

Popular Mechanics Magazine

318 W. Washington Street, Chicago, U. S. A.

EDITED BY H. H. WINDSOR

ISSUED MONTHLY

SUBSCRIPTION:

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Entered as Second Class Matter Sept. 15, 1903, at the Postoffice at Chicago, Illinois, under Act of March 3rd, 1879.

Published monthly by POPULAR MECHANICS CO.

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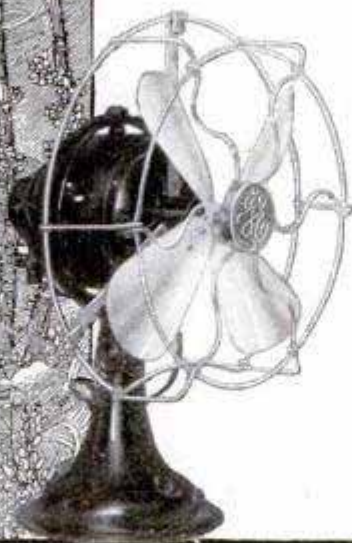
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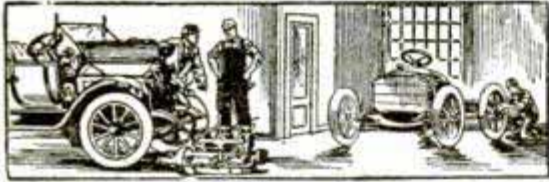
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Prizes Awarded

By Popular Mechanics Magazine in the contest for our Young Readers which closed March 31st, 1913

FIRST PRIZE \$25

Joe V. Romig Allentown, Pa.
"Amateur Mechanics' Combination Lathe"

SECOND PRIZE \$15

Edward Seija Chicago, Ill.
"How to Make a Water Motor"

THIRD PRIZE \$10

Florence Thomas Gordon, Ont.
"How to Make a Mechanical Camera"

FOURTH PRIZES OF \$5 EACH

- R. Bennett Pittsburgh, Pa.
"Magic Card Trick"
- Frank Pfefferle Appleton, Wis.
"Boy's Cyclemobile"
- W. P. Shaw Toronto, Can.
"Camp Loom"
- Edwin Bohnen Chicago, Ill.
"Recording Telegraph"
- Henry J. Marion Pontiac, Mich.
"Compass Time Chart"
- Charles Leonard St. John, N. B.
"Telephoto Attachment"
- Johnny Bauholster Gresham, Ore.
"Strawberry Ripener"

On account of there being five more contributions that deserved a fourth prize we have made an extra award for these five as follows:

EXTRA AWARDS \$5 EACH

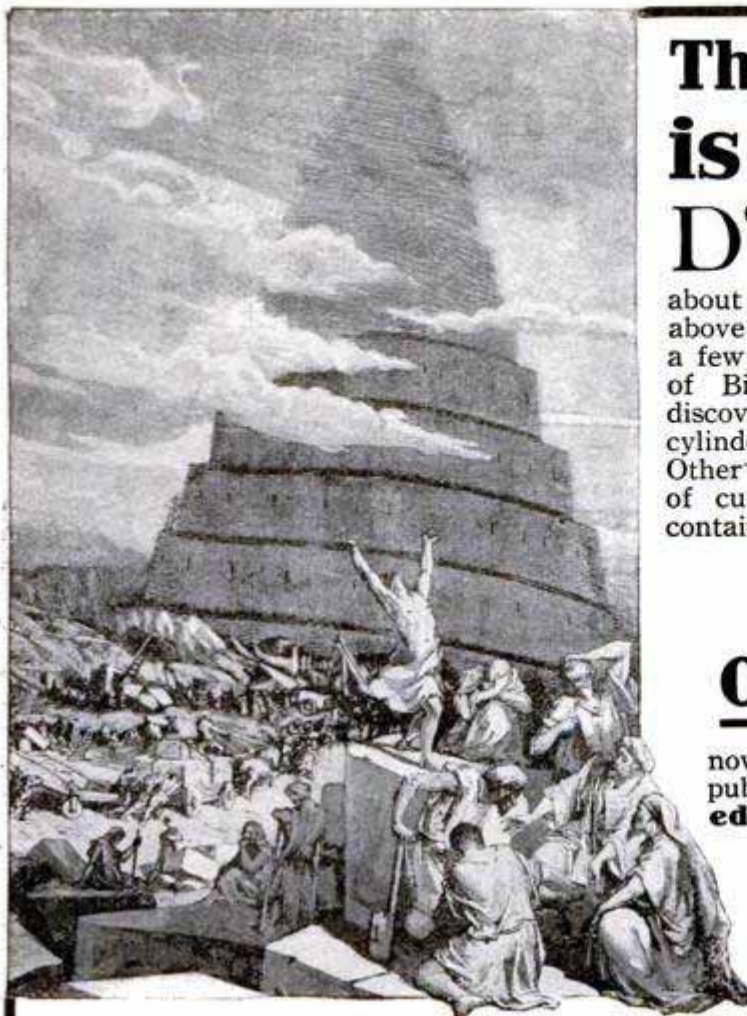
- Mildred E. Thomas Gordon, Ontario
"Reflecting Device for Viewing Scenery from a Car Window"
- McKinley Wood Ava, N. Y.
"Model Turbine Boat"
- Vance Garrison Bemidji, Minn.
"Muskrat Trap"
- David B. Lutz St. Louis, Mo.
"Match-Box Holder"
- Robert Hays Siloam Springs, Ark.
"Oil Burner for a Cook Stove"

Articles also have been accepted at our regular rates from the following:

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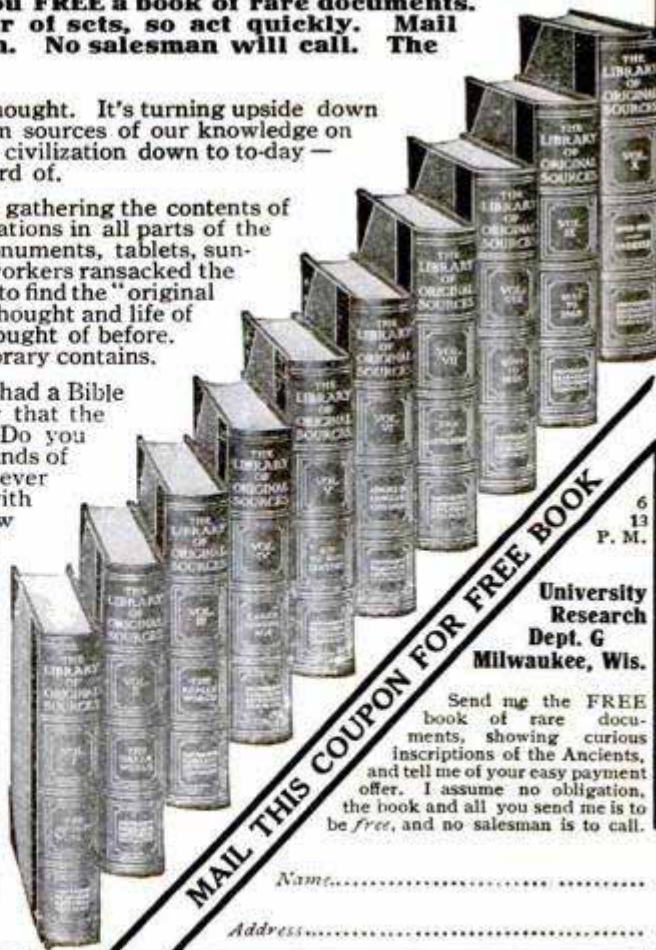
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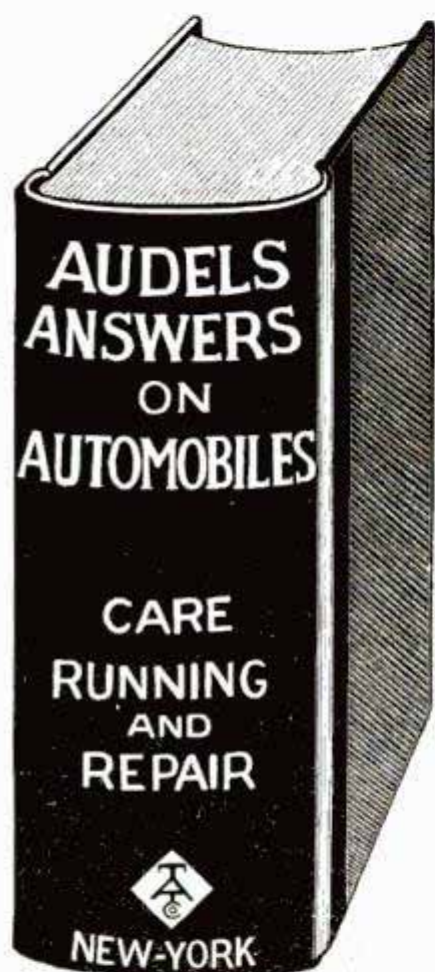
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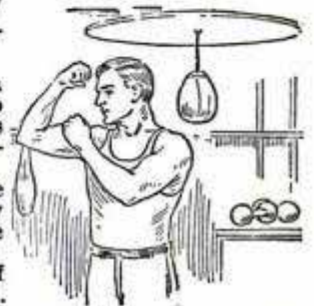
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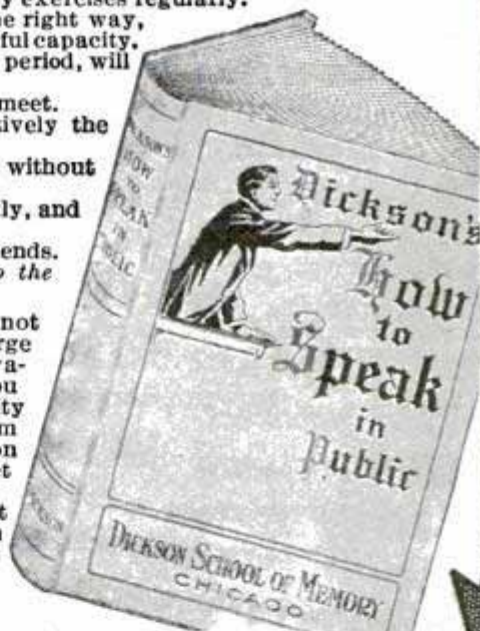
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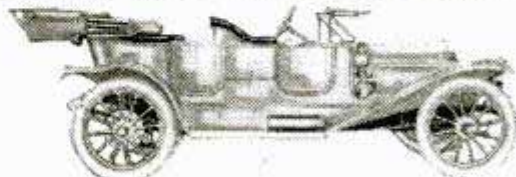
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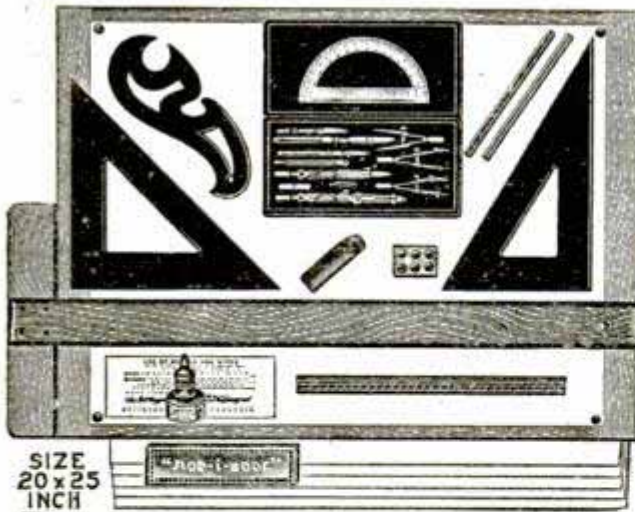
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PHOTOGRAPHERS, professional or amateurs, to handle a high-grade photo proposition. Assures you \$1,500 yearly. Steady employment. Write quick for particulars. United Photo Cutlery Co., Canton, Ohio.

ANY photographs reproduced on post cards 55c dozen. Tornado post cards 45c dozen. Ricard, Photographer, 3327 Fowler, Omaha, Neb.

PUBLISHERS, buy western photos from the western photographer, H. Kaloger, Chirook, Mont. Prices on request.

SEND us your best negatives to enlarge. Satisfaction guaranteed. Write for particulars. C. K. Waite, 3327 17th Ave., So. Minneapolis, Minn.

PHOTOGRAPHIC Post Cards from your films, 4c each; 30c dozen; \$1.50 hundred. Films developed, 10c. Careful workmanship. Samples free. Fred S. Marvin, Kane, Pa.

TRANSFER Photos on Watches, Glass, etc.; make good money; experience unnecessary. Full instructions for 25c. Kaloger, The Photographer, Chinook, Mont.

MAKE your own electric printer. Blue prints 50 cents. Des Moines View Company, Box 109, Des Moines, Iowa.

KODAK Films Developed, 10c per roll, any size. Prompt attention given mail orders. Prints $2\frac{1}{4} \times 3\frac{1}{4}$ to $3\frac{1}{4} \times 4\frac{1}{4}$, 3c; 4×5 to $3\frac{1}{4} \times 5\frac{1}{2}$, 4c. J. M. Manning, Box B, 1062 Third Ave., New York City.

OUR Photo Finishing Department at your service. Studio method, individual treatment. Best work possible. Films developed, all sizes, 10c. Prints, 3c, 4c and 5c. Send film for free sample. Lansing Studio, Box 1485, 73 $\frac{1}{2}$ Main Street, Springfield, Mass.

AMATEUR Photographers: Beautiful black and white photographs, rich in detail, are produced on professional photo papers. Are you getting real photographs or merely prints? There is a great difference; you be the judge. Send me a negative and stamp for sample, and price list today. W. R. Clement, Box 1046, St. Louis, Mo.

KODAK finishing as done in the factory. Any size roll film developed for 10c. Prints on Cyko, $2\frac{1}{4} \times 3\frac{1}{4}$, 3c; $2\frac{1}{2} \times 4\frac{1}{4}$, $3\frac{1}{4} \times 4\frac{1}{4}$, 4c; $3\frac{1}{4} \times 5\frac{1}{2}$, 4×5 , postals, 5c. Best work and 24-hr. service. Camera Shop, 17 East Main St., Marshalltown, Ia.

DEVELOPING, ten cents roll, any size. Prints 4×5 and Post Cards, four cents. All smaller sizes three cents. 8x10 enlargements, forty cents. O. E. McLaughlin, Detroit, Mich.

50c. OFFER for 10c. Send 10c and film, any size. Will furnish six prints. Beautiful work. Prompt service. 8x10 enlargements mounted, 20c. Roanoke Cycle Co., Roanoke, Va.

KODAKERS—A very special offer. Send and six exposure roll and 30c for developing, and six fine velvet prints—one beautifully hand-colored. Booklet and sample free. Kamera Shop, 179 Auditorium, Chicago.

POSTCARDS printed off any size films, 3c each. High-grade work quickly done. Send for samples and price list. LaMoille Postcard Works, LaMoille, Ill.

SPECIAL! This month we will make a beautiful 8x10 enlargement from kodak films for 25c. Factory methods. Camera Shop, 17 East Main St., Marshalltown, Ia.

LEARN Transphotography—make transparent photographs on watch dials, chinaware, etc.; instruction 25c. E. Greenhaigh, 816, 58th, Brooklyn, N. Y.

KODAKERS everywhere, mail me your finishing work. 12 years' experience; first film developed; samples and prices free. S. Harter, 1326 Deloss Street, Indianapolis, Ind.

$6\frac{1}{2} \times 8\frac{1}{2}$ GOERZ lens and camera, 5x7 camera. Box 133, Harwichport, Mass.

ELECTRIC Flash Lamp Battery, 110 V. Price complete, 75c. Eads & Johnson, 2703 T, Sacramento, Cal.

BIG Money Saved on Photographic Lenses and Apparatus—goods exchanged; repairing done. Ralph J. Golsen, 65 East 46th Street, Chicago, Department P.

PHOTOGRAPHS wanted by publishers. I'll find a buyer for all prints I deem worthy of publication. Send your name on a postal for leaflet of instruction. A. S. Dudley, Photographic Expert, Box 775 G, Philadelphia, Pa.

WE buy, sell and exchange. Bargains in Microscopes, Telescopes, Binoculars, Cameras, etc. Bargain list sent. Kahn & Son, Opticians, No. 54 John St., New York. Established 62 years.

MONEY in Photography. I start amateurs making money at home taking portraits; become professionals. Studio secrets, retouching, etc., fully explained. Wells' Studio, East Liverpool, Ohio.

BUSINESS OPPORTUNITIES

MAKE More Money! Operate a good, substantial Mail Order business—our "Silent Salesman" system can easily be done in spare time yet the possibilities are unlimited! For years "Booster" has actually and accurately led thousands like you over the Successful Road to Wealth. To succeed you've got to read The Booster Magazine for "Booster" is Opportunity and starts you in business for yourself—tells you how to get the dollars—puts you next to the best money making propositions on earth—ones that really get you the money. Send 10c for two months' trial subscription. Booster Magazine, Northwestern Building, Chicago.

STOP! Investigate at once! New business! No experience; 500% profit making photos with the new One Minute Post Card Camera. Takes and delivers finished post card photos in one minute right on the spot. No plates, films or dark room. Make big money everywhere, traveling or at home. This is your opportunity for immediate and permanent success. Don't delay! Write today for free information. The One Minute Camera Co., Dept. 223, Rand-McNally Bldg., Chicago.

YES, it's a new one, never advertised before. A beer coil cleaner that works like shot in a bottle. Build routes cleaning coils at 25c each. We lease you machine with exclusive territory. Weighs 15 lbs. Sand Blast Beer Pipe Cleaner Co., 312 Madison St., Chicago, Ill.

MAKE yourself independent. Learn collection business. Small competition; large returns. We teach and appoint you our agent. Service System, 117 North Dearborn St., Chicago.

START Contracting. Make big money renovating and polishing automobiles, hotel, bank, bar, store, home furniture, etc. No experience needed, no competition, few dollars sufficient to start. Our polish formula is the best existing. Full information for stamp. Exposition Specialty Co., 1632 Raigt St., San Francisco.

WE start you in business, furnishing everything; men and women, \$30 to \$200 weekly operating our "New System Specialty Candy and Popcorn Crispette Factories," home anywhere; no canvassing. Opportunity lifetime; booklet free. W. Ragsdale Co., East Orange, N. J.

FORM a corporation—Congress Law for D. C. and all states; cheap. Raise money easily. U. S. Legal Corporation, Washington, D. C., representing \$1,225,000,000.

WE Sell Patents. Established 1900. If you wish to add a new product to your line, write us. Charles A. Scott Co., 596 Central Bldg., Rochester, N. Y.

LEARN Metalizing. Transform Carnations, Roses, Butterflies, etc., into exquisite jewelry novelties. Pleasant, profitable home employment. Dime brings beautiful sample pin. P. Benson, Stewartville, Minn.

GOLDEN Seal the Golden Harvest, \$6,500 per acre. Easily grown. Explanatory booklet ten cents. Buckeye Gardens, 200 Main St., Cincinnati, Ohio.

I HAVE had ten years' experience and have made good in the Mail Order Business; began with \$5. Send for free booklet. Tells how. Heacock, 5074, Lockport, N. Y.

OPEN Automobile business of your own. Capital unnecessary. Only place to store machines. Full particulars 50c. Automobile & Motorcycle Exchange, Rochester, N. Y.

USE your spare time to build up a mail order business of your own. We help you start for a share in profits. 27 opportunities. Particulars free. Mutual Opportunities Exchange, Buffalo, N. Y.

\$\$\$ INFORMATION Reporters Wanted Everywhere. Big pay. Spare time. Confidential. Enclose stamp. National Information Sales Company, BCH, Cincinnati.

START a manufacturing business. New money-making plan and formulas 10c. Satisfaction guaranteed. Commercial Chemists, 731 Williamson Bldg., Cleveland, Ohio.

GOOD Results, Greatest Mail Order Magazine published; three issues 10c. Publishers, 2311 PM, North 43rd Ave., Chicago.

CASH for names, information, formulas, ideas, etc. Steady home business. Instructional booklet for stamp. Information System, 296 Marietta, Ohio.

AN intelligent person may earn \$100 monthly corresponding for newspapers. No canvassing. Send for particulars. Press Syndicate, 700 Lockport, N. Y.

\$150 MONTH. No canvassing or mail order phantom. You save merchants \$10 monthly, yet sell nothing. Box 4, Fort Scott, Kans.

EARN 5-10 dollars a day making cement fence posts; big, increasing demand. We show you how. Myland, 2125 N. Front, Philadelphia, Pa.

BIG money made. Baseball and football machines. Sullivan & Co., 650 Sherman St., Richmond Hill, N. Y.

INCORPORATE free; pay expenses; we take stock for services. Listed Securities Co., Elmira, N. Y.

EARN money in spare time. Pleasant home work, no canvassing. Send stamp. Lercap Co., Flushing, L. I., New York.

MR. Mail-Order Man! Deal with established corporation. We have ideal method for beginners or established firms. Patented specialties. Factory prices. No fake schemes. Copyrighted prospectus free. Mississippi Valley Co. Inc., Box M 629, Pittsburg, Kansas.

MAKE Money Making Concrete Mantels. We help you. 100% profit. Our adjustable iron forms make any size mantel. Forms cost \$25. Think of the thousands of mantels sold yearly. Write for information. Bishop & Gifford, N. Milburn Ave., Baldwin, L. I., N. Y.

DO you want a business all your own? Something permanent and profitable? Are you willing to work for it? If your answer is Yes, then write us. We have splendid opportunities for honest workers who have backbone (instead of a wishbone), and determination. We will help you to help yourself. For further particulars address Apex Specialty Co., 1343 Lexington Ave., N. Y. City.

PLASTOGRAPHY enables you to make from life, durable busts of your friends in imitation marble, bronze, etc. Copies statuary of old masters. Appeals stronger than photography or paintings; is less expensive, easier to learn. Full instructions, 50c; particulars free. Plastograph Studio, Fort Casey, Wash.

OUR magazine. Your inspiration. Tips to agents, Mail-order business. Hints to the trade. Beginners' helps. Small investment. Big value. 10c copy. 3 months, 25c. Prospectus free. "Lever" Mail Trader, 44, Elizabeth, N. J.

\$200-\$300 A MONTH. Be independent—be a manufacturer. Going out of the Medicine Business, we offer our rare European Formulas, all 4 collections, for \$2 as long as they last. Particulars free. Becker Co., 5325 Bishop, Chicago.

LET me send you free particulars concerning my "Half Dollar" advertising plan. Operate either locally or by mail. Immense profits. R. J. West, Topeka, Kansas.

YOUR 25-word advertisement placed in 28 good monthly magazines for \$1.25. One inch display, \$3. Write me before placing any advertising. I'll save you money. F. I. Miller, 1000 Bastable Block, Syracuse, N. Y.

SEND for my booklet "How You Can Become Your Own Master," without capital. In a business in which there is no competition. E. Daugherty, 1236 W. Madison St., Chicago, Ill.

LEARN Realty Business. Big income. We'll teach you. Free booklet tells how. American Realty League, San Francisco.

LEARN to make metallic sign letters. Experience unnecessary. Practically all profit. Particulars free. Cushing, 2715 South Main, Los Angeles, Cal.

LEARN a light manufacturing business that pays \$25 weekly in any locality. Particulars free. B. H. Elkins, Farmington, N. H.

YOUR business proposition intelligently and convincingly presented to one thousand investors for \$5. Companies incorporated and financed. Alfred S. Perry, Financial Agent, Fairfield, Conn.

STOP wage slavery. Formulas and instructions for manufacturing six big sellers and 100 business opportunities sent for 10c. W. J. Techtmann, P. O. Box 1487, Los Angeles, Calif.

BE your own boss—start a silver and metal plating business at home. No capital. Send for free descriptive circular. Gardener System, Dept. B. D., 803 Turk St., San Francisco, Cal.

BUY by mail anything you want at lowest prices. Send for catalogue. Agents wanted. Central Supply Co., Kansas City, Mo.

ASK Bode! He solves "Just Your" problems. Particulars free! Write now! Bode, 561p Main, Hartford, Conn.

MONEY-MAKING ideas help make more money. 2 copies 10 cts. A. Kraus, 154 Kraus Bldg., Milwaukee, Wis.

PATENTABLE ideas wanted—Send for 3 free books. R. B. Owen, 30 Owen Bldg., Washington, D. C.

AD bargains—20 words in 100 monthlies \$1; 100 weeklies \$2; in 20 big Sunday papers \$5. Life Co., St. Louis.

OPERATE Hahn's Premium Machines, the best seller for cigars and candies. J. Hahn, 1016 Germantown Ave., Philadelphia, Pa.

WE help raise capital at once to start you in retail, manufacturing, patent, real estate, mail-order, or any legitimate business, by means of "our practical method." Particulars free. The Business Aid Co., K. 504, Detroit, Michigan.

WOULD you like to own a good-paying mail order business? We have a line that gets repeat orders all the time. You can start in spare time; invest a dollar or two a week and soon own a nice business of your own; write for particulars. Nadico, 1664 Belmont Ave., Chicago.

LEARN Electroplating—Practical results may be obtained by following the directions in our book on electroplating. This is a working guide for the beginner written by an old hand at the business. 112 pages, 62 illustrations, cloth, 50 cents postpaid. Popular Mechanics Book Dept., 318 W. Washington St., Chicago.

LET the Parcels Post Help You. Add (\$15 to \$25 weekly) to your present salary or income. Start during spare time and build up a permanent mail-order business of your own. We show you how and help you make good. No canvassing. Experience unnecessary. The Parcels Post makes success doubly sure. Our new ideas and up-to-date plans bring the money. No so-called "Course of Instruction" to sell. We give that free. Write today. Address Pease Mfg. Co., Inc., Dept. A, 70 Broadway, Buffalo, N. Y.

MAKE and Sell Mission Furniture—From our instructions one man who was an amateur made and sold \$400 worth of just one article alone. We give you 98 designs and easily followed directions for making each piece in 3 books at 50 cents each or \$1.50 per set, postpaid. Popular Mechanics Book Dept., 318 W. Washington St., Chicago.

INCORPORATE your business under Arizona laws. Cost small. No franchise tax. Stockholders exempt from corporate debts. Do business anywhere. Laws and forms free. Southwestern Securities & Investment Company, Box D488, Phoenix, Arizona.

INDEPENDENCE and fortune quickly attained in the Manufacturing Mail Order business. I furnish Formulas, Manufacturing Processes and Trade Secrets in all lines. Sold under positive guarantee; 18 years' practical experience. Revision and improvement of Formulas and Processes—reduction of manufacturing cost—utilization of waste materials, etc., a specialty. Booklet, Formula List, and Valuable Information Free. W. L. Cummings, Ph. D., 127 Standard St., Syracuse, N. Y.

BIG Profits for You! Manufacture Barley Crisp. New confection. 5c package costs you 1c. Machine, instructions complete \$7.50 prepaid. Send 10c for samples. Barley Crisp Co., 1605 Hyde St., San Francisco.

MAIL Order Dealers! Advertisers! You need our 1913 Advertising Rate Book with the latest Dollar-making feature "Ads That Pay." Hot from the press! Gives you cost of Advertising in 2000 recognized magazines and newspapers, location, circulation, closing dates and other useful knowledge. Includes thirty original Mail Order propositions, winners every one of them. A \$10,000 investment at your service. You can make a legitimate profit of 95c on every dollar order. This very valuable manual sent prepaid to you for 10c. Write now! Dearborn Advertising Agency, 521 Dearborn St. Chicago.

TRIAL Offer: \$1 places your 25 word ad in 200 different magazines. Send copy now. King's Magazine, Box 13P. Little Silver, N. J.

STOP Here! Let me start you in a home business that will bring you money every day. Experience unnecessary. Spare time. No canvassing. I furnish everything and guarantee success. Send for proofs. Voorhies. Desk C. R., Omaha, Neb.

I WILL start you earning \$4 daily at home in spare time, silvering mirrors; no capital; send for free instructive booklet, giving plans of operations. G. F. Redmond, Dept. 306, Boston, Mass.

COLLECT money by a sure, simple, system. Income \$1,000 to \$5,000 a year. Quick results. No capital required. Instructive book. "Skillful Collecting," free. National Collectors Ass'n., Long Street, Newark, Ohio.

WHAT is your success is ours. Start a Mail Order Business. Deal direct with the Manufacturer. Free coaching. Free Warehouse privilege, goods at right prices. Our Patented Big Profit Mail Order Leader sold exclusively through our co-workers. Great Summer Repeat Order Leader and "Tested Out" Co-operative Working Plan now ready. Also our Manufacturers' limited Free Coupon Offer. Experience unnecessary and spare time to start. It will pay you to investigate. Full particulars, together with Sworn Statements, and Positive Proof. Write J. M. Pease Mfg. Co., 36 Pease Bldg., Main St., Buffalo, N. Y.

EARN \$7 to \$12 daily, restoring faded colors in rugs and carpets. Whole or spare time. Armenian Process. Great demand. No capital. Particulars free. Eldred, Dept. 75, Detroit, Mich.

RESILVER mirrors and make good money. Full instructions 25c. Elite Exchange, Dept. C.5, 3827 N. 44th Ct., Chicago.

AGENTS WANTED

AGENTS Wanted—Here's big money for you—and a stylish nobby suit absolutely free. \$40 a week easy. Many are making more. Nothing to learn. Nothing to buy. Nothing to invest. No capital required. We furnish everything free—even the suit of stylish clothes you wear. Our men are the swell dressers and it doesn't cost them a cent, and they make big money every week. Get in now. Now is the time for the big money. Your name on a postal brings everything free. The handsomest lot of samples of the latest suitings you ever looked at to choose your suit from. And a book of fashion plates showing the very latest, nifty, nobby styles; also measuring blanks and everything needed—all free. We pay expressage on everything. Send that postal now—don't wait. This is your chance—grasp it. American Woolen Mills Co., Dept. 614, Chicago.

WANTED—Resident agents to introduce the new Short Cut to Light. No engines, dynamos or intricate machinery; new inventions revolutionize old methods; costs much less to install and operate than any known method of illumination; gasoline lights that can be switched on and off instantly; artistic fixtures for all purposes, such as the lighting of stores, homes, churches, halls, streets, etc.; nothing to wear out or get out of order; a 10-year guarantee furnished with each system; an opportunity of a lifetime is offered industrious men to get into a permanent money-making business; every system installed sells others; every user an enthusiastic booster. Write at once. Gloria Light Company, 1271 Washington Blvd., Chicago.

MR. Mail-Order Man: Deal with established corporation. We have ideal method for beginners or established firms. Patented specialties; factory prices; no fake schemes. Copyrighted Prospectus free. Mississippi Valley Co., Inc., Box N, 629, Pittsburg Kans.

SIGN Agents—Painters—Something new and better. Attractive ready-made Gold and Silver letters. 21 kinds, easily applied. Make big money lettering store windows, making signs, and selling our line of flashing, sparkling chipped glass name-plates. No experience needed. Write for sample letter and catalogue and start at once. Address Attracto Sign Co., 2655 North Clark Street, Chicago.

MEN and Women wanted for Government positions. \$60 to \$75 month to commence. Vacations. Steady work. Over 12,000 appointments this year. Parcel post requires several thousand. Influence unnecessary. Write immediately for free list of positions. Franklin Institute, Dept. O 22, Rochester, N. Y.

HAVE you a few hours to spare? We want man or woman in each town. No capital needed. An hour's work shows dollars earned in spare time. Pocket sample. 400% profit. G. C. Mfg. Co. (Dept. 104), 20 Warren St., N. Y.

REAL live salesmen that have the ability to sell, send for free sample. New sanitary household article, 250 to 300% profit. Two to four sold in every home. Hammond Mfg. Co., 161 S. Commonwealth Ave., Los Angeles, Cal.

SELL something good—150% profit. Fast-selling necessity. Excelsior clothes line and reel; handy, simple. Particulars free. Excelsior Mfg. Co., 115 Worth St., New York.

MAKE and sell your own goods. Formulas by Expert Chemists. We obtain your Government Serial Number. Catalogue for stamp. B. Mystic Company, Washington, D. C.

\$100 COMMISSION on one order. \$200 to \$300 a week nothing unusual if you handle "Mercury" 170 advertising specialties. Agents in this and jobbers in foreign countries wanted. Large commissions. Write for our proposition. Mercury Novelty Co., 318 Broadway, Dis. 11-F, New York, U. S. A.

SELLING Agents Wanted for "Fire Out." Best selling small fire extinguisher. A real money maker for you. Our proposition won't disappoint you. The Inst. Lighter Co., Dept. M, Columbus, O.

AGENTS make 500% profit selling our gold window letters, novelty signs and changeable signs. 800 varieties in enormous demand. Catalogue free. Sullivan Co., 1238 Van Buren St., Chicago, Ill.

MANAGERS: Organize sub-agents. Sell wonderful patented metal attachable fans for sewing machines; unlimited profits, exclusive control; sample only \$1 postpaid. Particulars. Attachable Fan Co., Portland, Oregon.

\$25.00 TO \$50.00 week made easily by men and women selling our "Combination Self-Heating Flat Iron and Stove," needed in every home; sells on sight; fine Summer specialty. Write quick for full information. Doud Lighting Co., 174-A, North Sangamon, Chicago.

AGENTS—Get particulars of one of the best paying propositions ever put on the market. Something no one else sells. Make \$4,000 yearly. Send postal today for particulars. E. M. Feltman, Sales Mgr., 6178 Sycamore St., Cincinnati, O.

AGENTS—Stop canvassing. Our district managers are making big money employing sub-agents. You can also. We show you how. Write for particulars, stating territory preferred. Sanito Co., Rochester, N. Y.

WHEN you sell Feeny Vacuum Cleaners you make pleased customers. New principle—creates wonderful suction. One general agent's total commissions 1912 were \$18,498. Write today for our attractive propositions. Feeny Mfg. Co., C-28, Muncie, Ind.

KIMO—Greatest agents' proposition out. A waterproof shoe polish, with dauber, polisher and cleaner, packed in neat metal box. Send (21) 2c stamps for outfit. W. O. Turner Supply Co., 3005 S. Jeff. St., Muncie, Ind.

AGENTS—Big Profits Selling E. Z. Self-Heating Gasoline Irons; also E. Z. Gas Irons; have many new features; sell rapidly; territory now going fast; don't miss this opportunity. Write now for full particulars. Dept. B, Enterprise Tool & Metal Works, Chicago.

WE want one man in each locality; the surest proposition for 1913. Never offered before. Sales guaranteed. Write immediately. Phelps Specialty Co., Dept. M, Caro, Mich.

AGENTS: \$10 daily selling "Perfect" Double Suction Hand Vacuum Cleaners. Territory guaranteed. Perfect Cleaner Co., 384 Hudson St., New York.

AGENTS Wanted—We want a live man in every town to act as a sales manager. We want you in your town. Devote your spare time to our business and you will make bigger money than you ever made before. Give us all your time and we will make you rich. These are facts, not promises. \$50 a week at the start. Besides, a nobby free suit—and all the clothes you want at less than wholesale price. Wear one of our free suits as an advertisement and people will flock to you to buy a suit like it and you will coin money. Get our money making proposition and beautiful book of samples. Just send a postal card. We pay express charges on every thing. Join the live wires—send us a postal today. Paragon Tailoring Co., Dept. 614, Chicago.

AGENTS—Hurry—Something new. Sanitary device for telephones. Millions will be sold. 150% profit. Apply for territory. Hygienic Phondate Co., 1082 Jefferson, Toledo, O.

WINDOW Letter Agents: Increase your profits. Sell Attracto ready-made Gold and Silver letters—the kind with class to them. 21 styles—easily applied. Sample and catalog free. Attracto Letter Company, 2655 North Clark Street, Chicago.

BEAUTIFUL Embossed Gold Window Letters make 1000% profit without experience. New, easy proposition. Signs always needed. Ours last for years. Rock bottom prices. Essentials to work with mailed free. Embossed Letter Co., 235 W. Illinois St., Chicago.

SIGN Painting Agents: 1000% profit. Best and cheapest window letters made. Mounted sample free. Success positively guaranteed. Embossed Letter Co., 243 West Illinois St., Chicago.

BE Our Agent. We make the best Vacuum Sweeper manufactured. Women are crazy for them. We will sell you one at lowest agent's prices. Test it at home. Show it to other women tired of sweeping, dusting, etc. Take their orders and make money for yourself. Write at once for agency terms. The Junior Vacuum Cleaner Co., Dept. A, Bradford, Pa.

YOUNG man, would you accept and wear a fine tailor-made suit just for showing it to your friends. Or a Slip-on Raincoat Free? Could you use \$5 a day for a little spare time? Perhaps we can offer you a steady job. If you live in a town smaller than 10,000 write at once and get beautiful samples, styles and this wonderful offer. Banner Tailoring Company, Dept. 325, Chicago.

ENDLESS neckties sell on sight; girl made \$87 in one week; man made \$20 in one day; looks like any stylish necktie; ties in a different place each time; wears 20 times as long; patented; write for terms and free sample outfit. Endless Necktie Co., Gumbel Bldg., Kansas City, Mo.

HUNDREDS make \$50-\$75 weekly selling Guaranteed Hosiery for largest manufacturer in America. Why not you? Complete outfit free. Write quick to our city office. Madison Mills, Mfrs., 486 Broadway, New York City.

AGENTS Wanted—Either Sex—We return your postage, with particulars of the best vacuum cleaner; also vacuum washers. Cash Buyers Mfg. Co., Middlebury, Ind.

AGENTS, sell Genuine Imported \$1.50 Self-Filling Fountain Pens at 50c, and make \$4 clear on every dozen. Sample and prices 25c. Reese Pen Co., Mt. Pleasant, Pa.

AGENTS: Cost 2c, sell 25c. Sign letters put on with roller. Samples free. Embossed Letter Co., 230 West Illinois St., Chicago.

AGENTS—Big money in name-plates and signs. Don't fall to get our live-wire line. It's a money maker. Write at once. The Cellulina Co., Attleboro, Mass.

ABSOLUTELY New—Just out. Make large, liberal profit selling "Radiolite." Write Butler Mfg. Co., Dept. 51, Toledo, O., for details regarding this wonderful improvement in lamp burners. Nothing like it.

AN exceptional opportunity for live man or woman as local agent for "Steeltax" hosiery; something new; quick sales; repeat orders. Ideal Supply Co., Dept. C, 32 Union Square, New York.

AGENTS wanted quick. Clean, legitimate, money-making proposition. No space for explanations. Write for full particulars and exclusive territory. Krueger Mfg. Co., Dept. 2A, 167 W. Washington, Chicago.

INCREASE your profits \$30 weekly with our permanent agency. Full particulars free. Dept. N, Box 231, Atlanta, Ga.

LIVE men can earn \$5 to \$10 a day selling Solid Gold Convex Letters. 100% and over profit. 10c for sample and particulars. Wheeling Letter Co., Wheeling, W. Va.

AGENTS, if you are looking for quick sellers and big profits, wonderful opportunity; write for particulars. Trueter Supply Co., Milwaukee.

AGENTS—An exceptional opportunity to earn \$3,000 a year and upward. Something no one else sells. Send postal today for full particulars. A. S. Shuh, Sales Mgr., 1700 Sycamore St., Cincinnati, O.

ONE Million Agents Wanted. Fast sellers costing 2c, selling 25c, in quantities to \$50. Every firm needs. Postal brings samples. Embossed Co., 240 West Illinois St., Chicago.

GET complete outfit for monogramming autos and motorcycles with our transfer letters; small investment, big returns. Write for full particulars. Motorist's Accessories Co., Ashland, O.

AGENTS—You can make \$40 to \$75 a week selling Guaranteed Aluminum Ware to consumers. Complete sales course free—Your Territory Open. Answer Quick. Div. 7, American Aluminum Co., Lemont, Ill.

AGENTS—250% profit. Wonderful little article. Sells like wildfire. Can be carried in pocket. Write at once for free sample. H. Mathews, 1962 Third St., Dayton, Ohio.

AGENTS, \$50 weekly selling Presto Garden Hose Menders (no tools required). Send 50 cents for dozen. Standard Specialty Co., Indianapolis, Ind.

AGENTS: Drop everything and write us quick for special terms on Paine's Automatic Change Tray. Sells itself. Greatest money-maker in years. Address, Paine Specialty Co., Milwaukee, Wis.

AGENTS, Mail-Order Men: Send ten cents for two numbers of The Opportunity Advertiser. Robert S. Tyler Co., Portland, Maine.

AGENTS—\$5 daily selling our Handy Tool, 12 articles in one. Lightning seller. Sample free. Thomas Mfg. Company, 462 Third St., Dayton, Ohio.

SOAP Agents: Our Vegetable Soap, Toilet Articles and Remedies Excel and Outsell. Sample Free. Buchanan & Co., 54 N. Main St., St. Louis, Mo.

AGENTS—Shoes are a necessity. Sell them from factory. Particulars for stamp. Full Value Shoe Co., Lowell, Mass., Desk K.

AGENTS—We have a new leader; big profits; write for free sample and catalogue. New Century Specialty Co., 94 Piquette Ave., E. Detroit, Mich.

AGENTS: We manufacture the best Vacuum Sweeper made; a wonderful seller; exclusive territory. The Lufe Shannon Co., Waterloo, Iowa.

AGENTS: Something new. Costs 10c, sells for \$1. The Consolidated, Kokomo, Ind.

MEN'S shirts to measure. \$1.25 and up. Outfit free. Peerless Shirt Makers, Dept. 23, Chicago.

KIMONOS: Easily sold; profits liberal. Particulars free. Mandel, Edinboro St., Boston.

STAPLE article, sells like lightning. Send 10c for sample. Home Supply Co., 70 Federal St., Newberryport, Mass.

EXPERIENCED Agents: Write for big selling propositions. Snyder, Kuhns Bld., Dayton, Ohio.

GENERAL agents, capable of calling on the big trade themselves and handling canvassers for the house to house and office to office business, to sell the newest electric specialty on the market; sold everywhere there is electricity, in the home, office, factory, store, hotel; liberal profits; sales-driving sample weighs a pound; no experience or knowledge of electricity required; shows how to use one light instead of two and get the same results; sells for \$2.50, \$3.50, \$5.00 and saves the purchaser an investment of \$25.00. Write for particulars. The Handy Light Co., 155 Handy Light Block, Cincinnati, Ohio.

YOU can make more money operating a mail business, but before taking any chances invest 10c for two samples of "Booster"—the one bona fide Mail Order and Agents' publication on earth—a magazine that has for years actually and accurately started others like you in business for themselves by publishing the best money making propositions on earth—ones that really get you the money! Send 10c today—it's worth dollars to you. Booster Magazine, Northwestern Building, Chicago.

AGENTS—\$50 weekly; we manufacture the best needle case made, a wonderful seller; 200 to 500 per cent profit; talking unnecessary; our copyrighted "Trust Scheme" Envelopes do the work; general agents can make over \$100 weekly; send 10c for a 25c sample containing 115 needles; particulars free; buy direct from the factory at wholesale. Patsy Needle Co., 102 Davis Sq., West Somerville, Mass.

AGENTS—"Border Wars of Texas," a book of 400 pages of thrilling accounts of Indian raids, battles, etc.; 40 full page illustrations portraying the cruel hardships of the Texas pioneer. It is a quick seller for agents. Sent postpaid for \$1.50 cloth, \$2.00 morocco, or terms, etc., for stamp. Matt Bradley, Tioga, Texas.

INCREASE your income handling Right-Idea line all or part of your time. Practical articles needed everywhere, including vacuum cleaner, vacuum washer, gliding casters, etc. Something to interest everybody. Write for particulars. A. F. Rosenberger, 709 Rand-McNally Bldg., Chicago.

SPECIAL lot just received! New invention! Inexpensive, exceptionally clever household article, for every home. Interests everybody. Clean money for agents, both sexes. Send stamp now for illustrated folder and special sheet. It will please you. Dept. A, New England Auction Goods Co., Box 627, Providence, R. I.

WANTED—Responsible individuals or firms to take exclusive county and state rights for handling our new patented Extension Cover. Fits all sizes kettles and cooking utensils. One million will be sold this year. Foreign orders solicited. The Scott-Johnson Company, 500 Central Building, Rochester, N. Y.

AGENTS—Our Wonderful Luminous Crucifix; selling better than ever. Some territory still open. Shines all night in darkest room. Write for agency. Pioneer Portrait Company, 1259 W. 63rd St., Chicago.

SIGN agents, save money; buy our gold and silver flexible window letters, non-tarnishable, best made, four styles, big stock, immediate shipments—2 in., 60c; 3 in., 70c; 4 in., 80c. Assorted samples 7c. Instructions furnished free. Write to-day. New York Sign Letter Co., Dept. M, Arbuckle Building, Brooklyn, N. Y.

SALESMEN—Working for us means cash in your pocket every day; Household Device; duplicate orders; profits big, experience unnecessary. Write immediately. Specialties Supply Co., No. 31 Willoughby Street, Brooklyn, N. Y.

AGENTS: Send no money. Just say, send me particulars of your big Agents' Offer. M. F. Allen Co., 3057 Bedford Ave., Brooklyn, N. Y.

AGENTS—\$40 to \$75 a week, extra premiums, prompt shipments and a square deal. Success and prosperity assured. Sterling Aluminum Co., Canal Station 77, Chicago.

LOOK Here! Sell Berma Starch Enamel, greatest repeater and business builder. Perfumes clothes; lasting Oriental odor. 100% profit; samples free. Berma, 140 Nassau St., New York.

SELL "Spark-A-Lite" Pocket Lighter. Sure light always. Carry in pocket like fountain pen. Biggest money maker for summer season. With safety clip, only 25c postpaid. Sole distributors wanted. American Chemical Works, 33 West 97th St., New York City.

AGENTS, Representatives. Sell Silent Servant Steam Vacuum Clothes Washers. Does scientifically in twenty minutes what formerly required half day. We show you free income of \$4,000 to \$6,000 yearly. Self-selling household necessity. Write manager, Murray Manufacturing Company, 110 West 34th, New York.

AGENTS—Something new, big success, Lather Kreem, no cup, no brush, no soap, no lather; just apply and shave. Exclusive territory. Write quick. Send 25c for sample. Mory & Thorn, Dept. C, 260 W. Broadway, N. Y.

AGENTS, enormous profits in Window Signs. Unlimited field. Experience unnecessary with our splendid line ready-made gold sign letters, guaranteed non-tarnishable. Samples, instructions free. Eastern Specialty Co., Dept. 5, 63 Barclay St., New York.

CASH for names, information, formulas, ideas, etc. Steady home business. Instructive book for stamp. Information System, 297 Marietta, Ohio.

AGENTS, my proposition will net you \$c daily. Particulars free. Address, S. J. Fortune, 208 East Eleventh St., Richmond, Virginia.

I HAVE had ten years' experience and have made good in the Mail Order Business; began with \$5. Send for free booklet. Tells how. Heacock, 147 Charles St., Lockport, N. Y.

MAGIC outfit, 5 tricks, 10c. Israel, 440-J, East 146th St., New York.

READ the Agents' Magazine. Make more money. 2 months, 10c. Agents' Magazine, Chicago.

AGENTS—Sell our high-grade line of perfumes, toilet articles, soaps and combination boxes. 150% profit. We are manufacturers. Hoppinger & Roth, 216 N. 2nd St., St. Louis, Mo.

AGENTS sell rich-looking imported 36x68 rugs \$1 each. Carter, Tenn., sold 115 in four days, his profit \$57. You can do as well. Write for sample offer and selling plan. 2 sample rugs by Parcel Post prepaid \$1.89. A. Condon, Importer, Stonington, Maine.

WANTED Agents to sell new Sanitary Soap Sprayer and finest Powdered Soap manufactured. Just the things for Hotels, Offices, Hospitals, Lavatories, etc. Big money for traveling men to handle as a side line. For particulars address Sanitary Sprayer Co., 510 Westminster Bldg., Chicago, Ill.

PORTRAIT agents find our plan beats all others. Prompt shipments—rejects credited. 30 days' Credit. Catalogue of Portraits, Frames, Pillow Tops, sheet Pictures and samples free. James C. Bailey & Co., Desk H3, Chicago.

AGENTS—How many houses can you make each day? An article for each call that no housewife can resist. Recanvass territory and double sales. Write Reed & Co., 43 South Tremont Ave., Indianapolis, Ind.

AGENTS, Either Sex; Sell our New Luminous Cross Picture. Whole or part time. Cross shines brilliantly in dark. Mysterious and impressive. Big profits. Sample prepaid 25c. Particulars free. Hyde Art Co., 4535 N. Ashland, Chicago.

(CELLULOSIA) Door Plates, new, lettering pure gold. Send for sample case. Nothing invested. 100% profit, sell to every house. Public demands them. La Fontaine, Mfr., Sherburne, N. Y.

ACTUAL Agents Only—Write for Sample of Boyer's Automatic Re-Finisher, for Furniture and Store Fixtures. One application lasts a year. Finest thing in the world. Is not furniture polish, but a re-finisher, applied with cheese-cloth. Boyer Chemical Laboratory Co., 1 East Michigan Street, Chicago.

AGENTS—100% profit—sell to saloons—machine a whirlwind seller. Free sample and salesmanship course. Two sales a day \$15 profit. Write Simplex Mfg. Co., Dept. 7, Kewanee, Ill.

AGENTS—Make \$5 to \$10 a day, selling Finny-Cod, the new smoked sea-food. Sales at every house. Large profits. Quick sales. Send 25c for 1-lb sample. Postage paid. Stonington Fish Co., Stonington, Maine.

SELL Hero Fire Extinguishers. Make 300%. Box 694, Macon, Ga.

AGENTS: Enormous profits if you handle our line of goods. We have fast sellers that beat them all. Outfit terms 25c. T. D. Barnes, Hyde Park, Pa.

\$150 MONTH. No canvassing or mail order phantom. You save merchants \$10 monthly, yet sell nothing. Box 4, Fort Scott, Kans.

WRITE for particulars of proposition paying immense profits. Experience unnecessary. Central Mercantile Agency, 203 Market St., Ft. Scott, Kansas.

AGENTS Wanted—New typewriter necessity. Sales Manager, Box 217, Albany, N. Y.

AGENTS wanted for oriental novelties. Never before introduced. Quick sellers. Repeaters. Immense profits. Particulars free, or samples 25c. Kanematz, Box H-529, Portland, Oregon.

WANTED—Men and boys with mechanical ability to sell and put on our No-Slam outfits for screen doors. One outfit and particulars to agents, 15c. Satisfaction guaranteed. King Mfg. Co., Chicago.

AGENTS: Manufacture your own leaders. "Three In One." Something new. One preparation sells for three. Just use different labels on bottles. Formula supplied. Write today for particulars. Clyde Fahrney, Box 157, Waynesboro, Pa.

AGENTS wanted in every town to sell the new, wonderful Instant Vulcanizer. Join our money-making representatives. The Enterprising Novelty Co., 69 W. Washington, Chicago.

AGENTS: Sell Keno Hat-Hanger, newest patented proposition, \$30 weekly easy; sells for 25c; 15c gets sample. Kandlbinder Mfg. Co., 521 West Reynolds, Springfield, Ill.

AGENTS: Send today for show card sign catalogue. Popular Show Card Co., Dept. JN, 1235 Michigan Ave., Chicago.

A "LIVE WIRE!"—Imported Rugs, 30x68, sell for 98c. Great demand! Write quick for territory. L. Ebert (Importer), 112 Colorado, Indianapolis, Ind.

FINGERWRITER, Nickered sample 10c. Particulars free. K. Fancy Specialty Co., 303 Ashland Blvd., Chicago.

SHAVEZY Guard makes Safety Razor of your own favorite blade. Excellent line for shopmen everywhere. Sample 25c. Particulars, red stamp. Keon Mfg. Co., Waltham, Mass.

AGENTS—Demonstrators. Hydro-Vacuum Masseur. New invention. Sure big money. Indorsed by doctors and beauty parlors. Drop card now. Habasco, 504 Mathews Bld., Milwaukee, Wisconsin.

AGENTS—To sell the newest electric appliance on the market; sold everywhere there is electricity, in the home and office; liberal profits; sales-driving sample weighs a pound; i.e. experience or knowledge of electricity required; it shows how to use one light instead of two and get the same results; sells for \$3.50 and saves the purchaser an investment of \$25. Write for particulars. The Handy Light Co., 17 Handy Light Block, Cincinnati, Ohio.

"SPEARMINT" chewing gum—a dandy sideline. Sample box, 20 five-cent packages, sent prepaid, for 40c. C. Walsh, 407 Bonheur Bldg., Chicago.

AGENTS: Salesmen: Monthly Directory (Illustrated) always contains complete details of newest, best selling specialties. Sent 3 months for 10c. Directory, 120 Liberty St., N. Y.

EARN \$25.00 to \$50.00 a week. Parcel Post a great boom to the Mail Order Dealer, if he has the specialties which sell. We are Manufacturers of Patented Live, Big Profit Making Repeat Mail Order Specialties. Our co-workers sell the goods for us. Take advantage of our new combination co-operative "Tested Out" Selling Plan. New Summer Leader. Greatest Repeat-order. Patented, Just-in-season Leader ever manufactured by us. Spare time at first. Experience unnecessary. Big Profits. Small capital. Personal assistance. Write now for our co-operative Combination Manufacturers' Plan, Free Limited Coupon Offer. Positive Proof and Sworn Statements. J. M. Pease Mfg. Co., 35 Pease Bldg., Main St., Buffalo, N. Y.

AGENTS: Everyone desires Health and Beauty. The Vacuum Massage Device for home use, gives both. No drugs or electricity. Demonstration convinces the skeptical and gets the order. New invention. Low price. Be first in your territory. \$30.00 to \$50.00 a week. Big booklet free. Champlin Sales Co., Pittsfield, Mass.

AGENTS. Lady or gentleman in each state to sell our Pencil Sharpener, to offices, stores, schools, etc. Liberal commission. Beebe Co., 338 York, New Haven, Conn.

AGENTS—Salary or commission. Greatest seller yet. Every user pen and ink buys on sight. 200 to 500 per cent profit. One agent's sales \$620 in six days; another \$32 in two hours. Monroe Mfg. Co., X 6, LaCrosse, Wis.

AGENTS wanted for a new household labor saver. Quick seller. Big profits. Cary-Dane Co., 102 West 101st St., N. Y.

\$60 WEEK Selling New 3½ pound hand power Vacuum cleaner. Retail \$6. Get agency. Manufacturer, 723 Colonial Bldg., Boston.

BIG money in Essex Fan Motors, run by gas or gasoline. Winfield H. Smith, 10 Lock Street, Buffalo, N. Y.

BY acting as agent for our books, you can use your spare time to good advantage. You do not have to be a "professional" to take this up, as these books are just what everyone wants. Write for particulars. Popular Mechanics Book Dept., 318 W. Washington St., Chicago.

\$20-40 WEEKLY, selling guaranteed Hosiery, Underwear, Sweaters, Neckties, Handkerchiefs. Credit, Samples free. Sales Manager, Room 62, 54 Worth St., N. Y.

AGENTS make \$5.00 to \$10.00 a day on the start. Atkinson writes: "The best proposition I have found in my forty years canvassing." Permanent work. Household necessity. Saving 80%. Write to-day for General or Local Agents terms. Free sample. C. H. Stuart & Co., 18 Union St., Newark, New York.

CHEWING Gum—Sell to dealers. Clean, profitable business built up quickly with our new brands. Four flavors, novel packages. Send 10c for full pack of each and exclusive territory proposition. Helmet Gum Factory, 39 Opera Place, Cincinnati, O.

1500% PROFIT selling our Gold Sign Letters. We'll show you how. Samples free. Johnston Co., Quincy, Ill.

AGENTS make big money selling our new gold letters for office windows, store fronts and glass signs. Any one can put them on. Write today for free sample and full particulars. Metallic Sign Letter Co., 406 N. Clark St., Chicago.

WE are the largest manufacturers of Twisted Wire Brushes in America. Highest grade goods, best service, highest profit. Write for our new catalog. You are sure to win. Fuller Brush Co., 33 Hoadley Place, Hartford, Conn.

\$1,000 EARNED by three people within thirty days selling our Fire Extinguishers. Buyers everywhere, protected territory, 500% profit. Local and State Agents wanted. United Manufacturing Company, 1025 Jefferson, Toledo, Ohio.

U-KAN-PLATE—The polish that plates; \$18-\$40 week year round; exclusive field; free booklet. C. B. Seabury, L465, Boonton, N. J.

400% PROFIT selling our high grade work. Samples free. Gordon Co., Northwestern Bldg., Chicago.

AGENTS—\$200 monthly distributing Newells needle cases. Sell 115 needles in boots for 10c and make 200% profit. Approval Plan envelopes make talking unnecessary. Crew Managers write. Send 10c for sample book and particulars. Newell Company, 509 N. Grand, St. Louis, Mo.

\$2.50 PER day paid one man or woman in each town to distribute free circulars and take orders for concentrated flavoring in tubes. Permanent position. J. S. Ziegler Co., 443-D, Dearborn St., Chicago.

SIGN Agents—Stop paying fancy prices for Gold and Silver Metallic Sign Letters. Note ours: 2-inch letters, 70c; 3-inch, 80c; 4½-inch, 90c per 100. Non-tarnishable, staple goods. 5 assorted samples and instructions, 10c. Particulars free. H. Alexander, manufacturer, 328 East 59th St., New York. Established 1905.

AGENTS \$10 to \$15 per day easily made; 150% profit; exclusive territory; our cleaning, polishing and dustless mop is the big money getter and record breaker. Duncan Bros., 2910 N. Troy St., Chicago.

500% PROFIT selling our wonderful sign letters for office windows, store fronts and glass signs; resembles finest gold leaf; easily applied; samples free. Metallic Letter Co., 406 N. Clark St., Chicago.

SOAP agents make more money selling the celebrated Linro line. Coffee, flavorings, spices, soaps, perfumes, and 135 other items. Big commissions to you. Exclusive territory. Freight allowed. Handsome premiums to your customers. Free sample case. No deposit required. Free catalog. Linro Company, 13 Linro Bldg., St. Louis, Mo.

MEDALLIONS—300% profit. Make up your own goods and be independent. Catalogue free. Resag Co., 1205 Randolph St., Chicago.

AGENTS—Would you take a steady job where you can clear \$20 to \$30 weekly and work up to yearly profits of \$3,000 or more. My line is snappy household goods. Quick sellers. Get busy with postal asking particulars. E. M. Davis, B17 Davis Bldg., Chicago.

WANTED immediately agents to sell our high grade rebuilt typewriters, also ribbons and carbons; over 100% profit. Send for large illustrated catalogue and special agents offer. Harlem Typewriter Exchange, Agency Dept. 215 West 125th St., New York City.

KEY Checks—\$1.45 per 100. Dies for stamping names on checks, fobs, umbrella plates. Wholesale prices—Collar clips, sewing awls, etc. We show you how to make \$5 per day. Pease Die Works, Dept. M., Winchester, N. H.

AGENTS—County and State; men and women everywhere to sell the Pinless Clothes Line; a practical labor saving invention. Lasts life-time, sells on sight, gives perfect satisfaction. Agent Sutton of Georgia, sold over million feet; 100% profit; write quick for exclusive territory; information free; sample prepaid 25c stamps. Pinless Clothes Line Company, 520 Wilcox Bldg., Portland, Oregon.

AGENTS make \$30.00 weekly selling our 500 Handy Household Articles; catalogue free. Scheff Company, Desplaines, Ill.

WE manufacture glass paper; plain glass windows made to look like real stained glass; something new; easily applied; big money maker; 2 sample sheets, catalogue in colors, with discount for 10c. Parrish Co., Lakeside Bldg., Chicago.

AGENTS Wanted—Mechanics and shopmen make over \$100 a month in spare time selling transparent handled novelty knives and razors. Big profits. Sales easily made. Write for terms today. Novelty Cutlery Co., 67 Bar St., Canton, O.

YOU can make \$\$\$\$ as our general or local agent. Household necessity; saves 80 per cent; permanent business; exclusive territory; salary or commission; free sample; credit. J. Pitkin, 113 Redd St., Newark, N. Y.

STOP Here! Let me start you in a home business that will bring you money every day. Experience unnecessary. Spare time. No canvassing. I furnish everything and guarantee success. Send for proofs. Voorhies, Desk C. R., Omaha, Neb.

DON'T fail to read Independence and Fortune under Business Opportunities.

AGENTS—Portraits 35c. Frames 15c. Sheet Pictures 1c. Stereoscopes 25c. Views 1c. 30 days' credit. Samples and catalog free. Consolidated Portrait Co., Dept. 1196, 1027 W. Adams St., Chicago.

I WILL start you earning \$4 daily at home in spare time, silvering mirrors; no capital; send for free instructive booklet, giving plans of operation. G. F. Redmond, Dept. 306, Boston, Mass.

PERFECTION Pocket Adding Machine. Lightning seller. Agents wanted. Cincinnati Specialty Mfg. Co., Dept. R, Cincinnati, Ohio.

HELP WANTED

WANTED—Hydraulic and Electrical operators and maintenance men for large power plant in the East. Permanent position with good prospects of advancement for the right men. Plant in small town, located directly on the railroad, one hour's distance to larger city. Applications with full particulars to be sent to P. W., 6th floor, 318 W. Washington St., Chicago.

INSURANCE men wanted every town to handle fire, automobile, health and accident agency. Money-making proposition. Provident Insurance Association, Waco, Texas.

LOCOMOTIVE-Running Pays Big. Learn how. Particulars free. Superintendent, 1618 Mallers, Chicago.

CASH for names, information, ideas, formulas, etc. Steady home business. Instructive booklet for stamp. Nat'l Information System, 298 Marietta, Ohio.

MAKE money writing short stories. Big pay. Free booklet tells how. United Press Syndicate, San Francisco.

GOVERNMENT positions. Civil Service. Information free. Prior, 5 So. Wabash, Chicago, Ill.

MAN traveling in the eastern cities to introduce to Street-Car Co. improved trolley device. Chance to make a little fortune on patent pending invention. C. K., 6th Floor, 118 W. Washington St., Chicago.

BIG money writing songs. We pay hundreds of dollars a year to successful writers. Experience unnecessary. Song poems wanted with or without music—will pay one-half of profits if successful. Send us your work today. Acceptance guaranteed if available. Largest concern in the country. Free particulars. Dugdale Co., Dept. 265, Washington, D. C.

GET prepared for Government "Exams" by former United States Civil Service Secretary Examiner. Like Popular Mechanics. I offer no premiums, have no "Positions Guaranteed" or "Coaching Free" schemes. Straight propositions. Booklet C without obligation. Write now. Arthur R. Patterson, Rochester, N. Y.

MEN and women wanted for government positions. \$60 to \$100 month to commence. Vacations. Steady work. Over 12,000 appointments this year. Parcel post requires several thousand. Influence unnecessary. Write immediately for free list of positions. Franklin Institute, Dept. O 21, Rochester, N. Y.

WANTED—Distributors, men or women, to give away free packages our famous Perfumed Borax Soap Powder; no money or experience needed; good pay. H. Ward & Co., 218 Institute Place, Chicago.

GET a government job. List of propositions free. Franklin Institute, Dept. O 21, Rochester, N. Y.

SALESMEN: Two good men in each State. Paints, Oils, Greases. Signet Oil Company, Cleveland, Ohio.

\$75 MONTH paid railway mail clerks. Parcel post means many appointments. Apply immediately. Franklin Institute, Dept. O 21, Rochester, N. Y.

WANTED—Distributors of advertising matter everywhere. American Distributor, Blairsville, Pa.

WANTED—Railway Mail Clerks—Carriers—Postoffice Clerks. Parcel Post requires several thousand. Commence \$65 to \$75 month. Apply immediately. Franklin Institute, Dept. O 21, Rochester, N. Y.

"BIG Seller," men and women making \$25 and \$50 week easy; needed in every home; \$1.50 profit each sale; finest Summer specialty on the market. Write today for free literature. Doud Lighting Co., 174-B, North Sangamon, Chicago.

WHY work for others? I will start you in the Cleaning and Dyeing business in your own town. Big profits. Pleasant work. No capital. Free particulars. John H. Bayliss, Baltimore, Md.

BE a detective: Big wages, traveling everywhere. Write Detective Johnson, Department 2, Houseman Bldg., Grand Rapids, Mich.

FREE illustrated book tells of about 300,000 protected positions in U. S. service. Thousands of vacancies every year. There is a big chance here for you, sure and generous pay, lifetime employment. Just ask for booklet S-29. No obligation. Earl Hopkins, Washington, D. C.

WANTED—Postal Clerks—Mail Carriers. \$65 month commence. Apply immediately. Franklin Institute, Dept. O 21, Rochester, N. Y.

WRITE Moving Picture Plays. \$10 to \$100 each. Constant demand. Devote all or spare time. Experience, literary ability or correspondence course unnecessary. Details free. Atlas Publishing Co., 3045 Atlas Bank Bldg., Cincinnati, Ohio.

FIRST-CLASS experienced sales manager for city force of agents. Exceptionally liberal proposition; salary, commission and opportunity for share in profits to the right man. 707 Boyd Building, Winnipeg, Manitoba.

GOVERNMENT positions open to men and women. Big pay. List of positions free. Write immediately. Franklin Institute, Dept. O 21, Rochester, N. Y.

AGENTS make big money and become sales managers for our goods. Fast office sellers. Fine profits. Particulars and samples free. One Dip Pen Company, Dept. 2, Baltimore, Md.

DON'T Pay Anything to Learn a Trade. Investigate our system of teaching on actual contract jobs. Plumbing, bricklaying, electricity, automobiles; 200 workmen; six years' experience. Catalog free. United Trade School Contracting Co., Los Angeles

PLEASANT Home Work—Ambitious persons can earn good income in spare time copying letters. Former experience unnecessary. Send today addressed, stamped envelope for particulars. Box 17, Station H. G., New York.

ANY intelligent person may earn steady income corresponding for newspapers. Experience unnecessary. Address Press Correspondence Bureau, Washington, D. C.

WANTED Salesmen—Earn \$250 per month, sell advertised goods. Best contract on earth. Elato Co., Station L, New York, N. Y.

MEN—Earn \$100 to \$150 monthly investigating; chance to see the world with all expenses paid; write, Loraine System, Dept. 304, Boston, Mass.

BE a Detective. Earn \$200 monthly, positions open. A practical course in Detective Work taught by mail. American School of Criminology, Detroit, Michigan. Dept. F.

WANTED, Machinists, Agents, double your salary! Saunders' Hand Book Practical Mechanics; lightning reference. Thousands used. \$1.00, \$1.25, \$1.50. Circular sent. E. H. Saunders, 216 Purchase St., Boston, Mass.

MEN and boys to learn automobile repairing, driving on up-to-date cars; electricity, civil engineering, surveying. Methods most practical. Room and board while learning. Positions secured; satisfaction guaranteed; catalog free. National School of Engineering, 2110 W. 7th, Los Angeles.

GOVERNMENT Examinations. Most thorough preparation; \$5; returned if not appointed; particulars free. American Civil Service School, Washington, D. C.

WANTED one thousand chauffeurs and repair men. Our demand for automobile engineers exceeds the supply. Calls for men of intelligence and mechanical bent capable of commanding \$100 to \$150 per month upon graduation. Resident course \$20 to \$60. Home Correspondence course completed by practical road and shop work at this school, highly successful. Look this up. Auto Schools of America, Dept. T, 1600 Michigan Ave., Chicago.

STOP Here! Let me start you in a home business that will bring you money every day. Experience unnecessary. Spare time. No canvassing. I furnish everything and guarantee success. Send for proofs. Voorhies, Desk C. R., Omaha, Neb.

GO on the Stage. Vaudeville career offered you. Experience unnecessary. Managers endorse my method. Instructive vaudeville book free. Write today. Frederic LaDelle, Sta. 10, Jackson, Mich.

I WILL start you earning \$4 daily at home in spare time, silvering mirrors; no capital; send for free instructive booklet, giving plans of operations. G. F. Redmond, Dept. 306, Boston, Mass.

DON'T fail to read Independence and Fortune under Business Opportunities.

LOCOMOTIVE Firemen, Brakemen for all railroads. Wages about \$100; experience unnecessary. No strike. Send age; stamp. Railway Association, Dept. 89, Brooklyn, N. Y.

FOR ADVERTISERS

ADVERTISING matter distributed; sign tacking. Addresses supplied. Geo. A. Campbell, Steubenville, Ohio.

YOUR 30 word ad in our 24-page post-card magazine 15c. Display 50c inch. Elite Exchange, 3827 N. 44th Court, Chicago.

BARGAIN Advertising Rate—Just to get acquainted. 15 words, one insertion; guaranteed 13,000 copies printed, and one year's subscription, 25c. Digest, Grand Rapids, Mich.

5,000 PAPER Drinking Cups, printed, \$1.80 per M. Yarroll, New Britain, Conn.

DIAMONDS, WATCHES AND JEWELRY

GO direct to the diamond importer; buy our Genuine Perfect Cut Diamonds at \$97.50 per Carat—the world's lowest price, \$52.50 per carat less than any jeweler can sell! We guarantee to buy back our diamonds for cash, and allow the full price in exchange, any time! Any diamond shipped C. O. D. on approval, at our expense. Write for 104 page De Luxe Basch Diamond Book Free! See our display ad page 169. Address L. Basch & Co., Dept. C240, State and Quincy Sts., Chicago.

SURPLUS Stock High-Grade Gold-Filled Cuff Buttons. Regular \$1.50 grades. For quick disposal, price 50c. Plain Roman, Beaded Edge or Rich Fancy Design. Scarf-pins, 50c. Satisfy you in design or money refunded. Sent prepaid. J. Q. Kelly & Co., 6406 Rhodes, Chicago.

TIME and Its Measurement—An unusual book, being a readable and instructive history of time measurement from the sun dial of remote ages down to the clock period and the present day. Of interest to everyone connected with horology and contains much information not available elsewhere. Written by a great authority who has made this study a hobby. Price in cloth binding \$1.50 postpaid. Popular Mechanics Book Dept., Chicago.

MECHANICAL ENGINEERS

MACHINES designed and perfected. Cost of manufacture reduced. Estimates and contracts for manufacture of everything mechanical. G. L. Hogan, 4218 Grand Blvd., Chicago.

DRAWINGS for automatic and special machinery. Inventions developed and commercialized. Investigate. Stripe & Klepper, 230 North Jefferson St., Chicago.

EXPERT designing of special machinery, jigs, fixtures, and dies, for rapid production at low cost. Eastern Engineering Company, Dorchester Center, Boston, Mass.

INVENTIONS Developed, Machinery Designed, Working Drawings. Erie Engineers, Hippodrome, Cleveland.

MACHINE designing, working drawings, experimental machinery. Cary L. Abbott, Mechanical Engineer, 1241 Unity Bldg., Chicago.

MACHINERY, TOOLS AND SUPPLIES

FOR Sale—42-inch Henley Pulley Lathe with one 36-inch Face Plate and one Screw Head for attaching Face Plate or Chuck as desired. First-class condition. Full particulars and photographs on request. The Challenge Machinery Co., Grand Haven, Mich.

ENGINE lathe, 18-inch with chuck, \$85. Squaring shears, 30-inch, \$16. Boiler feed pump, 2x3x3, \$30. Magnetos, carburetors, coils. Keller-Lentz Co., Covington, Ky.

SPINNING Lathes for Sale—Three spinning lathes with counters, two 18-inch by 24-inch and one 16-inch by 36-inch between centers. Lathes in excellent condition. Richmond Mfg. Company, Richmond, Ind.

FLEMING Shoe Stitcher, new. Sewed less than 200 pairs. No use for it. Best offer. B. J. Parker, Box 510 Tilton, N. H.

FOR Sale—5x5 double-opposed engine fittings and transmission. M. C. Carley, Claremore, Okla.

8-H. P. stationary gasoline engine, \$85. Badger Motor Co., Milwaukee, Wis.

SEND 50c for booklet "How to Run and Install Gasoline Engines," and year's subscription to Gas Energy, 28 Murray St., New York.

GASOLINE Engines, 1/2-horsepower, upright, water-cooled, two-cycle, complete. \$20. Bare engine, \$13. Mustin Mfg. Co., Newport, Kentucky.

WANT 1 1/2 to 2 h. p. gasoline engine, small electric plant. Good exchange proposition. A. M. Ericson, Hector, Minn.

FOR Sale—All sizes new and second-hand pulleys, belting, shafting, hangers and supplies. Passman Bros., 39 S. Green St., Chicago, Ill.

FOR Sale—Thrill equalizing gas machine, 150 light capacity. Will sell cheap for cash. Write the Blanding Company, Detroit, Minn.

I HAVE several different sizes of the following machines for sale: Lathes, shapers, planers, drill presses, punch presses, fox turret lathes, screw machines, gas engines, steam engines and boilers, saw tables, band saws, swing saws. Pinner, 122 Water St., New York City.

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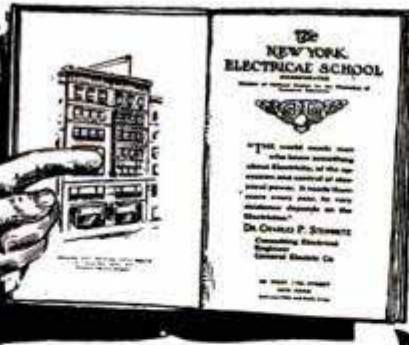
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Checks will be sent on the last day of each month for the prize articles received during that month. Publication in the magazine will follow in about two months.

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First Prize—ARTHUR WORISCHEK, New York City.....\$10
"Homemade Fire Extinguisher"

Second Prize—HAZEL KOLAR, Maywood, Ill..... \$5
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RALPH E. MOSHER, Port Deposit, Md..... \$5
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Continued from Page 30

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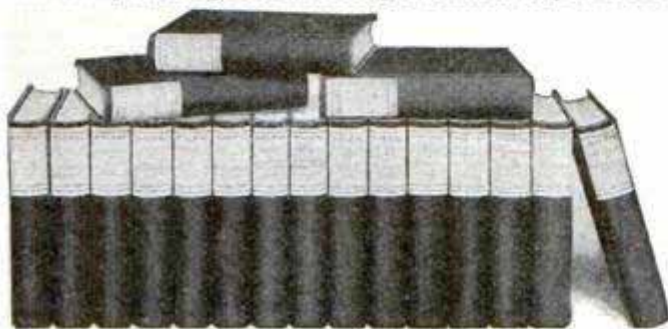
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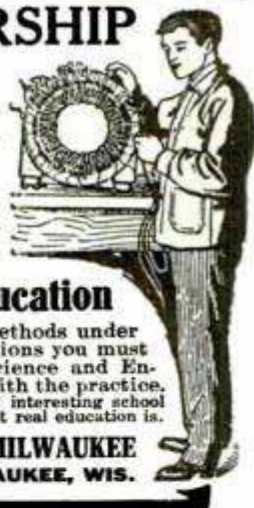
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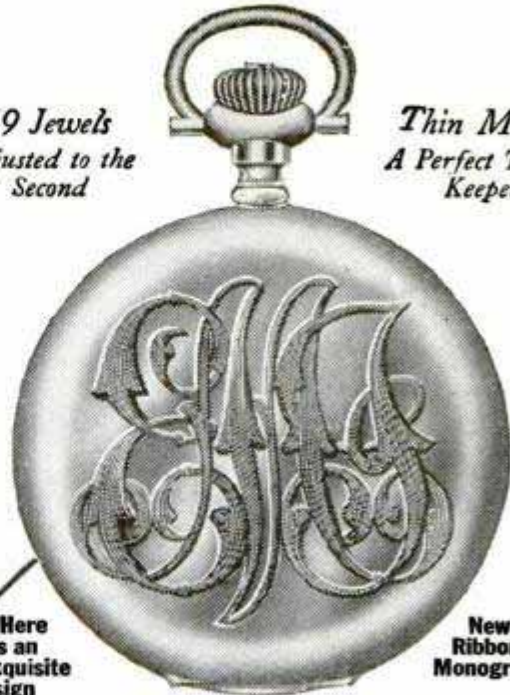


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A SCHOOL WITHIN ITSELF

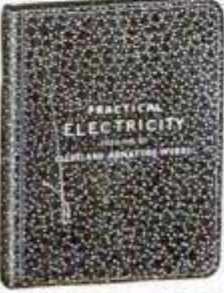
There are XX chapters in all, XIX carrying you from the fundamental principles of electricity on through the various branches to a point where the careful student comprehends the complete designing, care and operation of a dynamo or motor, and one chapter on electric automobiles, outlining their construction, care and operation, and all about storage batteries and how to handle them. Each subject is carefully written and to the point. After a student studies a subject, he is questioned on that subject in such a manner as to bring clearly to his mind the points he needs to know regarding same. The book contains a dictionary defining 1500 Electrical Words, enabling the reader to ascertain the meaning of any electrical word, term or phrase used in this book, as well as hundreds of others in common use. All required tables necessary in the study are in it.

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NAME

ADDRESS

Pop. Mech. 6-13

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of Correspondence, Chicago, U.S.A.

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Popular Mechanics Magazine

WRITTEN SO YOU CAN UNDERSTAND IT

Vol. 19

JUNE, 1913

No. 6

Baseball-Pitching Gun for Batting Practice

THE automatic ball-catching and returning device shown in a recent issue of this magazine, designed to give baseball pitchers unlimited practice, recalls a baseball-pitching gun invented some years ago by Prof. C. H. Hinton of Princeton University.

This gun, resembling a cannon in appearance and hurling the ball by means of gas shot into its breech from an ordinary repeating rifle, was not designed to take the place of a pitcher in a game, but to give batters an opportunity for unlimited practice.

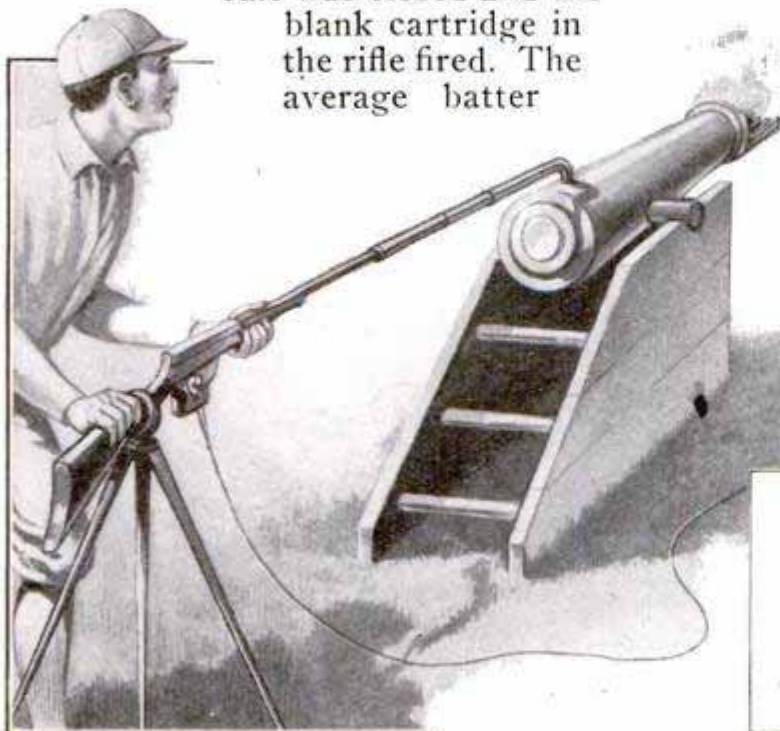
This gun was successful in that it would actually throw curves and throw them accurately, but there was one defect that could not be overcome, due to the "human equation." The gun never failed to inspire fear in the batter. That the batter would know just when the ball was coming, an electric wire was run to the batters' box, and by stepping on the plate the circuit was closed and the

blank cartridge in the rifle fired. The average batter

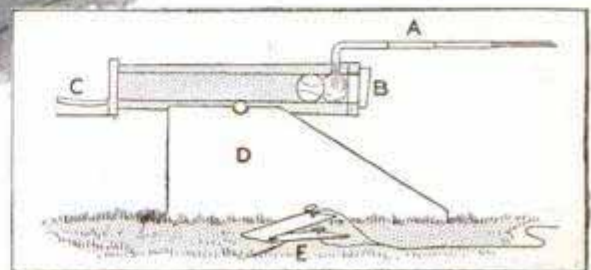
would step on this plate and then jump back about 4 ft., letting the ball go by. Another drawback was the fact that the hot gases soon acted on the covers of the balls and made them as hard as bricks.

An almost unlimited range of speed was obtained by making the tube connecting the breech of the gun, into which the rifle was discharged, telescopic. The shorter the tube, the greater the force. Rubber-faced curving fingers, adjustable to any plane about the muzzle, caused the ball to curve "out" or "in," or "drop," different sets of fingers giving different degrees of curve.

The inventor of the pitching gun



The Famous Princeton Pitching Gun: In the Diagram Below, A is the Telescopic Tube into Which a Rifle is Fired; B, the Removable Breech Block; C, Curving Fingers; D, Gun Carriage, and E, the Contact Plates Operated by Batter's Foot



*Schaeffer Hinton
U.S. Patent Office
Washington D.C.
(Son of C. H. H.)*

came from England in 1893 to be a member of the faculty of Princeton University. He had had some success in athletics at Oxford University, and soon became interested in baseball. He had not studied the game very long before he noticed that pitchers, in giving

practice to batters, did not pitch as well as in a game. So he set to work to devise a gun that would throw any curve at any speed, in order that a batter who was weak in "outs," for example, could bat against "outs" until he had learned to handle them.

A TALKING MACHINE FOR THE DEAF-BLIND

3694 A little device called a "Braille talker" makes it possible for people who are both deaf and blind to con-



Simple, Practical Device by Means of Which Persons Both Blind and Deaf can Carry on a Conversation

verse. It is a small polished piece of wood on which, at either end, are seven wooden keyboard stops. The two persons wishing to talk sit down and place their fingers on the stops. Six of the stops on each side, using the Braille alphabet, which consists of a system of points arranged in different groupings, are used for the formation of words. Different combinations of stops pressed down throw into position the points which the blind read by feeling them with their fingers. Six points, singly or in groups, are used to form all the letters. The seventh stop on each side of the board is the "spacer," pressed once to signify the end of a word and twice to show that the "speaker" has finished his or her "speech."

ⒸThe Suez Canal tolls for 1912 amounted to \$26,000,000.

Shipping World

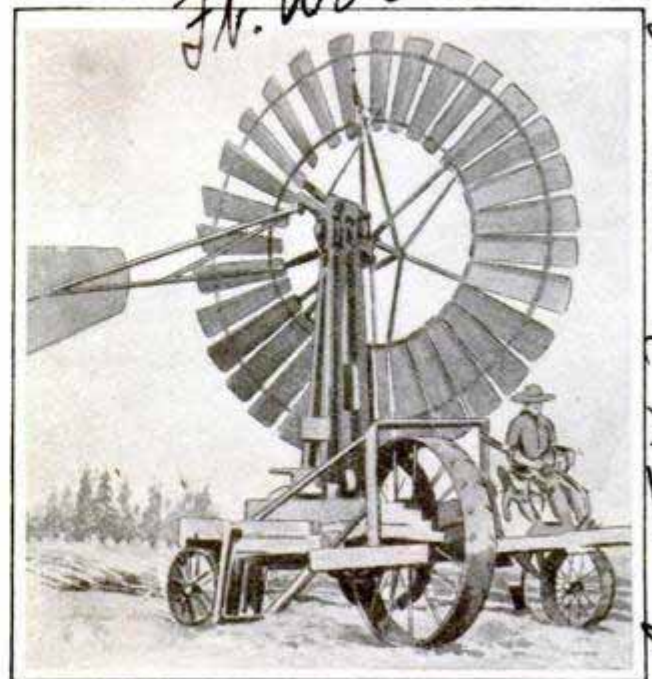
ELECTRIC LOCOMOTIVES OF GREAT POWER

3931 *Iron Age* 4/10/13
 Nine electric locomotives, said to be the most powerful ever built, have recently been ordered by the New York Central and Hudson River Railroad. The great power of these locomotives is due to the fact that the entire weight, 100 tons, is carried on motor-driven wheels. They will exert a sufficient tractive effort to haul a train weighing 1,000 tons at a speed of 60 miles per hour.

*General Electric Co
 Schenectady N.Y.*

3696 PLOW DRIVEN BY WINDMILL

Byron *Utah*
 A Texas inventor is attempting to harness the wind to the task of driving a plow. He made a trip of eight miles along a road with his queer plow, the wind driving it the entire distance, but has not yet succeeded in making it operate with the plowshare in the soil.

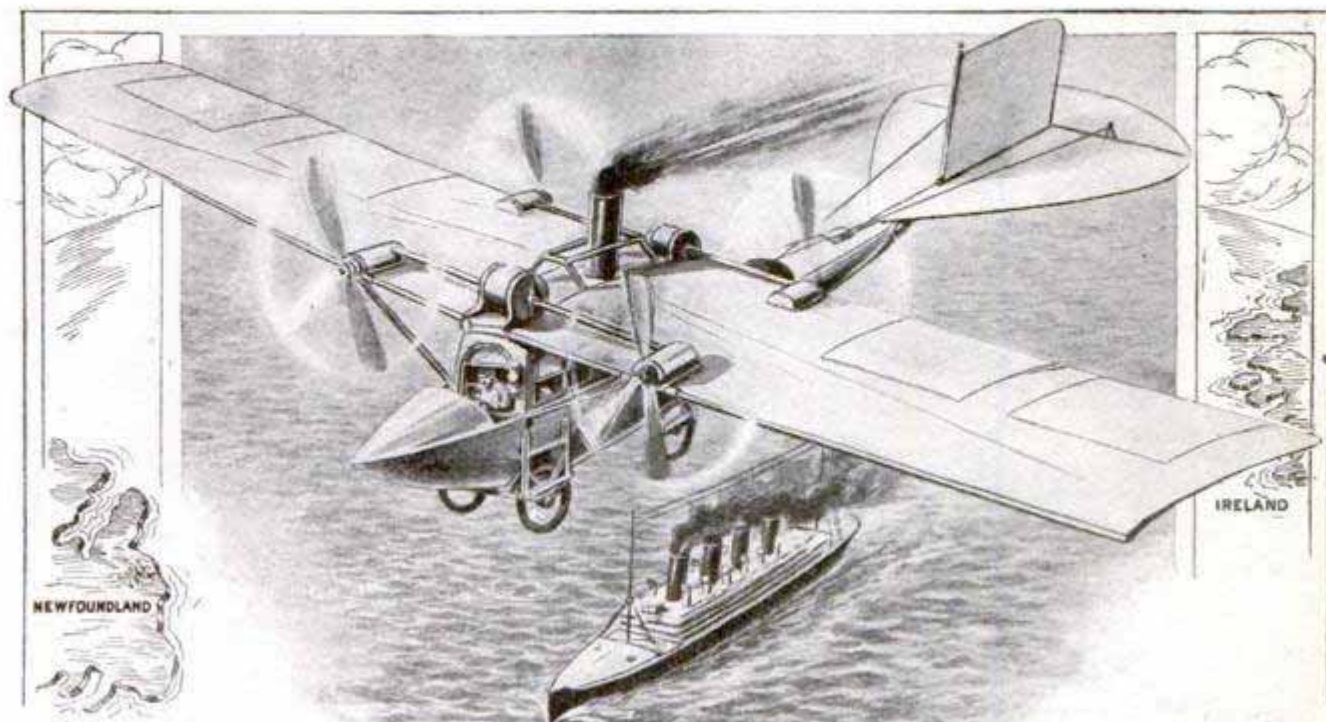


Windmill Hitched to a Plow

*and H. M. Fletcher
 Chamorro Tex.*

*British & Foreign Blind Union
 Great Fitzland St.
 London-Eng.*

STEAM-DRIVEN FLYING BOAT TO CROSS ATLANTIC



Steam Flying Boat
being Built to Cross Atlantic

To fly across the Atlantic Ocean in 31 hours in the largest and heaviest ship of the air ever constructed, is the aim of a young French law student of Chicago, who has already constructed the hull of an aerial craft which he will name "Napoleon."

This machine is planned to have the widest pair of wings ever made, constructed of aluminum steel. The total weight of the monoplane will be 5,000 lb., but the raising capacity of the wings, as designed, will be, theoretically, about 16,000 lb., sufficient to lift a crew of six men, with their provisions and fuel supply.

The motive power is to be provided by two 150-hp. steam turbines, weighing 250 lb. each, the fuel for which will be condensed coke. Each engine will control two 8-ft. propellers of the usual shape, one pair in front and the other behind. Additional stability is expected to be secured by six automatic balancers, in the form of square shutters to open and close as the hydro-aeroplane tips beyond a certain angle. A fluid in a metal ball will control the releasing triggers for each set of balancers, the action consuming only



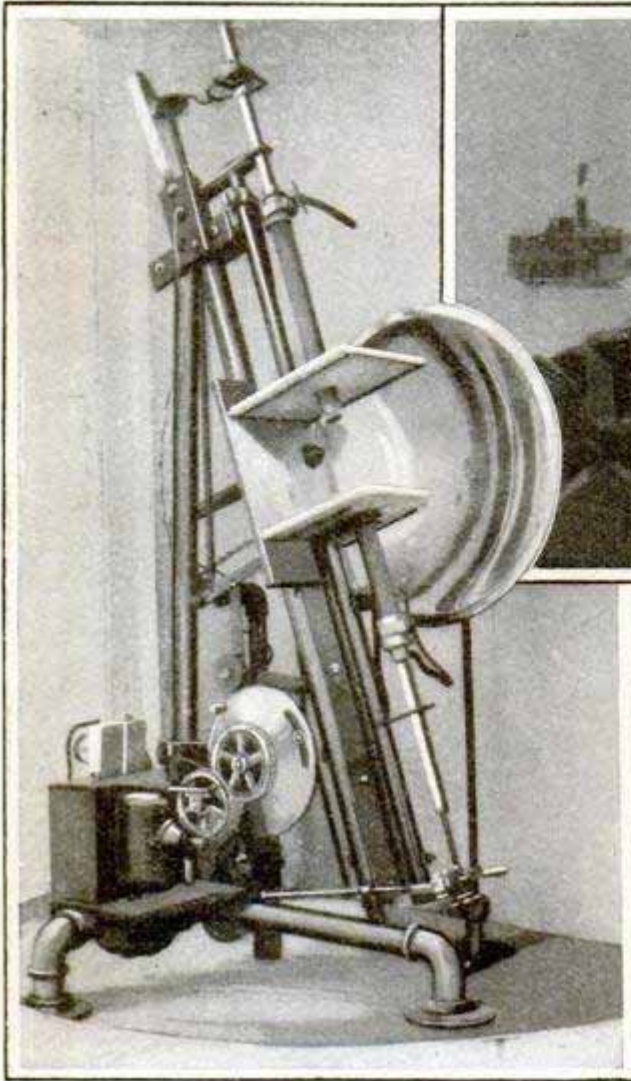
The Hull of the "Napoleon"

1/25th of a second. The inventor claims to have floated stationary in the air for more than 20 minutes by means of this equipment on an ordinary monoplane, during which time the shutters were kept fluttering constantly.

It is proposed to carry 800 lb. of coke, and over 500 gal. of water in two boilers, which the inventor claims will be sufficient to keep the craft in motion for 58 hours.

The spread from tip to tip of the wings is 100 ft. 6 in.; the boat hull is 35 ft. long, with a beam of 6 ft. 6 in. The length, over all, will be 55 ft. The area of the spread surface will be 1,655

*Built by A. Le Gouneur
Piscis Aviation Field*



The Electric Flash-Lamp Outfit on a Harbor Pier and a View of the Complete Outfit

ELECTRIC FLASH LAMP FOR 3584 LIGHTHOUSES

A new electric flash lamp for short-range lighthouses, and particularly for harbor lights, is here shown. The mechanism, which is simple, periodically produces a flash of light between the ends of the carbon rods. A powerful reflector is arranged just back of the carbons. The flash is obtained by drawing out or stretching the electric arc which is formed by the current in bridging the gap between the ends of the carbons. At the moment of greatest intensity the light is extinguished by an electromagnet. This method of producing the flash permits of variation in the time rate.

The lightness and simplicity of the outfit enable it to be used as a portable signal flash light by ships.

POTASSIUM FERTILIZER

FROM FELDSPAR

A method of producing potassium fertilizer, by treating, in the electric furnace, feldspar, or other minerals containing potassium, with a suitable proportion of carbon and iron, has been invented by a Swedish electrochemist. Tests of this fertilizer have shown that it is easily assimilated by all soils and that it does not contain chlorine, an element that is injurious to certain soils.

Inventor
Axel Lindblad,
Sweden

sq. ft. The boat, exclusive of flying rigging and machinery, weighs 496 lb. It is made of selected white pine on a frame of rock elm, sheathed with aluminum steel, and is shaped like an ordinary launch. The aluminum wings and tail will have cork inserts, instead of pontoons. Clock-spring steel, $\frac{1}{2}$ in. wide and of No. 16 gauge thickness, will be used in place of wire for stays.

The vessel will cost \$11,000 when completed, of which \$2,700 will go for each turbine. The equipment will include a wireless outfit and an electric-lighting system with searchlight. One of the crew of six will be an electrician and wireless operator.

The actual construction of the "Napoleon" was begun early in 1913, and the inventor plans, after experimental flights over Lake Michigan, to fly to the Atlantic coast, and then attempt to cross the ocean.

PAINTING THE PANAMA CANAL

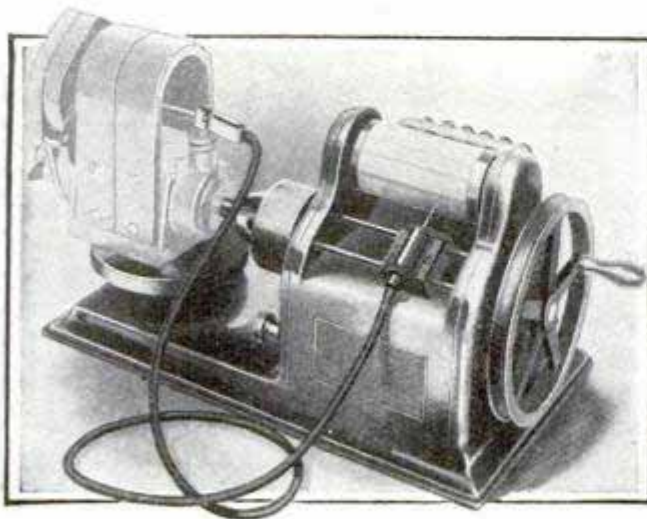
Canal Record
LOCK GATES 3/26/13

Permanent painting of the lock gates of the Panama Canal is now being carried on. The process involves two operations, the preliminary application of a solution to the steel to fit it for the adhesion of enamel, and the application of bitumastic enamel, or marine paint, to an average thickness of about one-sixteenth of an inch.

A RECORDING TESTER

36889 OF MAGNETOS

Ans. instrument designed for testing the ignition systems of gasoline engines makes a record of the timing and ignition of the magneto on a chart wrapped around a revolving drum. The lines on the chart represent degrees of crankshaft rotation. The chart is divided into 180 deg. and the drum travels at twice the speed of the magneto, so that each time the magneto produces a spark, which is ordinarily twice per revolution, or 180 deg. apart, the chart has made a complete revolution, and each succeeding spark should fall on the same line of the chart as the one preceding it. In this way is shown, by the alinement of the sparks on the chart, the relative timing, or synchronism, of each cylinder, while the area affected by the spark on the chemically prepared chart shows its intensity.

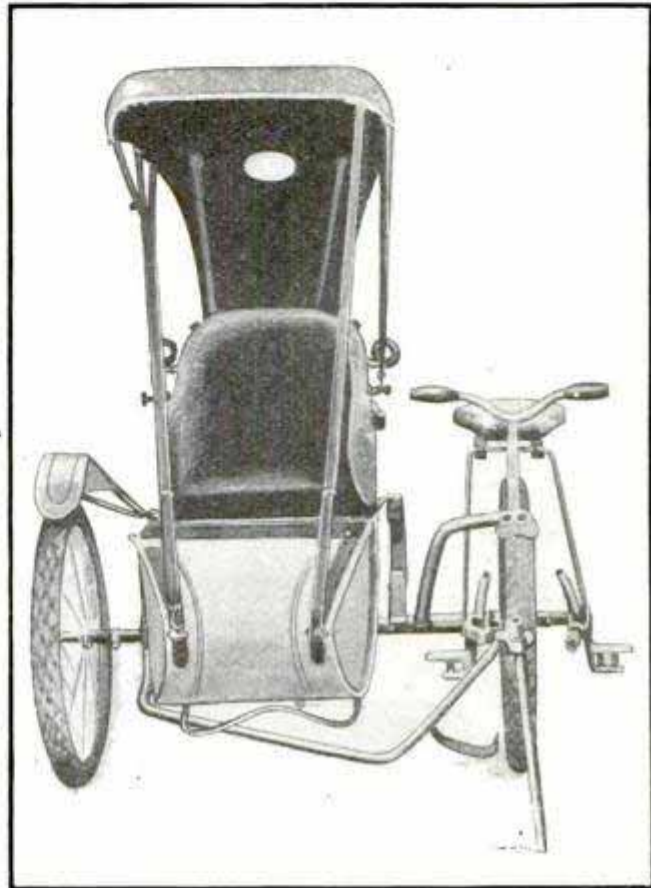


Device for Testing and Recording the Operation of an Ignition System

IMPROVED SIDE CAR FOR

3558 MOTORCYCLES

The most distinctive feature of this side car for motorcycles is the canopy or top which extends over the seat and



Motorcycle Side Car with Buggy Top

Motorcycles
provides the passenger with ample protection against the direct rays of the sun, and also acts as a suitable covering in case the vehicle is overtaken by a rainstorm or other inclement weather. Another important feature possessed by this type of side car is the "rocker motion" obtained by mounting the body upon the springs in a special manner.

POWERFUL SEARCHLIGHTS

FOR GERMAN AIRSHIPS

3916
A 40,000-cp. searchlight, capable of illuminating the *consular* sea from a height of 5,000 ft., was carried by one of the German naval dirigibles during recent maneuvers. A series of night experiments were held to demonstrate the practicability of searchlight observation from airships.

National Cycle Manufacturing Co. Aurora - Ill.

Photograph

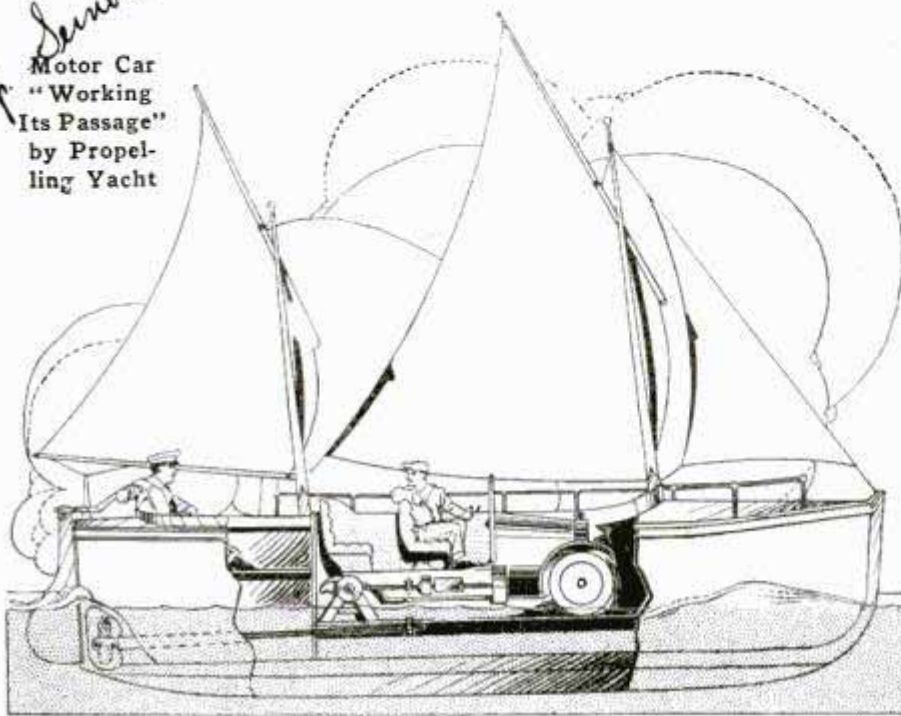
53

AUTOMOBILE USED TO DRIVE SMALL YACHT

3729

The application of an automobile to the propulsion of a small yacht has been worked out successfully by an

2.14 hp Samba
Motor Car "Working Its Passage" by Propelling Yacht



Col. Urwinston

English sportsman. The vessel, a 32-ft yawl, has a deep cockpit so arranged that the automobile can be run or lifted into it. The rear wheels are then jacked up and the driving mechanism of the car connected to the yacht's propeller by chain gearing. With a 16-hp. car the yacht was driven against head winds on a three weeks' cruise without trouble.

MAKING GAS PIPES OUT OF PAPER

3918

Serviceable gas pipes can be made out of paper, according to a French authority which states that such piping is now being manufactured by two processes.

In the first, the pulp is run into a mold through which a mandrel passes. It is then compressed, dried and varnished, the tubes so produced being rigid, and but little liable to leakage. In the other process, sheets of manila paper are cut to a breadth equal to the desired length of the tube, and then given a bath in asphalt in a state of fusion. Then, when half cold, the sheets are rolled tightly and uniformly round

The Gas Industry
Apr 1913
pg 228

an iron core, successive sheets being added until the desired thickness is attained. The tube is then subjected to pressure in a special machine, and covered with fine sand, which adheres to the asphalt.

It is estimated that 2,400 men will be required for the operation and maintenance of the Panama Canal.

