

NEW COLOR PICTURES THIS ISSUE

# POPULAR MECHANICS MAGAZINE

WRITTEN SO YOU CAN UNDERSTAND

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SEE PAGE 531



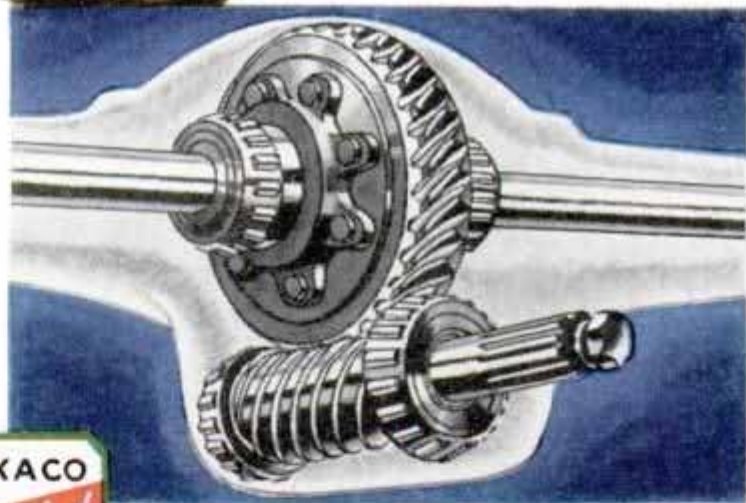
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FACTORY  
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To find somebody, to carry word to somebody, to get somebody's advice, to bring somebody quickly, to learn somebody's final answer is for the moment the one, all-important purpose.

Have you ever stopped to consider how great a part the telephone plays in the meeting of such emergencies?

Even our daily routine is a succession of lesser emergencies. Satisfactory living in this complicated world consists largely in grasping situations as they arise, one after

another — solving each promptly, finally, and getting on to the next. We dare not be always just a little too late.

It is because of all this that the telephone is so essential and helpful in the daily life of so many people. To millions of homes it brings security, happiness and the opportunity for larger achievement.

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# Popular Mechanics Magazine

200 E. Ontario Street, Chicago, U. S. A.

H. H. WINDSOR, Founder

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

April, 1934

Vol. 61, No. 4

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## Next Month

THREE hundred and eighty million dollars! That is what Uncle Sam is going to spend to make our navy equal to the best in the world. With treaty limitations, this means a search for lighter but stronger steels, improvements in armament and more speed. You can read all about it in the next issue of Popular Mechanics which will carry sixteen pages of pictures in color.



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 THE SECRET OF LASTING BEAUTY

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*Furnaces electric are 601*



# GRINDING VALVES AGAIN?

Forced to lay your car up for valve grinds two and three times a year? That's nothing to what I. L. Shimberg of Syracuse, N.Y. went through. Here's what he writes:

*"I had been a user of Quaker State, and changed to a cheaper oil. It was then necessary to have my valves ground twice in 2500 miles. The garage man showed me that the trouble was due to valve guides and motor being gummed up with carbon from the cheaper oil. I changed back to Quaker State, and have had no further trouble in any way."*

Why does ordinary oil stir up trouble? Because it's loaded with a thin, watery material called "light-end" oil. There's one quart of this, more or less, in every gallon. It burns up, vaporizes, blows away. Your car doesn't get full lubrication.

To be sure of *constant* lubrication, use Quaker State. No "light-end" material . . . it's removed at the refinery. You get an *"extra quart of lubrication in every gallon."*

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HOW LONG? HOW LONG?  
THIS HEART-BREAKING  
MONOTONY?  
THIS WRETCHED PAY?

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[The True Experience of a Man Who *Almost* Enrolled for LaSalle Home-Study Training]

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Through five typewritten pages he recounted the hardships of those intervening years. A really able man, he had moved from one position to another, only to find advancement closed to him for lack of specialized training.

No need here to recite those hardships—though in justice to him it is only fair to say that on four separate occasions he had *almost* enrolled . . . and that on each occasion he had postponed action because of some unexpected reverse seemingly beyond his power to avoid.

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to my increased knowledge. As it is, for all I know, there may be another five months without any position . . . with all sorts of dim prospects . . . and meanwhile I am getting older . . .

"*That settles it! To blaze with further procrastination! To thunderation with my financial program! I've borrowed the money, and I'll borrow some more . . . but I'll do something with my time! This year is going to see a big change in my affairs—and right here is where we start!*"

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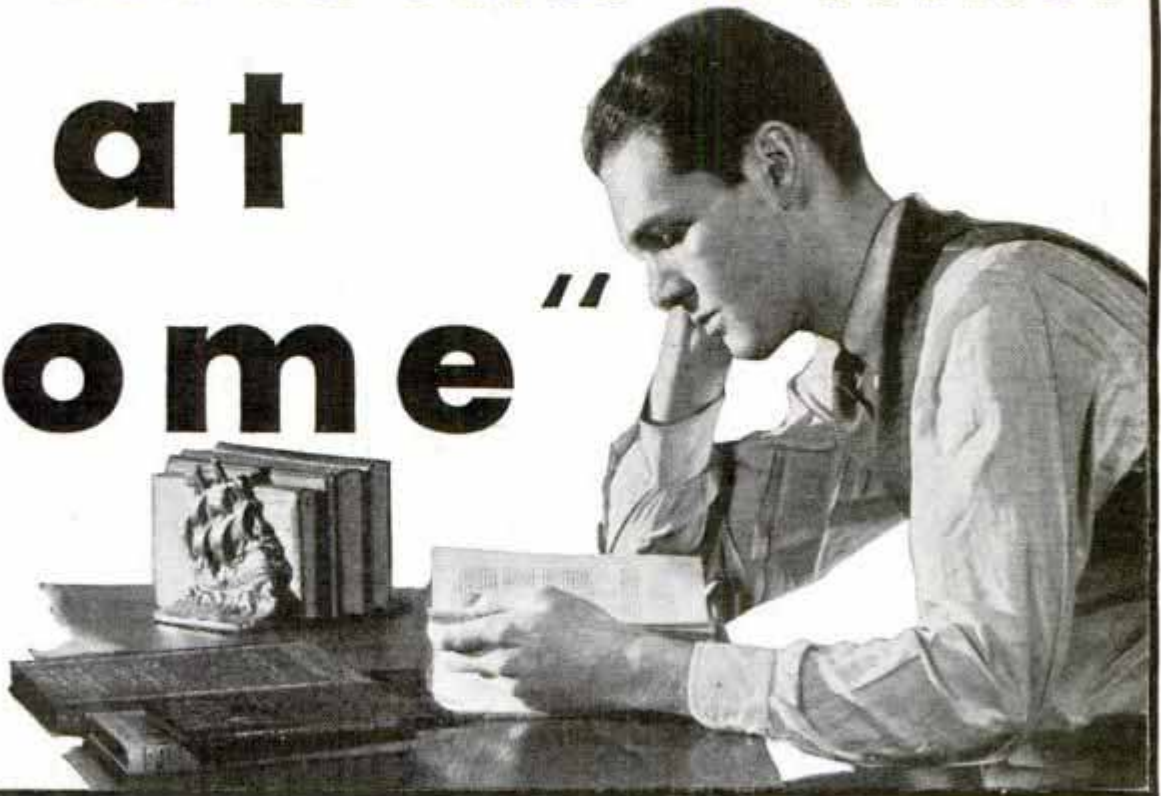
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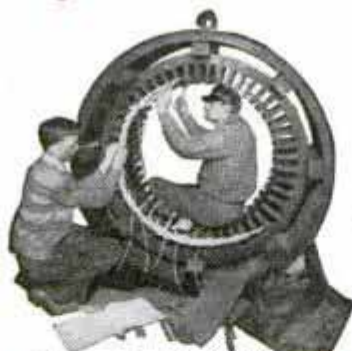
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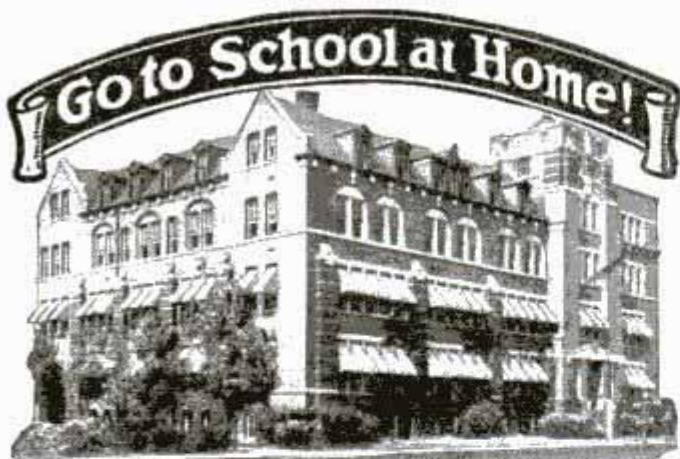
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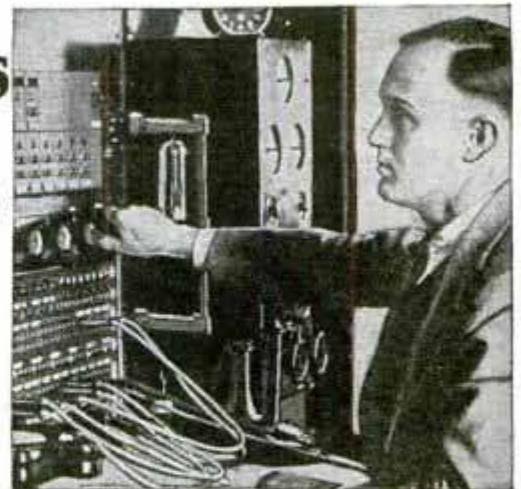
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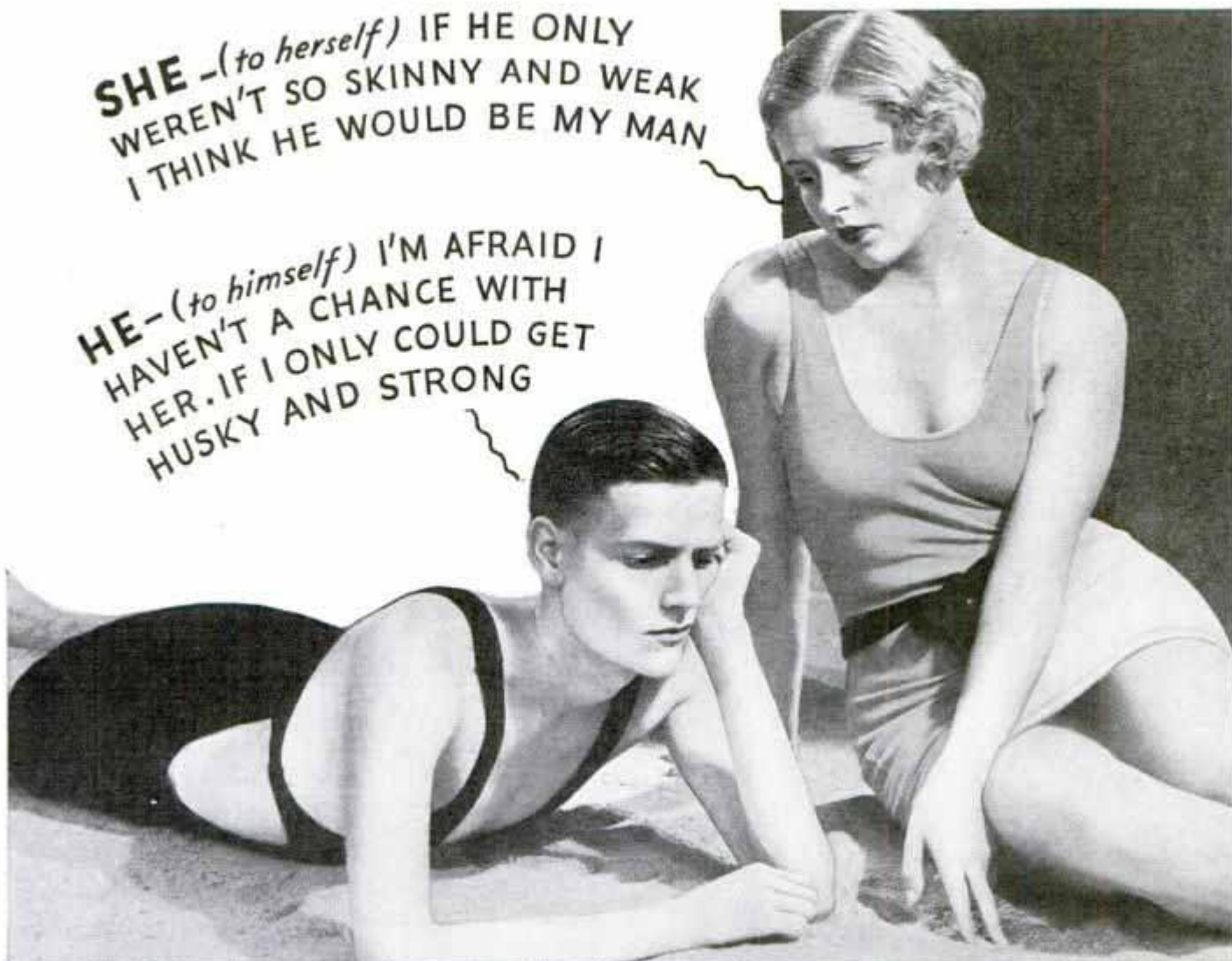
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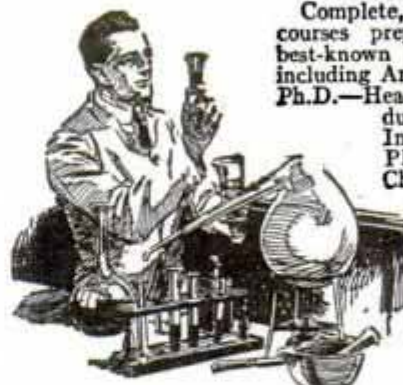
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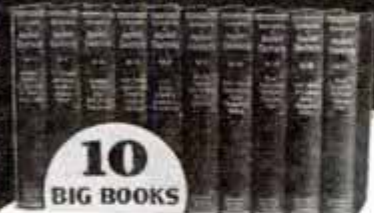
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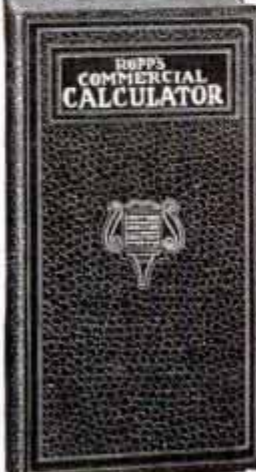
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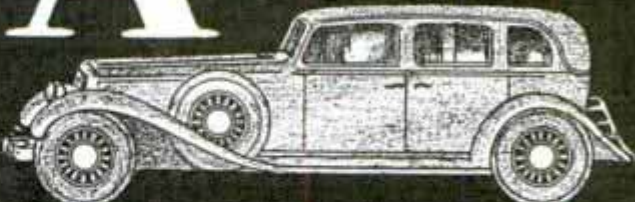
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**ROLLS**, Developed, printed, 25c. Mail your films to the biggest and best. Rolls developed and 8 good prints guaranteed plus free 8x10 enlargement coupon only 25c. Reprints any size 3c each. Geppert Studios, Dept. 130, Des Moines, Iowa. Member NRA.

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**16MM ART** Film 10c foot—\$9.00 hundred feet complete, Mickey Mouse - Chaplin - Ourgang-Felix 100 ft. \$3.00. Big features rented anywhere \$10—Tarzan-Buffalo Bill-Hunchback Notre Dame-Life Christ-Uncle Tom's Cabin-Jesus Nazareth, etc. Lists. Excelstor Films, Cincinnati.

**16MM FILMS**—Rental, sale, exchange. Dime brings catalogue, two "end" titles. Eastin Films, Dept. 13, Galesburg, Ill.

**\$\$\$PHOTOPLAY** Plots accepted any form for free reading and report. Our sales service selling consistent percentage stories to Hollywood studios—the most active market. Experienced writers revise, synopses, copy-right, submit to producers. Free booklet shows how. Universal Scenario Co., 254 Meyer Bldg., Hollywood, Calif.

**SEND** 10c For sample copy. Personal Movies Magazine, Canton, Ohio.

**BASS** Offers for a limited time brand new 100 ft. Stewart-Warner 16mm Cine camera, complete with case, F:3.5 lens, worth \$50.00, at \$18.50 each. Hundreds of other bargains in Bass Bargaingram No. 212 mailed on request. Write to Value Headquarters, Bass Camera Company, 179 W. Madison St., Chicago, Ill.

**BARGAINS** In 8, 9½, 16, 35mm equipment, parts, film, library catalog. 1944-J Boston Road, New York City.

**FREE** 16mm, 8mm Bargain lists. Films 35c up. Art sample 25c. Home Movies, Box 32, Easton, Penna.

**REELS** \$1.15. 500 Ft. 75, 2 for \$1.25. Jersey Films, 2075 Richland, Lakewood, O.



**MOVIE** Equipment exchanged-bought-sold. Films exchanged 25c up, (some loaned free). Art samples 25c. Send 3c for lists. Peerless, Box Y-11, Southgate, Calif.

**STANDARD** Silent portable machines. Film. Stereopticons. National Equipment Co., Duluth, Minn.

**35-MM FILMS**, Projectors. Stamp for lists. Box No. 6, Rosedale, Kans.

**BARGAIN** Lists 3c. Hoffman Film Service, 57 Broad, Albany, N. Y.

**WORLD'S** Greatest "Passion Play" 16 MM. (new) 5 reels. Rent or purchase. Write Hemenway Film Co., 37 Church Street, Boston, Mass.

**LEARN** Motion picture theatre business. Catalog. Theatre Institute, Elmira, N. Y.

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**BIG** Money cleaning upholstery in homes. We furnish everything. Degen Products, 6249-P St. Lawrence Avenue, Chicago.

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**CHEMICAL** Expert furnishes manufacturing formulas with complete working directions. Reliable individual service. Charges reasonable. Dr. Van Heeden, 4721 Lakepark, Chicago.

**INVENT** Something! Sell your inventions before patenting. Write W. T. Greene, 963 Barrister Building, Washington, D. C.

**FREE** Books mail order business. Stamp appreciated. Dolsen Herald, 36 Liberty Street, Brooklyn, N. Y.

**WANTED—Partner**—To pay foreign patent fees on training and testing device for aviators, half interest. United States and Canadian patents already allowed. For sale or royalty soon. Excellent commercial possibility. Room 104, % Popular Mechanics Magazine, Chicago, Ill.

**BREATH** Taking results selling new rubbers polish. Formula 25c. James McClellan, Littleton, Mass.

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**PROFITS** on your own goods. Make, sell them. Guaranteed formulas. Special prices, leads. Catalogs free. Gibson, Chemist, RD-4702 No. Racine, Chicago.

**1000 WAYS** To Make Money book, formulas and trade secrets for every manufacturing line. Illinois Universal, 800-P N. Central Ave., Chicago.

**\$5 TO \$50** Weekly. Grow fancy "White Queen" mushrooms in cellar or shed. Free mushroom book tells how. American Mushroom Industries, Ltd., Dept. 588, Toronto, Ont.

**DOLLARS** in "Fixit" service. We instruct. Particulars. Houlgate's "Fixit" Service, Station C, Pasadena, Calif.

**104 PAGES** Of copyrighted money making plans, compiled from actual instances by former aid, United States veterans bureau, vocational guidance service. \$1.00. Stone Publishers, Room 803, 1650 Bway., New York.

**PATENT** Your idea. Other men have read and profited by our free book, "How to Obtain a Patent." Fully explains many interesting points to inventors and illustrates important mechanical and electrical principles. With book we also send free "Record of Invention" form. Prompt service, reasonable fees, deferred payments, thirty-five years experience. Avoid risk of delay. Write immediately to: Victor J. Evans & Co., Registered Patent Attorneys, 650-D Victor Building, Washington, D. C.

**WANTED:** Partner to finance development of engine. Experiments prove principles correct. Exceptional efficiency and performance expected. Carl Bruner, 1812 No. Waco, Wichita, Kans.

**OLD** Spark plugs worth 3c each. Large company rebuilds. Thousands wanted. Collecting, selling, shipping, instructions 25c coin. Hammond Co., Paulding, Ohio.

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**MANUFACTURE** Chipped glass house numbers. Beveridge, 160-22 Locust, Jamaica, New York.

**FURNITURE** Refinishing; job painting; handyman shop. Start yours on nearly nothing; mostly all profit. John Braceland, 1439 South Ninth, Philadelphia, Pa.

**LEARN** To make handwrought silver. Authentic old methods by master craftsman. Porter Blanchard, 8626 Sunset Blvd., Hollywood, Calif.

**500 TRADE** Secrets 25c. Other propositions for 3c. Dean Systems, 141P Garson, Rochester, N. Y.

**600 SUCCESSFUL** Money-making ideas; many from government records. Not mail order plans. 35c only, stamps or coin. Enterprise Bureau, Tower, EP, Syracuse, N. Y.

**MAKE** Big money in the mercantile collection business. Easily learned. Free details. Cole & Associates, Tower, CP, Syracuse, N. Y.

**CASH** Income daily resilvering mirrors at home. Replating autoparts, tableware, etc. Outfit furnished. Write Sprinkle, Plater, 127, Marion, Ind.

**SUCCEED** With your products. Formulas, Processes. Analytical service. Catalog free. B. Thaxly Co., Washington, D. C.

**FLOOR-SERVICE** Salesmen needed. Wax floors, rent machines, sell paste, liquid and self-polishing wax. On market ten years. Durham Company, 9 School Street, Des Moines, Iowa.

**LIQUID** Marble—Anyone can make. Brushed, sprayed or molded. Rubberlike. Pyraloid molds! Composition flooring. Big money making these! Particulars free. Rapid Service, Edwardsville, Ill.

**NOW**, Maintain warehouse, northwestern distribution, half cost. Write Warehousing, 934 Bayless Ave., St. Paul.

**MAKE** Artificial marble, glazed tiles, no polishing, uncanny. Tabletops, bookends, floors, whetstones. Inexpensive, hard, enamel wood. Rubber moulds for exquisite novelties. Secret cement processes. Colorful samples free. (So. Calif. business reserved.) John A. Payn, 945 Grande Vista Avenue, Los Angeles, Calif.

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**PLATE** Auto fixtures, tableware, musical instruments. Simple outfits—instructions. Metalcraft, 515 Louderman Building, St. Louis, Mo.

**I MADE** \$50.00 Weekly renewing colors in rugs, upholstery, etc. Free booklet explains. Alhambra Laboratories, Box 44, Alhambra, Calif.

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**SECRET** Of making artificial marble. Formula 25c. Johnson, 4520 Christiana, Chicago.

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**SELL** By mail—New fast selling merchandise, circulars supplied, write, Superior Specialties, Springfield, Ill.

**MAKE** Products yourself. Tested formulas. Catalog free. Grinstead Laboratory, Edwardsville, Ill.

**MAIL** Order business is your opportunity. Many began small, now earn thousands yearly. No personal contact. Boundless opportunities. Have had over 30 years experience; will help you succeed. Send 25c for valuable booklets, none free. B. Breniser, 257 South 21st, Philadelphia.

**CHARTERS:** Delaware; best, cheapest; free forms. Colonial Charter Co., Wilmington, Del.

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**START 1934 Right!** Realize liberal income making today's leading specialties. Have others selling for you everywhere. Interesting new formula lists, valuable information free. Miller, Chemist, 1706 BPM, Tampa, Fla.

**MAIL** Order drug store. Let us supply your drug store wants. Information given; stamp appreciated. Mequon Drug Store, Thiensville, Wis.

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**BIG** Money at home plating auto parts, reflectors, mirrors, chandeliers; by new method; experience unnecessary. Outfits furnished. Gunmetal Co., Ave. N, Decatur, Ill.

**ARTIFICIAL** Marble sanitary flooring. Instructions covering wood or cement flooring 1/2 inch thick, fireproof, all colors, low cost. Ornamental casting, concrete plaster papier-mache decorations, garden furniture, statuary, flexible molds, particulars and illustrations free. Chris. Mahler, Elmont, N. Y.

**CHEMICAL** Expert will furnish formulas and trade secrets. All lines. Lists free. W. L. Cummings, Ph. D., 228 Gordon Ave., Syracuse, N. Y.

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**MAGIC** Liquid—Something new. Wonderful moneymaker. Particulars. Clinch, Brielle, New Jersey.

**MAKE** Your own products. Employ agents yourself. Toilet articles, soap, extracts. We furnish everything. Valuable book free. National Scientific Laboratories, 1950 W. Broad, Richmond, Va.

**LEARN** Account collecting. Good income, quick results. Interesting booklet free. National Collectors Association, Newark, Ohio.

**START** Little business anywhere. Everything furnished. No canvassing. Maywood, PM 923 Broadway, New York.

**HOME** Industries. Irvington, Nebr. Bi-monthly, 32 pages, three months 10c.

**THAT** Concrete Job. Don't be afraid to tackle it. With the instructions found in the new edition of Popular Mechanics Concrete Handbook you can easily make 173 articles of utility and beauty ranging from ordinary steps to garden furniture. This book will be sent for only 98c plus postage C.O.D. Send your order today to Popular Mechanics Press, Room 802, 200 E. Ontario St., Chicago, Ill.

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**ANY** Formula three dimes or money refunded. Ogg Laboratories, Tampa, Fla.

**KLOR-OX** Formula \$1.50. 30c makes 5 gallon. Wagner, 646 N. Madison, Stockton, California.

**FORMULAS**, Business plans. Literature free. Belfort, 4042 No. Keeler, Chicago.

**MAKE** Automobile specialties. Tremendous profits. 41 guaranteed formulas including tire repair dough, radiator solderseal, etc. All \$5.00. Chemical Research Laboratories, Ossining, N. Y.

**NEWEST** Guaranteed formulas. Catalogs free. Special prices. Leads. Gibson, Chemist, RD-4702 N. Racine, Chicago.

**FORMULAS**, Analysis, catalogue free. Hertzstein, 222 Ransom, Grand Rapids, Mich.

**FREE**—Formula literature. 465 formulas 25c. Thomson, 7309 Pingree, Chicago.

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**20 FORMULAS**, 20c. Latest, best—why pay more? International Agency, Cincinnati.

**LIQUID** Solder formula 25c, others. Investigate. Haispence Exchange, 561 E. 89th Street, Brooklyn, N. Y.

**MONEYMAKING** Formulas—Plans. Catalog free. Bestorall, 4047P North Whipple, Chicago.

**500 MONEY** Making formulas, 25c, postpaid. Womble's, Liberty, N. C.

**"500 SUCCESSFUL** Formulas," \$1.00; worth thousands!! Plan included: "Establishing Depression-Proof Business Yourself" T. Galluzzo, 409 Trenton, Pittsburgh, 21, Pennsylvania.

**NEW** And old formulas. 2 formulas and catalog 25c. Superior Formulas, Rome, Ga.

**MANUFACTURERS** Secret formulas. Make nationally known products. Money-makers only. \$1.00 each. List free. Thermo Works, Peoria, Ill.

**TESTED** Formulas. Newest, guaranteed! Catalog free. Grinstead Laboratory, Edwardsville, Ill.

**3,000 FORMULAS**, Facts, processes, trade secrets in Dr. Brown's Book of Formulas—380 pages. Price, postpaid \$1.00. Ogilvie Publishing Co., 57 Rose Street, Dept. 25, New York.



**SUCCEED** With your products. Formulas. Processes. Analytical service. Catalog free. B. Thaxly Co., Washington, D. C.

**LATEST** Formulas for almost any preparation. Particulars. Chemist, 830 South 41st, Omaha, Nebr.

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**MILLER'S** Foremost formulas. Exclusive, inexpensive, practicable, correct for guaranteed goods, all lines. Successful manufacturers use no others. Latest interesting literature free! Miller, Chemist, 1707-PPM, Tampa, Fla.

**FORMULAS**, All kinds. Guaranteed. Catalog free. Kemico, 31, Parkridge, Ill.

**10,000 MONEY-MAKING** Formulas. Tells you how to make and sell almost everything under the sun; cosmetics, muckage, anti-freeze solutions, battery solution, beverages, cheese, chewing gum, cleaning preparations, extracts, hair preparations, inks, bluing, leather polish, mirrors, perfumes, polishes, typewriter ribbons, carbon paper, washing powders, liquid soap, and hundreds of other profitable articles. Send no money. Just write a postal for "Henley's 20th Century Book of Formulas." Pay postman postage and \$4. Popular Mechanics Press, 200 E. Ontario St., Room 802, Chicago.

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**CHEMISTS'** Slide rule, editorial Jan. issue, saves time solving equations, gives molecular weights, shows formulas, 391 compounds. Durable precision instrument. Post-paid, complete instructions, two dollars. MWC Company, 508 Andrus Bldg., Minneapolis, Minn.

**WONDERFUL** Offer, special chemical set and valuable catalogue. Send 25c in money or stamps. Kemkit Chemical Corporation, 135B Johnson Street, Brooklyn, N. Y.

**FREE** Chemical catalogue. Enclose 3c stamp. Spanner Chemicals, 212 Forsyth, New York City.

**FREE!** Fascinating book of experiments! Also free—"Sciencecraft" magazine for 6 months! Send stamp. Sciencecraft, p-5049 Bernard, Chicago.

**AMERICAN** Amateur Chemists Society, founded 1931. Journal free. Lansing, Mich.

**SEND** Your chemical problems to Lowell Bunting, Consultant Chemist, Royal Oak, Michigan.

**FOR** Sale—Contents of laboratory, \$35. List on request. Caumont Laboratory, 32-36 150th Place, Flushing, N. Y.

**HANDBOOK** For chemical experimenters (revised 1934) illustrated, 50c. Experiment booklet 15c. Catalogue 10c. General Chemical Co., Reading, Penna.

**CHEMICALS**, Laboratory glassware and apparatus. Catalog CP. Biological Supply Co., 1176 Mt. Hope Ave., Rochester, N. Y.

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**AMAZING** Values produce huge profits! Establish own business selling everything to wear for men and women. Socks, ties 3c; pure silk ladies hosiery 33c; lingerie 25c; finest genuine \$1.50 quality Cellophane wrapped broadcloth shirts 67c; handkerchiefs 1c; scores of unbelievable bargains, all first quality, perfect branded merchandise. Write orders, you deliver or we deliver. Catalogue free. Kingtex Manufacturers, 83 Orchard Street, New York, N. Y.

**REDSTAR** Liniment—Corking good seller! Comes concentrated. Do own bottling. Labels free. A. Bucknam, 1219 Washington, Bath, Maine.

**"CRE-MOFF"** Cream siphon. Starts itself. Stops itself. Pays for itself. Sample 25c. Agents wanted. Dickey, Lawndale, California.

**MEXICAN** Hand made feather pictures. Send 25c (stamps) for \$1.00 worth sample and details. Mexican Art, Apartado 1593, Mexico City.

**AUTOMATIC** Paint—Forms beautiful designs on household articles. G. Cook, Box 204X, Milford, Mass.

**AMERICA'S** Greatest food bargain! Miraculous premium deals! Values that beat chain stores! Want free proof? Mail a post-card today. Kennedy Products, Inc., Kokomo, Ind.

**AGENTS**—Six purpose kitchen tool, cost dime, sells 25c. Baums Specialties, Kansas City, Mo.

**SEND** Hose size for samples and chance for \$10 daily, demonstrating sensational guaranteed hosiery for men, women, children. Full or part time. Everything furnished. Wilkmit Hosiery, Desk 374, Greenfield, Ohio.

**SELL** Our new 10c carded specialty. Needed everywhere. Sample 6c. Michigan Specialty Co., Zeeland, Mich.

**SELL**. Made to measure raincoats. Outfit free. Goodyear Rainwear, 18 West 22nd, New York.

**OPERATE** Home mail order business, selling our products. Everything furnished. Superior Specialties, Dept. 8, Springfield, Illinois.

**MAKE**—Sell your own goods! Formula catalog free. Kemico, 31, Parkridge, Ill.

**FLAVORING** Extracts—Bottle yourself! Labels, 600% profitmaking repeaters! Free offer! Thomas Manufacturing, Indianapolis, Indiana.

**SELF-THREADING** Needle packages, sample 10c. Wm. Oglesby, Vandalia, Ill.

**CARPENTERS**: Send 50 cents for our hand saw protector, three for \$1. Represent us in your territory. H. Longenecker, Greenville, Ohio.

**BIG MONEY** for you. Make, sell, printing cuts. Tremendous market. Learn quickly, amazingly easy copyrighted process. Free specimens. Hughes Products, 50 Miami, Terrace Park, Ohio.

**100% PROFIT** in the mystery cigar lighter. No flint or friction. What makes it light? No wind can blow it out. Retail 50c. Sample and sales plan 25c. New Method Company, Desk PM-16, New Method Bldg., Bradford, Pa.

**FREE** Literature describing many business plans. Belfort, 4042 No. Keeler, Chicago.

**BEAUTIFUL** Gold window sign letters. Penny each, any size! 2500% profit. Easily applied. Samples, complete working equipment free! Atlas Sign Works, 7941 Halsted, Chicago.

**MAKE** Money. Collect \$5, keep \$4. Two quick selling dollar per month "hard times" life policies. Write the Fidelity Mutual Benefit Association, Rockford, Ill.

**AGENTS**: Build additional income; 14 legitimate business enterprises; spare, full time; home, office; proved money-makers. Free booklet. Charlton, Box 6310, West Market St., Philadelphia, Pa.

**TERRITORY** Available. Ringanvalve seal stops oil pumping in ten minutes. One dollar per tube. Grawall Co., North Tonawanda, New York.

**AGENTS**:—Make \$25 week selling 45c household necessity; 125% profit. Scheff, 4949 Northwest Highway, Chicago.

**"PROFITS"** On this money maker. Every car owner sure prospect. Increases mileage. Removes carbon. Quick seller. Send 10c for free sample and sales proposition. Universal M. G. Co., Dept. P, 1441 Broadway, New York.

**SEVEN** Pack soap, pearls, ties, pens, pencils, all big sellers. Get our list. Hell Premium Co., Mork Bldg., Gaylord, Minn.

**1000 BARGAINS**—Drygoods, notions, toiletries. Agents—undersell stores. Free catalogue. Jobbers, Z-504 S. Crawford, Chicago.

**SPARE** Time earns money at home. Interested? Write Hetzel, 802 Garden, Hartford, Conn.

**AGENTS** Enormous profits! Demonstrate new automobile road light that throws a 67,000 power beam for over 1/2 of a mile. Representatives are earning upward of \$10.00 daily. Speedlight Company, Dept. 4-P, 555 W. Monroe St., Chicago, Ill.

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**SELL** Fibre flowers—Women buy on sight. Sample corsage 25 cts. Flowerart, Shreveport, La.

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**WOULD** \$1.00 An hour satisfy you? Then send me your name immediately. I'll give you a wonderful opportunity to make \$8.00 or more a day. Pleasant work. Particulars free. Albert Mills, 4512 Monmouth, Cincinnati, O.

**SOMETHING** New in fire extinguishers. Red Comet automatics. Proved in west five years. Exclusive territory. Low price opens pocketbooks. Write Red Comet, 404 Comet Building, Littleton, Colo.

**SALES** Kit free. Write for our free offer and catalog of household deals, cosmetics, extracts, etc. Make big money selling your friends and neighbors. Clyde Collins Chemical Co., Dept. PM-3, Memphis, Tenn.

**AGENTS** Wanted to sell new type ironing cords to the housewife, laundries, etc. Quick seller with a nice profit. Write for particulars. Diamond Braiding Mills, Chicago Heights, Ill.

**CASH** Paid for butterflies, insects. See Sinclair Display Advertisement on page 14A.

**SALESMEN'S** "Ideal" all-profit sideline. J. Home, 3949 Metropolitan, Chicago.

**CASH** Income daily resilvering mirrors at home. Replating autoparts, tableware, etc. Outfit furnished. Write Sprinkle, Plater, 128, Marion, Ind.

**NEW** Transparent day and night signs, 8"x14", cost 4c, retails 25c. Sample free. Clean up now! Lowy, 8 West Broadway, New York.

**300% PROFIT** Selling mystery gas lighter. Retail 25c. Costs you \$1.00 per dozen. Sample 10c. Square Deal Co., Desk PM-3, Bradford, Pa.

**AGENTS**—Distributors. Sell moth cakes, pads, crystals, bowlers. People buy millions. Fastest selling line in America. New items. Big profits. Patterson E-Co., 3705 University, Des Moines, Iowa.

**300% PROFIT** Selling new "20-in-1" kitchen utensil. Retail 25c. Costs you \$1.00 a dozen. Sample 10c. New Method Co., PM-16, Bradford, Pa.

**WE** Manufacture and distribute two fast selling articles. One a modern tire gauge. Takes pressure through side wall of tire. Write H. W. Jones & Son, Dept. G, 3833 Wilton Ave., Chicago.

**NEW** \$30.00 Value radio given in "free deal." Earn up to \$100.00 weekly. New sales plan. Meritone Mfg. Co., 3857 North Hamilton, Chicago.

**COSMETICS** Put up under your label. Samples 20c each. Asco, Bdx 1081, Washington, D. C.

**SUNBEAM** Polishing cloth tops them all! Agents make 200% profit! Send 10c for sample and free no risk offer! Malloy Mfg. Co., 129 E. Siebenthaler, Dayton, Ohio.

**DISTRIBUTORS**: Represent manufacturer. Sell Latex self-sealing bandage that breathes. Great demonstrator. Lowest prices. 400% profit. Good repeater. Exclusive territory. Neway, 3815-BT Harrison, Chicago.

**PROFITS** On your own goods. Make, sell them. Guaranteed formulas. Special prices, leads. Catalogs free. Gibson, Chemist, BD-4702 No. Racine, Chicago.

**STRANGE** Ironing cord. Prevent scorching. Saves electricity. Abolishes kinks, snarls. Approved by Good Housekeeping. For telephones also. 140% profit. Samples furnished. Neverknot, Dept. 4-A, 4503 Ravenswood, Chicago.

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**MEN** Or women! Look after local coffee and tea route. Call on homes with 300 highest quality necessities. Spare or full time. No investment. Permanent. Pay starts immediately. Bright future. Blair Laboratories, Dept. D-10, Lynchburg, Va.

**MOVALL**—New quick polish—glass, silver, etc. Distributors wanted. Murval Products, Drexel Building, Philadelphia.

**SELLS** Like hot cakes. Big profits. New laundry soapflakes. Perfumes clothes lastingly when washing. Territory given. Sunset Laboratories, Lynbrook, N. Y.

**300% PROFIT**. Buy direct from manufacturer. Moth exterminators, deodorants, insecticides, specialties, polishing cloths approved by Good Housekeeping, pure food flavors. Free samples. Shef Mfg. D. Co., Union City, N. J.

**SUCCEED** With your products. Formulas. Processes. Analytical service. Catalog free. B. Thaxly Co., Washington, D. C.

**AGENTS** Wanted—For new style piston and ring nationally advertised. All-Power Piston & Ring Co., 1001 E. First Street, Los Angeles.

**MAKE** More money selling shirts, ties, underwear, dresses, hosiery, raincoats, coveralls, pants, uniforms, play suits. Outfit free. Nimrod Company, Department 8, 4922-28 Lincoln Avenue, Chicago.

**MAKE** Products yourself. Tested formulas. Catalog free. Grinstead Laboratories, Edwardsville, Ill.

**MONEYBACK** Gas savers guarantee heat where wanted—selling them guarantees money where you want it. 20 years successful business makes selling easy. F. G. Wright, 4362 29th St., San Diego, Calif.

**AGENTS**: Smash go prices! Santos coffee 12c lb. 4-oz. vanilla 8 1/2c. \$1.00 size tonic 14c. Razor blades 5 for 8 1/2c. 100 sticks chewing gum 12c. 150 other bargains. Experience unnecessary. Write, Carnation Co., P.O. St. Louis, Mo.



**AGENTS**—Sell rich quality shoes \$2.95 up. Adams, of Calif., 90 pairs in 4 days, profit \$70.00. You can do same. Write for catalog and selling plan. Exclusive territory. Sample pair \$1.95. Avon Shoe Co., 100 Court St., Brockton, Mass.

**BURNING** Perfume candles. Sure fire quick sellers. Repeater. Particulars free. Mission, 2328 W. Pico, Los Angeles, Calif.

**MAN** in each town to plate auto parts, reflectors, bathroom fixtures, refinish beds, mirrors, chandeliers; by new method. No capital or experience required. Simple plan of manufacturing at home starts you in big money-making business. Outfit furnished. Free particulars and proofs. Gun Metal Co., Ave. H, Decatur, Ill.

**WHY** Sell goods with stingy profits? Make today's most profitable, biggest-selling specialties yourself. Have 1934 your best year. Valuable information free! Miller, Chemist, 1707-APM, Tampa, Fla.

**BIG** Money and fast sales. Every owner buys gold initials for his auto. You charge \$1.50; make \$1.45. Ten orders daily easy. Write for particulars and free sample. American Monogram Company, Dept. 40, East Orange, N. J.

**BIG** Money applying gold initials on automobiles. Easiest thing today. No experience needed. Free samples. "Raico," 1084 Washington, Boston, Mass.

**AGENTS**—Opportunity to make money; book containing 87 successful business plans; home or office; send for free introductory booklet. Elite Co., 214 Grand St., New York.

**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.

**AMAZING** Cleaner. Cleans everything. Sample free. Bestever, 5007P Irving Park, Chicago.

**A BUSINESS** Of your own making sparkling glass name plates, numbers, checkerboards, medallions, signs. Booklet and sample mailed free. E. Palmer, 512, Wooster, Ohio.

**SOMETHING** New, electric bulb attachment perfumes home. Purifies air. Destroys cooking odors. Attractive package. Quick seller. Sample 25c. Werner Mfg. Co., 172 Court St., Brooklyn, N. Y.

**FREE** Booklet describes 87 plans for making \$20-\$100 weekly, in home or office, business of your own. Elite Co., 214 Grand St., New York.

**MAKE** Your own products. Employ agents yourself. Toilet articles, soap, extracts. We furnish everything. Valuable book free. National Scientific Laboratories, 1950W Broad, Richmond, Va.

**PROFITABLE** Home business. Legitimate. No canvassing. Maywood Publishers, P-923 Broadway, New York.

**GENUINE** Gold letters for store windows. Easily applied. Free samples. Liberal offer to general agents. Metallic Letter Co., 438-B North Clark, Chicago.

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**MEN** Wanted: Permanent, steady cash income up to \$15.00 a day offered in the fourth largest industry in the world. Service business and professional men with necessities they need and must have. Startling low prices save buyers up to 200% to 300% and bring you flood of orders. You get your pay in advance. Repeat orders pyramid your profits. Master sales portfolio furnished makes previous experience unnecessary. No house to house canvassing, peddling or delivery work. No capital needed now or ever. Nothing for you to buy. No stock to carry. Rush name for complete information. Kaeser & Blair, Inc., Dent, 514, Cincinnati, Ohio.

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**SELL** Men's neckwear. Profitable proposition. Michael Cravats, 33-P Union Square, New York.

**SPONGES** And chamois. All kinds, lowest prices. Sells everyday. Remick, 804 S. Figueroa, Los Angeles.

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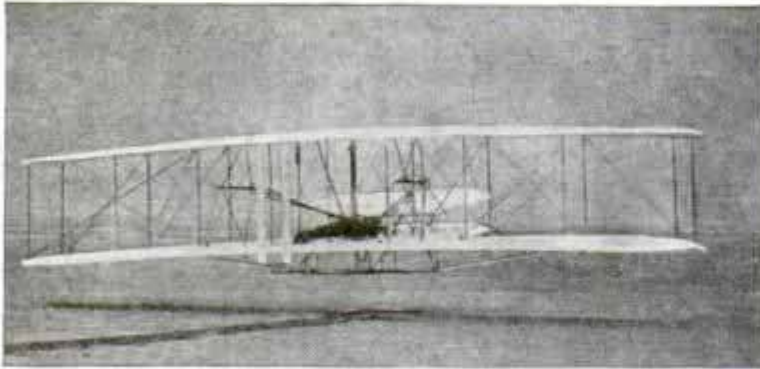
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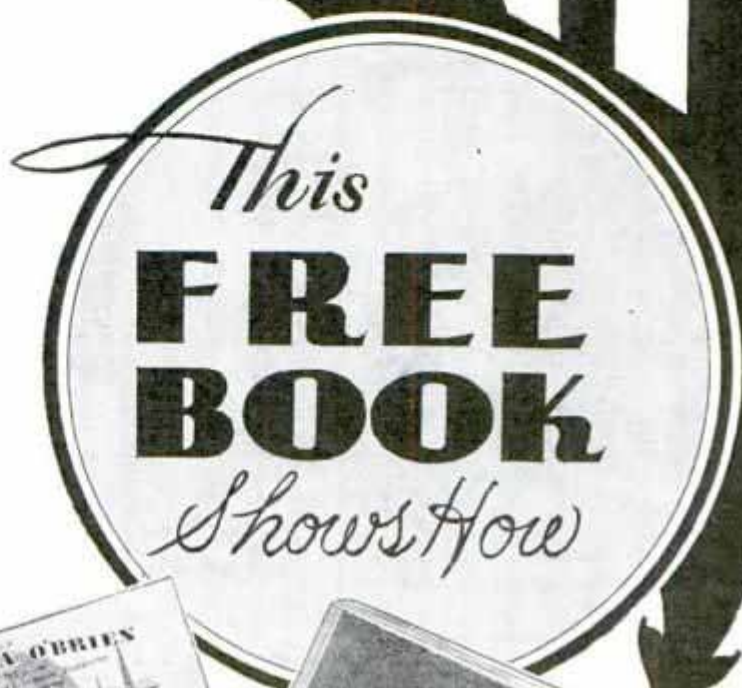
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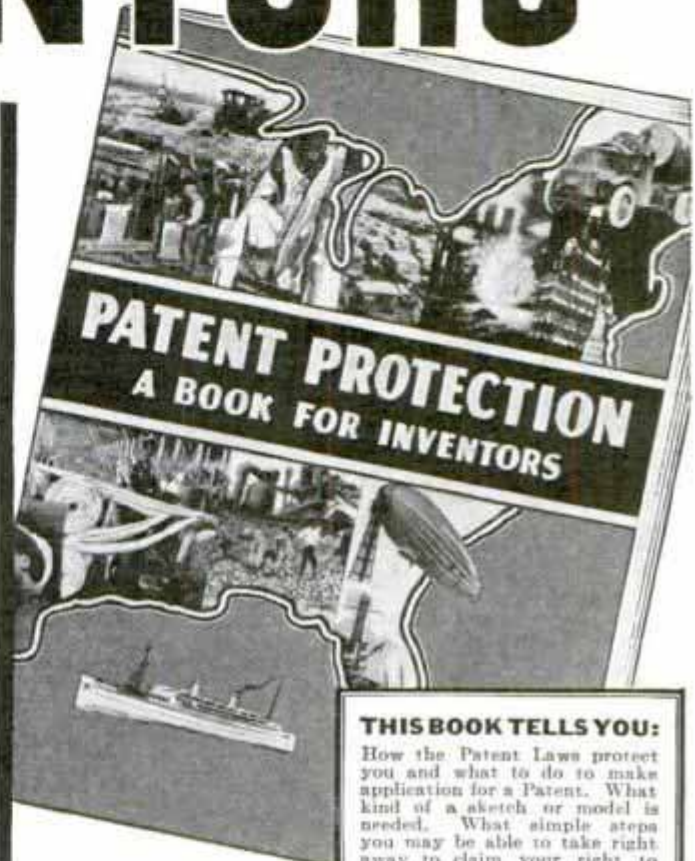
SOME of the world's best inventions came from men who didn't consider themselves inventors at all. The telegraph was invented by a painter, the typewriter by a farmer; a bank clerk the hand camera, a dentist the stock ticker. Or look at small inventions. A husband noticed his wife bending a hair pin to make it stay put. That gave him the idea of the crinkly hair pin. One day a golfer got the idea to make a wooden tee. Now wooden tees are sold by the millions every year. There are many similar examples in inventive history. That is why we say that the book shown here is for INVENTORS and Other Men with IDEAS. Whether you consider yourself an inventor or not—if you have an idea that will make money, save time, save labor, or give pleasure—you should find out how you can protect your rights to it. And this interesting, FREE book, PATENT PROTECTION, will tell you.

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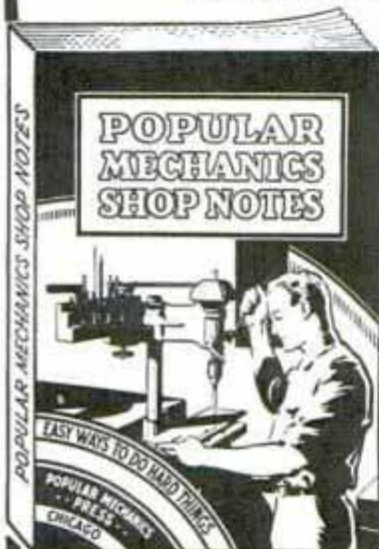
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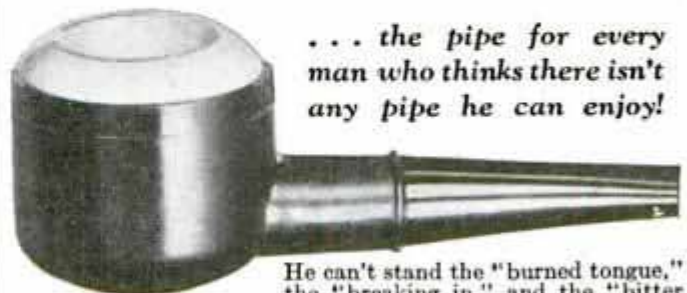
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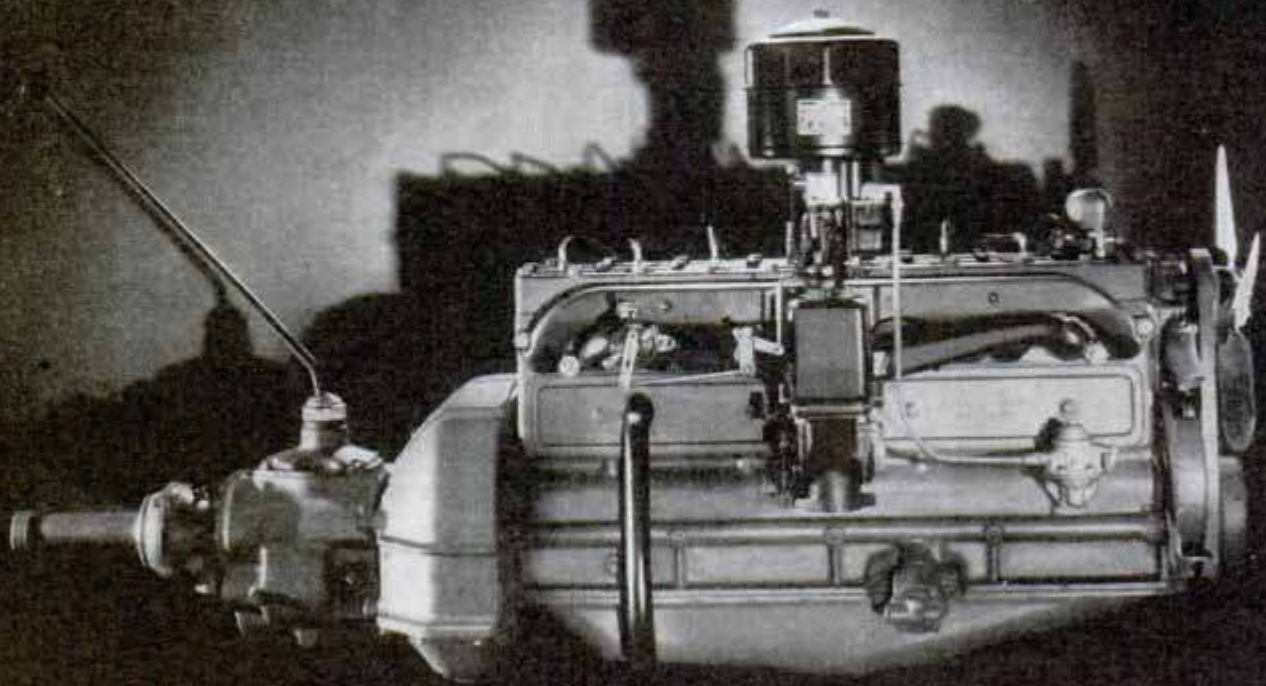
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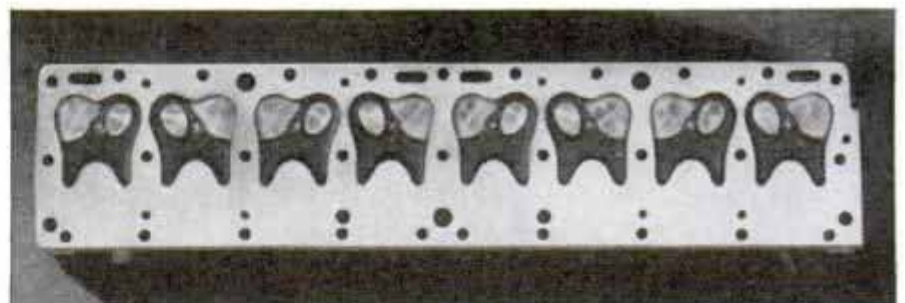
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## PONTIAC STRAIGHT EIGHT ENGINE

*Develops Greater Power . . .  
Delivers More Speed . . .  
Burns Less Gas Per Mile*

Last year's Pontiac motor was noted for its smoothness . . . its power, speed and economy. The power plant of the 1934 Pontiac, thanks to many engineering refinements, surpasses even its famous predecessor. Power has been stepped up to 84 h.p. . . . speed increased to 82 m.p.h. . . . yet the amazing Pontiac engine gives more miles to the gallon by a generous 10 per cent. As to *smoothness*, a prominent engineer states, "If you want more *smoothness* than you get in the Pontiac Straight Eight engine, you've got to go to a motor of more cylinders."



*New High Compression Head, Shown Above, Increases Engine Efficiency . . .*

The 1934 Pontiac engine uses a new and improved type of General Motors Research cylinder head with a compression ratio of 6.2 to 1. Directly above each valve, in the combustion chamber, is a metal boss or button. This cuts down the clearance space above the valves and brings the valve heads closer to the cooled roof of the combustion

chamber. The major advantages of this cylinder head design are: a smoother and less restricted flow of incoming and outgoing gases in the combustion chamber, and also cooler valves. The extra water-cooled surface in the combustion chamber adds enough cooling effect to permit the use of a higher compression ratio (6.2) without necessitating the use of premium-priced, anti-knock fuels.

*At Left—New Vacuumatic Spark Control and Gaselector*

Credit for much of Pontiac's new fuel economy goes to its new system of controlling the spark (see device at right of distributor) by a vacuum created by the suction of the engine. This new method unerringly advances or retards the spark to obtain maximum power from minimum fuel at all speeds and loads. It responds *instantly* to the ever-varying requirements set up by the throttle. . . . The Gaselector, shown just below the distributor, permits setting the spark to obtain maximum efficiency from whatever grade of fuel is used. . . . Pontiac Motor Company, Pontiac, Michigan.

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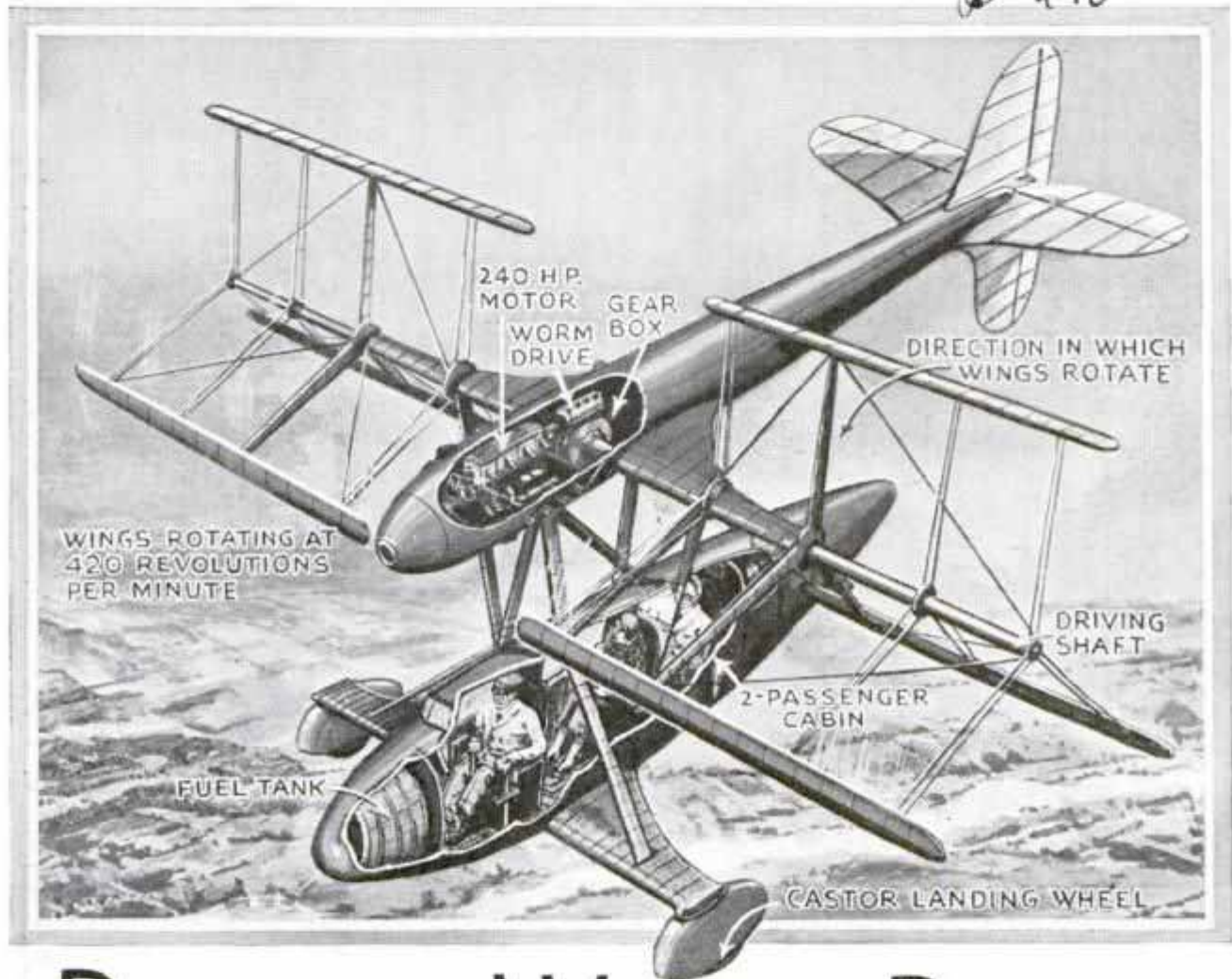
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WRITTEN SO YOU CAN UNDERSTAND IT

Vol. 61

APRIL, 1934

No. 4



## PADDLE-WHEEL PLANE *to fly* BACKWARD

*Cyclogiro*

AN airplane with revolving wings, like the blades of a paddle-wheel boat, is being built in Germany under the direction of Dr. Adolf K. Rohrbach, noted aircraft designer, who claims this revolutionary ship will be able to fly backward as well as forward, to hover motionless in the air and to ascend or descend vertically.

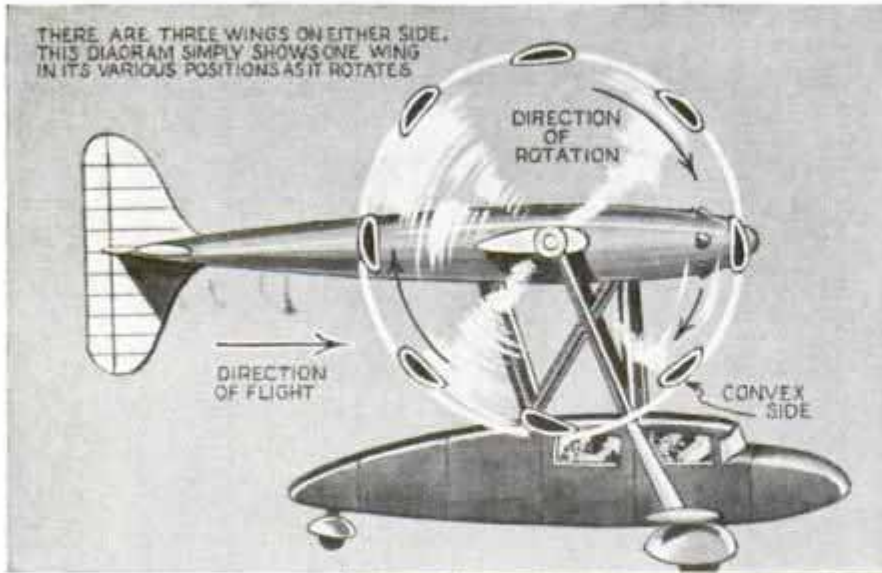
There are three wings on either side

*see June 1933 P. 833*

which are rotated around a central axis at 420 revolutions per minute by a 240-horsepower motor placed in a separate housing above the main fuselage. The narrow, rotating wings can be controlled by a lever in the cabin to give the craft forward, backward or hovering flight by changing the angle at which the wings move through the air. By manipulating the wing-control

*Rohrbach Works, Berlin 2.65*





ated very much like the gear-shift lever of an automobile.

When giving lift and forward motion, the wing at the top of its rotation revolves into the wind and has a high velocity which gives lifting force. When it has revolved one-fourth of the distance from the top the angle is changed by automatic gearing to give it forward propelling force.

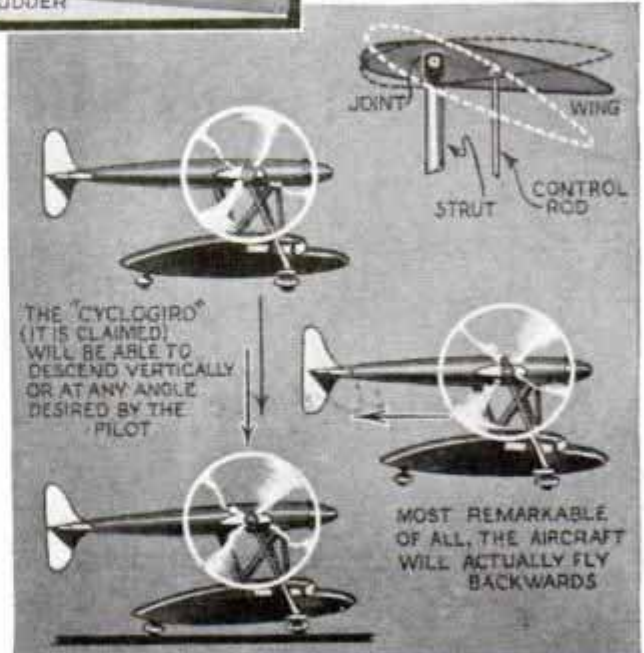
At the half-way mark it is again moved so that there is a lifting force on its convex side, and at the three-quarter point the angle is such that it offers minimum resistance to the air until it completes the revolution and comes back to its original position. Pedals controlling the rudder are also connected to the wing control gear.

lever, the machine can be lifted and moved forward at the same time, lifted and moved backward simultaneously, or merely lifted without forward or backward motion.

The craft, known as a "cyclogiro," carries a pilot and two passengers and the eight-cylinder, air-cooled engine operates the rotating wings through a worm drive. The plane is equipped with caster-type landing wheels so that, regardless of how it lands, the wheels turn to the correct position on grounding. In addition to being able to rise or descend vertically, it is also claimed that the pilot, with his engine shut off, can glide for 8,000 feet from an altitude of 1,000 feet to make an emergency landing.

Turning is accomplished by a sidewise movement of the wing-control lever, which gives an increased lift on one side and banks the craft. Pushing a pedal on the same side gives a greater forward force on the raised wing and completes the turn.

When the lever is set in any of the three positions, the leading edges of the wings change their angles of incidence automatically with each rotation, a shift of the lever causing an alteration of this automatic feature. The lever itself is oper-



Photos Courtesy Illustrated London News  
 Top, Position of Wing When Giving Lift and Forward Speed; Center, Control Lever for Changing Angle of Wings; Below, Diagram Shows Easy Maneuverability



**ICE YACHT LIKE ZEPPELIN HAS STREAMLINED HULL**

Germany, home of the Zeppelin, has produced an ice glider with a hull designed like a dirigible as the latest construction of an ice yacht. It was found that the streamline design was as effective in decreasing wind resistance for the ice boat at high speed as it was for the aircraft.

**BIRD-FOOD DISPENSER AIDS IN FEEDING**

One of the public parks in Hamburg, Germany, which is frequented by both birds and bird lovers, is equipped with coin-in-the-slot machines dispensing bird seed. The vending machines, the first of the kind in Germany, were installed when many persons expressed a desire to study and observe the birds at close range while others wanted to feed the birds, but did not want to be bothered with carrying food to the park. When a coin is inserted in the machine, a bag containing various seeds drops out.



*at Rangedorfer  
Ice Regatta*

*Germany*

*Wide World*

Ice Glider with Hull Like a Dirigible to Decrease Wind Resistance

**FOG DISKS ON CAR LAMPS AID DRIVER IN MIST**

Disks of translucent amber-colored paper are being used in England to aid the driver in night fogs. Placed over the lenses of the auto headlamps, the disks serve to reduce reflection of the headlamp beam into the driver's eyes. This reflection often is strong enough to prevent the motorist from seeing obstacles that may be in his path. The disks may be cut to fit any headlamp. A cross of adhesive gum or glue on the reverse side enables the driver to apply the disk to the headlamp glass quickly.



Children Obtaining Sacks of Bird Food from a Vending Machine

☐ The banana "tree" is said to be really an herb.

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*D 129  
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Frank Schroder  
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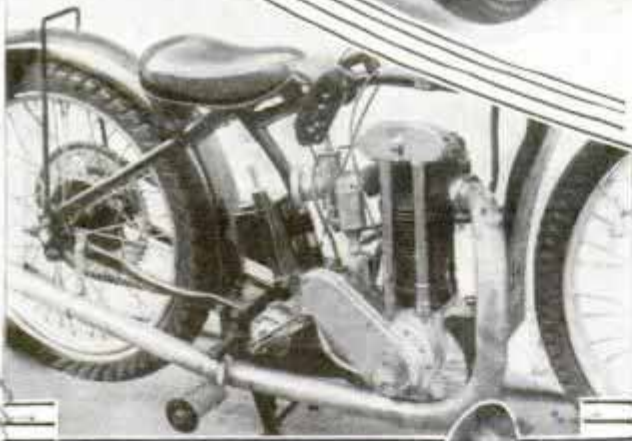
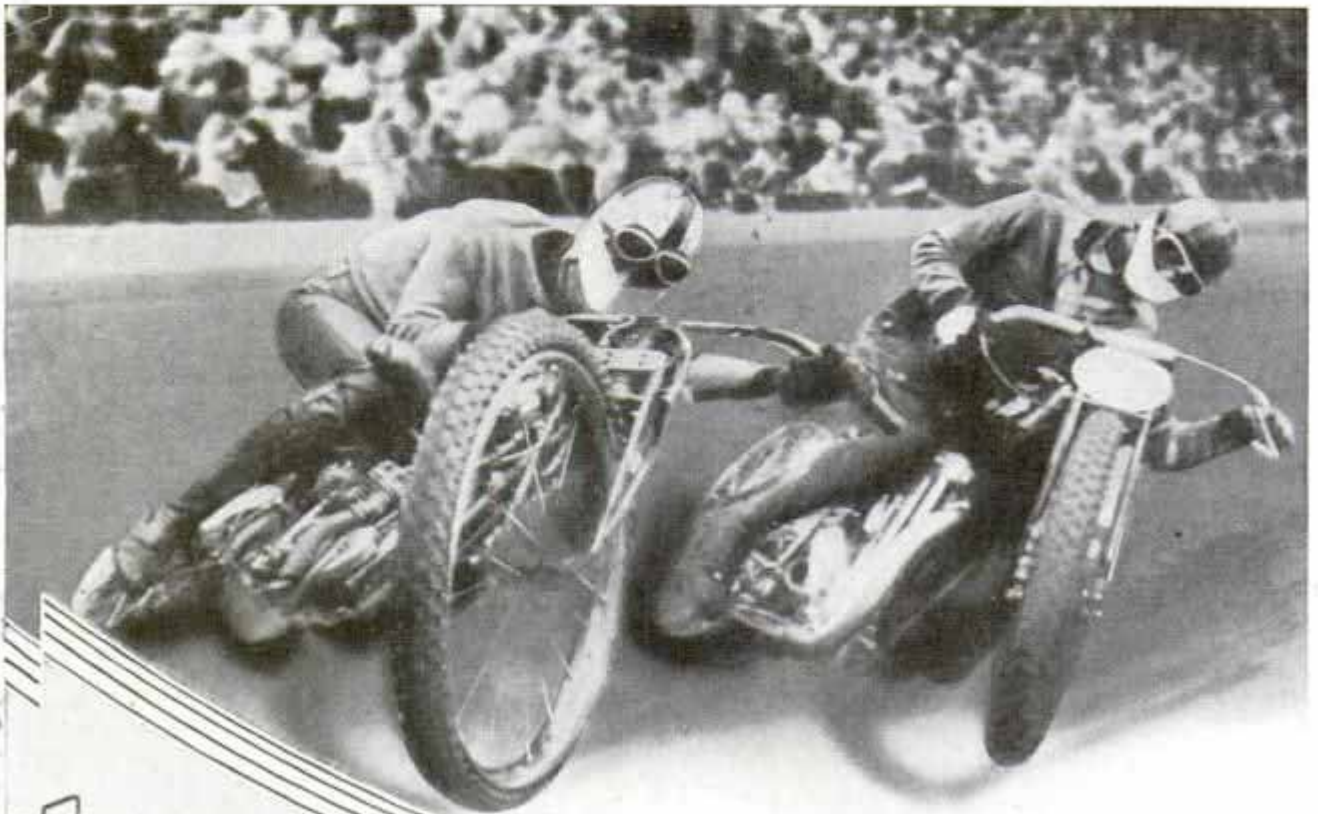
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# "Broadsiding"---the Latest Speed



Motorcycle riders and fans alike have found a new thrill in flat-track racing over a one-fifth mile course without inclined banks on either curves or straightaway, the riders relying on their skill and judgment, rather than artificial aids, to keep themselves and their mounts right side up. The "motoway" is thirty feet wide on the



Top, "Broadsiding" Close-Up; Note the Crash Helmets; Center, Typical Flat-Track Racing Machine; Bottom, a Spill at a Turn

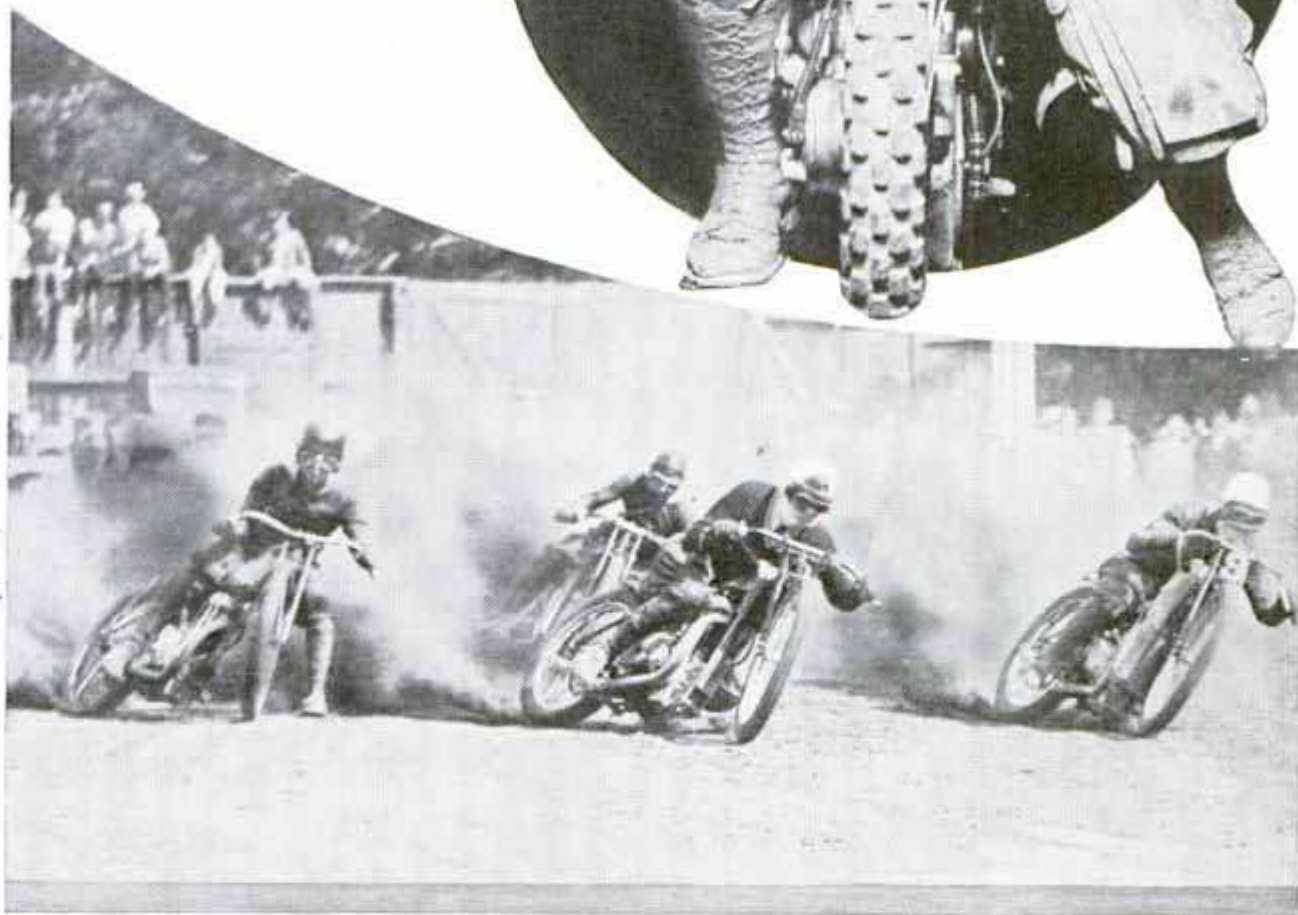
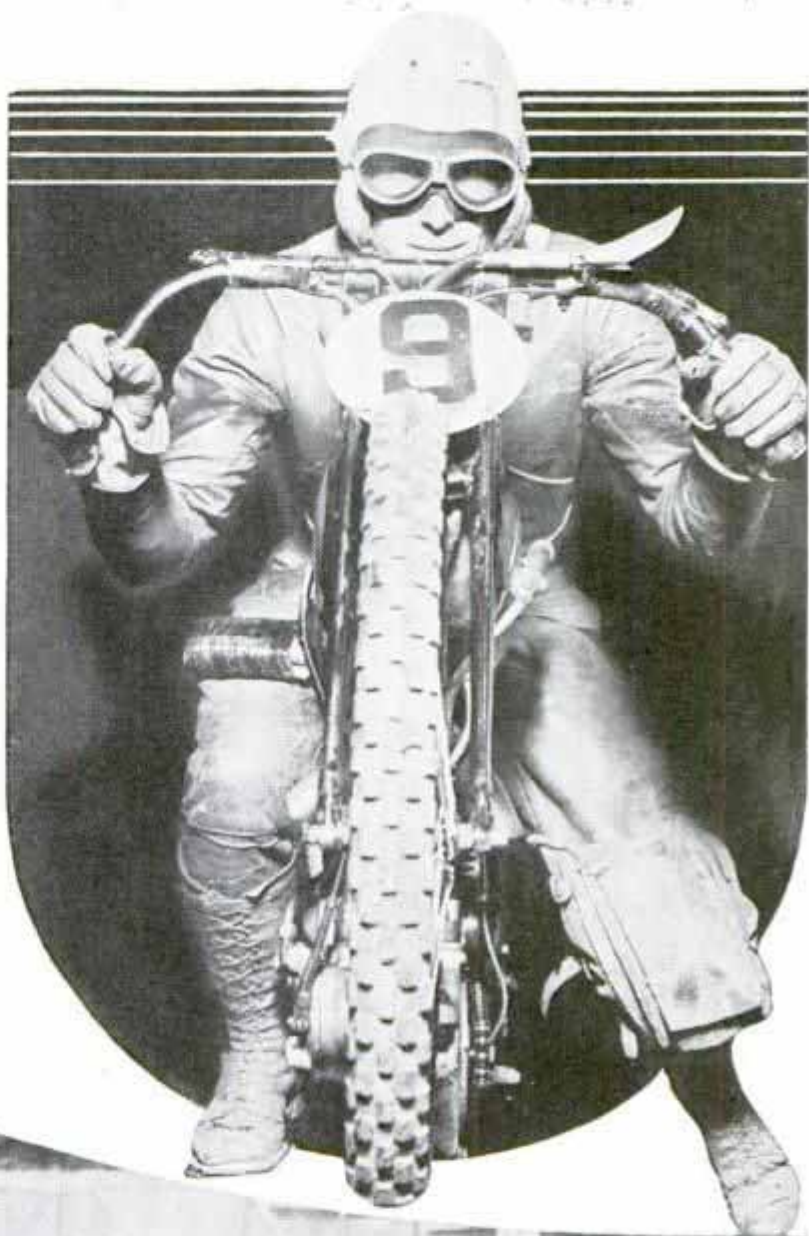
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# Thrill for Motorcycle Fans

straight and a maximum of forty feet at the turns which are built to triple radius arcs, so the rider must jockey his machine carefully on curves instead of turning a wheel to a set angle. The riders wear crash helmets, padded suits, heavy gloves, goggles, and handkerchiefs bound over mouth and nose. Some riders wear knee pads and others iron-soled left shoes to skid along the ground. "Broadsiding," the purposeful skidding of the rear wheel toward the outside at curves in order to "bend" the machine around the turn, is the high hazard of flat-track racing. The two wheels of a broadsiding machine are never in line in the turns, thus lending a startlingly "impossible" aspect to the jockeying of the rider.



Top, Dressed for the Flat-Track; Note Skid-Pad Worn on Left Knee; Bottom, Rider at Left Is Demonstrating Iron-Shoe Way of Skidding

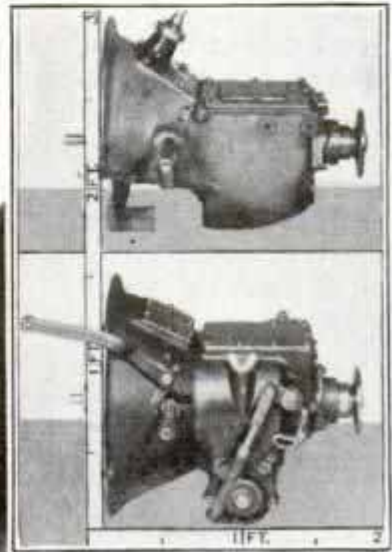


# Automatic Drive Gives Full Control of Auto

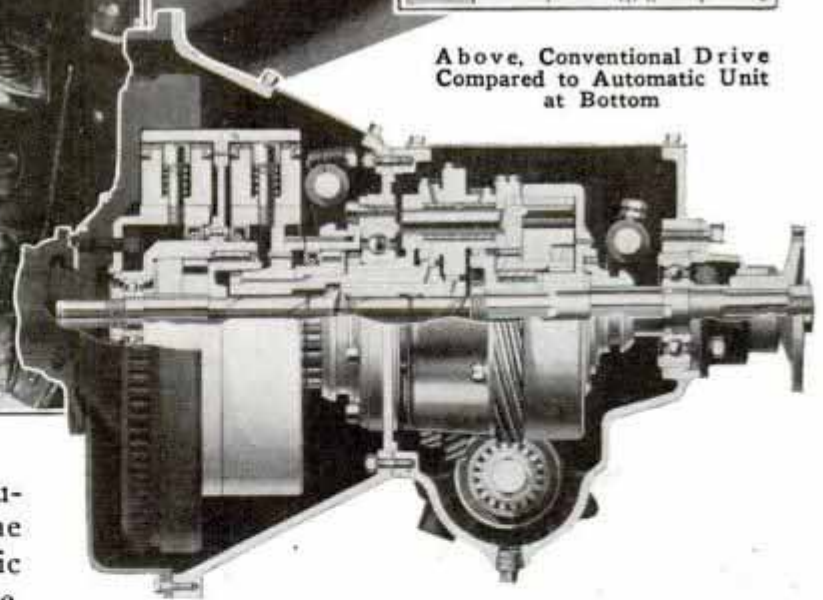
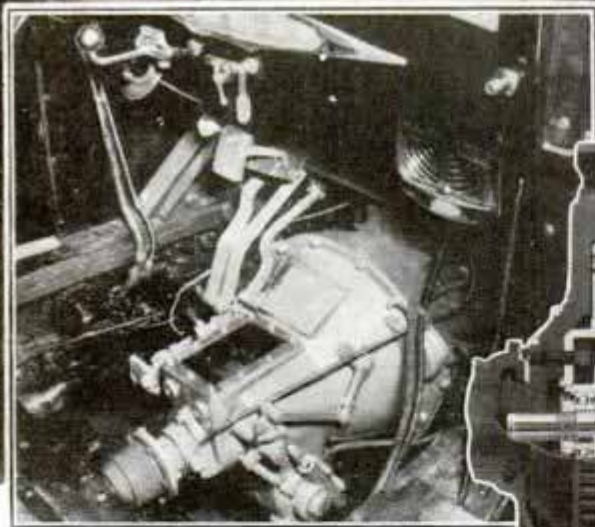
*mono-drive*

ten and fifty miles per hour by lifting the foot from the accelerator. All shifts are noiseless. A special second-gear clutch on the floor of the car permits the driver to change back to second gear from high at any car speed up to fifty miles per hour. The car may be locked in second gear for positive driving down hill. In heavy traffic, the car may be driven as slowly

*New Products Corp.  
1822 S. Wabash Ave. Chicago*



Above, Conventional Drive Compared to Automatic Unit at Bottom



Top, Left, Car without Gear Lever; Bottom, Left, Floorboard Removed; Bottom, Right, Cross-Section View of Automatic Drive

Complete mastery over the automobile is made possible for the driver by means of an automatic transmission unit, the mono-drive. Foot-clutch pedal and hand gear-shift lever are eliminated, the transmission being controlled by the accelerator pedal. The start is made in low gear, with the shift to second gear at ten to fifteen miles per hour when the driver lifts his foot from the accelerator. The car remains in second gear as long as the accelerator is pressed down, then the shift to high may be made at any speed between

as five miles per hour in high gear. The automatic clutch is not subject to slippage. Smooth starting is a feature, the transmission being jerk-proof. A manual control is provided for reversing the car or for operation if the automatic drive should fail. In a test automobile, the transmission has been used for 75,000 miles.

*See Sec 19 37-896.  
June 19 37*



# Magic Paper Makes 'Photograph' of Drawing

Drawings on tracing paper or silhouettes of any material may be "photographed" by means of reproducing materials in a small kit. Camera, negatives, darkroom and developing solutions are not used in the work. Sensitized or "magic" paper is placed on a flat surface with the stencil or tracing paper over it, the whole being covered with a glass printing frame. Exposure to some light source for a few minutes causes transfer of the drawing or silhouette to the paper. To develop, the exposed paper is placed in an inverted water glass with a small bottle, which contains ammonia and which is a part of the kit. Fumes from the open bottle cause the paper to develop. When the desired color and detail have been reached, the print is removed. The longer the print is allowed to develop, the darker it will be.



Top, Steps in Transferring Drawings or Silhouettes by Means of "Magic" Paper; Bottom Strip, Some Examples of the Work

## Portable Tester for Auto Brakes Shows Defects Quickly

Speeding up brake tests, a portable machine is applied to each wheel in turn. The wheel of the auto or truck is jacked up



Brake Tester Shown in Place on Wheel: It Gives Quick Checkup on Condition of the Brakes

and the brake lever is depressed one-fourth down. Then the three metal arms of the tester are placed over the tire and an anchor rod is run from the center of the machine to the ground to prevent the tester from turning. A hand lever is revolved, causing the wheel to turn forward until the brake sets, the amount of resistance at this point being automatically registered on paper inserted behind a stylus. The record also reveals defects. After the test, the slip of paper may be pasted to the windshield for examination by municipal or state highway policemen.

Coal was first discovered and used in Manchuria 3,000 years ago.

