

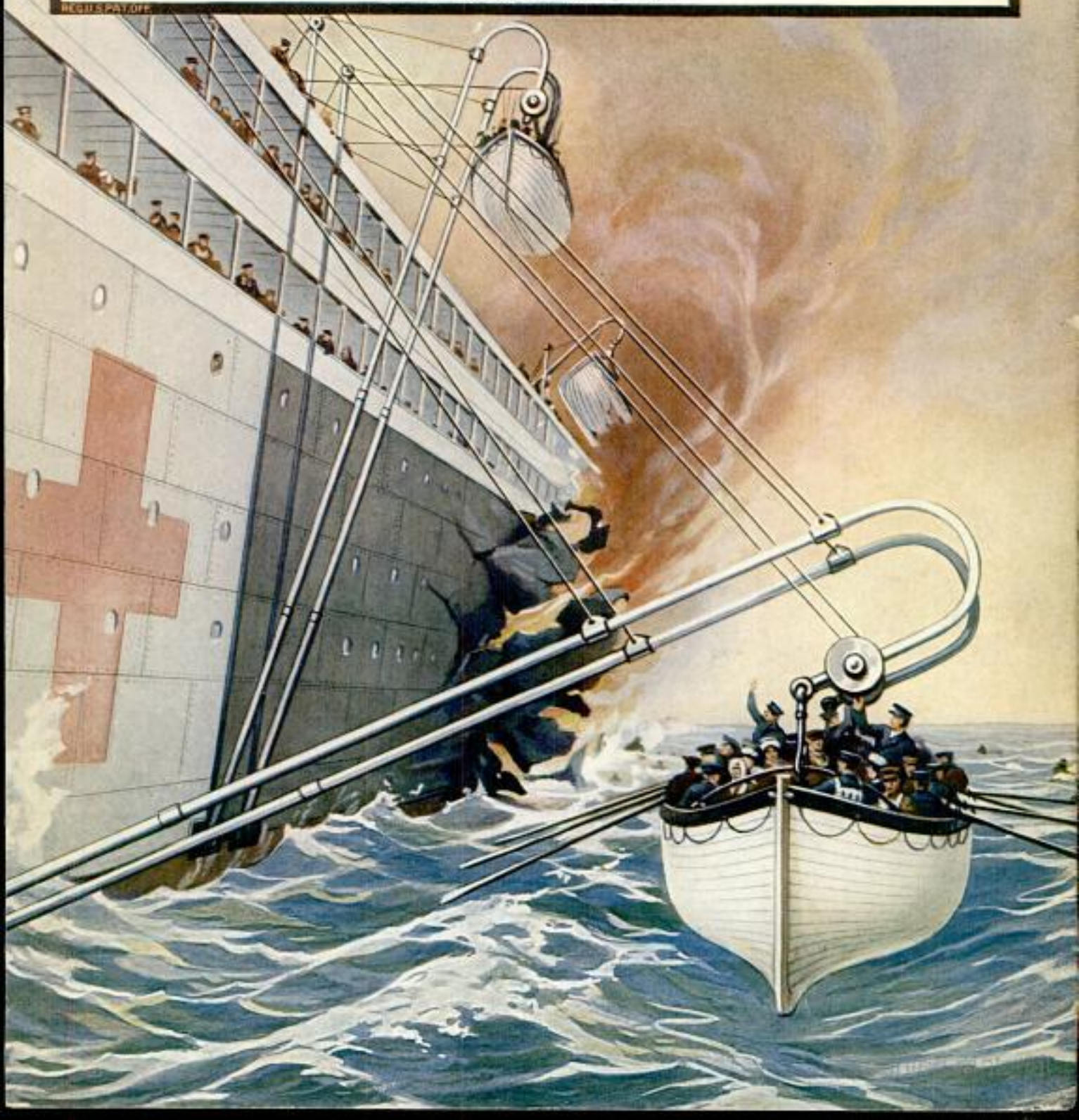
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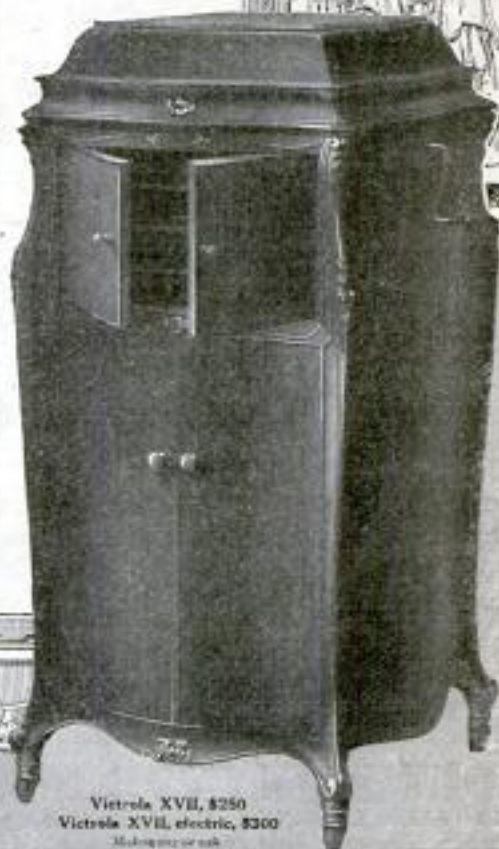
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6 N. Michigan Avenue, Chicago, U. S. A.

EDITED BY H. H. WINDSOR

England: The International News Co.
5 Beams Bldg., Chancery Lane, London, E. C.

Australia:
The Australasian News Co.

ISSUED MONTHLY

SUBSCRIPTION:

SINGLE COPY, 15 CENTS

In United States, and its possessions, Cuba and Mexico, per year, postpaid - - - \$1.50
To Canada - - - - - 1.75
To all other countries in the Postal Union - - - - - 2.50

All subscriptions are discontinued at expiration. Please examine the date printed on your wrapper.

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

Entered as Second Class Matter at the Post Office Department, Canada.

Published monthly by POPULAR MECHANICS CO.

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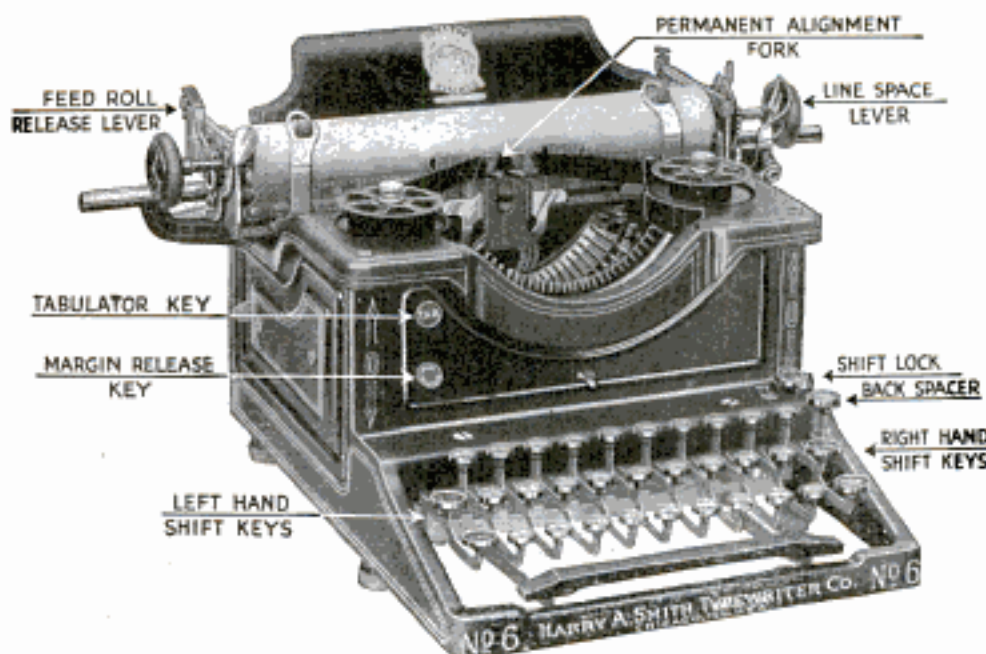
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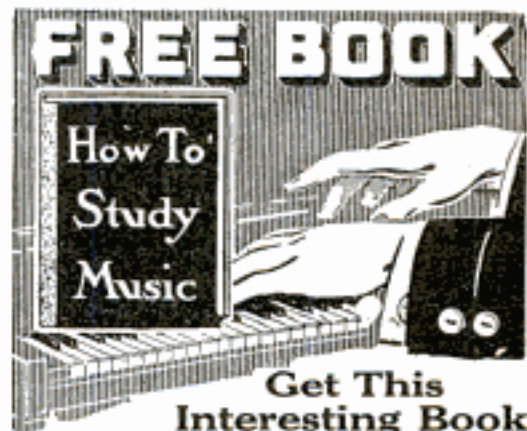
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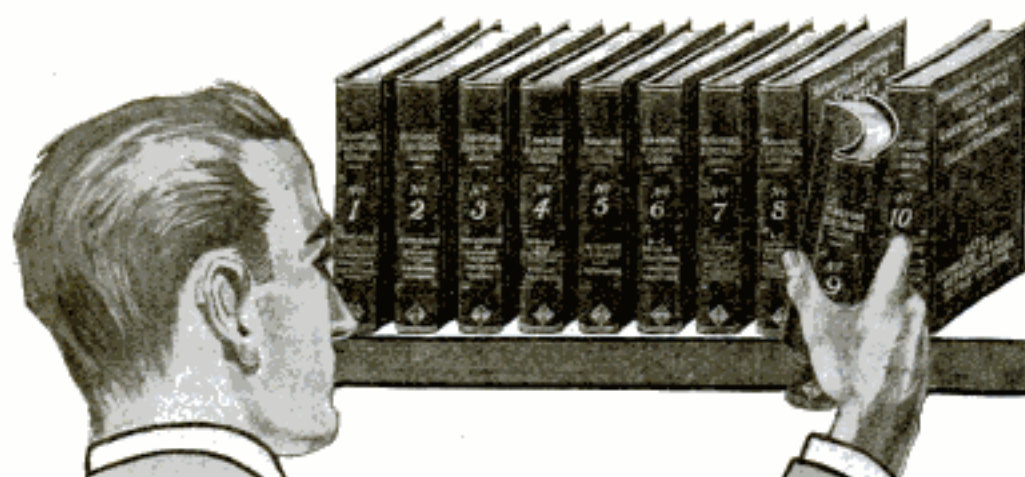
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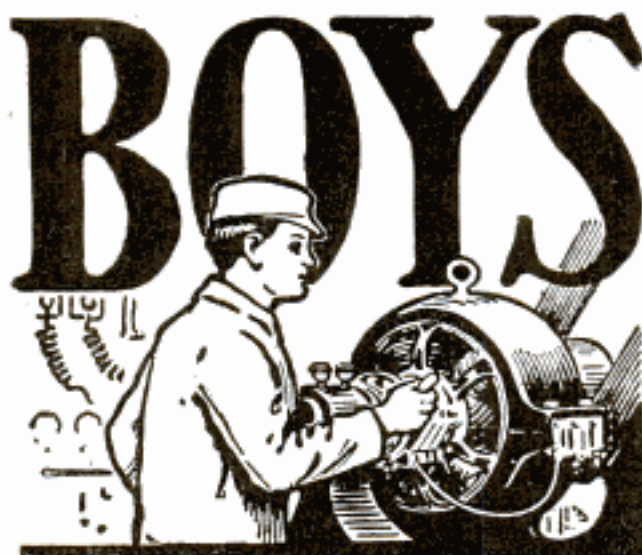
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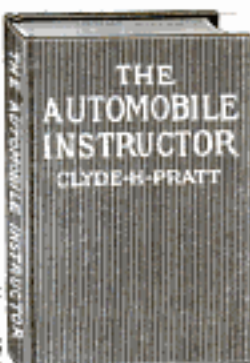
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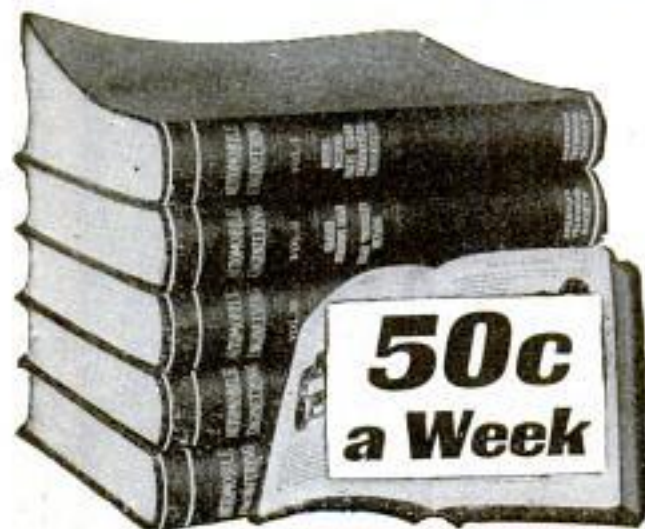
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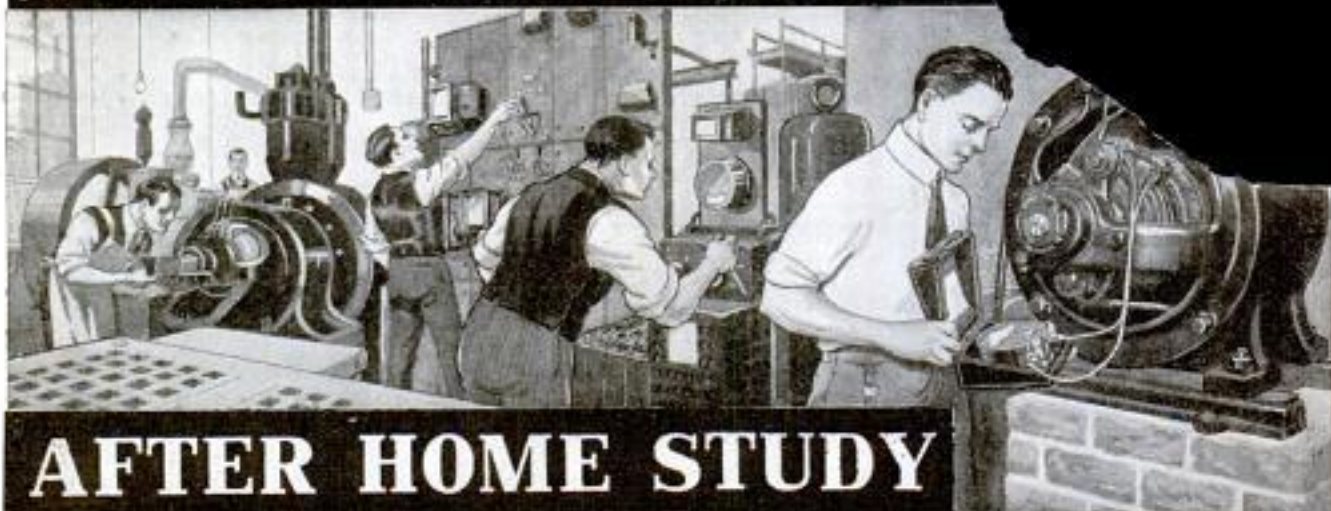
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LEARN the real estate business; our enlarged instruction book teaches listing, appraising, management, salesmanship, insurance, brokerage, advertising, renting, agency, estates, titles, rights, forms, etc.; revised edition; 240 indexed subjects; excels \$25 correspondence course; buckeye cover, \$1; alk cloth, \$1.25, postpaid. Realty Book Co., Dept. No. 25, Cleveland, Ohio.

SILVERING Mirrors—Recharging Dry Batteries—Gas Tonic—Orange-ade Powder—Straw Hat Cleaner—Luminous Paint. This valuable collection of formulas 25c. C. Johnson, 4319 N. Whipple St., Chicago.

STEADY income on the side. Manufacturing Carbo-Cide. Guaranteed successful gasoline interfilter-decarbonizer. Increases mileage, saves gasoline. Fibro-Vac, absolutely Perfect Automobile Puncture Plugger. Unlimited possibilities. Exclusive territory. Formulas supplied for those and twenty other automobile specialties. Particulars, stamp. Miller Analytical Chemist, Tampa, Florida.

BIG money in Home Town while learning. Success guaranteed. Experience unnecessary. Be first. P. D. Q. Sign System, Calgary, Alberta.

3,380 FORMULAS, Trade Secrets and moneymaking plans in "Encyclopedia Business Opportunities." 3 volumes. Worth \$5. Special offer \$1. Ideal Book Shop, 3315-K-7, Belleplaine Ave., Chicago.

MAIL-ORDER SUPPLIES

INCREASE your sales. Place your proposition before the readers of "Cartoons Magazine," 20,000 copies guaranteed every month. Classified rate 5c per word. Mail in a trial ad today. Cartoons Classified Dept., 78 E. Madison St., Chicago.

FOR ADVERTISERS

ADVERTISERS—Here's your opportunity. Your proposition placed before the readers of "Cartoons Magazine" for only 5c per word. Circulation 20,000 copies guaranteed. Send a trial ad for our next issue. Cartoons Classified Dept., 6 N. Michigan Ave., Chicago, Ill.

BUSINESS SERVICE

CLEVELAND, Ohio, office ten dollars yearly. Sixth City Service, Schofield Bldg.

INCORPORATE. Our lawyers do the work, saving you time, annoyance and money in incorporating under the most liberal laws in Arizona. Laws and forms free. Southwestern Securities & Investment Co., Box D488, Phoenix, Ariz.

COLLECTIONS

COLLECTIONS on commission. Beacon Collection Agency, Cedar St., N. Y.

DEBTS Collected Anywhere, Quickly! Established 25 years. William H. Dodd, 87 Nassau Street, New York.

AGENTS WANTED

LARGE Cleveland Million-Dollar Corporation will pay you \$20 to \$30 weekly for your spare time, or as high as \$100 weekly if you prefer to devote your entire time to representing a widely known and nationally advertised product in your community. Furthermore we will furnish you absolutely free a full and complete course in salesmanship. You do not have to pay one penny—you do not have to invest a single cent in our products. This course is the equal of any \$50 course in the country. Only one course given to each community. We are particularly desirous of securing inquiries from small towns having electricity. Write at once for full particulars. The Franitz Premier Company, World's Largest Makers of Electric Cleaners, Dept. 136, Cleveland, O.

TAILORING Agents Wanted—Big complete sample outfit and case, nearly 300 large cloth samples, 3 piece lists and everything needed for canvassing, or use in store, free to five agents. \$25.00 to \$40.00 a week; may make more. Write us today for free elegant outfit to begin, cloth samples, wholesale prices, special offer on a suit for yourself and full information—see our wonderful values, beautiful fabrics and styles. Established 28 years. Every garment made to measure—everything guaranteed and express prepaid. Just send a postal. American Woolen Mills Co., Dept. 114, Chicago.

AGENTS: Biggest moneymaker ever put on the market. "Eggette," the original egg substitute. Takes place of eggs in baking and cooking at less than ten cents per dozen. Sells rapidly to homes, stores, bakers, etc. A Guaranteed pure food product. Good opportunity to build permanent business with big income. No competition. Regular size package 10c, equal to 12 eggs. Attractive moneymaking proposition free. Write quick. Bestever Products Co., R-2 Douglas Park Station, Chicago, Ill.

AGENTS, stop looking for free automobiles. Make \$75 to \$100 weekly selling our guaranteed custom-made raincoats. We deliver and collect. 1917 outfit free. "Aero." Desk P, 175 E. B'way, New York.

AGENTS—Stamping names on Pocket Key Protectors; sample Check with your name and address, 12c. Stamping Outfits, Emblem Checks, Check Fobs, Name Plates, Hart Mfg. Co., Desk 2, 303 Degraw St., Brooklyn, N. Y.

Sign Letter Agents and Painters: 500% Profit Gold and Silver Sign Letters for Stores and Office Windows. Anyone can put on. Big demand. Free samples. Metallic Letter Co., 404 N. Clark St., Chicago.

HUGE profits selling Nibco Sanitary Brushes, Auto Washers, Brown Beauty Adjustable Floor Mops, Dustless Dusters, and other specialties. Big line. Fast sellers. Write today. Silver-Chamberlin Company, Department M, Clayton, New Jersey.

FREE sample with particulars. No splashing water strainers. Easy seller. Returns big. Experience unnecessary. Union Filters Co., New York.

AGENTS, Castrassers—100% profit selling Hartemex for the skin and complexion. The beautiful package makes first sales. The cream positively makes others. Exclusive territory. Sample free. Address J. F. Hartman, 67 Wordworth St., East Boston, Mass.

LUMINOUS Crucifix—Heatless Trouser Press: Toledo sold 60 Crucifixes in 10 days. Old Paducah, Paducah, Ky.

AGENTS—\$10 a day introducing wonderful new water filter for farm and city homes. Renders water pure and safe. Prevents typhoid and other diseases. Simple and easy to use. Low price, big profits. Write quick for territory and sample. Thomas Mfg. Co., 1702 North St., Dayton, Ohio.

OUR Representatives are getting rich with marvelous new household commodity. Free samples get over 100 orders daily. Big profits. Exclusive territory going fast. Join our successful organization of prosperous agents and send today for free samples and particulars. E. O. Andrews, Merrill Bldg., Milwaukee, Wis.

RARE Opportunity for State Representatives, General Agents and Agents. Latest Invention prevents hairpin loss. Sensation of 1917. Write quick. Loss Preventing Device Co., Gardena, Calif.

AGENTS—Our brand-new seller will get the money for you every time. Particulars free. Slevers & Frank Sales Co., Box 12, Chicago Heights, Ill.

MOTH Proof Garment Bags; High Grade Specialties. Money Makers. Utility Sales Co., Dayton, O.

MANUFACTURE a Necessity needed in every home. Big demand. Brand new. Particulars free. Mains, Box 22, Port Matilda, Pa.

AGENTS: Guaranteed Line; Big Repeater. 200% profit. Send 25c for Mailing Sample. Deel Mfg. Co., 932 N. LaSalle St., Chicago.

"MO-BE-CO" Agents make \$10 per day easily selling toilet preparations. Moen-Berg, Fosston, Minn.

MAN Wanted in each country community and every small town, to wear beautiful new tailored-to-order suit of clothes and be Agent in spare time among friends, relatives and neighbors. Confidential wholesale prices given, good profit on each order. No experience required, we teach you all you need to know. Write at once and get gorgeous, illustrated book of cloth samples free, and full instructions. Banner Tailoring Co., Dept. 605, Chicago.

STATE Representatives and Agents—We want men of known ability for best line of Cutlery offered for salesmen. Extremely liberal margins. Dept. P, Aerial Cutlery Manufacturing Company, Marinette, Wisconsin.

AGENTS! Sell Tiffany Quality Raincoats. Highest commission. Sample coat and outfit free. Write for particulars. Tiffany Raincoat Co., 1647 Heiden Ave., Chicago.

LARGE Manufacturer wants representatives to sell shirts, underwear, hosiery, dresses, waists, skirts, direct to homes. Write for free samples. Madison Mills, 503 Broadway, New York City.

GET into biggest money-making and automobile business—replacing necessary equipment. Live, ambitious men wanted as special factory representatives, exclusive territory, taking orders for tops, top covers, seat covers. "Stik-Tite" windows. No experience necessary. No capital required. No competition. Copyrighted system protects you. Free catalog, samples, full details. Cincinnati Auto Specialty Company, Dept. MC-77, Cincinnati, Ohio.

AGENTS make 500 per cent profit selling our Auto Monograms and Initials, Window Sign Letters, Changeable Signs, and Show Cards. 1,000 Varieties. Enormous Demand. Sullivan Co., 1123 Van Buren St., Chicago, Ill.

AGENTS: Big profits selling our New \$2.50 Automatic adding machine. Quick sales. Ten a day easy. No competition. Anyone having adding to do is positive customer. You'll be glad you wrote us. Bassett Company, 5921 Indiana Ave., Chicago.

AGENTS—Send for sample "Pretnot"—the wash day wonder. Be convinced you can do a whirlwind business. You can clear at least \$20 to \$100 weekly, according to spare or whole time. You don't have to talk; if she doesn't buy at sight, leave sample; she will be looking for you long before you are able to, make the rounds again. Samples furnished free. Premiums granted to agents who can produce. Credit given. Don't call. P. M. Motter & Sons, 3213 Warren Ave., Chicago.

AGENTS—To travel by automobile introducing our Big Line of fast summer sellers. The greatest line on earth. Make \$10 a day easy. Complete outfit and automobile furnished to workers. Write at once for exclusive territory. American Products Co., 8539 Third St., Cincinnati, O.

AGENTS—One man made 100 sales from 100 demonstrations to auto owners. 100% profit. You can, too. Details free. Dept. P. O. Box 286, Cincinnati, O.

AGENTS: Greatest money-making proposition out. Stopleak Seals Tire Punctures instantly. Increases life of tire and tube. Birks Supply House, 5214 Lake Park Avenue, Chicago, Ill.

PORTRAIT Agents, new and old, write us. We know what you want and need. Established 17 years. Pioneer, 1252 W. 63rd St., Chicago.

23% PROFIT—\$2.80 on each set sold. Newly invented Jubilee Spark Intensifier. Banishes spark-plug trouble forever. Sells on sight. Huge profits. Exclusive territory. Hurry! Jubilee Mfg. Co., Dept. M-8, Omaha, Neb.

WASHING Compound Agents—Ho-Loi-Hu-Na, Great Hawaiian Washing Secret (Improved)—Washday Wonder of the Age. Become District Sales Agent and make \$2,500 to \$5,000 a year. Cinch exclusive territory now. Get twice the money for your work. Opportunity is knocking. Adam Fisher Mfg. Co., Agency Dept., 2961, Ry. Exch. Bldg., St. Louis, Mo., U. S. A.

SAFETY paper cutter. Holds any razor blade. 400% profit. Sample 25c. Write E. P. Wilson Co., 828 Francisco St., Los Angeles, Calif.

AGENTS. New summer phonograph—the **Portophone.** Built into a carrying case. Ideal for automobiles, canoes, campers, etc. Wonderful tone. Low price. Big profits. Write for demonstrating sample. Orchestra Co., 1602 North St., Dayton, Ohio.

YOUR Name brings a copy of **Money Making Ideas.** The great 32-page agent's and mail dealer's magazine. A. Kraus, Kraus Bldg., Milwaukee, Wis.

AUTOMATIC Sash Lock—Newest home invention, now ready for agents. Locks either sash any position. Prevents burglary. permits ventilation; stops rattling. Sells on sight wherever people live. Big repeater. Handy, business-pulling demonstrator free. To prove it's the greatest agent's article we'll postpay 25c sample and "No-talking" sales plan for 10c. Try it—then you'll order a gross. Stonaker Co., 1410 Standard Theater, Cleveland.

NINETY Per Cent of Your Calls Turned into Sales! Wonderful Enthusiasm Follows Every Demonstration! Write at Once for Full Particulars of Our Line of **Eradium (Luminous) Articles.** Startling! Mysterious! Everlasting! Novel! They Shine in the Dark. Crucifixes, House Numbers, Bulbs, Match Boxes, Pictures, Switch Plates. Sole Manufacturers, The Pioneer Corporation, 1239 W. 63rd, Chicago.

AGENTS. We have a good proposition for you. Write for particulars and samples. Chicago Agency Co., 838 Altgeld St., Chicago.

AGENTS. Best seller yet. Every man a customer. Retail \$1. Write today. Curtis Co., Bement, Ill.

AGENTS. Sell patriotic felt novelties. Send stamp for full particulars. Schroeder, 770 Central St., Paul, Minn.

OLD Glory can be seen at night as in the day. Sell our beautiful ever-lasting luminous American flags. Good profits. Send 25c for sample. Luminous Flag Co., 1317 46 Street, Brooklyn, New York.

AGENTS—Big Hit. 6 Piece Aluminum cutlery set; new specialty delights housewives; good profits; 2 premiums clinch sales. Aluminum Cutlery Co., Div. 25, Sag Harbor, N. Y.

A \$2.50 PREMIUM with every \$1.98 sale and 70 cents profit for you means **Big Daily Profits.** Free Sample. Box 509, Shreveport, La.

LUMINOUS Paint! Shines in the dark. Big seller to hotels, garages, etc. Any article can be coated with splendid results, watches, clocks, electric switch plates, crucifixes, match boxes, etc. (Everlasting.) Only 25c a bottle. Luminous Paint Co., B-16 Douglas Park Station, Chicago, Ill.

"BE a Winner." Arnold made \$112 last week without investing a cent. Sell for large manufacturers finest to-order "Rex" raincoats and bathrobes. Sensational demand. We deliver and collect. American Mercantile Co., 31 W. 124th St., New York.

AGENTS for newly invented article, novel, useful. In demand among all classes everywhere. Fast seller, popular price, no competition, big profit. The Geo. W. Clark Co., Clark Building, Jacksonville, Fla.

AGENTS financially responsible who understand heating plants to sell **Blaske Fuel-Saving Devices** on monthly payment plan. Every heating plant a prospect. Guaranteed to save 20%. Evaporation tests at two universities average 25% saving. Wolf Fuel Saver Company, 14 East Jackson, Chicago.

MAN or Woman to travel for old-established firm. No canvassing; \$1,170 first year, payable weekly, pursuant to contract. Expenses advanced. G. E. Nichols, Philadelphia, Pa., Pepper Bldg.

YOU can be your own boss with our **Key Check** outfit. Good for \$5 a day stamping names on pocket key checks, fobs, etc. Sample check with your name and address, 15 cents. Pease Die Works, Dept. M., Winchester, N. H.

NO fortune, but a clean living. New household specialty. Carry in pocket. Write or enclose 10c for sample. Arco Sundry Co., 37 Liberty St., New York.

AGENTS: Stop Here—Dryola Chemical Dry Cleaner for all clothing, silks, feathers, furs, gray shoes, etc. sells to every woman after explaining merits. Five Dollars per hour profit. Write today for sample and particulars. Archart Chemical Co., Rosholt, So. Dak.

AGENTS—Handle Bonanza Sales Boards. Can be used for any purpose desired. Gordon Specialty Agency, Dept. B, 52 West Chippewa, Buffalo, N. Y.

GASOLINE Saver for Ford's: New Principle; Saves 20% Gasoline; increases power; reduces carbon. No moving parts. Put on with wrench in ten minutes. Price \$1.50. Guaranteed. 100% proposition to agents. The Little Cyclone Accessories Co., Dayton, Ohio.

AGENTS: 100% profit. Every railroad man wants one. Sample 7c. "Rhymes of the Rail," Box C-216, St. Paul, Minn.

NEW Patriotic War Atlas Free with my 1917 "Business Guide." Sells everywhere. Beginners clear \$7 daily. 50% commission. Outfit free. Prof. Nichols, Box P. M. 3, Naperville, Ill.

AGENTS: Write immediately for our proposition. Unlimited possibilities. Custe Lessire Cooker Co., 4191 LaCrosse Ave., Chicago, Ill.

AGENTS Wanted. To Handle Our **Free Hair and Fibre Broom** that Takes the Place of the High-Priced Corn Broom. Write for Protected Territory. 100% Profit. J. H. Hergensrather & son, 57 E. 43d St., Chicago.

RELIABLE People Wanted to Place Our **Orangeade Powder** in stores and appoint agents. Makes the most delicious drink you ever tasted by just adding cold water and sugar. Enough for 10 glasses and particulars 10c postpaid. Chas. A. Morrissey Co., 4417 Madison St., Chicago, Ill.

INVENT Something; Your ideas may bring wealth; free book tells what to invent and how to obtain a patent, through our credit system. Talbert & Parker, 4663 Talbert Bldg., Washington, D. C.

GAS Fire in any cook stove from common coal oil. Agents coin money. Wonder Burner Company, Columbus, Ohio.

AGENTS, \$50 a week. Will show you how. Genuine Gold Leaf Window Letters. Chicago Agency Co., 842 Altgeld St., Chicago.

MERCHANTS Buy at Sight. New changeable letter sign for window advertising. Large metal sign with 270 letters. Sells \$1.50. 500% profit. Greatest seller ever invented. Write for proposition. Changeable Sign Co., E. 162, Cleveland.

AGENTS: Automatic Automobile Signal just patented; enormous seller; big profits. Territory reserved. Write: Jordan, 1920 9th St., Washington, D. C.

EXCLUSIVE county rights. Sell Tankli; modern auto fuel. Profitable. Tankli Chemical Co., Cleveland, Ohio.

MARVELOUS Expanding Cuff Buttons. Presto, slip your cuffs up on forearm without unbuttoning same. Cuffs positively stay where placed. Lowered they close automatically. A real convenience and laundry saver. Wanted—High-grade agents to sell direct, as well as side-line salesmen to sell to the trade. We also have fifty popular-priced canvassing agents' specialties. Flexo Mfg. Corporation, Sheboygan, Wisconsin.

\$61.50 WEEKLY. Introducing and selling a new gas light burner for kerosene lamps. Beautiful light. No chimney. No mantle. Samples free. Lusher Manufacturing Co., Dept. 312, Cincinnati, Ohio.

SELLS like hot cakes. Brand new ironing wax. Perfumes clothes with lasting violet perfume. Working outfit 5c. Perfume Gloss, 13 Water St., New York.

DECALCOMANIA Transfer Initials and Flags: You apply them on automobile while they wait; cost 2c each; profit \$1.38 on \$1.50 job; free particulars. Auto Monogram Supply Co., Dept. 1, Niagara Bldg., Newark, N. J.

GOOD income refinishing chandeliers, brass beds, automobiles by new method, producing amazing results; no capital or experience necessary; particulars free. Gunmetal Co., Ave. H, Decatur, Ill.

"WASHWHITE" makes easy sales. Big profit. Sure repeat business. Genuine Rogers Siltorsare free to your customers, and valuable Premiums for you. Free printed matter and Sales Course. Free samples with every order. Cleans clothes without rubbing, and without injury to the finest fabric. 7 big washings for 15 cents. Sales Guaranteed. Write for Our Offer. The Nacma Co., Dept. L-7 20 W. Lake St., Chicago.

AGENTS—Handle perfection floor oiler; for oiling any kind of floor. Write Perfection Oiler Co., 620 K. of P. Bldg., Indianapolis, Ind.

AGENTS: 50 Calling Cards 10c. F. Shepard, Rome, N. Y.

RUSH postal for Free Sample "Spik & Span." Wonderful new washing tablet. Washes clothes spotless, without rubbing. Tremendous seller. 200% profit. Free Samples to boost sales. Newbury Co., 212 Peoria, Chicago, Ill.

MAKE and Sell Your Own Goods. Machinery unnecessary. Expert Chemist's advice. Special attention to beginners. Formula catalog for stamp. Blake, Mystic Company, Washington, D. C.

SELL. Guaranteed made-to-measure raincoats. Agent's price \$2.50 delivered. Make \$75 weekly. Outfit free. Standard Raincoat Co., 393 Broadway, New York.

AGENTS: You can make big money taking orders for our fine made-to-measure clothes, so write quick for 60 beautiful cloth samples, 32 smart styles in rich colors, wholesale and retail price lists, lowest prices and best offer to agents. \$5.00 to \$10.00 a day easy. Big outfit, over 250 samples free to live wires. No experience needed—no capital. We furnish everything free—pay postage or express charges—back you, boost you, show you how and clearly explain everything. Costs nothing to try. Let us make you a stylish suit to measure to prove our fine quality and style. Send postal or letter today. Paragon Tailoring Co., Dept. 714, Chicago.

PHOTO Pillow Tops, Portraits, Frames, Sheet Pictures, Photo Plates, Pennants. Rejects credited. Prompt shipments; samples and catalogues free to agents; 30-days' credit. Jas. C. Bailey Co., Desk P, Chicago.

OUR New Pocket Check Protector does work of \$25 machine. Sells for 50c. Big profits. All writers of checks ready customers. 50c brings sample and full particulars. Gray Mfg. Co., 300½ Main, Fort Worth, Texas.

WANTED. General Agent to represent us in your locality. Exclusive territory. Big inducements. Chicago Agency Co., 840 Altgeld St., Chicago.

"1916's SENSATION!" Eleven piece toilet article set selling like blazes at \$1.00 with \$1.00 carrying set Free! Enormous profits! Tremendous hit! Engle made \$31.00 first week. Write quick! Pierce Co., Dept. P, 906 Lake St., Chicago.

SOFT Drinks in Powder. Just add water—delicious, refreshing, healthful. Everyone buys—big profits. Enough for 10 glasses Orangeade and particulars 10c postpaid. Chas. S. Morrissey Co., 4417 Madison St., Chicago, Ill.

INSULATED Tyres, inner armor for Automobile tires, double mileage and prevent punctures and blowouts. Quickly applied. Cost little. Demand tremendous. Profits unlimited. Details free. American Automobile Accessories Co., Dept. P, Cincinnati, O.

BIG Profits for You! Manufacture Barley Crisp. New Confection. 5c package costs you 1c. Machine instructions complete \$7.50 prepaid. Send 10c for samples. Barley Crisp Co., 1295 Broadway, San Francisco.

GET Davis' Latest Proposition. \$15.00 daily a pinch. No matter how many times you have answered my ads in last 20 years, write again. E. M. Davis, Dept. 506, 903 Lake, Chicago.

MEDALLIONS—300% profits. Make up your own goods and be independent. Catalogue free. Resag Co., 1235 Randolph St., Chicago.

AGENTS—Our gold window letter proposition beats 'em all. Stairbrite Co., Dept. P, 1115 Second Ave., N. Y. Established 1905.

AGENTS make 500% profit handling Auto Monograms. Patriotic Pictures, Flag Novelties, Window Letters and Changeable Signs. Catalog free. Hinton Co., 6142 40th Court, Chicago, Ill.

AGENTS: Big Hit: Our 5-Piece Aluminum Set is all the rage. Cheaper than Enamel Ware. Sells like wildfire. Guaranteed 20 years. Retail value \$5.00. You sell to housewives for only \$1.98. Biggest seller of the age. 9 sure sales out of every 10 shown. Others cleaning up \$10.00 to \$20.00 a day. Answer this quick to secure your territory. Div. GG7, American Aluminum Mfg. Co., Lemont, Ill.

SNYDER'S Toilet Preparations and Household necessities are big values; big profit makers; sell themselves; Start making money immediately. T. H. Snyder & Co., Dept. M., Cincinnati, O.

RELIABLE People Wanted—Place Engine in stores and appoint agents. Takes place of eggs in baking and cooking at 9c doz. Large package and particulars 10c post-paid. Morrissey Company, 4403-5 Madison, Chicago.

WHO wants to make more money selling brushes that every household needs? Special method of getting entrance to demonstrate. Fuller Sanitary Brushes are nationally advertised—largest output—best terms and prices—western distributing stations. Your territory is valuable. Write, Fuller Brush Company, Hartford, Conn.; Hook Island, Ill.

THEY sell themselves; big profits. Wire Products Co., Scranton, Pa.

AGENTS: \$30 to \$100 a week. Free samples. Gold sign letters for Stores and Office Windows. Anyone can do it. Liberal offer to general agents. Metallic Letter Co., 407 N. Clark, Chicago.

EXCEPTIONAL opportunity selling Sanitary Brushes. Large profits, no permanent capital required. Every home a customer. Special selling help for agents. Proposition free. Sample ten cents. Puritan Sales Company, Dept. M, 1366 Broadway, N. Y.

DISCOVERED! Extraordinary New Proposition. Supreme Opportunity. \$200 per week Easy, demonstrating marvelous Adding Machine. Retail \$7.50. Work equals \$300 machine. Subtracts, Multiplies, Divides, automatically. Whirlwind in speed. Guaranteed Five Years. Used by U. S. Government. Sells everywhere. Amazing profits. Write quick for exclusive territory. Calculator Corp., Dept. PM, Grand Rapids, Mich.

\$50 WEEKLY and up selling Mexican Diamonds. Exactly resemble genuine; Same Rainbow Fire; Stand tests; sell at sight; Repeat orders. Write quick for Sample Case offer free. Mexican Diamond Importing Co., S. W. Las Cruces, New Mexico.

AGENTS. Make Big Money; fast office seller; particulars and samples free. One Dip Pen Co., Dept. 2, Baltimore, Md.

EXCLUSIVE selling rights given for our Wonderful Triples Folding handbag and other sellers. None sold in Stores. Write for terms and catalogue. Diamond Bros., 35 West 21st Street, New York.

CALIFORNIA Flower Bead Necklaces beat anything for quick sales and profits. Absolutely new. Write for agent's proposition. Mission, 2819 PM, West Pico, Los Angeles, Calif.

"GOLDINE" Sign Letters—1,000% profit. Particulars free. Johnston Co., Quincy, Ill.

MARRIED Salesmen and Agents—Wives to demonstrate in dept. stores, on salary. Easy sales to jobbers, dealers, consumers. All or part time, or side line. Appoint sub-agents. Silveron, the Silver-plating polish—needed in every home, hotel, restaurant, and garage. Guaranteed to Deposit Pure Silver. Write for proposition and sample. Exclusive territories open. Silveron, 157 Cedar St., N. Y.

AGENTS—Ho-Ro-Co Skin Soap and Toilet Goods plan beats everything for agents' profits. "Ho-Ro-Co." 112 Locust St., St. Louis, Mo.

WANTED—New Ideas. Write for list of Patent Buyers and Inventions Wanted. \$1,000,000 in prizes offered for inventions. Our Four Books sent free upon request. Victor J. Evans & Co., 163 Ninth, Washington, D. C.

AGENTS Wanted: Sell Polishing Cloths, Rust Remover, Food Flavors, etc. 130 household necessities, guaranteed line, big profits, quick repeater, permanent business. Stuart & Co., 18 Main St., Newark, N. Y.

\$1,000 PER Man per county. Strange invention startles world—agents amazed. Ten inexperienced men divide \$40,000. Korstad, a farmer, did \$2,200 in 14 days. Schleichler, a minister, \$195 in first 12 hours. \$1,200 cold cash made, paid, banked by Stoneman in 30 days; \$15,000 to date. A hot or cold running water bath equipment for any home at only \$6.50. Self-heating. No plumbing or waterworks required. Investigate. Exclusive sale. Credit given. Send no money. Write letter or postal today. Allen Mfg. Co., 311 Allen Bldg., Toledo, Ohio.

EASY, pleasant work for Mechanics, Shop Men, Clerks, during spare hours, will add many dollars to their salaries. Also want persons who can give full time. Big wages assured. Novelty Cutlery Co., 67 Bar St., Canton, Ohio.

AGENTS, 500% Profit. Sign-Letters for office and store fronts. Samples and particulars free. Inter-States Letter, 2424 N. Halsted St., Chicago.

AGENTS sell Reliable Custom-Made Raincoats and Gabardines. Big commission. Complete sample line free. Temple Raincoat Company, Templeton, Mass.

PORTRAIT Agents: Our goods will make you big profits. Delivery guaranteed. Refunds credited. Prompt shipments. Send for latest catalogue and prices. Adam J. Kroll & Co., 602 Blue Island Ave., Chicago, Ill.

WAR! Go if you must—but first start a manufacturing business for the home folks. Big income assured and easy with Miller's Guaranteed Formulas for manufacturing biggest advertised selling specialties: Wizard Washing Tablets—no wax, lime lye. Egg-O-Lene, pure food egg substitute. Tube Flavors. Putnam's Dry Cleaner. Zeeru-Salz, preserves eggs indefinitely (powdered). Carbo-Cide, automobile decarb nizer—increases mileage, saves gasoline. Fibro-Vac, wonderful tire puncture plugger—exclusive territory being rapidly taken. Latest money making propositions. Lists, information, stamp. Lise M. Miller, Chemist, Tampa, Florida.

SAMPLE—5c for 15c water filter; be first; catalogue free. Suvio, 606 East 161st St., New York.

"QUICKSELLERS"—Self-threading needles, assorted sizes 10c, three packages 25c; skeleton key, opens doors 10c, ten all different 50c, twenty, including premium \$1.00; unbreakable "Brightlight" inverted gas mantle 15c, two 25c. Ernest Benninghofen, Anderson, Indiana.

DANDELIONS destroyed easily, grass uninjured. Wonderful seller wherever there is a lawn. Exclusive territory to good agents, large profits. Nebraska Chemical Co., Dept. G, Benson, Nebraska.

AGENTS are making \$5 to \$10 daily selling our illustrated novelty shoe cards. Mornings, 23 1/2 Ave. 81., New York.

OUR line of sanitary brushes, mops and dusters is a winner. So is our proposition. Rich territory waiting. Agents wanted now. Sanford Brush Co., 544 W. Lake St., Chicago.

POWER tire pumps for Fords. Retail for \$5.50. Agents wanted everywhere. Big profits. Write for particulars. Universal Auto Specialty Co., Bates and Atwater Sts., Detroit, Mich.

SALESMEN WANTED

SALES Agents for widely advertised electric lighting outfit for farms and country homes. Exclusive territory to right man with automobile. No other capital needed. Fidelity bond required. Address the Western Electric Company, 195 Broadway, New York City, or 509 South Clinton St., Chicago, Ill.

SALESMAN Wanted—A dandy side line for salesmen calling on Auto Supply Jobbers, Dealers, Garages. Samples free; pocket size. Send for particulars. King Manufacturing Company, Brookline Mass.

NEW York Auto Specialty Manufacturers seeking agencies complete line selling accessories, want salesmen to handle city, county, state agencies. Gorman Company, 47 W. 42nd St., New York.

\$60.00 OR more can be made weekly selling staple moderate priced line to the general trade. Experienced salesman preferred; permanent position. Unusual opening now. Continental Jewelry Co., 351 Continental Bldg., Cleveland, O.

BIG opportunity for travelling salesmen for side line to establish agencies for a fuel-saving device. University tests show 25% saving. Commission basis. Wolff Fuel Saver Co., Lytton Bldg., Chicago.

WANTED—Salesmen \$25 to \$40 weekly. Clothing, tailoring, or retail experience or men who have taken orders for made to measure suits or raincoats. Take charge of agency to be placed in each county—No investment—new proposition—profitable, permanent. P. M. Nelson, 241 W. Van Buren, Chicago.

WANTED—Salesmen everywhere. 3,500 mile factory guaranteed tire. Large commission for exclusive territory. Opportunity. References. W. & G. Tire Co., Flatiron Building, New York.

WANTED—Representatives everywhere. Exclusive territory. Gold sign letters for stores and office windows. Any one can put on. Write today for free sample. Metallic Letter Co., 403 N. Clark St., Chicago.

EARN \$5,000 to \$20,000 yearly. New business necessity. Retail \$5 to \$20, 100-200% profit. Purchaser satisfied or money refunded. No competition. Exclusive territory. Free samples. Sayers, 408 Wainright, St. Louis.

SALESMEN—Acquainted with grocery trade. Large demand; liberal commission; pocket sample. Wirth Salesbook Co., Dept. P., Chicago.

SALESMEN—Get our plan for Monogramming Automobiles and motorcycles by transfer methods. Very large profits. Motorists' Accessories Co., Mansfield, O.

HELP WANTED

SALES Manager—Big manufacturer desires to connect with a live wire Sales Manager to handle on a big commission basis several splendid lines of automobile accessories. Will grant good territory to right man who can produce results. Address Wallace C. Hood Service Bureau, 1199 Woodward Avenue, Detroit, Mich.

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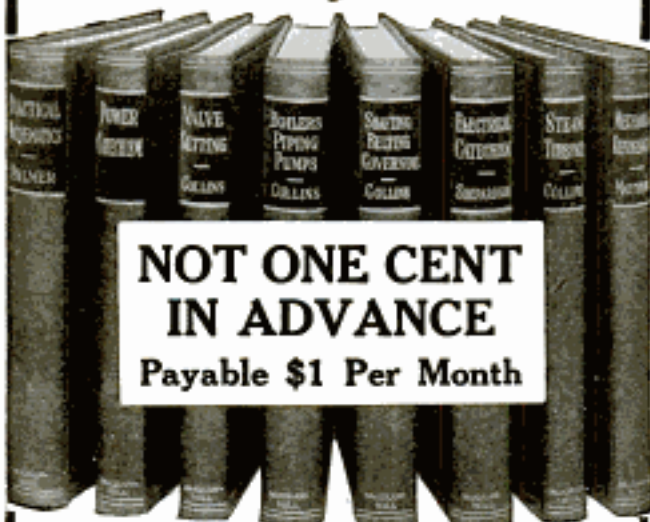
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| <input type="checkbox"/> Marine Engineer | <input type="checkbox"/> Common School Subjects |
| <input type="checkbox"/> ARCHITECT | <input type="checkbox"/> CIVIL SERVICE |
| <input type="checkbox"/> Contractor and Builder | <input type="checkbox"/> Railway Mail Clerk |
| <input type="checkbox"/> Architectural Draftsman | <input type="checkbox"/> AGRICULTURE |
| <input type="checkbox"/> Concrete Builder | <input type="checkbox"/> Textile Overseer or Supt. |
| <input type="checkbox"/> Structural Engineer | <input type="checkbox"/> Navigator |
| <input type="checkbox"/> PLUMBING AND HEATING | <input type="checkbox"/> Poultry Raising |
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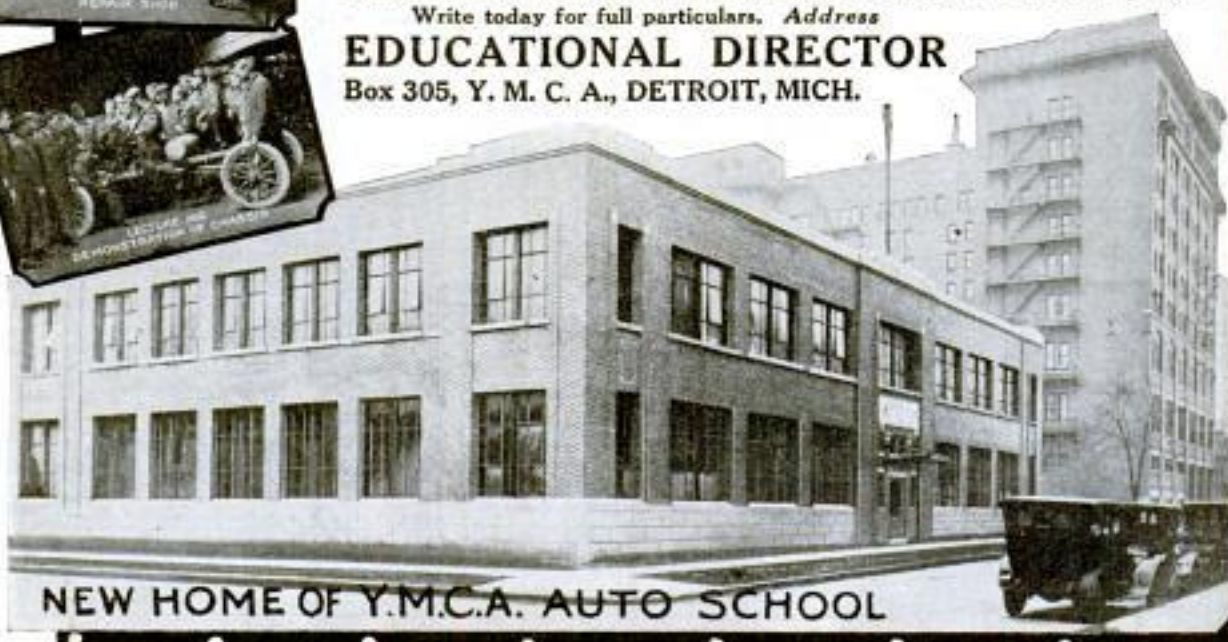
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| <input type="checkbox"/> Telephone Work | <input type="checkbox"/> Railroad Trainman |
| <input type="checkbox"/> MECHANICAL ENGINEER | <input type="checkbox"/> ILLUSTRATING |
| <input type="checkbox"/> Mechanical Draftsman | <input type="checkbox"/> Cartooning |
| <input type="checkbox"/> Machine Shop Practice | <input type="checkbox"/> BOOKKEEPER |
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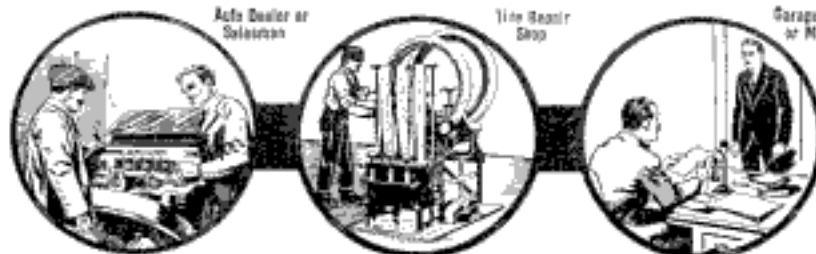
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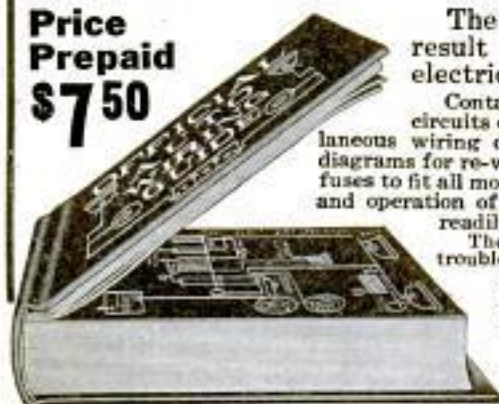
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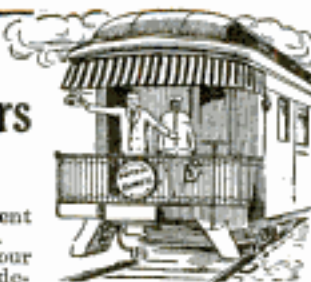
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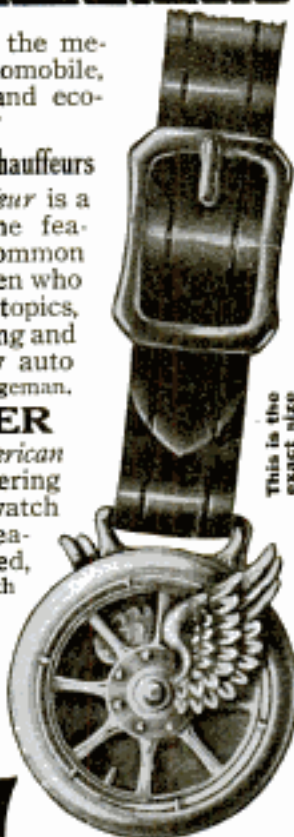
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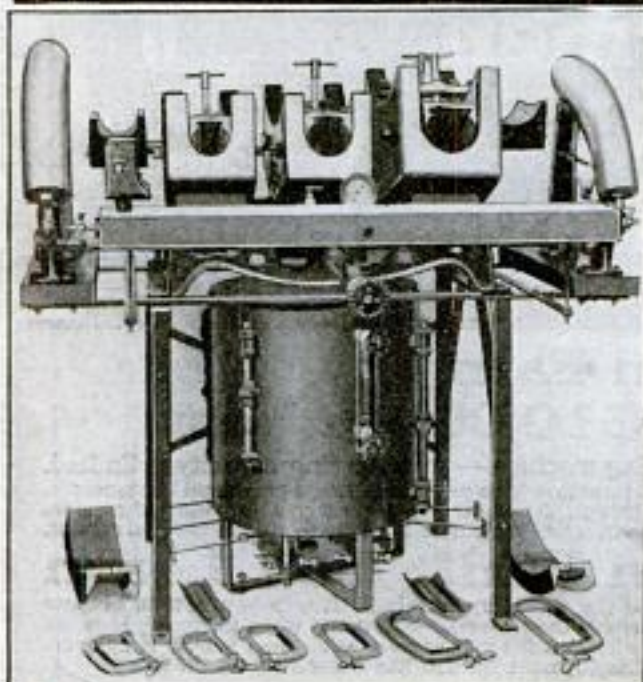
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| <input type="checkbox"/> Electric Wiring | <input type="checkbox"/> Show Card Writer |
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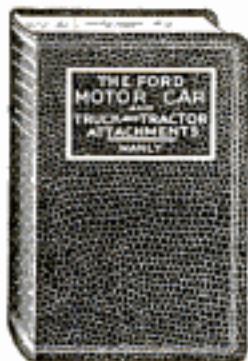
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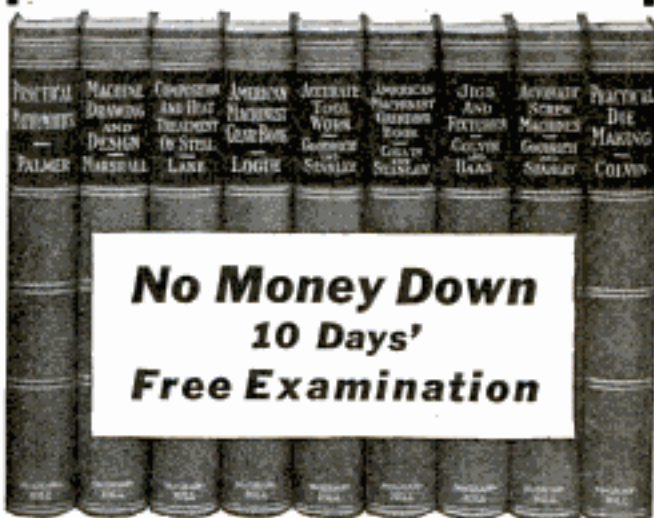
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Serve Your Country Where

The Heart of Our President's Proclamation:

"The Nation needs all men; but it needs each man, not in the field that will most please him, but in the endeavor that will best serve the common good.

"Thus, though a sharpshooter pleases to operate a triphammer for the forging of great guns, and an expert machinist desires to march with the flag, the Nation is being served only when the sharpshooter marches and the machinist remains at his levers.

"The whole Nation must be a team in which each man shall play the part for which he is best fitted. To this end Congress has provided that the Nation shall be organized for war by selection and that each man shall be classified for service in the place to which it shall best serve the general good to call him.

"The significance of this cannot be overstated. It is a new thing in our history and a landmark in our progress. It is a new manner of accepting and vitalizing our duty to give ourselves with thoughtful devotion to the common purpose of us all.

"It is in no sense a conscription of the unwilling; it is, rather, selection from a Nation which has volunteered in mass. It is no more a choosing of those who shall march with the colors than it is a selection of those who shall serve an equally necessary and devoted purpose in the industries that lie behind the battle line."

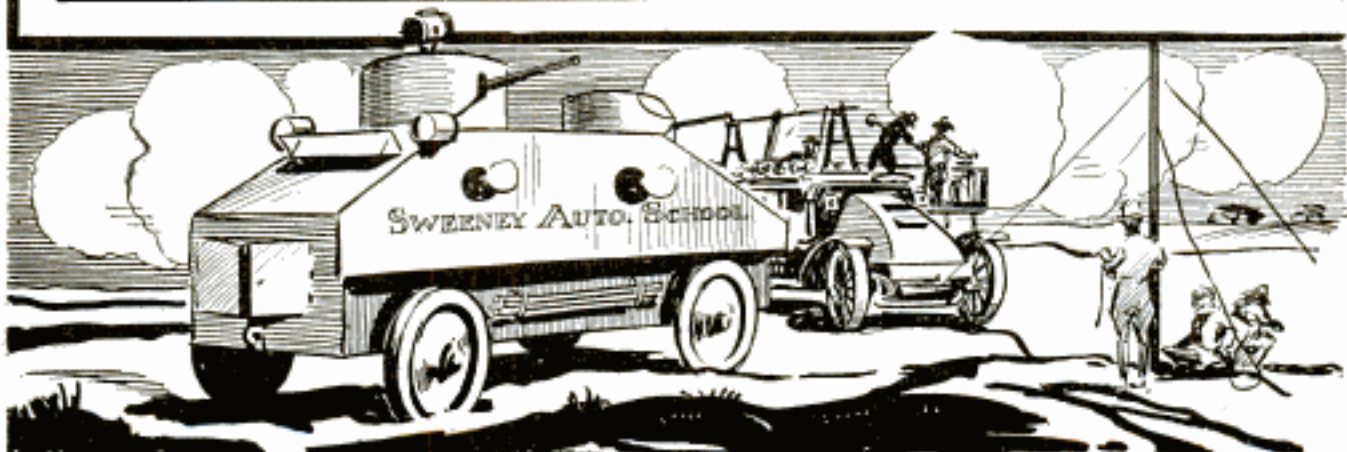
Our Nation Needs All Men, but in the Capacities They Are Best Fitted or Trained to Fill!

You want to show your loyalty, but how can you best do it?

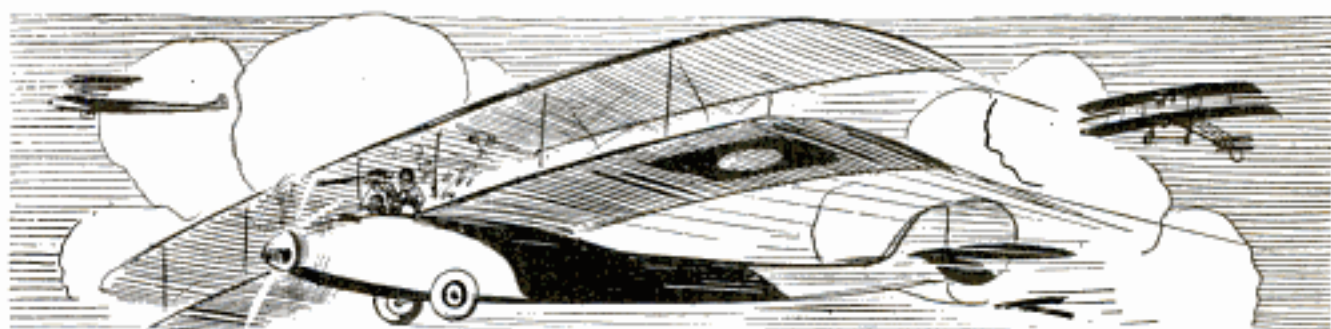
MECHANICS NEEDED AS MUCH AS SOLDIERS

Mechanics are needed as much as soldiers. We must have truck and ambulance drivers to go to the front with our army. To equip an army of 1,000,000 men, we will need 35,000 trucks and 75,000 trained drivers and repair men. Our navy needs mechanics in the shipyards and machine shops. Our aeroplane factories must have mechanics to make and assemble the motors used in these machines. Our munitions plants need mechanics to make shells and guns, and the greatest need of all is for mechanics in our home industries to take the places of those that prefer active service. Our automobiles and tractors must be sold and repaired, and we will need mechanics and garage men at home to do this.

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You Can Serve It Best.

It is not the desire of the Government to put a mechanic in the trenches or the man with no trade or training in our machine shops or on our farms. Every man to his place.

The significance of this part of our President's proclamation should appeal to all men. Every man must do his duty, not only the man of military age, but those over or under the conscription age.

TRACTOR OPERATORS IN BIG DEMAND

The man that can go on our farms and operate our tractors is doing his duty just as much as the man carrying a gun, and our Government has recognized this fact. Selective conscription means taking men that will least disturb normal conditions to carry the guns and put in the trenches. If you are a mechanic, you will be called to fill a mechanic's place, not a soldier's.

LEARN TO DO THINGS UNTRAINED MEN CAN'T DO

It is not a question of loyalty or bravery if you prefer to serve your country other than as a soldier. Get the training that will enable you to do something that the untrained man can't. **THE SWEENEY AUTOMOBILE AND TRACTOR SCHOOL** can train you in a short time to fill the place where your services will prove of real value to your country. If you are mechanically inclined, come here and get the training that fits your inclinations. Then you will make good.

GET INTO THE RIGHT JOB

Remember, selective conscription means fitting the man to the place, not the place to the man. A misfit always gets the worst of it. If you are in the wrong job, get out of it and into one that fits you.

Thousands of our automobile and tractor mechanics are going to war. Let the **SWEENEY SCHOOL** train you to fill their places at home. Somebody will have to. It might as well be you.

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Write today for my catalog; better still, wire me you are coming. Your country needs mechanics. Be one.

E. J. SWEENEY, President

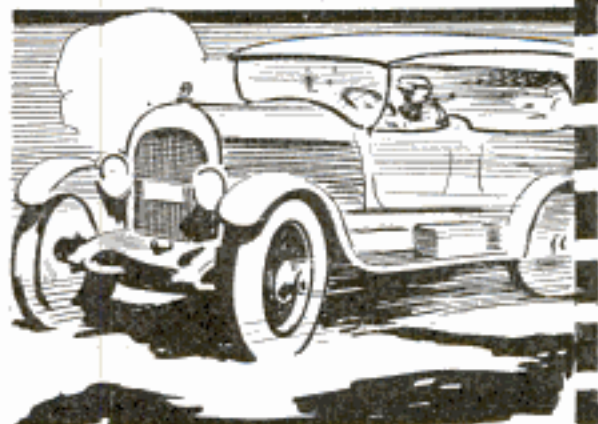
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Vol. 28

JULY, 19 17

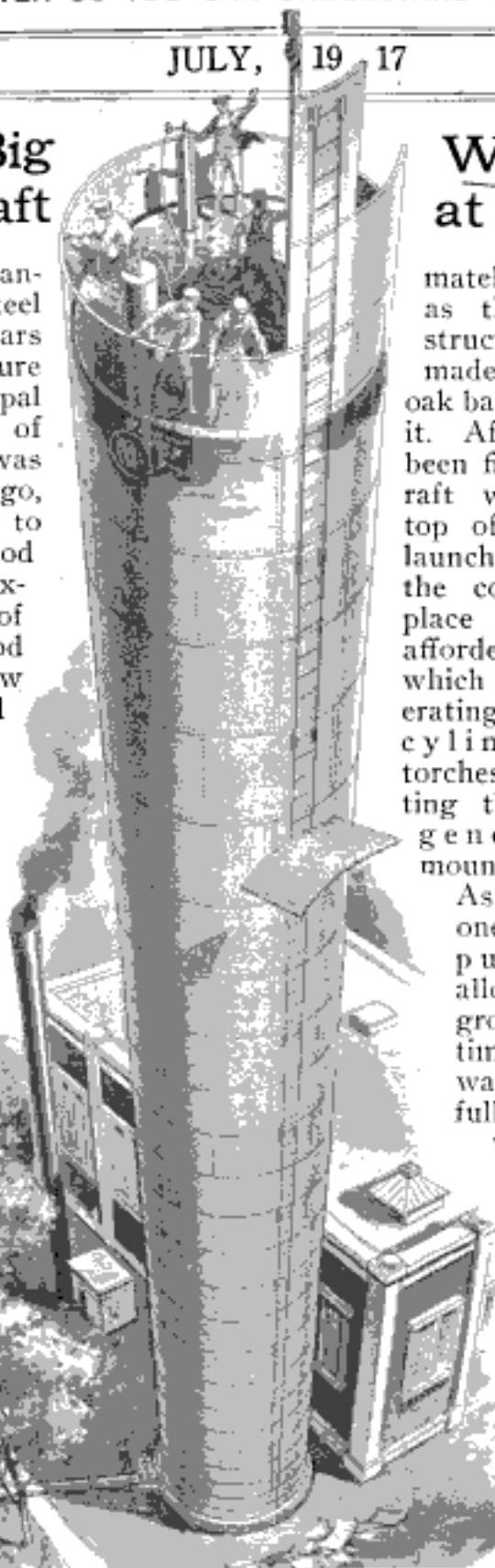
No. 1

Wrecking a Big from a Raft

WHEN the dismantling of a large steel standpipe, that for years had served as a pressure reservoir for the municipal water system in one of Chicago's suburbs, was undertaken some time ago, it was found necessary to adopt an unusual method of attack. The tank extended to an elevation of about 120 feet and stood within two yards of a new pumping plant that had been completed only a short time. Partly on account of the close proximity of the building, it was considered impracticable to fell the pipe by loosening it at the base and pulling it over with the aid of tackle. Therefore another, and more interesting, plan was instituted.

A circular platform of approxi-

Workmen Carried
on a Floating
Platform While
Cutting Down a
Steel Standpipe
with Oxyacety-
lene Torches



Water Tower at Its Top

mately the same diameter as the tank, was constructed and provision made for attaching four oak barrels to the bottom of it. After the standpipe had been filled with water, the raft was hoisted to the top of the structure and launched on the surface of the column. With it in place the workmen were afforded a platform on which to stand while operating inside of the steel cylinder. Oxyacetylene torches were used in cutting the metal, and two generating outfits mounted on the platform.

As the plates were cut, one by one, they were pushed outward and allowed to fall to the ground below. At all times the column of water had to be carefully regulated so that the raft would not float too near the top of the tank as the plates were removed. This was successfully accomplished by opening a cock in the drain pipe at the bottom of

Newsdealers will have the August issue of Popular Mechanics Magazine on sale July 20th.

the tank and discharging proportionate volumes of water as each of the sections was removed. Thus the platform dropped four or five feet at a time as the wrecking progressed.

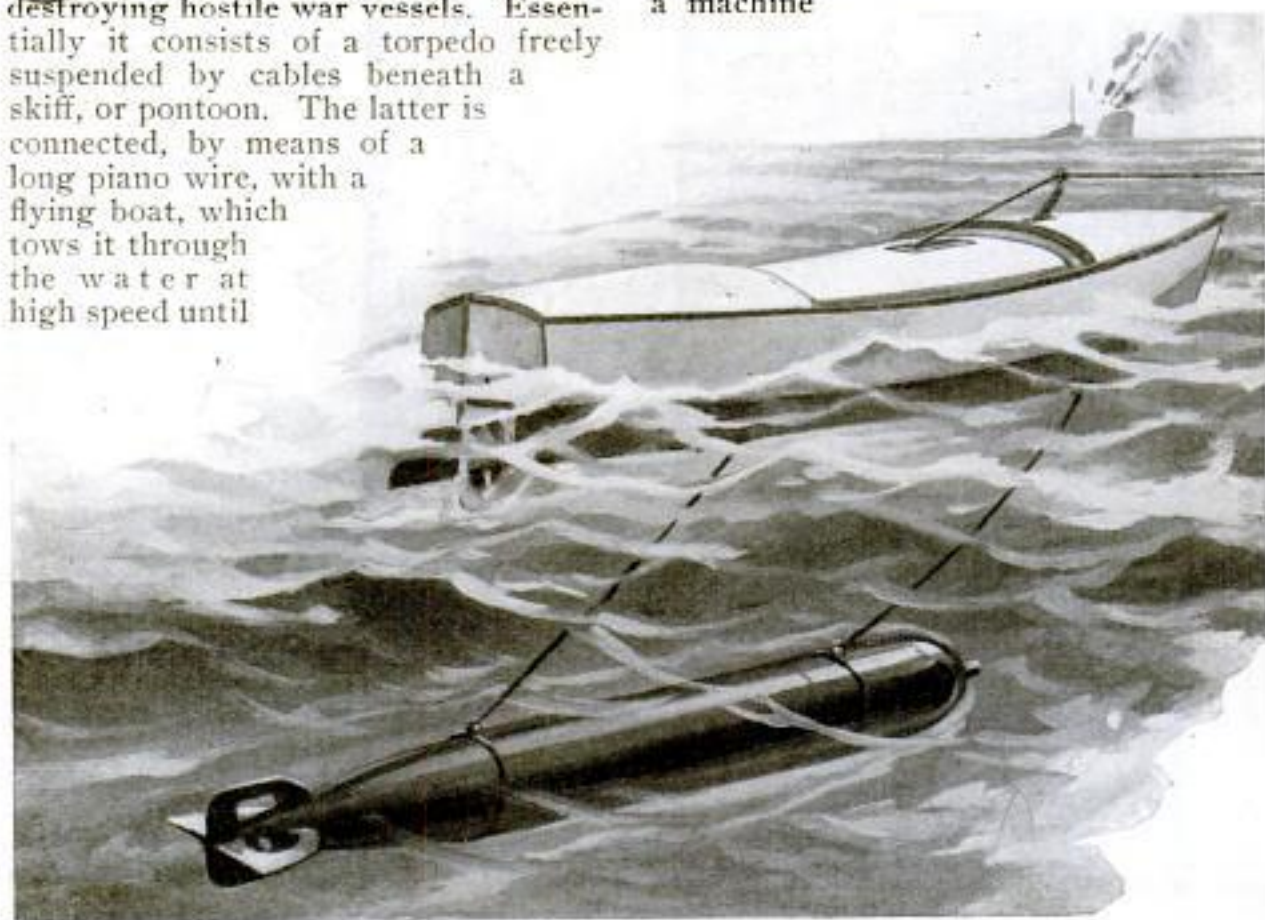
Throughout the operations painstaking care had to be observed to safeguard against accidents. A number of contractors declined to undertake the work because of its precarious nature. The tower rocked considerably when struck broadside by strong gusts of wind. At times the swaying became so great that some of the workers could not restrain expression of their fears. On such occasions the only thing that kept them from abandoning their

efforts was their appreciation of the danger involved in attempting to make a descent on the slender ladder extending up one side of the pipe. The strength of the wind made it seem more dangerous to undertake the downward climb than to stick it out at the top. This condition, of course, decreased as the work progressed and the height of the tower was lessened. In many places the plates had corroded until they were only half their original thickness. Had it not been for the stabilizing effect of the water, it is said, the swaying might easily have become great enough to cause the tank to buckle and crash to the earth.

STRANGE NEW NAVAL WEAPON IDEA OF GREAT SCIENTIST

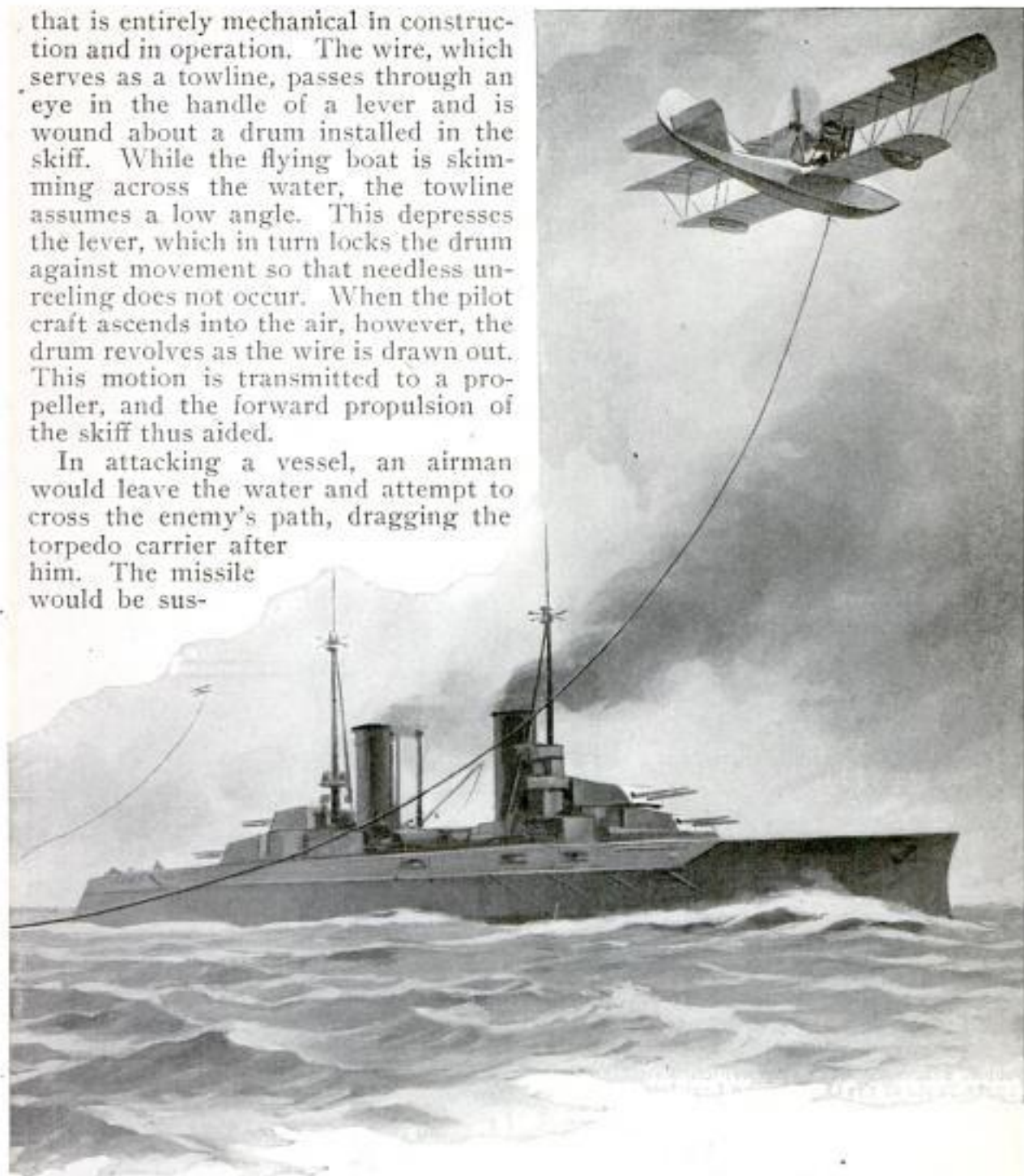
ONE of America's greatest electrical engineers, whose reputation extends throughout the world, has developed what he terms an aeromarine torpedo. It is intended as a weapon for destroying hostile war vessels. Essentially it consists of a torpedo freely suspended by cables beneath a skiff, or pontoon. The latter is connected, by means of a long piano wire, with a flying boat, which tows it through the water at high speed until

it strikes its target. The device is interesting because of the eminence of its inventor, who in this instance has departed from his accustomed field of endeavor and built a machine



that is entirely mechanical in construction and in operation. The wire, which serves as a towline, passes through an eye in the handle of a lever and is wound about a drum installed in the skiff. While the flying boat is skimming across the water, the towline assumes a low angle. This depresses the lever, which in turn locks the drum against movement so that needless unreeling does not occur. When the pilot craft ascends into the air, however, the drum revolves as the wire is drawn out. This motion is transmitted to a propeller, and the forward propulsion of the skiff thus aided.

In attacking a vessel, an airman would leave the water and attempt to cross the enemy's path, dragging the torpedo carrier after him. The missile would be sus-



The Aeromarine Torpedo Pictured in Use against an Enemy War Vessel: This Peculiar Mechanical Weapon Is the Invention of a World-Famous Electrician Which has Only Lately been Made Public

ended far enough beneath the bottom of the skiff to pass below a net, should one be encountered at the side of the ship. The towline, of course, would fall across the radio aerial, or across the deck, of a vessel. The continued pull upon it by the air craft would bring the torpedo, it is assumed, against the vessel with considerable force. To

gunners who can hit the periscope of a submarine in a choppy sea, a flying boat traveling at a low elevation would appear to be an excellent target. There are possibly important phases of the invention, however, that have not been made public, and if such be true, the time is not ripe for surmises as to their nature.