3816

PUMP THAT BLOWS WATER BY GAS EXPLOSIONS

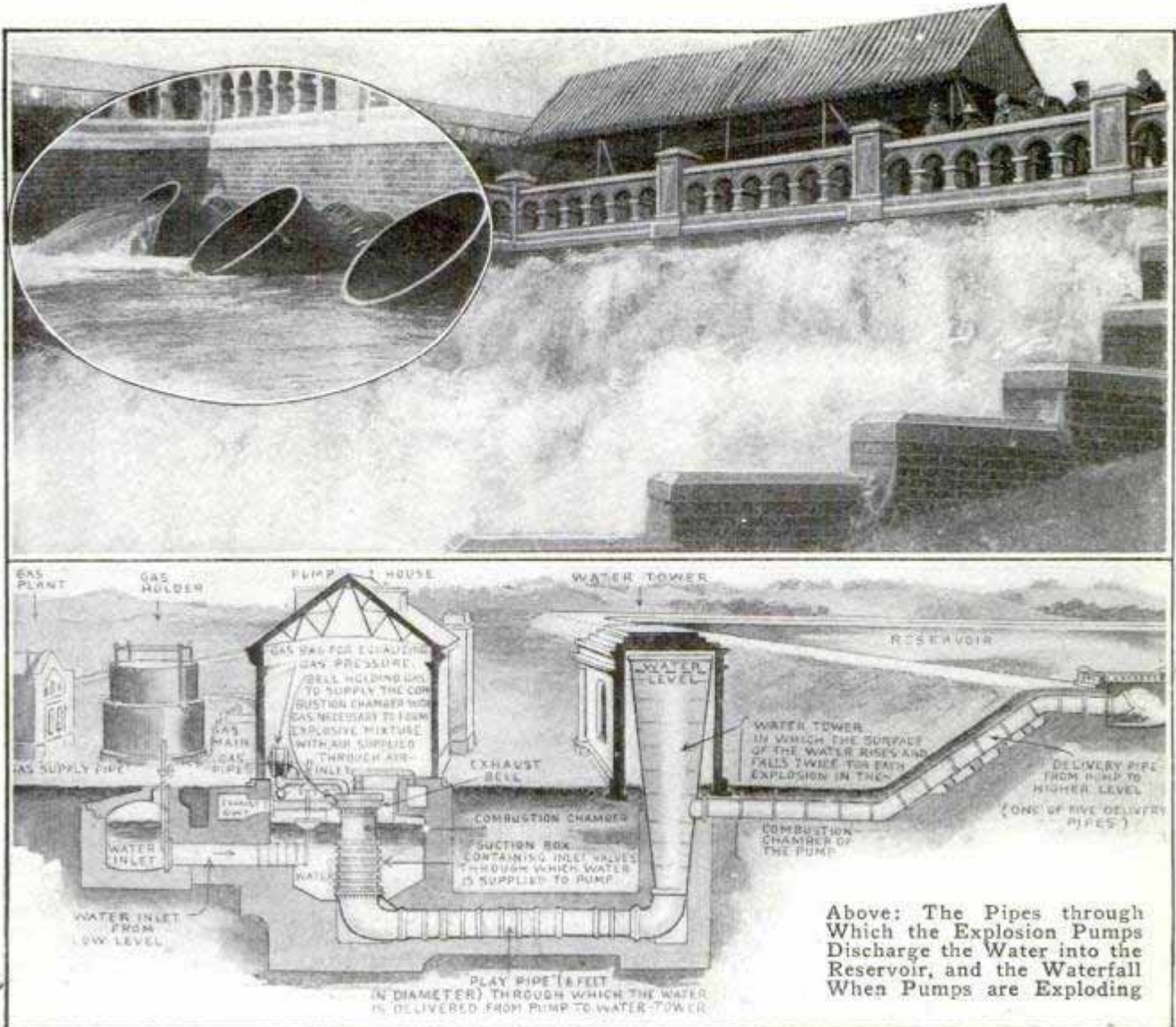
A new type of pump recently installed for lifting the water from the River Lea into the new 3,000,000,000-gal. reservoir which serves London, operates by the explosion of a mixture of gas and air directly against a volume of water. Five explosion pumps do the work, four of them discharging 40,000 gal. of water per minute each, and the other, 20,000 gallons.

The remarkable explosion pump, the nature of which is clearly indicated in the drawing, is the invention of an Englishman who was interested in the

various uses to which gas engines could be put. "Here is a piston removing water indirectly by the force of gas explosions," she said to himself. "Why should not the gas explosions directly remove the water?" The engine consists of two main parts—the combustion chamber and the play pipe. The water in the play pipe performs all the functions of the piston, flywheel and crank of the ordinary gas engine. A mixture of air and gas is pumped by a small compressor into the space above the water in the combustion

H.A. Humphrey - staff of Pump & Power Co., Ltd.
80 Victoria St

Pumps built by Humphreys & Co., Ltd.



Above: The Pipes through Which the Explosion Pumps Discharge the Water into the Reservoir, and the Waterfall When Pumps are Exploding

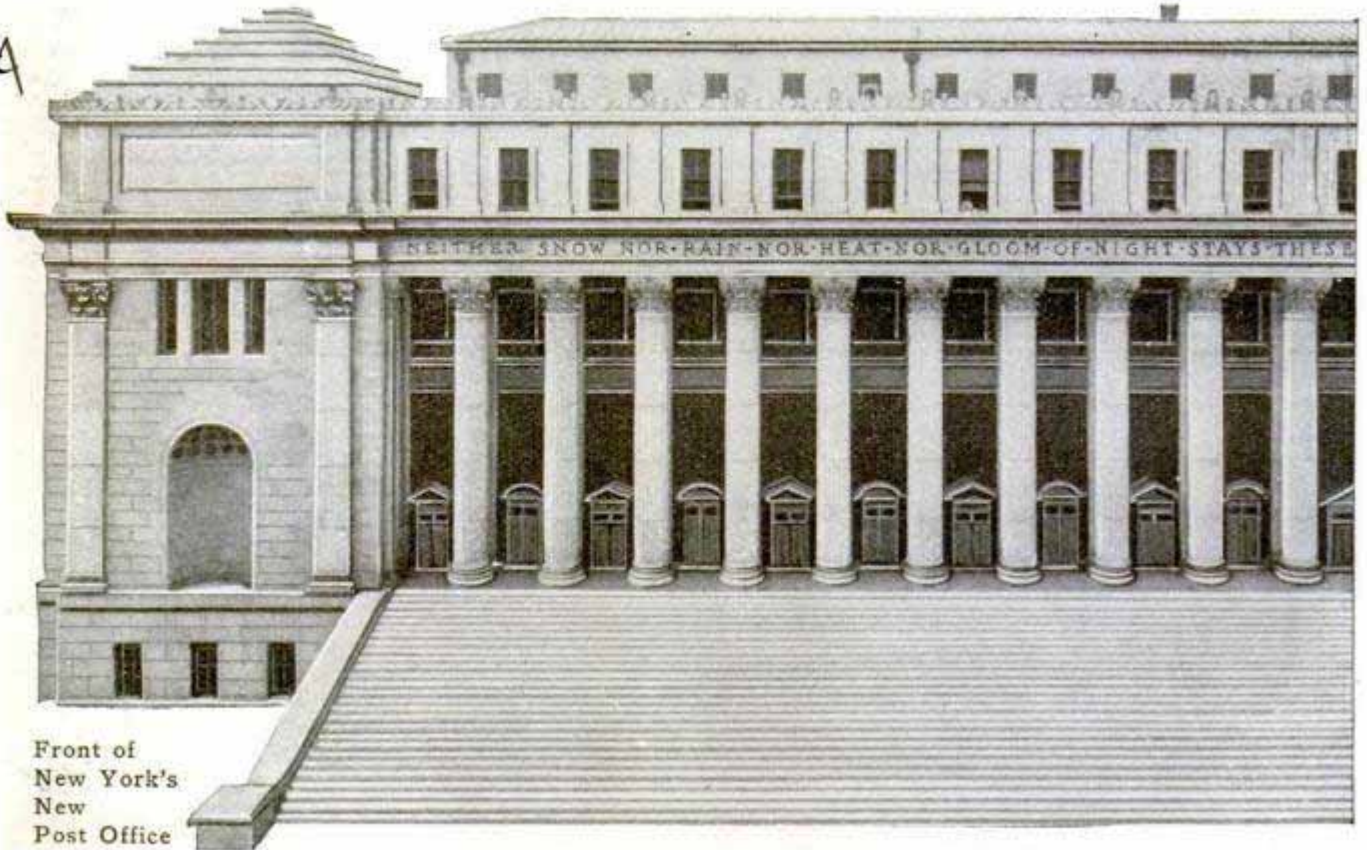
Drawing Explaining the Operation of the Remarkable Explosion Pumps

chamber and the charge is fired by an electric spark. The explosion drives the water along the play pipe, some of it rising in the conical tower and some passing through the delivery pipe into the reservoir. The momentum is sufficient to cause the water level in the combustion chamber to fall, a partial vacuum is created, more water enters through the inlet valves, and at the same time air is drawn into the combustion chamber through the so-called scavenging valves. The water in the conical tower, having come to rest, starts to fall and drives the water in the play pipe back into the combustion chamber, this action expelling the products of combustion, greatly diluted by the scavenging air, through open exhaust valves. As the water continues to rise, these valves are shut by it, thus compressing the diluted products of

combustion until the momentum is destroyed. The pressure attained is high enough to cause the water to surge back again along the play pipe, the pressure in the combustion chamber again falls below atmospheric, a charge of gas and air is drawn in, the water on its next return swing compresses the charge, this is ignited at the proper moment by the electric spark, and the process is automatically repeated. The explosions occur at the rate of about nine times a minute, and, in the case of the larger pumps, about 15 tons of water is delivered each time, the flow into the reservoir from the delivery pipe being continuous and practically uniform.

☞The law excluding automobiles from Bar Harbor, Me., has been repealed by the state legislature.

3689



Front of
New York's
New
Post Office

NEW YORK'S SIX-MILLION-DOLLAR POST OFFICE

New York's new \$6,000,000 post-office building, a massive pile of pink granite five stories in height and two blocks long, facing the rear of the Pennsylvania station, is the greatest building of its kind in the world. From the curb to the topmost piece of granite is 101 ft. There are 100,000 cu. ft. of granite, 18,000 tons of steel, 7,000,000 bricks, and 200,000 sq. ft. of glass in the building. The main corridor, corresponding in length to the outside colonnade, is a combination of buff marble, white plaster and glass, two stories high, 29 ft. wide and 280 ft. long. There are 400,000 sq. ft. of working space within the building.

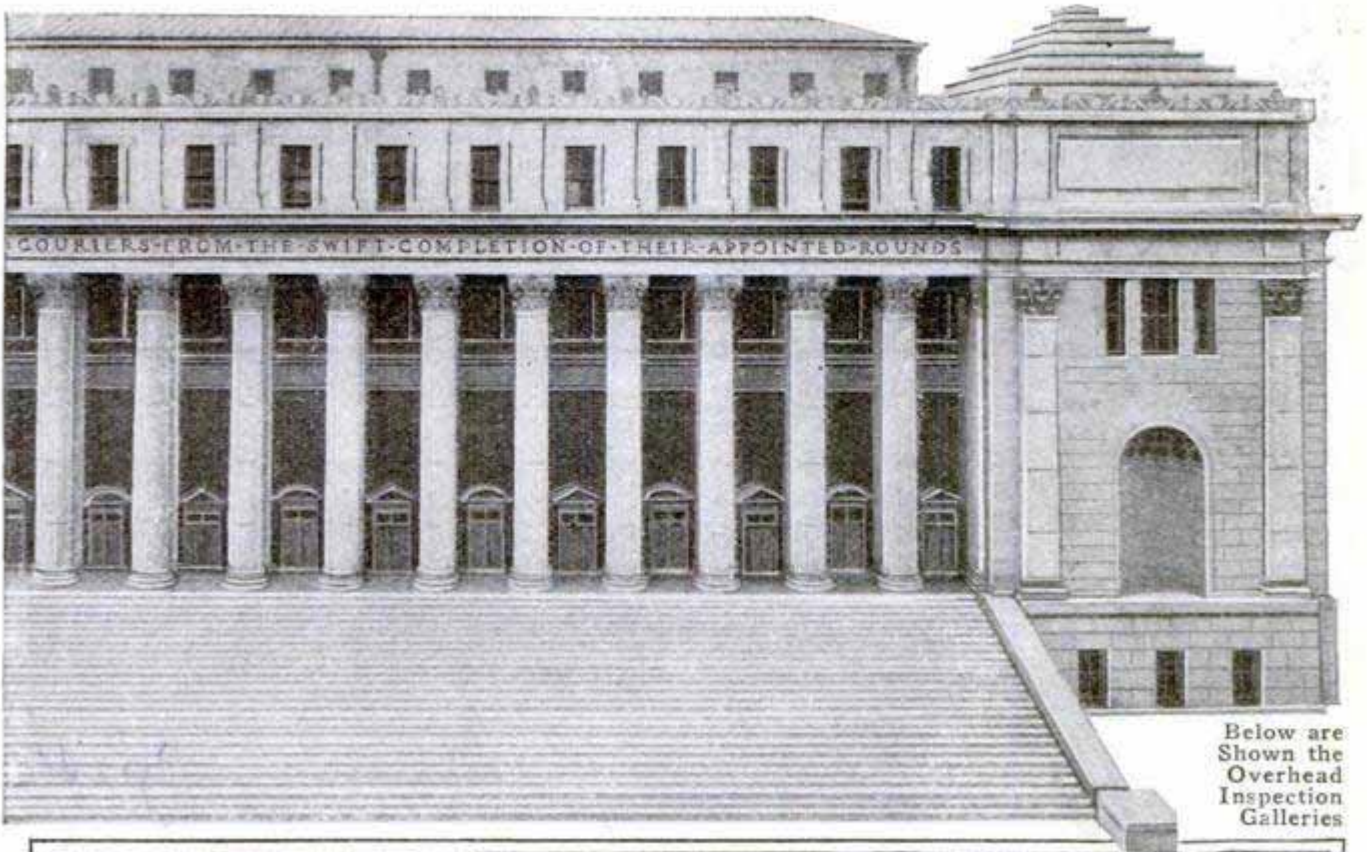
One of the most interesting features of the structure's interior is the series of overhead or "hanging" galleries from which the inspectors keep an eye on the employes. How to place the inspectors was a big problem, but the architects hit upon the idea of inclosing the open girders. So the white spans that arch overhead are hollow and large enough to permit a man 6 ft. tall to pass through them without discomfort. The inspectors look down upon the

men through the ²shutters, on the sides of the galleries, observing all that goes on without being seen. In the floors of the galleries are peepholes, so that the men under the spans do not escape observation. There is no part of the building in which mail is handled that is not covered by this system, which is so connected that the inspectors can pass from gallery to gallery. There is probably a half mile of galleries throughout the building.

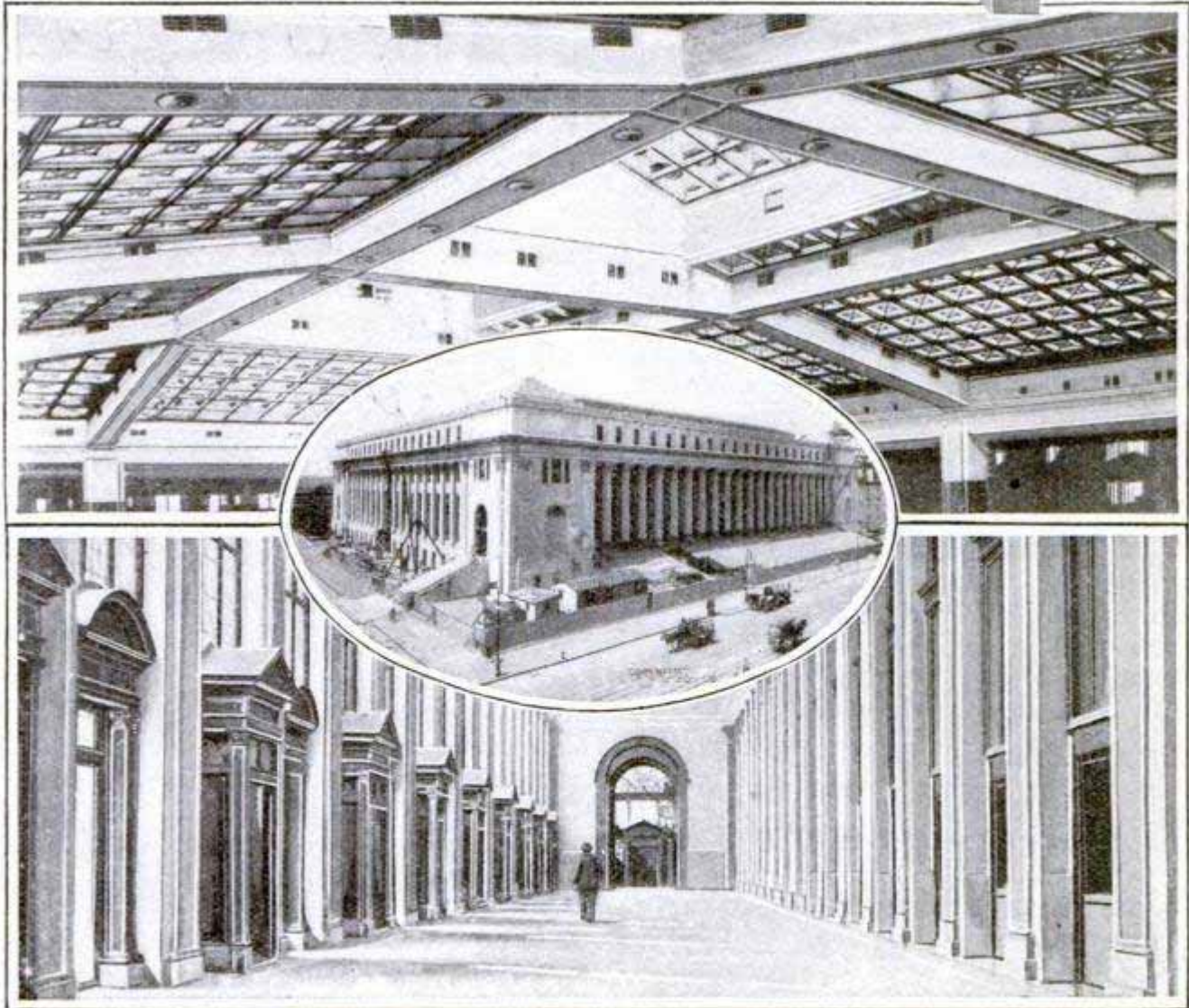
SLIGHT ELECTRIC CURRENTS DANGEROUS

According to a European investigator, any electric current strong enough to be used industrially is dangerous under certain conditions. The danger from a current depends on its strength measured in amperes. A current of $\frac{1}{10}$ ampere at even less than 100 volts may prove fatal, especially if the victim is perspiring or if a large part of the body is in contact with the conductor. The alternating current is generally more dangerous than the direct current.

according to investigation
by M. L. Zaccaria



Below are
Shown the
Overhead
Inspection
Galleries

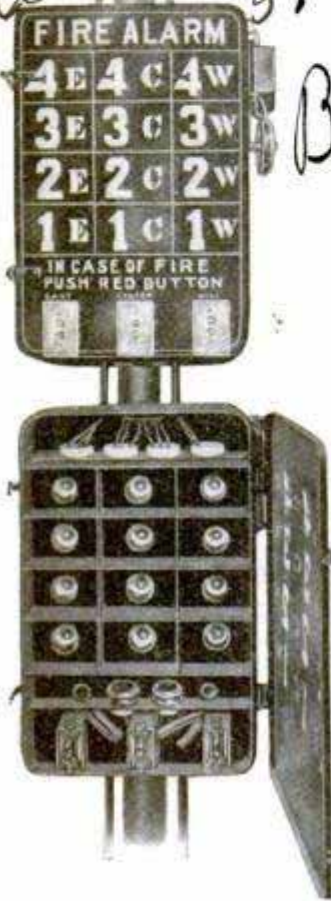


Main Corridor of the New York Post Office

*3689
Mahlon Lavery
w. Fred & Aurd*

FIRE ALARM SHOWS EXACT LOCATION OF FIRE

A fire-alarm box which indicates the floor on which the fire is located, and also in what part, designed particularly for factory buildings in which a large number of women are employed, has been brought out by a Brooklyn inventor. The accompanying illustration shows a box designed for a four-story building facing east or west. Boxes are placed on each floor. In case of fire, the alarm is sounded by pushing the button indicating the part of the floor where it has started. If the fire is at the east end, for instance, the button marked "east" is pushed. This sets off an alarm bell on all the boxes in the building and illuminates a number and letter to indicate the fire's position. If, for example, the fire is near the center of the third floor, "3 C" will be illuminated on every box. This tells every person in the building the location of the fire and enables them to determine the safest way to take to reach a place of safety.



*573
Washington
Brooklyn*

...ation between Colombo and China without retransmission. It now takes about 2 1/2 hours to transmit a 20-word message from Bombay to London, and a further hour, or hour and a half, for the message to be sent from Colombo to Bombay. By the new cable, therefore, there will be a saving of 3 hours and 50 minutes between Colombo and London. Under the present system a message has to be deciphered and retransmitted at Lisbon, Gibraltar, Malta, Alexandria, Aden and Bombay. The new cable is operated on the slot system by which a message is mechanically transmitted from section to section of a cable and is not relayed by hand until it reaches its ultimate destination.

RUBBISH RECEPTACLES FOR LAMP-POSTS

*3763
Portland Journal
Portland Oregon*

Some 300 lamp-posts and telephone poles in the downtown district of Portland, Ore., have been utilized as standards for rubbish receptacles. All that is necessary to empty one of the cans is to unfasten a catch, which allows the two semi-cylindrical sections to swing outward. A conical cover is set around the post, about 6 in. above the mouth of the can, to prevent rain from entering. Fruit, papers, paper bags, and like rubbish, must be thrown into these receptacles, and persons littering the street with such things are liable to arrest.



*3920
Daily Consular
Trade*

FAST CABLE SERVICE FROM LONDON TO FAR EAST

The new cable being laid direct from Lands End, Eng., to Hongkong, China, by way of Suez, Aden, Colombo, Penang, and Singapore, will place Colombo only 10 minutes away from London in the transmission of messages, and also means direct communi-

There are 1,156 buildings in New York, having 10 or more stories, but only 11% of more than 16 stories, and nine of more than 30 stories.

*pg 105
Eastern Telegraph Co. Ltd.*

EXPERIMENTS WITH AUTO-MATIC RAILWAY STOPS

In accordance with a recent *News* \$10,000 by the New York, New Haven and Hartford Railroad for a successful development of the railway automatic stop, two such devices are now being tried out. Both give promise of accomplishing the general purposes desired, though neither meets all the 18 requirements specified by the New Haven road. Applications have been received from all over the world, there being 1,574 in all. Of these only five per cent are regarded worthy of consideration, and only two have met with sufficient approval to warrant experiment.

HANSOM QUICKLY BECOMES A POWER VEHICLE

A London cabby has converted his hansom cab into a motor car by substituting for the original front wheels and seat a water-cooled gasoline engine, pneumatic-tired automobile wheels, and a motor-car seat, leaving the passenger portion of the vehicle as before. The power is transmitted through a roller chain to the front wheels. Auxiliary brake shoes are fitted to the rear wheels, which retain their original size and construction.

JUMPING DOG MAKES AN ILLUSION

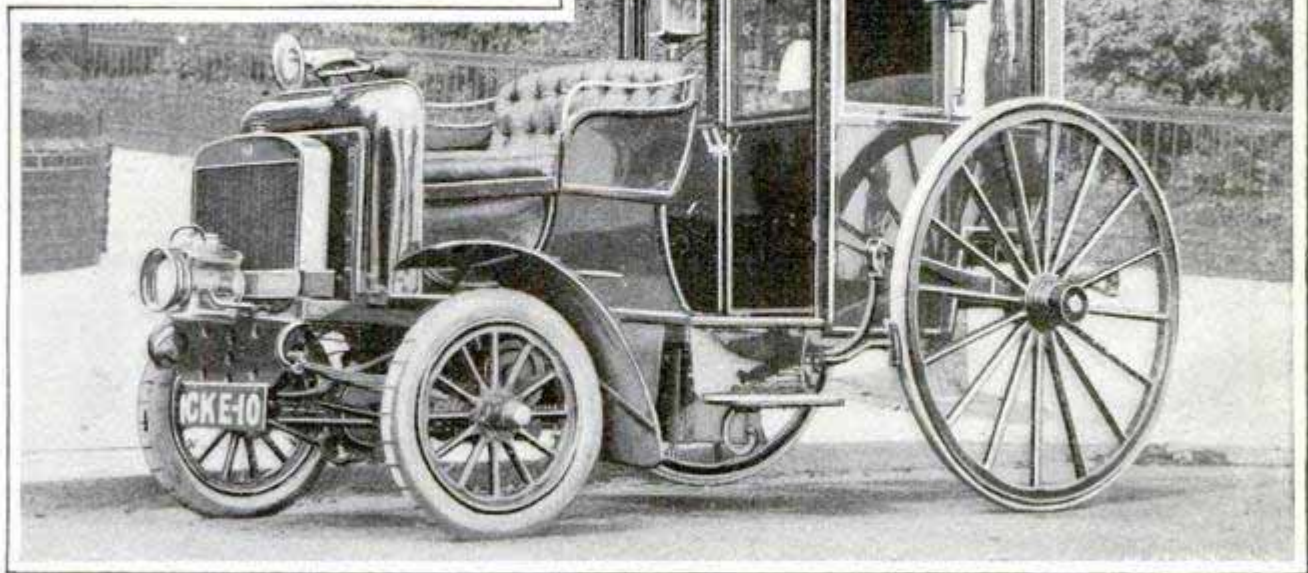
An interesting illusion is here shown. One dog seems to be standing up on



One of the Dogs has Just Jumped into the Air, and is Not Really Standing on the Back of the Other

the back of the other, reaching for his master's hand. In reality the dogs are two or three feet apart, one having just jumped, while the other is being coaxed to.

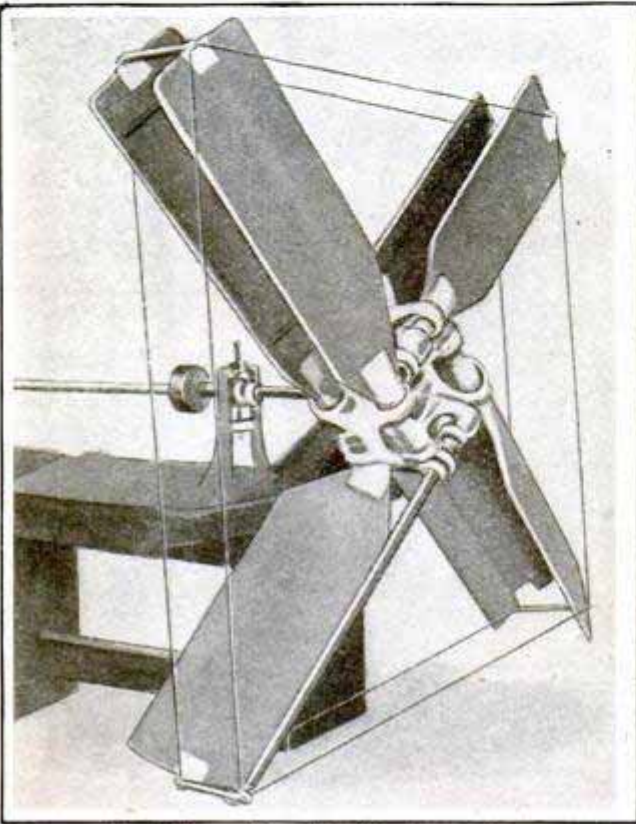
Mr. E. P. Lewis, Dubuque, Ia.



An Ingenious Conversion of a Hansom Cab into a Motor Car

"FEATHERING" PROPELLER FOR DIRIGIBLES

An 8-ft. dirigible propeller, arranged to change the direction of the thrust



An Adjustable Dirigible Propeller

while in motion, was tested recently in the laboratory of Columbia University.

It is possible, by revolving a cam, to feather the blades, thereby driving a dirigible ahead, backward, or causing it to descend or ascend, as desired, without changing the engine speed or action. The propeller, which is the invention of a Mexican, may take the place of elevating planes.

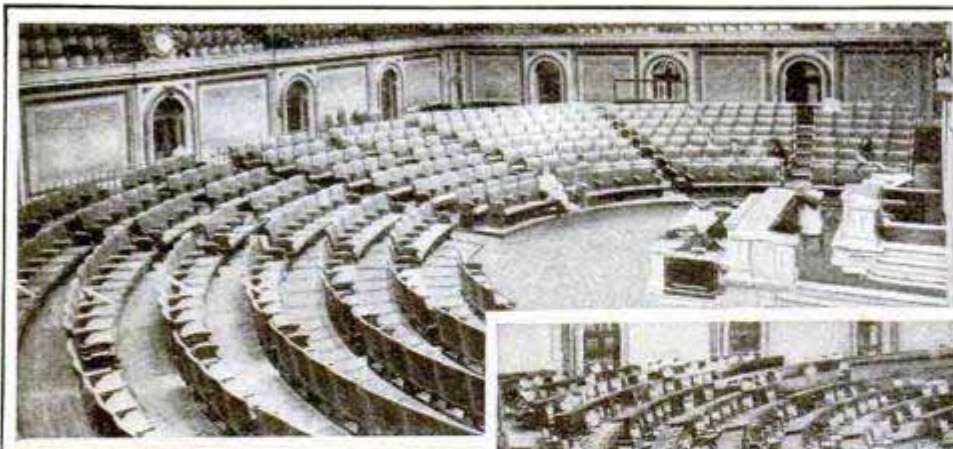
NEW RECORD IN WIRELESS TRANSMISSION

The world's record for continuous and reliable wireless communication was made by the cruiser "Salem" on a recent trip across the Atlantic to Gibraltar. The "Salem" was sent out to test the high-power station at Arlington. Complete day messages were sent from distances up to 1,300 miles and were received at distances above 2,400 miles. Night transmissions were sent with clearness and without a break for distances of over 3,000 miles.

On one trip early in April the coal bill of the White Star liner "Olympic" was \$25,000, an average of \$15.70 for each passenger. High prices brought about by strike conditions are given as the reason for this excessive cost.

By William J. Donnell

NEW SEATING ARRANGEMENT FOR CONGRESSMEN



New Arrangement of the House of Representatives

The House of Representatives of the 63d Congress of the United States, when it met in Washington on April 7, 1913, was

provided with seats arranged on the general lines of European parliamentary bodies, instead of the familiar desks and



House of Representatives, Old Arrangement

Christie - Photographer

*3/19/13
Aeronautics
Feb 19/13
Pg 68*

*Radio
3/19/13*

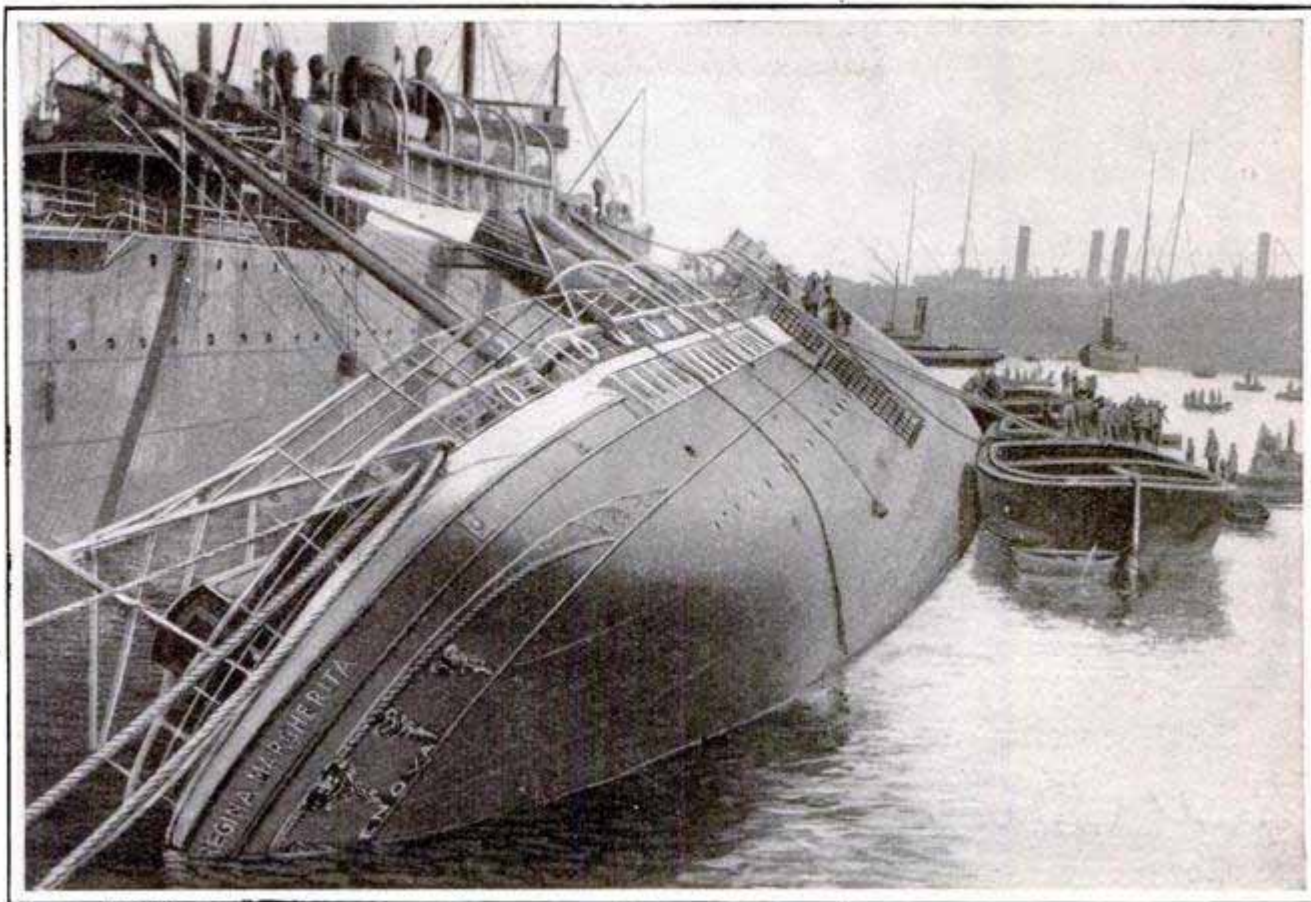


Photo by Paul Thompson

Transatlantic Liner Sinking at Her Moorings in Genoa Harbor

swivel chairs which had previously been used.

The provision of separate offices in the House office building for each member of congress has made the desks unnecessary, while the increased number of representatives required a more economical arrangement of the space in the House. As shown in the illustrations, the members are now seated in semicircles on upholstered benches partitioned off with arm rests. No changes were made in the arrangement of the desks of the speaker and the clerks.

Wreck
STEAMSHIP PHOTOGRAPHED WHILE SINKING

3705
The Regina Margherita
 This interesting photograph shows one stage in the foundering of the steamship "Regina Margherita" at her moorings in Genoa Harbor, from a cause at the time unknown. The vessel did considerable damage to the "Sannio," moored on her port beam, when she heeled over just before going down. At the stage of the sinking here shown

men were still on the vessel. The "Regina Margherita" was in service for many years between Genoa and Buenos Aires.

MUSEUM USES BUTTONS IN

369 | **SAFETY CAMPAIGN**

Museum
 More than 200,000 school children of New York are now wearing the green and red buttons of the American Museum of Safety, which has been carrying on a children's safety crusade since the beginning of the year. The object of this crusade is street safety, and the basis of the campaign is daily classroom talks by lecturers from the museum, both public and parochial schools being included. The talks are followed by the distribution of pamphlets containing "safety fairy tales," which the



29 West 39th St. New York

children are encouraged to take home and discuss with their parents.

All a girl or boy has to do to become a full-fledged member of the safety league is to put into practice the safety rules and wear the safety button. The design of the button is a green lantern on a red background. Among the rules of the league are: Never fail to look both ways for vehicles; keep eyes to the left until the middle of the street is reached, then to the right until curb is reached; never play any kind of a game in a street where automobiles and heavy trucks are constantly passing, or in streets where street cars run, and never run pushmobile races in a street.

A FOUR-STORY HOME FOR HORSES

The remarkable four-story building here shown is used as a home for the horses connected with the street-cleaning department of Charlottenburg, a suburb of Berlin. As will be seen, each of the three floors above the ground floor is provided with a balcony or gallery extending the entire length of the building, and the horses reach their quarters by walking up the staircases. The stables provide comfortable accommodation for several hundred animals.

RAPID CAR PAINTING WITH A BAKING ENAMEL

By the use of a baking enamel the Hudson and Manhattan Railroad is enabled to get cars through the paint shop in two days as compared with the 6 to 14 days required by the usual process in which linseed oil or air-drying enamel is used. The enamel consists of the ordinary varnish pigment baking mixture, the hardening of which requires the evaporation of turpentine and the oxidation of residual oils. It is applied in a free-running state. In drying the outside, the car is placed in a kiln of suitable size, while for drying the inside three sets of electric car heaters are suspended from the hand rods and the temperature raised to 200 deg. F. This temperature does not affect the wiring in the car.

PANAMA CANAL'S POWER DISTRIBUTION

Nearly 250 miles of lead-covered cable will be required in the electric-power distribution for the operation and lighting of the Panama Canal. The cables will be carried through the lock walls in vitrified clay ducts. In addition to the cable the lighting system will require about 112 miles of wiring.

A German Hotel for Horses, Showing the Staircases by Which the Animals Reach Their "Rooms"

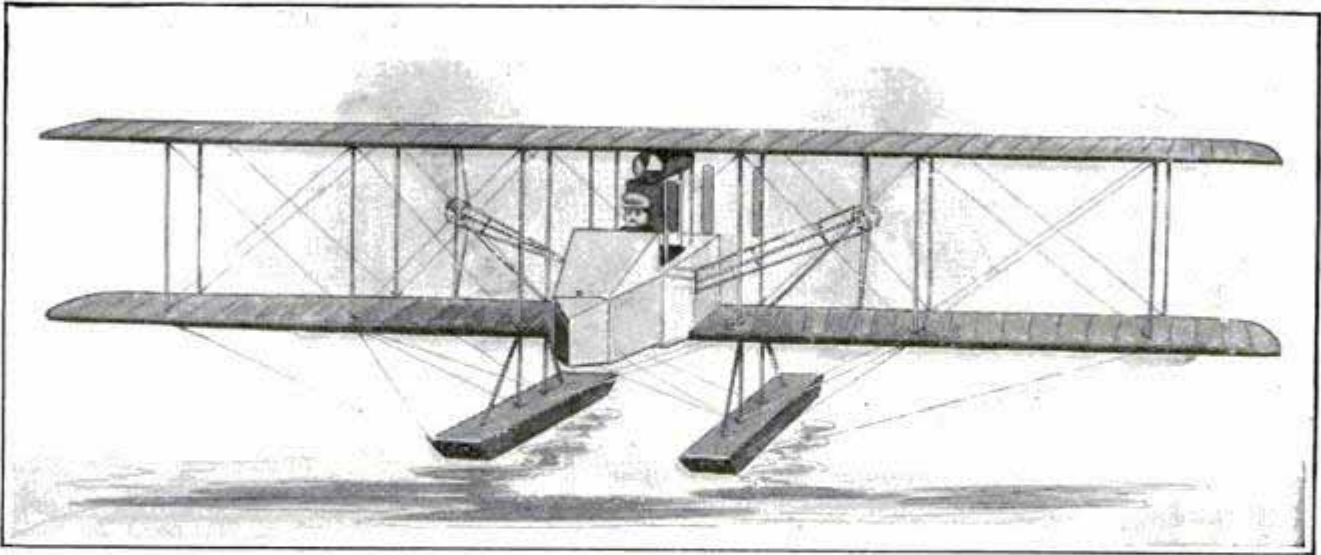


Courtesy Illustrated London News

3616
Ill
4/15/13
Pg 203

3925
Electrical Review
3/28/13
3922
Power No 13
4/27/13
Pg 448

36 17



The Wright-Type Hydro-Aeroplane Acquired by the U. S. Army for Coast-Defense Service

THE ARMY'S COAST-DEFENSE HYDRO-AEROPLANE

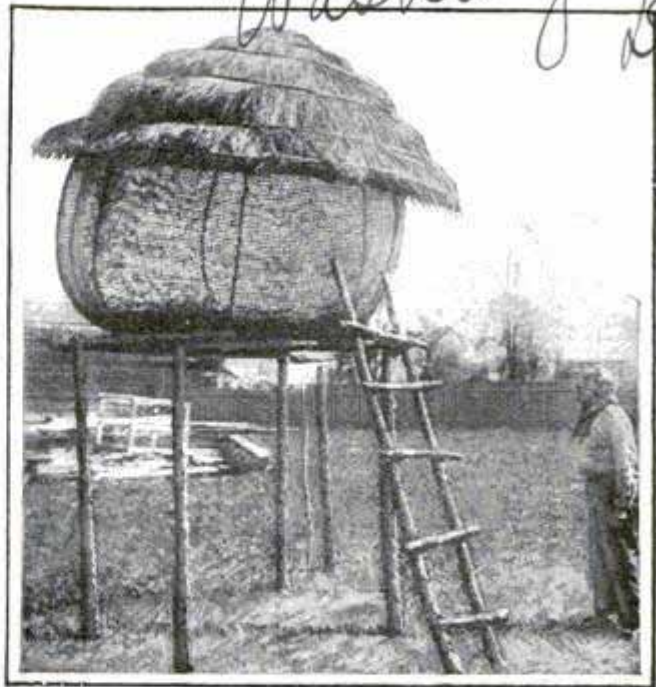
The U. S. Army has recently purchased this hydro-aeroplane and will use it for coast-defense service, for which a considerable fleet will be acquired before long. This machine has two pontoons and the engine and pilot are located in a long, streamline body mounted on the lower plane. The tail and rudders are mounted at the rear end of this body.

SOME EFFECTS PRODUCED BY RADIOACTIVE SUBSTANCES

In recent lectures on radioactivity Prof. Edward P. Adams, of Princeton University, demonstrated some of the effects produced by radioactive substances. One of the experiments showed the effect of a magnetic field upon the stream of cathode particles in a vacuum tube, illustrating how they are deflected from their path by its action. He also interposed a radioactive substance between the plates of an air condenser, with the result that the air in the vicinity became a conductor. By allowing a wire to become coated with radium emanations, he showed how the period of decay is observed and measured. The energy extant in one gram (15.4 grains) of such a radioactive substance as uranium is 6,666 hp. for one hour, or 1 hp. for 6,666 hours.

HUGE BASKET GRANARY OF 3697 PONCA INDIANS

The Ponca Indians of California store their grain in huge baskets elevated on rude platforms reached by ladders. Each basket has a rain-shedding cover made of grass or cedar bark. The Institute of Arts and Sciences of Brooklyn recently purchased this basket, which is large enough to shelter a whole Indian family. It is 6 ft. from bottom to rim, the top of the cone-



An Indian Basket Large Enough to Shelter a Whole Family

shaped cover being 9 ft. from the bottom. It weighs 325 lb., notwithstanding that it is made of light osiers.

Purchased for Brooklyn Institute of Arts and Sciences

air craft 1913
March 3

3919

Electrical World

Mitchell
U.S. Geological Survey
Washington, D.C.

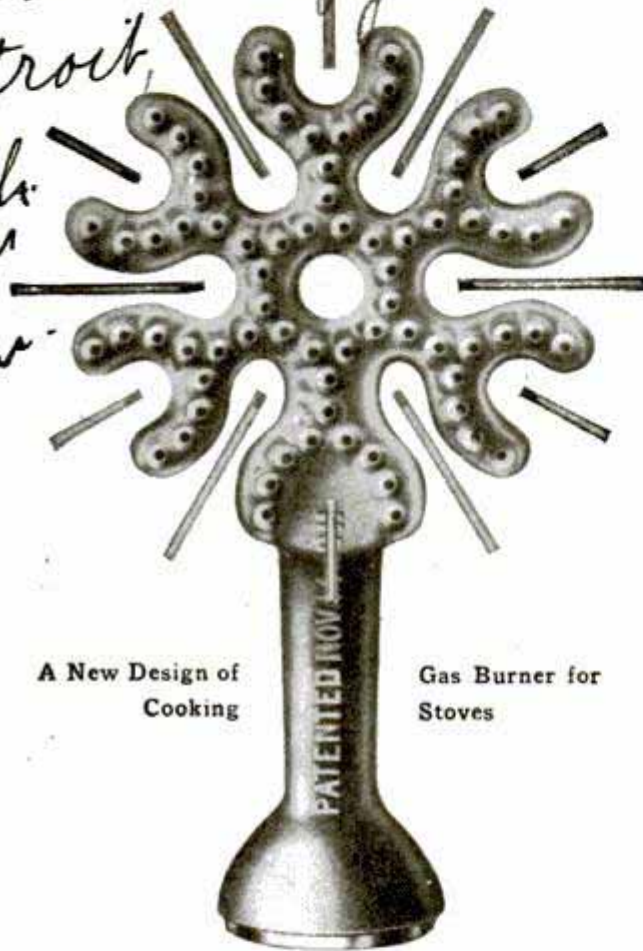
des ateliers de Construction H. Bollinckx

NEW BURNER GIVES EQUAL HEAT DISTRIBUTION

38 39

An improved design of burner for gas-cooking stoves has been incorporated in a recently patented burner

Sherman Mfg. Co. Detroit, Mich. & Rogers and Co. Canada



A New Design of Cooking

Gas Burner for Stoves

which is shaped to give an even and equal distribution of gas. The burner, as shown in the illustration, is made up of equal-sized intersecting circles of flame jets, the advantage of this arrangement being, it is claimed, a better cooking flame, as the heat is applied squarely to the entire bottom of a utensil.

EARTHENWARE PIPES FOR STORAGE OF PAPERS

39 4

A construction company in Belgium has solved the problem of safe storage of the original tracings of machinery parts, from which blueprints are made for use in the various shops, by means of earthenware pipes. The earthenware pipes are built into a concrete

Original tracings of machinery parts, from which blueprints are made for use in the various shops, by means of earthenware pipes. The earthenware pipes are built into a concrete

wall in the storerooms, and are slightly inclined forward in the wall to allow any water that might enter them in extinguishing a fire to run out. The tracings are placed in these pipes, which are closed by dished steel covers provided with handles.

GOVERNMENT NOW HAS SCALE-TESTING CAR

39 19

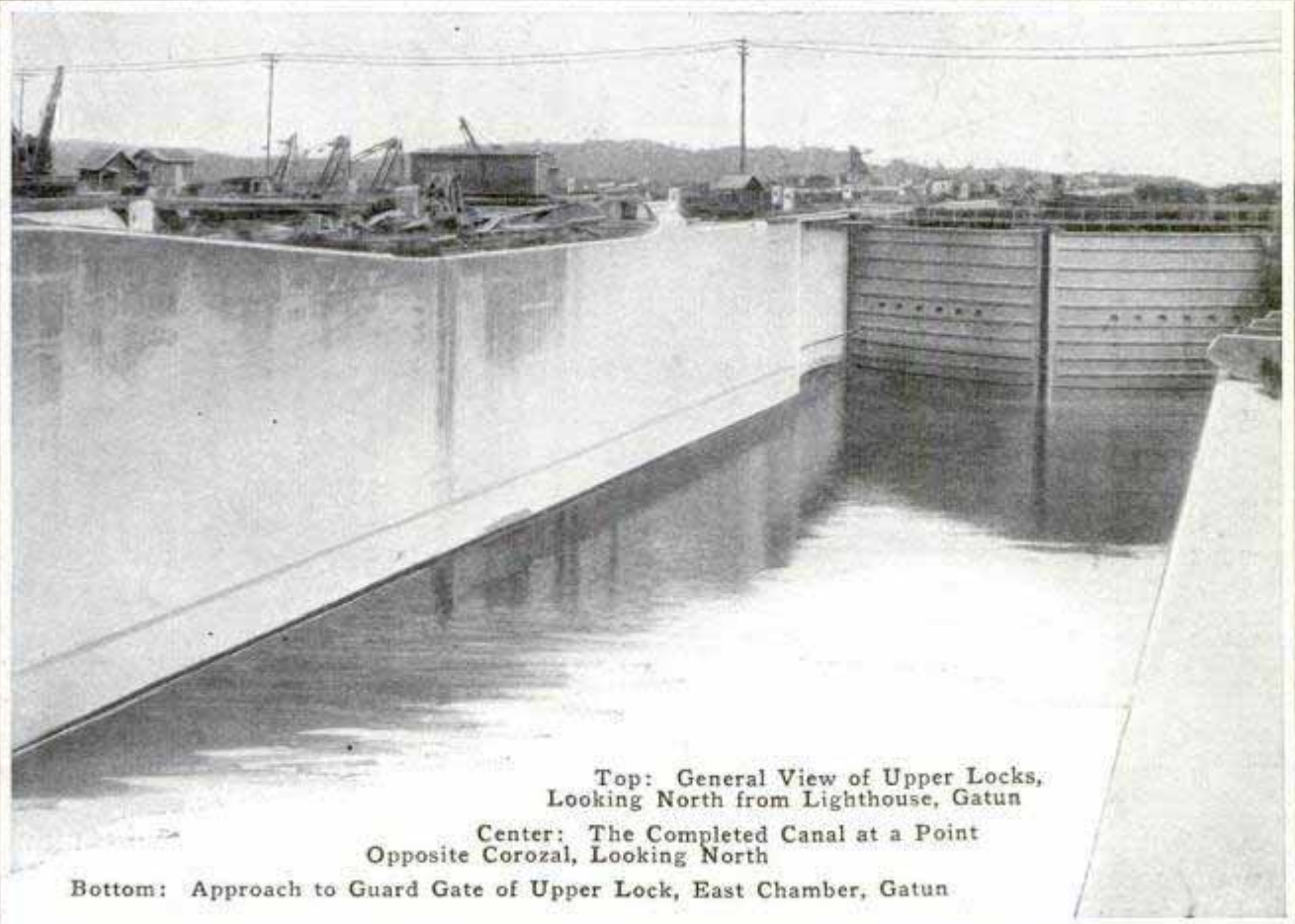
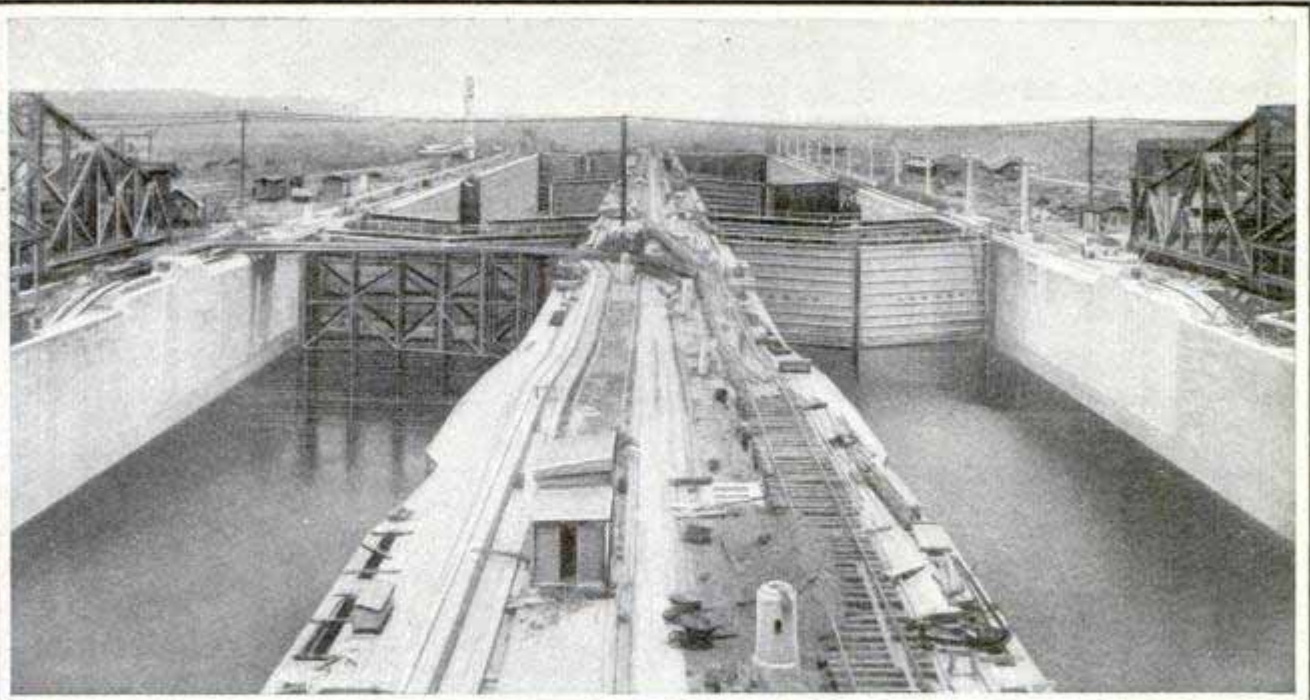
A special scale-testing car, carrying a number of standard weights of 10,000 lb. each, and a large number of 100 lb. weights, has been placed in service by the Bureau of Standards for the testing of scales in railroad yards, grain elevators and other places where interstate traffic is handled. A truck, capable of carrying 50 tons, will be carried on the car for use in moving the standard weights in testing the scales. The car is also equipped with a crane for lifting the truck and the heavy weights.

PANAMA CANAL IS ALMOST READY FOR SHIPS

These illustrations are of particular interest because they are the first showing water in the Panama Canal and locks. One of them gives a general view of the upper locks, Gatun, and another shows water in the approach to the guard gate of the upper lock. The third is a view of the completed Panama Canal.

It is not impossible that the Panama Canal may be open to navigation this year, as Col. George W. Goethals has stated that the passage of ships will be permitted as soon as one set of the twin locks can be operated. Work is being pushed on the lower guard gates in the west chambers, in order to have all the gates on this side completed as soon as possible, thus permitting the passage of ships before all the gates are completed, as the other side of the locks can be kept dry. The same plan is being followed at Pedro Miguel and Miraflores locks, and all the gates in the west chambers will be completed by October first.

39 25
These illustrations are of particular interest because they are the first showing water in the Panama Canal and locks. One of them gives a general view of the upper locks, Gatun, and another shows water in the approach to the guard gate of the upper lock. The third is a view of the completed Panama Canal.



Top: General View of Upper Locks,
Looking North from Lighthouse, Gatun
Center: The Completed Canal at a Point
Opposite Corozal, Looking North
Bottom: Approach to Guard Gate of Upper Lock, East Chamber, Gatun

THE MAKING OF SAND MOSAICS

Placing different-colored sand in a bottle to form mosaics is a kind of art developed with considerable success by an Iowa artist. He uses 41 tints of sand, all of which come from "The

*W.S. & D. Perrier
Algonquin Md
3619*



Interesting Examples of Sand Mosaics

Pictured Rocks," a tanyon in the high bluffs facing the Mississippi River near McGregor, Iowa. His "palette" is a fan-shaped case divided into 41 compartments, each containing sand of a different shade. In making the mosaics, the fine grains of sand are placed in the jar and worked of course into the positions wanted by means of little wooden tools of different shapes. The layers of sand are well tamped as the operation progresses.

*Frank C. Sawyer
Parkersburg W. Va.
Bldg*

When the jar is finally filled, the glass top is inserted and hammered down until every grain of sand has settled into place. This operation sometimes destroys the whole work, as it is not always possible to judge just how much pressure the glass will stand, but if the packing and sealing is properly accomplished, nothing but the breaking of the glass can ever affect it.

THE SOURCE OF THE NEW "MOTOR SPIRIT"

3856

The new automobile fuel appearing on the market under the name of "motor spirit" will, according to many automobile authorities, both in this country and abroad, do away, for many

years at least, with the fear of a fuel shortage that will raise prices to a figure almost prohibitive for many motorists. The new fuel can be sold at 3 cents per gallon less than the present price of gasoline, and it has an efficiency of 15 per cent more mileage per gallon than ordinary grades of gasoline.

It is not, however, because the new fuel can be sold cheaper than gasoline that it is to have such an important bearing on the auto-fuel question, but that 100 gal. of crude oil may now be de-

ended upon to yield 40 gal. of automobile fuel, instead of only 20 gal. Formerly, 100 gal. of crude oil gave 20 gal. of gasoline, 20 gal. of kerosene, and 60 gal. of fuel oil. Under the new process of refinement the crude oil still gives the 20 gal. of gasoline and the 20 gal. of kerosene, while the 60 gal. of fuel oil is so refined as to give 20 gal. of motor spirit, the remaining 40 gal. being a residue which may be sold for other purposes. This residue is said to be almost as valuable as was the fuel oil.

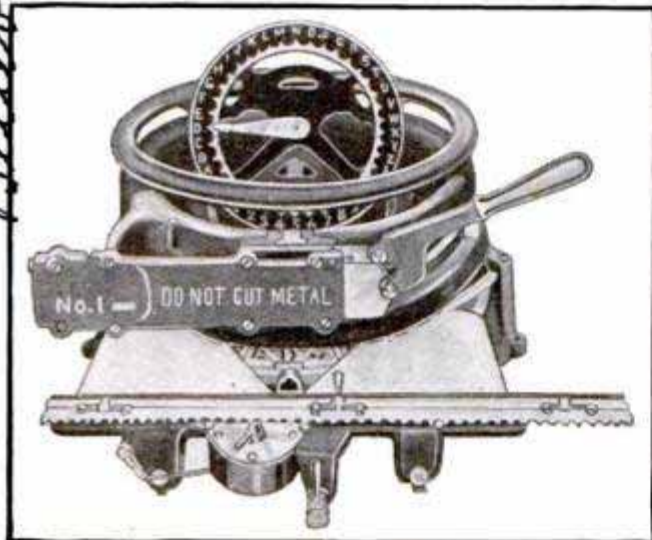
The new fuel thus obtained is very much like gasoline, except for the pungent odor, which is more noticeable than that of gasoline. There is a light-colored smoke in the exhaust, but this is not so pronounced as the bluish smoke due to too much oil in many cars. It has a specific gravity but little greater than that of the grades of gasoline now furnished to motorists, and

*Motor Spirit
Wm. Dr. W. M. Burton
Co. of Burton*

its use results in a slight increase of carbonization, but the deposit is soft and responds to an application of kerosene. It starts as easily as gasoline. "Motor spirit" is now on sale in the large cities and soon will be obtainable everywhere.

MACHINE FOR CUTTING PAPER STENCILS

The production of stencils is made easy by means of this machine. After placing a strip of pressboard in the paper gripper, the carriage is revolved until the indicator comes to the character to be cut, then a slight pressure of the hand on the lever accomplishes the cutting. A locking device comes into play before each punch, so that the charac-



A Stencil Cutter

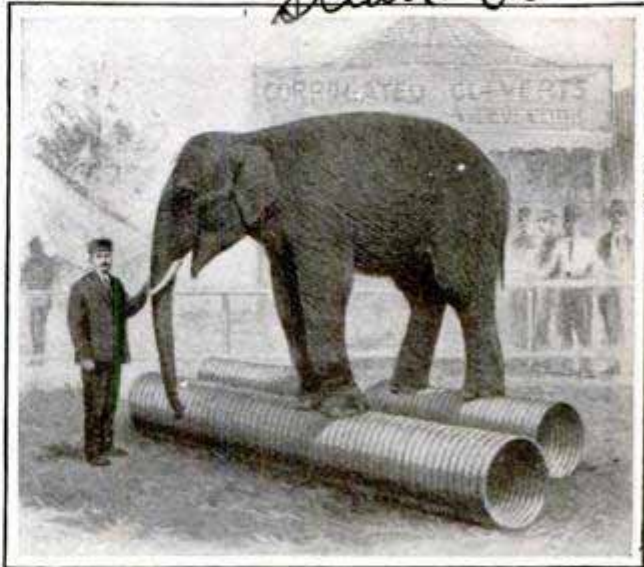
ters are cut in perfect alinement at all times. The machine cuts 1-in. characters, and from one to four lines.

ONE CANVAS TO HOLD MORE THAN ONE SCENE

An interesting artistic device by which it is possible to paint several different scenes on the same canvas has been invented by an artist of Moscow, Russia. When the light on the canvas changes, the scene also changes. The invention is based on the physical laws governing the complementary colors of the spectrum. The changes in the scene are brought about by the switching of electric lights.

ELEPHANT DEMONSTRATES CULVERT'S STRENGTH

A two-ton elephant was used as demonstrator for a corrugated metal



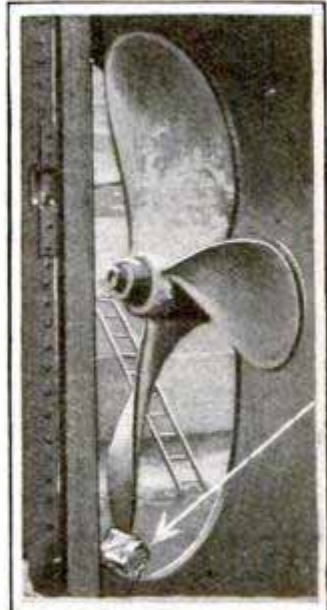
Testing the Strength of a Metal Culvert

culvert at the last Kentucky State Fair in Louisville. The big animal repeatedly stood on an 18-in. culvert made of No. 28 gauge galvanized iron. The originality of the stunt proved a good advertisement.

GRANITE BLOCK STOPS

The propeller of the steamship "Roma" of London

stopped just as she was leaving London for Glasgow, and could not be moved. The vessel had to be dry-docked, and it was discovered that a granite paving block had been caught and wedged between one of the propeller blades and the arch of the rudder post. Where the block came from is a mystery.



Courtesy Illus. London News

Ideal Stencil Machine Co. Belleville, Ill.

3759

3939

3781

Chamber + Metal Worker for a corrugated metal Steam Filler

pg 396 Harry Ross. Co. Newport, Ky.

pg

News

3708

London News

pg 250

Barry

PNEUMATIC RAMMERS FOR LAYING PAVEMENTS

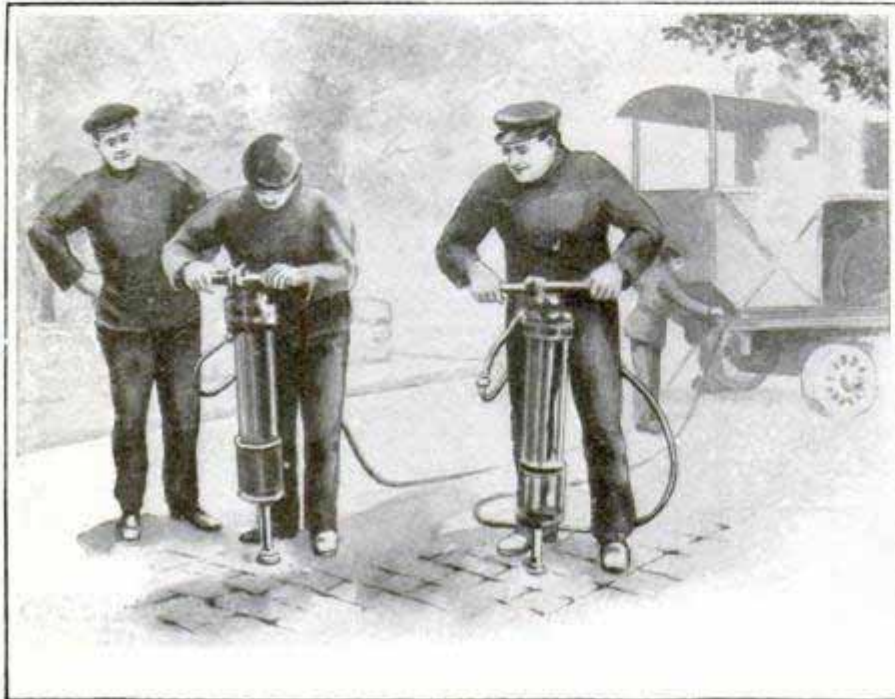
MUNICIPAL MOTOR STAND UNDER PUBLIC SQUARE

3559

3711

A German device for use in laying stone or other block pavements is a hand rammer operated by pneumatic

The construction of a large municipal vehicle stand under the public square of Cleveland has been suggested by the officials



Improved German Method of Laying Pavements

Cleveland Motor Stand
of that city as a solution of the increasing congestion of automobile traffic with which they have to contend. The plan involves the excavating of the square to a depth of about 30 ft. in order to construct a two-story garage, which would be covered by beds of flowers and shrubbery, so that the appearance of the square would remain unchanged, except for the necessary entrance. The proposed garage would accommodate approximately 800 vehicles, many of which are

power from a portable air-compressing plant in the same manner as a pneumatic riveter is used. Air is piped to the hand tools through wire-wound hose and the compressor is driven by gasoline engine, which also propels the car. It is claimed that the pneumatic paving rammers can be operated by men of less strength than are ordinarily required for laying pavements in the old way and will accomplish more than four times the amount of work possible when manual labor alone is used.

now compelled to stand upon the streets and block traffic, especially during shopping hours. The garage would also provide a central and safe place for the motor cars of hundreds of business men, and the storage cost per car would be comparatively low, as no investment is required for the purchase of real estate.

THE CURVES OF JAPANESE ROOFS

3538

The origin of the Japanese roof curve and the ease with which Japanese carpenters can so accurately construct what their architects design still continue to puzzle western architects and those interested in the more difficult phases of building construction. It is freely admitted that the curve of a Japanese temple roof is about as difficult a line to draw as man, in his ingenuity, has contrived, but how the Japanese artists themselves succeed so well in reproducing it has never been

CA novel means of soldering aluminum has recently been invented. The solder is aluminum or an aluminum alloy with a flux consisting of 30 parts cryolite, 35 parts common salt, and 35 parts potassium chloride. The solder is made in the form of a tube, inside of which the flux is placed, and these melt together when the tube is heated. The novelty of the invention lies in placing the flux inside the tube.

*Mr. Carl Edward Steiner
Fudirichaid, Germany*



Japanese Roof Curves Defy Architects' Skill

The Japan Magazine
 explained. Modern artists and writers see in these unique and beautiful curves a resemblance to the sagging outlines of the primitive tents used ages ago by the forefathers of the Japanese race who dwelt on the burning plains of China, but there does not appear to be any evidence to support such a conclusion. There is no doubt, however, that the curve is a catenary—the most beautiful, perhaps, of all natural curves formed by gravitation when a chain or cord is suspended between two points.



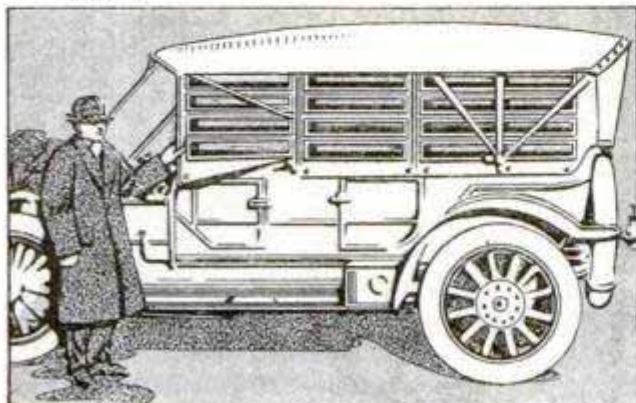
Sagging Tents may have Suggested These Roofs

the machine becomes virtually an entirely inclosed car, and the amount of transparent space assures a complete view. The curtains are easily attached to any standard top.

126 CELLULOID CURTAINS FOR AUTOMOBILES

A new automobile side curtain that is practically all window has been attracting considerable attention at automobile shows. The curtain is made of celluloid lights set in rigid frames. When the curtains are fastened down,

No data



Automobile Side Curtains That are All Window

Delroit Flash Curham Co.

3760 U. S. STOREKEEPER IS FAMOUS KNITTER

The "knitting man" is Maj. R. B. Chappell, a veteran of the Civil War, and now a storekeeper in the employ of the United States Government at Chicago. He has charge of certain liquid products in bond, and his duties consist in receipting for and keeping a record of the receipts and removals. Between times he sits in the front window and

*J. L. Graft
84 West South Water St.
Chgo.*

knits socks and wristlets, the number of which he has long since ceased to

Major R. B. Chappell, Who is Known in Chicago as the "Knitting Man"



count. He has been seen sitting in the same window, knitting, for more than 20 years.

THE BALBOA TERMINAL AT PANAMA

The construction of the extensive terminal piers of the Panama Canal at Balboa was recently commenced. The first work was the sinking of caissons for the support of Pier No. 1. This pier will be 1,000 ft. long by 201 ft. wide, the inner end connecting at right angles with the quay wall which forms the head of the slips, and which will itself be parallel with the canal. The machinery used for the construction of the large number of caissons includes a movable mixing plant, which can be shunted along a railroad track beside the platform on which the collapsible forms and reinforcement for the sections are set up.

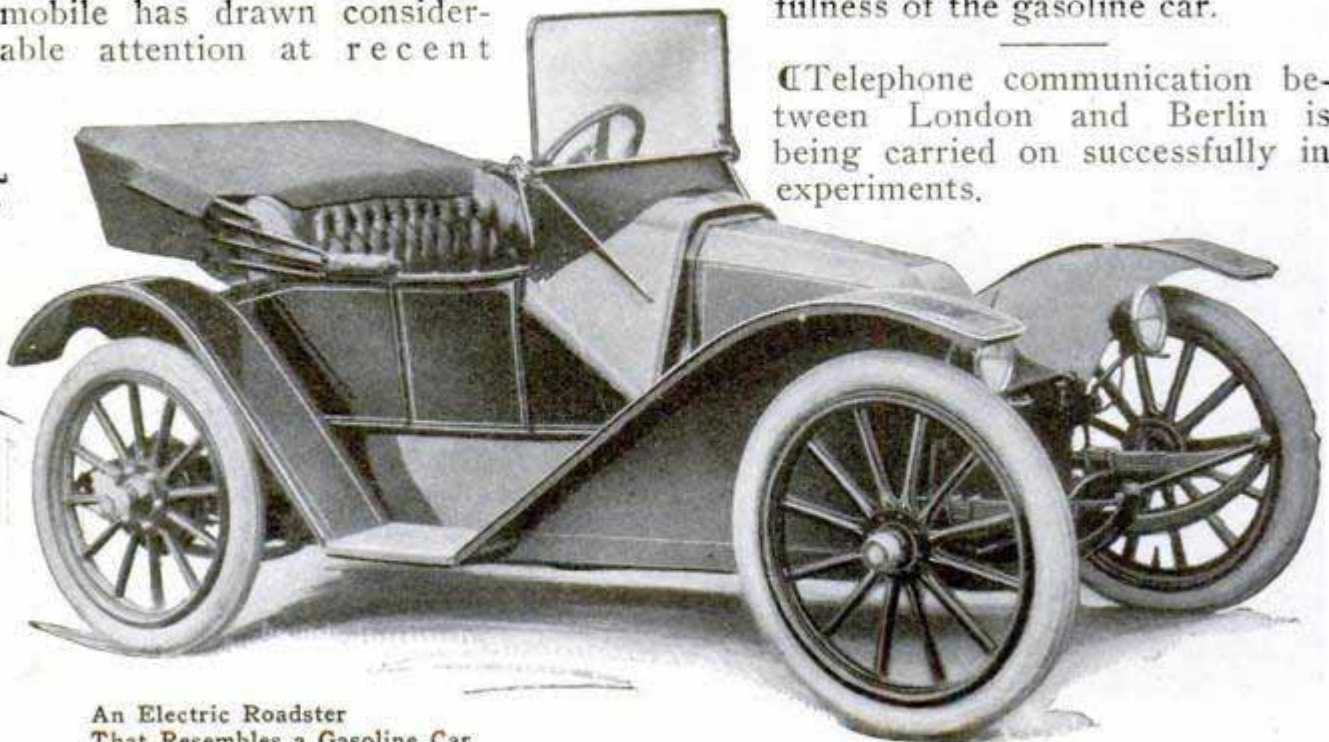
A bill was recently introduced in the New Jersey legislature designed to prohibit a railroad from testing the diligence of its engineers and firemen in the observance of track signals, without giving previous notice in writing to the engineer.

ELECTRIC CAR BUILT ON GASOLINE-AUTO LINES

An electric roadster built on the lines of the gasoline automobile has drawn considerable attention at recent

automobile shows. Even the scuttle dash has been adopted. The car is claimed by its makers to combine the simplicity and luxury of the electric with the flexibility and resourcefulness of the gasoline car.

Telephone communication between London and Berlin is being carried on successfully in experiments.



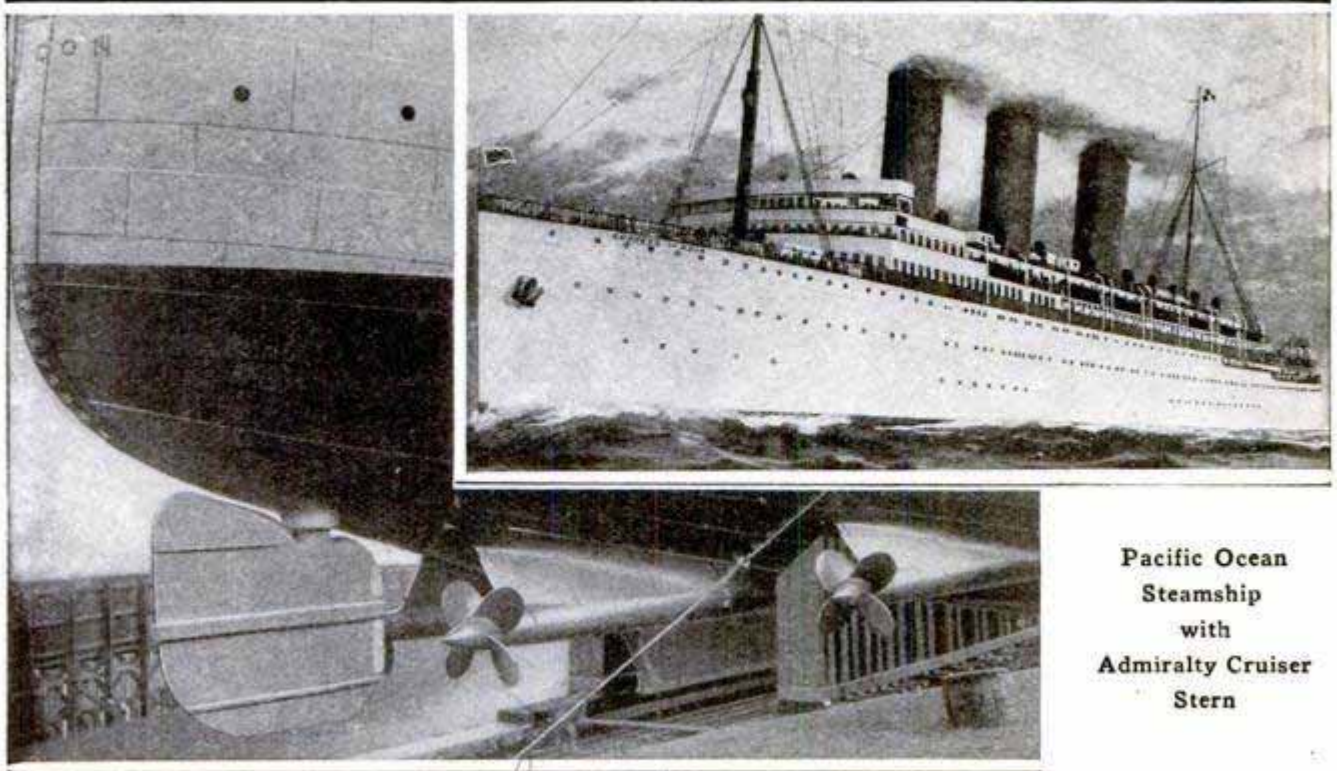
An Electric Roadster That Resembles a Gasoline Car

*March - Sibley Motor Co.
Sibley - Mich.*

3924

*Record
Eng.
Apr 5 381
Pr*

366N



Pacific Ocean Steamship with Admiralty Cruiser Stern

NEW TYPE OF VESSEL FOR PACIFIC-OCEAN SERVICE

A distinct departure from the ordinary has been inaugurated by the Canadian Pacific Railway in the construction of its new ships being built for passenger service on the Pacific Ocean. The steamers will be provided with sterns of the "admiralty cruiser" type, which, heretofore, has been a method of construction applied only to war vessels.

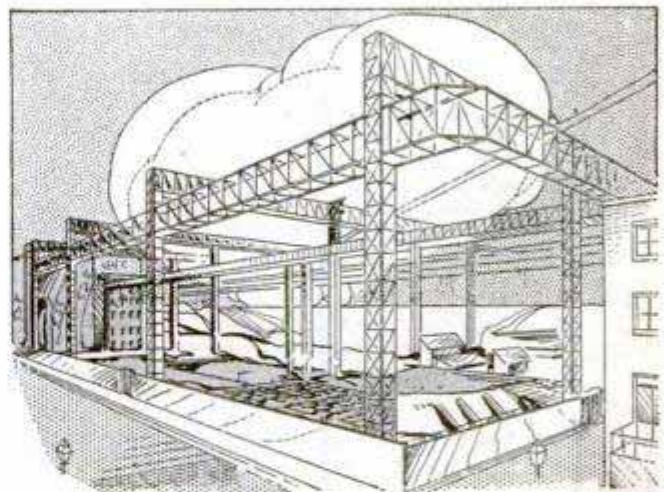
WIRELESS STATION IN MID-OCEAN

The island of Juan Fernandez, commonly known as "Robinson Crusoe's Island," lying off the coast of Chile, is to be utilized by the Chilean government as a mid-ocean wireless station. The site chosen for the station is at the summit of a hill 1,000 ft. high. The plant will have a working radius of 500 miles, so that a ship provided with wireless apparatus can be picked up within upward of 1,000 miles west of Valparaiso.

It is said that the steel skyscrapers of New York affect the compasses of ships making port there.

BUILDING ERECTED WITH TRAVELING CRANES

The large steel framework here shown used in the construction of a London office building is an adaptation of the ordinary shipyard crane, the framework providing a suitable support for the tracks upon which travel the electrically operated cranes that convey the building material to the desired position. The framework is suffi-



Courtesy Engineering News Erecting a London Office Building with the Shipyard-Crane Method of Construction

ciently large to allow a clearance of the building, which will be eight stories high and occupy the greater portion of an entire city block.

Handseal. Frayell

H. M. Statemery Office

3926

20 regn. graded

Robson
C.P.R.
Montreal Can.

New

265

348 3

386

SOME EFFECTS OF THE GREAT MARCH FLOODS



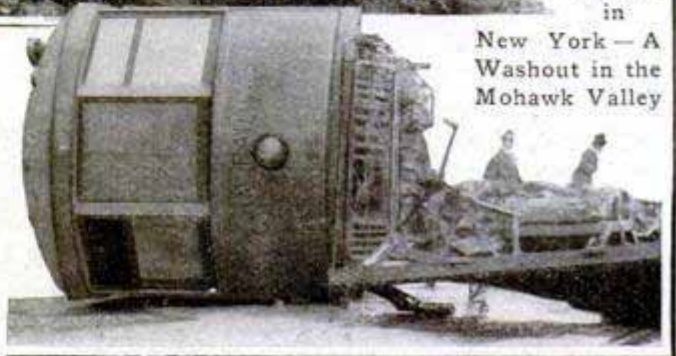
Bridge Pier Washed Out at Richmond, Ind.



The Floods in New York — A Washout in the Mohawk Valley



Flooded Territory in the Ohio Valley Indicated by Shading on Map



A Dayton Street Car Overturned by the Rushing Waters



The Only Dayton Bridge That Withstood the Flood Tide of the Big Miami River

AFTER THE WATERS WENT DOWN AT DAYTON

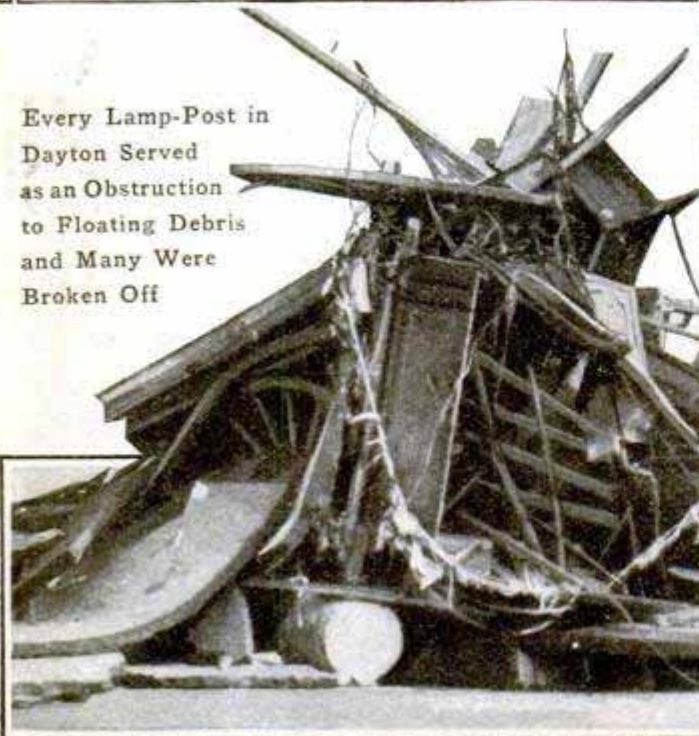


This Back-Yard Scene Gives a Graphic Impression of the Height and Force of the Flood

3264

THE HIGH WATER'S ODD AND PATHETIC EFFECTS

Every Lamp-Post in Dayton Served as an Obstruction to Floating Debris and Many Were Broken Off



COURTESY THE BILLBOARD

At Peru, Ind., Six Elephants Perished While Seeking Safety



Cincinnati Ball Park Flooded above the Private Boxes

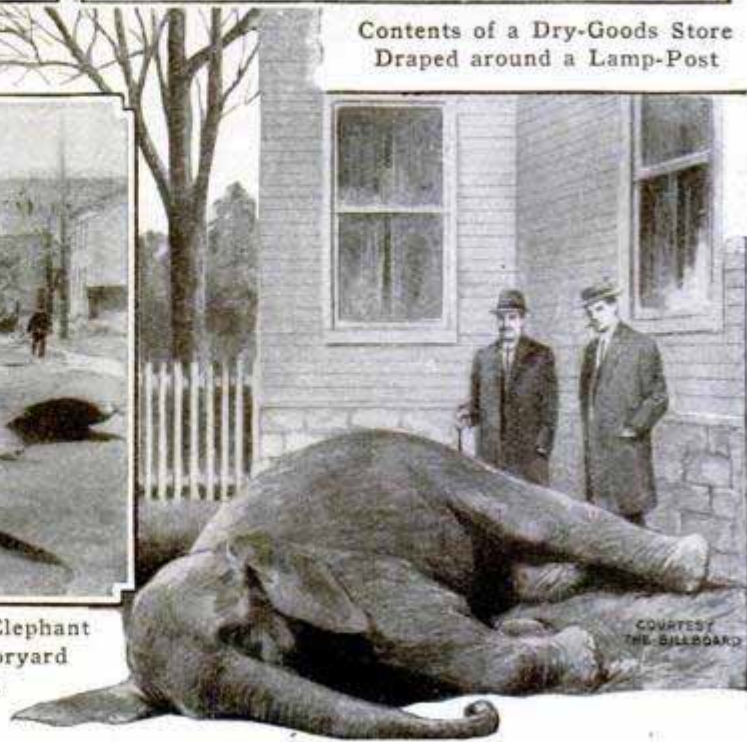


Contents of a Dry-Goods Store Draped around a Lamp-Post



Asphalt Pavement Undermined at Hamilton, Ohio

A Dead Elephant in a Dooryard at Peru



COURTESY THE BILLBOARD

OHIO-INDIANA FLOODS A NATIONAL DISASTER

No accurate estimate can be made of the number of lives lost or the financial loss occasioned by the floods that submerged southern Ohio, Indiana and Illinois late in March. It is known, however, that hundreds perished, while the property damage runs into the hundreds of millions, making it one of the greatest catastrophes in American history, if not the greatest of all.

Better than words can tell it, the story of the flood is revealed in the photographs reproduced on the three preceding pages, while the pictures on the two pages following record graphically many of the incidents of pathos and daring occurring in the course of the rescue and relief work.

The flooded territory is indicated on the map published herewith. The receding waters left ruin and desolation behind them, but the work of restoration was begun without delay. The heroic spirit of the stricken survivors was only equaled by the generosity of the rest of the country. Hundreds of thousands of dollars were subscribed in every important city for the aid of the flood sufferers, extensions of credit were granted by the great banks and wholesale houses to manufacturers and merchants whose business had been interrupted or injured, and from almost every town in the flooded zone came the cheering word that, whatever else they had lost, the people still retained the fighting American spirit, and that business and manufacturing was being resumed as before.

Pages could be filled with accounts of the work of the Regular Army troops and the National Guardsmen, who were dispatched to the flooded district and took charge of the relief work. There is material for more than one great book in the narratives of narrow escapes and loving self-sacrifice that were among the more striking features of the catastrophe, while the mechanical ingenuity of the American people was never better displayed than in the improvised devices for life-saving that were developed under the stress of necessity.

Several children were rescued from a house in Columbus in a washtub, running on a rope which was passed through the handles, and stretched across a flooded street. Thousands of people in Dayton were fed for days with food sent over life lines and telephone wires in baskets in the same manner. Zanesville was cut off from communication until the National Guard artillerymen attached a line to a cannon ball and fired it across the Muskingum River. Hundreds crawled or were carried to safety along telegraph and telephone wires. Everything that would float was used for rafts—coffin boxes, wooden bedsteads, and, in at least one instance, the roof of a submerged house, the tenants of which, driven to the attic by the rising flood, chopped the timbers apart and floated away to safety on the shingled rafters.

Motorboats were almost useless in the swift current in most of the flooded cities. In one or two instances, swimming horses towed rafts loaded with passengers to safety, and many horses climbed into second-story windows in the effort to escape drowning. Thousands of dead horses, however, were found in the streets of Dayton, Columbus, Hamilton, and other cities, after the water went down. The boats from the life-saving stations on the Great Lakes and those manned by the Naval Reserve proved of great value.

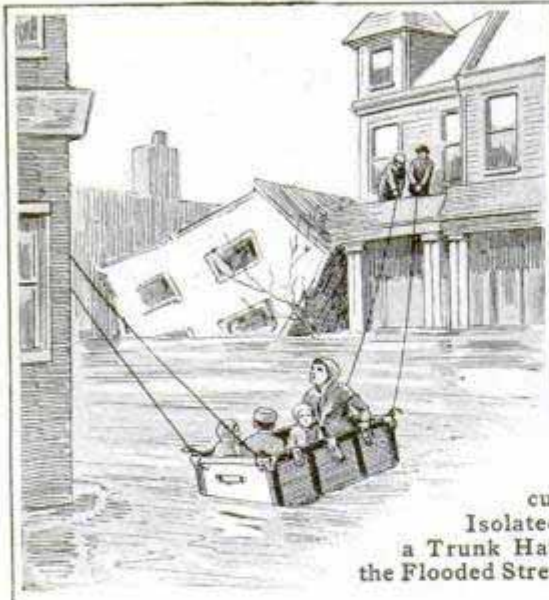
FRENCH MILITARY AIRMEN

4006 FLY OVER SAHARA

The conquest of the Desert of Sahara by means of the aeroplane is a dream of the French military authorities which began to be realized when four military aeroplanes recently covered the 500 miles between the Algerian coast and Biskra, a town of one of the largest oases in the desert. Each machine was piloted by an army lieutenant and one carried Colonel Bouttieaux as a passenger. The entire journey was made without escort or accident. The airmen arrived at Biskra April 17.

Dispatch from 797
Biskra, Algeria, in

INCIDENTS OF RESCUE WORK IN FLOODED ZONE



Mrs. Charles Schmidt, of Hamilton, Sat for Two Nights and a Day on a Mantel, Holding Her Two Babies



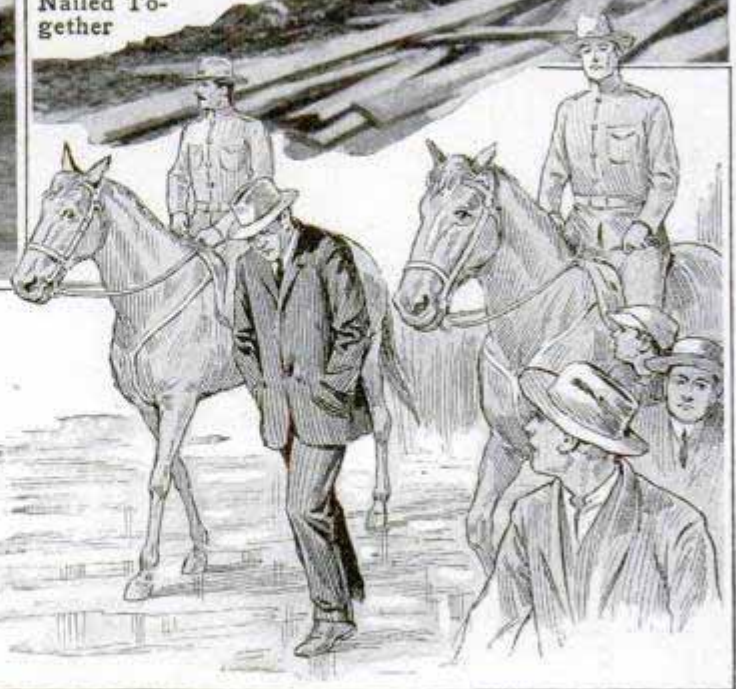
An Entire Family in Hamilton was Rescued from an Isolated House in a Trunk Hauled across the Flooded Street by Ropes



Troops of the Ohio National Guard Built a Pontoon Bridge at Hamilton to Enable Wagons with Food and Clothing to Enter the City

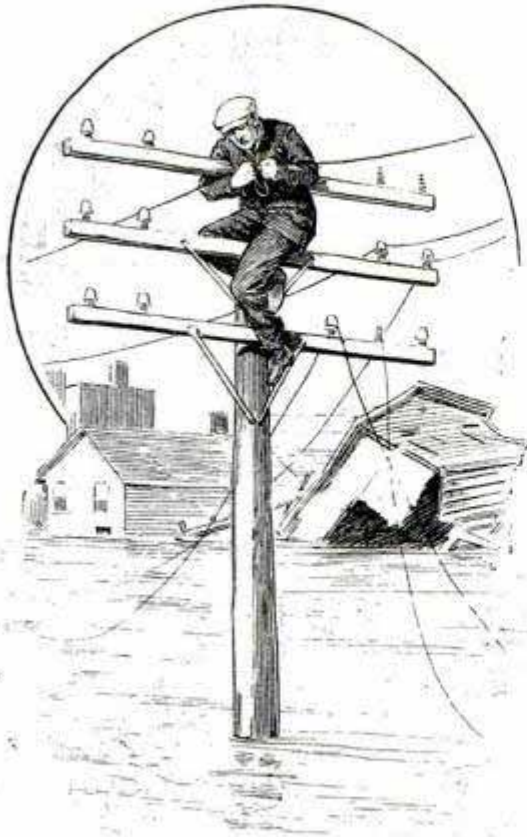


Rescue Boat Made of Four Washing Machines Nailed Together



For the First Time in America Since the Civil War the Military Punishment of Being Drummed Out of the City was Inflicted, at Hamilton. The Culprit was a City Official Caught Stealing Provisions While the Town was under Martial Law

PICTURES THAT SHOW HOW LIVES WERE SAVED



Earliest Com-
munication with Dayton
was Gained through a Telephone Lineman, Who
Held Broken Wires Together While Flood News
was Sent to the Out-
side World

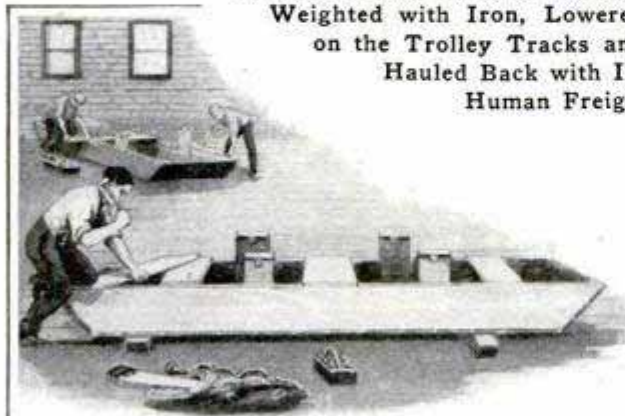


A Cincinnati Newspaper Chartered an Auto Truck and Sent
the First Motorboats into the Flooded District



Efforts to Rescue Nine Persons
from a Tree in Columbus
Failed Until a Motorboat
and a Scow were Tied
Together and Drifted
Downstream, the Rope
Catching on the
Tree. Five had
Dropped from the
Tree and Drowned.
Two were
Lashed to the
Branches
Dead. Two
were Saved

Many were Rescued on a Flat Car,
Weighted with Iron, Lowered
on the Trolley Tracks and
Hauled Back with Its
Human Freight



Scores of Boats Like This, Hastily
Constructed of Packing-Box Lumber
in a Big Dayton Plant, Saved Hundreds



TRIUMPHAL ARCH OF PANAMA-PACIFIC EXPOSITION

correspond in size to the plaza before the Cathedral of St. Peter's in Rome.

3829

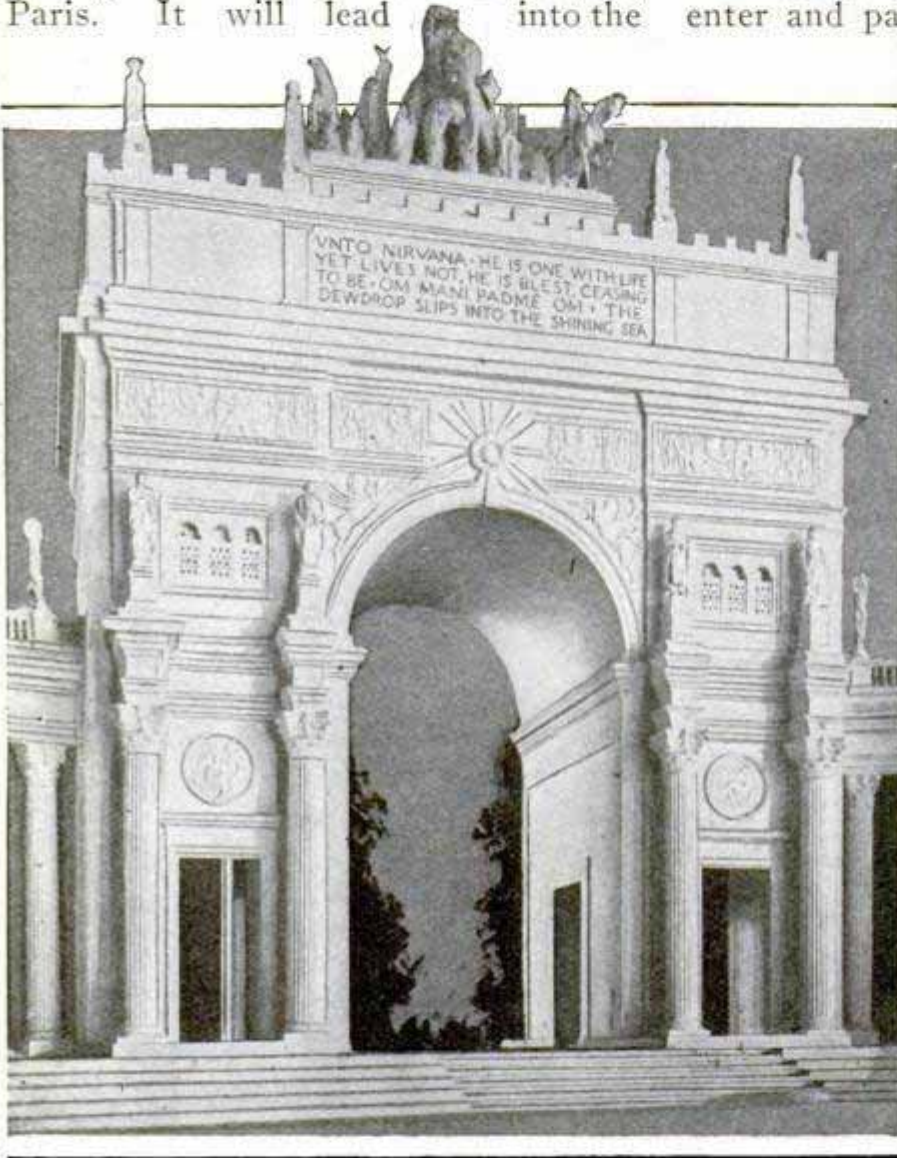
The Triumphal Arch on the east side of the Court of the Sun and Stars, at the Panama-Pacific Exposition, is to be larger than the Arch de Triomphe, Paris. It will lead into the

4011

NOVEL FARE SYSTEM FOR STREET CARS

A combination of the pay-as-you-enter and pay-as-you-leave systems is in effect in the street-car service of Cleveland, Ohio, where peculiar traffic conditions prevail. Cars from all sections of the city come into the downtown district to the public square and loop back, and it was for the purpose of relieving the rush-hour congestion at that point that the combination system was adopted. In the morning, when the passengers are picked up all along the line and unloaded practically all at once down town, the car is operated pay-as-you-enter. In the evening, when this condition is reversed, the car is operated pay-as-you-leave. It is found that a car can be loaded with 100 people in 70 seconds by loading from both ends, if the collection of fares is postponed until passengers alight at various points along the line.

Electric Traction
San Francisco
Apr 23



Copyrighted, 1913, Panama-Pacific Exposition Company
East Triumphal Arch of the Court of the Sun and Stars,
Panama-Pacific Exposition

Geo. H. Perry
Director
San Francisco Calif
Great east of Festive Court. The size of the structure may be judged by the fact that the height under the archway will be 90 ft. The group of figures surmounting the arch is symbolic of the Orient, and is composed of elephants, camels, horses and Arab warriors. A triumphal arch of equal size will be constructed on the opposite side of the court, surmounted by prairie schooners and figures typifying the west.

The Court of the Sun and Stars will

SOUND-PROOF HOUSE FOR MUSIC STUDENTS

3964

A house with sound-proof rooms, designed for the sole use of music students and teachers, is to be built in Berlin. The house will contain 50 rooms, in any one of which lessons may be given and practicing may be done without the possibility of disturbing others, or of being disturbed.

Christian
Sauer
Moscow

Brown & Co. N.Y.

CUNARD LINER "AQUITANIA" LAUNCHING OF THE LARGEST SHIP AFLOAT 3863

4009

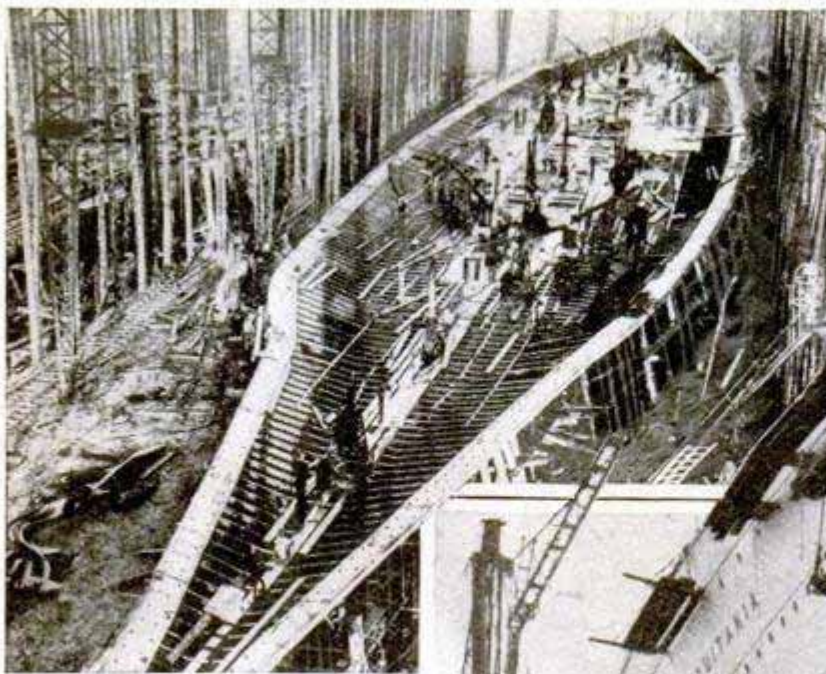
The liner "Aquitania" which was launched from the shipyard at Clydebank, England, April 21, is, with the exception of the New German liner "Vaterland," the largest ship afloat. In its construction, every precaution known to the shipbuilding art, apparently, has been taken with a view to making it safe in case of accident. This ship has a total length of 901 ft. and a breadth of 91 ft. The depth from keel to boat deck is 92 ft. 6 in., which is almost equivalent to the height of an eight-story building. With a gross tonnage of 47,000 tons, the ship is planned to make a speed of 23 knots per hour. A better indication of its size is given, perhaps, by the fact that it will have accommodations for 3,250 passengers as well as for a crew of nearly 1,000. The vessel will carry a sufficient number of lifeboats to accommodate every passenger, as well as the entire crew.

This vessel really consists of a ship within a ship. In other words, there are two steel shells, an inner and an outer, both being water-tight, with an intervening space of about 15 ft. This space is divided into comparatively small compartments by a system of horizontal and vertical water-tight bulkheads, so that the ingress of water from any fracture of the outer shell will be confined to a small area at the side of the ship. An added element of safety is given by a system of water-tight decks. Before beginning the construction of this vessel it was necessary to make extensive additions to the shipyard, although it is the same yard in which the "Lusitania" was built, while the foundation for supporting the vessel during construction was laid with as much care as if it had been the permanent foundation for a modern high building. In addition to the preparations in the yard, the river had to be deepened and widened for the launching, and the fitting-out basin was deepened in order to accommodate the liner during completion.

