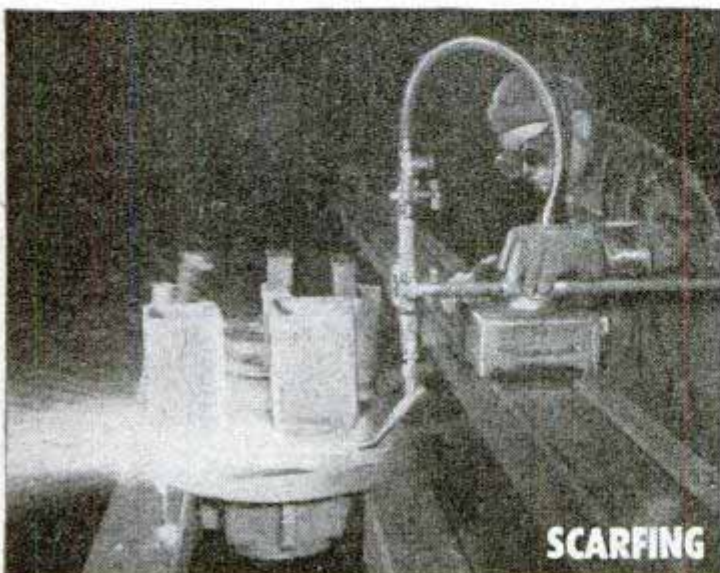
One of the greatest contributions of oxygen to the steel industry is in “scarfing” or “deseaming” steel bars and slabs. In processing steel, surface defects formerly were removed by laborious hand chipping or grinding. Now with a deseaming blowpipe a worker can remove all defects from a slab five times faster than it can be done by hand. “Scarfig” machines have been perfected that clean up all four sides of a slab of steel simultaneously. They’re so foolproof they ignore all sound metal.

Perhaps the newest of the flame-cutting



Air Materiel Command photo

Lifesaver for pilots who are forced to bail out at extreme altitudes is this emergency oxygen cylinder assembly developed for the Army. Bottle in flyer’s pocket holds enough oxygen for a parachute descent

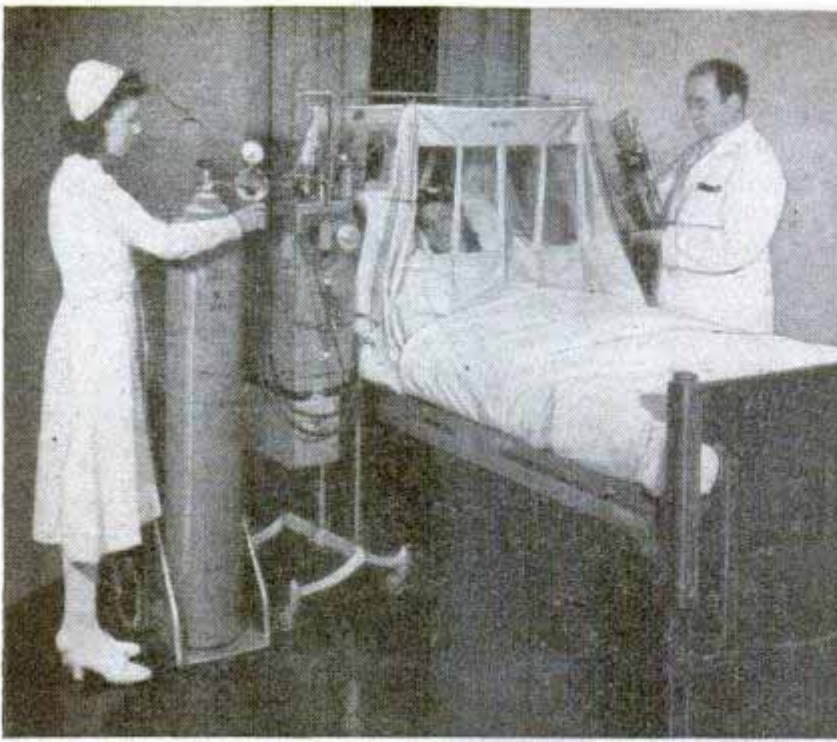


SCARFING



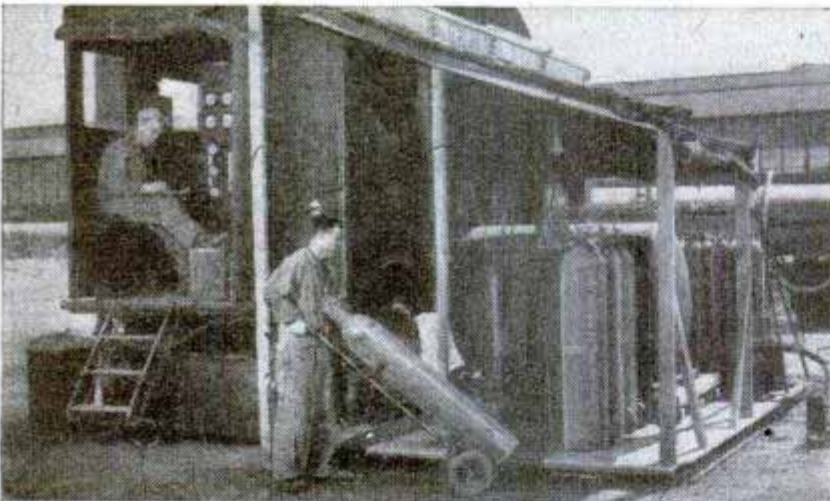
HARDENING





Air Reduction Sales Co. photo

**No modern hospital is complete without oxygen tents. The lifesaving gas is an essential aid in the treatment of many respiratory ailments**



Air Materiel Command photo

**↑ Army's mobile generator produces 1000 cubic feet of oxygen an hour**

**↓ Maze of pipe lines threading through welding section of industrial plant carries oxygen and other gases from central source to benches**



techniques is "powder scarfing." Stainless steels are made by adding other elements to ordinary steel. Formerly it was almost impossible to flame cut stainless steels because the flame would form oxides upon contact with the oxygen. The oxides spread like a film over the metal and prevented further cutting.

Today powdered flux is fed from a hopper into the oxygen stream. When the powder burns it melts and carries away the oxides as fast as they form, paving the way for ordinary flame cutting of stainless steel.

New machines cut patterns in thick or thin metal the same way a jigsaw cuts through a slab of plywood. By hooking several of the machines together, the same pattern can be cut from a good many pieces of metal at once.

Cutting metals isn't even half the story. Oxygen turns around and joins the metal.

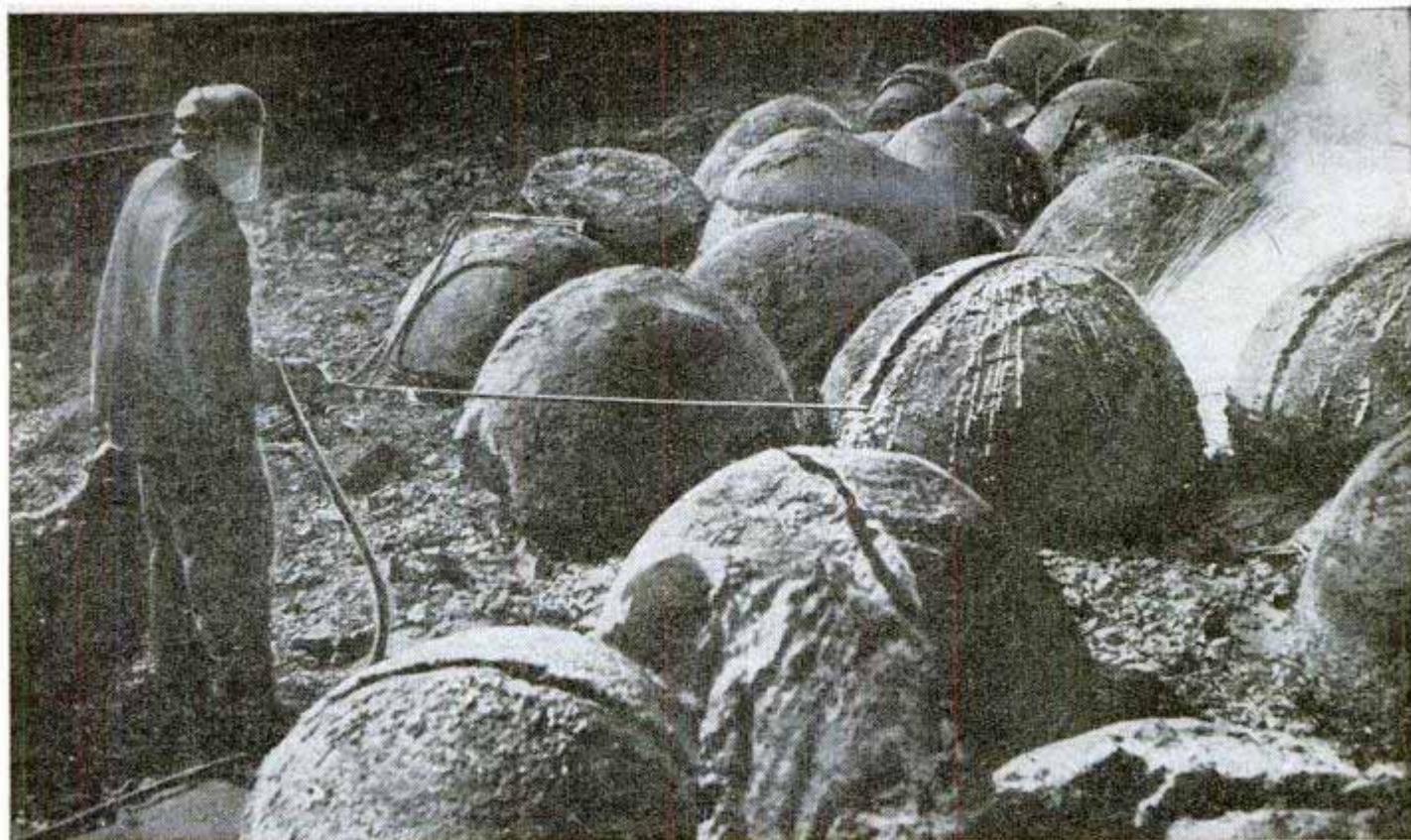
Oxyacetylene welding by hand is an old method. A newer process is "pressure welding." Heat and pressure are applied at the same time. Oxygen controls the heat so precisely that the metal becomes plastic but doesn't melt. Such welds can be heat-treated to become as strong as the base metal itself.

Still more recent machines permit high-speed automatic welding. All the operator does is set the controls.

Hard, wear-resistant surfaces can be put on localized sections of metal parts without changing the "core" metal. "Flame cleaning" is the quickest way to remove rust and scale from steel surfaces before painting. Still another new process is "flame spinning." Steel containers and tubes are spun and heat applied to close their ends.

But oxygen's uses aren't confined to plants and mills. The gas gives a lift to the health of thousands every year. Oxygen is an aid to recovery for many types of respiratory ailments and may be prescribed in treating serious





Linde Air Products photo

**Metal in slag-pot "skulls" was formerly wasted. Now the skulls are cut into small pieces with oxygen lances**

illnesses. The oxygen tent is standard equipment in every modern hospital.

The gas saves lives in the clouds as well as on the ground. During the war a "bail-out" cylinder was devised that fitted into the stratosphere flyer's suit. If he was forced to bail out several miles up it kept him alive until he could breathe normally.

A mobile oxygen generator also was developed that produced 1000 cubic feet of oxygen per hour. The generator proved oxygen can be manufactured inexpensively anywhere it's needed.

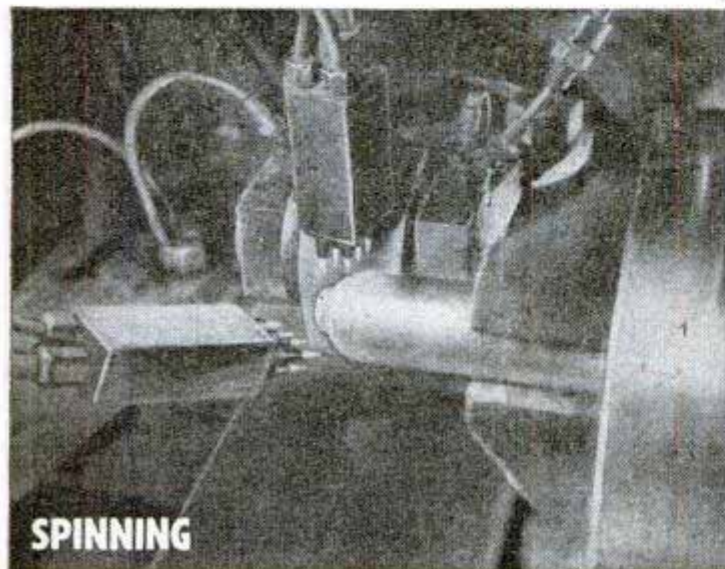
Experiments are under way that will find widespread new uses for the hard-working gas. A \$15,000,000 plant in Brownsville, Texas, will be finished next year. Every day it will mix together 40,000,000 cubic

feet of oxygen and 64,000,000 cubic feet of natural gas. Engineers are confident the daily result will be 5800 barrels of high-grade gasoline, 1200 barrels of Diesel oil and 150,000 pounds of chemicals. The manufacturing cost of the gasoline is expected to be 2½ cents less than the wholesale price of the gas you're now burning in your car.

Another proposal is to turn coal into heating and cooking gas. It's even been suggested that coal be burned underground to provide the cheapest possible gas. In either case oxygen would be required.

Ethyl alcohol burns with liquid oxygen to produce the tremendous power generated by all sorts of rocket motors.

The gas that became industry's man Friday is seeking and finding new fields.

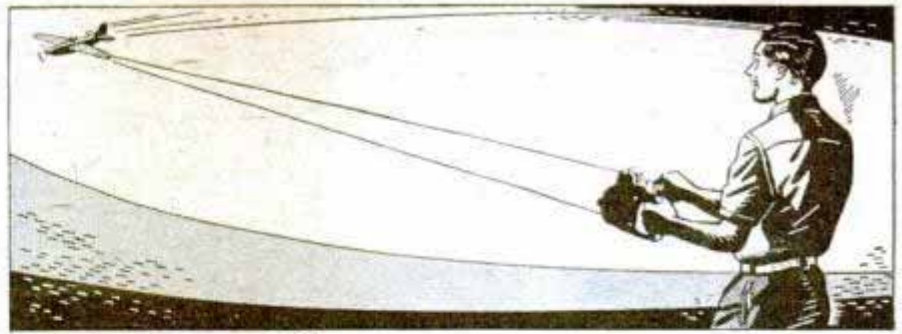


**SPINNING**



**FLAME CLEANING**





Electric impulse from battery inside reel trips a relay to control model airplane

## MODEL AIRPLANE REEL CONTROL

Gas engine powered model airplanes can be controlled in flight for dogfighting, formation flying, hedgehopping and other

stunts with a "B" battery powered reel control. The electric current is transmitted through the reel to a relay in the model plane. When a button on the control handle is pressed, the current trips the relay. This slows down or speeds up the engine for landings, take-offs or aerial maneuvers. The reel control and relay also can be used to operate flaps, retract or lower landing gear and to drop bombs or parachutes. Made of molded plastic, the reel has a pistol grip for one-hand operation.



## RICE-HULL BRICKS

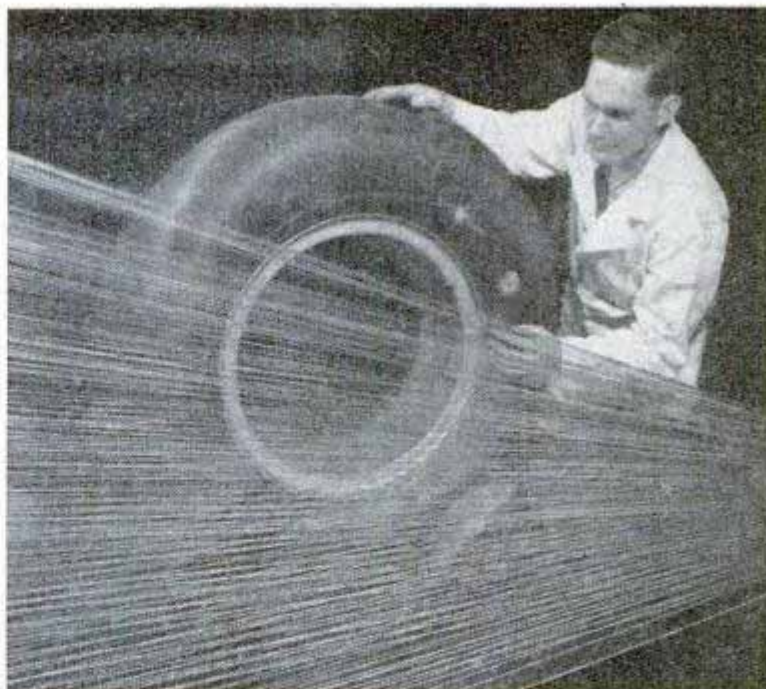
Waste rice hulls, which formerly created a disposal problem, are now being used for building materials. Building blocks made with the hulls look like concrete but weigh much less and will support heavy loads. Rice-hull fence posts may be nailed or

sawed like wood. Made from a mixture of cement, hulls and hull ash, the material is highly fire-resistant. It can be used also as an insulating material since the hull, one of nature's most perfect packages, is moisture and decayproof. Rice farmers have used small quantities of the hulls in the past to insulate icehouses.

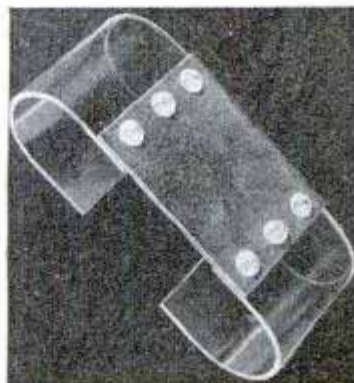


## Wire-Cord Tire Is Rugged

Steel wire replaces cotton and rayon cord in pneumatic tires said to be the most rugged ever built. Tests indicate they last up to 50 percent longer, run cooler under heavy loads at high speeds and recap more easily, and they have never been known to blow out. The cord consists of several strands of wire slightly larger than a human hair and is only .036 inch thick. Other than for the original ply preparation, the same machinery and building techniques are used for the new tires. Because of the wire cord's greater strength, fewer plies are required than with cotton or rayon. A test tire has already run 103,000 miles.



Firestone Tire and Rubber Co. photo



## Plexiglas Rivets

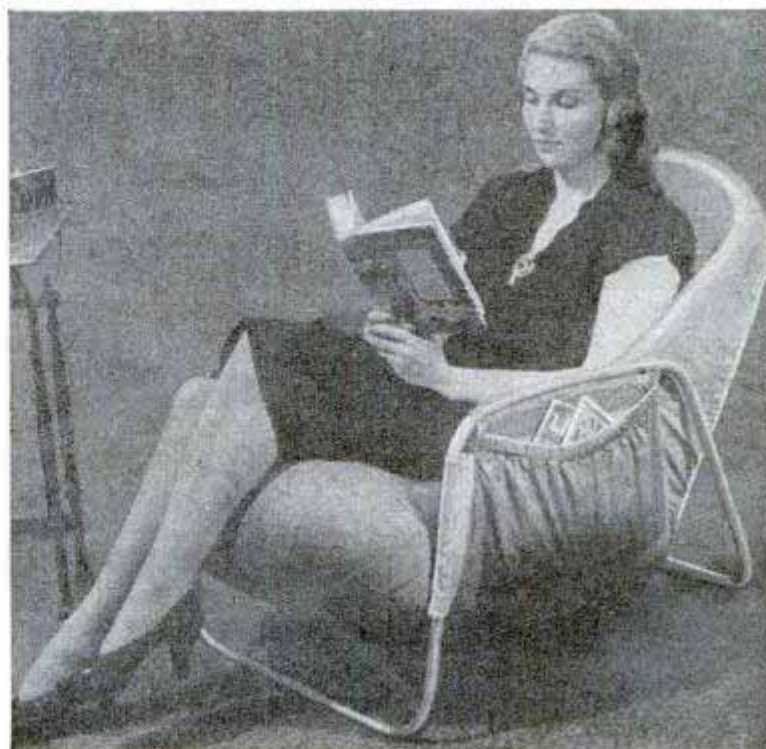
Plexiglas rivets have been developed for fastening light metals, leather, rubber, cardboard, upholstery and various plastics. They are inserted in fragile materials without shock by an air gun that heats and expands them. This also permits use of the rivets as "blind" fasteners. Exposed parts of the rivet can be fashioned into decorative effects by further heat application.



## Inflatable Lounge Chair

Air pumped into the seat and back of an inflatable easy chair forms comfortable cushions for complete relaxation. A tubular metal frame provides the support. When deflated, the chair can be packed into a zipper bag. The entire unit, manufactured by a Cardiff, Wales, firm, weighs only four pounds.

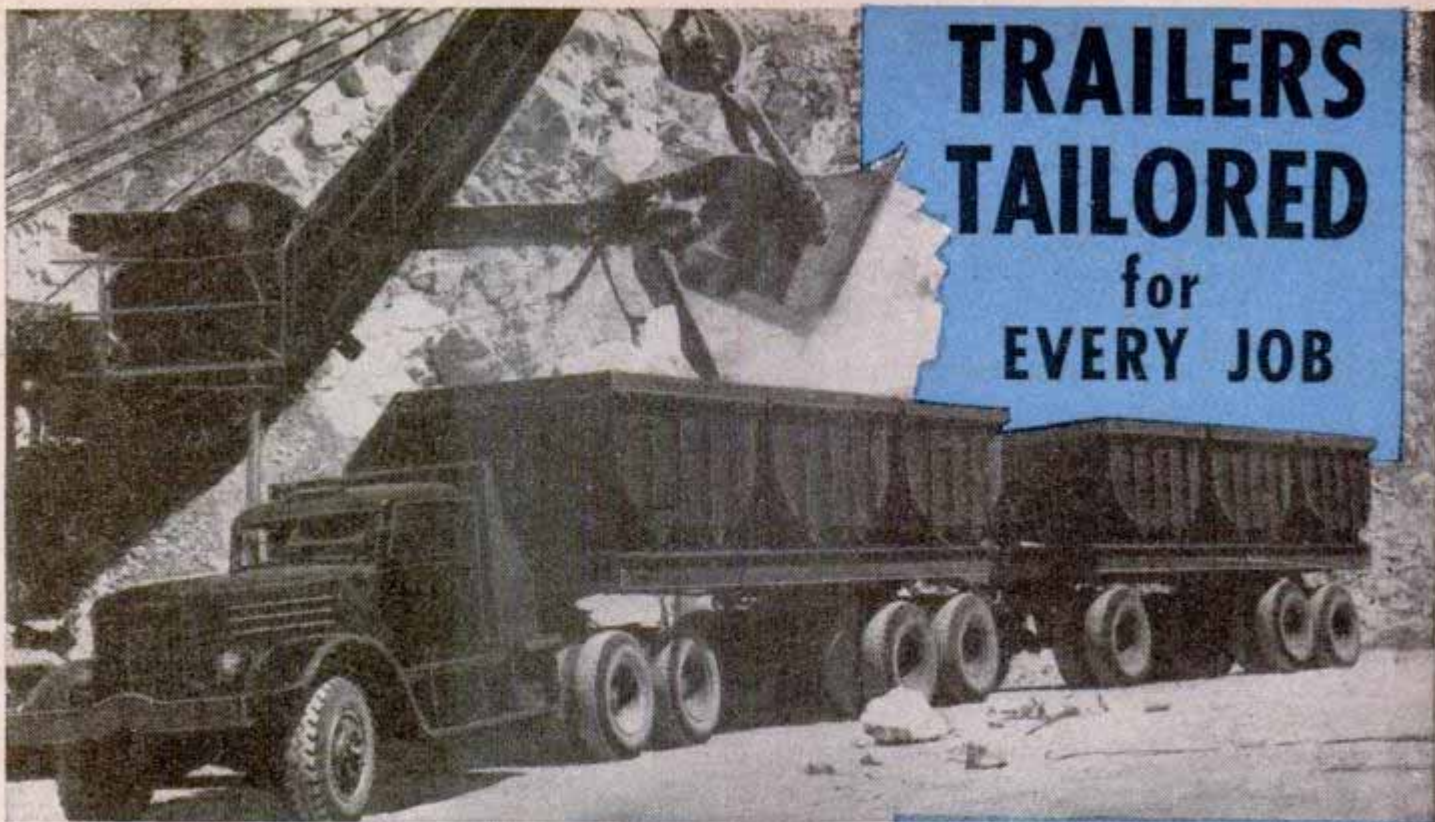
One mystery of plant growth has been solved—how chlorophyll in plants holds light energy from the sun long enough for it to be stored in plants as sugar, starch and other substances. Tests by University of California chemists demonstrated that chlorophyll has a phosphorescent quality which "captures" energy from the sun.



British Combine photo

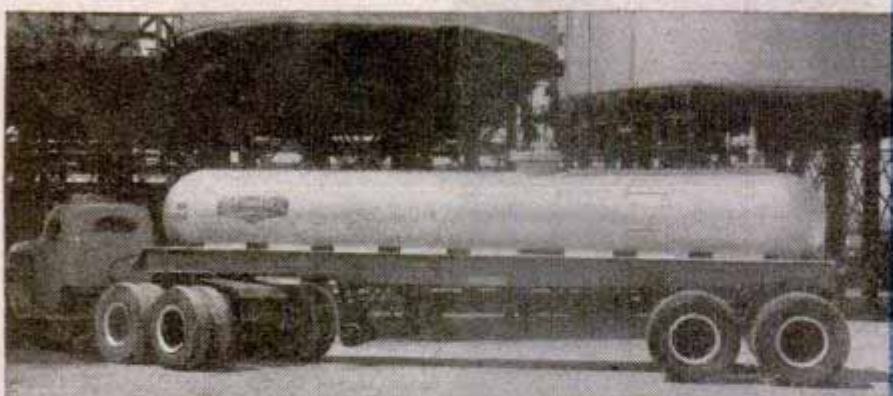


# TRAILERS TAILORED for EVERY JOB



Mountains of limestone in the sizzling Mojave desert are moved by trailer to cement factories operated by Southwestern Portland Cement Company

The driver pulls a lever and tons of stone are dumped automatically from a heavily laden trailer onto a railcar waiting to haul the material away



Twenty-ton rubber-lined acid tank is transported by 18-wheel trailer to 50 industrial plants in the Los Angeles area to supply their acid requirements

Portable-derrick drills and services oil wells. It weighs 30 tons, is 89 feet long, can be erected in two hours, compared with two days for steel towers

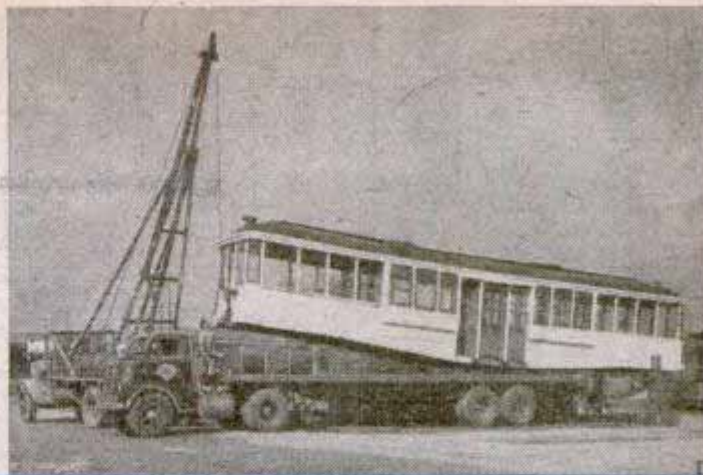
All photos courtesy Fruehauf Trailer Company







Butane gas for cooking and heating is transported by semitrailer to 2000 farm customers in the San Diego area. Center platform is for portable tanks



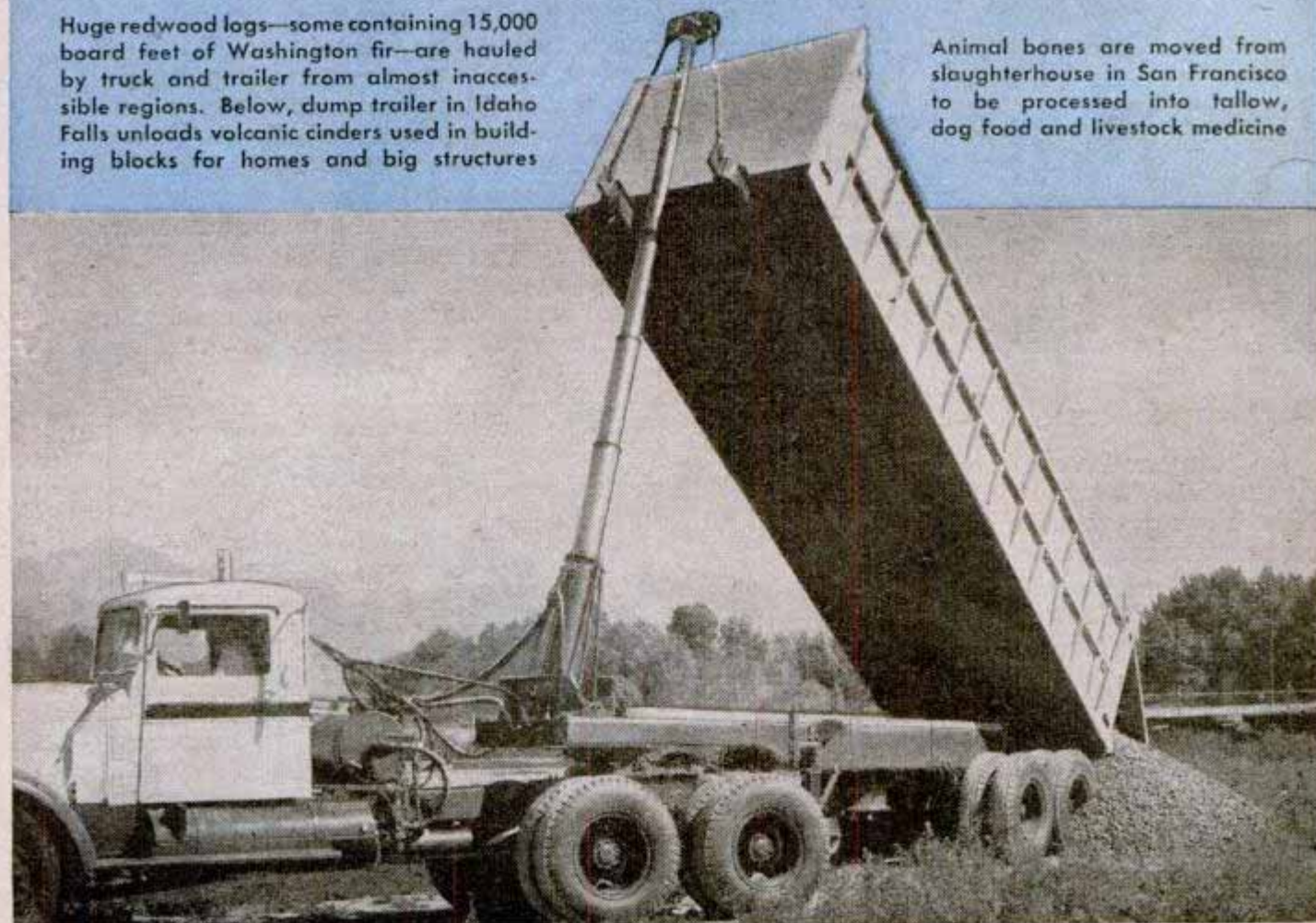
Old streetcars, moved by 35-foot trailers, are solving the housing shortage for some families. The trolleys also serve as hot dog stands and cabins



Huge redwood logs—some containing 15,000 board feet of Washington fir—are hauled by truck and trailer from almost inaccessible regions. Below, dump trailer in Idaho Falls unloads volcanic cinders used in building blocks for homes and big structures



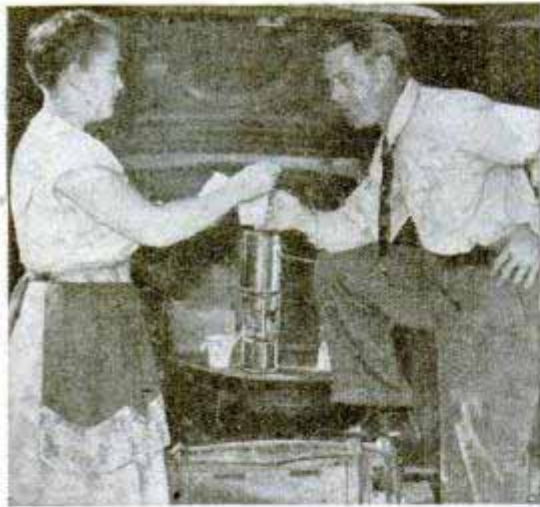
Animal bones are moved from slaughterhouse in San Francisco to be processed into tallow, dog food and livestock medicine







† Two cameras with all attachments are the photographer's tools. Right, he carries complete camping equipment and emergency rations in his car. Below, between shots he brews a cup of coffee on his stove



### 'Be Prepared' Is Cameraman's Motto

When Paul Calvert, staff photographer for a Los Angeles newspaper, receives an assignment, he's prepared to go anywhere in any kind of weather and stay for days to snap the pictures. His paraphernalia includes an aviation-type helmet for cold weather, knitted helmet, heavy gloves, overshoes, leather boots, flashlight, binoculars, pistol, complete change of clothing, Coleman stove, coffee, canned cream and sugar; condensed Army rations, mess kit, collapsible bucket, heavy overcoat with hood, sleeping bag, raincoat and hat, two knapsacks, a canteen with belt, tire chains—oh, yes, and two cameras.

### Drilling to Music

Soothing music calms nervous patients of Dr. Herbert Weinstock, a New York dentist. He has installed earphones, connected to the office radio, in the headrest on his dental chair. The patient can adjust the volume by a control on the armrest, bringing in music loud enough to drown the awesome whirr of the burrs and drills.

☐ First commercial passenger plane certified by CAA for take-off with gross weight above 100,000 pounds is the Lockheed Constellation.







## Electric Orchestra

Metal strings, aluminum tubes and amplifiers team up to produce strange new musical tones

By Vera and Henry Bradshaw

Photography by Ken Wright Studios

**E**LECTRICITY has invaded the field of music. Of course, the warm strains of the electric organ and the unusual tones of electric guitars are no longer wonders. But electronic music does not stop there! Awaiting public approval are electronic violins, cellos, violas and bass viols.

These instruments are bare skeletons of the originals. Void of a sound box, each instrument is merely a slender metal tube, over which rest the fingerboard and metal strings. The "big" bass viol has been diminished to a long aluminum tube barely four inches wide! A volume-control foot pedal and individual amplifiers complete these strange instruments.

Built around the idea that actual vibration of the strings, and not sound boxes, should be the source of tone, the instruments produce three-dimensional sounds. The secret of the inner workings of electronic instruments is this: metallic vibra-

tions of the strings, set up in a magnetic field, are transformed into electrical oscillations which are made audible by amplification through loud-speakers. The conversion is accomplished exactly as in the electric phonograph or radio receiver.

Although termed electronic, actually they are semielectronic and not mechanical in any way. They still require the skilled fingers of the artist to bring them to life. It is the amplification that electricity gives to hitherto unheard tones, the new power of holding notes longer than ever before, the unusual range and the fantastic blending of tone which bring about the amazing musical qualities of these instruments.

Not only can the electronic violinist get a tone as big and round as that of a wooden cello, or as thin as that of the violin, but he also brings to the audience eerie sounds, seemingly from far away. In electronic music, the listener hears the lowest notes.





**Adele Parrish, using a conventional wooden violin, blends her music with the tones Bert Lynn produces on his electronic violin. Below, Lynn uses a screwdriver to adjust his instrument. Note aluminum finger guide**



The frequencies of these low notes, ordinarily unheard, are amplified to the point of human ear detection.

The inventor of electronic instruments is Bert Lynn, who introduced his electronic "vibrolynn" to the public in 1935 in Earl Carroll's Vanities. The only instrument of its kind in the world, it mimics air raids, recites "Mary Had a Little Lamb," and produces remarkable tones and volume.

Lynn points out that these odd-looking electronic instruments can render either stringed music, a la Hawaii, or music which will blend symphonically with brass. Tone color can be controlled to such an extent that they sound like gut-stringed instruments at one moment, metal-stringed instruments at another, and something new and fantastic at the next.

The blending of extremely high and low tones can easily be accomplished with electronic instruments. The volume of high tones is cut down and that of low tones magnified. Lynn explains that with a wooden violin the high notes are loud and carrying. When the musician drops to the "G" string, though, the small sound box reduces this carrying quality. With the electronic violin, the player can increase the low-note



volume by automatically stepping up tone frequencies.

Let us imagine a bass viol 12 feet high with one player standing on a ladder to finger it while another bows it. This is the size a wooden bass would have to be, Lynn asserts, to create the depth, tone and color possible with an electronic viol. Also, an electronic bass player, with either a rubber hammer or a conventional bow, can achieve a kettledrum effect.

"With amplification," Lynn explains, "a deaf man can hear. With amplification a person with normal hearing can hear more notes. We get a better blend of sounds."

Tone volume is controlled by foot pedals. As the player bows or plucks, he also uses the volume-control foot pedal, pressing it down to create depth and a big, round tone, adding intensity when he hits the "G" string, releasing it as he plays up the scale because higher notes are heard anyway.

"The wooden-instrument violinist," Lynn says, "wants to play a soft note. It is very difficult. The scratch of rosin and the scratch of the bow being pulled over the strings can be heard. With an electronic violin, a mere reduction of pressure on the foot pedal is all that is necessary."

To eliminate the scratching, the wooden violin must be muted (which, in the midst of an orchestration, takes time), whereas an electronic instrument can be shifted from mute to open tone instantly.

The leader of an electronic orchestra faces a radiolike box equipped with knobs or dials. By turning a knob, he can change the tone color of his string section. He can bring out the high, sweet tones of the violins or he can make the string sections comparable to the brass so the listener can hear both.

Lynn believes that nothing will ever replace the beautiful, mellow tone of the wooden violin for the concert stage. But he thinks electronic instruments will replace wooden instruments for orchestra use, and possibly symphony, with the exception of the soloist.

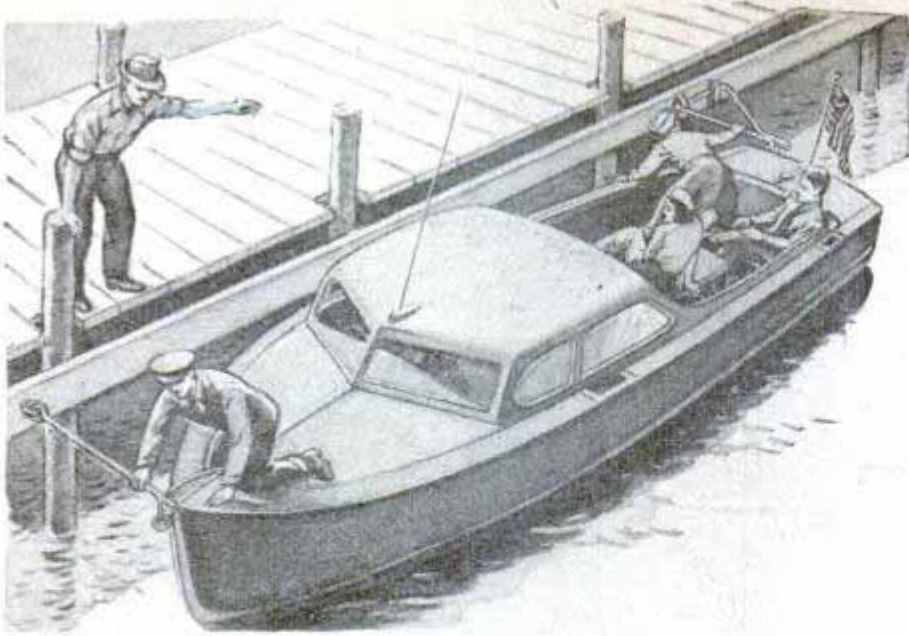
He also predicts that the electronic or semielectronic principle will be applied to the brass section of an orchestra by means of an automatic vibrato, similar to that in an electric organ.



Lynn, the inventor of electronic instruments, plays his favorite, the vibrolynn, which mimics air raids and recites "Mary Had a Little Lamb." Below, foot control regulates volume by stepping up tone frequencies

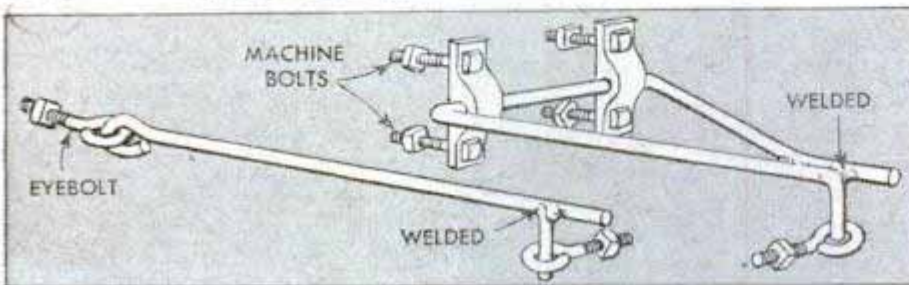






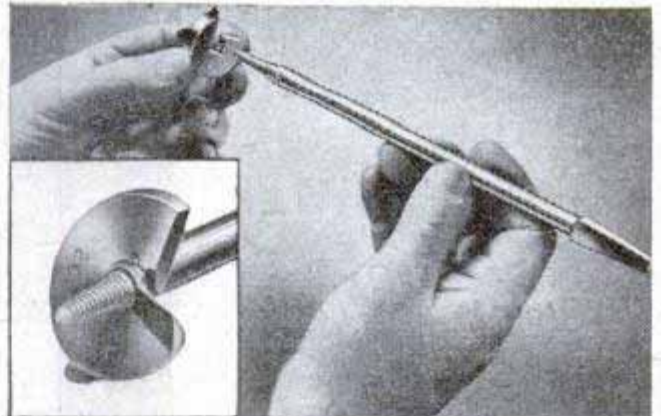
## Nonrub Boat Moor

Small boats can't rub against the pier when moored with a double fastening system that holds them several inches from the edge of the pier. Two eyebolts are installed in the boat, one on the stem and the other on the stern. A bracket working on a swivel is bolted to the pier to hold the prow of the boat and a triangular bracket that turns in a sleeve holds the stern. Each bracket has a pin that fits into the corresponding eyebolt to lock the boat in place. Wave action lifts the boat up and down without pushing it against the pier and damaging it. The brackets are made of  $\frac{7}{16}$ -inch cadmium-plated steel rods with welded joints.



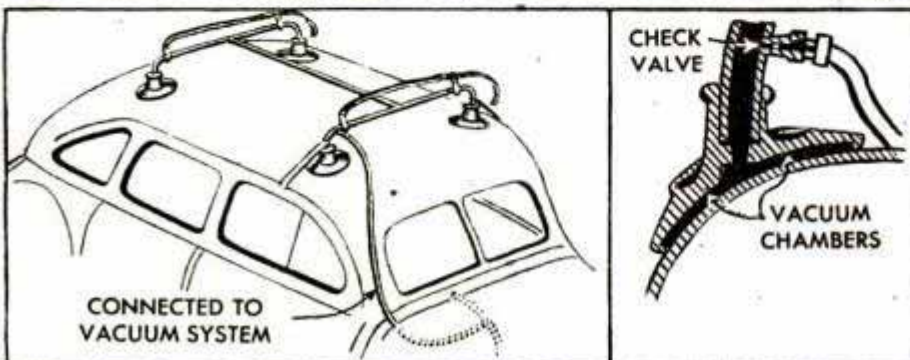
## Bit Has Changeable Boring Heads

Holes of different sizes can be bored with a single auger bit by changing the boring head instead of the entire bit. The lead screw is part of the bit itself, and the boring heads, available in sizes from  $\frac{5}{8}$  inch to  $1\frac{1}{4}$  inches, are fastened with a setscrew.



## Car's Vacuum Secures Boat Rack to Top

Boats or luggage can be hauled on top of an automobile with a vacuum-cup carrier. Unlike other suction cups, these are held tightly in place by a vacuum created by the car engine. The carrier is said to have a holding power of 640 pounds and cannot be pulled loose by rough roads or bumps.

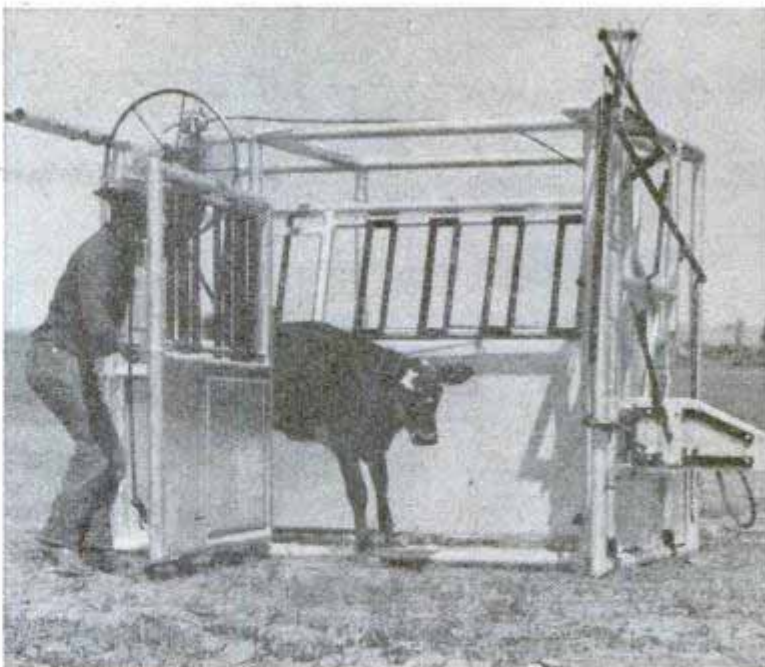


Ⓞ Fifty-seven 130-gallon water tanks were carried instead of sandbags or pig iron in cargo test flights of the 92-ton Lockheed Constitution.



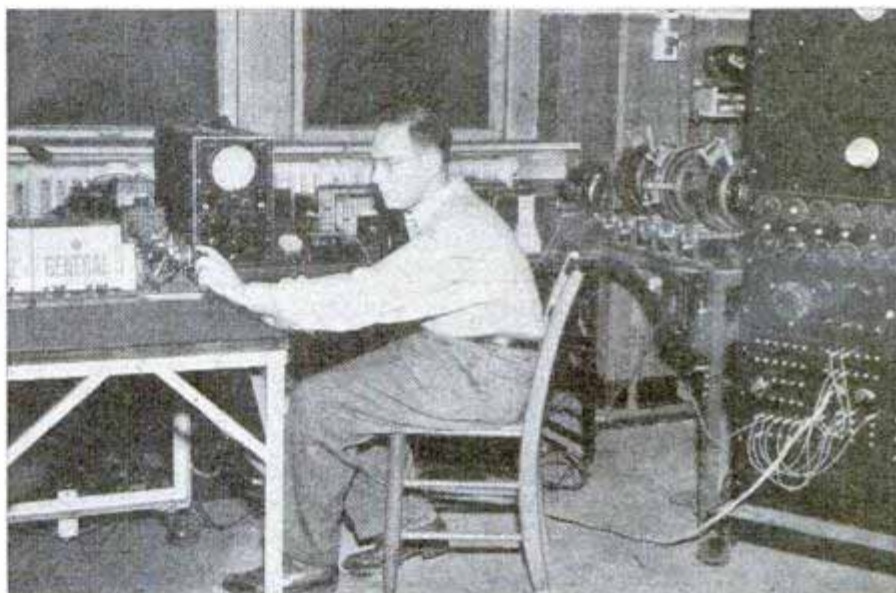
## Adjustable Dehorning Chute

Animals are protected from injury during branding or dehorning by an adjustable dehorning chute. The animal's head is held stationary by a stanchion and one side of the chute is moved in to prevent the animal from jumping around and injuring itself. After the branding or dehorning, a side door is opened to release the prisoner. The chute can be operated by one man. It is made of steel and is portable.



## Electrical Flood Gauge

Flood movements of rivers can be calculated a thousand times faster with an electrical computer built at Ohio State University. In the test model, electrical circuit elements represent the friction of the river bed and the channel's water storage capacity. After setting up "flood conditions" by introducing current, the flood crest's movement down the "channel" is observed and measured directly on an oscilloscope. Calculations are generally complicated by the rapidly changing effects of rainfall, tributaries, dams, reservoirs and channel variations.



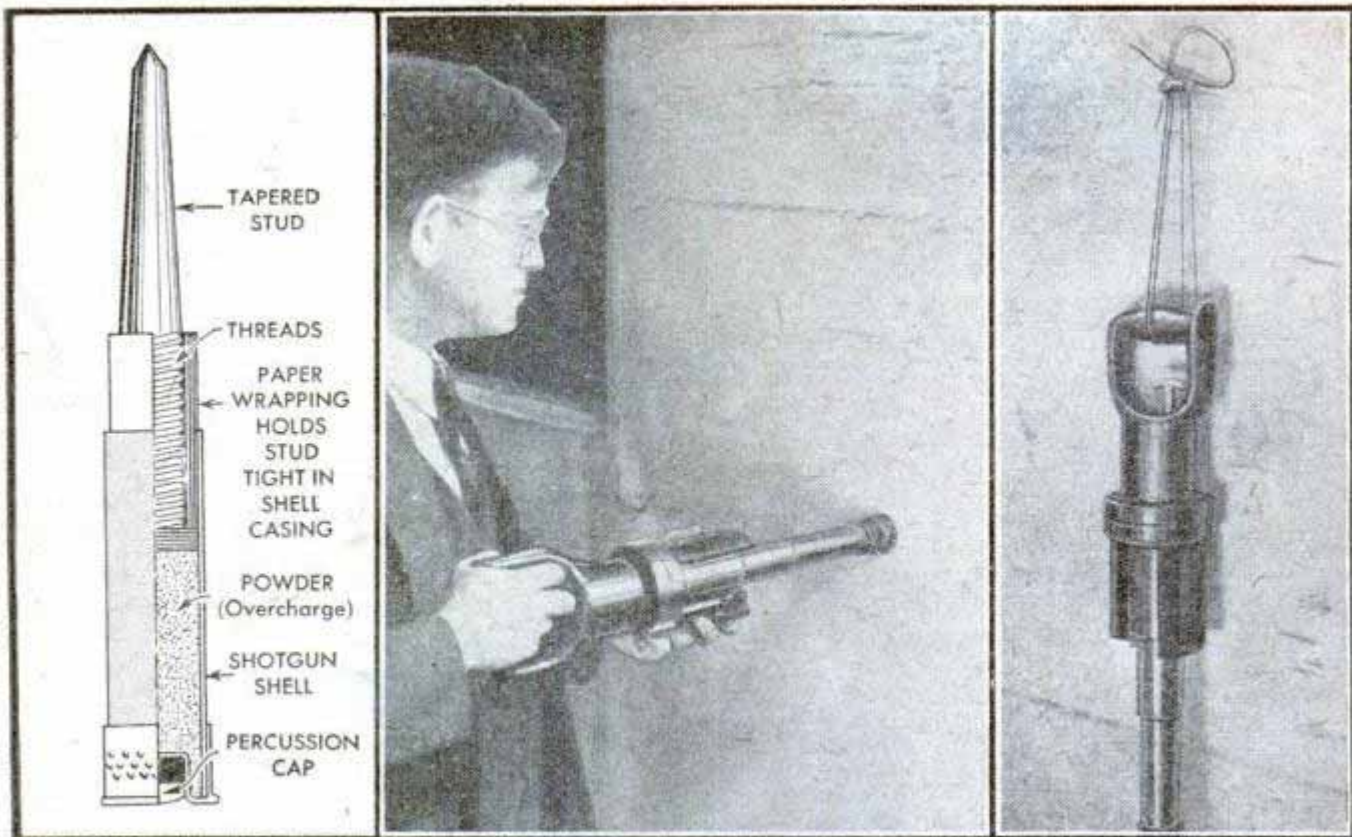
## Motorcycle Bus

Improvised from a motorcycle chassis, an open-air three-wheel bus hauls passengers in Rome, Italy. With gasoline strictly rationed, the more-miles-per-gallon economy of the two-cylinder motorcycle engine provides public transportation at low cost.

## Edible Orchids

Orchids that can be eaten may be grown in American gardens of the future. The edible orchids are among 11,000 plants and ferns brought back to the New York Botanical Garden by an expedition into Nyasaland in East Africa. Unlike the ornamental species that are found on trees, they grow in the ground like ordinary plants. The natives dig up their tubers and eat them with cornmeal.





## CONCRETE BOLT GUN

Bolts or studs can be placed permanently in concrete, brick or other rocklike material by firing them with a new high-velocity bolt gun. Driven by an explosive charge similar to a .410-gauge shotgun shell, the metal bolt is forced into the concrete and becomes securely embedded. The inventors claim that from one to two tons of force are needed to extract the bolt, several times the pull that will remove bolts



that are cast into the material or planted by expansion devices. Secret of the gun is a design that allows air to escape from the barrel ahead of the projectile plus a gas escape that prevents recoil. This permits placement of the gun in direct contact with the material to be entered and prevents fracturing of the surface. An adjustable footplate at the end of the barrel allows placing bolts at almost any desired angle. A typical projectile has a heat-treated point, is 3 inches long, with the outer inch being threaded and of  $\frac{5}{16}$ -inch diameter. The projectile embeds itself 2 inches deep in concrete, leaving the threaded portion projecting and ready for use.

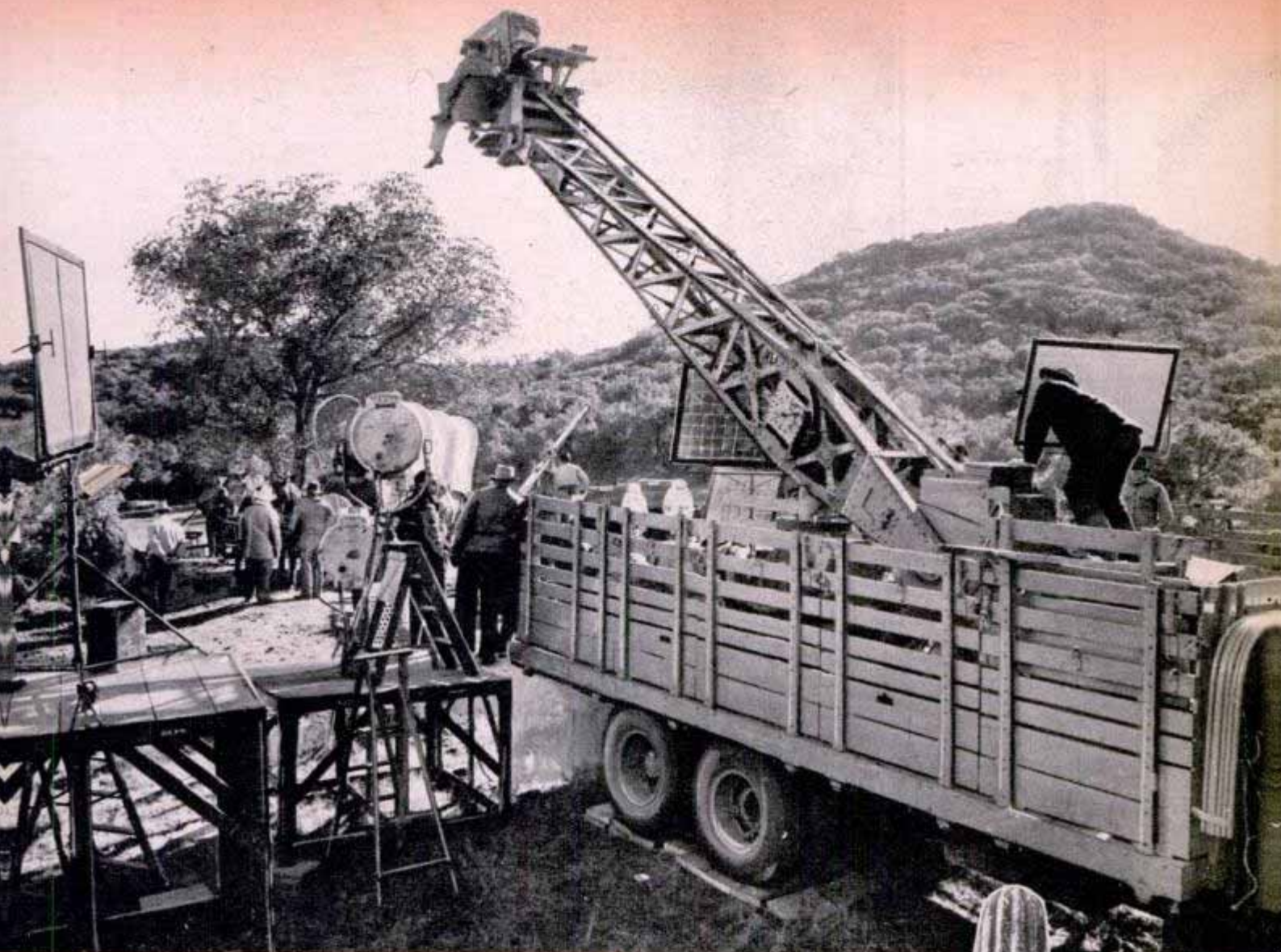
## Tripod Head for Panning and Tilting

Home movie makers can pan or tilt their "takes" with a new tripod head that fits all standard tripods and all still or movie cameras. The attachment permits panning without tilting, or tilting without panning. A knob on the handle locks or releases the panning action, while the handle itself regulates the tilting action. Ball-bearing construction permits 360-degree panning and the camera can be tilted in a 180-degree arc. A plug in the attachment screws into the base of the camera.

☞ When the Army sought experienced aid in devising body armor to protect airmen against flak, they acted on a Scotland Yard tip and contacted a British firm that had made bulletproof vests for U. S. gangsters.



# TRICKS OF THE GREEN MEN



Under a built-to-order tree, movie actors perform before a studio camera. Below, nonsticking soft grass "spikes" are inserted in plaster cactus plant for a scene

By Thomas E. Stimson, Jr.

**O**UT on location Nick Kalten was studying the tree under which a movie sequence was to be filmed the next day.

"The director just decided that he wants an apple tree in bloom here instead of this oak," he told his crew. "The tree is the wrong shape for an apple, so prune it back and fill in with eucalyptus branches to give it the right appearance. We'll use sumac leaves for foliage since we can't get apple leaves this time of year. I'll pick up a couple thousand artificial blossoms to wire on."

Not even an arboriculturist would have guessed on seeing the finished movie that the apple tree had been put together on the spot. Even the oak's rough bark had been smoothed with plaster and spray-painted to conform to its new species.





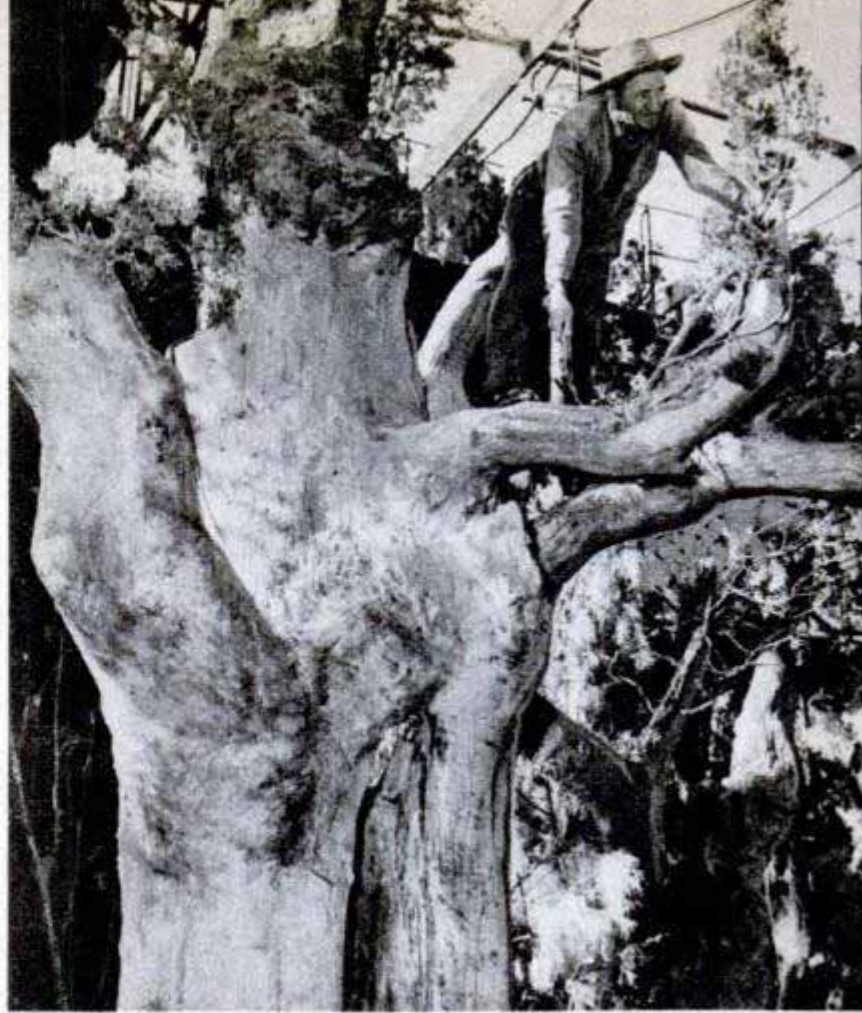
For picture purposes the tree was perfect.

Nature can't keep up with Hollywood studios. Tropical jungles, Iowa farms at harvest time and New England winter scenery may be needed on adjacent sound stages or on the lot during the same week. Each background must be authentic to fronded palms in jungles and stalks of wheat on farms.

Studio "green men" use natural trees and shrubs whenever they can. They use ingenious substitutes when the needed greenery is out of season or unavailable. Once Nick Kalten, head of the greenery department at Twentieth Century-Fox, was told that he had eight days to produce a Costa Rica coffee field that would stand close scrutiny on the screen. He filled the order although there were no coffee plants in Hollywood. To imitate coffee berries he bought thousands of half-grown dates from a desert date orchardist, painted them red and attached them to the stems of a native California bush that has pointed leaves similar to those of the coffee plant. Thinned out, trimmed to shape, and planted in dirt spread over a sound-stage floor, the composite bushes couldn't be distinguished from the real article.

On occasion Kalten has reproduced a cotton plantation by using black-eyed Susan plants when cotton plants were unobtainable, tying tufts of cotton on paper pods that were wired to the stems.