LOBBYIST'S LACE RECORDS DEEDS OF LEGISLATURE

A woman lobbyist who attended sessions of the last Oregon legislature for five weeks demonstrated by some



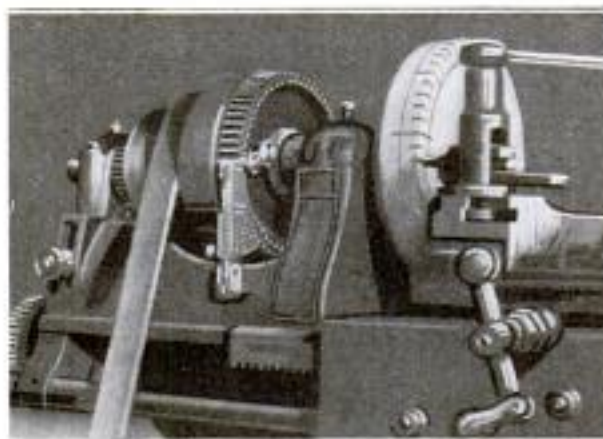
Lace Crocheted by Woman Lobbyist While Attending Oregon Legislature; the Figures in Order and What They Represent Are: Bow, Frances Willard Day Made Legal Holiday; Pear, Bill for Spraying Fruit; Chinese Pheasant, Law Pertaining to Its Protection; Sheep-Killing Dog, Severe Law against Same; Cow, Law against Live Stock Running at Large; Stork, Illegitimate-Child Law; Woman at Washtub, Widows' Pension Law; Two Men with Umbrellas, Candidates for Governorship; American Flag, Indorsement of Severance of Relations with Germany; Juggler, Legislative "Juggling"; Dancing Couple, Satirizing Manner in Which Male Members Sought Favor of the One Woman Legislator; Church, Proposal to Tax Churches

unique crochet work that on entering politics she had not lost her skill in handicraft. Practically all of the woman's spare time while at the sessions was occupied by crocheting lace in which she worked a symbolical record of what the legislature did. When a bill was passed pertaining to illegitimate children a stork was crocheted to signify the event. Two prospective candidates for governor, both members of the legislature, were represented by two figures, each ringing a bell to attract attention and carrying

an opened umbrella as an indication that he was a "dry." An American flag was worked into the lace on the day resolutions were passed indorsing the severance of diplomatic relations with Germany. A white bow, the emblem of the W. C. T. U., was incorporated in the lace when Frances Willard Day was made a public holiday. Other symbols were: a juggler, emblematic of the "trading" that went on, particularly during the last days of the session; a church, suggesting the proposal to make churches pay taxes, and a sheep-killing dog, signifying severe legislation against the implied menace.

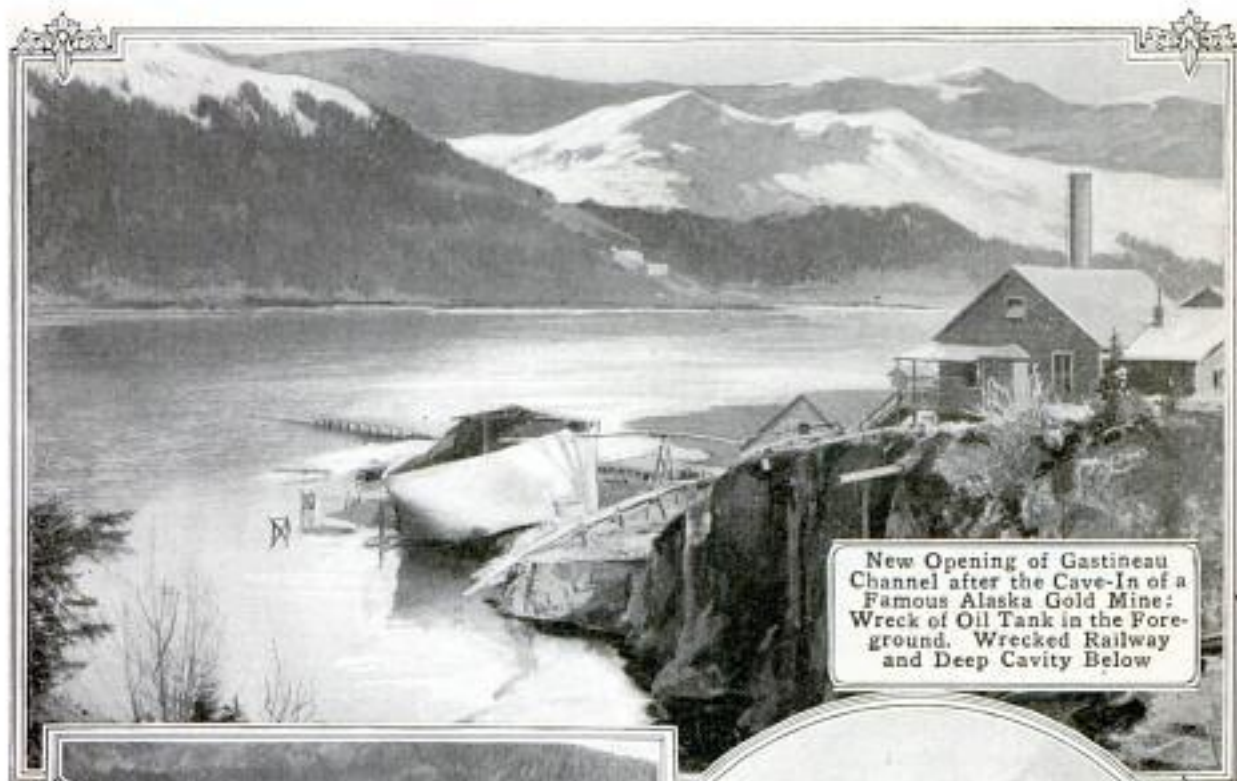
INDEXING ATTACHMENT FOR ENGINE LATHES

A useful attachment for engine lathes, or other machine tools in which the work is rotated, quickly locks the rotary part of the machine so that the work may be indexed or marked for drilling holes or other operations before removing it from the machine. With one row of 60 holes drilled around the large drive gear of the lathe, the new device is capable of accurately locating 42 different indexes, or sets of divisions. It is of very simple construction and can be readily operated by any machin-



Engine Lathe with Newly Patented Attachment on the Large Gear Wheel, for Indexing Work before Removal from the Tool

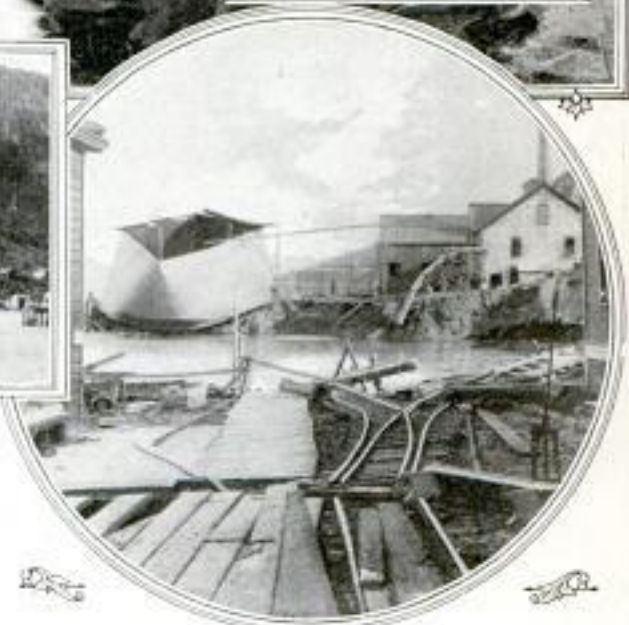
ist with the utmost accuracy. It is secured to the large gear wheel by thumbscrews and may be attached or detached in a few seconds.

FAMOUS ALASKA GOLD MINE WRECKED BY THE SEA

New Opening of Gastineau Channel after the Cave-In of a Famous Alaska Gold Mine; Wreck of Oil Tank in the Foreground. Wrecked Railway and Deep Cavity Below



Gold-Mining Camp on Douglas Island, Alaska, before the Recent Disaster: In the Center Is a Noted Gold-Quartz Quarry That Has Produced Millions



Damage estimated at \$15,000,000 was caused when the under-sea workings of a noted group of gold mines on Douglas Island, near Juneau, Alaska, were invaded by the icy waters of Gastineau Channel, on the night of April 21-22 last, with disastrous results. Only a thin skin of rock had separated the upper workings from the channel stream. When water broke through this in a thin trickle, the alarm was given, the miners at work on the night shift ran for the lifts, and only one human life was lost, although some of the workings extended to a depth of 2,000 ft. below the sea. An hour afterward, the intruding waters had flooded the mine and drove a spout through

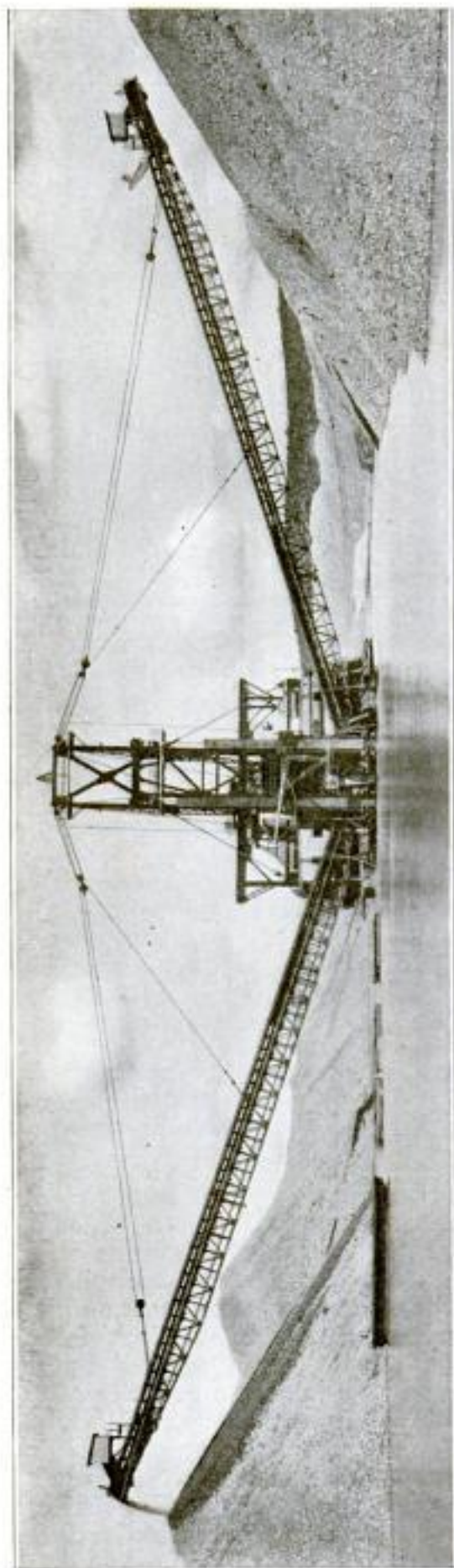
the main shaft 200 ft. into the air. Then came a surface cave-in which destroyed a number of the mine structures, including a costly steel oil tank and the company gymnasium and bathhouse, some of the buildings falling into the great cavity created by the disaster. An immense quantity of ore and of mining machinery was lost, and 1,300 miners were thrown out of work. Attempts will probably be made to mine the ore under the flooded diggings by deep tunneling beneath Gastineau Channel.

MAMMOTH GOLD DREDGE HAS TWO STACKERS

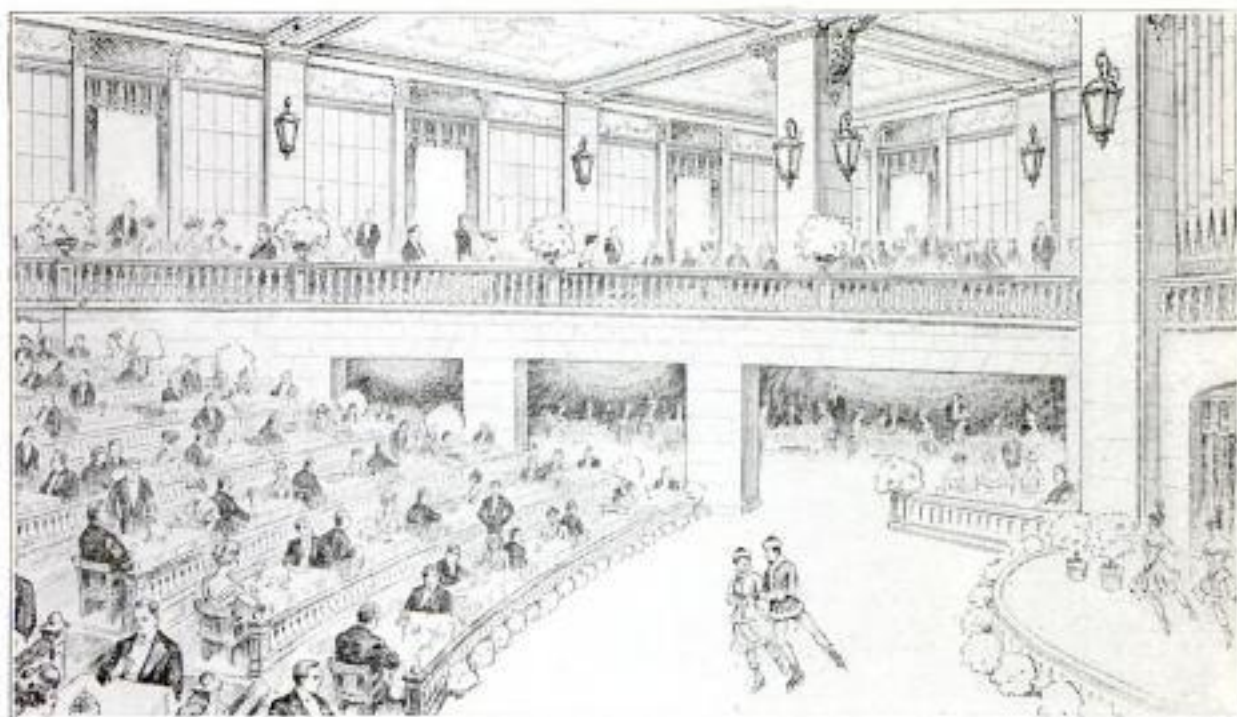
A dredge company contracted with the United States government not long ago to build flood-restraining levees on either side of the Yuba River, Calif., and to do it free of charge, the condition being that the company be allowed to dredge for gold while fulfilling its contract. Accordingly a gold dredge, costing \$500,000, was built which is said to be the largest of its kind in the world. An unusual feature of the mammoth floating machine is that it has two arms, each 225 ft. long, instead of one. These are provided with 44-in. belt conveyors that deposit the tailings on either bank of the stream as the dredge moves along. The digging ladder is equipped with steel buckets of 18-cu.-ft. capacity, which can dig to a depth of 80 ft. The hull which supports all this machinery is entirely of steel and is 165 ft. long and 68 ft. wide. The gold-saving tables have an area of 8,000 square feet.

NEW SOURCE OF PLATINUM FOUND IN SIBERIA

An interesting discovery of a new source of platinum is reported from Siberia, where the valuable metal is now being extracted by a Russian mining engineer from the conglomerate rock known as dunite. This rock contains chrome-iron ore, and it is from this ore that the platinum is obtained by processes of grinding and washing. Immense quantities of dunitic rock are found in Siberia, the Nizhni-Tagilsk district alone embracing an area of this formation estimated at 11.7 square miles. This is the scene of the experiments now being made in platinum extraction. The method is to grind the dunite under runners, in order to separate the chromitic slack, which is then subjected to further grinding until the pure platinum can be washed from it. A recent experimental grinding of chromitic slack yielded over 200 oz. of platinum out of 9,720 lb., and plans are being made to work the deposits of dunite on a large scale.



Gold Dredge on the Yuba River, California. Which Cost \$500,000: The Two Arms Are Each 225 Feet Long and the Steel Buckets, Having a Capacity of 18 Cubic Feet Each, can Dig to a Depth of 80 Feet below the Water



New Chicago Restaurant Built Like a Theater, with Tables Arranged Tier above Tier on Terraces: Every Seat Affords a View of the Stage and Ice Rink. The Room Measures 100 by 100 Feet and can Accommodate 1,200 Diners at One Time

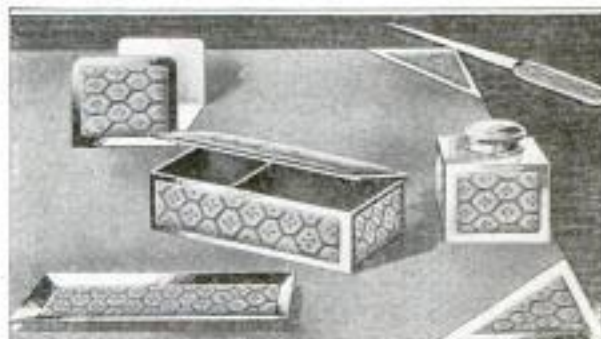
THEATERLIKE RESTAURANT HAS TERRACED FLOOR

The basement of one of Chicago's new hotels is occupied as a dining room which is really a restaurant and theater combined. Tables accommodating 1,200 diners are arranged in a balcony and on seven semicircular terraces that rise one above the other in front of a stage. Between the terraces and the stage is a skating rink, the ice for which is kept in condition by a special refrigerating system. Though this dining room measures 100 by 100 ft., the ceiling is so made that there are no pillars to obstruct the view, save close to the sides. The paging of guests is done silently, the names of persons wanted being shown on a large screen with the aid of a telautograph. A \$30,000 pipe organ is situated at the back of the stage.

Since the sale of opium in the open market became illegal throughout China a few weeks ago many poppy fields have been converted into wheat fields—a fact that will undoubtedly increase the use of wheat flour by the Chinese.

DESK SETS ORNAMENTED WITH BROCADE PANELS

A manufacturer of novelties has placed on the market writing-desk sets of brass, bronze, etc., each article of which is decorated with slightly padded panels of brocade, or other fabrics. This combination of cloth with the hard surfaces gives a warmth and color which other desk sets of metal only, even if very ornate, cannot possess. The variety of effects that can be obtained is only limited by the variety of fabrics available. These panels of cloth are so attached to the flat sides and tops of the articles that no seams, folds, or means of fastening are visible.



Bronze Writing-Desk Set Attractively Decorated with Slightly Padded Panels of Brocade so Attached to the Metal That No Fastening Is Visible

*The Walker Power Harvester Co.,
204 Mining Exchange Bldg.
Colorado Springs, Colo.*

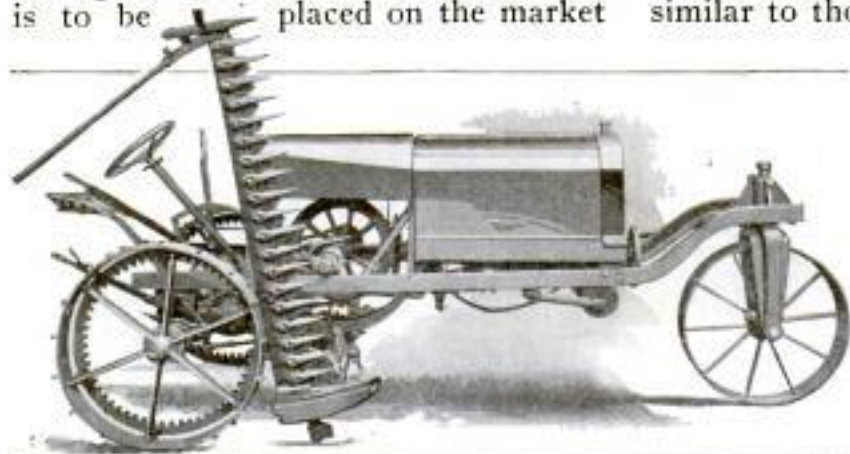
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POPULAR MECHANICS

MOWER DRIVEN BY ENGINE FROM LOW-PRICED CAR. *Colo.*

A gasoline-driven mowing machine is to be placed on the market

by a Colorado company in which parts similar to those in an ordinary mower are combined with the engine and other portions of a well-known low-priced automobile. The machine is mounted on three iron wheels, and the operator sits at the rear with all controlling levers within easy reach. It is claimed that it will do twice the work of a horse-drawn mower and that the gasoline consumption is low.



Gasoline-Driven Mowing Machine Said to Do Twice the Work of a Horse-Drawn Mower and at Low Cost

A THEATRICAL LABORATORY FOR TESTING PLAYS

By M. W. MEIER

IN its "Player's Workshop," founded by a woman, Chicago has what is perhaps the only organization of its kind in the world. It is a sort of theatrical laboratory, where one-act plays are tested out before being offered to the general public. Its location is in the 57th Street art colony and it has a membership of over 100 playwrights and actors.

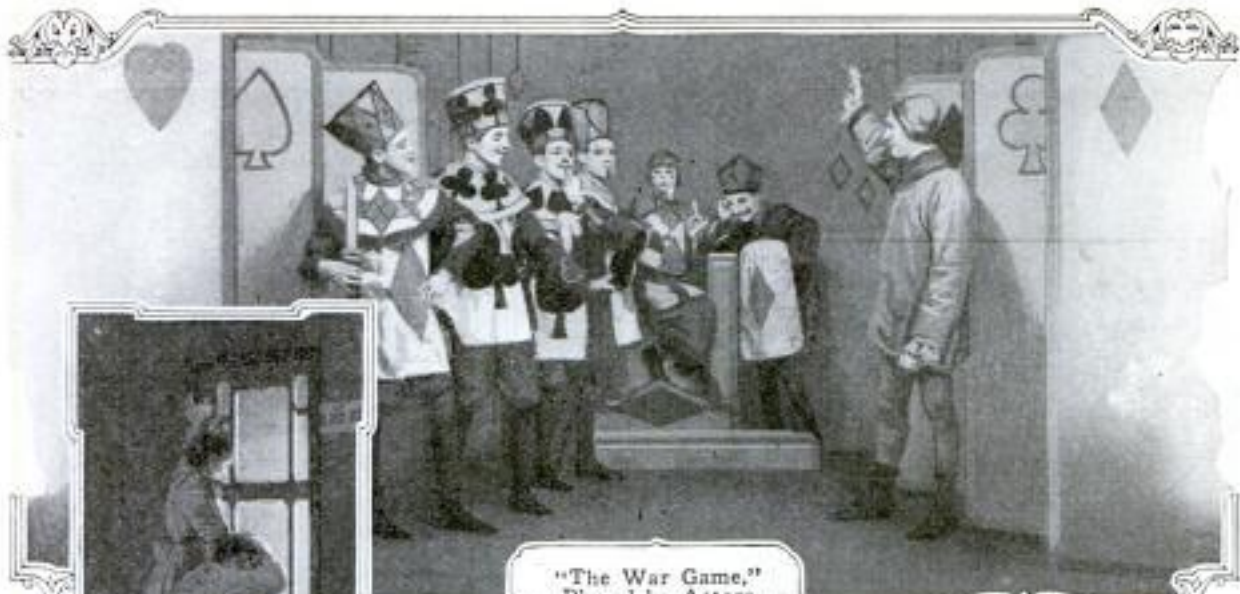
Every month three or four plays written by members are produced, and if successful in the eyes of the spectators are offered to theatrical managers for public production. Great care is given to scenic, lighting, and costuming effects. Each new play is carefully studied by experts in these lines, who then plan how it can best be presented.

New wrinkles and devices are continually being tried and injected into productions. The stage is quite small, only 17½ ft. wide by 15 ft. deep, and the staff is often handicapped for lack of space. The auditorium seats 90 and on six nights a month it is packed with members to witness the try-out performances. The actors are chosen from the organization, and the training

is so rigid and good that few of them can be called amateurs. Simplicity and originality are the keynotes of every performance. Nothing that is old or hackneyed is ever used, provided a new substitute can be found.

All stage and lighting effects are handled by an expert who, from an all too meager switchboard, brings forth a great variety of light effects. No footlights are used, all illumination coming from wing and border lights. Flood and spotlights are frequently utilized, but not so much as in other theaters. Here the play is the thing, and not the actors. The scenery is always strikingly beautiful and novel. Futurist touches are often added to good advantage. A well-known etcher has charge of all scene work, and is also the originator of many of the unusual costumes that are used.

Practically all the scenery is made up in flat sets, the height of the stage being too scant to permit the use of drops. For this reason also, the curtain is drawn from side to side rather than up and down as is customary. No set of scenery is ever used twice, a new one being painted for every play.



"The War Game,"
 Played by Actors
 Representing Suits of
 Cards: A Typical
 Scene from One of the
 Plays Produced in the
 "Player's Workshop,"
 Where Members of the
 Chicago Art Colony
 Give Frequent Entertainments to Introduce
 the Work of Local
 Playwrights



A Scene from
 "Civilization":
 Two Characters
 in the Play are
 Watching, from
 a Darkened
 Hospital Ward,
 Executions in the
 Courtyard Below



Pierrot in the Light
 of the Moon: The
 Lighting Effects,
 Like All the Other
 Accessories of These
 Unique Productions,
 are Worked Out by
 Club Talent

Skeletons Out of the Closet: Another
 Scene Realistically Played by Members of
 the Organization. Costumes and Scenery
 are All Designed by the Talent of the
 "Workshop," and would Reflect Credit on
 Experts of the Professional Stage



Apparition of Christ in a Window
 to a Discouraged and Forlorn
 Character in a Playlet Called
 "Dregs," Written by a Member of
 the Organization and Produced
 with Striking Effects in the
 "Player's Workshop": The Scene
 Tells Its Own Story, of the Renewal
 of Hope in a Mind Driven Near to
 Desperation, but Encouraged to
 Fresh Effort by the Miraculous
 Image of the Savior



Making a Relief Map of a National Forest: At the Left, Foresters Working on the Clay Model; at Right, Putting the Finishing Touches on the Plaster Map

RELIEF MAP OF CARIBOU NATIONAL FOREST

Using a method devised by a professor of the Agricultural College of Utah, members of the Forest Service stationed at Ogden in that state have just completed a noteworthy relief map of the Caribou National Forest, Idaho. The map is 13 ft. 9 in. long, 5 ft. 3 in. wide, and weighs



The Finished Map of the Forest Area, Showing the Relative Elevations, Also Streams, Roads, and Towns

several hundred pounds. Three copies have been made from the original clay model, one of which will be used for exhibition purposes on a railroad car. The horizontal scale of the map is two inches to the mile, the vertical scale being doubled to make the mountains appear to the eye as seen in nature. In making the map, a large vat was filled with clay on the smooth surface of which the 500-

ft. contours of the forest—which comprises 699,828 acres—were traced from a topographic map. The clay was then cut down into steps and

smoothed off to show the correct elevations; after which the relief was shaped into a close representation of the country, the clay being kept moist. It took over three months to make the model. A plaster-of-Paris negative cast was then taken, and from this the three positives were made. These contain a large percentage of macerated paper money, furnished by the Treasury Department. On the painted surface streams, roads, and towns are shown, and the forested areas are indicated by a sprinkling of green sawdust and cornmeal.

CHARTS ON FARM SUBJECTS FOR COUNTRY SCHOOLS

Lecture charts and lantern slides on agricultural subjects are furnished with appropriate printed lectures for the use of school superintendents and teachers in rural districts, who usually plan a circuit of neighboring schools for systematic study. The lectures deal with soils, crops, poultry, live stock, weeds, flies, home economics, and other interesting subjects which directly concern agriculture, the home, or the business of the country. The charts are 70 in. long, 63 in. wide, and can be read at a distance of 100 ft. or more. The set on each subject contains 10 to 15 cloth charts, mounted on an oak crosspiece, with an iron stand which can be used either indoors or in the open air, as desired. The sets are loaned for one or two weeks to rural schools or organizations.

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PROPOSE ELECTRIC LIGHTS FOR LINCOLN HIGHWAY

The lighting of Lincoln Highway by electricity from coast to coast is the ultimate aim of a movement set on foot recently in Ohio. The Stark County members of the Joyian League, which is a national organization composed of men connected with the electrical trade, have proposed that this order, through its branches located in various parts of the country, indorse and work for such an improvement. The plan has been well received in many quarters. Its originators estimate that the cost of illuminating the 33 miles of the highway which lie within Stark County would be \$4,000 per year.

SHIELD PROTECTS AIRMAN'S FOLDING CAMERA

An airman, who is also a photographer of considerable experience, found that he could not use his folding



Airman with Folding Camera Fitted with Shield to Protect It from Wind Pressure: The Shutter is Operated by a Thread



The Shield Is of Aluminum and is Made Like a Collapsible Carton so That It can be Folded Up and Carried in the Pocket

REACHER GIVES ACCESS TO HIGH GROCERY SHELVES

Easy access to cans or packages on the upper shelves of a grocery may be had by using a reacher consisting of a long arm, at one end of which are two rubber-covered jaws that can be clamped about the desired article. The jaws are controlled by either of two handles, one at the middle and the other at the lower end of the arm.



The Chicago municipal pier, which is 3,000 ft. long, is being converted into barracks for a regiment of reserve engineers who expect to drill as well as live there.

camera for taking pictures from an aeroplane because the wind pressure flattened out the collapsible portion of his instrument. Accordingly he devised an aluminum camera shield that can be fitted around the extended part of a camera in a few seconds, thereby giving it ample protection.

ALASKA ROAD HAS A CLEAR-ICE FOUNDATION

A hillside road recently built by the board of road commissioners for Alaska has at one point a foundation of many feet of ice. Mining operations at this point disclosed the fact that below a surface layer of 2 ft. of moss and tundra, there were 40 ft. of clear ice and then 6 ft. of gravel on the bedrock. A corduroy road of willow was therefore laid on the tundra and surfaced with gravel.

COXSWAIN MEGAPHONE USED BY COLLEGE GIRLS

The latest style of megaphone for coaches and coxswains of rowing crews



has been adopted by the oarswomen of several colleges. It is an 8-in. instrument of heavy fiber, and has a pair of light metal arms attached to an elastic band which goes round the head.

MAMMOTH CAVE LIGHTED BY ELECTRICITY

Electric illumination of important parts of the Mammoth Cave, Kentucky,

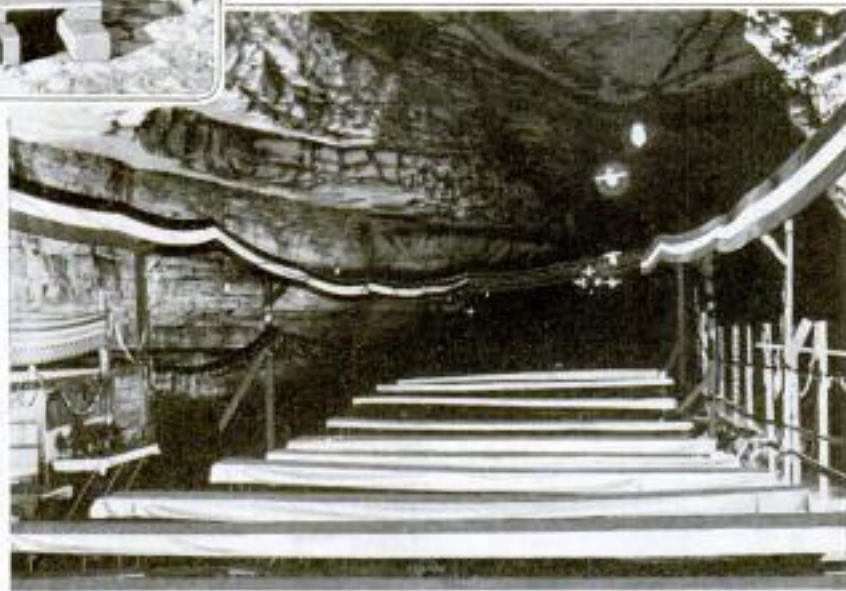


Electric Lighting Plant Newly Installed in the Mammoth Cave of Kentucky, Hitherto Lighted by Oil Lamps

is now an accomplished fact, a lighting plant having been recently installed at the edge of the Rotunda, which is the first main chamber of the cave. This chamber is at the end of a passageway, about 500 feet long, leading in from the entrance, the passage being lighted by electric lamps strung along the walls. The

Rotunda itself, which is 200 or 250 feet across, with a dome roof from 60 to 75 feet above the floor, is lighted by batteries of electric lamps set in shallow reflectors, placed on poles so that the lamps themselves are unseen. From the Rotunda two avenues lead off into the recesses of the vast cave, hitherto lighted only by dim, smoky oil lamps and the torches of guides. In one of these avenues is what is known as the Banquet Hall, containing a wooden inclosure with tables and equipment for serving the banquet customary when a large convention visits the cave in a body. This hall is now lighted with 2,135 electric lamps.

In the Rotunda, besides the reflector banks on poles, there is a large tripod carrying a 600-watt lamp, used to throw a particularly strong light on various features of the walls and roof of the cave. As the visitor receives at this point his first impression of the vastness and beauty of the great natural wonder, the installation of electric lighting has added to the effect produced by the subterranean scene, endowing the stalactite and stalagmite formations with prismatic colors never displayed by the old oil lamps. It is a distance of 380 yd. from the entrance through the Rotunda to the far end of the Banquet



Banquet Hall in the Mammoth Cave, Where Large Conventions are Often Entertained: Now Lighted by 2,135 Electric Lamps That Display the Natural Beauties of the Cave as Never Before. Showing Wonderful Prismatic Effects



Winner of Spectacular Climbing Contest Approaching the Most Difficult Stretch on the Steep Hillside

Hall, and this is the only portion lighted at present by the electric plant, while there are in all about 15 miles of passageway in the cave.

SPECIAL PHONE RATES FOR VACATIONISTS

When a telephone subscriber in Lincoln, Neb., goes on a vacation, or otherwise has no use for his phone for a temporary period of more than 30 days, the company will, upon request, make a special disconnect rate during the discontinuance of service. This is half the regular rate, and a valuable feature is that when a disconnect-rate phone is called, the call is taken by an information operator who states that the party called is away from home and tells where he is staying, also when he expects to return, this information being kept in a card index in the exchanges.

On the Humboldt National Forest in Nevada there are 315,740 sheep, the largest total to be found on any one of the national forests, while the largest number of cattle—75,818—is found on the Tonto National Forest in Arizona. The average annual value of the meat product of these two tracts is estimated at \$2,000,000.

MOTORCYCLE CONQUERS HILL OF PRECIPITOUS GRADE

During a spirited contest recently conducted in southern California, one motorcycle out of a number of entries succeeded in negotiating what is stated to be a 76-per-cent grade. Several thousand persons from various sections of the state witnessed the event. The cycle that carried away the honors was geared 16½ to 1 and made two triumphant dashes up the steep incline between rows of cheering spectators. The feat was made possible by the fact that the winning machine did not



depend upon an ordinary tire for traction. A demountable motor-car rim, about the circumference of which deep steel cleats had been riveted, encircled the rear tire and thus prevented the driving wheel from spinning. The competing machines were not similarly equipped, and therefore were unable to reach the top of the hill.

DEVICE FOR CLEANING CISTERNS WHILE FULL

A cistern can be cleaned quite thoroughly without pumping off any of the water, by using a simple device recently invented.



It consists of a galvanized-iron can, 5 in. in diameter and 10 in. long, to one end of which is attached a long extensible handle. The bottom of the can is provided with a large leather intake valve and in the upper end is a small hole fitted with a cork, designed to keep the air in the cylinder until it reaches the bottom of the cistern. A rod projects from the upper end of the cork and is bent so that it extends, through eyelets, down the outside of the can and about an inch below the lower end. When the cleaner is immersed in the water it remains filled with air until the end of this rod strikes bottom. This forces the cork out, allowing the air to escape, while dirt and muddy water rush in

through the leather valve. The cleaner can then be withdrawn, filled with deposit, and the process repeated.

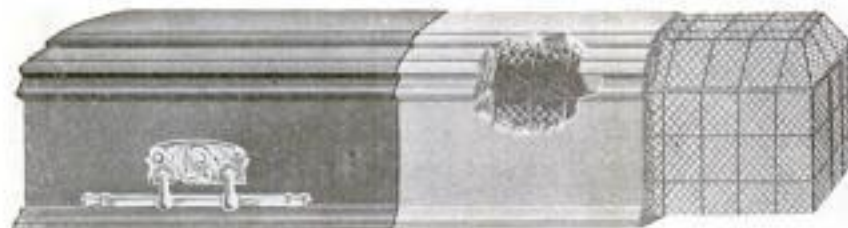
through the leather valve. The cleaner can then be withdrawn, filled with deposit, and the process repeated.

FAMOUS AIRMAN'S DEATH A LOSS TO OUR ARMY

A fatal aeroplane accident which resulted in a loss that the United States can ill afford, particularly in this time of national emergency, occurred May 9 when Victor Carlstrom and a student flier were killed at Newport News, Va. Within sight of several hundred persons the famous airman was taking his companion on the latter's first flight and had ascended to a height of 3,500 ft. when the aeroplane was seen to crumple and plunge to earth. Both men were killed instantly. Carlstrom was one of the best known fliers in the United States and had won many honors. Last November he attracted nation-wide notice by making a new cross-country nonstop record for America during a flight from Chicago to New York. However, a few days later his achievement was surpassed by Miss Ruth Law. Only a few weeks ago Carlstrom received an appointment as first lieutenant in the army aviation reserve corps, and he had begun a most valuable service to the country by instructing a large class in flying.

CASKETS AND VAULTS MADE OF REINFORCED CEMENT

Reinforced cement is now being used with success in the construction of



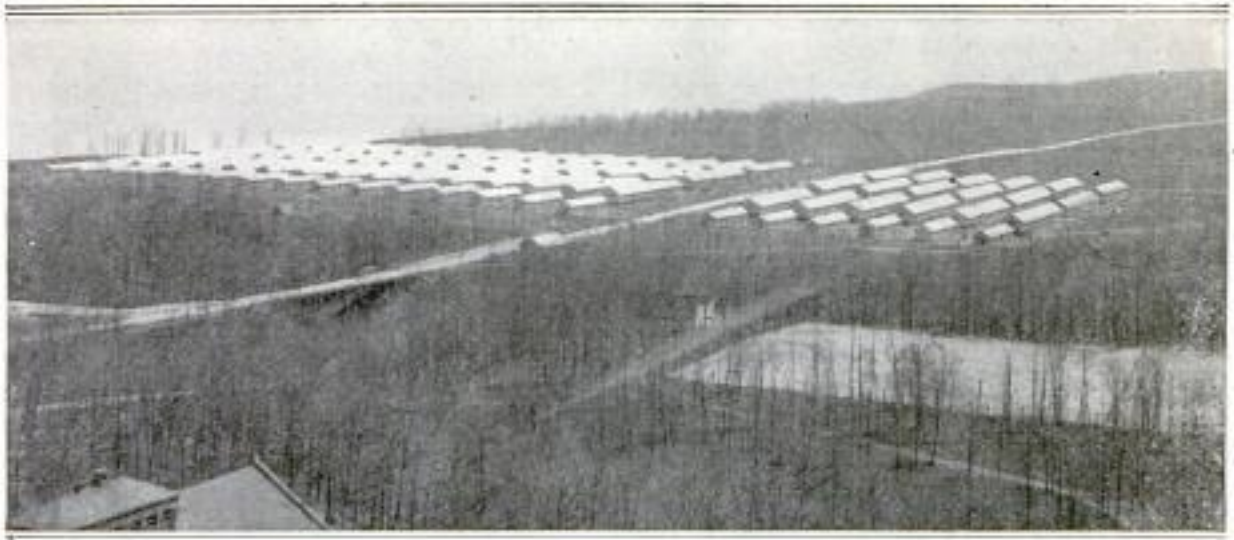
View of Cement Casket. Showing Cloth Covering, the Finished Cement, and the Reinforcing, Consisting of Wire and Rods

burial vaults and caskets of the most durable sort. Each casket is reinforced with sets of rods, that intersect at frequent intervals, and with strong wire

mesh. The cement used is thoroughly treated with waterproofing. The cover, like the rest of the receptacle, is able to withstand great weight. It fits into a V-shaped groove that extends around

the rim of the vault. Before it is put in place for the last time the groove is filled with liquid cement so that when the casket is closed it is hermetically sealed. In each cover is a plate-glass panel over which a small cement lid is sealed.

The vaults, the tops of which are more rounded, are made in much the same manner as the caskets.



Bird's-Eye View of Cantonment Erected at Fort Sheridan, Illinois, to Accommodate Some of the Several Thousand Men Now in Training at the Post: The 85 Buildings Shown in the Picture were Constructed in 10 Days

PERMANENT ARMY CAMP BUILT IN TEN DAYS

IN ten days of actual work, a bald knoll on the army reservation at Fort Sheridan, Ill., was converted into a well-planned cantonment with accommodations for 3,500 men attending the officers' training camp. The speed of the construction made this a feat perhaps unsurpassed in the Middle West, if not in the entire country.

Eighty-five separate one-story frame buildings were erected. They consist of 42 barracks, 20 by 126 ft.; 21 mess halls and kitchens, 20 by 112 ft.; 21 bathhouses, 14 by 63 ft., and a telephone-exchange building. The structures were built side by side in four long rows.

Organization and competent supervision accomplished the work. Materials were rushed to the grounds by special trains and motor trucks. Special trains also shuttled a large part of the force of 600 or 700 men between Chicago and the army post morning

and night. Approximately 1,250,000 ft. of lumber were used. All of this was delivered in about three days' time.

The romance of the undertaking swells as the details of its accomplishment are unfolded. Plans and specifications for the cantonment were received from Washington late on Saturday, April 28. Their complete revision by Monday morning was necessary to fit them to local conditions. This fell to Josiah L. Rice, the government's superintendent of construction at Fort Sheridan, who acted as director of works while operations were under

way. The general contract, awarded to a Chicago construction company, was signed on Sunday and dated for the following day. Rain fell on Monday, when work was supposed to be launched. Because of this, a time extension of one day was



Looking down the Street Separating the Bathhouses from One Row of Barracks and Showing a Trenching Machine at Work Cutting a Ditch for a Sewer Conduit: At the Time the Picture was Taken All of the Buildings were Nearing Completion

granted, and real building activity began on Tuesday, May 1. In this period

all orders had been placed, the necessary deliveries made at the grounds, 25 miles north of Chicago, and several hundred workmen collected.

From the instant operations started, until the final nail was driven, work was pushed at fever heat. The clatter of hammers and the hum of circular saws blended in a staccato rumble that was heard several miles on all sides. Yet, brief as was the time allotment, and great as was the work, system ruled and there was little confusion. Excitement prevailed, but it was the excitement of a hard game closely fought.

Khaki was in the foreground of the animated scene. Four officers and two "noncoms" of Company B, Ohio Engineers, played important rôles in supervising the construction race. While on their way to Camp Perry the soldiers were ordered to Fort Sheridan to lend their assistance in the work. And this, their first battle of the war, they won with honors and composure. The list embraced Captain Fred P. Troyan, First Lieutenants James H. Reding and John C. Reitz, Second Lieutenant Harry D. Churchill, and Sergeants John Vohs and Roy D. Burdick.

While the structures were springing up like pen-and-ink houses in a movie cartoon, water-supply mains, sewer conduits, telephone cables, and electric-

light feed wires were extended to the cantonment, which is situated across ravines several hundred yards from the old buildings at the post. Steam and gasoline trench diggers crept between the rows of growing shelters, cutting ditches for the drainage pipes, while others ate their way across the reservation to the site, making an underground pathway for the water line. Overhead, cables and wires were stretched as quickly as poles were tamped in place.

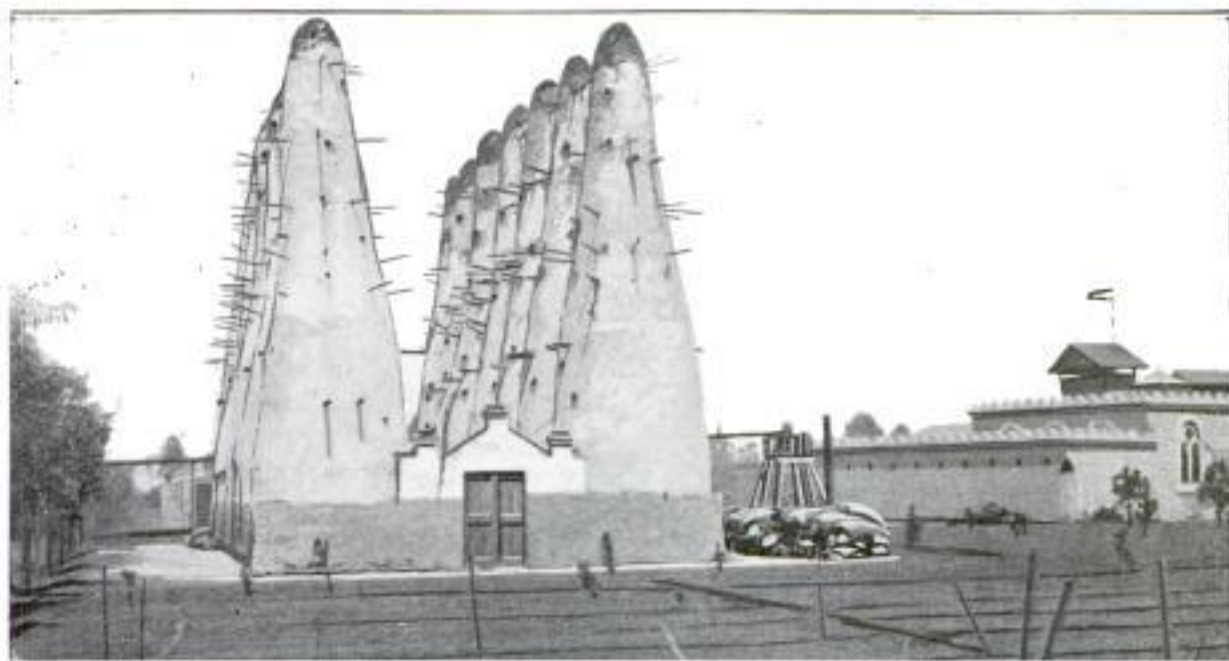
Thirteen days were allowed for the installation of all plumbing. Thus three days after the buildings were finished, shower baths, lavatories, and other toilet fixtures were ready for 3,500 men in 21 concrete-floored bath-houses. In addition, there was the plumbing in an equal number of kitchens. Fire hydrants, and near them coils of hose for protective purposes, were also supplied.

The work was a remarkable achievement, well done.

CA gold-palladium alloy has been put on the market as a substitute for the more expensive platinum-iridium alloy much used by chemists. Tests by the Bureau of Standards indicate that this new alloy can be used for many laboratory purposes in place of platinum.



If This Picture could Talk, It would Scream, for It Shows One of the Power-Driven Saws That Shrieked from Morning until Night for 10 Days. Standing in the Foreground near the Middle Is Lieutenant James H. Reding, One of the Ohio Engineers Who Assisted in Supervising the Work



COURTESY OF THE JOURNAL OF HEREDITY
 Fourteen Towers on a Large Egyptian Estate Which House Thousands of Pairs of Pigeons: Each Tower is Made by Piling 1,200 Clay Jars Tier upon Tier with Their Openings Facing Inward

STRANGE EGYPTIAN TOWERS SERVE AS PIGEON LOFTS

Pigeon raising is carried on by the proprietors of certain large estates in Egypt on a scale that is truly astonishing to most Americans. For example, the owner of the 14 strange-looking towers in the accompanying illustration started with 250 pairs of pigeons and in a few years these had increased to 8,000 pairs. About 1,200 clay jars are utilized in building each tower. These are laid tier upon tier with their openings facing inward. In addition to the birds raised, nearly 250 bu. of guano are produced annually.

CHINESE ERECT LANTERNS FOR SPIRITS OF DROWNED

Suspended from tall poles that are to be found on the banks of rivers in China are quaint lanterns that sway back and forth in the wind, adding a picturesque touch to the landscape by day and weird illumination by night. Each of these lanterns has been placed by relatives of some person who has been drowned in the near-by stream, in the hope that the spirit of the deceased may see the light as it journeys

in search of heaven. Many are too poor to erect these supports and so, by paying a suitable sum, are permitted to utilize other people's poles. This accounts for the presence of seven lanterns on the one shown in the accompanying photograph.



Picturesque Lanterns Hung beside a River in China by Relatives of Persons Who have been Drowned in the Stream, so That the Spirit of the Deceased may See the Lamp during His Journeyings in the Other World

SKYSCRAPER TO BE CENTER FOR BUYERS AND SELLERS

When a \$2,000,000 building, now under construction in New York, is completed it will no longer be necessary for a buyer visiting that city to travel through miles of congested streets to inspect stocks of goods, for it is proposed to house in this skyscraper permanent exhibits maintained by many producers in each of numerous lines. One floor will contain artistic booths occupied by shoe manufacturers. Another will be equally representative of the toy interest, another will be devoted to groceries, and so on. Here, also, buyers will find club accommodations, a restaurant, and an information bureau that will supply credit data, shopping news, and the like. Special provision is being made for the convenience of women also.

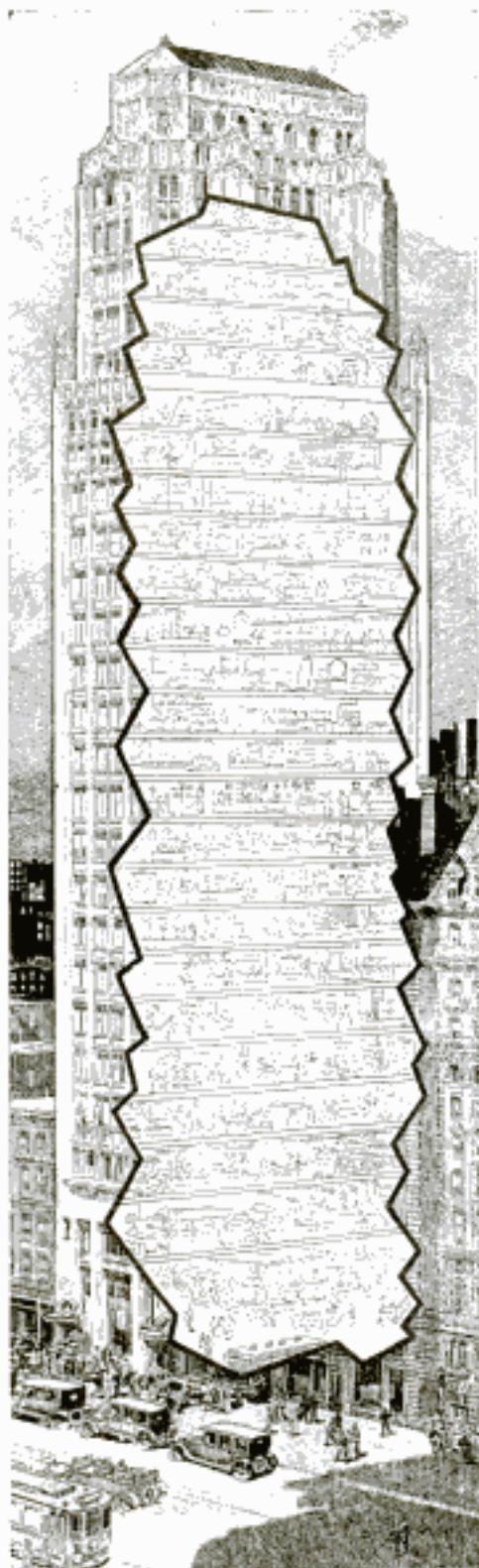
AUTO SHOW FOR USED CARS HELD IN CHICAGO

An automobile show in which used cars formed the bulk of the exhibits was held in Chicago during a recent week, and the novelty proved a success. Directed by a committee of dealers, the show was an experiment, looking to a solution of the problem of disposing of

secondhand cars, this being a trade problem in every city. About 50 dealers engaged space in the huge Coliseum—scene of the regular annual automobile shows—and some 200 used cars of a large variety of makes were exhibited daily. Each car was tagged with a certificate of inspection and serviceability, after undergoing a strict examination by a committee of mechanical experts appointed by the dealers' association, and was also plainly marked with its selling price. Sales were made direct from the floor, the exhibitors being allowed to remove cars and refill their space twice daily. Prices ranged from less than \$200 for some of the used small cars to \$1,800 for secondhand models of expensive make. Purchasers were numerous and the used-car show will probably become an annual event in Chicago.

GIANT DREDGE IS NOW USED AS CATTLE SHIP

Of late the seagoing dredge "Caribbean," which for several years did remarkable work in certain sections of the Panama Canal, has been converted into a cattle ship. This novel change in the vessel's status comes after an interesting career. It was constructed at Sparrows Point, Md.,



Two-Million-Dollar Building Which is Designed to House Permanent Exhibits of Hundreds of Manufacturers, so That Visiting Buyers can Place Their Orders with a Minimum of Inconvenience

in 1907, and taken to the Canal Zone, where it is estimated to have moved more than 10,000,000 cubic yards of material and dumped it at sea. When this work was finished the serious slides developed at Gaillard Cut. The purchase of an expensive plant for operating air drills used in blasting the slipping earth, was avoided by installing two high-power compressors aboard the "Caribbean." The latest alteration came when the dredge was fitted for live freight. Its suction and overflow pipes were removed, the hopper and dumping doors sealed, bulwarks erected, additional living quarters constructed, and a complete wooden deck provided. Loading apparatus, and feed and water troughs, were also installed, and the decks divided into pens. The boat now plies between Colon and Central and South American ports.

VAST LILY BEDS BEAUTIFY MISSISSIPPI RIVER

Some of the most beautiful and extensive natural water-lily beds in the world are to be found along the upper Mississippi. During the summer months persons come from miles around to look upon these vast exquisite displays. When the river is low portions of its bed, in some cases scores of acres in extent, are covered with shallow water, or wholly exposed. In such places the white and yellow lilies, sur-

rounded by their shining green leaves, are to be found, some of the beds stretching as far as the eye can see.

TAILPIECE DESIGNED TO IMPROVE VIOLIN'S TONE

Improvement in tone, it is claimed, is obtained by equipping a violin with a tailpiece so made that the four strings



The Tailpiece on the Right-Hand Violin Differs from the Ordinary One Shown at the Left so That the Strings are Separated Almost as Widely at Their Ends as at the Bridge. They Are Also Less Apt to be Cut by This Tailpiece

are tied about a rounded bar which forms the end of the piece. The bar is long enough to permit the strings to be spread as far apart at their ends as at the bridge—an arrangement which the designer believes produces better musical tones. Furthermore, strings tied in this manner press against no sharp edges and therefore are less apt to break.



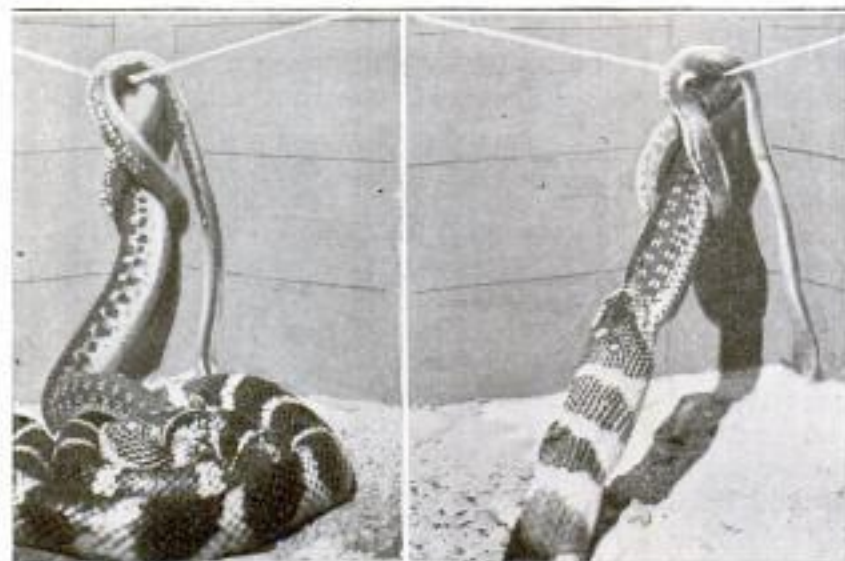
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One of Many Large Water-Lily Beds to be Found along the Mississippi River: Some of these Fields of Natural Beauty Are More than 100 Acres in Extent

REPTILE THAT EATS OTHER SNAKES A FRIEND OF MAN

Strange as it may seem, the larger of the two reptiles pictured in the accompanying illustrations is regarded

an adept at doing the thing illustrated here so vividly, namely swallowing other snakes. This reptile is immune to the bites of venomous serpents and frequently makes its meal on them, swallowing them head first. The fact



King Snake, Regarded as a Friend of the Farmer in the Southwest, Beginning to Swallow a Garter Snake Almost as Long as Itself

The Meal in Progress: The King Snake Took Three Hours to Swallow Its Adversary, Which Wound Itself about the Suspended Cord in an Effort to Escape

that it devours mice, gophers, and other field pests, adds to its popularity and its usefulness on farms, so that an effort is being made in southern California to prevent the extermination of this and other harmless snakes, as was told in Popular Mechanics Magazine for April. The creature which was devoured, as shown in the illustrations, was a garter snake nearly as long as its adversary. Though the doomed reptile fought hard and twisted itself about a

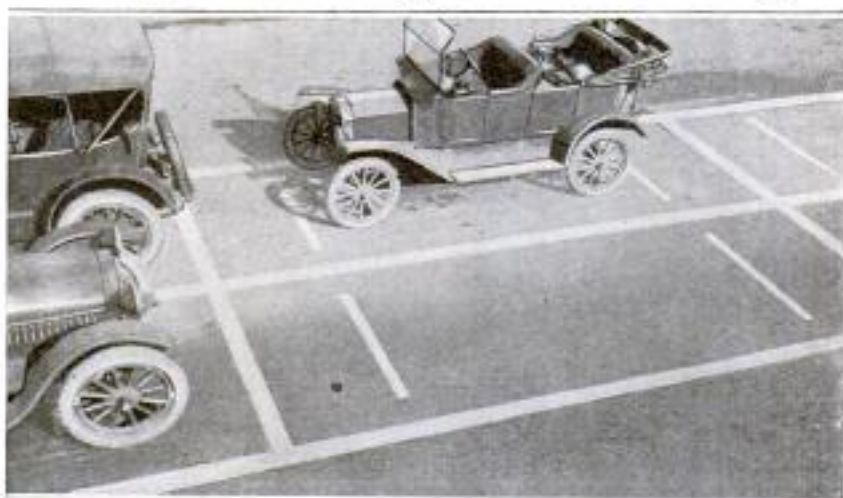
cord and nail in an effort to escape, the swallowing process continued for three hours, when the tip of the tail disappeared in the mouth of the king snake.

cord and nail in an effort to escape, the swallowing process continued for three hours, when the tip of the tail disappeared in the mouth of the king snake.

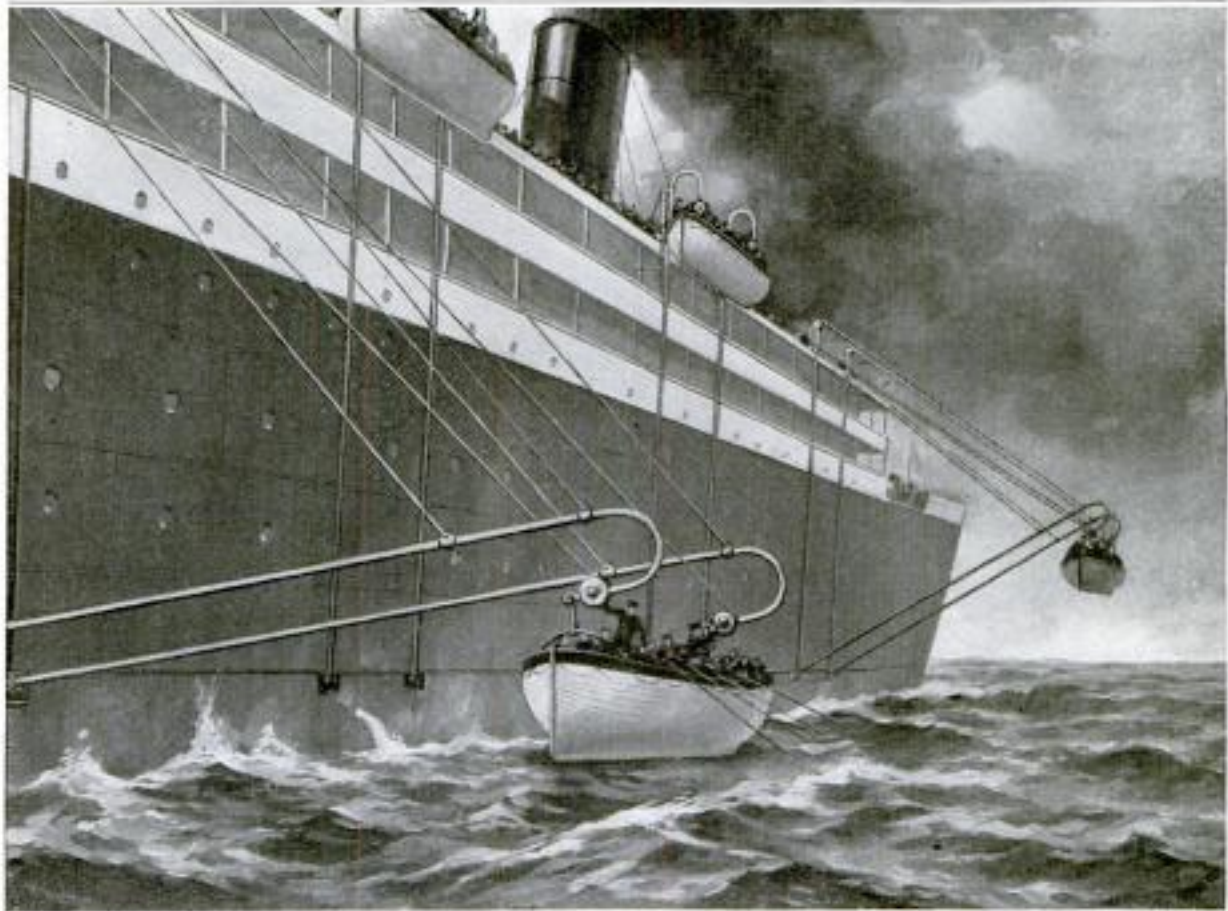
CENTER-OF-ROAD PARKING SYSTEM FOR AUTOS

In an attempt to find a satisfactory way of parking automobiles the city of Phoenix, Ariz., is now trying a system that is apparently well adapted to any street of the required width. Along the middle of a 100-ft. thoroughfare has been outlined in white paint a double row of parking spaces, each 15 ft. long and 8 ft. wide, with passageways marked at the ends of each area. All the cars in one row are required to face one way, while those in the

other row face in the opposite direction. It is planned to replace the painted lines with inlaid cement of light color so that the re-marking of the rectangles will be unnecessary.



System of Parking Automobiles in the Center of a Principal Street in Phoenix, Arizona: The Two Rows of Cars Face in Opposite Directions



Launching a Lifeboat by Means of Patent Davits of Recent Invention: The Long Arms are Pivoted in the Side of the Ship and Hold the Boat Out from the Side, to Lessen Danger of Swamping, While It can be Lowered Either from the Deck or by the Occupants

SHIP DAVITS HOLD BOAT FAR FROM THE SIDE

One of the numerous new forms of ship davits recently patented in this country and abroad, as a result of the frightful marine casualties of late years, is the invention of a Mobile, Ala., man and embodies a novel idea. His davits in normal position rest on pivots in the side of the ship and extend vertically in channels to the top or boat deck. The arms are of such length that, when lowered on the pivots by means of gear and tackle, they carry a suspended boat out far from the side, much as the arm of a movable crane would do; thus enabling a lifeboat to be launched when the ship has a considerable list to the opposite side, and also lessening the danger of the boat being carried down by the suction of a sinking vessel. Means are provided whereby the boat can be lowered either from the deck or by the occupants themselves.

LIGHT BULBS SUPPLANT POTATOES IN ODD RACE

A contest of two or more persons, each screwing electric-light bulbs into a suitably mounted row of sockets laid on the ground, has proved a novel substitute for the old-fashioned potato race. The new game is suitable for either indoor or outdoor festivities.



Modern Substitute for Old-Fashioned Potato Race: The Man Who Inserts Six Bulbs into Their Sockets First Wins the Race

WAGONETTE LUNCH SERVICE ON SOUTHERN TRAINS

Coach passengers on a southern railway who may not desire a meal in the



Wagonette Used in a New Lunch Service for Coach Passengers on a Southern Railroad: After Loading It in the Diner, the Attendant Pushes It from Car to Car

dining car are catered to by a "wagonette service," an innovation that is being given a thorough test. A small, light, and neatly built wagonette, of the domestic tea-wagon type, with three shelves, is loaded in the dining car with simple and inexpensive lunch material, and hauled or pushed through the coaches by a white-clad attendant, who serves passengers in their seats with whatever they wish. The freight of the white-enameled wagonette is temptingly displayed and includes sandwiches, lunch boxes, cold meats, pies, fruit, milk, and hot coffee and chocolate in vacuum bottles, with the necessary crockery and silverware.

1315 SURVEY OF STATES SHOWS MANY TRACTORS IN USE

A census of the number of farm tractors, gasoline and kerosene, which are in use in the United States at the present time shows a total of more than 34,000 machines. While the figures for some of the more sparsely settled states may not be quite accurate, neverthe-

less the compilers believe the survey gives a very fair idea of the widespread use of tractors for agriculture. Illinois leads all the states with 3,202 machines, while Kansas is second on the list with 2,287. Two other states, Iowa and Texas, are listed as having just a few more than 2,200, while North Dakota has 2,137. Arizona and Nevada are credited with 23 and 19, respectively, and 1,210 is the total for New York State.

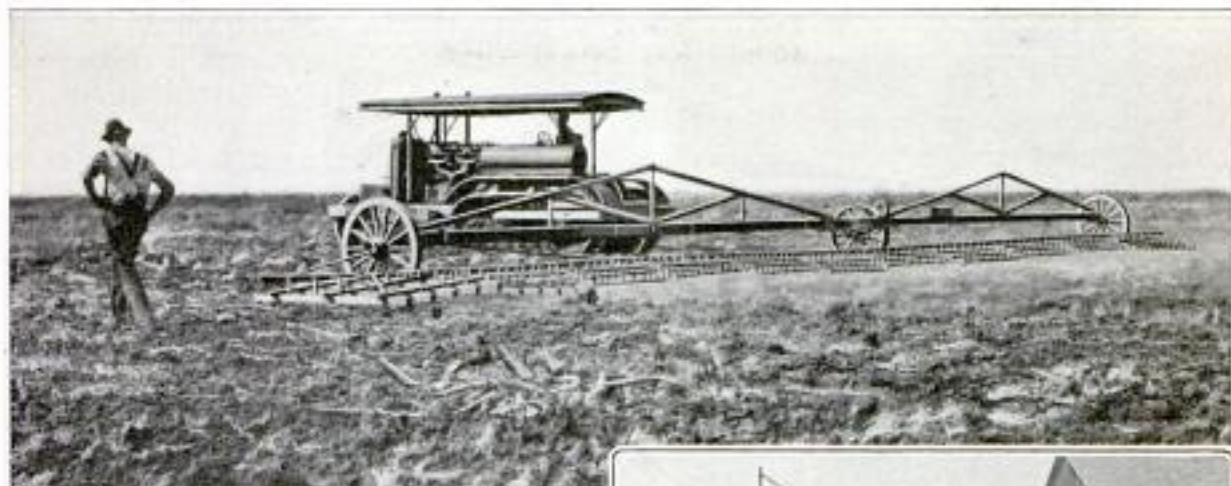
CANCELLATION STAMPS ON MAIL BOOST WAR BONDS

Terse patriotic appeals, incorporated in the stamps used to cancel postage on letters, etc., have been employed with marked success by the Canadian government in advertising its war bonds. Practically every one in the Dominion who receives mail is confronted again and again with such legends on his letters as, "Save Your Money: Lend It to Your Country," and "Help to Win the War: Buy War Savings Certificates." The United States government has seen the tremendous advertising power of such a plan, the cost of which is comparatively little, and is to popularize its "liberty loan" in a sim-



Canadian Government's Method of Obtaining Dominion-Wide Advertising of Its War Bonds, Practically without Cost: These Cancellation Stamps Are Sure to be Read by Practically Every Canadian

ilar manner, it is announced. Letter boxes and post-office walls are to be placarded for the same purpose.



New Harrow Evener, Which Covers a Swath of 80 to 100 Feet, at Work in the Field

IMPROVED HARROW EVENER WITH A WIDE SWATH

An extra-wide swath is made, with a consequent saving of labor, by an improved harrow evener recently patented. This device provides means for holding together a large number of separate harrow sections in alinement, so that they may be drawn along the ground by a tractor. It also folds up, when the harrow sections are removed, in such a way that the whole implement can be transported like a vehicle from one point to another, as required, with the harrow sections piled upon the rear end. A total width of from 80 to 100 feet of ground sown to seed, or newly broken, can be harrowed or evened at one passage of the machine over it, when extended with the harrows assembled in place. There are three carrying wheels, the central one supporting a horizontal ring of metal on which two long trussed arms pivot, with a ground wheel at either end. The harrow sections are connected to and drawn by these long arms.

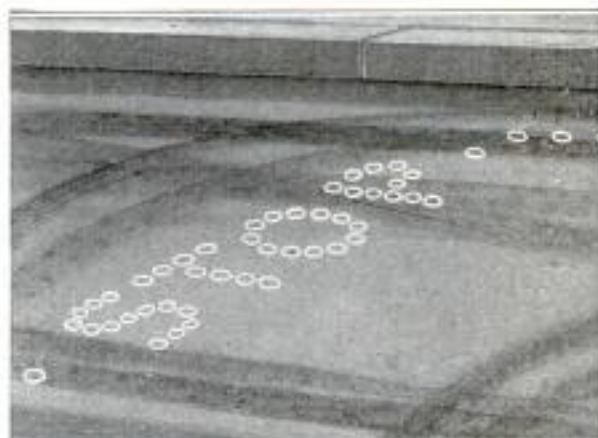
SAFETY SIGNALS NAILED TO CITY PAVEMENTS

Small metal disks nailed to the street pavement so as to form words of command and warning are used as signals to motorists in Los Angeles. The disks are about 1½ in. in diameter, of



The Harrow Folded Together at the Central Wheel for Transportation

bright metal, and the system appears to be proving more satisfactory than the painting of signals on the pavement, as paint quickly wears off where traffic is heavy. One advantage of the pavement signal, such as "Stop," is that it not only brings the motorist to a halt but shows him just where to stop his car, and pedestrians can govern themselves accordingly. By the Los Angeles system a safety zone is provided for persons crossing the street, the limits of this zone being also plainly marked in the pavement.



This Shows the Signal to Motorists, "Stop," Marked in the Pavement with Metal Disks Arranged so as to Spell the Word. Paint Wears Out, but the Metal Retains Its Brightness and Visibility

ELECTRIC DIRECTORY HELPS HOTEL GUESTS

Several hotels in New York have installed in their lobbies an electric directory for the guidance of their



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Using an Electric Directory in the Lobby of a New York Hotel: Pushing a Numbered Button Lights Up the Section One Wishes to Visit and Shows How to Get There

guests to points they wish to visit in the city. A metal directory board exhibits a city map, divided into 56 numbered sections, each lighted by a six-volt lamp controlled by a push button with a corresponding number. An index book gives the visitor the number of the section in which any street, building, or point of interest is located, as well as the name of the proper transportation line; and pushing the button of that number lights up the section on the board and shows its relative position and distance from the hotel.

ONE-ARMED SOLDIERS SHOW ABILITY TO DO FARM WORK

As a result of a scientific study of the effectiveness of artificial limbs made by certain European investigators it appears that men with crippled arms are becoming so proficient that they can do almost a normal amount of certain kinds of labor. According to

recent statistics agricultural laborers make up a large percentage of the war cripples. It is asserted that all those who have been farm laborers and have retained as much as one-third of an injured arm can, and should, resume agricultural pursuits, after suitable reeducation with artificial attachments. In a competition in digging, several men, each of whom had lost an arm, actually got through quicker than those who had lost a forearm and even quicker than two-armed men. The zest of the contest, which was not of long duration, is considered in part responsible for the gratifying showing. In harvesting, those who had lost an arm or a forearm each, reaped slightly more than what would be considered a normal man's work for the same short period of time. In reaping, which continued for three days, four one-armed patients accomplished very nearly as much as regular laborers would accomplish.

Arthur Allen

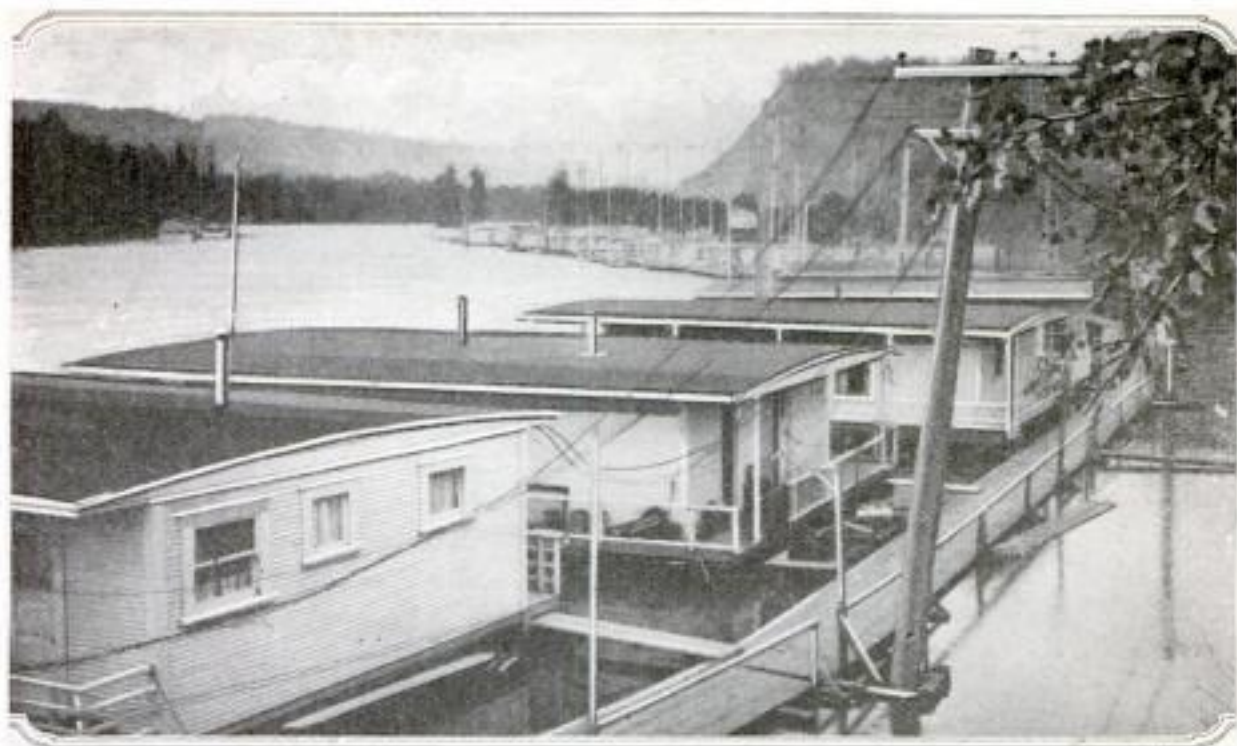
CARBON DEPOSIT REMOVED BY COLD-WATER DEVICE

Automobile troubles arising from deposits of carbon in the motor may be cured by a small cylindrical brass device recently



placed on the market, which is claimed to perform the fourfold function of a decarbonizer, a primer, a preventive of backfire, and an automatic "breather," or auxiliary air intake. The device is inserted between the carburetor and the intake manifold, and in operation is connected by a rubber hose to a supply of cold water. The motor being started, its suction draws water through the decarbonizer into the combustion chambers, where it is turned into vapor and breaks up the carbon to be carried out by the exhaust.

to be carried out by the exhaust.



General View of a House-Boat Colony on the Willamette River at Portland, Oregon, Where Many City Folk Make Their Homes during the Summer in Floating Abodes Like These

HOUSE-BOAT LIFE ENJOYED IN RIVER COLONIES

SEVERAL colonies of house boats along the Willamette River at Portland, Ore., afford the occupants an enjoyable mode of life during the summer season and some of the boats are used as dwellings all the year round. They are moored side by side along the river bank, sometimes connected by board walks, and are within easy reach of the business center by car lines. Young women engaged in business offices and



Fishing for Breakfast from the Rear Porch of a Willamette House Boat: Before Going into the City for the Day's Work in an Office, the Young Woman in the Photo is Trying Her Luck in Momentary Expectation of a Good Catch



After the Daily Business Grind in Portland, the Fair House-Boat Resident Enjoys the Evening Swim

stores, as well as young men, find the house-boat life most attractive, healthful, and economical, and club together to meet the expense of purchasing a boat and keeping house. A simply furnished house boat in an inexpensive colony may cost anywhere from \$100 to \$500, while in the more pretentious river colonies there are two-storied boats costing \$1,500 and



Typical House Boat of the Willamette River Colonies: This One Has Four Rooms and Bathroom. Entrance from the Board Walk Is at the Rear. Note the Ideal Diving Platform, the Flower-Bedecked Porch, and the Big Logs on Which the House Floats

upward. Furnishings have a similar range of adaptability to the owner's pocketbook, but the clear waters of the Willamette are free to all, the driftwood of the river furnishes fuel, electric light is obtained from the city system, and the usual moorage charge is \$3 or

\$3.50 a month. The harbor patrol keeps a keen lookout for fires among the house boats. Most of the boats are built on a platform of logs, and nearly all have screened front porches that are used as living rooms during the hot weather. The early morning or evening swim can



At the Left Is a Screened-Porch Living Room; at the Right the Kitchen and Pantry of a House Boat, All Displaying the Comforts of a Real Home

be enjoyed by simply diving off one's porch. Sometimes, when the fish are biting, breakfast or dinner can be taken from the river, and many of the house-boat folk find that while enjoying all the comforts of home and city life in their floating abodes, they

can at the same time cut the high cost of living very materially. In the summer many of the boats are floral bowers, being almost covered with flower boxes and hanging baskets.

COMBINED MOVIE CAMERA AND PROJECTOR

Motion pictures can be both taken and projected by anyone without previous experience, according to the claims made for a new machine that is a combined camera and projector. The construction is almost as simple as the operation and the invention is especially intended for home and business uses, such as filming the baby or one's friends in social activities, or demonstrating the operation of machinery to prospective customers. The cost of the combined machine brings it within general reach. Completely equipped, the camera weighs about five pounds and has a magazine capacity of 200 ft. of film. Standard film is used, also the usual finder, side focusing device, automatic footage register, and speed regulation. The change to a projecting device is made in about two minutes, including the substitution of lenses, adjustment of film reels, and attachment of a lamp house with a 400-watt electric lamp, supplied with current from any lighting circuit. The same crank is used in taking and projecting pictures.

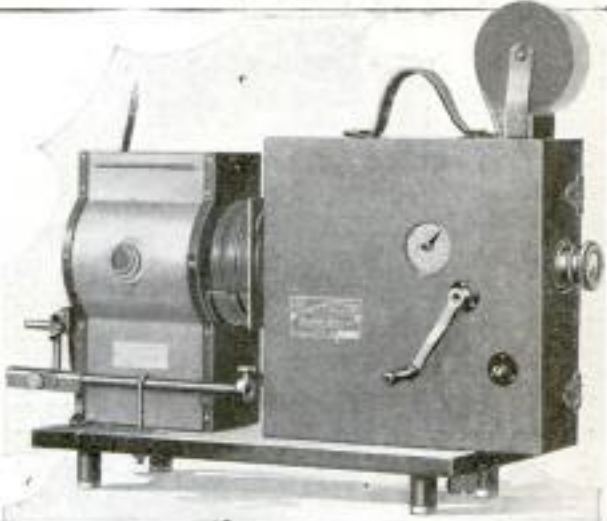
"SUITCASE" LABORATORY FOR LAUNDRYMEN

A chemical testing outfit that can be carried in a container no larger than a suitcase has been designed especially for laundrymen, so that



Compact Chemical Testing Outfit Designed Especially for Laundrymen, with Which They can Make Tests of Their Cleaning Materials, Thus Avoiding the Cost of Analyses by Chemists

they themselves can test the cleaning materials they use and thus avoid the cost of analyses by chemists. Holders are provided in the case for each bottle, tube, etc. One side of the portable



Taking a Motion Picture with a New Combined Camera and Projector: At the Right Is a View of the Camera with the Lamp House Added for Projecting a Picture

4430 Helen St
Pittsburg

of Industrial
Copyrighted material

cabinet can be folded down into a horizontal position to serve as a shelf. The top of this shelf is hard and white and attached to its center is a metal base in which an upright, provided with adjustable clamps, can be inserted. This standard is used to hold tubes while tests are being made. The outfit includes bottles of standard solutions for testing the hardness of water, the presence of chlorine, of alkali, and of acid.