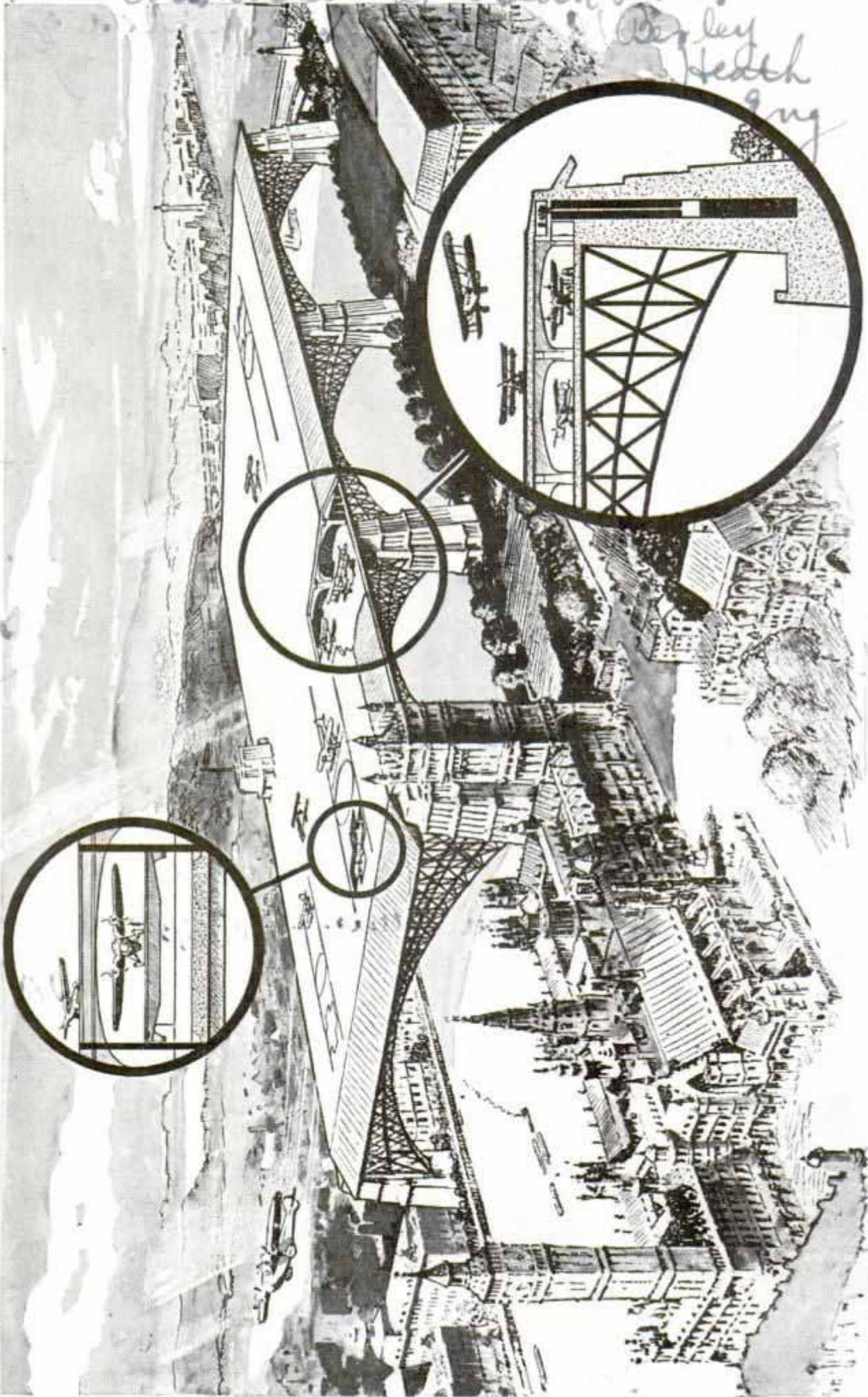
*do not answer letters. 10/25/55*  
*Little Swan Products Inc.*  
*1530*

*The Photo. ... Chicago*  
*Eric Spencers Supply Co.*  
*12-10-55*



14

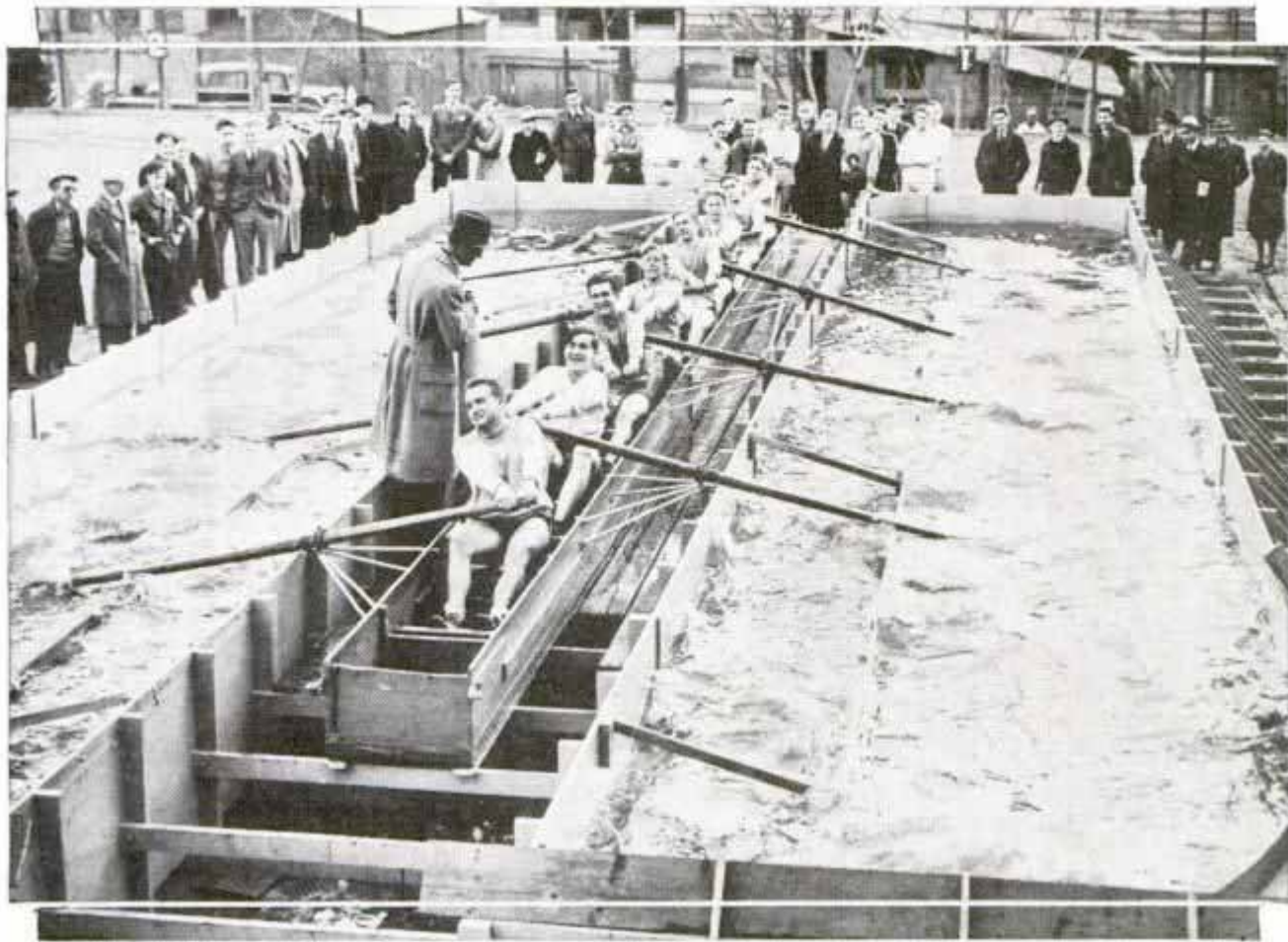
Capt. H. J. Williams  
Columberie 29 Bean Road  
Berkley  
Hedge  
ny



Courtesy London Evening News  
 Sketches of Air-drome Proposed for Construction over the Thames River in London Show How It Would Be Supported by Giant Towers; Cross-Section Views in Circles Reveal Plan for Hangar under the Landing Platform; Air Liners Would Be Prepared for Flights to the Continent in This Hangar; Elevators Would Carry Passengers to and from the Air-drome



# Racing Oarsmen Trained in Outdoor Tank



© International News  
Candidates for College Crew Are Shown Pulling on Their Oars in Outdoor Training Tank

Candidates for the Columbia University crew are trained in an outdoor tank before the time arrives for their racing boats to be placed in the Harlem river. Constructed of wood and canvas, the tank has a dummy racing boat extending from one side to the other. On either side of the boat is water. Candidates seated in the dummy racing craft pull on their oars as they would if training in real boats, but they make no actual progress because their boat is stationary. Thus, the oarsmen may learn much about uniformity of stroke and other fundamentals of racing before they step into the shells down on the river.

chased by Prof. Harvey H. Nininger, curator of meteorites of the Colorado museum of natural history. On analysis the meteorite was found to contain gold worth forty cents. Many gold mines produce ore less rich, and mine it at a profit.

*D 150 Silver Colo*  
**SEAL FOR AUTO WATER PUMPS  
MAKES PERMANENT REPAIR**

Leaks in the automobile water pump may be repaired permanently by means of

*\$ 1.50*



a seal that makes replacement of the old shaft unnecessary. The seal is installed by removing the old packing nut, pushing out the pump

shaft, screwing in the seal to the pump housing and pushing back the shaft. The seal is not affected by anti-freeze compounds.

## GOLD FROM THE SKY *D 201*

Gold has fallen from the sky on at least one occasion. Proof of this is offered by a meteorite which fell in New Mexico many years ago. A farmer plowed up the sixty-eight pound "stone" which was pur-

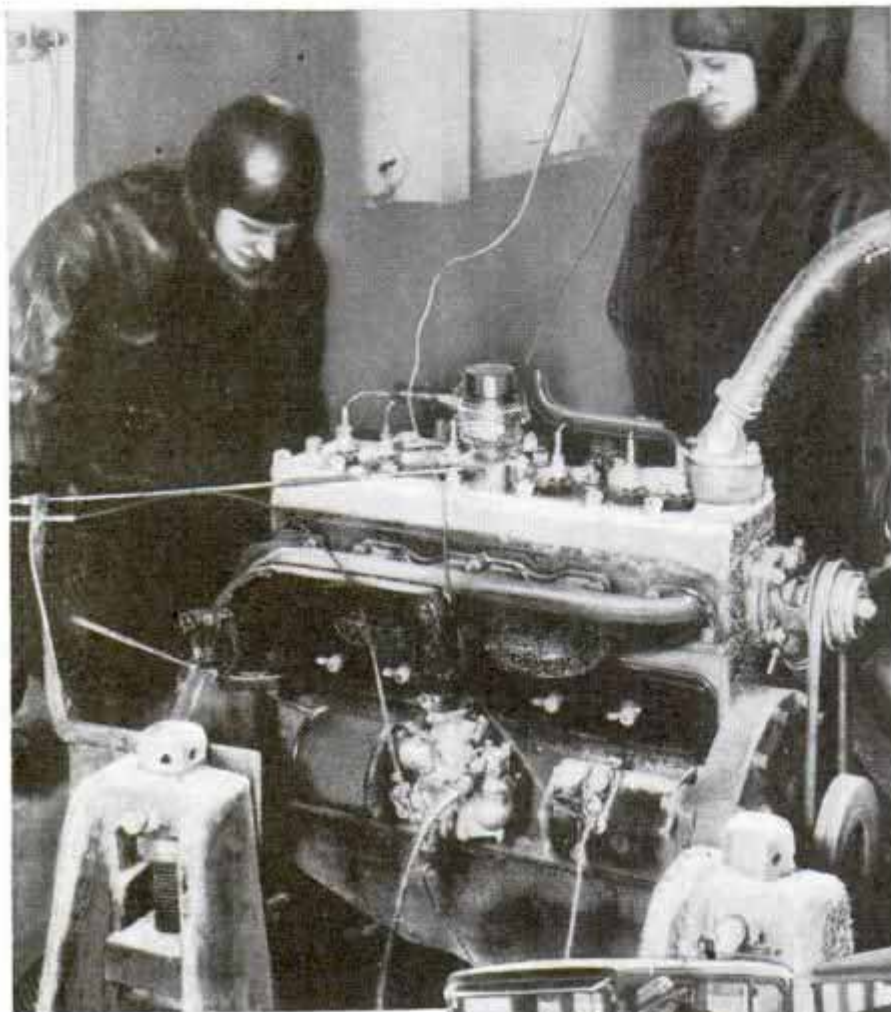
*Con. Frank C. Cross  
1114*

*The Simmons Mfg. Co.  
3405 Park Ave*



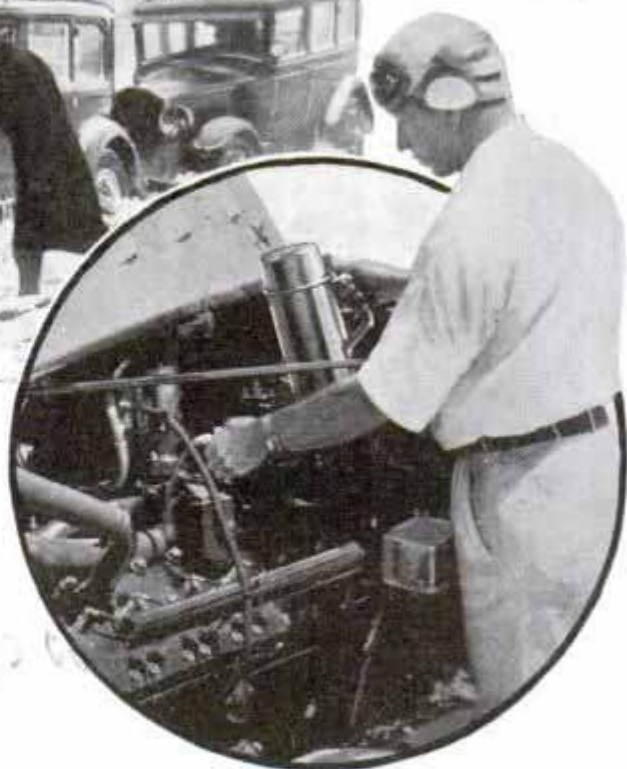
6 Packers 6 150 Normal 2200  
Chicago  
C1995

# WATCH YOUR OIL



could run so smoothly and that it could be started so easily on cold mornings. No more heavy oil for my car—winter or summer.”

This driver discovered only two things about light oil. Continued operation will show him that it will lubricate his engine as efficiently in warm weather as in cold, that it will increase gasoline mileage and that it will increase engine power and car speed. His oil consumption will be slightly more and he must check the oil level more frequently but his saving on gasoline will more than offset the expense



By JULIAN LEGGETT.

**E**ARLY in 1934, a midwestern driver decided to change the oil in his automobile engine. At the suggestion of the gasoline station attendant, he filled the crankcase with one of the new light-bodied oils recommended for winter use. After a week's driving in weather ranging from forty-five degrees above zero to ten below, this was his comment:

“I never knew before that my motor

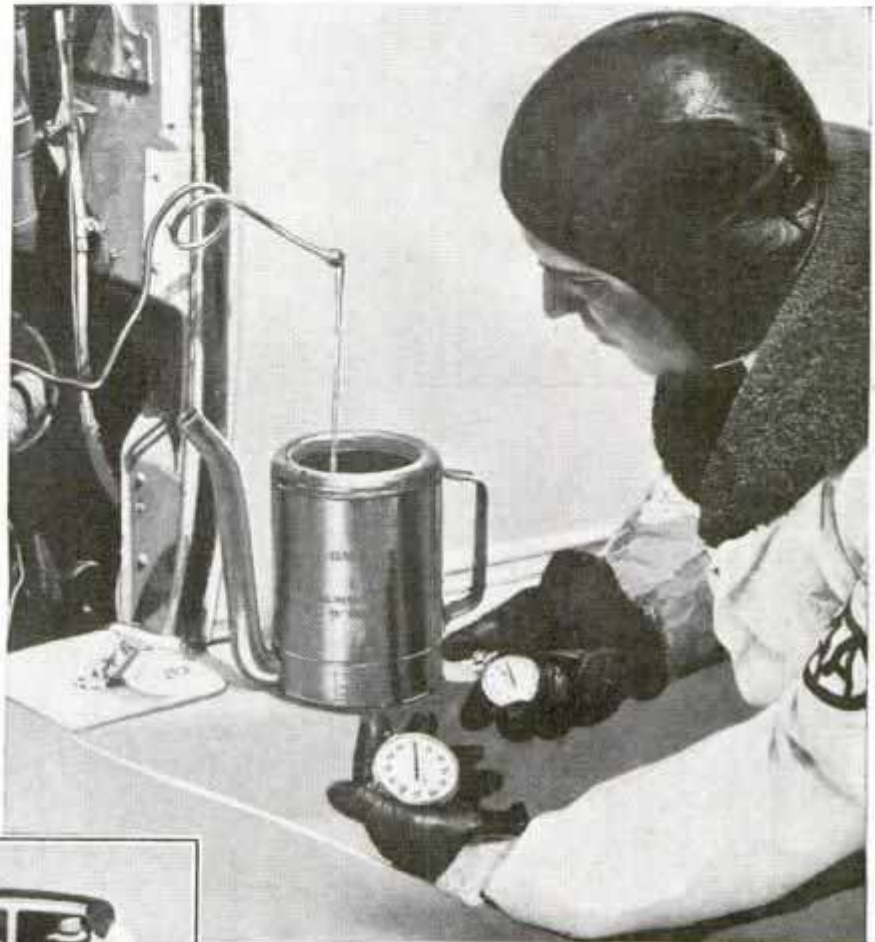
Top, Testing Engine Starting in “Cold Room”; Center, “Can’t Start”; Bottom, Light Oil for Racing



©1995

# and Save MONEY!

and trouble. Lubrication experts have found that light oils circulate more freely and penetrate to parts of the motor which heavy lubricants cannot reach. Bearings do not burn and pistons do not "seize" because the oil is too thin. Repair records for several years fail to show a single instance of a burned bearing traceable to the use of too light an oil. On the other hand, there are numerous cases of damage resulting from the failure of heavy oil to lubricate certain parts of the motor, particularly in cool or cold



Top, Checking Cold-Weather Properties of Oil; Bottom, Oil Test Car Atop Pikes Peak

weather. In this connection, the majority of "can't start" cases in cold weather can be traced to the use of too heavy an oil in the crankcase.

When winter comes, three things happen that make engine starting difficult: battery output is decreased, thus reducing cranking speed and ignition efficiency; fuel vaporization is retarded, making it more difficult to get a satisfactory mixture for starting, and the viscosity of the oil is increased, reducing cranking speed. The increase in viscosity of oil is simply the

thickening that occurs at low temperatures. All liquids increase in viscosity as the temperature is lowered.

The cranking speed of the engine, other things being equal, is dependent upon the viscosity of the oil at the starting temperature. If the oil is too heavy, it may be impossible to start because of the dragging effect of the oil on all the working parts. In the search for oils that would permit easier starting in winter, experts conducted numerous tests in Canada, in the "cold rooms" of automobile factories and in the northern districts of the United States. The result of these tests is the recommendation that two new winter oils, known as 20-W and 10-W, be used.

Many automobile manufacturers are recommending 20-W for use down to zero and 10-W for use in temperatures down to fifteen below zero. For colder weather 10-W is diluted with kerosene. Many tests made with dilution far in excess of the av-

*made by practically all refiners.*





approximately three miles per hour and lubricating the engine thoroughly.

Oil consumption increases if the viscosity of the oil is decreased, but usually to a less extent than is generally expected. It is dependent largely upon speed of driving. For example, road tests comparing winter grades of oil with heavy summer grades show that the difference in oil consumption is no more than that obtained by reducing driving speed from three to ten miles per hour at high speed. Sometime ago, thirteen automobiles tested on a

(Continued to page 134A)

average amount present under ordinary driving conditions have failed to show an increase in the rate of piston or cylinder wall wear.

What is needed is an oil that will allow a healthy battery to spin the engine freely. A good rule for all the year, but particularly for winter is "if in doubt as to which oil to use, use the lighter one." Sudden changes in temperature make it imperative that these light oils protect the engine parts in warmer weather than zero or below, because the automobile owner cannot change his oil every time the weather changes. To prove the efficiency of light oils at all temperatures, 20-W and 10-W were used in autos driven at high speed at eighty degrees. Motors performed efficiently, producing more power and speed without using as much gasoline. There was a slight increase in the amount of oil consumed.

During a record-breaking run in a Pierce-Arrow special using light oil, 20-W, Ab Jenkins drove 3,000 miles at an average of 118 miles per hour in twenty-five and one-half hours. The temperature was above 100 degrees most of the time, yet the light oil did its job well, increasing the top speed

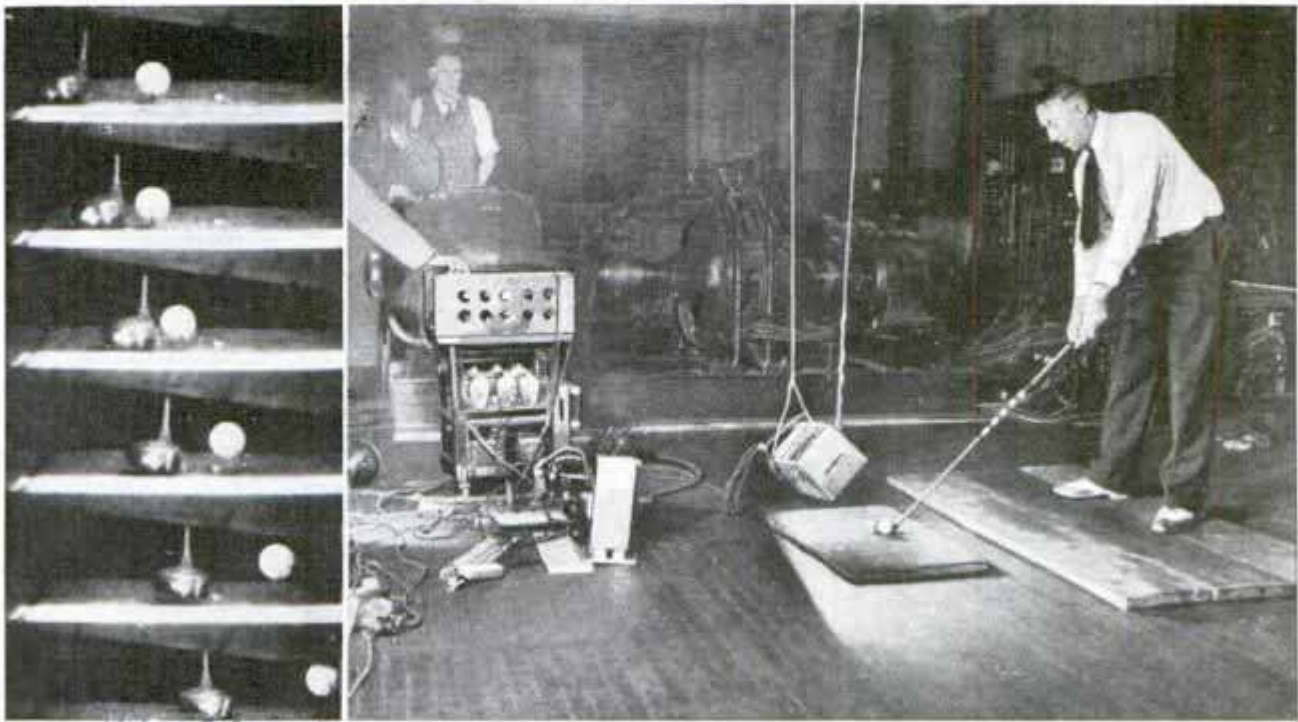


Top, Loaded Truck Tests Light Oil; Center, Viscosity Test; Bottom, Timing Starting Below Zero



D115

# Fast Camera Shows Velocity of Golf Ball



Left, Strip of Photos Shows Club Starting Golf Ball on Its Flight; Right, Photographing the Drive

How fast does a golf ball travel? The question has been answered by scientists of the Massachusetts Institute of Technology with the aid of a high-speed movie camera which snaps pictures at the rate of 960 a second. Pictures of a golf ball in motion showed that a hard-hit ball may reach a speed of 136 miles per hour. A study of the mechanics of a golf stroke also indicated that the longest drives are made when the ball is hit just after the start of the up stroke.

zle, the wax being melted as electricity is applied to wires within the nozzle. The sealing machine is small enough to be operated with one hand.

*Cambridge, Mass*

## BATTERY CAP WITH TESTER SHOWS WATER LEVEL



Measurement of the water level in the automobile storage battery is made easy by a combined filler cap and tester. A plunger in the cap suspends a float. The passage in which the plunger rests is large enough to permit the necessary escape of gases and at the same time give the plunger free play. A little red cap on the plunger is discernible when level with the battery cap. If it is not in sight, the battery needs water. As the water is added, the float rises gradually and when there is sufficient, the red cap is exactly level with the battery cap.

## WAX HEATED BY ELECTRICITY IN SEALING MACHINE

Disks of wax are heated by electricity and discharged through a nozzle in a fine stream for sealing letters and packages in a machine for use in the home or office.

The wax disks are stored in a chamber within the sealing machine, with a spring forcing them against the closed end of the chamber and directly above the discharge nozzle. An ejector engages one disk at a time and forces it into the nozzle.



*Es. Chevassus*

*D133 Chevassus Russ. Bldg.*

*#1920, 629*

*8/13/3*

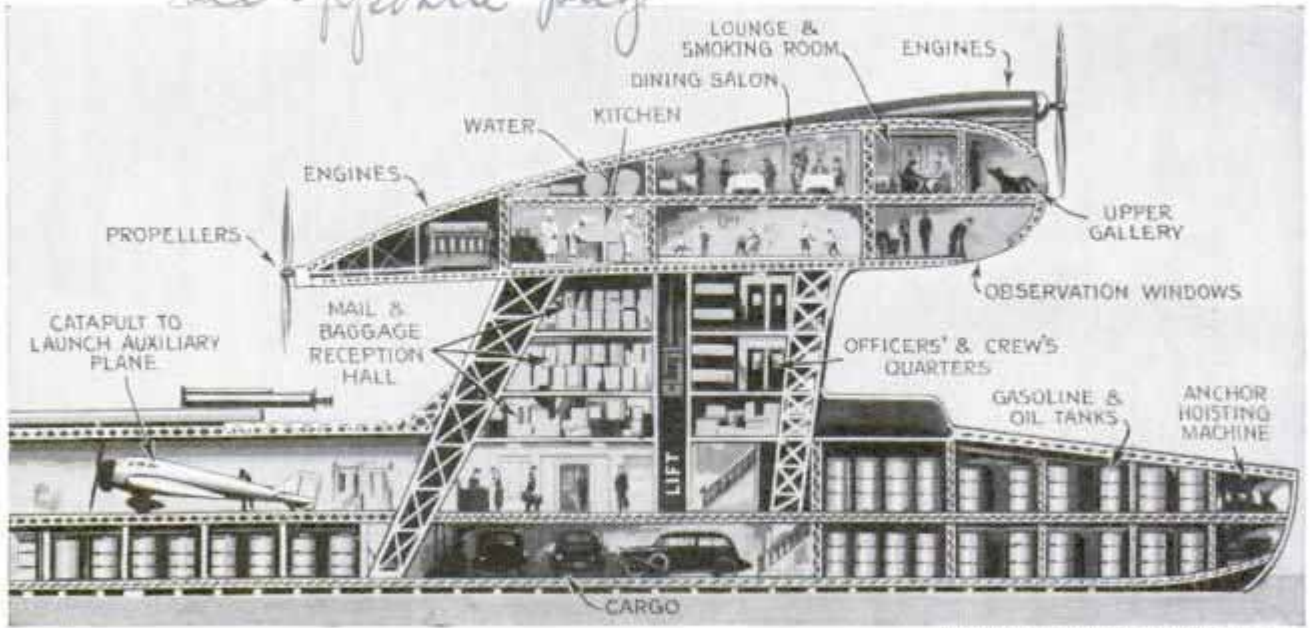
*Es. Chevassus, Russ. Bldg.*

*B. L. Esoprich Rubber Co. Akron, Ohio*



# Aircraft of Future Visioned as Flying Ocean

*See opposite page*



Cross-Section of Contemplated Transatlantic Aircraft as Big as an Ocean Liner; Note Catapult for Launching Auxiliary Plane and Propellers and Engines Fore and Aft

Copyright London Daily Telegraph

Both Germany and England are visioning future transatlantic aircraft as big as the ocean liners of today, and aeronautical engineers of these two countries are designing and planning for such hydroplanes. British engineers are dreaming of an ocean air liner which would carry 1,500 passengers and hundreds of tons of cargo at a speed of 220 miles per hour, making the trip from Southampton to New York in less than fifteen hours. Drawings depicting such a craft show engines and propellers fore and aft and an auxiliary plane which would be launched from the air liner by means of a catapult. A German air company also is said to be backing a venture to build a transatlantic aircraft which would carry 200 passengers and several tons of freight at 187 miles an hour.

## AMMETER BUILT IN HEADLAMP MOUNTED ON MOTORCYCLE



Some British motorcycles are being equipped with headlamps containing a built-in ammeter and light switch. The switch is mounted

at the rear of the lamp and has four positions—off, bright, parking and charge. A

tumbler switch on the handlebars is used to depress the bright light when meeting another vehicle. The ammeter is mounted on top of the lamp.

## BRIGHTER LIGHT GIVEN BY LAMP USING SODIUM VAPOR

Engineers of the General Electric company have developed a 10,000 lumen sodium-vapor light with a fixture which resembles a model of an early type of airplane. Such lights give from three to four



Sodium-Vapor Lamp and Fixture Which Gives More Light Than Ordinary Incandescent Bulb

times as much illumination for the same cost as ordinary incandescent lamps and have been installed on one side of the company's building in New York.

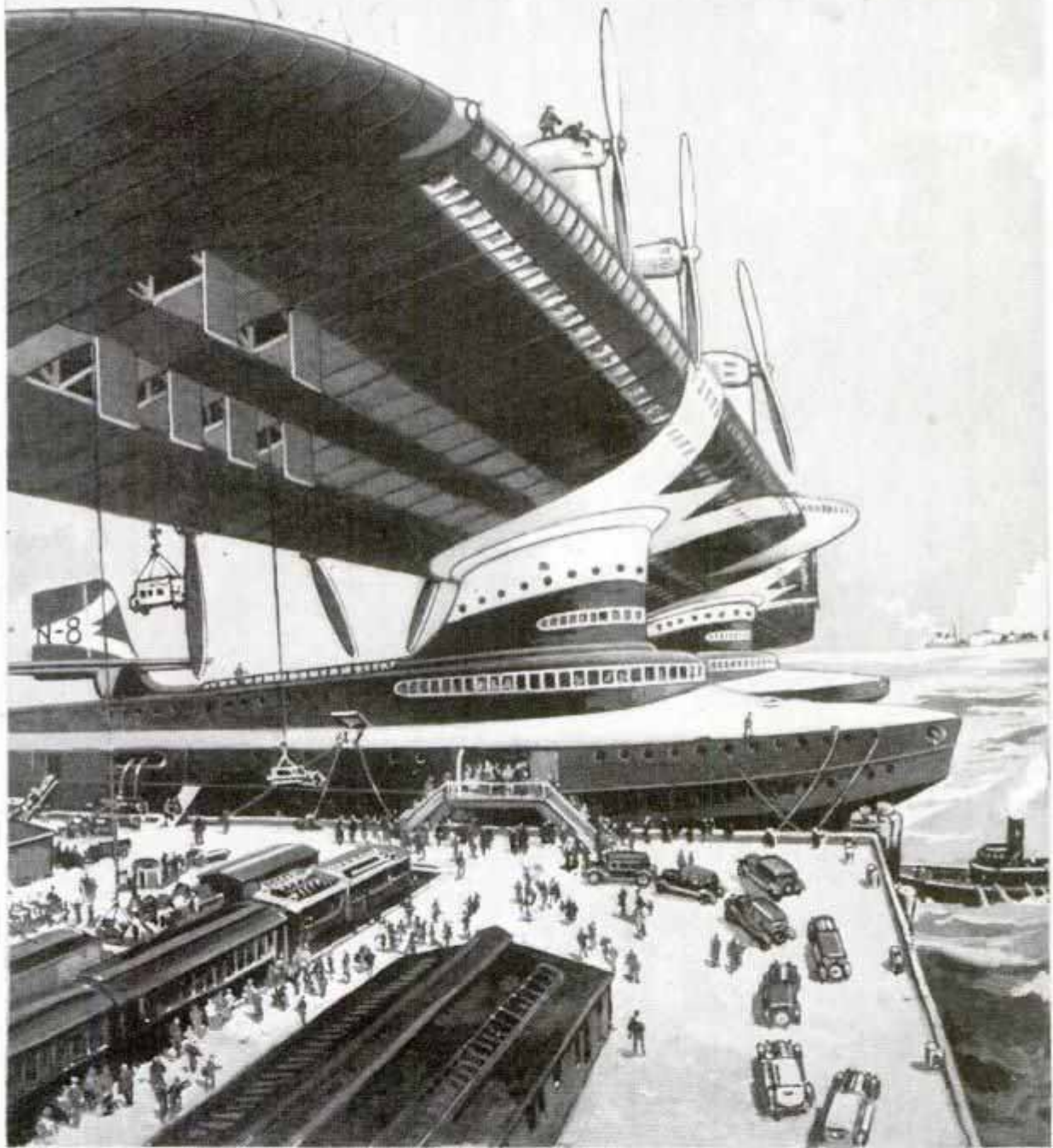
*Lucas Ltd. Serial King of Birmingham, 211*

*Cmd. Cross wheelton*



# Liner Carrying Fifteen Hundred Passengers

*see opposite page.*



Copyright London Daily Telegraph  
Artist's Conception of Giant Transatlantic Plane of Future  
Visioned by British Aeronautical Engineers; These Engi-  
neers Dream of the Day When Such a Plane Will Carry  
1,500 Passengers and Several Hundred Tons of Cargo at  
a Speed of 220 Miles an Hour, Making the Trip from  
Southampton to New York in Less Than Fifteen Hours





© Planet News  
Flower-Bearing Plant Is Shown Encased in Ice; Note How It Retains Its Shape and Beauty Even While Frozen

**FLOWERS IN BLOCKS OF ICE RETAIN THEIR SHAPE**

Flowers frozen in solid blocks of ice were exhibited at a recent horticultural show in London. The blooms were sent from Australia and in their frozen state appeared to retain their shape and freshness when viewed through the ice in which they were encased.

**CIRCULAR METAL SLIDE RULE FITS VEST POCKET**

Constructed of metal disks, a new circular slide rule fits the vest pocket. Accuracy is made permanent by etching black lines and figures on the metal disks, which are nickel silver and not subject to expansion or contraction when the weather changes.

The slide rule may be washed with soapy water when soiled. Rapid calculations with an accuracy of one-fourth of one per cent are possible.



All slide-rule problems may be solved quickly with the entire scale within the immediate range of vision, due to the circular shape. The front face has five scales, log, C, D, C1 or C inverted, and K. The reverse side has sine and tangent scales and an A and D scale for finding squares and square roots.

**ONE-MAN TRACK WRENCH HAS OWN ENGINE**

Particularly adapted to railroad maintenance work, a track wrench driven by a single cylinder, four-horsepower engine is operated by one man. The machine is used for tightening nuts at rail joints, switches and the like. It is light weight. The platform on which the machine is mounted is carried on rollers with frictionless bearings so that the wrench may be pushed from rail joint to rail joint with little effort. The engine provides two speeds, a high of seventy-one revolutions per minute and a low of twenty-five.



Latest Track Wrench with Its Own Motor Is Rolled along the Tracks as Shown Here

The direction of rotation of the wrench sockets can be instantly reversed. Hand levers control all operations.

Names and addresses of manufacturers and dealers in articles described in this magazine will be furnished by our Bureau of Information upon receipt of a stamped, self-addressed envelope.

Royal Horticultural Society, Flower show  
Horticultural Hotel Westminster

Share and Oklahoma Ave.

new model, etc.

Javelle Sales Co  
254 Broadway

Horstberg Mfg Co  
Railway Equip Dept.



# China Uses Billboards to Rebuild War Havoc



Photo, Ewing Galloway  
 One of the Billboards Being Used by Shanghai Real-Estate Operators to Help Rebuild Chapei; Note Chinese-Type Buildings as Contrasted with Modern Home, Shown at Right

Replacement of buildings destroyed by Japanese forces invading Chapei, a district of Shanghai, China, several months ago, has brought a real-estate and building boom. Advertising has increased, with billboards being used extensively throughout the section to spur interest in replacing the destroyed buildings with more modern structures.

D94  
**FLOOD WARNING SENT BY RADIO**

Warnings of threatened floods are to be broadcast by short-wave radio in Los Angeles county, Calif. The federal radio commission has granted permission for the operation of short-wave transmitters at three points in the Los Angeles flood-control district. When there are heavy rains in the mountains, men on lookout will watch the flow of water and if it becomes dangerous, will broadcast warnings

to those in the valleys below. One such station is in downtown Los Angeles and two others are in the mountains.

D96  
**NUT MAY BE LOCKED ON BOLT BY SQUEEZING CROWN**

By means of a special bolt section, the nut may be locked in any desired position on the bolt used in the 1934 Cadillac. This eliminates the necessity of straining ahead to the next cotter-pin hole or backing up to the last one. The crown of the nut is squeezed to the flattened side of the bolt under this new arrangement, assuring proper tension.

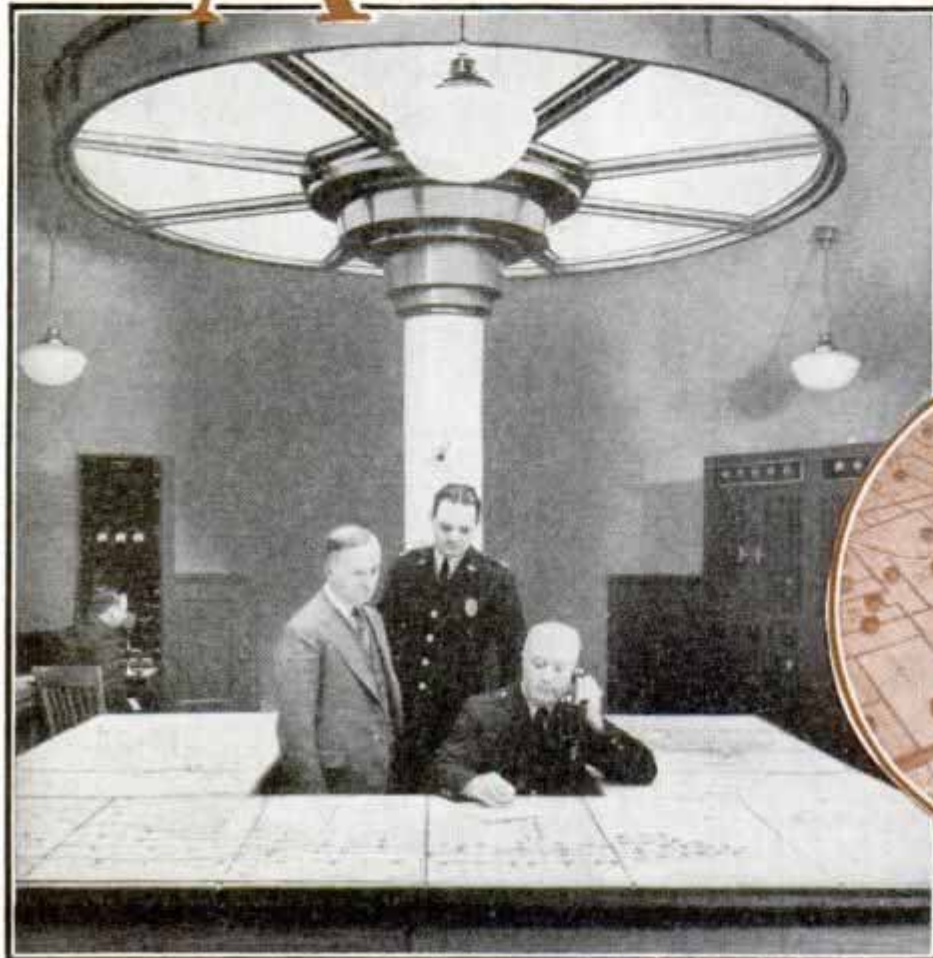


Chief Engineer, L.A.  
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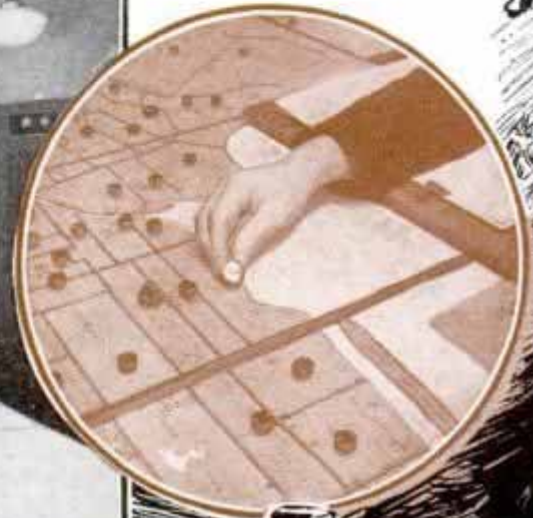


C1537 Keystone View Co  
219 & 44th  
New York City

# “ATTENTION!”



Left, Dispatcher's Room at New York Police Department Headquarters and Maps on Which Disks, Like Those Shown Below, Mark the Location of Each Cruising Radio-Equipped Squad Car



By H. W. MAGEE

“ATTENTION! Cars 1053, 1099 and 65; the address is —Fifth avenue, Manhattan; Signal 30; Authority, T. B.; Time, 1:43 p.m.”

Less than a minute after this message was broadcast over the New York police radio, Car 1053 skidded to a stop at the address, two officers leaped out and nabbed a bandit and his woman companion as they emerged from the building. Another bandit turned and fled into the building, was pursued to the roof and captured when he broke both legs trying to leap to the top of an adjoining structure.

The trio had held up and shot a man on the twenty-first floor of the Fifth avenue skyscraper. Someone heard the shot and telephoned the police. While the bandits were walking down four flights of stairs to avert suspicion, then descending by elevator to the lobby, the above alarm or-

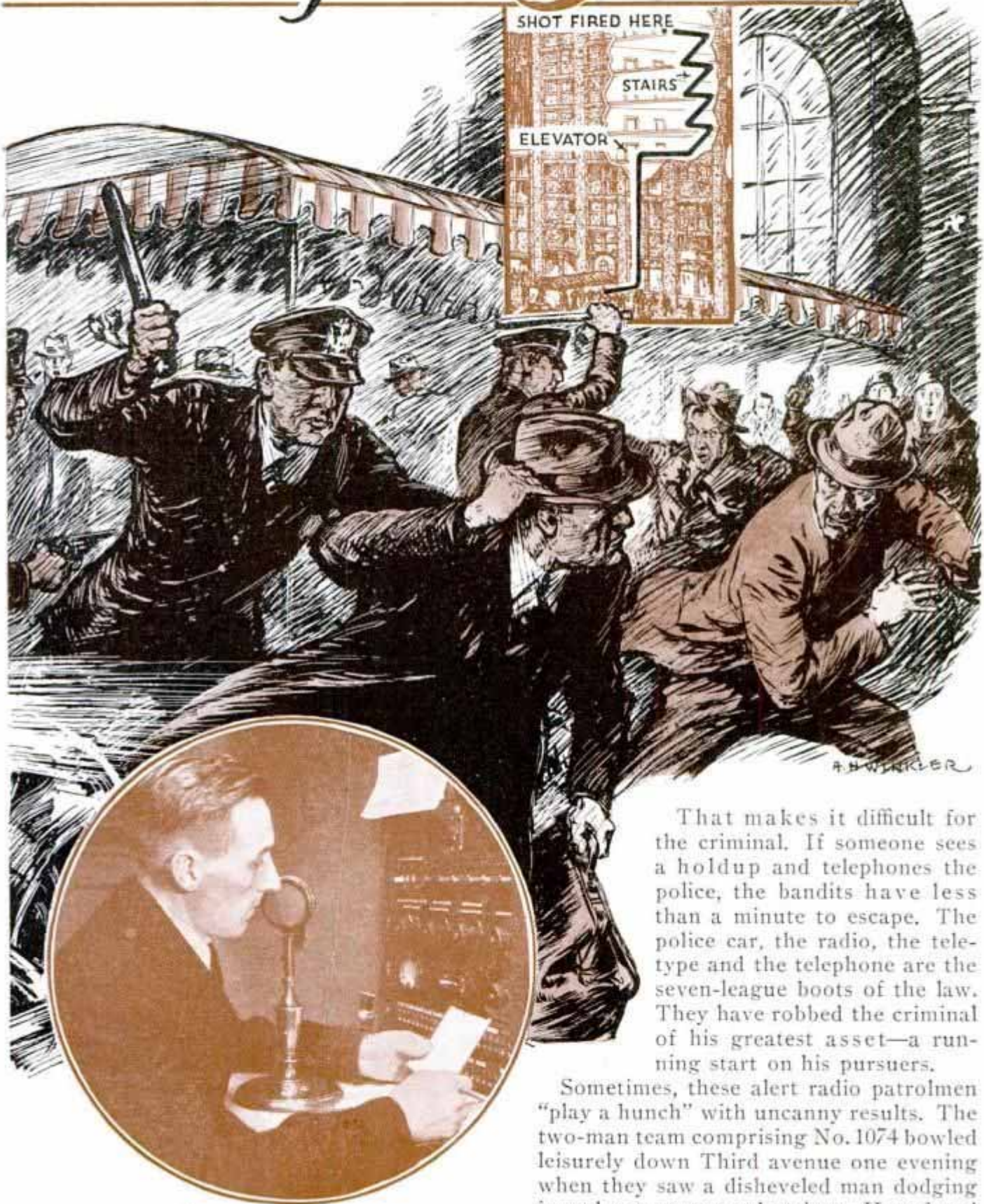
dered three near-by squads to the Fifth avenue address: “Signal 30,” a code number, indicated a reported robbery, shooting or assault, and “T.B.” gave the telegraph bureau as authority for the message.

Car 1053 did not “just happen” to be near by. Four hundred radio-equipped cars patrol the 316 square miles in which New York's 6,500,000 population live, so, regardless of where the crime might have been committed, a radio police-patrol car would have been less than a mile from the scene. And the average time taken to respond to an alarm—anywhere, any time—is just forty-five seconds!



C 1537

# ..Signal 30!"



Above, Artist's Conception of Police Capture of Bandits Fleeing Scene of Skyscraper Holdup; Below, Sending a Police Radio Message

That makes it difficult for the criminal. If someone sees a holdup and telephones the police, the bandits have less than a minute to escape. The police car, the radio, the teletype and the telephone are the seven-league boots of the law. They have robbed the criminal of his greatest asset—a running start on his pursuers.

Sometimes, these alert radio patrolmen "play a hunch" with uncanny results. The two-man team comprising No. 1074 bowled leisurely down Third avenue one evening when they saw a disheveled man dodging in and out among pedestrians. He refused to halt when called and the officers chased and caught him.





fleeing criminal formerly depended on. In spite of the fact that the communications system covers so much territory, and involves so many ramifications, it is extremely simple in plan.

The radio system consists of three transmitters, one at the Center street headquarters in Manhattan and the others in Brooklyn and the Bronx. All operate on

"Where you going and what's the hurry?" demanded the captors.

"Just trying to keep warm," mumbled the runner, mopping his brow.

"Hop in our car, it's warmer there," suggested the patrol squad, intending to question him further. They pulled from the curb when their number was called along with the familiar Signal 30 and a nearby address. The place was a restaurant where a man had been shot in a holdup a few minutes previously. As the officers entered with their prisoner still in tow, the victim gaped in amazement.

"That's the fellow right there," he gasped, pointing at the captive. The grinning officers hardly knew whether to credit luck or their alertness for the fact that they had their man in custody before they knew of his crime.

This tie-up of telephone, teletype and radio, a system devised by Thomas Rochester, chief engineer of the New York police department, has made it possible for the police to communicate almost instantly with every law-enforcement agency within more than 100 miles of New York and to cut off avenues of escape which the



Above, New York Radio Squad Recording Alarm; Below, Left, Police Transmitter and Power Amplifier, at Right

the same frequency but the Manhattan operator can start the other two transmitters by remote control and feed messages to them over a telephone circuit, or each station can be operated independently, a monitoring receiver preventing two of them from claiming the air simultaneously.

New York's police force, 20,000 strong, operates more than 1,000 cars and motorcycles, several boats and four airplanes. The radio messages go to 400 of these cars, one boat, one plane and one motorcycle. At any minute of the day or night, the Manhattan dispatcher knows the approximate location of each of these units, so he is the key man in the system.



C-753/301

Each car patrols an area of about three-quarters of a square mile, known as a "sector," and a big map on the dispatcher's U-shaped desk shows each sector while movable disks indicate the cars. Each disk bears numbers corresponding to that of the car it represents. Black numerals appear on one side of the disk, white on the reverse. Like a general marshaling an army, or a glorified checker player, the dispatcher moves these disks about as he issues his orders.

When the black numerals are up, it indicates the car represented by that disk is on regular patrol. When white is up, it shows the car is answering a call. Colored dots on each marker show the type of car and the branch of service to which it is assigned. A brass ring over a disk indicates the car requires radio servicing, and a disk on edge shows the car has left its sector temporarily.

This radio system is augmented by the telephone and teletype. There are five police telephone switchboards, the main one in Manhattan and one in each of the other four boroughs, Brooklyn, the Bronx, Queens and Richmond. Each of the more



Above, Front View of Police Transmitter; Below, Dispatcher Handing Message to Police Radio Announcer

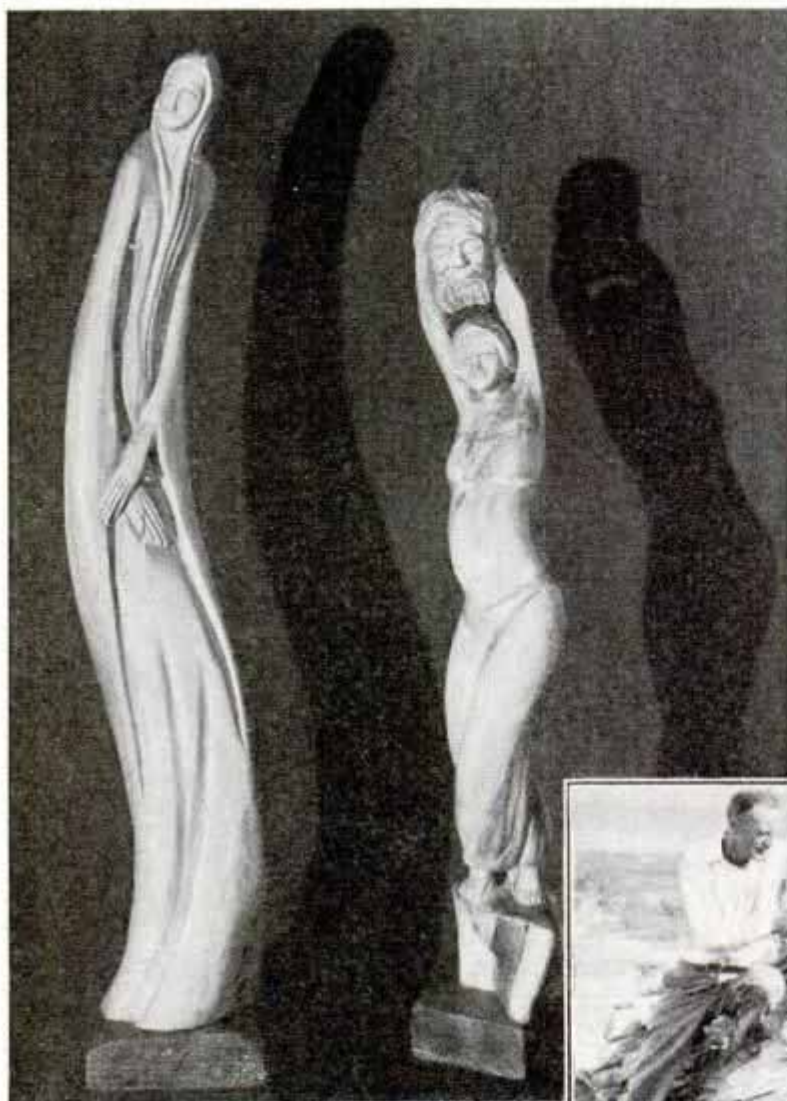
than 100 police stations receives teletype reports from these five main stations, including copies of radio messages. The teletype system is so arranged that a message sent from Manhattan goes to each precinct in that borough and also to each of the other borough headquarters, which

(Continued to page 120A)





# Rancher's Hobby Wins Favor in Art World *Canada*



Mr. Hodgson, as a hobby took up wood carving. The region in which he lives is almost barren of wood. At first he tried his hand upon the only available material, the bark of the cottonwood tree. But, while serving as a useful medium for his apprenticeship, it was not fully satisfactory. One day, while rounding up cattle, Mr. Hodgson's horse cast a loosened shoe by being caught in a juniper root. When Mr. Hodgson picked up the shoe, the root caught his eye because of its peculiarly human shape. Followed three years of experimenting. Although the juniper is plentiful, only a very few roots meet requirements. Those which have been most



*Canada*  
From the Alberta dry belt, near the town of Dorothy, a cowboy-rancher is sending to art centers of the world, carved figurines which have caused wide comment among critics of wood carving. The medium which he uses is new—the ugly twisted roots of the juniper bush. Though entirely self-taught as a sculptor, W. G. Hodgson's work is being hailed by experts as that of a man of rare ability. The chisels and knives he employs are made out of discarded Ford automobile parts. Several years ago



Top and Bottom, Some of the Remarkable Carvings Produced from Roots of the Juniper Bush; Inset, W. G. Hodgson, the Creator, Whose Work Is Being Acclaimed by Experts in the World's Art Centers



*Mr. George ...  
Hotel Marlton,  
3 W. 8th New York*

twisted and flattened by weather conditions in the struggle for survival are best suited for artistic creation. Within a short time Mr. Hodgson was amazed at the variety of possibilities that lay in the roots. Working with juniper, the artist cannot be certain of the finished product. Natural coloring, formation and the grain of the roots are controlling factors in producing perfect figures. When the carving is done a finish of turpentine and beeswax is added. Despite this willfulness of his subjects, Mr. Hodgson has produced some striking figures of Voltaire, Gandhi, Indian types and draped women.

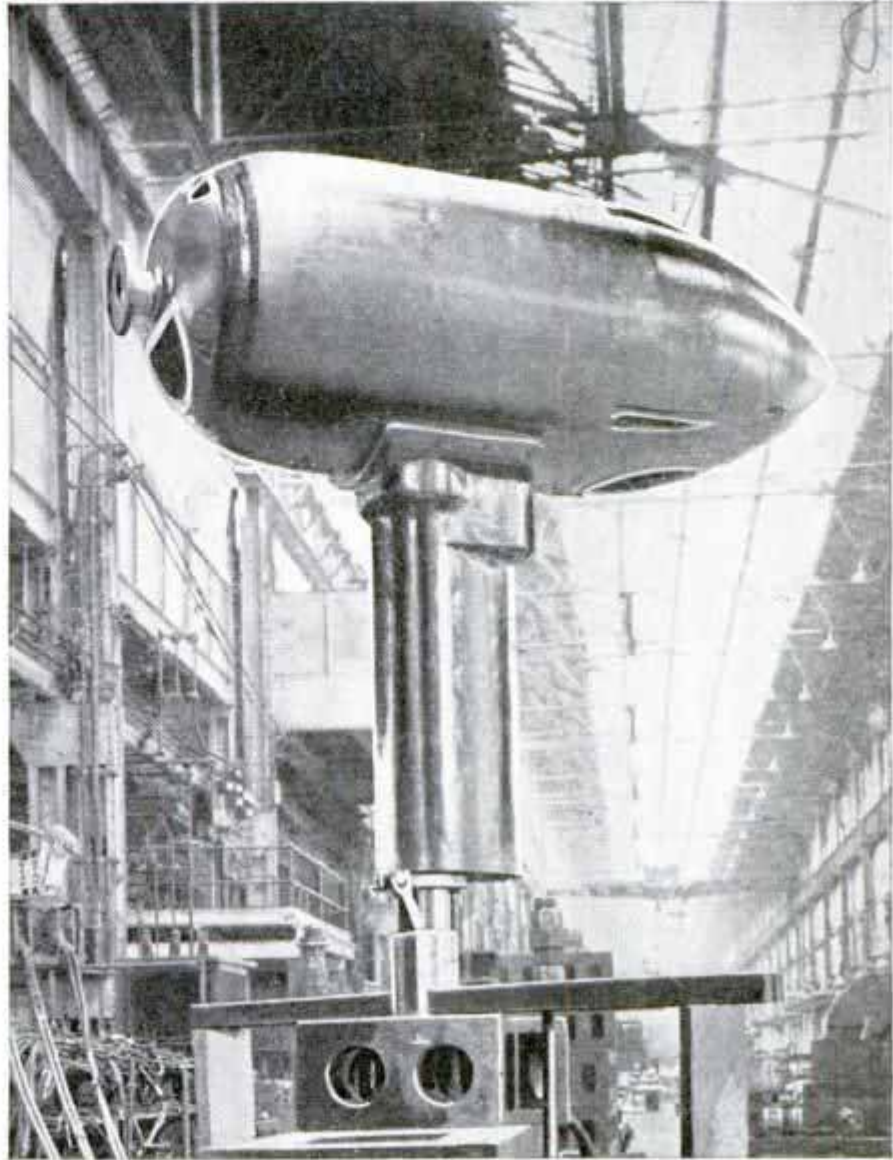
*D 119*  
**MINING MACHINE  
MADE OF OLD  
AUTO PARTS**

Parts of an old automobile have been turned into a simple-to-build placer mining machine by a western engineer. Extensive tests show that the machine will recover very fine flake gold. The variable speed feature, and several different types of inner linings for the concentrator are essential for treatment of different ores. For example, clay takes more water and less speed than gravel.



Gold-Mining Machine Produced from Parts of Old Auto; It Is Said to Be Highly Efficient

*Paul Baughman*



Set-Up for Studying Noises Made by Airplane Propellers; Motor Rests on Swiveled Column and Propeller Is Attached to Shaft

**AIR-PROPELLER SOUND STUDIED  
TO LESSEN ITS NOISE**

In order to determine how much noise an airplane propeller makes, and at what speed it makes the most noise, a motor and propeller have been set up for acoustic analysis at Langley Field. The 200-horsepower motor has a maximum speed of 3,600 revolutions per minute, but this can be reduced to 1,000 revolutions. The motor rests on a heavy supporting column which is swiveled so it can be turned through a complete circle. The propeller is mounted directly on the motor shaft and the nature of the sounds made by the propeller is determined with the acoustic analyzer. It is hoped that experiments with this equipment will result in developing propellers which cause less noise and vibration than those now used.

*Lewis...*





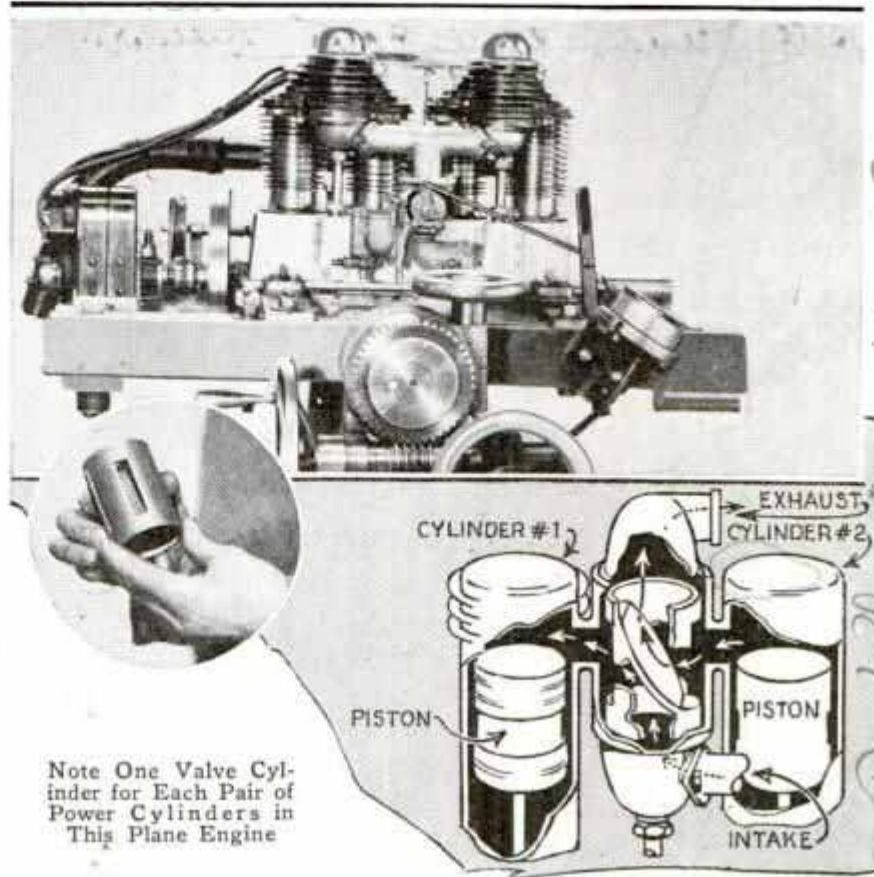


Q35

Refer me to Mr. W. North at 4507 North Ave. The Elmhurst

# Barrel Valve in Engine Drives Light Plane

One low-powered engine for light airplanes is equipped with "barrel" valves operating on a principle similar to a sleeve valve. One valve is provided for each pair of cylinders and consists of a barrel or cylinder open at each end and with intake and exhaust slots cut in the sides. A diagonal partition divides the interior of the valve into two parts so that when it turns to admit the fuel mixture to one cylinder, the adjoining cylinder is being exhausted through the other half of the valve. The air-cooled, low-powered engine in which these valves are used weighs sixty pounds and delivers twenty-five horsepower.



Note One Valve Cylinder for Each Pair of Power Cylinders in This Plane Engine

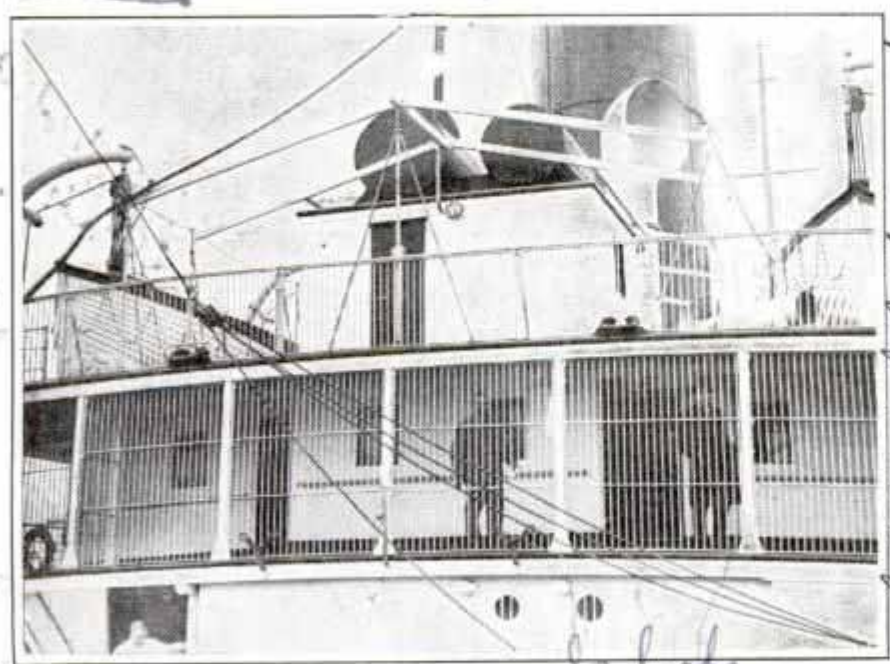
C.D. Klein 1309 Pico Blvd. Santa Monica Calif

C2051

# Iron Bars around Decks Protect Steamer from Pirates

Pirates who infest the China seas will have plenty of trouble in plundering the "Yochow," a steamship engaged in gen-

eral cargo trade between the East Indies, China and Japan. This boat has been fitted with iron grills inclosing the decks, the bars containing revolving spiked tops difficult to climb. Guns are also kept close at hand.



The Decks of This Steamer Plying in Chinese Waters Are Inclosed by Iron Bars to Protect the Vessel from Raids by Pirates

## WHEAT RIVAL IN NEW PLANT

Mitchell grass, a perennial native of Australia, may become a rival of wheat in this country, particularly in dry areas. It resembles wheat in appearance, but, unlike wheat, continues to grow and spread after being planted. Its roots can penetrate the soil to a depth of four feet, so it needs less rainfall to produce a crop.

D80

Maggs & Co. Ltd.

Mr. C. C. Carr, Los Angeles, Calif.

W. S. ...



© 1953

Cont. *Herbert* 55 W. 86th St. N.Y.C.

*Sealed Insects. Product New York*  
*Co. 30 Rockefeller Plaza*

# The MIRACLES



*Prof George W. Carver, negro chemist*

*coming glass walls*  
*making her Herbert*  
MILK and wallpaper made from peanuts, paving blocks reinforced with cotton, unbreakable crockery from tar, oil from coal, sugar from sawdust, and silk from glass.

These are just a few of the latest miracles of chemistry by which man has produced in a few hours what it has taken nature thousands of years to accomplish in her subterranean furnaces of heat, flame and immense pressure.

Synthetic substances, especially plastics, are appearing in great numbers. There apparently is no natural substance which chemists cannot create in a laboratory. Thus they have evolved a camphor that is entirely synthetic. Chemists have removed the gloss from rayon silk and given it a rich dull luster. Out of synthetic resins, chemists are making substitutes for wood and metal wall panels, for doors, floor tiles, and glass that is not really glass.

A tour through the magic wonderland of modern chemistry brings to light a new treatment for leather which makes its

gloss everlasting. Shoes made of such leather never need polish. Simultaneously, this treatment makes the leather waterproof and protects it against stretching or getting out of shape. It is also self-lubricating and sufficiently porous to ventilate the foot.

The problems of imparting permanent color to aluminum has been solved by a new process which oxidizes the metal electrolytically, allowing it to be colored by special dyes which dry very hard.

Whoever has tried to make a soapy lath-

Left, Section of Glass Wall Supported by Steel Frame; Above, Helmet Worn by Sand-Blast Cleaner

*Used Waxes*  
*2004*  
*Cambridge Mass*

*Mellon Institute*

*Arthur D. Little*



© 1953

# of CHEMISTRY



*Charles River Road  
Exembudae, Mass  
suggests } E. C. du Pont de Nemours & Co.  
Melmore, N. J.  
American  
I. Co. 52  
are  
W.*

er with very hard water or sea water will appreciate a new soap which makes the most mineral-laden water behave as if it were distilled. Transatlantic travelers will find this especially useful in taking salt-water baths. Moreover, this super-soap cannot be precipitated by acids.

Out of the laboratory



*Herbert*

*Metal Wire Cloth  
Co., 799 E. 139th St., New York 80, N.Y. 10020*

*Motor. Louis Allen Co 427 E. Stewart  
Fairbury, W.D.  
also  
General Electric  
Co. Schenectady  
N.Y.*



**FLASH PROOF**

nineteenth century, is now extracted from certain zinc ores so cheaply that it can be sold on the market for a mere \$4,000 a pound! It looks white and lustrous, like dull silver.

Getting down to refinements, one manufacturer is now offering a

Above, Gondola of ~~Settle~~ Stratosphere Balloon and Bar of Magnesium Alloy of Which It Is Made; Below, Playing Hose on Splash-Proof Motor

*Law Chemical Co. Medlar on hand*  
has come a sardine oil whose vitamin D potency has been especially effective in strengthening the bones of chicks. Cod-liver oil concentrates, which greatly reduce the bulk, are available to consumers in many forms.

wire mesh cloth with 160,000 openings per square inch, which is woven from wire finer than one one-thousandth of an inch in diameter.

Among recent development in chemistry is one which, if it were unsubstantiated, would sound like the wildest revery of a Jules Verne. Think of it!—cotton out of glass! In other words, cotton that is not cotton at all, but a super-cotton, for

Indium, a rare metal known since the

*Wide World photos. New York Chemical show*

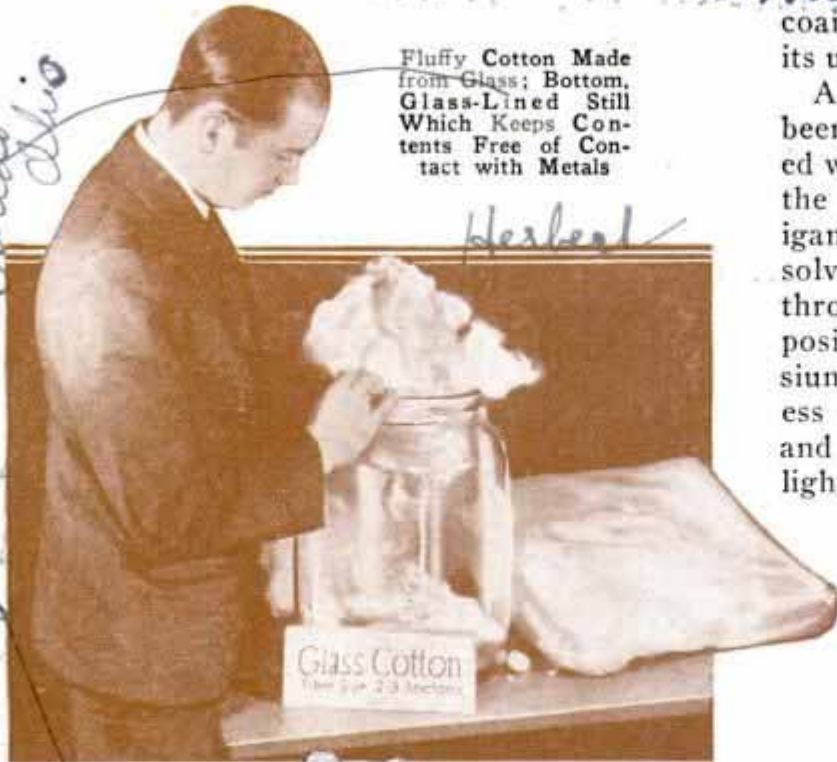


C1453

Magnesium Alloy  
Glass Chemical Co  
Midland, Mich

Libby, Overstreet & Co  
Sole Agents  
Rochester, N.Y.  
300 East Ave.  
Clyde, Ohio

Fluffy Cotton Made from Glass; Bottom Glass-Lined Still Which Keeps Contents Free of Contact with Metals



coarse, on a commercial scale; and its uses are endless.

Another drama of chemistry has been revealed by chemists associated with a company now developing the marine salt deposits of Michigan. Magnesium salts are dissolved by streams of water playing through a subterranean brine deposit. The valuable metal, magnesium, is separated by a special process of evaporation, crystallization and electrolysis. Result? A super-light alloy, with a bright silvery



Above, Leather Which Has Been Chemically Treated So That It Never Requires Polishing

its individual strands are about one-fourth as large in diameter as the common cotton strand grown in the South.

This discovery bids to create a tremendous industry by itself. The owner of the process has tested glass cotton in standard textile looms and succeeded in weaving fine, durable, soft cloth out of it.

Already there is a very large demand for cotton glass and wool for insulating motors, insulating walls, for upholstery, etc. The owner of the glass-cotton process now manufactures glass wool, fine and

Herbert  
luster and tremendous strength. Mixed with small percentages of aluminum and magnesium, it becomes the lightest commercial alloy now available. It weighs but .064 of a pound to the cubic inch, and has a physical strength almost equal to steel. This unusual magnesium alloy has been found useful wherever it is necessary to have great strength and light weight. Airplanes, automobiles, trains, structural beams and heavy-duty trucks can be constructed out of one or more of the alloys now manufactured commercially.

Handwritten text at the bottom of the page, possibly a signature or address.



*United States Steel Corp*

Aided by chemistry, the textile industry has developed tremendously in the last two years. A leading photographic film producer now utilizes the by-products of a basic process to make a variety of artificial yarns, lustrous and non-lustrous, that weave into beautiful dress cloths. A large chemical laboratory has perfected dozens of specialties in the way of synthetic cloths. One, intended for

*Wade world  
L.C.H. 3*

*Amend and sold by U.S.*



Below, Demonstration of Shot Welding; Right, Above, Fluorospark Lamp Which Shows Characteristics of Minerals; Below, Scale Which Weighs Rice Automatically

*Federal Pneumatic Scales*

*Dearborn Chevrolet*



*Wade world  
L.C.H. 3*

*Amend and sold by U.S.*

*Deber*

binding books, is waterproof, washable, and very durable. Other cloths made possible by chemistry resemble leather, rubber, wool, and linen. Rayon chemistry has been carried to the point where the chemist can do more with the artificial product than has ever been done with natural silk from the cocoon. Another discovery that will have value in the decorative arts is a process for coating cheap nickel with a thin veneer of platinum metal.

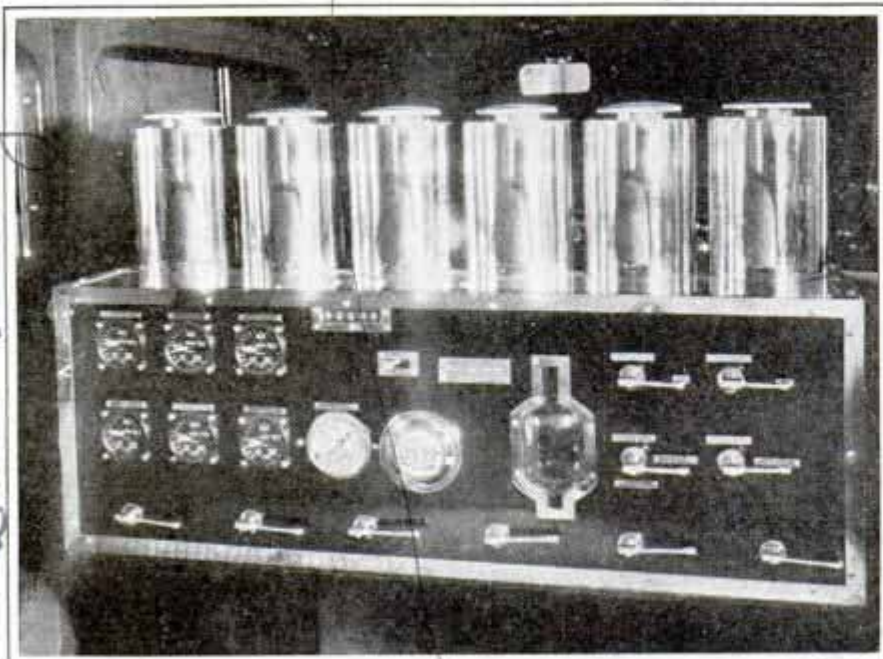
And now synthetic rocks with natural textures have come upon the scene. Shale, combined with an alkaline earth base and quarry waste, all united at steam temperature, is made into a variety of synthetic

rocks having genuine decorative qualities.

America is made more independent of Chilean nitrate deposits by the discovery that iodine can be extracted commercially from brine wells in the oil districts of California. And still another discovery makes it possible to collect a very high grade of potash from ordinary cement kiln flue gas. The cost of precipitating the potash out of the gas makes it possible for this new industry to compete with potash now imported to American farmers from abroad.



# Wide Variation in Gasoline Mileage Is Found



Test Apparatus Which Measures Fuel Consumption of Auto and also Indicates the Operating Efficiency of the Engine

question correctly. The testing device consists of six one-gallon tanks of gasoline mounted on a panel placed in the rear of the car and so arranged that any tank can be directed into the carburetor line by a valve system. Thermometers show temperatures of the water jacket, intake manifold, carburetor bowl, crankcase, transmission, differential and outside temperature. There is a gauge for measuring the vacuum in the intake manifold, thereby indicating the throttle opening, also a combined acceler-

How many miles does your car travel per gallon of fuel? Recent road tests with a device developed by a California lubricating engineer show many factors help determine fuel consumption. The temperature of the location where you are driving, atmospheric conditions, crankcase temperature, and the traffic conditions and the manner in which you handle your car are all deciding points in answering the

ometer and grade meter, for measuring engine performance, and an odometer measuring one one-thousandth part of a mile. The test car was run for 223 miles at various speeds and used 13.25 gallons of fuel. Under heavy traffic conditions, the instruments showed the car was making only five miles to a gallon of gasoline, while on the open roads it ran as high as twenty-two miles per gallon.

## Treasure Finder Recovers Articles Lost on the Beaches

One California man makes a living by recovering jewelry and other articles lost on the beaches by bathers, using for the purpose a homemade beach comber which sifts out the sand and retains everything else. The sifter is of strong wire mesh and the device works like a scraper. When it is pulled backward, a blade at the rear bites out the sand to a depth of about six inches, filling the mesh bottom. The apparatus is then tilted forward on two rockers, allowing the sand to run out but retaining articles as small as a dime. In "new" ground, the clean-up averages about fifty cents a day, but the operator has recovered diamond rings and other expensive jewelry as well.



Sand Sifter Which Recovers Jewelry Lost on Beach; Inset, Some of Articles Found

*Cont. John C. Pinehart, 944  
Main Street, Los Angeles*

*Cont. E. W. Dreyer,  
U.S. Post Office, Santa Cruz*

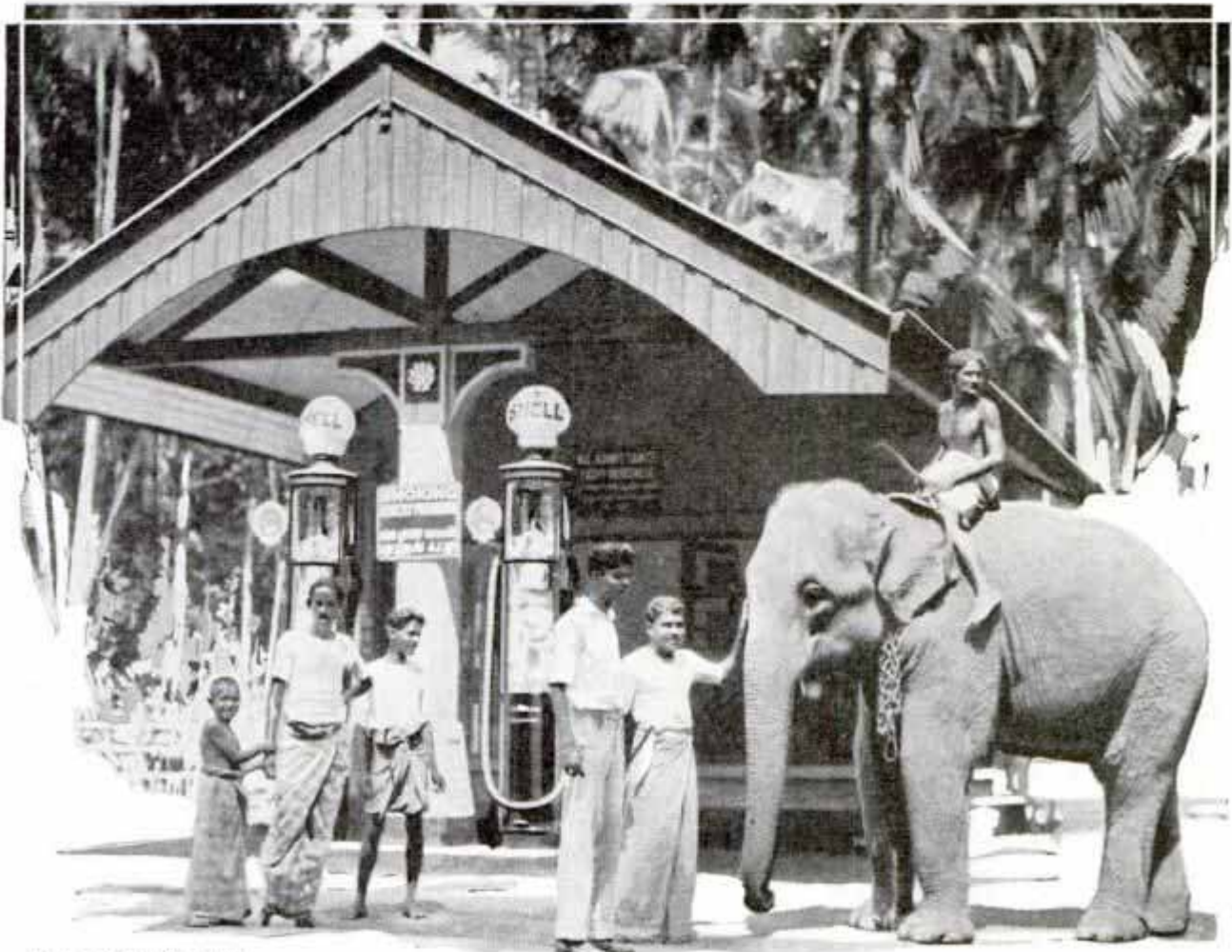
*2058*

*79 New Montgomery  
San Francisco, Calif*



D 8 3/4 ...

# Gas Stations Invade Ceylon, Land of Elephant



Photo, Ewing Galloway  
Tamed Elephants in Front of Modern Gasoline Filling Station Located on One of Ceylon's Excellent Motor Roads; Until the Coming of the Automobile, the Elephant Was Used for Heavy Work

How modern transportation is advancing into every part of the world is demonstrated in Ceylon where the automobile is challenging the elephant. Ceylon is a very ancient land, its known history beginning in the sixth century before Christ. It is a large island lying fifty-five miles southeast of the extreme southern point of India in the Indian ocean. The native inhabitants are the Singhalese, who are Buddhists, a gentle and peaceable people. The men have the custom of dressing somewhat like women. There are 600 miles of railroads and excellent automobile roads. Several thousands of elephants roam wild through the island's forests, large numbers being tamed for duties as beasts of burden. For centuries the elephant has been the principal means of travel in the island, but the introduction of the automobile, the truck and the filling station, that necessary aid to modern travel, is fast relegating the ele-

phant to a secondary place. Many elephants are still in service, of course, and the great beasts may be seen daily passing gasoline stations located on motor roads.

## D 10 4 CHIPPED ICE DISPENSER MAKES COLD DRINKS QUICKER

Serving finely chipped ice in a ribbon at the press of a lever, a shaved-ice dispenser speeds up the making of fountain drinks and offers ice free of dirt or contact with human hands. The ice issues from a spout at the bottom of the dispenser and twenty-five pounds of ice will serve 300 glasses, less than a second being required to fill each glass.



Ice Co.  
Dallas Tex.

Vertical handwritten notes on the left margin.

Vertical handwritten notes on the right margin.



*Spanish government*

*D124*



© International News Photos

Measuring This Giant Carrot from a City Vegetable Garden Required Use of a Yardstick

### THREE-FOOT CARROT WEIGHS THREE AND HALF POUNDS

Los Angeles now points with pride to its gardens as well as its climate. One youth planted carrots in a city lot vegetable plot and when he pulled them, found a giant among the harvest. The carrot pictured is nearly three feet long and weighs three pounds and seven ounces.

### TALKING NEWSPAPER IS NEXT FROM PRINTED RECORDS

Talking newspapers are made possible by a device which reproduces sound from paper "records" that may be printed in newspapers or elsewhere. It is called a "photoliptophone." The principle is that of the sound film, with the photo-electric cell being employed. On a special apparatus, the sound waves are photographed as a person speaks, or other sound is

made, and these photographs are reproduced. The sound photograph is placed around a cylinder of the photoliptophone, and as this revolves a ray of light, instead of a needle as in the case of a phonograph, follows the rows of waves and translates them to the original sound. When the device becomes generalized, daily newspapers may carry "sound sections" much as they now have other special sections. Reporting might be revolutionized, since it would be possible to catch the sound of news events.

### COMPLETE VIOLIN IN MINIATURE UNDER TWO INCHES LONG

Less than two inches long and weighing about one thirty-second of an ounce, a tiny violin, complete in all details, has been produced by Fasseur Ferron, of California. The instrument, which is one and three-quarter inches long, may be balanced on two fingers. Only the finest of aged Italian maple and pine were used in its carved body, which is finished in orange-colored oil varnish, similar in color and texture to that used by the old master violin makers. Ebony keyboard, pegs and tiny strings are all in perfect proportion to the remainder of the instrument. The maker has constructed a small case for this violin and a slightly larger one which he fashioned by hand.



