

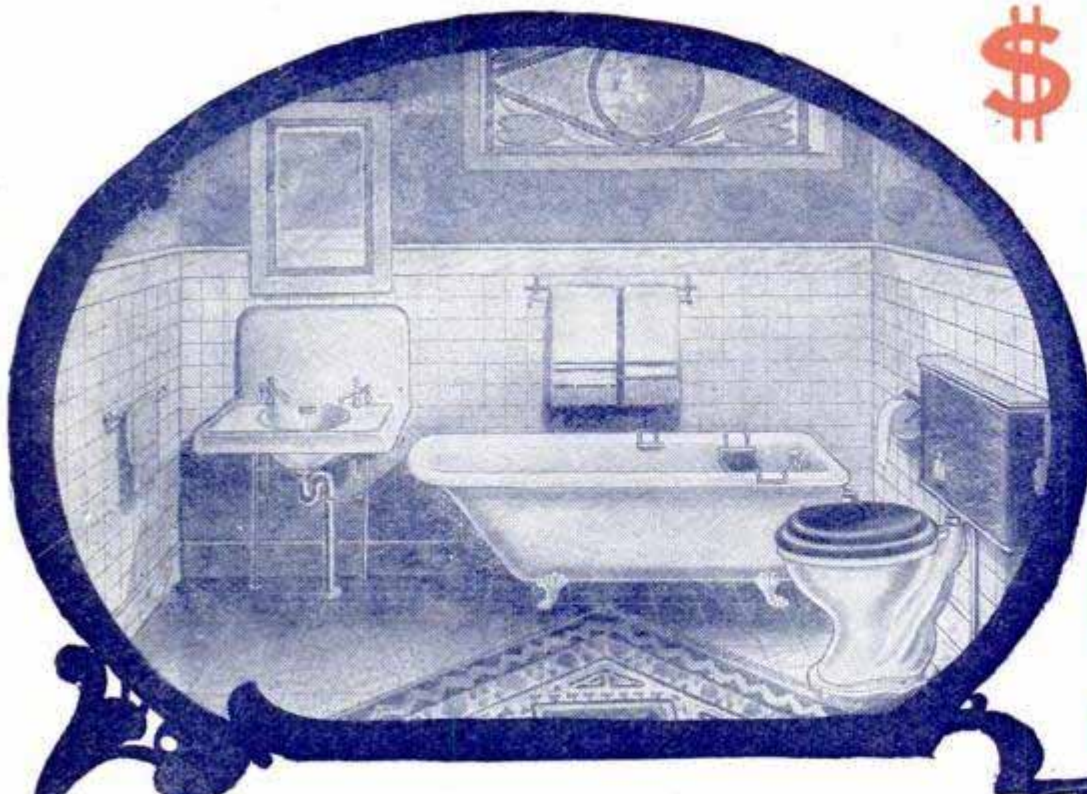
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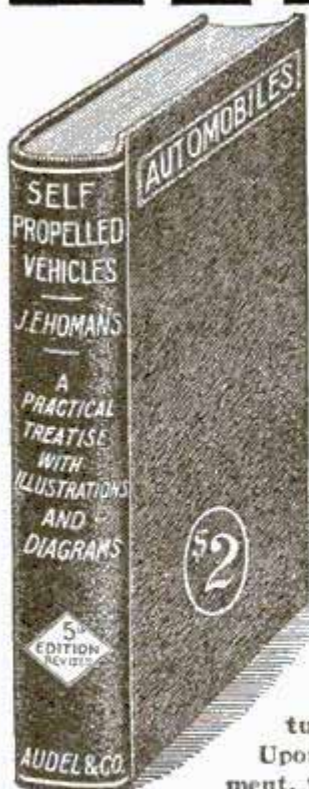
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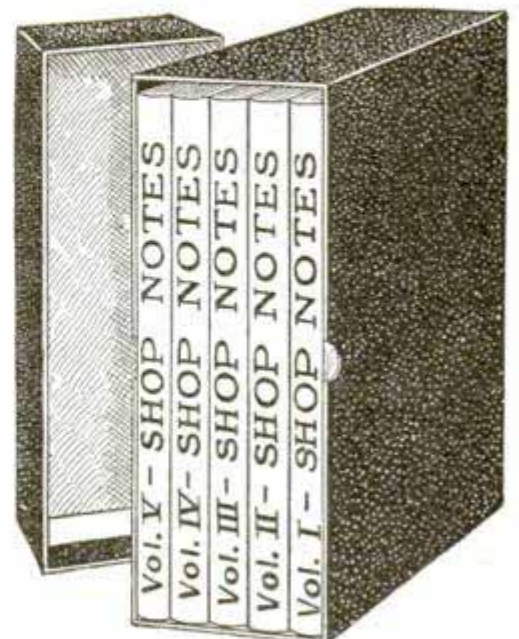
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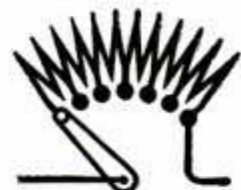


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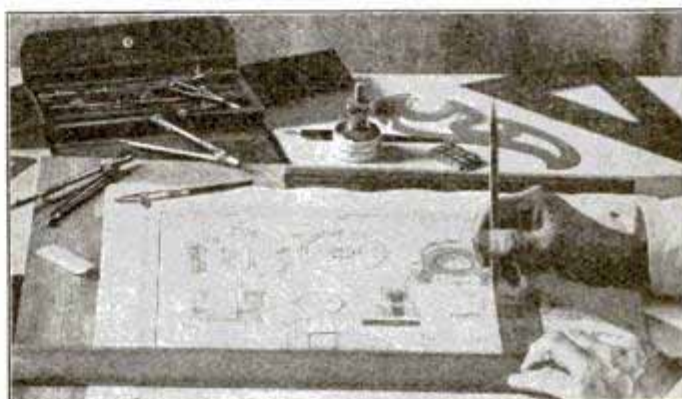
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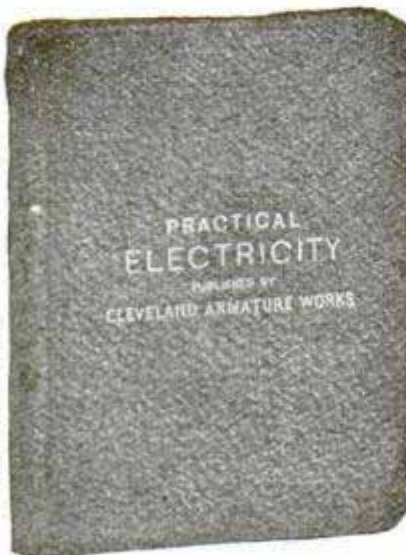
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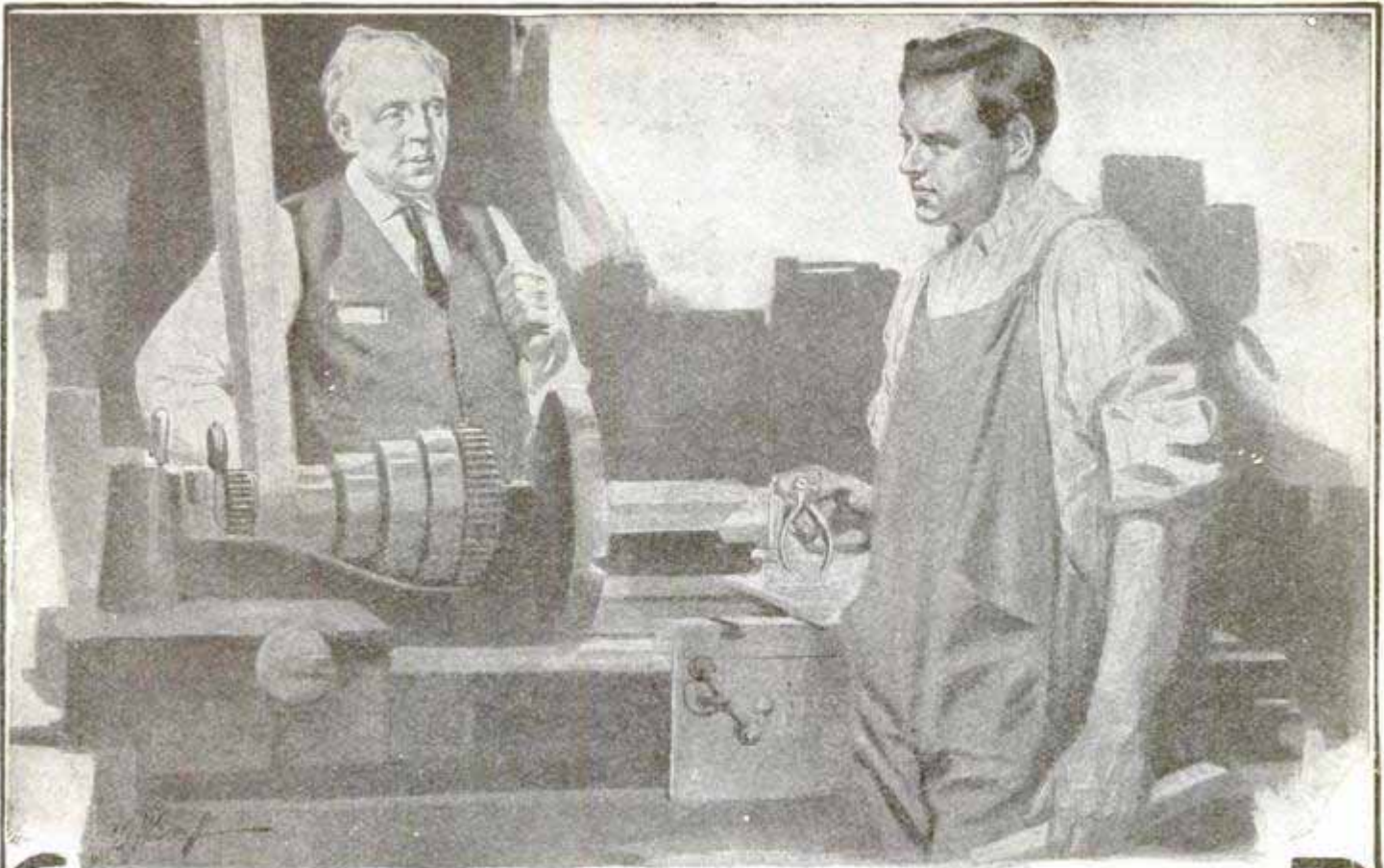
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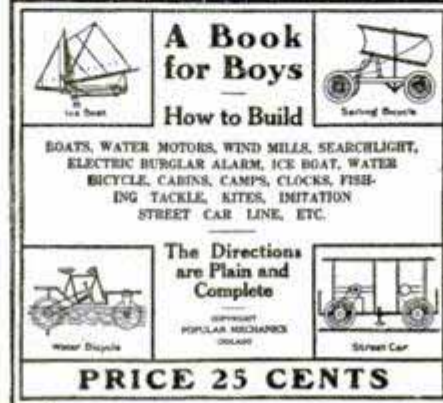
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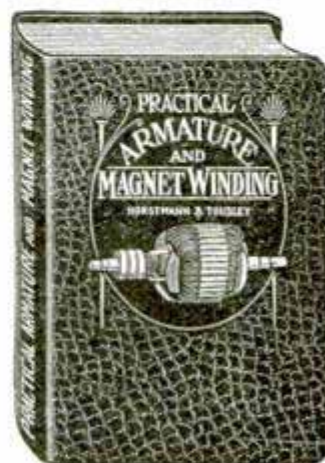
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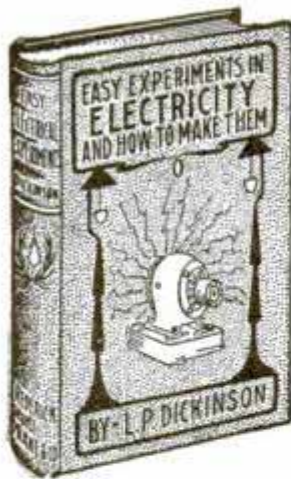
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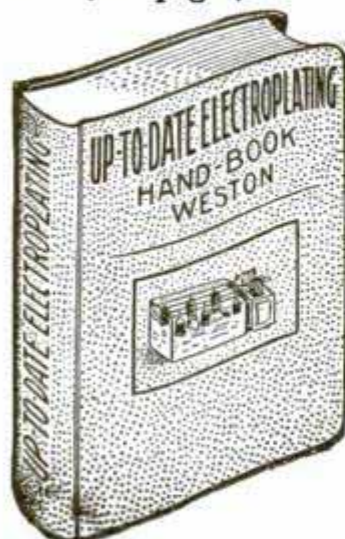
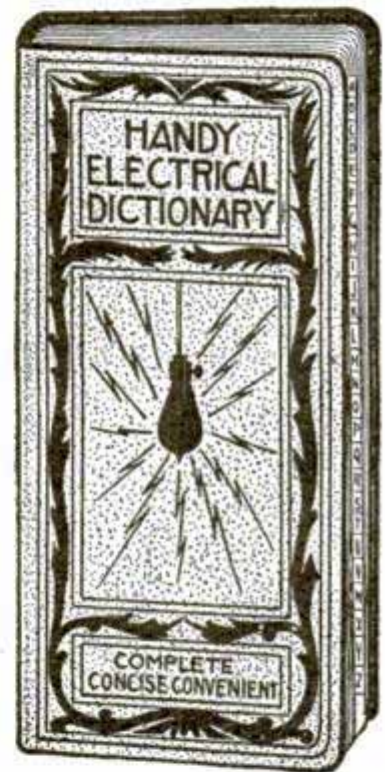
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IDAHO Post Card Exchange. Life membership and Alaska card for 10c. A. K. Nelson, Box 906, Boise, Idaho.

ONE DOZEN PHOTO POST CARDS made from any photograph for 50 cents. Your photograph returned with order, postpaid. All work guaranteed. Enough said. Give us a trial. Photo Card Co., 395 W. 17th St., Chicago, Ill.

BEAUTIFUL Vermont Post Cards; 12, 20c. Buck Printing Co., Randolph, Vt.

POST CARDS: Will you exchange? Choice collections made from our new list of boys, girls, men and women wanting exchanges. 10c. silver. The Shepard Company, Liggett Bldg., St. Louis.

EIGHT 12-COLOR VIEWS OF PITTSBURG. 15c; post card puzzles, 6 for 15c. Terrace Manufacturing, Belmar, Pittsburg, Pa.

100 STAMP PHOTOS OF YOURSELF, perforated and gummed, for 50c; perfect reproduction; send cabinet photo or postal. Returned uninjured. K. Charles Photo Co., Mt. Vernon, Pittsburg, Pa.

POST CARDS—Eight colored views of Decatur, 15c. Twelve magnificent Japanese Views (tinted), 35c. 24 Rulers of the earth, 35c. Big set of Lovers and Bathers, 25c. Percy Ewing, Decatur, Ill.

RICH, racy post cards, the real kind, selected, 6 for 15c.; 12 for 25c. Box 162, Albion, Mich.

EDUCATIONAL AND INSTRUCTION

WANTED—RAILWAY MAIL CLERKS, City Carriers, Postoffice Clerks, \$1,000 yearly. Examination soon. Preparation free. Franklin Institute, Dept. G-21, Rochester, N. Y.

BOXING TAUGHT free in your own home. I made \$60,000 in two years; knife or gun unnecessary—defend yourself with your hands. Stamp for reply. Leach Cross School of Boxing, 140 West 29th St., New York City.

TAKE OUR CORRESPONDENCE COURSE in engraving. Earn \$15.00 to \$30.00 weekly. Easily learned by our improved system without interfering with your regular duties. Dunmore School of Engraving, Sterling, Ill.

FASCINATING TRADE learned in few hours. Make \$5.00 per day. 6523 Latona Avenue, Seattle, Wash.

AGENTS AND OPERATORS WANTED—Positions guaranteed. Write for proof. Work for board. Wisconsin School of Telegraphy, Oshkosh, Wis.

CIVIL SERVICE EMPLOYEES are paid well for easy work; examinations of all kinds soon; expert advice, sample questions and Booklet 29 describing positions and telling easiest and quickest way to secure them, free. Write now. Washington Civil Service School, Washington, D. C.

\$200 to \$600 MONTHLY easily made fitting eyeglasses. Short, easy mail course. Diploma. Special reduced tuition fee. Big demand for opticians. Best and easiest money-making business. Quick sales. Tremendous profits. We assist you to start. Write today for free "Booklet 4." Tells how. National Optical College, St. Louis, Mo.

NAVIGATION

NAUTICAL SCHOOL—Lake and Ocean Navigation, Marine Engineering. Make a specialty of preparing young men for original or raise in papers. Special yachting course. Chicago Nautical School—founded by Lieut. W. J. Wilson, U. S. N.—Masonic Temple, Chicago. Send for circular.

TRADE SCHOOLS

WANTED—The Master Plumbers' Trade School of St. Louis wants men and boys to learn the plumbing and gas-fitting trades, and will teach these trades and give practical experience on new buildings while learning, which is something no other trade school in the country can do. The course covers from 3 to 4 months, and the tuition fee has been reduced from \$100 to \$50 for a short time only. For catalogue and full information, address Master Plumbers' Trade School, 3415 Lindell Ave., St. Louis, Mo.

YOU CAN EARN \$100 per month. We show you the way. Largest automobile and repair school in the world situated in our big factory. Best of expert teachers. 150 automobiles of all kinds always in the school; practical road lessons given. Write Dept. 7 for particulars and terms. International Auto School, 1241-1243-1245 Wabash Ave., Chicago, Ill.

AUTOMOBILE SCHOOL—Learn the automobile business, repairing and driving, in which you can earn good wages and have healthful and pleasant work. We give a thorough and practical course in road work and repairing. For full particulars address Academy of Automobile Engineering, 1420 Michigan Ave., Dept. "A," Chicago, Ill.

BUSINESS OPPORTUNITIES

"MAKE RICE CRISP," the new confection; costs 1c per package; sells like hot cakes for 5c. Profits \$10 a day sure. Machines and instructions, \$10 to \$20. Send 10c for samples and list.

WE EXCHANGE ANYTHING you require for whatever you don't need. Send stamp for complete list. Jenkins' Universal Exchange, Chicago.

AN UNUSUAL opportunity for a party with money to engage in grain and milling business; a fine chance to make big profits. Address, Box 2, Grangeville, Idaho.

CHAUFFEURS, INCREASE YOUR SALARY. Send for a complete instruction book that tells all about driving and adjusting automobiles; it explains all automobile engine troubles, etc. Postpaid, 25c. Satisfaction guaranteed or money refunded. George N. Pearson, Bala, Pa.

MAIL ORDER SUCCESS, monthly publication, teaches mail order business; starts beginners right; tells where to buy supplies, gives formulas, starters, plans, schemes, etc.; brimful interesting, instructive articles; \$1 year, three months trial, 25c. John Galvin, Publisher, Jamestown, Ohio.

LEARN to make money corresponding for newspapers. We teach you how; particulars. 2c stamp. Writers Institute, Jamestown, Ohio.

WE MAKE it our business to advise and assist our clients in selling their patents. Benjamin & Bassett, Patent Attorneys, 204 Dearborn St., Chicago, Ill.

WANTED—RAILWAY MAIL CLERKS, City Carriers, Postoffice Clerks. Many examinations soon. Over 8,000 appointments. Salary \$1,000. Preparation free. Write immediately for schedule. Franklin Institute, Dept. G-21, Rochester, N. Y.

HAVE YOU ANYTHING TO ADVERTISE? Tell your story to over two million readers for ten dollars. We will place a 24 word classified advertisement one time in 24 of the leading newspapers of the country. We prove insertion. Our 1909 Rate Book of advertising for 10c. Dearborn Advertising Agency, 349 Dearborn St., Chicago.

START A MAIL ORDER BUSINESS AND MAGAZINE and get your ads free—stamp brings plan. M. Walters, 35 Dean St., Brooklyn, N. Y.

SODA FOUNTAINS—New and second-hand. Easy terms. For catalog, Box 281, M. Vevay, Ind.

MANUFACTURERS AND MERCANTILE HOUSES desirous of establishing an agency in Mexico are requested to write for particulars. Address, Emilio Roux, Jimenez de las Cuevas, Num. 14, Puebla, Mexico.

I made \$50,000 in five years in the mail order business; began with \$5; anyone can start a mail order business at home. Send for free booklet. Tells how. Heacock, 884 Lockport, N. Y.

\$ MONEY \$ MAKING \$ SECRETS \$—Send 10 cents at once for a valuable collection of over two hundred ways to get the dollars; start a business of your own and make money. Satisfaction guaranteed or dime refunded. B. C. Frankson Co., Baltimore, Md.

FREE ACRES—With Colamco treasury stock; write for particulars. Co-operative Land and Mercantile Co., 1201-15 Union Ave., Kansas City, Mo.

ONE man or woman in any live county can earn \$200 monthly on \$100 capital, clean safe business; send stamp for details. T-1, Box, 226, Elgin, Ill.

FIRST CLASS INVESTMENT—Stock for sale in old established wholesale business. Good paying proposition. Management wants money for development of business. Company located in Lincoln, Nebr. Address, P. O. Box, 58, Lincoln, Nebr.

"WIRELESS"—Full account of rapid development of wireless telegraph and the great opportunities for investors in this field; send for free sample copy. Address, "WIRELESS," 18 Broadway, New York.

WANTED—AGENTS IN EVERY TOWN to assist in promoting manufacturing enterprises that promise large returns to investors. Good money for agents. B. Company, Box 203, Norwalk, Conn.

OPPORTUNITY IS KNOCKING at your door; grasp it by sending stamp for booklet. "How to Succeed in Ginseng Culture." 200,000 plants for sale. Epworth City Ginseng Gardens, Ludington, Mich., Dept. E.

SPARE TIME WORK—Make money easily. Men or women. No capital, outfit, canvassing or soliciting required. Spare time only. Write immediately. G. E. Cousins, 25 Virginia Ave., Indianapolis, Ind.

BIG MONEY—Start a dyeing, cleaning and pressing establishment, unlimited field, enormous profits, no capital needed. We teach you secret by mail. Particulars free. Ben-Vonde Co., Dept. C, Charlotte, N. C.

FOR SALE—A musical business, 40 Electric Pianos, running in good business places, making \$700.00 monthly. Sacrifice for \$11,000.00. Write if you mean business. This business makes money while you sleep. G. W. Riston, Kankana, Wis.

START A French dry cleaning establishment, new, big profits, capital unnecessary. Send 25c for my book. It tells how. Tom Weaver, 167 Peachtree, Atlanta, Ga.

MAIL ORDER BUSINESS that's a winner. Plan shows \$5,000 made with \$6. Particulars, stamp. Full plan mailed, 25c. Essex Association, Glen Ridge, New Jersey.

OUR INVENTION will reach them all—the school boy and all organizations and societies. A mail order specialty. Enquire, Inventor, 317 1/2 S. 12th St., Omaha, Neb.

MAKE MIRRORS AT HOME. Big profits with little outlay. One 18x36-in. mirror costs \$2 to \$5. You can silver a glass this size for 20c. Send 50c in stamps or money order and we will send you explicit directions how to do it; also how to emboss, grind, foil, gold leaf, frost, chip and make imitation stained glass. How to transfer photos on glass, bore holes in glass and cut skylights George L. Patterson & Co., Dept. 3, Brooksville, Ky.

GOOD BUSINESS. Imitation maple syrup easily made. Particulars free. Sanborn Syrup Co., Dept. B, Bakersfield, Calif.

NEW Invention, a money maker. Will sell or let good manufacturer have on Royalty. E. M. Lovell, New Windsor, Md.

1,000 GUMMED STICKERS 1x2 in., any wording, 50c postpaid.

CHEMICAL Analysis. Minerals, Ores, Coal, Water, Foods, Etc.; all kinds of formulas; processes developed. Charles Bacon, Chemist, Bayonne, N. J.

3,000 GUMMED STICKERS FOR \$1.00. Two colors; any size up to 1x2 inches, any wording. Guaranteed satisfactory. Terrace Manufacturing, Belmar, Pittsburg, Pa.

SURPRISING PROFITS—Guaranteed working formula manufacture Fly Paper mailed for \$1.00. Small investment—large profits, unlimited sale entire summer. Boyd, Moody Downing Building, New York.

WE START YOU in a permanent business with us and furnish everything. Full course of instructions free. We are manufacturers and have a new plan in the mail order line. Large profits. Small capital. You pay us in three months and make big profit. References given. Sworn statements. Pease Mfg. Co., 1013 Pease Bldg., Buffalo, N. Y.

\$3,000 TO \$10,000 YEARLY easily made in real estate business. No capital required. We teach the business by mail, appoint you special representative, assist you to success. Valuable book free. The Cross Co., 2834 Reaper Block, Chicago. See our other advertisements in this magazine.

LET me start you in a pleasant, profitable manufacturing business of your own. No mechanical ability, experience or capital required. I supply all material, teach you how to do the work and assist you in selling the goods. Exclusive territory, good profits, big demand. Be your own boss. Write today and secure your territory. H. M. Sheer, Dept. 1, Quincy, Ill.

BLACKSMITH shop. Good trade; near Seattle. For particulars, owner, G. Gustafsson, O'Brien, Wash.

"ART OF FINANCIERING," showing how business men may raise capital for business projects without recourse to brokers or promoters. Valuable Booklet free. Business and Finance Pub. Co., 119 Nassau St., New York.

BIG MONEY, any locality, operating or selling our Combined "Crystalets" Penny or Nickel Vending Machines. New idea. Lawful. Fine side line. Exclusive territory granted. Crystal Vending Co., P. Money Penny Bldg., Columbus, O.

AGENTS—\$300 every month selling our wonderful 7-piece Kitchen Set. Send for sworn statement of \$12 daily profit. Outfit free. Thomas Mfg. Co., 305 Home Bldg., Dayton, Ohio.

DON'T SLAVE FOR OTHERS. Reap the benefits for yourself. Fortunes made operating automatic penny weighing machines. Our scale speaks your weight. Write for Talking Scale circular. The United Vending Machine Co., 629 Caxton Bldg., Cleveland, O.

MY NEW STORE necessity is better than a telephone. Sells better than cash registers or scales ever sold. Sells for \$50 to \$1,000. Your ability alone limits your possibilities. Salesmen, Territory Managers and Local Agents wanted. Ref. First National Bank, Chicago, M. L. Pitmere, 183-189 Lake St., Chicago.

START MAIL-ORDER BUSINESS—Sell goods by mail; cash orders, big profits conducted by anyone, anywhere; we supply everything. Our plan positively successful; satisfaction guaranteed. Write for free booklet and sample catalogue. Central Supply Co., Kansas City, Mo.

AGENTS make \$103.50 per month selling wonderful self-sharpening scissors and cutlery. V. C. Glebner sold 22 pairs in 3 hours, made \$13; you can do it. We show how. Free outfit. Thomas Mfg. Co., 49 Home Bldg., Dayton, Ohio.

"DOLLARS & SENSE" FREE! Col. Hunter's great book free with Advertisers' Magazine one year at 50 cents. Indispensable to business men who advertise. Best "Ad School" in existence. Three months' trial subscription, 10 cents. Advertisers' Magazine, 747 Commerce Bldg., Kansas City, Mo.

AGENTS WANTED

PERFUME—GLOSS IN STARCH—gives clothes lasting perfume of Azure Violets, and makes them white as snow—other quick sellers, large profits. Agents wanted. Sample, 4 cents. Shipman, Lewis Block, Buffalo, N. Y.

MAKE money spare time. Pay us after established. Profitable business, easily operated and quickly started. Booklet free. Ohio Mail Order Supply Co., Columbus, Ohio.

AGENTS and Toy Dealers handle our "Play Coin!" Latest fad with the children. Sample box, 40c postpaid. Glenwood Supply Co., P 393 Yonkers, N. Y.

WANTED—RAILWAY MAIL CLERKS, City Carriers, Postoffice Clerks. Many examinations soon. 8,000 appointments coming. Salary, \$1,000. Annual vacations. No "Layoffs." Common education sufficient. Country residents eligible. Candidates prepared free. Write immediately for schedule. Franklin Institute, Dept. G-21, Rochester, N. Y.

AGENTS, SALESMEN, MAIL ORDER PEOPLE, and those who desire to improve their financial conditions should join The Mutual Agents League. It will put you in touch with the latest and most profitable propositions in the land. The League desires 10,000 new members. No membership fee! Send 10c for mailing expenses and you will be enrolled as full-fledged member.

You will receive membership certificate entitling you to all benefits. No other dues, assessments or fees.

You will receive one copy of "The Booster Magazine" which will keep you posted on all that is new and worth knowing in the Agency and mail order field.

You will receive 5 per cent discount certificates in payment of merchandise purchased from wholesale houses belonging to the league. This is worth many dollars.

You will receive The Agent's Friend, proving that agents need no license for selling. Worth 25c.

Receive advance information of new money-making propositions. Free information on any subject pertaining to agency work.

The Mutual Agents League has been created for your benefit and you should join. Send your little dime and receive everything mentioned above. The Mutual Agents League, 86 Plymouth Pl., Dept. G., Chicago, Ill.

WE WANT LIVE AGENTS IN EVERY STATE to solicit subscriptions for The Advance and other religious papers. Liberal commission paid. The Advance, 235 E. 40th St., Chicago.

MERRY WIDOW Slipper Pen Knife. The latest novelty. Fifteen cents. Sterling Novelty Co., Plainfield, N. J.

AGENTS—MAKE \$10 per day metalizing flowers, leaves, insects, etc., at home. Shape and beauty, as in life. Big sellers. Original formula, 25c. Etna Novelty Co., Box 134, Seattle, Wash.

LEARN TO MAKE RAISED LETTER SIGNS! I paid \$5.00 for instructions. Had them printed, and will send you copy, giving full instructions for 10c. Hermann, 4319 Michigan Ave., Chicago.

FIFTEEN PIECES SHEET MUSIC POSTPAID. One Dollar. Send for list today. Dime Music Co., L. D., 648, Savannah, Ga. Cheapest Mail Order Music House in America.

SELL POPULAR SHEET MUSIC. Big profits to agents—enormous demand. Send 25c for three complete copies and full instructions. Hermann, 4319 Michigan Ave., Chicago.

AGENTS don't accept an agency until you read our new book "Piling Dollars." It's free. Darling Co., Derry, N. H.

AGENTS, CREW MANAGERS, AGENTS—We want your name. New Catalogue—brand new specialties—each article an improved household need. Find out what the other fellow is doing—a postal will bring the catalogue and a chance for big money. Agents Supply Company, 3529 Willett Ave., New York.

MERRY WIDOW HANDKERCHIEFS. The joke of the season. "Nuf said." 25c postpaid. Ewing's, Decatur, Ill.

SEND A DIME—coins or stamps—for a sample of "Just-Pull," the greatest electric light attachment on the market. A child can operate it. Easy money. No labor attached to the selling. Takes one minute to show it; can't get out of order; sells on sight for 25c. 100 per cent profit. 2,000 sold to consumers at Chicago Electrical Show. Send ten cents for sample and full descriptive matter by return mail. Premier Novelty Company, Dept. A, 42 River St., Chicago.

EVERY woman wants it; thread-cutting thimble; sells like hot cakes; gold mine for agents; sample, 10c. Empire Supply Co., Box 789, Spokane, Wash.

AGENTS—Stamp names and addresses on key checks, name plates, watch fobs, etc. We supply blank stock and stamping outfits. Sample free. Hart Manufacturing Co., 80 Guernsey St., Brooklyn, N. Y.

WE GIVE ANY BOY OR GIRL FREE a baseball outfit consisting of one baseball, one catcher's mitt and one cap for 1909 or an air rifle or gold plated bracelet in neat box for selling 24 Parasian Gem scarf pins for us at 10c each. Write for the scarf pins today. When sold send us the money and we will send you all charges paid your choice of any one of these premiums. Bub Supply Co., Dept. 13, Charlotte, N. C.

AGENTS WHY BE IDLE when our Novelty Photo Holders will coin dollars for you; Catchy pocket side line; 200 per cent profit. Sample free. Davisco, Battle Creek, Mich.

\$1.00 FIRELESS COOKER—Complete with granite utensil, Aluminum Cover, Cookbook—Regular full sized guaranteed practical cooker sent possible agents on receipt of \$1.00. Royal Fireless Cooker Co., Battle Creek, Mich.

EVERY BODY wants them; easy fast sellers; \$7.00 a day; samples furnished. Dakota Novelty Co., Box 603, Sioux Falls, S. D.

AGENTS—Either sex make big money selling Thoreau adjustable window shade bracket. Sells at sight. Sample, 10c. Big profit. Write for particulars. Thoreau Mfg. Co., 6615 Monroe Ave., Dept. A, Chicago, Ill.

AGENTS WANTED—Incomparable; Allen's Royal Talcum, Tooth and Foot Powders, and Royal Shaving Stick. At stores, or mail, 15 cents. Send 50 cents for sample outfit and "Terms to Agents." Allen Pharmacal Co., Plainfield, N. J.

GOOD LUCK TOILET CASE—A most useful, necessary and handsome toilet case containing four toilet articles, indispensable to the correct man or woman. Bonanza for agents, 10c. Illustrated. Catalogue free. Eureka Company, Wheaton, Ill.

AGENTS—Big money, metalizing flowers, insects, making mirrors from plain glass. Each formula, 20c. Wright Co., Box 851, Geneva, Ind.

CHECK PROTECTOR, Vest pocket size, 50c. Every business man should have one. Agents wanted. Wharton Novelty Co., Marysville, O.

EVERYONE needs a small pocket screwdriver. Our "Midget" knurled handle screwdriver fills the bill. Agents wanted. Sample 10 cents. Sterling Novelty Co., Plainfield, N. J.

AGENTS—\$5 to \$10 a day easy money selling the "Germless" glass telephone mouthpiece. 100 per cent profit; telephone users buy at sight. Send 25c, coin or stamps, for prepaid sample and terms. Commercial Appliance Co., 133 Adams St., Chicago.

AGENTS—\$5 daily selling our Handy Tool, 12 articles in one. Lightning seller. Sample free. Thomas Mfg. Company, 240 Barney Bldg., Dayton, Ohio.

AGENTS wanted. Best selling article known. Sells at sight. High grade proposition. Don't miss this. Free particulars. Write today. Box 82, Fenway, Mass.

WONDERFUL INVENTION—Canchester Incandescent Kerosene Lamp. Burns with or without mantle, 10 times brighter than electricity, gas, acetylene, at 1/10 cost. Burner fits all standard lamps; saves 75% oil. No trimming wicks. \$10 daily. Beware of imitations. Outfit free. Canchester Light Co., 26 State St., Dept. P. M., Chicago.

AGENTS—New Invention; never before sold in your territory; horse owners wild about them; automatic hame fastener sells at sight; coin money; a fortune in your territory; free sample to workers; write at once. Automatic Fastener Co., G. 625, Cincinnati, Ohio.

AGENTS to sell the "QUICK ACTING HAND CLAMP." The best clamp ever invented. Put on and taken off by direct pressure of the hand. No screws to break. No threads to strip. Just the thing for action and cabinet makers, or light work where speed and gripping count. Can be taken apart and carried in the pocket. Sample by mail, 30c. Ready seller wherever shown. Big money to agents. Write today. Rydberg & Albrecht Mfg. Co., Westfield, N. J.

AGENTS—Now is the best of the year for household specialties; crackerjack line of samples and catalogue free. Dade & Co., Mark St., Roxbury, Mass.

PAULLUCIESO kills the flies in any room in fifteen minutes. Harmless to user. By mail, thirty cents. Agents wanted. Paullus Speciality Co., 802 Mulberry St., Muncie, Ind.

AGENTS to sell latest improved ladies' handbag; four satchels in one; good profit; particulars for stamped addressed envelope. C-curly Selling Co., Box 556, San Mateo, Cal.

AGENTS wanted everywhere to handle our brand new household specialty. Big profits. Easy sales. Many repeat orders. Write today. The W. H. Neller Company, Lansing, Mich.

MOSQUITO POWDERS—Dissolve in water; absolute protection; unlimited sale; entire summer; 10c package. Agents, 20 packages, \$1.00; \$4.50 hundred. Boyd, Moody Downing Building, New York.

AGENTS—If young boys can net \$35 a week selling "King of Fire Killers" (powder) under our liberal proposition. Why can't you? Address, Hayward, (personal), 34 Murray St., N. Y.

GOLD and silver sign letters for store and office windows. Particulars and sample free. P. Johnston Mfg. Co., Quincy, Ill.

POCKET Advertising Mirrors, twenty-five cents per dozen, postpaid. Sample, five cents. Sterling Novelty Co., Plainfield, N. J.

\$200.00 Monthly operating and selling dealers our match and peanut vending machines. Our novelty line complete. District agents wanted. United States Novelty Co., Duluth, Minn.

AGENTS, LOOK! Women and men. We have just added four new big sellers. Rockford, Ill. agent worked 3 days, then ordered 100 doz. Write for particulars and \$2 free offer. Fair Mfg. Co., Box 149, Racine, Wis.

WORKING for "the other fellow"? Stop slaving. Sell our automatic shade and curtain bracket. Sample, 40 cents. Particulars free. Amigo Supply Co., Dept 3, P. O. Box 27, Camden, N. J.

AGENTS WANTED EVERYWHERE to sell our newly patented pencil holders for telephones. Enormous quantities being sold. Exclusive territory given. Liberal terms. Sample, 10 cents. The Wm. W. Bythiner Mfg. Co., 308 Race St., Philadelphia, Pa.

AGENTS WANTED everywhere to handle our brand new household specialties. Big profits. Easy sales. Many repeat orders. Write at once for free particulars. Gem Mfg. & Supply Co., Dept. 37, La Jolla, Cal.

BURGLAR PROOF—Windows locked, with six-inch opening, 15c each. Great sellers. Agents. Cannon Mfg. Co., 1522 Kenmore Ave., Chicago.

AGENTS WANTED—Something new; sells at sight; 100 per cent profit. \$50 to \$100 a week easily made. Write today for full particulars. Goodson Electric & Mfg. Co., 32 Point St., Providence, R. I.

AGENTS—Manufacturers' agents, jobbers, crew managers, general agents, to handle our 4-piece "Dutch Cooking Set." Fast selling household necessity. Big profits. Sells every house. Full sized sample set. Special courses in salesmanship pertaining to same. Circulars describing set. Outfit and agency, \$1. Pace Brothers & Sons Pottery Co., Roseville, Ohio.

AGENTS—It's so easy to make \$200 monthly with our Dash Board Line Holder. We are shipping them in 10 gross lots. Sample, prepaid, 30c, silver. Wholesale Supply Co., D. 15, Valdosta, Ga.

WANTED—Agents, this is your opportunity. A water filter attached to faucet needed in every kitchen; sure seller; 100 per cent profit; sample, 25c; particulars free. Gem Mfg. & Supply Co., Dept. 31, La Jolla, Cal.

23 FOR DIRT cleans everything. Everybody needs it. Send 10c for can. Agents wanted everywhere. Corliss Chemical Co., 401 S. 12th St., St. Louis, Mo.

AGENTS—NEW AUTOMATIC CURRY COMB and other self-sellers. Big demand. First applicants control unlimited sales. Large profits. Write for proof and trial offer. Clean Comb Co., Dept. P, Racine, Wis.

WANTED—Agents, machinists, toolmakers, draftsmen, attention! New and revised edition Saunders' "Hand Book of Practical Mechanics" now ready. Machinist says, "Can't get along without it." Best in the land. Shop kinks, secrets from notebooks, rules, formulas, most complete reference tables, tough problems figured by simple arithmetic. Valuable information condensed in pocket size. Price, postpaid, \$1.00, cloth; \$1.25, leather with flap. Agents make big profits. Send for list of books. E. H. Saunders, 216 Purchase St., Boston, Mass.

AGENTS—\$75 monthly. Combination Rolling Pin. Nine articles combined. Lightning seller. Sample free. Forshee Mfg. Co., Box 248, Dayton, O.

IF THERE WERE NO TELEPHONES in your territory now, and you had the exclusive right of selling them there, your proposition would not be as good as one I have to offer you now, if you are the man or men. References First National Bank, Chicago. M. L. Pitner, 183-189 Lake St., Chicago.

AGENTS make big money selling our new sign letters for office windows, store fronts and glass signs. Anyone can put them on. Write today for free sample and full particulars. Metallic Sign Letter Co., 77 N. Clark St., Chicago.

MEDALLIONS SELL AT SIGHT. 300 per cent to 500 per cent profit. Make up your own goods and be independent. "It's easy." Catalog free. Fred Resag Co., 366 W. Randolph St., Chicago.

WANTED—Capable agents to handle new, high grade, up-to-date articles; lightning sellers in all homes, offices, stores, shops, \$3 to \$10 daily guaranteed. Promotion assured. Thomas Mfg. Co., 1301 Home Bldg., Dayton, Ohio.

EXCEPTIONAL OPPORTUNITY for energetic solicitors with grit and selling power. Article absolutely new and guaranteed. Tremendous seller. Everybody buys if shown. 60c to \$2 profit each sale. Virgin field awaits hustlers everywhere. Write today. Sanitax Co., 2399 Wabash Ave., Chicago.

NEW ART—Fascinating, rapid money maker. You can decorate china, burnt wood, pillow tops, anything, plain or colored from photographs. No talent required. Send stamp for information. D. L. Vallance Co., Elkhart, Ind.

JUST PATENTED, Young's Button Hole Gauge Knife. Nothing like it. Every woman wants one. One agent sold 107 at 25c each in one day, made \$13.37. Fifteen other useful rapid sellers. A. M. Young & Co., 10 Young's Bldg., Chicago.

AGENTS. \$100 monthly easily made handling one or more of our 350 fast sellers. Scheff Co., 640 Wells St., Chicago.

STIKPATCH MENDS STOCKINGS quicker and better than darning, wears longer, will wash, 20 patches, 10c, postpaid. Agents write for terms. Excellent profit. Sells on sight. The Stikpatch Co., Box 3294, Dept. C, Boston, Mass.

AGENTS—Sell Patented Radiumite Self-Honing Strop. Just being put out as an agency proposition. Strop covered by 16 patents. A \$2.00 razor given free with every strop sold. Strop retails for \$1.50. Millions being sold and agents coining money. Throw away old, worn-out propositions for something new and salable. F. J. King made 33 sales one Saturday afternoon in two hours. Outfit free. Thomas Mfg. Co., 904 Home Bldg., Dayton, Ohio.

AGENTS—Portraits, 35 cents; frames, 15 cents; sheet pictures, 1 cent; stereoscopes, 25 cents; views, 1 cent. 30 days' credit. Samples and catalog free. Consolidated Portrait Co., 172 W. Adams St., Chicago.

MALE HELP WANTED

AUTOMATIC SCREW MACHINE OPERATORS. Two experienced men on Brown and Sharpe Automatic Screw Machines; must be accustomed to close, accurate work. Address Department 29, Western Electric Company, Chicago.

WANTED—RAILWAY MAIL CLERKS, City Carriers, Postoffice Clerks. Examinations everywhere soon. Yearly salary \$600 to \$1600. Short hours. Annual vacation. Railway Mail Clerks have every second week off duty at full salary. No layoffs because of poor times. Salary certain twice monthly. Over 8,000 appointments will be made during 1909. Country and city residents equally eligible. These positions are excellent stepping stones for advancement to Postoffice Inspector, Superintendent and higher positions. Common education sufficient. Political influence does not help appointment. Candidates prepared free. Write immediately for schedule and free bulletin. Do not delay. Franklin Institute, Dept. G-21, Rochester, N. Y.

AGENTS WANTED EVERYWHERE to sell our newly patented pencil holders for telephones. Enormous quantities being sold. Exclusive territory given. Liberal terms. Sample, 10 cents. The Wm. W. Bythiner Mfg. Co., 308 Race St., Philadelphia, Pa.

SALESMEN and MANUFACTURERS—Agents selling mill and factory supplies will hear of a highly profitable side line by addressing. Manufacturers, P. O. Box 24, South Stillwater, Minn.

TOOL MAKERS—MACHINISTS. Three experienced men on milling machine work for our Tool Room. Must be high grade men and accustomed to close, accurate work. Address Department 29, Western Electric Company, Chicago.

TAILORING SALESMEN, own your own business and make \$200 a month or more taking orders for our made-to-order suits. No experience needed. Write today for free outfit. Warrington W. & W. Mills, 173 Adams St., Dept. 221, Chicago.

YOUNG men wanted to learn Wireless Telegraphy. 1,000 vacant positions. We qualify you to hold any position with a wireless company. Our new method and apparatus teaches you in your own home. Enclose stamps for particulars. Wireless Institute, Hibernia Bldg., San Francisco.

WE START YOU in a permanent business with us and furnish everything. Full course of instructions free. We are manufacturers and have a new plan in the mail order line. Large profits. Small capital. You pay us in three months and make big profits. Reference given. Sworn statements. Pease Mfg. Co., 1013 Pease Bldg., Buffalo, N. Y.

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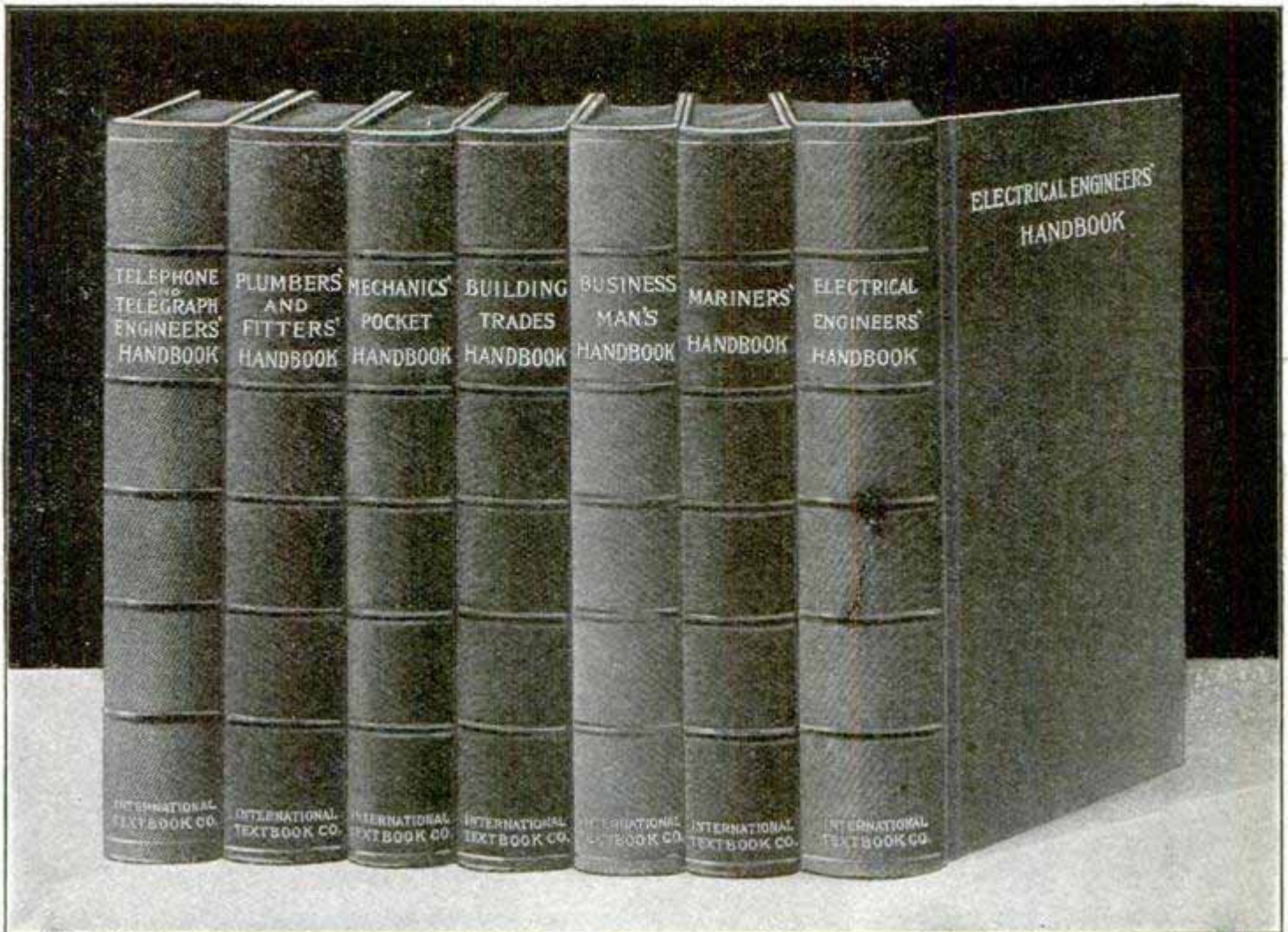
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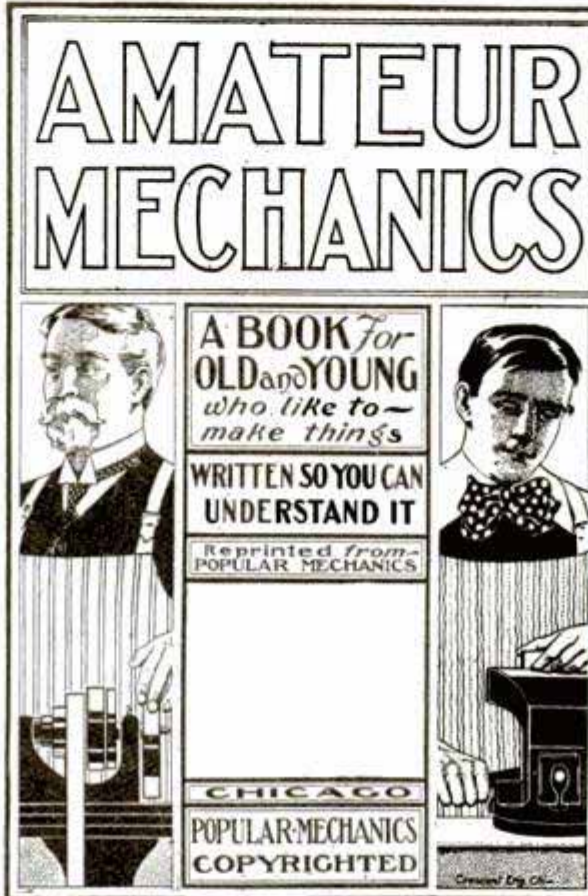
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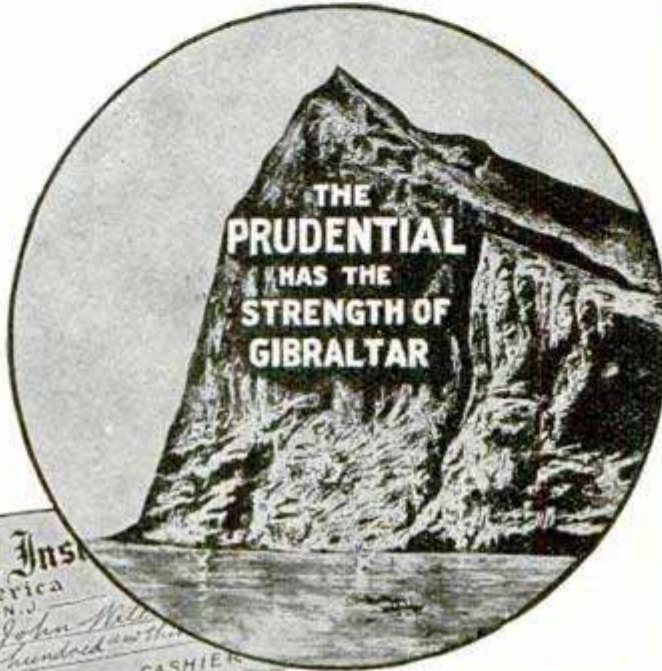
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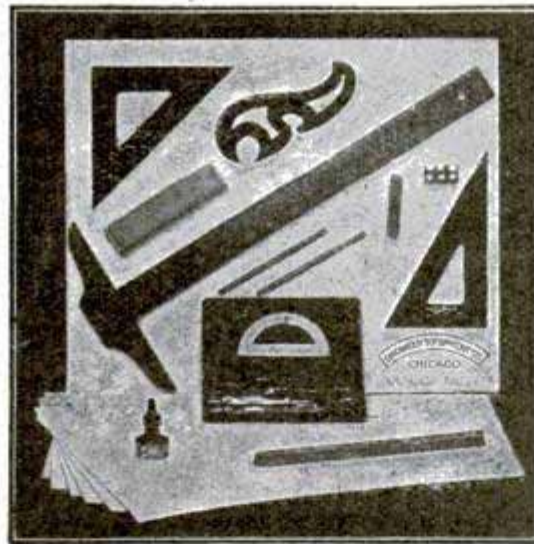
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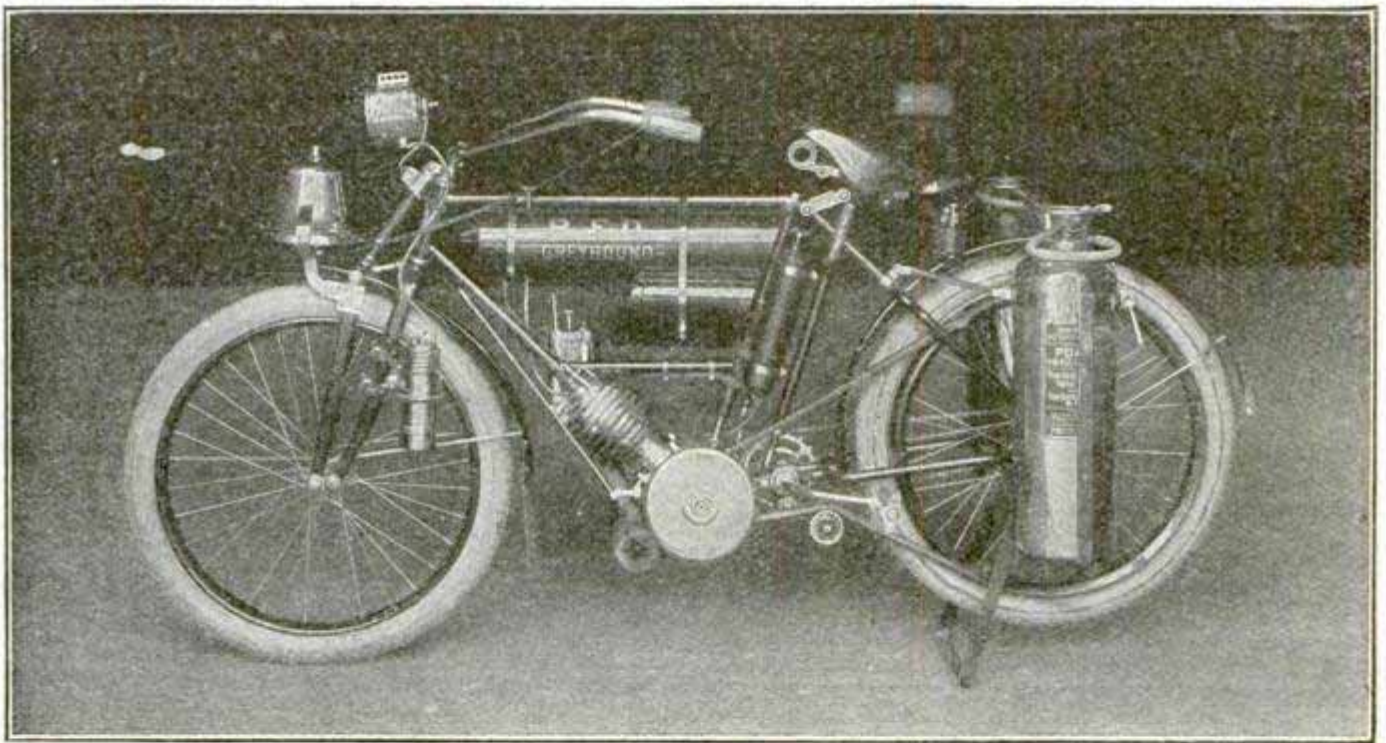
Vol. 12

JULY

No. 1

MOTORCYCLE FIRE BRIGADES

Carry Chemical Extinguishers, Have Automatic Stand
and Alarm Bell—Often Extinguish
Blaze before Engines Arrive



Motorcycle Designed for Fire Departments

If the experiments being carried on with motorcycles in connection with the Buffalo fire department prove as successful as claimed, motorcycle brigades may soon become a part of the fire-fighting forces of a number of the larger cities of the country.

A large proportion of fires originate in very small ways, statistics showing that about 80 per cent of alarms turned in are what the firemen call "lace cur-

tain fires". A trained fireman on the spot at the earliest possible moment, with a couple of chemical extinguishers as his fire-fighting ammunition, would often catch such a fire before it has time to develop into a serious affair, and it is for this purpose that the motorcycle equipment has been designed.

As is shown by the accompanying illustration, the extinguishers are mounted in spring brackets on each

side of the rear wheel of the motorcycle, enabling the operator to detach them quickly. The machine is also equipped with an automatic stand which takes care of itself when the machine is pushed off and resets itself when the fire is reached, also a loud alarm bell.

One of the machines has for some time been stationed at the Cleveland Ave. station of the Buffalo fire department, responding not only to alarms in its district, but outside as well. At nearly every alarm, irrespective of distance, the machine and its fireman have arrived at the scene of the fire before the other fire-fighting apparatus, several times extinguishing the blaze before the regular apparatus could get into action.

WICKER AUTO-OBSERVATION CAR

The unique automobile-observation car shown in this illustration is one of many being used this summer to convey people around Belle Isle, Detroit's beautiful park. The dashboard and seats are of wicker. One seat is for passen-



Motive Power Is Electricity

gers, the chauffeur being mounted on a raised seat in the back, somewhat similar to the driver's seat of a hansom cab. The motive power is electricity.

A MECHANICAL SKIPPING ROPE

This skipping rope, an attraction for young people at one of the amusement places in London, is not only mechanical but automatic as well. The rope



Skipping Rope That Turns Itself

revolves when the skipper steps upon the platform, this action releasing the spring or clutch that regulates the mechanism. The faster the skipper jumps, the faster the rope revolves.

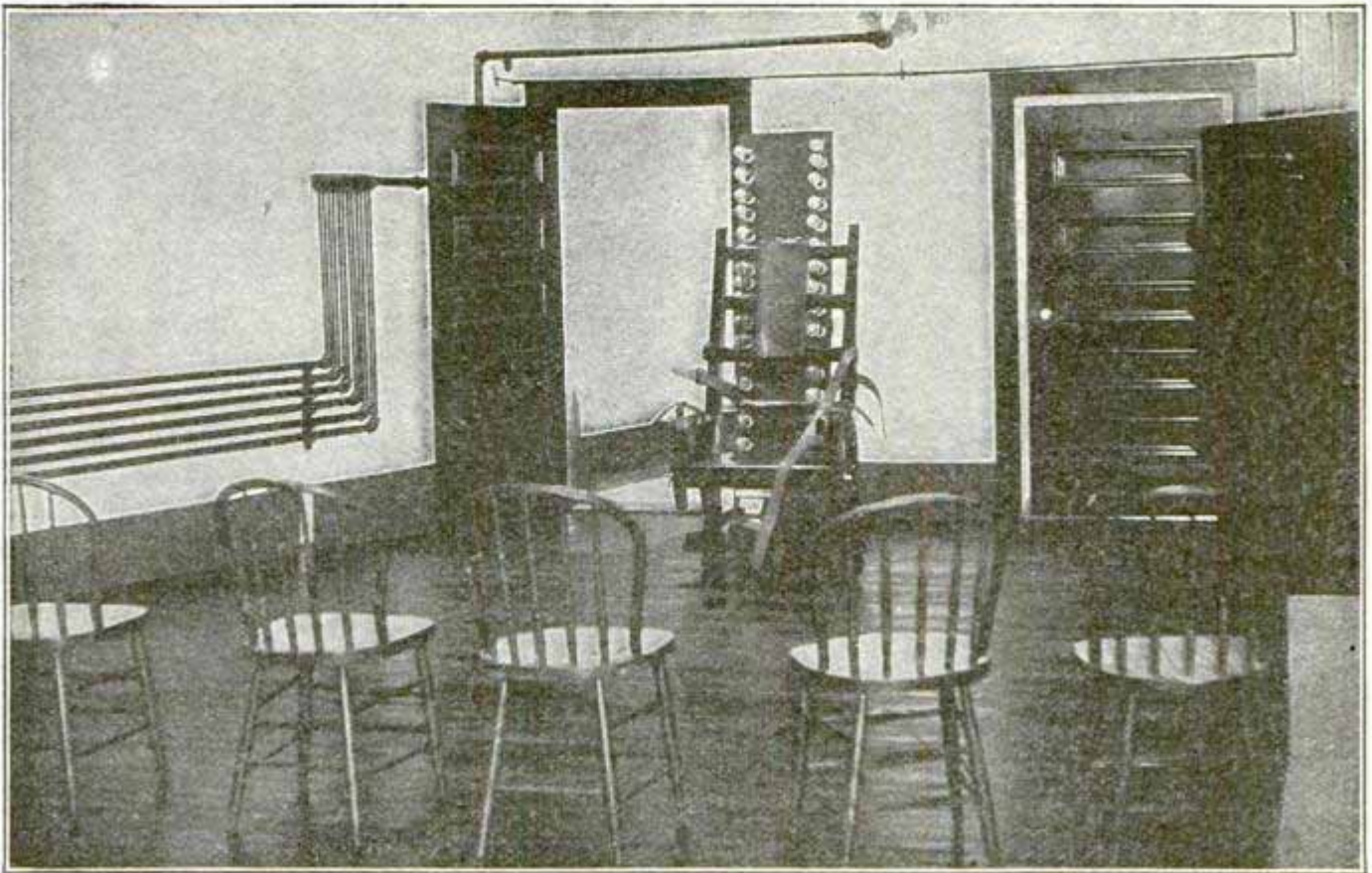
SCHEME TO JAIL FAST AUTOS

A new way to check automobile speeders which is likely to have some controlling effect on speed maniacs was recently presented in a resolution to the New York City Board of Aldermen. The resolution prescribes that if the owner, or driver, is arrested for the offence of exceeding the speed limit, the automobile or motor vehicle shall be detained in the corporation yards until the discharge or conviction of the accused.

The resolution is now in the hands of the committee on laws and legislation where it was referred without argument. It amends the former law and is a result of the increasing number of automobile accidents.

New York street cars killed 444 persons in 1908 and injured 35,060 others.

ELECTRIC DEATH CHAMBER OF A PRISON



First Death Chamber Used in the United States

This illustration shows the electric chair and death chamber of the state prison at Charlestown, Mass., said to be the first ever used in the United States. It is similar to the electric chair in New York state in which a woman was recently executed. A current of 1,500 volts is used to cause death, twice repeated after the first shock. The chairs shown in the foreground are for the witnesses of the execution.

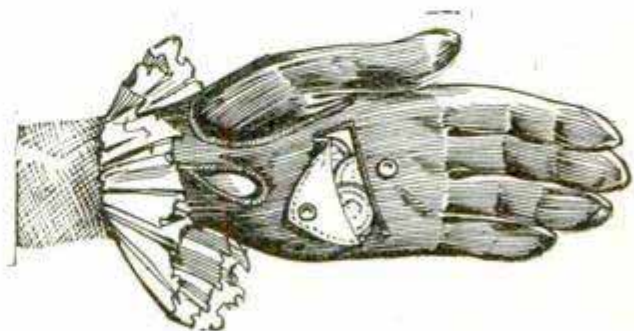
BROOMCORN HAS SUBSTITUTE IN HAY

A new broom which is practically made of a substitute for broomcorn, the interior or body being constructed of hay, is now being placed on the market. Only the outer edges or exterior of the brooms are made of broomcorn. The brooms are neat in appearance, are claimed to possess good sweeping qualities, and as much durability as cheap broomcorn. They sell in two grades, one costing 15, and the other, 20 cents.

A ton of timothy, cut with a binder, costs \$12 and makes 1,200 brooms, with 5 to 6 lb. of good hurl to each dozen. The high price of broomcorn is the reason for the substitute.

PURSE IN THE PALM OF A GLOVE

The latest novelty in purses is shown in this illustration. The purse forms part of the palm of the glove, the opening being provided with a flap and



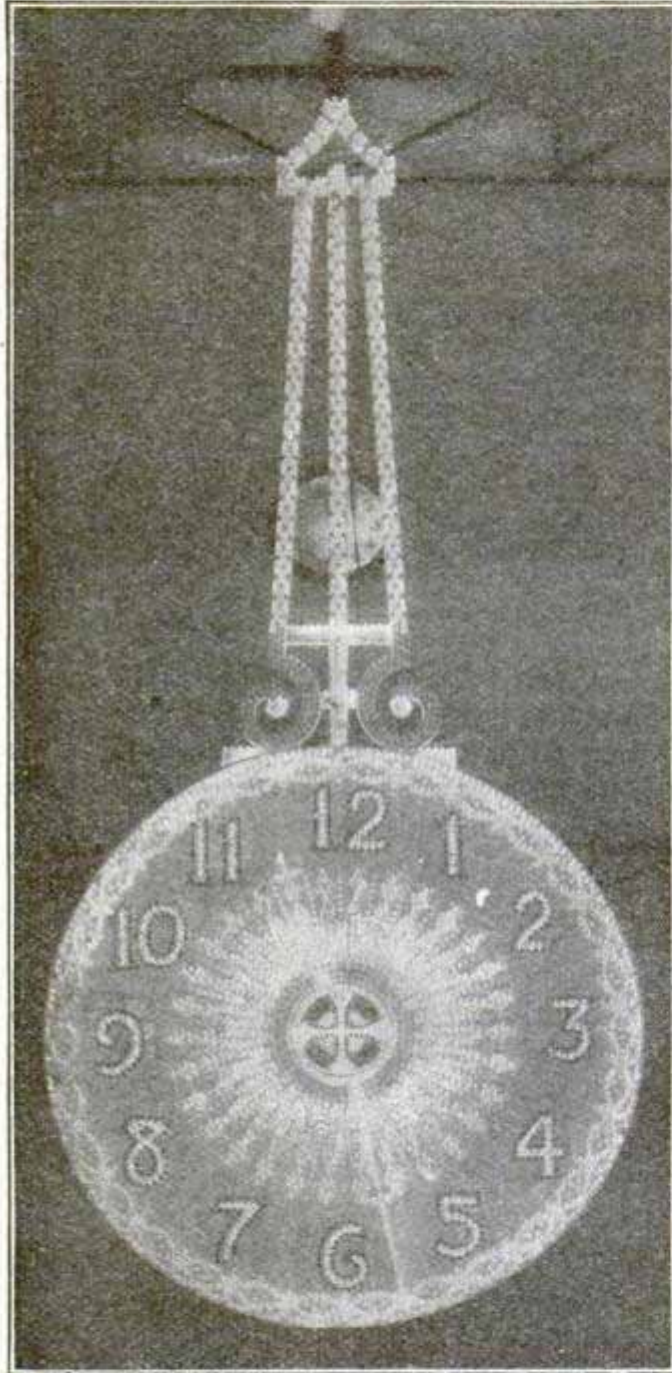
The Glove-Purse Novelty

clasp, so that there will be no danger of the contents being lost. Money or other valuables carried in such a place

are secure from the attention of thieves. The left hand is usually the least used, so the purse is part of the left glove.

MARVELOUS ELECTRIC CLOCK

The largest electric clock in America, a marvel of beauty and workmanship, was on exhibition recently at the Southern Electrical and Industrial Ex-



Copyright, 1909, by H. C. Korfhage

Electrical Clock of Wonderful Craftsmanship

position held in Louisville, Ky. The pendulum that swings majestically in its 15-ft. arc is 48 ft. in length, 20 ft. wide at the lower end, which forms the dial, and weighs over 3,000 lb. It contains 5,485 multi-colored electric bulbs, for which 11,000 connections were nec-

essary, and over a mile of wire. In making the connections 140 lb. of special screws were required.

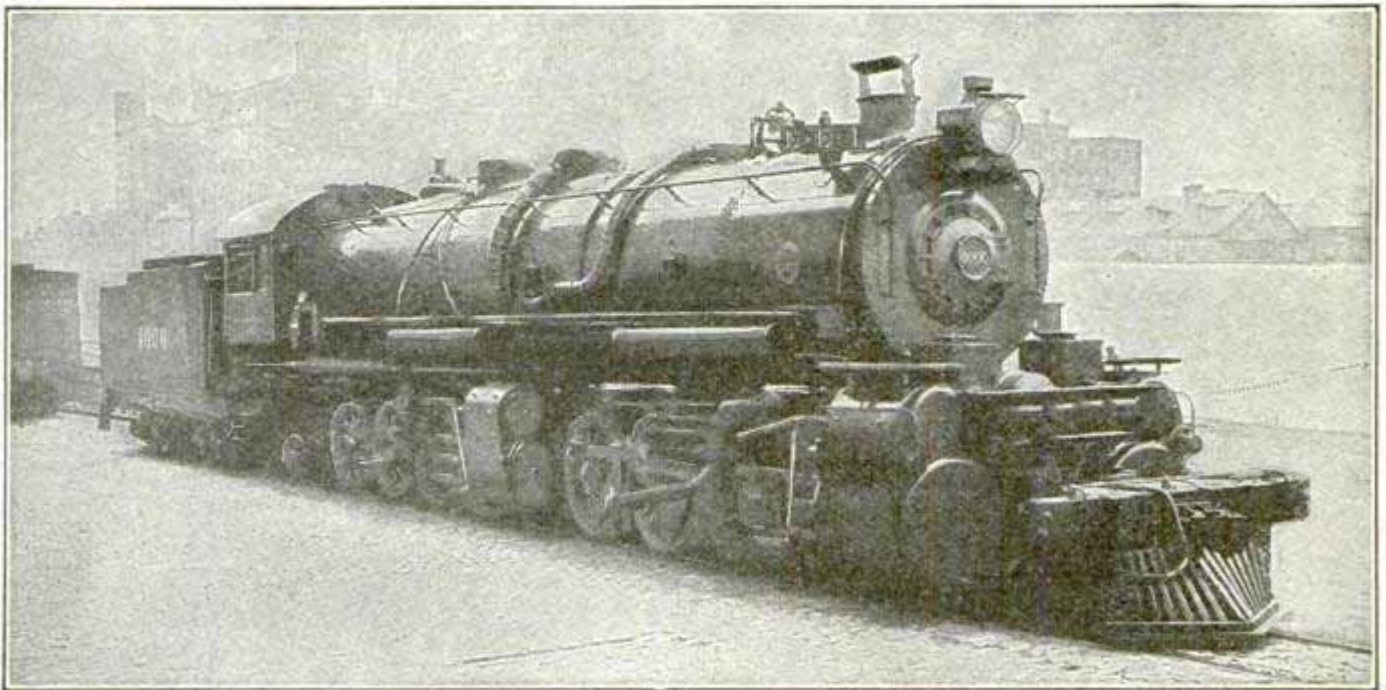
The dial, although it indicates hours, minutes and seconds, has no hands. The time in minutes is indicated by 60 series of lights, each series containing 32 globe-covered bulbs radiating from an ornamental centerpiece to the outer edge of the dial. Shorter rows of different colored lights indicate the hour, and these change their position 12 times during each 60 minutes, or once every 5 minutes. The seconds are shown by 60 lights placed at equal distances around the extreme outer edge of the face. The hour figures are 3 ft. high, outlined in colored lights. Each second the illumination in the outer circle of light moves forward one bulb, and when the dial has been entirely circled, the lights indicating the minutes also advance, and the hour hand, formed by lights, makes its slow journey at 5-minute intervals.

Despite the huge proportions of the clock, it will keep absolutely correct time, even to the second. The motive power for the pendulum movement is supplied by a small magnet near its top at the side. The mechanism of the whole machine is controlled by a small master clock of the kind used to operate the series of electric clocks that are seen in large cities. The clock was designed and made by H. C. Korfhage, of Louisville.

LIGHT COAL CONSUMPTION ON FLEET VOYAGE

During the globe-girdling trip of the American fleet much adverse criticism was expressed over the expense and probable value of the trip. The spirit of each vessel to excel in its efficiency is well shown by the coal consumption during the voyage. From San Francisco to Manila the entire fleet consumed only $6\frac{1}{4}$ tons of coal per mile for a distance of 12,608 miles. With foul bottoms which had accumulated on the outward voyage, the return distance of 13,385 miles was steamed with a coal consumption of about $6\frac{3}{4}$ tons per mile.

LARGEST AND MOST POWERFUL LOCOMOTIVE IN THE WORLD



Courtesy Baldwin Locomotive Works

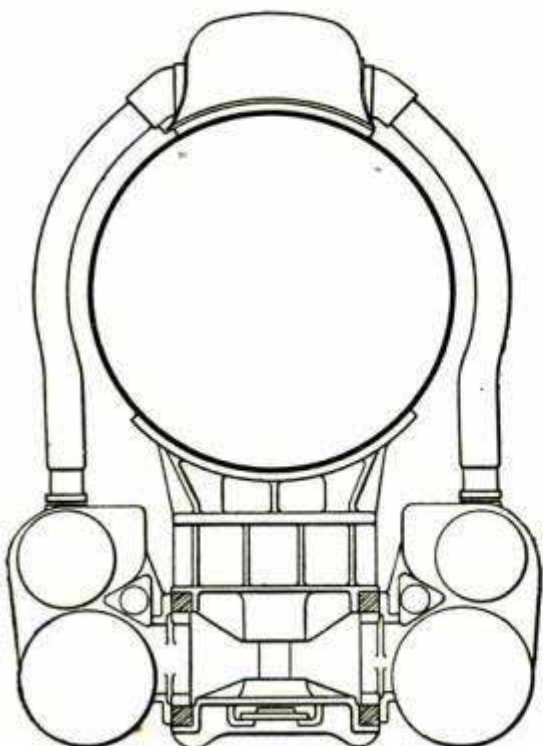
"Each Locomotive with Its Tender Weighs 596,000 Lb."

The two new oil-burning locomotives for the use of the Southern Pacific railroad on its Sacramento division, where the maximum grade is 116 ft. per mile and the rating 1,212 tons of cars and lading, are the largest and most powerful in the world. Each locomotive with its tender weighs about 596,000 lb. and is 92 ft. in length. The

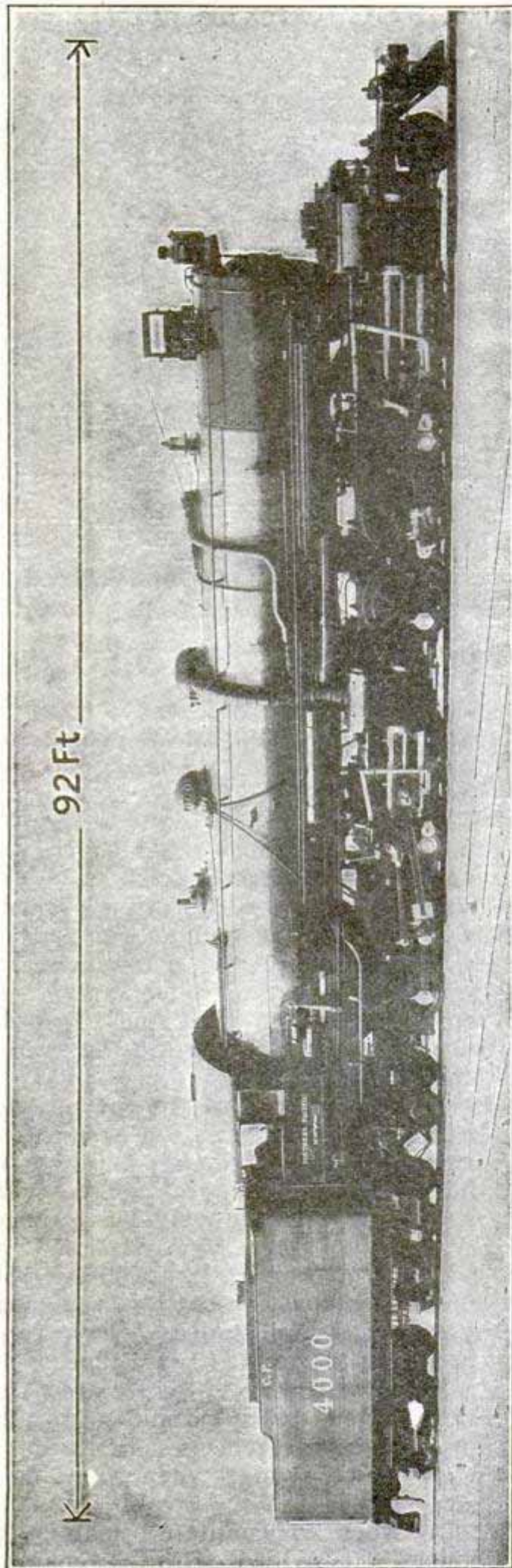
driving wheels number 16, eight in each coupled group, and the calculated tractive force is 94,640 lb. The total heating surface of each locomotive is 6,393 sq. ft., the fire box having 232 sq. ft., the fire tubes, 4,941 sq. ft., and the feedwater heater, 1,220 sq. ft. The outside diameter of the driving wheels is 57 in., and the boiler, equipped for oil burning, is 84 in. in diameter. A superheater, placed in the piping system between the high and low-pressure cylinders, is located in the smoke-box.

The detail parts of the locomotives have, where possible, been designed in accordance with existing standards of the associated lines, and each is practically equivalent, in weight and capacity, to two large consolidation type locomotives. In spite of their great size, the engines present a pleasing and symmetrical appearance. They are of theallet articulated type; that is, the body of the engine is "articulated", its frame being joined at midlength, the forward driving wheels constituting a truck which swings when rounding a curve.

In order to facilitate repairs, the boiler is provided with a separable



Furnishing Steam to Central Cylinders



joint, which is placed at the rear end of the combustion chamber. The joint is effected by riveting a ring to each boiler section, and uniting the rings by 42 bolts, $1\frac{1}{4}$ in. in diameter. The rings are butted with a V-shaped fit.

The waist-bearer under the combustion chamber is bolted into place, while the front waist-bearer and the high-pressure cylinder saddle are riveted to the shell. The longitudinal seams in the barrel are placed on the top center line, and have "diamond" welt strips inside. Flexible stay bolts are liberally used in the sides.

The tender is fitted with a 9,000-gal. water-bottom tank, and its capacity for oil is 2,850 gal. The photograph shows the appearance of the locomotive ready for service. The stumpiness of the stack is notable. The drawing illustrates the method of furnishing steam by outside connections to the chests of the central cylinders. This feature is also shown in the photograph.

COST OF CARELESSNESS IN ELEVATOR OPERATION

Many things have to be considered in keeping down the operating expenses of a large office building, yet it is doubtful if passengers, elevator operators, or even managers realize the cost of carelessness in passenger elevator operation. According to one authority the running of a car back after passing a floor costs money; running it back 3 ft. costing half a cent.

Take, for example, a 12-story building with 5 elevators, and assume that in each trip, both up and down, two errors are made, partly owing to the passengers and partly to the operator. Thus, for every round trip of each elevator there will be four errors made in bringing the car to the proper level, or running back a couple of feet to get a belated passenger. When an electric elevator starts up or down, empty or loaded, the first 4 seconds after throwing the lever costs as much money as traversing approximately 3 floors after a full speed is attained, and, according to the same authority, it is safe to say that half a cent is the cost of each



Queer Mounts Used by Madagascar Soldiers

start. Therefore, assuming that the four errors above mentioned cost 2 cents, there will be a loss of 10 cents in the time required for all the elevators to make one round trip. In an office building with 5 elevators, running continuously for 8 hours a day at 20 round trips per hour, or 160 round trips per day each, the loss by such carelessness would amount to \$16 per day.

SOLDIERS MOUNTED ON OXEN

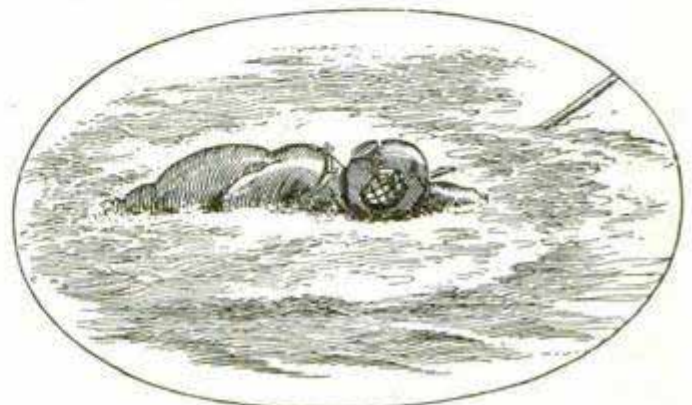
A body of lancers on "ox-back" would doubtless be considered a strange spectacle, in whatever part of the world they might be seen. In Madagascar the French have organized such a body of "cavalry." The reason for selecting oxen as the mounts of the natives is because of the scarcity of horses in the isle. Indeed for some unknown reason all horses that are imported weaken, and presently become practically unfit for use.

These native lancers serve as a military detachment and as police scouts. It was found at first impossible to get the natives to take any interest in the European forms of drill. But as soon as the wily natives discovered that they would not have to walk, but could ride during their military maneuvers all

this apathy disappeared and presently the French commander had his little troupe drilled in a way of which a colonel of European hussars might be proud.