VACUUM MASSAGE MACHINE OPERATED BY ANY FAUCET

Water flowing from a faucet supplies the power for a new massage machine now on the market, which stimulates



A Massage Device Which Stimulates Circulation of the Blood by Creating a Vacuum in the Rubber Cup Held against the Skin

the skin by creating a vacuum in a cup held against the flesh. It is claimed that it does not pound and jar as an electric vibrator does and that in many instances the cost of operating it is considerably less than that of the electric machines. This apparatus consists of a cylinder, 6 or 7 in. long, open at one end, and having at the other a rubber cap which fits over a faucet. Projecting from the side of the cylinder is a rubber tube, to the end of which a rubber cup, or cone, of any desired size, is attached. As the water flows through the cylinder the air is drawn in through the cup and tube, and when the former

is held against the face the resulting suction brings the blood to the surface, stimulating the skin.

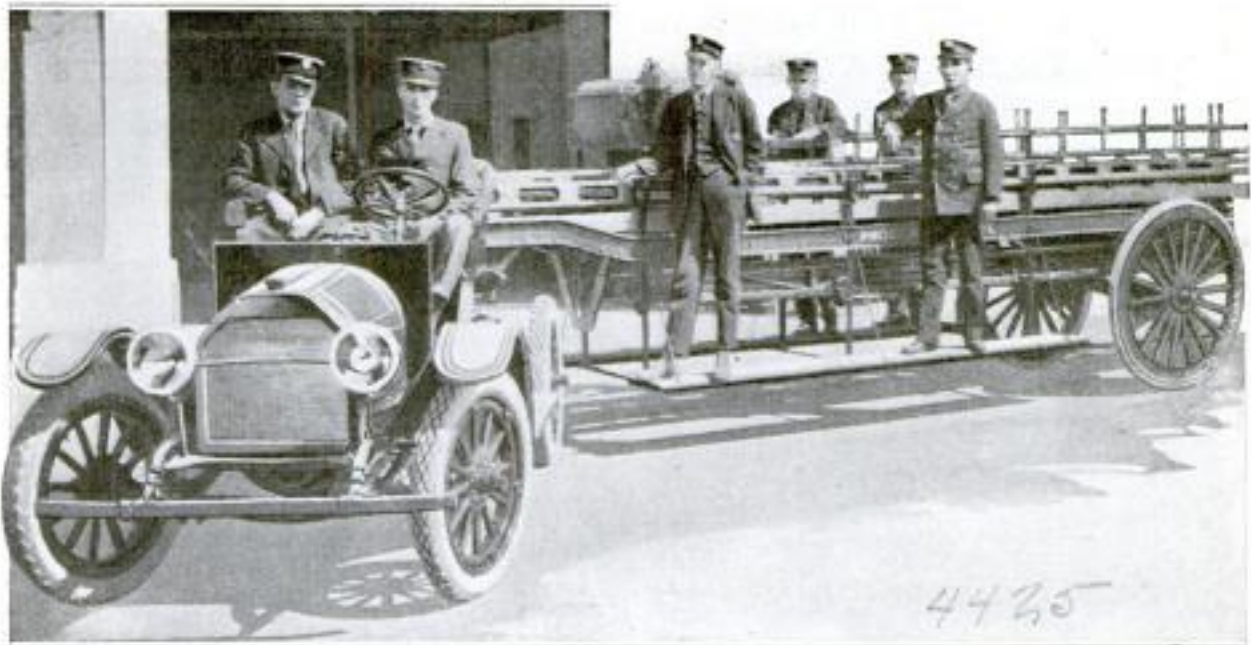
SELENIUM PROVES VALUABLE IN CABLE TELEGRAPHY

Of late years many important uses have been found for metallic selenium, and the true value of its properties are daily becoming more apparent. The element is a vital part of a recently announced invention that is reported to more than double the capacity of submarine cables. According to trustworthy information, the apparatus in use on some of the Atlantic cables has increased by about 125 per cent the speed of handling commercial messages. Selenium cells operate a siphon recorder and amplify the signals to such an extent that more than twice the usual transmission speed is obtained without lessening the legibility of the graphic records. Intense illumination of the cells is provided by a special arrangement which enables the concentration of 45 separate light beams upon a galvanometer mirror. The apparatus has increased the transmission speed in one Atlantic cable from 200 to 450 letters a minute, it is reported. Even better showings have been made in special tests.

CUBAN BASEBALL PLAYER "BONES" HIS BAT

A Cincinnati baseball player, a Cuban by birth, has been the subject of not a little good-natured banter because he "bones" his bat, that is, he rubs it with a calf's bone to fill up the crevices. This, he claims, is much to be preferred to scraping a bat with a piece of glass, as many players are in the habit of doing.





Auto Ladder Truck Built by Firemen from a Discarded Patrol Wagon and an Old Horse Truck

AUTO LADDER TRUCK MADE BY CITY FIREMEN

When the fire chief of a western city found that he needed an \$8,000 auto ladder truck, while his appropriation was exhausted, the loyal firemen at one of his stations came to the rescue by making a very creditable piece of apparatus of the kind desired, mostly of material that had been junked by the city. The motive power and forebody were furnished by an old four-cylinder patrol wagon, discarded by the police. This was dissected and rebuilt as good as new, with the addition of an electric starter and extra-large gas tank. An old horse-drawn ladder truck was hauled out of the city's scrap heap, lengthened and strengthened, furnished with rubber-tired wheels and a swivel connection to the auto forepart, and the final result was a well-equipped and efficient ladder truck costing \$675 instead of \$8,000.

STEAM-HEATED KETTLES IN HOSPITAL KITCHEN

An example of up-to-date equipment for a hospital kitchen is to be found in the accompanying photograph which shows a battery of steam-heated aluminum kettles in the Cook County Hos-

pital at Chicago. Each kettle is covered and is partly inclosed by a jacket into which steam is injected. By this means the food in each vessel can be brought to any temperature desired. Odors from the cooking are carried out of the room by pipes.



Battery of Aluminum Kettles in Kitchen of a Chicago Hospital; These Vessels are Partly Inclosed in Jackets into Which Steam is Injected to Heat the Contents of the Kettles

4357

greatest

Access

"STAIRWAY" BUILT FOR WEAK FISH TO AID SPAWNING

What might be designated as a stairway for weak and small fish of those families which go upstream to spawn



Runway in a Nevada Stream, Comprising a Series of Low Artificial Falls Constructed so That Small or Weak Fish can More Easily Make Their Way Upstream to Spawn

has been constructed in connection with a diversion dam on the Truckee River, Nev., the object being to provide waterfalls or rapids which are not so steep or high that they will prevent the smaller and weaker fish from ascending. This run consists of several steps formed by concrete gates built one above the other and about three feet apart. The concrete walls either side of the gaps through which the water rushes when the headgate is open, help to form comparatively quiet eddies in which the fish can rest before making the next leap to a higher level. Owing to the character of the ground the run was constructed at comparatively low cost.

ABILITY OF AUTO-TRUCK BRAKES SHOWN BY TESTS

The large number of accidents in New York City which have been caused by motor trucks recently led to an interesting test of motor-truck brakes, which was participated in by the police, the object being to ascertain in how short a space one of these heavy vehicles could be brought to a stop. Seven trucks, ranging in capacity from one to six and one-half tons, were tested both empty and full on a dry asphalt pavement. The heaviest machine, loaded, when running five miles an hour, was brought to a stop in 1 1/2 seconds and traveled 8 ft. after the brakes were set. When running 14 1/2 miles per hour it traveled 20 ft.; the one-ton machine when going five miles an hour with a full load, went 5 ft. 4 in., and when its speed was 20 miles per hour it traveled 44 ft. 11 in., all after the brakes had been set. Tests were also made at 10 miles per hour. The records of the other machines, generally speaking, corresponded with those given.

Auto Access

TIRE COVER SAFEGUARDS AGAINST COLLISIONS

A motorist has painted the spare-tire cover, attached to the back of his car, with black and white stripes. This makes the case very conspicuous even at night and so serves as an extra safeguard against rear-end collisions, which are now so frequent.



CA Japanese scientist is reported to have invented a submarine magnet with the aid of which thousands of projectiles have been recovered from the comparatively shallow water into which they have been fired during target practice.



Above is Shown a Coal Hod Shattered by a Bomb Explosion Which Occurred in Boston Courthouse, Killing Two Men. The Other Fragments were Collected in an Effort to Learn the Identity of the Bomb Maker. At the Right is a View of the Wash Room After the Explosion Occurred. The Bronze Door Knob Shown at the Left was Pierced by a Flying Piece of Metal

IMPERILED BOSTON PUBLIC STUDIES BOMBS

Because of a recent fatal explosion in the Boston courthouse and the discovery of infernal machines in other Massachusetts cities, effort is being made, in Boston particularly, to familiarize the public with the appearance of bombs of various sorts. The state chemist has prepared an exhibit consisting of a suitcase containing imitation bombs, to show what bombs look like and how they are carried, so that people generally will be cautious about handling strange packages. Two men were killed in the blast referred to, which took place in a lavatory near the room in which the supreme court was sitting. One theory is that some vengeful person left a suitcase containing a bomb in the lavatory and that a

janitor, who was one of the two killed, found it and, ignorant of its contents, was carrying it away when the charge went off. The bodies of the two men killed were blown to pieces and the near-by rooms wrecked. Soon after this an unexploded bomb was found near a Plymouth, Mass., factory, and some time since one was found near the statehouse. Some of the bombs seemed to have had a common source.



Exhibit Consisting of Suitcase, Containing Imitation Bombs Prepared by the Massachusetts State Chemist so That the Public could Familiarize Itself with the Appearance of a Common Type of Infernal Outfit

RAILWAY PLANS TO EMPLOY MANY WOMEN

Many of the great industries of the country have already begun to lay plans for the employment of an increased number of women to meet the scarcity of male employes which the war is creating. The Pennsylvania Railroad, for example, has notified the general superintendents on its lines east of Pittsburgh, to

ascertain the occupations in which women and girls can be employed and the probable number of places they could fill. No men will be dropped from the pay roll, the railroad has announced, but some may be called on to change their occupations. The proposed changes will not affect clerical work merely, but very probably will include some of those engaged in telegraphy, telephony, signaling, train dispatching, ticket selling, light machine-shop work, and car cleaning.

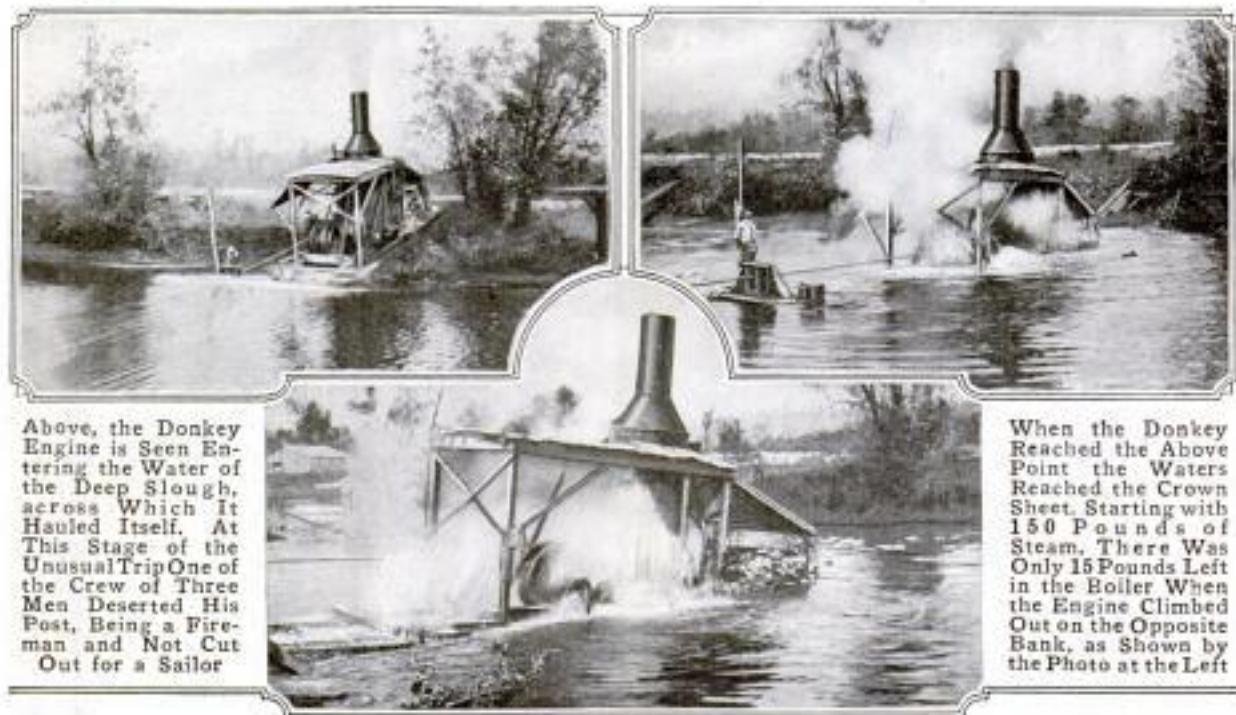
4400 DONKEY ENGINE STEAMS —ACROSS A SLOUGH

A donkey engine employed in clearing land on the lower Columbia River, Ore., made a record for itself by crossing a deep slough under its own steam not long ago, when no scow was available for its transportation to a new setting. The slough was 160 ft. across, several feet deep, and had rather steep banks and a soft bottom, but the engine forded it safely, although the water at one point reached the crown sheet of the fire box. The steam gauge showed 150-lb. pressure when the engine was fired up for the trip, and 15 lb. of steam was left when it landed on the opposite bank.

ORGANIZE "PIG CLUBS" TO INCREASE MEAT SUPPLY

As a means of increasing our meat supply the Department of Agriculture is urging bankers to aid boys and girls in the forming of "pig clubs." These groups, which already have a membership of over 30,000, are engaged in raising pigs. The assistance provided by banks is in the form of money loaned to the boys and girls for the express purpose of enabling them to buy pigs. The regulations of these groups vary, but all include an agreement on the part of the children to exercise proper care in the raising of the animals. The written consent of the parents is secured when a child obtains money from the bank, and the parents agree not to claim any right in the pig purchased. In some cases the club member gives a promissory note, payable when the pig is sold. Another method, called the "endless-chain plan," is for the child to cancel its debt in part by giving the banker two gilts from the first litter, to be put out to other boys and girls.

☐ Bicycle riding is very popular in Palm Beach, Fla., the hotels there having some 2,000 bicycles which they rent to guests.



Above, the Donkey Engine is Seen Entering the Water of the Deep Slough, across Which It Hauled Itself. At This Stage of the Unusual Trip One of the Crew of Three Men Deserted His Post, Being a Fireman and Not Cut Out for a Sailor

When the Donkey Reached the Above Point the Waters Reached the Crown Sheet. Starting with 150 Pounds of Steam, There Was Only 15 Pounds Left in the Boiler When the Engine Climbed Out on the Opposite Bank, as Shown by the Photo at the Left

COURTESY OF THE TIMBERMAN

COMMENT AND REVIEW

WHEN the word first went out to our people to stop wasting, it was repeated so rapidly and so often that in a few hours the message had lost its original meaning. The necessity to husband our food supplies and exercise every caution against needless waste still confronts us, and will until one year after the war ends. But automatically to stop the usual, normal expenditures for other ordinary necessities and requirements is quite another matter.

*Save, but
do Not
Hoard*

Will anything short of actual food restriction bring our people to realize the tremendous, wicked waste of food? It would be a sad comment on our intelligence if so. The food waste, to which every one of us must plead guilty, is so great that every day in the city of Chicago alone 1,250,000 lb. of food-stuffs are dumped into the city's garbage cans, while the waste in the entire United States would sustain life for every man, woman and child in our thirteen largest cities. Here is where we can all help, even the children.

In the city of Philadelphia is a very wealthy man, now retired, who started life as a poor boy. His father had died, leaving the mother and several children. These children were allowed to have sufficient food, but her constant admonition was, "Never take onto your plate more food than you intend to eat." So thorough was this training that all through life he has observed it, and with all that money can buy at his command, he today never takes upon his plate more than he is certain he will eat. Every boy and girl can help in this, and at the same time enlist their parents in a reform which does not restrict the quantity of food, but does stop a wicked waste.

We should cultivate the spirit of saving, but not carry it to the extreme of hoarding which, when general, upsets all the machinery of business life. Nor is there need of it, for never in the history of this country has so much money been spent in the same length of time as will go into circulation by reason of war preparation. Every farm, factory, industry, mill, shop and railroad will be called on to exert its utmost efforts. Many establishments will run night and day and then be unable to keep pace with the demand. Everyone, man and woman, who is willing to work will be employed at good wages.

Just now we are in the position of the swimmer who has plunged into very cold water: It takes his breath away, and for a moment he hesitates. Then comes the exhilaration, and with conscious strength he strikes out boldly in full confidence of what he is doing.

The billions which the Government is already spending and will expend practically all go immediately into circulation here in payment for services and material, and extend to the most remote points. Markets for every sort of produce and goods, the yield of mine and forest, the output of every kind of manufactured thing, will be alive with activity; and while no thought of stimulated industry entered into our decision to fight for universal freedom, the result will be a period of unusual material prosperity. As the President aptly says: "It is evident to every thinking man that our industries, on the farms, in the

shipyards, in the mines, in the factories, must be made more prolific and more efficient." We need more business, not less. Now is the time to open the throttle.

Don't waste; don't hoard; be normal; get busy.



EVERYONE who can possibly do so should buy one or more of the war bonds known as the Liberty Loan. Banks, capitalists and other investors are already doing so with liberal subscriptions, but the loan should be as widespread as possible. In England, as soon as the war bonds were issued in small denominations, the general public took bonds amounting to millions of dollars. Certainly our citizens will be no less patriotic. These bonds are issued in units as small as \$50 each, and throughout the country banks and trust companies are arranging to furnish these bonds on the partial-payment plan. Let everyone who can save and is willing to help, do his bit by taking his part of the Liberty Loan.

*Buy
a
War Bond*



HUNDREDS of thousands of city workers who are allowed a vacation this summer should plan to spend it on a farm. The shortage of help on our farms is greater this year than ever before, due partly to the patriotic effort of our farmers to plant every available acre. Two weeks of outdoor life on a farm will be not only a new and pleasant experience to those who have never tried it, but will do wonders in building up physically for the entire year. It is not so much the time spent in idleness which constitutes a real vacation as a complete change in one's everyday work. Farm work is much lighter than formerly, owing to the general adoption of labor-saving machinery, and a large part consists in riding where a few years ago the operator walked. While the city man may not be qualified to perform properly all kinds of farm work, there is plenty he can do, and when given the chance is likely to surprise his farmer employer by his readiness to learn and efficiency shown. Aside from the satisfaction of doing something worth while for our country, the return in health and strength which outdoor exercise affords, and the money earned instead of spent at a resort, there is a positive asset in this getting together of the city and the country man. Each will be surprised to discover what a lot of valuable experience the other fellow has, and how much each can learn from the other to mutual advantage. The farmer will find out the city boys are not all "dudes," and the city lad will realize the modern farmer is anything but a "rube." There will be some disappointment, of course, but the majority on both sides will make good. Don't wait until the last minute, but get in touch with some farmer at once. This can easily be done through the bureaus conducted by daily papers in all cities. You may raise a few blisters on your hands, but you will raise a tremendous appetite at the same time, and the rich

*Vacation
on
Farms*

tan and fresh blood will more than compensate for a few lame joints the first day or so. Many will know for the first time the joy contained in an old oaken bucket, and that new-mown hay has a fragrance which no amount of money can purchase at the perfumer's.



NOW is the time for work; work for men and women, boys and girls; for earnest, energetic, useful work. Leisure has its attractions, and easily becomes enervating; luxury is alluring to the onlooker, and trails a host of ills and pains; but work, real work, is the key to a happy mind and a sound body. With unprecedented prosperity and fortunes made as by magic, it is high time as a nation we restore good, old-fashioned manual labor to the dignity and respect it deserves and formerly had. He or she,

*Work,
Everybody
Work*

young or old, who speaks sneeringly of honest work with their own hands, or anybody else's hands, should themselves be sneered at and snubbed as snobs. It is by no means those of largest wealth who deserve rebuke in this respect — Marshall Field III, the richest boy in the United States and barely old enough to vote, enlisted a few days ago as private in the United States Cavalry.



APPARENTLY few people in this country have begun to estimate the war at anything like its full significance. When the war opened it was generally believed, even in parts of England, that six months would see its end. The late Lord Kitchener was roundly criticised when his first public comment was uttered that the war would last fully three years. Were he alive today he would doubtless feel justified in extending his prediction two or three years longer.

*The War
No Passing
Effort*

On this side the public, with only their hopes as a basis of judgment, declared it would not only be soon over, but could never involve the United States. Time has now prolonged the struggle into nearly three years, and the United States is itself in the war. We must not allow our own sanguine hopes, which are steadily fed with suitable propaganda from Germany, to longer deceive ourselves. Germany has today 9,000,000 soldiers. Our own Ambassador Gerard tells us that while Germans do not have as many foods as in peace times, nor as much, a condition of starvation there is a very remote possibility. And he declares the world will look in vain for a revolution similar to that in Russia, at least during the period of the war.

On the other hand, German intriguers in every country, large and small, are working at supreme effort in sowing seeds of discord. Those who know the South are well aware of the effort put forth the past few months in all the southern states to incite the colored people to an uprising against the whites, one of the many rewards promised being that laws would be passed authorizing marriage between black and

white, in that near future when Germany should be in control here. That the colored people of the South refused to be disloyal to their country is creditable to their good sense and patriotism, but the attempt did not fail for want of earnest efforts on the part of our enemies.

While the clash of arms is yet beyond a wide ocean, the sun does not set on an idle enemy, whose long-cherished plans of two generations for world domination are daily being unfolded.

A large number of our easy going, who assume to be informed but are far from it, still refuse to consider these plans seriously. They are the same careless thinkers who in August, 1914, confidently declared the war would not last six months.



GERMANS in Germany do not understand us. They think they do, but they don't. At this writing war with Germany has been declared some six weeks. Although practically in a state of war with this country for months, Germany has not considered the incident as worth acknowledging by a similar official declaration on her part. The German administration smiles indulgently and says we are only bluffers — there is no backbone or substance to us.

*Germany
does Not
Understand
Us*

At the head of a great daily in Berlin was a man named Doctor Dernburg. From this position he was called by the kaiser for special service, part of which was a visit to this country two years ago. He came on an errand of propaganda, but so clumsily did he work that he was soon requested to depart. While here, during a private conference, he spoke at considerable length on the instability of our national life, and based it on the "fact" (!) that we were only a nation of monumental bluffers. "Why," said he in proof of this, "your national game is poker, which is essentially a game of bluff." Parenthetically it might be proper to remark that if some of the poker-playing boys in the neighborhood of the Rocky Mountains ever happen to stray over toward the front their arrival will not have to be announced.

We are not deceived about ourselves, however. We are intensely unprepared. Because our people repudiated even the thought of conquest, we entertained a lovely but mistaken theory that all other nations felt the same. Now we know better. In characteristic American fashion we bend all our energies to getting ready, even at a late day. Germany had one million fully equipped soldiers actually on the march within three hours after war was declared. Our inability to put half that number under arms in three months is creditable to our heart, but not our head. Only the other day 1,500 college men from Harvard, Yale and Princeton assembled at Marblehead, without any preparation whatever having been made to receive them, and they had to go back where they came from. We have only begun to organize. Such mistakes as Marblehead will be ironed out. Every day will bring order out of confusion, and we soon will be in shape. So far as we are prepared we are well prepared, as, for instance, the United States destroyer squadron which crossed the Atlantic and

before anchors had scarcely touched bottom replied to the British admiral: "We are ready now."

The American young man can learn fast, think quickly, and act instantly; he can be depended on to do all these now his country needs him. Events will surely give the Prussian occasion to revise his opinion of us as a nation of arrogant bluffers and mere dollar makers.



SIX weeks ago Congress declared war. What it has done since, or rather failed to do, is anything but creditable to itself or the country. Many members have impeded the passage of bills with artificial

*A
Slacker
Congress*

debate; they have resorted to all manner of technicalities; they have burdened good bills with bad riders and jokers, and, in short, have blocked the wheels of legislation at every opportunity. Their excuse for their unpatriotic action is this or that personal hobby: It is to be hoped they are at least sincere in this, and that their action comes from lack of judgment and not from lack of loyalty. The fact remains, however, that some in support of their personal views have consistently rendered service to the enemy to a degree which strains the patience of patriotic Americans. The conviction is certainly taking root that the 88-per-cent professional (more accurately, politician) contingent in the two branches of Congress will eventually have to be replaced with 88-per-cent sound and successful business men. The latter may not count for much on the stump, but when it comes to sawing wood are the real thing. A good business man, for instance, would hesitate in these times of excessive taxes to vote a pork bill of \$27,000,000 for rivers and harbors, when on March 1, 1917, there was \$32,000,000 still unspent from the previous year for the same purpose. Yet this is precisely what Congress is trying to do, and then justifying the startling precedent of a retroactive tax because, as one of them writes me, "Uncle Sam needs the money." As the Chicago Post says: "Why not repeal the appropriation for rivers and harbors, flood control and public buildings, all largely pork bills, and without which the country can easily get along a few years more?" This country has admittedly been long-suffering and kind with its politicians, but even a politician may easily go too far.

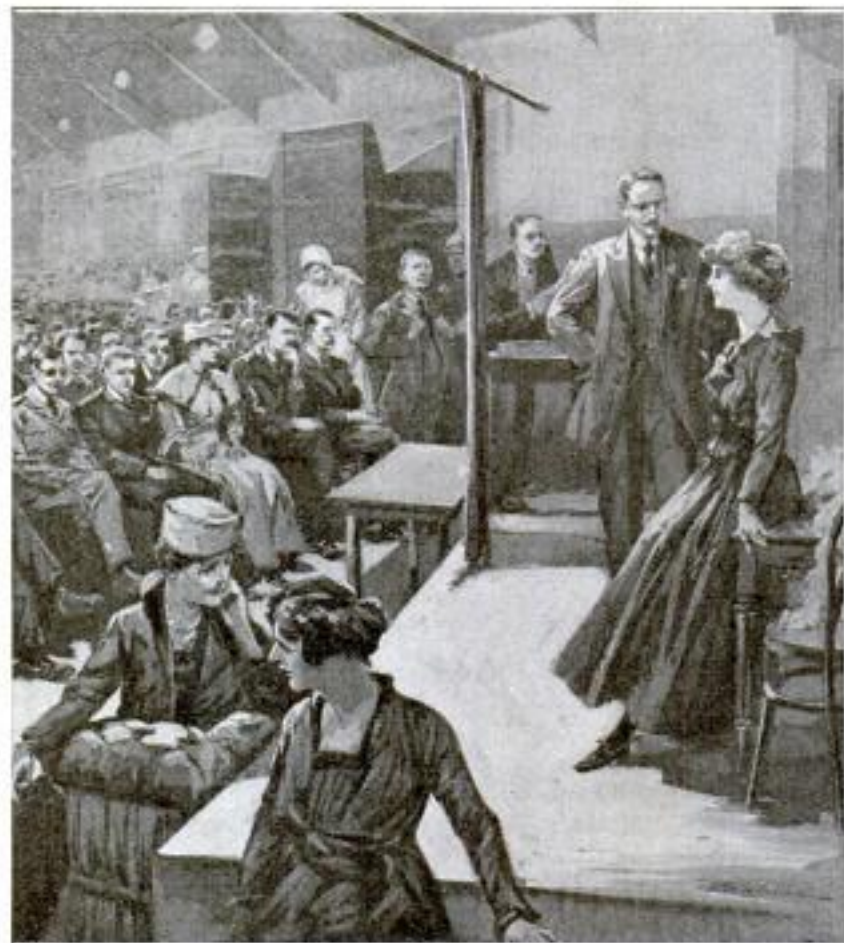
H. H. WINDSOR

May 19.



BLIND SOLDIERS "SEE" PLAY GIVEN ON BARE STAGE

A curious, not to say pathetic, spectacle was presented in London recently when a well-known play was enacted



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Strange Theatrical Performance Given in London for the Entertainment of Blind British Soldiers: The Players Wore Their Street Clothes Instead of Costumes, the Stage Was without Scenery, and a Teacup and a Telephone Bell Served as the Properties

before a large audience by actors who wore their street clothes instead of costumes and played on a stage utterly bare of scenery. The only properties used, aside from one or two pieces of furniture, were a teacup and a telephone bell. The explanation of this strange performance lies in the fact that the audience, with a few exceptions, was composed of soldiers who had lost their sight. To them stage settings, costumes, and lighting effects meant nothing, but every sound and the most subtle inflections of the players' voices were detected by the hearers with extraordinary readiness. That the

afflicted men were able to follow the action closely was indicated by their quick response to tragic and humorous lines. The action in one scene called for the breaking of a teacup, and in another the ringing of a telephone bell, hence the presence of these articles on the stage.

EXPERTS CONDEMN TALL SAPPY CORN

The growing of very tall corn—once a feat in which the farmer took special pride—is no longer looked on as desirable, according to the Department of Agriculture, for the producer is discovering that tall, coarse stalks add much weight to the load of fodder that he hauls to the feed lot, and that a large part of this excess is water. Additional unprofitable labor is necessary in hauling back to the field the uneaten stalks, along with the manure. Large, sappy stalks are not as profitable even for silage, experts say, as corn that has been planted early and is al-

most mature. As to the variety that is best to plant, it is pointed out that there is very little in a name because different lots of the same variety may produce quite different results. It is recommended that one use seed grown in one's own section, which has been properly selected and cared for.

☞ One person in every 25 in this country owns an automobile, making a total of 4,000,000 automobiles in the United States, according to statisticians. In their opinion these figures indicate that nearly every person who can afford a car now possesses one.

WAR SPIRIT REFLECTED IN LATEST STYLES

Clathery Women

Pringle's Co. N.Y.C.

Lord & Taylor N.Y.C.



A Brilliant Costume of Military Cut, Showing How Fashion is Reflecting the War Spirit: The Long Cape Is of Blue Serge and the Smart Shoulder Cape is Lined with Turkey Red. With This Garment the Military Sombrero Is Altogether Appropriate



More Distinctly Military and Plainer Than the Hat in the Central Picture Is This One of Pearl-Gray Felt, with the Brim Tilted Up in Rough-Rider Fashion and Held in Place by an Artillery Insigne and a Chin Strap of Black Patent Leather



Quite in Keeping with Military Clothes for Women Is This Cowboy Hat of Rich Golden-Brown Felt. The Broad Brim and Soft Crown are Adorned with Thongs of Patent Leather Laced In and Out, While Two American Flags Add a Patriotic Touch

Lord & Taylor N.Y.C.



The Three-Cornered Shape, Suggestive of Revolutionary Days, and the Red, White, and Blue Rosette are Happily Combined in This Black Velvet Hat to Typify Patriotism. Gold Braid is Used at Edge of Brim



In the Face of War-Time Scarcity of Leather the Resourceful Shoemakers have Turned More and More to Cloth. A Beautiful Example of Their Latest Products Is This White-Striped Pair of High Shoes

W. J. ... N.Y.C.

N.Y.C.

Photo Courtesy: Uncredited & Uncredited

PADS MAKE AUTO SPRING SELF-LUBRICATING

A new automobile spring is made self-lubricating by means of round, oil-saturated pads imbedded under the ends of the leaves. From these the oil is spread between the steel parts by capillary attraction, thereby preventing rust, squeaks, and undue stresses. The supply of oil is replenished through ducts provided in the ends of the leaves.



NEW LIGHT ON NATURE AND ORIGIN OF CANCERS

New and important data regarding the origin and growth of tumors and cancers have been secured by a scientist connected with the Department of Agriculture, who lectured on his investigation before the recent meeting of the National Academy of Sciences in Washington. The author expressed the belief that there is a very close relation between crown gall, a plant disease, and cancer in animals and human beings, and that both are of parasitic origin, which, so far as cancer is concerned, is contrary to the present

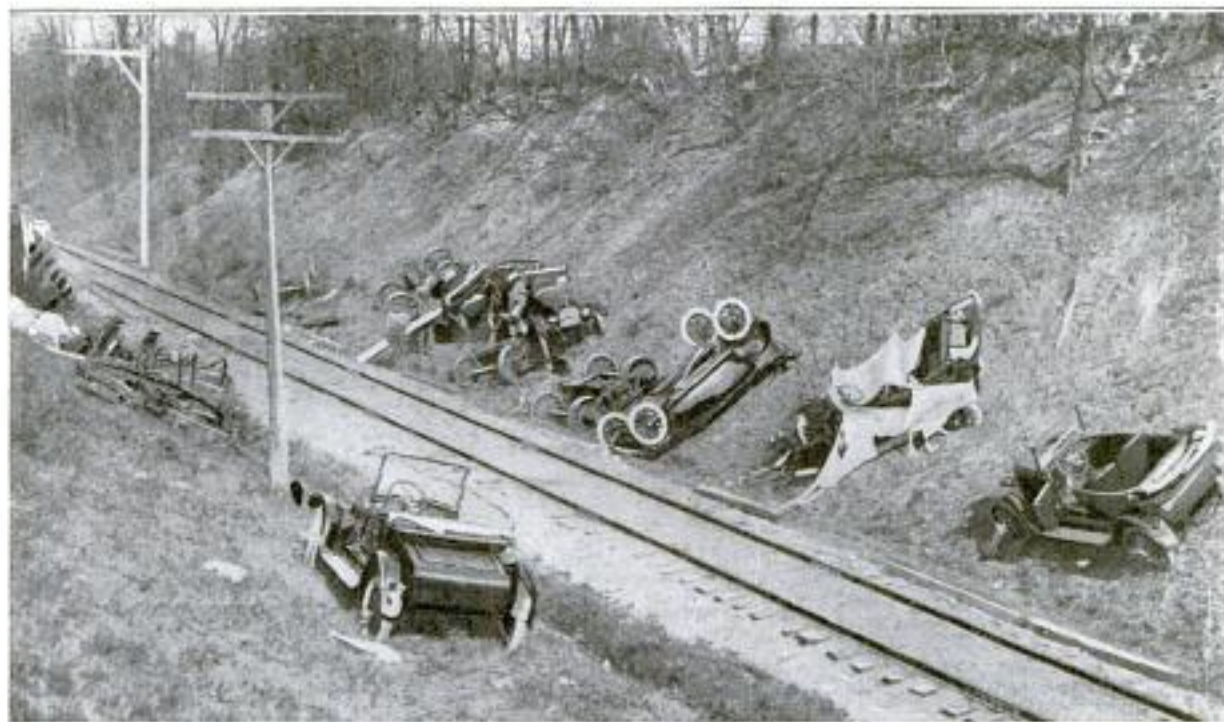
commonly accepted theory. During 16 months of study the investigator discovered a new type of crown-gall tumor which he has been able to produce at will by inoculating plants in particular places. This newer type corresponds to the most complex of malignant tumors in men and animals, he said. The scientist also believes that he has shown for the first time that tumors are due to chemical products of bacteria slowly liberated within the cells of the attacked plants.

"BIRDS" AND "BEASTS" MADE FROM SEEDS AND PODS

Ingeniously devised creatures of all sorts, made from seeds, cones, leaves, pods, bark, etc., are the product of a new woodcraft which is proving of fascinating interest to both children and adults. The variety of articles that can be made, and for which there is a market both in kindergartens and curio shops, is limited only by the ingenuity of the maker. By using halves of pine cones for wings, whole cones for bodies, burs strung on wires for legs, eucalyptus-seed pods for feet, and cantaloupe seeds for ears, these new craftsmen evolve groups of figures that include eagles with spread wings, ostriches, chickens, etc. Little pigs and opossums are made from camphor-tree pods. Hollow-tree crotches serve as rustic flowerpots. A little paint and shellac add to the attractiveness and durability of the articles.



Cleverly Fashioned Products of a New Woodcraft: Two Collections Showing the Interesting Objects That can be Made from Seeds, Cones, Pods, and the Like. The Flowerpots at the Right are Made from Hollow-Tree Crotches and the Pins on the White Cards are Made of Shellacked Leaves, Assembled to Look Like Flowers



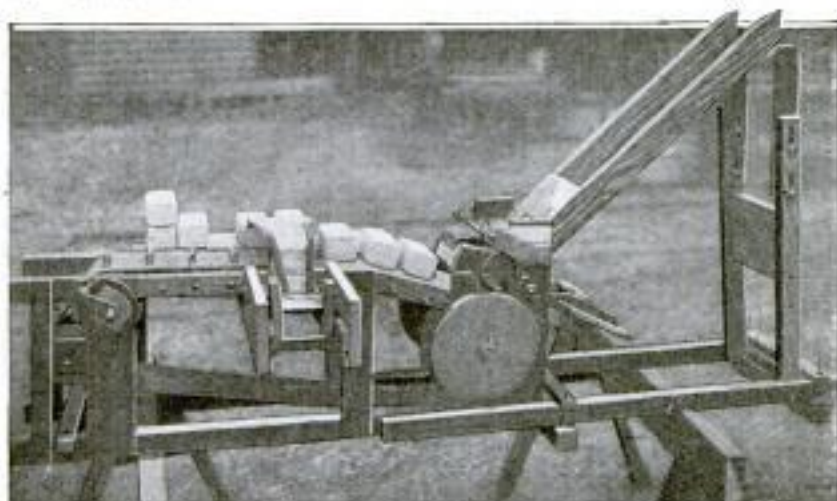
NEW AUTOMOBILES STREWN ALONG A RAILWAY TRACK

WHEN an axle broke on the rear car of a Norfolk & Western freight train near Cincinnati recently, and the car was overturned, the resulting wreck strewn along the track a number of the new automobiles with which the train was loaded. The photograph shows the odd sight presented when the single track was cleared of the wreckage, valuable autos and freight-car trucks being scattered on both sides of the right of way. Some of the autos sustained little damage; others were wrecked beyond repair.

AUTOMATIC FEEDER FOR BRICK REPRESS

A comparatively simple machine, especially suited for use in small or medium-size brick-yards, has been designed automatically to feed brick to a repress. The freshly cut brick are discharged, one at a time, from a chute onto an endless conveyor. The latter stops at stated intervals to allow a lever arm, called a shover, to push the two foremost bricks from the belt. As fast as the bricks are brought into position the process is repeated. The machine is intended to be so placed that it feeds directly into the repress, thus dis-

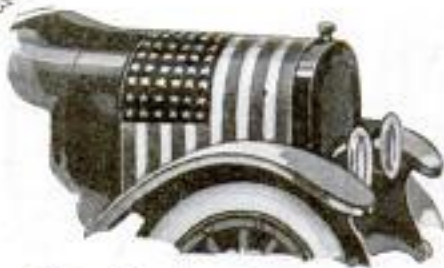
pensing with the transfer of bricks by hand, as is done in some cases. The inventor's plans also call for machines equipped with two or three shovers which will take brick from a single belt



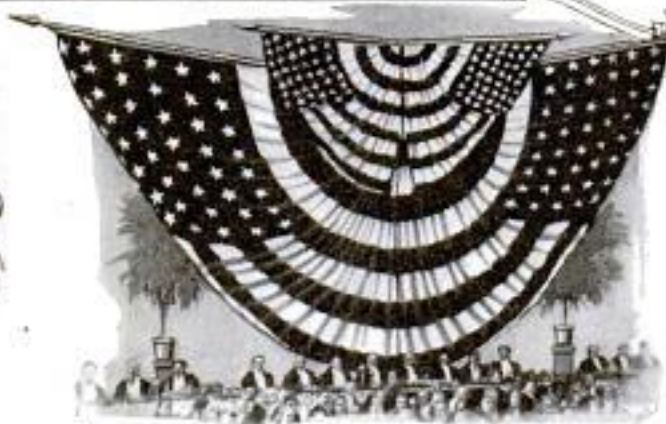
Hand-Operated Model of a Machine Designed to Feed Brick Automatically to a Repress: As Fast as the Brick are Brought in Front of the Arm Projecting over the Belt, the Arm Shoves Them Off into the Repress

and feed two or three represses at the same time.

MANY NOVEL WAYS IN WHICH THE NATION



View Showing One of Two
Flags Covering an Auto Hood,
the Other Being the French
Tricolor



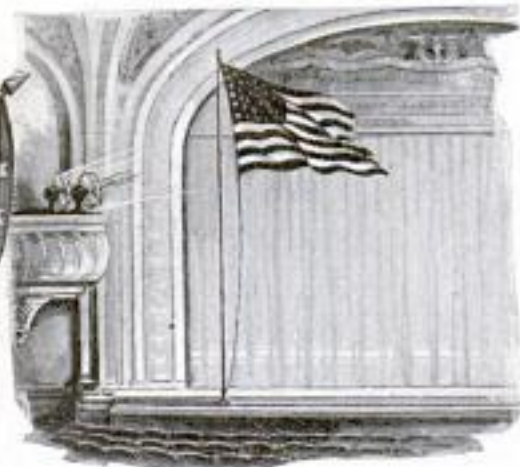
Four Flags, Very Artistically Gathered,
That Formed an Imposing Decoration Back
of, and above, the Speakers' Table at a
Banquet



Old Glory
between
French and
British
Ensigns on
Auto Hood



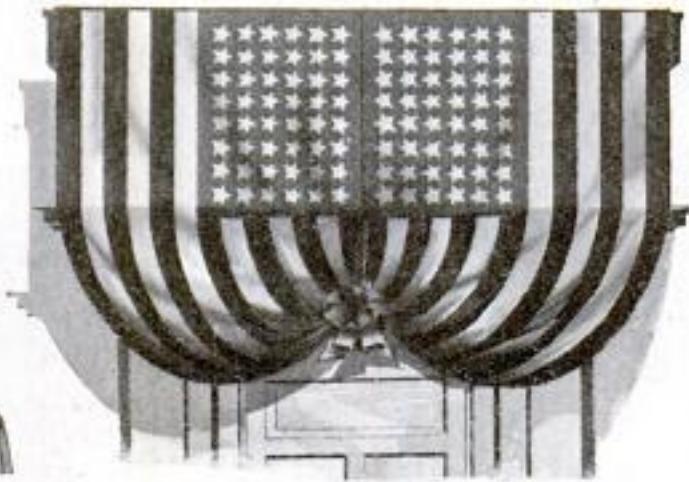
Fine Example
of Draping
about a Shield,
Worthy of
Careful Study



Emblem of Patriotism Effectively Dis-
played on a High-School Stage: An
Electric Fan Makes the Flag Fly as
If It Were Out of Doors



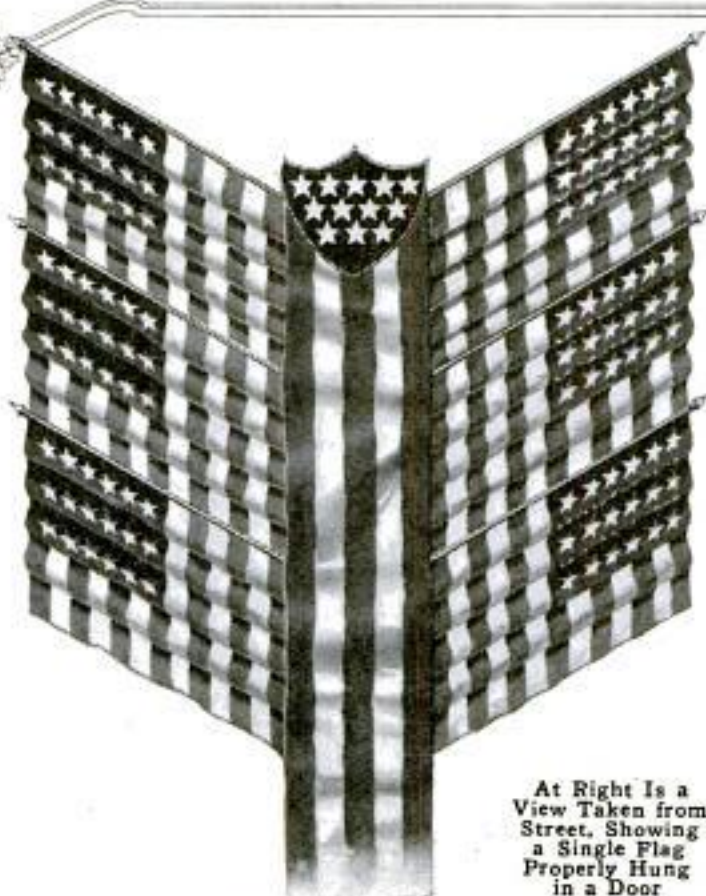
Two Flags Serve as a Pleasing
Substitute for the Usual
Draperies at the Rear Window
of This Limousine



The Proper Arrangement of Blue Fields,
When Two Flags are Hung Vertically
Side by Side, is Shown in This
Doorway Decoration

IS DISPLAYING AND DRAPING THE FLAG

American



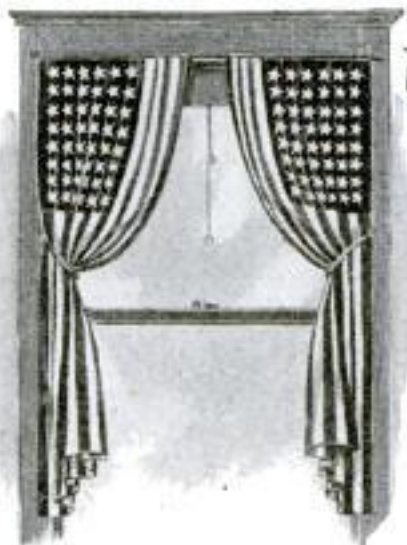
An Odd Decorative Effect for a Display Window, Produced by Placing Flags Containing Many Tucks Either Side of Ribbon Streamers



Auto Flag in Celluloid-Walled Case, Lighted by Bulb Concealed in Base



At Right Is a View Taken from Street, Showing a Single Flag Properly Hung in a Door



Here a Housewife has so Decorated a Window with Flags That They Take the Place of Curtains



Flag on Under Side of This Aeroplane Tells Its Own Story

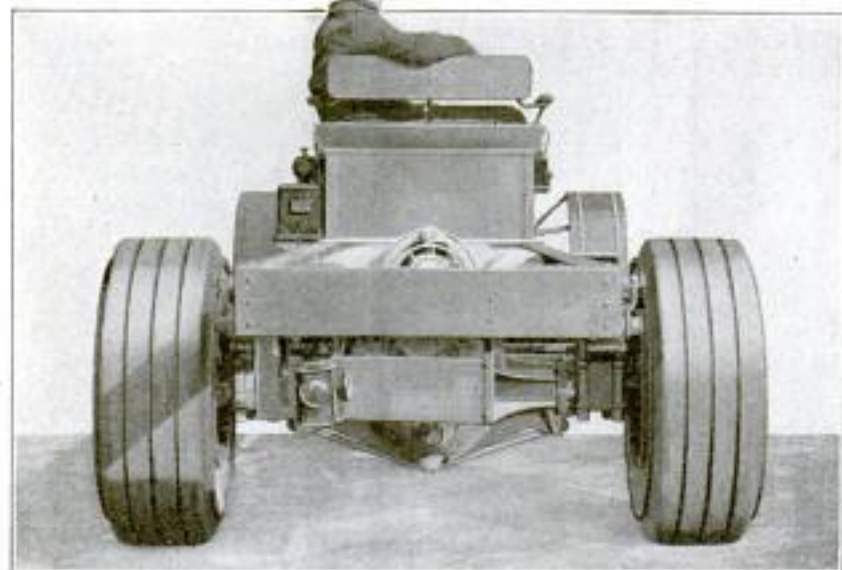


COPYRIGHT INTERNATIONAL FILM SERVICE
Flag Made of 2,500 Blossoms: Carnations Compose the Stripes and Blue Field Is of Cornflowers, Set with Starlike Cape Jasmine

HUGE TRUCK TIRES HAVE FOURTEEN-INCH TREADS

The demand for wide solid-rubber tires for six and eight-ton trucks, that are resilient and yet sufficiently

lasting, has resulted in the production by an Ohio company of 42-in. tires that are 14 in. wide. These are among the largest truck tires made. Careful study has shown that excessive internal stress on the rubber, as well as friction, is a destructive factor in the life of a tire. Narrow solid tires are able to expand at the sides at the point where the weight rests and so do not suffer undue internal stress. To make the same lateral expansion possible with this wide tire its tread is provided with three parallel grooves. These also aid in preventing skidding. A machine has been invented for regrooving these tires after they are worn down, without removing them from the rims.

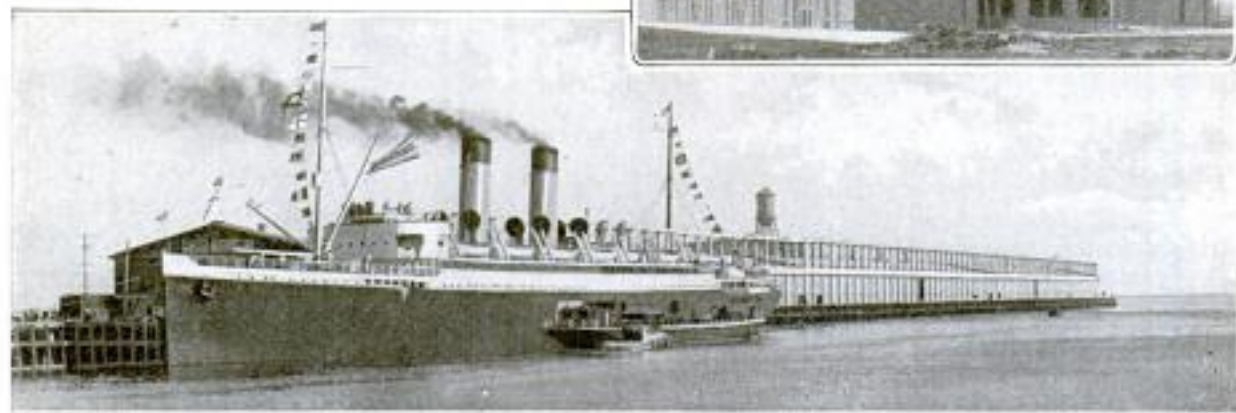


Six-Ton Truck, Equipped with 42-Inch Tires Having 14-Inch Treads: The Grooves are Designed to Permit Lateral Expansion of the Rubber at the Point of Greatest Stress. They Also Aid in Preventing Skidding

MAKING A GREAT HARBOR AT LOS ANGELES

Harbor improvements at Los Angeles are keeping pace with the phenomenal growth of the city's commerce, and plans now being carried out are expected to make the harbor within five years one of the first five seaports in the world. The first of a series of new transit sheds, just built

by the city, is 1,800 ft. long, 100 ft. wide, and fitted with the latest machinery for handling cargo freight. It



Pacific Steamship "Great Northern" at Its Dock in Los Angeles, alongside the First of the New Municipal Transit Sheds: At the Right is Shown, Nearing Completion, the First of Six Municipal Warehouses Planned in Connection with Great Harbor Improvements



One of the "Duplex" Locomotives of the Southern Railway, Made by Mounting the Tender on the Running Gear of an Old Light Locomotive, Thus Making an Auxiliary Tractor Which is Supplied with Steam from the Engine Boiler

is constructed of concrete and steel, and cost \$250,000. A series of six concrete-and-steel municipal warehouses is also being built at a cost of \$440,000 each. The first is nearing completion. Besides interior electric elevators, each warehouse will have 16 powerful outside hoists for handling goods from floor to floor. The dimensions of each will be 160 by 480 ft., with 11 acres of floor storage space. Thousands of acres are being reclaimed from the sea in carrying out the harbor developments.

DUPLEX ENGINES SOLVE A TRAFFIC PROBLEM

By placing the running gear of a discarded light engine behind one of their standard locomotives, mounting the tender on the running gear, and connecting the gear by a flexible steam coupling with the superheater of the engine, the mechanical department of the Southern Railway made what the officials called a duplex engine, the tender serving as an auxiliary tractor. This solved a troublesome problem of operation on a 68-mile line of single track, where the grades are heavy and traffic often became congested. The "tractors" were fitted to seven locomotives, and have proved very satisfactory on short, steep grades. The average increase of tonnage hauled by the engines with the tractor tenders, over similar engines without tractors,

is approximately 30 per cent. The parts taken from the discarded locomotives to make the tractors included the wheels, axles, frames, cylinders, side rods, and valve motion. Special steel castings were made to carry the connections between engine and tender.

INDIAN CHIEF STARTS FAD OF WEARING SPECTACLES

Members of the Ute tribe of Indians in Utah have recently acquired the habit of wearing spectacles, much to their own delight and to the profit of an optical salesman who was in their vicinity. A chief started the style by purchasing a pair of yellow-lens glasses from the white man and in a few days so many Indians demanded similar adornments that the drummer's supply was exhausted and he had to send for more. It is said that there are nearly 200 men, women, and children in this tribe who now possess spectacles. Some indicate their social position by wearing three pairs at a time. Glasses with heavy tortoise-shell rims have



proven popular. These Indians were on their way to attend a powwow in New Mexico, and it is thought that they wanted their new adornments especially for this occasion.

STRANGE ACCIDENT KILLS AMERICAN WAR NURSES

As a result of an accident without parallel in our navy's history, two Red Cross nurses on their way to France aboard an armed vessel, were among the first in United States service to lose their lives in the great war. A third nurse was seriously injured at the same time. These young women with many other nurses were seated on deck watching a test of guns and ammunition. When the third shot from a 6-in. gun was fired, a brass attachment of the powder charge, called a mount cup, struck the water and, flying back, hit a stanchion near the

nurses. The impact broke it into fragments which produced the fatal results stated above. The gun causing the accident was of a type for which the shell and powder are loaded separately. The powder charge is contained in a brass case and is there held in place by various parts, including a brass mount cup. When the gun is fired this cup invariably is thrown forward into the water without danger to anyone, but for some unaccountable reason, on this occasion it ricocheted and hit the ship.

CA military airman, Capt. W. A. Robertson, Jr., stationed at San Diego, recently ascended with one passenger in an army battleplane to a height of approximately 16,400 feet, thereby surpassing the American altitude record of 16,225 ft., for an airman and one passenger, held by the late Victor Carlstrom.

NOVICES STUDY GARDENING IN A SKYSCRAPER

Miniature gardens have been laid out in a Cincinnati skyscraper for the pur-



One of Several Miniature Gardens Which have been Laid Out in a Cincinnati Skyscraper to Aid in Teaching City Folks How to Raise Vegetables

pose of teaching city folks how to plant and cultivate vegetables. Here in the midst of offices, at neat little garden plots placed on tables, novices under the guidance of instructors learn how to make foodstuffs grow.

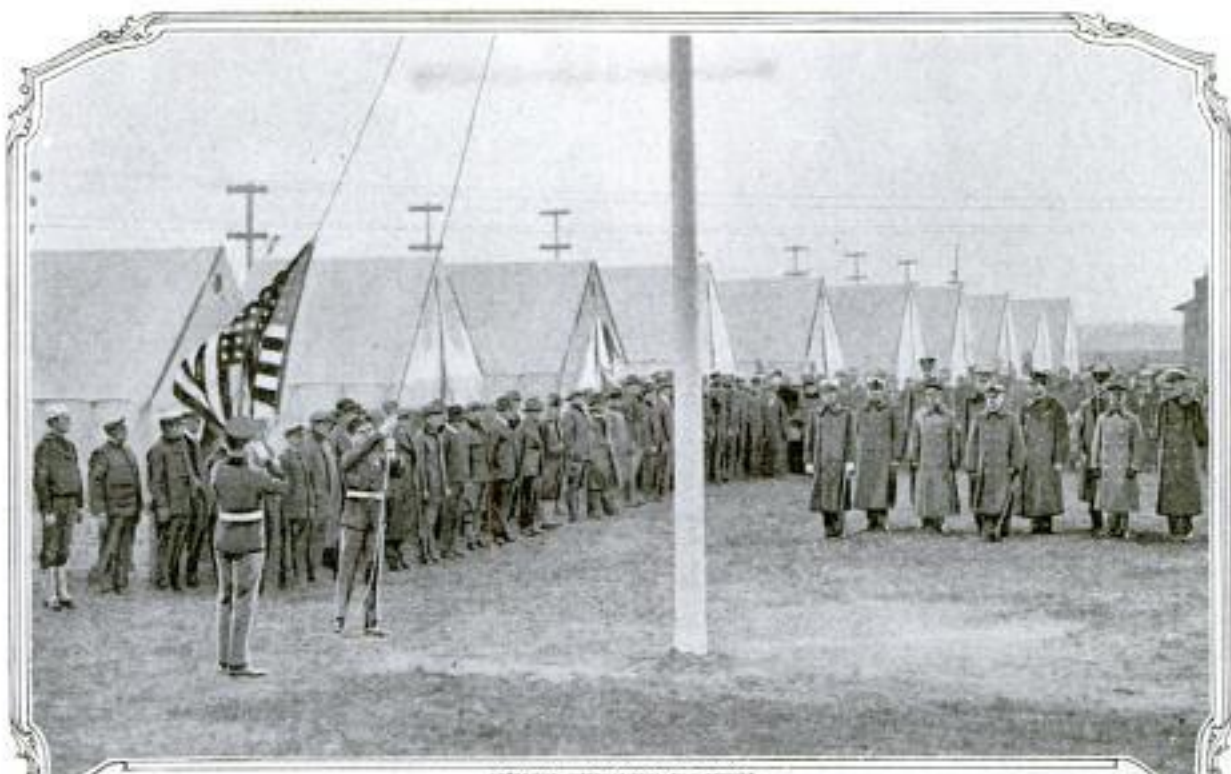
VOLCANOES FOUND TO BE HOTTEST ON SURFACE

Notwithstanding what schoolbooks have said, it now appears that a volcano

is hottest on its surface rather than below it. This is the conclusion drawn by a scientist who has made extensive investigations in craters in Hawaii and has obtained samples of gases and lava before they reached the air. Laboratory studies of these samples make it appear probable that much of the heat required to keep an open lava basin in fluid condition is supplied by the chem-

ical action of the gases. From these investigations the scientist concludes that in times of great activity the temperature at the surface of a volcano undoubtedly is higher than that below the surface.

WITH OUR AIRMEN AT HOME AND IN FRANCE



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Raising the Stars and Stripes above the New Aviation Field in Massachusetts, When the Training Camp was Turned Over to the Government Recently: The Post was Organized and Equipped by the Naval Forces Committee of the Public Safety Committee, and the Formal Presentation of the School Made in the Presence of Several Hundred Persons. The Key to the Field was Given to the Commandant of the First Naval District. Student Fliers will be Trained Here for the Navy Reserve Flying Corps



Before the Open Grave of Corporal Genet of the Lafayette Escadrille: The First American Airman Killed in the War against Germany since Our Entrance into the Conflict. The Picture Shows a French Officer Standing beside the Flag-Draped Casket While Eulogizing the Service Performed by the Deceased Pilot. While Flying over the German Lines, Genet was Wounded. He Managed to Drive Back to the Vicinity of Ham, Where He Died a Few Hours Later

SIDE LIGHTS ON OUR ENTRANCE INTO WAR



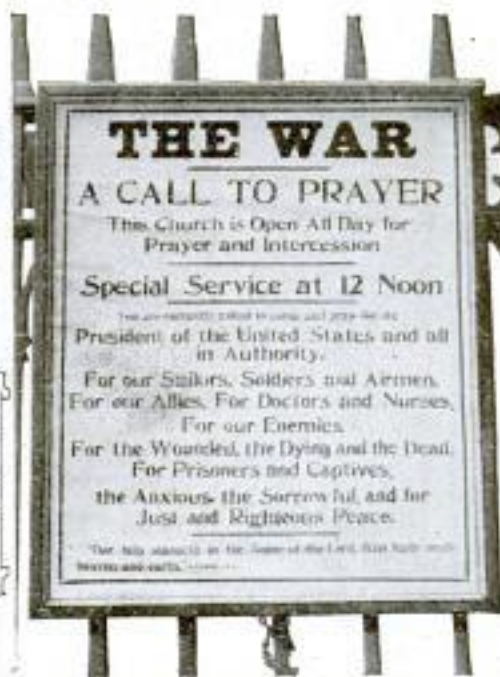
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Hundreds of Persons Crowded about the Statue of George Washington in the Place d'Iena in Paris on the Fourth Sunday of Last April, Designated in France as American Day, to Hear Addresses Delivered by Representatives of the French Government and Ambassador Sharp. The Occasion Was One of Enthusiastic Rejoicing on Account of Our Entrance into the World War on the Side of Democracy and Justice. The Stars and Stripes was Displayed with the Tricolor, and Cries of "Vive l'Amerique" Filled the Air



COPYRIGHT UNDERWOOD & UNDERWOOD

So Unusual a Sight Is the Real American in His Native Dress, That When Chief Eagle Horse, Garbed in Buckskin and War Bonnet, Stood Erect before the Public Library and Appealed to New Yorkers to Rouse to the Country's Cry for Fighters, His Patriotic Words Carried a Deep Meaning to the Assembled Crowd



THE WAR A CALL TO PRAYER

This Church is Open All Day for
Prayer and Intercession

Special Service at 12 Noon

President of the United States and all
in Authority.

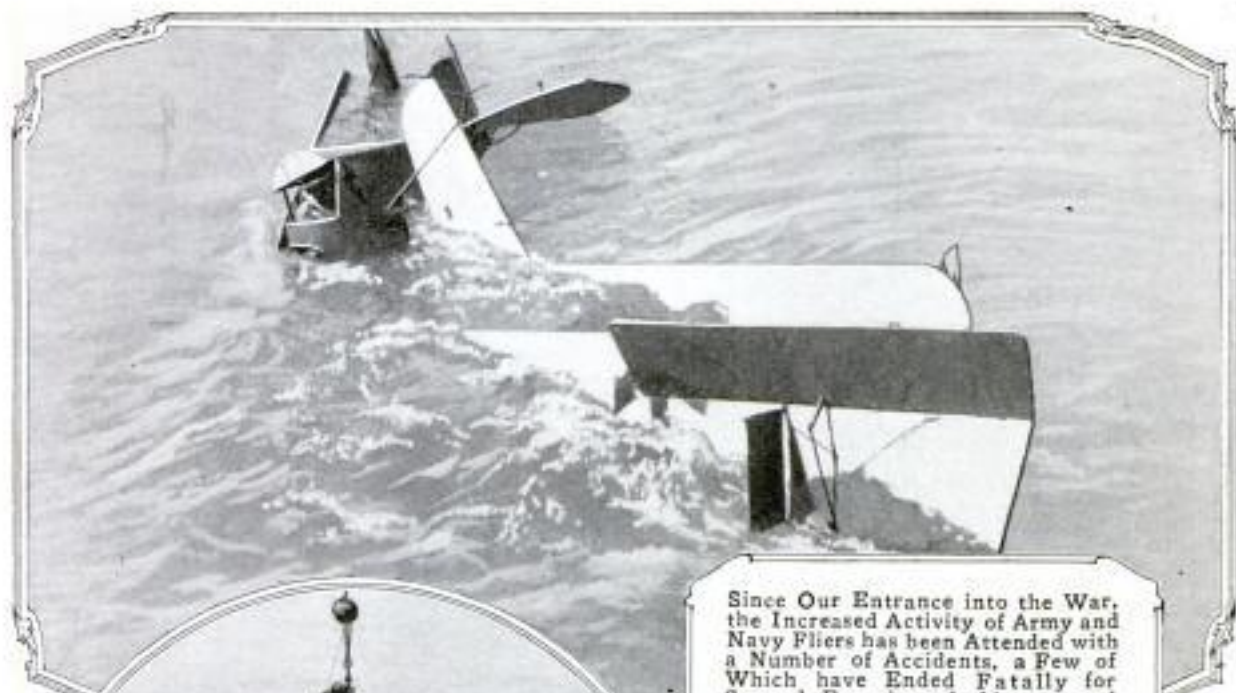
For our Sailors, Soldiers and Airmen,
For our Allies, For Doctors and Nurses,
For our Enemies.

For the Wounded, the Dying and the Dead,
For Prisoners and Captives,
the Anxious, the Sorrowful, and for
Just and Righteous Peace.

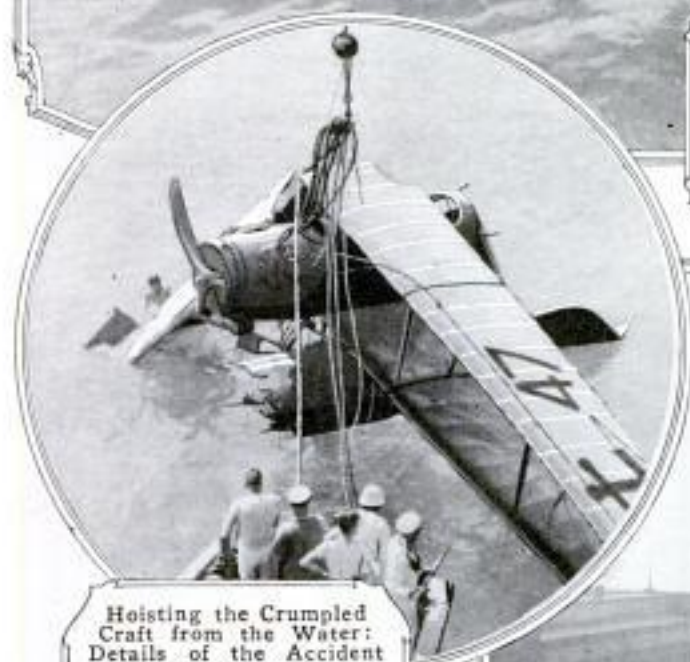
The Holy Scriptures in the Name of the Lord, God, Father, Son,
and Holy Spirit, Amen.

The Poster Reproduced Above Appears before Trinity Church on Broadway, in New York, and Admonishes the Ceaseless Throng of Passers-By to Enter the Edifice and Pray for Humanity and Righteous Peace. The Sign is Conspicuously Displayed and Attracts Many to the Doors of the Church

PICTORIAL ACCOUNTS OF RECENT NAVAL NEWS

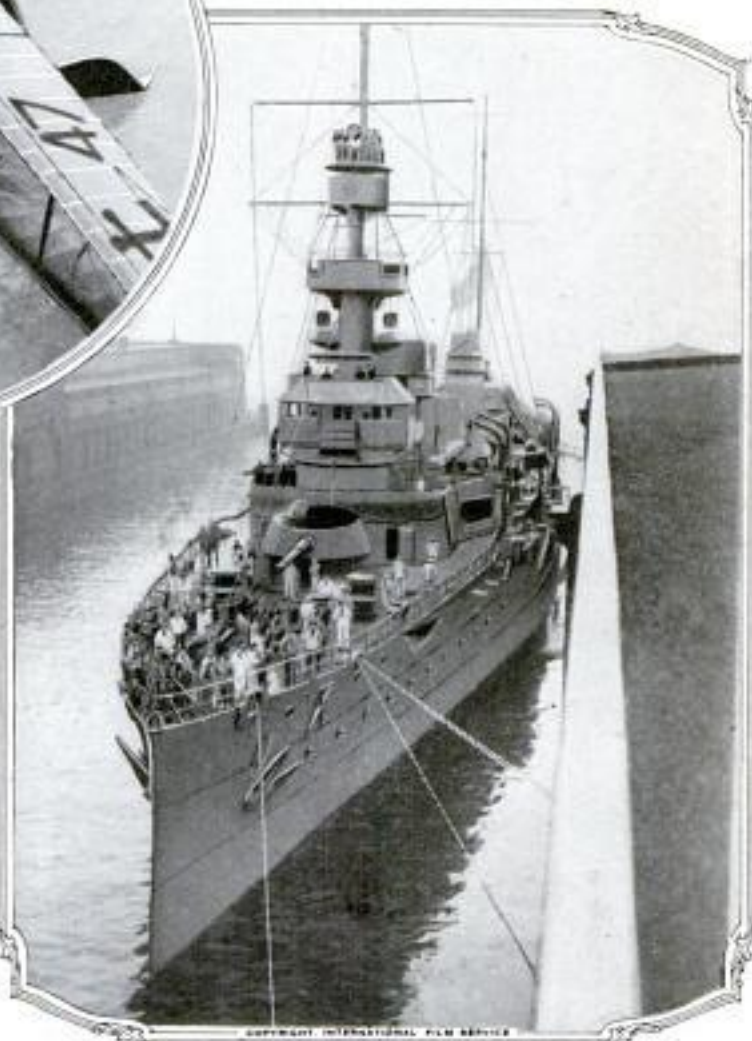


Since Our Entrance into the War, the Increased Activity of Army and Navy Fliers has been Attended with a Number of Accidents, a Few of Which have Ended Fatally for Several Experienced Airmen and Some Students. Pictured Above is the Wreck of a Navy Seaplane That Fell Recently



Hoisting the Crumpled Craft from the Water: Details of the Accident have been Censored and It is Not Known Where It Occurred or Whether It Resulted in Fatalities. The Right Wing may have Collapsed in the Air, or Broken When the Machine Plunged into the Ocean. It Appears to have been a Tractor Seaplane

The French Cruiser "Admiral Aube" Tied Up at New York after Putting In from Hampton Roads on May Day: The Vessel is One of the Fighters That Convoys the French Mission to This Country for the War Conference. Members of Its Crew were Feted and Given a Royal Welcome in Gotham

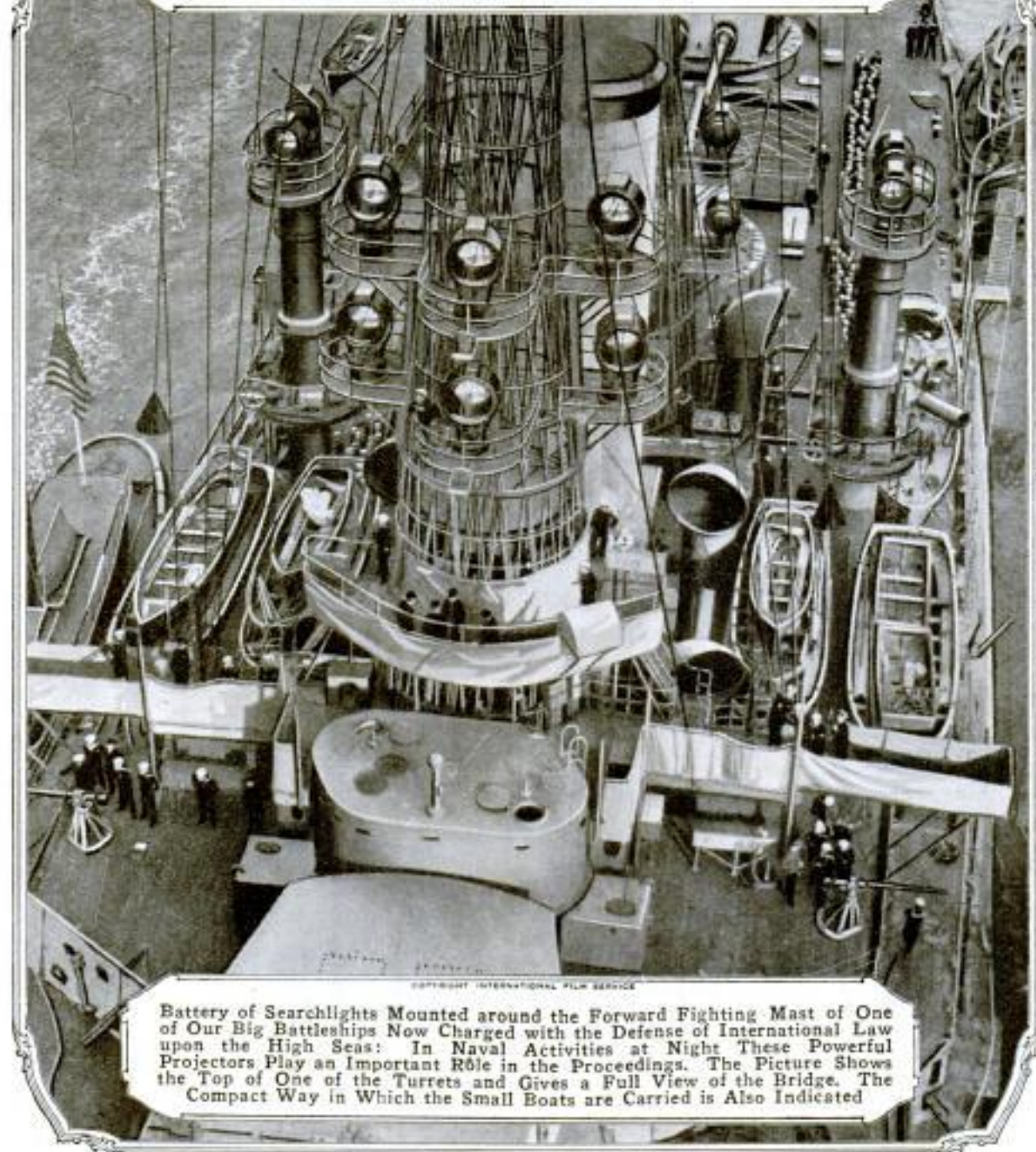


SHIP THAT FIRED OUR FIRST SHOT IN WAR



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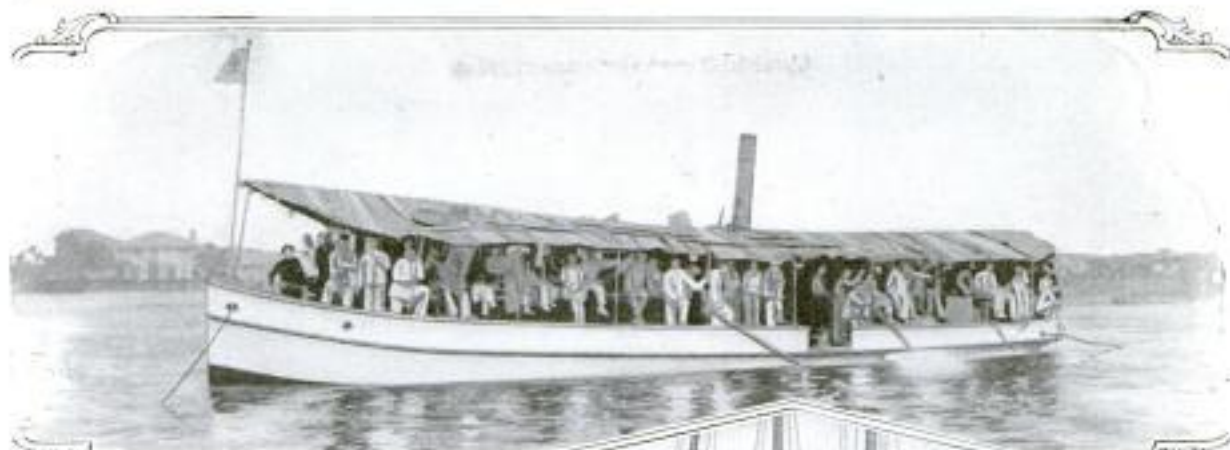
To the American Steamship "Mongolia" Belongs Credit for Firing Our First Shot in the War against German Ruthlessness. The Projectile Smashed the Conning Tower of a Teuton Submarine and Killed the Vessel's Commander. Contrary to the First Belief, the U-Boat did Not Sink, but Managed to Limp into Kiel. A Second Unsuccessful Attack was Made upon the "Mongolia" May Fourth as the Ship was Returning to an American Port



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Battery of Searchlights Mounted around the Forward Fighting Mast of One of Our Big Battleships Now Charged with the Defense of International Law upon the High Seas: In Naval Activities at Night These Powerful Projectors Play an Important Role in the Proceedings. The Picture Shows the Top of One of the Turrets and Gives a Full View of the Bridge. The Compact Way in Which the Small Boats are Carried is Also Indicated

AND OTHER VESSELS OF CURRENT INTEREST



When Chinese Troops are Moved from One Point to Another on Water Almost Any Kind of a Vessel That Happens to Be Available is Used as a Transport. Above, for Instance, is a 90-Foot Tug Loaded with 110 Soldiers. Boats of This Type Often Tow as Many as 15 of the Junks Pictured at the Right. The Latter are Usually Crowded beyond the Safety Limit, from 100 to 120 Men being Consigned to Each of Them. The Tent Visible on One of the Junks Illustrated is Used by the Commanding Officer



Following the Break in Diplomatic Relations between Vienna and Washington Last April, United States Customs Officials Seized 14 Austrian Merchantmen at Different American Ports. Armed Guards were Placed Aboard Them and Their Officers and Crews Taken to Concentration Camps. At the Left, Austrian Seamen are Seen being Escorted from One of the Vessels, and Above, on Their Way to a Government Revenue Cutter



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RUSSIA'S REVOLUTIONARY COUNCIL IN SESSION

The Council of Soldiers' and Workingmen's Delegates in Session in the Chamber of the Duma at the Taurida Palace, Petrograd: The Body, It Appears, Is the True Revolutionary Parliament of the New Republic. Instead of a Small Self-Chosen Coterie Bent upon Usurping Power, Without Professing Executive Rights, It Maintains a Vigil in the Interest of the Masses, Opposing the Seizure of Undue Dominion by the Provisional Government for the Middle-Class Liberals. Each Regiment of Russia's Enormous Army is Represented in the Council, as is Likewise Every Factory, Large or Small

CAMERA GLIMPSES OF RUSSIAN REVOLUTION



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Revolutionary Soldiers Corraling Reactionaries in One of the Streets of Petrograd Preparatory to Incarcerating Them in the Cells of St. Peter and St. Paul That Formerly Held Political Prisoners, Included in the Group of Captives Are Police Officials



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In the Entrance of a Church, Soldiers and Students Firing across the Moika Canal at Police Who, Armed with Pistols and Machine Guns, are Hidden in the Buildings Flanking the Opposite Bank: Sniping Such as This Continued for Several Days at the Capital and Caused Many Casualties



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The Red Flag of the Revolution: The Standard of Radicalism and Democracy during the Eventful Days in March When Freedom was Achieved in Russia. The Picture Shows Soldiers on the Fenders and Runboards of a Motor Car



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Staff and Soldiers of the Russian General Likhvitsky, Fighting in France, Listening to Their Commander Reading the Duma's Proclamation of the New Government: Subsequently a Chaplain Administered the Oath of Allegiance, to Which All of the Officers and Men Swore. It Was in This Way, Also, That the News of the Revolution and Its Triumph Reached the Troops Defending the Eastern Front