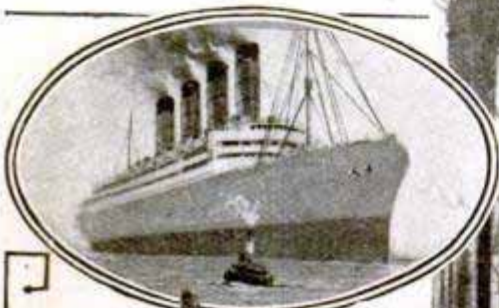
On April 3, 1913, the "Vaterland," the largest ship ever built, was launched at Hamburg, Germany. This ship measures 950 ft. in length and 100 ft. in width, being 50 ft. longer than the "Imperator," the largest ship ever previously launched. The hull of the "Vaterland" is constructed of steel plates of unusual strength, is provided with an inner shell extending well above the water line, with the idea of avoiding such disasters as that of the "Titanic." The vessel also has both transverse and longitudinal bulkheads, an added element of safety. Some of its size may be gained from the fact that more than 1,500,000 rivets, weighing 2 lb. each, were used in the construction of the hull. The largest locomotive ever built could easily be run through the smokestack, while the funnels extend 69 ft. above the deck, the height of an ordinary six-story house. The rudder weighs 90 tons, and the stock on which it swings 110 tons, but all is so delicately balanced that the rudder responds to a touch on the wheel nearly a fifth of a mile away.

The vessel will be propelled by steam turbines of the Parsons type. In the accompanying illustration the "rotor," or revolving part of one of these turbines, is shown, ready to be installed in the "stator," or outside casing. Both the rotor and stator carry blades varying in size from a few inches at the small end of the turbine to nearly two feet at the large end. These act reciprocally in converting the force of the steam into a rotary motion. Each rotor weighs 135 tons and carries 50,000 blades, all of which are placed by hand. Each of the large turbines is capable of developing 22,000 hp. and the total available power exceeds 70,000. The outer casing of each turbine is 25 ft. long and 18 ft. wide, while the propeller shaft is 18 in. in diameter. The "Vaterland" will be equipped with searchlights of 80,000 cp., the largest ever constructed, which will be carried high on the foremast. These

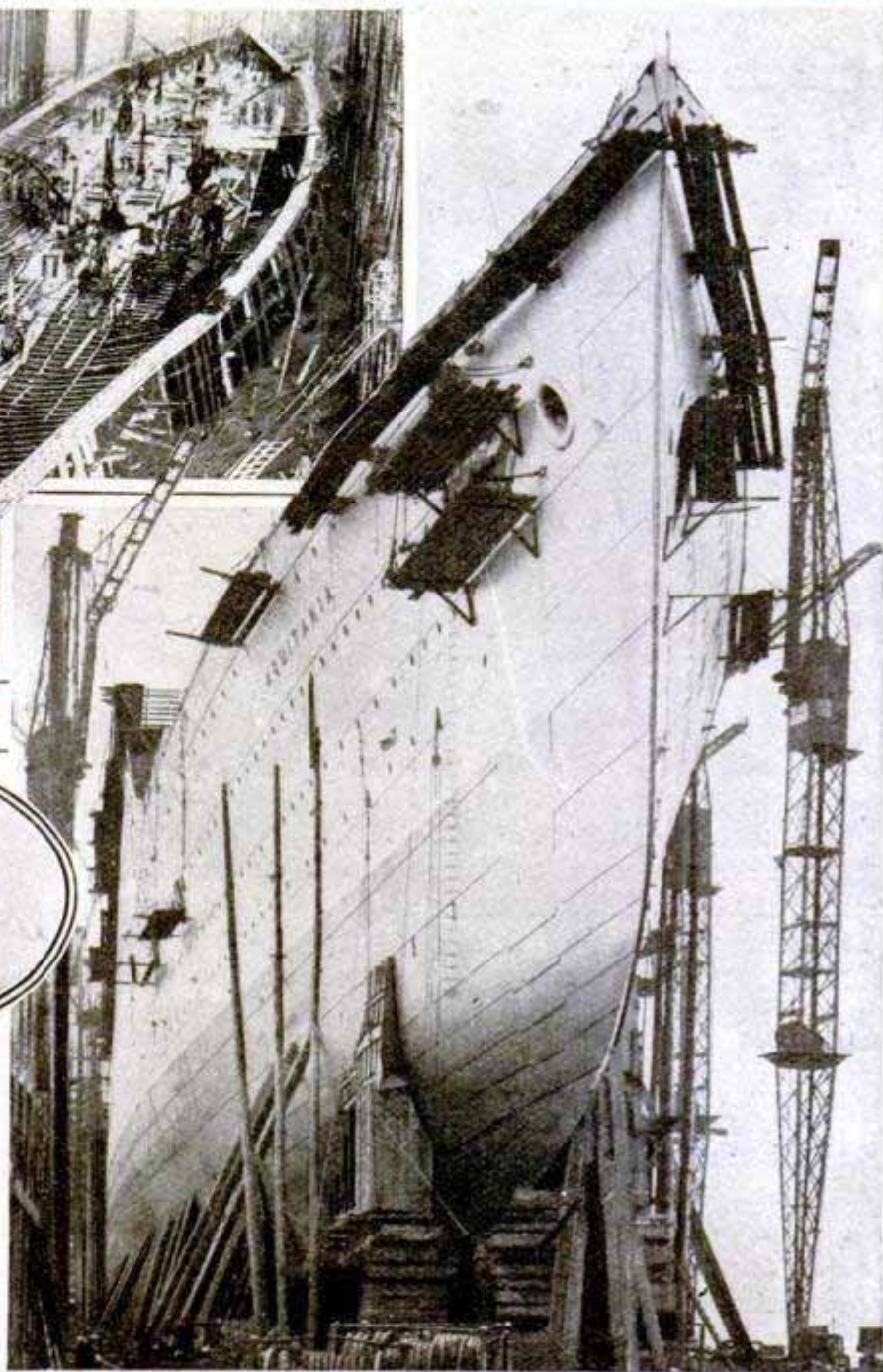
Cumard & Co.
149 N. Dearborn
Chicago
new York
built by Blohm & Voorn



Inner Bottom, Looking Forward



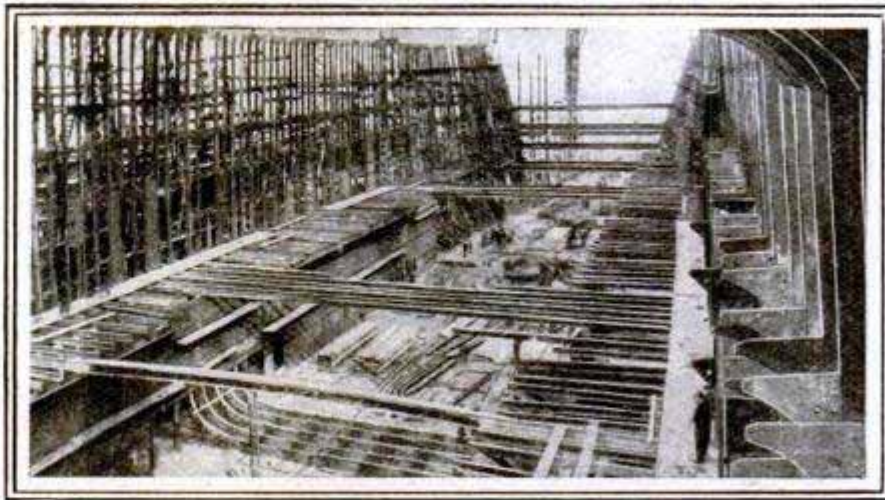
The "Aquitania"



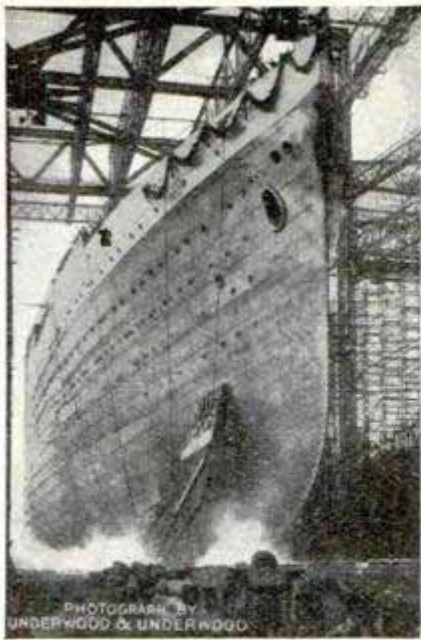
Bow View of "Aquitania," Ready for Launching



One of the Cranes Used in Building the Vessel

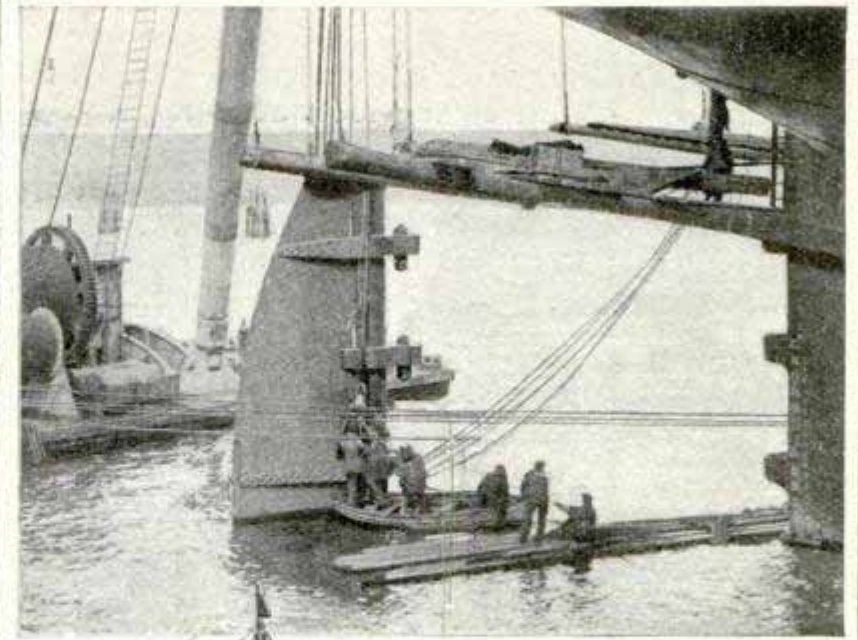


This View of Steel Framing above the Boiler Space Gives an Idea of the Amount of Structural Detail Required in the "Aquitania"

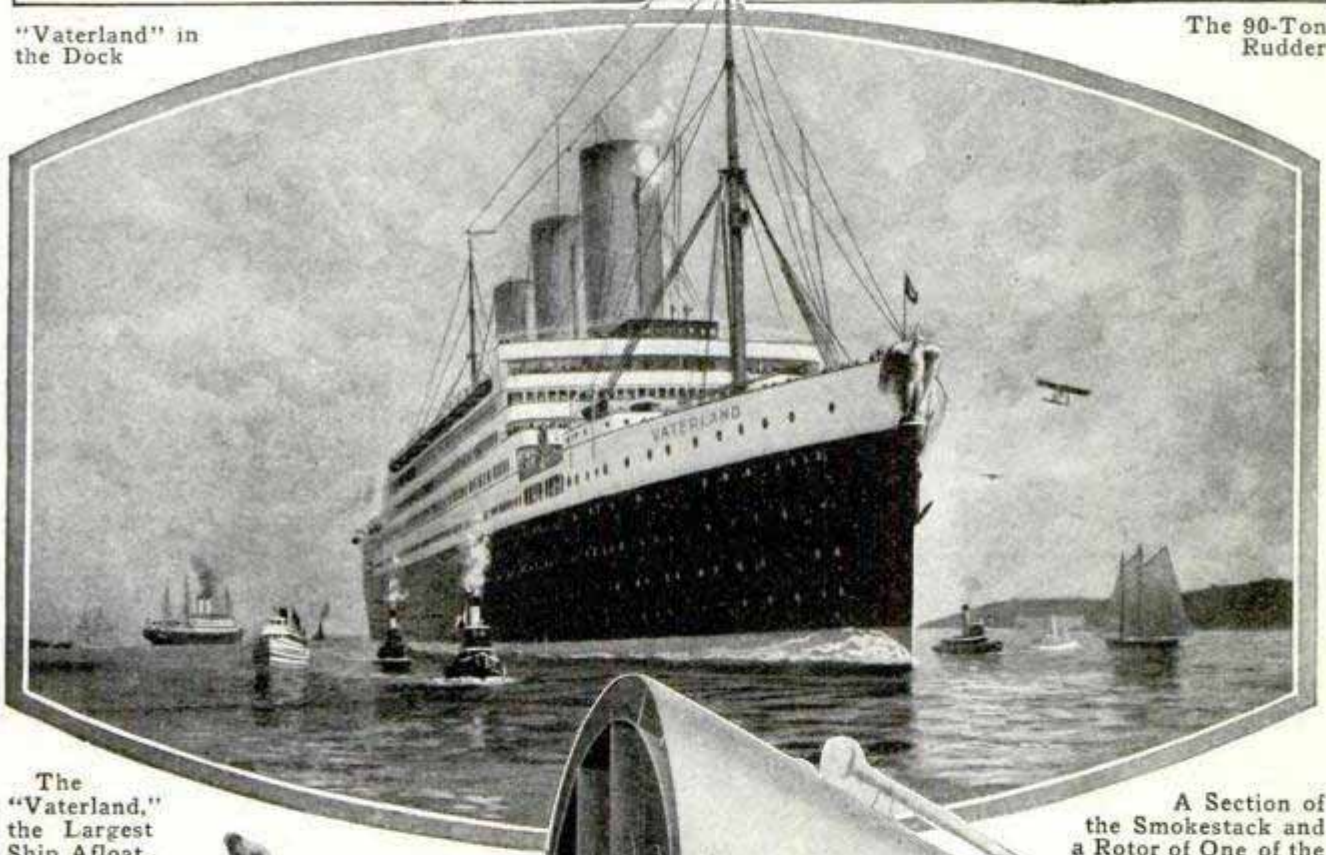


PHOTOGRAPH BY
UNDERWOOD & UNDERWOOD

"Vaterland" in
the Dock

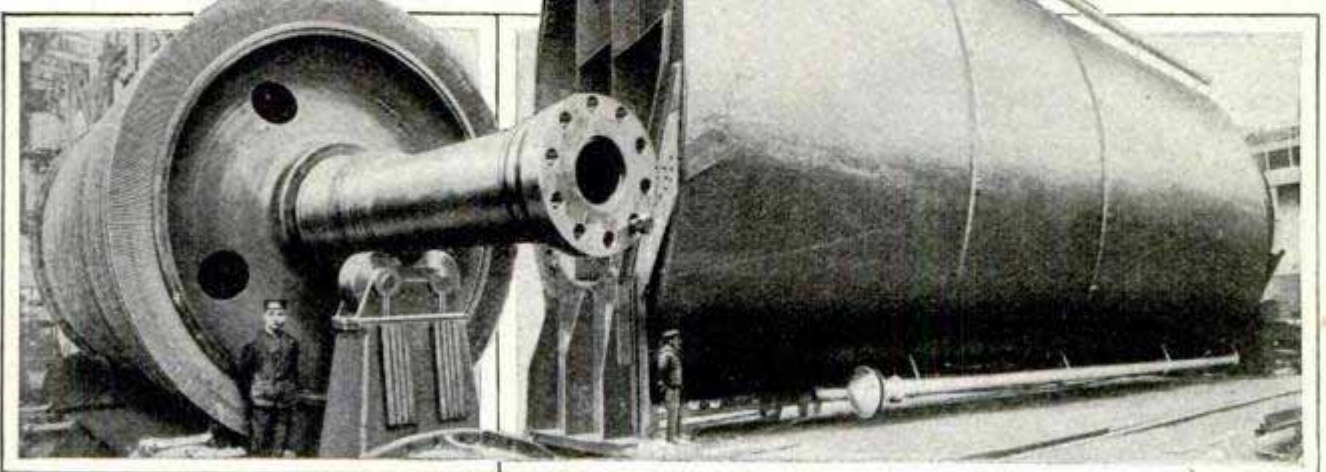


The 90-Ton
Rudder



The
"Vaterland,"
the Largest
Ship Afloat

A Section of
the Smokestack and
a Rotor of One of
the Steam Turbines



searchlights will be visible for 30 miles at sea, and will enable the lookout to illuminate an object at a distance of seven miles. The vessel will carry 84 lifeboats, enough to accommodate its full quota of passengers and crew.

WAR-WRECKED MEXICAN CLOCK TOWER

All that was left of the magnificent clock tower on Bucareli Street, Mexico City, after the storm of rebellious con-

3830



Lofty Clock Tower Wrecked by Projectiles in Mexico City

fact, is this distorted mass of ruins, which might be taken for a windmill wrecked by a cyclone. It was in direct line of the bombardment of the Imperial Hotel. The damage was done by projectiles from rapid-fire guns; Maxims, Gatlings and Colts being used.

WRECK WITH \$50,000 IN TREASURE IS FOUND

While setting a fish trap off the Alaska coast a diver recently discovered the wreck of the schooner "Sadie F. Caller," which sank 18 years ago with \$50,000 in bullion on board. The vessel lies in 60 ft. of water and is easily accessible. The diver arranged with the owners and underwriters for a half interest in all treasure recovered.

4004

News item in (?) daily paper from

U. S. NAVY ABANDONS TERMS "PORT" AND "STARBOARD"

3959

On the recommendation of the Navy General Board, the Secretary of the Navy has ordered that in giving directions for steering ships, the terms "right" and "left" shall be used instead of the traditional "starboard" and "port," on all vessels of the navy. *Chicago Daily News* report of the General Board, signed by Admiral Dewey, recommending the change, points out that the use of the nautical terms involves a distinct mental effort on the part of sailors, while every one has been familiar from childhood with the meaning of "right" and "left." Another mental effort, even more severe, is involved in the execution of steering orders in nautical terms, since the practice has been to adhere to the instructions used when ships were steered by a tiller instead of a wheel.

To put the helm to port, for instance, does not mean to turn the ship to the left, but to turn it to the right by moving the tiller to the left or port side. Steering wheels, however, are so arranged that turning the wheel to the right, or starboard, moves the tiller or helm to the left. So that, when the order is given "hard-a-port," the steersman must remember that this means turning the wheel and the bow of the ship both to starboard, while the only part of the vessel that moves toward the port side is the tiller, which he probably has never seen.

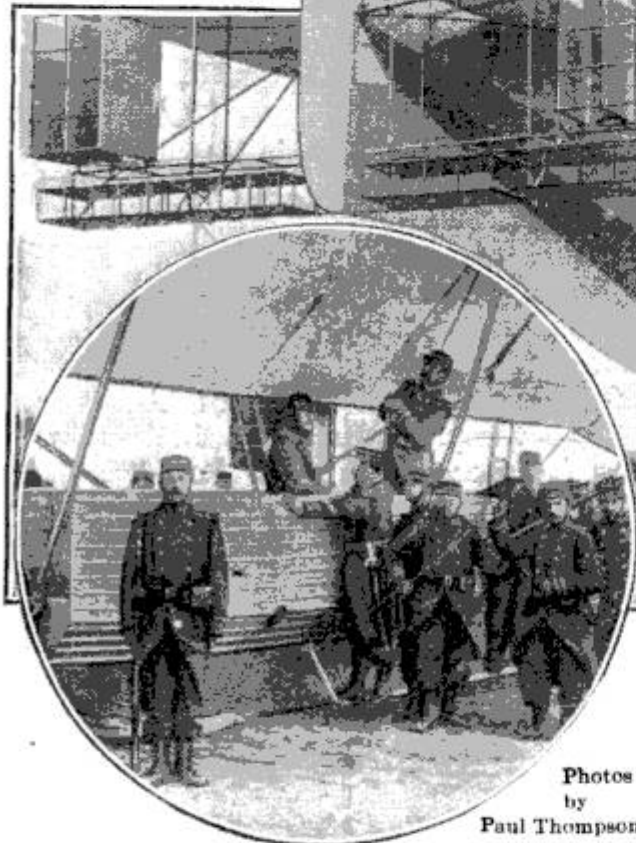
Under the new order, steering orders will be given with relation to the direction in which it is desired to turn the ship, so that the steersman getting the order "right" will turn the wheel to the right, and so turn the ship to the right, or, in the case of the electric steering apparatus now being installed on several navy vessels, will move the steering lever to the right. It is probable that the merchant marine will in course of time adopt the new practice of the navy.

Munich, Bavaria, is the first city to establish a museum of aeronautics.

Item in (1) from City, Wash paper

BABY BROUGHT TO LIFE BY PULMOTOR 4005'

New uses for the pulmotor, the wonderful electric apparatus for administering oxygen and keeping motion after from gas

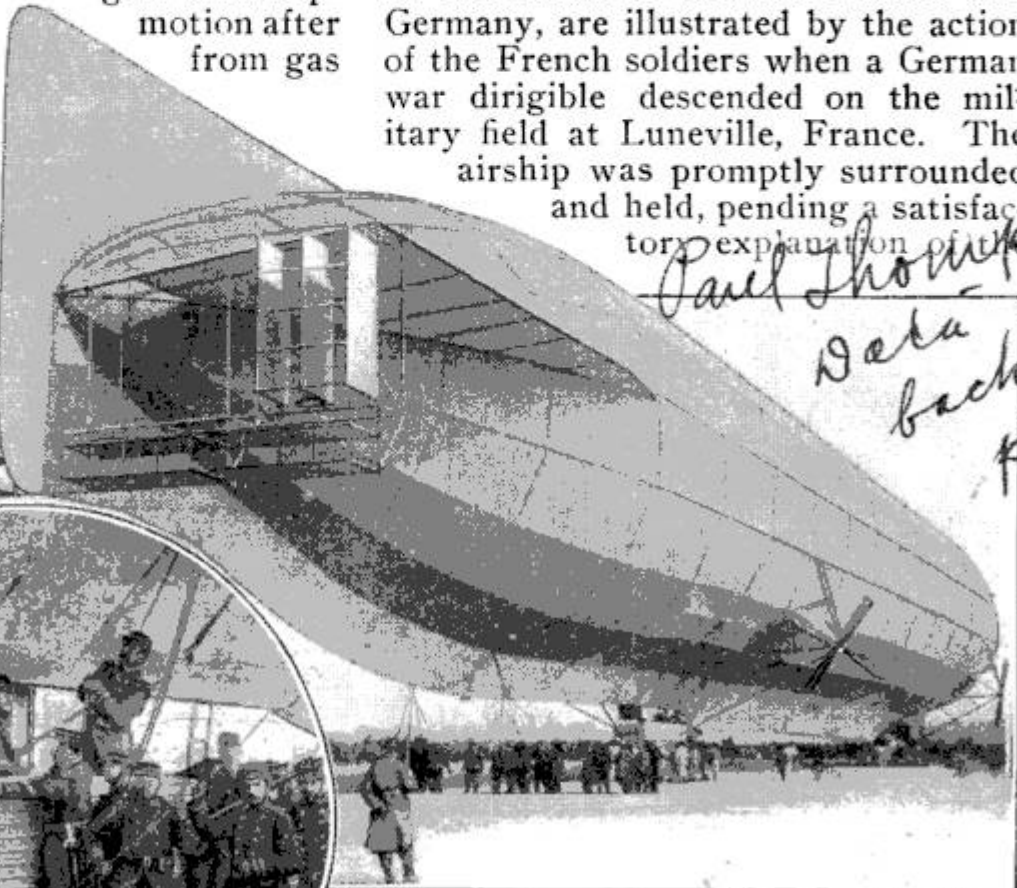


Photos by Paul Thompson

found by American physicians. A Kansas City physician recently used it to resuscitate a baby that had been born apparently dead, and after three hours' application of the instrument the infant's lungs were working normally and it was as lively as most newborn babies. In a Chicago hospital the pulmotor was used in the effort to restore to consciousness a victim of poisoning by heroin, one of the opium alkaloids. In this case it was not successful, although the physicians believe that if it had been used earlier, the patient would have lived, and that it may be of service in any case of opium poisoning.

GERMAN DIRIGIBLE LANDS IN FRANCE

The rigid observance of military regulations and, perhaps, the tensity of the relations between France and Germany, are illustrated by the action of the French soldiers when a German war dirigible descended on the military field at Luneville, France. The airship was promptly surrounded and held, pending a satisfactory explanation of



German War Dirigible, That Landed by Mistake on French Military Field

incident. The officers in charge of the dirigible explained that they had become lost above the clouds and, in descending, were unable to distinguish the boundary line between the two countries.

GOLD DESTROYED BY CHINESE CUSTOM

Burning a small piece of gold leaf is a custom observed by the Chinese at certain anniversary celebrations and it is estimated that gold to the value of over \$10,000,000 is destroyed annually in this way. This estimate is based on the assumption that each individual of a total population of 440,000,000 burns at each of two anniversaries a piece of gold leaf weighing .308 grain, making a total of 271,000,000 grains. A five-dollar gold piece weighs 129 grains.

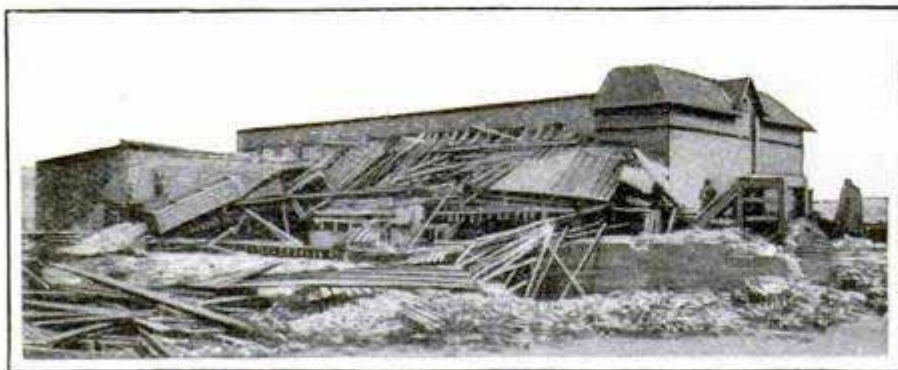
*Paul Thompson
Data on back of photo*

396

Coan

GAS EXPLOSION WRECKS LARGE WAREHOUSE

The terrific force developed by an explosion of natural gas was exem-



Ruins of Storage Warehouse Destroyed by Natural-Gas Explosion

P. L. Pender
plified during the progress of a fire at Medicine Hat, Canada, recently. The explosion wrecked a three-story brick cold storage warehouse and a canning factory, killing five people and injuring nine others. The structure was a large one, its dimensions being 100 by 200 feet.

BOILER, NOT CYLINDERS, OVER A ROD LONG

no data
In the April Popular Mechanics Magazine appeared a statement, about a new English locomotive, that "The usual outside cylinders have given place to inside cylinders, which are no less than 21½ in. in diameter and of the exceptional length of 17 ft. 3 in."

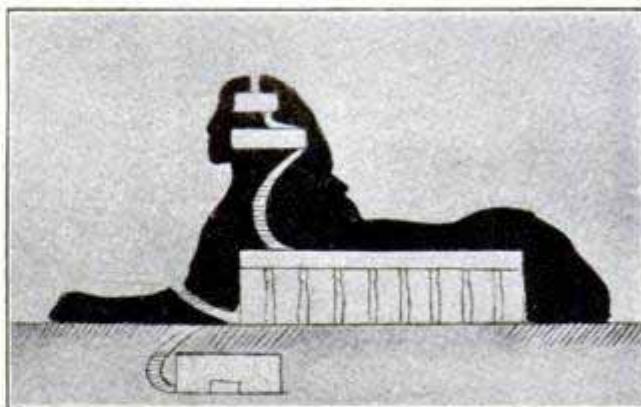
The statement was an error, caused by the omission of two lines of type. As originally written it read: "The usual outside cylinders have given place to inside cylinders, which are no less than 21½ in. in diameter and of 26-in. stroke. The huge boiler is 5 ft. 6 in. in diameter over all and is of the exceptional length of 17 ft. 3 in."

headed by Mr. William Carraker
An expedition organized under the auspices of the University of Pennsylvania set sail March 19 for Brazil, to explore the upper tributaries of the Amazon, a region never before visited by white men. Three years will be required for the exploration.

TEMPLES REPORTED FOUND 4052 IN THE SPHINX

Repeated reports received in England from Egypt in regard to investigations being made by Prof. G. A. Reisner, of Harvard University, indicate that the head of the Sphinx is the antechamber of a great series of temples. A depression in the head of the Sphinx had been observed by many travelers in the last hundred years, but no systematic attempt at

excavation had been made. According to the latest reports, on the removal of the sand and blocks that had been placed across the opening, Professor Reisner found himself in a chamber 60 ft. long and 14 ft. wide, forming a small but complete temple. This temple is said to be connected with a second temple at a lower level, and, through a tunnel running down the neck, with a far more spacious temple occupying the entire body of the Sphinx. These temples are all dedicated to the sun, the great deity of the ancient Egyptians. Professor Reisner is also quoted as saying that other tunnels lead to a great subter-



Series of Temples and Tunnels Said to have been Discovered in the Sphinx

ranean city, which probably was once inhabited.

Gelatin dynamite that gives off no poisonous fumes has been evolved by the U. S. Bureau of Mines.

COMMENT AND REVIEW

THAT wonderful new empire, Florida, is prolific in bright ideas, some of which have already been mentioned in these pages. The latest conception is so good and so easily adapted to almost every city, and the results are so immediate and practical, that the scheme deserves special mention.

*"100" for
a Clean
Kitchen*

In the city of Jacksonville, one of the employes of the Health Department has been detailed to inspect all the hotel and restaurant dining rooms and kitchens. In this case the work is done by a man, but the office is one which can be filled with equal ability by a woman. This inspector visits all these eating places several times each month, appearing at the most unexpected hours as well as during the times when regular meals are being served. The perfect grade is 100, which means the highest degree of cleanliness of rooms, kitchens, ice boxes, sinks, dishes, linen, and personal cleanliness of cooks, helpers, dishwashers, waiters and all other help employed in the preparation and serving of the food. Table linen and working and serving garments of the help are inspected; the appearance of the walls and floors is noted; and uncooked food is examined to determine its condition, whether fresh or stale. All failures to maintain a certain standard are checked on a printed form and each bad mark reduces the rating or "score" of the place for that month.

Thus far very good, but you will say, "How make the dirty places clean up?" That's the easiest part of all. Once each month the daily papers print the names of all the hotels and restaurants, one name to each line, so they are easily read, and opposite each name are the figures of the score. In the printed list before me there are 95 places reported, 7 of which head the list with the much wished for "100." Then the balance follow in order of the score, all but 12 receiving 90 or better, while the lowest was 85.

When the plan was first put in operation many of the proprietors laughed at it, and professed themselves indifferent to what the marking should be. Their customers were satisfied and didn't care anyway. And they had not cared previously, chiefly because they had never been in the kitchens. But when the first score was published trouble began, and angry patrons threatened to go elsewhere to dine. Then the proprietors saw a great light and promised reform. When the second month's score came out there was a marked improvement all along the line, some places showing a gain as high as 25 points. The inspection has been in force several months and the general rating is steadily rising. I believe no one has fallen back for the very good reason he dare not. Every person who patronizes a public eating place in the city immediately looks for the standing of the restaurant he patronizes. In this way that most potent appeal to the otherwise regardless—his pocketbook—is directly secured.

Do I hear some one hint at low marks for those who do not "come across," and another avenue of graft opened? In practice it doesn't work, because the man with the clean place who might be

marked low has his own proof at hand. All he needs do is to show his patrons through his kitchen and they can judge for themselves. And for the fellows who do not deserve high marks and buy them—his competitors have easy ways to find that out, too, for the place with the good rating and a filthy kitchen dare not open up to the inspection of patrons. Many of the finest hotels in the large cities already urge guests to visit their kitchens, at any hour, and find the practice the best advertising they can do. Some day the better-class restaurants also will find it profitable to do the same. It might not be a bad plan to require each place to print on its menu each day the rating it received for the previous month.



THE waters of the unparalleled floods which submerged cities and farms of several states have run their course and are now lost in the Gulf of Mexico. The details of the event are already fading into

*After
the
Flood*

history; the people with unbounded courage have set resolutely at work to rebuild their homes, factories and fortunes. Even the countless deeds of valor, many of which have not been excelled upon the battlefield, are told less and less often, as time leaves them far astern in the irresistible forward movement of modern activities.

The volume of water which fell in the Ohio region during those fateful four days has been estimated by a weather-bureau expert as sufficient to fill a reservoir five miles long, five miles wide and five miles deep; or a river 100 ft. deep, 1,000 ft. wide and 1,400 miles long; it would cover the entire state of Ohio to a depth of seven inches.

While the great flood is doubtless unlikely to be duplicated in a century or two, if ever, it differed from previous floods in the same district chiefly in volume with corresponding damage. Of the three great devastating convulsions of Nature—flood, tornado and earthquake—the flood is the only one which man can forestall. Already embryonic plans and schemes to prevent a recurrence are suggested, but none has been carefully worked out and therefore no estimate is possible of the probable cost. It is evident, however, that any effectual remedy must be through the medium of Federal Government, and, as previously suggested in these pages, accomplished largely by a capitalization of the enormous water power which would be secured by entrainment of what is now only a reckless menace.

That wonderful spirit of accomplishment that swept the fever from the Panama Zone and dug through mountains to connect two oceans, is surely competent to first solve the problem of our ever-recurring floods in the Ohio and Mississippi valleys, and then to execute the engineering plans that will turn the annual panic of waters into a permanent source of power. It is doubtful if any possible achievement by which Colonel Goethals might have served his country on the battlefield would have surpassed the honor and enduring fame he has so fairly earned as constructor of the Panama Canal. When the canal is completed our Army engineers may well turn their attention to a solution of the flood problem.

IT is greatly to be hoped the new Postmaster-General will in the near future reverse the action of Mr. Hitchcock, who was responsible for sending large quantities of mail by freight. For many years the policy of the Postoffice Department was to expedite and improve the transmission and delivery of mail. It remained for Mr. Hitchcock, in the exercise of the wide personal power vested in the Postmaster-General, to take the first decided step backward.

*Mail
by
Freight*

His scheme, which he excused on a claim of economy, was to send some of the second-class mail by freight trains part of the distance and then transfer it to a mail train for the remainder of the trip. For instance, second-class mail originating in Chicago, and addressed to subscribers in the southeastern states, was taken by freight to Cincinnati. Later the haul by freight train was extended to Atlanta before getting mail-train service. The result was what might have been predicted and publishers have been busy ever since trying to explain to disgusted readers why their magazines failed to come. A single recent example in our own case was sixteen mail sacks of Popular Mechanics Magazines for the southeastern states which were lost at some little flag station and did not turn up for more than two weeks.

Another feature not approved by lovers of fair play was the autocratic manner with which the Postmaster-General assumed to himself the province of both court and jury and designated which publications should go by freight and which should still enjoy the former fast-mail train service. It is certainly no more than plain justice that all publications entered under exactly the same conditions and requirements as mail matter of the second class, and all paying exactly the same rate of postage to the Government, should each receive the same service. To grant some the favor of fast service and consign others to the handicap of freight trains, and that at the caprice of one cabinet officer, is at least un-American; especially as the Postmaster-General is his own court of last resort on his own rulings, and the publisher has absolutely no appeal.

It is conceivable that such a condition might exist in Russia, but, of all places, not in the United States. The hope is again expressed that the new head of that greatest business department of the Government will in his own good time investigate this rank abuse and deal justly.

H. H. WINDSOR



3974



Copyrighted, 1913, by Underwood & Underwood, N. Y.

A Section of the Uncovered Ruins of Babylon. The Man is Standing upon a Section of What was the Long Street Named after Daniel

3972

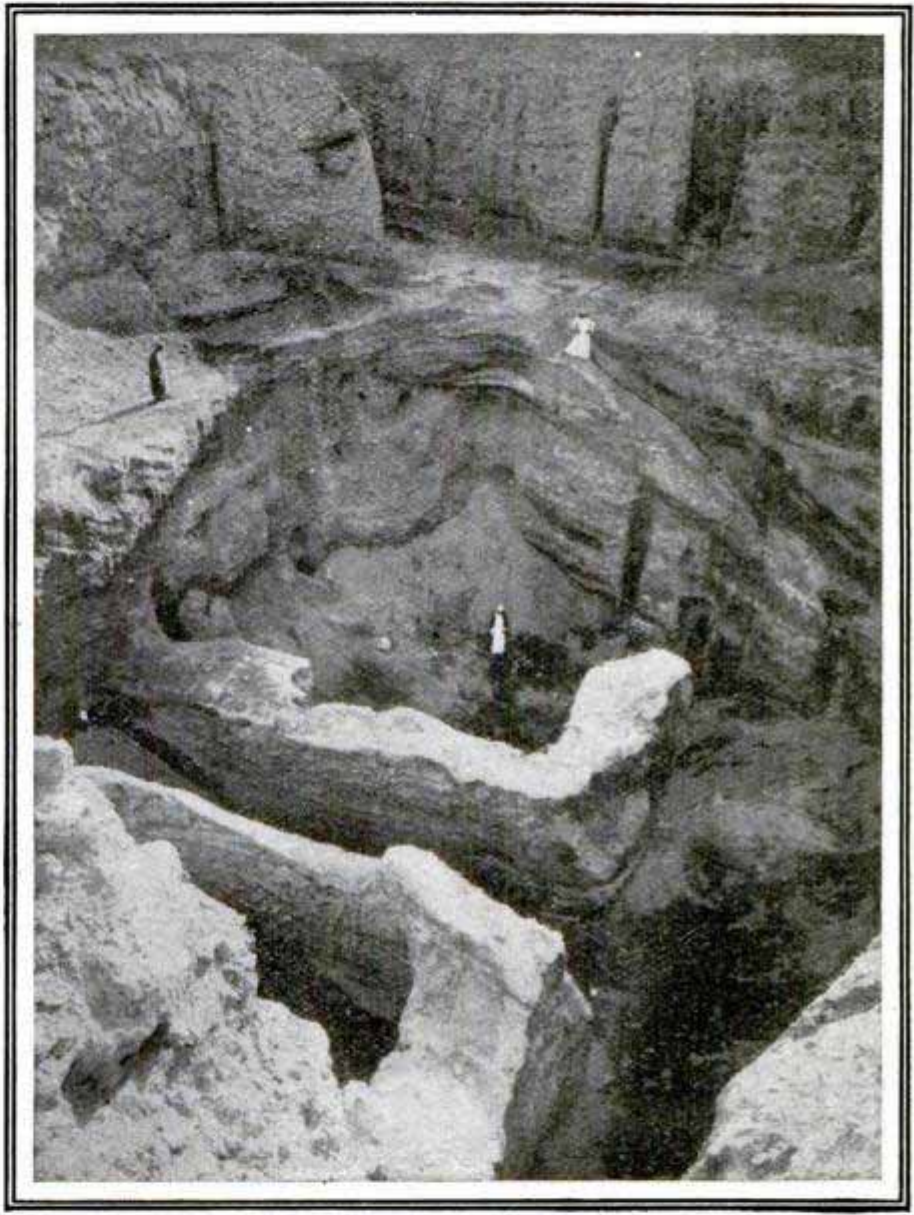
THE UNCOVERING OF ANCIENT BABYLON

Underwood & Underwood
And the whole earth was of one language, and of one speech. And it came to pass, as they journeyed from the east, that they found a plain . . . And they said, Go to, let us build us a city and a tower, whose top may

For 12 years, Prof. Robert Koldewey, director of the Archaeological Research in Babylon, which is supported by Kaiser Wilhelm of Germany, has carried on unceasingly the work of uncovering the ruins of the ancient city, which for centuries have been hidden away under the accumulation of dust, dirt and debris of the ages. Part of what has been accomplished is shown in the illustrations. Abandoned by men in the early days of our civilization, the biblical city, "the cradle of our civilization," was obliterated by the debris until 1900. The man on the left, in the illustration showing a cleared section of Babylon, is standing upon the remains of the brick pavement which was part of the long street named after Daniel, who himself, no doubt, traversed its length many times. In the ruins on the right, in the hollow, is the gate named after the goddess Ishtar. It was through this gate that the processional road of the god of Marduk passed and, turning to the right, led to Nebuchadnezzar's Throne Hall.

The smaller illustration is, perhaps, even more interesting, as it shows part of the ruins of the Tower of Babel. It was here, during the construction of this tower, that the polyglot tongues of the world were born, according to the account in the 11th chapter of Genesis:

And the whole earth was of one language, and of one speech. And it came to pass, as they journeyed from the east, that they found a plain . . . And they said, Go to, let us build us a city and a tower, whose top may



Copyrighted, 1913, by Underwood & Underwood, N. Y.
Part of the Ruins of the Tower of Babel, Where the Polyglot Tongues of the World were Born

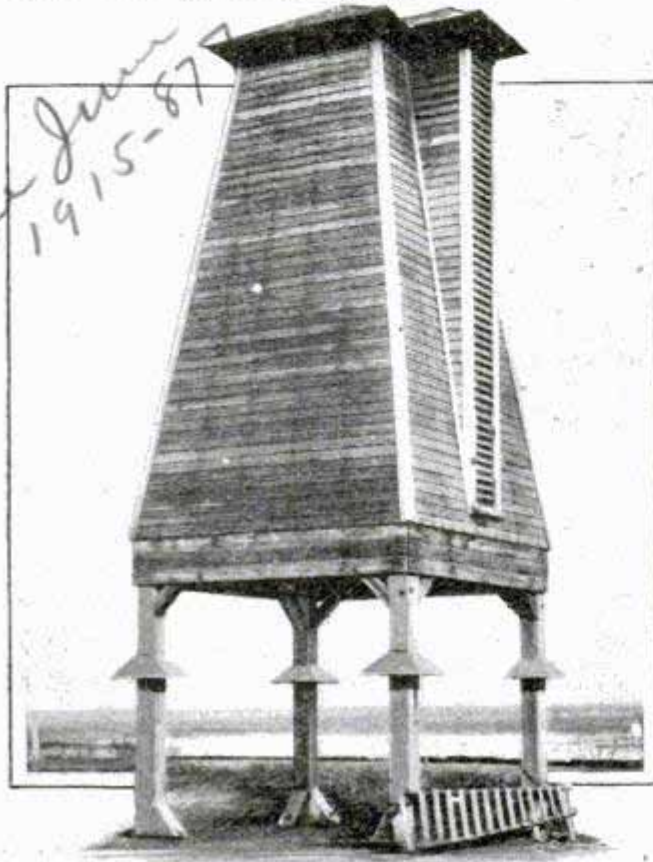
reach unto heaven . . . And the Lord came down to see the city and tower . . . And the Lord said, Behold, the people is one, and they have all one language, and this they begin to do . . . Go to, let us go down, and there confound their language, that they may not understand one another's speech."

The two walls shown in the center mark the entrance to the passage to the Temple of Esagila.

3942

BATS TO EXTERMINATE MOSQUITOES

Recent investigations indicate that the greater portion of the



House for Bats, a Feature in the Extermination of Mosquitoes

...et of the bat consists of mosquitoes, and advantage is being taken of this fact in ridding communities in Texas and other southern states of the mosquito pest. A house, such as shown in the illustration, is erected in a place where mosquitoes abound, and this quickly becomes a home and breeding place for the bats. The house is set high above the ground, and a metal shield is placed around each post to prevent access by rodents. It is believed that this may furnish a convenient means of combating yellow fever and malaria, the germs of which are carried by mosquitoes.

Over one-tenth of all the automobiles in the United States are owned by residents of the state of New York. In 1912 the number of registered automobile owners in that state was 107,262, an increase of 21,961 over the preceding year.

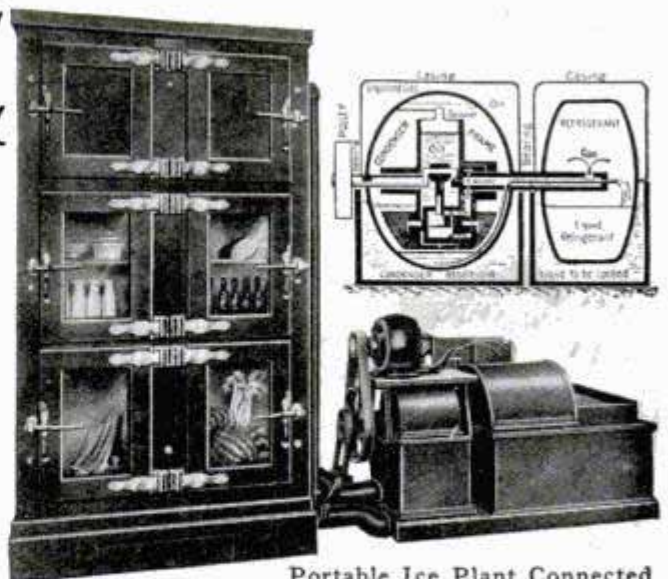
HYDROELECTRIC PLANT USES

His Export Weekly
A hydroelectric plant utilizing the power from a fall of 5,412 ft., which is 132 ft. more than a mile, is to be installed near Martigny, Switzerland. This is the greatest fall ever utilized for power purposes. One of the difficult problems is the construction of pipe lines that will withstand the enormous pressure, which, at the lower end, will reach 165 atmospheres, or 2,425 lb. per square inch. The lower part of the 3-mile pipe line, will consist of seamless drawn steel tubes, 2 ft. in diameter and of the required thickness for withstanding this pressure.

Canton Wallis

PORTABLE ICE MACHINE FOR DOMESTIC USE

387 Electrical World
A refrigerating machine of portable size, a French invention, has been placed on the American market. The refrigerating unit is self-contained, the principle employed being the compression system with sulphur dioxide as the freezing agent. The apparatus consists of two drums, the machinery in which is revolved by an electric motor. Only a small quantity of condensing water is required, it is claimed, and the mechanism is said to be fool-



Portable Ice Plant Connected to a Refrigerator, and Diagram of the Mechanism

proof, inasmuch as all parts are inclosed and sealed. The machine's connection to a refrigerator is shown in the illustration.

Sold by
H.W. Johns-Manville Co.

*Dr. Chas. W. Campbell
Refer to San Antonio, Texas*

*24 June
1915-87*

*Bert J. McLean
city editor, Daily Light,
San Antonio, Texas*



United States Department of Agriculture
Bureau of Biological Survey
Washington, D.C. June 1, 1915.

Mr. Wm. Lambe, Jr.
Wheaton, Ill.

Dear Sir:

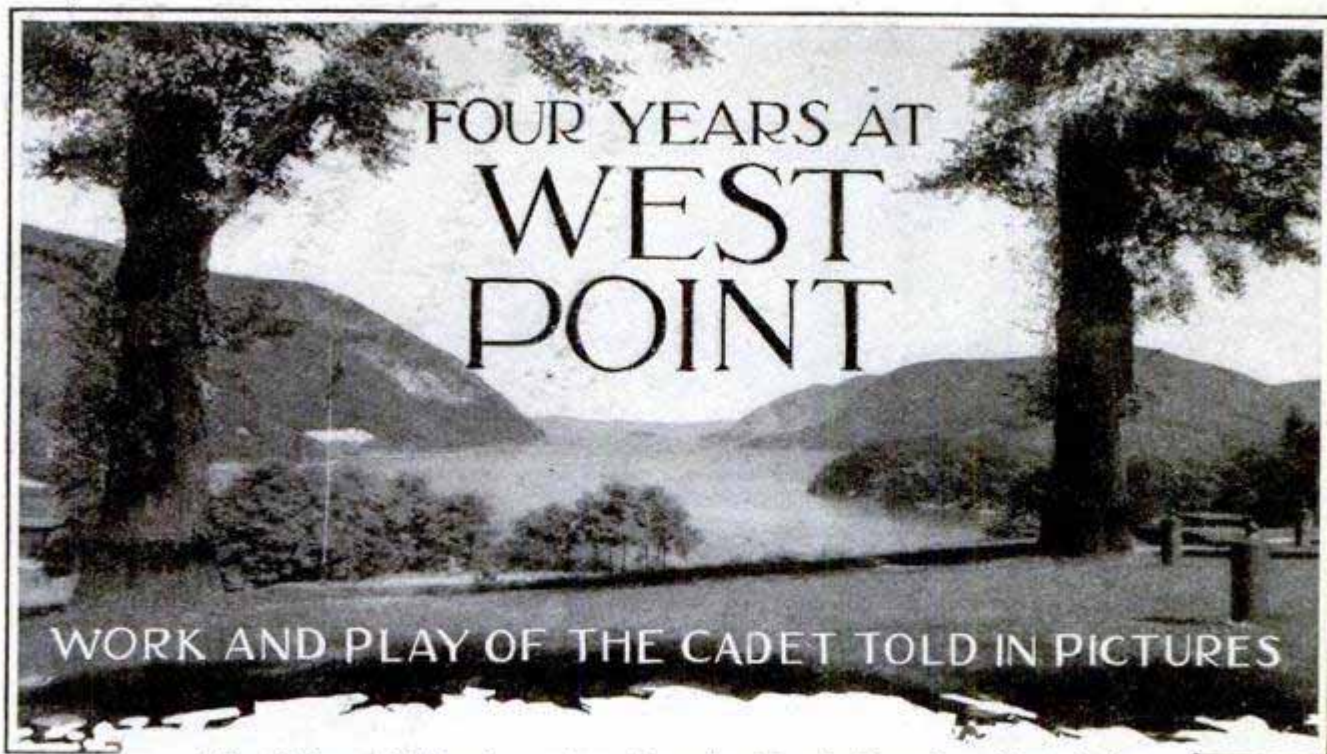
Your letter requesting a publication on bat roosts has been referred to the Biological Survey.

We regret to inform you that the Department has issued no such publication. Press notices concerning bat roosts and the value of bats as mosquito destroyers are all based on private experiments carried on at San Antonio, Texas. The species of bat occurring there, which congregates in such large numbers, is confined to the southern border of the Western States. There is bat in Illinois which will live together such large numbers the year round.

The essential factors in making collection of bat guano profitable are congregations of immense numbers of bats their roosting in the same spot continually. The northern bats do not assemble in such large numbers but for the most part they are migratory. The value of bat destroyers of mosquitoes has been in a locality of a large number from these insect pests.

Very truly yours,

(Signed) H. W.
Chief, Bio



The Hudson Highlands, as Seen from the Parade Ground at West Point

II—The Cadet's First Winter

PHOTOGRAPHS BY W. H. STOCKBRIDGE

THE first of September finds the West Point cadet back in barracks, after his summer in camp which was described and illustrated last month. Now he begins the classroom work that is to give him the necessary mental equipment for handling troops as an officer of the army. The new cadet, if he has not already made the discovery, quickly finds that West Point is no place for a lazy boy. Classes begin at 7:55 a. m. for everybody, and before that the cadet must have sprung out of bed at the sound of "reveille," washed, shaved, and dressed, set his room to rights and eaten his breakfast. With an hour and a quarter off for dinner, beginning at 12:30, the day's school work lasts until 3:45 p. m., but for the cadet who is ambitious to advance, there is little time for play between that hour and "lights out."

Mathematics takes up 85 minutes every morning for the fourth-class or first-year cadet. In the last 66 days of his first year the mathematics period, on Mondays, Wednesdays and Fridays, is spent out of doors, in the study of practical surveying, and from May 1 to June 4, the whole morning of every day, from 7:55 to 12 o'clock, is given to these allied subjects. An hour every Saturday morning during September, October, November, March, April and May, is given to the study of drill regulations. Every afternoon the first-year cadet must attend a class in English and history for an hour, and on ten Saturday mornings in December, January and February there are lectures on these subjects.

The gymnasium work is a daily requirement, except on Saturday, from October 1 to April 30—45 minutes every morning—and on Tuesdays and Thursdays, from May 1 to June 4. Not only ordinary gymnastic exercises are taught, but fencing, under the tuition of skilled swordsmen, and boxing and wrestling under the direction of Tom Jenkins, the famous heavy-weight professional wrestler. Swimming and dancing are also taught.

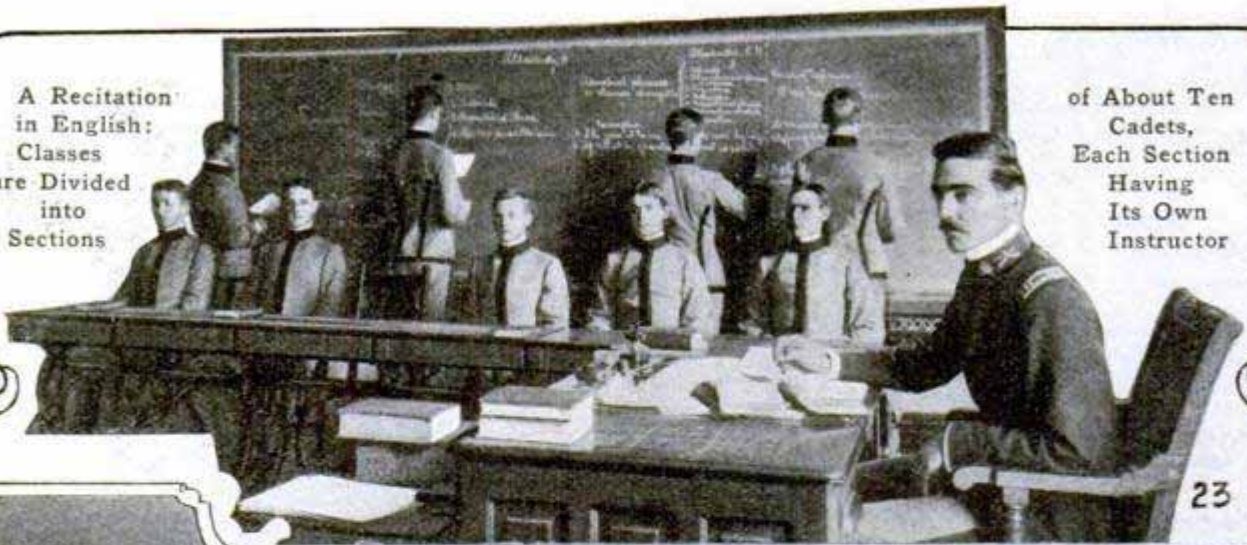
The splendid library of the military academy, containing 87,000 books, maps, and manuscripts, is open to the use of all cadets from 8 a. m. to 9:30 p. m., and much of the ambitious student's time must be spent there if he is to keep up with his classes. In December the fourth-class cadet comes up for his first examination. On the result of this examination depends his class standing, and cadets found deficient are discharged from the academy, unless the academic board recommends otherwise for special reasons. Nor is failure in examinations the only risk the cadet runs. Few get through the first year without demerit marks for some infringement of the rigid rules of conduct established for the development of the moral character of the future army officers, and cadets exceeding at any time the maximum number of demerits allowed for six months are immediately reported to the academic board as deficient in conduct, and discharged. Then, in May every year, there is a physical examination of all cadets, and those found physically disqualified are discharged.

The first-year cadet gets no vacation. Classroom work and exercises are suspended, as far as practicable, on New Year's Day, Washington's Birthday, Decoration Day, Fourth of July, Thanksgiving and Christmas, but the fourth-class cadet must spend his holidays at West Point.

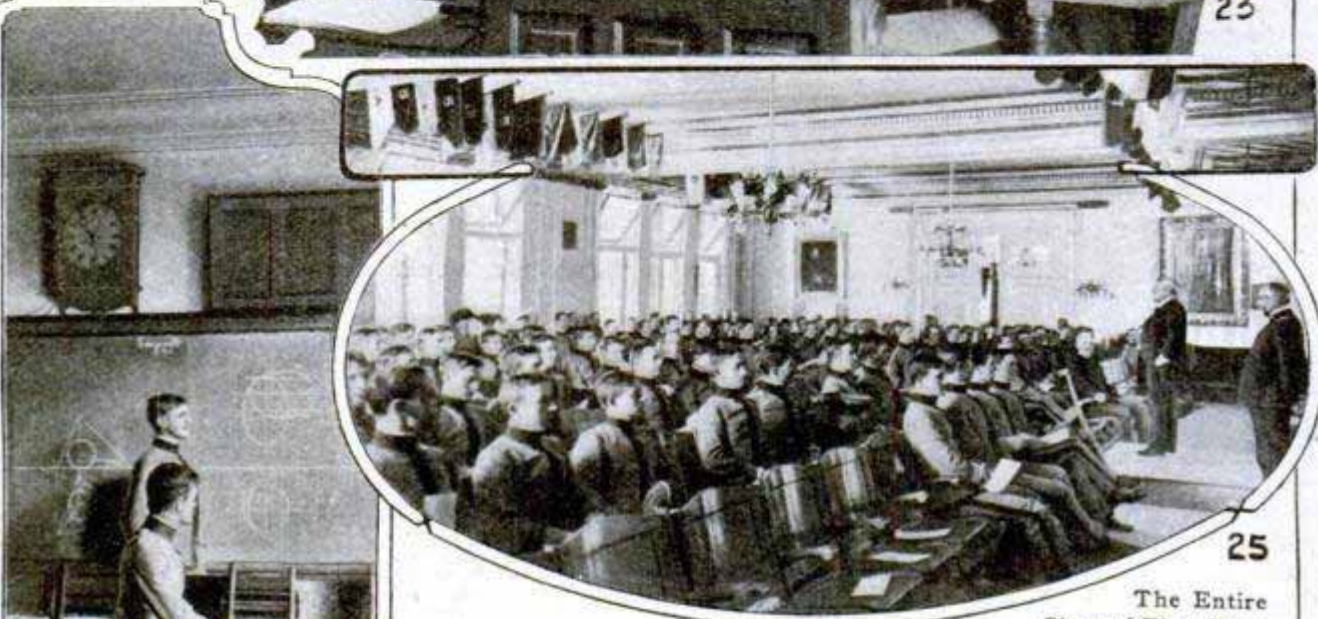
The first year's work ends with the successful passing of the June examinations. The daily drills and exercises have given the future officer a military bearing. He has added to his store of knowledge, not only of things military, but in many other lines, and he has become thoroughly familiar with the meaning of the word "discipline." His life as a third-class cadet will be illustrated in the July number.

A Recitation
in English:
Classes
are Divided
into
Sections

of About Ten
Cadets,
Each Section
Having
Its Own
Instructor

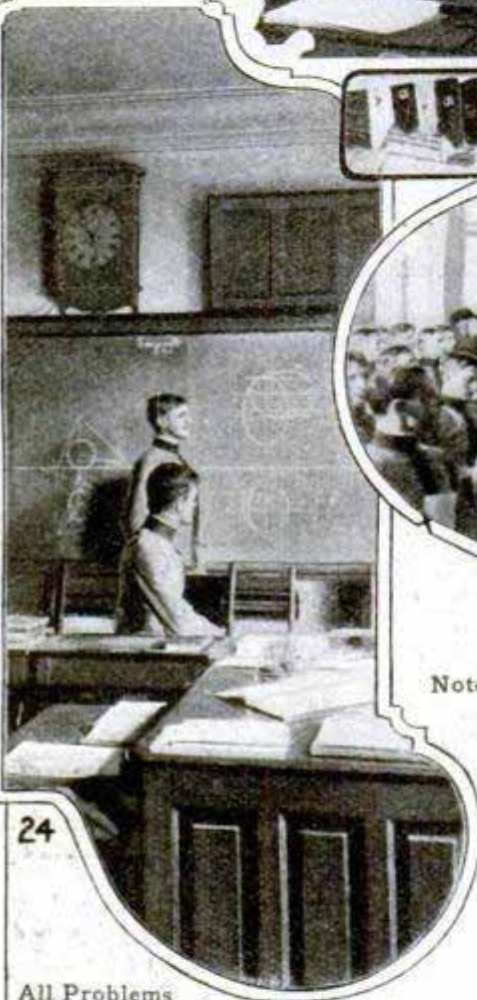


23



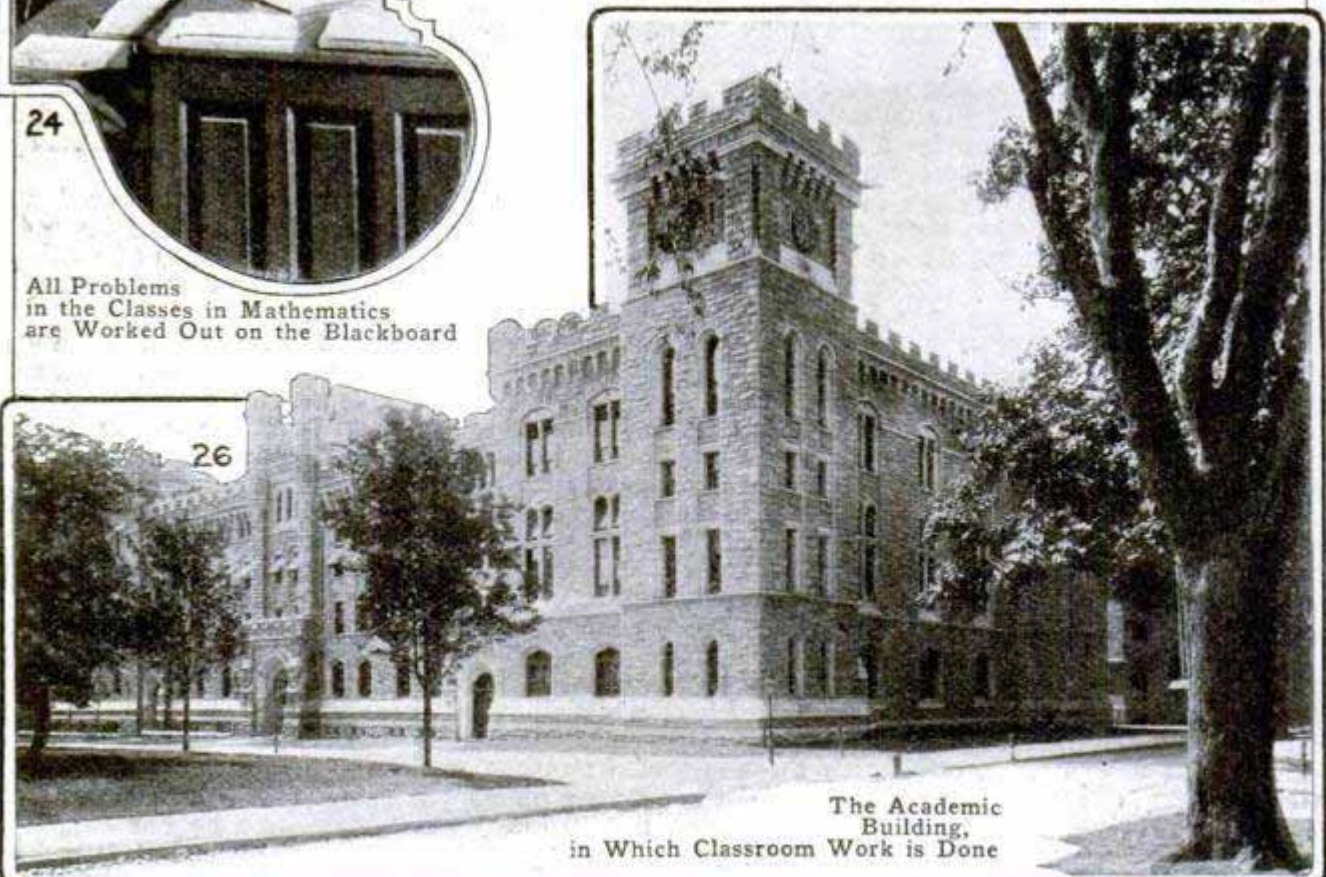
25

The Entire
Class of First-Year
Cadets Listening to a Lecture on History.
Note the Trophy Flags That Decorate the Ceiling of the Lecture Hall



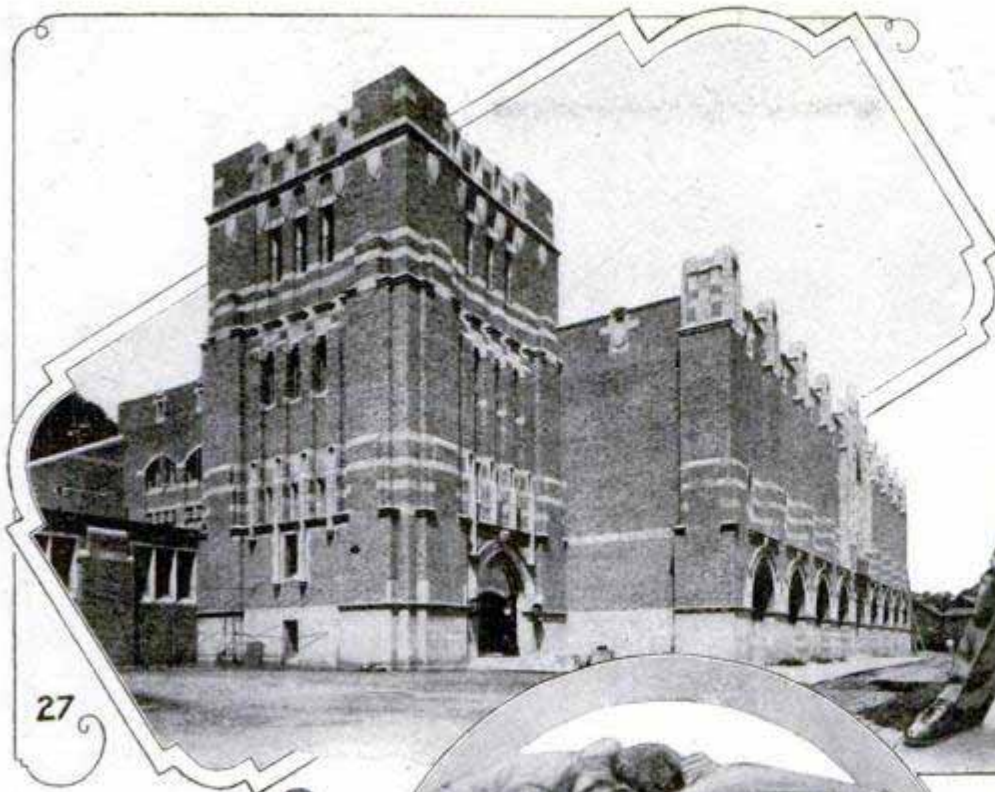
24

All Problems
in the Classes in Mathematics
are Worked Out on the Blackboard



26

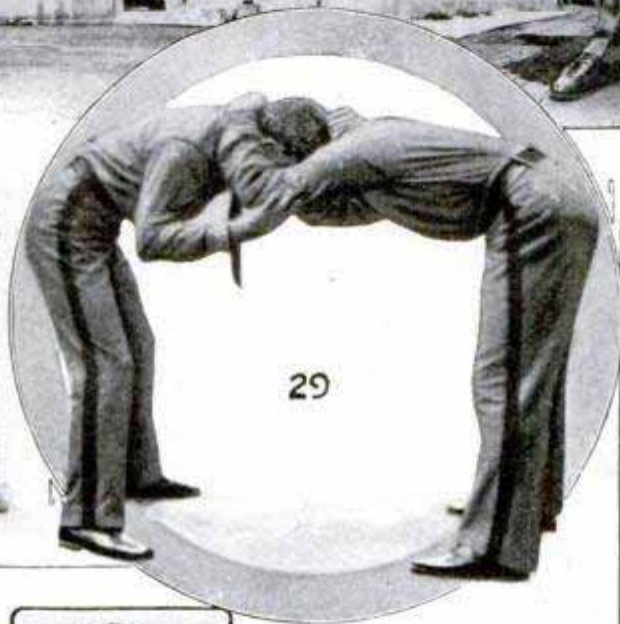
The Academic
Building,
in Which Classroom Work is Done



27

The Gymnasium,
West Point

Wrestling
and Boxing
are Taught
by
"Tom" Jenkins,
Who is Seen in
the Small Picture
at the Left.
Every Cadet
Must Learn Both

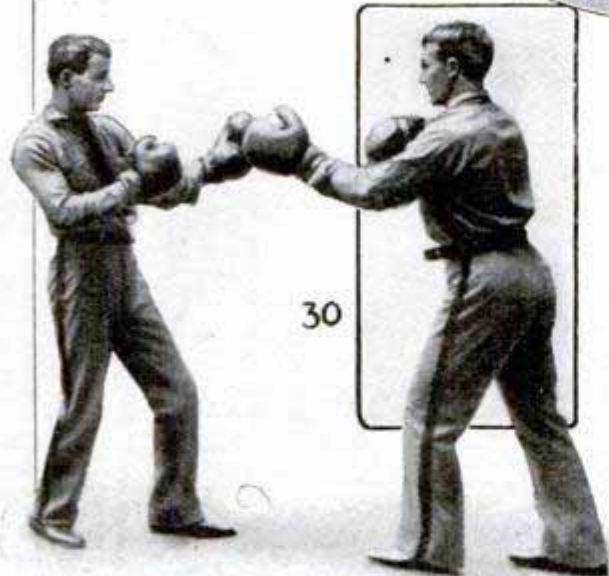


29



28

With the Dumb-Bells



30

Besides Regular
Gymnastic Exercises,
with and without
Apparatus,
All Cadets are Required
to Learn the Use
of the Sword.
A Class in Fencing
is Shown Below



31



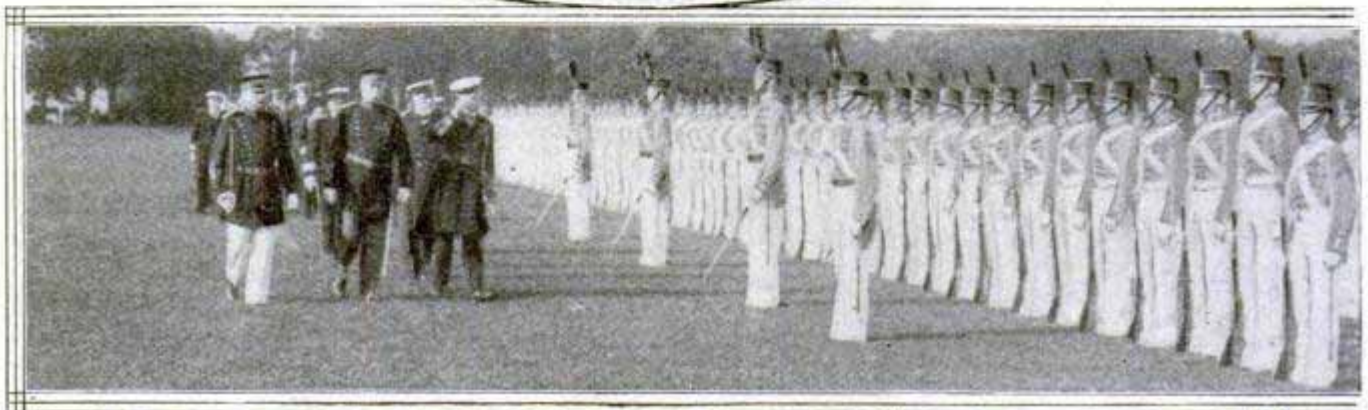
32

33



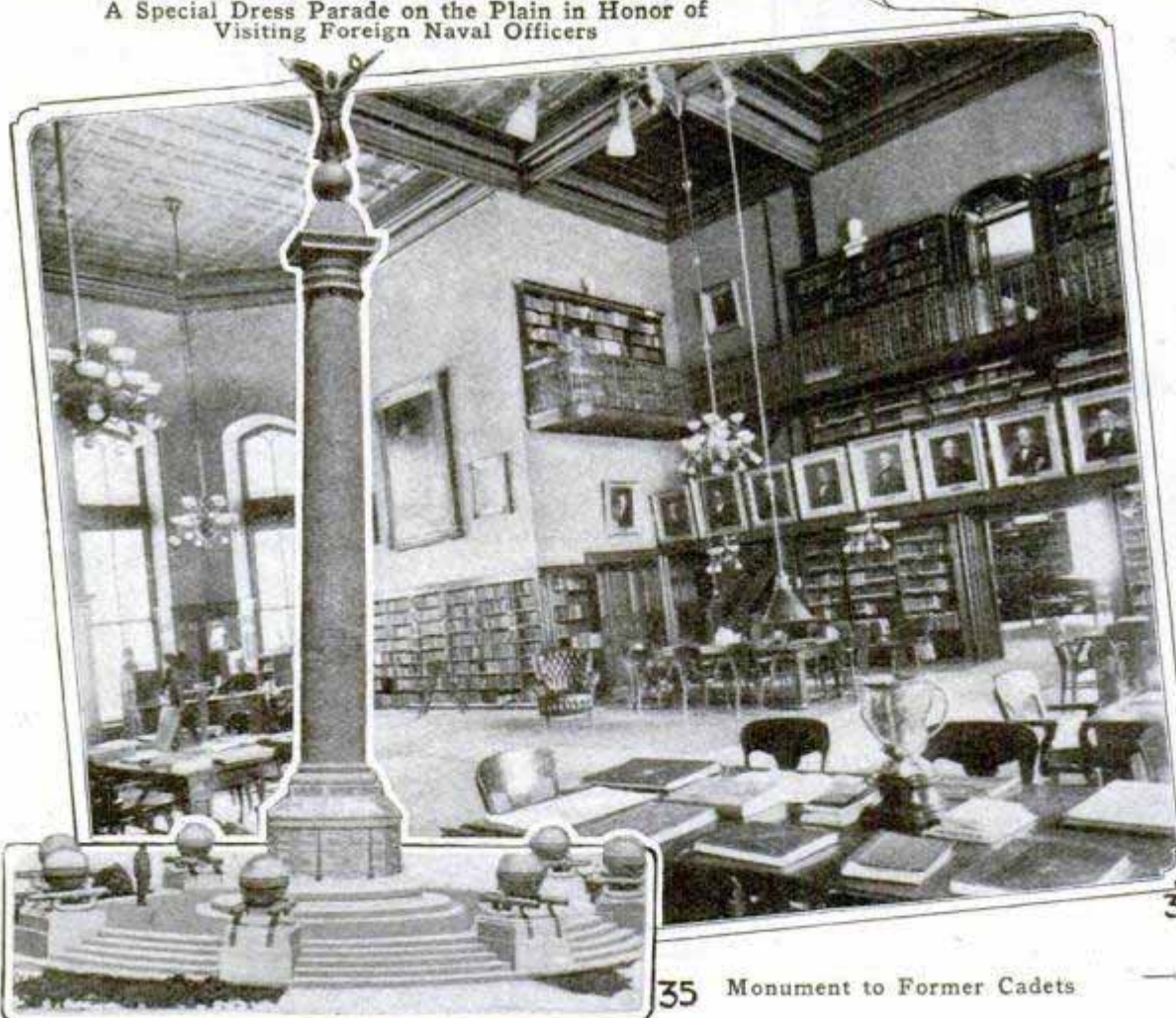
The Library, West Point.

One of the Oldest Buildings



A Special Dress Parade on the Plain in Honor of Visiting Foreign Naval Officers

34

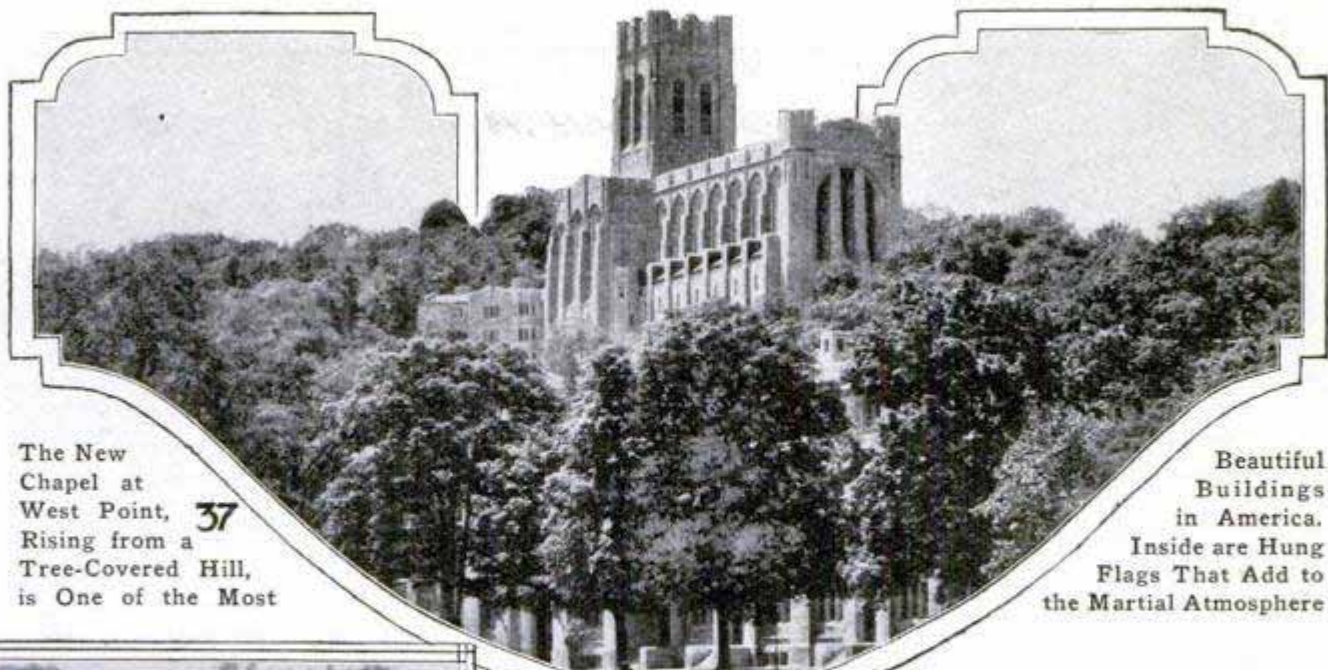


Interior of the Library, Showing Portraits of Distinguished Officers

35 Monument to Former Cadets

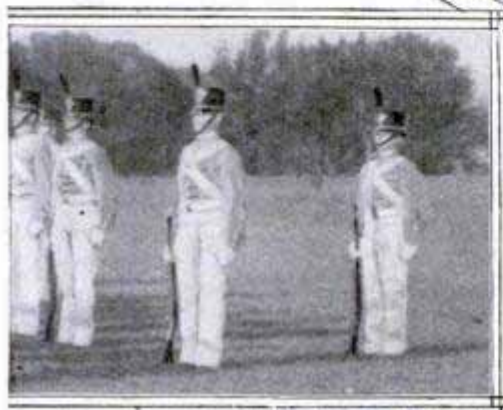
36





The New Chapel at West Point, **37** Rising from a Tree-Covered Hill, is One of the Most

Beautiful Buildings in America. Inside are Hung Flags That Add to the Martial Atmosphere



Interior of the Chapel, West Point **38**



39 A Pole-Vault on One of the Field Days When Inter-Class Contests are Held

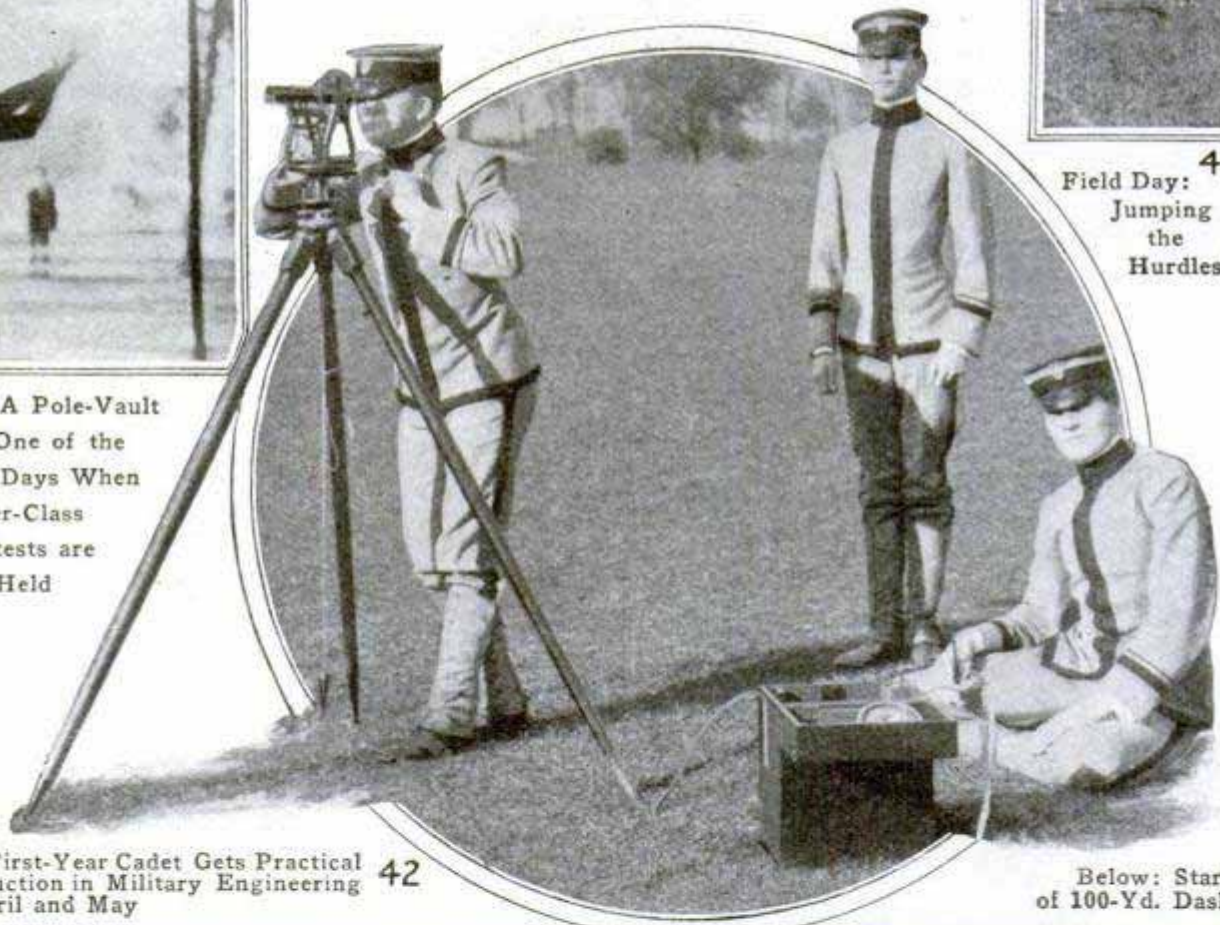


40

Field Day: Start of the Hurdle Race in an Inter-Class Contest



41 Field Day: Jumping the Hurdles



The First-Year Cadet Gets Practical Instruction in Military Engineering in April and May 42

Below: Start of 100-Yd. Dash



Photographs of the Cadet's Life in His Second Year will Appear in the July Issue

43

*Carroll
W. R. Tilton
Prairie Del.
Ohio.*

CIRCULAR HOUSE IN OKLAHOMA 3758

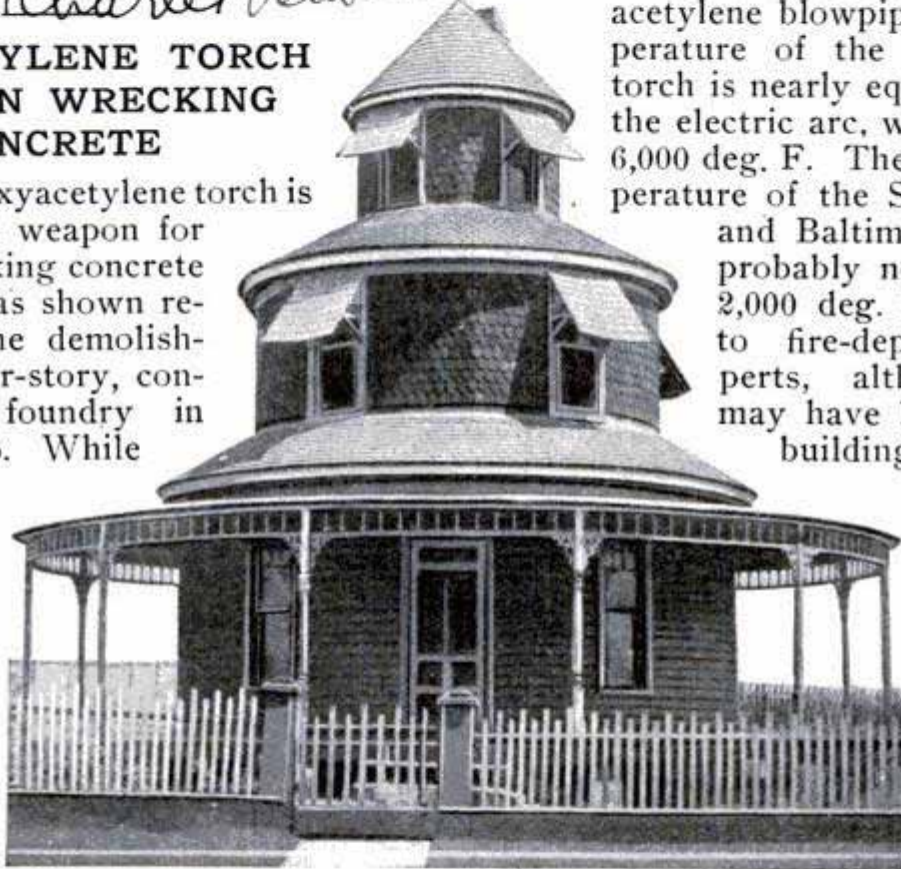
Wishing to own a house different from any other, a resident of Guthrie, Okla., constructed this curious round house. There are three stories, each of the upper ones being smaller in diameter than the one below. The lower floor is divided into three rooms, each having the shape of a slice of pie.

Charles Babcock

OXYACETYLENE TORCH USED IN WRECKING CONCRETE 3859

That the oxyacetylene torch is an excellent weapon for use in wrecking concrete buildings was shown recently in the demolishing of a four-story, concrete-steel foundry in Chicago. While using the oxyacetylene torches for cutting the metal parts, such as girders and reinforcement, the operators discovered how effectively the flame disintegrated the concrete. Under the heat it formed globules and ran as if it contained water, or like butter under the heat of the sun.

Subsequently, in using the torches for penetrating the concrete, the acetylene and oxygen pressures were increased to 20 and 50 lb. per square inch, respectively. The flame cut holes 2½ in. in diameter through 8-in. concrete slabs and ¾-in. iron rods in 2¼ minutes. The holes were cut by the torches in the center of each floor panel, and the size was then increased by breaking the concrete with heavy sledge hammers.



Quaint Round Dwelling in Guthrie, Okla.

The fact that concrete will run under the heat generated by an oxyacetylene torch brings up the question of the possibility of concrete melting away in the intense heat of fires. According to engineers of the Underwriters' Laboratory in Chicago, concrete failed in practically every instance in the San Francisco fire, but it would, apparently, take much more heat than is generated by such a fire to make it run as it does under the oxyacetylene blowpipe. The temperature of the oxyacetylene torch is nearly equal to that of the electric arc, which is about 6,000 deg. F. The highest temperature of the San Francisco and Baltimore fires was probably not more than 2,000 deg. F., according to fire-department experts, although there may have been parts of buildings, such, for instance, as long narrow passages of one kind or another swept by strong currents of air, where the temperature rose to 2,500 deg. F. The melting point of steel is 2,700 deg. F.

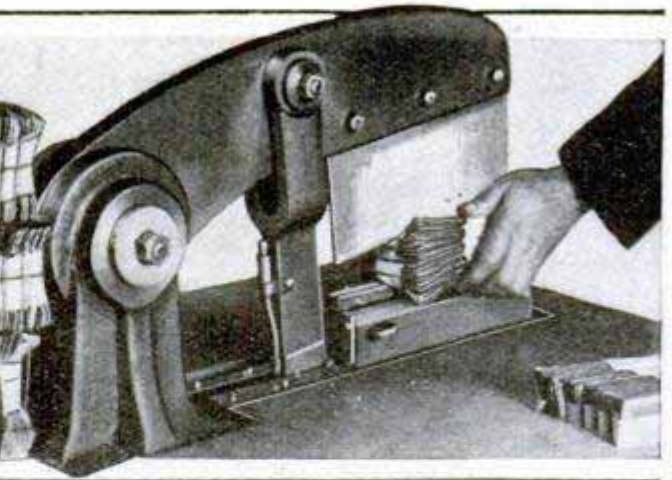
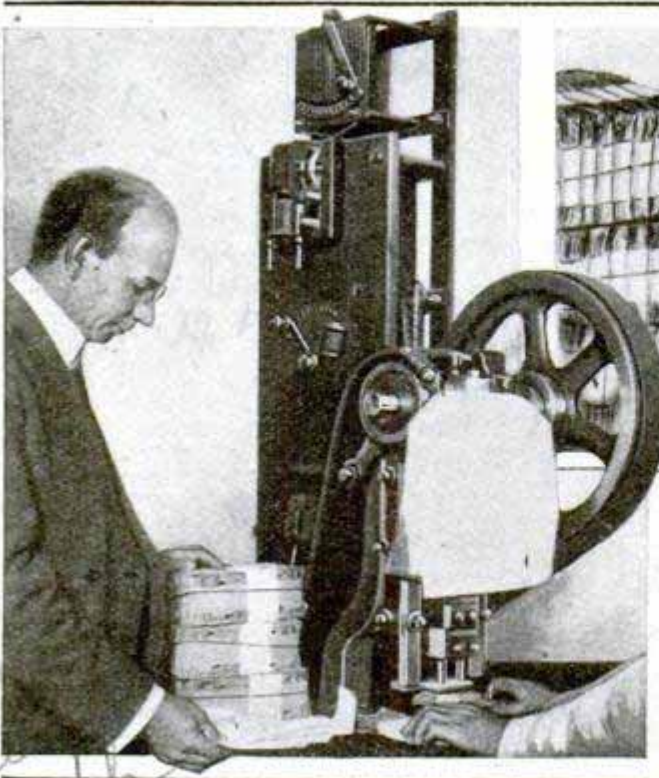
Chicago Chamber of Commerce Bldg.

LIGHTING ROADWAYS BY CURBSTONE LAMPS 3807

A system of electrical street illumination by curbstone lamps has been devised. An incandescent lamp is contained in a metal hood which is fastened to the concrete curbing by means of deeply imbedded bolts. A reflecting material lines the interior of the hood and the name of the street or the number of a house may be attached to the open or street face of the box. The bulbs are locked in position.

Chicago Chamber of Commerce Bldg.

Electrical Merchants



Photos by Harris & Ewing, Washington, D. C.

Government Employees at Washington Mutilating Bundles of Paper Money to Render It Useless for Further Circulation

CHOPPING BALES OF MONEY BY MACHINERY

Worn-out paper money received at the Treasury Department is destroyed after new bills have been exchanged for it, by first perforating, then chopping the bills in two and then reducing the fragments to pulp by maceration in water. A careful record of the number and denomination of each bill is made, after which the money is made up into bales, which are sent to the perforating and mutilating machines.

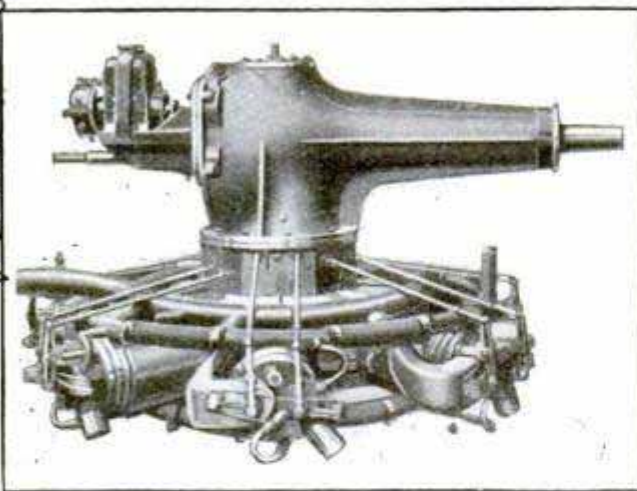
BRITISH SHIP JOINS IN ICE-BERG-PATROL WORK

The "Scotia," formerly an antarctic exploration vessel, has been sent to the North Atlantic seas as an ice-observation ship, under charter of the British government. Reports of the movements of ice are communicated by wireless to stations on the Labrador and Newfoundland coasts as warnings to the shipping world. Three scientific men form a portion of the crew and oceanographical observations are also being made. The cost of the expedition is being shared by the government and the principal steamship lines.

The U. S. scout cruiser "Birmingham" has been spending its second season of patrolling in the dangerous iceberg region for the protection of all ships.

VERTICAL-AXIS MOTOR FOR 360 HYDRO-AEROPLANES

This vertical-axis, rotary motor, which has been developed in France, is particularly adapted for hydro-aeroplanes, as it can be built into the body of the machine in such manner as to be completely protected from water. The vertical engine shaft is connected to the propeller shaft by speed-reducing gear. The speed can be varied between



Rotary Aeroplane Motor with Vertical Shaft, Particularly Designed for Hydro-Aeroplanes

300 and 1,350 revolutions per minute. The starting crank of the engine is within easy reach of the operator's seat.

Fore French
360
Paris - France
55 Rue Brangé - aux - Belles
Mfr. -

Worn-out money
perforated
chopped
reduced to pulp
maceration in water
number and denomination
made up into bales
sent to the
perforating and mutilating

380
Marine Journal
3/22/13
also
Daily Courier
Trade
14/17

SET HOTEL ON FIRE FOR MOTION-PICTURE SHOW

3764
 The "thriller" of the recent Police and Firemen's Benefit held in Los Angeles, was the burning of a four-story hotel, erected at a cost of \$5,000 by a motion-picture company. The conflagration served two purposes. It provided the motion-picture concern with a thrilling "fire-rescue" film, and drew nearly 25,000 people to the benefit, clearing about \$20,000 for the creation of a pension fund for the police and firemen of Los Angeles.

the "leading lady" and other "unfortunates" caught in the building, the fire and smoke were nothing more than red



This Hotel was Erected and Burned for the Making of Motion Pictures

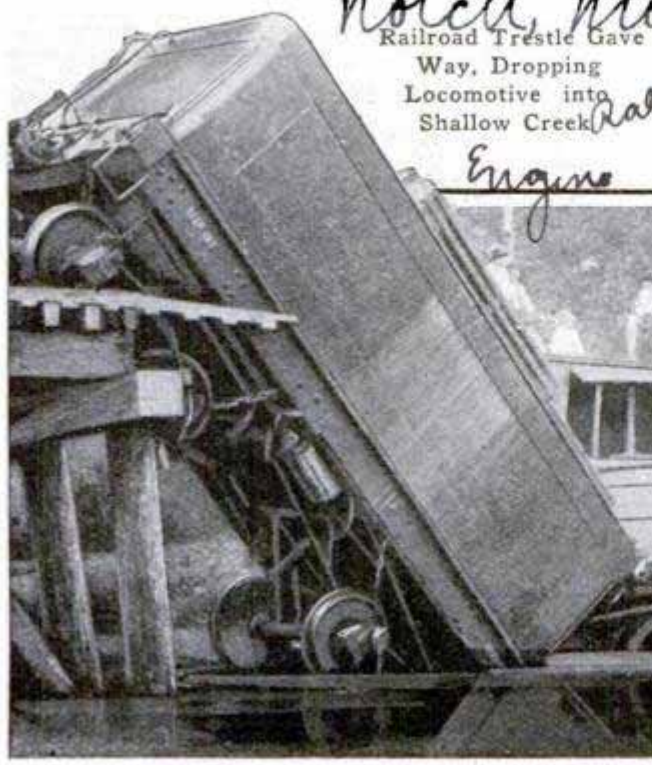
To add to the realism of the scene, a roof garden was built, and guests were drinking and dancing when the cry of "fire" rang out. During the rescue of

fire and powder, then the oil-soaked timber was ignited, and a real fire was provided.

TRAIN BREAKS THROUGH TRESTLE

3596
 A locomotive pulling a passenger train of four coaches and two baggage cars broke through a trestle crossing

a creek near Galena, Mo. The engine sank into the soft bottom of the creek, but the baggage cars and coaches remained on the track. Even the engineer and fireman escaped with nothing more serious than a jolting.



A society recently organized in France has for its purpose the development of better landing and controlling apparatus for aeroplanes.

Engine 2005.

PORTLAND HAS BUNGALOW FIRE STATION

The average fire station is not a thing of architectural beauty, so when it be-



A Bungalow Fire Station Just Erected in Portland, Ore.

came necessary to erect a station in a residential section of Portland, Ore., the chief of the fire department designed it on the lines of a bungalow. The interior is all furnished in mission oak, and the firemen who occupy it

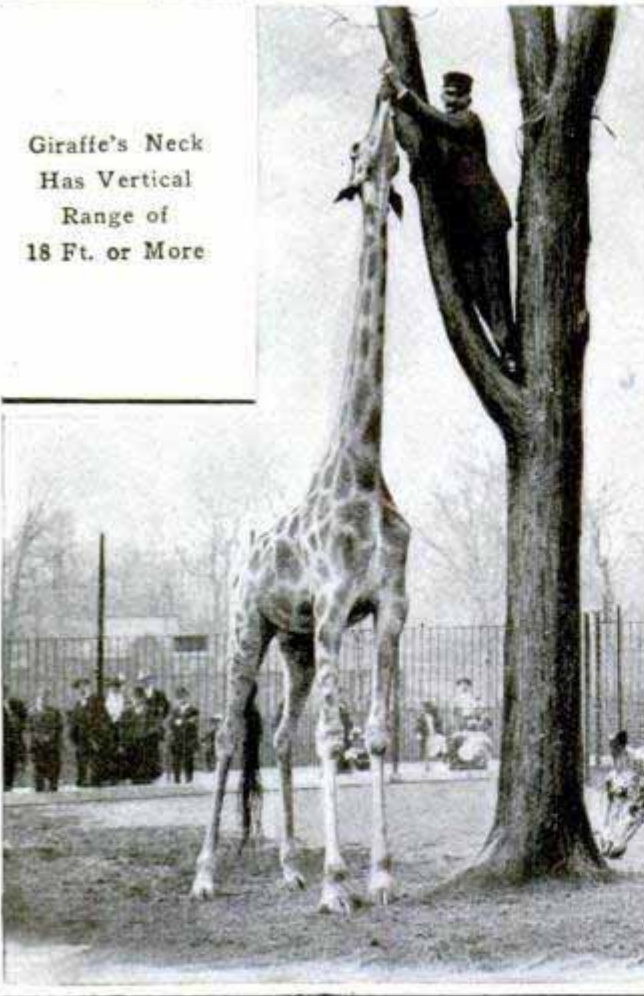
made the furniture. The firemen's general room, which is at the front, has a large fireplace at one end and bookshelves at the side. The apparatus room is large enough to accommodate one motor engine of the chemical type, and has a special radiator designed to keep the engine warm.

HARD WOODS TREATED BY BURYING IN LIME

A special treatment of native woods for use in the better grades of furniture has been tried with success in Germany. Freshly cut birch, oak, elm, pine or spruce is buried in earth mixed with lime and other materials, and left for from three to five months. A remarkably fine color is imparted to the wood so that it can be used without painting or staining, and after this treatment it has practically no tendency to shrink or swell.

GIRAFFES EATING AND DRINKING

The extreme vertical range of the giraffe's neck is shown in the accompanying illustration, taken at the New York Zoo. The giraffe at the right is in the attitude that this animal assumes when taking a drink of water, while the one at the left is stretching to the limit to reach food held in the hand of the guard.



Giraffe's Neck Has Vertical Range of 18 Ft. or More

3761
Emb
Frank Sterrett
350 East Ninth, North
Portland, Oregon

3593.
W. L. Beasley
69 W. 108 St.
N. Y.

SEWING MACHINE USED IN AFRICAN VILLAGE

A sewing machine in queer surroundings is shown in one of the illustrations, while the other is of the first commercially successful sewing machine, patented in 1829 in France by Thimonnier, and now kept in the museum at Lyons. Thomas Saint, an Englishman, obtained a patent on such a machine in 1790, but

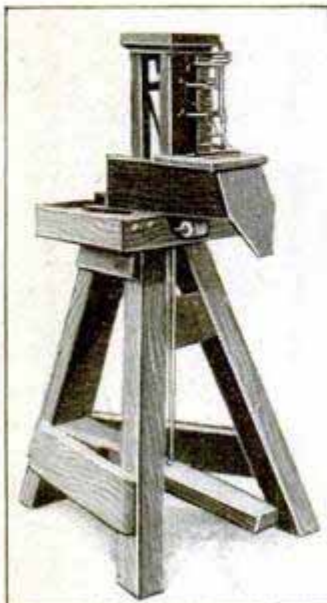


Photo by Paul Thompson
Above — The First Commercially Successful Sewing Machine. Below — African Women Using a Modern Sewing Machine in the Street of a Primitive Village

neither this machine nor those invented by Stone and Henderson, two other Englishmen, in 1804, and by Madersberger, of Vienna, in 1814, were found practical. Quite a number of Thimonnier's machines, which sewed an ordinary chain stitch by means of a hooked needle and a continuous thread, came into use.

ⓄThe British Admiralty is contemplating an auxiliary motorboat reserve for service in case of war.

AN UNUSUAL HOUSE MOVING IN SAN FRANCISCO

One of the biggest jobs of house moving ever attempted is now being carried out in San Francisco. To make room for the new buildings of the civic center in that city the three-story commercial high-school building, recently erected at a cost of \$300,000, is being moved from Grove and Larkin Streets to the corner of Hayes Street and Van Ness Avenue, a distance of over two blocks. The building is a brick structure weighing 8,000 tons and covers an area of 120 by 140 ft. The equipment required for the work, a large part of which will be made valueless for other purposes, represents a big investment. Two thousand steel rollers, 1,000,000 ft. of lumber, 150 tons of steel, and five miles of steel cable will be required, as well as thousands of carefully cut oak wedges and red-cedar shingles. Power is supplied by three engines working as a "team." They must be started and stopped at exactly the same instant, and must exert the same pull on the cables at all times. The work will cost the city \$151,000, practically half the value of the building.

SAUERKRAUT PLANT USES ELECTRIC POWER

Sauerkraut as a national food is being investigated very seriously by the French authorities. The Society for the Encouragement of National Industries recently awarded a gold medal to a farmer who installed a sauerkraut factory having 48 boilers and a daily capacity of 170 bu. of cabbage, all the machinery being driven by electric power. This farmer planted 65 acres to cabbage and obtained a yield of 10,000 heads per acre. The principal concern of the French agricultural department is to find some method of making sauerkraut cheaply so that it may be more generally used as an article of diet. One particular variety of cabbage, grown in Elsass, is said to be best adapted to sauerkraut manufacture.