Top, Tiny Case Containing Two Small Violins; Bottom, the Smaller of the Instruments Shown in Case

*Joseph O' Sullivan*

*Made by Fasseur Ferron*

*Mr. Fernando Cruz, Argentina*

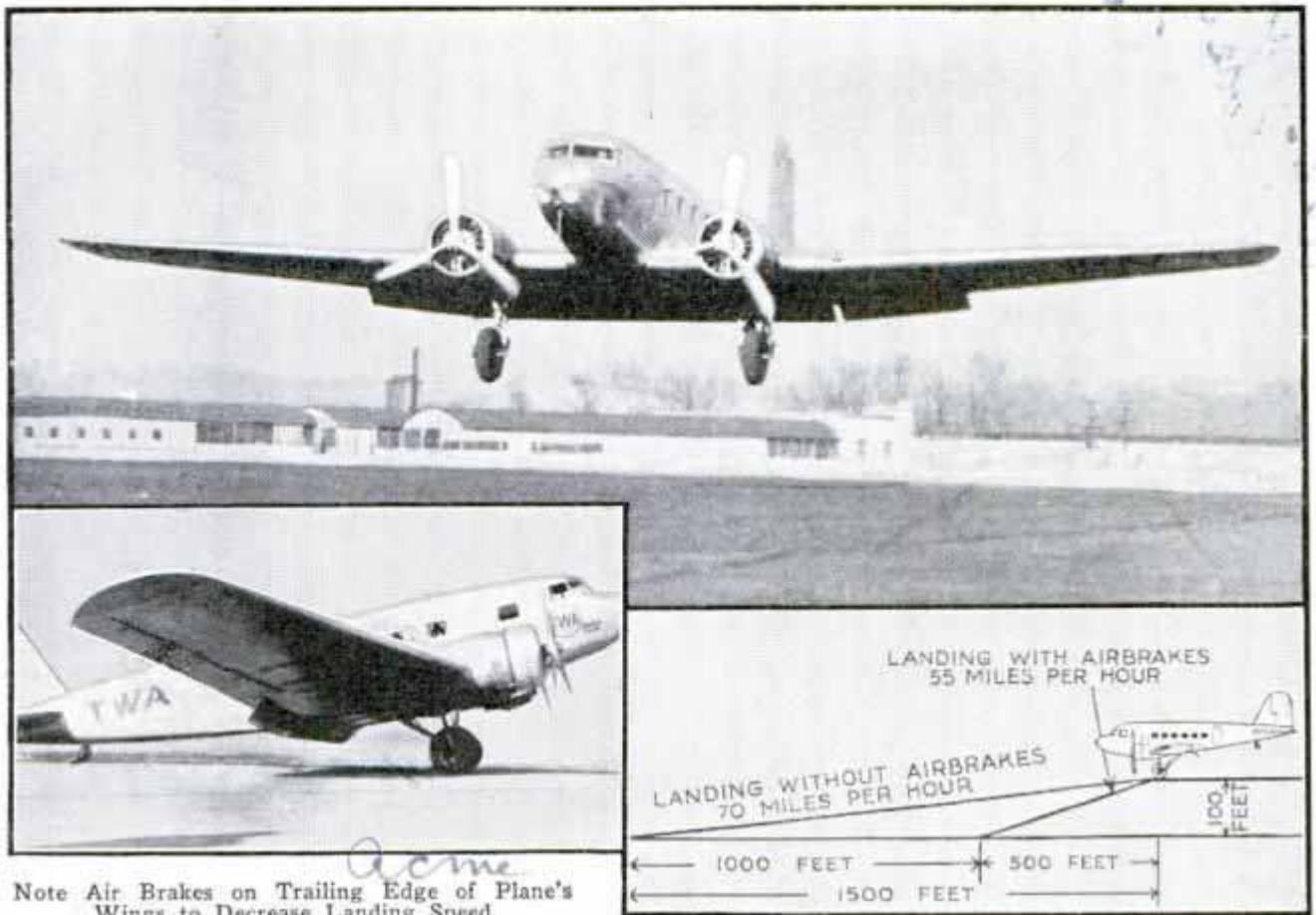
*rec. Oct. 1933*

*rec. March 1936*

*Made by Fasseur Ferron Pasadena*



# Plane with Air Brakes Lands at Low Speed



Note Air Brakes on Trailing Edge of Plane's Wings to Decrease Landing Speed

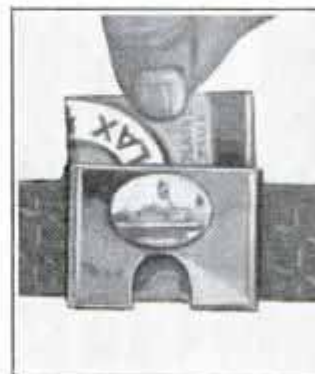
Adding more speed to commercial air liners brought a serious landing problem because, the higher the speed, the faster the plane traveled when it touched the ground. Transcontinental and Western Air liners have solved the difficulty by using "air brakes." The brake is located on the trailing edge of the wing and when the pilot lowers this flap, wind resistance slows the ship to a speed of about fifty miles per hour and reduces the space necessary for landings by about two-thirds. With the brakes applied, the gliding angle at 100 feet is reduced from 1,500 to 500 feet, permitting the ship to land on a comparatively small field by reducing its speed from around 200 miles per hour to fifty.

## BULLET MAKES A ROUND HOLE INSTEAD OF JAGGED ONE

Intended particularly for indoor target shooting, a 22-caliber long rifle cartridge is being produced with a sharp shoulder bullet which makes perfectly round holes in striking contrast to the jagged ones made by the ordinary cone-shaped bullet.

The round holes in a target are easy to score and easy to spot. The cartridge is of the high-speed type and is loaded with smokeless powder in a brass shell, while the priming is noncorrosive. The latter feature insures a clean bore, making unnecessary the cleaning of the rifle barrel after firing and greatly extending the life of the barrel.

## HOLDER FOR SAFETY MATCHES SLIPS OVER YOUR BELT



It is unnecessary to search through your pockets for matches if you wear a metal match holder which slips over your belt. It accommodates the standard size book of safety matches, is notched at the

bottom so the pack can be removed easily and is made of stainless steel.

Remington Arms Co.  
David School Co.

Cruver Mfg Co.  
2956 W. Jackson



© 1936 - see March

made at Lajcha Plain  
mine - Mother  
Lode country

# The TRUTH about



fifty of making as much as a dollar a day at placering. His chance of finding a new vein is hardly one in a thousand—but if he does make a strike, his reward may be a small fortune.

Of course, if you know metals and minerals and something of geology, you may hunt for a gold vein and find something else almost as valuable, even if you do not discover gold. The price of silver has advanced, and silver is associated with gold, as is lead. Or you may find tungsten ore or some other worth-while deposit, for it doesn't pay to close your eyes to everything but the yellow

By P. G. WORCESTER

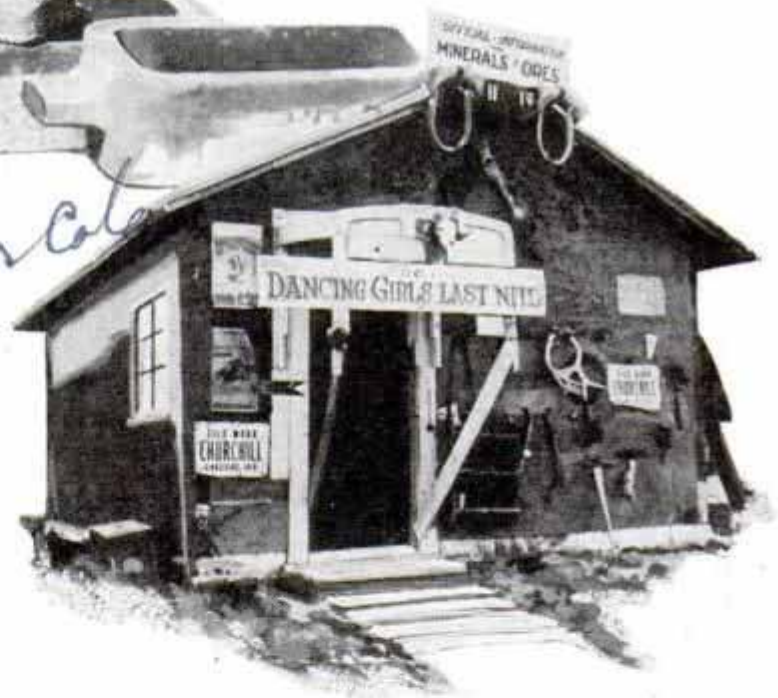
Professor of Geology  
University of Colorado

(Editor's Note—This is the second of two articles by Prof. Worcester. The first appeared in the March issue.)

**G**RIZZLED old prospectors, searching painstakingly for gold in unpromising territory, used to justify such seemingly hopeless work with the homely philosophy, "Whar it is, thar it is."

This is just another way of saying that gold is where you find it. Any competent mining man knows new strikes will be found, probably some in territory now considered unpromising. In fact, a rich strike was made only a few months ago near Mancos, Colo., in a region almost any geologist would have ridiculed.

So, if you would rather take the long chance of making a strike than the lesser gamble of making a living by placer mining, you can try your inexperienced hand at prospecting for veins. The inexperienced man has less than one chance in



Top, Gold Brick Worth \$12,000 Just Out of Mold; Below, Dance Hall of California Gold-Mining Camp

metal. But if you go hoping to return with nothing except experience, you won't be disappointed. This means you need enough cash to buy your equipment, pay your living expenses and get home in the fall. You would be foolish to start with less than \$150 plus transportation both ways.

Since the days of '49, professional prospectors have been roaming the hills, year

*[Handwritten scribbles and signatures at the bottom of the page]*



John Herbaty  
© 1936  
Alfred Harris

# the NEW GOLD RUSH

in and year out, in search of rich veins. Every previous depression has sent new hordes of seekers out, just as is happening today. Known gold-producing areas have been combed and re-combed by men who know the geologic formations in which gold occurs and the minerals associated with it. And no major discoveries of gold have been made in this country since the strikes at Tonopah and Goldfield, Nev., at the turn of the century, despite all this effort.

So go expecting to make a strike or nothing—it's a thousand to one it will be the latter. Select a mining camp and familiarize yourself with the nature of the rocks and



Top, Hard-Rock Men Digging Vein under Old Miner's Cabin; Left, Panning Gold in Idaho

Pierce City

mal, simple camp equipment, a guide book to prospecting methods and descriptions of common rocks and minerals, plenty of warm, heavy clothing and stout leather boots. You must take food with you and so must be within traveling distance of supplies when provisions are exhausted.

ores there. When you think you can recognize a gold vein if you see it, work out from the camp in every direction. Besides the simple and inexpensive equipment listed for placering, you will need a pack ani-

If you do stumble onto a vein, there is a possibility that it may be too low a grade to work. But suppose you make a strike! You are entitled to get excited, but after your delirium has subsided you must protect it. Here is how. Expose the



Leadville, Colo  
California Gulch

Above, Placer Mining in Colorado; Note the Sluice Box and Equipment; Below, an Old Prospector Entertaining Visitors at His Well

feet on each side, locating the area with corner posts and additional ones on the two sides. At the point of discovery post a written statement giving the date, the name you bestow on the claim, the trend of the vein and your name. Then locate the region as accurately as possible, go to the county clerk and find out who owns it. If privately owned, get permission to work your claim on a royalty basis. If owned by the government or the state, the county clerk will tell you what to do.

In the early days roads were poor, concentrating mills and smelters were

vein in as many places as possible and collect samples for free gold and assays. Sink a shaft or drive a tunnel ten feet deep at the point of discovery, measure 1,500 feet along the best part of the vein and 300

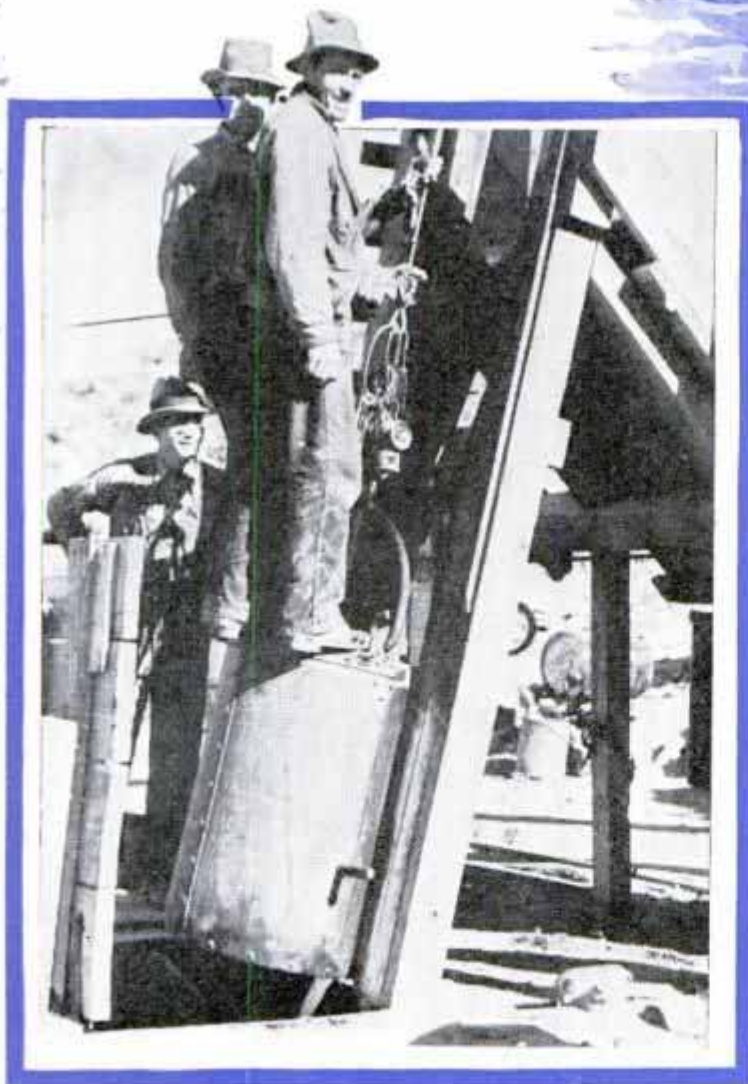
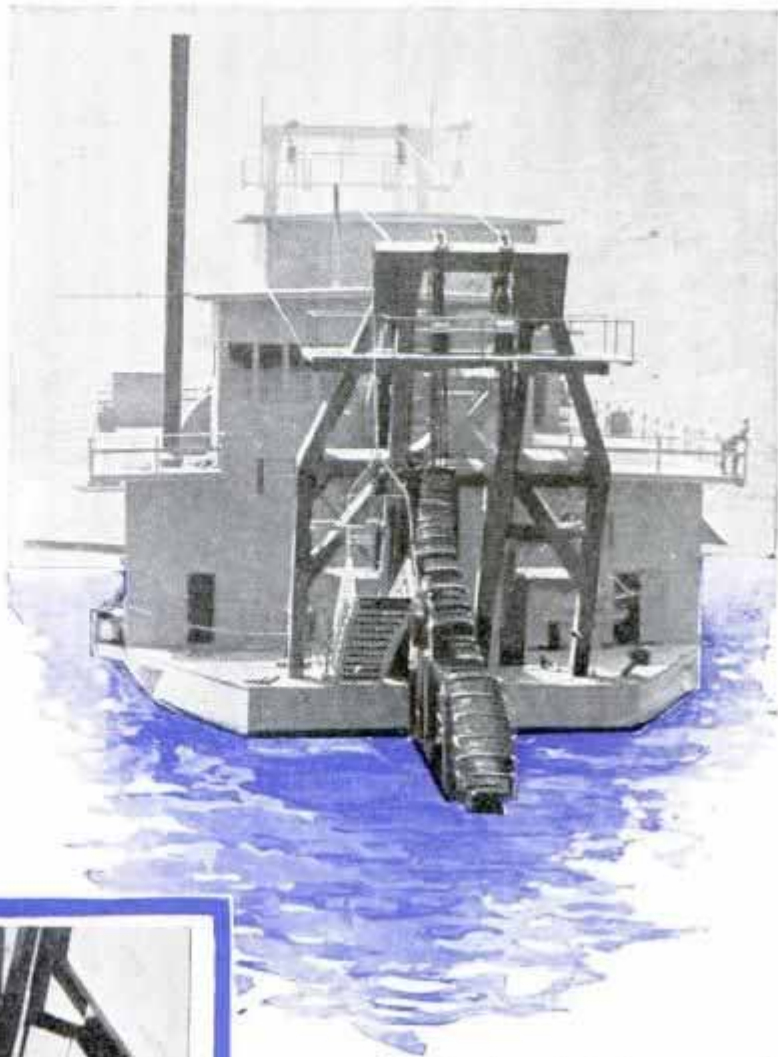
far apart, and concentration methods were simple and wasteful. As a result, only high-grade ores were saved, the rest—still containing gold—going over the dump. Tailings, the finely crushed rock from old



© 1936

stamp mills, also contained much fine gold which was thrown away because no method was known to recover it. Most of the mill tailings have been worked over, covered up or washed away, but there are thousands of mine dumps remaining. How about looking them over for the gold tossed away by early methods? Again the outlook is discouraging.

Most of these dumps have been picked over by hand and the best ore removed. Some contain ore which may assay from four to ten dollars a ton at present prices, but they also contain lean streaks where non-mineral refuse was dumped, so you may have to handle much worthless material along with the ore. Sup-



Top, Electrically Operated Gold-Mining Dredge Which Handles as Much Gravel as an Army of Prospectors; Below, Hard-Rock Miners Coming Out of Shaft

pose you do hand-pick several tons of ore from a good dump. Then what?

You must truck it to a concentrating mill, possibly one mile away but more likely fifty miles distant. You must pay milling charges ranging from three dollars upward, based on the complexity of the ore. Then you will probably find that the returns from the mill or smelter will be much less than the value indicated by your assays, sometimes only one-third of the assay figure. So you find yourself lucky to break even, and the more complex the ore you are handling, the less you are likely to profit.

Just as in placering, large scale operations often prove profitable on rich dumps near concentrating mills, but the man who can take out only a few hundred pounds a day by hand methods does not

(Continued to page 124A)

*S. Cozza Nevada*



# Big Map to Show Every Mountain and Valley

After nine years of labor by expert topographers, about one-third of a huge map of the United States has been completed at Wellesley, Mass. When finished, this map will be sixty-three feet long, forty-six feet wide and will show every mountain and valley in the country reproduced exactly to scale in height and size. Eventually, it will contain 900 blocks and 300 of them have now been placed. When the map is completed, it is expected to be of invaluable service to rail and air-line engineers in mapping new routes. It is constructed on a curved surface representing the exact curvature of the earth.



Topographers Working on Huge Map Which Will Show All Mountains and Valleys in United States

ain, the results holding the possibility of ultimate elimination of water-cooling. The steam-cooling, or evaporative, system consists of condensers fitted along the leading edges of the airplane wings and conforming exactly to their shape, thereby eliminating all "drag" or air resistance. Tests included climbing to 20,000-foot altitudes, gliding from that point to the ground and level flights with the engine running full throttle. At the peak altitude, the recorded temperature was twenty-seven degrees below zero centigrade. In the evaporative system water circulates within the cylinder jackets and through a suitably located "header" tank between engine and condenser. Steam from the tank rises to the condenser where it is cooled again to the liquid state. Such a system requires less water, the weight saved in cooling liquid for a 500-horsepower engine amounting to approximately 100 pounds.

## ENGINE WITH STEAM-COOLING PASSES TEST IN PLANE

Steam-cooling of the airplane engine has been tested successfully in Great Brit-

Rolls-Royce  
Kestrel engine

Rolls-Royce, Ltd.  
Nightingale  
Glad

Worcester Aircraft Co. Ltd. Cheltenham and Aerodrome, Gloucestershire, England.  
 D. 101



**DEADLY GAS SAVES LIVES OF FIRE VICTIMS**

Carbon dioxide, known as a gas that causes suffocation, is being used to help save persons gassed in fires and explosions. When an air mixture containing five-percent carbon dioxide is breathed by the gas victim, his respiration is speeded up, the lungs emptying and filling more completely. The carbon dioxide is delivered to the patient by means of a resuscitator that sends a small jet of the gas over the victim's head. A cartridge, or bulb, containing sufficient gas to revive one person has been devised to fit into a policeman's club or a fireman's ax. By turning a milled nut, the operator releases a steady stream of carbon dioxide near the gas victim's mouth while the Schafer method of prone pressure is applied. A handkerchief over the victim's face prevents the gas from escap-



Removing Cartridge of Carbon-Dioxide Gas from Fireman's Ax to Revive Gas Victims

ing into the air. The weight and shape of the policeman's club and the fireman's ax are changed but little to accommodate the gas cartridge.



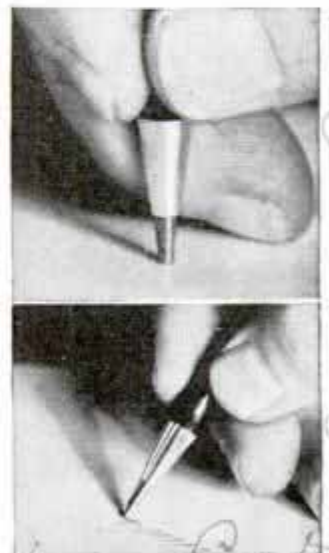
This Truck with Its Illuminated Glass Tank Is a Traveling Goldfish Store with Novel Advertising Appeal

**GOLDFISH DELIVERED BY TRUCK WITH LIGHTED GLASS TANK**

Goldfish are hauled in a three-ton, six-wheeled truck by a Pennsylvania distributor. The truck is equipped with a big glass tank which is illuminated at night to add to the advertising value of the form of delivery. The heavy glass tank and the water with which it is filled made it necessary to use the truck to transport the traveling fish store.

**PENCIL WITH AUTOMATIC FEED PROJECTS LEAD PROPERLY**

Lead is projected to exactly the proper length for efficient writing by means of an automatic feed in the latest pencil. To propel the lead for writing, the pencil is held upright and the point is pressed down against any solid surface, forcing the metal point up inside the pencil. Releasing the pressure causes the point to reappear, projecting the lead to the right length.



*Dr. Albert Brimmet  
Chief Surgeon  
Highland, Oregon  
Hemel, Bert, Jr. D2*

*D 55*

*The Schaw Fish Co. Erie Pa*

*D 75*

*(Mrs. Jess Robbins) 2*

*Stylolite Corp  
3017 San*

*Los Angeles Calif*



# Radio-Directed Rocket Seen as Mail Carrier

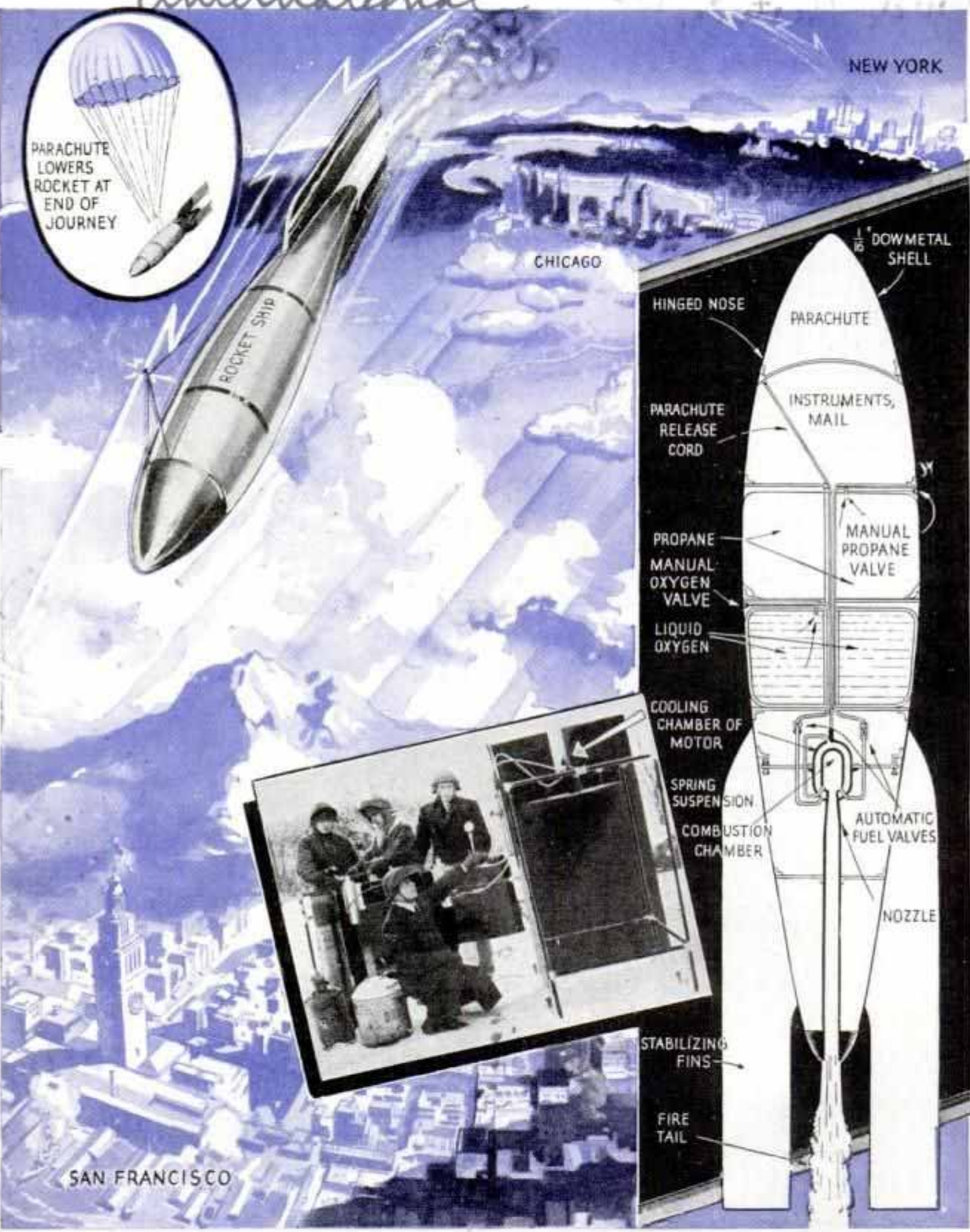


Diagram of Proposed Mail-Carrying Rocket to Be Directed by Radio on Flights across Continents and Oceans; Arrow in Photograph Points to Model Rocket Motor Recently Tested

Rockets controlled by radio may eventually carry mail across the oceans and from coast to coast, sailing through the stratosphere at speeds far greater than the fastest airplanes today. This is the prediction of Ernst Loebell, German rocket engineer and member of the Cleveland Rocket society which recently tested a

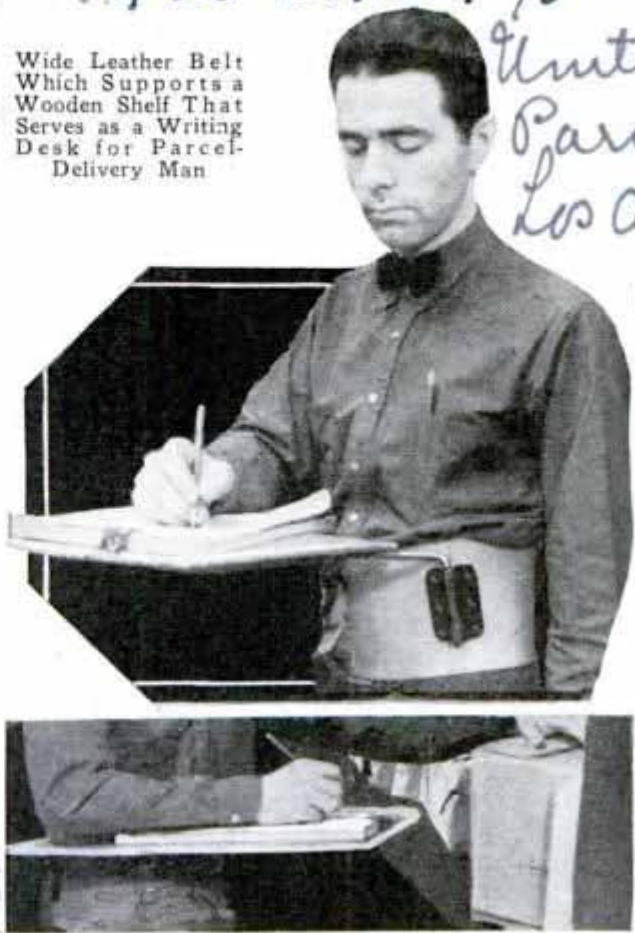
418 Hanna Bldg



*Paul D. Hugon  
420 W. 11th St. %*

model of a rocket motor as a preliminary to constructing a mail rocket. Already rockets have soared, under radio control, over courses 100 miles long, and one rocket, carrying a man who guided it, ascended six miles a few months ago. The bullet-shaped model motor tested at Cleveland was only six inches long and less than two inches in diameter. Yet, when connected to tanks of gasoline and liquid oxygen, it started with a roar from its iron framework to which it was fastened and exerted a pull sufficient to have lifted a thirty-pound weight several miles into the air. It consisted essentially of a metal chamber polished inside to reduce friction of gases and equipped with an expanding nozzle at one end. Fuel was introduced through special openings in controlled amounts and ignited inside the combustion chamber. The expanding gases, rushing out the nozzle, exerted a force which moved the motor in the direction opposite the nozzle opening. A rocket motor does not depend on the push of outrushing gases against the atmosphere for power. Instead, it is the reaction between the gases themselves and the walls of the combustion chamber and flaring nozzle which pushes it forward. Therefore, it can navigate in the stratosphere where there is no air to push against. The Cleveland group is now designing a fifteen-foot rocket intended to be shot several miles into the stratosphere and then descend on a parachute. Information gathered as a result of that flight is to be used in building a mail-carrying rocket controlled by radio. The stratosphere rocket motor is to be fueled with propane and liquid oxygen and it is estimated that it will have a lifting power of 500 pounds. It has been estimated that such a motor, the size of a football and weighing forty pounds, could develop from 10,000 to 15,000 horsepower.

Wide Leather Belt Which Supports a Wooden Shelf That Serves as a Writing Desk for Parcel-Delivery Man



*United Parcel Co  
Los Angeles  
Calif*

*2108 Alameda St.*

slots in a wide leather belt worn around the waist. This arrangement leaves both hands free to turn tags, and when writing, only one hand is employed since it is not necessary to support the desk.

**WATER SOFTENER FOR FAUCET IS EASY TO RECHARGE**

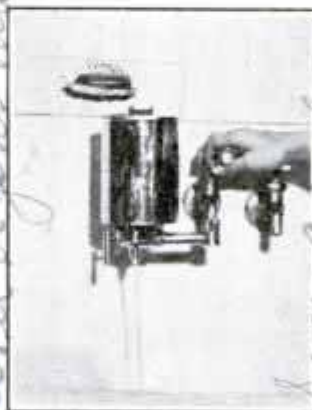
*D114*

Soft or hard water can be obtained from the same faucet if it is equipped with a water-softener attachment which will soften about forty gallons of water without recharging. It weighs only a few pounds and is about eight inches high. The unit contains a valve which can be turned so that either hard or soft water may be drawn, according to whether the softener is operated or not. It can be recharged without removing

**BELT SUPPORTS WRITING DESK AND LEAVES HANDS FREE**

*D92*

One of the employes of a parcel-delivery concern in Los Angeles whose work involves copying information from tags and labels has devised a walking writing desk to speed up his task. It consists of a wood writing surface or platform mounted on a metal frame, the ends of which rest in



from the faucet by adding a quarter of a pound of salt to the softening chamber.

*Swiss City, Iowa*

*2108 Alameda St.*

*Paul D. Hugon and Jens Madsen  
420 W. 11th St. %  
Swiss City Iowa*



c 1994  
Braid  
101 Park Ave New York

# Vikings WAR on the



This Denizen of the Deep Fought a Game Battle but Lost; the Whale Weighed Sixty-Nine Tons and Was Embalmed for Exhibition Purposes



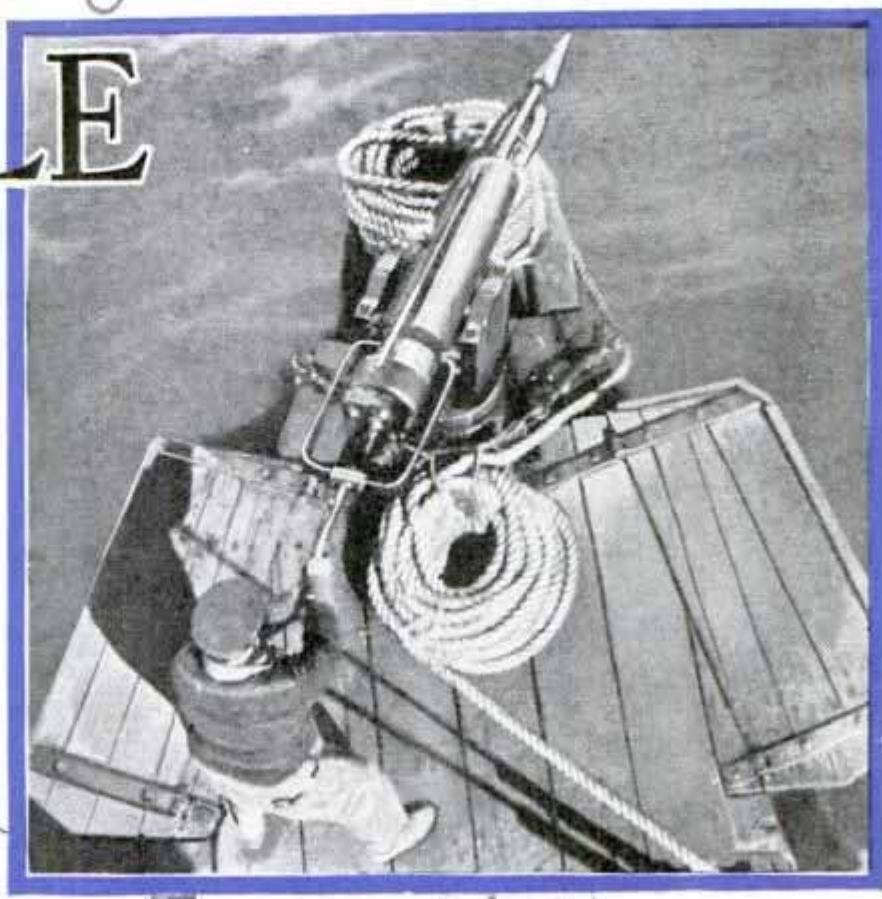
Cape Town,  
South Africa.

61774

# WHALE

By L. G. GREEN

EVERY summer an armada leaves Table Bay. A black fleet against a golden sunset—the great mother ship leading, the whale gunboats strung out in line and swaying to the long seas that come up unbroken from the Antarctic.



Above, Ready to Fire Harpoon; Below, Part of Catch of 1,440 Whales Chalked Up by Norwegian Ship during a 25,000-Mile Journey

This is the right kind of war. It calls forth all the skill and courage of the crews—Norwegians almost to a man—who steam south every year to that frozen battlefield. It is fought with wireless and explosive harpoons. But it is waged so that humanity may have soap and margarine, oil and phosphates. There are giants on both sides; the huge, good-

natured Norsemen, and opposed to them, showing almost human cunning at times, are the largest animals in the world. Also, the whale is the most mysterious creature in the seas. Research ships have been sent out to investigate the migration of these animals, their pairing and breeding habits, and the secret breeding place which it is so important to discover if the species is

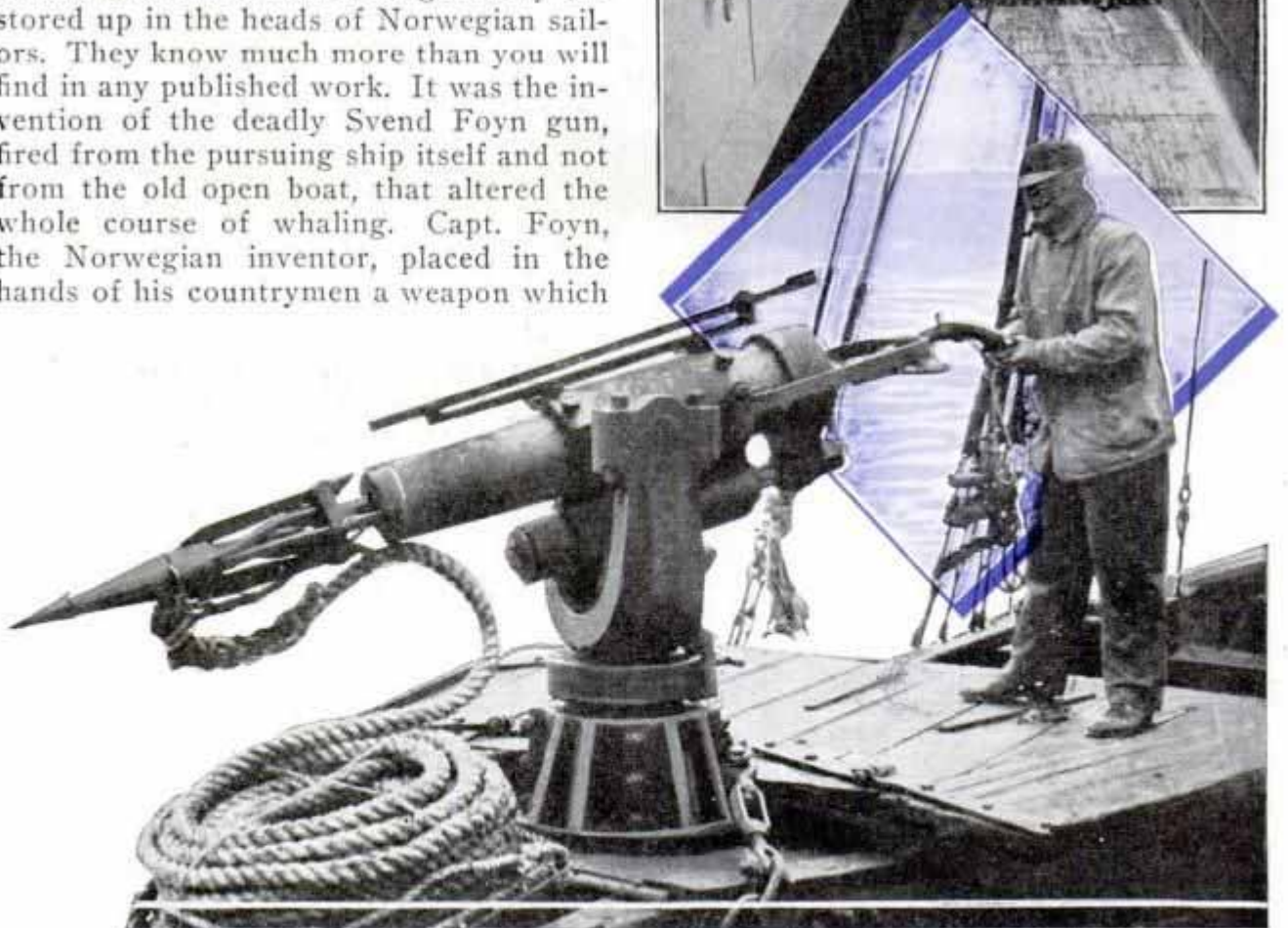
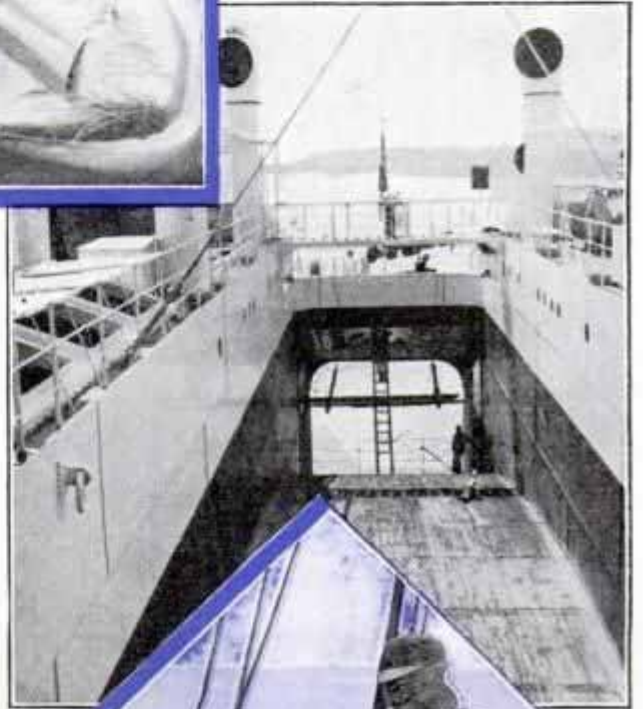




brought them millions in money and the control of whaling enterprise in all the oceans. The Norwegians have kept their knowledge almost entirely to themselves; and who can blame them? Today their mastery of the craft is such that British marine insurance

to be protected against extermination. British scientists in charge of this work believe that it will be twenty years or more before the life story of the whale can be written.

Unquestionably, many valuable secrets of whales and the Antarctic generally are stored up in the heads of Norwegian sailors. They know much more than you will find in any published work. It was the invention of the deadly Svend Foyn gun, fired from the pursuing ship itself and not from the old open boat, that altered the whole course of whaling. Capt. Foyn, the Norwegian inventor, placed in the hands of his countrymen a weapon which



Top, in Mouth of a Whale; Note Strainers Which Catch Minute Food on Which Animal Subsists; Center, Runway through Which Harpooned Whales Are Hauled Aboard Ship; Below, Modern Harpoon Gun



C1994

Edwin S. Morgan



Above, Harpooner Ready for Action; Below, the "Charles W. Morgan," Last Survivor of the New Bedford Whaling Fleet

firms quote a lower premium when a whaling factory vessel bound for the Antarctic is commanded and manned by Norwegians.

The Norwegians are the true explorers of the Antarctic. Remote islands, bays and coasts are well known to the whalers who penetrate waters never seen hitherto by the eye of man. During one of those rare "open seasons" in the south when the seas are free from ice, they must make important discoveries. There must be fascinating charts of new land, roughly drawn no doubt, in the pocketbooks of Norwegian gunners. But they do not tell.

For many years scientists have been trying to discover whether the whales found in the Antarctic spend all their long lives south of the equator, or whether they visit the Arctic regions. Also, some experts say there are but ten or twelve thousand left. The Norwegians declare that there must be a million or more—that they are hunting only on the fringe of vast herds.

This mystery of migration is one which the hard Norwegian seafarers solved long ago to their own satisfaction. When they first opened up the Antarctic hunting grounds they caught whales in which they found old, corroded harpoons and lances of many types. As a result they believe that during the lifetime of a whale—some say a thousand years—it may visit every ocean in the world.

Now we approach a dark secret indeed—the secret breeding place of the whales.

(Continued to page 128A)



*cl. no. Mr. F. W. Doehstetter  
Pittsburgh, Pa*



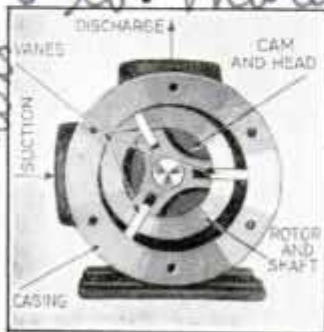
Testing Paper Which Has Been Treated by a Flame-Proofing Process to Make It Resistant to Fire

**PAPER IS MADE FIRE-RESISTANT BY FLAME-PROOFING**

After fifteen years of research, a Pittsburgh man has developed a flame-proofing process applicable to paper, cotton and other inflammable materials. Paper thus treated, it is claimed, becomes highly fire-resistant and is not destroyed even when an intense flame is applied to it.

**EFFICIENT ROTARY PUMP IS SELF-PRIMING**

Self-priming and capable of priming itself with air admitted into the suction line, a rotary pump delivers a greater flow of liquid than many pumps of that type. It operates quietly and without vibration at varying speeds. A suction lift of twenty-eight feet is developed, with the pump delivering more than its rated capacity at a rated speed of 400 revolutions per minute. It will pump air and water at the same time without tendency to air-bind. Action of the pump is positively controlled by means of a stationary cam, thus eliminating the necessity of relying



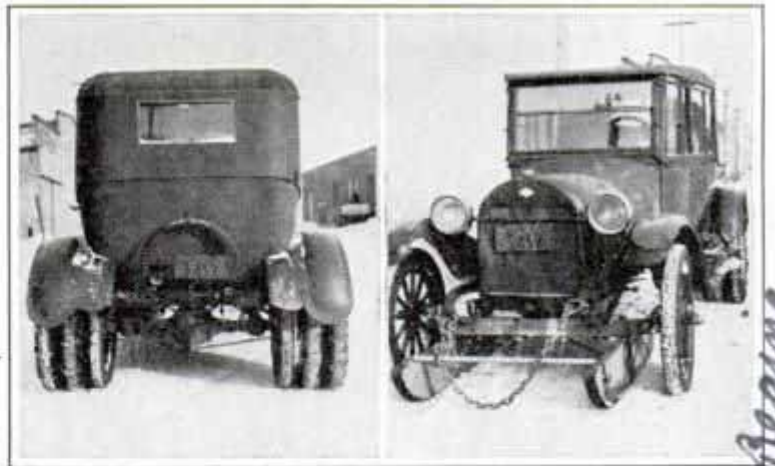
controlled by means of a stationary cam, thus eliminating the necessity of relying

upon centrifugal force, springs or other mechanical devices. With every revolution of the rotor, a definite amount of liquid is drawn into the pump through the suction inlet and discharged through the discharge outlet opening.

**D49 AUTO FOR SNOW TRAVEL HAS EIGHT REAR TIRES**

For traveling in snow-covered country, an engineer in Canada has equipped an old automobile with eight rear tires, runners which turn with the front wheels and a log chain for towing when the car is unable to make its way over particularly bad spots in the

road. The runners, attached to wood reinforcing the front axle, ride about two inches above the ground so that there is no drag on a clear road. Each rear wheel has three extra tires, the complete set of four tires on each wheel giving traction on snow. The runners keep the front end



Car for Traveling Snow Is Shown with Three of the Four Tires Used on Each Rear Wheel; Note Runners on Front

from sinking into the snow. Homemade chains are used, the chains consisting of a number of lengths of one-inch pipe held together by the remains of old tire chains. In summer, these chains serve as cleats for use of the automobile as a tractor in plowing. The construction of the car is unusual, it is understood, consisting of a Chevrolet frame, Chevrolet engine, McLaughlin-Buick radiator, Chevrolet and Reo transmissions in series with each other to obtain a greater speed reduction and a Reo truck rear axle and rear springs.

*Chief Engineer Regina Water Pumping*

*Benedix - Tree Bldg.*

*W. P. Craby  
Panta Machinery &  
Pump Co. Sparta Wis*

*Regina*



*Brewster Aeronautical & Cart Co. New York*

# Cardboard Globes Aid Geography Students

Inexpensive globes are being produced for students of geography for use in the classroom or the home. Made of cardboard, the globes have the network of degrees plainly marked and the topographic details reproduced with great accuracy. Thousands of the globes, ranging from six inches to ten feet in diameter, are being

Top, Cutting Strips for Cardboard Globes; Bottom, Ready for Schoolroom



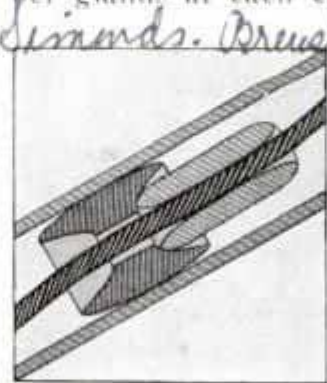
© Presse Photos

produced by a paper factory. Some globes have been equipped with a clockwork mechanism that turns them on their axes every twenty-four hours. The student finds the globe easier to use than a map.

## PUSH-PULL CONTROL "ROD" IS FLEXIBLE D106.

Mechanical parts in the automobile, the airplane and other vehicles and mechanisms may be controlled by a new type of push-pull "rod" which replaces the conventional stiff rod or double cable and pulley systems. The rod consists of a linkage of "olives" and "spacers" with ball and socket ends, threaded on a flexible cable, the whole encased in an aluminum alloy tube which can be bent in any desired direction. The device is made in two sizes

to withstand a pull or push from 200 to 760 pounds. Various types of ends are provided for connection to levers and the parts operated by the rod. Oil-proof rubber glands at each end of the tube prevent dirt and dust from entering and they retain the light oil that lubricates the linkage. The casing tube may be bent around any number of corners without impairing the efficiency. On airplanes, the device is used to control engine, brakes, adjustable propellers, flare or bomb releases, flying controls and other parts.



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*suggested globe made by (\$1.00) summer - 52 & 5 - Cardboard, Chicago*

*Brewster Aeronautical & Cart Co. New York  
Brewster Bldg. 111 E. New York*



D93 528

Columbia Wire & Iron Works  
466 E. Market  
Portland, Ore.

Parcel Cart for Shopper Which Eliminates Carrying



### PARCEL CART FOR THE SHOPPER ELIMINATES CARRYING

Parcel carts capable of supporting fifty pounds of merchandise are being used by shoppers to relieve them of the task of carrying several packages when marketing. The cart consists of a metal frame with a receptacle for the packages and is pushed on rubber-tired wheels. When at rest, it stands upright, but when in motion, it is reclined to a balancing position so the weight is evenly distributed.

### FREE-WHEELING GRINDSTONE RUN BY ELECTRIC MOTOR

Operation by electricity or by hand is possible in a new grindstone. On one side is a small electric motor connected through an overriding clutch to the shaft, while on the other side is the end of the shaft keyed for a hand crank. The grindstone is powered with a motor for use on direct or alternat-

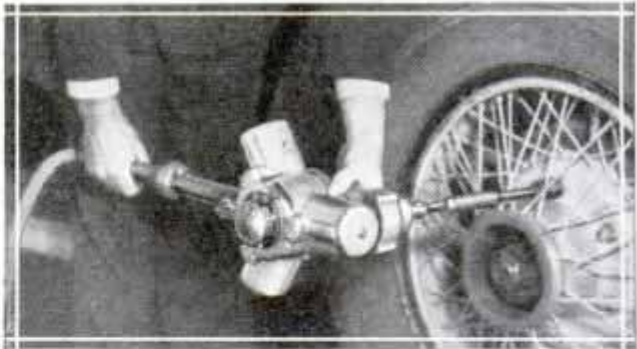


ing current of 110 volts. Encased in a weatherproof cover, the motor permits outdoor operation in any kind of weather. The motor drives the grinding wheel at about sixty revolutions per minute. All gears, shafts and other steel parts subject to wear are made of chrome alloy steel to prolong their lives. The overriding clutch gives the machine a free-wheeling feature. As the current is turned off, the centrifugal force stored up in the wheel causes it to revolve freely while the motor also comes to rest independently. The connection between the two is broken by the clutch and there is no strain on the motor. The machine is designed to take a twenty-two by two-inch natural sandstone. A special tunnel-shaped container permits wet or dry grinding.

D135

### AIR DRIVE OPERATES TOOLS FORWARD OR BACKWARD

Designed to save time and labor in any place requiring mechanical work, a compressed-air tool drive is available. The machine is particularly adapted to tightening and loosening bolts where full power is required, and to turning reamers, driving drills and operating various types of cutting tools. Since it is instantly re-



Power Drive for Tools Shown in Operation; Tightening Bolts on Wheel of an Automobile

versible, it may be used in repair work as well as assembly. The power unit is made of aluminum alloy. The three-cylinder motor is die cast in one unit with the crankcase. A single-throw crankshaft drives a simple valve mechanism which controls the air supply and a strongly tempered gear train. This gear train, running in oil, drives a tool head at speeds ranging from five to 150 revolutions per minute. Compressed air enters from a hose attached to a steel handle.

I. M. Seage & Fleming  
at Farmers Producers Market  
Columbia Wire & Iron Works  
466 E. Market  
Portland, Ore.  
J. M. Nelson market master

Columbia Wire & Iron Works  
466 E. Market  
Portland, Ore.

Hermis Electric Tools  
Elec. & Lumber Co. Co. Co.

Carl Tankerley  
518. Martindale



C2030

Levi W. Lombard

Boston Mass

# Gasoline-Driven Gun as Destructive as Army

Japan claims to have developed a gasoline-driven machine gun capable of firing 9,000 shots per minute. Only meager details of the Japanese gun are available, but it is believed to resemble a machine gun invented by an American fifteen years ago. This weapon was of the centrifugal type, could be operated by motor, steam or by hand and it was claimed it could fire 33,000 shots a minute. It had no barrel, and operated by moving a disk at high speed, the ammunition being fed through a funnel-like arrangement from a tube leading into veins beneath the disk. Claims of great accuracy are made for both guns. The one invented by the American was declared to have sent missiles through three-quarter inch steel at 100 feet.

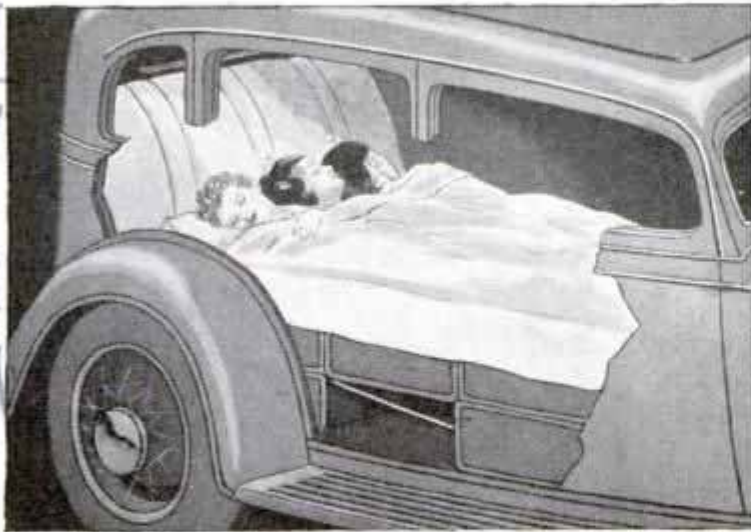


Motor-Driven Machine Gun and the Funnel-Like Arrangement through Which Ammunition Is Fed

## Combined Sleeper and Diner Unit Fits Standard Sedan

By installing special seating equipment in a standard sedan, the automobile can be converted into a sleeping car or diner in a few minutes. To make a bed in the car, the back seat, which is similar to any other except for a steel guard, is reversed

The space thus provided will accommodate three persons. If the driver wishes to continue while other passengers sleep, a temporary back rest is provided. For dining, the unit includes a convertible table in the back of the front seat. There is also plenty of storage space for food, sheets and blankets.



Interior of Sedan Transformed into Sleeper by Utilizing a Special Unit Which Makes the Conversion Possible

and the back rest of the front seat is allowed to fall to a horizontal position by loosening two screws attached to a lever.

move, but the Dry-Ice at more than 100 degrees below zero does this cooling operation almost instantly.

### LIPSTICKS MADE WITH "DRY-ICE"

Lipsticks now are being made with the aid of Dry-Ice. The solid carbon dioxide is used to cool the sticks, giving proper consistency to the cocoa butter or other substance forming the base. The cocoa butter is melted and the coloring matter added after which the preparation is poured into molds. If left in the air, several hours would be required for the sticks to become rigid enough to

add. info. Inverness Co. 24 W. 4th St. N.Y.C.

Embry Robert, 520 Broadway, N.Y.C.

Louis Lubin

See previous



# Pipes on Pigeons Bring Music from the Skies

Pigeons Equipped with Small Reeds, Like Tiny Organ Pipes, Which Emit Musical Notes When the Birds Fly



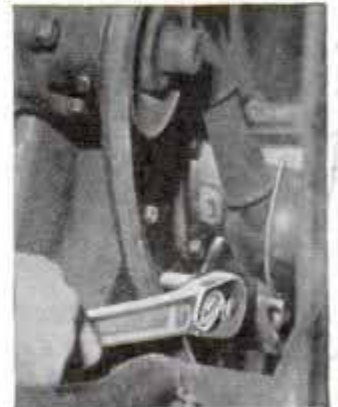
To the Chinese, the musical note of a reed pipe or the soft glow of a lantern in a garden offers satisfying entertainment, and they have harnessed the energy of birds and even of insects to provide such simple amusement. Tourists are often startled to hear soft music coming from the skies, but a glance upward shows only a flock of pigeons darting about. An examination of the birds at close range would reveal the secret for small reeds, like tiny organ pipes, have been attached to their tail feathers. When these birds fly, the wind blows through the pipes, which are tuned, and the musical notes result. Lanterns scintillating with light are also often seen and these may be real firefly lanterns—receptacles with transparent sides filled with the tiny insects and suspended in trees and gardens.

D34

## SHIFT LEVER REVERSES DIRECTION OF ACTION OF RATCHET WRENCH

For working in close quarters, a ratchet wrench is offered in which the direction of operation can be changed by flipping a lever

in the head of the tool. The only part of the mechanism extending beyond the head is the lug against which the thumb presses, so there are no parts to get in the way. The tool will fit any standard detachable socket or part having a one-half inch square drive opening. The concealed spring and ratchet gear are of rugged construction, and the words "On" and "Off," stamped in the head, indicate in which direction the ratchet is set. Thus a change can be made without moving the wrench from the work.



D102

## TRAVEL BY MONORAIL TRAINS PREDICTED BY ENGINEER

Travel by trains running on a single rail and kept from falling over by spinning gyroscopes is predicted by Dr. J. F. S. Ross, British engineer, after investigation of the problem of using gyroscopic stabilization. Dr. Ross points out that if once the arduous and expensive stage of experiment with monorail trains is successfully surmounted, the world may look back upon double-rail traction as antiquated and clumsy. With the railroads going modern, Dr. Ross believes that serious thought may be turned to the monorail for land transportation, as a means of allowing the railroad to follow not too far behind the increasing speed of the passenger and freight-carrying airplane.

*By Prof. Gyroscopic Stabilization of Land Vehicles. J. H. Williams*

© Wide World Photos

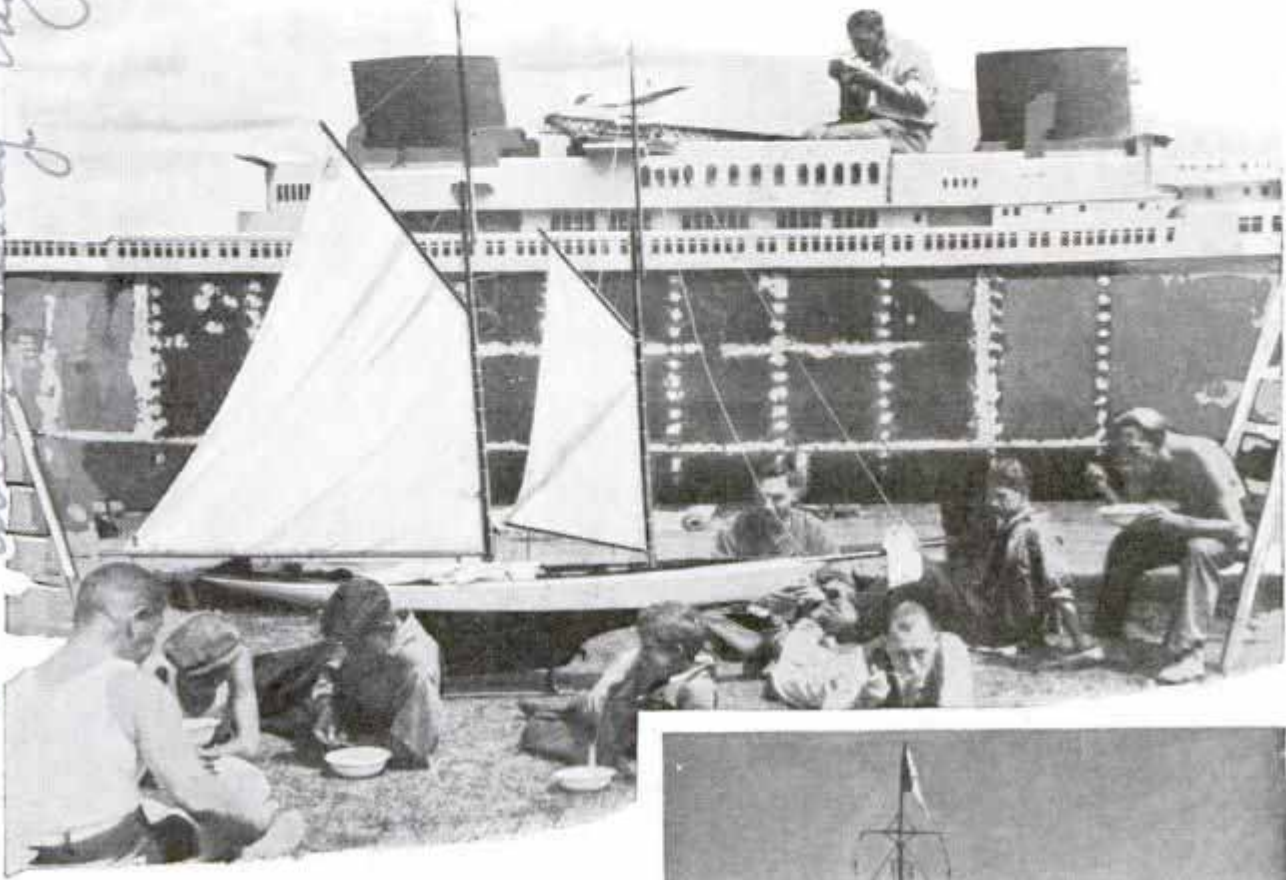


C1830 Oberleutnant Max Bartel  
Dresden, Germany

# AMAZING SHIP MODELS

## Teach Sea Lore

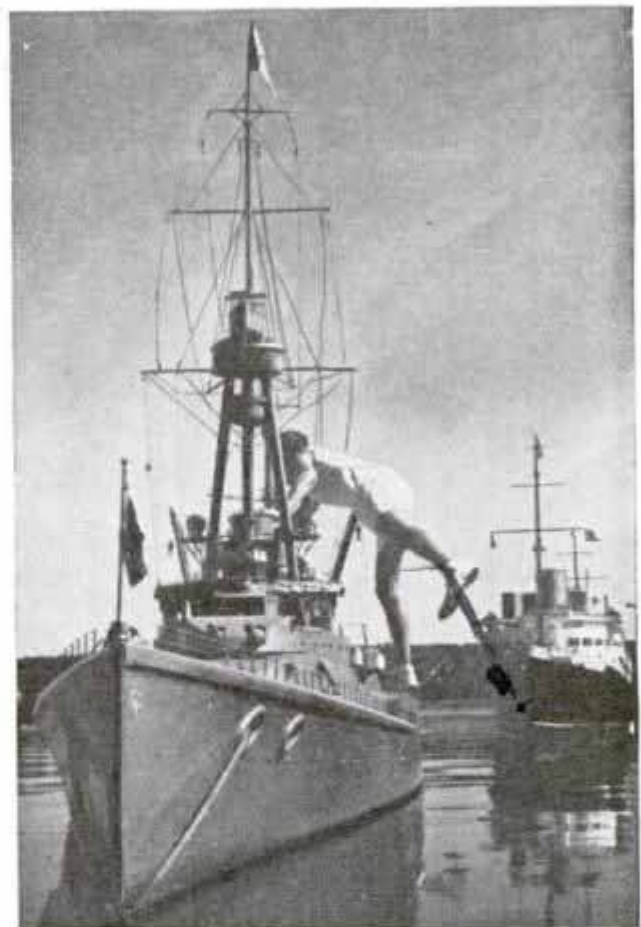
Com. J. S. H. Davis, Esq.  
"Lynners" 7 "Hollands Wood,"  
Wellbury, Surrey, England



ONE of the most remarkable dockyards in the world is located near Potsdam, where an old seaplane station has been converted into a plant for building large working models of famous boats. Here unemployed German boys between twelve and eighteen years of age, who have ambitions for sea or engineering careers, are trained to become model ship builders.

Much of the material and many of the tools have been donated by large manufacturers, and the models are taken to inland towns for exhibition. One craft is a model of the battle cruiser, "Hindenburg," which was surrendered after the Armistice was signed and was scuttled by its crew at Scapa Flow. This boat is nearly thirty-three feet long, has a beam of a little less than five feet, weighs more than three tons and makes a speed of more than seven miles an hour.

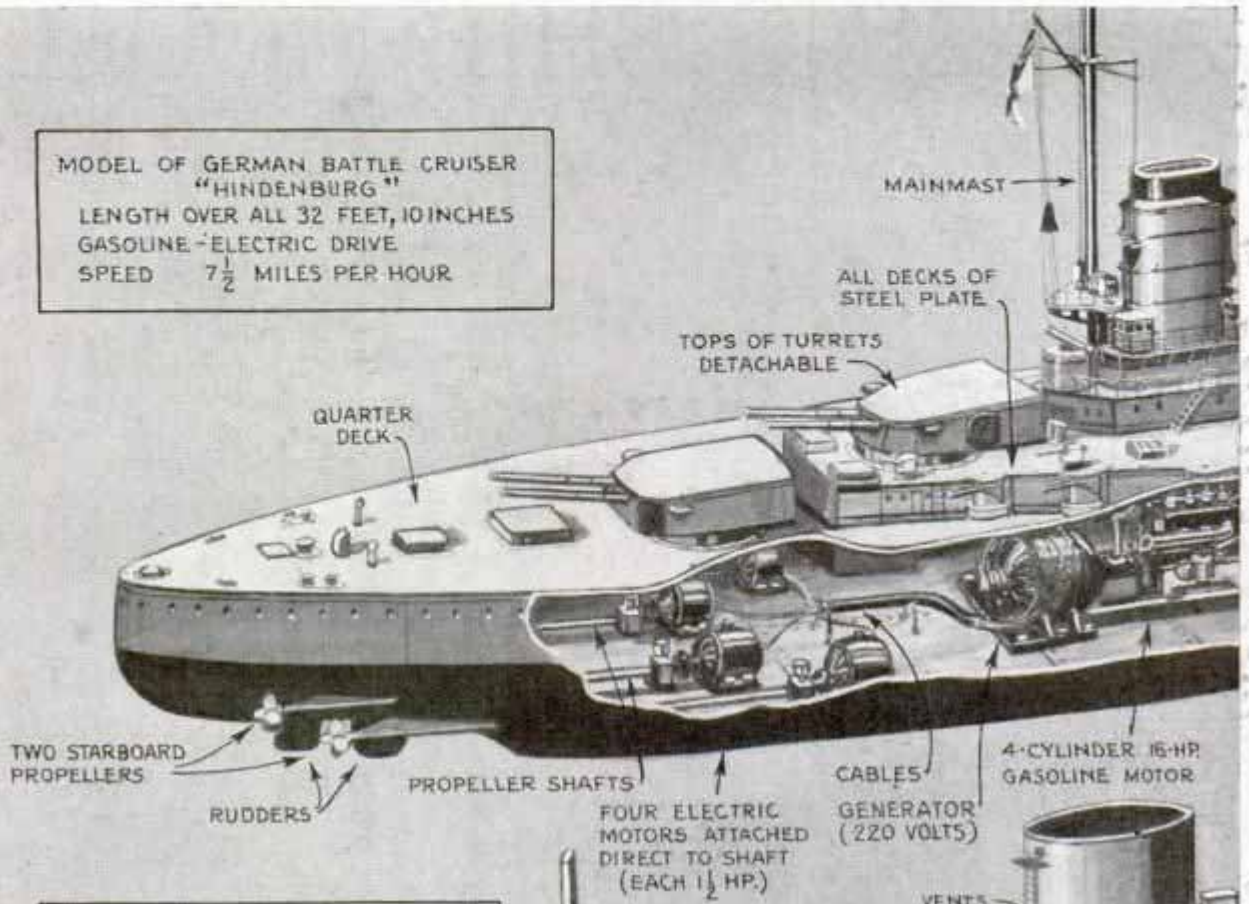
The ship is constructed of sheet-metal plating and is operated by a crew of two. It has a four-cylinder gasoline motor and



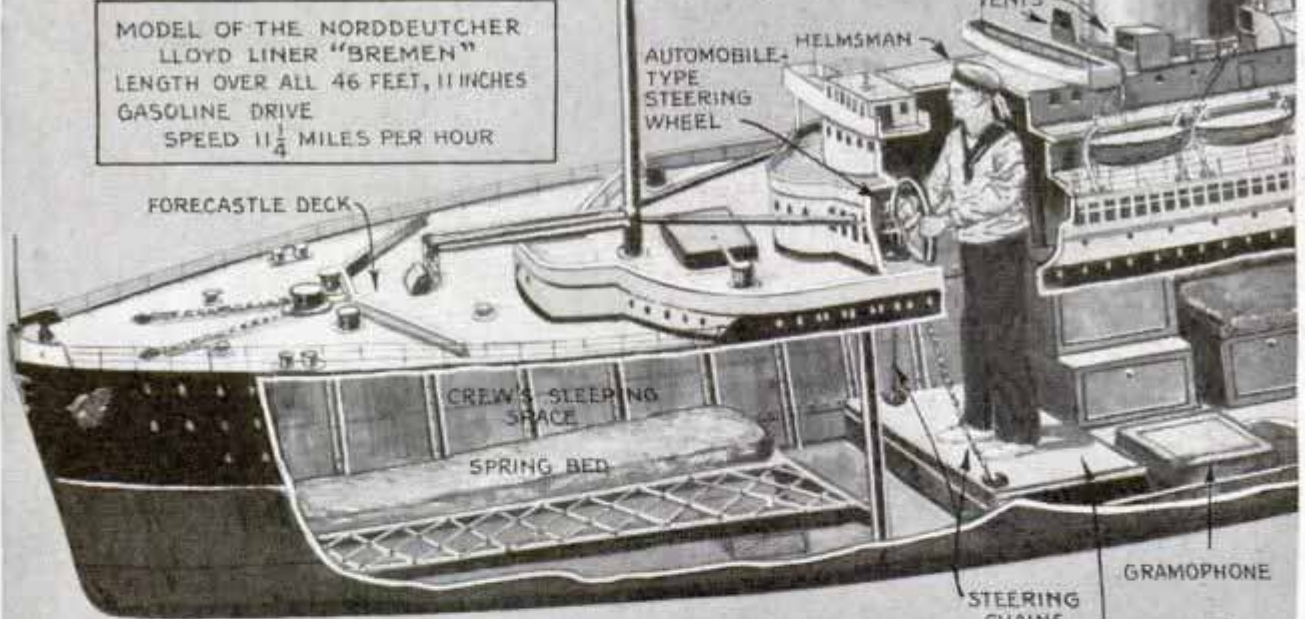
Above, Boy Builders Eating Lunch with "Bremen" Model as Background; Note the Size of the Model as Compared with the Model Builders; Below, Model of "Hindenburg"



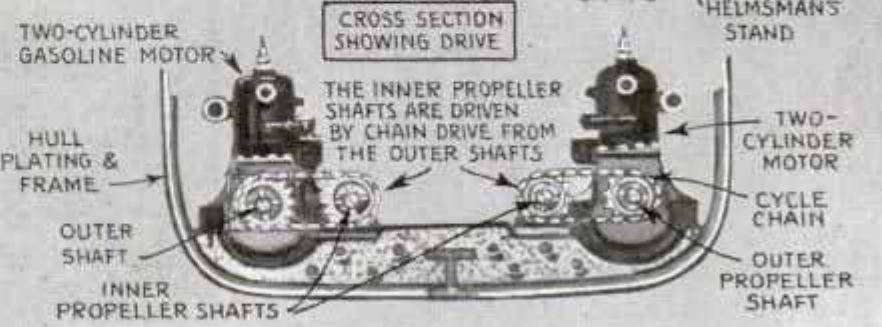
MODEL OF GERMAN BATTLE CRUISER  
 "HINDENBURG"  
 LENGTH OVER ALL 32 FEET, 10 INCHES  
 GASOLINE-ELECTRIC DRIVE  
 SPEED  $7\frac{1}{2}$  MILES PER HOUR



MODEL OF THE NORDDEUTCHER  
 LLOYD LINER "BREMEN"  
 LENGTH OVER ALL 46 FEET, 11 INCHES  
 GASOLINE DRIVE  
 SPEED  $11\frac{1}{4}$  MILES PER HOUR

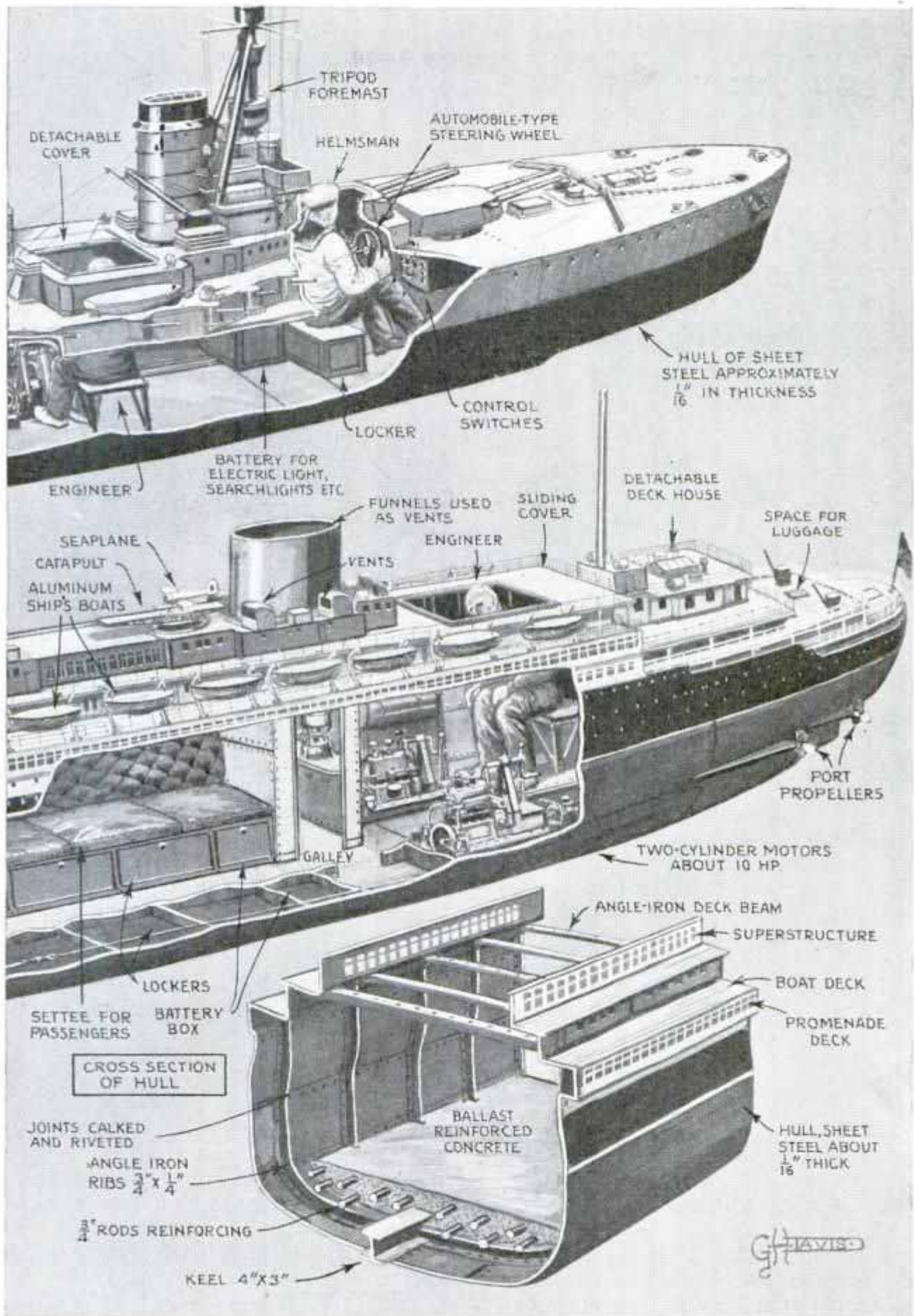


ALL FRAMES OR RIBS ARE OF  $\frac{3}{4} \times \frac{1}{4}$  ANGLE IRON  
 DRILLED FOR RIVETS (FOR SECURING PLATES OF HULL)



Cut-Away Drawings Showing Construction of Two of the Large Working Models of Famous Boats Built by German Boys; the "Hindenburg" Weighs More Than Three Tons

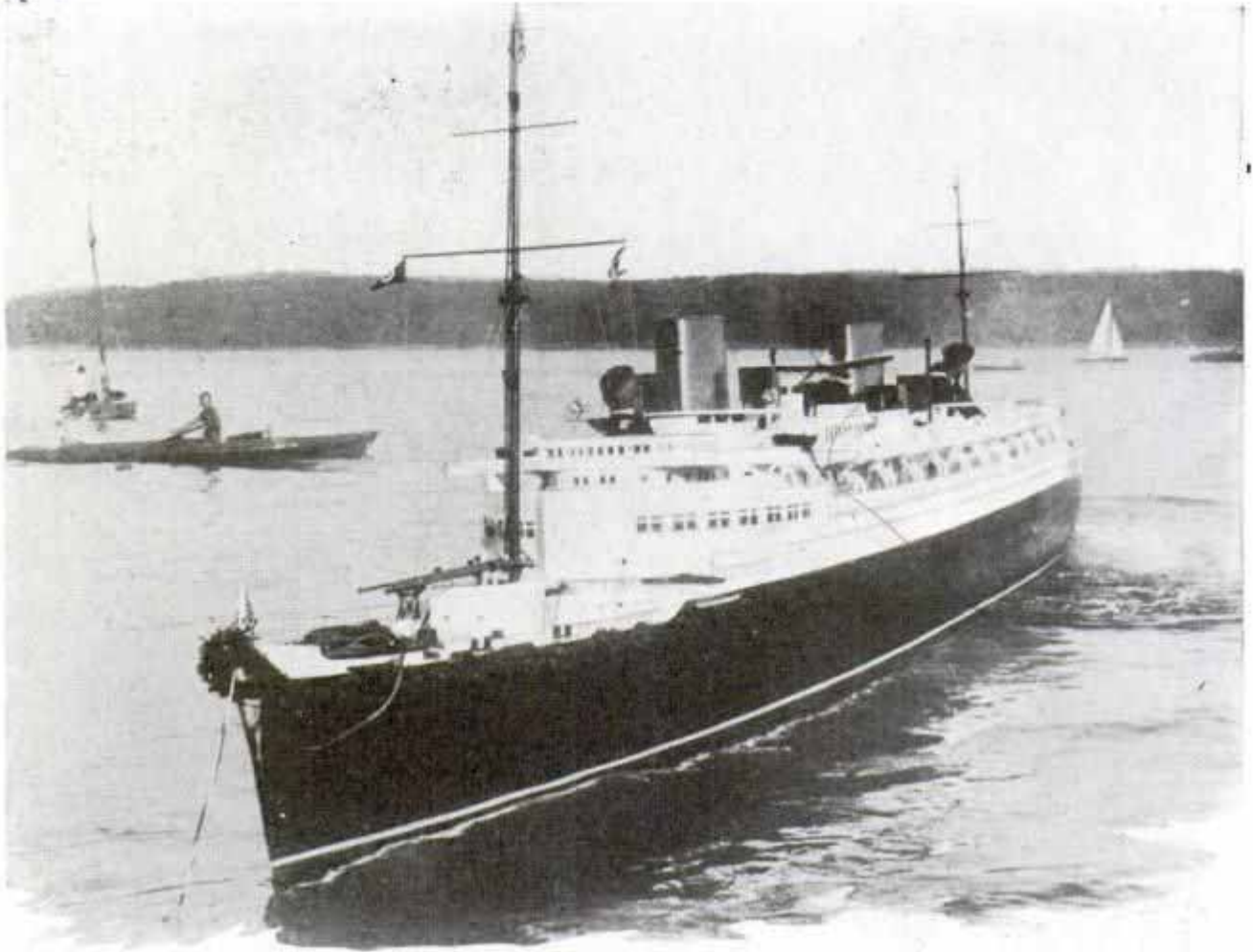




The Model of the "Bremen" Weighs More Than Six Tons, Is Nearly Forty-Seven Feet Long, Has Gasoline Motors and Can Accommodate Six Boys, Including the Crew of Two

Handwritten notes at the bottom of the page, including the number "200" and some illegible scribbles.





Model of "Bremen" Afloat after Official Launching: Note the Heads of the Steersman and Engineer Protruding above the Decks as Craft Embarks on Her Maiden Voyage

a gasoline-electric drive. A dynamo is coupled to the gasoline engine and four electric motors are connected directly to the shafts of the four propellers.

The largest craft thus far built is a model of the "Bremen," which broke the transatlantic record. This ship is nearly forty-seven feet long, has a beam of about five feet, weighs more than six tons and makes a speed of more than eleven miles per hour. This boat is also of sheet-metal construction with angle-iron frames. The plating is about one-sixteenth of an inch thick and was cut by hand. The ribs or frames, of angle iron, conform to the lines of the hull and are spaced about nine inches apart. The hull is riveted together and calked, the lower portion being filled with reinforced concrete to give strength and rigidity and act as ballast.

This vessel has sleeping quarters for the helmsman and engineer, and other bunks provide sleeping space for four passengers. There is a regular cook's galley, the vessel carries its own music in the form of a

phonograph and a radio receiver, and the ship has its own electric-light plant. The model fleet also includes the liner, "Hamburg," a four-masted sailing ship and a tanker for carrying supplies to vessels.

The idea originated with a German marine painter who served on a submarine during the world war. He raised money to start the model building school by painting and selling sea scenes, then was assisted by manufacturers and wealthy persons, who become interested in his plan of providing such an outlet for the energy of unemployed boys interested in the sea and also in model construction.

The boys receive no direct pay for their work, but are clothed and fed and obtain pocket money from the sale of pictures of their ships. The boats have been found useful in educating inland people unfamiliar with the sea and with shipping.

□ Nobel's invention of dynamite cheapened iron, lead, copper and zinc so industry could use the metals in new ways.

*Siemens Service*  
11/18/24



**CHISELING MACHINE QUICKLY CUTS GROOVES IN WALLS**

Grooves for electrical cables may be cut quickly and cleanly in walls by means of a machine containing several free-swinging chisels made of special steel. From 4,800 to 6,000 blows per minute can be delivered against any spot on the wall, resulting in accurate work. Width of grooves is regulated by the number of chisels, while the depth is controlled by an adjustable stop. The tool is inclosed in a safety aluminum casing. Rubber rollers help the operator to guide it along the wall. Felt strips prevent dust. In the lower part of the casing is a funnel-like opening to which a bag may be attached to collect particles chiseled out of the wall. A three-foot groove can be cut in a brick wall in four to five minutes, the same job requiring fifteen to twenty minutes when done by skilled hand labor. An electric motor drives the chisels.



White Outlines in Upper Center of Photo Show Filament of Latest Headlamp Bulb

to the specifications of shorter focal lengths without loss of lighting efficiency as determined by the quantity of light intercepted by the reflector and re-directed in the beam. Latest headlamp reflectors are much more sensitive to variations in the position of the light source. In order to minimize this variation to practical limits, the bulb is designed so that it allows a maximum tolerance of one-hundredth of an inch in the light center position, just one-fourth the variation allowed in former types. The focusing collar has three "key-hole" slots which prevent installation of the bulb in any except the correct position.

**VENTILATOR ON AUTO WINDOW FITS ANY CAR**

Ventilation of the interior of the automobile without introducing drafts is accomplished by a patented ventilator that can be attached to any car. It is easily installed. Working on a ball and socket joint, the ventilator can be turned at any angle, or when not in use it can be turned inside of the car. It has been tested in open position at a car speed of forty miles per hour, a lighted match retaining its flame in any part of the car.