RUSSIA PAYS TRIBUTE TO REVOLUTION'S DEAD



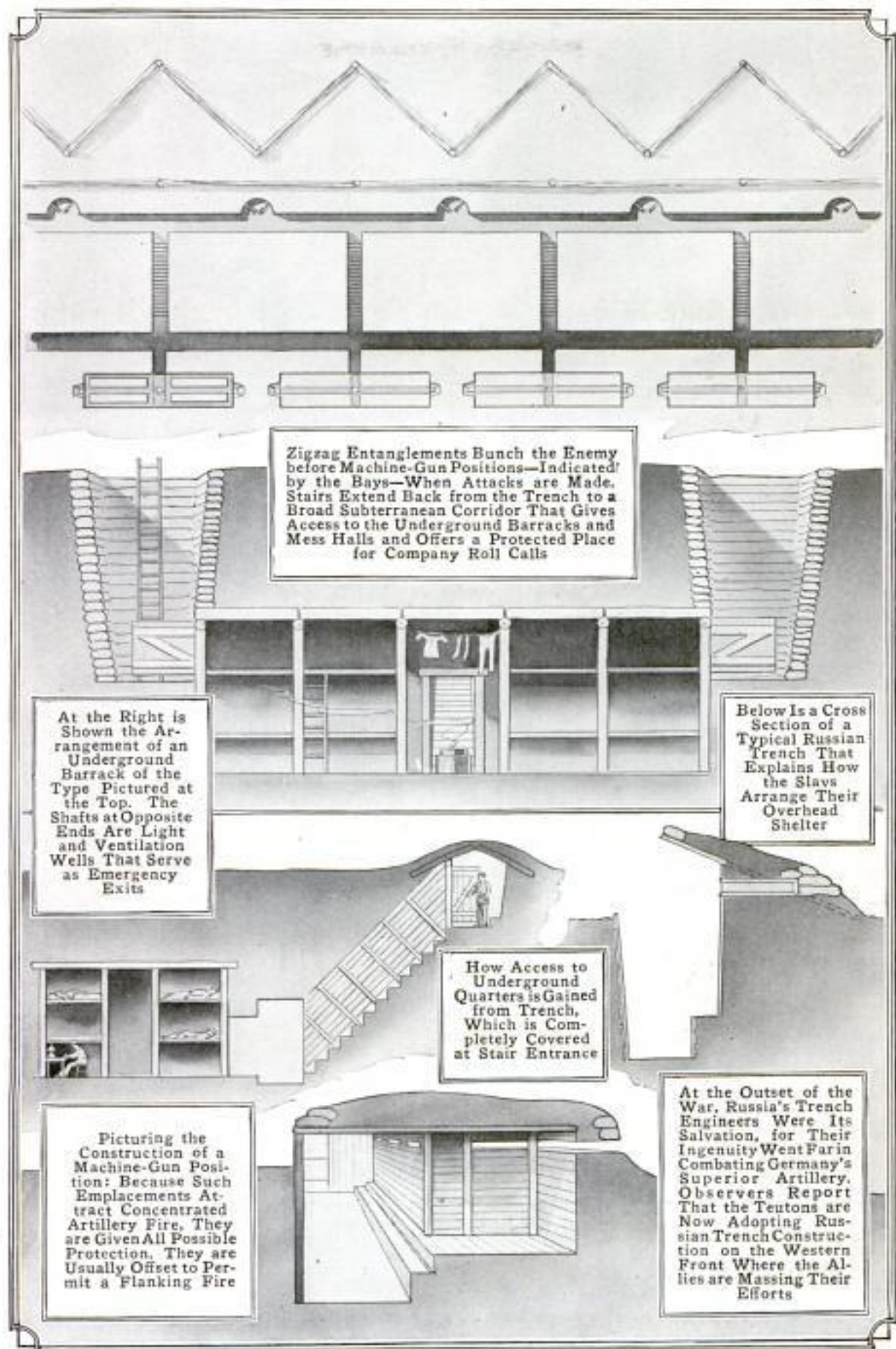
The Crowd, Composed of Workers, Students, and Soldiers, in Nevsky Prospect at Petrograd Making Its Way to the Duma: In This Street the First Shots of the Revolution were Fired and Liberty Born to Russia. It Was Close to This Place That Soldiers, upon being Ordered to Fire into the Throng, Killed Their Officers and Joined the People. Because of Its Width, Nevsky Prospect has Always Been a Gathering Place for the Populace, and Therefore the Setting of Many Historical Events

Soldiers, Workmen, and Students, Pallbearers of Those Who Died in the Uprising: The Funeral of the Revolutionists was Made an Occasion of Great Demonstration. Thousands, Headed by Regiments of Soldiers, Marched Solemnly to the Burial Place. Everywhere Were the Red Banners and Flags of the Revolution, Many of Them Bearing Significant Phrases



High Officials, Including Prince Lvoff, President of the Provisional Government, and M. Miliukoff, Foreign Minister Who Later Resigned, Mingled with the Masses before the Open Graves of Those Who Died for Russia's Liberation. The Ministers are Standing Adjacent to the Post at the Right

RUSSIA'S MASTERLY UNDERGROUND DEFENSES



Zigzag Entanglements Bunch the Enemy before Machine-Gun Positions—Indicated by the Bays—When Attacks are Made, Stairs Extend Back from the Trench to a Broad Subterranean Corridor That Gives Access to the Underground Barracks and Mess Halls and Offers a Protected Place for Company Roll Calls

At the Right is Shown the Arrangement of an Underground Barrack of the Type Pictured at the Top. The Shafts at Opposite Ends Are Light and Ventilation Wells That Serve as Emergency Exits

Below is a Cross Section of a Typical Russian Trench That Explains How the Slavs Arrange Their Overhead Shelter

How Access to Underground Quarters is Gained from Trench, Which is Completely Covered at Stair Entrance

Picturing the Construction of a Machine-Gun Position: Because Such Emplacements Attract Concentrated Artillery Fire, They are Usually Offset to Permit a Flanking Fire

At the Outset of the War, Russia's Trench Engineers Were Its Salvation, for Their Ingenuity Went Far in Combating Germany's Superior Artillery. Observers Report That the Teutons are Now Adopting Russian Trench Construction on the Western Front Where the Allies are Massing Their Efforts



OUR ALLIES PAY TRIBUTE TO WASHINGTON

Issues That Once Arrayed France and the United States against Great Britain were Obliterated and the Alliance of the Three Nations in the Interest of Human Rights and Liberty Impressively Solemnized. When the British and French Missions Visited Mount Vernon and Paid Reverent Tribute to the Memory of George Washington. For the First Time the Union Jack and Tricolor were Draped with the Stars and Stripes over the Tomb of the First President. As Officials of the Three Sisters in Arms Stood before the Entrance of the Sepulcher with Bared Heads, Marshal Joffre, Hero of the Marne, Entered the Vault and Laid a Bronze Wreath upon the Sarcophagus. He was Followed by the Right Honorable A. J. Balfour, Head of the British Mission, Who Placed a Large Floral Piece beside the French Token

FOOD FOR FIGHTING FORCES AND CIVILIANS



Mobile Field Kitchens of the Latest Type are Supplied with Insulated Heat-Retaining Compartments That Keep Food Piping Hot for Hours at a Time. A Unit Such as is Pictured Above is Adequate to Serve the Needs of 250 Hungry Soldiers



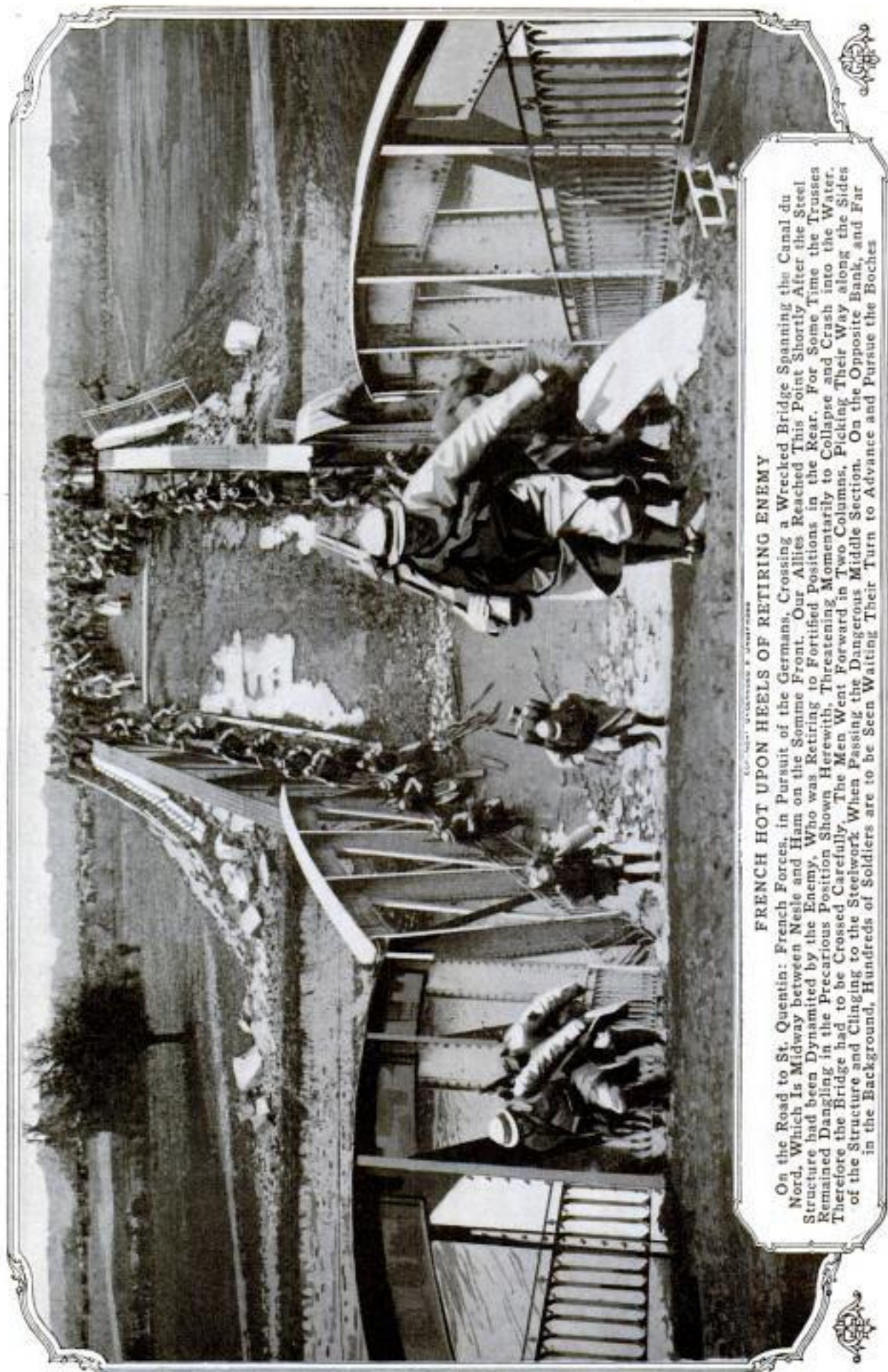
Placing Food in a Heat-Retaining Compartment of One of the New Kitchen Outfits: In This Way Victuals can be Prepared While an Army is Marching. General Efficiency is an Outstanding Feature of the Equipment



One of the United States Army's Big Tractors Drawing a Supply Train of Many Tons: Machines of This Type are among the Most Powerful Built, and, Armed by the British, are the Famous "Tanks" of the Western Front



In These Days of Food Scarcity, the Hoe is Taking the Place Proverbially Ascribed to the Pen and is Becoming Mightier than the Sword. This Shows a Patriotic Society, Armed with Gardening Implements, Marching to a 10-Acre Plot Which It has Undertaken to Make Productive



FRENCH HOT UPON HEELS OF RETIRING ENEMY

On the Road to St. Quentin: French Forces, in Pursuit of the Germans, Crossing a Wrecked Bridge Spanning the Canal du Nord, Which Is Midway between Nele and Ham on the Somme Front. Our Allies Reached This Point Shortly After the Steel Structure had been Dynamited by the Enemy, Who was Retiring to Fortified Positions in the Rear. For Some Time the Trusses Remained Dangling in the Precarious Position Shown Herewith, Threatening Momentarily to Collapse and Crash into the Water. Therefore the Bridge had to be Crossed Carefully. The Men Went Forward in Two Columns, Picking Their Way along the Sides of the Structure and Clinging to the Steelwork. When Passing the Dangerous Middle Section, on the Opposite Bank, and Far in the Background, Hundreds of Soldiers are to be Seen Waiting Their Turn to Advance and Pursue the Boches

HERE AND THERE WITH AMERICAN WAR WORKERS



Entertaining a Crowd in Boston Common: The Strong Man of the United States Navy Holding His Own against the Combined Efforts of a Dozen Husky Lads. The Muscular Seaman Is a First-Class Fireman aboard the "Virginia"



This Is a Steeple Jack's Way of Risking His Life for the Stars and Stripes: Untangling Old Glory on a Staff Jutting Out from the Twenty-First Story of the Municipal Building at New York. The Man Accomplished His Work, Although Hampered by a Stiff, Snow-Laden Wind



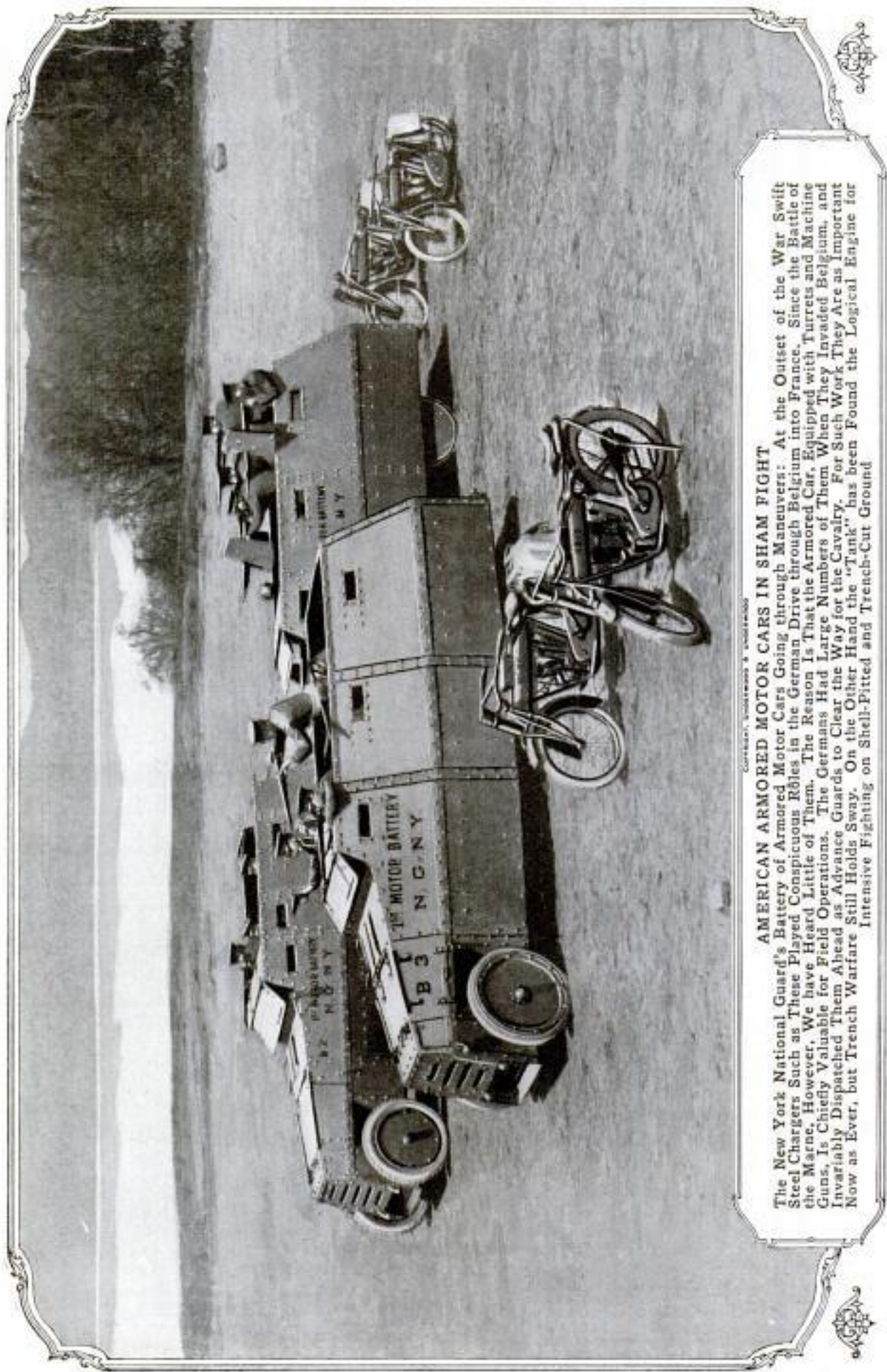
Recruiting Fighters in the Rural Districts of California: A Roadside Scene. The Expedition was Sent Out by a Western Newspaper—Not by the Government—and Operated through a Territory Adjacent to San Francisco, Sounding the Call to Arms



Red Cross Worker Employing an Electric Machine That Cuts Gauze into Bandages of Various Widths: Many Thicknesses of the Flimsy Material are Cut Smoothly and Quickly in a Single Operation by This Machine Driven from an Ordinary Lighting Circuit



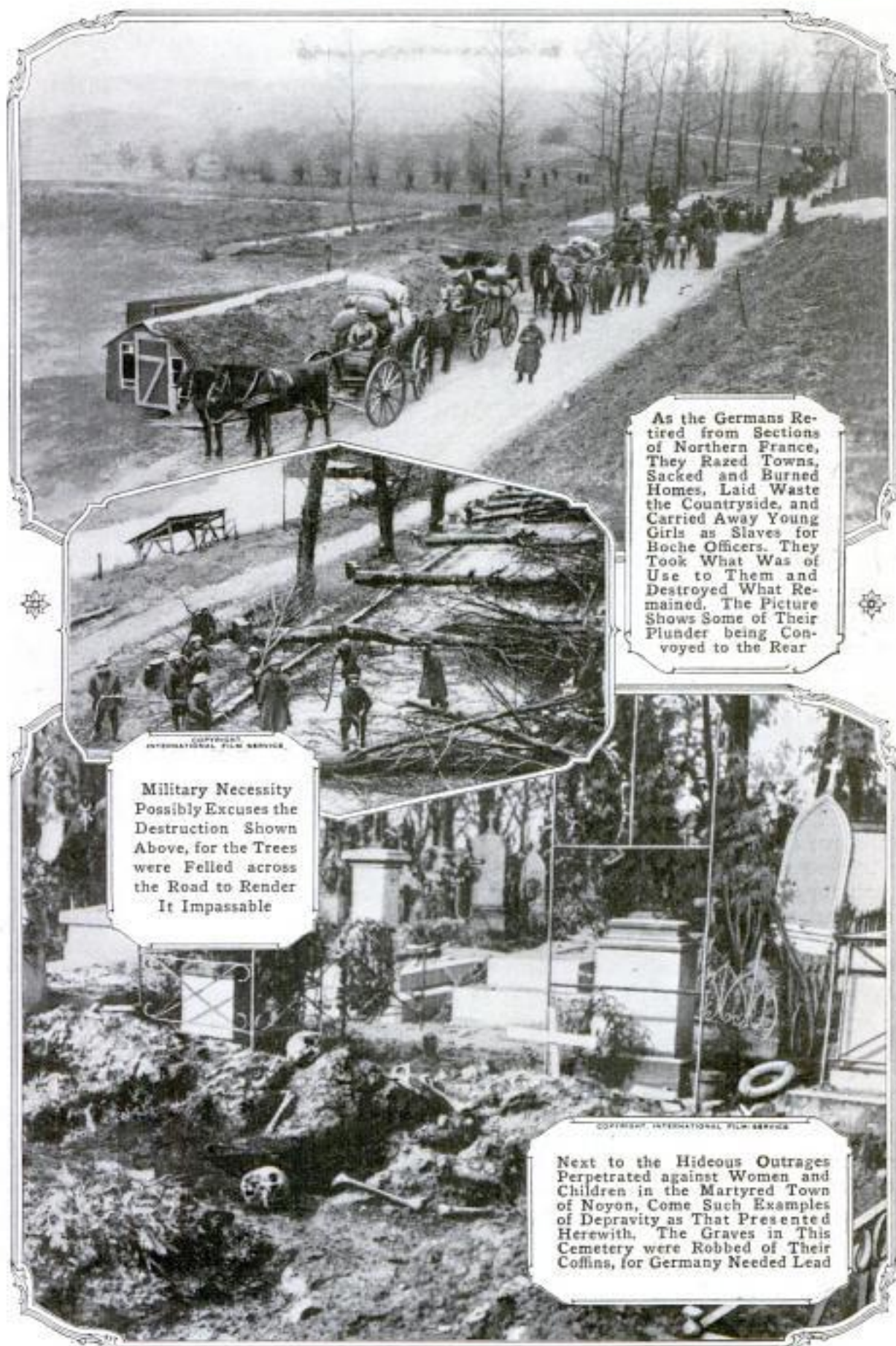
All of the Men and Women Employed at the Bronx Park Zoo, New York, are Doing Their Bit in One Way or Another. While a Hundred Women Gather in One of the Animal Houses and Sew for the Red Cross, the Men Devote Their Energies to a 15-Acre Garden Plot



AMERICAN ARMORED MOTOR CARS IN SHAM FIGHT

The New York National Guard's Battery of Armored Motor Cars Going through Maneuvers: At the Outset of the War Swift Steel Chargers Such as These Played Conspicuous Rôles in the German Drive through Belgium into France. Since the Battle of the Marne, However, We have Heard Little of Them. The Reason is That the Armored Car, Equipped with Turrets and Machine Guns, is Chiefly Valuable for Field Operations. The Germans Had Large Numbers of Them When They Invaded Belgium, and Invariably Dispatched Them Ahead as Advance Guards to Clear the Way for the Cavalry. For Such Work They Are as Important Now as Ever, but Trench Warfare Still Holds Sway. On the Other Hand the "Tank" has been Found the Logical Engine for Intensive Fighting on Shell-Pitted and Trench-Cut Ground

WORK OF THE VANDALS IN NORTHERN FRANCE



As the Germans Retired from Sections of Northern France, They Razed Towns, Sacked and Burned Homes, Laid Waste the Countryside, and Carried Away Young Girls as Slaves for Boche Officers. They Took What Was of Use to Them and Destroyed What Remained. The Picture Shows Some of Their Plunder being Conveyed to the Rear

Military Necessity Possibly Excuses the Destruction Shown Above, for the Trees were Felled across the Road to Render It Impassable

Next to the Hideous Outrages Perpetrated against Women and Children in the Martyred Town of Noyon, Come Such Examples of Depravity as That Presented Herewith. The Graves in This Cemetery were Robbed of Their Coffins, for Germany Needed Lead



Scene Showing the Shores of the Sandy River, near Portland, Oregon, Lined with Hundreds Who Turned Fishermen during a Recent Unprecedented Run of Smelt; Such Vast Numbers, as Shown on the Right, were Caught That the Price Dropped to One Cent a Pound



OREGON FOLK CATCH VAST QUANTITIES OF SMELT

Millions upon millions of smelt filled the Sandy River near Portland, Ore., recently during an unprecedented run in that stream and enabled hundreds of persons to lay in stores of fish which will supply them for months. So great was the multitude of swimming creatures during the two weeks that the run lasted, that they could be scooped up by the hundred with ordinary dip nets. Two men in a boat, using two small nets, secured 1,500 lb. in a few hours. Such large quantities were offered for sale that the market price dropped to one cent a pound. Many people improvised smokehouses in which to preserve what they caught, while others salted the fish down in barrels and jars.

COARSE-TOOTHED SAW FOR PRUNING TREES

In pruning trees having either large or small limbs to be cut, one can work to the best advantage with a short



Saw Designed Especially for Pruning Trees: It Is 26 Inches Long and Has Three Teeth to the Inch

large-toothed saw, such as has been put on the market recently. This saw is 26 in. long and has three teeth to the inch.

TEST OF HOLLOW CONCRETE RAILWAY TIES

A prolonged test is being made on a 200-ft. stretch of railroad track at Riverside, Calif., of hollow concrete ties recently patented. The ties are said to have stood up well under the strain of an interurban high-speed electric service, with an intermittent service of heavy steam-railway trains. In outward shape the hollow concrete ties resemble those of wood, so that replacements can be easily made. They are 7 by 8 in. in cross section, 8½ ft. long, and have 1½-in. walls, thickened to 2 in. under the rail seats. Flat steel plates are used under the rails, instead of standard tieplates, with screws through the tie to cushion plates of oak inside the hollow space. Each tie has 32 lb. of steel-rod reinforcement, and additional reinforcement of wire cloth and netting is contemplated in the design. The tie weighs 320 lb. and can be handled by two men. The objects of lightness and resilience are claimed to be secured, and the tests will be continued.

NEW MACHINE-GUN MOUNT WITH PERISCOPE

An improved machine-gun mount designed by an American inventor for use of the allies in the European trenches, was turned over to the ordnance department of the United States Army when diplomatic relations with Germany were severed. Without material rearrangement it will carry any machine gun used by the army. The mount weighs 150 lb. and can be completely disassembled in 10 seconds. In case of retreat it could be carried to the rear by five men, the separate units weighing not over 35 lb. each. A gun on this mount can be operated in safety by one man, who could be concealed from 2 to 20 ft. below the level of the gun. The weapon can be aimed in a complete horizontal circle for straight blanket fire, or at any angle from direct overhead fire to a muzzle depression of 45° .

A periscope feature gives the gunner in trench fire complete sight of the field, while himself entirely concealed from view, and he can fire at will from his concealed position.



New Machine-Gun Mount with the Gun at 45-Degrees Muzzle Depression, Commanding Streets from a Roof

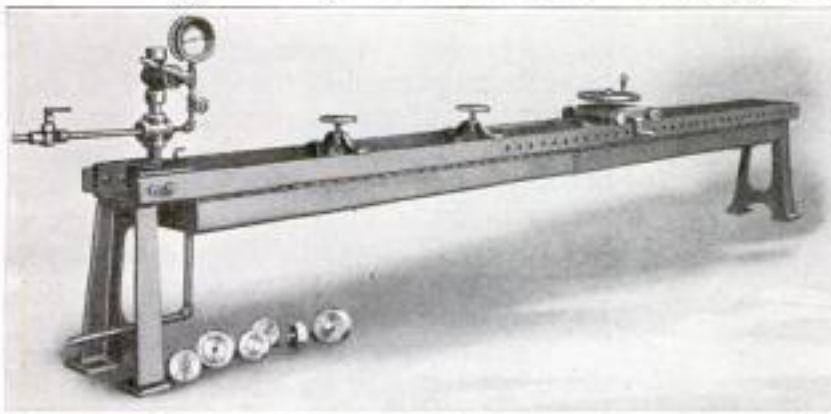


This Shows the New Mount Carrying a Machine Gun Operating at 90-Degrees Perpendicular Fire, against Air-Craft Attack. It will Carry Any Machine Gun Used in the Army

HYDRAULIC TEST MACHINE FOR BOILER TUBING

A new testing machine for boiler and other tubing is designed to exert in-

or a power-driven pump. The machine consists of a frame with two rectangular tie bars, with a stationary abutment at one end and at the other a carriage mounted on rollers, forming a moving abutment. The tube to be tested is adjusted between these abutments, the carriage being then secured to the side frame by pins. The tube being filled with water, pressure is applied by the hydraulic pump to the desired point, which is indicated on a gauge.



New Hydraulic Boiler-Tube Testing Machine: The Tube being Filled with Water When Fixed in the Machine, Pressure is Applied by a Pump and Indicated on the Gauge

ternal hydrostatic pressure upon the tube and to be used with either a hand

THREE-SEATED PORCH SWING WITH CRIB FEATURE

A novel porch swing, recently patented, has three adjustable armchair seats, the middle chair and either of



Triple-Seated Swing Which Is Convertible into a Children's Crib, as Shown, Leaving a Seat for Mother

the outer ones being turnable so as to face each other. When latched in this position the arms form a safe crib for young children, leaving the third chair for the mother or nurse. The chairs are secured in the position desired by turning a thumb nut. In making the crib, the middle chair is moved in either direction, so that the arms will join, its clamping bolt projecting through a longitudinal slot in the seat board for this purpose.

LONG-HANDLED LAMP AND MAGNET FOR MOTORISTS

Automobilists will find very convenient a combination inspection lamp and magnet with which dark recesses in a motor can be examined easily. Mounted on the end of an 18-in. flexible handle is a 4-cp. bulb and a magnet 1 in. in diam-



The Little Lamp at the End of This 18-Inch Handle Is Convenient in Examining a Motor. The Magnet Enables One to Pick Up Small Metal Parts Easily

eter, which is convenient for picking up small metal parts. Current for the tool is supplied through a light cord.

DEEP WELLS GIVE ISLANDS SUPPLY OF PURE WATER

Although still far from ideal, the water-supply situation in the Philippines is most encouraging, especially when compared with the unspeakable conditions that prevailed at the time of the American occupation. Years and considerable money have been spent in providing artesian wells and educating the people to use them. Two years ago there were more than 1,000 deep wells publicly and privately owned in different provinces, and since then many others have been drilled. The importance of this work, from the standpoint of sanitation, is tremendous, but according to experts connected with the Bureau of Sciences at Manila, there is much yet to be done. In some districts the natives even now are dependent upon surface waters. In some other places where pure water is available, many, because of ignorance and indifference, fail to make use of it, preferring instead to obtain their supplies from more conveniently located sources that often are seriously contaminated. In 1915 there were more than 50 water systems in operation and as many more planned by communities of various sizes. All of which gives an idea of the extent of the progress. The entire cost of all unsuccessful deep wells for public use, and two-thirds of the expense incurred in providing satisfactory ones, has been borne by the insular government. In addition to this, manual and power-drilling outfits have been provided by it to all of the provinces. This arrangement has naturally been responsible for the results accomplished. In many localities good water is found at depths ranging from 200 to 300 ft., but in others it is necessary to go even three times as far. In only one instance has fresh water been encountered at a depth greater than 1,000 ft. Some of the deep wells have natural flows, and the largest of them, a gusher struck at Bayambang, Pangasinan, delivers 1,000,000 gal. daily. Before a new well is made public, its water is tested by experts.



The Picture Above, Showing the Reindeer being Driven along a St. Louis Thoroughfare, was Taken When the Fleet Little Animals Were Less than a Year Old



Harnessed to a Buckboard: The Reindeer as They Now Appear When Driven in the Streets. Never do They Make Their Appearance without Attracting a Great Deal of Attention

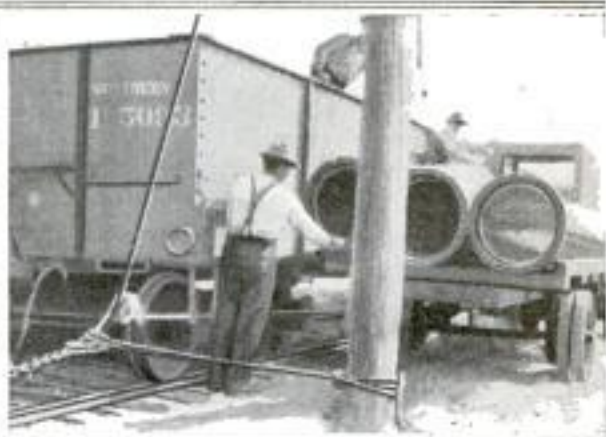
REINDEER TEAM IS DRIVEN THROUGH CITY STREETS

Many a youngster who dreams of Santa Claus and loves some of the fascinating old nursery tales with Lapland settings, would delight in seeing a reindeer team that frequently appears in the thoroughfares of St. Louis. The animals are young and thoroughly broken for city driving. Harnessed to a light sulky, or buckboard, they are fleet and picturesque. Never are they driven without attracting notice, as might well be surmised.

TRUCK LOADS ITSELF WITH HEAVY MAINS

When confronted with the problem of how to unload a car filled with water-main sections, each weighing a ton or more, employes of the city of Glendale, Calif., devised means where-

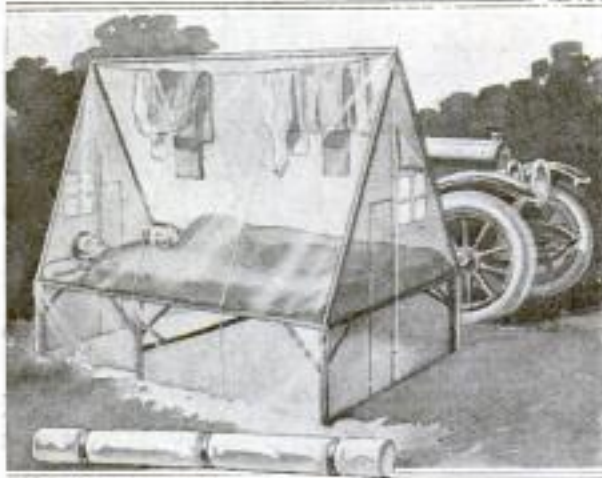
by an automobile truck did most of the work. The big castings had to be lifted from a gondola car and then lowered onto the truck. A telephone pole was set 4 ft. into the ground close by the railway car, and a pulley fastened to its upper end and another one near its base. A rope, after being attached to the truck, was run through the pulleys and fastened to one or two of the pipes. After distances had been properly gauged the truck was driven forward a few yards, thereby hoisting the pipe out of the freight car. To lower it onto the truck, the latter was carefully backed up with the aid of another pulley and rope fastened to a well-anchored car some distance away.



Two Views Showing the Way in Which an Automobile Truck was Employed to Hoist Heavy Water Mains from a Gondola Car and Then Lower Them onto Itself

NEAT COMBINATION OF BED AND TENT HAS MANY USES

The problems of camping are greatly simplified for the motorist, canoeist, hunter, or boy scout by means of a new



Combination Tent and Bed That Folds into a Small Bundle and can be Easily Carried on the Running Board: It can be Set Up in Five Minutes, and with It the Motorist Is Independent of Hotels

combination tent and bed in which a number of good features are united. The outfit requires no tent stakes or ropes and is provided with a light folding frame so that it can be erected in a few minutes. The bed measures 4 1/2

ft. wide and 6 ft. 4 in. long. At either end of the tent are screened ventilators and the walls are provided with supplementary flaps that keep out mosquitoes, flies, etc. Rolled up, the entire outfit forms a bundle only 8 in. in diameter and 4 1/2 ft. long. The bed can be used in the home without the tent, if desired.

TOWN FIRE WHISTLE BLOWN BY SODA-WATER GAS

A little town of southern Oregon, Ashland by name, claims the distinction of possessing the only fire alarm in the United States—probably the only one in the world—operated by carbonic-acid gas, the kind familiarly used in soda water. The town alarm, formerly a bell, is now a whistle and it is blown by gas pumped into the town from a distant well under heavy pressure, to make an effervescent water. A 2-in. pipe connects the gas line with the whistle on top of the fire hall, and the former bell rope is used to operate a valve which admits the compressed gas to the whistle when its alarm is required.

TEST TRACK BY BACKING CARS INTO FLOOD

Fearing that a section of track in Portsmouth, Ohio, which was covered

weakened, a crew of railroad men cautiously investigated its condition in the manner shown in the accompanying photograph. A train composed of an engine, a caboose, and a hopper car, arranged in the order named, was backed onto the submerged track very slowly. Men were stationed on the open car and were able to watch conditions to advantage. They were prepared to stop the train at a moment's notice and to "retreat," leaving the end car if necessary. In places the water rose almost to the car floors.



Railroad Men Investigating Condition of Submerged Track by Backing a Short Train onto It Very Cautiously

with several inches of flood water, had been washed away or was seriously

ing the end car if necessary. In places the water rose almost to the car floors.

Widemann Goat Milk Co.,
King City, Monterey Co.,
Calif.



Part of the Herd of 3,500 Goats on a Single Ranch in Monterey County, California, Where Goat's Milk is Now Evaporated and Canned on a Commercial Basis for the First Time, Making It Available for City Dwellers. The Photo Shows a Fine Lot of Milkers

DEVELOPING THE COMMERCIAL POSSIBILITIES OF GOATS

By ALBERT MARPLE

IF the aims and objects of some of the leading ranchers and dairymen of California materialize, the thoroughbred milk goat will be an important factor before long in the lives and health of the people of the United States. Although the goat has been one of the most important domestic animals in Europe, we on this side of the Atlantic seem to be reluctant to grasp the real worth of this little chin-whiskered creature. We have, in some measure, made use of the common or "Mexican" goat, but not until very recently has goat's milk been handled here in a commercial way.

During the past few months a number of goat ranches or dairies have sprung up in southern California, appearing in true mushroom style, and tending to show that when the real value of the milk of the goat is known, it is bound to receive a warm welcome. These ranches sell the goats'

milk fresh, as does the ordinary dairy, the average price received being 25 cents a quart. And in addition to selling the milk in this way a considerable quantity of goat cheese is manufactured in that section.

There is one company, however, which for the first time in the history of the goat-milk business, is evaporating that product under vacuum, after which it is canned and presented to the consumer in very much the same condition as evaporated cow's milk. The object is to make this product just as accessible to those living in the heart of the large city, where a goat is never seen, as to the farmer or suburbanite. To evaporate goat's milk, as is claimed to be the



Thoroughbred Doe on the Milking Platform: This Goat Averages About Five Quarts of Milk Daily, Worth 25 Cents a Quart

case with cow's milk, increases its keeping and digestible qualities, also its purity, as well as ease of transportation.

This innovation in the goat-milk industry has just been introduced by a

concern in Monterey County, Calif., about 100 miles south of San Francisco.



A Week-Old Kid Taking One of Its Last Natural Meals before being Weaned by the Aid of a Bottle

The ranch of this company, five miles from King City, consists of 5,000 acres of the prettiest rolling country imaginable, while its herd of goats at this writing numbers about 3,500, these being divided as follows: 2,500 does of the milk-producing age; 750 between the ages of three and six months; 200 babies, and 50 bucks.

The work of raising the babies on this ranch is of unusual interest, for the process is practically

identical with that necessary for the raising of the human infant. For about a week following birth the kid is permitted to remain with its mother, after which the mother is turned into the herd of "milkers," and the kid is fed by hand. For this purpose an ordinary feeding bottle and nipple are used, it taking about two days to wean the babies. A mixture of half goat's and half cow's milk is fed at the start, after which the percentage of goat's milk is

gradually lessened. For a week or 10 days the kids are fed by hand; then they are taught to feed from nipples arranged along the sides of long pans. This nipple feed continues for about three months, when the little ones are further weaned by being fed, for a space of about three weeks, on one meal of grain and one of milk

daily, after which the milk is eliminated entirely.

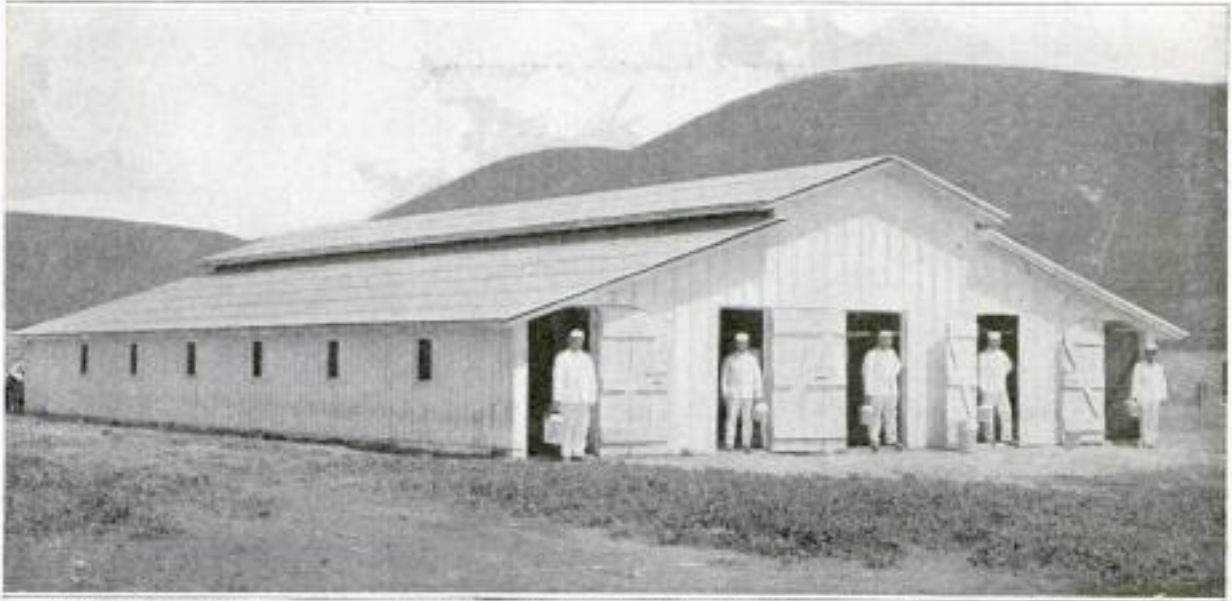
The does on this ranch are divided into two herds, the "dries" and the "milkers." They are kept in separate corrals and are fed from different parts of the range. The milkings occur at 4:30 in the morning and the same time in the afternoon. At 9:30, after the morning milking, both the dries and the milkers are taken out upon their respective feeding grounds, accompanied by a herder, and they return to the corrals



Teaching the Little One to Drink: An Ordinary Feeding Bottle and Nipple are Used, with Half Goat's and Half Cow's Milk



Nipple Feeding from Long Milk Pans: The Kids Soon Learn to Use This Method, which is Continued for About Three Months



The Milking Shed on a Large Goat Ranch: Twice a Day 400 Goats at a Time are Milked in This Barn. The Milkers Sit behind the Animals, Instead of at the Side as in Milking Cows, and the Goats Stand on Wooden Platforms

just before milking time in the afternoon. For the milking process a large barn has been provided, and shifts of 400 goats each are arranged. During milking, the goats stand upon wooden platforms and eat from clean mangers, while the milkers sit behind the animals, rather than at the side as in milking cows. From the milking barn the milk is taken to the milk house, where it is cooled, poured in sanitary cans, and loaded on auto trucks, bound for the condensary in King City.

As has been stated, the condensing of this milk and the canning of it are entirely new to the goat-milk industry,

and the method of treating the milk at this condensary is of interest. After being unloaded from the trucks the cans containing the milk are arranged in rows upon the concrete floor. When everything is in readiness the milk is poured from the cans into a mammoth copper heating kettle, which has a capacity of 200 gal., or 2,000 lb., and while in this kettle, it is heated to at least 160° F., after which it is drained by vacuum to the copper vacuum boiler, where the condensing process takes place. This consists of reducing the quantity of milk about 50 per cent, the portion taken away being entirely



A Goat Kids' Playground on the Ranch: The Young Animals Are Just as Playful as Kids Ought to Be, and Special Apparatus Like the Above is Provided for Their Amusement

water. The condensing process takes about 40 minutes, after which the milk is drawn to the hot-milk tank or reservoir, and from this it is pumped to and over a tubular cooler, from which it is piped to the filling tank. This tank is in reality the reservoir of the filling machine, which has a capacity of two dozen cans at a time.

After being filled the cans are crimped in a sanitary manner, packed in the cases in which they are to be shipped and taken to the sterilizer, which holds 60 dozen cans at one filling. This device is in the form of a drum, within which the cases are fastened. When the cans are in place, the lid of the drum case is closed and locked, and the drum is then revolved at a fair rate of speed, during which operation live steam is injected into it. The interior of the device is brought to a temperature of 240° F., and permitted to remain at that heat for at least one hour. The cans and their contents, after being taken from the sterilizer, are permitted to cool. Then, if necessary, they are placed in the shaker. The purpose of the shaker is to bring whatever portion of the milk may have become thick, due to the rich quality of the milk, back to its original

condition. The shaker moves back and forth at a rate of 50 trips per minute, this operation being continued from 10 seconds to 5 minutes, according to the requirements of the milk. From the shaker the milk is taken to the store-room, where the cases are turned over once each day for two weeks, this operation revealing the leaks, if any, in the cans; then the cans are labeled, after which the milk is ready for shipment.

The goats on the ranch are of the kinds that are considered the best milking strains in the world, namely, the Toggenberg (Swiss), Anglo-Nubian (English), and Saanen (Swiss). A good milk goat will produce twelve times her own weight of milk in a year, while the cow is considered as doing very well if she produces about four times her weight. At present the goat milk is being produced solely for infants and invalids, although it is the object of these dairymen to widen the field as rapidly as possible. One of the most important points about the goat is that it is considered free from tuberculosis, while the United States officials condemned, because of tuberculosis, in the year 1914 alone, 29,738 cows out of those slaughtered for food purposes.

BULLOCK CARRIAGE USED IN MADEIRA

Until recently almost the only means of conveyance in the island of Madeira was the bullock carriage known as the

"carro." A popular form of this vehicle carries four passengers in two opposite seats of wickerwork, nicely upholstered, with low side entrances and a canopy top, the body of the carro being mounted on springs on a pair of strong wooden, steel-shod runners with upcurved ends which sustain the weight. A driver walks beside or behind the vehicle, occasionally dropping a greased rag in front of first one runner and then the other, to lubricate them as they pass over it, while a boy walks in front of the team of oxen, directing them with strange cries.



This Slow but Comfortable Vehicle Called a "Carro," Is a Familiar Sight in Madeira, on Streets Paved with Smooth Pebbles from the Ocean Beach



Motor Busses are being Operated in Chicago for the First Time. Although the Popular Demand for Them has Been Urgent for Several Years. The Pictures Show Two of the Machines Carrying and Discharging Passengers at Different Points along the North Shore. Service to the South Side is Expected to be Instituted in the Fall

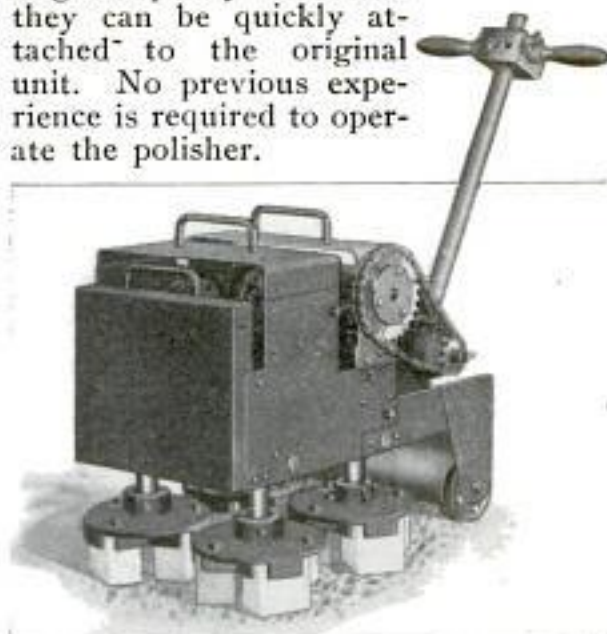
MOTOR BUSES GIVE RELIEF TO CHICAGO STRAPHANGERS

After several years' negotiations, motor busses have finally been admitted to Chicago boulevards and are now carrying north-shore residents to and from the loop district. Although a fair schedule is maintained, there are as yet hardly enough of the machines in use noticeably to lessen congestion on north-side transportation lines during the rush hours. This effect, however, is expected to result as the size of the flotilla is increased. Service to the south side is to be inaugurated in the fall. The cars are of the usual double-decked type.

NEW FLOOR POLISHER HAS TWO DETACHABLE UNITS

A motor-driven floor-polishing machine, which has just been offered to the trade, can be operated with either two or four revolving disks according to the requirements of the job. Each disk is connected with a vertical driving shaft by a universal joint so that pressure is applied directly to its center even on an irregular surface. The polishing is done by four carborundum blocks attached to each disk. The two detachable revolving units are provid-

ed with a separate metal framework and gearing, and when a machine of larger capacity is desired they can be quickly attached to the original unit. No previous experience is required to operate the polisher.



Floor-Polishing Machine with Four Revolving Units, Two of Which can be Detached: The Machine is Driven by a One and One-Half Horsepower Motor and Weighs 325 Pounds

ARTISTIC CHICKEN HOUSE LOOKS LIKE A DWELLING

Strangers passing the artistic structure shown herewith, which is situated on an estate in southern Wisconsin, have sometimes mistaken it for a concrete dwelling, but as a matter of fact



This Well-Built Structure, Which at a Glance Looks Like a Dwelling, Shelters Chickens on an Estate in Southern Wisconsin

it is a chicken coop of the most up-to-date and elaborate sort. The smooth white outer walls, the diamond-paned windows, and the gambrel roof give it quite the appearance of a home for folks instead of for a few score fowls of which the wealthy owner is fond.

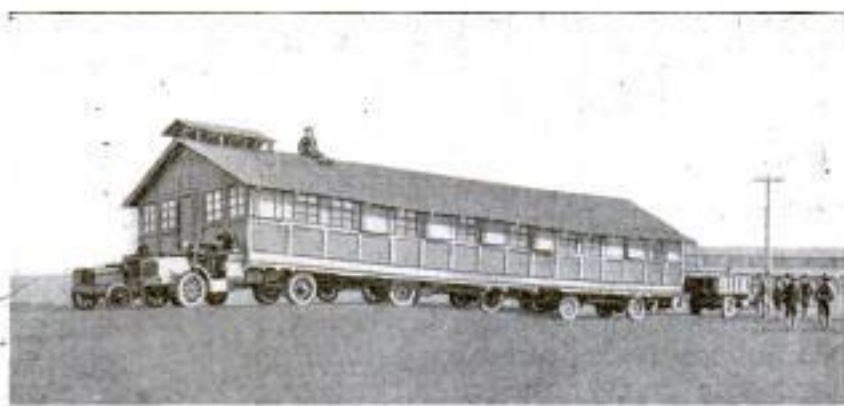
FARM TRACTOR PUMPS WATER FROM CELLARS

A farm tractor rendered excellent, though unusual, service in Norfolk, Neb., recently, when it aided in pumping water



This Farm-Tractor Engine is Driving a Pump for Drawing Water from a Flooded Cellar in Norfolk, Nebraska

motor trucks to an unusual task not long ago when they employed them in



Novel Method of Moving Frame Structure: Army Mess Hall at Camp Wilson, Texas, Mounted on Motor Trucks Which Carried It About a Mile to a New Site

moving a large wooden mess hall about a mile to a new site. After suitable temporary construction had been provided within the building, it was raised up and a number of the trucks were placed beneath it. The two foremost machines were so placed that their forward ends, including the front seats, projected beyond the building, enabling the drivers to see the road ahead. In transit the big frame building looked like an ark on wheels.

from flooded cellars in the town. High water had practically tied up business and power was scarce, so the tractor was brought to the scene and connected by a belt with a pump. This outfit was able to draw off the water at a rapid rate.

ARMY TRUCKS CARRY BIG MESS HALL A MILE

Army engineers at Camp Wilson, Tex., put

MOVIE SHOWS ON THE EDGE OF GRAND CAÑON



This Building on the Edge of the a Motion-Picture Theater Seats and Giving Shows

Tourists visiting the Grand Cañon of Arizona recently have been surprised to find a motion-picture theater built on the very edge of the cañon, at a point from which one of the world's most wonderful views is obtained. The little theater seats about 50 people and shows are given four times a day during the tourist season. It is owned and managed by an explorer-photographer widely known for his work in the cañon. Light



Power House in the Cañon That Furnishes Electric Light for the Movies, 50 Feet Above

Grand Cañon of Arizona Contains Seating About 50 Tour- Four Times a Day

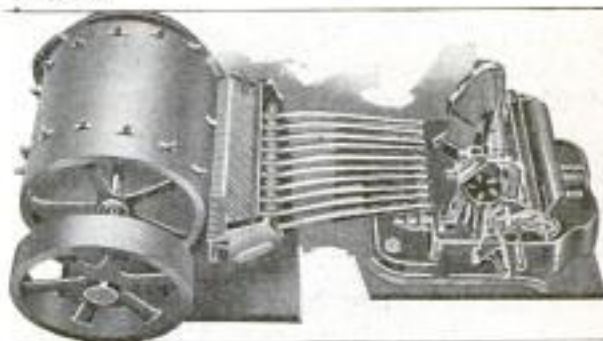
for the projecting machine is obtained from a dynamo and gasoline engine, located in a small galvanized-iron shed about 50 ft. below the theater, but controlled from the operator's booth, where the wife of the explorer reigns supreme. From the back porch of the picture house,

which is propped against a slope of the cañon in the big horseshoe cut near El Tovar, the tourist looks down 2,000 ft. into the bed of the cañon.

MECHANICAL DEVICE TESTS SPEED OF TYPEWRITERS

One of the large typewriter concerns of the country employs a mechanical device, in preference to expert operators, to test the speed of each machine turned out. The small motor included in the apparatus drives a cylinder a foot in diameter, on the surface of which are rows of projecting teeth. As the cylinder revolves it trips rubber-tipped hammers, which in turn strike the keys of the typewriter being tested. Each machine is operated by a device of this character for half an hour, at the rate of 560 strokes per

minute, and if it fails to respond properly, is sent back to the assembling room.

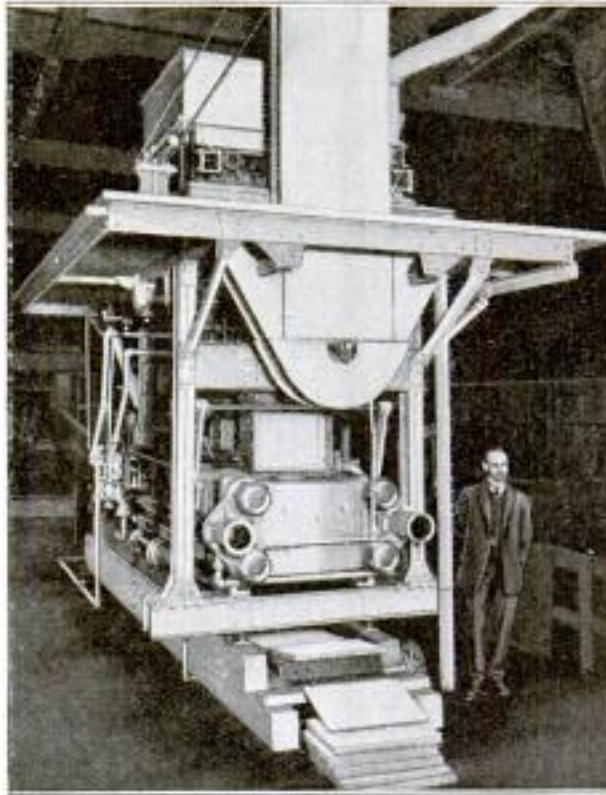


Speed Tester for Typewriter: The Revolving of the Cylinder at the Left Operates the Hammers, Which in Turn Strike the Keys of the Typewriter. Each Machine is Tested for 30 Minutes at a Rate of 560 Strokes per Minute

(Incr.) 74

HYDRAULIC MULTIPLE PRESS FOR WET MATERIALS

A new form of hydraulic press, with multiple pressing compartments, has been devised for the removal of mois-



Automatic Hydraulic Press, with Multiple Compartments, for Removing Water from Wood Pulp: Pressed Pulp Cakes are Seen Coming from the Machine in the Foreground

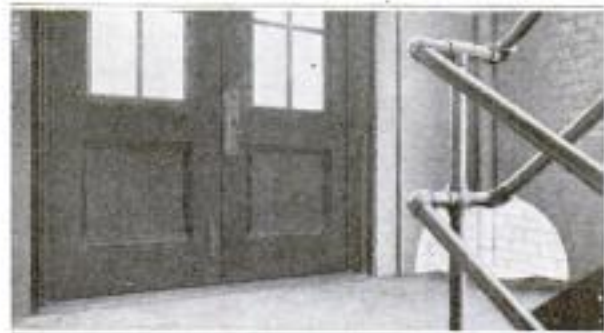
ture from all kinds of wet or pulpy materials, such as wood pulp, or any process requiring great and steady pressure. The multiple-compartment system consists of a plurality of compression chambers, operated simultaneously and automatically, their movements being timed and controlled by a special governing device. Thus a number of cakes of a compressed product may be in process of compression at once, and there is a consequent saving of power. A series of compression cylinders is carried backward and forward so that their pistons receive in turn the pressure of a hydraulic ram, this pressure being applied to the material confined in the compression chambers, which are charged and discharged automatically.

DEEP SNOWS CAUSE DEATH OF YELLOWSTONE ELK

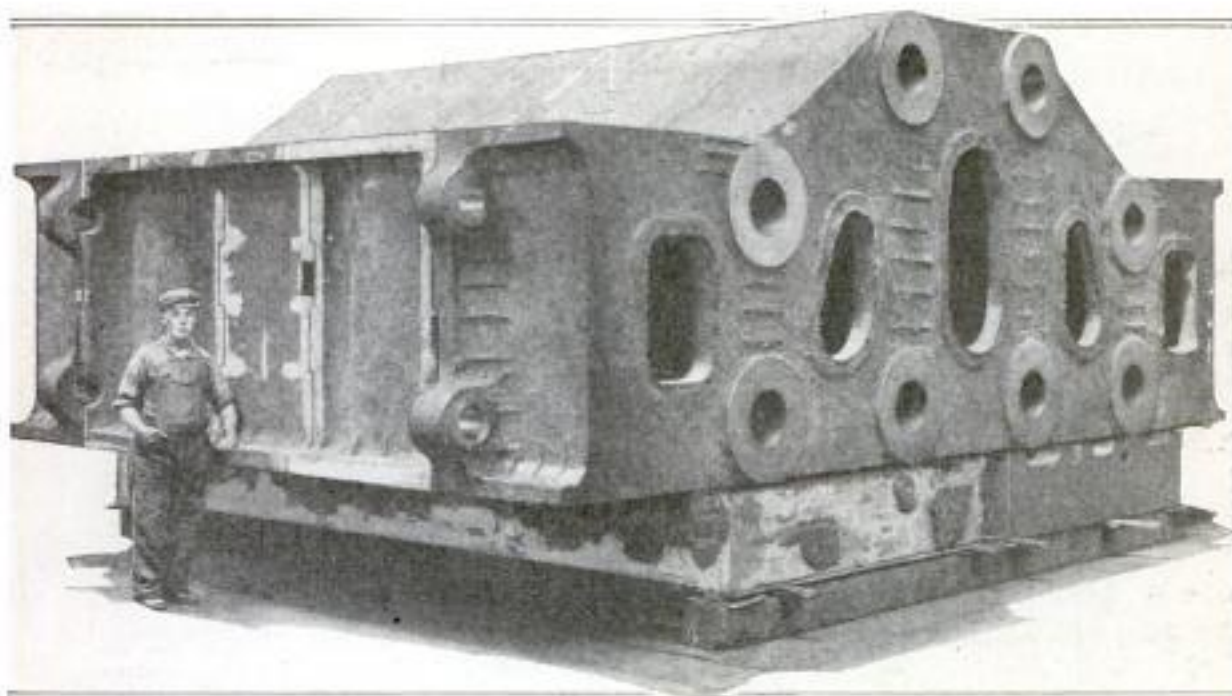
Many of the elk in the two principal Yellowstone herds perished through the conditions which existed this year, due to an exceptionally heavy winter snowfall and the late oncoming of spring. Deep, crusted snow prevented the elk from getting at their usual feed, and the weakened animals, especially the calves, died rapidly in spite of the large supplies of hay provided by the government for such emergencies, which were soon exhausted. One of the herds, numbering more than 20,000 elk, usually winters around Jackson's Hole, in Wyoming, and is known as the southern herd. The Biological Survey had provided over 600 tons of hay for feeding them, but the losses amounted to possibly one-third of the entire number, including practically all last year's calves. The northern or park herd is estimated to contain over 30,000 elk, and these were widely scattered in search of food, with considerable losses probable.

SPITTING HABIT CURED BY PAINTING CORNERS WHITE

Employees in a certain Boston factory, who had acquired the insanitary habit of spitting in the corners of the room, were cured of the practice when the floor and walls adjacent to the corners were painted white. This simple expedient also served as an inducement to the janitor to be particularly careful when sweeping and mopping in the corners.



Corner in Boston Factory Painted White so That Employees would Be Less Apt to Expectorate in It



Showing the Five Castings, Each Weighing About 96,000 Pounds, Assembled

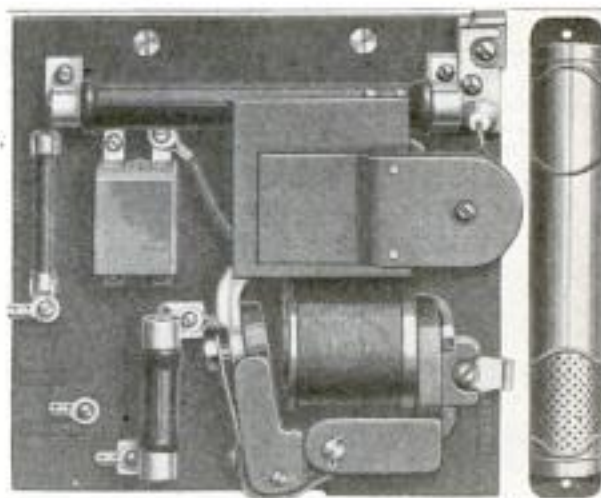
HEAVY CASTINGS ARE MADE FOR POWERFUL MACHINE

Five castings, having a total weight of 480,000 lb., were recently made at a Pennsylvania steel plant for a 9,000-ton forging press. Neither the individual parts nor the machine itself is record-breaking in size, but both are sufficiently large to be of interest, particularly to the layman. At the same plant a single casting weighing 400,000 lb. was produced some time ago.

THERMOMETER CONTROL FOR STREET-CAR HEATERS

To save a great deal of the electric current usually wasted in heating electric cars, the street-car systems of Chicago and other cities are being rapidly equipped with a new device which appears to give a simple and reliable form of thermostatic control of the heating. The regulator is mounted in a steel box, which is usually placed on the wall of the car vestibule. It is connected by two wires to an accurate mercury thermometer in a perforated metal case, mounted inside the car. The wires connect with two special platinum points fused into the glass of

the thermometer, one near the bulb and the other at a specified temperature point on the tube, usually between 50° and 52°. The mercury completes the electrical connection of the contacts. When the temperature in the car reaches 50°, say, a circuit is formed which opens a switch in the regulator



Regulator Panel of New Device for Thermostatic Control of Electric-Car Heaters; This Panel Connects with a Thermometer in the Car

and shuts off the heating current. As soon as it falls below that point, the heat is similarly turned on. Thus an equable temperature will be maintained in the car.

CIVIC FEATURES THAT PROMOTE THE COMFORT



The Call of Outdoor Life is Made More Alluring by Many Convenient Ovens Like This Provided on the "Sky Line Drive," near Cañon City, Colorado



Umbrellalike Concrete Shelter for Street-Car Patrons in a Salt Lake City Suburb: Panels are Provided in the Post for Street Signs



An Example of the Provision Made for Visitors in Its Beautiful Mountain Parks by the City of Denver: Stone and Undressed Pine have been Used Very Effectively in This Shelter



A Rustic Fountain in Sioux City, Iowa, Having as Much Charm as an "Old Oaken Bucket": The Hollow Knot That Serves as a Bowl, to Which Concealed Pipes Lead, is Cement-Lined



Because of Its Queer Shape They Call This Six-Sided Seat a Tub. It Stands on an Ocean Pier at Venice, California

AND ENJOYMENT OF RESIDENTS AND VISITORS



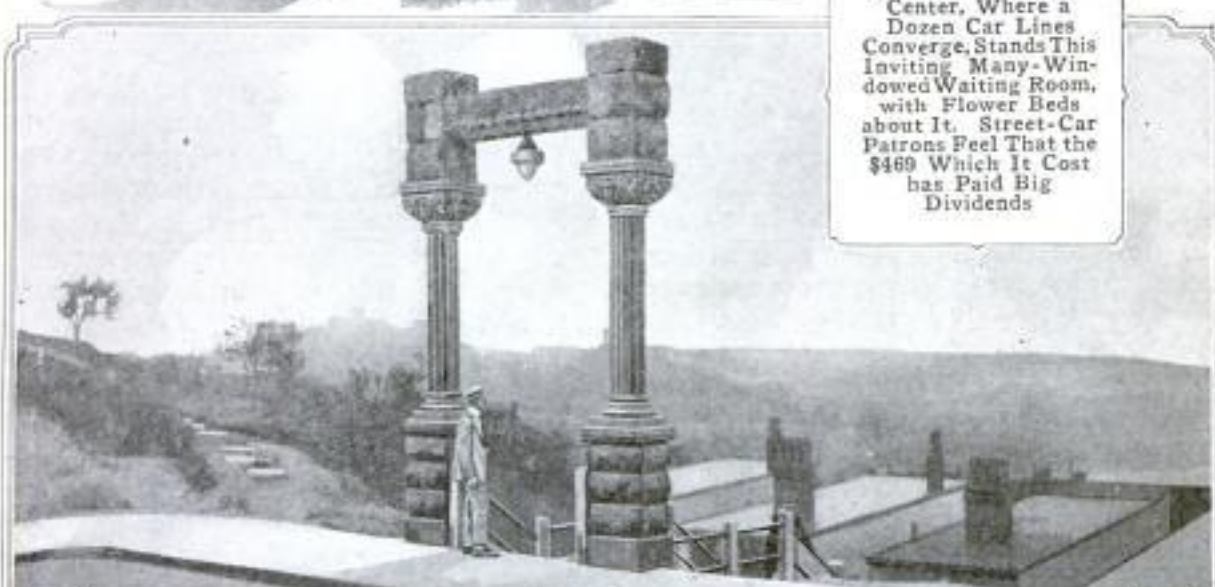
In These Tree Pots of Concrete Small Trees can Grow Despite Hard Pavements



Graceful Traffic Guide at Modesto, California, Adorned with Potted Plants: On the Sides Are Signs "Keep to Right," At Night Red Lights are Shown



At Denver's Civic Center, Where a Dozen Car Lines Converge, Stands This Inviting Many-Windowed Waiting Room, with Flower Beds about It. Street-Car Patrons Feel That the \$469 Which It Cost has Paid Big Dividends



When Cincinnati's Old Courthouse was Torn Down Two of Its Marble Columns were Used to Make This "Gateway to the City." From This High Point of Vantage One Obtains an Impressive Panoramic View of the City's Business District and Many Public Buildings

BIG CLOCK WITHOUT HANDS TELLS TIME BY FIGURES

In the tower of the Union Station of Nashville, Tenn., is a great clock which is believed to be different from any other tower clock in many respects. Instead of the usual circular dial with revolving hands, the time is shown by white figures 28 in. high, mounted on endless flexible bands, which move across the face of the clock, changing every 60 seconds. Figures of this height can, of course, be read much



farther than those on an ordinary clock dial occupying the same space. At night they are illuminated. The clock is operated by weights, aggregating several hundred pounds, which are wound up automatically by electrical power. This remarkable timepiece was constructed by a resident of Louisville, Ky., who devoted his spare time to the task for a number of years. In seeking to construct a clock of the peculiar type demanded, he was confronted with many mechanical difficulties which had to be solved along original lines.

ADAPTABLE TRAY OUTFIT FOR SORTING LETTERS

A new outfit for offices, designed to make the sorting of correspondence easier, consists of four trays held one above the other in staggered positions, a short distance apart, by a standard having a broad base and



notches in one side of its upright portion, into which the trays can be inserted so that they are held securely.

Any or all of the units can be taken out or rearranged merely by tilting them up, thus releasing them from their support.

CASTER-MOUNTED CAN FOR PRINTER'S "DEAD" METAL

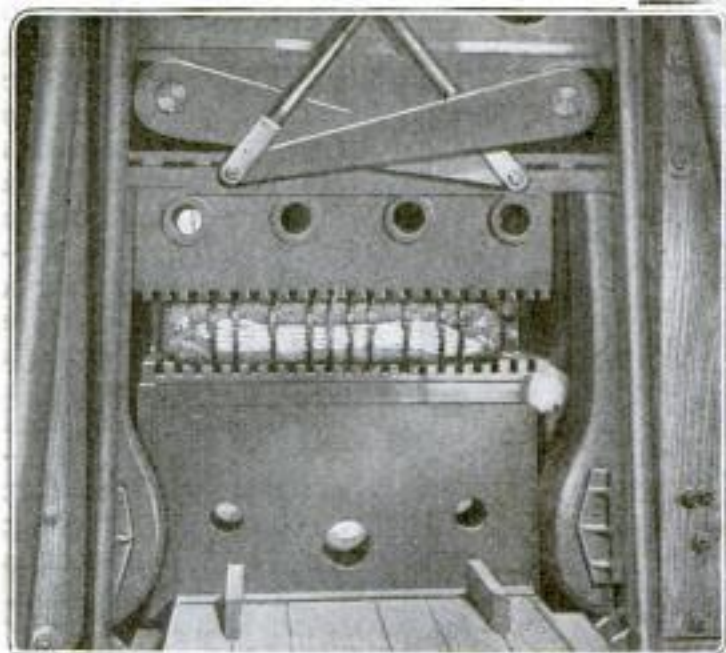
A large galvanized-iron can, equipped with casters and handles, has been put on the market and is proving a great convenience in printing shops as a receptacle for "dead" metal. It saves the printer's time because it can be drawn close up to the case or stone to receive old matter when it is being thrown out, and its transfer to the casting room can be accomplished without any lifting. Dirt is not apt to collect around the can since it can be moved easily.



NEW DISPENSING MACHINE FOR MALTED MILK

A malted-milk dispensing machine has been designed for soda fountains which discharges a carefully measured amount of powdered milk at each operation, thus preventing waste and at the same time serving as a sanitary container. The upper part of the apparatus constitutes a hopper in which the supply of material is kept. By pressing down a lever projecting from the side of the machine the desired amount of powder is discharged from a measuring device into the glass placed to receive it. This measuring device can be set for any one of eight different amounts.





Bale of Cotton in the New Machine being Compressed to a Density of 34 Pounds per Cubic Foot

POWERFUL COMPRESS MAKES COTTON BALES SMALLER

By compressing cotton bales to a far greater density than has been common heretofore, it is now possible to increase by nearly 50 per cent the capacity of freight cars, warehouses, and steamships, as regards cotton. A powerful press of a new type has shown during recent tests in New Orleans' huge new warehouse that it can easily compress cotton bales to a density of 34 lb. per cubic foot, whereas with the older presses 20 to 22 lb. per cubic foot was the limit. The new equipment is said to be capable of increasing the density to as much as 50 lb. Arrangements have been made to install a number of these high-density compresses in the warehouse, with a view to attracting much additional land and water traffic to New Orleans. About 73 bales of the reduced size can be loaded into a 36-ft. freight car, whereas between 50 and 60 of the regular-size bales are a capacity load.

Ⓒ Powdered glass is said to be used as a filling between two layers of thin armor plate on German armored cars, thus forming a protection against rifle bullets that is very effective.



General View of New High-Density Compress in New Orleans' Huge Cotton Warehouse

CANE USED AS CONTAINER AND STAFF FOR FLAG

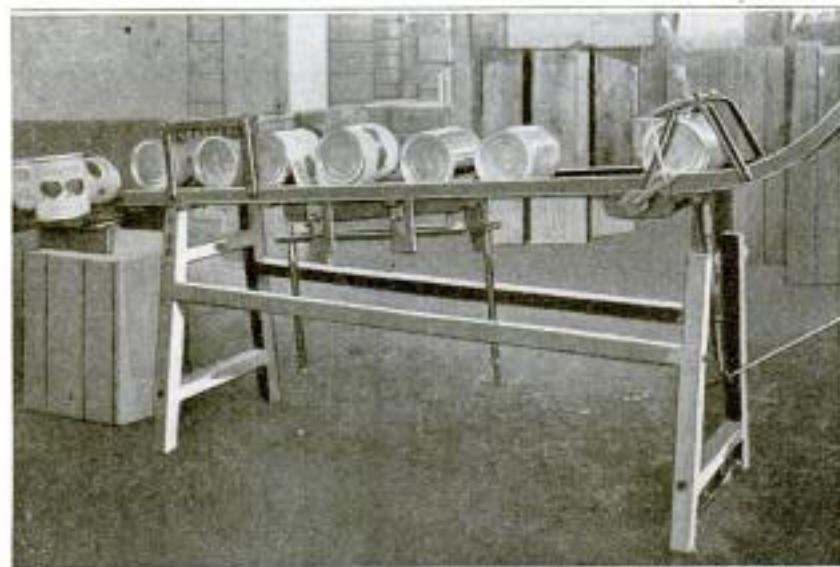
A walking stick, in which a flag may be carried when not displayed, is a recently patented invention of special interest in these days of patriotic demonstrations. The cane is hollow and by removing the head a flag, which is tightly rolled up, may be withdrawn. Means are provided for attaching the emblem to the end of the stick, which thereupon serves as the flagstaff. Carried in the cane, the flag is not wrinkled and is protected from the weather.



Hollow Cane in Which Tightly Rolled Flag can be Carried, Protected from the Weather; By Removing the Head the Flag can be Withdrawn and Attached to the Cane, Which Thereupon Serves as a Flagstaff

CAN-LABELING MACHINE OPERATES BY GRAVITY

A labeling machine for gallon-size cans, which operates entirely by grav-



Gravity-Operated Machine for Labeling Cans: As Containers Roll down the Incline Each Receives Sufficient Paste to Enable It to Pick Up a Label. It Then Passes beneath Brushes Which Smooth Out the Wrapping

machine costs practically nothing to operate and is less complex than a power-driven piece of equipment. The cans to be labeled are placed at the upper end of an incline, down which

they roll of their own weight, passing over a tray containing adhesive and then over a stack of labels. While rolling along enough paste is acquired by a can to pick up a label from the pile. The adhesive is so placed that it comes in contact with only the two ends of the paper strip, which is automatically wrapped around the can. At the end of the incline the container passes under brushes which complete the labeling process by

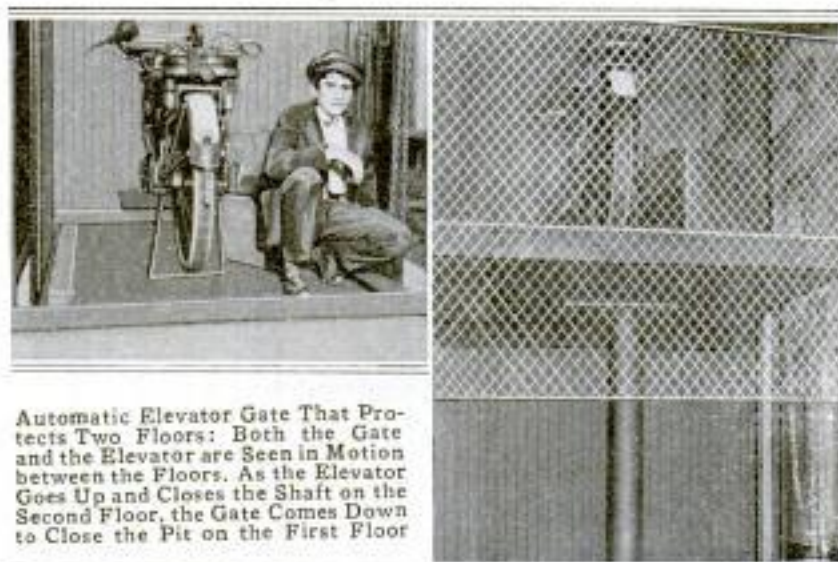
ity, has been built to do work now done by hand in many factories. The

smoothing out and pressing down the wrapper.

ELEVATOR GATE OPERATES ON TWO FLOORS

The proprietor of a motorcycle warehouse has designed and installed an elevator gate that serves to close the shaft entrances on either floor of the two-story building when the elevator is at the other floor. This is accomplished by hanging the gate in a steel groove by chains that run over pulleys at the top of the shaft and then are securely fastened to the floor of the elevator on its rear side. Thus the gate operates somewhat like a counterweight. When the elevator is at the first floor, the gate is in position before the opening on the second floor. When

the elevator goes up, the gate comes down to the first floor. Movements of the elevator are signaled by an electric gong, and with the gate device the shaft cannot be left open. The cost of



Automatic Elevator Gate That Protects Two Floors: Both the Gate and the Elevator are Seen in Motion between the Floors. As the Elevator Goes Up and Closes the Shaft on the Second Floor, the Gate Comes Down to Close the Pit on the First Floor

installation was less than that of other gates in common use.

SHRAPNEL

By REGINALD TRAUTSCHOLD, M. E.

A SHORT time ago, a man was haled to the police court for having under his arm a package containing a shrapnel, incorrectly referred to as a shrapnel shell. It is safe to assume that had passers-by known the contents of the package, at least one side of the street would have been shunned, while had the package dropped to the sidewalk a wild panic might readily have ensued. As a matter of fact the package the man carried was as safe as a box of candy, for shrapnel without a fuse is harmless and the fuse is fitted to the shrapnel only on the battle field. We hear a great deal of talk about "shrapnel" and read more, but, as this incident shows, we really know mighty little about it.

While all artillery projectiles are not shrapnel, the word is often incorrectly used, even by men who have been under artillery fire and who are very often apt to describe as effects of shrapnel what are in fact effects of high-explosive shells. Then, what is shrapnel?

The dictionary defines shrapnel as "a shell filled with bullets and having a bursting charge to explode it at any time in its flight." This definition is credited to a British officer, but, while accurate, is somewhat misleading. It describes the inside of a shrapnel well enough, as shown in Fig. 1—a view which has become quite familiar in the past three years. The bullets, technically shrapnel, are imbedded in rosin and fill the steel casing above the diaphragm which closes up

the powder pocket in the base of the casing. In this powder pocket is confined the powder charge which "explodes" the shrapnel. A timing device, from which emanates the flash which ignites the powder charge at some predetermined instant, caps the shell casing and forms the nose of the shrapnel. All this has become familiar enough to many within the last few years, with the possible exception of the timing device and its operation.

So much for what a shrapnel is. What a shrapnel does is clouded by even more general misunderstanding.

Consulting the dictionary again, we note that the shrapnel carries a bursting charge to explode it, and the general belief is that this charge, carried in the powder pocket in the base of the casing, shatters the steel shell and scatters the charge of shrapnel bullets. Even the head of a prominent concern engaged in the manufacture of war munitions, in describing the powder pocket, uses the expression, "which contains the necessary amount of powder to explode the casing." This may happen at times, but it is not what a shrapnel is designed to do, nor what a properly built shrapnel will do.

On firing a gun loaded with shrapnel, the cartridge case is left behind, just as is the shell when discharging an ordinary shotgun. The complete shrapnel, with its time fuse, etc., is projected at a high rate of velocity, revolving rapidly in its

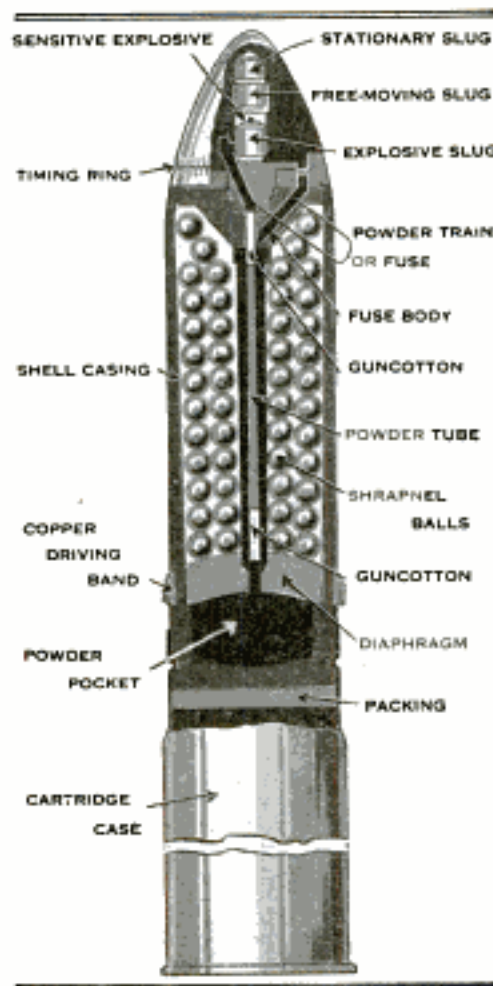


Fig. 1—Section of a Shrapnel: A Three-Inch Size Contains from 240 to 250 Bullets, Varying to Give Exact Weight

flight, and travels as a unit until such instant as the flash from the fuse reaches the powder pocket. When ignition of the powder charge occurs, the diaphragm, separating the powder pocket from the section containing the shrapnel balls, is driven forward. This strips the fuse body from the end of the shell casing, while the forward travel of the casing is seriously retarded, if not arrested or reversed. On issuing from the casing, the diaphragm plows through the mass of shrapnel balls and scatters them in all directions, the rosin which bound them together having been melted by the heat of the explosion and the friction created in driving the collection of shrapnel and partly melted rosin from the shrapnel casing.

The blast of the gases formed by the explosion of the powder charge on issuing from the open end of the casing scatters the shrapnel still further and imparts to the balls a velocity which makes them very destructive within a radius of about 60 feet of where the shrapnel "breaks." Part of the gases generated in the powder pocket are apt to escape through the powder tube and this strips the fuse cap from its body, or, if the fuse body is stripped from the shell casing before this takes place, the fuse body is pulled from the end of the powder tube. After the break of a shrapnel, the head of the projectile continues in advance, with a certain accelerated speed, followed by the diaphragm, powder tube, etc., and the spread of scattering shrapnel. The casing, having lost much of its momentum, drops to the ground (Fig. 2).