Over Land and Meer

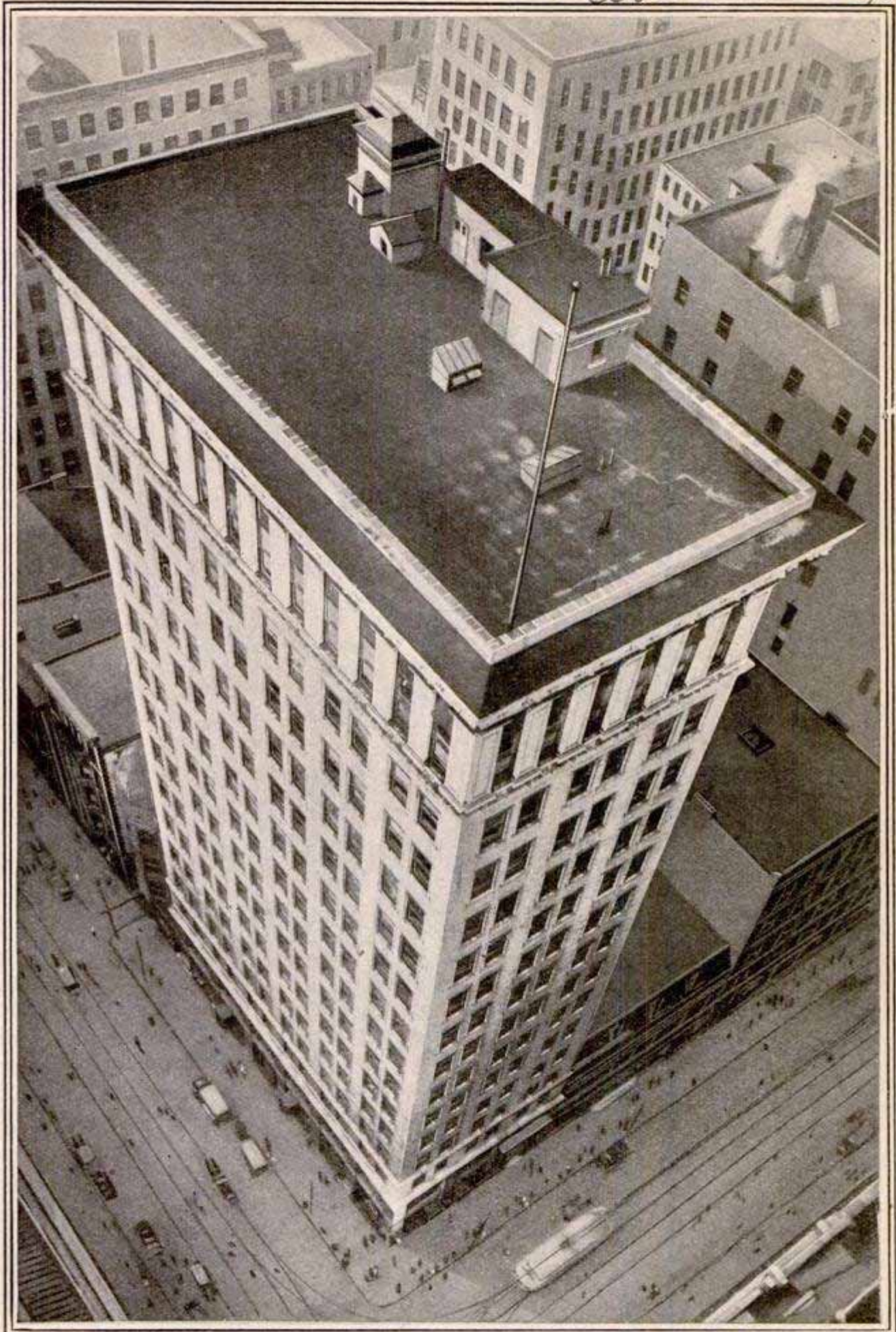
3469

385

no data

34 7'0

6/0 James Hall
Cincinnati, Ohio



This 16-story building in Cincinnati was photographed from the 24th floor of a neighboring 34-story building. It is the Ingalls Building, one of the first concrete skyscrapers erected. Its roof was originally of concrete blocks with which waterproofing compounds had been mixed.

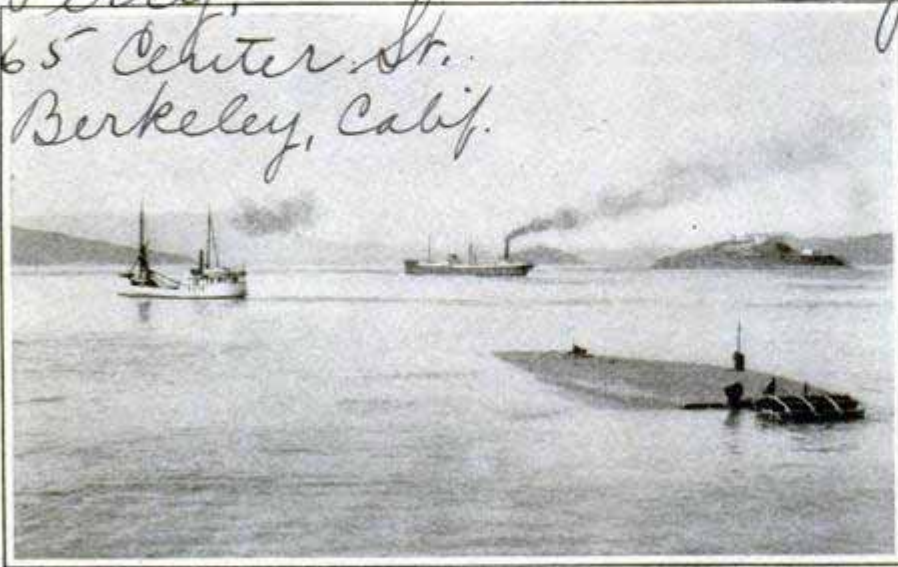
TREASURE SHIP FLOATING BOTTOM UP

The unusual spectacle of a river steamer floating, bottom up, instead of sinking after having collided with an-

MOUTH OF TUNNEL CLEARED BY UNIQUE METHOD

A unique and successful method was employed in opening a water tunnel from Lake Styttingen to the Sannanger power station in Norway. The head of the tunnel is at the bottom of the lake, 85 ft. below the surface of the water. As it was impossible to reach the work from the lake end, the tunnel was begun at the lower end and driven upward until only a rock curtain 6½ ft. thick remained between the tunnel and the lake. This was removed by a 500-lb. blast of dynamite. Since it would be impossible to remove the

*L. R. Perry,
2165 Center St.
Berkeley, Calif.*



An Inverted Treasure Ship

other boat during a dense fog, was recently witnessed on San Francisco Bay. The inverted craft was an object of special attention because it was supposed to still have bullion to the amount of \$30,000 on board when the accompanying view was taken.

broken rock after the discharge, two ditches had been excavated across the upper end of the tunnel, into which, it was expected, the debris would be washed by the first rush of water, leaving a clear passage. The tunnel ran full immediately after the explosion.

New York Sun

LIMITS LENGTH OF TRUNKS TO FORTY-FIVE INCHES

The Interstate Commerce Commission has approved the rule adopted by the principal railroads, limiting the length of trunks carried free as baggage to 45 in. Larger trunks must pay, for each additional inch, the rate for 5 lb. of excess baggage. Trunks more than 72 in. long need not be accepted as baggage at any rate, nor those having more than two bulging sides or with two bulging sides not opposite. The rule was adopted because of the difficulty of handling the popular "wardrobe" trunks, so constructed that they cannot be stacked up in baggage cars. The rule is to take effect only after due notice to the traveling public has been given.

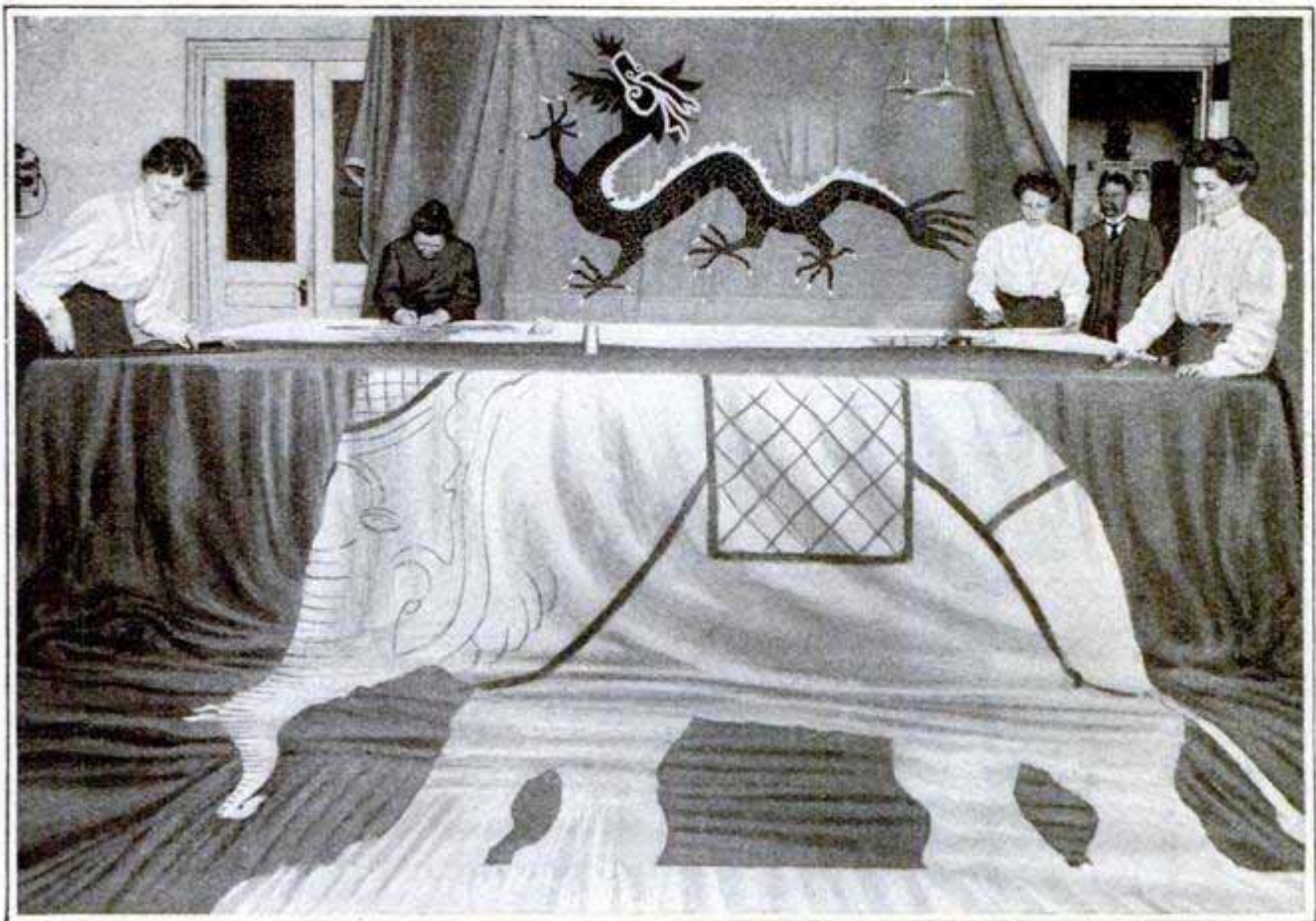
3851

THE NAVY'S FLAG-MAKING ESTABLISHMENT

All the flags for the American warships are the product of the flag-making establishment of the New York Navy Yard. The illustration shows one of the white-*elephant* flags of Siam in the making, with a Chinese flag in the background. Every U. S. warship is equipped with the flags of all nations, to fly on ceremonial occasions when in the waters of the country they represent and in "dressing ship."

The bunting comes from Massachusetts. Each piece must weigh 5 lb. to every 40 yd., and must stand a weight test of 35 lb. to the square inch. For testing strength of color, the fabric is steeped in salt water for six hours and then exposed to the sun for another six

3588



Making Foreign Flags at the New York Navy Yard: The Chinese Dragon Flag is Seen Above and the Siamese Flag Below

hours. There is a fixed rule that all worn-out flags must be burned. This is to prevent the using for menial purposes of material that has once been used as "the colors." Out of 160 varieties of flags made for the navy, 43 are the colors of foreign nations.

ENGINE USES WASTE HEAT TO INCREASE OWN POWER,

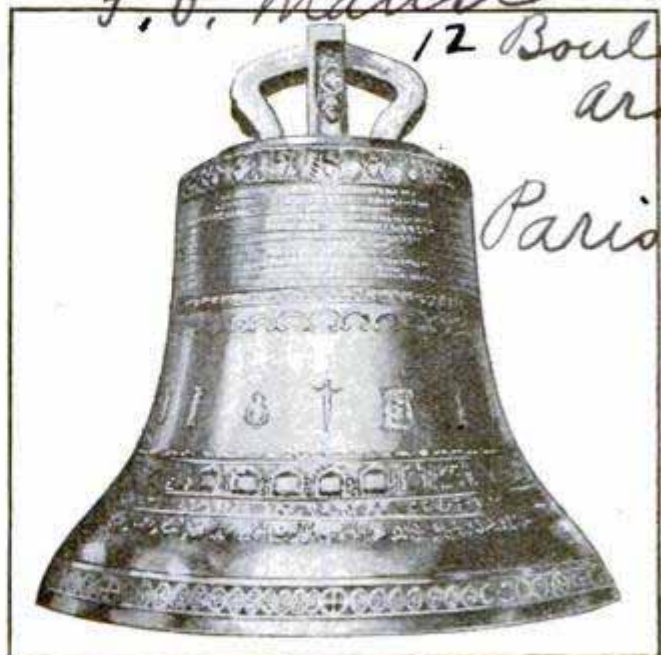
A new German gas engine, constructed to utilize waste heat for raising steam for the operation of blowers, which are used to increase the pressure of the explosive air-gas mixture in the cylinders, is said to have great mechanical efficiency. The method employed is analogous to the condensing systems of steam engines. Its operation includes the scavenging of the engine by means of the air blast which blows all waste gases out of the cylinders. The power requirement of the auxiliary mechanism can be supplied without resorting to outside sources.

THE GREAT BELL ON

3598 MONTMARTRE

The new Sacré-Coeur Cathedral, recently built on the height of Montmartre, which is the most famous of the chalk hills of Paris, has one

F. P. Masson
12 Boulevard Arago,
Paris.



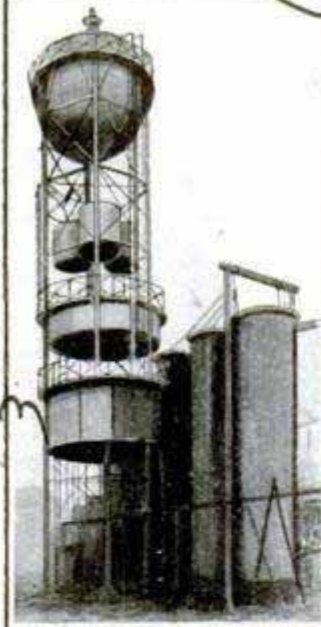
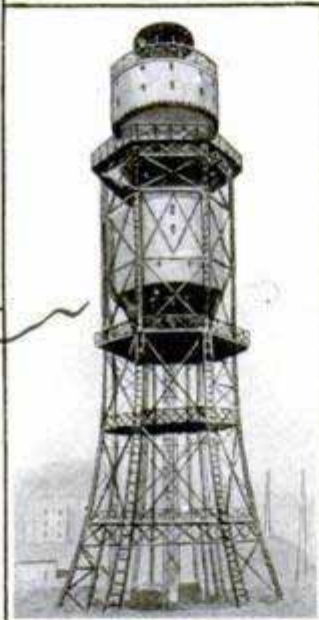
The 20-Ton Bell of the Cathedral on Montmartre, Paris

3721
The Nation
the engineer
of 1913
March 15
Pg. 3
maker unknown

of the largest church bells in that city. This bell, which is a handsome example of modern bell work, is covered with artistic scrolls and lettering. The weight of the bell itself is 20 tons, and with the heavy clapper and accessories, the entire weight suspended in the tower is nearly 30 tons.

WATER TOWERS OF UNUSUAL DESIGN

More attention is paid to the design of water towers in foreign countries than in America. Of the towers shown here, the one having the largest diameter is built almost en-



Water Towers of Unusual Construction Seen in Foreign Countries

tirely of reinforced concrete and covers a large area of ground. The tank has a capacity of more than 500,000 gal., is supported by pillars of solid granite

blocks and supplies water for a large manufacturing plant in Germany.

The lower steel tower on the right is reinforced by braces of similar material, is more than a hundred feet high and supports a tank that holds about 264,000 gal. The tank is divided into two sections, so that one may be cleaned without interfering with the service.

The upper tower on the right supplies water for an Italian town, the higher tank being used for supplying the higher portions of the town, while the other tank serves the low-lying districts. These tanks are also divided into two compartments for the purpose of cleaning them, and, in order to protect the water against the effect of the sun's heat, their walls are double, a strong draft of air being forced between the walls so that the inner one is cooled by the evaporation of water. The fourth tower is constructed with six tanks connected to a number of near-by containers and is used for the purpose of absorbing the by-product of coke furnaces.

SMALLER MONEY NOT TO BE ISSUED AT PRESENT

The small-sized paper money of new design, described in the May issue of Popular Mechanics Magazine, will not be issued as originally planned, if at all. The new Secretary of the Treasury has suspended the order given by his predecessor and work on the engraving of the plates has been stopped. It is probable that some change in the size and design of American paper money, to make it conform more closely to the best artistic standards and more convenient to handle, will be made, but not until the whole subject of currency reform has been settled by Congress.

CA custom that is rapidly increasing in popularity is the artificial flavoring of watermelons by injecting a fruit extract into the stem of the melon while it is still green. An ordinary hypodermic syringe is used for the purpose.

*3630
Berliner Tageblatt
/22/13
German
Hamburg, Germany
Savannah, Ga.*

GATHERING GOLD FROM THE OCEAN'S FLOOR

By FRANK PARKER STOCKBRIDGE

HUNDREDS of millions of dollars worth of gold, silver, copper and precious stones are lying on the bottom of the sea, ready to the hand of the first person who will devise means of recovering them. Inventors in every part of the world are building submarine boats, diving armor, dredging apparatus, and other devices, solely for the purpose of finding and bringing to the surface these sunken treasures.

The two main problems to be solved are those of protection against water pressure and of providing light in which to work. The latter problem is more easily solved than the former. Modern developments in electric lighting make it practically certain that powerful searchlights can be devised which will give sufficient illumination for salvage operations at depths as great as 400 ft. Divers who have been down 150 ft. agree that even when the sun is shining brightly, the ocean depths are in semidarkness, which increases as one descends.

The other and more serious problem is that of pressure. The ordinary diver's equipment depends upon a constant supply of air pumped in from above, and a rubber suit with a metal helmet, all air-tight, or nearly so, to keep the water from rushing in the minute the pressure of air pumped through the hose becomes less than the water pressure from outside. Theoretically, of course, the air pressure could be maintained at a point that would equalize the water pressure, but what would become of the diver? Men working in compressed-air caissons under a pressure of 45 lb. to the square inch are risking their lives—and 45 lb. means a depth of only 104 ft. of water. At 200 ft. the water pressure is a little over 86½ lb. to the square inch; at 250 ft. it is over 108 lb.; at 300 ft. it is 130 lb.—and many of the sunken treasure ships lie at even greater depths.

Very few divers have descended as deep as 100 ft. One adventurous young man went down 196 ft. in Puget Sound,

but on a second attempt his helmet was crushed by the 85-lb. water pressure and he was hauled up dead. Two English naval officers are said to have descended 210 ft., but could remain at that depth only a few seconds.

The problem of getting down to the deep-lying treasure ships, therefore, is essentially one of constructing a mechanism sufficiently rigid to withstand the terrific water pressure. It must carry its own supply of oxygen, since any sort of flexible air tube would be crushed flat long before a depth of 400 ft. is reached, and it must be so constructed that the diver inside it can accomplish something after he reaches the wreck, even if he can do nothing more than attach a grappling hook to a copper ingot.

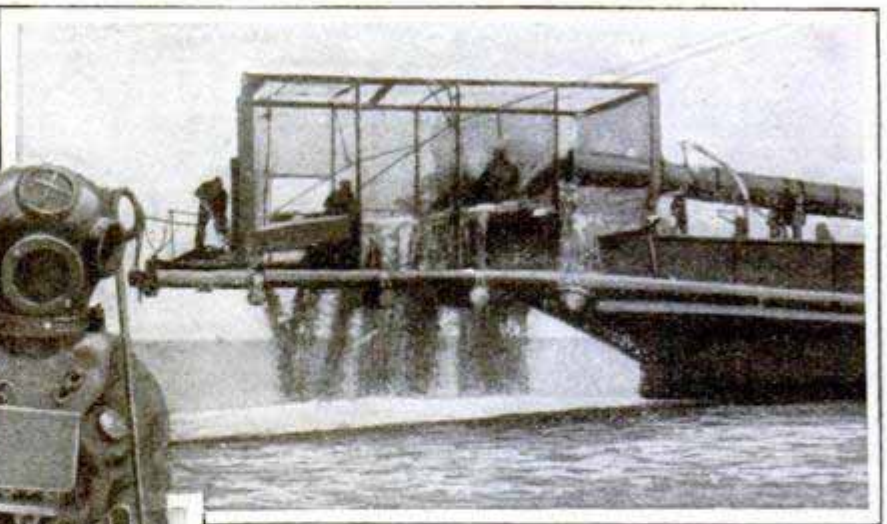
The portable oxygen supply, originally worked out for mine-rescue apparatus, has been recently adapted to diving armor by the German inventor of the pulmotor. The construction of a hollow apparatus with walls braced against tremendous pressure from without, is even less difficult from an engineering point of view. Modern glass makers can furnish "bull's-eyes" sufficiently strong to resist a pressure of several tons to the square inch, enabling the diver to see what he is doing. The illustrations herewith show a number of recent attempts to combine the essential elements of a real deep-sea diving apparatus in a practical manner.

Most interesting of these is the suit of armor, constructed of one of the new aluminum alloys, braced internally and provided with articulating joints at the shoulder, elbow, hip, knee and ankle, these joints being water-tight at very high pressure. Instead of gloves, the ends of the arms are provided with hooks running through stuffing boxes so that they can be manipulated by the hands of the diver inside the metal sleeves. This apparatus carries its own supply of oxygen and is intended to be used in connection with a new

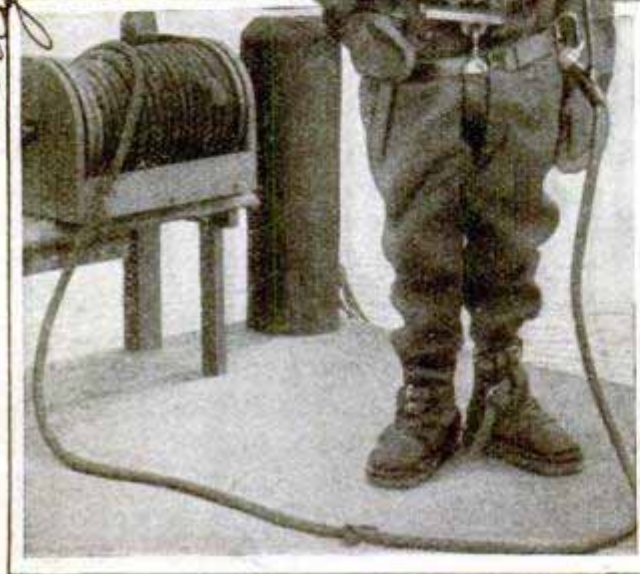
*Drägerwerk
Lübbeck
Germany*



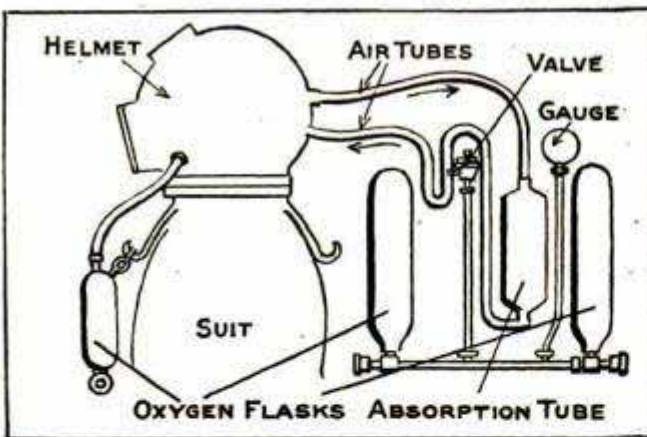
Diver Descending



Dredging Ship "Lyons" Recovering Treasure from the Wreck of "La Lutine"



Diving Apparatus Carrying Oxygen Supply



Mechanism of Oxygen Diving Equipment

type of inclosed electric lights, which may either be lowered independently or attached to the armor. Tests of this apparatus so far have been successful. An apparatus constructed on the same principle by another inventor, has been operated successfully in 280 ft. of water.

An ingenious device intended to carry two men to a depth of 400 ft. or

more consists of a hollow steel sphere, 8 ft. in diameter. The spherical form gives it the greatest possible resistance to water pressure. It is equipped with an electric motor which operates a screw propeller and a drill. Attached to the device, outside of the sphere, are eight powerful electromagnets supplied with current through a cable from the surface. It is the inventor's idea that this apparatus can be lowered alongside the hull of a steel or iron ship and, while still suspended from above, be manipulated into any position desired by means of its own propeller and rudder. When the ends of the magnets are in contact with the metal side of the ship, the current is to be switched into the magnet coils, thus holding the whole mechanism firmly against the side of the wreck. The drill, operated from within the sphere, is then to be brought into play, to make a hole in the steel plating of the ship, to which pontoons, consisting of air-tight steel cylinders, are to be firmly attached. With a sufficient number of these pontoons attached to a wreck, and the water and air exhausted from their cylinders, it is expected that a ship of almost any size can be floated and towed to shallow water or a drydock.

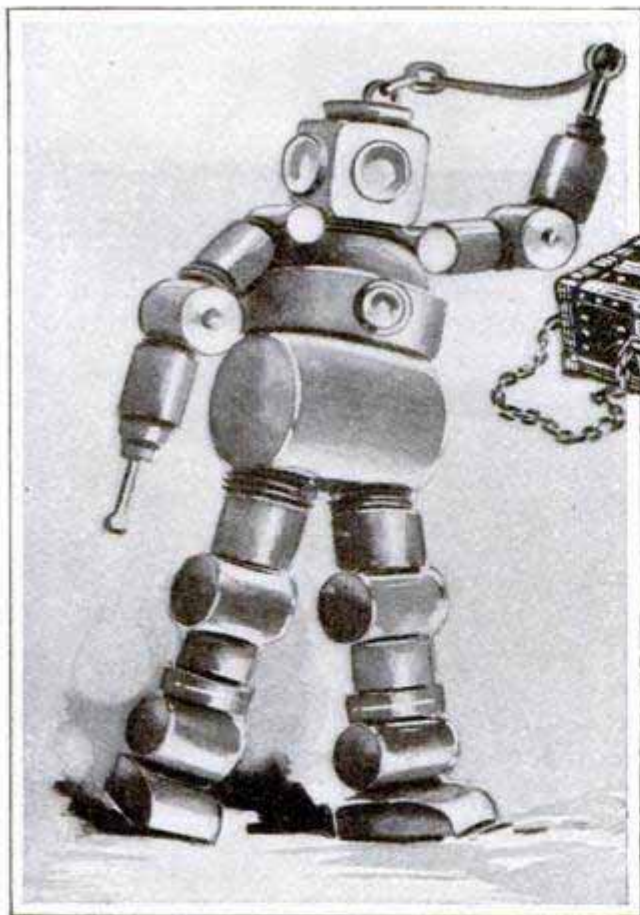
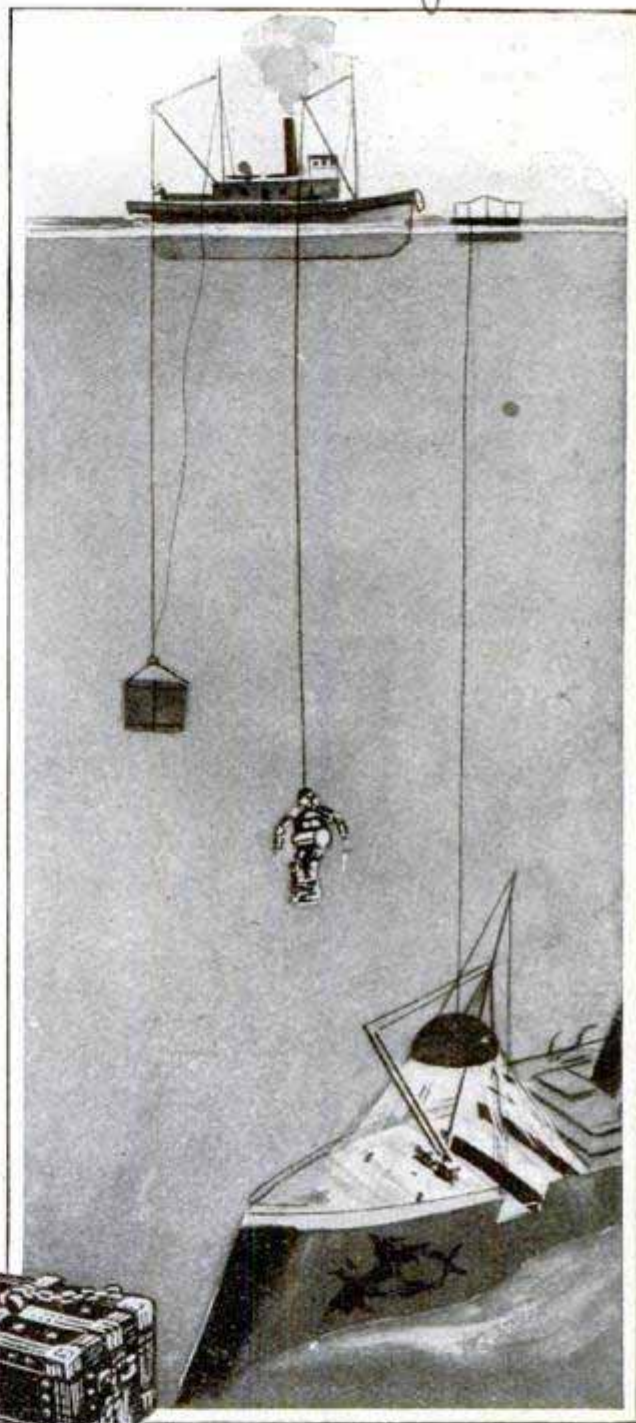
Another type of treasure-seeking device, recently patented, consists of a steel cylinder, or tube, running vertically through the hull of a steamer so that it can be slid or telescoped down

*John Francis Hall
Yale '98 B1*

to the bottom of the ocean. The inventor of this device believes that work at considerable depths can be done with it, the operators descending from the ship through the tube to the point where the material to be salvaged lies.

One of the most promising devices for recovering sunken treasure is a new type of submarine boat recently constructed at Los Angeles. This boat, which has been successfully tested, is 75 ft. long, 7½ ft. beam, and weighs 43 tons. Instead of storage batteries it is operated by a gas engine which is said to work as well submerged as on the surface. A blower for forcing the exhaust gases through a valve in the hull is the main element that makes the submarine use of gas engines possible. The propellers are placed at each side a few feet aft of the bow, not only eliminating the tendency to dive, but giving greater speed when submerged than on the surface.

It is the plan of the builder of this submarine to construct one on the same plan, strong enough to withstand the



Novel Diving Armor to Resist Great Pressures, and Deep-Sea Searchlight for Recovering Sunken Treasure

pressure at a depth of 1,000 ft., with a lifting capacity of 75 tons, and equipped with grappling hooks and clam-shell dredging jaws which may be operated from within, as well as with powerful searchlights for throwing beams of light to the bottom of the sea. With this boat, the inventors hope not only to recover much of the sunken treasure which has already been located, but to discover the exact whereabouts of other sunken treasure ships, the present position of which is not definitely known.

The encouragement for inventors

working along these lines is found in the knowledge already at hand of wrecks bearing treasure, some of which have been sunk for hundreds of years. In 1502, a Spanish fleet carrying quantities of gold from Santo Domingo sank off the island of Santa Lucia at an unknown depth, in a hurricane that drove the ships of Christopher Columbus into a near-by harbor for safety. From then on, for two centuries, the record of the Spanish conquest of America is filled with reports of sunken treasure ships bearing the riches of Peru and Mexico back to Spain.

A chest of gold containing over \$3,500,000 was accidentally dropped overboard in a little harbor on the west coast of Nicaragua, in March, 1578. It is still there. When the Spanish Armada was wrecked off the British coast, in 1588, treasures of gold and silver estimated at from \$75,000,000 to \$100,000,000 went to the bottom with the ships. The wrecks of many of these Spanish galleons have been located, and some of the treasure has been recovered. At several points on the Welsh and Scottish coasts, every heavy storm washes ashore Spanish gold coins and jewels. One of these galleons lies off Tobermory, and divers who have gone down close to it report that they can see broken treasure chests with the gold pouring out. Treacherous cross currents, however, have killed every diver who has attempted actually to reach the wreck, by twisting his air hose—an accident which the new types of diving apparatus would be free from.

In the harbor of Vigo, Spain, lie the wrecks of 40 ships, some of which had just arrived from Mexico and South America laden with gold and silver bars, early in 1702, when they were caught in the harbor by a fleet of British warships, and sunk in 400 ft. of water. From the few that were captured, the British commander took \$5,000,000 in gold and it is estimated that there is still at least \$40,000,000 at the bottom of the bay. An Italian nobleman has made several attempts with a diving apparatus consisting of

an observation chamber at the lower end of a circular steel tower to recover some of these treasures.

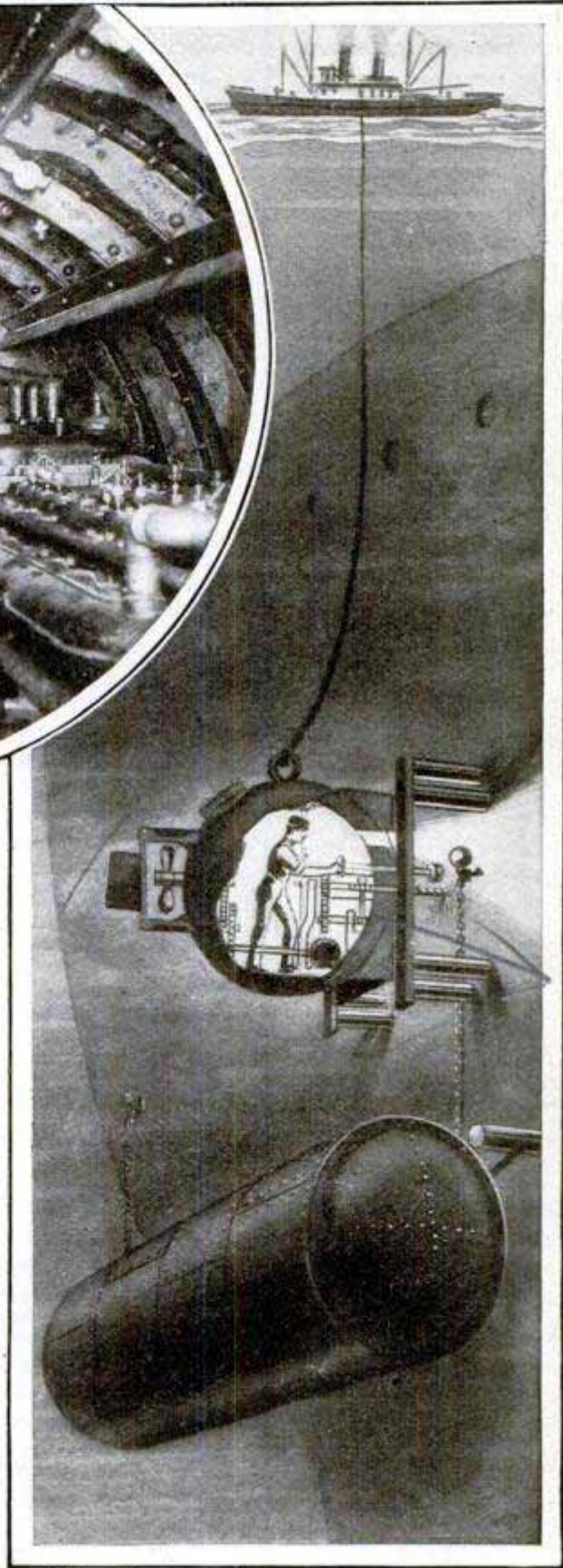
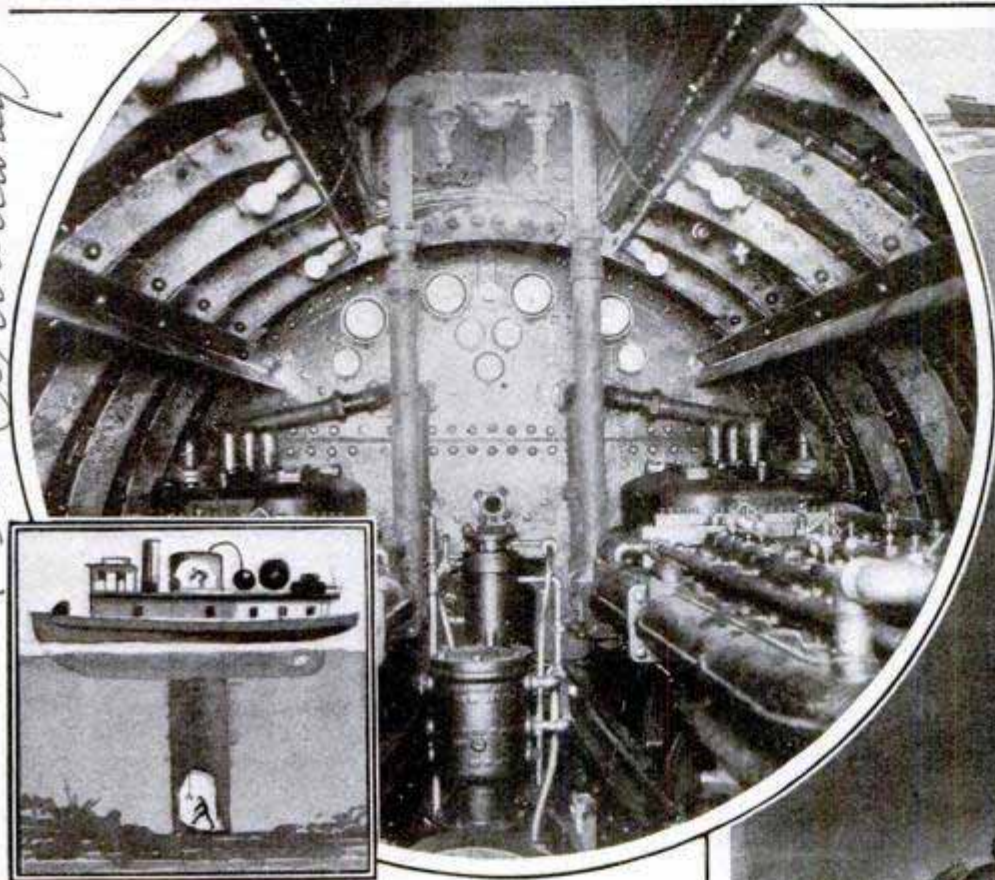
In 1799, the British warship "La Lutine" sailed from Yarmouth for Cuxhaven, carrying treasure insured for nearly \$6,000,000, to be taken to Germany for a group of English bankers. Only two of her crew were saved when she sank at the mouth of the Zuyder Zee. The King of Holland, in 1800, organized an expedition which recovered \$278,000 from the wreck. In 1821 he renounced his claim in favor of the King of England, who immediately turned his title to the sunken treasure over to the underwriters committee of Lloyd's. Since then efforts have been made from time to time to recover this treasure.

The main difficulty is not the depth of water, but the sand which covers the wreck. The sand has at times been partially cleared away, only to be washed up again by storms. In 1858, divers recovered \$140,000 worth of gold from "La Lutine." Up to 1889, about \$500,000 of this treasure had been brought up, in bars of gold and silver bearing the stamps of nineteen different London bankers. Several divers have reported that a space 12 ft. square close to the wreck is paved with silver bars wedged so tightly together that they cannot be moved with crowbars. Two years ago a number of English business men organized the National Salvage Association and equipped a ship, the "Lyons," with powerful suction dredges to recover "La Lutine's" treasure. As shown in one of the illustrations, the mud and sand dredged up is passed through screens which would catch even a small coin, and a corps of divers is kept at work whenever the weather permits.

There are hundreds of other sunken treasure ships the location of which is definitely known, and thousands of others which might be found with suitable submarine exploring apparatus. The ancient Roman records tell of two barges laden with golden vessels and jewels which sank off the island of Ischia, in the harbor of Naples, more

Gas-Engine Submarine

for Seeking and Recovering Sunken Treasure



The Sliding Tube for Work on the Ocean Floor

Engine Room of New Submarine; Showing Pump for Expelling Waste Gases

At the Right: Spherical Diving Bell with Magnets for Holding to Steel Ships

than two hundred years before the Christian era, and beyond a doubt a complete exploration of the floor of the Mediterranean would bring to light untold millions in ancient treasures. And even in these days, treasure ships still sink. The steamer "Golden Gate" lies at the bottom of the Pacific off Manzanillo, Mexico, with \$7,600,000 in gold on board, all in one big express safe, waiting for the diver's grappling hooks. The Canadian Pacific steamship "Islander" lies in 180 ft. of water off Juneau, Alaska, with a large cargo of bullion. The old wooden lake freighter "Pewabic" has been lying sixty years in a little over 200 ft. of water in Lake Huron, with \$500,000 in copper ingots in her hold; the "San Pedro," in Cum-

Wrecks may be Raised by Air Cylinders or Pontoons

Sisson Reef Inter-Continental
Labor Co. Suite 414

Los Angeles
Calif
J.W. Mitchell
619 Broadway

1914/16 American Salvage Co
224 W. 42nd St, New York
See Salvage

*Montparnasse,
Paris, France 835*

The plans contemplate the use of the Rio Grande reservoir and raising the dam 27 ft. above its present crest. An auxiliary supply will be secured from the Camacho reservoir and possibly from Gatun Lake. The most modern purification plant will be installed. It is found that the stream waters of the Isthmus yield readily to aeration and aluminum-sulphate treatment followed by sedimentation and sand filtration, and for this reason it is not expected that the problem of purification will prove a difficult one.



383 **FRENCH BUILDER ERECTS HOUSE AROUND TREE**

Because Victor Hugo had planted it, a Paris apartment-house builder caused a seven-story building to be built around a tree, which is nothing but a dead trunk a few feet from the sidewalk, instead of bringing the entire front of the structure to the street line

How Parisian Landlord Saved Victor Hugo's Tree at 229 Boulevard Raspail as in the case of neighboring buildings. It is estimated that the owner's respect for the celebrated author has cost him several thousand dollars.

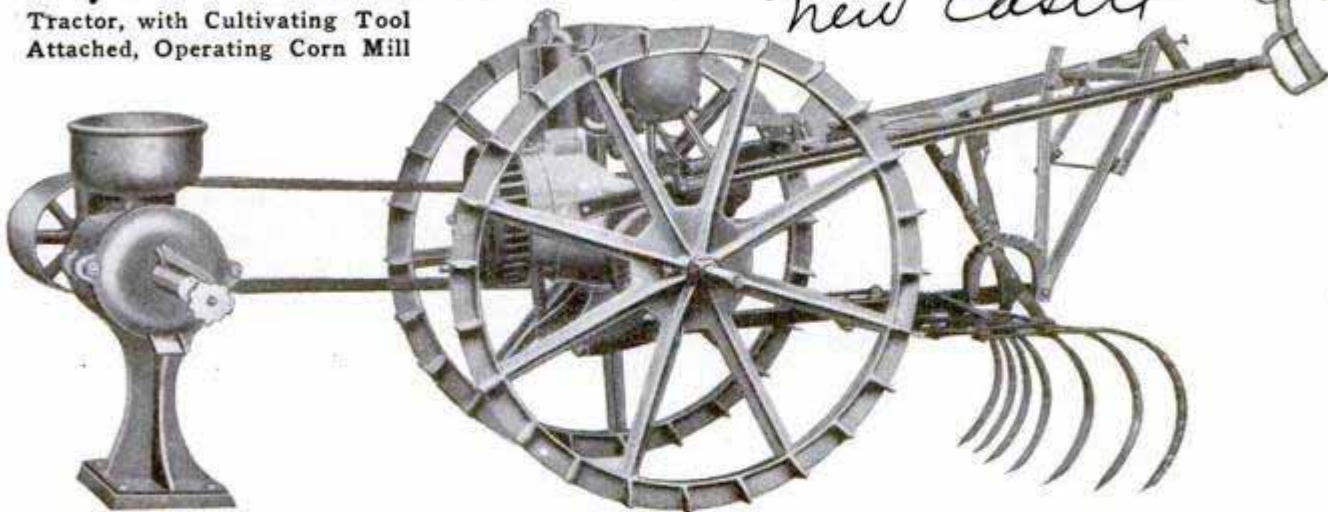
John
TWO-WHEELED TRACTOR AIDS IN MANY WAYS

A gasoline-engine tractor which can be put to many uses on the farm has been placed on the market in this country. The machine is a two-wheeled

separators, grindstones or other implements. The engine is a single-cylinder air-cooled power plant and the drive is obtained through a steel worm to a

3172 Universal Tractor Co. New Castle - Ind.

Tractor, with Cultivating Tool Attached, Operating Corn Mill



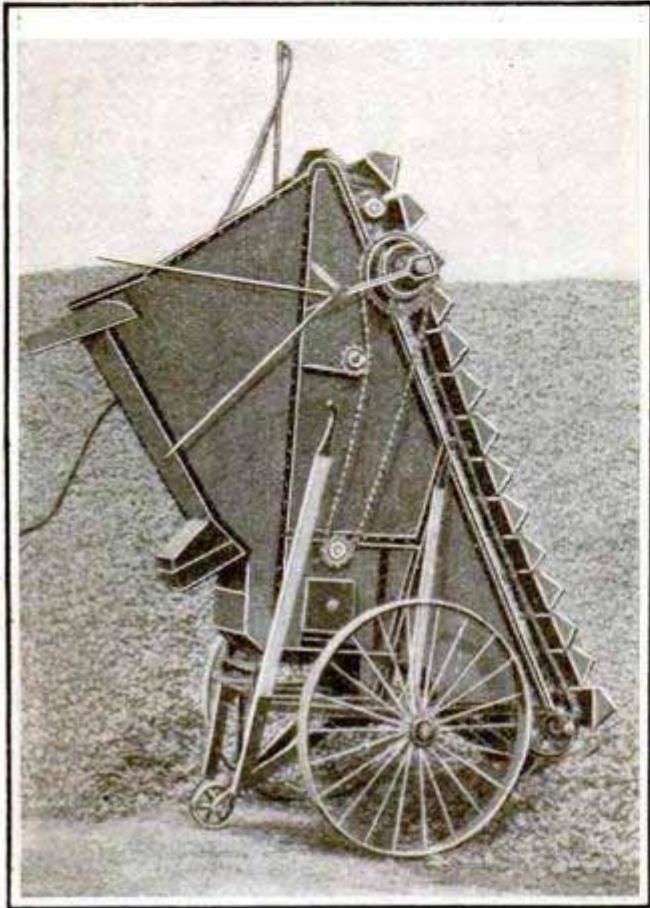
contrivance which may be used with cultivator tools of standard design in the fields, or connected, by means of a belt, to pumps, wood saws, cream

bronze gear. The gauge between the wheels is adjustable from 26 to 42 in. The speed is regulated by an adjustable governor, inclosed in an oil bath.

ELECTRIC LOADER FOR COAL WAGONS

3392

This portable wagon loader, designed especially for the handling of coal, is pushed into operative position by



A Portable Wagon Loader Which Screens and Bags

hand, but its conveyor and other mechanisms are driven by an electric motor. The machine screens, bags and loads, the material being carried to the top, from which it falls onto the screens, by means of the conveyor buckets.

NIGHT-TIME SIGNALS BY WIRELESS

Radio Time

The Naval Observatory time service, which provides the country east of the Rocky Mountains with standard time, is to be extended to include every day of the year, and in addition a second signal will be made every night at 10 o'clock, seventy-fifth meridian time. The night signal will be automatically repeated by the Naval Radio Station at Arlington, reaching remote parts of

the Atlantic Ocean, the Gulf of Mexico, and the Caribbean Sea, as well as far inland. This service is expected to be of the greatest assistance to ships at sea.

LOADING AUTOMOBILES INTO FREIGHT CARS

3923

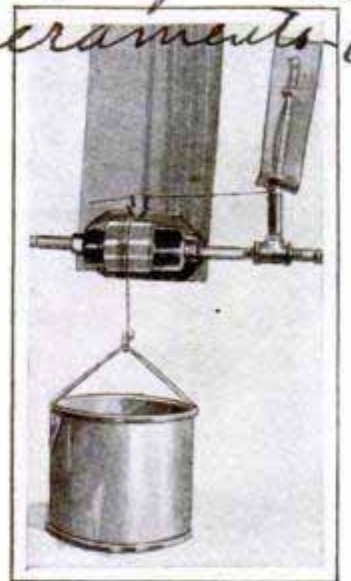
A predicted famine in freight cars for the months of April and May resulted in several of the big automobile concerns making a considerable outlay, to improve facilities for quick loading. One of the concerns, for instance, expended \$60,000 for a new loading shelf, two blocks long, level with the tracks and supported on concrete piers. The steady stream of finished cars coming out of the factory are lifted to the loading shelf by means of two large hydraulic elevators, which lift two cars at a time. Automobiles are loaded into cars on both sides of the platform. By double-decking the interior of the freight cars, six automobiles were shipped in each.

DEVICE TESTS STICKINESS

OF ROAD OIL
Robert E. Jones

A device for testing the stickiness of road oil, invented by the geologist of the California Highway Commission, has revolutionized the method of purchasing the oil used by that body in the construction of highways. The old specifications for road oil called only for a certain per cent of asphalt. Later a certain per cent of cohesiveness was added as a requisite. Since this device was invented the commission has been using adhesive-ness or stickiness as the basis for its purchases.

2701 California Ave. Sacramento Calif



Patentee
C. B. Osborn

Specialty Engineering Co.
Emerald, Cornwall Philadelphia, Pa.

387
Army & Navy Journal
5/5/13

The device is a simple one, and its purpose is to demonstrate the ability of the oil to bind foreign substances. It consists of a hollow brass cylinder, 20 in. in diameter and 6 in. long, through which a stream of water, at the desired temperature, is run. Around the cylinder is fitted a brass ring, 3 in. wide and of a diameter sufficient to leave a space of $\frac{5}{1000}$ in. between it and the cylinder. A weight is hung from this ring by means of a cord, the weight, in this instance, being a bucket weighing a little more than $6\frac{1}{2}$ lb. In making the test, the cylinder is heated by running water at a temperature of 77 deg. F. through it. Then the cylinder is coated with oil, and the string suspending the weight is wrapped around the cylinder three times. The number of seconds it takes to pull the ring around the cylinder three times determines the relative stickiness of the oil.

The inventor of the device says he has noted a vast difference in the stickiness of oil having about the same asphaltic content and the same amount of cohesiveness, the range being from 6 to 1,000 seconds in the unwinding of the cord.

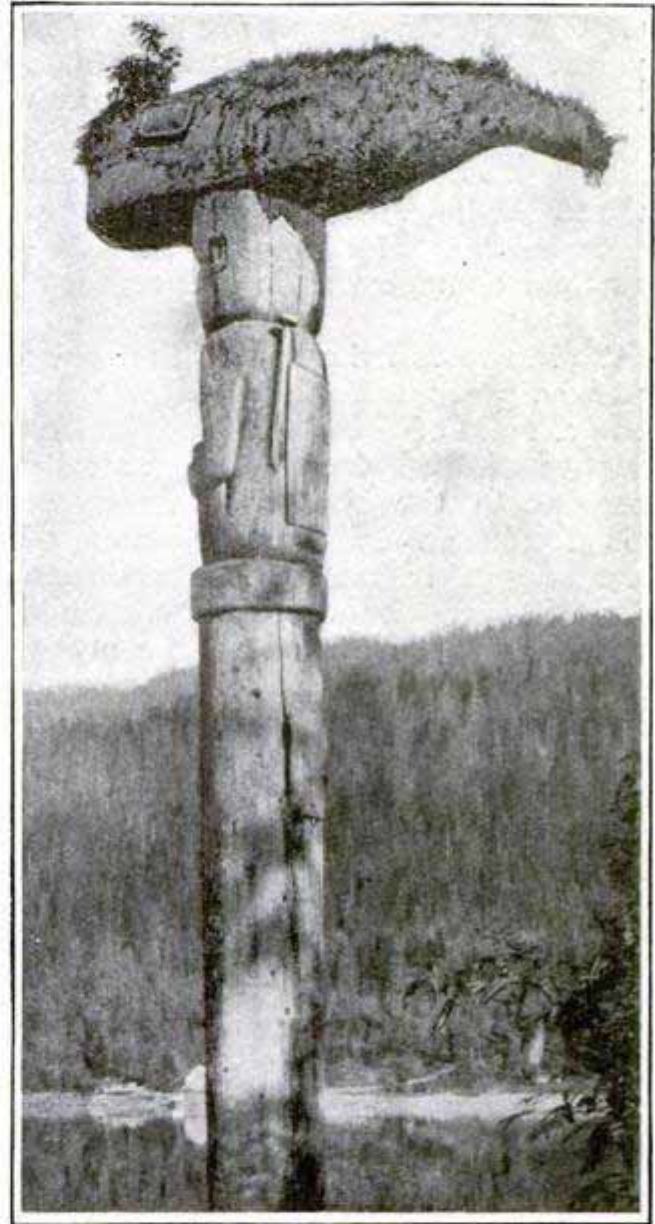
DEPOSIT OF FULLER'S EARTH
38 71-7m IN PANAMA

New York 1913
An extensive deposit of fuller's earth, has been discovered near Gatun, Canal Zone, on land owned by the United States. The peculiar value of the deposit lies in its location on the edge of Gatun Lake convenient for shipment. Fuller's earth is now imported into the United States from England, where the largest deposits have heretofore been found. It is used in the manufacture of woolen goods and in removing grease from fabrics of wool.

☞The sovereign princes of India are fast abandoning their gorgeous equipages of state and resorting to motor cars made in the United States, because of the increased convenience and saving in time.

NORTHWESTERN INDIANS USE
358 HOLLOW-POST TOMBS

The method of burial of the Indian of British Columbia is one of the most interesting usages of the North Ameri-



W. L. Beasley
The Tomb of a Magical Medicine Man of the tribes. The bodies of the great Shamans, or magical medicine men, are given an "aerial" burial. The upper part of a hollow post is carved to represent the figure of a man, and the body is placed upright in this hollow entrance being through an opening in the back, which is then boarded up. The earth-covered "roof" of the strange sepulchre is merely ornamental.

☞Guillaux, a French airman, flew 190 km. (118 mi.) in 1 hr., Mar. 6, 1913.

SOME LESSONS FROM THE OMAHA TORNADO

ONE hundred and forty persons were killed, more than two thousand homes destroyed, and property damage estimated at nearly \$7,000,000 was done in the city of Omaha alone by the tornado of Easter Sunday, March 23, 1913. Six separate tornadoes that swept across Nebraska, Iowa, Illinois, Missouri and Indiana on that date killed more than 200 persons and rendered thousands homeless, but the principal damage was in and adjacent to Omaha.

While some of the houses that were wrecked were the homes of wealthy people, most of them belonged to poor families who were rendered practically destitute by the disaster. In view of this condition, the business men of Omaha quickly raised a subscription fund of several hundreds of thousands of dollars to be loaned to the needy for the rebuilding of their homes at low interest rates and without regard to security, and, in addition, the county was authorized to issue bonds for \$1,000,000 for the purpose of giving the sufferers, as far as possible, the value of their possessions lost by the storm.

Investigations by a building expert as to why some buildings withstood the force of the whirling wind cloud, revolving at a speed almost impossible to compute, while most of those in its path were completely destroyed, justify the conclusion that the construction of tornado-proof dwellings is not difficult, but is merely a matter of somewhat better workmanship than is ordinarily put into cheap buildings.

The recommendations as to the construction of ordinary frame houses resulting from this investigation are as follows:

"Studdings, partitions and rafters should be of 2 by 6-in. lumber instead of 2 by 4-in., as is commonly used.

"Floor joists never should be more than 16 in. apart and preferably only 1 foot.

"Eight hundred pounds of nails

should be used instead of the 400 lb. usually deemed sufficient.

"Side sheathings should be 8-in. lumber fastened on 2 by 6-in. studding with two nails in each stud.

"Floor joists should be 2 by 12 in., and the top floor in attic houses not smaller than 2 by 8 inches.

"Extra 2 by 6-in. rafters should be inserted, joining the main rafters in the middle and running at right angles to the top-floor joists.

"Framework should be anchored to foundations with huge bolts, laid 2 ft. deep in foundation and bolted on the upper side of heavy timbers placed across the floor joists. These bolts should be placed every 4 ft. around the house.

"Window sashes should not be smaller than 1½ inches.

"Wide, overhanging roofs should be avoided. The roof never should overhang more than 6 inches."

Near Twenty-fourth and Lake Streets the only dwelling standing within six blocks was one built after the construction outlined above. Other houses, in which 2 by 4-in. studding was used, were torn and twisted into absolute demolition.

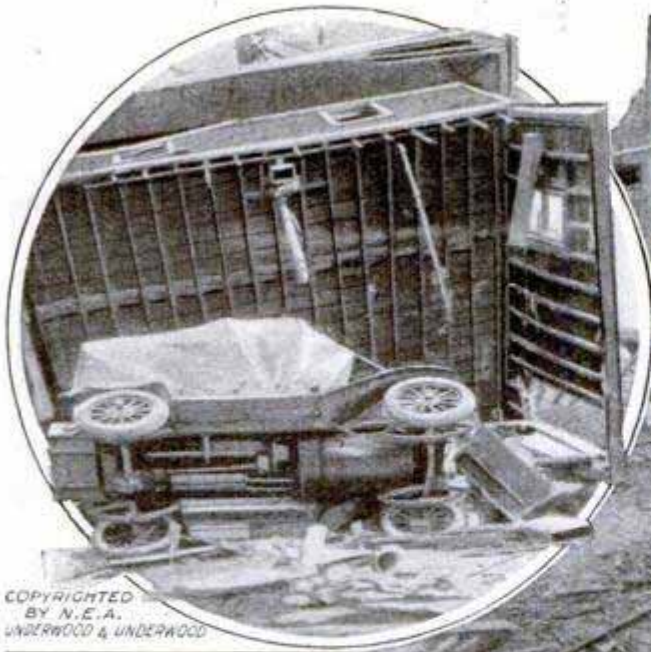
The extra cost of a tornado-proof dwelling should not be more than \$350 or \$400, according to the report. Most of this is represented by added labor cost.

The Trinity Methodist Church was almost totally destroyed. Its walls were of brick bound by lime mortar. A portion of the roof which did not fall was of heavy hardwood, joined by mortise work and heavy spiking. The portion which fell was of 2 by 6-in. lumber secured by three nails in each end—six nails would have held the roof and the walls would not have collapsed.

The 17-in. brick walls of the Plymouth Congregational Church crumbled like paper. Lime mortar was used.

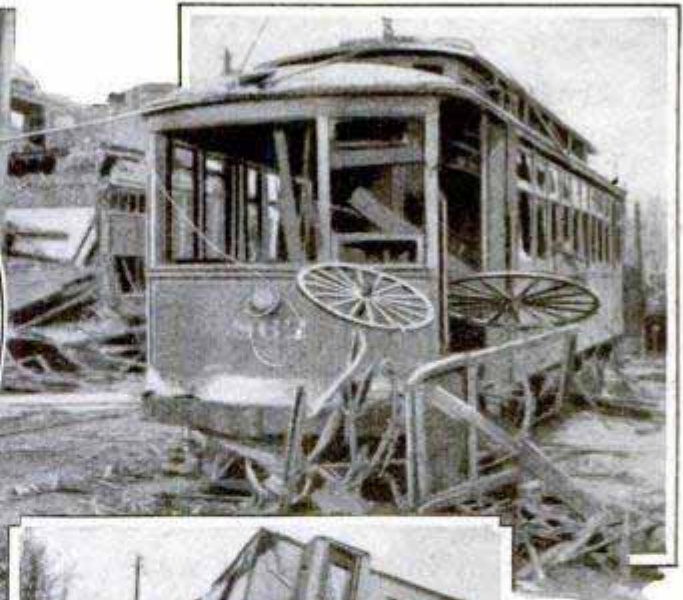
The million-dollar Joslyn Castle stood directly in the path of the storm. The solid brickwork under the stone

George C. Kansas City, Mo.



COPYRIGHTED
BY N.E.A.
UNDERWOOD & UNDERWOOD

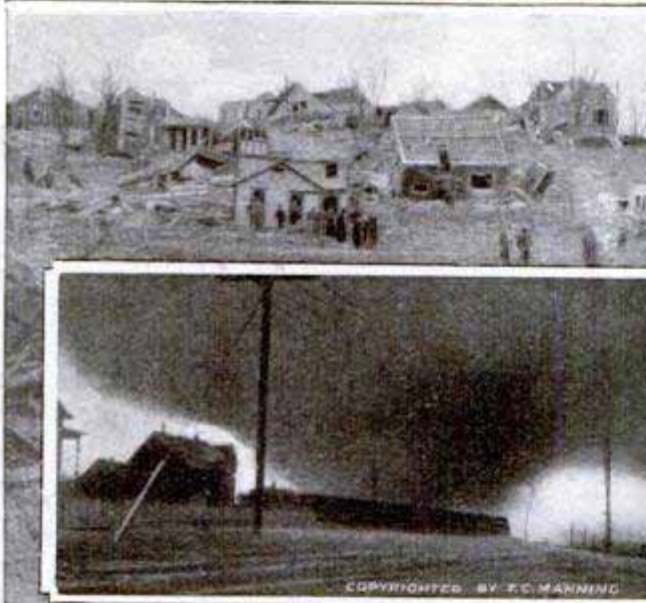
Garage and Automobile
Wrecked in Omaha



A Wrecked
Street Car



A Cottage Upset
in Omaha



COPYRIGHTED BY
UNDERWOOD & UNDERWOOD

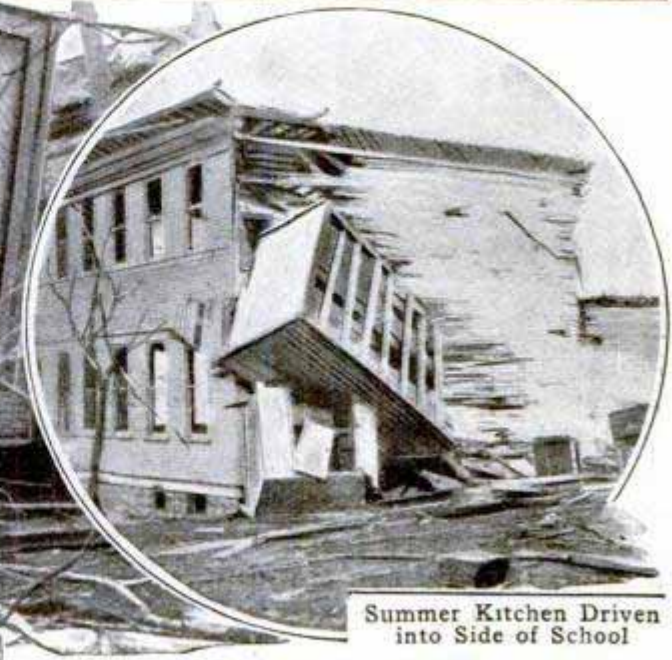
General View of a Portion
of the Storm Area



A Photograph of the
Omaha Storm Cloud



One of the Houses Blown
from Its Foundations



Summer Kitchen Driven
into Side of School

vener clung together like rock—it was laid in cement.

The Webster telephone exchange barely was damaged. Its walls were 13 in. thick, but the bricks were laid in cement mortar and were tied at regular intervals with bricks laid crossways.

The Sacred Heart Convent was destroyed. Its 17-in. brick walls were laid with lime mortar.

Windows also are a large factor in the destruction of buildings by storm. A wide plate glass in a garage was blown in and then the roof was lifted off. An entire section of the wall was carried away clinging together like a solid slab of rock. It was laid in cement. But the plant of the Omaha Light and Power Company, directly

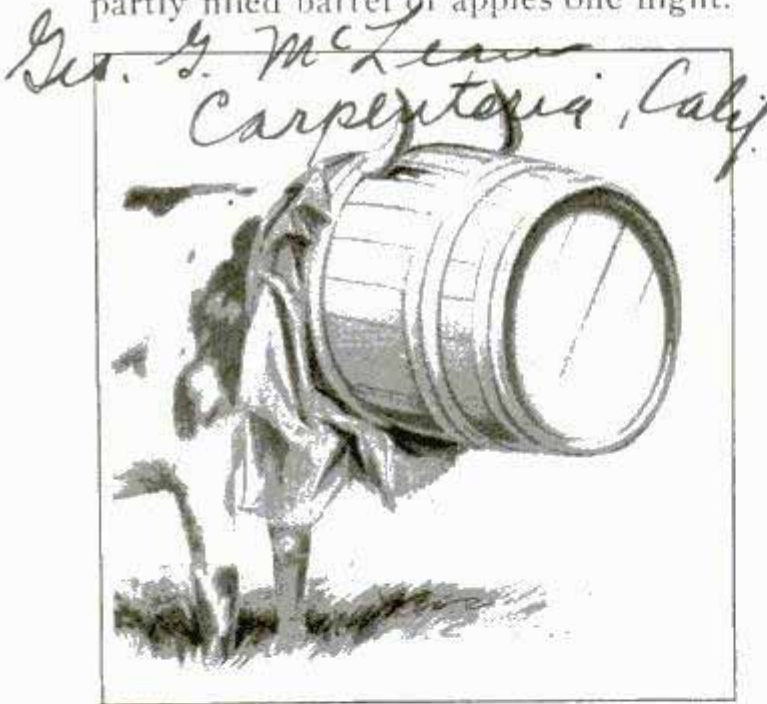
in the storm, was not damaged. Its windows were of 8 by 10-in. wire glass—none was broken and the square brick building came through the twister unharmed.

“There are no freak tricks in a tornado,” the report says. “Its freakishness is due either to the good or bad construction of buildings. And all can be made to withstand any storm—brick and stone walls should be laid in cement mortar. Lime mortar crumbles too easily.

“The safest place to go in a tornado depends on the kind of building. In frame, stucco or veneered houses, run for the basement. In brick houses, stay out of the basement. That’s where the bricks fall.”

COW FASTENS OWN HEAD INSIDE APPLE BARREL

In order to secure a savory meal, a California cow thrust her head into a partly filled barrel of apples one night.



A Barrel-Headed Cow

The animal’s long horns penetrated the side of the barrel, however, and her head became securely fastened. The cow was found, next morning, fully half a mile away from the spot where the barrel had been standing. The use of a saw was necessary before the animal could be freed.

AUTOMOBILES UPHOLSTERED WITH SPUN GLASS

An artificial silk, made from spun glass, is being manufactured in England for upholstering automobiles. The glass threads of this artificial silk are only one-thirtieth as thick as an ordinary human hair, and are scarcely visible to the naked eye. By the action of chemicals, this thread is said to be made stronger and firmer than any other artificial silk. The cost of producing material woven from it is claimed to be only one-fourth the cost of artificial silks made from cellulose. The glass cloth is incombustible, very resistant to moisture, acids, alcohol and oils, and is easily cleaned.

388
The Automobile
1913
Apr 27
Page 764
Manufacture 3/1/13

GERMAN MOTOR-PROPELLED LIGHTSHIP

This German lightship, recently placed on duty at the mouth of the River Elbe on the North Sea, is a considerable departure from customary lightship construction, in that she is built on lines resembling a yacht, and is provided with power in the form of internal-combustion engines, which give her a speed of between 10 and 11 miles an hour.

The ordinary type of lightship, par-

99

Stettin Germany.

Designer. H. E. Johns Hamburg.



A Yachtlike, Motor-Powered German Lightship

ticularly in European waters, is a bluff-nosed, almost barrel-shaped vessel, having no propulsion means. When this type of lightship is once moored she has to stay moored, no matter what goes wrong, until a tender or some other power vessel appears on the scene. If she drags or breaks her cable she has no chance of regaining the mooring. The motor-propelled lightship, on the other hand, can take care of herself if trouble occurs. She may also ease the strain in her cable during a gale by starting her engines and driving ahead a little.

RAILROAD CRANE HAS A SEVENTY-FOOT BOOM

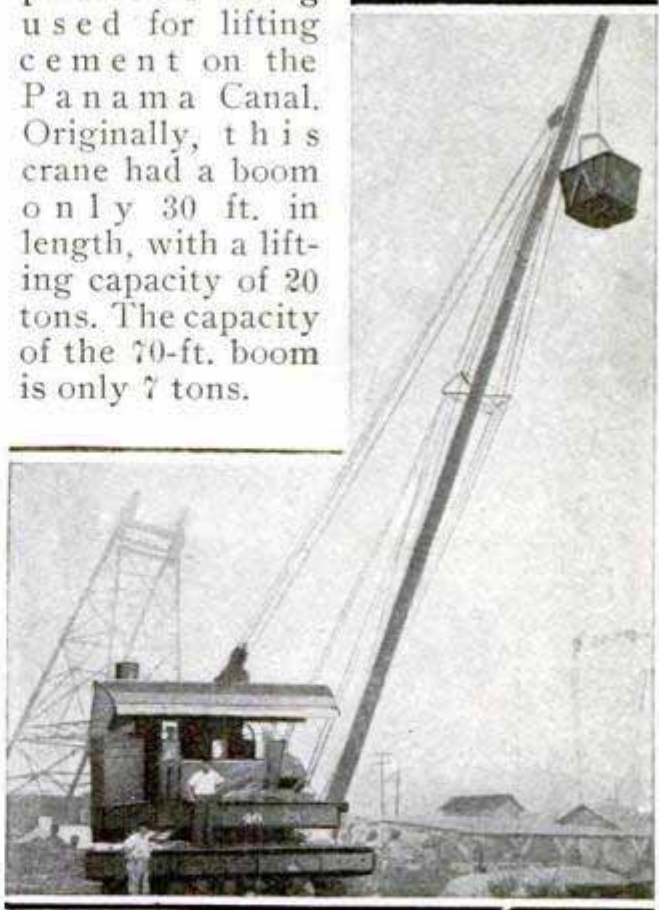
No data

A boom 70 ft. long on a railroad crane is exceptional, but such an apparatus is being used for lifting cement on the Panama Canal. Originally, this crane had a boom only 30 ft. in length, with a lifting capacity of 20 tons. The capacity of the 70-ft. boom is only 7 tons.

3915

METEORITES MAKE AIR

Export Industries
QUAKES
 The suggestion that the explosions of meteorites cause air quakes comes from no less an authority than W. F. Denning, the astronomer. The explosion of meteorites is sometimes audible. A large meteorite, falling near Holbrook, Ariz., and recorded by Prof. W. M. Foote, broke up with a loud noise that lasted half a minute or more. More than 14,000 fragments were scattered over a stretch of three miles. Such an explosion in the air would send out air quakes for long distances.

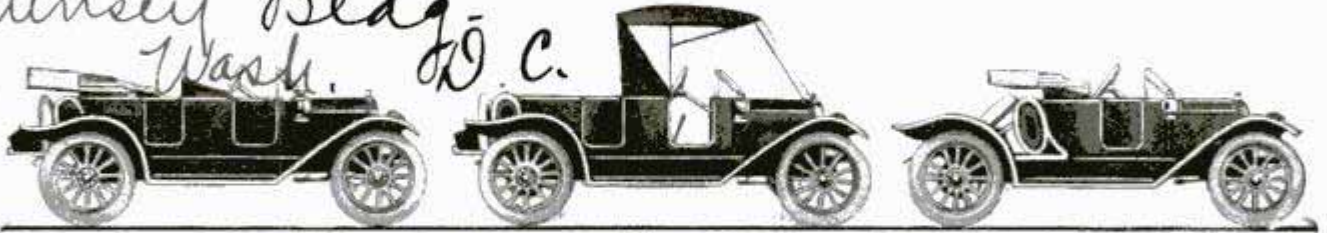


Railroad Crane with 70-Ft. Boom Used on Panama Canal Construction Work

THREE-PURPOSE AUTOMOBILE HAS BEEN DESIGNED

An American automobile designer has perfected a general-service car for which the advantage is claimed that it

its base are mechanisms for working the eyes, eyelids, head, mouth, arms, and the hands and fingers. Fourteen different parts may be worked at once, and 3,600 different positions may be produced. In addition, two phono-



Three Styles of Motor Cars Incorporated in a New Convertible Design of Automobile

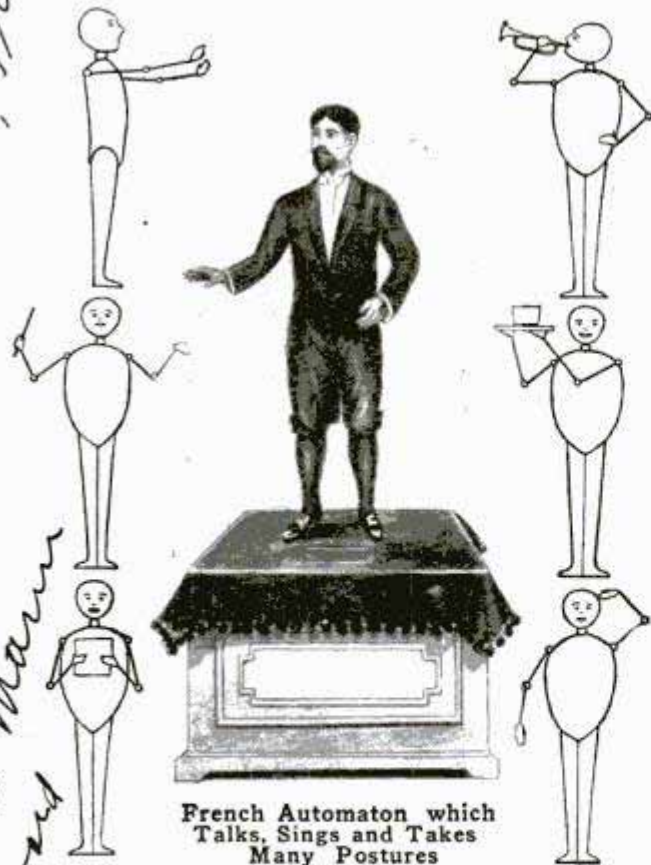
can be used for three distinct purposes through the convertibility of an adjustable body. By pushing or pulling the longitudinally sliding body, a conventional two-seated roadster, a touring car, or a light delivery vehicle, is obtained without the addition or removal of any fittings or parts.

graphs are incorporated, one for talking and the other for singing, so that they can be put on in turn.

This automaton is especially designed for advertising purposes. It can, for instance, be dressed as a cook and placed behind a table bearing food products. Or it may be placed in front of a store to hand advertising matter to passers-by, and at the same time proclaim the value of the wares and invite persons to enter. The mechanisms are operated by an electric motor, also concealed in the base.

A FRENCH TALKING AUTOMATON

A new French talking automaton, just placed on the market, is said to



French Automaton which Talks, Sings and Takes Many Postures

ST. PETERSBURG RAILROADS TO BE ELECTRIFIED

Plans have been made for the electrification of all railroad lines in the vicinity of St. Petersburg, Russia, the necessary power to be generated by a hydroelectric plant utilizing the falls of the Valky River. The transmission lines will carry current at a voltage of 400,000. This has necessitated the designing of apparatus of a special kind. Tests will be conducted on short lines of road before the final adoption of the plan.

"MAUD HEATH'S CAUSEWAY," AN EARLY GOOD ROAD

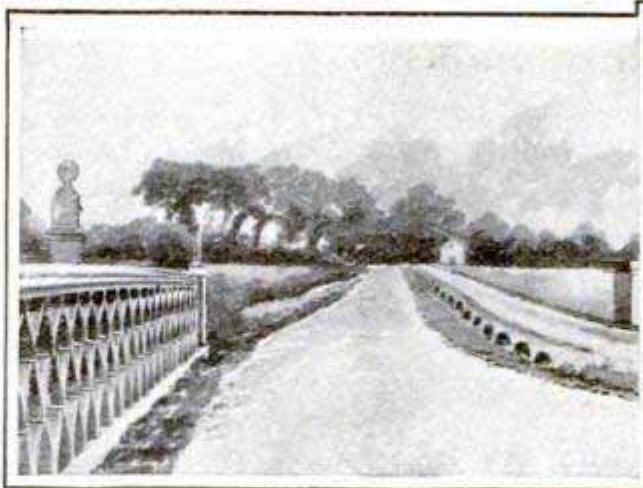
Probably the earliest recorded instance of a perpetual endowment for the maintenance of a country road relates to a thoroughfare connecting four parishes in North Wilts, England.

Vertical handwritten notes on the left margin: 'The National Business Exchange', 'Munsey Bldg Wash. D.C.', 'suite 525-525', 'Munsey Bldg, Wash. D.C.', 'made by Torcades Firm, Paris, France.', 'F. O. Mann Boulevard Paris.'

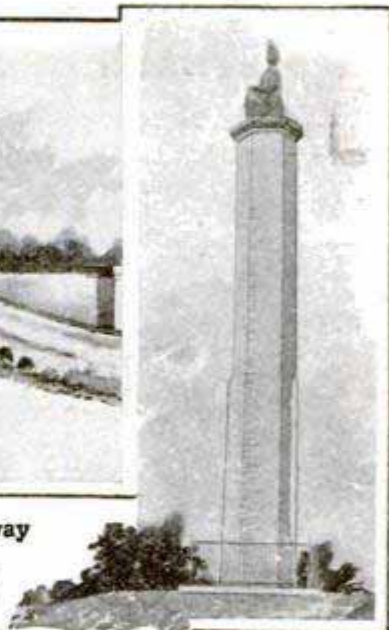
Handwritten notes on the right margin: 'Oregon', 'La. Schreiner', 'modern', '375', '377'.

The Maud Heath Causeway - 1914

The endowment for the construction and maintenance of this causeway, or more correctly "causey," a word derived from the French, meaning a pitched road, was made 450 years ago by Maud Heath, a market woman who lived on a farm near Bremhill. She experienced so much difficulty in conveying her eggs, butter and chickens over the 4 1/2 miles of swampy road from her farm to the market at Chippenham that she resolved to devote the savings of her life to the providing of a sound footing for her successors for all time to come. In memory of



A Section of Maud Heath's Causeway



The Monument

the woman's foresight and public spirit in this and other ways, a monument was erected in 1838 by appreciative citizens of the locality in which she lived.

760

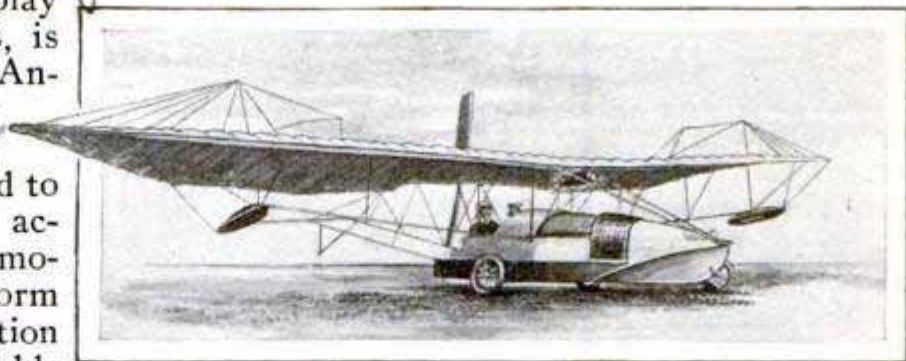
WILD ANIMALS TRAINED AS MOTION-PICTURE ACTORS

A jungle of several acres inhabited by wild animals of all countries, many of which are already well trained for the parts they are to play as motion-picture actors, is maintained near Los Angeles by one of the big American film-producing companies. It is intended to extend the acreage and accommodation until the motion-picture jungle will form the largest single collection of wild animals in the world; and within it will be, and now is, for that matter, enacted many stirring scenes. A big elephant named "Toddles" is, for instance, the star performer in a film catalogued as "Lost in the Jungle," in which Toddles, during his wandering in the forest, finds the heroine lying exhausted on the ground, and, kneeling, lifts her to his back and gallantly carries her to safety.

All the animals are as conscientiously trained to do acts for the motion-picture camera as are the trained animals of a circus.

HYDRO-AEROPLANE SHAPED LIKE MOTORBOAT

One of the most substantial-appearing hydro-aeroplanes yet evolved, as regards the boat portion of the machine,



A German Hydro-Aeroplane with a Main Float Similar to a Racing Motorboat

is the German air-and-water craft shown in the accompanying illustration. The main float or pontoon, if shown alone, would be unquestionably taken for a racing motorboat, for the lines of its hull are similar, the deck is completely covered over, with the engine inside, and the only open space is a wide seat at the stern, in which the airman and his passenger are seated in the same manner as the pilot and mechanic of a racing motorboat, protected by a spray hood.

Albatross - Doffeldeckee

Leonard S.

BAGGAGE CONVEYORS ON STEAMSHIP PIERS

Several of the piers used by the transatlantic liners sailing from New York are equipped with electric bag-



Baggage Conveyor and Stairways on One of the Transatlantic Piers

gage conveyors for elevating and lowering baggage to and from the dock or street level to the steamer floor of the wharf houses, whence gangways extend to the upper decks of the steamships. At the Cunard pier, for instance, the conveyor runs up alongside the double stairway provided for the passengers. These conveyors are of the reversible type, elevating cabin baggage for outgoing steamers, and conveying it from the upper to the lower floor when steamers are discharging after a voyage.

SOUTH AFRICAN GOLD MINE A MILE DEEP

Ore is being mined at a depth of over 5,000 ft. in the Catlin shaft, the deepest gold mine of the Witwatersrand in South Africa. Considering the small and uniform increase in temperature in this shaft and the fact that there are apparently no mechanical barriers, it is believed that mining can be carried on at a profit at a depth as great as 8,000 ft. The deepest metal mines in the world are in Michigan.

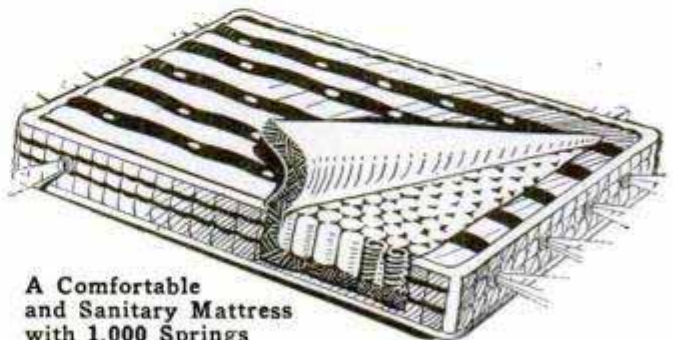
DANGER FOR RAILROADS IN 350 AUTO TAIL LIGHTS

The red light as a signal on the rear of automobiles is an annoyance to railroad men, if not a real danger according to a committee representing the locomotive engineers operating trains in the New England States. This committee has asked the Massachusetts Highway Commission to change the red light on automobiles to white, or some other color not used in railroading. There are many places, particularly in Massachusetts, where highways run parallel with railroad tracks. It is not an infrequent occurrence for an engineer to see a

red light when the train is running around a curve and jam on his emergency brakes to bring the train to a quick stop, only to have the red light move away on the back of an automobile.

The Hotel World A VENTILATED MATTRESS FOR BEDS Pg 13

A ventilated bed mattress which has holes on the sides for automatically insuring a free circulation of air through every part of the mattress, thus keeping it in a sanitary condition, is being manufactured. This mattress has more than 1,000 separate spiral springs,



A Comfortable and Sanitary Mattress with 1,000 Springs

which yield to every line of the body and conform to every changed position.

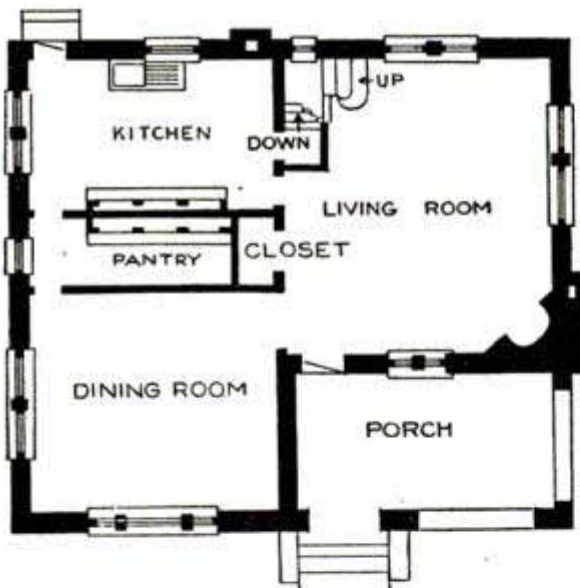
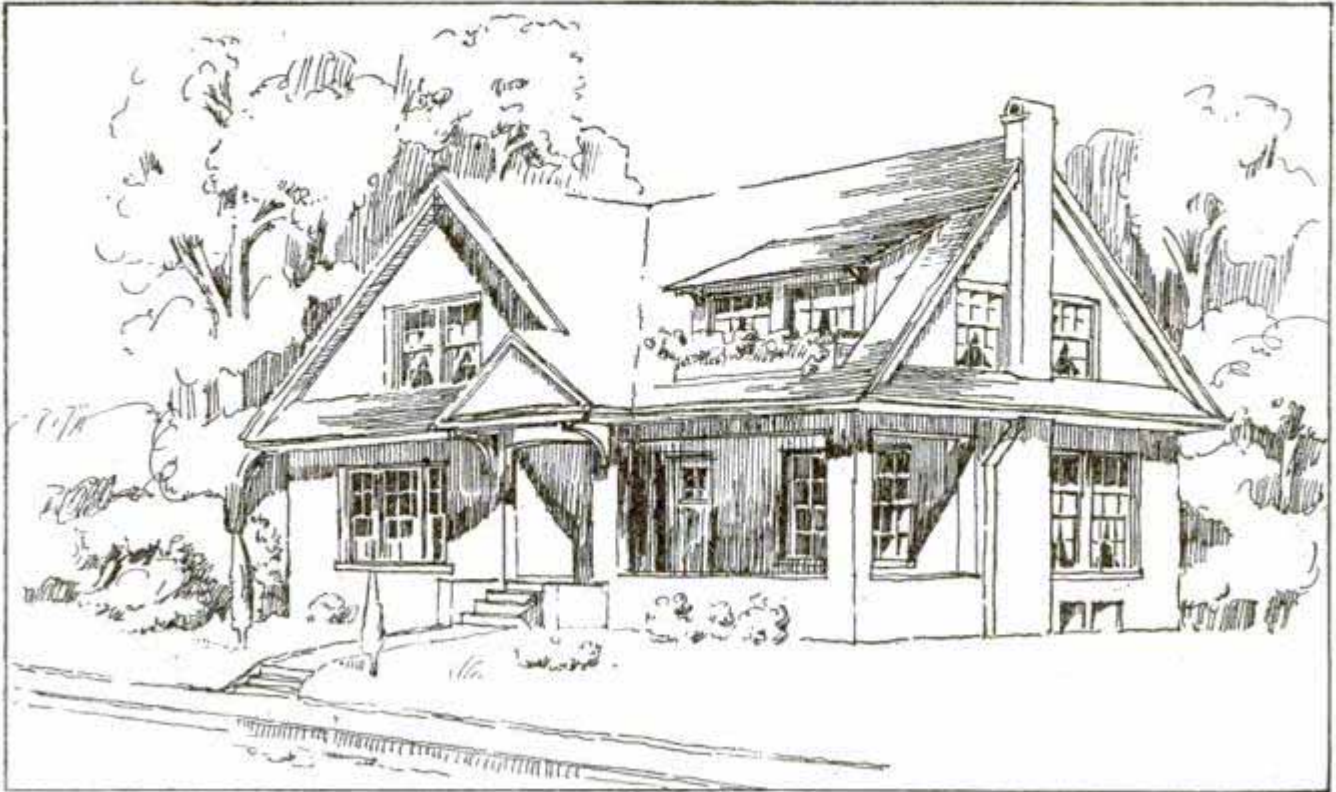
Marshall Ventilated mattress Co. ...

W. H. ... 88 ... Read ... New York ... 3419

W. H. ... 13 ... 350

3920 ... Air ... 8000

A MODERATE-PRICED COTTAGE



E. F. Lange, Architect, Philadelphia, Pa.

With a 26-ft. frontage, the depth of this moderate-priced cottage is 24 ft. The living room measures 12 ft. by 13 ft. 6 in., the dining room 10 ft. by 12 ft. 6 in. Each of the four bedrooms is 10 ft. 6 in. in its longest dimension. Interesting features are the location of the dining room at the front of the house, and the stairway leading directly up from the living room.

BUTTER FROM PASTEURIZED SWEET CREAM FOR NAVY

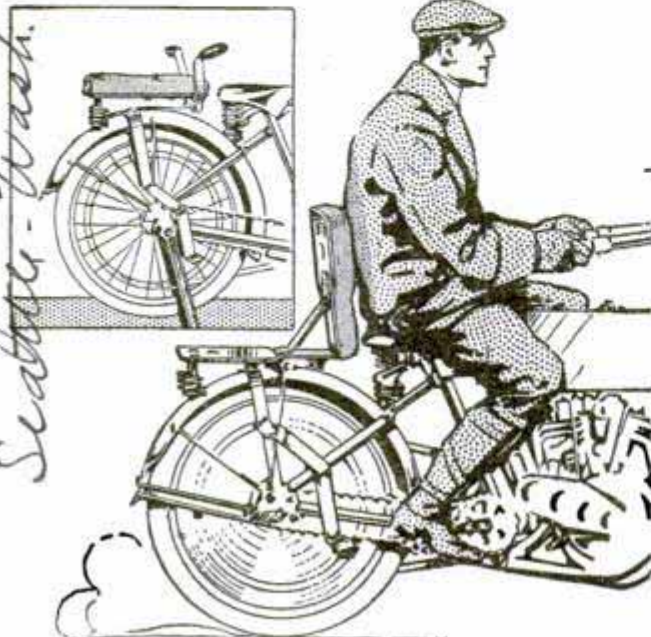
Tests made for the navy, by the United States Department of Agriculture, of butter that had been kept in cold storage for from 7 to 10 months, demonstrated that an extra quality of butter made from pasteurized sweet

cream does not deteriorate in any respect when properly packed and stored. This butter was packed in 5-lb. tins, lacquered both inside and out, and hermetically sealed. No preservative except common salt was used. It was the product of creameries located in California, Minnesota and Pennsylvania.

*Press Notice from
U. S. Department of Agriculture*

MORRIS-CHAIR COMFORT FOR MOTORCYCLISTS

A combination extra seat for motorcycles that may be used for carrying a passenger, or raised up to form a back



Extra Seat Which may be Used as Back Rest

for the regular seat, has been put on the market. The seat, which is readily attached to any standard motorcycle, provides an excellent back rest for the driver when raised to an upright position, and may also be utilized as a baggage carrier.

REVENUE-CUTTER SERVICE SAVES ITS COST

The U. S. Revenue-Cutter Service is seldom heard of outside of the important sea and lake ports, and the popular impression is that it is devoted principally to the prevention of smuggling. As a matter of fact the service of the revenue cutters and their crews covers a wide range of hazardous and exciting duties. In the last fiscal year the ships and men of the service saved 106 persons from drowning; assisted and cared for 275 sailors, and others, in distress because of wrecks or other mishaps at sea; rendered assistance to 260 vessels with 2,212 persons on board, and valued with their cargoes, at \$10,545,573; removed or de-

stroyed 45 derelicts floating at sea and menacing life, and recovered and delivered to their owners other abandoned ships valued at \$166,175. Judged by the returns in dollars and cents alone, the revenue-cutter service saved property valued at more than \$4 for every \$1 spent by the government in its maintenance.

FRENCH GOVERNMENT WILL HAVE 35 MORE DIRIGIBLES

The French government has authorized the purchase of 35 dirigible balloons, each having a capacity of about 700,000 cu. ft. of gas, for work in connection with the navy. Thirty-one are to be stationed at coast points, so as to command the western Mediterranean, Algeria and Tunis. One will be on the Atlantic coast and three within reach of the North Sea. These dirigibles will be much larger than any now under French control, and as large as all but one of the German military dirigibles.

PARCEL-POST BAG FOR MANY PURPOSES

The parcel-post bag here shown may be used for sending a variety of articles, including laundry, dressed chickens, and fruit, safely through the mails. The pouch is made of strong cotton cloth, with stout tie string and tough address tag securely attached to one end.



The sailing ship "Seal," built 103 years ago in Southampton, Eng., sailed recently from Biddeford, Eng., for Durban, South Africa, a distance of about 6,000 miles.

Fox Mfg. Co. 1032 Jackson St. Seabrook, Wash.

3500

Manufactured in U.S.A.

Motorcycling 2/6/13 Pg. 76

3735

The Engineer's Journal

LONG-LIVED MOTOR TRUCKS STILL IN SERVICE

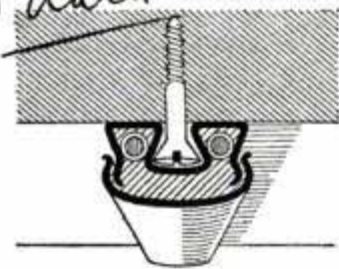
There is being used in Washington, D. C., a motor truck that, in three years, has attained a mileage of 147,728—an average of more than 47,500 miles per year, or about 130 miles per day. Three motor trucks in Wilkesbarre, Pa., have each run from 98,000 to 175,000 miles and are still in active service, while a Swedish motor truck, built in 1900, has covered more than 225,000 miles and, with no other repairs than an annual overhauling, is apparently in as good condition as when it was built.

Swiss

ORNAMENTAL METAL MOLDING FOR ELECTRIC WIRING

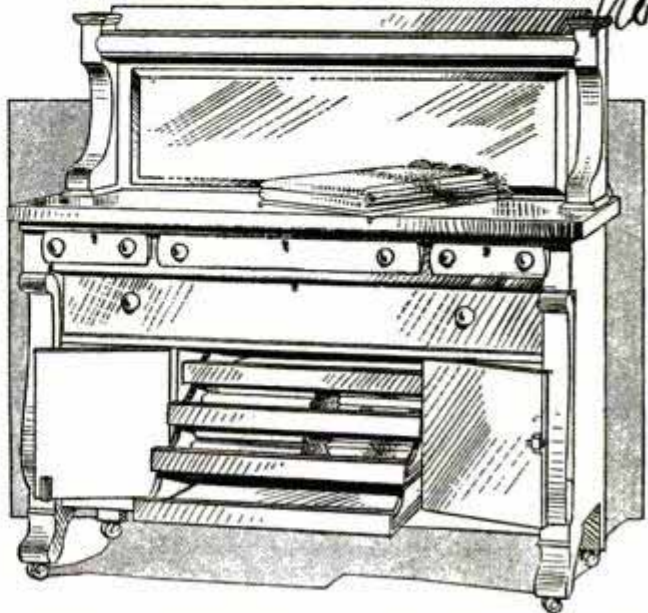
A practical and, in some of its forms, ornamental fixture for indoor electrical wiring, to take the place of tubing and other devices, has been brought out recently by a German firm. It is made in sections and consists of two parts, one adapted to be affixed to the wall and providing two compartments for wires; the other, a cover or cap, to be snapped on when the wires have been laid in.

The material used is sheet metal and the device can be had in various finishes to correspond with other electrical fixtures in a home, thus being serviceable also as a picture molding, without offense to the eye. To the electrician it should appeal by the ease with which it may be applied to or removed from the wall, as a glance at the accompanying sketch will show, and because the cover can be taken off to bare the wires for inspection or repair. Another advantage of this fixture is that the insulation of wires is safe from the damage which often results in drawing them through tubes. Over the wooden strips of somewhat similar pattern, it has the advantage of being fireproof.



SIDEBOARD WITH SLIDING RACKS FOR SILVER

Instead of the stationary shelves usually found in the lower part, the central portion of this sideboard is

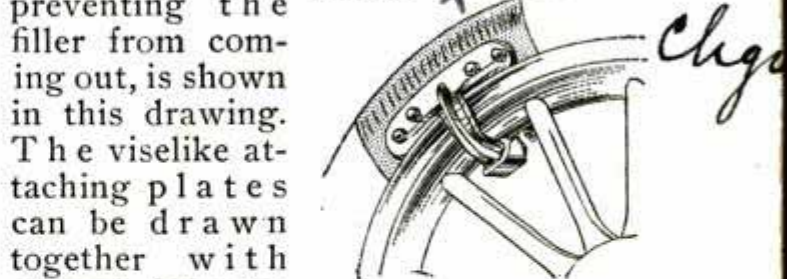


Ingenious Small-Drawer Arrangement for Sideboards

provided with four sliding racks, particularly designed for such silver as platters, serving dishes, plates, and the like.

"FILLER" BOOT FOR AUTO

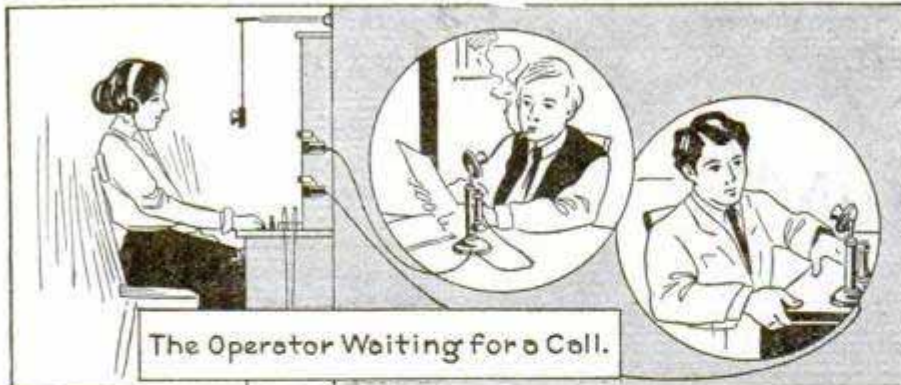
3488 **TIRES**
Martin Blow-out Protector Co
A boot especially adapted for filled tires, fitting snugly and firmly over large cuts and preventing the filler from coming out, is shown in this drawing. The viselike attaching plates can be drawn together with great force by means of a clamp, thus eliminating the necessity of deflating the tire while applying the boot.



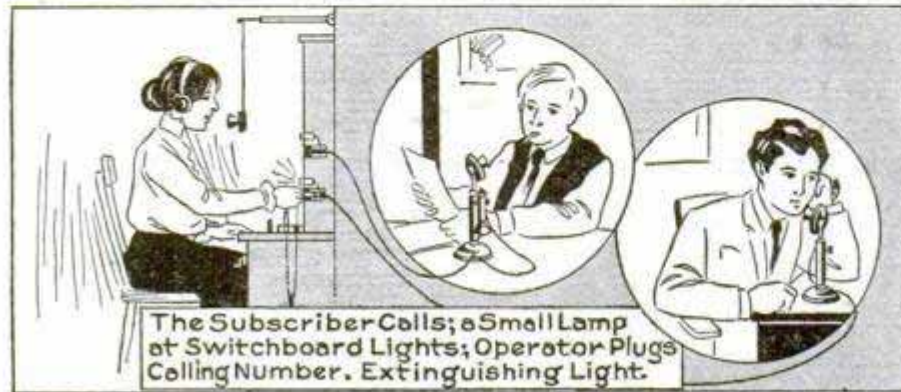
CA movement is on foot to use the Panama Canal construction equipment for the digging of a 1,000-mile irrigation ditch through western Nebraska and Kansas.

Arbon. & Ditzler Land

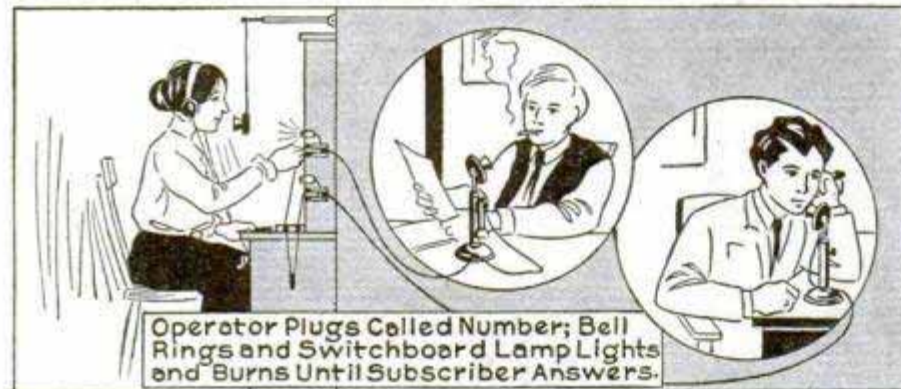
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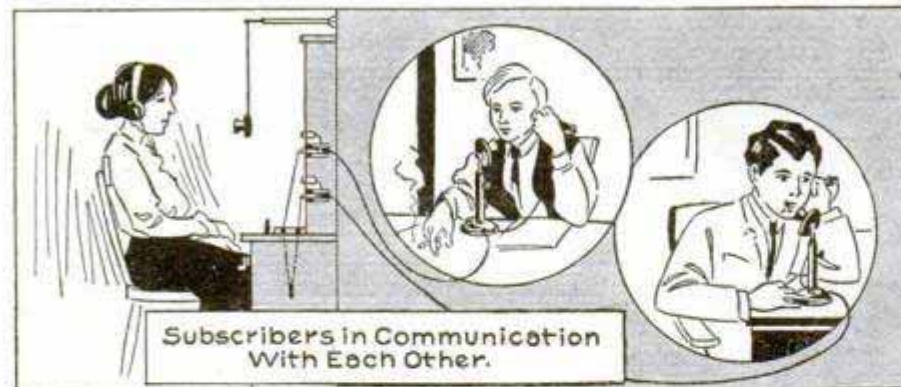
The Operator Waiting for a Call.