Cutting Groove in Wall for Electric Cable; Note Equipment Carried by Workman

**AUTO LIGHTS ARE IMPROVED TO BETTER FOCUS**

Changes in the design of automobile headlamp bulbs have been made necessary by the demand of engineers for smaller headlights which contribute to a rounder "nose" on car fronts. Westinghouse Electric and Manufacturing company has produced a "streamlined" bulb that solves the problem of shorter focal lengths in the reflectors of smaller headlamps. This new bulb is prefocused and has a collar constructed around its base. It conforms

*Ans. Hans A. Kutschbach, Berlin, Lanbury*

*Crawford 17931*

*Smilton*

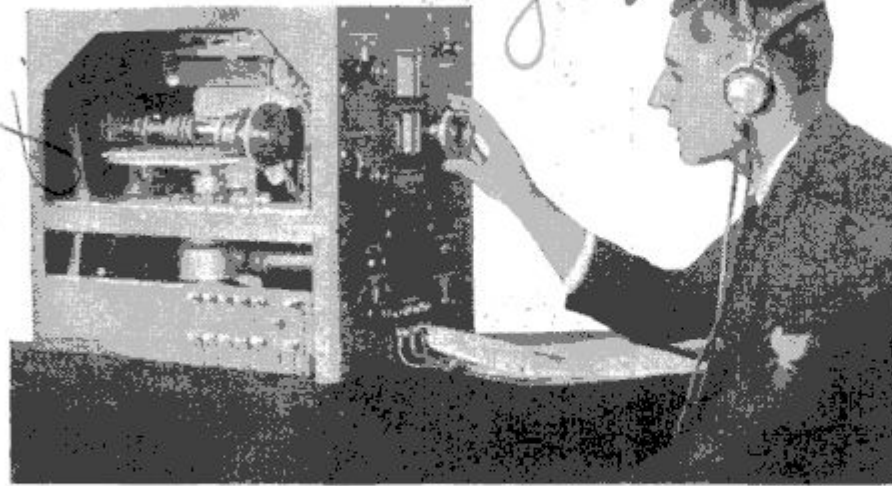
*Iserman product.*

*Westinghouse Lamp Co. 300...*

*Charles C. Singer, 25 Glen Cairn, I. Arm. Apt. 2-6, Montreal.*



# World's Ships to Talk Same Code Language



Vessels of the chief maritime nations of the world may now talk the same language, the result of a new international code of ship communication just adopted. The code is the outgrowth of communication difficulties encountered by vessels of different nationalities during the World War. Neutrals and belligerents could not understand each other. The code is simple. For each letter of the alphabet there is a flag. And for each numeral there is a pennant. In conjunction with these there are three repeater flags and a code and answering pennant. Messages are conveyed by letter groups. In the visual code, these letter groups do not exceed four letters. For instance, flags H and Y run aloft mean, "You should beware of derelict dangerous to navigation in position mentioned." HYB means something else. Repeater flags mean repeat the letter. For instance HYB and the first repeater means HYBH, the second repeater would mean Y and the third B. Before an international code message is sent the sending ship runs up the code pennant. The answering pennant (which is the same) is flown by the receiving ship after the message has been received. There also is a radio code in which five-letter groups are used instead of four. This is done as a precaution to reduce to a minimum

A		L		W		NUMERAL PENNANTS	
B		M		X			
C		N		Y			
D		O		Z			
E		P		REPEATERS		1	
F		Q			First Repeater	2	
G		R			Second Repeater	3	
H		S			Third Repeater	4	
I		T		CODE AND ANSWERING PENNANT		5	
J		U			Code and Answering Pennant	6	
K		V				7	
						8	
						9	
						0	

Top, Operator Receiving Universal Radio Code Recently Adopted for Shipping; Bottom, World Marine Flag Code Which All Ships Will Use; Both Codes Resulted from Difficulties in Communication Between Vessels of Different Nationalities during the World War

*Hydrographic Office, U.S. Navy*

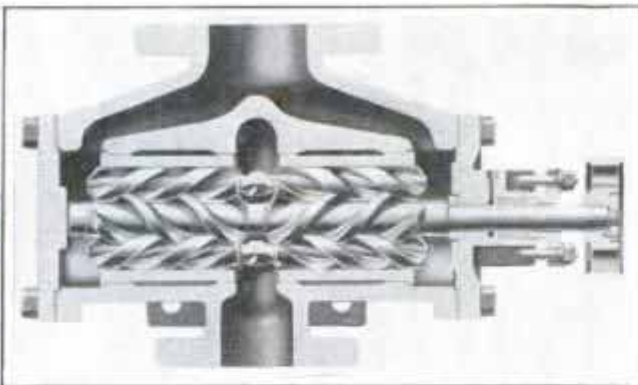
*Copyright 1949 by the U.S. Navy*



chances of error. Adopted by twenty nations, every ship of any consequence will carry the new code books. In the visual code the original alphabet of twenty-six letters produces twenty-six messages, the two-letter combination 637, the three 13,724 and the four, 11,000. The radio code produces 35,600 combinations. Eleven thousand of each code represent geographical places. Nine hundred and fifty of the radio letter groups are purely medical. Ship communication by flag signals dates back to ancient Greece when an admiral of that country was said to signal his ships by running aloft his purple cloak.

**STEAM-DRIVEN FUEL OIL PUMP IS HIGHLY EFFICIENT**

Highly efficient and economical, a steam-driven fuel oil pump is being offered in a compact unit. A worm reduction gear enables the small turbine to operate the pump at high speed, yet at low cost. The pump is of the rotary displacement type, having no valves, only one shaft packing and no packings under high pressure. The speed of the turbine is controlled by a small hydraulic governor operating a



Cutaway View of Pump for Fuel or Lubricating Oil; It Is Driven by Steam

throttle valve. Oil for lubricating the worm and gear bearings and teeth is provided by a self-contained system, including a filter through which the oil is circulated. The unit will deliver oil to burners or to a lubrication system at any rate up to 500 gallons per minute.

**SPOT-LIGHT "SPECTACLES" AID IN DOING CLOSE WORK**

Spot-light "spectacles" have been developed for doing close work on delicate

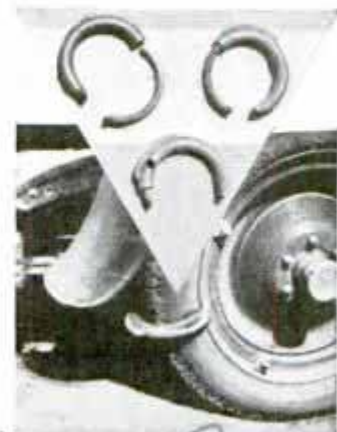


Double Spot-Light "Spectacles" Which Illuminate Close Work and Leave the Hands Free

machines, models and small objects. Double spot-lights are attached to a spectacle-like frame, a bar replacing each lens framework. The device rests on the nose and the bar with its two lights is just above the level of the eyes, one bulb being above each eye. A wire extends from the lights to a four and one-half volt battery which is carried in the pocket. Reflectors behind the bulbs can be tilted to direct the light up, straight ahead or down.

**MUD HOOK FOR THE AUTO TIRE IS EASY TO PUT ON**

Mud hooks or snow grippers made particularly for automobiles with disk wheels are easy to put on and as easy to remove, even in mud or snow. The grippers are made of malleable iron and each consists of two parts, one curved section telescoping into the other. To install, it is only necessary to join the two sections around the tire in front of a lug bolt, pull the telescoping part out until the heels come in contact with the rim, then pull up against the tire. To remove, the procedure is reversed. Two hooks are usually used on each rear tire.



*De Laval Steam Turbine Co.*

*class: 250 W  
34th. New York*

*Calgary, Alberta, Canada*

*cl. no. J. D. Core  
401-15th St. N.Y.*

*C2058*

*C2026*



©1963 Eastman Kodak Co  
Rochester, NY

# The Latest WONDERS



especially interested amateur criminologists because it suggested a possible short cut to the apprehension of murderers.

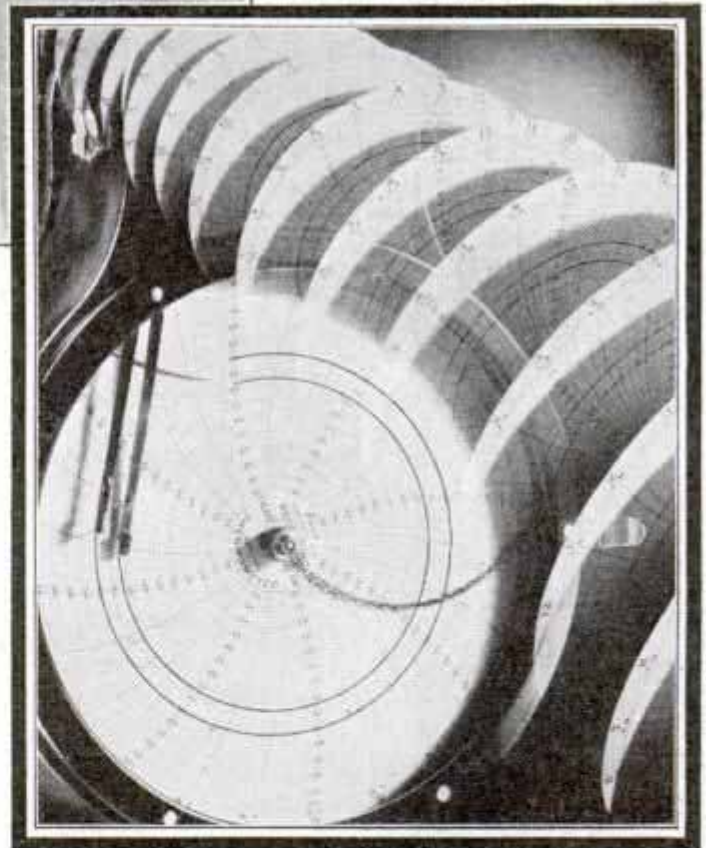
The rest of Kipling's background for the idea rests on the startling fact that, under certain laboratory conditions, it is truth, not fiction. Experiments revealing the probable basis for the belief were reported in a medical book contemporaneous with Kipling's story. Perhaps, before Kipling wrote "At the End of the Passage,"

By FRANKLIN COURTNEY ELLIS

DEATH by sheer terror had taken a victim at a lonely spot in India, which in midsummer is a cauldron no white man should enter.

The question was, what sight, even in a land of jungle and mystery, could have stricken the exiled engineer with a fear so deadly that he could not survive it? His closest friend found out—so goes the Kipling story—by photographing into the open eyes of the dead man with a kodak, and, when the films were developed, tore them up in horror.

Kipling's literary use of the idea that the retina of a man's eyes will retain and reveal the scene he carried to sudden death reflects two backgrounds. First, it brought to black and white the persistent but highly mysterious belief that in violent death the eye may become a photographic record—a belief that has



Top, Photo-Montage Telling Story of Chemical Purity of Yarn; Below, Recording Thermometer Intended to Show Constant Temperature Maintained in Making Chemical

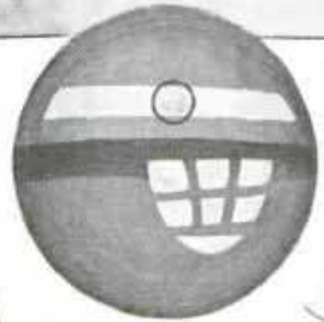
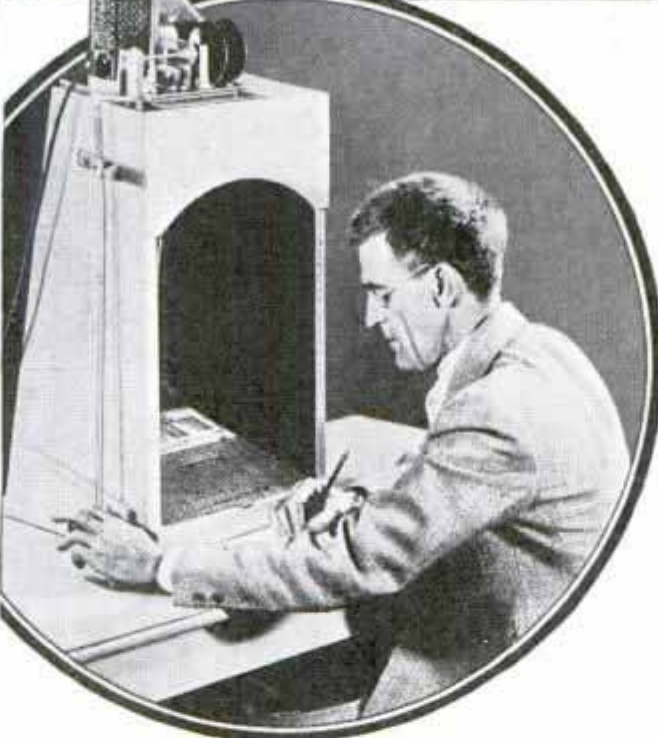
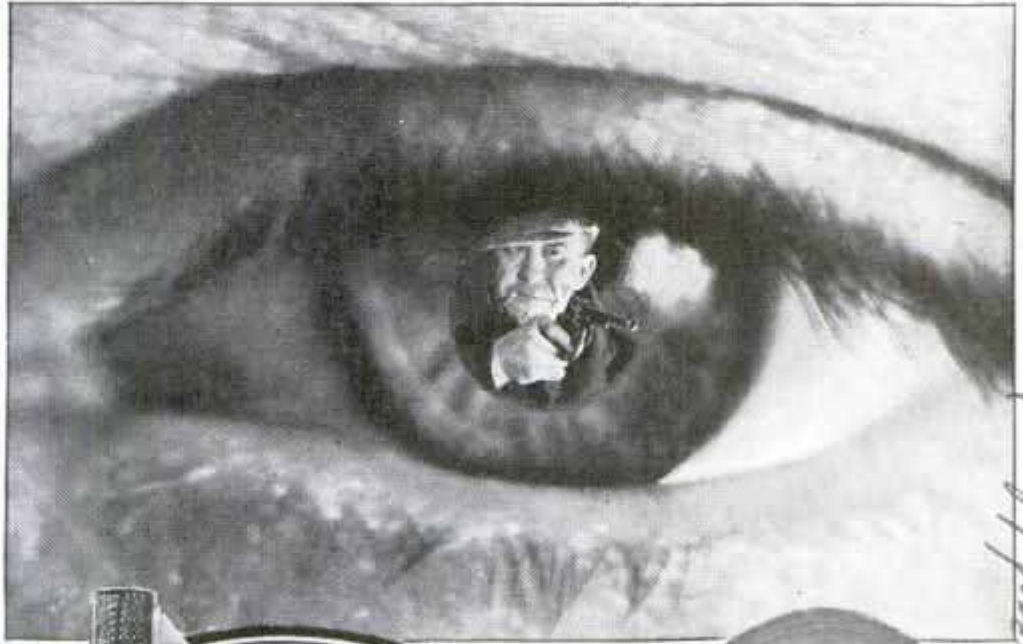
he knew of this finding by Michael Foster, of Cambridge university:—

"If the image of some bright object, such as a lamp or a window, be thrown onto the retina either of an eye in its nat-



C 1963

# of PHOTOGRAPHY



Left, Newspaper Pages Copied on Tiny Strip of Film and, Above, Viewing Device Which Enlarges the Page Images so Any Page or Any Column Is Easy to Read

Lower Photo Courtesy W. B. Saunders Co.

Top, Under Certain Laboratory Conditions, the Image of a Murderer Might Be Retained in Retina of Eye of Victim; Below, "Photographic" Image of Window Fixed in Death on the Retina of a Rabbit

to be bleached, the rest of the retina remaining purple. In fact, an 'optogram' of external objects may thus be obtained."

ural position or of one recently excised, care having been taken to keep the retina for some time previous away from any rays of light, the portion of the retina on which the rays have fallen will be found

see that this laboratory fact that has become a photographic superstition is not likely to solve any murder mysteries. The image on a retina is obliterated in a very short period of time. Unless the retina were removed and chemically "fixed" within a fraction of a minute, no image would remain. If a surgeon happened to be on the spot, equipped to remove a retina immediately after a murder, he would

*(medical supplies)*

*7/14/34*

*7/18/34*

*Dr. Roy S. Hopkins, Eastman*



© 1963



Lower Photo Courtesy Dr. L. Bendikson. Above, Enlargement from Miniature Negative Indicated by Arrow; Right, Note Big Lens on Little Camera; Below, Showing How Infra-Red Photography Revealed Deleted Passages of Old Manuscript



camera. Except for its improved design, this man's camera may appear to be the same he carried a few years ago, but look sharp. This camera probably has a larger lens. Thereby hangs a tale.

That is one reason why he need no longer be a "fair weather" photographer. On dark days, or early in the morning on that dawn fishing expedition, or late in the afternoon when he returns from work,—so long as there is daylight, his modern camera will get the picture.

The nearest thing to the impossible in 1934 is to ask the impossible. Photographic science, which had not been "stumped" at photographing carbon-dioxide gas at least 26,000,000 miles away on

Venus and human beings in black darkness on earth, has also produced a film especially suited to indoor photography by electric light. Under those conditions the new "super-



The Huntington Library, San Marino, Calif.

be likely to turn his attention instead to struggling with the murderer, while the vague retinal image faded away for want of a four-per-cent potash alum bath.

Putting aside for a moment the more obviously spectacular achievements of this science of light pictures, let's see what the ordinary citizen may do with his own

sensitive panchromatic" film gets a picture with three times the speed possible five years ago. Multiply the increased speed of the film by the increased light transmitted by the lens, and it will be apparent that pictures indoors may be made nine times faster than formerly.

Amateur photographers today also have

Handwritten notes at the bottom of the page, including the number '41'.

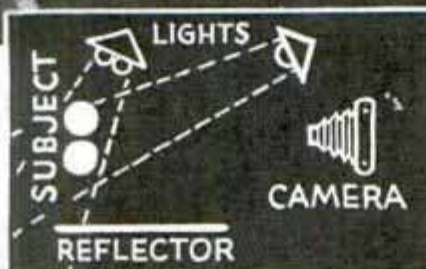




Arrangement for Making Indoor Snapshot at Night with Photo-flood Lamps; Below, the Result

photo-flood lamps which fit the regular electric sockets, or into special reflectors, and make the room bright enough for snapshots. Gone at last is the need for tedious time exposures. Each photo-flood lamp in an efficient photographic reflector gives a light equivalent to that of twenty-five ordinary 100-watt lamps. Lamp for lamp, in other words, 1934 photographic illumination can be twenty-five times as great as the electric lighting commonly available for amateur photography five years ago, counting in the fact that the average amateur photographer would not then have had easy access to special photographic reflectors. Multiply twenty-five by the nine-times increase we calculated for the speed of film and camera, and our 1934 amateur's possibilities for taking night pictures in the house have been speeded up more than 200 times.

Some amateurs today are sighting through cameras only half as large as a hand. These are the instruments of "miniature photography," producing negatives that can be covered almost completely by a special-delivery stamp. The mode of these miniature photographers is to make a number of shots of each subject. Then,



after the film has been developed, they take enlargements from the best negatives.

Here, again, the photographic scientists have stepped in to provide the material that progress demanded: another new type of film, one in which the clumps of silver-salt grains are so fine that big enlargements of excellent quality can be



© 1967



existence to previous experiments on natural-color movies and on the distortionless recording of sound on film.

Interesting work also has been done in the past five or six years with photographic film sensitive to the invisible infra-red rays, especially in penetrating through haze to make pictures at great distances and in taking pictures in the dark. A man who discovered something else interesting that could be done with infra-red photography is Dr. L. Bendikson, of the Huntington library, at San Marino, Calif., near Los Angeles.

Three hundred years ago the Spanish Inquisition's censors were very busy crossing out with heavy ink streaks the "undesirable" printed passages falling into their



Top, Photo-Montage to Advertise X-Ray Film; Note Radiograph of Chest in Background; Below, Example of Photo-Mural Decoration; the Walls Are Covered with Enlarged Snapshots

made from miniature photography's tiny negatives.

Yet it is not really so simple, this business of providing new photographic materials for the asking. When we speak of "fine grain" in film, we must think in terms of millionths of an inch. When the objective was gained, not long ago, the pedigree of this sensitive fine-grain film was extraordinary. Among other things, the film for miniature photography owes its

hands. A number of the world's great museums possess valuable manuscripts with parts made illegible by the Inquisition's black brush.

In his search for a means of penetrating the censor's dense ink, Dr. Bendikson came upon the idea that if the pigment in the obliterating marks were a different material from the pigment of the original printing ink of the manuscripts, the two

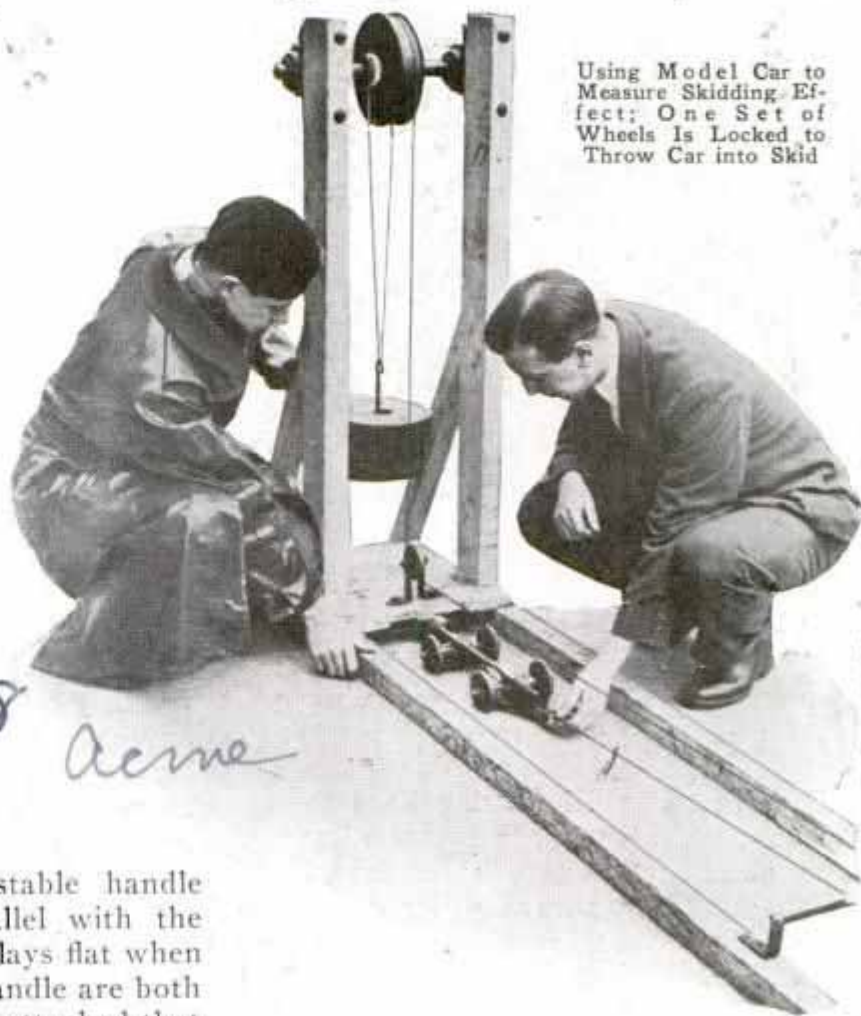
(Continued to page 116A)



# How to Prevent Skidding Is Shown by Tests

British scientists of the ministry of transport are trying to find out how to prevent skidding of an automobile. In determining the cause and effect of skidding, they use model cars and carefully measure results. One set of wheels of the model is locked and the car is given a sudden shove to throw it into a skid, the extent of which is recorded on a meter. The lesson for motorists is to be sure their brakes are equalized and to avoid locking the wheels of their cars.

Using Model Car to Measure Skidding Effect; One Set of Wheels Is Locked to Throw Car into Skid



C2028

Acme

## MOVING HANDLE MAKES FREIGHT HOOK SAFE

Equipped with an adjustable handle which can be turned parallel with the hook, a safety freight hook lays flat when not in use. The hook and handle are both of metal and the latter is so attached that it can be given a quarter turn. After hook and handle are parallel, the tool can be laid down without leaving the hook exposed. The handle end of the hook is squared to fit a similar squared hole in the handle, a spring keeping it in place when the hook is in use. When not in use, the handle is pushed down and turned to bring the hook into the safety position, as illustrated.

Jango H. Kinap Co  
Los Angeles, Calif.



## SEA-GOING BUTTERFLIES

Sea-going butterflies are not uncommon and a few recently made the voyage from the United States to England as stowaways on a ship. The Canadian department of agriculture reports that the purser of a boat which leaves from Nor-

folk, Va., in the autumn, said the insects always gathered around the potato locker on deck. When the ship sailed, some were shut in this locker.

D12

## RIOT GUNS MOUNTED ON DOORS OF POLICE SQUAD CARS

Squad cars of the Lincoln, Nebr., police department have their riot guns mounted on holders attached to the doors, making them easily accessible and still inconspicuous and out of the way. The weapons are also at hand as soon as the door is opened. Brackets for mounting are made of oak and a leather strap is used to hold the gun in place on the door.



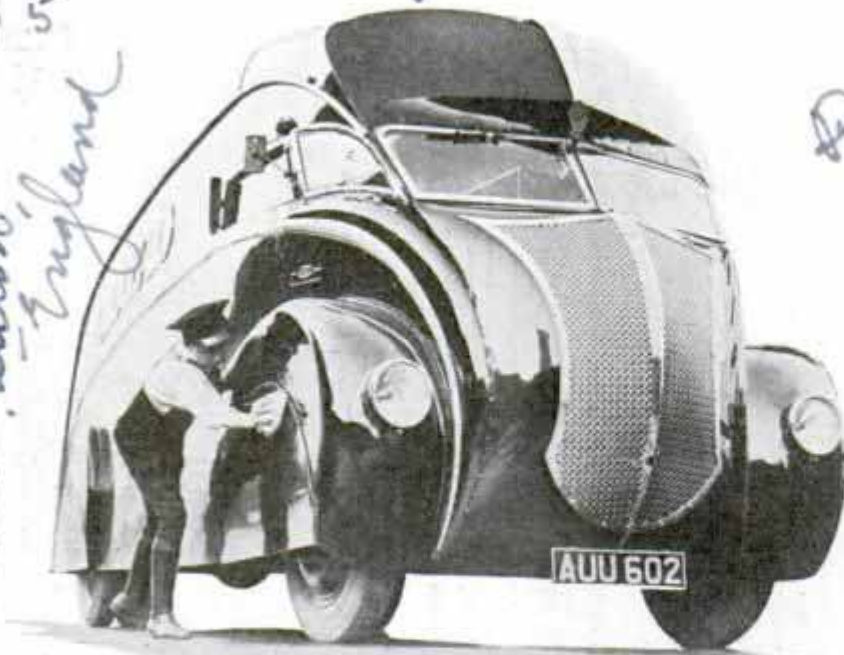
James Montagnes

Capt. Paul Shively  
Lincoln, Nebr.



*used by firm in Wembley* *San Diego, Ariz* *1/13/34*

*D 5*  
*Commer Cars Ltd*  
*Biscot Road Luton*  
*England*



*D 116*

### ARCTIC WINTER IS STUDIED AS A HEALTH AID

Health values of the Arctic winter are greater than those of the polar summers, Russian physicians and scientists report in announcing a plan to establish a new type of health resort. A special medical commission will be sent to the Arctic soon to select a site for the first health resort beyond the polar circle. Study of health conditions in the frozen north will be continued, as the result of reports made by Soviet Arctic expeditions during

Giant Bus with Flowing Lines Designed to Reduce Wind Resistance; Note How Wheels Are Covered and Front End Sloped

### TWO-TON STREAMLINED BUS PLACED IN SERVICE

Constructed with flowing lines to decrease wind resistance, a two-ton bus has been placed in service in England. The odd-looking streamlined vehicle is mounted on a forward control chassis. Its sweeping lines make it an object of interest in traffic.

recent years that they have failed to find any specific disease characteristic of the Arctic. "Passing the night on the snow at a temperature of fifty degrees below zero," says one report, "never affected the health of the people who came even for the first time to the Arctic regions. This fact indicates that the temperatures of the Arctic seem not to be harmful to human health." As one explanation, the Russians state that ultraviolet rays of the sun are stronger in the Arctic than in temperate zones.

### TRAILER HITCH FOR THE AUTO ALSO PROTECTS BUMPER

*D 41*

Attachable to the rear bumper, a trailer hitch bar not only provides a means of

### PORTABLE HUMIDIFIER FITS TOP OF WARM-AIR REGISTER

*D 68*

For homes heated by means of warmed air emitted through registers, a portable humidifier for such registers is now available. It consists of three water pans into which two fabric wicks are immersed. Perforated plates are placed so as to promote the maximum circulation of warm air over the evaporating surfaces. The frame, pans and ventilating plates are of brass and about 200 square inches of evaporating surface are provided, sufficient to add about nine quarts of water to the air per day, it is claimed.



Bar for Hitching Trailer to Auto Is Shown Attached to Rear Bumper; It Protects Bumper



towing a trailer or another automobile, but also protects the bumper of the car on which it is used. The bar is attached to any bumper without drilling holes. Owing to the large anchoring surface and to the spring steel of which it is made, the protector bar is rigid on the bumper and cannot shift. The bar is available for single or double bar bumpers.

*3 50*  
*more info Automotive*  
*Taylor Instrument*  
*Companies Rochester*



D 8 8



ITALY'S king of the seas, the record-breaking liner Rex, in New York harbor, after crossing the Atlantic in 109 hours and 58 minutes.

D 8 8. Capt. Leon  
Blaseman.  
FEB 21 1914





# SHOW BOATS of the

GIANT floating palaces offer every luxury of a modern hotel from high-speed elevators to open fireplaces, daily newspapers, movies and stock tickers.



FROM huge anchors to spick-and-span bridge, the ship of today is a triumph of inventive genius which makes life afloat safer than ashore in your own home, or riding in your automobile.



D88 ALTHOUGH guided by radio and the automatic helmsman, a ship's position is still checked with a sextant and the sun is "shot" daily from the bridge.

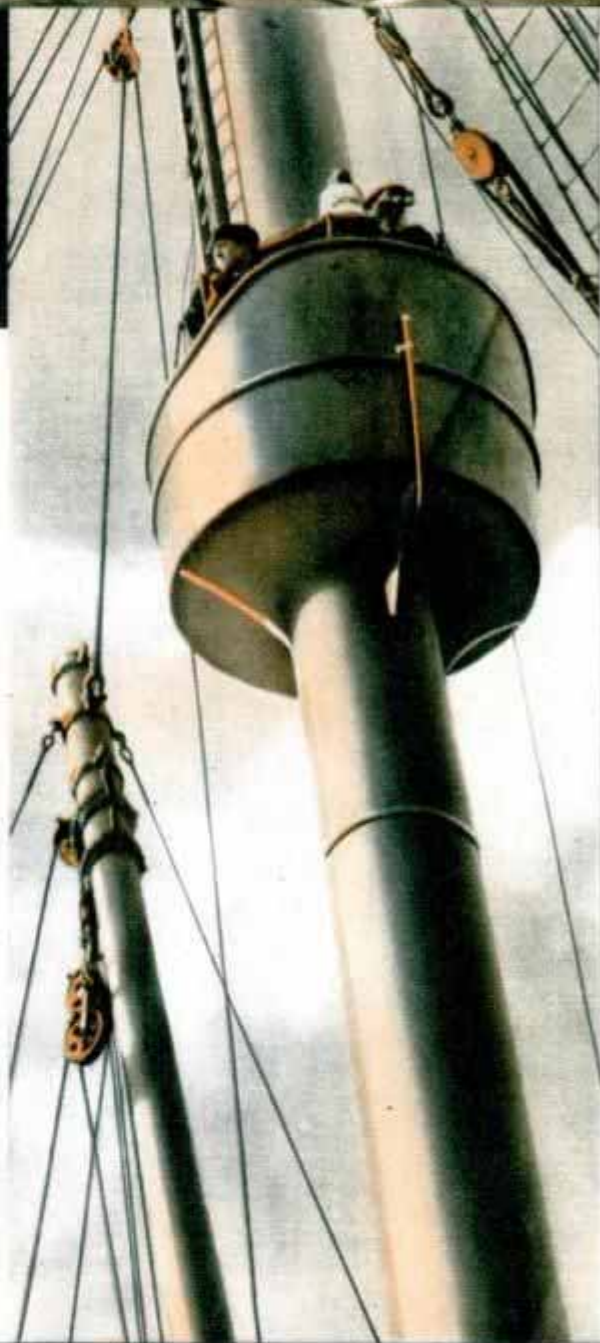




# ATLANTIC

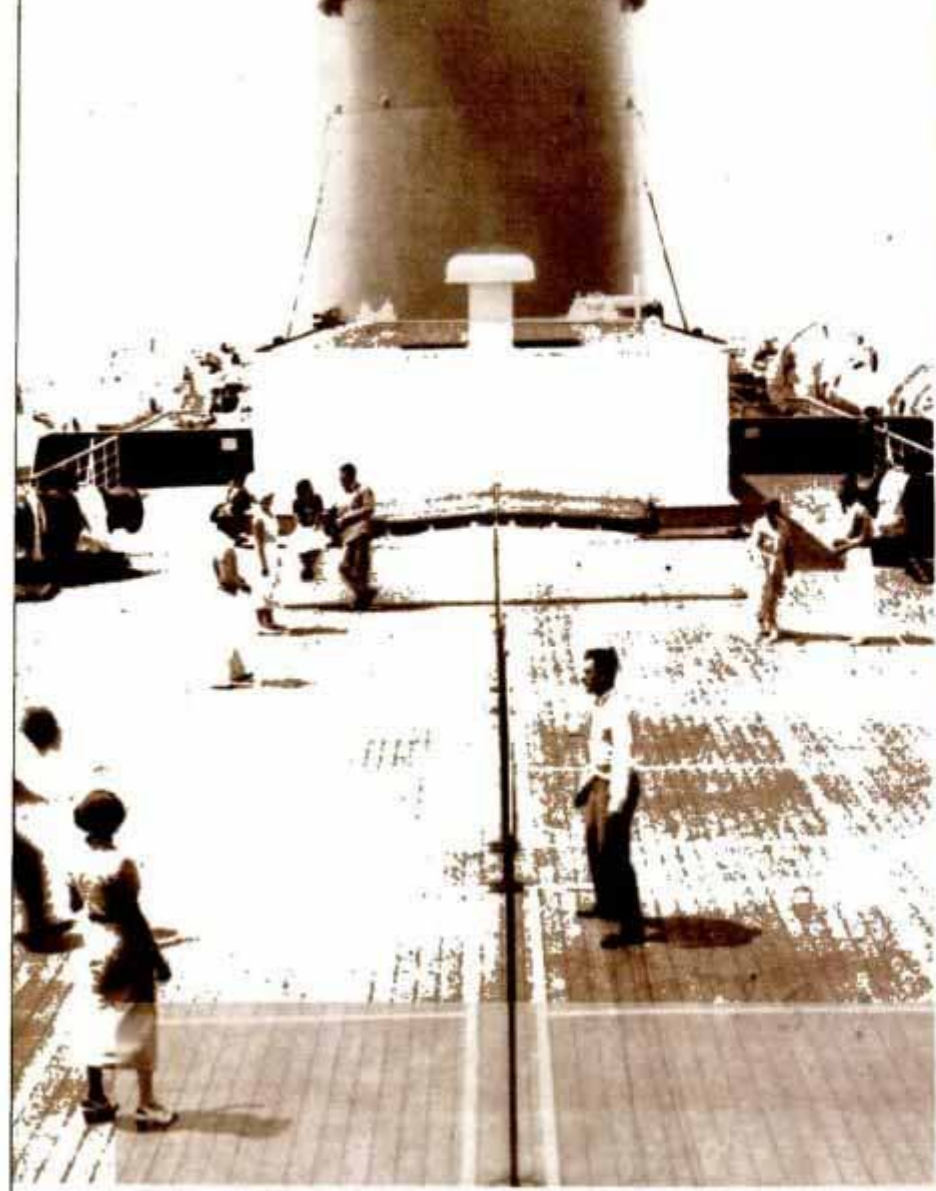
DEMAND for more safety and greater speed still challenge inventors and designers.

FROM prize fights on deck to the cocktail hour before an open fireplace, passengers enjoy all the comforts of a city.



AS in the days of "wooden ships and iron men," an unceasing watch is kept from high up in the crow's nest for any signs of danger such as a hidden derelict or some ship in distress.





**A**T THIS moment thousands of ships are plowing the seven seas, carrying no less than a million people to all the chartered ports of the globe. If you are a passenger aboard a modern ocean greyhound, your life is safer than if you were on the streets of a city. Today safety, speed and comfort rule the sea.

Speed is the big factor in capturing millions of dollars' worth of business. But at what price? The "Rex" burns 1,100 tons of oil daily while running at a normal speed of twenty-six knots. Add just three knots, and the

**W**HILE passengers play, stewards sort ten tons of meat and sea food.

D88







BEAUTY combined with utility, one of the lounge rooms on the Rex and a brokerage office in the Isle de France.

D88

consumption leaps to 1,550 tons every twenty-four hours! The cost of those extra knots on a single crossing amounts to \$20,250!

Each step forward in comfort and speed depends on inventors and experimenters. A series of tests with models led to the discovery of the bulbous bow principle. What is it? Streamlining pure and simple. Look at the blunt head of a shark. When ships' hulls are designed as well as sharks' heads,



MONEY 7 \$ 3,972,200



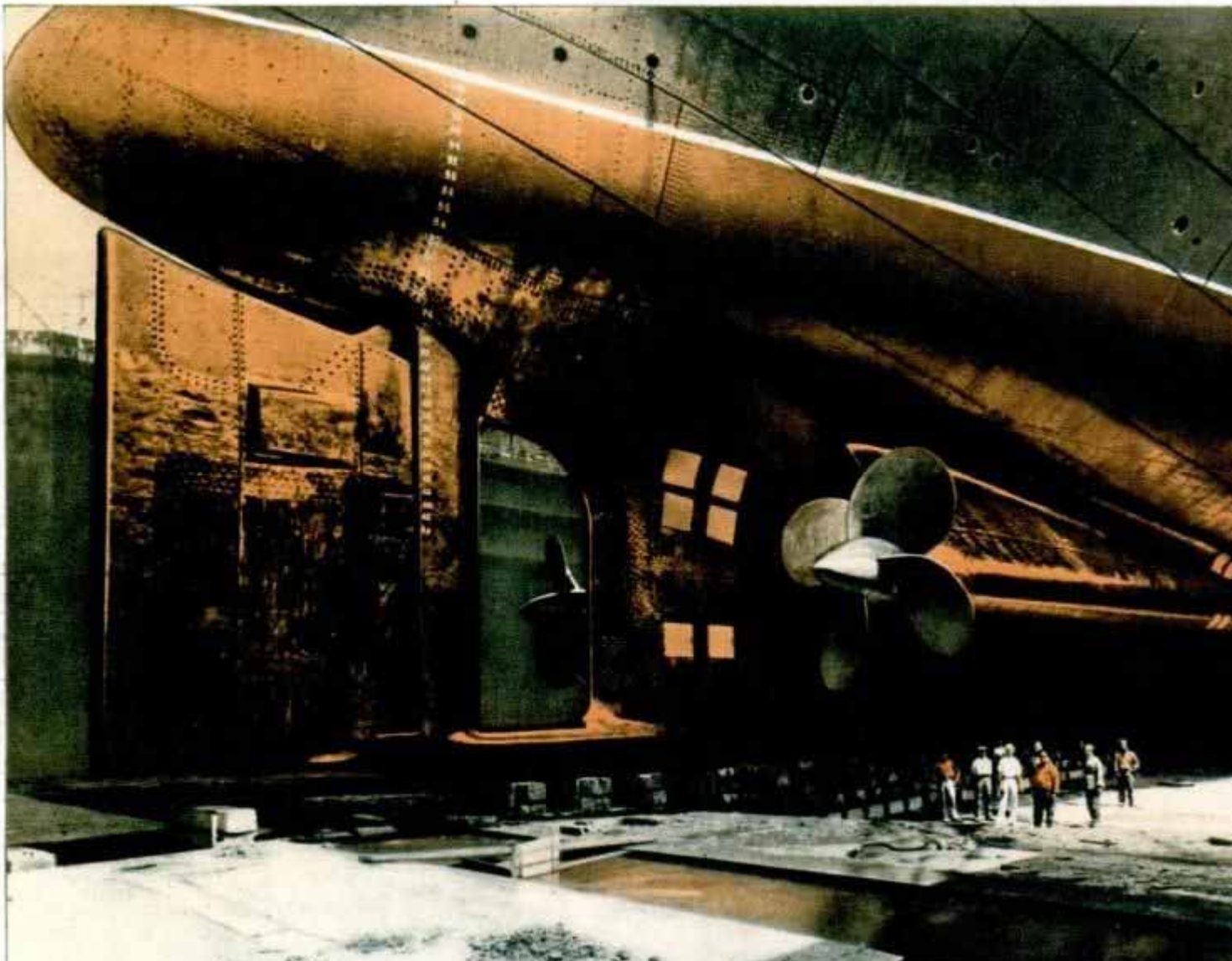


*see letter*

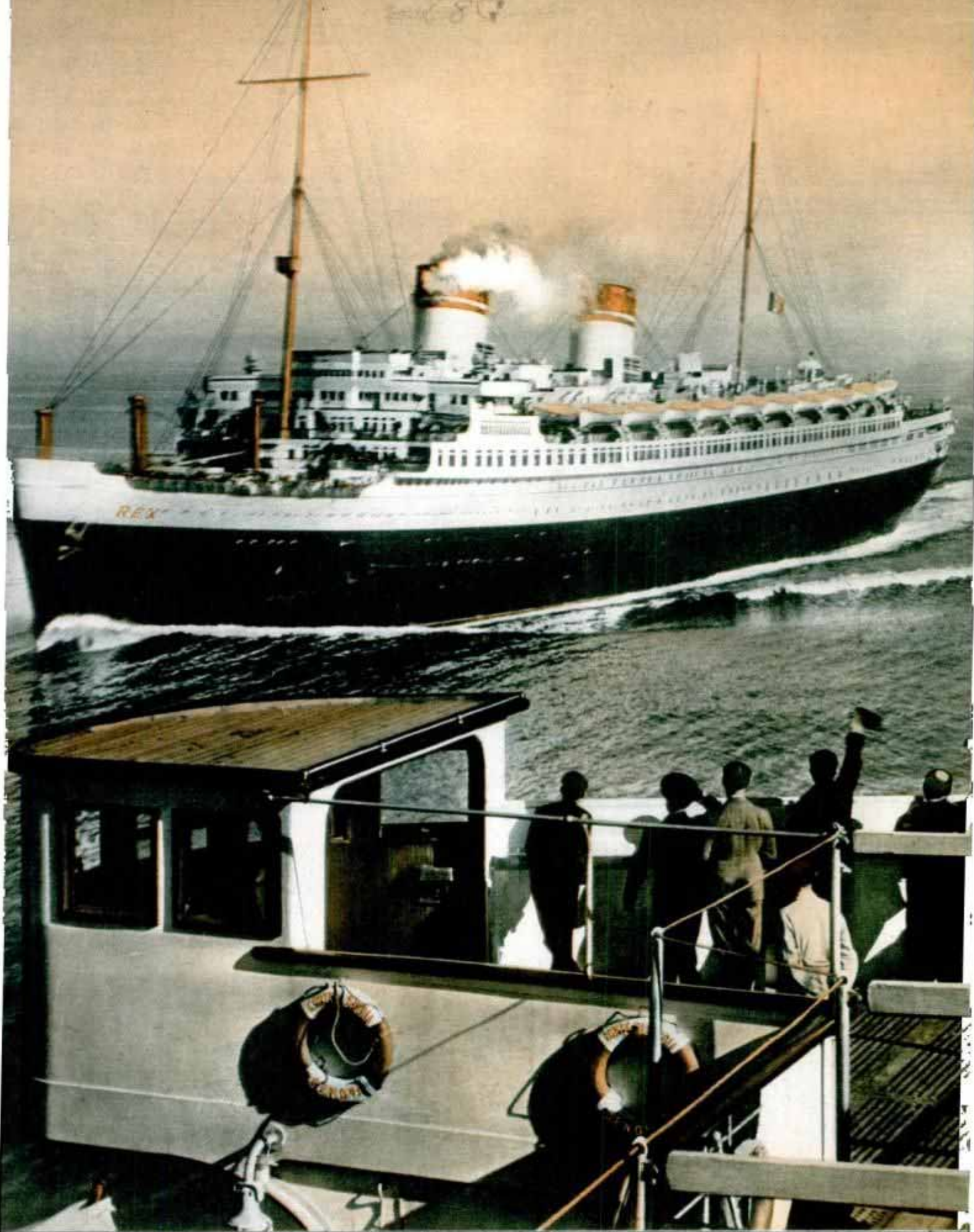
the speed of ships will be accelerated without adding to their power. The original bulbous bows on the "Bre-men" and "Europa" took the shipping world by storm. In practice, however, it was learned that the full bulbous bow, while very efficient in smooth water, misbehaves in heavy-seas. The most recent specifications call for semi-bulbous designs.

Another improvement which has increased the efficiency of ship engines is the Mitchell thrust block, named after a brilliant consulting engineer in Melbourne, Australia. A man of ideas, A. G. M. Mitchell proved a principle of lubrication without so much as touching a machine

A CARGO hoist and one huge propeller and rudder of the Rex as the ship lay in drydock before its record-breaking run.



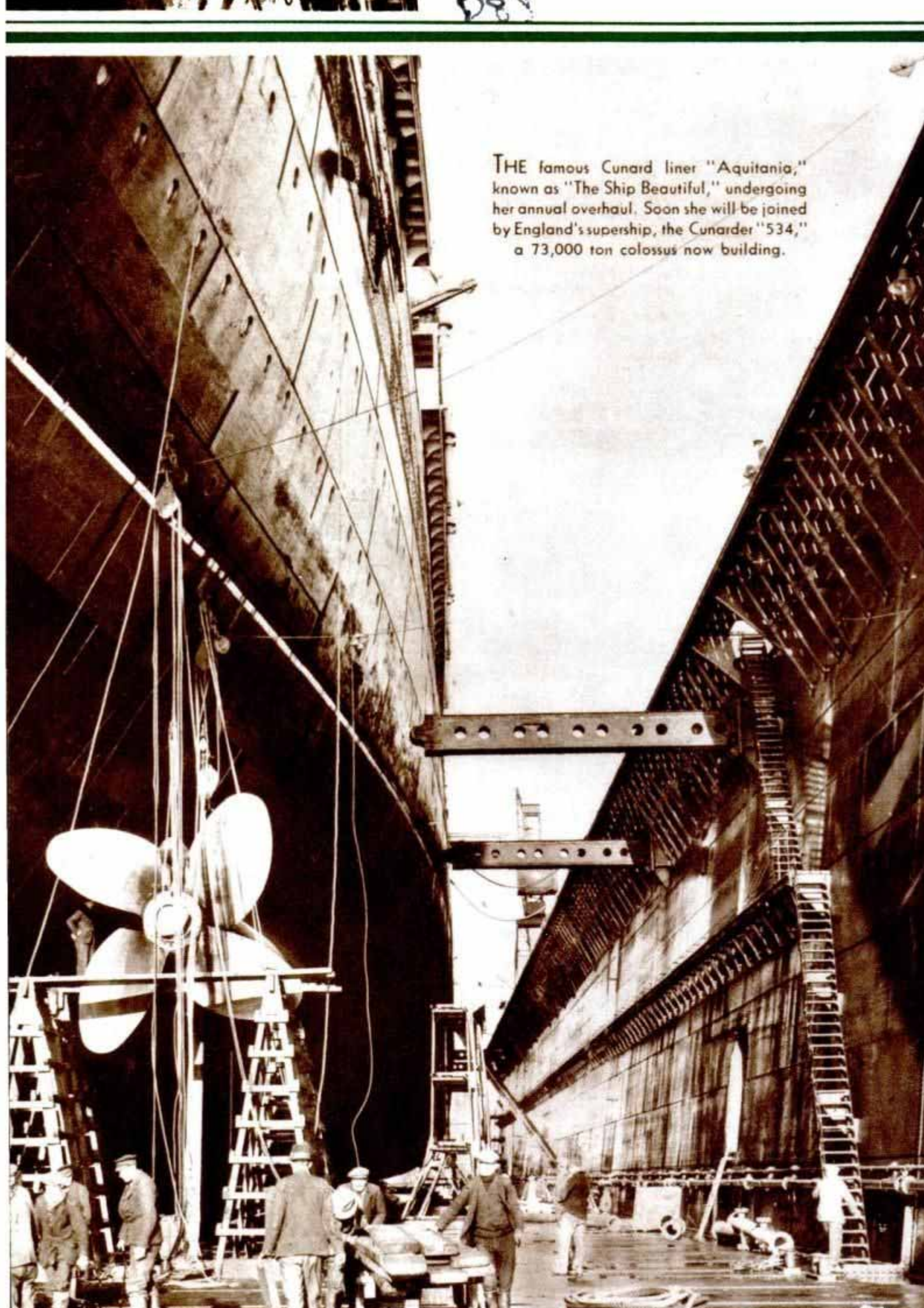




D 88

PASSING on the liner lanes of the Atlantic, the Rex salutes the Conti di Savoia as latter's officers cheer latest record holder in her race to port.





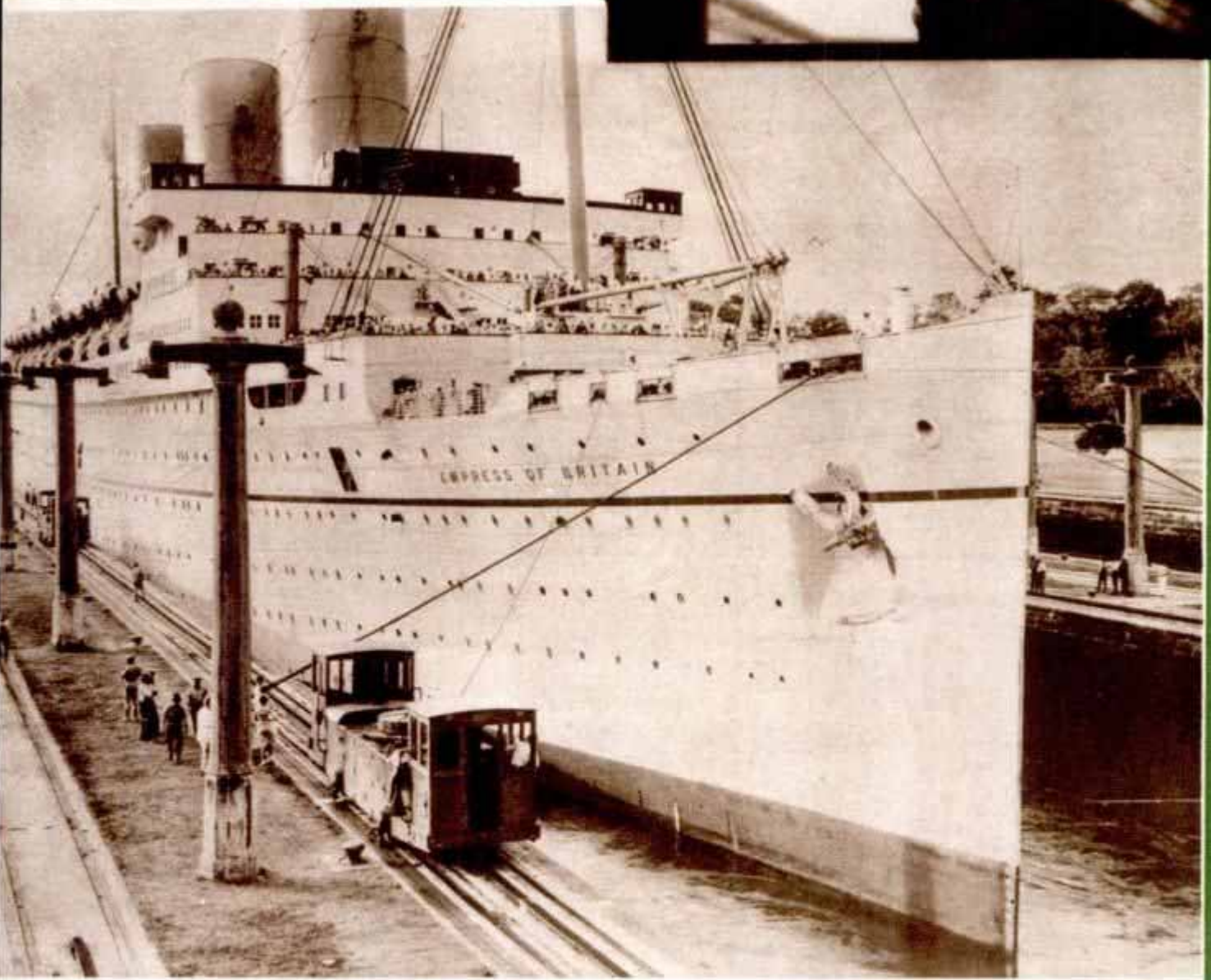
THE famous Cunard liner "Aquitania," known as "The Ship Beautiful," undergoing her annual overhaul. Soon she will be joined by England's supership, the Cunarder "534," a 73,000 ton colossus now building.



or soiling his hands with grease. He worked out his ideas with cold figures—all on paper!

Driving large ships at high speeds would be a difficult thing without the Mitchell thrust block. As late as 1914, the "Britannic" was equipped with fourteen different collars to keep her propeller shaft from disembowelling the ship. The fourteen collars required great quantities of lubricant and a separate liquid cooling system. Came Mitchell and said:

CANADA'S greyhound, the "Empress of Britain," passing through the Panama canal, and, above, a watch officer on the bridge of a liner.







“You have fourteen collars doing the work of one collar. Why? When two flat surfaces move over one another at a small angle, the oil is forced into a wedge-shaped space and lifts the moving surface clear of the opposing one.”

You had a “kick-back” in the old ships that amounted to 110 tons at twelve knots per hour in a 12,000 horsepower vessel. One Mitchell thrust block and a thin film of oil can absorb that kick! The bearing pressure per square inch on the Mitchell thrust block is ten times greater than in the old block, but the friction is only one-fifteenth of what it was formerly.

You know, of course, that ships lose a great deal of weight in crossing the Atlantic Ocean. On reaching a destination, there is nothing but the ashes left of perhaps 5,000 tons of fuel. Be-

LUNCHEON on deck and the forward funnel of the Rex with observation windows through which passengers may look forward.



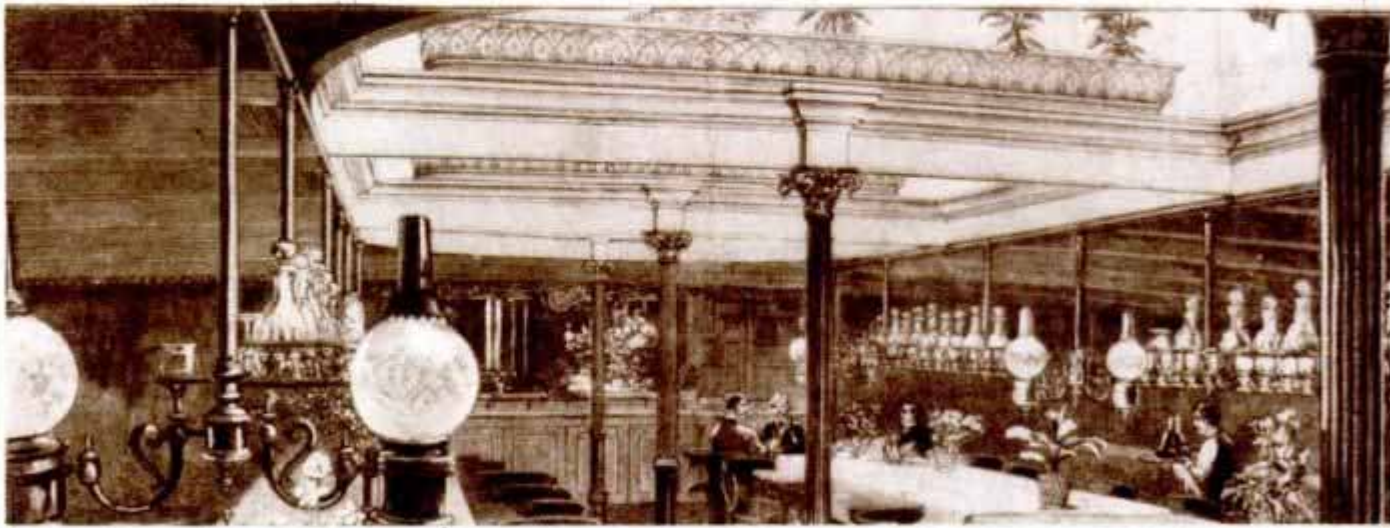
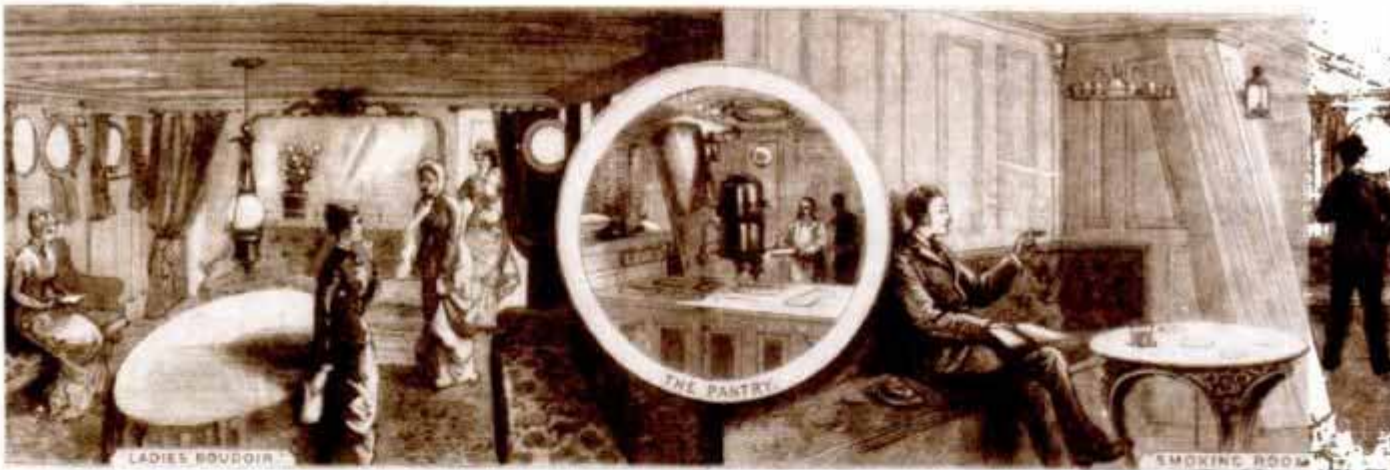
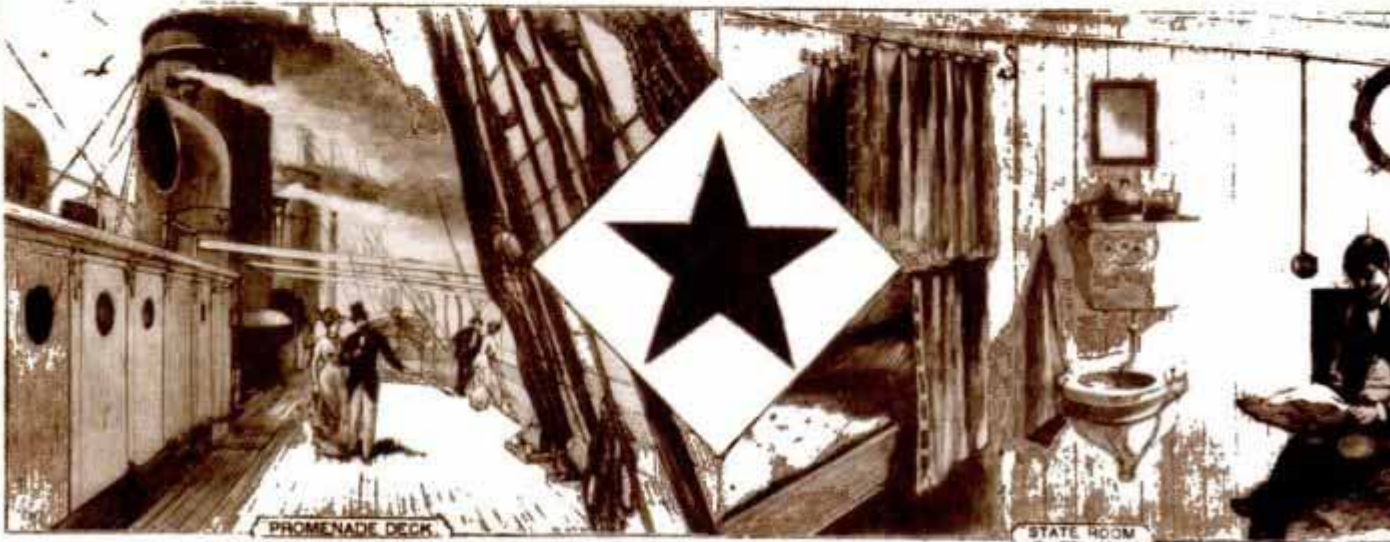




DECK of the Rex resembles some fashionable beach as her passengers enjoy the luxurious outdoor pool and lounge beneath gaily-striped umbrellas.

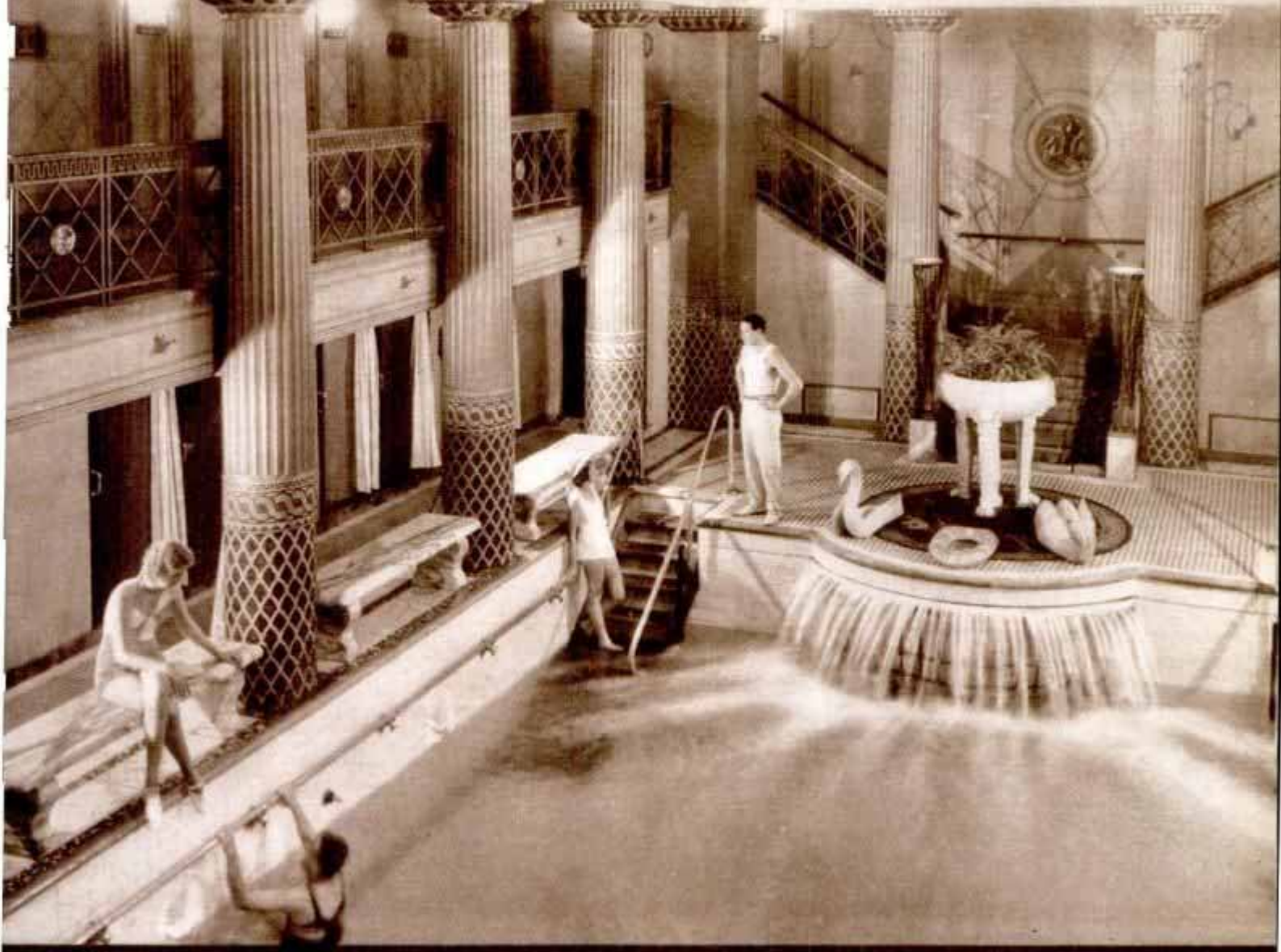
288





OCEAN travel in the '70s, as illustrated in Leslie's Weekly, showing sails, kerosene lamps and "comforts" of that bygone age of travel.





D88

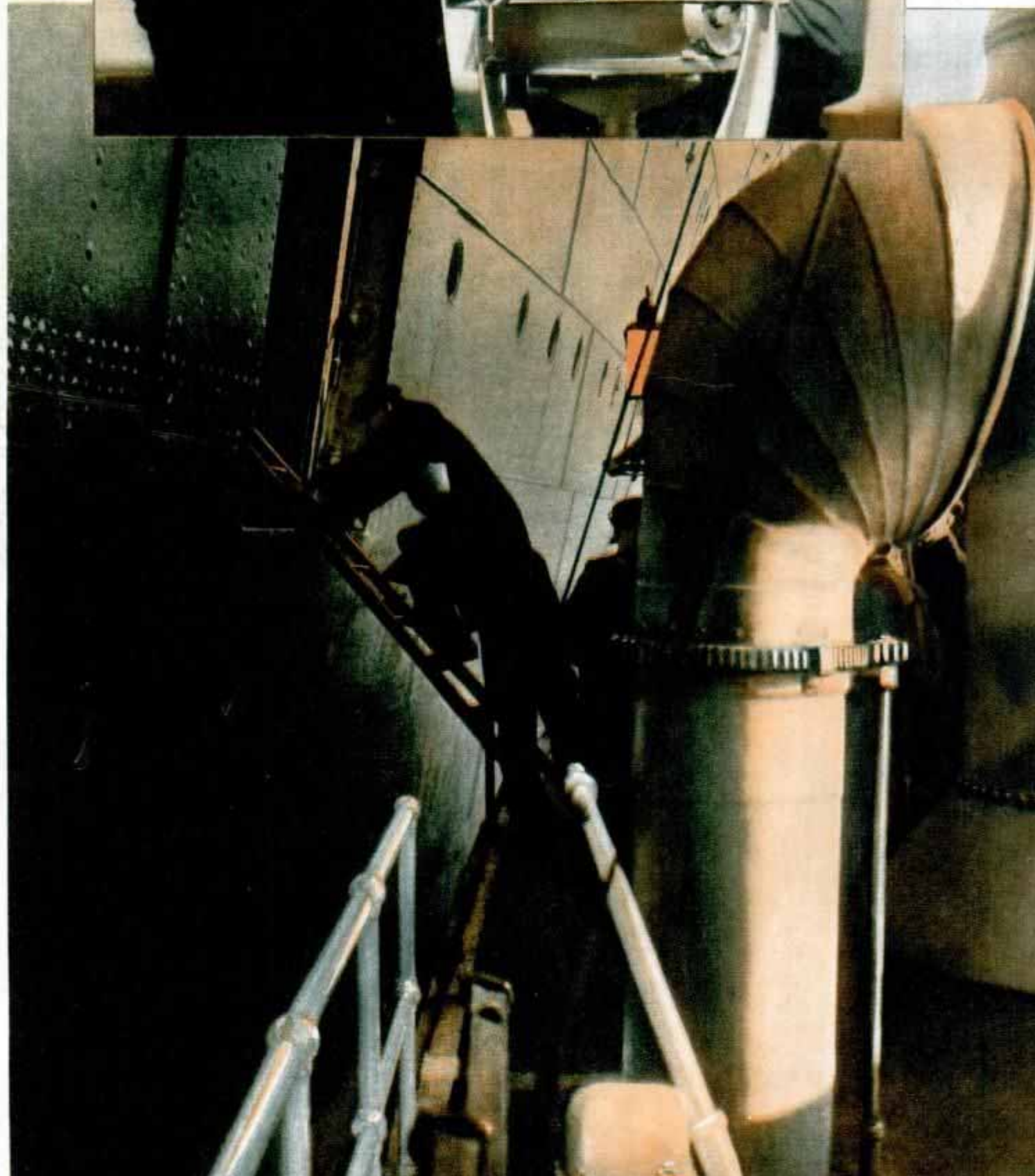
MARBLE lined, indoor swimming pools and outdoor games of all descriptions make a trip on a modern liner a thing of joy with complete relaxation for the passengers.



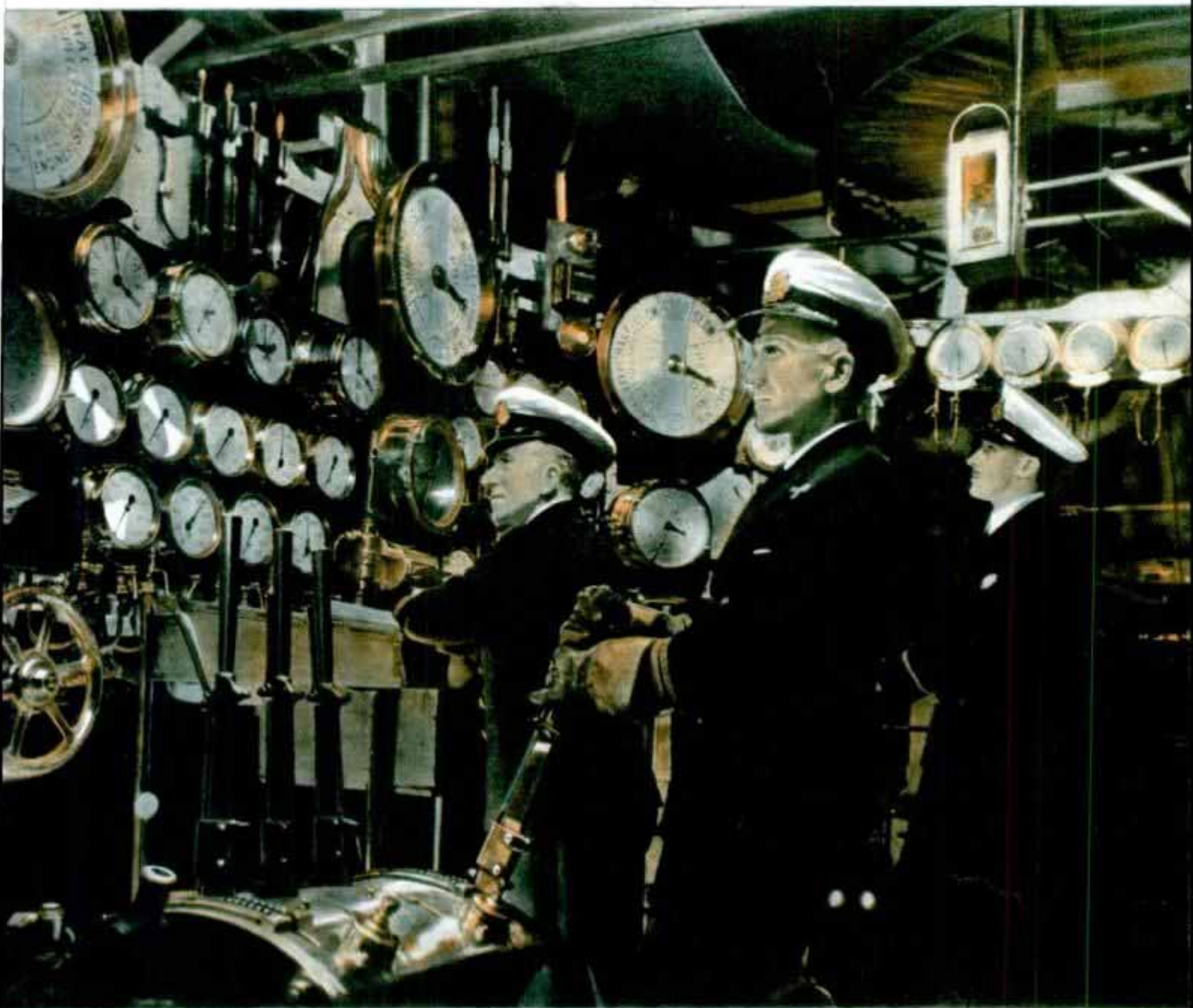


DPA

BRIDGE officers and liner picking up customs inspectors at quarantine.







THE "Chief" and his assistants at the controls of a Cunard liner getting under way for a dash across the Atlantic.

D88

sides, the ship's commissary gives up about eight tons of flour, 10,000 bottles of liquid, 50,000 eggs, twelve tons of meat, and tons of vegetables besides.

But can you imagine that a ship loses much weight through her funnels? A large oil-burning greyhound loses 100 to 140 tons of smoke in an average roundtrip crossing of the ocean! All in all, a greyhound loses from 5,000 to 8,000 tons of weight in one crossing of the Atlantic!

At this time, when trans-Atlantic air travel is in the offing, and twenty-four-hour schedules between continents are likely, it is timely to recall that only 442 years ago

Columbus made an ocean crossing in seventy days.

There was little advance in speed until the era of the American clipper ship, which had heels that outflashed any man-made contraption on the seven seas. The "Lightning," with a stroke of good luck, covered 434 nautical miles in one day on her maiden voyage. The "Red Jacket" clipped off the distance between New York and Liverpool in thirteen days. The "Atlantic," in an international race, traveled from Sandy Hook to England in twelve days and four hours.

A great turn- (Continued on page 134A)





CAPT. GEORGE FRIED, famous for his sea rescues and now on the new S. S. "Washington" of the United States Line, at the Kolster radio direction finder in the chart room of the United States liner "President Roosevelt." Below, ship's officers at their work during a blow on the bridge of a Cunard liner.

D 89



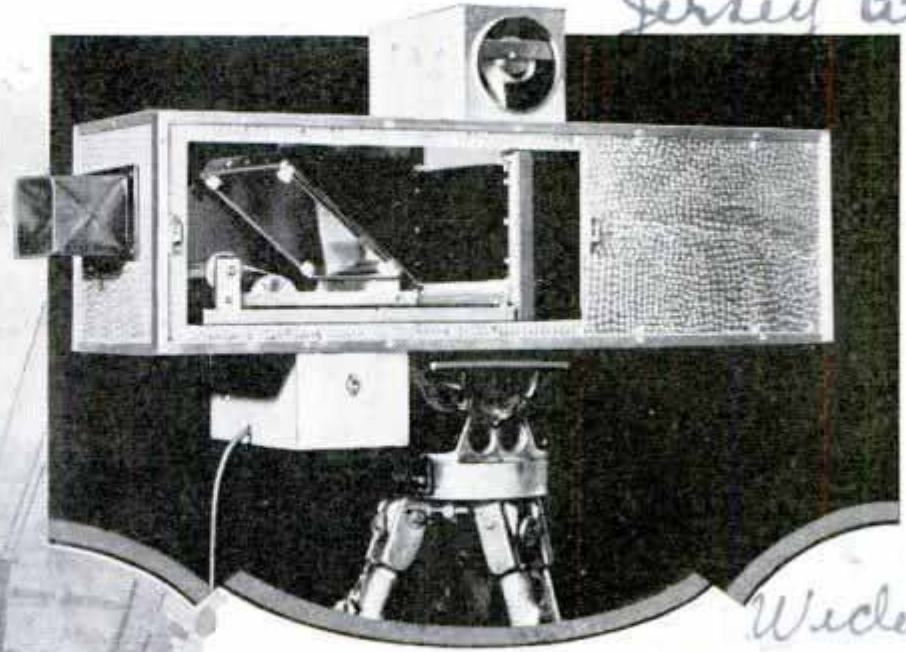
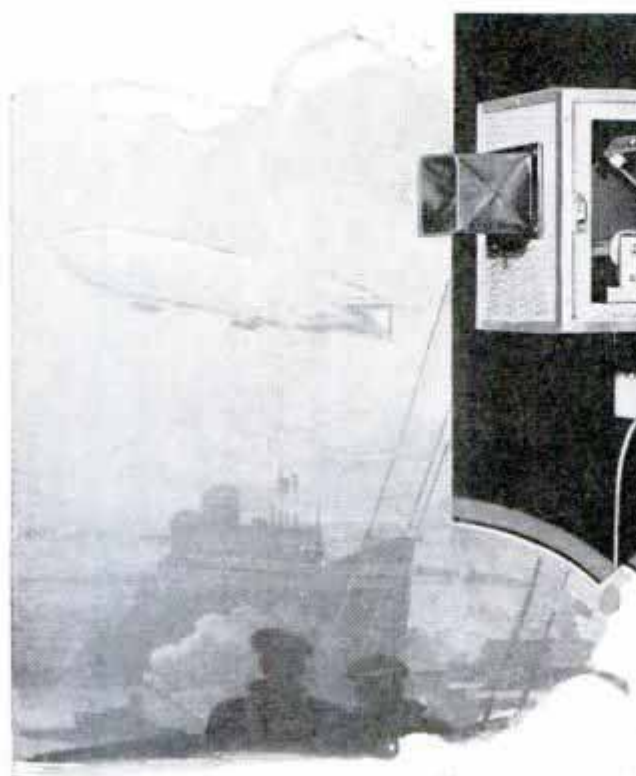


see  
may  
1923

D. S. O. and J. H. Lavelle M. Williams

181 Morgan St  
Jersey City

# Camera Mounted on Boat 'Sees' Through Fog



Camera Used on Ships in Foggy Weather to Make Pictures of Objects Invisible to the Navigators

To extend the visibility of navigators on ships plowing through fog, a camera has been developed which records on a specially treated infra-red ray film, developing and fixing the negatives in thirty seconds. The camera has been installed on the American liner "Manhattan," and is intended to extend the visibility of the navigator from two to four times, showing other ships and rocks or the shore line which the navigator himself cannot see in the fog.

D 64.

## SENSE OF SMELL IS MAGNIFIED TO TEST WATER

Impurities in drinking water can be detected by a mechanical nose, known as an osmoscope, which is a small meter operated by attaching it to the nose and developed at Harvard university. The meter saves the human nose from the fatigue of olfactory organs which ordinarily dulls the keenness of smell. In mechanical principle the smell meter is an air pump operated by a mercury piston. It is first filled with air purified of all odors, then the smell to be analyzed by sniffing is trapped and pumped into the meter. For each cubic inch of odoriferous air admitted, the

piston forces out an equal volume of pure air. The nose, attached to the instrument, gets its first smell at the "threshold," the smallest sniff it can recognize. The sniffs continue with increasing and exactly measured amounts of smell. The sniffer was made to aid in investigating a recent discovery that some drinking water turns pink, blue and green and gets bad smells and tastes from electrolysis of water pipes. Radio sets grounded to water pipes were

Sniffing through a Mechanical Nose Which Magnifies the Sense of Smell



for Hachenbach to get more sense of water as stem

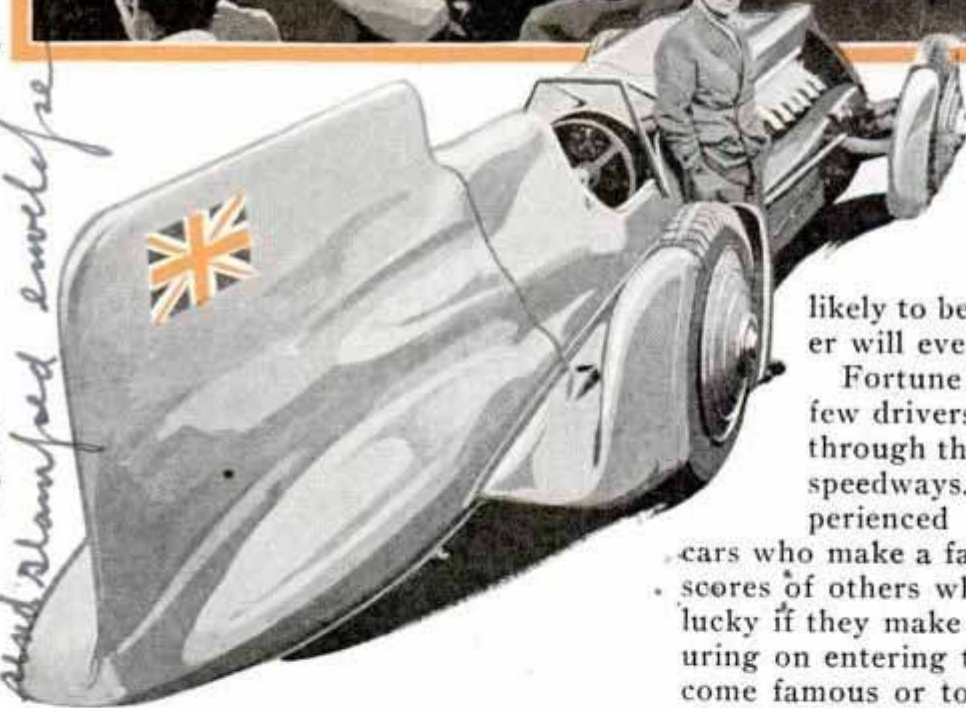
blamed for this electrolysis and so were stray earth currents from leaky commercial lines.

Keystone  
Chas. Prof. Gordon McFair



Cont. Robert W. Boardman  
c/o The Infantry Journal  
4115 17th St. N.W.  
Washington, D.C.

# Breaking Into



Top, Dirt-Track Race at Reading, Pa.; Left, Sir Malcolm Campbell and His Record-Smashing "Bluebird"

By "EDDIE" SKINNER

**F**AME, fortune, and the thrills of the world's most dangerous sport—these are the lures that attract thousands of lead-footed daredevils as each racing season rolls around. Why do you want to break into the racing game?

Fame? Headlines are very nice indeed, but their novelty soon wears off. Cheers from the grandstand cannot be heard while in action, and one glance at the crowd while tearing down the stretch is

likely to be the last look that driver will ever take at anything.

Fortune? There are a select few drivers who make big money through their skill on the big-time speedways. There are other experienced men with expensive cars who make a fair living, and there are scores of others who consider themselves lucky if they make expenses. Anyone figuring on entering the racing game to become famous or to accumulate a fortune had better think up some other calling, for the dirt track is a short cut to neither.

But if you have speed in your blood, lead in your foot, and believe that the sport is worth while for its own sake, here's how to get started:

There are two things you will need—a car and the ability to handle it. We'll assume that you have some ability in the mechanical line and are capable of rebuilding a car from the ground up. If you're not, just forget about racing, for you won't get anywhere.

While most of the big speedway cars

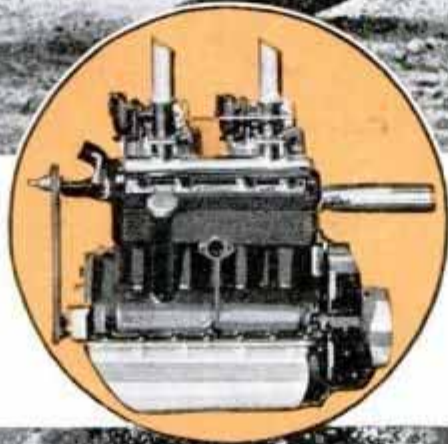
6908 Fourth St. N.W.  
Takoma Park, Washington, D.C.  
and stamped envelope



# DIRT TRACK *Racing*



Top, a Spill on the Track; Right, Ford Motor with Racing Head; Below, the Author and His Home-Built Racer



shaft and connecting rods are as good as any you can get, but aluminum solid-skirt pistons must be used. If you're used to working on stock cars, and fitting the pistons with precision, .015 of an inch will seem like a lot of clearance, but this is necessary to take care of the expansion.

A stock radiator may be used, but it is best to buy a good racer radiator. The fan blades should be cut off one half, since they retard the flow of air at high speeds. A cast-iron fan belt pulley is no



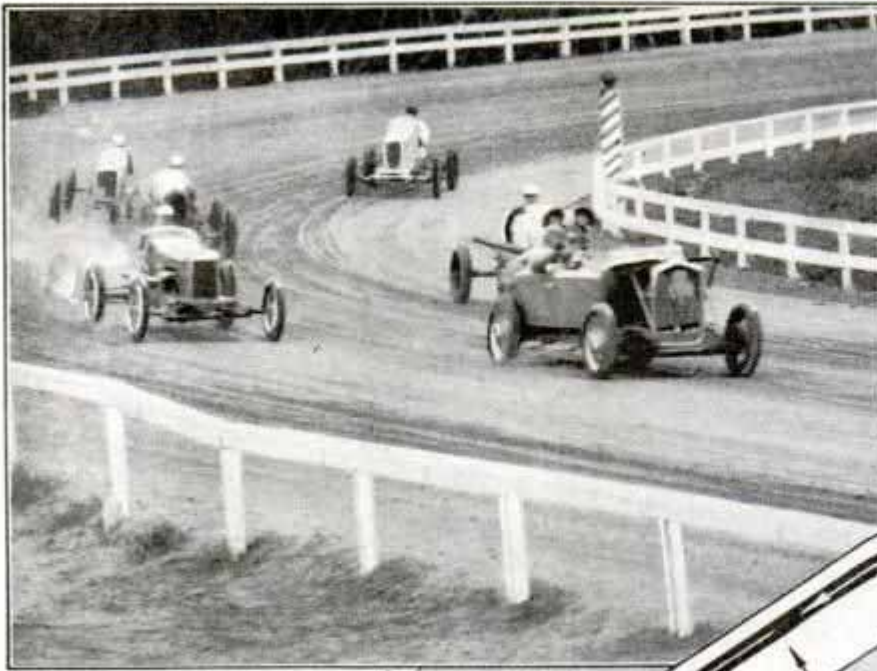
good, as it will fly apart at high speeds. I use a sheet metal rim pulley from the first model B Ford. The Ford water pump should be retained.

cost as much as \$25,000, many of the dirt-track races are won by home-built jobs and a few hundred dollars. A model A Ford, from which a car fast enough for any dirt-track race up to twenty-five miles may be built, may be picked up for as little as ten dollars. A 1929 model is best, for the block is open in front and the fly-wheel can be cut down easily.