Manufacturing trees is a standard job with the studio green men. At Twentieth Century-Fox, Kalten maintains a "skeleton park" of basic trees that have been used in



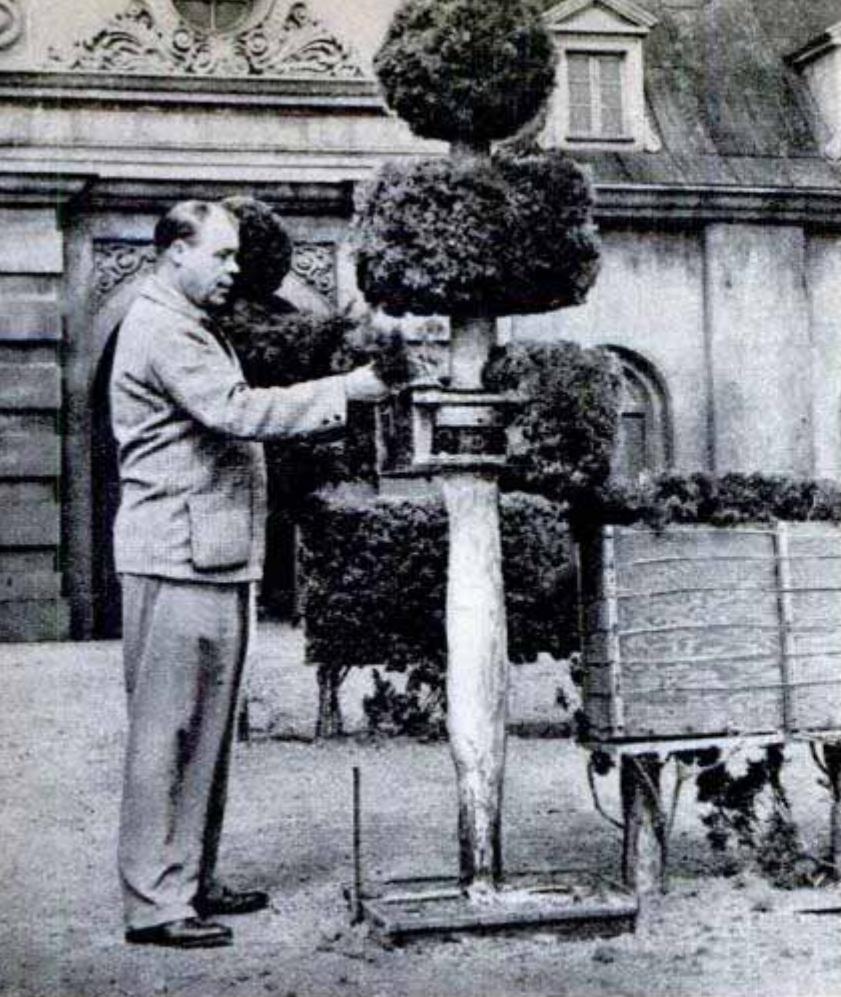
Foliage is added to natural-and-plaster tree by movie "green man"

scores of pictures. Each skeleton consists of the trunk and major branches of a particular species, chosen for size and shape. Mounted on a wheeled platform, each skeleton is decked out with additional branches and foliage when it is needed in front of a camera. The bark may be natural or may be plaster casts of bark from similar trees. Plaster is used to smooth over the joints where new branches are nailed to the stub limbs of the skeleton. "Dressing" the tree for a picture includes concealing its wooden base with grass or weeds. If portions of the roots are to appear

Palm trunks on portable stands and artificial flowers and leaves are made to order and stockpiled for scenes







Formal hedges are of greenery added to wood and plaster trunks

they will be built from plaster and painted.

Kalten keeps hundreds of other stock trees on hand. Sycamore, mountain oak and live oak are good base trees for all except tropical backgrounds. Magnolia, pepper, weeping eucalyptus and palm trees are used when a tropical or semitropical background is specified. For close-ups, authentic foliage is used; for middle-distance shots, foliage of sycamore, elm, oak or eucalyptus substitutes well for many species.

When one of his natural tree trunks won't do for a certain scene Kalten builds his own tree, often of barrels or kegs. Mi-

nus their tops and bottoms, the barrels are strung on a tall pole and nailed to it. Then sheets of artificial bark are stretched around the barrels and nailed in place. The bark consists of thin plaster casts attached to burlap backing. Wrapping the burlap around the barrels cracks the plaster, of course, but the cracks occur along the natural crack-lines of the bark and so are not visible. To this artificial trunk Kalten adds plaster roots, natural limbs and foliage.

Towering palms of several varieties are easily fabricated by wrapping plaster casts of palm bark around a tall eucalyptus pole from which all the branches are removed, or around built-up skeletons of two by four timbers. Old blueprint paper is used to represent shaggy bits of bark partly detached from the trunk. The fronded tops of the palm trees are created by tying to an iron framework at the top of the trunk a number of real palm branches.

One greenery assignment called for a giant redwood tree inside a sound stage, realistic enough for a

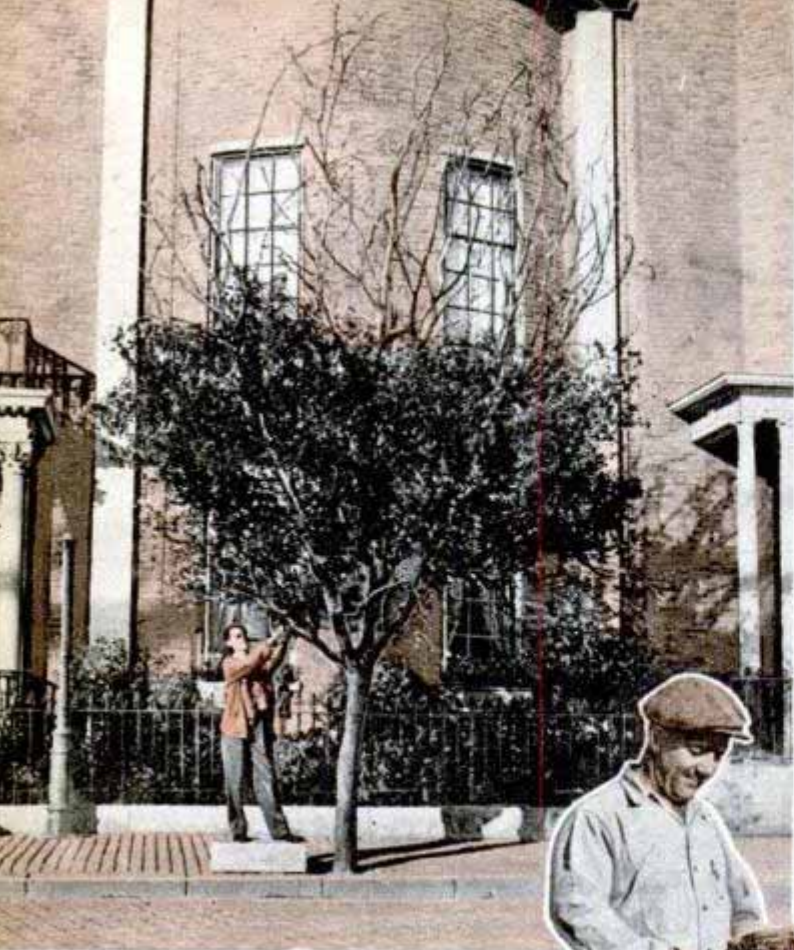
couple of lumberjacks to cut with axes. An actual redwood, of course, towers hundreds of feet in the air. Even a 30-foot section of such a tree, 15 feet in diameter, would cost a prohibitive amount for transportation alone.

Kalten knew that only one side of the tree would appear and that only about 15 feet of its height would be visible. He obtained enough redwood bark to build up that much of the trunk. At the point where the lumberjacks were to cut into the tree he built in a solid backing of timber, closely joined and with vertical grain. That was

Branches are nailed to artificial tree after the trunk and limbs are moved by hoist truck to the film setting







Only the lower half of this tree has foliage since camera will take in only that portion



Gnarled manzanita limbs serve as dwarfed trees for film with Siam setting. Bases and wire platforms will be concealed by leaves. Below, bleak bushes covered with artificial snow are "planted" for winter scene



all that was needed and movie audiences saw what appeared to be an actual tree-cutting operation in the forest.

Gnarled manzanita trunks and branches are ideal bases upon which to build up weird trees and shrubs such as are found in some foreign areas. For one mystery picture Kalten was called upon to create a "beautiful and sinister" plant unlike any living shrub. He got just the effect the director wanted by combining large artificial oleander flowers with natural oleander leaves that were attached to the twisted branches of a manzanita.

There is a four-acre nursery of live trees and shrubs on the Twentieth Century-Fox lot, together with hothouses in which tropical plants are grown for close-up scenes. When fresh vegetables are needed in a picture or when growing vegetable plants are required, they usually are bought from truck gardeners in the Hollywood area and transplanted just before the scene is filmed.

Grass is always in great demand and some Hollywood nurseries specialize in growing acres of different varieties for use by the studios. Cut as sod several inches deep, the grass is laid on the wooden floor of a sound stage to serve as lawns and parkings. Even under the heat of the lamps it stands up for several days. Live grass is augmented with thousands of mats of artificial grass when large areas are required. The artificial grass consists of raffia sewn on burlap and treated with glycerin and calcium chloride. These chemicals keep the grass pliable and make it fire-

proof. Similar treatment is given to most other artificial greenery used inside the sound stages.

Always on hand are hundreds of feet of stock hedges of various shapes and from one to 18 feet tall. Each hedge comes in units three or four feet long for easy handling. The units are mounted on flat boards that are buried under the dirt. A few men can "transplant" an imposing looking hedge in a few minutes so that it appears to have been growing in its location for years. Natural stalks of bushes are used in building a hedge, the upper portions of which consist of wood and wire framework into which juniper or other evergreen foliage is placed, trimmed to shape, and spray-painted.

Another handy device that Kalten uses

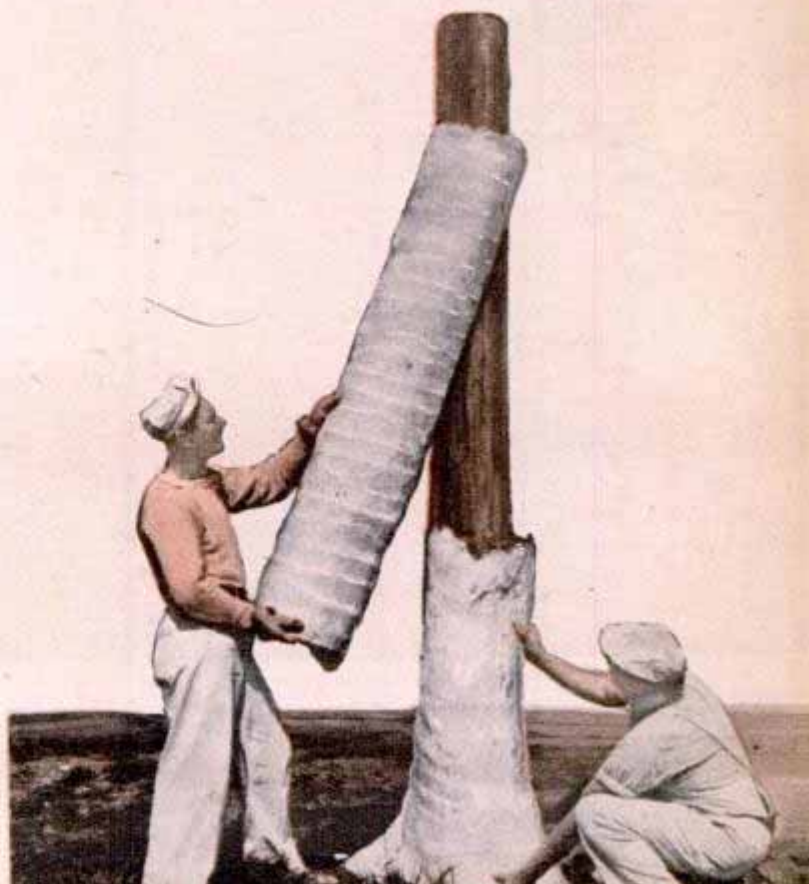




is the "traveling forest." This consists of a low trailer on which a scaffolding 25 feet long and 16 feet high is mounted. Decked with foliage, it is wheeled into the background of an out-of-doors scene. To the camera it looks like a distant clump of trees or brush. It is used chiefly to conceal buildings in the distance or skylines that would not be in keeping with the picture being filmed. If a story of early Mexico is being filmed, with tall buildings of Beverly Hills visible in the distance, a few units of traveling forest are spotted in the background to conceal the office buildings.

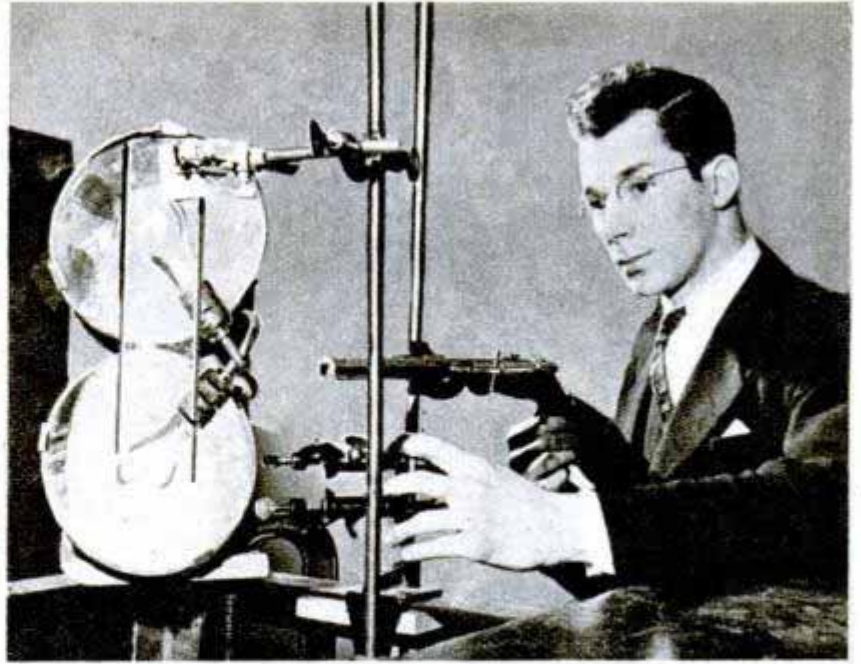
Kalten estimates that he has turned out almost half a million trees in the last 30 years in addition to uncounted acres of artificial bushes, shrubs and plants. Making a tree, he decided long ago, is a lot easier than trying to imitate one. That was a job that he had only once, early in the days of Hollywood, when a director decided that a flooded river scene needed a small tree, partly submerged, in the middle distance to indicate the height of the flood. There was no way to anchor a tree in the water so Kalten stood there, holding the branches and foliage of a tree in front of him, while the actors ran through the scene.

Exotic tree is created by attaching clumps of wild growth to limbs fashioned from wood and coated with plaster. Below, abandoned telephone pole is used to test the appearance effect of plaster "palm bark"





## HIGH-SPEED CAMERA TO SNAP 800,000 PICTURES A SECOND

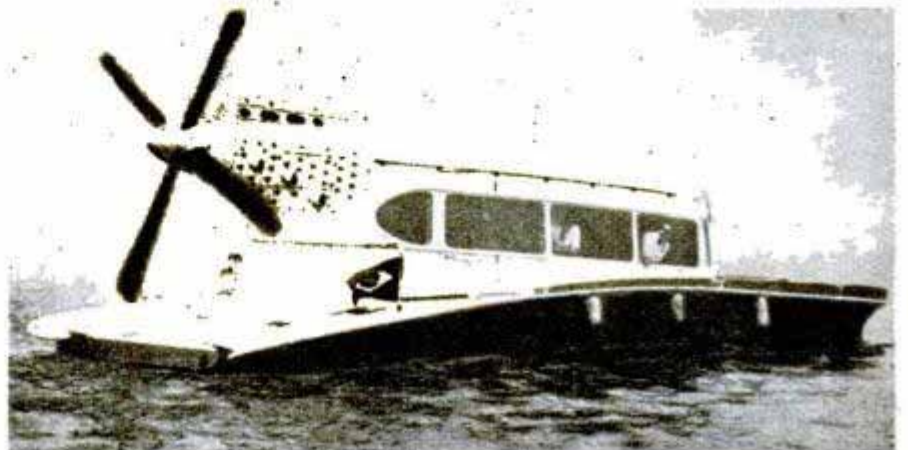


Top, a battery of small lenses snaps pictures. Top right, rifle is aimed preparatory to photographing bullet. Model above takes 70,000 pictures a second

Sights too quick for the human eye will be recorded by an ultra-high-speed camera nearing completion in Canada. The camera is designed to shoot 800,000 exposures a second. An experimental model built by physicist Kenneth Baird will take 70,000 clear pictures a second and modifications are expected to make the new camera the fastest one in existence. Photographs of the split-second impact of a bullet will last two minutes when shown at the normal screening rate of a 16-mm. projector. Film for the camera is wound on a revolving drum. A spinning metal disk with slots placed around the circumference acts as a shutter. Multiple lenses, producing images in rows of five across the film, take pictures five times as fast as a single lens with the film moving at the same speed. Baird expects to replace the five lens series with as many as 40 smaller lenses to boost the speed even further. To minimize blurring, a set of revolving prisms reflects the images to the film. Ordinary flash bulbs provide light for the pictures. The camera will be used to study the reaction of explosives and electricity and to solve high-speed problems of engineering.

### Propeller-Driven Boat

In preliminary trials at Rio de Janeiro, Brazil, a boat driven by an airplane propeller has attained speeds of 40 miles per hour. The craft is designed for use in coastal waters. Cabin, engine and propeller are mounted in one unit on the hull.





# The CRAFTSMAN

★ Botching a piece of critical work in the shop is not always due to a lack of skill—often it's simply the end result of poor lighting. Light where you want it at the bench or over a machine usually calls for portable lighting units and that's just what the article on page 213 details and describes. You'll be especially taken with the spotlight mounted on a boom. It puts light right at your fingertips where it's needed most.

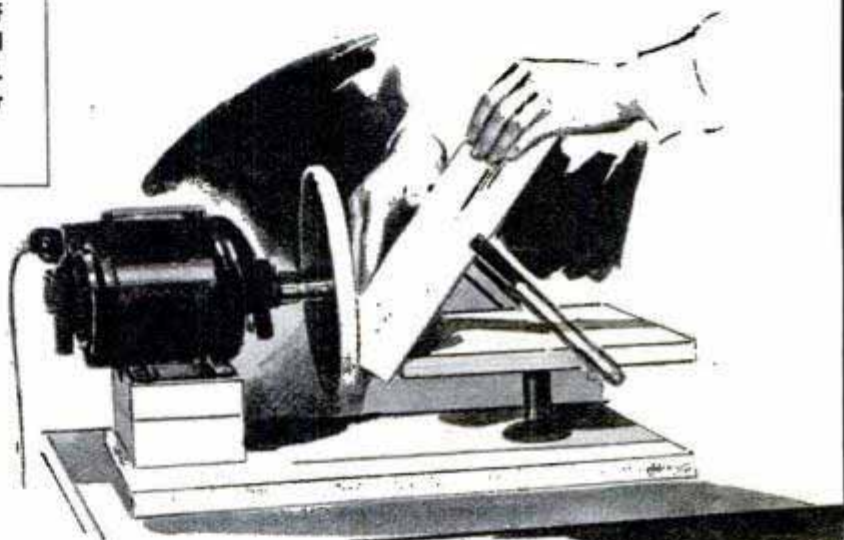
★ Not only is a disk sander simple to put together but it does work almost impossible to produce in like quality and finish by hand methods. After you go over the story on page 209 you'll want one in your shop.

★ A long auto trip and a few-months-old baby—that combination can add up to a lot of discomfort for everybody unless you plan ahead and build the auto baby crib described on page 183.

★ You'll probably wish you had had it yourself when you were a youngster—that merry-go-round for your own back yard described on page 185. Its aim in life is to keep the children happy in their own yard for hours at a time.



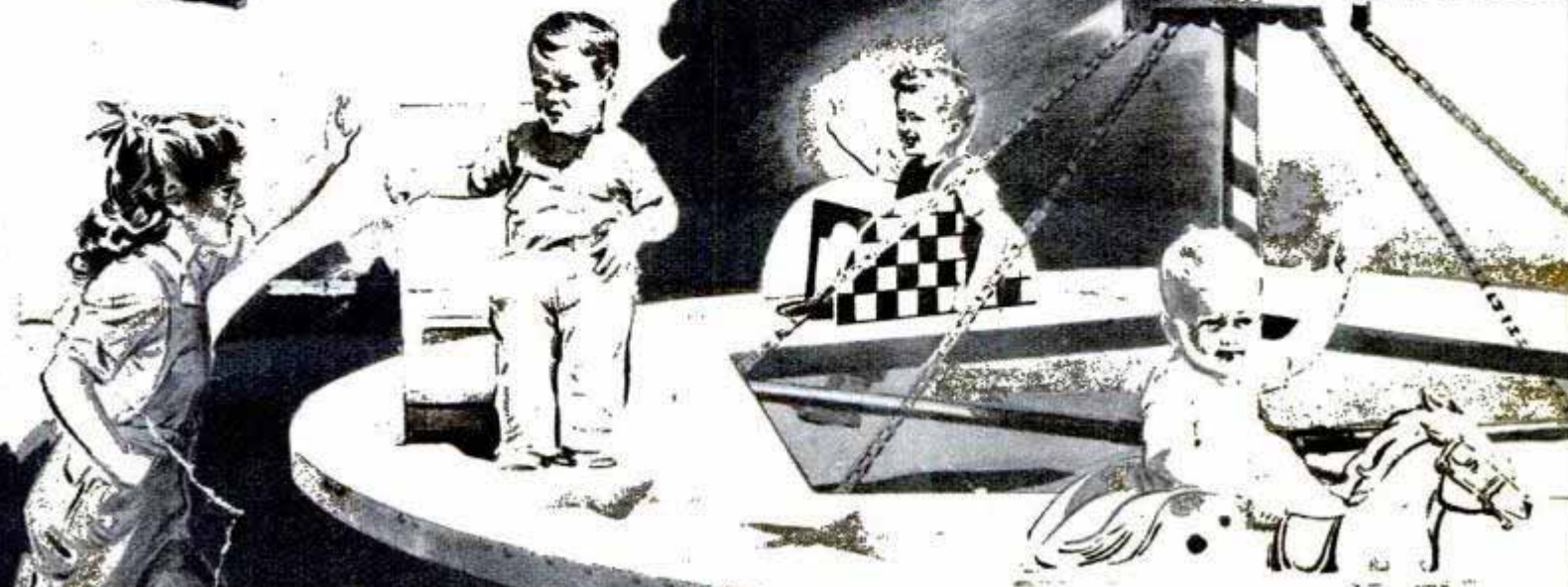
PORTABLE SHOP LIGHTS



DISK SANDER



AUTO BABY BED



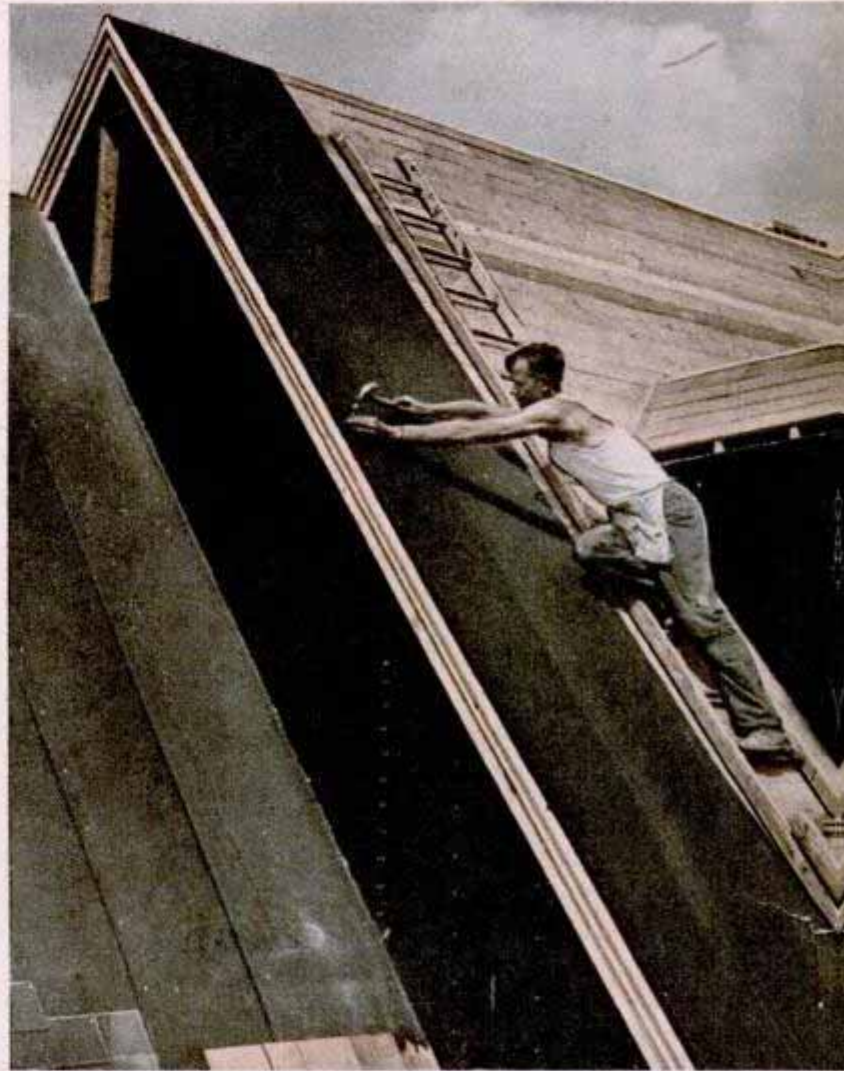
MERRY-GO-ROUND



THE POPULAR MECHANICS

*Build-It-Yourself*

**HOUSE**



After laying the roof boards and sawing off the ends straight, the cornice is applied. The edge of this is flush with the roof boards as shown in the photo

Below, the house is completed except for some paint touch-up here and there. Note simple yet effective arrangement of both high and low-growing evergreens

Although not absolutely necessary, a layer of roofing felt under the shingles will be well worth-while. Use the heavy black type of felt and spot-tack it lightly

The photo below shows how the wide siding is laid over the insulating-type sheathing to make a long-lasting, weatherproof wall that is neat and sturdy





In this, the concluding installment, we tell you briefly how Jacques Brownson laid the roof, put on the siding, installed the doors and windows and completed the interior of his home, ready for occupancy

### PART III

By James R. Ward

**I**N LAST MONTH'S installment of *The House That Jacques Built*, we went through construction up to where the roofing material was ready to be laid. This can be of your own choice, but should be of high quality, since no house is better than its roof. Although not absolutely necessary, the roof boards should first be covered with heavy black roofing felt, lightly tacked into place. This provides a smooth surface for the shingles.

Since it is desirable to close in the house as soon as possible, especially if you are not working full time on it, put in the windows and exterior doors next and then apply the siding. Use a carpenter's level to plumb the window and door frames. Give all exposed wood a priming coat of paint as soon as it is put in place. This protects it from moisture and helps prevent warping. In fact, you should give the exterior of the house a couple of coats of paint as soon as it is completed.

If you have been a little pressed for time to work on the house, you can take it easier from here on as the house cannot be damaged by the weather. The first job inside is to put up the rest of the partitions and install the plumbing and electrical wiring. If you are building the house in a town or city, check with the officials as to whether or not plumbing and wiring have to be done by a licensed workman. If you are in a

Here the boys are framing the open ends of the breezeway; 2 by 6s are used for this purpose to make a framework that will withstand high winds



When setting in the window frames, make sure that they are plumb. Check them with a carpenter's level



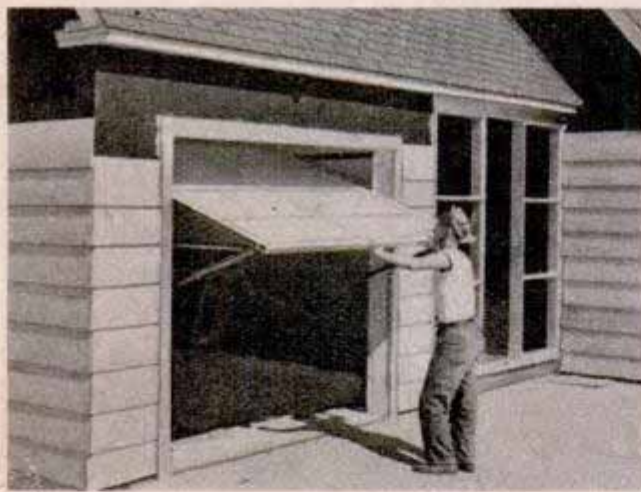
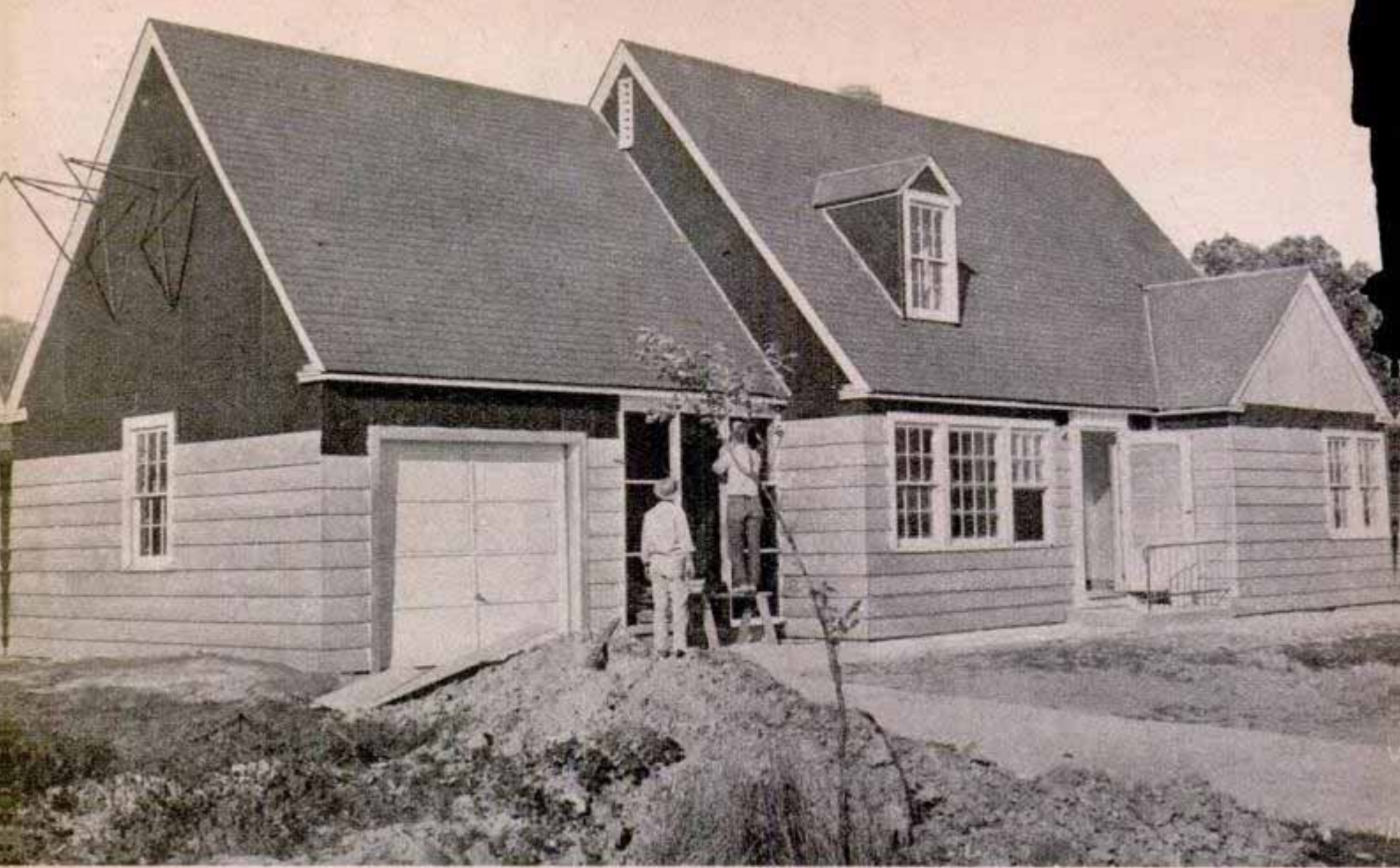
If you pour the sidewalk at the side of the house before applying the siding, the latter will be clean



Framing the projecting portion of the dining nook comes next. All the window and door frames, as well as other framing, are done before applying the siding







After installing the overhead type of garage door, it is tested to make sure that it closes correctly

rural area, contact your local utility company as to their requirements for wiring.

After the wiring and plumbing have been put in, it is a good idea to complete the concrete work, such as the basement floor, stoops, walks and driveway, and also the garage floor. You should put a drain in the garage floor, or, as we did, slope the floor toward the entrance so that it will drain down the driveway to the street. While we are on the subject of drainage, don't forget to lay a tile line around the outside of the foundation at the footings. Lay the tiles with open joints and run the line into the sewer. Place a small piece of tarred roofing paper over the top of each joint. Then cover the tile to a depth of a foot or so with

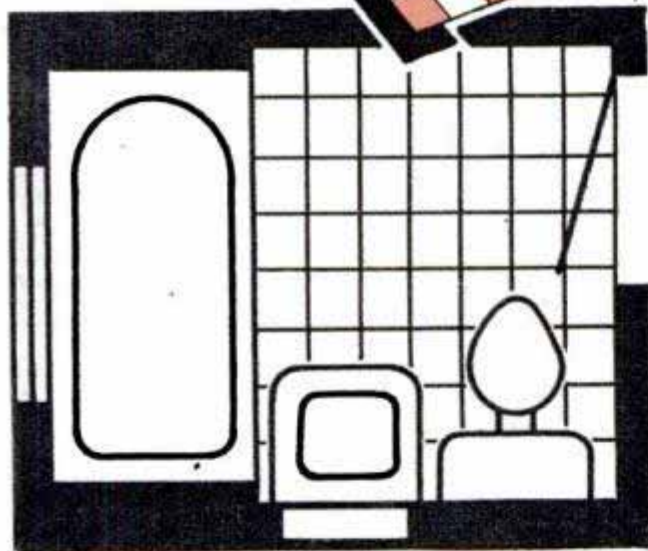


Here Jacques is cutting a stair stringer with an electric saw. A saw of this type will save much time

coarse gravel or crushed stone and complete the fill with dirt. Also, tile each window well into this line. If this tiling is not done, water, during heavy rains, will seep into the basement and also collect in the window wells, from where it may flow into the basement, or at least cause the window sash and casings to rot quickly.

Now, with the house closed in against the weather, and partitions, wiring and plumbing in and concrete laid, you are ready to complete the interior. If the outside walls are to be insulated, do that next. Use a blanket type of insulation and place it between the studs, taking care to fill all spaces around windows and doors. If rooms are to be finished on the second floor immediate-





Note arrangement of the spacious kitchen cabinets, top, for step saving between stove, refrigerator, sink and dining nook. Bathroom layout is indicated above

construction is the same regardless of the size or style, the information contained in our book on building this house will enable you to change it almost any way you wish, or even build one of your own design.

In conclusion, there are several things that every prospective homeowner should check thoroughly before a lot is purchased or construction started. Since many of us spend the better part of a lifetime acquiring a home, we want to be sure that the location is desirable in every way. To name but a few things, be sure the location is everything you think it is. Are the sewers already in and adequate, and are other utilities sufficient? What are the prospects for future heavy assessments? How about the zoning laws of the town? Are they sufficient to protect you against heavy manufacturing plants being located nearby? Are schools and public transportation convenient and adequate? Are taxes satisfactory? What are the future plans of the town that might be likely to raise taxes excessively? Is the town or neighborhood in which you propose to build likely to build up and improve so your property will continue to gain in value? What will your location be like 10, 15 or 20 years from now? And, last but not least, what kind of people will you have for neighbors, and will your children have the environment you desire? Satisfactory answers to these questions and many others before you build may save you much disappointment and hundreds of dollars in the future.

THE END



As a service to our many readers, we have prepared blueprints and a book, **Your Home and How to Build It Yourself**, which gives complete step-by-step instructions for building this house in five styles. Plans and book are available by writing to Popular

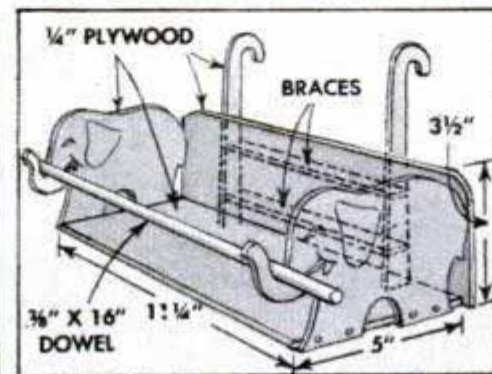
Mechanics Press, 200 East Ontario Street, Chicago 11, Illinois.

THE BOOK .....	\$ 3.00
COMPLETE SET OF BLUEPRINTS.....	12.50
BOOK AND BLUEPRINTS.....	14.00
DUPLICATE SET OF BLUEPRINTS.....	5.00



## Pillows for Swing Stay At Correct Height

Held in position by a wide band of canvas, porch-swing pillows can be adjusted to a height most comfortable to the occupants of the swing. The band must be long enough to fit around the back of the swing, and one section is made of elastic to provide the necessary "stretch." Snaps fasten the ends. Ordinary porchswing pillows are used with straps sewed on the backs for the band to pass through.

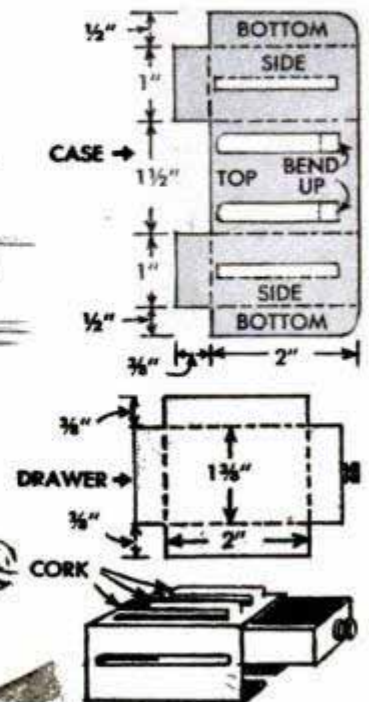
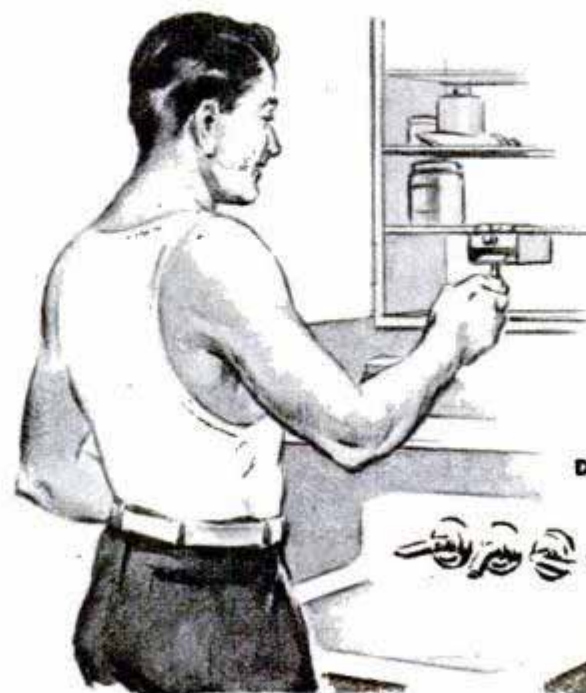


## "Mother's Aid" Hooks To Side of Crib

By using this convenient tray, the young mother will find that time can be saved by keeping such necessities as swabs, cleansing tissue, powder and rubbing oil at hand. Because of the hooks on the back, it's an easy matter to transfer the tray from the back of a chair to the crib or any other location. Materials for the tray and the method of assembly are indicated in the upper right-hand detail.—John L. St. Lawrence, Tiverton, R. I.

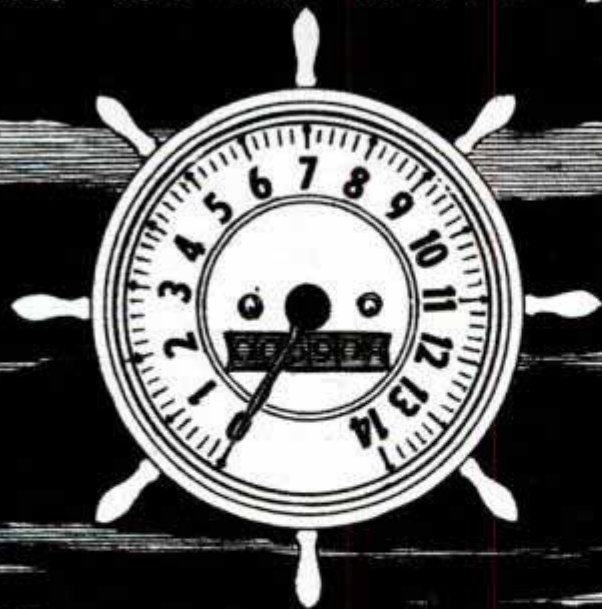
## Safety-Razor Holder Clips on Shelf

When clipped to a shelf in the medicine cabinet, this holder for a safety razor and blades provides a handy place to keep these articles. Both the case and the drawer should be made of lightweight sheet brass if this metal is available as it will not rust. The dimensions given in the right-hand detail are for a holder that will fit most makes of razors on the market. All joints should be soldered together.—R. W. Madden, Palatine, Ill.



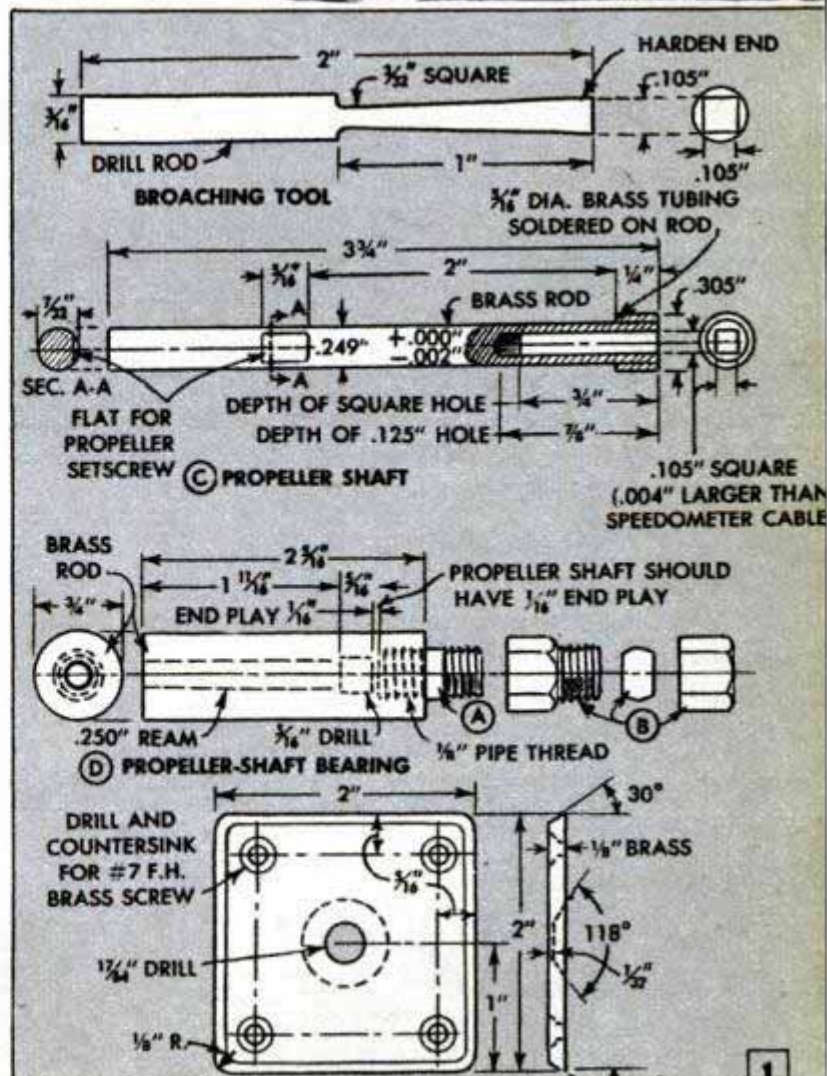


# from used auto parts



FOR the boating enthusiast who likes to know how far he's traveled and how fast he got there, here's a speedometer made from a few auto parts that indicates both total mileage and speed with fairly close accuracy. A used speedometer and cable are purchased and most of the remaining parts are made and assembled in the home workshop. The heart of the unit is a small propeller mounted on the keel which turns the speedometer cable to record the speed and total mileage on the speedometer. Certain details of the assembly will vary with the type of boat that is used, but the individual parts that make up the unit will remain the same.

Fig. 1 gives the dimensions for the propeller shaft, propeller-shaft bearing and the packing plate. The propeller and propeller-shaft bearing bracket are detailed in Fig. 3 and the general assembly in Fig. 4. The dimensions of all parts given here are for a 1941 Chevrolet speedometer and cable and it may be necessary to alter some of these to fit units of other manufacture. Part of the propeller-shaft bearing assembly, detail A of Fig. 1, is a  $\frac{1}{8}$ -in. standard brass nipple. Detail B consists of a male to female coupling threaded on one end for the nipple and on the other to fit  $\frac{1}{4}$ -in. outside dia. brass tubing, complete with sleeve and nut. The brass rod, detail D, is drilled, reamed and tapped as shown. Detail C gives the dimensions for the shaft and this part is made of brass rod also. The .105-in. dimension for the square hole in the end of the shaft may have to be altered to fit the speedometer cable that you are using, but, in any case, make the hole .004 in. larger than the cable. By using the drill press as an arbor press, the broaching tool, upper detail in Fig. 1 can be used to square the .125-in.









# RODS, REELS and LURES

*Just knowing where they are isn't enough — knowing the right lure, the proper rod and reel, and how to handle these bait-casting "tools" — that's the combination it takes to catch 'em*

By Robert Page Lincoln

TIME was when bait casting was done with a "multiplying" reel and a short steel rod measuring only 3 or 4 ft. in length. But the refinements of experience in plug throwing soon brought a demand for a longer, more pliant rod plus that certain nameless quality in a rod which a fisherman calls "life." Nowadays, and only after ideas got a lot of kicking around, the seamless tubular steel rod about 5½ ft. in length gets the okay from most bait casters, although somewhat longer rods are used by some with good success. Others still use the shorter rod for such specialized work as salt-water fishing from piers, bridges, or causeways where the short rod is more or less a necessity. Good steel rods of a tapering square or triangular section also are finding considerable favor, especially when handling the heavy spoon lures or the large plugs. These rods, being stiffer, generally have somewhat more initial "drive," an aid in getting a heavy lure away on a long cast. Bamboo bait rods also are preferred by many fishermen for throwing live baits, heavy lures and for other special purposes. They like the stamina and "backbone" of the bamboo rod. An offset handle on a bait-casting rod, Fig. 1, has some advantages over the straight handle. In the former the reel position puts the thumb in a natural, unstrained contact with the





# TYPES of LURES

reel spool and gives a more delicate and positive control of the running line. Bait-casting reels of the 100-yd. line capacity are perhaps the standard. Actual capacity is usually between 80 and 100 yds. Line sizes used in bait casting range up to 24-lb. test. Hard-braided lines are quite generally favored.

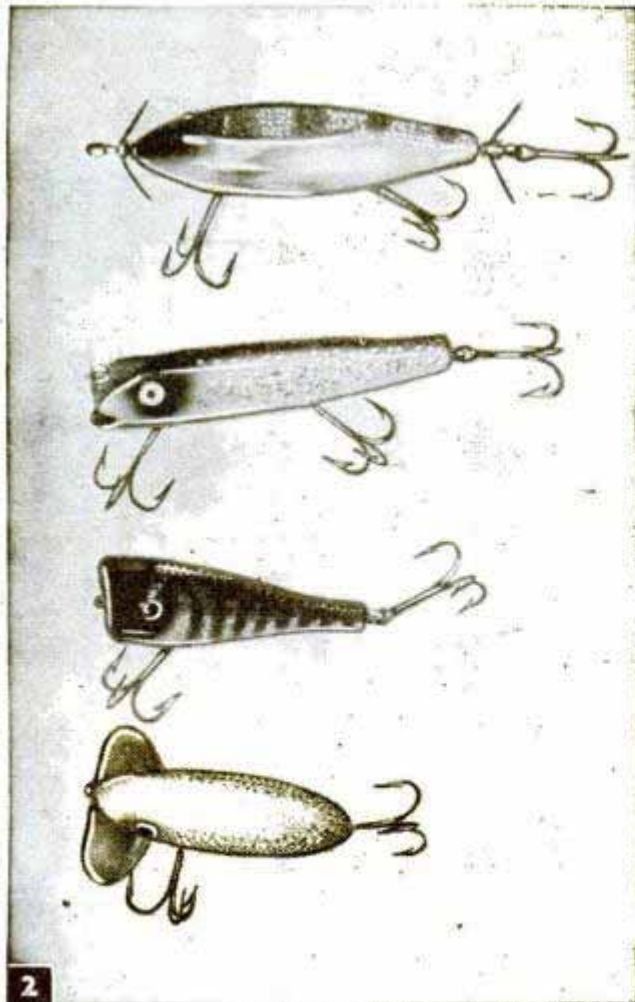
A bait-casting reel, Fig. 1, should have the level-winding feature, which aids in laying the line on the spool. Some reels have large-diameter cork arbors which prevent slippage and bring the line up high on the reel spool. On other reel spools with small arbors many fishermen fill the spool partly with old line, then attach sufficient new line to fill the spool to within  $\frac{1}{4}$  in. or so of the spacer bars. A full reel gives better control of the line at the start of the cast and aids in thumbing the line when casting and also in playing the fish.

Lures for bait casting, Figs. 2 to 6 inclusive, come in various types: the floating or

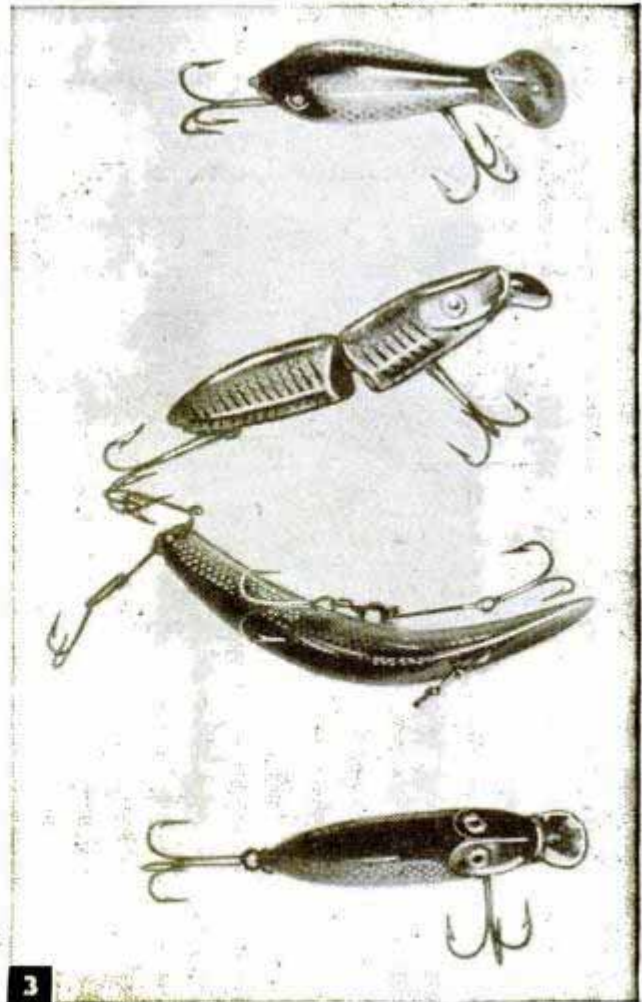
top-water lure, the combined top-water and underwater or diving lure, the sinking-plug lure, and the various metal lures, also of the sinking type. Then there are the baby or lightweight plugs, most of which work 6 to 12 in. under the surface. Floating plugs are usually jerked or "popped" on the surface to simulate live bait. Effective stand-bys, these, and they can be used successfully in most waters where the black bass is found. Some lures in this class are so designed that they give the necessary animation when merely reeled in steadily. In the second class named are the lures which float when at rest, but when reeled dive underwater and have a snaky, undulating "crawl" that is very effective. The typical red-head wobbler, with a scoop indentation at the head, is a popular number. Most of these lures have specially shaped metal mouthpieces that cause them to wriggle through the water.

The third class, called sinking lures, will sink slowly if not reeled in promptly. Many have propellerlike spinners fore and aft which give them animation. Others, such as the deep runner, can be trolled deep. The latter, and also some other types, can be used for under-surface trolling in the summer when the bass lie deep.

## FLOATING LURES

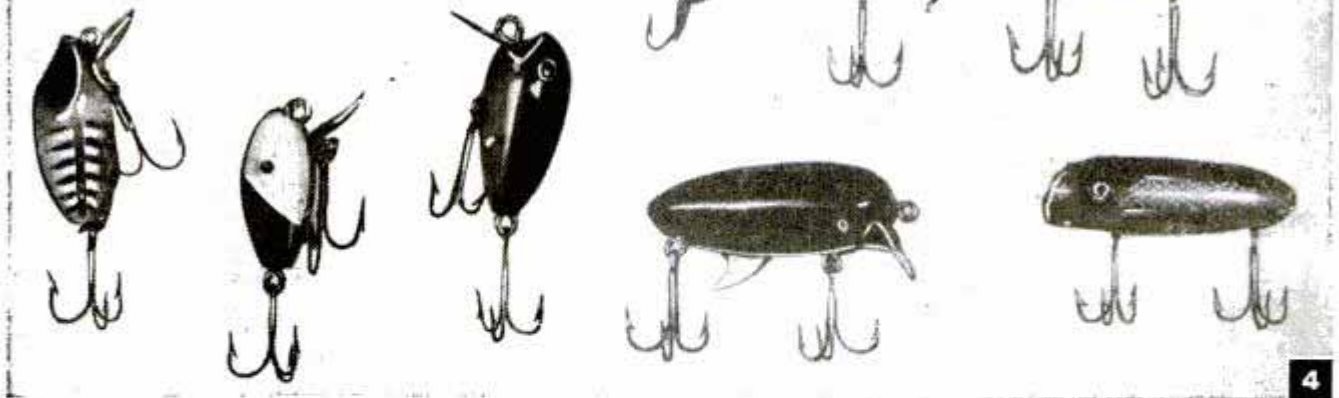


## DIVING LURES





## Lightweight or Baby Lures



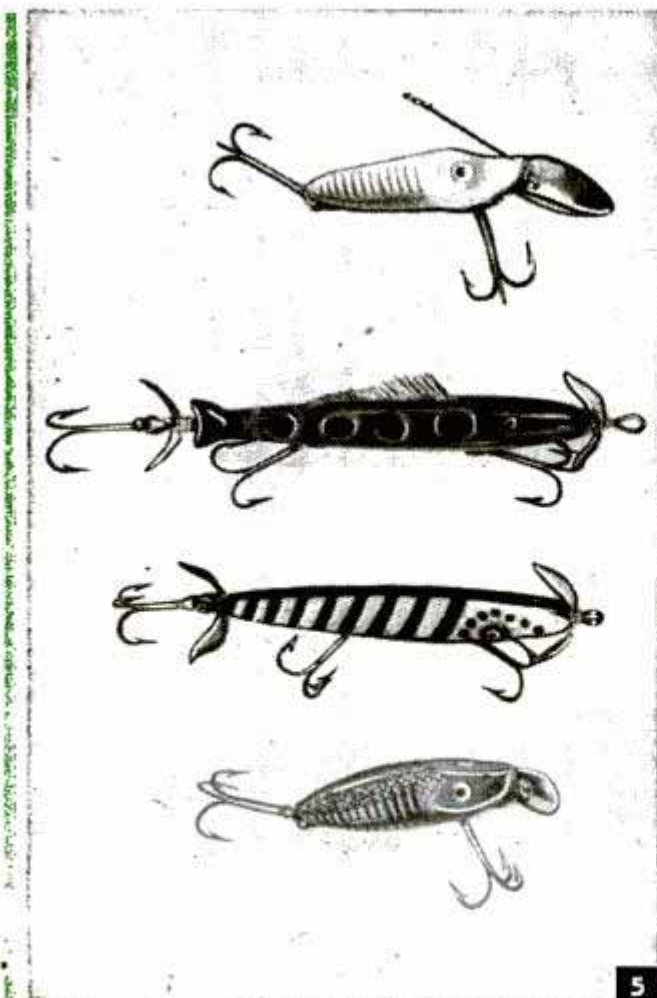
4

Metal, or weedless, lures should be included in the tackle box for often they will take fish when the plug lures fail to make connections. The skirted weedless lures may be cast into the lily pads or other vegetation and then reeled in without snagging. The same is generally true of pork-rind lures which come in both plastic and metal construction. Bass lures range from  $\frac{1}{2}$  to 1 oz. in weight with the in-between  $\frac{3}{4}$ -oz. weight about the most popular. Lures lighter than  $\frac{1}{2}$  oz. belong in the baby bass-plug class.

Often these baby plugs are miniature duplicates of larger lures. Others are original in design but most of them belong to the wiggler type of lure. Of course, nearly all plugs are considered most effective when used in fairly clear water. The lightweight items are particularly useful when fishing near banks and around logs. Use 9 to 12-lb. test lines when throwing the light plugs.

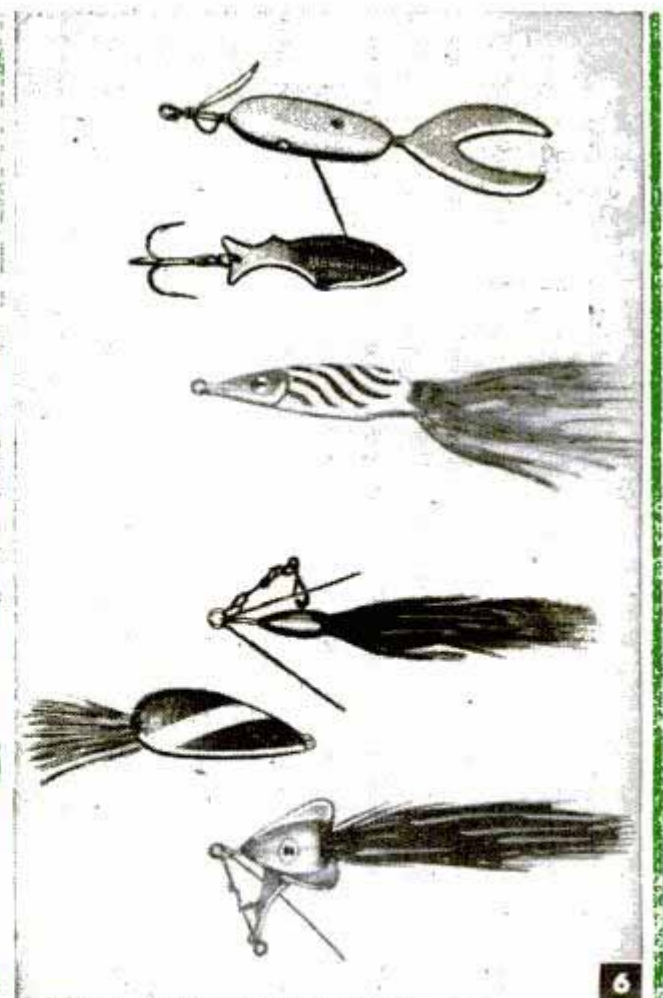
There are two generally accepted methods of bait casting, the overhead cast and

## SINKING LURES



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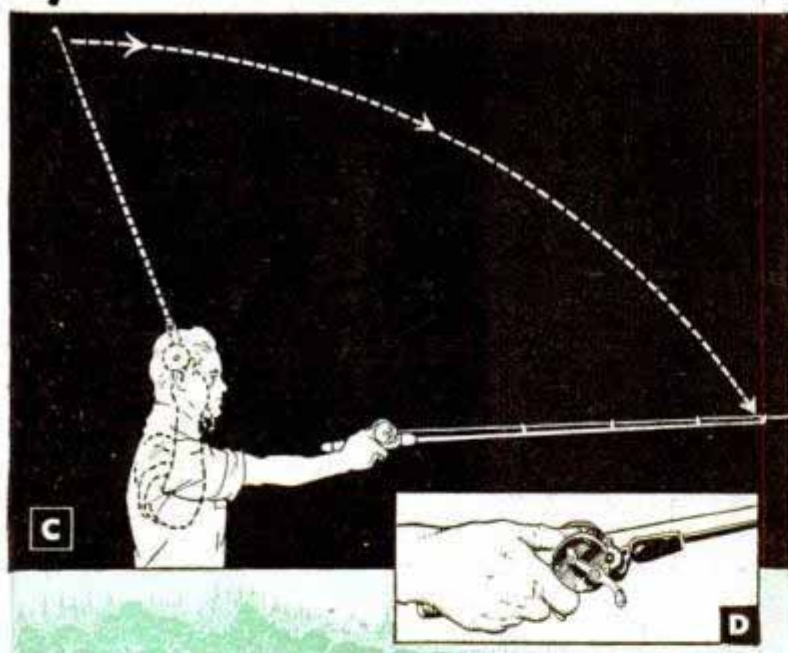
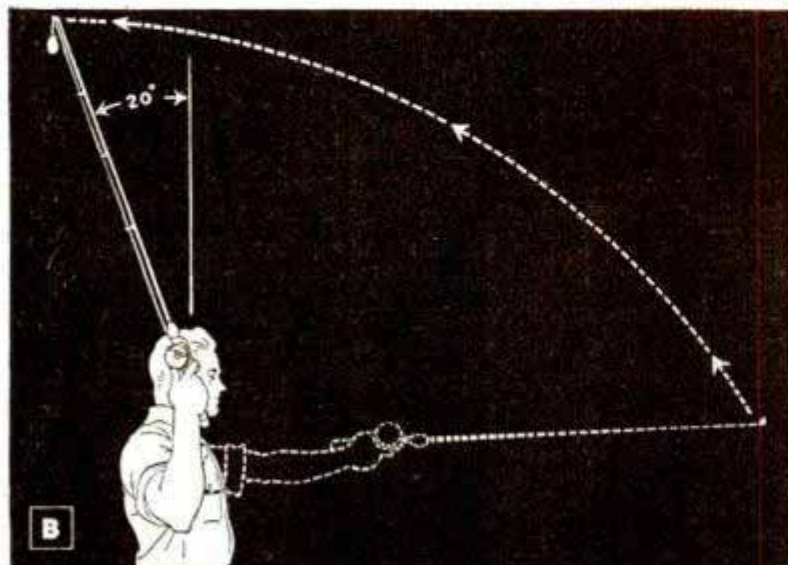
## WEEDLESS LURES



6



## THE OVERHEAD CAST



the side cast, the latter also known as the underhand cast. Overhead casting is the usual method used over open water but some good fishermen favor the side cast for all conditions, and all use the side cast where it is necessary to work close to shore or under overhanging trees. The mechanics of the overhead cast are quite simple. The trick in making this cast is holding the rod tip toward the spot where you wish to place your lure, Fig. 7, A. The rod is then carried straight up over the right shoulder, Fig. 7, B, so that it assumes a backward slant of about 20 deg. There is only a slight pause between the back cast and the start of the forward cast. It's a combined wrist and arm motion. As the lure goes forward some casters stop the rod at approximately a 45-deg. angle. Others drop the rod almost to the horizontal position, Fig. 7, C. One trick in preventing backlash is simply tipping or turning the rod one quarter turn to the left as the lure goes forward. This movement also helps to slow the reel spool.