EXHAUSTED DIVER FLOATING TO SURFACE

As part of the education of the English naval divers, the beginners are taught how to save themselves, should they become exhausted, by allowing their suits to fill with air and shooting rapidly upward to the surface, where they are dragged into the boat by the attendants. This is not always safe, however, with ordinary suits, as the air may accumulate in the back of the suit, and, gaining access to the legs, cause the diver to turn turtle and shoot helplessly upward, with the risk of



Training the English Diver

coming in contact with a ship's or boat's bottom. Therefore, the diver must be standing upright when he allows the air to fill the suit, the chances being that if he knows how, he will come up properly.

To guard against the accidental blowing up of a diver's suit, which sometimes occurs when he is crawling on the bottom, with head down, the British admiralty some time ago recommended diving suits with an arrangement for lacing up the legs and thighs, so that the air could not fill out those parts.

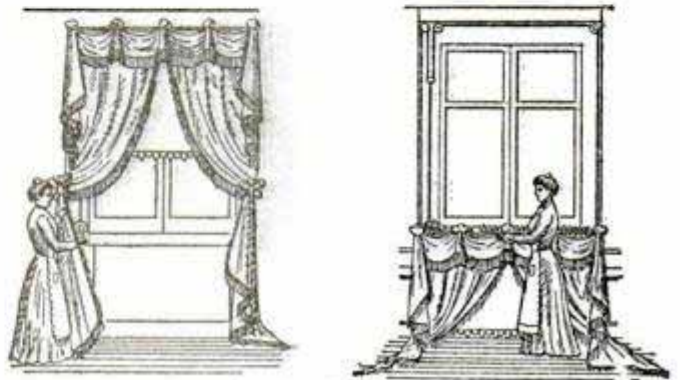
A LOCOMOTIVE ON RUNNERS

Some time ago this magazine published an article on a logging boat that could run on land as well as on water. This illustration of a locomotive on runners and wide traction wheels is just as unique and interesting. A number of them, known as "log haulers" are in use in the Maine woods. They need no track, and any road or trail that is ordinarily level is sufficient for their needs. Such a locomotive of the woods will draw 15,000 ft. of logs, which is usually the work of 12 double horse teams. But three men are required to

operate them, and as wood is the fuel burned, it can be procured in the woods. The locomotives are steered by gear attached to the runners, which are forward.—Photo by Harry B. Stanwood.

NEW CURTAIN-HOLDER ARRANGEMENT

The taking down of lace curtains for dusting or cleaning is a tedious task that the housewife feels no inclination to perform oftener than once in several



Labor-Saving Curtain-Holders

months, the curtains in the meantime receiving only the scanty dusting possible when not taken down. Yet curtains are a perfect nest for microbes, and to make a daily dusting possible the holder arrangement shown in the illustration has been devised.



"Log Hauler" Used in the Maine Woods

The arrangement consists of a rod on each side of the window casing upon which run a number of slides, geared to a light wire cable. The curtains are fastened to the slides, and these are raised or lowered by turning a drum hidden behind one of the curtains, thus making it possible to lower the curtains, dust the tops, and lift them into position again with ease.

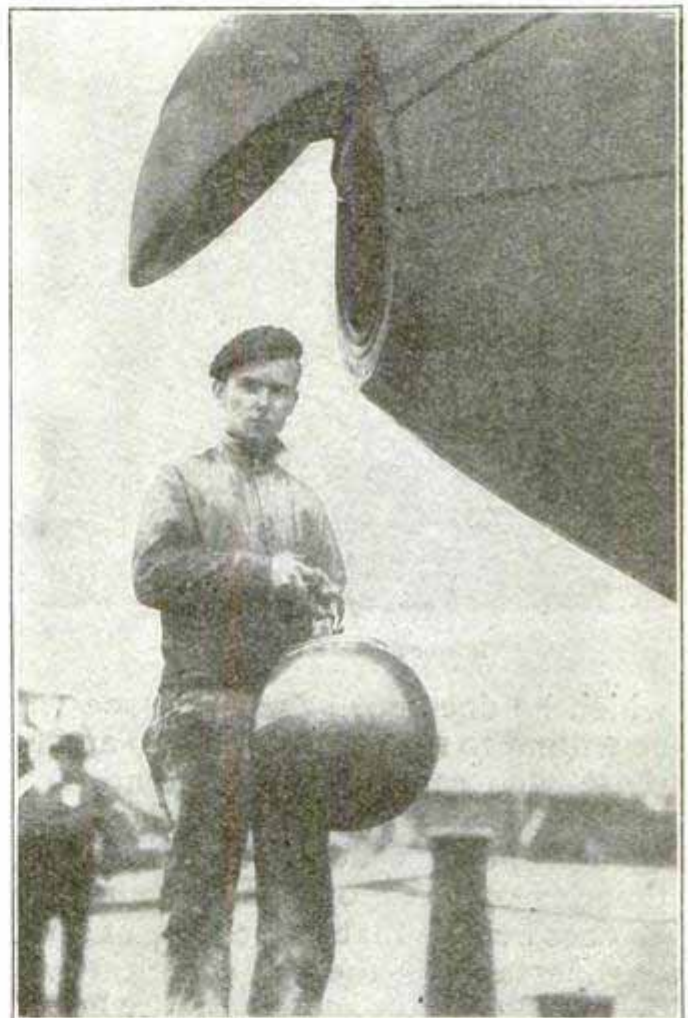
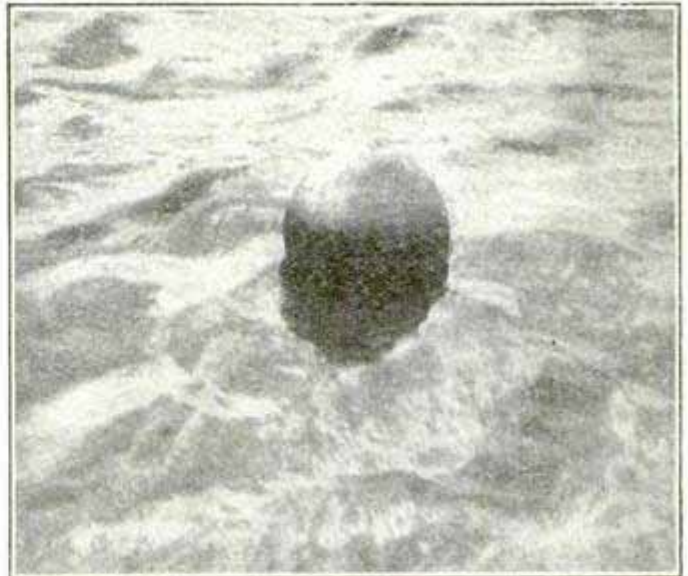
SALE OF OLD ARMY RIFLES STOPPED

It has been the practice of the United States army to sell discarded rifles to dealers who disposed of them indiscriminately at low prices. The majority of such rifles have been going to South American republics, but a short time ago a large consignment was bought by a speculator and sold in blocks to department stores in the larger cities of the country. The department stores in their turn retailed the rifles at almost nothing. So many of them were disposed of in Chicago that the police department of that city made complaint that such a practice was dangerous, as it offered an opportunity for people to obtain them so cheaply that the city might be imperiled in times of strikes and riots.

Protest was made to the United States authorities, and this, coupled with the fact that it has for some time been considered unwise to allow the rifles to go to South America, caused the government to prohibit sales to other than patriotic organizations.

THE EMERGENCY SIGNAL OF A SUBMARINE

The new danger and emergency signal of the U. S. N. submarines is shown in these illustrations. It consists of a copper ball signal buoy attached to 100 ft. of 1/16-in. bronze wire. When the submerged submarine is in danger, the device is automatically released by a valve from the inside, and the ball rises to the surface, presumably entering the water from the torpedo tube of the submarine. A special telephone is to be arranged inside the ball so that communication can be carried on between



A Submarine's Distress Signal Buoy—Opened Torpedo Tube and Buoy

the officers of the submerged submarine and the officers of the tenders.

One of the illustrations shows the opened torpedo tube of a submarine and the ball. The other shows one of the balls in action, with a submarine in the depths below.

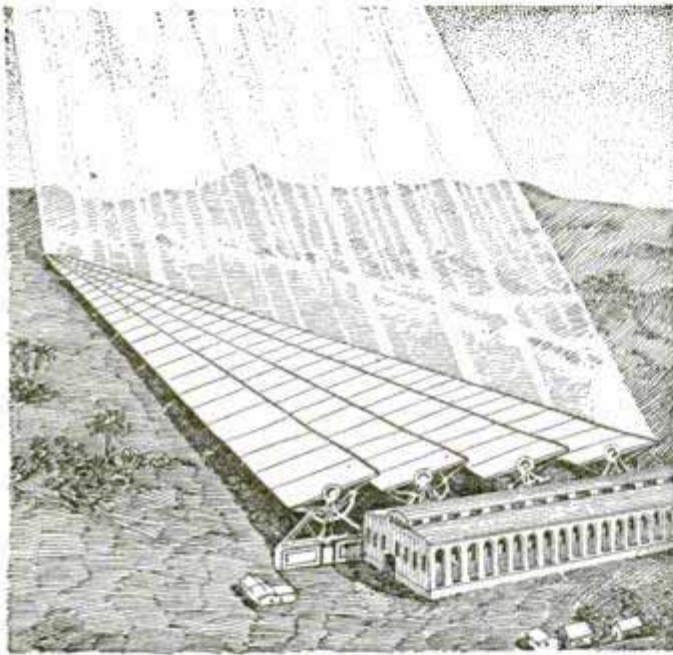
London has a population of 4,795,757.

THE SCHEME TO SIGNAL MARS

Prof. Pickering's Practical Plan

The world was somewhat startled recently by the assertion of Prof. W. H. Pickering, of Harvard University, that he had a scheme by which it would be possible, if not highly probable, for the earth to communicate with Mars by means of signals if there are living and intelligent beings upon it, as many noted scientists believe.

His method of making communication possible would cost \$10,000,000,



Mirror Signal for Martians

which he does not believe anyone will be willing to furnish. He is also among those who seriously doubt that there are any living beings upon Mars, although he has due respect for the theories of those opposed to him, but he does believe that his scheme of sending messages is the one practical way of finding out, once for all, whether there are such beings, although he admits that if no answering signals were made, it would not disprove the theories that Martians exist.

Whatever the merits of the scheme may be, however, from a mechanical standpoint it is of great interest as narrated by the man who formulated it.

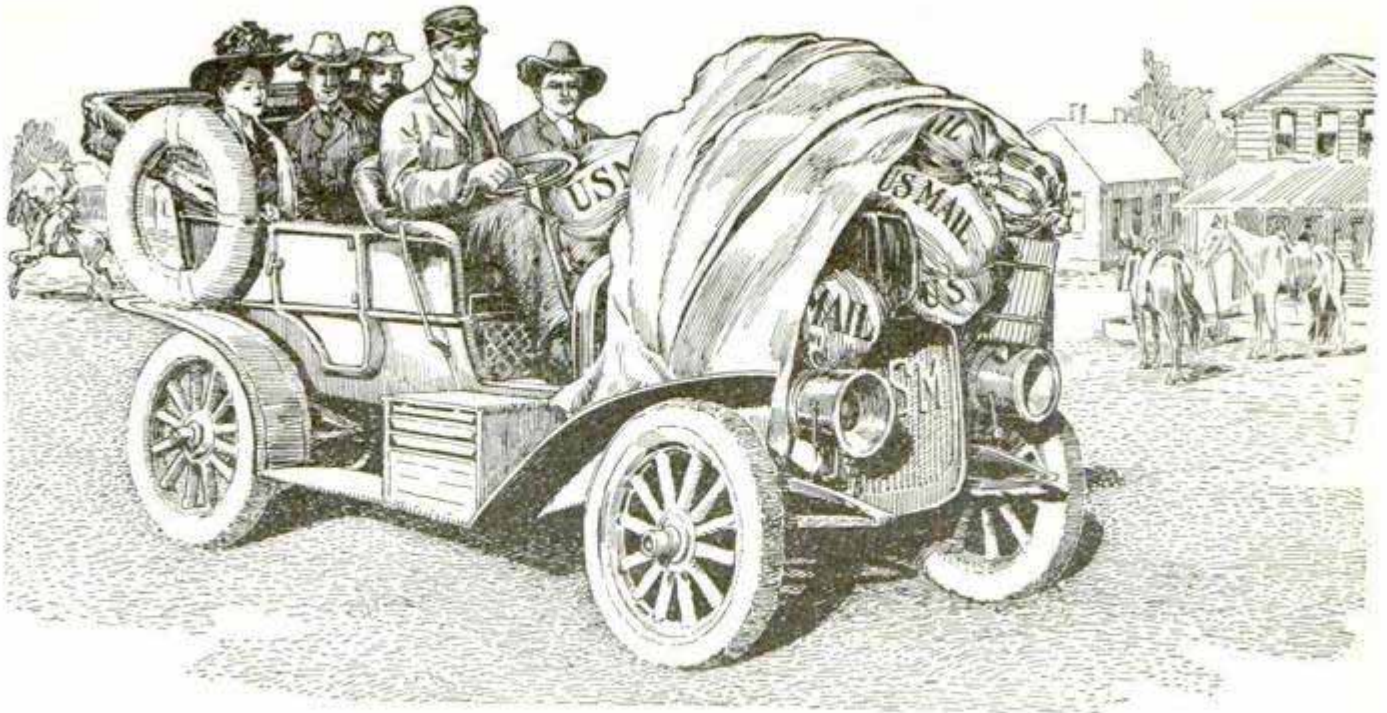
"My scheme," says Prof. Pickering, "is to fix 50 mirrors, each mirror 25 ft. square, on shafts like the polar axis of an equatorial telescope. Each large

mirror should be made up of 100 little ones, $2\frac{1}{2}$ ft. square. There should be 50 shafts, thus bringing the total number of 25-ft. square mirrors up to 2,500. I estimate that each large mirror would cost \$4,000, including motors, labor, attendance, etc., thus making a total of \$10,000,000. This number of mirrors would make, in all, one-fourth of a square mile of mirrors.

"The shafts would be mounted parallel to the axis of the earth, and caused to revolve by means of motors in a direction opposite to that in which the world revolves. By this means a steady flash of light, bright enough to be visible through a telescope, would be sent from the earth to Mars. The question of the number of mirrors necessary for sending this flash is a simple matter of astronomical calculation which any astronomer can figure out in five minutes.

"The signals from the earth should be kept up for three or four months, and at the end of the year they should be started again, and continued perhaps, for several years. It is reasonable to expect that if there are Martians in existence of sufficient intelligence to take notice of these signals, they will have done so by that time, if they are going to do it at all. It is probable that they would erect some apparatus similar to the signal-flashing mirrors on the earth. Then, if flashes similar to those sent from the earth were flashed from Mars, a system of dots and dashes would have to be studied out. In hoping to get such signals back, we must assume, of course, that the Martians, if there are any, have telescopes, eyes, etc., just as human beings have on this earth."

The minimum distance between Mars and the earth is 35,000,000 miles, but for the receiving of signals from the earth, Mars, according to astronomers, is in better position when it is off to one side, about 50,000,000 miles away. The signals could then be flashed from the side of the earth which is in the sunlight to the dark side of Mars. Mars gets into this advantageous position twice every two years, such a time being due next September.



AUTOMOBILE MAIL SERVICE IN TEXAS

One of the most interesting transportation lines in Texas is the automobile line between San Angelo and Big Springs, a distance of 100 miles. Two cars make the round trip each day, one starting from each place. In addition to the passengers each car carries, which often number six, the line is responsible for the transportation of U. S. mail between the two communities. The mail bags and hand baggage are carried on the hood of the machines, as shown in the illustration.

HAND MAGNET FOR MANY USES

A hand magnet, which will pick up 10 to 15 times its weight of $\frac{7}{8}$ lb., has been placed on the market. It is designed for operation on an ordinary electric-lighting circuit, and is furnished with drop cord and plug so that it can be attached to any lamp socket. A push-button, mounted on top of the magnet and operated by the thumb, closes the circuit to the coils and makes the magnet operative. On releasing the button the poles become demagnetized and the load is released.

In machine shops the magnet is used for clearing chips and borings out of machinery or removing them from parts of the work not easily accessible

as, for instance, from the bottom of a deep cylinder. Tools, bolts, etc., dropped into places where it would be almost impossible to fish them out by



Courtesy Edison Bulletin

Hand Magnet Lifting Nails

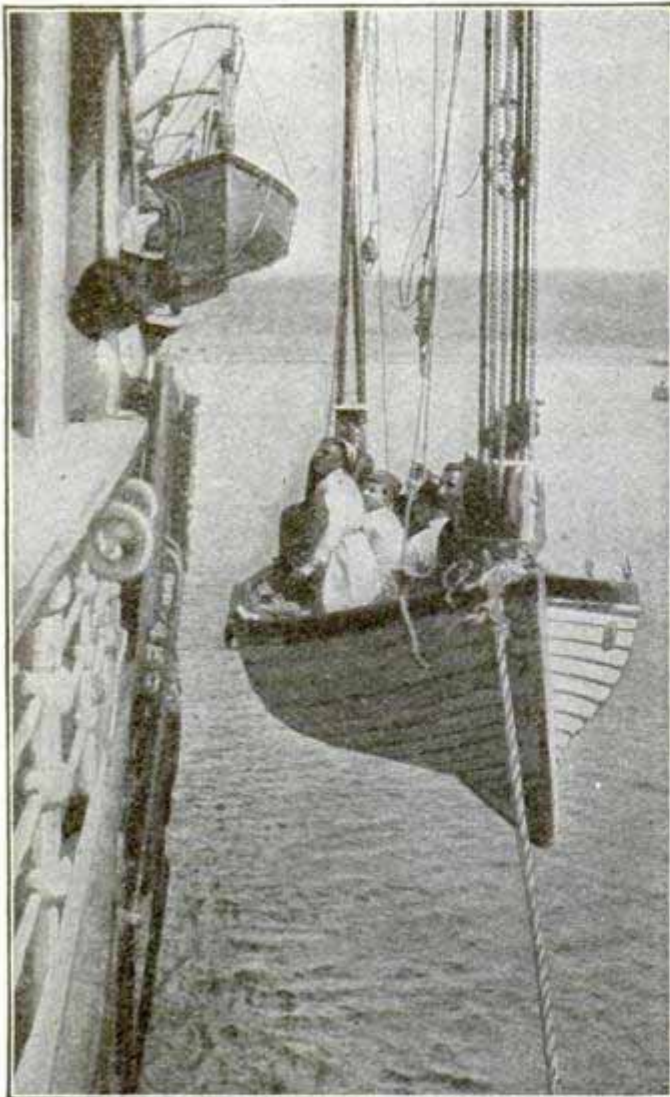
ordinary means, are recovered by simply passing the magnet over the place. Tacks and nails can be separated in-

stantly from brass screws with which they have become mixed by passing the magnet above the pile. Hot pieces of metal, also, may be picked up by it.

One manufacturer is putting such a magnet to a novel purpose. He is paving an alley in the rear of his concern with ashes, and finding that many nails from packing boxes, burned under the boilers, were mixed with these ashes, threatening the tires of his automobile trucks, he uses the magnet to remove them before strewing the ashes.

TAKING THE DOCTOR ON BOARD

The officers of a ship entering the Suez canal on a homeward voyage from the East have to undergo a few trying minutes, especially when there is a cholera scare in Europe. No ship can pass without a clean bill of health, and therefore the port doctor must come aboard. Should some suspicious



The Doctor Does Not Climb Aboard

case of illness be discovered, a dreary wait in quarantine is necessary.

Although the ship stops, the doctor does not climb a ladder to the decks. His boat is made fast to davits and his crew as well as himself are raised to a position from which he and his assistants can comfortably step aboard.

FURNITURE OF PALMETTO WOOD

Although the wood of the cabbage palmetto, with its beautiful dotted cream and black appearance, is delightful to look upon, very little of it has been used in the manufacture of furniture and novelties, because no way had been found to preserve it against time and its warping tendencies. Now, however, a process of treating the wood has been discovered that, it is claimed, will make possible its utilization for certain lines of furniture, and make its markings stand out all alone, as does the birch or birdseye.

Stands, cabinets, mission furniture, walking canes, brush backs, and paper cutters made of the wood as specially treated have been turned out as samples. The cabbage palmetto abounds in the lowland sections of Florida, and the process of treatment is the discovery of a company in Datona.

WRECKED QUEBEC BRIDGE TO BE RECOMMENCED

The great steel bridge across the St. Lawrence river a few miles above Quebec, which fell while being constructed in August, 1907, killing 78 men, will be recommenced in the next few months. The plans are now practically completed, but several years will be required for its construction. The bridge was to have been in the first place 150 ft. above high water mark, but owing to the fact that it is feared that ships of the future will not be able to pass it in running up the river to Montreal, the new engineers are considering the advisability of providing for at least 10 ft. more headroom. The original 1,800-ft. channel opening will be provided.



Taking Licensed Toll in the Rockies

In the rebuilding of the bridge none of the steel manufactured for the original structure will be used, and the structural shapes on the ground will be treated as scrap. The engineers having the new task in hand are Maurice Fitzmaurice of the London County Council, Mr. Vautelet, for many years bridge engineer of the Canadian Pacific, and Ralph Modjeska of Chicago.

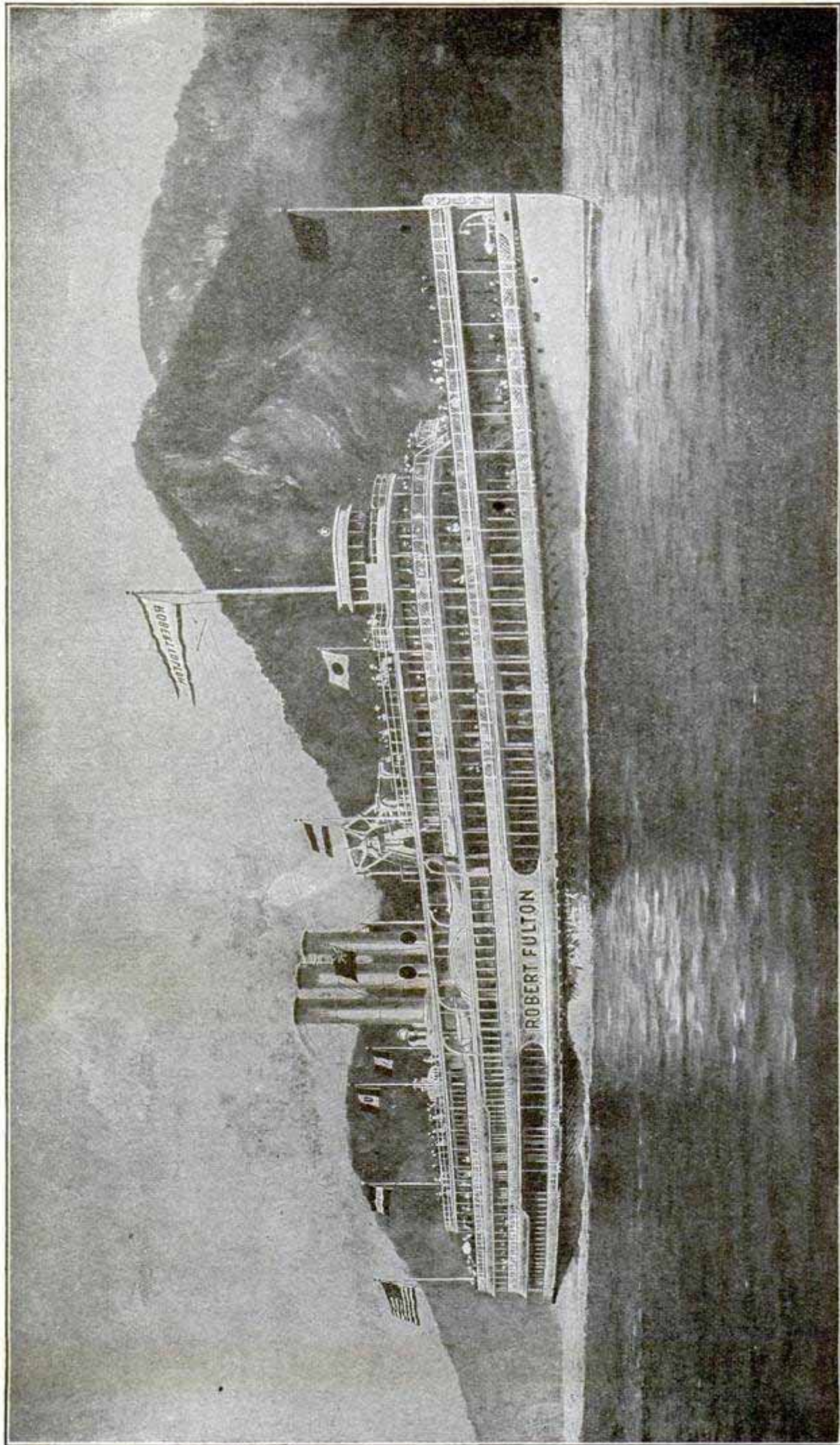
A MOUNTAIN TOLL GATE

The people of the rural districts of the United States are familiar with the toll gate, although, in the past few years, such means of income have been done away with in the more thickly settled parts of the country. This toll road is situated in the midst of the Rocky mountains. The keeper of the gate sits upon the porch of his small log cabin, in close reach of the line that pulls down the gate or bar. When horses approach, he pulls the gate and toll is required before they can pass. The other end of the bar is weighted so that it will swing up when the keeper of the gate lets go of the line.

TITANIUM ALLOY FOR RAILS AND CAR WHEELS

Titanium alloy, with which steel rails and car wheels are now being treated for some of the great railway systems of the country, notably the New York Central lines, is claimed to add immensely to their strength and durability.

Titanium is itself an element found in large quantities and varying percentages throughout many of the iron ores of the world. It is found in the United States, Canada, Norway, and Sweden in considerable quantities. Thousands of acres of iron ore territory in the Adirondacks are impregnated with it. Fifty years or more ago these ores were shipped to Troy, N. Y., where iron was produced that for a long time was second to none in durability and strength, but when the Civil war commenced these operations were stopped and not again vigorously continued until about 1900. Some of the Adirondack ore runs as high as 43 per cent titanium, and is consequently a titanium ore with iron as an impurity.



The Latest Hudson River Steamer

THE "FULTON" BUILT IN RECORD TIME

All records in steamboat construction were broken by the shipbuilding company which launched the Hudson river steamer "Robert Fulton" at its yards at Camden, N. J. in a little less than 11 weeks from the time the keel was laid. The vessel is 348 ft. long, 76 ft. wide, has 4 decks and a carrying capacity of 4,000 people, and is expected to make 28 miles an hour. As far as possible her construction is of steel. Fire-proof compositions are used for the lighter partitions.

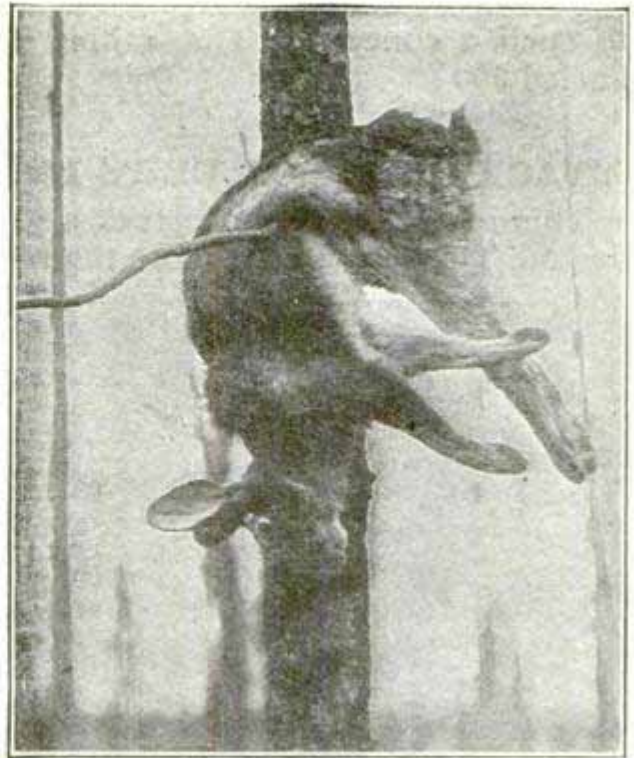
The rush in building the vessel was because of the desire to have her completed and ready to make her first passenger trip on May 29, the day on which New York, Jersey City and the other cities bordering the Hudson river, celebrated the centenary of Robert Fulton's first successful trip on the river.

AEROPLANES AS SCOUTS; NOT FIGHTERS

Wilbur Wright has made the statement that in his opinion the use of the aeroplane for dropping bombs or explosives into a hostile army is impracticable, as the machines must rise 1,000 or 1,500 ft. above the ground to escape shell fire. At that height accuracy would be impossible in dropping explosives when moving at 40 or 50 miles an hour. He believes their only use in war will be as scouts and messengers.

NITRO-GLYCERINE LETS GO IN ILLINOIS

Two men were blown to pieces and the factory of a torpedo company at Gordons, Ill., was demolished in April by the "letting go" of 120 qt. of nitro-glycerine. A hole 60 ft. in diameter and 15 ft. deep was blown in the ground, and the factory and boiler house scattered over several acres of ground. The appearance of the ground adjacent to the place where the explosive let go is shown in two of the illustrations. The other illustration is a unique ex-

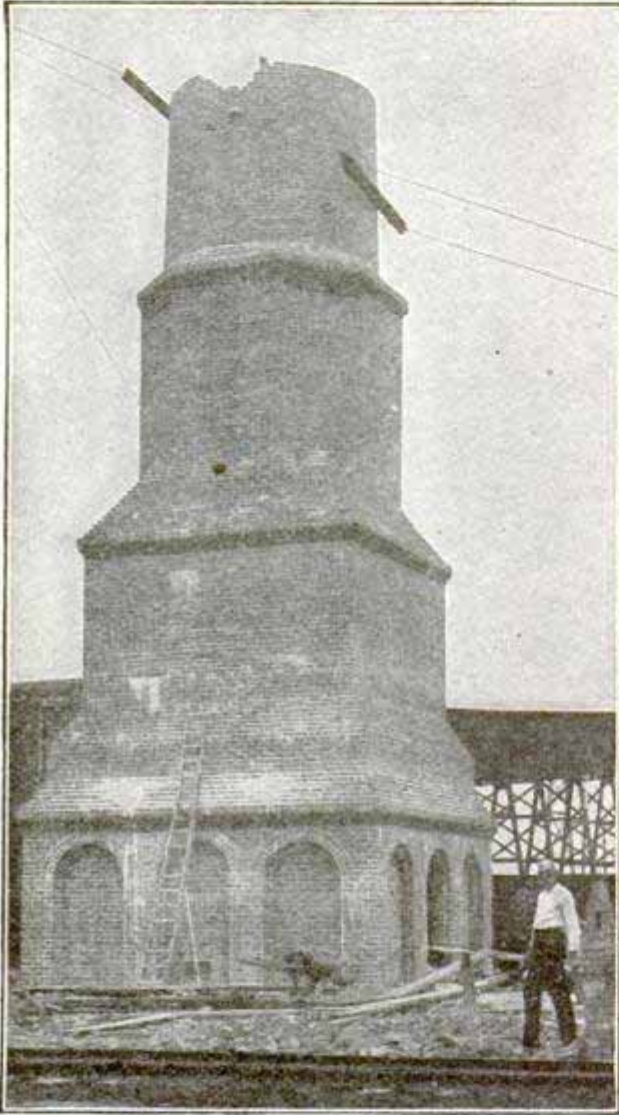


Rabbit Hurlled into Tree by the Explosion—Remains of the Nitro-Glycerine Plant

ample of the danger of living too close to such a concern. The rabbit was hurled 300 ft.

STACK ENDS BUILDER'S LIFE

This great brick smokestack at Galveston, Tex., but a little more than one-



This Stack Caused the Death of Its 80-Year-Old Builder third completed, ended the life of William Lucas, the man who built it, brick upon brick, a master stack-builder 80 years old. Lucas, who is shown standing beside the stack in the illustration, was given the contract, although his bid was higher than others, because similar stacks constructed by him had withstood the hurricane of 1900. He laid the foundation himself and raised it to a height of 65 ft. when one of the iron supports gave way and dropped him to the ground. The completion of the stack was to have been his last work, but he died 24 hours after the accident.

TO CONTROL WAR FLEETS FROM WASHINGTON BY WIRELESS

With the idea of making it possible to direct and control the fighting fleets in the Atlantic from Washington in time of war, the bureau of equipment of the U. S. navy proposes to establish in the capital city a wireless station that will be capable of sending messages 3,000 miles.

Such a station, to be effective, must be able not only to send messages 3,000 miles, but to do so under all conditions of atmosphere, night or day. Also the instruments used must be such that the messages sent through them cannot be intercepted, and therefore must be made exclusively for the use of the government.

Wireless messages have been sent much farther than 3,000 miles, but only occasionally and by accident, through unusual atmospheric conditions. Many of the stations which have sent or received messages long distances can be relied on only to send messages under ordinary conditions a distance of several hundred miles.

U. S. SCOUT CRUISERS' SPEED AND FUEL TESTS

In the 24-hr. full speed test of the United States scout cruisers "Chester," "Salem," and "Birmingham," the first named finished the race 20 miles ahead of her nearest rival, the "Salem." The "Birmingham" dropped out of the race after a run of 12 hr. because of a breakdown in her engine room. Over this breakdown there has been considerable controversy, owing to the fact that it was claimed a bolt was found in the machinery that had no place in any part of the engine.

The "Chester" averaged nearly 29 miles an hour for the 24 hr., as against the best speed of the "Salem," which was nearly 28 miles. During the race, the "Chester" developed 26,000 hp. and burned approximately 415 tons of coal, and the "Salem" 20,000 hp., consuming 430 tons.

FRENCH DEVICE DIMINISHES TIRE PUNCTURES

Road authorities are interested in a novel machine now being tested out on race courses in France. The machine is a two-wheel vehicle with electro magnets suspended close to the ground from the axle, which picks up nails and small bits of metal sometimes so costly to owners of racing stock. They look to a general use of the device on American automobile thoroughfares in this country to diminish the number of tire punctures.

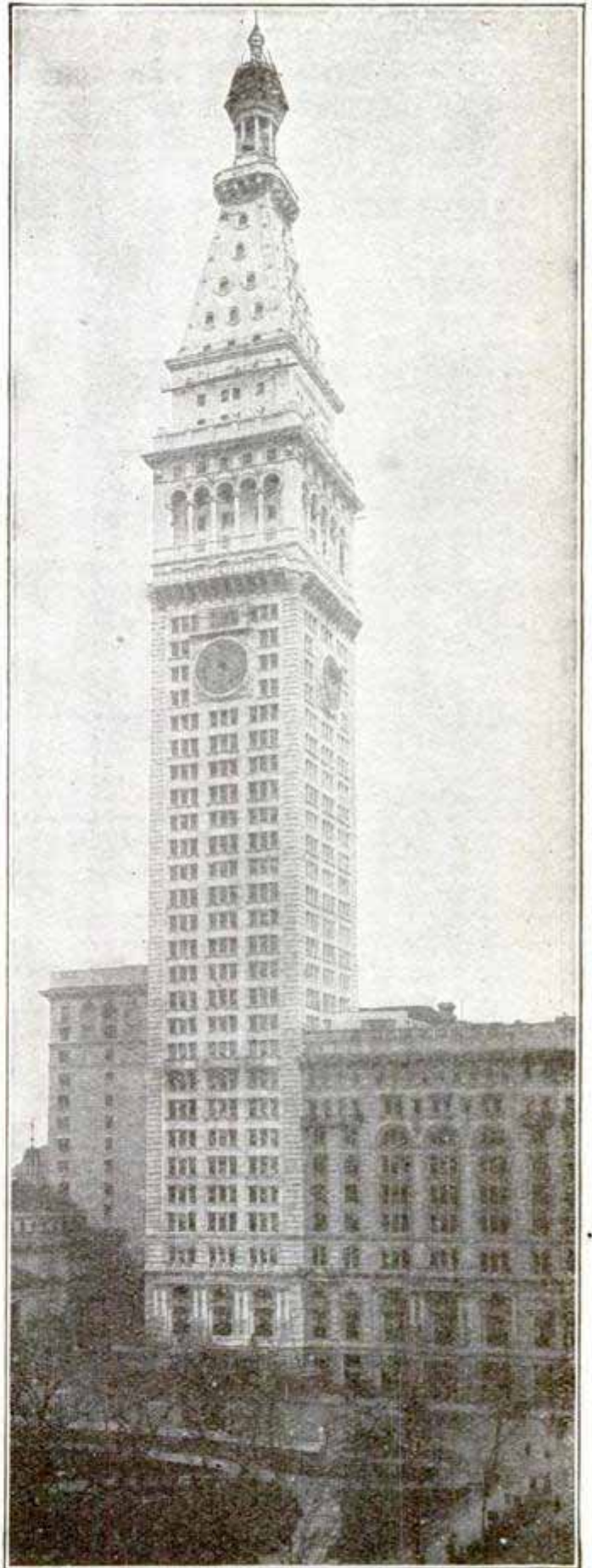
THE GREAT METROPOLITAN TOWER

This remarkable tower makes the Metropolitan Life building of New York the tallest building in the world. The outside construction work is now completed. The tower, 75 by 85 ft. in dimensions, reaches a height of 683 ft. above the street level. From the third sub-basement of the building to the top is 740 ft. of continuous perpendicular steel work. The tower is used for offices. Frequently that portion of the building above the clock is entirely hidden from view to spectators on the street when a bank of high fog rolls across the city.

WORK OF PILOTS ON SUEZ CANAL

The qualifications of a Suez canal pilot are above those required of most men in the mechanical field. He must at least speak two languages, French and English, and the work requires a certain delicacy and constant strain uncalled for in the average vocation of man.

There are about 120 pilots on the canal and they receive an average of \$3,000 per year for their services. A pilot receives \$10 for a night's work. His time of work is regulated by the government. Each pilot takes four or five ships through a part of the canal a week and is required to take several hours' rest after guiding a ship through



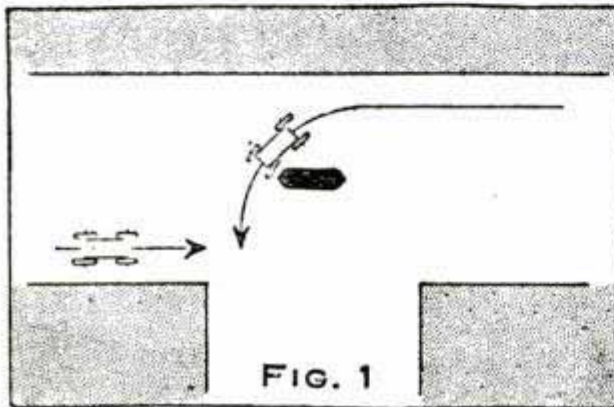
Copyrighted, 1909, by Underwood & Underwood, New York
The Tallest Building in the World

his district. On the canal proper there are about 80 pilots; twenty of these live at Port Said, 40 at Ismailia, and the other 20 at Suez, thus dividing the

canal into three districts. Those at Suez and Port Said are engaged in taking the ships out of the port and bringing them in. Those at Ismailia engage in the navigation of the canal proper.

RULES OF THE ROAD FOR AUTO DRIVERS

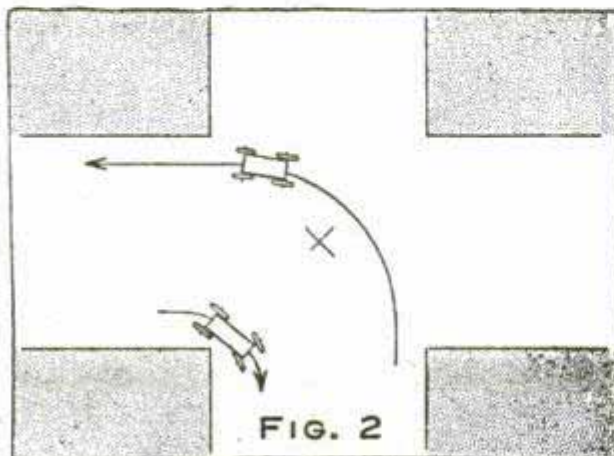
In operating an automobile in a city there are certain fixed rules of the road that must be observed and a few others that should be, if the driver of a car wishes to avoid trouble. First on the list is the rule regarding keeping to the



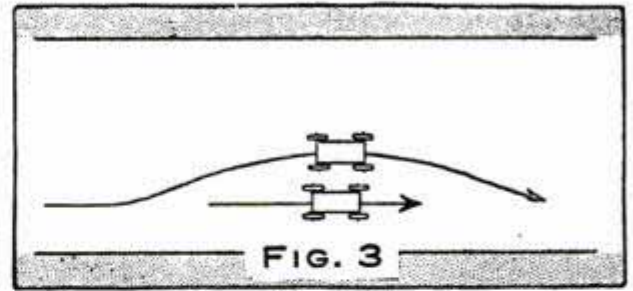
Turning Pedestrian Refuges

right. Nearly every automobile owner, whether he be a novice or an experienced driver, knows this rule and generally keeps it, but there are other rules, mostly unwritten, that are just as important and very seldom conformed to. Several of these are illustrated in the drawings, which were published originally in Motor Age and should be carefully studied by expert and novice alike.

At the intersections of boulevards in Chicago are small, narrow obstructions of concrete designated as pedestrian refuges. These rise about $1\frac{1}{2}$

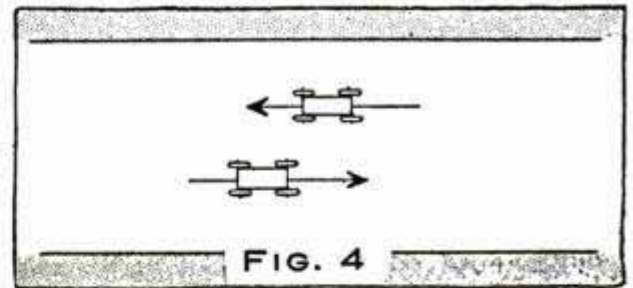


Proper Way to Turn Corners



How to Pass Vehicles

ft. above the pavement and are about 3 ft. wide by 6 ft. long. There is one located at each boulevard intersection, and pedestrians, confused by the rush of automobiles, can step upon them and know that they are protected from being run down. Confusion to automobiles is sometimes caused, however, in swinging around these refuges in turning from one boulevard into the other. Therefore, drivers should use signals, a wave of the hand to the right asking the driver of a car coming from the other direction to pause, while a wave to the left gives the other driver the right of way. Figure 1 shows the refuge in the center and how it should be rounded. Such refuges are now being placed on the pavements of many cities.



When Meeting Vehicles

In turning ordinary corners the rule illustrated in Fig. 2 should be obeyed. A vehicle turning to the left from the right hand side should pass the center of the street intersection before making a turn. If the driver is making a right-hand turn, he should hug the curb as closely as possible in rounding the corner.

Figure 3 illustrates the proper manner of passing another vehicle going in the same direction. Never pass to the right. If you do it is upon your own responsibility and you have no recourse in case of an accident caused by the other driver turning in to the curb. Always go to the left and be sure you

are well ahead before attempting to swing back into line again.

When two cars meet, as shown in Fig. 4, the safest way for each driver is to keep well to the right of the crown of the road, in this way avoiding the possibility of a collision.

In desiring to turn around in a street, it is always well to reach a corner before making the attempt, as illustrated in Fig. 5. The turn should not be attempted until the farther corner has been reached, then a wide swing should be made, caution being observed to avoid other vehicles going in both directions.

One of the rules of the road which should be enforced by police departments and which applies to vehicles of all kinds and descriptions is that which calls for slow-moving vehicles keeping as near to the curb as possible, leaving the left side of the right-hand side of the street for faster vehicles. How this would work out is illustrated by Fig. 6.

Always obey the rule shown in Fig.

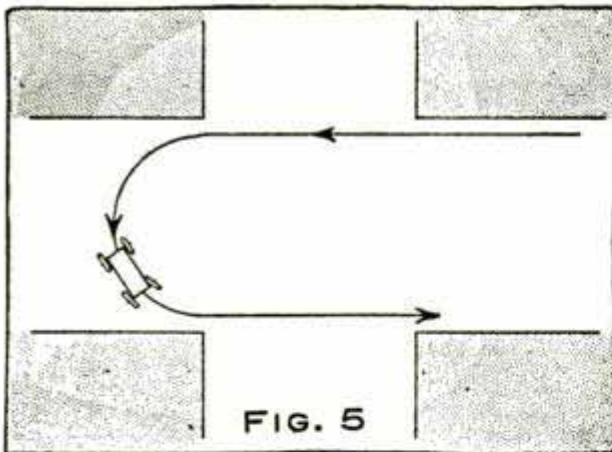


FIG. 5 Making a Turn in a Street

7 when stopping beside a curbing. The rules of the road demand that vehicles of all kinds stop with the right wheels next to the curb, but this is not generally observed. An automobile should always be standing in such position that when it is started it goes in the direction other vehicles are taking on the same side of the street.

The illustration designated as Fig. 8, is an example of the manner in which traffic should be controlled where a number of streets run into a circle. No vehicle entering such a circle should be allowed to turn to the left, even if it

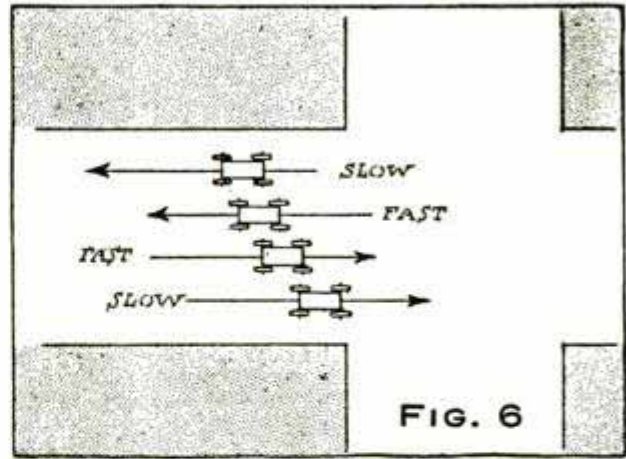


FIG. 6 Slow Moving Vehicles and Fast

is going to swing into the next street, but be compelled to go around the circle to the right until the desired street is reached.

Boston recently adopted a set of road rules that should be enforced by every city in the country. Several of these rules are the same as have been

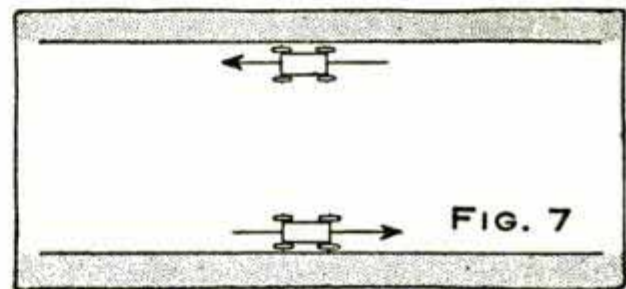


FIG. 7 Proper Stop at the Curb

mentioned in connection with the illustrations, but in addition are the following:

On a highway divided longitudinally by a parkway, viaduct, walk, sunken way or subway structure, vehicles shall keep to the right of such division.

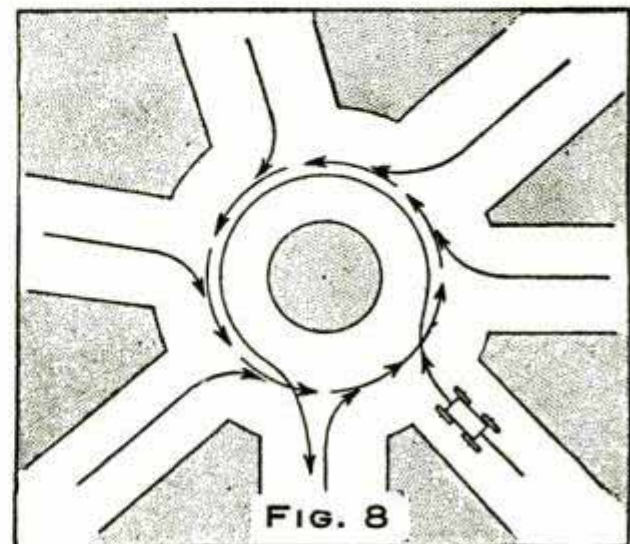


FIG. 8 All Vehicles Turn to the Right

No person having charge of a vehicle shall allow same to come within 10 ft. of any vehicle in front of him when approaching and passing over a crossing where a pedestrian is about to pass.

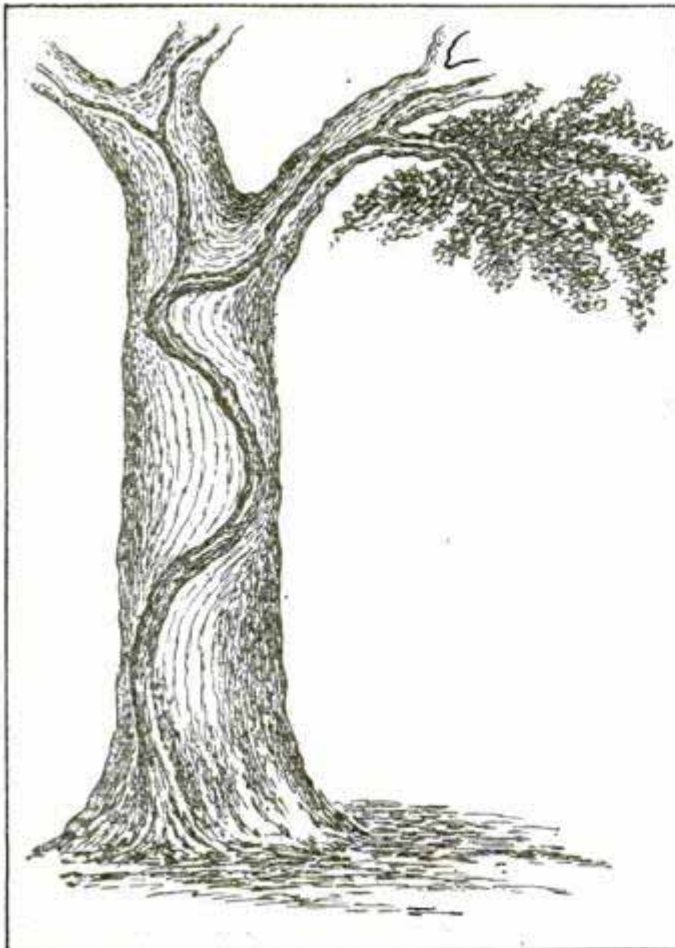
Every driver of a vehicle shall, in slowing up or stopping, give a signal to those behind by raising a whip or hand vertically.

In turning while in motion, or in starting to turn from a standstill, a signal shall be given by raising a whip or hand, indicating the direction in which the turn is to be made.

IRREGULAR GROWTH MAKES BEAUTIFUL WOODS

Beauty in dressed woods is from two causes which can be found by a study of the growth of trees. The inherent cause is the grain, or the silver lines which radiate from the pith to the tree's circumference and separate each season's growth. The foreign cause is the result of irregular growth.

During the growing life of a tree there are many chances of accident that may divert a cylindrical growth or



Such Growth Makes Finely Figured Woods

cause a variation in fiber that becomes accentuated as the tree attains its growth. When one side of a tree receives the stress of the weather and the other is sheltered, it gives the tree a spiral growth, or a twist, as in the accompanying illustration. Each year this growth becomes more pronounced. The breaking of limbs and embrasures cause odd growths. An early warm spell will cause the sap to ascend and a cold snap will set in and check the flow of moisture before it reaches the full length of the trunk. This causes an enlarged butt and irregular fiber. These irregular growths produce the most beautiful dressed lumber.

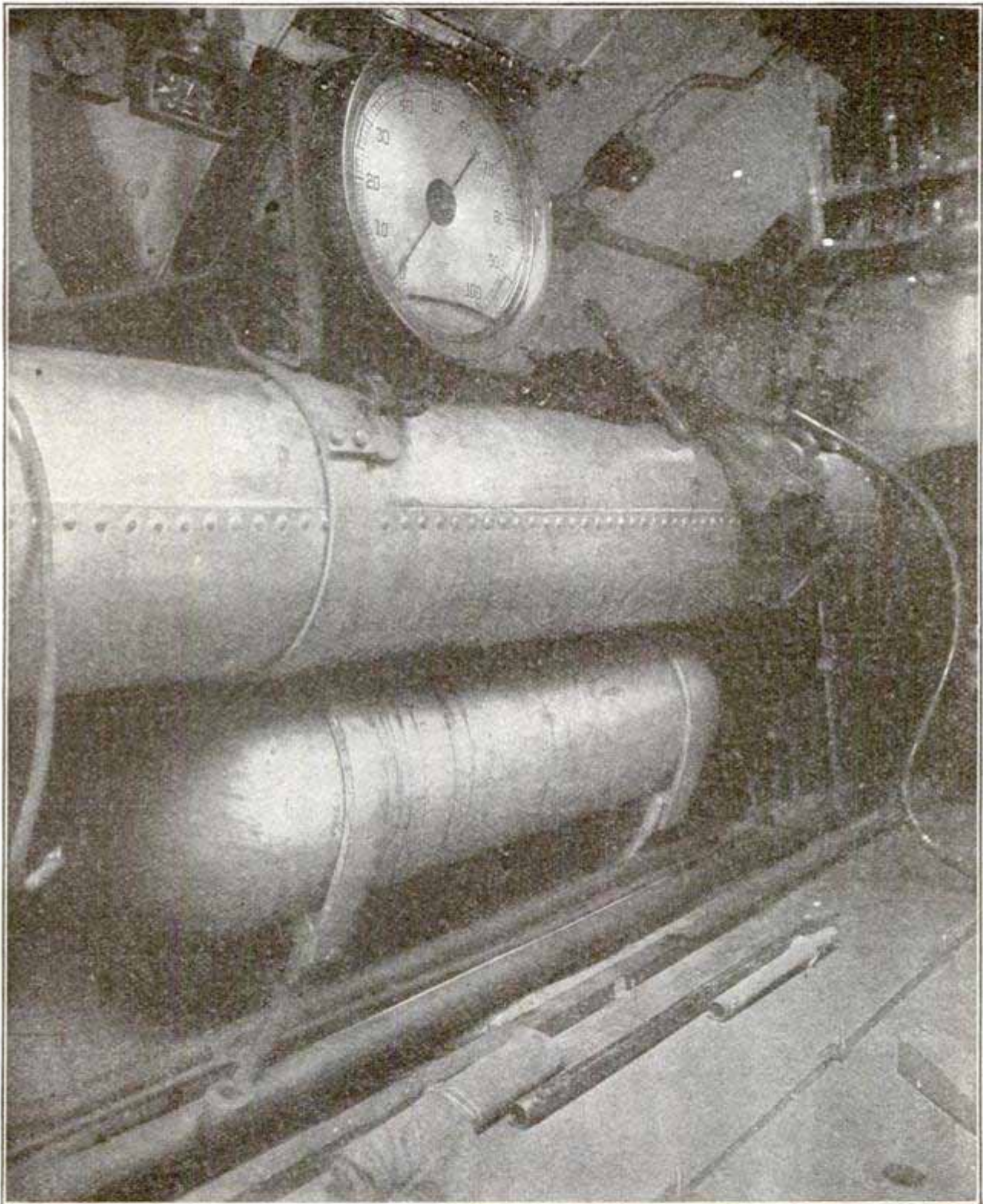
A CLAIMED CURE FOR CONSUMPTION

A prominent figure in London publishing circles believes he has found a cheap and positive cure for tuberculosis by a treatment that is extremely simple. A poultice, the exact prescription of which has not been given out yet, but containing acite and chloride, is placed on the body of the patient as near as possible to the organ or membrane that is affected. In about a week an ulcer is formed, connected by what is called a ray of inflammation with the diseased organ. This forms a kind of duct through which the muco pus is drawn out of the system. The ulcer must be carefully dressed each day with a special salve.

It is understood that consumption hospital authorities in London are gravely considering whether to submit one of their patients to the new treatment, but before the discovery is officially recognized a final test on a large scale is to be made. Among the cases which the remedy is claimed to have cured is that of a 17-year-old boy, who was afflicted with an advanced case, the lungs and glands of the throat being affected.

Wilbur Wright's first airship is about to be placed in a Paris museum alongside of Alder's "Avion," the first machine in Europe to rise above the ground.

INTERIOR VIEW OF A SUBMARINE



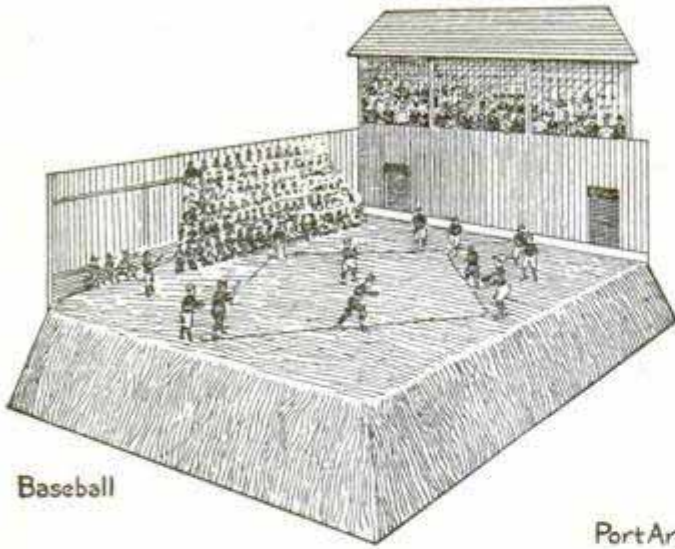
Important Mechanisms of a Submarine

This photograph is a mid-ship view of a U. S. submarine, resembling more the interior of some shop than that of the interior of a ship. The dial is the mechanism that shows the depth to which the vessel has sunk. The two cylinders compose the main ballast tank. They are the first filled when about to dive, and the first to be

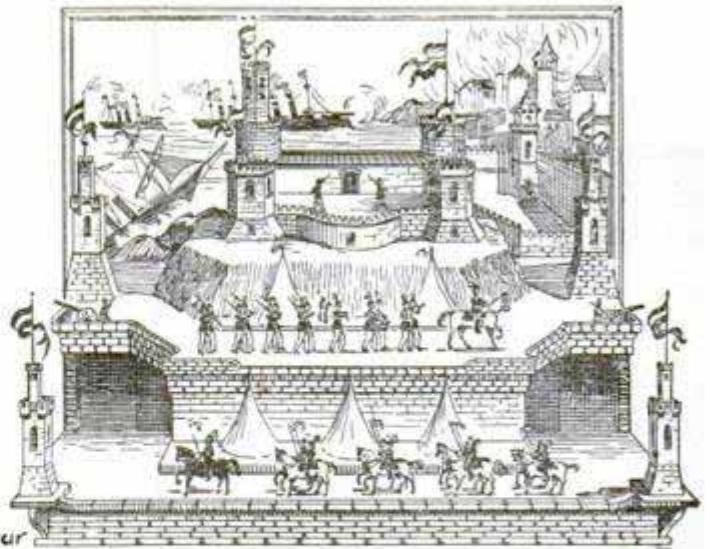
“blown” when ready to rise to the surface again. _____

There are now more than 1,000 automobiles in use in the capital of Mexico. _____

Soaking wheat in wood alcohol and spreading it on the roof of a building will effectually rid the place of birds.



Baseball



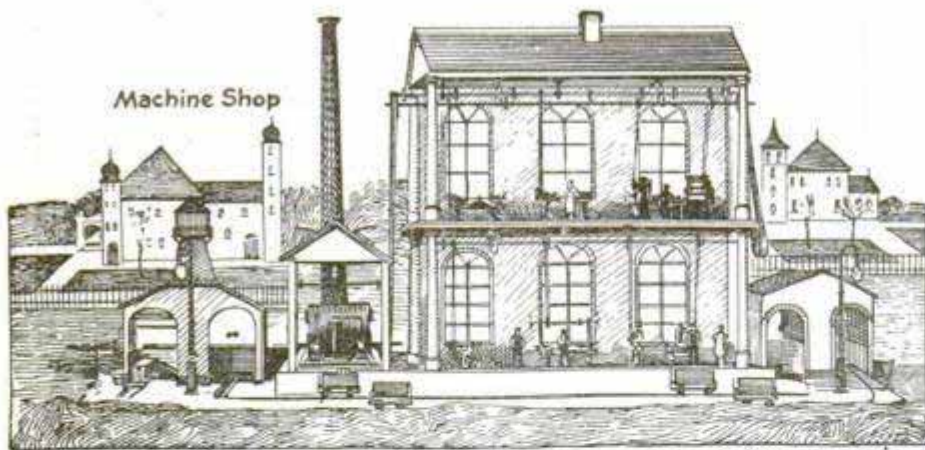
Port Arthur



Christmas Market



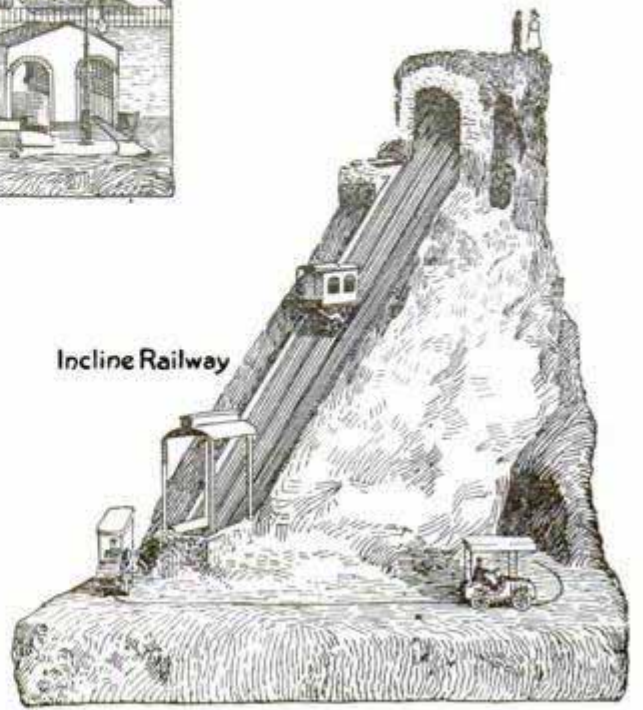
Acrobat



Machine Shop



Hunting Scene



Incline Railway

MECHANICAL WINDOW ATTRactions

Moving-figure and scenic displays for store windows are attractions that never fail to draw the attention of the people passing along the street, that is, while the attraction is new. For this reason, it is a losing policy to buy an expensive mechanical attraction outright, unless the store is located where the passing throng continually changes, such as the central business districts of metropolitan communities.

The rental of window attractions for such short periods as two weeks or a month is possible through concerns which make a business of such rentals. The illustrations show a number of mechanical displays, ranging in rentals from \$10 for two weeks to \$300 for a month. The devices are perfect in construction, are easily operated and are true to the subjects they depict, being designed with artistic ability and rare skill. Nearly all are imported.

The baseball set is 3 ft. wide by 3 ft. long. The pitcher turns his head to watch the runners on the bases, then throws the ball, and the players run from base to base.

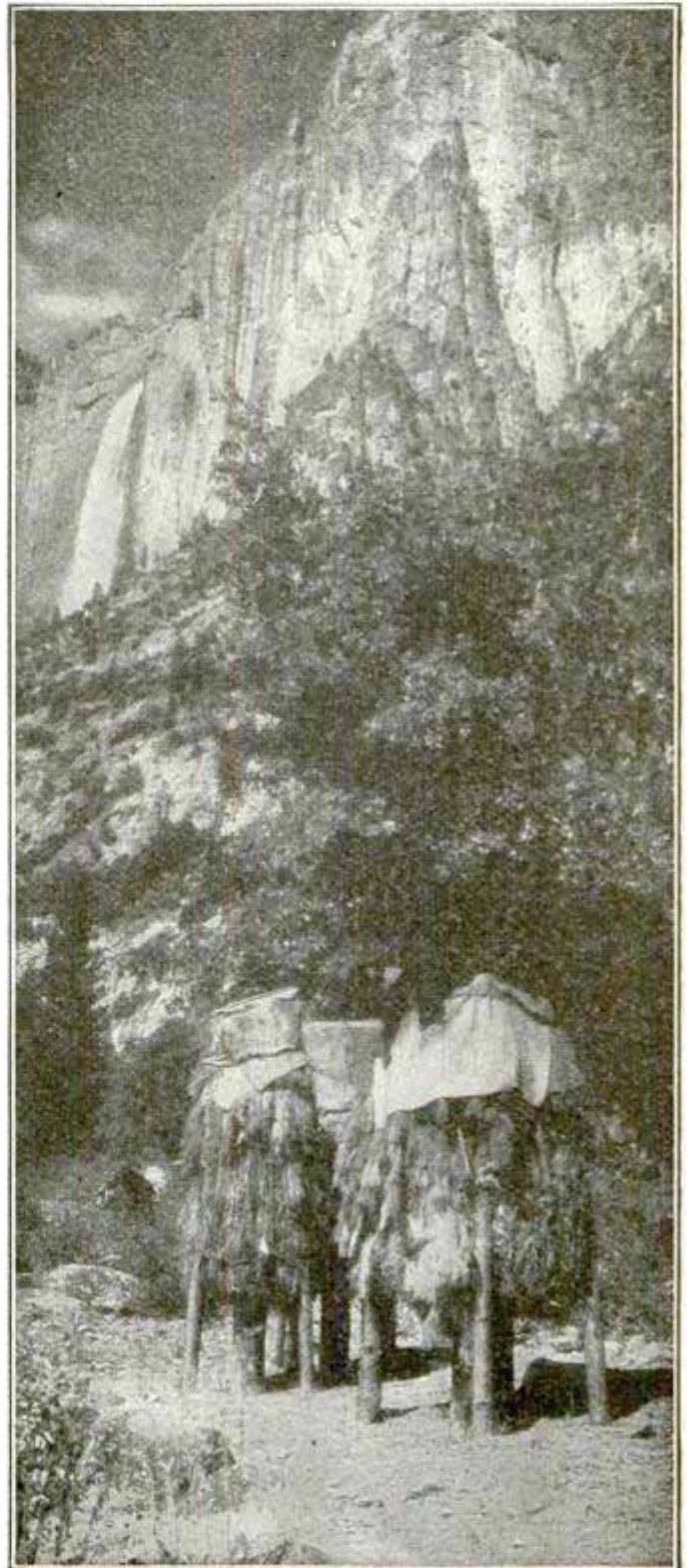
The Port Arthur set is 5 ft. long by 4 ft. wide. Soldiers parade on upper platform, cavalry march under tunnels, and sentries pass and repass on the castle walls. The Christmas market set shows sleighs, wagons and people parading through a city in which are tradesmen selling wares for Christmas. The Christmas tree in the center loaded with presents (and lighted at night) revolves. The acrobat, which is one of the cheaper sets, performs with the chair, moving his head from side to side and waving a wand.

The incline railway is a set 6 ft. long by 7 ft. wide, cars running up and down and autos moving around. In the machine shop set, 10 ft. long by 4 ft. wide, 22 small machines and engines are seen working, dolls representing workmen. Cars move around the platform. The hunting scene is one of the most expensive in rental. Hunters on horseback, and dogs and rabbits scurry around, at times being behind the rocks, then com-

ing to the front again. The mountain has cottages, watermill and factory.

NOVEL STOREHOUSE OF YOSEMITE INDIANS

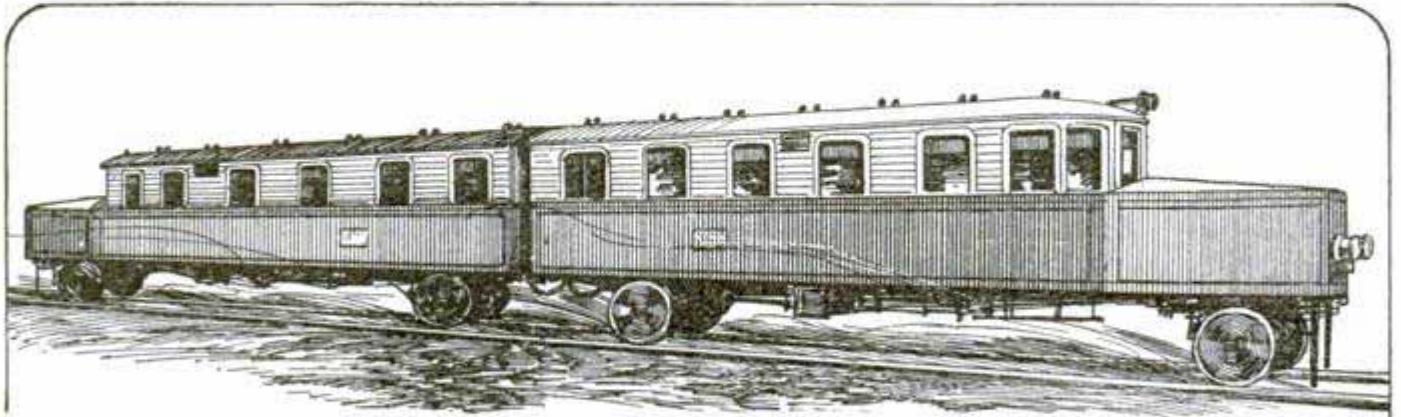
In the Yosemite Valley, California, the native Indians store their summer hoardings of pine nuts and acorns in this novel cache. It is protected from dampness by being raised from the ground and the rain easily runs off from its well thatched sides.



Storing Pine Nuts and Acorns

DOUBLE ELECTRIC CARS OF SELF-CONTAINED TYPE

The Prussian railway authorities have ordered 57 double electric cars of the self-contained type shown in this



Two-Section Self-Contained Motor Car

illustration, for use in those sections of the country where the passenger service is too light to pay for the operation of regular trains drawn by steam locomotives.

The double coaches are composed of two nearly identical sections, coupled closely together. It was found impracticable to build single cars, as in order to have the desired seating capacity they would have to be constructed of such length as to render them unsuitable for use on tracks having anything more than moderate curves.

Tanks at each end of the double cars contain the accumulator batteries and, being entirely isolated from the passenger compartments, the travelers will not be annoyed by the acid fumes. The batteries are composed of 168 cells, half of which are located in each tank. The electric equipment consists of two 80-hp. motors, and the batteries are 310 volts with a capacity of 368 ampere-hours.

The double cars weigh about 60 tons, will carry about 100 passengers, and attain a speed of 36 miles an hour. They will run 65 miles upon one charge, and as only half of the batteries need be used if necessity demands, traffic will not be interrupted should one half get out of order. Air and electrical brakes are both provided, and should one section break away from the other the rupture will cause air brakes to be automatically applied on both.

WORLD COMMERCE BREAKS RECORD

A record for the international commerce of the world was established in 1907, according to the statistical ab-

stract of the United States. The total exports of the various countries and colonies for that year is placed at \$14,000,000,000, and the imports at \$16,000,000,000. Of this grand total, the United States is accredited with 14.4 per cent of the imports and with 9.2 per cent of the exports. Ten countries contributed more than two-thirds of the total.

CONCRETE GARBAGE CANS RESEMBLE TREE STUMPS

The new garbage cans distributed through Central Park in New York are constructed of concrete, and made to



appear like a tree stump or section of a tree trunk. The opening into which the rubbish is thrust is on one side near the top. The idea of such garbage cans is the same as that which caused a Frenchman of artistic temperament to

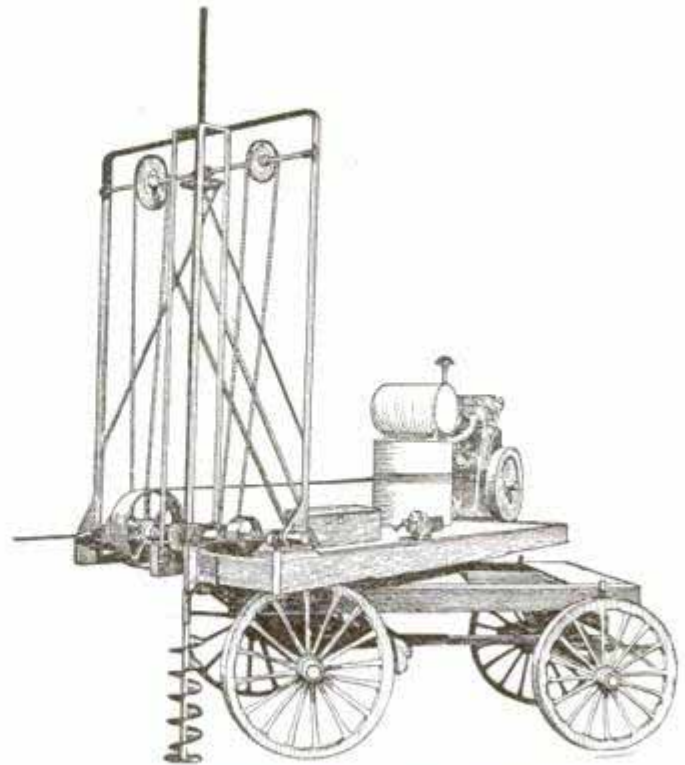
have the concrete chimney of a private electric plant on his beautiful estate disguised as a tall tree trunk. Such cans do not mar the natural beauty of a park as do the ordinary galvanized tin garbage cans.

MACHINE BORES POST HOLES

The interesting post-hole boring outfit shown in this illustration will make a hole uniform in size at top and bottom and of any depth to 6 ft. It consists of a boring machine, mounted on a truck in such a way that it can be worked at either side or back of the truck. The holes are made by a large auger, or chisel bit, operated by a gear working in a toothed shaft, which furnishes the means for raising or lowering it. The power is applied by two friction clutches, which permits this raising or lowering of the auger without reversing its motion.

The engine and gasoline tank are placed on the front part of the machine, in this way providing sufficient weight to balance the other end, and the power is transmitted from the engine to the drive pulley by means of a belt. The machine will dig holes in any kind of soil onto which the truck can be driven, cutting readily through hardpan, shale and soft sandstone. Two men are required to operate it.

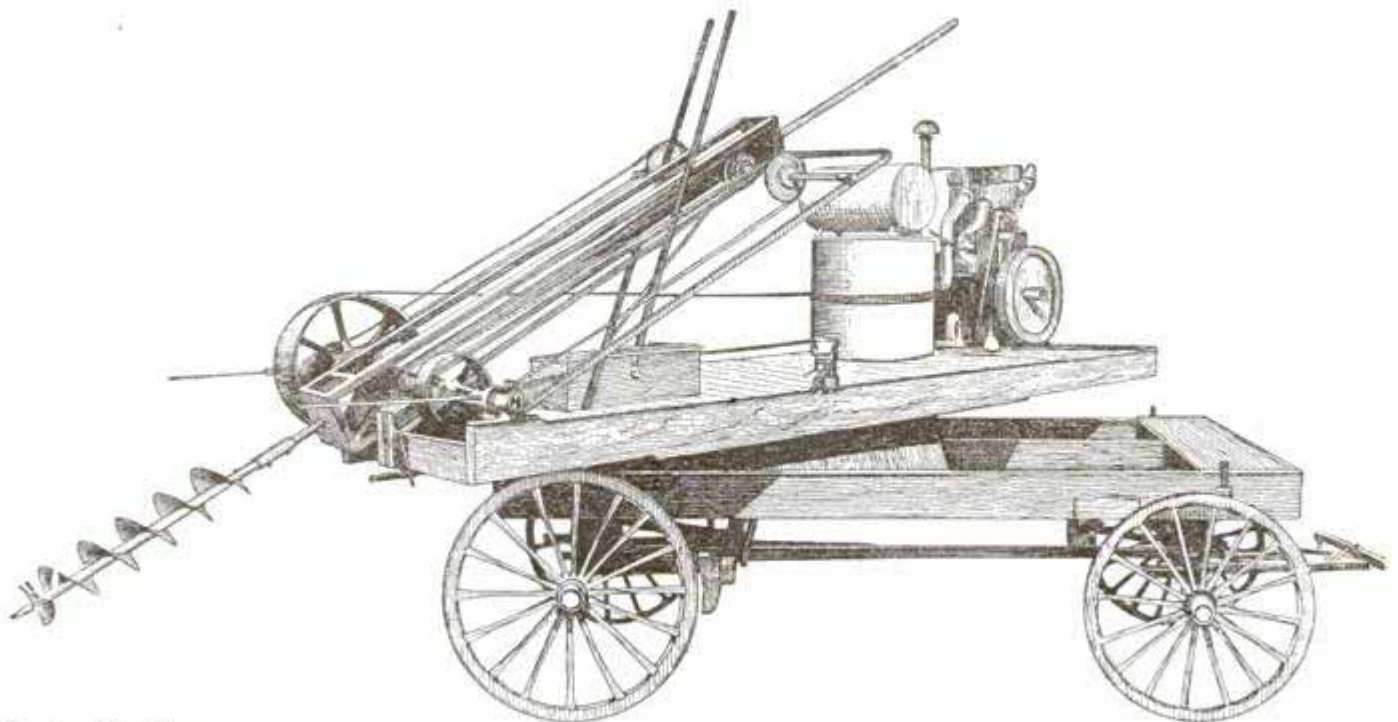
The machine illustrated is provided with a 10-hp. engine and weighs about 2,500 lb. A smaller size, driven by a $7\frac{1}{2}$ -hp. engine, is also on the market. Two men and one machine will accomplish the work of a gang of a dozen men, without the usual amount of back-

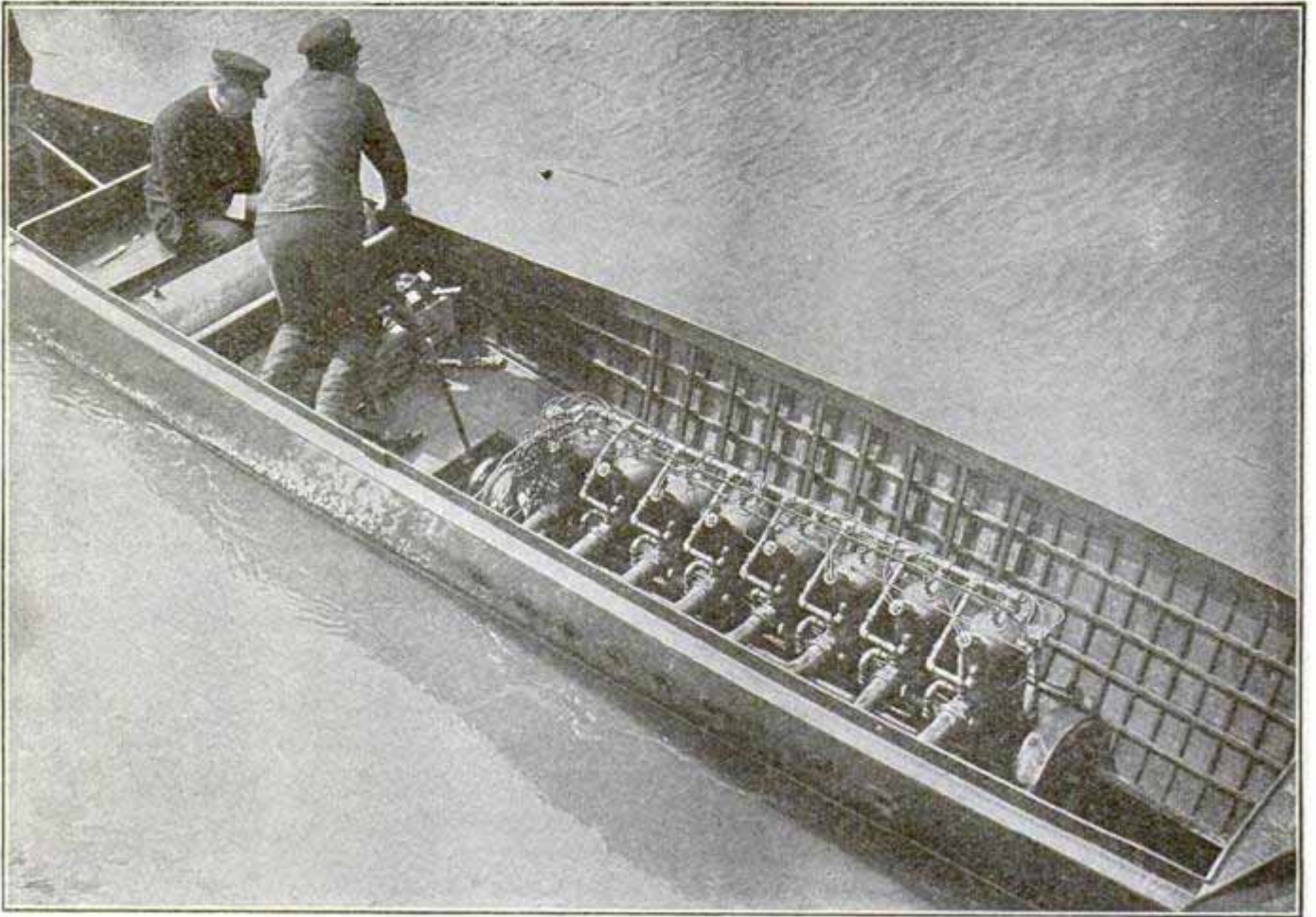


Makes a Hole Uniform in Size

breaking labor. The holes can be bored at any angle desired. The illustrations show the machine in two positions. One shows its position when not in operation, and the other shows it in position for boring.