A racing head is essential. Several good makes are on the market. The Ford crank-

The standard Ford oil system is sufficient with minor alterations. The outside oil line should be discarded and the oil level raised by brazing a piece of metal on the back of each dip. Mount an oil pressure gauge so that it may be read at a glance. It should register four or more





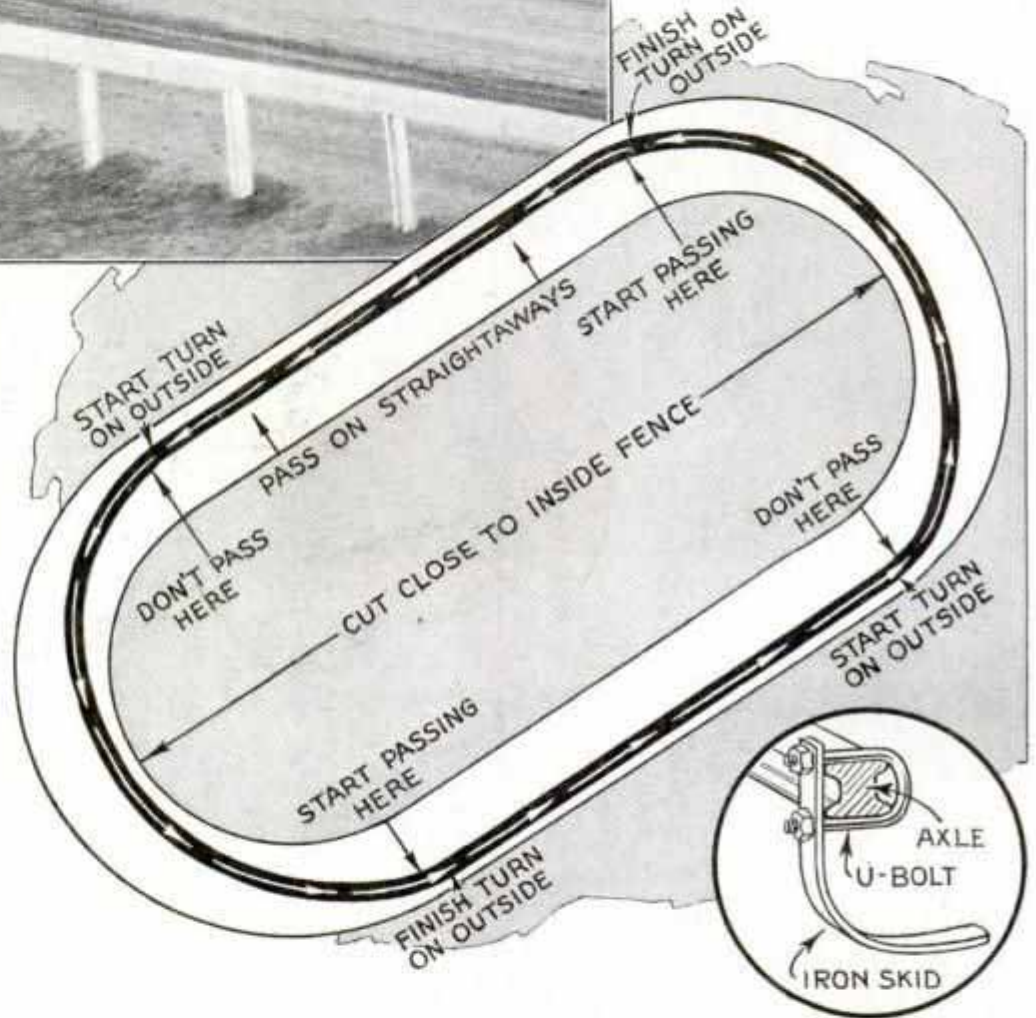
Above, Taking a Turn: Right, Diagram Showing Where to Pass and How to Take Turns, and How to Attach an Iron Skid

pounds at the start, but this will drop to two pounds when racing. An extra breather placed on the crankcase will save oil. With a rocker-arm head the valve clearance should be from .012 inch to .015 inch. Down-draft carburetion is essential, and most drivers favor

two carburetors. A stock Ford transmission needs little alteration. The gear-shift lever should be cut off and the drive shaft and housing shortened eighteen inches on the pinion gear end. A 1929 flywheel weighs fifty-five pounds, and should be cut down to thirty. The 1928 flywheel should be shaved down to sixteen pounds.

Later on you may want to lock your rear end. Experienced drivers do this and find it pulls them out of turns faster. With the differential locked one wheel is skidding whenever the car is not moving in a straight line, and the fellow who has driven only road jobs will needs lots of prac-

tice with the locked rear end before he enters a race. The stock Ford front end is not suitable, and is seldom seen on the track. A 1926 Overland axle is ideal. This should be fitted with Dodge or Chevrolet spindle arms, steering arms and tie rod. A Franklin steering gear



is the best stock equipment, but most drivers buy a special racing gear.

The steering wheel should have flexible spokes so it will not crush your chest if you pile up. Wire wheels are required in all A.A.A. races, and should be used always. The front wheels should toe in very slightly, if at all.

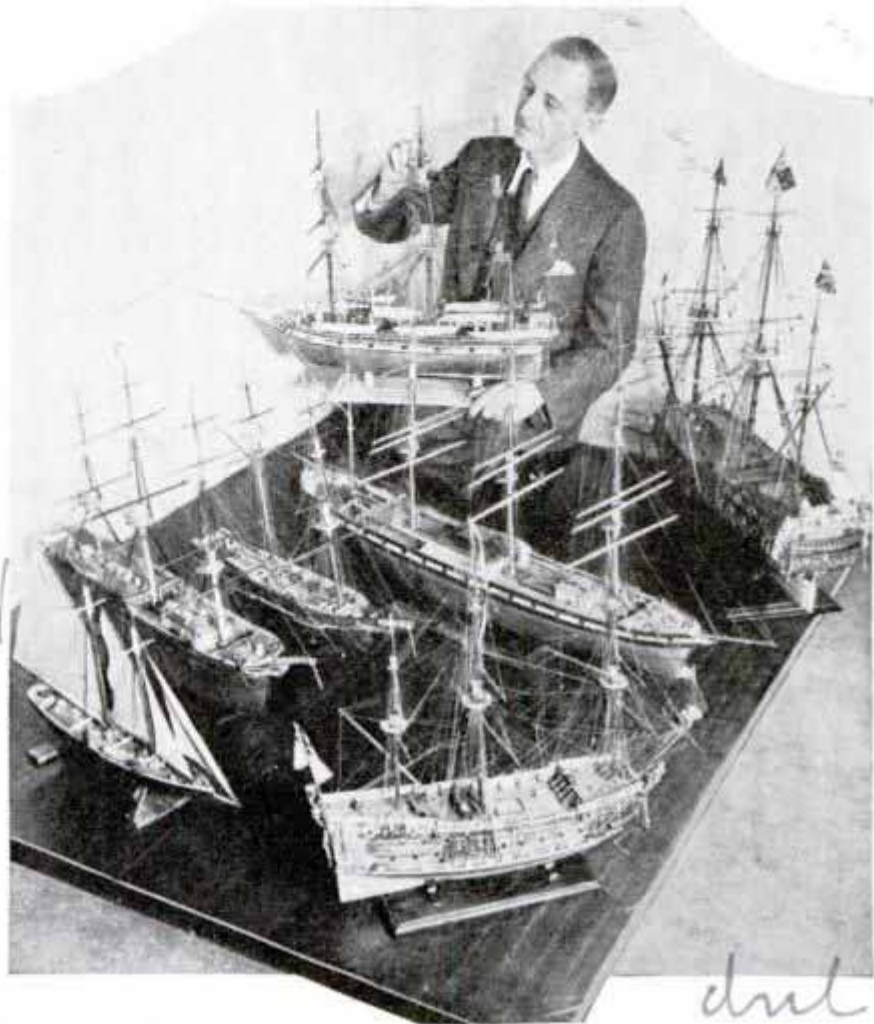
The springs should be nearly flat, the Ford model T being best for the rear end, that of 1917, which may be distinguished by the flat ends, being best of all. A model A spring is fine for the front axle.

The best stock frame available is a 1932



# Model Fleet Required Four Years to Build

After four years of work, a California man has completed an entire fleet of model boats such as sailed the seas in the eighteenth and nineteenth centuries. All are made to the same scale and form a group of contemporary vessels. The ships include a British three-decker frigate, two old-time whalers, a packet ship, a four-masted bark, a fishing schooner and a ten-gun brig, all dating from 1700 to 1870.

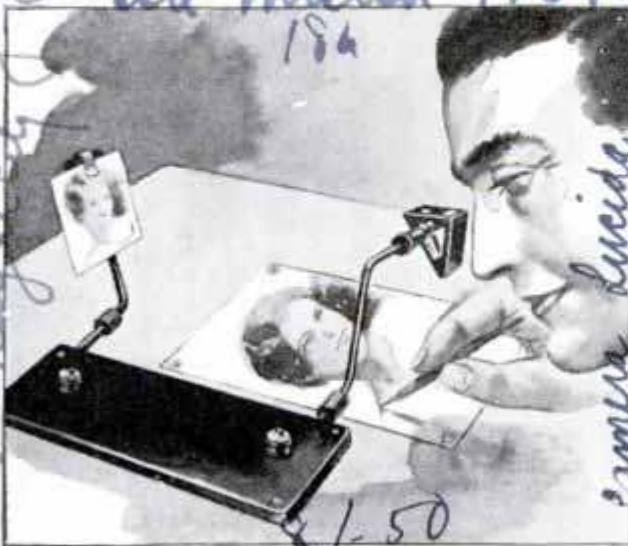


Fleet of Model Boats of Eighteenth and Nineteenth Centuries, All Built to Same Scale by a Man Who Spent Four Years at the Task

## REFLECTOR HELPS ARTISTS TO COPY SKETCHES

Copying pictures and sketches is made easier for the artist if he uses a reflector somewhat like the finder in a camera. It consists of a base with two adjustable bars, one holding the drawing to be copied and the other supporting the reflector, which is a hollow prism with a mirror at the back and a glass in the front. By peering through an eye-piece in the top, a reflection of the sketch is seen on the drawing-board paper if the original is well lighted and the drawing board is shaded.

By adjusting the supports so that the distance between reflector and sketch is less than the distance between reflector and board, the reflection can be made to appear larger than the original. All the colors of the original are shown in the reflection.



Reflector Resembling the Finder in a Camera, Which Aids the Artist in Copying Sketches

## BARBED PLANT SEEDS KILL FISH

Wild sunflower seeds have been found to be a deadly diet for young trout. Small barbs or prongs are attached to such seeds and these become fixed in the flesh of the fish. While the seed is not poisonous to humans, it is believed that it may have a toxic effect on the trout. No grown trout have been found with the barbs in their flesh, and it is believed the seeds are only dangerous for fingerlings.

Sept. 23 25 Lafayette

at March 1904.

184

Lucida

1-50

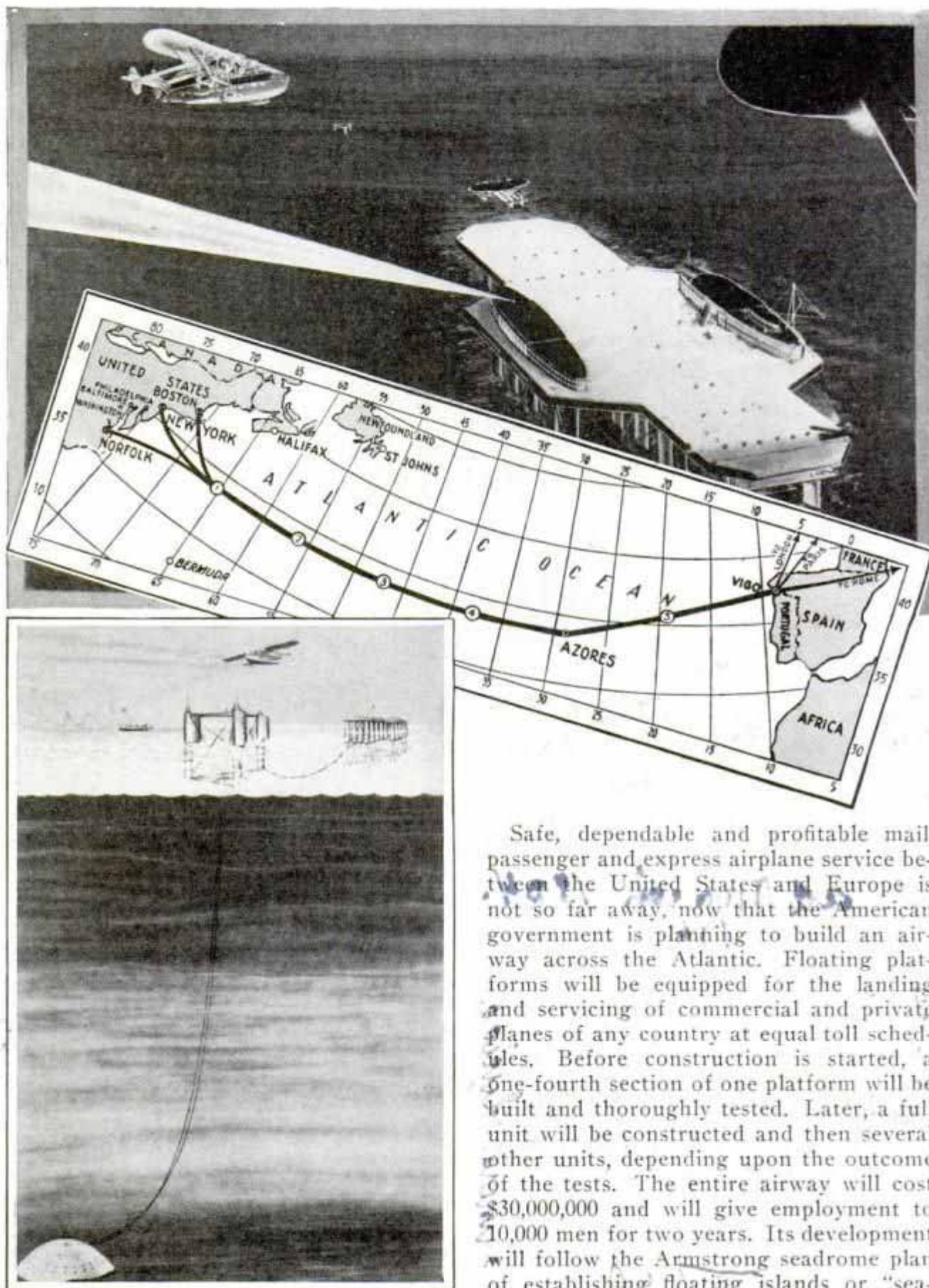
D136

Federal Stamping & Engineering Corp

Canadian Dept of Fisheries



*Wide World Photos*  
**Floating Airports to Service Ocean Planes**



Safe, dependable and profitable mail, passenger and express airplane service between the United States and Europe is not so far away, now that the American government is planning to build an airway across the Atlantic. Floating platforms will be equipped for the landing and servicing of commercial and private planes of any country at equal toll schedules. Before construction is started, a one-fourth section of one platform will be built and thoroughly tested. Later, a full unit will be constructed and then several other units, depending upon the outcome of the tests. The entire airway will cost \$30,000,000 and will give employment to 10,000 men for two years. Its development will follow the Armstrong seadrome plan of establishing floating islands or "seadromes" at 500-mile intervals along the southern route, via the Azores. This type

Top, Drawing of Mid-Ocean Landing Stage for Planes; Center, Proposed Air Route; Bottom, Method of Anchoring Floating Airports on Surface of Atlantic



of platform is 1,250 feet long, remains motionless in heavy seas, is anchored and can be equipped with aids to air navigation, accommodations for stop-overs and facilities for emergencies. The platform is 100 feet above sea level and buoyancy tank counterweights are 200 feet below the surface, in still water. The first island, 500 miles off the Atlantic coast, could be located in such position as to enable air service to start from Boston, New York or other cities along the eastern seaboard.

**JIGSAW RUN BY FOOT POWER CAN BE USED WITH MOTOR**

Supplied in knockdown form to be assembled by the purchaser, an inexpensive jigsaw is operated by foot power, but can also be converted into an electrically driven tool at any time by attaching a motor to replace the foot pedal. The saw can be used anywhere and the user has both hands free to guide the work when working the pedal. Graphite-bronze oilless bearings are used at vital points, the saw guide is of hardened steel and the blade can be



Foot-Operated Jigsaw Which Can Be Converted to Electric Drive by Attaching Small Motor

adjusted to any tension by means of a wing nut. An arm extending over the work table holds the board being sawed and can be adjusted to any desired height.



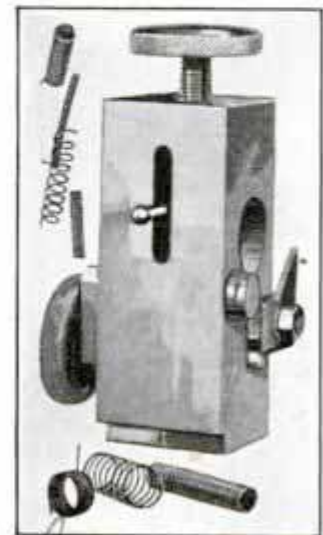
The Top of This Umbrella Is Made of Paper and the Stays, Ribs and Handle Are of Cardboard

**UMBRELLAS MADE OF PAPER DISCARDED AFTER USE**

Paper umbrellas are being offered at a price so low that they can be discarded after use, although they will last for several months. The stays, ribs and handle are made of a cardboard-like paper and the umbrella itself is of tough, stout paper chemically treated to make it waterproof.

**SPRINGS WOUND BY HAND TOOL WITH ADJUSTABLE SHAFT**

Either round or square wire of any length can be coiled into a spring by means of a hand winder with an adjustable shaft. By placing the tool in a bench vise and using the mandrel, the tool will coil compression springs by adjusting the shaft for that purpose. A feature is that the same setting can be used to coil either compression or extension springs. The tool is steel, except two brass washers.



*Roger Augustman Co  
28 H 2 W. Island Blvd*

*John Blayner  
629 Meek St.*

*John B. Fisher  
8221 Goodwin Ave  
Cleveland, Ohio*

*2030*

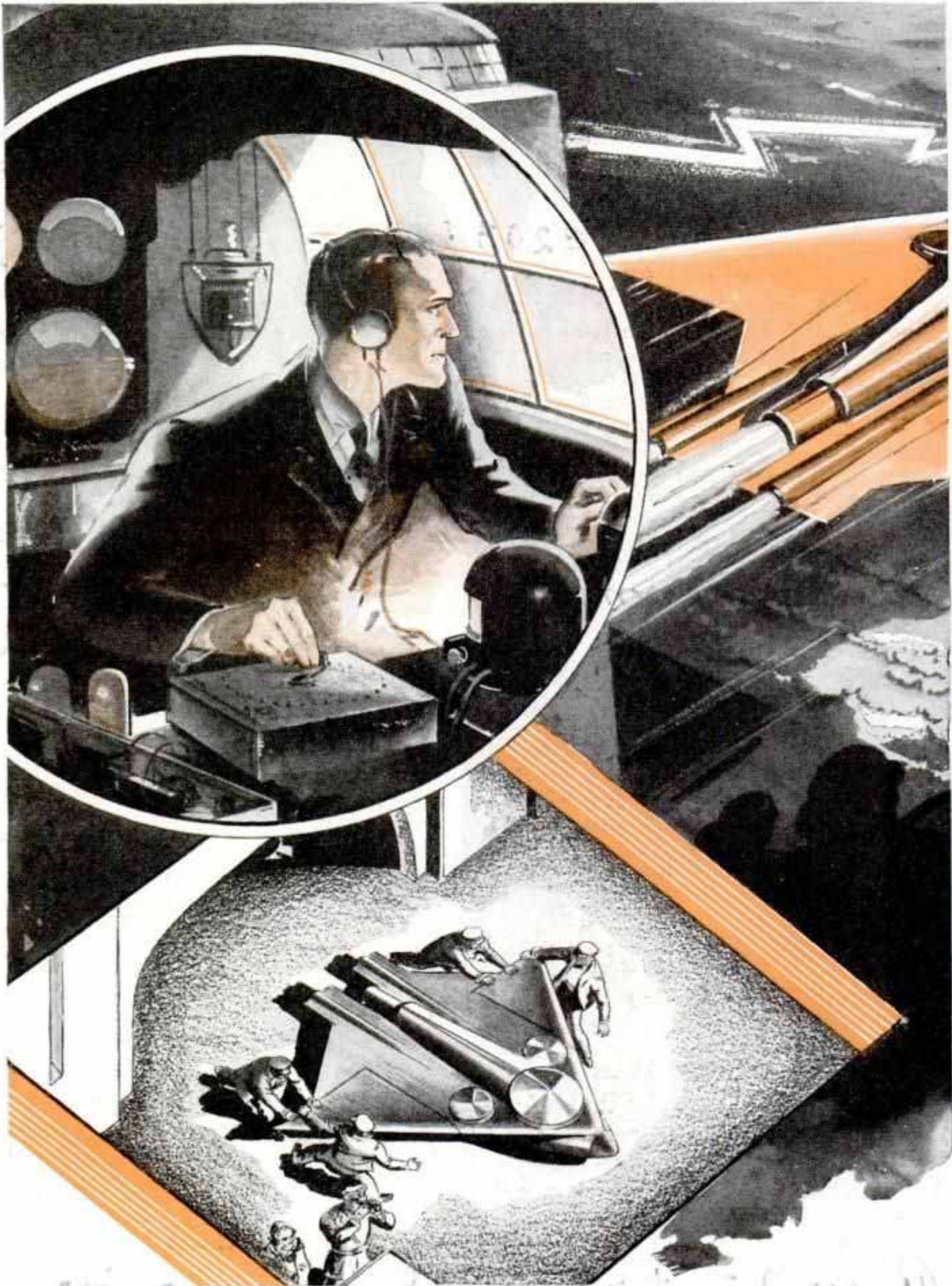
*Beach Homecraft*

*D76*



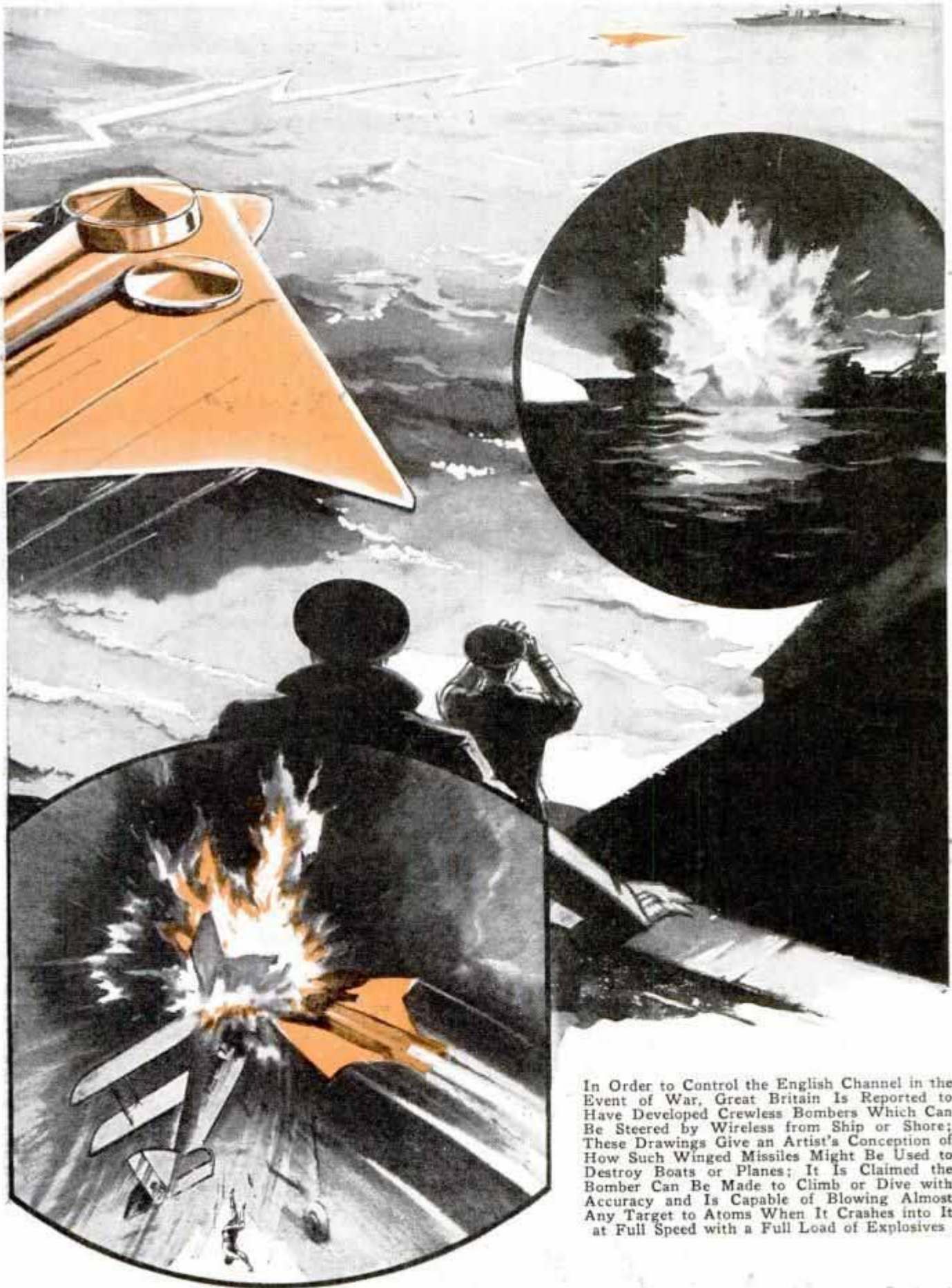
C2045 / Kralyner

# Crewless Bombing Planes Directed by Radio





# Flying Robots to Protect English Channel



In Order to Control the English Channel in the Event of War, Great Britain Is Reported to Have Developed Wireless Bombers Which Can Be Steered by Wireless from Ship or Shore; These Drawings Give an Artist's Conception of How Such Winged Missiles Might Be Used to Destroy Boats or Planes; It Is Claimed the Bomber Can Be Made to Climb or Dive with Accuracy and Is Capable of Blowing Almost Any Target to Atoms When It Crashes into It at Full Speed with a Full Load of Explosives.



*Kalamazoo Mich*

*State museum, Trenton*

*D 108*



"Witchballs" on Mountings with Rare Bowl and Striped Ball Cover Shown at the Center

### RARE "WITCHBALLS" ONCE USED TO WARD OFF DISEASE

"Witchballs," those globe-like objects of pale aquamarine glass with loppings of opaque white, which were used in the nineteenth century to ward off disease, were among the pieces of rare glassware exhibited in a New Jersey museum recently. Witchballs once were placed in windows to attract disease germs, their owners believing that they might keep the home free from maladies in this manner. The globes with their white stripings also were used as covers for pitchers and bowls to keep out flies and germs. Another object in the exhibition was a swirled bowl with a ball cover.

### MITTEN CLEANS AND POLISHES METALS AND GLASSWARE

*D 103*

Golf clubs, tile, glass, linoleum and many parts of an automobile can be cleaned and polished quickly and easily with a mitten, one side of which is treated with the clean-



Mitten Which Cleans Metal or Glassware When One Side Is Used and Polishes When Reversed

*Par. Islo Ref Co*

ing preparation while the other side does the polishing. No water is used. The surface to be cleaned is rubbed gently with a circular motion. The mitten is then reversed and the other side, made of soft cotton material, is used for polishing.

### SHOES HEATED BY ELECTRICITY KEEP THE FEET WARM

Electrically heated shoes add to the comfort of persons who are chronic sufferers from cold feet and are also used in cases of depleted blood circulation and in treating nervous disorders. The footwear is of ankle height and is of soft, white eiderdown. A rheostat control is built into a carrying case and a wire plugged into any electric outlet starts the heat, which



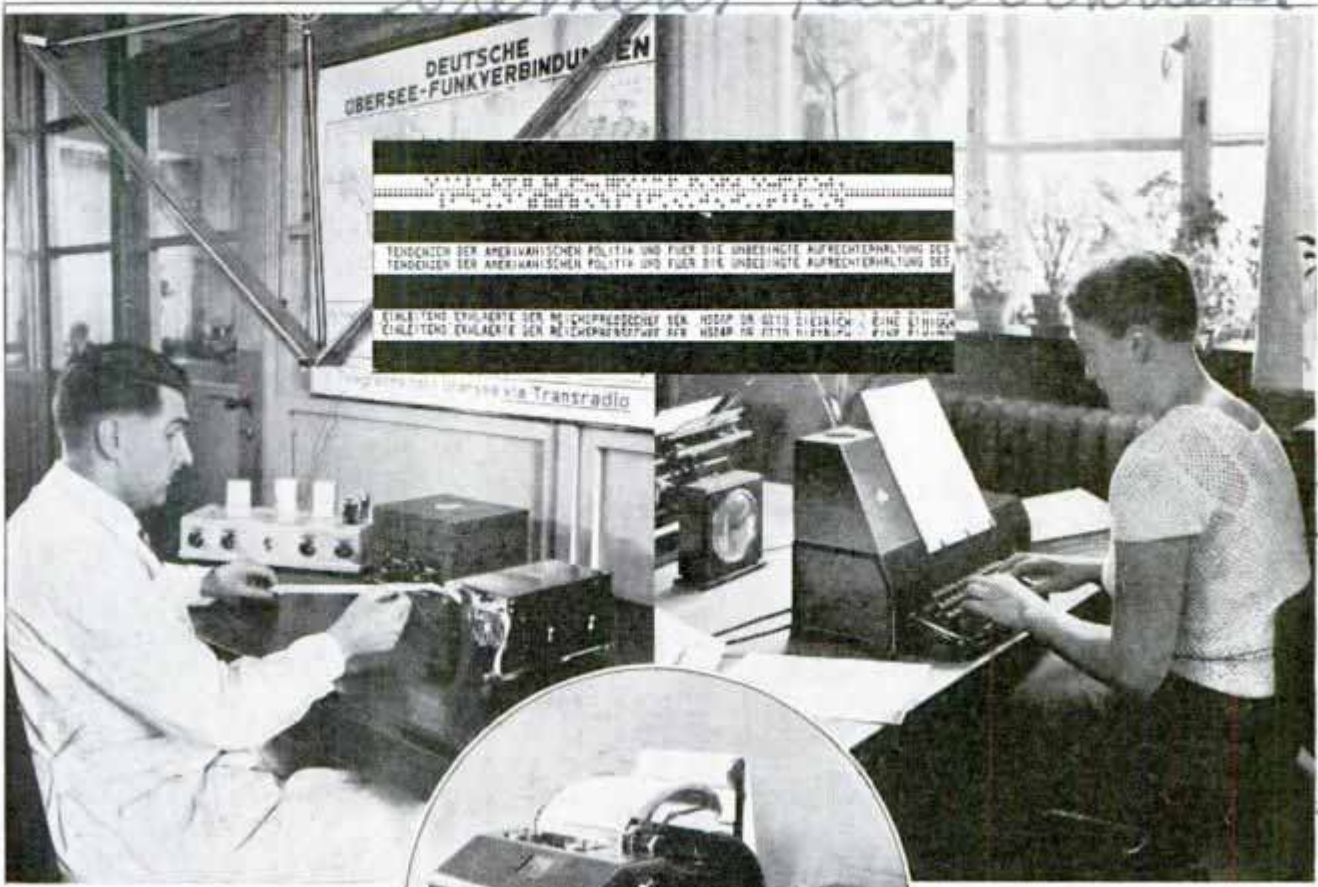
Electrically Heated Foot Warmers Which Can Be Plugged into Any Convenient Wall Outlet

can be regulated from body temperature up to 115 degrees. The foot warmers are used in hospitals to assist circulation in the lower limbs immediately after the operation has been performed.

Popular Mechanics Magazine does not publish the name of the maker of, or dealer in, any device described in its pages, but this information will be furnished by our Bureau of Information upon request, accompanied by return postage.



# Radio Typewriter Also Works by Telephone



Right, Typewriter Transmitter; Circle, Another Transmitter; Left, Receiver; Strip Above, Sample Tape from Receiver

Two long-distance writing machines have been produced in Germany, one operating by telegraph and telephone and the other by radio or wire. The telegraph-telephone machine, which resembles a typewriter, has a dial by means of which connections may be made with the telephone of the individual or office to which a message is to be sent. When the connection is made, the message may be delivered in the usual way, by voice, or by typing it on the machine. A receiving machine at the other end takes down the message just as it is typed in the sending office. Such communication can be made automatic for use after business hours when there is no operator in the receiving office. Existing telephone cables may be used for the system, which is similar to the telegraph printer in wide use, by means of the application of multi-frequency, which permits simultaneous use of the same cable for a telephone conver-

sation and a telegraph message. The radio-wire writing equipment usually is used for wireless communication, but is capable of transmission by free-circuit wires. The transmitter consists essentially of a typewriter keyboard and of a cylinder which is turned by a motor at constant speed. On the cylinder there is, for each character, a circular camshaft serving as a stencil. If the letter "E" is struck, a contact is made with the disk "E" and then, by means of the camshaft, the circuit is closed. In this way, there occurs for each letter a definite sequence of frequency impulses and interruptions which are sent as current impulses into the air over the antenna. At the receiving antenna, these impulses are amplified and conducted to a magnet, which presses a paper strip moving at uniform speed against a rotating alphabet-contact roll. Thus the characters are reprinted on the tape. The receiving sets operate automatically. Reception is satisfactory, even when atmospheric disturbances are severe.

*Siemens-Schuckert. Werke, Berlin. Siemensstadt*

*Siemens-Schuckert. Werke, Berlin. Siemensstadt Germany*



D 815

Lockheed Aircraft Corp.  
Pasadena  
Calif

# High-Speed Airliners to Join Two Continents



Fourteen-Passenger Transport Plane Which Will Speed Up Service over Pan-American Airways; Ships Like This Can Operate at Altitudes of 30,000 Feet at Speeds of 200 Miles Per Hour

Pan-American Airways has ordered two new types of transport planes which will be used to speed up the service between this country and points in Central and South America. Six Douglas transports have been ordered, each powered by two supercharged 700-horsepower motors and capable of operating at altitudes up to 30,000 feet. These planes will fly over the highest ranges of the Andes mountains at a speed of 200 miles per hour, carrying

fourteen passengers, a crew of three and 1,000 pounds of mail and express over the north and south international route by way of Mexico and Central America and on down the coast of South America. Six Lockheed twin-engined transports also have been ordered. These planes will have a top speed of 215 miles per hour, a cruising speed of 185 miles per hour and will carry ten passengers, a crew of two and half a ton of mail and express.

## THE FISH WON'T HEAR YOU

Fish possess some kind of hearing apparatus but it is very poor at best, it has been found in investigations by scientists. Direct tests of the hearing of fish are difficult because sounds made in the air are scarcely transmitted to the water at all. If a diaphragm is placed between the air

and the water and made to vibrate, or a bell is struck under water, the fish will respond. Dr. Harry Bateman, of the California Institute of Technology says, "Shout all you want while fishing; the fish won't hear you. But don't stomp around on the bottom of the boat; that will surely frighten them away."

Douglas Aircraft Co Santa Monica, Calif

D 118

Phyllis Research Center Pasadena Cal



**MILE-A-MINUTE TORPEDO BOAT  
LATEST SEA WEAPON**

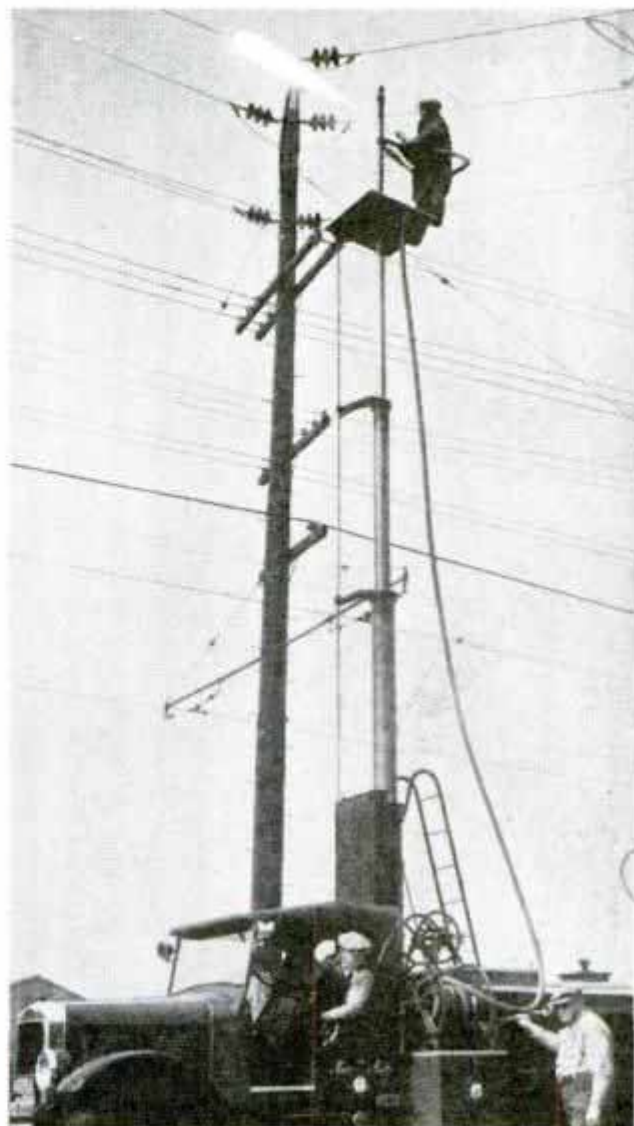
Capable of sixty to seventy miles per hour, speed boats armed with two torpedo tubes are being tested in France. The boats are sixty feet long, fifteen abeam and propelled by two internal-combustion engines developing 1,000 horsepower each. Lightning-like maneuvers may be performed by the craft, which are virtually invisible from a comparatively low altitude in any but the clearest weather. The boats would be able to dart over the surface of the sea to discharge their torpedoes without fear of air bombs, shells from forts or battleships and submarine attacks. One of the boats has attained a speed of fifty-five knots, while another with a smaller cruising range has developed fifty knots. This type of boat, it is claimed by experts, would be invaluable in paralyzing the transport of troops by sea.

**TRUCK HOISTS CONCRETE MIXER  
TO AID GRAVITY FLOW**

One concrete mixing truck is equipped with hydraulic pistons which elevate the mixing unit about eight feet above the ground before pouring. This allows gravity to assist in the emptying process and enables the use of a long chute so that concrete can be poured twenty feet or more from the truck. The discharge end of the drum is raised, leaving the mixer at a considerable angle, but a discharging device inside the drum cleans and empties it completely. It is useful in pouring concrete across parkways or chuting it through windows for flooring jobs, as well as in laying sidewalks and similar work.



Truck Elevating Concrete Mixing Drum to Speed Up Emptying



Extension Pole with Platform Is Used in Cleaning Power-Line Insulators; It Reduces Danger

**TELESCOPIC POLE ON TRUCK  
AIDS POWER LINE WORK**

Hazards of cleaning high-voltage insulators by hand are reduced greatly by a truck equipped with a telescopic pole, on top of which is mounted a small platform for the workman. When the pole is elevated to the proper height, the workman releases a stream of water from a hose extending from the truck, thus cleaning the insulators without coming in contact with the high-voltage wires. The truck also is used in fighting occasional fires along the transmission-line right of way where there are no water mains.

*Designed by Los Angeles Bureau of Power and Light  
Mr. Lee, Station 380, S. Broadway*

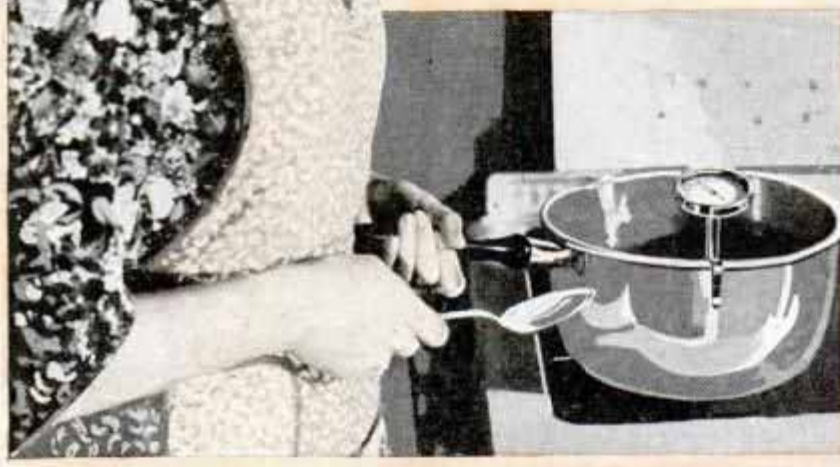
*Chain Bell Co  
1644 W. Bruce St.*



# New CONVENIENCES



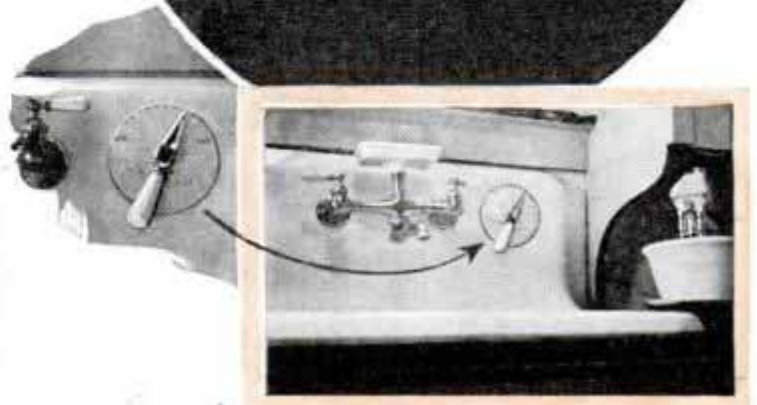
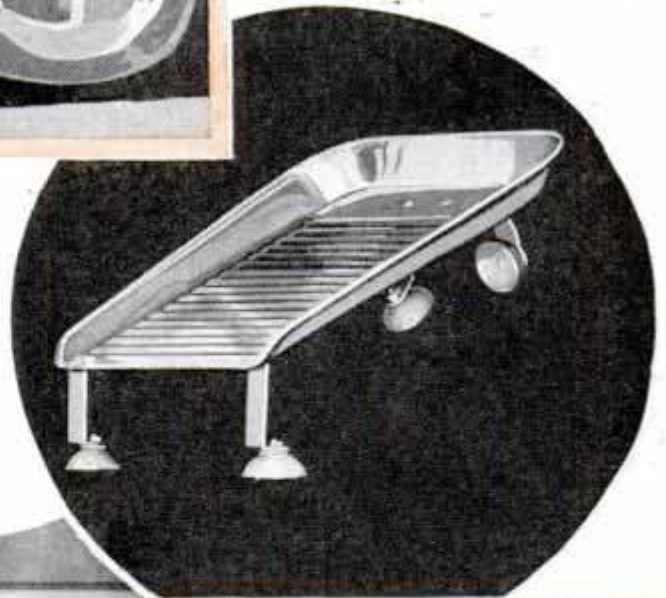
Right, Bread in Gas Toaster Is Turned without Being Touched; Knobs on Top Permit Turning Each Piece; Toaster Holds Three Slices



Left, Dial Thermometer for Cooking Is Clamped on Side of Pot with the Element Immersed in the Liquid; There Are No Glass Tubes; Below, in Circle, Small Laundry Board That Is Attached to Bottom and Front of Wash-bowl or Sink by Vacuum-Cup Feet; It Is Made of Pure Copper



Above, Wall-Type Egg Beater; Bowl Fastens Securely to the Beater by Means of Lever; Housewife Simply Turns the Handle; Right, Hot-Water Faucet Controlled by Thermostat; Any Water Temperature at Any Speed of Water Flow May Be Obtained by Turning Pointer to Desired Temperature on Calibrated Dial of Thermostat; Saving on Water Is Claimed

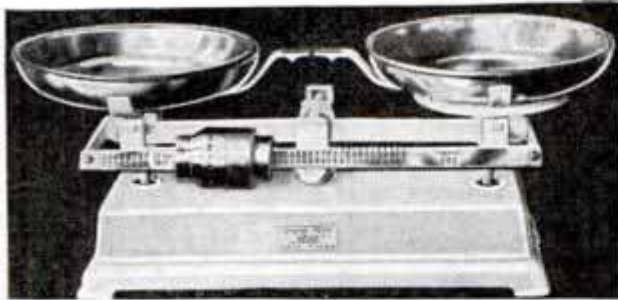




# for YOUR HOME



Top and Right, Sponge-Rubber Washboard on Which Fine Fabrics May Be Washed without Damage; Top Photo Shows How Rubber Pad Is Removed from Board; Convenient to Carry, the Board Is Useful on Trips; After Using, It Is Rinsed and Rolled in Towel to Dry



Above, Micro-Precision Scales for Household Use; Sensitive Adjustment Gives Exact Weight; Right, Electric Table Stove Which Has an Oven with Heat-Resisting Glass Windows; Toasting and Baking Pan Has Ejector Rod for Pushing Hot Pans In or Out; the Glass Windows Slide In or Out for Cleaning; Skillet Grill with Drain Plug Boils, Sautes and Bakes Potatoes; Oven Reaches Baking Temperature in Six to Seven Minutes; Skillet Grill Boils Water in Eight Minutes



Above, Utensil Made of Aluminum Uses French Drip Method in Producing a Single Cup of Coffee at the Time; the Method Is Said to Give the Coffee as Good Flavor as That Made in an Eight-Cup Percolator or Pot



D 52

# Diamond Hunters Brave Perils of Jungle Life



Above, American Explorer and His Wife and Guide Forging River in Jungle during Search for Diamonds; Left, Looking for Diamonds in Jungle

many species of carnivorous animals and poisonous reptiles, but one of the principal dangers was the myriads of bowlders above and below the turbulent rapids they traveled by boat. Impact with one of these bowlders would have wrecked their boat and plunged them into waters teeming with schools of tiny but deadly man-eating fish which have been known to devour all the flesh from a human being or animal in less than five minutes. In some parts of the country, the explorers waded streams up to their necks, carrying their equipment and provisions above their heads. They returned recently and now are drawing up a report on the expedition.

For six months, William La Varre, American explorer, and his wife faced the perils of the jungles of British Guiana while making a survey of the wild region in a search for diamonds which the adventurers believe are to be found in the dense jungle regions. Accompanied only by native blacks and Indians, La Varre and his wife moved for week after week by painfully slow progress through one of the most inaccessible jungle areas ever penetrated by man. He found a fever-ridden country inhabited principally by

Forty million or more young trees are being planted on lands where erosion has washed off the rich top soil, under conservation work plans.

*Cecil B. Buehler, 11 Park Place  
Newport City  
Ruehler*

*La Varre to ploratenis  
369 Lexington Ave.*

*Seed Service  
1/20/34*



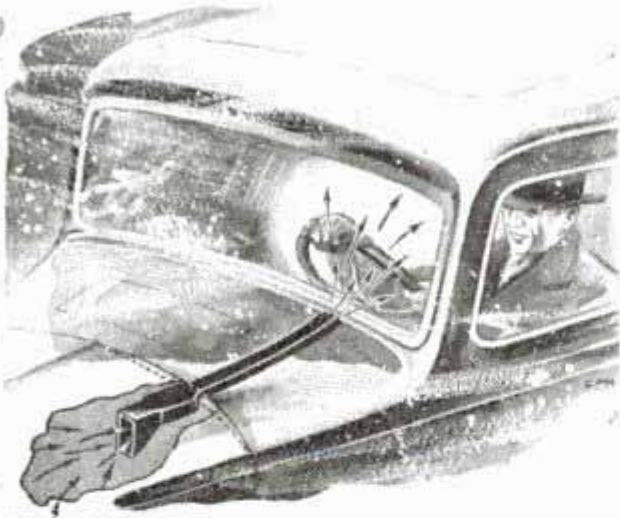
Reported by National Safety Council Chicago

**"MOVE OVER" SIGNAL FOR TRUCK OPERATED BY ELECTRIC EYE**

Truck drivers on French highways are being robbed of any excuse for not moving over to allow trailing cars to pass. The trucks are being equipped with "move over" signals operated by an electric eye, or photo-electric cell, and a movement is afoot to compel all trucks to use the device. To signal a desire to pass, a trailing motorist flashes his lights. The rays strike the electric eye which rings a bell beside the driver.

**MOTOR HEAT STOPS FROSTING OF AUTO WINDSHIELD**

Automobile windshields may be cleared of ice formations by means of a simple rubber tube that is held in place by the hood. One end of the tube is placed under the hood to pick up the engine heat, while the other lies on the cowling directly in front of the driver, releasing warm air at the base of the windshield. As the heat melts the ice formations, the wiper may be used to help remove moisture from the glass. The defroster has no working parts, being nothing more than a heat carrier.



HOT AIR FROM ENGINE

Drawing Shows How Rubber Defroster Carries Hot Air from Engine to the Auto Windshield

**NAILS AID MOUNTAIN CLIMBERS TO SCALE SHEER CLIFFS**

Three men recently succeeded in climbing to the top of a particularly hazardous mountain in the Alps after four days of effort, their success being due largely to their novel equipment. To scale the sheer

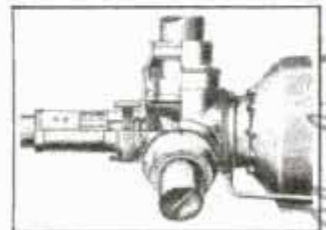


Mountain Climber Scaling Cliff with Aid of Rope Passed through Nails with Ringed Heads

cliffs, they drove nails with ringed heads into the sides of the mountain, then passed a double safety rope through the rings. They then ascended this hazardous ropeway which in some places provided the only foothold, driving nails and extending their rope as they climbed.

**PITCH OF PROPELLER CHANGED WHILE PLANE IS IN FLIGHT**

Controllable pitch propellers have offered a greater flexibility in maneuvering aircraft, and one has now been developed which enables the pilot to alter propeller pitch while in flight. This feature enables a pilot to vary the pitch to the most efficient point for taking off, landing or for flying speed. The three blades are pivoted on radial bearings and connected through bevel gears to a master bevel driven by a small electric motor bolted to the blade hub. Gradual propeller-pitch change is made possible without complicated and bulky parts by using a 27,000 to one, three-stage heliocentric speed reducer.



Collaborating with Curtiss Aeroplane & Motor Co. Valparaiso

Universal Gear Corp. 19th and

U.S. A. V. Co. Belvedere, Ill.

Trieste, Italy

D23

D24

D37



C2052



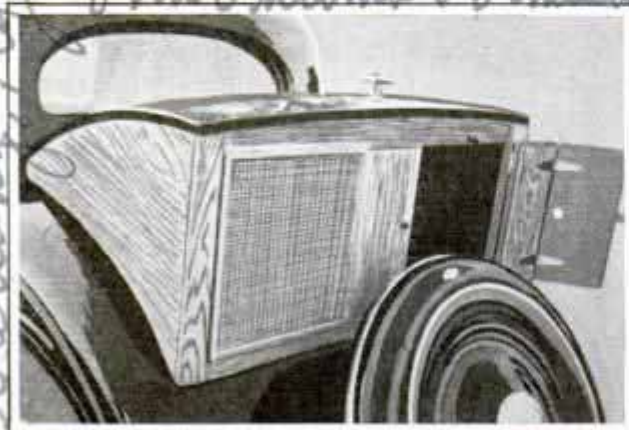
Overhauling and Repairing a Lifeboat at a Diminutive Drydock in London Where All Such Craft Are Constructed, Equipped and Repaired

**SMALL DRYDOCK IS "HOSPITAL" FOR REPAIRING LIFEBOATS**

London boasts a diminutive drydock which at first inspection might be taken as a repair depot for model ships. Actually, however, it is a lifeboat "hospital." It is there that lifeboats are equipped and overhauled and every boat in active service is docked there periodically.

**DOG CARRIER FOR COUPE BUILT IN BAGGAGE COMPARTMENT**

Dogs and other pets can be transported easily in a coupe without a rumble seat if it is fitted with a compartment placed in the rear of the car. The cover of the luggage carrier forms the roof of the compartment for the pets and the door is fitted



Carrier for the Dog or Other Pet Which Fits in Luggage Compartment of Coupe

with a ventilating panel. Such a carrier provides space for several dogs and is suitable for carrying hunting dogs.

**MODEL AIRPLANE HELPS TEACH FLYING**

Responding to the operator's rudder-bar, joystick and switch exactly as in a real ship, a model airplane is being offered as an aid to students of aviation. The small plane climbs, banks, turns, dives and lands, performing all movements as the student moves the various controls. The ship is mounted on a tube which may be raised twelve to fifteen inches during maneuvers. Two motors



Student at Controls of Miniature Plane Which Can Be Put through Many Maneuvers

with eight-inch propellers set between the wings of the plane provide the air stream. The operator controls movements of the plane's rudder, elevator, ailerons and the speed of the motors. Wires passing through the tube are connected to the controls on the model ship and to the student's rudder-bar and joystick. The student may be seated at the controls in a manner similar to that position assumed by a pilot. As he sends the small ship through its movements, the student watches the result, learning just what to expect when he does the same thing in a real plane.

*London  
Capt. End  
in Popular*

*2049  
Rockwood Industries  
Inc. & Extension  
511 W 54th St  
New York 19 N.Y.*

*Claw Joseph Weisinger  
511 W 54th St  
New York 19 N.Y.*

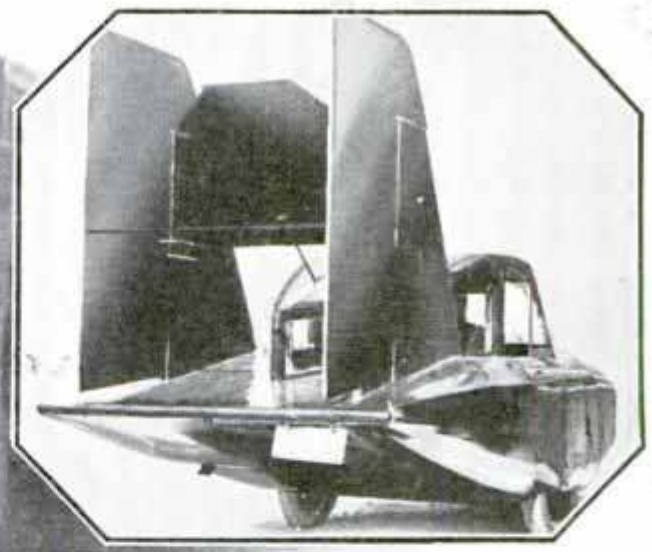


© 2035

*Am. Sch. of Aviation, Moody*  
*Esugenheim School of*  
*Aeronautics, Georgia School of*  
*Technology, Atlanta*  
*Isa*

# Auto Like Airplane Is Steered with Rudder

Modeled after an airplane, an automobile which travels on two wheels and is steered at high speed by two large air rudders has been tested successfully. The



Interior and Exterior Views of a Two-Passenger Auto Built Like an Airplane; It Travels on Two Wheels and the Big Rudder Aids in Steering and in Balancing

body resembles the fuselage of an airplane streamlined over a glass-enclosed cabin with room for the driver and one passenger. Behind and above the body are the rudders. Two wheels, one on each side of the body, carry the weight and supply the motive power. There is a small auxiliary wheel in front to absorb a small part of the weight at very low speeds, but it has no part in the operation of the vehicle and swivels like a caster. As the vehicle picks up speed, a horizontal air-control surface between the rudders tips it back, raising

the auxiliary wheel from the road, and it moves in a balanced position on its two main wheels. The driving wheels have individual brakes which play an important part in steering and the motor is located in the conventional position in front. The thirty-two horsepower engine has a low fuel consumption since comparatively little power is required. It is claimed the vehicle handles well in heavy traffic.

True squashes and pumpkins will not cross when grown side by side.

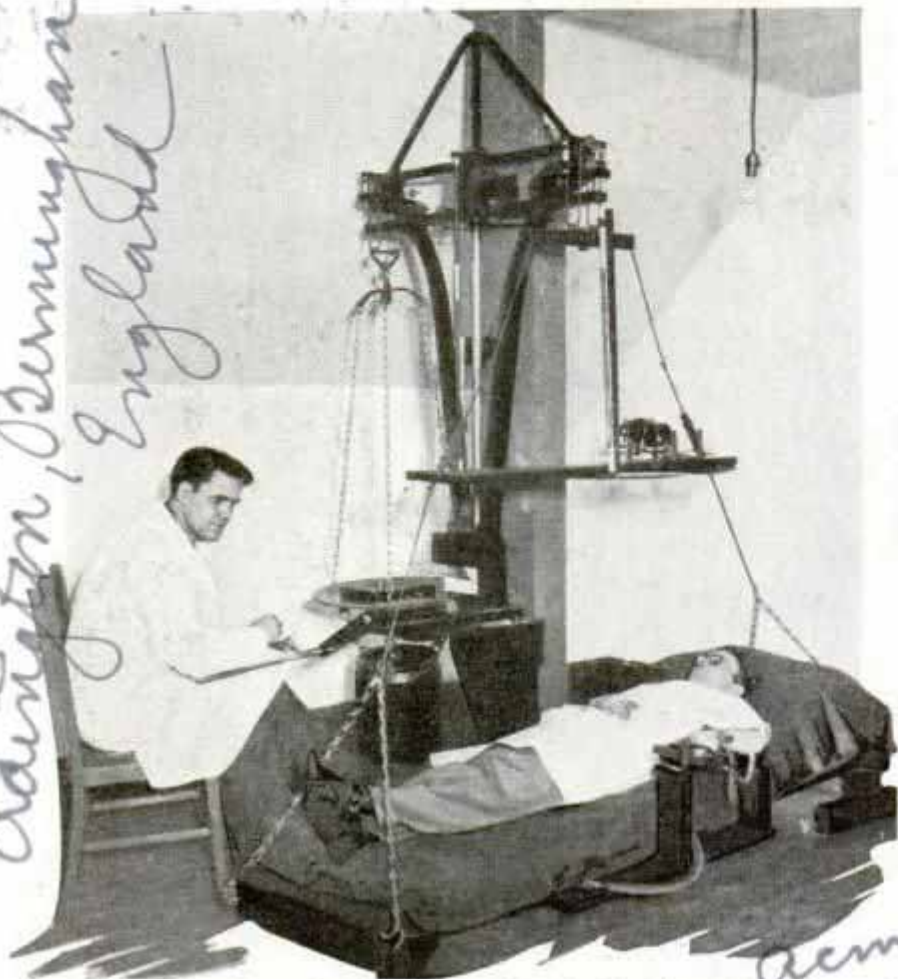
*Science Service*  
*11/2/24*



c2018

# What Are Your Best Hours for Work?

Rubber Co Ltd  
Edington, Birmingham  
England



After spending more than two years in experiments attempting to learn during what period of the day a man's energy is at the highest and he is best equipped for work, Prof. G. L. Freeman, of Northwestern university, has decided the period varies with each individual. One man, for instance, may work best in the morning, while another may be at his peak in late afternoon, or the evening. Prof. Freeman experimented with more than fifty subjects, checking energy and loss of weight for each on a scale sensitive to three-thousandths of an ounce. By such tests he determined just how much energy an individual expended doing identical tasks at different periods, thus arriving at the best time for work.

Determining Best Hours for Work for a Man by Checking His Energy and Loss of Weight on Scale Sensitive to Fraction of an Ounce

acme

## Hedge Trimmer on Tractor Is Run by Gasoline Engine

Sumitof

Cutting hedge fences is speeded up by employing a trimming machine mounted on a small tractor. The cutter is run by a gasoline engine mounted at the side and the knife can be lowered or raised to cut at a uniform height, regardless of unevenness of the ground being traveled.



Hedge Trimmer Mounted on Small Tractor and Run by Gasoline Engine; It Cuts at a Uniform Height

### GEARS FOR AIR LINERS

By using geared motors, transport planes of the United Air Lines are to be speeded up from twenty to twenty-five miles per hour. With such motors the air liners now cruising at about 170 miles per hour will be able to fly nearly 200 miles per hour. The present 550-horsepower motors will be replaced

with the same ones fitted with a reduction gear to the propeller.

B. O. ...





C 4663

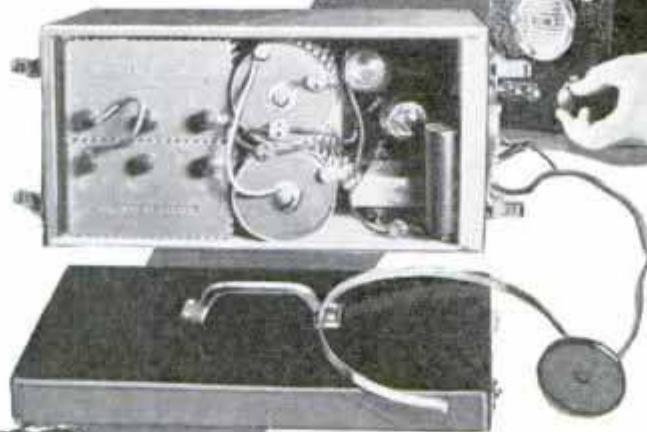
# HEARING AID

serves ONE to TEN

# HEADSETS

ALTHOUGH this hearing aid unit can be easily carried, it is primarily intended for the home or office. It employs a two-stage audio amplifier, with type-230 tubes, and weighs 5¾ lb. without the batteries. The single-button carbon microphone, mounted on the front of the case, is a modified Universal model A. This complete unit is available ready for use with the exception of two 45-volt B-batteries and two No. 6 dry cells. The tubes are of the 2-volt type and draw only .06 amp., therefore the batteries will last a long time if the device is always turned off when not in use.

Experimenting with this unit, it was found to have sufficient amplification to op-



erate ten or more small featherweight headphones of the Trimm type connected in parallel. It is therefore practical for use in churches or other public gathering places. Seats can be equipped with

small control boxes. A midget phone jack, of the open-circuit type, and a 10,000-ohm potentiometer should be mounted in the boxes so that each listener can control the volume to suit his individual needs. The two-wire line is run directly through the control boxes and the outside terminals of the potentiometer are connected to each side of the line. The center terminal is connected to one side of the phone jack and the other side of the jack to one side of the line.



*Universal Microphone Co.*



# PENTAGRID

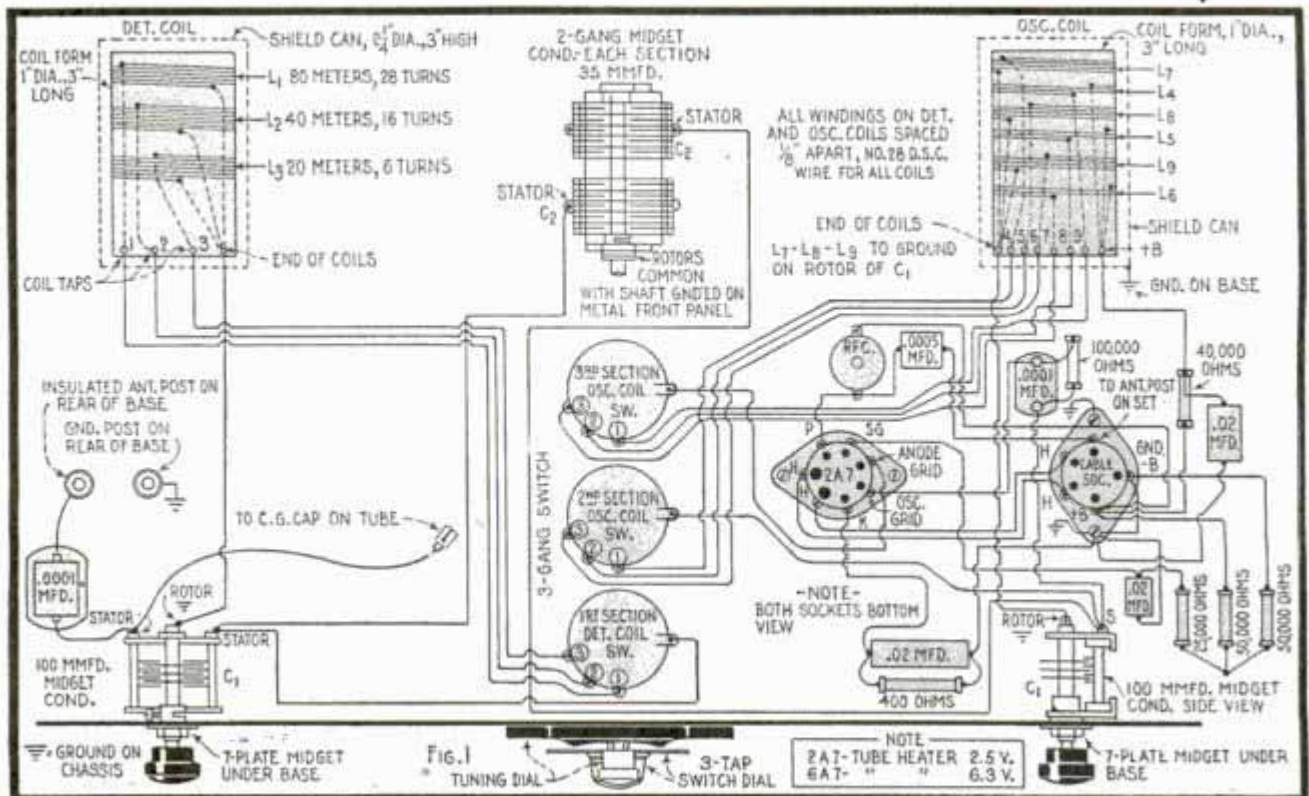
## One-Tube Short-Wave Without Plug-In Coils

turning a switch the coils for the various short-wave bands are connected in the circuit. There is sufficient overlap in each coil to cover the principal foreign short-wave phone stations operating in the 19 and 25-meter bands as well as the regular amateur key and phone ranges with the exception of 160 meters. The converter is purpose-

designed for maximum efficiency in these particular bands. Two of the German stations were received with good volume during the preliminary tests of the converter, which was used with a standard a.c. superheterodyne broadcast receiver under ordinary conditions.

By R. E. DAVY

**I**NEXPENSIVE and easy to build, this short-wave converter has many advantages over former types that required several tubes and plug-in coils. By merely









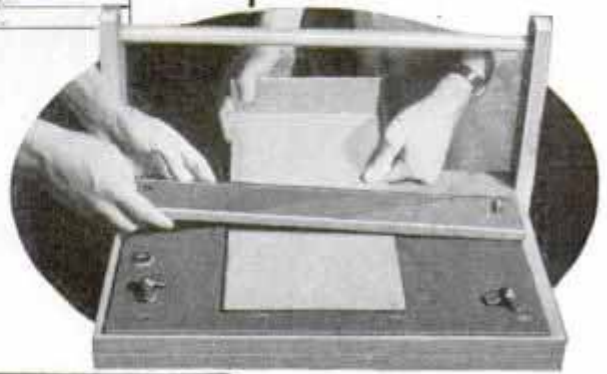
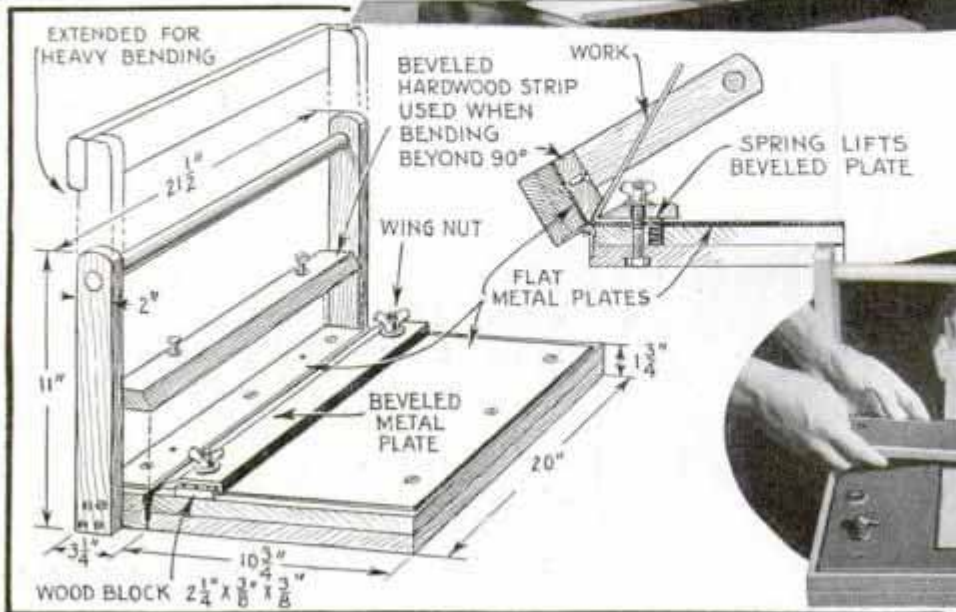
# Bench Brake for Forming Metal Radio Bases



Sheet-metal bases for radio receivers and power units are rapidly replacing the flat breadboard layouts formerly used by experimenters. They enable the builder to mount resistors, small coils and condensers under the base. Further ad-

vantages are concealed wiring and shorter leads; in some cases a tube may even be mounted below the base as in the pentagrid short-wave converter described in this issue. Practically any kind of thin sheet metal may be used for the purpose;  $\frac{1}{16}$ -in. aluminum or eraydo, a form of zinc, is commonly employed. For small receivers, builders usually bend the metal sheet between two blocks of wood in a vise; a few taps with a wooden mallet results in a fairly good bend. This method is not satisfactory, however, when larger bases are to be formed. The simple homemade bench brake, shown in the photos and diagrams, will handle larger sheets of metal; the result is a good sharp bend and the

finished product has a commercial appearance. The construction diagrams are self-explanatory and require little further comment. The sketch at lower left shows how the leverage may be increased for heavier material. The beveled metal plate, under which the material is clamped for bending, consists of a discarded 19-in. paper-trimmer knife. These heavy knives can be obtained from printing firms who junk them when they are dull. Hardwood is used for the base sections, which are carefully hinged at three points.





*E. H. Johnson Co  
Waseka, Minn*

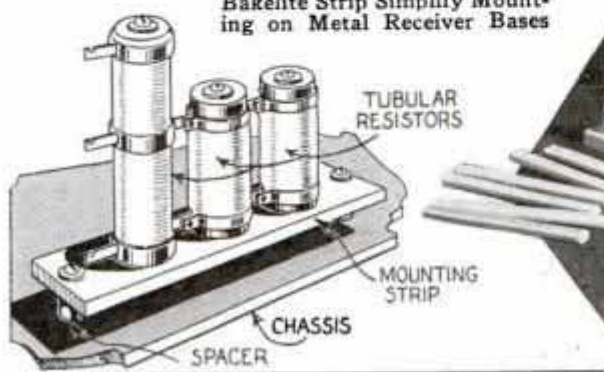
# Practical RADIO SUGGESTIONS

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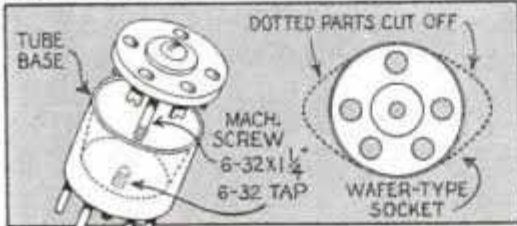
*Leitchman Co  
Cambridge, Mass*



Resistors Grouped on Small Bakelite Strip Simplify Mounting on Metal Receiver Bases



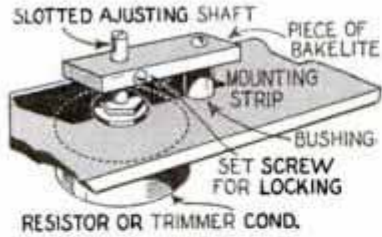
Inexpensive Porcelain Insulators for Amateur Radio Experimenters; the Various Types Shown Include, Stand-Off in Four Sizes, Feeder Spreaders, Airplane Antenna, and Transposition Blocks in a New Design for DX Doublet Antennas



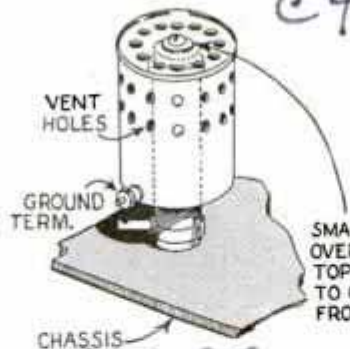
Homemade Adapter for Inserting Tubes in Tester without Breaking Cartons; Connect Socket Terminals to Prongs



Electrolytic Condenser for Power Units Has Three 8-Mfd. Sections; Metal Container Is Common Negative; Left, Tin Can as Protection from Hot Resistors

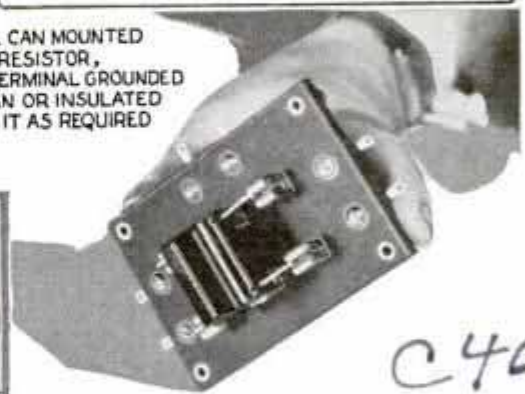


Above, Locking Device for Critical Adjustment of Experimental Apparatus; When Setscrew Is Tightened Vibration Will Not Alter the Setting



SMALL CAN MOUNTED OVER RESISTOR, TOP TERMINAL GROUNDED TO CAN OR INSULATED FROM IT AS REQUIRED

Low-Cost Featherweight Headphones Available in 2,000 or 4,000 Ohms Weigh only 5 Ounces; Headband Is Light Spring Steel and the Shells Are Aluminum

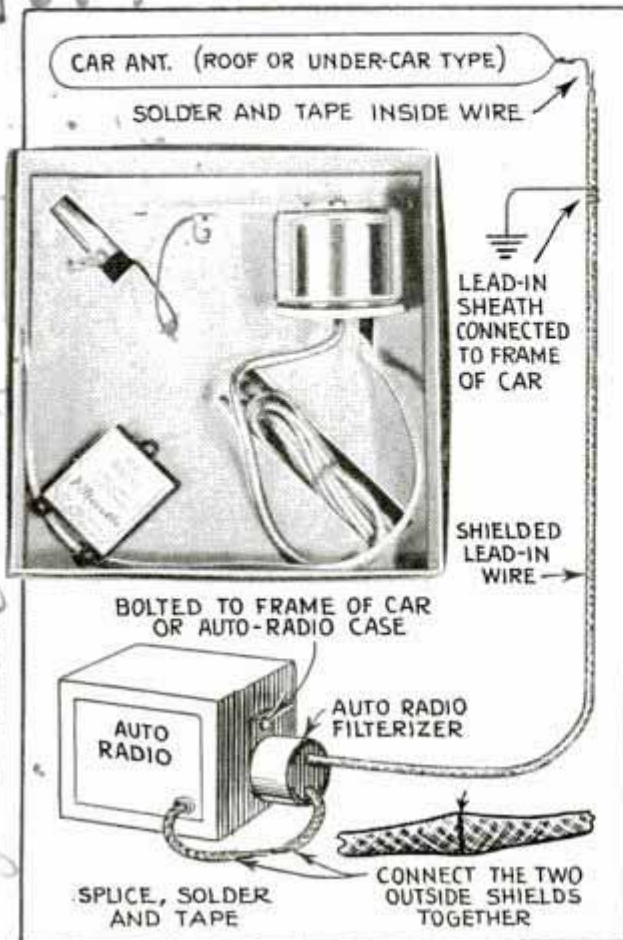


Quick Change-Over from Small Transmitter to Receiver Easily Made with This Double-Pole, Double-Throw Switch

*Trimmer Wiff Co  
2000 Mendel St*

*General Radio Co  
Cambridge, Mass*





Auto-Radio Noise-Filter Kit; Diagram Shows the Method of Isolating the Antenna

### Noise Filters Improve Auto-Radio Reception

Reducing noises in auto receivers, without interfering in any way with the operation of the motor, has been a difficult problem in many installations. The filter kit illustrated has been offered recently as a practical method and is claimed to provide relief from radio noises caused by spark plugs, distributor and generator. A shielded antenna lead to the set and special filters for the dome, tail light, and other wiring of the car, prevent noises from reaching the antenna and permit the signals to arrive at the receiver without being mixed with interfering sounds.

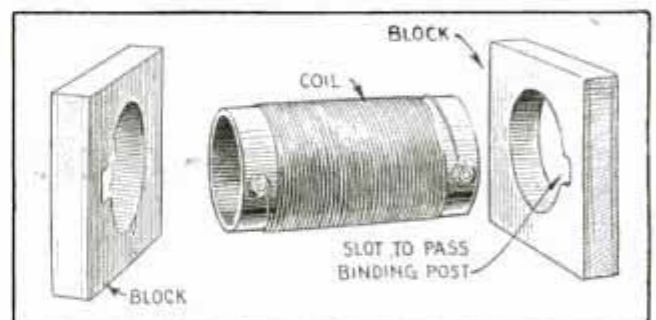
### Radio Inventions Needed

Every radio experimenter is a potential inventor, in fact the amateur is credited primarily with the practical application of radio in the home of today. Many problems are yet to be solved and the average experimenter, unhampered by the knowledge of previous unsuccessful attempts, is quite likely to stumble on to practical so-

lutions. Antenna systems are still far from being free from noise, receiver and transmitter construction can be simplified and improved. The new tubes now available offer many interesting possibilities, a single tube doing the work of several of the former types. A practical and entirely new, low-priced television system is needed. The ultra-short waves offer a wide field for exploration and relays can be simplified for radio remote control. All-wave receivers should not require switching devices and the present methods of automatic volume control leave much to be desired. Really, portable receivers, compact long-life dry batteries, sensitive metal locators, and many other radio devices are still to be developed.

### Matching Homemade Coils for Ganged Condensers

Anyone who has wound his own coils knows that even though he may wind the exact number of turns, of the same size wire, on a given diameter of tube a perfect match is seldom obtained for single-dial control. The compression-block idea shown in the sketch is recommended. The coils are wound by hand in the usual manner and temporarily connected in the circuit. Those that check up a bit "low" in inductance are removed and pressed gently between the wood blocks until the signal volume indicates that they are all matched. When a coil is too "high" in inductance, spreading the turns slightly will bring it down. When matched they should be coated with shellac.



Wood Blocks for Compressing Coils; Holes Are Cut to Just Pass the Coil Form

Blueprints covering radio construction articles in past issues can be obtained for 25 cents each; when material lists are not included in the articles, these are available without charge on receipt of postage.

Chicago, Albid Radio Corp. 803 W. Jackson Blvd.

C 4651 Jake Deutschman  
Co; Canton Mass  
© 4657





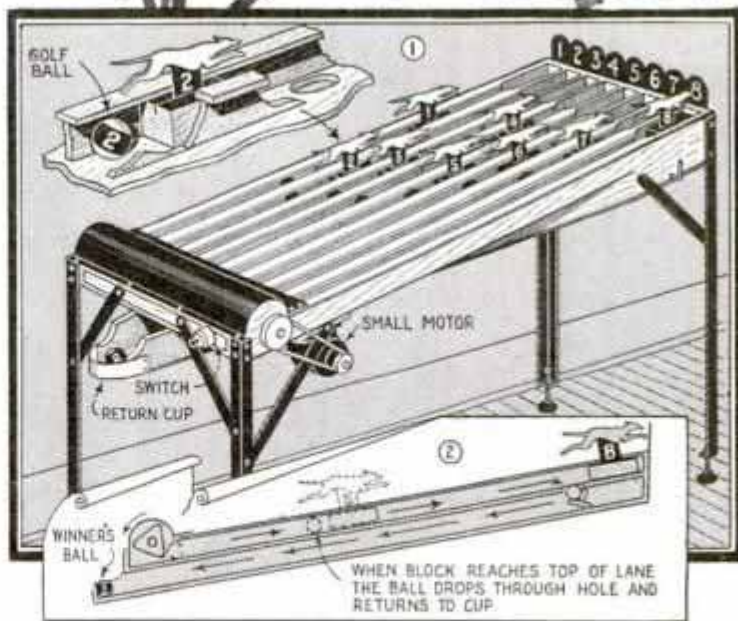
# The RACING GREYHOUNDS

*Small Motor  
Runs this New  
Mechanical  
Game*



HERE is a fascinating party game which is of interest to both young and old. It consists of an inclined board having a number of tracks in which miniature greyhounds are sent scooting along in a rather erratic and uncertain way, Figs. 1 and 2. The motive force is supplied by a small motor-driven paddle wheel, which bats golf balls with varying force against the blocks on which the dogs are mounted. By carefully examining the drawings that show the constructional details of this game, you will soon get an accurate idea of just how the mechanism works and how the various parts are assembled.

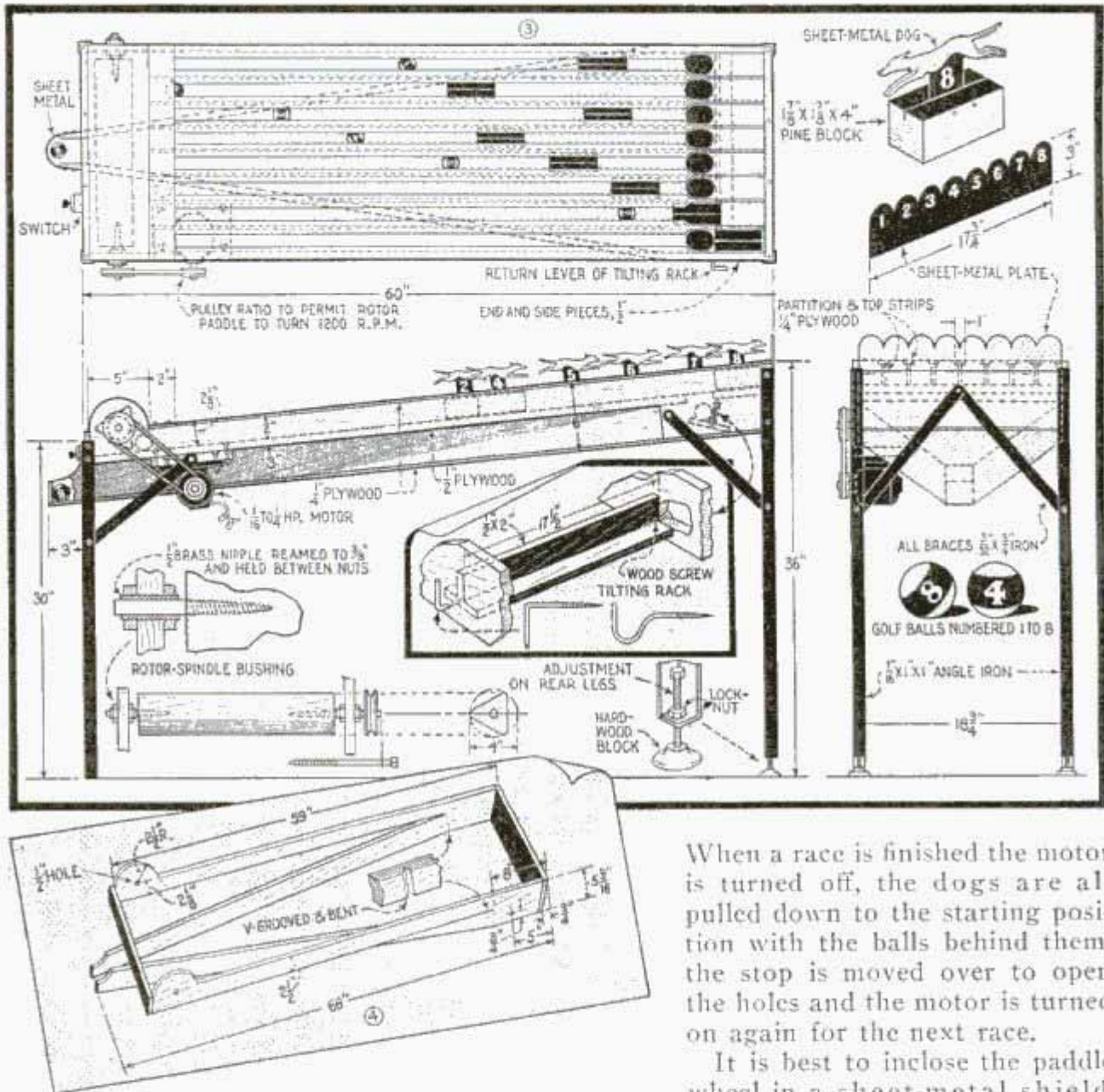
Strips of 1/4-in. plywood are used to divide the top into eight 2-in. lanes in which the smooth blocks that hold the dogs are placed. The three-sided paddle wheel at the lower end of the table should be made of hard maple, and should travel at a speed of from 800 to 1,200 r.p.m. Care must be taken to have the paddle wheel well balanced in order to prevent undue vibration. Almost any



small motor will serve to supply the necessary power, and a snap or toggle switch is placed at a convenient position as shown in the drawing.

When playing the game, the first dog





that reaches the upper end of the track wins the race. The ball that has been striking it, and is correspondingly numbered, then falls through a hole at the end of the track, into a return trough which leads to a cup just below the starting point. The frame for the table and the return trough are shown in Fig. 4. Each track, of course, has a hole at its upper end, and in order to prevent any other ball than the winner's from getting into the return trough, a wooden stop is placed directly underneath the row of holes. The stop consists of two pieces of  $\frac{1}{4}$ -in. plywood assembled as shown in a detail of Fig. 3, and pivoted at each end. As soon as a ball drops on the horizontal part, the stop moves over to close the row of holes, preventing any more balls from entering.

When a race is finished the motor is turned off, the dogs are all pulled down to the starting position with the balls behind them, the stop is moved over to open the holes and the motor is turned on again for the next race.