Should the force of the explosion within the powder pocket not be suffi-

cient to strip the threaded connection between the fuse body and the shell casing, the steel shell would explode, but only in such a case. To retain the effectiveness of the shrapnel, the fracture would be limited to a section near the mouth of the casing, where its walls are comparatively thin, and the shrapnel would be scattered from the

remainder of the casing as before. The shattering of the steel casing takes place only when a shrapnel fails to break properly. It is not what a shrapnel does ordinarily, but what it may do in the case of an emergency.

A shrapnel which breaks properly during flight simply scatters shrapnel balls, not fragments and pieces of jagged shell such as fly from an exploding high-explosive shell. When a shrapnel, through failure of the time fuse to respond, does not explode until it comes in contact with the ground or some other firm object in its path, then, and only then, the steel shell is fractured and pieces scattered in all directions. Damage frequently described as caused by flying pieces of shrapnel casings, therefore, is more probably correctly to be ascribed to fragments of high-explosive shells.

A properly built shrapnel can be timed to break accurately at any predetermined distance in its flight, notwithstanding the fact that on leaving the muzzle of the gun it may be traveling at a speed of close to 2,000 ft. per second. The time fuse controlling this all-important function is carried on the end of the shell casing and forms the nose of the projectile. Different types of fuses are employed, but the one depicted in Fig. 1, a combination detonator and time fuse, is simple and

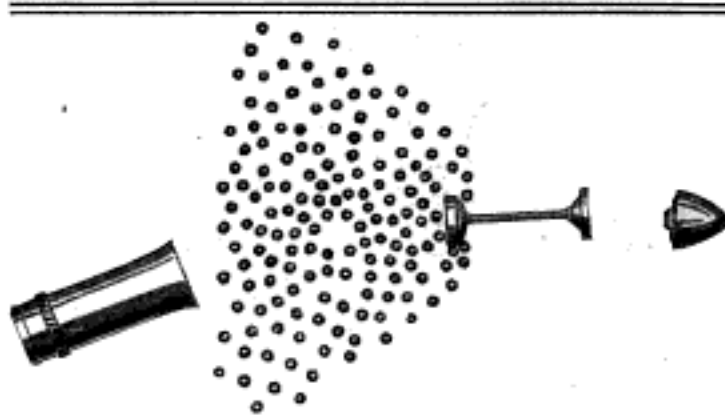


Fig. 2—What Happens When a Shrapnel Breaks Properly: During Flight, at the Time Set, the Powder Charge is Ignited, the Balls are Scattered by the Diaphragm Plowing Forward, and the Head of the Projectile Flies in Advance

well illustrates the principle involved. The cap of the fuse contains three slugs, or pellets, the upper one of which fits firmly into the nose of the cap and serves primarily as a cushion against which the center free-moving slug rebounds on the discharge of the gun. The free-moving slug fits loosely in the cap, so that on the instant the shrapnel leaves the cartridge case on firing it is thrown forcibly against the lower slug. This explosive slug carries on its upper end a small quantity of ignitable and highly explosive substance which is instantly exploded with a flash when struck by the free-moving slug. This ignites a powder train, or fuse, encircling the inside of the timing ring and connecting with the lower of the two powder trains shown in the illustration as leading to the guncotton in the upper end of the powder tube. The flash from the ignited upper section of guncotton is transmitted with lightning rapidity, through the central powder tube, to the guncotton in the lower end of the powder tube, and the powder charge in the powder pocket is thus ignited.

Adjustment of the timing ring regulates the time required for transmitting the flash of the sensitive explosive on

the end of the explosive slug to the powder under the diaphragm, so that the shrapnel will break at any predetermined point in its flight. This regulation is accomplished by simply increasing or decreasing the length of fuse which has to be consumed between the point at which it is ignited by the flash from the explosive slug and its connection to the train leading to the guncotton.

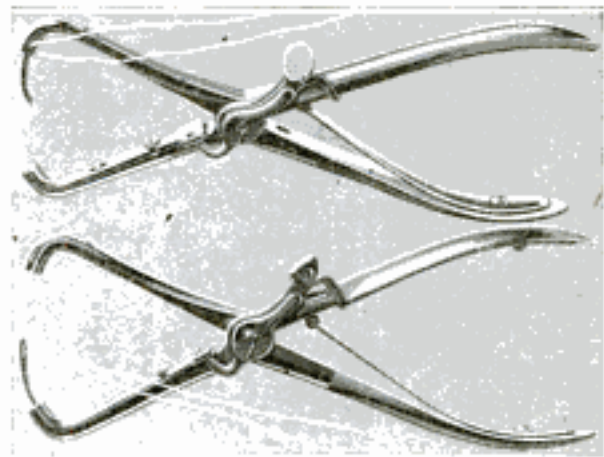
Should the free-moving slug stick, however, and fail to strike the explosive slug when the gun is discharged, the shrapnel will not break, but explodes when it strikes a firm object. On striking, the explosive slug is thrown violently forward by the concussion and in moving forward opens communication to the upper of the two powder trains, so that the flash of the sensitive explosive ignites this more direct train. This explodes the powder charge in the pocket instantly, as no time is wasted in the preparatory consumption of the encircling fuse within the time ring.

A shrapnel is in fact nothing but a kind of smooth-bore cannon charged with bullets, which is shot off while in flight and explodes as a bomb only when it fails in its mission.

SURGICAL SEWING FORCEPS SAVES OPERATOR'S TIME

For the more rapid and regular sewing up of wounds and incisions, a surgeon has designed an instrument which has the general character of a pair of forceps and is handled similarly. It carries a needle at one end of the curved blades. When the handle of the device is closed, the needle passes through the flaps of tissue, carrying the thread with it, and is automatically seized and held by the opposite blade. Then the handles are closed again and by pressing a thumb catch near the middle of the forceps the needle is released from its position in the second blade and returns to its original place in the first blade, ready for another stitch. The stitches are made in an in-

stant of time, much more rapidly and with greater regularity of spacing and of tension than is usually possible by hand.



First and Second Positions of the Needle in New Surgical Sewing Forceps: It Passes from One Blade to the Other in Making the Stitch

CITIZENS STRING BOOM TO SAVE A DAM

When the dam that furnishes power to run the municipal lighting plant of a



Scene When the Mazeppa, Minnesota, Dam was Expected to Give Way, After Part had been Torn Out, as Shown

Minnesota village was repaired last summer, the authorities failed to replace an ice boom that protected the dam. As a result, when the ice went out in a sudden thaw this spring, part of the dam was carried away. To save the rest and avert a calamity, a few citizens volunteered to string the boom across the river, and this they did in four hours, saving the dam at the risk of their lives.



Citizen Volunteers Stringing a Boom across the River to Save the Dam from Further Damage by the Ice

another. Not only is it proposed to undertake extensive works of this character after the war, but certain projects are under way at the present time. Today Germany has more than 8,000 miles of navigable waterways. This total includes open rivers, rivers made navigable, canals, and navigable lakes.

The Rhenish papers, it is said, are talking freely of building a canal from Antwerp to Aix-la-Chapelle and Cologne, thus making a navigable waterway from the Scheldt to Constantinople. It is proposed, also, to greatly improve the canal facilities from Strassburg to Basel, a distance of 79 miles. The Mosel is to be regulated

so that the ore deposits in Lorraine and Luxemburg can be transported by water. The Elbe is being improved and the Moldau, its principal tributary in Bohemia, will be canalized as far as Prague. The



The River and Dam Next Day, After Danger had Passed: The Boom Held the Ice in Check and Saved the Village Thousands of Dollars

WATERWAY IMPROVEMENTS PLANNED BY GERMANY

In the midst of war Germany has found time to plan numerous important extensions to its inland-waterway system, including the improvement and construction of canals and the regulation of streams. In fact, the present conflict has tremendously increased the need of making all possible improvement in facilities for transporting materials from one part of the empire to

Oder is to be improved also, and with certain tributaries which connect with the Bromberg Canal, will be well joined with the Vistula.

ⓄThe war has entirely shut off the European trade in fireworks, out of Hongkong.



Two Teams of Percheron Horses Switching a Train of 19 Cars Loaded with Hemlock Logs in the Yards of a Wisconsin Paper Mill: Note the Team "Hanging to the Pull"

FREIGHT TRAIN SWITCHED BY FOUR HORSES

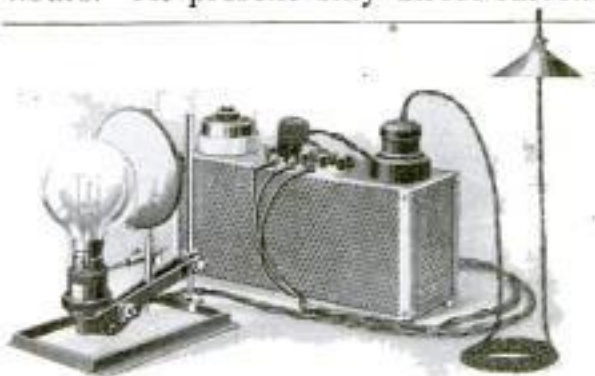
When a yard switch engine broke down at Eau Claire, Wis., recently, a train of 19 flat cars, carrying hemlock logs for a paper mill, was switched by two teams of heavy Percheron horses belonging to the paper company. The freight load moved was 118,000 ft. of timber, weighing 944,000 lb., in addition to the weight of the cars. The teams weighed 3,400 lb. each.

arc

LAMP OF HIGH EFFICIENCY UNUSUAL IN DESIGN

Intense illumination that is hardly distinguishable from daylight, so far as color is concerned, is said to be produced by a new incandescent lamp of radical design. Practically all of the light developed by it emanates from a small ball of fused tungsten which forms one electrode of an arc. Because of this, the light source is easily and effectively controlled with lenses and reflectors. It is intended particularly for use in projection lanterns and provides an almost perfect disk of light, which, when thrown upon a screen, is reported to be free from blurs and other inequalities. The lamp differs from ordinary incandescent ones in that it is an inclosed arc which strikes

between tungsten electrodes in a nitrogen atmosphere. In intrinsic brilliancy, its range is between 400 and 30,000 cp. to the square inch. In addition to being adapted for projectors, it can be used advantageously in microphotographic work, for matching colors under artificial light, and for similar purposes. Its life is about 500 hours. At present only direct-current



Practically All of the Light That is Developed by This Inclosed-Arc Lamp Emanates from the Small Globule of Fused Tungsten

lamps of this type are available. A resistance box allows current of any voltage from 100 to 250 to be used.

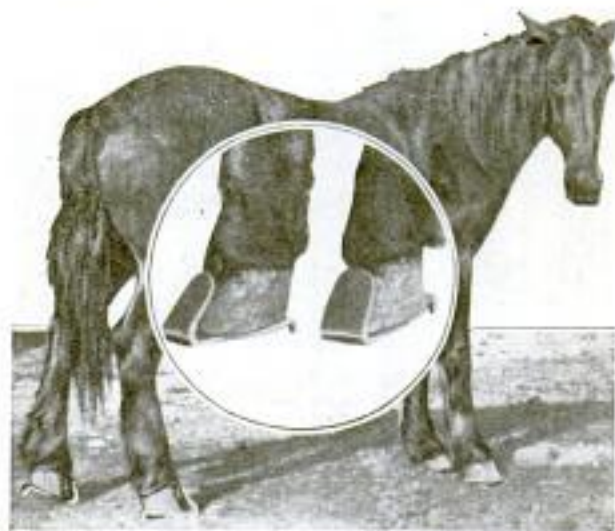
According to a table tentatively adopted by the state highway department of Michigan, the number of vehicles for which 9-ft. gravel roads are economically suited is up to 200 per day, while the number for 16-ft. concrete roads is from 500 to 2,000 per day.

Umi

on

OPERATION AND ODD SHOES SAVE FAITHFUL HORSE

The faithfulness of a work horse was rewarded some time ago by giving it expensive surgical aid when it became



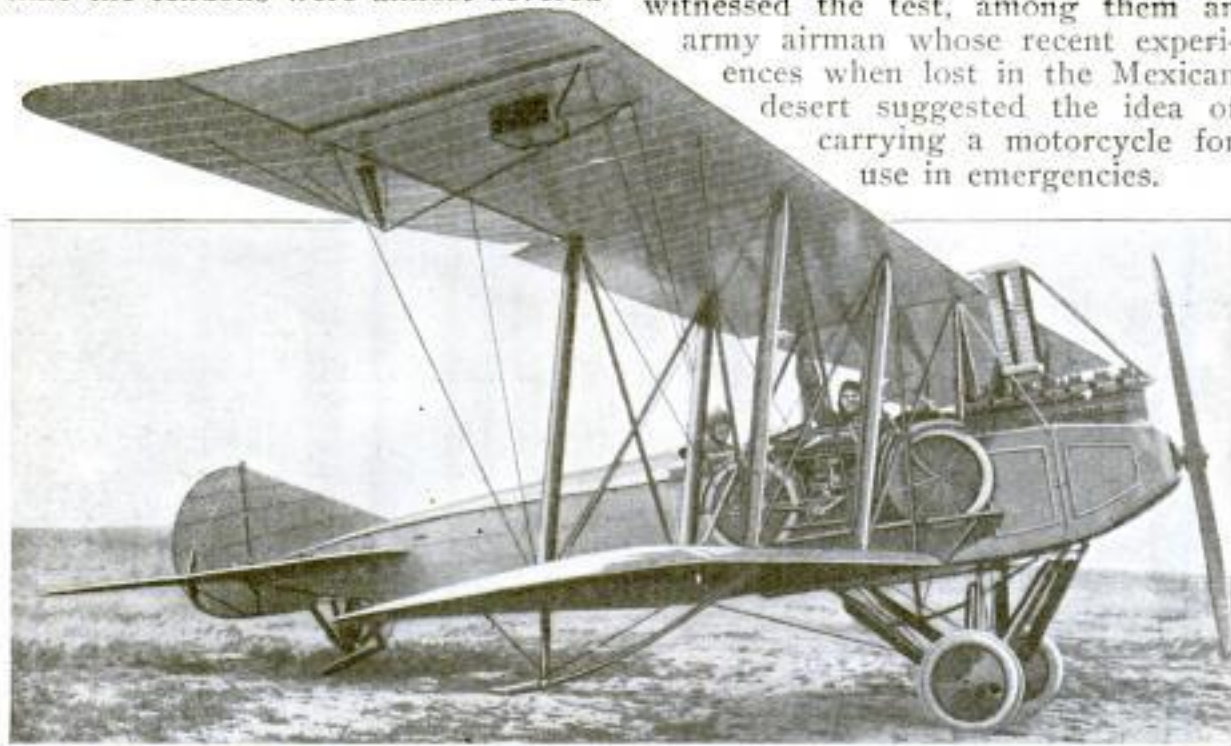
Work Horse Operated on Twice for Lameness: Insert Shows the Horse's Hind Feet Shod with Special "High-Heel" Shoes, Having Protectors in Front Which Enabled It to Walk without Stumbling

very lame. The tendons of the animal's hind legs had contracted so that it could stand only on the front edge of its hind hoofs. To remedy this the horse was operated on twice. The first time the tendons were almost severed

in several places between the fetlock joints and the hock, and the second time, above the hock. After being in a sling for several weeks the animal was able to walk, but with its hoofs still tilted forward a little. It was then provided with special rear shoes, having heel calks an inch high and broad "bumpers" that curved up in front of its feet so that it would not stumble. Now it walks and works almost as well as ever. The owner says he has never regretted the expense, which amounted to several hundred dollars.

MOTORCYCLE AS ADJUNCT TO AN AEROPLANE

In a recent aeroplane flight in California an airman carried with him, besides a passenger, a fully equipped motorcycle. After flying more than 100 miles, part of the time at an altitude of over 6,000 feet, a landing was made and the motorcycle was used to obtain gasoline at a garage two miles from the spot. The motorcycle was then replaced on the aeroplane for the return flight, which was made in safety. A number of army and navy officers witnessed the test, among them an army airman whose recent experiences when lost in the Mexican desert suggested the idea of carrying a motorcycle for use in emergencies.

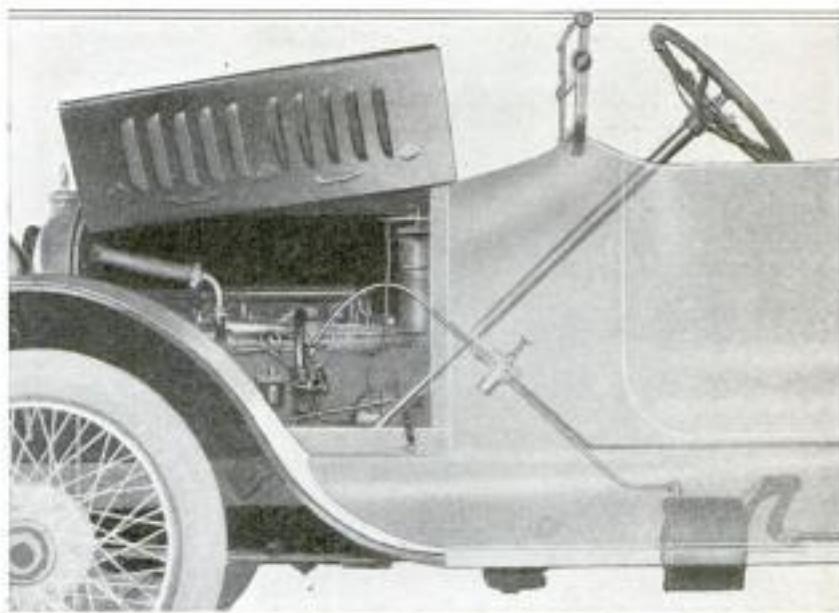


Motorcycle Mounted on an Aeroplane: During a Recent Flight in California the Cycle was Used to Get Gasoline from a Distant Garage

QUICK-ACTING VACUUM BRAKE FOR AUTOS

The latest automatic brake for automobiles is somewhat similar in action to the air brake in railway use. Instead of operating by the force of compressed air, however, the auto vacuum brake operates wholly by the normal suction of the engine. Like the air brake, it has a cylinder and piston connected to the brake rods. The cylinder is small and may be mounted on the frame or any convenient cross member of the chassis. There is a copper-tubing connection to the intake manifold of the engine, and in this is located a simple valve, controlled by a lever or button convenient to the hand or foot. For hand control, the lever is placed on the steering column; for foot

control, a button on the toe board is provided. A slight touch is sufficient to apply the brake, either to bring the car to a gradual stop or to stop it instantly, as the intake vacuum will exert as much as 1,000-lb. braking



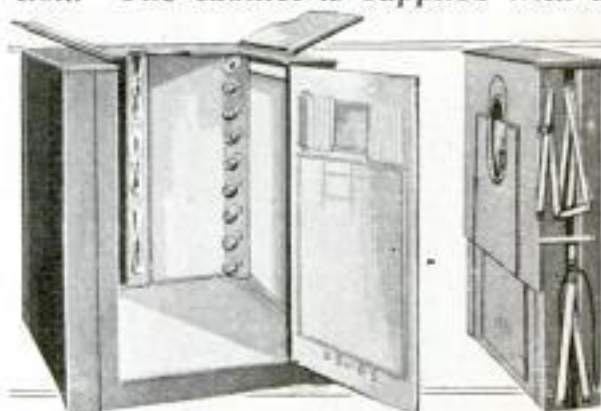
Mechanism of New Auto Vacuum Brake, Which Operates by Suction of the Engine through a Special Cylinder and Piston Connected to the Brake Rods

power at the rear wheels. It operates even on the slowest engine speed.

FOLDING STEEL LIGHT-BATH CABINET FOR HOME USE

Collapsible, pressed-steel cabinets outfitted with electric equipment comparable with that installed in the large stationary models used in hospitals and sanitariums, are being constructed to facilitate the administration of light baths in the home. One type is provided with ball-bearing hinges, an automatic roll top, and folding panels, so that it closes compactly and may be stored conveniently in a small closet or toilet room. The operation of opening and closing the cabinet is a simple one which requires little physical effort, while the matter of moving it from one room to another through narrow doors presents no difficulty whatever, since it is supplied with casters and is only 8½ in. thick when folded. The lighting equipment con-

sists of 44 lamps wired in four circuits and arranged on special shields in such a way as to protect a person from the danger of being burned. Double walls provide the necessary thermal insulation. The cabinet is supplied with a



Occupying Little Space When Not in Use, This Folding Cabinet is Provided with Essentially the Same Equipment as the Large Stationary Models Intended for Hospitals

wide door so that a large or feeble patient may enter or leave it easily.

PAINTERS AND DECORATORS GO TO SCHOOL IN IOWA

In several cities in Iowa painters and decorators are going to school. Iowa State College, at Ames, Ia., seeking to give practical aid to men of the painting trade, now employs experts who offer two courses in this line of work. One is conducted at the college and lasts four weeks. The other is a two-weeks' course and is given in several cities during the slack season, so that men can take advantage of it with a minimum of inconvenience. The size of the classes is limited for the sake of efficiency, and while half of the

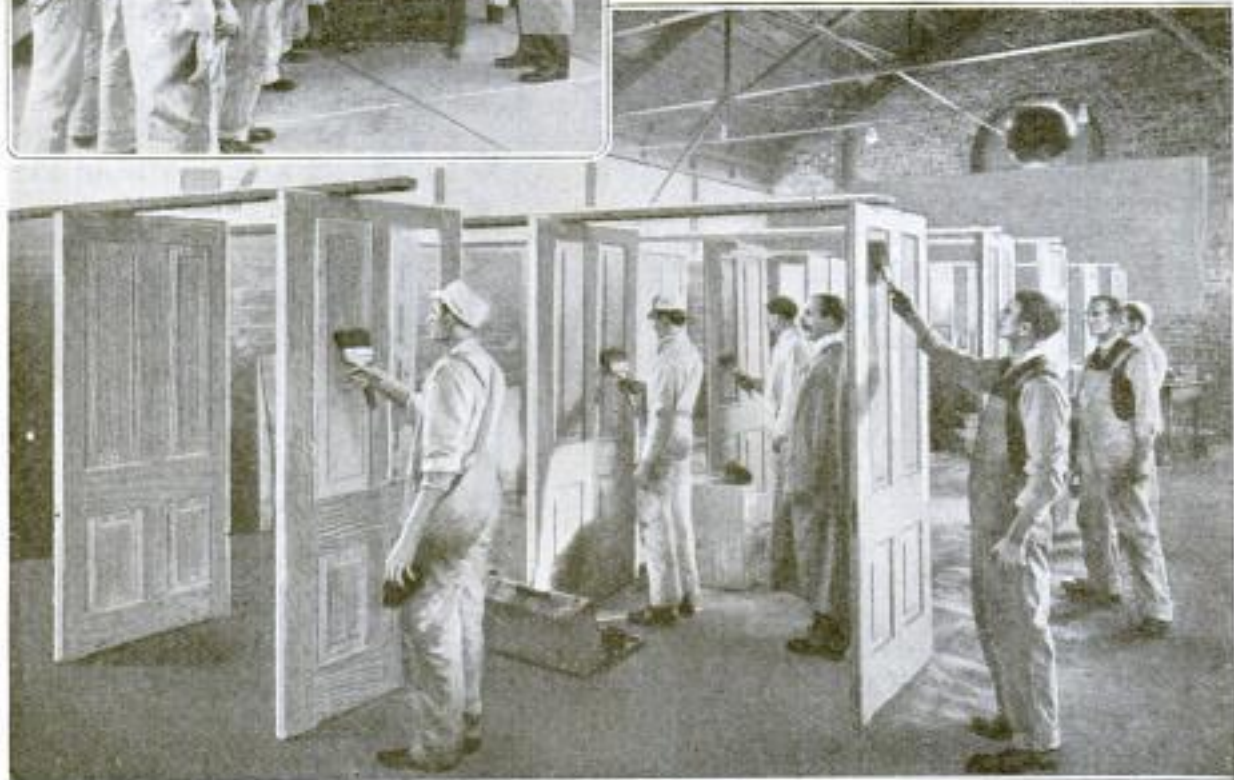
men spend the morning doing wall work, the other half do graining, for example, and in the afternoon the two groups change about. The evenings are occupied with general discussions and lectures. The equipment used includes a large number of doors and panels on which the men work under the supervision of the instructor. In some cases, too, men are assigned to practical jobs in houses or elsewhere. One painter, after he had taken the short course, redecorated without cost a home that he had previously decorated, because what he had learned made him dissatisfied with his previous work.



METHOD OF ROAD REPAIR SAVES MANUAL LABOR

Machinery
A

The shortage of unskilled labor which has been felt increasingly since the war began has caused contractors to adopt many labor-saving practices, one of which is shown in the accompanying illustration. In this case a self-propelling crane is employed to remove crushed stone from a gondola car



Painters Learning to Better Their Work: These Men are Enrolled in a Course in Painting and Decorating Offered by Iowa State College. Above: College Instructor, an Expert Decorator, Explaining the Fine Points of Mahogany Graining



Spreading Crushed Stone with a Minimum of Manual Labor: The Gravel Car and a Self-Propelling Crane Move Along Side by Side, While the Stone is Deposited in Piles, and Spread by a Scraper

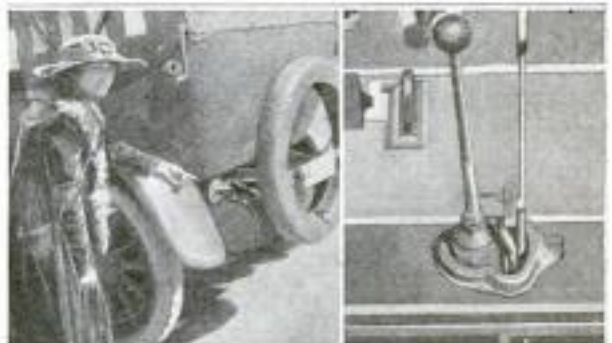
and dump it directly on a road under repair. An electric locomotive slowly draws the car along a trolley line which parallels the road, while the crane moves forward on the highway, depositing the material in piles as it goes. The contractor has further lessened the manual labor involved in spreading the crushed stone, by attaching a wheeled scraper behind the crane. As the road implement is drawn along, it smooths out the piles, so that little shoveling is required to finish leveling it off.

RUSTPROOFING BATH FOR IRON AND STEEL 4297

A chemical bath for rustproofing iron, and steel parts of all sorts, against atmospheric attack has been developed by an American firm. Many automobile concerns are said to be using the process. It gives the metal a dull, etched appearance and does not prevent its use in the ordinary way, it is said. Springs, for example, can be made to function as usual without affecting their rustproof qualities. The articles to be treated, after being cleaned, are immersed in a boiling bath containing phosphate salts and are kept there for about two hours. After the chemical treatment has been completed, the parts are removed, dried, and dipped in oil. They then can be painted or enameled.

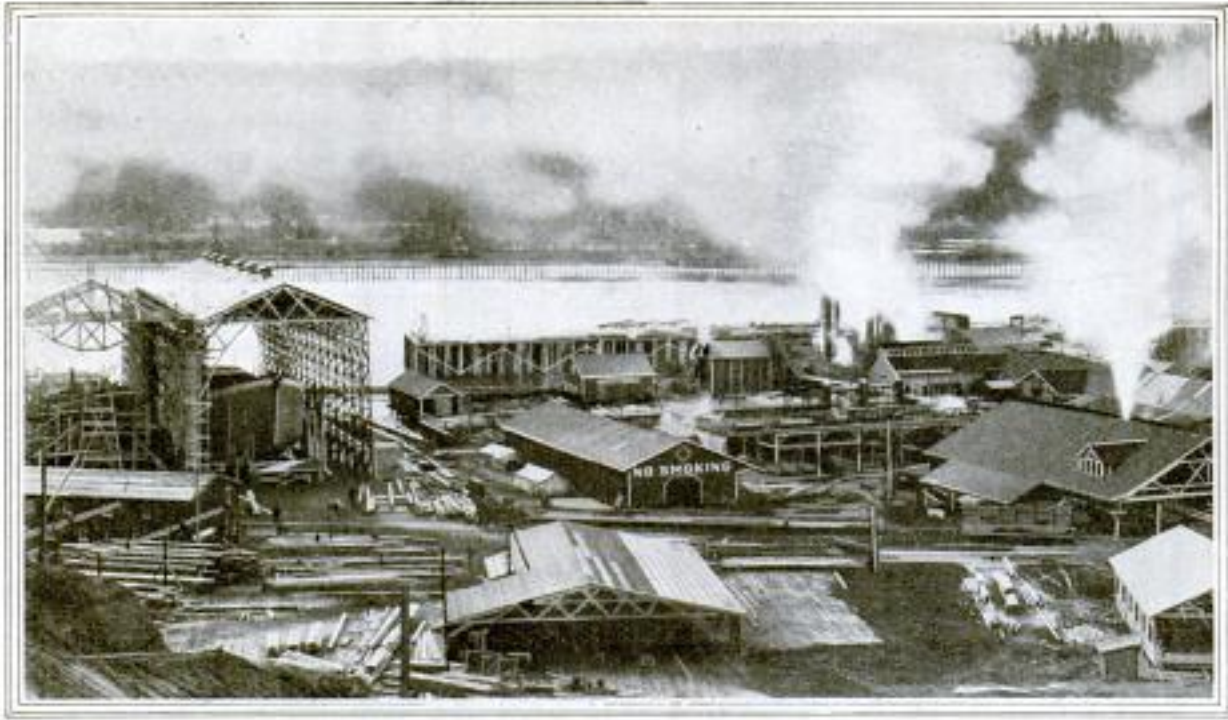
REAR HORN OPERATES WHEN CAR IS BACKED UP

Because not a few automobile accidents have occurred while cars were being backed up, a young woman has patented a rear-end horn, designed to prevent such mishaps. The reversing of the transmission causes the signal to operate automatically. The horn is situated at the back of the car just beneath the body. The electric wiring with which it is connected extends to the gear shift and is attached to a brass contact arm that is fastened in a horizontal position to the base of the brake lever. This brass projection is so placed that when the transmission is thrown into reverse, the gear lever strikes it and causes the horn to operate. By having the tone of the horn entirely different from that of signals now used, the device is made more effective.



Rear Horn Which Sounds a Warning When the Car is Backed: Projecting from the Base of the Brake Lever Is a Brass Arm Which Makes a Contact with the Gear Lever When the Transmission is Reversed

*Warrant W. Varian (L.A. Cal.)
The Parler Rustproof Co
Detroit, Mich.*



General View of a Shipyard in Portland, Oregon, Showing Two of Seven Ways: One of the Two has been Roofed so That Work can Go On the Year Round

4141

BUILDERS HASTEN TO FILL NEED FOR WOODEN SHIPS

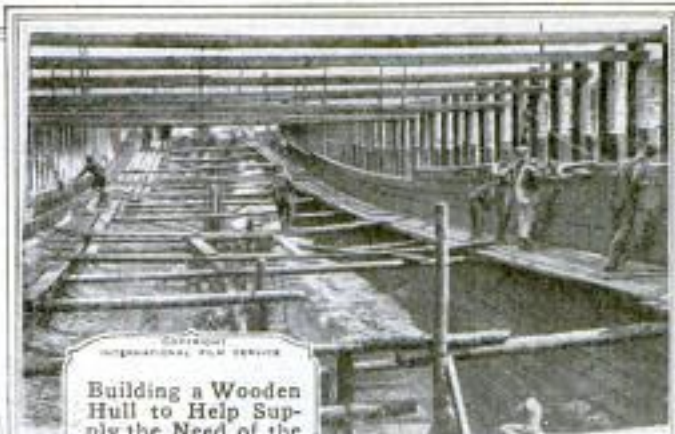
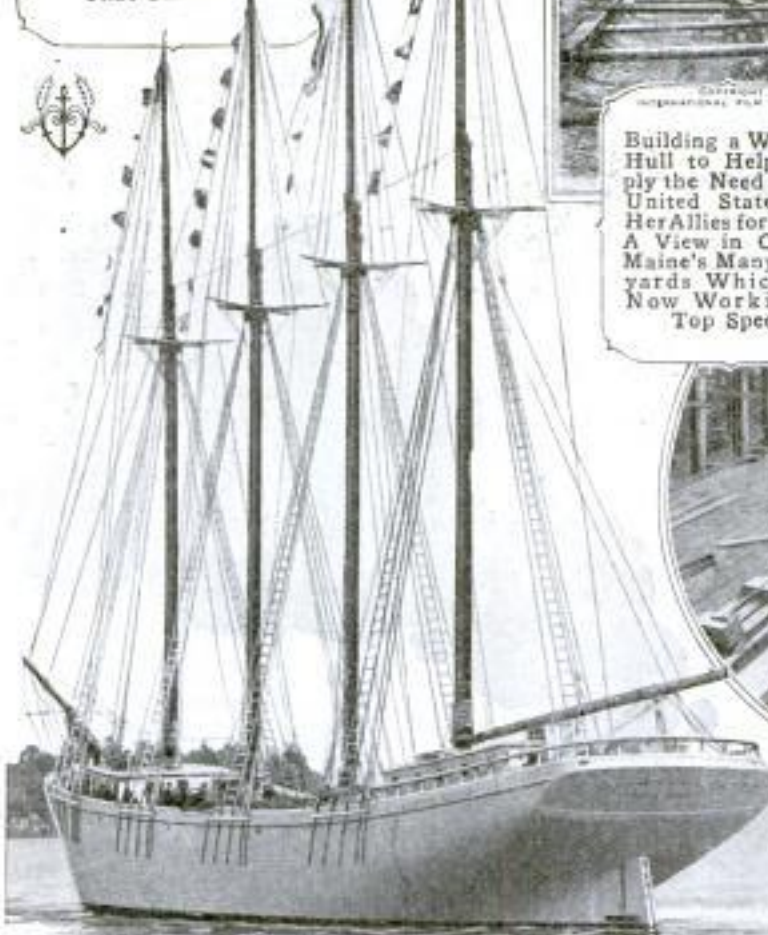
In response to England's recent declaration that the present great need of the allies is "ships, and always ships," the United States is now bending every energy to supply that want, so far as it can, with modern steel craft. But the need is enormous and use can be found for every type of bottom that can sail the seas, whether steel or wooden. This emergency has created a great opportunity for the builders of wooden vessels of small tonnage particularly, and shipyards on our east and west coasts have become scenes of feverish activity. Old yards in Maine, long since idle or almost so, are now working to their capacity. Builders of wooden ships in Washington and Oregon, like those in Maine, are taking advantage of the vast timber resources at their very doors, and are turning out boats at a rapid rate. It is interesting to note that Oregon alone, according to estimates, possesses one-sixth of the standing timber of the United States. Government authorities now realize that though powered wooden vessels cannot be profitably utilized so extensively as has been advocated recently, nevertheless there is need for all wooden ships that can

be built, for they relieve by just so much the excessive demand for steel vessels. The Federal authorities have organized a \$50,000,000 corporation, headed by the ablest engineers and shipbuilders in the country, and within a few months this government-owned concern expects to be turning out hundreds upon hundreds of vessels.

TO BUILD FEDERAL ARMOR PLANT IN WEST VIRGINIA

The government's great armor-plate and projectile plant, for which congress has appropriated \$12,700,000, is to be located in a rugged part of West Virginia, namely at Charleston. This city was selected by a special navy board after it had personally inspected more than a score of cities and carefully considered their respective claims. Charleston, the board decided, offers an ideal combination of military safety and accessibility to the materials that will be needed. The city tendered to the government several desirable sites free of cost, on one of which the plant will be erected. One of the protected gorges in the region will be converted into a proving ground.

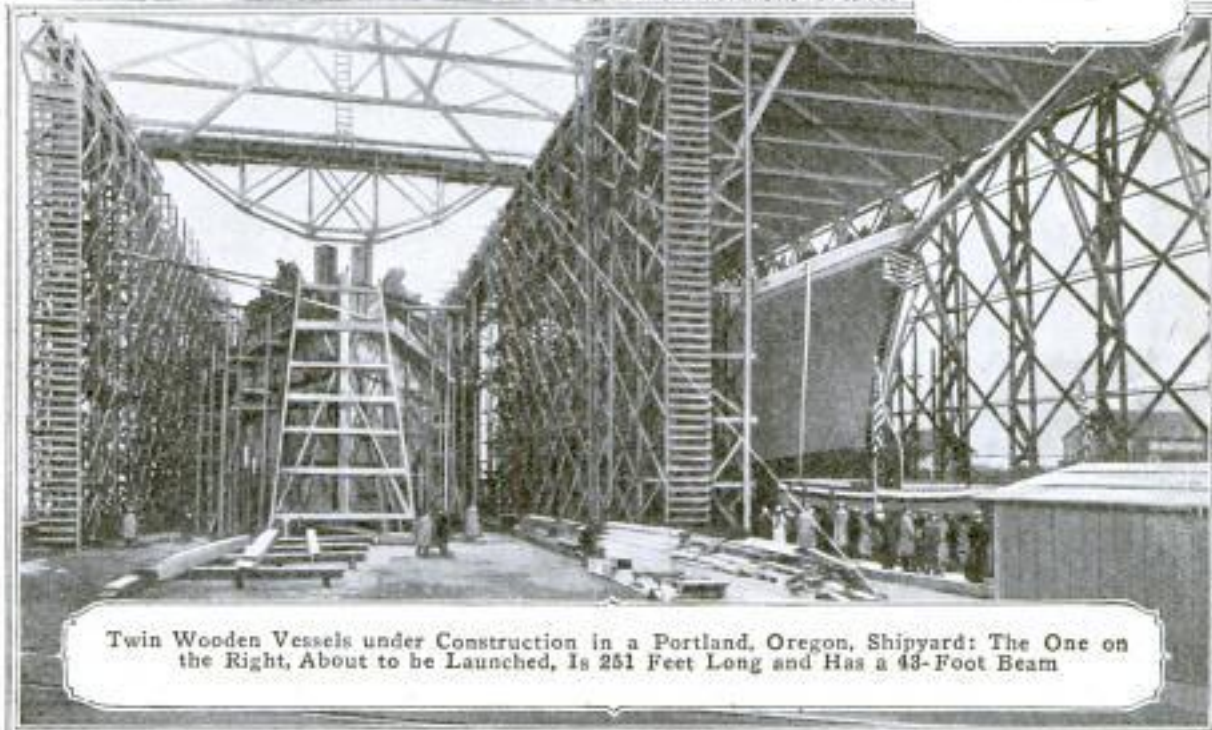
Schooner Recently Launched at Camden, Maine: This Vessel, a Fine Example of Wooden Construction, Is 158 Feet Long and Has a 36-Foot Beam. It is Valued at \$80,000. A Decade Ago It Could Have Been Built for Perhaps Half That Sum



Building a Wooden Hull to Help Supply the Need of the United States and Her Allies for Ships: A View in One of Maine's Many Shipyards Which are Now Working at Top Speed



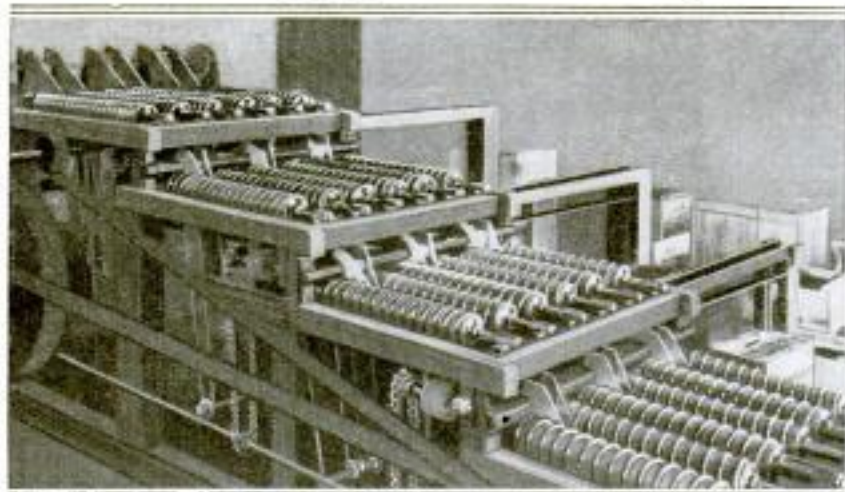
A Pacific Coast Shipyard: Three Timbers, Each 124 Feet Long, being Prepared to Do Keel Service



Twin Wooden Vessels under Construction in a Portland, Oregon, Shipyard: The One on the Right, About to be Launched, Is 251 Feet Long and Has a 43-Foot Beam

NEW OLIVE-GRADING DEVICE REPLACES HAND SORTERS

Satisfactory work is apparently being accomplished with a lately invented olive-sorting apparatus installed



The Rollers in Each Tier of This Olive Sorter are Spaced Differently, so That the Smallest Olives Drop Through at the Outset and the Largest Ones Last

in a large pickling plant, where heretofore the grading has been done by hand. The machine consists in part

of four stepped tiers of spiral rollers, arranged in pairs that revolve away from each other. At the rear end of the machine small bucket conveyors lift ungraded olives from a large bin and discharge them between

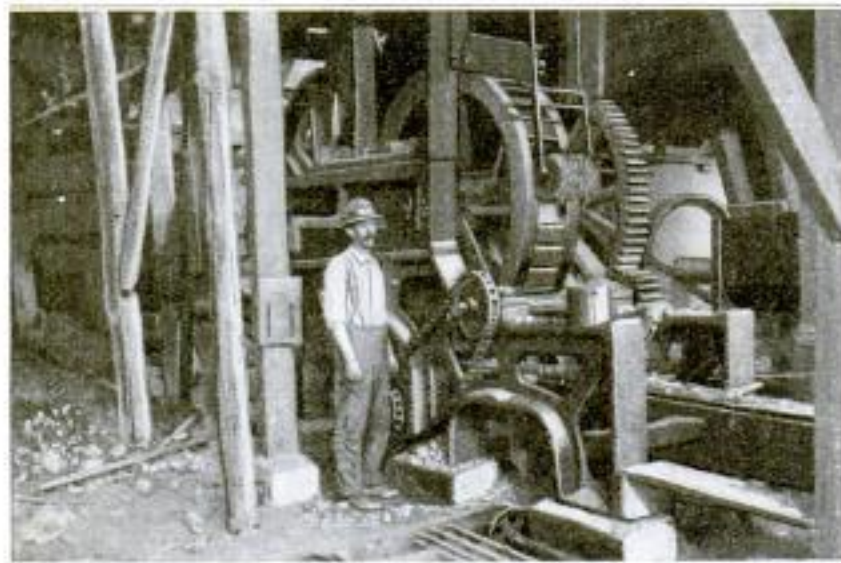
the rollers composing the first battery. The spacing of the rollers is such as to permit the smallest fruit to drop into a bin below, while the rest is carried to the next tier, and so on until the intermediate sizes have been sorted out and the largest olives delivered into a receptacle at the front of the machine. In this way various grades of olives are quickly separated.

When the fruit drops into the sorting bins its fall is broken by canvas so that the danger of bruising is overcome.

ROTARY MACHINE FOR MAKING "SOFT-MUD" BRICKS

Approximately 50,000 bricks are molded in a single day with an odd

near Mt. Vernon. The apparatus is locally known as a wheel machine, and



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Queer Brick-Molding Machine Employed in a Yard near Mt. Vernon

machine used in a plant located on a part of the original Washington estate,

dropped onto a belt conveyor at the bottom and transferred to drier cars.

although apparently uncommon elsewhere, is used at a number of yards in the vicinity of Washington. The device consists essentially of two large wheels or drums, one of which has 42 forms arranged about its circumference. The clay is fed into a hopper at the top of the machine and forced into the various molds as they come into the proper position. As the two wheels revolve in contact, the clay is tightly compressed. The molded bricks are



Moving an Oklahoma Town to a New Town Site on a Railroad: The Buildings are Hauled by Tractors, as Shown, Sometimes to Distances of 10 or 20 Miles from Former Sites

MOVING OUT-OF-THE-WAY TOWNS TO A RAILROAD

By J. R. HENDERSON

In the silver and gold-mining camps of the West, when a rich "strike" is made, a small city of tents and shacks springs up almost within a night. One town may be practically deserted in favor of a new one; but whoever heard of moving the town—post office, stores, dwellings, and all—for a distance of 10 or 20 miles?

It could not be done—the nature of the land, rough and hilly, would not permit it. Instead, tents and huts are erected; then, after a time, more pretentious buildings, and finally comes a railroad, with a box car for a depot. That's a "boom town" in the West.

On the level plains of Oklahoma they do things differently. Instead of slowly building up a new town in a very desirable locality (in the oil or zinc fields, for instance), the people simply move the old town to the new location.

Every few weeks a whole town moves its location. Enterprising Oklahomans think little of moving a whole city. Healdton moved recently and is now known as New Healdton. The people of Staunton moved their town 20 miles to a railroad. Cornish did the same thing, though not quite so far.

So did Hewitt, Walters, Bottsford, and many others.

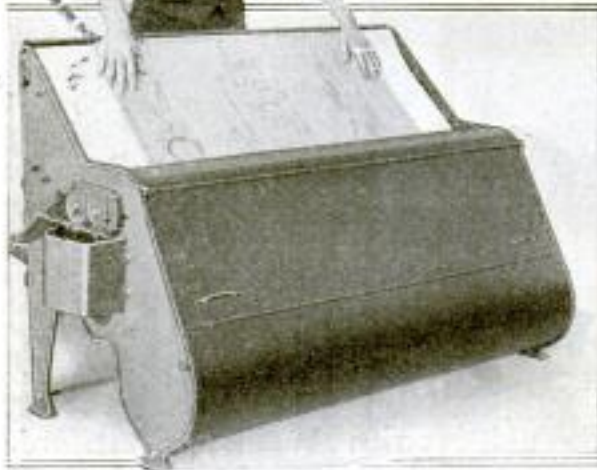
The railroads are the greatest cause of this town-moving. They are in the town-site business themselves, and are far more concerned in selling building lots on new sites than in developing tonnage in old towns. Wherever they wish to have a town, perhaps near some newly discovered oil pool or lead and zinc deposit, they throw down a track, build a nice depot, and a little advertising brings not only new buildings, but perhaps some town 10 or 12 miles away, which moves to the new site. Many such towns are not doing very well, and have no prospect of a railroad coming to them, so they pick up and move, houses and all, to the railroad, be it 5 or 25 miles away.

Some of the larger buildings may take three or four tractors to move them, but move them they do, and in quick order. The largest of these towns will usually move completely within a week or less. It is a common thing to have one or more traveling shows doing a thriving business on the new town site within five or six days after the first building of an old town starts for the new location.

BLUEPRINTING MACHINE OPERATES AT LOW COST

Simplicity, speed, and low cost of operation are special features of an electrically driven blueprinting machine

that is now being used by architects and others. The blueprint paper may be stored



Blueprinting Machine So Simple an Office Boy can Run It: When Operated at a Rate of One Foot per Minute the One in Charge can Print, Trim, Wash, and Dry Prints without Stopping the Machine. No Dark Room is Required

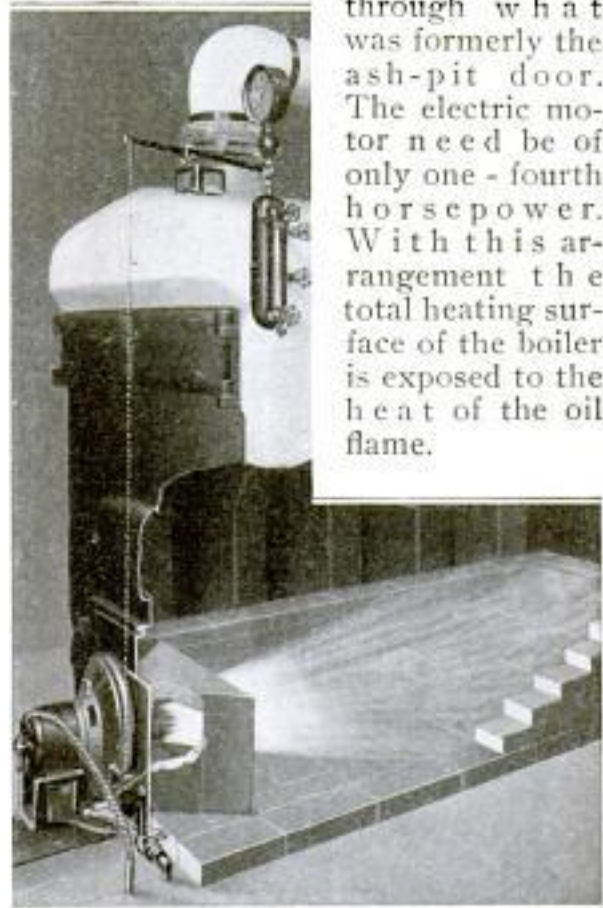
in a chamber in the front of the apparatus. In printing on a continuous roll, the paper is fed from this chamber down an incline table, and is carried along by an endless belt, with the tracing placed over it. The belt is guided by rollers which cause it almost completely to encircle a printing cylinder made of wire, wound spirally. Within the cylinder is a mercury-vapor tube so situated that the paper passes within 2 in. of the light. After the paper and tracing have followed the belt almost around the cylinder, the paper is delivered into a light-proof chamber at the back, and the tracing to the operator. Any width of paper up to 48 in. can be used.

A telephonic device, with a microphone attached, has been invented in Norway, which when lowered into the water enables fishermen to detect the presence of near-by schools of fish, it is said.

IMPROVED OIL BURNER OF ROTARY TYPE

Crude oil may be readily substituted for coal as fuel for steam-heating boilers, and other purposes, by means of an improved rotary oil burner recently patented. In this burner a small electric motor is direct-connected to a blower and oil atomizer. The atomizer is composed of a number of thin disks, over which the fuel oil is carried by centrifugal force and then thrown off in a finely divided spray into an annular stream of low-pressure air furnished by the blower. The oil and air enter the combustion chamber in the form of an inflammable vapor, which ignites close to the burner and is readily adjustable to a large or small fire as desired, by regulation of the supply of air and oil. The entire apparatus takes up hardly more than a square foot of space and rests on the floor in front of the boiler, the oil atomizer entering the boiler

through what was formerly the ash-pit door. The electric motor need be of only one-fourth horsepower. With this arrangement the total heating surface of the boiler is exposed to the heat of the oil flame.



View of Multiple-Disk Rotary Crude-Oil Burner at Work in a Steam-Heating Boiler Converted from Coal Burning, the Coal Grates being Removed and Fire Brick Set in the Ash Pit

RAILWAY PREPARES FARMS FOR WAR VETERANS

Returned war veterans of the Dominion, who are capable of agricultural work and wish to engage in it, are to be assisted in a material way by one of the Canadian railroads. At a cost of about \$3,500,000 the company is outfitting a thousand farms which will be offered to successful applicants at low prices on a 20-year payment plan with six per cent interest. Irrigated tracts consist of about 80 acres, while others embrace a quarter section. Each farm is being fenced and provided with a comfortable house, a barn, implement shed, and well. Forty acres of land is broken for a tenant, and fireguards plowed about the buildings. When necessary, the company provides a purchaser with a team, two cows, a sow, some poultry, a wagon, plow, harrow, disk, \$25 worth of small implements, seed for 40 acres, and credit for freight and incidentals to the amount of \$50. If it is clear that a colonist cannot otherwise support his family during the first year, cash advances, not exceeding one-half the value of the constructive work done by him, will be made. The farms are being grouped in colonies and will be under the jurisdiction of expert superintendents situated at central control stations, where additional implements and male live stock will be kept for community use at a moderate charge. Another scheme enables veterans to acquire 320 acres of unimproved land in certain districts.

MORMON TEMPLE LIGHTED AT NIGHTTIME

For the first time since its completion 24 years ago, the Mormon temple at Salt Lake City, Utah, was illuminated at night during a recent church-



First Illumination of the Mormon Temple, Salt Lake City: Flood Lights of 150,000 Candlepower were Focused on the Central Statue. The Blur in the Sky Records the Progress of the Moon While the Photograph was being Taken

conference week, and presented a striking picture. A system of flood lighting from adjacent buildings was used, the light from several massive projectors, aggregating about 150,000 candlepower, being concentrated on the brass-and-gold statue of the angel Moroni (son of Mormon), which surmounts the central tower of the giant façade. The lighting was experimental, but proved so successful that the projectors will be kept in service for gala occasions.

NOVEL OBSERVATION BOOTH FOR TRAFFIC OFFICER

A traffic booth of novel character has been designed by a Dayton, Ohio, policeman and is used at a street intersection in that city. It consists of a wooden shelter having a large glass window on each side so that the officer stationed within has a full view of traffic in all directions. The roof of the booth is somewhat like a pagoda. Beneath the overhanging eaves of the upper section are narrow windows in which appear in turn the words "Go" or "Stop," according to the officer's desire. The refuge is heated and lighted by electricity derived from one of the wires that pass overhead.

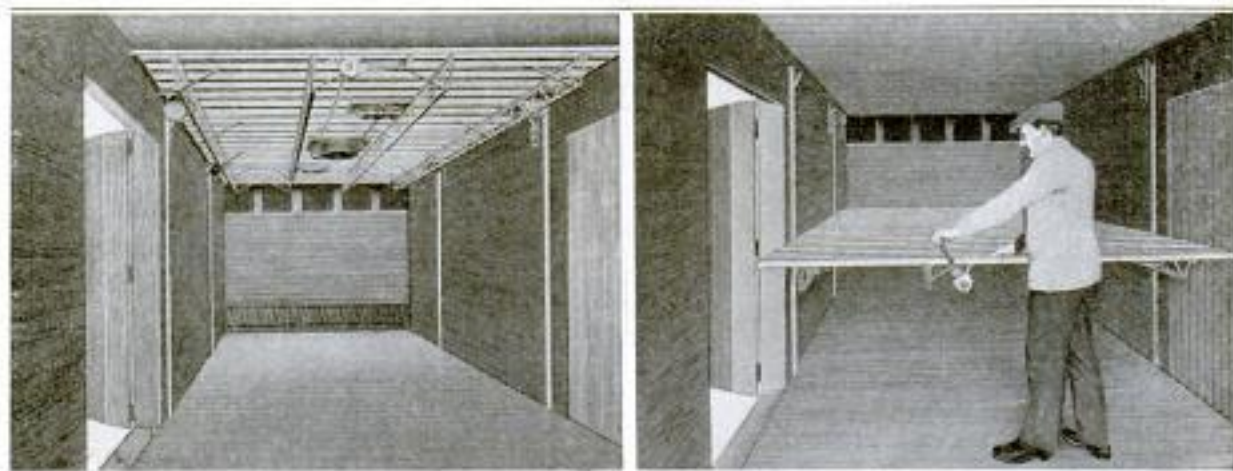


Comfortable Shelter for Traffic Policeman in Dayton, Ohio: The Booth is Lighted and Heated by Electricity

A resolution has been introduced in the senate authorizing the Secretary of the Interior to take the proper steps to make the so-called Rittman process of manufacturing gasoline available to the public. This method, described in Popular Mechanics Magazine in June, 1915, greatly reduces the cost.

REFRIGERATOR-CAR FLOOR INSURES VENTILATION

Ventilated flooring is desirable in refrigerator cars carrying fruits, vegetables, and dairy products, and the common method has been to use sections roughly made of two-by-fours, which were thrown out when the trip was ended. A new patent auxiliary flooring is permanently installed in the car, and can be raised to the roof with one hand, by a small windlass, when not required. It affords better ventilation than the old-style sectional flooring, being constructed of slats supported on small trusses. Two sections complete the floor of a car, and the side cables used in raising them are inclosed. It is claimed that the new flooring will save its cost in lumber in a short time. It is also possible to use the auxiliary floor, when hoisted half-way to the roof and there secured, to make a double-decked car for some kinds of freight. In either hoisted position the floor may be supported on brackets.



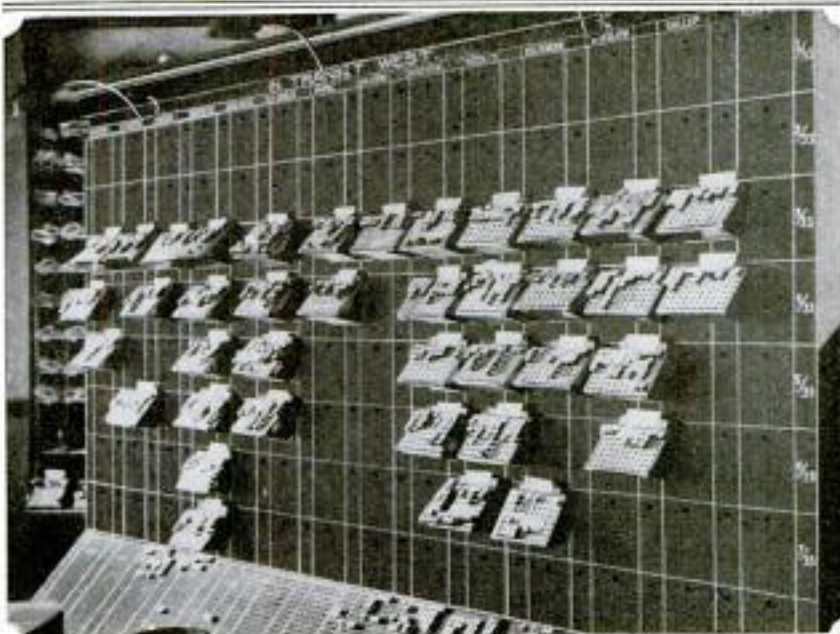
Ventilated Flooring for Refrigerator Cars: It can be Raised to the Roof When Nonperishable Freight is Carried, or Makes a Double-Decked Car When Double Floor Space is Required

HOW CONSTANT ACCOUNT IS KEPT OF FREIGHT TRAINS

One of the big problems of railroad-ing which has been solved ingeniously has to do with keeping track of the freight trains in transit, as well as of every car, the nature of its load, its destination, etc. The means employed by one of the great roads in the Southwest includes a large wall board marked off with vertical rows of rectangles, each row representing a station from which train crews report, or track between stations. Each train is represented by a curious-looking little box that can be hung in front of any of the rectangles by hooking it into a hole provided.

As the movements of the trains from place to place are reported by wire to the headquarters where this device is located, the train boxes, as they are called, are moved along to corresponding rectangles. The upper surface of each box is perforated with holes in which round-headed pegs are inserted. Each peg represents a freight car and its position designates the car's posi-

tion in the train. A tag attached to each train box bears notations regarding the train's departure, etc., while a sticker on each peg shows by its color and by data recorded on it, the nature



Each of the Curious Boxes on This Board Represents a Freight Train in Transit. A Close View of One Train Box, with a Peg for Each Car in the Train It Symbolizes, is Shown at the Right



of the car's load, its destination, and the car's symbol. Each car must be accounted for in every report until it reaches the end of its journey. The great advantage of this ingenious board is that it visualizes the traffic condition of the whole route.

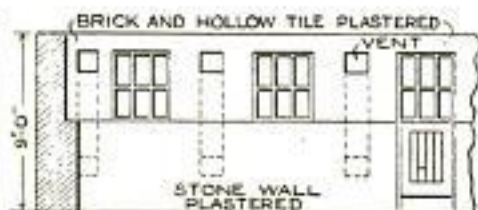
BUNGALOW BUILT ON TOP OF GARAGE

By erecting what is virtually a bungalow on top of his place of business, a garage owner in Los Angeles found a very satisfactory means of utilizing a single building lot for both business and residence purposes. The garage portion of this structure measures 60 by 42 ft. and abuts on the street. The rear half of the building was made two stories in height, the upper part resembling a bungalow in almost every particular. At the rear is a screened

porch and in front the sloping roof is extended to form a wide veranda that overlooks the graveled roof of the garage. This level space serves very

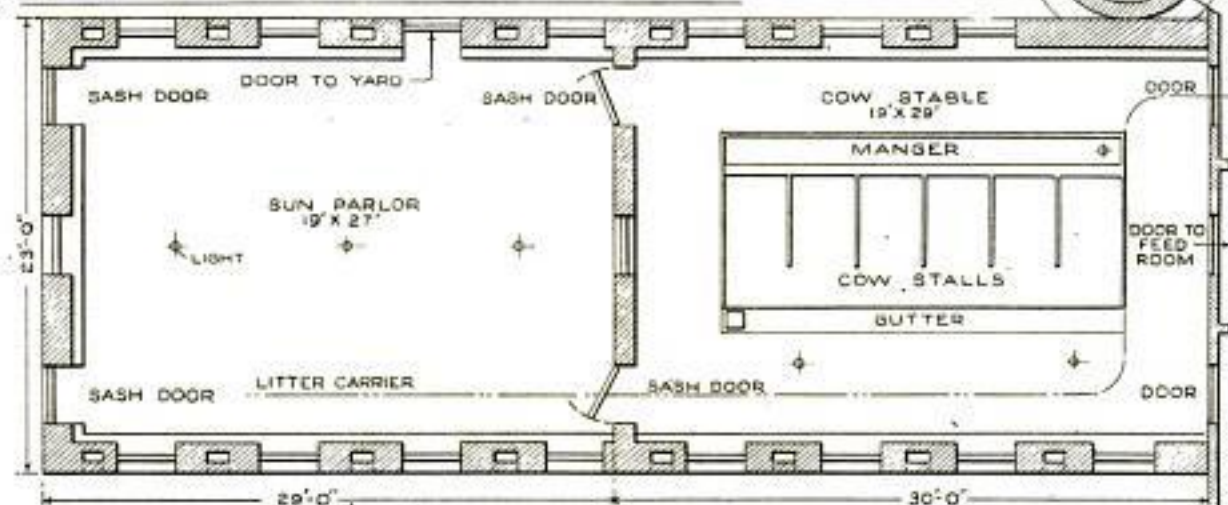


A Los Angeles Garage Surmounted by an Apartment Which Resembles a Bungalow in Almost Every Particular, Even to the Style of Roof and Porch



INTERIOR ELEVATION

In the New Jersey Stock Barn Pictured at the Left, a Sun Parlor for the Cows is a Distinctive Feature, Occupying the Space at the Right of the Building



Floor Plans and Interior Elevation of the Stock Barn, Showing the Large Relative Space Allotted to the Sun Parlor and the Arrangement of the Stable for Six Valuable Cows

well as a yard in which, for example, clothes may be dried. The owner finds his apartment quiet, especially well lighted, and the air free from dust.

COIL-SPRING FERRULE FOR FILE HANDLE

A removable handle for a file has been devised, which is protected with a special ferrule to prevent the handle from splitting. The ferrule consists simply of a tightly wound coil spring that can be slipped onto the end of the wooden holder. The latter is slotted about the hole in which the end of the tang is inserted so that the aperture can be expanded to receive the iron member. When the tool is submitted to twisting or other strain the coiled ferrule tends to bind more tightly and will not expand or give way to pressure exerted from within.



SUN PARLOR FOR COWS IN A BARN PLAN

Plans for construction of a new barn on a stock farm in New Jersey provided for a space 19 by 27 ft. which is practically a sun parlor for six valuable cows housed in the barn, although the owner does not call it by that name. This space is fitted on three sides with double-glazed windows and communicates with the adjoining cow stable. The barn is a model farm structure, 224 ft. long, with wings at each end, forming a three-sided court. Stone construction was used to a height of 6 ft., with brick and timber above, and the cost of the barn, including a silo, was \$27,000. The six cows have exclusive use of the sun parlor.

(Since the outbreak of the war 17 of Great Britain's prisons have been closed and the male prison staff reduced from 3,001 to less than 2,000.

THE ROADSIDE MARKETS OF SOUTHERN CALIFORNIA

By JOHN EDWIN HOGG

ESSENTIALLY the outgrowth of motor-vehicle traffic, thousands of roadside markets selling from the producer to motorist consumer have sprung up along the highway system of southern California. The new institution, which to all appearances flourishes by diverting to itself profits which formerly went to the middleman, has also been carried out to some extent along the highways of the East.

Any ranchman of southern California who chances to dwell along one of the main arteries of vehicular traffic may enter into the

roadside-market business with but little effort and almost no investment. The mechanics of the roadside market

are seldom more elaborate than some form of roof to offer protection from the sun, a few racks for displaying the products, and a wheelbarrow, pushcart, or other conveyance for carrying the stock into the market from the ranch in the background on which it is produced.

Sunday, when the highways are thronged with thousands of motor cars, and the motoring population of the larger cities seek the open country, is the harvest day



A Roadside Floral Market in Southern California: These Markets Are a Natural Outgrowth of Automobile Traffic in a Benign Climate with Good Roads



Ripe Oranges are Sold for Ten Cents a Dozen in a Wire Basket at This Roadside Market, near Eagle Rock, California. The Market House Consists of a Roof, Thatched with Palm Leaves

for the roadside markets. The advent of the institution has also developed the southern California Sunday into the market day of many motorists who seek to combine their Sunday's outing with the opportunity to purchase their next week's supply of fresh food-stuffs at prices representing a considerable saving over city-market prices.

The ranchmen have learned that it is easier and essentially more profitable for them to dispose of their produce, or even a portion of it, at their very gates than to be put to the expense of hauling to the city markets and then accepting a narrower margin of profit. Simultaneously the motoring public has learned that it is more logical to secure fresh produce which has come from the tree or garden on the day it is purchased, and at minimum prices, than to buy from the city mar-

kets produce which stock several days

may have been in and in the retail price of which a multitude of middlemen's profits must necessarily be included.

No such institution as a roadside market existed in southern California three years ago. The first ones began as small stands where the ranchmen thought only to sell an occasional watermelon to passing motorists. From the sale of watermelons the field evolved into the marketing of cantaloupes, oranges, strawberries, casabas, and other ready-to-eat fruits. Then came vegetables, nuts of all sorts, butter, eggs, milk

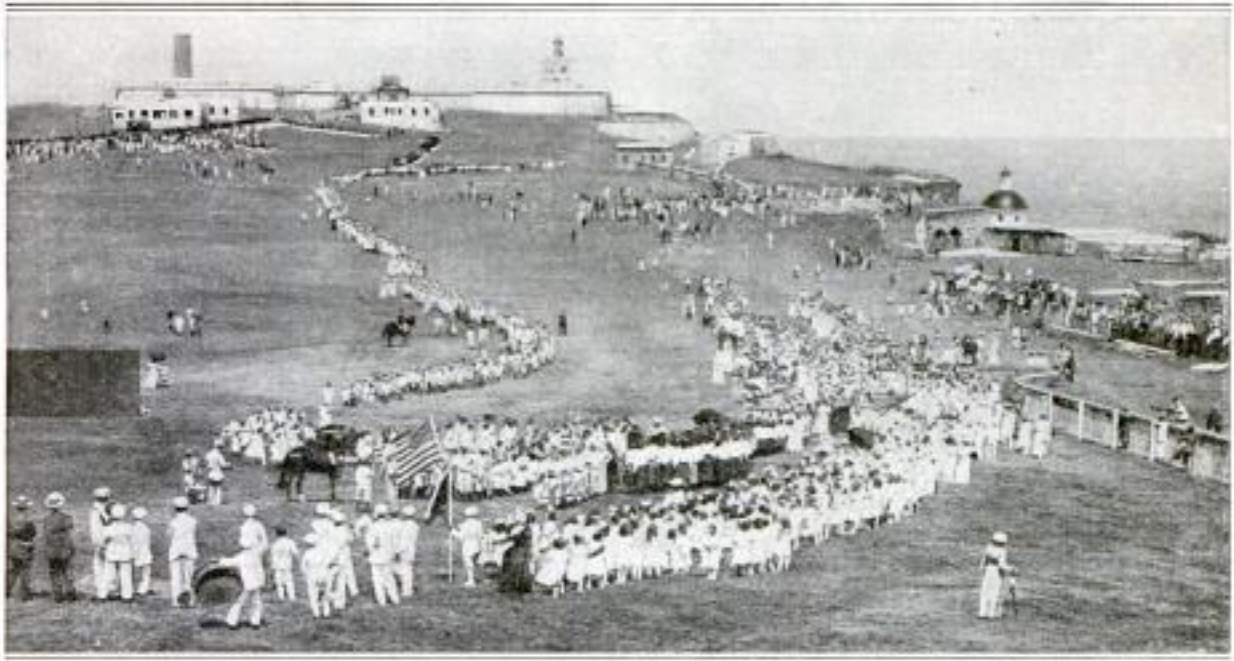
and cream, honey, live poultry and rabbits, and even orange marmalade, jams, and preserves. Each addition to the stock adds popularity to the service, which would be sorely missed were it discontinued.



In This Roadside Establishment Sweet Peas, Violets, and Carnations are Offered for Sale Side by Side with Vegetables Fresh from the Adjoining Ranch



A Large Roadside Fruit Market near Glendale, Where Practically Every Variety of Fruit Produced in Southern California may be Purchased by the Passing Motorist



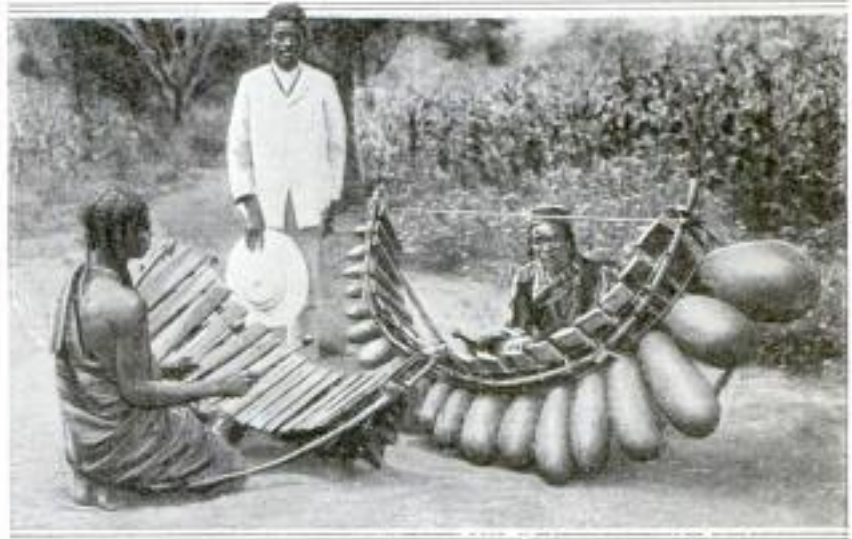
PORTO RICANS CELEBRATE GRANT OF UNITED STATES CITIZENSHIP

CHILDREN of the schools of San Juan marched in the Campo del Morro and participated actively in the public demonstration recently given by Porto Ricans in celebration of their new citizenship. Although the Stars and Stripes was unfurled in the island nearly 20 years ago, the inhabitants have been in the peculiar position of being an unrecognized part of a republic. America's occupation of the island until now has deprived the inhabitants of the franchise enjoyed in the dark days of Spanish rule when their deputies were seated in the Cortes at Madrid. Hereafter, the government is to be headed by a governor appointed by the president, and a council named jointly by both. Also there will be a dual-branch legislature which will select a commissioner to congress who, however, will not be seated as a delegate. The laws made by the insular legislature will be subject to the approval of congress and the president.

PRIMITIVE MARIMBA MAY BECOME POPULAR HERE

Since Americans have shown such phenomenal fondness for the Hawaiian ukulele, perhaps they will develop a similar liking for the "marimba," another musical instrument found among primitive peoples, which has been introduced into this country. A picturesque type of marimba is made in Angola, Africa. It is provided with a set of hardwood keys attached to a semi-circular framework. Fastened to the under side of the keys are hollow gourds arranged according to size. Each gourd, besides its mouth, has a small hole in its side, covered with

a membrane taken from spiders' nests that appears to be essential to the sounding quality. The instrument is played with rubber-tipped sticks. The marimbas made in South America have wooden sound boxes instead of gourds.



African Natives Playing Marimbas, Which Have Hollow Gourds for Sound Boxes. South American Marimbas have been Heard in This Country and Phonograph Records have been Made of Selections Played on Them

SEA BASS CAUGHT WITH A BIG MOUTHFUL

Those who doubt the voracity of the sea bass, or question the fact that it



Any Doubt That the Sea Bass Attacks Its Own Kind should be Set at Rest by This Photograph from the Texas Coast

preys upon its own kind, may be convinced by the photograph of an unusual catch reported from Texas. An 8½-lb. sea bass was taken in the act of swallowing another fish of the same species and not

very much smaller, as the camera shows beyond possibility of doubt.

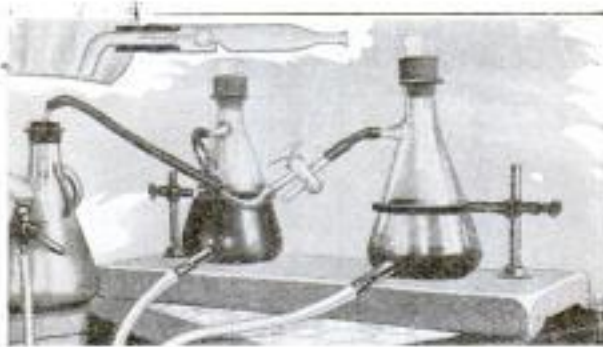
BOY SCOUTS TO BE TAUGHT FIRST AID TO AUTOS

A movement has been started to give systematic instruction in auto-repair work to the Boy Scouts of the country, so that they may be able to render practical first aid to motorists who are stalled by the roadside on account of minor troubles. Two classes of instruction will be given, with the cooperation of scoutmasters, each consisting of a series of three lessons. The first series will be elementary and specially designed for the younger

scouts, while the second or advanced course of lessons is intended for the older members of the organization. Scoutmasters will be provided with printed instruction sheets from the headquarters of the movement, and the lessons may be supplemented by lectures by automobile experts to the scout companies of their respective communities.

HELPFUL CHECK VALVE MADE FOR SUCTION FLASK

One of the chemists connected with the Department of Agriculture has devised an effective check valve that obviates the interruptions commonly encountered when filtering is being done through Gooch crucibles with the aid of suction. It is inserted near the bottom of a suction flask and allows the accumulated filtrate to drain off automatically when a stopcock, that cuts off the vacuum force and restores normal pressure within the container, is turned. In laboratories devoted to analytical chemistry it is not infrequent that from 10 to 50 filtrations must be completed in rapid succession. It is in such cases that the new valve proves valuable. By the usual method it is necessary to disconnect the vacuum system and displace the crucible holder before emptying a flask. This is a source of much inconvenience, especially when quick work is imperative. The details of the valve are explained by the accompanying illustration.



Detailed Construction of the Check Valve is Indicated at the Top, While the Main Part of the Illustration Shows Its Use with Suction Flasks



Among the Quaking-Aspen Trees of Utah, Which Now Serve Little Useful Purpose but may Prove a Valuable Source of News-Print Paper Supply, as It is Proposed to Use Them for Pulp

QUAKING-ASPEN-TREE PULP FOR PAPER MAKING

Shortage of the paper supply has directed attention to the possibilities of using the quaking-aspen trees of Utah for reduction to pulp for paper manufacture. These trees cover approximately 100,000 acres of the slopes in northern and central Utah. Their usefulness is limited to serving as a cover for young evergreens, although to a certain extent they aid in controlling stream flow and are therefore conserved by foresters. The timber is soft and valueless commercially at present, but without denuding the aspen areas, the mature trees, it is claimed, would furnish an annual paper supply sufficient for the news-print needs of the entire West. It grows rapidly, maturing at 20 to 40 years of age, in large areas on the gentler slopes and flat regions where it could be easily and cheaply gathered for the pulp mills. Only trees of three inches or more in trunk diameter would be taken. Paper making from aspens is not new to the people of the state, the Mormon pioneers having produced a

fair grade of news print from wood pulp and rags in Salt Lake City prior to the days of railroad transportation.

WINDMILL TOWER HOUSES AUTO AND CHAUFFEUR

In a suburban yard near Chicago an old inclosed windmill tower, from which the wheel and machinery have been removed, serves as a garage. Above the place where the car is kept is a room for the chauffeur. Vines partly cover the odd-shaped structure.



A butter-dispensing machine has been invented that discharges a piece of butter of a certain size with each operation of a lever. The invention is designed to save labor and material for the restaurant owner.

*Inventor: Nikolaus Kargus
my
no et ad. given*

FOOD FOUND IN LOFTY CLIFF DWELLING

Though settlers have lived in Nine-mile Cañon, near Harper, Utah, for perhaps a third of a century, it was



Primitive Structure High Up in a Cañon Wall in Utah, Which was Found to Contain Several Ears of Well-Preserved Corn and Other Seeds

only recently that a primitive structure built high up on the almost perpendicular wall of the gulch, was explored. The building, which is regarded as the work of cliff dwellers, is made of adobe and stone and occupies a niche in the rugged wall, 60 ft. above the floor of the cañon, and is practically inaccessible. After letting down over 100 ft. of rope from the top of the wall, an investigator descended by this precarious means and gained access to the primitive shelter. Here he found several ears of well-preserved flint corn, such as is

now grown on many arid western farms, and a quantity of seeds resembling squash seeds. Neither rodents nor birds had molested this supply. The dry climate doubtless aided in preventing its decay. Poles extending across the top were built into the masonry and probably once formed a part of a larger structure. It is thought that the primitive people used this, together with other shelters in the cañon, as reserve storehouses, and that access to them was gained with the aid of ladders and poles.

ALFALFA LUNCHEON SERVED TO KENTUCKY FARMERS

Alfalfa was served to Kentucky farmers in the form of hot biscuits, doughnuts, cake, and candy, at a luncheon during the recent annual farmers' week exhibition of the Agricultural College at the state university. The progressive young women of the domestic-science department took care of the cookery and convinced their farmer guests that very palatable products may be obtained for the table from their alfalfa crops. The flour of alfalfa is of a creamy tint before cooking and a light green afterward, and while pea-green biscuits may not at first appeal to the average housewife, the flavor is regarded by many as rich and delicious. Food requirements may easily result in greatly increased use of alfalfa for flour in the near future. The recipes used in cooking it are about the same as those for wheat flour. Alfalfa candy is made from a glucose pressed from the stalk.

ACETYLENE REFUSE USED FOR PLASTERING

Commercial uses have been found recently for the accumulations of acetylene ash, hitherto regarded as worthless and dumped into sludge pits at hundreds of gas storage-tank charging stations throughout the country. It has been discovered that the material can be utilized to make plaster and whitewash, and as a substitute for



Sludge Pit of an Acetylene-Gas Charging Station, Containing the Slaked-Lime Residue of Calcium Carbide. Now Used for Plaster and Whitewash: Such Pits Are Sometimes Several Feet Deep

marble dust in surfacing roads, the former waste product has acquired a market value of at least 50 cents a ton at the sludge pits, some of which cover several acres and are 8 to 10 feet deep. As acetylene gas is derived from calcium carbide, and the residue is practically nothing but slaked lime

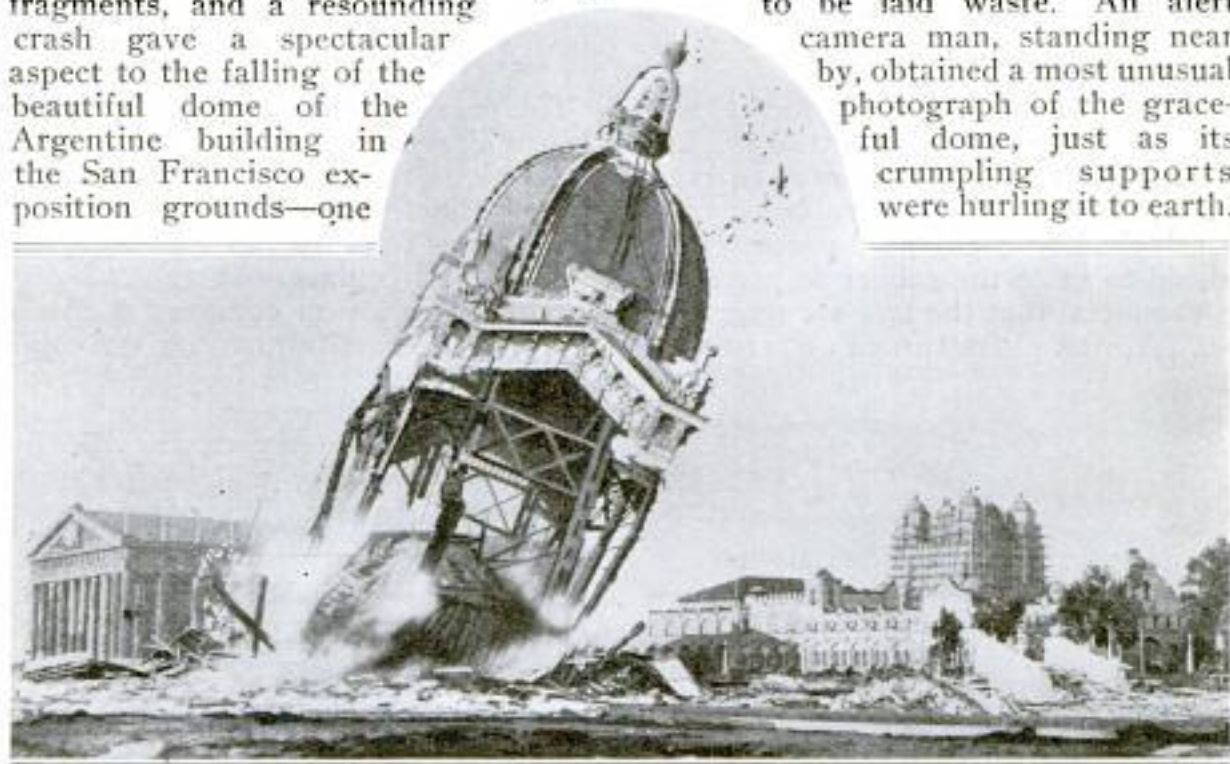
and water, the sludge makes good plaster and is said to harden almost like rock. Its disposal has long been a problem at every charging station and it has usually been dumped on a piece of low ground. When this was filled, a new dumping place had to be procured.