Denatured alcohol has been successfully manufactured from flax straw at the North Dakota Agricultural College. The yield of 35 gal. per ton does not make it a paying proposition.





The "Bre'r Fox II" and Its 8-Cylinder Gas Engine: Note Side Exhaust—Reproduction of Photograph Taken When Boat Was at Full Speed

MOTORBOAT AVERAGES 27.3 MILES PER HOUR FOR 1,554 MILES

A record run of 1,554 miles by a motorboat traveling at the rate of 27.3 miles per hour throughout the distance has just been accomplished by the "Br'er Fox II" which left Cincinnati recently to make the long-distance speed-test run to New Orleans, carrying a message from the Governor of Ohio to the Governor of Louisiana. Faster time has been made by racing motorboats over a short course, but the 1,554-mile run breaks all records for speed maintained throughout long-distance races.

The boat holding the new record derived its motive power from an 8-cylinder gas engine, cylinders bored 5 by 5, and capable of developing 80 hp. The craft carrying the engine is built of $\frac{1}{4}$ -in. material and measures 40 ft. long by 4 ft. 3 in. beam, of the rib and carvel construction, and is bulkheaded in three compartments. The engine consumes 10 gal. of gasoline per hour and enough of the fluid is carried to run her 8 hours without a stop. This continuous running is made possible by a unique

water-cooling device for the engine which keeps the mechanism cool enough at all times to allow the hand to be held anywhere upon it. The engine is set upon an aluminum base and complete weighs 900 lb. The hull weighs 650 lb. and affords enough room for four persons. Three people were in the boat upon the record run.

The illustrations show the speedy craft at full speed and a close view of her engine, a feature of which is the side exhaust, unlike other boats of her kind which carry the perpendicular pipes.

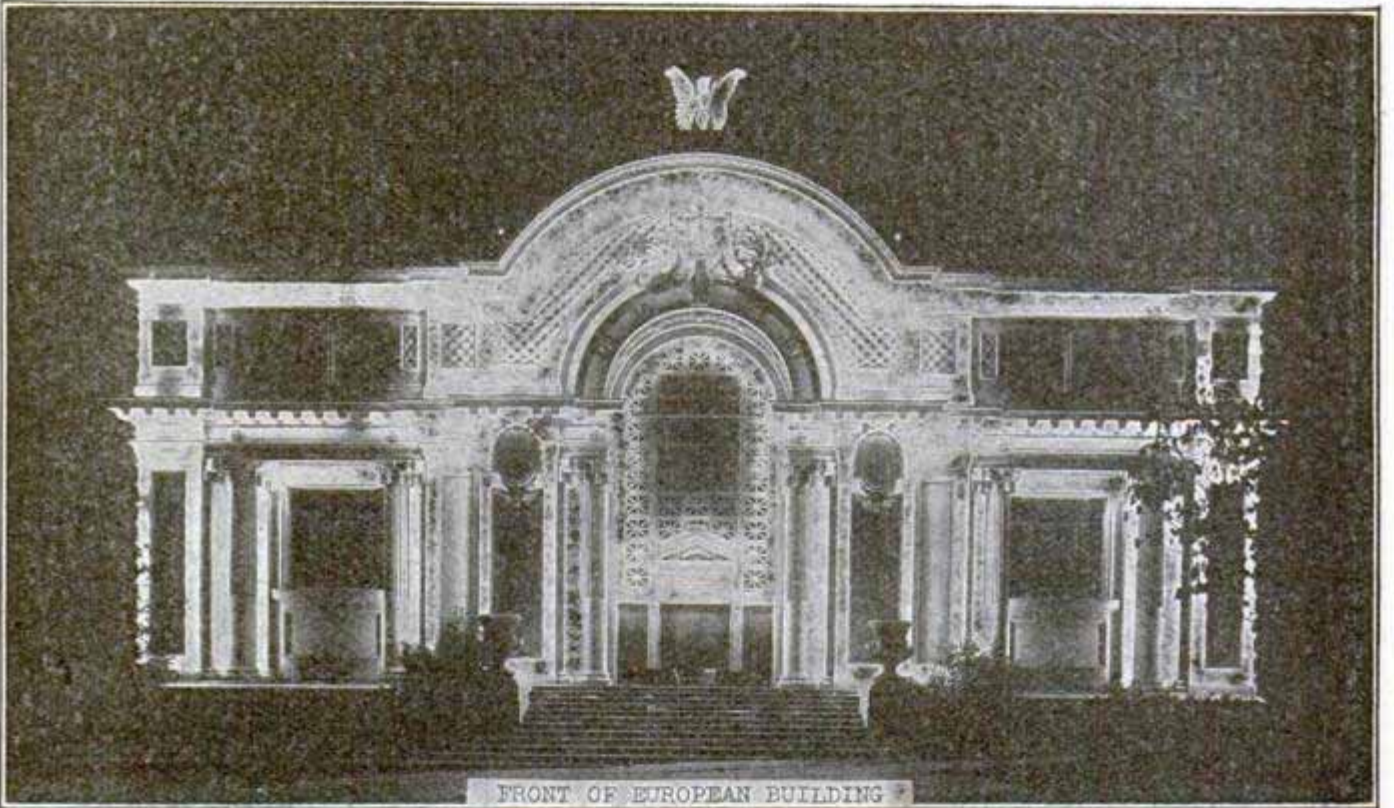
THE HUMAN BONEYARD OF HAVANA

The old Spanish custom of burial in Cuba is to rent a lot in a cemetery, not buy it outright, as is the procedure in America. When the rental is not paid, the body is removed, placed in quicklime to take off all the flesh, and the skeleton thrown into the enclosure shown in the illustration. As a result of many years of such a gruesome practice, the enclosure now contains thousands of these skeletons.

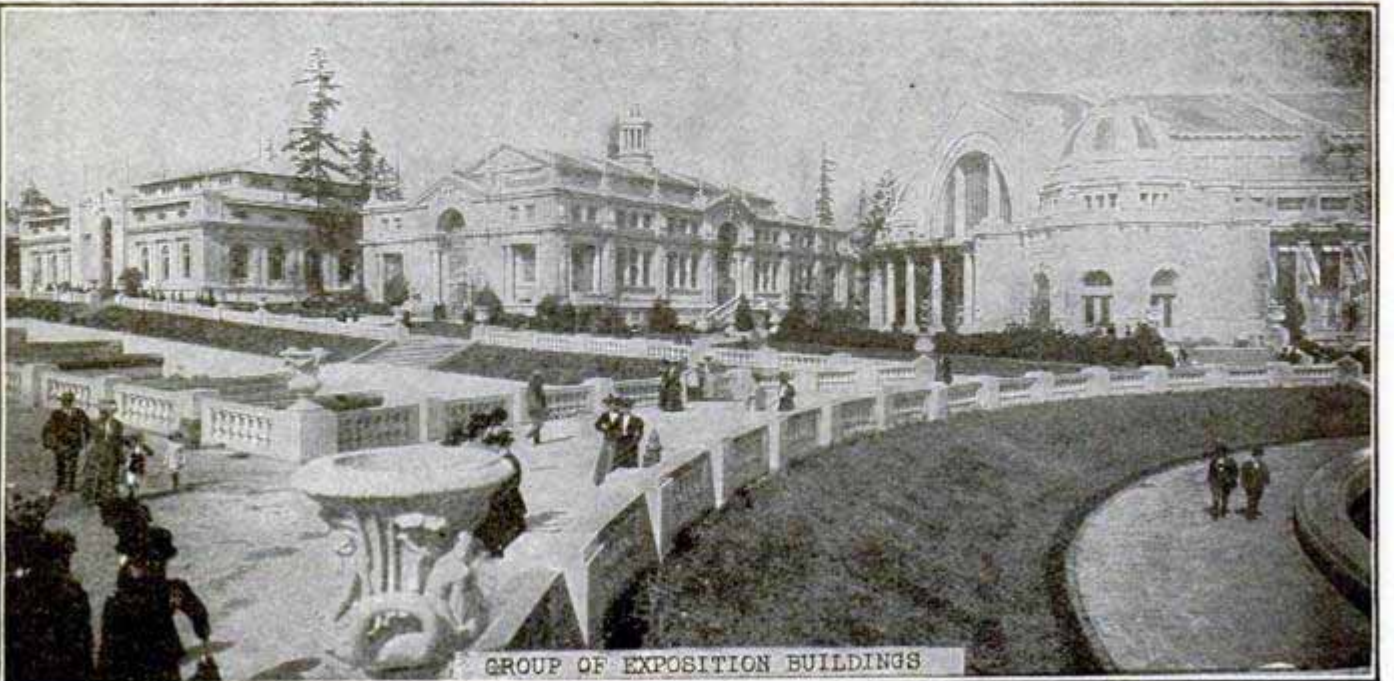


Inhuman Display of Human Bones

MACHINERY HALL IS ONE OF PERMANENT STRUCTURES FOR UNIVERSITY



FRONT OF EUROPEAN BUILDING



GROUP OF EXPOSITION BUILDINGS

THE GREAT EXPOSITION OF THE NORTHWEST

Alaska-Yukon-Pacific Exposition at Seattle Tells the Wonderful Story of the Greatness of the Northwest and Alaska in a Voice That Will Be Heard All Over the World—Buildings and Landscape Features Set Off by Mountain Peaks and Ranges of Surpassing Grandeur

By L. W. Thavis

Not long ago the greatest railroad man in the world, returning from a tour of the Northwest, declared that section of the United States was ripe for a railroad building campaign that would break all records. Forthwith his and other great systems began to build. With the extension of transportation lines came people in great tidal waves, with brains, money, skill and ambitions, to this new land of opportunity. What they have already accomplished, and the much greater possibilities of the immediate future are graphically told by the Alaska-Yukon-Pacific Exposition now being held in Seattle. No new land ever held out such attractions, nor as large and quick returns as does our Great Northwest today.

Alaska, once known only as the land of snow and gold and hardship, is found to offer along its coast lines homes for millions, with a climate most desirable and a soil of bountiful fertility. Railroads are being shot through heretofore impassable mountain barriers so that the wealth of copper, gold and other riches may be brought out. More and more steamships are faring back to Puget Sound laden with northern treasure, and the empire above 54-40 is daily winning to its opportunities thousands of men who would carve out homes.

It is of all this that the Exposition tells. The East has been told, but has ignored the warning, that the day is not far distant when the world's greatest trade will be trans-Pacific; when the way from the Pacific coast to Shanghai and Hong Kong will be as is to-day the way from New York to Liverpool and Havre.

The Northwest is fully alive to its immediate future and knows the big-ness of it. That the East may also wake

to it is its desire, and the Exposition is its alarm clock. It has exposed to view in Seattle what the United States has to offer that the Orient needs, or may need, and what the Orient has by way of trade. It has given the producers of both hemispheres an opportunity to "get together" to their mutual benefit. It is offering to exchange labor-saving American machinery for the things the less forward Oriental people make by hand.

As a spectacle, no exposition has excelled this display of the Northwest. The electrical features are wonderful. Architecturally, the buildings are of surpassing beauty and grace. There are scores of beautiful gardens and a mile or more of such amusement attractions as the "Midway" made famous. As an exposition, it is exhaustive. The huge Palace of Manufactures is an exhibit of the liberal arts complete within itself; Machinery Hall displays the inventive genius of the whole country; the Palace of Agriculture tells the story of the natural wealth of the western states and Canada. The Japanese buildings and village cover the largest display Japan has ever made on a foreign shore; China presents a whole street of Peking.

The United States government did not extend a dollar of direct financial assistance, but it did appropriate \$600,000 to fully exploit Alaska, the Philippines, Hawaii and the fisheries, constructing the largest group of buildings it has ever erected at any exposition.

From the standpoint of the lover of the beautiful, it has been surpassed by no World's Fair. The wonderful natural advantages that the surrounding country presents were taken into consideration by the building and landscape architects, the combination producing a result truly wonderful. The cascades and geyser basin form the center of the general decoration scheme. Surrounding both are sunken gardens that will be rich in bloom for the entire period of the Exposition. Beyond are the formal gardens and lawns, the vistas ending in groves of native evergreens. To the south, 80 miles away,

stands Mount Rainier, the highest in the United States, and so outlined against the clear sky of the Pacific coast as to seem much nearer. To the northwest are the Selkirk mountains, and to the west the snow-crested heads of the Olympics make a rugged outline against the sky. Mount Baker, another magnificent peak, is plainly visible from the grounds in a northeasterly direction. In the immediate foreground are Lakes Washington and Union, on the shores of which the Exposition is held.

tries as models for his central figures.

The main buildings of the Exposition are grouped around these central decorative features. They include the Agriculture, Manufactures, State Fisheries, Mines, Machinery, Fine Arts, Transportation, Foreign, Auditorium, Forestry, United States Government (which is a group of five buildings), Canada, Japan, Alaska, Hawaii, Philippines and Government Fisheries.

The educational value of the Exposition is great. As its name implies, it



Washington State Building—Will Revert to the University after the Exposition

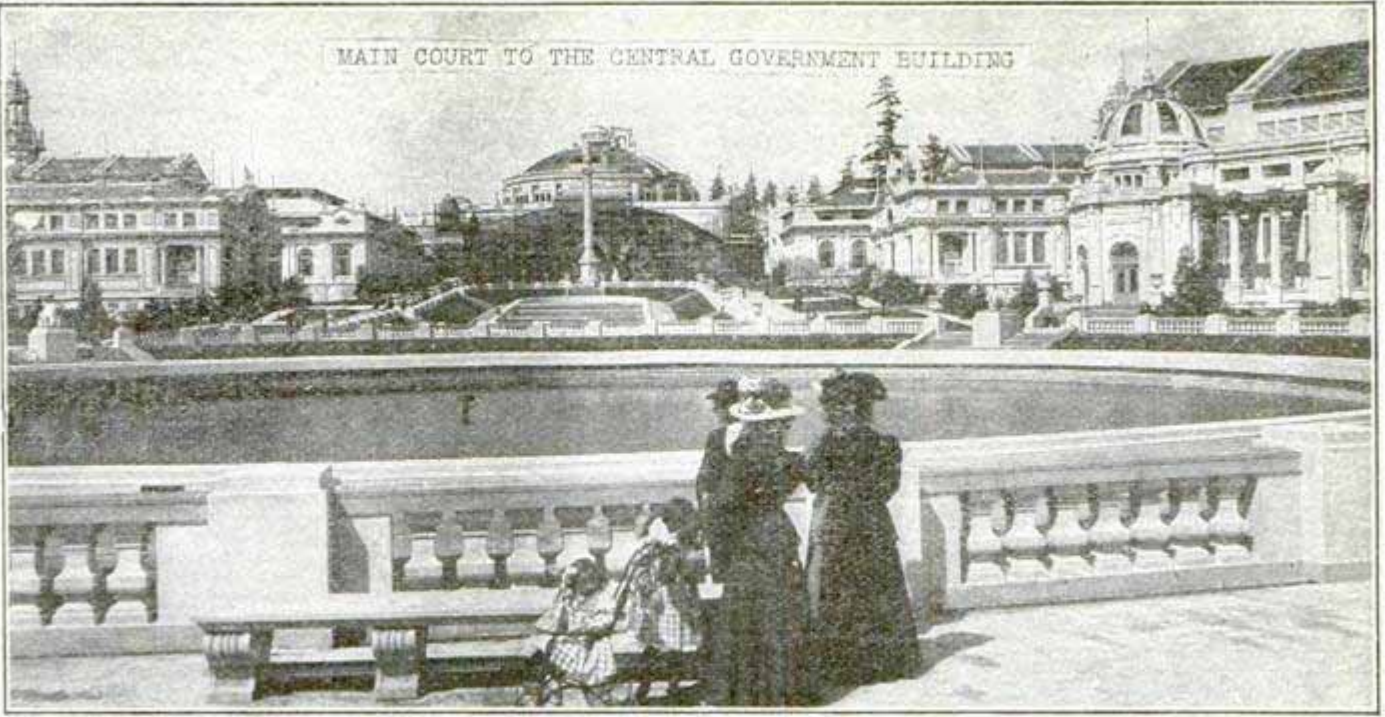
Over the narrow neck of land that divides the salt water from the fresh, Puget Sound comes in from the ocean, a great inland sea of itself that lies between two mountain ranges and brings the commerce of the world to Seattle's doors.

The Exposition monument stands in the plaza in front of the Federal buildings. It is entirely covered with gold from Alaska and the Yukon, and its splendor is one of the features. Seven thousand dollars worth of gold dust was used to gild the monument. At the head of Cascade Court stands a monument typifying the "Spirit of the Pacific," the sculptor having used the aboriginal races of the Pacific coast coun-

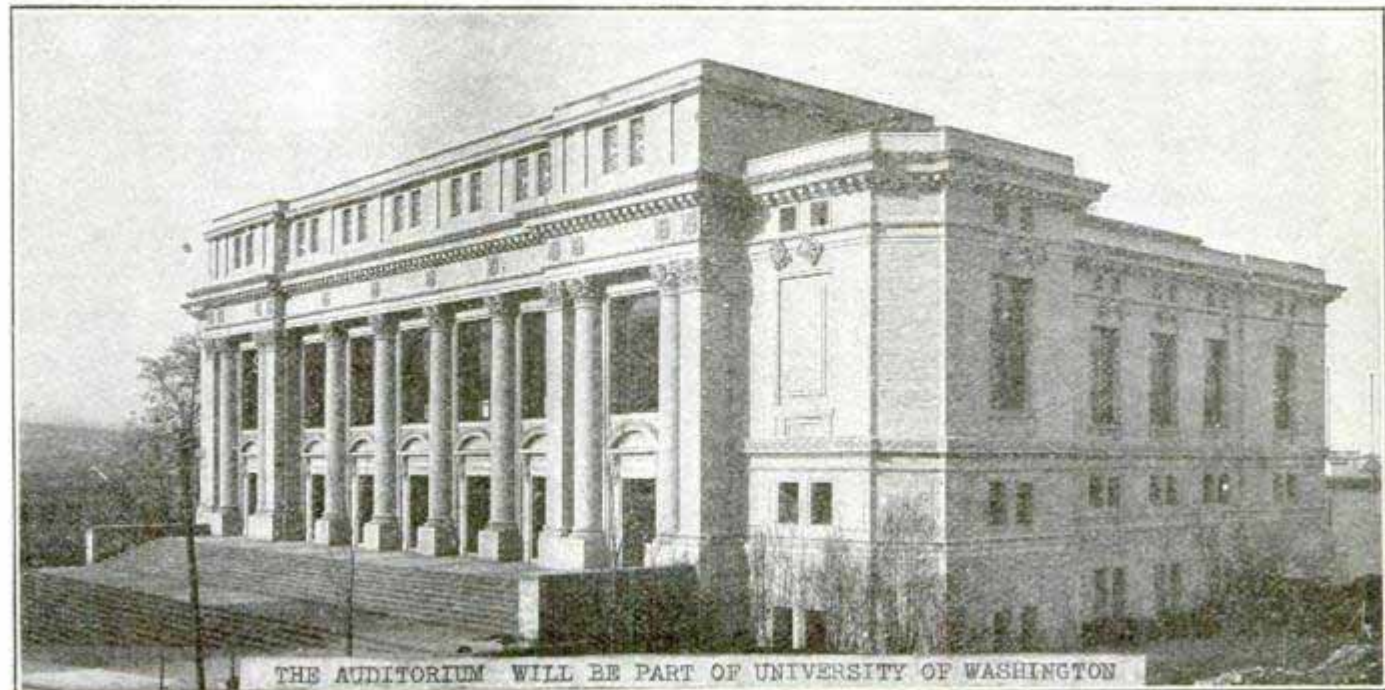
was designed to exploit resources of the United States and Canada that were acquired when these young countries stretched their spheres of influence and pushed their frontier lines to some of the few remaining virgin fields of trade and commerce. If the visitor to the Fair seeks information regarding Alaska he can find it by a few hours' study in the Alaska building. Every feature of that great north country is exploited, from working models of the mines that send out their millions in gold to the little flower that lifts its head to greet the midnight sun.

From that great part of Alaska that reaches from the tempered zones of the Pacific currents, to the ice fields that

MAIN COURT TO THE CENTRAL GOVERNMENT BUILDING



MANUFACTURES BUILDING LOOKING ACROSS CASCADE COURT



THE AUDITORIUM WILL BE PART OF UNIVERSITY OF WASHINGTON

lose themselves in the barren wastes of the top of the world, come men and material to tell the story of the land of gold.

The Alaska-Yukon-Pacific Exposition amuses as well as instructs. What the "Midway" was to Chicago, the "Pike" to St. Louis, and the "War Path" to Jamestown, the "Pay Streak" will be to Seattle.

The climatic conditions of Seattle are excellent. When the thermometer gets to about 80 in summer the people think it is hot, and when it drops to 30 in the winter a "cold spell" is talked about.

PENDULUM GYROSCOPE FOR AEROPLANES

The greatest problem of the aeroplane to-day is to find an absolutely



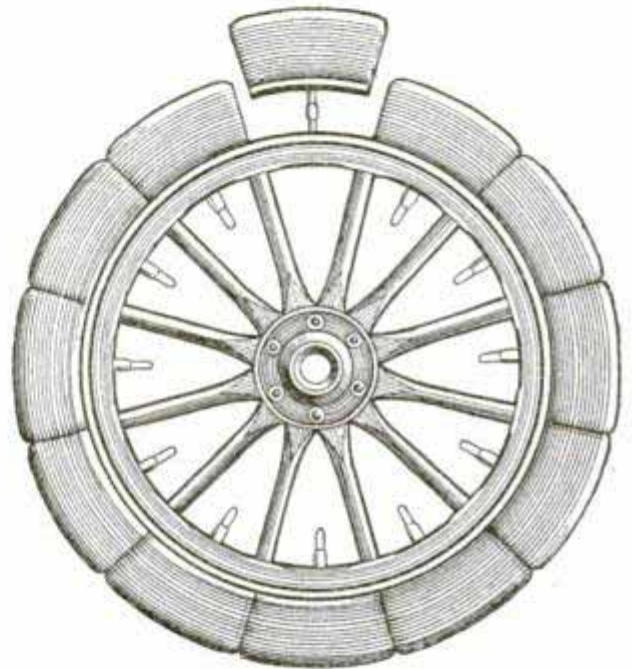
sure means of automatic balancing. Many attempts have been made to accomplish this end by pendulums, but these proved unsatisfactory because the many oscillations that occur before the pendulum gains a vertical position are a source of great danger. The gyroscope has also been considered, but the foremost experts insist that a small gyroscope will not have sufficient

power to attain the required result and that a large gyroscope would be impossible because of the weight. Therefore, a French inventor has combined the two in the manner shown in the illustration. He thoroughly believes that what neither could do alone can be accomplished by the two together, the small gyroscope exerting

its power to keep the pendulum in position, and the pendulum keeping the aeroplane in balance.

SECTIONAL AUTOMOBILE TIRE

A new automobile wheel which is drawing much attention abroad is shown in this illustration. The feature of the invention is the fact that the pneumatic tire is sectional, each section having its own valve and being blown up separately. Twelve sections make the complete tire, and should any one



Pneumatic Tire Made Up of 12 Sections

of them be punctured, it is only necessary to remove that one and put on a new one, several extra sections being carried.

PARIS HAS AN ANNUAL HAM FAIR

Paris, along with her exhibitions of art and culture, has a ham fair each year. The exhibits are arranged in a row of booths over a mile long. Of the 110 tons of sausage offered for sale, there were 9 tons of horse flesh and 17 tons of mule and donkey sausage. One salesman recently showed a row of hams of pig, horse, ass and mule flesh and offered morsels for the public to taste. The fair is not local, as the German, Italian, and Viennese merchants also make their exhibits.

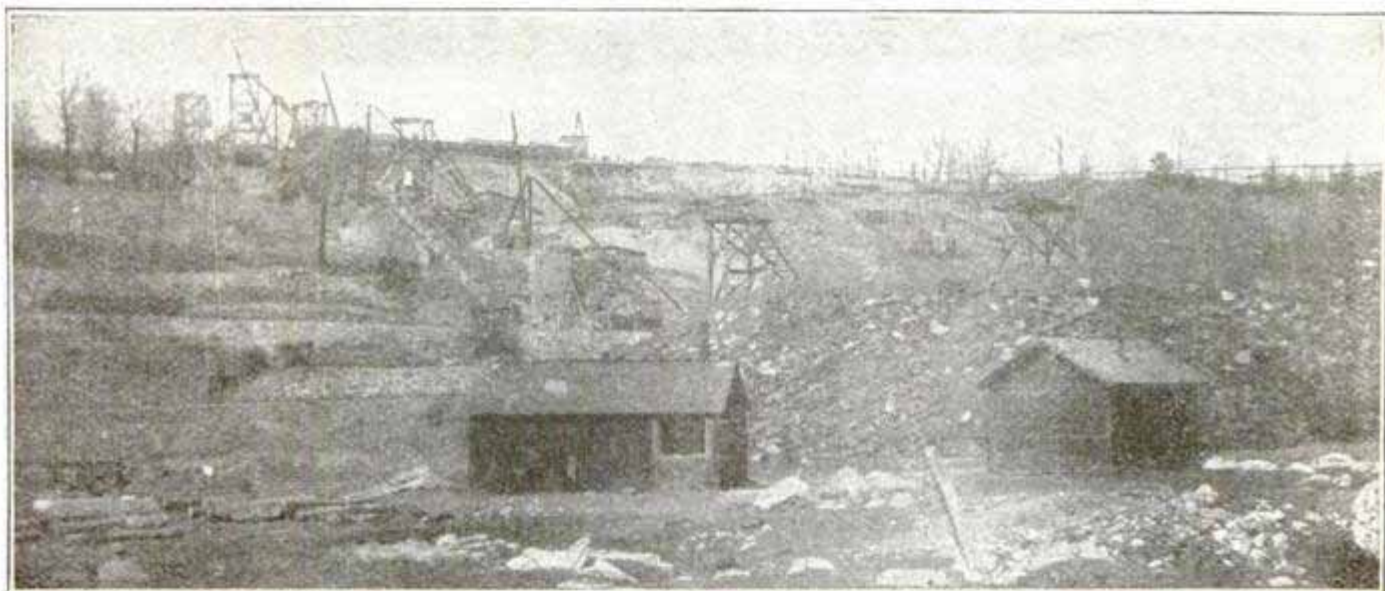
ATTEMPT TO QUENCH FAMOUS BURNING MINE

Engineers Build Concrete Wall to Stop Flames Burning More Than 50 Years

Fires have been known to burn for months and even for several years, but undoubtedly one of the greatest continuous fires ever recorded in history is that of the famous burning coal mine of Summit Hill, Pa. In 1858, just 51 years ago last February, the fire commenced. Since that time it has smoldered steadily, eating up hundreds of thousands of tons of coal, and burning its way deep under ground to a point a mile westward from Summit Hill.

shafts were struck, and into these were poured refuse, water and wet clay, the purpose being to block the fire by a wall of such material. More than 600 holes were sunk, and into these thousands of tons of "gob" or slush was forced, some of the holes eating up as much as 8,000 tons of material. Several hundred thousand dollars were spent in this work, but the fire crept around the impeding walls and continued to burn.

Now, however, expert engineers have evolved a scheme, which it is believed will finally achieve the desired result, at a cost close to \$1,000,000. Six shafts are being sunk into the earth across



The Attempted Quenching of a 51-Year Fire

To-day a final attempt is being made to extinguish it.

The shaft in which the fire began led into a mine that had been worked for many years. Lack of men and lack of means prevented a proper fighting of the danger when it started. In the early days of coal mining much of the coal which is now regarded as valuable was considered worthless, and discarded as refuse. The enormous quantities of this discarded coal became combustible fuel to the hungry fire.

In 1862 the company attempted to make an open cut to block off the fire. After an excavation of 2,000 ft. was accomplished, the work, for some now unknown reason, was abandoned. The next attempt was made 16 years ago. Holes were sunk until cracks or open

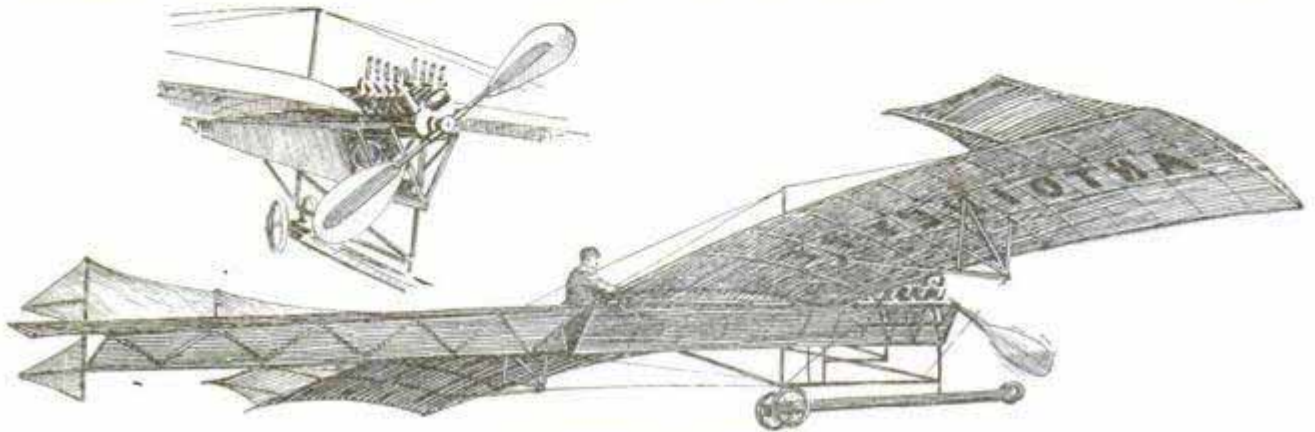
the path of the fire, the first being an open cut 100 ft. long and 12 ft. wide. Three of the remaining shafts will be 50 ft. long by 12 ft. wide, and the other two 20 ft. long by 12 ft. wide. All are situated 50 ft. apart and will be sunk to the coal vein, a depth of more than 200 ft. All the coal will be taken from these shafts and from the intervening space between them, a solid wall of clay or concrete, or both, being substituted in place of the coal. This impregnable wall will extend to the bottom of the vein in the valley, where water will complete the barrier.

The illustration shows the head frames of the six shafts. The burning mine is to the right of the head frames. According to estimates of the engineers, made in May, the work should

be completed at about the time this issue reaches the public.

A DRAGON-FLY FLYING-MACHINE

One of the most graceful of all flying-machines, and one that has succeeded in making several short flights, is this aeroplane of M. Rene Demanest,



A Dragon-Fly Aeroplane

a French inventor. It has two wings and a long body and tail, not unlike those of a dragon-fly, from which fact it is so spoken of. Unlike other flying-machines, the motor is above the wings, as is also the operator, who rides upon it almost as one would ride a beast of burden, instead of being seated in a framework hung beneath it. The operator guides the rudder of the machine with the right hand, directs the stabilization wings with his feet, and controls the engine with his left hand. A pair of bicycle wheels at one end of a long, narrow framework and a roller at the other end form a support for the machine when on the ground.

EUROPEAN FIRE INSURANCE LAWS STRINGENT

One of the main reasons why the per capita fire loss in Europe is only one-tenth of that in the United States lies in the fact that the fire insurance laws abroad are more stringent, and that in all the larger cities and towns the danger of fire is minimized by strict building regulations.

Under the laws of France, a house owner cannot insure his own property from loss by fire originating on the

premises, but only from loss occasioned by fire having its origin elsewhere. The owner of a building is also liable for damage to other property from fire originating on his property, except under certain extenuating circumstances. This vital difference between this government regulation of insurance in Europe and the American method makes the property owners doubly careful

that everything belonging to them is properly guarded. Such a law is also enforced in Brussels.

NATURAL GROWN IMAGES FINISHED BY MAN

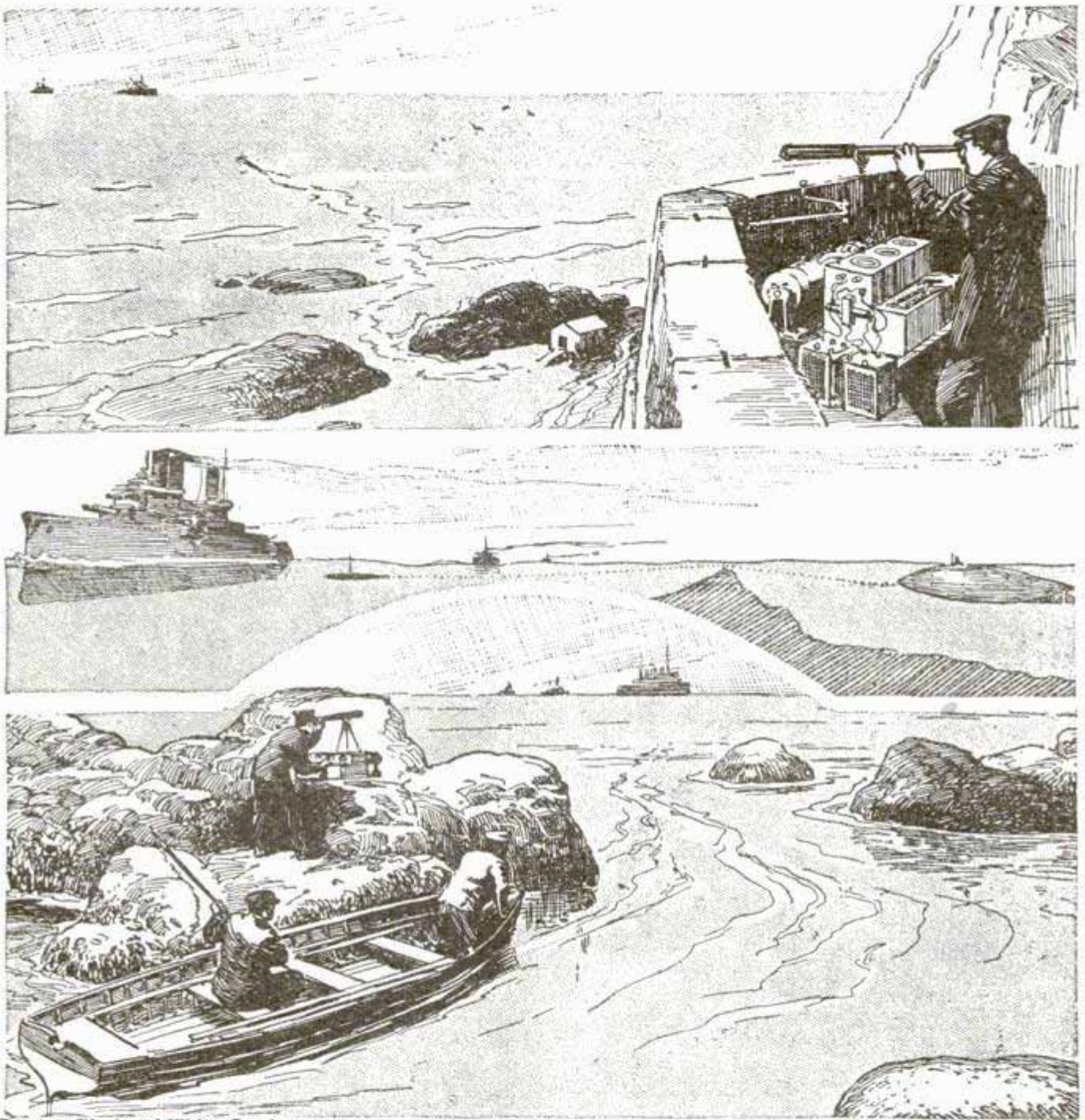
The curious wooden images shown in this illustration are natural growths of wood called cypress knees, and were cut near Melrose, Florida. The development of features, fingers, feet, etc.,



Nature as a Sculptor

on some of the different images has been completed with a knife, but the general outlines are as grown. The fowl, for instance, at the left of the top row, has had its head formed with a knife. The bird at the right of the top row has had its beak whittled and scraped into shape.

A SUCCESSFUL WIRELESS-DIRECTED TORPEDO



Courtesy Black and White London

Method of Steering the Wonderful English Wireless-Directed Torpedo

The English press and weekly illustrated magazines are loudly acclaiming a marvelous wireless-directed torpedo which they believe may revolutionize marine warfare and materially interfere with the effectiveness of aerial war fighters. A torpedo that can be propelled and steered by wireless waves of electric energy has long been the dream of inventors and naval men. Many such torpedoes have been invented, and much has been claimed for

them by their sponsors, but none has proved its merit to the extent claimed for this English invention.

"All attempts to steer torpedoes," says one English magazine, "have hitherto failed. Ever since Hertzian waves made wireless telegraphy possible, torpedo direction has been the dream of inventors. Many have toiled, all have failed save one."

Description of the torpedo is conspicuous by its absence, the mechanism

undoubtedly being kept a secret, but the following paragraphs will give some idea of its control and what is expected of it:

"The actual apparatus, like all products of genius, is simplicity itself. It possesses all the elements of portability, flexibility, and control requisite to the purpose in view. Its essentials are, at the transmitting station, a source of electricity, such as an accumulator, a spark coil, control keys, a selective device, and a wave transformer and transmitter. This equipment, which is under the control of an operator, is placed on shore or on the deck of a battleship, cruiser, destroyer, or submarine, as the case may be. The outfit weighs about 200 lb., a mere bagatelle compared with the massive construction of the battleship which it may be instrumental in sinking.

"In the shell of the torpedo is placed the sensitive mechanism which receives the wireless power from the sending station and uses it for the purposes of the operator, who may be two or three miles distant. The propelling machinery of the torpedo is not disturbed by the introduction of the wireless equipment, which weighs 40 lb., and comprises suitable devices by means of which the tiny craft is steered, made to rise and fall, and by which its deadly charge is exploded. The mechanism is designed to operate in synchronism with that used at the sending station, so that when the operator presses a certain key a definite and known response takes place in the torpedo.

"The system adopted is absolutely innocent of aërials, antennae, earth-plates, or any of the paraphernalia of ordinary wireless telegraphy. The transmitters and receivers are of small compass, and quite unobtrusive. The system is entirely secret, and cannot be disturbed by any of the wireless telegraph equipments with which battleships are fitted. The operator sits at a row of small keys, and by the position of his selective device he can tell exactly how to steer the torpedo. By day, the wake of the torpedo would tell him, of course; and by night, a tiny electric

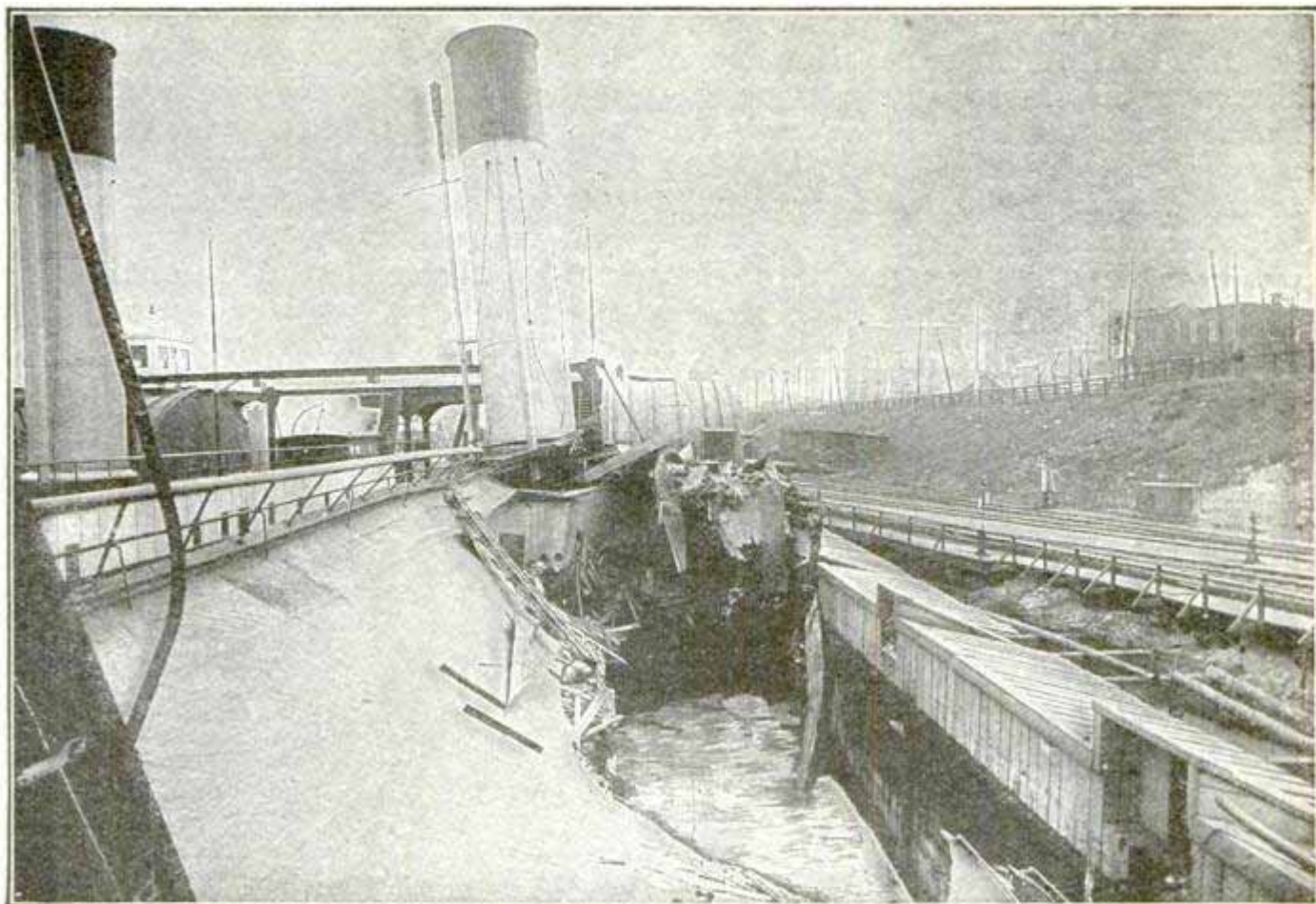
lamp, carefully screened from the enemy, would be used to show the position of the torpedo, and by this it would be guided with absolute certainty until the fatal blow was struck.

"Torpedo nets will be of no value. The object of attack is sighted and the range found. The torpedo is sent on its fateful mission, and steered into the very nets of the doomed ship. By the wake of the little craft its course has been guided under the influence of the invisible wireless power. The first torpedo hardly lands in the net before it is exploded and the net shattered. Before repairs can be effected, a second torpedo is sped on its way and steered through the gap torn in the nets by its predecessor. Once past the border line of the nets its mission is fulfilled.

"The airship can be fought in the same way, an aerial torpedo being steered to its mark no matter how much dodging and swooping the airship is made to perform to get out of its way." The drawings give some idea of how the torpedo will be operated. One shows it being directed from a submarine, and the other two illustrate its operation from the land.

DIFFICULTIES IN CONSTRUCTION OF ALASKAN RAILROAD

In the construction of the Copper River railroad in Alaska, one of the most difficult engineering tasks ever undertaken on the North American continent will be involved. The line strikes across the Copper River flats to the stream itself, and then follows the river to the head of its enormous delta. The difficulties of the route are in the fact that the road must cross and recross the river because of two great glaciers which extend to the water and discharge enormous quantities of ice during the summer. The only passage possible is by crossing between them. The bridges required for the crossings will be about 1,800 ft. long, and as huge blocks of ice must pass under them, endangering foundations, the problem of their construction and support is exceptionally difficult.



Wrecked Car Ferry "Michigan"

GREAT LAKES CAR FERRY RAMMED

The illustration shows the extent of injury inflicted upon the car ferry "Michigan" when she was recently rammed by the steel freighter "James P. Walsh" in the Detroit river. The "Michigan" transports trains across the river from Detroit to Windsor, Ont., and was in midstream when the collision occurred. Completely disabled, she drifted down stream. Two tugs answered her signals of distress and with some difficulty towed her to the Canadian shore. The great rent in her side shows plainly in the illustration. The "James P. Walsh" was practically uninjured.

FULTON AERIAL FLIGHT FOR \$10,000 PRIZE

An aerial contest open to all airships propelled by mechanical means, without limitation of the power used or the mechanical principle involved, will be the Fulton Aerial Flight, to be conducted under the auspices of the Aero

Club of America, September 25 to October 9, 1909. A prize of \$10,000 will be given the winner by the New York World, and he will also receive a commemorative gold medal from the Aero Club of America.

The contest will be one of the features of the Hudson-Fulton celebration in New York City during October and September. The flight will be from New York to Albany. This course may be changed if the feat of sailing through the air from New York to Albany be accomplished prior to that time. The starting point will be on Governor's Island and the natural course will be over the Hudson river, although the aviators can choose their own course.

Each contestant agrees in making his entry that he will abide by the decision of the contest committee and waives all rights to contest in the courts for injury of himself or his apparatus for himself, his heirs and assigns. Each airship shall carry at least one passenger and have absolutely no connection with the ground or any other craft. Entries must be made in writing before

June 1, 1909, to the Aero Club of America, No. 12 East 42d Street, New York, and must be accompanied by an entrance fee of \$200 in cash. Seventy-five per cent of this fee will be returned to actual starters. The committee will refuse entry to anyone who has not already made three successful flights and demonstrated ability.

The great dam will be about a mile long, a half-mile wide at the bottom and about an eighth-mile wide at the top; a young mountain thrown into a valley that the Chagris river will never move. When the dam is finished, and the waters of the Chagris river are held back there will be no sudden rise of the river as there is now, caused



The Cabbages Grow Large in Kansas

THE PANAMA CANAL

[By Warren Wood, in Engineering Contracting]

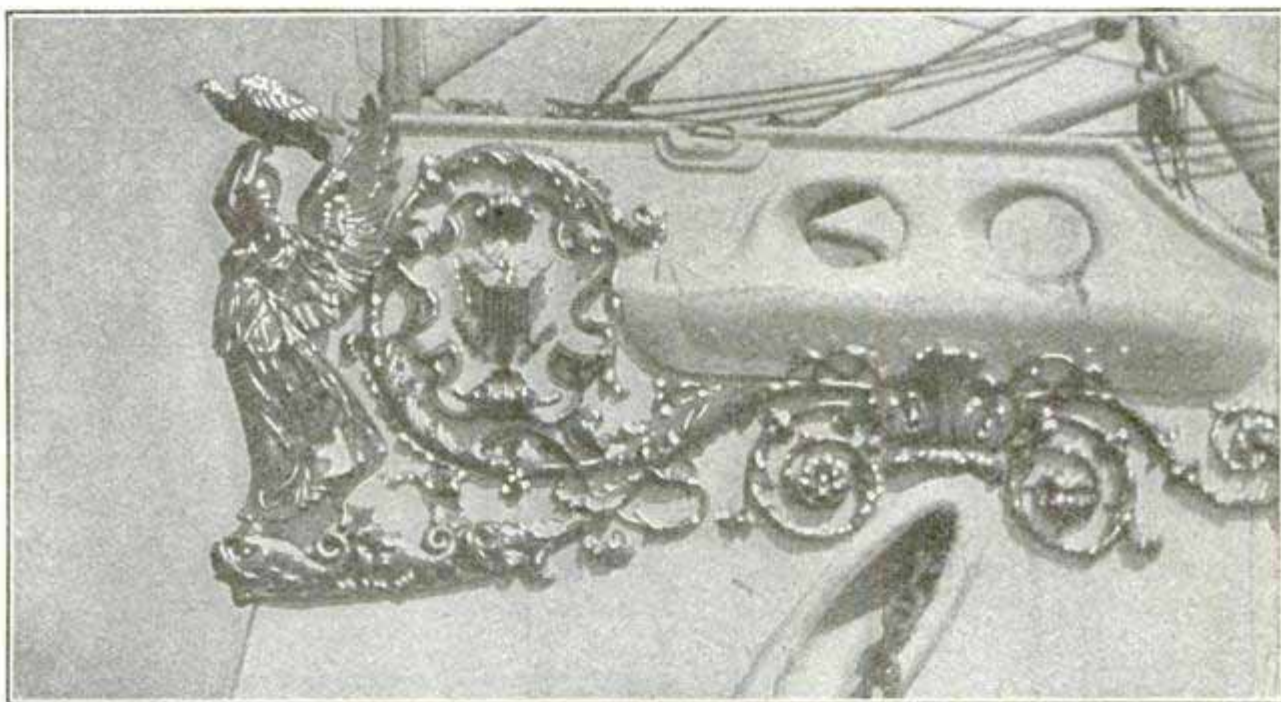
I will give a brief description of the canal as I saw it and as truthful as I can remember: Around Colon everywhere are to be seen the activities of the Americans, but no great problems are to be solved here. Coming to the Gatun dam, this bone of contention, such as underground lake, 500 ft. of mud, stratified rock, etc.; this great fill which is going to make the dam will be so large and contain so much material that its very weight will be the means of suffocating the underground lake, squeezing the mud out of existence, holding down the stratified rock, and make every liar that has seen "the dam going out into the sea" sneak into his hole and pull the hole in after him.

by the heavy rains and creating a terrible force of water, but it will be like pouring water into an immense tub and letting it run out of the other side over the spillway and thereby lose its force. When this artificial lake is formed it will reach to Bas Obispo and from there starts the Herculean feat of cutting through a mountain, Gold Hill, the highest cut from the bed of the canal to the top being nearly 900 ft. From Bas Obispo to Paraiso is the greatest excavating; the rock is of such a nature in a great many places that it requires drilling and blasting, but the largest amount is taken out by the giant steam shovels, as with but two or three exceptions the whole isthmus is volcanic ash, compressed and of such a nature that it breaks and slides. The average person's conception of the

canal is a cut through the mountain, like a canyon of the West, but in reality it is a ditch at an angle so sloping that the earth cannot of its own weight slide toward the center. Standing on the top at Empire it seems almost impossible that human beings ever dug through such a mountain. On the Pacific side, walls have practically been extended to an island for nearly two miles so that it can be dredged and made deep enough without its filling in from the action of the waters. The same length and height of locks is required on the Pacific side

TO BE THE ONLY FIGUREHEAD IN THE U. S. NAVY

Within a few weeks there will be but one figurehead in the entire American navy and that will be the ornament that adorns the bow of the cruiser "Olympia," the flagship of Admiral Dewey in the battle of Manila. The figureheads have been ordered removed from the various ships by the Secretary of the Navy on the ground that while in battle practice the sun shining upon the polished brass ornaments reflects the light as would as many mirrors and thus be-



Copyrighted by S. S. Scott.

Figurehead of the U. S. Cruiser "Olympia"

as on the Atlantic. The rock for the Gatun dam is taken from Porto Bello, eighteen miles down the coast from Colon, and is as fine a quality as the Staten Island or Princeton trap rock and will withstand the elements for a thousand years, or as long as the mosquitoes will stay in New Jersey, as they were all sent from Panama to Jersey. I do not know what one looks like in Panama having never seen one, not even one. I will predict that Panama City and along the canal from Bas Obispo to Paraiso will be the favorite summer resort for thousands of Americans during February and March, after the canal is finished. In conclusion I will say the canal is being put through by the best methods, and by skilled and competent men.

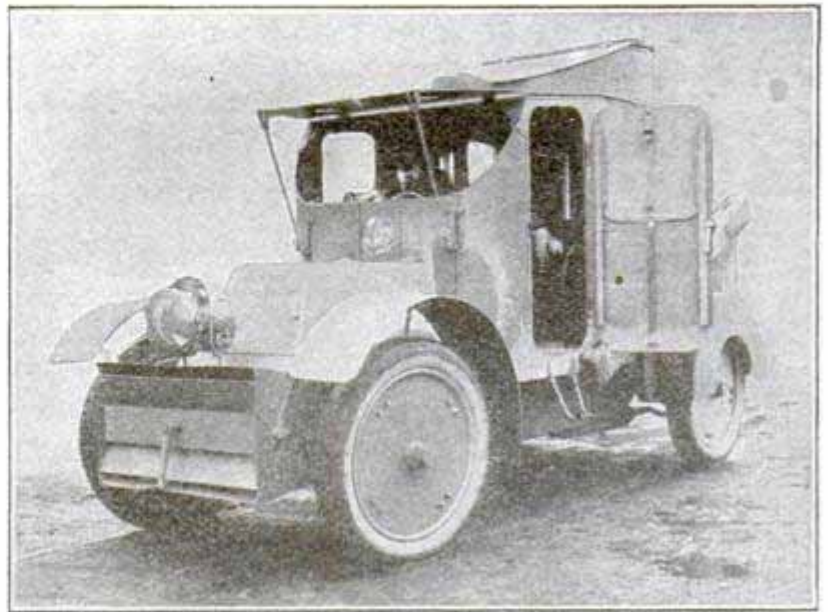
trays the positions of the ships, when they would not otherwise be visible. It is also said that the reflected light from the figureheads shines in the eyes of those handling other craft and that accidents are made possible. The figurehead that is to remain, and which is pictured here, is the finest piece of work of its kind ever made. It is from a design by St. Gaudens and is entirely of brass, costing \$11,000. It is always highly polished and has the appearance of being golden.

The Simplon tunnel, from Italy to Switzerland, is the deepest mining work in the world. It is 7,000 ft. below the peak and is 12 miles long.

RUSSIA'S WAR AUTOMOBILES

Emulating Germany, Russia has recently been experimenting with a number of specially designed and heavily armored automobiles for war. The experiments were so successful that 20 of the type here shown are being constructed and more will probably follow. The machines weigh about 6,500 lb., are driven by a 30-hp. engine at a speed of about 30 miles an hour, and can climb grades up to 25 per cent.

The armament consists of a Hotchkiss gun which fires 600 shots a minute. The armor is claimed to be capable of resisting any shot fired at a distance of 70 ft. This, of course, does not include projectiles from cannon.



Russia to Fight with Autos

GOVERNMENT POSITION FOR A THIN MAN

Considerable fun was recently made of the United States government by the press of the country over the fact that a thin man—the thinner the better—was being advertised for to assist in the operation of refrigerating machinery in a special government railway car designed for the pre-cooling of fruits.

The consideration was from \$900 to \$1,200 a year, a salary warranted to keep the incumbent thin, according to one writer. All the thin man will have to do is to keep as thin as the salary demands, squeeze himself into odd nooks and crannies of the car, when occasion arises, to insure the pre-cooling of fruit wedged in remote corners, and have an intimate knowledge of machinery.

Canada leads the world in producing asbestos. Her output during the 30 years of asbestos production has been \$20,000,000 worth.

ENGINE FLAYS ITSELF WITH STEEL ARMS

An interesting act of heroism occurred recently on one of those big camel-back engines still used on some of the eastern lines. In this type of locomotive the cab is perched above the boiler and further forward than in other locomotives. The fireman's position is on the tender and altogether removed from the engine cab. This peculiar accident was the shearing off of the crank pin, which released the driving rods. The engine was running over 70 miles an hour and as the steel arms swung with the same momentum as the drive wheels, they crashed into

the cab, crushing both legs of the engineer. The fireman, Perkins Wooley, unable to get to the engineer's cab, swung practically underneath the tender by his feet from the narrow iron steps and broke the air connection. The engine was fearfully battered before the train stopped, but the passengers were saved.

WHERE NATURE COOKS THE FOOD

In certain parts of New Zealand both the native and white women use the natural hot springs to do their cooking. In the Rotorua region it matters not whether the cook wishes to roast a piece of meat, boil potatoes, or steam pudding, all she has to do is to step out of doors and place the cooking utensil in a steam hole. The cover is then put on and a piece of coarse sacking over the whole completes the operation. In a short time dinner is ready.

At Whakarewarewa the whole earth just beneath the surface is a mass of boiling springs. Millions of gallons of



Cooking Over Hot Springs

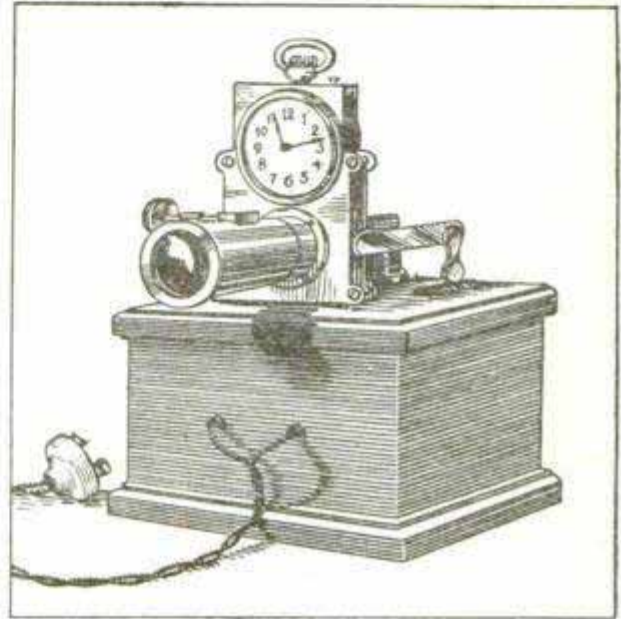
hot water hiss and steam, sending vapors skyward in great white clouds. Strike the ground almost anywhere with a stick, and the hole thus formed fills with hot water. Hot water for baths, the week's washing, and for the

ordinary purposes of the household is always at hand.

The illustration shows three native women cooking their dinner in one of the countless holes.

"SHADOW" CLOCK FOR THEODORE ROOSEVELT

When Theodore Roosevelt returns from his African hunting trip he will



Ingenious Clock for Ex-President

find awaiting him a "shadow" clock, the second of its kind in existence. The gift will be received from its inventor, an Australian who wishes to pay his respects to the ex-president because of the visit of the world-girdling fleet to Australia.

The clock is made with two dials, one for day use and one for night. The night dial is transparent, with lenses above it and a small electric lamp underneath. When the possessor of the clock retires for the night, he turns the night dial toward the ceiling. Attached to the side of his bed is an electric push button, connected with the lamp by a flexible cord. By pressing this button at any time during the night, the lamp is turned on, and the outlines of the numerals on the dial are thrown against the ceiling. The shadow of the dial is 4 or 5 ft. in diameter, making the numerals easy to read.

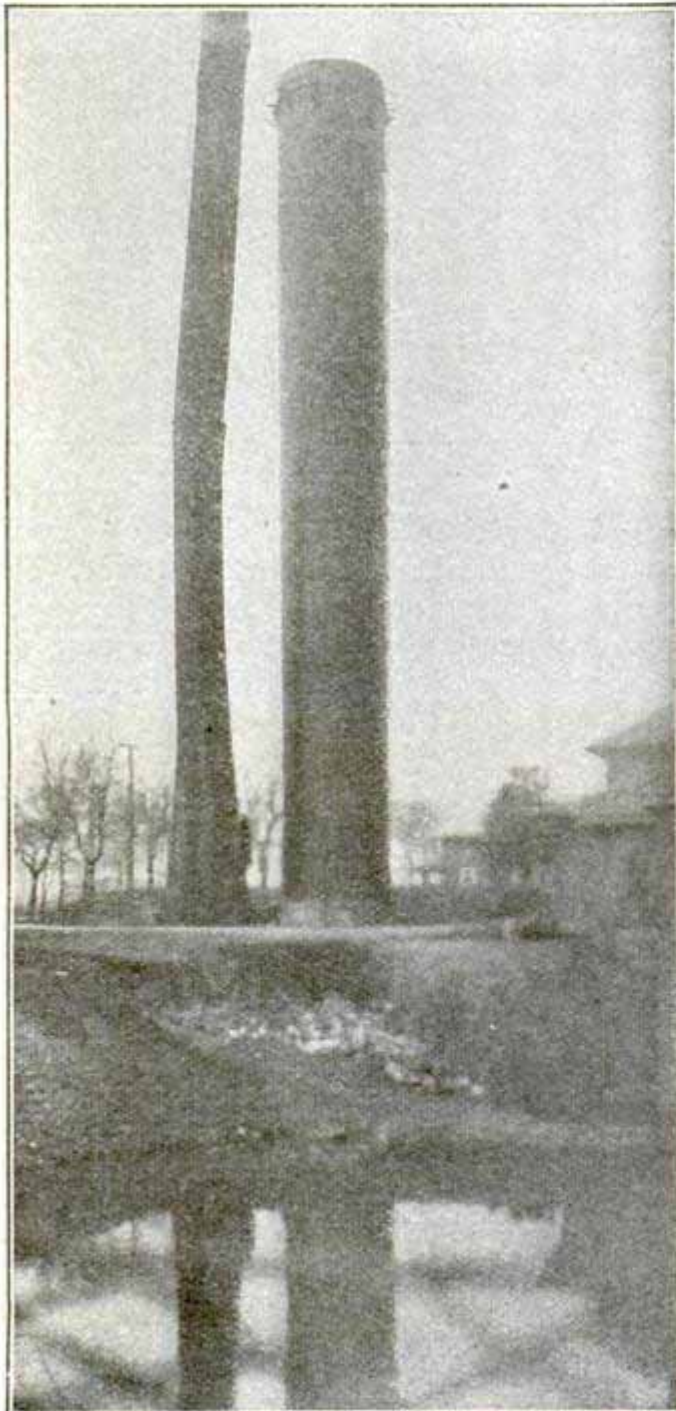
Photographs of Mr. and Mrs. Roosevelt will be placed on both dials, the

front of the case will be decorated with crossed American and Australian flags, and the sides will bear reproductions of the Australian coat of arms.

The Australian who invented the clock and is to present it to the ex-president is R. B. Smith, now living in New York.

STACK RESISTS DEMOLITION

The 120-ft. smokestack, erected some 15 years ago at La Grange, Ill., was recently discarded and pulled down. For many hours it resisted the attempt to demolish it, the 1½-in. rope first used

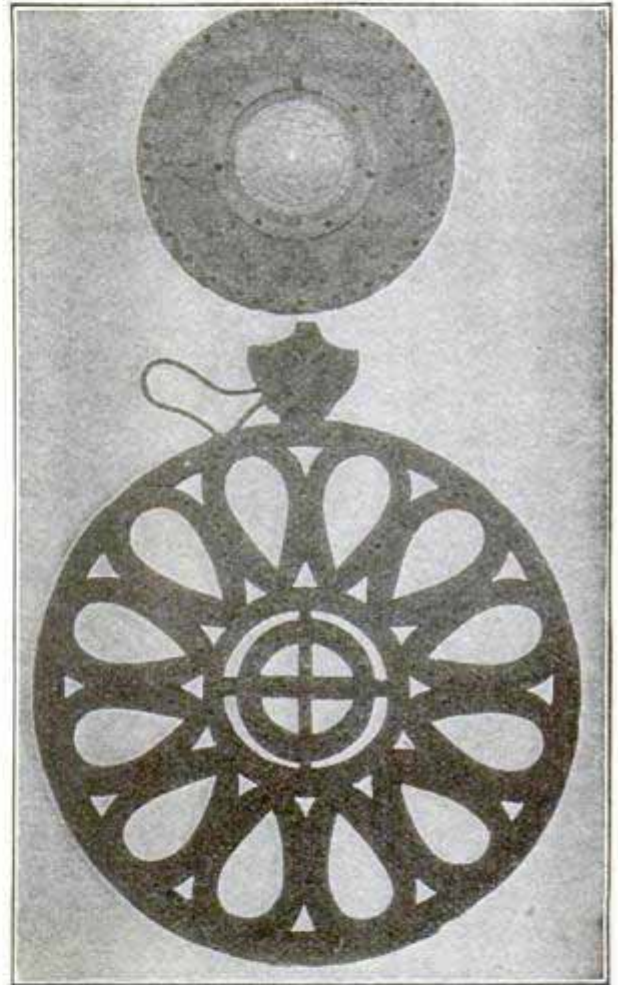


Just before the Fall

breaking six different times. At last a steel cable was resorted to and the great stack was pulled crashing to the ground. The illustration shows its appearance just before the fall commenced.

PRIMITIVE SIBERIAN CALENDARS

These illustrations, which look like the designs for some classical interior



Marking the Passage of Time in Siberia

decoration scheme, are in reality the primitive calendars of the Yahun Reindeer tribes of Siberia. The larger, about 1 ft. in diameter, is the year calendar, and the smaller is a monthly calendar. The days are reckoned by putting pegs in the holes. There are just 12 rings around the year calendar, each ring representing a month. Each ring has from 29 to 31 holes. The calendars are carried on a string around the neck of their owner.

A German company has formed to lay a cable from Germany to Brazil.

EXTINGUISHING OIL FLAMES WITH FOAM

The attempt to extinguish fires by water, where petroleum, gasoline, benzine, or other liquid hydrocarbons lighter than water, are involved, usually results in the spreading of the inflammable liquid, an increase in the area of combustion, and a greater intensity of conflagration.

Sand is often used to extinguish such fires, but Germany has taken a distinct step forward in solving the problem,

sure evolved, and consequently the charge does not issue with sufficient force to cause a spattering of the burning liquid upon which it is poured. The result of the chemical reaction between the alum and the bicarbonate is a prompt evolution of carbon dioxide, which in contact with the licorice solution, forms an exceedingly stiff and persistent foam. Such a layer of foam containing an inert gas upon the surface of a burning liquid effectually cuts off all access of air, and combustion necessarily ceases.



Remarkable Example of Natural Foam Occurring at the Dam at West Point, Nebr., During Recent High Water—The Foam Was 20 Feet High and Extended Clear Across the River

the means employed being a tenacious foam which clings to the burning liquids and cuts off the supply of air necessary to maintain combustion, thus extinguishing the flame. The apparatus employed consists of a simple metal cylinder, provided with a long spout and divided into two chambers. One chamber is charged with an aqueous solution of potash alum and sodium sulphate, the other with a similar solution of sodium bicarbonate, sodium sulphate, and licorice-root extract.

The cylinder of the apparatus is so arranged that on being inclined or reversed the two solutions mingle as they issue from the spout. There is no pres-

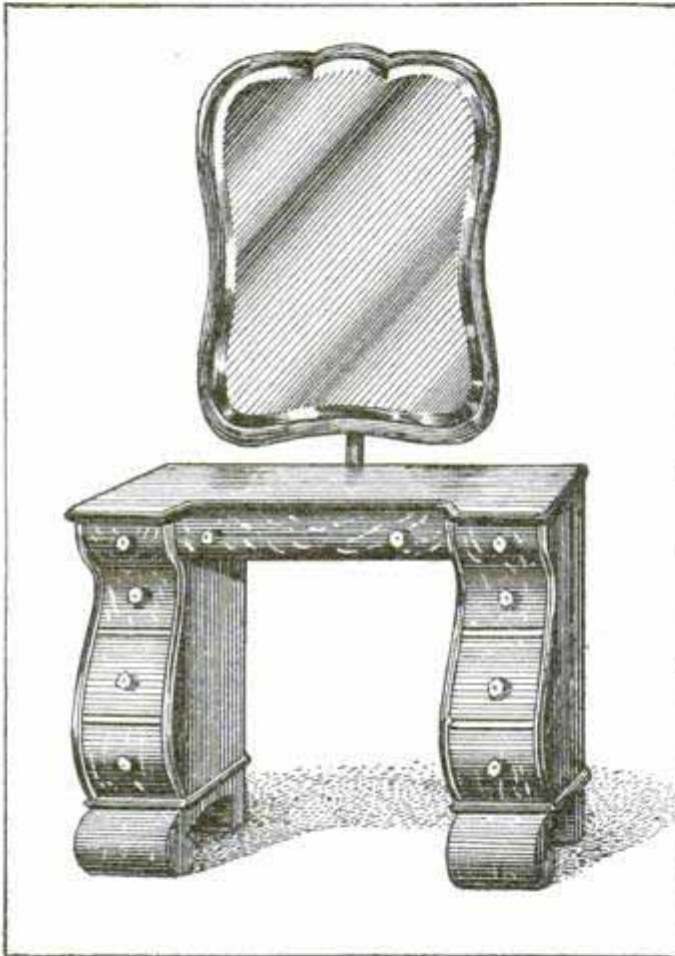
One successful test of the apparatus was the filling of an iron vessel, 5½ by 2½ ft. in size, and 4 in. deep, with 18 gal. of benzine, the ground also being saturated. This was lighted and allowed to burn for three minutes. The contents of two foam extinguishers were then allowed to flow over the whole and combustion was promptly arrested. The layer of foam was removed, the benzine lighted again, and an attempt made to extinguish the flame with water from a 2-in. hose. Instead of extinguishing the flame, the water increased the area of combustion.

The apparatus is now being advocated by the German authorities for

use on motorboats and in automobile garages, drug stores, and other places where combustible liquids are in use or stored.

ANOTHER DESIGN OF DRESSING TABLE

The features of this dressing table are that the mirror is adjustable to



Mirror Adjustable to Any Angle

almost any angle, the gracefulness of its proportions, and its ample drawer room. It is made in either mahogany or oak.

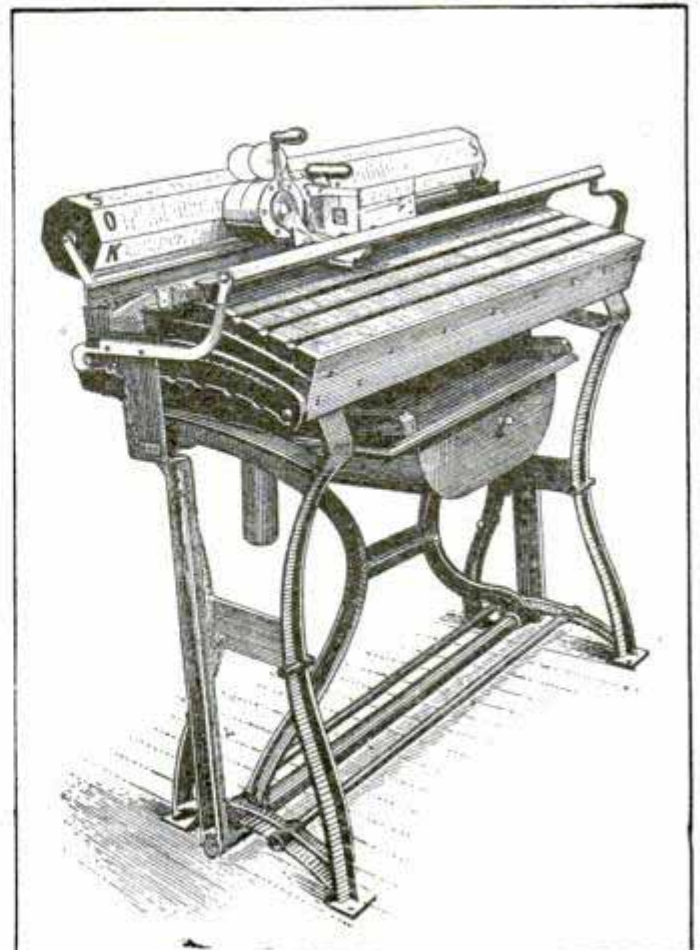
RAILROAD TICKETS PRINTED AS DEMANDED

With a view of reducing the work of a railroad ticket office, and for the purpose of rendering the pasteboard or other material of a ticket valueless up to the moment of purchase, an ingenious printing machine which prints the tickets called for, has been invented and placed in use in Germany. Now, instead of being surrounded by thousands of different tickets for the sta-

tions of the railways of Germany, there is only a small unpretentious machine standing beside the clerk at the ticket window. In this, the tickets are printed with lightning rapidity when the travelers give their destination. The only stock the clerk has to trouble about is an adequate supply of blanks, while the only bookkeeping is the totalling of an automatically printed duplicate record upon which every ticket printed and sold is mechanically registered by the machine.

The machine is 42 in. long by 23 in. broad, and about 4 ft. in height. It has a series of small troughs, carrying, in edgewise position, small printing plates corresponding to every purpose for which tickets are issued. At the back of the machine, upon an octagonal drum, is carried an indicator on which is inscribed the name of every station upon the system, arranged in alphabetical order. Along the top of the machine travels a small, light carriage. This is the printing apparatus.

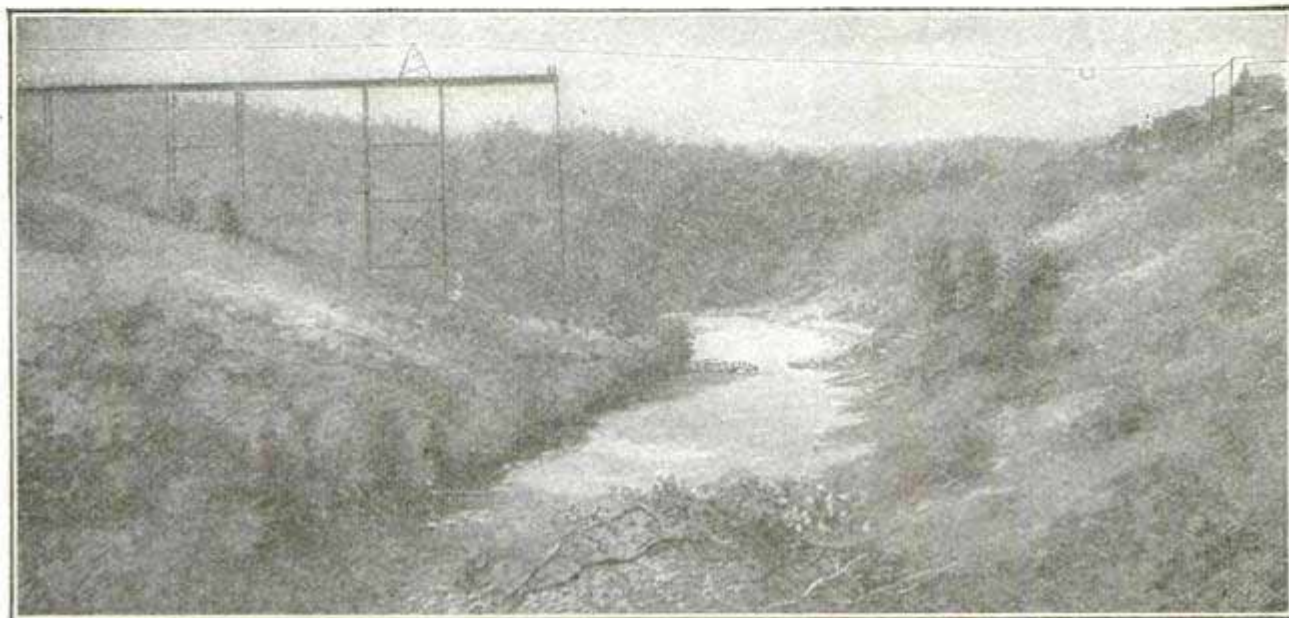
The operation of the machine is simple. When a ticket is demanded the clerk takes a blank and slips it into the



Prints Railway Tickets While You Wait

printing carriage. The carriage is run over its path of travel until the pointer comes opposite the name of the station called for, picking up the required plate as it does so. Then a handle is turned and a fully printed ticket drops out of the printing carriage ready for issuance, no other operation being necessary. The blank during this short

The machine can be made to fit the requirements of any railroad, irrespective of its size or the mixed character of its traffic. It is simply a question of accommodating the dimensions of the machine to suit the conditions. The machine illustrated, which is in one of the German stations, carries more than 2,000 printing plates.



Overhead Cables Used in Building This Bridge

time in the machine, receives the names of both the station of departure and destination, together with the date, route of travel, class of carriage, amount of fare, distinctive number, and other details that might be necessary, such as fast or slow, palace, workman's, excursion or tourist train. The plate is returned to its rack again by the carriage immediately after the impression is made. The date, of course, is set each day.

At the same time as the ticket, the record of the sale is printed in duplicate upon the continuous strip of paper, together with the fare and other information required for booking. All the clerk has to do when he goes off duty is to total the strip and count his cash.

An additional feature of the machine is that it is proof against being tampered with. No ticket can possibly be issued without the fact being recorded, and it is equally impossible to withdraw any plate from its position in the rack. Only the printing carriage can do this.

BRIDGE BUILDING WITH AID OF CABLES

Owing to the height of this railroad bridge, which stretches 200 ft. above the normal water level in a California river, it was found necessary to stretch 2¼-in. cables from bank to bank, a distance of 1,000 ft. By means of them all the structural steel was hoisted by a trolley and swung out into position. The total length of the bridge, which is now completed, is about 900 ft. The pier foundations are of reinforced concrete.

GREATEST INDUSTRY TO ABOLISH SUNDAY WORK

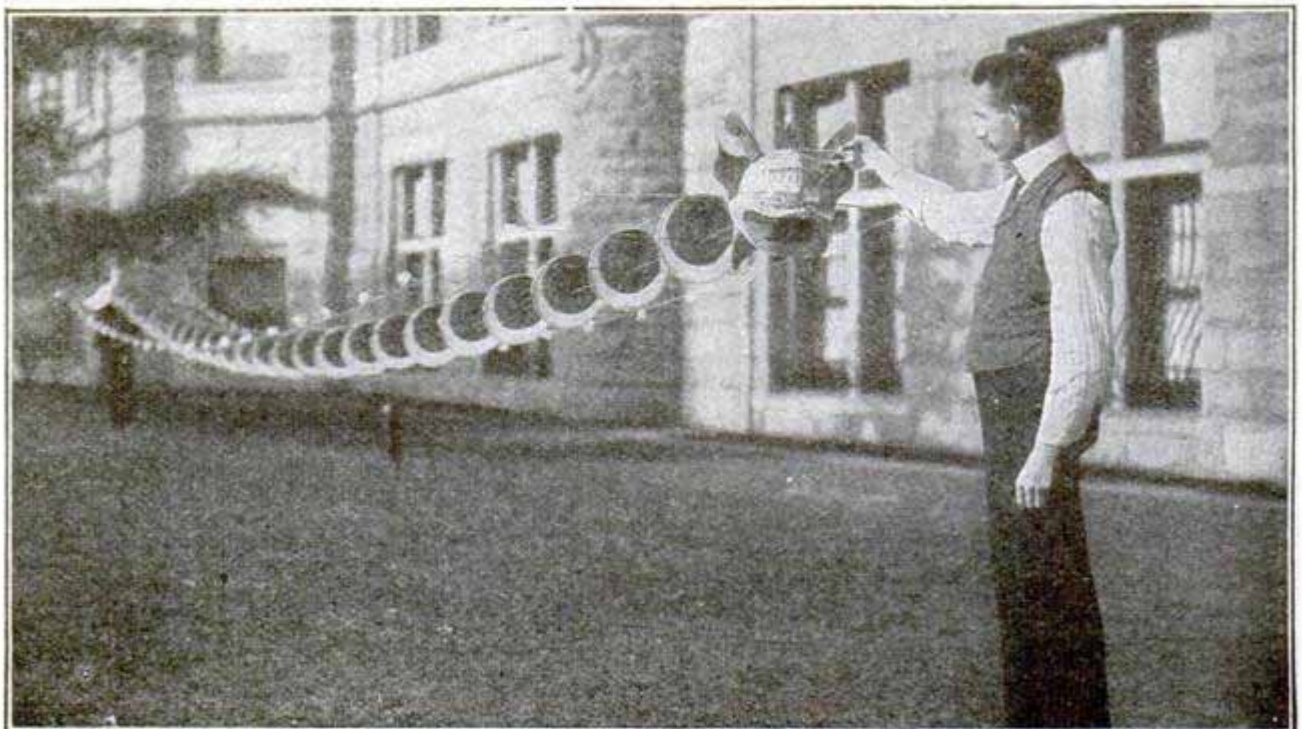
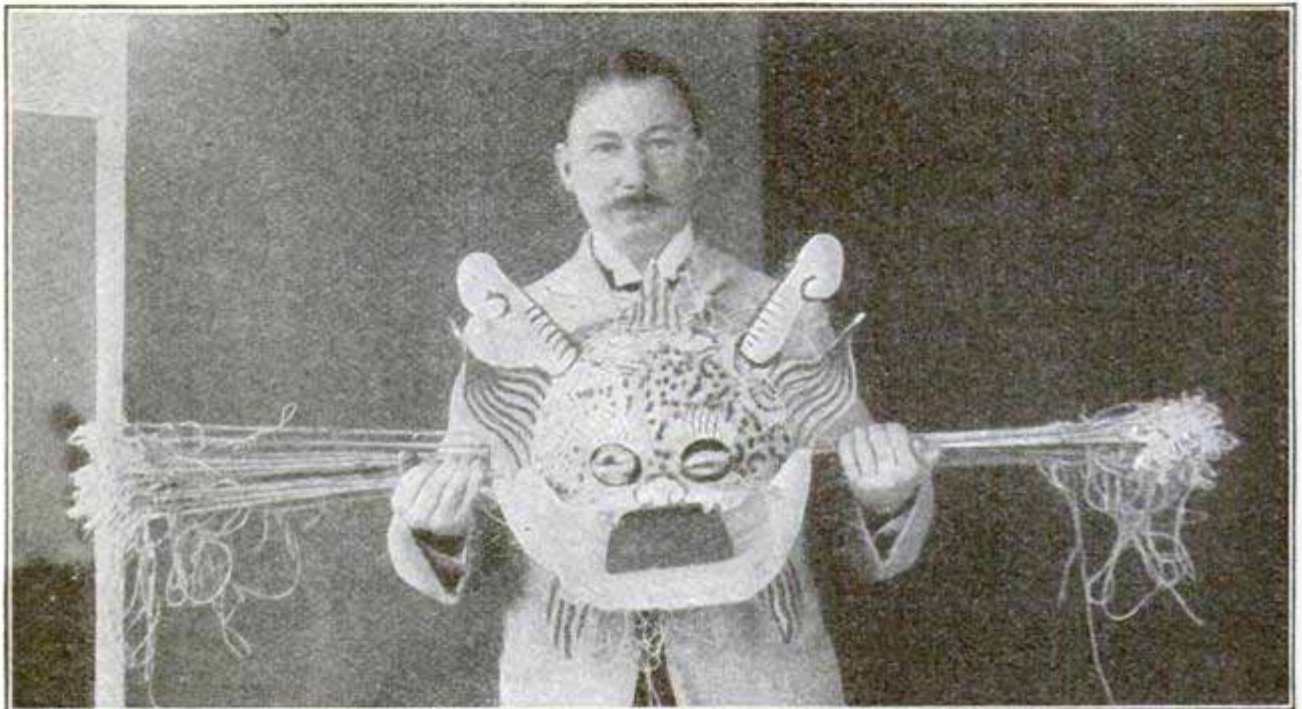
That giant industry, the United States Steel Corporation, is now trying to remember the Sabbath day to keep it holy. This new departure for them is not the result of any ethical reasoning, but because the heads of the corporation believe that it will be money and time saved in the year's run. They have come to the conclusion that a

man can turn out as much work in 6 full week days, getting his Sunday's rest, as has been done in 7 days.