It is best to inclose the paddle wheel in a sheet-metal shield.

Also, it is convenient to make the legs collapsible, and therefore, angle iron may be used to advantage, rigidity being obtained by means of flat-iron corner braces.

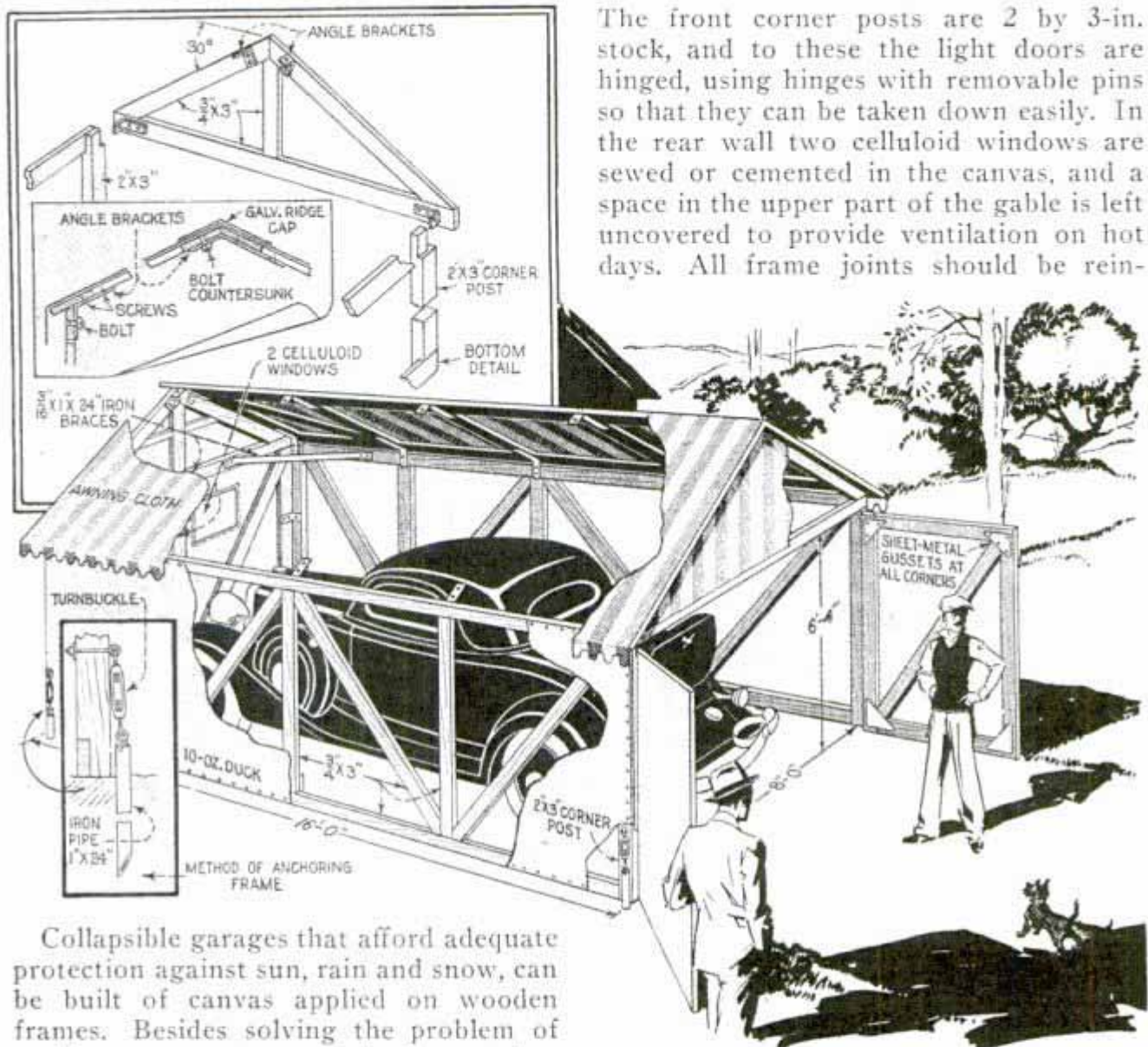
### Cementing Movie Films Together

Amateur motion-picture films and other celluloid articles may be effectively cemented by first cleaning and then brushing the parts to be joined with glacial acetic acid, after which the parts should be immediately pressed together. This method is a handy one when regular cement for this purpose is not at hand.

☛ A coating of five parts of coal tar, one part gasoline, and one part japan drier will make canvas nearly waterproof.



# A Portable Canvas Garage for Your Cottage

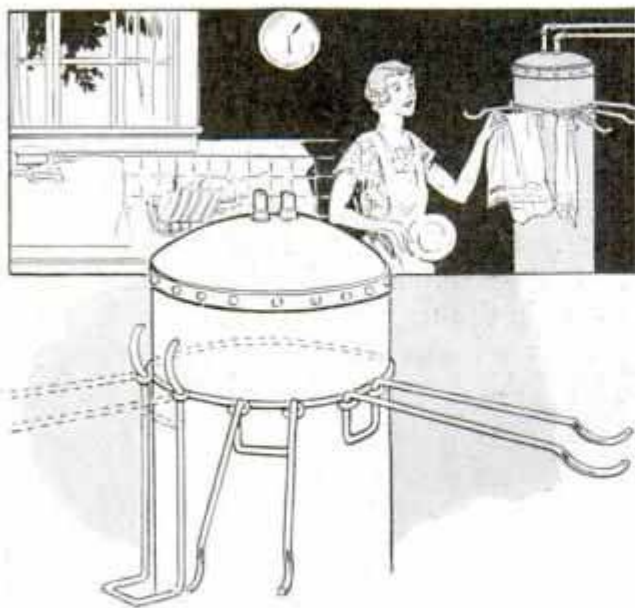


Collapsible garages that afford adequate protection against sun, rain and snow, can be built of canvas applied on wooden frames. Besides solving the problem of getting a garage at a much lower cost than one made of wood or steel, its portability is an advantage for those who have a summer home or cottage. While, according to the dimensions given, the garage is very compact, yet there is ample height and length for your car, with about 18 in. to spare on each side. To protect it against high winds, the framework is anchored at the corners to four long iron-pipe stakes by means of eyebolts and turnbuckles. The stakes are simply 24-in. sections of 1-in. pipe cut at an angle at one end and having an iron loop for the turnbuckle at the other. The structure is built up in five sections, including two sides, one end, two roof halves and a front gable end, all bolted together with angle brackets. The framing throughout is of  $\frac{3}{4}$  by 3-in. pine, with diagonal bracing installed as shown.

The front corner posts are 2 by 3-in. stock, and to these the light doors are hinged, using hinges with removable pins so that they can be taken down easily. In the rear wall two celluloid windows are sewed or cemented in the canvas, and a space in the upper part of the gable is left uncovered to provide ventilation on hot days. All frame joints should be rein-

forced with light iron or  $\frac{1}{4}$ -in. plywood gussets. The horizontal frame member or sill is raised about an inch above the ground level so that pull of the turnbuckles is exerted only on the corner posts. The roof is made in two halves, secured with angle brackets and covered with awning cloth. A galvanized-sheet ridge cap is screwed to one side, but overhangs the other side when assembled. Small carriage bolts with countersunk heads are installed as illustrated. The canvas covering over them prevents them from falling out. No attempt is made to have a garage of this nature theftproof, but a lock will keep small children out. It makes a very neat appearance with tan-duck sides, bright-striped awning cloth for the roof, and designs stenciled on the doors.





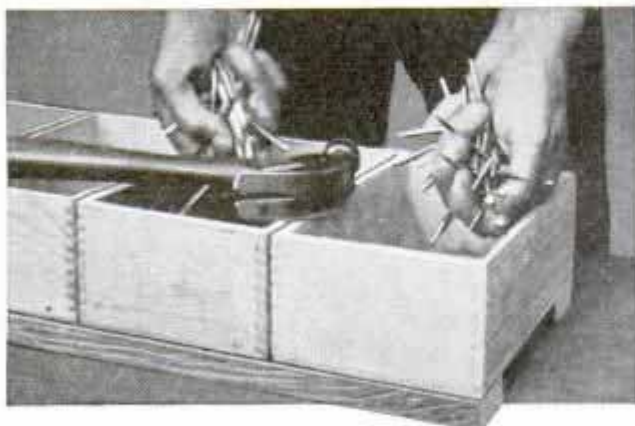
Clothes Held on Folding Rack Are Dried by Heat from Hot-Water Storage Tank

### Homemade Clothes-Drying Rack on Hot-Water Tank

Heat radiating from a hot-water tank in the kitchen or bathroom can be utilized to dry clothes by using this folding rack. It is made by bending small loops in a length of heavy wire, which is fastened around the tank. The arms that fit into the loops are made in pairs and they extend horizontally from the tank to hold the towels. They may be lifted and dropped down out of the way when not in use.—G. E. Hendrickson, Argyle, Wis.

### Nail Tray Improved from Small Boxes

Several small boxes placed side by side and then nailed to a couple of crosspieces as shown, make a good nail tray. Boxes



Small Wood Boxes Nailed to a Couple of Crosspieces to Serve as a Nail Tray

of suitable size for this purpose can be obtained at almost any drug or grocery store.

### A Cedar Chest in Medieval Style

This handsome and commodious chest can be built by the home craftsman who has only a moderate knowledge of cabinet work and wood carving, and when completed has all the richness in appearance of a distinctly expert job. Although classified as a cedar chest, only the bottom and back are of this fragrant wood, the remaining construction being of Tabasco mahogany. The first step is to make the corner pieces. Note in the perspective cut-away drawing that the sides are mortised into these corner posts. The substantial mahogany feet are built up of three pieces which are fastened to the corner posts with two long screws up through the bottom. Glue is, of course, used in all joints. A finishing strip is glued and nailed around the top edges of the sides and corner posts. Before assembling the chest, sandpaper each part carefully, and complete all the carving, because the latter will not be so convenient on the assembled chest. The two front corner posts are carved to the design shown, almost all of which can be done with a flat, narrow chisel. The background is then stippled with a nail and mallet. For the large panels with the knight in armor, first lay out the design on paper and transfer it to the wood with carbon paper. The outlines are cut with a veining tool, and the background removed to about  $\frac{1}{8}$  or  $\frac{3}{32}$  in. with a chisel. The background is then hand-stippled. Carving on the border of the lid is accomplished in much the same manner, but the corner areas, however, must be carved after assembly. The finish of this job is of greatest importance. The knight in armor with his shield and plumes can be given a touch of color, but the remainder of the chest is most effective in a brown-mahogany water stain. First moisten the raw wood with cloth or sponge, and sandpaper smooth. Next apply the filler and when dry, sandpaper again, using a fine grade in each case. Then put on the water stain and when dry, sandpaper again, following with three coats of thin shellac, using steel wool after each coat except the last.

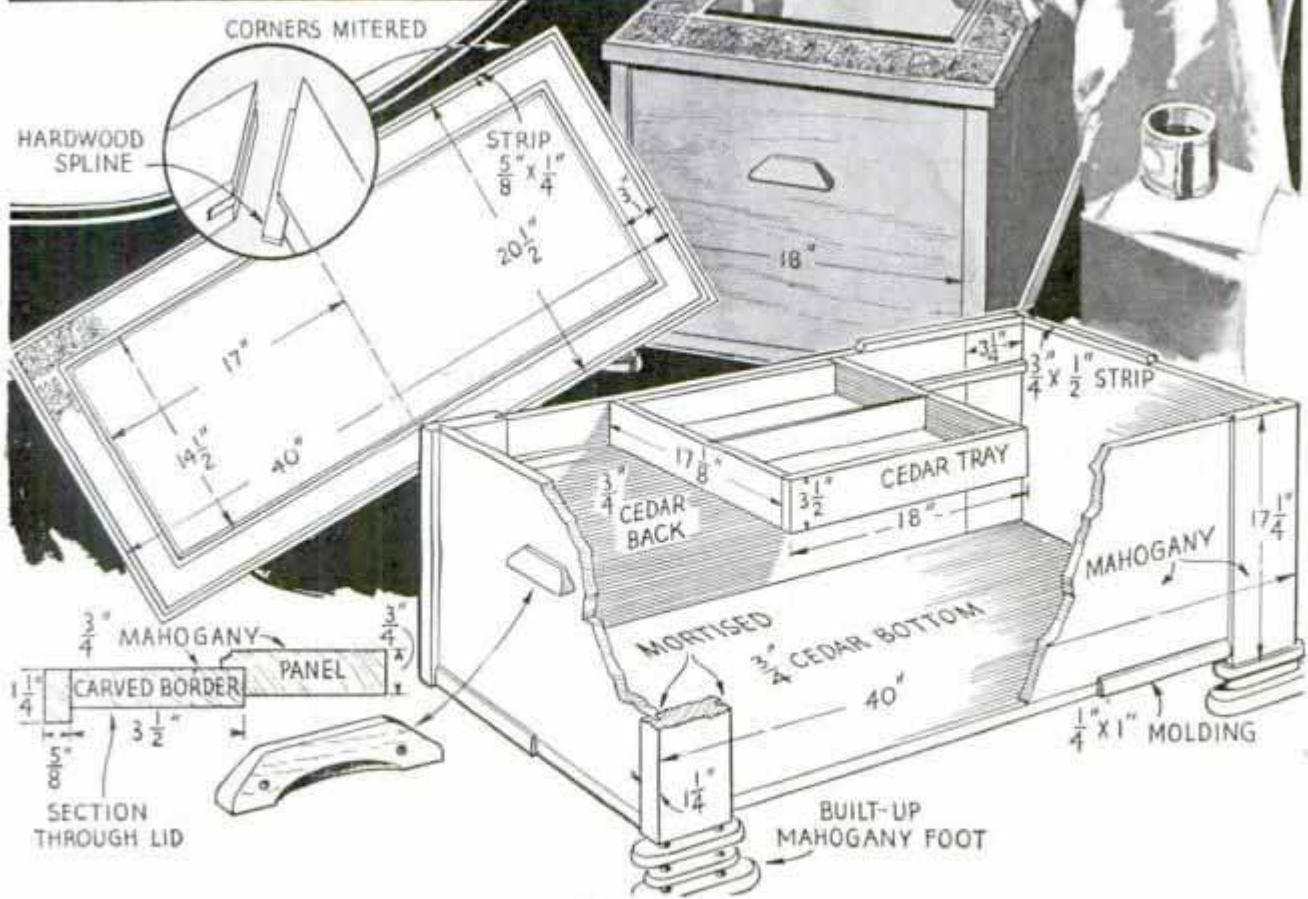
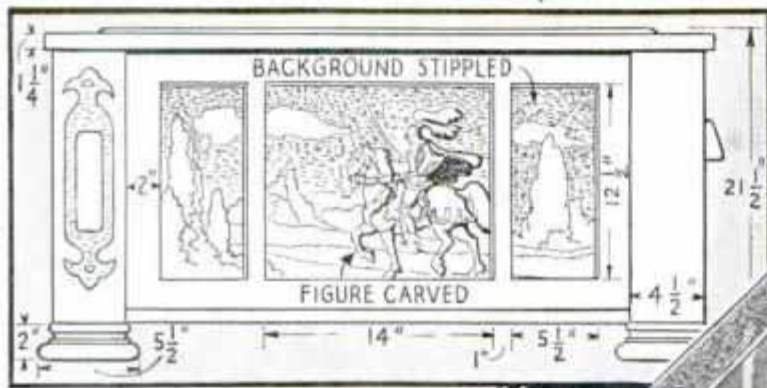
☞ Brass or copper can be tinned by boiling it with tin filings in a solution of caustic alkali or cream of tartar.





# MASSIVE CEDAR CHEST

*in Medieval style...*







Water Mixer, of the Type Attachable to Kitchen-Sink Faucets, Used as Drinking Fountain

### A Sanitary Drinking Fountain on Your Kitchen Sink

If you have a water mixer on the faucets of your kitchen sink, it can be converted into a sanitary drinking fountain by simply turning the center spout upward as shown. This does not interfere with the regular use of the attachment.

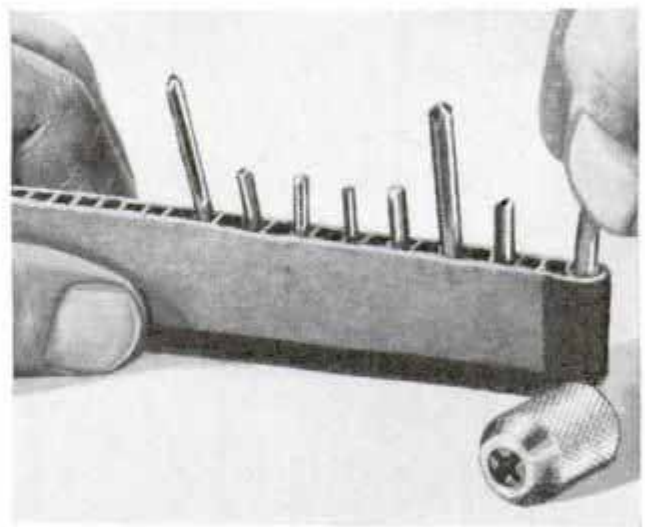
### Repairing Glass and Chinaware

Broken chinaware and crockery may be repaired by cementing the parts together with a hot molten mixture of bleached shellac and gutta percha. Gutta percha, 1 part, and flakes of bleached shellac, 10 parts, are cautiously melted together while constantly stirring in a double boiler. The parts to be cemented should be cleaned and heated after which the hot cement is applied to the broken edges. The parts are then quickly pressed firmly together and bound until the cement has hardened. Unused cement may be poured into small bars and remelted whenever needed. If the work to be repaired must stand heat after the repair, another type of cement, made by rapidly mixing dry casein, 1 part, and water glass, 10 parts, is very effective if made quickly and applied without delay. The water glass and casein are most easily mixed by shaking them together in a bottle. In preparing this cement, only

pure casein should be used. Casein glue will not serve the purpose. Clear or colored glass is mended by painting the broken surfaces with water glass and pressing the parts together and binding them until dry. This method produces a clear glass-like repair that is noticeable only on close inspection. All excess water glass must be removed from the surface of the glass before it hardens. Pieces of broken glass may be fastened together very rigidly with a cement made by dissolving shellac, 5 parts, in turpentine, 1 part. To dissolve, the mixture should be placed in a double boiler, the bottom part of which contains water, and heat applied. When the mixture is of even consistency, fine pumice stone, 5 parts, is added and stirred until the cement is smooth. This cement is applied to the surfaces to be united and the parts are pressed together. To fasten glass to metal, a cement consisting of rosin, 40 parts, plaster of paris, 4 parts, and turpentine, 1 part, is effective. The ingredients are carefully melted together, thoroughly mixed and then applied hot. The metal and glass should likewise be warmed before applying this cement.

### Corrugated Cardboard Used as Holder for Small Drills

A piece of corrugated cardboard makes an excellent holder in which to carry small drills in the tool box. Reinforce the sides and ends of the cardboard with gummed



Corrugated Cardboard Makes Good Holder for Small Drills When Reinforced with Gummed Tape

tape and then place the bits in the corrugations as shown in the photo.



### How to Prevent Rusting of Home Workshop Tools

The best preventive against rust on tools and machinery in the home shop is to remove the dampness as much as possible. Unslaked lime will absorb moisture in confined places, such as tool drawers and chests, while a good rust preventive that can be applied to the tools can be made as follows: In acetone, 1 oz., dissolve enough fine celluloid cuttings to make a thick syrup. To this add pure benzol, 1 oz. and turpentine, 1 oz. After this has been mixed, add castor oil, 5 drops. Keep the mixture in a well-stoppered bottle and apply it to the tools with a cloth. To remove rust spots already on metal surfaces, rub them with a solution of chloride of tin. After the rust disappears, wash and dry the surface and then apply powdered chalk or a metal polish.

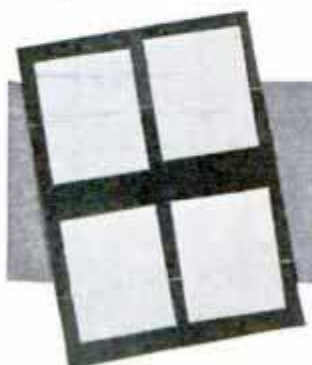
### Soft Solder Keeps Small Nuts from Loosening

When lock washers are not available to put under small nuts, a drop of soft solder will keep them from loosening. Thoroughly clean both the nuts and the threads above them before applying the solder. This can be removed with the point of a sharp chisel when the nuts are to be taken off.



### Drying Photos Outdoors

Photographers who prefer to dry their photos outdoors, but do not like to risk the prints falling from the ferroplate, can



remedy this trouble by simply stretching a small rubber band around the plate and over the photos. When dry, the print is held firmly by the band.—Ivan Grosvenor, Richmond, Ind.



Tapered Terrace Wall Has Less Tendency to Be Cracked by Freezing and Thawing of the Ground

### A Terrace Wall That Will Not Crack

It is common practice, when building terrace walls of cement, to slope the cut of the soil outward at the bottom and to erect the wall at the same angle. Although, to all appearances, the strength of such a wall is increased according to the degree of the slope, the physical behavior of the banked soil in successive periods of freezing and thawing has not been taken into consideration, and the alternate upheavals will eventually crack the wall. To attain the same effect in appearance of the wall and to multiply its retaining strength several times with an equal amount of concrete, the terrace should be slanted inward and the wall should be tapered upward from both sides as shown in the circular detail. Expansion and contraction of the soil in freezing will be accommodated by the inside slope of the wall surface.—G. E. Hendrickson, Argyle, Wisconsin.

### Imitation Sand Finish on Walls Produced with Corn Meal

A rough imitation sanded finish on walls can be had by mixing corn meal with the paint before applying it. The fine particles of meal should be sifted out and the coarser portions stirred into the paint. The corn meal, being of approximately the same density as the paint, stays suspended in the mixture. The amount of the sanded effect is governed by the amount of corn meal put in the paint.—J. W. Falconer, Glen Ellyn, Ill.



# SCALE MODEL



One of a fleet of sixty coast-to-coast Boeing transport planes which clipped off 182 m.p.h. in test flights at Seattle, under full load conditions of ten passengers, crew of three and cargo. This view gives a graphic impression of the plane's 74-ft. wing, the mounting of its two 550-hp. motors, and its clean streamlining. The plane takes off after a 770-ft. run, climbs at the rate of 830 ft. per minute and lands at 58 miles per hour

By W. CLYDE LAMMEY

## PART I

**B**UILDING this scale-model plane of wood is not a task of accurately reproducing a great number of intricate details but it is a matter of working into a few pieces of wood the beautiful symmetry and graceful streamlining which are the principal features of the full-size ship. The scale is approximately  $\frac{5}{16}$  in. to a foot, and the material used is hard, white maple.

The wing piece, Fig. 1, is made up of six strips, five from  $1\frac{3}{16}$ -in. stock and one from  $\frac{1}{2}$ -in. stock. After all pieces have been cut out, lay them, straight edge down

on a flat surface, square the ends and clamp together. Square gauge lines across all pieces and groove on the circular saw or with a dovetail saw and hand chisel. Bring the groove to the exact width and then remove the waste outside the dotted line on each one. Next make up the parts of the fuselage. The  $\frac{1}{4}$ -in. dowel holes should not go clear through. Join the parts with waterproof casein glue. When dry, spread glue on the joining faces of the six pieces which form the wings, and before clamping these place the fuselage in position. Then draw the assembly together with C-clamps.

Cut the wings roughly to form, allowing  $\frac{1}{8}$  in. for finish. Form the slot in the after end of the fuselage and saw roughly to shape as indicated.

Fig. 3 shows the cabin sides, each of which consists of two thin pieces of stock

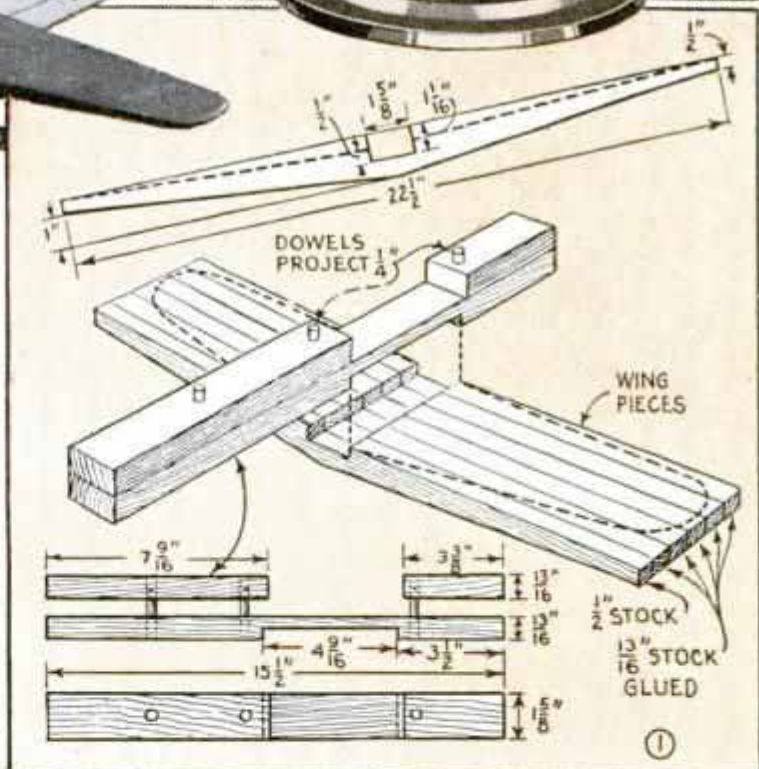


# of FAST AIR LINER



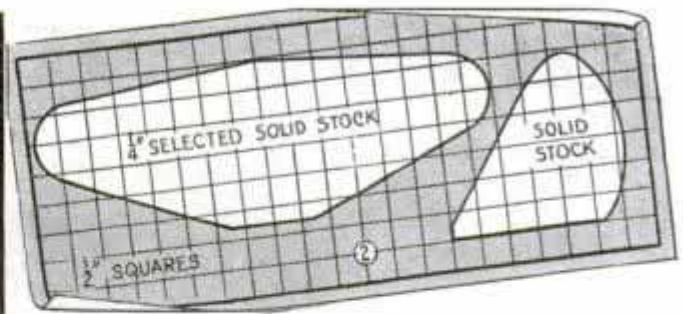
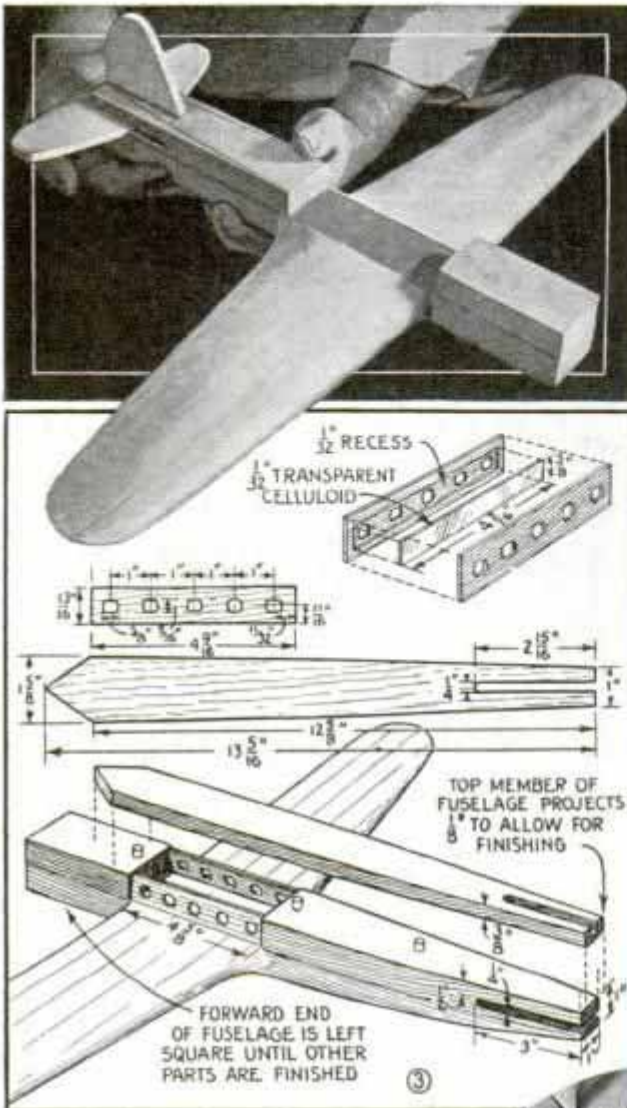
glued together with a strip of transparent celluloid between. To make the sides, rip out a piece of flat stock to 2 in. wide and the same length as the sides are to be, then locate  $\frac{3}{16}$ -in. holes for the windows and bore these about  $1\frac{1}{2}$  in. deep. Rip off  $\frac{1}{16}$ -in. strips from the edge into which the holes have been bored. Clamp two of the strips together with the holes opposite and enlarge to the size given with a round file. Bring the windows to a uniform size. Separate the pieces and cut a shallow recess to take the celluloid strip. Assemble both sides as indicated in the drawing. Fit the sides in the fuselage and note particularly that each side is inclined  $\frac{1}{16}$  in. inward at the top. After the glue is dry plane the top edges flush.

After this has been done, make up the top member of the fuselage. This piece is grooved for the fin shown in Fig. 2. Make sure that you have a perfect joint through-



out the length, then glue the part in place. Allow the after end to project  $\frac{1}{8}$  in. Cut the fin and the single piece which forms the stabilizers to the size indicated but do not glue these parts in place until the wings and after end of the fuselage have been shaped to very near the final form. Shape the plane from the rough form





The cut should begin at the center of the wing and progress to the edge all along the length. The section of this portion of the wing throughout the length should not be flat but should finish with a convexity of about  $\frac{5}{32}$  in. at this stage. After both wings have been finished to an approximation of this curve, round the forward edges first to a semicircular form. Leave the wings at this stage. It will be noted from Fig. 4, which shows a head-on view of the finished plane before motors and landing gear are attached, that the sides of the fuselage throughout the length of the cabin are flat in vertical section. However, from a point just to the rear of the pilot's cabin, the side of the fuselage extends in a long, sweeping curve back to the tail. Also the oval shape of the fuselage becomes continually more

pronounced from the rear of the passenger cabin back to the trailing edges of the stabilizers. Be careful when removing the waste from the fuselage that these curves are kept uniform.

First round over the edges of the fuselage at the top and plane and rasp the waste off the sides until they are very nearly down to the required curve. Then turn

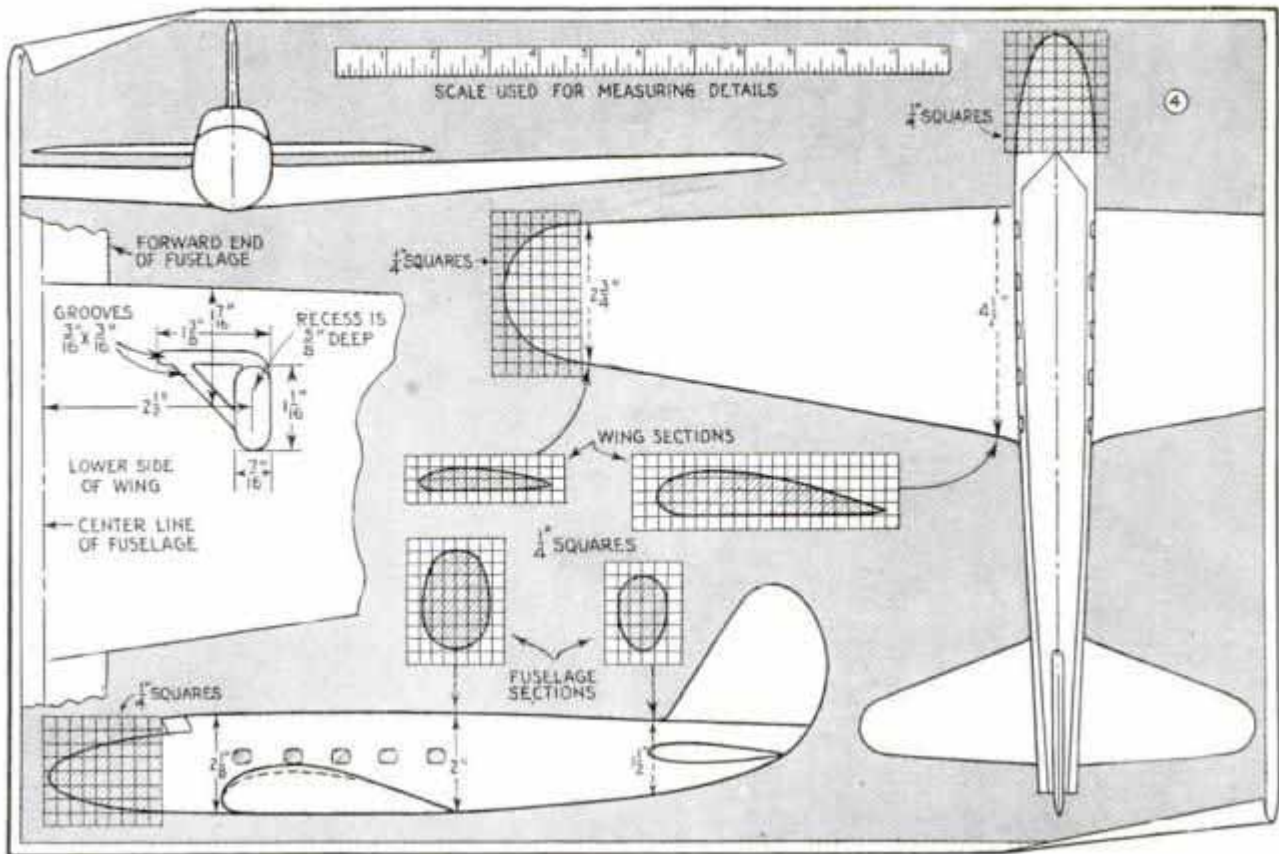
the plane upside down in the vise. The bottom of the fuselage curves upward from the trailing edge of the wing, the curve shortening in radius at a point just under the stabilizers and continuing unbroken to the top of the fin. Work this down to approximately the size indicated from the trailing edge of the wing to the tail. At the point where the trailing edge of the wing meets the fuselage it is necessary to undercut the latter so that the curves of both wing and fuselage may con-

with an assortment of files and wood rasps. You will need several double-cut files of assorted sizes and a fine and coarse wood rasp. A patternmakers' spoke shave and a very small plane are both useful in removing waste from fuselage and wings. Keep the tools razor-sharp. Also have a file card handy for cleaning the files. Before using them scrape all the surplus glue from the joints with a dull knife.

The fuselage, from the forward end of the cabin back to the tail, must be worked down to contour simultaneously with the wings, otherwise it is difficult to bring the parts to the proper form. Leave the nose of the fuselage square for the time being. Begin first with the back or trailing edge of the wings on the top side. Use the coarse rasp to get the waste off quickly.







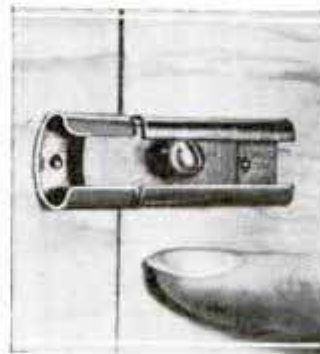
tinue unbroken away from this point. Now the stabilizer and fin may be fitted and glued in place. Sections of the wings, fuselage, stabilizers and fin are shown in Fig. 4.

This done, bring the wings down to the sizes indicated. Next, drill a small hole for a single screw through the bottom of the fuselage at the center of the wings, cut the edge of a small hardwood block V-shaped to fit the angle of the wings at this point and fasten with a small screw. Drawing the vise jaws down on this block will hold the plane securely while working on the forward end of the fuselage. The V-shaped windshield of the pilot's cabin inclines forward about 5 degrees with the vertical. This angle is readily formed with a file on both sides of the vee. With a coarse file you can quickly remove the surplus stock from the nose but be careful not to remove too much on the corners just ahead of the pilot's cabin. Directly in front of the windshield, the body of the fuselage is very nearly flat and from here to the tip of the nose the section changes gradually from oval shape to round. When the fuselage has been finished all over to very nearly the required size smooth all surfaces by scraping and sanding.

To finish the model ready for the motors and landing gear, make a careful layout on the bottom of each wing, using the center of the fuselage as a base line. Bore out the waste and finish with a sharp chisel to form openings for the air wheels of the retractable landing gear. Grooves taking the frames on which the wheels are mounted are also cut in with a sharp chisel to a depth of  $\frac{3}{16}$  in. At this stage it is well to cover all surfaces with a thin coat of white shellac to prevent the absorption of moisture.

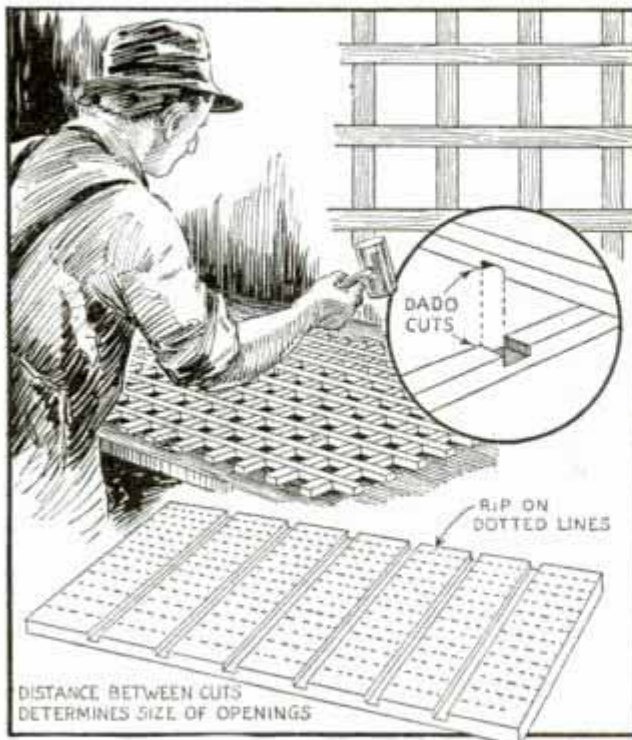
(To be continued)

### Door Bolt Made from Curtain Rod



When a sliding door bolt is needed and none is at hand, one can be quickly improvised from a flat, telescoping curtain rod. Two short sections of the larger half of the rod are screwed to the door and casing, while a piece of the smaller half, cut off and fitted with a finger grip, slides inside as shown.





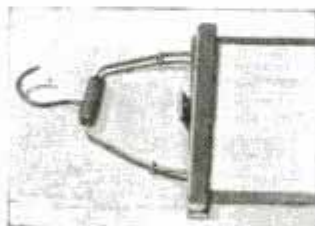
This Method of Making a Wood Grille Saves Time and Assures an Accurate Job

### Quick Method of Making a Grille

Here is a fast and accurate method of making a grille. Take a board of the same length as the desired grille and make several equally spaced dado cuts across it, cutting halfway through the thickness of the board. Then rip the board into strips just as wide as the dado cuts, as indicated by the dotted lines in the lower detail, and assemble the grille. This is done by placing half of the strips on a bench with the dado cuts upward and the other half across them so that the cuts come together to form half-lap joints. If the sawing has been carefully done, the joints will fit tightly.

### Trouser Hangers Used as Clamps in Gluing Light Work

Trouser hangers of the type shown will serve as emergency clamps to hold light, flat work together while gluing it. If the work is very thin, it is a good idea to trim the inside surfaces of the clamp so that they contact the wood along their entire length.—C. W. Handley, Los Angeles, Calif.



### How to Make Aquarium Tables

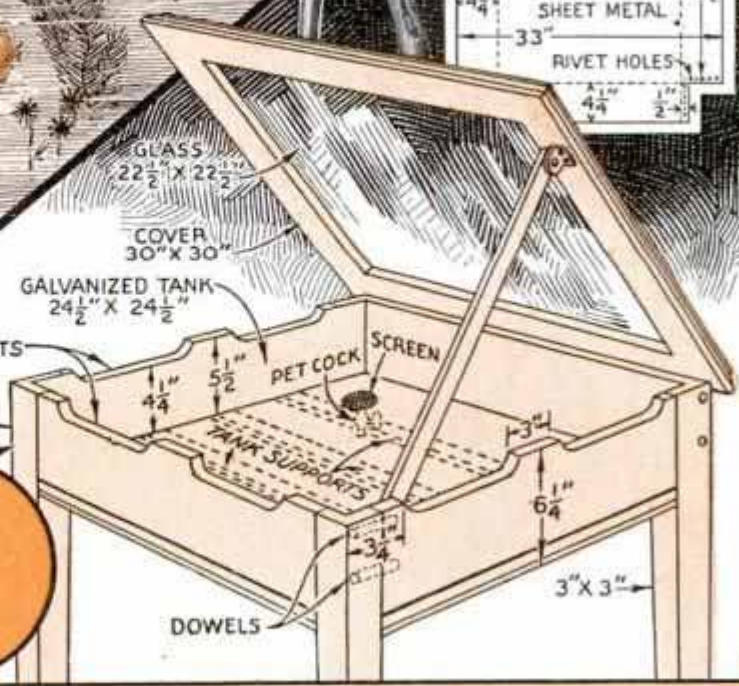
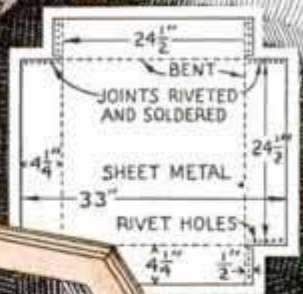
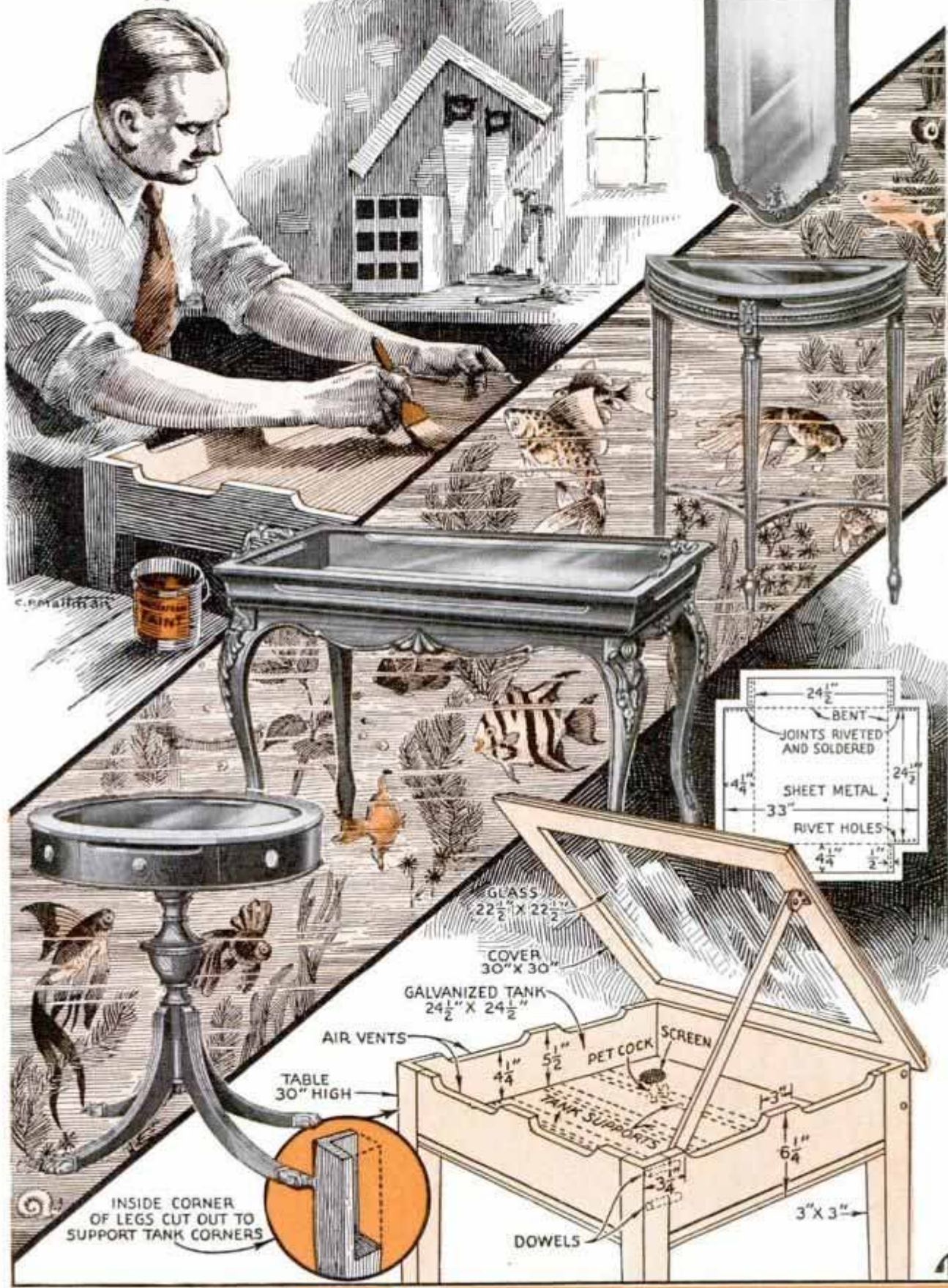
Here is a novel form of aquarium that will be the source of much admiration in either the home or the office and also in places of business, such as tea rooms and restaurants. As you will see from the types shown on the opposite page, this idea can be applied to almost any kind of a table without making it less suitable for its regular purpose. The construction is quite simple although the exact arrangement, of course, depends on the particular table you wish to build. For an ordinary square table, a rigid frame, firmly fastened to the legs, is necessary, after which a sheet-metal pan  $4\frac{1}{4}$  in. deep is made. When making the tray, drill a hole in the bottom near one corner and solder a petcock underneath so that water can be drained conveniently. A fine screen should be soldered over the opening. After the seams of the pan have been carefully soldered, all traces of the soldering flux should be thoroughly removed. Any acid that might remain, will, when absorbed by the water, cause the fish to die. Strong washing soda may be used to clean the tank out thoroughly after which the inside should be painted a sky blue or light green. The first coat of paint should be very light while the second should have more body. A waterproof paint should be used for this purpose. After the paint is completely dry apply a coat of spar varnish. The top should be plate glass for best appearance, although in some cases double-strength or crystal glass will be satisfactory. The glass is laid in the top frame, which is rabbeted, and  $\frac{1}{4}$ -in. molding is tacked on to hold the glass in place. Also, some brace should be provided to hold the top up when it is desired to get at the aquarium. The notches in the sides, which come directly under the top frame, provide sufficient circulation of air without the danger of dropping things into the aquarium.

### Homemade Ink for Shading

Ink for use with shading pens and lettering brushes can be readily made with ordinary fountain-pen ink. All that is necessary is to add small pieces of gum arabic until the fluid is of a suitable heavy consistency.

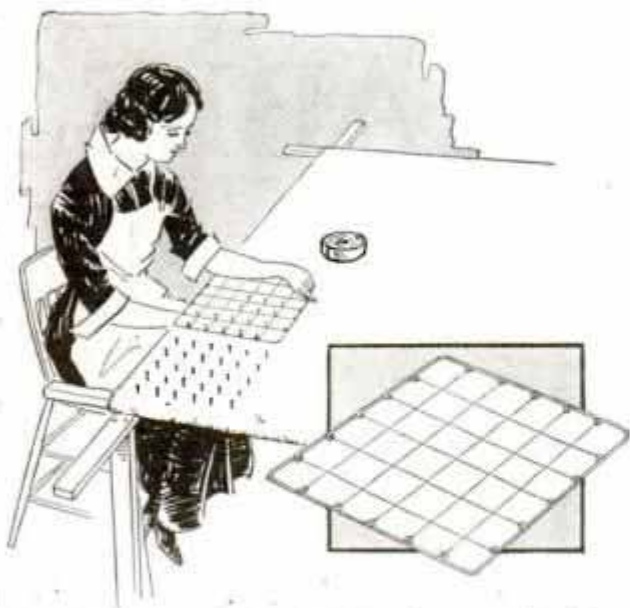


# Aquarium TABLES



INSIDE CORNER  
OF LEGS CUT OUT TO  
SUPPORT TANK CORNERS





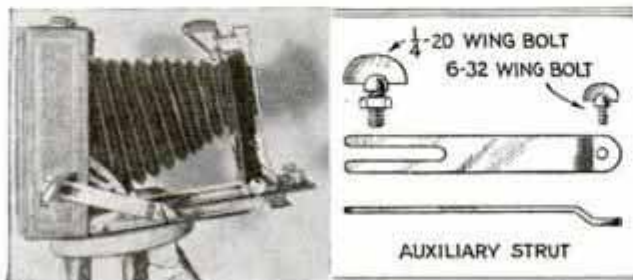
Wire Frame Evenly Divided into Squares with Cross Strings Helps Space Quilt Knots Accurately

### Wire Frame Spaces Quilt Knots

When making quilts you will find this wire frame a great help and time-saver in spacing the knots uniformly. The frame is made of medium-gauge wire with evenly spaced loops through which cross strings are tied to form squares as shown in the detail. In use, the frame is placed at one corner of the quilt and pins are stuck through the quilt at the corner of each square formed by the cross strings, after which the frame is moved and the procedure is repeated until the entire surface of the quilt is marked off.

### Hand Camera Fitted with Tilting Back

A folding camera is easily equipped with a tilting back for taking photos of tall buildings, where vertical lines must be rendered parallel, by the addition of an auxiliary strut made from a strip of brass. Offset the strut as shown, drill a No. 18 hole at one end and slot the other to take a  $\frac{1}{4}$ -20 wing bolt, which has a nut fixed about  $\frac{1}{4}$  in. from the end with solder, to



Auxiliary Strut Permits Bed of Hand Camera to Be Tilted for Photographing Tall Objects

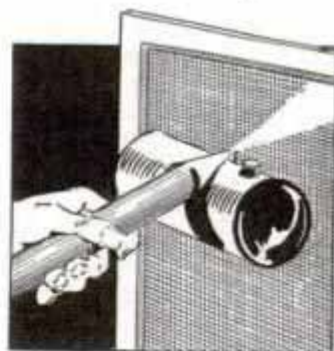
clamp the auxiliary strut when the regular struts are disengaged. Drill and tap the bed of the camera on the right-hand side for a No. 6-32 wing bolt as shown. The bed of the camera may now be raised and locked in a tilted position.

### Filling Bottles with Narrow Mouths

Glass bottles and other containers that have small mouths can be filled with a liquid easily with the aid of heat. Warm the container and allow it to cool with the mouth submerged in the solution with which it is to be filled. This may be repeated as many times as necessary. Heating expands the air in the container, and, when cooled, the air contracts, which forms a partial vacuum, causing the liquid to be drawn into the container.

### Window Screens Painted with Hand Spray Gun

An ordinary hand fly spray gun of the type shown will be found handy for spraying paint on screens and other small jobs. The gun plunger should be operated with long even strokes to better concentrate the spray. If lacquer is used, some lacquer thinner should be added, but with paint, turpentine is used to reduce the consistency. After use, the gun should be thoroughly cleaned of all lacquer or paint with thinner or naphtha, respectively, otherwise the paint will dry and clog the spray tube.



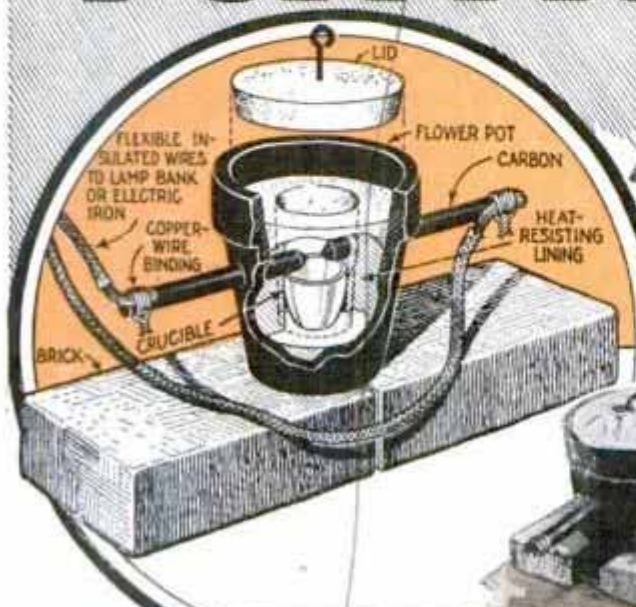
### Binder for Small Glue Jobs

When a press is not available for holding small wood pieces together while the glue is drying, a satisfactory method is to bind them together with a number of heavy rubber bands. Larger work can be handled in the same way by using strips of old inner tube and cementing the ends together. As glue will not adhere to rubber, no special precautions are necessary in stretching the band around the work.



Becker Brothers Carbon Co  
223 N. Ashland Ave  
Chicago, Ill

# Electric-Arc FURNACE



*to melt metals  
and make alloys*

By C. A. CROWLEY

WHERE high temperatures are needed for melting small quantities of metals, making alloys, or performing chemical experiments requiring intense heat, a small electric-arc furnace, which is easy to make and costs little, will often be found indispensable in the home workshop or laboratory. It is built in a flowerpot, as shown above. Holes for two electric arc-light carbons are cut into opposite sides of the pot about three-fourths of the height of the pot above the bottom. The holes should be just a fraction larger in diameter than the carbons. They are best made by slowly drilling through with a small drill, after which they can then be carefully reamed to the proper size with a coarse rat-tail file.

A good refractory lining for this furnace is made by mixing while dry, equal parts of fire clay and ground asbestos. This filling material is worked to a thick, even, putty-like cement with a small quan-

tity of water glass. Only the amount to be immediately used should be made up, as when allowed to stand, this cement gets stone hard and becomes useless. The bottom of the flowerpot is covered with the refractory cement to a depth of about 1½ in. It should be pressed firmly in place and tamped level and even with a flat-ended stick. A smooth drinking glass whose sides taper slightly is now set upright on the center of this bottom lining to serve as a mold for the side lining. The arc carbons are next wrapped with a layer of asbestos paper, which may be secured in place with a short length of thread. They are then inserted through the holes in the pot and their ends pushed square against the drinking glass. The asbestos is used to prevent cement from sticking to the carbons and thus making it impossible to remove them, after the lining has hardened. The space between the glass and







the pot is next filled to within  $1\frac{1}{2}$  in. of the top with the lining cement. It should be applied in small quantities, packing thoroughly to eliminate air pockets. The drinking glass should be carefully removed immediately after the packing is complete, otherwise it may permanently stick to the cement and have to be broken away after the lining has hardened. If the glass is to be saved it should be immediately washed in water to remove the water glass. The carbons should next be carefully turned in their asbestos wrappers to make certain that they are not stuck. They should not be removed, however, until the lining has dried for a couple of days. The lining may be dried out in an oven in about 5 hrs., although a better job will be had if it is allowed to dry in the air for a week.

To make a lid for the furnace, get a round cardboard carton of the same diameter as the inside of the flowerpot, and cut it to a depth of about 2 in. to serve as a mold. Before pressing cement into the box a piece of stiff iron wire is bent to the form of an eye at one end. The other end should be buried in the cement cover so that only the eye projects to serve as a



handle for removing the cover from the furnace with a pair of tongs. The cover should be allowed to dry in the mold and the cardboard is torn away after the cement has hardened.

When the lining has dried the carbons may be removed. A 3-ft. length of heavy-duty heater cord is connected to each carbon at its unpointed end. The strands of fine wire in the heater cord may be held in good contact with the carbons by binding with wire as shown, or if a more permanent job is wanted, brass clamps may be made to hold the wires. The other ends of these wires are connected to the binding posts on a small block as shown. An electric-arc furnace cannot be connected directly across the lighting circuit without blowing fuses, so the family electric flatiron comes into play as a limiting resistance. The iron is plugged into the socket also mounted on the board. With this arrangement the iron is connected in series with the carbons. To start the arc, push the carbons together with their points about in the center of the furnace. This should be done with a pair of pliers having taped handles to avoid shock and burns after the furnace has been running for a few minutes. After the carbons have been in contact for a few seconds they will become hot on the ends, and then one of them may be carefully pulled away

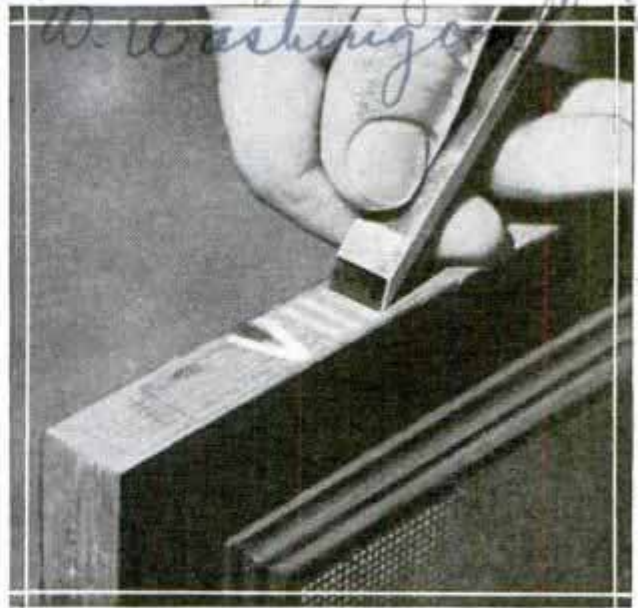


from the other for a distance of about  $\frac{1}{4}$  in. A little practice will enable you to draw an arc without difficulty. The cored-type of carbons are the easiest to use. The arc should not be viewed with the naked eye but a pair of goggles should be worn and with these you will be enabled to see the condition of the arc without danger to the eyes.

Copper wires held in the arc are immediately melted and burned. Almost all common substances undergo similar chemical change when they are exposed to the high temperature of the arc. If a few scraps of fine copper wire are cut into short lengths, placed in a small crucible and sprinkled with borax to prevent the formation of the black powder, or copper oxide, which was formed when the wire was held directly in the arc, they may be melted in 10 or 15 minutes. The lid should be kept on during the melting of copper as a great amount of heat will be required. The copper will glow red and finally white, and you may think that it is not going to melt at all, but do not give up, for the wires will presently and unexpectedly lose their shape and form a molten pool of mirror-like brilliancy in the bottom of the crucible. If you add to the molten copper about half its weight of zinc and then turn off the arc, the zinc will melt and mix with the copper to form the common but very valuable alloy known as brass. Brasses have varying proportions of zinc and copper, depending upon their purposes. Similarly, if tin is added to molten copper an alloy known as bronze is formed. There are hundreds of interesting and valuable experiments in this magic of metals known as alloying, which may be performed with this arc furnace. New alloys are discovered or invented every day. Many of the modern alloys have properties entirely different from either of the metals used in their manufacture.

#### Screens and Storm Sash Marked with Roman Numerals

Here is a method of marking screens and storm sash that will not rub off and cannot be obliterated by painting. Along one edge of the sash or screen cut Roman numerals into the wood with a sharp chisel. A duplicate number is then cut in

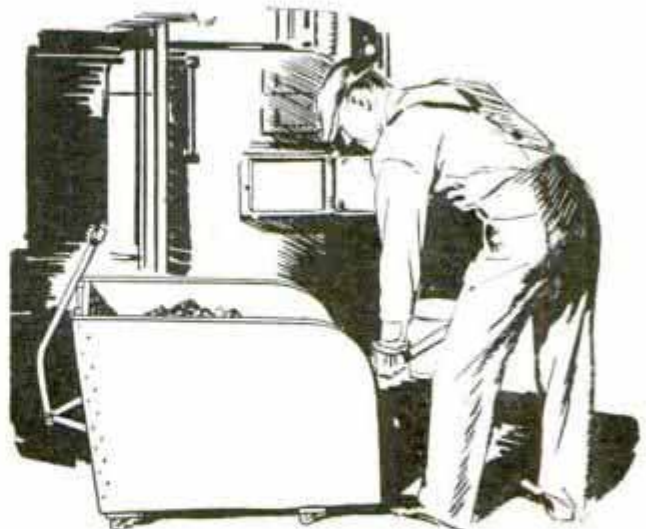


Roman Numerals Cut in Edge of Screen and Window Frames Identify Them Permanently

the side of the window frame where it will not show when the screen is inserted.—W. V. Gray, Milwaukee, Wis.

#### Wheeled Hopper Keeps Your Coal Near the Furnace

In homes where the coal bin is some distance from the furnace, this wheeled hopper will be found handy. The hopper is a large box with one end removed and the upper rear corners rounded. Four large casters are screwed to the bottom of the box. If desired, a handle can be provided for pulling the hopper across the



Hopper Fitted with Large Casters Used to Wheel Coal from Bin to Furnace

basement floor. In this case, a tongue taken from a boy's express wagon was used.—J. E. Dekker, Chicago.





Jig Made from Steel Block Helps in Cutting Rings from Pipe with Hacksaw

### Jig for Cutting Rings from End of Pipe with Hacksaw

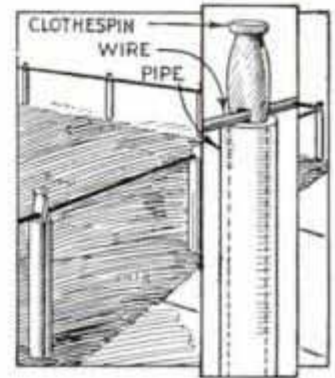
On a job I needed several rings that were to be cut from the end of a pipe, and, having no tool with which to cut them, the illustrated jig was made and a hacksaw was used to do the work. A steel block was drilled through from one side to take the pipe, which was held in place rigidly by means of a setscrew, and the end of the block was slotted to serve as a guide for the saw. After clamping the jig in a vise, I was able to saw off the rings quickly and accurately. The jig is also handy for squaring the ends of shafts.—A. H. Waychoff, Phoenix, Ariz.

### Repairing Loose Base on Electric Lamp

Photographers and others who use high-power incandescent lamps of 1,000 and 1,500 watts, frequently find that a slight jar has loosened the lamps in their bases. A good heat-proof cement for repairing these so that they are as good as new consists of powdered asbestos made into a paste with sodium silicate. The cement should be used immediately after mixing and the lamp should be allowed to set over night.

### Clothespins Attach Wire to Pipe Posts on Lawn Fence

Ordinary clothespins will be found an effective means of attaching wire to the tops of short pipe posts, which are often used in putting low protective fences around lawns. The inside diameter of the pipe should be of a size to take the clothespins tightly when they are put over the wire and driven into the ends of the posts.



A coat or two of paint will improve the appearance of the clothespins and protect them from the weather.

## 380 Blueprints for Home Craftsmen



Masterpieces of American Furniture; **Governor Winthrop's Desk**, Nos. 846 to 848, incl. (3 prints). **Thomas Jefferson's Music Stand**, 871 and 872. **Benjamin Franklin's Chair**, Nos. 873 and 874.

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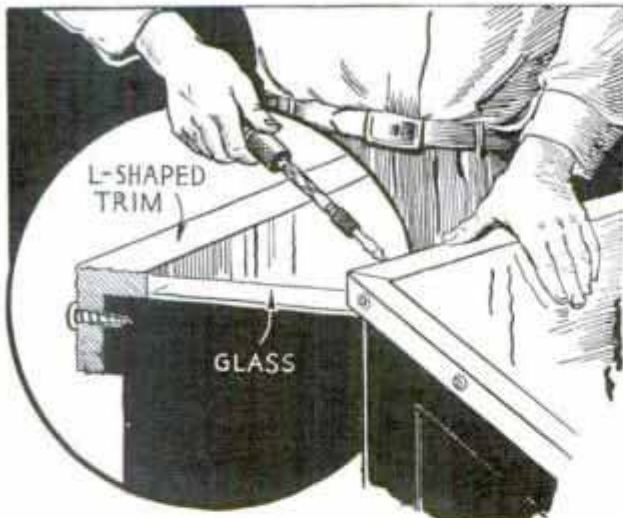


### Non-Poisonous Dope for Sealing Pipe Joints

In cases where a sealing dope that contains lead is objectionable, pipe joints may be effectively sealed with a mixture consisting of equal parts by weight of thick spar varnish, graphite, slaked lime and linseed oil. The lime and graphite are well mixed in the dry form and are then mixed with the varnish, to which the oil has been added. This mixture will keep indefinitely if stored in a sealed container.

### How to Apply Glass to a Table Top

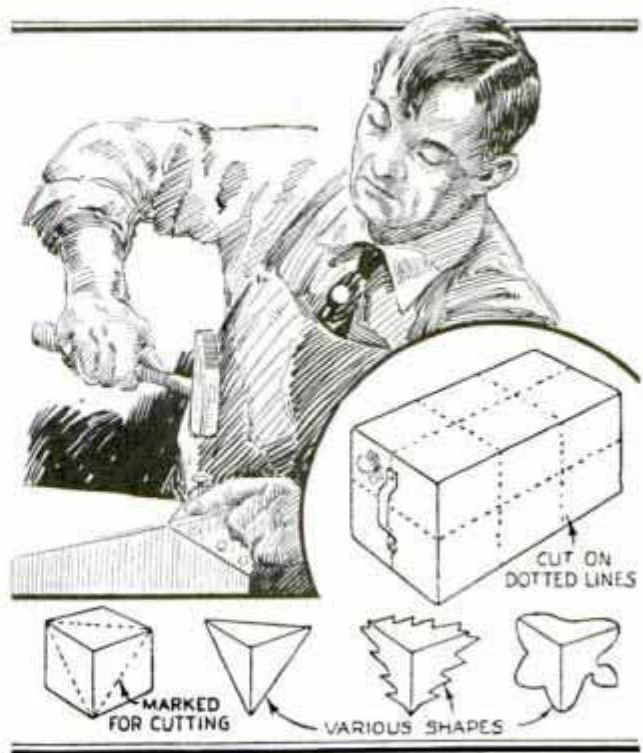
Prized by many, a glass-top table is a possession that anyone can have by covering one of their tables with plate glass. Have the glass cut so that it is about 1 in. smaller all around than the top to be covered. Then get some L-shaped trim from your lumber dealer and fasten the glass in place with it as shown. In shaping the trim for your particular use, make the short side or top exactly the same thickness as the glass. Allow a little clearance between the long side of the trim and the table edge to assure a tight joint between the glass and the trim when the latter is



Glass Easily Applied to Table Top by Using L-Shaped Trim to Hold It in Place

screwed in place. A marred table top should be covered with felt before applying the glass. If the corners of the trim are mitered and care has been taken in applying it, a neat job will result.

Violins will take on a soft, beautiful luster if first rubbed with split almond meats and then with a piece of China silk.



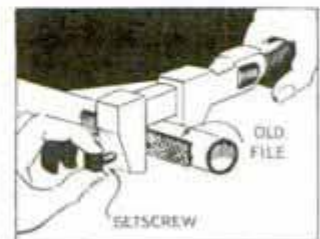
Box Corners Strengthened by Applying Corners Cut from Old Discarded Tin Cans

### Decorative Hardware Made from Corners of Square Tin Cans

On a bunch of cheap boxes and chests it was found that the strength would be greatly improved if the corners were covered with metal pieces. To keep down expense, which was already too great on the job, the pieces were made by cutting off the corners of some discarded square tin cans. With a little extra work, the corners were trimmed to various shapes, which greatly improved the appearance of the boxes and chest as well as strengthening them.

### Setscrew Makes Monkey Wrench More Useful

By drilling and tapping a hole in the stationary jaw of a monkey wrench to take a setscrew, the tool can be applied to a wider range of work than that for which it was originally intended. In some cases, the wrench can be used as an emergency clamp, or a light vise, and, when used in connection with an old file, as shown, it serves as a pipe wrench.





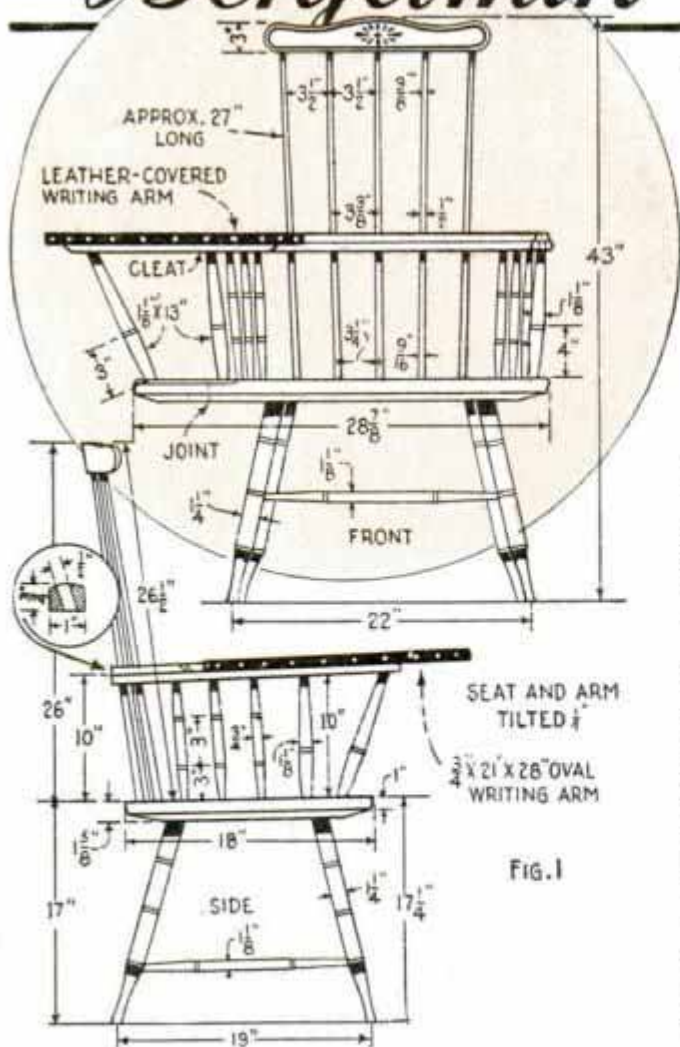
B.P. 893.4.

# Famous MASTERPIECES



By R. O. BUCK,  
Lane Technical High School, Chicago

## Benjamin Franklin's



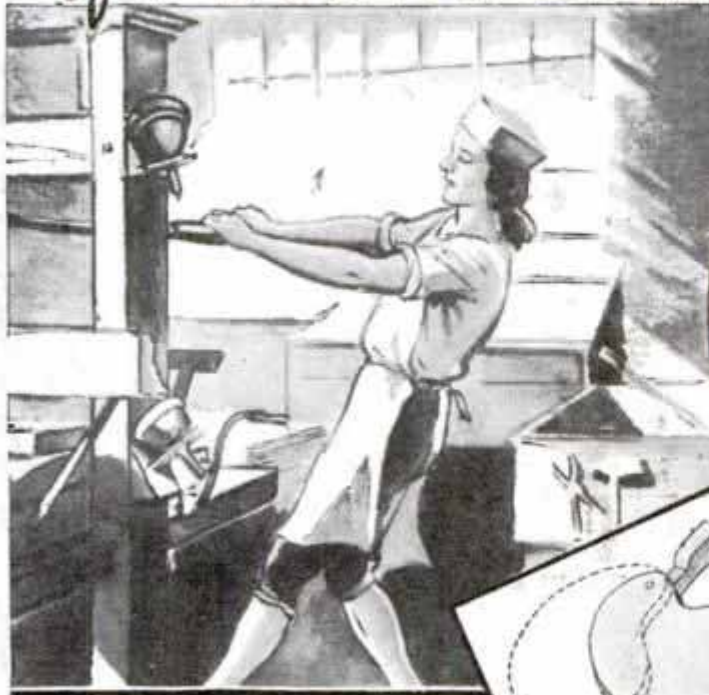
Third of a Series of Articles Giving All Details of Construction Needed to Reproduce the Original Pieces

CAN you imagine Benjamin Franklin sitting in this very chair, in a corner of his printing establishment, writing his homely philosophy, much of which will live forever in our literature? The chair, which is shown in Fig. 2, is now the property of the University of Pennsylvania, which Franklin founded. It is of the Windsor type and while not as graceful as many of the Windsors of the period, has a certain ruggedness and honesty of line and construction that typifies the man to whom it belonged.

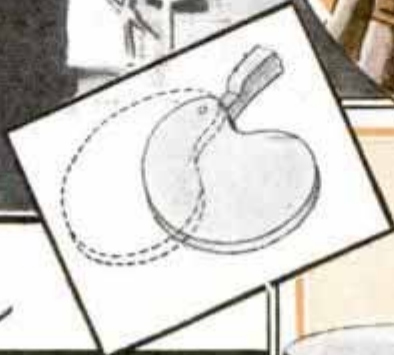
The Franklin chair, as was the practice with all chairs of this type, was made of three kinds of wood. White pine was used for the seat because it could be obtained in wide clear pieces and was easily worked. The legs, rungs and turned spindles are made of maple but the arm bow, comb and long back spindles are white oak, which because of its long fiber was more easily bent. The use of several kinds of woods is probably the reason why old Windsors were usually painted. The



# of AMERICAN FURNITURE



## Chair



Franklin chair was apparently a dark green originally.

Fig. 1 shows two views of the chair. The right arm carries a writing arm of rather generous size, which is pivoted so that it can be swung out of the way when one is entering or leaving the chair, but can be drawn over the lap when working. The seat is fashioned first. Some clear white-pine planking should be glued up to form a block  $1\frac{3}{8}$  by 18 by 29 in. Make a paper pattern from the drawing in Fig. 4 to mark out the contour for bandsawing. The horns on the right side, which are used to support the writing-arm structure, are cut right on the piece, in the original, but could easily be spliced to the seat if you wish to save material. A sectional view through the seat is shown in Fig. 5. Notice that the seat is chamfered from underneath to avoid the appearance of too great thickness and still give ample bearing for the legs and arm supports in the soft wood. The edges are also beveled and the corner decorated with a  $\frac{1}{4}$ -in. cove cut. A second decorative cut,  $2\frac{1}{2}$  in. from the outer edge, is made with a veining

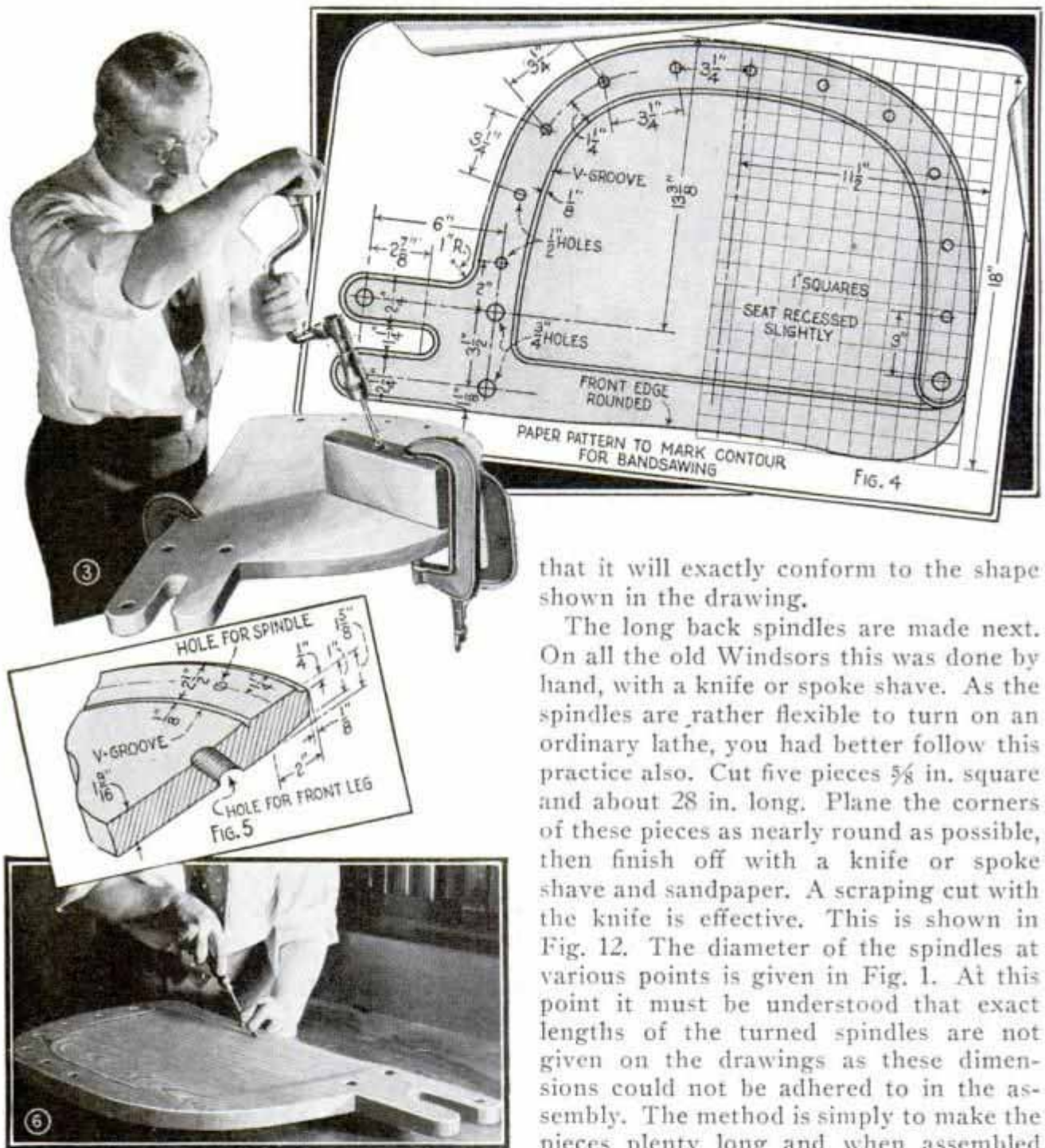


Courtesy University of Pennsylvania

tool. This operation is shown in Fig. 6. Whether the seat of the chair was hollowed slightly originally or has been worn hollow in use is hard to determine, but your chair should be eased slightly, as shown, to produce this effect.

The bowed arm, which is built up of four segments, is simply bandsawed to shape and spliced, as shown in Fig. 7. Only the left side of the arm proper and the bow have formed ends as the other arm is hidden by the writing arm. Figs.





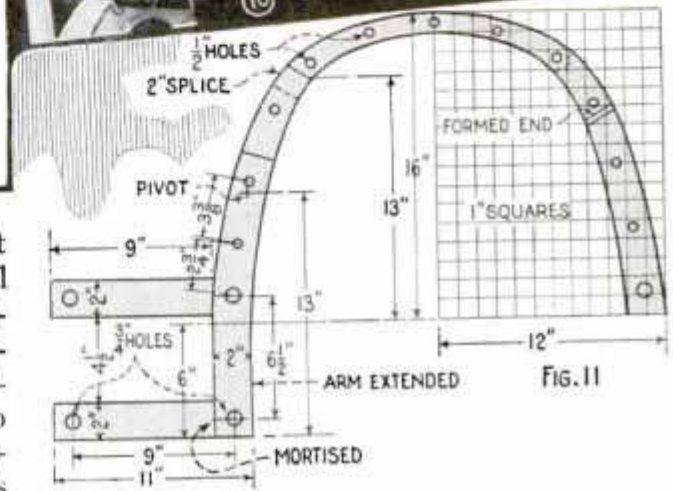
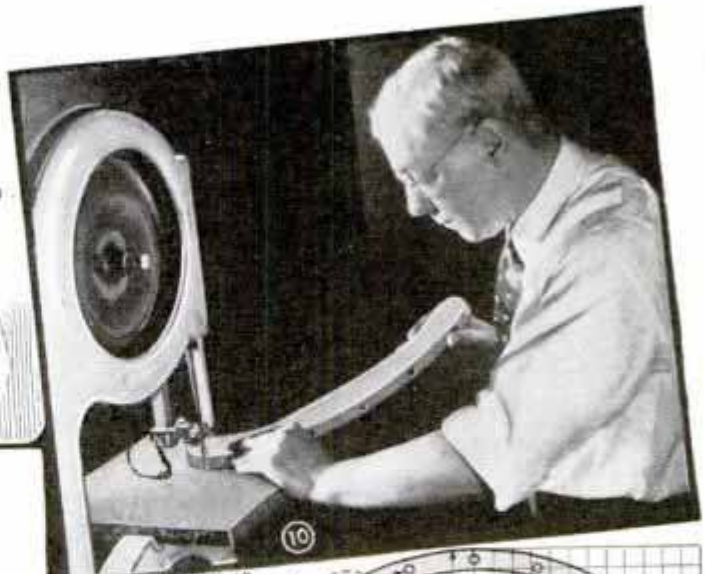
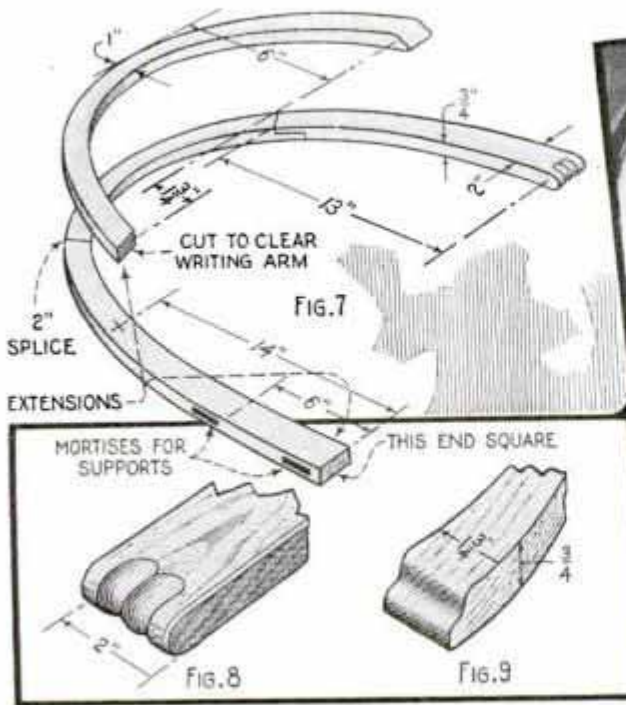
8 and 9 give an idea of how the formed ends are made. The carving on the arm is very simple and can readily be formed with a sharp gouge and a piece of sandpaper wrapped on a dowel rod. The molding shown in Fig. 9 is merely sawed and sanded. A squared drawing of the complete arm is given in Fig. 11, from which you should lay out full-size patterns of both the complete arm and the segments which make it up. When gluing up this part, it is suggested that you place the pieces right over the complete pattern, which has been mounted on a board, so

that it will exactly conform to the shape shown in the drawing.

The long back spindles are made next. On all the old Windsors this was done by hand, with a knife or spoke shave. As the spindles are rather flexible to turn on an ordinary lathe, you had better follow this practice also. Cut five pieces  $\frac{5}{8}$  in. square and about 28 in. long. Plane the corners of these pieces as nearly round as possible, then finish off with a knife or spoke shave and sandpaper. A scraping cut with the knife is effective. This is shown in Fig. 12. The diameter of the spindles at various points is given in Fig. 1. At this point it must be understood that exact lengths of the turned spindles are not given on the drawings as these dimensions could not be adhered to in the assembly. The method is simply to make the pieces plenty long and when assembled and fitted, saw off the waste portion. The rounded shoulders are not intended to fit up tight against the adjacent piece as in a square mortise. Refer to the assembly drawing, Fig. 1, for the dimensions of the two front spindles. Turn up these two pieces on your lathe as the next step.

The rather simple type of turning used for the legs and spindles is commonly called "bamboo turning," probably because of its resemblance to the tropical wood. In order to lay out the slant of the spindle holes it is necessary to make a temporary set-up of the arm and seat. To do this bore the holes for the two front





spindles, just completed, so that they slant outward about 10 degrees but are vertical from front to back. The angle for the center spindle in back is determined by laying out a cardboard gauge of the proportions given in Fig. 13. This figure also shows the position of the arm rail in relation to the back edge of the seat. This should be carefully followed to secure the proper pitch to the back of the chair. All of the holes should be bored way through the seat or arm, taking care that the bit does not splinter out the underside of the piece.

We are now ready for a trial assembly as is shown in Fig. 14. Set the center spindle and each of the front spindles in place in the seat and through the arm bow so that the latter will be in proper position, then drive a small wedge at the back spindle to hold it so. With the arm bow in position, the slant for the various spindles can be determined and marked off on the sides of the seat and arms as shown, so that when it is taken apart, these holes can be bored to the proper slant also.