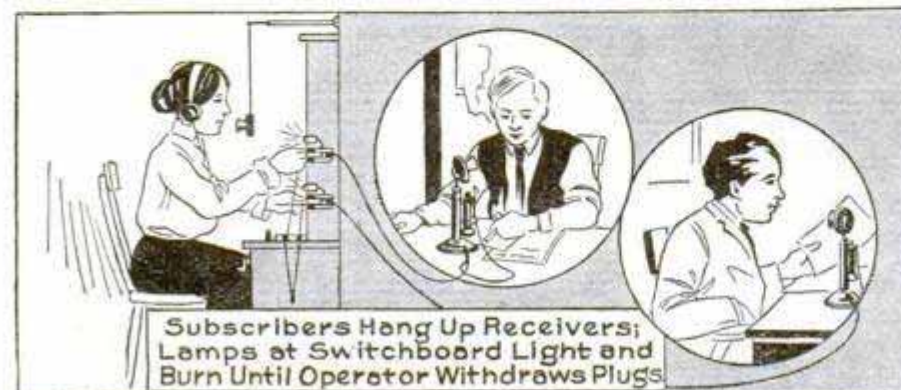
The Subscriber Calls; a Small Lamp at Switchboard Lights; Operator Plugs Calling Number. Extinguishing Light.



Operator Plugs Called Number; Bell Rings and Switchboard Lamp Lights and Burns Until Subscriber Answers.



Subscribers in Communication With Each Other.



Subscribers Hang Up Receivers; Lamps at Switchboard Light and Burn Until Operator Withdraws Plugs.

WHAT HAPPENS WHEN YOU CALL "CENTRAL"

Just what occurs in the telephone company's establishment when one calls for and obtains a telephone connection is to most of us a mystery which the illustrations on this and the opposite page go far to clear up. Incidentally, a study of the complicated process of "getting a number" may serve to make one less impatient at delay or occasional mistakes on the operator's part.

The illustrations on this page show what occurs when the call is for a subscriber whose phone is connected with the same exchange as that of the "party" calling. On the opposite page are shown the operations necessary to establish communication between subscribers connected with different exchanges.



¶The hairlike tips of the heads of grain, often called "beard," and like formations on plants and trees, act as outlets for the earth's electricity, causing them to be always surrounded by a static charge, according to a Finnish scientist. This, he claims, has a beneficial influence on the growth of the plant, and explains why there are large quantities of ozone in pine forests.








Subscriber Lifts Receiver and Line Lamp Lights.

Operator Answers and Light Goes Out.





Subscriber Calls for Number On Another Switchboard; First Operator Calls Her Co-Worker at the other Board by Pushing Proper Button and Repeats Number Called by Subscriber

Second Operator, Finding Called Number Not Busy, Connects Trunk Line With Called Number, Ringing Second Subscriber's Bell, and Gives Number of Trunk Line Used to First Operator, Who Connects Her Subscriber



Subscribers in Communication With Each Other and Operators Ready for Another Call.








Subscribers Hang Up Their Receivers; Two Lamps on Switchboard of First Operator Light and She Removes Plugs, Thus Breaking the Circuit.








Breaking Connection by First Operator Causes Lamp of Connecting Trunk on Second Board to Light and Second Operator Removes Plug from Trunk Line Used, Thus Clearing Letter for Next Call



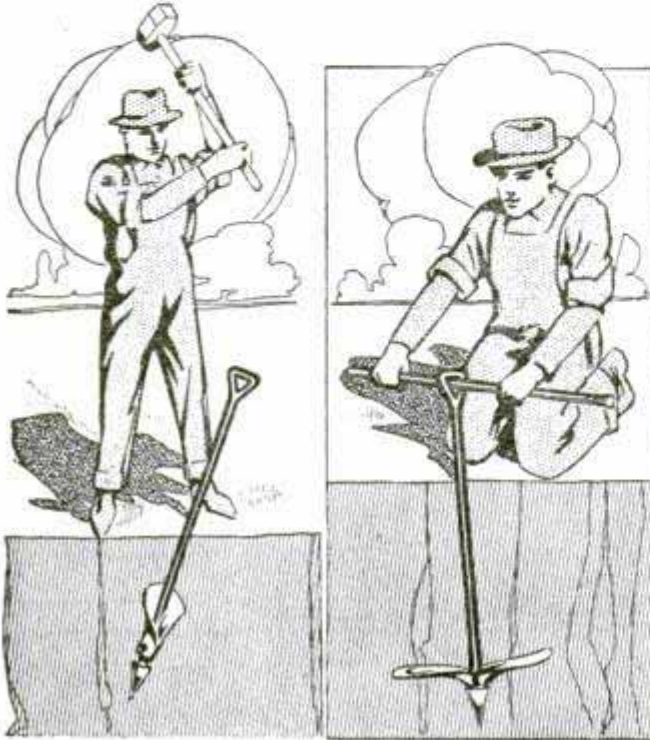
13
Trunk Line and Operators Again Ready for Another Call.

of Railroad are La Crosse Ill

POLE ANCHOR THAT CAN BE DRIVEN INTO POSITION

An anchor for telephone poles that can be driven into the ground without digging a hole, and which requires



No Digging Required to Install This Anchor

about one minute of one man's time for installation, has been placed on the market. The top of the anchor bar is provided with a hole in which an iron bar is placed for turning the anchor until its two jaws are forced apart like the blades of a ship propeller after the device has been driven to the required depth.

ELECTRIC-LAMP FILAMENTS

BROKEN IN QUEER WAY

That the filaments in electric-light bulbs may be broken by dusting the bulbs with a feather duster has been discovered by a series of tests conducted for the purpose of determining the cause of the short life of incandescent lamps furnished to an eastern school. The reason for the breakage was ascertained by putting a number of new lamps in circuit and after brushing them with a feather duster, turning on the current, when several of the filaments immediately broke.

In another set of lamps wiped with a cloth, instead of the duster, there was no breakage, indicating that the trouble was due to the action of static electricity produced by the feathers rubbing on the glass bulbs.

IRRIGATION AND RAILROAD

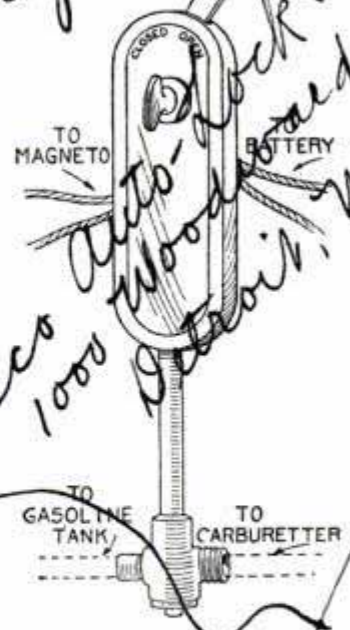
FOR SAHARA DESERT

The government of West French Africa is planning the irrigation of a large part of the Desert of Sahara and the construction of a railroad across the desert to connect with the South African railroad system. It has been found that the river Niger can be diverted and regulated to supply water to a very large desert area, and that the project will be much easier to carry out than the irrigation of Upper Egypt now being undertaken under British direction. The upper Senegal River can also be used for irrigating purposes and a rich agricultural territory created out of what is now a desert waste.

LOCKING UP THE SPARK

622 AND GASOLINE

Among the numerous devices for thief-proofing automobiles is a locking arrangement which shuts off the gasoline when the key is turned in a Yale lock, and also disconnects the battery and the magneto, so that neither fuel nor spark can be supplied to the motor.



The hawklike turtle of West Indian waters supplies the tortoise shell of commerce and these shells are worth from \$5 to \$25 per pound, according to thickness and markings.

3446

3733

The Engineer
1913
201

Motor World
Capital
Auto-Lock Sales Co.
1000 Detroit, Mich.

3718

Hawks

New York

**ARMOR-PROTECTED HOSE
ELIMINATES KINKING**

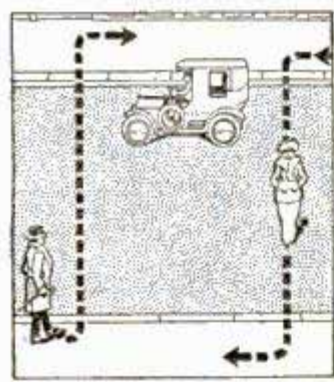
3742

A type of flexible hose, designed to overcome the common tendency to kink, has been developed by a New York firm. It consists of a rubber hose protected by metal armor in the form of a spiral ribbon. The latter restricts the curvature, and sharp bends are eliminated. The edges of the metal interlock to assist in the protection of the rubber. This type of hose is furnished in any outside diameter up to 12 inches.

**STREET REGULATIONS FOR
BERLIN PEDESTRIANS**

chgo

In the Schöneberg and Charlottenburg residential districts of Berlin



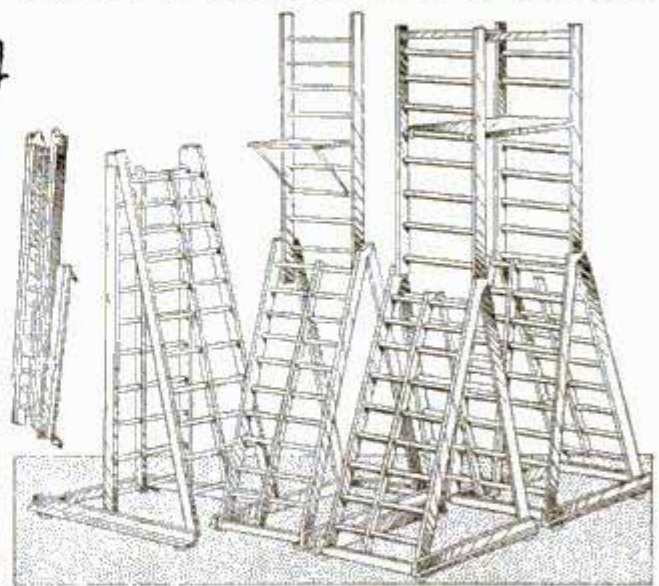
pedestrians now have to heed police regulations in going across streets. It has not been felt necessary to compel crossing only at corners, as is being advocated in some American cities, but diagonal crossing is absolutely prohibited. Pedestrians must, on leaving one curb, go directly across.

**A FOLDING SCAFFOLD FOR
SMALL SPACES**

*Mr. Heathman
Paris's Green
Fulham,
England*

An improved type of folding scaffold or ladder for use in places where every inch of storage space is an important consideration, and which, when needed, may easily be carried to the position where it is desired to set it up for use, has been designed by an Englishman. The scaffold or trestlework is mounted upon a square framework, each corner of which is provided with a suitable caster, so that the device may readily be moved over the floor. The scaffold is quickly set up and attached to the carriage by setscrews, and the sliding

section is easily raised to the height required to reach the work to be done.

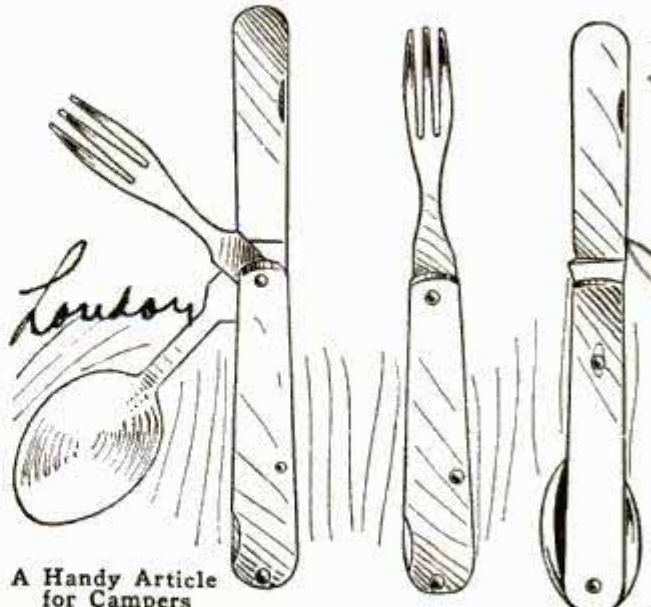


A Handy Folding Scaffold for the Home

It is possible to use the trestle singly, as shown, or in pairs connected with scaffold boards and partition rails.

**A COMBINATION KNIFE FOR
CAMPERS**

The combination of useful articles for campers here shown comprises a knife, fork and spoon constructed on the principle of a pocketknife, each half of which may be used separately and at the same time as the other. The handy device is made of nickel-



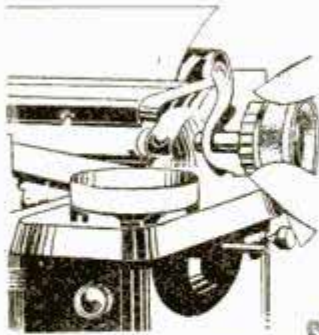
A Handy Article for Campers

plated metal, except the knife blade, which is of steel, and the article when folded measures only 3 3/4 by 3/4 inches.

*Abraham
Brooker
Sheffield*

HANDY LITTLE THINGS FOR EVERYDAY USE

This type of soft rubber ring, which



Rubber Thumb Ring for Typewriter Rollers

has been designed for placing upon the hard-rubber rings attached to each end of the typewriter roller. It prevents the operator from having sore thumbs and increases her efficiency by giving increased leverage on the roller.

This baby scale is for the mother who wants to know exactly how much her baby is gaining in weight. The



Baby Scale for the Attentive Mother

scale weighs up to 24 lb., by ounces, is easily operated and is finished in white enamel. The willow basket is securely fastened to the platform.

An ornamental bottle stopper recently invented is provided at the top with a



A Wine-Bottle Stopper that Prevents Spilling

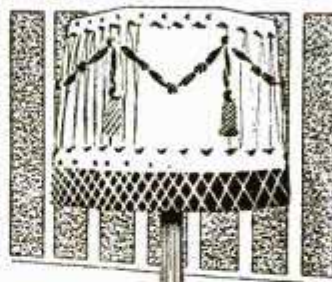
cup-shaped rim designed to take up the last drops from the bottle's mouth when the liquid is poured, and thus prevent dripping or trickling down the side of the bottle.

A bread toaster recently placed on the market is circular in shape, has a perforated metal



A Bread Toaster for Use over Hot Flames

bottom, and the top is made of woven



Portable Lamp that Throws an Indirect Light

wire. The toaster is designed especially for use over gas, gasoline and coal-oil burners without contact with the flame.

An electric portable lamp that can be used either for indirect illumination or for direct

lighting has recently been invented. The shade is made either of silk or art glass and gives a soft illumination to the entire room.



An Outdoor Sleeping Bed for the Baby

An outdoor sleeping bed for



A Portable Bathtub for Various Occasions

infants that is fly-proof, cat-proof, and easy to roll in and out of the door, is being manufactured. The sides, one end, and top are covered with fine wire screen and the crib may

be used as a regular bed at night.

A portable bathtub recently designed for small summer homes, country houses without plumbing, and various other purposes, is made like the regular tub, has four rubber-tired wheels and a handle



Steel Clothes Posts That can be Removed

A. T. Knowlson Co.

(Milwaukee Steel Post Milwaukee)

219 So. Arbor, Chgo
Am. Cutlery Co. 108 Chambers St. N.Y.
L. Wolff mfg. Co. Chgo
3. Re-naut 43 Bond St. Braintree

Sheboygan Cigar Box & Sign Mfg. Co. Sheboygan, Wis.

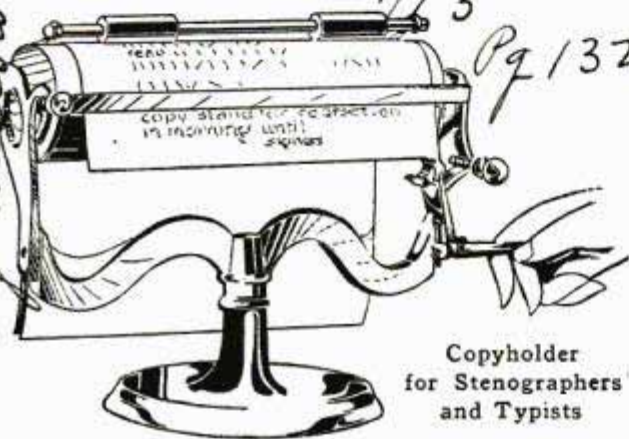
In case 126 West 24th St. New York City 855

spring to support the felloe and give resiliency to the wheel. The steel tire, which is shrunk over the rim or felloe of the wheel, is expected to solve the problem of making wheels for trucks so well that they will survive the evils of service without using rubber for tires.

3576

USEFUL COPYHOLDER FOR TYPISTS.

A new copyholder for typists and stenographers is so constructed that, by simply pressing a small lever at the right, the copy is moved forward as desired. It works equally well with



Copyholder for Stenographers and Typists

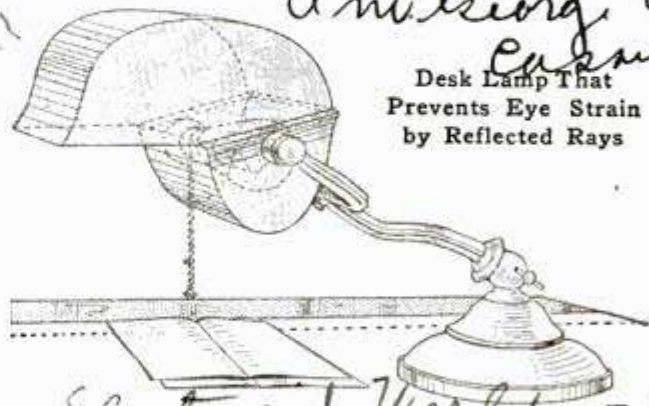
single sheets of manuscript as with a stenographer's notebook. The device has a broad, solid base to prevent the holder from being easily overturned.

THOUSAND-FOOT SHIP LOCK BEING BUILT IN WALES.

A huge lock, to be one of the largest in the world, is being built to admit ships to the Alexandra Docks, Newport, Wales. The extreme range of the tides on the Welsh coast makes a lock necessary, the water level changing daily as much as 34 ft. at certain seasons. The lock is 1,000 ft. long and 100 ft. wide, with a depth of water at the outer sill of 11 ft. at the lowest tide and 45 ft. at the highest. Pumps with a capacity of 10,000,000 gal. an hour will be used to fill the lock. While narrower by 10 ft. than the Panama Canal locks, the length is the same and the depth greater.

READING LAMP THAT GIVES DIFFUSED LIGHT

An entirely new type of reading lamp, the reflector of which throws a diffused light instead of a glare, has



Desk Lamp That Prevents Eye Strain by Reflected Rays

been invented. The electric bulb in this lamp is so arranged within the reflector that the rays from both the reflector and the bulb are thrown upward against another reflector which throws the light outward and downward with a pronounced intensity, thus making it possible to read printing or writing without straining the eyes, or subjecting them to the direct rays of the bulb.

COMBINED ASH TRAY AND FLOWER VASE

A not inartistic combination in Sevres porcelain is here shown. In the neck of the vase is placed a glass receptacle for flowers, while the concave upper portion of the base is provided with three perforations through which tobacco ashes and burnt matches may be dropped.



The total exports from the Philippines for the 10 months ending July, 1912, showed an increase in value of \$11,000,000 over the same period in 1911.

Sold by Grands Magasins de Nouveautés

Weber-Knapp Co. Jamestown, N.Y.

3728

Pg 132

1128

Amberg & Casady

Electrical World - Dec 28

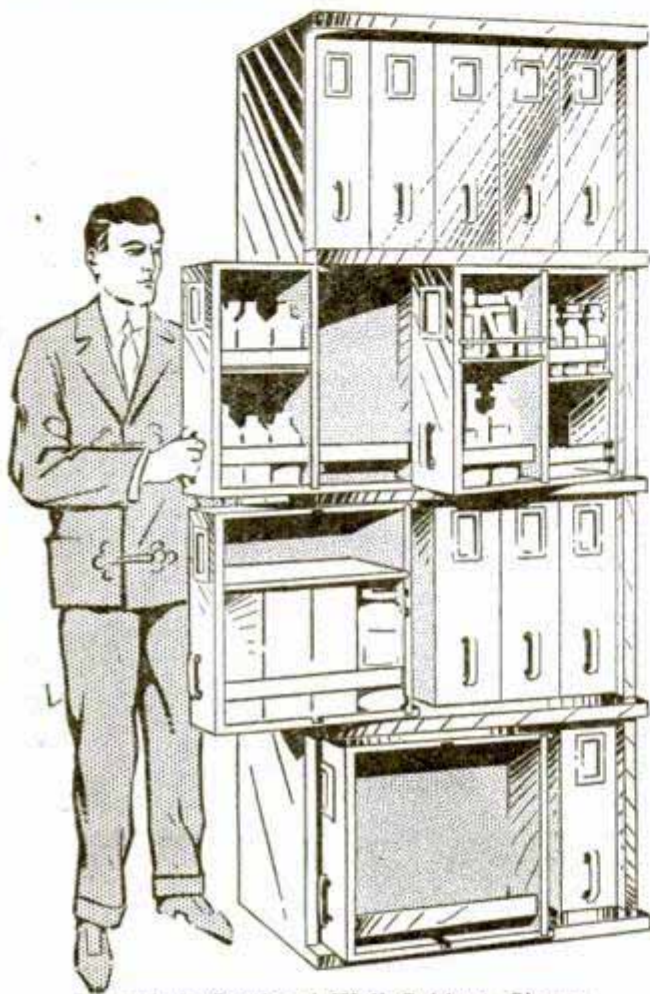
Illustrations 12/28/12

Canal
The Steamship
March 1913

Leith Scotland

SECTIONAL CABINET FOR DRUG STORES

This type of sectional wall cabinet for drug stores is designed especially to accommodate such stock as is ordi-



Druggist's Sectional Wall Cabinet, Shown Partly Open

narily carried on the prescription case. The illustration shows the cabinet with the upper part closed, and with several of the sections pulled out for use.

The top row of drawers is designed to carry tablets or pills in bottles of 100, 500, and 1,000, arranged alphabetically. In the second row from the top, in the left-hand drawer, is shown fluid extracts in quarter pounds and pounds; the right-hand drawer accommodates powdered extracts and small chemicals, the third row from the top contains patent medicines, and the bottom section accommodates quart bottles.

Germany is to attempt to control the public clocks in the whole empire by wireless.

AUTOMOBILE FIRE BRIGADES OF EUROPE

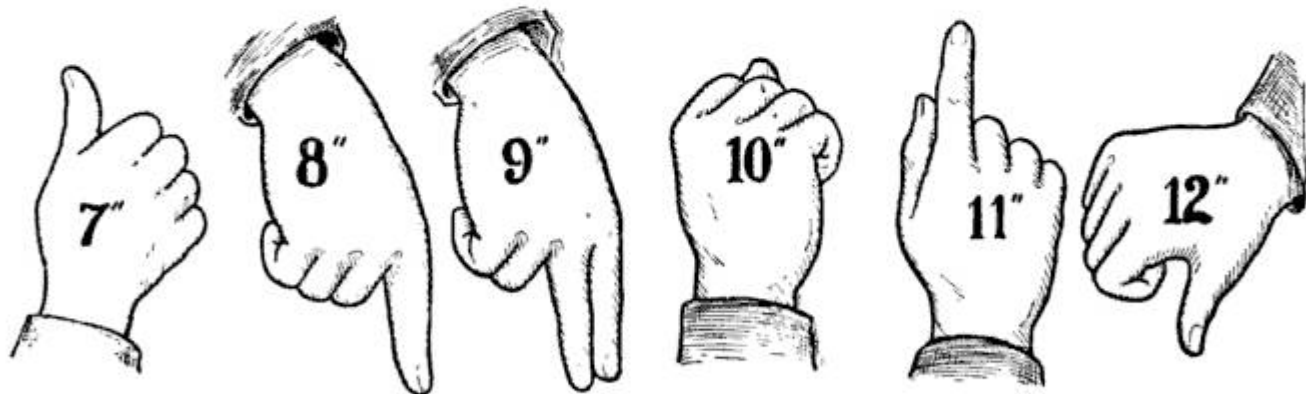
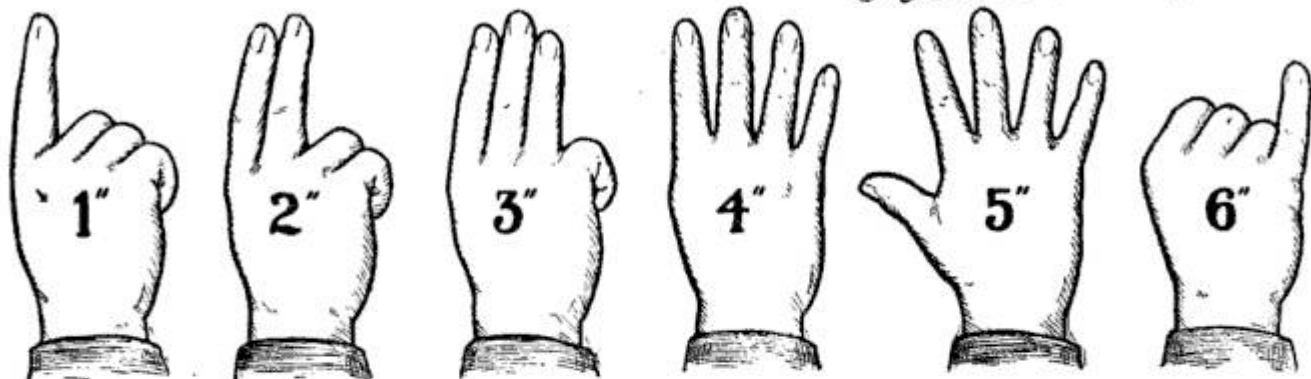
Automobile fire engines and other motor-driven apparatus are now used by the fire departments of all the large cities of Great Britain, France, Belgium, and Holland. The automobiles carry the pumps necessary to throw the water and also supply motive power for propelling the machine. Eight men usually compose one city fire company and snap couplings, instead of the screw-on type, are used to connect the hose. The companies also use the portable fire escape, a device built on the order of an extension ladder, that can be raised to a height of 90 ft. One of the most effective of the apparatus used is an air-pump automobile with many air tubes which connect with smoke helmets that permit the firemen to enter smoke-laden buildings without danger of being overcome. Sometimes the members of an entire company will don these helmets and go into a burning structure when it would be impossible to do so without ample protection against the smoke and means for securing fresh air for the purpose of breathing. Although the fire-fighting equipment used abroad is somewhat inferior to that employed in the United States, the difference is more than made up in the matter of fire protection, the buildings abroad being almost fire-proof in every instance. Cement, steel-frame and fireproof construction is the rule; wooden buildings are extremely scarce; the roofs are usually proof against fire, and wooden shingles are practically unknown.

BALLOON AS ARMORIAL DESIGN

The little town of Leichlinger, near Elberfeld, Germany, has adopted a real up-to-date heraldic device in the form of a silver balloon on a blue field, the balloon being of the type built in that town by the aeronaut Erbsloh, and in which he made a fatal flight. Up to the present time Leichlinger has been without either arms or seal.

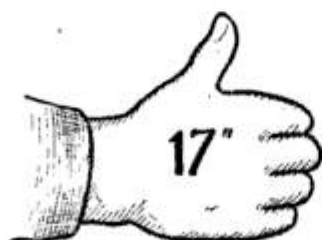
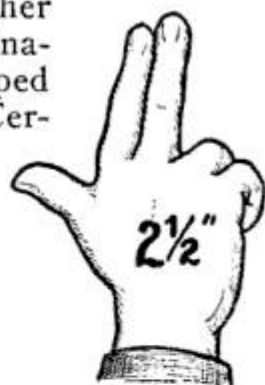
Berliner Tageblatt

Indianapolis Drug Cabinet Co., Indianapolis, Ind.



THE SIGN LANGUAGE OF THE WESTERN SAWMILLS

A signal system similar to the deaf-mute alphabet has been developed by the workers in the great saw-mills of the state of Washington, because the noise of the machinery is such that no human voice can penetrate it, according to the West Coast Lumberman. The system is especially devised to indicate the various thicknesses of board or plank to which the logs are to be sawed. Where dimensions other than thicknesses are concerned, various combinations are used and different mills have developed individual combinations for such purposes. Certain combinations are used to make signs representing both figures and fractions; that is, for instance, the sign for $3\frac{1}{4}$ is made in two movements, the three first fingers of the right hand being first raised, indicating 3, and then folded, whereupon the little finger of the same hand is raised to represent $\frac{1}{4}$. The signs here shown are generally used



and are thoroughly understood by the workmen, and the signs up to and including 12 are given with the hand stationary. From 12 to 19 they are made by placing the hand in a horizontal position and drawing it across the body from left to right.

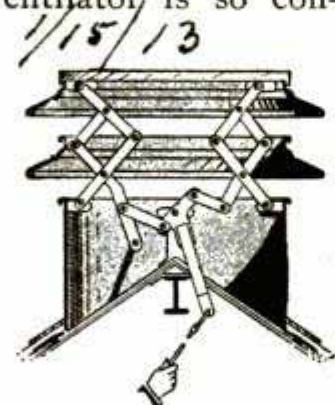
GOGGLES FOR SEEING BEHIND

These goggles are fitted on one side with a small mirror for enabling the wearer to see what is going on in the rear without turning his head, and do not interfere with a clear view of the road in front. The goggles are made in various sizes and have been designed especially for automobile drivers, motorcyclists and others who find it desirable to know what vehicles may be approaching from the rear.



IMPROVED VENTILATOR FOR ROOFS

A simple device, recently patented in Germany, for raising or lowering the caps of a roof ventilator is so constructed that the operation is accomplished by a series of metal strips connected to the ventilator top and its glass cap in such a manner that the ventilator may be opened by simply pulling a chain attached to the lower end of one of the strips, which operate on the lazy-tong principle.



NEW LAW REGULATES HOURS OF DUTY ON BOARD SHIP

The Nautical Gazette
A new law, regulating the manning of steam vessels subject to the inspection laws of the United States, went into effect on *3/12/1913*. The legislation provides that no licensed officer shall be required to remain on duty for more than 12 hours in any 24 while a vessel is at sea, except in case of emergency. No officer can be compelled to do duty for more than nine hours a day while a boat is in port.

COMBINED LAMP GUARD AND VAPOR SHIELD

This vapor-proof, water-tight portable lamp guard is particularly designed for use in gas plants, *McNeil's Brewery*, breweries and other places, where short-circuiting might cause an explosion of gases. The glass globe screws over the lighting unit, and this is in turn protected by a wire guard.



SEPARATING CARBON FROM COAL

3230 TAR
A method of separating from coal tar the finely divided carbon which it holds in suspension has been developed by a Swedish chemist. The coal so recovered has valuable physical properties. The most valuable use found for it is as a material for crucibles, for which it is claimed to be superior to graphite. It also makes excellent electrodes. After the removal of the coal, the tar is golden brown and transparent.
J. Aheson Stockholm Sweden
What is said to be the strongest wood in the world is being imported from Australia. It is known as "Yate" timber and is used in automobile construction.

Goggles "Microscope Co." 1001 N. Willow Ave. Chicago - Ill.
Berlin - Tageblatt
L. A. Jahn Erfurt - Eisenach - Erfurt Germany

Pract

3/12/1913

Pg 11

3250

3230

115/13

Jan 1913

Sweden

Engineer 603 Northern
Bank Bldg Seattle Wash
719 CURIOUS EFFECTS OF SUGAR
IN PORTLAND CEMENT

Engineering News
Vol 67 No 10
Page 478

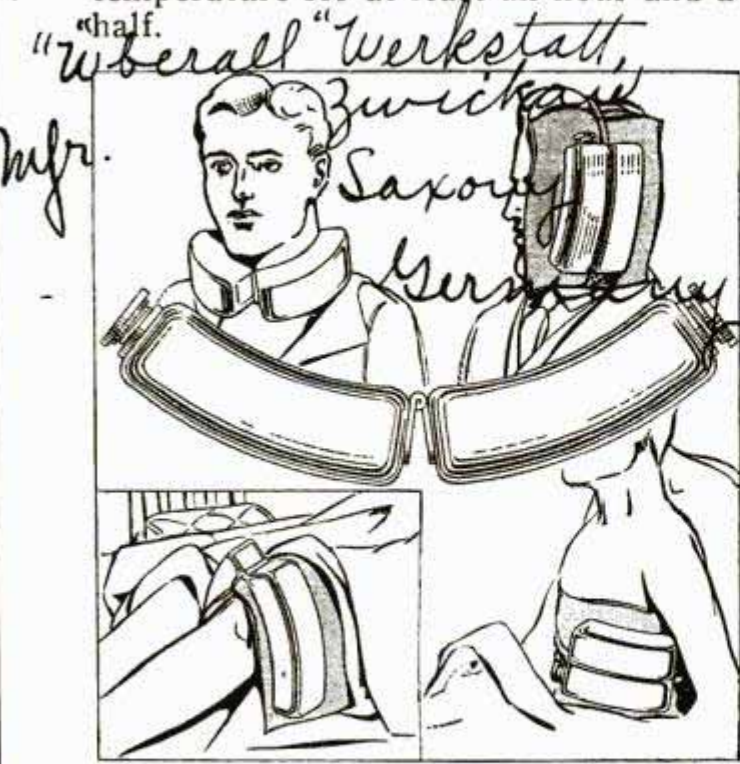
That sugar in quantities as small as one-quarter of one per cent of the weight of the cement will completely prevent the cement from setting, and that one or two per cent of sugar will make the cement set quickly, but will later cause it to disintegrate or break up, has been established by a series of tests conducted by a chemical engineer, who also claims that the action is more pronounced with some cements than with others.

Further experiments have failed to determine accurately the cause of the pronounced action of a small quantity of sugar upon a large quantity of cement.

INGENIOUS WATER-BOTTLE BANDAGE

Reklam's Universum
A water-bottle bandage, consisting of two metal sections so hinged together

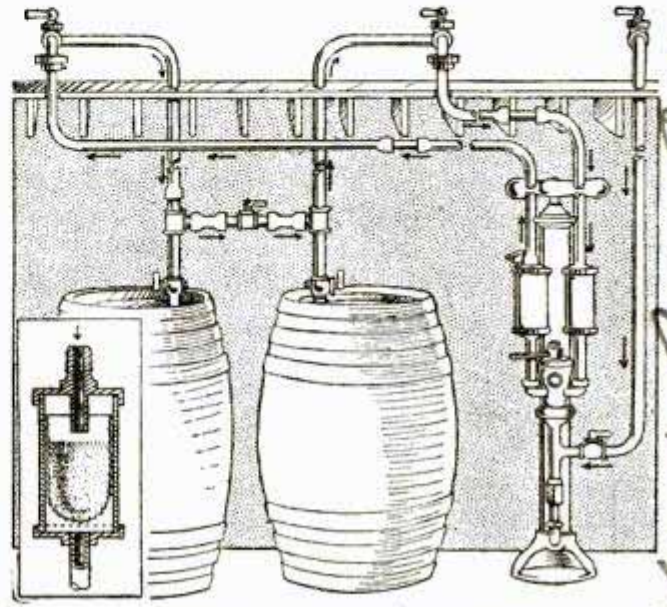
that they can be applied to circle the throat, leg or arm; or, folded together, be placed upon the side of the face or any other portion of the body, is being marketed in Germany. Hot or cold water so applied will keep an effective temperature for at least an hour and a half.



Hot-Water Bottle That Fits the Curves of the Body

Latting
No. # 712, 642
SAND-BLAST CLEANER FOR
3398 SMALL TUBES

A new patented cleaner for pipes used for transmitting liquids employs crushed quartz in such manner that the



Sand-Blast Cleaner for Small Pipes

interior surface of the pipes are cleaned as the inside of a bottle is cleansed by dropping small shot into the bottle and shaking it vigorously. The apparatus is attached to soda-water or similar pipes and the sand, which is contained in a screenlike cup, is forced by compressed air rapidly through the pipe by water drawn from the supply faucet and lodges in another screenlike retainer, after having traversed the entire circuit of pipe. By turning a lever the sand may then be forced back through the pipe to the first retainer and this operation may be repeated until the pipe is clean.

Inventor C. Laidler
Walter 71264

ARTIFICIAL MEAT MADE FROM
3350 MALT GRAINS

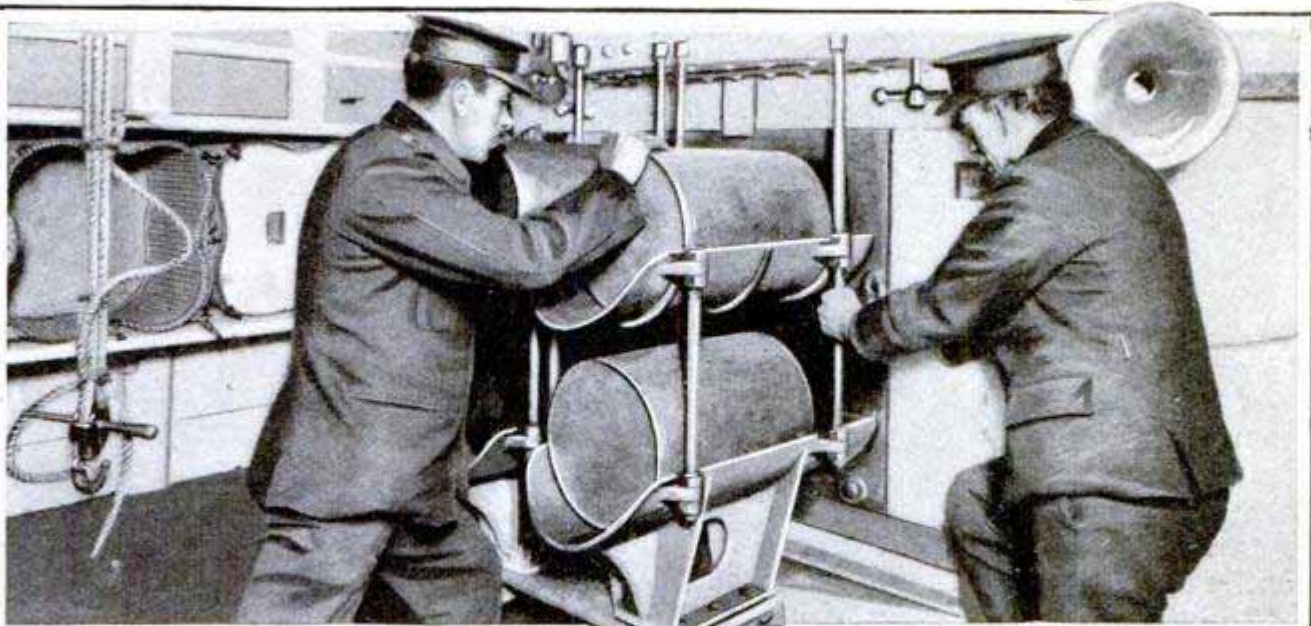
Artificial meat that closely resembles butcher's meat in taste, but has greater food value, is claimed to have been produced by a Belgian chemist. The artificial meat is made from malt grains which are washed, pressed and treated with sulphuric acid and lime. The mass is then filtered and dried until it has the appearance of a paste, and has the flavor of real flesh.

Small Blast Pipe Cleaning
312 Madison St.
Chicago

Clipping from
paper (2)

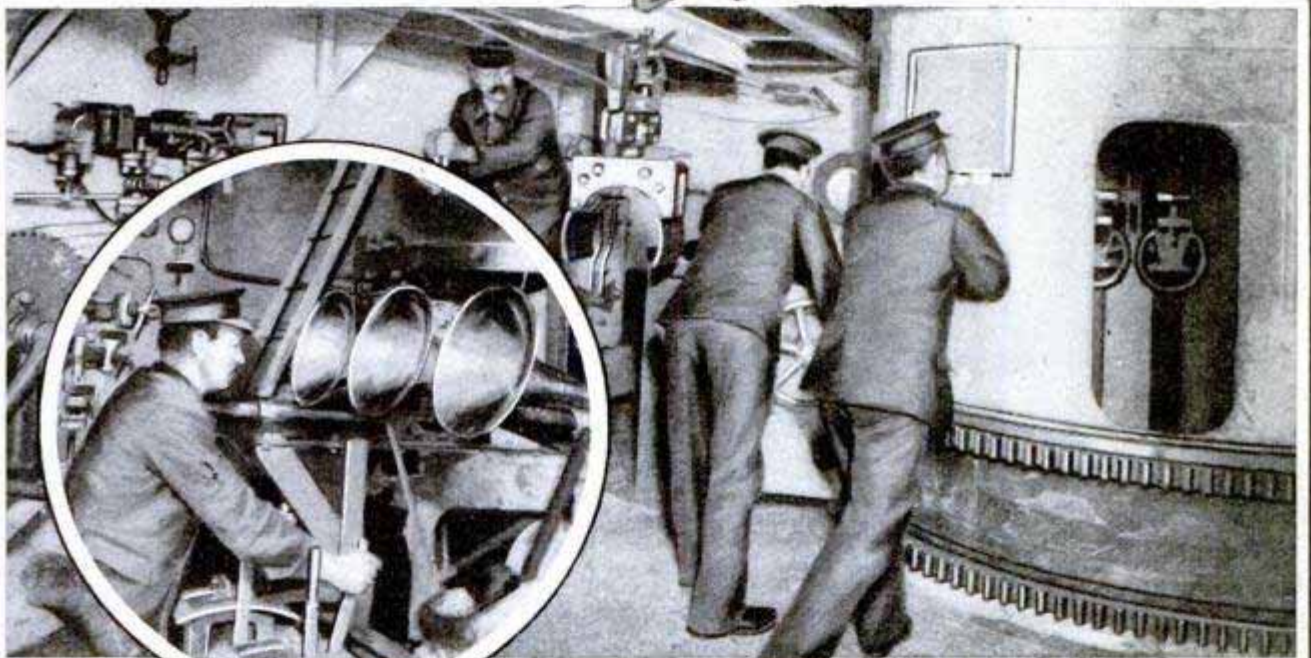
ON THE "NEW ZEALAND," BRITAIN'S NEWEST CRUISER

rough



In Powder Magazine: Ammunition Conveyor

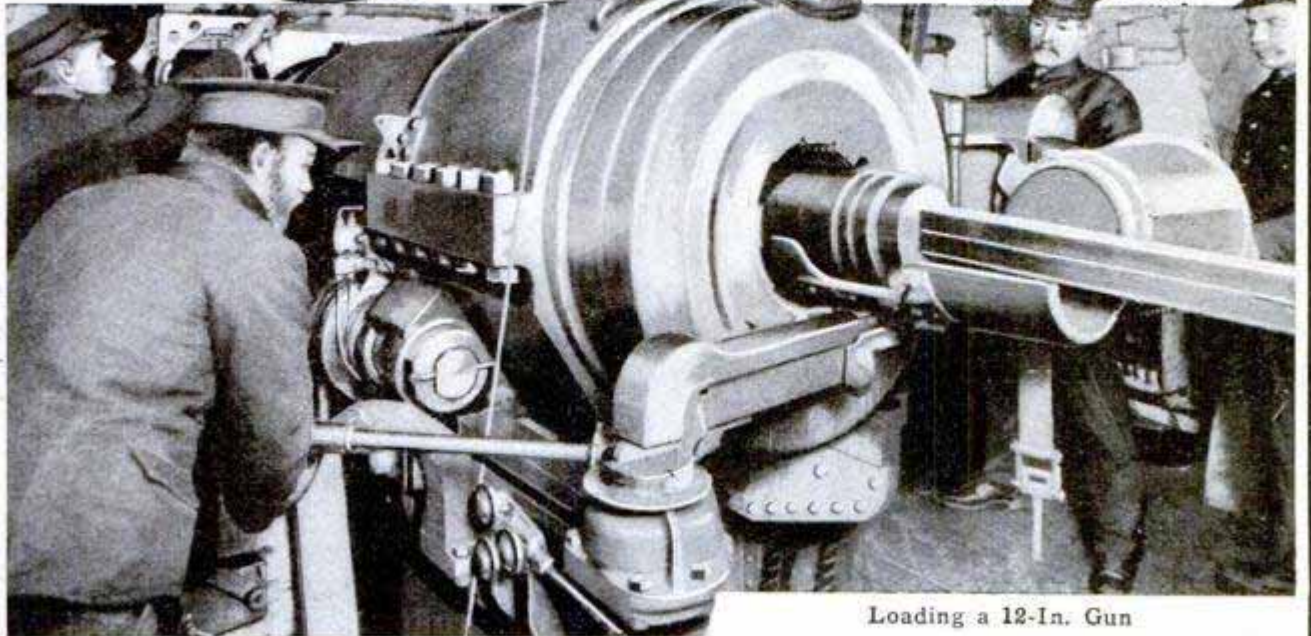
Hoisting Cordite for 12-In. Gun



Directing

Loading of Gun

Shell Chamber and Ammunition Hoist



Loading a 12-In. Gun

A HOLE TO THE CENTER OF THE EARTH

By J. E. MURPHY

Associate Member, American Society of Civil Engineers

Popular Mechanics

MANY of the dreams of modern science have come true, and the world has become accustomed to marvels in the way of scientific accomplishment. But the most daring dream of all—sinking a shaft to the center of the earth—contemplates a thing so stupendous as to make all past achievements seem insignificant. This has been proposed in a vague way several times in the last half century; but Camille Flammarion, the French scientist and author, has recently outlined a specific plan for setting the standing armies of Europe at work digging such a shaft, the purpose being “to tap the inexhaustible sources of heat and power” stored beneath the surface of the earth. In the present state of engineering science an attempt to harness these Herculean forces would result in the immediate destruction of the apparatus used. But no man can say what advances will be made in that science in a single generation, or what agencies may be discovered for neutralizing the effect of the high temperatures which are believed to exist in the core of the earth. In fact, it is more than possible that within two hundred years, or even half that time, a trip to the center of the earth may be simply a matter of time cards and train rules, with no more danger than now exists in surface transportation.

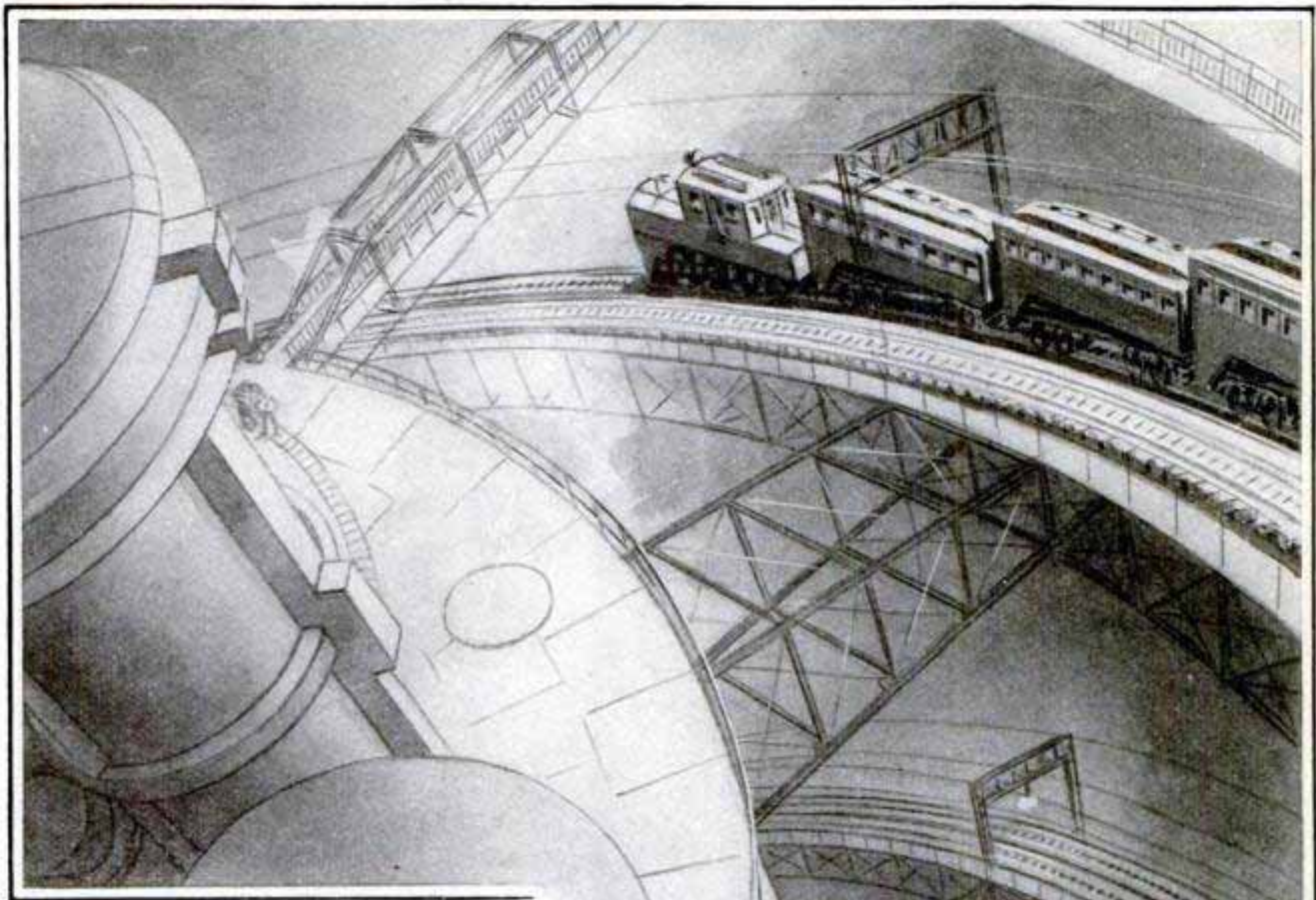
Engineering science is capable of digging such a shaft, if provided with means for neutralizing or controlling the internal heat of the earth. The old theory that the center of the earth is a mass of molten rock has long been discarded, and scientists are now convinced that the earth has a solid core that is more rigid than the hardest steel. Volcanoes are fed, not from a molten center, but from local and isolated lakes of subterranean fire located probably within a few hundred miles of the surface. From the study of earthquakes and volcanoes the outlines of these subterranean lakes are

known with a fair degree of accuracy, and it would not be difficult so to locate the shaft as to avoid all trouble from this source.

But in sinking such a shaft the engineer would encounter forces as formidable and implacable as the Earth spirits of the old Northern mythology, while a trip to the center of the earth would carry with it so much of strange experience as to seem like a trip to fairyland.

Before beginning such an undertaking let us consider what it would mean in an engineering way. The shaft could be sunk to a depth of two miles by ordinary methods and the materials could be hoisted to the surface by cable as in deep mining. This is, however, deeper than the deepest existing mines. But at this point a radical change would be made in the mode of transportation. Cables of the best steel break under their own weight at a length of less than four miles. On the other hand, no system of forcing the load upward from the bottom could be employed, since a depth would soon be reached at which a steel structure reaching to the surface would buckle and collapse.

It would be possible to use elevators running down the side of the shaft, if operated by a series of independent cables, each cable taking the car through a stretch of two miles. These cables could be operated locally by electric motors supplied with power from central stations. But a little consideration shows this plan to be impracticable for reaching any great depth. The highest speed at which elevators are operated at the present time is 700 ft. per minute, which is equivalent to practically eight miles per hour. With a stop to make every two miles and with the unavoidable delays connected with changing from one cable to the next, this speed would be greatly reduced, and it is not likely that an average speed of more than two

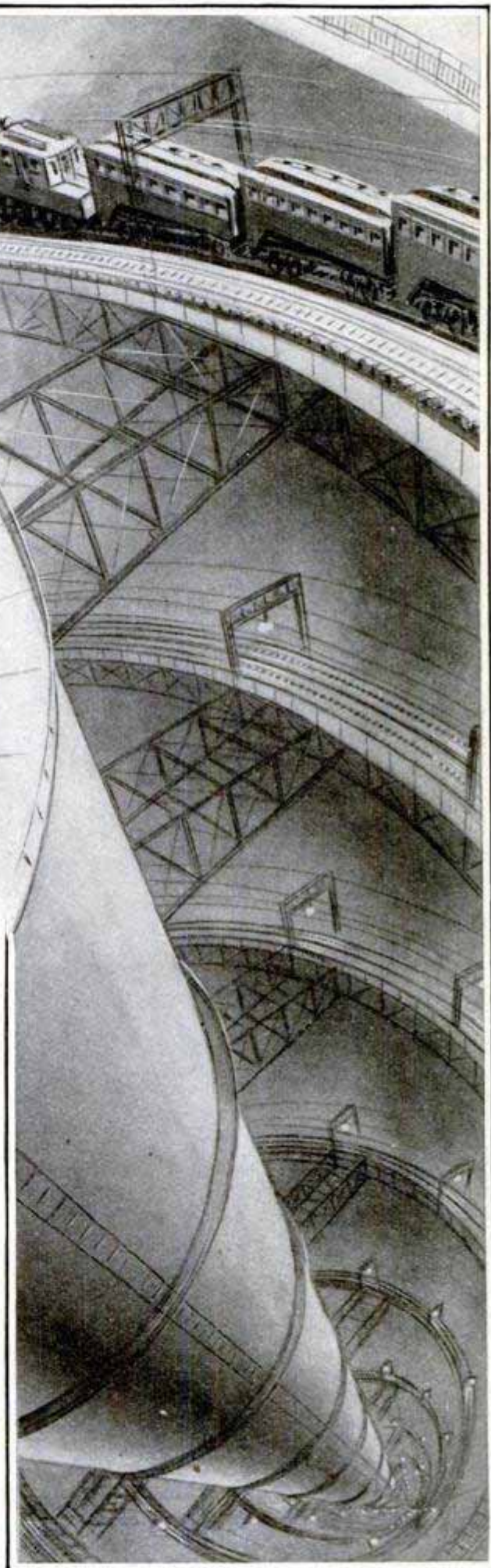


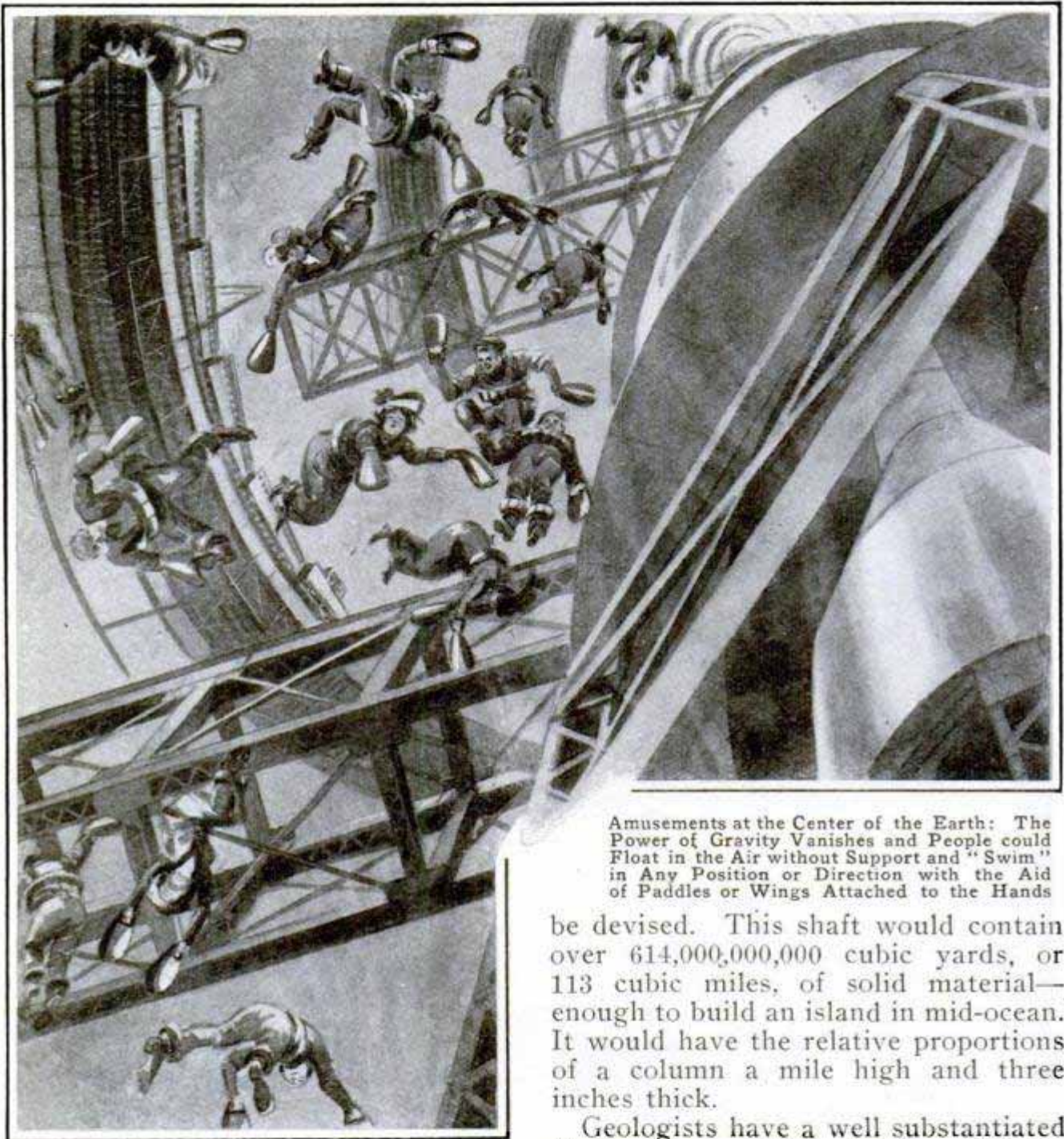
Looking Down to the Center of the Earth:
How a 1,000-Ft. Hole with Ventilating
Shaft and Spiral Railway would Appear

or three miles per hour could be maintained. Added to this would be the annoyance of the continual stops. It would be about the same as making a trip across the continent on a street car that stopped at every street and highway crossing.

Only one means of transportation would seem to be practicable—a spiral railway running downward on a sharp grade around the edge of the shaft, supported on cantilevers firmly anchored in the solid rock of the canyon-like walls. For safe and rapid operation two tracks would be required, one for down-bound and the other for up-bound traffic; while the curve of the track could not safely have a radius of less than 500 ft. This would make necessary a shaft 1,000 ft. in diameter.

Ventilation would also present a serious problem, since it would be necessary to force air from the surface downward for a distance of nearly 4,000 miles. Only one method seems practicable—an enormous air conduit extending down the middle of the shaft. The





Amusements at the Center of the Earth: The Power of Gravity Vanishes and People could Float in the Air without Support and "Swim" in Any Position or Direction with the Aid of Paddles or Wings Attached to the Hands

air would be forced to the bottom in this conduit and would return in the area between the conduit and the walls of the shaft. A conduit at least 500 ft. in diameter would be required. Here again the question of support would be of the utmost importance. No means would be available but to suspend the conduit at comparatively short intervals on gigantic intersecting trusses spanning the thousand-foot space from wall to wall. Some such construction as this would be required unless a practical means of supplying and safely conveying liquid air should

be devised. This shaft would contain over 614,000,000,000 cubic yards, or 113 cubic miles, of solid material—enough to build an island in mid-ocean. It would have the relative proportions of a column a mile high and three inches thick.

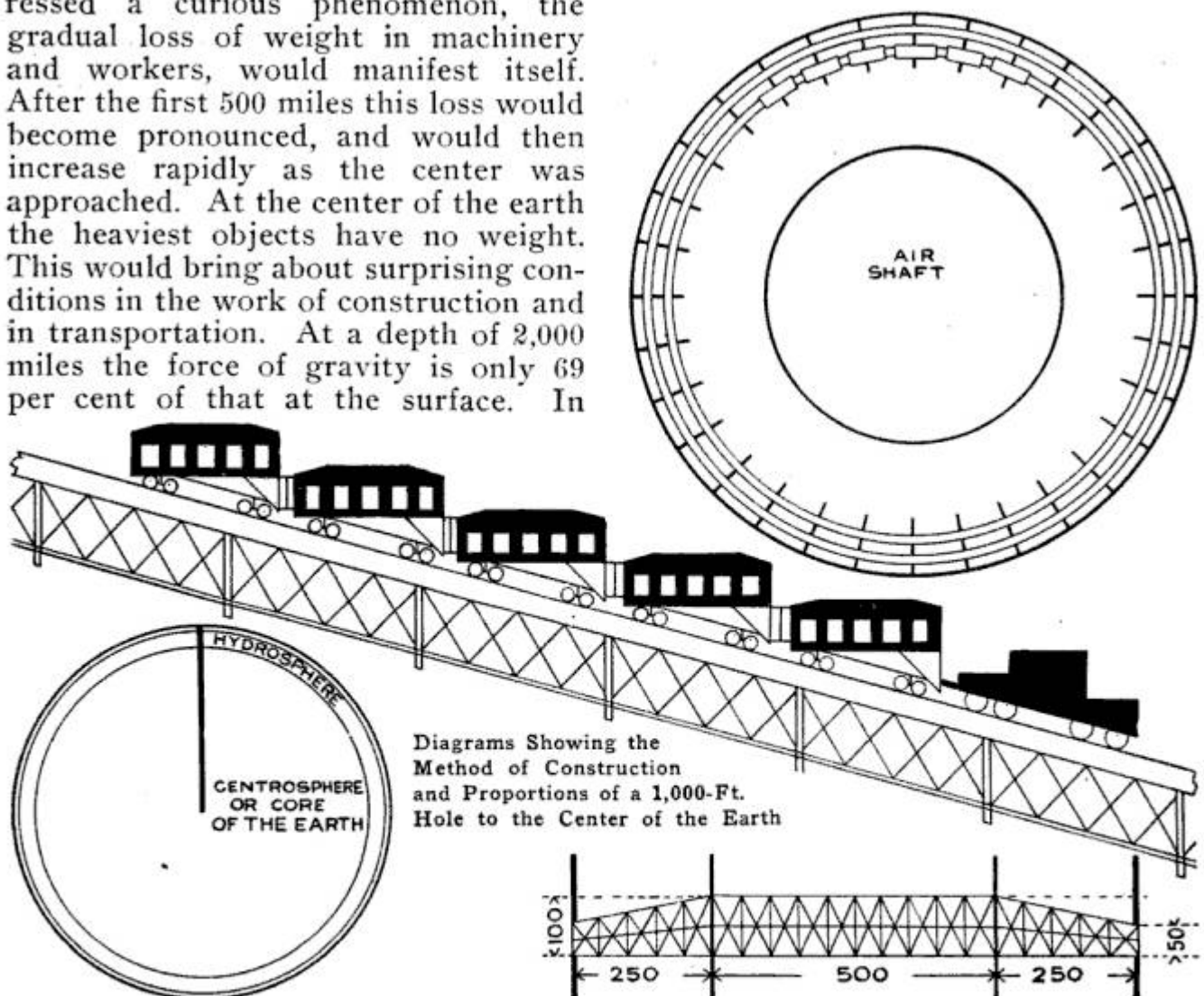
Geologists have a well substantiated theory in regard to what is called the hydrosphere, a watery envelope of which the oceans are the visible parts. According to this theory the hydrosphere is continuous and entirely envelops the core of the earth, the greater part of it consisting of water-bearing rock. The thickness of the hydrosphere is unknown, but it is probable that water pressures such as engineers never dreamed of would be encountered in piercing it with a shaft.

Sources of heat and power would undoubtedly be found and would be made available for the use of mankind. But the most revolutionary results fol-

lowing the sinking of the shaft would be of another kind. Gold and diamonds, now within reach of the miner, appear to have been forced up from great depths by volcanic action, and it is believed by geologists that enormous reservoirs of these and other precious metals and stones exist in the interior of the earth. It is possible that such quantities of gold would be brought within reach by the digging of the shaft as to render that metal worthless as a medium of exchange; while diamonds would become so common as to be classed properly as playthings. Present standards of value would be destroyed, and a new social and economic order would follow. What the new unit of value would be, it is impossible to say. But it is certain that the usefulness of the precious metals for that purpose would be gone forever.

As the sinking of the shaft progressed a curious phenomenon, the gradual loss of weight in machinery and workers, would manifest itself. After the first 500 miles this loss would become pronounced, and would then increase rapidly as the center was approached. At the center of the earth the heaviest objects have no weight. This would bring about surprising conditions in the work of construction and in transportation. At a depth of 2,000 miles the force of gravity is only 69 per cent of that at the surface. In

other words, a man weighing normally 150 lb. would weigh 104 lb. at this depth, while a 70-ton car would weigh 49 tons. As greater depths were reached, weight and the danger of falling would become less, but the momentum of moving bodies would be unchanged. It would be difficult, if not impossible, to keep a train on the rails if weight were depended on. At the same time a collision with the walls of the shaft would be as disastrous as at the surface. It would be necessary to substitute some force to take the place of lost gravity—and this force would undoubtedly be magnetism. Flat metallic wheels fixed to the framework of the cars would run on third rails, which would be charged with an electric current of the proper intensity for each depth. In this way a substitute for gravity could be provided. Nor would this be the only precaution necessary. Gravity is re-



quired for walking, and even for sitting securely in a seat. Car floors and seats would be charged electrically in the same way as the rails, while suits of flexible metal would be provided for the passengers.

With the proper kind of motor a track grade of 25 per cent (a fall of one foot in four) would be practicable. The motor would be electric, with power applied through a cog rail. At 40 miles per hour, allowing for necessary stops, it would take a month to go down, while two months might be required for the return trip.

With the shaft completed and the railway in operation, it is not difficult to imagine, in a general way, what a trip to the center of the earth would be like. From the start, night and day, as in the polar regions, would lose their meaning, unless these natural divisions of time were produced artificially in

the lighting of the cars. Passengers would gradually become aware of a strange lightness, which would grow more pronounced as greater depths were reached until, at some point, probably 2,000 miles below the surface, the metallic suits would be brought into use. Subterranean wonders that it is impossible to guess the nature of would supply the "sight-seeing" features of the journey. At the center of the earth swimming in the air, with the aid of mechanical accessories, would be the natural mode of locomotion, while if one preferred to walk in normal fashion it would be necessary to seek an electrically charged surface. It is not likely that one would care to make an extended stay in this strange region. After a few days, or a few weeks at most, one would be ready to begin the 16,000-mile journey back to the sun and sky.

Frank C. Perkins
3299

LOADING A MOTOR TRUCK WITH ITS OWN POWER

One of the makes of heavy motor trucks is being equipped with a power-loading device receiving power from the engine. By means of a "nigger-head" mounted on the motor shaft, and two pulleys for carrying the rope, heavy articles, such as pianos, safes, and the like, can be drawn into the body of the truck with but little exertion.

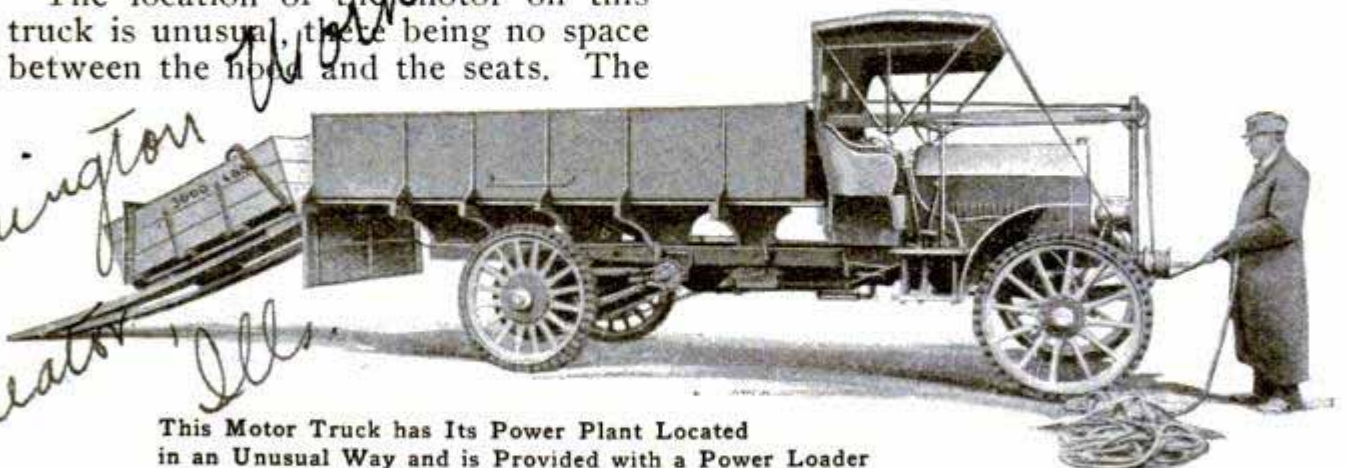
The location of the motor on this truck is unusual, there being no space between the hood and the seats. The

tending far enough out for him to sit comfortably with his feet operating the clutch or resting upon the flooring at the side of the hood.

3540

THE FOUNTAINS OF THE RUSSIAN CZAR

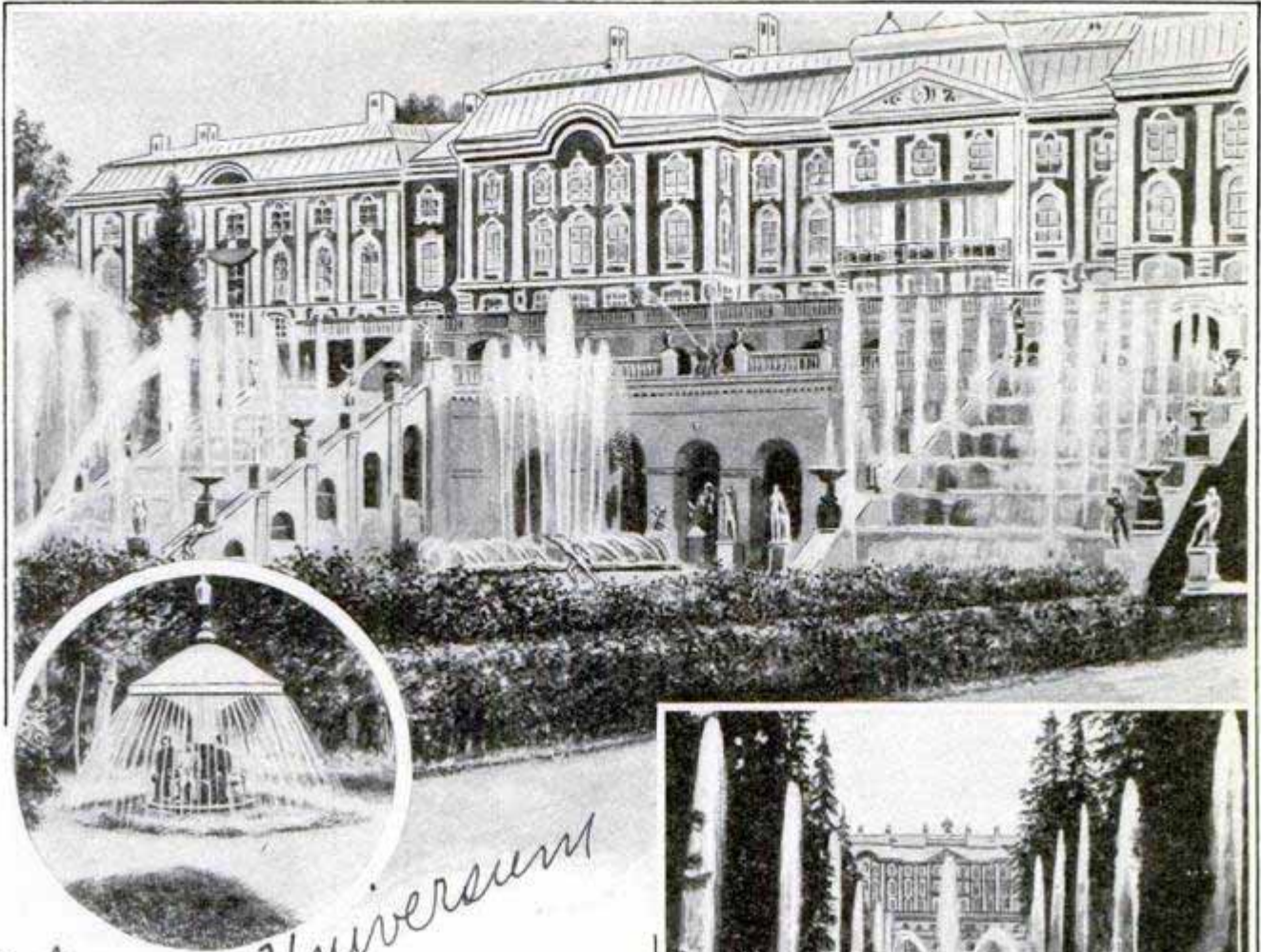
Among the most striking decorative features observed in connection with the imperial palace and grounds set apart for the exclusive use of the czar of Russia and his family are the numer-



This Motor Truck has Its Power Plant Located in an Unusual Way and is Provided with a Power Loader

controls and steering wheel are at the side of the hood, the driver's seat ex-

ous fountains of water that gush forth from various unexpected sources and



*Not
Reclaw's University*

Fountains of the Russian Czar: Above, the Peterhof Palace; on the Right, the Samson Canal; Left Corner, a Mushroom Fountain on the Palace Grounds



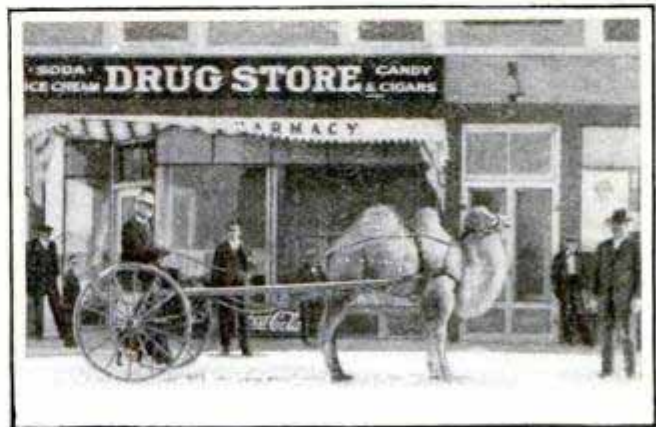
form the most prominent part of the scheme of decoration.

The several approaches leading to the czar's palace at Peterhof and the spacious grounds immediately surrounding this magnificent residence are dotted with fountains. The palace gardens are also resplendent with these small geysers, arranged on distinctly original and artistic lines. One design, known as the mushroom fountain, is a summer house having the appearance of an open umbrella, from the edges of which issue jets of water, and another beautiful scene is presented by the alley of fountains built along each bank of the Samson canal, an artificial stream which extends from the palace through the adjacent gardens that, with their many fountains, flowers, and shrubbery, form a real fairyland.

AN ANIMAL OF THE DESERT

3694 IN HARNESS

The odd sight of a camel harnessed to a two-wheeled cart and driven slowly along the snow-covered streets of Denver was witnessed quite often in that city last January.



Seen in Denver Last January

*Robert C. Brown,
1414 So. Sherman St.,
Denver - Colo.*

Telegraph

MOLDING SAND PREPARED BY ELECTRIC MACHINE THROUGH CONNECTIONS FOR LAND AND CABLE LINES

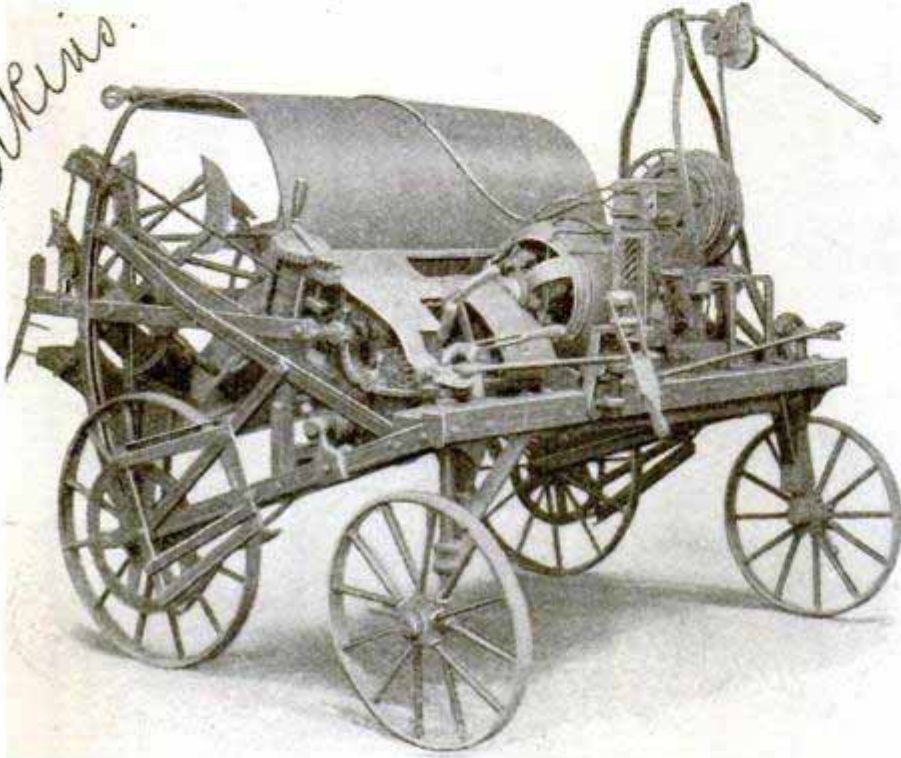
3471

An electric machine has been constructed to do the work of preparing the sand used for molds in foundries.

3643

One of the big cable companies announces that it has succeeded in developing a system by means of which

Frank C. Perkins



Ingenious Electric Mixer for the Handling of Molding Sand

Each blade of the cutting cylinder, which makes 75 revolutions per minute, slices off a small quantity of sand, and throws it in the air behind the machine, breaking all lumps and separating the grains. By this system the sand is quickly and thoroughly cooled, all the steam and gas is blown out, and the pile is left loose and light from top to bottom. The machine is moved about in the shop by its own power. In operation, it is run through a heap of sand on the floor, leaving it in the usual long heap for floor molding, or throwing it back in a heap by a squeezer or stationary bench. It is operated by a 5-hp. motor, the current being taken through a flexible cable, carried by an automatic reel.

¶An old torpedo boat of the German navy has been converted into a combined tugboat and ice breaker and is now in service in the former capacity on the upper Spree, the river that traverses Berlin.

it will be possible to use the International Morse system, hitherto confined to land lines and comparatively short cables, on long submarine cables, thus making it possible to telegraph without a break from, say, Chicago to Vienna. The system now employed of cable transmission is in reality the old single needle alphabet, in which the dots are represented by a signal to the left and the dashes by a signal to the right. Owing to the disparity in the formation of the two codes it has not been possible to transmit

messages from a land line to a long cable, or from cable to land line, and messages arriving at the cable terminus have to be translated from one system of code into the other before they can be transmitted.

In the new system it is said that dots and dashes can be sent at approximately the same speed as signals are sent by the old method, the scheme being to utilize current reversals for transmission purposes. Thus, a letter which in the Morse code is signified by two dots is transmitted by employing the current in one direction for the first dot and in the opposite direction for the second dot. The discharge from the cable between each signal, hitherto wasted, is utilized for effecting the reversal of the battery.

¶An apple grower of the state of Washington, in order to prevent the warm winter weather from starting his trees to grow, placed 100 tons of broken ice around their roots.

London
James
Eng. Suppl
Feb 27
Mr. John South Chief Eng'r
International Cable

ROOF GARDEN ON A MODERN OFFICE BUILDING

3541



Photos by Building Management

Converting the roof of a modern office building into an attractive summer garden, and incidentally adding to the profits derived from renting the balance of the structure for office purposes, is among the latest profitable building-management methods adopted by the owners of a tall structure in Montgomery, Alabama.

The roof contains about 3,000 sq. ft. of space surrounded by an iron railing, along the entire length of which are boxes filled with earth, where numerous beautiful flowers and trailing vines grow. As the top floor and roof were leased by one of the oldest clubs in the South for a period of 10 years, one part of the roof has been fitted up as a kitchen, which is connected by dumb waiters with the dining room on the floor below, where the club's headquarters are situated. The roof also is provided with electric lights and all the furniture necessary for the convenience and comfort of

Beauvois

Bell Office Building, Montgomery, Ala.

those who frequent the garden, which furnishes an excellent view of the city and surrounding country and enables

Building Management,



the members of the club to take advantage of the cooling breezes during the hot summer months. The rental price of the roof space is approximately 35 cents per square foot and, at this rate, provides an annual net profit of about \$1,050.

CAST OF HIAWATHA IN TREE-TRUNK PATCH

Saving old trees by cutting out decayed sections and filling the hollow



done by a sculptor of Minneapolis.

with cement is now a widely used method of tree surgery, but the combining of tree surgery with the art of the sculptor is a new departure. In Longfellow Gardens, at Minnehaha Falls, Minnesota, is a cast of Hiawatha in a tree trunk. It was

A FLOATING PALACE FOR THE HUDSON RIVER

The new steamer "Berkshire," intended as a night boat on the Hudson River between Albany and New York City, is the largest vessel ever designed for river use. The ship is 440 ft. long and 90 ft. wide. It has five

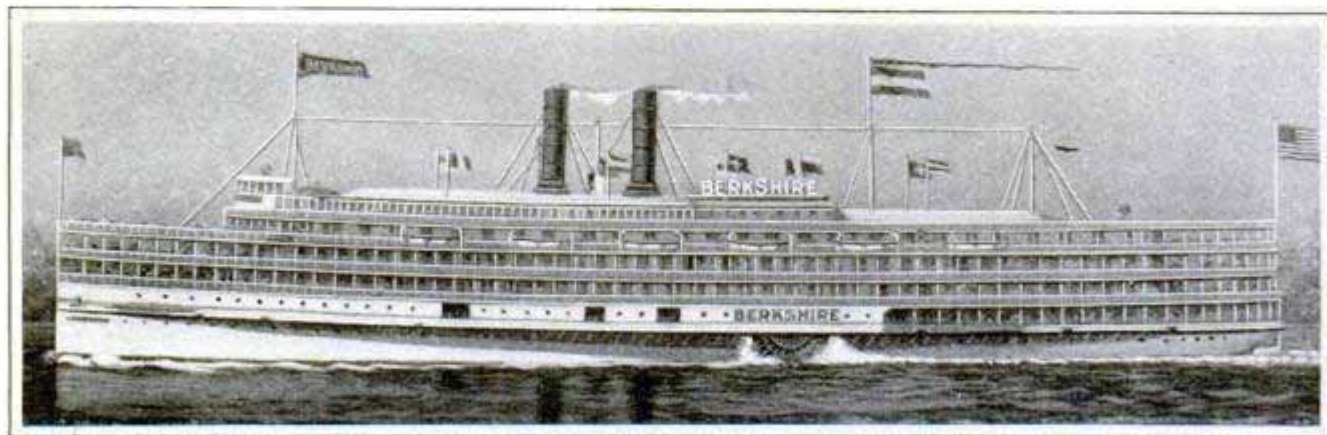
decks, 450 staterooms affording sleeping accommodations for 1,500, a dining room about 100 ft. long, a special observation room on the forward section of the upper deck, and many other special features for the comfort and convenience of the passengers. Telephones, fire appliances and a complete fire-alarm system are installed throughout the ship, which is also provided with two searchlights, the forward reflector being more powerful than the largest used on any battleship. The hull, from keel to the saloon deck, is of steel plate.

PRIZE OF \$50,000 OFFERED FOR FLIGHT OVER OCEAN

A prize of \$50,000, offered by Lord Northcliffe, owner of the London Daily Mail, to the first airman to cross the Atlantic in a "waterplane" in 72 consecutive hours, is likely to be competed for by several Americans, as well as French, German and British fliers, this summer. A "waterplane" is described as an aeroplane able to alight upon and start from the water. The contest is open to the world. Competitors may start either from Canada or Newfoundland, or from any point in Great Britain or Ireland.

A prize of \$25,000 to the first airman to fly in a British machine around England, Scotland and Wales is also offered by Lord Northcliffe.

Brooklyn is the chief market for old tin cans, which are cast into sash weights.



The "Berkshire," the Largest Steamer Ever Built for River Traffic

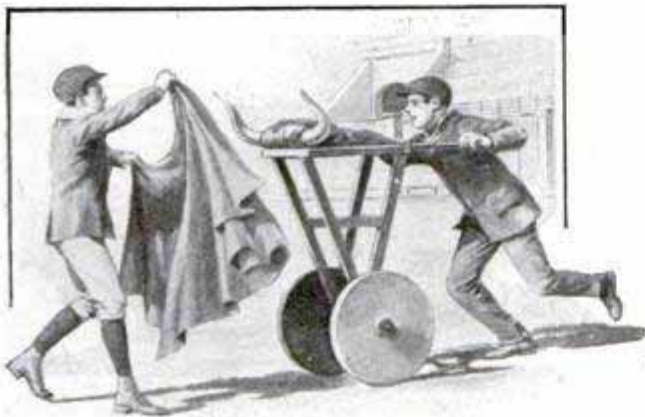
C. M. Englis,

24 Broadway Ave

SPANISH BOYS PLAY WITH "HOBBYBULL"

As far as the excitement of the game is concerned the Spanish boy and his "hobbybull" overtops the American boy and his "hobbyhorse." The boys of Malaga and other Spanish cities find great amusement in mock encounters with the "hobbybull," which is a framework mounted on a pair of wooden wheels, carrying a pair of horns lashed to its forward end. Armed with a scarlet cloth, one of the boys "infuriates" the "hobbybull," while another brings this mock animal into action. If the matador is apt in his taunts, and the other boy particularly spirited, the game may well become serious.

The boys shown in the illustration



Courtesy Travel Spanish Boys Bull-Fighting with "Hobbybull"

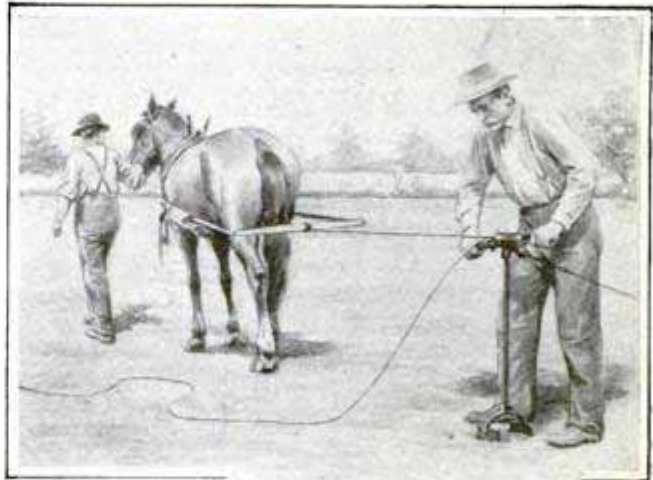
are the sons of one of the caretakers of the Malaga bull ring, and are training to become matadors.

BORING POST HOLES BY HORSE POWER

A soil auger by means of which the farmer may make his horse do the heavy work of post-hole digging, instead of twisting his own arm and back muscles, is here shown. The outfit is simple to operate. The horse pulls a rope through a grooved pulley, this action revolving the auger. All the auger operator has to do is to press downward on the handles. When the auger is full the horse is stopped and the earth shaken out. This is repeated until the hole is of the desired depth.

Henry F. Holtman,

From 35 to 45 ft. of rope is pulled out to complete a 3-ft. hole, 9 in. in diameter. In making the first hole, a stake

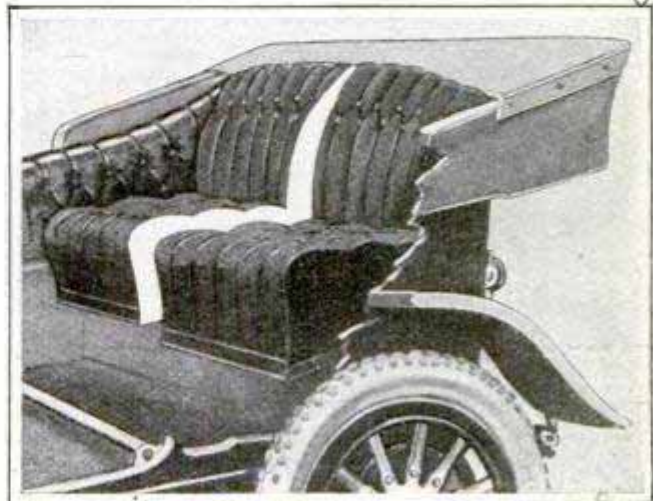


The Pulling of the Rope Revolves the Auger

is driven into the ground to fasten the anchor cable to. After the first hole is bored, an anchor post is used, the anchor cable serving to measure the distance from hole to hole, as well as to keep the auger upright during the boring. At one end of the anchor cable is a short piece of chain, the purpose of which is to allow the cable to be quickly shortened should the auger begin to lean.

ADJUSTABLE REAR SEAT FOR MOTOR CARS

One of the motor-car novelties on the market is an adjustable rear seat which can be raised or lowered 2 in. and also moved backward or forward 3 in. by simply turning a small wheel



The Seat, Back and Low, and Forward and High

3496

525

Official Gazette

3487 Automobile Dealer and Repairer

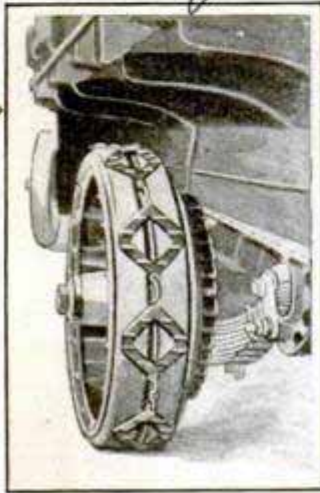
Pg 71

51331

within easy reach of the hand. The manner in which the seat may be adjusted to the desired angle or height is shown in the accompanying illustration.

DEVICE TO PREVENT DOUBLE TIRES FROM SKIDDING

An attachment designed for preventing motor truck wheels equipped with double rubber tires from skidding or slipping is being manufactured. The skidding device consists of a series of plates connected together by chain links which, with the eight raised points on the exposed surface of each plate, provide the wheel with an effective road-gripping surface.



3807
The Automobile
Mar. 20, 1913
pg. 679
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of each plate, provide the wheel with an effective road-gripping surface.

FRENCH KEROSENE ENGINE HAS NO CARBURETOR

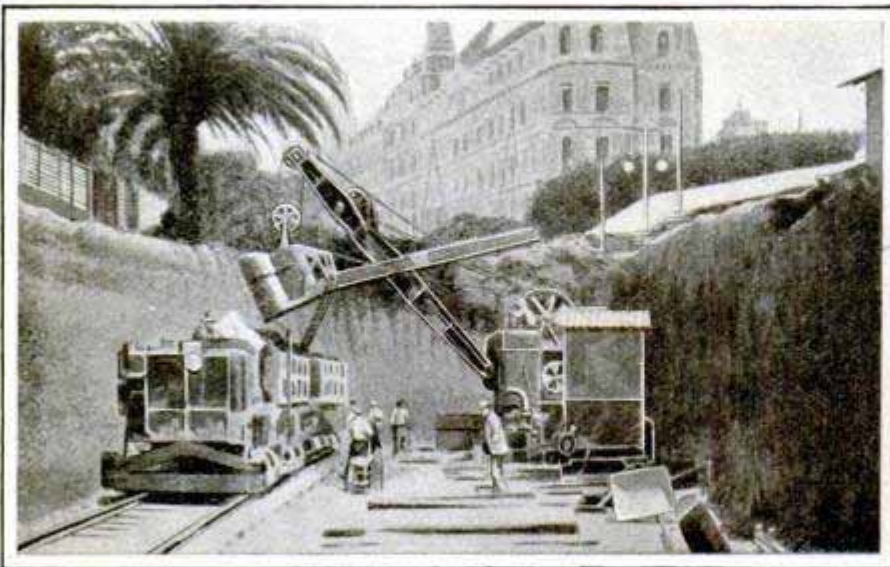
A French engineer has developed an original type of water-cooled four-cycle motor which is capable of starting cold, with kerosene as fuel, and of running on crude oil. It is about the same size as the standard type of gasoline engine so that it can be readily placed in existing chassis. A carbureting device is entirely unnecessary, as the timing of the intake valve is arranged so that the injection of a quantity of fuel into the cylinder is not made until after the piston has gone some distance on its downward stroke. The vacuum thus caused is sufficient to "pulverize" the fuel and to draw in a regulated supply of air under atmospheric pressure. The exhaust valve has the usual timing.

⌈The largest known phosphate-bearing field is in the Rocky Mountain region through the states of Wyoming, Utah, Montana and Idaho. It is at least 420 miles long and 220 miles wide.

THE BUENOS AIRES SUBWAY SYSTEM

The problem of traffic congestion in Buenos Aires is probably more difficult in its solving than that of any

Some of its business streets are exceptionally narrow; so narrow, in fact, that a fallen cab horse at midday



Excavating a Subway in Buenos Aires

The Engineer
Mar. 20, 1913
brings the traffic to standstill in 15 or 20 blocks. The city authorities have attempted time and again to improve conditions, but the first really adequate step is that now being taken of constructing subways for the street cars. These subways will clear the three main streets running east and west from cars, leaving them clear for ordinary traffic. The method of construction is the cut-

other city of a million or more population on the American continent.

and-cover, that is, only two blocks of a street are cut off at a time.

Myg. - Eureka Non-Skid Mfg. Co. Brooklyn - N.Y.

Oil

Mr. J. W. M. Bellamy - Street eng. Mr. Delaunay - Bellville

3803

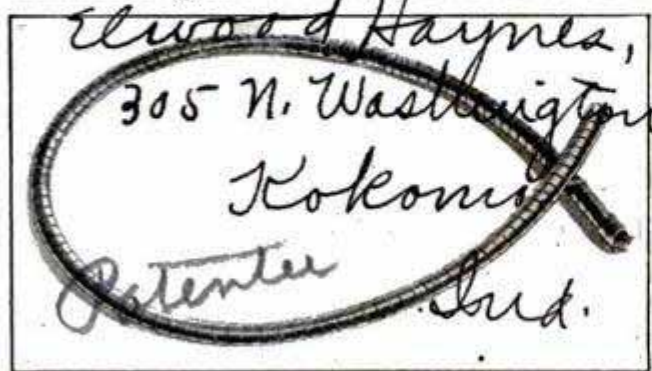
108 Fulton New York

SHIP'S UPPER WORKS CAUSE UNNECESSARY RESISTANCE

The question of wind resistance experienced by modern high-powered ships is being made the subject of investigation by designing engineers. It is pointed out that the hull lines of up-to-date vessels need little improvement, but the deckhouses and upper works are still being constructed without thought of air resistance. Comparative tables have been compiled to show that the resistance of air for a 10,000-ton passenger steamer is 1.35 tons when the ship is traveling at 18 knots (20.7 miles per hour) in a calm, as against 17.17 tons when it is traveling at a speed of 16 knots (17.4 miles) against a 58-mile wind, which is not unusual.

ALLOY USED FOR HIGH-SPEED LATHE TOOLS

Lathe tools made of alloys of cobalt with chromium and other metals are claimed to be cutting at a speed impossible with tools made of what is known as high-speed steel. This long shaving, weighing a little over a pound, was cut from a 2-in. nickel-chrome steel bar in 30 seconds by a 1/8-in.-square lathe tool of such composition. In one of the tests it was found possible to turn semisteel gear wheels at a rate of 120



Long Steel Shaving Cut by an Alloy Lathe Tool in 30 Seconds

ft. per minute with one of these tools, while 40 ft. per minute was all a high-speed tool was able to accomplish.

TYPEWRITER OPERATED BY THE VOICE

The complete elimination of the stenographer is the aim of a Brooklyn inventor who is at work attempting to perfect

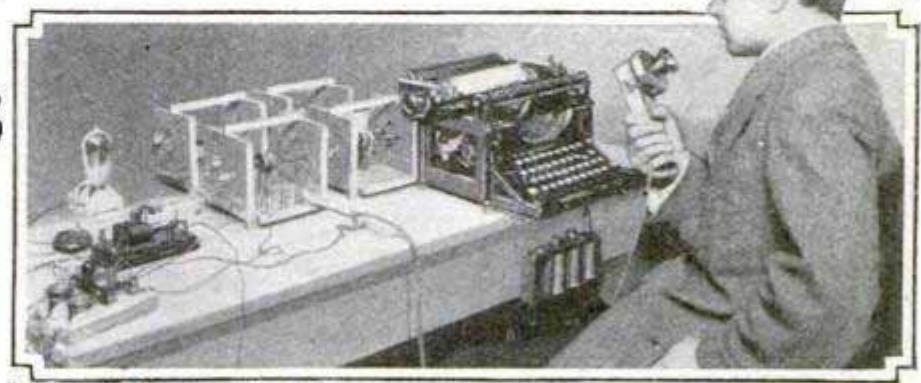


Photo by Edwin Levick, N. Y. Brooklyn Inventor Operating His Typewriter by Speaking into Telephone Transmitter

an apparatus by means of which the voice, speaking into a telephone transmitter, will operate a typewriter. He uses a system of steel reeds, which correspond, in their operation, to the fibers of the internal ear, and a number of electromagnets. A sound spoken into the transmitter sets the diaphragm vibrating. Each letter of distinctive sound possesses an individual overtone and this affects the steel reed attuned to it, causing the reed to vibrate sufficiently to close an electric circuit. As soon as the circuit is closed, a magnet moves the key of the letter spoken. The apparatus is said to record perfectly all the vowels when spoken distinctly into the transmitter, but it has trouble with some of the consonants, which is attributed to the lack of sensitiveness in the steel reeds.

3745

SAVING COKE FROM ASHES BY MECHANICAL PLAN

German chemists are experimenting with processes for the recovery of the combustible material remaining in coal ashes. One mechanical method is said to save 38 tons of coke from 2,000 tons of ordinary boiler ashes. The process consists of first merely crushing the ashes and then separating the ingredients by placing them in liquids of different specific gravity.

Chv. Adolph 7

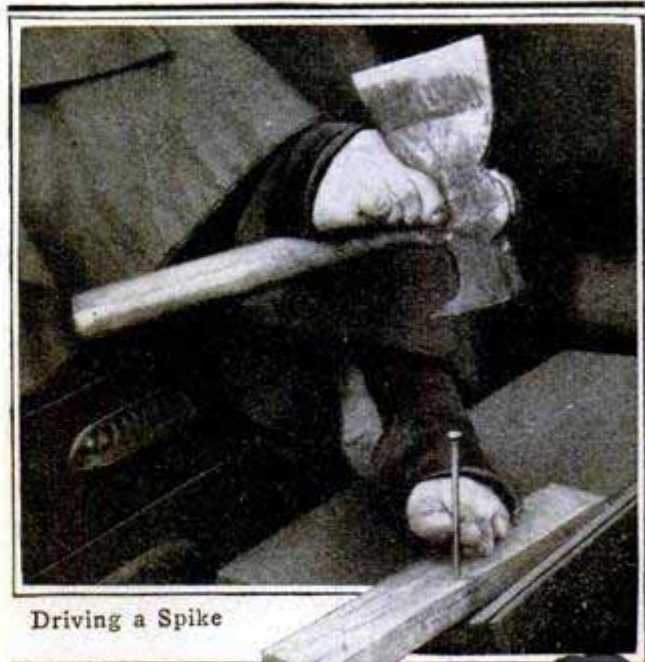
John 13. Florence
 1323 Bedford St., Brooklyn, N. Y.

ARMLESS GIRL DOES THINGS WITH HER FEET

3522 A remarkable demonstration of the control the mind has over the body is provided by Miss Kittie M. Smith, an armless Chicago girl who uses her feet to do the things the average person accomplishes with the hands. So adept has Miss Smith become that she makes cabinets, bookcases, desks, and like furniture, using with skill all the necessary tools, such as saws, chisels, planes, etc. In nailing, however, she uses a hatchet instead of a hammer, as the shape of the former is better adapted for a tight clutch between the toes. Miss Smith also sketches with pen and pencil, does excellent needlework, and uses a typewriter for her correspondence. The daily task of making a toilet, including brushing her teeth and washing her face, is done with comparative ease. She is also an adept gardener, using all ordinary implements with her toes in the garden of the home for disabled children which she has founded at Maywood, a Chicago suburb.

One afternoon when Kittie Smith was but nine years old she found a bottle of whisky while doing housework in her home. She drank freely from it, not knowing the nature of whisky, and its effect was almost immediate. Her father, who was in an adjoining room, called to her to put some wood on the kitchen fire. She told him she was sick, but he insisted and she obeyed. She had taken the lids from the stove, when, from the combined effect of the heat and the whisky, she became unconscious and fell on the open stove. A few minutes later a small brother came in and found her so badly burned that both arms had to be amputated three inches from the shoulders.

It is estimated that about three-fourths of the \$10,000,000 it costs to build a battleship in Germany is distributed in wages and salaries, and that some 15,000 employes obtain a living through the building of such a ship.