The first order to this effect was recently enforced in the company's galvanizing department, and will be gradually extended over the entire works of the corporation. Police were ordered to arrest those who insisted on working on that day. They had some difficulty making the foreigners understand that hereafter they would be laid off on Sunday.

HUGE CENTIPEDE KITE

Probably the longest and one of the most remarkable kites in the world is this gigantic centipede kite from China. It is 40 ft. long and is made up of 22 body joints and a head. One of the photographs shows a kite complete, and the other is a closer view of the head. The eyes of the head revolve while the kite is flying, and the serpentine motion of the whole kite gives it the appearance of a dragon-like creature of the air.



Close View of Head of Kite—The Kite Complete



"Spread upon the Table Is the Whole Amount of the Fine"

TEXAS COLLECTS BIG FINE

A bundle of money amounting to \$1,808,843 was received by the state treasury of Texas in one bulk from the Waters-Pierce Oil Company in payment of the fine which the courts assessed against it for violating the anti-trust laws. All of the money, with the exception of a few hundred dollars, was in currency. In the package which is shown as standing erect in the accompanying picture is \$1,200,000. It is made up of 120 bills, each of the denomination of \$10,000. Spread upon the table is the whole amount of the fine, \$1,808,843. State officials and employes are grouped about the money.

ered and perfected the explosive, but also a wireless apparatus with which to set it off from a distance of a mile or more. This invention, however, he does not consider as great as the discovery of the explosive. The force of the latter, he insists, can be directed in any direction he desires, and as a proof inquirers were shown the tree in which he had exploded the three ounces. Its tops had been sliced off as with a knife, but beneath not a leaf had been disturbed.

"I had the charge fixed so that the force went upward," said Williams. "A man standing beside the tree would probably have been frightened to death, but not otherwise injured."

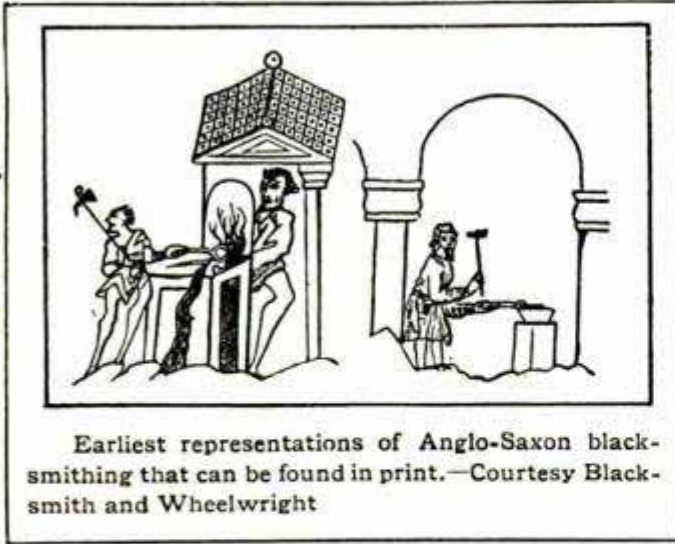
POWERFUL EXPLOSIVE INVENTED BY SCHOOL BOY

An explosive that is claimed to be 40 times as powerful as dynamite has been invented by Charles Williams, an 18-year-old boy of Evansville, Ind. A bottle containing 3 oz. of the explosive and placed in a tree three miles distant shook nearly every building in Evansville, according to local press reports, and a pound of it, so say experts, would have wrecked buildings within a mile.

Not only has the young man discov-

JAPAN GRANTS MOTOR FISHING BOATS SUBSIDIES

Japan is well known for protecting her shipping interests and husbanding her fisheries. That nation is now granting subsidies to all fishing vessels equipped with the newly adopted internal-combustion engines as auxiliary power. Japan grants \$14 per ton and \$9.70 per horsepower at the time of their construction, with a yearly subsidy of \$8.60 per ton and \$5.70 per horsepower. Additional encourage-



Earliest representations of Anglo-Saxon blacksmithing that can be found in print.—Courtesy Blacksmith and Wheelwright

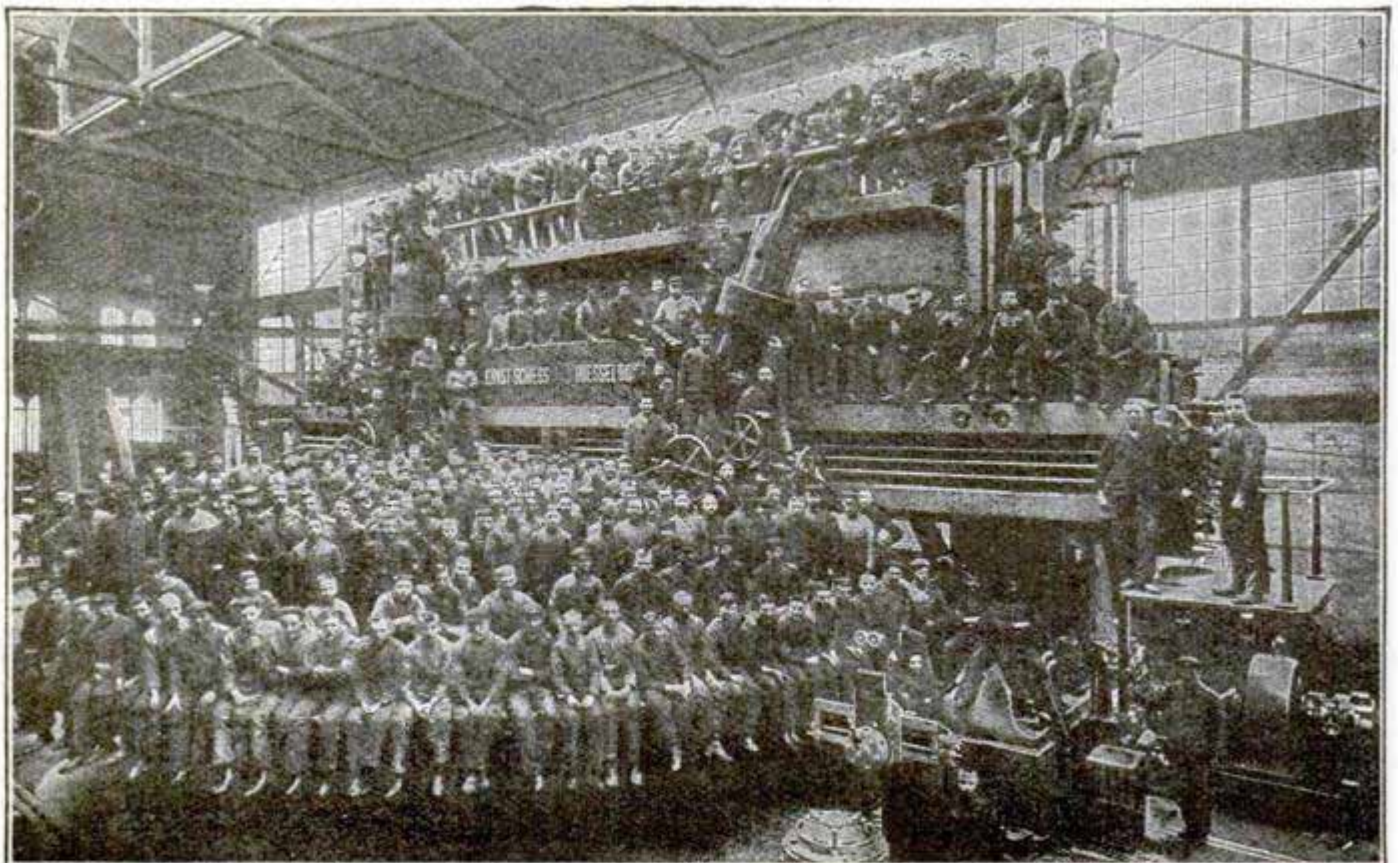
ment Japan offers is \$35.25 to each skipper who owns his own vessel; \$24.30 to each engineer and \$5.76 annually to every fisherman.

The Japanese have taken advantage of the fact that British firms which have been supplying Japan with gasoline engines failed to take out patent rights in that country and now the Japanese are building the same type of engines in large numbers without paying royalties or license. Great Britain sees a deep purpose in the building of these boats, as she herself has a large

fleet of them which are intended to be used for sweeping the mine-infested seas that would surround her during a naval war.

MAMMOTH BORING AND TURNING MILL

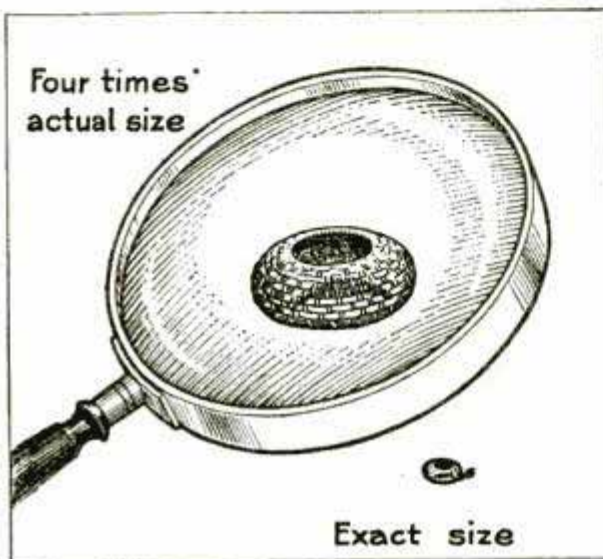
This illustration shows the largest boring and turning mill in the world. It was completed recently at Düsseldorf, Germany, and will work upon an object 39 ft. 4 in. in diameter and 11 ft. 2 in. high, the table of the machine itself being 36 ft. in diameter. Some idea of the immense size of the machine can be gained by contemplating for a moment the fact that the illustration shows 227 men standing and sitting upon it. The total weight of the machine is 330 tons. The table, turned by an electric motor, can make four revolutions per minute. The control of the motor, as well as the feed and speed changes, are all effected from devices placed on the traveling tool heads, in order to eliminate the necessity of the operator descending from the table to stop or start the machine.



Group of 227 Men on Huge Boring Mill—In the Foreground Is Shown the Smallest Boring and Turning Mill Built by the Firm

SMALLEST WOVEN BASKET IN THE WORLD

This woven basket, so small that it is necessary to use a magnifying glass to appreciate the skill of the workmanship, is claimed to be the smallest in the world. It is a trifle over one-eighth of an inch in diameter, hardly large enough to hold a drop of water, and every stick is perfect. The design woven into it represents the flight of birds. It was made by a member of the Sotoyomi tribe of Indians in Lake County, California.



Basket $\frac{1}{8}$ In. in Diameter

The drawing shows the exact size of the basket; also, its size four times magnified.

DRIVING AN ORE TEAM

This illustration shows an ore team, consisting of six horses and a wagon loaded with sacks of ore, passing through Crescent, Nevada. The driver of this team is riding on the wagon and driving with six lines, but frequently he rides one of the "wheelers," and

drives with a "jerk" line, which is merely a rope fastened to the bridle of one of the lead horses. The second pair of horses in such a team is called the "pointers," because they point the course of the wagon. When a sharp turn is to be made one or the other of these horses jumps over the chain and pulls on a straight course instead of making the turn with the lead horses. It is in this manner that the wagon is kept safely on the trail. The pointers have to jump over the chain so often that they soon become adept, and hop back and forth as nimbly as a trained dog through a hoop.

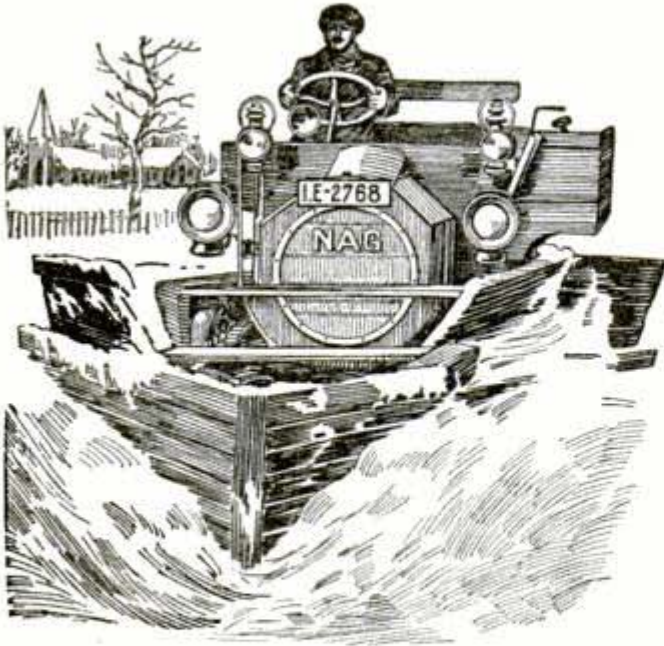
FIGHTING THE SNOW IN BERLIN

The snow fall in central Europe last winter broke all records for many years, Germany probably receiving the worst of it. For days at a time, following each big storm, the streets of Berlin were blocked to such an extent that the street department of the German capital was taxed to the limit. One snow storm cost the city \$8,000 to clear away, automobile snow plows and vans being used to a great extent in the work.

The motor plow shown in one of the illustrations is one of the first ever used in any country. It is essentially a 6-ton truck with a wooden plow of triangular shape fastened to its front. This was driven through the deep drifts by a 32-hp. engine, pushing the snow to both sides and making a fine path for vehicles. The facts that the power was applied from behind the plow and that the wheels were at all times running on the portion of the road already



The Driver Uses Six Lines



Motor Snow Plow Used in Berlin

cleared, instead of horses struggling through the drifts ahead of the plow, as ordinarily is the case, was a great advantage of the outfit. The use of the motor plows also demonstrated the fact that it is possible to change quickly an ordinary heavy automobile truck into a snow-fighting device with but little expense.

A NEW STEEL COKE CAR

Out of a recent order given by the Pennsylvania Company for 2,200 new coke cars 1,000 of them were to be made of all steel in a new design giving greater capacity than cars ever built for regular service. These cars consist of four hoppers each and have eight openings in the bottom of the car which makes the car practically self-cleaning. The main feature of

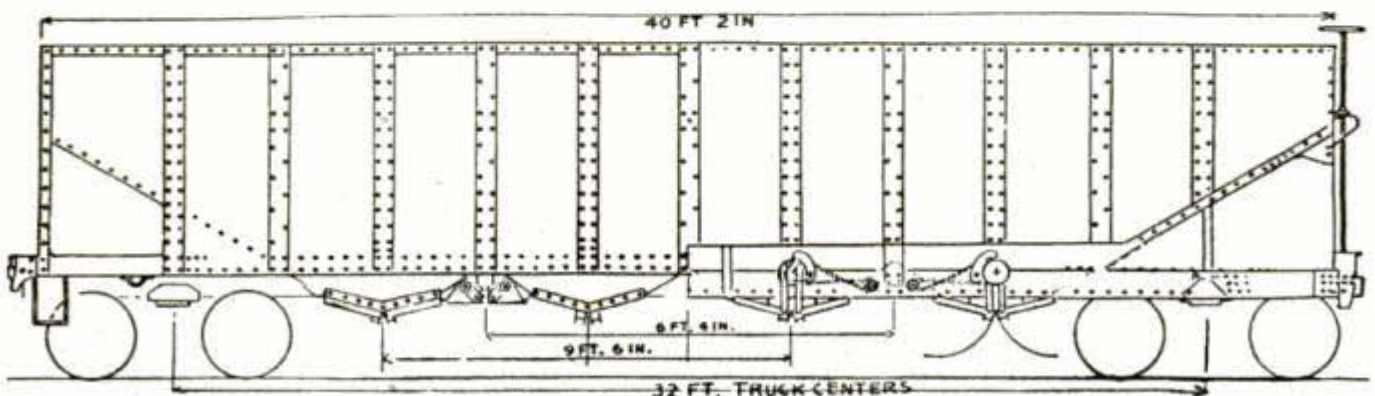
these cars is to provide as large an opening as possible to greatly facilitate the unloading. The area of the space when all doors are open is 84 sq. ft.

Three smaller cars of a similar type were unloaded by three men in 15 minutes from the time they were placed on the trestle until the engine moved them away. The coke ran out from the car in 1 minute and 45 seconds from the time the doors were opened. The much larger and four-hopper car is expected to make even better time. The coke rack will not be used and the loss of space will be replaced in the greater length of the car. The total capacity of each new car will be 2,794 cu. ft., providing for a load of 100,000 lb.

ANTI-COLLISION DEVICE FOR FIRE HOUSES

Disastrous collisions have often occurred between street cars and fire-fighting apparatus when the latter has been leaving the engine house, especially where street cars run by on intersecting streets. To prevent such collisions at the start, an ingenious trolley cut-out device has been installed at Rochester, N. Y.

The device consists of a standard circuit breaker, mounted on a trolley pole. One terminal of the breaker is tapped to the feeder and the other terminal to the feed tap which feeds the trolley section. Section breakers are cut in on the trolley wire at a sufficient distance so that when the current is cut off the car will not travel across the path of the rushing fire teams.



Design of Coke Car Which Greatly Facilitates Unloading

When a fire alarm comes in and the apparatus leaves its house, the wheels of the fire truck run over a contact maker which cuts the current from the wire. The moment the power fails the motorman knows it, and applies his brake. When the fire apparatus has crossed the street the conductor goes to the breaker on the pole and closes the circuit again by pulling a cord attached to the breaker handle.

In case the fire apparatus is to go in a direction opposite from the street crossing, the man on duty in the fire house throws out the contact maker in the floor so that the current will not be shut off on the trolley wire.

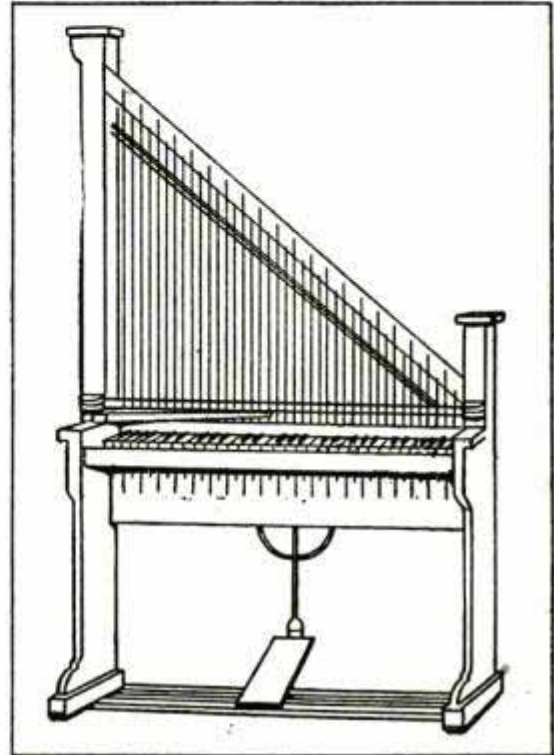
HOUSE CONSTRUCTED OF BEER BOTTLES

This house is not a "freak" in the true sense of the word, but a comfortable, livable dwelling at Rhyolite, Nev., built of beer bottles because beer bottles were more plentiful than any other kind of material that could be used for building purposes. More than 5,000 glass bottles went into its construction.

In the boom mining camps of arid Nevada, building material is a large item of expense, and it is not unusual to find dwellings constructed of any conceivable substance that can be utilized for such purposes.

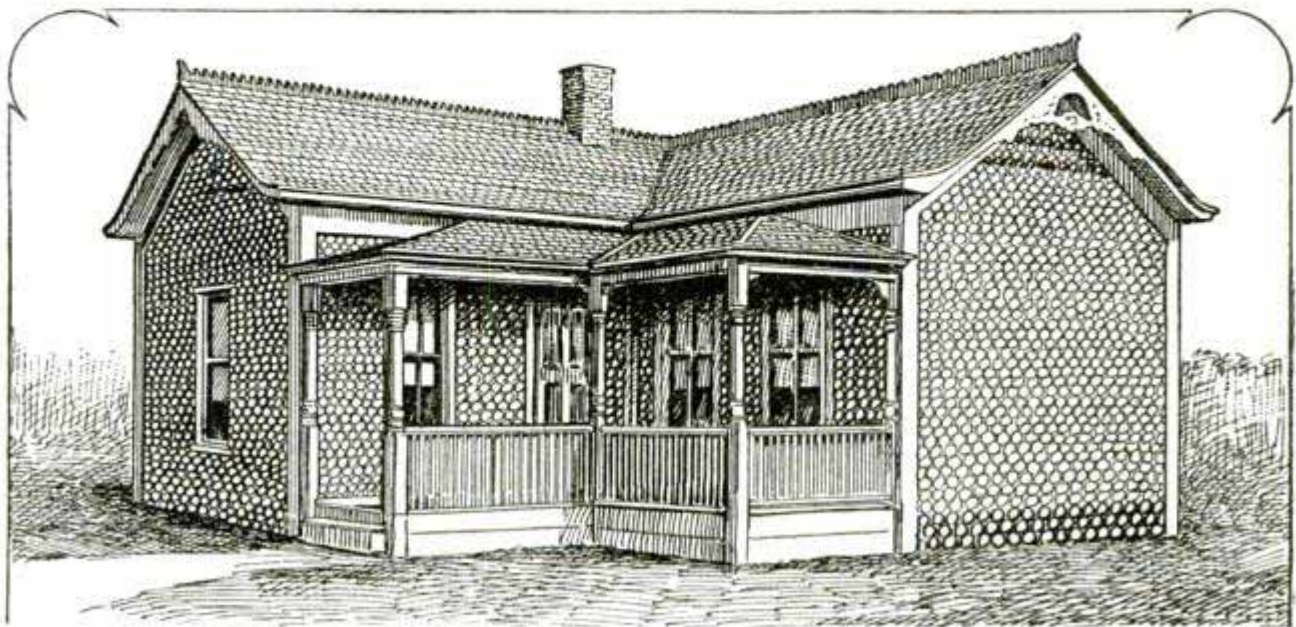
NOVEL PIANO-VIOLIN

A new musical instrument, known as the piano-violin, has been devised in Austria. It looks like a harp, plays like a piano, and sounds like a violin.



Sounds Like a Violin

The upper portion of the instrument consists of a series of strings, each of which is operated by one of the keys on the piano keyboard. Across these strings runs an endless traveling band which performs the functions of a bow. Each string is attached to a pivoted



More Than 5,000 Glass Bottles Used in its Construction

arm, worked by a key as on an organ or piano. When a key is pressed down, the string it actuates comes in contact with the traveling band, producing the sound made by a bow on a fiddle string. A pedal regulates the sound.

FOX HUNTING IN ENGLAND

The only dogs usually heard of in connection with fox hunting in England is the pack of hounds that runs



Terrier on Way to the Hunt

the quarry to earth, but little terriers often play an important part. The mission of the small dog is to drive the fox from its den or from places where it may have taken shelter that are too small for the hounds to get into. One terrier is usually carried along with each pack of hounds.

Until recently no special arrangement had been devised for the carrying of terriers, but now a special groom carries the leather bag shown in the illustration, and from it the terrier contentedly surveys the surrounding landscape until its services are required.

Five miles of the Panama canal were thrown open to navigation on February 1, when two Pacific steamships were allowed to pass through the channel from La Boca wharf to the Bay of Panama.

PORTABLE SELF-PROPELLED CANAL LOCK

It Dams the Water of the Canal and Pushes it up the Grade, Carrying Vessels Along With it—Wheel Propelled by the Water it Dams

(Condensed from Scientific American)

This movable self-propelled canal lock, the ingenious invention of an Italian engineer, consists primarily of a paddle wheel placed across the section of the canal, with the axis of the wheel resting on iron rails set into the retaining walls at the sides. The canal, of course, is an inclined one leading to a higher body of water, otherwise locks would not be necessary, and it may have a grade of from 3 to 6 or 7 per cent.

The clearest idea of the system can be gained by looking at the illustrations, which are of the model canal built near Rome by the inventor. This model canal is about 80 ft. long, the width being about 14 in. The small boat used is 3 ft. 6 in. long, and draws 4 in. of water. The paddle wheel almost closes the canal, the opening below the wheel being about $\frac{3}{8}$ in., just enough to allow a slightly less quantity of water to pass under the wheel than comes down the canal. The wheel is locked by a simple device and the water backs up for a distance of 15 or 20 ft., thus giving a head of about 6 in. It is upon this head of water that the canal boat rests. When the wheel is unlocked it immediately begins to revolve, rolling up stream by the aid of the power generated by the water running under it and turning the paddles or buckets. The greater the head, the faster the wheel moves, thus allowing the water to pass under the wheel faster, and when the water has reached its normal head of 6 in. the wheel assumes its normal speed, which is about $\frac{1}{2}$ mile an hour in the model.

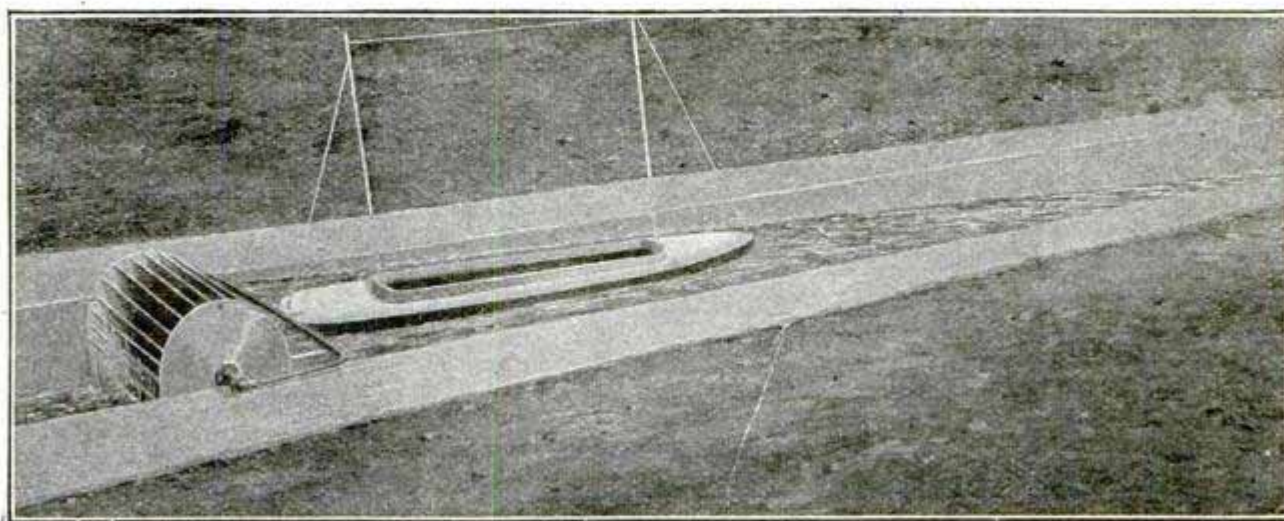
This description, of course, concerns only the movement up the canal, and another canal is used for traffic down. In the latter as well as the former exactly the same principle of the water wheel is used, with the exception that the main axis of the wheel for the

descent is carried upon a truck supported by four wheels running directly on the rails.

Although the model system is all that has yet been constructed there seems

and when the tendency is to go too fast, the head of water in front of it will fall, thus decreasing its speed.

The core of the idea, simply stated, is that the wheel pushes a head of water



Model Canal Built Near Rome; 80 Ft. Long, 14 In. Wide

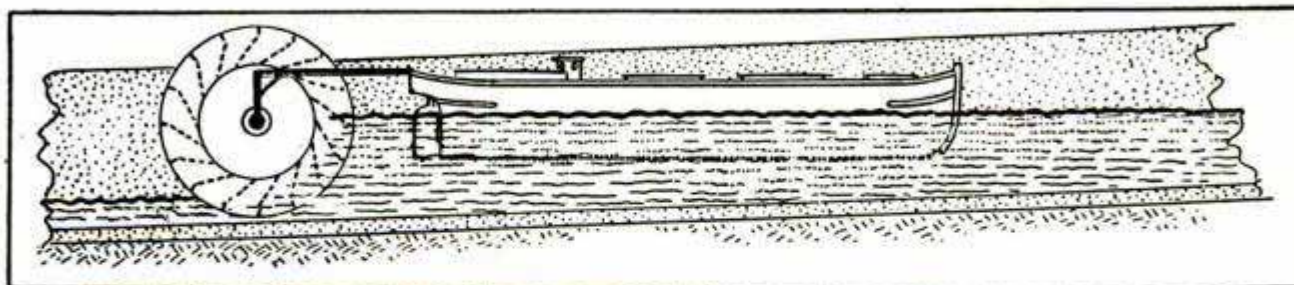
to be no doubt but that it will work satisfactorily on the large basis required for actual conditions, and in places where it can replace a string of locks time could be saved in the passage of a boat as well as economy in construction achieved.

Experts claim that in a canal built upon a grade of 4 per cent, boats 120 ft. long could be passed through by this system where there is an available water supply of 420 cu. ft. of water per second, which is as much as is re-

sufficient to float vessels and by which the vessels are carried along, up a grade to a higher level of water, and by power generated by the water it allows to escape under it.

BARNUM'S MONUMENT ROBBED

Some time ago the citizens of Bridgeport, Conn., erected the handsome monument shown in the illustration in memory of their most famous citizen,



Plan of Construction of Model Canal

quired for the operation of the Erie canal for the same tonnage. The amount of traffic makes no difference as long as the boats keep a few hundred feet apart.

It is likewise interesting to learn that the device is self-regulating in speed. When the tendency of the wheel is to go too slowly, the head of water back of it will increase, thus creating a greater force to make it move faster;

P. T. Barnum, of world-wide circus fame. Four beautiful bronze urns were placed at the corners of the base, where they recently drew the attention of a connoisseur of old metal at a psychological moment, this moment being one at which his funds were low. Consequently, three of the urns disappeared in a night, to be found later in a junk shop, and the robber paid the penalty in the county jail. The urns

were so disfigured they could not be restored.

Minor cases of vandalism against



(Courtesy Monumental News)

Barnum's Monument Before It Was Robbed

public monuments are not infrequent, but this is one of the most daring instances on record.

HOW TO MAKE A SETTEE

This handsome piece of mission furniture is designed to be made up in three different pieces as desired, the only changes necessary being in the length of the one front and the two back rails. The settee can be made into a three-cushion length by adding the

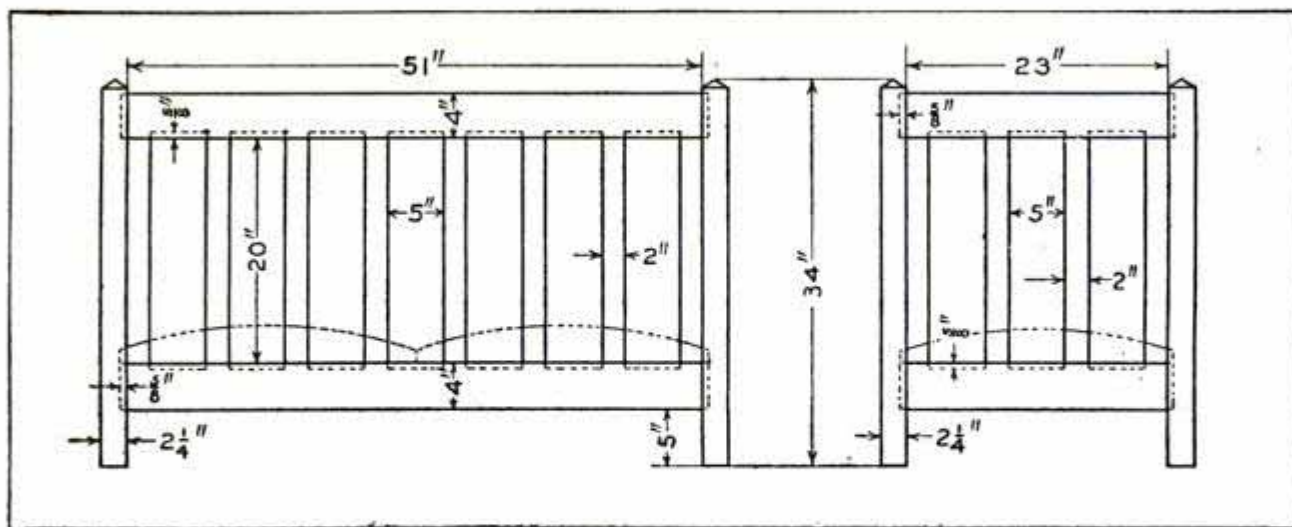
stock list of materials ordered mill-planed and sandpapered will be sufficient to make up the settee as illustrated. Oak is the most suitable wood which can be finished in either mission or a dark golden oak.

- 3 rails 1 by 4 by 52¼ in.
- 4 end rails 1 by 4 by 24¼ in.
- 4 posts 2¼ in. square by 34½ in.
- 13 slats 7⁄8 by 5 by 21¼ in.
- 2 cleats 1 in. square by 51 in.

All the rails are mortised into the posts for a depth of 5⁄8 in., also the slats are mortised 5⁄8 in. into the rails. The material list gives the exact dimensions for the rails and slats as they will not need to be squared for entering the mortises provided you are careful to get all lengths cut to dimensions. When cutting the mortises take care to get them square and clean. The posts have 1⁄2 in. extra added for squaring up and cutting the corners sloping on the top ends.

The joints are all put together with glue. Nails can be driven into the posts intersecting the tenons of the rails on the inside, as they will not show and will help to make the settee more solid.

The cushions can be made with or without springs as desired. If made without springs, 15 slats must be provided in the material list 1⁄2 in. thick, 2 in. wide and 24 in. long to be placed on the cleats fastened to the inside of



Details of a Mission Settee

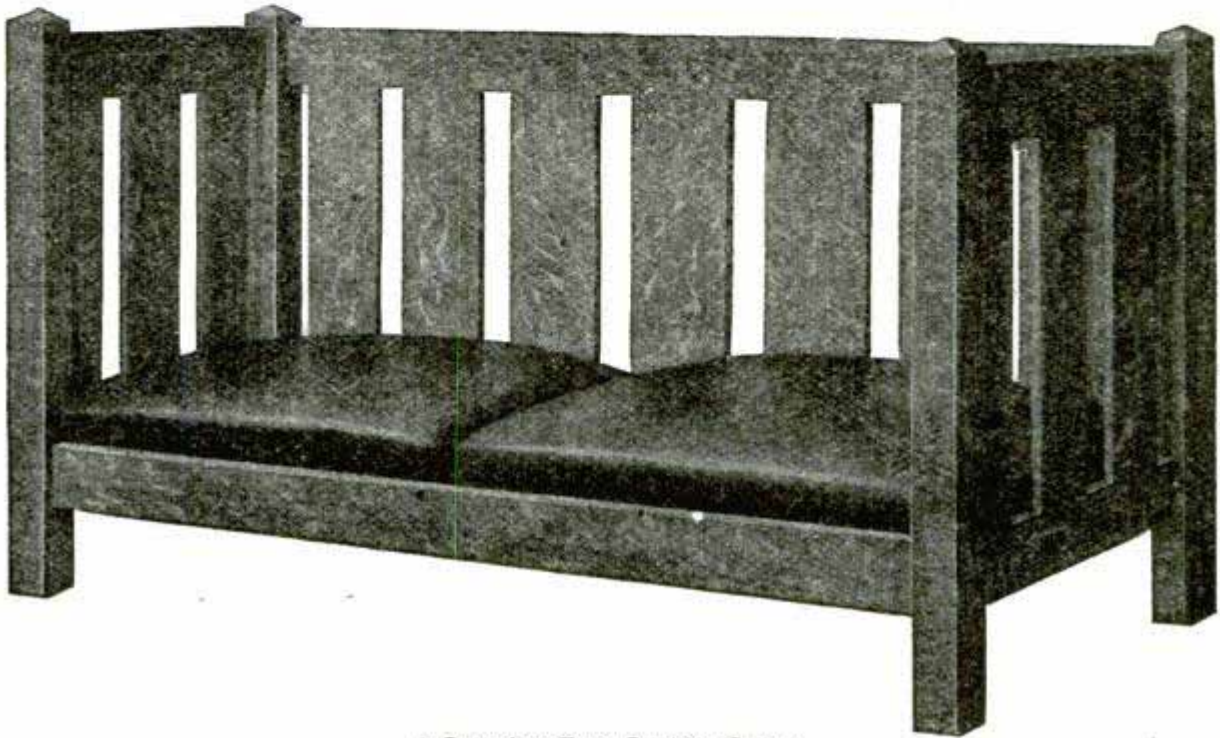
length of another cushion to the dimensions of the one front and two back rails. A companion piece chair can be made by using suitable length rails to admit only one cushion. The following

each bottom rail. The two cleats are fastened one on each inside of the front and back rails with screws. The location as to height of these cleats will depend upon the kind of cushions used.

The parts necessary to make the cushions with springs are as follows:

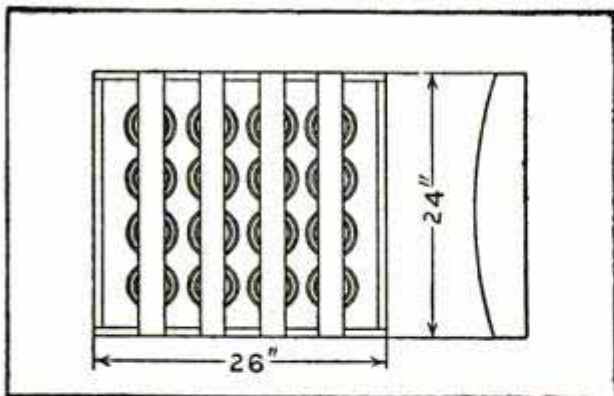
- 4 pieces 1 by 2½ by 26 in.
- 8 pieces 1 by 2½ by 24 in.
- 4 pieces 1 by 2½ by 22 in.
- 32 8-in. springs.
- 2 pieces leather about 29 by 31 in.

the open box frame. When complete the cushions are set in loose on the cleats, which should, in this case, be placed about 1 in. from the top of the rails.



A Complete Two-Cushion Settee

An open box is made from two 26-in. and two 22-in. pieces, and across the bottom are mortised and set in four 24-in. pieces to form slats on which to set the springs. The tops of the springs are tied or anchored with stout cords



Detail of the Cushion

running in both directions and fastened to the inside of the pieces forming the open box. These should be tied in such manner as to hold each spring so it cannot slip over and come in contact with another spring.

Roan or pebbled leather are very popular for cushions for this style of furniture. The leather is drawn over the springs and tacked to the outside of

INGENIOUS DEVICE TO REACH SUNKEN TREASURE-SHIP

A great steel tube, nearly 100 ft. in length, with an extension section and a working chamber at the lower end, is the latest device with which an attempt will be made to recover the greater part of the \$2,500,000 treasure in gold coins and bars, which is said to have gone down in the "Lutine" in 1797 near the island of Terschelling, off the coast of Holland. A portion of the treasure has been recovered, but all ordinary dredging plants are now useless, as the vessel has gradually sunk deep into the sand.

One end of the tube will be clamped to the side of a steamship or barge, and the other end with its extension section will be sunk by means of water ballast until it touches bottom. Then, by means of compressed air, all water will be forced out of the tube and chamber, so that engineers and divers can descend.

But the ingenious part of the arrangement is the two powerful suction pumps or dredgers which are attached

to the outside of the chamber. These, operated by engineers inside the chamber, are expected to suck away the sand around the sides of the tube until it sinks by its own weight onto the deck of the wrecked ship. Then the divers, making their way to the deck by means of water-tight doors in the chamber, hope to enter the hold and bring the treasure out by easy stages.

ELECTRICALLY-DRIVEN BRASS POLISHER

To keep a high polish on brass work, whether it be in engine rooms, on ship-board, or in large buildings, requires hard labor of a kind that is sometimes neglected, although not by well regulated staffs. This machine, which is an electric polisher, was designed to save both time and labor, and is much more economical than hand polishing.

The outfit consists of a small electric motor with switch mounted on the top and straps for swinging it over the shoulder of the operator, the motor resting against his hip. On the arma-



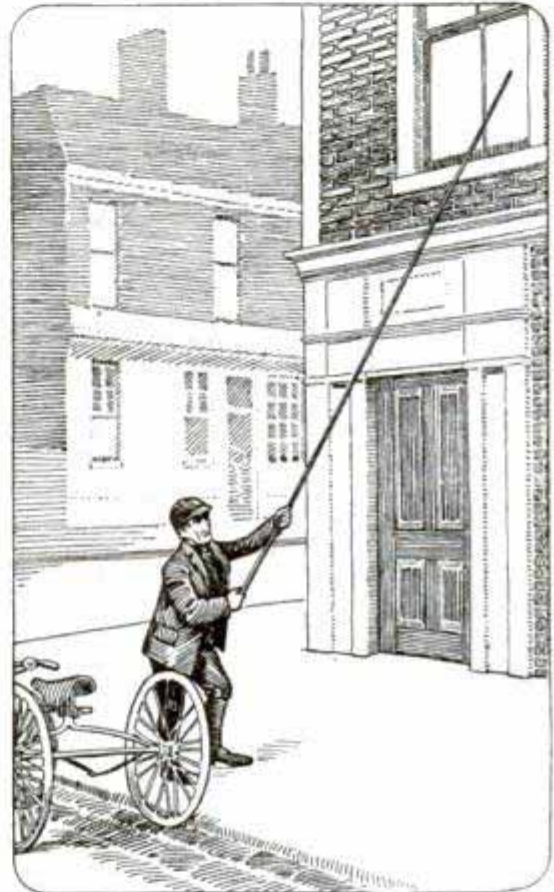
Polishing Brass

ture shaft is a flexible shaft at the end of which the polishing disk is revolved. The outfit is provided with a long flexible cord and an attachment plug, so

that it can be connected to any electric lighting fixture with ease.

A HUMAN ALARM CLOCK

Probably one of the most curious means in the world of earning a living is that of the window-tapper of Notting Hill, London, who is, figuratively speaking, a human alarm clock. He is



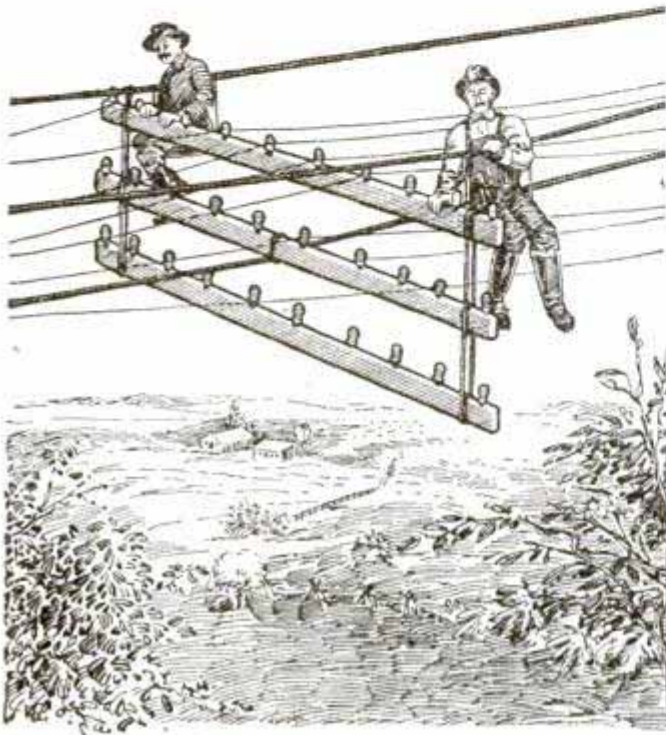
"Awake! Awake!"

employed by many persons whose business compels them to start work in the early hours of the morning, and his hours are from 2 a. m. until 8 a. m. He makes his rounds on a tricycle and he rattles at the windows of his clients with a jointed fishing-rod. His rattle is more persistent than that of an alarm clock and will not cease until he is certain that the person in the room is not only awake, but out of bed, thus insuring that they will not go to sleep again. His fee is small, but the total is considerable for a 70-year-old man to earn.

The new United States battleship "Michigan" has been presented with a silk flag which cost \$325.

SUSPENDING TELEPHONE WIRES WITHOUT POLES

It is sometimes difficult to string wires to telephone poles in the valleys of some of the rivers of California because the water carries them away



Suspended Across 700 Ft. of Space

during flood season. This illustration shows the plan adopted to suspend the wires across 700 ft. of a river valley near Fresno. The ordinary telephone-pole crossbars are made fast to heavy cables, and these bars carry the wires, as under ordinary circumstances. Three sets of cross bars are attached to the suspension cables in the 700-ft. space.

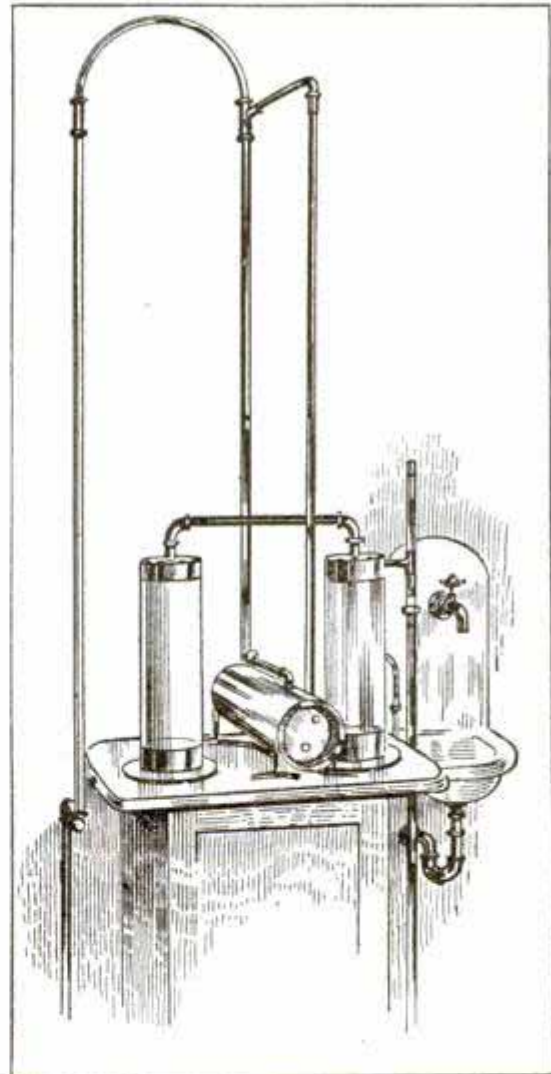
SMALL OZONE WATER-PURIFYING PLANT

The apparatus shown in this illustration is a small ozone water-purifying plant of a size that would be suitable for a large hotel, restaurant, store, or any place where a large amount of drinking water is consumed. It has a capacity of 4,000 gal. per day.

In its operation, either direct or alternating current service at the usual lighting pressure is passed through a transformer which raises it to about 8,000 volts. This high voltage produces a silent electric discharge in the

ozonizer, which is a box containing alternate plates of aluminum and mica-nite. It is this electric discharge and the air that passes through the box that produces the ozone.

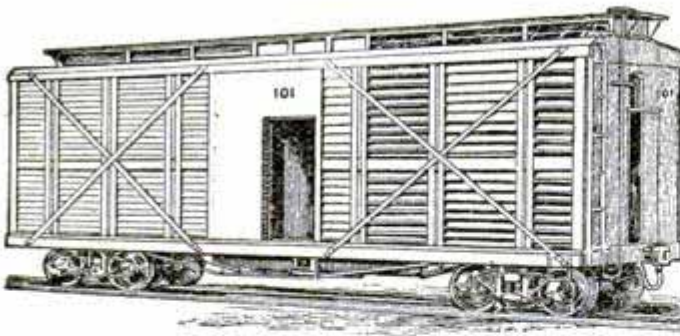
The water to be treated flows from the city mains to the highest point of the pipe shown in the illustration, and descending it draws the ozone by means of an aspirator from the ozonizer, thoroughly mixing with it and causing every particle of water to come in contact with particles of ozone. The ozone charged water then passes into a sterilizer where the process is completed by the ascent of the ozone in the form of innumerable minute bubbles, which, coming in contact with



Capacity, 4,000 Gal. per Day

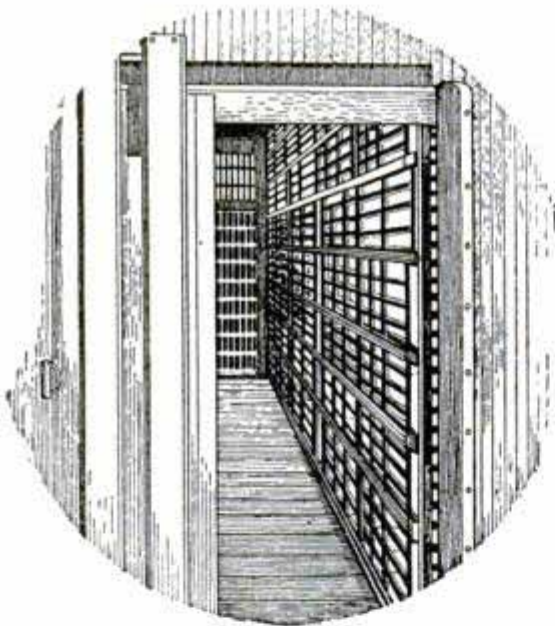
any disease germs, completely destroy them.

Ozone is practically a concentrated form of oxygen, and destroys the bacteria the same as if they were burnt with fire.



CAR FOR POULTRY TRANSPORTATION

This exceptionally well designed poultry car was recently built for the American Poultry Car Co. The tiers of poultry crates are built in sections of convenient size, with sliding doors accessible from a passageway running the full length of the car in the center.



Passageway Full Length

There are doors at both ends of the car as well as sliding doors at the sides. The side sheathing of the car is made of

adjustable shutters which may be closed completely or arranged for proper ventilation.

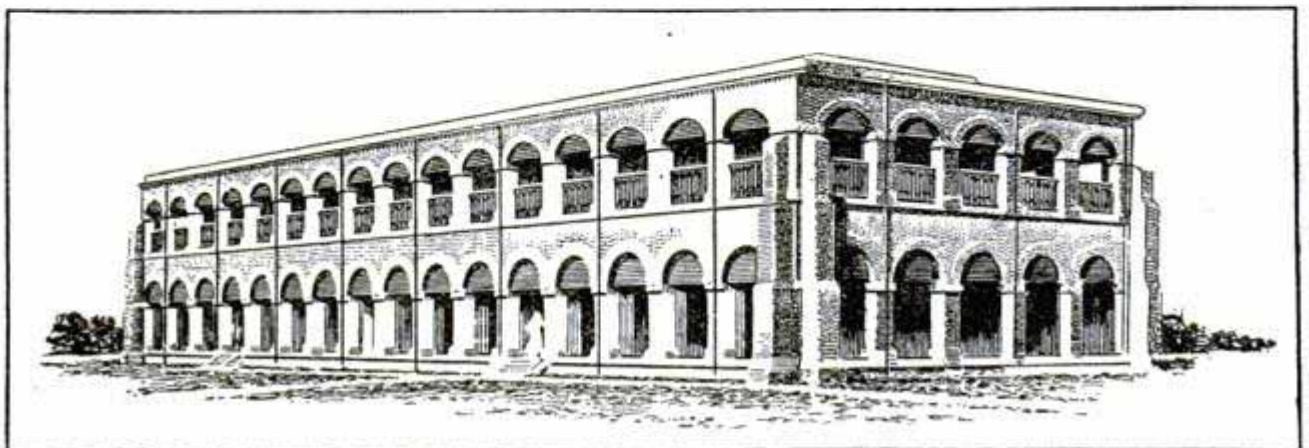
BENGAL RAILWAY HAS HOME FOR APPRENTICES

A large and completely equipped building has recently been opened by the Eastern Bengal State Railway as a home for the European and Eurasian apprentices attached to the locomotive and car shops of the line. Formerly there was no such accommodation, the boys having to board themselves in separate rooms provided by the railroad, and the idea is an innovation for India.

It is believed that the new home will not only benefit the boys earning low wages, but will also teach them to appreciate a clean, comfortable home, and generally cultivate a desire for order and respectability. The boys sleep in two large dormitories, and provision is made for a large study and reading room, as well as a general dining room. Broad verandas on all sides of both floors is one of the features of the building.

The home and boys are under the supervision of a European superintendent and his wife.

Telephones have been installed in the homes of 517 trainmen of the Pennsylvania system at Altoona, Pa., so that the men can be called by wire when their turn comes to take a train out, instead of by a messenger or "call-boy."

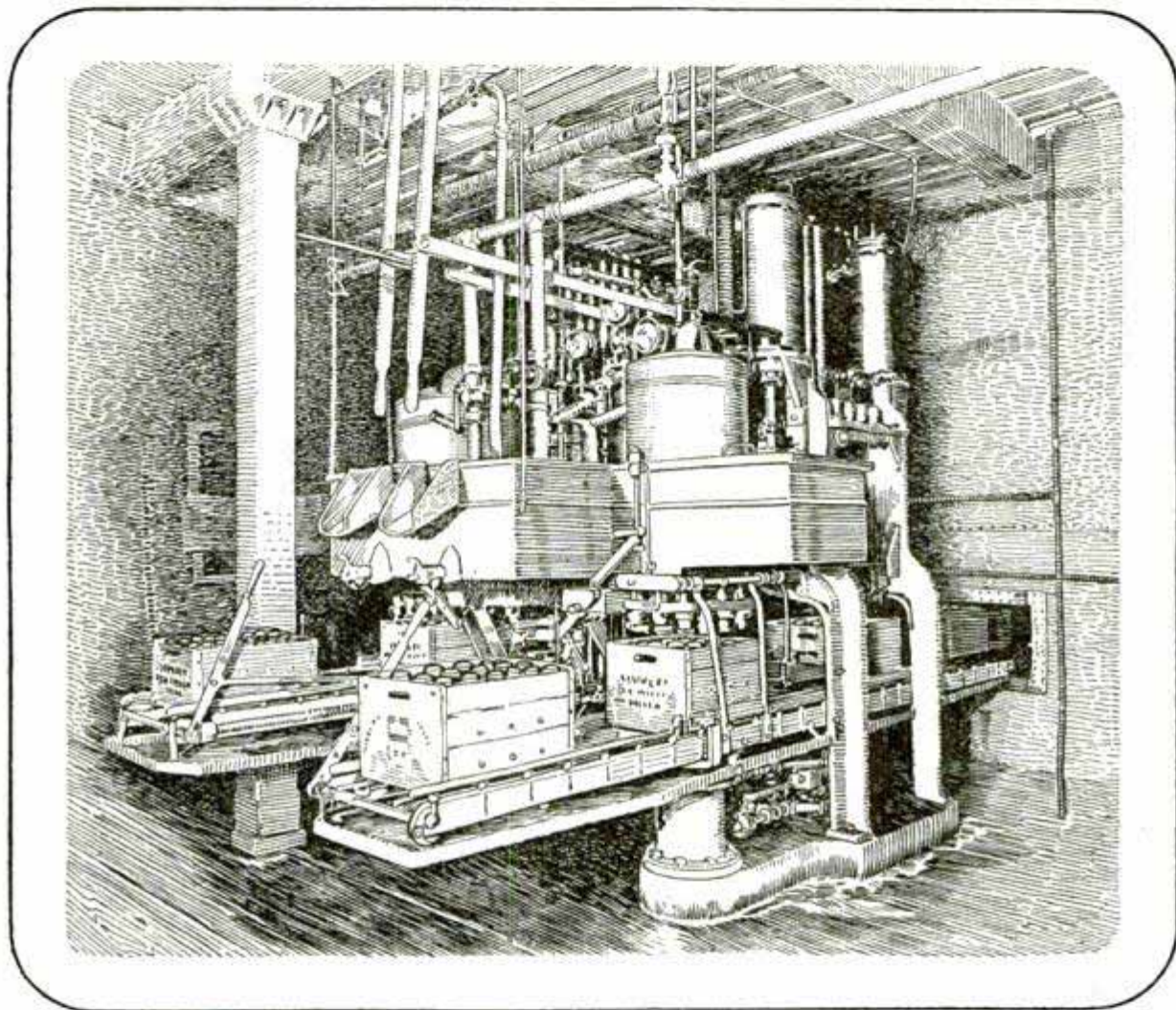


Eastern Bengal State Railway's Model Home for Apprentices

BOTTLING MILK BY MACHINERY

The filling of milk bottles by ordinary methods is such a tedious task for large metropolitan milk companies that such a machine as the one here illus-

tries it to an apparatus which automatically caps each bottle and then discharges the carrier upon a car. This car carries the filled bottles either to a



Filling 7,680 Milk Bottles an Hour

trated has become an absolute necessity. This machine is the newest and speediest yet placed in commission. Operated by two men, one to operate the machine itself, the other to see that it is properly fed with bottles, it has a capacity of 7,680 bottles an hour. Each operation, which takes about 15 seconds, fills with milk 12 quart bottles in one carrier and 20 pint bottles in another.

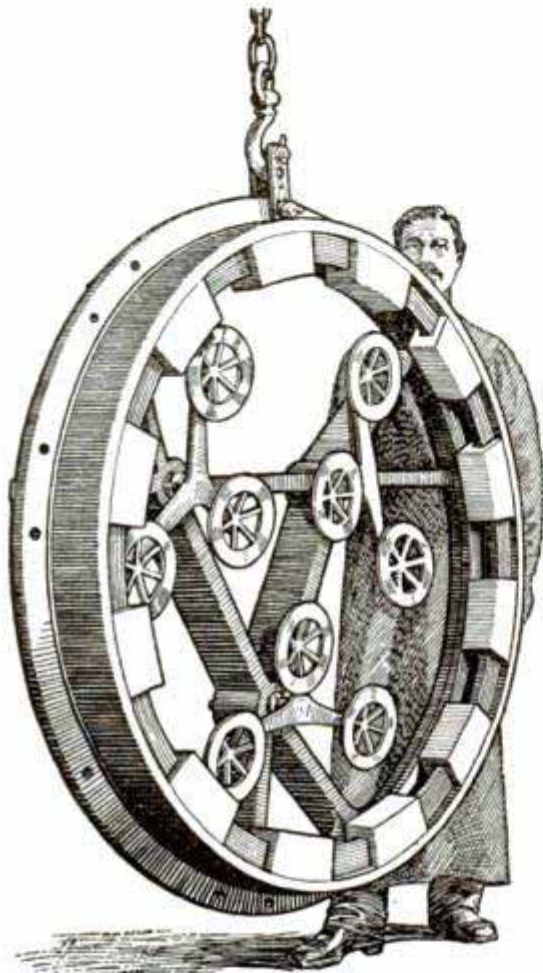
With almost human intelligence the machine picks up a carrier of empty bottles, straightens it, if it happens to be out of line, moves it under and lifts it against a battery of spouts from which the milk issues, lowers and car-

cold storage room or a platform from which wagons are loaded.

The machine is claimed to be absolutely sanitary, even the caps for the bottles being sterilized after they are placed within it. The rate of operation may be regulated to the fraction of a second by a speed adjuster, operated by a hand wheel. This is necessary because it takes more time to fill a quart bottle than a pint. Half-pint bottles, which have a neck the same size as a pint bottle, are also used, the machine being adapted for cream as well as milk, also for buttermilk. Cream and buttermilk flow much slower than milk, another reason for the speed adjuster.

INGENIOUS CELL FOR HUGE REFLECTOR

This cell for the new 40-in. reflecting telescope in the Lowell observatory is



Cell of Lowell Reflecting Telescope

entirely different from anything of the kind previously made. The glass it will hold weighs 907 lb., and its own weight is but 915 lb., which is unusually light for the purpose. The "wheels" are supports for areas of weight of the mirror, and so made that they will expand and contract with heat or cold in the same ratio as the glass. The mirror is divided into nine areas of equal weight, one "wheel" coming in contact with the center of gravity of each area.

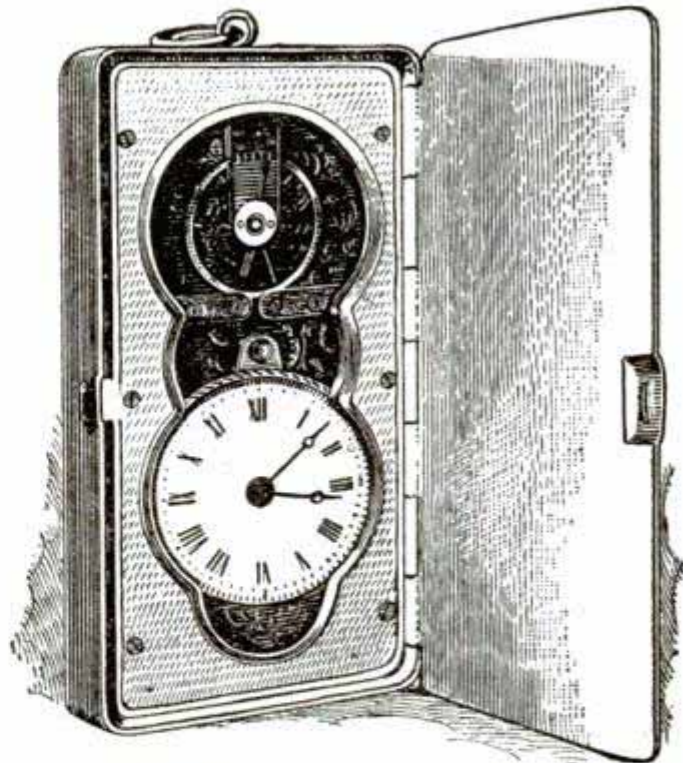
Photographs of heavenly bodies, unless they be the sun or moon, are not snapped, but time-exposed. Therefore the most delicate clockwork must be employed, in addition to human checking through a finder, to keep the planet, asteroid, star, or nebula, in the exact center of the field of view throughout the period required for the making of

the negative. It is essential that all possible precautions be taken with the apparatus to prevent temperature changes from altering the form of the photographic image.

OLD POCKET CLOCK AND SNUFF BOX

This novel pocket clock or watch and snuff box combined is over 100 years old, yet keeps excellent time today. Instead of the works and dial being inclosed in a round case, with the dial over the works, as has been the custom since the pocket time-piece first came into use, the works are above the dial and show when the cover is opened. The back part of the case is a snuff box.

The case is of silver, lined throughout with gold. The back is handsomely engraved in flowers and other designs, and the outside of the front lid bears the design of a dial, vines, etc. The height of the case is $2\frac{3}{4}$ in., the



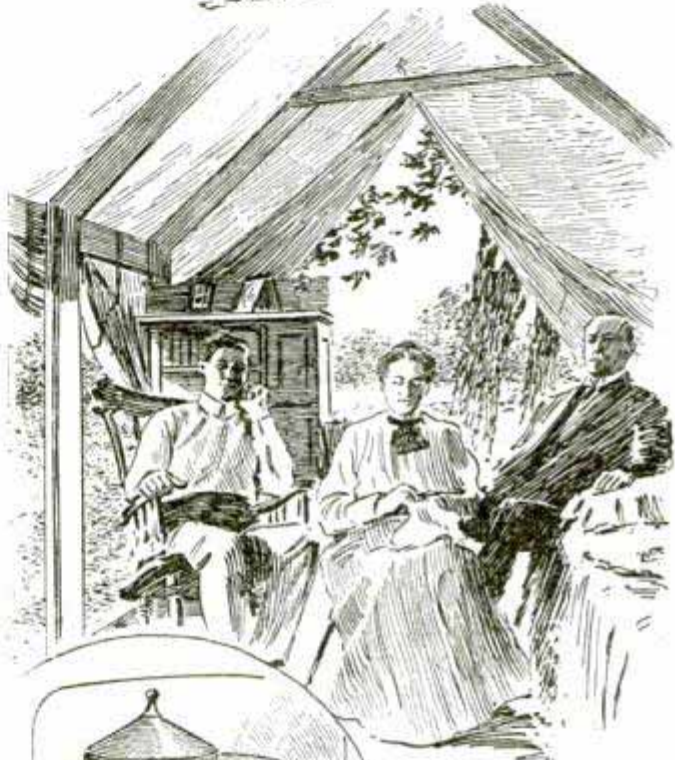
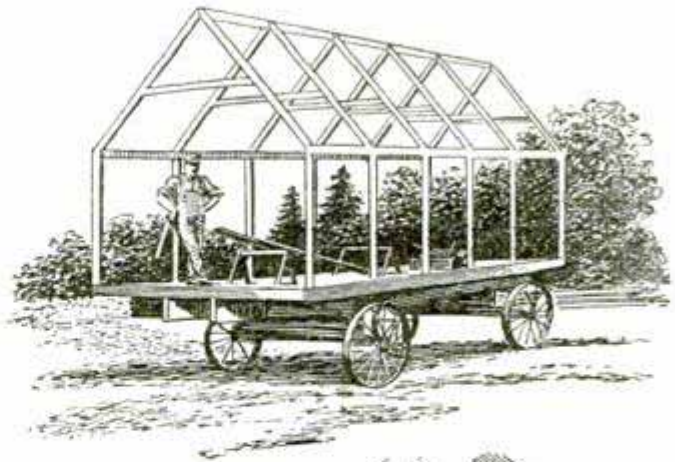
Remarkable Old Watch Still Keeps Time

width $1\frac{3}{8}$ in., and the thickness $\frac{3}{4}$ in. The works are pronounced a marvel in construction by all jewelers who have examined them.

TENTS ON WHEELS

Tents on wheels are far superior to tents pitched on the ground, because they furnish means of transportation, make possible a continual change of scene, and keep the living quarters well off the ground. Many families provided with such an outfit journey several hundred miles during the summer season and go southward in the fall, stopping several days when the scenery strikes their fancy. Others do not take horses with them, but hire teams when a move is desired, moving only once in awhile.

The usual equipment is about 21 ft. long, 9 ft. wide, and 10 ft. from floor to peak. These illustrations show a "tent on wheels" that has been recently patented and placed on the market. The framework bolts together easily and can be placed on ordinary low-wheeled farm or other wagons.



Framework of Tent on Wheels
Interior View of the Outfit

RABBITS AS FOOD AS WELL AS PESTS

The rabbits with which Australia is overrun are fought as pests, and undoubtedly generally known only as pests, more than \$17,000,000 having already been spent in constructing rabbit fencing to keep them from destroying the productiveness of the land. But they are also a source of revenue, although their value is vastly over-balanced by the damage and expense they are responsible for.

During the last five years 41,423,000 frozen rabbits and 98,242,000 skins were exported while 5,000,000 skins were used for local consumption, these skins representing rabbits that would consume as much grass as more than 2,000,000 sheep. Last year England received in cold storage ships nearly 600,000 crates of the pests, which provided her with cheap and wholesome food that hardly could be spared by the poorer classes.

The loss to railroads in earnings for the year 1907-8, caused by the panic of 1907 is now estimated at \$330,000,000.

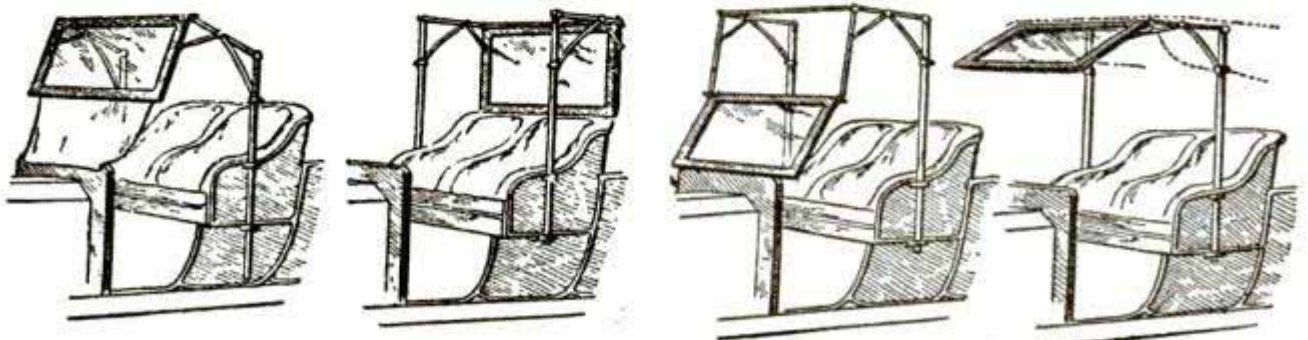


AEROPLANE DEVICE FOR BICYCLES

One of the most interesting small exhibits at the recent aerial show held in London was a cycloplane. The box-like planes fastened high enough above the bicycle frame to clear the rider's head are claimed to give lightness to the machine, thus making possible more speed.

ADJUSTABLE WIND SHIELD

An adjustable wind shield that can be placed at any height in front, above, or back of the two forward seats, is being used on many automobiles in England and on the continent. Four positions are shown in the illustration.



Ingenious Wind Shield

LARGER RAILWAY TIES ARE NECESSARY

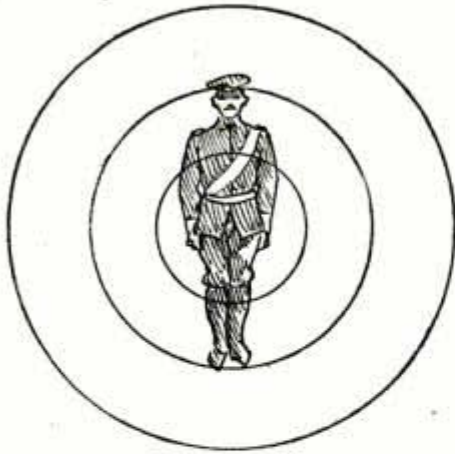
It is claimed that in order to keep pace with the increase in number and weight of engines and trains, larger ties must be used. According to the Railroad Herald these ties should be at least 8 in. by 10 in. by 9 ft. in dimensions, thus giving per tie a bearing area of 7.50 sq. ft. as against a similar surface of 5.33 sq. ft. in the 6-in. by 8-in. by 8-ft. tie now ordinarily used, an increase of 40 per cent. Spaced with 24-in. centers, 15 ties would have a total bearing area of 112.5 sq. ft. as against 96 sq. ft. for 18 smaller ones. Such ties, creosoted and tie-plated, supported by good rock ballast, would, according to the same article, measure up to the requirements of up-to-date track.

THE WRIGHTS IN ENGLAND

In the early part of May the Aeronautical society of Great Britain, at a meeting remarkable for its demonstration of enthusiasm, conferred upon Wilbur and Orville Wright its first gold medal. Col. J. E. Capper, the English war office's aeronautical expert, referred to the Wright brothers as unspoiled by public adoration, and declared that the nation which failed to keep pace with the flying developments might get badly left in war.

England will probably conclude arrangements with the Wrights for war aeroplanes after the trials of the machines above English soil.

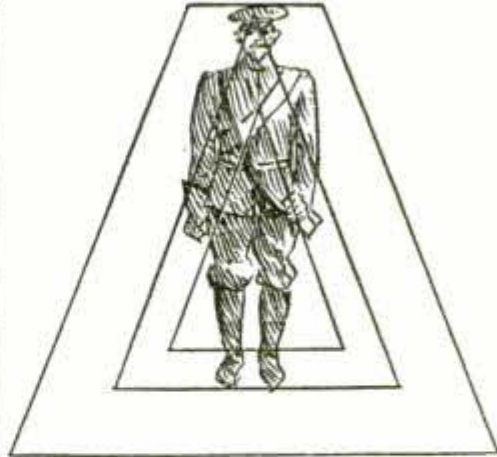
The new electric iron smelter tested at Redding, Cal., has demonstrated its success.



An Impractical Army Target



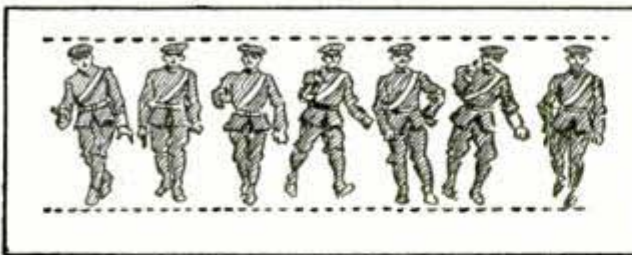
Used with Triangle Diagram



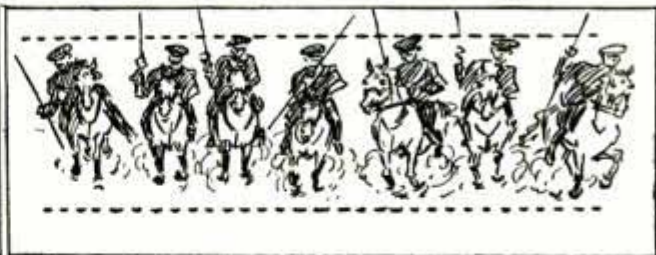
Makes Scoring Practical

THE NEW BRITISH ARMY TARGETS

European military experts some time ago concluded that the circle target is unsuitable as an aiming and scoring diagram for human figures, and on the new British targets the lines showing the closeness of the hit are now triangular. Two of the drawings show the circular and the triangular target. The reason why the circular target is unsuitable is obvious, also, the fact that the triangle has direct relation to the human figure as an aiming and scoring surface. The other illustrations show an infantry target for individual firing, and infantry and cavalry targets for collective firing.



(Courtesy Black & White, London)



An Improvement in Army Targets

MACHINERY OF PIONEER STEAMER A RELIC

What is left of the machinery of the steamer "Beaver," the first that ever plied the waters of Puget Sound, is to be kept at Tacoma by the Washington State Historical Society as a memorial of the early days of the Northwest. The vessel is also claimed to have been the first steamer to cross the Atlantic ocean from east to west. She left Europe in August, 1835, and made her first stop at Robinson Crusoe island, on the

west coast of South America, in December of the same year.

MOTORBOAT LEGISLATION

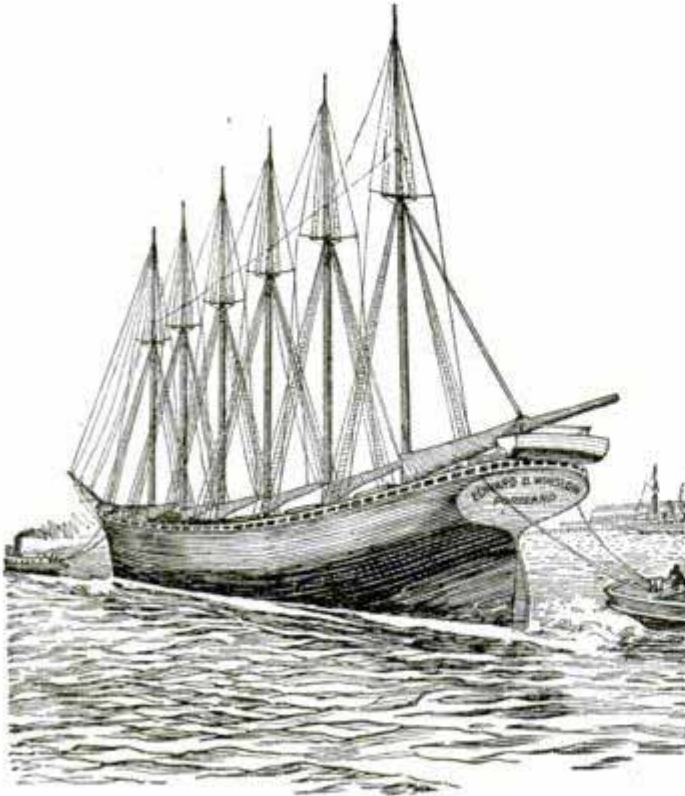
The national legislation requiring mufflers or underwater exhausts, and life preservers on small motorboats was defeated. George Uhler, supervising inspector-general, states that it is not at present likely that there will be any change in the laws or rules governing such craft.

PROPER AIR PRESSURE FOR AUTO TIRES

On account of the great damage done to automobile tires by running them improperly inflated a regular fixed

schedule of air pressures has been computed, based upon the size and weight of load. For 3½-in. tires, 60 lb. is recommended; for 4-in. tires, 75 lb.; for 4½-in. tires, 85 lb.; for 5-in. tires, 90 lb.; and for 5½-in. tires, 95 lb.

Electric service throughout a large part of Southern California was put out of commission for 10 minutes recently by the electrocution of a huge eagle, which alighted on two of the main feed wires. This often occurs in California.

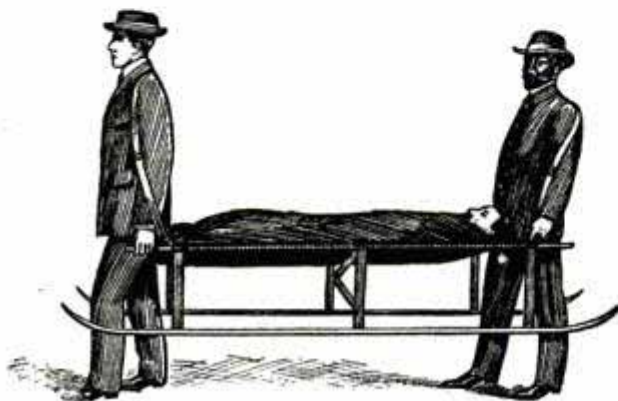


HUGE WOODEN SAILING SHIP

The "Edward B. Winslow," a 6-masted wooden schooner, is one of the largest sailing vessels in the world. The illustration shows her at a Philadelphia coal dock taking on her first load. She is able to carry 5,800 tons of anthracite, but owing to her great depth of 28 ft. 6 in. when so loaded, could not get through the Delaware river, therefore her first trip was made with 5,500 tons.

STRETCHER FITTED WITH RUNNERS

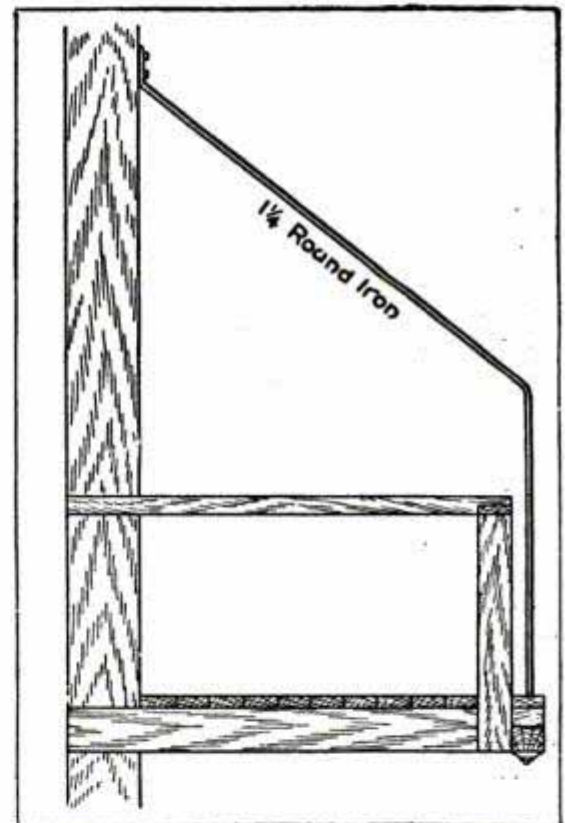
In Switzerland, where almost every person old enough to walk and young enough to get about takes an active part in winter sports, it is not unnatural that there are many accidents. Broken limbs or strained tendons are



sometimes the result of ski-jumping and tobogganing, and, in anticipation of such accidents, stretchers of the kind here illustrated are in readiness at well-frequented courses and jumps. They are provided with runners so that they can be slid along where the way is smooth. When traveling over rough ground the stretcher is carried, straps being passed over the shoulders of the attendants.