Panama-Pacific

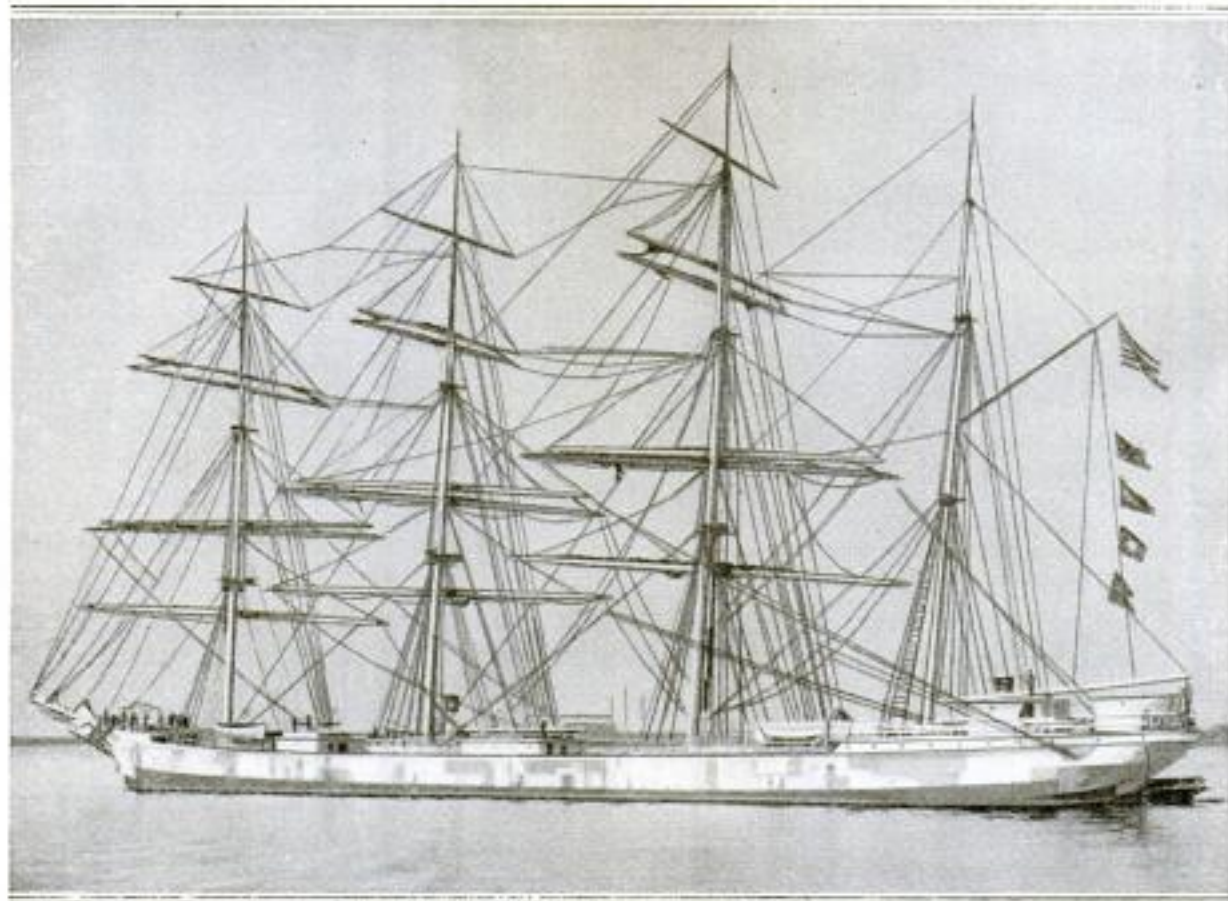
ARGENTINE BUILDING AT EXPOSITION DEMOLISHED

A cloud of dust, thousands of flying fragments, and a resounding crash gave a spectacular aspect to the falling of the beautiful dome of the Argentine building in the San Francisco exposition grounds—one

of the last of many artistic structures to be laid waste. An alert camera man, standing near by, obtained a most unusual photograph of the graceful dome, just as its crumpling supports were hurling it to earth.



Remains of Beautiful Argentine Building at San Francisco Exposition Photographed Just as the Big Ornamental Dome was Topping to the Ground



The "Edward Sewall," One of the Few Remaining American Clipper Ships: Its Four Sky-Scraping Masts will Soon be Removed, for It has been Bought by an Oil Company and will be Equipped with Power as a Prosaic Tanker

INSULATED PLIERS RESIST HIGH VOLTAGE

Metal pliers, insulated for 10,000 volts, have been placed on the market recently. The handles are covered with a thick coating of rubber which is attached by a patented process that is said to unite the rubber so perfectly to the metal that the two are inseparable. All the pliers turned out are sub-



Metal Pliers for Electrical Workers, with Rubber-Covered Handles Insulated for 10,000 Volts

jected to laboratory test. They are intended for use by automobile repair men, and the like, as well as linemen and others engaged in various kinds of electrical work.

CLIPPER SHIP TO BECOME A POWERED TANKER

The passing of the American clipper ship will soon be emphasized by the conversion of the "Edward Sewall," one of the few remaining vessels of that famous rig, into an oil tanker, propelled by oil engines. It was recently purchased by an oil company with no eye for the beautiful, and on the completion of its present voyage out of Galveston its towering spars with their wealth of snowy canvas will be removed, machinery will be installed, and the sightly hull will become a tank.

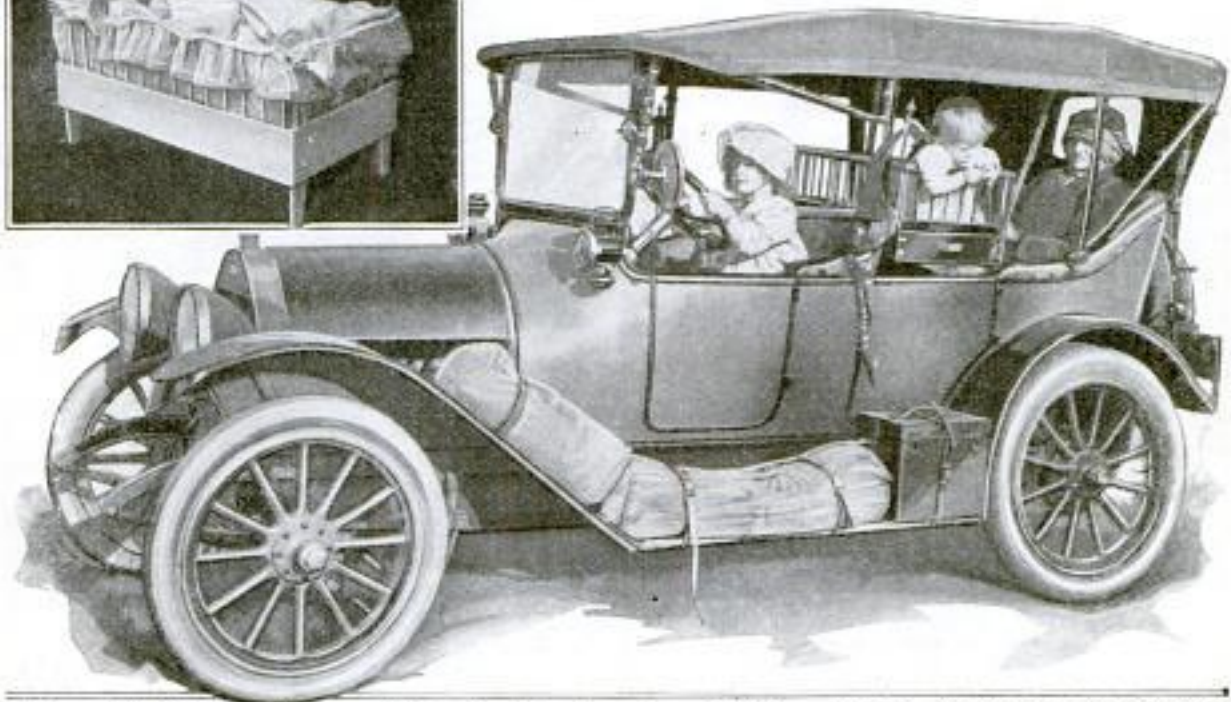
ARTILLERY EAR DEFENDERS WORN BY MILL WORKERS

Ear defenders, such as were designed by artillerymen in Europe, are being used by workers in stamp mills in South Africa. These protectors, consisting of small hard-rubber plugs that resemble

chess pawns, are worn in the ears. A passage extends lengthwise through each plug, and at the enlarged bell mouth is a fine wire screen that breaks up the sound waves. Workmen provided with these devices can more readily detect unusual noises, as for example, those caused by broken machinery.

FOLDING CRIB FOR USE IN CAR, CAMP, OR HOME

Its all-around serviceability is one of the important features of a new folding crib which can be set up in an automobile and affords a safe resting place for a baby when taken on a motor trip. One side of the little bed attaches to the back of the front seat, while straps attached to the ribs of the car top, support the other. If desired, the legs and sides can be folded against the mattress frame so that it forms a bundle but $4\frac{1}{2}$ in. thick. In camp or in the home the crib stands on its own legs. One of the side rails can be turned down and the crib used as a seat. This feature makes it particularly convenient for camping.



Folding Crib Which can be Installed Back of the Front Seat of a Car or Used in the Home in the Ordinary Way: When One Side is Turned Down It can be Used as a Seat, if Desired

FOREST RANGER DEVISES COMBINATION TOOL

A forest ranger whose duties involve much repair work on telephone lines of the Forest Service has devised an improved type of pliers which consists of ordinary pliers with a broad, flat hook forged onto one end of one handle. This addition is especially serviceable in splicing or bending wires. The improved tool serves such a variety of purposes that it enables the rangers to get along with a much smaller number of implements than they carried formerly. The useful hook adds little to the tool's weight.



CA specimen of spruce has been found which the Wisconsin state geologist estimates is 500,000 years old.

SELECTED PIECES OF ARTISTIC FURNITURE

Near 5th av., N.Y.C.



10
Its Availability as a Lounge or as a Bed Makes This Mahogany Day Bed Especially Serviceable in an Apartment or Small House

2
Out-of-the-Ordinary Book and Magazine Rack That Stands on or beside a Reading Table

3
Semi-Indirect Light on This 74-Inch Customer Gives It Added Utility

4
The Attached Lights and Open Shelves of This Dressing Table Are Features That Count for Beauty and Convenience

8
Reed Tea Wagon of Unconventional Type: The Low Wheels Make the Large Space below the Top Easily Accessible

9
Folding Table for Tea or Breakfast Use: It is Made to Stand Alone When Folded

13
Spacious Phonograph-Record Cabinet with Sliding Top Which Affords Easy Access to Records Arranged on Edge

Peterson Art Furniture Co.

Peterson Art Furniture Co. Fairbanks, Minn.

Flexible Distributing Co. 527 So. La Salle St.

Keywood Bros & Wakefield Co. Chgo

ILLUSTRATING LATEST TRENDS IN DESIGNING



7

Peterson Art Furniture Co.

An Artistic Attached Light and Inkstand and Two Raised Drawers Make This Writing Table Distinctive



Bookcase with Handy Open-Shelf Space at Top, Designed Especially for a Bedroom



5

Peterson Art Furniture Co.

R. Williams Co. Wash. D.C.



Very Decorative Lamp and Flower Holder Combined with Mother-of-Pearl Shade and Cut-Glass Vase

High-Grade Phonograph of New Type: Sound Issues through Screened Grill. Albums Hold 119 Records. Turntable Compartment Closes Like an Organ



6

Unusual Drop-Leaf Desk, Finished in French Gray with Decorations in Old Rose, Soft Blue, and Ivory



Substantial and Ornamental Chaise Longue Made Up of Armchair and Bench That can be Used Separately

Erskine-Danforth Corp'n Stamford Conn.

OPERATING-ROOM DEVICES IN A MODERN HOSPITAL

Many improved devices have found their way of late years into the operating rooms of the modern hospital.

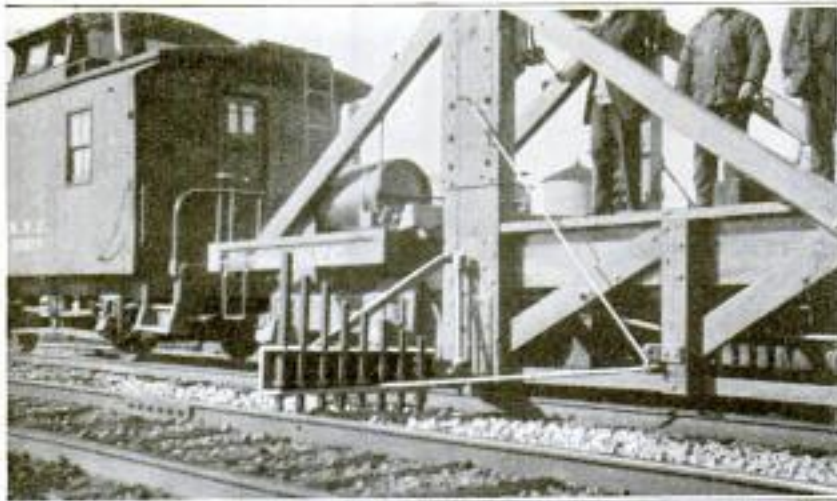


One of the Rooms in the Operating Pavilion of a Cincinnati Hospital: Note the Studio-Lighting Effect, and the Wheeled Furniture Which can be Moved without Handling

At a great new hospital in Cincinnati, for instance, all the rooms in the operating pavilion are lighted on the studio plan, which gives the surgeons a maximum of light for their work. All the tables, receptacles, and other articles of furniture are on ball-bearing wheels, making them easily movable by a slight motion of the foot, without touching them with the hands. Small clamps hold the wheels of the operating tables firm during an operation, and are released by the foot when the table is to be moved. Even in the stationary sinks, the water is turned on or off without handling faucets, by means of nicked valves underneath, manipulated by the knee of a doctor, nurse, or attendant.

RAILROAD-BALLAST CLEANER KILLS TRACK GROWTHS

On railroad lines where a great deal of grain is hauled every year, much trouble is experienced with grain growing through the stone ballast between



This Device Kills Vegetation between Railway Tracks by Stirring Up the Ballast with Its Steel Prongs as It is Drawn along the Line

the tracks, from seed dropped in transit. The New York Central lines have recently adopted a device which is used to kill such vegetation. It consists of a metal frame holding pointed steel rods of graduated sizes in a vertical position at the side of a work car, so as to form prongs that loosen and displace the ballast, sending all the finer material to the bottom. The cleaner is securely braced to the car at the required level when in operation, but can be swung in or out in about 10 seconds, as well as raised or lowered, by air pressure from the car on which it is fastened. It is drawn at a speed of from 8 to 10 miles an hour.



The Man in the Rowboat is Laying the Cable in a Loop Extending Out into the Lake. One End being Held Fast on Shore by Means of the Rod



The Cable Used in Accumulating the Moss is Wound on a Reel. Here Shown Mounted on a Rowboat, from Which It is Payed Out into the Water



Cutting the Moss from the Cable as It is Pulled Ashore: This View Gives Some Idea of the Way the Revolving Line Accumulates the Undesirable Vegetation



Team of Horses Pulling in the Cable about Which the Moss has Accumulated: The Long Steel Line is Divided into Sections by Swivels Which Permit the Various Parts to Revolve Freely as They are Drawn Across the Bottom of the Reservoir

RESERVOIR DRAGGED WITH CABLE TO REMOVE MOSS

The engineers in charge of Denver's water supply have found it most desirable to remove the moss which grows in portions of the big water reservoir, both because it clogs the screens and filters and because it is thought to foster the growth of algæ. The novel means used to get rid of the moss is to drag the bed of the lake by laying a 1,000-ft. cable in a loop extending out from shore and then drawing it in to land, and repeating this process until the entire bottom has been traversed.

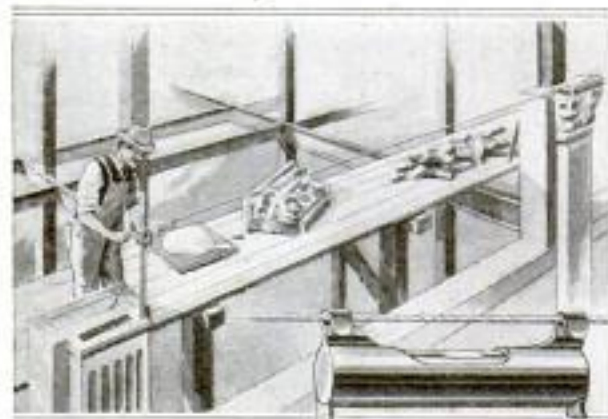
The cable is wound on a reel and placed in a boat. After one end of the line has been anchored on shore, the boat is rowed out about 400 feet and then back to within 100 ft. of the starting point, the cable being payed out as the boat moves along. The steel line is then run through a pulley and hitched to

a team of horses which draws it ashore, bringing moss with it. Larger quantities are secured in this way than might be supposed, for the cable is divided by swivels into several sections which revolve freely, binding the weeds about them. Additional moss, torn up by the roots, floats to the surface and eventually is blown ashore, after which it is gathered into piles and burned with the rest.

ALUMINUM LINE LEVEL FOR BUILDERS

A small aluminum line level of recent invention is designed to replace the 16-ft. wooden straightedge long used by the building trades to secure level construction of walls and other parts of a building. It is of pocket size, furnished with hooks for hanging on a

taut line stretched from the point which serves as a guide level, and is put up in a leatherette case, the outfit including a 40-ft. line and a spring clamp with which the level can be at-

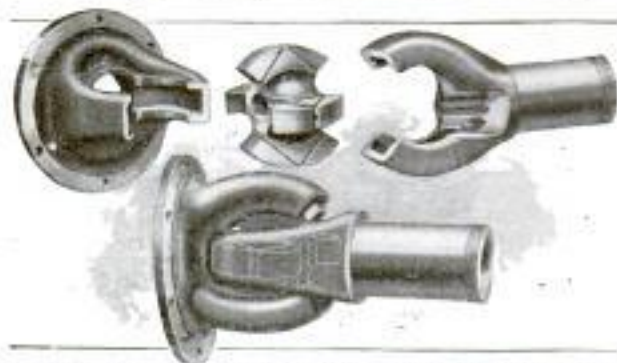


Using a New Builder's Level Which is Hung on a Line Stretched from the Guide Point

tached to a steel square or pocket rule, thereby serving as a plumb rule or bench level. In use, the line from the guide point is tightened with the right hand at any distance up to 40 ft., while the level is placed on the line with the left hand, the hooks being turned outward.

UNIVERSAL JOINT DESIGNED FOR STANCHNESS AND LIFE

Because of the large bearing surface provided by its design, great strength and durability are proclaimed advantages of a new three-piece universal joint that is being brought out by a western manufacturer. The parts are incased in a grease-tight steel housing that keeps out grit and other foreign

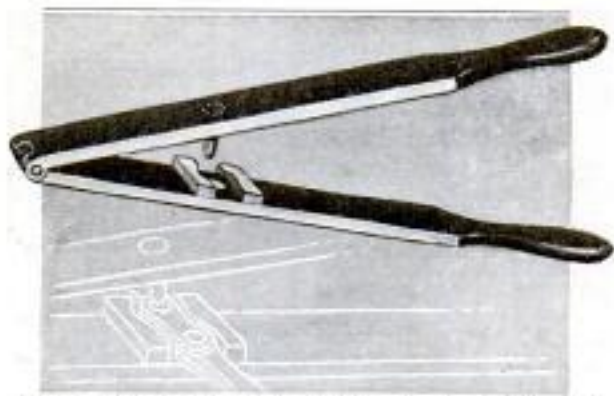


The Three Working Parts of the New Universal Joint: When Assembled the Members are Inclosed in a Grease-Tight Steel Housing That Retains the Lubricant and Keeps Out Dirt

particles. Lubrication is accomplished by centrifugal force, instead of being defeated by it. Two grooved yokes hold the center block in such a way that no pin, rivet, or bushing is required to retain it in its proper position. It is the intention to provide the device in sizes which will meet all demands for universal joints.

MOTORCYCLE CHAIN TOOL OF NUTCRACKER TYPE

Motorcyclists will welcome the appearance of a new chain tool of very convenient size and weight, which will be marketed very soon. Most of the chain tools now in use work on the screw principle and force out the chain pin by screwing down on it, which is often a slow process. The new tool



Convenient New Tool for Taking Apart a Motorcycle Chain by Punching Out the Pin from Any Link, with Action Like That of a Nutcracker

works like a nutcracker, and a motorcycle chain can be taken apart with it almost instantly. The two parts of the tool hinged together are of drop-forged steel, the outer ends forming handles. On the inside of the lower part, at an appropriate distance from the hinge, there is a rack for holding the chain link and a hole through the body of the drop forging, in such a position that the chain pin may be forced down through the hole by a hardened steel spike which is welded into the upper part of the tool. The length of the tool for motorcycle use is 9 in. and its weight 18 oz., so that it can be carried in the kit. Larger sizes will probably be made for motor-truck and other heavy driving chains.

SUCTION KILLS TWO MEN IN GALLERY OF BIG DAM

A strange accident, illustrating the tremendous suction created by water rushing over the Elephant Butte dam in New Mexico, occurred recently in a gallery in that great water barrier. An attendant on coming to work was unable to find the fellow employe he was to relieve and so went through the gallery in the dam looking for him. At an air-inlet chamber of one of the valves he found the missing man and a companion standing with their faces against the wall, dead. Their bodies apparently were held in place by the suction through the air-inlet tube. The theory advanced regarding the strange accident is that the two men inadvertently approached too close to the opening, and that their bodies practically closed it, so that the suction due to the vacuum in the tube held them secure and they could not escape. The pressure on the exposed portions of the two human forms was estimated at 6,000 lb. To release the bodies the attendant had to close the valve.

INDICATOR SYSTEM DEvised FOR ELEVATOR REGULATION

For regulating elevator service in large buildings, an electric indicator system has been developed to afford operators a tangible way of preventing cars from becoming bunched. It also informs a starter, or general supervisor, regarding the position of each lift and, when necessary, enables him to communicate with any of the elevator men. A signal box installed in each car shows, by illumination of numerals, the locations of all the lifts in a battery as they pass from one floor to the next. An indicator at the manager's desk sup-

plies the same information. When a car is delayed and unable to keep its



In Each Elevator There Is an Indicator That Shows the Operator the Positions of All the Cars. Only the Progress of the Pursuing Car Need be Watched to Keep All of the Lifts in the Proper Order

position, the runner can flash the pursuing elevator to take the lead. Likewise, signals can be transmitted to any car from the manager's desk. The system has been tried out for some time in a southern office building.

PNEUMATIC GUN USED TO DESTROY TRENCHES

Correspondents with the German forces in France report that the British are bringing into service a new type of gun which appears to be pneumatic. It produces no noise when fired, thus making it possible to use it at points close to the front. The missiles discharged are said to explode like mines, working destruction over a considerable area.

SOME NOVEL AND LITTLE-KNOWN ACCESSORIES



A Time-Saving Tool for the Small Gardener. Supplied with Three Disks of Different Sizes. Price \$1.50



Odd Foot Rule Made of Twelve Distinct Kinds of Native Wood, Such as Maple, Gum, and Ash. Price 75 Cents



Pasteboard Indicator Shows Dairyman How Much Milk, Cream, or Butter is Desired



Glass-Lined Bowl, Intended Particularly for Fruit Salads, Which Has Separate Compartment for Chipped Ice. In London. \$17.50



Laundry Rack Supplied with Eight Parallel Rods Equal to Many Feet of Clothesline: It is Attached to the Ceiling and Readily Raised or Lowered. Its Purpose is to Save Steps and Lessen the Drudgery of the Family Wash Day. Clothes Go from Wringer to Rack and from There to Ironing Board



Trick Novelty Which Detonates a Percussion Cap: It is Loaded and Put beneath Some Object. When the Latter is Lifted the Cap Explodes. Price 10 Cents



Light, Canvas-Covered Parcel-Post Laundry Box Intended for Student: The Reversible Top Flaps Overlap and Carry Home and College Addresses. Price \$1.50



Electric Attachment for Oil Lamp: Socket Fits in Place Like Chimney. The Change may be Made in a Minute. Price \$2



Bracelet Consisting of Miniature Portraits of Movie Favorites Mounted in Gilt Frames Threaded on Strap. Price \$1



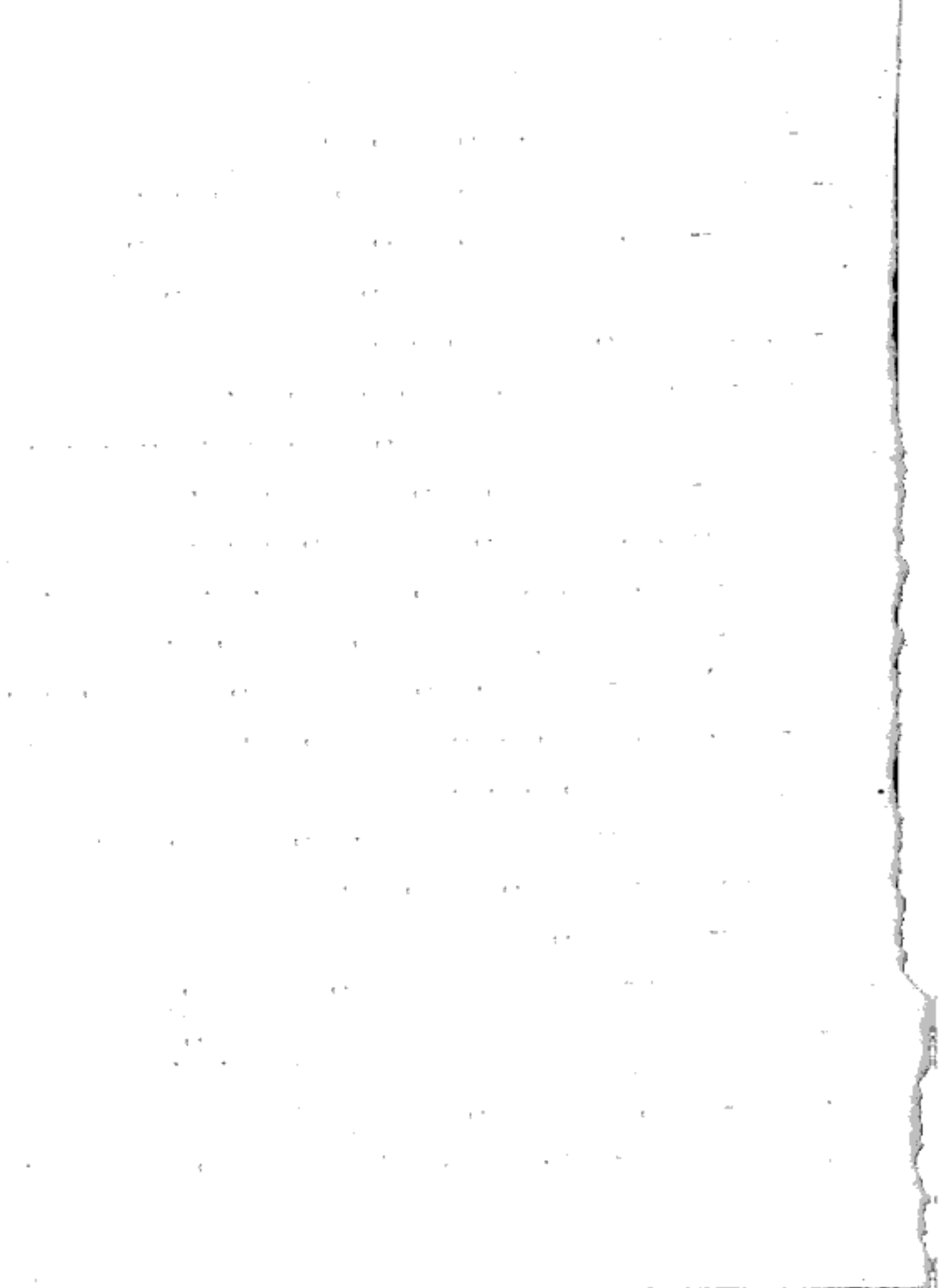
Lawn or Porch Swing with Adjustable Back and Top: The Latter may be Used as a Sunshade or Windbreak for Either Front or Back Side



Rapid-Working Pitter Feeds Fruit, Removes Stones, and Delivers Seeded Cherries and Pits into Separate Receptacles. Price \$1.50

DATA JULY NOVELTIES

- SEEDER-- Osmundson Spade Mfg. Co., Perry, Ia.
- RULE-- Biltmore Estate Industries, 10 Plaza, Biltmore, N. C.
- MILK INDICATOR-- Invt. by William S. Bowen, 506 Buttonwood St., Nerristown
- SALAD BOWL-- Goldsmiths & Silversmiths Co., 112 Regent St., London
- BINGO-- S. S. Adams Co., Plainfield, N. J.
- LAUNDRY BOX-- Mfg. by Charles T. Geowey, S. Bend, Ind.
- Laundry Rack-- Overhead Clothes Dryer Co., 471 W. 145th. ST., N. Y. C.
- LAMP ATTACHMENT-- Harvey Hubbell, Inc., Bridgeport, Conn.
- MOVIE BRACELET-- F. B. Warner Co., Chambers St., N. Y. C.
- COUCH HAMMOCK-- Invt. by C. F. Waldman, 1514 W. 7th. St. Los Angeles.
- CHERRY SEEDER-- New Standard Hardware Works, Mount Joy, Pa.
- ROBE CLIPS & MONOGRAM-- Parks Mfg. Co., 236 Aborn St., Providence, R. I.
- BANDAGE-- Invt. by W. Hayden, M. D., Marshfield, Ore.
- DICTIONARY SET--Mark Cross, N. Y. C.
- CANOPY PLUG RECEPTACLE-- Hart & Hegeman Mfg. Co., Hartford, Conn.
- PENCIL CLIP--- Reeta-Hunt Corp., Putnam, Conn.
- WALKING STICK--Mendel Bros., Chicago
- STANDARD SPRAY PUMP--- Standard Stamping Co., Marysville, O
- CHECK-PROTECTOR CHECK BOOK--- Feldman Check Protector Co.,
108 W. 34th. St. *n.y.*
- FOLDING CRIB-- Barri, 72 Baker St., London
- PRISCILLA SEWING RACK-- Invt. by Mrs. ^A Alice Kent Trimpey, Baraboo, Wis.



INTENDED FOR THE HOME AND ITS MEMBERS



Stanch Clips, Connected with a Heavy Curb Chain, Hold a Robe Firmly in Place on a Rail. Price \$5. The Monogram Plate Costs \$3



A Glazed-Morocco Dictionary Set for Library Table, Consisting of English, English-French, and English-German Volumes. Price \$9.50



Pencil Clip That may be Attached with Equal Facility to a Work Apron or Coat Pocket. Price 5 Cents



Dainty Folding Crib That may be Fitted into the Waterproof Case, Shown at End, for Traveling



For the Summer Girl, a Smart Walking Stick with Three-Compartment, Dark-Green Leather Bag Attached. The Price is \$14



An Adhesive Tab Attached at the Free End Permits This Antiseptic Bandage to be Applied Easily with



One Hand. Price About 15 Cents



Showing the Installation of a New Wall Plug Finished to Match the Canopy of a Bracket Fixture



Efficient Portable Spraying Outfit with Tank Designed to be Strapped to Gardener's Shoulders: It is Supplied with a Direct-Acting Force Pump and Shown Here with a Nozzle for Spraying Potatoes. Price \$7.50



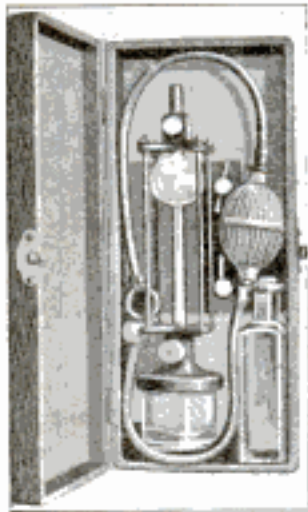
Check Protector of Sensible and Convenient Form for Private Depositor: It maybe Had with Name and Address Lettered in Gold on Cover and Printed on Blanks. With 250 Checks, Price \$2.50

Adjustable Metal Sewing Rack That may be Attached to Window Casing: It Holds All Necessary Articles for Mending and Darning. Price 50 Cents



POCKET INDICATOR GIVES COMBUSTION DATA

A compact apparatus has been devised for the use of engineers, superintendents, and operators of power plants in ascertaining the percentage of carbonic-acid gas resulting from the combustion of coal, gas, oil, or any other fuel. A knowledge of this percentage is a reliable indication of the character of combustion in furnaces. The higher the percentage can be raised, the greater is the fuel economy—hence the importance of such tests. The new indicator does the work of a bulky apparatus formerly required, and is contained in a small portable case, requiring no setting up or preparation for immediate use. From 17 to 20 analyses of combustion gases can be made in an hour with this instrument, the reagent used being a solution of potassium hydroxide in water.



TIME-SWITCH CLOCK USED TO CONTROL LIGHTS

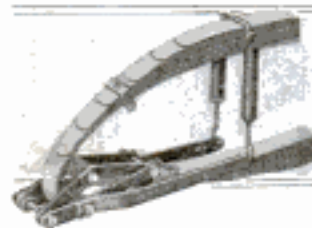
Electric lights in a show window or outside a store can be turned on or off automatically at any time desired by means of a time-switch clock recently placed on the market in Chicago. It has a standard eight-day movement with 12-in. dial for timekeeping purposes, but is provided with a special switch attachment by which night lights are controlled without re-



quiring the services of an attendant. In operation, the indicators of a small dial on the clockface are set at the respective hours at which the lights are to be turned on and off each night, and the switch then works automatically, operating at the same hours every night until the indicators are changed.

NEW SHOCK ABSORBERS AID AUTO SPRINGS

Small jolts, jars, and vibrations of a motor car, to which the regular springs are not sensitive, are taken up, it is claimed, by a new form of shock absorbers, adjustable to any make of car with full or three-quarter scroll elliptic rear springs. The construction includes a pair of coiled tension springs attached to an arrangement of cantilever bars mounted at the end of the rear springs, where they respond to all actions of the axle.



NEW SERVICE-PIPE FISH TRAP FOR WATER SYSTEM

Small fish, shells, and other foreign matter, occasionally pass through water mains into the service pipes of industrial plants and business houses, clogging the pumps, drains, and faucets, and sometimes causing considerable trouble. A trap designed to prevent difficulties of this kind may be connected with a supply pipe. It is an iron casting with a globular basin that catches whatever is stopped by a nipple-shaped strainer installed above its mouth. The trap is thoroughly flushed by opening a valve in the bottom of the basin. If wished, the latter may have a direct connection with a sewer pipe.



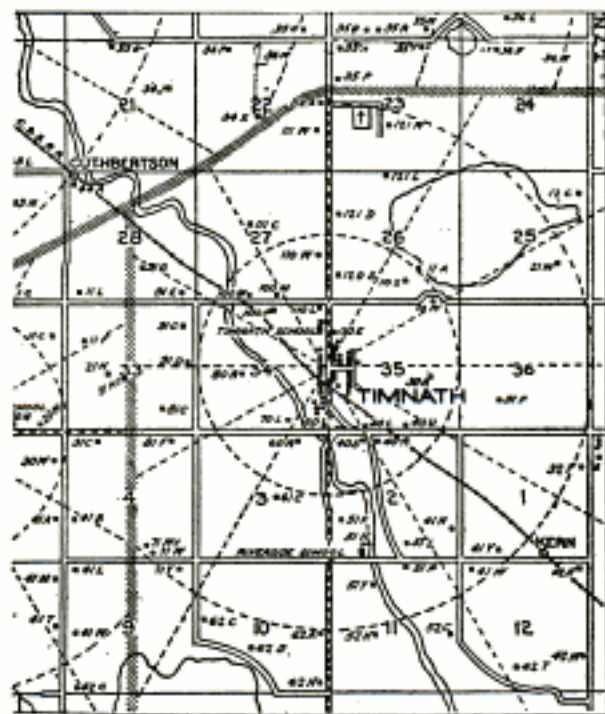
NUMBERING FARMS BY THE CLOCK SYSTEM

A Colorado farmer has devised a method of locating farms by numbers, which he calls the "clock system," the numbers being allotted according to the general plan of a watch or clock dial. A rural directory based on this system was recently issued to cover a district of which Fort Collins, Colo., is the center, and by its aid any farm within a given distance of this center can be readily found. In an accompanying map 12 dotted radiating lines are drawn out from the central town so as to make 12 spaces between them, and these are used to indicate the direction of the farms lying within them. If a farm number begins with 11 or 12, it indicates that it is situated north of the town. To fix the distance, circles are drawn around the common center at distances of one mile apart. Thus, if a farm is numbered 122, for example, it indicates that it lies north and two miles from the town. The number 63 would indicate that the farm is south of the town and in the third mile sector—the figure 6 being south on the clock dial—and so on for the rest of the

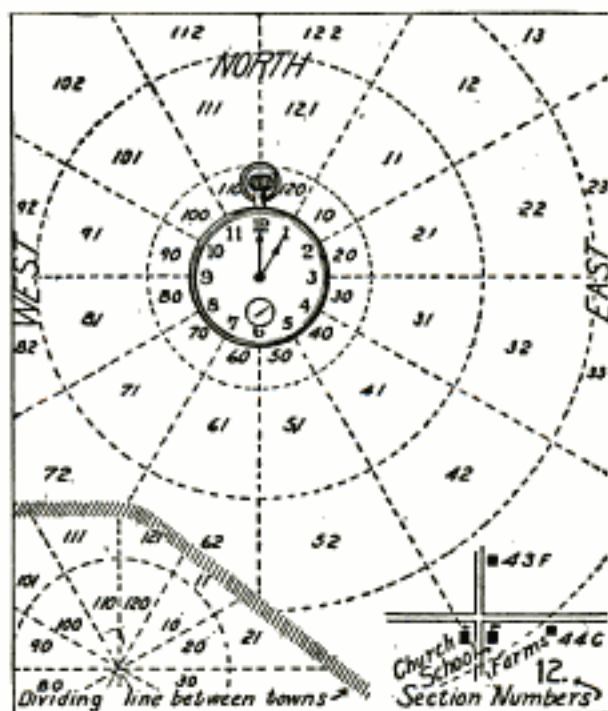
farms in the district. Each town can be made a directory center in this way, and letters added to the numbers serve to identify the farmhouses still further.

TRUCK TIRES OF HEAVY CORD CONSTRUCTION

Cord tires of the pneumatic type are now built for motor trucks as well as for pleasure cars, the construction being similar, but the truck tires are much larger and stronger, with greater numbers of plies of cords. The tread is specially designed to prevent skidding of heavy loads, and the tubes used with the tires are of course extra heavy. These big cord tires are especially adapted for trucks ranging from $\frac{3}{4}$ to $2\frac{1}{2}$ tons, for auto busses, sight-seeing cars, and fire apparatus. They are made in sizes from 36 by 6 in. to 42 by 9 in., with from 10 to 16 plies of cords, according to their size.



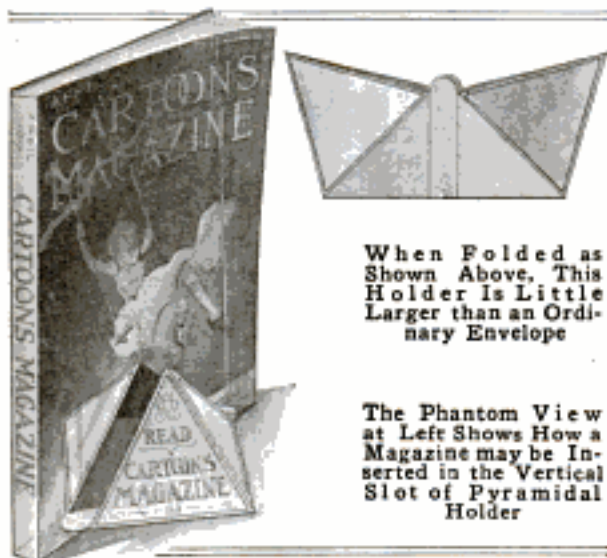
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At the Left Is the Map of a Colorado District of Which Timnath Is the Center, with Its Farms Indicated by Numbers and Letters According to the Clock System, Which is Explained by the Diagram at the Right

FOLDING PAPER HOLDER FOR DISPLAY PURPOSES

An inexpensive pyramidal holder for display purposes has been devised which is made of cardboard and when



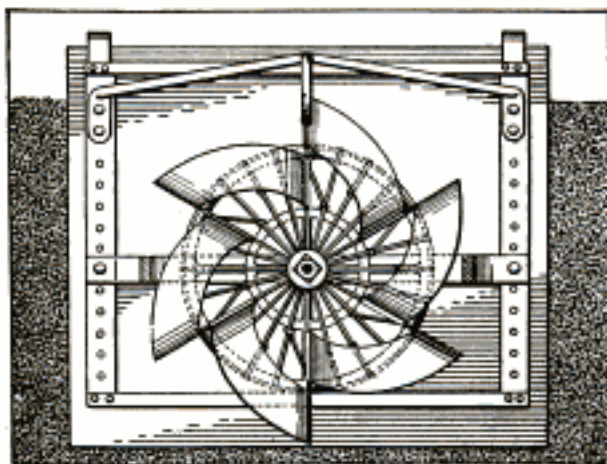
When Folded as Shown Above, This Holder Is Little Larger than an Ordinary Envelope

The Phantom View at Left Shows How a Magazine may be Inserted in the Vertical Slot of Pyramidal Holder

not in use can be folded flat. Opened, it has a square base with four slanting triangular sides, forming a pyramid which is divided into halves by a vertical slot. A book or magazine inserted in this gap is held securely in a vertical position.

FISH GUIDE FOR SYSTEMS OF IRRIGATION

A method of preventing fish from entering the flumes or ditches of an irrigation system has been devised by



This Revolving Machine, Placed at the Head of an Irrigation Flume, Protects Fish by Keeping Them in the Main Stream

a North Dakota inventor. It consists in placing at the head of each flume a 22-in. wire cage with V-shaped fans over the wires, the cage being supported on a stationary shaft held by an outside brace and frame. When the water is allowed to flow into the flume, its action revolves the cage and fans, thus scaring the fish and keeping them in the main supply stream. The object is to protect the fish from dying in the shallow flumes when these are drained.

KEROSENE USED AS FUEL IN A GALLEY RANGE

For twelve months past kerosene has replaced coal as fuel in the galley range of a government lighthouse tender, with satisfactory results. The oil reservoir was a standard type of tank used with vapor lamps. This was connected to an oil-engine starting torch, located horizontally with its nozzle just inside the door of the fire box. Passing through a hole in the front fire brick, the flame was deflected by a curved fire brick to the top of the fire box. False brick was installed to fill up the space between the grate and the burner. The range was heated for cooking in from 7 to 10 minutes, about one quart of kerosene per hour was consumed, and meals were prepared much quicker than with coal.

MOISTURE-PROOF PAPER FOR WRAPPING GOODS

Package goods, and merchandise which should reach the hands of the consumer free from dust, grease, moisture, or the effects of atmospheric changes, may be protected by a new waterproofed lining and wrapping paper which resembles a thin parchment in appearance and texture. It can be soaked in water or crumpled in the hand without losing its strength, although it cuts or tears readily to any size required. It comes in sheets 24 by 26 in. and 25 by 40 in., the smaller size weighing 26 to 27 lb. per ream of 480 sheets.

GUARD POSTS TO CAPTURE AUTO THIEVES

More than \$800,000 worth of automobiles having been stolen in southern California during the past year, local authorities have arranged for a series of guard posts at each of the seven mountain passes by which alone stolen cars can be removed by land from the Los Angeles district, where thefts have been most numerous. Guards stationed at each post will check the number of every car that attempts to pass. Being promptly furnished with the numbers of stolen cars, they will arrest the driver of any car bearing one of such numbers, detaining the car for its owner. Anyone attempting to pass without stopping when ordered, will find himself in a

trap. Hitherto most of the autos stolen in the district have been driven to a distance through the passes, it is claimed, and the new guard-post system is expected to prove efficient in wiping out this "foreign market"



Guard Posts to Intercept Stolen Autos will be Maintained in the Mountain Passes around Los Angeles at the Points Indicated in the Map by Crosses

thievery. It will cost \$30,000 a year to maintain the guards, but there are about 120,000 automobiles to be protected in Los Angeles territory.

UNUSUAL CONNECTION FOR TWO WATER SYSTEMS

Two neighboring Ohio towns, Dover and New Philadelphia, recently discussed the erection of an additional pumping station to be used in emergencies. Instead of going to that expense, however, it has been proposed to install a rather novel connection between the water systems of the two communities, so that in case of special need one can supply the other with water and the amount furnished can be measured accurately. This connection, as provided for in the plans, con-

sists of two parallel pipes united at one end to a Dover main and at the other to a New Philadelphia main. In each of these parallel pipes would be a check valve, one of which would swing toward Dover and so allow water to flow through it only in that direction, while the other valve would swing in the opposite direction, permitting only a current in the direction of New Philadelphia. Set in proper relation to each check valve would be a meter, enabling each town to know how much water it supplied to its neighbor. The cost of such a connection would not be large.

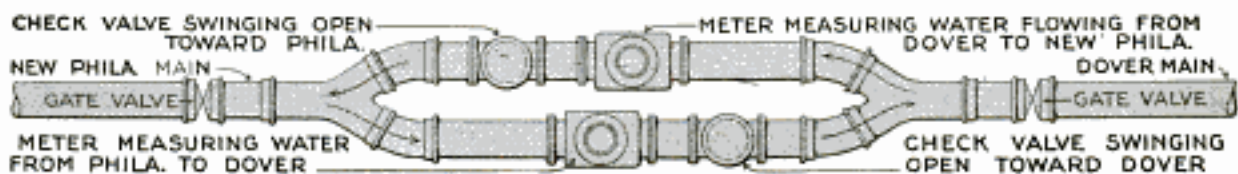


Diagram of a Proposed Connection between the Water Systems of Two Communities, Showing Valves and Meters Arranged in Such a Way That Water Flowing in Either Direction can be Accurately Measured

STRANGE PICTURES OF BIRDS AND ANIMALS, AND



A Policeman in Memphis, Tennessee, When Angry, Broke This Stray Dog's Leg with a Club and Then Threw Him into a Garbage Can. Later Kind Folks Rescued and Cared for the Dog, Whom They Call "Fido." The Officer was Fined and Discharged, Showing That Not Even a Policeman can Afford to Be Cruel



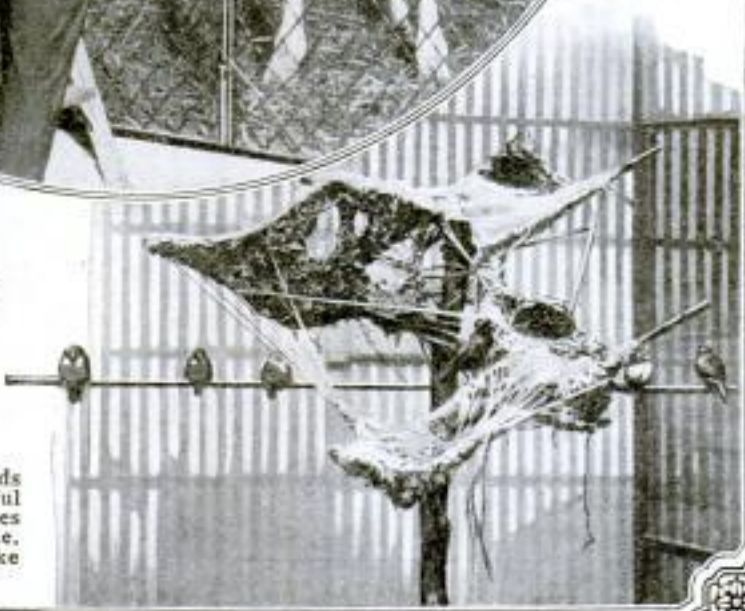
Baby Lion Sees His Reflection in Top of Table, in Mayor's Office, Boston



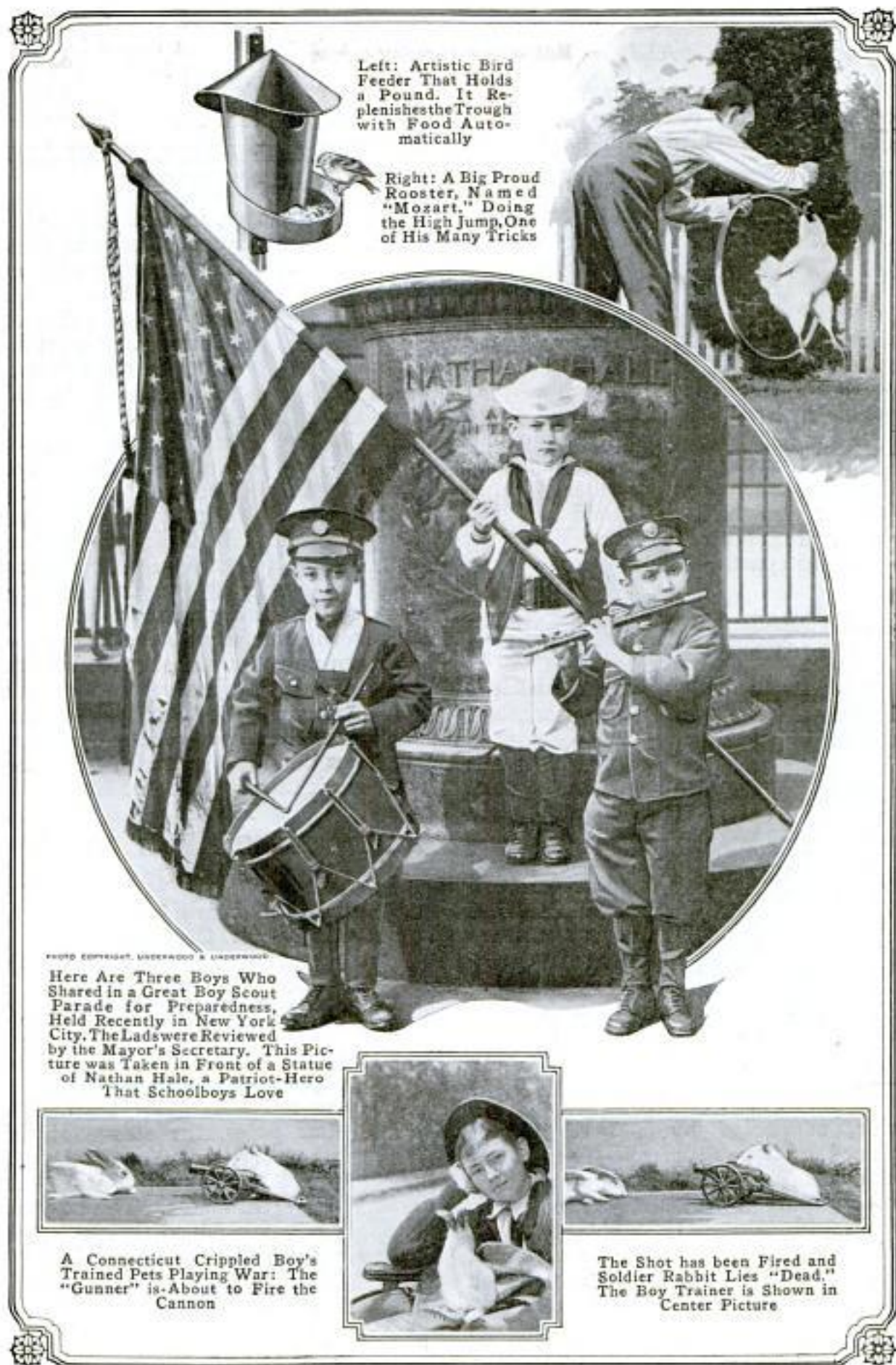
Photo Courtesy, International Film Service

Even Giraffes, with Their Long Necks, Sometimes Have Sore Throats Like Folks, and That Is Just What Happened to This Giraffe, Whom They Call "Goliath." So the Circus Men Had to Bundle His Neck All Up—and It must have Taken Yards and Yards of Cloth

On the Right Are Some Weaver Birds in a Boston Park and the Wonderful Nests Which the Skillful Little Creatures have Woven with 40 Balls of Twine. It Took Them Two Months to Make Their Interesting Homes



CHILDREN'S ACTIVITIES OF UNUSUAL INTEREST



Left: Artistic Bird Feeder That Holds a Pound. It Replenishes the Trough with Food Automatically

Right: A Big Proud Rooster, Named "Mozart," Doing the High Jump, One of His Many Tricks

PHOTO COPYRIGHT, UNDERWOOD & UNDERWOOD

Here Are Three Boys Who Shared in a Great Boy Scout Parade for Preparedness, Held Recently in New York City. The Lads were Reviewed by the Mayor's Secretary. This Picture was Taken in Front of a Statue of Nathan Hale, a Patriot-Hero That Schoolboys Love



A Connecticut Crippled Boy's Trained Pets Playing War: The "Gunner" is About to Fire the Cannon



The Shot has been Fired and Soldier Rabbit Lies "Dead." The Boy Trainer is Shown in Center Picture

NEW BRICKLAYER'S RAKER SUITED TO ALL NEEDS

A new raker for bricklayers is more convenient than the ordinary tool because it is provided with four points



of as many different sizes. The head, or blade, is square and is pivoted at its center to a suitable handle. Projecting from each side of this revolvable part is a slightly up-turned point.

The width of these projections ranges from $\frac{1}{4}$ in. to $\frac{1}{2}$ in. so that the tool is suited to raking mortar from between brick laid various distances apart.

EVAPORATION FOOD COOLER MADE OF CONCRETE

A concrete food container, which is kept cool by evaporation, represents a recent improvement on coolers with canvas walls built on the same principle.



This chest stands about five feet high and is cylindrical in shape, with small screened ventilators in the sides and a narrow door in front. Four circular, revolving shelves are provided inside, supported by a vertical pipe placed in the center. The cooler stands outdoors and rests on a raised base having a projecting edge that is fashioned into a trough and, when filled, serves as a barrier to ants, etc. On the top is a reservoir from which water drips through valves into a surrounding groove and then overflows down the sides of the container. The

resulting evaporation keeps the interior cool. The thick walls retain the cool air and withstand the heat of the sun well.

HOSE CLAMP FOR USE ON ANY AUTOMOBILE

A garage owner, instead of keeping in stock hose clamps of several sizes to be used on different makes of cars,



will find a single style of patented clamp very convenient, because it can be adapted to all sizes of hose. It is a straight strip of metal, in which are 13 holes, $\frac{5}{8}$ in. apart. The metal band is pliable and can be bent around

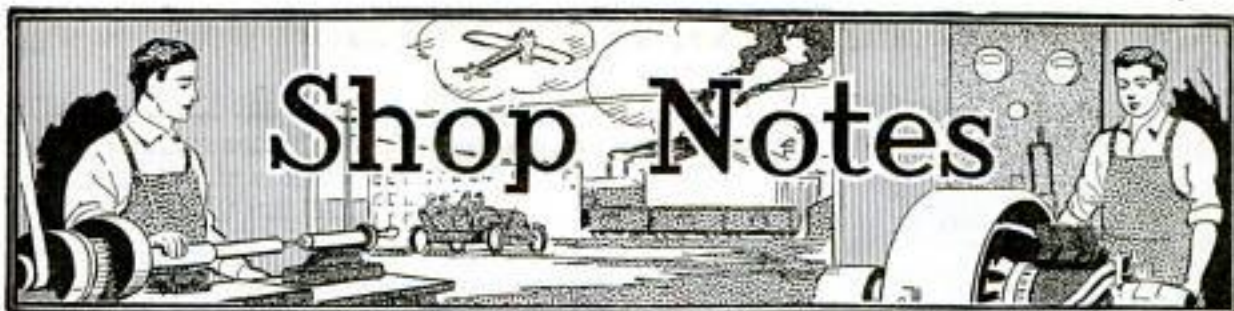
the hose easily. By inserting a threaded bolt through the proper holes and screwing on a nut, the clamp can be drawn up tight. It only remains to break off the projecting end of the band by bending it back and forth a few times. Small perforations between the holes help to make possible an even break at any point desired.

NONFOULING HALYARD TOP FOR FLAGPOLES

A patent ball-bearing halyard top, now available for flagpoles of either



steel or wood, revolves with the slightest shift of the breeze and keeps the flag from fouling in any kind of wind. It can be attached to any wooden pole by means of screws, and when used with steel poles, the sleeve of the revolving top is wedged securely into the hollow pole. The halyard sheave wheel is protected from moisture by a bonnet, carried on a shaft which runs on ball bearings and is topped with a gilded ball or a weather vane.



Miniature Landscape Built Up of Concrete

By A. J. VIKEN

AN interesting use of concrete is in the making of models of landscapes, for practical uses as well as for pastime or in scientific work. One of the widest applications of this form of model construction is for display and advertising purposes, where small lakes and picturesque natural effects are desired. The photographs show a miniature landscape which I made principally of reinforced concrete. It measures 20 by 30 in. and is built in a box 5 in. deep. The trees are Japanese air plants. The log cabin is built of matches and toothpicks. Window wire screen was used for fences and bridge railings. In the lake are gold fish, a submarine, a row-

boat, and a ship. The lower photograph shows the size of the log cabin and people compared with a match and a 16-size watch.



The Match and Watch Give a Basis for Comparison with the Cabin

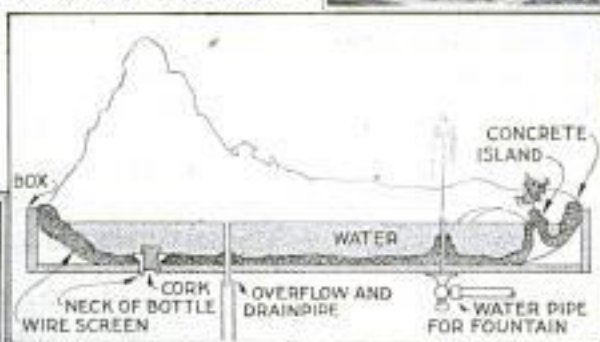
boat, and a ship. The lower photograph shows the size of the log cabin and people compared with a match and a 16-size watch.

The mountain and hills, as shown in the sectional diagram, were built on a skeleton of iron wire, and wire screen,

to make the landscape as light as possible. The bottom of the lake was also formed with the aid of wire screen and the concrete put on top of it. After the concrete had dried, the whole landscape was painted in natural colors. The bot-



General View of the Rugged Mountain Lake



Sectional Diagram of the Construction

tom of the lake was given two coats of dark-gray paint, and when thoroughly dry, a coat of paraffin wax was added to make it waterproof, and to prevent the paint from affecting the water. The whole landscape is mounted on a stand like a rectangular mission table.

An Artist's Palette Supported by the Easel

Artists and others who sketch out of doors can make good use of a palette which hooks to the easel and is supported by a stick, as shown. The shelf keeps within easy access the several articles of a painter's outfit, while he is working. It eliminates some of the distractions of outdoor work. The hand

is free from holding the usual thumb-hole palette, a comfort appreciated



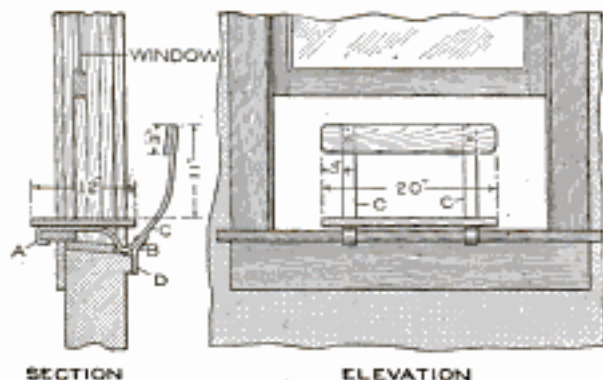
The Artist can Work More Freely When His Materials are Kept on the Palette Shelf, Making a Thumb Palette Unnecessary

especially in hot or cold weather, and in mosquito-infested regions.

The palette consists of shellacked canvas tacked on a wood stretcher. Hooks on the easel and screw eyes on the palette provide a support. The brace is inserted in a slot, and held by a large screw eye.—Phil Bierdemann, Chicago, Ill.

A Safety Window-Cleaning Seat

In the home, and in many shops or buildings where window washers are not employed and the usual safety de-



This Homemade Seat Is Comfortable for Window Washing and Insures Reasonable Safety

✓ vices are not used, a small window-cleaning seat is practical as a safety

measure. One like that shown can be made easily by the home mechanic. It hooks over the window stool, at A, and rests on the sill, at B. The main supports C are of $\frac{1}{4}$ by $1\frac{1}{2}$ -in. band iron, shaped as shown, and riveted to a seat of wood, 12 by 20 in., and braced at the top with a wooden rest, 3 by 20 in. The safety strips D are of $\frac{1}{8}$ -in. band iron, riveted to the pieces C. The position of these strips should be determined carefully for the windows on which the seat is used. The back rest makes the work of window cleaning easier.

Hints on the Making and Use of Coil Springs

The experimenter or mechanic often spends time trying out springs that could not possibly do the work expected of them, owing to a lack of knowledge on this important subject. First as to coil springs: Compression springs have open coils and the pressure on each end is toward the center. Tension springs have their coils wound close together; the working pressure on their ends is away from the center. A compression spring of greater strength is made by increasing the size of the wire; making fewer coils per inch of length, or decreasing the outside diameter of the coils.

When this kind of spring is compressed, its outside diameter is slightly increased. Where a spring fits in a hole, this should be allowed for. A given weight will compress a long spring more than a short spring, otherwise of the same dimensions. In building a mechanism with a spring that is to be compressed, see that in the extreme closed position there is room left for the spring itself.

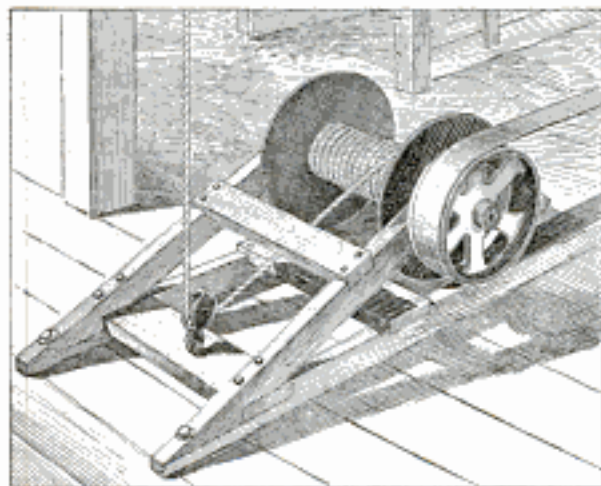
A stronger tension spring is made by increasing the size of the wire, or by decreasing the outside diameter of the coils; and a weaker one by changes in the opposite direction. A compression spring of fair quality may be made from a tension spring by spreading the coils with a screwdriver. The loop on the end of a tension spring can be made,

P. P. Avery,
38 Millard av.,
Garfield, N. J.

with pliers, from the end of the spring wire. Springs may be coiled from spring wire, brass or steel, or from piano wire. Spring wire comes annealed or tempered; if the former is used, the spring has to be tempered after coiling.—Donald A. Hampson, Middletown, N. Y.

Homemade Power Hoist for Loading Hay in Barn

Having a gasoline engine for use on the farm, I rigged it up to aid in loading hay into the barn, by building a hoist for it. An ordinary hay carrier, or fork, was used, with the same tackle commonly used with a team in hoisting the hay into the mow. I built a frame of 2 by 4 and 2 by 6-in. lumber, bolting it together strongly, as shown. The check reel from a corn planter was mounted in it as a drum. On the end of the center shaft a drive pulley was mounted and belted to the engine, which was set in the barn on its usual skid. The clutch for checking the hoisting of the load quickly was on the engine. The arrangement proved more



This Hoisting Arrangement was Devised on the Farm for Use with an Engine, in Putting Hay into the Mow

dependable than horses and made it unnecessary to unhitch the team, or to use an extra team for the hoisting.—Ralph A. Page, Urbana, Ill.

CA worn broom can be used handily for cleaning corners by cutting it to a sharp point at one side.

Warning Horn at Sidewalk Garage Door

A garage, situated on a much-traveled street, uses an effective scheme



The Warning Horn Set in the Metal Window Pane Is Effective in Safeguarding Pedestrians

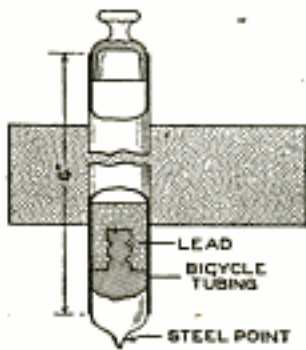
to warn pedestrians on the sidewalks when a car is about to leave the garage. A circular hole was cut in a sheet-metal pane set in one of the sections of a window at the doorway, and a large electric automobile horn was set into it. The mechanism of the horn is supported on a bracket, fixed to the wall. When a car is ready to leave, the employe, who opens the sliding door, touches a push button, sounding the horn. Passers-by "wake up" without fail at the blast, whereas the car horns, sounded inside, cannot be heard readily outside.—John Miller Bonbright, Philadelphia, Pa.

Cementing Gaps around Machinery Tension Keys

There are usually unsightly gaps around tension keys used to hold together sections of large flywheels, and other heavy machinery parts. If this space is filled with neat cement, a smooth, workmanlike finish is obtained that will not crack nor crumble. After painting it the same color as the machinery, the joint is hardly discernible. The cement can be chipped out when desired.—H. P. Roy, Kansas City, Mo.

A Drop Plumb Bob of Weighted Tubing

A plumb bob which may be dropped so that its point will indicate a "plumb spot" is handy as a part of the equipment of a home tool chest. An easy way to make a plumb bob of this type is as follows: Cut a piece of $\frac{3}{4}$ -in.



bicycle tubing 6 in. long. Turn a piece of steel to fit the bore of the tube and point it for the bottom of the bob. Turn the other end of this plug with several grooves around it, so that

when the lead is poured into the tube with a point in place, the grooves are filled with lead. Pour in about 3 oz. of lead, holding the tube perfectly vertical. Turn a metal plug, as shown, for the upper end of the tube. Secure it by a rivet through the tube. It is best to make this plug so that it can be removed and the plumb line knotted through a vertical hole.—J. H. Beebe, Rochester, N. Y.

Shelf for Order Books on Auto Dash

A shelf, made from $\frac{5}{8}$ -in. surfaced stock, painted to match the dash of a

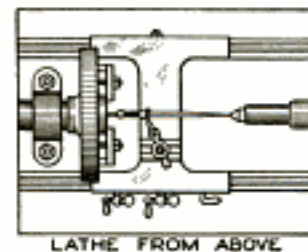
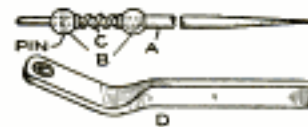


delivery, or collector's, automobile, makes an excellent place for order books and the like. The books are always in convenient position; they cannot easily be bounced out of the car and lost,

nor thrown on the floor and walked on, becoming soiled and dog-eared. The shelf is set across the dash at an angle, so that the books lie nearly vertical, in a slotlike rest.—Francis W. Nunenmacher, Berkeley, Calif.

Indicator for Centering Faceplate Work

Some means for accurately locating the center of faceplate work in the lathe is a great convenience to machinists or tool makers. An effective device for this purpose is shown in the sketch. The rod A is of $\frac{1}{8}$ -in. cold-rolled steel, 12 in. long. One end is turned to $\frac{3}{32}$ in., for a length of $1\frac{3}{4}$ in., and pointed to an included angle of 60° . The other end is filed to a sharp point, and both ends are casehardened. Two $\frac{5}{16}$ -in. bearing balls, B, are annealed, and drilled $\frac{3}{32}$ in. to fit the end. The spring C is made from .020 music wire $\frac{5}{8}$ in. long, and wound on a $\frac{3}{32}$ -in. core. The inner ball is free to slide, while the outer one is fastened to the rod with a pin, the spring separating them.



The stock D, for holding the testing bar, is used in a tool holder, and is made of $\frac{5}{16}$ -in. square cold-rolled steel. A $\frac{7}{32}$ -in. hole is drilled and chamfered in the flattened end. The view of the lathe as seen from above shows the tester in use. The stock is fastened in the tool holder, the bar A is pushed through the $\frac{7}{32}$ -in. hole in the flattened end, and the carriage advanced until the 60° end of the bar is in contact with the job. This pushes the loose ball against the spring and holds the end against the work. By starting the lathe and observing the relation of the pointed end to the tailstock center, it is easy to determine how much the piece is off center.—William E. Jewett, Jersey City, N. J.

Time may be saved in drafting I-beams, and other duplicate parts, by making a triangle having special angles, or a hole in it, for marking these standard shapes.

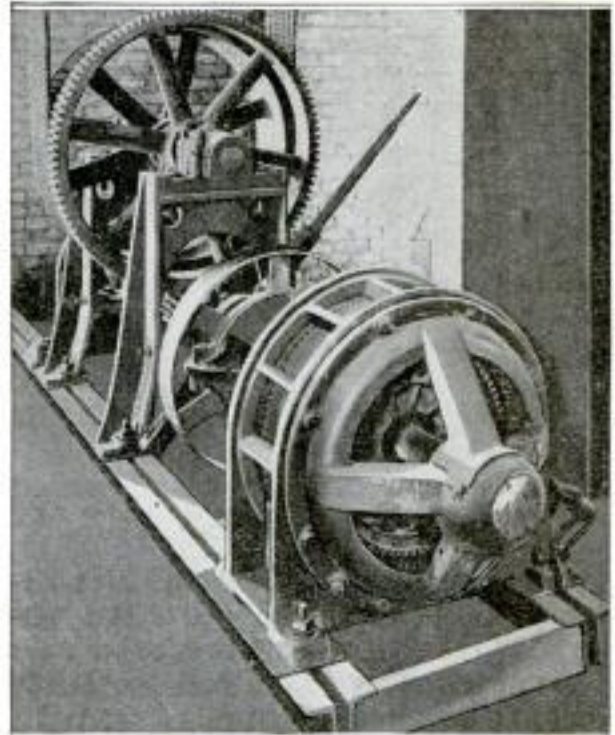
Structural-Steel Sliding Base for Motors and Machinery

By A. L. FENTON

A STRUCTURAL-STEEL sliding sub-base is often convenient for belt-drive electric motors and machinery, and may be arranged substantially as shown in the photograph and detailed in the sketches. These sub-bases are desirable especially where the service is severe, and the belt requires frequent tightening. Provision is usually made on the bases of belt-drive motors to permit take-up for belt tightening, but in some cases the adjustment provided by the manufacturer of the motor is not sufficient. Where a sub-base of the type shown is used, the base can be made long enough so that any reasonable amount of take-up will be provided.

The structural-steel members of the base are I-beams, held together with plates, riveted to their lower flanges, as detailed in Figs. 1 and 2. Holes for the anchor bolts are provided in the plates. Channels may be used instead of I-beams with a decrease in cost, but an I-beam has two flanges as against one for a channel, and hence is capable of being riveted more securely to the

In installing the structural-steel sub-base, it is mounted on top of the foundation prepared for the motor, as shown



A Substantial Foundation for Motors and Machinery Which Permits of Easy Adjustment or Removal of the Machines

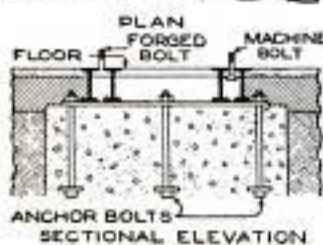
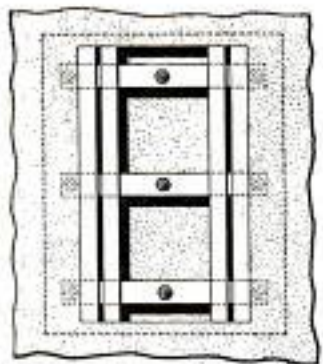


Fig. 1

The Frame is Built Up of I-Beams to Which Steel Plates are Riveted

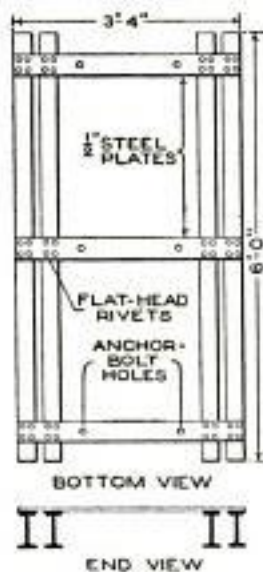


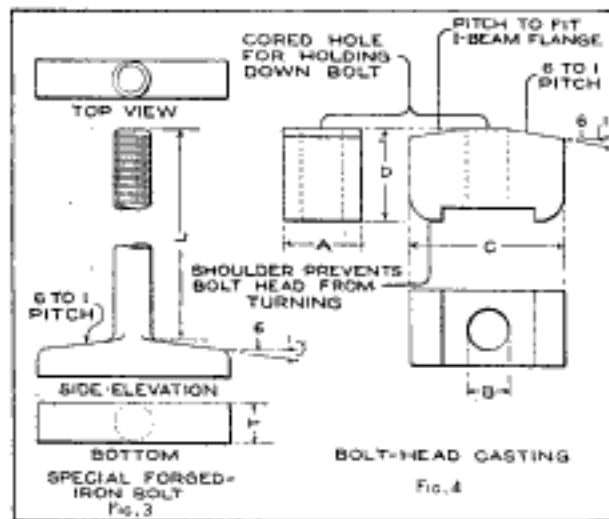
Fig. 2

plates, and held more rigidly upon the top of the foundation where it is to be installed.

in Fig. 1. The height of the foundation should be such that the top faces of the I-beam members will, after the sub-base has been installed, lie flush with the face of the top floor. The surfacing of the floor should be built up close to the sub-base, as indicated in the sectional elevation.

The motor base is bolted to the sub-base by means of bolts set in the slot between the pairs of I-beams, as shown in two forms in Fig. 1. The bolts for this purpose are made as detailed in Fig. 3, or ordinary machine bolts can be used in combination with a casting similar to that shown in Fig. 4. The casting is shaped to fit the I-beam flange, and the head of the bolt is held in a recess, preventing the bolt from turning. The T-bolt is forged by welding a piece of stock of suitable dimensions to the head end of an ordinary machine bolt. The under side of the T-head should be given a 6 to 1 pitch to correspond with the pitch on the

flanges of the I-beam, or channel members, in the sub-base, against which it is clamped. The thickness *T* of the head should be such that the



A Forged Bolt with a T-Head, or a Machine Bolt, may be Used to Secure the Machine Bases

bolt can be dropped into the slot between the I-beam members of the sub-base, so that if a bolt breaks, a new one can be substituted, and so that it will not be necessary to place the bolts in the sub-base until all of the rough work involved in building the foundation and setting the sub-base has been completed. The length *L* of the bolt will be determined by the thickness of the motor base, and by the general proportions of the particular installation.

Where a bolt-head casting, like that of Fig. 4, is to be made, its thickness, *A*, should always be such that the casting can be inserted in the slot between the I-beams in the sub-base. Hence, these I-beams must be spaced a little farther apart than the thickness *T* of the head of the forged bolt. The diameter *B* of the hole should be just large enough to produce a good sliding fit on the bolt. The length *C* should be about twice the thickness, and the height *D* proportioned as shown.

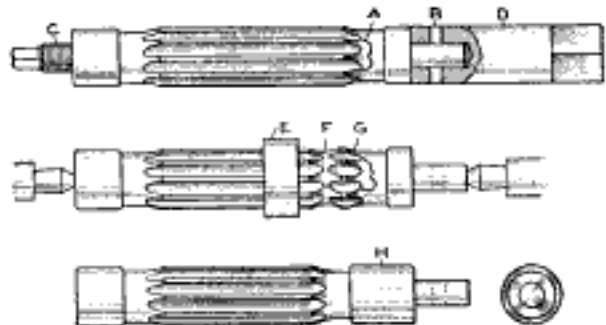
Filing Down a Thin Washer

It is difficult to hold a thin washer in a vise while filing it on the face, and a good method of accomplishing this is to file the washer flat on the bench, or on a block. Drive a nail into the bench

top, or into a block, so that its head is just below the surface of the washer, and place the latter over it. Lay the file flat across the washer, a little to one side of the center. File with a forward stroke only, causing the washer to turn slowly. An even cut will be removed from all parts of the surface.—Walter B. Raynor, Patchogue, N. Y.

Repairing a Large Reamer

An apprentice drove the expansion screw of an expensive, large hand reamer in too far, causing the reamer to crack, as indicated at *A*. A satisfactory repair was made by first removing the pin *B*, separating the shank *D* and the body. The screw *C* was then taken out, and a tight push-fit collar, *E*, was forced on the blades, to hold down the broken ones. The reamer was put on centers in the lathe, and the groove *F* was ground in. The portion between the new groove and the old one at *G* was ground down to a diameter slightly smaller than before. A steel bushing, *H*, was made, the hole in it being .003 to .004 in. smaller than the newly ground part at *G*. The bushing was heated and shrunk on the reamer, the old groove beside it being made as wide as the original one, at *A*. The bushing held down the broken blades, and was



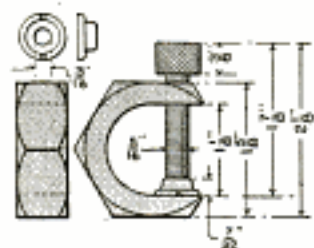
An Expensive, Large Reamer was Saved by Making a Skillful Repair for It

ground down to the size of the shank *D*. The reamer was then reassembled.—Richard H. Jehlicka, Worcester, Massachusetts.

ⒸA machine bolt is usually screwed down $2\frac{1}{2}$ times its diameter.

Machine Clamps Made from Hexagon Nuts

I made a set of hexagon clamps which are strong and useful for many kinds of small work, by fitting 1-in. cold-pressed nuts with thumbscrews, as shown in the sketch. One side of the nut is cut away and a $\frac{5}{16}$ -in. knurled thumbscrew, provided with an adjustable cap at its lower end, is fitted to it, as shown. These clamps may be laid flat on work and can be used like parallel clamps in many cases.—J. Harger, Honolulu, Hawaiian Islands.