Driving a Spike



Using a Scroll Saw



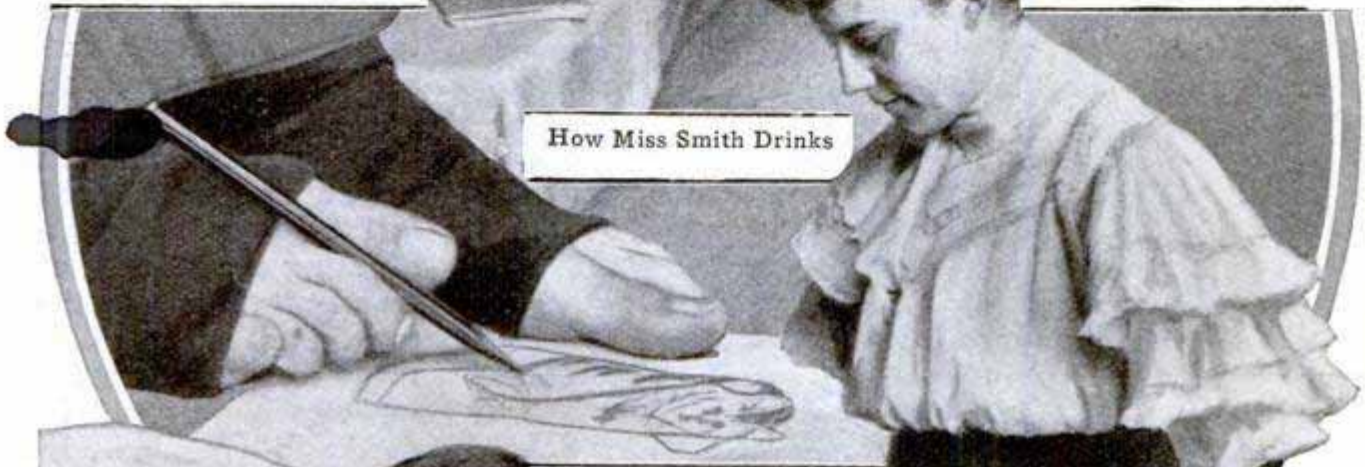
Using a Crosscut Saw in Her Workshop



One of Her Drawings



Embroidered with the Toes



How Miss Smith Drinks

Sketching

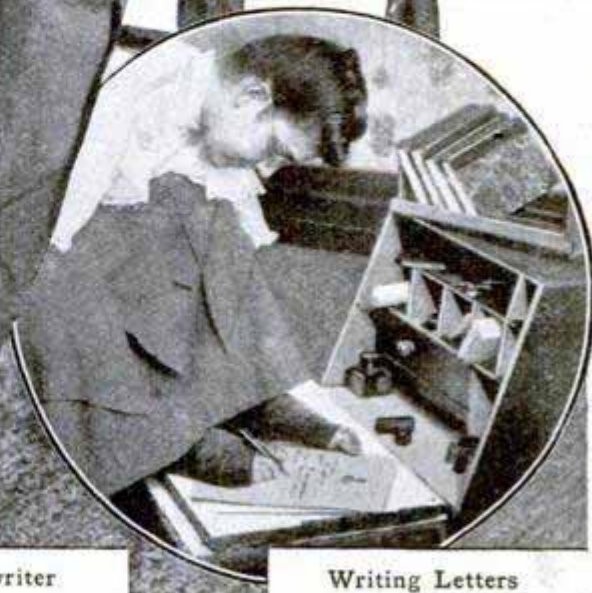


Putting on Glasses

Photos
Copyrighted
by
Kittie M. Smith



Using a Typewriter



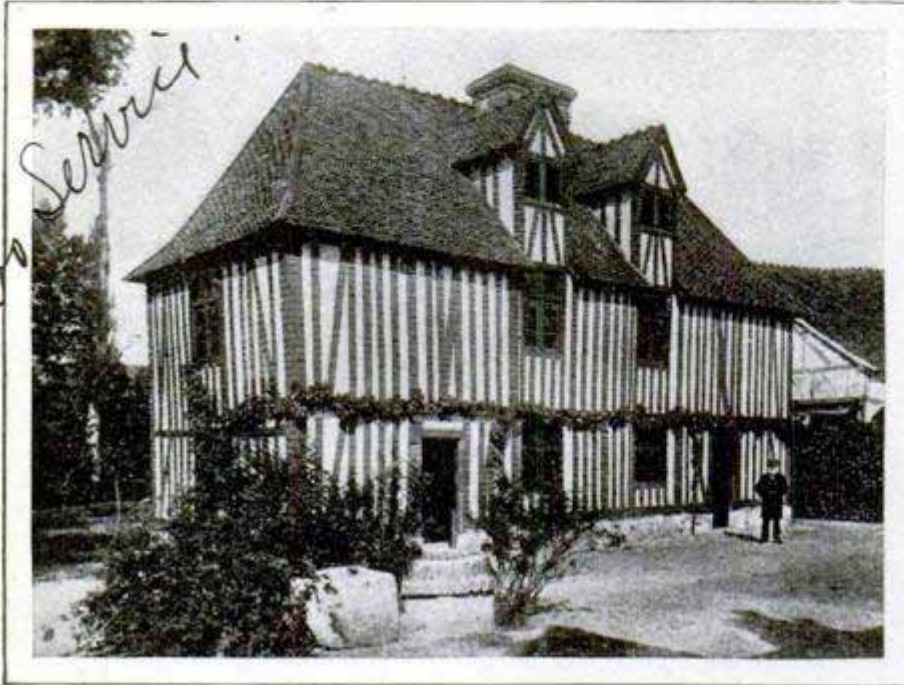
Writing Letters

HOME OF FRENCH DRAMATIST PRESERVED TO FRANCE

This quaint house, once the home of Pierre Corneille, near Rouen, has been preserved to France as a memorial to

9/16

Main News Service



J. P. Morgan Contributed to the Fund Raised to Preserve This Home of a Poet and Dramatist to France

this poet and dramatist by the raising of \$9,000, the last \$2,000 of which was contributed by the late John Pierpont Morgan.

PERCENTAGE OF CASUALTIES IN A MODERN BATTLE

106 3

It is estimated that the number of men killed and wounded in a modern battle, when a division of 18,000 soldiers sustains a loss of 10 per cent, is as follows: 20 per cent, or 360, will be killed outright; 8 per cent, or 144, will be so seriously wounded that it will be inadvisable to move them; 40 per cent, or 720, can walk to the rear for treatment; and 32 per cent, or 576, will require transportation. These percentages are used for the purpose of estimating the amount of transportation necessary, and in calculating the time required for clearing a field of dead and wounded. In

recent wars the mortality among those of the wounded that have been collected and removed to the rear, has been but 3 per cent to 6 per cent.

GUNS IN AEROPLANES SHOOT WITH GREAT ACCURACY

That machine guns can be fired from flying aeroplanes with a greater degree of accuracy than has yet been attained by shooting along the ground has been demonstrated as a fact during recent experiments conducted by army officials of the United States and England. The tests showed that a target was struck about nine times out of ten from the deck of an airship, which indicates that a very small amount of ammunition was wasted.

*Hydro Aero
Aero
Jan
Pg*

SIGNATURES SERVED ON A SILVER TRAY

1109

Serving signatures, instead of viands and edibles, on a silver tray was the unusual method adopted by the agents



Silver Salver Bearing Signatures of Donors

of a well-known automobile concern of England in presenting their managing director with a token of their appreciation in the form of a solid silver salver upon which were engraved the autographs of those who participated in its selection and presentation.

The Steamship
BRONZE HOSE USED IN OILING WARSHIPS 904.

Bronze hose, constructed without the use of rubber, canvas, or leather, is now being used for oiling the liquid-fuel warships of the British navy while traveling at high speed out at sea. The method of oiling is for the warships to tow the fuel vessel at a distance of about 1,200 ft., the oil being pumped from the latter to the former through a flexible metal hose. Steel-wound spiral hose was first tried, but this corroded after a moderate amount of wear, and bronze was substituted.

GREAT SPAN OVER HUDSON
3844 **HAS BEEN PROPOSED**

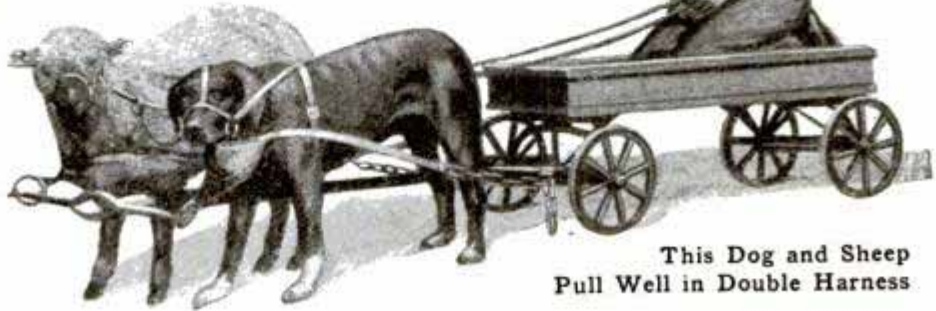
The construction of a great bridge across the Hudson River at New York City has been recommended by the New Jersey and New York Interstate Bridge Commissions. The proposed structure would have a span of about 2,800 ft., a width of 108 ft., and a height above the river of 170 ft. It would cost \$42,000,000. Two tunnels under the river, one for eastbound traffic and the other for westbound traffic, have also been advised.

CHINESE ARMY TO HAVE
3752 **MANY AEROPLANES**

The Chinese army is to acquire an aerial corps of close to 1,000 aeroplanes by the end of 1916, the budget for the current year providing for 250 machines. The government has engaged a French military airman to organize the aerial navy.

BOY DRIVES SHEEP AND
902 **DOG IN HARNESS**

Teaching a sheep and dog to do teamwork in drawing a cart was the somewhat difficult task undertaken and successfully carried out by the boy shown in the cart. He likewise planned and made the harness. The queer team was not trained for show



This Dog and Sheep Pull Well in Double Harness

J. L. Graft
84 W. South
Water St.
Chgo.

but for use, and when the boy owner, Louis Held, of Lyons, Wis., was asked to lend himself and team as one of the attractions at a county fair he refused on the grounds that it would worry the sheep and disturb the even temper of the dog.

WHEN ANOTHER FLAG FLOATS
3673 **OVER OURS**

The only occasion upon which another emblem is allowed to float over the stars and stripes is during the time when the church call is being sounded at navy yards and upon vessels of the navy. The picture shows the position of the national emblem and the church call upon the flagstaff at a naval station on the Pacific coast.



Monthly
Pacific Naval
Pg 17

Berliner Tageblatt

BIPLANE WITH DRAGON-FLY CHASSIS

The dragon-fly type of aeroplane chassis or body, distinctly a development of the monoplane, is being found

953

The Aeroplane
Nov 28-1912
Pg 545



The Comfortable Chassis of the New Bristol Military Biplane

just as satisfactory for biplanes, one of the latest and best examples of the adaptation being here shown in a military biplane, recently ordered from an English concern by a foreign power. This type of chassis, with the power plant mounted in its head, the propeller direct-connected, and the pilot's and passenger's seats just back of the engine, assures a riding comfort that has always been one of the distinct advantages of monoplane construction. This chassis is hung centrally between the upper and lower planes of the machine.

vertical

FURNITURE CASTERS OF LEATHER

Data

Many furniture casters are now being made from leather by cutting disks of the required size and cementing them together to form the wheel, which is then put into a lathe and turned until the face of the wheel is rounded. Disks of metal, fastened to each side of the wheel, provide bearings for the axle that runs through the wheel. This type of caster is made for use on hardwood floors, and casters of compressed felt are also manufactured for the same purpose.

Other styles of casters include those of glass, designed for the purpose of insulation, and ball-bearing casters having no wheel, but a ball that revolves on a circle of smaller balls.

FALLING CHIMNEY "SNAPPED" IN MID-AIR

3845

A chimney, 100 ft. in height, composed of 60,000 bricks, was recently demolished in Plattsmouth, Neb. The wrecking was accomplished by taking a few bricks at a time from the base until more than half of it was removed.

Plattsmouth, Neb.

INTERNAL STRESS REVEALED IN CELLULOID MODELS

With the aid of celluloid models of gears, an engineer is enabled to ascertain, almost at a glance, just how much internal strain similar gears made of steel will probably withstand and where they are most likely to give way. Glass models were formerly used but they proved too brittle. Rays of light are passed through the models in operation and a strain appears as a color fringe, enabling the proper constructional remedy to be applied.

3843

W. S. Wood
New York
1913



One-Hundred-Foot Chimney Photographed While Falling

Plattsmouth, Neb. and Terra Cotta

substituting oil-soaked blocks for the bricks as the work progressed, and then setting the wood on fire. The chimney fell 15 minutes after the wood was set on fire, and the camera caught it as its fall was almost exactly half completed.

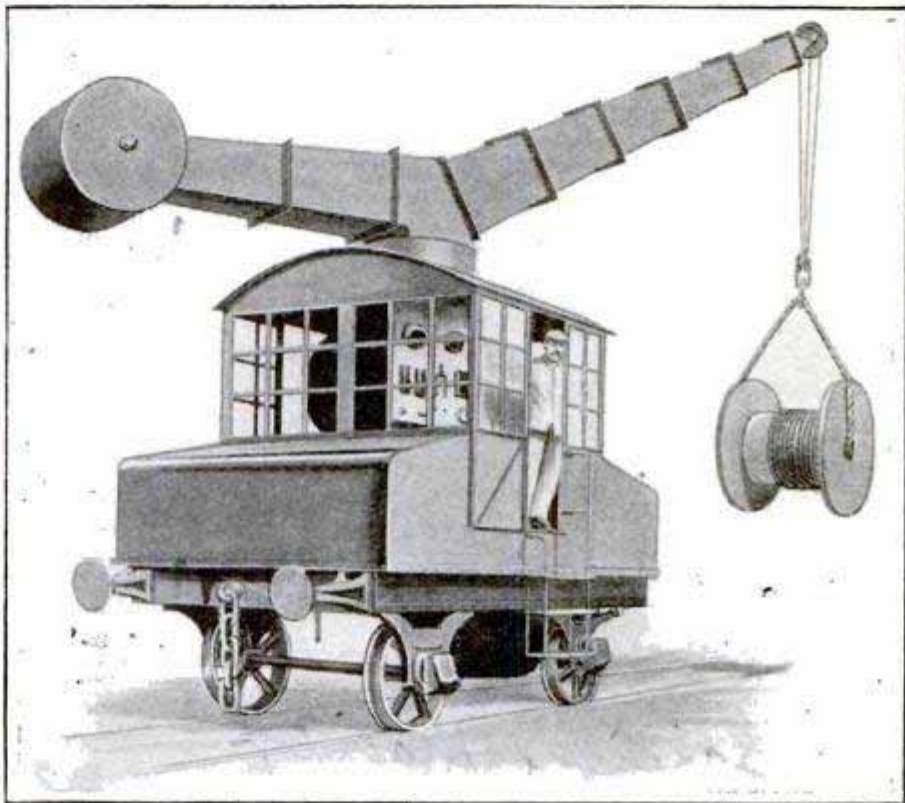
THE SOURCE OF ARTESIAN WELL WATER

3715 The source of the water which supplies the majority of active artesian wells is the water-filled stratum of sandstone or other porous rock material through which the liquid *Review* slowly passes between other layers of impervious rock or clay until it is tapped and comes to the surface. *By* at this point is below the source of the supply. It was formerly supposed that the water of artesian wells came from constantly flowing underground streams or large reservoirs, but this conclusion has since been proven to be mere guesswork. To illustrate how slowly underground water travels, following the dip or the slant of the rock or clay, there are many artesian wells along the Potomac River in Virginia from which, according to some geologists, water is now being taken that fell as rain 160 miles distant from the wells when Washington was president of the United States, having traveled underground at the rate of between one and two miles per year.

¶ Sir Edward Grey is urging that the English people purchase Sulgrave Manor, in Northampton, the home of the ancestors of George Washington, and present it to the United States as a good-will gift.

Steel Co., Highbridge
712
MANGANESE-STEEL BUCKETS FOR PANAMA DREDGING

3810 The hard-rock digging which the dredge encountered in the Pacific Canal entrance channel of the Panama Canal induced the placing of an order for six manganese-steel buckets to replace carbon-steel buckets originally used. These buckets have a capacity of 35 cu. ft. each and the dredge operates 39 of them on a chain. The purchase of the manganese-steel scoops was intended for experimental purposes. *13*



Courtesy Die Export Woche
German Locomotive Crane Operated by Self-Contained Power

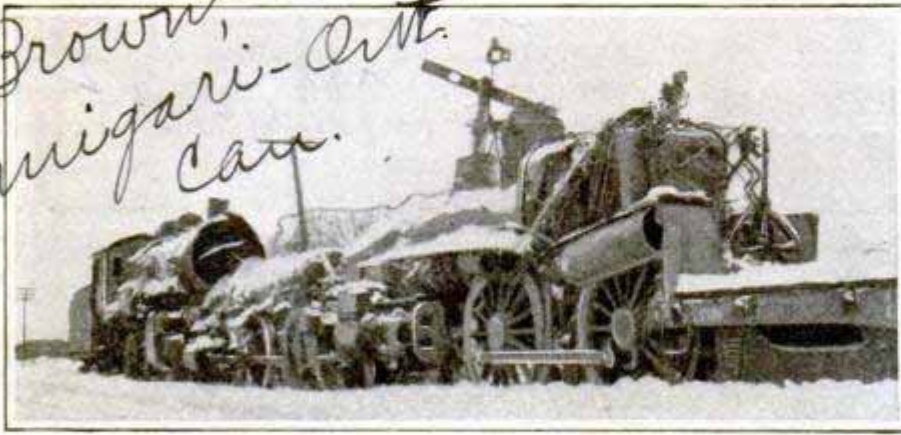
GIANT CRANE OPERATED BY STORAGE BATTERIES

3556 The interesting feature of this locomotive crane of German construction is its hoisting machinery, which is operated by means of a battery of 150 storage cells instead of power direct from an electric cable. A heavy counterweight at one end of the crane enables a load of almost eight tons to be lifted without upsetting the machine, which is propelled by a 22-hp. motor and will easily pull three or four loaded freight cars at a speed of about four miles an hour.

*aktien Gesellschaft
Lauhammer*

**THREE LOCOMOTIVES
CRASH IN STORM**

It seems miraculous that these locomotives could be so wrecked without serious injury to the engineers and



Three Locomotives Demolished in Collision without Serious Injury to the Crews

firemen, yet the crews of all three locomotives escaped with but slight injuries. The wreck occurred on the Grand Trunk Railroad near Buffalo, a freight train, drawn by two heavy locomotives, colliding head-on with a cattle train drawn by one locomotive. The freight train was running at a speed of about 30 miles an hour, and the cattle train slightly slower. A blinding snowstorm was responsible for the collision.

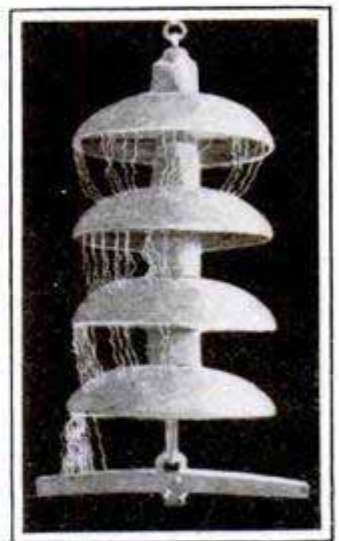
**CHINA BUILDS LONG BRIDGE
OVER YELLOW RIVER**

After having been under construction for three years, one of the longest bridges in China was opened for traffic in December last. It connects the northern lines of the Tsiensin-Pukon railway over the Hwangho, or Yellow River, which is regarded as the world's most treacherous watercourse. The site is about 660 ft. from its mouth. Between abutments, the bridge has a length of 4,120 ft., the greatest

span being 540 ft. The structure includes flood approach bridges, each with a span of 300 ft. The permanent way on the main span is 44 ft. above low water. The bottom of the foundations lies 20 to 24 ft. below the river bed and piles were driven 42 ft. below the foundations.

**NEW METHOD OF HANGING
PORCELAIN INSULATORS**

A new type of insulators for electric cables carrying high-tension currents consists of a series of bowl-shaped porcelain members, the upper sides of which are covered with close-fitting metal caps extending a little below the edges of the members, which are connected to each other as shown. It is claimed that the metallic armor furnishes protection against stone-throwing youngsters, breakage due to handling and mounting, and also prevents the insulators from becoming wet by rain.



**REFUSAL TO CANCEL STAMPS
RESULTS IN WITHDRAWAL**

Following the refusal of a great number of minor post-office officials to cancel the new Russian ter-centenary commemoration postage stamps issued by the Russian government, the different series, bearing the likenesses of the present czar and several of his predecessors, were withdrawn. From the day that these stamps were first used, certain officials refused to obliterate the portraits of the present czar. As a result of the decision to recall the issue, these stamps have become valuable with philatelists.

Horticulturists of the Bureau of Plant Industry at Washington are experimenting to develop a rose from which attar of rose can be distilled, that will thrive on American soil.

*3701
J. F. Brown,
Amigari-art.
cap.*

*Scientific American
3/22/13
Pg 181*

*3812
Christian Science Monitor
Boston
dovign
Mar. 21, 1813*

*Mrs. Porzellanfabrik Hermsdorf
Hermsdorf*

Wood
Jan 1913

or snow. It is further claimed that these metal protectors form a continuous path along which discharges can take place without touching the porcelain parts, in case of any sudden or heavy increase in the voltage of the line.

PHOTOGRAPHY OF WOOD WITHOUT CAMERA

31. A simple and accurate way of obtaining photographs of the grains of different kinds of wood without the use of a camera is to place a very thin slice of wood in an ordinary printing frame, insert a piece of photographic paper, and proceed in the ordinary manner of printing from negatives. The print thus obtained, however, is a negative instead of a positive, the pores of the wood showing as black

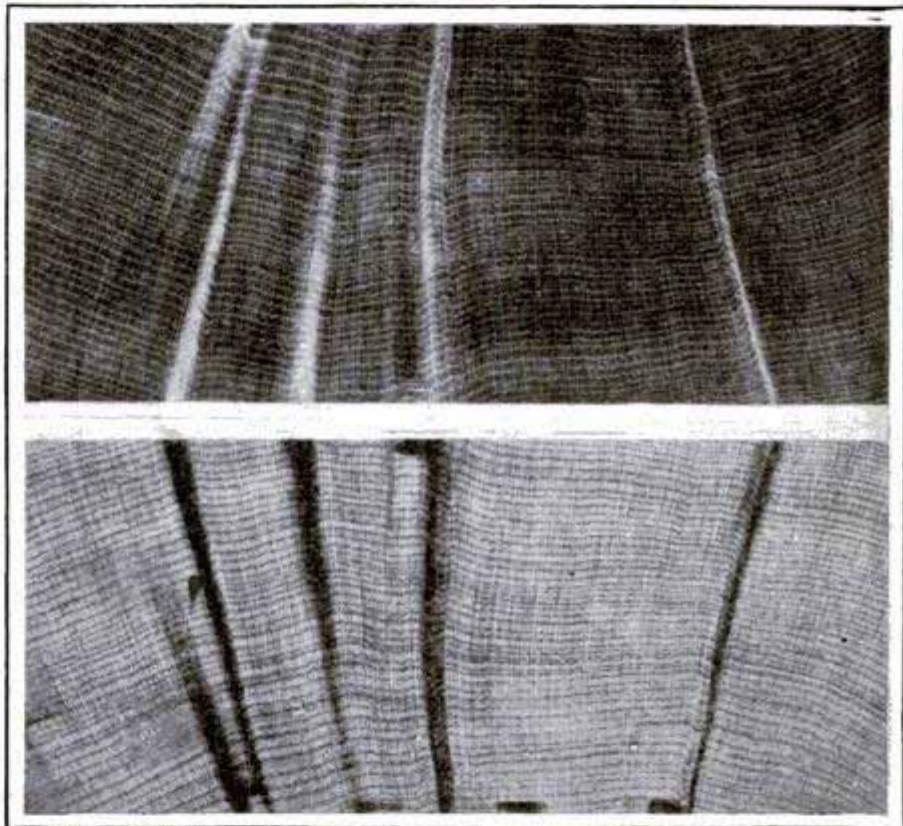
BABIES' WHITE CLOTHING MAY INJURE VISION 112.

"Let white be utterly abolished," says an eminent London specialist, referring to the color surroundings of infancy, "and in a few generations I believe there would be a 20-per cent decrease in the number of people wearing glasses." Leading physicians and eye specialists in this country have also reached a somewhat similar conclusion, and it is not altogether unlikely that a campaign may be waged against the use of so much white.

Everything surrounding the infant in fairly well-to-do families seems to be white. Until several years old, the baby is generally dressed in white, given white celluloid toys, put to sleep in white cribs, the nursery is usually white, and the nurse always wears white aprons.

"No wonder baby blinks his weak little eyes and turns his head painfully away from glaring light," says the Optical Journal and Review. "White is not for babies and should never be used in the nursery. Neither should baby be dressed in white, nor his nurse, nor his pet rag dollies, nor should the little crib or carriage or furniture be of white."

Thousands of people, according to this authority, grow up with weak eyes solely because they spent their infancy in white surroundings.



Courtesy Wood Craft
Above - Negative Print of Cross Section of Bird's-Eye Maple Made without Camera. Below - A Positive Print of the Bird's-Eye Maple Made from the Paper Negative

spots and the dense fibers as white areas. It is therefore necessary to print from this negative to obtain a photograph that shows the wood as it appears to the eye.

STEEL-TAPED CABLE TAKES PLACE OF CONDUITS

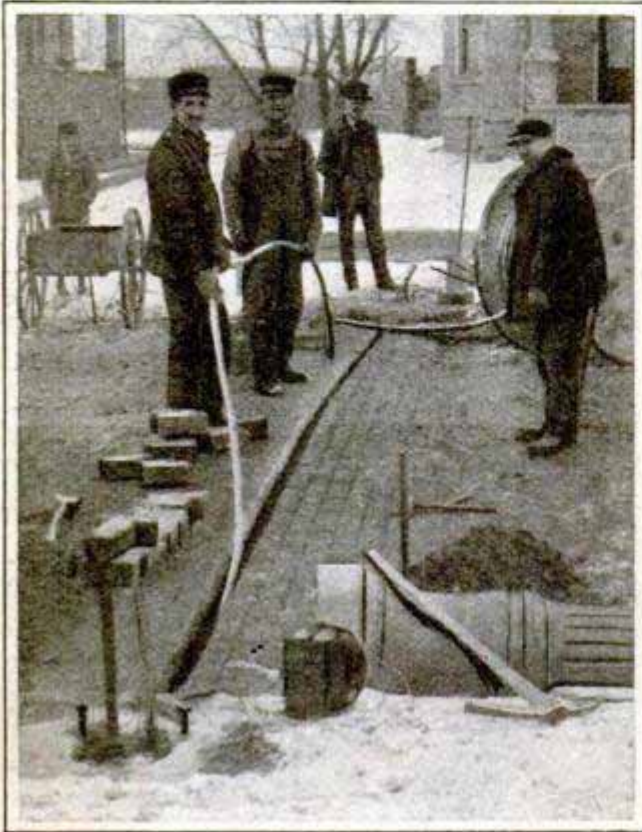
In all large cities electric and telephone wiring is no longer carried overhead, but underground, in conduits. The regulation conduit, however, is too expensive for extensive use in many small cities, so a steel-taped cable

The Optical Journal & Review
Jan 16, 1913

Ampers Electrical Co.
201 Devonshire Boston

Mrs. Record
2-1913

has been designed which is claimed to serve just as well for certain purposes. The field for the steel-taped cable in-



Steel-Taped Cable Laid under Pavement for Street Lighting

cludes suburban districts, parks, private estates and manufacturing plants where conditions do not justify the expense of a conduit system and where changes are seldom made. The illustration shows such a cable, comprising a regular lead-covered cable coated with jute and tar, over which are two windings of steel tape in reverse directions, being laid under a brick pavement to feed street lamps. In using the cable for park lighting in Henderson, Ky., it was laid in a narrow, shallow trench, with the earth replaced and sodded.

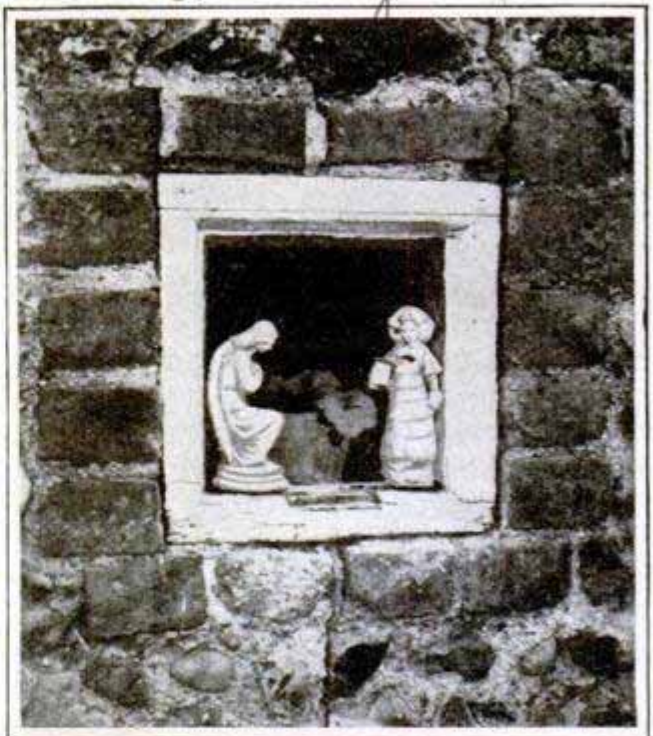
IMPROVED METHOD OF EXTRACTING BENZOL

Benzol, which is contained in the naphtha produced by the destructive distillation of coal, from which it is separated by fractional distillation, may yet prove to be a possible substitute for gasoline, owing to a new process of coal distillation. The value of

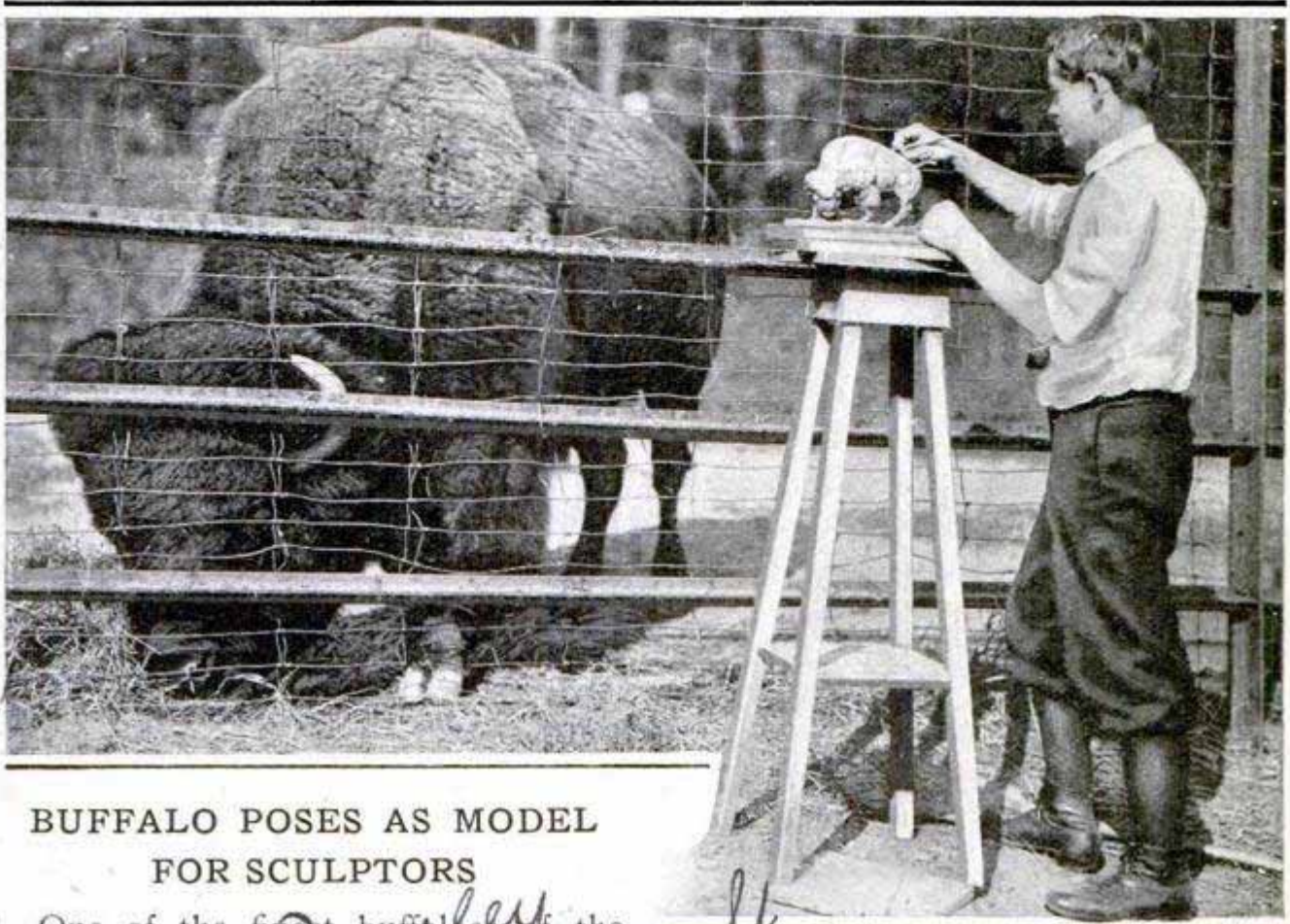
the new system lies in the large increase of yield over the existing coke-oven methods of recovery. By the latter, only from 1 to 1½ gal. are recovered from the ton, while by the new method one ton will yield 3 to 10 gal. on an average, 5 gal., and at a temperature of only 800 deg. F. instead of 2,000 deg., as in the case of the coke-oven process. More interesting still, it has been found that by this process Scotch "cannel," a kind of coal once extensively used in gas works, but now greatly fallen in value, will give, through suitable treatment, as much as 20 gal. of benzol per ton.

WINDOW BUILT TO CALL A LOST SON HOME

A little window in the wall of a Kentish cottage bears a sad history. It faces the sea and was built by a mother whose only son ran away to be a sailor because of his father's anger. The window was constructed by the mother eight years ago, and every night since a lighted candle sheds a beam out to sea, illuminating two little figures on the window ledge, the boy's youthful toys. The mother hopes they will bring her son back.



A Window That has been Calling a Son Home for Eight Years



BUFFALO POSES AS MODEL FOR SCULPTORS

One of the finest buffaloes of the herd in the New York Zoological Garden is kept in a separate corral for the benefit of the sculptors who wish to model the now almost extinct animal. The illustration shows an ambitious student of sculpture. It is not unusual to find several sculptors working at a time.

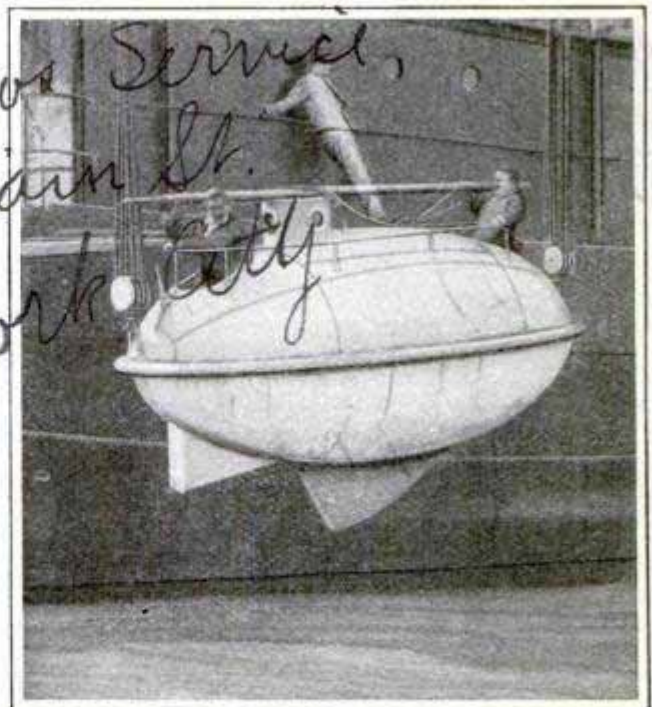
Sculptor Modeling a Buffalo at the New York Zoo

in an attempt to turn her over, but she resisted every effort. With 18 persons aboard she sank to the depth of the fender.

TESTING AN UNSINKABLE LIFEBOAT

The egg shaped, unsinkable lifeboat was given a practical demonstration recently in the Hudson River before the U. S. Board of Supervising Inspectors of Steamboats. The craft is built of galvanized steel plate, and has a steering or outlook tower fitted with four 6-in. portholes. Entrance to the boat is by two hatches or manholes, one forward and one aft. The rudder is fitted with two tiller handles, so that the boat may be steered from within or from the outside.

In the tests, seven men swung out over the water from the handrail encircling the upper part of the craft



Lowering a Noncapsizable, Unsinkable Lifeboat into the Water

and Capt. Prude

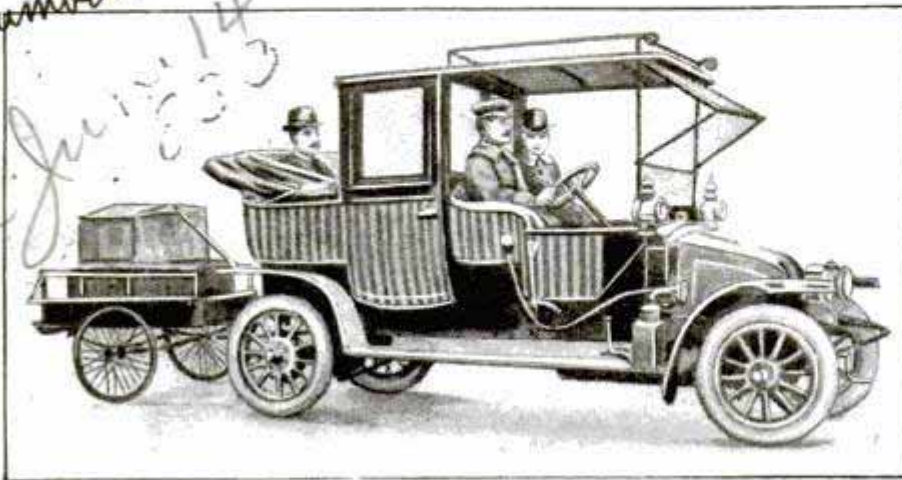
3762

The International News Service, 200 William St. New York City

STEEL BAGGAGE TRAILER FOR AUTOMOBILES

A steel trailer for carrying baggage behind motor cars, instead of conveying it upon the top of or inside an auto-

*No number
see page 14*



Motor Luggage Trailer Made of Steel

mobile, has made its appearance. The trailer is built of steel throughout and mounted upon two rubber-tired wheels, which run on ball bearings of special construction.

The vehicle also is attached to the rear of the car by a special joint that permits the trailer to be pushed backward by the car without swinging from side to side.

DRILLING MANHOLE UPWARD INSTEAD OF DOWNWARD

Drilling a manhole through solid rock, in an upward direction instead of downward, is an unusual feat that was recently accomplished in Baltimore by an engineering firm employed to improve a certain section of that city. The manhole was worked upward from a tunnel 22 ft. underground by drilling 36 holes in a circle from the roof of the tunnel upward, with one hole in the center, which was the only one that was used for charging and firing. When it be-

came no longer possible to operate the drills from the bottom, holes were drilled from the top to meet those drilled from the bottom. Then the bottom of the center hole was stuffed with bagging, several feet of sand were packed on top, and the hole was charged and fired in the usual way. In this manner the manhole was driven upward to the surface of the ground.

*Eng. Record
Nov. 2-1912
Pg 487*

MODIFYING THE DIN OF MAGNIFIED SOUND

3848

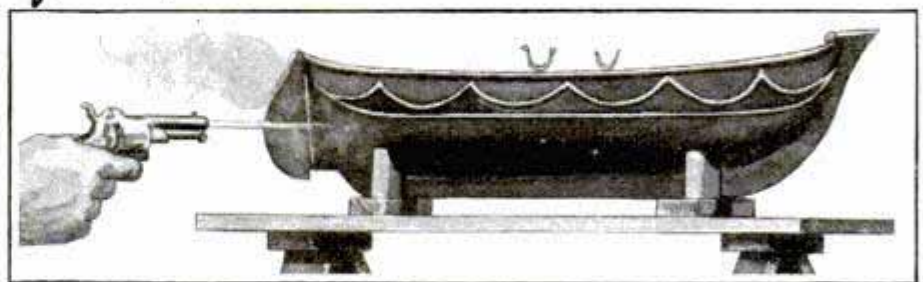
For the purpose of improving the acoustic properties of a manufacturing building in which the noise of machinery seemed unusually loud, fine piano wires were strung across a room some 3 ft. from the ceiling and several feet apart. The nerve-racking din was minimized to a marked degree, owing to the breaking up of the air vibrations by the wires, and the workers became more efficient. In homes, the use of rugs, draperies and curtains are important modifying elements.

*The Iron Age
3/27
Pg 277*

RUBBER LIFEBOAT REPAIRS ITSELF AUTOMATICALLY

3594

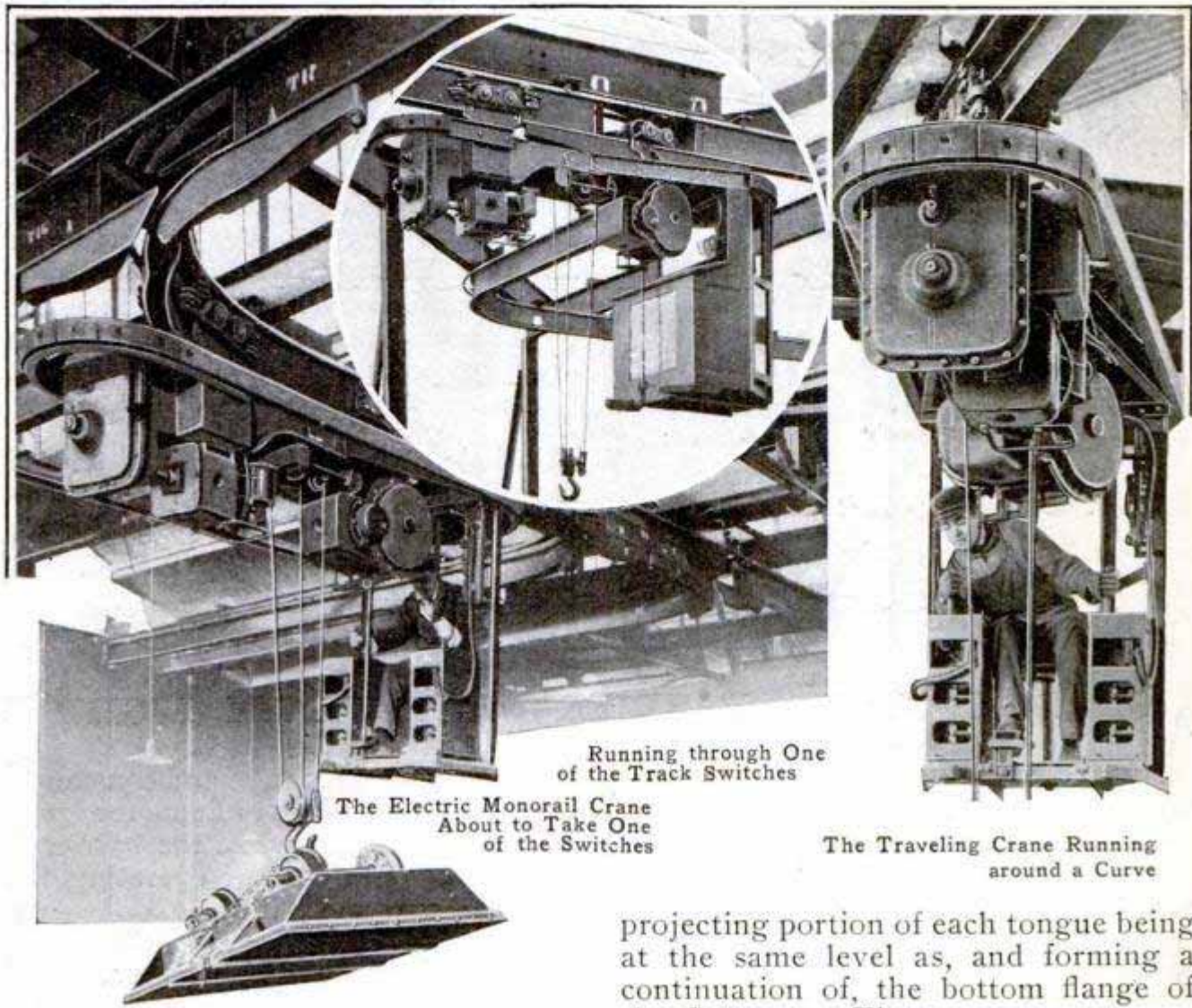
A London inventor has constructed a collapsible lifeboat having a special rubber skin which automatically re-



Folding Lifeboat Which Repairs Itself When Punctured

pairs itself when punctured. The illustration shows a model of the lifeboat being fired at with a revolver, the material remaining water-tight.

*Invention of
H. L. Pryor*



Running through One of the Track Switches

The Electric Monorail Crane About to Take One of the Switches

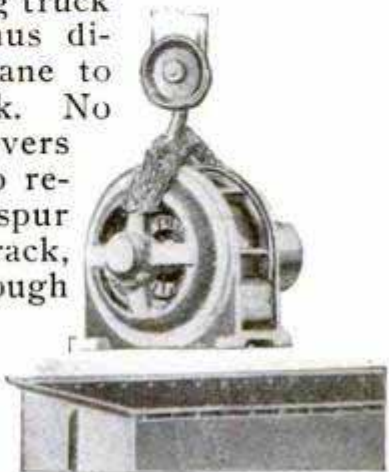
The Traveling Crane Running around a Curve

3620 TRAVELING CRANE HAS UNIQUE SWITCHES

Unlike the ordinary traveling cranes, the electric hoist here illustrated is of a monorail type that runs from department to department through narrow passages and doorways, has several branches, and runs around curves. Probably the most interesting feature is the track switches, which have no moving parts. There are no open ends of track to be guarded, no setting of switches for the desired direction of travel, and the trolleys run through the track switches in all directions without stopping. All the operator has to do is to select his route and pull the required lever. The two I-beams, constituting the main or straight-through track, and the third I-beam, which constitutes the spur or curved track, have cast-steel extension pieces, or tongues, rigidly secured to the terminals, the

projecting portion of each tongue being at the same level as, and forming a continuation of, the bottom flange of the I-beams. These tongues are so shaped that there is sufficient space left between them for the trolley trucks to pass.

When the trolley approaches a switch at which it is desired to run from the main to the spur track, the operator pulls the steering lever. This raises a horizontal roller to a position in which it engages a curved rib on the under side of the central switch-tongue and the leading truck is swiveled, thus diverting the crane to the spur track. No operation of levers is necessary to return from the spur to the main track, nor to run through the track switch on the main track in either direction.



A FASCINATING TOY FOR THE CHILDREN

Among the latest devices for amusing the young folks is a toy that



A Toy That Makes Showers of Harmless Sparks

throws showers of harmless sparks which are especially effective in the

dark. The device consists of an emery-covered wheel with a metal axle upon which is hung a tin clamp. At either end of the axle is a loop of twine with pasteboard disks at the outer end. The toy is held in the two hands by the pasteboard disks and whirled around about 30 times in order to twist the strings. Then, on moving the hands toward and away from each other, the wheel buzzes around, striking the tin disk and producing showers of sparks.

A little electric light and battery of the pocket variety attached to a memorandum pad in such manner that the light is thrown directly upon it, was recently patented.

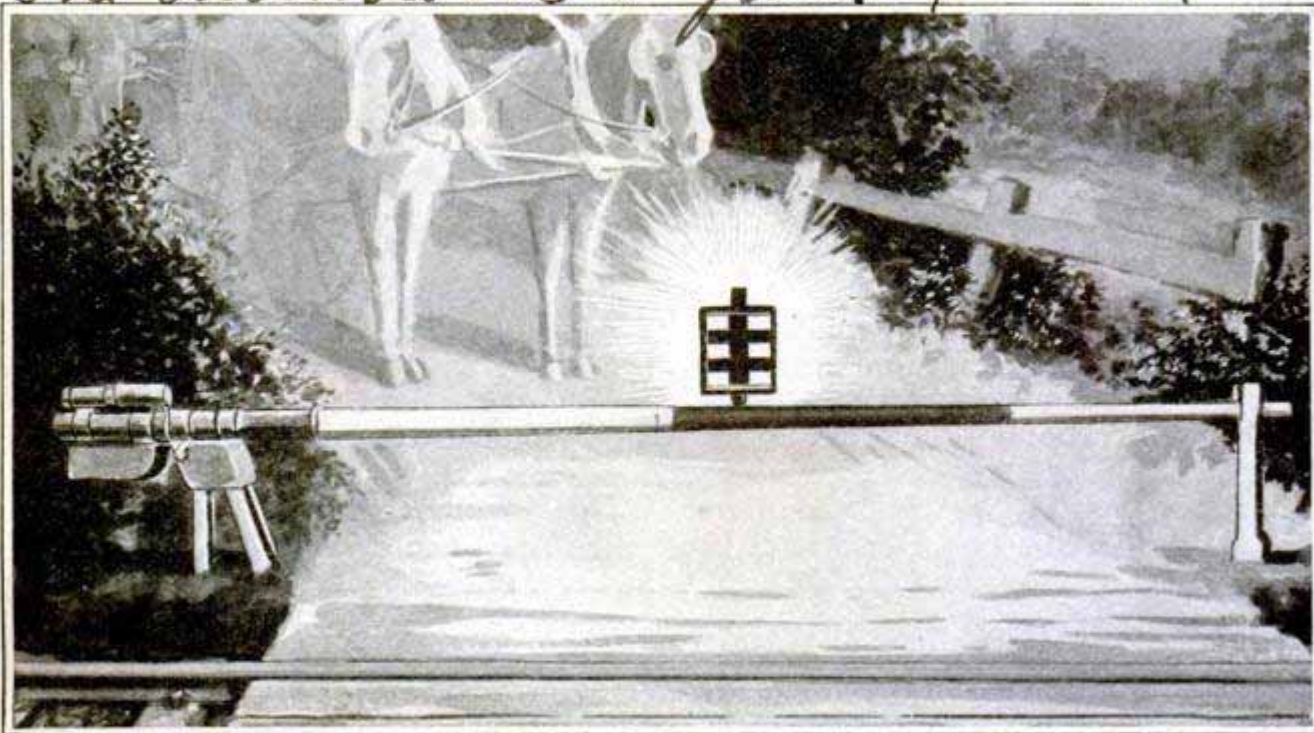
GRADE-CROSSING BARRIER WITH FLASH LIGHT

An automatic flash light for attaching to the middle of the barrier or bar used for guarding grade crossings of railroads has been invented. The light source of the apparatus is a steel bottle located at the heavy end of the barrier and containing acetylene gas dissolved in acetone. The gas is carried to the flash-light lamp by means

of a single metallic tube and constantly maintains a small jet of flame for igniting the flash light when the barrier is let down. The cost of operating the device is extremely low.

A company in Copenhagen, Denmark, makes the disinfecting of telephones its business.

The Automobile - Jan. 9 - 1914



Automatic Flash Light for Railroad Grade Crossings

Made by Julius Pirtsch Co.

Mfrs. - Wm. Strick Co. New York 29 E. 19th St. 1209

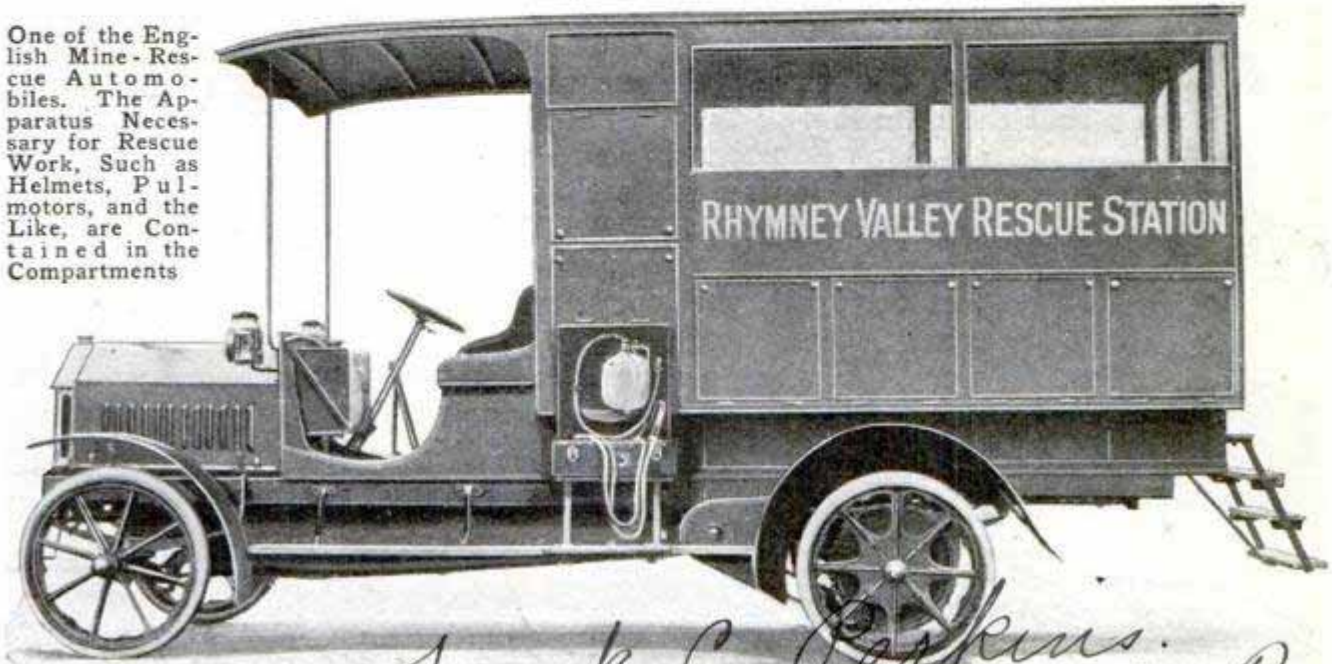
Ans. Otto Knaenger 1209 E. 19th St. N.Y.C.

**ENGLISH MINE-RESCUE
AUTOMOBILES** 3396

In addition to the provision that every coal mine shall maintain one or

ious metal from the material passing through the holes in the screen; a pumping apparatus, furnishing an ample water supply for washing and sluicing the gravel, and the necessary

One of the English Mine-Rescue Automobiles. The Apparatus Necessary for Rescue Work, Such as Helmets, Pulmotors, and the Like, are Contained in the Compartments.



*Frank C. Perkins.
Erie Co. Savings Bank Bldg
Buffalo*

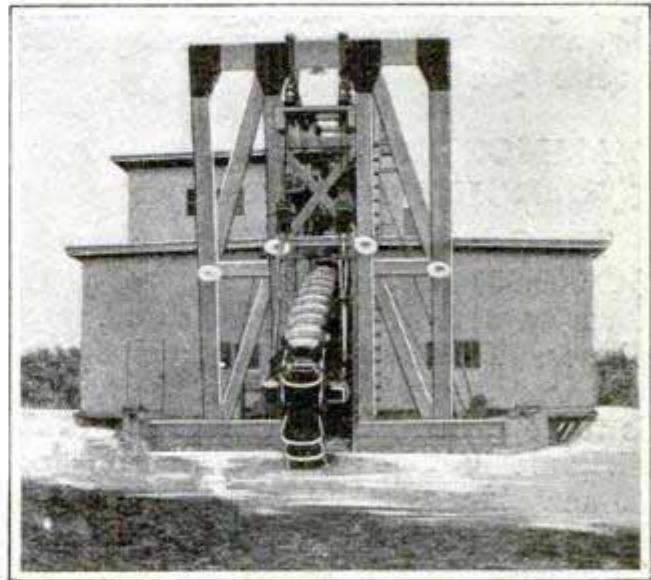
more competent rescue brigades, the English requirements provide that a fully equipped rescue automobile be attached to every central rescue station in constant readiness for calls. The rescue automobile of the Rhymney Valley station is here shown. In the numerous compartments are two pulmotors, a pump and fire extinguishers, oxygen cylinders, lamps, potash cartridges, tools, and the self-contained rescue helmets and jackets used by the rescuers.

ropes by means of which the dredge may be placed and held in any position.

The excavating apparatus consists of an endless chain of buckets of great weight and strength, that will cut and dig not only the gravel, but the bedrock as well. The action of the buckets is slow and powerful, so that the gold-bearing gravel is picked up in a mass with very little agitation. As the buckets are water-tight, there is no possibil-

**A MODERN GOLD-DREDGING
MACHINE** 3633

One of the modern gold-dredging machines comprises a digging apparatus at the bow of the boat, for raising and delivering the material into a screen, located about amidships, in which the material is sized and washed; and an elevator or stacker at the stern, conveying the over-size material from the screen to a necessary distance behind the dredge and onto the pile of "tailings," or refuse.



The machinery also includes a gold-saving device, for recovering the prec-

Modern Type of Gold Dredger Used in Brazil

N. Y. Engineering Co. (3633)

380 Motor Cycling 3/4/13

ity for the gold to be lost, and the material is delivered into the washing and separating screen in an almost continuous stream.

LONDON LEGISLATES AGAINST NOISY MOTOR VEHICLES

An "era of silence" began in London, England, on April 1 last. On that date an amendment order to the motor-vehicle laws, passed by the Local Government Board, making it a misdemeanor to open the muffler cut-out of an automobile or motorcycle, went into effect. An interpretation of the law is that noise made by a motor is evidence of an infraction of the rule, whether a silencing contrivance is used or not. Paris authorities have also issued an edict making the use of muffler cut-outs punishable by fine or imprisonment.

AN ENVELOPE SEALER FOR THE OFFICE

The construction of this envelope sealer is such that the gum flap of the envelope is moistened by passing between two rolls, one of which is a wet felt roll, the other being of steel. As the envelope passes between these two other felt rolls that

"Office Boy"



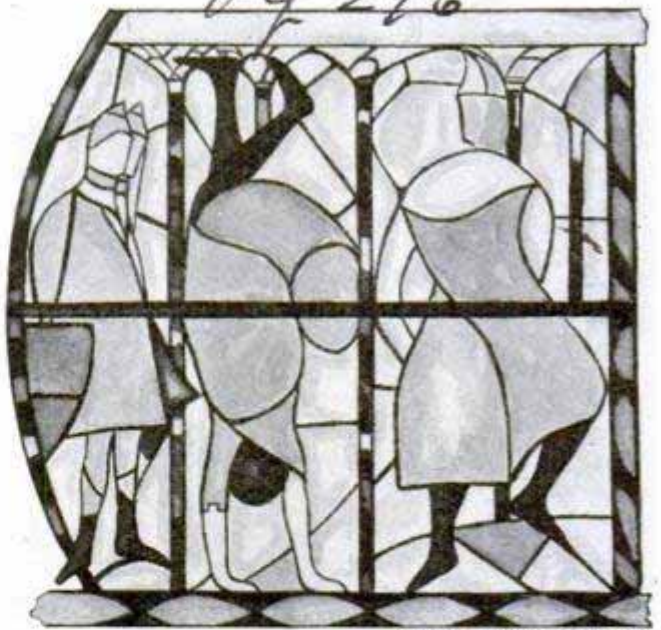
Seals 100 Envelopes a Minute

tween these two rolls the flap is pushed down and held until the envelope is drawn between two other felt rolls that

thoroughly seal the envelope and remove any moisture it may have obtained from the moist roll. The device weighs 14 lb., can be operated by any boy, and, it is claimed, will seal 100 envelopes a minute when operated at full speed.

SALOME IN AN OLD CHURCH WINDOW

The red-stockinged Salome of Lincoln Cathedral, England, is one of the quaintest examples of the stained glass work of the fourteenth century. It is a panel of the window which lights the south transept of the cathedral. With true dramatic instinct the designer selected for representation the moment in the story when, as he conceived it,



Courtesy The Graphic
The Salome Window of Lincoln Cathedral

MAMMOTH AERO FLEET TO BE BUILT IN GERMANY

The German government is to spend \$12,500,000 during the next five years for a naval fleet of dirigibles and aeroplanes. This fleet is apart from that of the army, on which nearly \$25,000,000 is to be spent. The construction of 10 dirigible balloons of the largest size, 50 aeroplanes and 54 double, revolving balloon sheds is called for immediately. The aeroplanes alone will be manned by 1,452 officers and men.

Borger Mfg. Co. 308 Sycamore St. Cincinnati

Aero & Hydros Apr. 5 - 1913

3709

pg 296

3 8 6 8
Barbary-Worth Hotel Co.,
El Centro, Cal.

COLD-STORAGE HOTEL FOR HOTTEST AMERICAN CITY

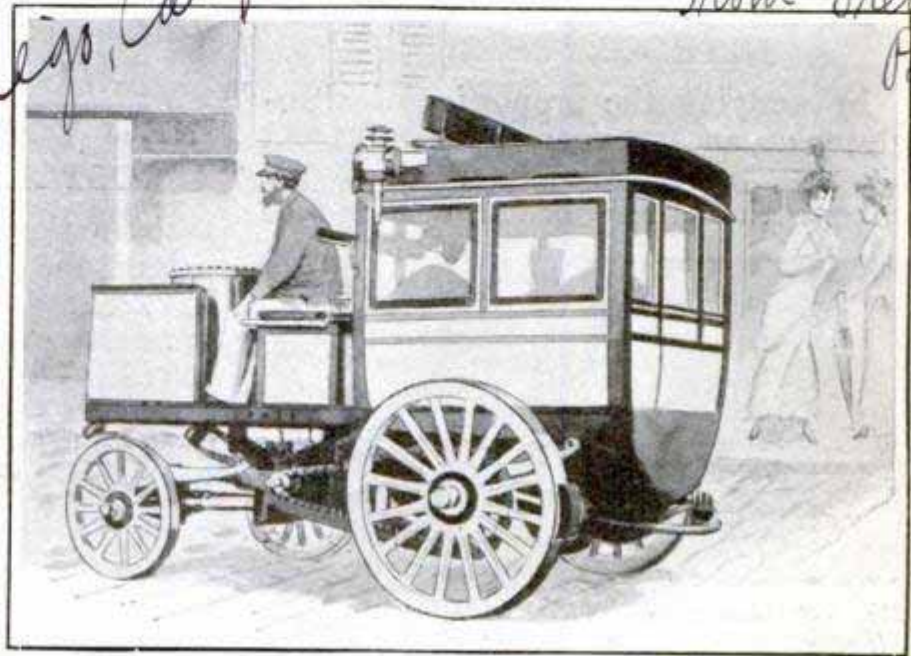
A cold-storage hotel is to be built at El Centro, Cal., which is situated 150 ft. below sea level in the center of the Imperial Valley, and is considered by the United States Weather Bureau to be the hottest city in the country. Yet the development of the surrounding territory brings many visitors the year round, to accommodate whom in comfort a company is now building a hotel, at a cost of \$150,000, that will have a cooling system throughout the building, in every room, and even in every bed. The cooling pipes will be everywhere, the bed frames being made of them. The walls, floors, and roof of the building will be double, and will contain vacuum spaces throughout. The company guarantees the house will be delightfully cool in the hottest weather, and that the guests will be comfortable, and eggs and meat sweet and fresh even when the thermometer ranges around the 120° mark for long periods. The hospitality is to be ready for use this summer.

San Diego, Calif.
San Diego, Calif.
San Diego, Calif.

EARLY TYPE OF FRENCH MOTOR OMNIBUS

The type of motor omnibus first used in Paris was a steam-driven vehicle made in 1891, before the days of the

From French Paper



One of the First Motor Omnibuses of Paris

gasoline autobus. A boiler and a small engine of the four-cylinder type, mounted on the front of the platform, was used to drive the rear wheels by chains, and the wheels were bound with ordinary metal tires. The bus, which carried only six passengers inside and three on the top seat, made quite a sensation when operated in the suburbs of the city.

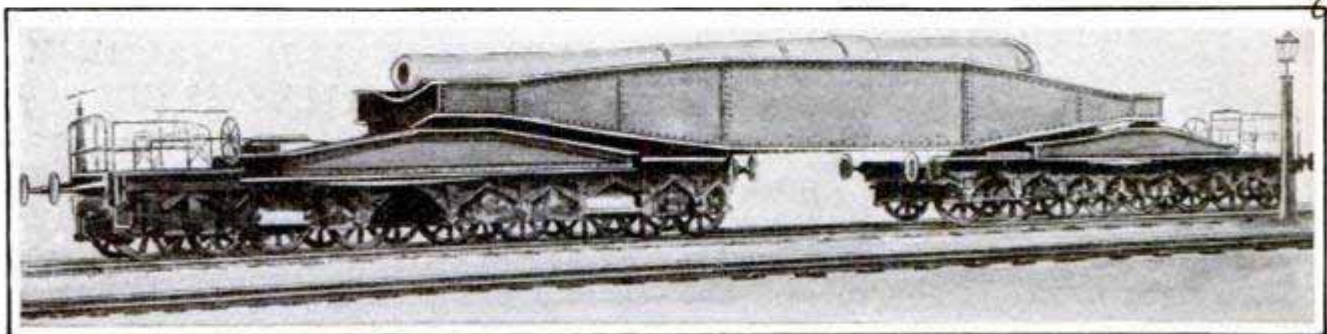
3 5 8 2

RAILWAY CARRIAGE FOR HEAVY GUNS

The Krupp factory at Essen, Germany, has several exceptionally heavy railway cars for use in transporting

heavy guns and gun mountings. Four trucks, each having four wheels, carry a structure similar in appearance to a

Cosmos 1/30/13 Pg 116



Special Railway Cars Used by the Krupps for the Transportation of Heavy Guns and Gun Mountings

Krupp Gun Factory,

bridge girder, on which the guns or gun mountings are placed for transportation. The complete outfit has a length of 87 ft., and a carrying capacity of 154 tons.

PUTTING OBEDIENCE INTO NITROGLYCERINE

In studying the properties of nitroglycerine, an American chemist, Harold Hibbert, made the interesting discovery that there are two kinds of



Fig. 1—Photograph of Nitroglycerine Crystals in Labile Form Which Experiments Show will Not Explode So Easily As in Other Form

such as are shown in Fig. 1 are produced, these being of what is called the "labile" form of nitroglycerine. If these are allowed to stand, they slowly change into the "stable" form of nitroglycerine. The crystals shown in Fig. 2 were obtained by cooling the liquid to a low temperature and then dropping in a crystal of the stable form.



Fig. 2—Crystals of Nitroglycerine in Stable Form, Which Experiments Show to be Safer Than the Liquid

forms into steel cups, and allowed a 2-lb. weight to drop upon them. The liquid exploded when the weight was dropped 6 in.; the stable solid, when it

dropped 10 to 12 in., and the labile form, when it dropped from 14 to 16 in.

The discovery is particularly interesting because it seems possible that further researches may lead to the manufacture of some form of this explosive which, with ordinary care, could be handled with perfect safety.

3846

NEW YORK'S NEW SUBWAYS COSTLIER THAN PANAMA

From the standpoint of finances involved, the proposed New York Rapid Transit Subway System is one of the greatest engineering feats yet projected. The total expenditure for the extension and improvement of existing lines and the establishment of a service to Brooklyn will amount in round numbers, to \$302,000,000. When completed, the valuation of the entire system will exceed the cost of the Panama Canal work. A considerable mileage is already under contract. The entire system is to be ready for operation by January 1, 1917.

WIRELESS FIRE ALARM BRINGS AID TO SHIP

When fire broke out in the steering-engine room of the "Ohnda," while at anchor in lower New York Harbor, an alarm was turned in to the Brooklyn Navy Yard by means of the wireless system. Deputy Fire Chief Woth at the Battery headquarters was notified and a fireboat was soon on the way. The flames were quickly extinguished. This was the first time in the history of the New York department that an alarm had been sent in by wireless.

"WHAT IS IT?" MACHINE OF THE MAY ISSUE

The machine illustrated in the May issue without description, under the title of "What is It?," is a trench excavator with bank-sloping attachment, designed for the digging of small, open drainage ditches or tile trenches.

No. number

Engineering News

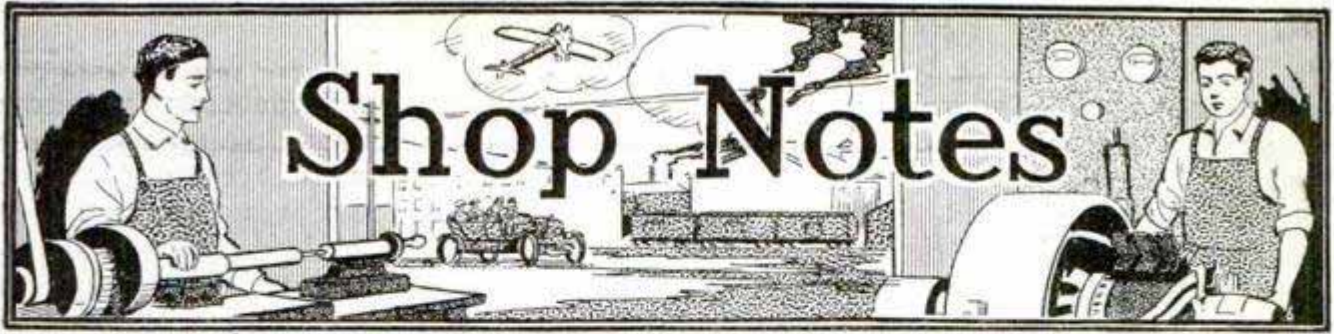
Vol 69 No 13

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3808 The Maritime

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2736



Shop Notes

An Oxyacetylene-Welding Outfit

By A. H. WAYCHOFF

*Louis, Colo.
Kovacic*

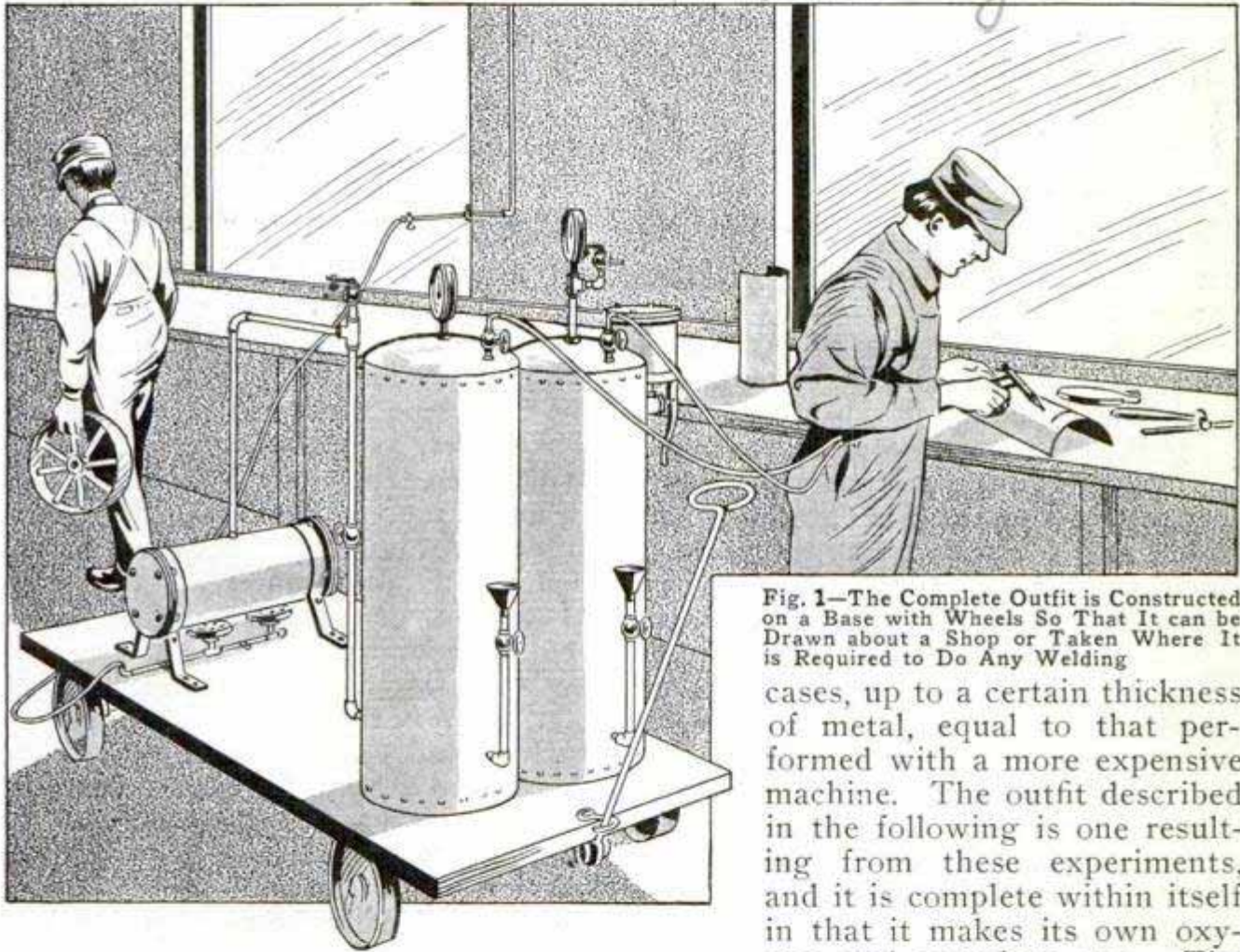


Fig. 1—The Complete Outfit is Constructed on a Base with Wheels So That It can be Drawn about a Shop or Taken Where It is Required to Do Any Welding

The expense of outfits for oxyacetylene welding, regularly offered on the market, prohibits their use in the small shop or the average blacksmith shop, where the amount of work is not enough to make such an outfit indispensable. Yet some kinds of work require a welding machine of this kind, and through the ingenuity of some shop owners, who had the time to spare, after various experiments, the construction at home of an inexpensive outfit has been made possible. The work done with this apparatus is, in all

cases, up to a certain thickness of metal, equal to that performed with a more expensive machine. The outfit described in the following is one resulting from these experiments, and it is complete within itself in that it makes its own oxygen and acetylene gas. The

construction of the parts constituting the outfit, as shown in Fig. 1, will be described separately.

The Oxygen Generator

The receiver A, Fig. 2, is made of an old hot-water boiler, 60 in. high and 24 in. in diameter, holes being drilled and tapped for $\frac{1}{2}$ -in. pipes, at B and C, near the bottom. As this receiver must be kept half full of water, the filling pipe, connected at B, should be carried up a little above the halfway point on the outside, and a globe valve and fun-

nel attached. This valve should always be kept closed except when filling with water. A hot-water boiler usually has two holes in the head, and pipe connections were made in these, one being equipped with a needle angle valve, D,

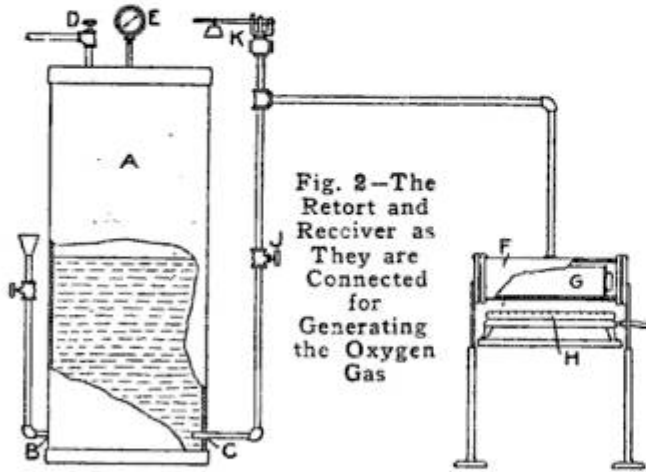


Fig. 2—The Retort and Receiver as They are Connected for Generating the Oxygen Gas

and the other with an ordinary steam gauge, E.

The retort F consists of a piece of pipe, 18 in. long and 5 in. in diameter, with a blind flange fitted on each end. A gasket is placed between the blind and regular flanges, to make the retort perfectly air-tight. The interior of the retort is fitted with a tray, G, made of a piece of tin. The retort is placed on supports, about 2½ ft. high, and a gas burner, H, is attached beneath, as shown. The center of the retort on top is drilled and tapped for ½-in. pipe, and connections made, as shown, to the receiver A, at C. A ½-in. globe valve, J, is inserted in the line, and a safety valve, K, placed at the top, as shown. The upper part of this pipe line should be carried a little above the top of the receiver A.

The oxygen gas is generated from equal parts of manganese dioxide and potassium chlorate. These chemicals should be absolutely pure and free from dirt or sawdust. They are placed in the tin tray G, which is slid into the retort by removing one of the blind flanges, and after both blind flanges are bolted tightly in place, inclosing the chemicals, the gas burner H is lighted, the receiver being first half filled with water and the valve J opened. As soon as the chemicals become hot they will give off oxygen gas, which is forced

through the pipe connecting the retort with the receiver and through the water in the bottom of the receiver to the upper part where it is stored ready for use. When the desired pressure is obtained, the gas burner can be regulated so that just sufficient gas is generated for use in the torch. It is absolutely necessary that the chemicals be kept clean and that no sulphur or any form of organic chemicals, such as sugar, wood, sawdust, etc., be allowed to get mixed with the potassium chlorate, as it will then become a violent explosive. There is no danger, however, if the chlorate is kept clean. The working pressure is from 25 to 40 lb., and the safety valve should be set to hold a pressure of from 50 to 60 pounds.

The Acetylene Generator

Another range boiler, the same size (60 in. high and 24 in. in diameter) as the receiver for the oxygen, is used for the acetylene generator and reservoir. The boiler, as shown at A, Fig. 3, is drilled and tapped for a ½-in. pipe, at B, and a pipe connection with a globe valve and funnel is attached to fill the boiler half full of water as in the case of the oxygen receiver. The valve should be kept closed except when filling with water. A hole, 3 in. in diameter, is cut in the opposite side near the bottom, and a short nipple used with a flange and a blind flange, as shown at C. This is used in cleaning out the residue that accumulates from the used carbide. The cleaning-out hole could be supplied with the regular handhold attachments in the place of the nipple and flanges.

The top of the boiler is equipped in a similar manner to the oxygen receiver. There are two pipe connections, one having an angle needle valve, D, and the other fitted with a gauge, E, and a safety valve, F.

The feeding hopper for the carbide is made as follows: A hole, 2 in. in diameter, is cut in the boiler near the top, at G, and a 2-in. pipe flange bolted over it to make a tight-fitting joint. A 2-in. nipple, H, 4 in. long, carrying a tee, J, another nipple, K, 6 in. long, and

a cap, L, are screwed into the flange. The cap is drilled in the center, tapped and fitted with a stuffing box, to admit the rod M that controls the feeding device N. The side outlet of the tee J is fitted with a short nipple, on which is attached the carbide hopper. The body O of the hopper is made of a 12-in. length of standard 6-in. pipe with a flange and blind flange, P, for a covering. The bottom is made of a cap drilled and tapped centrally for the pipe connection to the tee J. The feeder N is made to fit the hole in the 2-in. pipe snugly, and by the operation of the lever Q a charge of carbide is introduced into the reservoir where it drops into the water and is converted into acetylene gas. The pressure required is from 5 to 15 lb. and can be easily kept up by the working of the feed lever.

The pressures for both the oxygen and acetylene are so low that second-hand boilers can be used as well as new ones, so long as they are gas-tight and not rusted out in any place.

The torch is a very difficult tool to make and it is advisable to purchase it from any oxyacetylene-supply house. The cost of a good one will be from \$5 up. Any drug store or oxyacetylene-supply store can furnish the manganese dioxide and the potassium chlorate, also the welding rods and fluxes.

When the two generating plants are complete they are connected as shown in Fig. 1. They can be set on a platform equipped with wheels for hauling it about. In this case a small gasoline tank will have to be supplied and arrangements made to have a heating burner for the oxygen retort.

To start the torch, light it and gradually turn on the acetylene, until it is burning with a steady flame, then slowly turn on the oxygen until the color comes to a bluish tint with a small white tip in the center. This will produce the hottest flame.

The welding is a very simple operation; in fact, it is much easier than to do brazing. Make a V-notch on the break, place the pieces together, then turn the flame into the notch, which will

melt the metal on the edges and cause it to run down into the crevice. Apply a welding rod of the same material as the work being welded in the notch and allow the flame to melt it and fill the space with metal. Scaling powder is

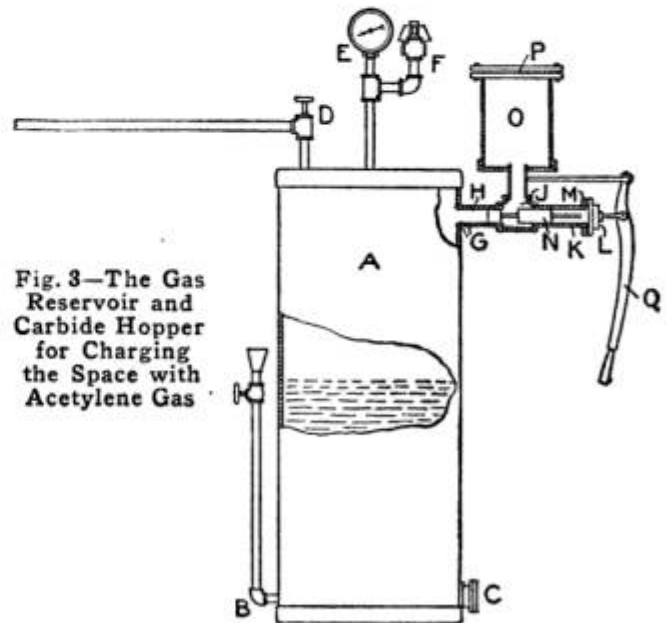
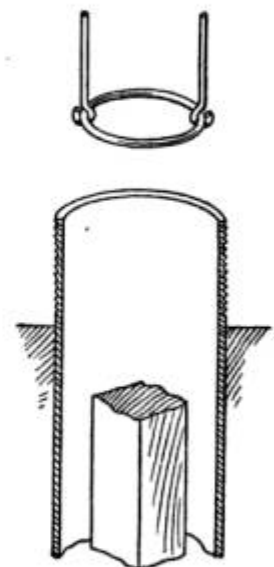


Fig. 3—The Gas Reservoir and Carbide Hopper for Charging the Space with Acetylene Gas

used on copper and cast iron, and an aluminum flux for aluminum, but a good job can be done with borax and boracic acid mixed. These instructions are very simple, but nevertheless an outfit made as described will do just as good work as any high-priced outfit that can be bought.

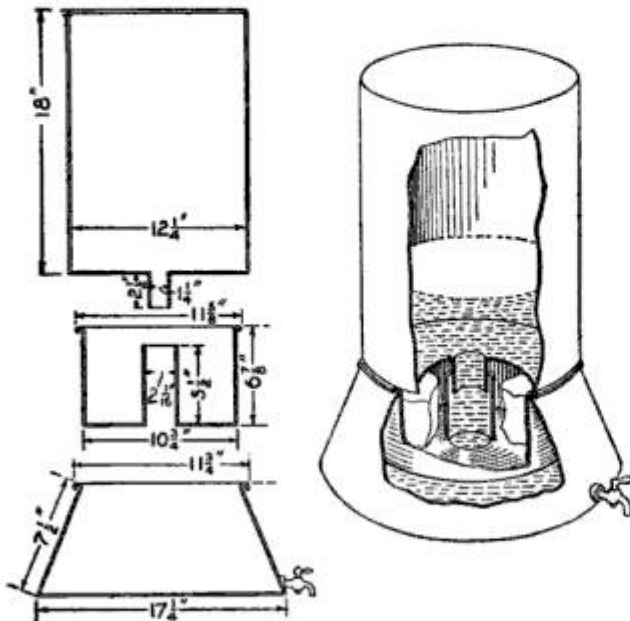
Pulling a Broken Pump Rod

Make a ring of heavy wire that will slip easily into the well casing and have a hole large enough to encircle the rod. Fasten wires loosely to the opposite sides of the ring. Lower the ring into the casing, at the same time keeping the ring as nearly level as possible, until it slips over the end of the rod at least 12 in. Pull on one wire only, and the ring will grip the rod so that it can be drawn out.—Contributed by Theodore Wilson, Atlanta, Ind.



Water Cooler

Drinking water iced in a pail is not agreeable to all persons and many times will cause sickness to workmen



Cooler for Water Where the Ice is Kept in a Separate Compartment Surrounded by the Water

in shops during very hot days. The water should be cooled by ice placed in a separate chamber which is surrounded by the pure water.

A cooling tank that will supply pure water for about 60 workmen can be easily made in the following manner: The water receptacle is shaped like a bottle and when filled with pure water it is placed in an inverted position so that the neck will extend into the base which has a faucet attached. The ice chamber is placed in the base where the water entirely surrounds it. The three parts are made of galvanized iron.

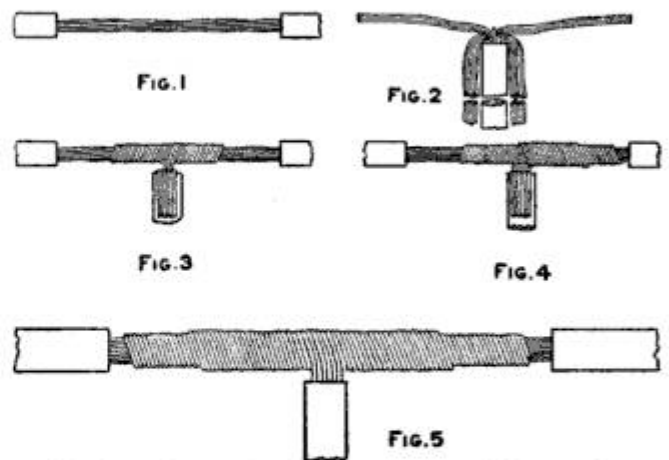
Growing Large Onions in Rich Soil

An onion grown in rich soil will produce large tops and small bulbs. This I averted by tying a piece of linen thread around each plant, about 1 1/2 in. above the ground, to strangle the top. The thread must be tied neither too tight nor too loose, just tight enough to prevent too much sap flowing into the top. I found that this would produce large bulbs and small necks, therefore better onions, that would also keep much longer when stored.—Contributed by J. W. Bauholster, Gresham, Ore.

Tapping a Large Electric Cable

On construction work it is frequently necessary to tap a line at right angles, and where the line is made up of several strands the proper way to make the connection is shown in the sketch. The insulation is removed, at the place for the connection, from the straight-line cable for about 3 1/2 in., Fig. 1, and on the end of the line to be connected for about 5 1/2 in. These lengths are for a cable of 19 strands. The wires are then thoroughly cleaned and six of the strands on the end of the cable are turned down on each side of the cable from the outer layer, and three each way, at right angles, from the next layer, Fig. 2, whereupon the center wire is cut off. Wrap the three strands each way, as shown in Fig. 3, and draw them tightly around the bared straight cable, and wrap the six strands each way on top of the three strands in the opposite direction, as shown in Fig. 4. It is best to wrap each wire separately in the latter operation. Be careful to have the strands lying close together and drawn tightly around the cable. The finished wrapping should appear as shown in Fig. 5. Apply the flux and solder by pouring the melted metal on the joint.

Any traces of the soldering flux should be removed after the joint is soldered. An application of alcohol



Various Stages in the Operation of Connecting a Line at Right Angles to a Cable

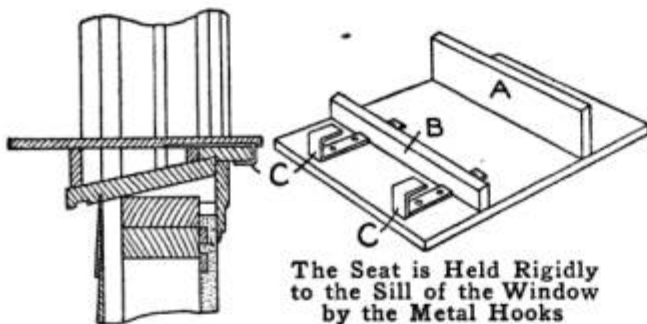
will clean the joint and keep it from corroding. Oiled linen makes a good substitute for the expensive tape on the joint, and this is then covered with the

usual application of friction tape, well painted. For wires of different sizes, the insulation must be removed for a different length, but in no case are any strands removed except the center strand as stated.—Contributed by G. E. Farquhar, Newark, Ohio.

A Seat for the Window Washer

Many times it is difficult to wash windows on account of the narrowness of the sill, and where it is lower than the stool of the window. The seat shown makes it an easy matter to get at the outside of the glass.

The seat is made of a board, 15 in. long, 12 in. wide and 1 in. thick, to which two crosspieces of wood, A and B, are attached as shown. The piece A rests on the sill and B keeps the seat secured so that it must be lifted to



be taken off. Two hooks of iron, C C, are fastened to the under side of the board where their ends will slip under the edge of the stool board.—Contributed by Edward Silja, Chicago.

Making Ells for Pipe

The use of a jig in conjunction with a universal chuck makes it an easy operation to machine an ell in a drill press or lathe. The jig consists of two parts, the first, Fig. 1, being for machining one opening in the ell and the second, Fig. 2, for finishing the other opening at a true right angle to the first.

The first part is made of round or hexagon stock, the latter preferred if a three-jawed chuck is used. The pin A fits a tapering hole and when driven in, it draws the ell in the opening tightly against the beads on the ends,

the slot in the part being drilled and cut just wide enough to admit the body of the ell.

After machining one opening the ell

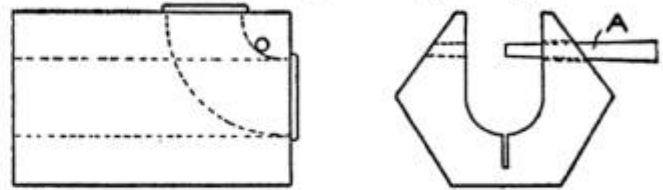


FIG. 1

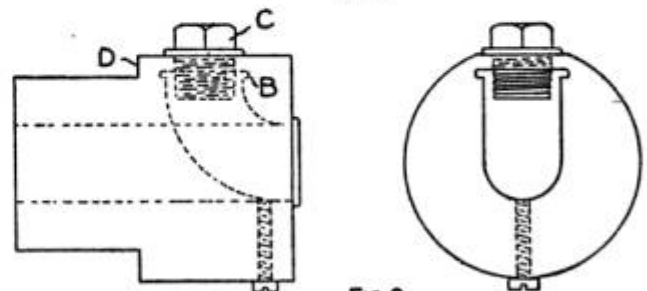


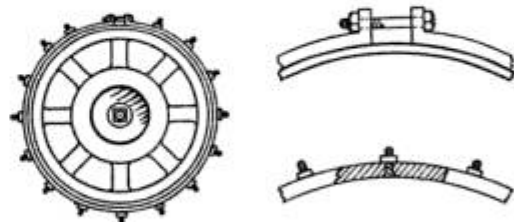
FIG. 2

Positions of the Ell in the Jig for Machining the Openings at True Right Angles

is placed in the other part of the jig, Fig. 2, which is made in a similar manner to admit the body of the ell and the bead B. It is held in place with a screw, C, having a true pipe thread. The screw will hold the ell in position with the unfinished opening at a true right angle and straight out from the center. The turned shoulder D, on this part, makes it easy to place the whole in a chuck.—Contributed by Edwin Menger, San Antonio, Tex.

Grouters for a Lawn-Mower Wheel

The lawn-mower wheel that causes trouble by slipping may be easily remedied with an auxiliary tire supplied with grouters made of small stove bolts. The tire is a piece of strap iron, about 1 in. in width and of a length to encircle the rim of the wheel, with

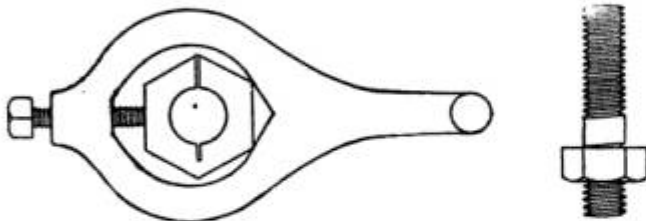


Auxiliary Tire Supplied with Stove Bolts for Grouters to Attach on a Lawn-Mower Wheel

ends bent up to receive a bolt for clamping it in place. The iron is then drilled or punched to receive the stove bolts.

Dogs to Hold Threaded Shafts in a Lathe

In doing turned work on threaded shafts and bolts in a lathe it is necessary to provide some means other than

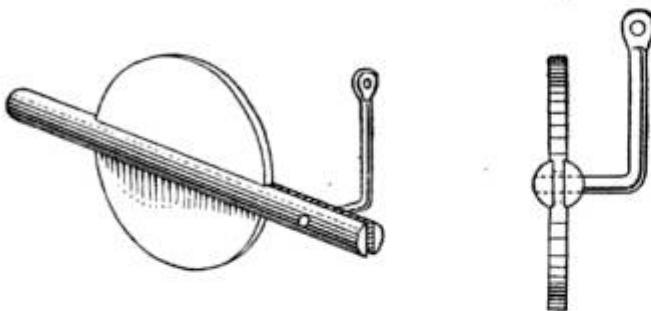


The Slot in the Nut Forms a Clamp That Grips the Threads on the Shaft

the ordinary dog to hold the work without injury to the threads. The method I use seems to be the best, and the device is very easily made and applied. A nut that will fit the threads on the work being turned is cut almost in half with a hacksaw, as shown in the sketch, and used in connection with the regular lathe dog. The metal removed by the saw is sufficient to allow the nut to grip the threaded part of the shaft when the dog is clamped over it.—Contributed by John P. Kolay, Ithaca, New York.

A Butterfly Valve

When starting a gasoline engine in cold weather it is sometimes necessary to shut off the air and allow only the



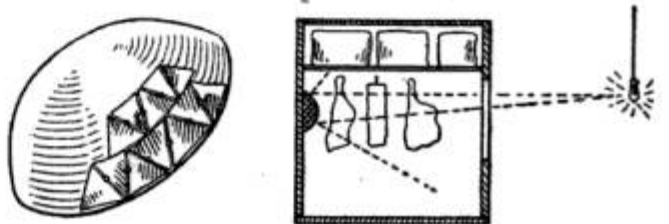
Butterfly Valve for Placing in a Pipe to Control the Air Supply to a Carburetor

gas to enter for making a rich mixture. If the engine is not equipped for shutting off the air, a hand must be placed over the opening. Instead of this method, motors not so equipped can be fitted with a butterfly valve in the air-intake pipe at small cost. Such a valve is shown in the illustration. The stem is a piece of $\frac{1}{4}$ -in. rod with a hacksaw slot cut almost the entire length. A

piece of $\frac{1}{8}$ -in. sheet brass is cut to the circle of the pipe, and filed across the center to fit the slot. Thus made no pin or screw is required to hold it in place. Holes are drilled through the walls of the pipe across the diameter, the circular disk of brass put in place and the split wire shoved through the holes and onto the disk. A $\frac{1}{8}$ -in. wire is then driven into a hole drilled through the stem, as shown, which locks the parts together and forms a lever for attaching a spring and the connection wire, if desired.

Reflecting Light into an Ice Box

A wood chopping bowl was procured and its bottom covered with small triangular pieces cut from a mirror. The reflector thus made was hung in the ice box directly in line with the store light outside when the door was opened. The reflected rays from the



When the Door of the Ice Box is Opened the Reflected Rays Immediately Illuminate the Interior

light gave sufficient illumination to all parts of the interior. The pieces of mirror are tacked on the bowl at various angles so the rays of light will be reflected in different directions.—Contributed by E. L. Douthett, Kansas City, Mo.

A Belt-Lacing Cutter

An excellent and practical lacing cutter for doing the work quickly and uniformly can be made from two or more safety-razor blades and a suit-



The Blades are Set in the Wood Handle and Spaced to Equal the Width of the Lacing

able piece of hard wood, which serves as both handle and holder. Make the desired number of cuts in the wood

with a saw, then drive the blades into position by gently tapping them on the ends with a hammer.—Contributed by W. A. Jaquythe, Richmond, Cal.

Jumbo Chuck for Watchmakers

Not having the universal chuck in my set and being in need of something larger than the ordinary split chuck, I constructed a jumbo chuck from an old No. 12 gauge shotgun wad cutter. This



An Ordinary Cutter for Making Shotgun Wads Made into a Jumbo Chuck

not only served my purpose, but it is useful in many ways to the watchmaker.—Contributed by A. I. Horworth, Ben Avon, Pa.

Staging Hook for Shinglers

The usual method of attaching a shingle to a piece of timber, then driving nails through the shingle into the finished part of the roof, many times causes a leak which could be avoided if hooks were used to hold the staging timber. Hooks, made as shown in the sketch, are attached by placing one hooked end into a space between the sheathing boards and hooking the timber into the other end. With this hook it is unnecessary to make any holes in



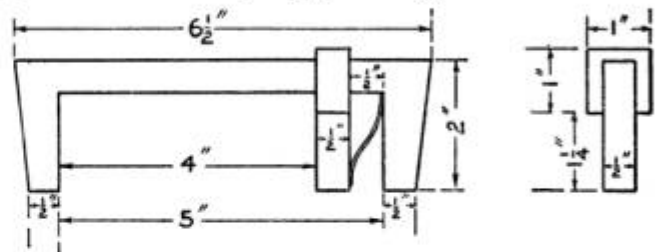
The Hook Prevents Making Holes in the Finished Roof, and the Staging is Much Easier Raised

the finished part of the roof.—Contributed by Clyde Hall, Eureka Springs, Arkansas.

A Line Holder for Brick Masons

When laying brick on long walls it is often necessary to place a brick in the center to keep the line from sagging. A very simple tool, and one that is handy to use for holding the line, is shown in the sketch. Wherever it is necessary to hold the line, place a brick flush with the outside and slip the tool

over the brick, allowing the spring to push the clamping part against the line

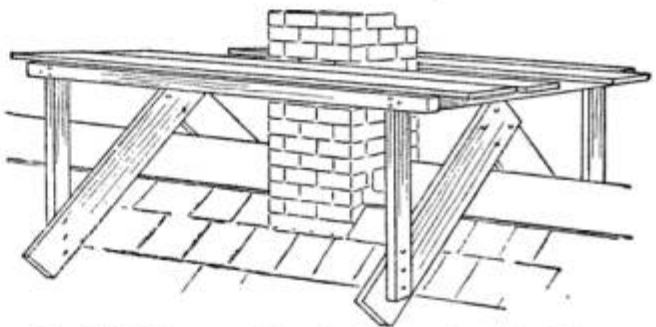


The Tool is Easily Clamped over a Brick and Holds a Line Flush with the Outside

which lies on the face of the brick.—Contributed by Robert M. Thomas, Denver, Colo.

Roof Scaffold without Fasteners

In repairing or building chimneys a scaffold is necessary and the usual method is to fasten the vertical pieces to the roof. A better way is to fasten

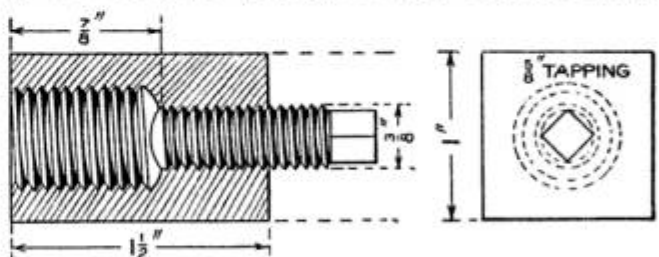


Scaffold Supports for the Ridge of a Roof That Requires No Fastenings

the vertical supports to pieces nailed together to form an angle equal to the pitch of the roof. These pieces are placed over the ridge of the roof without any fastening whatever and the scaffold built upon them.—Contributed by Fred L. King, Islip, L. I.

A Stud Driver

When setting studs, the common practice is to put two nuts on the stud



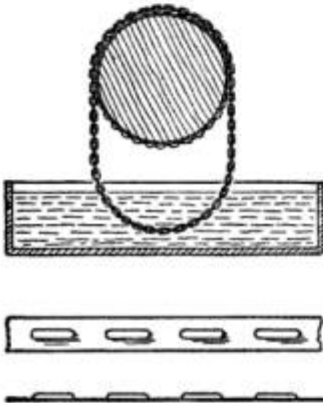
Dimensions for a Driver to Turn 5/8-In. Studs into Place without Damage to the Threads

and screw them up until they are well locked together, says Power. This fre-

quently injures the thread, but such damage can be avoided by making a stud driver similar to the one shown. For a $\frac{5}{8}$ -in. stud a piece of 1-in. square stock is suitable. This is drilled and tapped out $\frac{1}{4}$ -in. deeper than the diameter of the stud. A $\frac{3}{8}$ -in. hole is also drilled and tapped through from the top. This small hole allows a pin to be screwed through and come down on top of the stud, thus preventing injury to any threads on the stud when it is screwed in.

Chain Oiler for a Bearing

A method of providing a positive chain oiler for a shaft bearing running at a slow or medium speed is shown in the sketch. An ordinary inexpensive open-link brass chain is used, and is run over a sprocket made by draw-punching teeth in a strip of thin sheet brass having a length equal to the circumference of the shaft. A little figuring, or stretching of the brass strip, may be necessary to get the correct spacing of the teeth at the joint. A little solder, or escutcheon pins driven through the sprocket band, will hold the sprocket on the shaft.—Contributed by Wm. C. Terry, Boston, Massachusetts.



Improved Method for Electrodeposition of Platinum

In view of the constantly rising price of platinum, a new method, recently published in a French journal, of electrolytically depositing it on baser metals to make them noncorrosible should be of interest especially to makers of laboratory utensils and apparatus.

The platinum salt used to make the electrolytic bath is its chloride in com-

ination with potassium. In passing the electric current through this bath a dark deposit of finely divided metallic platinum, so called platinum black, is formed on the object to be plated, at the cathode. The chemical reaction of the bath is alkaline at that point. It is therefore necessary to add some acid to the bath in order to obtain a plating that will stick. For this purpose no inorganic acid may be used, as it would attack the object to be plated, but citric acid—the acid occurring in lemons and various other fruits—is found very satisfactory.

A suitable solution is made by dissolving 10 parts, by weight, of citric acid and 2 parts of the platinum salt in 100 parts of water. This solution is heated to a temperature of 185 deg. F. The object to be plated must be removed from the bath every 10 minutes, well dried and polished. By adding more of the platinum salt the bath may be rejuvenated, but can otherwise be used 25 to 30 times.

Oil Spreader for an Oilcan Nozzle

A very convenient device to spread lubricant over rapidly moving surfaces is made as shown in the sketch. It consists of the brush part, taken from a discarded toothbrush, which is drilled centrally to receive the end of the can spout, a screw eye being fastened in one end to hold it in place. The manner of using the device is obvious.—Contributed by G. H. Holter, Jasper, Minn.



Splitting Large Blocks of Stove Wood

When splitting large blocks sawed from logs for stove wood, hit the top of the block with a slight slant of the ax directed toward the edge of the block. The ease with which blocks may be split will surprise anyone.—Contributed by J. R. Quirk, Wheatland, Wyo.

Paving and Pavements

By GEORGE LITTELL

PART I

[The object of this article will be to give the reader a general idea of the course of procedure and the latest methods employed on a construction job of this kind. Only the actual work will be described.—ED.]