PECULIARITY IN CONSTRUCTION

The accompanying drawing shows a landing that extends from a gallery cut

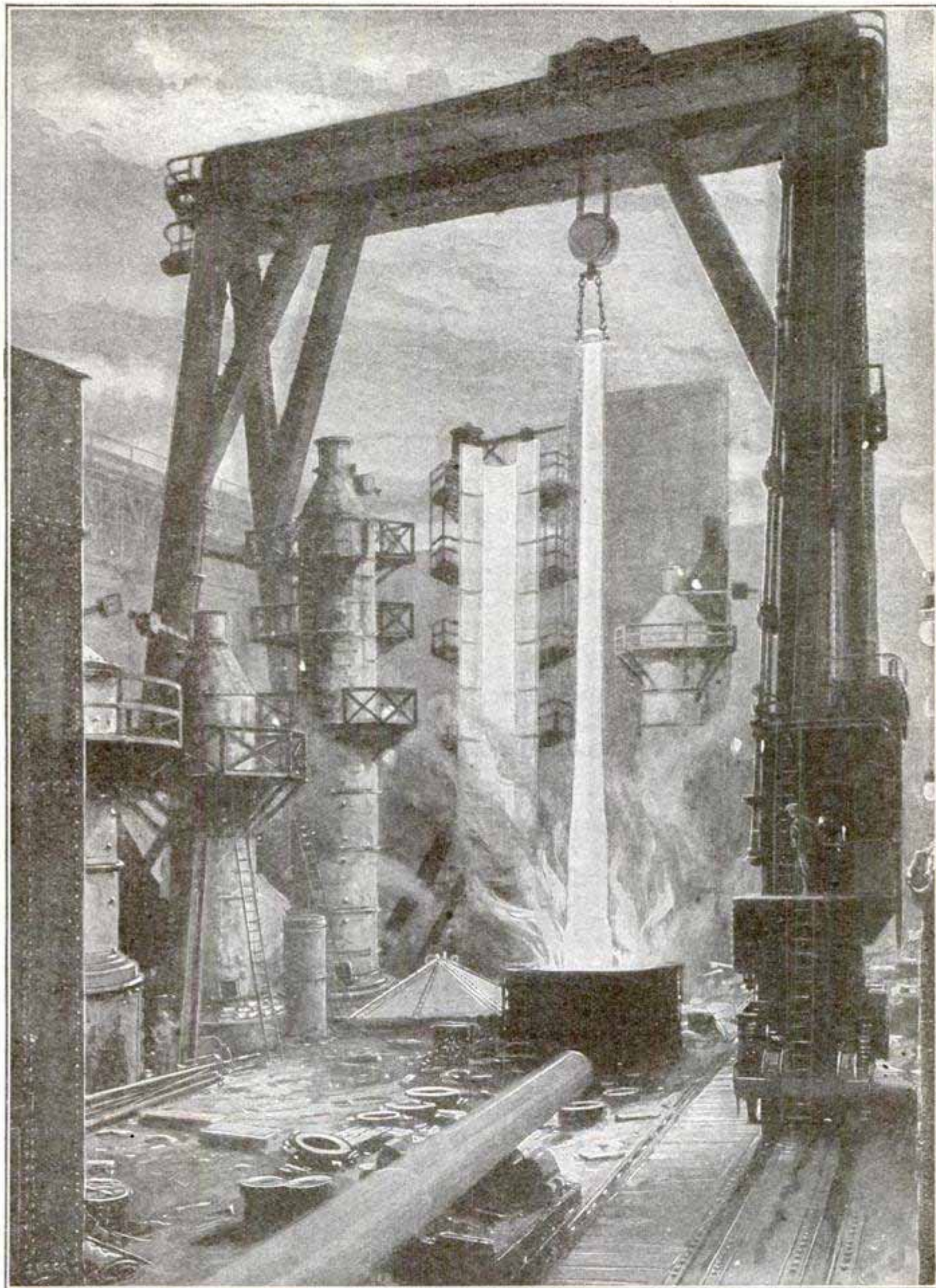


A Miscalculation Here

under a crane runway in a machine shop. It is interesting because, as the drawing shows, the brace construction does absolutely no good. The machine shop is in Columbus, Ga.

The Technical High School of Munich has conferred the honorary degree of Doctor of Technical Sciences on Wilbur and Orville Wright.

The Aero Club of France has issued its first licenses as sky pilots. The Wright brothers are among those so honored.



GUN WORKS AT SHEFFIELD, ENGLAND.—The vertical metal towers shown in the drawing are furnaces lined with brick, and are used for heating tubes for guns in the process of oil-hardening. The tubes are placed in the furnaces, are heated to a specified heat, and are then picked up by the crane shown, which is a travelling crane capable of lifting a hundred tons. The tubes are carried to a position over a large tank sunk vertically in the ground and filled with oil, and are lowered into it until completely immersed, and left there to cool. To reduce the height of the lift, the furnaces are so constructed that their sides open and make it possible to take the tubes from the furnace in a horizontal direction. An open furnace is shown in the background. The tube illustrated (an "A" tube for a 50-calibre 12-in. gun) is some 54 ft. long in the state shown. Directly the tube touches the oil, the latter bursts into flame, but this stops as soon as the tube is completely immersed.—Courtesy London Illustrated News.

BATTLE FLEET IN PRIME CONDITION

Newspaper Stories to the Contrary False—The
World Cruise a Great Practical Train-
ing School—Extra Expense
Only \$1,500,000

Secretary of the Navy Meyer emphatically denies the recent report that the Atlantic fleet, which encircled the globe, had returned worn out and was fit only for junk. On the contrary, he declares that lessons of the cruise will result in a gain in efficiency of the naval arm, and when the big sea fighters are again united they will be in better war condition than ever.

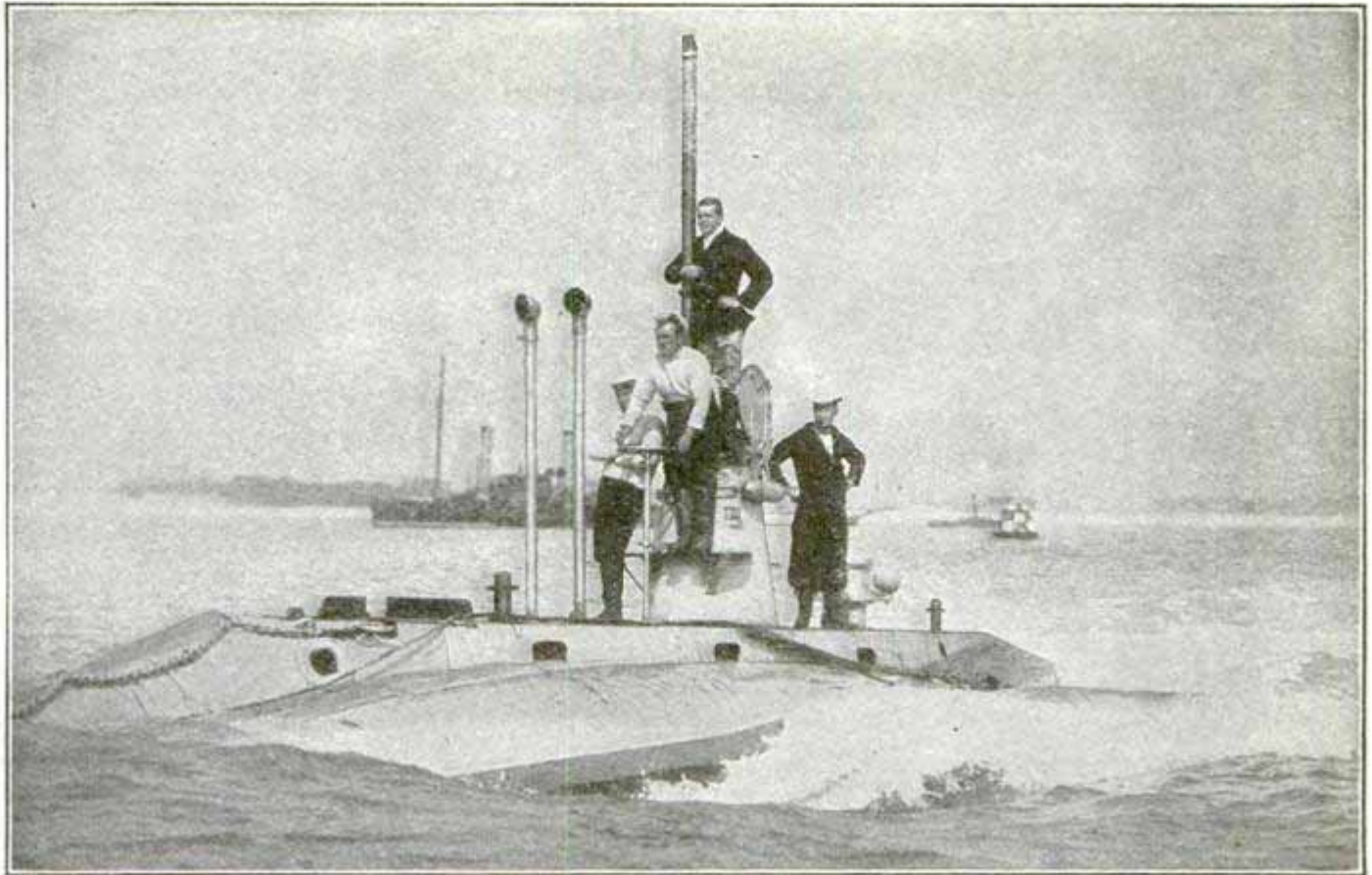
The 16 battleships of the Atlantic fleet will go from the navy yards, where they are now being overhauled and docked, on June 15 radically changed in outward appearance. The vessels will practically be in a condition for action to a degree which has never before prevailed in the naval service in time of peace and when there has been no prospect of war. These important changes are mainly the result of experience gained during the circumnavigating cruise of the fleet, which Secretary Meyer says cost the government \$1,500,000 above what would have been the cost of maintenance and operation had the ships remained in home waters. Naval strategists look upon this extra expense as a premium paid for the benefit of increased naval efficiency and as representing an investment most useful in improving the hitting power of the naval arm.

The most conspicuous change which the civilian observer will recognize is in the color of the vessels. The hull, small boats, and, indeed, all of the exposed portions will be of a shade described as a dull gray, without the lustre to reflect the sun or otherwise add to the prominence of the ship. It is the color decided upon by the experts as least likely to attract attention and as possessing the greatest degree of invisibility. This idea has been carried out by the removal of all the brass fittings, even to the doorknobs, and includes the abandonment of the bow ornaments and gilt letters of the ship's name.

The removal of the bow ornament is justified not only as a means of taking from the ship a conspicuous feature, but as accomplishing a reduction in the weight carried by each vessel. The policy is to reduce these weights so as to bring each vessel down to fighting trim, carrying only those things of practical value in attack, which is considered before the factor of defense. There has been an elimination of some of the boats carried by the battleships, with the substitution of motor for row or sail boats, so that time may be saved and the burden reduced. It is in this connection that there has been a removal of what is known as top hamper. Much of the material which has hitherto made the main deck of a battleship an overcrowded platform has been placed below deck, out of sight and range of an enemy's shots, or has been entirely eliminated.

Another feature which has been tried out successfully is the method of carrying ammunition. Some of this will be stored in the turret, where it will be conveniently at hand, and where it is considered quite as safe to those who handle it as if it were stored in the shellrooms below the turret. This makes possible an emergency supply of projectiles, with a saving in the time of handling and a corresponding increase in the rapidity of fire. The problem of taking care of powder has engaged expert attention, and there is now being adopted a system of cooling the magazines so that there can be maintained a uniformity of temperature as a protection against accidental ignition.

A conspicuous change is the installation of the fire control masts and the removal of the old military mast. The new structures are of steel piping, so interlaced as to resist attack and remain in position, no matter if the enemy succeeds in hitting the mast and cutting the metal in many places. The platforms at the top are to be used by the range finders in determining the distance from the enemy. This requires an elaborate system of electrical communication, which is also being in-



British Submarine No. 2 under Full Speed

stalled and which will be tried out during the target practice to be held in August or September, probably off the Virginia Capes.

Electricity is being used to a greater extent than ever before, and much of the mechanism on board the ships is now to be controlled in that way. This is especially so in the turning of the turrets, which can be regulated to a degree hitherto impossible and with a nicety of movement that renders it possible to describe the complete arc of the turret at so deliberate a rate as to be imperceptible to an observer.

The searchlights have been taken from the positions they have hitherto occupied and hung on the skeleton masts. In the coming maneuvers it is purposed to ascertain if these positions are the most effective, and some twelve or fifteen of the torpedo boats will be used in exercises in conjunction with the big ships.

Many changes will be made in the superstructure of the ships, and wherever possible the temporary bridges and cabins will be removed. It is probable that some of these structures will

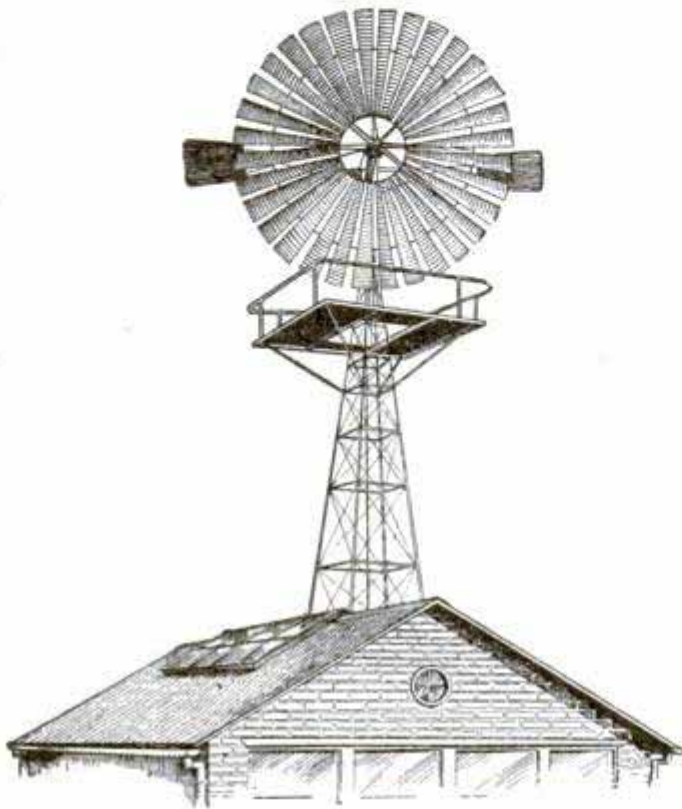
be replaced, but it is desired in the coming summer to ascertain what can be permanently omitted with advantage in the maneuvering of the sea fighters.

Internally many minor changes will be made, such as the removal from the turrets of electrical appliances which endanger life or restrict the operations of the gunners. It is also proposed to install metal instead of wooden furniture, and some consideration has lately been given to furniture made of asbestos, with the idea that there may be the least possible chance of conflagration on board ship. It is in this connection that it is proposed to look into the question of metal instead of wooden boats.

These are a few of the changes being made on the ships of the Atlantic fleet and which will be made next year on the ships of the Pacific fleet. It means the placing of the battleships of the American navy in a condition for battle without the trouble and confusion of throwing overboard all the things which would have to be abandoned when going into action.

ELECTRICAL POWER FROM WIND POWER

Wind power is a form of energy which costs nothing to produce, but this advantage is seriously diminished



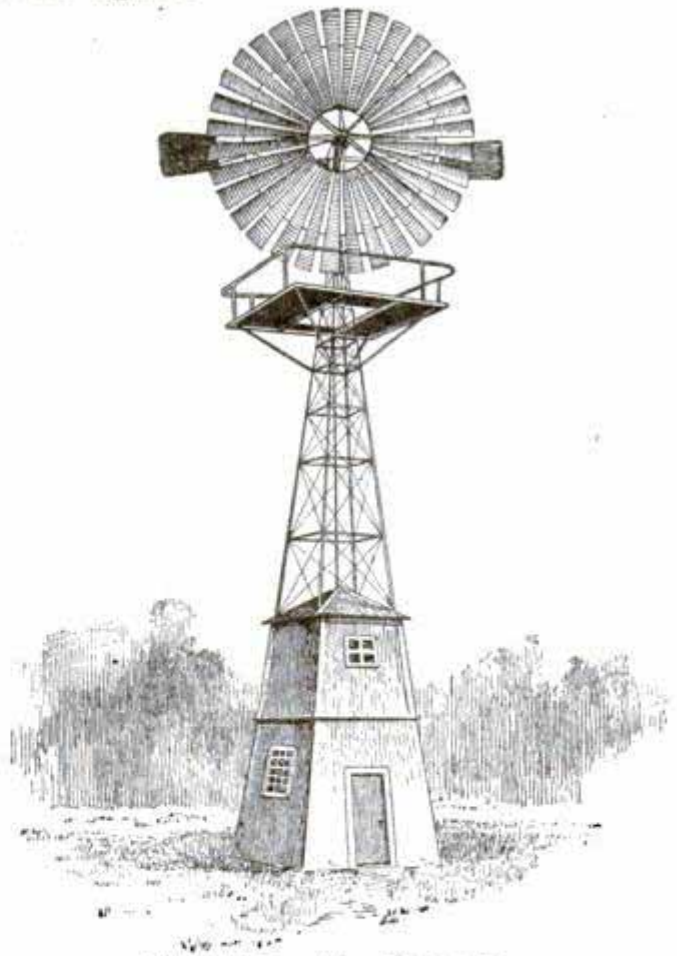
Mounted on a London Shop

by the fact that wind is not under human control, blowing or ceasing to blow regardless of the tasks depending upon it. The possibility, however, of combining the power of the wind, when it wills to blow, with specially governed dynamos and batteries in such manner that this erratic power can be transformed into a perfectly steady flow of current available for use at any moment, may mean a future for the windmill that its centuries of usage in the past could never reach.

The windmill shown in the first illustration is on a shop in London and is constructed on principles calculated to utilize the energy of wind currents of varying force and direction in the most efficient manner. The turbine is mounted on a light steel tower on the roof of the workshop. The power is transmitted by worm gear from the shaft or axle of the wind wheel to a vertical shaft which is carried down the steel tower. At the lower end of the vertical shaft is an ordinary pulley of

large diameter, and this is joined up by belt to the electric generator or dynamo, mounted vertically on a swinging bracket, which has an arrangement of heavy weights attached so that the driving belt is always automatically maintained at driving tension. The speed variation of the dynamo ranges from 800 to 1,600 revolutions per minute, the total gear ratio between the wind wheel and the dynamo pulley being about 35 to 1.

The regulation of the dynamo is effected by a series of electro-magnetic contacts. These contacts come into operation successively as the speed of the wind wheel rises, and once the minimum dynamo speed is reached, an automatic device connects the battery up and it begins to charge. When the wind ceases to such an extent that the power generated is not enough to force current into the battery the connection is automatically broken until the wind rises again.



This Mill Furnishes Electricity

A wind of about 6 miles an hour causes current to be generated, and the plant has been tested up to a gale of 60 miles an hour with perfect regula-



Windmill in Holland Furnishing Power to Wood-Working Shop in Lower Part of Building

tion. The power generated increases enormously, of course, as the wind increases.

Aside from the electric control or regulation on the dynamo, the wind wheel itself is governed by an ingenious system of tails or vanes. These can be set to a predetermined position, so that even in the strongest winds the power of the windmill is kept within the power of the entire plant.

The accumulator battery of this windmill has 54 cells, giving over 100 volts, capable of supplying a large number of lights as well as driving a number of motors. The wind wheel is 16 ft. in diameter, and the cost of the plant complete was about \$750. A considerably smaller and much less expensive plant can be made, having good efficiency in country districts where conditions are more favorable than in cities.

The second illustration shows a self-contained plant, with dynamo room and battery room built into the bottom of the tower.

RAILWAY TRACKS SUSPENDED FROM CABLES

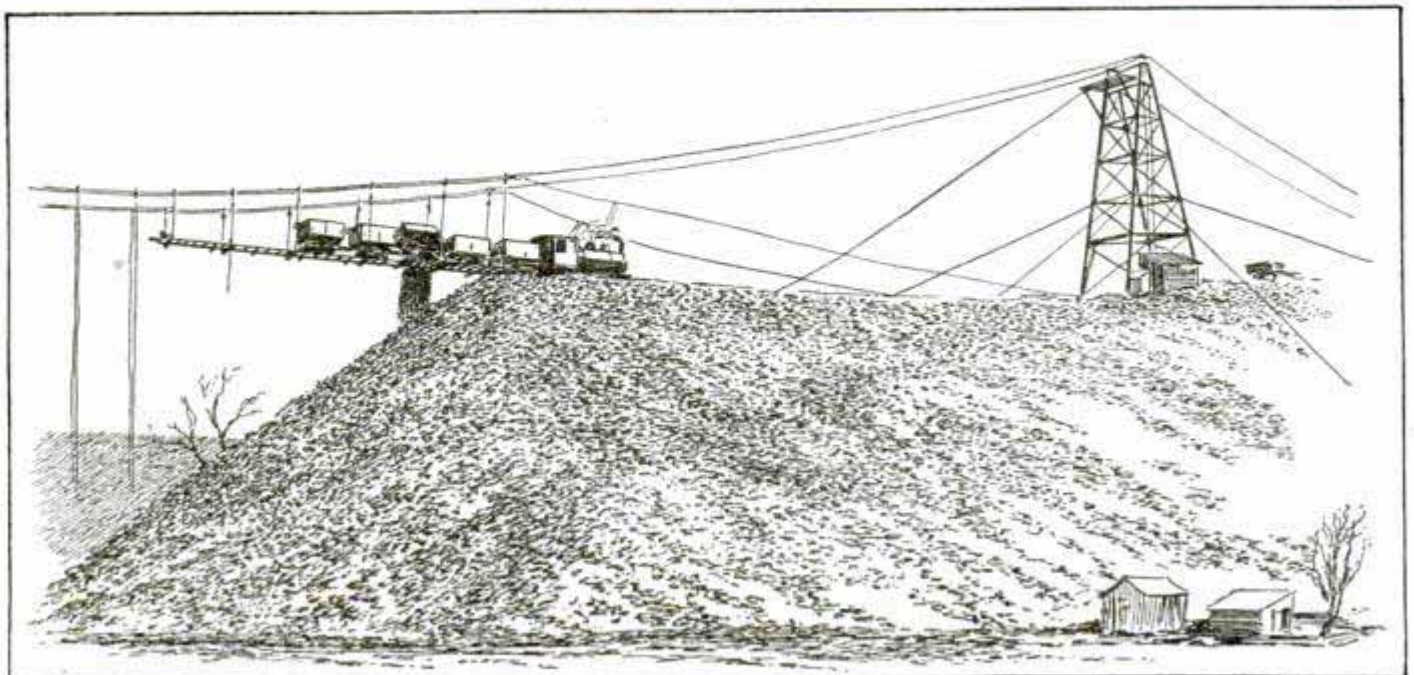
This ingenious method of making fills, the feature of which is the traveling bridge or railway track suspended from cables, was resorted to on the Delaware, Lackawanna & Western railway near Blairstown, N. J. The

embankment made was 1,100 ft. long and about 80 ft. high at its deepest part.

The apparatus consists of two towers, one fixed and one movable, between which a double cableway is suspended. From this cableway is hung a cradle, or traveling bridge, on which a 3-ft. gage track is laid. As the fill progresses the track is extended, and the train of dump cars pushed out upon it by a locomotive, each car being dumped as it reaches the end of the fill. As shown in the illustration, the suspended part of the track extends far enough out from the end of the fill to allow five cars to be pushed out. The cars, of course, are empty when they reach the end of the track.

ANOTHER ADDITION TO ENGLAND'S GREAT FLEET

The illustration shows the "Vanguard," England's greatest battleship yet launched, as she will appear when completed. She is an improved "Dreadnought," 500 ft. long, with a beam of 84 ft. and a draught of 27 ft. Her displacement will be about 19,500 tons. She is the heaviest ship that has ever been launched for any navy, or was, at least, at the time of her launching in February. Her weight as she entered the water approached 10,500 tons. Her armor amidships is 11 in. thick, and

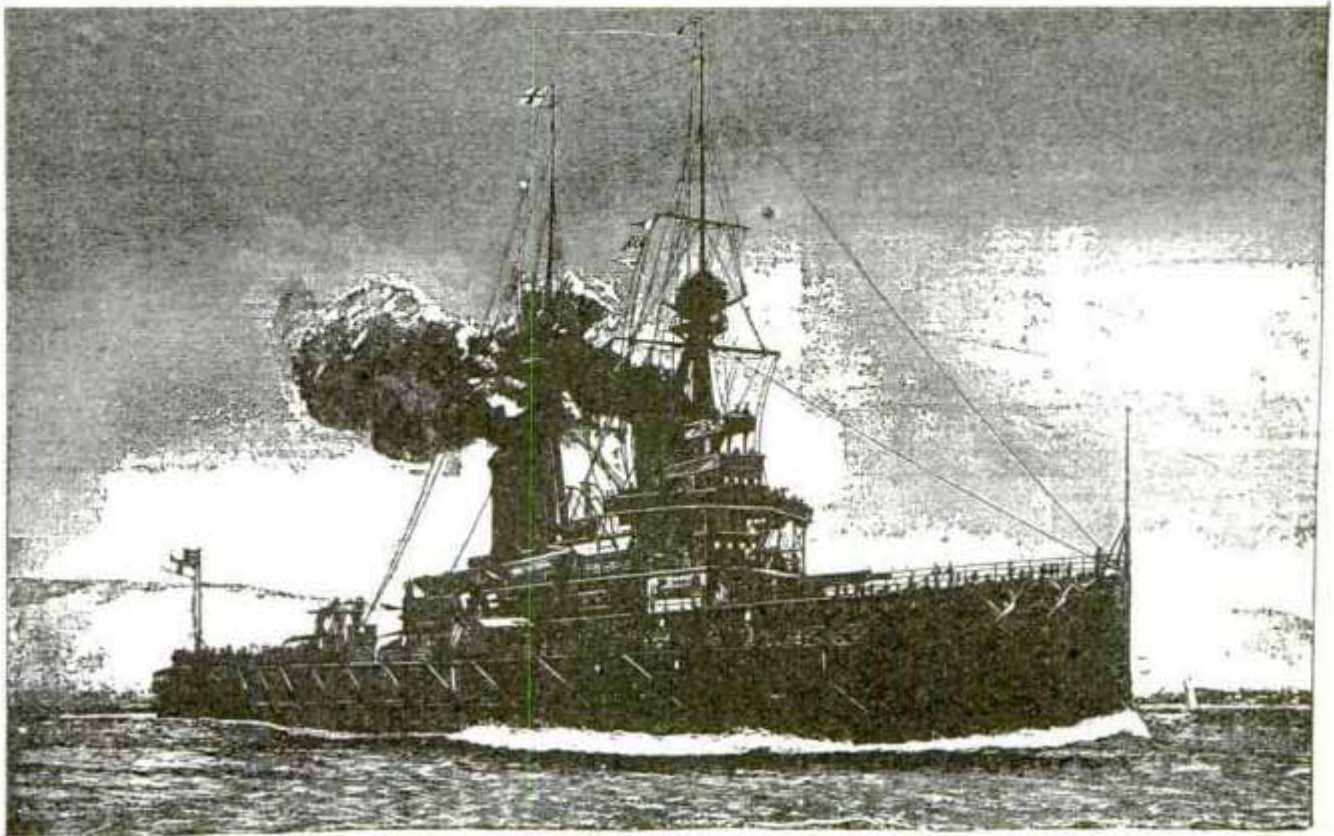


Suspended-Track Method of Making a Fill

she will carry ten 12-in. guns in her main battery.

The great activity in the naval ship-

A No. 5 steel rod, for instance, can be drawn down in one operation to No. 14 or No. 16 gauge.



The "Vanguard," Heaviest Ship Ever Launched

yards of the world, and the numerous launchings of great battleships, each one larger than the previous, make it somewhat difficult to state at any given time that a battleship is the largest and most powerful ever dropped into the water.

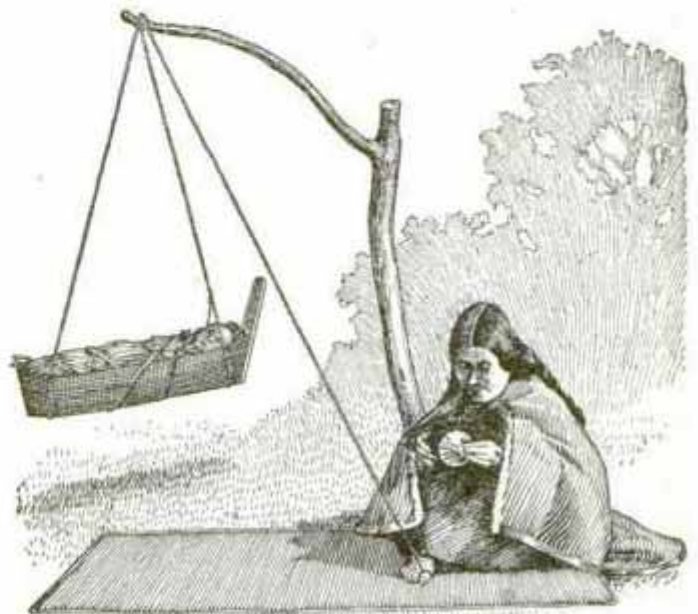
CONTINUOUS PROCESS OF DRAWING WIRE

Wire is produced by a series of drawing processes, a metal rod being drawn through a number of dies, each a degree smaller than the preceding one, gradually attenuating it until the finest wire is produced.

With the drawing machines now ordinarily used, the rod, or wire it becomes after the first drawing, has to be drawn through one die at a time, a tedious process requiring intermediate handlings, but by a new machine, thoroughly tested and found practicable, the drawing is continuous. That is, the wire can be reduced through 5 to 9, or even more dies at once.

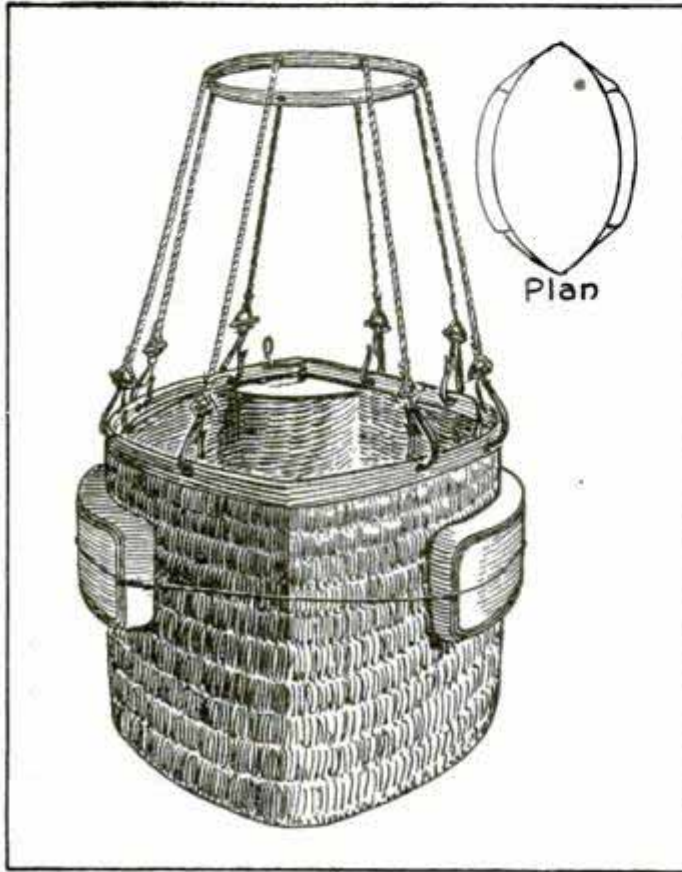
A PRIMITIVE BIT OF MECHANISM

A unique method of accomplishing two things at once is shown in this photograph of a British Columbia Indian woman. She is spinning with her hands and at the same time rocking the cradle suspended from a limb by a cord attached to her big toe.



BALLOON CAR A LIFEBOAT

Many plans have been devised to protect the luckless balloonist from drowning when he has been deceived by a fog and made a landing in a body of water or the sea instead of on land.



For Both Aerial and Marine Use

So much attention was directed to this class of mishaps to air travelers that the French Aero Club recently instituted a competition for such designs.

A German balloonist has made a balloon car which will ride lightly on the waves and has the new feature of a brass rim which can be turned in the second when the car strikes, and detaches the car in that time. If the suspension ropes were cut off successively, as usual, the greater strain on one side of the car during the operation would capsize it. The car is oblong as a boat and has floats attached.

ADVANTAGES OF THE AUTOMOBILE BUGGY

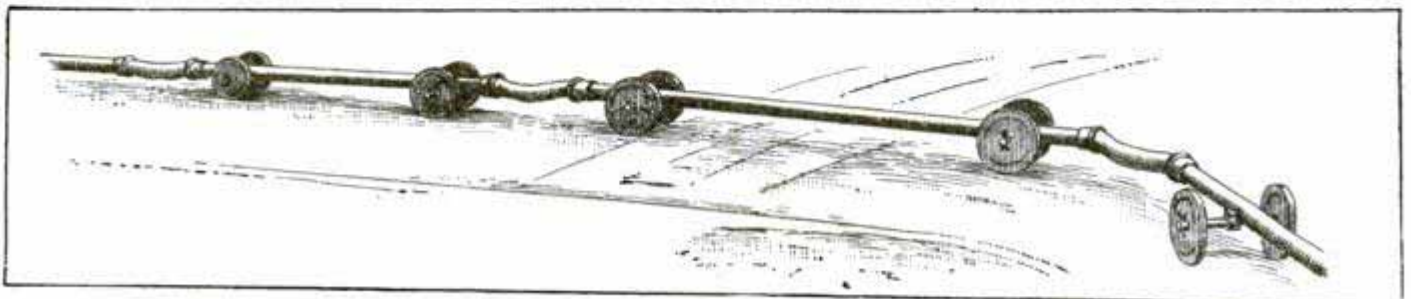
The high-wheeled automobile buggy, in appearance an ordinary buggy with large wheels and a motor driving it instead of a horse drawing it, is steadily growing in popularity as an efficient and inexpensive automobile for use in the smaller cities of the United States and throughout the country districts.

Among its advantages is the fact that, because of its high wheels, it can take ordinary road obstructions at high speed without inconvenience to its occupants. Hard rubber tires answer every purpose of such machines, thus obviating inflated tires and the expense that always attends them. Durability is also a prime factor in their growing popularity, the high wheels affording a clearance that enables them to run over bad roads with the same facility as the ordinary buggy. The lightness of the automobile buggy, being only a featherweight as compared to the weight of the heavy auto, means that the motor can not only be of less horsepower, but the power can be concentrated on moving the vehicle, in place of being largely consumed in moving the dead weight of a heavy construction.

PORTABLE WATER PIPE

In cleaning the slush off of the pavements of Buffalo, N. Y., in the spring, the cleaning department utilizes a line of iron piping, carried on small trucks, the wheels of which are 12 in. in diameter. Each length of pipe is carried on two trucks, and the ends of the pipe are connected by short lengths of hose, thus securing flexibility and making it possible to turn corners.

The reason given for such a device is that such work is destructive to

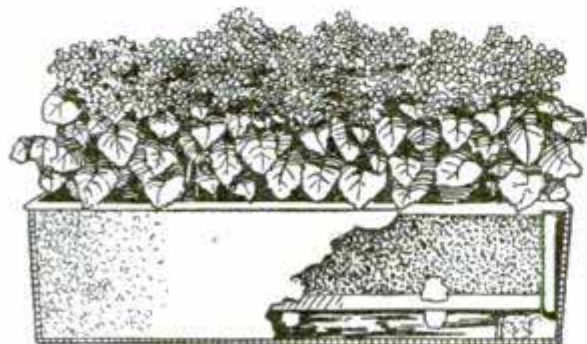


Pipe Line Used for Washing Streets

regular fire hose, as the lengths would have to be dragged all day over the pavements. A short length of hose at the end of the line of pipes and a nozzle complete the outfit.

BOX THAT PROTECTS FLOWERS FROM NEGLECT

Florists generally are finding an increased interest taken in the self-water-



Self-Watering Flower Box

ing flower box which has been on the market only a short time. The box was designed especially for those who desire flowers, and water them to-day but forget them to-morrow. A reservoir in the bottom of the box holds a sufficient quantity of water to supply the plant for several days, and a sponge draws the water up to the soil and gives the plant the nourishment of life despite the careless owner's neglect.

ADJUSTABLE ELECTRIC LAMP BRACKET

This electric lamp bracket was designed to meet the requirements of physicians, surgeons, opticians, dentists and draftsmen. The bracket is made of steel, is rigidly put together, has a horizontal radius of 5 ft. in any direction, and is adjustable vertically anywhere within 8 in. above or below



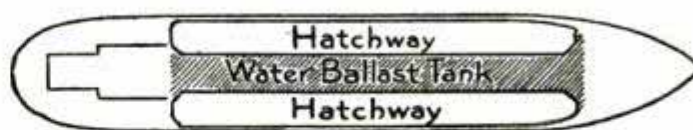
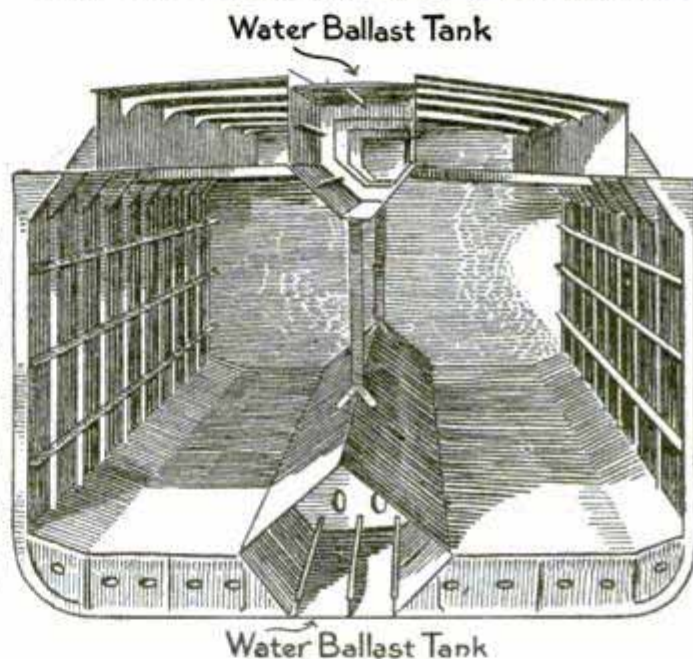
Excellent for the Medical Profession

the mounting. The electric light socket is also adjustable on its fastening and the reflector can be set at any angle.

VESSEL WITH BALLAST TANK UNDER CENTER OF DECK

The feature of the merchant vessel shown in these illustrations is the continuous ballast tank under the center of the deck, although she has other features carefully designed with a view to economy of working expenses, such as continuous side hatchways on the deck. The water ballast chamber runs along between these hatchways.

The water ballast capacity of this novel tank arrangement is about equal



Courtesy London Marine Engineer

to that which would be secured by the same vessel if constructed with topside wing tanks, and, in addition, this new disposition of ballast produces a steadier and more comfortable ship without unduly taxing the strength of the ship's construction, as generally occurs when extra ballast is carried in a deep tank. Perhaps the most important advantage gained by this method of construction, viewed from the ship owner's standpoint, is the increased immersion allowed through the fact that the deck ballast tank is constructed partly above the moulded depth level. This construc-

tion, in conjunction with the continuous side hatchways, forms a substantial erection connecting up the ordinary erections, giving extra strength and reserve buoyancy so that with little increase in weight of steel structure over that of the ordinary vessel, a valuable reduction of the freeboard, and therefore a considerable increase in the dead-weight capacity of the ship, is gained. This increase, in this instance, is esti-

mated to amount to nearly 300 tons of cargo.

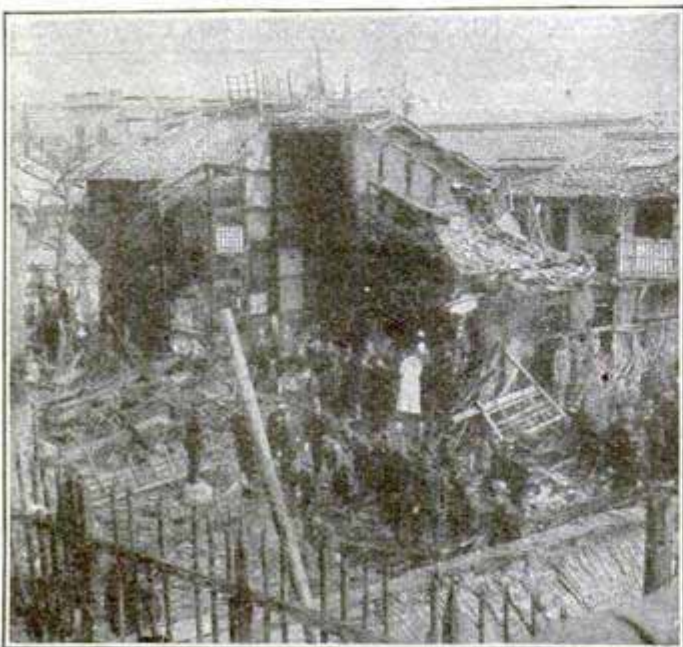
The illustrations show the arrangement of the continuous ballast chamber and the hatchways. Although spoken of as continuous, the chamber breaks off, however, on reaching the engine room and continues aft again beyond it.

DYNAMITE EXPLOSION IN OSAKA

The accompanying views from one of our readers in Japan, illustrate the destructive effect of a big dynamite explosion recently at Osaka, Japan, which caused the death of nearly a hundred persons. The explosion was followed by a rain of fragments of human bodies which were blown upward by the force of the explosion. The conflagration that followed wiped out quite an area of the closely built up city. The fire consumed ten of the light native houses in as many minutes. The work of the fire brigade saved the city. The picture shows how complete was the destruction of the Japanese houses, and the absence of brick construction in the empire's commercial center.

HOLDING RAILWAY BANKS WITH GRASS

Railroads have been experimenting for a long period of years to find the grasses that will grow successfully and hold the soil on their steep earth embankments. The Iowa Agricultural Experiment Station has been making some tests and has found that where a road runs east and west, the north side of the fill needs to be planted with a type of plant different from that on the south side. The dryness of the south bank makes a growth of clover almost impossible. The western wheat grass has been grown more successfully on the southern slope because it is adapted to dry conditions. It is abundant on the plains east of the Rocky mountains and in evidence along railways where it has been introduced on account of its bluish color. The Hungarian brome grass is adapted to the north slope and will grow in patches on the south side of the fill.



Explosion in Japan's Commercial Center

DAMAGE IN CLEVELAND BY TORNADO

The tornado which struck Cleveland, Ohio, in April, killing seven people, was responsible for the damage shown in these illustrations. The house, as is illustrated in the drawing, was cut completely in two as if severed by a giant knife, one half being blown over and the other half remaining standing.

The photographs show a wrecked church and a view of a street on which the telephone poles were blown down over a mile stretch, stopping traffic for 24 hours. The steeples



Storm Cut House into Two Sections



Wrecked Church



Telephone Poles Interfere with Traffic

of the St. Stanislaus Polish Catholic church were completely demolished, entailing a loss of \$75,000. These steeples were the highest in the city.

ELECTRIC HEADLIGHTS FOR LOCOMOTIVES IN NORTH CAROLINA

The legislature of North Carolina has passed a law requiring electric headlights to be used on all railroad locomotives running at night in the state. The law specifies an electric or power headlight of at least 1,500-cp., measured without the aid of the re-

flector. Of the locomotives of any system not now equipped, one-fourth must have the lights by April 1, 1910, one-fourth the next year; one-fourth the next, and all by April 1, 1913.

The law does not apply to locomotives regularly used for switching, locomotives used only in the day time, or to locomotives running to shops for repairs. An engine may finish its trip notwithstanding the unavoidable disablement of its headlight, if the light was in good condition when starting out. A further exception is made of North Carolina roads, independently owned, operating 125 miles or less.

THE AUTO-MOBILIZATION OF ENGLAND

Nearly 400 Automobiles Quickly Mobilized to Aid in Repelling an Imaginary Invasion of England at Hastings—More than 1,000 Troops Were Transported to the Threatened Point in About Three Hours—Possibility of Rushing Thousands of Troops to the Coast by This Means Is Demonstrated

By Francis M. Buzzell

The invasion scare which England is undergoing, with Germany in the rôle of the villain should such a terrible tragedy occur, has developed one phase at least which pertains to the enjoyment of the whole little island, as well as to its patriotism. The thought of what might happen should England's great war fleets prove inadequate to keep the huge standing army of Germany from landing on British soil struck the country in general with the suddenness of a flash of lightning, turning popular interest, for the time being at least, from the known strength of England's sea prowess to the less clearly defined strength and adequacy of its land forces at home. As a result of this timely thought, fanned into fierce flame by a theatrical production, the plot of which was just such a disastrous invasion, the enrollment of a volunteer army is merrily progressing.

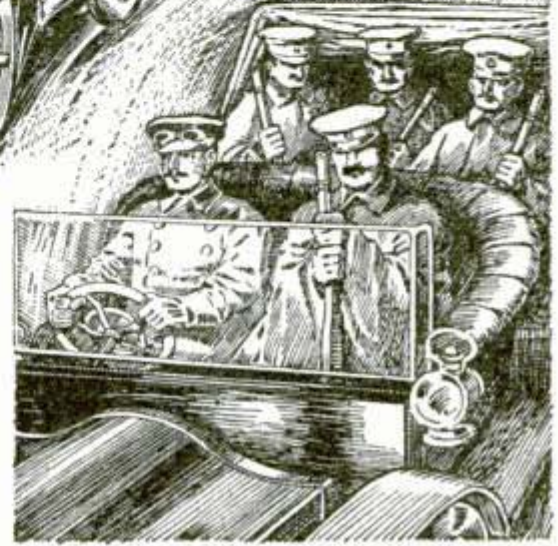
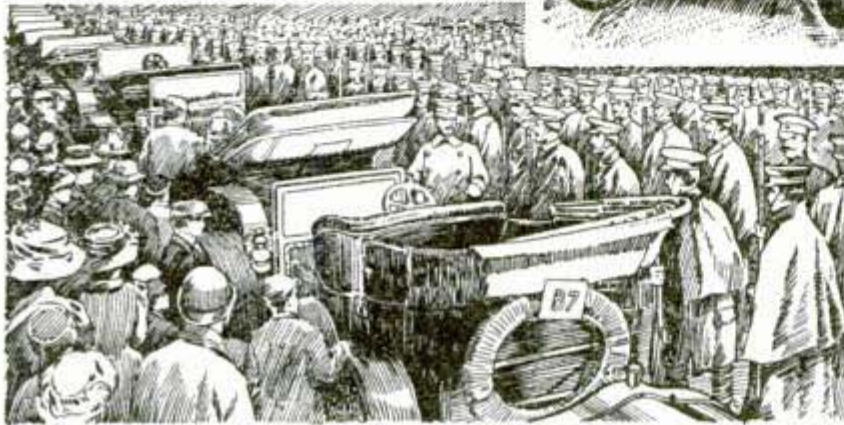
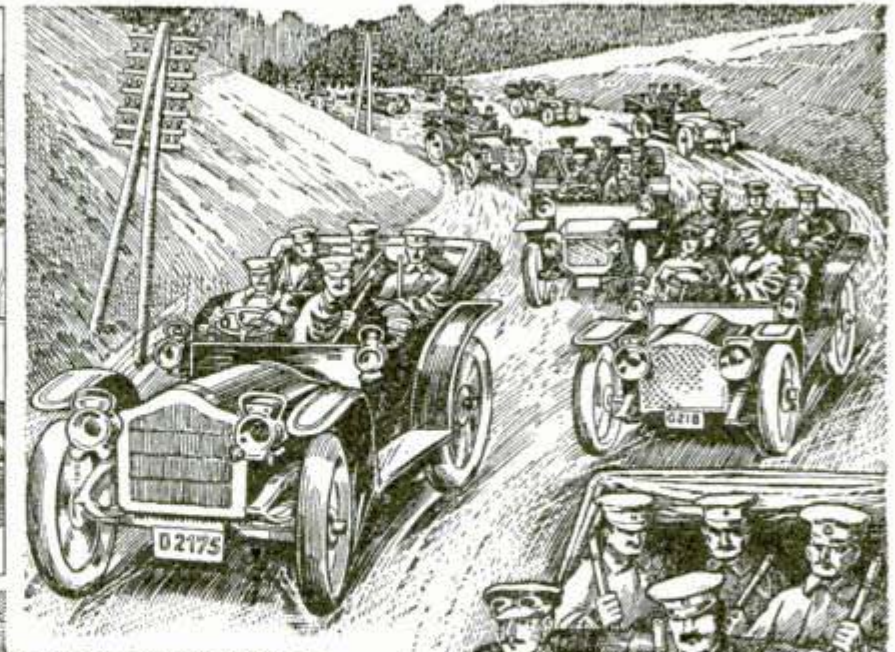
This enrollment has brought forth a natural epidemic of excitement and patriotism, but the crowning of the whole was the idea of mobilizing the automobiles of the country, with their owners or chauffeurs, to transport troops to any point on the coast that might be threatened. Some idea of the popular enthusiasm aroused by this procedure is shown in the sketches from photographs, which were taken when troops were recently rushed to a pretended relief of Hastings, as an experiment.

The experimental mobilization was carried out just as if Hastings really were threatened, instead of the crisis being only an imaginary invasion. In the early hours of the morning, word was flashed to the London Automobile club that Hastings was threatened, notification also being sent to the of-

icers of the Guards and the newspapers at the same time. Telegrams were sent from the automobile club to members of the association in all parts of London to have their cars at Wellington barracks at 7:30 a. m. Nearly 400 cars of all kinds and descriptions, from ordinary touring cars to magnificent limousines and high-speed motor vans and trucks answered the summons.

An army of special war correspondents materialized, as well as an army of soldiers. Nearly 50 cars were available for the correspondents, over 300 cars were for the conveyance of officers and troops, and about 30 trucks and vans for the transportation of the necessary impedimenta. The cars got off in seven sections. The press cars bore a black and white pennant and were free to go anywhere. The seven real army sections were lettered from A. to G., and each bore distinguishing flags. Three sections took up their loads at Wellington barracks, including the 1st. Scots Guards, their officers, signaling officers, buglers, etc. Other sections carried four companies of the Grenadier and Coldstream Guards, three of the companies embarking at Chelsea parade ground and one company on the Victoria Embankment. The two sections composing the vans and trucks carried water tanks, machine guns, and ammunition, medical stores, tools, reserve ammunition, signaling stores, camp equipment and food.

The police arranged admirably for the dash out of London, despite the short time at their disposal. Inspectors and constables effectually stopped traffic from blocking the way, and the sections formed in a complete column at the Penge rendezvous at 10 o'clock. The real start was then commenced, the way being thronged by immense mobs of excited onlookers. According to the English press, the hatred of automobiles accredited to the public in general was totally absent, the cars being greeted by the greatest enthusiasm. The distance traversed from London to Hastings was about 75 miles, the trip being made in a little more than three hours. A few punc-



Supply Section Starting—Enthusiastic Crowds Watching the Start

The Dash to Hastings

tures constituted the major portion of the mishaps, and most of these were received on the dash back to London, the return trip also being part of the test.

Although the experiment was in all seriousness, the result meaning a great deal to England should an invasion threaten, comedy also had its part. Many automobile owners, with little regard or forethought for the work demanded of their cars and a sublime and patriotic disregard of the probable effect of rough usage, had sent magnificent machines, richly upholstered and furnished in royal taste. Many a smartly-liveried chauffeur looked askance at the rifles of the soldier boys, and visions of scratched varnish, dented panels, and marked upholstery loomed before them.

Mr. Haldane, prime minister of England, Gen. Sir Francis Stopford and many other important military experts watched the start. More than 1,000 soldiers were carried, and it is estimated that should a real crisis occur,

soldiers could be carried to the point of attack by thousands, before they could hardly get started by other means of transportation.

WORLD'S PETROLEUM PRODUCTION

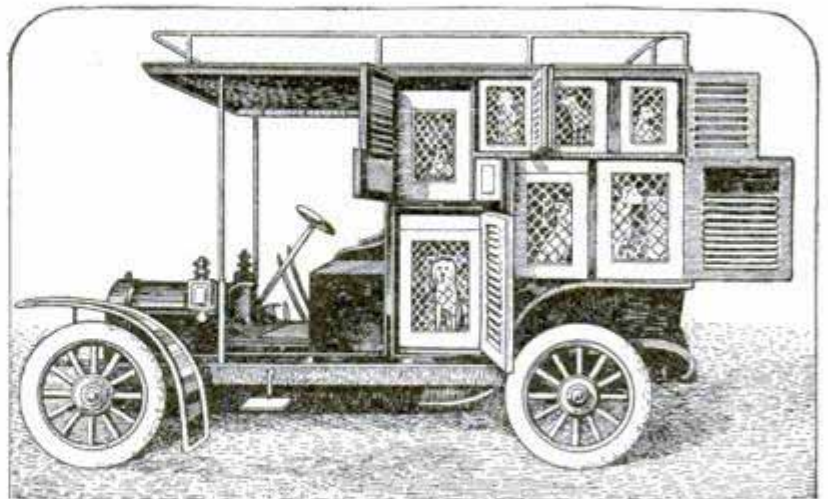
The Petroleum Review publishes the following figures showing the world's petroleum production for the past two years, that for 1908 being approximate:

Producing Country	1908 Tons	1907 Tons
America	22,000,000	20,000,000
Russia	7,500,000	8,000,000
Dutch India	2,300,000	2,200,000
Galicia	1,600,000	1,100,000
Roumania	1,100,000	1,000,000
India	600,000	550,000
Other Countries	450,000	450,000
Total.....	35,550,000	33,300,000

A new ventilator especially devised for railway cars is a panel of glass or sheet metal stamped with bosses which are perforated by quarter-inch holes. The panel mounted on the wall may be reversed, and if the bosses project outward, a current of air passes out; reversed, the current passes inward.

AN AUTOMOBILE DOG-CATCHER

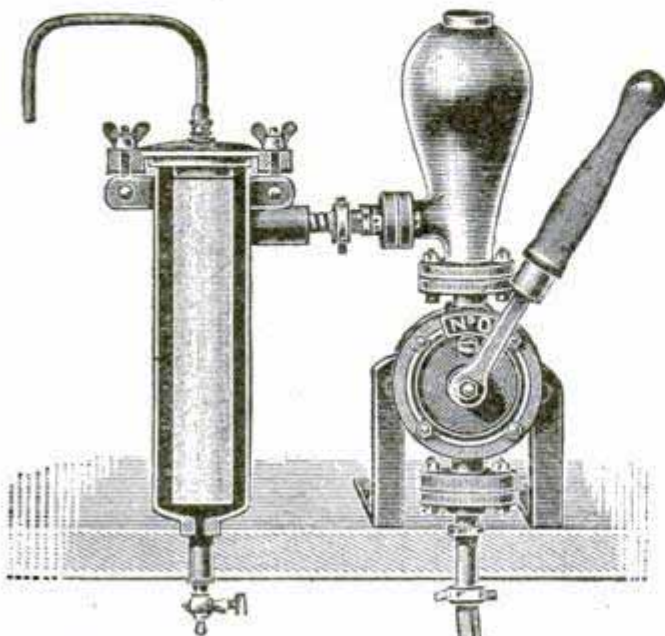
The dog is probably a much more petted and valued animal in Paris than in any other city in the world. A stray dog is not dropped into an ill-smelling pen on a wagon and unconcernedly driven off to the dog pound to be drowned, but is placed in the well-ventilated cages of this automobile and transported in comfort to the station where the owners of stray dogs go in search of their missing pets.



Caring for Stray Dogs in Paris

HAND-OPERATED PUMP AND FILTER FOR ARMY USE

The problem of pure water for drinking and cooking purposes in army campaigns, especially when operations are being carried on in hot or fever-infested parts of the world, is one of the most serious to face, contaminated water often being a more serious menace to an army than the bullets of the enemy. The illustration shows a hand-operated rotary pump and filter attachment of the kind used by the British army in the South African campaign, which furnished an adequate supply of fresh water immune from death-dealing bacteria.



Filtering Apparatus for Armies and Expeditions

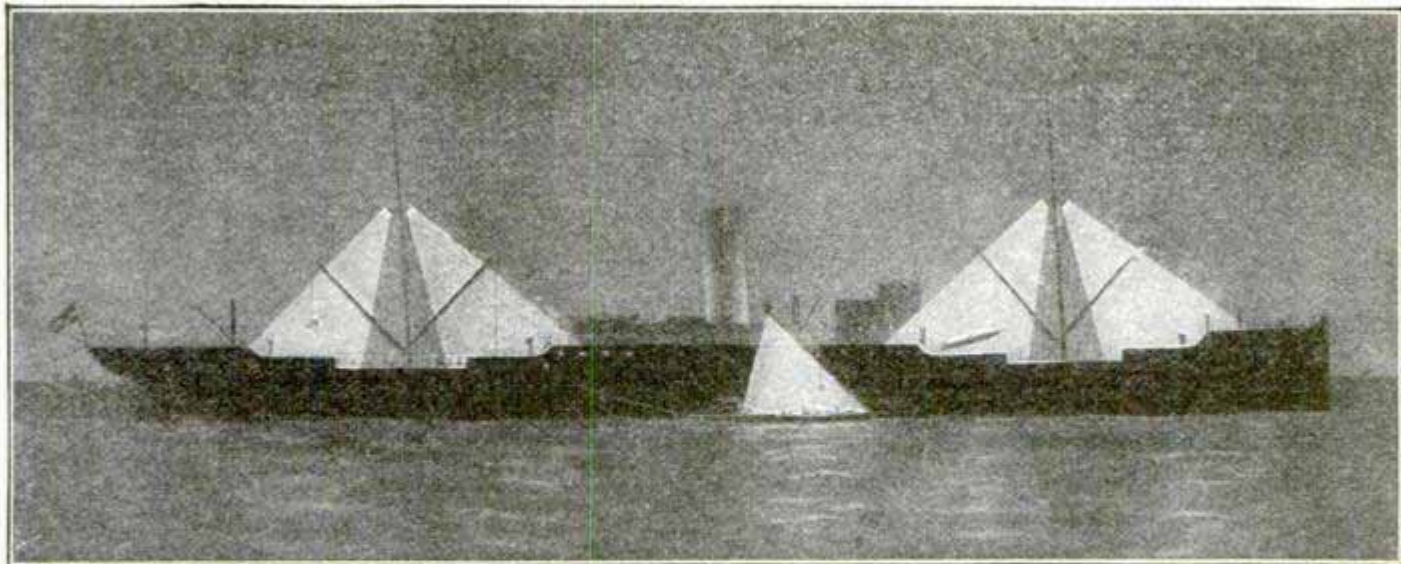
Working the pump by hand raises the water and forces it through the filter in a steady stream. It matters not

whether the stream or well from which the water is pumped is filled with bacteria and mud, the result is pure and sparkling water.

DISTILLING TURPENTINE BY ELECTRIC PROCESS

A plant in operation for the past two years in Vancouver in which experiments have been carried on to demonstrate the practicability of obtaining turpentine from the resinous woods of British Columbia by an electrical process of distillation has proved the possibilities of the process. It is claimed that from one cord of pitchy wood costing \$5, there can be extracted chemically pure turpentine, tar, oil, rosin, charcoal, and pitch to the aggregate value of \$24.70, the present market value of these commodities, at an expense of \$12, giving returns of \$12.70 per cord. From one cord of wood by this process is obtained 60 lb. of rosin, 20 gal. of tar oil, and 1,300 lb. of charcoal. The amount of turpentine obtained has not been given out. The oil is used for wood preservative, and is also manufactured into shingle stain. The charcoal, having been coked is cooled in an airtight can, is very perfect and valuable for making powder.

Italy is to build four great "Dreadnoughts" and several scout cruisers at a cost of \$52,800,000.



Acetylene Flares Aid in Unloading Ships

UNLOADING SHIPS BY ACETYLENE FLARES

Unloading ships at night by the light of great acetylene flares has been demonstrated successfully on the Thames, the lights being arranged as shown in the illustration. Five flares are usually used on a ship, two flares being swung up to each mast and one attached to the roof of a cabin or other raised work amidships. Merchant ships usually have only two masts, but if they have more, flares are attached to all.

Actual use of the flares on nights that are stormy seem to effectually demonstrate that a brilliant light is thrown in spite of the dirty weather, a qualification of great importance in work on shipboard.

The flares are strongly constructed of the best cold rolled steel, and, either empty or fully charged, weigh less than oil flares. The carbide and water cannot freeze while in operation, even in the coldest weather. Moreover, what is a vital consideration in working dangerous cargo at night, the lights give off no sparks or fire of any kind, consequently there is no danger of fire or explosion. Should the lights be tipped over, the flame is immediately extinguished.

The flares can be charged in a few minutes and lighted, and, being perfectly automatic in working, need no further attention until the supply of carbide is exhausted. The rapidity with which the acetylene flare can be

brought into use, its entire independence of any engine or dynamo, and the brilliant character of the light, as well as its safeness, are all points in its favor as compared with electric lights or oil flares.

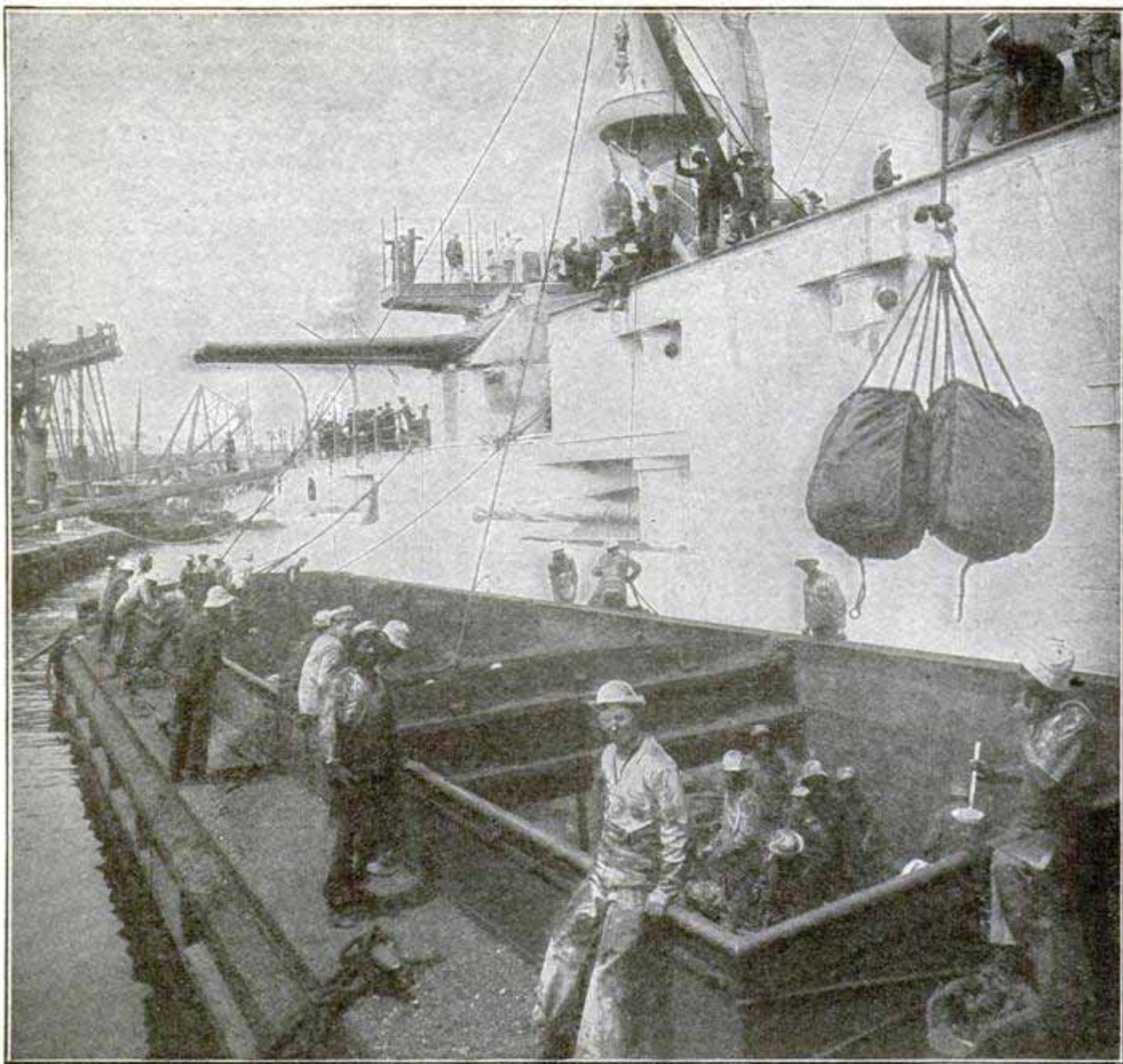
HAT TRIMMED WITH REAL FLOWERS

The accompanying illustration shows the result of a florist's idea to keep abreast of the season's fashions, and in doing so he inadvertently broke into millinery. It is nothing more than one of the so-called "waste basket" hats with the crown detached for holding fresh flowers. The hat sells for from \$8 to \$15 and the designer did a good



Courtesy Florists' Review

New Hat with Nature's Flowers



Life in Our Navy—Coaling a Battleship

business with the "smart set" as long as the novelty lasted.

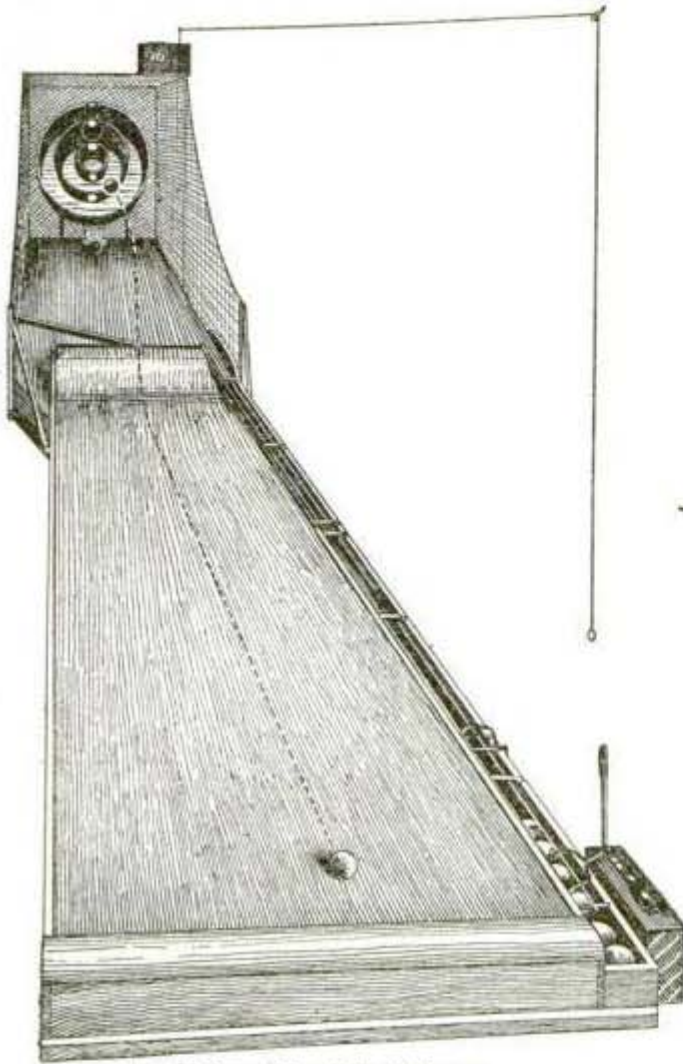
The florist bought the latest shapes of various shades. A box-maker inserted a pasteboard bottom and cut out the crown, which he hinged on with a flap, the space between the crown and the pasteboard bottom to be filled with flowers. The flowers are chosen altogether according to the taste of the wearer and are subject to the changing whims of the wearer from day to day. The hat will easily hold a corsage of 200 spring violets.

A New York operator recently wrote 1,635 words in 15 minutes, an average of 109 words a minute.

SKEE-BALL BOWLING GAME

Skee-ball bowling, in which the ball is jumped or skeed into the pockets in the same manner as a skee-jumper rises from the bump in his flight, is a new and unique hand-ball game that seems destined to great popularity. The alley is built in two sections, each 16 ft. long. At the end of the first section is the bump, and at the end of the second, which is inclosed at the sides and back with netting, are the pockets. These pockets are numbered from 10 to 50, and are arranged as shown in the illustration. The two pockets numbered 40 and 50 are cup-like and just large enough to receive the ball. The 30-pocket is the same shape but more

than twice the size. The two small score pockets form the two outer rings of the circle.



Unique Hand-Ball Game

In playing the game, the ball, which is $.31\frac{1}{2}$ in. in diameter, is rolled along the alley. When it strikes the bump, it is sent into the air and if properly directed will hit the target, dropping into one of the pockets. Great skill is required to consistently make a good score. The maximum score with 9 balls is 450, and after months of trials the alley score reached at the factory was 410. An electric device automatically adds up the score and shows it on the indicator.

MANY TITLES GIVEN TO FIGURE ON CAPITOL DOME

Very few, even of those whose occupations keep them constantly beneath the shadow of the magnificent statue that crowns the dome of the capitol at Washington, know its real name. When the original plans for the capitol

building were drawn, provisions were made for a statue to surmount the dome, and although 50 years have elapsed since it was erected, comparatively few persons know its real name.

The history of its construction is interesting. It was first designed as symbolical of "Liberty." Following criticism the model was changed and it is now called "Armed Liberty," and is by far the most symbolic of all statues in Washington.

Thomas Crawford, father of the late novelist, F. Marion Crawford, was the artist. Jefferson Davis, then Secretary of the War Department, was present when the model was submitted. The statue then wore a liberty cap and carried a bundle of rods. He thought the cap was emblematic of emancipated slaves, while Americans were born free, and the bundle of rods as suggesting the duties of the Roman lictor had lost its significance. His views were in-



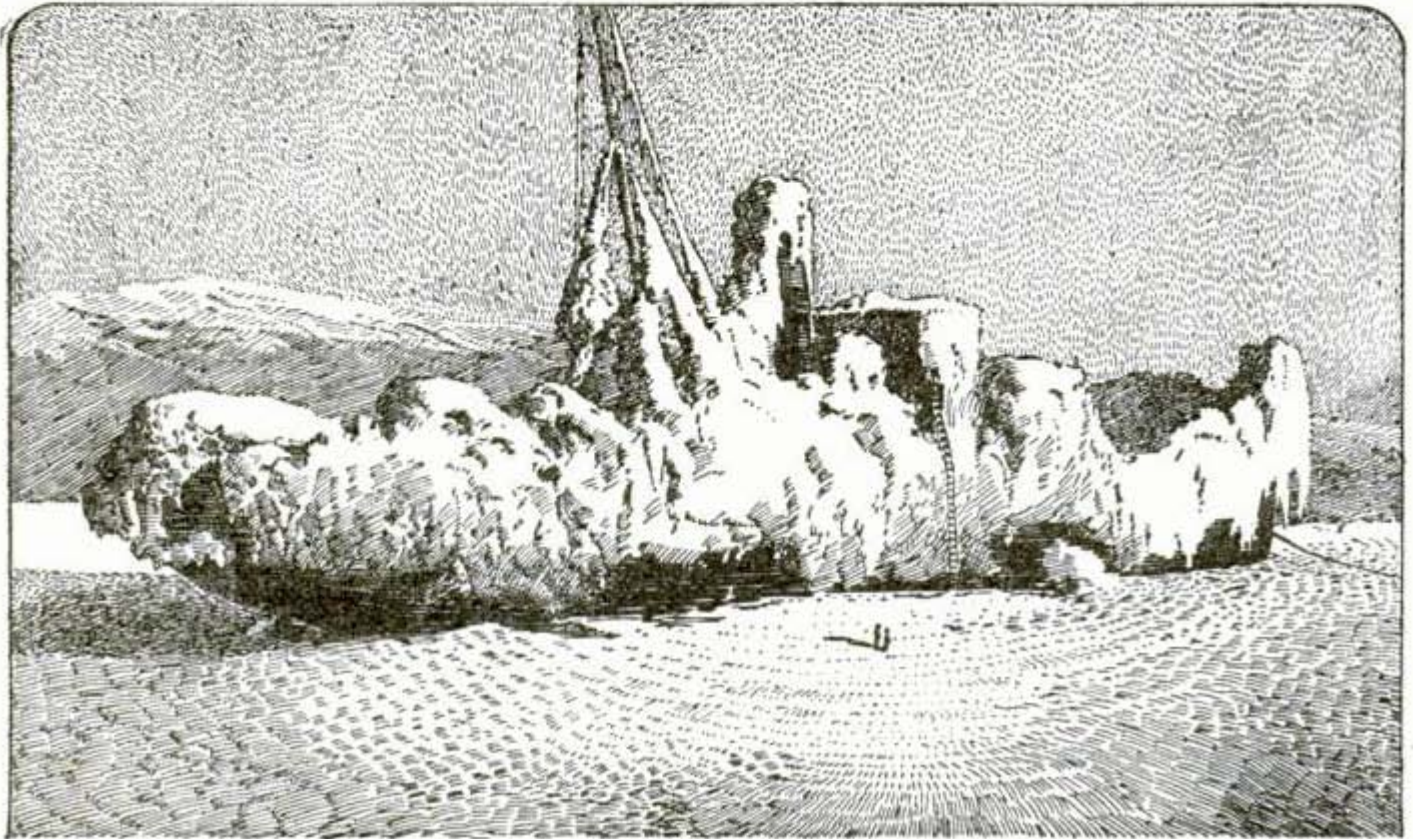
"Armed Liberty" Surmounts Capitol

corporated in the new cast and the name changed.

"Armed Liberty" is 9 ft. 6 in. tall and weighs 14,985 lb. Owing to its lofty position few persons appreciate its strength and beauty.

SUBSTITUTE FOR LEAD PIPE

A new lead pipe has been introduced into the plumbing world which has some qualities superior to the ordinary lead piping. The pipe is made of a



Ship Completely Covered with Ice

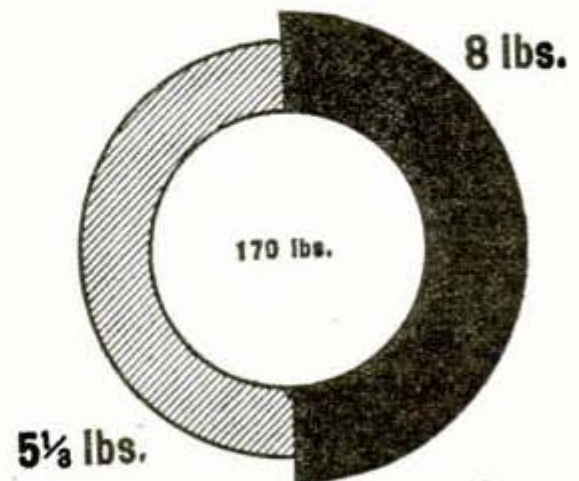
WRECKED BY A COATING OF ICE

Great ships are often wrecked by colliding with icebergs or heavy floes of ice, but it is very seldom, in this part of the world, at least, that ships are wrecked by a coating of ice formed by the water that breaks over them in a rough sea, as was the vessel here illustrated.

The grain trade of the Black Sea is conducted with a rush just previous to the closing of navigation each year in an attempt to transport as much grain as possible, and occasionally some vessel attempts to make a trip so late in the season that disaster follows. This vessel was so covered with ice in a heavy storm that she became unmanageable and drifted ashore.

Wisconsin has passed a bill prohibiting the use of autos by others than their owners.

new mixture of metals, pig-iron and Regulus antimony, thoroughly mixed in certain proportions. The quality depends on the purity of metals used. It is less susceptible to the bad effect



Relative Size of Pipes

of hot water, does not sag, and is least affected by the pounding and crushing to which ordinary plumbing is sub-

jected. Ordinary $\frac{1}{2}$ -in. lead pipe weighs 3 lb. per ft. and the new pipe 2 lb. per ft.

The illustration shows the relative thickness and weight of the two pipes.

AN INGENUOUS LOCOMOTIVE SCALE IN EIGHT SECTIONS

A locomotive scale recently installed by the American Locomotive Co. at Schenectady, is drawing considerable interest because of its new features, embodying flexibility, the ability to accurately give the weight on each pair of wheels and to accommodate any size of locomotive from the smallest to the largest.

The scale is in eight sections, as shown in the illustration, which was made before the scale was placed in its pit. The pit in which the scale is used is of concrete, containing rails upon which the eight sections, each section in reality a complete scale, can be shifted. The locomotive to be weighed is run over the pit and one of the sections is run under each pair of wheels. Oil is then forced into small cylinders and the piston rods supporting the scale platforms are evenly and slowly raised, lifting the locomotive clear of the track.

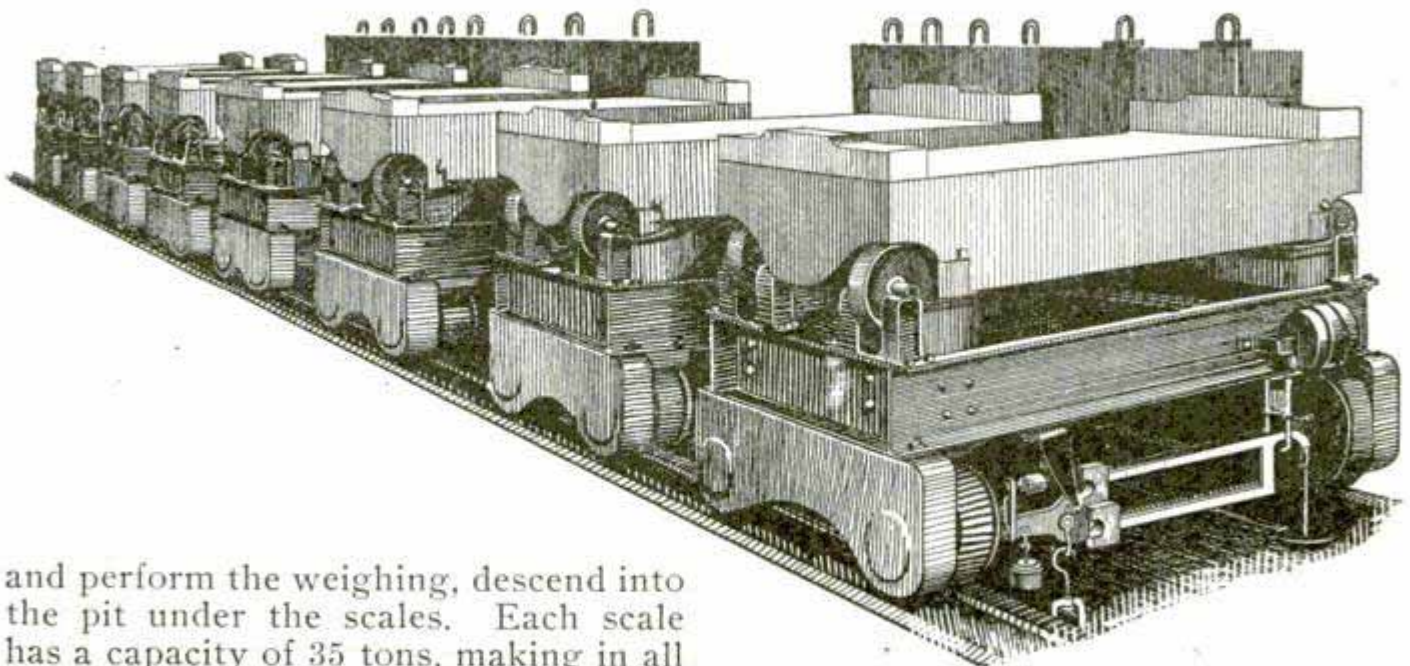
The men who adjust the scale trucks

The ability of the scale to accurately weigh the weight on each pair of drivers is, of course, its most important feature. Railroad companies wish locomotives built as powerful as their roadbeds will admit, and consequently must be sure that the weight on no single pair of drivers exceeds the desired limit.



ADJUSTABLE SINK SEAT

This swinging sink seat and adjustable leg is much superior to the kitchen chair because it is swung under the sink and out of the way when not in use. The leg or standard of the seat



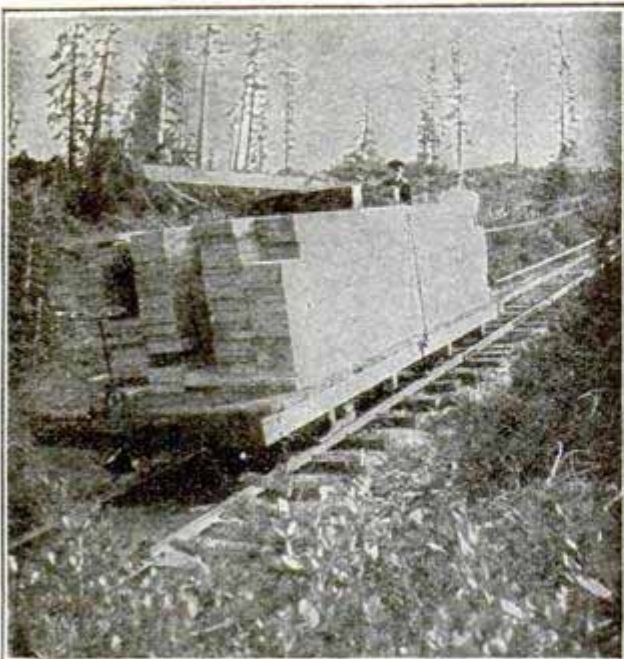
and perform the weighing, descend into the pit under the scales. Each scale has a capacity of 35 tons, making in all a weighing capacity of 280 tons. The pistons have a total lifting capacity of 739,200 lb.

Locomotive Scale that Registers Weight on Each Pair of Drivers

is made in both a 24 and a 27-in. height, and the seat itself is in either birch or mahogany finish.