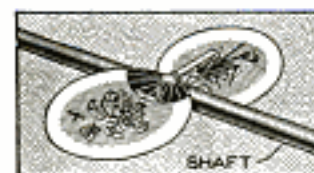


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Fans on Machine Shafting Cool Workman

Lacking an electric, or other common power fan, an ingenious workman in a machine shop attached two ordinary paper hand fans to the line shafting, securing them with cord, as shown. The result was a rather unique fan, which cooled him at his machine, nearly as well as the boss's elegant brass fan cooled him, in his private office.—M. J. Doyle, Cleveland, O.



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shown. The result was a rather unique fan, which cooled him at his machine, nearly as well as the boss's elegant brass fan cooled him, in his private office.—M. J. Doyle, Cleveland, O.

Skimmer for Removing Slag from Molten Metal

In using molten lead or other metal, especially in the workshop where it is gathered in many small pieces, it is important that the slag be skimmed off carefully. A handy tool for this purpose was made by hammering a piece of iron rod out to the shape shown in the sketch,



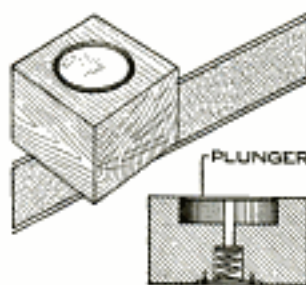
A handy tool for this purpose was

made by hammering a piece of iron rod out to the shape shown in the sketch,

the small end serving as a handle, and the rounded edge of the skimming end fitting against the curve of the ladle in which the metal is melted.—E. K. Marshall, Oak Park, Ill.

Device for Wrapping Small Articles of Uniform Size

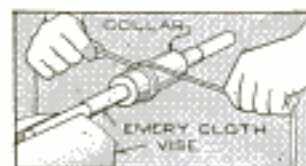
A block for wrapping small articles, such as typewriter ribbons, in tin foil, can be made from wood with metal fittings, as indicated. The hole in the top is cut $\frac{1}{16}$ in. larger than the width of the article to be wrapped. The foil is laid on the



top of the block, then the article is pressed down, and the foil drawn from the sides and pressed with the palms of the hand. When released the article rises above the top, so that it can be handled easily. Articles wrapped in this form are neater and more uniform than when wrapped by hand. The shape of the hole in the block can be varied to suit special needs.—A. H. Hale, Brooklyn, N. Y.

Reaming a Bushing or Collar without Reamer

To enlarge a bushing properly, where a reamer is not obtainable, take a round rod, or a piece of wood, somewhat smaller than the bushing; wrap emery cloth around the rod and place one end in a vise. Place the bushing over the emery cloth. By coiling a cord twice around the bushing, and pulling on the ends of the cord, first one, then the other, the bushing is dressed to a perfect fit. In reaming a bushing by this method, for piston pins, etc., it should be made to fit rather loosely, because of the tendency to tighten when in place.—J. W. Reynolds, Mason, Ill.

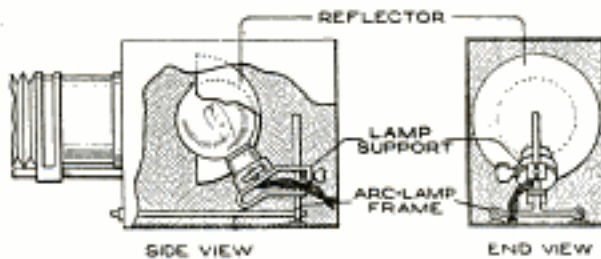


Saving Overall Buttons That Pull Through

The buttons used on mechanics' overalls and jumpers sometimes pull out. Examine the buttons used; if in the center two bent wires hold on the button, they can be sewed on again. With a pair of cutting pliers cut off the rivet head of the button that pulled through the cloth; remove the wires from the center of the button, and it may then be sewed on. If it is the type of button that shows a round rivet-head center, it cannot be so used again. Keeping these buttons saves hunting up other suitable ones.—John Hoeck, Alameda, Calif.

Incandescent Lamps Used in Stereopticon Lanterns

The electric arc lamp has been used to a great extent in stereopticons and moving-picture apparatus, where an intense light is essential. However, the newer high-candlepower incandescent nitrogen lamp, from 300 to 1,000 watts,



The High-Power Nitrogen Filament Lamp Is Safe and Efficient for Use in Stereopticon Lanterns

provides a satisfactory substitute for the arc lamp. The former requires little attention, and is more economical of current. It is also safer than the arc lamp, and is easily adapted to stereopticon equipment.

A special support of $\frac{1}{8}$ -in. sheet iron is provided for the arc lamp, as shown, and is clamped on the vertical rod. A 300-watt lamp is satisfactory for small stereopticons, and the 500-watt size for larger ones. Round-bulb lamps are used, and a reflector, placed behind the lamp, increases the light efficiency. The old housing and lamps are used.—E. A. Binney, St. Louis, Mo.

Valve and Stand for Inflating Tires Quickly

Much time is spent in inflating tires in automobile factories and garages, and the device described reduces this opera-

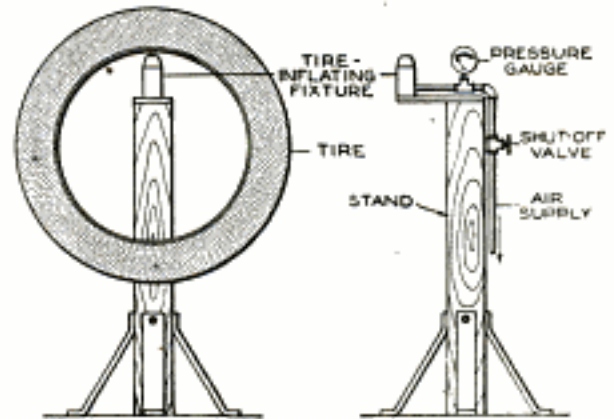
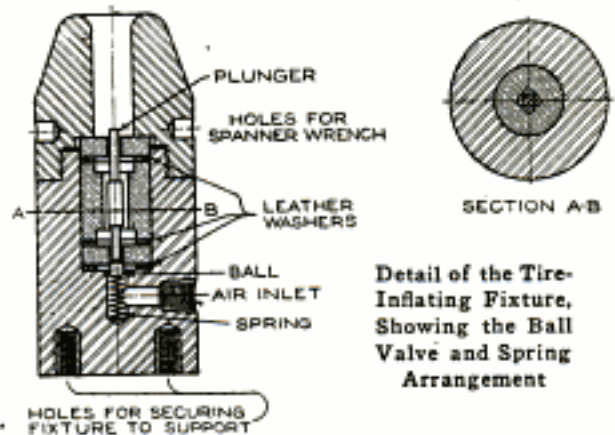


Fig. 1

The Tire is Inflated After It is Mounted on the Rim, and Before the Rim is Placed on the Wheel

tion to a minimum. The tire is inflated after it has been placed on the rim, and before the latter is placed on the wheel. A stand is used, as shown in Fig. 1, and a special valve is arranged on the tire-inflating fixture. This is shown in the detail sketch. The weight of the tire and rim presses down the plunger, which bears, at its lower end, on a ball and a spring, controlling the air at the inlet. The air passes around the spring and the ball and up into the tire valve. A pressure gauge and a shut-off valve



Detail of the Tire-Inflating Fixture, Showing the Ball Valve and Spring Arrangement

are provided in the air line, so that the air may be regulated easily.—William J. Outcalt, Detroit, Mich.

ⒸA piece of tin, fixed to the lower edge of an ax handle at the head, saves wear.

Barrel Sprinkler for Oiling Roadway

In summer, the suburbanite is often confronted with dusty driveways and walks that are easily improved with a

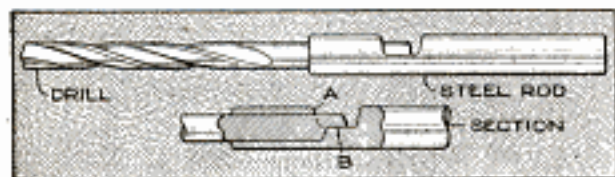


Occasional Oiling of Roadways with a Homemade Sprinkler will Keep Down Dust around the Home

homemade oil sprinkler, like that shown. A steel frame, mounted on wheels, was rigged up to hold an ordinary oil barrel. Inserted in the bung is a short piece of pipe equipped with a shut-off. To this is attached the sprinkling pipe, having perforations, about $1\frac{1}{2}$ in. apart, of sufficient size to allow the oil to flow freely. The cart may be drawn, or pushed, the latter being more convenient, discarded shoes being worn, and a thin layer only applied.—J. C. Grindell, St. Louis, Mo.

A Solderless Extension Drill Rod

In using an extension drill, a common practice is to sweat the shank of the drill into a brass tube, or a rod bored



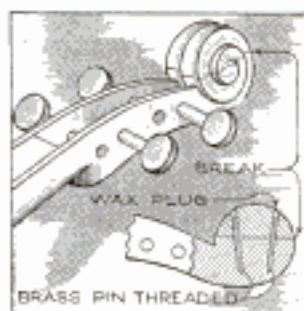
The Drill is Held in the Extension Rod by the Shoulder Joint

out. This process fixes the drill more or less permanently in the rod or tube, and requires special heating for the

soldering. By making a special drill rod with a simple chuck arrangement, as detailed in the sketch, it is unnecessary to solder the drill into place. The end of the drill rod is bored out to receive the drill, and a groove, A, is filed across the rod and into the drilled hole. This provides a small, slightly beveled shoulder, B, which grips a corresponding shoulder on the end of the drill. The fastening is very strong if carefully made, and the drill can be quickly removed.—V. Arkin, Chicago, Illinois.

Hidden Screw Rivets for Woodwork

When one has done a fine bit of gluing, as on the neck of a violin, some not unsightly reinforcement is often desirable. I proceeded in the following manner in making such a repair: Using No. 17 brass escutcheon pins of a suitable length, I cut off the heads, and gripped the pins in the chuck of a small hand drill, and threaded them. Taking another light hand drill, and with a drill about two sizes smaller than the pin, I bored through the glued parts as many holes as were necessary. I cut off the point of the pin, and, with it still in the hand drill, screwed it into the hole. To hide the screw pins, I cut them off on the top side and dressed it smooth. Carefully pricking a center mark, and taking a drill the size of the brass wire, I drilled out a little of the end. By waxing these holes and staining the spots properly I had a strong and neat job.—L. M. Drake, Daytona, Fla.



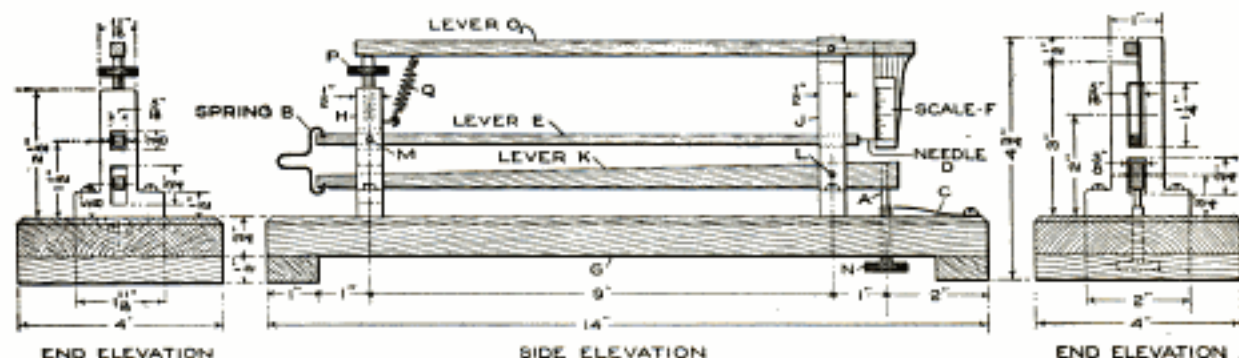
Ⓒ A bearing for moderate speeds and light duties should be of a length at least two diameters of the shafting. High-speed shafts should have bearings of a length four times the diameter of the shaft.

A Direct-Reading Lever Micrometer

By H. L. WILEY

THICKNESSES of paper, sheet metals, rubber and cloth fabrics, wire, and similar materials, can be read directly to .0001 in. with this lever mi-

ried on fine needles thrust through them at points M and L. The levers work through slots cut in the supports H and J. To keep the levers from



When the Operator becomes Accustomed to This Homemade Lever Micrometer, He can Read to Minute Accuracy with It

rometer. It can be operated much more rapidly than a screw micrometer of the usual type, over 30 readings per minute being possible after a few minutes' practice. To operate the micrometer, the anvil A is raised by placing the finger lightly upon the spring link B, the object to be measured being guided to its position under the anvil by means of the guide spring C. When the object is between the jaws of the micrometer, the spring link B is released, and the needle D, at the small end of the lever E, immediately indicates the thickness of the object upon the scale F. Upon the base G are mounted two supports, H and J, through which run the levers K and E. These levers, K and E, work respectively on the pins L and M. The upper anvil A is set into the end of the lever K, and forms a contact with the lower anvil, which is the end of the screw N. The small end of lever K is connected to lever E by means of the spring link B, which is made out of a piece of clock spring, or other thin, flat spring steel. The small end of the lever E terminates in a fine needle, working close to the scale F. This scale is carried on the end of lever O.

Base, supports, and levers are made of cedar, or other light-weight wood, as the machine is delicate in its action, and superfluous weight in the moving parts, especially in lever E, should be avoided. The levers K and E are car-

touching the sides of the slots in the supports, washers, or fillers of fine glass beads, can be used on both sides of the levers.

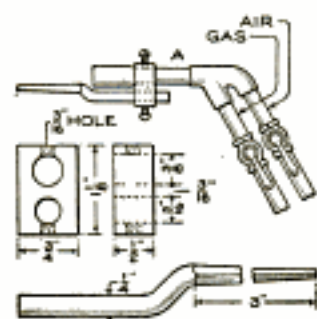
The scale F is 1 in. long, graduated to hundredths of an inch. If desirable, a reading glass can be mounted on support J, directly focused upon the scale. With the upper and lower anvil jaws in contact, the reading on the scale should be zero. If such is not the case, adjustment is made by means of the screws N and P. Both of these screws work directly in the wood. In placing them, holes, slightly less in diameter than the screws, are drilled into the support H, at the top of which is located the screw P, and into the base G, through which passes the screw N. The coarse adjustment, by means of which the indicator needle D is brought within .01 in. of the zero line on the lower end of the scale F, is made with the screw N. The finer adjustment is made with the screw P. The lever O is held lightly against the screw P by means of the small coil spring Q.

This machine is accurate, by close observations, to .00001 in. and will stand considerable hard use without requiring adjustment. As soon as the operator becomes accustomed to its use he can read to $\frac{1}{50,000}$ part of an inch without difficulty. The machine will indicate the thickness of a pencil mark on paper.

Tool for Soldering Automobile Radiators

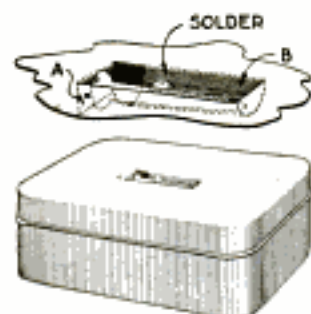
An attachment made in the shop to be used with a common gas-and-air torch is the best arrangement for soldering automobile radiators I have ever used. When the leak occurs in the cells of a honey-comb radiator, little difficulty is experienced in soldering it. A tube radiator can also be soldered, without moving the webbing.

The soldering iron is made of $\frac{1}{4}$ -in. round-iron stock, bent as shown in the sketch, ground square and slightly tapering from the curve to the point. The length of the iron depends on the depth of the place to be soldered, 3 in. being practical. The torch unscrews at A, allowing the device to be slipped on through the $\frac{3}{8}$ -in. hole in the clamp, provided with setscrews.—Charles G. Moon, Des Moines, Ia.



Boxes for Small Hardware Display Contents

A convenient way to keep nails, screws, and other small parts, is to place them in tin boxes of uniform size, which may be stacked without the use of shelving. It is desirable to mark the boxes so that the contents may be identified easily.



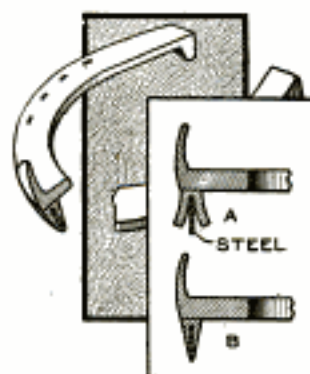
A good way to do this is to make a depression in the top or front of the box, large enough for one of the articles contained. The sketch shows how a screw was fastened in the top of the box. The part A was bent to hold the head, and the part B hammered in.—H. K., West Nyack, N. Y.

Washer Holds Bolt from Turning in Clamping Grooves

To keep the head of a bolt from turning in the clamping grooves of a planer, miller, or other shop machine, on which machine parts are bolted down while in process, take a washer of the same size hole as the bolt diameter, and turn over two opposite edges of it so that the head of the bolt fits between them. Then slip the washer under the head of the bolt, so that it rests in the clamping groove, almost as a part of the bolt head. This takes up the looseness.—J. Fast, Denver, Colo.

Preventing Rapid Wear on Horseshoe Calks

An efficient method of fixing a horseshoe calk so it will stay sharp is



to have the blacksmith split the toe calk lengthwise and insert a strip of steel cut from a worn-out mowing-machine knife. This is done after the calk is welded to the shoe. The inserted strip of steel, ready for welding, is shown at A, and the calk with the strip of steel welded in place, at B. The hard steel will not wear away as fast as the softer part of the calk, hence the calk wears in a V-shape, remaining comparatively sharp.—Clarence H. Green, Columbus, Ohio.

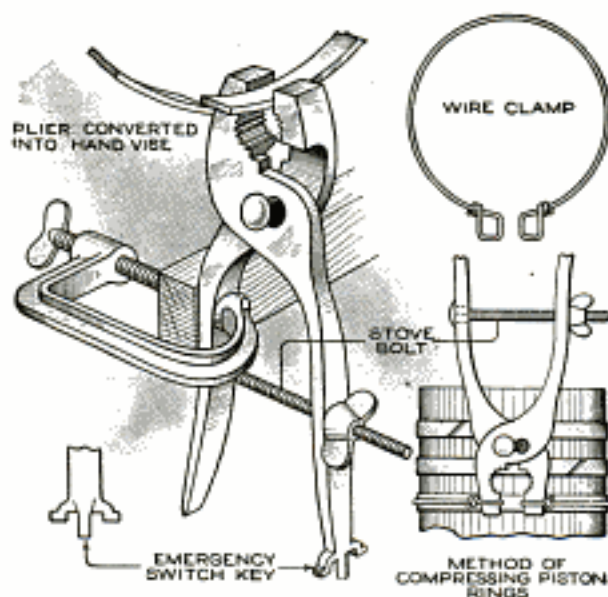
Toothed End Prevents Screwdriver from Slipping

The troublesome slipping of an automatic screwdriver, often experienced when driving is unusually light or hard, can be avoided by filing small teeth in the edge of the blade. About 24 teeth to the inch, or about seven teeth to a medium blade, is suitable, and they should be kept sharp as saw teeth.

Handy Plier Vice Used on Piston Rings

An effective method of securing additional usefulness from an ordinary combination adjustable plier, is to drill two elongated holes through the handles, inserting a $\frac{3}{16}$ by 3-in. screw or stove bolt, as shown. A thumb nut controls the adjustment, providing a hand vise that is useful for light work. A C-clamp fastens the plier quickly on an automobile running board, for roadside repairs.

One of the many novel uses to which the vise may be applied is as an aid in a one-man method of inserting pistons in the cylinders of a gas engine. A wire band of the diameter of the piston is made, as shown, with loops at the ends for the nose of the plier. The vise in position, as indicated, compresses the piston ring and holds it clamped until the piston is slid forward into the cylinder. The end of one handle of the plier is forged and filed into a convenient automobile-



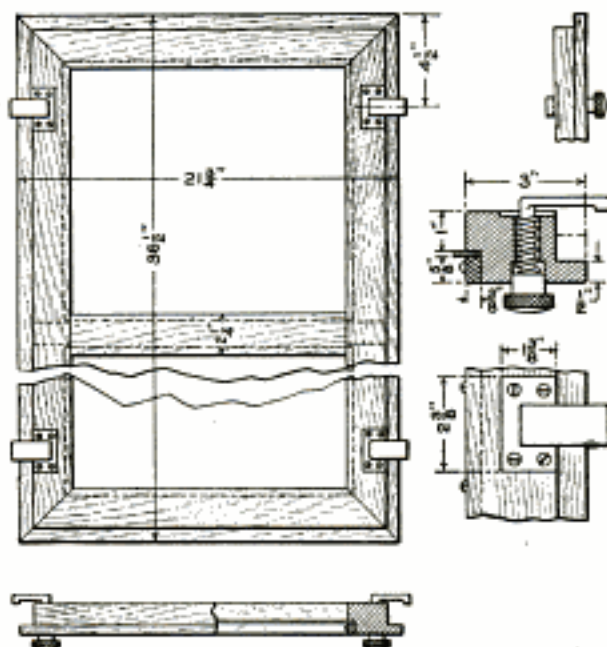
The Automobilst and Mechanic can Make Better Use of a Plier by Applying These Simple Kinks

starting switch key, which cannot easily be mislaid.—George A. Luers, Washington, D. C.

☞ A few drops of oil applied to the joints of a folding rule greatly facilitate its use.

Emergency Sash for Railroad-Car Doors

Window sashes are frequently broken on railroad coaches, and it has been



This Emergency Sash was Designed for Use on Railroad Coaches

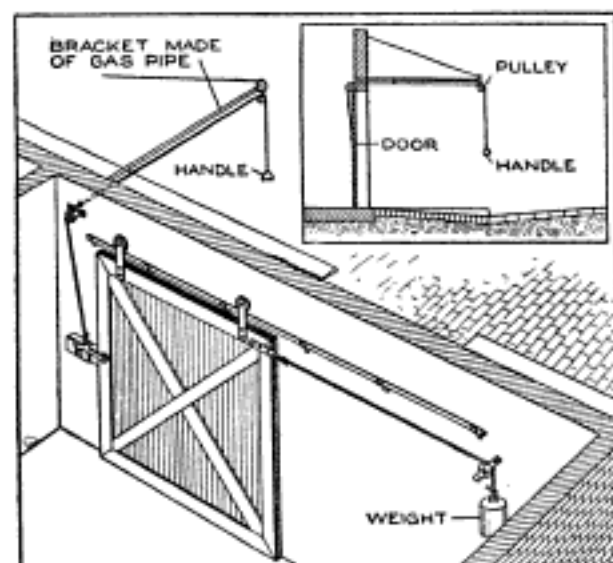
found desirable to have emergency sashes on hand at the repair shops of divisions. The sketch shows the detailed construction of such a sash that can be installed in a few minutes. The glass is held in a wooden frame which is locked in place by means of four catches. The latter are shown in detail in the sketches at the right. The catch consists of a brass fitting, cast with an angle plate at one end and a round rod at right angles to it. The rod is machined and fitted to a plate fixed to the sash. A spring acting against a knurled knob, sliding over the end of the rod, draws the angle end firmly against the window casing.—John W. Shank, Renovo, Pa.

Boiler-Furnace Stokers' Inspection Glass

A piece of blue glass, about 4 in. square, mounted in a small frame having a handle, is useful for stokers in examining the condition of the fires in large boiler furnaces, which require close and repeated inspection to maintain efficiency.

Self-Opening Garage Door

It is often annoying, especially in rainy or winter weather, to get out of an automobile at the garage in order



The Driver of the Car Pulls on the Handle, Releasing the Catch, and the Door Opens Automatically

to open the door. Customers at a public garage usually toot their horns until the door is opened, and in order to make this unnecessary I built a self-opening arrangement for the garage door. The auto driver pulls on the handle suspended in front of the door, releasing the door catch. The door is then automatically opened by the counterweight. The garage attendant can easily close the door, and adjust the catch for the next patron. This device is also handy on private garages. A section of gas pipe, braced with strong wire, was used to support the pulley and the unlocking cord.—R. S. Matzen, Fort Collins, Colo.

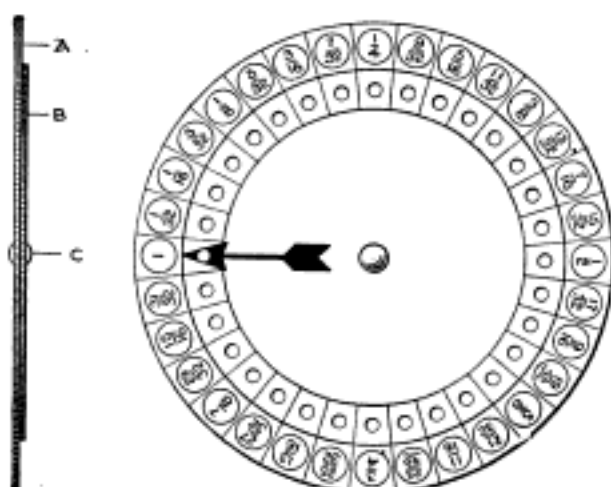
Hammering Tightens Worn Brass Thumb Nuts

When brass thumb nuts used on drawing instruments, and for similar purposes, become worn, they may be tightened by hammering them slightly to make the threaded hole smaller. Place the nut on a metal plate and strike it a level blow with a hammer. Try the nut in its original position, and repeat the hammering until a tight fit results.—E. C. Griess, Grand Forks, N. D.

Shop Device for Addition of Fractions

Draftsmen, machinists, and many other mechanics, will find the home-made instrument shown in the sketch almost indispensable after giving it a trial. A disk, A, of heavy white cardboard or opaque celluloid, is graduated as indicated. A smaller transparent disk of celluloid, with small holes drilled in it to correspond to the graduations on the disk A, is riveted to the latter, at C, permitting the disks to turn. The arrow is scribed on disk B.

To add two fractions, such as $\frac{5}{16}$ and $\frac{7}{32}$, set B so that the arrow is at 1, place a pointed, pencil-like stick in the hole in the arrowhead and turn this disk until the arrow is at the fraction $\frac{5}{16}$; then place the stick in the hole now opposite 1, and turn B until the stick is at $\frac{7}{32}$. The arrow will then be at $\frac{17}{32}$, which is the sum of the two fractions. This process may be carried on indefinitely, and each time the arrow passes the unit graduation, 1 is added to the sum. To subtract two fractions the operation is reversed. The arrow is placed at the larger fraction; the stick is placed in the hole opposite the smaller one, and disk B is turned back to 1. The arrow will then be found to point to the difference of the two. Disk A may be graduated to suit the uses



Much Time is Saved and Errors Minimized by the Use of This Handy Adding and Subtracting Device

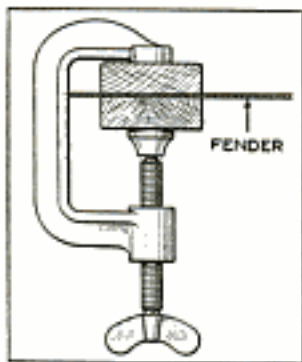
for which it is intended, and decimal equivalents to the fractions placed underneath them.—James F. Boyd, Detroit, Mich.

Rapid and Accurate Repair of Broken Tapeline

When the only available steel tapeline on a job broke it was necessary to make a repair immediately. A piece, about 1 in. long, was broken out and it was replaced and a good joint made as follows: A piece of steel was cut from an old stovepipe, to the same width as the tape and 3 in. long. It was marked carefully to correspond to the broken part, and riveted into place with ordinary carpet tacks, cut down to the proper length.—P. A. Midland, New York, N. Y.

Removing Dents from Auto Fenders or Sheet Metal

A simple and effective means of removing dents from automobile fenders



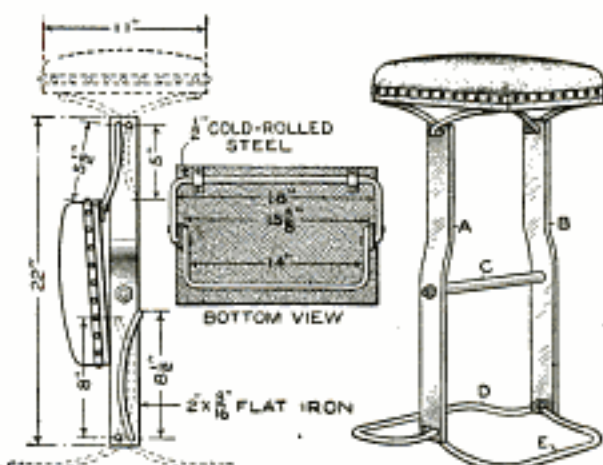
or sheet metal is to clamp the damaged part between two wooden blocks, as shown in the illustration. An iron cabinetmaker's clamp is best suited for this purpose, but various other

means of applying pressure may be used. Where the damage is considerable, this method will, of course, restore the surfaces only partly.—Arthur E. Miller, Evansville, Ind.

Cushion-Seat Folding Stool of Metal

This compactly folding stool was made of high-grade materials shaped by the use of a forge. If softer metal is used the parts may be bent cold. Strap iron, $\frac{3}{16}$ in. thick, was used for the pieces A and B. The brace C is a bolt. The pieces D and E are made to snap together, the shoulders on the ends of each checking the motion of the other. The upper supports are made similarly of $\frac{5}{16}$ -in. cold-rolled steel. The rigidity of the stool depends on the care with which these

parts are made and fitted. The padded top is built up around a wooden frame, one of the upper supports being hinged to it, as shown in the bottom view.

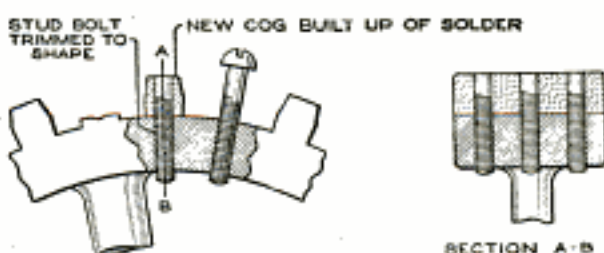


The Upper and Lower Supports Brace Each Other, and the Stool can be Folded Compactly

The method of folding the stool is indicated at the left.—Hubert Kann, Pittsburgh, Pa.

Repairing Broken Teeth in Fiber or Paper Gears

A repair of broken teeth in gear wheels made from fiber or compressed paper, by replacing the broken teeth with lead reinforced by screws, proved satisfactory. The broken tooth stub was dressed down with a file, and holes for machine screws were drilled as indicated in the sectional views. The bolts were given a brushing with soldering acid, and the tooth was built up on them, with solder and a soldering copper. After roughing in the tooth, it was finished with a file. The heads of

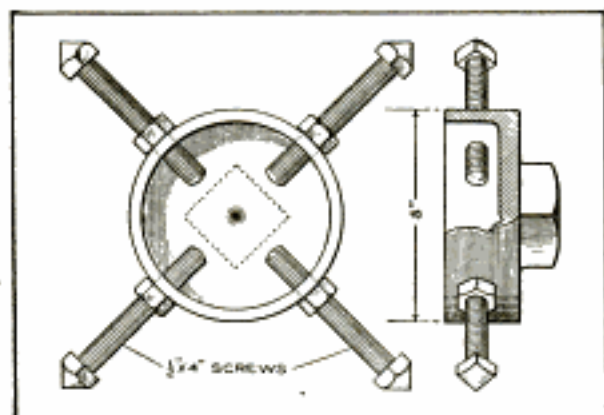


The Broken Teeth were Replaced by Building Up New Ones of Solder around Machine Screws

the bolts were cut off flush with the curved surface of the gear. Such a repair, properly made, will last practically as long as the other teeth.—Logan E. Anderson, Cove, Ore.

Spider for Cutting Large Pipe in Lathe

A machinist in our shop, having to turn out a lot of 8-in. pipe for coup-

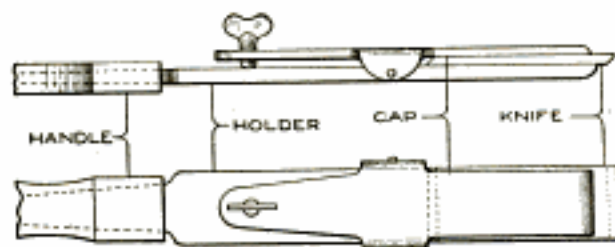


The Work was Turned Out in Record Time with This Tool

lings, had no tool large enough to center the pipe in the lathe. He obtained a 5-in. plug and drilled four holes in it, and tapped them out for $\frac{1}{2}$ -in. screws, as shown. Taking four $\frac{1}{2}$ by 4-in. machine screws, he ground the heads to a point, leaving just enough to put a wrench on. He fitted four locknuts to the screws, and put them in place. The tool is inserted into the end of the pipe, adjusted, and centered, and the locknuts tightened up. The other end of the pipe fits into the chuck of the lathe.—Charles K. McCluskey, Wheeling, W. Va.

Holder for Wood-Turning Tools

Instead of having handles for each wood-turning tool, a mechanic made a



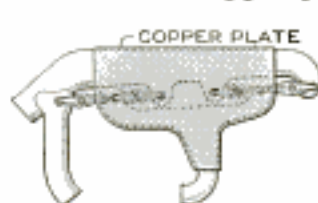
This Holder Provides for a Number of Knives or Bits for Wood Turning, with a Single Handle

simple holder which makes it necessary to have only a single handle and a number of bits, which are inserted as required. The bits, or knives, are thin, making it easier to grind them to

various shapes. The detailed construction of the holder is shown in the sketch. A sheet-metal clamp is pivoted over the main support of the holder and clamps the knife by means of the thumbscrew.—M. E. Duggan, Kenosha, Wisconsin.

Copper Covering Transmits Heat to Auto Intake Manifold

A practical means of heating the intake manifold of an automobile from the hot exhaust manifold, to increase the efficiency, is to cover the entire intake manifold, and part of the exhaust manifold, with No. 20 gauge copper, bending well around each, and making it meet in the rear of the intake manifold. This copper plate is held in place



by boring holes through it to correspond to the bolts on the engine block, slipping it over these bolts, and then setting the pipe clamps in place, tightening them with the nuts, as usual. The copper plate conducts the heat from the hot exhaust manifold to the intake manifold. After running the engine 10 minutes, the intake manifold becomes so hot that the hand cannot be held safely on it, thus preheating the gas, and making it more combustible.—Charles A. Pettit, Rossville, Md.

Ropes Fed through Floor from Basement Stock Room

Coils of different-sized rope lying around the main floor of a hardware store look untidy, to say nothing of the valuable floor space they occupy and the dust they collect. A good way to do away with this nuisance is to place the coils in the basement on a shelf, bore holes in the floor for the different sizes, and pull the rope through, as required. A single loose knot will prevent the rope from sliding back. A measuring scale is laid out from the hole, the rope being pulled out and measured off in one operation.

Filing Cork in a Lathe

Cork cannot be turned in a lathe in the usual manner, but can be cut down quickly by filing it, much as metal spindles are finished in a speed lathe. A coarse file, preferably of the type used for filing wood, is used for the roughing out. Special care must be taken that the file is applied only on the forward or cutting stroke. If the cork is of a fairly solid texture, it can be worked quite smoothly. To finish the surface, apply a fine file, gradually applying greater pressure. To give the cork a polished surface, burnish it with a smooth piece of steel.

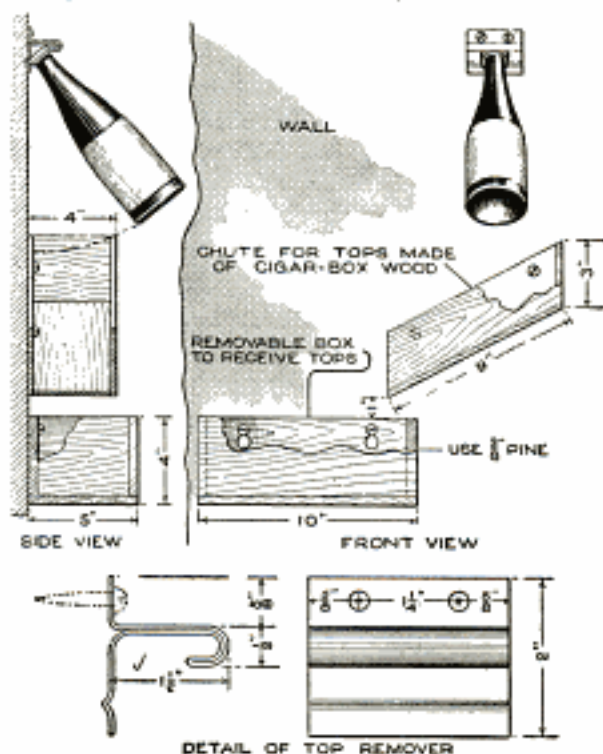
Beveled Piston Ring Overcomes Excess Oil in Cylinders

Many automobile and similar motors have a tendency to pump oil into the compression chamber, which causes rapid accumulation of carbon. I have found the first cylinder usually the worst. After some experimenting I filed off the lower, outer corner of the piston ring at the bottom of the piston, beveling it slightly. The ring was replaced in its normal position, and reduced the pumping of oil. The opening around the corner of the ring prevents the oil from being sucked up into the cylinder. When a piston fitted quite loosely, an oversized piston was substituted with very good results, the lower ring being beveled as described.—J. W. Reynolds, Mason, Ill.

Remover and Wall Receptacle for Bottle Caps

In a store, or other place, where drinks or bottled goods are sold in bottles having metal caps, a convenient way to remove the caps and prevent them from falling on the floor is to install an arrangement like that detailed in the sketch. The caps are removed quickly by means of the small device fastened to the wall, and dropped into a chute and a box made of cigar-box or other thin wood. The box is suspended on screws and can be quickly

removed and emptied. The cap remover, as detailed, is made of a strip of galvanized sheet iron, bent over a

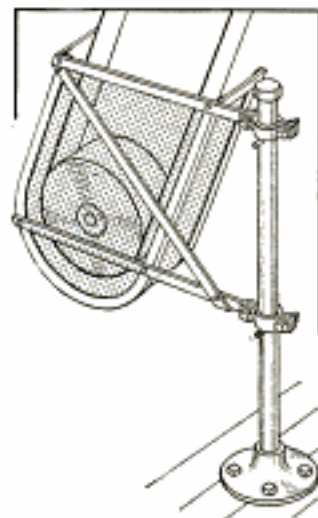


The Bottle Caps are Quickly Removed and Dropped into the Receptacle, Avoiding the Danger of the Slippery Caps on the Floor

$\frac{1}{2}$ -in. pipe held in a vise. It is fastened with screws.—P. P. Avery, Garfield, New Jersey.

Belt Guard Pivoted for Easy Removal

A belt guard on some machines, while desirable for safety, is considered a necessary evil, especially when it interferes with making quick adjustments of parts of the machine, which it makes inaccessible. A swinging guard that can be moved out of the way in an instant is shown in the sketch. It is supported by a pipe column, which may extend from the floor to the ceiling, if desired.—J. J. O'Brien, Buffalo, N. Y.



Suggestions on the Care of Automobiles and Motorboats

By HAYES BIGELOW

INEXPERIENCED automobile and motorboat owners may find the following suggestions helpful: Almost all nuts, bolts, and screws have right-hand threads. They tighten as the hands of a watch turn, and loosen in the reverse direction. If a nut or bolt fails to turn on applying moderate pressure, remove the wrench, and tap the part firmly, several times, with a hammer. By using wrench and hammer alternately, almost any "frozen" nut or bolt may be started. With slotted screws, tap on the head of the screwdriver with a block. When the screwdriver shaft is square a wrench or pliers may be used.

The application of oil, or, in some cases, heating the surrounding metal, facilitates the work. Be sure the wrench fits snugly, and does not cause burrs. Left-hand threaded nuts are usually placed on axles, or other bearings, where the motion might tend to remove a right-hand threaded nut. Propeller-shaft stuffing boxes in boats may have left-hand threads. A left-hand thread loosens as a right-hand thread tightens, and vice versa.

Graphite, No. 1 or finer, is often useful. Mixed with oil or grease and applied to threads, it prevents sticking, and is particularly useful in making up pipe joints and union nuts which will be subjected to heat. Candle wicking, rubbed full of grease and graphite, makes a good packing for propeller-shaft stuffing boxes, setting up little friction—a good point to remember when dealing with a hard-starting, two-cycle engine not equipped with a clutch. Plain graphite, thoroughly rubbed over wheel rims, tends to prevent rusting.

Shellac is not dissolved by gasoline. Always use shellac on the threads of gasoline connections. Gasoline-supply tubing sometimes develops leaks suddenly; a cloth soaked in shellac provides a temporary repair when wrapped around the leaky pipe. Tire tape will

not hold gasoline long unless shellacked. Soap is a fair substitute when shellac is not at hand. Gasoline cuts the oil in white and red lead, and many kinds of varnish.

Storage batteries need distilled water frequently, and lack of water ruins them. Some cells lose water more rapidly than others in the same battery. Sulphuric acid weakens slowly, and should never be introduced into the cells except by an expert. Acid fumes rise from the cells, and if given a chance to work on battery connections, will cause corrosion, which may put a self-starter, operated from the battery, out of commission. All connections should be bright, and assembled with vaseline, which is impervious to acid fumes. Corroded bolts and lead-cased nuts can be cleaned by boiling them in a solution of cooking soda and water. Such connections, if corroded, are likely to stick very tight, and can best be loosened by applying a pair of hot tongs to the nut before attempting to twist it.

If the self-starter operates sluggishly, run it 30 seconds and then feel its battery and line connections. If a connection is warm, its contact is either loose or corroded, and the full current is not able to pass through it. Generator armatures should be clean and not sticky, and the brushes free and smooth.

Blue smoke pouring from the exhaust indicates too much cylinder oil, and this condition produces carbon trouble. Only a stiff, new engine justifies the use of much oil, and even then the smoke should be a trail rather than a cloud. Black smoke indicates too much gasoline in the carburetor mixture, and will result in sooted and irregular sparking plugs. If the engine chokes and emits black smoke when suddenly given more throttle, the carburetor is usually at fault, and it is best to consult an expert carburetor adjuster.

When descending steep hills, shift into middle or low speed, cut out the spark, and let the car operate the engine, as much brake wear is thus avoided. With practice it is possible to see reasonably well around a corner. Show windows frequently afford reflections of the side street.

On motorboats, carry adequate life-saving apparatus at all times when the craft is in commission. Even though willing to assume a dangerous risk, it is well to remember the government requirements, and that inspectors are paid to guard boat owners from their own recklessness in disregarding dangers.

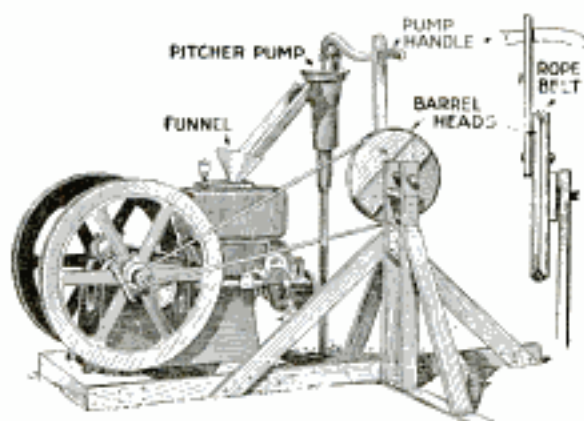
Have at hand in the automobile, or motorboat, the following items of equipment: Shellac, tire tape, graphite, rubber and asbestos packing, cotton wicking, waste, overalls, hand soap, towel, dry-battery tester, extra spark plugs, matches, and a trouble lamp. Lastly, know the rights on the water or the road, use caution, and have consideration for the "other fellow." Happily, friendliness and rendering of assistance are quite common among drivers of gasoline motors on the road as well as on water.

Temporary Pump for Cooling a Gas-Engine Water Jacket

A pumping engine for flooding a cranberry bog at a critical time was put out of commission by the breaking down of the circulating pump supplying the water jacket. The owner devised a substitute as follows: Two barrel heads were nailed together so the beveled edges formed a grooved pulley wheel, as shown. The pulley was then mounted on a pipe shaft in a wooden framework, and lined up with one end of the engine flywheel shaft. The belt was a piece of spliced rope.

A pitcher pump outside the engine house was driven down, as indicated, opposite the wooden pulley, and a wooden arm was bolted to the pulley. The upper end of the arm was slotted to fit the pump handle, this arrangement giving a 2-in. stroke to the pump.

The old circulation pump was disconnected, and the water pumped was

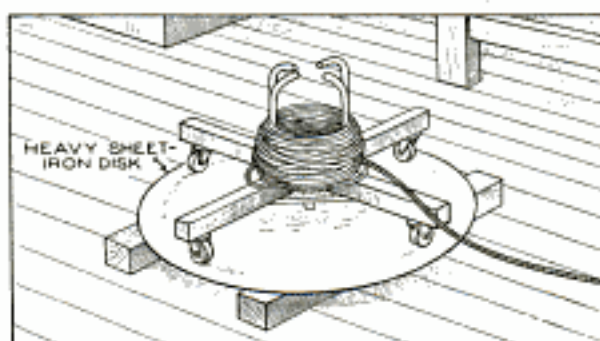


This Emergency Water Supply for a Gas-Engine Water Jacket Proved Serviceable for Several Months

conducted to the engine by means of a trough.—L. B. Robbins, Harwich, Massachusetts.

Roller-Bearing Reel for Electrical or Other Wire

To replace cumbersome horizontal-drum wire reels on his various jobs, an electrical contractor designed the reel shown. It feeds out the wire in various directions without jamming. The framework is a wooden cross, and rods serve as a drum for the wire coil. Casters are provided to operate on a disk of heavy sheet iron, bolted to a wooden foundation. The reel is held



The Wire may be Drawn from the Reel Easily in Various Directions

in position by a long bolt, and is free to turn. The coil is placed in position quickly, and the device is readily portable.

A pocket in the front cover of a schoolbook is convenient for carrying notes and papers.

Artist's Cabinet Made from Old Sideboard

The great miscellany of material, tools, paper, sketches, etc., with which



Instead of Using Various Makeshifts, an Artist Rebuilt This Cupboard to Suit His Special Needs

an artist works were cared for economically by providing a cabinet for them, which was adapted from an old sideboard, or china cabinet. Adjustable shelves were fitted into the upper cupboard for books, tools, etc. Three shallow drawers were built into the center section, which was an open shelf. At the right of this shelf a roll of paper was mounted in a holder. The lower section was provided with a hinged door to which the cupboards for mats, paper, etc., were fixed.—John T. Bowe, Chicago, Ill.

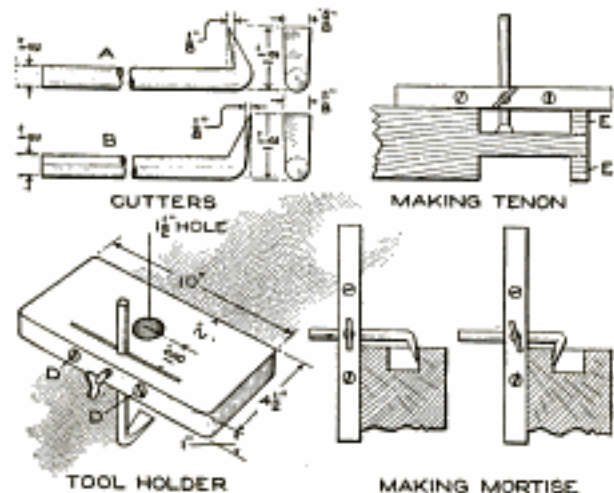
Hand Tool for Making Mortise-and-Tenon Joints

One of the chief causes of failure in home woodworking by intelligent, though inexperienced, persons is lack of knowledge in the proper use of chisels in making joints, particularly the common mortise-and-tenon variety. This joint must be exact in its con-

struction or it is almost worthless. Having to build with the aid of inexperienced helpers, several pieces of furniture in which were many mortise-and-tenon joints, to be made by hand, I made a device that did the work rapidly and accurately.

First, I had made two tools, A and B, of $\frac{1}{2}$ -in. tool steel, grinding them carefully. Tool holders of maple, as detailed, were made, the screws D preventing splitting, when the wing screw, which holds the cutter, is tightened. The $1\frac{1}{2}$ -in. hole is an outlet for chips. The various steps in making a mortise and tenon with this router are: First, saw and chisel for the tenons, as detailed, leaving strips E as bearings for the router and removing them later. Trim both sides of the tenon at one setting of the tool.

To make the mortise, use the tools as shown: The two tools make it possible to cut both sides of the mortise from the same side of the piece. Make all of the similar cuts with one setting of each of the tools, using a chisel for



By the Use of This Homemade Router Mortises and Tenons were Cut Quickly and Accurately by Inexperienced Workers

preliminary work, as usual, to within a scant $\frac{1}{16}$ in. of the lines.—D. D. Gurnee, Hempstead, N. Y.

Indicators having a metal point require a specially coated paper of good quality. Apply a thin coating of this mixture, by weight: 1 part zinc oxide, 4 parts water, $\frac{1}{10}$ part gum arabic. Permit it to dry thoroughly.



An Eight-Pointed Star Kite

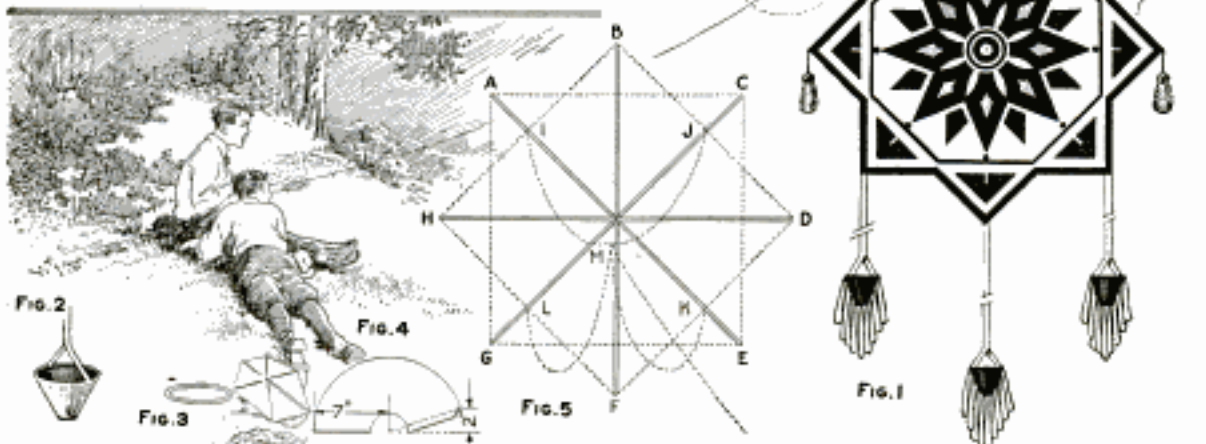
By CHARLES M. MILLER

NEARLY every boy can make kites of the several common varieties without special directions. For the boy who wants a kite that is not like those every other boy makes, an eight-pointed star kite, decorated in an original and interesting manner, in various colors, is well worth while, even if it requires more careful work, and extra time. The star kite shown in Fig. 1 is simple in construction, and if carefully made, will fly to a great height. It is balanced by streamers instead of the common type of kite tail. Any regular-shaped kite should be laid out accurately, as otherwise the error appears very prominent, and unbalances the poise of the kite.

The frame for this star kite is made of four sticks, joined, as indicated in Fig. 5, with strings running from one corner to the second corner beyond, as from A to C, from C to E, etc. A little notching of each pair of sticks lessens the thickness of the sticks at the center crossing, and strengthens the frame. The sticks are $\frac{1}{4}$ by $\frac{1}{2}$ in. by 4 ft. long. They are set at right angles to each other in pairs, and lashed together with

cord, and also held by a $\frac{3}{4}$ -in. brad at the center. The strings that form the sides of the squares, A to G, and B to H, must be equal in length when tied. The points where the strings forming the squares cross each other and the sticks are also tied.

The first cover, which is put on with paste, laying it out on a smooth floor or table as usual in kite making, is plain light-colored paper. The darker decorations are pasted onto this. The outside edges of the cover are turned over the string outline, and pasted down. The colors may be in many combinations, as red and white, purple and gold, green and white, etc. Brilliant and contrasting colors are best. The decoration may proceed from the center out,



The Boy Who Makes a Star Kite of This Type will Have a Construction Different from the Common Run of Kites, Especially If He Decorates It in an Attractive Manner

or the reverse. The outside edge in the design shown has a $1\frac{1}{2}$ -in. black stripe. The figures are black. The next octagonal black line binds the design together. The points of the star are dark blue, with a gilt stripe on each. The center design is done in black, dark blue, and gilt.

The flags are tied on, and the tassels are easily made of cord. The outside streamers are at least 6 ft. long, and balanced carefully. Ribbons, or dark-colored lining cambric, are used for them. The funnel-shaped ends balance the kite. They are shown in detail in Figs. 2, 3, and 4, and have 1-in. open-

ings at the bottom, through which the air passes, causing a pull that steadies the kite. They are of dark blue, and the cloth fringe is of light blue. A thin reed, or fine wire, is used for the hoop which stiffens the top. Heavy wrapping or cover paper is used to cover the hoops. It is cut as shown in Fig. 4 and rolled into shape.

A four-string bridle is fastened to the frame at I, J, K, and L, as shown. The upper strings are each 18 in., and the lower ones 32 in. long, to the point where they come together, and must be adjusted after the kite line is fastened at M.

Second Handle on Hoe or Rake Saves Stooping

Anyone who has used a hoe or rake for days at a time will appreciate the labor saved by the attachment for the



Much of the Tiring Labor in Using a Hoe or Rake is Overcome by This Simple Homemade Attachment

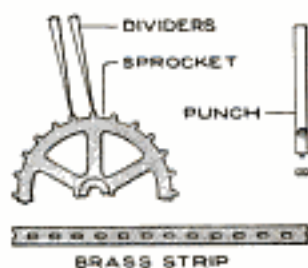
handle shown in the illustration. It is adjustable to various-sized persons by means of the holes at the front end of the horizontal piece. The two parts are each made of strips joined at the middle portions, and arranged to clamp on the handle of the hoe or rake. In hoeing around shrubs and large plants, the handle may be set to one side.—A. S. Thomas, Amherstburg, Ont., Canada.

Photo-Copying Lens Increases Angle of Camera

Trying to take some indoor pictures, I found the angle of my ordinary lens was insufficient to "get in" the various objects I desired. Not having a wide-angle lens, I decreased the focal length of the lens by using a copying attachment. The results were quite pleasing, and while there is some distortion and less of the plate is covered than usual, there is a remarkable increase in the angle of view. To obtain definition, it is necessary to stop the lens down, but the pictures are very clear.—Samuel L. Pickett, Denver, Colo.

Belt for Sprocket Drive Made of Brass Strips

Being unable to purchase a small driving chain for sprockets made by cutting out every other tooth in gears taken from a clock-work, I used a brass strip, properly punched, and found it satisfactory. The

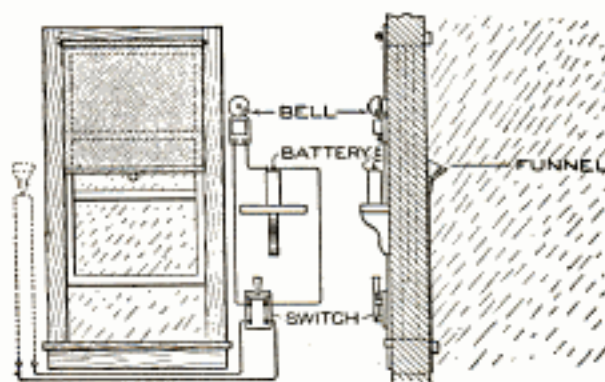


strip was .005 in. thick and the points where the holes were to be punched out were indicated by dividers set from the gears. I made a punch from a nail, leaving a small center on it as shown,

and grinding the end to an oblong shape. I used a piece of sheet lead as a die, on which to punch the strips. The marks made by the dividers provided spots on which to set the center of the punch, making the result quite accurate.—Edward M. Davis, Philadelphia, Pa.

Rain Alarm with Drop-of-Water Contact

An annunciating device, which awakens a person sleeping in a room with the window open and warns him that it is raining, so that he may close the window, is an interesting bit of electrical construction. On the outside of the house, as detailed, is a funnel fixed to the wall. At its small end, two separate wires have their terminals. The wires enter the room at the frame of the window, and connect to an electric bell, and a dry cell. A drop of water entering the funnel, flows down to the small end, falling on the terminals of the wires, and acting as a conductor, completes the circuit, ringing the bell. A



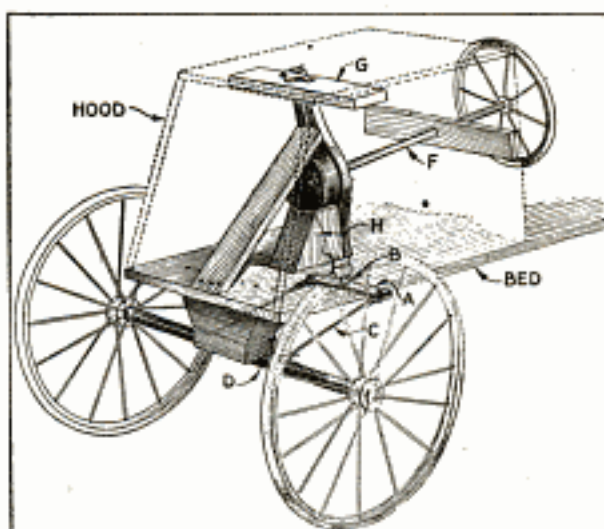
INSIDE VIEW OUTSIDE
A Drop of Rain Water Completes the Bell Circuit,
Thus Giving Warning of the Rain

switch inside cuts out the circuit, stopping the bell's ringing.—John M. Chabot, Lauzon, Quebec, Can.

Coaster Steering Gear Made from Cream-Freezer Drive

In rebuilding a wagon into an automobile coaster, I used the driving rod and gears from an old ice-cream freezer, and found that it worked so well that perhaps other boys might be interested

in the job. The front of the coaster was covered with a hood, and the steering wheel was set back of it, as shown. The center rod of the freezer was used



A Steering Rig That Works Almost Like That on an Automobile was Made Out of the Driving Parts of an Old Ice-Cream Freezer

for the steering post F, and an old rubber-tired wheel was made into a steering wheel. The casting from the top of the freezer, with the gears in it, and the rod on which the turning crank was fastened were set on a block, H, and braced, as shown. The shaft where the crank was fastened, at B, was set through the wagon bed. A crosspiece of iron, A, was wired to the axle D with wires C. A heavy block was used for a turntable. The top end of the casting was fastened to the hood with a brace, G, and the block H steadies the rigging also.—L. Chester Bryant, El Dorado, Ark.

Pad for Glass Vessels Made of Corks

In the kitchen, shop, laboratory, and other places where glass or other fragile dishes or vessels are used, a convenient pad on which to rest them can be made by stringing corks on a strong cord or wire in the form of a ring. Several rings of corks may be used to make a mat, or rings slightly larger in diameter than the bottle or vessel may be made for certain sizes of containers. If desired, the corks may be cut to fit closely on the radial joints, making the resulting ring more secure.

A Shaving Lamp and Mirror for the Camp

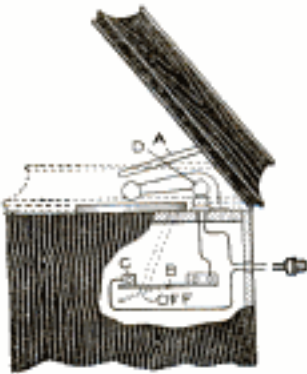
To make shaving possible in camp at night, or with little daylight, a small mirror was provided with an electric flash light. The mirror was set to swing free, in a wooden support. The light was fastened slightly above and behind the mirror, and swings at its base, so that it can be tipped upward or downward, throwing the light correspondingly. A piece of wood,



1¼ by 3½ in., and as long as the mirror frame is wide, serves as a base. The arms will hold the mirror far enough in front of the lamp to allow room in which to swing. The body of the lamp is set on a block, and held between two wooden pieces, into which a band of iron was set near the top. The uprights move in an arc, pivoting at their lower fastening, on screws.—C. L. Meller, Fargo, N. D.

Automatic Electric Light on Talking-Machine Cabinet

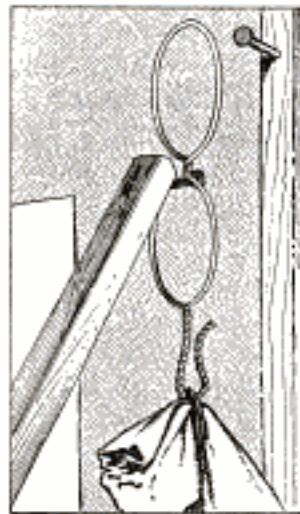
In many homes the phonograph is placed where little light is available in changing the records, setting the needle, etc. An electric light which is lighted only while the cover of the phonograph is raised, is well worth installing. A metal arm, A, supports the open cover of the cabinet. When the cover is closed, this arm passes through a slot and takes the position shown by the dotted line. A



strip of spring brass, B, is fastened to the inside wall of the cabinet, in the path of the arm, so that it will be pushed down to the off position, as indicated. When the arm releases the strip B, the latter presses against the contact C. A small electric lamp, D, is set in the corner, and electrical connection made to it through B and C, the plug connections passing through the back of the cabinet. When the cover is down, the electric circuit is open, and the moment it is raised, connection is made at C, and the lamp lights. The backs of most phonograph cabinets may be removed easily to make these changes.—M. C. Ball, Kansas City, Mo.

Device for Suspending Parcels from Overhead Hooks

To hang small sacks or other articles out of reach overhead, so that they may be easily taken down, I use a double-eye hook which I made of wire. A single piece of wire is used, and twisted into two loops, as shown, and then formed into a twisted hook.



I use a pole with a nail, hooking it into the lower loop, to raise the parcel; this leaves the upper loop free to be hooked on the nail above.—E. B. Warren, Garnet, Mont.

Steel Wool as Aluminum-Ware Cleaner

It takes little trouble to keep aluminum pots and pans shining if they are cleaned frequently with steel wool, water, and a nonalkaline soap. Use a very fine grade of the wool, and give the utensils a few rubs frequently, rather than attempt to clean them only occasionally, when much soiled.—L. P. Langan, Denver, Colo.

A Swimming Machine

Made in the Home Workshop



By T. S. CHESNUTT

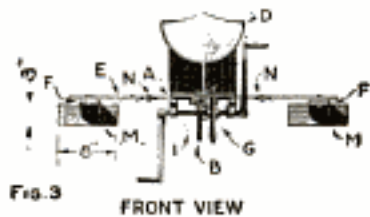
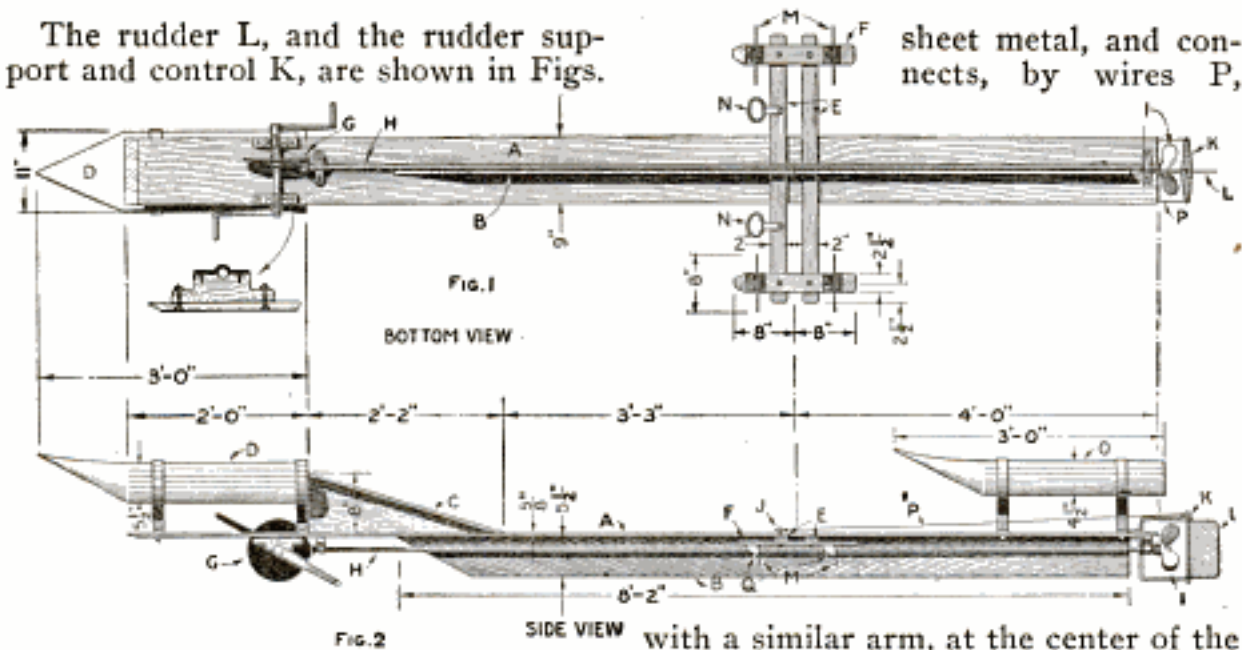
PROPELLED by the hand-power driving mechanism and the folding flippers driven by the feet of the rider, this novel swimming machine attains a speed of from 5 to 12 miles an hour. The operator lies prone on the main board A, with the chest on the slanting rest C, Fig. 2, near the front, and the feet in the loops N. The cranks are turned with the arms, and the feet are drawn forward and back, moving the crossbars E to which the flippers M are attached. The cranks drive the propeller I, by means of the gears G and the shaft H. The flippers are hinged to the pieces F, and fold up on each forward stroke, reducing the resistance greatly. The feet are drawn forward alternately, causing the crossbars to pivot on their center bolts, yet maintaining their parallel relation. Thus, while the flippers on the right side are in action, those on the other side are being drawn forward, folded up by the action of the water. The galvanized iron tanks D and O float the operator, and make it impossible to sink the machine unless the tanks are punctured. The body of the operator is completely submerged, as shown in the headpiece illustration. When he becomes tired, it is only necessary to retain a good hold, and lie on the board A. The machine is steered by means of the rudder, controlled by the feet, at the crossarm J, Fig. 2, similar to that at K, Fig. 1, and detailed in Fig. 4. The construction is simple, and the parts may be easily obtained or made.

The construction is begun by making the wooden parts. Make the main

piece A $\frac{5}{8}$ by 9 in. by 11 ft. 5 in. long, with the lower edge of the bow beveled slightly; the keel B, $\frac{5}{8}$ by $5\frac{1}{2}$ in. by 8 ft. 2 in. long. The piece C is made to fit the incline, which is 8 in. high and 2 ft. 2 in. long, on the base, and supported by a wooden bracket. The tanks, as shown in Figs. 1 and 2, are of two sizes, the front one being deeper and wider than the rear one. They are made of galvanized iron, soldered water-tight, and supported on brackets of $1\frac{1}{2}$ -in. strap iron. The wooden main portions are fastened together with brass screws, countersunk carefully. Note that the keel is not on center, but that it is set slightly to one side, as detailed in Fig. 6.

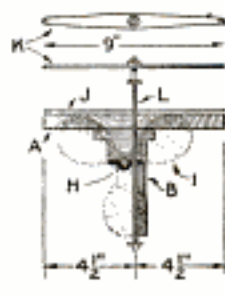
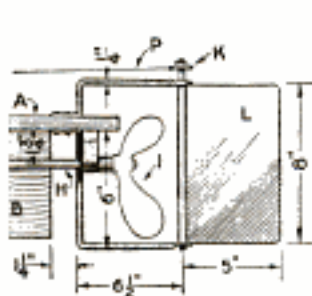
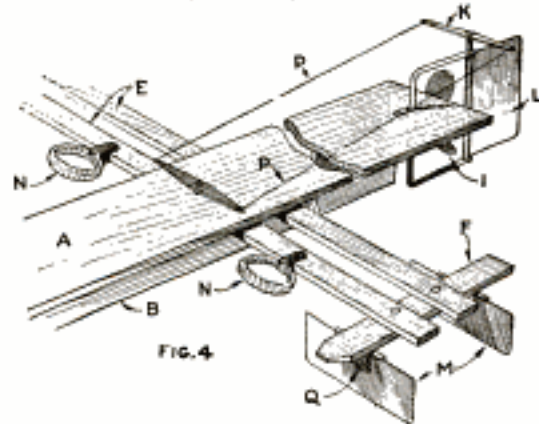
The driving mechanism of the propeller is shown in bottom and side views in Figs. 1 and 2. The bevel gears G are 5-to-1 ratio, the larger one being about 8 in. in diameter. They may be varied in size, according to the gears available, which may be obtained from machine shops, or from old machinery. The propeller shaft is a $\frac{3}{8}$ -in. steel rod, and is supported by wooden hangers with strap-metal bearing caps, fastened with bolts, or screws, as detailed in Fig. 1. They are made to suit the shaft, the center of which is $1\frac{3}{4}$ in. below the under side of the board A. The shaft may be supported along the keel by metal straps, if desired. The propeller, shown in detail in Figs. 5 and 6, is of bronze, 7 in. in diameter, and may be one of several standard patterns. It may also be made of sheet metal, the blades set into a metal collar.

The rudder L, and the rudder support and control K, are shown in Figs.



Assembly Views Showing the Main Details of Construction and the Arrangement of the Parts

4, 5, and 6, in detail. The rudder is of sheet metal, fixed to an iron rod, or post, at the top of which the rudder control K is fixed. The arm K is of



The Perspective Sketch, Fig. 4, Shows Clearly the Arrangement of the Parts of the Flipper and Crossbar Mechanism as Well as the Stern and Its Fittings, Which are Detailed in Figs. 5 and 6

sheet metal, and connects, by wires P,

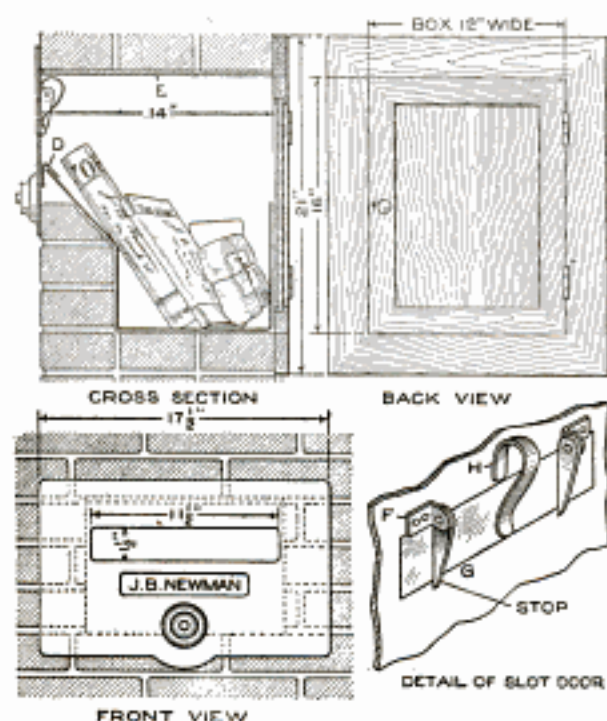
with a similar arm, at the center of the forward flipper crossbar E. The rudder support is made of $\frac{1}{4}$ -in. round iron, flattened at the ends for fastening with bolts.

The flipper mechanism is shown in Figs. 1 and 2, and in detail in Fig. 7. The loops N, for the feet, are made of strap iron, $\frac{1}{16}$ by 1 in., wrapped with cord. The loop ring is pivoted to the crossbar E by means of a U-shaped strap of iron, bolted into place, and riveted to the ring. The crossbars and the other wood parts are of ash. The bars are $\frac{3}{8}$ by $2\frac{1}{2}$ in., by 3 ft. 6 in. long. The pieces F are $\frac{5}{8}$ by $2\frac{1}{2}$ by 16 in., and centered 3 in. from the ends of the crossbars E. The flippers are 3 by 8 in., of No. 22 gauge sheet iron. They are hinged to a piece of sheet metal by means of a roll made over a $\frac{3}{16}$ -in. rod. The portion forming the upper half of the hinge fits between the two end rolls of the hinge, and its side edges are shaped in a quarter circle, and bent down as stops for the flippers on the back stroke, as indicated at Q, Fig. 7.

The upper edge of the keel is notched to receive the crossbars, sufficient play being allowed to give a satisfactory forward and backward limit for the stroke. Bolts are used for the fastenings wherever possible, especially at the pivotal points. The nuts should be set to prevent them from coming off easily, by riveting over the ends of the

A Homemade Residence Mail Box

Mail boxes installed in residences are often not of sufficient size to accommodate packages and magazines, and to meet this need, this mail box was



This Substantial Mail Box Is Large Enough to Care for Magazines and Small Parcels as Well as Letters

designed. The contents are removed by unlocking a small door on the inside of the house, or on the opposite side of the wall in which the box is set. The views of the box show its construction, the dimensions being suggestive only, since they vary with local conditions. The cross section shows the method of setting the box in a brick wall. The front view shows the bell, the metal name plate, and the deposit slot, provided with a spring-hinged door. The wooden casing and the inside door are shown in the back view.

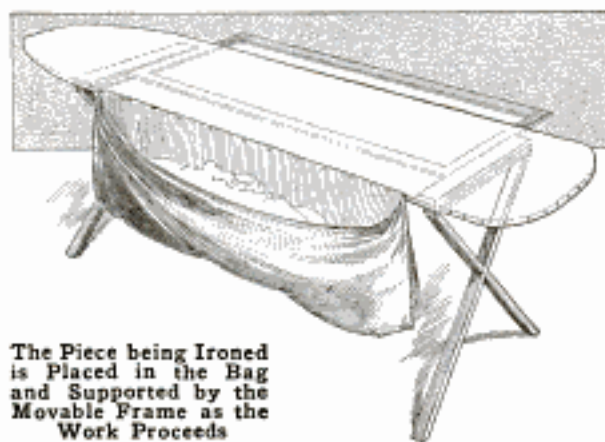
The box and opening in the metal plate on the front should be broad enough to accommodate the larger magazines, and the box should be deep enough so that the magazines may stand on end in it. A metal box of the proper size is placed inside of the opening, as shown in the sectional view. A small lip, D, is soldered on the front edge to prevent any mail from falling

down between the box and the wall. A $\frac{1}{4}$ -in. metal plate, E, supports the brick forming the wall above the opening.

A suggestion for a means of mounting the door to the slot in the front plate is shown in the detail sketch. The door is supported on angles, F, and pieces, G, forming hinges. A spring, H, keeps the door closed. The lower ends of the pieces G extend below the lower edge of the door, serving as a stop.—M. P. Norton, Chicago, Ill.

Extension on Ironing Board Supports Large Pieces

An attachment for the ironing board that prevents large pieces from falling to the floor and becoming soiled is a worth-while addition to the kitchen equipment. Strips of pine, $\frac{3}{8}$ by $1\frac{1}{2}$ in., were used for the frame, which is 18 in. wide, and of a length to suit the ironing board. It is attached to the under side of the ironing board by means of slides. Across the front edge of the frame, tack a shallow muslin bag to hold the unironed portion of the article on the board. By sliding the frame backward, the support holds the ironed part smooth, and away from the



The Piece being Ironed is Placed in the Bag and Supported by the Movable Frame as the Work Proceeds

floor. When not in use, turn the bag back against the board, and slide the frame into place.—J. E. McCoy, Philadelphia, Pa.

⌋ Instead of a soft rubber, use gasoline applied with a soft cloth, to clean dirt and pencil marks from tracing cloth.

Reinforcing the Ends of Rubber Handlebar Grips

The flexible rubber grips used on bicycles and motorcycles have good shock-absorbing qualities, but they have a tendency to break off at the end of the handlebar. They may be reinforced by a small stick projecting from the end of the handlebar tubing. One end of the stick is cut to fit tightly in the opening, and the other to fit the flexible end of the grip.—George M. Zimmerman, Fort Sumner, N. M.

Film Holder for Photographic Developing

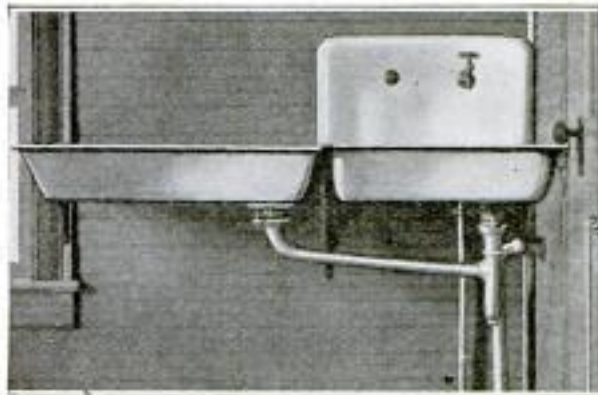
The amateur photographer who uses roll film and who does his developing by the tray method, will find this device a simple and reliable means for holding the film spool while removing the film, duplex paper, autographic carbon paper, gummed labels, etc. Once the spool is properly placed in the holder, there is little danger of its dropping. The holder takes various sizes of film spools. The side fingers are $\frac{3}{16}$ by $\frac{3}{4}$ by 23 in. long. A small peg is set in each finger, $1\frac{1}{8}$ in. from the end, to engage the spool. The upper ends of the fingers are nailed to a tapered block of wood, $\frac{7}{8}$ by $3\frac{1}{4}$ and $2\frac{1}{2}$ in. wide, and 8 in. long. The holder can be conveniently fastened to a wall, door casing, or to the under side of a shelf in the dark room.—John Hoeck, Alameda, Calif.



Old Sink Installed as Dish-Draining Basin

An added convenience for the housewife is the installation, in the place of the drain board customarily attached to the kitchen sink, of a second sink, with waste connections. Light wooden slats in the sink bottom give it all the utility of a drain board, without the danger of

dishes slipping off onto the floor. A sink, of the old-fashioned kind used,

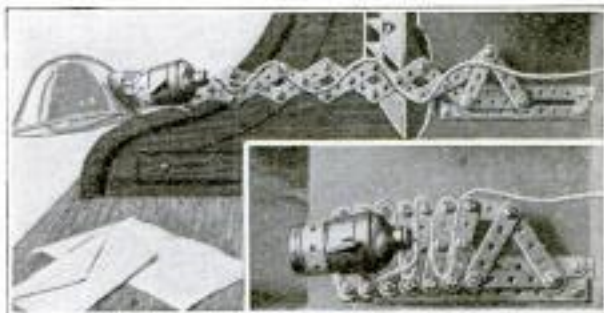


The Extra Sink Replaces the Drain Board and Does Its Work More Effectively

can be purchased about as cheaply as a good drain board.—E. C. Blomeyer, Waco, Tex.

Desk-Light Arm Folds into Pigeonhole

The extension arm for an electric lamp shown in the illustration was made of strips from steel building toys. I installed it in my writing desk, and fastened it with one screw to the back of the desk inside the pigeonhole. When collapsed the arm measures $7\frac{1}{2}$ in. from the fastened end to the front end of the socket, leaving only the globe protruding. Extended, it measures $16\frac{1}{2}$ in. The lamp cord is taken through a hole in the back of the desk. If a very rigid arm is wanted, the strips can be doubled. I used screws with two nuts, but rivets can be used also, leaving the joints to move freely. The

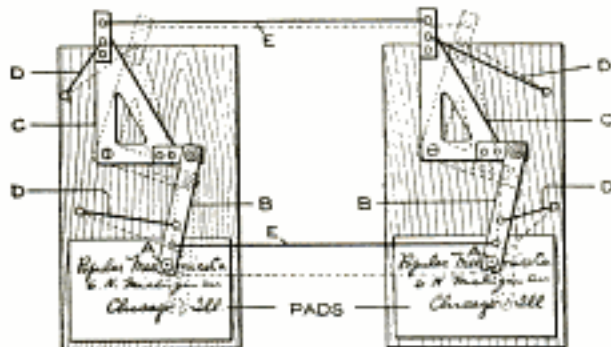


This Desk Lamp and Holder Folds Up into a Pigeonhole When Not in Use

sliding feature at the inner end adds about 2 in. to the length of the arm when extended.—A. J. Viken, Waterloo, Ia.