Skillful thumbing of the line, Fig. 7, D, is a trick one must master by practice. The main purpose, of course, is to prevent the line going slack behind the plug. Thumbing starts when carrying the rod over the shoulder preparatory to the forward cast. The thumb is then pressed firmly on the reel spool. But as the forward cast is made the tip of the thumb is lifted slightly so that the line can feed out. The idea is to feed just enough slack into the line so that it "keeps up with the plug," so to speak, without retarding forward movement of the lure. Then, as the cast nears its end, you can drop the lure where you want it by light thumb pressure. The underhand or side cast, Fig. 8, A, B and C, is simply the overhead cast made with the rod swinging in a horizontal plane. Here the rod is carried back to the same 20-deg. angle as in the overhead cast and the forearm is brought into play as before. A snappy wrist action is imperative. It takes practice to master the side cast, more especially because you can't "aim" the plug as you do in the overhead cast. When the rod move-

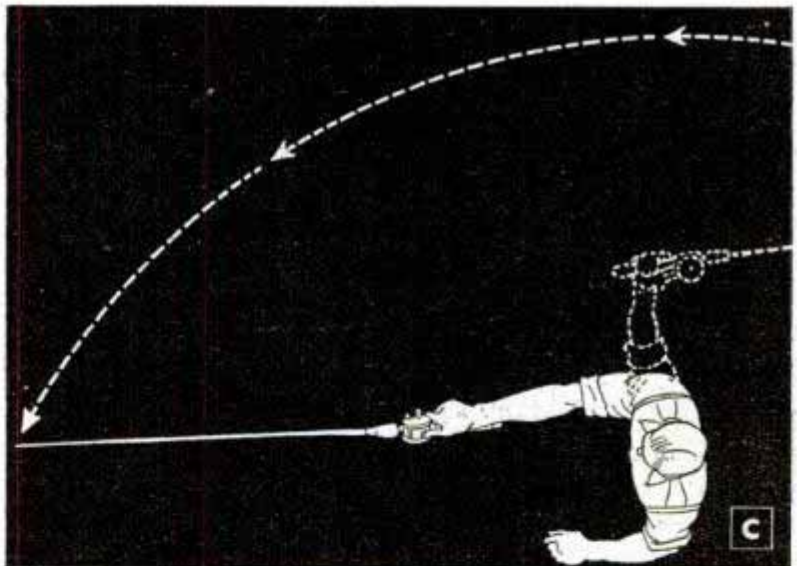
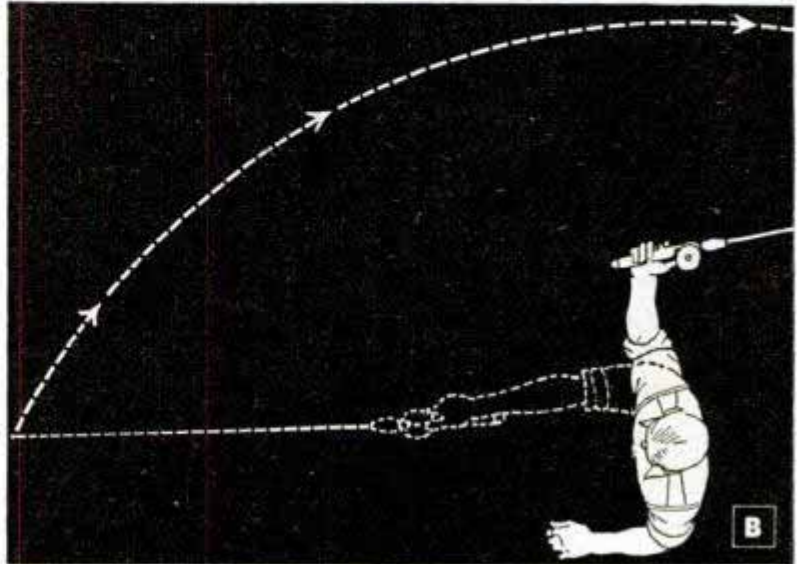
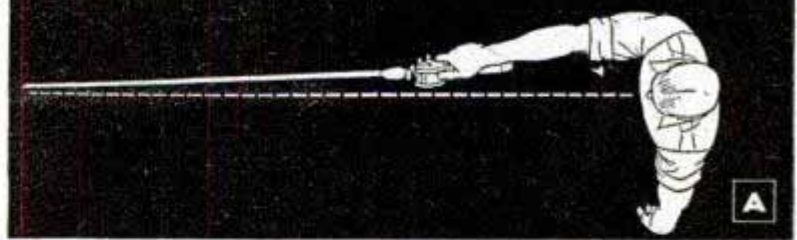


ment is finished the tip points at the spot toward which you're aiming the lure. The movement of the rod throughout is altogether in the horizontal plane, not up or down. The reel remains more or less horizontal throughout the cast, the spool of the reel facing up. Leaning the body to the right and bringing the head down in line with the horizontal position of the rod aids some casters in making accurate casts by this method. Many casters use the side cast exclusively when fishing from a boat. And when you have to get under trees and overhanging branches the side cast must be used from any position. Some casters find it easier to let the wrist take a natural twist in the backward and forward movements, Fig. 8, A, B and C. This twisting motion tends to give more freedom of movement and a snappier wrist action. At the start, A in Fig. 8, the reel is in the vertical position. From the start to the finish of the back cast, B in Fig. 8, the rod and reel are turned about 90 deg. Then, as the rod is brought forward, Fig. 8, C, the reel and rod come back to the vertical position again. Of course, the equipment must be in good condition. Worn guides, a loose, shaky reel spool or a frayed line—any one of these defects will cut down accuracy and shorten the distance of the cast. Rough, badly worn guides are especially troublesome. They slow down a running line and may snag it and break the coating. It's difficult to keep a worn reel lubricated so that it runs free. Most reels can be made as good as new by replacing worn parts.

A bait-casting leader of synthetic gut or raw silk is generally best as it forms a more or less invisible connection between the line and lure. Also, the leader gives a better action to the reeled lure. Gut leaders for bait casting are usually fitted with snaps, thus making a change from one lure to another only a matter of seconds. Medium-sized snaps are used for average-sized lures. The fly-leader type snaps generally are best for light lures. Even though no gut leader is used, snaps should be used. They are tied directly to the line.

## THE SIDECAST

8





## Portable Spray Rig for Garden Made From Wheelbarrow

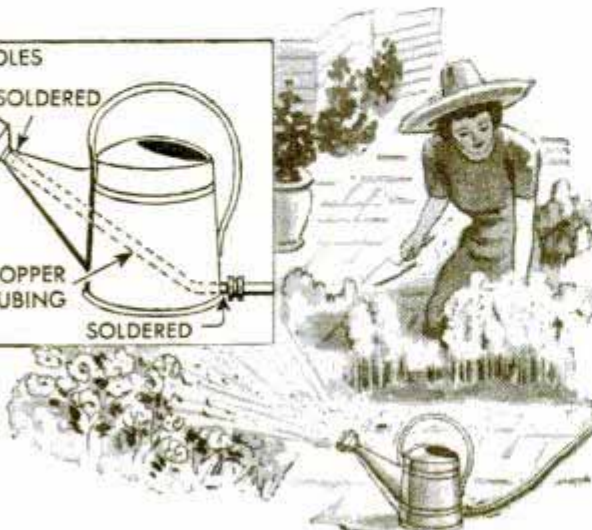
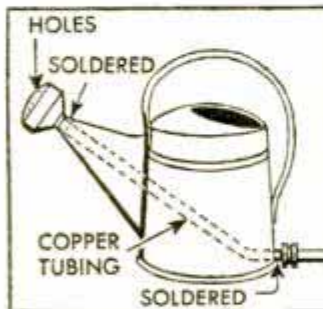


Using a wheelbarrow, an old hot-water tank and the necessary spray pump, you can make a portable spray rig that has a large capacity. Cut the tank in half and rivet a clip on the side to hold it in the barrow. It will be necessary to cut a hole in the bottom of the wheelbarrow so the tank will set in it. A standard spray pump is bolted to the inside of the tank in such a position that the handle can be worked easily. When not in use as a sprayer, the pump unit is removed and the hole in the wheelbarrow is covered with a piece of metal.

F. E. Averill, Jr., Santa Ysabel, Calif.

## Sprinkling Can Attached to Hose Simplifies Watering Flowers

Attach a sprinkling can to the hose and you'll find it a lot easier to water your flower beds. A length of copper tubing having approximately the same inside diam-

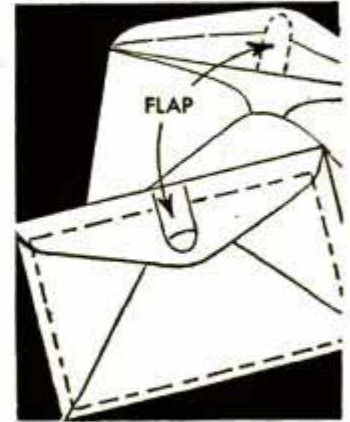


eter as the hose is soldered into the neck of the can and into a hole cut near the base. A female connection to fit the hose is soldered here also. The can is moved about without having to turn off the water, as is the case with some sprinklers.

A. F. Cox, Chicago.

## Paper Held Securely in Envelope

To secure a folded paper containing a coin, or to hold a letter in place, cut a U-shaped flap in the center of the envelope flap and stick this to the paper inside the envelope. Then fasten the flap in the regular manner. The U-shaped piece is cut to include some of the adhesive material on the flap of the envelope.



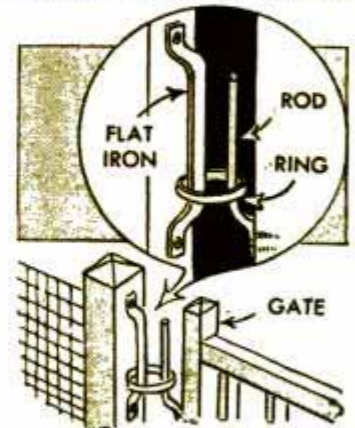
Nels S. Ekberg, Sioux Falls, S. Dak.

## Solution Rids Cabin of Insects

If you want to rid a cabin of flies and other insects, burn a small amount of a mixture of turpentine and menthol crystals inside the building. Place a teaspoonful of the crystals in a can cover, add a few drops of turpentine and ignite the mixture. The fumes, while not unpleasant to humans, are offensive to most insects.

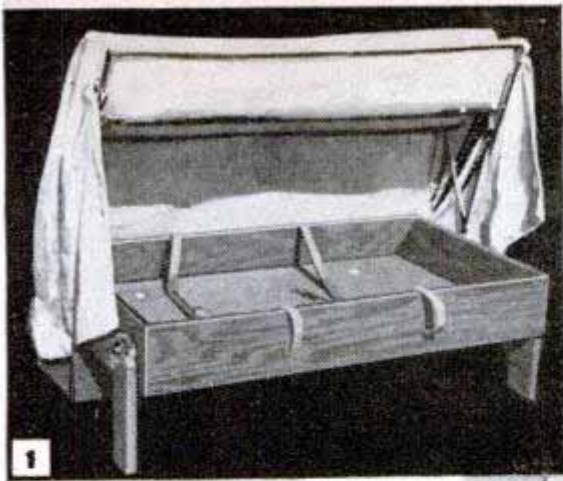
## Easily Constructed Gate Latch

Only a ring and two door handles or short lengths of rod and flat iron are required to make this simple but effective gate latch. If door handles are used, a ring is slipped over one which is screwed to the fence post. One end of the other handle is cut off and fastened to the gate with the open end up. To close the gate, slip the ring over the open end of the handle. If rod and flat iron are used to make the latch, form the pieces in the manner indicated in the circular detail.



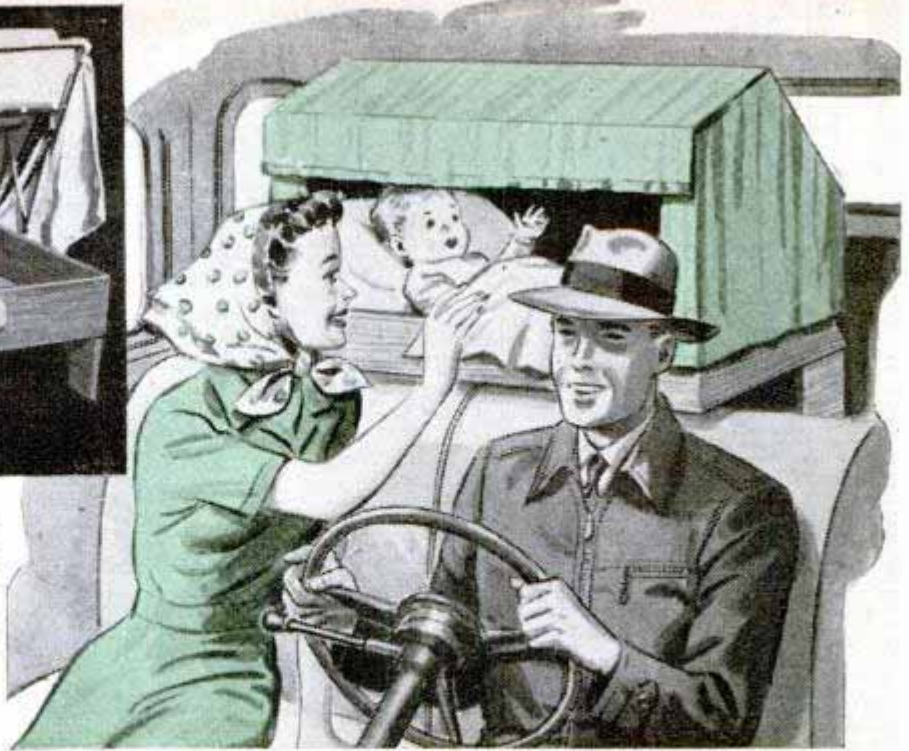
Keep a small magnet with your pins and needles so that when you need to pick up a number of them your magnet will do the work quickly and easily.





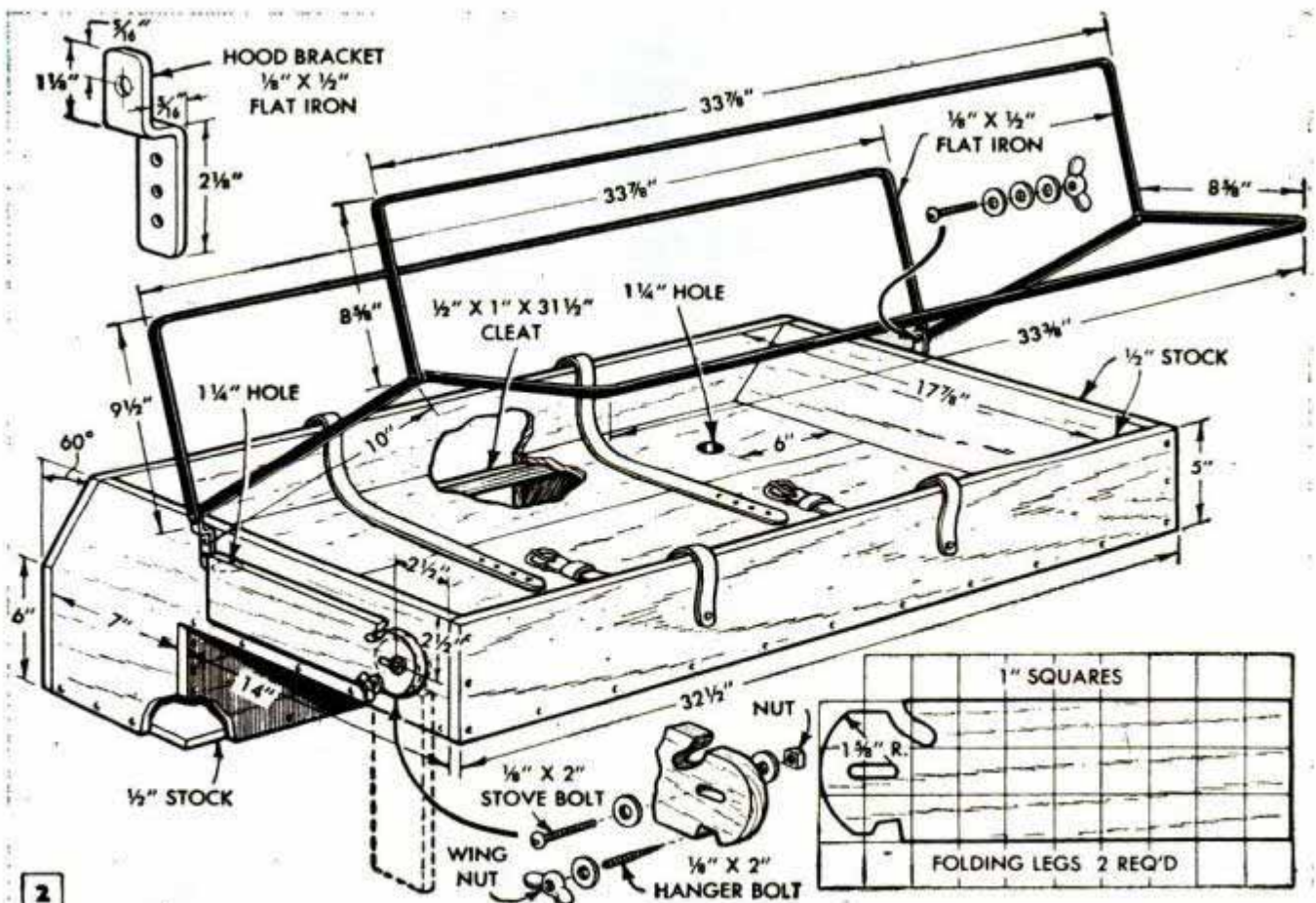
# PORTABLE BABY CRIB

By M. L. Bobing



Babies just don't fit in auto seats even on comparatively short trips, and taking a few-months-old youngster on a long trip poses a real problem. This portable crib or bed is the solution, for it keeps everyone comfortable and able to enjoy themselves. The crib pictured in Fig. 1 and detailed in Fig. 2 is designed to be placed on the ledge back of the single seat in a coupe, but by adding a suitable hanger bracket and folding legs it will fit equally well on the back

of the front seat in a sedan. With the crib in either position you will probably need to install a separate rear-view mirror, either on the fender or door frame, as the crib canopy obscures the field of the inside mirror. Essential details of construction will be found in Fig. 2. The straps, Figs. 1 and 2, are fastened to the frame with screws and are buckled loosely over the child's blankets. Adjust the legs so that the crib stands level when in place.





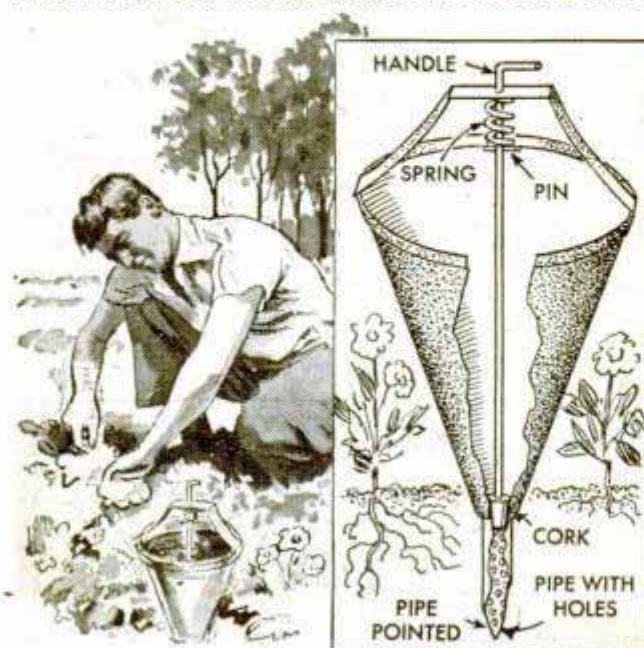
## Hammock Has Magazine Pocket Under Cushion at Head



Papers and magazines are always at hand when kept in a pocket sewed beneath the head of a hammock. Canvas is used to make the pocket and it is fastened on with carpet thread. Allow enough "bulge" so that several magazines and papers will fit.

## Watering Device Reaches Roots And Improves Growth

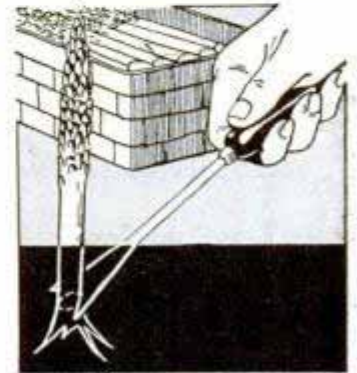
If you have some special plants that you want to give the best possible care, this watering device can be used to get moisture down around the roots where it will do the most good. A cone-shaped reservoir made of sheet metal is used to hold the wa-



ter. Attached to the narrow end is a pointed piece of pipe in which numerous tiny holes are drilled. There is a bracket across the open end which is drilled for a rod. One end of the rod is fitted with a cork and the other is bent and fitted with a compression spring and pin. The spring serves to keep the cork in place. To use the device, press the pipe into the soil and lift the handle, allowing the water to seep into the ground and thoroughly saturate the root system.

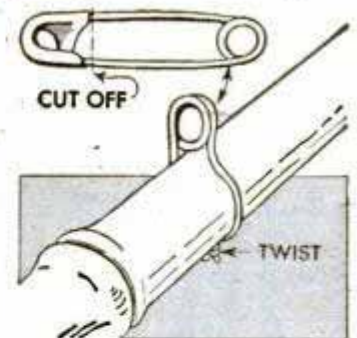
## How to Cut Asparagus Plants

According to one truck gardener, cutting asparagus stalks above ground may cause the stump to bleed and wither or dry out. He recommends making the cut at a slant just below the surface of the bed. Then the cut will heal and produce better. The type of knife that produces a clean cut is illustrated and should have a sharp edge.



## Guides for Bamboo Fishing Pole

Guides for a bamboo fishing pole can be made from safety pins of assorted sizes, using the largest pins at the butt and graduating with smaller sizes toward the tip. To make the guides, cut off the catch leaving two prongs and the eye at the other end. Then wrap the prongs around the pole and bring the ends together on the underside, twisting them to fasten in place. Fine wire or tape can be wrapped around the guides and the pole so that the fastenings will not slip or twist.



## Pencil Clip Used as Depth Gauge

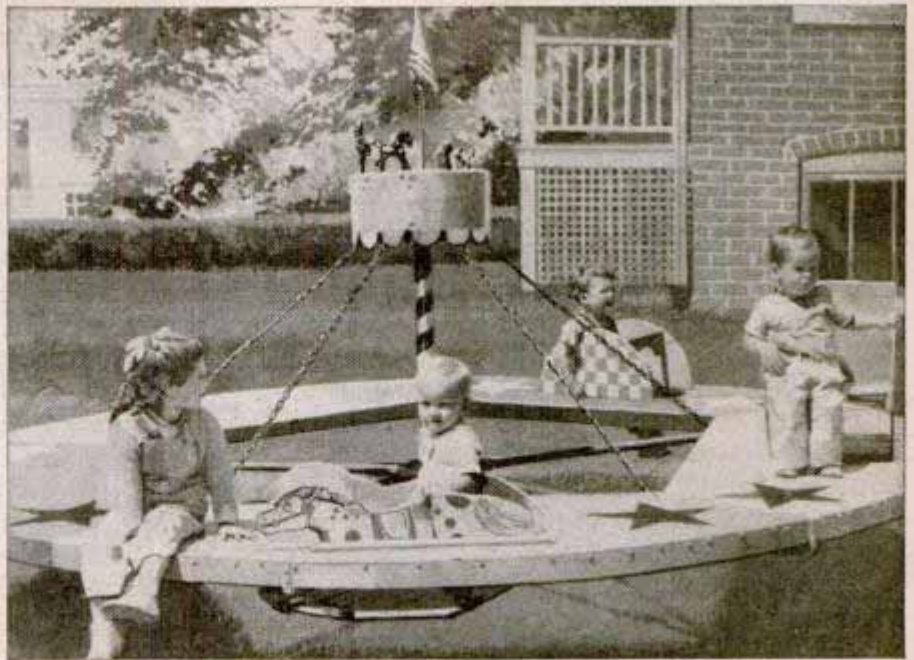
When a depth gauge isn't available, a pencil and sliding pencil clip can be used to take fairly accurate readings. For example, if the depth of a blind hole is to be measured, place the pencil point in the bottom of the hole and set the clip so that it is flush with the top. The distance from the point to the clip is the depth of the hole. This method will not work where the measurement must be exact, but for emergency use it will serve.

Paul Criton, Jr., Kayville, Sask., Can.



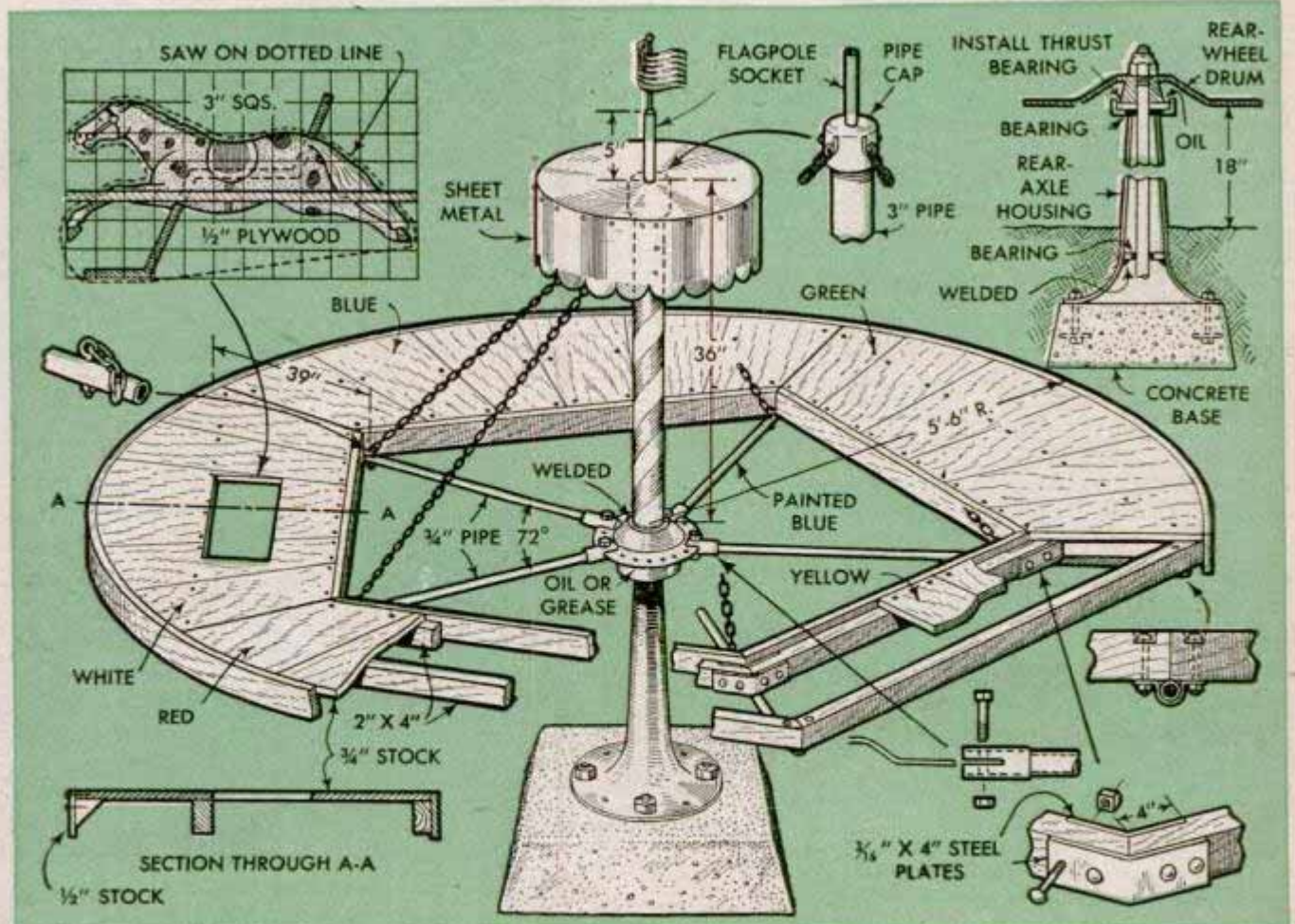
# Back Yard Merry-Go-Round for Children

Safe and sturdy, this back yard merry-go-round provides ideal amusement for children too small to play the rougher games of older children. Details of construction given here need not be followed exactly since they will depend upon the materials that can be obtained. The pedestal and spindle assembly on which the merry-go-round turns is the rear axle and housing from a car, cut down and bolted to a concrete base as shown in the upper right-hand detail. The same detail indicates the mounting for the rear-wheel drum. After completing this part of the assembly, weld a 36-in. length of 3-in. pipe to the top of the drum and screw on a pipe cap. Then weld the flagpole socket to the cap. The lengths of pipe that serve as struts to connect the pedestal to the wooden platform are cut and assembled as shown in the center and lower right-hand details. Finally, attach



chain braces to the struts and pipe cap, and weld the sheet-metal canopy in place. Seats for the merry-go-round can be of a size and design to suit the age of the children. A pattern for a pinto pony is given in the upper left-hand detail, and the top photograph suggests a few other types. Finish the ride with gaily colored enamels.

William W. Fears, Vallejo, Calif.





# Make Your Fence A VERTICAL

**T**URN your rock garden on edge—it's just as simple as that. Moreover, there's no trampling of the blooms, and you get more plants in less than half the space and a better all-season exhibit of flowers than you see in most horizontal gardens. Fig. 4 lets you in on the secret of construction. As you can see, a vertical garden is nothing more than an orderly pile of rocks—stones, if you'd rather—laid up to a height of 6 or 7 ft. with rich, black earth used as mortar. The sectional drawing in Fig. 4 has been purposely exaggerated to show the general idea to better advantage. Obviously, you couldn't follow this literally and expect to have the rocks stay in place. Some builders lay up a vertical course of stones on one side in regular mortar, then on the opposite side lay only irregular sections of the wall in mortar, just enough to give the wall form and also support against tipping. Then the spaces between the mortared sections are filled in with loose stones and black soil to make a sloping face as in Fig. 4. The

**Gardeners with a flair for the unusual will appreciate the novelty and practical advantages of vertical flower plantings**

loose stones are laid up in irregular pattern and fitted together loosely so that there are sizeable spaces for earth fill. Stonework should be arranged so that there is room for a quantity of soil on top of the wall as many plants thrive in this elevated position where there is plenty of air and sunlight. On a new wall, newly planted, the soil will quickly wash away unless there is some means provided for retaining it until the root systems of the plantings spread enough to hold the earth in place. Builders usually cover the vertical plantings with coarse burlap or an open-mesh cloth made especially for holding soil on terraces. Where the location is suitable, such as that against a hillside, the earth can be cut away to a vertical face and soil and stones laid against this in such





# GARDEN

a way as to form a rock-and-earth facing which slopes inward slightly.

Many rock-garden plants, except those producing bulbs, are suitable for wall plantings, Figs. 1, 2 and 3. Plants should be selected with some thought for pattern of the blooms, suitability for the location, and time of blooming. A number of varieties which bloom at different times will give you an all-season series of flowerings. Some of those which bloom continuously can be planted alternately along the wall.

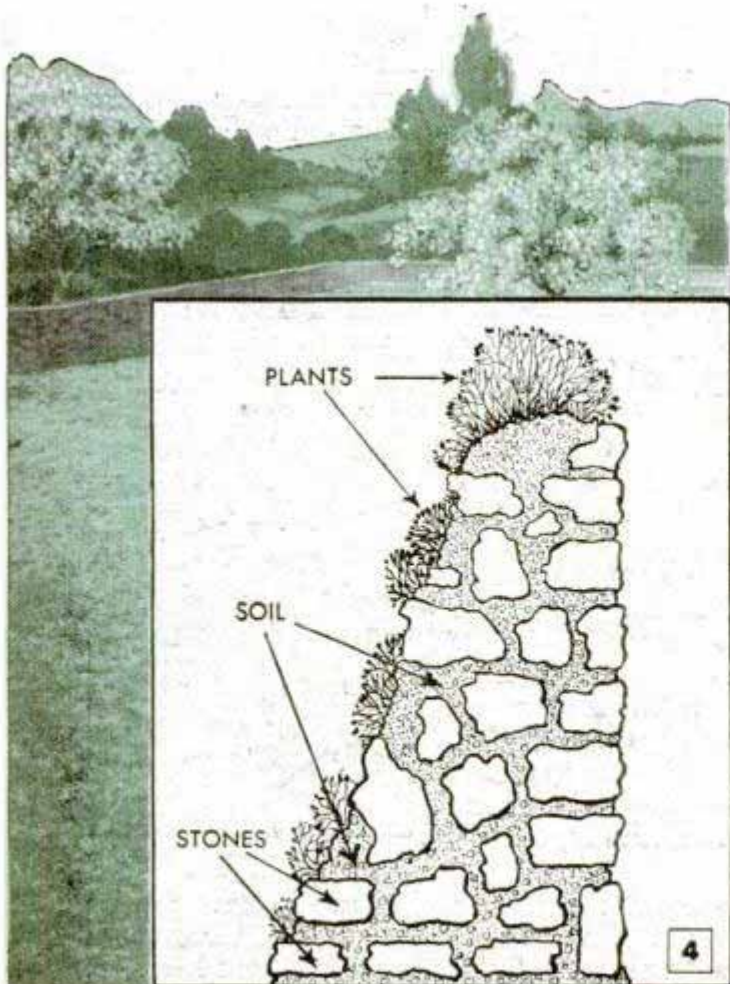
Suggestions could include a great variety of suitable plants, but of course the gardener's choice will vary. Sweet alyssum, and the variety known as "golden tuft," are especially adaptable. Both are spring-flowering perennials, but the former is quite commonly grown as an annual, the seed being started indoors. Aubrietia, also known as false or purple rock cress, goes well with the alyssums, or when grown in masses. One species of phlox, known as "phlox subulata" or "moss pink," and several varieties of the succulents lend a colorful variety to any wall planting. The succulents are more particularly effective as individual plantings rather than in large groups. They will thrive best near the top of the wall where the soil is drier.



When you build your rock garden on edge you get more plants in less space and a better all-season exhibit of blooms than in the usual horizontal plantings

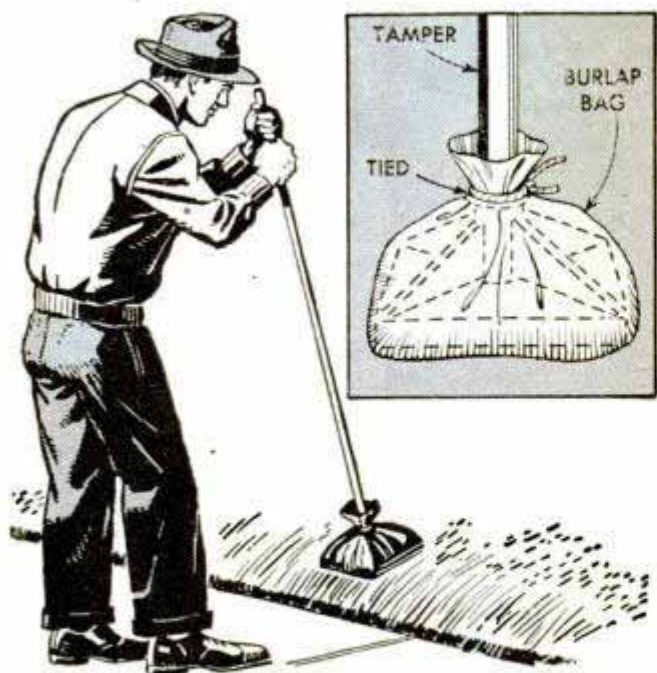


Above, varieties planted alternately to produce masses of bloom make attractive color patterns. Below, certain succulents are suitable for vertical gardens. Regular watering is essential in hot, dry weather





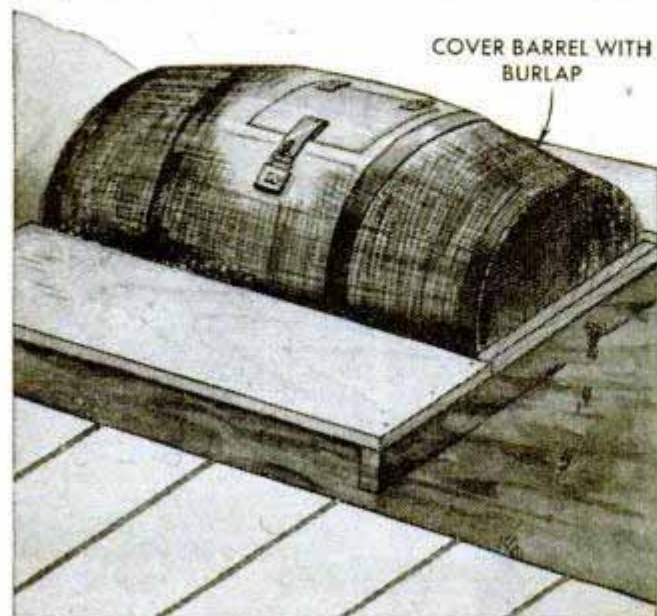
## Burlap Wrapped Around Tamper Keeps Soil From Sticking



Burlap wrapped over the head of a tamper when working on wet soil will keep mud from sticking to the tool. From time to time it may be necessary to remove the cloth and clean it. However, a neater job of tamping will result and the work will not be so tiring.

## Refrigerator Made From Barrel Keeps Food Fresh in Camp

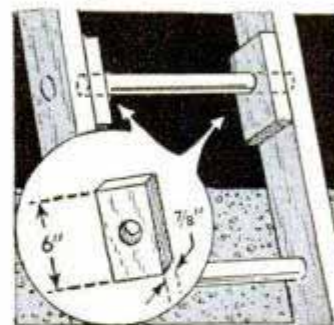
With this barrel refrigerator, you won't have to worry about keeping food fresh in camp. To make the refrigerator, cut an opening in the side of the barrel and fit it with hinges, a hasp and a lock. This provides access to the inside. Shelves are fastened into the barrel so that food is easy to get at. To provide stability in the water, the side boards are added. Turtles can



be kept off these boards by driving nails through from the bottom. Burlap is thrown over the barrel with the ends trailing in the water to provide evaporative cooling. Anchor the refrigerator to a float or dock.

## Replacement Rung for Ladder

Here's a quick way to replace the broken rung in a ladder. First saw off the broken ends so they are flush with the inside of the rails, and cut two blocks as shown in the circular detail.



These blocks are drilled to take the ends of the new rung. Slip the rung into the blocks and nail the latter in place.

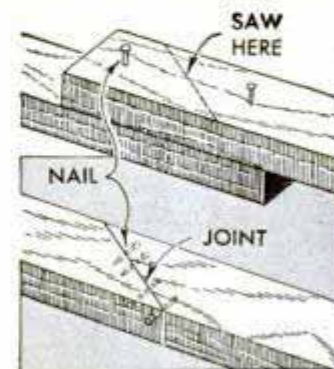
## Refinishing Upholstered Cushions

For a very small outlay, you can refinish upholstered davenport cushions and do a workman-like job. First open one of the seams at the back and remove the filling and the nest of springs. If the latter are in good condition, all that will be needed is a 3 lb. roll of cotton batting, 80 by 90 in. However, if the springs are too worn, a new set should be obtained. Ask for a set with an overall dimension of 15 by 18 in. as this is the size for most davenport cushions. Wrap the cotton lengthwise and crosswise around the springs, securing and lacing it in place with ordinary string. Then slip the springs and batting into the cover, sewing the latter shut to complete the job.

Francis W. Henry, Pottsville, Pa.

## Cutting Butt Joints That Match

If a miter box isn't handy, here's a way to cut butt joints that will match perfectly. One piece is laid on top of the other, allowing enough overlap, and the two are fastened together with small nails. Then the cut is made at an angle and the pieces are separated. Either nails or fasteners can be used when the butting ends are joined in place. — Floyd Crain, Carterville, Ill.

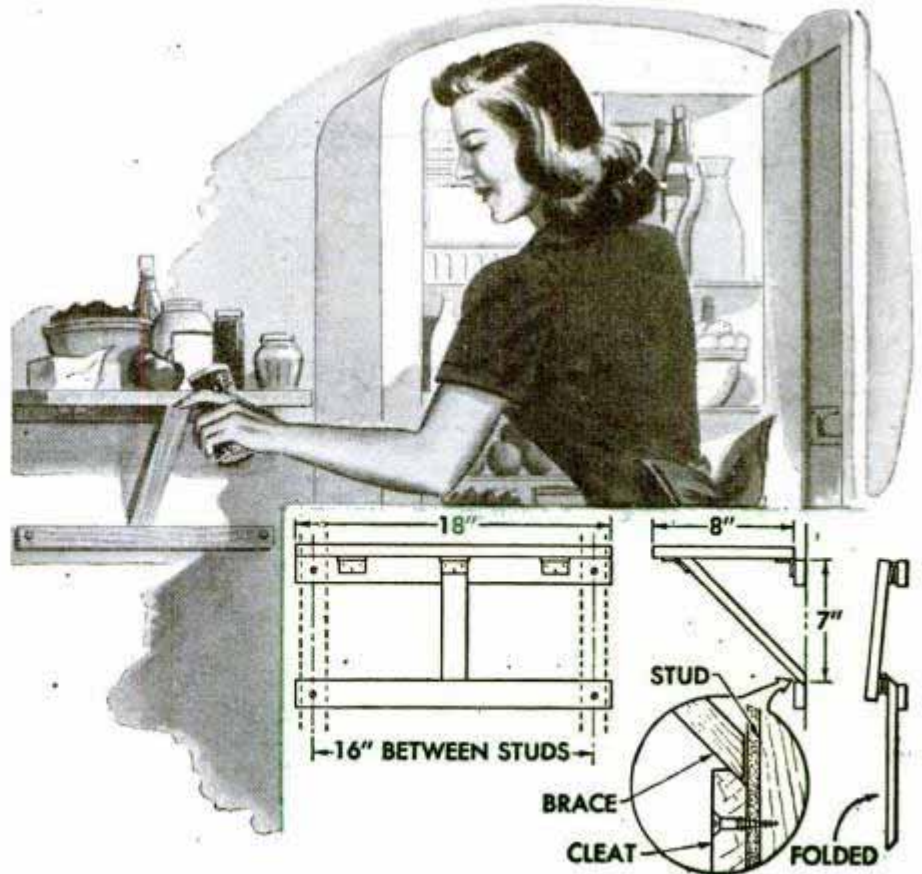


Plastic chessmen that are hollow can be made easier to play with by filling them with plaster of paris to make them heavier.



# Drop Shelf Near Refrigerator Saves Many Steps

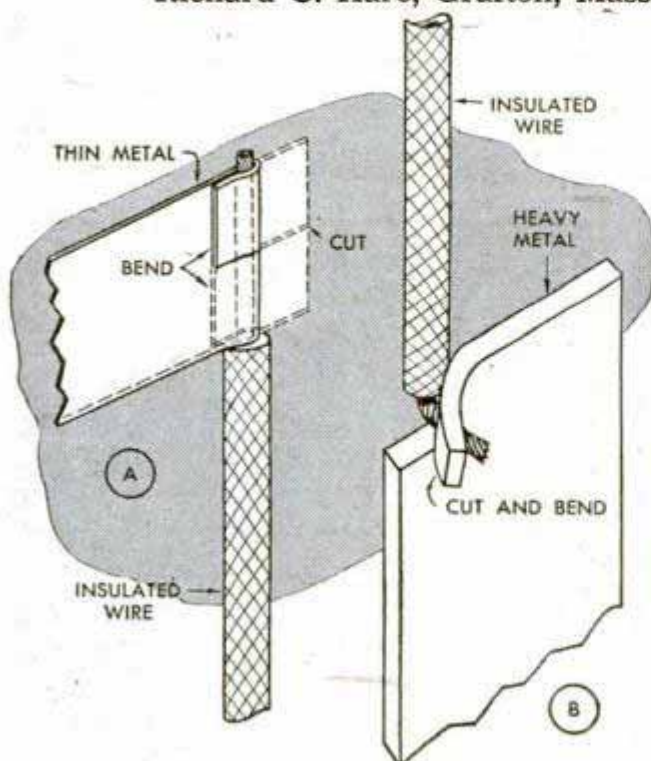
A drop shelf near the refrigerator will come in handy when taking out foods. Many different items can be taken out at one time, which eliminates opening and closing the door repeatedly. For example, if milk, eggs, butter, meat and salad dressing are needed, this usually means two or three trips to the refrigerator, but with this shelf all can be handled at one time. The shelf is made 18 in. wide so that the supports can be screwed into studding. The manner in which the brace fits into the cleat is indicated in the circular detail. The shelf can be painted white and decorated with decals.—Hi Sibley, Nuevo, Calif.



## Attaching Wire to Sheet Metal

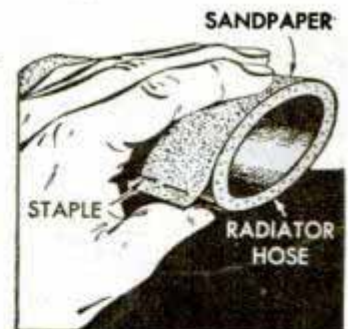
To make good electrical contact between a wire and sheet metal, cut the metal lengthwise a short distance and wrap the ends around the wire in opposite directions, as indicated in detail A. For larger sheets, make a slit in one corner and bend the metal down and over the wire, detail B. If the wire is insulated, the insulation should be removed.

Richard C. Hare, Grafton, Mass.



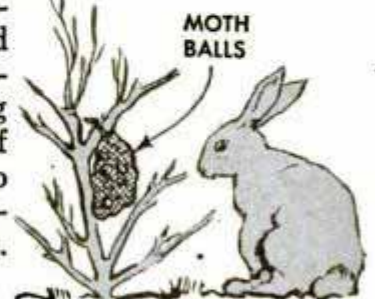
## Hose Used as Sanding Block For Irregular Work

For sandpapering in crevices, slots and other out-of-the-way places, use a sandpaper holder that has the paper stapled around a piece of automobile radiator hose of the proper length. Because of the flexibility of the hose, it may be squeezed into almost any shape that is required to do a difficult sanding job.



## Protecting Small Trees and Vines

As protection for small trees, bushes and vines from rabbits, tie a loose cloth sack of moth balls to the trunk a few inches above the ground. Damage to trees caused by deer can be prevented by tying several sacks of the moth balls to the lower limbs.—R. A. Jenkins, St. Louis, Mo.



☞ To clean artificial flowers, place them in a bag, pour in a cup of salt and shake.



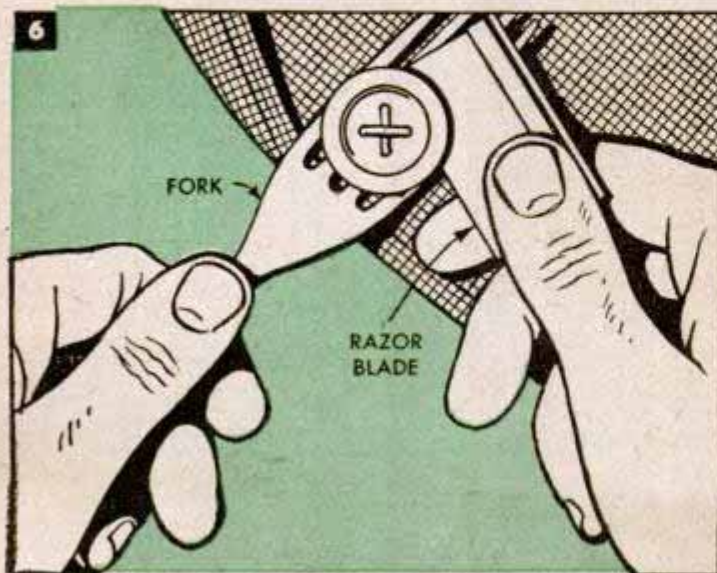
# Solving HOME



1. Attached to the back of a lawn or garden chair, a folded square of oilcloth will serve as a headrest and also as a cover or pouch for a dustcloth. If kept here, it's not necessary to make a trip inside to get a cloth when you're dusting

2. Screwed to the front of a wooden coat hanger, a coat hook serves as an ideal place on which to hang a hat and keep it and your coat together. If the closet is a small one without a shelf, this will be an especially convenient arrangement

3. When recovering an old chair or other piece of upholstered furniture, try painting the heads of the upholstery tacks with colored fingernail polish so that they will either match or blend with the particular fabric and trimming being used





# PROBLEMS

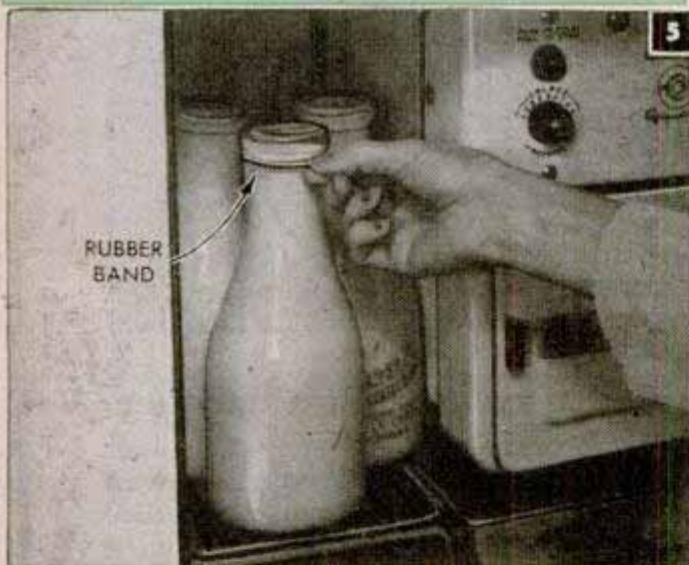
4. Two ordinary clothespins will provide a neat holder for a dustpan. Screw the clothespins to the inside of a utility closet door or to a wall at some convenient location. The dustpan will slide into place between the two halves of the pins

5. Use a rubber band as a warning signal for young and not-so-young refrigerator raiders. The contents of any container on which a band is found should not be touched so that the food will be on hand when needed to prepare the family meals

6. If you're removing a button with a razor blade, knife, scissors or other sharp instrument, slip a fork under the button, as shown, to prevent cutting the cloth. The tines act as a guard to keep the blade from coming in contact with the material



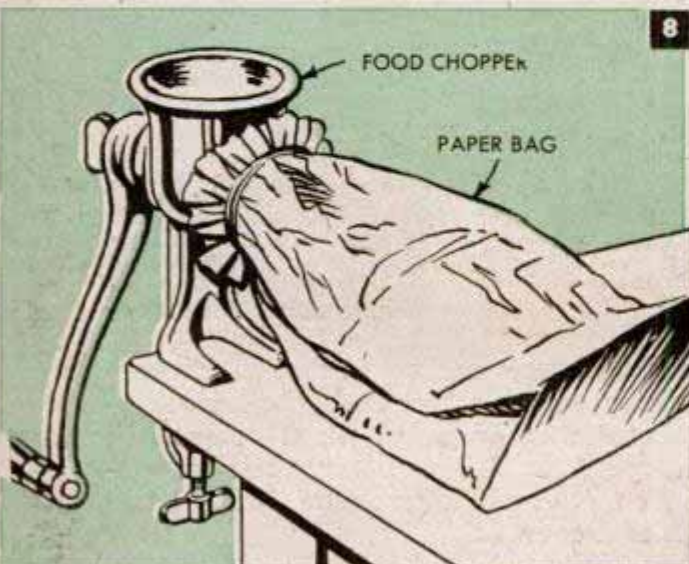
2



7. In an emergency, when the regular opener for a screw-type jar isn't handy, a piece of sandpaper will serve. Wrap the paper over the lid with the grit side down and twist it

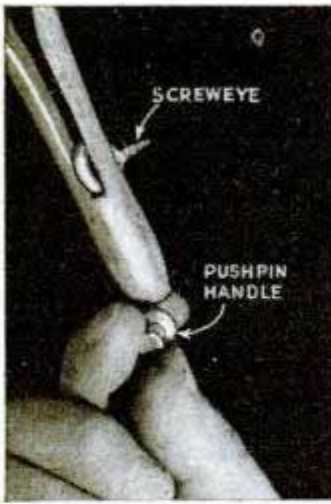
8. To save cleaning up time when preparing food in a chopper, tie a paper bag over the mouth. After grinding, remove the bag and empty the contents into a mixing bowl or dish

9. Should a recipe call for half a lemon, the other half can be covered with a small, plastic bowl cover and stored in the refrigerator. Then it will not dry out so quickly





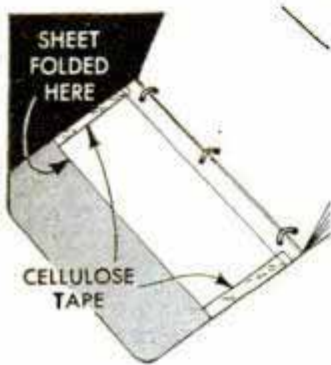
## Clothespin to Drive Screw Eyes



When you have a number of small screw eyes to drive, strain can be avoided by using an ordinary clothespin to drive them. Attach a pushpin to the head of the clothespin to serve as a handle. With this "tool" the screws can be driven in a short time.

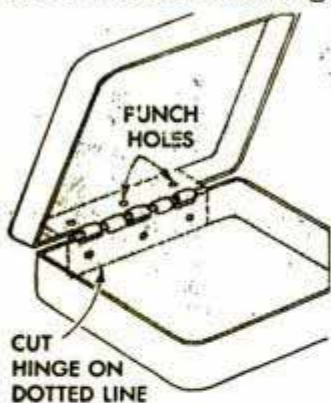
## Pocket in Notebook for Papers

A handy pocket for loose papers can be made by doubling the last page in a notebook and fastening the top and bottom edges to the cover with cellulose tape. The sheet should be fastened loosely to take as many papers as possible. Should the pocket wear out, it can be replaced easily with another page from the notebook. — Beatrice E. Reese, St. Petersburg, Fla.



## Hinges Made From Metal Boxes

Small hinges that can be used on novelties and gift boxes or for other small work can be made from lightweight metal boxes that contain aspirin or other medicines. Cut out the portions of the box where indicated by the dotted lines and then punch holes in each half for the screws or nails that are used to fasten the hinge. — Wm. E. Danne-man, Chicago.



## Valve Keepers Replaced Easily

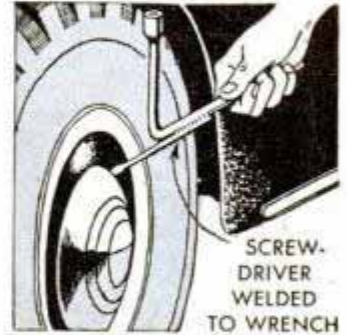
One of the quickest and easiest ways to install valve keepers on an auto motor is to use a long-blade magnetized screwdriver. The inside of the keeper is coated with heavy grease and then placed on the tip of the screwdriver, against the flat side. This is pressed onto the stem. When both

keepers are in place, ease the valve spring down with the lifter, making sure each half remains in place.

D. W. Brentlinger, Richmond, Calif.

## Versatile Two-in-One Auto Tool

Here's a two-in-one auto tool that will be a welcome addition to any motorist's kit. It's made by welding the shank of a screwdriver to the handle of a tire wrench in such a manner that several inches of the tip end project. When removing a wheel, the screwdriver is used to pry the hub cap off, and then the wrench is used in the usual manner.



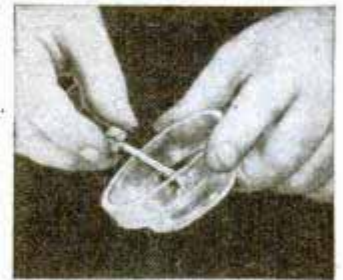
## Name on Gas Cap Prevents Theft

If the owner's name is written or printed on the gas cap of an automobile, it is not likely to be taken, and if lost, the finder will know where to return it. There are several ways to mark the cap; the name and address can be scribed with a sharp-pointed tool and then lacquered. Or the name may be stamped with marking dies if available.



## Plastic Decorated With Lacquer

Desk stands and similarly shaped articles made of transparent plastic can be given a decorative treatment that will harmonize with most color schemes. Just coat the inside of the object with lacquer or enamel. More than one color may be used to make a multicolored pattern. If it is desired to remove the finish, wipe it with a bit of absorbent cotton that has been moistened with lacquer thinner.



Next time you use a paintbrush for varnishing, prepare it by placing it in a mixture consisting of equal parts of varnish and turpentine. This is better than turpentine alone, which may make the bristles rough and coarse.



# SWEEPING IS NOT ENOUGH

Solvent cleaners supplement the work of the vacuum cleaner and broom and keep your rug looking bright and clean

*By Mildred Anderson*

**D**URABILITY of your wool-pile carpet or rug is largely dependent on the day-to-day, month-to-month care you give it while it's serving its purpose right on the floor. Under special conditions and exceptionally severe usage, periodic professional cleaning is necessary to supplement home care. This is emphasized further when one gives some thought to how a wool-pile carpet is constructed and how the different types of dirt affect the pile structure. The term "wool pile" describes the tufts of woolen yarn held together by a backing of lengthwise and crosswise yarns.

Usually these backing yarns are made of cotton or jute, sometimes of other materials. Weaves differ. In some, the pile yarn is looped around the backing yarn. In others it is not. Generally the backing is sized to give it body and firmness.

To most homemakers dirt is simply dirt—something to be gotten up off the floor and out of the house with as little fuss and labor as possible. But people who peer at dirt through powerful mi-



Photos courtesy Von Schrader Mfg. Co.

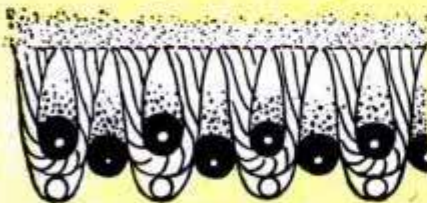
croscopes have discovered that there are three kinds responsible for wear and discoloration of your rugs. Surface litter is lint, hair, threads and other items which collect on the surface of the pile. It is easily removed. The second is light, clinging dirt. Much is deposited on the pile by air currents and gradually is worked part way down into the pile tufts by foot traffic. This type of dirt also is easily removed with a vacuum



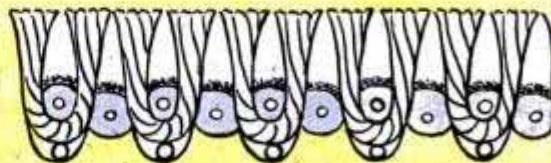
(A) NORMAL—TUFTS INCLINE IN SAME DIRECTION



(B) SHADING—TUFTS INCLINE IN OPPOSITE DIRECTIONS



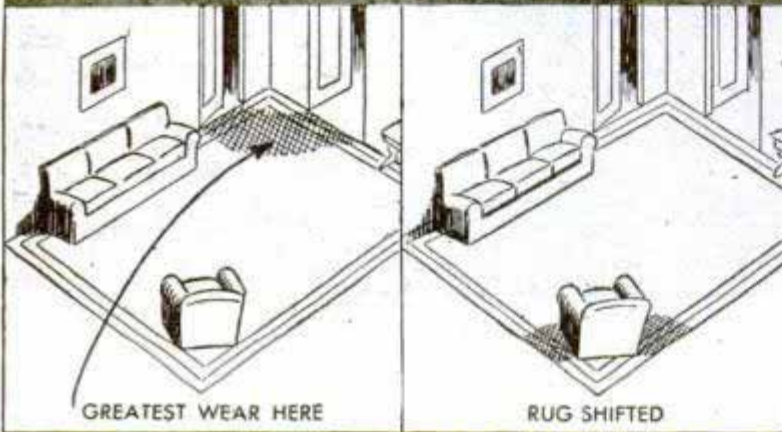
(C) BEFORE CLEANING WOOL-PILE RUG. NOTE EMBEDDED DIRT



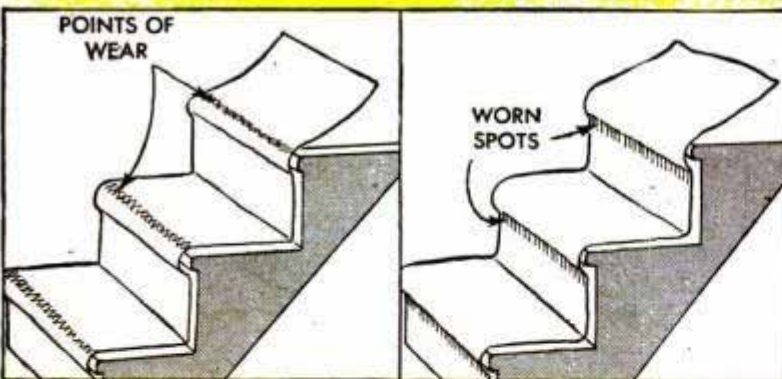
(D) AFTER CLEANING WITH VACUUM CLEANER SOME DIRT REMAINS

(2)

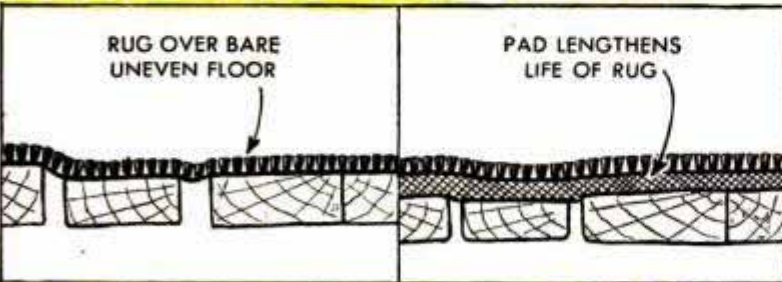




④ Shifting a rug has the effect of rerouting foot traffic and equalizing wear. Sometimes moving furniture will do it



⑤ Stair rugs get the greatest wear at the front edge of the stair tread. Shift the rug as shown to hide wear streaks



⑥ Unsightly wear streaks quickly show on a rug laid over an uneven floor. A pad lessens breaking strain on rug fibers

cleaner. The third variety is very much heavier than the other two. It has a powdery consistency and is bound together by certain sticky substances. It is not so easy to remove because it is heavy enough to work itself gradually down to the base of the pile tufts and over a longer period becomes embedded in the yarns of the backing, Fig. 2, C.

When the sharp abrasive particles contained in this heavy dirt are rubbed against the wool-pile tufts by action of foot travel, they cut the tufts near the backing yarns. The grease in the dirt causes it to cling to the pile and mat it, producing the condition known as "shading," Fig 2, B. Often the colors of the rug are dulled and may even change noticeably as the tufts flatten or incline in several directions, Fig. 2, A and B. For example, delicate rose colors will become a neutral taupe shade as the rug becomes soiled. No household vacuum cleaner can remove all of this type of embedded dirt, Fig. 2, C and D. If the cleaner were made sufficiently powerful to do so it would ruin the rug in a short time. But regular cleaning holds this deposit to a minimum. The schedule of maintenance should include both the daily and weekly care plus periodic special care. Rug manufacturers often recommend that a vacuum cleaner be used daily for a short time on each rug and carpet in your home. Shaking and beating of rugs is not advised. In time it may break the backing yarns and loosen the pile tufts. The vacuum cleaner may be used without any ill effects from the moment your new rug arrives. Every new rug will fluff to a certain extent because of the number of short fibers left in the pile. After several times over with the cleaner this usually clears up.

Most rug manufacturers do not recommend home shampooing, the chief reason being that the average home does not have facilities for adequate rinsing, which is essential to success. Quick drying is another problem of shampooing at home. Wet cotton and jute backing yarns, which do not dry quickly, may cause mildew or rotting. However, should floor shampooing at home be impera-





Solvent cleaner sprinkled on the rug, then brushed in with stiff-bristle brush and later removed with vacuum cleaner, picks up much of the embedded dirt, cleans and straightens the tufts and brightens the colors

tive for some practical reason—as in the case of wall-to-wall carpeting—one can use a specially prepared nonalkaline detergent. Nevertheless, in most cases it's best to take the carpeting up and send it to a reputable professional rug-cleaning service.

For periodic care in the home, carpet manufacturers often recommend use of prepared cleaners which consist of absorbent powders mixed with a cleaning solvent. These are worked into the rug pile with a hand brush, Figs. 1 and 7, or a machine. After the solvent evaporates, the powder is removed with a vacuum cleaner, Fig. 3. Although this process cannot be expected to equal a professional shampooing, it will greatly improve appearance by brightening the colors and lifting the pile, and at the same time it will get a lot of the deeply embedded dirt as well. These ready-prepared cleaners are particularly effective on hard-twist or frieze carpets as they do not affect the texture.