TRANSPORTING OF LUMBER DOWN A MOUNTAIN

A lumber company on the mountain side at Fulda, Cal., has found it necessary to build a mill within its field of operation and to cut the felled timber into lumber before shipping it down the mountain. The reason for this is in the fact that its railway is too steep to transport the logs safely. The road is 17 miles long, with an incline of 3 miles,



Photos by H. E. Frost

A Mountain Lumber Railway

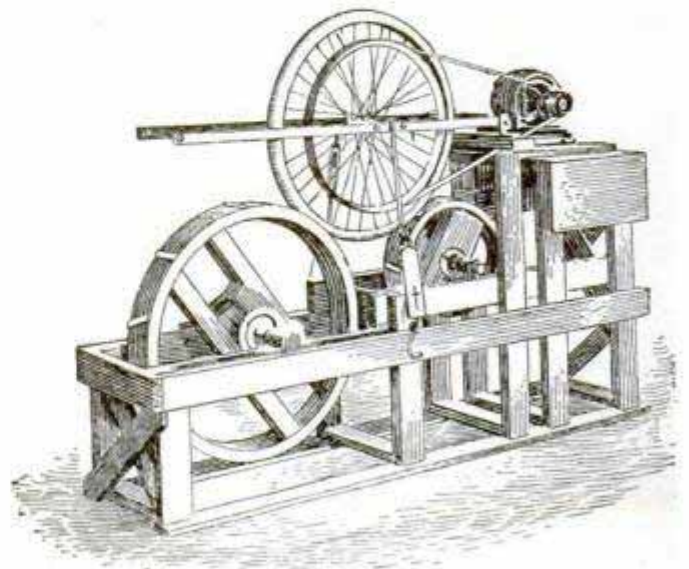
the grade being $27\frac{1}{2}$ per cent part of the way. One car of lumber is lowered at a time, by means of a cable which draws the empty cars up again.

RUBBER TIRE TESTING

This machine was made to test the life of a bicycle tire. The average tire can stand its vigorous punishment little over 15 hours. During that time the tire is driven over rough wooden blocks, steel strips and a coarse grade of emery cloth, by a small electric motor attached directly to the wheel.

The tire to be tested is placed upon a rear bicycle wheel. Common spring balances, which correspond to the weight of a rider, hold the tire down with an equal pressure on two wooden wheels underneath. The faces of these wooden (resistance) wheels are covered with emery cloth of coarse texture, and blocks of steel and wood at intervals. The motor drives the tire wheel at the rate of 14,000 revolutions every hour over the rough edge of the two wooden wheels, which makes the usage much like that to be expected among the furrows and ruts of a country road.

Every time the tire wheel revolves, it travels over 8 ft. of emery cloth and is struck by 21 blocks, or, in other words, 8 ft. of bad country road. The quality of the tire is determined by the time it takes to wear down to the canvas and by chemical analysis of the worn bits of rubber.



Machine Reproducing Road Conditions

PRIVATE ELECTRIC LIGHTING PLANT FOR \$550

Tungsten Lamp Makes Possible an Inexpensive and Efficient Lighting Plant for Country Homes—
Selection of Fixtures and Planning of Lighting—How to Estimate the
Requirements for and Size of Plant—Estimate of Cost

It is the purpose of this article, condensed from data compiled by T. H. Amrine, of the Illinois University engineering experiment station, to give a concise idea of the kind of private electric light plant required to illuminate a country home with 25-volt tungsten lamps. Because of the importance of this information we do not wish to condense too closely, therefore, will publish it in two installments; the first, dealing with the nature of the plant required and its cost, in this issue, and a treatise on the method and cost of operation and care of the apparatus in the August issue.

PART I.

The present state of development of the storage battery and the wonderful improvements that have been made in incandescent electric lamps during the past year have opened up to residents of the country districts new possibilities in the way of home lighting by private electric plants. The farmer and the resident of the small country town have long felt the need of the electric lamp. They appreciate the adaptability, cleanliness, safety and the convenience of this method of illumination, but usually live too far from any central lighting station to be able to buy power at a reasonable cost.

Up to the present time the great difficulty in the design of a small lighting plant has been the size and cost of a storage battery outfit. To start up the engine and dynamo every time a few lamps are required is too inconvenient to be considered for a moment. Consequently the storage battery is necessary, and with the ordinary carbon filament incandescent lamps this battery must be a large and expensive one.

Now, however, there has been invented and placed on the market a new type of lamp which makes possible that which was difficult before. It has a filament made of the rare metal called "tungsten", and with it a given amount of energy will produce nearly three times the candlepower that would be produced by an ordinary filament lamp. Electrical energy is measured in watts, one of which represents $1/746$ part of a horsepower. With the 110-volt, 16-cp. carbon lamp it takes from 3.1 to 3.5 watts of energy to produce a can-

dlepower of light. With the tungsten lamp of the same voltage it requires about $1\frac{1}{4}$ watts of energy to produce a candlepower. Consequently, when using the tungsten lamp for a private plant, it will take much smaller storage cells to operate a given number of candlepower of lights than it would if carbon lamps were used. These new lamps are on the market in 25 to 30-volt sizes. They give 20 candlepower and require only about 25 watts of energy to operate them, making possible the cheapest kind of a plant.

It is well to explain here that voltage is electrical pressure, or that which tends to make an electric current flow. When it is said that a lamp is a 110-volt lamp it is meant that it takes 110 volts of electrical pressure to drive sufficient current through the resistance of the lamp filament to heat it hot enough to glow. It must be understood that it does not indicate the amount of electricity that flows, simply the pressure that causes it to flow.

To return to the tungsten lamp again, it may be stated that it will burn a greater number of hours than the carbon lamp, as well as being cheaper to operate. The carbon lamp will, under good conditions, burn about 500 hours, and at the end of that time its candlepower will have fallen 20 per cent. The tungsten lamp will often burn 1,000 hours, and during that time will lose only 10 per cent of its original candlepower efficiency.

Now that the possibility of an inexpensive but efficient plant through the adoption of the tungsten lamp has been shown, an endeavor will be made to explain in a clear and simple manner

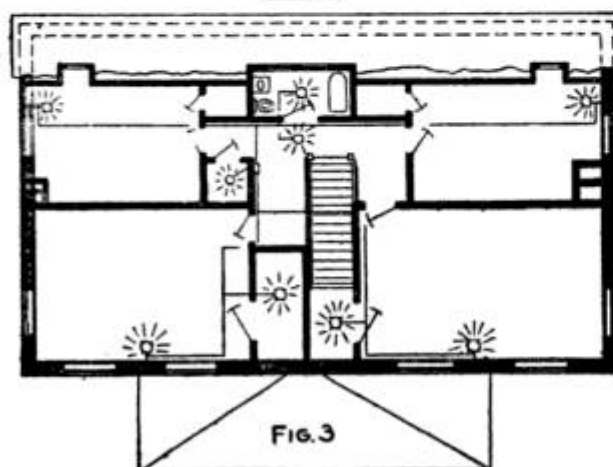
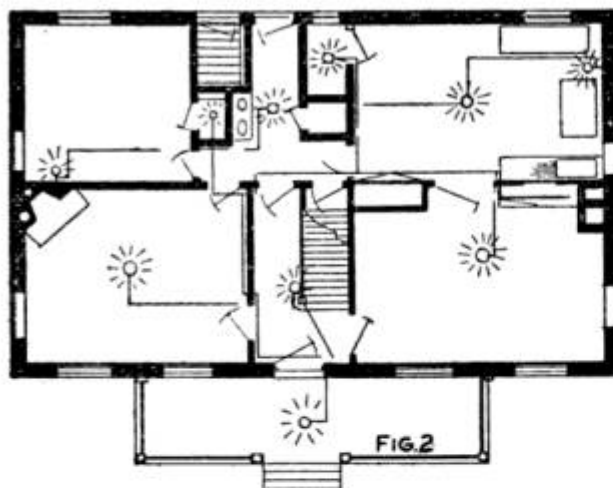
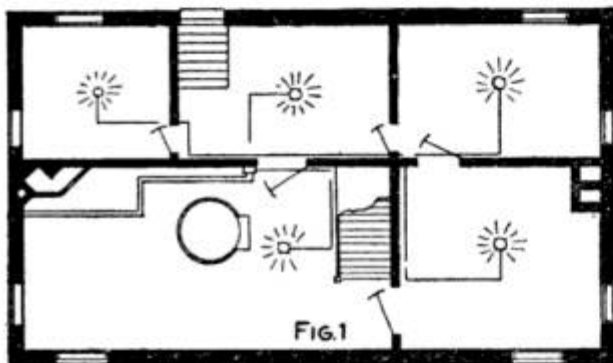
what is required in its installation. Since the object of an electric light plant is to provide illumination for the house, it is common sense to plan a good lighting scheme and then build a plant and install wiring in accordance. This statement is called forth by the fact that the opposite course is generally pursued. The wiring is usually installed and the outlets for the lighting placed in a haphazard way at any convenient spot.

For the sake of a clearer understanding of the subject it may be assumed that this installation is to be in a country home having, on the first floor, a living room, dining room, kitchen, front and rear hall, one bedroom and a

large porch in front. On the second floor there are four bedrooms, each provided with a closet, and a bath room and hall. In the cellar there is a large furnace room, a fuel room, laundry, vegetable room, and store room. Plans of the two floors and the basement, are shown in Figs. 1, 2, and 3.

As the living room is that in which most of the leisure time of the family is spent, it should be well lighted. First of all there must be a light for reading purposes. Since the family is likely to be large, several persons will often wish to read at the same time, so a considerable area should be well illuminated. When looking for a lamp to furnish light for reading, the average person promptly selects a table reading lamp. The ordinary table electric reading lamp would be very satisfactory for one or possibly two persons to read by, if a general illumination for the room were taken care of by other lamps; but in the ordinary farm house, usually more than one or two persons wish to read at the same time. Moreover, the lamp that furnishes light for reading is usually required to furnish a general illumination. Thus a table lamp will not do. Accordingly, a 3-light fixture is provided as shown in Fig. 4. The lamp in the center is sufficient for ordinary occasions, and at times when a general illumination rather than a concentrated light for reading is desired, the middle light is turned out and the two outside lamps are used.

The dining room requires a strong illumination over the table and a soft pleasing light over the walls and ceiling. This can be obtained for the room by two lamps placed in prismatic bowl reflectors hung at a height of 6 ft. from the floor. A single unfrosted lamp will light the hall, one lamp hung in the middle of the kitchen will suffice, one lamp with flat enameled metal reflectors should be placed in each room in the cellar, and a lamp placed inside a prismatic reflecting ball will be required for the porch. For each bedroom a bracket fixture carrying one light in an opal bell reflector is suffi-



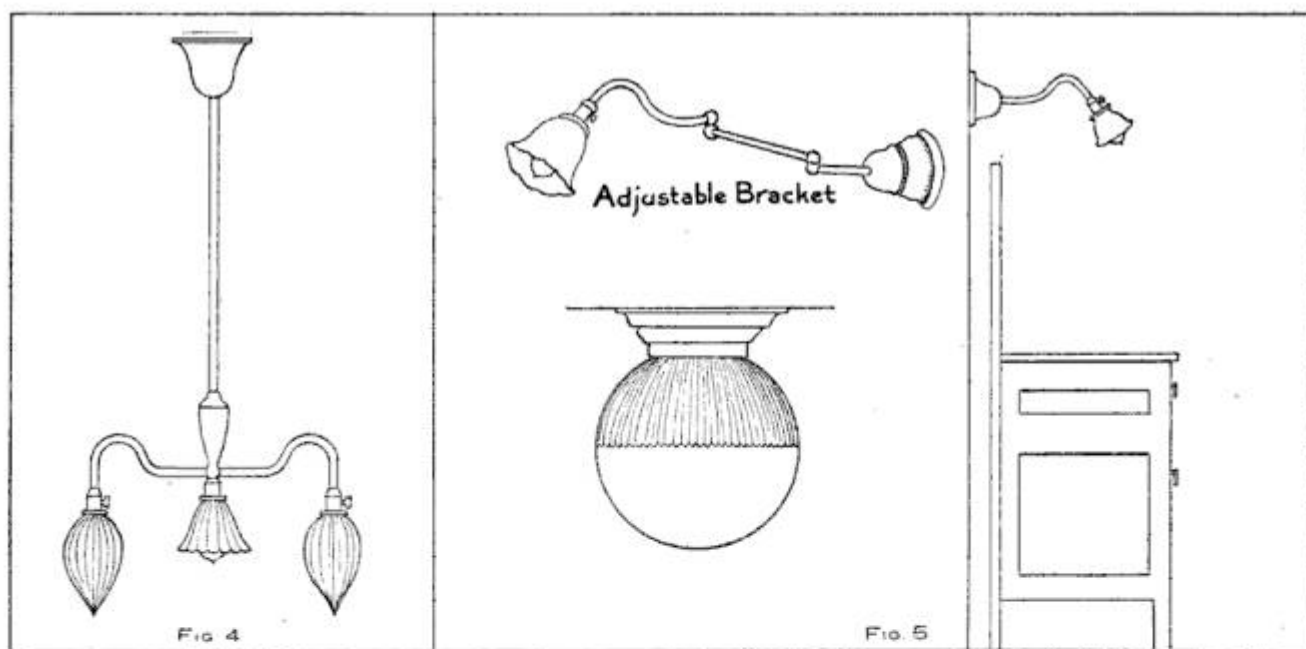
cient. An 8-cp. carbon lamp can be placed in the bedroom closets. These are simply drop lights suspended about 6½ ft. from the floor. Simple, single-light pendant fixtures are provided for the second floor hall and bath room. These, as well as the bedroom lamps should be frosted. Bedroom and porch lights are shown in Fig. 5.

Now that the number of lights for this country house have been decided upon, and it is safe to follow this general plan in almost any house, the next important question is to estimate the hours during the day that the lamps in each room will be lighted. This will give an idea of how large the storage battery will have to be to operate the lamps. Of course, the size of the battery will also depend upon how often it is convenient to charge it. We will assume, therefore, that the battery will be required to operate the lights on one charge for a day on which the max-

hours during the day that they are lighted.

Dining Room: Two lights, on during breakfast and supper.	
5:00—6:30 a. m.....	} 6 lamp hours
5:30—7:00 p. m.....	
Living Room: Three lights, on only after supper.	
7:30—10:30 p. m.....	10½ lamp hours
Kitchen: Two lights, on while preparing meals and washing dishes, morning and evening.	
5:00—7:30 a. m.....	} 10 lamp hours
5:00—7:30 p. m.....	
Front Hall: One light.	
8:00—10:30 p. m.....	2½ lamp hours
Front Porch: One light.	
7:30—9:00 p. m.....	1½ lamp hours
Rear Hall: One light.	
5:00—6:00 a. m.....	} 2½ lamp hours
6:00—7:30 p. m.....	
Bedrooms: Two lights.	
5:00—5:30 a. m.....	} 2½ lamp hours
9:00—9:30 p. m.....	
One light.	
10:30—11:00 p. m.....	
	<hr/> 35½ lamp hours

This gives a total of 35½ lamp hours. Therefore, a battery is required that will operate one lamp approximately 36 hours, with one charge.



imum amount of light is used. This will be in the winter when the nights are long and when there is some special occasion that keeps the family up later than usual. A probable lighting schedule for such a day is shown in the following table. In the column to the right are given the lamp hours per day. The lamp hours per day for each room are the number of lights in that room multiplied by the number of

Before going further it is well to become familiar with another unit used in electrical measurements. It is called the ampere and is the unit by which current flow is expressed. That is, the current which flows through the filament or other electrical conductor is measured in amperes, while the voltage is the pressure which makes it flow. The lamps chosen for this house will allow about one ampere of current to

flow through the filament when the pressure of 25 volts is applied. To produce continually a pressure of 25 volts, 15 storage cells are required, and it is now necessary to determine how large the cells must be to hold a sufficient charge to let one lamp burn 36 hours. As was just stated, one lamp will permit one ampere of current to flow, hence the battery will have to be large enough to hold a charge sufficient to provide a flow of one ampere for 36 hours; that is to say, a 36-ampere-hour storage battery, the ampere hour being the unit of capacity by which manufacturers rate storage batteries. The nearest commercial size of battery to 36 ampere hours is the 40-ampere-hour battery. This, therefore, must be chosen in this instance.

The "normal rate" of charging a storage battery is the number of amperes of current that must be forced into the battery to charge it in eight hours from an almost discharged condition. Since this is a 40-ampere-hour battery, its normal charging rate is 40 divided by 8, or 5 amperes. When there is plenty of time for charging, it is best to charge the battery at the 5-ampere rate, but if time is lacking, it may be charged in a shorter time with a current of 7, 8 or even 9 amperes. This capacity of storage battery will require charging only once per day when there is the heaviest probable load, but there will not ordinarily be the full quota of lamps burning, even in the winter, hence as a matter of fact, the battery will not have to be charged more than once in two days. In the summer when the days are long and few lamps are necessary, one charge will be sufficient for a week or even more.

Now that the battery is selected, the dynamo with which to charge it must be decided upon. Each cell of battery when fully charged will give a pressure of about 2.6 volts so that the entire 15 cells will give a pressure of 15 times 2.6, which is 39 volts. Owing to the fact that in charging a battery the current must flow into it in a direction opposite to the flow of current when

the battery is discharging, the entire voltage of the battery is opposing the voltage of the dynamo. Therefore, if the dynamo is able to drive any current into the battery when it is almost charged, it must give a higher voltage than the maximum voltage of the battery. Since the maximum voltage of this battery is about 39 volts, the dynamo should be able to generate about 42 or 43 volts. A 45-volt machine is a regular commercial size so this voltage will be decided upon for the dynamo.

Dynamos are rated by the kilowatts of energy they will produce. As was previously explained, a watt of electrical energy is equal to $1/746$ part of a horsepower. A kilowatt is equal to 1,000 watts. Hence a kilowatt equals $1000/746$, which is about 1.34 hp. Now the number of watts of electrical energy produced by a dynamo is equal to the product of the volts of pressure and the amperes of current. The dynamo, therefore, must give at least 9 amperes of current at 45 volts pressure. Hence, it must produce 9 times 45, or 405 watts. The nearest commercial size to 405 watts is the $\frac{1}{2}$ -kilowatt, or 500-watt size. Therefore, a $\frac{1}{2}$ -kilowatt machine is the proper one.

The gasoline engine to drive the dynamo comes next in selection. It must be able to yield 1.34 times as many horsepower as the dynamo does kilowatts. Since gasoline engines are usually rated rather high, and often on account of some lack of adjustment do not give their full number of horsepower, it is well to get an engine considerably larger than the size calculated. For the $\frac{1}{2}$ -kilowatt dynamo, a 2-hp. engine is the proper one.

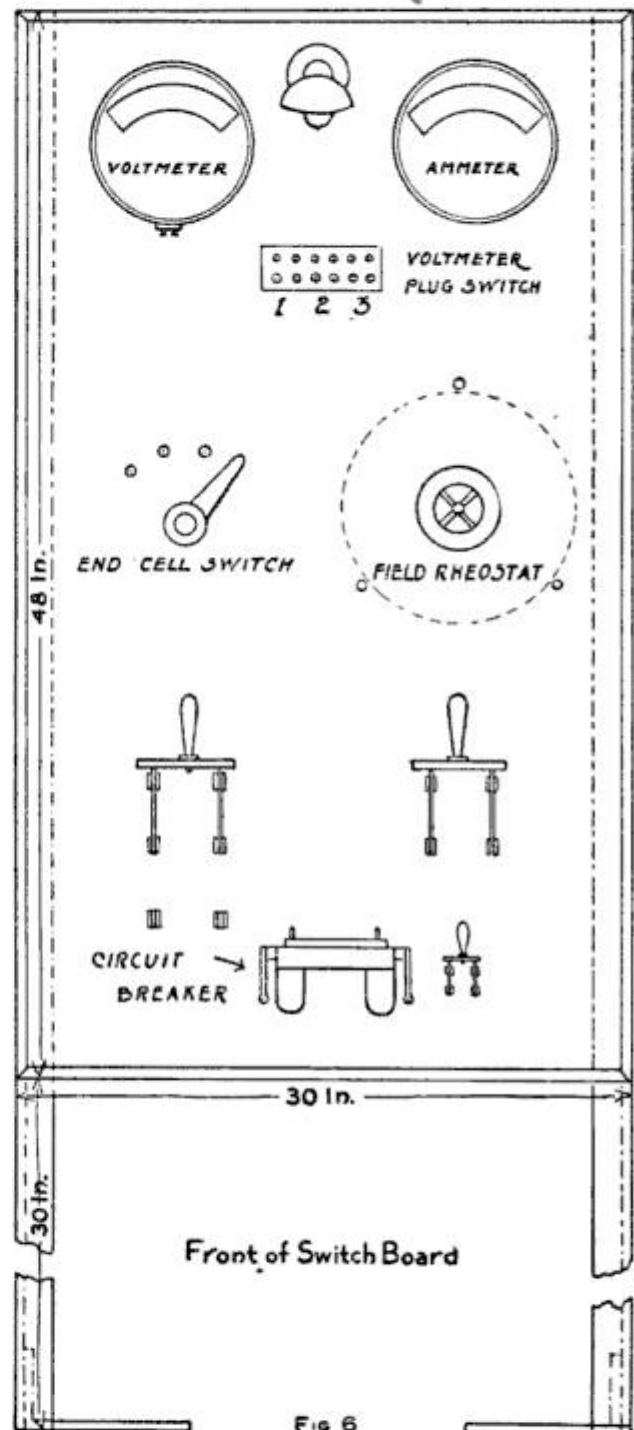
A switchboard apparatus with which to control the dynamo and storage battery are next to be selected. An adjustable resistance, called a rheostat, is supplied with the dynamo. This is to enable one to control the voltage of the dynamo so that the battery can be charged either rapidly or slowly. There must be an ammeter to measure the current that is being supplied the battery when charging; a voltmeter to

measure the pressure produced by the machine, also that produced by the battery, and the voltage that is supplied the lamps. Also, there should be a circuit-breaker, which is a sort of automatic switch, and its purpose is as follows: Suppose that the battery is being charged by the dynamo and there is no attendant at the plant. If for any reason the engine stops, the dynamo fails to generate any voltage. Since the voltage of the storage battery is now no longer opposed by that of the dynamo, current will flow from the battery back into the dynamo and tend to operate the dynamo as an electric motor. As soon as the dynamo stops working, the circuit-breaker automatically opens the circuit and thus prevents current flowing back to its source of generation.

As has been noted before, the storage battery, when almost discharged, gives only 1.8 volts per cell, so that to produce the 25 volts necessary to light the lamps to full brilliancy, the entire 15 cells are required. However, when the cells have been fully charged and the charged current is stopped, they give about 2.2 volts per cell, so that to light the lamps all of the cells are not required. Hence a method should be provided to increase gradually the number of cells of battery that are being used as the battery becomes more and more discharged. This will make possible a practically constant voltage supplied to the lamps so that they will burn at almost their full brilliancy until the battery is discharged. For this purpose is provided an end cell switch.

Since it should also be possible to obtain a reading of the voltage at three different places and there is only one voltmeter, a way must be provided to switch the voltmeter terminals from one place to another. A plug switch is therefore provided, having 3 double pairs of holes, or jacks. To the upper pair of each one of these double pairs of jacks are connected, the leads (wires) coming from the voltmeter. To the lower part of the first double pair are brought leads from the two terminals of the dynamo; to the second, leads

from the terminals of the battery; and to the third, leads from the two sides of the line leading to the lamps. By means of a 4-point plug any one of the



three pairs of leads can be switched-on the voltmeter.

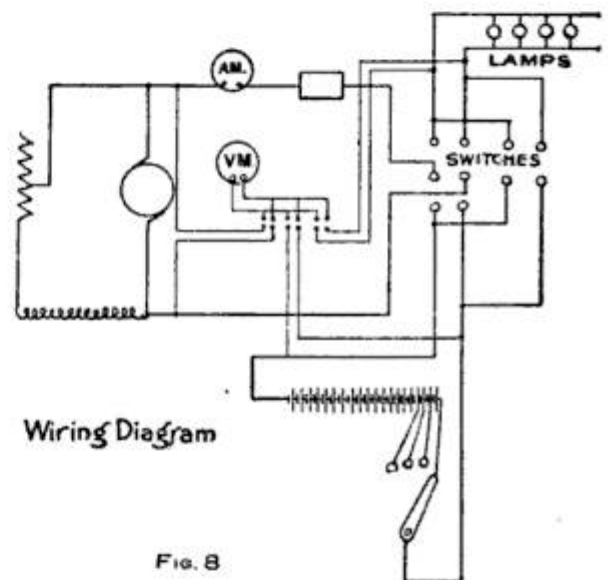
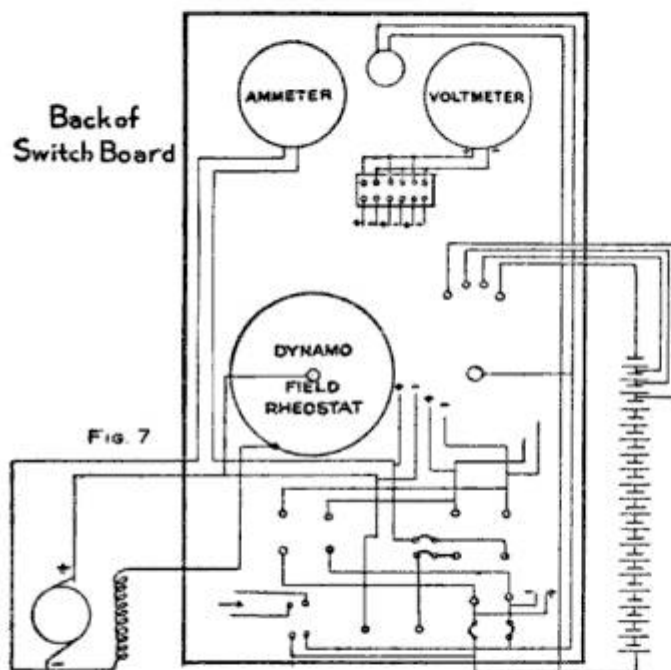
Two switches are provided. One is a double-throw switch by which the dynamo can be thrown onto the battery for charging, or by throwing it the other way the lights can be operated directly from the generator. To operate the lamps directly from the dynamo, the voltage must be reduced to about 26 or 27 volts, otherwise the lamps will soon be burned out by the

excess voltage. By leaving this switch open and closing the other switch, the dynamo circuit is opened and the battery is operating the lights. Figure 6 shows a diagram of the switchboard with the apparatus in place, and Fig. 7 shows the rear of the board with the connections as they should be made; Fig. 8 shows a schematic diagram of the connections in the power plant, and Fig. 9 the arrangement of the engine room.

All of the wires leading from the battery to the switchboard, the circuit from the switchboard to the armature

three amperes of current, are supplied through any circuit.

Ordinarily a plant of this sort would be housed in a building large enough to accommodate all of the machinery of the farm that could be operated by the gasoline engine. Such a building would usually not be fireproof, therefore, the gasoline tank should be buried at some distance from the building and the supply pumped to the engine as needed. Where space is limited and compactness desired, as would be the case if the plant were used to light a house in a town, the engine building



terminals of the dynamo, and the one leading from the switchboard to the house, should be large enough to carry the maximum current with only a small drop in voltage. For this system, 8 amperes will be about the maximum current used. Assuming a distance of 200 ft. from the switchboard to the cabinet in the basement, No. 8 B. and S. gauge insulated (covered) wire should be large enough to carry the maximum current with only a small loss. Wires of this size are therefore run to the basement and from there directly up to the second floor. From the distribution cabinets on each floor leads are run to each room. These wires need be no larger than No. 14, since not more than three lights, requiring

should be of brick or concrete, with a separate compartment for the gasoline tank. If the storage battery were placed in the basement of the house where it will not freeze, as may be done, a 10 to 16-ft. building would be of ample size to accommodate the plant.

Full instructions for installing such an apparatus and wiring are omitted from this article, as it will be better to secure an experienced man to do this work, but the information outlined in it, with the information that can be obtained from the companies furnishing batteries, engine and dynamo, will enable anyone to decide upon the size of the equipment needed and to order intelligently.

Estimate of Cost of Plant

A good storage battery of the 40-ampere-hour size will cost from \$4 to \$5 per cell. A quotation of \$4.60 per cell was made by one of the best companies. Since 15 cells are required, the total cost of the battery will be approximately \$70.

Gasoline engines can be estimated at about \$60 per horsepower, the smallest sizes costing perhaps a little more than this. A 2-hp. engine of a good make will cost about \$125.

Complete switchboards vary in cost according to the material of the board, i. e., whether of slate or marble and according to the grade of the instruments and switches furnished. A first-class marble switchboard equipped with good instruments will cost approximately \$100.

A one-half kilowatt dynamo, shunt-wound, 45 volts, of a first-class make can be had for \$65.

Seventeen tungsten lamps will be required, each costing \$1, making a total of \$17.

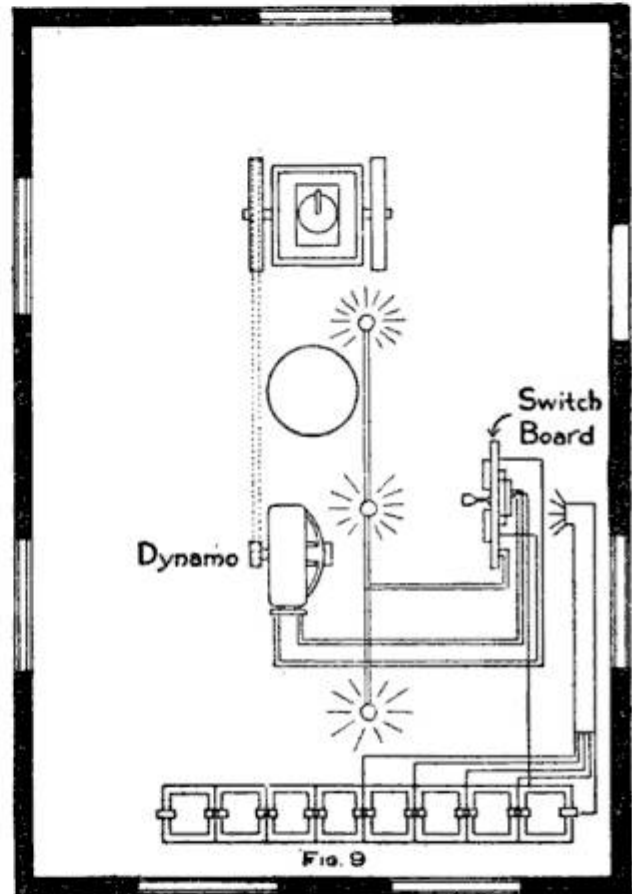
Fourteen 8-cp., 25-volt carbon lamps will cost about \$3.

1000 ft. No. 14 wire.....	\$12.00
550 ft. No. 8 wire.....	25.00
Cabinet for basement.....	2.85
Cabinet for first floor.....	5.00
Cabinet for second floor.....	2.85
Porcelain cleats and tubes.....	2.00
18 snap switches.....	7.20
Labor: 2 men, 8 days, at \$3.00..	48.00

Fixtures

Living Room: One 3-light pendant fixture fitted with one Holophane reflector and two stalactites	7.00
Dining Room: Two light fixtures with Holophane prismatic bowl reflectors.....	7.00
Front Hall: Single light fixture with Holophane stalactite....	4.00
Kitchen: Single light fixture fitted with opal bell reflector.	2.00
One adjustable bracket fixture	2.00
Veranda: Prismatic reflecting ball in ceiling fixture.....	2.00
Cellar: Cleat receptacles.....	
Five required	1.25

Bedrooms: Single light bracket fixture with opal bell reflector	
Five required	6.25
Bath Room: Single light fixture with opal bell reflector.....	1.50
Hall: Second floor; Single light fixtures with opal bell reflector	1.50
Closet and Pantry: Five drop cords and sockets with ceiling rosettes	1.50



Arrangement of Engine Room

This makes a total cost of a little over \$525 for the entire outfit and for its installation. Allowing for incidentals and for expenses unprovided for in the estimate the plant will cost not more than \$550.

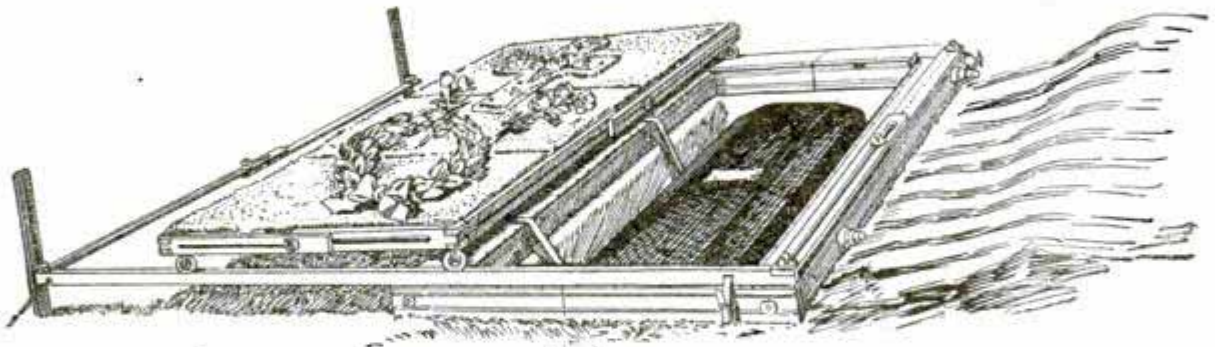
[To be continued.]

FLOWER HOLDER AND COVERING DEVICE FOR GRAVES

Realizing that the sight of a casket after it has been lowered into the grave is often the cause of much hysteria on the part of the mourners, a concern in Pennsylvania has devised the flower-holding and grave-covering device here illustrated. It is so arranged that the lowering of the casket into the grave

by the lowering device automatically draws a frame over the opening, completely closing and covering it with a bed of flowers.

from across the platform thus protecting the employer from careless help as the dial registers exactly the weight. A counterbalance, equal to the weight



Floral Grave Covering Softens Grief at Burials

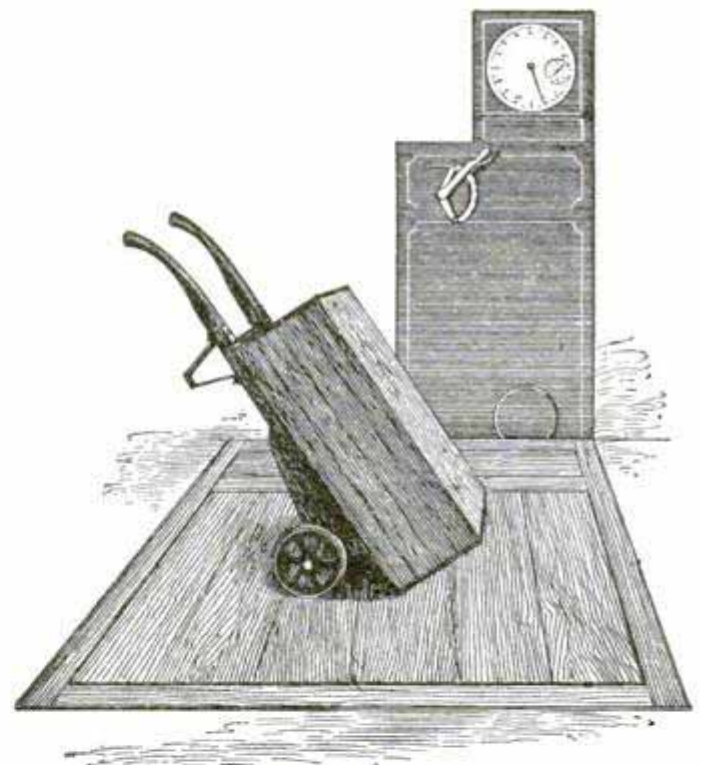
The device is adjustable in length as well as width so that it can be used in connection with any sized grave. The one illustrated is adjustable from 4 to 7 ft. in length. Across the top of the frame, running crosswise, are telescoped rods, adjustable in width from 21 in. to 38 in., forming a substantial grating upon which flowers are banked. Four rubber-tired wheels under the frame run upon a grooved track, adjustable standards being used to elevate the track to a level with the grave. Straps fastened to the outer edge of the device are attached to the straps used to lower the casket, thus drawing it over the grave as the casket is lowered. The device weighs about 35 lb.

of the truck used, is effected by means of a device near the hand lever. Another pleasing feature is that the mechanism is not jarred by the running of heavy trucks on and off.

AUTOMATIC PLATFORM SCALE

The automatic scale has been refined to a nicety and is now used exclusively by several railroads. It is equipped and constructed as any other scale with a few exceptions. The weight is registered on a 12-in. dial similar to a clock face, but the reading of it is reversed. The weight is read from the dial exactly as the clock only that the small dial within registers the approximate or large weight in units of 500, and the large dial shows the exact weight in pounds less than 500. Thus, considering the size of the platform, its capacity is practically unlimited.

The scale registers quickly and accurately and can be read with ease



Dial Registers the Net Weight

MUSICAL WIRELESS MESSAGES

A wireless system, devised in Berlin, consists in sending out the vibrations which form a message as pure musical tones that can be picked up by the receiver. It is claimed that the fact that the vibrations are musical tones will make maintenance of communication possible in spite of the most violent atmospheric disturbances.

EDITORIAL

The Peace Congress has come and gone. From every platform and pulpit in Chicago, the peace advocates fired volleys into the ranks of the less thoughtful; the convention reports were published in all the papers in the land. Meanwhile the naval shipyards of the world have had a busy month. The forges glow, and the noise of the pneumatic riveters is heard in the land as never before since the world began. While national in character, the gathering was given an international flavor by the presence of several members of the foreign embassies at Washington.

Have the pebbles cast into the ocean of human thought produced circles of impulse of large radius? To what extent have you, who read this, been stimulated to do or say anything which will cause wars to cease? Have your beliefs been changed? For, while the people of almost every nation agree with one accord as to the fearful desolation of war, how many of these same humans would talk peace if their own country should tomorrow receive a positive insult from some other nation with whom theirs is now perfectly friendly? Of nothing is humanity so profligate as lives. History wearies in telling of the thousands slain in battle who never did know what the fight was for.

In other words, have we yet civilized to the point where we really want peace? Or are we world nations like the poor inebriate who, while deploring his condition, said to me "the trouble is I don't want to be cured"?

It is evident that if every inhabitant of our world had to settle all his disputes and enforce his rights with his own fists that this planet would be the most barbarous in all the universe. Laws, police, social standing, self-respect and self-control, have made a resort to physical arms in the case of the individual of comparatively rare necessity. Why, then, should not the nations submit to, and themselves voluntarily create, an international court to administer justice with an international army and navy to enforce the court's decision? In theory the plan is logical, operative and inexpensive. If each of the large powers would contribute a fraction of its navy, the resulting fleet would be so overwhelming as to make resistance suicidal. Under this plan the annual expense for armies and navies to each country would be only a small percentage of the present outlay, to say nothing of the saving by preventing wars which might otherwise occur.

It is costing England over \$300,000,000 this year to maintain its army and navy in a time of peace: \$5,000,000 to \$10,000,000 a day is the estimated cost to this country of a war with any of the great powers.

To be consistent in our peace resolves, however, we must cease to instill warlike motives and ambitions in our children. No longer shall the fledgling orator recite "Horatius at the Bridge"; untaught the deeds of Spartans, Romans, and the Six Hundred; no more pictures of charging sword and bayonet, and sinking ships. The lace epaulets must lose their lustre; the military schools teach mechanics instead of tactics; our street parades be made up of boys and girls strewing flowers and singing songs instead of soldier boys trailing muskets to the sound of fife and drum.

Unquestionably the world would be infinitely better under such millennium conditions, but—
Do we really want to be cured?

Our own cruisers certainly did look good to American missionaries in Turkey not so long ago.

However, the destiny of "Dreadnoughts" seems likely to be dependent more on money than morals. Swords, the modern brand, cannot be drawn indefinitely without pens behind them to sign checks. The competition of nations in building more and larger ships than their fellows is approaching the day when the burden will chafe the neck of the people. In time of actual

hostilities, the soldiers of Valley Forge heed not their bleeding, frozen feet; but in time of peace the element of consuming patriotism sleeps, and the shoe pinches.

When the time is ripe for universal disarmament, this country is the logical one to take the initiative. By reason of our wealth, strength, geographical position, and freedom from complications, we are in a position to take the leading part.

Are we willing to be cured?

* * *

A man can plan and build a house which will suitably and comfortably meet all the requirements of himself and family for 10 or 20 years to come. It does not often happen that any radical changes are made in a skyscraper when once completed. A ship is equipped and put in service and she carries the same masts, winches and compartments until she is wrecked or goes into the boneyard.

The house will need repainting occasionally, and new shingles at longer intervals; the elevator ropes in the office building wear out but they are replaced by like; and the ship may lose an anchor requiring the purchase of another. The changes in all these are of comparatively trifling moment, but—

A railroad is never finished.

Like a cucumber vine, the instant it ceases to grow it begins to wither. There must be continuous expansion and enlargement. Larger cars require more powerful locomotives, and both in turn call for heavier rails, bigger round houses, stronger bridges, longer platforms and sidings, increased safety devices, while the straightening of curves and the leveling of grades come in for their share of attention on even the oldest roads. Little wonder then with our railroads consuming nearly one-half of all our manufactured steel and iron and fully one-half of all the lumber made each year, that they are the unfailing barometer of the business activity of the Nation.

* * *

During the past month a decided improvement in business prospects has been evident. The train of industry which has been climbing the up-grade so long is steadily approaching the summit of its difficulties. Not in all lines of business is the improvement noted, yet many begin to see where orders are coming from in the near future. There is every indication that we are rapidly approaching the point of greatly increased industrial activity. The trade paper being a specialist in its particular line of industry is a most reliable authority. The editorials in some two hundred of these journals received, report either increased business or its prospect during the next three months.

When the tide turns it is likely to come in a great wave, and the prudent manufacturer is he who takes advantage of the present opportunity to overhaul his plant and put it in first-class condition. Old and time-consuming machinery should be thrown out and the latest and most economical installed. Many plants have grown rapidly and new machines were set where they could be placed and put in operation with the least delay. This did not make for logical or convenient handling of work, with the result that material passed through the shop on the erratic lines of a flying bat, instead of the direct, speedy movement of the carrier pigeon. Modern methods require conservation of energies, and nowhere is this more true than in a manufacturing plant. Railroads lower grades and straighten curves for this same reason.

Many an owner who is proud of his plant would find numerous costly leaks if he would either visit other similar works, or go through his own in a thoroughly critical spirit.

H. H. WINDSOR.

GREAT BATTLESHIP IN THE RIVER OF ITS NAME

The trip of the U. S. S. "Mississippi" up the Mississippi river to Natchez, Miss., the latter part of May was a memorable event for the people along the great central river of the country, because it was the first time a great modern battleship had breasted its waters that distance. Natchez is about 175 miles up the river from New Orleans, and some fears were expressed at first that the huge ship could not reach it.

On May 22, the "Mississippi" was presented with a punch bowl, the gift of the people of Natchez. It is made of hammered copper and silver, gold lined, and stands 18 in. in height on a tray 36 by 24 in. In his speech of acceptance Captain Fremont cited the presence of the battleship in the Mississippi as a demonstration of the navigability of the great river and an indication of greater possibilities in the future.

SANITARY HANGERS IN STREET CARS

One of the rapid transit companies of New York has been testing novel non-leather hangers to take the place of the customary hand straps, the idea being to make the cars as sanitary as possible. The new hangers are made of No. 26 steel tubing, covered with a glazed porcelain enamel. The porcelain coating prevents

the absorption of dirt or perspiration, and every night the handles are immersed in an earthen vessel containing a solution of carbolic acid, which destroys all germs that might be clinging to them. The hangers do not have to

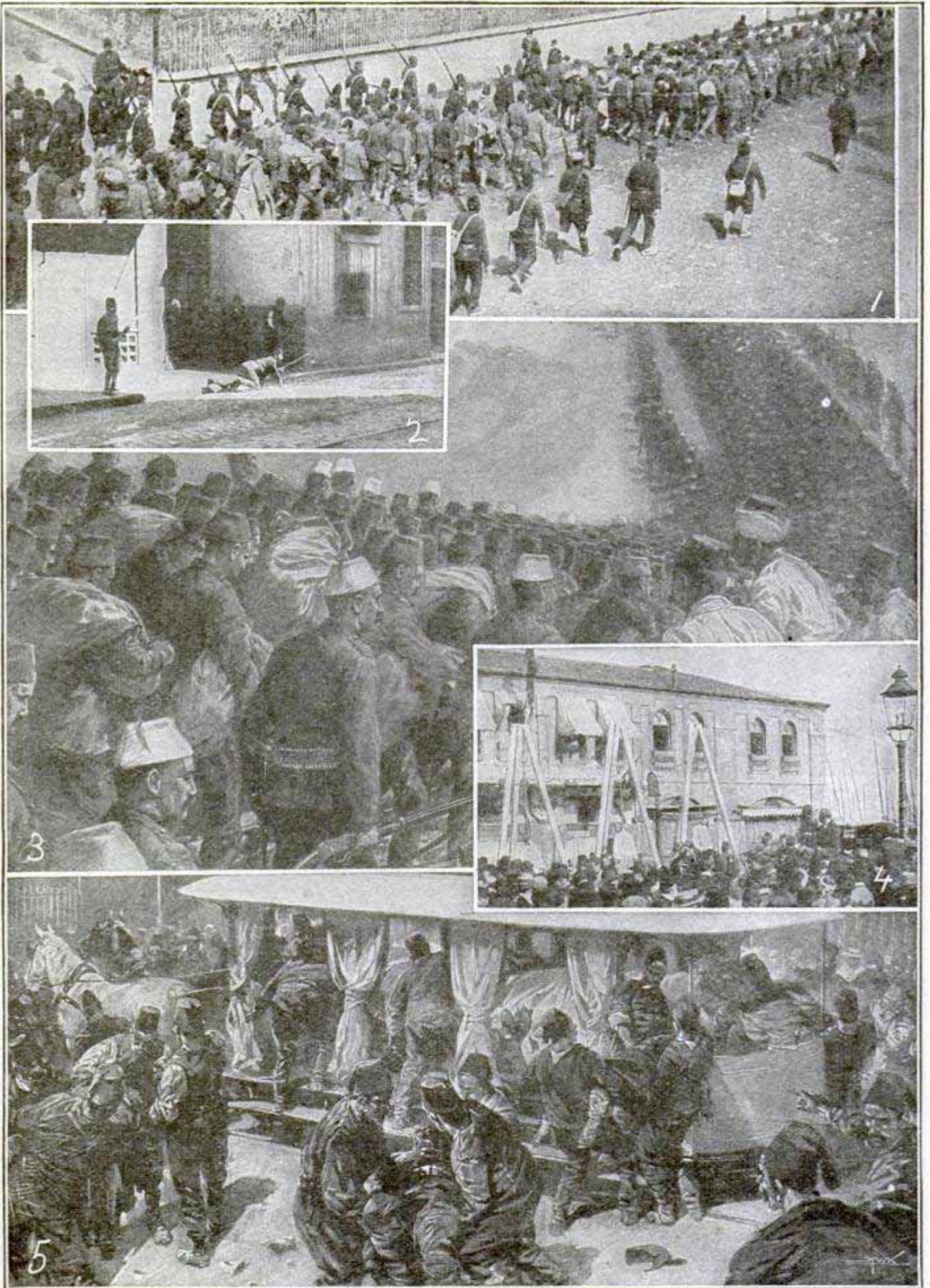
be removed for this treatment, as the vessel is simply lifted up beneath them. After being dipped, they are left to dry without further attention.



NEW FRENCH GASOLINE-ELECTRIC FERRY

The use of ferries still affords an imperfect substitute for bridges between Rouen and the mouth of the river Seine in France. The old clumsy ferry system has, however, been reconstructed. The system of steam has been discarded to avoid the difficulties of installing boilers. The mixed operation of gas engine and electric power has been adopted.

The new construction is very simple. Two longitudinal beams support the bottom of the boat which is flat, but the ends rise to an obtuse angle and the space beneath is made into airtight compartments which protect the ends and corners of the boat most subject to injury. The parallel beams outside of the main beams carry the cabins, one of which houses the passengers to the number of 25, and the other, the boat machinery. The novel feature of the reconstruction is in the rudder on each end arranged to fold up when landing.



THE REVOLUTION IN TURKEY—1—Marching captive citizens, tied with ropes, to prison; 2—Armed revolutionists lying in wait; 3—Surrendered troops being marched out of city; 4—A triple execution in public place; 5—Removing the dead in horse cars.

HOW TO MAKE A MORRIS CHAIR

The stock necessary to make a morris chair of craftsman design as shown in the engraving can be purchased mill-planed and sandpapered on four sides as given in the following list:

- 4 posts $1\frac{1}{4}$ by 3 by 36 in.
- 2 front and back rails $\frac{7}{8}$ by $5\frac{1}{2}$ by 24 in.
- 2 side rails $\frac{7}{8}$ by $5\frac{1}{2}$ by 28 in.
- 2 arm pieces $\frac{7}{8}$ by $5\frac{1}{2}$ by 37 in.
- 7 slats $\frac{3}{8}$ by 2 by 24 in.
- 2 cleats 1 by 1 by $22\frac{1}{2}$ in.
- 2 back stiles 1 by $2\frac{1}{2}$ by $24\frac{1}{2}$ in.
- 2 back rails 1 by 2 by 17 in.
- 3 back slats $\frac{3}{8}$ by $1\frac{1}{2}$ by 19 in.
- 1 back support $\frac{3}{4}$ by $\frac{3}{4}$ by 24 in.
- 2 support rests 1 by $1\frac{1}{2}$ by $8\frac{1}{2}$ in.
- 2 dowels $\frac{1}{2}$ in. diameter, 6 in. long.

First make and put together the sides of the chair. While the glue is setting on these parts make and assemble the back. The front and back rails may next be made and placed and the cleats and bottom slats fastened. With the adjustment of the back the chair is ready for the finish.

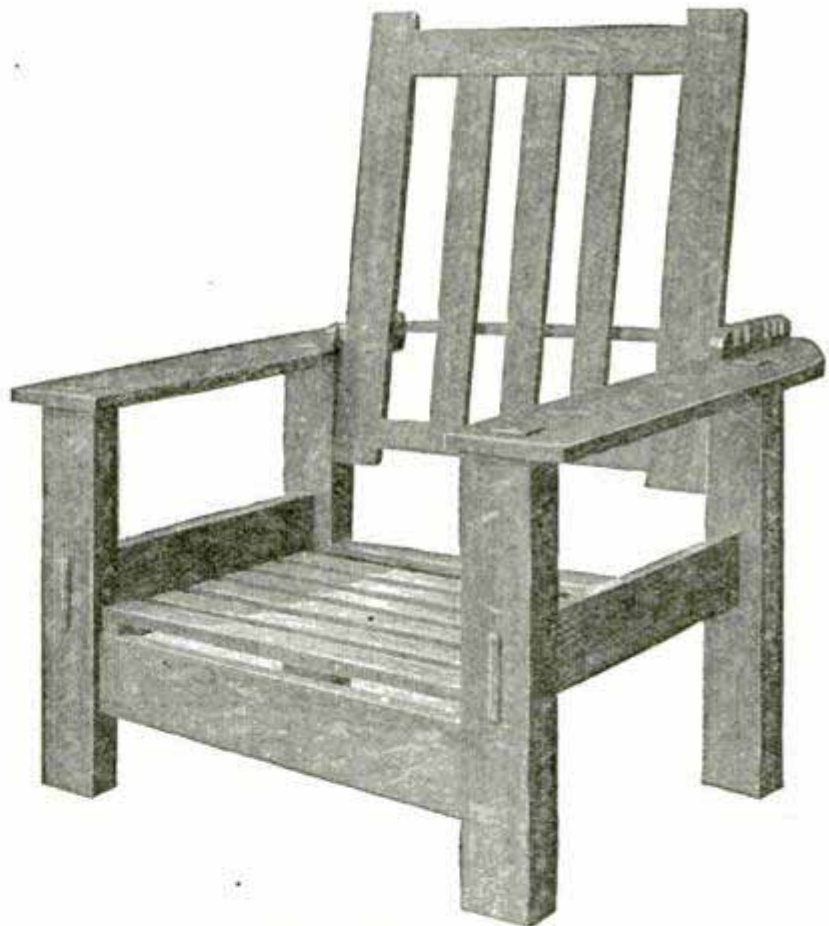
The posts are to be tenoned on the upper ends. These tenons are to project $\frac{3}{16}$ in. above the arm and should be slightly beveled. The lower ends of the posts, likewise, all other projecting ends, should be beveled to avoid their splintering. All sharp corners, as on the arms, should be sandpapered just enough to take their sharpness off so as to not injure the hand.

That the chair may be properly inclined the rear posts are cut 1 in. shorter than the forward ones. To get the correct slant on the bottoms of these posts, lay a straight-edge so that its edge touches the bottom of the front post at its front surface but keep it one inch above the bottom of the rear post. Mark with pencil along the straight-edge across both posts.

At the rear ends of the arms are the notched pieces that allow the back to be adjusted to different angles. These pieces may be fastened in place either by means of round-head screws from

above or flat-heads from underneath the arms. The notches are to be cut $\frac{3}{4}$ in. deep. If more than three adjustments are wanted, the arms must be made correspondingly longer.

The dimensions for the tenons on all the larger pieces will be found on the drawing. For the back, the tenons of the cross pieces, the rails, should be $\frac{3}{8}$ by $1\frac{1}{4}$ in. For the slats, the easiest way is to not tenon them but to "let in" the whole end, making the mortises in the rails $\frac{3}{8}$ by $1\frac{1}{2}$ in. This will necessitate cutting the sides of the mortises very accurately, but this extra care will be more than compensated by not having to bother with the cutting



Complete Morris Chair without Cushion

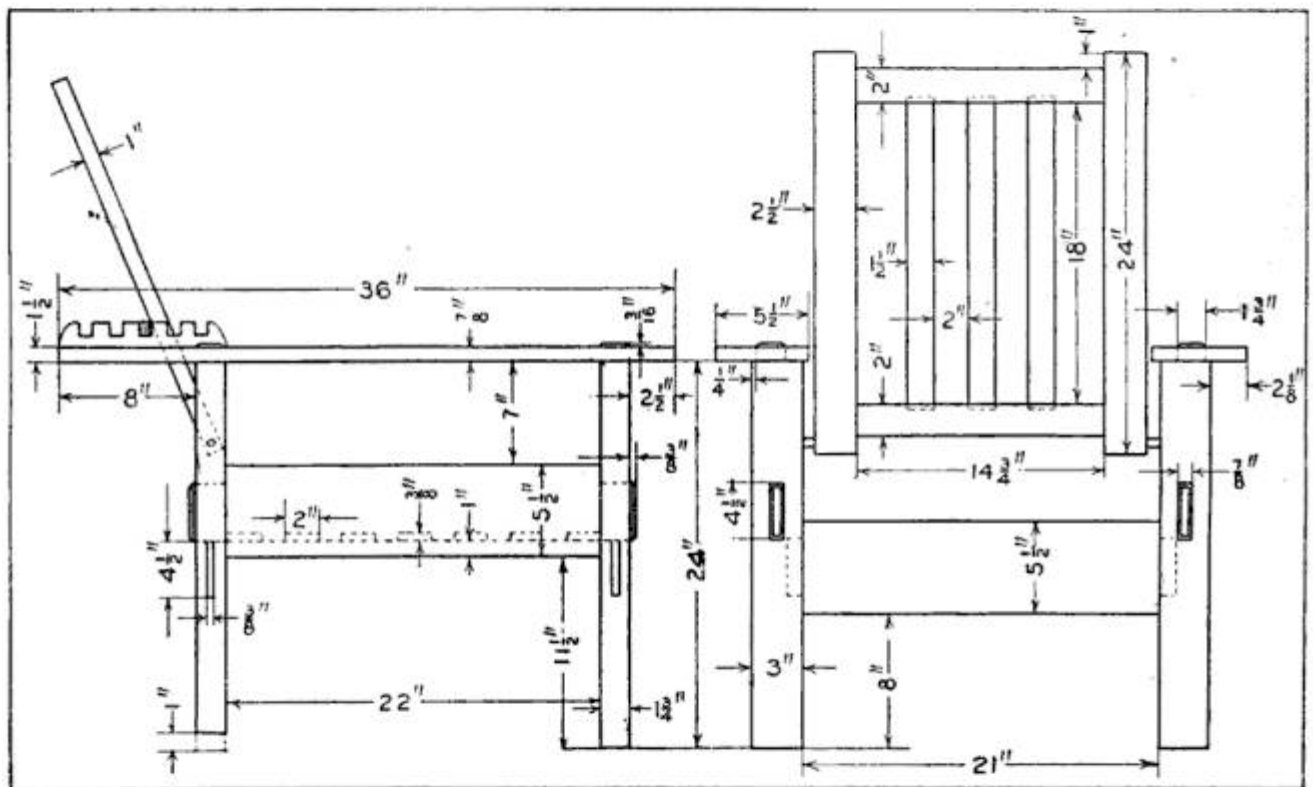
of tenons on each end of the three back slats.

To finish the chair, put on a coat of water stain, first removing all surplus glue and thoroughly scraping and sandpapering all the parts that were not so treated at the mill. The color of the stain will depend upon the finish desired, whether golden, mission, etc.

Water stains cause the grain of the wood to roughen, so it will be necessary to resandpaper the surfaces after the stain has dried, using fine paper. Next apply a coat of filler colored to match the stain. Directions for its application will be found upon the cans in which the filler comes. After the filler has hardened put on a very thin coat of shellac.

What step is taken next will depend upon what kind of a surface is desired. Several coats of polishing wax may be put on. This is easily done—directions

together by lacing leather thongs through holes previously punched along the edges of the parts. A very pretty effect is obtained by using thongs of a different but harmonious color. The manner of lacing may be any one of the various laces such as are used in lacing belts or as shoe strings. These cushions may be filled with hair or cotton felt. Denim or burlap may also be used as a covering and are much less expensive than the leather. Lace one side and the two ends, then place filling and complete the lacing.



Details of a Morris Chair

will be found on the cans—and makes the most satisfactory finish for mission and craftsman furniture. It is the easiest to apply. Several coats of shellac or of varnish might be put on instead of wax. Each coat of the shellac should be rubbed when thoroughly dried with curled hair or fine steel wool or fine oiled sandpaper. Rub the first coats of varnish with hair-cloth or curled hair and the last coats with pulverized pumice stone and crude oil or raw linseed oil.

Cushions for the chair can be made at home. They may be made of art leather such as Spanish roan skin and the top and bottom parts fastened to-

gether by lacing leather thongs through holes previously punched along the edges of the parts. Art leather cushions retail at from \$16 to \$20 a pair and the denim and burlap at \$6 to \$9.

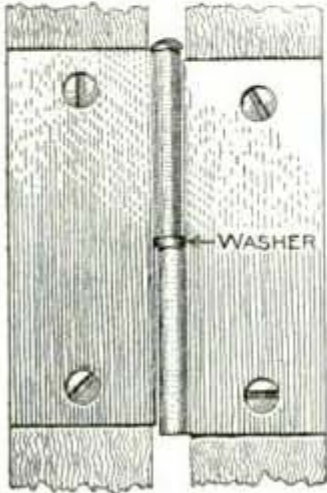
The bottom cushion should be made the full size of the chair. The front and back rails extend a little above the slats and thus hold it in place. The back cushion will settle down a little and therefore may be made nearly the full length from the slats to the top of the back.

In the first target practice of the U. S. S. "Mississippi" the total number of hits on a floating target was 67 per cent.

SHOP NOTES

How to Remedy a Sagging Door

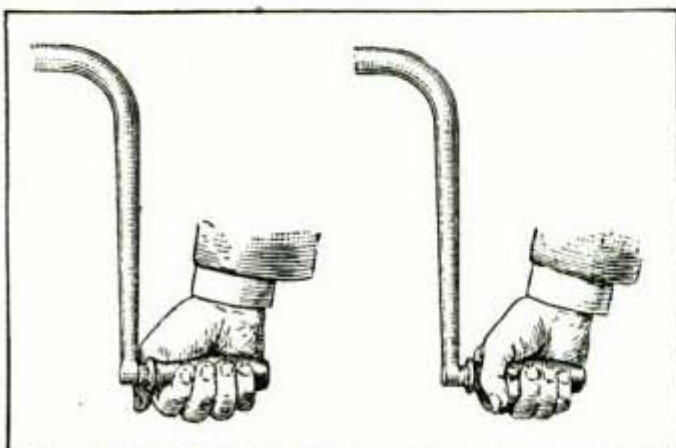
A shed or barn door that has sagged so that the outer end rubs on the floor, sometimes wearing an arc-shaped groove, is quite an annoyance. If you do not want to reset the hinges on such a door, or have not the tools to do the work, the door can be raised high enough to prevent its dragging by inserting a washer or two on



the pin between the halves of the hinges. The door can be lifted carrying the pin off the hinges with the top half, the washers put on the pins and the door replaced in a very short time. —Contributed by Donald A. Hampson, Middletown, N. Y.

How to Grasp an Automobile Starting Crank

Most of the accidents caused from cranking an automobile engine are due to the crank suddenly flying backward before the hand can be removed and this usually results in a broken or strained arm or wrist, says Automobile Dealer and Repairer. These accidents



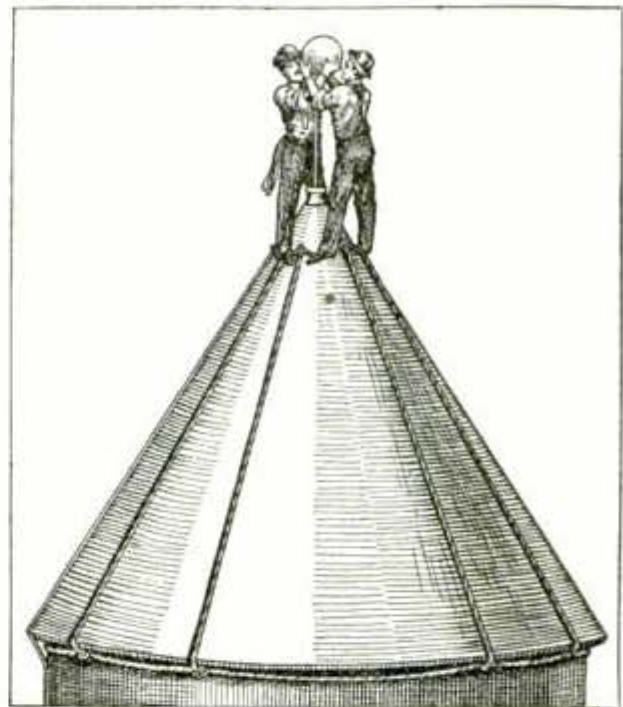
Right Way

Wrong Way

can be avoided if the operator will take hold of the crank and place the thumb on the same side as the fingers. Never take hold of the crank as you would any other handle, with the thumb on the opposite side from the fingers.

Holding On to a High Dome

A cap or ornamental ball on the dome of a very high building had become rotten and apparently in a condition ready to fall. The dome was hard to reach, and when reached, it was diffi-



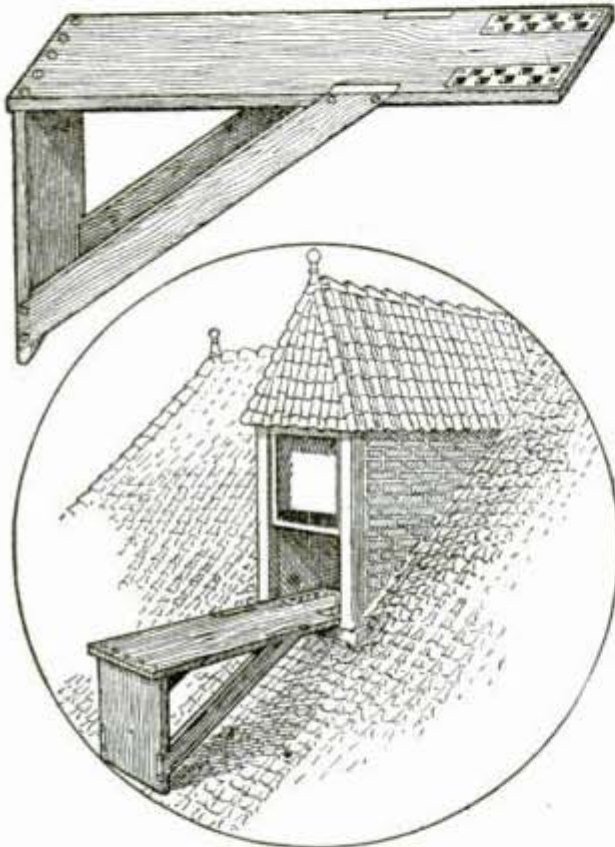
Rope Support on a Dome

cult for a workman to remain on the roof and remove the ball at the same time. A lightning rod conductor passed through the ball and extended several feet above. The old ball had to be lifted over the end of the rod and the new ornament placed on in the same way. To do this a rope was put around the outside of the dome underneath the eaves and a smaller ring of rope about 3 ft. in diameter placed around the top near the ball. The two rings of rope were then connected by means of six or eight lengths of rope as shown in the sketch. This kept the top ring of

rope in such position that the workmen could step in the rope and hold themselves while lifting the ball.—Contributed by I. G. Bayley.

A Painter's Dormer Window Jack

An ordinary painter's jack used on straight walls cannot be placed on dormer or roof windows and for this reason a special jack may be constructed as a makeshift platform. A



A Special Jack

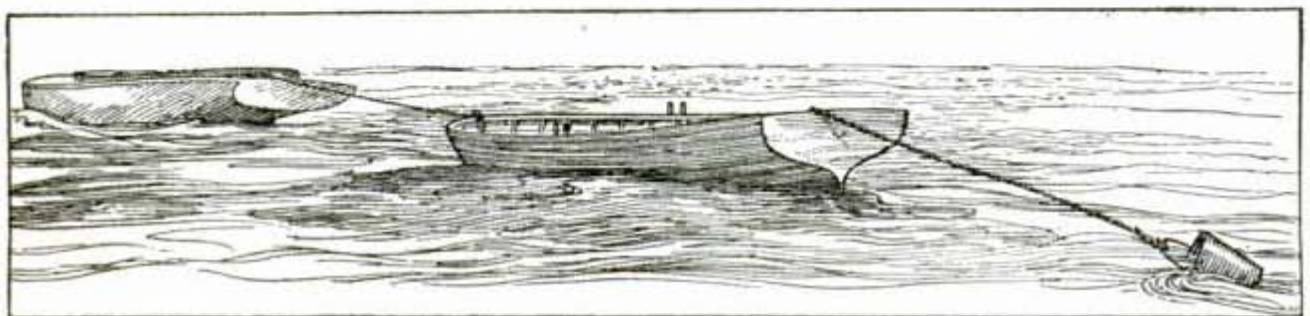
very simple and easily constructed jack for such a purpose is shown in the accompanying sketch. The horizontal board is about 4 ft. long and the vertical board 18 in. or 2 ft. long according to the slope of the roof. These two boards are cut from one 1-in. board 12 in. wide, and they are braced with 1 by 3-in.

strips which are mortised into the edges of the horizontal and vertical boards as shown. Metal plates $\frac{1}{4}$ in. thick having a number of square holes for adjusting pins are fastened with screws to one end of the horizontal board as shown.

Protecting Anchored Boats in Tide Water

In any river where there is a tide or current a small boat or tender will cause damage to the yacht or large boat by bumping the side while the latter is at anchor. On very large yachts this trouble is easily overcome by using a long pole called a boot boom and by making the small boat fast to this it will easily swing her clear and no bumping results. The small launch or sail boat cannot carry a long boot boom very well, but they usually have a galvanized deck or water pail. If a line is made fast to the pail and the stern of the small boat, the tide or current pushing against the pail keeps the small boat away from the larger one. This may seem foolish to a landsman but anyone who has gone cruising has been awakened more than once during the night by the small boat knocking the big boat and especially so when a steamer passes. The swells caused by a steamer will throw the small boat against the larger one with great force.

If the yacht or launch is anchored and the tide running up stream swings the boat that way, the small boat will bump the larger one when the wind is blowing down stream. This is caused by the yacht swinging with the tide, and the small boat drawing only a few inches, the wind overcomes the force

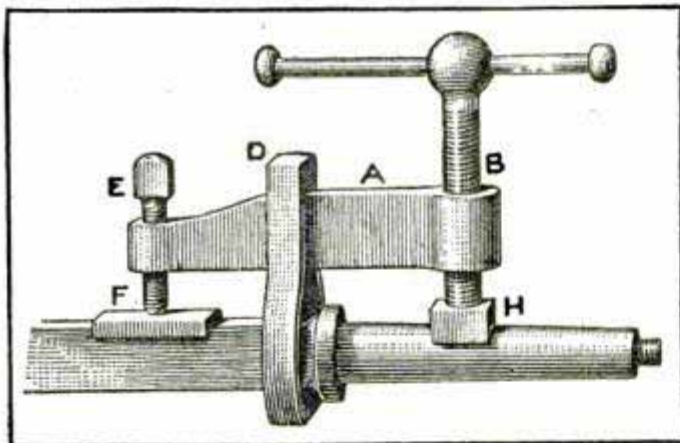


The Bucket Keeps the Boats Apart

of the tide and it is driven against the larger boat. The pail will keep the boats apart in this instance.—Contributed by W. F. Quackenbush, New York City.

A Blacksmith's Axle Set

The main part of the axle set, A, is made from a piece of iron 9 or 10 in. long, 1 by 2 in. on one end, and tapering down to 1¼ in. on the other end. The largest end is drilled and tapped for a 1-in. screw, B, which has a pin made on its lower end on which the block H is loosely fitted so it will remain stationary while the screw is being turned. The block has an arc of a circle cut out to fit the axle. The small end of the main piece, A, is drilled and tapped for a 5/8-in. set screw, E. The link, D, is made from iron 7/8 or 1 in. square to fit over the axle and the lar-



Setting an Axle

A. The plate F is fitted on the square part of the axle to keep the set screw from denting the metal, says Blacksmith and Wheelwright. The cut plainly illustrates how an axle may be set at any angle.

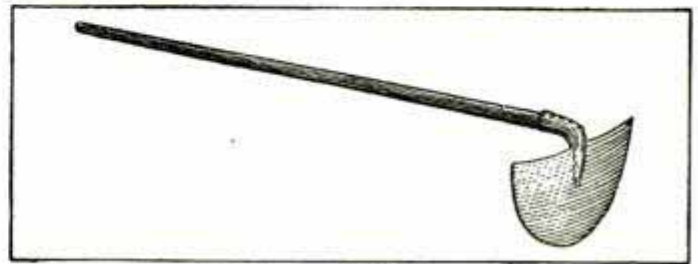
How to Harden Tools Made from Machine Steel

Railroad picks, plows, etc., can be made from machine steel provided the cutting parts are hardened as follows: Forge the tools to the required shape and heat the cutting point almost to a welding heat, then apply cast-iron filings or chips with a ladle, the cast iron

will melt and flow over the parts. When enough cast iron is applied to cover the parts, immerse in cold water. The surface will be so hard that a new file will not cut it and the parts will have great wearing qualities.—Contributed by W. O. Hay, Camden, S. C.

How to Make a Heavy Hoe

An old shovel which has been worn down will make a fine heavy hoe. The



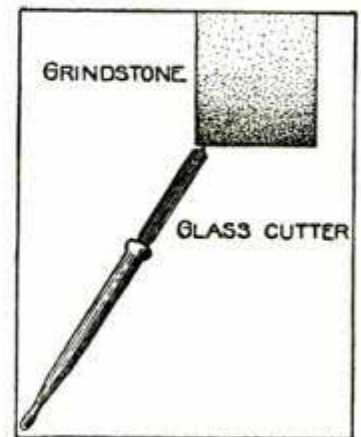
Made from an Old Shovel

shovel handle is removed and the shank heated and bent to the required angle. A long handle is fitted into the shank and fastened. The hoe when completed is good for heavy work. Contributed by F. A. Nattinger, Campbell, Calif.

How to Sharpen a Glass Cutter

When the edge on the small wheel of a glass cutter becomes dull and does not cut or make a scratch on the glass, hold the wheel lightly against an ordinary grindstone, first on one side of the wheel and then on the other, as shown in the sketch. This will grind both sides even and make the cutting edge sharp.

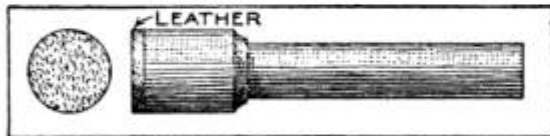
Place the end of the cutter containing the wheel in the flame of a torch or fire and heat to a red, but not a white heat. Dip the red hot end into clear cold water. Put a drop of oil on the wheel and run very lightly over an oilstone to remove any part of a feather



edge if there is any at the edge of the wheel. If the wheel is ground and tempered properly, you will have a cutter as good as a new one.—Contributed by Arthur E. Toll, Milwaukee, Wis.

A Tool for Making Highly Finished Metal Surfaces

The highly finished surfaces on machinery parts can be put on with a very simple tool illustrated herewith. The

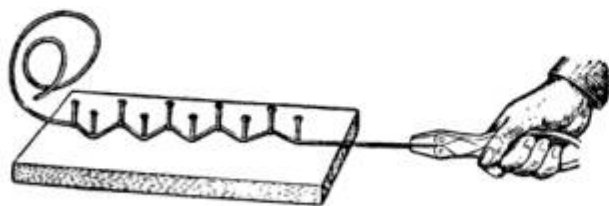


Metal-Polishing Tool

main part of the tool is turned from mild steel in the shape shown. Three small, pointed steel pegs are fastened in the end on which to place the leather disk. The leather can be changed when the piece becomes worn. A little emery and oil is put on the metal surface, the tool placed in a drill chuck and the metal held against the end of the tool while it is turning. The circles can be made in various ways by moving the metal around while holding the surface close against the leather end of the tool. If the tool is used in a universal milling machine, the circles can be made in straight rows overlapping each other. A great many graduations of the circles may be made by having several different sized tools.—Contributed by A. W. Moser, Salem, Mass.

Home-Made Wire Straightener

Secure a board about 6 in. wide and 18 in. long; drive a number of nails about 2 in. apart in a zigzag row



Pulling Wire Through the Nails

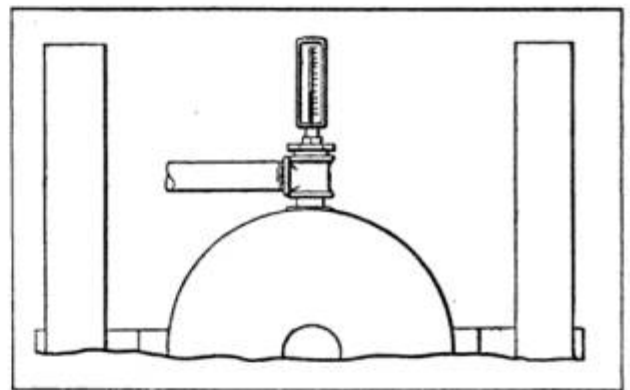
through the middle of the board. The wire to be straightened is placed between the nails and pulled through them with a pair of pliers as shown

in the sketch. Small size wires can readily be straightened in this manner.—Contributed by Philip E. Bayley, Cape May Point, N. J.

Testing Jacketing Water Temperature on Gasoline Engine

One of the items gas engineers overlook is the amount of cooling water used. The accompanying sketch shows a scheme which was adopted by a correspondent of Power to decrease the water consumption. A thermometer was placed on the outlet pipe from the water jacket of the cylinder. The temperature can be watched and just enough water supplied to keep the cylinder properly cooled.

A valve with a pointer and index



Thermometer on Overflow Pipe

plate can be put in the inlet pipe and so marked that the right amount of water can always be turned on when starting the engine. The engine will work with a water temperature at about 140 deg. F.

How to File Soft Metals

When filing soft metals, such as solder or babbitt metal, the file, after a few strokes, will become filled with metal, causing scratches on the surface being filed. The surface may be filed smooth, provided the file has been well oiled. The oil prevents the cutters from clogging and also allows the metal to yield easily. Oil the file every few minutes and use a card frequently in cleaning and the work will be smooth.—Contributed by Jno. E. Ganaway, Paducah, Ky.

Changing Wheels on a Drawbridge

The draw span of a bridge on the Willamette river in Portland, Oregon weighs about 800 tons and the cone-shaped wheels supporting the draw were too small in diameter and had to be replaced with new ones. There were 60 of these wheels weighing 600 lb. each. The changing of the wheels was accomplished by using 60 wedges made from cottonwood $\frac{3}{4}$ in. thick at the butt, 10 in. wide, with one-half of them 8 in. and the other one-half 12 in. long. The draw was opened over the rest and the exact position of each wheel marked, and then the draw slightly closed. The wedges were placed in position on the race plate with alternating lengths. A winch was used to pull the draw up on the wedges until 30 wheels were released by passing off the ends of the 8-in. wedges. A lever with a false axle, and suspended from above by a differential chain was used to slip the old wheels on for removal and the new wheels were placed in position in a reverse manner with the same lever. The process was repeated with the remaining 30 wheels and the job completed.

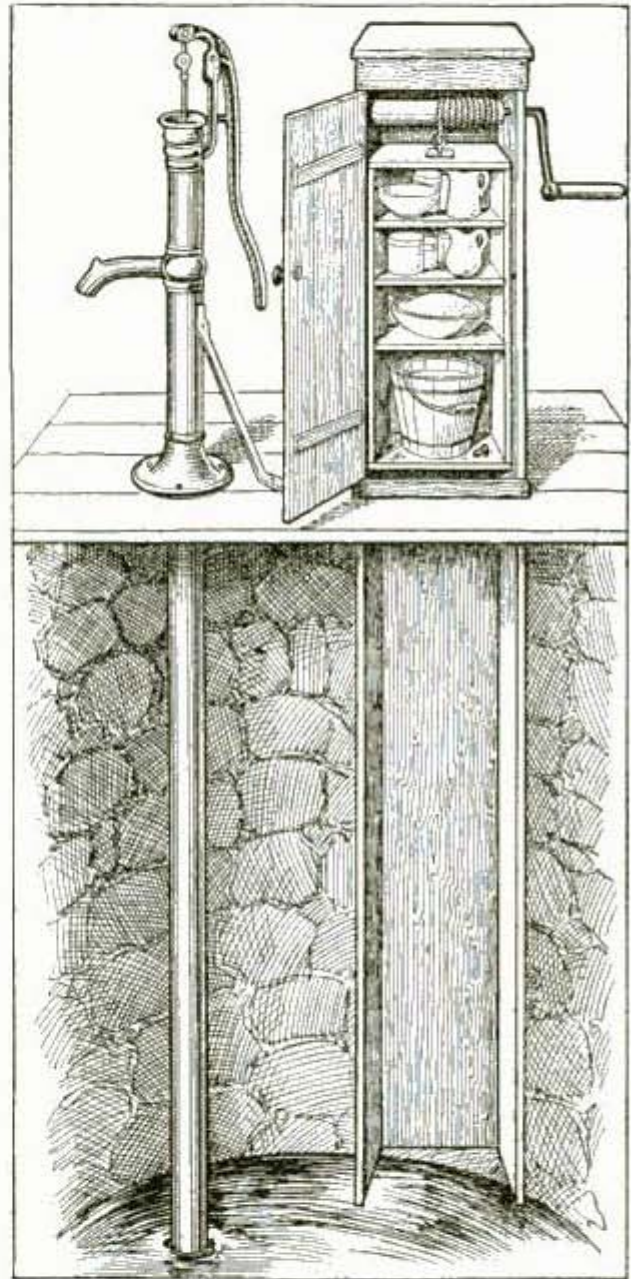
The work of changing the wheels was estimated to cost \$1,800 and the time required to jack up the draw and replace the wheels to take two weeks. The work by the above method was done in nine hours at a cost of \$25 and was executed by the foreman that suggested the plan.

The one difficulty was to find the proper wood that could be used for the wedges. This was discovered by accident. While watching an iron plate being rolled in a local shop the foreman noticed a dent in the iron. This was examined and found to be made by a piece of cottonwood passing through the rolls with the iron.—Contributed by C. B. Woodworth, Portland, Oregon.

When grinding cylinder valves, the loose emery and grindings can be kept from entering the cylinder by a piece of waste tied to a string and forced into the cylinder. The waste can be drawn out by means of the string.

Substituting a Well for a Refrigerator

A country place is not always situated where ice can be procured during the summer months and a substitute refrigerator must be provided. A resident of a country place devised a cooling apparatus which he placed in his well. The device consisted of a box



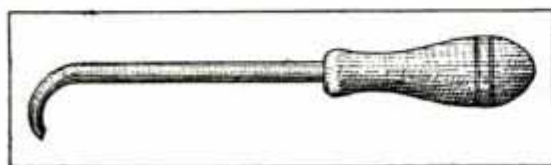
Keeping Victuals Cool

about 1 ft. square made of boards having a length to reach almost to the water level and to extend about 4 ft. above the platform of the well. A short box containing several shelves is made to slip easily into the long one similar to a dumb waiter. This smaller box is lowered and raised with an old-fashioned windlass. The smaller box containing the shelves is filled with things to be kept cool and the box then

lowered to the bottom of the long box or near the water in the well. The rope holds the box in this position until the food is wanted, when a few turns of the crank will bring the box and its contents to the top within easy reach from the outside.—Contributed by J. B. Smith, Haskell, Okla.