Grading

When the excavating gang arrives upon the job it finds that the engineering crew has placed stakes, at regular intervals, along both sides of the proposed street. These stakes are marked with the "cut" to be made at that point and are placed at an offset from the curb line of the finished pavement. This offset may vary with conditions, but is usually about 3 ft.

A pair of stakes are shown in position in Fig. 1, the "cut" 0.50 being equal to "cut" 0.50 ft., or, to be very plain, cut $\frac{1}{2}$ ft. These cuts are given to the crown, or top, of the finished pavement and care must be exercised when doing the rough grading. When figuring the actual cut to be made, to ascertain the crown of the subgrade, the following method must be used. The given cut to the crown is the surface level of the finished pavement, so that the depth of the cut must be the total of the surface coating, the cushion coat and the depth of the concrete.

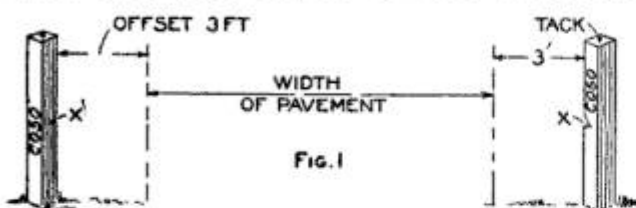


FIG. 1

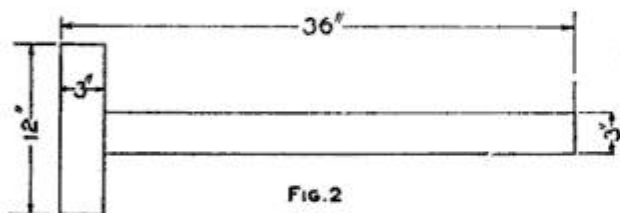


FIG. 2

Stakes Set by the Engineering Crew Designate the Amount of Cut or Fill

For example, a brick-paved street using the cut given in Fig. 1 would be as follows:

Given cut 0.50	0 ft. 6 in.
Thickness of brick.....	0 " 4 "
Thickness of cushion.....	0 " 1 "
Depth of concrete.....	0 " 6 "
Actual cut to subgrade.....	1 ft. 5 in.

To obtain the crown of the subgrade three wooden tees, made as shown in Fig. 2, are used; two being

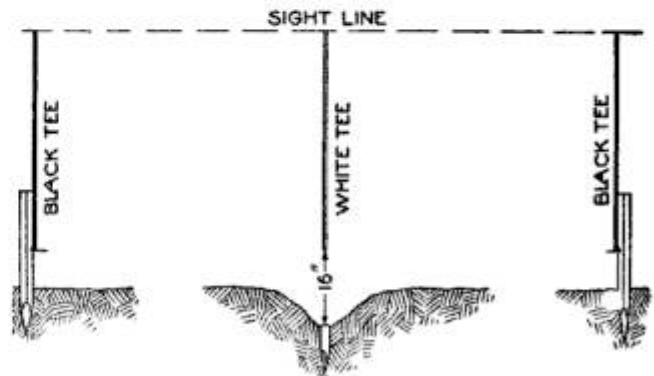


FIG. 3

The Crown is Obtained by Sighting over Tees Placed on the Stakes to Adjust a Center Tee

painted black and one being painted white; or they may be painted red, white and blue. The point of a pocket-knife is placed into the stake, at X, Fig. 1, on either side of the road, and a black or colored tee is placed upon each. The white tee is then held between them and lined up for height. A stake is then driven down 1 in. less than the actual cut to the subgrade or, using the example, 1 ft. 4 in. This operation is illustrated in Fig. 3.

Stakes are then driven in on the offset line and the actual grading is commenced. If the soil is of clay, or fairly loose, an ordinary grading plow is used, but if it is composed of stone, pieces of block asphalt, cinders, etc., as is often the case, a router plow is called into action. One of these plows is illustrated in Fig. 4.

The plows are started one after another up one side of the road and down on the other, leaving a hard road in the center for the use of the teams. After the sides are plowed up, the wagons use one side of the road while the plows loosen up the center. The same route is covered again and again until the subgrade is reached. Scrap-

ers are also used, sometimes, but not to any great extent when a heavy cut is to be made.

The wagons are usually lined up and

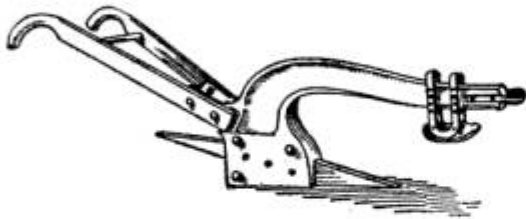


FIG. 4

Implement Used Instead of the Plow for Loosening Up Earth Packed Hard by Traffic

a crew of about 10 laborers is placed on the head or lead wagon; about eight laborers on the next wagon; about six laborers on the third, and about four laborers on each of the others. This method of loading keeps the teams continually on the move and the earth is speedily removed.

When the rough grading is finished, the tees are again used and stakes are set 10 in. higher than the subgrade. The gutters are cut to grade by using a line set on the bank, and quarter

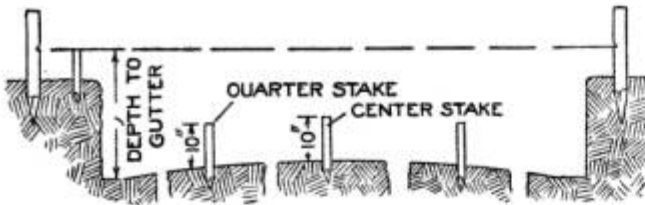


FIG. 5

The Tees are Again Used after Rough Grading to Set the Stakes on a Higher Level

stakes are set midway between the gutter and the crown of the road, Fig. 5, and experienced graders, with mattocks and shovels, trim off the few remaining lumps and fill up the depressions until the finished grade is smooth and even. Different soils settle to different depths when the roller is put upon them, but if the grade is finished $\frac{3}{4}$ or 1 in. higher than the desired subgrade it will usually press down until it is nearly correct or, at most, $\frac{1}{2}$ in. high. This will necessitate only $5\frac{1}{2}$ in. of concrete instead of 6 in. and, while not materially weakening the foundation of the pavement, means a considerable saving of concrete if the job is a large one.

Trenching

After the finished grade is obtained the next operation is trenching for the drain tile. The width and depth of this trench is shown in Fig. 6, at A. The drain tile, broken stone, concrete and curbing are shown in position at B.

The drain tile comes in 1-ft. lengths and is simply laid on a foundation of gravel, chips from curbing, old concrete or some similar material; covered with 1 or 2 in. of the same material and then with about 4 in. of fine earth, well tamped. The concrete base for

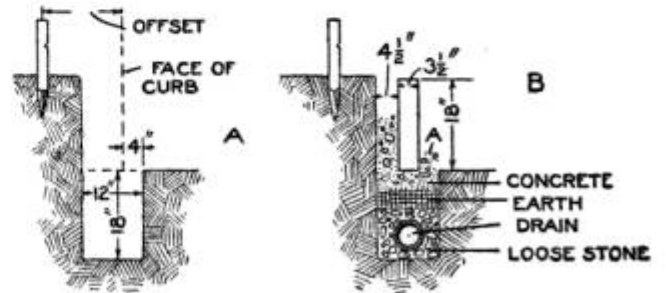


FIG. 6

Trenching for the Drain Tile and Its Location with the Fillers in Place

the curb is laid upon this earth, the curb is set and more concrete is tamped in behind it.

Concrete Curbing

While concrete curbing is gaining favor among highway engineers with great rapidity, not only on account of the lower cost of construction, but also on account of a better-looking and more lasting job, its use is not yet universal. A great number of the larger cities have adopted this type of construction while others have not used

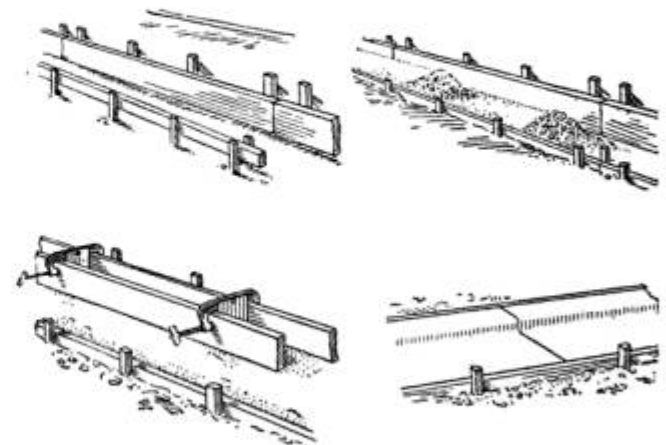


FIG. 7

Method of Using Wood in Constructing a Form to Make a Concrete Curbing

it up to the present time, but that does not lessen the popularity of the product.

While concrete curb and gutter forms can be constructed of plank, as any other form or mold for concrete, the cost is very high and for that reason the contractors are using the pressed-steel forms, as the finished product is more satisfactory and from 60 to 70 per cent cheaper.

The illustrations, Fig. 7, show the successive steps in placing wood forms for making concrete curbing. One of the metal forms, set and partially filled with concrete, is shown at A, Fig. 8. This style of form is used mostly in connection with dirt roads or macadam highways, while the curb form shown at B is used in place of the old-style stone curb.

When this form is used the excavation is made as for the stone curbing, but a little wider; the forms are set up in the excavation, filled with concrete and firmly tamped. As soon as the

concrete is sufficiently set, usually in about a half hour, the forms are removed and the surface troweled down.

As yet the specifications for concrete

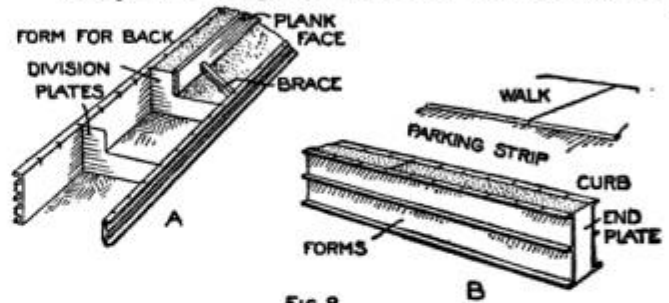


FIG. 8
Sheet-Metal Forms are Much Better Than Wood and Less Expensive to Use

curb and gutters are far from being standardized, but the majority of specifications call for a curb 18 in. high by 6 in. thick, and for combined curb and gutter 12 in. high by 6 in. thick, and the gutter 6 in. thick by 18 in. wide.

When using the combination curb and gutter forms, the face of the curb is made by placing a plank against the form, A, Fig. 8, and this plank is removed as soon as possible and the face troweled down.

(To be continued)

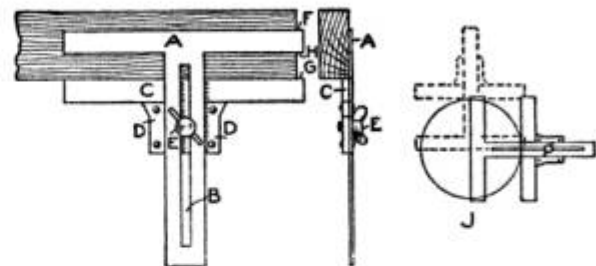
A Tool for Laying Out Mortises and Tenons

A tool for laying out mortises and tenons, and the manner in which it is used, is shown in the sketch. A T-shaped piece, A, is cut from $\frac{1}{8}$ -in. sheet steel, and a slot, B, cut longitudinally through the larger part or blade. A shoulder, C, is then cut from $\frac{1}{8}$ -in. material, and two pieces of $\frac{1}{8}$ -in. sheet steel, D D, are fastened by four rivets to the shoulder C, forming a recess in which the blade of the T-shaped member slides. A hole is then bored in the shoulder C and tapped for a thumb-screw which serves to hold the parts at the desired point. The edges F and G must be filed perfectly parallel, and if in addition the edge H is made perfectly parallel with edge G, the tool may be used as a sliding caliper.

The advantage of this tool over a marking gauge in laying off mortises is that a point of a knife blade may be used for marking instead of the marker on the gauge, which has a tendency to

follow the grain of the wood and thus make a ragged line.

This tool may also be used as a centering tool for round stock. Set the



A Mortise and Tenon Laying-Off Tool Which is Also Used as a Centering Tool for Round Stock

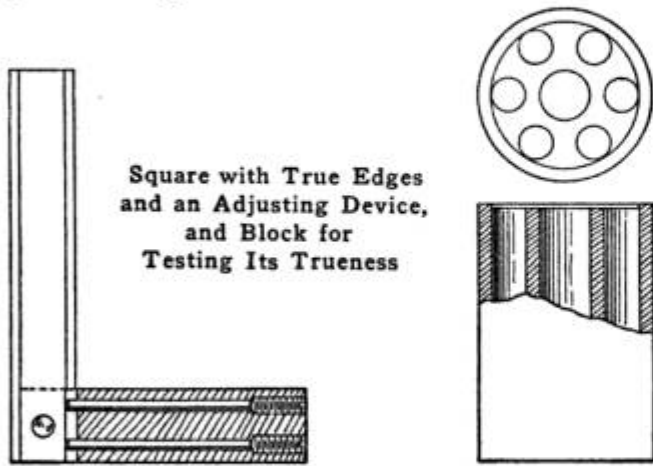
tool to the radius of the circle to be centered, as shown at J, and mark a line across the diameter, then move the tool around until it is at right angles with the line just scribed and mark another line on the diameter. Where these two lines intersect is the center.

—Contributed by Wm. A. Robinson, Waynesboro, Pa.

¶ If a lump of sal ammoniac is left in a tool box, the tools will rust.

Knife-Edge Square and Testing Block

The square is made in the usual manner except that the blade swings on a pin through the base and that in it are



Square with True Edges and an Adjusting Device, and Block for Testing Its Trueness

FIG. 1

FIG. 2

inserted two screws for adjustment, as shown in Fig. 1. The testing block, Fig. 2, for testing the square, is made in cylindrical shape, of tool steel, ground perfectly straight and the sides at true right angles with the surface of the ends.

The square should be very carefully made by grinding and lapping the surfaces. In case the square is dropped, it can be tested for trueness on the block and adjusted, if the fall changed the position of the parts.

A Shop Acid Jar

There are but few shops doing either railroad or contract work, that do not keep an acid vat or jar in which to immerse injectors, check valves, and other boiler accessories, for the purpose of removing the scale and incrus-

drochloric acid, commercially known as muriatic. As this acid attacks almost any metallic substance it touches, the only receptacle that can be used for holding it is a glass or glazed-stone jar. The 20 or 30-gal. jar is the vessel generally used, and so far as being affected by the acid, it would last forever, but such a vessel is easily broken and for this reason objectionable. Workmen while placing pieces of metal in the liquid are apt to be careless and break the jar. The most frequent accident is to let a heavy piece drop into the solution and break the bottom from the jar. The breaking of the jar alone does not mean so much, but the solution is lost, and in many cases another jar is not at hand nor a solution in readiness, and important work must be delayed.

A great many schemes have been tried to preserve the acid jars, but the one illustrated is about as practical as anyone would desire, and it will give satisfactory results. A box is constructed to inclose the jar. It should be large enough to allow at least a 2-in. space between the inner sides of the box and the vessel, and high enough to permit the latter to be set about 2 in. from the bottom of the box and to leave about 3 in. of the box projecting above the top of the jar. The space below and around the jar, to the top of the box, is to be filled with mortar, which should overlap the rim at the top of the jar and be made flush with its inside surface. The sketch, Fig. 1, shows this construction very clearly. A number of small wood

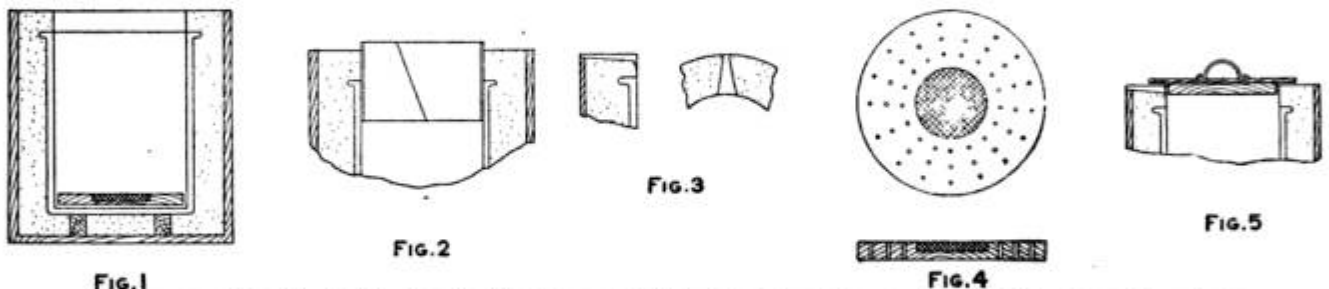


FIG. 1

FIG. 2

FIG. 3

FIG. 4

FIG. 5

An Armor Sheath of Mortar is Built around the Earthen Jar to Protect It from Breakage by Hard Blows of the Articles Placed in the Acid Bath to be Cleaned

tation deposited on them from the boiling water of the boiler.

The most common and practical chemical used for this purpose is hy-

blocks can be pressed into the first or bottom filling of the box to prevent the jar from settling while putting in the side filling. A sleeve of

sheet iron can be rolled and placed inside of the jar, to be used as a form for the cement, as shown in Fig. 2. A small depression or runway should be formed in the mortar at some place on the top surface, as shown in Fig. 3, to allow the acid to be drained off when its renewal becomes necessary.

In order to doubly safeguard the bottom of the jar from breakage, a false bottom is placed in the vessel. The construction of this bottom is very simple. A circular piece of wood, about $1\frac{1}{4}$ in. thick, should be cut with a diameter about $\frac{1}{4}$ in. smaller than the inside diameter of the jar. In the center of this board a recess, about 6 in. in diameter and $\frac{5}{8}$ in. deep, is hollowed or turned out and filled with lead. The buoyancy of the bottom can be greatly lessened by drilling a considerable number of $\frac{1}{4}$ or $\frac{3}{8}$ -in. holes through the portion of wood outside of the lead center, as shown in Fig. 4.

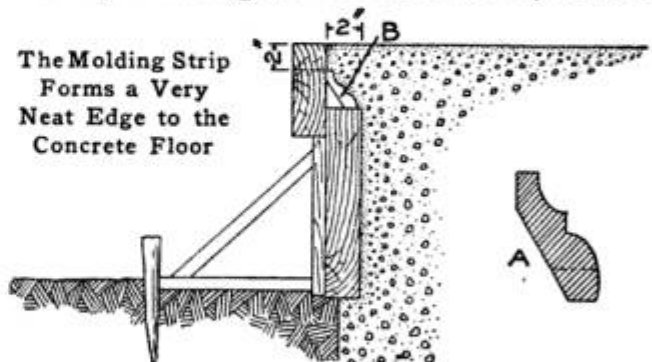
The cover of the jar is constructed as shown in Fig. 5. An acid jar, protected in this manner, should last indefinitely, as any blows it may receive on the inside are made harmless by the solid casing of mortar, and injury to the vessel from the outside through the armor around it is almost impossible. The false bottom can be easily renewed, as the acid has little or no corrosive effect on lead, so that it is only necessary to make a new wood disk.

Cleaning a Spark Arrester on a Tall Stack

A spark arrester on the top of a high smokestack of the round metal kind became clogged and so stopped up that no draft could be had for the fire. As the arrester was located too high to be reached with a pole and something had to be done at once to procure a draft, I procured a shot gun, loaded some shells with fine shot and shot through the arrester several times, which cleaned it out completely.—Contributed by Harry E. Garbish, Stratford, Wisconsin.

Molding a Neat Edge on a Concrete Porch Floor

The facing boards of the mold are built up as high as the porch is to be made, allowing an offset of 2 in., or the

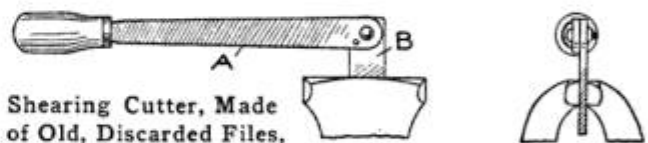


thickness of the first plank, as shown. The square corner formed by the offset in the boards is filled in with a portion of a crown mold, which is the idea of a correspondent of American Carpenter and Builder. The molding piece is prepared by ripping the piece on the line shown in the cross section A. The strip is then fitted in the offset, as shown at B.

First a neat cement is filled in against the form, then the coarser mixture placed on the inside.

A Wire Cutting-Off Tool

A device for cutting off light wire or drill rod can be cheaply made from two old 12-in. files. The positions of the old files are shown at A and B in the sketch. The teeth of the files are partly ground off and the tangs removed. Two holes are drilled through the part near the tang end of both pieces, one for the hinge bolt and the other the size of the wire to be cut. A handle of wood is fitted to the outer end of A, and the part B is

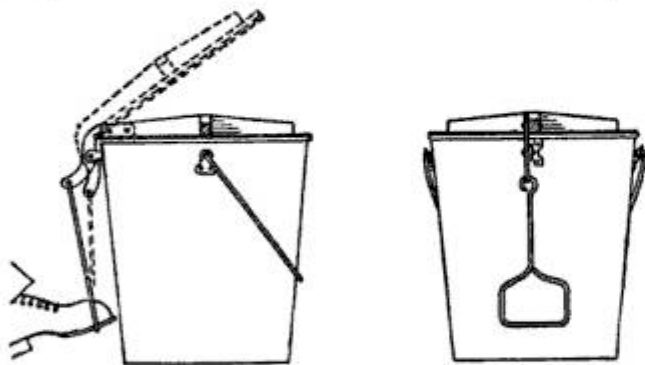


Shearing Cutter, Made of Old, Discarded Files, for Cutting Lengths of Wire

gripped in a vise. When the pieces are hardened, the device makes a serviceable tool, so cheap that a separate one can be made for each size of wire to be cut.

Garbage-Bucket Cover Operated by a Foot Lever

A cover operated by a foot lever is a much desired attachment for a garbage can or bucket. Such an arrange-



The Cover of the Bucket is Easily Raised by Pressure of the Foot Placed in the Loop

ment can be made as follows: Cut a cover from sheet metal and fasten two pieces of wood across the top. A lever shaped from metal is pivoted to the top edge of the bucket and fastened between the two pieces of wood. A loop of wire is attached to the lower end of the lever. A pressure of the foot in the wire loop will lift the cover.—Contributed by John V. Loeffler, Evansville, Ind.

Closing Water-Gauge Valves from a Distance

The breaking of a water glass gauge usually results in burning or drenching



The Attendant can Easily Close the Valves from a Safe Distance When the Glass Breaks

the fireman while turning off the valves. The arrangement shown in the sketch is one I rigged up for closing the valves from a distance without injury to the person in charge. The valve

stems are equipped with grooved pulleys instead of the hand wheels. A stout cord is wound around the pulley on the lower valve, drawn taut and passed about three times around the pulley on the upper valve, then carried upward and over a pulley attached in the ceiling and horizontally to any desired point at a safe distance where it runs over another pulley in the ceiling and is dropped to a place within reach.—Contributed by J. W. Madison, Oshkosh, Wis.

Fitting Band-Saw Rubbers

The endless circular bands of rubber, covering the face of large wheels on a band saw and on which the saw itself runs, sometimes become loose at points, and if run that way, they "bag" out or stretch so that when resetting the band it is found too large for the wheel, or it may be that the band was originally too large.

To make it fit, procure a pail of boiling-hot water and immerse a loop of the band, say, about 1½ ft., in it at a time and continue until the entire length has been gone over. It will make the band a tight fit on the wheel. If applied with a coat of shellac, it will be a permanent and satisfactory job.

Removing a Broken Machine Screw

To remove a small machine screw when the head is broken off, take a small soldering copper and tin the broken part of the screw, being careful not to get solder on the other parts. Then take a machine screw that is a trifle larger than the broken one, file the end bright and tin it. Sweat the two screws together with solder and when it cools a screwdriver will turn out the broken screw.—Contributed by Gertrude M. Bender, Utica, N. Y.

A coiled wire spring attached to the upper end of the board on a paper holder makes a convenient pen and pencil holder.

Practical Telephony

By HAROLD HINTON

PART III

The Automatic System

The automatic, or no-operator, system of telephony was developed because of the fact that the old-style common-battery, multiple-switchboard had too many disadvantages, among which were delay in connecting and disconnecting, due to manual switching; incorrect numbers; irregular attention, and often discourtesy to the subscribers; high cost of operation and the

was found to be impossible except at a ridiculous cost, and the problem was finally solved by a combination of systems.

The office apparatus used with this system may be classified as selecting switches, line switches, and accessory apparatus. The general layout of the automatic switchboards is shown in Fig. 13, but this plan shows none of the line-switching apparatus and is

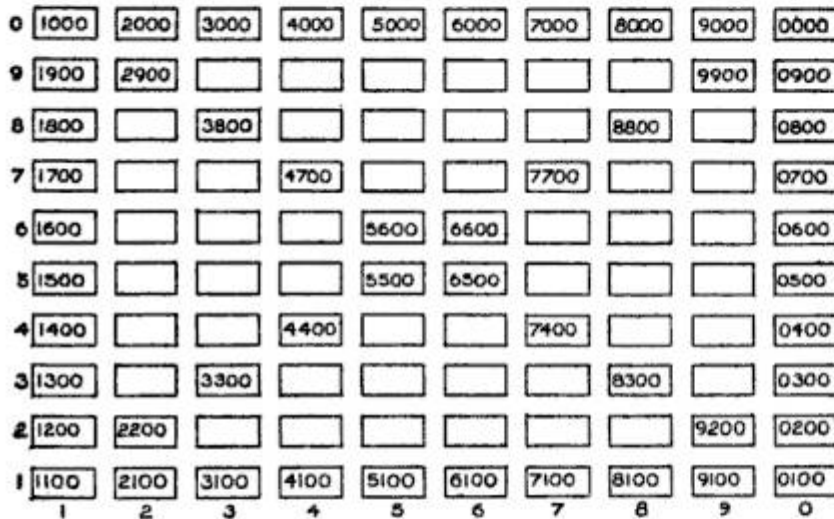


Fig. 13

The General Layout of an Automatic Switchboard and the Principle of the Line Switch Which Connects Itself to Any Idle One of a Smaller Number of Trunk Lines

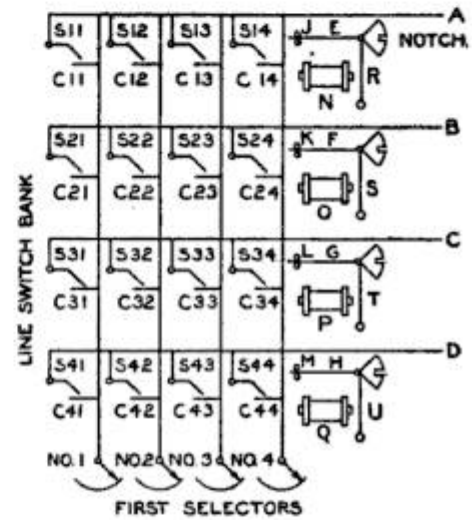


Fig. 14

operator's tendency to "listen in" on a conversation when she had the time. While the present-day operator is very well trained, being thoroughly taught the principles and operation of the switchboard in a regular school where everything is up-to-date before she is given a position at the main switchboard, still the desire for greater speed, greater accuracy and absolute secrecy, as well as a uniformity of service and larger dividends to the investors, has led to the automatic system, where every man is his own operator, and where the chance of anyone listening on a busy line is very remote.

The early inventors of the automatic systems had only a few lines in mind and thought that they could build up the exchange with the subscribers, as in the common-battery system. This

used simply to show the layout of the switchboards, and nothing else. Each of the oblongs in the figure represents a 100-line switchboard unit, 10 of these boards being placed in a row, so that there are 1,000 lines in each row.

It is the duty of the selecting switches to pick out the thousand and hundred desired and to connect with the line called. Small offices are equipped with primary line switches which trunk the calls direct to the first selector, but in a 10,000-line exchange, as shown in Fig. 13, these are called first selector, second selector, and connector. The thousand is picked out by the first selector, the hundred by the second selector, and the tens and units by the connectors which thereby complete the circuit.

It is the duty of the line switch to

locate an idle first selector for the calling line. In large offices there are primary and secondary line switches,

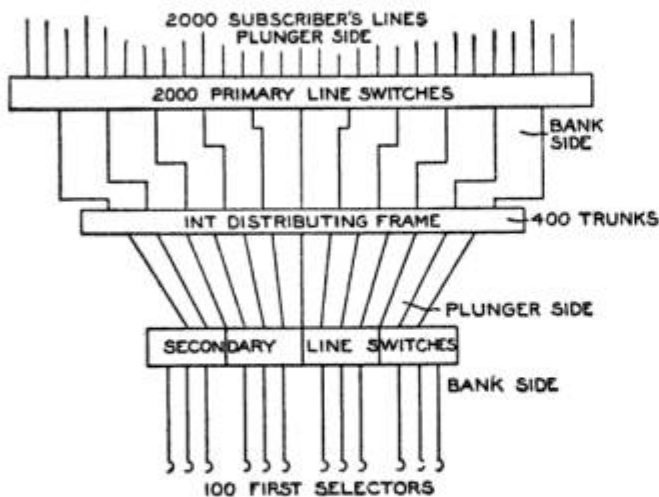


FIG. 15

Plan Showing Relation of the Primary and Secondary Line Switches and Their Connection to the First Selectors

arranged so that from 1,000 to 2,000 primary line switches trunk into from 300 to 400 secondary line switches, and these trunk into 100 first selectors.

The principle of the line switch, which allows any one of a number of lines to connect itself to any idle one of a smaller number of trunk lines, is shown in Fig. 14. The subscriber lines A, B, C, and D enter from the right of the figure and each line is attached to

with a fixed contact arm, C 11, C 12, etc., and each spring having its own fixed contact arm. These pairs are arranged as shown in the sketch.

The contacts are wired to the first selectors, and all of the first contacts, C 11, C 21, C 31, etc., are connected together to the first selector No. 1. The second contacts, C 12, C 22, C 32, etc., are connected together and led to the first selector No. 2, etc. A subscriber, desiring to use the exchange apparatus, can do so by causing one of his springs to be pressed into contact with its corresponding contact, which will extend his line to the first selector. This connection is caused by a plunger and line-switch magnet. The plungers E, F, G, and H each carry a pair of insulated rollers J, K, L, and M, each pair being pivoted on its respective end of the magnet armature, N, O, P, and Q, the magnets R, S, T, and U being controlled by the subscriber's line. When the magnet is energized the plunger is drawn forward so that one of its insulated rollers presses a spring into contact with its contact plate. A master switch selects an idle first selector and, by means of a feather cam on the guide shaft, which engages the notch on each

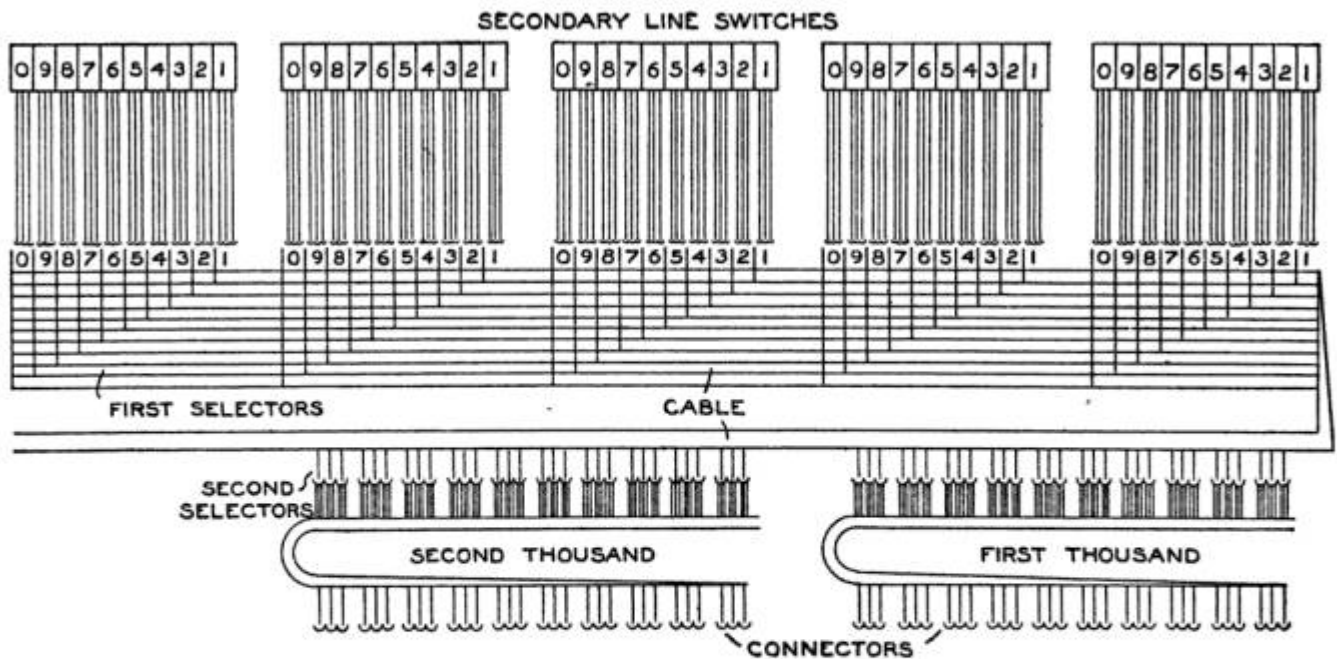


FIG. 16

Single-Office System Where Each Group Has Its Own Distinct Set of First Selectors, the Top of the Sketch Showing Five Groups of Secondary Line Switches

springs, S 11, S 12, etc., which are as many as there are first selectors, each spring being arranged to make contact

fantail, keeps the idle lines directed toward the first selector. When a subscriber removes his receiver from the

hook, his line magnet pulls the plunger into the bank and away from the guide shaft which, by the aid of the master switch, throws the remaining plungers into line for another idle trunk.

The relation of the primary and secondary line switches are shown in Fig. 15; the trunks from the banks of the primary shelves run to the secondary line switches and from the secondary line switches direct to the first selectors. In this way any subscriber in the group can obtain the services of any of the first selectors connected to that group. A 10,000-line exchange usually has five groups with 2,000 lines in each group, trunking into 100 first selectors. These groups are designated by the number of the thousands which they take. The 1 and 2 groups take the first and second thousands; the 3 and 4 groups take the third and fourth thousands; the 5 and 6 groups take the fifth and sixth thousands, etc.

A 10,000-line single-office system wherein each group has its own distinct set of first selectors is shown in Fig. 16. At the top of the sketch are the five groups, each of 2,000-lines capacity, of secondary line switches, the primary line switches not being shown. Each group of secondary line switches is composed of 10 shelves of 10 lines each leading to as many first selectors. The 100 first selectors are also mounted on 10 shelves of 10 switches each.

The first selector under the control of the calling device must pick out the thousand in which the desired line lies and automatically select an idle trunk to that thousand.

The second selectors are arranged by thousands, as in Fig. 16, and the first selector shelves, numbered 1, in all five groups are multiplied together and run to the second selectors according to thousands, the first level to the first thousand, the second level to the second thousand, etc. In a similar way all first selectors of shelves numbered 2 are multiplied together and wired to the proper thousands, terminating in second selector on shelf 2 in each case.

The trunking from the second select-

ors to the connectors is entirely local to the thousand concerned. The first level is wired to 10 trunks leading to

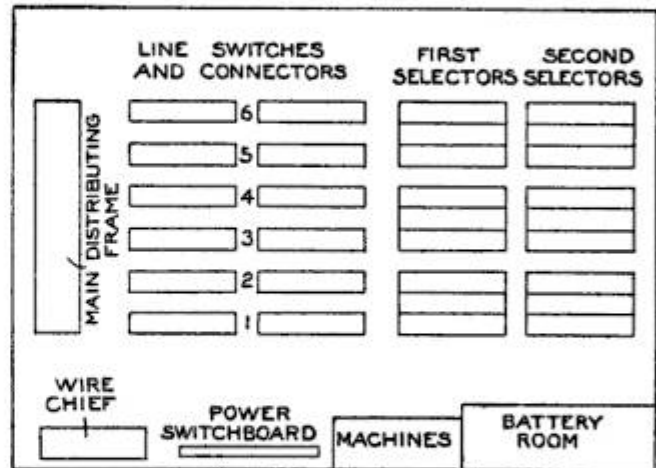


Fig. 17

A Floor Plan of a 6,000-Line Single-Office Exchange Equipped on a 10,000-Line System

10 connector switches in the first hundred of that thousand. The second level is wired to the connectors of the second hundred, etc.

It must be understood that, in the diagram, the lines represent cables containing the proper number of wires, which are branched off to the selectors and connectors at the proper points.

A floor plan of a 6,000-line single-office exchange, equipped on the 10,000-line system, is shown in Fig. 17, and a floor plan of a 4,000-line office in a 100,000-line system is shown in Fig. 18. This last figure shows the incoming selectors, outgoing secondary line switches, etc., which are necessary

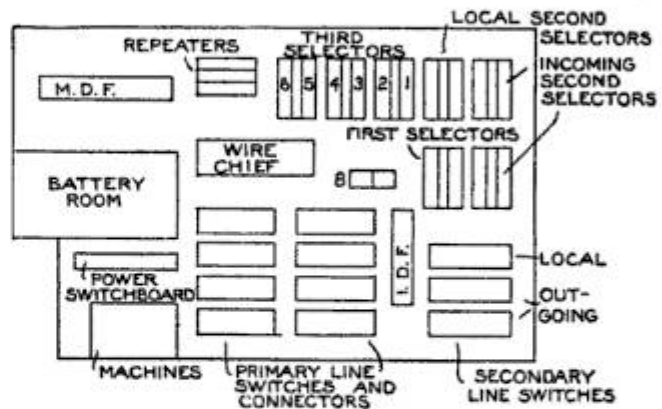


Fig. 18

A Floor Plan of a 4,000-Line Single-Office Exchange Equipped on a 100,000-Line System

when trunking from one exchange to another.

The connections of an automatic wall set is shown in Fig. 19. This instru-

ment is much more delicate and complicated than the common-battery wall set, as it must not only talk the same as any other phone, but must also operate the switches in the exchange. The talking circuit consists of a transmitter,

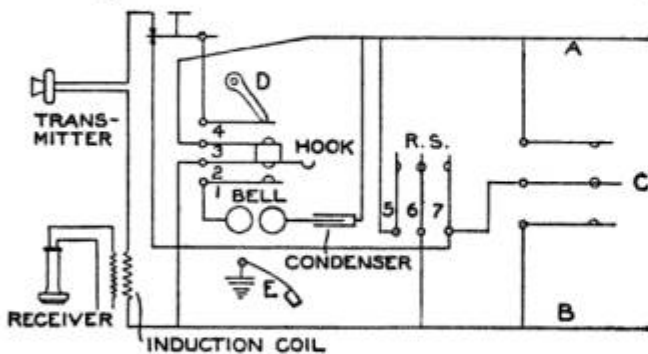


Fig. 19

An Automatic Wall Set, Showing the Talking Circuit in Series with the Primary of an Induction Coil

connected in series with the primary of an induction coil and across the line to receive current from the central-office battery. The circuit is controlled by the hook switch as usual. The bell and condenser are wired through the hook, and the receiver is connected to the secondary of the induction coil.

The controlling of the switches is divided into three functions: selecting, ringing, and release. The operation of a three-wire switch requires that each wire be grounded a certain number of times. The transmission of the unit 5

is accomplished by the grounding of the vertical line A five times and the rotary line B once. This operation of sending as many impulses as there are units in the number and following by one impulse over the rotary line, must be repeated for each number called, and this work is done by the impulse springs C, which are actuated by the dial and connected mechanism.

A finger, D, is arranged to cause the springs 3 and 4 to separate when the dial is turned in calling, as during the sending of the impulses each line must be insulated from the others. The ground spring E is let down on its contact when the receiver is replaced on the hook, as the ground connection should be cut off from the instrument wiring when the receiver is on the hook.

The ringing key is connected in series with the talking set and opens the circuit and grounds the vertical line when depressed.

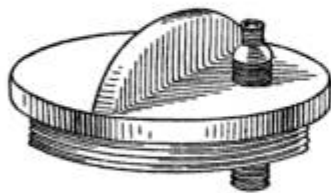
With the descent of the hook lever a lug is pressed against springs 5 and 6, causing them to come together and make contact with spring 7, until the lever is completely down, when the lug slips from spring 5 and allows all three springs to clear each other, thereby causing the release or disconnection.

(To be continued)

Forced Gasoline Supply for an Automobile

With automobiles, depending on gravitation for the gasoline feed, trouble is often experienced on a hill climb by not having enough gasoline in the tank to feed properly to the carburetor. The engine exhausts

a few times and then stops. Sometimes this will happen when there is 1 in. or more of gasoline in the tank, for the reason that the grade is so steep that the carburetor stands higher than the level of the gasoline. Natur-



ally, the first thing an experienced motorist would do in such an instance would be to back downhill, turn the car around and back up the hill. This will put the tank higher than the carburetor and gravitation will do the rest.

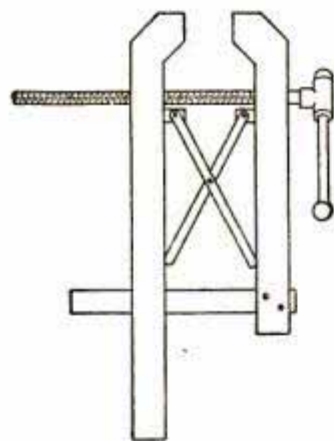
But if far from home, this is a tiresome and laborious method. A motorist has found a way to make this unnecessary, by adopting the following scheme: A valve stem was procured from an old inner tube and the upper part, which contains the core or check valve, was sawed off. Then a hole was drilled in the brass plug of the gasoline tank, large enough to admit the valve stem so that the upper end projected through the plug, the

stem being then soldered in place. A gasket was cut for the tank plug so that it could be screwed down to make it air-tight, and the job was complete. Under ordinary conditions, the little check valve is removed from the valve stem so that air is admitted through the opening.

When stalled on a hill, the little check valve is screwed into place, connected with an air pump and a little pressure applied in the tank. This will force the gasoline feed and make it possible to travel 6 or 8 miles on a small supply of gasoline.

Parallel Vise Jaws

The gripping portion on the jaws of a vise never holds the work solidly unless their surfaces come together parallel.



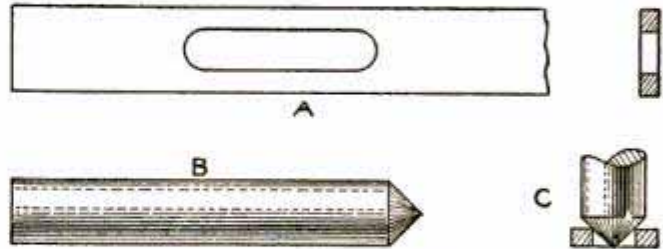
The ordinary carpenter's vise is usually adjusted at the lower end with a pin inserted in holes or a ratchet bar and pawl, but either is an unhandy arrangement at the best. I rigged up my vise with a device similar

to lazy tongs, the two upper ends being fastened near the screw and the lower ends bearing against the inside surfaces of the jaws. The turning of the screw to open the jaws forces the lower parts open at the same time, and in closing them the lower ends are held apart the same distance as that between the jaws. The connecting pieces at the top must be attached to make the space occupied by the parallel device equal to that between the gripping parts.—Contributed by Chas. Root, Home, Kansas.

CA few small teeth filed in the back edge of a carpenter's saw are very handy for cutting off nails when repairing old work.

A Burr-Removing Tool

Several thousand slots were punched in steel strips, one of which is shown in the sketch at A. The burr at the ends of the slots, though slight, was

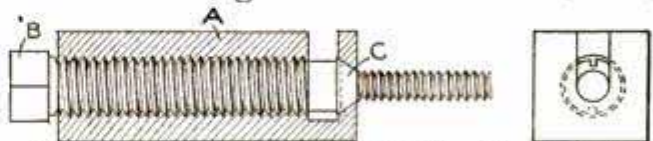


Tool for Removing the Burred Edges on a Slot Punched in a Metal Strip

objectionable and it was desirable to have the edges slightly rounded. To take off the offending sharpness a piece of drill rod, B, was beveled on the end to 45 deg., then the beveled end was ground on a coarse emery wheel while the drill rod was rotated. This produced small cutting edges on the roughened surface, which, when hardened, proved very lasting. The cutter was placed in a fast-running drill, the slotted steel strips, held in the hands, were pressed lightly against the revolving tool C and moved lengthwise. The burr and sharp corners were thus effectively removed.—Contributed by Donald A. Hampson, Middletown, N. Y.

Holding Countersunk Screws to Thread Up to the Head

The device illustrated was made by a correspondent of American Machinist for holding countersunk screws so that they could be threaded up to the head. It consists of a body, A, drilled and tapped to receive the plug B, which is a trifle larger than the head of the

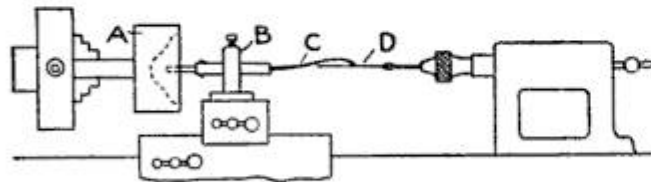
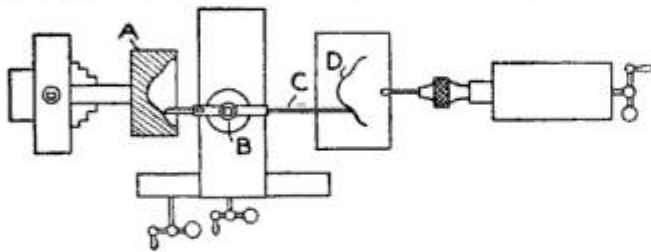


The Screw is Held Tightly in Place So That the Threads can be Cut Close to the Head

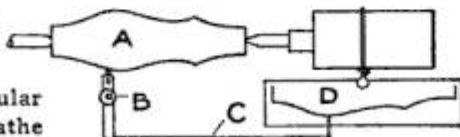
screw to be threaded. The hole C is countersunk for the screw, and then slotted to permit the head of the screw to be slipped out by slightly loosening the plug.

Template Guide for Lathe Work

Forming dies, balls, ball hollows, and similar work, may be easily accomplished in an ordinary lathe with the



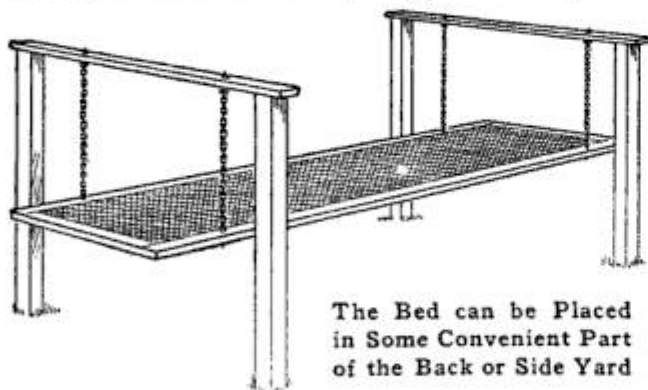
The Template Guides Lathe Tool When Turning Irregular Work in a Lathe



use of the attachments shown in the sketch. The work to be turned is shown at A in the different sketches, and the ordinary toolholder B is guided by a pointer, C, which is kept on the template D. It is obvious that if the pointer C follows the outline of a drawing on the template, it will cause the tool to cut the same shape into or on the work being turned.—Contributed by V. Verpeut, Jersey City, N. J.

Open-Air Swinging Bed

The best way to avoid the discomfort of a stuffy bedroom on a hot night is to prepare an outside swinging bed in the manner shown in the illustration. Procure an old bed spring and suspend



The Bed can be Placed in Some Convenient Part of the Back or Side Yard

it with four chains hanging from eye-bolts fastened in crosspieces on four posts. With an old carpet and a cou-

ple of blankets, this makes a comfortable place to sleep. A canvas can be thrown over the top to protect it from the sun's rays if the occupant desires to use it for an afternoon's nap.—Contributed by T. Canary, Chicago.

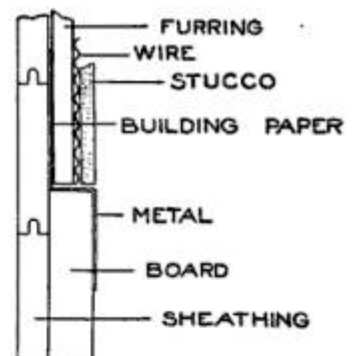
Broken Wires in the Insulation

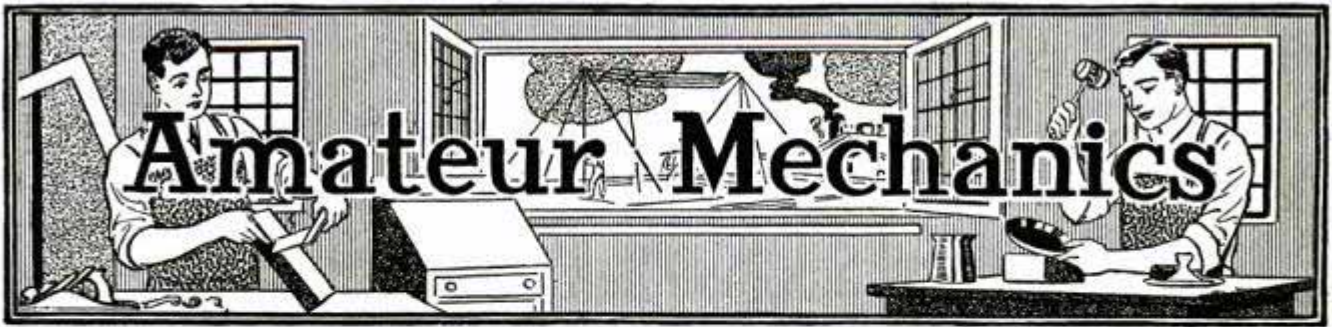
It is a common occurrence for an electric wire on the igniting system of an automobile to become broken within the insulation. This will cause no end of trouble, and the kind that is not easily found. It is best to look for these hidden breaks before taking the engine apart to locate the cause of the trouble.

To Avoid Stucco Leaks

Very frequently roof work in connection with stucco walls develops leaks which are hard to locate. The leaks are usually not the fault of the roofer.

To eliminate all danger, the construction should be as shown in the sketch. The leaks in the stucco will be caught by the metal flashing which carries the water to the surface on the outside. This method also gives a shoulder for the stucco work to rest upon and helps to keep it from cracking. The board used should be as thick as the combined thickness of the furring, mesh and stucco, and should be 5 in. high, so that it will be flush with the outside of the stucco when finished. When properly installed the upright portion of the metal must be back of the entire construction, even to the building felt or paper ordinarily used on stucco work, the down turn serving as a counter flashing under which any other flashing, such as is used with tile, tin or slag roofs, can be slipped.—Contributed by Ward Mosher, New York City.



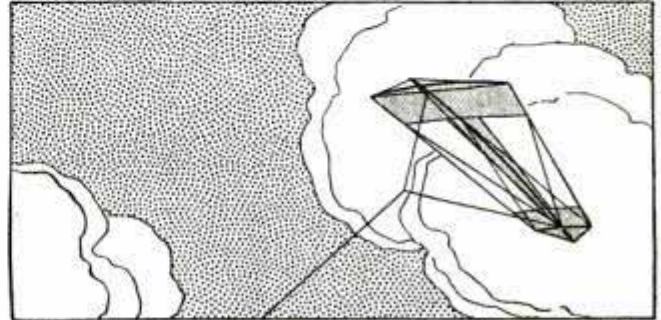


An Aeroplane Kite

By W. A. REICH

After building a number of kites from a recent description in *Amateur Mechanics* I branched out and constructed the aeroplane kite shown in the illustration, which has excited considerable comment in the neighborhood on account of its appearance and behavior in the air.

The main frame consists of a centerstick, A, 31 in. long, and two crosssticks, of which one, B, is 31 in. long and the other, C, 15½ in. long. The location of the crosspieces on the centerpiece A is shown in the sketch, the front piece B being 1¾ in. from the end, and the rear piece C, 2¼ in. from the other end. The ends of the sticks have small notches cut to receive a string, D, which is run around the out-



The Kite Being Tailless Rides the Air Waves Like an Aeroplane in a Steady Breeze

side to make the outline of the frame and to brace the parts. Two crossstrings are placed at E and F, 7 in. from either end of the centerpiece A, other brace strings being crossed, as shown at G, and then tied to the crossstring F on both sides, as at H.

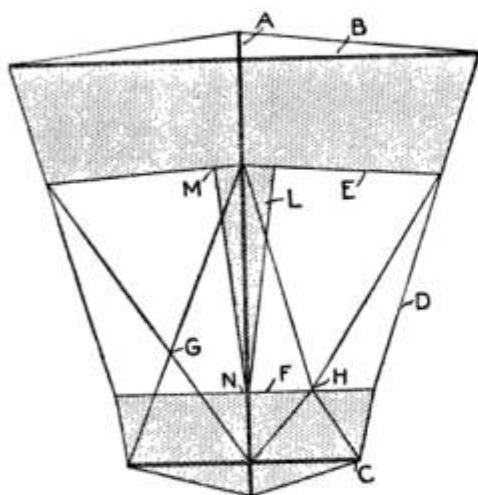
The long crosspiece B is curved upward to form a bow, the center of which should be 3¼ in. above the string by which its ends are tied together. The shorter crosspiece is bent and tied in the same manner to make the curve 2½ in., and the centerpiece to curve 1¾ in., both upward. The front and rear parts, between the end and the crossstrings E and F, are covered with yellow tissue paper, which is pasted to the crosspieces and strings. The small wings L are purple tissue paper, 4 in. wide at M and tapering to a point at N.

The bridle string is attached on the centerpiece A at the junction of the crosspieces B and C, and must be adjusted for the size and weight of the kite. The kite is tailless and requires a steady breeze to make it float in the air currents like an aeroplane.

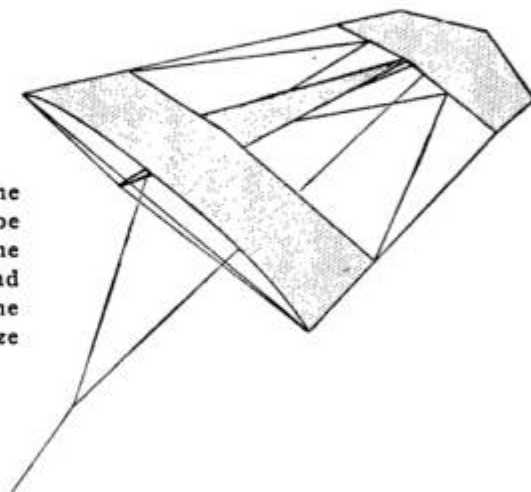
The bridle string and the bending of the sticks must be adjusted until the desired results are obtained. The



bridle string should be tied so that it will about center under the cross-



General Plan and Outline of the Kite, Which may be Built in Any Size if the Proportions are Kept, and Its Appearance in the Air on a Steady Breeze



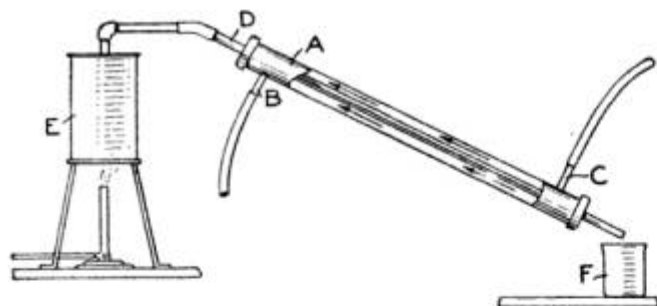
stick B for the best results, but a slight change from this location may be necessary to make the kite ride

the air currents properly. The center of gravity will not be the same in the

construction of each kite and the string can be located only by trial, after which it is permanently fastened.

Distilling Apparatus for Water

Pure water, free from all foreign substances, is frequently wanted for making up photographic solutions and



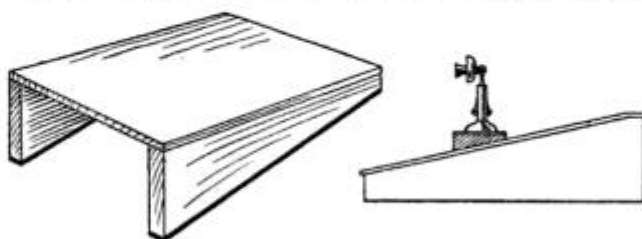
Homemade Still for Removing the Impurities in Water That is Used in Mixing Chemicals

many other purposes. An apparatus for distilling water can be very easily made from galvanized pipe fittings. The outer cooling jacket A is a piece of 1-in. pipe, 2 ft. long, threaded on both ends, and bored and tapped for $\frac{1}{2}$ -in. pipe at B and C. A hole is bored and tapped for $\frac{1}{2}$ -in. pipe in each of the two caps used on the ends of the pipe A, and a piece of $\frac{1}{2}$ -in. pipe, D, 2 ft. 8 in. long, is run through the holes as shown. The joints are soldered to make them water-tight. Two $\frac{1}{2}$ -in. nipples, 4 in. long, are screwed in at B and C. The retort, or boiler, E, in which the impure water is boiled may be made of any suitable vessel and

heated with a Bunsen or gas burner. A beaker, or other vessel, F, is placed below the lower end of the small pipe. The cold water from the faucet, which flows into the outer jacket at C and out at B, condenses the steam in the small pipe D, turning it into water which falls into the beaker in large drops. The water is often distilled a second time to remove any impurities which it might still contain.—Contributed by O. E. Tronnes, Evanston, Ill.

Telephone Stand for a Sloping Desk

Having a sloping-top desk and being compelled to use the telephone quite frequently, I devised a support for the telephone so that it might stand level and not fall off. The sides of the stand were cut on the same slope as the desk top, and their under edges were



Stand with a Level Surface for a Desk Telephone to be Used on a Sloping Desk Top

provided with rubber strips to prevent slipping.—Contributed by J. M. Kane, Doylestown, Pa.

An Electric Horn

A simple electric horn for use on a bicycle, automobile, or for other purposes, can be constructed as shown in Fig. 1. The size will of course depend somewhat on the use for which it is intended, but one with the diaphragm $1\frac{3}{4}$ in. in diameter and the horn 5 in. long and 4 in. in diameter, at the large end, will be sufficient for most purposes. This will make the instrument $7\frac{1}{2}$ or 8 in. in over-all length.

The horn proper, A, Fig. 1, is constructed first. This can be formed from sheet brass. To lay out the metal to the desired size draw a cross section, as ABCD, Fig. 2, then project the lines AC and BD until they meet at E. Strike two arcs of circles on the brass sheet, using EC as radius for the inner one and EA for the outer. Measure off FG and HJ equal to $3\frac{1}{4}$ times DC and AB, respectively, and cut out FGJH. Roll and lap $\frac{1}{4}$ in. at the edges and solder the joint neatly.

After smoothing the edges on the ends, solder a very thin disk of ferrotype metal, B, Fig. 1, to the small end of the horn. This is used for the diaphragm. Cut out a ring, C, from $\frac{1}{4}$ -in. hard fiber and bevel it on the inside edge to fit the horn. Also make a disk of fiber, D, having the same outside diameter as the ring C. These parts form the ends for a brass cylinder E, which is made in two parts or halves joined on the lines shown in Fig. 3. Fasten one of the halves, F, Fig. 3, to the fiber ring C and disk D, Fig. 1, with small screws, the other half to be put in place after the instrument is completed and adjusted.

A small support, G, is cut from fiber and fastened in as shown. A pair of magnets of about 50 ohms are mounted on this support. The parts from an old bell or buzzer may be used, which consist of a soft-iron armature, H, Fig. 1, having a strap of spring brass, J, attached by soldering and pivoted at K, with an adjusting screw, L, to set the tension. Another U-shaped spring-brass strip, M, constitutes the

current breaker, which has an adjusting screw, N. The points of contact on the current breaker should be tipped

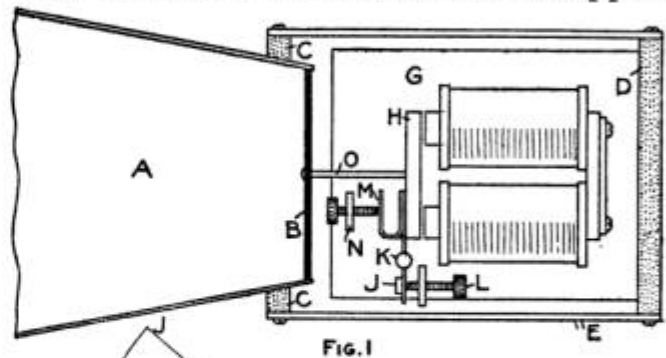


FIG. 1

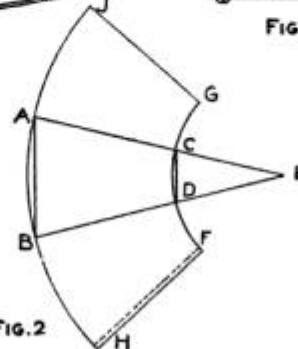


FIG. 2

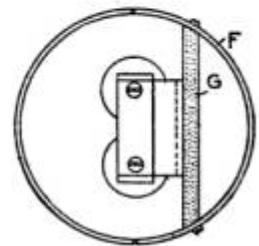


FIG. 3

An Electric Horn Operated in a Manner Similar to an Electric Bell on a Battery Circuit

with platinum. A piece of brass wire, O, is soldered to the diaphragm disk B and the soft-iron armature H, to connect them solidly. The tone of the horn can be adjusted with the screws L and N. The faster the armature vibrates, the higher the tone, and vice versa. The connections are the same as for an electric bell.—Contributed by James P. Lewis, Golden, Colo.

Combination Meat Saw and Knife

A very handy combination knife and meat saw can be made of an old discarded saw blade. The blade is cut on a line parallel with the toothed edge, allowing enough material to make a good-sized blade, then the straight part is ground to a knife edge and a wood handle attached at one end. The handle is made in halves, placed one on each side of the blade, and riv-

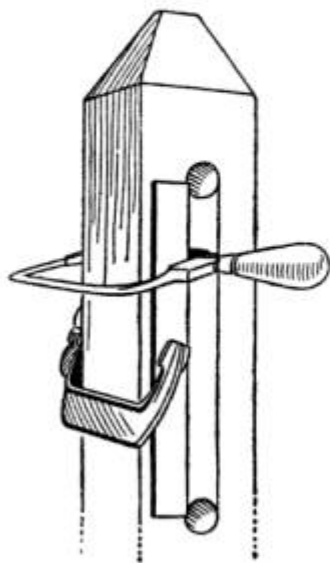


The Blade of the Knife is Cut from the Toothed Side of a Discarded Saw Blade

eted together, then the projecting metal is ground off to the shape of the handle.—Contributed by A. C. Westby, Porter, Minn.

Guide for Cutting Mortises

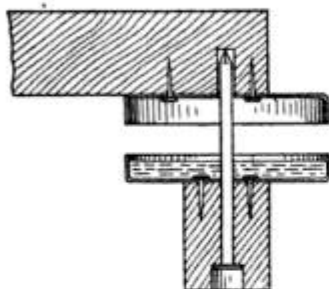
After spending considerable time in cutting one mortise in a piece to make



the settee described in a recent issue of Popular Mechanics Magazine, I devised the plan shown in the sketch which enabled me to cut all the mortises required in the time that I cut one in the ordinary manner. Two metal plates, one of which is shown in the sketch, having a perfectly straight edge, are clamped on the piece with the straight edge on the line of the mortise. A hacksaw is applied through holes bored at the ends and a cut sawed along against the metal edges.—Contributed by George Gluck, Pittsburgh, Pennsylvania.

Insect-Proof Poultry Roost

To protect the poultry from mites and other insects while roosting, I constructed a roost hanger, as shown, with oil cups made of empty shoe-polish cans.



The cover of the box was nailed to the roost and the bottom, for holding the oil, on top of the roost support. A large nail was driven through the support from the under side and through the center of the can bottom, so that about $1\frac{1}{4}$ in. projected above the latter.

The can cover was perforated in the center and a hole, about $\frac{1}{2}$ in. deep, was drilled in the roost so that the end of the nail would easily slip into it. The bottom of the can was filled with a mixture of kerosene, vaseline and car-

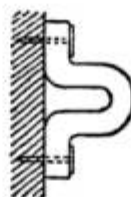
bolic acid and the roost set in place. Both ends of each roost are fixed in the same way. This makes it impossible for any insects to get on the roost.—Contributed by Rudolph Netzeband, St. Louis, Mo.

To Prevent Shade Rollers from Unwinding

Obtain a stick for the hem on the lower end of the shade that is 2 in. longer than the shade is wide. Place two small wood screws in the window casing below the shade roller in such a position that they will catch the ends of the stick when the shade is raised to the top.—Contributed by Harry E. Kay, Ossining, N. Y.

A Screen and Storm-Door Cushion

A good cushion that will prevent a spring door from slamming can be made out of material cut from an old rubber boot or, better still, from an old hollow rubber ball. Three strips of heavy rubber, $1\frac{1}{4}$ in. long and $\frac{3}{8}$ in. wide, are cut and each fastened with two tacks so that the center will make a hump, as shown in the sketch. One cushion is fastened near the top, one near the bottom, and one in the center, in the rabbet of the door frame.—Contributed by D. Andrew McComb, Toledo, O.



Repairing a Coaster Brake

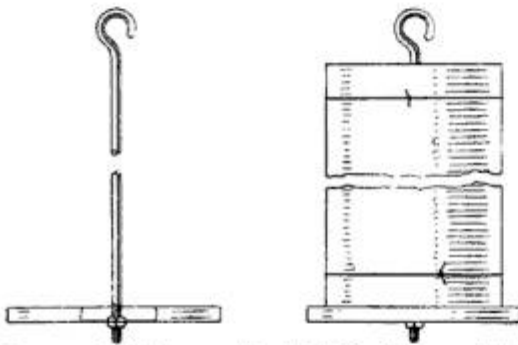
Anyone having a bicycle coaster brake that is apparently useless because it will not brake, can easily repair it in the following manner: Remove the inner hub by unscrewing the cones and insert a piece of clock spring, about the same width as the brake shell and almost as long as



its inside periphery. Replace the parts and the repair will render the brake quite as efficient as a new one. The spring serves as a braking surface for the expanding steel shoes of the brake.—Contributed by Heber H. Clewett, Pomona, Cal.

Flypaper Holder

The ordinary method of using sticky flypaper is quite annoying, as it cannot be easily removed from anything that may come in contact with its sticky surface. The best way to avoid this trouble is to make a holder for the paper, and one can be constructed of a piece of wire and a metal cover taken from a jelly glass. The wire is threaded at one end on which the cover is



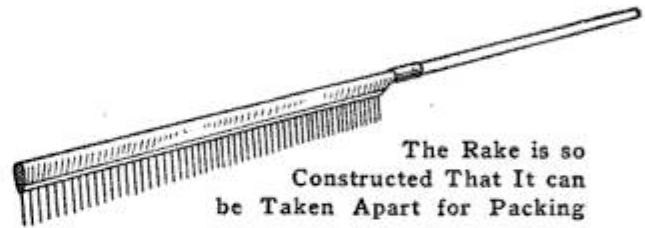
The Paper, Held in an Upright Position, will Catch More Flies Than If Placed Flat

clamped between two nuts. The upper end of the wire is shaped into a hook for hanging it wherever desired. The paper is rolled with the sticky side out and tied with strings, then slipped over the wire and set into the inverted cover. The cover prevents any of the sticky substance from dripping onto the floor and the wire holds it from being blown about the room.—Contributed by Percy de Romtra, Cape May Point, N. J.

A Fish Rake

The fish rake can be made in any size, for minnows or salmon, but it is especially adapted for fish that run in schools, like smelt, herring and minnows. Procure a piece of wood, 7 ft. long, 4 in. wide and $\frac{7}{8}$ in. thick, and make a handle 3 ft. long on one end. Dress the other end to an edge, rip off

a 1-in. strip and drill holes to receive nails or pieces of wire from the back, through the edge, and projecting about



The Rake is so Constructed That It can be Taken Apart for Packing

4 in. The strip is then replaced and fastened with screws. The handle can be cut from the blade and jointed by using tubing. This makes it handy to take apart and pack.—Contributed by L. W. Pedrose, Seattle, Wash.

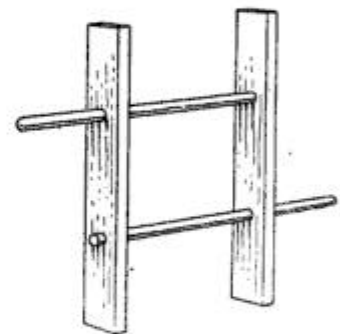
To Harden Small Blocks of Wood

Small blocks of wood can be hardened so that they will not split so easily when small screws are inserted by boiling them in olive oil for about 10 minutes. The olive oil can be kept for future use. If it is desired to waterproof the blocks after hardening them, they should be placed in melted paraffin and allowed to cool in the solution. This gives the block of wood a good appearance and makes it nonabrasive and waterproof.

Homemade Clothesline Reel

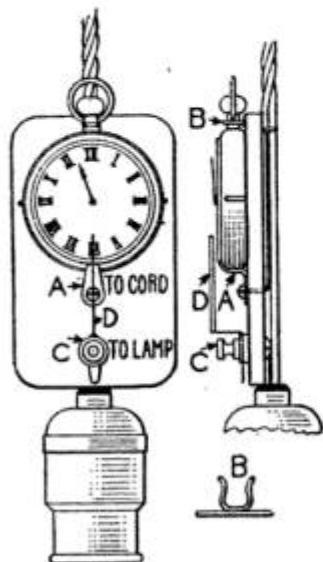
It is much better to make a small reel, like the one shown, for a clothesline than to wind the line on the arm, the usual method of getting it into shape for putting away.

The reel consists of two strips of wood, 16 in. long, 3 in. wide and $\frac{7}{8}$ in. thick. These are joined together with two pieces of broom handle, allowing a space of 9 in. between the sides and an extending handle of 5 in. on opposite sides, as shown.—Contributed by Bert Longabaugh, Davenport, Iowa.



An Electric Time Light

Although the modern alarm clock is a wonderfully effective piece of mechanism, it is, to say the least, very abrupt in its manner. It seldom confines its efforts to the chamber of its owner, but spreads its disturbance all over the building. It is very easy for a person to arise early in the summer and no greater difficulty should be experienced in winter, if the bedroom is brightly lighted at the proper hour. To do this



simply and automatically became the problem.

The first thought was to obtain one of those clock-actuated electric-light switches, such as the stores use, but this would not do, because it meant some unsightly wiring around the room. It was then remembered how, in the course of some experiments, an ordinary incandescent light was operated through a piece of No. 36 gauge wire without any sign of heating. If, then, a wire only 1/200 in. in diameter were of ample carrying capacity, surely a dollar watch would be sufficient to make the connection. Such being the case, the whole mechanism could readily be attached to the drop cord of a lamp directly above the socket, thus obviating any additional wiring. This all proved to be true, and the whole was made and attached in the course of a couple of hours.

While one might feel enthusiastic about this small and easily contrived affair, it is scarcely to be presumed that it would operate so effectively on one who had spent the larger part of the night tripping the "light fantastic," or in undue conviviality. An ordinary 16-cp. globe has thus far operated perfectly, and a 40-watt tungsten lamp

would, if not too far away, surely awaken the hardest sleeper of sober habits.

The base of the mechanism is a small piece of 1/4-in. hard wood, upon which is fastened a small brass bracket, A, bent so as to hold the watch from slipping down. A small clip, B, was then arranged so as to grip the neck of the watch after its lower edge had been placed against A, and a small brad at either side prevented lateral movement. In this way the watch was held firmly, yet in a manner that would permit its being taken out instantly when necessary. The glass and minute hand were removed. The brass bolt from an exhausted dry cell was placed at C, so as to clamp a small copper washer to which was soldered a narrow strip of copper, D, about 1/16 in. wide and cut from a leaf of an old dynamo brush. This strip is arranged so as to wipe the hour hand as it travels past, but being so thin, it has no appreciable effect on the time keeping. As illustrated, the device is set for six o'clock, but by loosening the nut C an hour's adjustment either way may be had. It is a very simple matter, however, to arrange the device so it will operate at any hour. In connecting up, one end of the drop cord is removed from the socket and attached to A, which throws the current through the watch, thence along the hand and down D to C, from where it is carried by a short piece of wire to the socket again. As there are so many circuits through the watch, the small current required for one light does not affect it in any way. Thus far, no trouble has been experienced in making this delicate connection with 110 volts, but if any should develop, the contacts may be tipped with the small pieces of platinum taken from a burned-out globe.

☞The meat of a white English walnut may be easily removed by heating the nut in an oven or on top of a stove, then using a knife to pry the shell open.

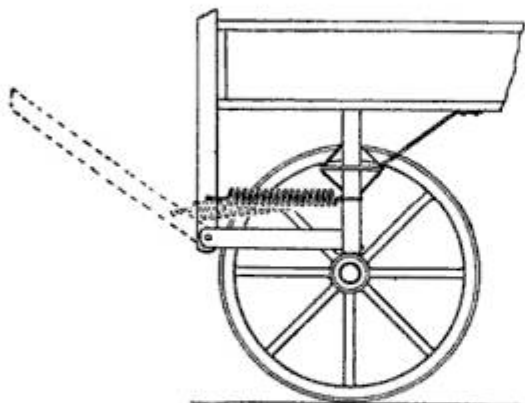
Imitating Ebony on Oak

The wood is immersed for 48 hours in a warm solution of alum and sprinkled several times with the following mixture: One part of logwood of the best quality is boiled with 10 parts of water, then it is filtered through linen and the liquid evaporated at a low temperature until its volume is reduced by one-half. To every quart of this bath are added 10 to 15 drops of a saturate of soluble indigo entirely neutral in reaction.

Smaller pieces may be steeped for a time in this solution, then the wood is rubbed with a saturated and filtered solution of verdigris in warm, concentrated acetic acid, and this operation continued until a black color of the desired intensity is obtained. The oak wood dyed in this manner is very similar to real ebony.

Tongue Holder for a Boy's Wagon

To prevent any mishap when coasting in a boy's play wagon fasten the tongue with a coil spring so that it will be kept in a vertical position. The tongue is always out of the way when it is not used for drawing the wagon. The spring is only strong enough to hold the tongue, so that when this is used for pulling there is little or no tendency of the spring to draw the tongue upward. The coil spring is

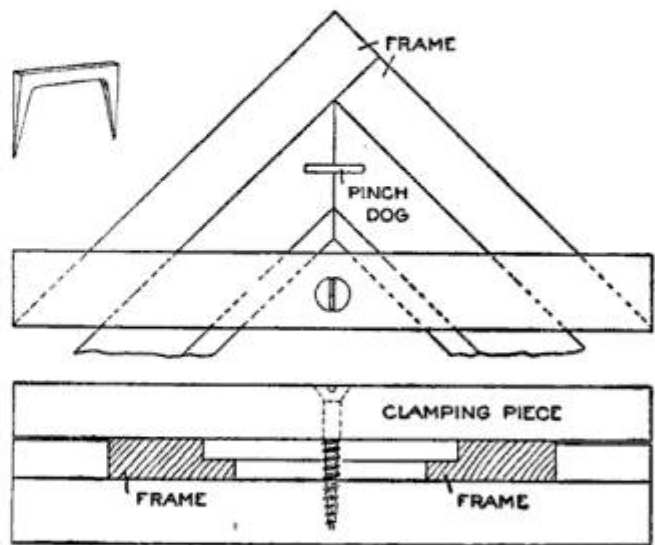


Holder for the Wagon Tongue to Keep It in a Vertical Position When Not in Use

fastened with one screw eye in the tongue and one in the front axle.—Contributed by Wm. F. Benson, Brockton, Massachusetts.

Gluing Small Mitered Frames

The mechanic who attempts to fasten a mitered frame in the home workshop usually comes to grief. This is



Clamp for Holding the Corner of a Frame While Gluing and Fastening the Mitered Joint

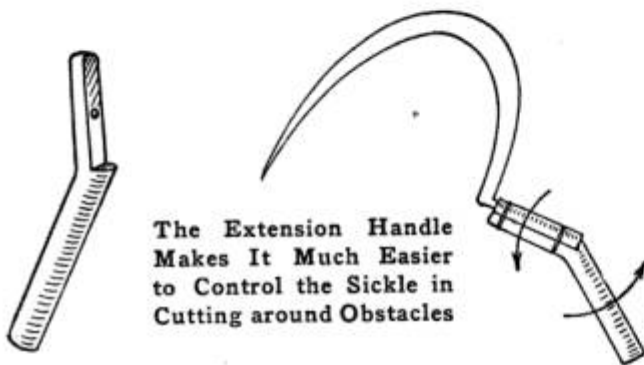
due to lack of proper facilities for holding the frame straight and out of wind, and for clamping or drawing the miter joint together after the glue has been applied. The little device shown in the sketch, if properly made and used, does away with the usual difficulties and annoyances. It consists of a triangular block of wood with raised strips on the two edges that make the right angle, and the clamping piece with the wood screw through the center on the long side. The raised strips are made somewhat thinner than the frame to be fastened, as the clamping piece should bear on the frame and not on the strips; the function of the strips being to hold the frame square. The triangular block should be large enough to take the corner of the frame and leave room enough for the wood screw that holds it in place on the block. Four of these blocks will be necessary and they should be used in conjunction with pinch dogs. These dogs come in different sizes and may be purchased at supply stores or made as shown. The outside of the legs should be straight and parallel and the inside tapered so as to draw the joint together.

When a joint is ready to be glued, a piece of paper is placed on the block

under the joint to keep it from sticking. Apply the glue and push the two sides into the corner formed by the raised strips, the dog is then driven in lightly and the clamping piece screwed down tightly, and if the miter has been properly cut, a nice close-jointed and square corner will be the result.—Contributed by J. Shelly, Brooklyn, New York.

Handle Attachment for a Sickle

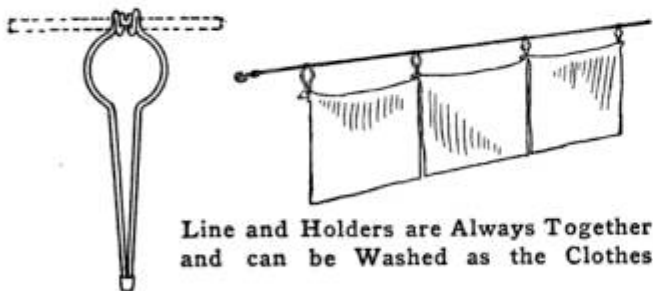
For cutting around flower beds or bushes and in close places I find that an extension handle for a sickle is



quite an assistance. The auxiliary handle is bound to the sickle handle with wire at the ends and is further fastened with a screw in the center. The arrows show the directions in which the hands should be moved in working the sickle.—Contributed by A. S. Thomas, Gordon, Can.

A Clothesline for Small Goods

Handkerchiefs and small pieces included in the week's laundry are usually quite troublesome to hang with the larger pieces, and for this



reason I constructed a special line for the small goods. A line was cut to fit between two porch posts and a hook made of galvanized wire tied to each

end, staples being driven into the posts to receive them. Three or four wire grips were formed and attached to the line. It was only necessary to draw the corner of a handkerchief into the grip as it was wrung out, placing several in each grip. The line with its load was then carried out and attached between the porch posts. This made it unnecessary to look through the clothes for the small articles. It also prevented chilling the fingers and no pins were needed.—Contributed by R. D. Livingston, Hopkinton, Iowa.

Automatically Controlled Ice-Box Lights

Often the ice box is placed in a dark closet or some out-of-the-way place, and it is almost impossible to locate articles already in the box or put others away without considerable inconvenience on account of the lack of proper light. This difficulty can be easily overcome by mounting a small electric lamp in each of the different compartments of the box, which will

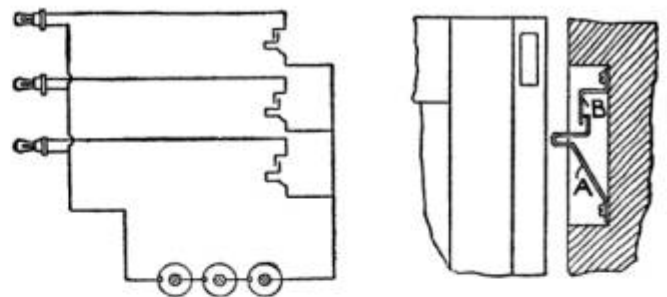


FIG. 1

FIG. 2

The Lamps will be Automatically Lighted When the Door of the Ice Box is Opened

be automatically lighted when the lid of the box is raised or the door opened. The circuit through the lamp is controlled by a special switch mounted in such a way that its contacts are open when the doors and lid of the box are closed. A diagram of the circuit is given in Fig. 1, which shows three lamps, each controlled by a separate switch, connected in parallel to a battery of several dry cells. The lamps should be of low voltage and need not be very high in candlepower. The number of cells needed in the battery will depend upon the voltage of the

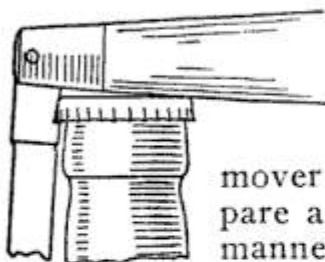
lamps. The voltage of the battery and the rated voltage of the lamps should be approximately the same.

A special switch that will serve the above purpose is shown in Fig. 2. It consists of two pieces of spring brass, A and B, about $\frac{3}{8}$ in. wide, bent into the forms shown. These pieces are mounted in a recess cut in the jamb of the door or lid in such a way that the free end of the piece A is held away from the piece B when the door or lid is closed. When the lid of the box or the door is open the two springs come in contact and the lamp lights; upon closing the lid or door the contact is broken and the lamp goes out.

A good quality of rubber-insulated copper wire should be used in making the connections, and all parts should be as well protected from moisture and the possibilities of mechanical abuse as possible. It would be best to tape the lamps in the sockets with a piece of friction tape so as to prevent moisture getting into the socket and, perhaps, shortening the lamp. A short piece of brass tubing can be mounted around the lamp to protect it mechanically. Be sure to place the batteries where they will be kept dry.

A Bottle-Cap Lifter

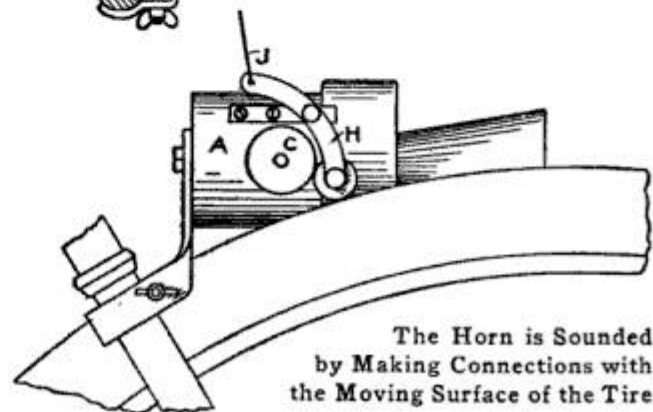
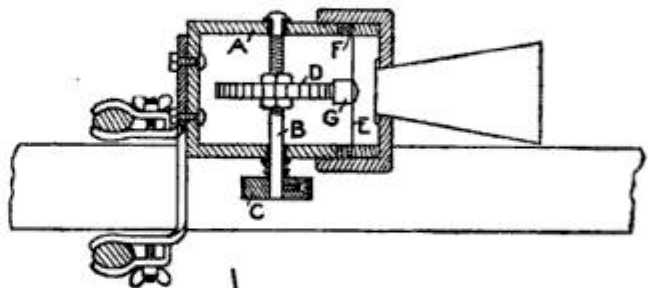
To remove the crimped bottle cover so extensively used requires a special lifter, the corkscrew being of little use for this purpose. When a cap-cover remover is not at hand, prepare a pocketknife in the manner shown, and it makes an excellent substitute. It only requires a small notch filed in the heel of the blade, which does not interfere with the ordinary use of the knife in the least.—Contributed by John V. Loeffler, Evansville, Indiana.



Ants may be effectively destroyed by placing a coop with a chicken in it over the hill.

A Mechanical Bicycle Horn

The body of the horn A is made of metal, about 3 in. in diameter, with a screw cover. The shaft B, to which is



The Horn is Sounded by Making Connections with the Moving Surface of the Tire

attached a driving pulley, C, and a ratchet wheel, D, is fitted in holes drilled through the diameter of the body. The diaphragm E is clamped, between the edge of the body and the cover, on a seat made of rubber rings, F, and carries a contact device, G, that is riveted to its center. The diaphragm should be set so that the contact will touch the ends of the ratchets.

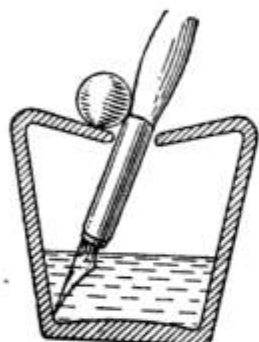
A metal cone is fastened in an opening cut in the center of the cover, over the diaphragm. The back of the body is fitted with a bracket for attaching it to the front fork on a bicycle. The lever H carries an idler pulley which is forced against the bicycle tire and the pulley C by means of a cord, J.

Adjusting the diaphragm contact on the ratchet wheel will change the tone of the horn.—Contributed by P. Mertz, Jamaica, L. I.

Retarder for Plaster of Paris

When it is desired to lengthen the time of setting after preparing plaster of Paris, dissolve 1 oz. of citric acid in water used for mixing 100 lb. of plaster, and it will retard the setting for about three hours.

An Inkwell Stopper



A good way to keep an inkwell of the type shown in the sketch clean is to place a marble over the opening. The marble keeps out flies and dust, is easily rolled aside and is no obstacle to the pen entering the well. — Contributed by James M. Kane, Doylestown, Pennsylvania.

A Grass Rake

This adaptation of an ordinary iron rake for use on a lawn was the outcome of not having a lawn rake at hand. Two spools, each $1\frac{1}{2}$ in. in diameter, were procured and one forced on each end tooth of the rake. The spools were forced on the teeth just far enough to allow the rake to slide on the ground



The Spools Prevent the Teeth from Injuring the Grass Roots as the Rake Passes over the Ground

and prevent the other teeth from digging out the grass. The end of the spools may be rounded and smoothed so that they will slide easily on the ground.—Contributed by H. E. Gray, Montclair, N. J.

A Staple Puller

A very simple way to pull a staple is to use the claws of an ordinary carpenter's hammer and a nail, as shown in the sketch. The staple can be removed quickly without being bent, and no damage to the material into which it was driven will result.

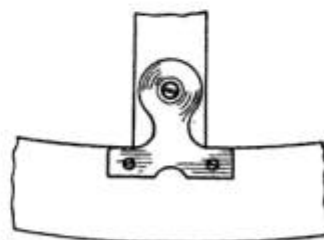


To Remove Acid Stains from Cloth

Apply pearlash directly to the stain, allowing it to set a minute or two, then boil the article in soap water for several minutes. The method is harmless and inexpensive, and can be used by anyone.

Repairing Rocker on a Chair

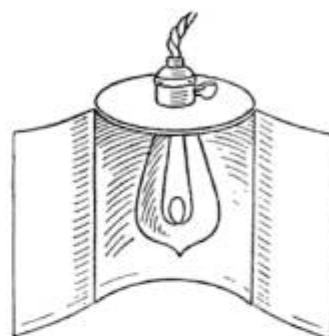
The tenons on the posts of a rocking chair being broken off so close to the rocker that it was impossible to make the ordinary repairs, four window-shade-roller brackets were used in the following manner: The metal was straightened so that it would lie flat and two brackets were used on the end of each post. This made a neat and strong repair.—Contributed by Chas. Schmidt, Baltimore, Md.



Electric-Lamp Reflector for a Target

An ordinary 1-lb. coffee can may be quickly fashioned into a most effective reflector for an electric bulb. The light is projected upon the target while the marksman's eyes are shielded. Of course, this device can be used for other purposes.

The can is shaped into a reflector by cutting it open along one side with a pair of snips, then following the circumference of the bottom halfway around on each side. Bend the flaps outward as far as desired and cut a hole in the bottom just large enough to insert the bulb, as shown.—Contributed by Burke Jenkins, Port Washington, L. I.



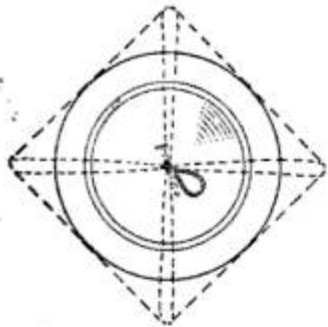
Linoleum may be renewed by applying floor wax in liquid form.

Making Small Taps

The owner of a private workshop has need for taps and occasionally wishes to make them, not because they are cheaper, but for the sake of experience or to get some special thread. In cutting the flutes, whether it be by hand or in a shaper, it is a good plan to give the flutes an angle, that is, to cut them, not parallel with the axis of the tap, but at an angle of 5 to 15 deg. with the center line. This makes the tap cut easier, giving it a wedge action instead of just simply pushing the metal off. The same method applies to counterbores and countersinks, which, when so made, take less power to drive.

Sink a Substitute for a Dishpan

On special occasions when company is entertained or in large families, it is almost impossible to wash all the dishes in an ordinary dishpan; in fact, the large platters will not go in at all, so I devised the following method as a substitute for a larger pan.

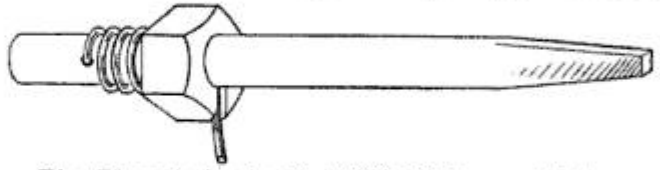


A tin disk was cut from the top of a tomato can with a can opener so as to be as round as possible, then a piece of cheesecloth was folded into an even square, the disk placed in the center and all four corners of the cloth drawn over to the center of the disk. A nail was driven through the center of the disk, to make a hole, through which a string was drawn with the nail and tied to it to form a loop on the head. This is used to stop the sink drain.

When this is put over the drain outlet the sink may be used as a dishpan. The same result could be obtained a little better with a piece of an old rubber boot or rubber coat, but usually this material is not at hand, and the cheesecloth will do almost as well.—Contributed by Hannah Jennings, Chicago.

How to Make Small Coil Springs

Procure a nut, having a small thread that will admit the size of the wire to be used in making the spring. Cut a



The Threads in the Nut Will Guide as Well as Coil the Spring Evenly

small notch to the depth of the thread where the thread starts, and procure a smooth rod that will pass snugly through the threads of the nut. Shape one end of the rod to fit a carpenter's brace, if there is no drill chuck at hand, and drill a hole in the other end to admit one end of the spring wire.

Bend the wire at right angles and insert the end in the hole. Place the end of the rod in the nut, which should be gripped in a vise, and turn the rod, at the same time seeing that the wire is guided into the notch cut at the start of the thread. The wire will follow the thread of the nut and make a perfect spring of an even opening throughout its length. Closed or open coils can be made by using a nut having the proper number of threads.—Contributed by A. Spencer, Kinston, N. C.

A Pruning-Saw Guard

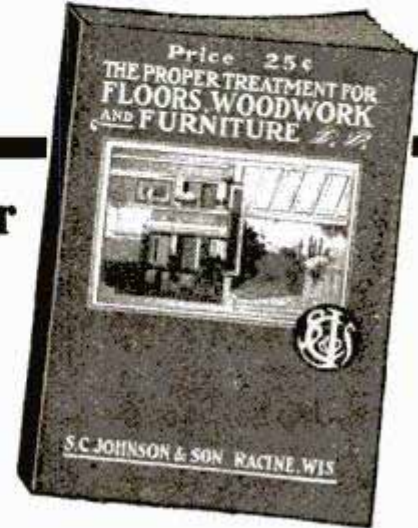
The double-edged pruning saw with coarse teeth on one side and fine on the other would be far more widely used, if it were not for the fact that the unused edge so often injures the bark of the trunk when the saw is being used. A very satisfactory guard may be quickly made of a brass curtain rod by prying it apart slightly at the seam and cutting a suitable length to fit over



The Teeth on the Unused Edge are Covered with a Piece of Brass Curtain Rod

the edge, as shown in the sketch. This will cling to the saw blade by its own tension.—Contributed by James H. Brundage, Katonah, N. Y.

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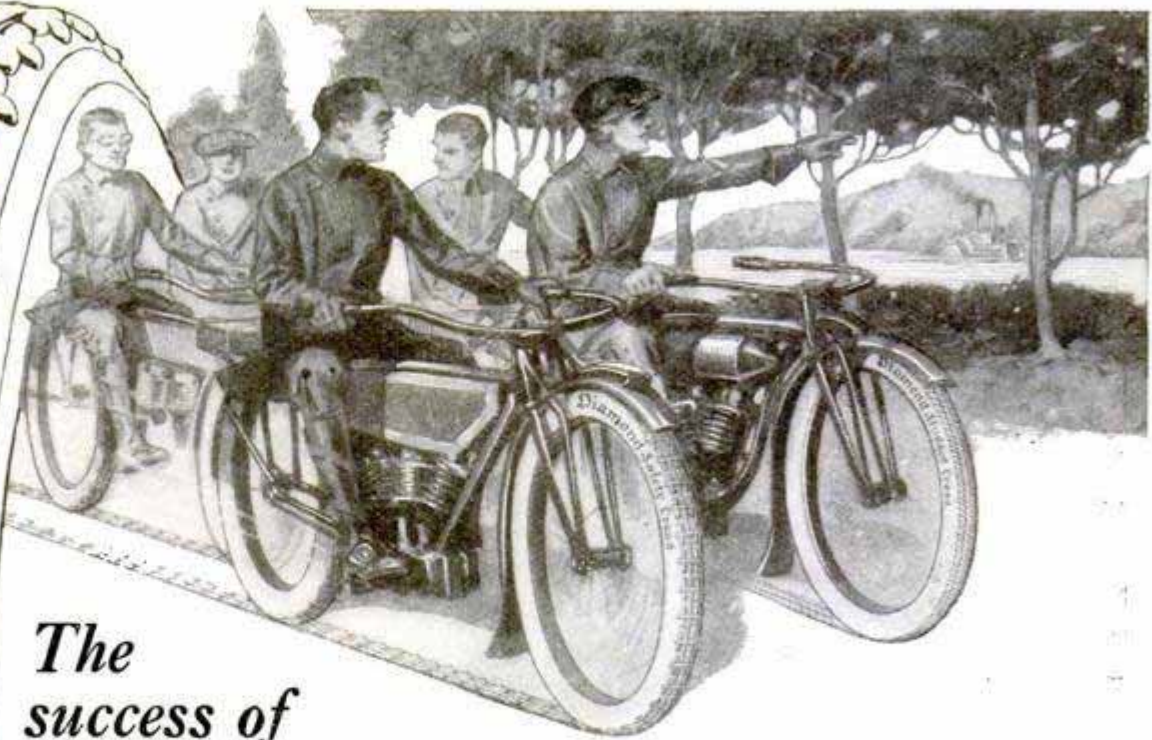
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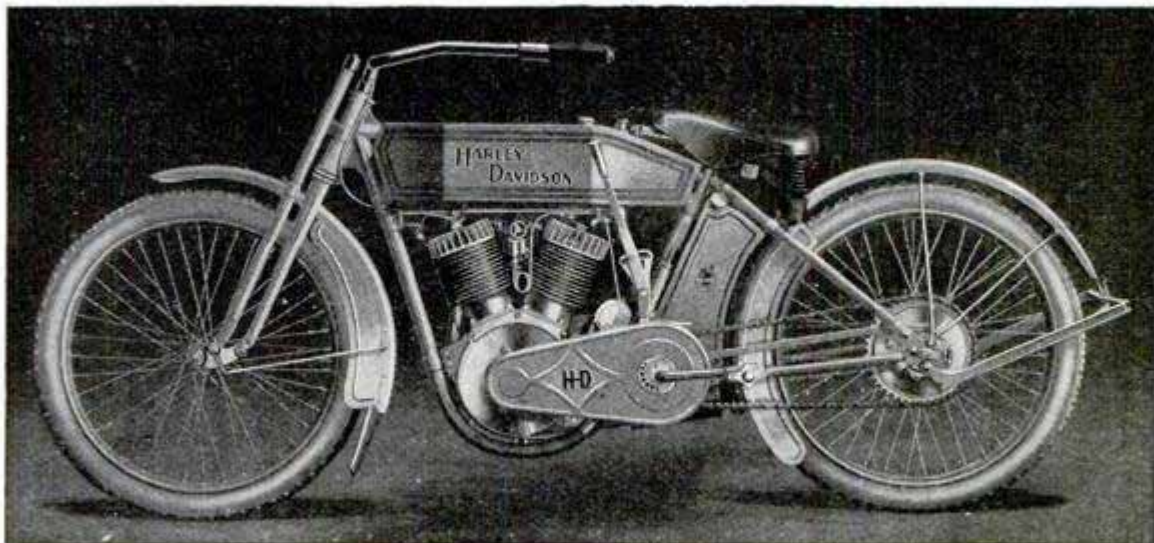
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By R. E. Olds, Designer

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Reo the Fifth is the only car in its class which offers them all *this year*.

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The leading cars this year have left-side drive. You know that all cars must follow.

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The laws in Europe compel the driver to sit close to the cars he passes. And he sits there now in the best cars built in America.

Reo the Fifth has this left-side drive. More than that, it has a single-rod center control.

All the gear shifting is done by moving this rod only three inches in each of four directions.

There are no side levers to block one front door. There are no center levers to block

entrance at right. Both brakes are operated by foot pedals. So the Reo driver is never forced to dismount in the street.

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Skimpy tires are also going out. Big tires are costly. But they save the extra, over and over, in cost of tire upkeep.

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Set-in Lights

All the best cars now have set-in dash lights—electric lights—instead of projecting oil lamps.

Note all the fine models. Projecting lamps,

by another year, will be sadly out-of-date. Reo the Fifth, like all the best cars, abandoned them this year.

Fine Finish

Cars are also coming to lasting finish. Reo the Fifth has a 17-coated body. It has genuine leather upholstery, filled with the best curled hair. Even the engine is nickel trimmed. And every detail shows the final touch.

Cars skimmed in these things, however well they look today, will very soon look shabby.

Watch these features. They are visible, conspicuous. The lack of them, to every man who sees it, marks a passing type of car.

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Men are also coming to well-built cars. By the Reo standard, this is what that means.

Our steel is made to formula. Each lot is analyzed twice.

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Sold by a thousand dealers. Write for our catalog and we will direct you to the nearest Reo showroom.

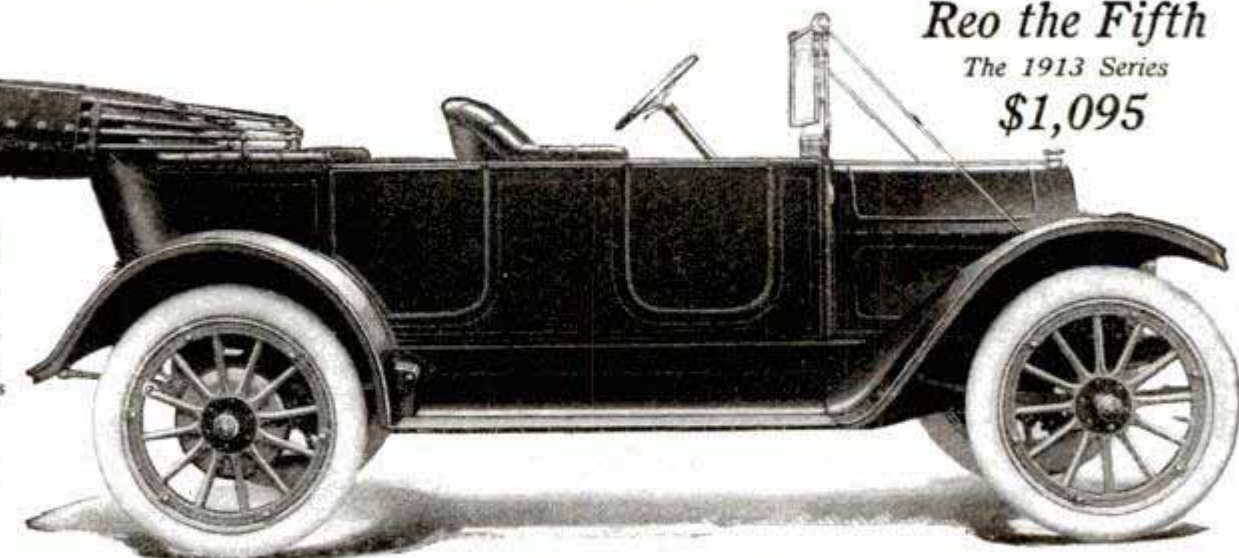
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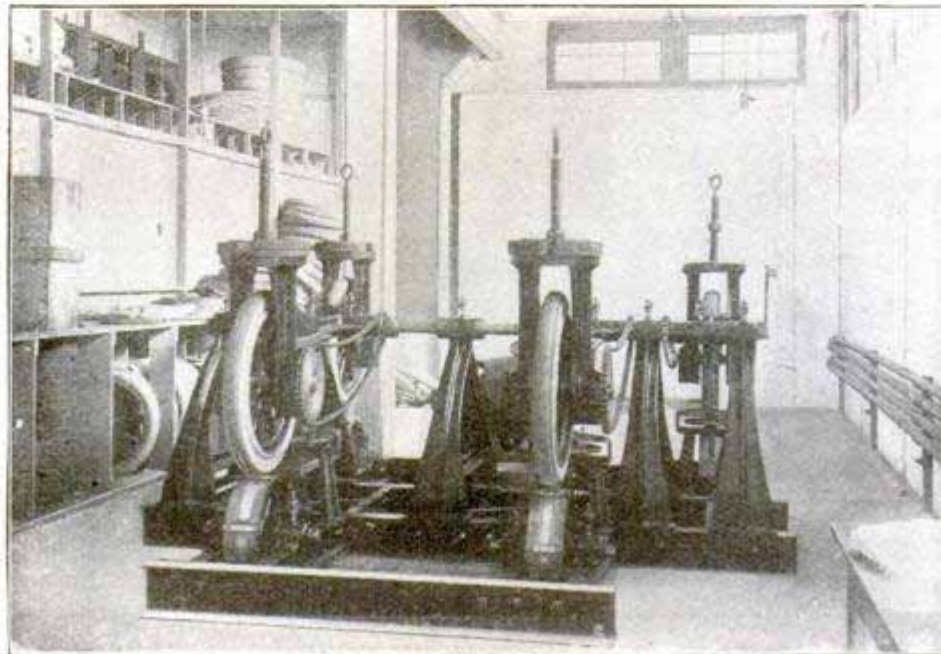


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This machine, running night and day, wears out four tires at a time under road conditions.