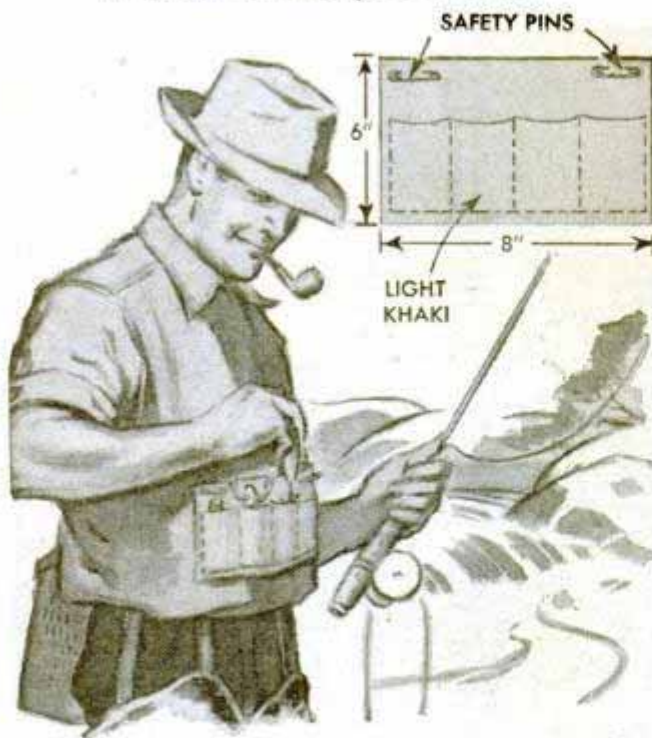
When removal of spots is called for, there are several general precautions to follow. First, try to catch the spot quickly before it sets into the pile. Blot up liquids as soon as possible with a clean, absorbent cloth or white blotting paper. Remove excess semisolid materials with a dull knife or

spatula. If the carpet has been wet through, raise it to let the back dry. On frieze or twist-pile carpets, solvent cleaners are preferred. Many spots will yield to treatment with carbon tetrachloride or to a cleaning solution which has this chemical as its base. Use a small quantity of the solvent and work from the outer edge of the spot inward. Keep the room well ventilated.

One general rule to follow with all types of rugs and carpets is to save the manufacturer's label and follow the cleaning instructions given. Wool frieze or hard-twist rugs, luster type white rugs, rayon rugs and cotton rugs should not receive run-of-the-mill treatment. Instructions should be followed with care and attention to every detail. You also can prolong the life of a rug and equalize the wear by shifting it on the floor as in Fig. 4. Sometimes it is possible to reroute the foot traffic merely by shifting the furniture. Stair rugs get a lot of wear at the points indicated in Fig. 5. A slight shift slips the worn streaks out of sight in the corner where the riser meets the tread. Even the best rug will soon show pronounced wear streaks if you lay it over an uneven floor as in Fig. 6. Of course a pad will help but it's best to level the floor or cover it with plywood before laying the rug.



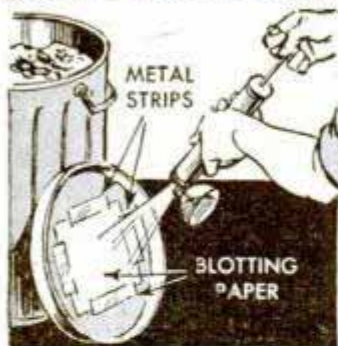
## Bait Carrier Fastened to Shirt Keeps Tackle at Hand



When wading in midstream or fishing along the shore, it's difficult to carry a tackle box with a supply of extra baits. However, with this canvas carrier, three or four lures can be carried with no inconvenience. The carrier is made of light khaki cloth and each pocket is about 2 by 4 in., the number of pockets being determined by the number of lures you wish to carry.

## Garbage Cans Are Disinfected By Spraying on Blotter

To disinfect his garbage can, one householder secured a large square of blotting paper to the underside of the can lid. Then



at regular intervals the blotter was sprayed with disinfectant. Because of the absorbent nature of the paper, it retains the spray longer than would the metal surface of the can lid.

## Washing Machine Adapter Plug Prevents Unauthorized Use

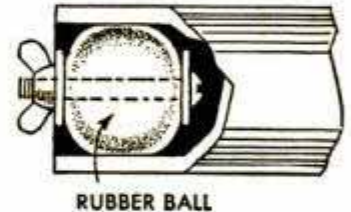
Having to keep a washing machine in an apartment-house basement, one owner found that by reversing the plug arrangement and using an adapter piece, unauthorized people were discouraged from using the machine. Instead of the usual male plug on the machine cord, a female plug

was used, and the adapter, consisting of a 4 or 5-in. length of cord, was fitted with a male plug on each end. With this arrangement, the washing machine cord was plugged into the adapter, and the adapter connected to the wall receptacle. The machine cannot be plugged into a wall outlet without the special cord which, of course, was not left with the machine.

George A. Austin, Syracuse, N. Y.

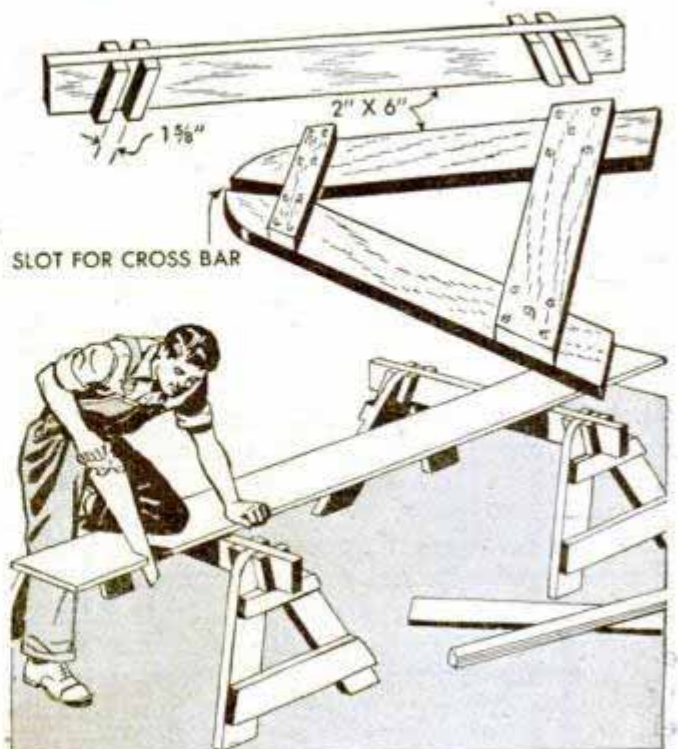
## Ball Substitutes for Pipe Plug

Where the water pressures are low enough, a sponge-rubber ball can be substituted for a pipe plug or cap if the latter is not available or if the pipe has not been threaded. The ball should just fit inside the pipe. Punch a small hole through the ball and insert a bolt, using washers on both ends, through the ball. After the ball is placed in the pipe, several turns of a wing nut will squeeze it tightly against the sides of the pipe to hold it in place.



## Demountable Sawhorse Is Ideal In Basement Workshop

If you are cramped for space in your basement, these demountable sawhorses will come in handy because they require little storage space when taken apart. Cleats are nailed to the cross bar, forming a slot that fits between the legs. The top and bottom braces for the legs are screwed to them, and the top ends of the legs are rounded.





# "DETECTIVES" SPOT GOOD DRIVERS

These simple devices will help beginners learn how to handle a car safely—and taking the tests might surprise some oldtimers behind the wheel who learned their driving the hard way

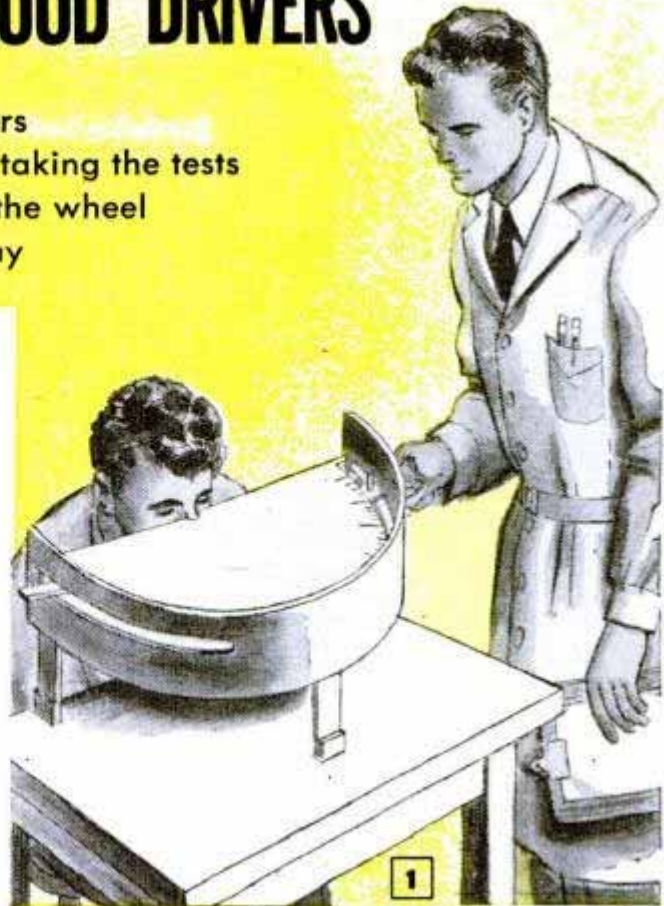
BY ERIC DEVINE

Auto accidents don't always just happen. Accidents on the highway usually "develop" and then happen. Fatal crashes occur even when driving conditions seem to the casual observer to be ideal—good visibility, a straight road, a dry pavement. Cars sometimes crash through the gates and into trains standing still on a highway or street crossing; they run off the pavement, off the road shoulder into the ditch, crash into poles and trees and bridge abutments in broad daylight.

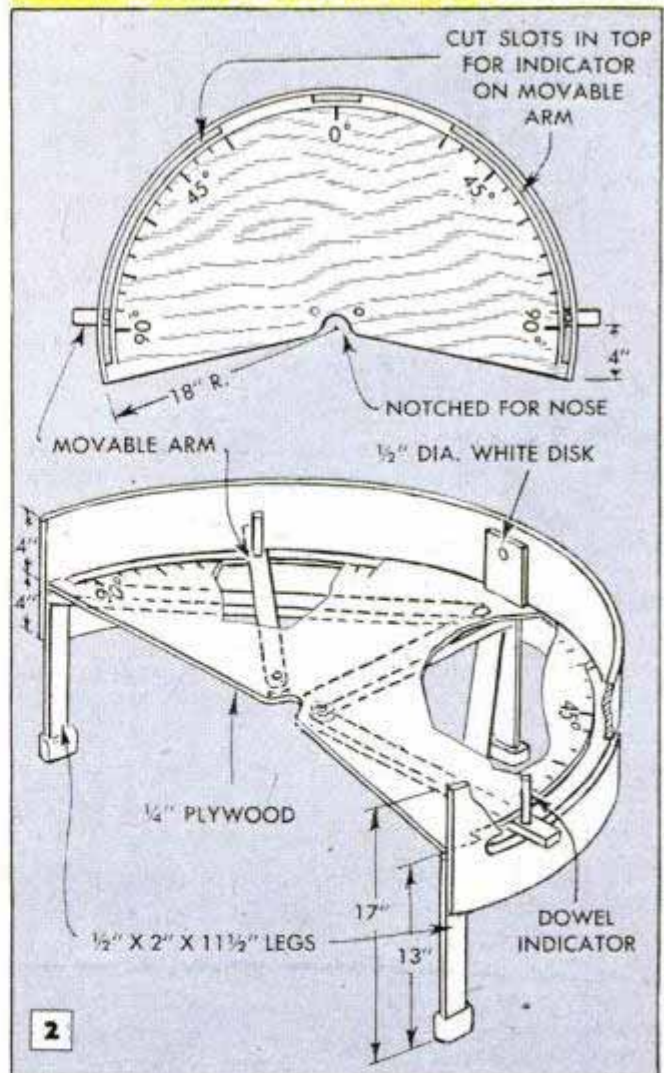
Generally the causes or reasons are more or less obscure. Frequently the reports state laconically that "the driver lost control" or "the car went out of control." But, perhaps just as frequently, examination of the wrecked car—if there was enough of it left intact to determine—revealed no mechanical fault which could be the direct cause of the crash.

Whenever there are a number of cars on the highway in close proximity, all traveling at varying speeds and some in opposite directions, circumstances and conditions of traffic may combine, in a split second, to produce the cause or causes of a fatal crash or one that results in serious injury to several persons. Only the ability of the drivers to "see it coming," and to act instantly in the emergency, will avert the danger.

In selecting recruits for the efficient and safe operation of motor vehicles, the U. S. Army put drivers-to-be through a series of tests designed to expose the nature and extent or degree of physical defects which could handicap the prospective driver and of which he himself might not be fully aware. One of these, the field-of-vision test, Fig. 1, determines just how far to the right or left an object must be before it passes out of the driver's field of vision when he is looking straight ahead. This test quickly reveals the eye defect commonly known as "tunnel" or "barrel" vision. Such an eye deficiency may seriously handicap a driver unless he learns to compensate for it by exercising the greatest caution when ap-



**1** FIELD OF VISION TEST

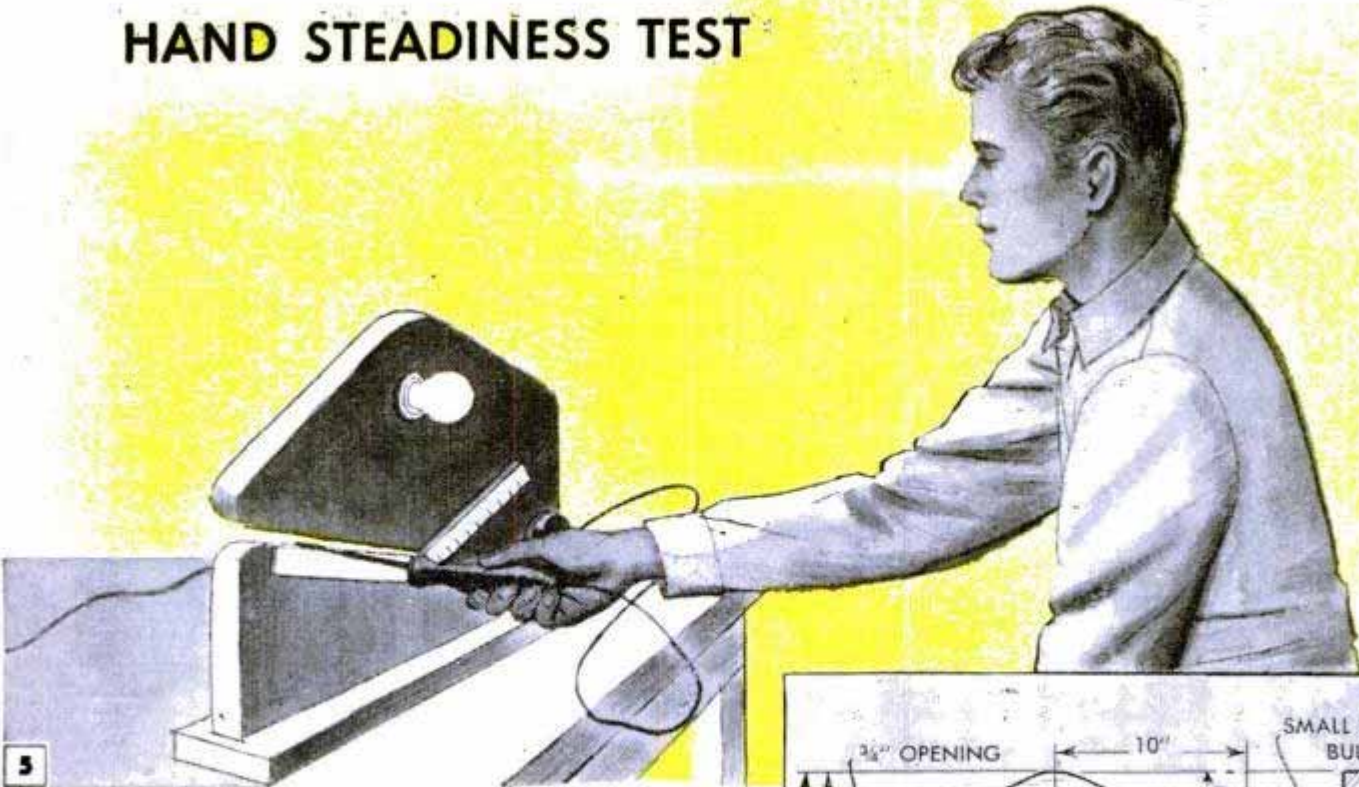








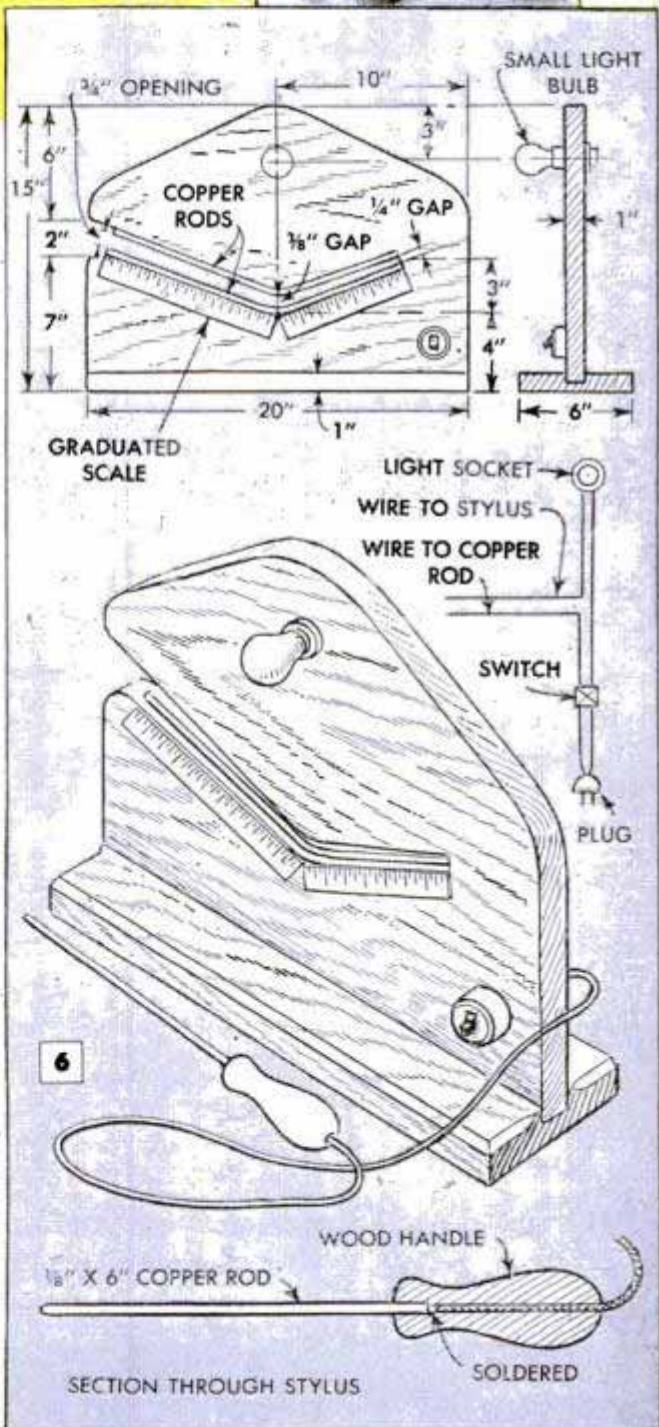
# HAND STEADINESS TEST



movable rod to a point exactly opposite the stationary one. The subject makes five trials, a separate reading being taken for each and then an average value is determined as a result.

If, in any of the trials, the movable rod is stopped more than 1 in. from the fixed rod, a deficiency in judgment is indicated which should be regarded by the prospective driver as a warning rather than any direct reflection on his ability. It also should be remembered that there are variable factors, both in the taking of the tests and out on the road where the man at the wheel must meet varying conditions of traffic, visibility, etc. It should be kept in mind that the tests are not necessarily designed to be conclusive one way or another, but rather to develop in the subject an appreciation of the dangers of a handicap.

The hand-steadiness test is interesting just by itself, without any application to driving ability. It is often used merely as one test in the total measurement of a driver. It is not at present regarded as being in any sense conclusive in determining qualifications. Figs. 5 and 6 are self-explanatory. In operation the operator passes the stylus down the gap. If unsteadiness of hand causes the stylus to touch the copper rods the light flashes on and a reading is taken. The procedure is repeated three times. All three of these devices are similar to those used by the U. S. Army and also the National Conservation Bureau in driver-training programs although of course in regular training schedules the tests are supplemented with extended instruction courses.





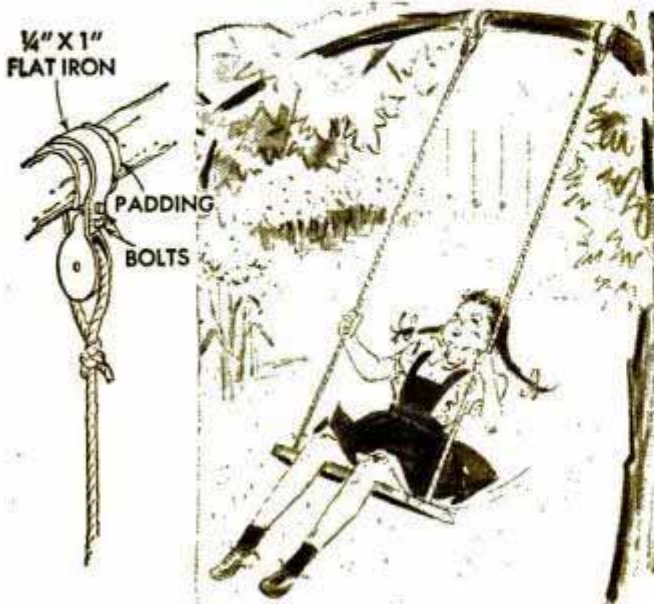
## Screen Tacked on Porch Railing Makes Safe Child's Play Pen



If screen wire is tacked to the inside of a porch railing, very young children will have a safe place in which to play. With the screen covering the rails, it is not possible for the child to do any dangerous climbing or to push toys off the porch. If the screen extends to the floor, balls and other round objects will not roll under the railing beyond the youngster's reach.

## Special Hangers Prevent Swing From Damaging Tree

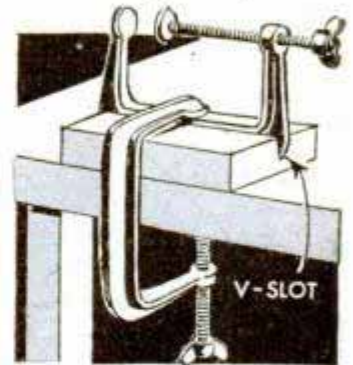
Made so there is no rubbing where it is fastened to the branch of a tree, this swing is sturdy enough for almost any child. The hangers are two lengths of flat iron that



are bolted around the limb with pulleys attached to the hangers. The ropes are run through the sheaves and tied. There should be padding between the flat iron and the branch.—R. E. Murray, Fremont, Ohio.

## Two C-Clamps as Emergency Vise

Here's a quickly rigged vise for the home modelmaker that requires only two C-clamps and a small block of wood. The wood that acts as a base is notched to fit the back of one of the clamps and the other clamp serves

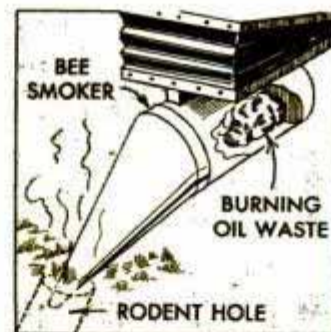


to hold it and the wood in place. The vise can be used for light and small work only.

Harold M. Winz, Republican City, Nebr.

## Bee Smoker for Gopher Hunters

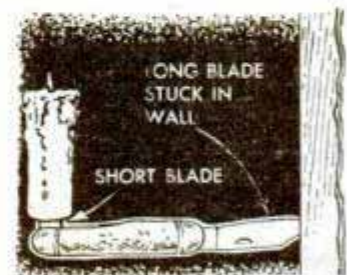
Farmers and others who wish to rid their property of gophers will find that they can be "smoked out" of their holes quickly by using a bee smoker.



Fill the smoker tube with oily cotton or waste, ignite it and insert the spout in the burrow opening. Usually a few strokes will fill the burrow with smoke and drive the animal to the surface in a very short time.

## Jackknife Is Handy Candlestick

Safe and convenient, this candlestick holder will come in handy at camp, or in some dark corner of the basement where there isn't sufficient light. The large blade of the knife is stuck into a wall or tent post and the small blade, which is opened at right angles to the handle, holds the candle. With this arrangement, the flame is at some distance from the wall or tent post.—E. Handleman, Syracuse, N. Y.



☐ Linen handkerchiefs won't need ironing if stretched and pressed flat against a mirror until dry. This idea is especially handy when traveling.

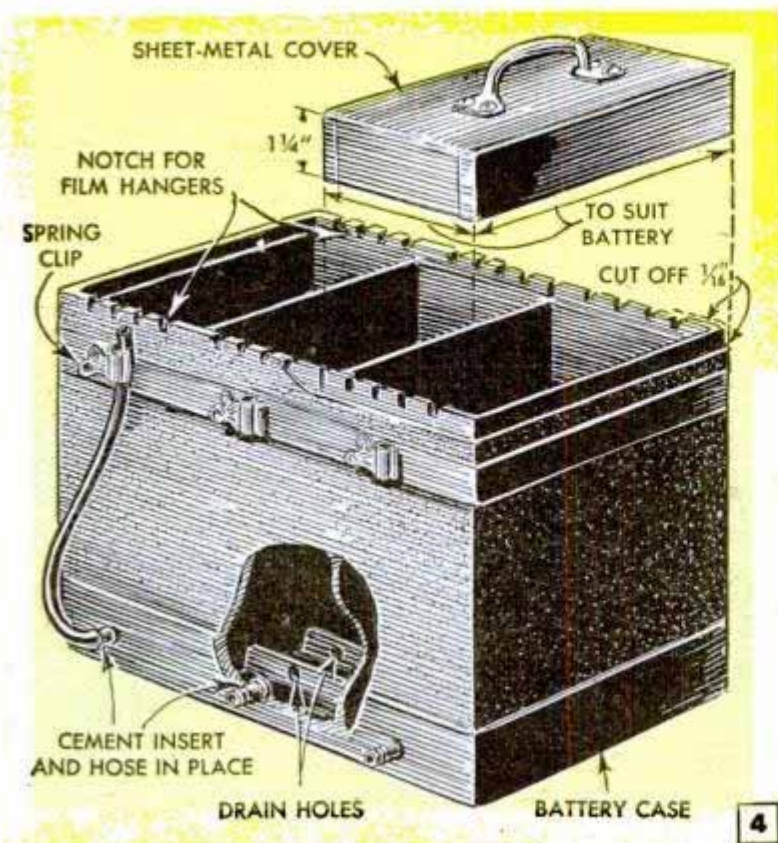
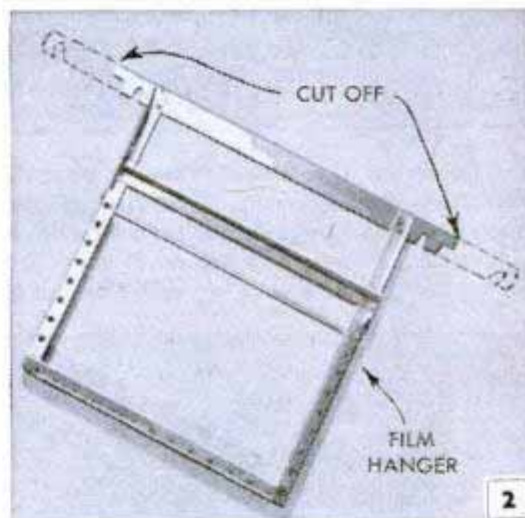
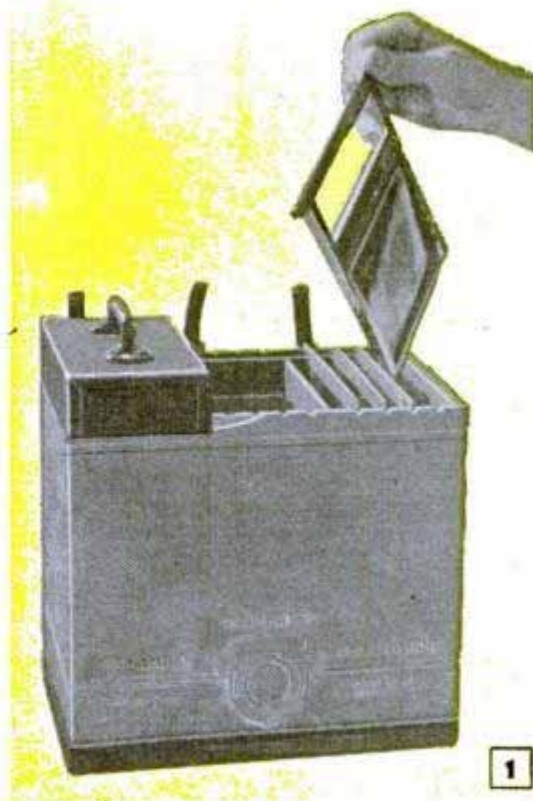


# FROM BATTERY CASE TO DEVELOPING TANK

*Here's a small three-in-one tank that's ideal for developing, rinsing and fixing cut film*

By William Riederich

FOR the photographer who has occasion to develop small batches of cut film up to 5 by 7 in. in size, this compact unit, Fig. 1, will do the entire job; it requires little storage space and is easy to drain, Fig. 3. The tank proper is made from a 3-cell storage-battery case of 15 or 17-plate size, sound and free from cracks. After thoroughly cleansing the case with a soda and water solution, cut a shoulder around the outside top edges of one end cell to permit a light-tight fit for the cover, Fig. 4. Remove about  $\frac{1}{16}$  in. Then cut notches in the top of each cell for the number of film holders you will require and make a slit for the lip of the cover that fits against the compartment dividing the center and end cell. The cover is dimensioned to fit, making sure that it will not leak light. Finish it with several coats of acid-resisting paint. Holes are drilled in each cell and through the bottom ribs to insure complete drainage. Force rubber inserts into each outside hole and attach lengths of rubber tubing to these, holding the tubing in place with clips screwed to the side of the case. Finally, it will be necessary to shorten the arms of the film holders to fit the tank, Fig. 2. In use, the cell with the lid is for the developer; the center cell is for the rinse and the uncovered end cell for the fixing solution.







The lowering sky, the lighthouse and the angular detail introduced by the weathered driftwood in the picture above suggest symbolically the dangers of shipwreck. Below, who wouldn't spark with interest at the thought of a real log cabin on the lake shore?



At first glance you think of a sentinel rock but actually it's a pillar of earth with the surrounding area washed away. Farm editors like such shots as this

# Profits

## IN ROADSIDE PICTURES

By Paul Hadley

Old millstones are good bets for the roving photographer. Here they are serving as an "atmosphere" exhibit near the entrance to a large antique shop







Once proud sailing vessels, these old hulks now lie partially sunken and listing, favorite studies for artists and photographers. Don't miss such a shot

**T**HERE are salable roadside photos hidden along every mile you travel by auto. The ability to "see a picture," to recognize instantly the elements of good photo material, is one of those sixth senses the traveling photographer must acquire. When you're speeding swiftly through the countryside, the essentials of a good picture have a way of momentarily falling into place, giving you a fleeting glimpse, and then disappearing just as suddenly. Other pictures often "develop" along the way. You may pass a given spot—a dam, an old mill, a lighthouse or a cabin—several times and see nothing to excite a photographer's interest. But if you watch these spots there will come a day when the natural lighting, the cloud formations and the tonal values are just right.

Then there is what might be called the seasonal picture; that is, it develops as a result of the change in season. Many landscapes, street or roadside scenes, and close-ups of detail frequently offer little of photographic value unless covered with a mantle of snow or locked in the winter ice. Often you will see picture possibilities then where none appeared before. Likewise

This odd passenger depot is located at the top of Lookout Mountain near Chattanooga, Tenn., and it is a terminal of one of the world's steepest railways



JUNE 1947



Pictorial shots such as this one of a mountain home are always good to have in your photo file. Notice how the cloud formation enhances the pictorial values

winter scenes more or less lacking in appeal may develop into interesting and dramatic shots during the spring, summer or autumn season.

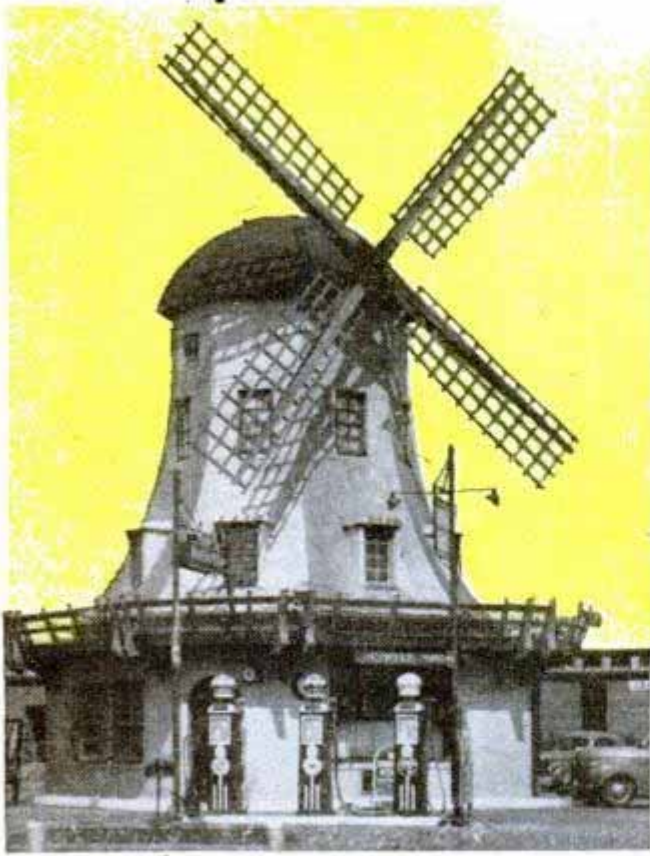
You don't search exclusively for the unusual, the novel or the unique in roadside views. Very often the commonplace holds even more interesting possibilities for the observing free-lance photographer. Frequently one will have the experience of studying a view from one spot without seeing anything attractive in the composition. Move a little from your point of vantage, right, left, forward or back. Sometimes just a few steps one way or another will have the effect of changing the composition of the scene before you into something with definite and perhaps striking photographic values.

Point of interest and a composition which stimulates thought on the part of the reader—these generally top the features editors look for in a photoprint. Study the accompanying photographs and see how, in various ways, they fill this order. Who, for example, wouldn't spark with interest at the prospect of owning a real log cabin by the lake shore, and who wouldn't like to know

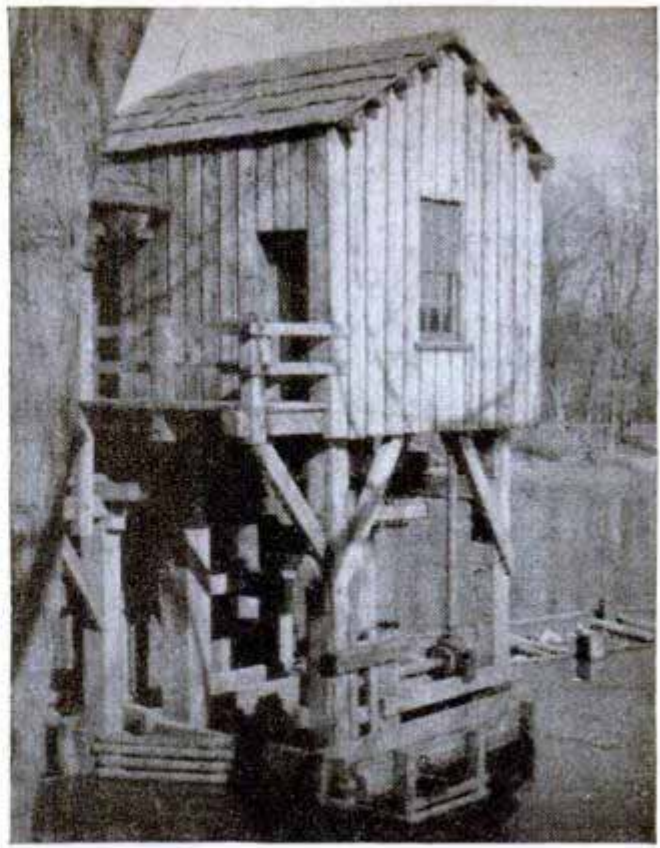
Even a box camera is capable of good photos when in the hands of an expert. Note the sharp reflection of the wagon and the horses in the still water







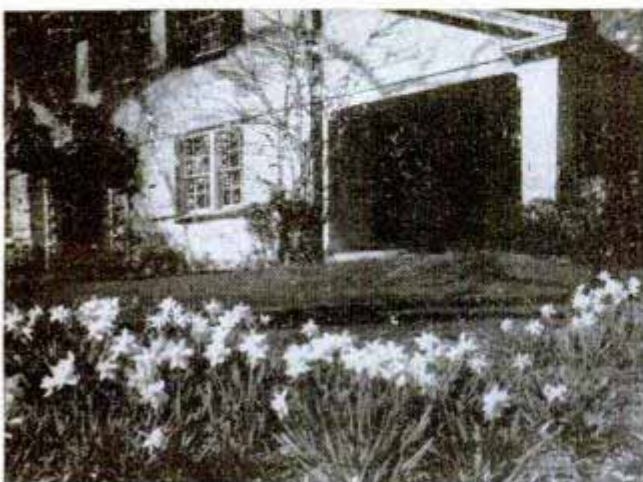
Trade journals are usually customers for such photos as the one above of the combination coffee shop and filling station with the Dutch windmill motif, and, below, the woods photo of a newly felled big tree



Never pass up a water mill. It's a natural with most editors. This one is a very famous restoration—a part of the Abraham Lincoln Memorial at New Salem, Ill.



Below, carefully composed photos of home grounds, spacious lawns, flower gardens and trained shrubbery are used by publications devoted to homeowners



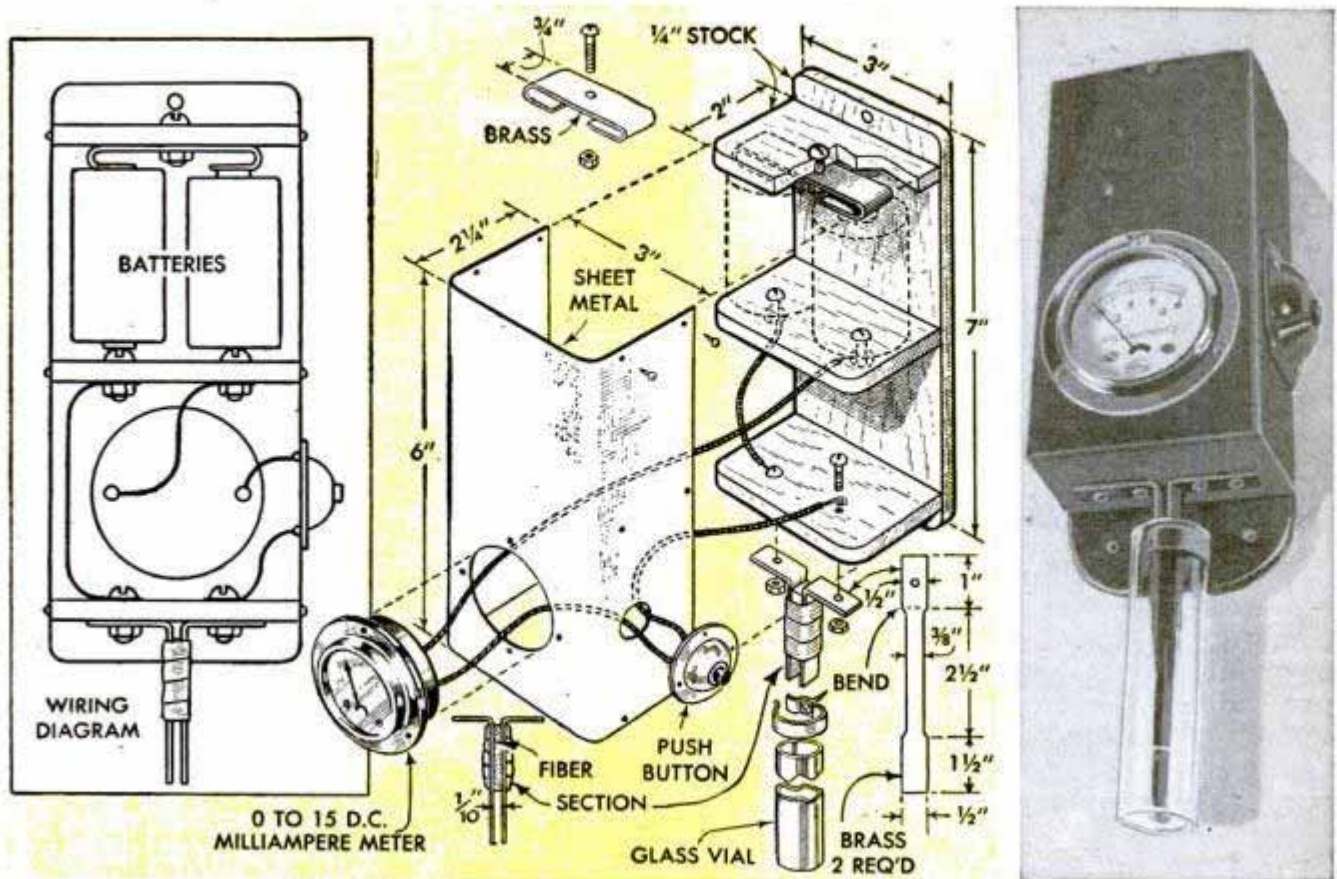
the real story of the old millstones? The shot of the lighthouse towering against a lowering sky and framed by a piece of weathered driftwood gives one an inescapable feeling of stark reality.

Trade journals, farm and garden publications, and magazines featuring articles of interest to the homeowner are markets for good photos such as that of the combination gas station and coffee shop with the Dutch windmill motif. Well-composed photos of home gardens and flower arrangements are always good bets for the roadside photographer. Photos of famous historical buildings, monuments or restorations are good prints to have in your file.

The camera used for this work is a matter of individual choice. Some photographers prefer a view camera taking a large film size so that they can make salable contact prints direct from the negative. Photo-prints in the 4 by 5-in. size are quite generally acceptable to photo editors but the 8 by 10-in. size nearly always gets a better rating. With many photographers experienced in outdoor work the reflex camera gets the nod of approval because it gives all the advantages of ground-glass focusing in a smaller, lighter package than the view camera. Moreover, in the reflex camera you see the image right side up while focusing. Negatives smaller than 4 by 5 in. should be "blown up" in an enlarger to 4 by 5, 5 by 7 or 8 by 10-in. size.

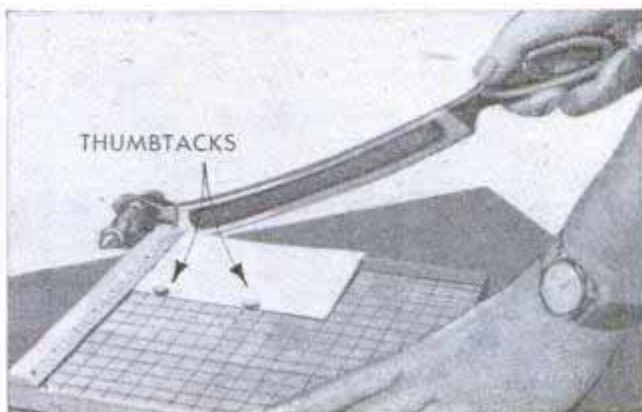


# Hypo Wash Tester Gives Accurate Readings



Photoprints that are to be toned or kept for permanent records—any prints that are to last—must be thoroughly washed. Although there are several ways of testing the wash chemically, this electric tester is built up around the principle that concentrations of salts in water have a resistance to the passage of electric current that can be measured. Simplifying the taking of a series of readings, or checks, will speed up the job of washing. A d.c. milliamperemeter or milliammeter giving a reading of 0 to 15 will do very well, although others having a slightly different range will serve. The details tell the story of the construction of the tester. A push-button switch that cuts off the current makes it possible to reduce battery drain, which ordinarily begins as soon as solution touches the brass

blades and would continue as long as solution remained on the blades. The closed-end glass tube is held in place with a spring clip. File or grind a fill mark as indicated in the right-hand photo. Make sure the bottom of the tube touches the ends of the test blades. Then see that the batteries are inserted as shown in the left-hand detail—one right side up and the other upside down—and check the positive and negative connections to the meter to be sure they are correct. Take a reading from the tester with the tube filled to the mark with plain water. Then, to use, drip the hypo wash directly into the tube. As long as the meter reads above the check reading with plain water, washing of the prints or negatives should continue. Always test with the same amount.—John Steinke, Cleveland, Ohio.



## Thumbtack Stop for Paper Cutter

Because it is often difficult to see the graduations on a paper-cutter board in the dim light of a darkroom, use a couple of thumbtacks to serve as a work stop. By hooking the sheet under the heads of the tacks, it is possible to hold the paper more steadily than when pressed against the ruler only. For extra large sheets, it may be necessary to use three or four tacks to keep the paper properly lined up and prevent its slipping on the board.



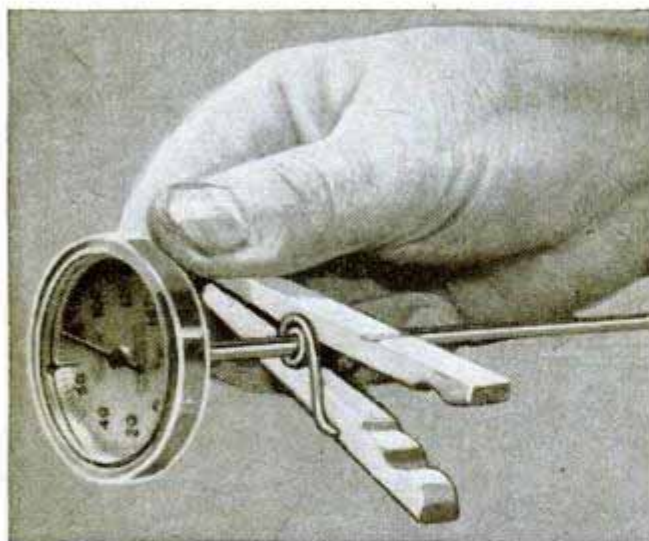
## How to Use Chipped Photo Trays



Until a badly-chipped photo tray can be repaired or replaced, avoid using it in that condition because iron stains on negatives or prints might result. Instead, line the tray with a sheet of waxed paper which will mold itself in position when the processing solution is poured into it. This will serve as a temporary waterproof liner.

## Dial Thermometer for Liquids Is Held by a Clothespin

When using a dial-type thermometer in the darkroom to determine the temperature of liquids, slip the shank through the coil of a spring clothespin and the thermometer can be attached anywhere. It can be clipped to the side of a tray or tank to register the temperature, or when not in use, it can be fastened to a nearby shelf support.



## Negatives Are Kept With Prints

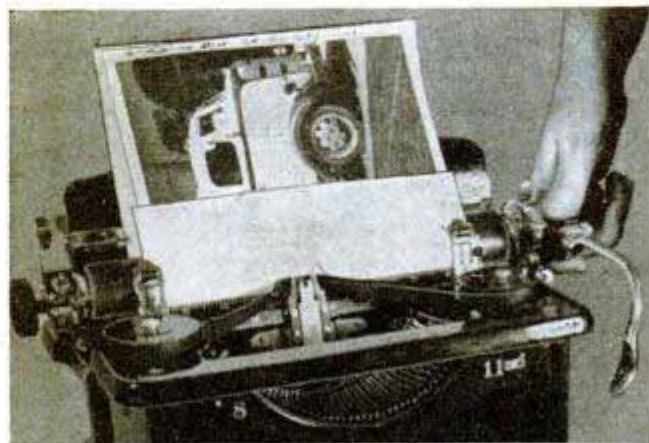
If you use art corners to fasten snapshots in an album, it's an easy matter to slip the negative behind the print when mounting pictures. This serves as protection for the

negative and helps to identify it. In addition, you know where to find the negative in case additional prints are required.

Margaret Tatroe, Edmonton, Alta., Can.

## Print Straightened in Typewriter

One of the simplest and quickest ways to straighten a curved glossy print when you don't have a regular print straightener is to run it through the typewriter. The curved side should be away from you as

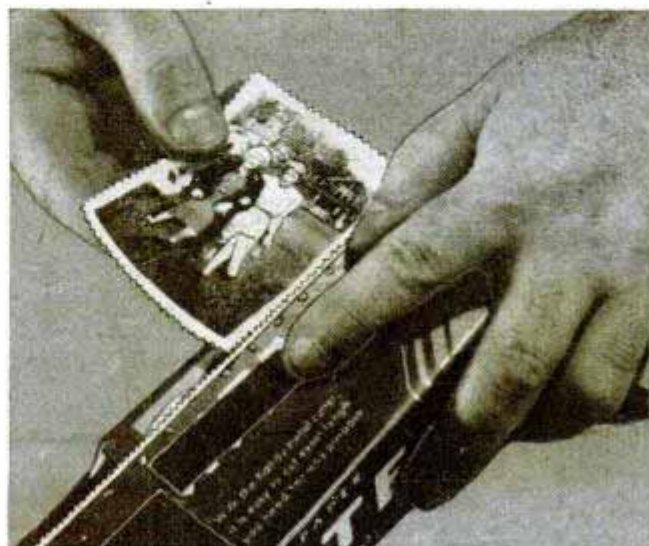


you feed it into the machine. A piece of paper laid over the surface of the picture will protect it from scratches. Most pictures will be flat after passing through the typewriter once, but in some cases, when heavier weight papers are used, it may be necessary to repeat the treatment.

Bob Hurst, Chicago.

## Snapshots Given Deckle Edge

Glossy photographs and snapshots on single-weight paper can be given a deckle edge with the serrated cutter on a box of waxed paper. Merely slip one edge of the print underneath the cutter, hold the latter down firmly and pull the photo up, being careful when making the tear. Allow sufficient margin for the deckle edge when trimming the print in the paper cutter.





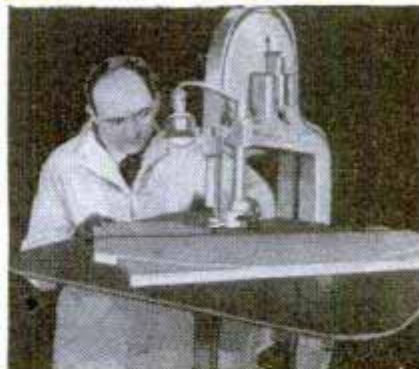
# CRAFT QUIZ



1. Best window screen material is—  
 (a) Bronze (c) Aluminized zinc  
 (b) Black (d) Galvanized



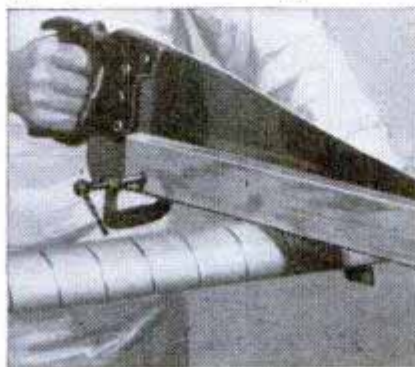
2. Orange shellac is thinned with—  
 (a) Turpentine (c) Naphtha  
 (b) Orano (d) Alcohol



3. First bandsaw was invented in—  
 (a) 1798 (c) 1850  
 (b) 1808 (d) 1892



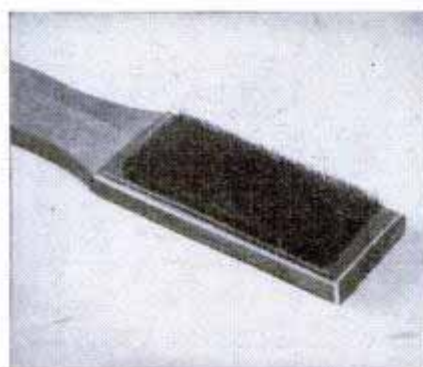
4. Hammering copper makes it—  
 (a) Ductile (c) Soft  
 (b) Brittle (d) Flexible



5. His next operation will be—  
 (a) Sanding (c) Spinning  
 (b) Filing (d) Turning



6. He is repairing the—  
 (a) Flashing (c) Thimble  
 (b) Culvert (d) Flue



7. This gadget goes with—  
 (a) Files (c) Metal cleaning  
 (b) Lathe (d) Soldering



8. This house roof is—  
 (a)  $\frac{1}{2}$  pitch (c)  $\frac{1}{4}$  pitch  
 (b)  $\frac{1}{3}$  pitch (d)  $\frac{3}{4}$  pitch

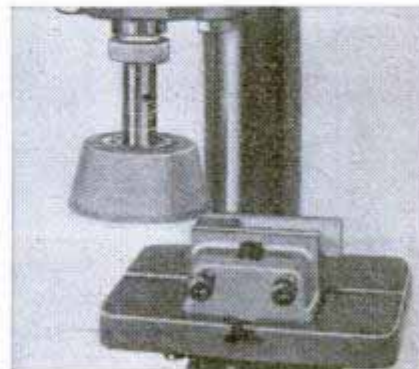


9. Copper silhouette cutout is—  
 (a) 2 diopters (c) 3 ohms  
 (b) 22 gauge (d) 15 mils

**ANSWERS:** 1—a; 2—d; 3—b (however, not in general use until about 1850); 4—b; 5—b (spiral turning is cut by hand filing); 6—a; 7—a (file card, for cleaning); 8—b (vertical height or "rise" is  $\frac{1}{3}$  the horizontal distance between eaves); 9—b; 10—a; 11—c



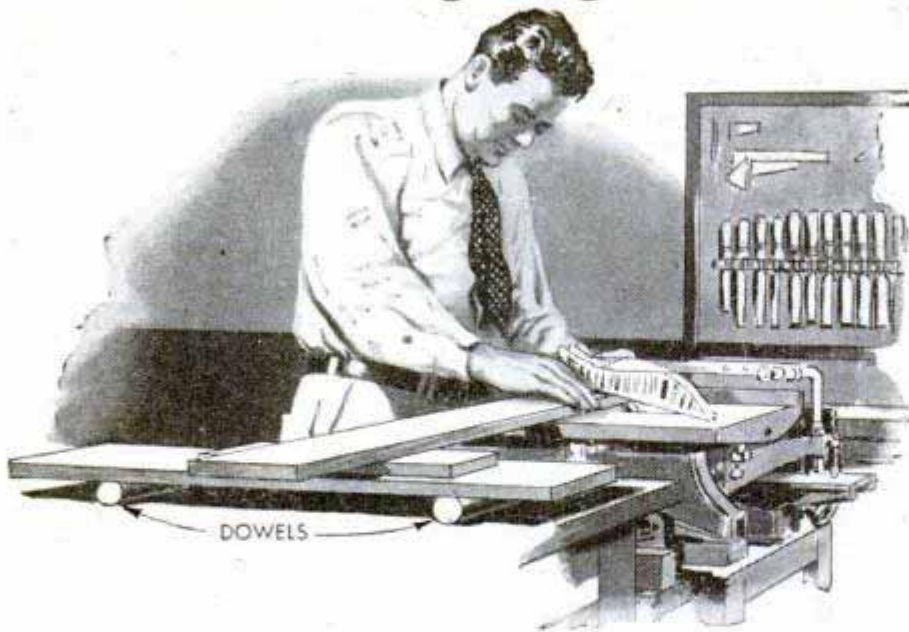
10. This style chair looks best in—  
 (a) Maple (c) Whitewood  
 (b) Walnut (d) Fir



11. Shape of grinding wheel is—  
 (a) Saucer (c) Cup  
 (b) Dish (d) Straight



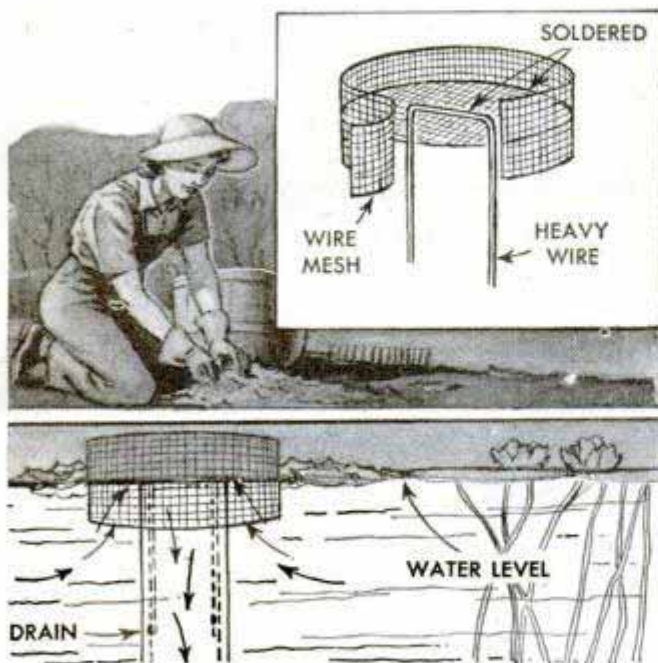
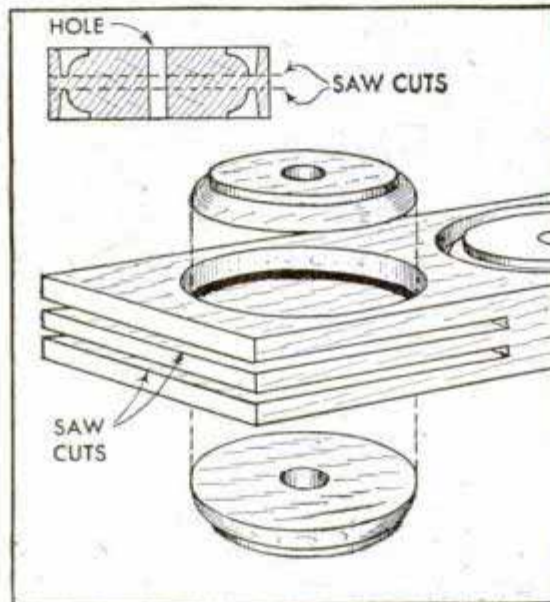
## Roller Arrangement for Bench Rig Makes Sawing Long Boards Easy



Users of bench saws often find it difficult to cut long boards because the ends project over the saw table and are hard to handle. If two or three large dowels or rollers and some supporting boards are used as a carriage, the job is easy and the cut will be clean. The supporting board, or boards, should be several feet long, and the rollers large enough to make up the difference in height between the workbench and the saw table. Dowels, short pieces of pipe or tin cans are used as rollers.—James V. Oldham, Park Ridge, Ill.

## Ornament Bases Cut Quickly

Bases for ornaments such as flag stands and candlesticks can be produced in quantity by the method outlined: Select a suitable piece of stock and drill pilot holes for the centers; then cut the outlines of the bases with a fly cutter. Finally, plane and sand the four sides and saw the bases from the stock, as indicated.—Thomas G. Sutherland, Chicago.



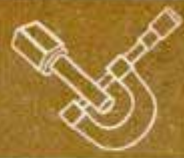
## Wire-Mesh Baffle Keeps Leaves From Clogging Pool Drain

Leaves and other debris floating on a garden pool soon collect around the overflow outlet and prevent the water from draining. The wire-mesh baffle shown here will prevent this. Cut a circular piece about 2 in. larger than the outlet and solder a 3-in. strip around the edge, as indicated. Then bend a length of heavy wire in a U-shape and solder this to the underside of the baffle. The projecting lengths of wire should be a snug fit inside the drain and extend downward for some distance.

Edward H. Stutz, Cleveland, Ohio.

☐ A round oatmeal container covered with attractive wallpaper will provide a serviceable hat stand that will add to the appearance of your closet.



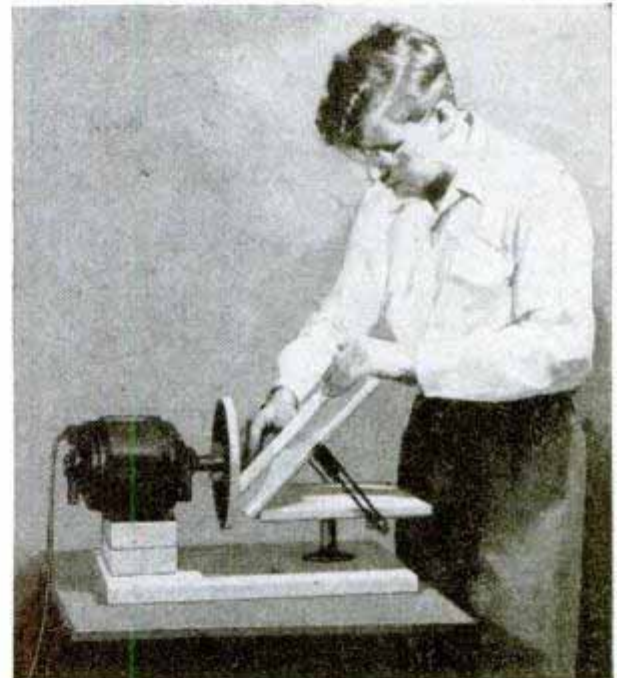
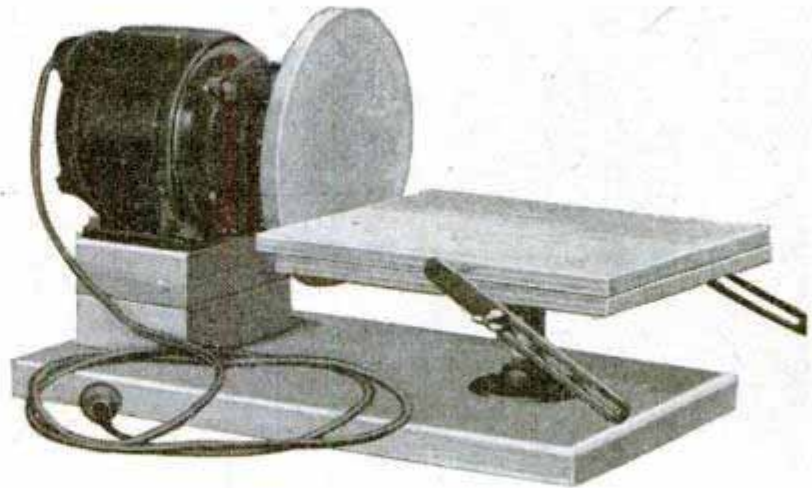


## 12-inch DISK SANDER has tilting table

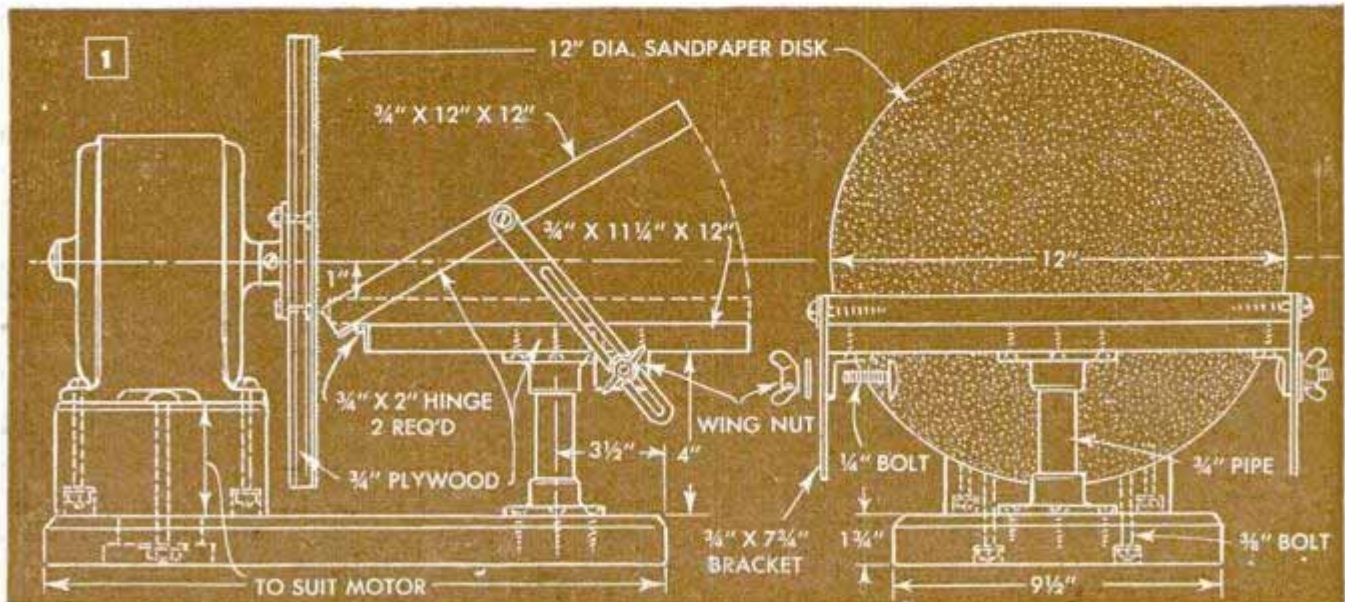
By Paul F. Sass, Jr.