How to Make a Scoring Tool

The accompanying illustration shows a home-made scoring tool. This tool is used to make oil runs in babbitt bearings. The metal part of the tool

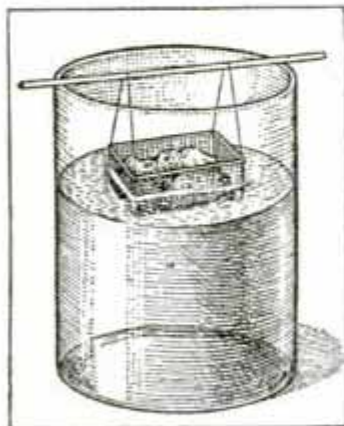


Oil Groove Tool

can be made from an old round file, which is bent and finished to the shape shown. A common file handle driven on the steel tightly will complete the tool, which is operated by drawing it toward you while cutting.

Quickly Dissolving a Substance into Solution

When making up strong solutions of gum arabic, dried egg white or any substance not easily soluble, provide a



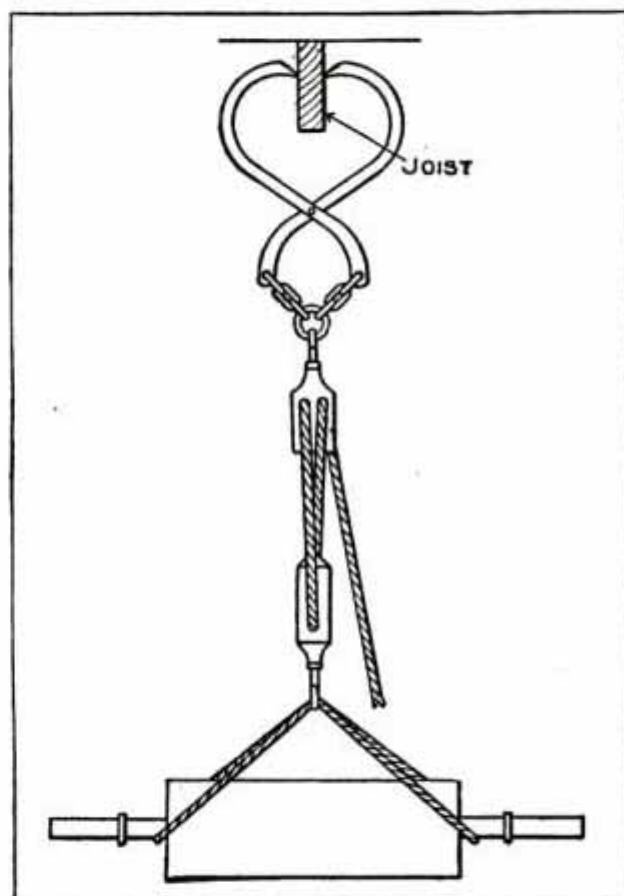
perforated basket which can be suspended near the top of the water or other solvent as shown in the cut. By this means a circulation is induced, and the solution takes place in a very short time. For

powdered solutions, a cloth bag may be substituted for the basket, although a basket made of different mesh wire cloth can be used and made to fit in an ordinary battery jar. A porcelain colander is preferable when making solu-

tions for chemical purposes as there is no contamination from the metal screen.—Contributed by Dr. C. A. Munsterman, Peoria, Ill.

A Roll Lift for a Rolling Mill

When the rolls of a mill must be removed from their frames to be re-babbitted or sent away for grinding, they make quite a heavy weight for lifting by hand. The accompanying illustration shows a handy device which



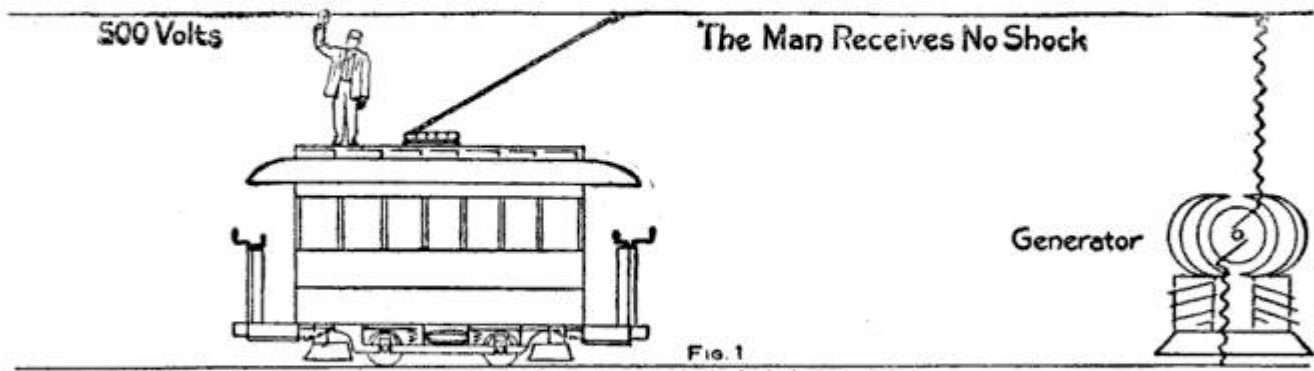
Lifting a 600-Lb. Roll

can be put up quickly over a machine at the point where the rolls are located. The hooks are made similar to a pair of ice tongs and can be fastened temporarily to any overhead joist, says American Miller. A tackle is then attached to the hooks for lifting the roll. The roll is pried up out of the bearing and a stick or board placed so the shaft cannot drop back in the box and then a rope is put around the shaft to form a lifting bail for the roll. This bail is attached to the lower end of the tackle and one man easily removes a 600-lb. roll.

Things to Know about Handling Electric Wires and Switches

Many persons handle electric switches, push buttons, and socket switches, little knowing that in some instances they could receive a heavy shock and possibly be killed by high

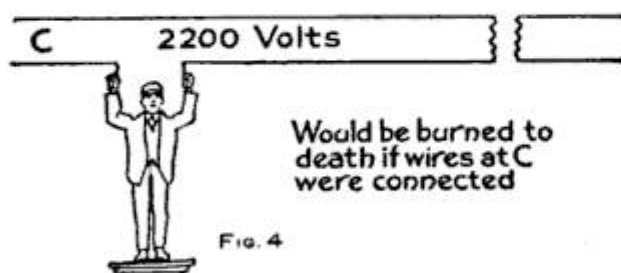
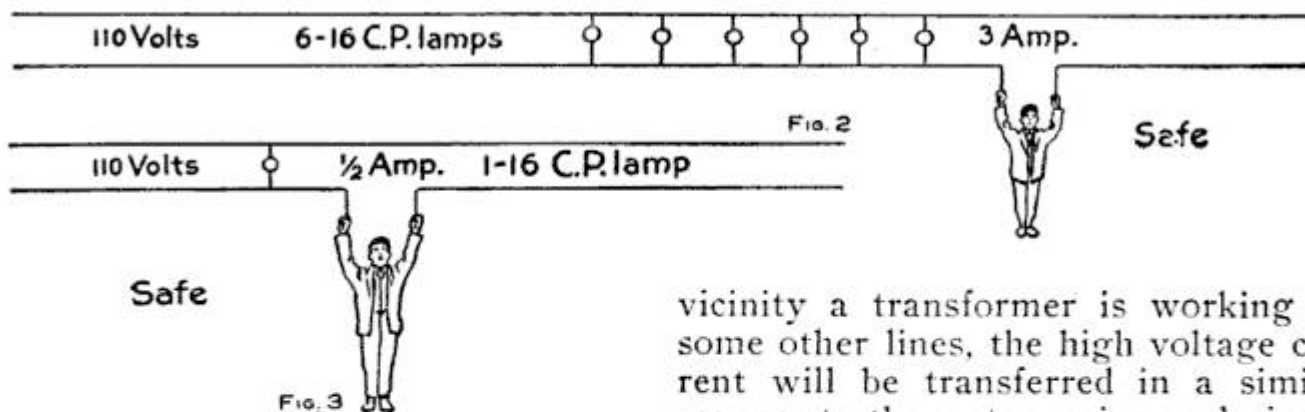
As shown in Fig. 3, with only one 16-cp. lamp, he receives only $\frac{1}{2}$ ampere. If a person takes hold of a line as shown in Fig. 4, no shock will be felt, but should the lines be connected at C,



tension wires, even though they are not connected with the ones on which the switch is attached. We often see a workman doing some repairs on a trolley line while standing on top of a car, as shown in Fig. 1. The man receives no shock, as his body offers too much resistance while he stands on top of the car, even though the line is carrying 500 or more volts. Many times we have seen a person take hold of the ends of

he would be burned to death instantly.

A person often turns off or on a light while standing in a bath tub. This is a very dangerous thing to do. Should the 110-volt current come from a transformer that is supplied with a current of 2200 volts, he is liable to receive the full current from the 2200 volts and be killed instantly. Should the current be supplied from a 110-volt direct-current dynamo and in some near



live wires, as shown in Figs. 2 and 3. If he is holding the negative wire of the line with six 16-cp. lamps in the circuit, as shown in Fig. 2, only three amperes of current will be passing through his body on a 110-volt current.

vicinity a transformer is working on some other lines, the high voltage current will be transferred in a similar manner to the water mains or drainage pipes connecting with the bath tub. In Fig. 6 is shown how a person may safely take hold of both lines, provided all lights are turned on.

A dangerous shock may be received from the ends of pipe underground. The ends of the pipe are represented by A and B, Fig. 7. When supplying a connecting pipe or replacing a broken length and digging around the ends A and B, they should be connected by a piece of wire of sufficient size to carry the current. The workman

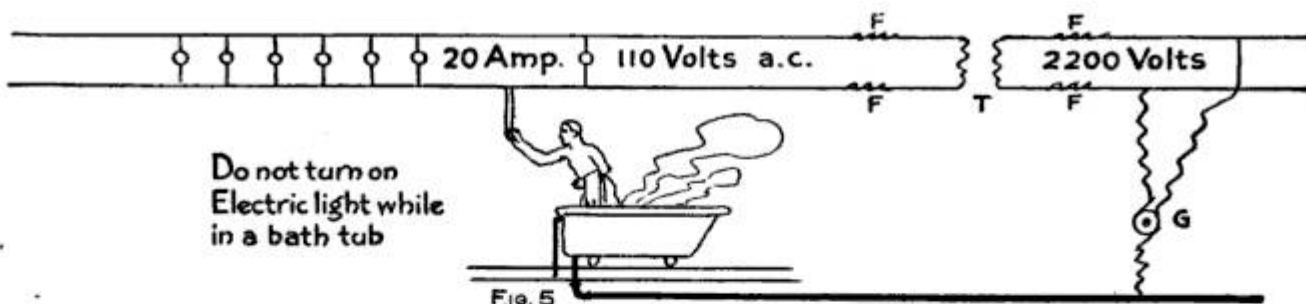


Fig. 5

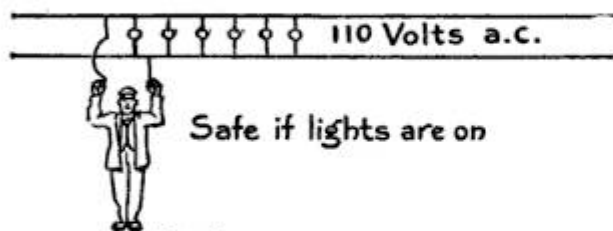


Fig. 6

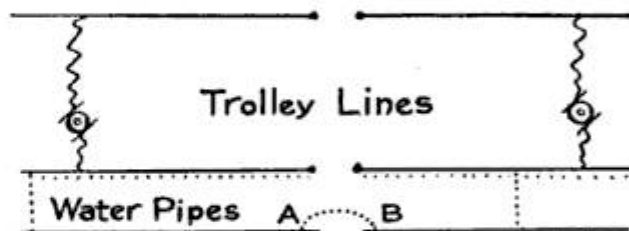
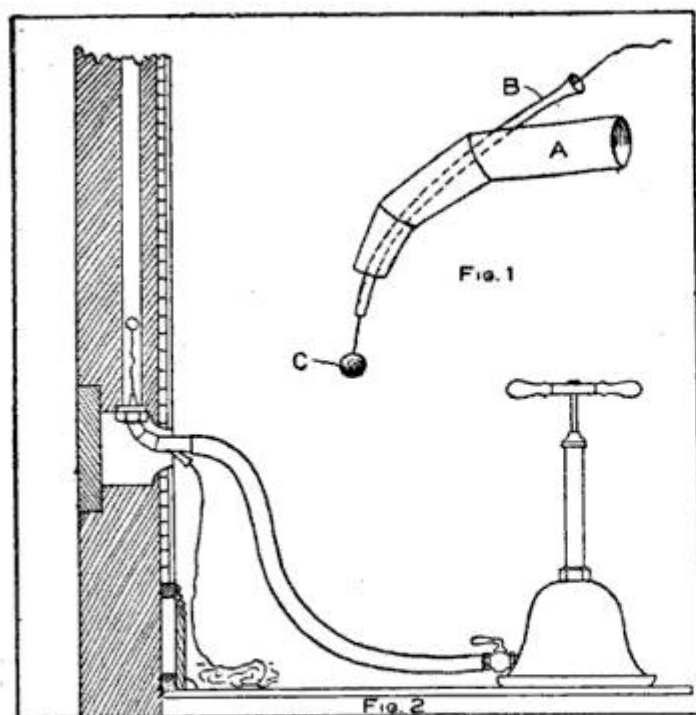


Fig. 7

should use dry rubber gloves when making the connections.—Contributed by Lee R. Clarke, Elmhurst, Calif.

Starting a Line Through a Crooked Conduit

Long crooked conduits are not easily supplied with a fish tape for drawing in line wires. The tape is sure to get caught somewhere in the turns and cause trouble. The method herewith illustrated will put a line through the most crooked conduit in a few minutes'



Blowing Lines Through Conduits

time. A tin tube, A, Fig. 1, is constructed $\frac{3}{4}$ in. in diameter at the large end and tapering down to $\frac{5}{16}$ in. at the small end. Inserted in this tin tube

in as nearly a straight line as possible is a $\frac{1}{8}$ in. copper tube, B, with the outer end made flaring with a smooth rounding edge. The inner end projects about $\frac{1}{2}$ in. beyond the end of the tin tube. A stout cord is used for the line and a ball made from cork, C, is fastened to its end. The cord is passed through the copper tube with the extra length coiled loosely on the floor. A plumber's force pump with a stop cock is connected to the large end of the tin tube with a garden hose. The cock is closed and a high pressure pumped up. Insert the tin tube with the cork ball in front of it tightly in the end of the conduit, as shown in Fig. 2, and open the cock. The ball will be blown from 30 to 50 ft., depending on the number of bends in the conduit, pulling the cord in its trail.—Contributed by James H. Grenshaw, Jr., Richmond, Va.

Another Way to Protect Food from Ants

The following is an effective and simple way to keep ants from food: Chalk the legs of the table or show case with crayon or carpenter's chalk for a space of 2 or 3 in. When the ants leave the table or show case for water they cannot climb back over the chalk. A table can be cleaned of ants in this way within a half hour from the time of applying the chalk. This method will remove ants where they are so thick that they will bridge a can of liquid in 2 or 3 hours and reach the food over the bodies of their fellows.

Window Display of Nails

Nails are not often used for a window display, yet they might be used once in a while to advantage, says Hardware and Metal. The sketch shown illustrates the centerpiece for a display of hammers and nails. The kegs are arranged at the back of the window somewhat in the manner shown in the drawing. On the floor in front is a great pile of nails and above is a keg from which a constant stream of nails is pouring. If properly constructed, the illusion will be perfect. In the picture illustrating the side view is shown the simple mechanism.

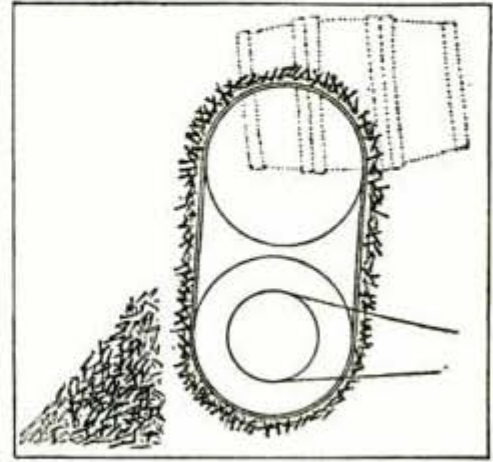
Two wheels or drums about 8 in. wide are placed one above the other and around them is run a wide canvas belt. To the canvas is fastened a section of flexible wire poultry netting. Large wire nails are fastened to the netting with fine wire. The nails are tied on as thickly as possible and each should be tied tightly, as it might fall off and interfere with the mechanism. Some of the nails near the middle of the belt should be allowed to dangle loosely as that will give them the appearance of falling when the wheels revolve. When the belt has been finished, cut away a nail keg so that it will fit over the top wheel, letting the front side of the belt extend out a few inches in front of the keg. Nails should be piled up at the sides of the cut keg to conceal the cut places. Now put a big pile of nails on the floor directly in front of the belt. They may be piled over a box and the back of the pile should be as nearly perpendicular as possible in order to bring the pile close to the belt. The speed of the motor should be reduced to make the wheels turn slowly. Viewed from the front this will make a mystifying exhibit. The steady stream of nails pours naturally from the keg, yet the pile on

the floor grows no larger and the keg is never empty.

In connection with this display are used cards showing a sample of every kind and size of nail carried in stock. These should be arranged in rows graduated from the smallest to the largest.



Front View of Display

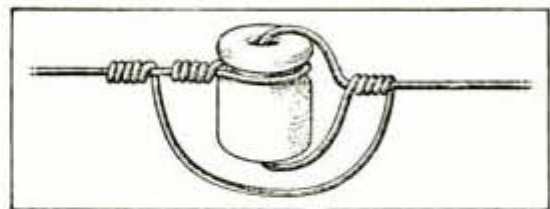


Details of Construction

The remainder of the display could be made up of hammers arranged on the floor and on boards at the back and ends of the window.

Anti-Hum Connection on Telephone Wires

Telephone wires will expand during the summer and in winter they draw up and cause quite a noise on buildings to which they are attached, says a correspondent of Telephony. This may be easily remedied by taking an ordinary



Insulation in the Drop Wire

porcelain knob, such as shown in the sketch, and cut it in on the line between the building and the pole, so as to break the physical continuity of the wire. One end of the line wire is passed through the hole in the knob and twisted around itself with an end left to bridge over the knob and to be soldered to the other end of the line wire. The noise will stop at the knob, and the part of the line attached to the building will be perfectly quiet.

How to Make a Lead Hammer

A quick way to make a lead hammer is to use the body of an ordinary brass globe valve and put a handle in the place left after removing the cap and valve stem. Build up at each end to

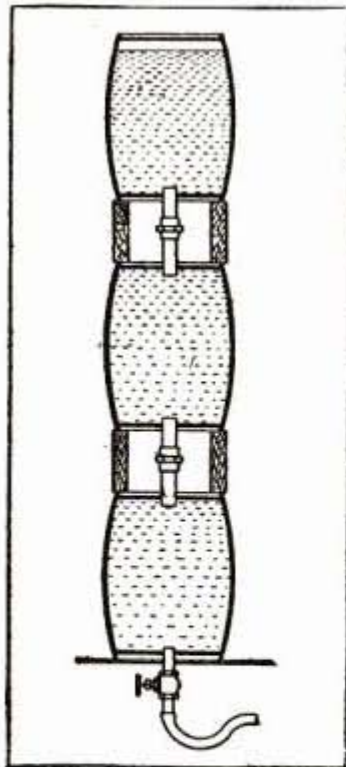


Valve Part Filled with Lead

allow an excess of lead to trim up for a face and then fill the body with melted lead. This will make a hammer that will appear as shown in the illustration. — Contributed by C. G. Smith, Brooklyn, N. Y.

Fire Protection for a Mill

A miller taking charge of a mill noticed piled up with the scrap in the basement an accumulation of 15 or 20 oil barrels. These were in a condition



to invite a fire in the near future by spontaneous combustion. Permission was granted to make use of these barrels to reduce the fire hazard. All barrels were tested to make sure they would hold water and then three were placed one upon the other, putting two 4-in. blocks of wood between them and connecting the barrels with 2-in. gas pipe,

making a watertight connection between the three barrels, says a correspondent of American Miller. A set of three barrels was placed in each corner of the upper story of the mill. A pipe with a valve and proper connec-

tions for a garden hose was fitted in the bottom end of each lowest barrel. A hole was bored through the floor and a hose attached for use on the floor below. This gave ample pressure for protection from fire in its first stages, and is a long way ahead of pails and one barrel of water. Where a slight pressure can be brought to bear on an incipient fire, it soon can be brought under control.

Fastening the Ends of a Motorcycle Belt

The ends of a belt on a motorcycle will frequently pull out and cause much trouble. The following remedy can be used to good advantage. Secure a heavy belt lace $\frac{1}{2}$ in. wide and run it through the belt about $1\frac{1}{2}$ in. from each end. Lap the ends of the lacing over on to the belt and punch holes through the lacing to correspond with those of the belt fastener. Pass the belt fastener through both lacing and belt and connect up in the usual way. If the connection bolts are screwed up as tight as possible your troubles from this source will be at an end.—O. H. Crooker.

How to True Up Commutators

Take a piece of ordinary soft tool grindstone and shape it to practically the same shape as the commutator by holding the stone on the commutator after removing all of the brushes; let the machine run at full speed. The stone is to be operated by hand lengthwise of the commutator. If the commutator is a large one, for instance, 40 in. in diameter, the stone will have to be larger in order to get the greater surface to bear on the commutator. If the stone is very large, it will be necessary to insert an eyebolt and use a small pair of rope blocks to hoist it up and to support it while in operation.

A commutator as large as 48 in. has been made almost as true in this manner in 30 minutes as it would be after spending perhaps a whole day with a

turning tool; in fact, the grinding is much more satisfactory because it does not have the tendency to loosen the commutator bars that the turning tool has, and it will always bring the mica down to the level of the bars, says a correspondent of Graphite.

Another method which has been successfully used along this same line, is to cut a wood block the shape of the commutator and paste fine sandpaper upon the concave side, operating this in the same manner as the stone.

Sawdust Road for a Sandy Top Soil

In a district in Minnesota where there is nothing but sand for a top soil an experimental section of new type road construction has been tested out with satisfactory results. It was almost impossible to preserve a road in this district without adding some other material. A 4-in. layer of sawdust was raked into a stretch of these roads which had been carefully graded. The traffic thoroughly ground together this mixture and wherever ruts were worn into the surface they were filled with sawdust. The main object of this construction is that the fine particles of wood will rot, forming a heavy loam with the sand which will result in a firm roadbed suitable to ordinary traffic.

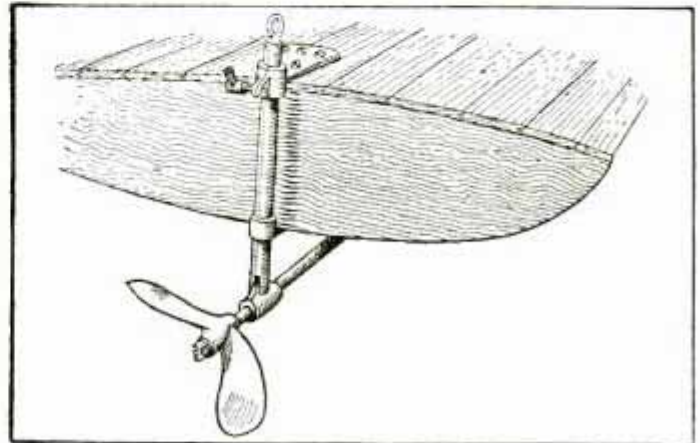
Removing Cement Taste from Cistern Water

The taste of cement in cistern water is caused by the soluble salts in the cement walls dissolving in the soft water. As the amount of these salts is small, that part near the surface in the wall and bottom will soon be dissolved out, says Municipal Engineering. If the first water put in the cistern is allowed to remain a few days and then pumped out, almost all the trouble will disappear. A very few fillings will certainly reduce the amount below the point where the taste would be objectionable. If the wall after the first emptying is given a good waterproofing with alternate applications of soap and

alum solutions at intervals of 24 hours, the cure can be hastened.

Raising a Motorboat Propeller for Shallow Water

In a recent exhibit of motorboats in London at one of the stands was shown a boat called a duck punt. While the boat was constructed especially for shallow water it could be used in deep



Propeller on a Duck Punt

water, and as it was driven by a gasoline engine, some means had to be provided for a propeller when in shallow water. A universal joint was used in the propeller shaft and the bearing near the propeller blades was fastened to a support that could be raised to draw up the propeller close under the stern. The support is a round shaft that slides in two bearings one of which is slotted and has a set screw for clamping the shaft at any desired point.

Home-Made File Cleaner

A brush does not always clean a file properly and something of a harder substance must be used to remove the particles of filings that are stuck in the cutters. The sketch shows how to



Copper File Cleaner

make a cleaner from a piece of copper tubing. A copper tube $\frac{1}{4}$ in. in diameter and 4 or 5 in. long is flattened on

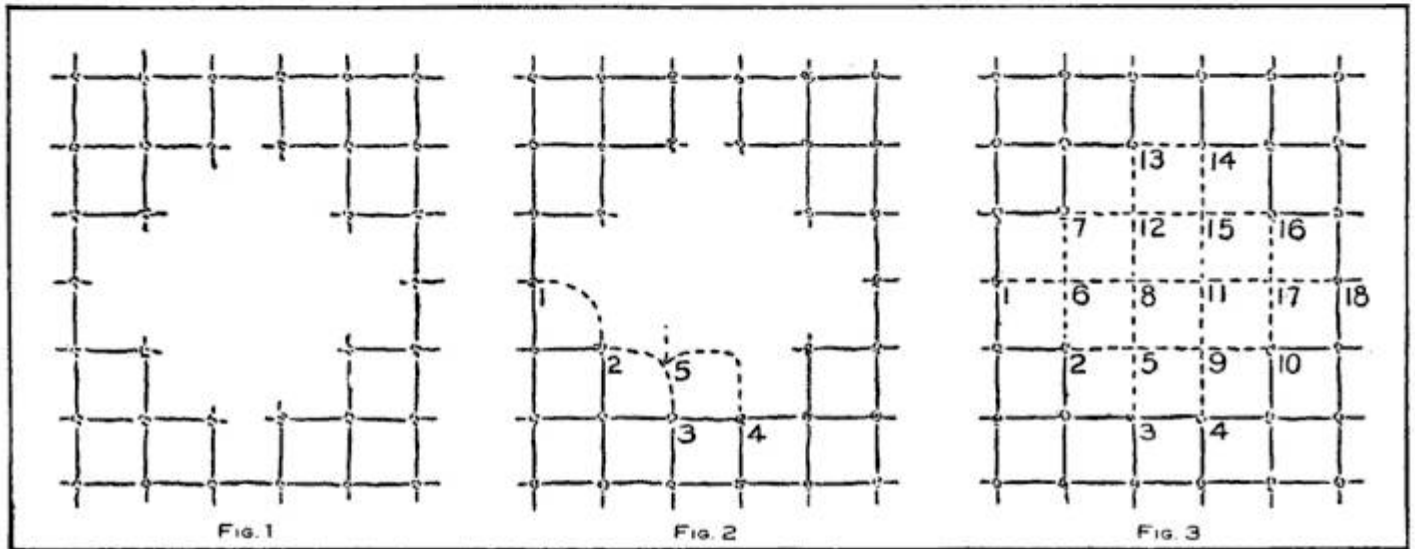
both ends and one of the ends bent at right angles as shown. Push an end of this tool along lengthwise of the cutters on the file and all filings will be removed. Use larger sized tubing for very large files.—Contributed by A. W. Moser, Salem, Mass.

How to Repair a Hammock

A large or small tear in a hammock is repaired in the same way. The meshes of the net must be cut out and a symmetrical figure made, as shown in

as shown at A, Fig. 4. Then threading the cord through the loop, a knot is made as shown at B, or, better still, a fisherman's bend knot made as shown at C. This last knot is not only easy to make, since it passes through the eye but once, but will hold much better without slipping, says Carpet.

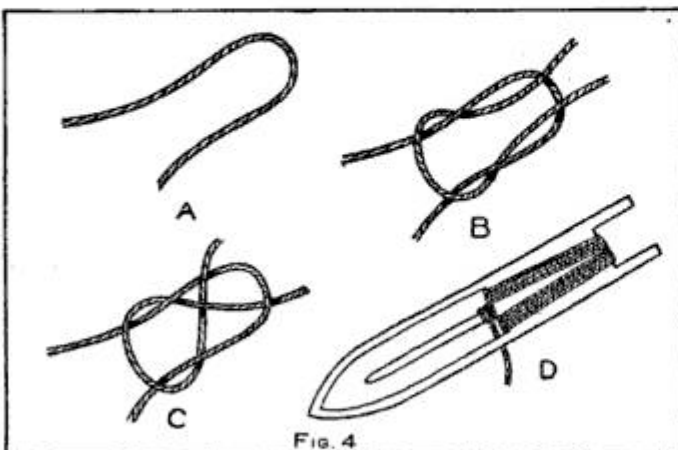
If the tear is a large one, make a needle, as shown at D, Fig. 4, from a piece of thin board, to hold the cord while making the meshes. The needle is about $\frac{3}{4}$ in. wide and 6 in. long. The cord or twine is wrapped around



Showing the Successive Steps in Patching a Hole

Fig. 1. There must be a single square or mesh and a double one on opposite sides of the tear. Commence filling in the meshes, as shown in Fig. 2, with the first tie in the middle of the double mesh, going through each successive stitch and knot as numbered from 1

this needle, and just sufficient end is given for the knots or stitches as they are being made.



Tying the Knots

to 18 in Fig. 3, ending in the middle of the opposite double mesh.

The knots are formed by pinching the meshes, as at 5, Fig. 2, into a loop

Reducing the Size of a Drilled Hole

When a hole has been drilled too large in a piece of iron or steel a good method of reducing the diameter to the proper size, provided the difference is not too great, is to heat the piece red hot, then, by taking care to keep the axis of the hole perpendicular to the surface of the water, submerge the piece half way. The lower half will become cold and shrink and the upper part, which is not in the water, will remain red hot and shrink to a certain extent as it cools, being pulled together by the chilled part. When the top part finally cools, that side will shrink more, making one-half of hole smaller than the original size. Heat the piece red hot again and repeat the operation, but this time cool the opposite side of the

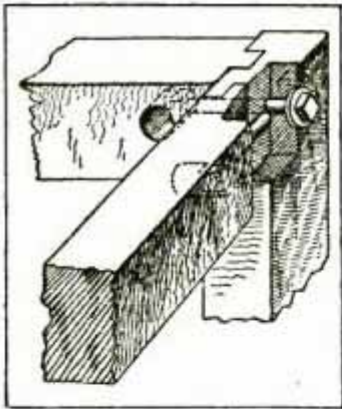
piece in water. This is a practical scheme and will reduce holes in metal to a surprising degree.—Contributed by H. D. Chapman, Washington, D. C.

How to Kill Knots

There is nothing better to apply on ordinary knots and pitchy places in boards than good grain alcohol shellac. Two thin coats of the shellac is much better than one heavy coat. Particularly bad knots are surely killed by covering them with some good outside varnish or gold size and letting it remain until "tacky," then laying on medium tin foil and burnishing. Let this dry thoroughly before applying the paint.

Joints for the Workbench

The joints of a workbench are sure to work loose in time, and it is important that they be constructed in such a way that they may be tightened from time to time. The accompanying sketch shows the construction of a joint that a correspondent of Scientific American used for years with perfect satisfaction.

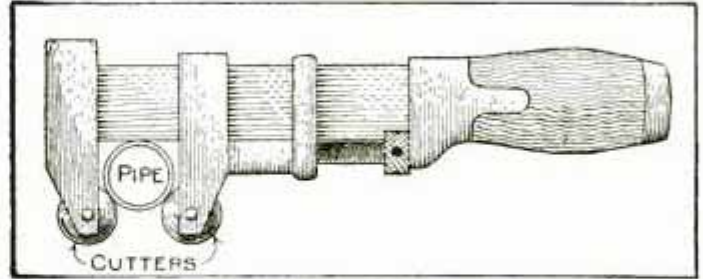


The frame of the bench is made of 2 by 3-in. sticks. Sockets are cut in two adjoining faces of the post to receive the tongues formed on the horizontal sticks of the frame. The sockets are made deeper than the tongues, so as to permit of adjustment. A hole is bored through the post and endwise into one of the horizontal sticks through the tongue. A bolt is fitted into this bore and is screwed into a nut which is introduced into the stick through a transverse hole. In the same way the other stick is secured to the post, care being taken to have the second bolt hole at a different level so that it will clear the first one. The bolts can be drawn up very tight, so as to make a firm joint. When the joint

works loose it can be tightened up with a wrench in a moment's time.

Home-Made Pipe Cutter

As I had two pipe-cutting wheels and no tool to put them in, I set about to

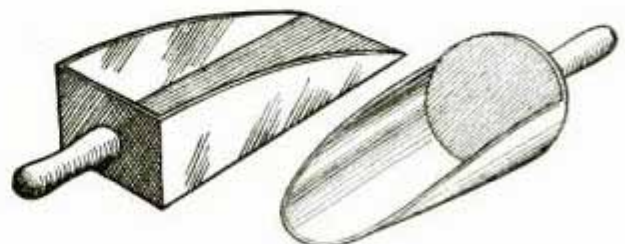


Cutters Applied to a Monkey Wrench

devise a way to make use of them. The pipe I intended to cut was a small size and it did not require an extra large opening for the cutters. I took an old monkey wrench and slotted the jaws so the cutters would slip in the slots, and then drilled a hole and inserted a pin in each jaw through the wheels for a bearing. Then I drilled some holes in the thumbpiece of the screw so a pin could be used in tightening up the cutters on the pipe. This device will cut a small pipe as well as a regular cutting tool.—Contributed by Ed Borchick, Cleveland, O.

Home-Made Scoops

Small scoops for use in dipping meal, flour, salt and sugar may be made from old baking powder, fruit or oyster cans, as shown in the accompanying sketch. If a fruit or oyster can is used, the remaining ragged edge left from cutting the can open is heated so the solder in the joint will melt and that part of



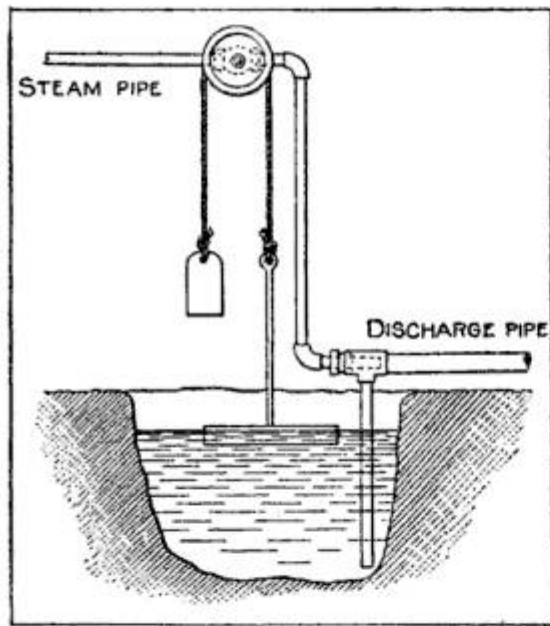
Scoops Made from Discarded Fruit Cans

the end removed by a smart rap of a stick or piece of iron. The metal forming the sides of the can is cut rounding and sloping toward the bottom end

making the scoop as shown. Cutting the sides of a rectangular can is much easier than cutting the round can. One side is removed and the two narrow edges are cut rounding toward the bottom as shown. In either case a wood handle is attached to the bottom of the can with nails or a large screw.—Contributed by L. B. Worden, Penn Yan, N. Y.

Discharging Water Automatically from a Steam Pipe Duct

The accompanying sketch shows a simple device constructed to discharge water from a steam pipe duct or tunnel at a point 8 ft. below the surface of the ground and under such conditions that it cannot be conveniently connected to



Float Operates Valve

a sewer. At the lowest point of the duct a pit was dug about 2 ft. wide and 18 in. deep, says a correspondent of *Metal Worker*. A wooden float 12 in. in diameter and 1½ in. thick covered with tin was placed in the water, as shown. To this float a ⅜-in. rope was attached, and passed one and one-half times around a 6-in. pulley, which had been substituted for the wheel on the globe valve. A counterweight was then tied to the free end of the rope.

As the water runs into the pit the float is raised and the counterweight lowered. The movement of the rope which is thus brought about opens the valve, allowing steam to rush through

the 1½-in. suction tee at the top of the pit, creating a partial vacuum in the pipe leading to the water. The water is thus drawn out of the pit and discharged through the 1½-in. pipe to a surface drain. As the water is discharged from the pit the float lowers, and by the movement of the rope closes the valve and the discharge ceases. The float is so adjusted that it will operate the valve when the water has risen to within a few inches of the bottom of the duct. The pipe duct is of concrete, 6 by 6 ft. in inside dimensions, with walls 8 in. thick, and it is about ¾ mile long.

The suction tee used was made from an ordinary 1½-in. tee by screwing a ¾-in. long nipple through the 1½ by ¾-in. bushing in the end of the tee, so that it extended just past the side outlet. Suction tees in which a bronze nozzle is used in place of the ¾-in. long nipple may be bought ready for use from supply houses.

How to Varnish an Automobile

The shape, formation and sweep of the panels on automobiles are so entirely different, the size so radically increased, that larger brushes will be needed in order to cover the big surfaces conveniently, says the *Carriage Monthly*. On some of these great limousine bodies, for example, the brushes which the carriage varnisher is best accustomed to will be found decidedly too small, inasmuch as they necessitate working faster than the capacity of the varnisher will warrant and accomplish right results. He must, therefore, familiarize himself with the brushes of larger size. In like manner he must acquaint himself with the surfaces of increased size. No motor car surface is too large to be flowed entirely over without any laps. Varnish laps are dangerous at best.

Take in the size and special features of the surface and of each individual panel before applying the varnish. Then study the general requirements, after which proceed with the work. A 1-in. bear's hair or badger's hair brush,

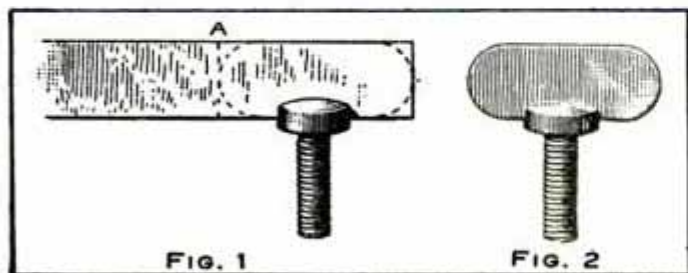
preferably the latter, should be used to wet in the outer edge of the panel with varnish. Then catch up the flow with the large 3- or 3½-in. half elastic, flat, bristle varnish brush for the rubbing varnish, and a full elastic brush for the finishing varnish, coating the surface, however large it may prove to be, in solidly before squaring up and laying off finally.

For these surfaces of large size it is advisable to use both elastic rubbing and finishing varnish, although this is not absolutely necessary. The elastic varnishes will be found great aids in getting over a large surface.

The chief cause of failure, however, with the inexperienced motor car varnisher is the attempt to divide the surface, of an unusually large one, into sections, and introducing laps at the intersection of the sections.

How to Make a Thumbscrew

There are occasions where time would be saved if it were not necessary every time to find a screwdriver of a certain size to unfasten a small screw. In automobile repairs, for instance, take the cover of the carburetor float chamber, or the cover of the contact make and break, lubricator fittings, or any part fastened with a few small screws. An ordinary screw can be converted into a thumbscrew and it will be found worth while in effecting the change, says Blacksmith and Wheelwright. Obtain a narrow strip of hard rolled sheet brass, or strip of soft steel, a shade thicker than the slot of the



Wing Attached to a Screw

screw and ½ to ¾ in. wide. Trim the edge with a file, that is one end of the strip so that it may be driven tightly and squarely into the slot of the screw as shown in Fig. 1. Hold the screw supported on the strip in the flame of a

blow torch and heat sufficiently to run solder in and around the joint. Cut off with a cold chisel at A or nick across with a file and trim the corners as shown in Fig. 2. Hexagon head screws may be fixed in exactly the same manner if a slot is first cut across the center of the head with a metal saw.

A Rolling Water Barrel

An ordinary barrel makes a fine water wagon, a very useful adjunct during a dry spell when water must be brought from a neighbor's well. Two plates of metal are drilled central-



The Barrel is Easily Drawn

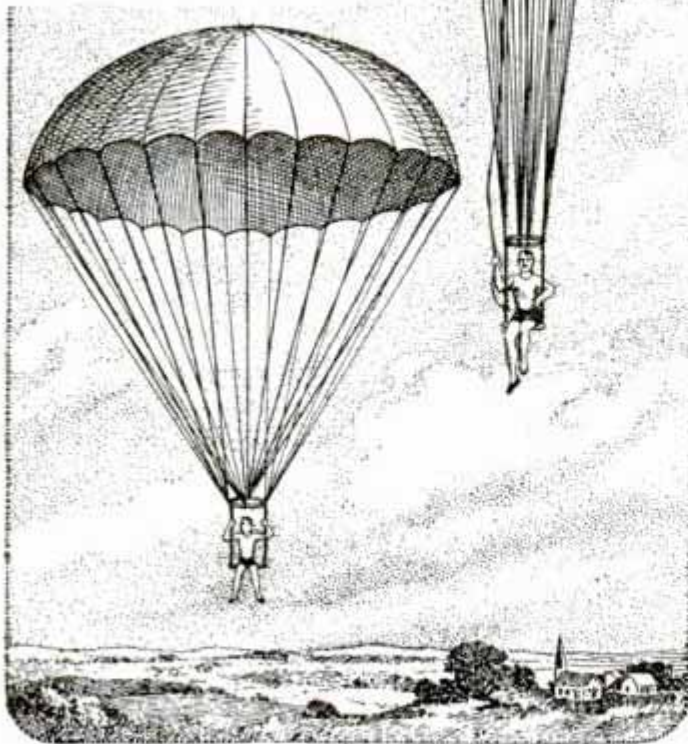
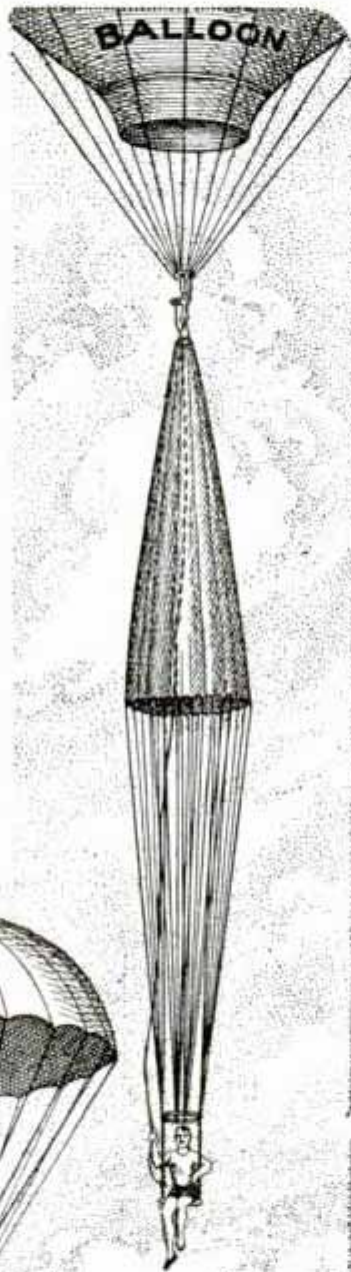
ly to admit bolts, and also small holes drilled and countersunk to admit common wood screws. Two bolts are inserted in the plates and one plate is attached on each head of a barrel exactly in its center with the thread end of the bolt sticking out. Secure a piece of iron 2 in. wide, thick enough to not bend easily and three or four times the length of the barrel. The iron is bent in the shape of a U and the ends drilled to fit over the bolts. The iron is then placed over the barrel with the ends on the bolts. A handle can be fastened to the iron, or the barrel can be drawn with the iron alone. A vent hole and a filling hole are also required, but these must be plugged up when rolling the barrel. The barrel filled with water can be easily drawn on a smooth level surface by one person.

Shellac will be more pliable and easier to spread if a small portion of gum camphor is added.

How to Make a Parachute

By Captain Penfold, Aeronaut, Sydney, Australia

Most people have not seen an aeronaut leaving his balloon in mid-air and reaching the earth by the aid of a parachute. Herein is a description of how to construct a parachute to carry a person weighing up to 150 lb. The parachute is made up from 26 sections of cloth, 15½ ft. long. As the sections are only 3 ft. wide in the widest part, the material must be purchased in this width. This will require about 135 yd. of unbleached muslin, 1 yd. wide. A pattern from which to cut the sections is made



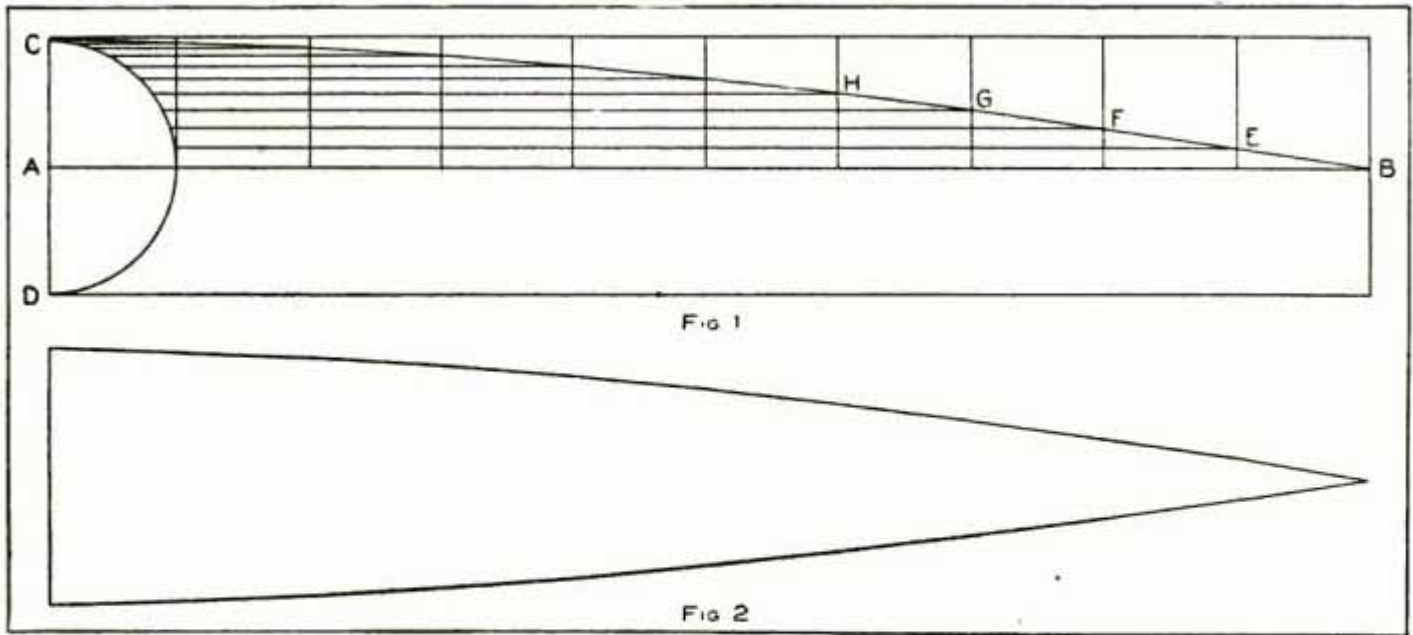
Ascending and Descending

on a sheet of paper 3 ft. wide and 15½ ft. long. A line, AB, Fig. 1, is drawn

lengthwise in the middle of the paper. Mark one end CD, as shown, and describe a half circle on the paper with a radius from A to C or from A to D. Divide one-half of this semi-circle into 10 equal parts; also divide the line AB into 10 equal parts. Perpendicular lines are drawn parallel to the line AC intersecting the division points made on AB. Horizontal lines parallel with AB are drawn intersecting the division points made on the quarter circle and intersecting the perpendicular lines drawn parallel with line AC. A line is now drawn from B to E, E to F and so on until all intersecting lines are touched and the point C reached. This makes the curved line for each side of a section. The paper is now folded on the line AB, keeping the marked part on the outside. The paper is cut, cutting both folded sheets at the same time, on the curved line from B to C. When the paper is unfolded you will have a pattern as shown in Fig. 2. The 26 sections of cloth are cut from this paper pattern.

Procure about 884 ft. of sash line cord and cut it into 34-ft. lengths. This will make 26 pieces. Join the sections of cloth together with a double seam enclosing 15½ ft. of each piece of cord in each seam. The stitch is made on a sewing machine after enclosing the cord. When all seams are made, the 26 cords will hang free for 18½ ft. from the periphery of the cloth rim. Turn the bottom edge of the cloth over 2 in. and sew this around to make a seam. Take care to see that all seams are secure where the cords leave the cloth.

Cut off the top or pointed ends of the sections and fold the cloth over and make a seam, thus leaving a vent or opening at the top. This hole will allow the air to pass out which prevents oscillation during descent. Two loops of cords each 2½ ft. long are securely attached at the top of the cloth enclosing the 26 cords to attach the

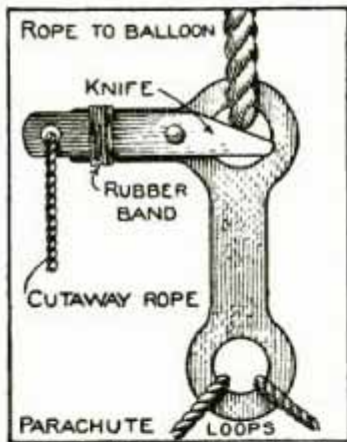


Cutting the Proper Curve for the Sections

cutaway knife handle. The cutaway knife is made from two pieces of thin steel as shown.

The bottom or loose ends of the cords are securely fastened to a strong

wood or small iron ring 18 in. in diameter, making four bunches, two of 6-cord and two of 7-cord ends. A trapeze bar is hung from this ring by two ropes, each about 3½ ft. long. A cut-



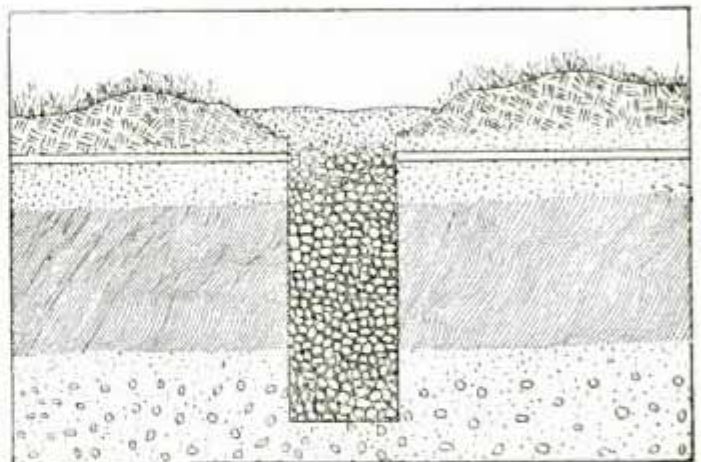
away cord is attached at the upper end to the cutaway knife, as shown, and runs through the top opening or vent down through the parachute and is tied loosely to the trapeze. The parachute complete weighs about 35 lb.

The usual drop before the cloth spreads to bear the weight is about 50 ft., the balloon bounding up with the released weight makes it appear to be greater to the spectators. The rate of descent is about 10 or 12 ft. a second when the parachute is fully inflated.

A gouge may be used as a substitute bit if a proper sized bit is not at hand. The gouge can be placed in the brace the same as a bit.

How to Drain a Sink Farm

Twelve acres of sandy loam soil had a sloping surface from all directions toward the center, and the spring rains would flood about one acre in the middle, drowning out the growth from any seeds planted in the soil. The water remained long enough from a hard rain to spoil the crops, yet it would eventually drain away through the sandy soil. There is not a spot within a mile that was low enough to drain the water. Such a farm can be drained with a cesspool dug in the lowest part



Cesspool Filled with Large Gravel

of the field, says Country Gentleman, provided there is a sand or gravel subsoil. Make the excavation about 6 ft. in diameter and several feet deep to strike the gravel. Fill the hole to within 3 or 4 ft. of the top with coarse gravel and then place sand on top.

The hole should be broadened out at the top, as shown in the sketch.

A slightly higher ridge should be made around this hole and grassed down to hold back the water and catch any sediment that might eventually choke up the drain. Several of these wells could be made in low spots and if the drainage still remained imperfect, lines of tiles could be laid from the wells up the slopes.

Automobile Power Plant Used on the Farm

Automobiles are coming into use on the farm as a means of pleasure for the farmer and his family. There is nothing more natural than a desire to utilize the splendid power plant contained in a car for other purposes than propelling it over the roads. An ingenious farmer has solved the problem in a manner apparently satisfactory to himself, says a correspondent of *American Machinist*. The farmer devised an arrangement whereby the act of putting the car in its shed places it in position and so associates the wheels with the machinery of the dairy that the engine when started will do the heavy work of running the separator.

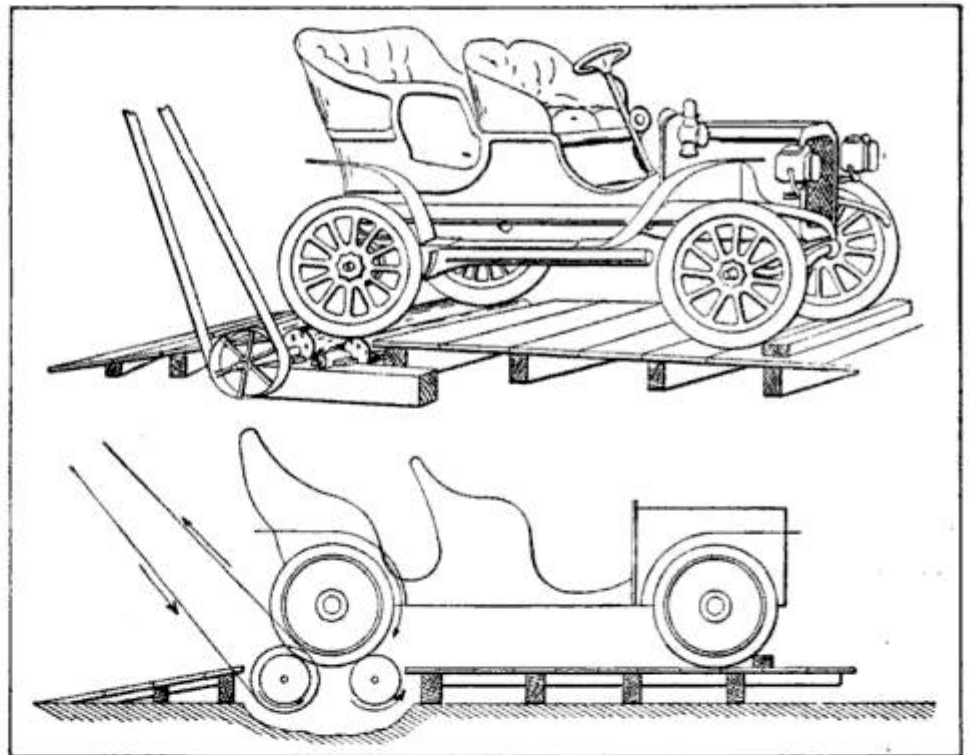
The accompanying sketch shows this device so plainly that it is not necessary to describe it other than to call attention to the two rollers, one of which has its shaft extended outside the box to carry a pulley from which the belt runs to an overhead shaft. It is easily apparent that the revolution of the wheels of the car will cause a reverse motion of the rolls which is transmitted by means of the pulley and belt to the shaft and thence to the machinery. In this way the wear on the tires is rendered uni-

form. The grip on the rolls that these tires exercise is surprising.

A peculiarity of this arrangement is that the car shows a tendency to skid from side to side. This, however, is easily overcome by means of props or bumpers which are put in place so as to limit the sidewise motion of the car within the shed, the mere pressure of the hand serving to move the car easily when the wheels are revolving on the rolls.

In very warm weather or on long heavy pulls, it is sometimes necessary to connect the circulating system with the water supply in order to prevent heating of the cylinders.

For sawing wood, cutting feed, or any work of an intermittent nature, it is necessary for someone to control the



The Car in Its Shed Running Dairy Machinery

engine on account of there being no governor. As a matter of fact, our farmer has a small boy at the throttle most of the time as the separator is sometimes thrown off without warning.

Cast-iron sinks will not rust if they are given a coat of good linseed oil before being put in place.

To cut shellac gum properly use nothing weaker than 92 per cent alcohol

AMATEUR MECHANICS

How to Make a Candle Shade

Lay out the pattern for the shade on a thin piece of paper 9 by 12 in., making the arcs of the circle with a pencil compass. As shown in the sketch the pattern for this particular shade covers a half circle with $2\frac{3}{4}$ in. added. Allowance must be made for the lap and as $\frac{1}{4}$ in. will do, a line is drawn parallel $\frac{1}{4}$ in. from the one drawn through the center to the outside circle that terminates the design.

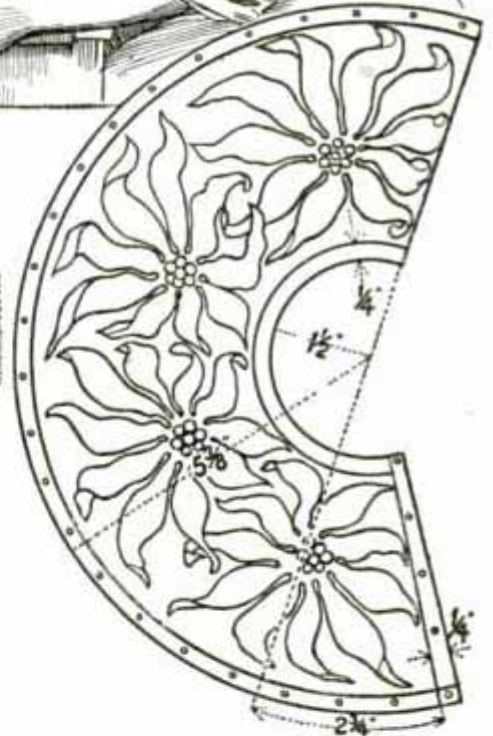
Nail a thin sheet of brass, about 9 in. wide by 12 in. long, to a smooth board of soft wood, then trace the design on the brass by laying a piece of carbon paper between the pattern and the brass. After transferring the design to the brass, use a small awl to punch the holes in the brass along the outlines of the figures traced. Punch holes in the brass in the spaces around the outlined figures, excepting the $\frac{1}{4}$ in. around the outside of the pattern. When all the holes are punched, remove the brass sheet from the board and cut it along the outer lines as traced from the pattern, then bend the brass carefully so as not to crease the figures appearing in relief. When the edges are brought together by bending, fasten them with brass-headed nails or brads.

If a wood turning lathe is at hand, the shade can be made better by turning a cone from soft wood that will fit the sheet brass shade after it is shaped and the edges fastened together. The pattern is traced as before, but before punching the holes, cut out the brass on the outside lines, bend into shape, fasten the ends together and place on the wood cone. The holes are now punched on the outlines traced from the pattern and the open spaces made full of holes. The holes being punched after the shade is shaped, the metal will stay and hold the perfect shape of a cone much better.



Completed Shade

Punching the Holes



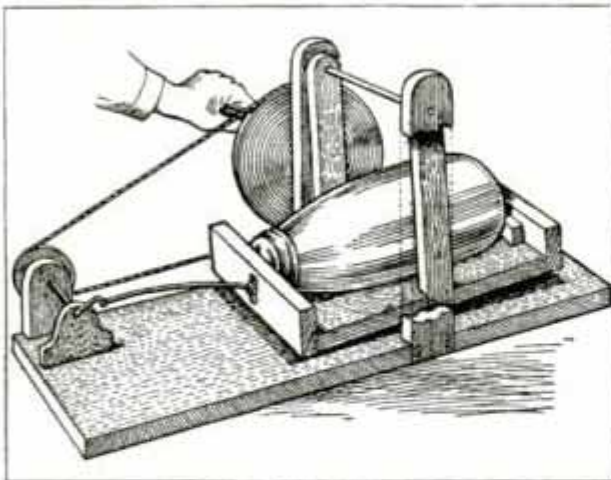
Pattern

The glass-beaded fringe is attached on the inside of the bottom part with small brass rivets or brads placed about $\frac{3}{4}$ in. apart. The thin sheet brass may be procured from your local hardware dealer and sometimes can be purchased from general merchandise stores.—Contributed by Miss Kathryn E. Corr, Chicago.

Dip the point of a nail into oil before driving into hardwood. The nail will go through without splitting.

Home-Made Small Churn

Many people living in a small town or in the suburbs of a city own one



Making Butter

cow that supplies the family table with milk and cream. Sometimes the cream will accumulate, but not in sufficient quantities to be made into butter in a

large churn. A fruit jar usually takes the place of a churn and the work is exceedingly hard, the jar being shaken so the cream will beat against the ends in the process of butter-making. The accompanying sketch shows clearly how one boy rigged up a device having a driving wheel which is turned with a crank, and a driven wheel attached to an axle having a crank on the inner end. This crank is connected to a swinging cradle with a wire pitman of such a size as to slightly bend or spring at each end of the stroke. The cradle is made with a cleat fastened to each end, between which is placed the fruit jar, partially filled with cream. The jar is wedged in between the cleats and the churning effected by turning the crank.—Contributed by Geo. E. Badger, Mayger, Oregon.

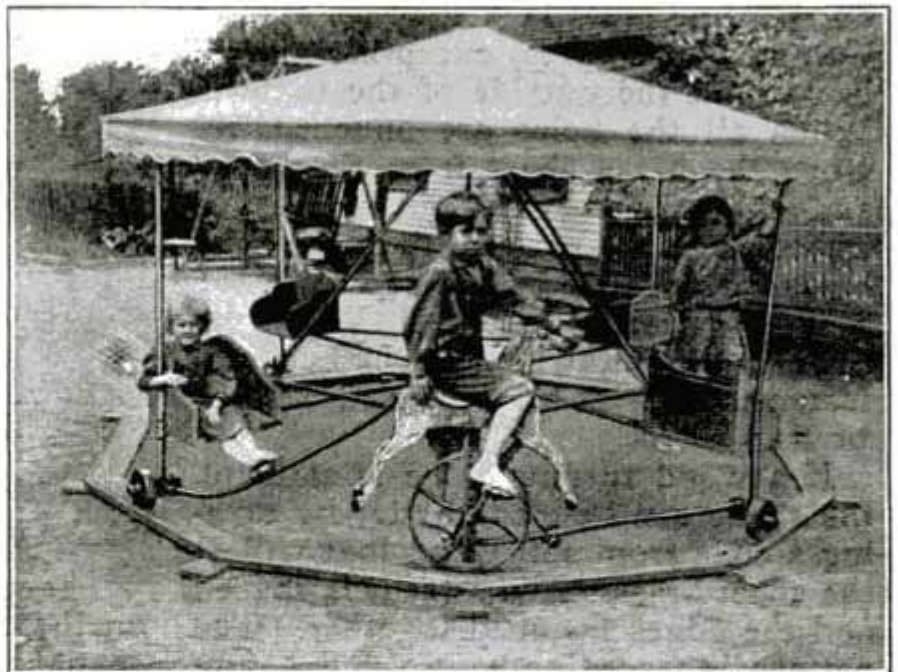
Home-Made Round Swing

Gas pipe and fittings were used wherever possible in the making of the swing as shown in the photograph.

The diagram drawing shows the construction. A 6-in. square cedar post is set in the ground about 3 ft., allowing 2 ft. to remain above the ground and a $\frac{7}{8}$ -in. piece of shafting is driven into the top part of this post for an axle. A cast-iron ring, or, better still, a heavy wheel with four spokes of such a size as to be drilled and tapped for $\frac{1}{2}$ -in. pipe is used for the hub, or center on which the frame swings. If a wheel is selected, the rim must be removed and only the spokes and hub used. The hole in the hub must be $\frac{7}{8}$ in. or less, so the hub can be fitted to the shafting that is driven in the post. A large washer is placed on top of the post and the hub or cast-iron ring set on the washer.

The drilled and tapped holes in the four spokes are each fitted with a $4\frac{1}{2}$ -ft. length of $\frac{1}{2}$ -in. pipe. These pipes are

each fitted with a tee on the end and into this tee uprights of $\frac{1}{2}$ -in. pipe in suitable lengths are screwed, and also



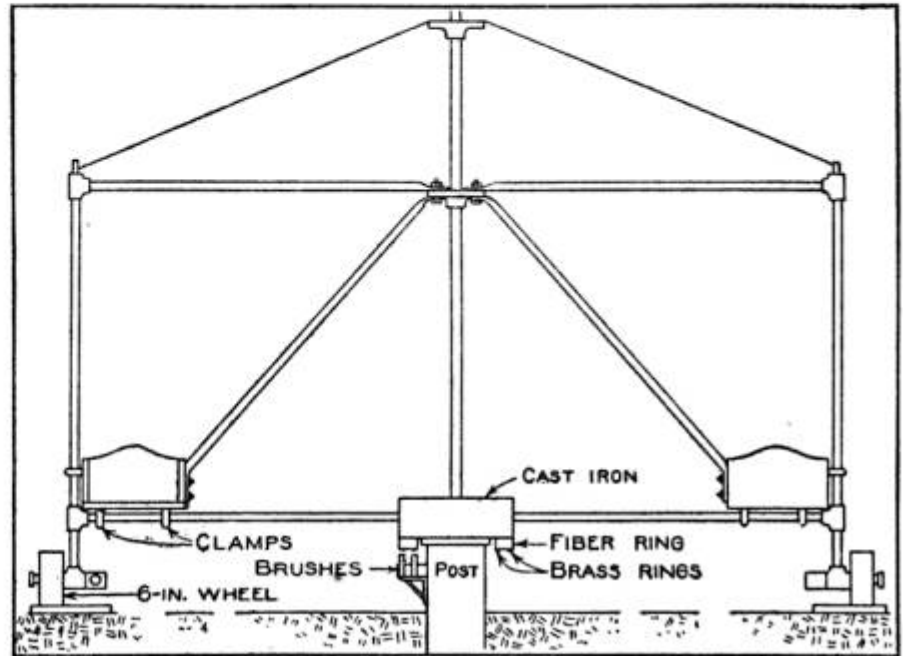
The Merry-Go-Round Complete

short lengths with a tee and axle for the 6-in. wheel are fitted in the under side of the tee. The uprights at their upper ends are also fitted with tees and each joined to the center pipe with $\frac{1}{2}$ -in. pipe flattened on the inner end and fastened with bolts to a flange.

The bottom part of the cloth cover-

ing is held in place by a $\frac{1}{2}$ -in. pipe, bent to the desired circle. Four braces made from $\frac{1}{2}$ -in. pipe connect each spoke and seat to the flange on the center pipe. An extra wheel 18 in. in diameter is fitted in between two seats and used as the propelling wheel. This wheel has bicycle cranks and pedals and carries a seat or a hobby horse. The four seats are fastened to the four pipes with $\frac{1}{2}$ -in. pipe clamps.

Small miniature electric lights are fastened to the overhead braces and supplied with electric current carried through wires to the swing by an ingenious device attached to the under side of the cast-iron ring or hub of the wheel. A ring of fiber on which two brass rings are attached is fastened to the hub and connections are made to the two rings through two brushes fastened to the post with a bracket. The wires run under the surface of the ground outside and connected to the source of electricity. The wires from the brass rings run through the center pipe to the top and are connected to the lamp sockets.



Details of the Swing

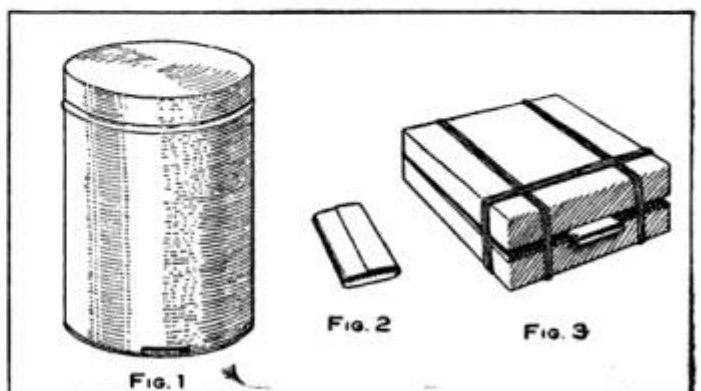
bent in the shape as shown in Fig. 2 to serve as a guide for the coin through the various boxes. This guide is inserted about $\frac{1}{8}$ in. in the smallest box between the cover and the box and three rubber bands wrapped around the box as indicated. This box is then enclosed in the next larger box, the guide being allowed to project between the box and the cover, and the necessary tension is secured by three rubber bands around the box as before. In like manner the remaining boxes are

Old-Time Magic—Part V

The Disappearing Coin

This is an uncommon trick, entirely home-made and yet the results are as startling as in many of the professional tricks. A small baking-powder can is employed to vanish the coin, which should be marked by one of the audience for identification. Cut a slot in the bottom on the side of the can, as shown in Fig. 1. This slot should be just large enough for the coin that is used to pass through freely, and to have its lower edge on a level with the bottom of the can.

The nest or series of boxes in which the coin is afterwards found should consist of four small sized flat paste-board boxes square or rectangular



Appliances for the Disappearing Coin

adjusted so that finally the prepared nest of boxes appears as in Fig. 3.

The coin can easily be passed into the inner box through the tin guide,

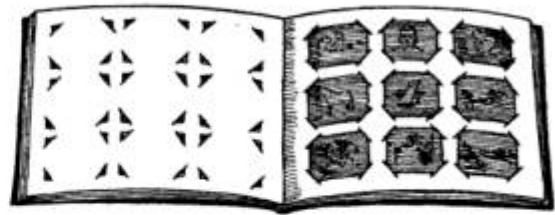
then the guide can be withdrawn which permits the respective boxes to close and the rubber bands hold each one in a closed position.

The performer comes forward with the tin can in his right hand, the bottom of the can in his palm with the slot at the right side. He removes the cover with the left hand and passes his wand around the inner part of the can which is then turned upside down to prove that it contains nothing. The marked coin is dropped into the can by some one in the audience. The cover is replaced and the can shaken so the coin will rattle within. The shaking of the can is continued until the coin has slipped through the slot into his palm. The can is then placed on the table with his left hand. Then apparently he looks for something to cover the can. This is found to be a handkerchief which was previously prepared on another table concealing the nest of boxes. The coin in the right hand is quickly slipped into the guide of the nest of boxes, which was placed in an upright position, and the guide withdrawn, and dropped on the table. The performer, while doing this, is explaining that he is looking for a suitable cover for the can, but as he cannot find one he takes the handkerchief instead. The handkerchief is spread over the can and then he brings the nest of boxes. He explains how he will transfer the coin and passes his wand from the can to the boxes. The can is then shown to be empty and the boxes given to one in the audience to be opened. They will be greatly surprised to find the marked coin within the innermost box.

How to Keep Film Negatives

There are many devices for taking care of film negatives to keep them from curling and in a place easily accessible. Herewith is illustrated a method by which anyone can make a place for the negatives produced by his or her special film camera. The device is made up similar to a post card album with places cut through each leaf to admit each corner of the

negatives. The leaves are made from white paper and when the negatives are in place the pictures made on them can

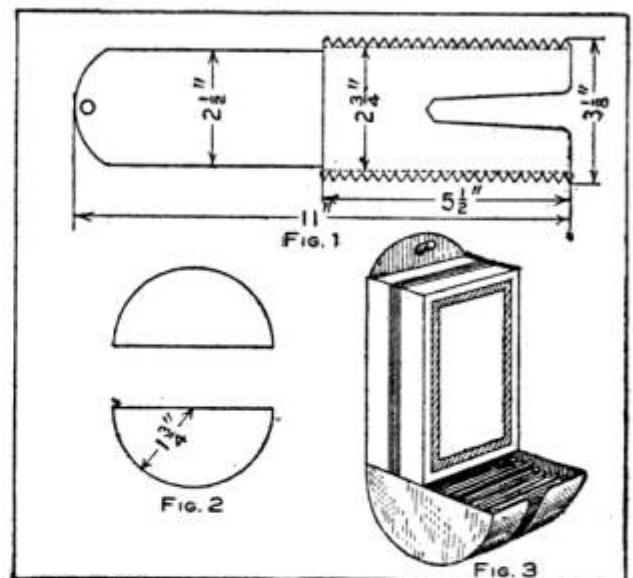


Negatives on White Paper Background

easily be seen through to the white paper background. These leaves can be made up in regular book form, or tied together similar to a loose-leaf book, thus adding only such pages as the negatives on hand will require.—Contributed by H. D. Harkins, St. Louis, Mo.

Home-Made Match Safe

Cut a piece of tin in the shape and with the dimensions shown in Fig. 1. Bend the saw-toothed edges at right angles to the piece on the dotted lines. Bend the part that is marked $5\frac{1}{2}$ in. in a half circle. Make a circle $3\frac{1}{2}$ in. in diameter on another piece of tin, cut



Details of the Match Safe

out the circle and cut the disk in two as shown in Fig. 2. These half circle pieces are soldered to the sides of the teeth of the half circle made in the long piece of tin. Remove one end from the inside box containing matches and slip the back of the match safe through between the bottom of the inside box and the open end box that

forms the cover. The matches will fall into the half circle tray at the lower end of the box which will be kept full of matches until they are all used from the box.—Contributed by C. F. White, Denver, Colo.

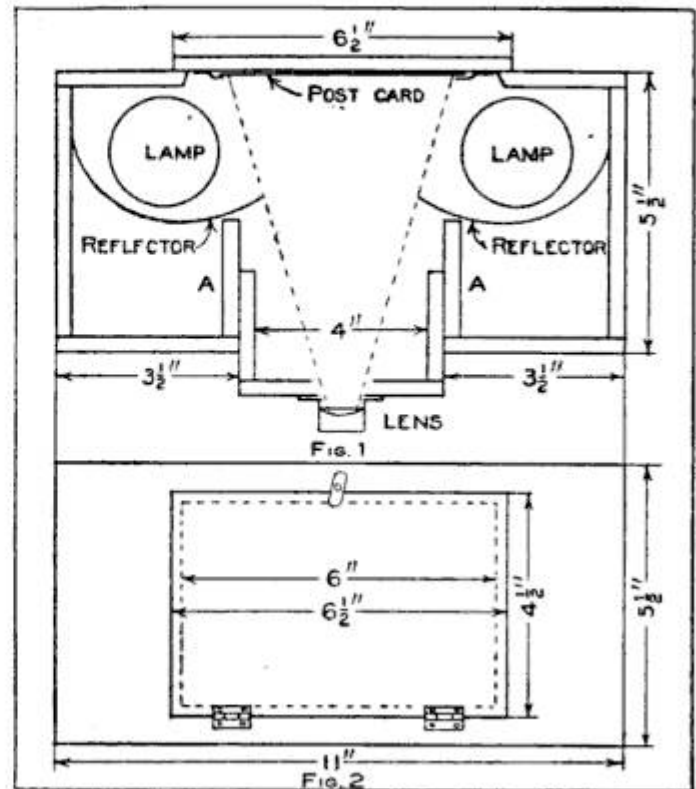
An Electric Post Card Projector

A post card projector is an instrument for projecting on a screen in a darkened room picture post cards or any other pictures of a similar size. The lantern differs from the ordinary magic lantern in two features; first, it requires no expensive condensing lens, and second, the objects to be projected have no need of being transparent.

Two electric globes are made to cast the strongest possible light on the picture card set between them and in front of which a lens is placed to project the view on the screen, the whole being enclosed in a light-tight box. The box can be made of selected oak or mahogany. The lens to be used as a projector will determine the size of the box to some extent. The measurements given in these instructions are for a lens of about 5 in. focal length. The box should be constructed of well-seasoned wood and all joints made with care so they will be light-tight.

The portion shown carrying the lens in Fig. 1 is made to slide in the main body of the lantern for focusing. A box should first be made 5½ in. wide, 5½ in. high and 11 in. long. A hole is cut in the back of the box 4 by 6 in. represented by the dotted line in Fig. 2. This will be ¾ in. from the top and bottom and 2½ in. from each end of the outside of the box. Two strips of wood ½ in. wide and 6½ in. long are fastened along the top and bottom of the back. The door covering this hole in the back, and, which is also used as a carrier for the post cards, is made from a board 4½ in. wide and 6½ in. long. The door is hinged to the lower strip and held in position by a turn button on the upper strip. The slides for the picture cards are made from strips of tin bent as shown, and tacked to the inside surface of the door.

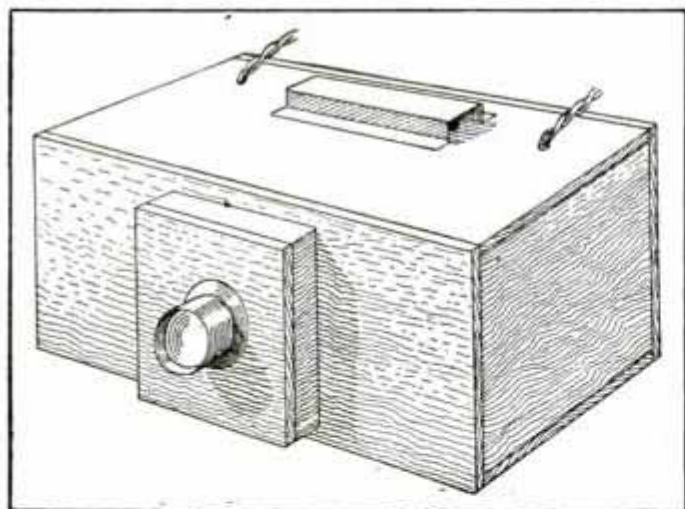
The runners to hold the part carrying the lens are two pieces 2¼ in. wide by 5 in. long and should be placed ver-



Details of the Post Card Lantern

tically, AA, as shown in Fig. 1, 3½ in. from each end. An open space 4 in. wide and 5 in. high in the center is for the part carrying the lens to slide for focusing. The part carrying the lens is a shallow box 4 by 5 in. and 2 in. deep in the center of which a hole is cut to admit the lens. If a camera lens is used, the flange should be fastened with screws to the front part of this shallow box. The sides of this box should be made quite smooth and a good, but not tight, fit into the runners. Plumbago can be rubbed on to prevent sticking and to dull any rays of light.

Two keyless receptacles for electric globes are fastened to the under side of the top in the position shown and connected with wires from the outside. Two or three holes about 1 in. in diameter should be bored in the top between and in a line with the lights. These will provide ventilation to keep the pictures from being scorched or becoming buckled from the excessive heat. The holes must be covered over on the top with a piece of metal or wood to prevent the light from showing on the ceiling. This piece should not be more than ½ in. high and must



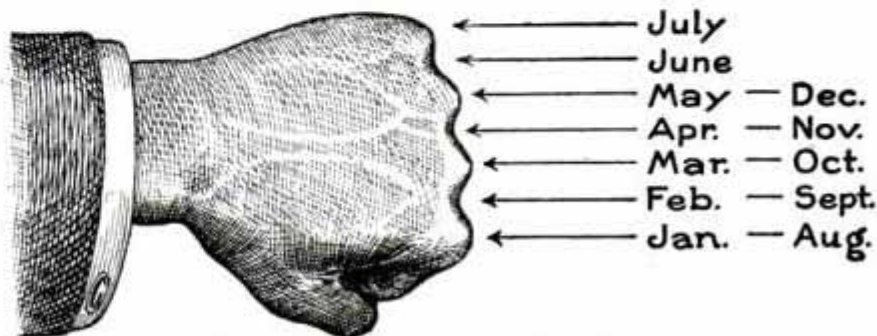
Post Card Lantern Complete

be colored dead black inside to cause no reflection.

The reflectors are made of sheet tin or nickel-plated metal bent to a curve as shown, and extending the whole height of the lantern. The length of these reflectors can be determined by the angle of the lens when covering the picture. This is clearly shown by the dotted lines in Fig. 1. The reflectors must not interfere with the light between the picture and the lens, but they must be sufficiently large to prevent any direct light reaching the lens from the lamps. In operation place the post card upside down in the slides and close the door. Sliding the shallow box carrying the lens will focus the picture on the screen.

A Handy Calendar

"Thirty days hath September, April, June and November," etc., and many other rhymes and devices are used to aid the memory to decide how many days are in each month of the year. Herewith is illustrated a very simple method to determine the number of days in any month. Place the first finger of your right hand on the first knuckle of your left hand, calling that knuckle January; then drop your finger into the depression between the first and second knuckles, calling this February; then the second knuckle will be March, and so on, until you reach July on the knuckle of the little



The Knuckles Designate the 31-Day Months

finger, then begin over again with August on the first knuckle and continue until December is reached. Each month as it falls upon a knuckle will have 31 days and those down between the knuckles 30 days with the exception of February which has only 28 days.—Contributed by Chas. C. Bradley, West Toledo, Ohio.

The Fuming of Oak

Darkened oak always has a better appearance when fumed with ammonia. This process is rather a difficult one, as it requires an airtight case, but the description herewith given may be entered into with as large a case as the builder cares to construct.