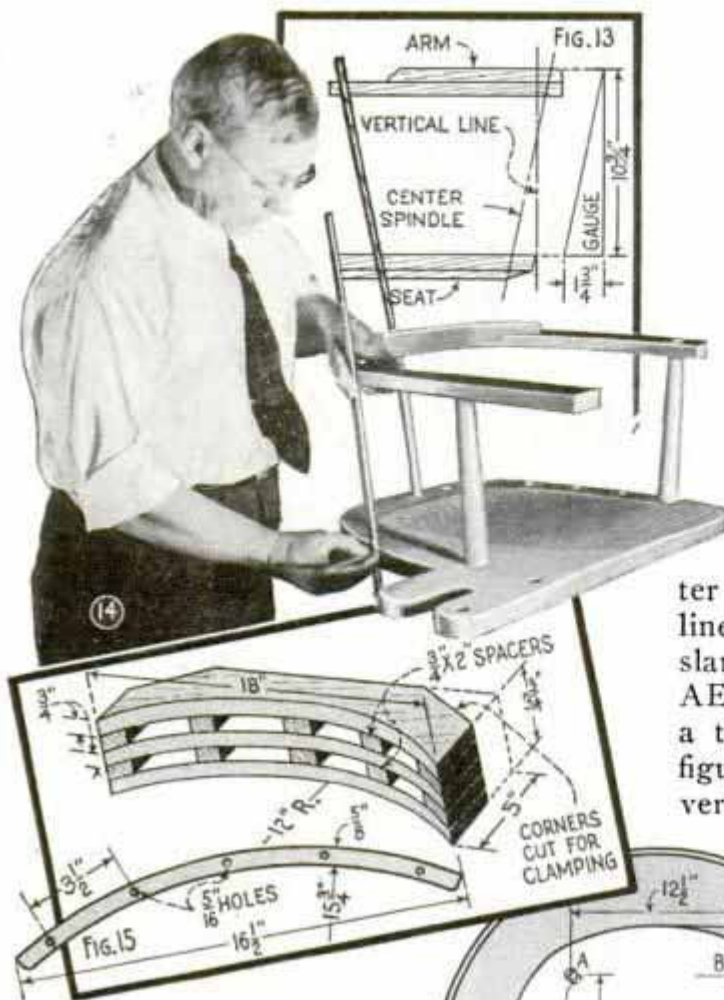
A piece of oak or ash  $\frac{5}{8}$  by 3 by 18 in.



is required for the comb. This piece is to be steamed and bent in a form. The procedure for this operation, in case you have never attempted it, is as follows: construct a wood box, of any 1-in. material, about 24 in. long, 5 in. wide and 3 in. high. Fasten the pieces together with screws and arrange so that one of the ends may be removed to insert the piece which is to be steamed. A  $\frac{3}{8}$ -in. vent hole should be drilled in one end and an ordinary garden-hose connection set through the other. After placing the piece to be steamed, and which has been soaked in water over

night, in the box, seal it up by screwing in the end. A short piece of garden hose is used to convey the steam from the spout of a teakettle or other source, to the steam box. The steaming should be continued





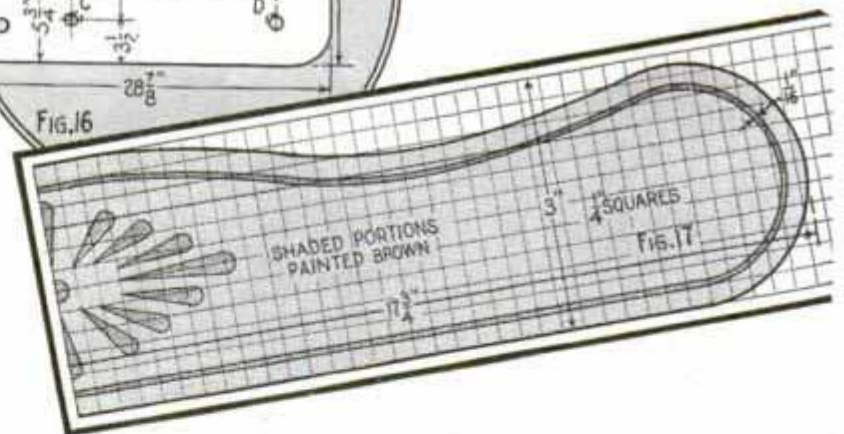
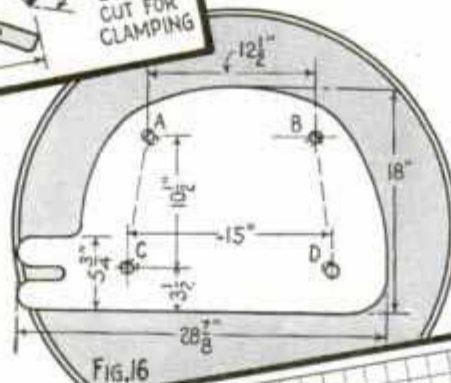
for three or four hours, after which the piece is taken out of the box and immediately clamped to a form like the one shown in Fig. 15, which has previously been constructed. Start the clamping at the center and work toward each end, using at least five hand screws. The spaces between the layers of the form are intended both to save material and to permit the piece to dry out more readily. You will notice that the form has a greater curvature than the finished piece is to have. This is to compensate for the amount it will straighten out after it is released from the form. Fig. 15 also shows the approximate radius of the finished piece and also the spacing of the spindle holes, which are  $\frac{1}{2}$  in. deep.

A paper pattern should be made from the squared drawing shown in Fig. 17 so that it may be laid on the piece to work it out for bandsawing as shown in Fig. 10.

Be sure to do the sawing after it has been bent to shape as the curvature would be uneven at the narrower places if it were bent after sawing.

The spacing of the holes for the legs is shown in Fig. 16. Lay out the lettered points carefully on the upper surface of the seat. Drilling the holes for the legs is rather ticklish business because of the necessity of getting the rake exactly uniform for each pair of legs. The method demonstrated in Fig. 19 is suggested. Let points A, B, C and D represent the centers of the holes which you have just laid out on the seat, and E, F, G and H the center points of the bottoms of the legs. Then lines CG and HD represent the projected slant of the front legs. Similarly BF and AE represent the back legs. By laying out a triangle as shown at the right in the figure, using the projected slants and the vertical height of the seat from the floor,

the actual slant and length of leg can be obtained. Make two cardboard triangles to these proportions. The actual drilling gauges are marked off from these triangles. Any scrap 2 by



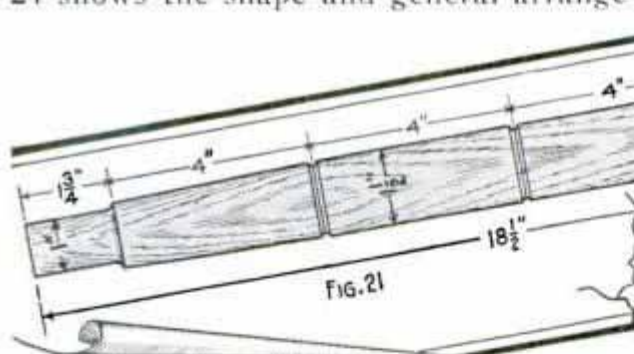
4-in. is suitable for the purpose as they are used only twice. Draw a line on the seat and clamp the gauge firmly over it, to bore an accurate hole as in Fig. 3.

Fig. 21 gives the dimensions for the turned legs. The grooves serve the double purpose of ornamentation and spacing of the rungs. The legs are sawed to length and to the bottom slant only after they have been wedged into place permanently. Green wood was invariably used in old Windsors as it would remain tight after it



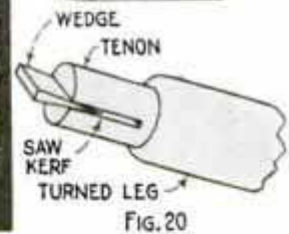
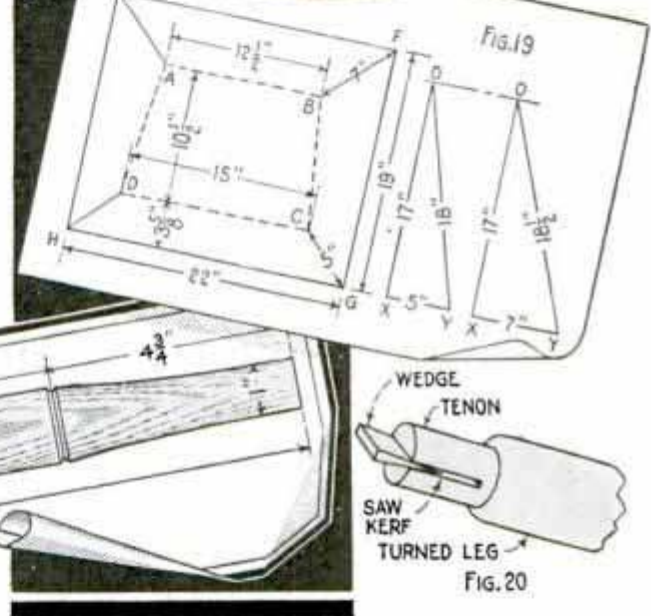
had dried out and expanded. Where dry material is used, the common practice is to use a wedge, as shown in Fig. 20. Of course, no glue was used whatever on the old chairs but this practice cannot well be followed in your reproduction, so use glue on the legs as well as the wedges. The design for the rungs is so simple that all necessary information can be obtained from the assembly drawing. The length of these pieces is best determined by actual measurements on the legs. After marking the slant and length in this way, bore the rung holes, holding the legs in a vise for the purpose, or more easily, on your drill press, as shown in Fig. 18. In order to hold the round stock securely, a V-block should be made of some scrap stock and used as shown in the figure.

The writing-arm support is shown in Fig. 22. Some careful laying out for the slant of the spindles is required but the method used for the arm spindles can be used here also. Notice that the top rails which support the writing arm are mortised into the side of the arm proper. Fig. 24 shows the shape and general arrange-



ment of the writing arm. A  $\frac{1}{4}$ -in. carriage bolt will serve nicely for the pivot. The top of the bolt should be set below the surface and the hole filled with a plug to form a flush surface. The pine writing arm on the Franklin chair is covered with black leather, as shown, and fastened along the edges with black round-head nails, spaced about 2 in. apart.

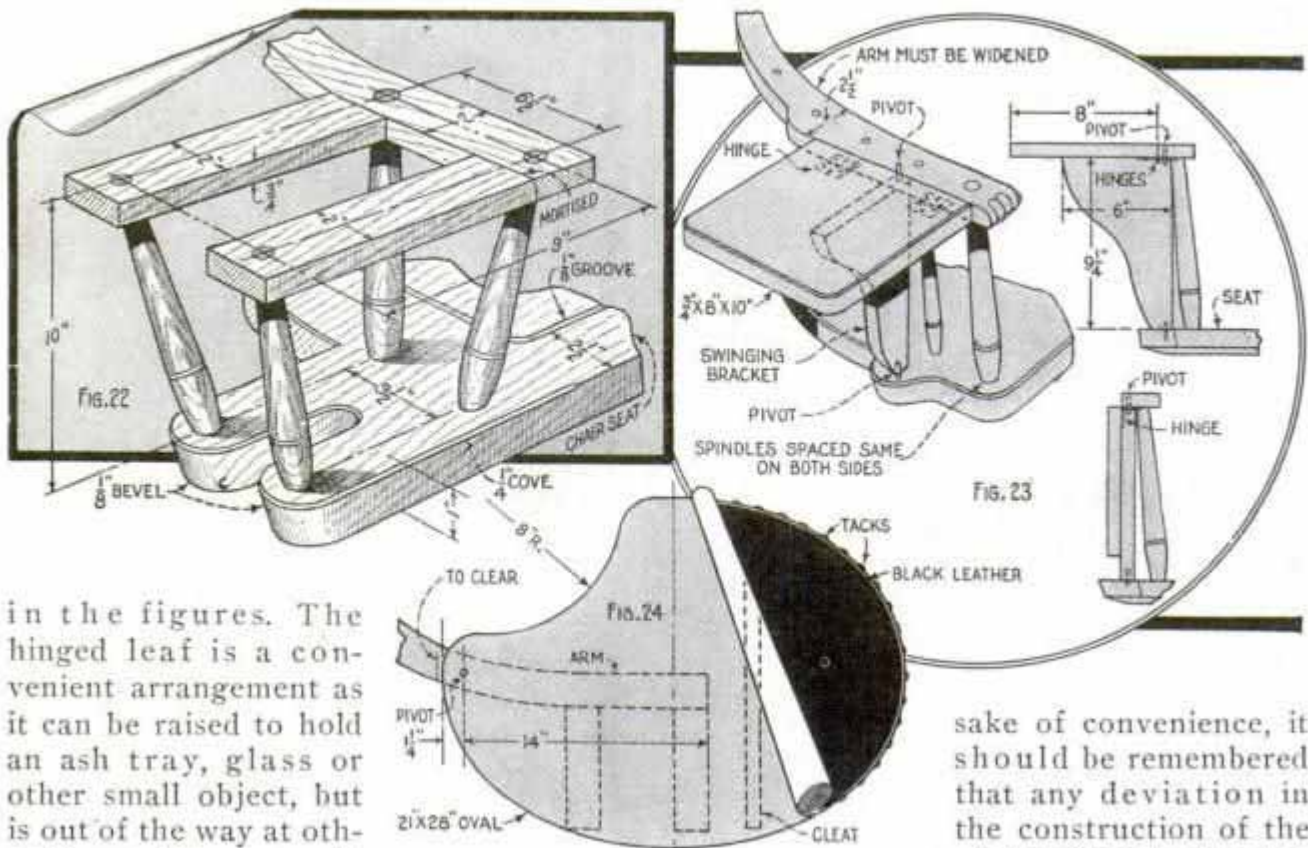
Old Windsors were usually painted so that the various kinds of woods was not apparent. However, it is quite possible to produce a good walnut or mahogany effect on the entire chair that is more in keeping with modern furnishings. This is accomplished by filling the open-grained oak with paste wood filler and the rest of the chair with thin shellac. The chair is then painted with a ground color of the



desired shade, followed by several coats of varnish. The rosette design on the comb, which is shown clearly in Fig. 17, is stenciled on. A piece of rather heavy drawing paper is used and the shaded portions of the design are cut out with a sharp knife. The stencil is then shellacked on both sides. The paint, which is brown on the original, should be rather thick and applied with a stippling brush.

If desired, the chair may be made without the writing arm by simply omitting the horns on the seat and making the arms the same on each side. Another suggestion is a small hinged leaf like that shown in Fig. 23, supported by a butterfly bracket. This arrangement necessitates a slight change in the shape of the arm and spacing of the spindles, as indicated





in the figures. The hinged leaf is a convenient arrangement as it can be raised to hold an ash tray, glass or other small object, but is out of the way at other times. However, although a hinged leaf supported by a butterfly bracket occupies less space than the large pivoted writing arm, and you may desire such a practical adaptation for the

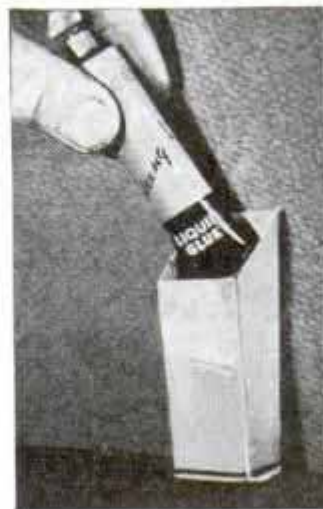
sake of convenience, it should be remembered that any deviation in the construction of the chair will make it a less accurate reproduction of the original, and that your copy, if altered, will lose some of its interesting historic appeal, which is, of course, one of its outstanding features.

### Making Words Float into Picture in Home-Movie Titles

In our February issue, the article on making novel home-movie titles contained a paragraph which described the process of making the title words float into the picture. Unfortunately one of the steps in the process of doing this was omitted. After the loose letters have been laid on the title card, the latter must be turned around so that the lettering will be upside down from the position of the camera, or the position of the camera may be reversed. Then the camera is started and the letters are blown away with the aid of a soda straw, starting at either end of the sentence and keeping the straw on one side of the lens, or behind it. The title film is reversed, end for end, and is spliced into the picture film which, when projected, shows the letters coming into the picture. If the first step of reversing the title card is omitted the title will be inverted when it is projected. Also, in this article mention is made of exposing each

title word for about three minutes to allow sufficient reading time. This, of course, should be three seconds per word.

### Handy Wall Pocket to Hold Your Toothpaste Tubes

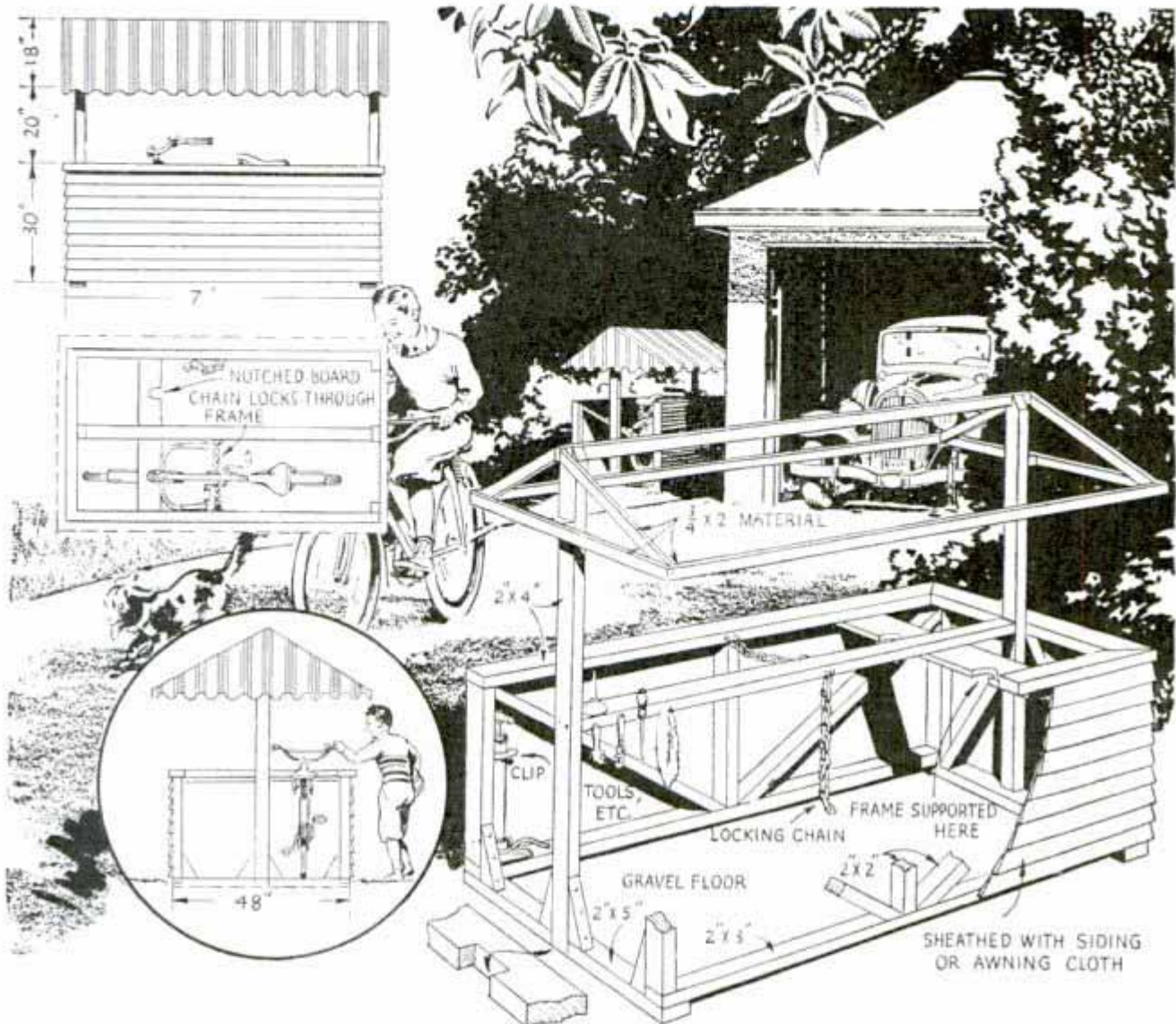


space in the medicine cabinet where such tubes are usually laid on the shelves.—R. J. Marran, Kansas City, Mo.

Cardboard cartons in which tubes of glue, toothpaste and shaving cream are sold are easily made into wall pockets for holding them. Merely cut off the top as shown in the photo and tack the bottom section to the wall. This idea will also save



# Neat Shelter to House the Family Bicycles



In the absence of convenient storage space for bicycles, you can quickly build this small garage in which they are securely padlocked and which will not detract from the neat appearance of your yard. Besides, such a shelter will give junior a place to keep his tools and bicycle accessories. The framework is made as light as compatible with sufficient strength of the structure, keeping in mind that it may

have to be moved. Corners should be braced with diagonal members, except at the door on one end where triangular blocks serve to add rigidity. Two vertical pieces, one in the center of each end, support the awning-cloth roof. The sides can be sheathed with lap siding, matched lumber or even wire mesh covered with awning cloth. In case of lap siding, the corners should be neatly mitered.

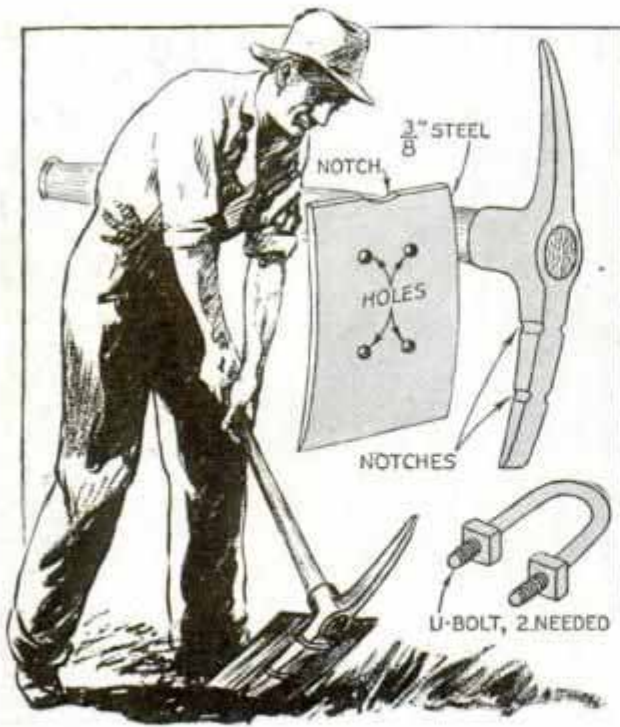
## Blue Glasses Aid in Focusing

In using the ground glass to focus a camera it should be remembered that the blue rays in daylight have the greatest effect on the negative material. Different colors of the spectrum do not have the same focal length. By wearing a pair of blue sun goggles or glasses while focusing

only the active blue rays will be brought to the sharpest focus on the ground glass, resulting in clear, brilliant pictures. This is true when using photoflood lamps, as well as daylight, for illumination.

Celluloid triangles may be writ<sup>d</sup> with anhydrous acetic acid, whi<sup>ch</sup> colored to contrast with the ce<sup>l</sup>





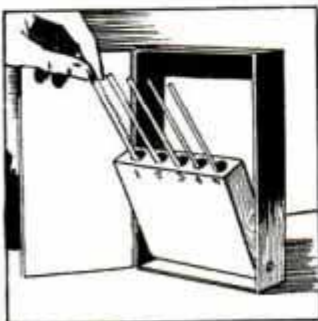
Piece of Steel Fastened to Wide Blade of Pick Makes Good Mattock for Emergency Use

### Mattock Improvised from a Pick

When a mattock is needed and none is at hand, one can be quickly improvised from a pick and a piece of  $\frac{3}{8}$ -in. steel about 3 in. wide. First file four notches in the side of the wide blade of the pick to take two U-bolts. Then curve the steel slightly, sharpen the lower edge and drill four holes in it, as shown, to take the bolts. Also make a shallow notch at the top edge of the piece so that it will fit up snugly against the pick handle. Now place the steel on the inside surface of the pick blade and fasten it in place with the U-bolts. The width of the steel may be varied to suit.

### Scrollsaw-Blade Container Made from Cigar Box

In order to keep my scrollsaw blades neatly arranged, instead of being scattered over the bottom of a drawer, I used a box with a tilting holder. It is a wood block drilled to take the blades and is pivoted inside a shallow cigar box at one end.—H. C. Male, Dundas, Ont., Can.

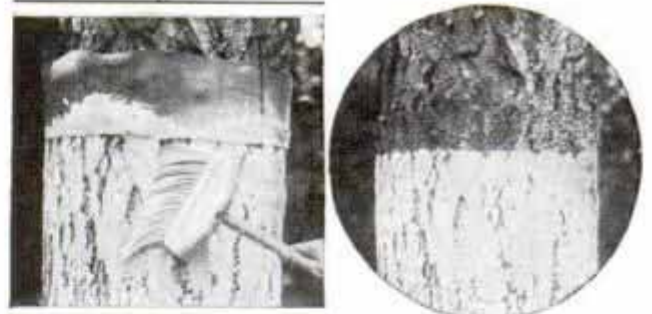


### How to Develop Enlargements without Fixing Trays

Amateur photographers who do not have trays large enough to handle enlargements can do the work as follows: Expose the print in the usual way, then soak it in water for a minute. The temperature of the water should not exceed  $70^{\circ}$  F. Then place the paper on a sheet of tin or any hard, flat surface free from dust or grit. Next saturate a large wad of cotton with the developing fluid and rub it over the entire surface of the paper quickly and evenly until the picture is developed. The fixing is done in the same way.—Benjamin Heller, Bronx, N. Y.

### Getting Neat Whitewash Line on Tree Trunks

When whitewashing part of a tree trunk to protect it against crawling insects, fasten strips of inner tube around the tree a foot or two apart. Then apply the whitewash between the strips. When these are removed the edges of the whitewash will be straight provided the edges of the rub-



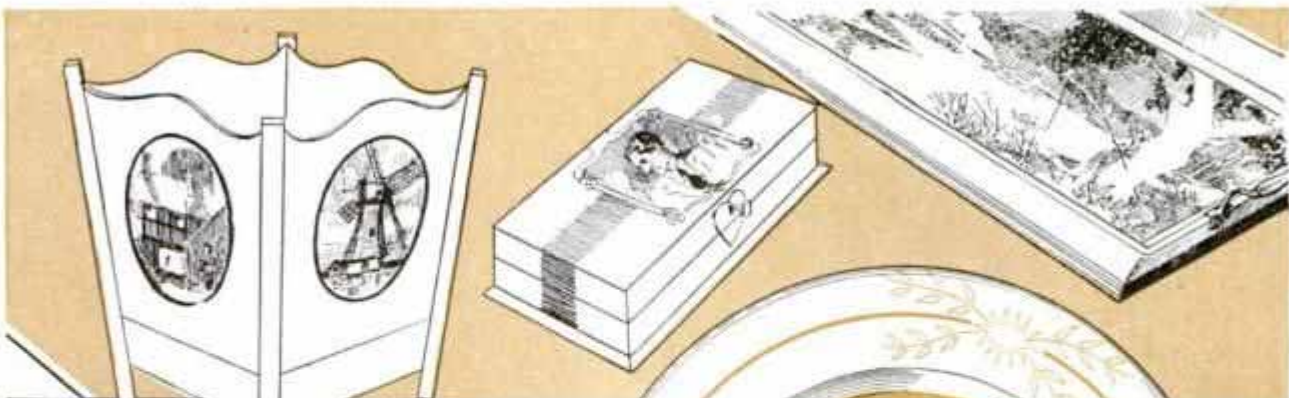
Strips of Inner Tube Help in Getting Neat Whitewash Line on Tree Trunks

ber have been trued up. The strips will save time in doing this work as the whitewash can be applied hurriedly without any attention to the edges.

### Worn Bolt Threads Temporarily Repaired with Tinfoil

When threads on a bolt are worn or stripped so that a nut will not hold, wrap a layer of tinfoil around the threads and then screw on the nut. The tinfoil will fill in the worn threads so that the nut will fit tightly. This idea is also good for making tight joints in pipe, especially if it is used for gas.

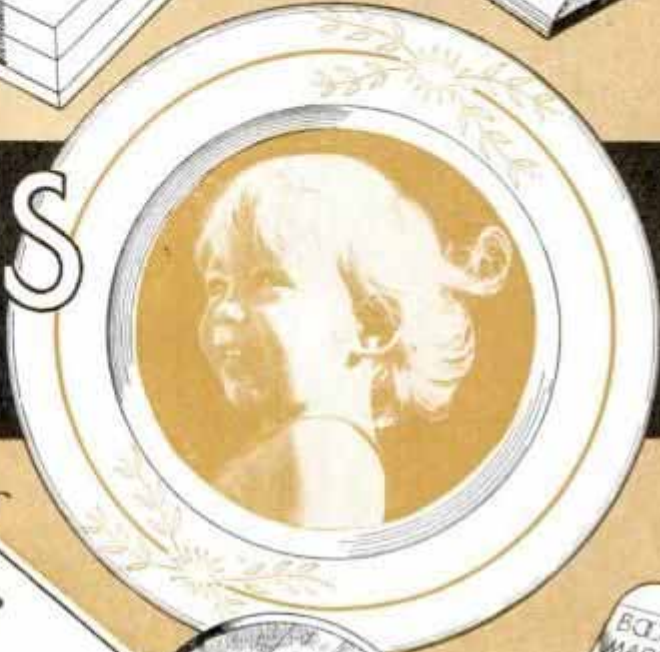




# PHOTOS

on

## China, Glass and Metal..

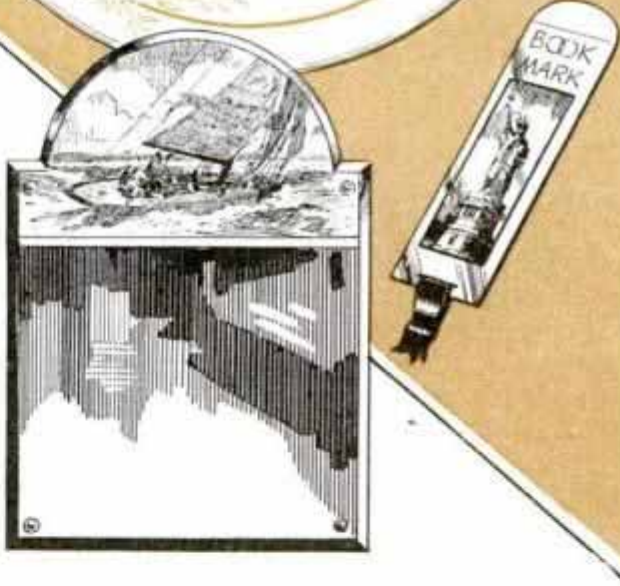


By RAYMOND BARKULOO

ANY amateur photographer can easily reproduce photographs on glazed pottery, chinaware, glass or metal and the reproduced picture may be made in any one of a large number of colors. A few chemicals, a piece of glass, a small window-washing squeegee, a graduate, three trays or shallow enameled pans are required. A supply of fresh Carbro tissue in any color may be procured from a local photographic dealer.

Pictures are transferred from prints; the negatives are not needed. In making the first trial select a photo having strong contrasts and transfer it to a sheet of aluminum. The photo selected should have a white border. The piece of aluminum should be cut about 1/2 in. larger each way than the photo. After selecting a piece of Carbro tissue of a suitable color and slightly larger than the photo, place the tissue in a pan of clean water to soak. The temperature of the water should not be above 60° F. The photo should also be placed in a pan of water to soak. Both should soak for at least 5 minutes.

While the photo and tissue are soaking,



the sheet of aluminum should be thoroughly polished on the mount side with fine emery paper and steel wool. It should then be thoroughly cleaned with warm soapsuds, rinsed in cold water and allowed to dry away from dust. The side upon which the picture is to be placed will have to be coated with a gelatine mixture so that the picture will adhere. The gelatine mixture is prepared in two parts. First, weigh out gelatine, 40 grains, and place in an enameled pan with water, 1 oz., and allow it to soak for about 15 min. While it is soaking dissolve chrome alum, 3 grains, in warm water, 1/2 oz., in a sepa-

Central Camera Co Wabash, Chicago  
230  
8x10 only size

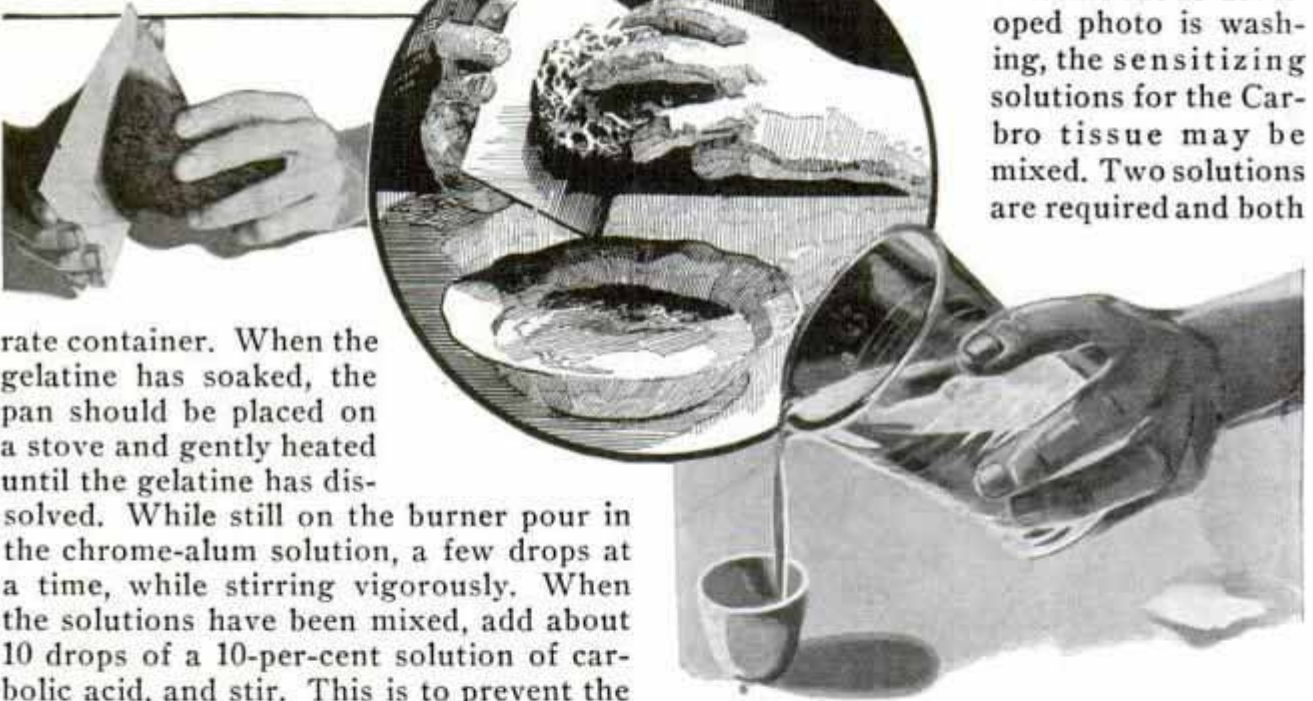




5 min. When bleached, it should be washed for about 10 min. in cold water and it is then re-developed by placing it in a tray of Elon-hydroquinone developer diluted according to the instructions furnished with the developer for use with bromide paper. Any developer for bromide paper will be equally satisfactory. If a bromide enlargement is used, the bleaching and re-developing will not be necessary. The print should be left in the developer until it has regained its original appearance. When development is complete, the print should again be washed for 10 min. in cold water to remove the developer. The developer should be

saved as it will be needed again later.

While the re-developed photo is washing, the sensitizing solutions for the Carbro tissue may be mixed. Two solutions are required and both



rate container. When the gelatine has soaked, the pan should be placed on a stove and gently heated until the gelatine has dissolved. While still on the burner pour in the chrome-alum solution, a few drops at a time, while stirring vigorously. When the solutions have been mixed, add about 10 drops of a 10-per-cent solution of carbolic acid, and stir. This is to prevent the gelatine from spoiling. To coat the aluminum, place it face up on a level surface and pour a few drops of the gelatine mixture onto it. This should be spread evenly and quite thin over the surface with a soft, clean brush. It will take about  $\frac{1}{2}$  hour for the gelatine film to harden. The drying must take place in a room which is free from dust.

The wet photo is now treated. This is done by first bleaching it in a solution made by dissolving potassium ferricyanide, 100 grains, and potassium bromide, 33 grains, in water, 10 oz. The wet print is placed in this solution, contained in a glass or enameled tray, until it has bleached as much as possible. This will take about

of them are best made in concentrated form. The first is made by dissolving 1 oz. each of potassium dichromate, potassium ferricyanide and potassium bromide in water, 20 oz. It may be stored in a clean bottle and labeled "Concentrated Sensitizer No. 1." The second solution is made by mixing 1 oz. each of glacial acetic acid and strong hydrochloric acid with 40-per-cent formaldehyde, 22 oz., and water,  $1\frac{1}{2}$  oz. It is labeled "Concentrated Sensitizer No. 2." A hardening and cleaning solution should also be made at this time by dissolving chrome alum, 1 oz., in water, 20 oz. This is labeled "Cleaning and Hardening Solution."

2. For photo 21X6

2. For photo 21X6





If by this time the gelatine surface on the sheet of aluminum has hardened, you are ready to sensitize the tissue. If it has not hardened sufficiently, the print and tissue should be left in water until it has, because once the sensitizing is started the work will have to be completed without interruption.

Working sensitizing solutions are next prepared and poured into separate trays. Six oz. of Concentrated Sensitizer No. 1 is added to water, 18 oz., and poured into the first tray. After thoroughly rinsing the graduate, measure out 1 oz. of Concentrated Sensitizer No. 2 and mix it with water, 32 oz., which is poured into the second tray. A large clean sheet of thick glass is laid in the sink or on the drain board so that it can be used as a squeegee surface. Water should be poured over it and the well-washed wet photo placed face up in its center. The tissue is now carefully lifted from the water and completely submerged in No. 1 sensitizer. The tray should be gently rocked. The tissue is left in this solution for 3 min., after which it is removed by one corner and held over the tray to drain for about 10 sec. Then it is immersed in the No. 2 sensitizing solution, where it is left for a very short

time, 15 sec. being about right for the average photo. If the finished picture is pale and flat, the tissue was left in the No. 2 solution too long, but if the photo is dense and lacking in detail, the bath was not long enough. After the tissue has been removed from the No. 2 bath by one corner, it is quickly laid on top of

the wet photo previously placed on the sheet of glass. Lay it even and in its final place at first without moving the tissue over the print, as this will produce blurring or double printing. A large sheet of thin waxed paper is next placed over the tissue and held in place with the hand while squeegeeing the print and tissue into close contact. At each stroke the squeegee should be slid to the extreme edge of the waxed paper to remove the water squeezed from between the print and tissue. Do not squeegee too hard, as the tissue and the print may then permanently stick together. The waxed paper should be left in place to prevent the evaporation of moisture from the print and tissue. The glass with its attached wet print, tissue and waxed paper is next set in a cool place, not over 65° F, and left for 15 min. Then remove the waxed paper and carefully lift the print and tissue from the





glass by inserting the point of a knife under one corner. The print and tissue may now be separated by gently pulling them apart. None of the tissue should stick to the print. If it does, either the temperature was too high in the room or the tissue was squeegeed too severely. The print will be bleached if everything has been satisfactory. It should be placed in water to wash. Then, without any loss of time, the tissue should be placed evenly on the gelatine-treated sheet of aluminum, which has been moistened with water. The tissue is then squeegeed into perfect contact, placing a sheet of waxed paper over the tissue. Care should be taken not to squeeze the gelatine from between the tissue and the aluminum. After squeegeeing, the wax paper is removed and the aluminum sheet with its tissue should be placed on a perfectly smooth surface, covered with a sheet of glass weighted lightly, and allowed to dry for about 45 min.

While the tissue is drying the well-washed print may be placed in the developer which was used in the first part of the work and allowed to re-develop to its original appearance. After thorough washing, the print is ready to be used again or it may be dried and saved with no ill effects from having served these purposes. A photo produces better Carbro prints after it has been used once.

The dried tissue on the aluminum is carefully placed in a large container or tray of water at a temperature of 125° F. In a few minutes colored gelatine will be

seen to ooze out from between the tissue and the aluminum sheet. The tray may be gently rocked to aid the dissolving of the gelatine. When the paper backing of the tissue starts to separate from the aluminum, carefully lift it off by one corner. The surface of the aluminum will now

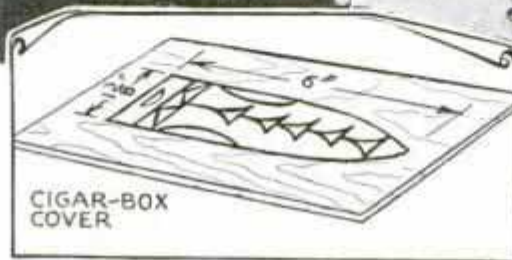
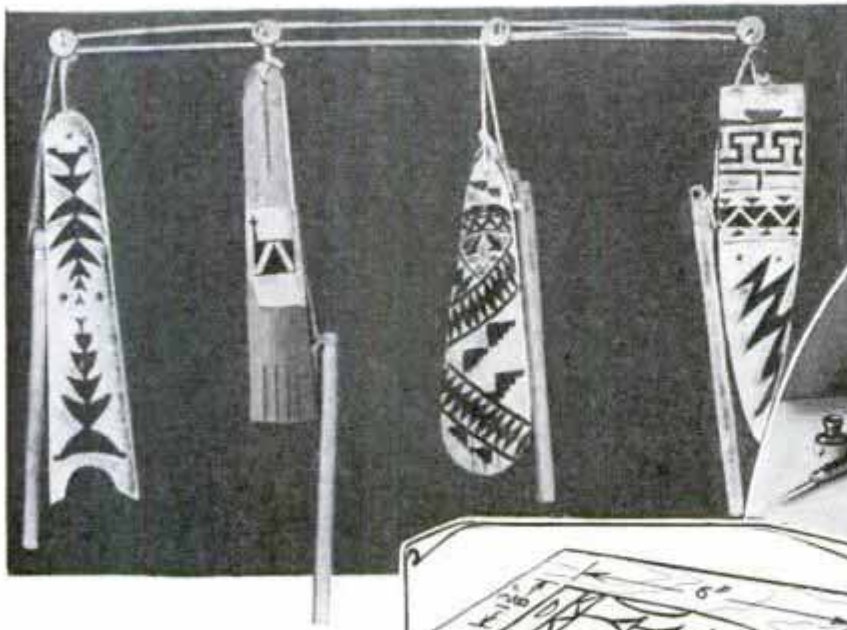


look mottled in the color of the print to be made. The tray should be rocked gently and the excess gelatine allowed to dissolve away. Great care should be taken not to damage the surface of the gelatine as it is soft and delicate and it should not be touched with the fingers. When the picture is complete, the aluminum is removed from the water and immersed in the cleaning and hardening solution, which should be used full strength. The completed picture should be allowed to stand in this solution for 15 min. After this, it is washed in cold water to remove the alum. The picture is still soft and should be allowed to dry over night. Artificial heat should not be used as it is likely to blister the picture. When the picture is dried it is permanently preserved by flowing on a thin coat of clear metal lacquer.

This process may be applied in exactly the same manner to the production of colored pictures on almost any article. If the surface upon which you wish to place the picture is curved it will be found convenient to press the tissue onto the support and secure it in place while drying, by binding with sponge rubber. The rubber will slow down the drying and therefore a longer time should be allowed.



# Indian Moaning Sticks from Cigar Boxes



For amusement, or as a means of earning some pocket money, you can easily whittle out Indian moaning sticks such as shown in the photo. Each one is about 6 in. long and  $1\frac{3}{8}$  in. wide, the exact shape and decoration being varied to suit your taste. Drill a couple of holes near the edge at the cen-

ter, or make about three fine saw cuts in the lower end, after which a 2-ft. length of waxed

cord is slipped through a hole at the center of one end and tied. In use, take the end of the string in hand and whirl the stick over your head.—Frank Conly, Denver, Colo.

## Removing Pen Points with Eraser



the rubber eraser and the pen point will enable you to get a firm grip.

To easily remove a pen point that is stuck in its holder, take an eraser from a lead pencil and hold it under the point with the fingers and pull outward. Friction between

## Making Glue Joints Waterproof

Many waterproof glues have a tendency to stain the wood, which is often objectionable. In this case, use an ordinary strong fish or animal glue, and, when the joints are dry, coat them with strong formaldehyde applied with a narrow brush. This will coagulate the glue and make it entirely waterproof. Do not add the form-

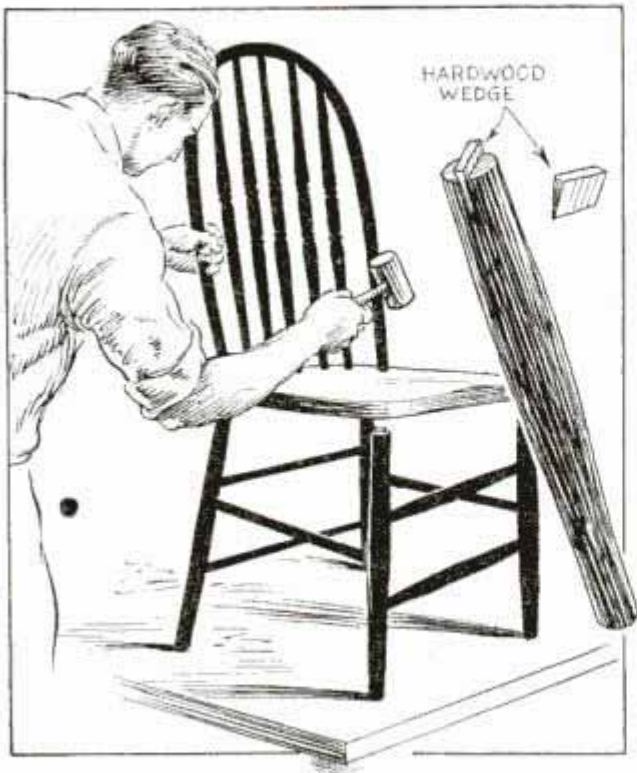
aldehyde to the glue beforehand as it will cause it to thicken before it can be applied to the work.

## Liquid-Measuring Container Made from Pickle Jar

An accurate liquid-measuring container that is handy in photographic work can be made from a 12-oz. pickle jar by cementing a paper scale on the outside surface to divide the height of the jar into twelve parts. The numbers on the scale are staggered; even numbers on one side and odd numbers on the other. A rubber band snapped around the jar aids in obtaining the liquid level for any amount.





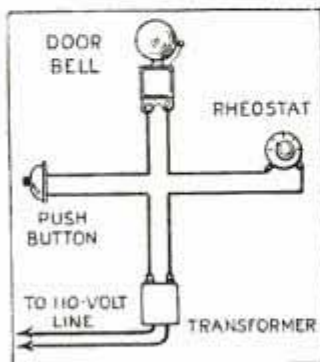


Small Hardwood Wedges Spread Ends of Loose Chair Legs and Tighten Them in Their Holes

### Tightening Chair Legs with Wedges

To tighten chair legs that have loosened, remove them and saw slots in their ends to take small hardwood wedges, leaving a small portion of the wedges project as shown. Then drive the legs into place. When the end of the wedge touches the bottom of the hole as it is driven in, the end of the leg will be spread inside the hole. In cases where the tenons have worn or the holes in which they fit have been enlarged, make a larger slot in the end of the leg and use a larger wedge.

### Rheostat Controls Doorbell



that it is heard only in the lower rooms, or it may be adjusted to be heard all over the house.

Night workers who find that the doorbell disturbs their sleep in the day time can install a rheostat in the bell circuit as shown, and control its sound. With this installation, the sound can be controlled so

### Lettering on Photographic Negatives

The following method will produce a professional appearance when lettering photographic negatives, the lettering appearing in white. First carefully letter or typewrite the matter on a sheet of plain paper with hectograph ink or ribbon. Slightly moisten the gelatine surface of the negative emulsion, which is the dull side, and press down the lettering in good contact with it. After a minute, peel off the paper and the writing will appear correctly reversed on the negative. The purple hectograph ink is most satisfactory, and may be used on Cellophane if there is difficulty in placing the lettering.

### Typewriter Keys Cleaned with Cloth and Golf Tee

It is often difficult to clean typewriter keys and remove all the dirt near the inside edges. Take a wooden golf tee, trim off the concave portion on the end. Then hold a cloth moistened with benzine over the head and turn it around on the key as shown in the photo. This will effectively remove dirt without damage to the key.—Frank W. Bentley, Jr., Missouri Valley, Ia.



### Files Sharpened by Etching

Old files can be quickly sharpened by the following process: First run a roller that has been charged with printers' ink over both sides of the file so that the ridges become inked. Then dust the ink-coated surface with powdered rosin and heat the file until the rosin melts. By placing the file in dilute nitric acid, the space between the ridges will be eaten away, while the ridges, which are protected with rosin, will not be affected. After this treatment, remove rosin with a scratch brush and the file will be as sharp as a new one.

☞ When overshoes are hard to put on, a piece of newspaper slipped over the heels of the shoes, makes the job easier.





# Homemade PAINT SPRAY GUN



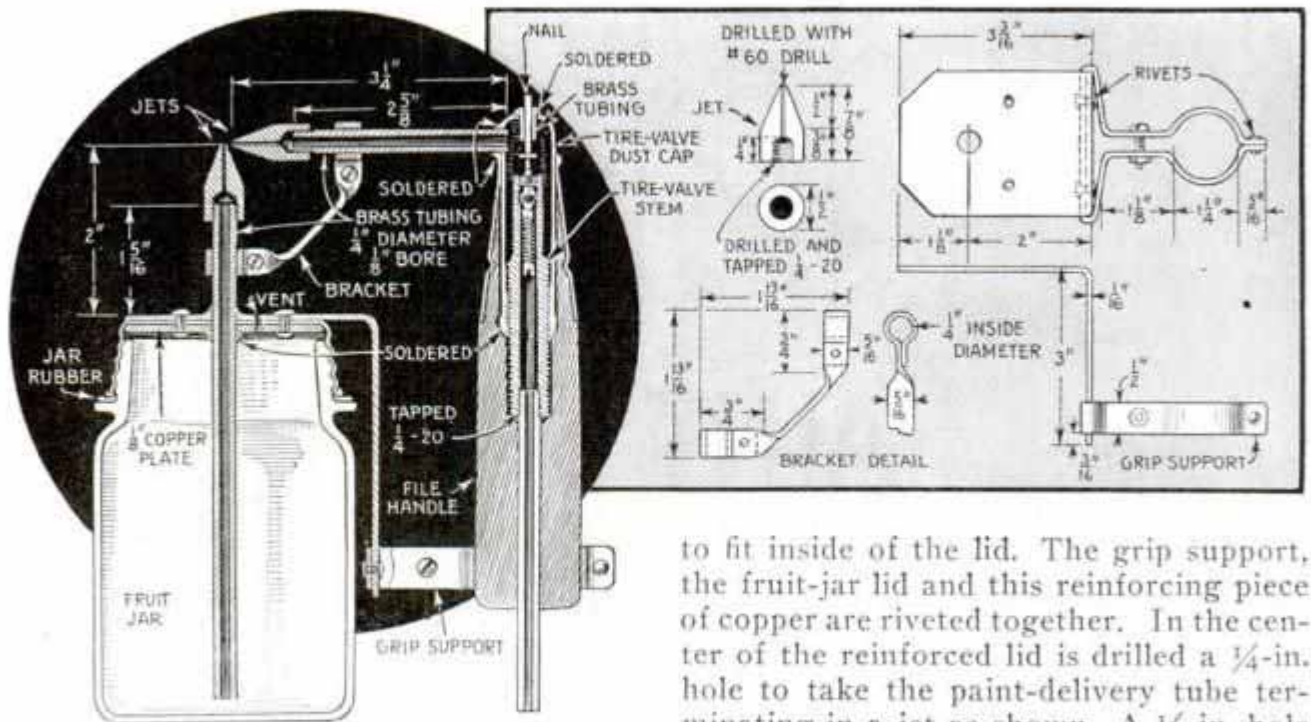
By  
ARTHUR LINDBERG

**F**OR the average small job around the shop, this inexpensive spray gun is entirely satisfactory. The parts are adjustable so that a fine, even spray is produced. All the auxiliary equipment needed is a small air compressor such as described in the December, 1933, issue of Popular Mechanics Magazine. The important item required in constructing the spray gun is an automobile inner-tube valve stem complete with valve and dust cap to serve as an air control. The other parts are made from materials found in the scrap box of any workshop.

The clamping parts originally used to hold the valve stem in the inner tube should be sawed off, leaving the stem as long as possible. The standard hole in the bottom end of the stem is of the proper

size to be tapped with a  $\frac{1}{4}$ -in. tap without drilling, so this size is recommended. A piece of brass tubing long enough to extend through the handle and receive the air-supply hose is threaded and screwed into the tapped hole. With the valve screwed securely into the stem, the part of the stem that extends above the valve is sawed away so that the nail head used to depress the valve will not shut off the air supply when it is operated. The nail should be long enough to extend through a  $\frac{1}{2}$ -in. length of brass tubing soldered into the top of the large dust cap. The tubing, which must be a snug fit for the nail, serves as a guide to keep the nail head directly over the valve. The end of the nail projecting from the cap is made just long enough so that when the valve





stem is completely depressed it is flush with the end of the cap as shown. With this adjustment the thumb used to control the air valve effectively prevents the escape of the small amount of air which tends to leak out around the nail.

Air from the valve is delivered to the jet through a length of brass tubing terminating in a jet which is detailed. The tubing used here and for making the other parts of the gun should be  $\frac{1}{4}$  in. outside diameter and  $\frac{1}{8}$  in. inside diameter. If thin-walled tubing is used it will be difficult to thread with standard dies. A rigid connection between the valve cap and the tubing can be made by soldering, if the hole in the cap is made just large enough so that the tube can be pressed into place. In soldering these and other parts of the gun, it is recommended that muriatic acid completely cut with scraps of zinc be used as a flux. Soldering paste is difficult to use in making joints of this type. The acid will run into the tight joint and be followed by the molten solder if a large hot iron is used.

An important feature of this spray gun is the use of a standard fruit-jar lid for the paint-container cover. This makes it possible to store spraying lacquer in sealed jars and to change from one color to another with a minimum of effort and economy of lacquer. The lid used in the construction of the gun should be reinforced with a ring of  $\frac{1}{8}$  in.-thick sheet copper cut

to fit inside of the lid. The grip support, the fruit-jar lid and this reinforcing piece of copper are riveted together. In the center of the reinforced lid is drilled a  $\frac{1}{4}$ -in. hole to take the paint-delivery tube terminating in a jet as shown. A  $\frac{1}{8}$ -in. hole is also drilled through the assembly to serve as an air vent. The length of this tube will depend upon the size of fruit jar to be used. The model shown in the photograph was fitted with a pint jar; however, the half-pint size is usually more convenient in the small shop. The delivery tube is soldered to the grip support piece and to the copper reinforcing piece, as shown, by the same methods as were previously described.

After a standard file handle has been drilled so that it will slip over the valve and air-inlet tube, and a bracket has been bent from sheet steel, the gun is ready for assembly. The handle is inserted into the grip support and tightened just enough to bind slightly. The bracket is then slipped onto the air and paint-delivery tube as shown and the jets screwed on. The air jet should be adjusted so that the center of its outlet hole is in line with the top of the paint-delivery jet. The distance between the air jet and the paint-delivery jet should be about  $\frac{1}{8}$  in. With the parts in this position you may fill the jar with lacquer thinner and make final adjustments to produce an even spray. Although a very low pressure will operate this gun, about 25 lb. is the best value. If a jar larger than one of one-pint capacity is used, a higher pressure will be required. The height of the air-delivery jet above the paint jet is the only critical adjustment. If the adjusting screws are loosened slightly, this ad-

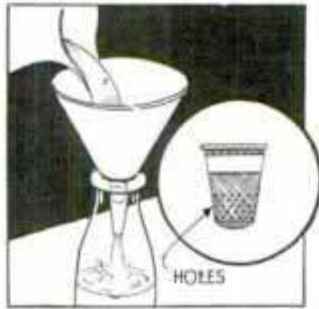


justment may be made very accurately, after which they may be drawn up tight to make the setting permanent. When this adjustment is properly made the gun will give a fine mist of lacquer without losing large drops at the jet. If trouble is experienced with drops forming at the paint-delivery jet, this jet should be removed, put in the lathe, and the pointed surface turned down until the delivery hole and the beveled edge meet in a knife-like edge.

Spray painting should not be attempted with brushing lacquer cut with solvent. Only regular spray lacquer should be used. Spraying should be conducted away from open flames and out of danger of fire as the solvents used are inflammable.

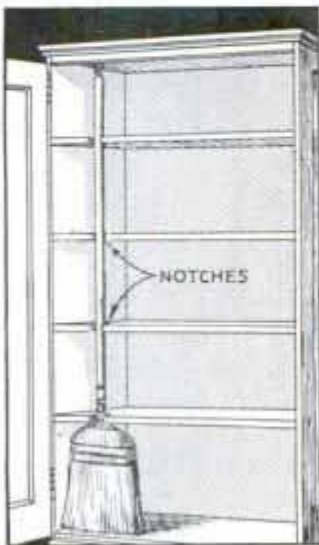
### Sewing Thimble Serves as Strainer inside Funnel

Unable to find a strainer that would fit the mouth of milk bottles, I improvised one from a thimble and a tin funnel. A number of small holes were drilled or punched in the bottom and sides of the thimble, which was then placed inside the funnel. In cleaning, the thimble is removed, leaving the funnel available for other purposes.—  
R. H. Mix, Maysville, Mo.



### Broom Stored in Utility Cabinet

By cutting small notches in the edges of the shelves of a kitchen utility cabinet as shown, space is provided for storing the broom inside. It is suspended from the top of the cabinet by means of a screw-eye and a screw-hook. The broom takes very little space inside the cabinet and it is always handy when needed.—  
Dan Courtney, Chicago.



FRUIT-JAR RUBBERS

Fruit-Jar Rubbers Tied Together with String Provide Mat That Protects Dishes in Sink

### Dish Mat Made from Fruit-Jar Rubbers

A rubber mat to protect dishes against breakage when draining them in a sink, after they have been washed, can be made by tying a number of old fruit-jar rubbers together with string as shown. The mat can be made to fit the bottom of the sink or can be used on a table top.

### Preparing Objects for Photographing

When it is necessary to photograph an unfinished wood or metal object and have it appear in the picture as though it had been finished, the following procedure will do the trick: Dilute water glass with an equal quantity of water and add enough whiting to make the mixture cover well. Apply the mixture with a brush. It will dry quickly, and one coat will be found sufficient to give a glossy finish that will photograph like shiny enamel. For a matte finish, dilute the water glass still more and add more whiting. The intermediate gray tones between white and black can be had by mixing a little lampblack with the solution. After the photograph is taken, sand down the water-glass surface and it will be found to have acted as an excellent filler over which the regular finish can be applied.

☞ If gasoline and kerosene are used in a mixture, it should be kept well stirred because the kerosene will settle.





Salvaged Bricks Are Quickly Cleaned of Mortar with This Tool without Danger of Breaking Them

### Homemade Tool Quickly Cleans Mortar from Salvaged Bricks

Finding that many salvaged bricks were broken in cleaning them with a hammer or old hatchet, one contractor made a number of tools like the one shown. With these tools, the work was done much faster and the bricks were not broken. The blade of the tool is a piece of  $\frac{1}{4}$ -in. steel about 3 in. wide. One end is sharpened and the other end is tapered to form a tang for the handle, which in this case was a piece of old garden hose. A smaller piece of steel is bent at right angles at one end, which has teeth filed on it, and the other end is drilled and is riveted to the blade of the tool. The teeth aid in removing the large pieces of mortar, while the scraper is used in removing the smaller pieces.—A. H. Waychoff, Phoenix, Ariz.

### Thimble Guards Finger in Cutting Glass

If you are in the habit of pulling one of your fingers along the edge of a piece of glass as a guide when cutting narrow strips from it, a thimble worn as shown will prevent the finger from being cut. It is best to lay the glass on a flat surface and use a straightedge as a guide, although the above method is often used to save time in stores where glass is sold.

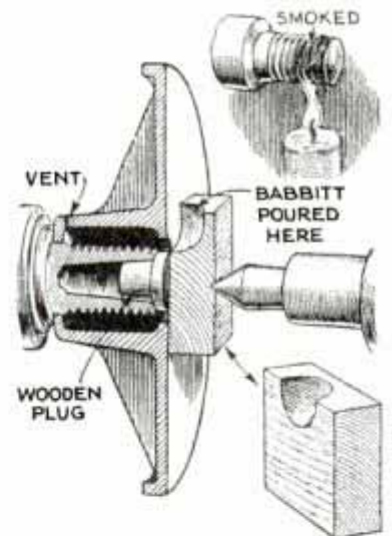


### Hastening Growth of Potatoes

To hasten the sprouting and growing of potatoes, cut the seed and leave it exposed to air in a moderately warm room about a week before planting. This will allow the raw sides of the pieces to heal, thus conserving their moisture content and vitality, which immediately develops the sprout when planted. Potato seed, freshly cut and planted, loses much of its strength by "bleeding," and growth is thereby retarded for several days.

### Bushing a Faceplate Hub with Babbitt

A lathe faceplate, which is too large for the headstock spindle, can be bushed with babbitt as follows: The threads on the headstock spindle are first smoked to prevent the babbitt from adhering and the end of the spindle is then plugged. The faceplate is next accurately centered over the end of the spindle, where it is held by means of a wood block and the tailstock center as shown, a small notch being cut in the top edge of the block to provide a sprue for pouring in the molten babbitt. A vent is drilled in the hub of the faceplate. After the latter has been poured and allowed to cool, the faceplate is unscrewed from the spindle and the ragged edges of the babbitt are trimmed off.



### Careless Grading of Lawns May Kill Grown Trees

Before doing any extensive grading over lawns or gardens occupied by trees, it is best to consult a landscape gardener as there are many varieties of trees that require a shallow-root system. These trees are apt to die by smothering of the roots if the ground around them is covered with additional soil to a depth greater than 6 in.









Short Sections of Old Auto Tire Protect Hands When Pushing Wheelbarrow in Tight Places

### Hand Guards on Wheelbarrow Handles

To prevent their hands from being injured when pushing wheelbarrows through doors and other narrow passages, the workmen on a construction job made guards from old auto tires and slipped them over the wheelbarrow handles as shown. The sections are about 2 in. wide and have holes at the ends to take the handles. These guards have the advantage over other methods of protecting the hands as they are quickly removed.

### Padlocking the Telephone

After several unexplained long-distance calls had been charged to a telephone that was of necessity left unguarded a few hours each day in the field office of a construction company, a bicycle padlock was inserted through the receiver hook as shown, so that the receiver could not be removed. This eliminated the long-distance calls, and it was also found that the local calls were reduced considerably.—W. V. Gray, Milwaukee, Wisconsin.

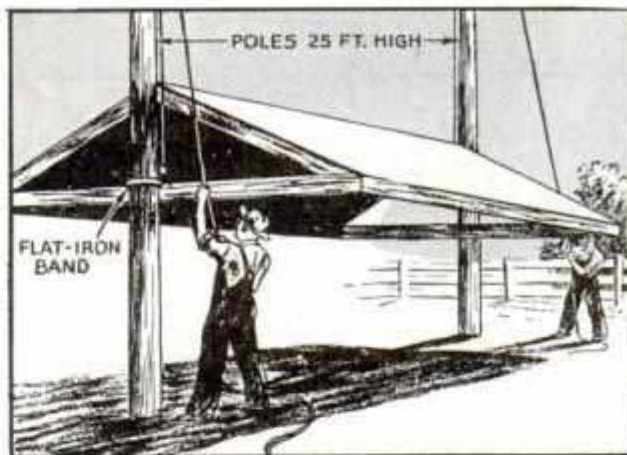


### An Aid in Laying Out Metal Work

A thin coating of copper on the surface of steel through which to scratch with the scriber when laying out work, is commonly used. The ordinary solution of copper sulphate and dilute sulphuric acid works well but is quite corrosive and does not always give a good coating. A better solution for the purpose consists of a few crystals of copper sulphate dissolved in a half pint of a saturated solution of zinc sulphate. The latter is made by dissolving as many zinc-sulphate crystals in water,  $\frac{1}{2}$  pt., as possible. Moisten a rag with this solution and rub it over the surface of the work. The copper coating thus produced will not easily rub off.

### Movable Roof Protects Stacked Grain from Weather

Suspended from the tops of two high posts by means of ropes and pulleys, this roof can be raised or lowered. It was built to protect stacked beans, but when not used for this purpose, it becomes a shelter for farm implements or a feeding place



Raised or Lowered with Ropes and Pulleys, This Roof Protects Grain or Machinery from the Weather

for lambs. The roof is 14 by 24 ft. and is covered with sheet metal. To prevent side sway, two iron bands that slide over the posts are bolted to the frame of the roof.

### Using Mortiser in Hardwood

When using a power-driven mortising chisel in hardwood, do not force or try to punch the tool through the wood, but give it time to cut. Remember that more pressure and power are required to cut into hard wood than in soft wood.



3775 N. Halton St. Milwaukee Wis.

# Tuning up your BANDSAW

by W. Clyde Lamme

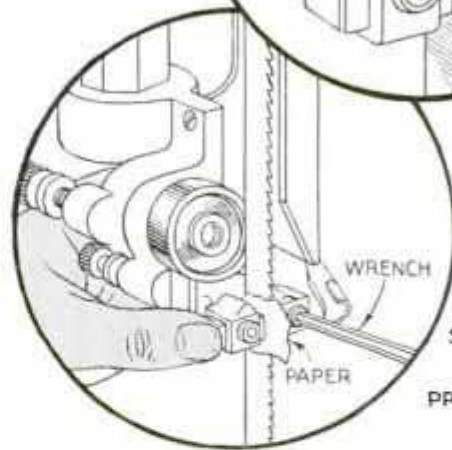
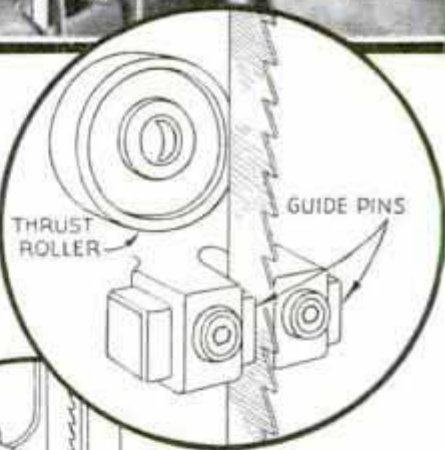
**A**SIDE from a dull blade, about the only source of trouble with a band saw is an improper setting of the blade guides. If your band-saw blade tends to drag in the cut or pull sidewise, making it impossible to follow a line on the stock, examine the set and the sharpness of the teeth, and also the adjustment of the guides.

Figs. 1 and 5 show the method of setting the guides on the ordinary small band saw. Note particularly the position of the blade between the guide pins and also that the ball-bearing thrust roller is set so that the gullets between the teeth just clear the edges of the pins on either side of the blade. Especially with the narrow blades, 1/4 in. and less, it is necessary to obtain the maximum bearing against the face of the guide pins in order to prevent the blade from canting sidewise in the cut. The back of the blade should bear on the rim of the thrust roller in the position shown. Make sure, when setting, that the blade cannot slip off the roller under the pressure of sawing.

An improved type of upper-blade guide is shown in Fig. 2. This guide permits a very accurate setting of the thrust roller for various sizes of blades, and also allows setting the guide pins without disturbing the adjustment of the roller. To set for proper clearance of the blade through the pins, the headless set screws holding these in place are first loosened with the hexagon wrench provided and a single thickness of newspaper is inserted between the blade and one guide pin, as shown in Fig. 2. Then the pins are pressed lightly together with the thumb and first finger and the set screws are tightened to hold the pins in place. Always test the setting by turning the wheels slowly by hand to make sure that the length of the blade passes through the guides freely. Adjust



① ENLARGED VIEW SHOWING PROPER POSITION OF BLADE IN THE UPPER GUIDE



② ENLARGED VIEW OF UPPER GUIDE SHOWING MANNER OF ADJUSTING GUIDE PINS FOR PROPER CLEARANCE

the lower guide in the same way. Some small machines now on the market have a tensioning device which indicates, by means of a scale and pointer, the proper tension for blades of varying width. A reasonably accurate means of adjusting for tension on machines not having this feature is to first tighten the blade just



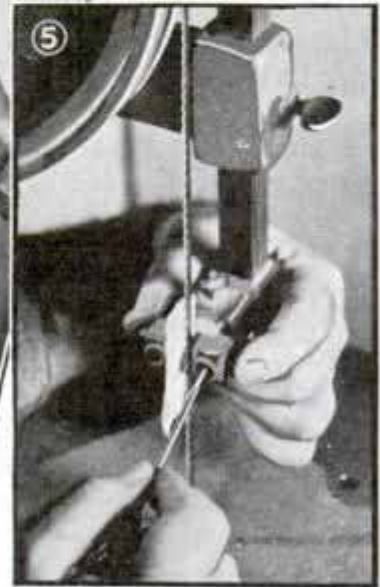
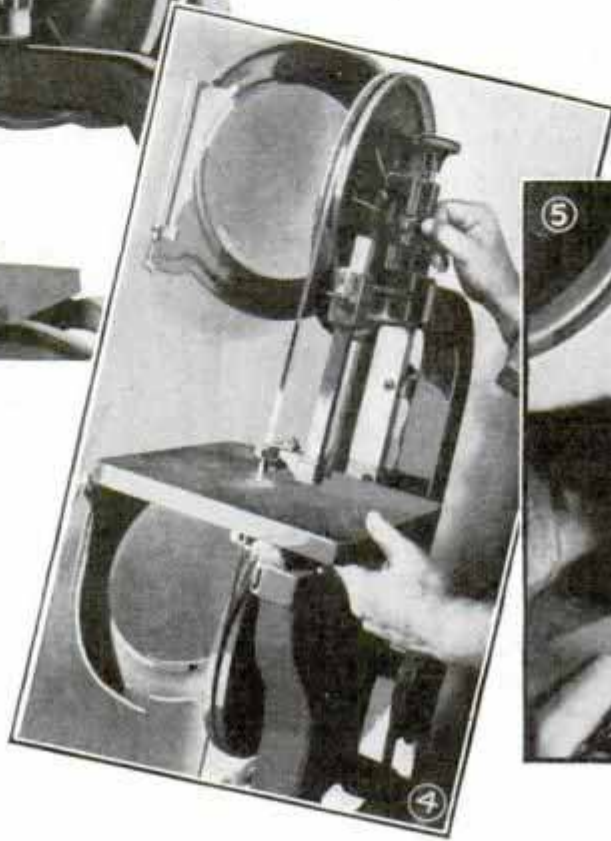


enough to prevent its running off the wheels, then start the motor and draw up slowly on the tension screw on the upper wheel until the blade straightens out, that is, shows no tendency to vibrate or flap when the machine is running at its normal speed. There is a certain point in degree of tension where practically all blades will run smoothly over the band wheels provided, of course, the blade itself is in the proper condition.

All small band saws of reliable make are provided with a means of tilting the upper wheel to properly align the blade through the guides and track it on the center of the wheel treads, as in Fig. 4. The left detail of Fig. 8 shows what happens when the blade is not tracked properly on the upper wheel. The blade is drawn to the edges of the treads on both wheels and also rides heavily on the thrust rollers above and below the machine table, thus causing it to be bent out of line. If run in this position on the wheels, it will not only give trouble in the cut, but is likely to break at any time. The right detail of Fig. 8 shows the blade properly tracked on the wheels. When using a new blade for the first time or changing from one blade width to another, it is always necessary to re-track the upper wheel and re-

adjust the upper and lower guides to suit. When sawing, the upper guide should be as close to the stock as possible to give adequate support to the blade.

It is equally important that the blade be aligned through the guides square with the table. As will be seen from Fig. 7, it is necessary to make sure that the pins of the upper and lower guides are in line, otherwise the blade will be

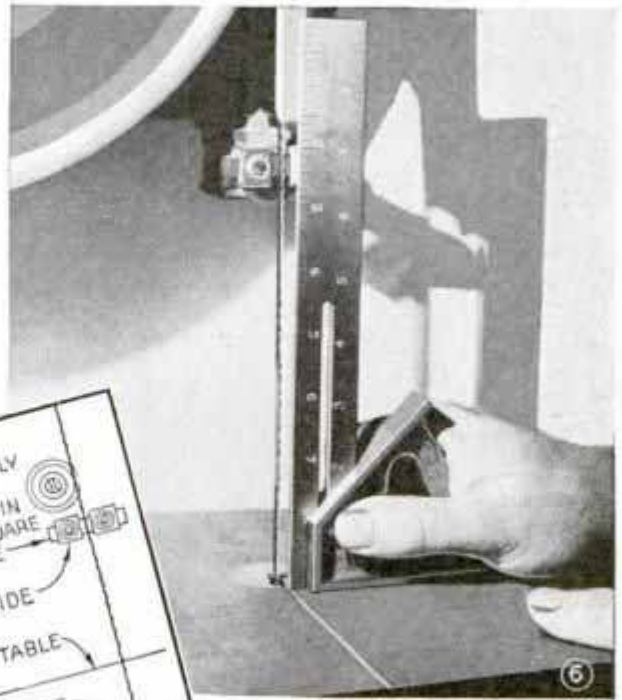
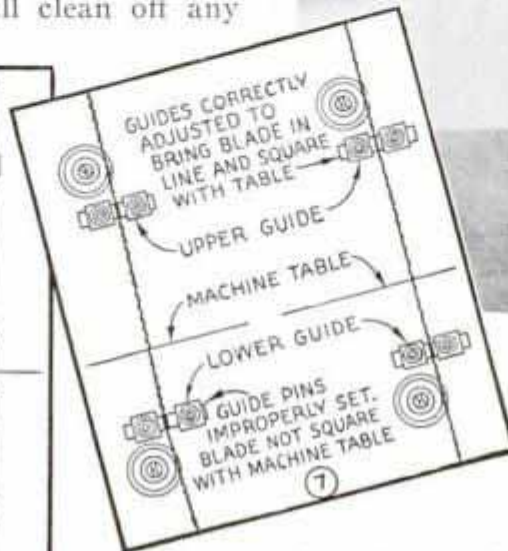
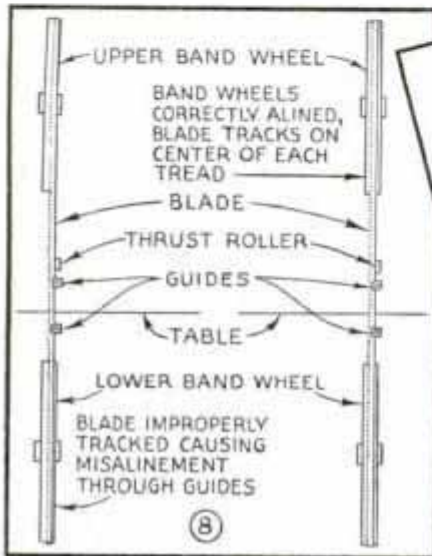


out of square with the table. This will not only result in an inaccurate cut but is likely to cause breakage. Be sure first that the table rests on the leveling screw with which every machine is provided, then set a combination square upright on the table with the edge against the blade, as in Fig. 6. This will show any misalignment and the guide pins are easily adjusted to the proper position.

Band-saw blades not in use should never be thrown in a drawer with other tools but should always be hung on a hook in the storage cabinet. Protect the blades from rust by wiping them with an oily rag before coiling, and when you coil the blade be careful that the points of the teeth do not strike or rub together. Wipe the blade dry before placing it on the band wheels, as the oil tends to harden the rubber treads and the teeth are likely to clog with sawdust if oil or grease is present. If, for any reason, the blades do become rusty, coil



them and allow to soak in kerosene for several hours. Then clean off the remainder of the rust with a thin strip of fine emery cloth doubled over the back of the blade. After the blade so cleaned is on the wheels and lined up, take off the upper guide and set the lower back so that the blade does not touch it. Start the machine and hold a fine oilstone against the back of the moving blade, as in Fig. 3, at the same time rocking the stone slightly back and forth. This will clean off any



per edges of the truck bodies were covered with sections of large rubber hose to prevent wear. The hose was slit along one side and was

slipped over the edge of the bodies. Old auto tires may be used for this purpose if desired. The rubber also served to reduce accidents to workmen from heavy material slipping while resting on the edges of the trucks.

rust and insure smooth running. If the wheels are fitted with bronze-sleeve bearings, keep these well oiled as they carry considerable pressure, due to the tension of the blade. Machines fitted with sealed ball bearings need no attention.

### Rubber Protects Edges of Small Truck Bodies

In a storage yard where small trucks were used to move scrap material, the up-

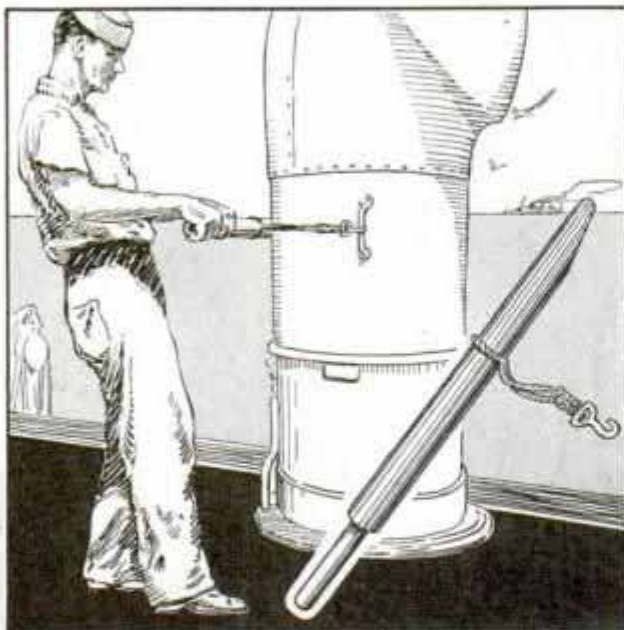


Rubber Hose or Auto Tires on Top Edge of Truck Bodies Prevent Wear

### Safe Method of Splitting Firewood

The usual method of holding a stick of firewood to be split against a chopping block with the foot is dangerous. This is especially true if the wood splits easily, with one blow of the ax, as it may pass on through the stick and injure the foot. To prevent any possibility of this happening, use the following method: First square up a good size chopping block of dry hardwood and embed it firmly in the ground on one side of the woodpile. Set on end the stick of wood to be split and drive the blade of the ax deeply into it but with the head still projecting outside of the wood. Then with a twist of the ax handle, turn the blade and stick upside down, and, holding the ax in this position, strike the head of the ax on the chopping block. If the wood is straight grained, it will split easily.





Pole with Rope and Hook Tied Near One End Used to Open Ship Ventilators

### Tool for Opening Rusty Ship Ventilators

Among my duties on board ship was that of opening the ventilators, some of which had rusted and turned so hard it was almost impossible to open them by hand. To facilitate this work, I rigged up the tool shown. It consisted of a pole having a short length of rope tied to it a foot or so from one end with a hook at the other end of the rope. In use, the hook was placed in the ventilator handle after which the pole was used as a pry bar, as shown, to turn the ventilator.—Joseph Gandia, Sr., S.S. "Coamo," New York City.

### Testing Seed Corn for Germination

According to experts at the Colorado Agricultural College, it is best to test for germination a few kernels from each ear of seed corn before planting it. The kernels may be bulked and tested between paper towels, moist cloths or blotters, or in a soil box. When less than 90 per cent of the kernels in the general test germinate, a thorough test of each ear to be used for seed should be made in what is known as a modified rag-doll tester. This can be made from two double thicknesses of good quality paper towels, a strip of waxed paper and rubber bands or string. After wetting the paper towels thoroughly, place one of the double thicknesses on the waxed paper. Draw parallel lines about 2 in. apart across the doubled towel

with a soft or indelible pencil. Number the columns and give corresponding numbers to the ears of corn to be tested. The numbers can be written on slips of paper and fastened to the ears with rubber bands or string. Place six kernels from ear No. 1 in column No. 1, and the same number from each of the other ears in the columns that correspond with the numbers of the ears. Place the remaining double thickness of wet paper towels over the kernels, and roll up the tester loosely. Tie or fasten the ends with rubber bands or string to keep it from unrolling. In place of the paper towels, strips of canton flannel or muslin may be used, although the paper is better. If the materials used in making the tester have been thoroughly wet, the waxed paper will prevent evaporation of the moisture and permit germination of the kernels within seven to nine days in a room of ordinary temperature.

### Tar-Paper Cones Protect Trunks of Small Fruit Trees

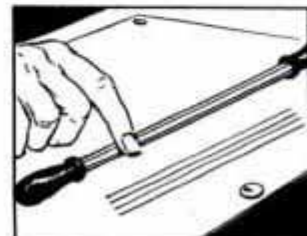


To keep rabbits from chewing the bark off his small fruit trees, one orchard owner protected them with cones of heavy tar paper as shown. The cone also maintains an

even temperature around the trunk of the tree so that winter sunshine will not cause the sap to mount in one side and then freeze and damage the bark of the tree.

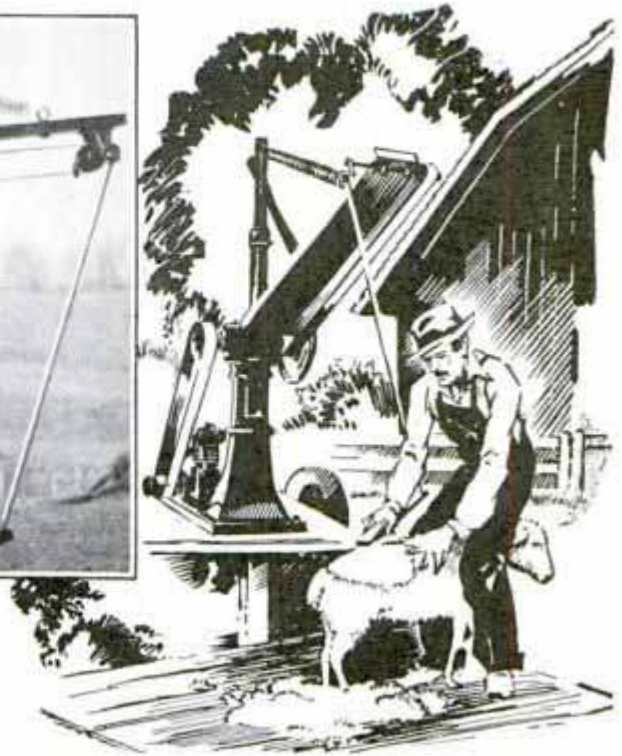
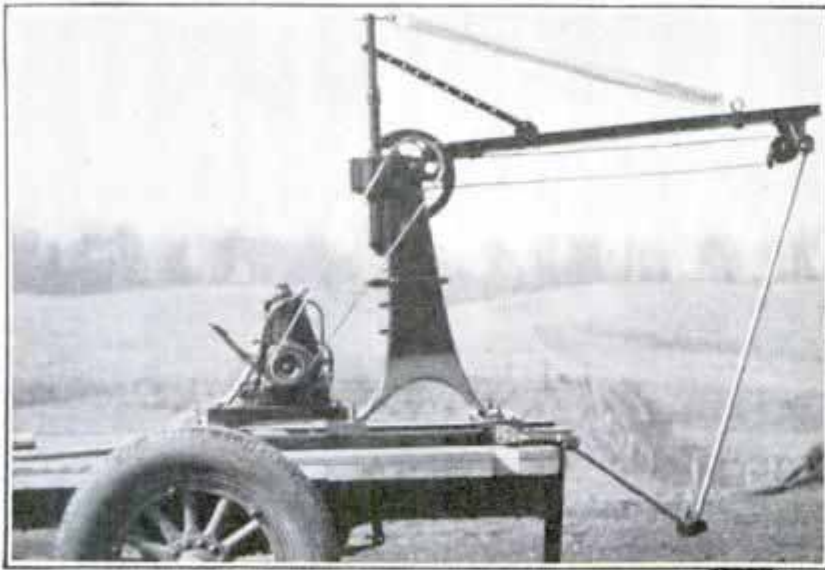
### Rolling Ruler Saves Time when Shading or Crosshatching Drawings

By slipping rubber bulbs from medicine droppers over the ends of a pencil, a rolling straightedge is provided for ruling parallel lines in shading or crosshatching. A ruler of this kind will save time, as it is only necessary to roll it a trifle with the finger to space the lines, instead of taking both hands for the work.





# Old Cream Separator Supports Power Shears



The usually difficult problem of finding a suitable supporting crane for a home-made sheep-shearing outfit was solved by one farmer when he used a cream-separator frame for the purpose. Besides serving as an efficient crane, the frame provides a means of transmitting power from the motor to the shears without undue friction from improvised countershaft bearings. The motor is belted to a pulley on the end of the separator crankshaft, and the other end of the shaft carries a second pulley belted to the flexible arm of the shearing head, which is attached to the crane arm. This is a plank hinged to the separator frame and is supported by a

heavy coil spring, one end of which is fastened to an extension run up from the support that formerly held the milk bowl on the separator. The crane arm has a vertical swing of approximately  $45^{\circ}$ . The spring is just strong enough to overcome the weight of the arm so that the operator can easily change the adjustment by pushing up or pulling down on the flexible arm of the shearing head.—William F. Boals, Mansfield, Ohio.