**S**QUARING UP small, rough-sawed parts, smoothing end grain and finishing the edges on plywood—these are quick, easy jobs for a disk sander, and at the same time are among the most difficult and tedious to do by hand. Exclusive of the motor, which can be  $\frac{1}{4}$  to  $\frac{1}{2}$ -hp., 1725-r.p.m. capacity, the sander is made from odds and ends that are found around most workshops, and only hand tools are needed for its construction.

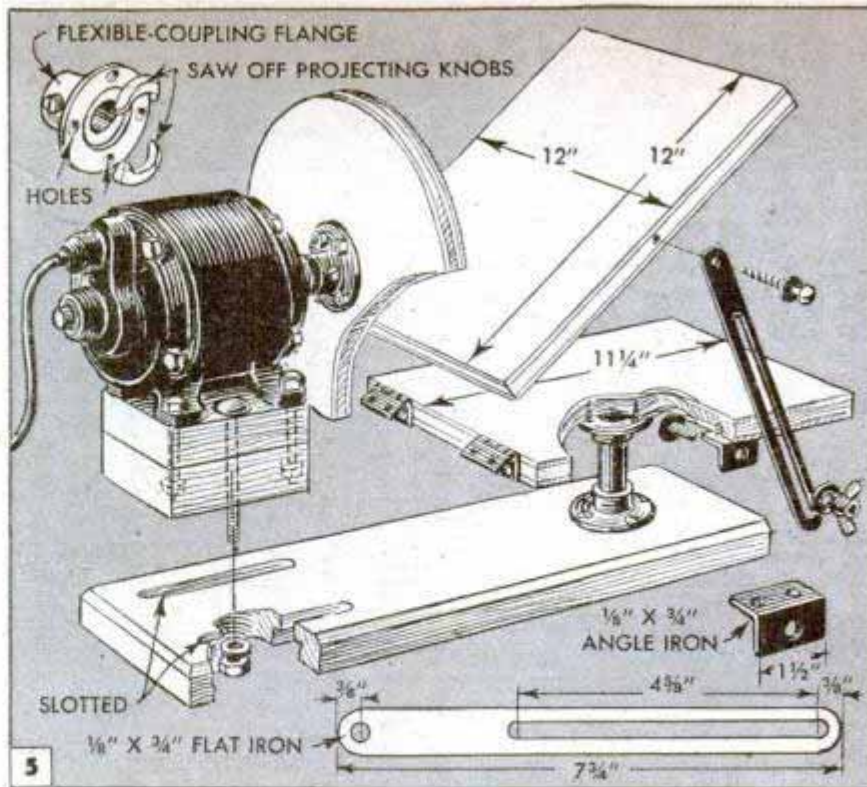
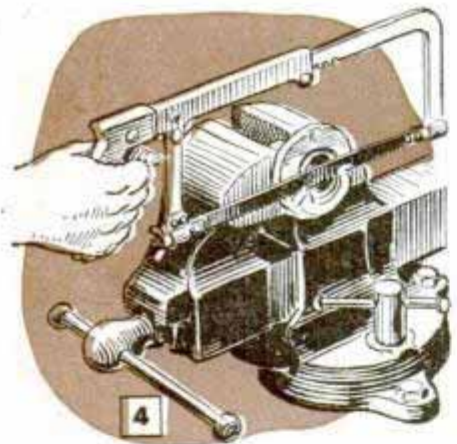
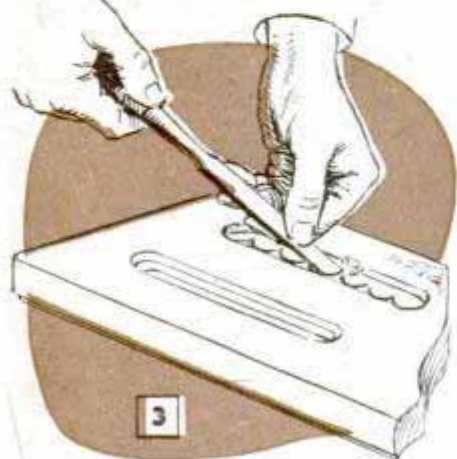
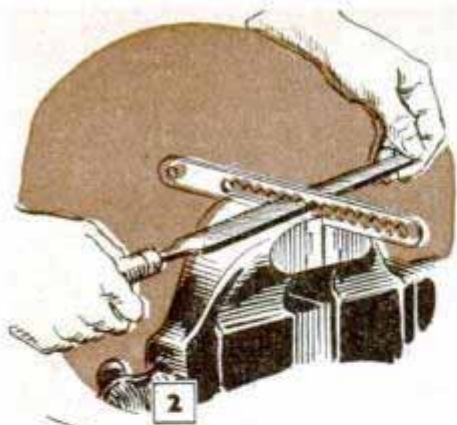
Dimensions for the motor-mounting block are omitted because they will vary with the motor that is used. As far as height is concerned, the center line of the motor should be 1 in. above the tilt-table top, or  $6\frac{1}{2}$  in. above the base, and, lengthwise of course, it centers on the base. Bolt the motor to the block and countersink holes for the nuts and washers, Fig. 1. The base is slotted to provide for adjustment of the motor, and these slots are countersunk also, Fig. 3, so the block mounting nuts and washers can be recessed. Make the slots a little wider than the diameter of the bolts to provide adjustment sideways. The table and tilt top are screwed to a pipe-and-flange pedestal that is  $3\frac{1}{2}$  in. from the end of the base opposite the motor. Dimensions for



Sanding surfaces at any desired angle is not difficult because the tilting table is adjustable







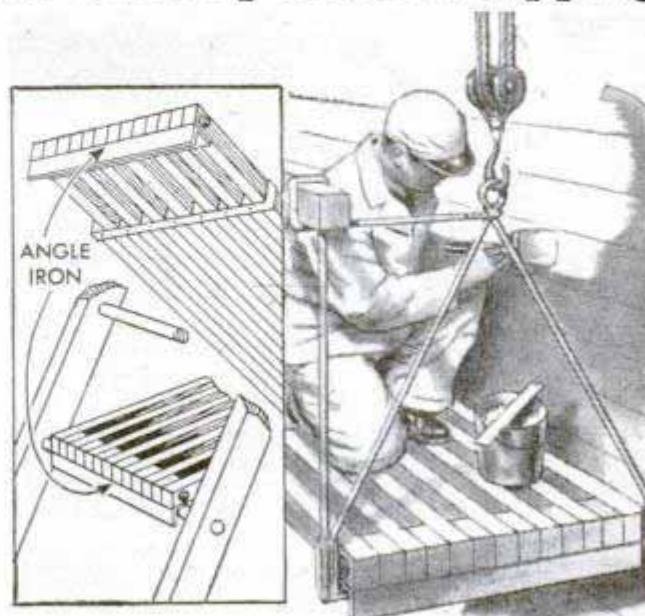
the table and tilt top, which are  $\frac{3}{4}$ -in. plywood, are given in Fig. 5, as are the details of the adjusting brackets. The slots for the brackets are drilled and filed as indicated in Fig. 2. Two butt hinges are used to secure the tilt top to the table, allowing the former to overlap the latter as shown in the left-hand detail of Fig. 1. A flexible-coupling flange is used as a mounting for the sanding disk. The face is cut off flush with a hacksaw, Fig. 4; or, to insure a disk that will run true, it can be faced in a lathe if the latter is available. To complete the sander, cut a  $\frac{3}{4}$ -in. plywood disk 12 in. in diameter and bolt it to the flange with flat-head screws, countersinking the holes so the heads will be a little below the surface of the disk. Glue on the sandpaper and finish the unit with gray or black paint. For convenience in operation, a toggle switch can be mounted on the base or block to control the operation of the motor instead of using a switch in the line or on the wall.

## Angle Iron on Ends of Scaffold Will Keep It From Slipping

Safety for those who work on scaffolds is increased by screwing angle irons to the ends so the scaffold cannot slip off the supporting members. One leg of the angle should be flush with the end of the scaffold. If the scaffold is of the expanding type, the iron should be attached to the stationary pieces only.

## Ridding Granary of Rats and Mice

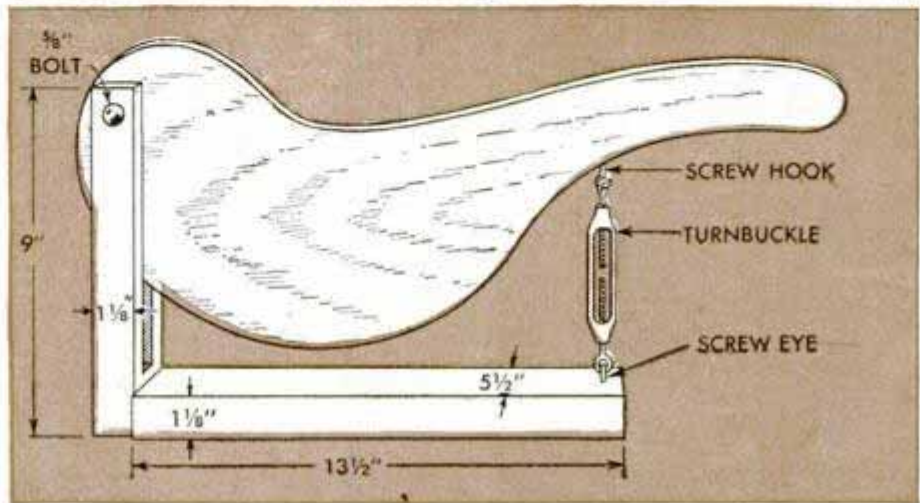
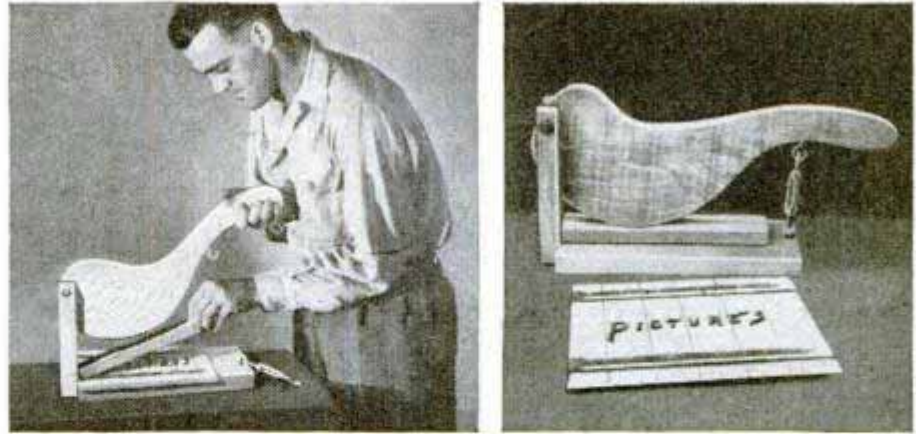
When killing rats and mice in a granary, a "club," made by nailing a 24-in. length of garden hose to a short wooden stick, will come in handy. The stick serves as a handle. With this device you can get into difficult corners not accessible with a heavy stick, and, when a blow is struck, the club doesn't "sting" your hands.



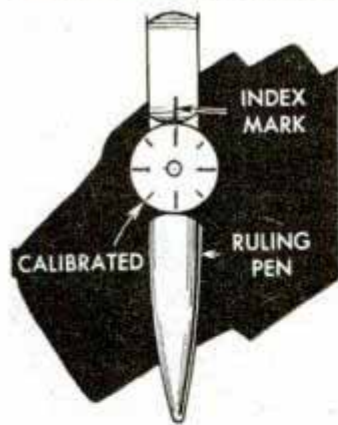


# Cam-Shaped Clamp Holds Work of Varied Size

Necessity being the mother of invention, one craftsman devised this clamp to glue wooden letters on a book when he had no suitable clamping device on hand that would cover a large enough area. The dimensions given in the lower detail need not be followed necessarily, but they represent an average size for this particular kind of work. The upper left-hand photograph shows the book being placed in the clamp with a board over the letters to equalize the pressure. Because the lever is cam shaped, work of varying thickness can be clamped in short order, the amount of pressure being regulated by the turnbuckle. Hardwood was used throughout in the construction of the clamp.



## Calibrating Marks for Ruling Pen



If calibrating marks and an index mark are made on a ruling pen, it's easy to set it and duplicate the width of lines previously drawn. The nut is divided into eighths and an indexing mark is made on the pen above the nut.

## How to Replace Oil-Pan Gaskets

When replacing an oil-pan gasket on your car, instead of shellacking it to the pan use string to hold it in place. It's only necessary to tie it through every other hole. When the pan is pulled up, the string sets into the gasket. Secured in this manner, it will be easier to remove the gasket for replacement.

W. V. Atharas, Ashland, Ore.

❏ Never put the ivory handles of knives or forks into hot water as it causes them to crack and discolor. Instead, hold the handles while washing the blades or prongs.

## Park Bench Has Reversible Back And Faces in Two Directions

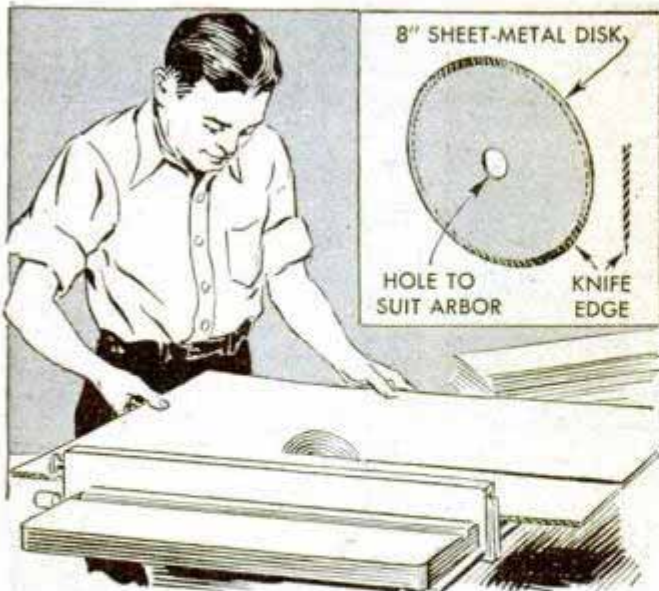
Taking a tip from the manufacturers of railway coach seats which have reversible backs, one carpenter applied the same principle when making park benches. The back is pivoted to the legs and the users can face in one of two directions merely by changing the position of the back. Occupants of the benches can always enjoy the sun in clear weather.

Paul Hadley, Philadelphia, Pa.





## Strips of Cardboard Cut Quickly With Knife-Edge Disk



Where strips of corrugated cardboard were used to pack glassware in a manufacturing plant, difficulty was encountered because the cardboard was too thick to cut with a knife and sawing left rough edges. The solution was accomplished by making a disk of metal about as thick as stovepipe and sharpening it to a knife edge. When mounted on a saw, the disk cut the cardboard with ease.—Everett Goddard, Sidney, Vancouver Island, B.C., Can.

## Preventing Tape From Unrolling



In a shipping department where gummed tape is used to seal packages, it was found that without a holder the tape unrolled and was difficult to use. One clerk overcame this trouble by coating both sides of the roll with rubber cement. Not only does this prevent the tape from unrolling, but also seals the sides against moisture.—Kenneth Murray, Colon, Mich.

## Color Bands Identify Oil Bottles



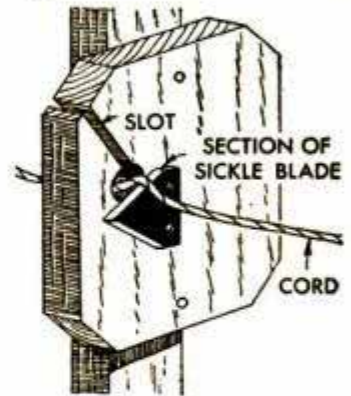
By painting the spouts of oil bottles with different colors and numbers of bands, one filling station is able to identify any grade or viscosity at a glance. This saves consid-

erable time and means that the customer can be served quicker. The bottles are filled during off periods when the attendant is not busy with customers.

Opie Read, Jr., Chicago.

## Sickle Blade Makes Twine Cutter

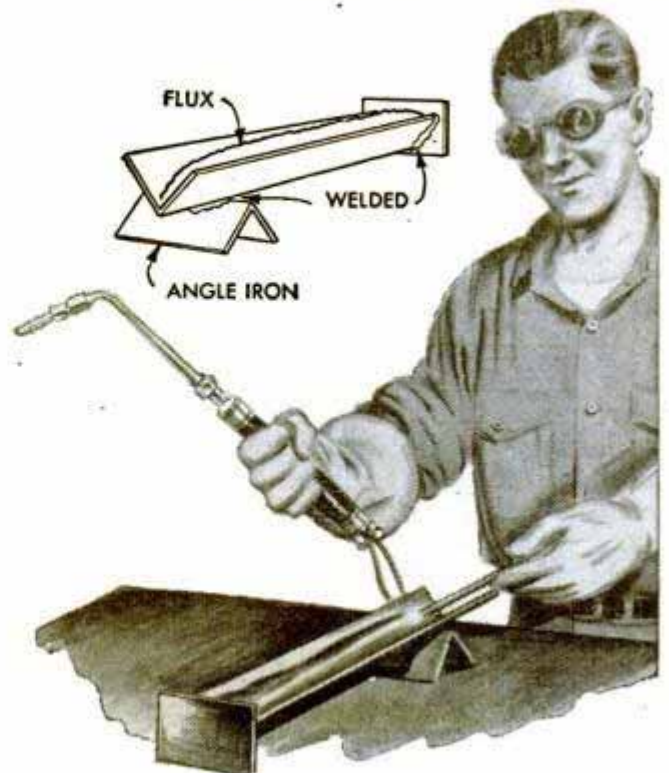
With an old sickle section and a scrap piece of hardwood, a safe and efficient twine cutter can be made in short order. The wood is cut square and the four corners are trimmed. Then a slot ending in a drilled hole is made. Mount the cutter so that one of the cutting edges partially covers the hole in the block. When the section becomes dull, it can be reversed. Fasten the unit to a post or at any other convenient place.



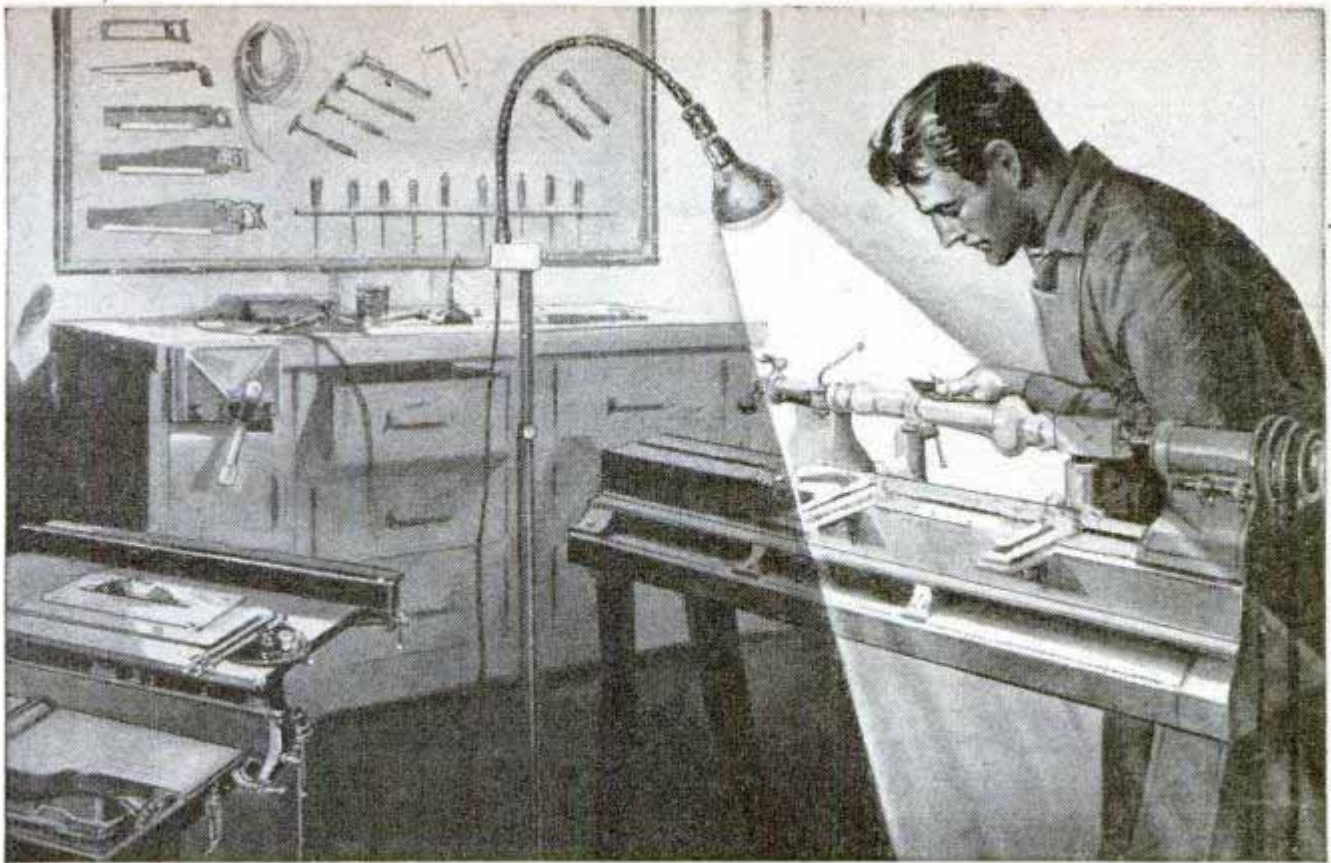
## Metal Trough for Welding Flux Saves Time on the Job

When using rods that are dipped in flux, a welder can save much time if the flux is poured into a trough so that more of the rod can be covered at a time. The trough, which is about 1 ft. long, is made of angle iron with one end closed and the other supported by a shorter angle. Be sure to pour the flux back into the can and seal it after finishing a job.

Andrew Vena, Philadelphia, Pa.





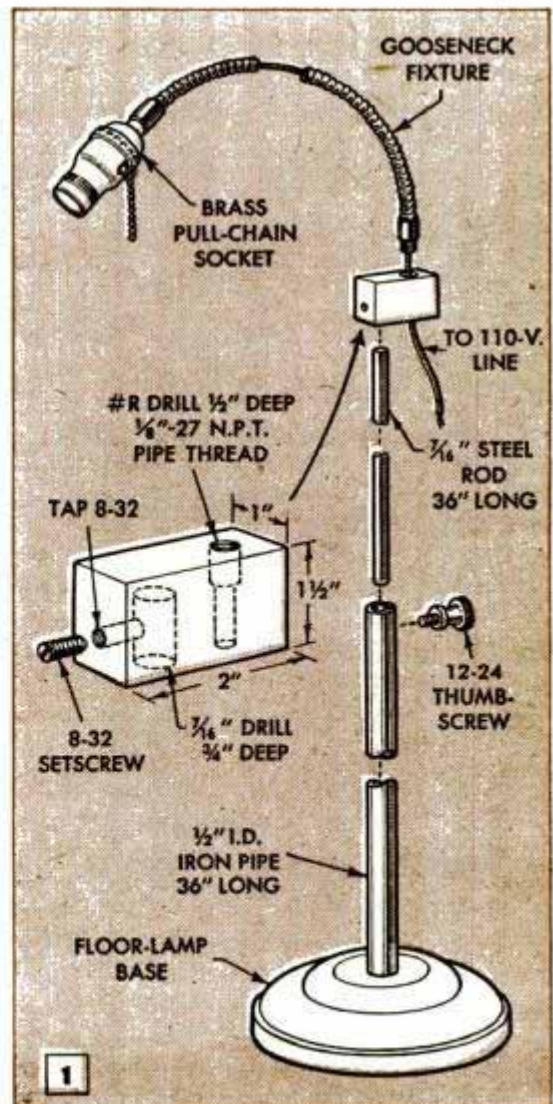


## SHOP "FLOOR LAMPS" By A. Maxwell

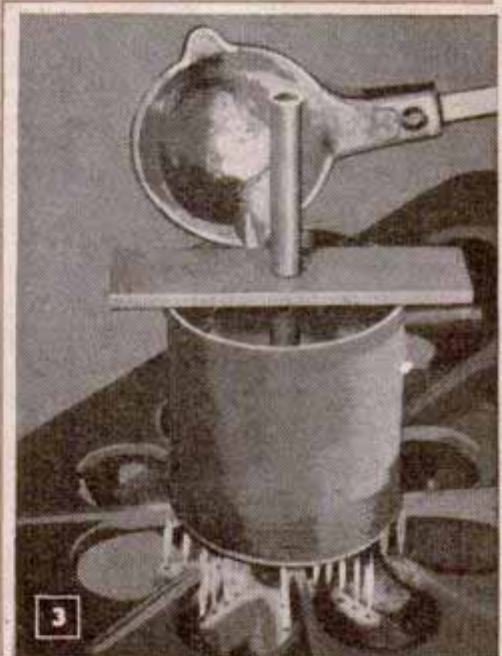
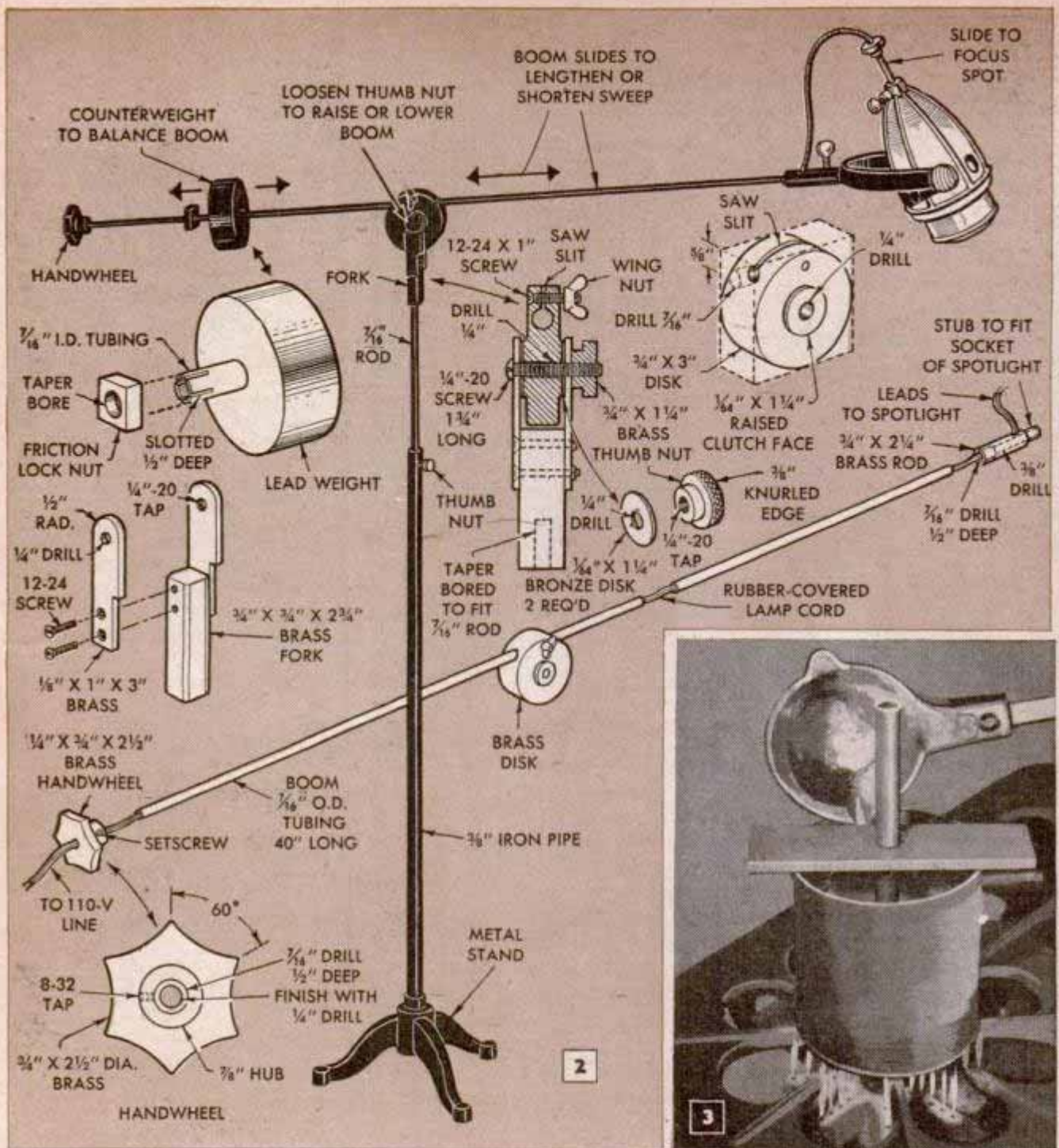
ALTHOUGH the human eye is adaptable to varying light conditions, it's better to provide a good source of illumination when working in a shop or around machinery where accuracy and precision are essential. The two shop floor lamps described here are designed to give the kind of light that will avoid eyestrain and to direct it where needed. In addition, by using special bulbs now on the market, the lamp shown in Fig. 1 will do multiple duty by serving as a source of infrared, ultraviolet and photographic light. The baby spotlight, Fig. 2, also performs well in the photographic studio.

Of the two lamps, the one with the gooseneck adjustment is easier to make because it requires fewer parts, and in some respects it is more versatile, due to the fact that many different types of bulbs can be used with it. The base should be heavy and compact. The cast-iron standard or base taken from an old floor lamp will serve—the heavier the better. Probably it will be necessary to bore and tap the hole in the base to fit the threads on the  $\frac{1}{2}$ -in. pipe that serves as the lower half of the upright. The upper half, which serves as the sliding member, is a length of  $\frac{3}{16}$ -in. rod approximately 36 in. long, as is the pipe. The diameters of these two pieces do not have to be held exactly, but they should be sufficiently rigid and not fit together too loosely. Drill and tap the pipe for the thumbscrew that adjusts the height of the lamp.

A metal block that serves as a swiveling member for the gooseneck fits on top of the rod and is locked in position with a headless setscrew. First, machine the outside dimensions and then drill and





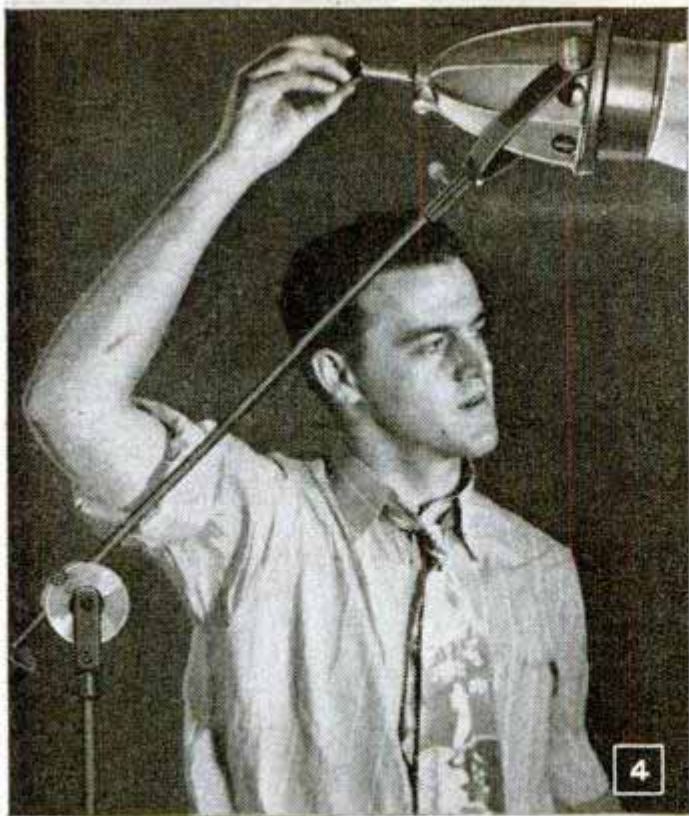


tap the holes as indicated in the center left-hand detail of Fig. 1. The tolerance between the rod and the block should be small so that any vibration transmitted from machinery will not affect the lamp. When selecting a gooseneck fixture for the lamp, be sure to get one that is long enough to provide the range of adjustment that you want. It should be possible to set the lamp near a machine and direct the light almost on the work. A brass pull-chain socket is used because it's easy to reach the chain when turning the light on and off. However, any type of socket that has a built-in switch will serve equally well. No reflector is needed for this lamp since the bulbs that are used have an inside coating that serves this purpose. For ordinary service in the shop, a 200-watt flood or spotlight, as com-

monly used for photographic work, will fulfill most requirements. For specialized purposes, such as drying paint in a hurry, an infrared bulb is used. And, of course, with an ultraviolet light in the socket, you have a health-giving sun lamp.

The second lamp, the focusing baby spot, Fig. 4, has a smooth, universal manipulation that is obtained by careful workmanship and fitting of each part. It has a large range of adjustment and is especially handy for reaching hard-to-get-at places where the lamp must be set at some distance from the work. Also, the focusing feature makes it possible to cover a wide area or to concentrate the light in one spot, whichever is required. The effectiveness of the lamp is indicated by Figs. 5 and 6. In Fig. 5 the mechanic is outside the beam of





light, which spreads an even illumination over the motor, while in Fig. 6 an ordinary bulb is suspended from the hood, directing its light into the mechanic's eyes as well as on the work.

The spotlight and mounting fork are purchased as an integral unit and, if obtainable, should be made of aluminum because of its light weight. The lighter the holder, the smaller the counterweight and the greater the ease with which the lamp can be manipulated. A heavier stand is needed than that shown in Fig. 1, and the three-legged type illustrated in Fig. 2 is recommended. Construction of the two upright members is similar to that given for the first lamp and they can be made of materials at hand if sufficiently sturdy. The boom is made of  $\frac{7}{16}$ -in. outside dia. tubing instead of rod and is about 40 in. long.

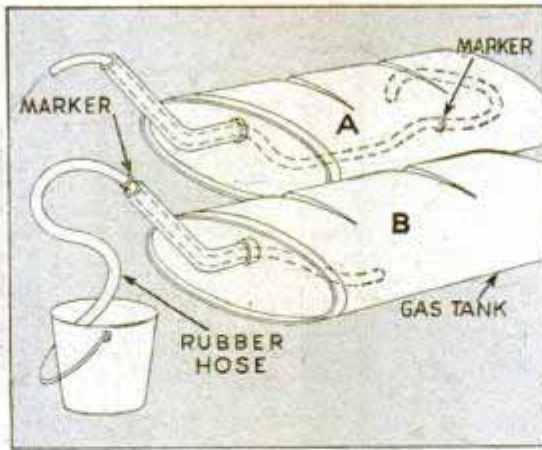
With the exception of the counterweight, the remaining parts, which control the adjustments, can be turned in a lathe. The counterweight is made of lead and should weigh about one third more than the spot. Casting it requires the use of a tin can in which the guide sleeve,  $\frac{7}{16}$ -in. inside dia. tubing, is carefully centered. To prepare the tin can for pouring, bore a press-fit hole in the bottom and steady the sleeve with a wooden brace, Fig. 3. Unless you have a large ladle, it will be necessary to pour the metal in batches. To prevent chilling between pourings, set the can over a low flame but be careful not to melt the bottom. After the lead has set, remove as much of the can as is possible with tin snips; mount the weight in a lathe and true it up. Then shorten and slot the sleeve,



fitting it with a friction lock nut as indicated in the upper left-hand detail, Fig. 2. The fork and disk that serve as the pivoting member for the boom are dimensioned in the upper right-hand and center left-hand details. Construction of the handwheel is shown in the lower left-hand detail. The spotlight may come equipped with a fork that will not fit the boom, and in this case it will be necessary to add a brass-rod bushing, as shown in the lower boom detail. When assembling the unit, run the light cord from the spot through the boom tubing and out the handwheel.



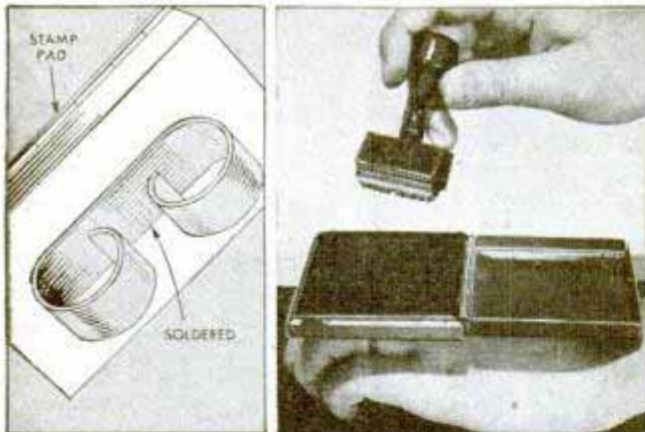
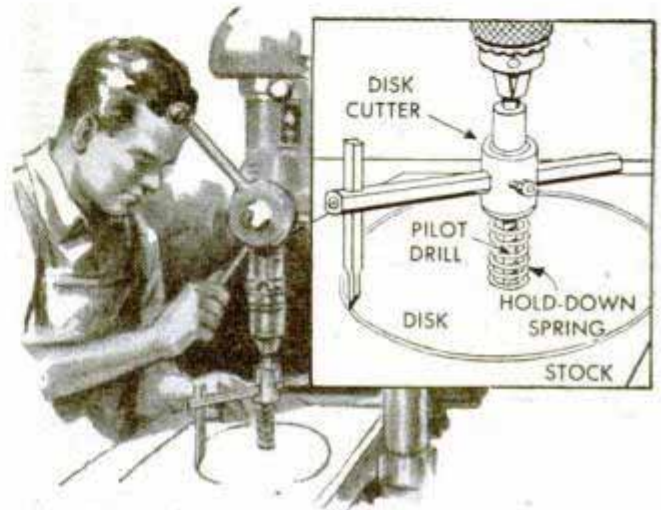
## Marker Placed on Rubber Tube Aids in Siphoning Gas From Tank



Simple and quick, this method of siphoning gasoline requires only a length of rubber hose or tube. Mark the tube to indicate how far it can be withdrawn and still allow the end in the tank to be near the bottom. To use, insert the tubing, detail A; then close the open end with the thumb and withdraw until the marker shows. Hold the hose as indicated in detail B and let the gas flow into a container.

## Hold-Down Spring for Disk Cutter Retains Waste Stock

Because a drill-press disk cutter has to run at relatively high speeds to produce a smooth cut, there is a tendency for the disk to spring up, and in some cases, damage the point of the cutter bit. To avoid this trouble, slip a length of coil spring over a pilot drill so that it is held between the chuck and the work. The spring should be a fairly stiff one and about as long as your drill to provide the proper tension and hold the disk against the drill-press table.—Albert M. Lindner, Jr., Cold Spring, N. Y.



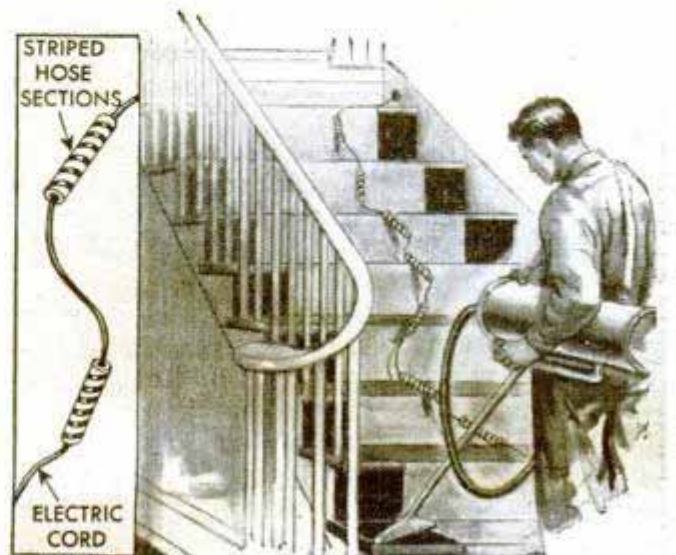
## Strip of Metal Soldered to Pad Provides Finger Holes

Inspectors on assembly lines often have to carry a stamp pad and rubber stamp to mark finished products. To make it easy to carry the pad, one inspector soldered a metal band to the underside of the pad and bent the ends to form finger holes. Thus the pad could be slipped over two fingers and be ready for use. This is handy when stamping products where size of the item requires the inspector to move about.

## Striping Around Cleaner Cord Warns Apartment Tenants

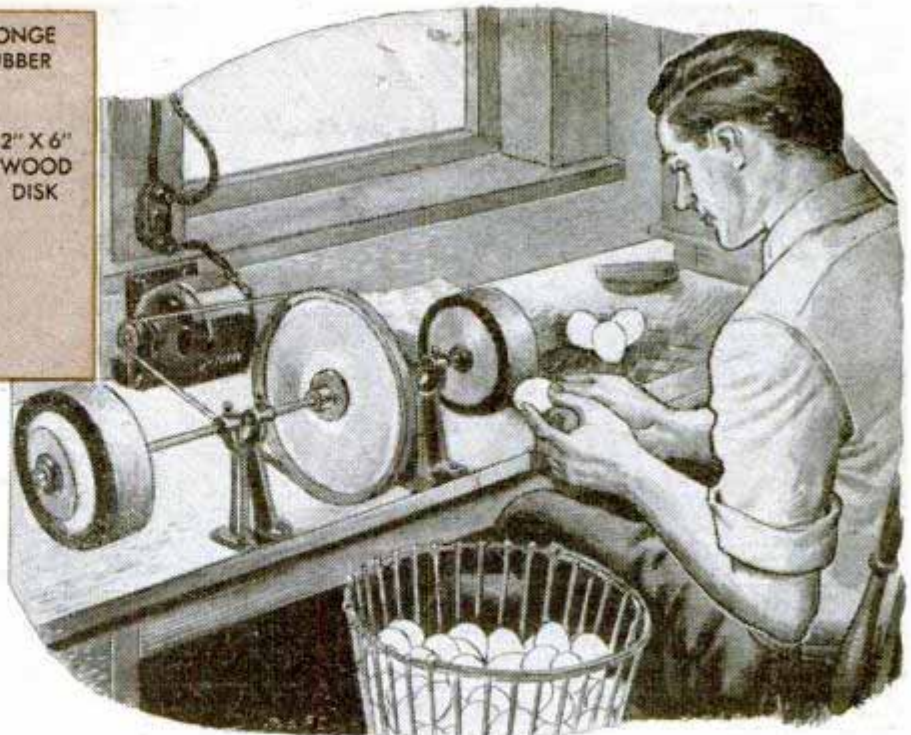
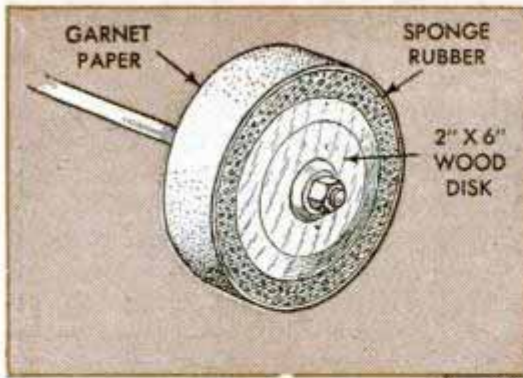
When the hallways in apartment buildings are not too well lighted, it's easy for tenants of the building to trip over the vacuum-cleaner cord when the janitor is cleaning the hall or stairs. To prevent such accidents, cut a number of short lengths of hose or tubing that will fit snugly over the cord and paint spiral stripes on them. The pieces of tubing should not be more than 3 ft. apart on the cord.

☞ Rubber bands wrapped around the handle of a bath brush will assure a firm grip.



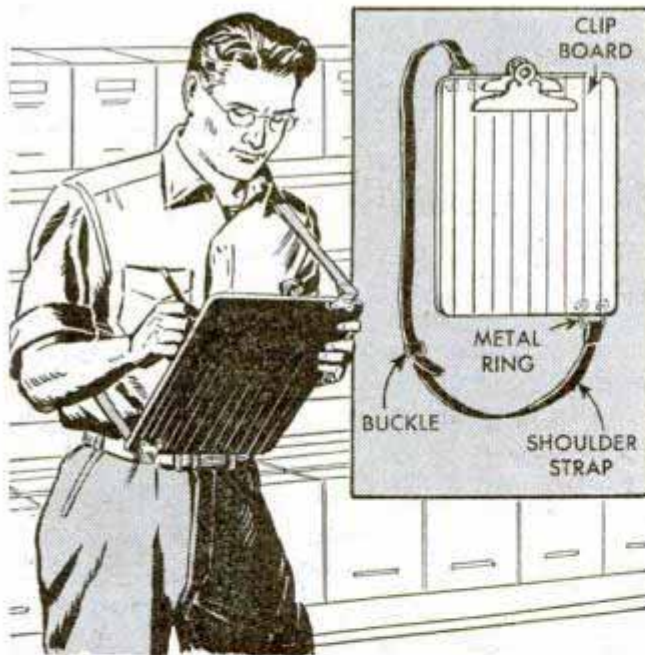


# Eggs Cleaned Quickly by Motor-Driven Buffer



Time consumed in cleaning eggs on a poultry farm can be halved through the use of this motor-driven buffer. It's provided with two wheels so that several persons can clean eggs at the same time. Construction of the wheels is shown in the upper left-hand detail. A 2 by 6-in. hardwood disk is used for the center with a fairly thick strip of sponge rubber wrapped and glued around it. Then garnet paper is glued to the rubber to provide an abrasive surface. The wheels are overhung on a common shaft supported by

two pedestals and bearings that have the driven pulley mounted between them. The motor can be bolted to the wall or bench, depending upon the space that is available. To clean eggs quickly and give them a fine sheen, run the wheels at about 250 r.p.m.



## Clip Board Has Shoulder Strap For Ease in Carrying

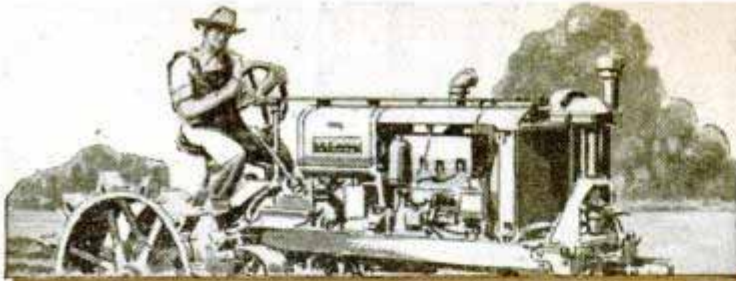
Clerks and others who have to keep papers on a clip board when working around the shop or office will find that a shoulder strap for carrying the board eases the work considerably. The strap is attached to the top and bottom corners, diagonally, with metal rings. A buckle provides adjustment.

## Adding-Machine Tape Held Erect With Sheet-Metal Guide

Fashioned from a strip of light sheet metal, this guide will hold an adding-machine tape upright so a whole column of figures is visible. Two channels guide the tape, which is fed from the bottom. The two feet holding the guide are fastened to the machine with self-tapping screws. When necessary, the guide can be removed.

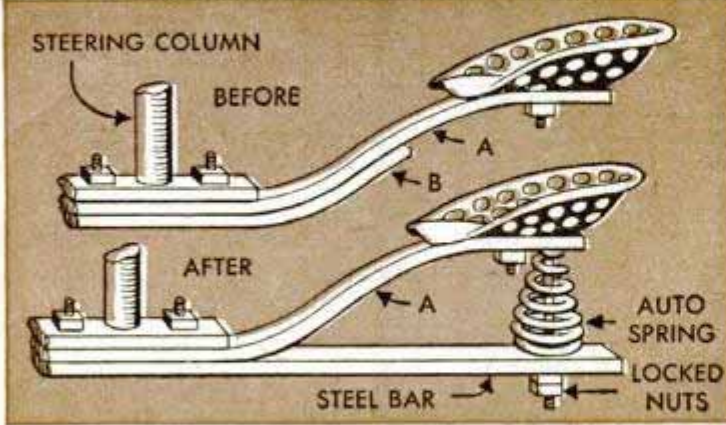






## Spring-Reinforced Seat Offers Smooth Ride

To make his tractor smoother riding, one farmer removed a part of the spring-leaf support for the seat and reinforced it with a discarded auto spring to provide a "knee-action" ride. This was done by replacing leaf B, top detail, with a steel bar, bottom detail. The latter served as a support for the spring which is held between it and leaf A. A bolt is fastened to the seat and passes through the spring and bar, being held in place with locked nuts. Although the details of this arrangement are for one particular make of tractor, it could be adapted to most makes by modifying the support for the spring.—Carl W. Willman, Jr., Moberly, Mo.



## Wire Cutter Attached to Pitchfork Simplifies Barnyard Chores

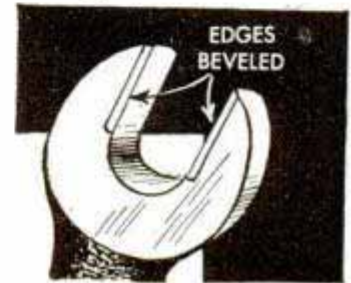
One of the most used tools on a farm or ranch, the pitchfork is generally at hand, but wire cutters to open a bale of hay or straw are often hard to locate. Many steps and much time can be saved if a cutter is attached to the pitchfork handle. The cutter is made from an old file that has been annealed by heating to a bright red color and then allowed to cool slowly. A 3 or 4-in. section of the file is ground to form the hook and then bolted to the handle. In use, the hook is slipped under the wire and the fork is braced against the bale of hay. A sharp pull on the handle will cut the wire.



## Altered Wrench Speeds Work

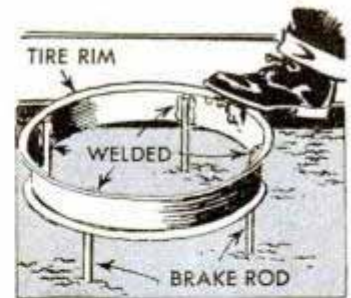
Grinding the edges of open-end wrenches to a slight bevel will speed work because the wrenches will slip over the heads of bolts and nuts more quickly. The bevel must not be too wide as this would weaken the grip of the wrench.

Wm. P. Houser, Organ, N. Mex.



## Demountable Rim as Foot Scraper

Useful on the farm or in outlying filling stations and stores on muddy roads, this foot scraper is made from odds and ends that are easy to find. The scraper itself is a demountable automobile rim having four rods welded vertically to it to serve as legs. Discarded brake rods will serve for this purpose.



## Hints for Grinding Soft Metals

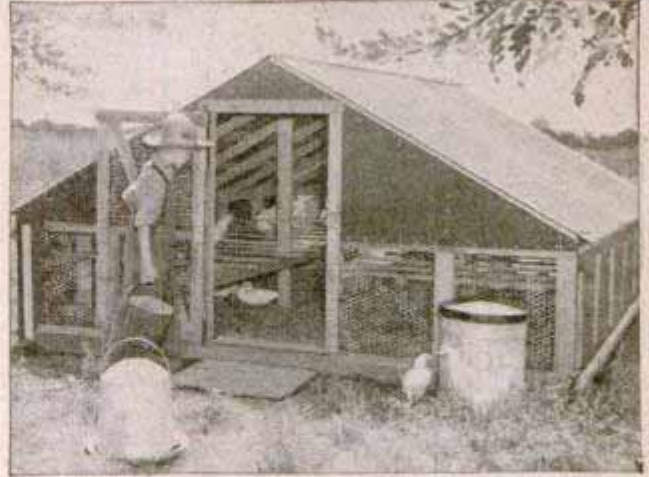
When using a sanding machine, soft metals such as aluminum can be finished well if the belt, grade 180, is filled first with chalk. The chalk prevents the belt from becoming clogged with the metal. Never press too hard if the belt does not have the proper grinding action as it may be that a new one is required.



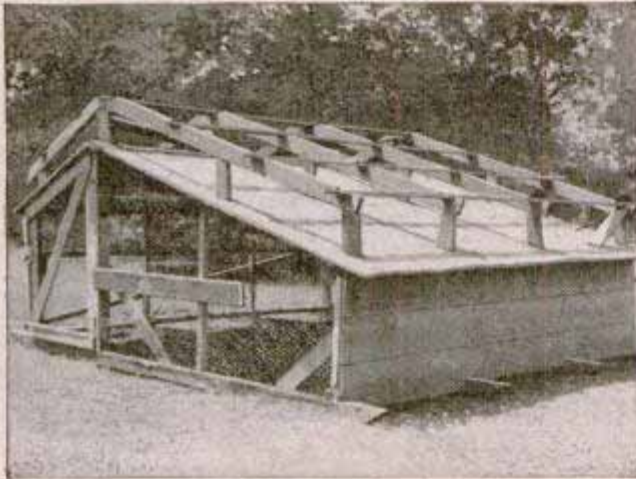
# Six Ideas for Poultrymen



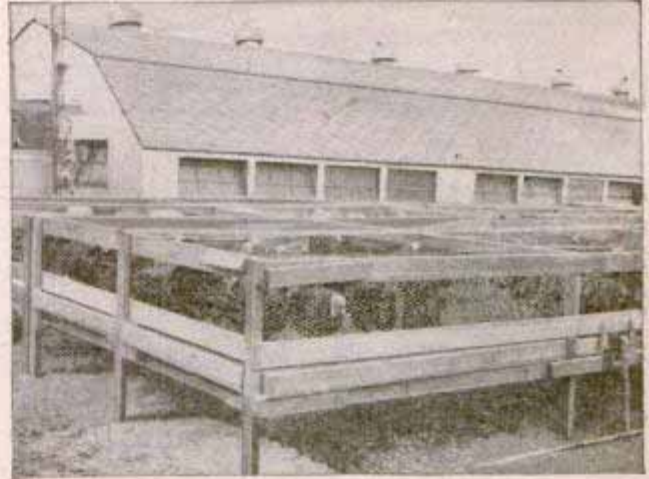
One poultryman has found that sliding doors like these give good control of sunlight and ventilation in the laying house. Doors are seldom completely closed except in stormy weather or when it is very cold



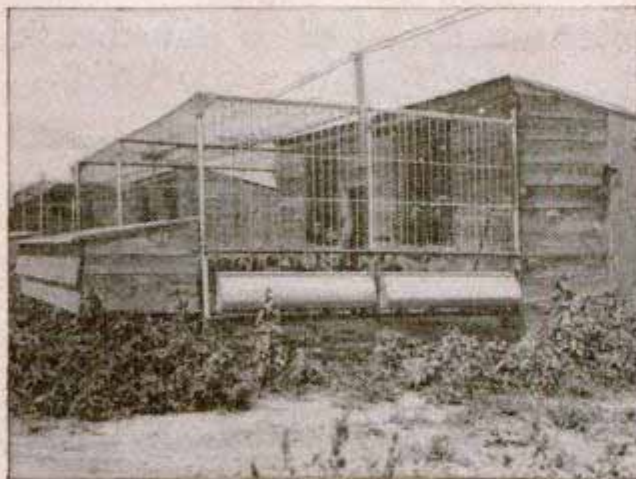
Floor of this poultry range shelter is simply a fine-mesh poultry netting. Has a center boardwalk and the gable ends and roof are covered with a waterproofed soft-pressed board nailed to a wood framework



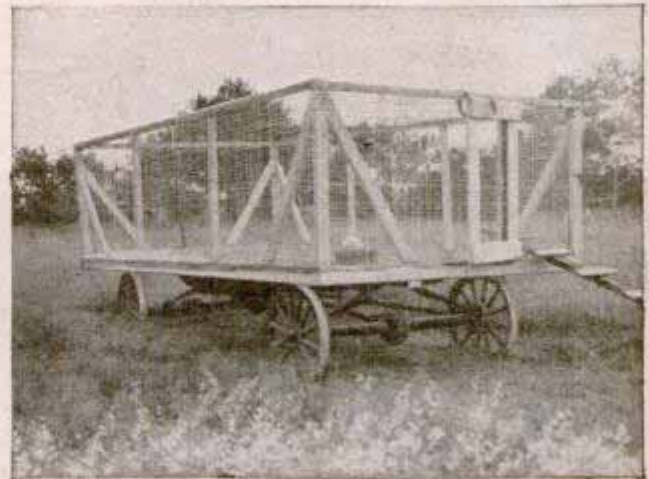
Cleanliness and portability are the features of this range roost and shelter combination for turkeys. Shelters the tender poults from stormy weather and provides an open-air roost for the birds later on



Either chicks or turkey poults can be raised to maturity in these wire-floored sun porches attached to conventional brooder houses. Detachable feed and water pans along the sides provide for easy feeding



Another type of sun porch developed especially for brooding turkey hens. The shed-roofed nests are attached to the porch at the left. After hatching, the hens are removed and the young poults take over



A portable wire floor and roosting pen for turkeys or chickens. Protects young birds at night when first moved to the range. Chickens are sheltered by covering one end of wire enclosure with a tarpaulin



## Bolt at Claw End of Wrecking Bar Straightens Warped Joists



Welded to the inside curve of a wrecking bar near the claw end, a section of a bolt or stud will provide a point of leverage to pry warped joists in place when repairing flooring or doing other maintenance work. The bar could be used also to force loose flooring boards in place when sprung.

## Wooden Dividers Proportion Mix Carried in Wheelbarrow

In order to save time on the job, one builder made wooden dividers that would fit into wheelbarrows and proportion the space correctly for the different kinds of concrete mixes. This is especially handy



when only small batches of concrete are to be made. A handle is attached to one of the separator boards so the divider can be removed and placed in the barrow easily.

## Roofing Compound on Bolt Heads Keeps Them From Rusting

If asphalt roofing compound is applied to the exposed heads, nuts and threads of bolts, it will keep them from rusting. This is valuable especially for farm machinery and equipment which is exposed to severe weather. The compound is applied with a brush. Such a protective coating does not require frequent renewal.

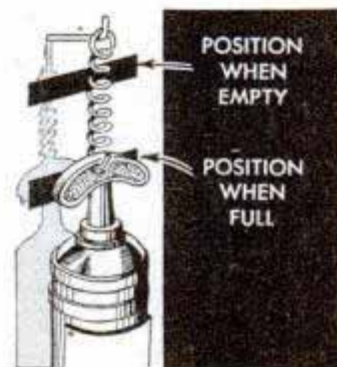


## Extinguisher Suspended by Spring Indicates When It's Empty

To make sure that fire extinguishers would not be overlooked when they were empty, one store manager conceived the idea of hanging them from the supporting hooks by means of springs.

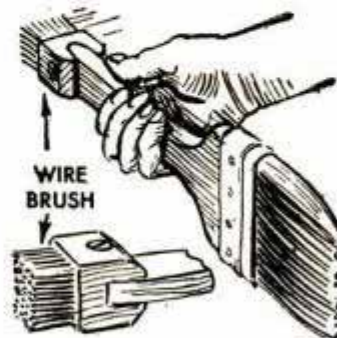
Lines were painted on the wall to indicate the position of the full and empty containers. When full, the extinguisher is at the lower mark; when empty, at the higher one.

G. E. Hendrickson, Argyle, Wis.



## Bristles Attached to Paintbrush Make Dual-Purpose Tool

Fasten a section from a stiff wire brush to the handle of a paintbrush, as shown in the detail. This will be handy to use when scraping scale and rust from surfaces to be painted.



□ A small bottle that has a dropper in the cap provides a handy container in which to keep light oil for use on small motors and machines around the house.

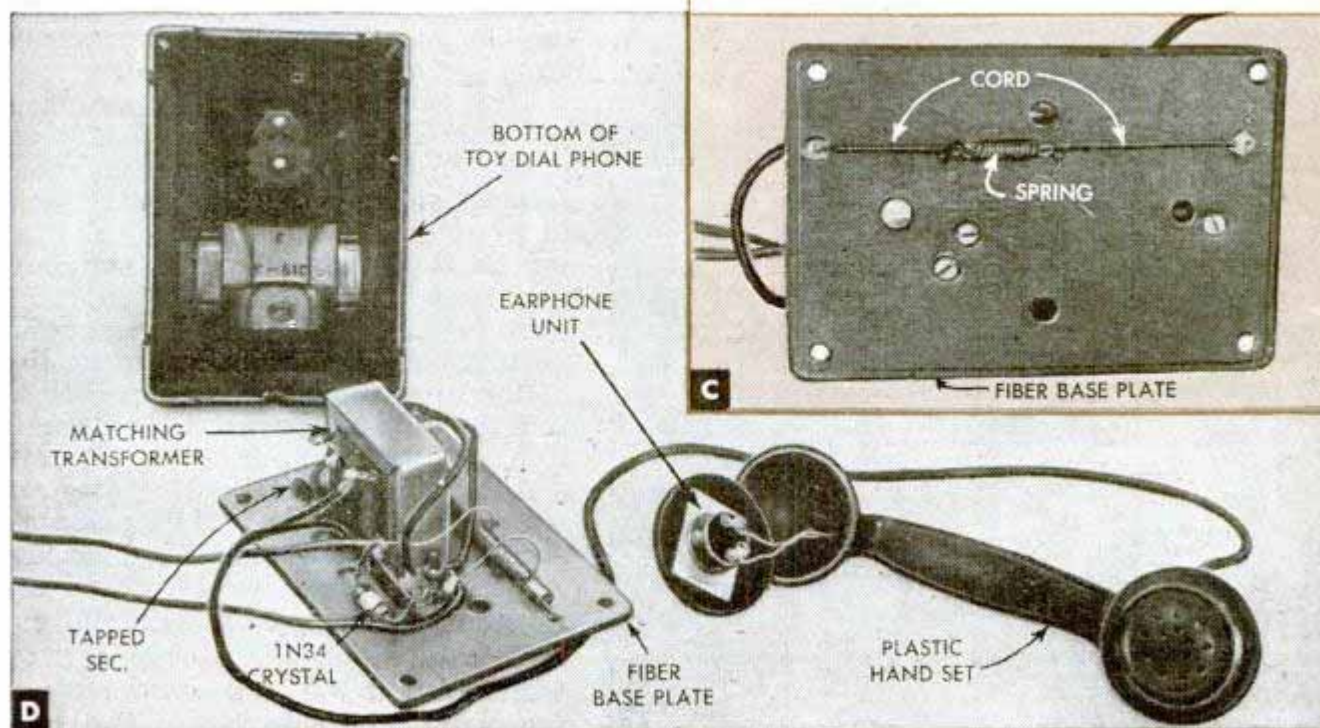
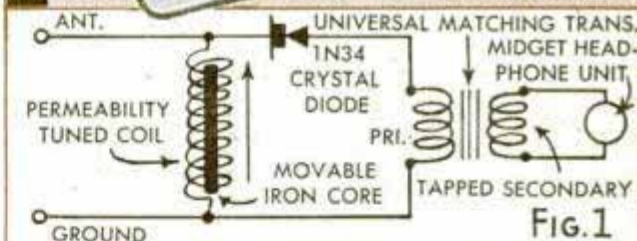
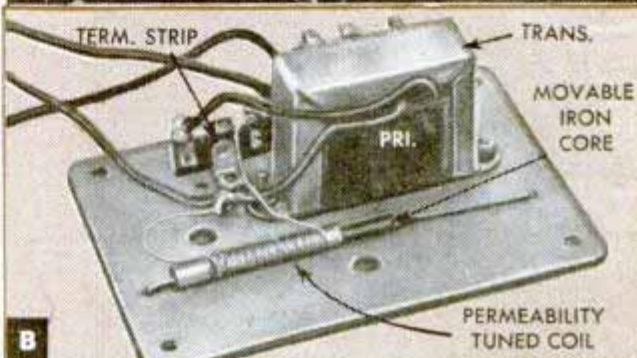




## CRYSTAL SET BUILT INTO TOY TELEPHONE

**D**ADDY really made a hit with this youngster when he converted his plastic toy telephone into a modern crystal receiver. The set is concealed in the base of the make-believe telephone and a tiny earphone is installed inside the handset unit so that the youngster hears the pre-tuned local station when he holds the phone to his ear.