Oak articles can be treated in a case made from a tin biscuit box, or any other metal receptacle of good proportions, provided it is airtight. The oak to be fumed is arranged in the box so the fumes will entirely surround the piece; the article may be propped up with small sticks, or suspended by a string. The chief point is to see that no part of the wood is covered up and that all surfaces are exposed to the fumes. A saucer of ammonia is placed in the bottom of the box, the lid or cover closed, and all joints sealed up by pasting heavy brown paper over them. Any leakage will be detected if the nose is placed near the tin and farther application of the paper will stop the holes. A hole may be cut in the cover and a piece of glass fitted in, taking care to have all the edges closed. The process may be watched through the glass and the article removed when

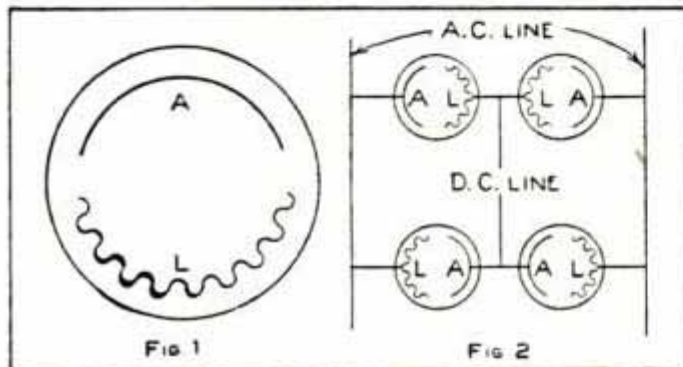
the oak is fumed to the desired shade. Wood stained in this manner should

not be French polished or varnished, but waxed.

The process of waxing is simple: Cut some beeswax into fine shreds and place them in a small pot or jar. Pour in a little turpentine, and set aside for half a day, giving it an occasional stir. The wax must be thoroughly dissolved and then more turpentine added until the preparation has the consistency of a thick cream. This can be applied to the wood with a rag and afterward brushed up with a stiff brush.

How to Make an Electrolytic Rectifier

Many devices which will change alternating current to a direct current



Electrolytic Rectifier and Connections

have been put on the market, but probably there is not one of them which suits the amateur's needs and pocket-book better than the electrolytic rectifier.

For the construction of such a rectifier four 2-qt. fruit jars are required. In each place two electrodes, one of lead and one of aluminum. The immersed surface of the aluminum should be about 15 sq. in. and the lead 24 sq. in. The immersed surface of the lead being greater than that of the aluminum, the lead will have to be crimped as shown in Fig. 1. In both Fig. 1 and 2, the lead is indicated by L and the aluminum by A.

The solution with which each jar is to be filled consists of the following:

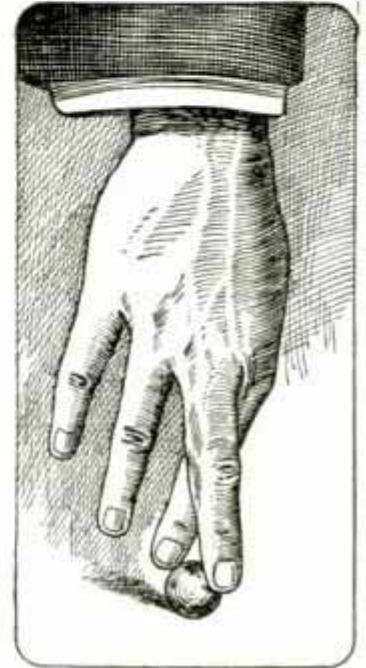
Water	2 qt.
Sodium Carbonate.....	2 tablespoonfuls
Alum	3 tablespoonfuls

Care should be taken to leave the connections made as shown in Fig. 2. The alternating current comes in on the wires as shown, and the direct current is taken from the point indicated.

The capacity of this rectifier is from 3 to 5 amperes, which is sufficient for charging small storage batteries, running small motors and lighting small lamps.—Contributed by J. H. Crawford, Schenectady, N. Y.

The Rolling Marble

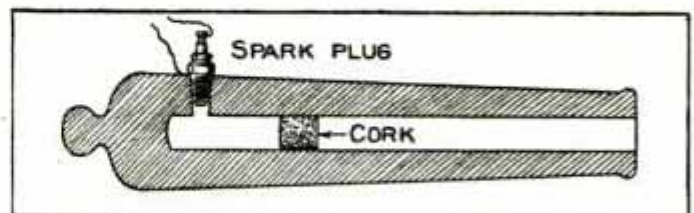
Take a marble and place it on a smooth surface, the top of a table will do. Ask some one to cross their first and second fingers and place them on the marble as shown in the illustration. Then have the person roll the marble about and at the same time close the eyes or look in another direction.



The person will imagine that there are two marbles instead of one.

A Gas Cannon

If you have a small cannon with a bore of 1 or 1½ in., bore out the fuse hole large enough to tap and fit in a small sized spark plug such as used on a gasoline engine. Fill the cannon with gas from a gas jet and then push a



Gas Cannon Loaded

cork in the bore close up to the spark plug. Connect one of the wires from a battery to a spark coil and then to the spark plug. Attach the other wire to the cannon near the spark plug. Turn the switch to make a spark and a loud report will follow. Contributed by Cyril Tegner, Cleveland, O.



Fig. 1



Fig. 2

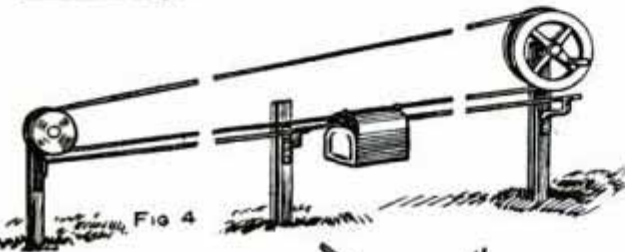


Fig. 3

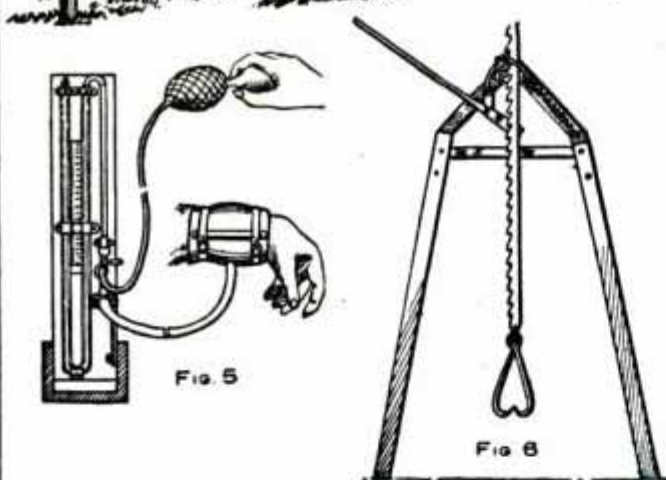


Fig. 4

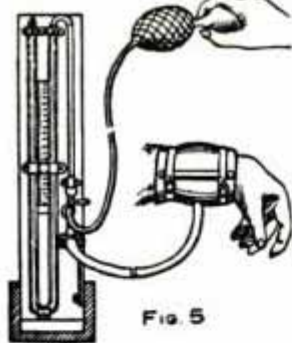


Fig. 5

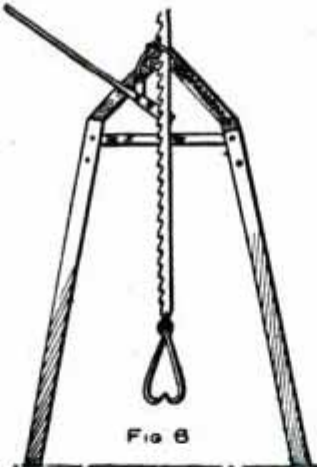


Fig. 6



Fig. 7



Fig. 8

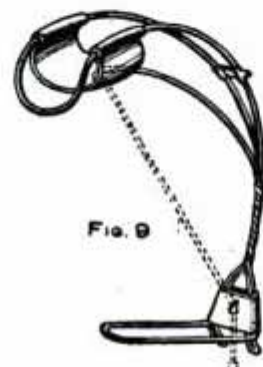


Fig. 9

TURN-OVER COLLAR AND TIE ARRANGEMENT.—A turn-over collar, presumably of flannel or other soft materials for summer wear, with an arrangement along the bottom on the inside through which a necktie can be passed, is shown in Fig. 1. The illustration shows the outer side of the collar, and, in being worn, the upper part is turned down, effectually hiding the tie arrangement in the back. Such separable collars make it possible to wear a soft shirt much longer than if the collar were part of it.

COLLAR LIFE-PRESERVER.—A life-preserver adapted to encircle the neck is shown in Fig. 2. It has a body sheet which lies directly on the shoulders, back and breast of the wearer, held in position by straps which pass under the arm-pits. Attached to the body sheet, or canvas foundation, are 2 cork blocks, slightly tapering in form. Only the lower ends of the blocks are fastened to the canvas.

IMPROVED COAL-SCUTTLE SHOVEL.—The coal-scuttle shovel shown in Fig. 3 has a body formed of a series of openings and rounded elongated convexities or raised parts. In lifting coal out of the scuttle, the dust and slack fall through the openings and the raised rough surface keeps the coal from sliding off.

RURAL MAIL-BOX RUNWAY.—The mail boxes used in the rural delivery service must necessarily be at the edge of the road in a position that will be the most easily reached by the carrier from his wagon. The box must therefore be placed some distance from the house, a considerable inconvenience in wet or stormy weather. With the cableway in Fig. 4, which can be extended to any length, it is possible to place mail in the box from the porch of the house, run the box out to the road, and draw it back again with the incoming mail after the carrier has made his call.

MEASURING AND INDICATING BLOOD-PRESSURE.—Fig. 5 illustrates a device for determining or measuring the arterial pressure. The instrument is fastened to the wrist and consists of a fluid manometer, pressure scale, sensitive valve, tourniquet, a bulb to supply air pressure, means to close the source of air-pressure supply, and means to release the excess air pressure after constriction of the artery. The amount of air-pressure, shown on the scale, and the force of the blood pushing through the artery make it possible to determine the blood-pressure.

LIFTING JACK.—The drawing designated as Fig. 6 shows a handy lifting jack in which the lifting power is exerted above instead of under it, as is ordinarily the case. Objects lying flat on the ground can be raised with it, an impossibility with the under pressure jacks, unless a hole is dug under them.

AN INGENIOUS METHOD OF EXTRACTING STUMPS.—Fig. 7 shows a method of removing stumps which consists of applying an explosive at the base and in binding the top just above the ground to prevent the upward escape of the expanding gases. The binding is a cable, having hooks at the ends which are imbedded in the wood. The method keeps the stumps from flying to pieces, and by confining the gases gives much more force to the explosive.

KEY FOR BATHHOUSES.—The key shown in Fig. 8 has a 2-part hollow receptacle which forms its handle, and furnishes a safe place for the rings of the bather and such small change as he or she desires to have with him while on the beach. Rings are placed in one part of the receptacle and silver in the other. The means for closing the receptacle securely are the same as used on many purses. The key is carried around the neck on a chain or cord. Along all large bathing beaches there are refreshment booths, and as many bathers stay on the beach for several hours, it is inconvenient to have to go to the bathhouse for money when wishing to buy something.

NURSING-BOTTLE HOLDER.—A nursing-bottle holder which fastens to the body of a bed or cradle is illustrated in Fig. 9. It is made of wire, so bent as to form a foot, an upright and a long near-

PATENTS

spring material connects the wires where the bottle rests and can be forced apart to receive it. A light chain running from the top of the holder to the base suffices to regulate the bottle's elevation by pulling the end of the holder down or allowing it to spring upward.

COMBINED DISH-PAN AND DRAIN.—Fig. 10 is an ingenious dish-pan and drain arrangement. The articles washed are placed on the rack in the drain extension, the bottom being so slanted as to carry the water that drains from them back into the pan.

MEANS FOR CLOSING THE ENDS OF CONDUITS.—The device illustrated in Fig. 11 is for the purpose of closing pipes or conduits through which water or other fluids are flowing. The manner in which the device closes a pipe is clearly shown in the drawing. After the cap is pushed into position, the lever is pulled down, pressing it tightly against the pipe.

ADVERTISING DEVICE FOR SUBWAYS.—An ingenious advertising scheme for subways is shown in Fig. 12. It is just the opposite of moving pictures, but has the same effect because of the movement along the side of the subway wall or tubing, each picture showing a consecutive movement, exactly like the pictures on a moving-picture film. Electric lights illuminate each picture in the series, and as the trains rush by, the passengers, seeing the pictures in succession, get the same impression as in watching moving pictures thrown on a screen.

PIG-TAIL WHISTLE.—Every youngster wants a whistle, and usually a new kind of whistle every time. The whistle shown in Fig. 13 has an imitation pig tail as its body.

HANGING CAMP FIRE AND TORCH DEVICE.—The device shown in Fig. 14 should be of interest to every one contemplating a camping or hunting trip. It is a collapsible iron basket which can be hung from a tree, as shown in the illustration, or from a limb, provided a chain is added to insure that the limb will be a sufficient height above the flame to escape being burned. The basket is formed of a series of hoops, connected by chain links, forming a receptacle in which material for fire is placed. A bucket hangs above it for boiling purposes and such articles of food as can be roasted are placed in the embers. The fact that it is off the ground insures an excellent draft at all times, and the flame efficiently lights the camp and its surroundings.

FRUIT-CLIPPER.—The fruit-clipper designated by Fig. 15 is designed especially for such purposes as cutting bunches of grapes and like fruits from vines, but can also be used for clipping fruits of any kind. It has 17 teeth, any one of which, brought into contact with a stem, will clip it.

MARINE PROPELLER.—The marine propeller in Fig. 16 comprises a pair of blades coiled spirally about the shaft, and is radically different from the ordinary and accepted propulsion screw. The outer edges of the two blades lie in an imaginary sphere. It is claimed that the blades will act effectively upon all of the water within an area equal to that inclosed by a great circle of this sphere.

SINGLE-TRACK BALL-BEARING ROLLER SKATE.—It is claimed that the roller skate shown in Fig. 17 embodies the same oscillating action in connection with the roller carriers as all high-grade 4-wheel skates, and that it is possible to execute the same movements as with any skate equipped with 4 rollers. The feature of this design of skate is the construction of the roller carriers, the inner connection of each carrier being cushioned to the frame.

A ROTARY WATER-DRIVEN SCRUBBING BRUSH.—The scrubbing brush illustrated in Fig. 18 is water-driven, its inner portion, consisting of bristles attached to the under side of the spokes of a metal wheel, revolving, and its outer portion, forming a ring of bristles, being stationary. The wheel has peripheral buckets which engage the force of water, thus revolving the brush. The water used

Fig. 10

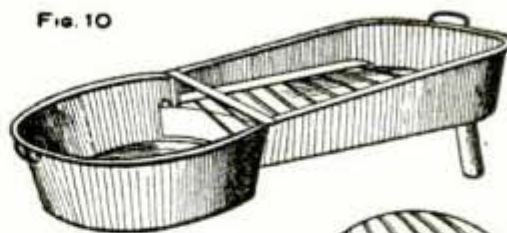


Fig. 11

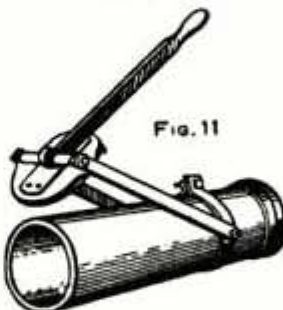


Fig. 12

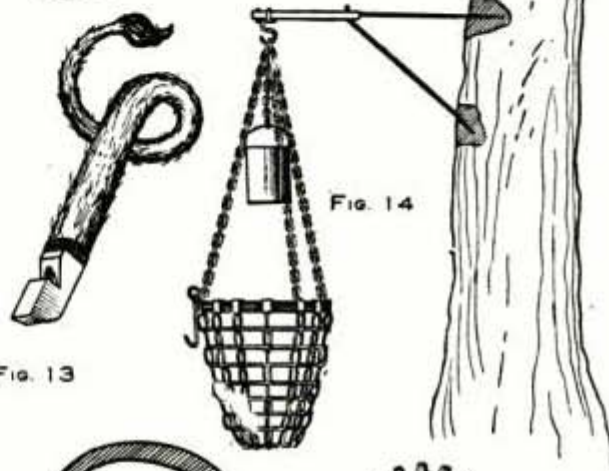


Fig. 13



Fig. 14



Fig. 15

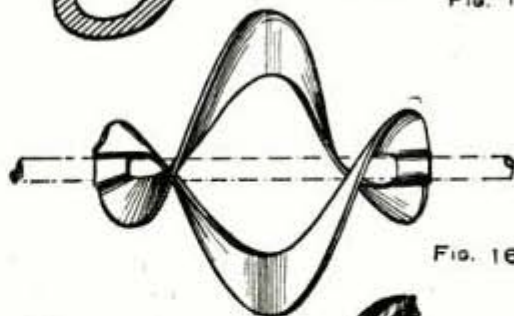


Fig. 16

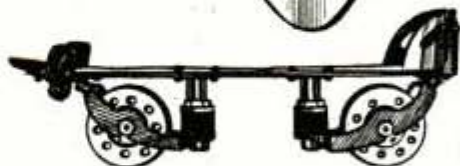


Fig. 17

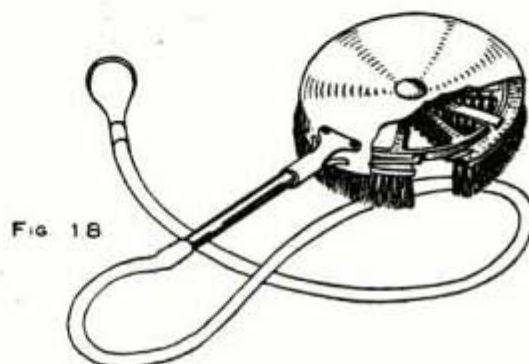


Fig. 18

PROGRESS IN THE PHILIPPINES

Interesting Glimpses of the Forward Movement

At the Iloilo trade school native boys are given a course of instruction in practical mechanics, corresponding to the work of the manual training schools here. The students are not only taught the useful arts, but their work is of so high an order that the articles made are in constant demand. The following list of sales during the past year indicates the range of the work and the excellence of the product. The figures are the number of pieces; not values:

Teachers' desks sold to the province of Iloilo....	50
Picture frames sold to the public at large.....	200
Large storage book cases sold to province of Iloilo	40
Fire-fighting hooks sold to the province of Iloilo.	53
An iron gate, for the American cemetery at Iloilo.	1
School desks sold to the province.....	5,000
Table legs made and sold each month.....	1,200
Lockers sold to constabulary.....	1,500
Lockers sold to public.....	200
Large aparadores sold to public.....	100
Pieces of office furniture sold to the Philippine Railway Co.....	162
Inlaid checker board tables.....	15
Other articles of iron and steel manufacture.....	3,000

At the agricultural school each boy is allotted a small parcel of ground and required to plant and raise garden vegetables, such as egg plant, beans, tomatoes, radishes, etc.

The Philippine School of Arts and Trades teaches a great variety of trades. The Manila Times says: "In the exhibit of the Trade School Miss Perpetua Tabique draws an immense crowd each afternoon at four o'clock with her demonstration of the hand loom used to make Philippine cloth. There is a large number of carved photograph frames, with the original models hung near so that the excellence of the work can be seen. There are large, solid, camphor wood chests the wood for which was selected in Hongkong nearly two years ago by Mr. Magee when he was superintendent of the school.

"In addition to the other wood exhibits, the collection of tables of red narra forms a striking exhibit. There are tools for all sorts of iron work which were made by the boys in the iron working department, tools which

are as good as any imported into Manila for sale, which shows the extremely practical work done by the pupils in this branch of the school."

Good Roads is the subject of an annual contest in which prizes are offered for the best papers.

The Governor General in his recent message stated: "Speaking on the subject of taxation, it is deemed desirable to again call the attention of both chambers of the Philippine Legislature and through them the attention of the Filipino people to the palpable fact that the taxes imposed upon the Filipino people for the maintenance of the Insular Government and provincial and municipal government, so far as known, are the lowest imposed by any civilized government in the world."

Many will be surprised to learn that tuberculosis is the cause of thousands of deaths each year, the death rate from this cause being greater than either plague, dysentery or cholera. Already arrangements are being made for the education of the people along the lines of prevention, and the establishment of open air sanitariums, together with more sanitary methods of street cleaning.

DEEPEST MINES IN AMERICA

The deepest metal mines in the world are in the Lake Superior copper region. The Red Jacket shaft of the Calumet and Hecla mine has a vertical depth of 4,920 ft., while the Tamarack has two still deeper shafts, one being 5,180 ft. down, and the other 5,230 ft. By attaining a depth of a mile underground, and showing with what ease operations are conducted at such a great depth, the Lake Superior mines have demonstrated that it is probably possible to penetrate as far into the earth as the ore goes.

The Pennsylvania railroad is to erect a \$1,000,000 station in Baltimore, Md.

Part of Sixteenth street in Washington is to have its name changed to "Avenue of the Presidents."

THE SENATORIAL AUTOMOBILES

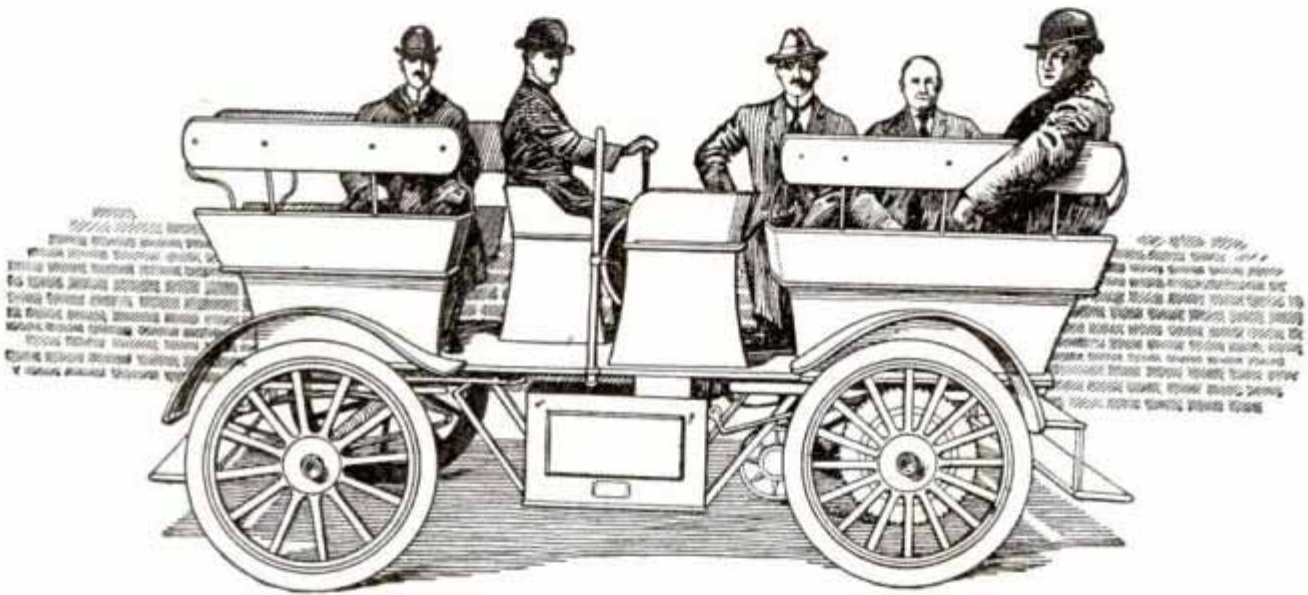
A subterranean passage, somewhat resembling the secret underground exits of medieval castles, differing only in the fact that it is more commodious, is traveled by up-to-date conveyances, and is not secret, is the latest acquisition of the United States Senate. It leads from below the senate wing in the Capitol to the new senatorial office building a short distance away, and is a means by which the national lawmakers can ride back and forth be-

quent wrecks brought about by broken rails.

CROW'S-FOOT ELM SUBSTITUTE FOR HICKORY

Crow's-foot elm, a tree growing thickly in Queensland, Australia, is, according to the American consul at Brisbane, a perfect substitute for the rapidly disappearing American hickory, used by wagon manufacturers for wheels, shafts, poles, and spokes.

There are two varieties of crow's-foot elm growing in Queensland, one



Automobile Used in Senate's Subterranean Passage

tween the two. Electric automobiles of the type shown in the illustration furnish the means of transportation.

AN UNBREAKABLE STEEL RAIL

After extensive experiments, the Bethlehem Steel Co., has produced a nickel-chrome rail, which will sell for \$51 a ton, and which is claimed to be practically unbreakable. A new mill will be erected at Gary, Ind., for its manufacture, severe tests instituted by E. H. Harriman proving the new material perfect. The activity which led to the compounding of the new rail is the result of a probing by the American Railway Engineer and Maintenance of Way association of the railroads. The railroads have been severely criticised because of the fre-

being dark in color and the other light. The former is found chiefly in North Queensland, while the latter is a product of the southern part of Queensland, where it is often called hickory. The wood of the darker variety is very beautiful when cut in the radial direction, having a light golden ground mottled with flakes of bright brown. The color changes as the wood is held at different angles to the light. It is extremely elastic, even being used for trout fishing rods. The weight of the wood per cubic foot is 46 lb. In one of the tests, a piece 2 by 2 in. held its form two years after being bent into a semicircle, the ends being free during all that time.

There is not much to choose between the light and the dark variety of the wood, but the light is preferred by

many because it bears a resemblance to hickory. The quotation for steamer rates from Brisbane to San Francisco is \$15.81 per 1,000 ft.

THE NEW COPYRIGHT LAW

On March 3rd, 1909, Congress passed a new copyright law which goes into force July 1st, 1909, and takes the place of the Revised Statutes of the United States which have heretofore covered this subject.

The new law repeats the principal provisions of the old law, giving the person who is entitled to a copyright the exclusive right to print, publish, sell, translate, dramatize the copyrighted work, also the right to deliver lectures, sermons, etc., exhibit moving pictures, and to perform the copyrighted work on musical instruments of any kind.

A special provision of the law recites that whenever the owner of a musical copyright has used or permitted the use of his copyrighted work on an instrument which reproduces music mechanically, then any other person may make similar use of the copyrighted work upon the payment to the proprietor of a royalty of two cents on each part manufactured. The law provides for sworn returns as to the use of such works on machines and for the failure to pay the royalties. The reproduction of a musical composition by a coin-operated machine is not considered a public performance for profit unless a fee is charged for admission to the place where such machine is operated. A copyright upon periodicals or composite works covers each part as well as the whole.

The following works are subject to copyright:

- (a) Books, including composite and cyclopaedic works, directories, gazetteers, and other compilations;
- (b) Periodicals, including newspapers;
- (c) Lectures, sermons, addresses, prepared for oral delivery;
- (d) Dramatic or dramatico-musical compositions;
- (e) Musical compositions;
- (f) Maps;
- (g) Works of art; models or designs of works of art;
- (h) Reproductions of a work of art;
- (i) Drawings or plastic works of a scientific or technical character;
- (j) Photographs;
- (k) Prints and pictorial illustrations.

There are other provisions of the law which are technical, but the purpose of the new act is to cover the use of copyrightable matter on machines for reproducing music, pictures, and sound. The law is very comprehensive and while it will probably require amending as the occasion arises for interpreting the new law, undoubtedly as a whole it will stand and be of great value to the public.

A copyright term is 28 years and may be renewed for another 28 years. When the owner of a copyright sells it, the buyer may substitute his own name in the required notice of copyright on each copy, by having the transfer recorded in the records of the office at Washington.

REFRIGERATING VESSEL STATEROOMS

One of the most recent inventions for modern steamships is a device for cooling staterooms on vessels fitted with refrigerating machinery. This device consists of a pipe about 8 in. in diameter and 5 ft. long, the lower end having oblong openings about 4 in. deep, so arranged around the bottom as to form a grid for admission of air. Inside the pipe is a brine coil supplied from the refrigerator, and on top of the pipe is a small centrifugal fan driven by a small motor on a bracket to one side. On starting the fan the air is drawn in through the openings at the bottom of the pipe over the brine coil and through the fan back into the room at a considerably reduced temperature.

By this device the stateroom can be kept comfortable even in the most sweltering weather, partly due to cooling, but mainly to the increased relative humidity.

W. J. McGee, of the department of agriculture, estimates the loss by forest fires last summer at approximately \$1,000,000 per day.

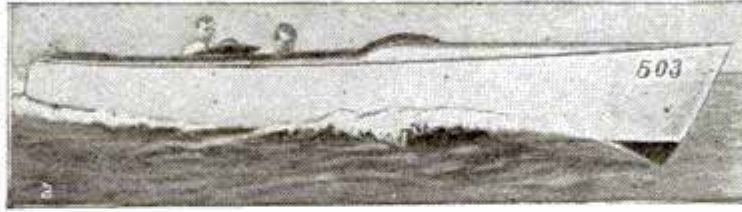
The wooden spire of the historic St. Paul's church at Richmond, Va., is to be replaced by steel.

Build Your Own Boat and Save Two-Thirds

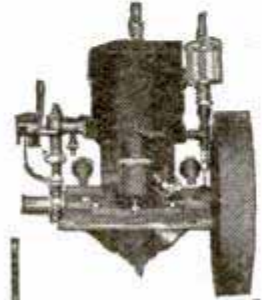
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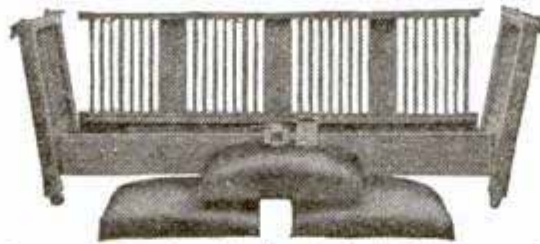


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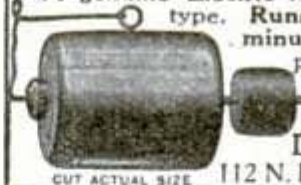
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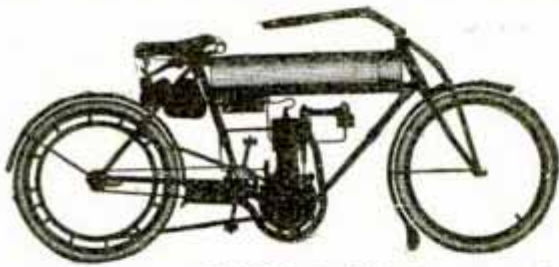
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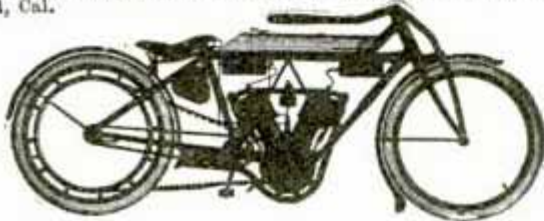


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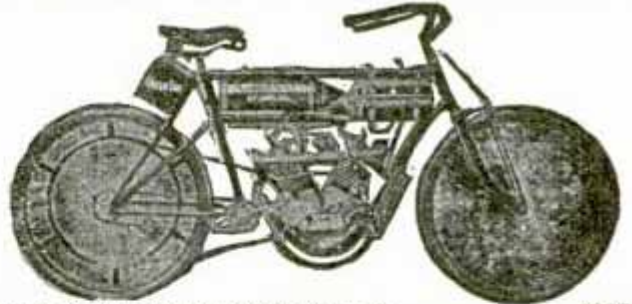
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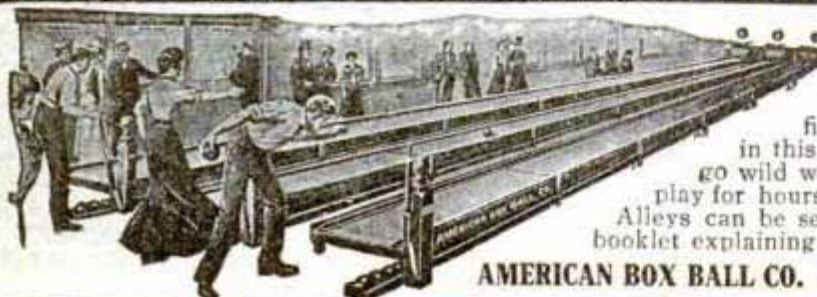
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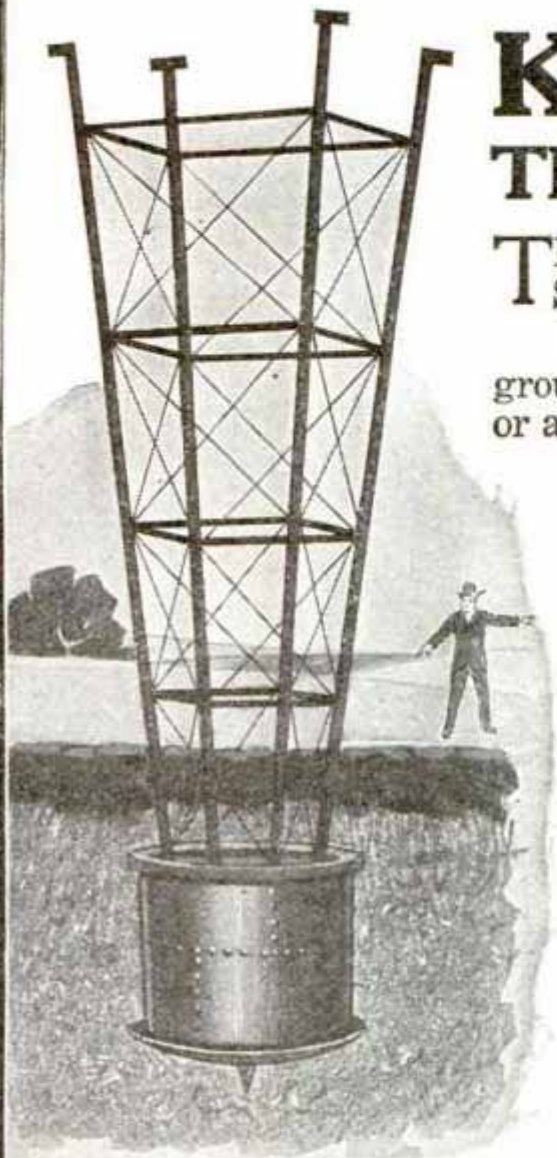


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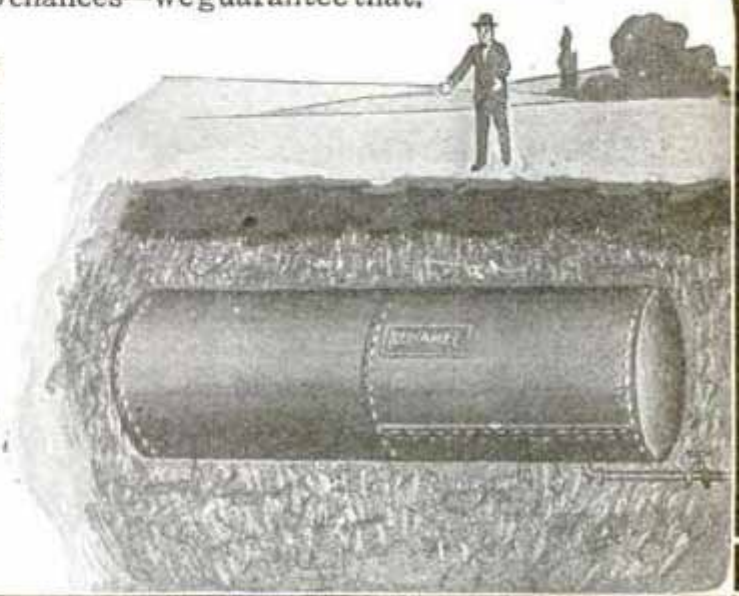
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A TELEPHONIC ERROR.—Rev. Hugo Tell, a quick, irascible priest of a western town, had occasion to use the "long distance" one day, and through some mistake "Central" was not as polite as she should have been. The reverend gentleman felt it his duty to call up the inspector and accordingly did so.

"Who is this?" inquired the inspector.
 "Hugo Tell," snappishly came the answer.
 "What did you say?" asked the inspector.
 "Hugo Tell," bawled the father, growing red in the face.
 "Look here, sir," came the reply of the inspector, "this is not the place to get funny, and I want you to understand that no profanity is allowed on this line."
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"This is Elizabeth," said the gentle voice at the other end of the line, "and I want to speak to Mr. Smith."

"Mr. Smith is not in," answered the good lady in cold, hard tones. "Whatever you have to say may be said to me."

"You won't do," was the prompt reply. "I must speak to Mr. Smith."

"Look here, young lady," ragefully exclaimed wifey. "I am Mrs. Smith, and I want to know who you are that calls up my husband and insists on talking to him."

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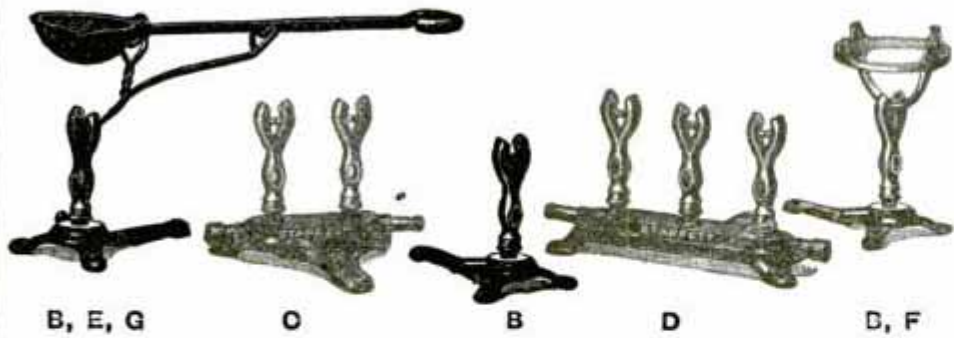
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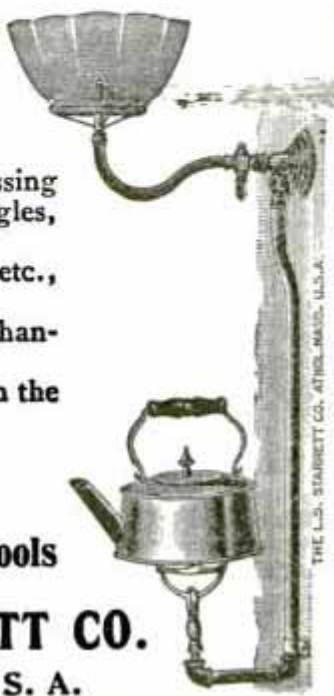
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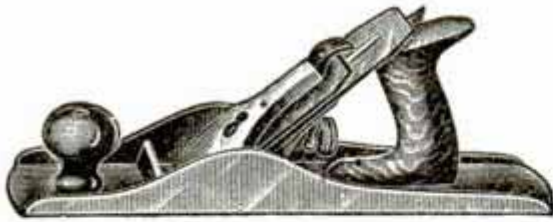
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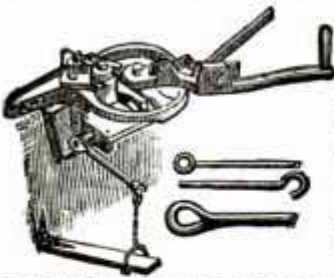


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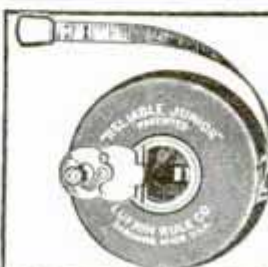
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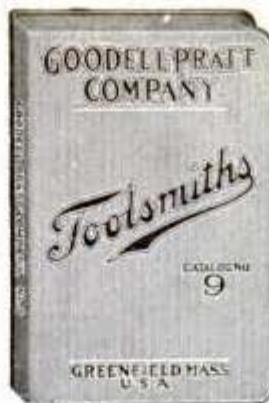
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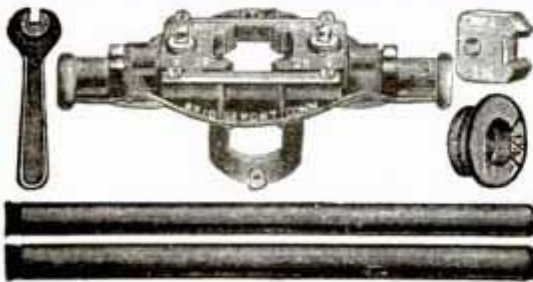
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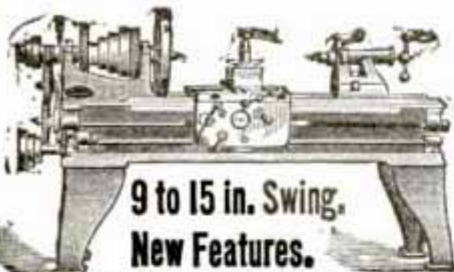
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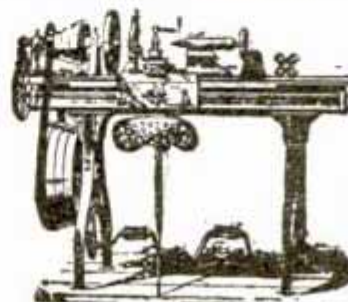
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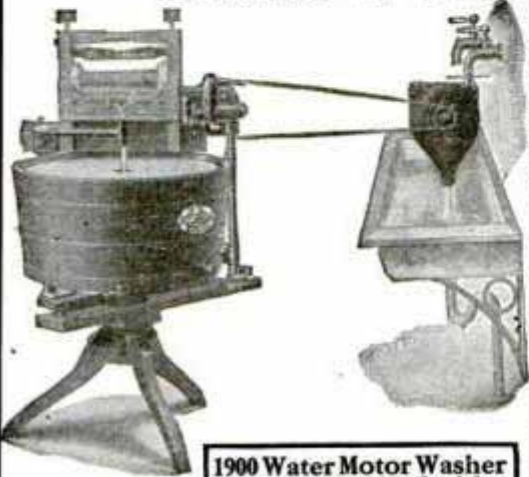
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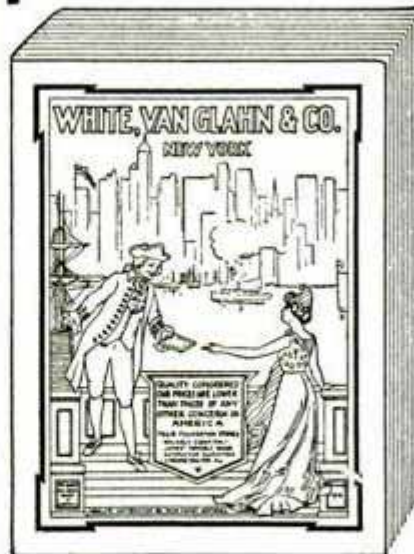
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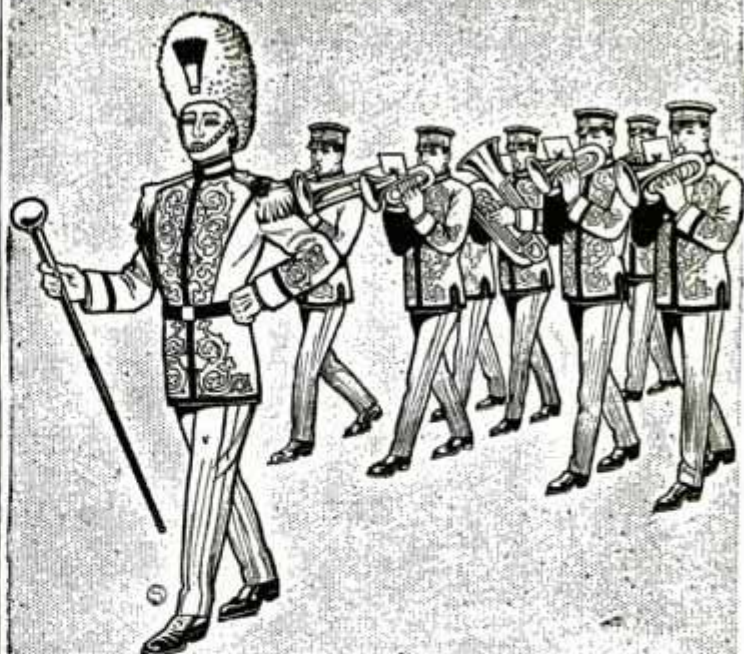
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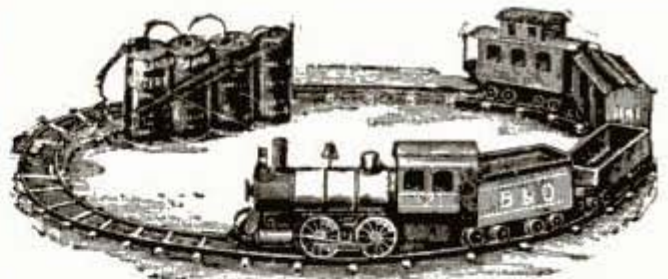
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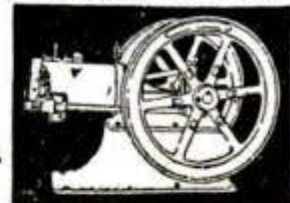
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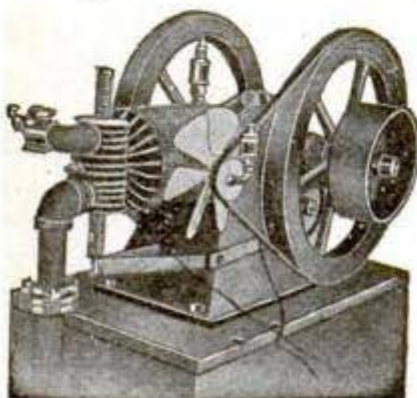
A NEW METHOD OF KEEPING POTATOES.—Consul-General Richard Guenther, of Frankfort, reports that a German publication, the "Practical Adviser in Fruit Raising and Gardening," states that a new method for keeping potatoes and preventing sprouting consists in placing them on a layer of coke. Doctor Schiller, of Brunswick, who has published the method, is of the opinion that the improved ventilation by means of coke is not alone responsible for the result, but believes that it is due to the oxidation of the coke, which, however, is a very slow one. Coke always contains sulphur, and it is very possible that the minute quantities of oxides of carbon and sulphur, which result from the oxidation, mixing with the air and penetrating among the potatoes are sufficient to greatly retard sprouting. Potatoes so treated are said to keep in good condition until the following July.

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"I don't know," rejoined the grocer. "What can he do?"

"Well," replied the parent, "I don't suppose he could do much at first except buy and sell goods and manage your business for you, but later on when he gets a little experience and sense he might be able to sweep out, do up packages and run errands."

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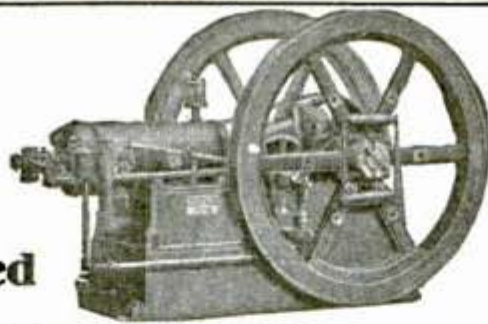
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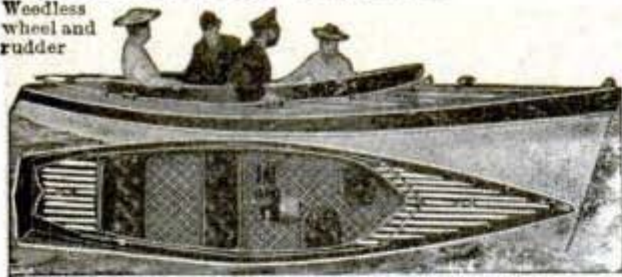
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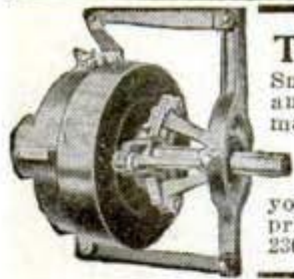
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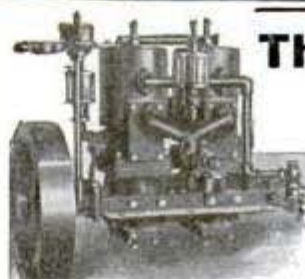
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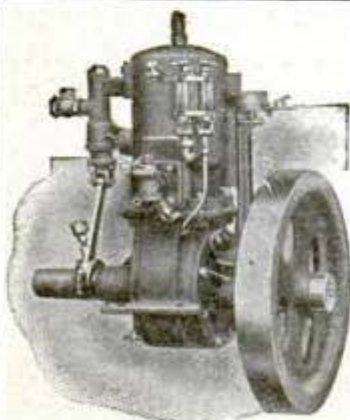
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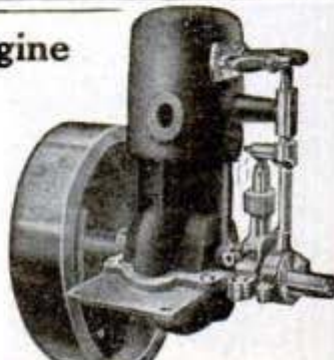
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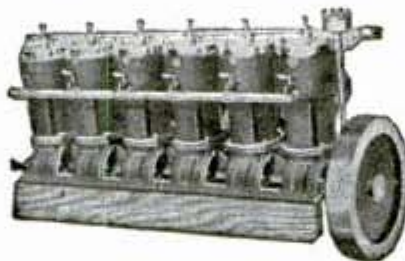
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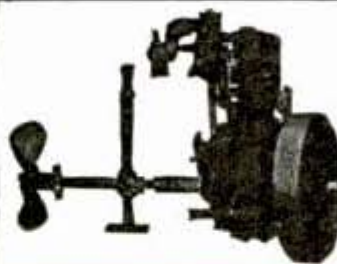
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and a perfect record for reliable performance and superior build is behind Pierce Motors. They are all that good motors should be. Equally dependable are

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Write for Book showing different sizes, prices, etc., and telling about Pierce supremacy. Don't buy a Motor Boat or Motor till you hear from the pioneer builders of Gasoline Motors.



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are elegantly designed, carefully built, and genuinely satisfactory. They cost a little more than some, but the few extra dollars stand for real excellence, and the certainty of lasting reliability. We carry a large stock on hand and can make prompt shipments. Write us your requirements.

If interested in Pleasure Boats of any kind, write today for our handsome Booklets enclosing ten cents in stamps for the Book of Motor-Boats, or five cents for either The Canoe Book or Row Boat Catalog.

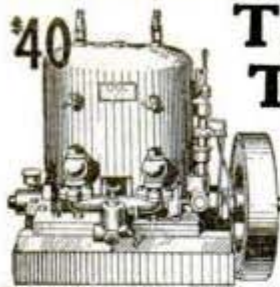
Racine Boat Mfg. Co. Box 680 Muskegon, Mich.

You can examine the genuine "Racine Muskegon" models at our New York, Chicago, Detroit, Camden or Seattle stores, or at the Iver Johnson Sporting Goods Co., Boston, Mass.



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Is The Northwestern Marine Powerful Engines for high speed boats.

In use by the United States Government Light House tenders, and the Chicago Police Department, cases where extreme speed and absolute reliability are required.

Very compact and silent running. So carefully built that a woman or child can operate it. Not the cheapest, but the best. 2 to 8 H.P. Retail price \$40.00 and up. Wholesale prices to boat builders and agents. Send for our big illustrated catalog. Northwestern Steel and Iron Works, Box 523-N, Eau Claire, Wis.

Make a Motor Boat of Any Boat in Five Minutes



You can do it with the Waterman Outboard Motor, which you can quickly attach (and detach) to the stern of any skiff, row boat, dinghy, punt, sail boat, and have a good motor boat. It is not a toy, but a reliable 2 H. P. Marine Motor that will drive an 18-foot row boat 7 miles an hour, 4 hours on gallon gasoline. Simplest motor made. Weight 40 lbs. Equipped with **Schebler Carburetor**. Four years' successful results behind it. Send for **Catalog C. Canoe Motors, 1, 2, 3, 4 Cylinders—Catalog K. Standard Type Motors, 1 to 30 H. P.—Catalog A.**

DUBRIE MARINE MOTORS

We Furnish All Equipment Needed

All Ready to Install

We make it easy for you to get a boat motor this year. Equipment furnished with DuBrie motors now includes *everything*—tank, pipe-fittings, gasoline pipe and all—ready to install. Our special equipment offer makes it impossible for you to get any other motor at so low a cost. No other motor so easy to install. Thousands of DuBrie Gasoline Motors are in use in Speed Models, Livery and Fishing Boats. They start easily and are always ready. Wonderful economy of fuel, dependability and bull-dog persistency. Ten sizes— $\frac{2}{3}$ to 27 horse power—one, two or three cylinders. Send for descriptive catalog.

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Because of our vaporizing device, Kerosene, Distillate or Gasoline may be used in the DuBrie Kerosene Motor. A pint of kerosene per horse power keeps you going full speed for an hour. *There's more power in kerosene or distillate. It's vastly cheaper.* None of the fuel can escape to cause odor or fuss. These engines run smoothly and persistently. They cost far less than other kerosene motors. All sizes from 4 to 27 horse power—one, two and three cylinders. Our catalog gives all details. Ask for it.

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The hull alone is worth more than we charge for this speedy boat, fully equipped and ready to run. It is 18 feet long; seats 10 passengers comfortably; has DuBrie 6 horse power gasoline engine; 16 inch propeller with reverse gear. Speed (actual) 9 1/2 to 10 miles per hour. Write quick, if you are interested, for the number of these boats is limited.

\$225 Complete—Ready to Run

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obliged to comply with the provisions of law in regard to life-preservers and licensed operators. (The life-preservers must be of the sort prescribed by the regulations of the Board of Supervising Inspectors. They must bear the United States inspectors' stamp.)

While the law does not require it, the department recommends, in the interest of safety to life, that a life-preserver for each person on board be carried on all motorboats, regardless of size or occupation.

Documenting, Inspection, Etc.—All motorboats of over 5 net tons engaged in the carriage of freight or passengers for hire must be documented; that is to say, licensed by the collectors of customs. (Vessels under 5 net tons are not documented in any case.) The license of the vessel obtained from the collector of customs (designated a document) is additional to and must not be confounded with the license required for the operator of a motorboat of 15 gross tons or less carrying passengers for hire.

Motor vessels of over 15 gross tons engaged in the carriage of passengers or freight for hire must also be inspected by the United States local inspectors of steam vessels and must carry a licensed engineer and a licensed pilot.

Documented vessels must have name and home port on stern and name on each bow. Official measurement is necessary only in case of vessels requiring to be documented.

While the law does not require it, the department recommends

Do You Want Power? The Strelinger is guaranteed to develop 25 to 35 per cent more than rated power. Do you want reliability? The Strelinger has an unequalled record covering 12 years. Do you appreciate fuel economy?

The Strelinger 4 CYCLE 1-6 CYLINDER

is guaranteed to operate with 25 per cent less fuel than any 2 cycle engine built—and from 10 to 15 per cent less than any other 4 cycle engine. Do you appreciate durability? One man writes: "Eight years in use and only \$1.00 spent for repairs." Hundreds of other equally strong endorsements.

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All sizes 4 to 100 H.P. Enclose 10c stamps for Nickel Plated Pocket Marine Compass.

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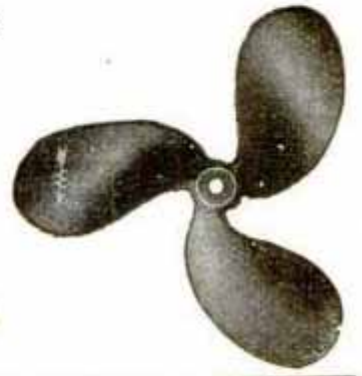
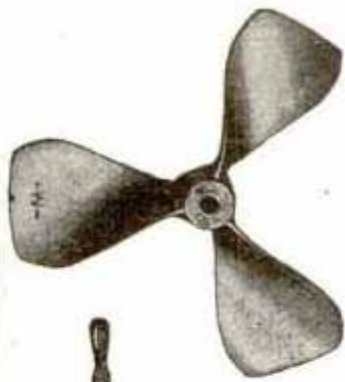
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Grand Rapids, Michigan



that the name be conspicuously displayed on undocumented motor-boats

A nervous woman on an ocean liner approached a deck-hand during a season of "head seas," and asked:
"Have you ever seen any worse weather than this, Mr. Sailor?"
"Take a word from an old salt, mum," replied the deck-hand.
"The weather's never very bad while there's any females on deck making inquiries about it."—Bluejacket.



WATKINS' SPECIAL MOTOR

3 HORSE POWER—30 Lbs.

Aluminum base, copper water jacket, steel shaft, bronze bearings, special carburetor.

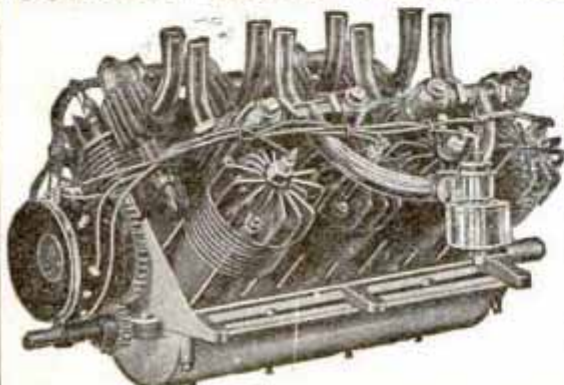
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Made in large quantities, therefore price right. Especially adapted for Canoe or Light Boat.

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CURTISS LIGHT WEIGHT MOTORS



Adopted by the U. S. War Department and used by all prominent Aeronauts.

Absolutely essential where great power and light weight are required.

One to eight cylinder. Two to one hundred H. P.
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Our frames and material to finish will save you **TWO-THIRDS THE COST** of a similar completed boat. The saving on freight alone is very great.

Send for our catalog, enclosing 10c in stamps or silver to cover mailing cost. The most comprehensive book on boats ever issued, fully describing and illustrating 50 different models for both pleasure and commercial use.

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Wharf 398

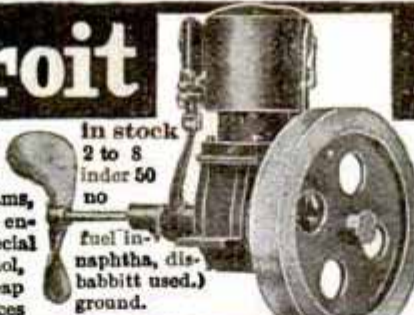
BAY CITY, MICHIGAN

2 H.P. Detroit

Engine \$29⁵⁰

Other sizes at proportionate prices ready to ship. Single cylinder engines, h. p.; double cylinders 8 to 20 h. p.; Four cyl h. p. Engines start without cranking. No cams, sprockets, only three moving parts. All engines counterbalanced @ No vibration. Special factor burns gasoline, kerosene, coal oil, alcohol, tillate. Plastic white bronze bearings (no cheap Crankshaft drop forged steel. Bearing surfaces

In stock 2 to 8 in. 50 no fuel in naphtha, dis-babbitt used.) ground.



Adjustable steel connecting rod. Waterproof ignition system. For your launch, sailboat, rowboat, stern wheel boat, or railroad track car. 20,000 satisfied users, free catalog and testimonials. Demonstrator Agents wanted in every boating community. Special wholesale price on first outfit sold.

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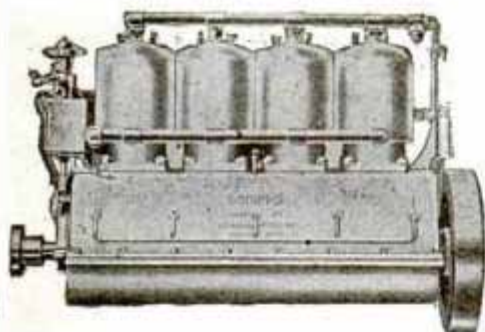
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Before selecting your engine, you should know all about Scripps Marine Motors. The best for you to realize the unusual care that has been used in building this superior type of motor is to secure this book and read how perfectly every detail in the Scripps Motors has been worked out.

We want every man owning a motor boat, or who is thinking of owning one, to have this book. It will help him in his work of selection, and enable him to choose his motor intelligently. To this end we have printed an extra large edition and a copy will be sent free to any interested person. Scripps Motors have gained an enviable reputation

for service, for power and speed, and for reliability of construction. They range in power from 4 to 100 H. P. and in size from 1 to 6 cylinders. Write to-day for this book that tells how Scripps Motors are made and what they have done.



Scripps Motor Co., 650 Lincoln Avenue Detroit, Michigan

Regal Marine Engines

have Conservative Horse Power Rating and this experiment by one of our customers proves it.

The stern of this customer's launch, having a 14 H. P. Regal Engine in it, was tied to the stern of another launch having an 8 H. P. engine which in turn was tied to the stern of another 8 H. P. launch. On starting the engines the 14 H. P. Regal took the other two boats up the lake.

Regal Engines are built for High Speed or Heavy Duty service and are guaranteed to always operate satisfactorily.

Get a copy of catalog No. 18.

Regal Gasoline Engine Co.

67 W. Pearl St., Coldwater, Mich.

See our Exhibit at the Seattle Exhibition

Representatives wanted.



Write for terms.

LEPROSY IS CURABLE SAYS DANISH EXPERT.—Dr. Edward Ehlers, the world's greatest expert on leprosy, and Director Royal Frederic Hospital, Copenhagen, writes the following to the Washington Post:

The Washington Post pays me a high honor in inviting me to examine Mr. Early, the so-called leper, now under care of the District of Columbia. America does not need to appeal to foreigners in this matter. In the United States there are many leprosy experts, as experienced and as deeply interested in the study of this disease as I, among them James Nevins Hyde, Chicago; James White, Boston; Dr. Bulkley, of New York; Dr. Bracken, St. Paul, Minn., and last, but not least, Isadore Dyer, New Orleans. The latter I consider one of the best diagnosticians of leprosy in our times. My accidental presence in this country explains best, however, my being called into the Early case. I shall report upon that after examination.

Every great city of more than 500,000 inhabitants, in our days, has lepers in it. They shun small communities and become, at a very early period of their disease, so afflicted that they become incapable of working and depend on the public charity in the big cities.

We must consider these facts philosophically and try to provide

Your Safety Demands

Baldridge

Reverse Gear

Eliminate danger and delay from motor boating by equipping your engine with a Baldridge Reverse Gear. Gives quick and absolute control of your engine for starting, backing up or stopping. Simpler, more compact, more durable than any other reverse gear. Beware of cheap reverse gears, made simply to sell. Every Baldridge is tested under running conditions before leaving factory and is fully guaranteed. Prices and descriptive matter sent on request. Agents wanted

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Nothing External Revolves

DETROIT REVERSE GEAR

STARTS REVERSES INSTANTANEOUSLY STOPS

All in an oil tight case.

The Simplest, most Reliable, most Compact, and the Smallest Perfect Marine Reverse Gear ever offered. No outside moving parts to throw the oil or grease, tear skirts, or bruise hands or catch waste. No noise. Made in sizes for from 2 to 80 h. p. All sizes in stock. All gears guaranteed 1 year. Write for special prices.

DETROIT ENGINE WORKS 24 Beaufait Ave., Detroit, Mich.

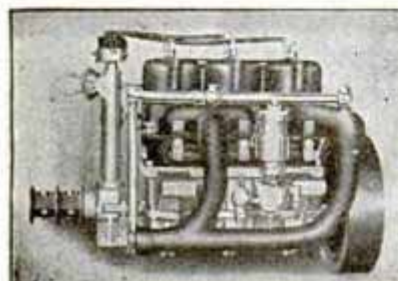


NO BACK FIRE—NO BASE EXPLOSIONS

Roberts Marine Engines are the only two cycle engines made that are POSITIVELY GUARANTEED to be free from the back fire or base explosions.

ROBERTS MOTORS ARE TROUBLE PROOF

They are simple in construction—powerful—are not "choked" but have large intake and exhaust and every part is standardized and interchangeable. Adjusted so accurately that they start on the first turn of the crank. Nothing is experimental—every part is thoroughly tested in the best testing room in the world. They give much greater power and more speed than any other engine of the same horse power made—are free from vibration—economical in the use of fuel, and every Roberts Engine is guaranteed to give perfect satisfaction. **WE MAKE IMMEDIATE SHIPMENT** Write today for our "Book of Unsolicited Testimonials," and catalogue describing our 11 unequalled models, from 1½ to 60 H. P. **ROBERTS MOTOR COMPANY, 1419 Columbus Ave. SANDUSKY, OHIO, U. S. A.**

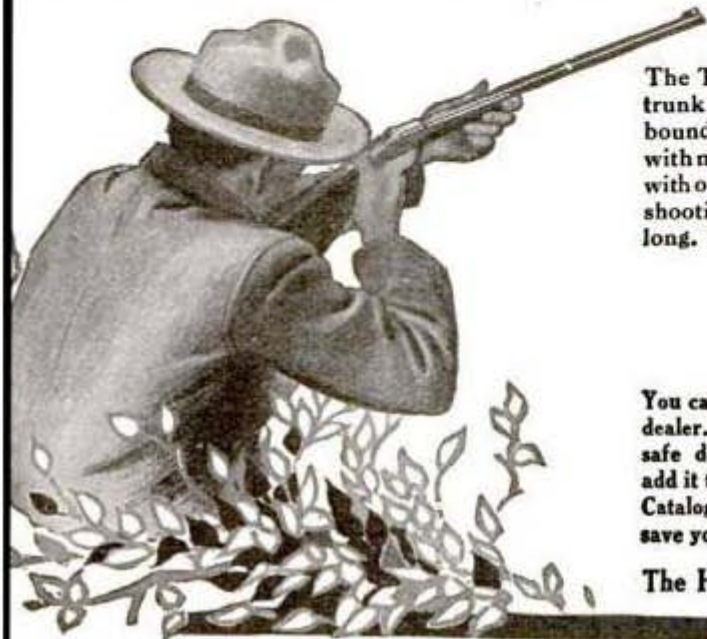


TO THE MAN WHO SHOOTS

HOPKINS & ALLEN

NEW MODEL No. 922 RIFLE

is a marvel for accuracy and penetration—unexcelled by any .22 calibre rifle made—a handsome gun, beautifully balanced and guaranteed to the fullest extent. Unusually well made and extremely reliable.



The Take Down feature enables the rifle to be carried easily in suit case or trunk and facilitates cleaning. Made with the popular level action. Rebounding hammer remains in safety notch when gun is not in use. Fitted with military butt-plate; adjustable Rocky Mountain step rear sight and rifled with our patented increase twist, which adds greatly to the effectiveness of the shooting. Handsomely oiled walnut stock and fore-end. Barrel 24 inches long. This new model rifle is a great improvement over our old model No. 922.

No. 922—22 cal., 24 in. barrel, shoots 22 short, long or long rifle rim-fire cartridges - **\$6.00**

No. 932—32 cal., 24 in. barrel, shoots 32 cal., short and long rim-fire cartridges - **\$6.00**

You can get this rifle at all good hardware and sporting goods stores. See your own dealer. If he can't supply you, on receipt of price we will ship direct and guarantee safe delivery and satisfaction. Send 10 cents for a beautiful Cow-Girl Poster, and add it to the decoration of your room. Write also for our FREE 1909 Gun Guide and Catalog. It describes all our different rifles, shotguns and revolvers. See what our prices save you and how you get a better arm at the same time.

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"The Motor of Quality"

Write for Catalog "S 1."

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The High Grade Engine Builders

Best grade cedar canoe for \$20

Best Grade of Cedar Canoe for \$20.00. We sell direct, saving you \$20.00 on a Canoe. All canoes cedar and copper fastened. We make all sizes and styles, also power canoes. Write for free catalogue giving prices with retailers' profit cut out. We are the largest manufacturers of canoes in the world.

DETROIT BOAT CO. 156 Bellevue Ave., Detroit, Mich.

well for lepers that they will prefer to live in asylums rather than in the big communities. Lepers are timid. It is a crime to persecute them, as has been done, for any of us could innocently acquire the same disease, and one of us would care to be considered a pariah. It is certainly a dreaded and dreadful disease, and it is contagious. But it is more fearful as to contagiousness than tuberculosis. Leprosy certainly is curable. In the Norwegian asylums there are living people of 90 years of age who acquired leprosy at the age of 20. They lost perhaps fingers, toes, eyes, and other parts of their bodies, but they lived to old age, because the disease was arrested, and that is what I call "curable," for, unhappily, lost fingers cannot grow again. In the middle ages the authorities isolated the patients. In our day the question is not simply the isolation of patients. We pay attention to the treatment of the disease. If only you will deliver a leper from his struggle for life, doubly hard for those who see their fingers and toes falling off in pieces, you make it possible to send the sickness to sleep, to arrest it. Give the leper food, clothing, baths, medicine, and bands to dress his wounds, and then the wounds will heal, the eruptions cease their violence, and the whole evolution will tend toward the milder form of the disease—"anesthetic leprosy." It is the wet form of the disease which is malignant. Beside the general hygienic treatment walks the medical treat-

ELECTRIC MOTOR

Sent prepaid to any address for 35c

EMPIRE ELEC. WORKS, 841 Bridgeport, Conn.

GRAY MOTORS

6 HORSE POWER COMPLETE \$89.50 IMMEDIATE DELIVERY.

1, 2 & 3 Cylinders, 3 to 30 Horse Power

Price—\$60 and upwards. Write for color catalog today—with beautiful color print of yacht Grayling—fastest cruising motor boat of its length and beam in the world—most complete marine catalog ever published. **Gray Motor Co., 7 Leik St., Detroit, Mich.**

16 FOOT STEEL LAUNCH \$96

With 2 H.P. Engine Complete

18-21-25 foot launches at proportionate prices. All launches fitted with two cycle reversing engines with speed controlling lever; simplest engine made; starts without cranking, has only 3 moving parts. Steel rowboats, \$20.00. All boats fitted with water-tight compartments; cannot sink, need no bant house. We are the largest manufacturers of pleasure boats in the world. Orders filled the day they are received. We sell direct to user, cutting out all middle-men's profits. **Free Catalogue.**

For over thirty
years the
word

Shawknit
TRADE MARK.
MADE IN U.S.A.

And it is these two features in particular that you look for, expect and have a right to insist upon.

It is precisely what you get when you buy *Shawknit* socks.

Because the welfare of tender feet has not been sacrificed for the sake of durability.

Neither have long wearing qualities been overlooked at the cost of true foot comfort.

Shawknit cotton socks for summer wear are delightfully soft to the feet, because made from best selected long fibre cotton yarns, which *we comb and spin in our own mills.*

Nothing of a harsh nature creeps into the make-up of *Shawknits*, which produces a feeling of discomfort so noticeable in many socks, for which greater wearing qualities are claimed.

Then again *Shawknit* socks are shaped in the knitting — not stretched over board forms — that is why they do not bind over the instep, and push a hole through the toe.

Shawknit socks are seamless, thus doing away with a disagreeable feature prevalent in other socks, which irritates the sole of the foot and causes excessive perspiration.

Anyway write to-day for beautifully illustrated catalog and price list — the handsomest thing of its sort ever issued

SHAW STOCKING CO.

on socks has been a sure sign of superior foot comfort and durability.

Your money back if dissatisfied
without red tape or formalities

There are no socks made to-day that give you greater value of *comfort, durability* and *style* for your money than *Shawknit* socks — recognized the world over as the standard — but frequently imitated.

For this reason always look for the *Shawknit* trademark stamped on the toe when buying socks. Then you are sure to get the genuine — the kind that feel better, look better and wear longer.

The following assortment of light weight cottons will be found most appropriate for summer, and equal in wear, fastness of color and appearance to higher priced goods.

Style 3554B — Black (Snowblack)
Style 3554T — Tan — for tan shoes
Style 3554C — Rich Navy Blue
Style 3554F — Gun Metal Gray
Style 3554H — Heliotrope
Style 3554K — Hunter Green
Style 3554M — Reseda Green
Style 3554R — Ox Blood

Extra light weight for spring and summer, 25c. a pair, or 6 pairs of any assortment, \$1.50, sent direct. Charges prepaid to any point in the United States upon receipt of price, should you be unable to procure them from your local dealer.

Made in sizes 9-11½ inclusive. Please specify when ordering direct.

11 SMITH STREET, LOWELL, MASS.



The
COLLAR
THAT SAVES THE DOLLAR

Think of it—at least two cents a day for your collar wash bill! That's \$7.30 a year—and \$3.00 for the collars. That's \$10.30. You didn't know it costs so much? Well—four **LITHOLIN Waterproofed Linen Collars cost \$1.00** and will last you a year. When soiled just wipe them white as new with a damp cloth. The same collar you have always worn, only waterproofed. Always keep in shape, never wilt or fray, and are to be had in every fashionable style. All sizes. Then there's "cuff" money—figure that out, and you'll investigate. If so, you'll buy **LITHOLIN**

Collars 25c. Cuffs 50c.

Always sold from a **RED** box. Avoid substitution.

If not at your dealer's, send, giving styles, size, how many, with remittance, and we will mail, postpaid. Styles booklet free on request.

THE FIBERLOID COMPANY

Dept. 25, 7 Waverly Place, New York

STYLE **LITHOLIN** FIT

ment. The best remedy we know against leprosy is chaulmaogra of

A modern leprosy asylum must offer to the inmates such conditions of existence that they gladly enter the asylum, instead of feeling any tendency toward the unsteady, vagabond existence which offers such great danger to the community. Patients who still are able to work ought to be occupied in such kinds of work as they like and can do. They should be paid a small compensation for the work they do, to enliven them and to prevent them from idleness. But all products of the leper's own hands should be used in the asylum, and should under no condition come out among perfectly healthy persons.

Society should never allow leprosy patients to keep their children. They should be taken from them and educated at public cost. This principle has been brought into use by me in the Icelandic law for my government in 1894 and 1895, inspired by me, and in the law for the Danish West Indies (1908), and in the German law on my personal request to the German emperor, at audience 1897.

Leprosy is not hereditary, as still commonly believed by the public. It is believed so because the danger of contagion is always greater in the intimacy of family life.

The Mission to Lepers in India and the East has created in India and China many asylums for the children of leprosy patients, the so-called "Untainted Children's Homes." The results from these institutions have been most surprising, and many children have been protected against their parents' sickness, while not all of them could have escaped in the leper's family home.

I cannot omit to add a few words as to the three lepers isolated at the Metropolitan Hospital, on Blackwell Island. It seems to me that they are living under circumstances unworthy of the great American nation. These lepers seem to be attended by an old man, whose first words to me were, "Don't put your hands on them."

But how can we clean their sores and dress their ulcers without

2 HP Stationary \$29.50
ENGINE ONLY

2½ to 8 H.P. Proportionate Prices.

For use on the farm and in the shop. Runs cream separators, churns, pumps, grist mills, corn shellers, washing machines, lathes, printing presses, etc. Burns kerosene (coal oil), alcohol, gasoline, naphtha, distillate, without change of equipment, starts without cranking, throttling governor, drop forged crank shaft, best grade babbitt bearings. Free catalog tells how to save half cost of hired help. Testimonials. 10,000 in use. All sizes in stock ready



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FLYING MACHINE

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Will fly by its own power over one hundred feet, in a circle or straight away. This wonderful toy was an original model, developed in the making of a successful man-carrying machine. Built on totally new scientific principles, and acknowledged by leading students in Aeronautics as the most wonderful invention of the age. Measures 14 inches across, 5 inches high, 6 inches long; weighs less than one ounce; will carry more than its own weight. Very durable, amusing and instructive to both young and old. Interest increases with every flight. If started upside down it will right itself and continue flying. Price \$1.00 at your dealers. If he cannot supply you we will send direct by express prepaid in the U. S. on receipt of \$1.00.



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and save money. Anyone can do it. No mechanical ability or experience required. I supply all material and teach you how to do the work.

THREE SIZES. The Acme Automatic Cooker boils, stews, roasts and bakes. Does better cooking and saves 80 per cent fuel and kitchen drudgery. It cooks the food, not the cook.

Make Fireless Cookers for sale. Good profits, big demand, easily sold. I give exclusive territory and assist you in selling the goods. Full particulars free. Write today.

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Rowboat \$20.00

20 different Designs

Can ship immediately in any quantity. Need No Boat-house. Never Leak, Rust, Check, Crack or Rot. Every boat has water tight compartment, so cannot sink. Write for FREE Illustrated Catalogue and Special Prices.

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A Genuine Edison Phonograph

On Absolutely **FREE TRIAL**

in your own home. No money down—No C. O. D. No obligations. Sold on easy payments as low as \$2.00 a month and at lowest cash prices. Return at our expense if you don't wish to keep it after free trial. Everyone should have our Free Catalog of genuine Edison Phonographs. Write for this great FREE catalog today. A postal will do. But write today.



F. K. BABSON, Edison Phonograph Distr., Suite 119Y Edison Block, Chicago

BEST HOT WATER RESIDENCE HEATING BOILER MADE

Guaranteed and sold direct to consumer

Capacity of Heater nearly doubled without additional fuel by use of **Center Pipe** carrying water up through the center of deep fire pot. Heats from all sides.

We want to sell you a heater. Write to-day.
PHILLIPS HEATING CO.
Dept. E, Aurora, Ill.



Made of Fragrant Southern Red Cedar, Our

COLONIAL CEDAR CHESTS

are ideal wedding or birthday gifts, and priceless family heirlooms. Absolutely moth, dust and damp proof, a perfect home storage for delicate furs and fabrics, costing less than one season's cold storage. Heavily bound with riveted copper bands, with roomy lock drawer; dull natural finish. Sold at low factory prices with privilege of free inspection.

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"I guess," said he, complacently, "there won't be any more folks asking if the Browns, Biddles, or the Hansons live in this house. I've fixed them."

"What have you done?" queried Mrs. Langworth.

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"And what did you print on it, my boy?"

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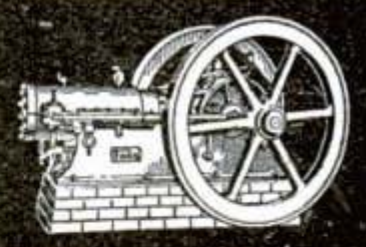
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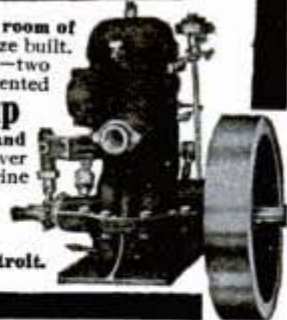
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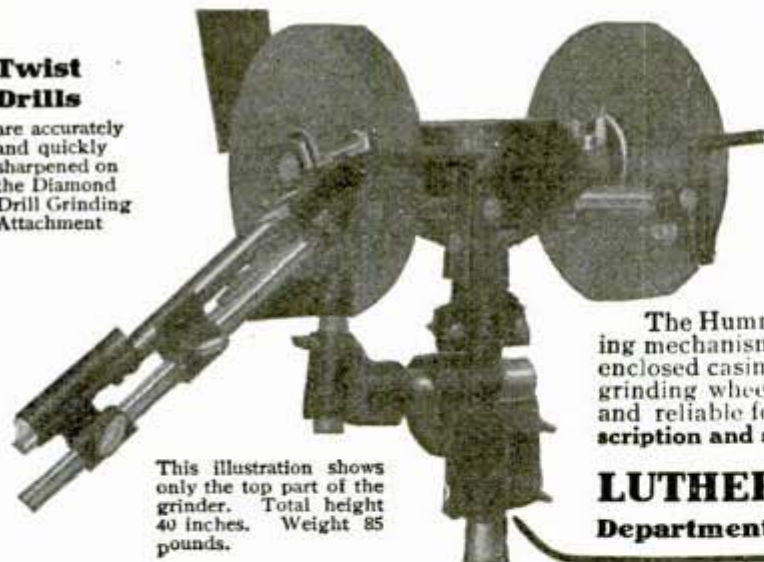
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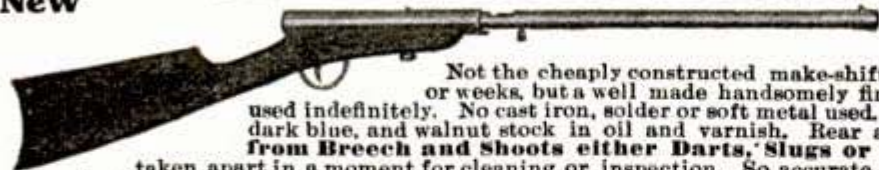


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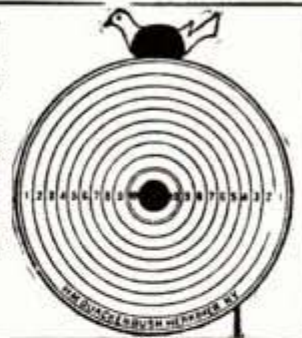
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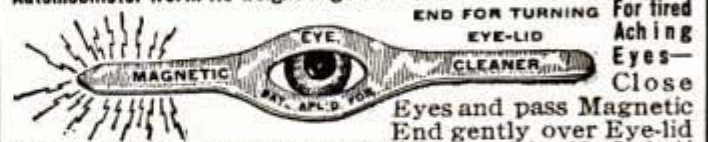
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