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They found immense economy. Savings so large, so convincing, that they told the facts to others.

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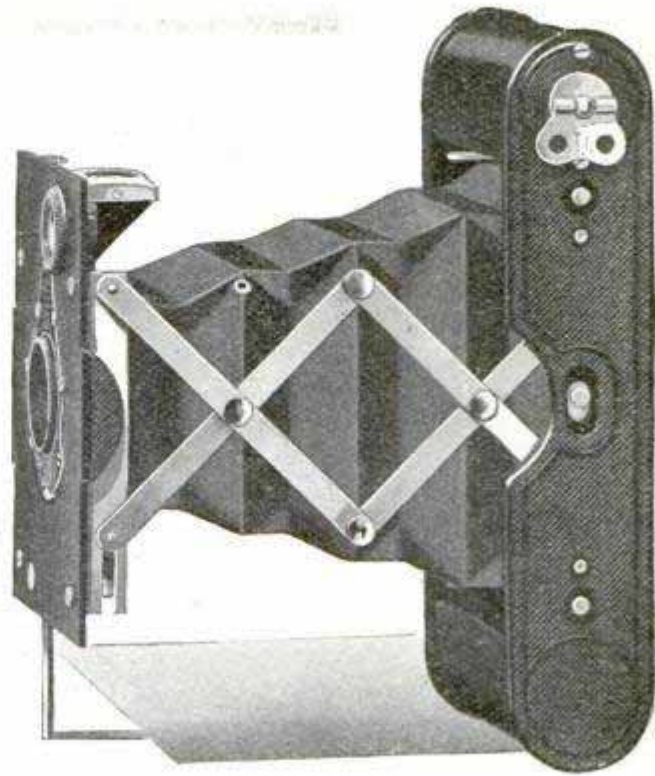
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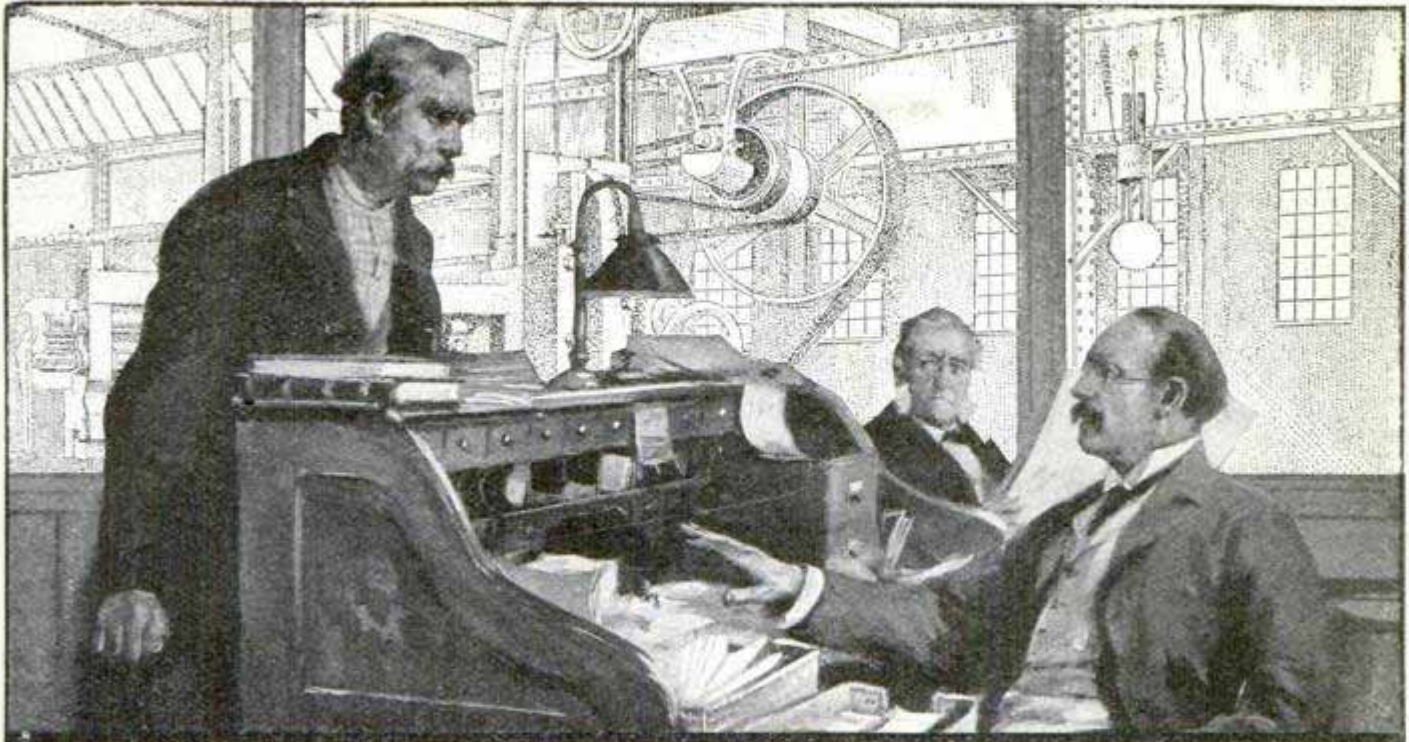


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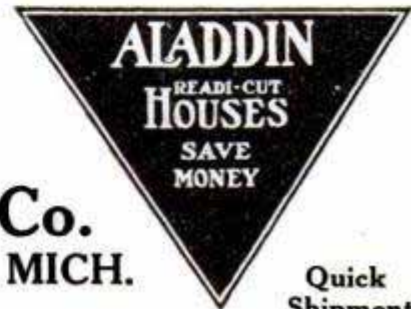
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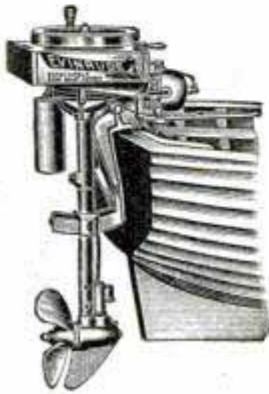
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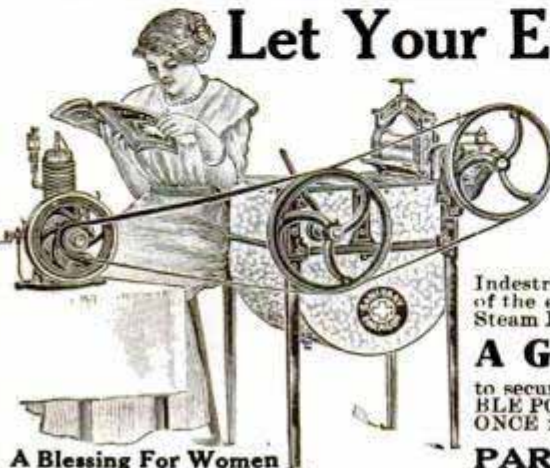
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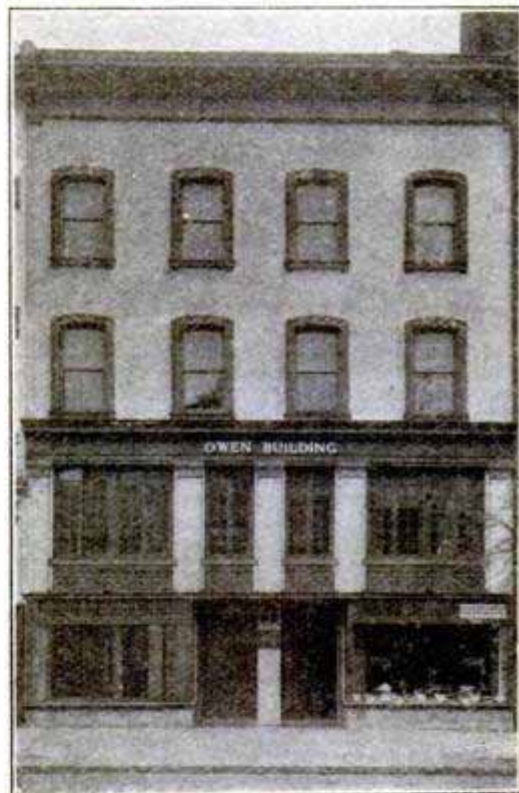
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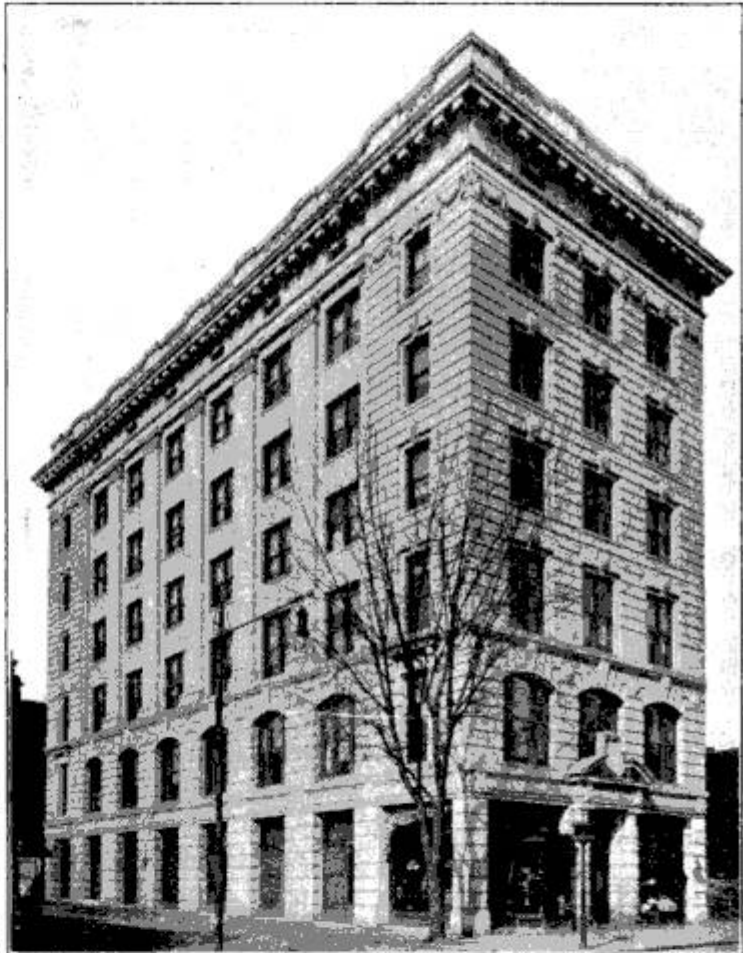
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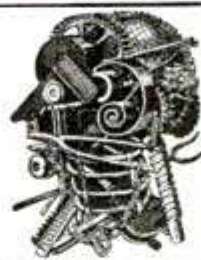
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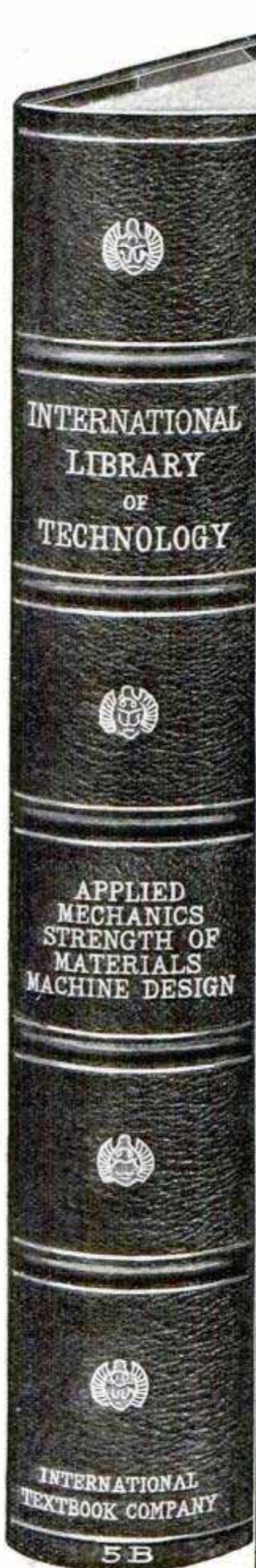
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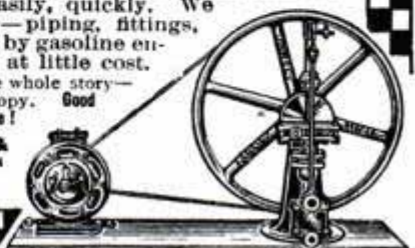
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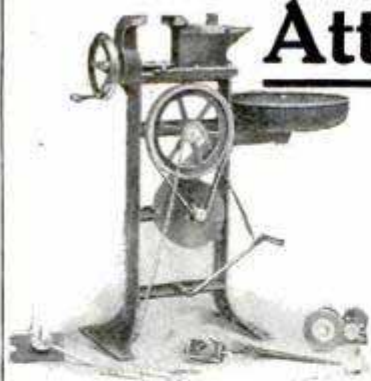
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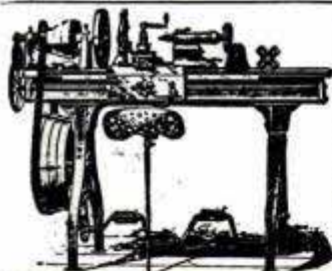
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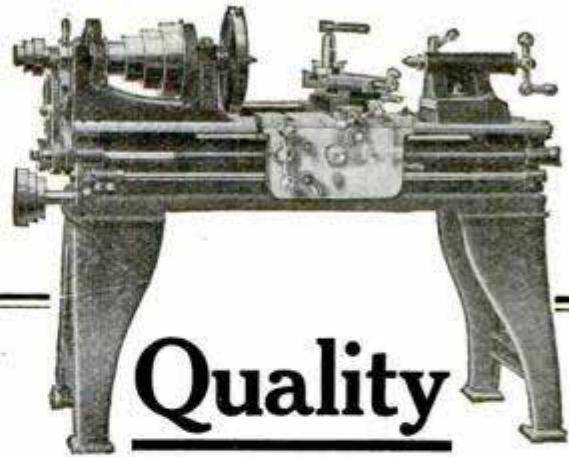
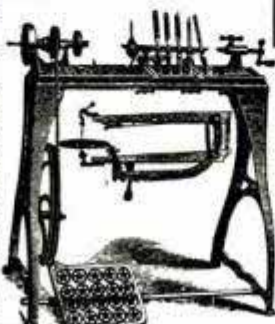
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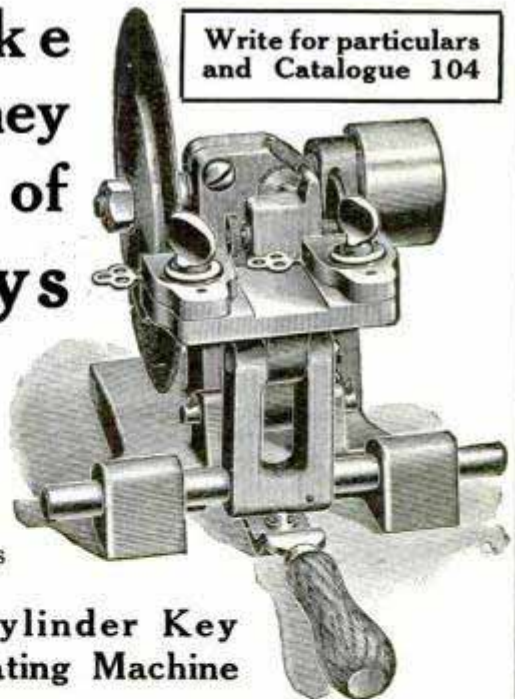
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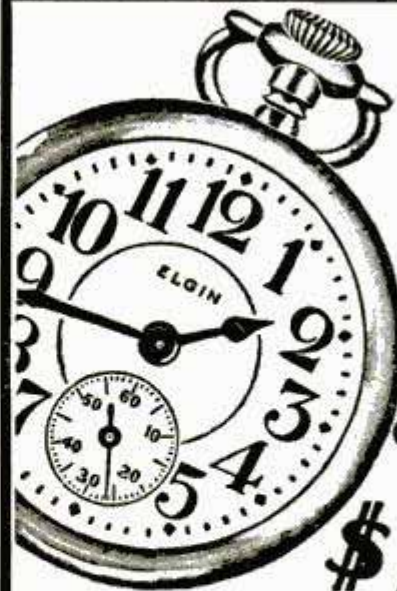
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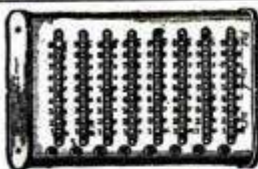
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square miles, or about 66 square miles if the abandoned mines are included, but the engineer of a resident mining company has estimated that the tract embraces practically 400 square miles. The mines, which were acquired by Great Britain in 1886, are divided into pits, hillside workings and cavern, or cave mines. Before the annexation



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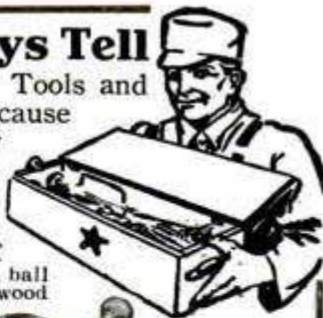
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A Drill unequalled in strength, durability, easy action and all-around excellence. Has cut gears, ball thrust bearing, and carries 8 wood boring points ranging from 1/16" to 11/64". The way this tool is made insures long and satisfactory service—try one. Write us for a copy of our Catalog.

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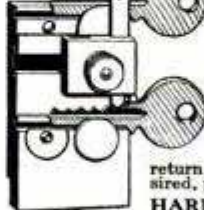
of the country to the British Empire the mines were worked in the crudest possible manner by the Burmese natives, but powerful pumps are now being used for removing the water from the pits in order that the gems may be recovered. Streams of water are also used to wash away the top soil in the valleys and thus uncover the layer of ruby dirt or "byon" which is carried away in tracks to rotating pans and a "pulsator," as in the diamond mines of Kimberly. Most of the fine rubies

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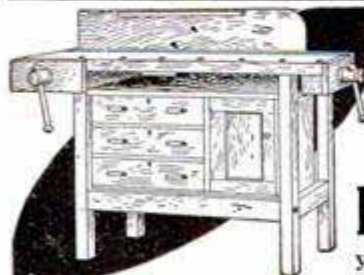
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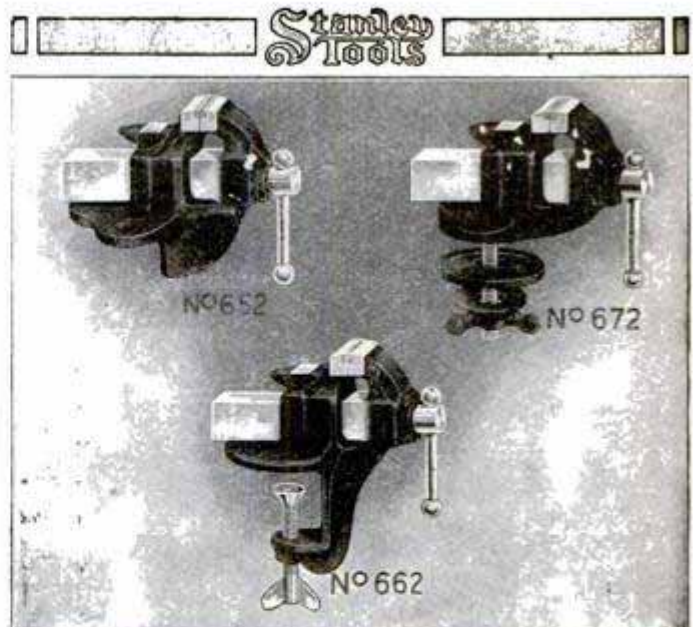
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No. 90 - Standard Style, in 14 sizes, 2" to 30" blades.

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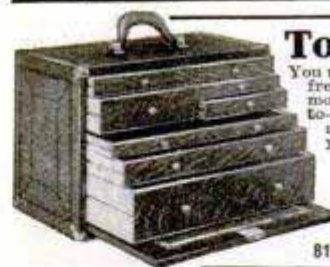
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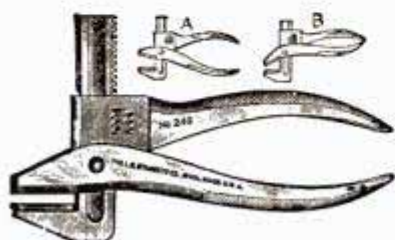
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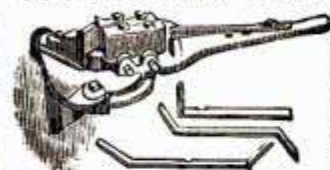
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The L. S. Starrett Co.
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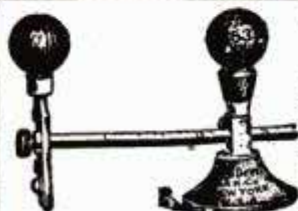
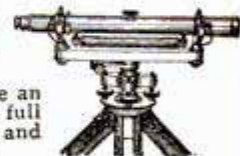
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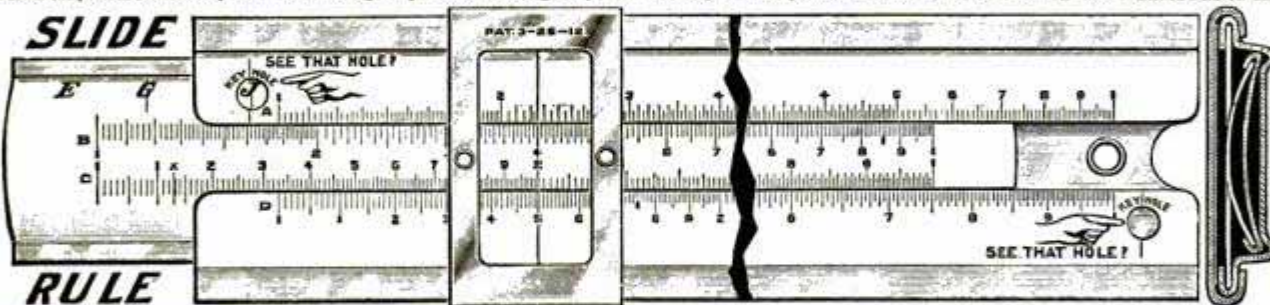
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ACCIDENTS IN METAL AND COAL MINES—A report recently made by the Bureau of Mines shows that fatal accidents in the metal mines of the United States are more numerous in proportion to the number of men employed than are the fatalities in coal mines. Of the 165,979 men employed in 1911 in the metal mines, 695 were killed, which represents a rate of 4.12 per 1,000 men employed, as compared with 3.73 per 1,000 for the coal mines of the country. Besides the fatal accidents,



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Capacity of wrench: 7 inch wrench—7 inch 45 degree: up to 1/2 inch pipe or any object up to 1 inch square, wt. 3/4 lb., \$1.00. 10 inch wrench—10 inch 45 degree: up to 1 inch pipe or any object up to 1 1/2 inch square, wt. 1 5/16 lb., \$1.25. 13 inch wrench: up to 1 1/4 inch pipe or any object up to 2 inches square, wt. 2 3/4 lb., \$1.50.

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KUTTER
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there were 4,169 serious accidents, or 25.12 per 1,000; and 22,408 slight injuries, or 135.01 per 1,000, in the metal mines. About 32 per cent of the fatal accidents and 29 per cent of the serious accidents were due to falls of ore or rock from the roof, wall, or bank.

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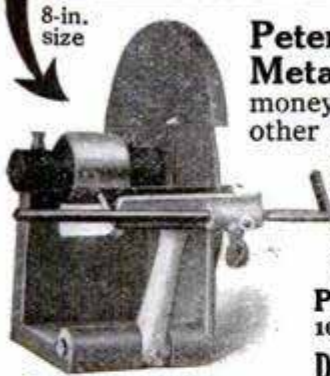
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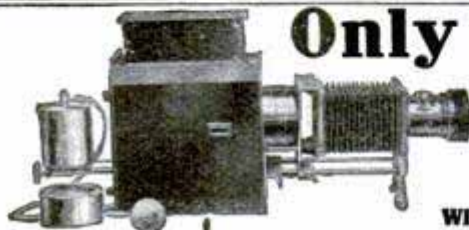
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Spiegel, Mau, Stern Co.
3531 Wall Street, Chicago (413)

automobile sweeper are now being used in Havre, France, but more experiments are to be made before horse-drawn apparatus is given up. Of the street-washing machines used in Berlin, 18 are motor-driven, and 10 are horse-drawn, the former being found more efficient. Hamburg, Germany, is testing two electric-motor sweepers, but the rest of the equipment is horse-drawn.

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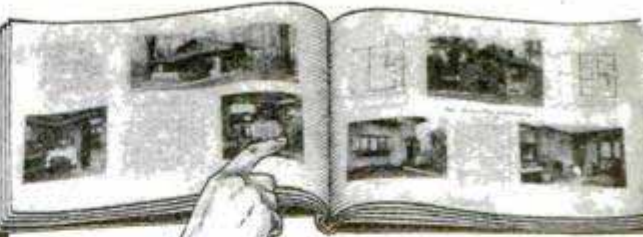
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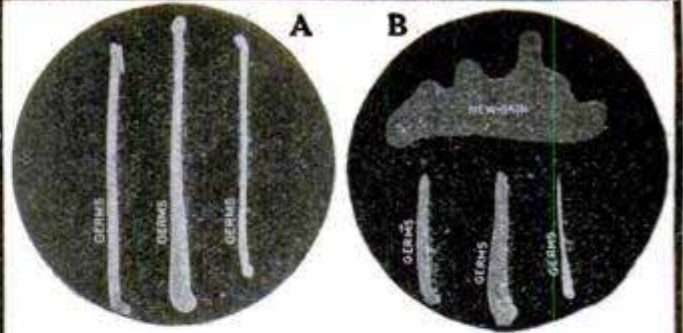
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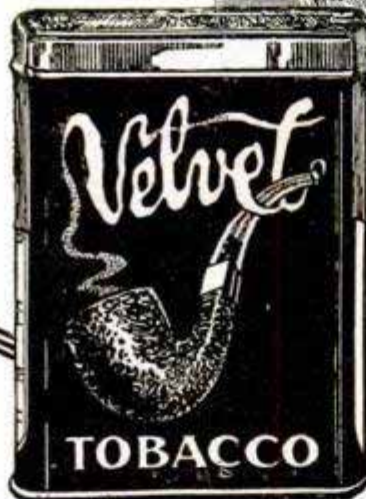
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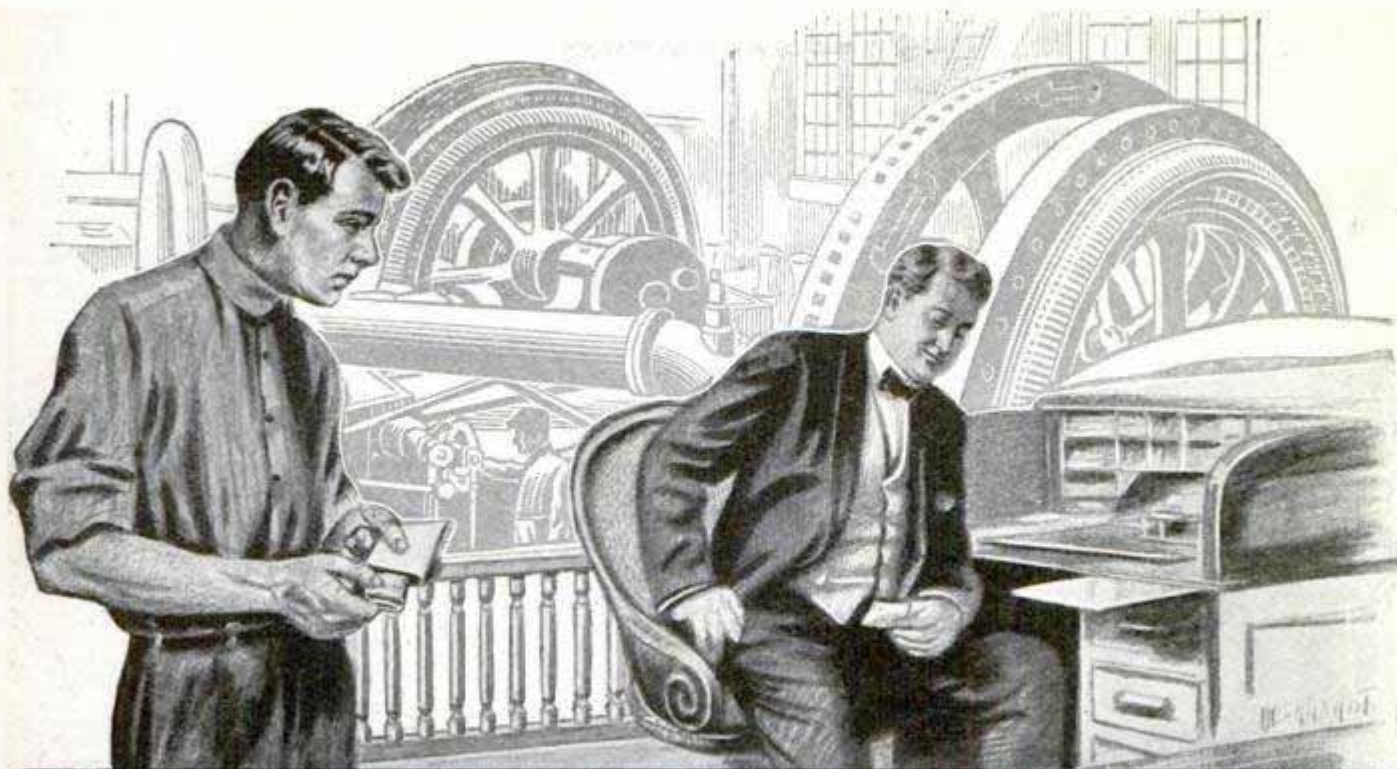
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said, "and then a man came with a cart for the waste paper; then two vacuum cleaners were brought by two different firms. But most of the carts came to fetch things. Two laundry vans came for the 'dirty washing,' a wagon came for two cases of carpets, and then a rail-

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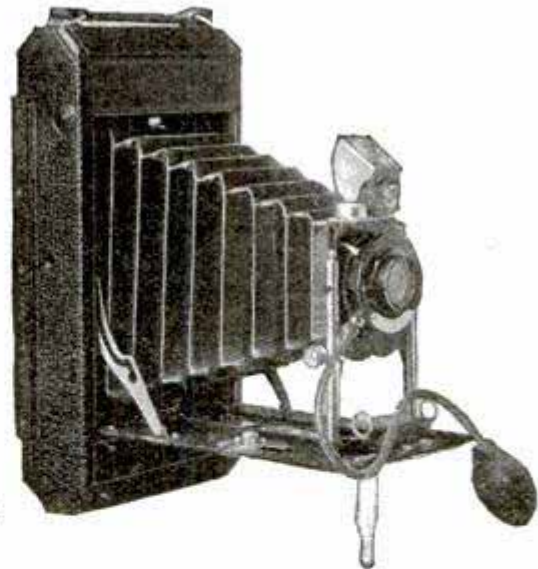
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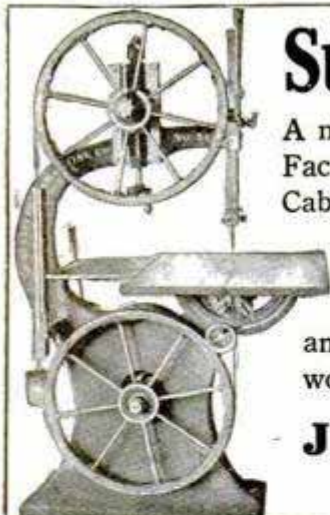
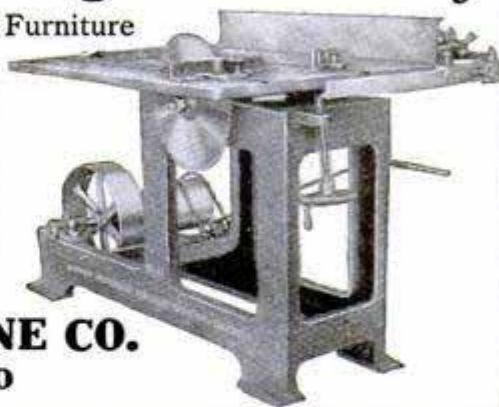
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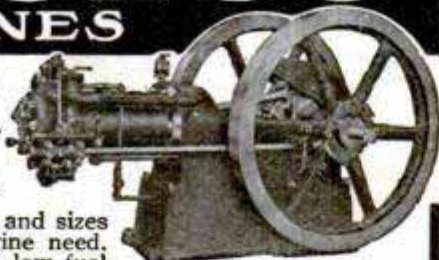
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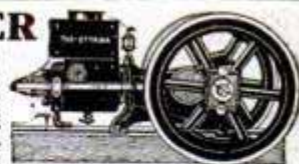
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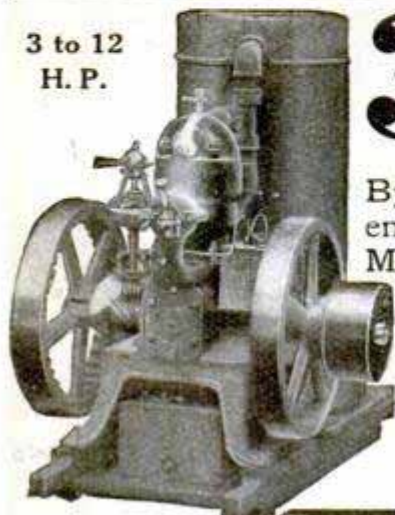
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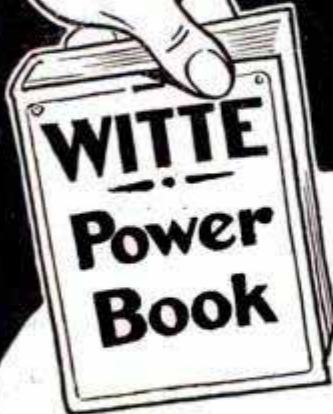
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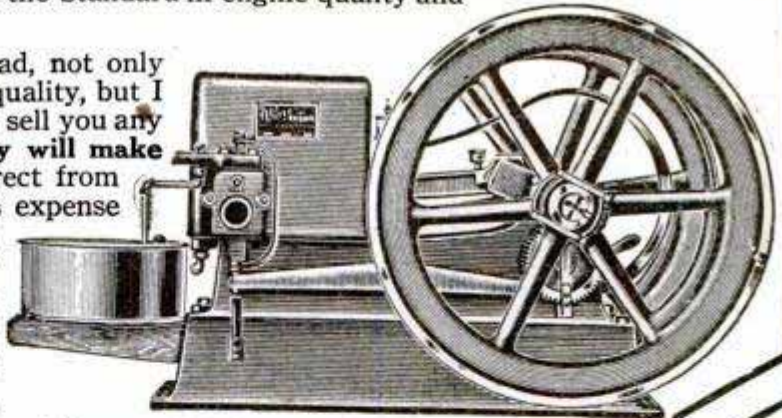
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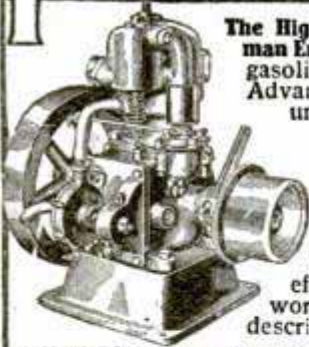
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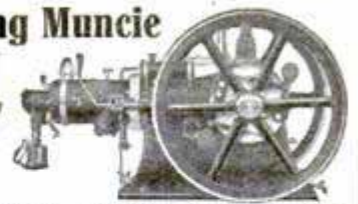
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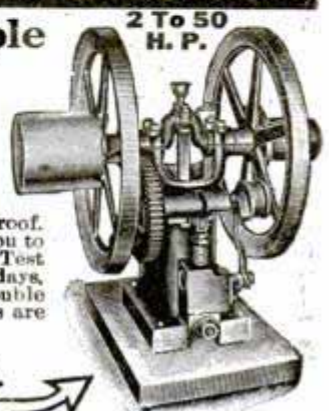
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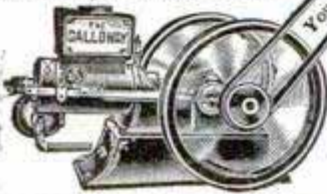
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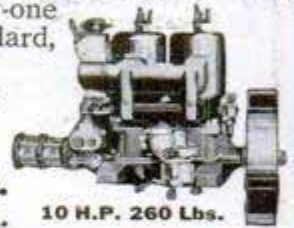
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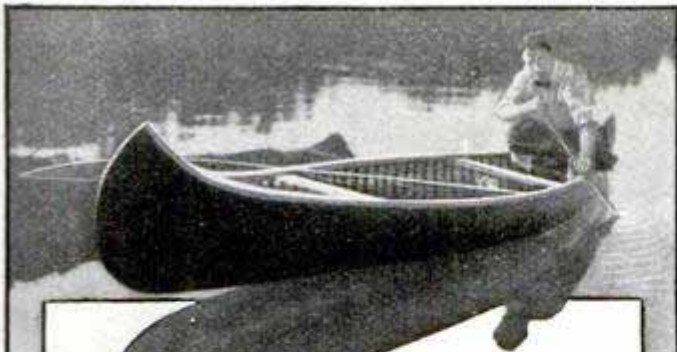
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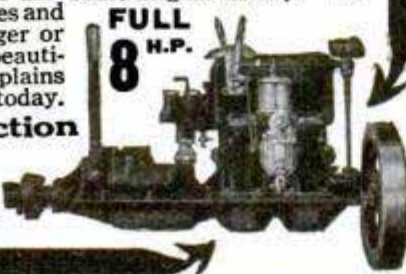
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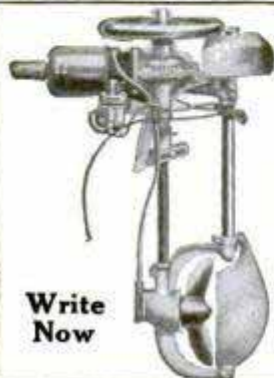
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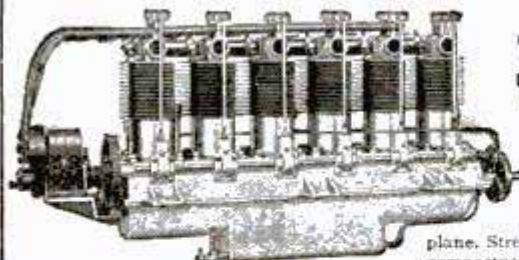
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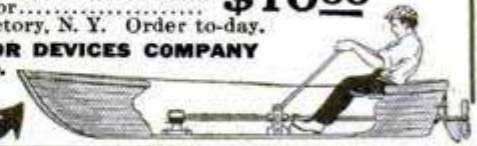
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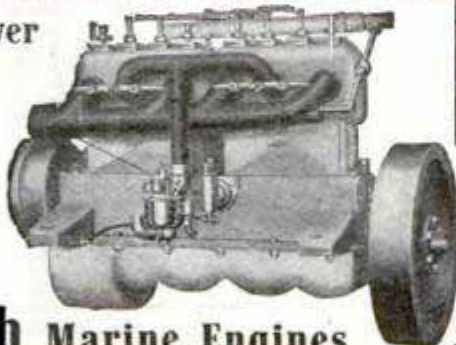
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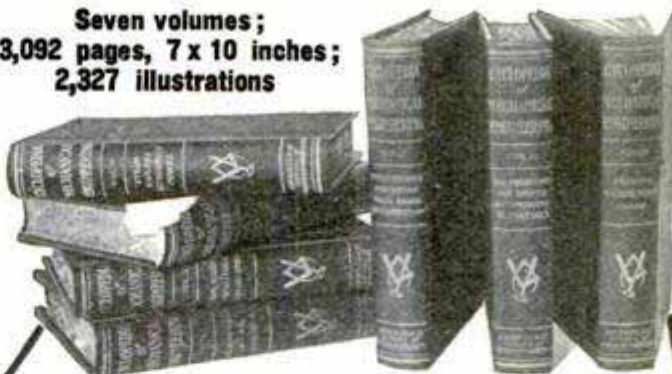
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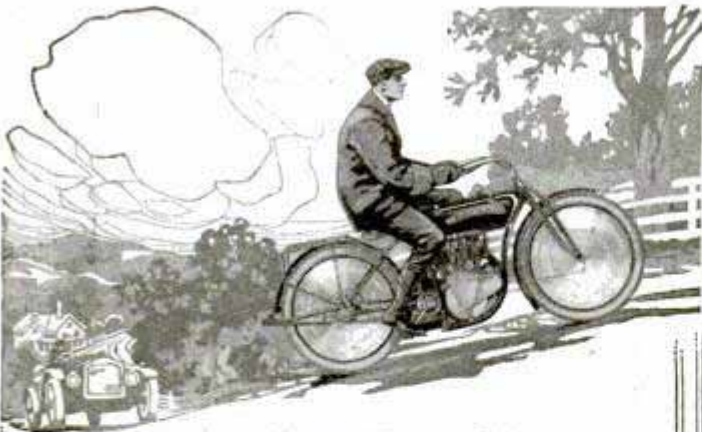
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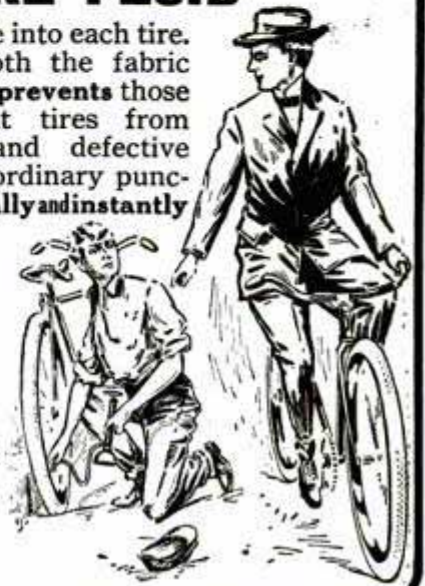
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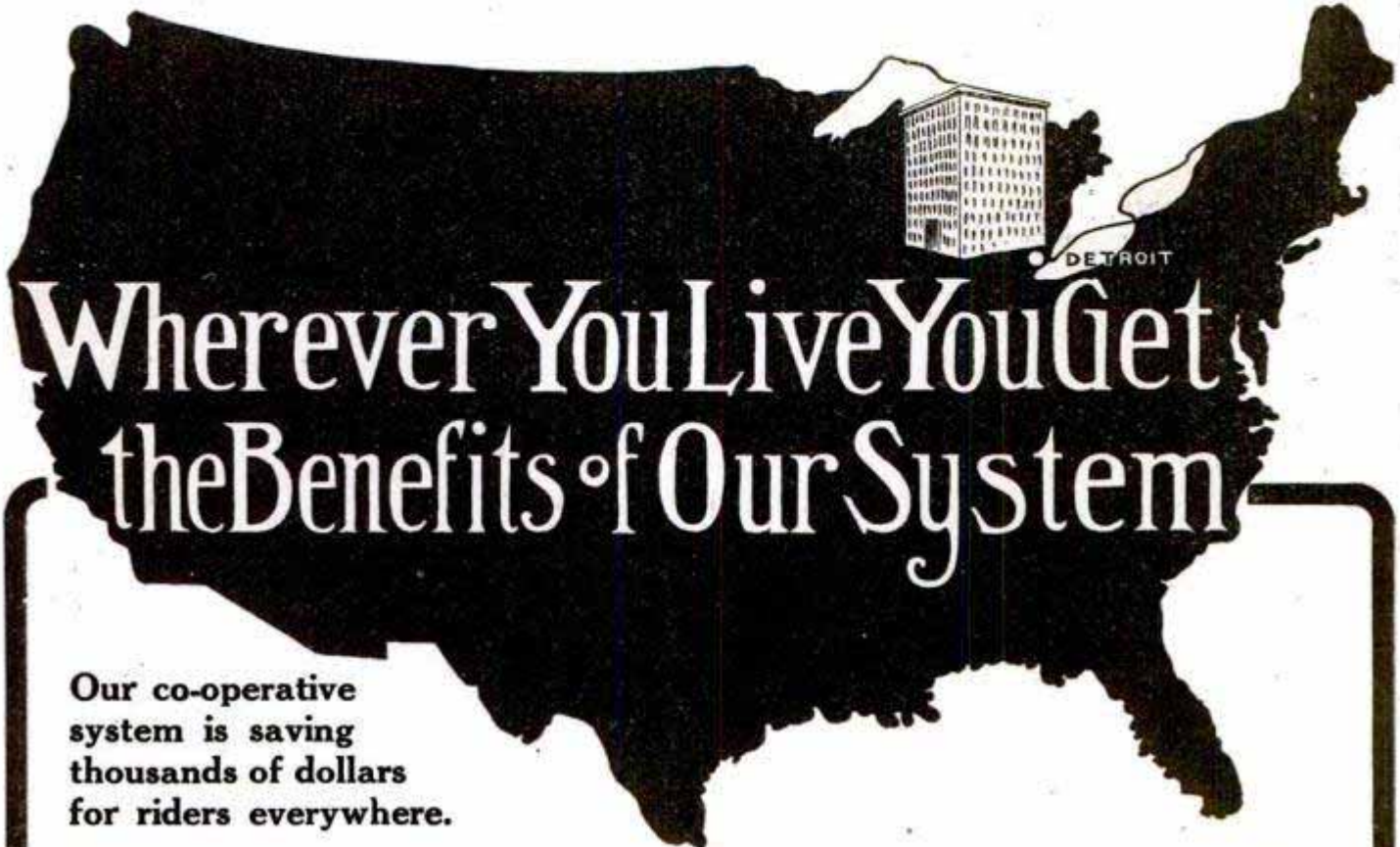
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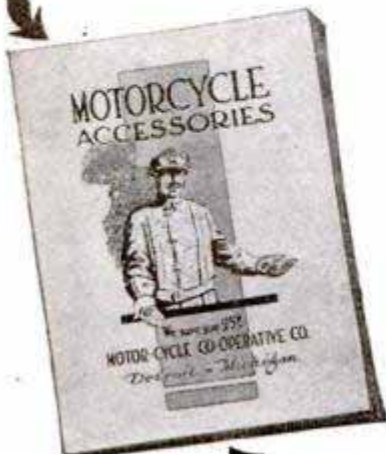
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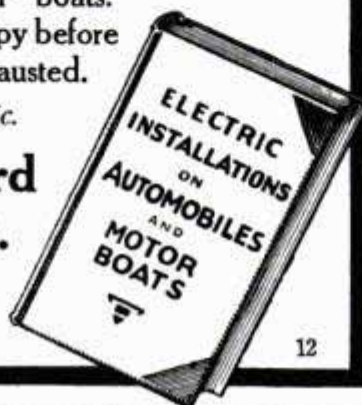
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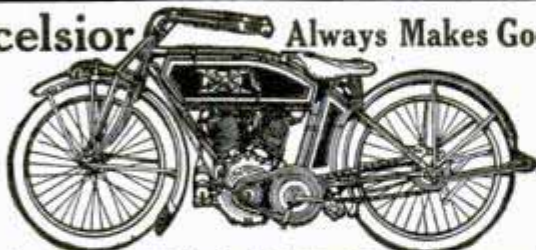


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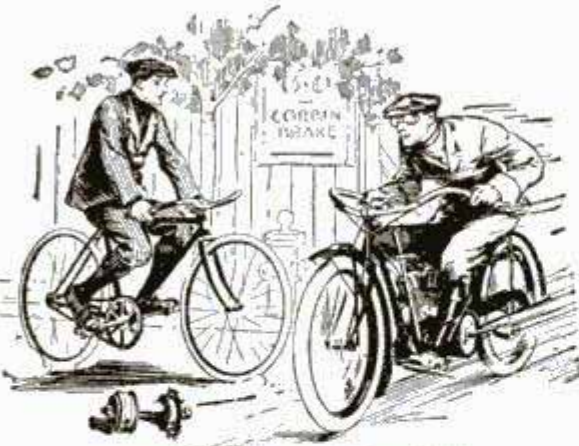
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Not "cheap" mall-order wheels. Not sold in a "cheap" mall-order way. Only wheel with Truss Frame, giving double strength, and Hygienic Spring Fork, taking up every shock. Comes complete. **GUARANTEED TEN YEARS** (twice the guaranty of any other wheel). Protection from thieves—protection from accidents. Satisfaction or money back.

Write for **FREE Illustrated Catalog**
AMERICA CYCLE MFG. CO., Dept. 1067
1108 South Michigan Boulevard CHICAGO, ILL.

Instant Control!



THE CORBIN Duplex Coaster Brake

Enables bicycle riders to avoid sudden accidents or collisions. Operated instantly by the pedal. The standard of safety, reliability and control. Invaluable for touring. Corbin Two-Speed brake is an immense assistance on steep up-grades or against strong head winds. Greatly appreciated by elderly riders.

Either of these brakes fitted to your wheel at any bicycle repair shop.

Send for 1913 free catalog showing all Corbin Brakes, Hubs and Axles

American Hardware Corporation
CORBIN SCREW DIVISION
302 High Street New Britain, Conn.
Licensed Coaster Brake Manufacturers

claim it is absolutely impossible for them to do business.

The effect will be very serious upon the commercial credit of the state, as wholesalers must insist upon having the protection of fire insurance for goods not yet paid for. Lack of insurance facilities will also greatly interfere with bank loans on grain, cotton and staples in warehouses, the insurance certificate usually being attached to the warehouse receipt as an essential to the loan. It will also affect the insurance of mortgages on buildings, as insurance is always required to protect the mortgagee, while bond issues and other sim-

\$5,000 a Year from Ten Acres

With Six Months Vacation



Independence and a Competence for Life

Five Thousand Dollars a Year

net income from ten acres of matured apple and cherry orchard in the *frostless* and *wormless* Bitter Root Valley with a *home and six months vacation* annually in one of the most magnificently endowed natural environments on the Creator's footstool, with *golf links, hunting, fishing and mountain climbing* and with neighbors of culture, education and refinement—is the opportunity we offer you.

We believe you will *investigate* this opportunity because this appeal for investigation is directed to broad-minded and sensible readers, living in an age of scientific progress which has made the impossible of yesterday the reality of *today*. This is *not* an offer of something for nothing. It is an opportunity for you to make an immensely profitable compact based on mankind's partnership with Nature. *We are now growing more than three thousand acres of fruit trees, one to three years old, for satisfied customers who would not consider selling their orchards at a large advance over their cost.*

\$5,000 Yearly For Life From Ten Acres

A Bitter Root Valley apple orchard bears commercially in its fifth year. Ten acres, fully developed, should be capable of returning you during early maturity, strictly net, a profit of \$2,000 to \$5,000 yearly. Beginning with the 10th year from planting, judged by experience of others, 10 acres should net you an *income of \$5,000 yearly and employ only half your time.*

If you have a fair-sized income now and are willing to improve your condition, *you do not need much capital* to possess one of these big-paying orchards.

Our Proposition and Plan

briefly stated is this: We will sell you a CHOICE 10-ACRE ORCHARD HOME TRACT (spring of 1913 planting) best standard varieties apples and cherries—with the *Company's definite written contract* to care for and develop your orchard under expert horticultural supervision for five full growing seasons from date of planting, including all land taxes and irrigation charges. You may, if desired, assume personal charge of your orchard at any time and secure a refund.

The land should easily become worth, conservatively stated, in fair comparison with other improved land, \$1,000 an acre. There is a clean profit to you of 100 per cent on a 5-year investment to count on at the outset. Only a \$300 cash payment required now to secure your orchard tract—balance in easy payments divided over a ten-year period. Your payments for the first few years are practically ALL the cash outlay you will have, as *your orchard tract should meet all payments falling due while in commercial bearing period and yield you a handsome profit besides.* Our reservation plan provides for *inspection of the land by you, and your money back* if dissatisfied.

—INVESTIGATE by using this coupon TODAY—

BITTER ROOT VALLEY IRRIGATION CO.

849-855 First National Bank Building, Chicago, U. S. A

Robert S. Lemon, General Sales Manager.

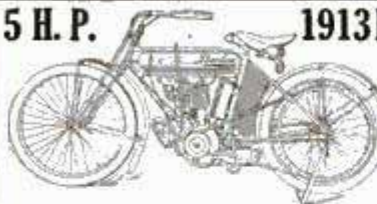
Please send me full information concerning your Riverview Orchard Tracts in Bitter Root Valley.

Name _____

Street No. or Rural Route _____

Town _____ State _____

5 H. P. 1913 Peerless Motorcycle



With Free Engine Idler and Bosch Magneto, together with the best there is in motorcycle construction—Power, Speed, Endurance, and those Wearing Qualities so essential for low cost of maintenance. 5 MILES FOR ONE CENT
Agents Wanted—Liberal Discounts

PEERLESS MOTORCYCLE CO., 179 Huntington Ave., BOSTON, MASS.

MOTORCYCLE SUPPLY CATALOGUE

LOWEST PRICES—LARGEST EVER ISSUED

If you ride a motorcycle you cannot afford to be without our big catalog of 1216 supplies. We ship prepaid at prices lower than you are used to paying. Motor repair parts are half price. A \$20,000 stock for immediate shipment. Since 1904 we have been the leaders.

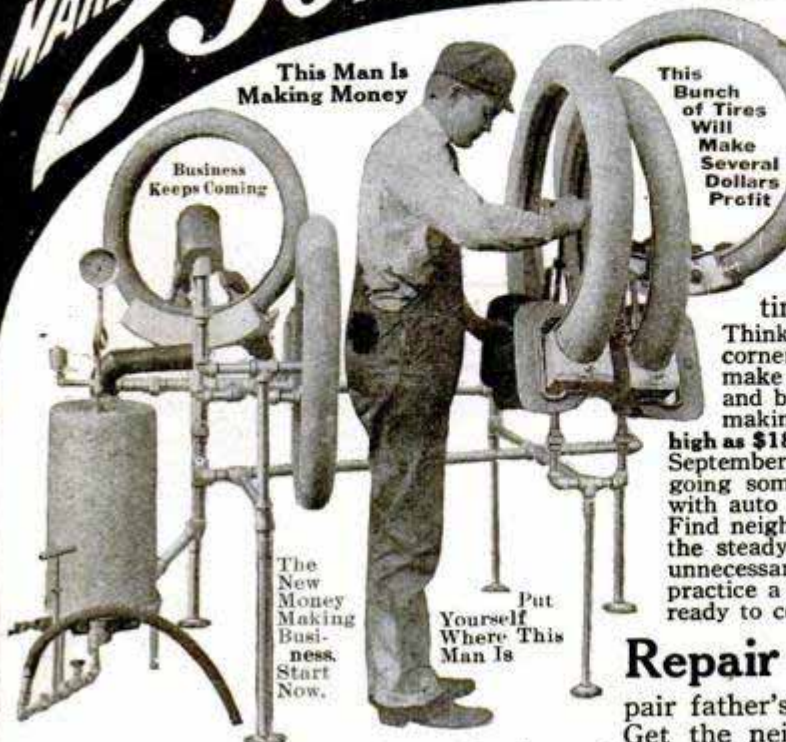
Write today, enclosing 4c postage for catalog P.

Branch,
3664
So. Main St.
Los Angeles,
Cal.

MOTORCYCLE EQUIPMENT CO.
MECO BLOC HAMMONDSPORT, N. Y.



MAKE \$250⁰⁰ A MONTH REPAIRING AUTO-MOBILE TIRES



This Man Is Making Money

This Bunch of Tires Will Make Several Dollars Profit

Business Keeps Coming

The New Money Making Business. Start Now.

Put Yourself Where This Man Is

Be first to enter this new big paying business in your town. Open your pockets. Let the dollars pour in. Act quick. Every auto sold means more tires to mend. Automobile business is growing fast—enormous field for tire repairing. Punctures and blowouts are common. Tires need retreading and vulcanizing. Something going wrong all the time. Thousands forced to buy new tires because they can't get old ones fixed. Think of the old bicycle days—repair shops on every corner—all making money—busy day and night. Autos make same proposition over again—only ten times bigger and better. Users of Haywood Tire Repair Plants are making big money. Johnson, Tex., writes: "I made as high as \$18 profit in a day." Another man who bought a plant September, 1911, writes he has cleared over \$3000.00. That's going some! Operate a plant as side line in connection with auto business—garage or as an independent business. Find neighborhood where there's a bunch of autos—get all the steady business besides transient work. Experience unnecessary. You learn quick. Simply follow directions—practice a few days on a couple of old tires and you'll be ready to coin money. Business comes fast and easy.

Repair Tires at Home.

Young men! and boys repair father's tires—get money he pays garage man. Get the neighbor's work. Make money to attend

college or to start a garage and repair business. Auto owners—repair your own tires—save money—pay for your outfit in short time. We have outfits for home use. Anyhow investigate. Send today for catalogue. See the wonderful possibilities in this marvelous field. Learn of the enormous money-making opportunities in this fascinating new business.

HAYWOOD TIRE & EQUIPMENT CO., 632 N. Capitol Ave., Indianapolis, Ind.



THE FEILBACH LIMITED

Here's a Lighter, Stronger, Faster Motorcycle

Speed, comfort, quality and all that the term "Limited" signifies in connection with railway travel is embodied in this newer, stronger, faster, easier riding motorcycle—the

Feilbach Limited

a new departure in motorcycle construction. Its many special features, including Long Wheel Base, Spring Fork, Special Seat Support with Longitudinal Springs and its neat, trim, graceful appearance appeal instantly to the motorcycle enthusiast. **Price \$250**

You will never realize what maximum motorcycle comfort and quality are until you see and ride the Feilbach Limited. Whatever you do, don't buy a motorcycle before you get details of the Feilbach Limited. Write us today for Folder A. **Agents Wanted.**

FEILBACH MOTOR CO.
1248 Holton St. MILWAUKEE, WIS.

Please Mention Popular Mechanics

ilar transactions will likewise be affected. The Orr bill, which forced the insurance companies to this unusual action, was enacted in the closing hours of the recent legislature. It makes it a felony to consult any rate book, schedule or other guide in quoting rates on fire insurance, or to have any understanding or agreement which tends to increase the price of in-



\$40 Motorcycle

We have the largest line of new and used Motorcycles in the country at the lowest prices. We also have a thoroughly equipped repair department and are in position to furnish repairs for any machine. Send us your machine to be overhauled. We pay cash for second hand motorcycles. *Send for Catalog.* **HARRY R. GEER CO., 888 McLaran Ave., ST. LOUIS, MO.**



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We Make the Price

To get our latest book FREE, give name of your motorcycle. This is the most complete exclusive motorcycle accessory catalog ever published. You can't afford to be without it. Address us today.

KANSAS CITY MOTORCYCLE SUPPLY CO.
1501 Grand Ave. Kansas City, Mo.

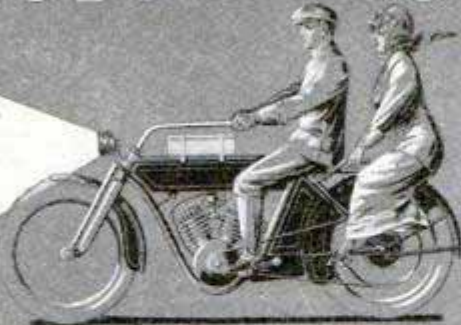


RIDER AGENTS WANTED

in each town to ride and exhibit sample 1913 model. Write for Special Offer. **Finest Guaranteed 1913 Models \$10 to \$27** with Coaster-Brakes and Puncture-Proof Tires. **1911 and 1912 MODELS ALL OF BEST MAKES..... \$7 to \$12**
100 Second-Hand Wheels
All makes and models, good as new
Great Factory Clearing Sale. \$3 to \$8
We Ship on Approval without a cent deposit, pay the freight & allow **10 Days' Free Trial**

TIRES coaster-brake wheels, lamps, and sundries, half usual prices. **DO NOT BUY** till you get our catalogue and offer. Write now. **MEAD CYCLE CO. Dept. M108 CHICAGO**

Prest-O-Lite



The Only Practical Light for Motorcycles

Prest-O-Lite is the only lighting system that makes night riding possible, pleasant and SAFE.

The ready-to-use gas costs no more—usually costs less—than the carbide a generator consumes.

The first cost is low [\$10]. Prest-O-Lite never gets to be second-hand, and is always a **READY CASH ASSET**.

You can easily afford it. You cannot afford to be without it if you ride at night. One accident might cost you more than years of Prest-O-Lite service.

Easily attached to any motorcycle. We will arrange for immediate exchange service for anyone, anywhere.

See any motorcycle (or automobile) dealer, or write us.

DON'T ACCEPT AN IMITATION!

The genuine Prest-O-Lite, when empty, can be immediately exchanged for a full one, ANYWHERE AND ALWAYS. Imitations cannot.

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Branch offices and Service Stations in all principal cities. Charging plants in all parts of the country.

Exchange Agencies Everywhere

insurance. The principal is made responsible for the act of the agent, and western managers of fire-insurance companies in Chicago, or company officers in Hartford or New York, can be extradited and held for trial.

The maximum penalty is five years in the penitentiary and \$5,000 fine. The usual presumptions of innocence are taken away and the accused is required to clear himself, while the accuser need not set up the time or place when the alleged violation took place. The property of a company found guilty can be forfeited



Morgan Gas Lighter

Agents wanted everywhere to handle this Specialty.

LARGE PROFITS

Increasing Demand. Send for Territory and Sample.

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No hill too steep. No sand too deep.

OLYMPIC 4 cylinders \$1500

MAJESTIC 4 cylinders \$1975

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1301 East Main St.

JACKSON, MICH.

EDWARDS FIREPROOF STEEL

GARAGES

For Automobiles and Motorcycles

\$30 and Up

Easy to put up. Portable. All sizes. Postal brings latest illustrated catalog.



THE EDWARDS MFG. CO., 320-370 Eggleston Ave., Cincinnati, O.



Use This Camera 10 Days FREE

Don't send us a penny; merely send your name, address and occupation on coupon below, and the new **Naco Film Pack Folding Camera** will be sent to you by Parcel Post. Try this camera for ten days, see how splendidly it works, note the new method for inserting film pack—no hinges or springs to mar the film and allow light to enter. This camera is made with **Meniscus Achromatic Lens** and **Uno Automatic Shutter**. It takes pictures $3\frac{1}{4} \times 5\frac{1}{2}$ in.—post card size; a real pocket camera—outside dimensions $4\frac{1}{4} \times 2\frac{1}{2} \times 6\frac{3}{4}$ in. Loads in daylight—no dark room required. You can use the camera for pleasure or profit—take pictures for making money, or for fun or study. It is a great pastime and a liberal education.

If at the end of ten days, you find that it is just the camera you want, send us \$2.00; and then send us \$2.00 a month for 5 months—\$12.00 in all. If you do not want this camera, simply return it at our expense. You take no risk.

This is the Greatest Camera Offer Ever Made in America

The **Naco Film Pack** is a National Camera, covered with fine walrus grained leather; the woodwork is ebonized, making a beautiful contrast for the nickel-plated trimmings. The National Camera Co. is revolutionizing the camera business by its great offers, and here is one that you should take full advantage of.

Special Film Offer

You will need a pack of films to try out this camera and we make this special offer: Send us \$1.00 and we will send you a pack that will take 12 pictures. After you have taken the pictures, send the films to us and we will develop, print, and send them to you without any additional charge. Fill out this coupon today, and try the wonderful **Naco Film Pack** for ten days free. We will send it to you prepaid—you take no risk.

NATIONAL CAMERA CO. St. Louis, Mo.

Send me for 10 days' free trial your **Naco Film Pack**. If I am satisfied with it, I will send you \$2.00 as first payment and then \$2.00 a month for five months. If I do not wish to keep the camera, I will return it to you at the end of ten days at your expense. (I enclose \$1.00 for your special film offer.)

NATIONAL CAMERA COMPANY,
901 Lucas Ave.,
St. Louis, Mo.

Name

Address

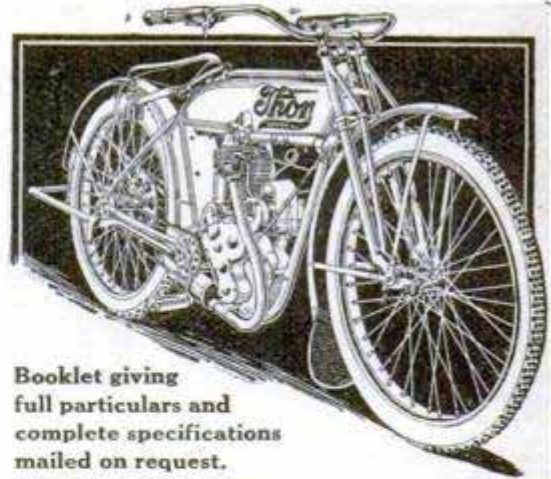
Occupation

To hasten shipment, send two business references.

Thor

The World's Greatest Motorcycle

A better motorcycle cannot be built, a fact well worth investigating — fact open for investigation and comparison.



Booklet giving full particulars and complete specifications mailed on request.

THREE MODELS—ALL LEADERS

All Chain Drive and THOR Positive Free Engine Clutch.

- Model 13-M 4 H.P. Single.....\$225.00
- Model 13-W 5 H.P. Single..... 240.00
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AURORA AUTOMATIC MACHINERY COMPANY
1307 Michigan Ave. CHICAGO, ILLINOIS



THE GREAT AMERICAN
Eagle

9-12 H. P. Chain Drive Twin
Send for catalog and prices.

EAGLE MOTOR CO.
(P.M.) Brockton, Mass.



Ten Days' Free Trial

allowed on every bicycle we sell. We **Ship on Approval** and trial to anyone in the U. S. and *prepay the freight*. If you are not satisfied with the bicycle after using it ten days, ship it back and *don't pay a cent*.

FACTORY PRICES Do not buy a bicycle or a pair of tires from anyone at any price until you receive our latest **Art Catalogs** of high grade bicycles and sundries and learn our *unheard of prices and marvelous new special offers*.

IT ONLY COSTS a cent to write a postal and **FREE** by return mail. You will get much valuable information. **Do Not Wait; write it Now!**

TIRES, Coaster-Brake rear wheels, lamps, parts, repairs and sundries of all kinds at half usual prices.
MEAD CYCLE CO. Dept. M 108 CHICAGO

Build YOUR OWN Side Car Motorcycle

Side Cars two parts. Four models to choose from. Send for Catalogue and terms.

**\$65⁰⁰
UP**

AGENTS WANTED
Baxter Side Car Co., 119 Broadway, Cambridge, Mass.

to the state, and treble damages are allowed any person who holds himself injured by any violation.

As there are over 10,000 agents in Missouri the unintentional act "tending to increase the cost of insurance" of any one might subject to a five-year term in prison the president of his company who did not even know there was such an agent. It is a violation

DAYLIGHT
BY NIGHT

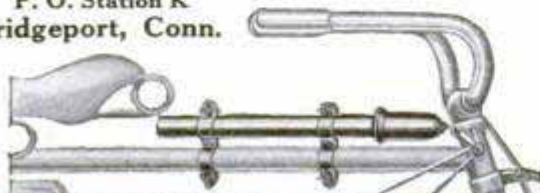


The most popular lamp on the market. Riders who want to see all of the road at night, use the "SEARCH-LIGHT"—it is a handsome, dependable lamp, burns gas and makes its own gas. Won't jar out. **BRIDGEPORT** bicycle pumps are best. Get one of these pumps and a "Search-Light."

Ask your dealer. Write for illustrated catalog.

BRIDGEPORT BRASS COMPANY

P. O. Station K
Bridgeport, Conn.



HENDERSON



4 cylinders, 8 H.P., \$325
free engine, chain drive,
Tandem attachment complete, \$25

If you haven't written for the new Henderson catalog or called on the nearest dealer to see the machine—our advice to you is to delay no longer.

Even with our output greatly increased, some men will not get a Henderson this season unless they act quickly.

Dealers are urging quicker deliveries of machines already sold, and are clamoring for more than their original allotments.

It is just as we predicted — that the Henderson popularity would grow and grow.

Send us your name for the catalog and the nearest dealer's address.

Henderson Motorcycle Co.
1158 Cass Ave. DETROIT, MICH.

Smart Men Wanted \$5 to \$10 a Day For Men Who Can Talk

Smart men, clever talkers, good mixers—send us your name and address. We've got a truly wonderful proposition for men like you. We start you in tailoring business, furnish everything, back you to the limit. Hustlers make \$5 to \$10 a day.

"Just Like
Finding
Money"



Be a Money-Maker! Look Prosperous!

Don't be a wage slave on small pay. Be your own boss! Make money fast and easy. Mix with prosperous people. Dress in the height of style. Our men are pointed out as top-notchers, winners, envied by all.

Grand FREE Outfit— Write for It Today

This big, wealthy tailoring concern spares no expense to start you right. Furnish Grand Free Outfit, handsome color plates, elegant cloth samples, tape measure, complete instructions and selling helps—everything free. No money or experience necessary. Just write.

Start a Fortune in Spare Time

You can do it. Whole time or spare time. For 20 years this company has been famous for making the swellest, best-fitting, longest-wearing made-to-measure clothes. (15)

Write today for Free Outfit.

THE PROGRESS TAILORING CO. Dept. 206, CHICAGO

to do anything "which tends to lessen competition," so that a company manager is guilty if he closes one of his agencies for any reason, since that tends to reduce competition.

The insurance companies hold that it is impossible for them to do business with safety under such a law

\$15.00 TO \$20.00 PER DAY PROFIT FOR YOU!

Here is your chance to go in business and make BIG MONEY this summer. NO knowledge or experience in photography required. Photos made direct on POST CARDS or TIN TYPES without the use of plates, negatives or dark room. Developed, toned and fixed in one solution, and delivered on the spot in ONE MINUTE. Don't miss this opportunity to become independent. Write today for our new catalogue and price list.

JAMESTOWN FERROTYPE COMPANY
Dept. 146, 1113 S. Halsted Street, Chicago, Ill.



WHITE ZIRCON

The only substitute for diamond showing a magnificent play of color. Cuts glass and resists fire and acid tests. A natural gem mined only in Ceylon. Far superior to white sapphire or topaz. Guaranteed satisfactory at one-twentieth the price of diamond. Mounted in solid gold and platinum. Sent free for examination. Catalogue and "Facts About Gems" by Prof. G. M. Butler of the Colorado School of Mines, mailed free.

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Let Us Send You The New Edison Phonograph On FREE TRIAL

We will send the New Edison right to your home for a free trial. Your choice of outfits. \$2.00 a month now pays for a genuine Edison Phonograph at lowest Rock-Bottom prices and without even interest on monthly payments. Send today for our beautiful Free Edison catalogue. Just write on a postal. "Please send me your Free Edison Catalogue." Then sign your name and address. Do this today.

Babson Bros., Edison Phonograph Distr.
119X Edison Block Chicago, Ill.



Typewriter Sensation

2 Dollars a Month

Buys a
genuine
Standard
No. 2

SMITH-PREMIER

Typewriter and at

\$72.20 less than the manufacturer's price.



Never before has anything like this been attempted. Dealers get \$3.00 a month rent for this make of machine not nearly as perfect as the one we will send you, and you pay only TWO DOLLARS A MONTH AND OWN IT.

Send the Coupon and We Will Ship You This Smith-Premier Typewriter on Approval

When the typewriter arrives, deposit with the express agent \$7.80 and take the typewriter three days and try it. If you find it to be the best typewriter you ever saw, satisfactory in every respect, keep it and send us \$2.00 each month, until our special price of \$27.80 is paid. If you don't want to keep it, return it to the express agent, and he will give you back your \$7.80, and return the typewriter to us. We will pay the return express charges.

You won't want to send this machine back after you have seen it and tried it. You can't imagine the perfection of these machines till you see one, and the price is \$72.20 less than the catalogue price, and it is guaranteed just as if you paid \$100.00.

Perfect machines only, complete outfit, nothing extra to buy, no strings of any kind to this offer. Just think of buying such a typewriter for \$7.80 down and \$2.00 a month. Thousands of people have paid \$100.00 cash for Smith-Premiers. It's standard, by many considered the best typewriter ever built. A key for each character, so each character is always the same; a type brush for cleaning the type built into the machine; the tilting carriage; comes to you with tools, rubber cover, everything ready. It runs beautifully. It's wonderfully simple and strong. It will last a lifetime. I sold a similar supply of these beautiful machines about a year ago to everybody's satisfaction.

Only 200 orders will be filled on this offer. Act today to be sure

The coupon states the terms. Fill it out, send it now, today. You can't lose, and it's the greatest economical typewriter opportunity you will ever have.

COUPON

HARRY A. SMITH, Dept. P,

No. 180 North Dearborn Street, Chicago, Ill.

Ship me a No. 2 Smith-Premier f.o.b. Chicago, as described in this advertisement. I will pay you the \$20.00 balance of the special \$27.80 purchase price, at the rate of \$2.00 per month. The title to remain in you until fully paid for. It is understood that I have three days in which to examine and try the typewriter. If I choose not to keep it I will carefully repack it and return it to the express agent. It is understood that you give the standard guarantee for one year.

Name.....

Address.....

Shipping Point.....

AGENTS

SALESMAN
MANAGERS
YOUNG OR OLD
NEW BUSINESS

**NEW BUSINESS JUST OUT**

DROP THE DEAD ONES. AWAKE! START WITH THIS NEW INVENTION, THE 20th CENTURY WONDER

Get started in an honest, clean, reliable, permanent, money-making business. Sold on a money-back guarantee

The Blackstone Water Power Vacuum Massage Machine
For the Home. No Cost to Operate. Lasts Life-Time

LISTEN No Competition, New Field, New Business. Price within reach of all. That's why it's easy to sell. Endorsed by Doctors and Masseurs. Removes Wrinkles, rounds out any part of the face or body, brings back Nature's beauty. Almost instant relief can be given all kinds of pains. A demonstration convinces the most skeptical person. Sales easily made.

Read On! What Others Do, So Can You.

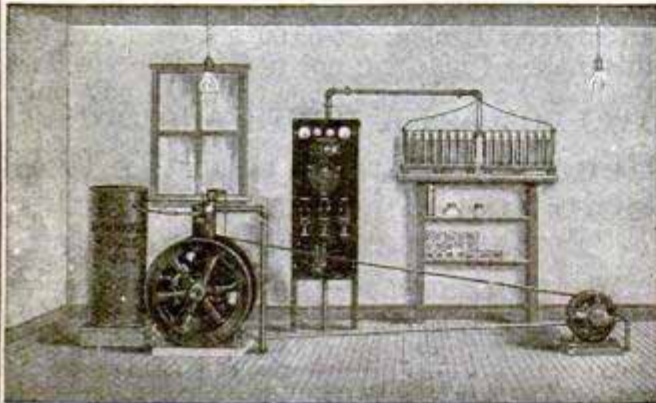
Parker writes, sold eight machines first day. Margwarth, says, I am making \$19.00 per day. Schermerhorn, eight dozen machines first month. Shaffer writes, am selling four out of five demonstrations. Vaughn, orders one dozen, four days later wires "ship six dozen by first Express." Lewis, sells four first hour. Men, women, everybody makes money. No experience necessary. Protected territory to active workers. We own all patents. Big book entitled, "The Power and Love of Beauty and Health," Free. Investigate now, today. A postal will do. A big surprise awaits you. Address, BLACKSTONE MFG. CO., 711 Meredith Bldg., TOLEDO, O.

AGENTS

GENERAL AGENTS
ROAD MEN
MAKE MONEY HERE
Start Now—Today



Operate Your Own Electric Light & Power Plant



A Fairbanks-Morse Electric Plant furnishes light and power at the small cost of generating current. Gives a clear, restful light and does not burn up the oxygen as do oil lamps and gas. Absolutely safe; no danger of fires or explosions.

Electric power can be used for running fans, operating pumps, water systems, small printing presses, coffee grinders, sewing machines, vacuum cleaners, etc. Engine can be used for water supply or driving light machinery.

CATALOG NO. 449UN

fully describes 50-light outfit shown and other plants up to 500 H. P. Write for copy.

Fairbanks, Morse & Co.

900 S. Wabash Ave. Chicago, Illinois
Oil and Gasoline Engines, Electric Motors, Pumps, Water Systems

**\$20 EXTRA
A WEEK**



Every store throughout the country needs show cards. You can earn big money writing show cards for small stores.

Bissell's Show Card Writers' Outfit consists of seven liquid colors, brushes, pens and specimen of alphabets with instructions necessary to learn this fascinating and profitable profession. With our outfit you can learn to do this work in your spare time, and it costs only \$3.75 complete, prepaid to any part in U. S. Proprietors and clerks in small stores can write their own cards.

We guarantee the outfit to be perfect in every respect. Everything ready to use. Send in your order to-day.

J. G. BISSELL COMPANY,
Dept. B, 49 Barclay St., New York.

and that their action is not intended as revengeful or retaliatory.

They declare that, "While we keenly desire to do business in the state of Missouri and to extend to property owners therein the protection of our policies, we

ANYONE USING FIGURES NEEDS IT

to check mental calculations. For General Office or Personal Desk. **Over 60,000 in use**—mostly sold thru recommendation. Guaranteed—money refunded if not satisfactory after 10 days trial.

Buy from your stationer or order direct. Agents Wanted.

E. Gancher, A.A.M.Co.
119 W. Broadway, New York



Mr. Sensible Inventor:

RIGHT NOW, before spending any money or running any risks, get the benefit of our 25 years' experience with patents, WRITE NOW.

BENJAMIN AND BASSETT
Patent Attorneys and Mechanical Experts
Providence Savings Bank Bldg., WASHINGTON, D. C.



GENUINE DIAMONDS DIRECT FROM THE IMPORTER

\$97.50
PER CARAT

This Lowest Price in the World is the result of our 34-year effort to eliminate every middleman between the Amsterdam diamond cutters and you. Our enormous sales justify our adding only the barest smallest profit to our own importing-cost. Our mail-methods, cash buying and selling, keep expenses and losses out of our price! Hence, our price **\$97.50 per carat**—\$50 per carat less than any jeweler can sell! We ship any diamond and mounting you select subject to your examination. ON APPROVAL at our expense and risk! Not one penny need you pay or deposit to see, compare, test our diamonds!

- 1-8 carat \$5.25
- 1-4 carat \$17.50
- 3-8 carat \$31.25
- 1-2 carat \$45.00
- 3-4 carat \$67.50
- 1 carat \$97.50
- 11-2 ct. \$146.25



A Few Examples of BASCH Prices:

14 K. solid gold engagement rings, \$3.75. This and all other mountings priced at actual manufacturing cost!

	Price complete		Price complete
I-101. 1/4c. dia.	\$12.00	I-104. 1/4c. dia.	\$48.75
I-102. 1/4c. dia.	21.25	I-105. 5/8c. dia.	60.00
I-103. 3/8c. dia.	35.00	I-106. 3/4c. dia.	71.25

With every Diamond we issue our Written Legal GUARANTEE TO REFUND THE FULL PRICE IN CASH less 10% at any time within two years; and accept any diamond at our full price IN EXCHANGE, at any time! We certify the carat weight quality, and value of every diamond. No equal protection has ever been offered to the diamond buyer by others! Investigate this feature before you buy another diamond!

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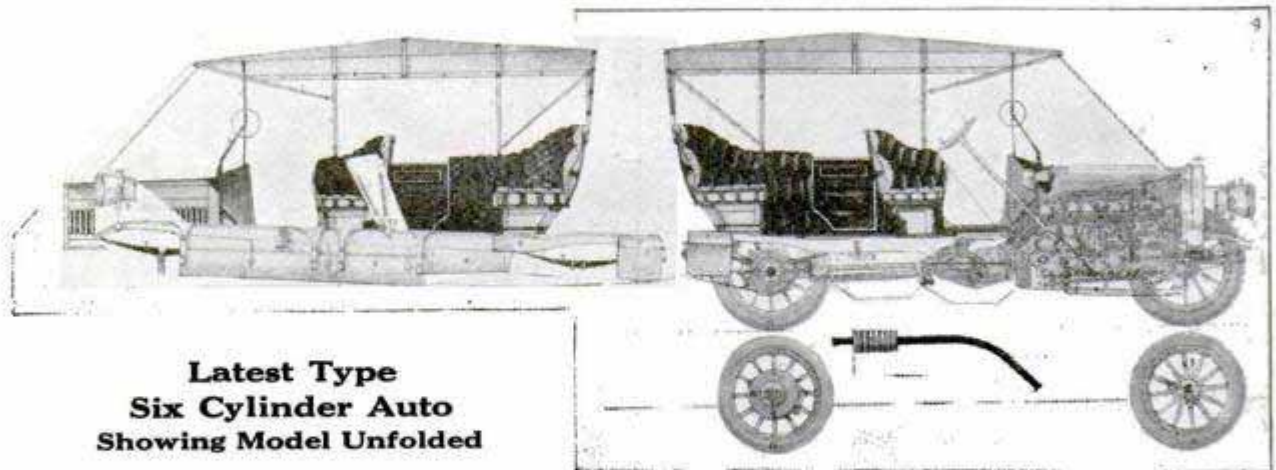
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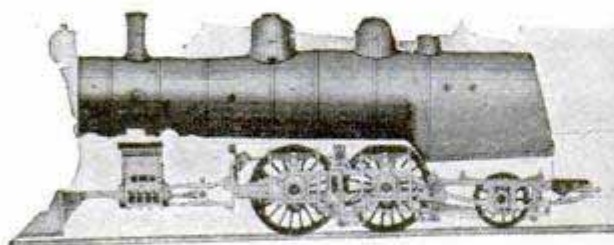
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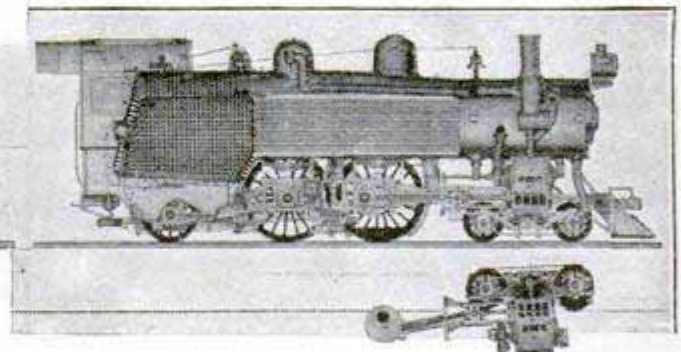
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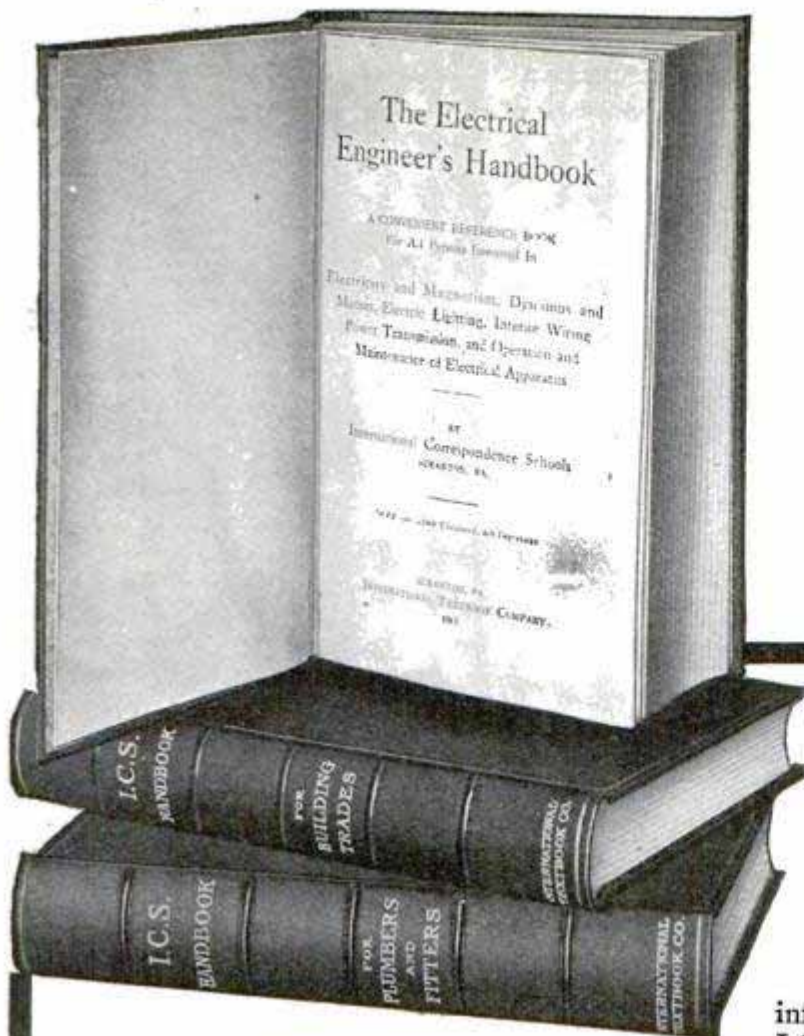


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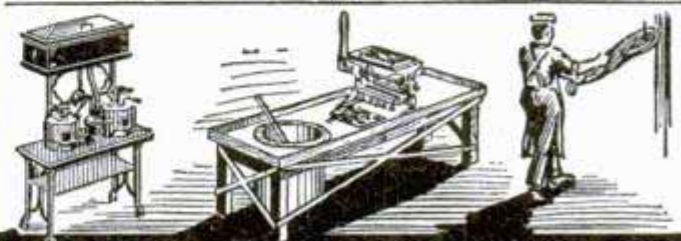
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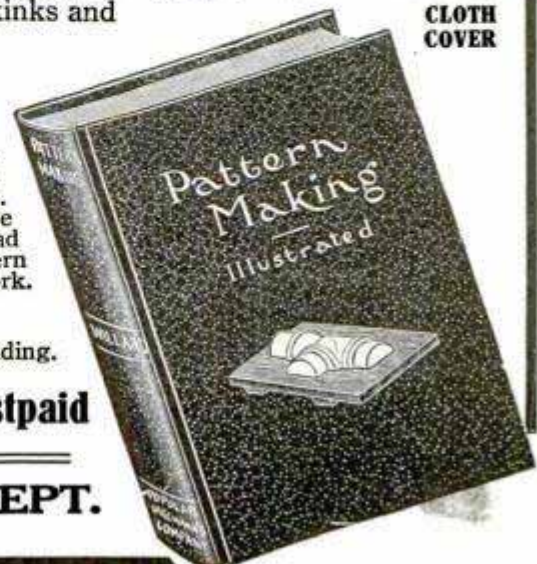
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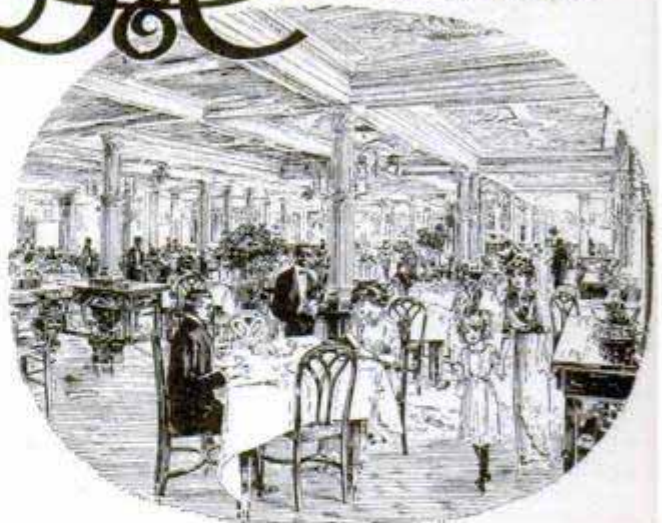
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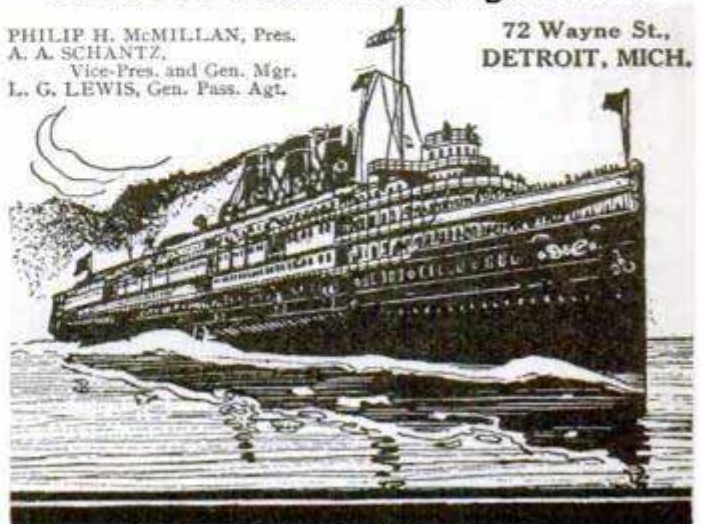
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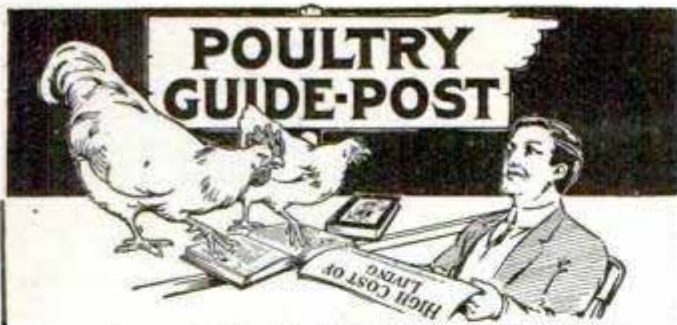
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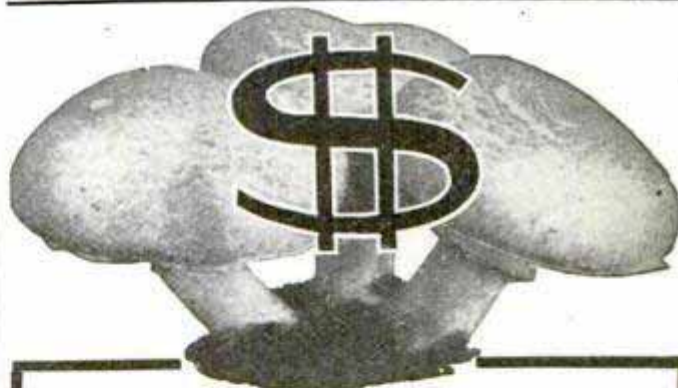
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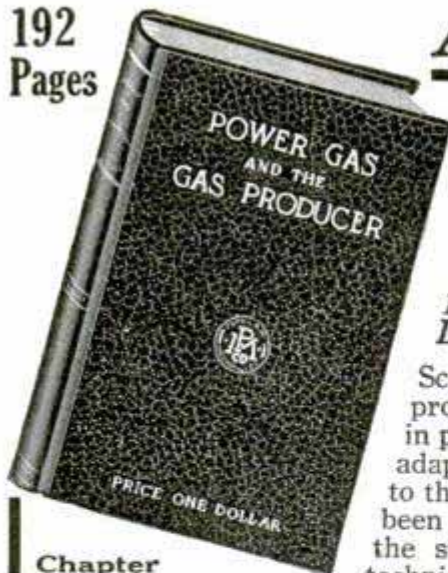
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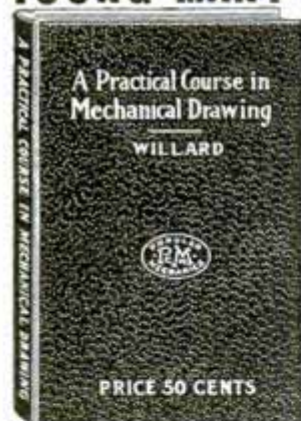
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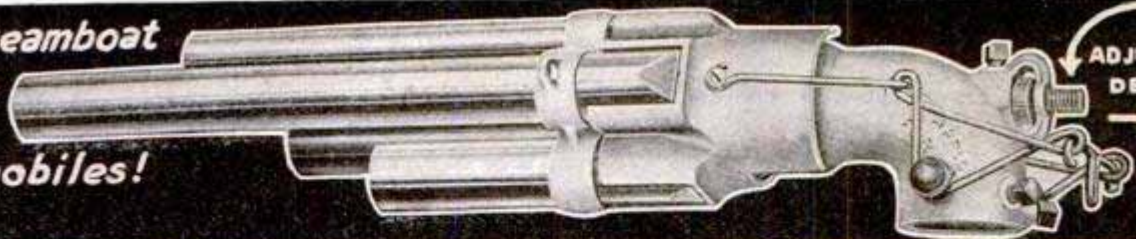
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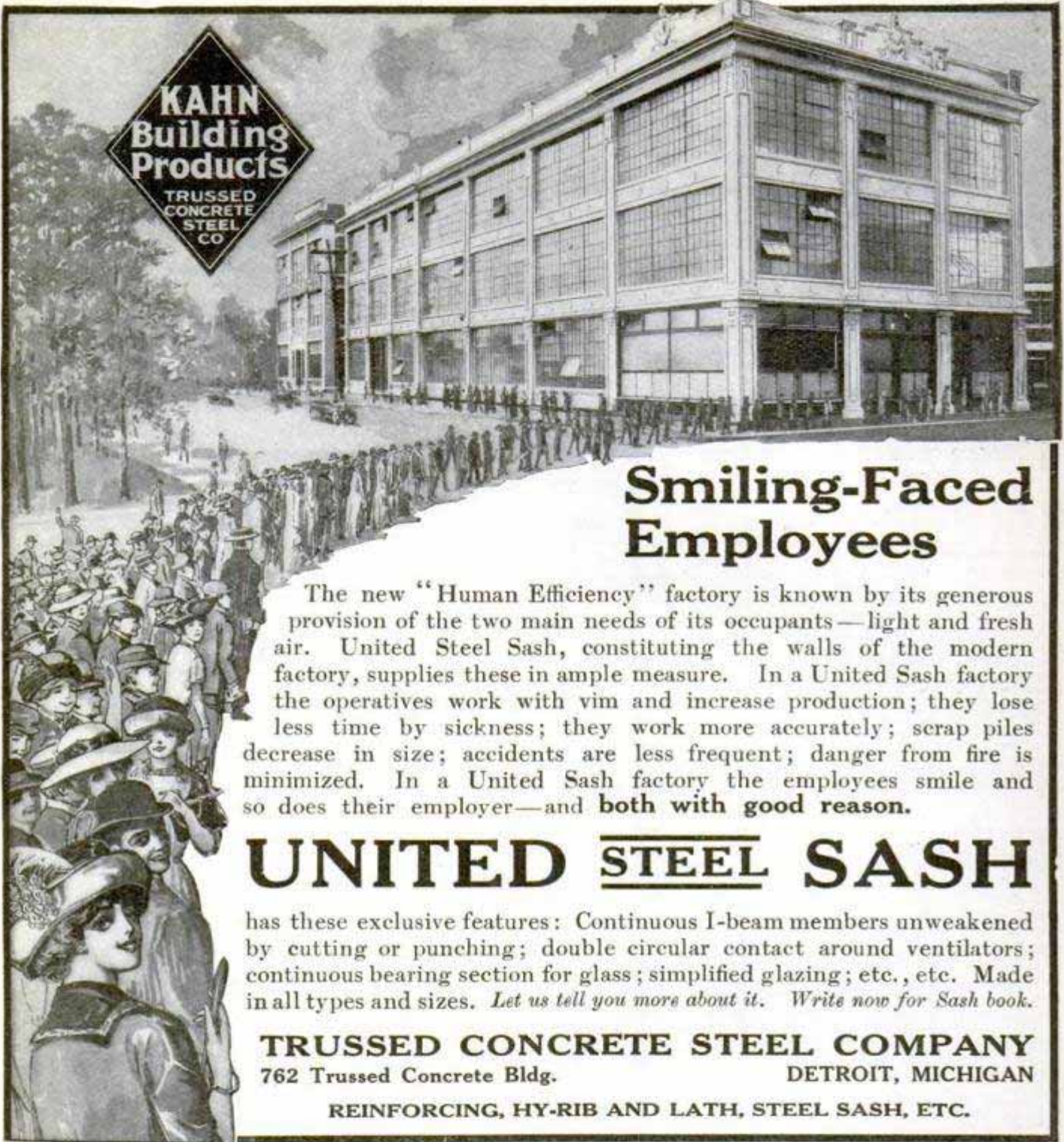
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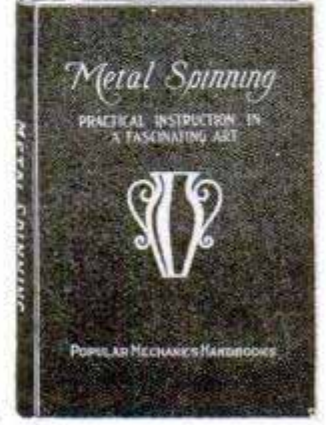
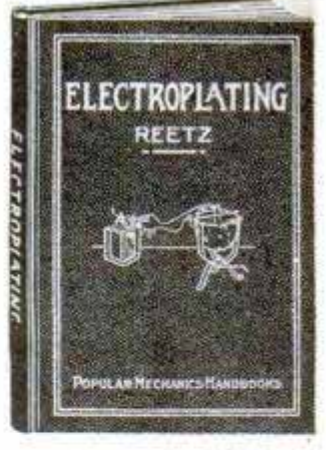
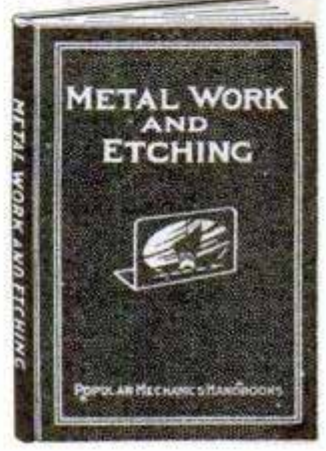
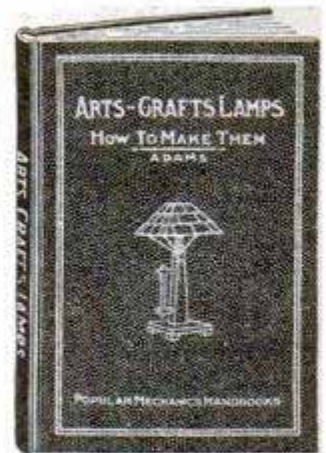
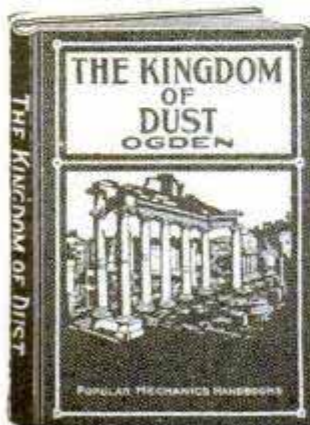
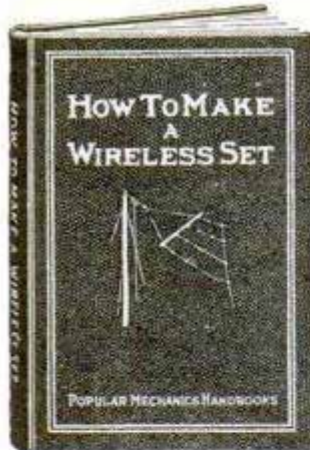
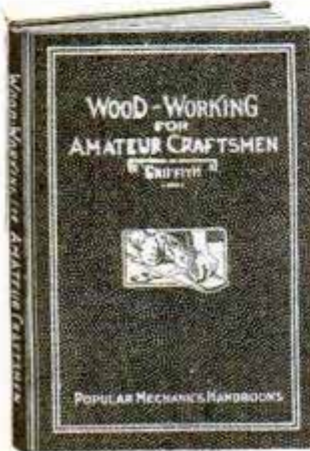
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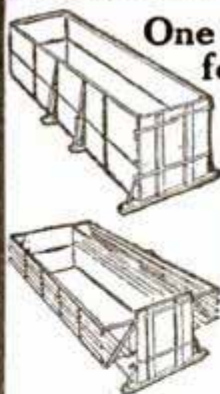
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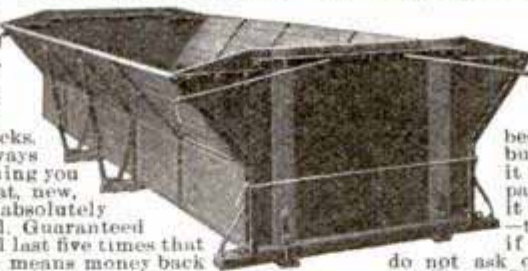
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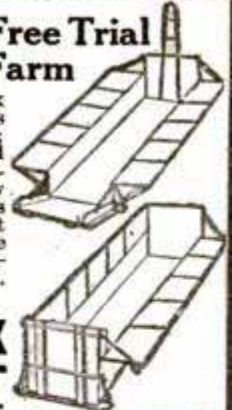
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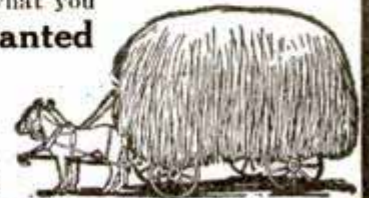
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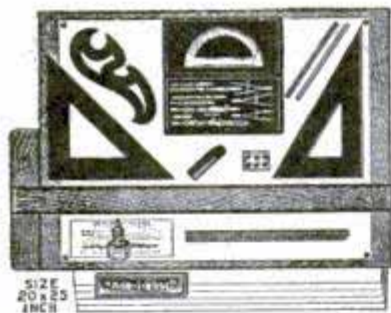
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