The set employs a type 1N34 Sylvania germanium crystal and a permeability-tuned coil. Any small earphone may be used; the one shown was a war surplus unit catalogued as a "hearing aid type." It has very low impedance, which made a speaker matching transformer necessary, selecting the taps that gave the loudest signal. Photos B, C and D show views of the completed receiver on the fiber base plate. The circuit diagram appears in Fig. 1. A knife is used to take the caps off the plastic handset so that the earphone can be mounted. Wires run to the earphone through the hollow body of the handset; holes are made through the body spacers with a heated copper wire. The earphone is spaced from the plastic cap by means of a cardboard washer cemented to the cap with china cement; this washer must clear the diaphragm. Cement is used to replace caps on the handset; when completed, set is connected to antenna and ground.





# "Wireless" Record Player Transmits

By Arthur I. Rattray

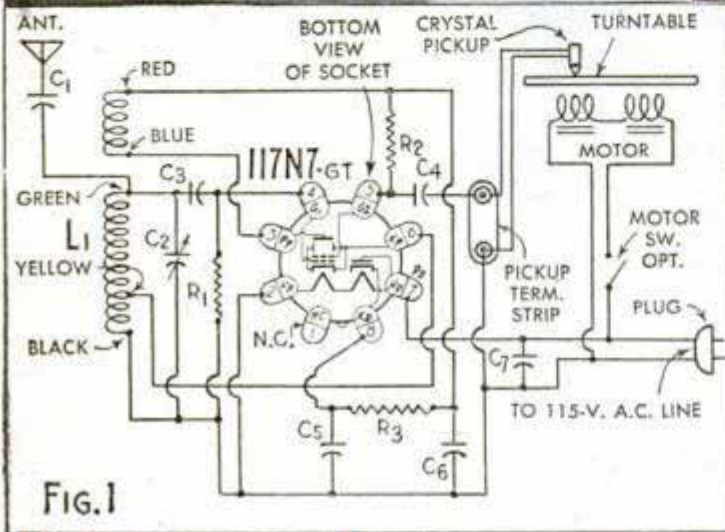
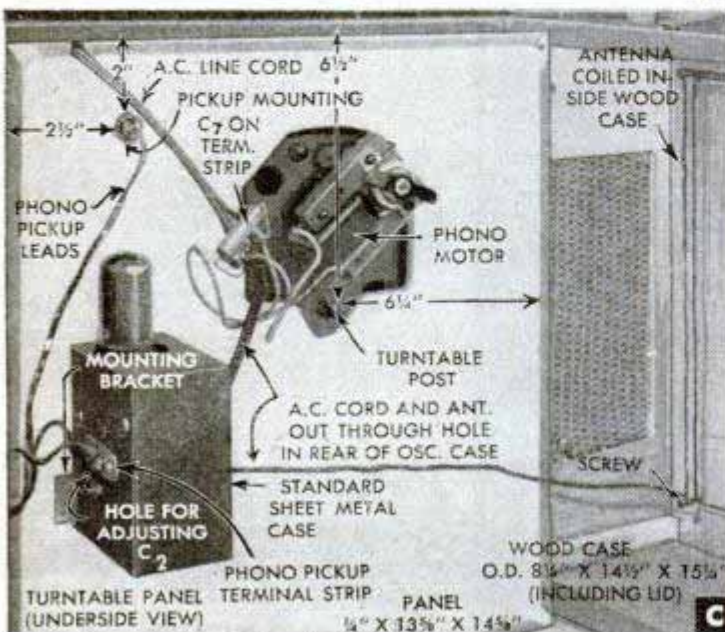
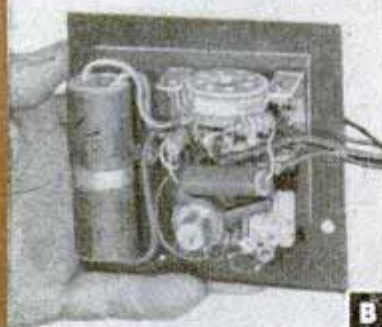


FIG. 1

- L1—Unshielded adjustable oscillator coil (adjustable from 175 to 520 kilocycles)
- R1—47,000-ohm 1/2-watt carbon resistor
- R2—390,000-ohm 1/2-watt carbon resistor
- R3—10,000-ohm 1/2-watt carbon resistor



ONLY one tube is used in this portable "mystery" record player which supplies sufficient modulated power to play records through radio receivers at full volume in other rooms in the home without wired connections. The circuit design of the phono-oscillator is a combination Hartley oscillator with additional feed-back being provided by the plate circuit. This oscillator is modulated by applying the output of the phono-graph pickup to the screen grid of the type 117N7-GT tube. One section of this dual-purpose tube is a diode and the other a pentode. The diode section is used for rectification and the pentode section is employed for the R.F. power oscillator circuit.

Housed in a small standard metal case 4 in. square and 2 in. deep, this tiny phono-oscillator is fastened to the underside of the turntable panel board near the edge by means of small angle brackets as indicated in photo C. The frequency of the oscillator is variable between 1350 to 1700 kilocycles by means of the screwdriver adjustment illustrated in photo A. Holes are drilled in the wood carrying case and the small metal case so that the screwdriver may be inserted in the adjusting screw of the 36-mmfd. ceramic-type trimmer condenser C2. This enables the operator to select a quiet spot on the dial of the broadcast receivers where the recorded music may be tuned in without interference from any broadcasting station.

The schematic circuit diagram is given in Fig. 1. Please note that all parts for the oscillator are mounted directly on the back of the small metal front panel inside a guide line as indicated in photo B. This standard metal case, available from all radio parts houses, has removable front and back panels. A hole is cut in the top of the case above the tube socket so that the tube can be inserted externally, thus making a very compact unit.

A detailed pictorial wiring diagram appears in Fig. 2; the various parts are separated to show the wiring clearly. Actually the parts are mounted close together on the panel, with the exception of the a.c. line terminal strip which is mounted on the underside of the wood turntable panel. The two-



# Music to Any Set in the House

section electrolytic condenser is strapped to one of the pickup terminal strip mounting screws; the oscillator coil has its own mounting screw. The fixed condensers and resistors are self-supported by their stiff wire pigtailed leads. Solder all connections carefully with rosin-core wire solder, and use insulated hookup wire for the circuit. Photos C and D show all assembly details clearly.

The antenna for the phono oscillator is 8 ft. long and can be either strung out or coiled in a loop around screws in the bottom of the wooden case. This carrying case is a standard leatherette-covered type used to house portable phono-radios; any similar case may be employed. The phono-motor used is a 78-r.p.m. constant-speed motor, providing rim drive on the turntable. A crystal pickup with an output of between 1 and 1.5 volts should be used; the tube may be either a type 117N7-GT or a 117P7-GT, which are interchangeable. The motor switch, indicated in Fig. 1, was not used in the original model but may be added if desired; the switch can be a single-pole, single-throw toggle type mounted on the turntable panel. Detailed student material list R-356 is available from Popular Mechanics Radio and Electronics department upon receipt of ordinary letter postage.

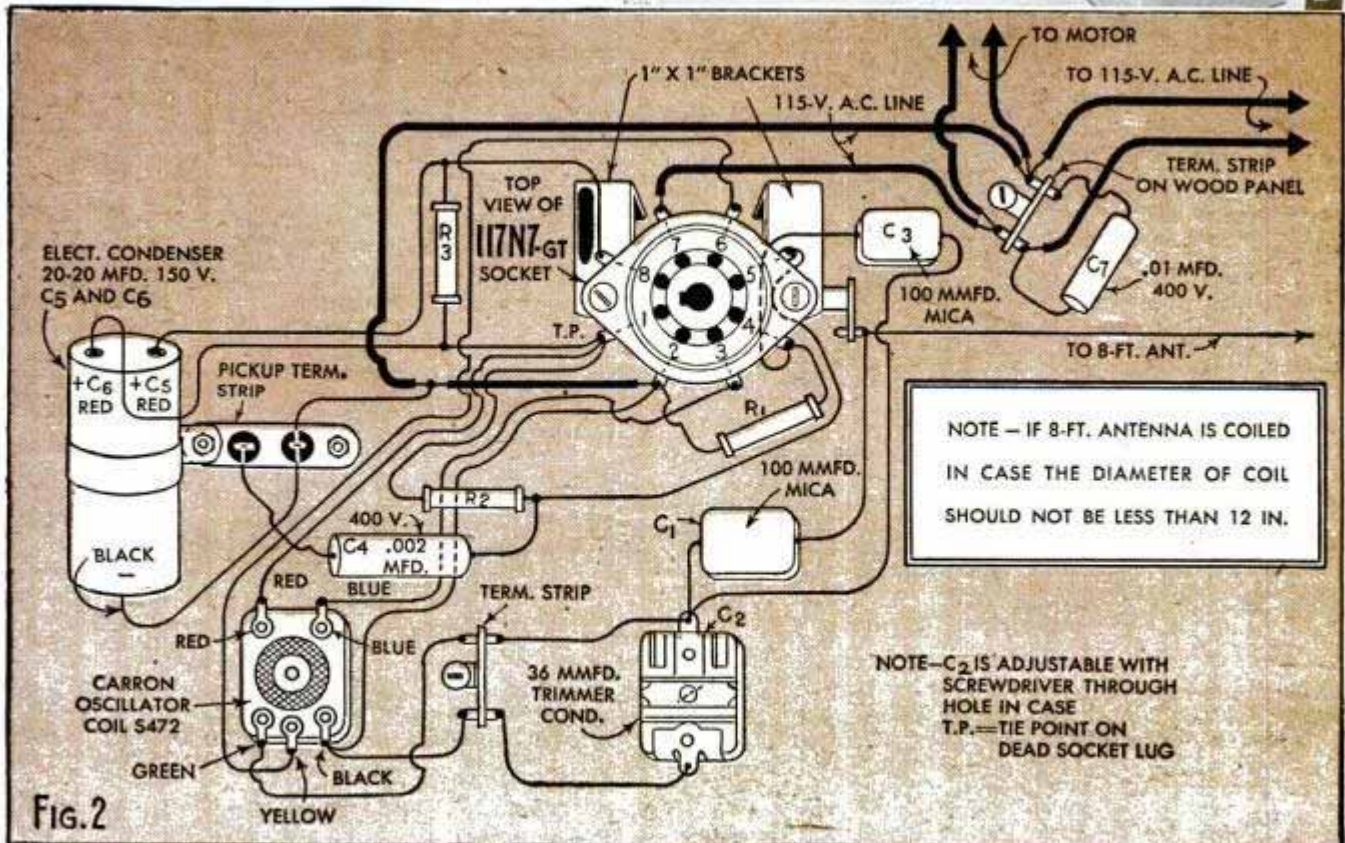
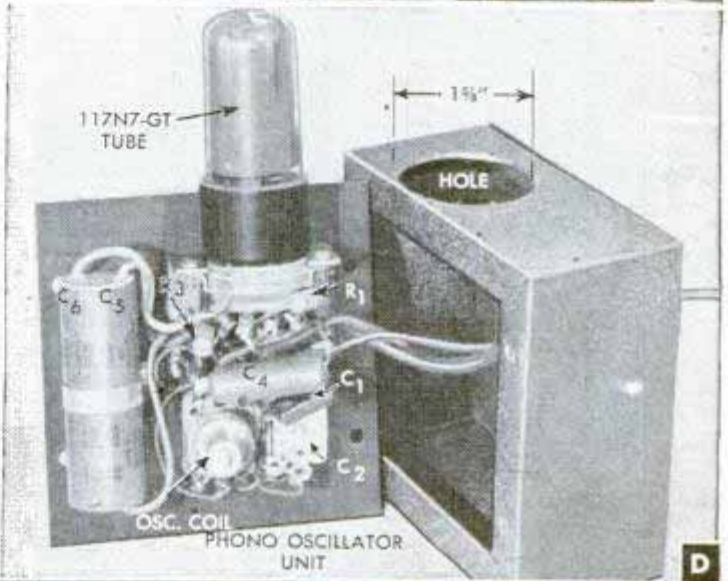


FIG. 2



# Electronic Hints for Today



**A**



(A) Unidirectional crystal microphone stops feedback and features "cardax" dual-frequency adjustable response selector for flat or rising needs; also includes a built-in switch

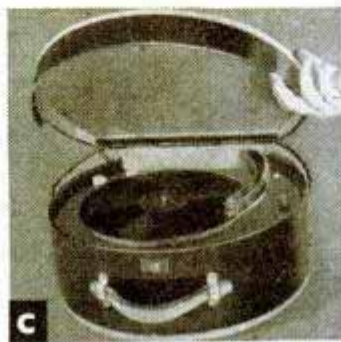
(B) Electronic photo-timer provides split-second timing from 1/25 second to 40 seconds. Two long-life vacuum tubes are employed

(C) "Hat box" a.c. record player has 3-tube built-in amplifier, 5-in. speaker, crystal pickup and employs a permanent sapphire needle

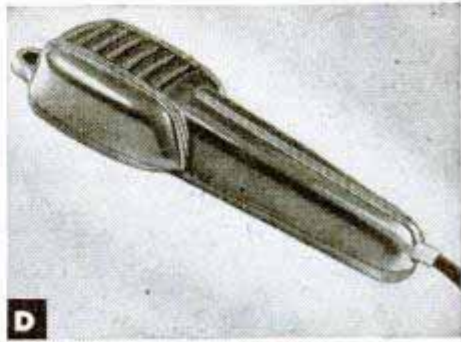
(D) Hand microphone equipped with a "metal-seal" crystal is claimed to withstand unusual humidity conditions for paging and call uses



**B**



**C**



**D**



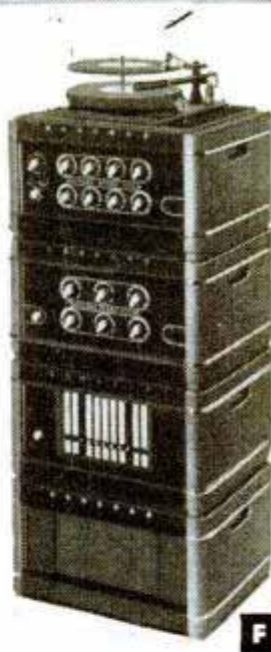
**E**

(E) Two-coin operated radio receiver for hotel guests provides 30 minute operation for 10 cents, 90 minutes for 25 cents. A.c.-d.c. set with 5 tubes

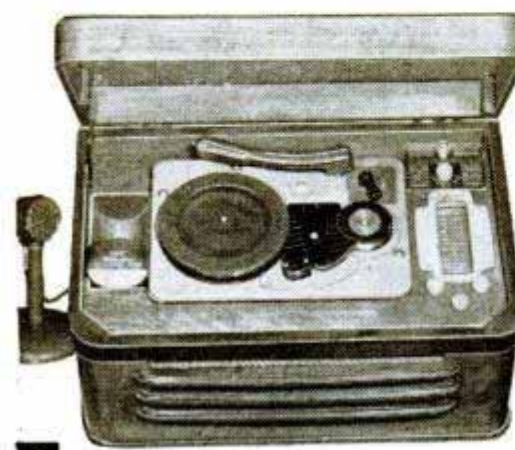
(F) "Add-a-unit" amplifier in separate portable sections provides unusual flexibility. Beginning with a basic 15-watt or 30-watt unit the power can be increased to 90 watts if required

(G) Wire recorder, radio and phonograph in table model for \$169.50 with 1 spool of wire. It is claimed to record both speech and music with high fidelity

(H) When R. J. Leichter and wife visit the Browns on the third floor, a remote speaker and a long wire to an amplifier-speaker unit solve the baby sitter problem in their first-floor apartment



**F**



**G**



UPSTAIRS **H**



DOWNSTAIRS

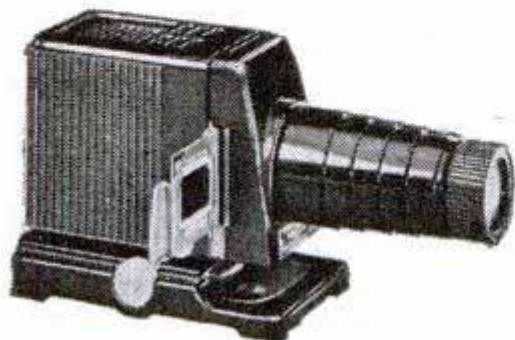


# FOR SUPERB COLOR SHOWS...

## Kodak Still Projection Equipment

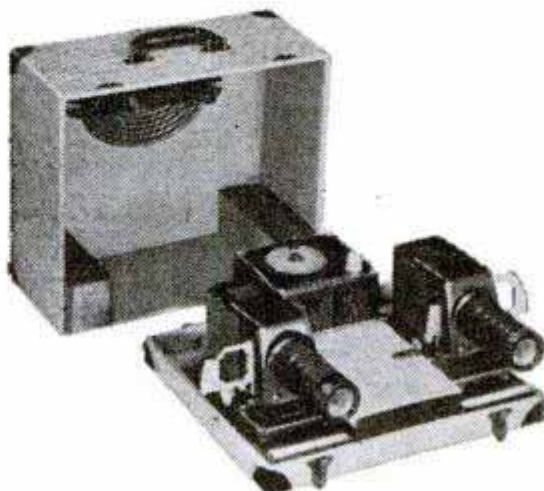
Set up your trim, efficient Kodaslide Projector; load as many as 46 slides in the Kodaslide Changer . . . and you're off to a brilliant showing.

For the slick professional touch, use two Kodaslide Projectors, with the Kodak Dissolve Control Outfit . . . one slide fades out as the next fades in. Consult your Kodak dealer about this equipment . . . EASTMAN KODAK COMPANY, ROCHESTER 4, N. Y.



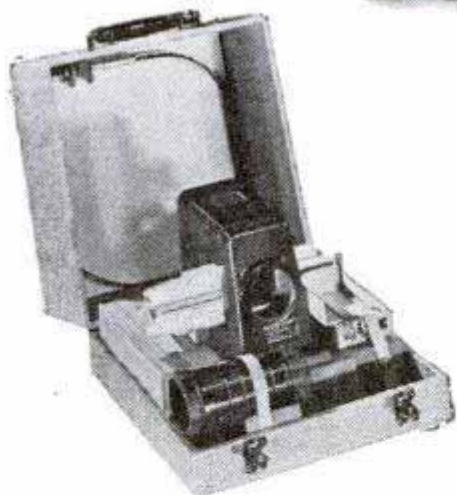
**Kodaslide Projector, Model 2A,  
with 5-inch f/3.5 lens**

Shows your Kodachrome transparencies brilliantly. Lenses and entire optical system *Lumenized*—ultrahard coated. Result: approximately 50% more illumination delivered to your screen . . . Accessory 7½-inch f/4 lens also available.



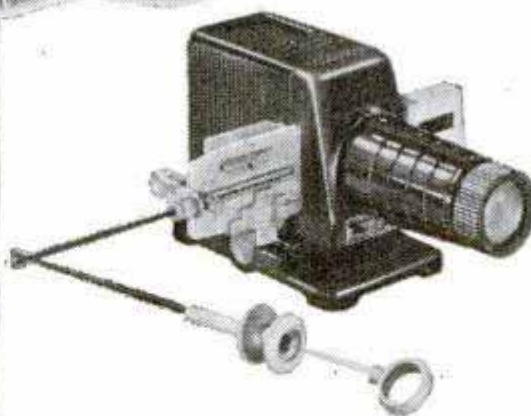
**Kodaslide Dissolve Control Outfit**

One image appears on screen as other fades out. No awkward pauses, no "break." Outfit consists of case, electrical control unit, two projector platforms, storage space for lens barrels and slide files. (Projectors not supplied with unit.)



**Combination Case**

Provides space for Kodaslide Projector, Model 2A, spare lamps, the lens, a Kodaslide Changer, and two Kodaslide Sequence Files. Removable cover contains matte screen for trial projections.



**Kodaslide Changer (shown  
here on Model 2A Projector)**

Hand-operated plunger (30" cable) automatically changes up to 46 Kodaslides. Fits Kodaslide Projectors, Models 1, 2, 2A.

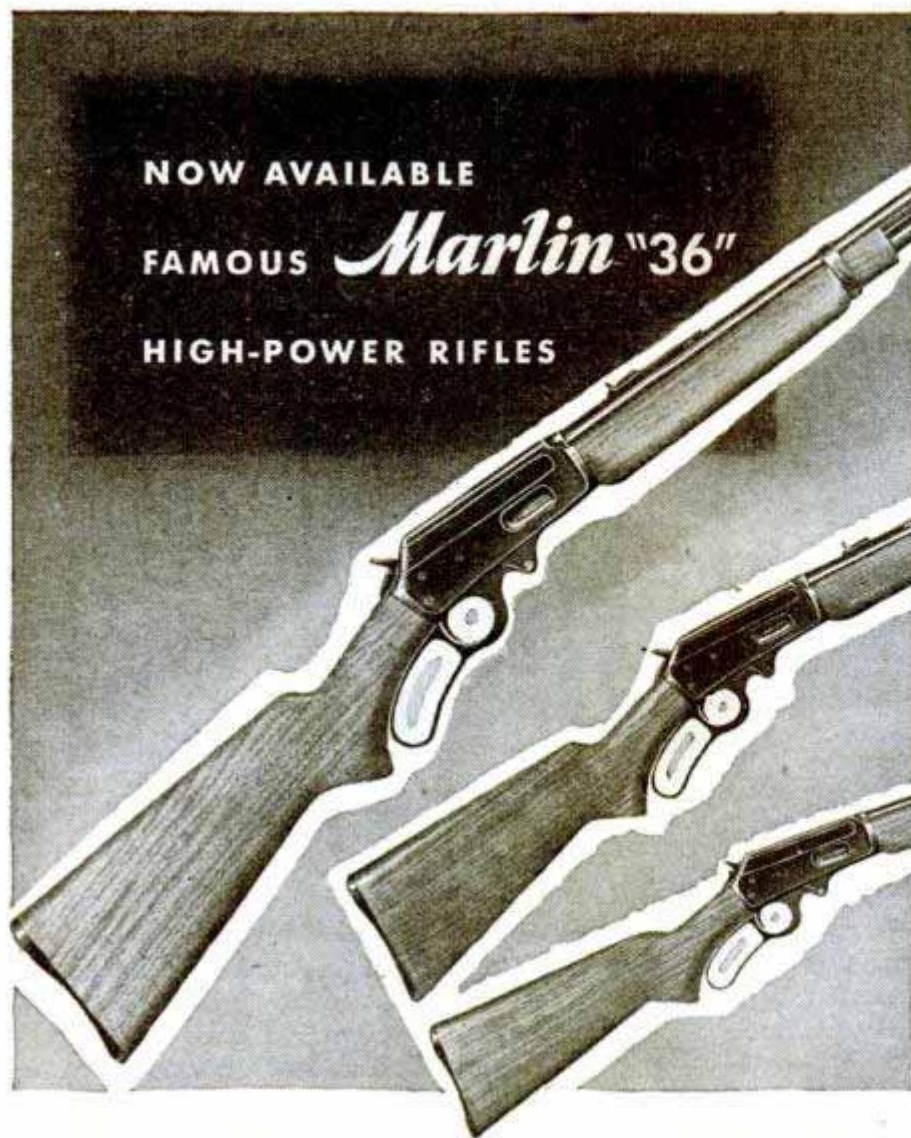
**Kodak**



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Barrel Length 20"

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Barrel Length 20"

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Barrel Length 24"



MODEL 36 CARBINE, with full magazine of 7 shots and 20" barrel, is ideal for fast shooting in brush and from horseback \$55.60\*

● Here's a tip if you plan to buy a Marlin Model 36 Rifle this year: *give your dealer the order now*. It takes time and skilled manpower to turn out fine sporting guns. 1947 production, while increased, will not last long. We suggest you order now—to be sure of your Marlin 36 for the Fall hunting season. It will give you a lifetime of sport.

#### OUTSTANDING FEATURES OF MARLIN 36 RIFLES:

Rugged construction; dependability; accuracy; long life. Solid top, non-glare receiver, allowing *low* telescope mounting; drilled and tapped for Lyman 56 and other receiver sights as well as tang peep sight. Powerful extraction of shells, ejection at the *side* for safety—deep-cut, Ballard type rifling—fast lever action—tapered barrel of special smokeless steel—unbreakable coil and trigger springs—selected American walnut stock and forearm. All Marlin High-Power Rifles are targeted and proof tested (JM) before shipment.



MODEL 36 SPORTING CARBINE—6 shots, 20" barrel—has the balance and feel of a longer rifle, yet handles fast in thick cover. \$55.60\*



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Famous High-Power Rifles 30/30 and .32 Special Calibers

\*Prices slightly higher west of the Rockies.

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# "Dave ought to know better than that"



**AL:** Yeah, I wouldn't take that set of drills if they gave it to me.

**PHIL:** Just junk — that's all they are. And Dave's bragging about the bargain he got.

**AL:** You'd think he'd know by this time that you can't save money buying "no-name" tools.

**PHIL:** Sure, it's plain as day that when a well-known manufacturer puts his name on tools, those tools have got to be good. And when you buy tools *without* known brand names, you're just throwing money

away.

**AL:** Well, I guess we all have to learn it the hard way.

**PHIL:** Yeah. I made some bad buys before I got wise. Now I stay away from bargain counters and do all my tool buying at the hardware store.

**AL:** Same here—and the first thing I look for is the brand name.

Your **HARDWARE DEALER** sells **QUALITY tools**  
and hardware... Buy from HIM



## POPULAR MECHANICS

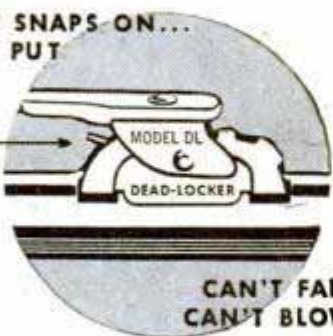


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WINDSHIELD WIPER  
ARMS and BLADES

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STAYS PUT

FINGER-  
TIP  
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CAN'T FALL OFF  
CAN'T BLOW OFF

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for military aircraft—now for your car.)

## DON'T SHOOT YOUR GAS-PUMP MAN!

He's doing the best he can. Sure, he knows how dangerous it is for you to drive your car... in stormy weather... with your dull old windshield wipers that smear and smear. He'd gladly put on for you quickly a pair of keen new ANCO RAIN-MASTER Wiper Blades and Arms. He has them—Newest Models! But he forgets to remind you? Too busy? You can't shoot him for that!



After all, it's *your* car to protect. So *you* remind *him*. Get RAIN-MASTERS... patented features... original equipment on many makes of high grade cars and trucks... used in war—on our fighting tanks and trucks and ships and bombers too... because ANCO RAIN-MASTERS clean quicker, clean cleaner... last longer. May save you a costly smashup.

Ask for RAIN-MASTER Windshield Wiper Arms and Blades next time you buy gas.

THE ANDERSON COMPANY  
Established 1918  
GARY, INDIANA

## What Makes an Athlete Tick?

(Continued from page 133)

rest period, showed that the variations in the response of the heart caused by differences in physical condition were definitely correlated with the subject's powers of endurance. Thus the endurance of an athlete could to a certain degree be determined from the responses of the heart to a simple stool-stepping test.

Other tests conducted on a new group of 25 distance runners showed that changes in pulse rate accelerations during exercise reflected changes in condition. The men were first tested in the spring when all were preparing for competition, and later in the year when most had relaxed their observance of training rules. Still more variations were introduced by testing men after an all-night party, or after recovering from an illness. All confirmed the accuracy of the method.

Archie Williams, whose heart showed the best response and whose endurance score was highest, later developed Olympic potentialities. Lesser laurels also came to numbers two, three and four—Del Fishback, Bill Dougherty and Les Vorhees, names well remembered by Pacific Coast fans. Only one good athlete developed from the poorest half of the group and this man achieved some fame as a wrestler.

To record heartbeats an electric tachometer was designed which weighs 30 pounds and is portable. An attachment makes the device valuable to hospitals. It can be used to keep constant check on a patient's heartbeat, and when slight variation in the pulse rate occurs it sounds or flashes a warning. The principle is similar to that of automobile speedometers which glow red when certain speeds are reached.

Another method to determine whether an athlete is in condition is the flarimeter test. The person tested blows into a tube in an effort to maintain a 10-inch column of water at a constant level. After a short period he again blows into the flarimeter. The difference in his endurance indicates his physical condition. The inability of a person to hold the water at a certain pressure for a long period of time is not due to lack of air in his lungs, but to an interference with circulation caused by the exertion.

During the study of physical condition, scientific data on the effects of the common cold on physiological responses to exercise were tabulated. Although medical authorities have declared that individuals suffering from a cold should not engage in exercise there was no definite proof that

(Continued to page 232)



Dependable

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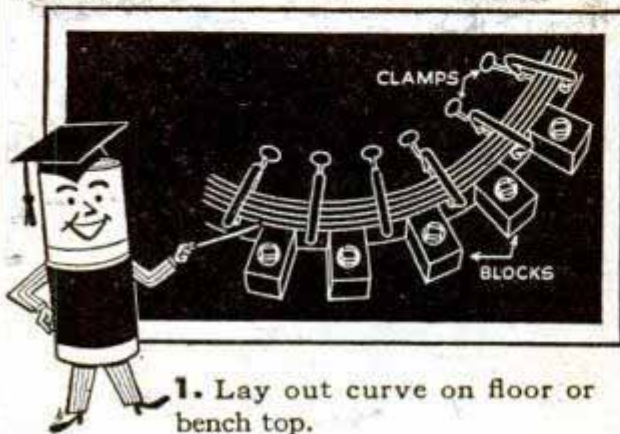
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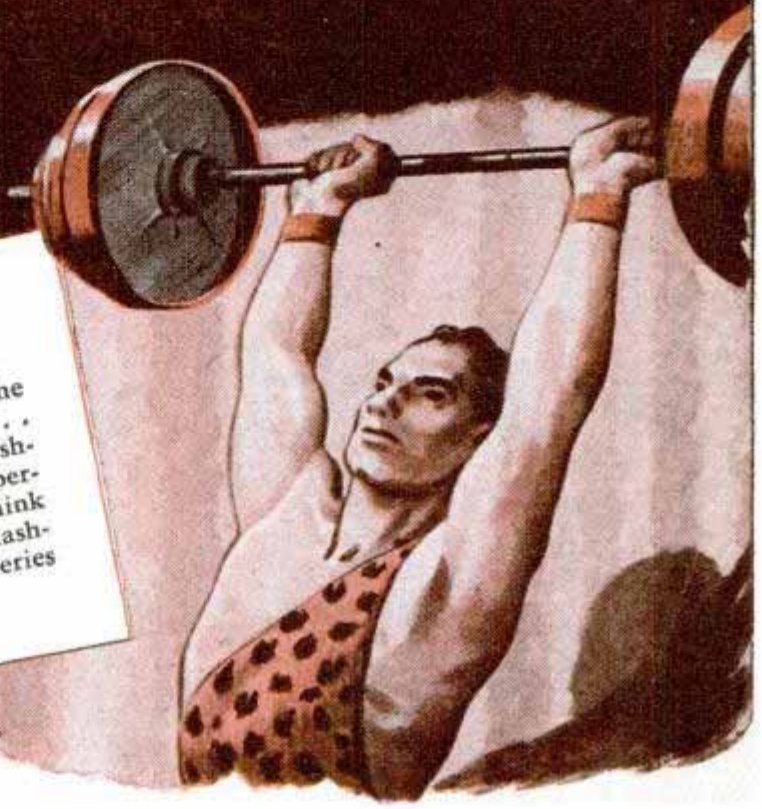
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Can YOU raise 400 pounds 7 feet in the air? A few champion strong men can . . . But the energy of *one* tiny "Eveready" flashlight cell, properly expended, could perform this back-breaking feat 3 times! Think of this kind of energy when you buy flashlight cells . . . ask for "Eveready" batteries every time. *Still 10¢ each.*



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*High Energy*  
**MEANS BRIGHTER LIGHT,  
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*Cuts Wash Time*

**USED** on thousands of truck fleets, buses and trains. Also for floors, vats, walls, etc. Clean water is constantly fed through five foot handle and 11" brush. Each stroke soaks, scrubs and rinses. Nylon mixture tufts are hand-stitched into block. Brush back and handle are steel. Handle connects with standard size hose. Guaranteed to cut washing time in half. Mail order today. Include **\$11.75!** check for postpaid shipment.

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Please ship.....Speed Wash Brush(es). If not satisfactory we understand Brushes can be returned within 30 days for full refund.

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this was so. Many athletes believed that exercise was actually good for a cold. University students in the third-day stage of an uncomplicated cold underwent the stool climbing exercise while their heart and breathing rates were recorded. Such tests give a practically complete picture of a person's physiological responses through a series of ink graphs on a long strip of paper. Blood pressures were also taken, as well as a flarimeter blow test.

Similar figures were obtained after the patients had recovered from colds. Significant differences between the results led to this conclusion: a person suffering from a cold is under handicap and will suffer 12 to 18 percent greater strain from exercise.

Although the no-smoking rule is almost universally enforced by coaches, there is still some controversy as to the actual physical effects of tobacco. Students were blindfolded, given a cigarette to smoke and then told to hold a metal pencil in a small hole. Any wavering of the hand was recorded electrically. The tests showed that a person's steadiness, as well as his pulse rate, is affected by smoking, but they did not indicate whether this is physically harmful.

Tests with large groups of athletes and nonathletes are showing a definite relationship between athletic ability and psychological attitudes. For example, college men who are above average in general athletic ability almost always say they would have attended high school physical education classes voluntarily. Among those that are below average, 17 percent attended physical education classes because they were forced to go. Although there may be little or no difference in the general personalities of the two groups, athletes tend to be less neurotic, less introverted, and lower in hypochondriac tendencies. Whether this is a cause or result of participation in sports has not been determined, but there is reason to believe that athletes are a better-adjusted class of students.

On the basis of our present knowledge, individual differences in running ability are divided as follows: 20 percent psychological, 20 percent skill, 40 percent physiological (including such factors as muscle viscosity and efficiency of blood circulation), and 20 percent unknown factors. Any of the four factors may be important when applied to a particular athlete.

What makes an athlete tick is a subject that requires much more experimentation before a definite and comprehensive answer can be given. The psychologists and the physiologists are doing the "pure" research. It is up to the coaches to find the practical application for such studies.





*Radiator rusted-  
Vacation busted*

*Clean out rust with*

### **DU PONT Cooling System CLEANSER**

Before your engine is ruined by overheating, clean out rust and scum in the radiator. Just pour in a can of DU PONT COOLING SYSTEM CLEANSER, run the engine 30 minutes or more, then drain. No reverse flushing is necessary. It dissolves rust—cleans thoroughly, quickly, and safely.



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### **DU PONT Acid and Rust INHIBITOR**

After cleaning out the radiator, you can keep it free from rust all season by pouring in a can of DU PONT ACID AND RUST INHIBITOR. This neutralizes the acid and prevents damaging rust from forming.



*Avoid radiator leaks with*

### **DU PONT Cooling System SEALER**

You can stop leaks quickly and securely—and make the cooling system LEAK-PROOF—by pouring in DU PONT COOLING SYSTEM SEALER. It will not clog the radiator or harm hose or metal parts.



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Hobbyists say so  
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**PRICE  
\$4.95**

Chuck size . 1/4"  
Length . . . 10"  
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JOIC can even drill around a corner. Here's why. It's adjustable, the only hand drill with swivel chuck and handle.

JOIC is a handy tool for easy drilling in tight places. For example, you can drill any number of holes at exactly the same height. (See top illustration at right.) JOIC will be a must, once you get your hands on it.

JOIC Hand Drill is all metal construction, rust proofed, and enameled. The removable end cap of the handle is convenient for storing drills.

This wonder drill is available almost everywhere. If your dealer's stock is exhausted, or does not include JOIC, kindly send us his name so we can make sure you are promptly supplied.



Drill's flat side holds bit parallel to surface.



Handle's 180-degree range locked by thumb screw.



Turret locks chuck in seven different positions.

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SAW  
BLADES**



Made in widths from 1/8" to 1-3/4"

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3/8"-3/16"-1/4"-3/8" wide, 6'6" long..... .95 each  
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Other sizes at proportional prices

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Engineers All Metal Army Type Hand-Sighting

**LEVELS**

**\$2.00** PRECISION QUALITY



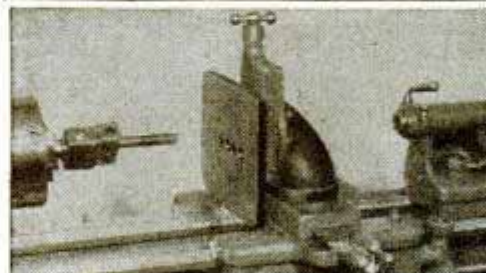
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## Give You 9 "Help the Job" benefits

RECOMMENDED BY A STAFF OF WOMEN  
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 Guaranteed by  
 Good Housekeeping  
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Read over the 9 points below. You'll say: "Just the features I want in work clothes!" Yes, BIG YANK gives you benefits that make the job easier—make you look neater—help you get ahead. Real comfort, too—long wear, and so economical. Choice of popular fabrics and colors.

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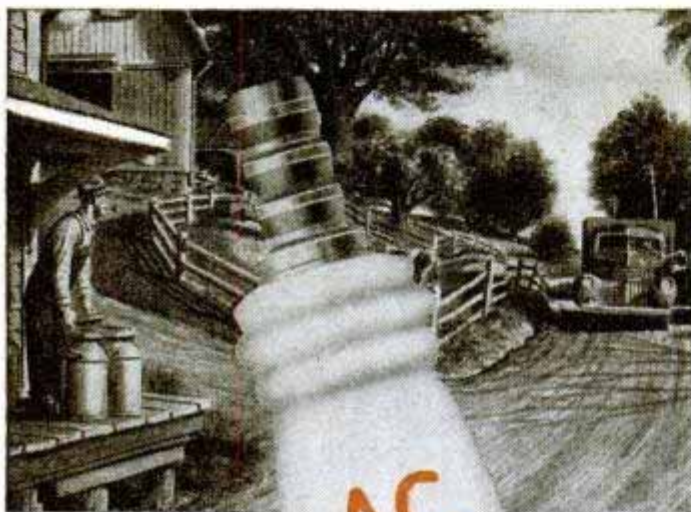
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**AC  
SPARK PLUGS**

AC SPARK PLUG DIVISION • GENERAL MOTORS CORPORATION

## Germes Put the Squeeze on Oil

(Continued from page 94)

write to Dr. ZoBell about it. He has no bacteria cultures for sale, is up to his ears in further research work and cannot answer individual queries. You can get the patent and a complete explanation of how the oil bacteria work by writing to the U. S. Patent Office, Washington, D. C., asking for Patent No. 2,413,278 and enclosing 25 cents to cover printing and mailing.

When the laboratory work was done, then came the problem of trying out the new discovery under field conditions. Several oil companies were eager to inoculate their exhausted wells. But it was decided finally to let the Pennsylvania Grade Crude Oil Association work out the practical aspects. This is a nonprofit organization and is in an area whose wells have become pretty well depleted.

For example, the Bradford field in northwestern Pennsylvania for many years had produced a high-grade 100 percent paraffin-base petroleum, highly prized as a lubricant. In an area of 78,000 acres some 25,000 wells had been drilled. Since the early 1870s, when drilling was first started, about 600,000,000 barrels of oil were pumped out of that one field. Water-flooding the wells has made it possible to produce another 500,000,000 barrels. Water under high pressure was pumped into the oil-bearing strata, forcing the oil to producing wells from which it is pumped to the surface. It is estimated that another 550,000,000 barrels of oil are left in the sands—about 35 percent of the original oil. Will the bacterial method make it possible to recover this oil, which now sells for about \$350 per barrel?

Exactly how the wells are inoculated, and how much oil the bacteria will produce, the Pennsylvania Grade Crude Oil Association is not prepared to say at the moment. Preliminary experiments have proved encouraging and further tests now in progress are expected to give a definite answer.

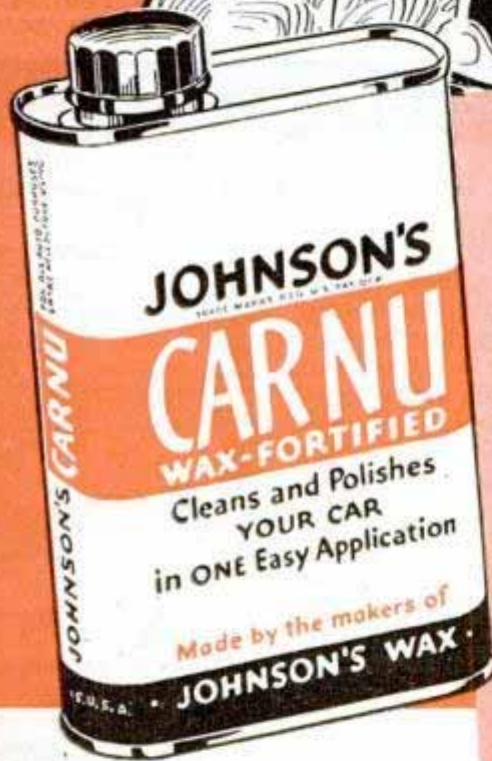
It is known, however, that the bacteria spread in all directions—like a creeping fire—at the rate of about two inches a day. The bacteria can move by stringlike appendages called flagella, and spread also by multiplying. The wells already are drilled, the pipes are in place and the pumping machinery is ready to operate. If wells that are producing a barrel or two a day are stepped up to 10 or 12 barrels, it will mean greater production for the oil companies and cheaper gasoline and lubricants for the average motorist.

(Continued to page 240)



# Quick change artist in action!

How Johnson's Carnu,\*  
famous liquid-type car polish,  
makes a quick job of car shining  
... cleans and polishes  
in one application



## What Carnu does

**Before Carnu:** Dirt and oxidized paint make car finish rough, lusterless.

**After Carnu:** "Showroom shine" is restored. Finish is bright and beautiful, and so smooth that future dust and dirt may be wiped off easily!

## How Carnu does it

**Apply Carnu . . .** It's easy — just rub hard enough to loosen the grime, then let Carnu dry completely to a white powder.

**Wipe Carnu off . . .** Nothing to it — just wipe off the powder. Dirt comes with it, leaving the finish shining like new.



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2. Protects the finish.

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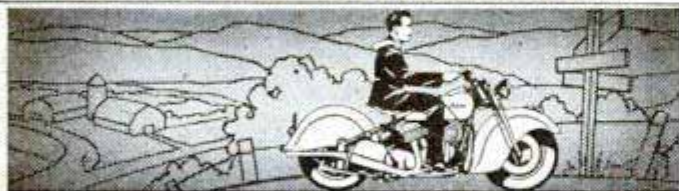
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STOPS LEAKY FAUCETS

SAVES WATER BILLS!

The only tool at this amazing low price

**\$1.00** complete with brass replacement seat

that actually inserts **A NEW SEAT!** IN YOUR FAUCET!



1. Remove bonnet and stem of faucet



2. Insert DAVOS Faucet Reseater, turn handle till new seat opening is topped.

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Additional brass seats may be obtained at a charge of 10c each.

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Motorists Wise  
**SIMONIZ**

The implications of this experiment are tremendous. In addition to reviving "dry" wells, there are many petroleum-rich oily shales and sands where oil exists, locked in the sediments in such a way that it is too costly to remove—up to \$5 and \$6 a barrel by present methods. One of these areas is the Santa Maria oily shales of California. Another is the Athabaska sands of Alberta, Canada. Millions of barrels of oil lie attached in microscopic films or as tiny droplets to grains of sand and shale in these areas—waiting to be liberated.

Use of bacteria for boosting production of oil wells is a technique that calls for the services of an expert. If not, it can be as dangerous as a sharp knife in the hands of a three-year old. You've got to be certain that the bacteria you introduce into your oil-bearing formations are the right strain of the new desulphovibrio halohydrocarbonoclasticus. Some bacteria, points out Dr. ZoBell, actually chew up the hydrocarbons of oil. It is thought, for example, that certain areas of the world which exhibit all the geological characteristics of rich oil fields, but which are barren, may have been invaded in ages past by oil-eating bacteria.

The petroleum industry has considered some odd and unorthodox methods of getting oil out of stubborn geologic formations. They've heard and investigated proposals for using detergents, acids, chemicals, water, superheated steam and natural gas pumped in under pressure. The use of bacteria, strange as it may appear, also offers promise and the suggestion is being backed up by solid, scientific experimentation.

Dr. ZoBell's "oil bugs" may yet prove that the slogan, "good to the last drop," is almost as applicable to oil production as it is to coffee.

### Source of Atomic Energy

Atomic ovens have produced a new chemical isotope which can be split to release atomic energy, according to Dr. Glenn T. Seaborg of the University of California. The new substance is neptunium 237, a chemical twin of neptunium 239 which is used in making the atomic bomb. The number of atoms in a given quantity of the chemical which will split and thereby release energy is so low that the isotope could not be used in a bomb, Dr. Seaborg reports. A small quantity of the chemical has been produced for special studies.

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Whatever the make, model or degree of cylinder wear in your engine, there is a Sealed Power Ring Set specifically engineered to do the best possible job for you. Sealed Power workers are proud of their product and its 36-year record of preference by leading car, truck and engine builders. See your Sealed Power Franchise Dealer. Send a postal for illustrated, informative new booklet on 7 ways to save oil. It's free and may save you lots of money. Sealed Power Corporation, Dept. G6, Muskegon, Mich. In Canada: Stratford, Ont.

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No one piston ring design can meet all replacement needs. Sealed Power Individually Engineered Ring Sets are made up from twenty-six (26) basic ring designs, which permit each set to be specifically engineered to do the best possible job in a particular make of engine.

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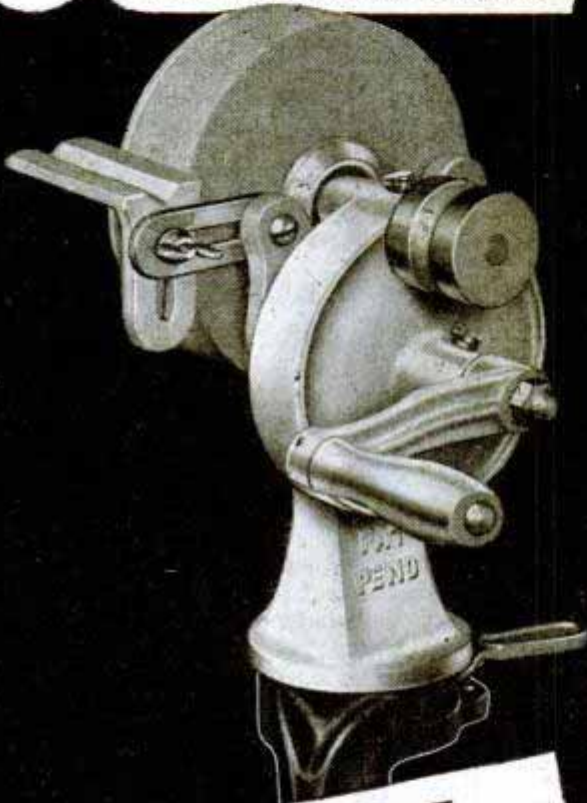
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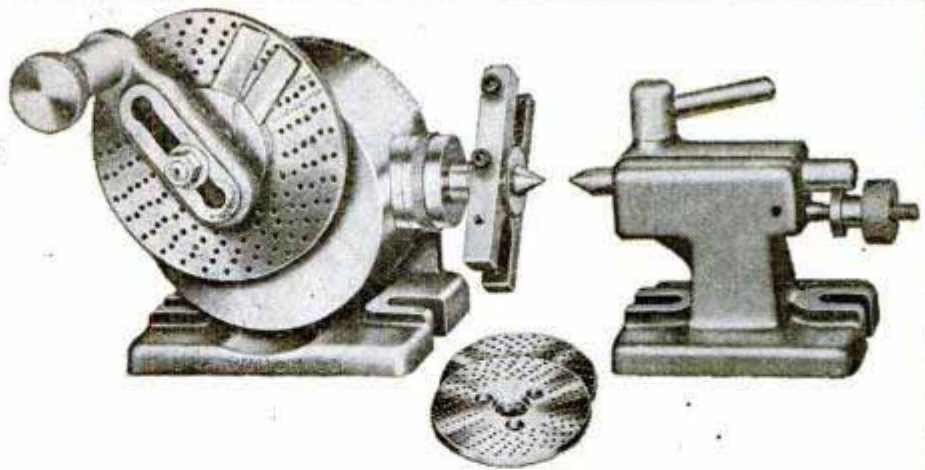
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Grinds your drills like factory in 25 seconds. Gives perfect center and clearance. Saves drills, time and money. No shop should be without the Super Drill Grinder. Guaranteed to do the work or money back. The Grinder that gives a rounded point!

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## New Wealth From Waste

(Continued from page 120)

alcohol. Xylose sugar also can be treated with heat to produce furfural, an oily liquid employed in petroleum refining. The cobs then are ground into a fine powder and treated with a stronger acid which breaks down the cellulose structure into a solution of glucose sugar, from which ethyl alcohol is made.

The Peoria plant is capable of handling 3.3 tons of corncobs in eight hours. From this, 1600 pounds of xylose and a ton of corn sugar can be produced, both of which can then be fermented to make liquid motor fuels. These materials and the lignin residue will yield 90 to 95 gallons of motor fuel from a ton of cobs, and about half of it will be in the form of ethyl alcohol.

Agricultural experts estimate that 200,000,000 tons of farm residues are produced annually, and that perhaps half of this amount might be available for industrial uses. The remainder is needed by farmers for livestock and soil improvement.

Although many of these residues can be turned into motor fuels, experimentation in this field is at present confined to corncobs. Other residues, such as the hulls of oats, rice and cottonseed, the shells of nuts, peanut pith, flax shives and cereal straws, are being used in a number of products ranging from cigarette paper to fiberboard and as an extender for plastics.

Not only cobs but corn itself is assuming many new roles. In one chemical process, a purified protein called zein is extracted from corn. Zein, which is odorless, is used as a coating for paper and wood, particularly for food packaging. It has been used as a replacement for shellac to provide a scuff-resistant material for phonograph records.

The properties of zein make it a useful component of ink for high-speed printing. Several magazines and printing ink manufacturers are experimenting with it for this purpose.

Textile fibers can be produced from zein and woven into dresses, sweaters and neckties. Dr. A. K. Smith of the Peoria laboratory says zein fibers have a dry strength equal to wool and a wet strength two thirds that of wool. Cost is between one half and three fourths the price of wool.

Another new use for corn is in the manufacture of phenolic resin plywood glue. Corn gluten or soybean meal can be substituted for about 40 percent of the phenolic resin. This lowers the cost without reducing the quality of the glue.

Three or more sheets of wood veneer are

(Continued to page 248)



# AUTO-LITE "Plug Tips"

## AVOID WASTE, Check Spark Plugs Regularly

The right type of spark plug will save you time and money. Plugs which are faulty and mis-fire waste as high as 10 per cent of your fuel, according to experts. And hard-to-start engines can lose valuable time.

Check all your spark plugs regularly to make sure you have the right plugs for your engines.

This Auto-Lite "Plug-Chek" Kit quickly helps you find spark plugs that are causing trouble. All you do is match plugs with pictures on the "Plug-Chek" Indicator — each example refers to a page in the "Plug-Chek" Data Book that shows you what to do.



\* Because these illustrations are not in full color, they do not accurately reproduce the actual firing tip appearance. For accurate, full color reproduction, mail the coupon.



**Too Hot\***  
If spark plug firing tips are fused or blistered, plugs are operating too hot and may be causing loss of power.



**Normal\***  
If spark plugs look like this, they are of correct heat range. Get your Auto-Lite "Plug-Chek" Kit right now.



**Too Cold\***  
If spark plug firing tips show deposits of carbon or are wet with oil, plugs are too cold, may waste dollars in costly gas.

Send for your Auto-Lite "Plug-Chek" kit...only 10¢!

Switch to  
**AUTO-LITE**  
SPARK PLUGS

### THE ELECTRIC AUTO-LITE COMPANY

Department PM3, Toledo 1, Ohio

Enclosed find ten cents for the Auto-Lite "Plug-Chek" Kit that includes both the "Plug-Chek" Indicator and Data Book.

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## SOLDERING MADE EASY

YOU can now make clean, smooth soldered joints or repairs with this amazing new kit that contains all of the necessary Solder, Flux, Cleaners and detailed instructions.

**EACH KIT CONTAINS**

- Generous supply of SOLDER
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**COMPLETE INSTRUCTIONS.** Experienced mechanics as well as the beginner will want, and keep, these unique, simple, concise directions. Anyone can now easily make clean soldered joints and repairs to Cast Iron, Steel, Brass, Bronze and many other alloys.

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MOTOR SCOOTER

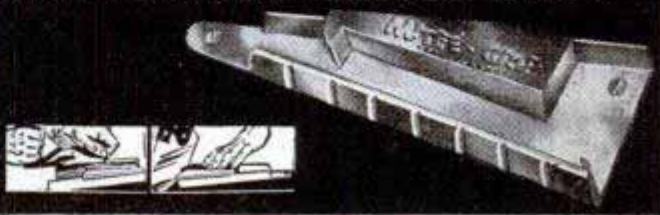
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For City or Highway — factory, farm or commercial use!

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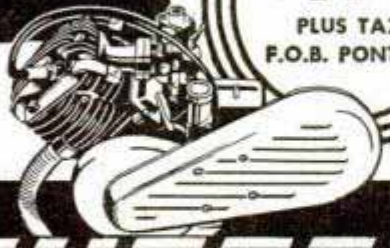
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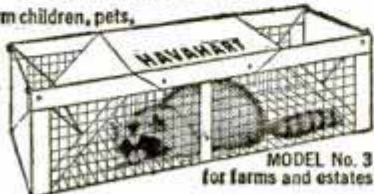
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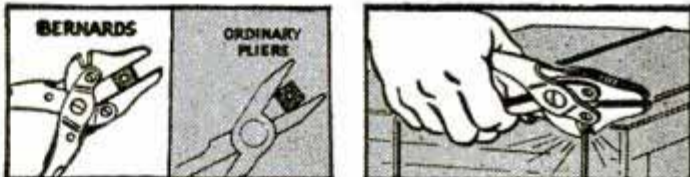
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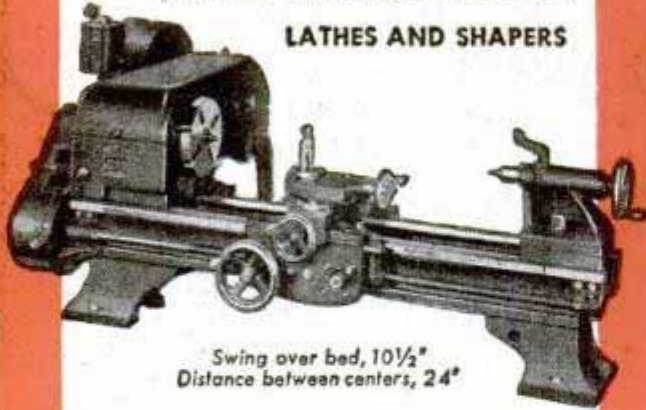
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LATHES AND SHAPERS



Swing over bed, 10½"  
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Another reason for  
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The ability of the Logan Lathe to hold to closest tolerances after years of usage results from advanced design and precise construction methods. Logan lathe bed ways are within .0005" of parallelism. The front bearing seat on the Logan ball bearing mounted spindle can vary no more than .0002". Total spindle run-out 12 inches from the bearing is less than .0008". Rugged, massive construction is combined with these precision standards, and vital points of the lathe are protected by self-lubricating bronze bearings. These are a few of many reasons why it pays to choose a Logan Lathe for the small shop as well as for industrial use.

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for sustained accuracy.
- 2 **RUGGED, ACCURATE BED**  
within .0005" of parallelism.
- 3 **SELF-LUBRICATING BEARINGS**  
at vital points lengthen life.
- 4 **BACK GEARS ENCLOSED IN HEADSTOCK**  
with shifter rack safely and conveniently  
at your finger-tips.
- 5 **RUBBER CUSHIONED COUNTERSHAFT**  
for smoothness and accuracy in working area.
- 6 **THREE POINT SUPPORT**  
Steadies the countershaft, prevents rocking.
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Prevents accidents. Keeps lathe clean.
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DEPT. B-6, 4901 LAWRENCE AVE., CHICAGO 30, ILL.

glued together to form plywood, and the glue is so strong that the wood tears apart before the glued sections give way. Plywood glued together with this glue was used in Liberty ships, airplanes and PT boats during the war.

War-born shortages of cork led to the development of a substitute for cork made from the pith of peanut shells. It is called Noreseal, named for the Northern Regional Research Laboratory, plus SEAL. Noreseal has been tested and found satisfactory for liners in bottle caps for beverages, fruit juices and extracts. It also can be made from cornstalks and sugar cane.

The cork substitute is made by grinding and screening out the pith from peanut shells, mixing with glue, glucose and various chemicals, then heating the mixture and beating it to admit air. The material is formed in sheets or poured into individual bottle cap liners.

The list of new uses for farm products is almost endless. One synthetic rubber (called Lactoprene) is made from whey; a cigarette moistening agent from apples; mineral-rich poultry feed from vegetable wastes (leaves and stems).

Farm crops are the nation's income, and by using that income as a basis for industry, the United States can follow a course that will conserve its capital (petroleum, coal and ore) and extend its industrial life.

**How to make a starch sponge at home.**—The ingredients for making a starch sponge in your home refrigerator are 6½ tablespoons of powdered cornstarch and 2⅔ cups of cold water.

Slowly add ¼ cup of water to the starch while stirring. Continue stirring until a smooth paste is formed. Add the rest of the water while stirring. Cook for 15 minutes in a double boiler over vigorously boiling water, stirring constantly for the first five minutes, then occasionally to keep the starch from sticking to the pan.

The cooked paste should be smooth, thick and creamy, like cornstarch pudding. Pour the hot paste into a refrigerator ice-cube tray from which the partitions have been removed. Place the tray on the upper shelf in the freezing unit. Have the refrigerator set at "normal." Leave the paste in the freezing unit until completely frozen. This will require at least 24 hours.

Then remove the tray from the freezing unit. Allow the paste to thaw. Cold or barely lukewarm water can be used to hasten thawing, but not hot water. Do not direct a strong stream of water onto the frozen paste, because this will break it up.

(Continued to page 252)



# Larson

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### AND LAWN BENCHES

Another new  
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Hook together for table

Copyrighted instruction sheet for easy assembly. Illustration shows how table is constructed and ease with which it is converted into a pair of lawn benches. Quickly taken apart for storage. Set of hardware only. Lumber not included.



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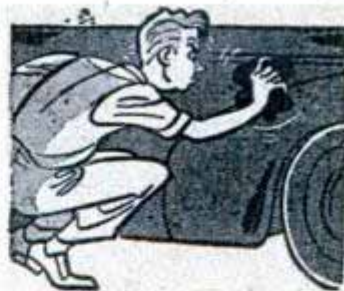
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## A "charley-horse"



## For ease and speed



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Removes dull traffic film—restores the original color and lustre—quickly, easily and safely.

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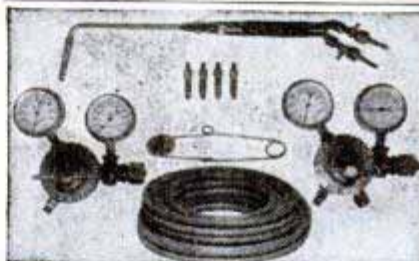
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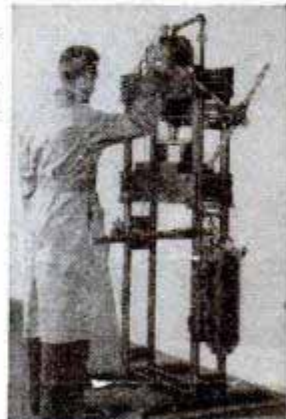
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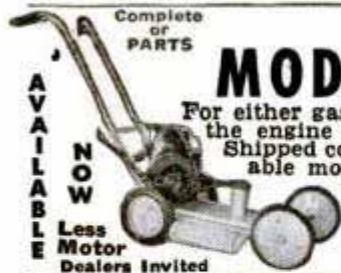
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What marks a box,  
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So all may know  
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If your dealer can't supply you, write us.

Remove most of the water from the thawed starch sponge by pressing slowly and gently, preferably between sheets of screening or on a perforated tray so that the water can easily be drained away. If the water is not allowed to flow away, it will be reabsorbed by the sponge as soon as the pressure is released. A good sponge springs back into its original size and shape when the pressure is released.

To make a dried sponge, cut the damp pressed sponge into pieces of the desired size and shape before drying. Then place the pieces of damp pressed sponge in front of a fan and allow to dry at room temperature until firm and tough. Crisp the starch sponge by final drying in an oven at a temperature below 200 degrees.

## Dress Parade on Rails

(Continued from page 104)

search, Inc., in cooperation with several railroads may outmode all other types of locomotion. It's the biggest threat to oil power, and railroads may throw the switch back to coal if it's successful.

Coal is a difficult fuel to handle inside a turbine, but in this engine unprepared coal is atomized finer than face powder by "exploding" the air inside it. Delivered to the combustors, it burns under 70 pounds pressure per square inch. The resulting gases enter the turbine at 1300 degrees Fahrenheit to turn the turbine blades and air compressor. The turbine turns electric generators which drive the locomotive.

Economy is the biggest advantage of the coal burner. Its proponents expect the coal-burning gas turbine to operate at a cost of about 26 cents a mile compared with 56 to 60 cents a mile for the Diesel-electric. Furthermore, the colder the outside temperature the more efficiently the turbine operates, and there's no smoke.