## Treating Seed Grain to Control Smut

Tests made at the Nebraska College of Agriculture show that smut in barley may be controlled by treating the seed, before planting it, with a solution of formaldehyde, 1 pt., and water, 40 gal. The solution will treat from 40 to 50 bu. of seed. The amount of water used as a carrier for the formaldehyde may be reduced to 10 gal., this treatment being preferred in many cases as it wets the seed less. This treatment may also be used for oats. Some prefer to use a small hand sprayer to apply the formaldehyde. In this case, the formaldehyde is mixed with only one pint of water and then sprayed over 40 to 50 bu. of grain. Seed grain sprinkled with a solution of formaldehyde should be cov-

ered for about 6 hrs., and, if not planted immediately, should be spread out to dry.

## Pencil Pointer Made from Wire Mesh

Artists and draftsmen will find this little lead-pencil pointer a great improvement over the sandpaper pad customarily used for this purpose. The material needed is a piece of fine wire mesh about 2 in. square and a small tin can. The top of the can is cut out and the wire mesh is soldered over the opening as shown in the photo.







Does your car tramp, shimmy, weave or wander? Simple tests you can make will show what's wrong. Proper wheel alignment will save tires and make driving easier

# The Menace of



② under-inflation is responsible for the spotty wear on the tire A, while the tread on tire B was literally burned away by too much toe-in. The scalloped condition of tire C was caused by a slightly twisted axle.

Although loose steering-gear assemblies are common causes of alignment trouble, caster, camber, toe-in, king-pin inclination, eccentric wheels and even possible sprung frames must be taken into consideration. While the design of steering gears differs, there are three important adjustments on all of them, namely, end play in the cross shaft to which the pitman is attached, up-and-down play in the steering column and play between the worm gear and sector. Reference to your instruction book will probably enable you to make these adjustments, remembering, however, that too tight adjustments are as bad as loose ones. If adjusting the gears does not remedy the trouble, jack up the front end of the car so that both wheels are free from the ground, and then, grasping them as shown in Fig. 3, pull them together and push them apart repeatedly, noting the play in the tie-rod and drag-link bushings. If these are worn excessively, lost motion in

By  
JIM WARD

WITH mile-a-minute speeds now the rule rather than the exception, automotive and tire engineers are applying to everyday motoring a lesson learned years ago on the racing-car speedway. They are showing how unbalanced wheels and misaligned front assemblies can be a menace to safe and comfortable driving as well as causing undue wear on the tires, three examples of which are shown in Fig. 2. Wrong camber combined with





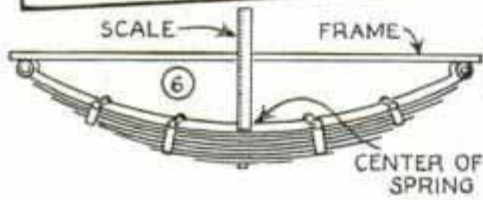
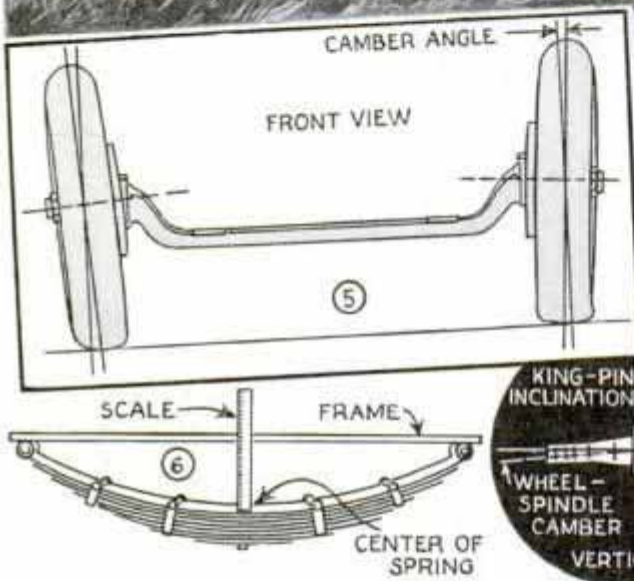
the steering wheel will result and new ones should be installed.

Next, test the king-pin bushings as shown in Fig. 9, by grasping the wheel at the top and bottom and pulling in and out. Wear here will affect the camber and toe-in, and may result in a bad shimmy. This test will also do for the wheel bearings if a wedge is first inserted between the end of the axle and the brake housing as indicated in the circular inset of Fig. 9. The purpose of the wedge is to take up any play in the king-pin bushings while testing the wheel bearings. If play is noticeable in the latter, tighten them, being careful not to overdo the job, which will

wear the bearings and races rapidly. It is best to tighten the bearing until the wheel drags slightly when turned and then back off the adjustment a quarter or half turn. It is also a good idea to check the spring bolts, clips and shackles. Any looseness in these parts will affect the angle of the axle and cause an unbalanced condition. To make sure the axle is in its correct position with relation to the spring, and has not slipped backward or forward, take a stick and compare each side, measuring from the spring bolt to the axle at the king-pin, Fig. 12.

If the trouble still persists after tightening the steering assembly, check the cast-





er, which is the amount in degrees of backward tilt of the front axle, Fig. 11, to be sure both wheels have the same amount. Shimmy, a violent side-to-side motion of the front wheels, at speeds under 25 m.p.h., hard steering, a tendency of the car to wander or weave over the road shows too little caster. Wrong caster also shows up by cupped or pitted tires. Sagging springs or a twisted front axle affect caster. If the axle is bent, the services of a mechanic are needed, but steel wedges are available to be inserted between the spring and axle to compensate for sagging springs. In this case, use a scale, Fig. 6, and check the amount of sag so as to be sure both springs are equal.

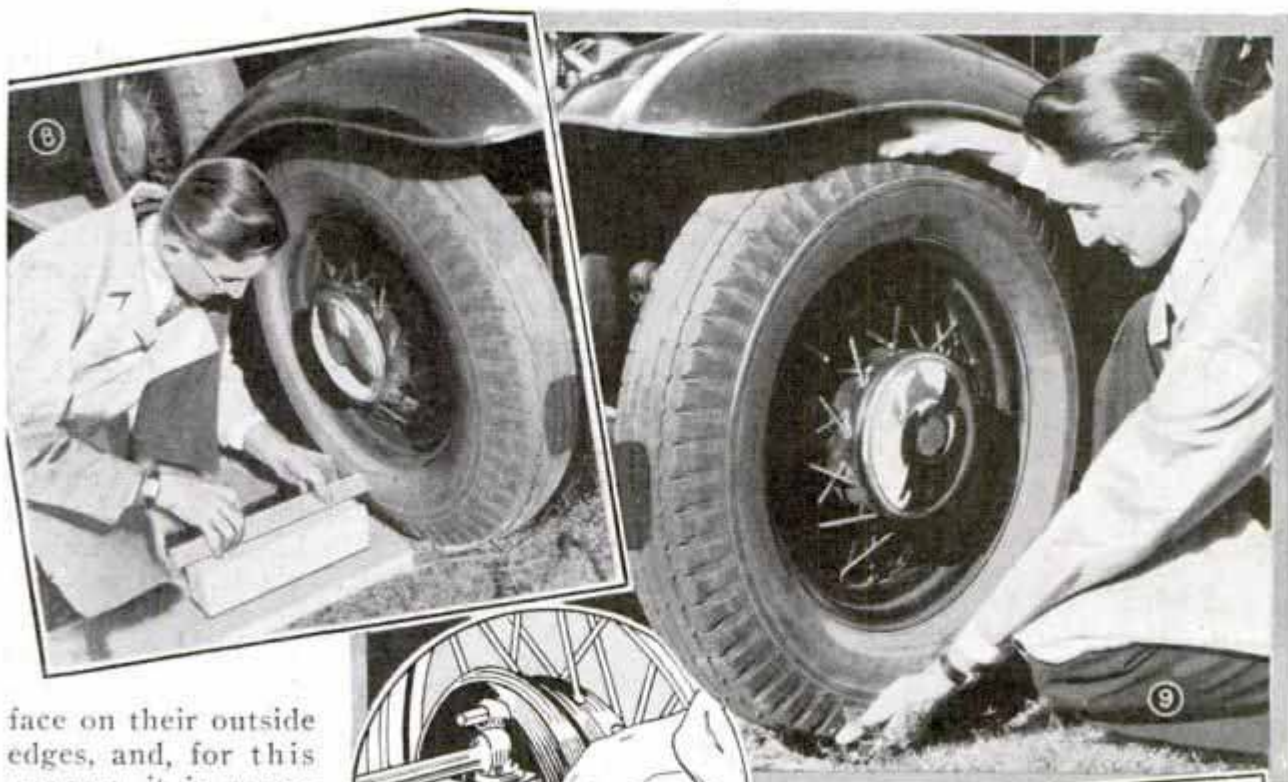
Camber is the amount in inches or degrees that the front wheels are tilted outward at the top to compensate for the weight of the car, which tends to pull them in at the top. This is illustrated in Fig. 5. Camber tilts the wheel spindle

down at the outer end so that most of the weight is carried on the large inner wheel bearing, thus bringing the weight near the pivot to make steering easy. The small bearing at the end of the spindle serves mainly as a thrust bearing. While not absolutely accurate, the check for camber shown in Fig. 1, will serve to tell whether or not the camber is the same in both wheels. Using a rule and a carefully squared board, take measurements at both the top and bottom of the wheels on both sides of the car. Best results will be had with this check

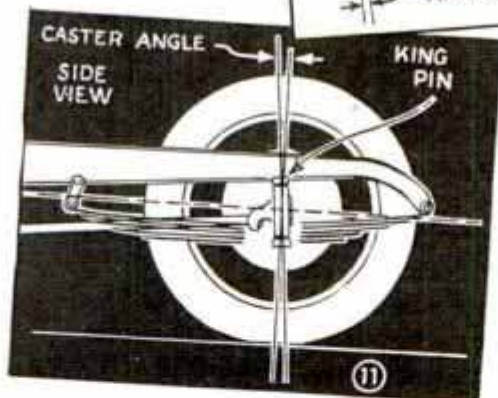
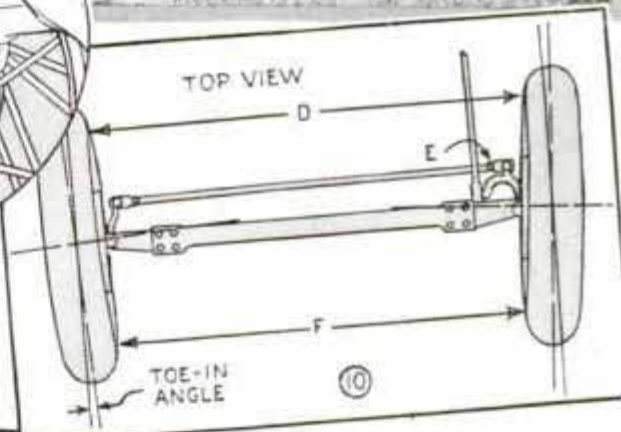
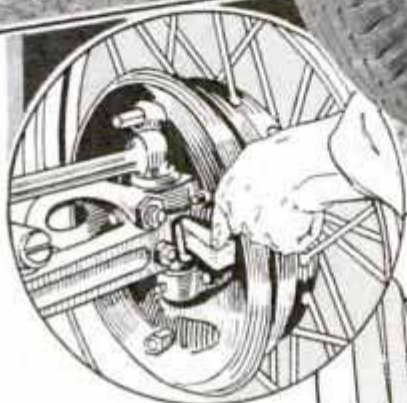
when the front wheels and the testing blocks are on a level surface, either a long plank or a smooth floor that is level. Camber varies in different cars, but the important thing is to see that it is the same in both wheels. Wheels that have excessive camber have a tendency to roll in a circle, consequently the tires must slide over the road surface, thus causing premature wear. While camber does not show up in any movement of the car, unless it be hard steering, it is very destructive to tires. It is in fact so much so that manufacturers are now reducing the amount of camber and compensating for it by inclining the king-pins as shown in Fig. 7. Also in the later cars, the front-axle construction provides a sideways inclination for the king-pins, which tends to cause the front wheels to steer about a pivot approximately under the load center.

It is obvious that camber has a tendency to cause the tires to contact the road sur-





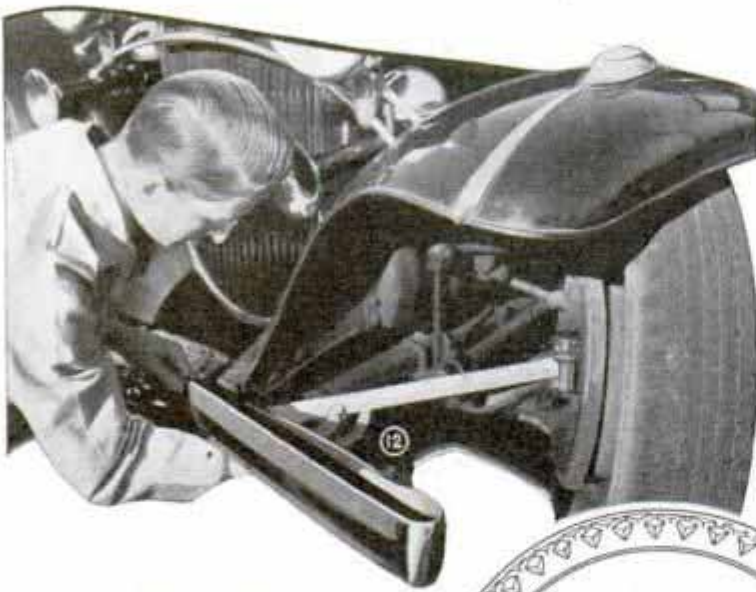
face on their outside edges, and, for this reason, it is necessary that they toe-in slightly at the front to change the point of road contact to the center of the tire surface. This is shown in Fig. 10, distance D being greater than F. Fig. 4 shows a check for toe-in, using a simple homemade gauge, which is a narrow strip of wood having two short arms pivoted to the ends by means of bolts and wing nuts. Both arms are pointed at their free ends and one is fitted with a small block the edge of which is divided into fractions of an inch. A short section of yardstick is handy for this purpose. Incidentally, the results of misalignment are shown by the tire on the right front wheel of the car in the photo. Note that it is worn much more than the other one although both tires were put on the car at the same time. To test toe-in, with the gauge, jack up both front wheels, make a chalk mark around the tires in the exact center and set the points of the gauge on them, locking the arms with the wing nuts to hold the ad-



justment. Then set the gauge against the rear sides of the wheels with the pointed ends of the arms at the same height on the tires. The distance between the chalk lines at the rear should be from  $\frac{3}{16}$  to  $\frac{3}{8}$  in. greater than it is at the front. If this is not the case, loosen the tie-rod connection at C in Fig. 10 and screw it on or off in order to get the proper adjustment.

Dancing wheels, violent up-and-down movements of the wheels at high speeds, are the result of unbalanced or eccentric wheels. This trouble is usually caused by a warped wheel, a tire that has been worn on one side more than on the other, or blow-out boots inside the tire. Unbal-



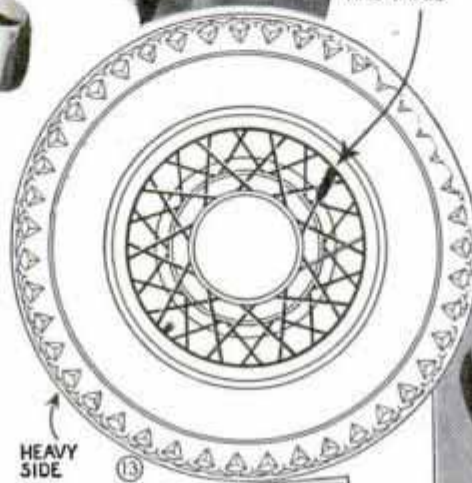


anced wheels have even been traced to large patches, or several small ones near one spot on the inner tubes. A test for a warped wheel is shown in Fig. 8. This consists of a couple of wood blocks on which a rule is placed with one end held almost touching the tire, after which the wheel is turned slowly and any variation between the end of the rule and tire noted. Driving against curbs or in deep ruts are causes of this trouble. About the only remedy is to have the wheel straightened. In the case of old tires, a slight bulge in the outside wall of the tire may be misleading in this test.

If an eccentric wheel is suspected, it is best to have it tested at a service station, although a fairly accurate test can be made with it on the car. Jack up the wheel, be sure the bearings are not too loose or too tight, and then spin it slowly several times, allowing it to stop after each spin. If the wheel is not eccentric or heavy on one side, it is not likely to stop at the same place, and neither will it move of its own accord when it is stopped at different locations with the hand. If the wheel always stops with the same spot underneath, it is unbalanced. This condition can usually be remedied by wrapping wire solder around a spoke on the light side of the wheel and then wrapping the solder with friction tape to hold it in place; Fig. 13. Balancing weights,

Fig. 14, are available for this purpose if you do not care to use the solder. One type of weight that has proved satisfactory consists of a piece of bronze weighing 1 oz., and having a lip that slips over the wheel rim. A setscrew locks the weight in position, and can be loosened when rebalancing becomes necessary.

The menace of wheel dancing, or "tramp" as engineers call it, cannot be over-emphasized. When an automobile equipped with 6.50 - 16-in. tires is traveling 55 m.p.h., its wheels are revolving at the rate of 725 r.p.m. A slight out-of-balance condition is magnified by the action of centrif-



ugal force. So great is the magnification that a 1-oz. weight, attached to the outer edge of a 15-in. wheel, exerts a pull of 35 lb. when the wheel is spinning 725 r.p.m. If both front wheels of a car are out of balance, the resulting tramp will be greatest when the heavy spot is at the bottom. These relative positions constantly change, because of turning corners. Figs. 15 and 16 show a wheel being balanced with precision instruments in a garage.

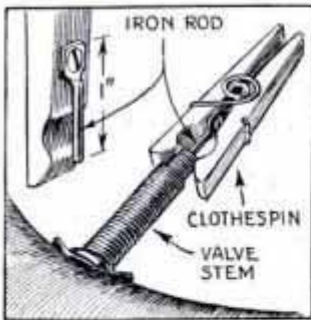


### Testing Motor for Compression Leaks

To determine if compression losses occur through the valves or past the piston rings, first remove all the spark plugs except the one in the cylinder to be tested. If a compression test meter is available, also remove this plug and fit the meter in its place. Open the throttle wide and crank the motor by hand if the compression must be "felt," but with a meter, use the starter. If the compression is weak, remove the spark plug or the meter and pour a little heavy cylinder oil in the opening, being sure that there is enough to spread evenly over the top of the piston to provide a temporary seal between the rings and the cylinder wall. Replace the plug or meter and repeat the test. If the compression is still weak, the trouble will be found in the valves, but if it tests correctly, then the loss is due to leakage past the piston rings.

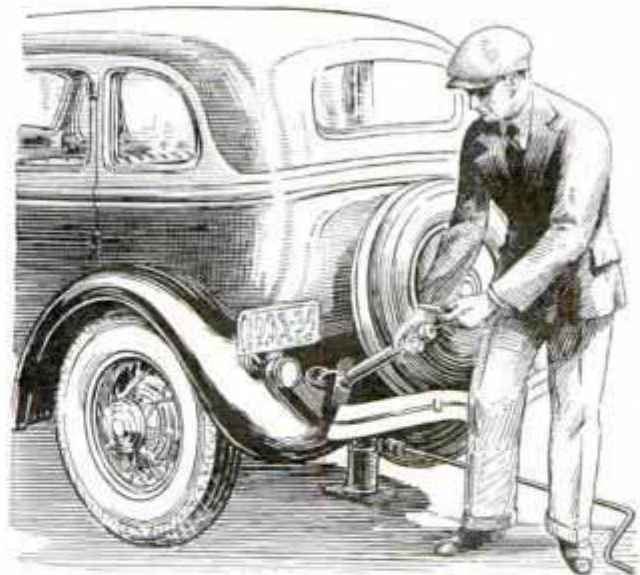
### Clothespin Deflates Inner Tubes

Made from a spring-type clothespin and a short piece of iron rod, this inner-tube deflater is a handy addition to the motorist's tool kit. The rod is flattened and drilled at one end, and is then screwed to the inside of one of the clothespin jaws. In use, the jaws are slipped over the end of the valve stem so that the rod depresses the valve.—Ralph McClung, Hitchins, Kentucky.



### Faded Fluid in Gasoline Gauge Colored with Iodine

When the fluid in a hydrostatic-type gasoline gauge fades so that it is difficult to read the gauge, try adding a drop or two of iodine to the indicator tube with a medicine dropper. This will give the fluid a brown tint. Care should be taken not to add more than two drops of the iodine as more will change the specific gravity of the indicating fluid enough to make the gauge reading inaccurate. Even a couple of drops will affect it somewhat, but not enough to be of any great importance.



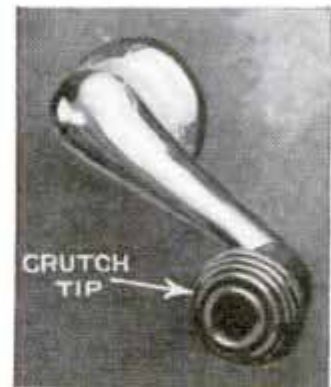
Water Removed from Gasoline Tank with Tire Pump on Which Plunger Leather Has Been Reversed

### Siphoning Water Out of Gas Tank

During cold weather, water in the gas tank of a car may freeze and stop the flow of gasoline to the carburetor. This trouble can be avoided by removing the water with a tire pump. To do this, turn the plunger leather upside down and use it as a suction pump, first jacking up one of the rear wheels so that all the water will settle at one end of the tank. Then insert the end of the pump hose into the tank, pushing it to the bottom. Pump until you draw out gas that is free from water.

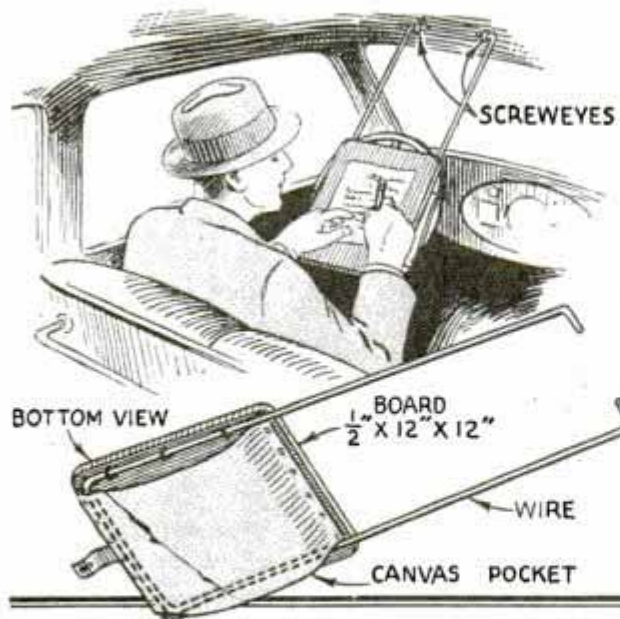
### Enlarging Grip on Car-Window Crank

Small cranks that are used to raise or lower car windows are sometimes rather hard to manipulate when heavy driving gloves are worn. If a rubber crutch tip is slipped over the crank handle, as shown, it will afford a good grip. If the tip is too long and interferes with the operation of the crank, part of the end can be cut off.



☐ In case you buy one new tire at a time, always keep the newest tire on the right front wheel, as a blowout in this tire is apt to cause an accident if traveling at high speed.





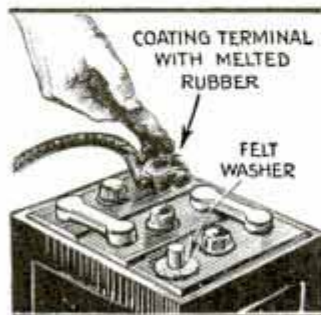
Hinged above the Windshield, This Writing Board  
Folds against the Car Top When Not in Use

### Salesman's Writing Board Folds against Car Roof

Salesmen, and others who travel in cars, will find this writing board handy. It is 12 in. square and is fastened just above the windshield by means of screw eyes and iron-rod brackets, as shown. When not in use, the board is raised up against the top where it is held with a turn button. A canvas bag tacked to the underside of the board holds writing materials.

### Preventing Corrosion on Terminals of Storage Battery

Corrosion on storage-battery terminals may be almost eliminated by the following methods: The first one consists of forcing a thin felt washer over each battery post before connecting the cables. The washers are kept soaked with cylinder oil, which prevents acid from the battery



getting on the posts. An application of oil each time water is put in the battery should be sufficient. The second method consists of thoroughly coating the post and cable terminals with melted rubber after they have been tightly connected. This is best done by rolling up a short section of old inner tube

and melting the end over an open flame. The softened rubber is then applied to the connections until they are well coated.

### Polishing Headlight Reflectors

Unless headlight reflectors are polished at intervals, they become tarnished and the light is not evenly reflected. Before attempting to polish the reflectors, remove the tarnish with a soft linen cloth that has been dampened slightly with a solution consisting of alcohol, 1 pt., and sulphuric acid, 1 teaspoonful. Rub the reflector with the cloth until all the tarnish has been removed and then wash it with another cloth saturated with alcohol, followed by a water bath to remove the alcohol. To polish the reflector, get some precipitated chalk from your local drug store, dip a soft wet cloth into the chalk and rub the reflector briskly. If the work has been done properly the reflector will be free of scratches and will have a polish like new.

### Angle-Iron Clamps Used to Protect License Plates

In order to fasten his license plate on the bumper, yet protect it against damage, one driver clamped it to the crossbars by means of short pieces of angle iron and flat iron, as shown. In this way, the projecting edges of the angle iron protected the plate.—W. F. Lowder, Humboldt, Ia.



### Installing Fiber Gears

When installing tightly fitting fiber gears of the type used on model-A Fords, damage to the teeth may be prevented by thoroughly greasing them before the new gear is forced into place. Care must be taken to make sure that the teeth mesh properly and that any pressure applied to force the gear in place is applied directly in line with the cam shaft so that the tendency is to force the gear squarely against the back flange.

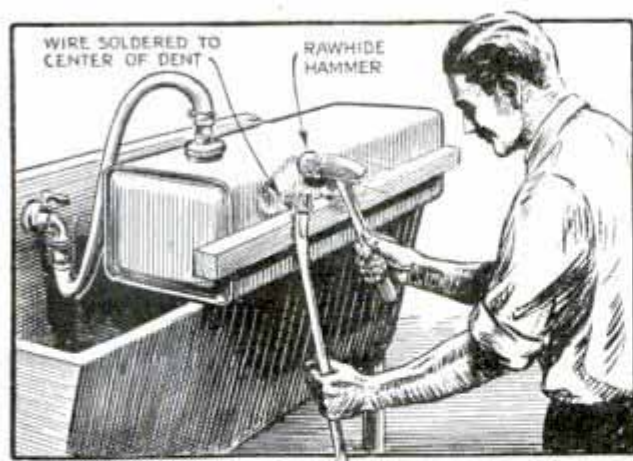


### Stopping Oil Leaks in Rear Main Bearings of Motor

A car was driven into my garage and when the motor was shut off oil flowed from the flywheel housing. This, of course, was caused by oil from the crankcase passing by the rear main bearing. So the bearing cap was removed and three grooves about the size of No. 18 wire were cut from the oil groove to the front of the bearing to let the surplus oil return to the crankcase. The car has been driven over 12,000 miles since then without trouble.—William Heeley, Lancaster, Mass.

### To Straighten a Dented Gasoline Tank

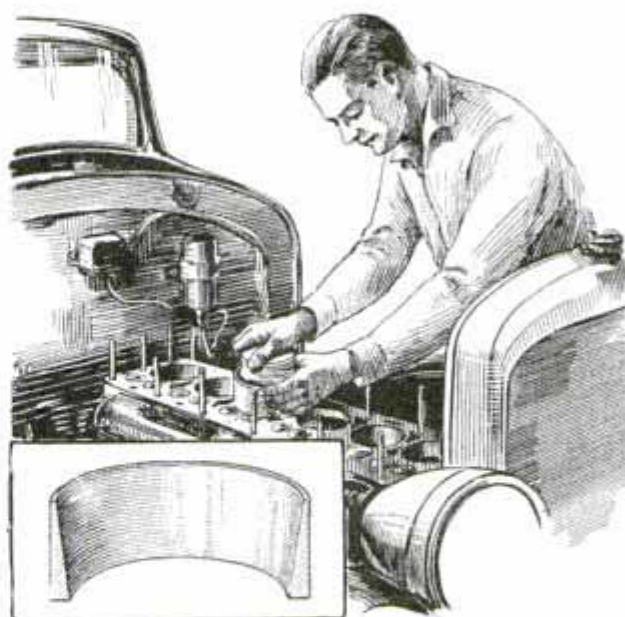
A dented gasoline tank can easily be straightened in the following manner: First solder a piece of stiff wire to the center of the dent. Then create a pressure inside the tank by filling it with water under pressure. If the force from your city water mains is not great enough, the job can be done by filling the tank with water and then pumping air into it with a tire pump. In this case, it will be necessary to solder a tire-valve stem to the tank filler-hole cap. Using compressed air alone may result in injury to the mechanic if the tank should rupture. After a pressure has been created inside the tank, the dent is removed by pulling on the wire by means



Dents Safely Removed from Gas Tank with Aid of Water Pressure and Rawhide Hammer

of a pry bar while the surface around the dent is tapped with a rawhide hammer.

Automobile skid chains hooked together make a handy ladder for getting into cisterns and places where a regular ladder is difficult to use.



Short Section of Pipe, with the Inside Surface Bored to a Taper, Is Used as Piston-Ring Compressor

### Piston-Ring Compressor Made from Large Pipe

When installing pistons and rings, a short section of pipe tapered on the inside, as shown, will be found handy as a ring compressor. At the lower end the inside diameter of the pipe should be the same as that of the cylinders but the diameter at the top is greater to take the uncompressed rings. The tapering can be done by boring out the inside of the pipe in a lathe. In use, the small end of the pipe is set flush with the cylinder walls, and the piston, with the rings assembled, is pushed down.

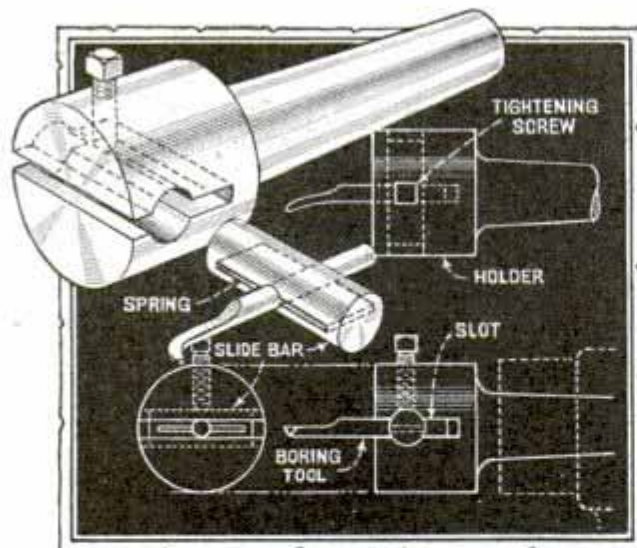
### Rubber Covering for Jack Lever

To prevent the handle of a large garage jack from scratching the finish if it is accidentally bumped against a car, wrap the handle with strips of rubber floor matting and bind it in place with friction tape. Lengths of old garden hose split on one side are also good for this purpose.

### Stopping Squeaks in Shock Absorber

Annoying squeaks that sometimes develop in one or both of the front shock absorbers of model-77 Chryslers can be eliminated by removing the brass by-pass plunger spring and grinding the end down about  $\frac{1}{2}$  in. These springs are stiff and produce too high a back pressure on a hard road shock.





Holes Bored and Reamed on Lathe in a Short Time with This Tailstock Tool Holder

### Adjustable Tailstock Tool Holder

Lathe operators will find this tailstock tool holder a time saver when boring and reaming medium size holes, which are in-

variably a little out of true unless a light cut is made with a boring tool before starting the reamer. This short boring operation, of course, takes time as it necessitates the removal of the tool holder, running over the cross slide and inserting the boring tool. The holder shown does away with this and makes the boring work one operation with the drilling and reaming. By using the drill and reamer in a taper sleeve and this holder with a taper shank, accurate holes can be bored. The holder has a slot cut across the front to fit the boring tools used and is drilled through to take a slide bar. This is drilled in the center to fit the tools and has a saw cut on each side of the hole. A tightening screw completes the job. The tool is set by moving the slide bar over where the screw will bind it in any position. Once set, the holder can be slipped in the tailstock and the work done quickly.

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Second installment on constructing a model of a transcontinental transport plane, description of which has already started in this issue, page 594.

### **WOOD JOINTS WITH HAND TOOLS**

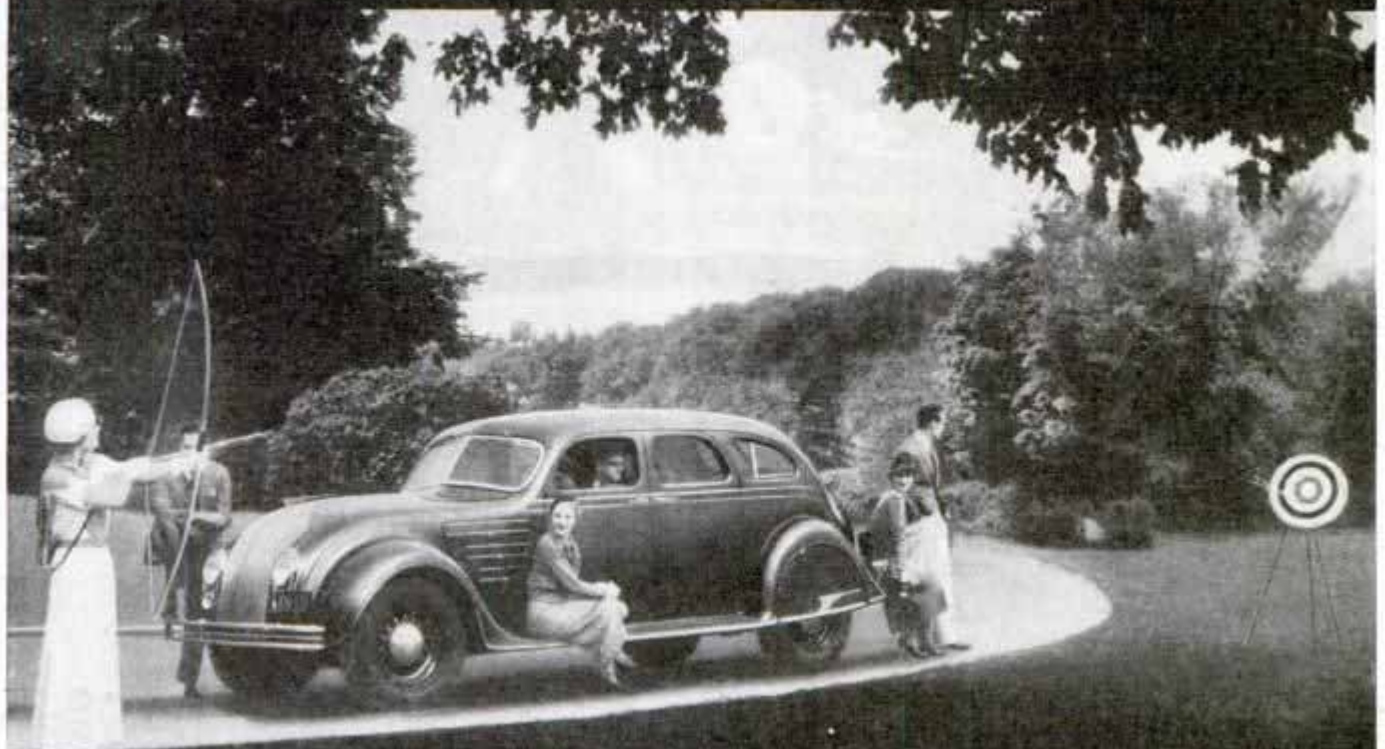
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## Those penciled scrawls are a sign of jangled nerves

If you're the stolid, phlegmatic sort of person who doesn't feel things very deeply, you'll probably never have to worry about nerves. But if you're high-strung, alive, sensitive, watch out. See whether you scribble things on bits of paper, bite your nails, jump at unexpected

noises—they're signs of *jangled nerves*.

**So be careful. Get enough sleep—fresh air—recreation. And make Camels your smoke.**

**For Camel's costlier tobaccos never jangle your nerves—no matter how steadily you smoke.**

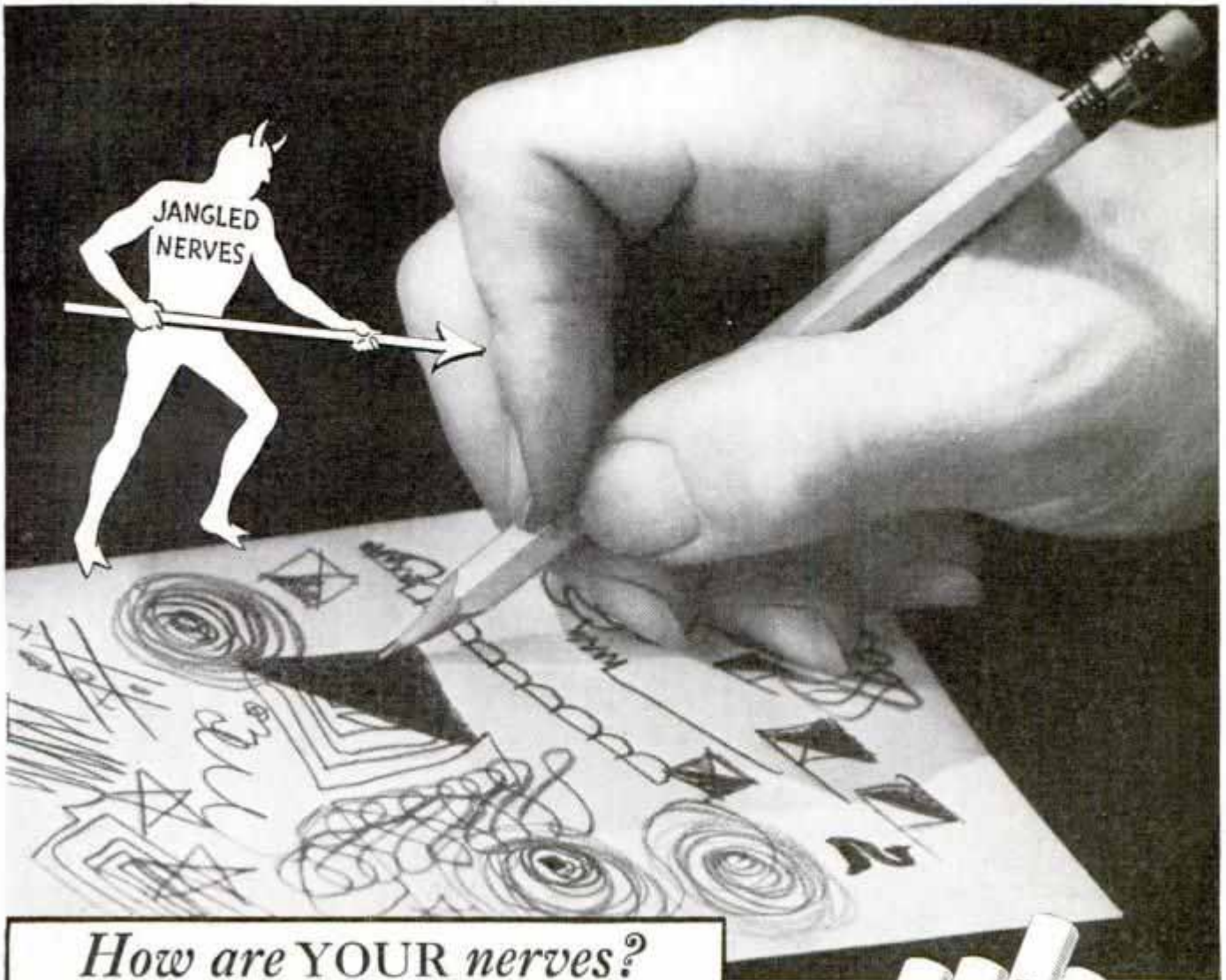
### ***COSTLIER TOBACCOS***

Camels are made from finer, **MORE EXPENSIVE TOBACCOS** than any other popular brand of cigarettes!

# **CAMELS**

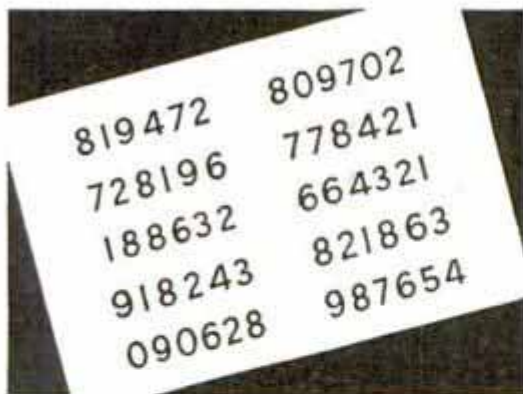
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TRY THIS TEST



Here is a series of numbers. Two numbers in this series contain the same digits...but not in the same order. See how fast you can pick out these two. Average time is one minute.

*Frank J. Marshall (Camel smoker), chess champion, picked the two numbers in thirty seconds.*



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MATCHLESS  
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**I**S YOUR HAIR difficult to keep in place? Does it lack natural gloss and lustre?

It is very easy to give your hair that rich, glossy and orderly appearance so

essential to well-groomed boys. Just rub a little Glostora through your hair once or twice a week—or after shampooing, and your hair will then stay, each day, just as you comb it.

Glostora softens the hair and makes it pliable. Then, even stubborn hair will stay in place of its own accord.

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A large bottle of Glostora costs but a trifle at any drug store and will last for months.



**Glostora**  
FOR THE HAIR



## THE LATEST WONDERS OF PHOTOGRAPHY

(Continued from page 542)

inks might reflect infra-red radiation differently, even though they reflect visible light alike so that in an ordinary photograph the deleted passages appear as dense black lines.

Dr. Bendikson acted upon the suggestion, and he was successful. The result: a photographic print of the original page with the censor's ink almost completely eliminated and sentences appearing clearly that for three centuries had lain hidden. By the same method Dr. Bendikson has also been able to read the printing on important documents charred in a fire something like twenty years ago.

Another new photographic procedure promises to preserve for posterity an invaluable type of contemporary historical document, the daily newspaper. An apparatus has been developed that can rapidly photograph more than eight full-size newspaper pages on a strip of film one and three-eighths by twelve inches, and a month of fifty-page papers on a single reel of film that is less than four inches in diameter.

Taken, when it was needed, out of the safe in a newspaper office or a public library, a month's reel from the back files would be read on a simple viewing device that enlarges the tiny page images on the film up to half again the size of the original page. Articles from the files either may be read from the viewing device or may be photographically copied full size on paper.

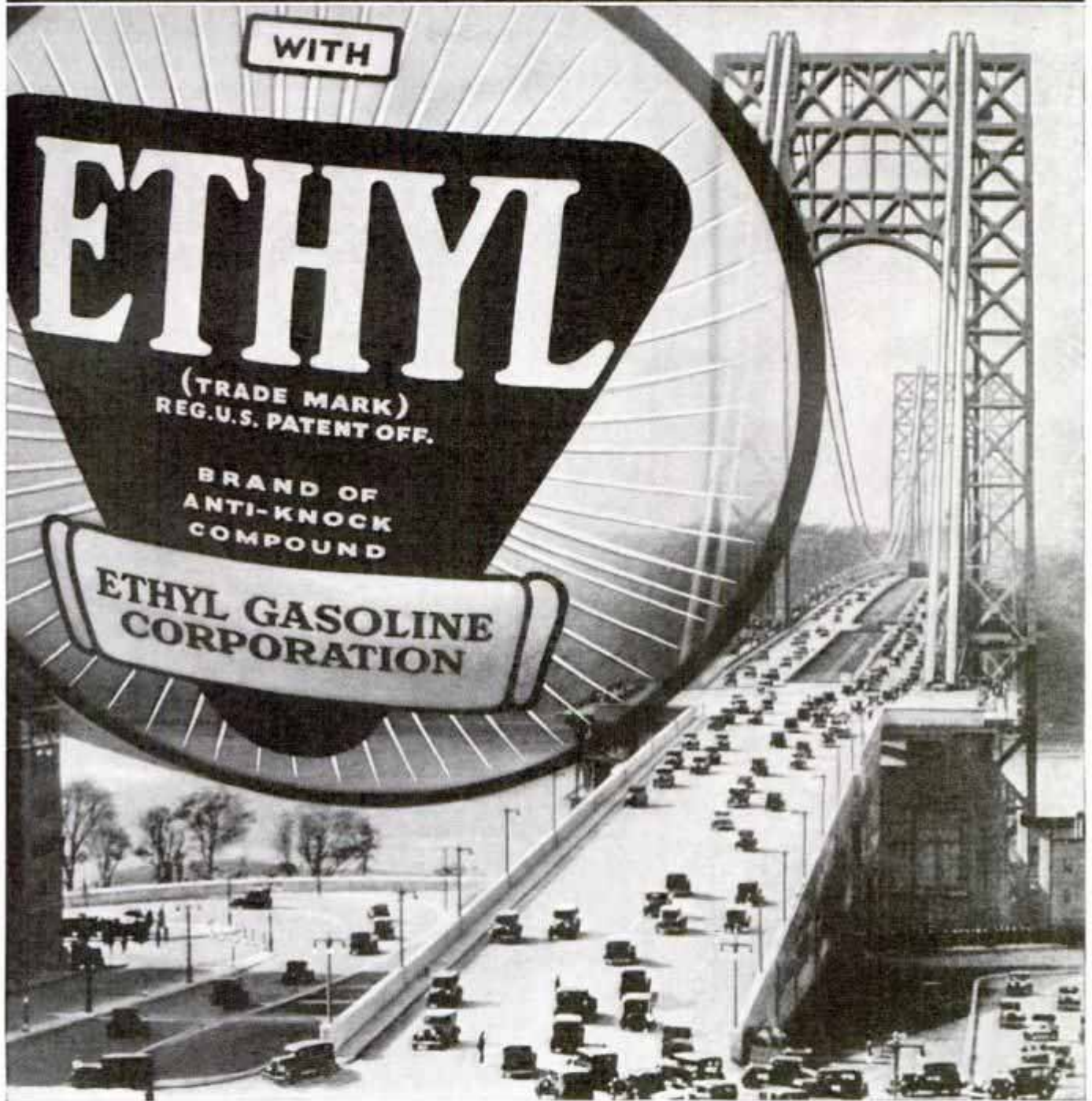
The deterioration of newsprint paper in newspaper files has presented a serious problem. By putting their back numbers on film, which is chemically much more stable than newsprint, newspapers and libraries are expected to be able to preserve their files indefinitely—and to re-copy them from the film if necessary.


"Photo-murals" is another photographic innovation that has reached significant heights within the past year, both in size and in quality. Photo-murals are extreme enlargements from photographic negatives on strips of sensitized paper subsequently affixed to a wall by paperhangers' usual methods. By means of photo-murals, walls may be decorated either with large

(Continued to page 128A)



**TAKE YOUR CAR ACROSS THE BRIDGE**



 *The way to bridge the gap between good performance and best performance is with Ethyl in the tank. Yet the "toll" is now down to only 2¢ a gallon over regular. Less, on the average, than \$1 a month to make the most of your car investment! — NEXT TIME GET ETHYL!*

ETHYL CONTAINS SUFFICIENT LEAD (TETRAETHYL) TO MAKE IT THE WORLD'S QUALITY MOTOR FUEL

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# For Snapshots at NIGHT



... with the new  
**SUPER SPEED FILM**

All you need is a camera with an F/6.3 (or faster) lens, (use wide open); some of the new super speed film and a few G-E MAZDA Photoflood lamps in your light sockets. Then you are ready to take snapshots around the family circle, of friends, parties, children . . . AT NIGHT!

G-E MAZDA Photoflood lamps are good for two hours of picture-taking . . . good for dozens of pictures.

Get some of these lamps and some of the new film from your druggist or camera dealer and enjoy SNAPSHOTS AT NIGHT! General Electric Co., Nela Park, Cleveland, O.

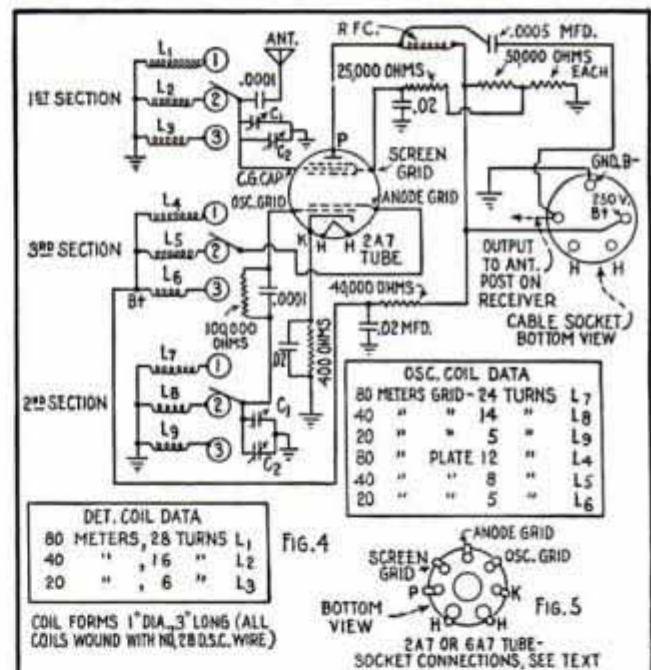
**For action pictures** and shots of babies and pets, use G-E MAZDA Photoflash lamps. They operate simply, in light socket or from flashlight batteries. Enable even box cameras to get good indoor pictures. Each lamp gets one picture . . . Retail for 15 cents.

**GENERAL ELECTRIC**  
**MAZDA PHOTOFLOOD LAMPS**

## PENTAGRID MAGIC BOX

(Continued from page 583)

fasten the base to the front panel. The two-gang tuning condenser is mounted in the center with its insulated base fastened to the metal base; the shaft is grounded on the front panel. The two 100-mmfd. midget condensers are of the 7-plate Hammarlund type. These are mounted one on each side of the front panel, 1½ in. from the bottom and 1½ in. from the side. A ¾-in. hole is cut in the center of the base, 1½ in. from each side, for bringing up the switch leads to the coils. A hole is cut in the rear of the base for mounting a wafer-type 5-prong socket for the output and power-supply cable plug. This cable plug is detailed in Fig. 3. The 3-gang switch is mounted on the front panel between the two 7-plate midget condensers, 1½ in. from the bottom. The tube socket is



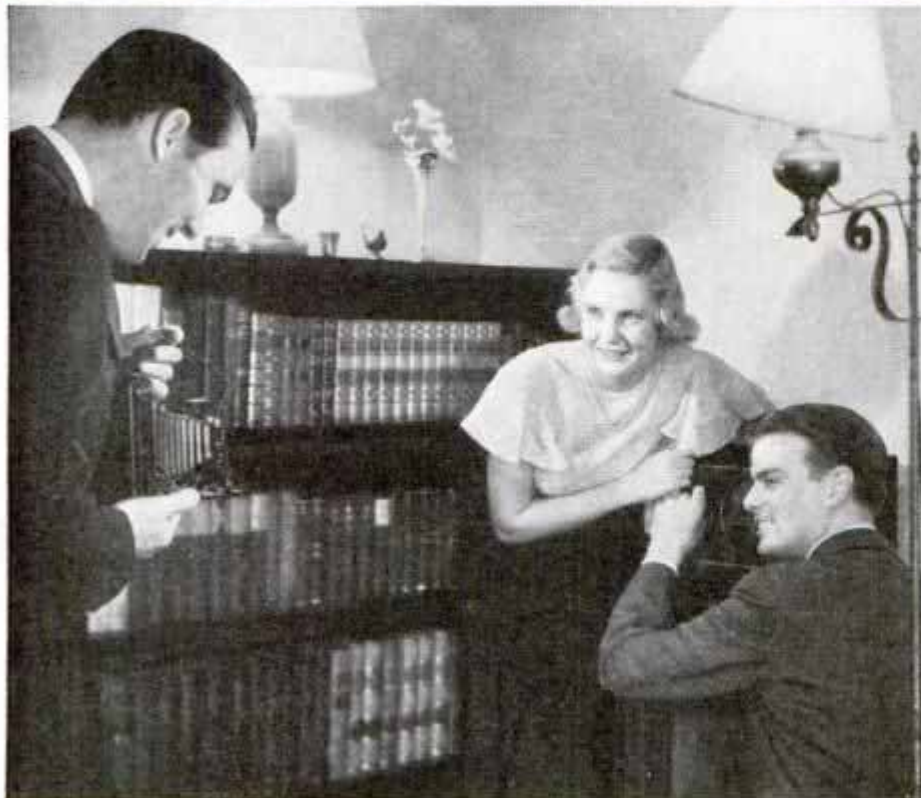
mounted on two metal brackets under the base; these angle brackets are 1¼ in. high so that the tube will be in a horizontal position. A complete material list may be obtained without charge upon application. The schematic diagram, coil chart and tube-socket connections are shown in Figs. 4 and 5.

The coil forms may be fiber or bakelite tubing and all winding details are given in Fig. 1. The detector coil has 4 terminals, or taps, brought out at the bottom, one a common ground and 3 grids. The oscillator coil has 8 terminals on the lower end,

(Continued to page 122A)



# Snapshots at Night!



How to get this picture



● **LIGHTS:** Two Mazda Photofloods in lamp "A"; one Photoflood in lamp "B."  
**EXPOSURE:** 1/25 second at  $f.6.3$ .  
**FILM:** Kodak "SS."

## ...with Eastman's remarkable new "SS" film

IT WAS WELCOME NEWS. It spread in a hurry. Now . . . for the first time . . . thousands are making snapshots indoors—at NIGHT!

Use any camera with an  $f.6.3$  (or faster) lens, two or three Mazda Photoflood bulbs (they screw into any light socket), and

**KODAK "SS"**—the lightning-fast film, with green lightning flashes on the familiar yellow box.

**PHOTOFLOODS** (35 cents each) give intensely bright light for about 2 hours, good for lots of pictures.

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Kodak Super Sensitive Panchromatic Film. "SS" Film, Eastman's latest, has three times the speed of ordinary film under artificial light.

Just use the camera as you would for an outdoor snapshot—hold it in your hand and press the button. Click—you've made a snapshot at NIGHT!

**FREE FOLDER.** Indoor pictures are easy with "SS" Film—the only trick is arranging your lights. Ask your dealer (or write direct) for the folder, "Snapshots at Night," Eastman Kodak Co., Rochester, N. Y.

## FINE CAMERAS . . . Ideal for Night Snapshots

**KODAK SIX-20** (left),  $f.6.3$  lens, ideal for night snapshots,  $2\frac{3}{4} \times 3\frac{3}{4}$  pictures, \$17.50. **Kodak Six-16**,  $f.6.3$  lens,  $2\frac{1}{2} \times 4\frac{1}{4}$  pictures, \$20. **Recomar 18** (center) . . . a versatile camera. Ground glass back, self-timer,

double-extension bellows,  $1/250$  Compur shutter,  $f.4.5$  lens—\$46. **Pupille** (right) . . . miniature camera. Ultra-fast  $f.2$  lens . . . speeds up to  $1/300$ . 16 pictures each loading. With case, range finder, two filters—\$90.



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**ATTENTION! SIGNAL 30!**

(Continued from page 501)

in turn relay the message. From Manhattan teletype reports can also be sent to Nassau county on the east, to Hawthorne on the north—one of the central distributing points for New York state—and Newark, N. J., on the west, one of the central stations for that state. These points in New York and New Jersey are connected by teletype to all local law-enforcement agencies of the two states.

Albany, one of these state points, can repeat New York's messages to the Massachusetts state police, and Newark relays to Trenton which, in turn, covers New Jersey. Trenton also is connected with Pennsylvania, and New York messages thus can be disseminated to the Pennsylvania state police. Finally, there is a connection with the port authority which controls the main bridges and the Holland tunnel.

With this system of radio communication and motor patrol, augmented by teletype and telephone, the police can transmit a general alarm almost instantly to 400 cruising cars, at least one of which is less than a mile from the scene of trouble, and within a few minutes can relay the same information to all police stations in the city, to the port authority, to near-by areas east and north, to the state police of New York, New Jersey, Massachusetts and Pennsylvania and to local law-enforcement units in the latter states.

The radio is reserved for messages of prime importance where immediate action is essential, the teletype and telephone systems being used to broadcast other information. For the sake of brevity, all assignments are indicated by code calls, such as the Signal 30.

The speed of these radio patrolmen in cleaning up cases is remarkable. They reach the scene of trouble in less than a minute, require less than two minutes to communicate with the radio dispatcher by telephone to receive some particular message when ordered by radio to make such a call, and usually clean up a case and make a complete report on it in fifteen minutes or less. They respond to about seventy-five calls a day, make one arrest for every eight calls answered or about 3,200 a year, mostly for major crimes, travel 90,000 miles a year on patrol duty

and recover almost a million dollars worth of stolen merchandise annually.

Smaller cities near New York have recently installed police radio systems with two-way communication, enabling the patrol squads to converse with each other or with headquarters. This is impractical in New York but experiments have been conducted with very short waves for specific purposes. Tests disclosed, for instance, that it is possible for a battalion commander to direct firemen in a burning building by radio. The short waves have also been used, with limited success, in two-way communication between persons in the subway tubes and a police car on the street above them.

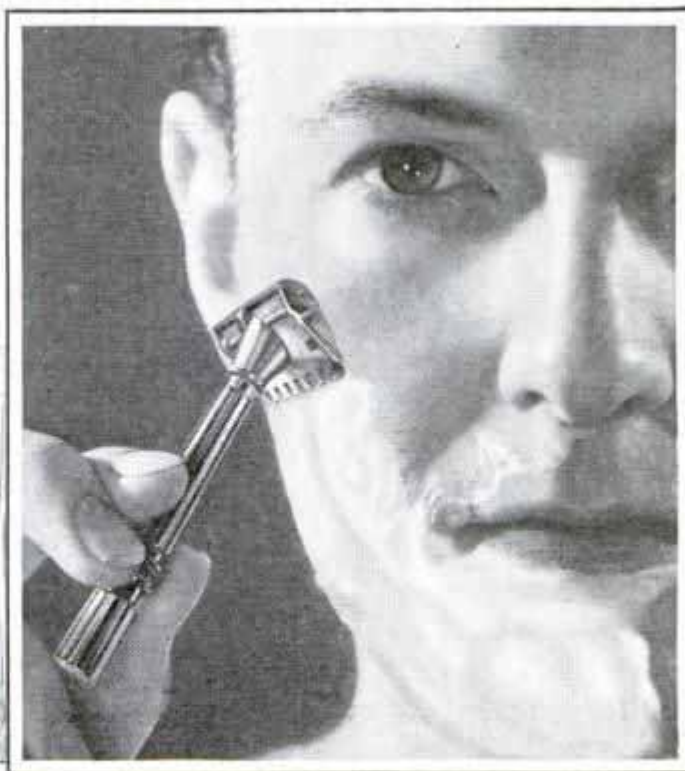
While radio squads do not patrol the subways, one of their most unusual captures was made there. A Brooklyn laundry was held up and a witness saw the three fleeing bandits board a subway train. A radio patrol car answering the alarm picked up the witness and raced the train for four miles until the car was in the lead. Then one officer and the witness boarded the train while the other officer drove to the next station. The policeman who boarded the subway captured all three men single-handed and marched them out at the next station into the arms of his waiting companion.

The radio patrol has made the eye-witness and innocent bystander an ally of the police in fighting crime.

"The law-abiding citizen at last has been given an opportunity to thwart crime on his own hook," says a police official. "Citizens are invited to notify the police immediately when they see a crime being committed or when they observe circumstances which appear suspicious. A radio squad is on the job immediately, ready to deal with the criminal on his own terms, and frequently the honest citizen thus has the satisfaction of depriving the law-breaker of the opportunity of escape after the crime has been committed. The radio patrol cuts down the time advantage the criminal once enjoyed."

☞ Popular Mechanics Magazine does not publish the name of the maker of, or dealer in, any device described in its pages, but this information will be furnished by our Bureau of Information upon request, accompanied by return postage.





# Barbers and GEMS use straight, flat blades!

Both work with long, smooth, tugless strokes—both hold the blade at the *same slant*—both slide through the beard at right angles—and both leave the face purring with comfort.

Gem's specially designed bevelled top duplicates the barber's stretching fingers, takes up the skin's slack, tightens it like a drum and brings every hair upstanding to be cut at root level.

We build Gem Micromatic Blades of fifty per cent thicker surgical steel—so toughly textured and tempered that they withstand without frazzling the 4840 separate stoppings we give them. This exclusive process produces a micromatically exact, deeply wedged edge—an edge which Dual Alignment (Gem's unique patented feature) holds in such perfect control that it can be used with even *greater* safety than duller, softer and thinner

blades. Dual alignment locks the blade unbudgingly on the guard at five separate points, and holds it so rigidly that it *can't* creep, warp or scuff a contour.

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Super-keen, non-flexing blades which last so much longer that there's less shaving and *no* saving in *any* substitute.

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You will be amazed and intrigued to find that CASCO—a clean, nonodorous powder—mixes so quickly in cold water, forming a creamy, easy-spreading glue that makes all jobs *permanent, heat-proof and moisture-proof*.



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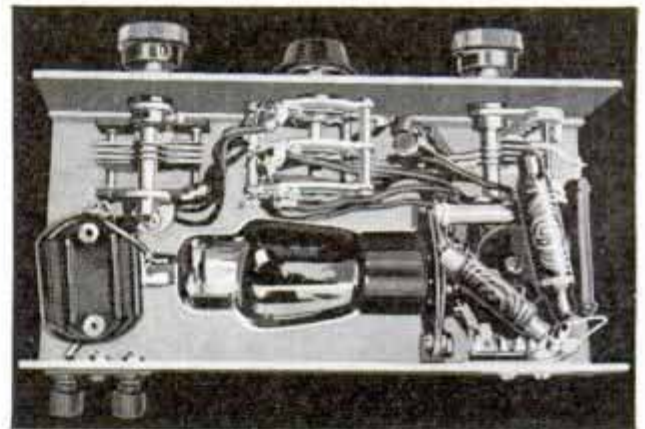
Save 2c; stick on  
a Penny Postcard



## PENTAGRID MAGIC BOX

(Continued from page 118A)

3-grid, a common ground and 3-plate with a common positive B. Power for type 2A7 tube may be obtained by placing the fiber disk, detailed in Fig. 3, under the prongs of the first r.f. tube in practically any a.c. broadcast receiver. The positive B voltage is not critical and those who wish can connect directly to the positive and negative of the high-voltage supply in the receiver, 200 to 250 volts, and a 2.5-volt heater supply, thus disregarding the adapter disk. An enlarged blueprint of all diagrams is available; those who wish it should specify blueprint R-196. The antenna lead from the cable is connected to the receiver antenna post; the regular antenna is then connected to the converter antenna post. The best ground combination is found by trial; leaving the regular ground on receiver, connect the set and converter



Underside View Showing Tube in Position

ground posts together. Also try a ground connection from the ground post on converter to a direct ground on the metal chassis of receiver.

Tune the broadcast receiver to a quiet spot leaving the volume control well advanced; set the switch dial of the converter on the range desired and turn the oscillator condenser, at lower right, to zero. Now adjust the detector condenser, at lower left, to the point where the highest background noise is heard. The main tuning condenser at center is then slowly moved over the band. If no signals are heard, reset the oscillator about 10 points higher each time and tune over the band as before. If the quiet spot selected on the receiver does not produce satisfactory results, try another until the best setting is located.





# NEW TIRE ENDS BLOW-OUT FEAR GIVES MONTHS OF EXTRA WEAR

## Sensational Life-Saver Golden Ply Makes New Goodrich Silvertowns 3 Times Safer From Blow-outs at High Speeds

**T**HE odds are strong against you when you have a blow-out. Especially if you happen to be riding along 40, 50 or 60 at the time. **BANG!** It's all over in a flash. And your chances of keeping off the accident list are mighty slim—unless you have plenty of luck.

To protect motorists from blow-outs—to give you a tire that *will* stand up under the terrific speeds of today's high-powered automobiles, every new Goodrich Silvertown has the amazing Golden Ply. This remarkable invention, found only in the new Silvertown, resists heat. Thus, blisters don't form. The great, unseen cause of blow-outs is prevented before it begins. The "safest-tire-ever-built" is now made 3 times safer from blow-outs at today's high speeds.

And here's proof. Racing dare-

devils tested it out at breakneck speeds. Tested it on the world's fastest track. Gave it everything they had. *Not one blow-out.* Similar tires *without* the Life-Saver Golden Ply failed at one-third the distance the Golden Ply Silvertowns were run.

### No Extra Cost

Extra safety. Extra mileage, too. Yet Goodrich Safety Silvertowns cost no more than other standard tires. Get a set *before* your turn for a blow-out comes.

**FREE!** Handsome emblem with red crystal reflector to protect you if your tail light goes out. Go to your Goodrich Dealer, join Silvertown Safety League, and receive one FREE. Or send 10¢ (to cover packing and mailing) to Dept. 334, The B. F. Goodrich Rubber Co., Akron, O.



Heat starts "invisible blisters", which grow and grow until "BANG"... a blow-out.



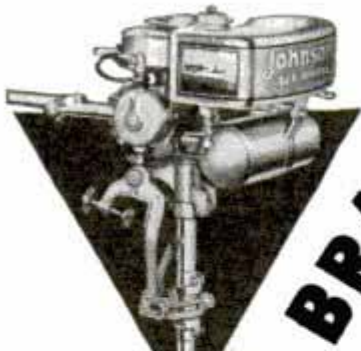
New invention makes the Safety Silvertown 3 times safer from blow-outs at high speeds.

# Goodrich Safety Silvertown

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**THE TRUTH ABOUT THE NEW GOLD RUSH**

(Continued from page 517)

have much chance. One Colorado mining man with years of experience says he has known only one man who ever succeeded in making a living by re-working old dumps single-handed.

Suppose you want to join with two or three friends, pool resources and lease and operate an old mine on a royalty basis. Many mines with good showings of ore have been abandoned because they did not pay at former gold prices or by former methods of concentrating. No two mines are alike, but suppose you take over a tunnel 300 feet long which has not been worked for years but which has a simple gold ore worth ten dollars or more a ton at present levels.

You may find a cabin and tool house standing, but you will have to purchase equipment and clean out the old workings, which may entail re-timbering part of the tunnel. You must buy or cut timber and it will take a couple of weeks to shape and set your timber if one-third of the tunnel must be so treated. Your equipment for mine and shop will cost at least \$150 exclusive of timber and powder, and when you begin actual mining operations, the bill for powder will be at least \$175 for each 100 feet the tunnel is driven.

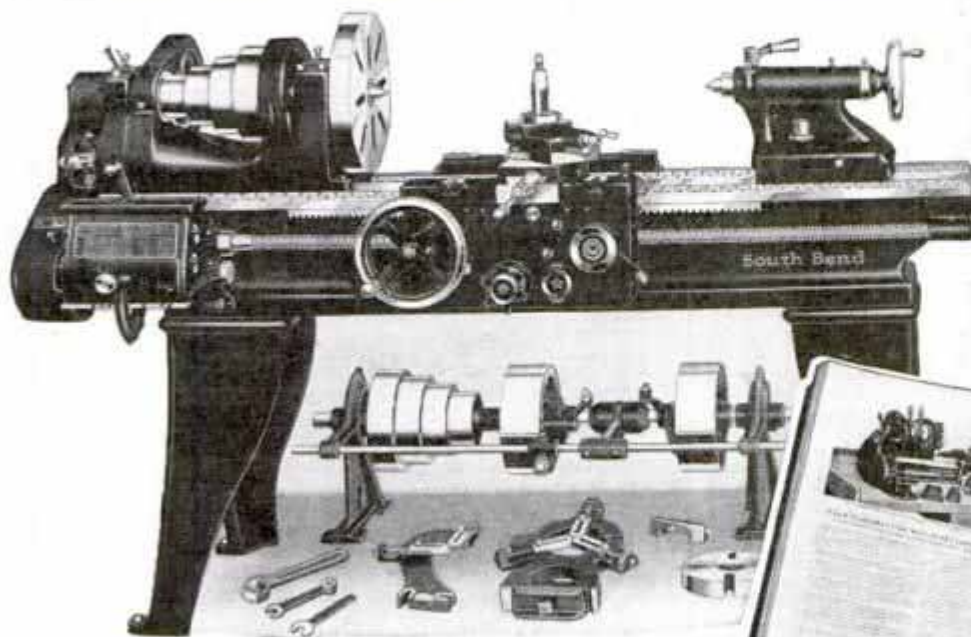
But, if you are a greenhorn, you won't know how to set the timber, how to place your shots or a hundred other things which are essential in such operations as this. Your best course is to go to some mine and work for nothing or for your board—if you can get it—until you acquire the necessary experience. In the meantime, look around for a likely abandoned mine. But don't try this without experience, and then remember that it is still a gamble.

If you want to stay at home and do your gold mining by proxy, you can invest your grub-stake in mining stock. That is likely to be a much bigger gamble than trying to find gold without previous experience unless you know what is back of the yellow certificates the salesman offers. When you are tempted to invest in a gold mine, remember that in most cases, a money-making mine does not have to seek capital. Experienced men with money are only too

(Continued to page 132A)



# Get one of these Valuable Books



16" x 6' Quick Change Gear Overhead Countershaft Driven Lathe. Weight 1875 lbs. \$540.00

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New 1934 Catalog just out illustrates, describes and prices the entire line of South Bend Back-Geared, Screw Cutting Precision Lathes and attachments for manufacturing plants, machine shops, repair shops, automotive service shops, home shops, laboratories, etc. A very valuable book to any one interested in modern methods of metal working. Contains 72 pages, 8" x 10 1/2". Sent free, postpaid to any part of the world. Use coupon below.

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9"x3' Quick Change	795 lbs.	\$275.00	\$373.00
11"x4' Quick Change	965 lbs.	\$340.00	\$479.00
13"x5' Quick Change	1510 lbs.	\$402.00	\$575.00
16"x8' Quick Change	2460 lbs.	\$580.00	\$792.00
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Size of Lathe Interested in.....

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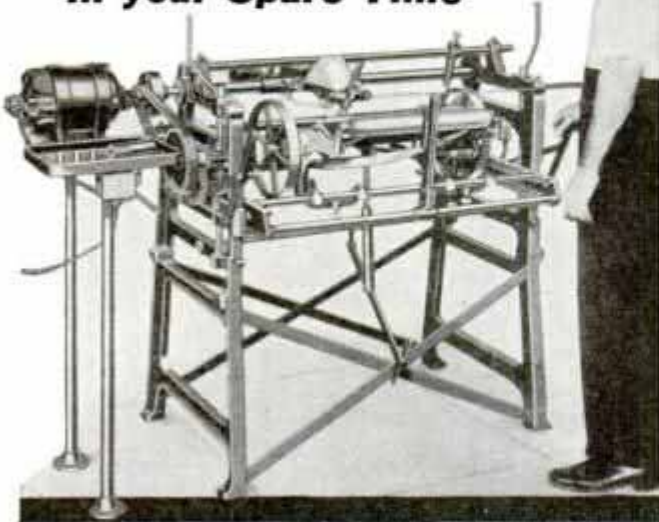
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Makes old, dull lawnmowers cut like new. It uses the correct principle of grinding the blades on a grinding wheel—the FACTORY method—and the method we have used for 30 years. This produces the proper bevel or clearance and is the only way old, dull lawnmowers can be perfectly sharpened. Mowers run easier—stay sharp longer—customers come back year after year.

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No experience is required. Start right at home. Attach the Ideal to your lamp socket. Blades are automatically ground to fit the cutter bar without taking lawnmower apart. You can sharpen any make of lawnmower in 15 to 20 minutes—you get \$1.00 to \$1.50, depending on size and condition of mowers. New attachments also grind skates, grass shears, hedge shears, sickles, scythes, axes, gum saws, etc.

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200-Page Book tells how and when to plant. Send 5¢ stamp to cover postage. Price Lower Than Ever Before.

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## BREAKING INTO DIRT TRACK RACING

(Continued from page 564)

Chevrolet, with a model T Ford cross member used at the highest point of the drop. The ends of the frame, extending to the rear, support the gas tank and tail of the body. The body should be high enough to enable you to duck your head in case of a spill.

Having the car and the ability, there's no mystery about breaking into the game. Anyone who applies to the promoter of an outlaw meet will be given a chance to show what he can do; nerve and a fast car often being the only requirements to enter.

The most dangerous part of the race is that mad dash into the first turn. The one who can get into and out of that first has a big advantage as long as he can maintain the lead, for he can pick his own course on the track and will not have to eat the other fellow's dust. Once around the first lap the cars usually string out and it is seldom that more than two or three will enter a turn together.

There is only one way to take a turn on a dirt track and that is to hit it hard near the outside of the track, skid the rear end around until pointed for the inside of the turn, and step down all the way, letting the engine pull you out of the skid. The brakes are used very little, although some drivers slam them on an instant as they enter a turn. Brakes are useless in case of a smashup; you won't have time to use them. If you see you are going to pile up, pick a soft spot in the fence between posts and duck your head.

When a smashup occurs in front of you is when all your driving skill and judgment must be used. You can't figure on swinging wide because the driver close on your tail is expecting you to drive straight ahead. If you swing out suddenly he will probably pile into you. When the driver in front loses control he will invariably head for one fence or the other. You'll have a split second or less to figure which fence it is going to be, and you must guess right and clear him on the other side, altering your course as little as possible.

If another car wants to pass you, the only sportsmanlike way you can prevent him is to drive faster than he does. Crowding him out is against the rules.



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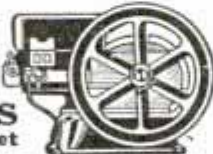
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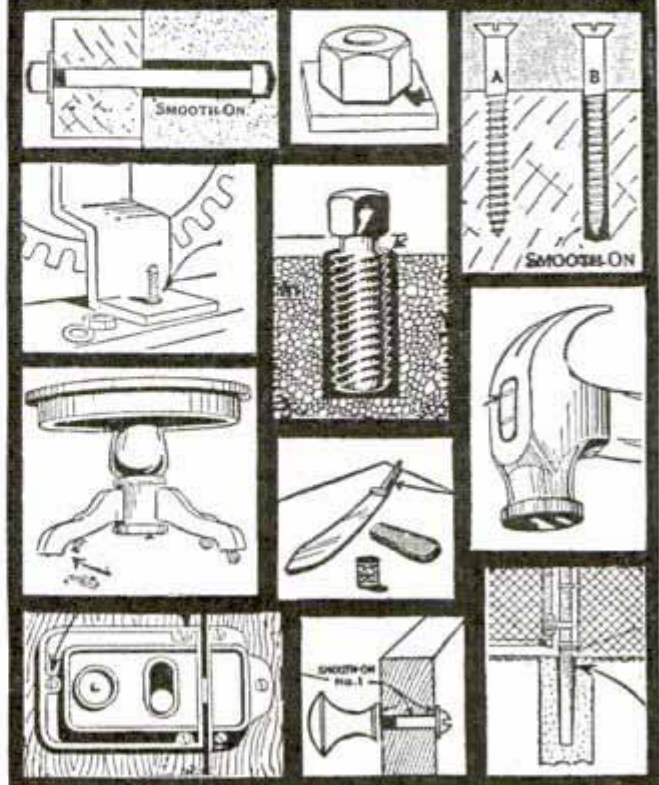
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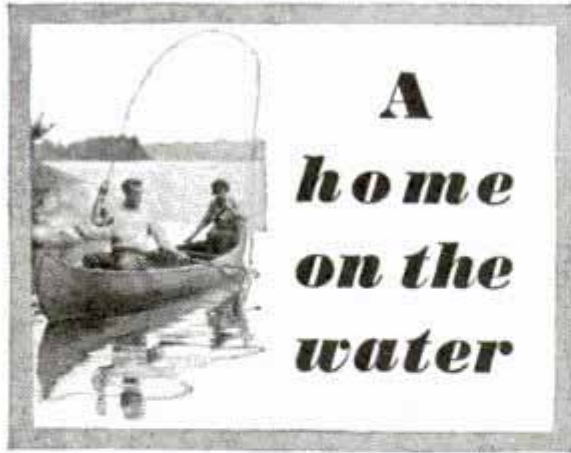
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(Continued from page 116A)

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(Continued from page 525)

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## THE TRUTH ABOUT THE NEW GOLD RUSH

(Continued from page 124A)

glad to finance it. Here are some of the things you should know before you buy any part of a gold mine if you ever hope to see your money again.

You should demand a report on the property from a reputable and disinterested geologist or mining engineer who has taken his own samples and had his own assays made. After that, you should determine his integrity and ability through the state or federal bureau of mines.

You should have a careful estimate from this authority or some other competent person on the amount of money required to put the mine in working order. You will never get your money out if you sink it in a hole which will cost more to dig than the gold is worth.

You should have a careful estimate of the cost of milling or smelting the ore in this particular mine. If it is going to cost three dollars to smelt a ton of ore producing two dollars, you won't get rich.

Also try your best to determine the reserve of ore in the mine. You ought to have some idea of how much you can get out before you put money in. No one but a competent geologist can determine this fact—and sometimes he can't. Remember that the mere fact that there is gold in a gold mine doesn't mean, necessarily, that it is a good investment. What you want to know is, "How much does it cost to get it out, and what is it worth when it is out?"

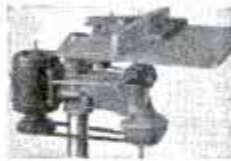
But the glamour of gold still lingers in the west, and hunting for the yellow metal becomes a high adventure to the uninitiated despite the plain, cold facts which prove that he will be lucky to break even. If you have the take-a-chance instinct and are endowed with the persistence and patience of the intrepid, weather-beaten sourdoughs of '49, you probably see nothing but opportunity in the dark picture that has been painted. And the stoical plodders who panned and picked fortunes out of the hills and then lost them overnight would be the first to agree with you.

But finally, if you are determined to join this new gold rush, recall the chances each time you dream of a strike—one in a thousand, may be less. And good luck—but don't forget that grub-stake.



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## WATCH YOUR OIL AND SAVE

(Continued from page 492)

race track used seven times as much oil at fifty-five miles per hour as at thirty, demonstrating that oil consumption increases with the speed, instead of being the direct result of changing from heavy to light oil.

The average automobile owner becomes alarmed when he is obliged to add oil frequently to the crankcase. If lubrication is efficient, it is natural that some oil will be consumed. Avoiding the use of light oil because more is required than of heavy oil is false economy, since the gain in gasoline mileage may be as high as six per cent and is generally large enough to more than pay for the extra light oil.

Automobile engine oils are classified as S.A.E. 10, S.A.E. 20, S.A.E. 30, S.A.E. 40, S.A.E. 50 and S.A.E. 60. In addition to these engine oils which have been standard for a number of years the two new oils, 10-W and 20-W, have been approved for winter. These will, no doubt, replace S.A.E. 10 and S.A.E. 20 for winter use. The figures refer to viscosity which is the oil man's method of measuring the body of the oil.

There has been a tendency for drivers to call for heavier and heavier oils. One large mail-order house, selling more than 5,000,000 gallons of oil each year, sells more than eighty per cent in S.A.E. 40 and 50 class, which is heavy oil.

While the new winter oils may be used in warm weather, engineers suggest the change to S.A.E. 30 for fast driving in summer, thus compromising with the motorist's desire for low oil consumption.

088

(Continued from Roto Section)

ing point came with the introduction of steam on large vessels. The "Savannah," first vessel to use steam in crossing an ocean, reached Liverpool in twenty-six days.

The present speed record, held by the "Rex," is four days, thirteen hours and fifty-eight minutes. It is hardly likely that this crossing will be eclipsed until the operation of either the French supership "Normandie" or the Cunarder's "534," tentatively called the "Princess Elizabeth."

The minimum speed specified for these ships is thirty knots, fast enough to cross the ocean in ninety-six hours.

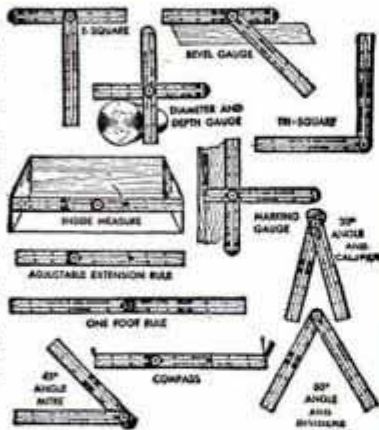


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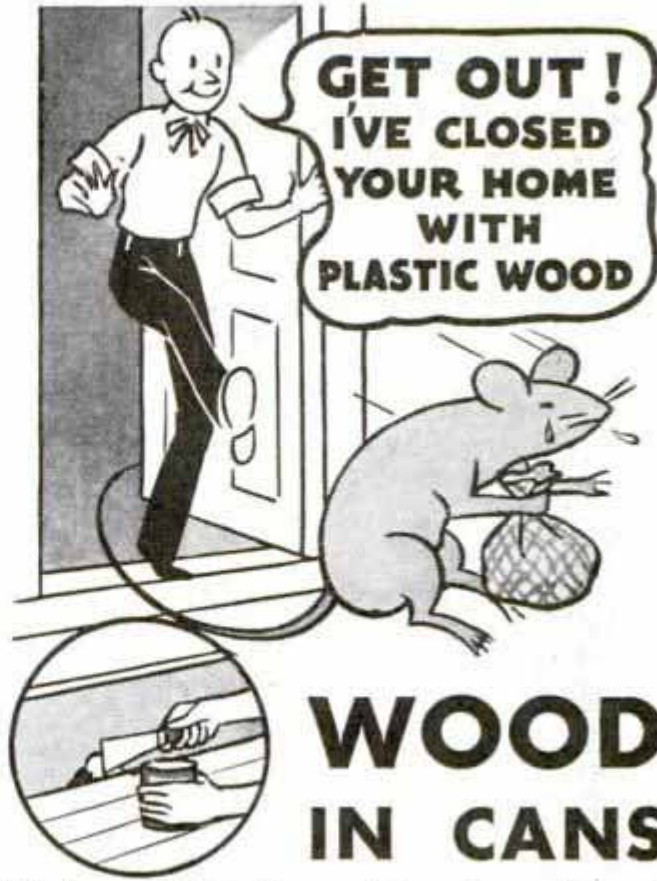
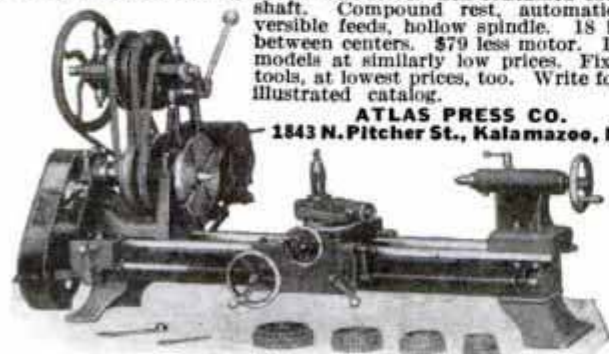
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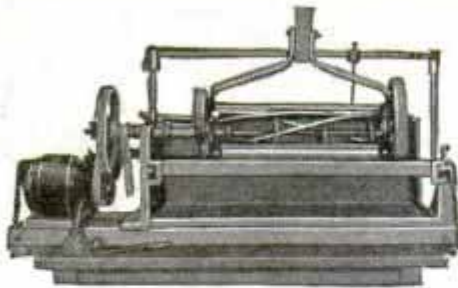
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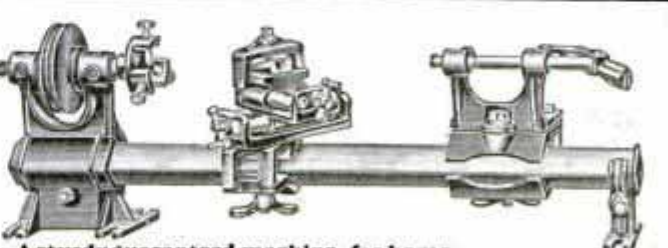
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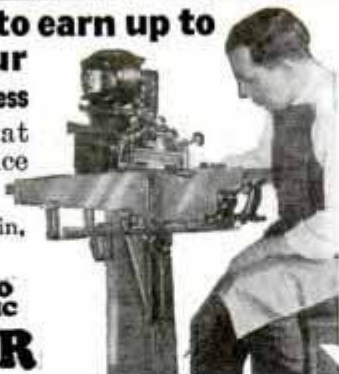
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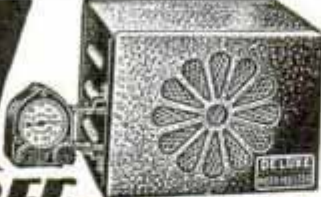
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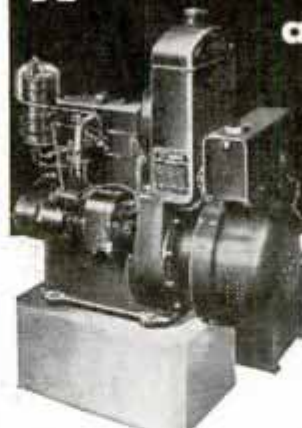
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