Another locomotive just around the bend is a Westinghouse gas turbine which burns a low-cost fuel oil. This puts it in economic competition with conventional rail prime movers. Its chief advantage is its small size, about half that of a Diesel-electric engine.

The railroads are catering to you with many new services, too. For example, a number of the new coach trains have reserved seats throughout at regular fares. You can phone in a reservation and pick it up on the train without waiting in line. A group of 34 railroads is establishing a credit system; anyone with references who does a lot of traveling can obtain a credit card and sign for all expenses, paying his bill at the end of the month. The card takes

(Continued to page 256)





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The ideal rifle for year 'round shooting indoors or out. Shoots low-cost SUPER PELLETS without noise, odor or recoil. Requires no cleaning.

Adjustable power—rifled barrel for accuracy. .177 and .22 caliber models.

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3 HENRIETTA ST., ROCHESTER 7, N. Y.

### Shoot CROSMAN *SuperPells*

The BETTER Ammunition for ALL .177 and .22 caliber Air Pistols and Rifles.

.177 cal. . . \$2.50 per M

.22 cal. . . \$3.00 per M

POSTAGE PREPAID

At your dealer or order direct

CROSMAN ARMS CO. HENRIETTA ST., ROCHESTER 7, N. Y.

FOR  
GREATER  
ACCURACY  
MAXIMUM  
POWER

## NEW! METAL FORMING TOOLS

**VISE IRON BENDER.** Easily bends 1/2" square or round; 1/4" up to 2" wide. Makes hooks, rings, brackets, eyelets, etc. Screw adjustment for accurate work. All steel. Price \$10.00 PP. Immediate delivery.

**VISE FORMING TOOL.** Makes cylinders, ovals, cones hoops and round corners in sheet metal, wire and 1/4x2 steel strap, 2" to 60" in dia., 18" wide. \$8.50 PP.

**12" BRAKE.** Fits in vise, or bolts to bench. Forms angles, channels, boxes and crimps in sheet metal and thin strap iron. \$14.50 PP.

**12" VISE PRESS-BRAKE.** Forms channels in sheet metal, 1/8" to 1/2" wide, up to 4 ft. long. \$8.50 PP.

Order direct, or send for details. Sheet metal and wire forming booklet, 50c.

VISE BRAKE MFG. CO., Dept. P.M., 1318 So. 30th Ave., Omaha 5, Nebr.



## NO TEDIOUS HAND TURNING!



Revolves Three Times a Minute

Sturdy, adjustable, it's equipped with 50 feet of cord; 110 V. AC. Useful indoors too. At better stores or write for literature. \$39.50 each.

**KASSON**

## Electric Bar-B-Q

GENERAL DIE AND STAMPING CORPORATION  
270 Mott St. Dept. MP New York 12, N. Y.

## NEW TOOL READY

QUICKLY SHAPES, SANDS, CARVES, PROFILES, BANDSANDER  
GRINDS, BEVELS, SMOOTHS, POLISHES, CLEANS!

Industry's most versatile machine—THE MEAD BANDSANDER—now available to hobbyists, craftsmen, model makers, pattern makers, home workshops—cuts fast and clean on wood, metal, plastics! Works equally well on inside cut-out openings or irregular outside edges, on intricate scrolls, curves. Saves hours of tiresome hard work—does better job. Nothing else like it. **IDEAL TO GIVE OR GET FOR WORKSHOP!** Sold on 5 Day's Trial, money back GUARANTEE.

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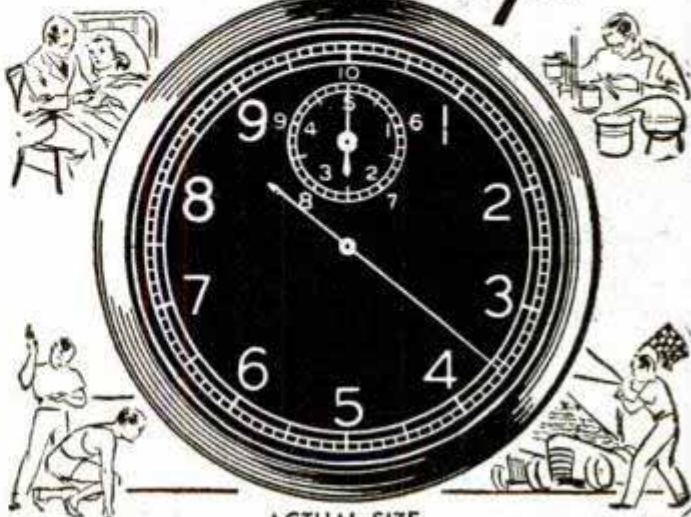
Write for free, lavishly illustrated Circular describing how Bandsander—the machine that amazed the experts—saves time, money, trouble. Write now—a post card will do!

MEAD SPECIALTIES CO.  
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BRAND NEW! **\$9.95**  
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ACTUAL SIZE

**GUARANTEED!** If not satisfied, return within 10 days for money back. But you'll keep and treasure this beautiful 9-jewel, 1/10 second pocket stop watch. Shockproof, water-resistant. Handsome non-corrosive, chromium-plated metal case. Unbreakable crystal. Sweep second hand. Precision-made by WALTHAM craftsmen to rigid specifications for U. S. Army.

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AT DOUBLE THIS PRICE!

- Sweep Second Hand • Shockproof
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HANDICRAFT  
KNIVES & TOOLS



Choice of experts in every art and craft field. Singly and in sets, 25c to \$45.00.

Buy where you see this sign —  
At hobby, hardware and gift shops.

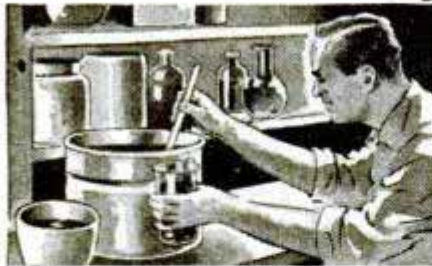
X-acto Crescent Products Co., Inc., N. Y.  
In Canada, Handicraft Tools, Ltd., Toronto  
\*Reg. U.S. Pat. Off.

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Start Now In Spare Time!

Be A Manufacturer  
Hold Your Job! Work At Home!

15  
TRADE  
SECRETS



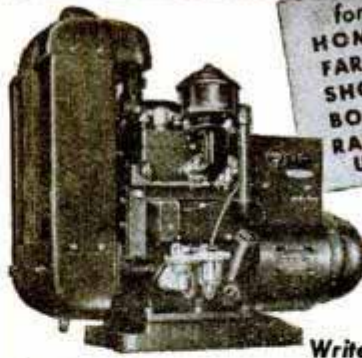
Starting in your kitchen or basement, in spare time, you can build a profitable manufacturing business of your own. We provide 15 valuable processes, developed and perfected in America's largest laboratories at the cost of millions of dollars. You make products which are in great demand—for example, "Thermo-Sol", a new inexpensive fireproofing that has no competition; "Chem-Stone", a new plastic liquid that makes concrete as hard as stone; "Water Seal", the secret sealer for leaky walls and ceilings, and 12 other easy-to-make, easy-to-sell products. We supply everything you need. Get started now!



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FARMS  
SHOPS  
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USE

Onan gasoline engine-driven Electric Plants supply reliable, economical electric service for any use. Portable, stationary or standby models. Water or air-cooled, compact and rugged.

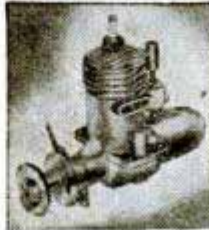
A.C.: 350 to 35,000 watts in all standard voltages and frequencies. D.C.: 600 to 10,000 watts, 115 and 230 volts. BATTERY CHARGERS: 500 to 3,500 watts; 6, 12, 24, 32 volts.

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## New THOR "B" ENGINE—\$6.95



The new THOR "B"—Sensational miniature gasoline engine that really works. Super-power performance. Smooth, velveted power that roars into action with a "twist of the wrist." Over 20,000 already sold. 1/6 H.P. Complete with coil, condenser, and fully illustrated instructions, ready to run, only \$9.95. In KIT form, fully machined, 5 minutes to assemble, \$8.95, without coil and condenser. Powers all models. Send \$1.00—shipped collect same day C.O.D. Free. Send for 24-page illustrated hobby catalog.

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## NEW PANTAGRAPH PORTABLE ADDING MACHINE

Add, subtract, multiply. \$999,999.99 cap. Easy fingertip operation. Nothing complicated about this practical new type machine. Ruggedly constructed. Lightning fast. For business, farmers, professional men. Use it a week on our money back guarantee. Return for refund if not satisfied. \$14.50 C. O. D. plus postage. Cash orders prepaid. This company is 100 years old. Established 1846. Clip this.

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"SAWZIT"—A Tool of 1000 Uses. Handles Like Knife. Cuts Like a Hack Saw

A versatile tool for the mechanic, electrician, carpenter, modelmaker, handyman. Reaches places no other saw can get. Uses broken or new hack saw blades. Comes with 1 blade. Additional blades, 6 for 25c. Postpaid ALGONQUIN PARTS DARIEN, CONNECTICUT

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Preserving baby shoes in metal, pearl, gold, silver, bronze. No experience necessary. 500%-1000% profit. Your own business.  
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Many small parts can be formed without dies, to duplicated accuracy of .001" with DI-ACRO Precision Machines. — Benders, Brakes, Shears. Save die expense and time delay. Ideal for experimental and research work, making samples, models, etc., as well as regular production runs. Write for descriptive literature.

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SHEAR

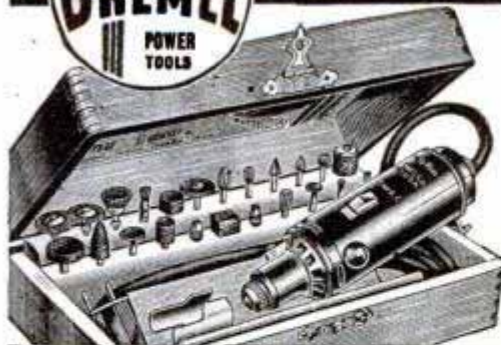
BENDER

BRAKE





# MOTO-TOOL ★ THE "POCKET-SIZE" MACHINE SHOP



**"MAN . . . WHAT A POWERHOUSE!"**

**A TOOL THAT PACKS YEARS OF PLEASURE**

Here's a tool to please a man's heart . . . one that holds promise of endless creative hours. Dremel Moto-Tool is a "war veteran" . . . used by all branches of the armed forces in far-flung repair bases . . . helped set production records at General Electric, Westinghouse, Remington Arms, Ford and others. Hobbyist or expert craftsman, first choice is Model 2 Moto-Tool Kit with its handsome felt-lined, highly finished wood case with rows of tools begging to be put to work. Write for FREE catalog of Moto-Tool attachments and accessories.

**MOTO-TOOL FEATURES:**

Oil-less, sealed bearings • Patented automatic chuck lock pin • Over-size armature shaft, hardened, ground, polished • 110 Volt, AC-DC motor • Sliding snap-type switch • Cord protector • Shockproof bakelite housing • Dust-filtered, air-cooling system • Weighs only 13 oz. • Dynamically balanced for vibrationless operation.

**MONEY BACK GUARANTEE:** Buy Dremel Moto-Tool and Accessories from your dealer. If he cannot supply you, order direct from factory on 10 day trial. Shipped postpaid for cash in full; or for \$2.00 sent C.O.D. for balance plus postage.

**DREMEL MFG. CO.,** Dept. 117-F, Racine, Wisconsin



Approx. 27,000 R.P.M.

- Burring
- Grinding
- Routing
- Polishing
- Engraving
- Sharpening
- Drilling
- Inlaying
- Sawing
- Sanding
- Carving
- Cutting

**Moto-Tool Kit No. 2**, with 23 accessories (high speed steel cutters, grinding wheels, polishing accessories) and heavy-duty professional Model 2 Moto-Tool in natural-  
**finish, hardwood case . . . \$23.50.** (Items purchased separately would cost about \$30.00; you save \$6.50.)  
**Moto-Tool No. 1** with one emery wheel point . . . \$16.50.  
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**Model 1 Moto-Tool** with one emery wheel point . . . \$9.85.

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A Hull Streamline Automobile Compass for Father's Day means no more lost directions, treacherous driving on wrong roads for Dad. Insist on the original Hull for accuracy, dependability. At your dealer's. Write for circular. Price \$3.95.

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## KUT RITE lawn mower sharpener

Patented. 3 popular sizes; retail prices: 14", \$1.40; 16", \$1.50; 18", \$1.60

Send Check or Money Order  
Postage for mailing twenty cents.

**ACCURATE SHARPENER MFG. CO.**  
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Pat. No. 2250764

## PULVEX "DDT" FLEA POWDER



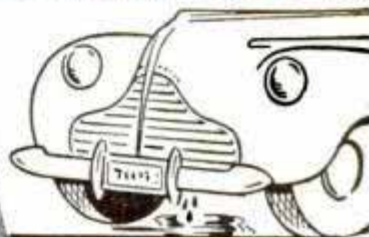
Kills the fleas *Quickly!*  
Keeps others off for Days.



Pulvex also comes with ROTENONE, the original formula. BEST FOR CATS.

Either Kind 25¢ & 50¢

# STOP LEAKS!



**Cooling Systems Made Leak-Proof QUICKLY**

**WARNER LIQUID SOLDER—Non-Metallic—Deposits Tiny Fibers to Repair Leaks Anywhere in Cooling Systems. Simply pour in! Finds and REPAIRS every crack or hole. Do it yourself—or see your service man.**

**Warner-Patterson Co., 920 S. Michigan Ave., Chicago 5**

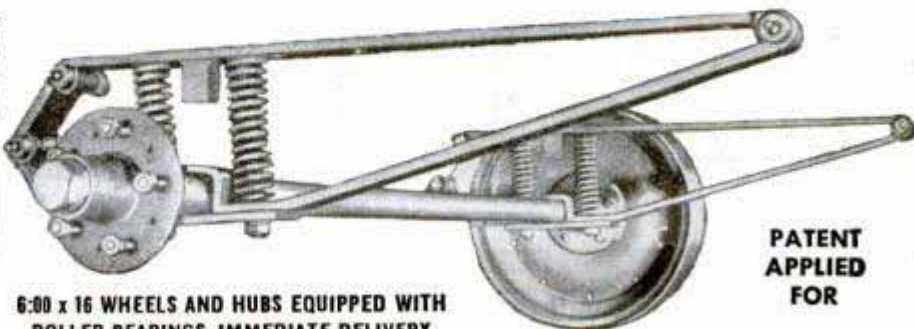


**MACHINISTS — TOOLMAKERS**  
Better construction of Gerstner Tool Chests, makes them better values. Free Catalog.

**GERSTNER TOOL CHESTS**  
447 Columbia St., Dayton 7, Ohio

# TRAILER AXLES • HUBS • WHEELS AND SPRINGS

Axles are strong construction and can be supplied with or without our new coil spring suspension. Straight axle has standard 58" tread. Drop axle has 58 1/2" tread. Spring centers 46" on both axles. Load capacity 1500 pounds. Write for Descriptive Literature.



Remittance with order	Axle Only	Axle with Springs
—No C.O.D.		
Straight Axle, Std. Tread	\$ 6.75	\$24.75
Drop Axle, Std. Tread	12.00	30.00
Wider tread axles available at additional cost		
PRICES F.O.B. FENTON, MICH.		

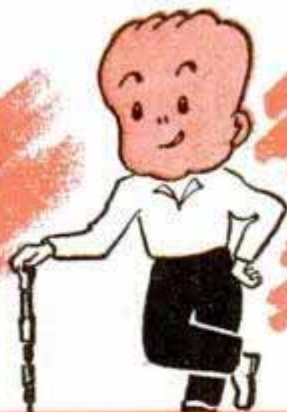
6:00 x 16 WHEELS AND HUBS EQUIPPED WITH ROLLER BEARINGS. IMMEDIATE DELIVERY

PATENT APPLIED FOR

**MANUFACTURERS AND DEALERS WRITE FOR QUANTITY LOT PRICES**

**200 S. LEROY ST. INDUSTRIAL MACHINE TOOL CO., INC. FENTON, MICHIGAN**





**Save Time  
on Routine Jobs**

## with an **AUTOMATIC SCREW DRIVER**

Whether it's light production assembling or a routine home workshop job, you can save a lot of time with a Millers Falls Automatic Screw Driver. This unique spiral ratchet tool can handle any screw driving job quicker and easier. By simply shifting the knurled control sleeve and the spiral lock nut, it can be used either as a regular rigid screw driver, a right or left hand ratchet, or as a complete automatic. Made with or without quick return.

Smooth, powerful action and tested dependability are built right into Millers Falls Automatic Screw Drivers. You can depend on them for long-lasting satisfaction. Ask to see one at your dealers today.

**One thing in common—Quality**



**MILLERS FALLS COMPANY  
GREENFIELD • MASSACHUSETTS**



care of all costs including tickets, berths, meals and other services. Some of the Santa Fe trains will have a sick room in the club-lounge car. If anyone must be removed by stretcher a special hinged wall opens out of the room and the patient can be transferred directly to an ambulance.

Chesapeake and Ohio started the first theater-on-rails last January on the George Washington between Washington and Cincinnati, and other railroads will follow suit soon. Twin-unit dining cars of the George Washington were rebuilt into a theater with 50 seats that fold into the wall. There's no charge for the 16-mm. pictures shown twice nightly on a four-by-five foot screen.

Car manufacturers have designed some unique specialty cars that are still future promises. When the demand for basic equipment has been filled you'll probably find night clubs with dance floors, playrooms with slides and teeters for the kids, and casino cars for the card players.

Over a year ago an advertisement appeared in the newspapers that drew a lot of chuckles but pointed out an obvious shortcoming in rail service. It was inserted by Robert R. Young of Chesapeake and Ohio, who leveled an accusing finger at the railroads because a hog could cross the country without changing trains but humans couldn't.

Today coast-to-coast sleeper service is a reality and you can step into your compartment in Washington or New York and never open the door until you arrive at Los Angeles, San Francisco, El Paso or San Antonio. You can even travel from Mexico City to New York without leaving the car!

Travelers will have a choice of many spanking new streamliners within a year. North Western will add an overnight sleeping car train this summer to its fleet of 400s running from Chicago to the Twin Cities. The Milwaukee Road will have six new fast trains costing \$1,500,000 apiece in daily service between Tacoma-Seattle and Chicago within a few months. Twin coach streamliners, the Shasta Daylights, are scheduled by Southern Pacific for the end of '47 for runs on the scenic route between San Francisco and Portland. Rock Island and Southern Pacific plan triweekly de luxe trains between Chicago and Los Angeles this summer on a 39 $\frac{3}{4}$ -hour schedule.

Illinois Central's new City of New Orleans is running between that city and Chicago in 16 hours. North Coast Limiteds of the Northern Pacific will make the run between Chicago and the North Pacific coast in 45 hours. Burlington has ordered Vista Dome cars for its California Zephyrs to op-

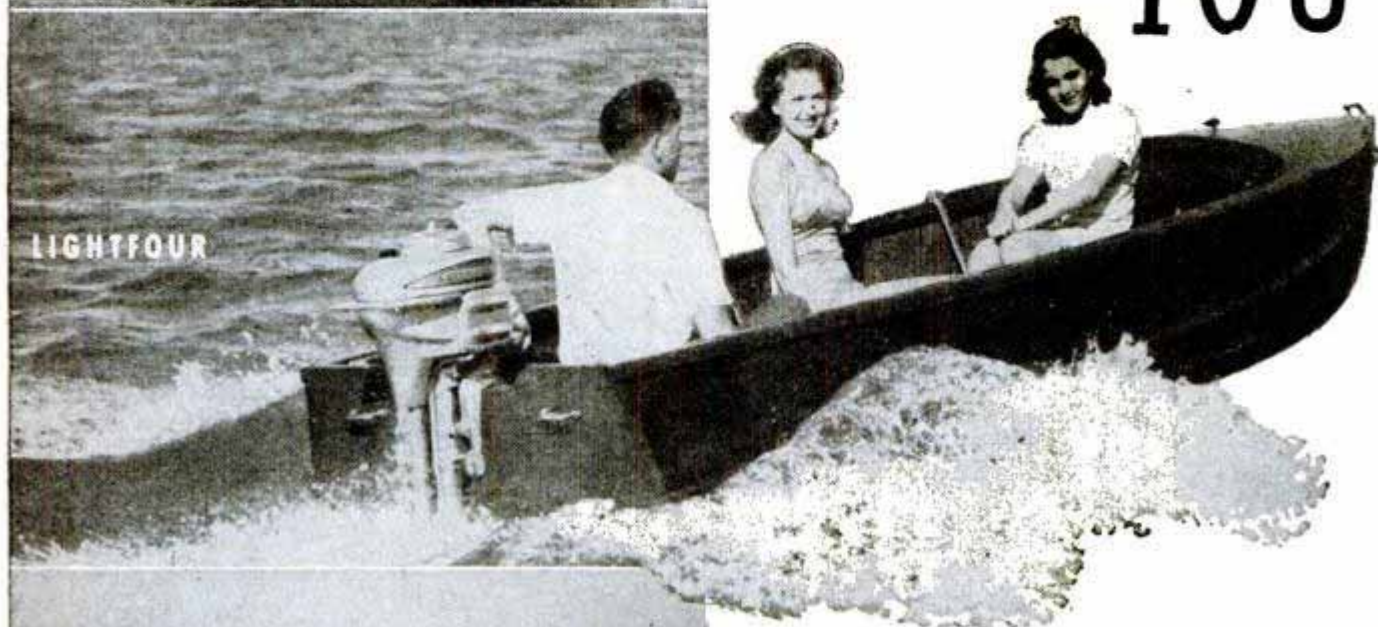
(Continued to page 260)



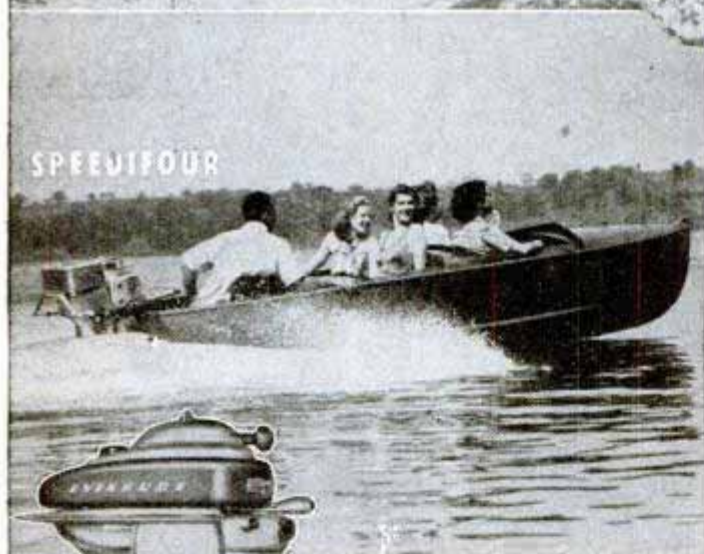
# There's a "Four" for YOU—



ZEPHYR



LIGHTFOUR



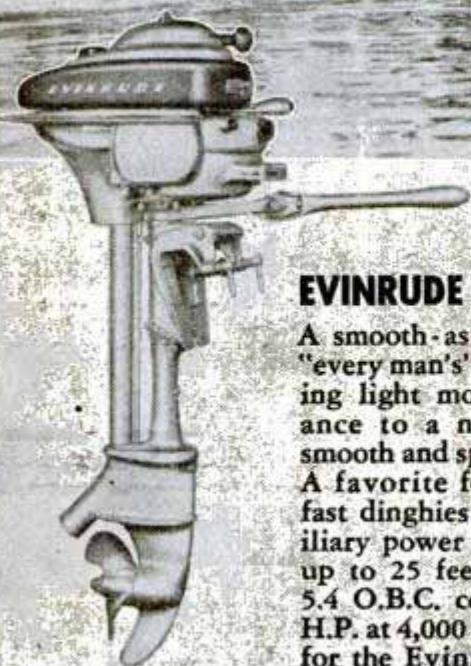
SPEEDIFOUR

—just right in size, power, performance . . . in Evinrude's complete line of 3 thrilling four-cylinder models!

If you want a motor developing 5 horsepower or more — why not enjoy the *extra* smoothness — the *extra* thrill of performance — that are yours with an Evinrude "four"?

There's nothing like them — for any boat, or any kind of service! No other type of outboard motor to match their velvety surge of power, their responsiveness and flashing get away!

See your Evinrude dealer — look for his name under "Outboard Motors" in your classified telephone directory. Catalog of the complete Evinrude line of 7 models sent on request. Write for it today—address, EVINRUDE MOTORS, 5561 North 27th Street, Milwaukee 9, Wis.



## EVINRUDE "ZEPHYR"

A smooth-as-silk four in "every man's" size—bringing light motor performance to a new level of smooth and spirited action. A favorite for powering fast dinghies and for auxiliary power on sail boats up to 25 feet. Develops 5.4 O.B.C. certified brake H.P. at 4,000 R.P.M. Write for the Evinrude catalog.

# EVINRUDE

FIRST IN OUTBOARDS • 38TH YEAR

In Canada: Evinrude Motors, Peterboro, Ontario.



Now you get  
**2 PIPES IN 1**

NO EXTRA COST

# Thoro-Kleen

AIR COOLED ALUMINUM PIPE WITH INNER AND OUTER BOWLS OF GENUINE IMPORTED BRIAR

Ask Your Dealer for the Genuine Thoro-Kleen



**\$2.50**  
COMPLETE

NATIONALLY FAIR TRADED

2 INTERCHANGEABLE SCREW-ON BOWLS  
FEATHERLIGHT • ALL PARTS REPLACEABLE  
INSIDE FILTERS • SPIC AND SPAN CLEAN  
VULCANITE RUBBER BIT BEVELLED FOR COMFORT

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939-M 8th AVENUE, N. Y. 19, N. Y.

Territories Open. Jobber Inquiry Invited.

## BUILD YOUR OWN RADIO

### 3-TUBE AC-DC KIT



It's great fun to build and hear this fine 3 tube set. Gets all stations from 550 to 1500 kc. For 110 volts AC or DC. Uses 2-6J5 and 1-6SJ7 Tubes. Complete kit, less tubes, wire, solder, and phones, only **\$6.15**

Kit of 3 Tubes.....\$2.40 — Set of Phones.....\$1.95

### 5-TUBE AC-DC MODEL



A full-sized 5 Tube SuperHet Kit with Automatic Volume Control, Built-in Antenna, PM Dynamic Speaker, Brown Plastic Cabinet. Uses 12SA7, 12SK7, 12SQ7, 50L6, 35Z5 Tubes. For 110 volt AC or DC. Complete, less tubes..... **\$12.75**

Complete Kit of Tubes (as above).....\$4.08

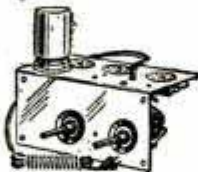
### PHONO Oscillator 2-Tube Kit



Build this fine Phono Oscillator with complete kit and instructions. Mounts anywhere. 110 volts AC or DC. Including two tubes Only..... **\$5.33**

Order from New York or Chicago  
Enclose postage with order

### PHONO AMPLIFIER 2-Tube Model



Compact, mts. any position. Tone, volume controls. 35Z5, 50L6, 110 V. AC-DC. Wired, ready to operate, less tubes..... **\$2.95**  
2 tubes for above.....\$1.62  
3-Tube Model — Similar, uses 35Z5, 12SK7, 50L6. **\$4.45**  
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**NEWARK**  
ELECTRIC COMPANY, INC.

CHICAGO  
323 W. Madison St.  
Chicago 6, Ill.

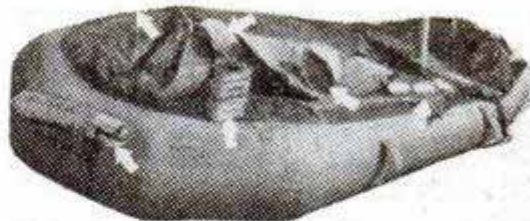
New York City Stores: 115-17 W. 45th St. & 212 Fulton St.

# WAR SURPLUS

Cost Gov't approx. \$100 to \$500

## NEW RUBBER LIFE BOATS

Complete with compressed Air Cylinder, Paddles and Miscellaneous standard equipment.



Guaranteed. Can be inflated in less than 5 minutes. Portable, folds up in case. Can be carried underarm.

1 MAN RAFTS ..... **\$15.75** 5 Man Rafts.....\$34.75  
7 Man Rafts.....\$49.75

Immediate shipment. Sent postpaid.

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## Redecorating?

A single coat of Luminall paint, in the rich, new colors, will work wonders in your home. Use over wallpaper ... dries in 40 minutes. There's a dealer near you.

Luminall Paints, Chicago 9.



**Use Luminall**  
for brighter interiors



AMAZING NEW *Star* SCIENTIFIC GAS BURNER

Automatic, Self-Acting • Needs No Adjustments • Jet Type • Cannot Backfire • Powerful in Performance  
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- \* STOVES
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EASY ASSEMBLY IN LARGE UNITS WITH STANDARD PIPE FITTINGS

\$2.00 POSTPAID

PROMPT DELIVERY AVAILABLE

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## CORROSION and FRICTION

Use Fiendoil on tools, electrical appliances, household devices. It actively

Lubricates • Cleans • Prevents Rust

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**40c**

## FIENDOIL

"The Enemy of Corrosion and Friction"



## HOME-PLANNERS • BUILDERS

IN 10 SECONDS!! All 11 lengths and angles of rafters for any size and shape of simple or hip roof. Struggle no more with tables. Just set dial to "pitch" and "run" and the measurements show up in windows. Save time and materials. The RAFTER DIAL: \$1 95

E. Weyer, Dept B, P.O. Box 153, Planetarium Station, New York 24, N. Y.

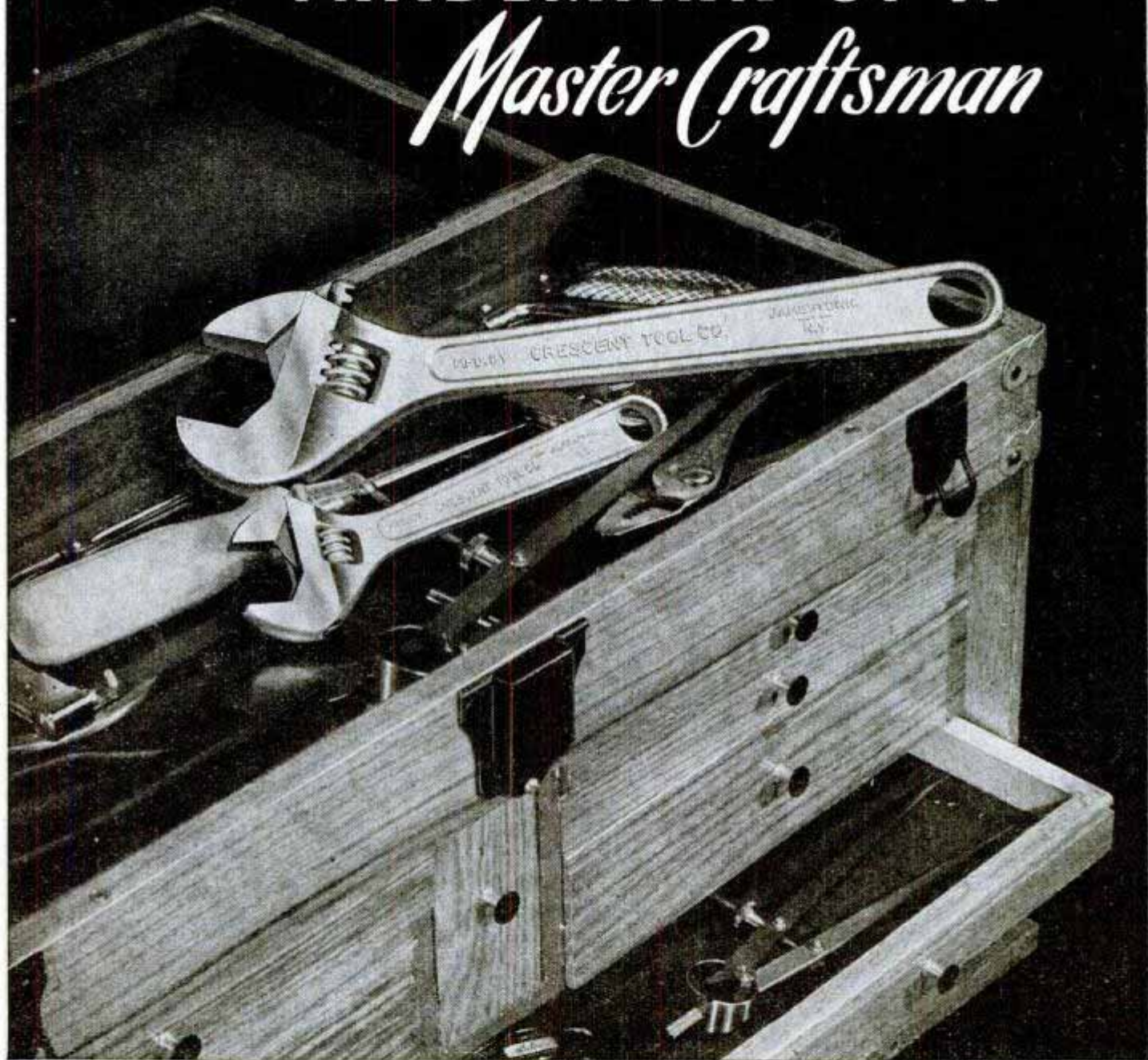
POPULAR MECHANICS



# CRESCENT

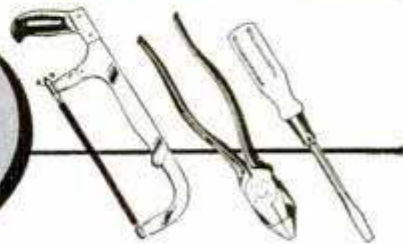
TRADEMARK OF A

*Master Craftsman*



**\*CRESCENT TOOLS**

*Give Wings to Work*



\* "CRESCENT" is our trade mark registered in the United States and foreign countries for wrenches and other tools. "Crescent" tools are made only by Crescent Tool Company of Jamestown, N. Y., and are sold by leading distributors everywhere.



# SMASHING PRICE CUT ON THE HUDSON TURBO GRINDER



Here is one of the most sensational price reductions you've ever read. The Hudson Turbo Grinder is now reduced in price to only \$4.95. The Hudson Turbo Grinder was a great value at \$8.95. Now it's a twice-as-good value at \$4.95.

## HERE'S WHY WE'RE REDUCING THE PRICE

This amazing Hudson Turbo Grinder has caught on. Thousands have ordered it and the tremendous volume of orders has permitted us to set up large quantity production runs at substantial price savings. Now everyone who works with tools can afford to own a Hudson Turbo Grinder.

The Hudson Turbo Grinder is a top quality product—super-hard silicon carbide grinding wheel, stainless steel shaft, oilite bearings, gleaming chrome housing, colorful vinylite tubing.

Simple to operate—just attach to your faucet, turn on the water and the Hudson Turbo Grinder spins at 3000 to 10,000 RPM depending on water pressure.

Sharpens knives, scissors, wood planes, chisels and all edged tools. Buffs and polishes silverware and metals. If you are a handyman, hobbyist, housewife, or mechanic, if you want sharp tools, join the thousands who are now getting sharp edges, quickly and easily, with the Hudson Turbo Grinder.



## FULL MONEY BACK GUARANTEE

Available thru any progressive dealer, or send money direct.

### THE HUDSON PRODUCTS CO., Inc.

4400 St. Aubin Ave. Room 206 Detroit 7, Mich.

erate between Chicago and San Francisco. The Twentieth Century Limited has cut running time between Chicago and New York to 15½ hours.

Packed into these trains are frills and luxuries designed to attract vacation as well as business travelers. The railroads say your vacation shouldn't wait until you've reached your destination, but should start as soon as the conductor calls "All Aboard!"

## Report From Antarctica

(Continued from page 112)

several thousand feet thick acts as an effective shield against emanations which could affect detecting devices, such as Geiger counters.

The fact remains that resources of the continent, as large as the United States and Canada combined, the accumulation of a billion years, are locked under an ice cap. Most of this time the land was clear of ice and, at some time, densely forested, as evidenced by already discovered coal resources sufficient to supply all American demands for a half century. It is probable that there are oil reserves buried under the ice and it is difficult to imagine any mineral not there to some extent. It is not beyond possibility that there is an unknown region in the interior of east Antarctica where there are ice-free stretches, perhaps with some vegetation which has survived in regions of hot springs. Such open stretches in the ice are known in the Arctic.

Geologically speaking, expedition experts say, parts of the continent were forested not long ago. In Palmer Land there is fossil sequoia, similar to that of the California species, dating back not more than 20,000,000 years. The land apparently was abundantly forested in the days of dinosaurs but certainly was ice covered during all the age of man on earth.

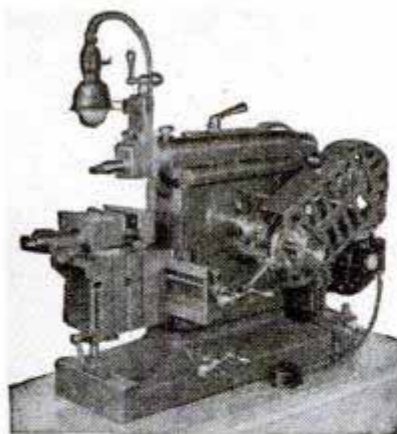
Ideas of a Shangri-La among the ice mountains are beyond remotest possibility. Geologists are not concerned now primarily with the continent's resources, although these may become important in the next century. The greatest interests now are theoretical.

Among lofty peaks of the continent's interior, which project like islands out of the ice, they hope to find the missing arc in a ring of ancient mountains completely encircling the Pacific, providing a link between the southern Andes and the New Zealand mountains and thence an ancient land bridge between South America and Asia. Countless millenniums ago some ti-

(Continued to page 264)



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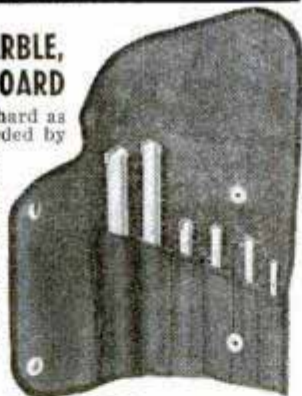
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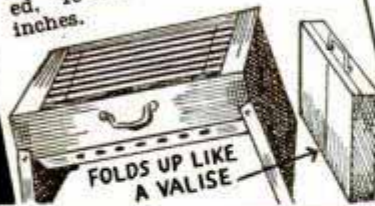


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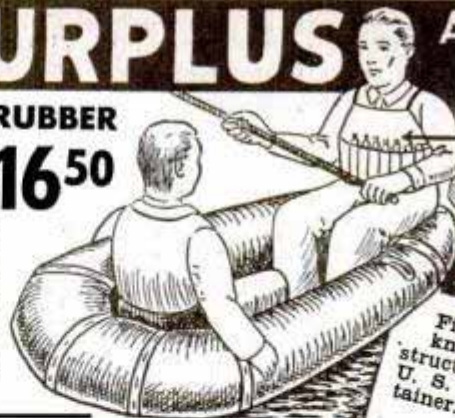
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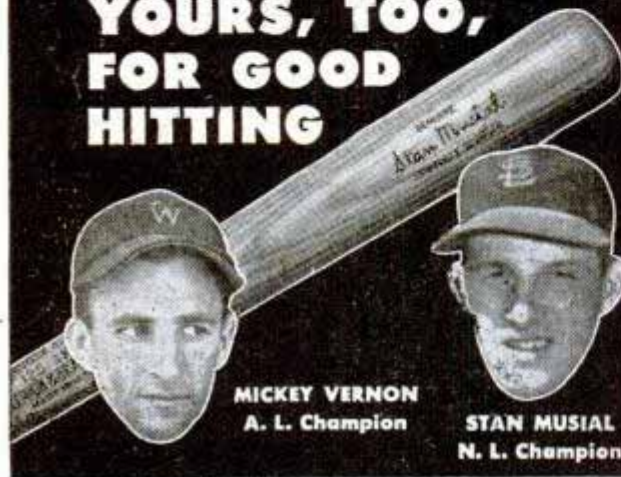
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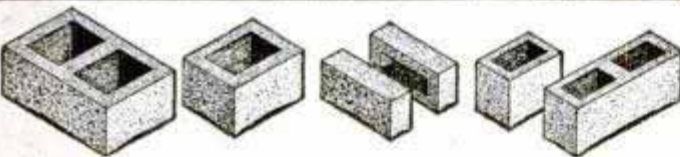


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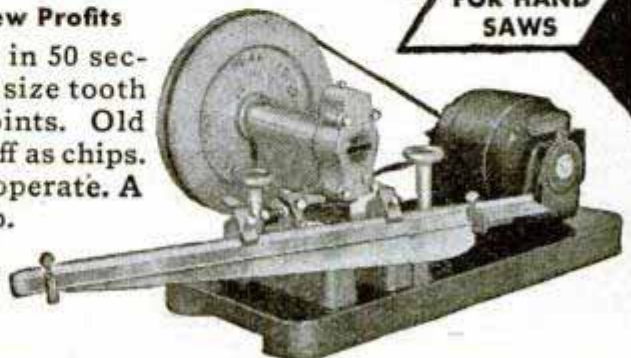
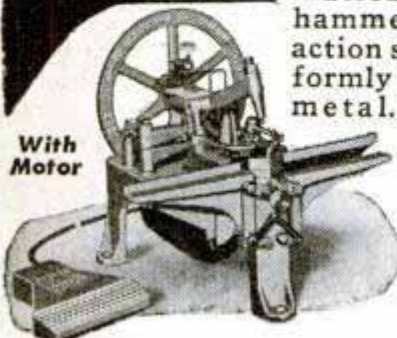
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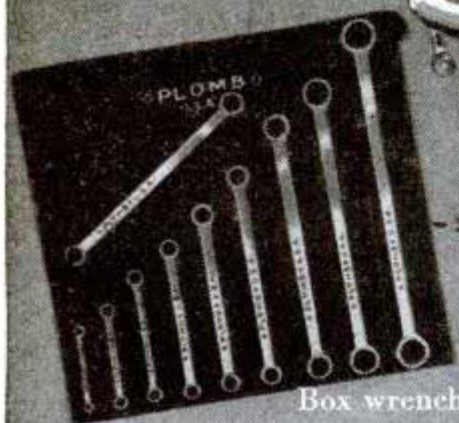
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tan force pushed outward from the Pacific depths in all directions, piling and folding rocks in front of it into mountain ranges with abysmal depths at their bases. Links in the practically continuous chain are the Aleutians, the mountains of Alaska and the Rockies, the Andes, and the mountains of New Zealand, Formosa and Japan. If the interior antarctic peaks prove to be of the same folded structure, the Pacific ring theory will be considered completely proved.

This in turn will lead to significant deductions on the structure of the earth itself and the mysterious forces which have produced its present form. Of greater interest is the light these studies will throw on the process of mountain building everywhere. Here are telescoped into years processes which elsewhere require millenniums. Ice is like rock, with structure and behavior similar to basalt or granite. Great areas of shelf ice here are subjected to enormous pressures from the continental ice behind it and from continuous accretions to its own weight from winter snowstorms. Sheets of ice are folded over each other in much the same pattern seen in the Grand Canyon walls. In this way mountains have been built up all over the world, but ice mountains are piled up in a few years whereas a rock mountain requires millions of years. Specimens of antarctic ice are being brought back to Washington for preservation with rock types in the government's geological museum.

Near the Bay of Whales base is one small ice range which, geologists say, seems almost an exact small scale model of Switzerland's Jura Mountains. Most of the geological work was concentrated in the canyons of this formation. Since fossil search is possible only on long trips inland, where mountain tops are exposed above the ice, this seems impossible during the short summer season.

THE END

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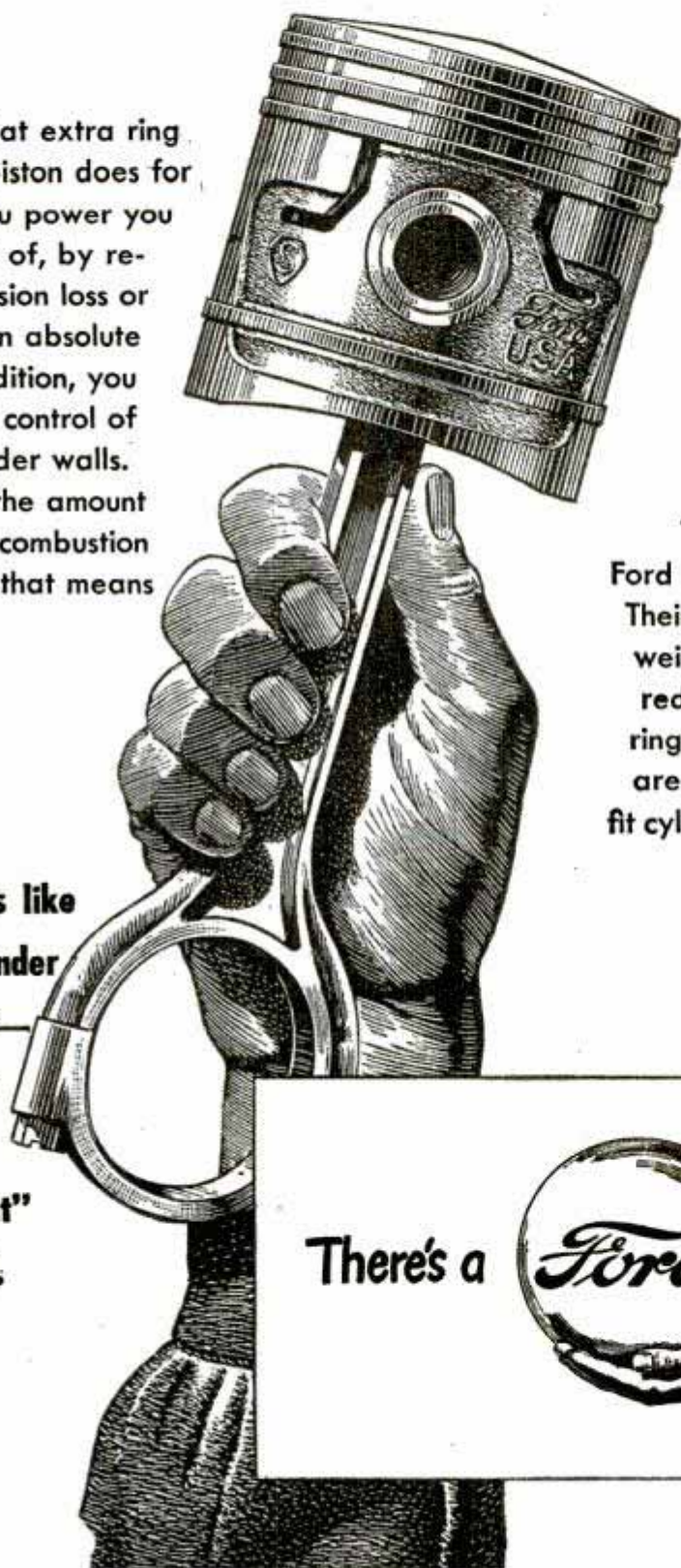
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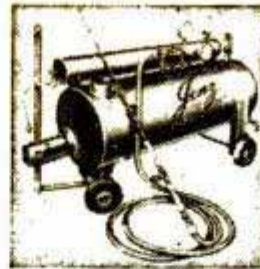
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Ready for Delivery!

SYNCRIO . . . new, remarkable, patented, magnetic jig saw . . . needs no belts . . . no motor . . . no gears . . . no oiling! Just plug into any 60 cycle A.C. 110-130 volt outlet—and saw! Portable . . . world's safest saw! Cuts clean, smooth . . . no sanding necessary. Perfect for models, displays, inlays, etc. Cuts intricate designs on 3/4" soft wood, 1/2" plywood and thinner hardwoods, metals, plastics . . . NOT for ordinary lumber. Leaves NO ragged undersides on plywood or heavy cardboard. Special magnetic safety stroke features! Nothing else like it! Sold on 10 days Moneyback Trial! Prompt delivery guaranteed. Rush name, address on postcard for FREE details, Trial Offer. Hurry!

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\$24.95  
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Precision machined in one thousandths, up to 4" outside and 3 3/4" inside measurements. Guaranteed accurate, easy to read and adjust. Satisfaction guaranteed or money back. Also indicators and gauges. Shipped prepaid on receipt of remittance. On C.O.D. shipments, send deposit of \$2.00.

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**WAKE UP YOUR SCALP** Want better looking hair? Embarrassed by falling dandruff, itching scalp? Then try VITABRUSH, new electric driven scalp brush that gives your scalp a vigorous and invigorating "workout" in just three minutes of fun. Cleans scalp. Stimulates blood supply. Restful. Pleasant. Write today for complete information and satisfaction-guaranteed offer. Hershey Mfg. Co., 3717 Field Bldg., Chicago 3

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WICHITA, KANSAS

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For the finest  
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To behold in operation—with its smooth, murmurless currents of fresh air swirling 'round you—this is a thrill you'll relive again and again as you use a Vornadofan. Draftless, gentle billows, powerfully driven by a new principle in air circulation, cool as they refresh as they soothe. You simply must see it all in a demonstration to understand how and why. Ask your dealer and he'll be as thrilled to show you as you will be to see.

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<p>1 Compressed air is thrust through cones in greater volume.</p>	<p>2 High-pitched propeller blade "bites" off and circulates more air.</p>	<p>3 A special, patented cone construction absorbs air noises.</p>
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World's Finest Air Circulators



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**A**RC WELDING is easy with the new Lincoln "Fleet-Arc Jr." A.C. Welder because of its exclusive "Arc Booster". This device prevents electrode sticking, makes arc-striking as simple as striking a match on a hot stove.

Welding of light and heavy metals and alloys, hard-facing general repair and construction work are all easy with the "Fleet-Arc Jr." Range 20 to 180 amps. Smooth, continuous "dial tuning" control—no plugs to shift. Low-priced. For complete details, write for free Bulletin 365.

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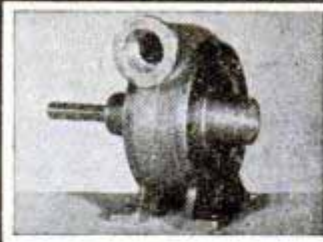
Largest Manufacturer of Arc Welding Equipment in the World



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Build your own real working model pumps from our complete kits which include all necessary castings, shaft and bearing materials, impeller or gears, machine screws, blueprints and detailed instructions.

Either kit complete . . . \$5.00 postpaid  
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POPULAR MECHANICS



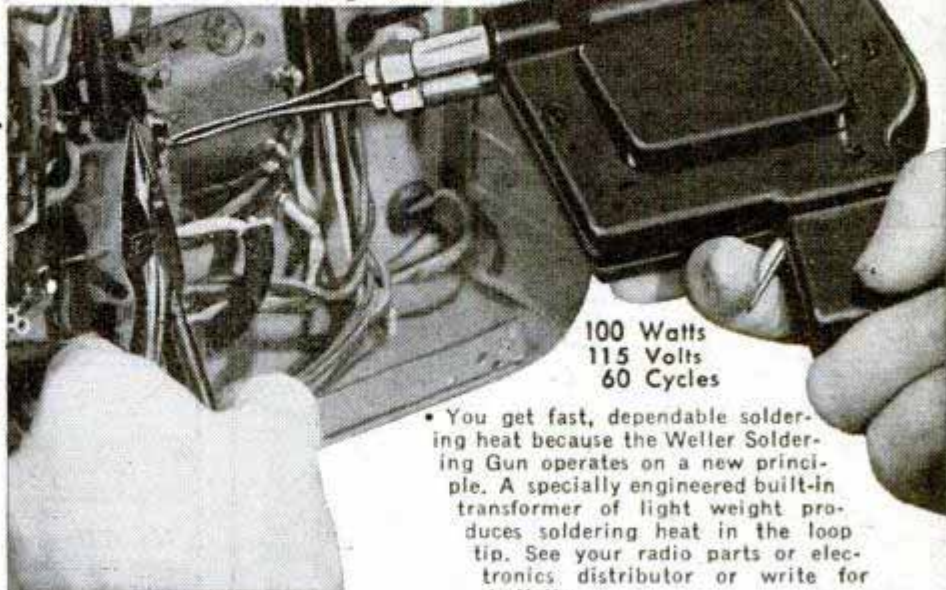
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## For Faster Soldering

**5-SECOND HEATING**  
Ready to solder in 5 seconds.

**LESS TIP RETINNING**  
Heats only when needed.

**FAST COOLING**  
Ideal for service calls.



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In Canada: Atlas Radio Corp., Ltd., 560 King St., N. W., Toronto, Ont.  
Export Dept: 25 Warren St., New York 7, N. Y.

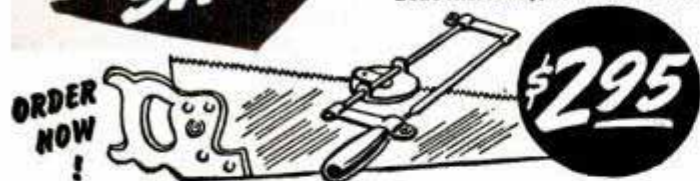
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**12 lbs. SURPLUS RADIO PARTS \$2.00**

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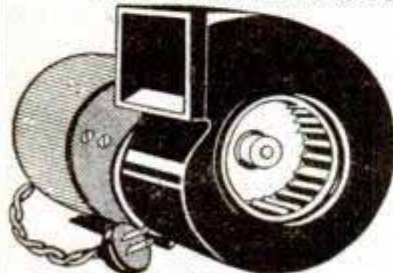
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## THE NEON GLOW

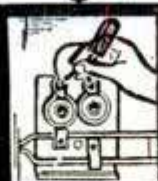
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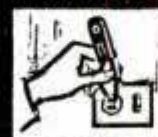
200 Central Ave. Newark, N. J.



FUSES

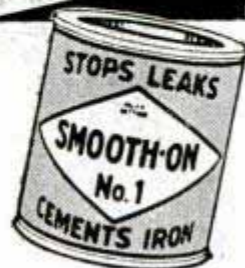
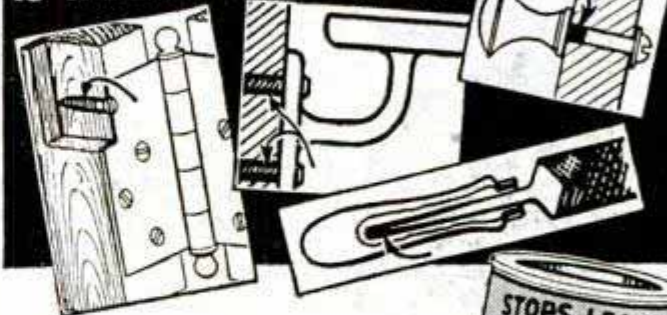


MOTORS



OUTLETS

# HOW TO MAKE LOOSE FIXTURES STAY TIGHT



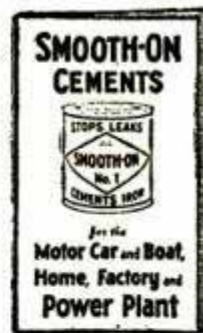
Hinges, door handles, coat hooks, drawer pulls, knobs, casters, bathroom fixtures, tool and cutlery handles, set in Smooth-On No. 1 Iron Cement, do not work loose.

Mix the cement with water, apply it to the hole in which the screw, bolt, tang or other part fits, and insert the part. Smooth-On hardens quickly and holds the part firmly in place.

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## FREE REPAIR HANDBOOK

40 pages. 170 diagrams. Simple instructions. Tested, short-cut repairs on home, garage and shop equipment. Pocket size. Send coupon for YOUR free copy today.



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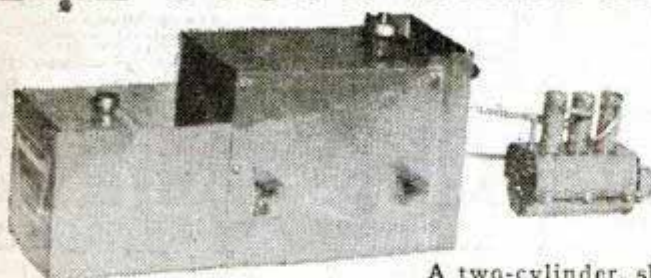
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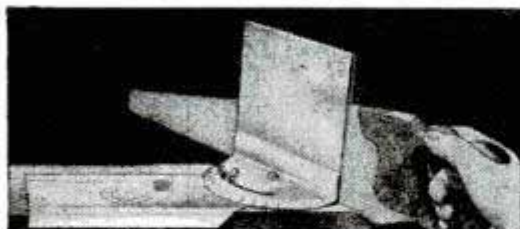
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- FITS ANY SIZE BOARD!
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- ALLOWS SAWING AT ANY ANGLE
- WEIGHS 1¾ LBS.

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An innovation in miter boxes! Lighter in weight, handier than old type. Designed to accommodate any saw. Precision built of cold rolled steel.

Miter gauge has complete mobility. Simple one-quarter turn of wing-nut locks gauge at selected angle. Guide flange on base places SAW-KUT GUIDE firmly against board aligning saw perpendicular to axis of board. Enables framing of windows and doors without pre-cutting boards.

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IF YOUR DEALER  
CAN'T SUPPLY  
YOU SEND  
COUPON TODAY!

DEALERS!  
WRITE FOR  
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## DON'T THROW IT AWAY • FIX IT! with this complete ELECTRIC SOLDERING SET

Set No. 207 includes:

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For soldering tin, brass, copper, etc. A necessity for every home workshop. Ideal for general repair, model, hobby, electronic, radio work, and other hard-to-reach jobs requiring exactness and speed. New 20-watt design gives 100-watt performance.

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Above items (used—Government Surplus) guaranteed in good Mechanical and operating condition.

Write for illustrated circulars.

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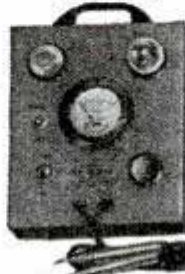
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AC ammeter range 0-10 Amp. Serves as wattmeter with conversion chart range 55 to 1100 watts. High sensitivity neon tube for high-resistance tests. Tells AC from DC. Tests continuity, shorts, grounds, live and dead circuits, automatic irons, vacuum cleaners, motors, etc. Checks thermostats under working conditions. Tells instant it cuts in and out. Also controls heat on soldering irons. Operates on 110 V. AC, 50-60 cycles. ONLY \$14.50 complete, postpaid. MONEY BACK GUARANTEE.

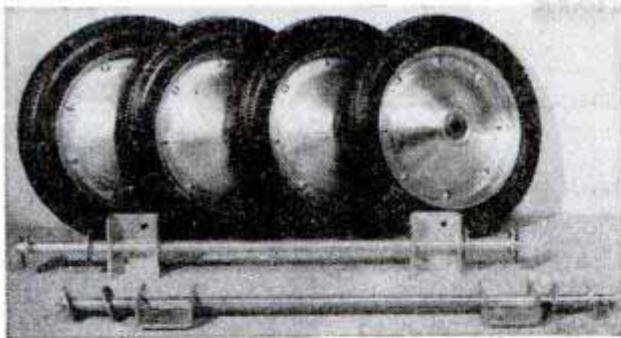
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**BUDD STEEL WHEELS** with GATES,  
MADE TO OUTWEAR ANY  
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**NOTE: Not the  
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**Semi-Pneumatic Puncture-  
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## BUDD HEAVY STEEL WHEELS

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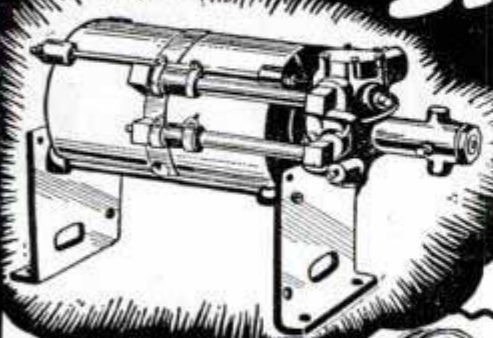
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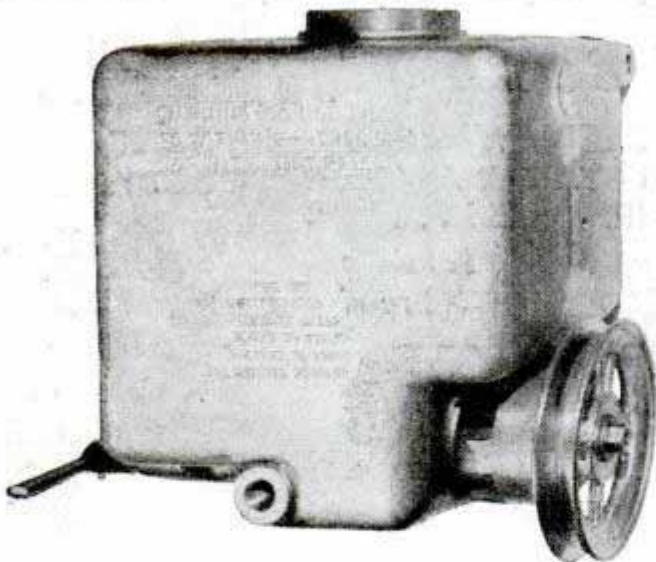
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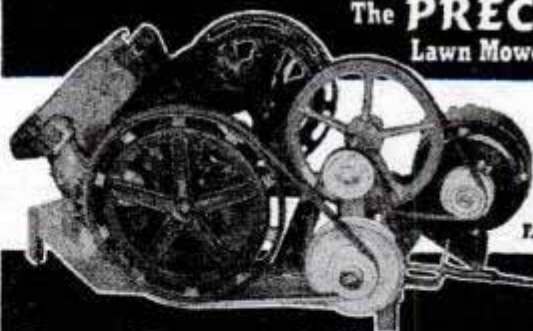
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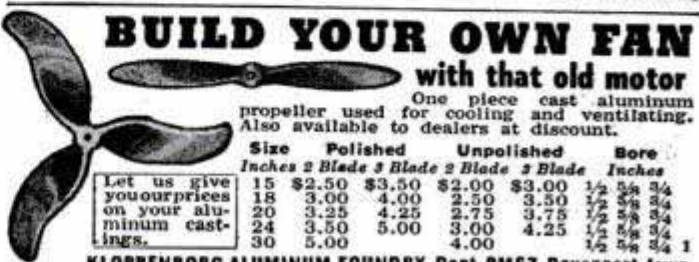
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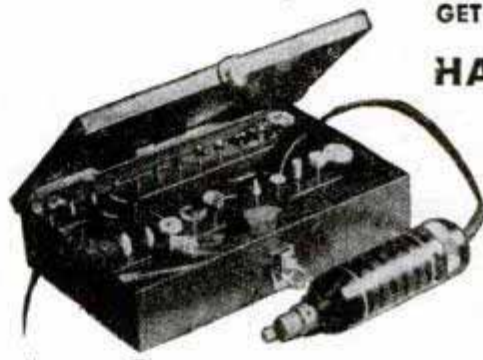
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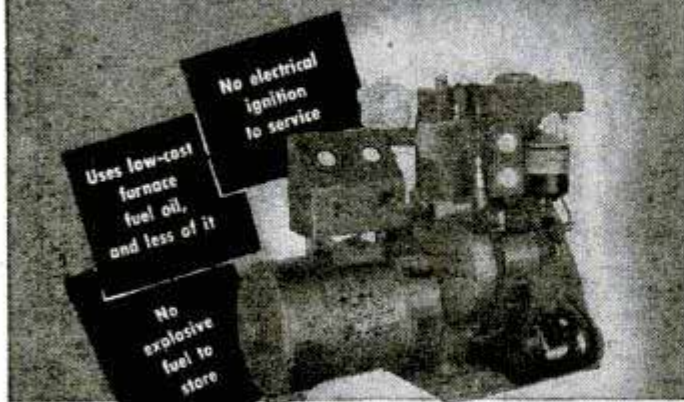
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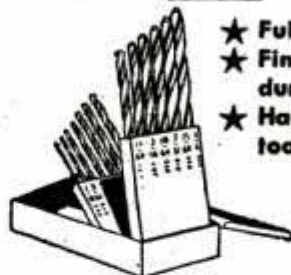
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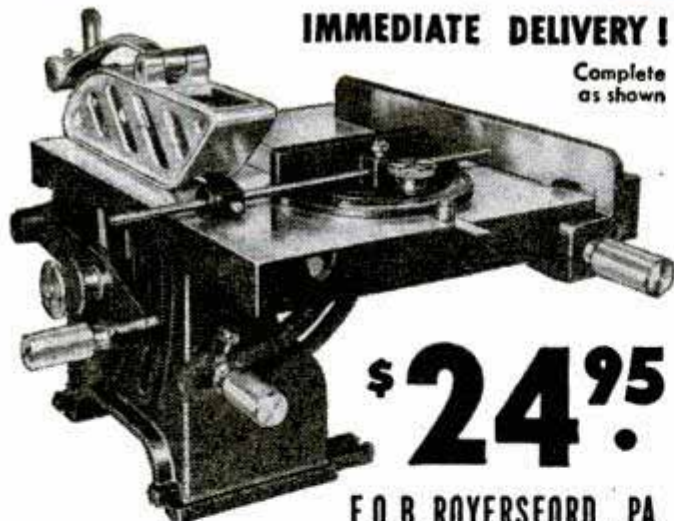
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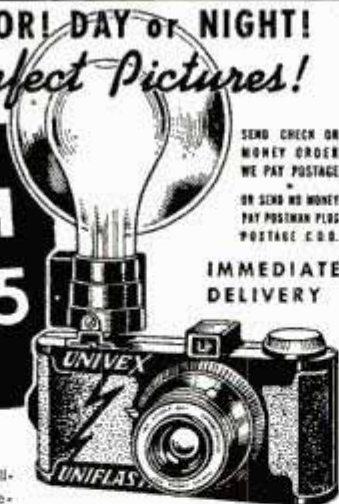
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For skiers, fliers, campers, hunters, fishing, beachwear, safety-wear, motorcycling, bicycling, boating and many other uses. Set comes complete (boxed) with 9 extra interchangeable shatter-proof, flexible, cellulose acetate lenses. Amber, Green and white colors. A rubber flexible chamois lined goggle frame. Back adjustment head strap. Made for A. A. F. Cost Gov't approx. **\$1.59**  
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Manufactured by Bausch & Lomb for U. S. Air Corps. Quality and Style with Bone Nose Cross Bar, individual case. Priced at big savings which INCLUDES postage..... **\$8.95**  
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VEST POCKET SIZE  
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• Lubricates



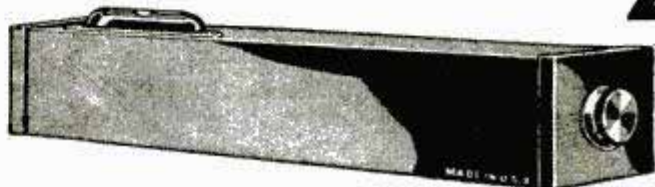
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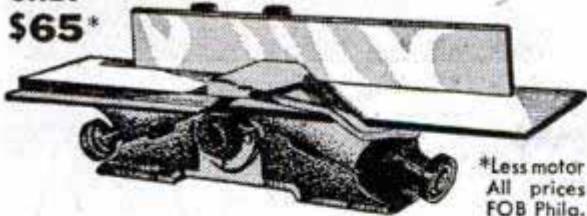
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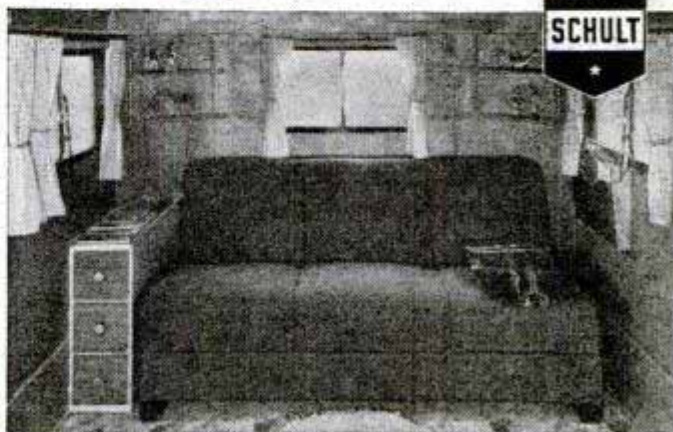
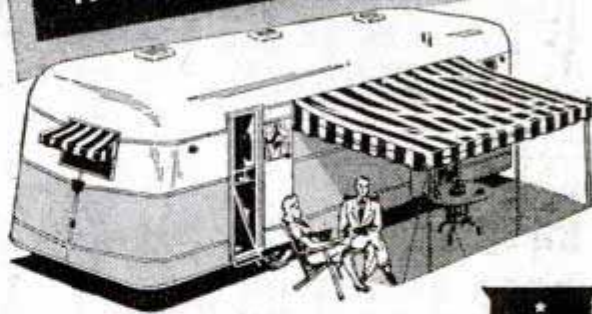
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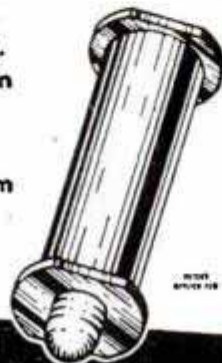


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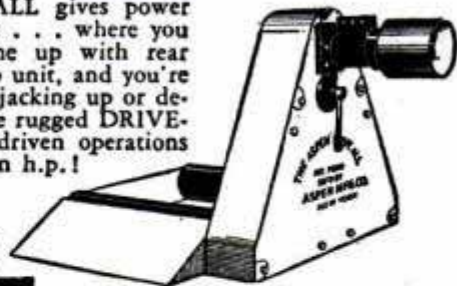
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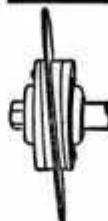


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Starts screws in hard-to-get-at places. Saves time and temper. Dealers, jobbers, salesmen wanted.

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**This Sensational 4<sup>th</sup> of July Offer! \***

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**102  
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**AT AMAZING BARGAIN PRICE**

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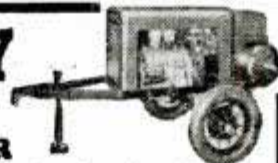
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CALENDAR  
WATCH**

Tells time, name of day and date.  
 Day name changes automatically.

No. XD382 — Calendar watch, 17 jewels  
 waterproof, shockproof, anti-magnetic, ra-  
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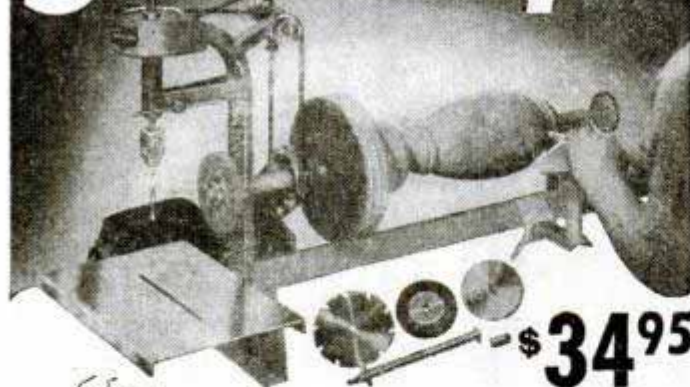
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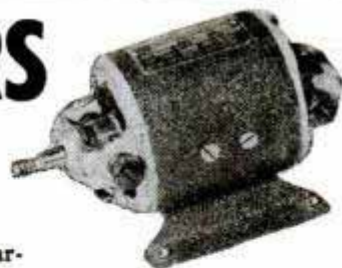
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\$3.95  
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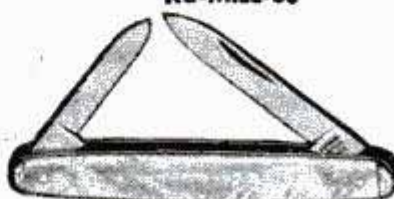
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# CAMILLUS

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No. 42  
Size 3 1/2"

For CAMILLUS means a knife of finest value. Hand honed blades of custom made steel.

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16MM 50 ft. magazine film, super X or XX processing not inc.. \$1.75  
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the tool you need is in  
the hollow handle



A boon to the harried tool hunter is this new Home Kit which contains seven interchangeable tool bits made of finest alloy steel. Bright red hollow plastic handle holds a gimlet, instrument and 1/4" screwdriver, a Phillips bit, tack

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VACUUM-AIR  
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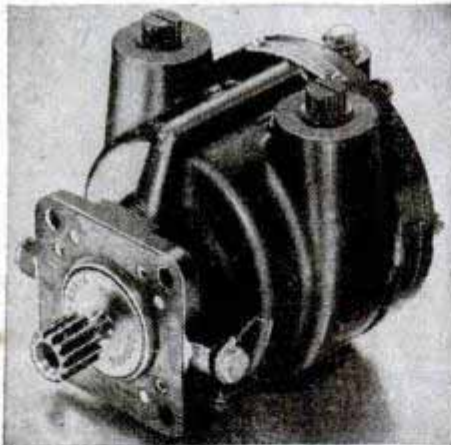
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Now Only

**\$9.95**

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It's fast... cuts on an average of 1 ft. per minute up to 3/4" medium hard wood. Operates on 110-120 V. 50 or 60 cycle alternating current. If your dealer does not yet have Moto-Saw, send \$5.85... we'll pay postage. Or send \$1. pay postman halinates sanding. MONEY when you get a Moto-Saw in your BACK if not delighted after 5 days trial.

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**SNAP - it's on! PULL - it's off!** Easy, fast! Wiggins coupling is guaranteed leakproof! Saves water, time. No bruised fingers or twisted hose. Precision made of solid aluminum bar stock. Lifetime use. For the best in water hose couplings, buy Wiggins! On sale at better stores \$1.35 complete.



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BRAND NEW GOLFING ACCESSORY!**

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**SAVING'S ELECTRONIC  
FUN WITH JUKE BOX BANK**

The kids will love to save, and you'll thrill when this Electronic Juke Box glistens colorfully and lights on coin insertion. Here is the perfect gift for children and adults alike. Built of sturdy plastic and metal construction, this Electronic Bank makes friends of the entire family, and adds up to "money in the bank." Special Price to Dealers. Mail your order today.

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**\$1.69**

1/6 actual size



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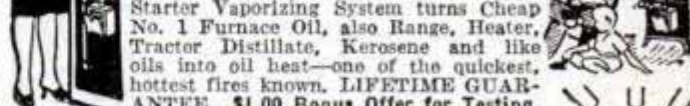
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FOR HEATING AND COOKING STOVES - FURNACES

**HEAT YOUR HOME, COOK YOUR MEALS  
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**NO MORE SHOVELING COAL**

**OR ASHES.** Sensational Fuelizer



Starter Vaporizing System turns Cheap No. 1 Furnace Oil, also Range, Heater, Tractor Distillate, Kerosene and like oils into oil heat—one of the quickest, hottest fires known. **LIFETIME GUARANTEE.** \$1.00 Bonus Offer for Testing. We will let you try it in your own stove or furnace for one month. Get yours for introducing. Big profits QUICK. Be first. Send in your name today for details and cash in on the tremendous demand for this Amazing Invention.

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## Look what this Amazing New Tool does for You!

You can now use your electric drill to sand, polish and grind. Do better work in half the time.

Here's the new "Wonder Tool" you won't want to be without. Fits on any electric drill, 3/4" or larger. Snap abrasive Disc on or off in few seconds. New Discs cost only few cents. Ready instantly to sand, grind, buff, or polish. Works equally well on wood, metal or plastic. A "must" for every home work bench and small shop. Does better work in fraction of time formerly required. Now offered at about 1/2 regular price while limited supply lasts. Rush order with \$1.98 or

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 Handy for hikers, fishermen, cyclists — for lunches, etc.

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 For hunters, fishermen, farmers, gas station men, milkmen, etc. Large size only.

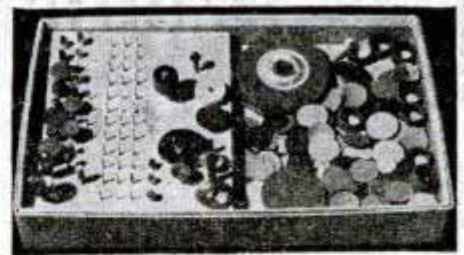
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**#1 COMPLETE KIT**  
 102 Grinding, Cutting and Polishing WHEELS PLUS 150 ass't items for Home or Shop



- 2 Grinding Wheels 3" and 2" dia.
- 2 Rotary Files, High Speed Steel.
- 6 Rotary Cutters 1/8" Shank.
- 3 Rotary Cutters 3/32" Shank.
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- 1 Circular Saw 1 1/2" dia.
- 1 Mandrel for Circular Saw 1/4" Shank.
- 1 Rubber Cylinder Mandrel 3/32" Shank.
- 1 Rotary Drum Sander 1/8" Shank.
- 10 Bands for Rotary Drum Sander.
- 15 Rotary Felt Wheels 1" dia.

Total Value \$45 if bought separately

**FINEST ROTARY TOOLS EVER SOLD BY MAIL**

**ONLY \$9.75**

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**#2 COMPLETE ASSORTMENT**  
 Carborundum Grinding Wheels, NORTON, Etc.  
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 PLUS 200 ass't items for Home or Shop



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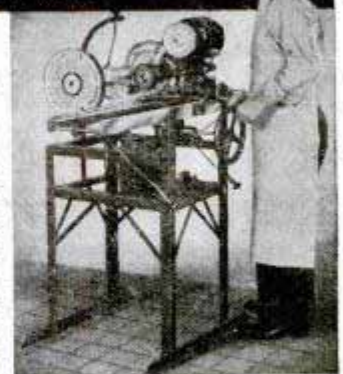
We Require \$1 Deposit on C.O.D. Orders

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**FULL or SPARE TIME**

Build a Business of Your Own in Your basement or garage and earn \$135 a month. Mr. Felber of Ind., writes, "My UNIVERSAL GRINDER is faster and more accurate than any other grinder. Its efficiency enabled me to sharpen 150 mowers in 4 1/2 months. More than paid for itself the first month. Every customer satisfied." Mr. Hardy of Mississippi writes, "Received my Universal Grinder the first part of May and by August 18 had sharpened over 1000 mowers." Mr. Bacon of California writes, "The lawn mower business, with the use of my Universal Grinder, has been a gold mine these last two years."



Only on the UNIVERSAL GRINDER can the inside face and edge of the stationary blade, as well as the reel blades, be ground to proper clearance

**ALL IN ONE SET-UP**

WITHOUT REMOVING ANY BLADE FROM MOWER  
 Tool Grinding Rest Included  
 Write for Free Folder

**Rogers Mfg. Co., Dept. 67-M, Lindsey, Ohio.**



Our Finest Precision REBUILT  
**MOTOR BLOCK**  
 ASSEMBLIES



**Sold Outright or Exchange**

Rebuilt by skilled mechanics. Assembly has Rebores Block with New Pistons, Pins, Rings, Re-ground Crankshaft, and all New Bearings. Guaranteed 90 Days.

**Allowance on Old Motor**

We ship at outright price. Send your motor prepaid, must be suitable for rebuilding. Send in notarized bill of sale showing title number if any. We refund difference when we receive your motor.

\$5.00  
Crating  
Charge

**For 1928-41 FORDS and 39-41 MERCURY**

Year	Out'rt.	Exch.	Year	Out'rt.	Exch.
1928-31	98.00	73.00	1938, 24 Stud 85	149.00	99.00
1932-34, V8	149.00	99.00	39-41, 24 Stud 85	149.00	99.00
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37-38, 21 Stud 85	149.00	99.00	1939-41 Mercury	149.00	99.00

**For 1934-42 CHEVROLET Cars and Trucks**

Year	Out'rt.	Exch.	Year	Out'rt.	Exch.
1934 Mstr.	117.50	87.50	1940 All	107.50	87.50
1935 All	117.50	87.50	1941-42	107.50	87.50
1936 All	127.50	87.50	41-42, Hi-Torq.	117.50	97.50

**For 1935-42 DODGE Cars and Trucks, 3 1/4" Bore**

Year	Out'rt.	Exch.	Year	Out'rt.	Exch.
1935-39	139.00	109.00	1941	125.00	95.00
1940	139.00	109.00	1942	125.00	95.00

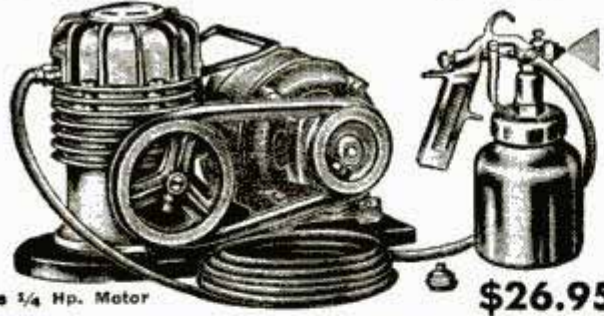
**For 1935-42 PLYMOUTHS**

Year	Out'rt.	Exch.	Year	Out'rt.	Exch.
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SEND 25% CASH WITH ORDER, BALANCE C.O.D.

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**Portable Paint Sprayers**



Uses 1/4 Hp. Motor

**\$26.95**

Complete as illustrated, less motor. Sprays all kind of paint, lacquer, varnish and etc. Oil-less ball bearing compressor. 2 cu. ft. air per minute. 15 to 50# pressure. Sprays paint 5 times faster than hand brushing.

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**No. 444**—Outfit, twin cyl. 4 cu. ft., production type gun, 15 ft. air hose, reg. and gauge, V belt and motor pulley. Complete less motor, **\$47.50**. Uses 1/2 hp. motor.

**Spray Guns—Low Pressure**  
 Operate on 15 to 50# pressure

#112—1 qt. cup	\$6.50
#121—Production type	7.95
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Regulator & Gauge 0 to 160#	4.95
Air Filters	1.85
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 110V AC-DC

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 Pumps 100# pressure. For inflating tires, spray painting and etc. Complete with hose, pump, gauge, and spark plug adaptors **\$4.75**  
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 20c additional west of Rockies

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**GAS ENGINES — 1/2 TO 1 1/2 HP. 37.95 UP**  
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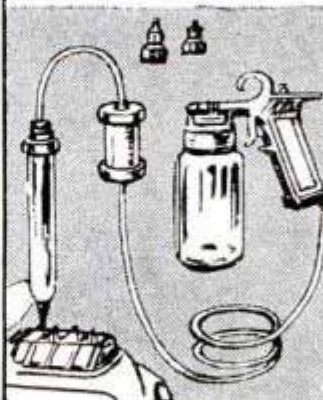


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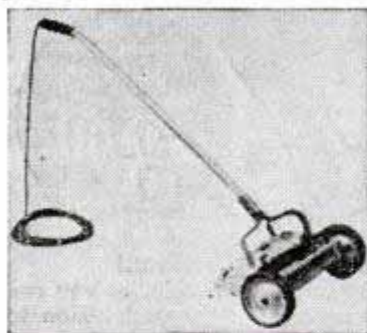


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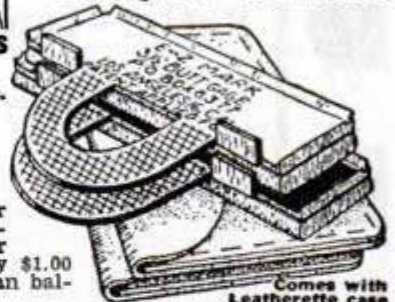


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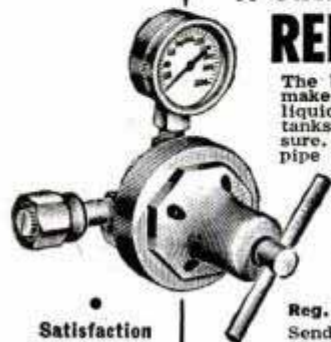
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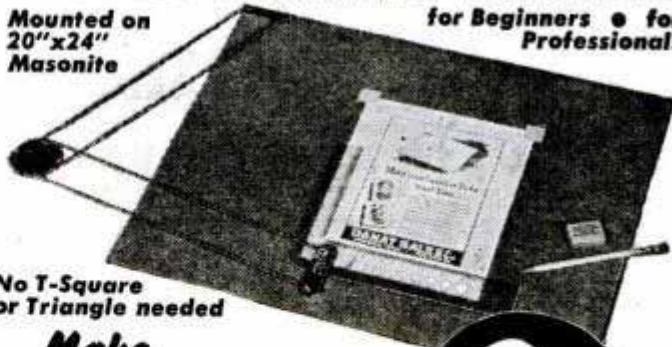
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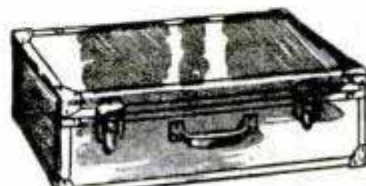
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10c  
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**DICA DOO PAINT BRUSH BATH**

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At Paint, Hardware, Dept., and 5 & 10c Stores  
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5' 6"x3'..... \$15.95  
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Over 50 yds. Suitable for all kinds of garments. White nylon ..... \$15.95  
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—sharpening saws with the Foley Automatic Saw Filer. It makes old saws cut like new again. All hand saws, also band saws and cross-cut circular saws can be filed on this ONE machine.

**THERE ARE HUNDREDS OF SAWS TO BE FILED** in your own neighborhood, used by farmers, carpenters, homes, schools, factories, etc. W. L. Tarrant writes: "I left my old job last September and in 10 months have filed 2,159 saws. We have a lovely business worked up and cannot keep up with the work."

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Send Free Plan on Saw Filing business, no obligation

Name \_\_\_\_\_

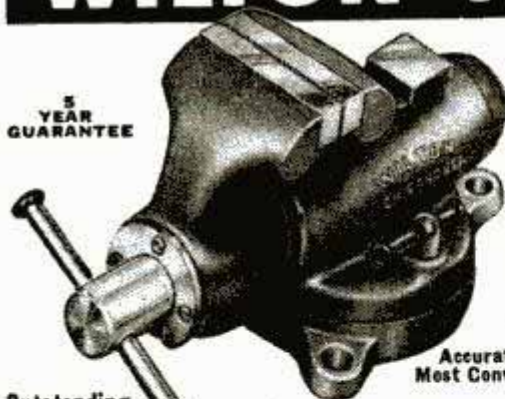
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**SWIVEL BASE**

Accurately Holds Work in  
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Ground Anvil.

Jaws are always truly parallel—no shifting or wobbling. Just what you need for precision work. Jaw inserts are reversible and interchangeable. Streamlined patented enclosed design prevents dust and filings from entering and wearing internal parts. Extra rugged because head and nut are made from malleable alloy—53,000 lbs. tensile strength.

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Satisfaction Guaranteed — We Pay Delivery Charges

SIZE	WITHOUT SWIVEL BASE	WITH SWIVEL BASE	EXTRA COPPER OR BRASS JAWS (INDICATE CHOICE)
2"	\$ 9.85	\$11.20	\$2.34
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3"	12.30	14.95	2.57

Wilton Vises are also available in industrial sizes including combination pipe jaw types.

For catalog sheet describing larger industrial sizes, write Dept. A-6.

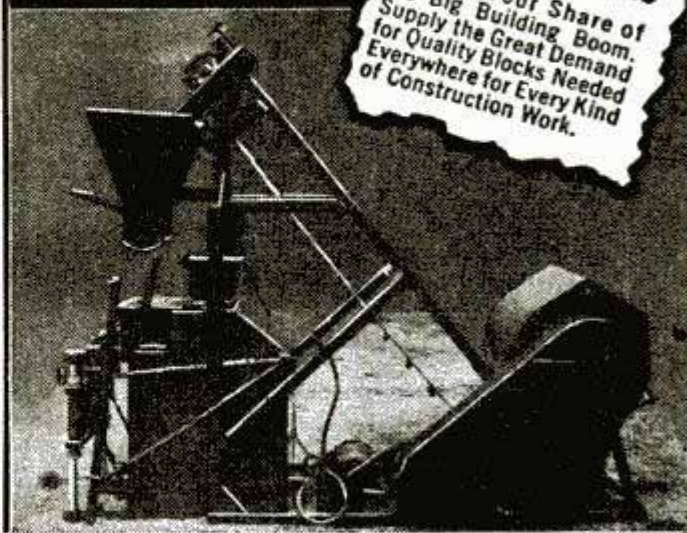
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Everywhere for Every Kind  
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12" x 1.75" wheel.....\$3.25  
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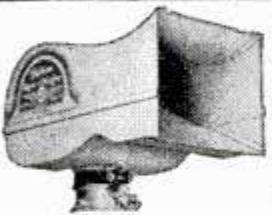
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**BE THE FIRST TO HAVE GEARED  
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Use this smart, strong 9" Metal Steering Wheel (pictured) Black lacquered rim with nickel plated spokes and hub for a 3/8" shaft, for only \$2.87 postpaid USA. You can buy the essential parts, i.e., gear reduction steering unit, and ball bearing pedal drive assembly, to use on your present car, or build one complete, using our axles, wheels, frames, etc. Write for free sketched price list.

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Midget radio small enough to carry in a pocket. Gets regular programs thru a sensitive crystal. Extra long range. Very clear tone.

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**\$695**  
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**Complete with FOUR 600x16 Tires**

**Completely Enclosed Self Contained Unit**

Standard JXD Hercules Gas Engine 4-in. Bore

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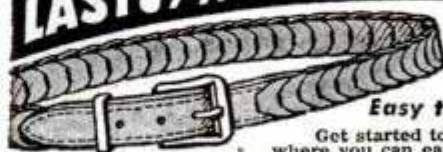
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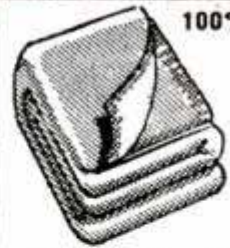
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Famous tough; long-wearing combat boots; comfortable, ideal for hunting, camping. Comp. sole, rubber heels. Sizes 9A, 9 1/2A, 9B, 9 1/2B, 10B, 10 1/2B, 11A, 11B. Shp. wgt. 5 lbs.  
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5-ft. length, matched woods, sturdy construction. A much-wanted War Surplus item. Shp. wgt. 3 lbs.  
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ONLY \$1.75 POSTPAID — No C.O.D.  
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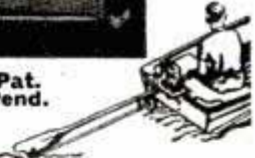
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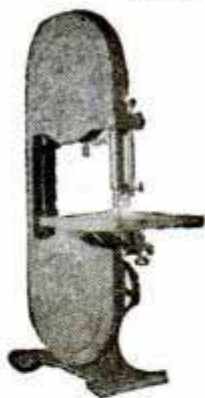
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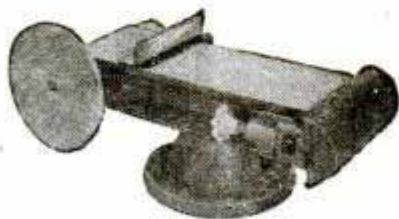


IDEAL FOR FACTORY  
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This 14" precision-built saw is expertly constructed of finest materials and designed for use on wood or metal. Frame of durable heat-treated cast iron with aluminum guard. Bronze Oil-lite bearings throughout; hardened blade guides and inserts, ground tilting table surface, 14 tooth all-purpose blade .....

**\$79<sup>50</sup>**

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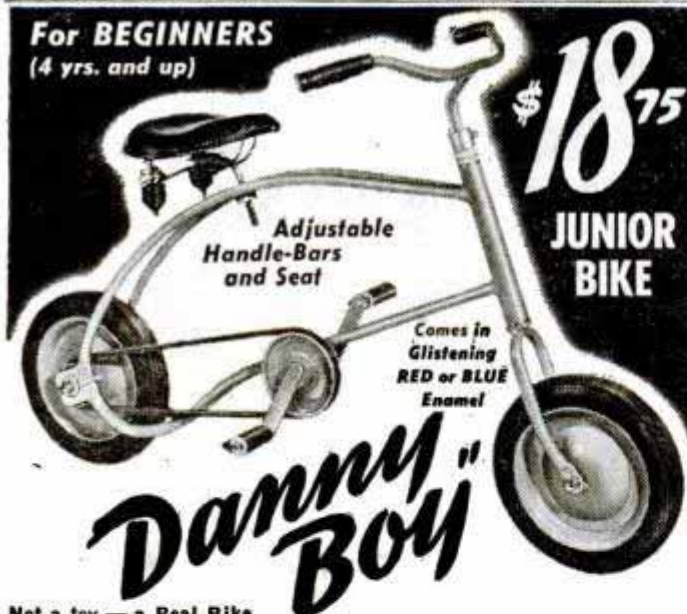
This sander is precision built and has a sturdy cast iron, heat-treated frame. All rotating parts dynamically balanced and set in ball bearings. Has a 6"x14" working surface, 8" disc. Can be adjusted quickly—easily! Here's the ideal sander to complete your shop equipment.....

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Comes in  
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- Wheel Base 32 Inches
- Sturdy Fork — Bronze Bushings
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- V-Belt Drive—Safe—Quiet
- Full Bearing Pedal Crank
- Rubber Pedals—Streamlined
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Specify Color when ordering — Shipped Express Collect — Send Check or M.O.

**Prompt Shipment Guaranteed**

**Danat Company, 624 S. Michigan Ave., Chicago 5, Ill.**

# Sensational New SAVES TIME AND EFFORT Tool

A New Revolutionary Hand Tool that INSTANTLY MEETS WITH THE APPROVAL OF ALL MECHANICS... Just what they have wanted to make their work easier and faster... GRIPS SECURELY and RATCHETS AUTOMATICALLY.



PAT. PEND.

## Marvelous Invention!

COMPOUND LEVERAGE  
& DOUBLE BROACHED  
—JAW

These features make The LOGAN the outstanding wrench on the market today... Important to any mechanic.

### A Ratchet WRENCH FOR Tough Nuts—

CAN'T SLIP—CAN'T SPREAD GRIP  
JUST SLIP IT ON TO THE NUT

The LOGAN Ratchet Wrench slips readily onto the nut from the side or top... engaging nut securely. The ratchet construction makes it unnecessary to remove wrench until tightening or loosening is done... A new experience for all mechanics... Saves knuckles and temper.

#### Mechanics Enthusiastic

An indispensable tool for Mechanics and Auto Owners also for the home mechanic.

IF YOUR DEALER CANNOT  
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### LOGAN Ratchet WRENCH

Note These Features

- IT RATCHETS
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- DROP FORGED CHROME VANADIUM

AVAILABLE SIZE 5/8  
START YOUR SET NOW

**ONLY \$2<sup>50</sup>**

Postpaid in U.S.A.  
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## Emergency Bottled Power!

*New*  
**DOUBLE-PURPOSE AIR-O-FLATER**

**FIRE EXTINGUISHER  
TIRE INFLATER**

*New*  
**LOW PRICE \$5<sup>45</sup>**  
Complete with mounting bracket

**Distributors WANTED**

**A "MUST" FOR CAR OWNERS!**

Puts out gas, oil and electrical fires—contains the new CO2 fire-fighting gas, under high pressure. Safe and easy to operate, non-injurious and quick-acting. Also inflates tires "in a jiffy"—simply attach hose connection to valve stem and turn lever of AIR-O-FLATER—tire is inflated in about 3 seconds.

See your dealer, or mail check (or M.O.) for \$5.45 — satisfaction guaranteed or money refunded. Refill — 75c.

**GENERAL AIR PRODUCTS CORP.**  
3318 MONTROSE AVE. CHICAGO 18, ILL.



### HAND MICROPHONE



Top quality hand microphone with control button in handle. Highly sensitive. Has rubber covered cord and tel. plug. Fine for use on home recorders, public address systems, etc. Brand new—perfect. Shp. wgt. 2 lbs. Stock No. 170. Each... **\$1.95**

### MESS KITS

Regulation two-piece Army Mess Kits with folding handle. Used but perfect. Weight 2 lbs. No. 69c. A116—Ea. **69c**



### CANTEENS

Reg. U. S. Issue canteens. Plastic screw top chained to body. Slightly used but perfect. Wgt. 1 lb. 117—Metal **69c** 118—Plastic—Ea. **69c**



### CANTEEN CUPS

All metal. Folding handle. Wgt. 1 lb. No. A120—Each... **25c**

### CANTEEN COVERS

Heavy canvas. Button fastener. New No. 530—Each... **69c** Used No. 119—Each... **35c**

### ARMY BANDOLIERS

Of fine heavy khaki. Big roomy pockets with snap button fasteners. Fine for hunters, campers, boy scouts, etc., also for shop work in carrying small parts, etc. Material alone is worth this price. Shp. wt. 1 lb. 11 Pocket Type No. 129 Each **49c** 5 Pocket Type No. 128 Each **29c**



### WOOL BLANKET

Full size and 100% wool. Used but renovated for reuse. Use for camping, etc. Shp. wgt. 3 lbs. No. 233—Each... **\$4.89**



### BAYONET BLADE

Fine forged steel. Ground but not polished. May be made into throwing or hunting knife or spear. Blade 6 3/4 x 3/8 inches, 1 1/2 inches overall. Will take and hold a fine edge. Shp. wgt. 1 lb. No. 664-R—Each... **49c**



### PROF. TELEGRAPH KEY

Purchased from the gov't. Finest design and construction. Base measures 3 3/4 x 3 inches. Original value \$2.50. All parts of instrument brass. Adjustable. A-147. Each... **98c**



### LIFE PRESERVER BELTS

Right from the invasion beaches. Consists of two air chambers. May be inflated automatically with "sparklet" cartridges or manually by attached hose. Adjustable in waist size. One air chamber guaranteed air tight—other may need a tire patch. All belts are used and slightly soiled but a bargain at this low price. No. 1261—Each... **\$1.00**



### SPARKLET CARTRIDGES

May be used with above belts. In boxes of 10. Stock No. 254. Per Box... **50c**

# WAR SURPLUS AND HUNDREDS OF OTHER BARGAINS

### POPULAR RECORD ASSORTMENT



Fifty records of modern dance, race, blues and hillbilly selections. No two alike. Famous name bands and artists included. Used in juke boxes, but guar. perfect. Shipped exp. collect only—no exchanges or refunds. Wgt. 28 lbs. No. A303—50 records... **\$9.64**

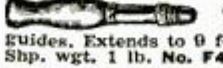
No. A300—25 Records. All Dance. Wgt. 14 lbs. **\$4.88**

No. A301—25 Records. Hillbilly, Race and Blues. Wgt. 14 lbs. Set... **\$4.88**

No. 302—25 Records. All Hillbilly numbers. Wgt. 14 lbs. Set... **\$4.88**

### TELESCOPING BAIT AND FLY ROD

Combination 4 piece telescoping bait and fly casting rod. Screw locking reel seat. Cork grip. Snake guides. Extends to 9 feet, telescopes to 38 inches. Shp. wgt. 1 lb. No. F411—Each... **\$3.65**



### SATCHEL POUCH

Heavy canvas pouch. Ideal for totting lunches, shopping, books, etc. Has 11x12 inch pocket. Brand new, guaranteed perfect. Has oversize flap with single strap fasteners. A113—Each... **\$1.69**



### RADIO HEADPHONES

Extremely sensitive with 4000 ohms resistance. Brand new and fully guaranteed. With moisture-proof cord and phone plug. A splendid value for the radio serviceman and experimenter. A106—PAIR... **\$2.95** New supersensitive phones. A108—Pair... **\$5.95**



### BINOCULAR CASE

Heavy cowhide, hand sewn. Die cut top for compass. Will fit 8x30 Bausch & Lomb or similar binocular. Wgt. 2 lbs. No. A191, Each... **\$2.95**



### CAVALRY SPURS

Genuine wishbone type cavalry spurs. Nickered brass. A102, Pair... **98c** A103 Spur straps per set of four... **50c**



### SHERRILL COMPASS

A finely balanced liquid immersion accurately calibrated compass with mtg. bracket. Measures 5x3 inches. Compensating adjustments. Worth much more. Shp. wgt. 5 lbs. No. A122, Each... **\$9.85**



### WOOL SLEEPING BAG

G.I. Type 100% wool with 30 inch Talon zipper. Used but renovated for reuse. Shp. wgt. 3 lbs. No. 165, Each... **\$3.95**



### 7 LB. EXPERIMENTER PARTS ASSORT. KIT



A "gold mine" for the radio serviceman. Hundreds of valuable radio parts, new radar and electronic parts and subassemblies, coils, resistors, trimming condensers—worth many times this low price. A130R—7 lbs... **\$1.79**

### LEVEL WIND ANTI BACK LASH

Highest quality with chrome plated frame: 3 piece take down design, 4x 5/8" S & F S. Bronzed bearings and jeweled spool caps. Spool diameter 1 1/2 inch; pillar length 1 1/2 inch. Capacity 100 yard line. Onyx head ring. Shp. wgt. 1 lb. No. 450F—Each only... **\$8.55**



### RAIN SUITS

New 2 piece rain suits. Of durable wear resisting water and wind repellent OD fabric. Bib style pants, zipper fly. Jacket has parka attached. Guaranteed 100% weatherproof. Small, medium and large sizes. Shp. wgt. 3 lbs. No. R549. Ea. **\$4.95**



### 2 Man Mountain Tent

Regulation Army type two man mountain tent, complete with poles, guy ropes, etc. Of durable nylon with reinforced seams. Ideal for outdoorsmen, campers, etc. Shp. wgt. 10 lbs. A splendid value. Stock No. 202—Each... **\$9.95**



### PUP TENTS

Regulation Army Pup Tents of durable, brown canvas. Used, but in good condition. Fine for campers, outdoorsmen, boy scouts, etc. Wgt. 8 lbs. A100—Tent only **\$3.95** A110—Tent, new... **\$7.95** A101—Ropes, wooden poles and stakes for above. Per set **\$1.00**



### 27 LENSES, ALL NEW, PERFECT.

For experimental work in optics. Consists of 27 precision ground and polished prisms and lens elements in assorted diameters and focal lengths. Big variety, positive, negatives, etc. Actual value over \$100.00. A519—27 PIECES... **\$7.95**



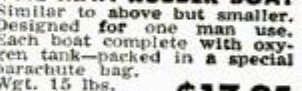
### 50 LENSES SEMI-FINISHED

Lenses similar to above but not polished. All are blanked and formed ready for polishing. Negatives, positives and prisms in Crown and Flint glass. Worth many times this low price. A520—50... **\$1.95**



### ONE MAN RUBBER BOAT

Similar to above but smaller. Designed for one man use. Each boat complete with oxygen tank—packed in a special parachute bag. Wgt. 15 lbs. No. 526—Each... **\$17.95**



### METAL TOOL CHEST

All metal welded construction 16x 8 1/2 x 11 overall. Has 5 roomy, easy sliding drawers. Hinged drop front. Metal top and end handles. Use it for tools, small parts, etc. Shp. wgt. 48 lbs. Stock No. 282, Each... **\$9.75**



### CAMERA TRIPOD

Purchased from Gov't. Used but perfect. For cameras up to 8x10 inches. Folds to 32 inches, extends to 58 inches. Needs adapter to mount camera. Wgt. 5 lbs. Stock No. 190, Ea. **\$4.95**



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Values galore! Hundreds of hard-to-find items for home, shop and outdoors. Make remittances by money order, bank draft or personal check. Send 25% deposit on C.O.D. orders. No C.O.D.'s on orders for less than \$5.00. Include sufficient postage on parcel-post orders—any overage will be promptly refunded. All quotations F.O.B. Chicago. Used items and materials are guaranteed serviceable and as described. Your money back if not more than satisfied.

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# UTILITY CABINET

36 ROOMY COMPARTMENTS  
4 - 7" Drawers  
With Removable  
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A Thousand Uses For  
**HOBBYISTS  
MECHANICS  
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For home workshop, factory,  
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Made of heavy gauge aluminum. Strong  
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Rust proof.

**Cabinet \$2.98 (plus postage)**  
**SINGLE TRAY WITH COVER 60c**  
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**THE KNICKERBOCKER CORP. MANTENO, ILL.**

THE *Natural* WAY  
TO LIGHT A PIPE

- Windproof
- Lightweight
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**\$3.50**

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Unconditionally Guaranteed

**Nimrod  
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Make Up To **\$600**  
An Hour!



Operate Your OWN Home-  
Weaving Business With **AMAZING**  
New **DEEN Power Loom!**

Make yourself financially independent! Start a steady business  
of your own . . . right in your home! Earn **BIG PROFITS** by  
weaving thousands of different designs of rugs on the new easily  
operated Deen Power Loom. Machine will automatically weave  
ten yards of beautiful intricate designs every hour.

**DEEN LOOM TAKES UP LITTLE SPACE.** You can put this  
marvelous weaving machine in a corner of your living room,  
basement, garage, or spare bedroom. Then later on, as your busi-  
ness expands, you can move into regular business establishment.

**IDEAL BUSINESS FOR HANDICAPPED PEOPLE** such as  
veterans and persons handicapped by loss of sight or limbs, and  
those unable to do strenuous labor. Loom is simple to operate  
. . . a child can run it. Any rug design you wish can be woven  
by merely changing paper guide pattern.

**ORIGINAL INVESTMENT CAN BE RETURNED IN  
THIRTY DAYS.** A small investment gets you started in your  
own business right away. Deen Loom has capacity of from  
eighty to one-hundred yards a day . . . in only one month it is  
possible to get back your original investment. Demand for home-  
woven rugs is **GREATEST IN HISTORY. DON'T DELAY**—  
start making plans for your own business NOW. Write today for  
free descriptive booklet and full information. Address Dept. 31,  
DEEN LOOM DIVISION.

**THE GIBSON CO., World Herald Bldg., Omaha, Neb.**

"Makers of DEEN Looms — FAMOUS Since 1895"

Remarkable Invention  
**QUICKLY  
INFLATES TIRES**



**SIMPLE!  
AUTOMATIC!  
CLEAN!**

Lightweight!  
Handy!  
Carry It  
In Your Car!

Don't put yourself on the spot with tire trouble! It's not funny  
to be caught with flats, small punctures, or a slow leak when  
help is out of sight and you're in a hurry.

**Now! Be Prepared . . .**

with the new, modern on-the-road emergency aid. Carry a handy,  
lightweight Diamond Emergency Unit in your car—the miniature-size  
steel cylinder containing compressed CO<sub>2</sub> that inflates tires instan-  
tly, automatically. Nothing to it! No pumping, towing, or struggling  
with dirty tools. Simply attach and open valve. In less than three  
minutes you can be on your way. Safe, odorless, stainless carbon di-  
oxide even helps preserve tires.

**PUT OUT FIRES, TOO!**

(No car or truck engine is fire proof.) Crowds out oxygen in split sec-  
ond—smothers oil, gas, and electrical fires. Without even raising the  
hood—you can extinguish engine fires! Size—12 3/4" x 1 3/4". Weight—2  
lbs., 6 oz. Get Diamond Emergency Unit NOW—only \$6.45.

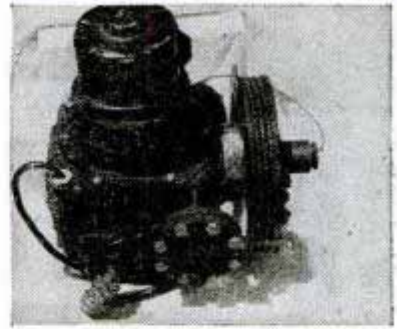
**SEND NO MONEY** Simply mail name and address. On delivery,  
pay postman \$6.45 plus C.O.D. charges. Order  
today or write for details.

**THE AKRON LAMP & MFG. CO. 106 HIGH STREET  
AKRON 11, OHIO**

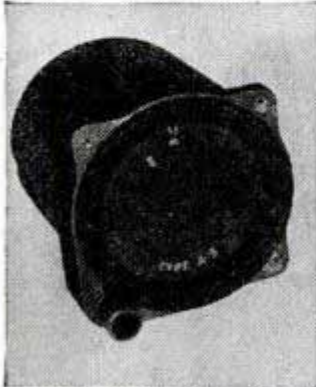


# MILLIONS of War Surplus "GADGETS"

The following seven carefully selected surplus items are all components of the A-5 Sperry auto-pilot, used to guide bombers throughout the world! Original cost of these items totaled many thousands of dollars; we offer them now at little more than 1% of original cost! Weights shown are packaged weights.



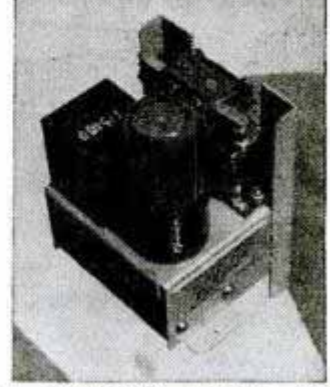
**1. SERVO UNIT**, a combination hydraulic cylinder and electric type actuating unit. Includes Holtzer-Cabot 1/10 hp 24 volt DC motor (6000 rpm), gears, shafts and many other valuable items. **NEW! Weight 23 lbs. . . . . \$8.95**



**2. INDICATOR**, Pilot Director, Sperry. Includes autosyn motor, indicator face, etc. **NEW! Weight 2 lbs. \$1.95**



**3. AMPLIFIER**, for rudder servo. Includes 4 tubes: two 1632, one 1633, one 1634; condensers, transformers, switches, resistors, terminals, tube sockets, chassis, etc. Ideal for radio hams, etc. **NEW! Weight 5 lbs. . . . . \$2.95**



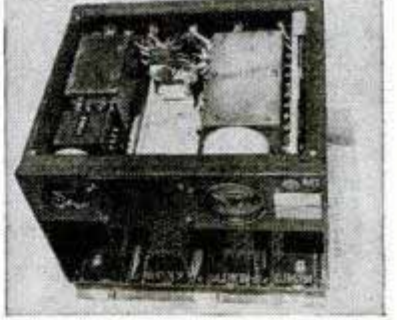
**4. AMPLIFIER**, erection type. Contains one 1633 tube, transformer, relay, condensers, registers, socket, chassis, etc. **NEW! 2 1/2 lbs. . . . . \$1.45**



**5. GYROSCOPE**, Directional. Has a fine precision electric 110 volt AC gyro mounted in brackets, one autosyn transmitter generator, one 110 volt AC motor (small) 3 phase, 11 electro-magnets, bearings, gears, slip rings, plugs, etc. A beautifully built expensive unit chuck full of gadgets! **NEW! Weight 14 1/2 lbs. . . . . \$9.95**

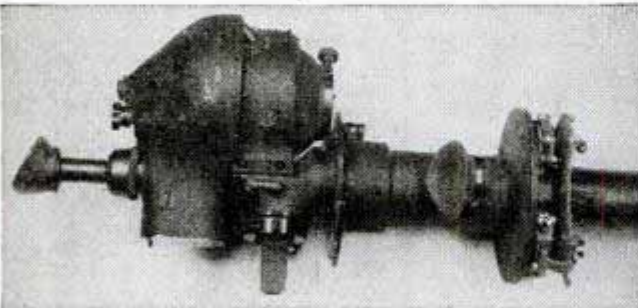


**6. CONTROL UNIT AND PANEL**, Sperry. This is the unit that controls the units that fly the huge bomber by electronics! **SIZE 7 1/2"x8"x4 1/2"**. A gold mine! Includes 6 toggle switches (retail price \$2.55 each), two three way switches, 3 indicators (can be used as amp, or volt meters using own calibrations), plugs, resistors, etc., etc. **Weight 6 1/2 lbs. . . . . \$5.95**



**7. AMPLIFIER RACK, ASSEMBLY**, Auto-Pilot A-5, Sperry. This assembly is the electronic device that the servo amplifiers were used. Is not merely a rack but a complicated assembly that is filled with many many valuable items to gadgeteers. **Size of assembly is 14"x10"x12"**. As pictured, it includes the 2 1/4" dial type AC volt meter, 0 to 120; Frequency meter 350 to 450 dial size 3 1/4"; many fine relays; capacitors, resistors, condensers, plugs, screws, nuts, etc. **Weight 25 lbs. . . . . \$8.95**

**AUTOMATIC PILOT LOT:** The above seven assemblies may be purchased in one single lot **\$34.95** for only . . . . .



**8. AIRFORCE DRIFT METER, TYPE B-3.** Built to close precision tolerance by Bendix for Bombers. Overall length 47". Net weight 24 lbs. Contains many valuable unreplaceable items such as precision lenses, eyepieces, switches, electric gyroscope, filters, prisms, scales, etc. Invaluable to the experimenter. Used to determine drift of aircraft in flight. Cost many hundreds of dollars! Shipping weight app. 40 lbs. Slightly used. A bargain at only **\$19.95**

**9. TRIPLE OUTPUT DYNAMOTOR.** Input voltage 24 volts, output is 300, 150 and 14.5 DC; rpm 6000, cont. duty, temp. rise 50C. Has voltage regulator, fan, etc. **Weight 20 lbs. Less than 1% original cost, used condition. . . \$6.95**

**10. AIRCRAFT MACHINE SCREW AND RIVET ASSORTMENT.** All new, ten sizes and types of screws as well as alum. rivets. Not mixed but in separate boxes. Including a metal tool box. **Weight 27 lbs. All this for. . . \$9.95**

**11. ULTRA-HIGH FREQUENCY RECEIVER,** Aircraft marker beacon receiver, 75 megacycles, can be used on either 12 or 24 volts, uses two tubes, etc. Circuits furnished. Slightly used. **Weight 4 lbs. \$9.95**

**12. DUAL CYLINDER HEAD TEMP. GAGE,** 0 to 350 deg. C, when properly wired can be used to record temperature of water, oil, cylinder heads, etc. (Wires not furnished). Has two sensitive micro-amp jeweled movements. **NEW, Weight 2 lbs. . . . . \$6.95**

**13. INTERPHONE AMPLIFIERS TYPE RL-7.** Includes tubes, coils, condensers, phone plugs, mike plugs, fuse holders, receptacles, switches, 24 volt dynamotor (250 volts output), as well as many more fine parts. **Weight 8 lbs. . . . . \$9.95**

**14. RADIO HEADPHONES AAF TYPE,** used good condition, **weight 1 lb. . . . . \$1.10**

**15. RADIO THROAT MIKE AAF TYPE,** used good condition, **weight 1 lb. . . . . \$1.00**

**16. MALLORY RADIONOISE FILTER;** For cutting noise between radio and motor, etc. **NEW! Weight 2 lbs. . . . . \$1.29**

**17. STAINLESS STEEL AIR TANK.** Used by AAF for oxygen, 24" long, 6" diameter. High pressure range up to 400 lbs: 500 cu. in. volume. Pipe fittings each end. Can be used for air pressure, air horns, boat buoys, markers, etc. **Stainless steel, Weight 5 lbs. . . . . \$3.95**

**IMPORTANT:** We pay no shipping charges! Include adequate on cash orders to pay charges or we will ship collect charges. No orders accepted for less than \$2.00. No C.O.D. shipped unless 20% deposit made in advance. App. shipping weight of each item is listed.

**AERO INSTRUMENT COMPANY** MUNICIPAL AIRPORT HOUSTON 12, TEXAS



# SOUTH BEND LATHES

**FOR PRECISION WORK**

Built for precision machining, South Bend Lathes are ideal for all kinds of fine work. Their dependability has been proved in every type of shop—from the smallest to the big toolrooms, laboratories, and production lines of large industries.

They give you the best of everything. Accuracy that is more than adequate for exacting jobs. A versatility for efficient machining on all types of operations. And the ease of operation and rugged durability that have made South Bend Lathes favorites of craftsmen everywhere.

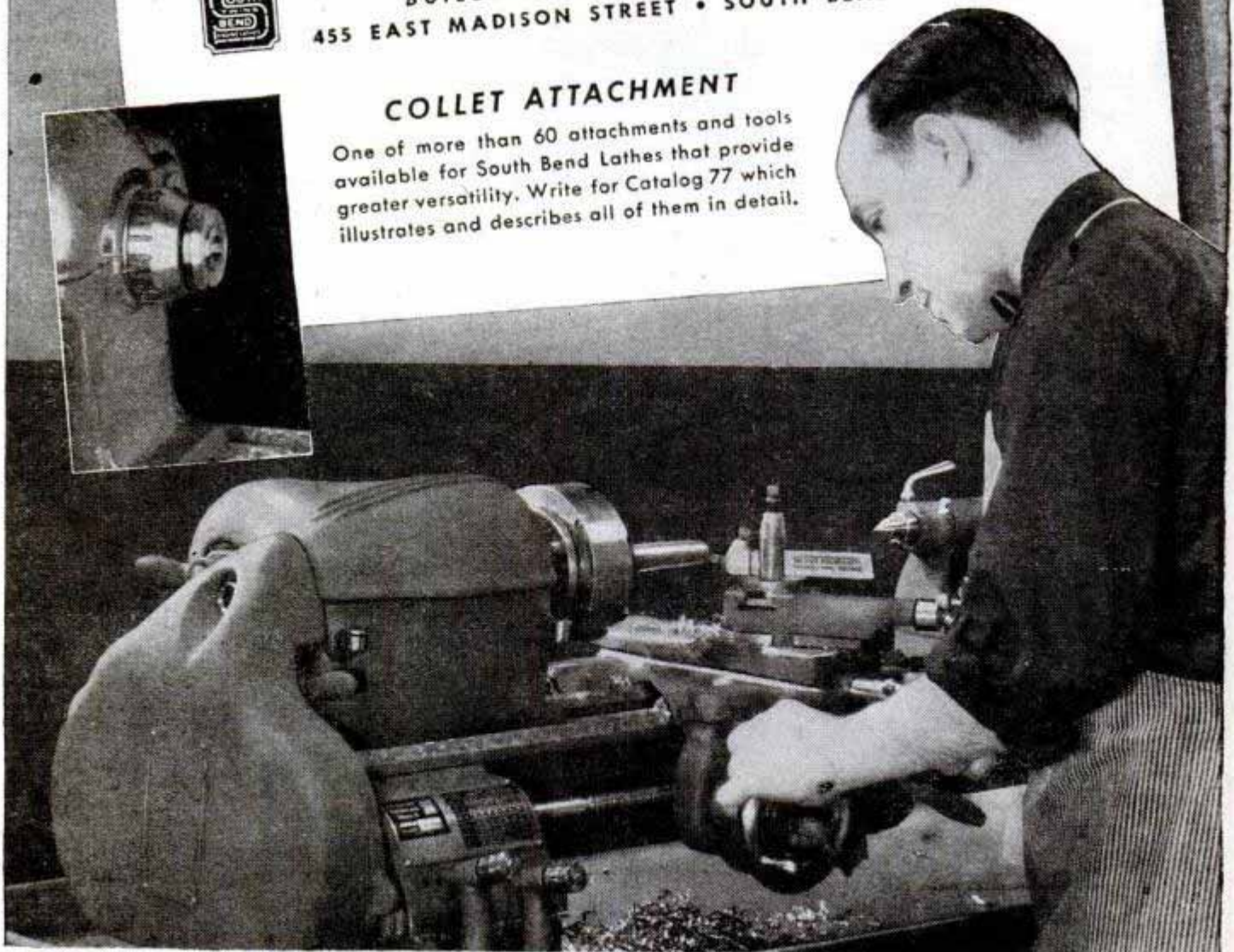
Prices are only slightly higher than pre-war—and improvements developed to meet exacting war production requirements give you greater dollar value. Write for catalog, stating size of lathe in which you are interested: 9", 10", 13", 14½", or 16" swing.



**SOUTH BEND LATHE WORKS**  
BUILDING BETTER LATHES SINCE 1906  
455 EAST MADISON STREET • SOUTH BEND 22, INDIANA

## COLLET ATTACHMENT

One of more than 60 attachments and tools available for South Bend Lathes that provide greater versatility. Write for Catalog 77 which illustrates and describes all of them in detail.



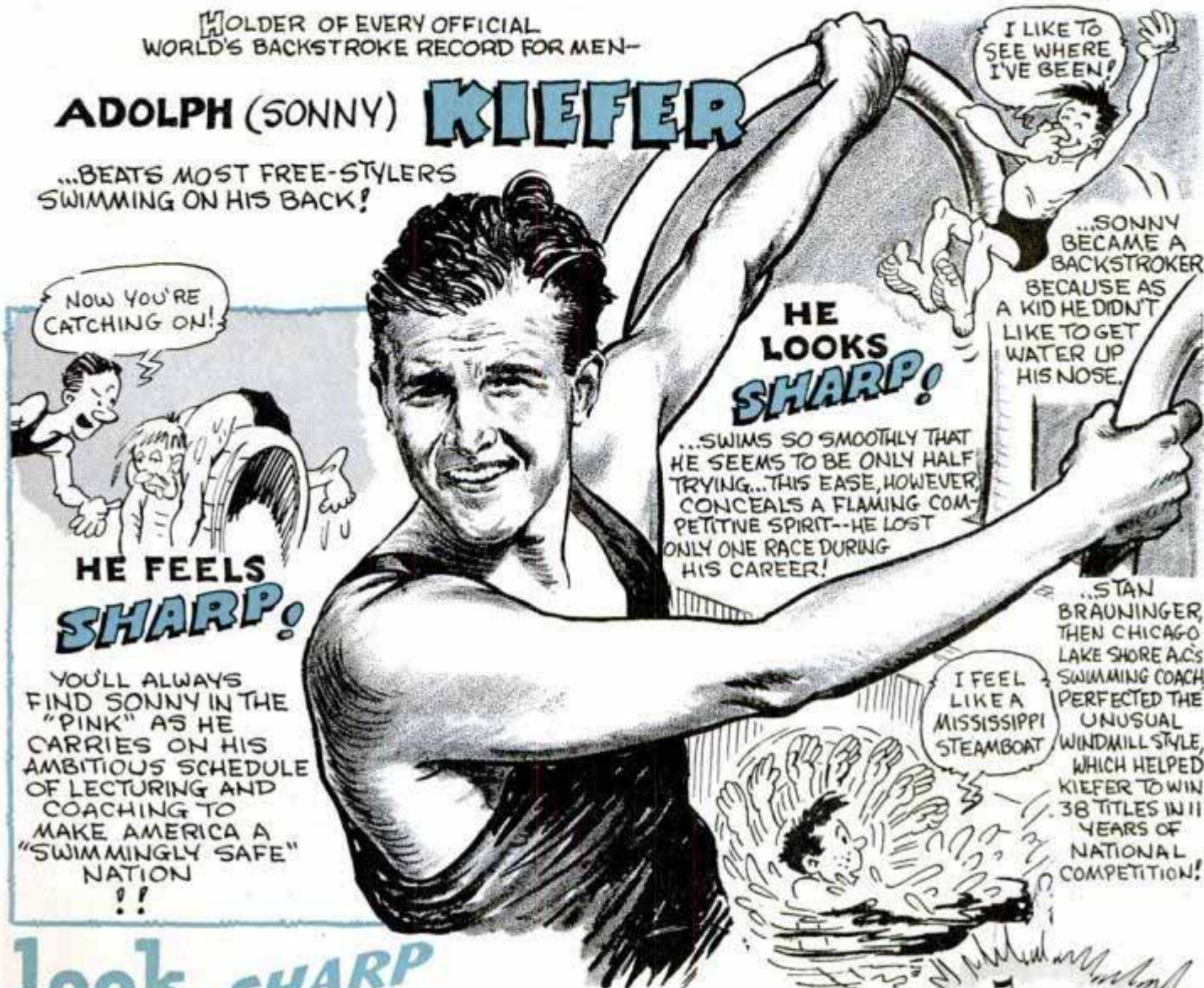


# SPEAKING OF RECORDS by FRANK WILLIAMS

HOLDER OF EVERY OFFICIAL  
WORLD'S BACKSTROKE RECORD FOR MEN—

## ADOLPH (SONNY) KIEFER

...BEATS MOST FREE-STYLERS  
SWIMMING ON HIS BACK!



NOW YOU'RE  
CATCHING ON!

I LIKE TO  
SEE WHERE  
I'VE BEEN!

HE  
LOOKS  
**SHARP!**

...SONNY  
BECAME A  
BACKSTROKER  
BECAUSE AS  
A KID HE DIDN'T  
LIKE TO GET  
WATER UP  
HIS NOSE.

...SWIMS SO SMOOTHLY THAT  
HE SEEMS TO BE ONLY HALF  
TRYING...THIS EASE, HOWEVER,  
CONCEALS A FLAMING COM-  
PETITIVE SPIRIT--HE LOST  
ONLY ONE RACE DURING  
HIS CAREER!

HE FEELS  
**SHARP!**

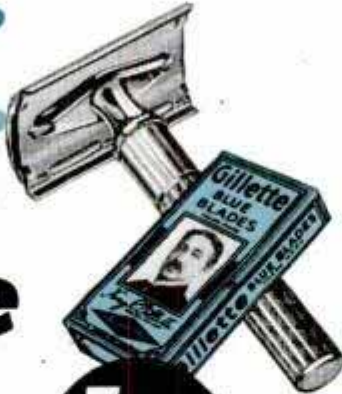
YOU'LL ALWAYS  
FIND SONNY IN THE  
"PINK" AS HE  
CARRIES ON HIS  
AMBITIOUS SCHEDULE  
OF LECTURING AND  
COACHING TO  
MAKE AMERICA A  
"SWIMMINGLY SAFE"  
NATION  
!!

I FEEL  
LIKE A  
MISSISSIPPI  
STEAMBOAT

...STAN  
BRAUNINGER,  
THEN CHICAGO  
LAKE SHORE A.C.'S  
SWIMMING COACH  
PERFECTED THE  
UNUSUAL  
WINDMILL STYLE,  
WHICH HELPED  
KIEFER TO WIN  
38 TITLES IN 11  
YEARS OF  
NATIONAL  
COMPETITION!

look **SHARP**  
feel **SHARP**  
be **SHARP**

use  
**Gillette**  
**Blue Blades**  
with the **SHARPEST** edges  
ever honed!



5 for  
25¢

HE IS **SHARP!**

YES SIR, SONNY KIEFER ALWAYS USES  
**GILLETTE BLUE BLADES**  
WITH THE SHARPEST EDGES EVER HONED.  
THAT'S BECAUSE THEY GIVE HIM  
THE SLICKEST, MOST REFRESHING  
SHAVES MONEY CAN BUY.  
ALSO-- HE KNOWS THAT  
**DOUBLE EDGES MEAN  
DOUBLE ECONOMY!**

● You *look* sharp for you enjoy the swellest shaves ever. You *feel* sharp because they're refreshing and give you a lift. You *are* sharp for you get far more shaves per blade and save money. Ask for Gillette Blue Blades.

ENJOY BOXING  
EVERY FRIDAY NIGHT  
OVER ABC NETWORK. GILLETTE'S CAVALCADE OF SPORTS  
ALSO AIRS THE ALL-STAR BASEBALL GAME, JULY 8, AND  
OTHER CLASSICS YEAR 'ROUND.

**Gillette Safety Razor Company, Boston 6, Mass.**

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FOR *Dependable* BALL TIP WRITING



Color photograph by John Paul Pennebaker

# SHEAFFER'S *Stratowriter*

- QUICK NOTES AND CASUAL WRITING
- MAKING MULTIPLE CARBONS AND STENCILS
- ADDRESSING PACKAGES
- MEMOS WHILE TELEPHONING
- WRITING ORDERS
- WRITING ON ALMOST ANY SURFACE
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