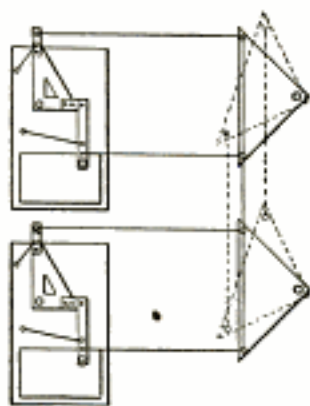
Simple Machine for Transmitting Writing

An interesting and novel construction for amateur or boy mechanics is a telautograph or writing telegraph



A Message Written on the Pad with a Pencil is Transmitted to the Other Pad at a Considerable Distance Away

machine. The instruments, as shown, are duplicates with the exception of the placing of the rubber bands. They can be made in different sizes, and satisfactory results were obtained by making the base 7 by 12 in., the arm B 5 in. long and $\frac{3}{4}$ in. wide, and the triangle C 6 in. by $3\frac{1}{2}$ in. A hole is bored in the arm B, slightly smaller than the pencil to be used and a slot sawed from the edge to hole, so that when the pencil is forced into the hole it will be tightly gripped, as at A. The arm B is fastened to triangle C, to move freely. The triangle is fastened to the base, and can also move freely.



The larger diagram shows the instruments placed in parallel position. The smaller diagram shows how they can be placed one above the other. An unruled pad is fastened to the base of each instrument with thumb tacks. The operation may be traced by noting the successive action of the parts when the

rubber bands D are stretched tightly to hold the moving parts in position. The strings E should be strong, and stretched taut.

The larger diagram shows the instruments placed in parallel position. The smaller diagram shows how they can be placed one above the other. An unruled pad is fastened to the base of each instrument with thumb tacks. The operation may be traced by noting the successive action of the parts when the

pencil on the pad at the left is moved in writing a message. The pivoted triangle communicates the action to the string E, which actuates the other triangle and its lever system. The rubber bands serve to steady the action. The instruments may be arranged a short distance apart for play or experimental purposes or set in rooms on different floors, by making suitable pulley connections for the cords E.—William Freebury, Buffalo, N. Y.

Diagonal Corners on Disk-Record Covers

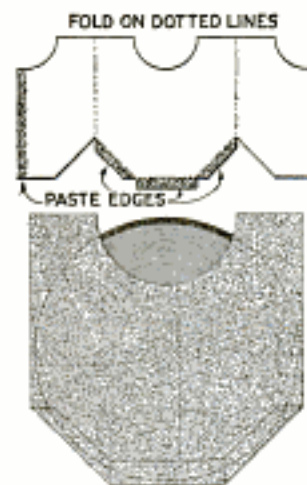
Having been bothered with the edges of square paper covers of disk records curling,

making it unhandy to place them in a file, I remodeled them as shown in the sketch. The covers without the lower corners were so convenient that I made others by folding and pasting paper of the shape shown in the pattern.

It was found desirable to use a good quality of paper for the new envelopes, as this gave added protection.—J. H. Moore, Hamilton, Ontario, Can.

Live Poultry Weighed Handily in Funnel Scale

A deep funnel, or cone, made of sheet metal and attached to an ordinary platform weighing scale or a draw scale, is useful especially in weighing live poultry. The fowl is placed in the funnel head first and remains quiet while being weighed, which is not the case in most common methods of weighing. The funnel is mounted on three legs, for use on a platform scale, and suspended from a ring by chains, from the hook of a drawspring scale.—C. W. Reemtsen, Des Moines, Ia.



Transferring Pictures to Glass

The surface of glass on which pictures are to be transferred must be thoroughly clean. A coat of nearly colorless varnish is applied, and permitted to dry overnight in a room free from dust. Wet the picture, soaking it in clear water for about 10 minutes. Place it on blotting paper with the front side down, leaving the back wet. Varnish the glass again, and place the picture face down on the varnished surface, pressing out the bubbles, working from the center out. Rub on the back of the transfer paper until the picture is transferred to the varnished surface, and remove the paper carefully. Permit the picture on the glass to dry, and then varnish it.

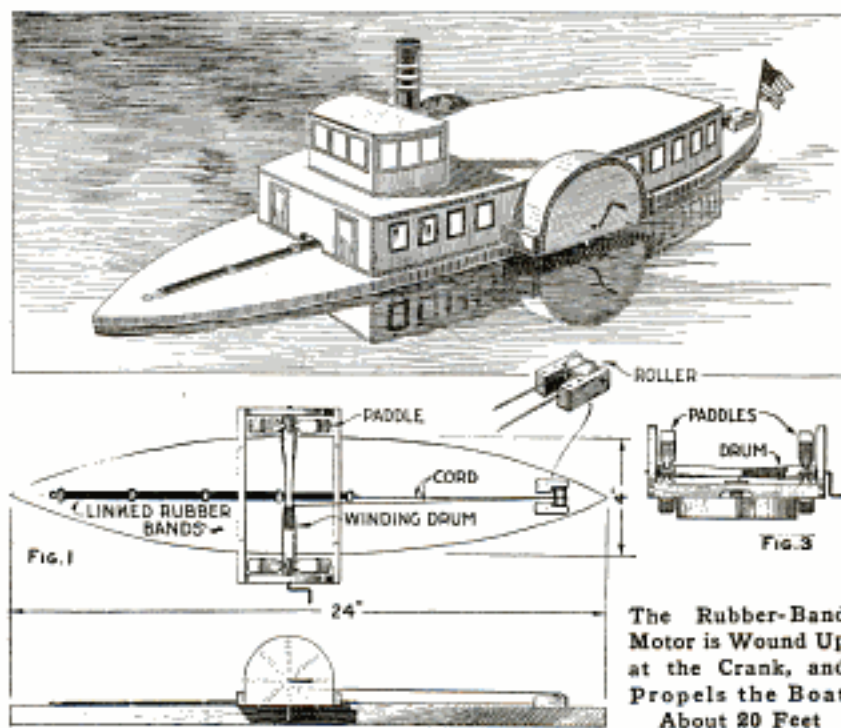
An Order-Memo Device for Delivery Routes

A milk driver who had many extra orders of milk and cream to deliver had considerable difficulty in keeping track of the orders. He overcame this difficulty by the use of a clip attached to the steering wheel of his truck. He got a spring clothespin, wired one side of it to one of the spokes of the steering wheel, and now places his extra orders in a ring attached to the clip, as they come on his route. When he makes a delivery, he moves the memo on the ring, bringing the next order before him. This method can be used in many other businesses, where articles such as newspapers are delivered on routes.—Francis W. Nunenmacher, Berkeley, California.

☞To counteract mildew on canvas, coat the parts with soap and rub well with powdered chalk or whiting.

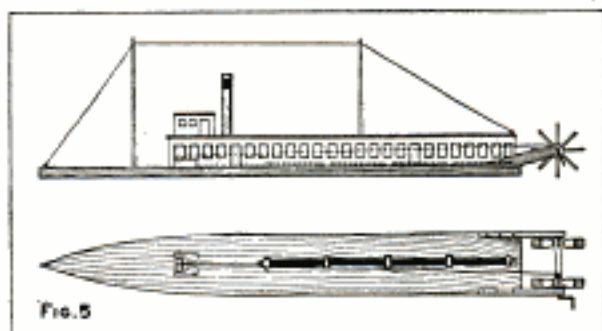
Model Paddle-Wheel Boats

Only a few boys have ponds of their own, in a pasture, perhaps. But there



The Rubber-Band Motor is Wound Up at the Crank, and Propels the Boat About 20 Feet

are miniature lakes in our city parks, pools at our summer camps, and old water holes in the woods; if all of these fail, a boy can still sail his ships on the bathtub sea. A simple side-wheeler, built of wood, is shown in the sketch. It winds up with a crank and runs 15 to 20 ft. A float is made by pointing the ends of a thick board, the dimensions of which are given in Fig. 1. On this the paddle-wheel frame is nailed, as shown in the top view, Fig. 1, the



The Stern-Wheeler Is Similar in Construction to the Side-Wheeler as to Driving Mechanism

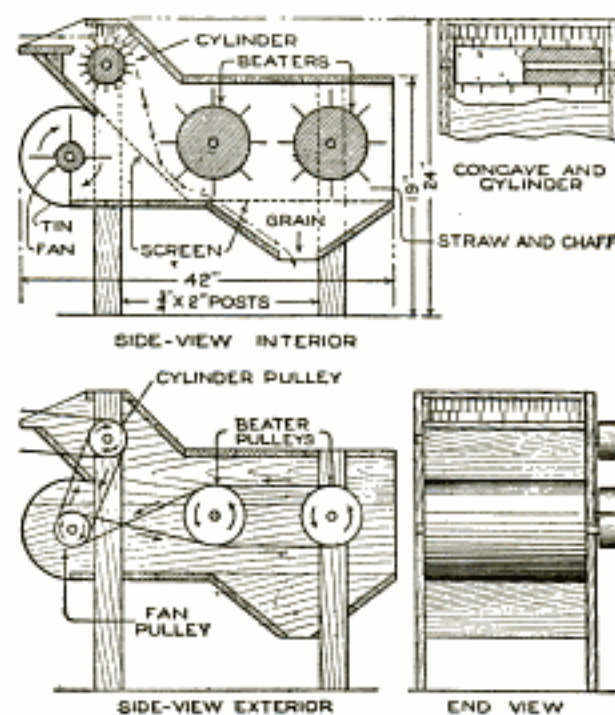
side view, Fig. 2, and the end view, Fig. 3. It is made of thin wood. A broom-handle section, just long enough

to slip into this frame, is whittled to form a winding drum, and fitted with paddles, wire axles, and a crank. A second shorter section of the broom-handle, set between blocks nailed to the stern, serves as a roller for the rubber bands. These, linked together and tied to a length of heavy cord, as shown in Fig. 1, are fixed to the bow

and run over the roller to the drum. The addition of a top, or lid, of cardboard, wood, or tin, and painted to resemble cabins and pilot house, and fitted with masts and a smokestack, completes the model. Fig. 5 shows a similarly built stern-wheeler with the stern-wheel shaft set on brackets.—E. R. Smith, Walla Walla, Wash.

A Small Thresher of Practical Use

Buckwheat, oats, wheat, morning-glory seeds, and other grains and seeds, were successfully cleaned with a model



Made as a Model, This Small Thresher Proved Useful for Various Grains and Seeds

thresher of simple design which I made from materials picked up in and around the farm workshop. It is 24 in. high, 14 in. wide, and 3½ ft. long. For a cylinder, I used a roller, 3 in. in diameter and 1 ft. long. The teeth are nails driven spirally about the cylinder in rows that alternate with similar teeth in the concave, the nails being driven ½ in. apart. The fan consists of a small roller upon which four pieces of tin are nailed. The beaters are larger rollers, into which wooden teeth are set. To hold the cylinder, fan, and

beaters in place, four posts and two crosspieces were used, as shown.

The power used is an 8-ft. windmill that I constructed, using a buggy wheel as the frame. The cylinder must be run at a fairly high speed, the fan nearly as fast, and the beaters may be run much slower; this is taken care of by the relative size of the pulleys. The screen between the fan and beaters must be of small mesh so that grain will not fall through into the fan chamber. The sieve through which the grain drops must be the proper size for grain, and can be varied for the different kinds of grain or seed threshed. It is better to put only the heads of grain into the thresher, as long straws twist about the rollers. The material to be threshed is fed into the cylinder in the usual manner, and takes its course as indicated by the arrows, the grain falling to the spout at the bottom, and the straw and chaff being blown out at the exhaust for it. Soft wood was used in the construction, 7/8-in. stock for the heavier pieces, and 3/8 or 1/4-in. stock for the other parts. The curved housing for the fan was made of tin. Leather or rope belts, fitted tightly, may be used. The power is applied on the cylinder pulley, hand or other power being suitable.—F. E. Brimmer, Dalton, N. Y.

Moth-Ball Puzzle as Window-Advertising Novelty

A druggist recently puzzled thousands with a novel window display. A small white ball in a 1-in. glass tube, about 10 in. long, displayed in a show window, would sink to the bottom, then

slowly ascend, only to sink as before. A sign reading "What Makes It Move?" kept the crowd guessing. The tube was apparently filled with water. The construction is simple. The tube is about three-quarters full of carbonated soda water. The white ball is an ordinary moth ball. The ball sinks, and when it becomes soaked gradually as it lowers, bubbles of gas cling to it, carrying it to the top of the solution. There the gas escapes, destroying the ball's buoyancy, and causing it to sink again. This process is repeated over and over.—David J. Lonergan, Minneapolis, Minnesota.

Record-Cleaning Pad Fixed to Talking Machine

By providing a practical method of keeping talking-machine records free

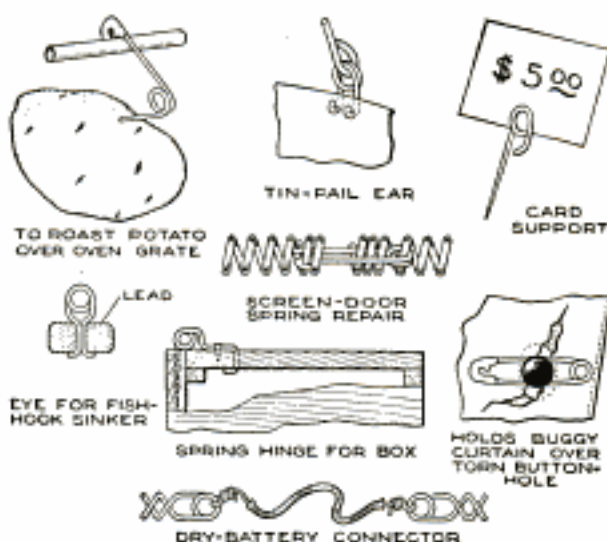


from dust automatically, as they are played, the life of the record is prolonged and the reproductions are more clear, and free from scratching sounds. A felt pad supported on a fixture made of a strip of brass does the work nicely. The pad is clamped in a clip at the end of the brass strip, and the entire device is held in place by the spring action of the upper clip, which fits over the end of the reproducing arm. The pad or the whole device can be slipped out of place quickly.

Novel Uses for Safety Pins

It is surprising to note how many uses can be made of an ordinary safety pin, both as an emergency-repair device, and for other purposes. I found 40 simple uses for safety pins, a few of which are shown in the illustration. Some of the many other uses are as a chain, a candle holder, a spring, a cover

holder for a kettle, and as a pencil clip. Most of these can be made by twisting



These Eight Examples of How an Ordinary Safety Pin can be Used for Practical Purposes Are Suggestive of Many Others

the safety pin with a small plier. By using a cutting plier, many more useful kinks can be devised.—George G. McVicker, North Bend, Neb.

Moving Heavy Objects with a Broom

After trying to move a heavy trunk alone, the attempt is usually given up until some friend can be called in to lend a hand, because a truck

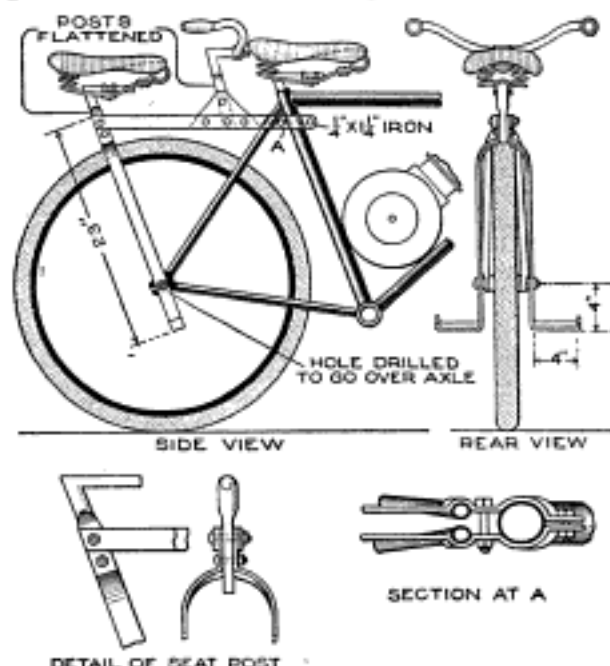


The Broom Is Slippery and Rides over the Floor or Even Carpets without Trouble

or other means of handling such heavy objects is not at hand. An ordinary sweeping broom will serve as a sled to move a stove or similar object in the home without heavy lifting. The straw in the broom is slippery and can be drawn over carpets without injuring them. In handling a stove, the legs must of course be removed, one person drawing the load and the other steadying it.—Samuel H. Avery, Chicago, Ill.

Rear Seat for Motorcycle or Bicycle

A rear seat mounted on a light support that can be quickly attached to a



DETAIL OF SEAT POST
This Light-Weight Homemade Rear-Seat Fixture Is a Convenience for a Strong Bicycle or Motorcycle

strong bicycle or a motorcycle is handy, and one like that shown in the sketch can be made in the home workshop.

The supporting frame, consisting of two main sections forming a fork over the rear axle, and a brace extending to the bicycle frame, are made of $\frac{1}{4}$ by $1\frac{1}{2}$ -in. strap iron. The seat and the handlebars are supported on posts of the usual type, flattened at their lower ends, and riveted to the fixture. The lower ends of the fork are bent to form foot rests. The detailed construction of the seat post and the method of clamping the brace at A are shown in the smaller sketches. The fastenings of the seat and handlebar posts are made with rivets or bolts.—P. P. Avery, Garfield, N. J.

Changing Wheels Equalizes Wear on Baby-Cab Tires

The front and rear wheels of a baby cab are usually of the same size and the tires on the rear wheels are worn much more rapidly than those on the front wheels. By changing the position of the wheels, the wear on the tires is equalized, making it unnecessary to renew them until all are worn out.—J. Cecil Alter, Cheyenne, Wyo.

A Craftsman Leather Billfold

By LIVINGSTON HAVILAND

The making of a billfold is easily within the range of an amateur in

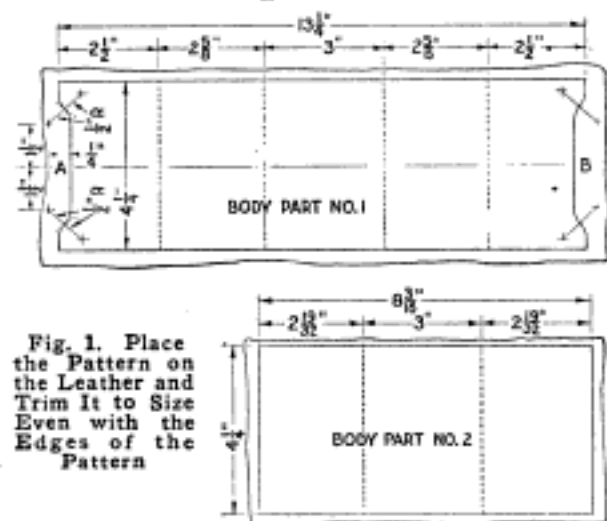


Fig. 1. Place the Pattern on the Leather and Trim It to Size Even with the Edges of the Pattern

leather work, who will observe the instructions carefully. Seal, morocco,

pigskin, and ooze sheep are satisfactory. Skiver, or thin leather, and silk moiré make suitable linings. When the processes involved in the making of the billfold are mastered, numerous other small articles in leather will suggest themselves, and can be made similarly.

The finished billfold is shown with the cardcase side up; folded, and with the bill compartment open, in Fig. 2. Begin the making of it by cutting a pattern of stiff cardboard for the main portion, or body part No. 1, as shown in Fig. 1.

Make a second pattern for body part No. 2, as shown in Fig. 1. Trim the leather to fit the patterns, a straight-edge of metal being placed over the pattern as a guide for the knife. A

close-grained hardwood board, or a piece of sheet zinc, is suitable as a base for cutting the leather.

Cut pieces of lining slightly larger than the patterns. If skiver is used, it must be glued to the leather with a good quality of leather glue, which should be pliable so as not to crack the leather. Do not stretch the lining, but merely smooth it gently, as otherwise it may cause the leather to buckle. Place the glued parts under a light weight to dry. In fitting the silk lining into place, apply a thin stripe of glue around the edges only, and permit them to extend beyond the leather. Then trim them off neatly.

Part No. 1 is to be folded to form the back of the billfold and also the two pockets for cards. The parts are glued as shown in Fig. 3. Weight the billfold and permit the glue to dry. The sewing may then be undertaken.

The neatness of the billfold will depend largely on the care with which the sewing is done, and the finish on the

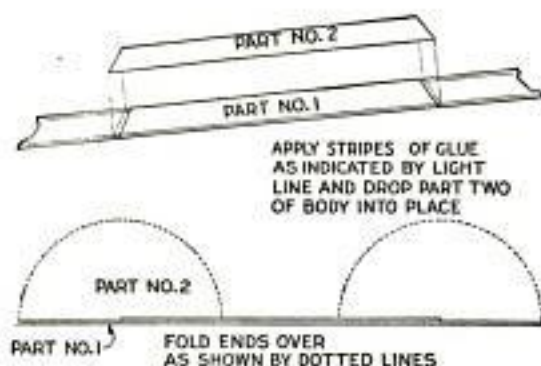


Fig. 3. Glue the Parts Together Carefully along the Edges, and Fold the Ends as Indicated

edges. Draw a straight line with a blunt-point tool along the edges to be

sewed, $\frac{3}{16}$ in. from them. Mark the spacing for an inch of the stitches on a strip of paper and transfer them to the stitching line. Punch the holes, making certain that each is made with the awl held vertical, as shown at D. Back



Fig. 2. The Photographs Show the Cardcase Side, the Folded Billfold, and the Silk-Lined Money Compartment

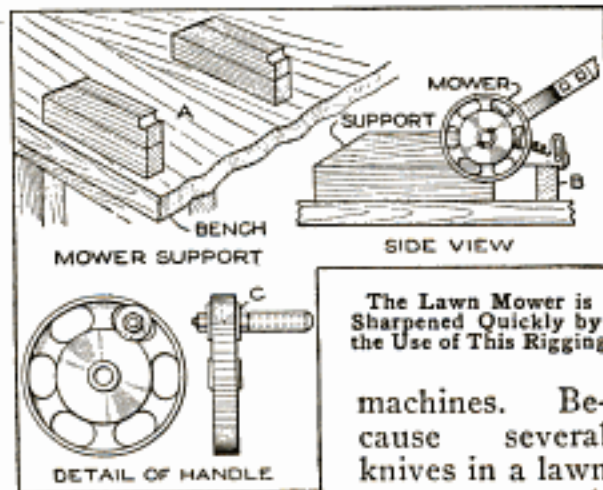
the open ends with strips of cardboard when punching holes in them. Heavy,

waxed silk of a color to match the leather is used for the sewing. The work may be done by hand without a holder, clamped between two boards. Thread the two needles and start them from the right side, as at E. Pass the needle from the first hole through the second as at F. With the needles then in position, as at G, continue this stitch. Tie the ends of the thread neatly at the end of the stitching. Trim the edges and tool them to a smooth finish with a suitable metal tool, or rod, heated moderately, applying water with the finger tip.

⌄The taper of a key is generally $\frac{1}{8}$ in. per foot of length, and keys having a head are preferable because of greater ease in removing them. The width of a key is usually $\frac{1}{4}$ the diameter of the shaft, plus $\frac{1}{8}$ inch.

Lawn Mower Sharpened Efficiently with Simple Rigging

With this device, one can quickly sharpen the lawn mower, or perhaps earn money sharpening the neighbors'



machines. Because several knives in a lawn mower work against the cutting blade, it is difficult to sharpen a mower satisfactorily with a file or stone. A usual method is to reverse the cutting-wheel cogs, turn the mower upside down, and run it backward over the ground. By the use of grinding paste on the cutting blade the cutting wheel tends to sharpen itself. This process can be improved by supporting the mower, as shown at A, the blocks permitting the mower's driving wheels to rest outside them. A block, B, supports the wooden roller. Remove the driving wheels, and the gears which turn the cutting wheel. Take the gear from one end and put it in the other end, replacing the driving wheel. By revolving the latter backward, the cutting wheel will also turn backward. Apply a paste of emery powder and lubricating oil to the cutting blade, and adjust the blade so that it comes fairly into contact with the cutting wheel. Turn the driving wheel backward, and gradually tighten the adjustment until a good edge on the cutting blade and the knives is produced.

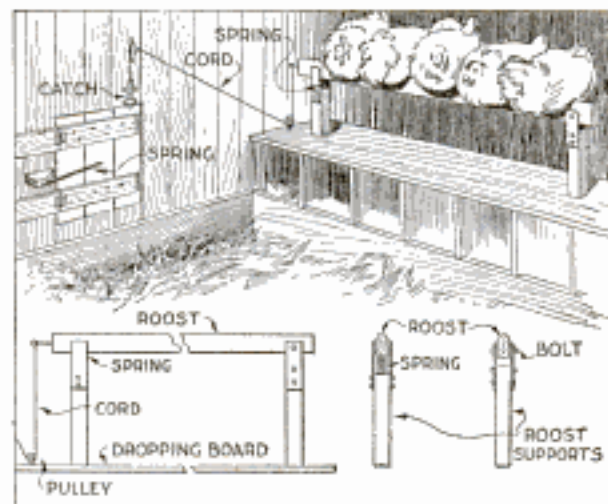
A handle fixed on the driving wheel, as shown at C, makes turning it easier. After sharpening, replace the gears, clean the bearings thoroughly, and replace the driving wheels.—Ed. M. Hawes, Everett, Wash.

Rubber Pads for Opening Screw Watch Bezel

The modern screw case for watches is primarily for the purpose of keeping dust from getting into the delicate works. Unless one is possessed of a strong grip, it is hard not only to set the case tight enough to keep out dust, but also to open the watch when adjustment is necessary. To make this work easy, a jeweler has, as a part of his tool kit, several rubber dies to fit the different sizes of watch cases. He made them from old rubber heels, cut to fit the watch cases closely. Danger of breaking the crystal is also overcome.—C. E. Drayer, Cleveland, Ohio.

Spring Roost Releases Poultry-House Door Latch

Those in the habit of shutting their poultry houses at night to prevent disturbance or loss by night-prowling animals, will be interested in a contrivance that makes this unnecessary. The principle of the mechanism, as illustrated, is that the opening to the poultry house is closed after the fowls have gone to roost, and in the morning when they descend from the roost, the door automatically opens, and they are free to go out. The spring door opens inside, with hinges at the side, and a suitable



The Door is Opened Automatically When the Fowls Leave Their Roost

bumper. The spring has just sufficient tension to cause the door to open when the catch is released.

The roost is fitted up as shown in the detail. One end is held by a bolt, while the other rests on a coil spring compressed by the weight of the fowls on the roost. A cord is attached at the spring end, passing through pulleys to the door, where it is fastened to the end of the bolt catch. The door is closed after the fowls are on the roost. The spring end is compressed to a level position, by their weight. The instant the birds leave the roost, it rises and pulls the cord, releasing the catch, and permitting the door to open.—George S. Brown, Norwich, Conn.

A Child's Bell-Ringing Hoop

In making this useful toy, first, a wheel from an old baby carriage was



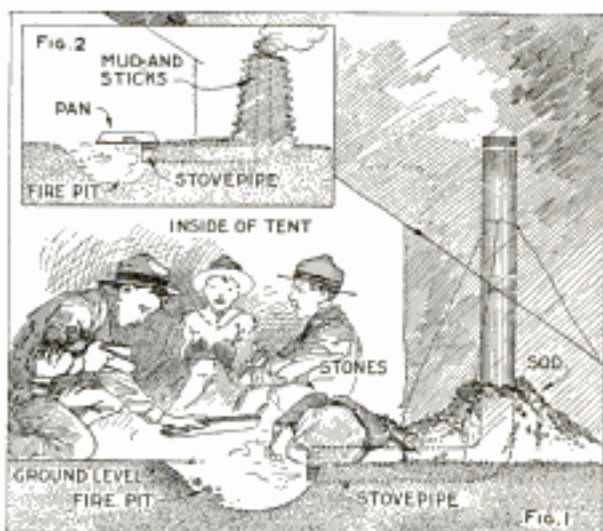
stripped of the tire; then two laths were fastened together at one end, and the wheel inserted between them, at the other end, and held by a bolt. A strong cord was passed around the groove in the wheel, and around a spool, nailed so as to

turn on the side of the lath when the wheel is rotated. Driven into the rim of the spool are three nails, which strike against the old alarm-clock bell, fastened as indicated.—W. F. MacGregor, Toronto, Can.

Emergency Camp Stoves Quickly Made

While conducting a boys' camp in summer we experienced a severe sleet storm. Our tents were not equipped with stoves and I faced a double problem: to keep the boys warm and to keep them contented. The difficulty was solved by having them construct emergency camp stoves, as shown, using iron stovepipe, and other mate-

rial at hand. One length of pipe is laid under the side of the tent about 4 in. in the ground, as in Fig. 1. An elbow mounted in sod connects with the chim-

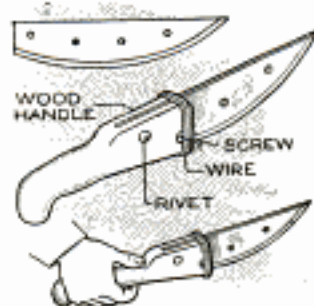


Boys at a Summer Camp Kept Themselves Busy during a Cold Spell by Making These Stoves

ney. A stone at the front of the stove regulates the draft, and stones placed upon the pipe hold the heat. The arrangement diagrammed in Fig. 2 is built with one length of pipe or a stone conduit. A hole is dug into the ground, about 10 in. deep. Over this is placed a pan, and an opening is made at the front for the fuel. The chimney is made of stones and sticks picked up around the camp, and plastered with mud. Coffee may be boiled or small cooking done on this stove.—William H. Leach, Alden, N. Y.

Pruning and Brush-Cutting Knife

With the blade of an old beef cutter and a stout wood handle, I fashioned



a brush knife that is superior to a sickle for cutting down heavy weeds. The blade was secured in a slotted handle by a screw and rivet, and the top of the handle wired

as an additional security. A blade of this sort is handy, also, for pruning purposes.—J. M. Kane, Doylestown, Pa.

MODEL FLATS FOR SMALL INDUSTRIAL CENTERS

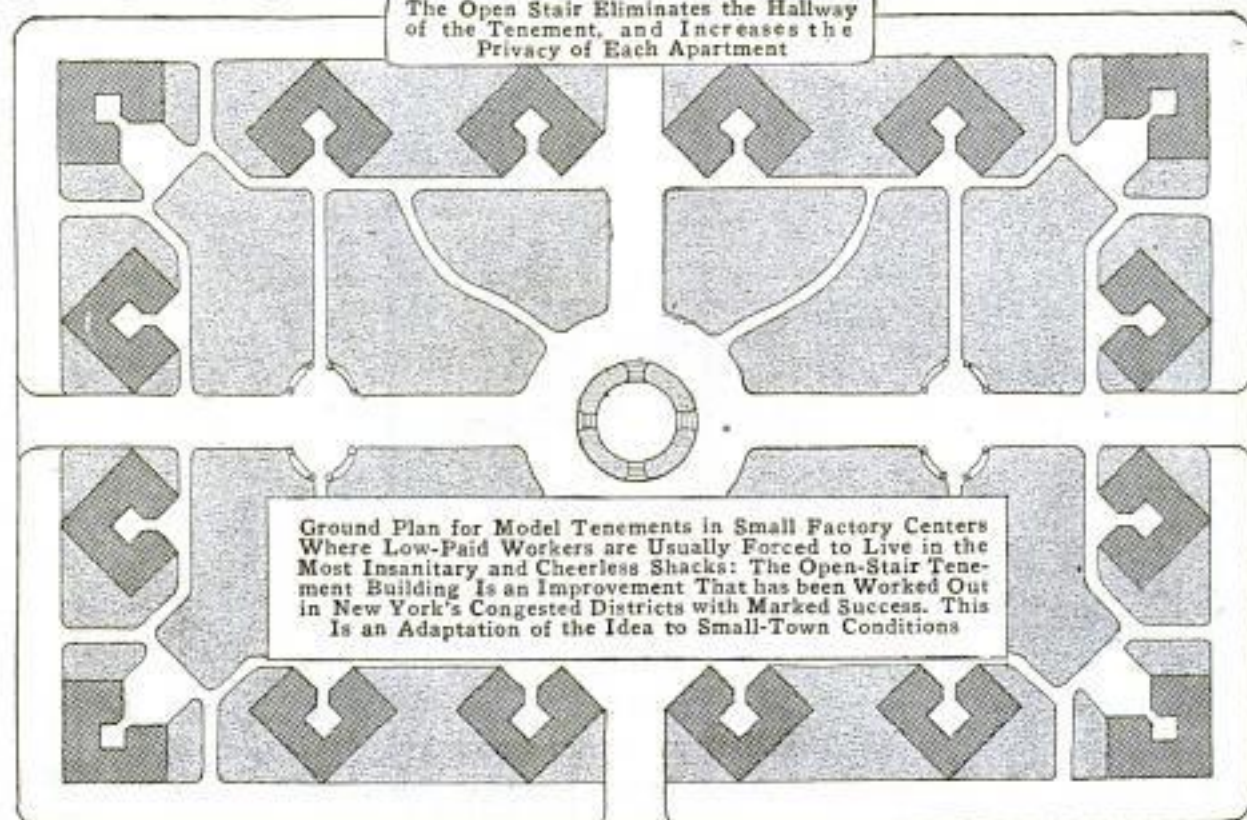


TO provide sanitary, attractive residence quarters for low-paid workers in small manufacturing communities is the aim of the architect who originated the open-stair model tenements, which have gained the financial support of New York millionaire philanthropists. The adaptation of the same type of apartment building to conditions prevailing in factory and industrial towns where land is available at moderate prices, is suggested. It is hoped to obliterate the long rows of dismal, barnlike hovels, such as are shown above, by erecting three-story tenements around the sides of large plots of ground, as pictured



below. Since the separate units are set at an angle of 45°, instead of square with the sidewalk, air and light are assured. Grass plots and garden spaces are allowed for all tenants. Each apartment has its private entrance on an open-stair landing, not in a dark, inclosed hall. Outside rooms, toilet facilities, electricity, gas, hot and cold water, and steam heat supplied from a central plant, make each of the suites comfortable. Country tenements of this type could be rented for \$1.10 a week for each room. Three-story buildings accommodating three families on each floor could be built for about \$12,000 each.

The Open Stair Eliminates the Hallway of the Tenement, and Increases the Privacy of Each Apartment



Ground Plan for Model Tenements in Small Factory Centers Where Low-Paid Workers are Usually Forced to Live in the Most Insanitary and Cheerless Shacks: The Open-Stair Tenement Building is an Improvement That has been Worked Out in New York's Congested Districts with Marked Success. This is an Adaptation of the Idea to Small-Town Conditions

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Shrewd buyers are placing their orders for Aladdin Homes at present low prices. They are not going to take a chance on the future when the big demand comes for building materials in the European countries. You can save from \$300 to \$1,000 by building *Now*. Aladdin prices are considerably below the present market. Send for a copy of the big book "Aladdin Homes" showing over 100 homes, many in colors.

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The material for a complete home is furnished from a single source and at a single fixed price—eliminating extras. All of the lumber, framing, sheathing, building paper, shingles, siding, porch work, outside finish, flooring, windows, doors, stairways, interior woodwork, nails, glass, paints, varnish, stains, and lath and plaster are included in one price and shipped together at one time. Delays usually experienced waiting for deliveries of material are thus done away with.

Aladdin lumber, millwork and interior finish are all of the very highest grades and highest quality to be found in the forests. All exposed lumber inside and outside is clear and free from knots.

The Aladdin Book of Homes illustrates and describes over one hundred modern homes, priced from \$100 to \$6000—bungalows, two-story dwellings of stucco, siding and shingle exteriors, summer cottages, barns and garages. If you expect to do any building, you should certainly have a copy. Send stamps for Aladdin Book of Homes No. 180.

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BAY CITY, MICH.**

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\$643



This Home
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This Home
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This Home
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Westinghouse

SMALL MOTORS, FANS, ELECTRIC WARE FOR THE HOME

Your Unseen Servant

He comes at your bidding, but you do not see him.

You turn a switch or put a plug in a socket, and instantly he is at work.

He lights your lamps, cooks your meals, washes and irons your clothes, sweeps your rooms, gives you a breeze on hot summer nights, freezes your ice-cream, warms your bed, heats the baby's milk, runs your sewing-machine, polishes your silver, grinds your knives, transports you to your office and carries you up or down in the elevator.

He works for small wages and is at your service twenty-four hours a day.

But you would not have this universal servant—at an expense anyone can afford—except for the work of many engineers who have made possible the economic generation of electric current and provided the means of turning that current into light, heat and power.

When you use your Westinghouse Electric Iron or Toaster-Stove or Sew-Motor, you owe the lightening of your household tasks not alone to these appliances, but to many other types of electrical apparatus in the origination and perfection of which Westinghouse engineers have played a leading part.

These include the turbo-generators in the power-house miles away, that generate the electricity, and the switchboards, meters, transformers, rectifiers, regulators and more that make possible the control, distribution and use of this great force.

And Westinghouse engineering has been accompanied at every step by complete manufacturing facilities and high manufacturing standards.

Thus Westinghouse quality is the same, whether in a great 15,000 horsepower blooming mill motor, a 75,000 kilowatt generator or little fan motors and electric irons in a million homes.

WESTINGHOUSE ELECTRIC & MANUFACTURING CO.

East Pittsburgh, Pa.



A Westinghouse Electric Fan keeps the home comfortable in hot weather for a few cents a day.



A Westinghouse Electric Iron eliminates the hot stove, saves steps and is ready any time anywhere there's a lamp-socket.



Westinghouse Electric Waffle for the table provides a quick, easy and efficient way to prepare breakfast and supper.

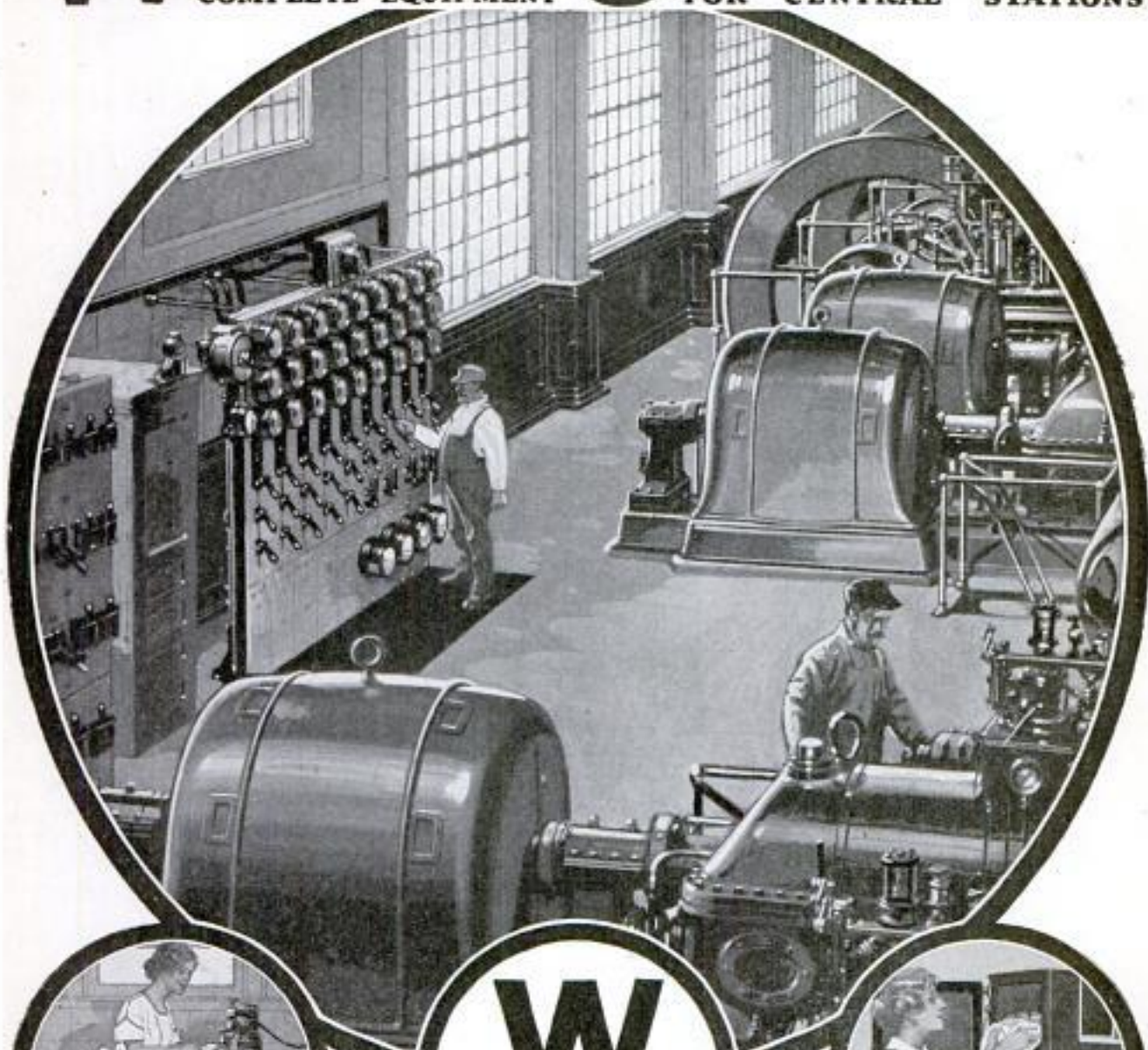


A Westinghouse Sew-Motor makes an electric machine of any ordinary sewing-machine, abolishing the toil of treading.

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Westinghouse

COMPLETE EQUIPMENT FOR CENTRAL STATIONS



An electric washing-machine, equipped with a Westinghouse Motor, saves time, labor and wear-and-tear on the clothes.

A Westinghouse Electric Milk-Warmer heats baby's milk quickly at the turn of a switch. Can be attached wherever there's a light-socket.



W

WESTINGHOUSE
ELECTRIC



With a Westinghouse Automatic Electric Range the dinner is ready to serve when you come home after an all-day absence.



An electric vacuum cleaner, driven by a Westinghouse Motor, ends tiring, unsanitary, inefficient sweeping with a broom.

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BLUE STREAKS

TRADE MARK REG. U. S. PAT. OFF.



Why Some Dealers Goodyear Blue

Bicycle riders have been paying too much for their tires. And the tires have not been good enough.

High profits have been to blame.

And, too many brands of tires, too.

But now Goodyear comes out with a really good tire—the Blue Streak—which costs the rider only \$3.25 each. It is as good as some other tires that cost \$5.00 each, and better than most that equal it in price.

It means big savings for the rider.

Long Wear Pleases Dad

You will find your Goodyear Blue Streaks wearing a good long time. There are many miles of happy travel in these tough, rugged tires, built with two stout reinforcing strips of fabric beneath the tread. The strong two-ply tire body has wonderful durability. Such a long wearing tire is most economical.

Springy Tires Make Pedaling Fun

No boy likes to push a bicycle with heavy, clumsy tires. So Goodyear Blue Streaks are made of fine two-ply fabric carried in lively rubber. That gives you strength and extreme lightness in your tire. Such a resilient tire makes pedaling easy. The tire shares the job with your legs.

GOODYEAR

AKRON

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BLUE STREAKS

TRADE MARK REG. U. S. PAT. OFF.

Do Not Handle *Streak Bicycle Tires*

Naturally, some dealers refuse to handle Goodyear Blue Streaks. They want a higher profit on each tire.

But those dealers who *do* sell you Blue Streaks—and there are many of them—place your satisfaction ahead of their own profit.

Find the Goodyear dealer in your town. The fact that he has Blue Streaks for sale means he is a square deal merchant.

Boys everywhere are wearing Goodyear Bicycle Caps. Ask your dealer. They're especially popular with Bicycle Clubs—name of club printed on the cap.



When a gypsy peddler sells you a horse, he probably does not plan on seeing you again. He wants to make one sale—and plenty of profit. Never mind about your satisfaction.



The Goodyear dealer sells you better bicycle tires cheaper. He wants to see you again—often. He wants to keep you as a permanent customer. Goodyear Blue Streaks help him do this.

Non-Skid Treads Save Side-Slipping

Goodyear Blue Streaks are made with sharp-edged blocks of rugged rubber that bite the ground like teeth, in travel. Side-slipping is prevented. Besides, these stout rubber blocks add to the life of the tire. Press your thumb on a Blue Streak Tread. You can feel the "bite."

See your Goodyear Dealer or write The Goodyear Tire & Rubber Co., Akron, O., for his address.

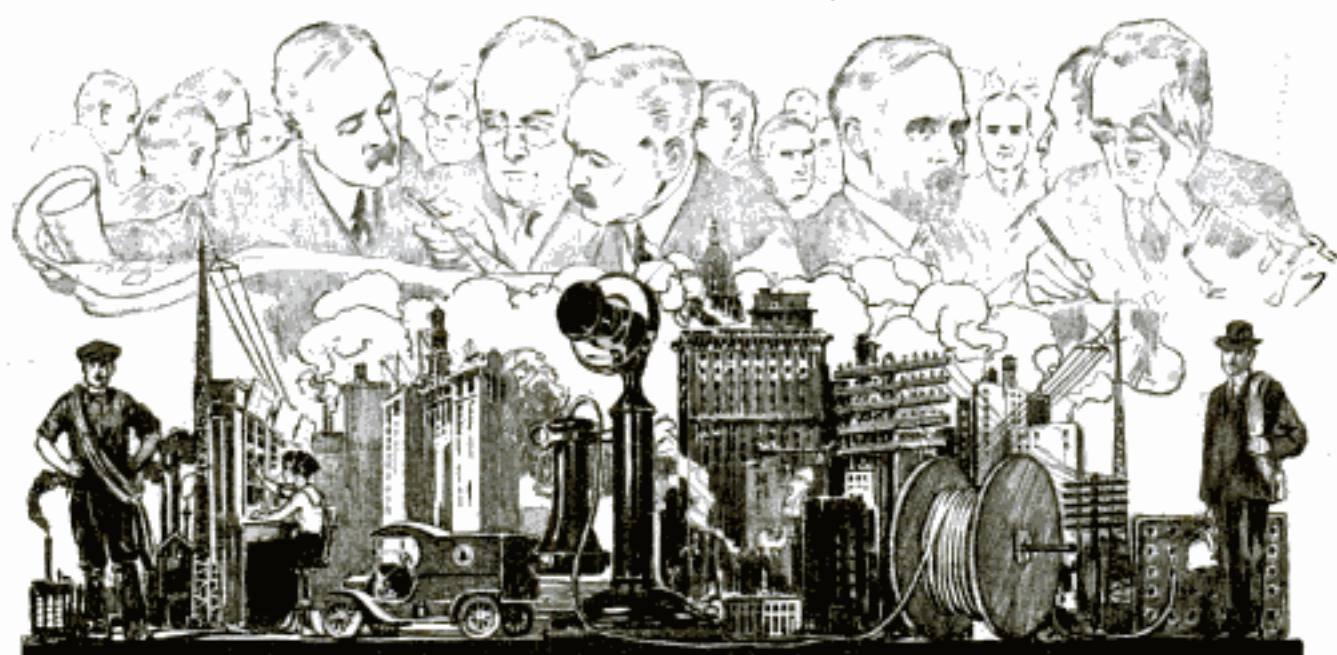
Handsome Tires—Show Your Friends

Blue Streaks are good-looking as well as long-wearing and easy-riding. They put your bike on parade—make it look like new. You will know Goodyear Blue Streaks by the smart Blue Streak on each side of the tire.

GOODYEAR

AKRON

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Our Real Reserves

Grim war today drags whole nations in its wake. The organized machinery of the government and the army and the navy in all their power cannot fight unaided. They constitute only in small part the country's real forces.

The bones and sinews of campaigns are supplied by our developed farms and specialized farm machinery; our highly organized steel industry, factories and mines; our facilities of transportation and communication. Railroads, telephone and telegraph systems link together and speed up the many activities of the nation.

But these material resources are not the whole. Back of each industry and activity there must be organizations of human beings, requiring years of patient training and actuated by the spirit of loyal service.

This spirit and training for service in the common welfare constitutes above all else the real strength of a Republic and insures victory. Joining all the country's resources is a fine spirit, a thorough training, a great, sustained concentration of real effort typified by the Bell Telephone System.

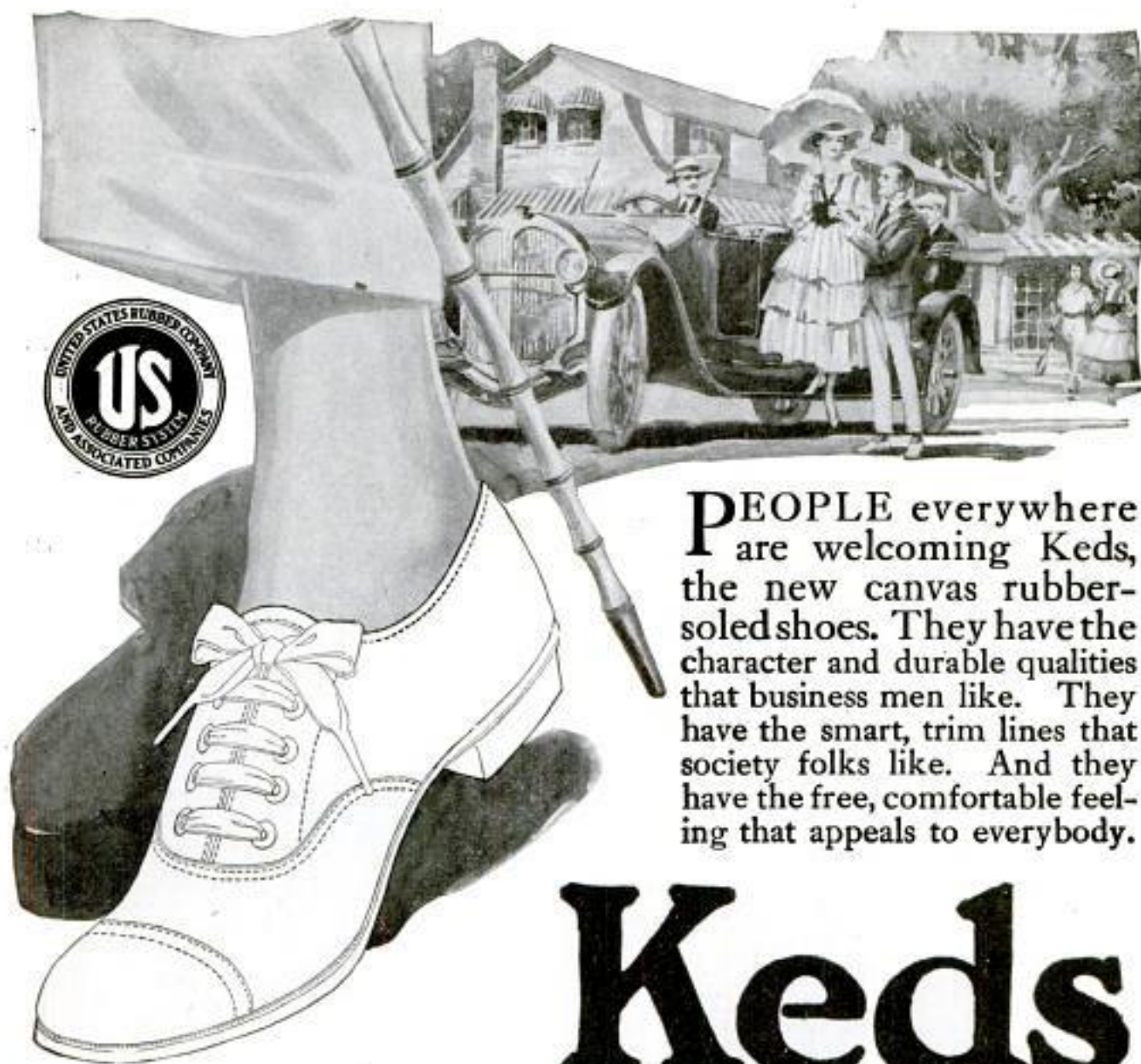


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Universal Service



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Wear Keds to work and make every step every day light and springy. You can get any style you like—high or low heels with low tops or high tops. There are Keds for every fancy.

Ask your dealer to show you the three leading brands of Keds for each member of the family.



**\$1.50
up**



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to
\$2.00**



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to
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You can get a better balance of comfort, style and economy in Keds than in any other shoe you can buy. Every pair carries the reputation of the largest rubber manufacturer in the world.

United States Rubber Company

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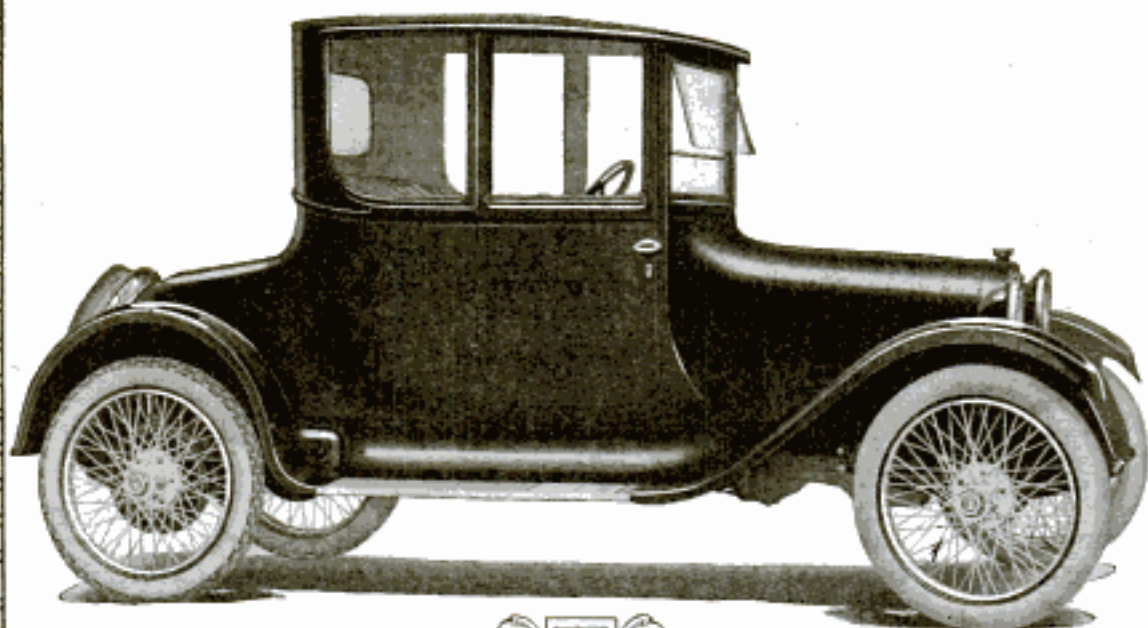
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The convertible coupe is well
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The Dominant One-Ton Truck Unit



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are now made to fit ALL makes of Cars—the same sturdy, extra heavy construction throughout that characterizes ALL Dearborn Truck Units, the same care and attention to detail, material and workmanship forces recognition of their superiority in daily service in nearly every line of business—cheaper to operate than a team and wagon.

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All Dearborn Truck Units are designed so that 90% of the load is carried on their heavy Dearborn Rear Axles, Heavy Springs and Heavy Pruden artillerytype Rear Wheels, with guaranteed hickory spokes and felloes. Bock Heavy Duty Roller Bearings, Baldwin Roller Chains, Baldwin Steel Sprockets, Jack-Shaft Hangers and Back-Rod Hangers HOT riveted to frame—not merely bolted.

We Want an Exclusive Dealer in Every Locality

Dearborn Truck Units are built in our own factory under our own supervision by expert auto mechanics and are guaranteed. It is the Biggest Seller in the truck field today and our Dealers are making Big Money. Territory is being rapidly taken under our liberal, exclusive agency plan. It will pay you to write TODAY for particulars and territory desired.

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Fair Treatment

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GOODRICH SILVERTOWN CORD TIRES

BEHOLD the *cord* that has made *cord tires* mean *durability, easy-riding comfort, mileage, and gasoline saving economy* to knowing automobile owners. Behold **CABLE CORD**, the unique cord made especially for the patent-protected two-ply Silvertown Cord Tires, and found **ONLY** in them.

Note the **SIZE** of **CABLE CORD**, its **SUPPLE STRENGTH**, and the **TWO** layers of it **CROSS WRAPPED** into a sinewy tire body.

Wrought of many threads the size of the "cords" of **WEB TIRES**, strong enough to swing the weight of a man, **CABLE CORD** gives Silvertowns a flexible strength which, yielding to the blows of a rough road, comes back without jolt or jar.

Fused with rubber as a cobbler's waxed end is waxed—a perfect weld of cord and rubber **40 PER CENT. RUBBER—CABLE CORD** keeps

Silvertown Tires immune to tire fever (internal friction), the destroyer of many ply tires.

Therefore, Silvertown Cord Tires, the only *two-ply, cable-cord* tires, outlast many ply tires with their multiplied tire fever.

Know them by their **Red-Double-Diamond** trade mark and graceful extra size, the tires you can not afford to deny yourself.

The **B. F. GOODRICH CO., Akron, Ohio**

Goodrich also makes the famous fabric tires — **Black Safety Treads**

"Silvertowns make all cars high-grade"

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"The Best Thing I Ever Did Was to Send a Coupon Like This!"

"I KNEW that accidents were a greater danger than the old smallpox or yellow fever. I knew that twice as many people are hurt at home as on street cars—that four times as many are hurt at home as on railroad trains—and when I saw that 3 cents a day would save me and my family—I sent that coupon. That's why my mind's at ease, even though that fall down the step-ladder did put me out of business."

3 cents a day saved him. Let it save you from worry and money loss—



AETNA-IZE



If you are in a "Preferred" occupation and under 50 years of age, 3 cents a day brings \$1,250 to \$3,250 in case of death by accident; \$5 to \$10 weekly income for life for disability, plus \$1,000 to \$3,000 for loss of two limbs or eyes, or the income plus \$500 to \$1,500 for loss of one hand, foot or eye; or \$250 for death from any cause. You can make these amounts as much larger as you like by paying more than three cents daily.

Send this coupon now and find out. Don't wait until the accident comes. Don't wait until street car or cellar steps or slippery sidewalk puts you in bed. Remember one man in seven is killed or hurt each year. Send the coupon now and be safe in time.

AETNA LIFE INSURANCE COMPANY

Drawer 1341

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The largest company in the world writing Life, Accident, Health and Liability Insurance

Agency opportunities for all Casualty and Bonding lines

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 I have marked the kinds of insurance I
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 is _____ years. I am
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22

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A Hot Summer Task Made Easy and Cool

The high cost and scarcity of servants make it imperative that you simplify your laundry work. Do it the easy way—the *cool* way—the economical way—with a

Western Electric Washer and Wringer

When you experience the saving in labor and time, and particularly when you realize that the old way rubs the life out of the fabrics, you will find this machine an investment that will soon pay for itself.

In the Western Electric Washer the clothes are gently *rocked* back and forth through hot suds. Since there is no rubbing, the clothes do not wear or tear. And the cost of electricity for one week's wash is only about three cents! The step-saving electric iron will complete the week's work in quick time and with none of the discomforts of ironing the old way.

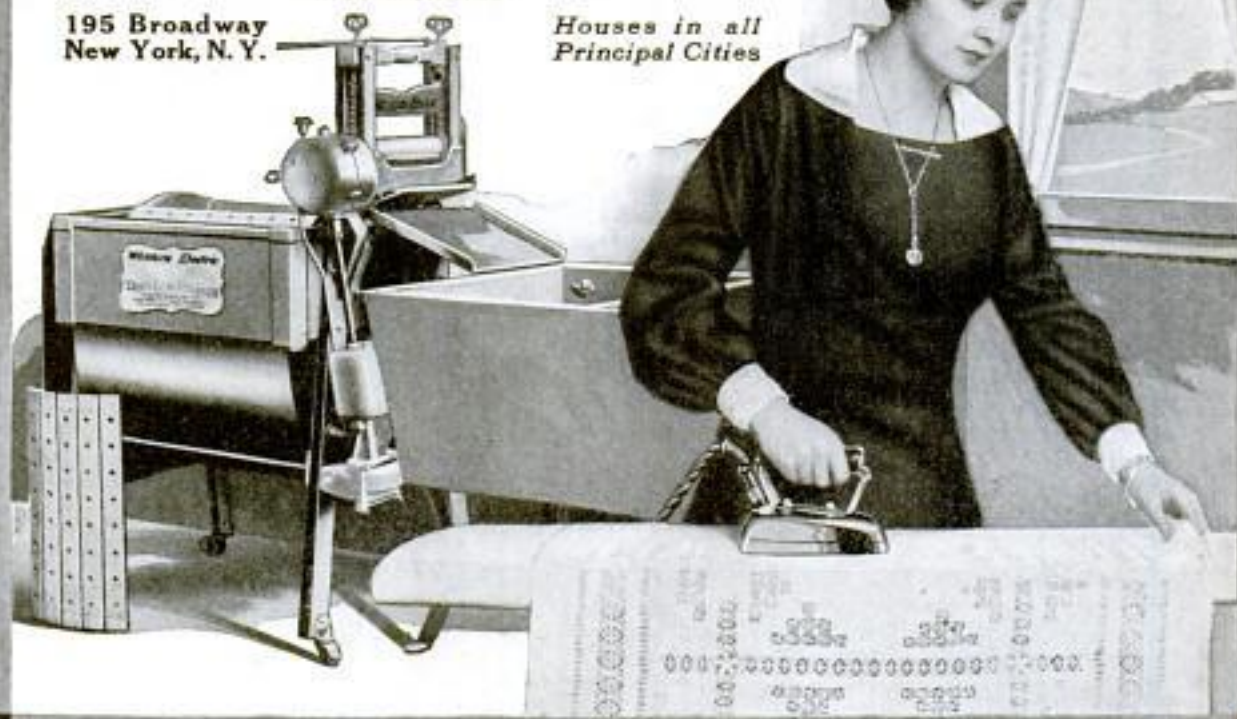
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NEW—Right from the Factory. Aluminum doors and front. Lens—2" B. & L. Tessar F: 3.5 in focusing mount.



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\$350, 400 ft. capacity U. S. Cinematograph M. P. camera. Regular and trick crank. Forward and Reverse take-up. Film meter, speed indicator. Direct focus tube 50 M. M. Zeiss Tessar F: 3.5 lens in interchangeable tube. Complete with 4 round Metal Magazines. Our price, \$200.

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\$350, 400 ft. Williamson Professional, Diaphragm and Spot Dissolve, Prismatic focus device, forward and reverse take-up, trick crank. Our price, \$185.

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Professional Kino

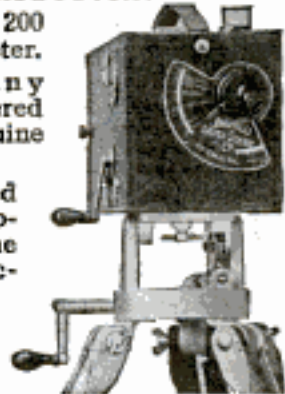
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NEW—Right from the Factory. Lens—50 M. M. focus B. & L. Tessar series 1 c F: 3.5.

Capacity 200 ft. Film meter.

Mahogany case, covered with genuine leather.

Guaranteed to take absolutely the finest pictures.



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Life Insurance Without Agents is a Distinct Public Service

POSTAL LIFE METHOD SANCTIONED BY THE UNITED STATES SUPREME COURT

TIMELY TALK ON A VITAL SUBJECT

(SCENE: Pullman smoking compartment. Judge Kirkland and Lawyer Roberts continuing a conversation begun at dinner).

Judge: "Well, this business of selling direct-by-mail throughout the country is surely very popular with the public."

Lawyer: "Yes, but some of my clients say that in the interests of local merchants, the States ought to find some way to check it."

Judge: "I don't see why they should check it or how they can do it. Selling merchandise is an interstate business. I can sell and you can buy in the best market wherever it is. What can a State do about it?"

Lawyer: "You're probably right, I'll admit. The States can't very well put the 'kibosh' on legitimate interstate business."

Judge: "Certainly not. The States cannot hold up arbitrarily any direct-by-mail transaction, such as paying life-insurance premiums by mail."

Lawyer: "How's that?"

Judge: "Policies are written for people, 'direct,' all over the country, and have been for years. The United States Supreme Court has decided unanimously that life-insurance premiums on such policies are exempt from State taxes. The usual license fees and charges also do not apply. All this helps policyholders."

Lawyer: "Oh, you refer to the Postal Life?"

Judge: "Yes, that Company hasn't any agents and never has had. The applicant deals direct, personally or by letter. The method is good common sense as well as sanctioned by law."

That tells the story. Thoughtful insurers like Judge Kirkland take policies with the Postal Life and not only hold on to them, but are disposed to take new insurance, while those like Lawyer Roberts, who at first write in out of curiosity, at last find they can save money by taking a Postal Policy and they do it.

Find Out What YOU Can Save

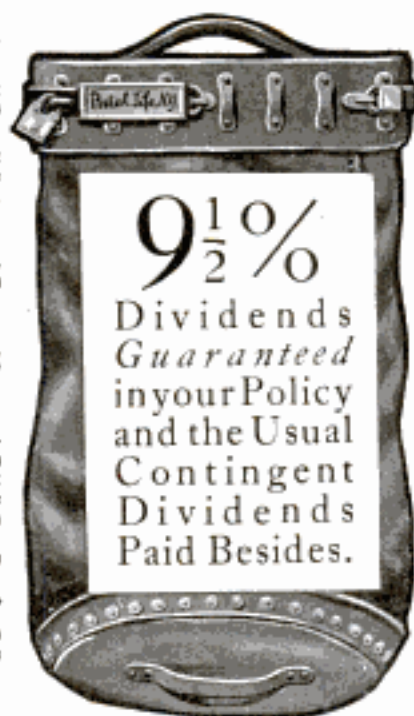
You should take advantage of Postal benefits and economies. Call at the Company's office or simply write and say: *Mail insurance particulars as mentioned in POPULAR MECHANICS for July.*

In your letter be sure to give:

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2. Your occupation.
3. The exact date of your birth.

You will receive full information based on official reports regularly filed with the New York State Insurance Department. Writing places you under no obligation and no agent will be sent to visit you. The resultant commission-savings go to you because you deal *direct*.

POSTAL LIFE INSURANCE COMPANY
WM. R. MALONE, President 511 Fifth Ave., Cor. 43rd St., New York



Lawyer (laughing): "Guess you're right. I wrote the Postal once myself just to find out how the Company did business, but never followed it up."

Judge (laughing): "I go you one better; I not only wrote them, but took a policy nine or ten years ago and have carried it ever since."

Lawyer: "How's the cost?"

Judge: "Lower than in other companies for the same kind of insurance—legal reserve—and besides that, they give me a free medical examination each year just so I can keep in trim."

Lawyer: "That's pretty good. You live in Idaho and deal with a New York company by mail. Did you ever look the Company up?"

Judge: "Only to know that it is chartered and licensed by New York State, whose laws are very strict, but I called on them when I was East a while ago. They're now in their new building on Fifth Avenue."

Lawyer: "So I've heard. Believe I'll write them to figure on a policy for me."

Judge: "Don't think you could do better. Life insurance without agents is a distinct public service. The point is made, and I think it is a good one, that the Company is subject to the United States Postal Authorities. The Postal simplifies the business, saves you money, safeguards your health and will treat you right in every way. I'd take another policy myself if I hadn't passed the age limit."



New Postal Life Building

The King of Sports

Invigorating — spontaneous — and interesting to the last degree — is trapshooting. It is the Sport of Kings and the King of Sports — replete with excitement and exhilaration.

Winging the wily clay pigeon has become quite *de rigueur* in smart country places and has proved a welcome boon to both host and hostess in the entertainment of house parties.

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Booklet No. 386

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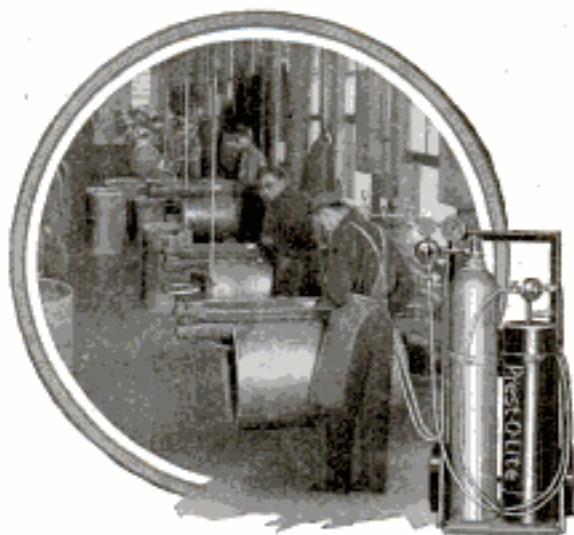
Oxy-Acetylene Welding and Cutting

**Makes steel barrels stronger, neater—
at lower cost**

THE steel barrel is just one of the thousands of manufactured metal products which are made stronger, neater, better and at less cost by using oxy-acetylene welding in place of rivets, bolts and threaded joints.

In thousands of American factories—in the manufacture of automobiles, farm implements, engines, metal furniture, delicate tools and instruments—this process is used in routine production. To secure its economies and advantages many manufacturers have even made sweeping changes in the design of their products.

If you use bolts, rivets or threaded joints in the construction of any product, let us show you what welding can accomplish. This process is saving millions of dollars for railroads, factories, foundries, machine shops, garages, in quick repairs to broken machinery parts, tools, and defective castings.



Above illustration shows part of large department devoted to welding seams of steel barrels by the Prest-O-Lite Process.

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Employs both gases (acetylene and oxygen) in portable cylinders. Prest-O-Lite Dissolved Acetylene (ready-made carbide gas) is backed by Prest-O-Lite Service, which insures prompt exchange of full cylinders for empty ones. Provides dry, purified gas, insuring better welds, quicker work, and lower cost, and also avoids the large initial outlay and heavy depreciation incurred in making crude acetylene in a carbide generator.

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Send today for illustrated literature and data, showing specific instances of savings made by welding—savings that may be made for your shop or factory.

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Repair shops and service garages everywhere are finding oxy-acetylene welding a ready money-maker. Broken or worn parts are made good as new—easily, quickly and at small cost. This kind of service and the savings made on repairs attract many new customers. At moderate charges *your* profits are too large to overlook. Necessary equipment is not expensive. Write us today for full details.

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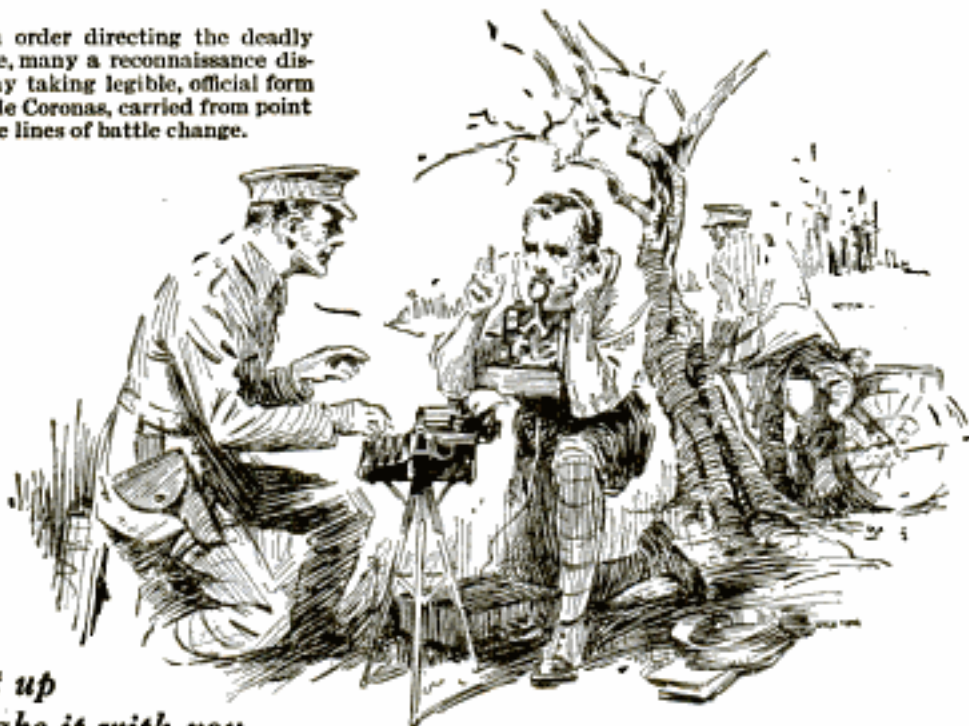
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Countless Coronas are in daily use in many sectors of the great battle-fields. Their ready portability, made possible by their light weight and compactness, appeals alike to the officer whose orders must be legible and to the war correspondent who today is contributing history.

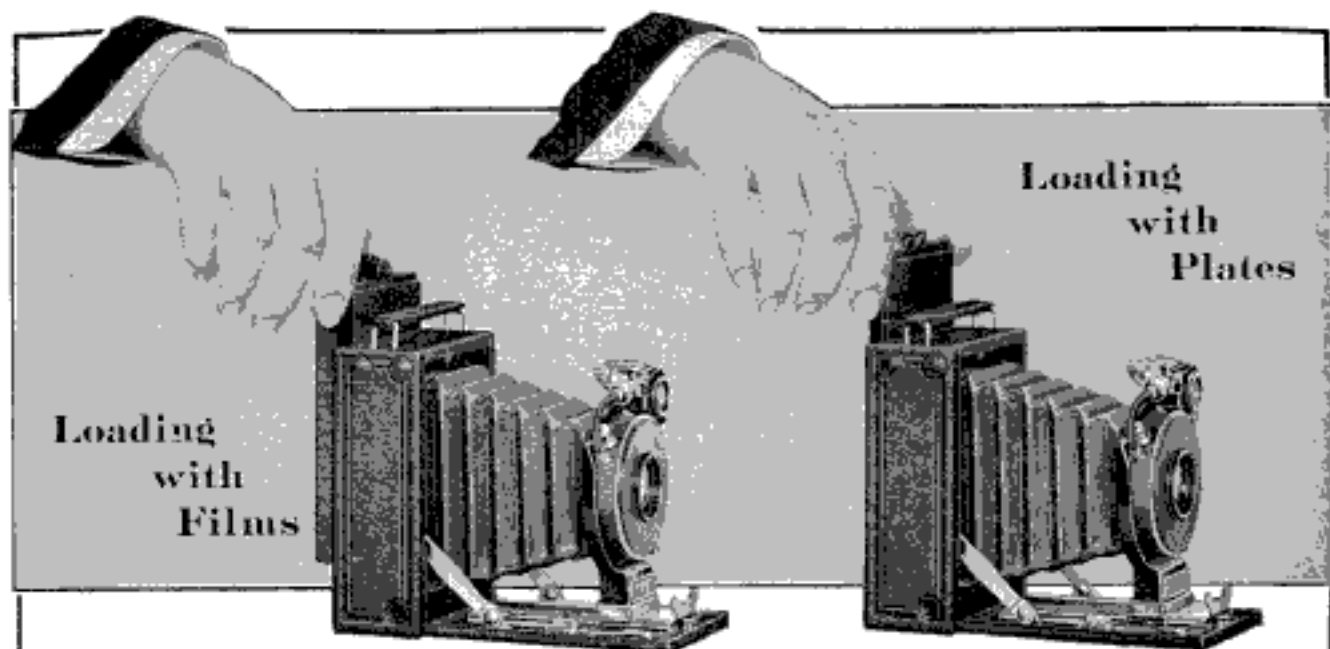
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Really two cameras in one

PREMO No. 12

And it is such a small, such a thoroughly capable one, too. It is at once a plate or a daylight loading film camera. One method may be employed as easily as the other. It's just as the user chooses.

Focusing and composing may be done by use of finder and focusing scale, or at any time, for absolute accuracy the ground glass screen is easily used with either film or plates.

The camera makes $2\frac{1}{4} \times 3\frac{1}{4}$ pictures, it measures $1\frac{5}{8} \times 3\frac{1}{4} \times 4\frac{5}{8}$ inches, it weighs but 24 ounces, but it is so cleverly constructed that it will accommodate a three-hundredth of a second shutter, and the best and speediest of anastigmat lenses, including the Kodak Anastigmat $f.6.3$, and the B. & L. Ic Tessar $f.4.5$. With such equipments

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Champion Plugs are the *source* of four out of every five cars' power—they start the things happening inside these cars that make them run.

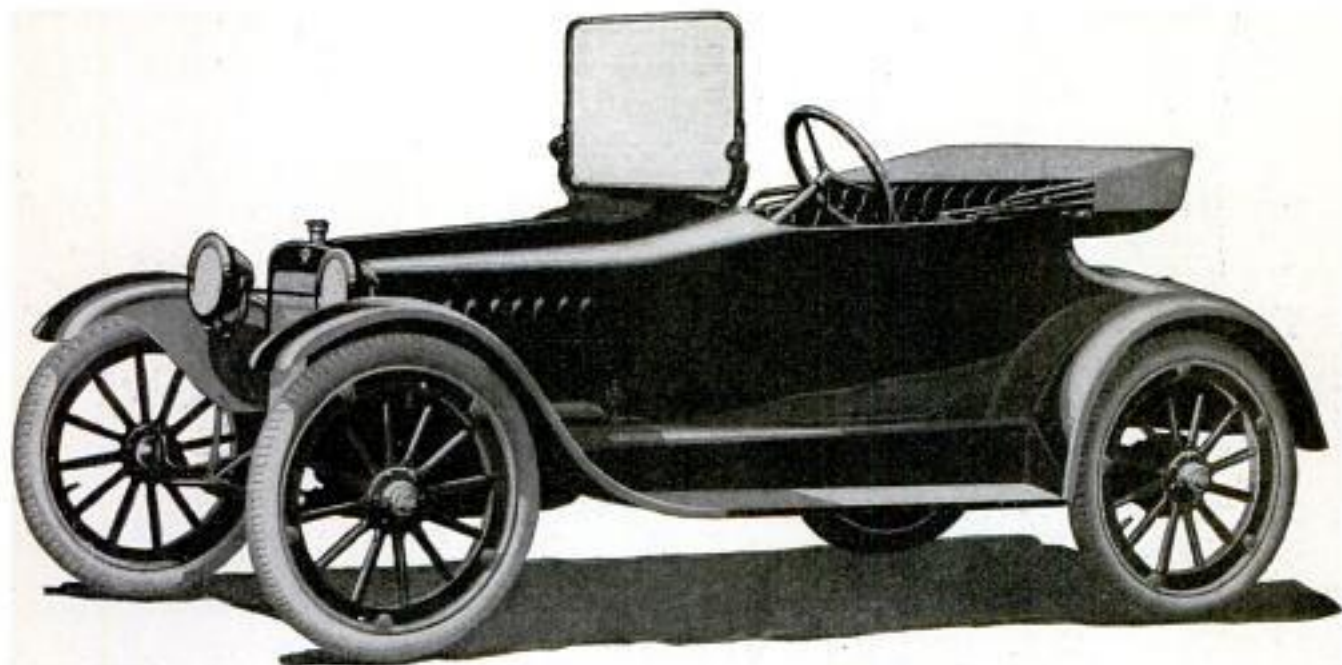
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Some More Road Records Sent in by Saxon Roadster Owners

"I wish to congratulate you on the great car you build in Saxon Roadster. After running mine over 5,000 miles, it does not show the least sign of wear, and is mechanically perfect. When it comes to all around service there is no car at anywhere near its price that can match it. My Saxon Roadster is good for 5,000 more miles and then some."—DOUGLAS SHAPE, New York City, N. Y.

Runs Perfectly After 5,200 Miles

"Last Saturday I ran to Youngstown, Ohio, in my Saxon Roadster. It is a 64-mile trip, and half of the distance the roads were extremely rough. My exact running time was 4 hours, which is very good when road conditions are considered. The return trip was made in the same time. I used 5 gallons of gasoline and one quart of lubricating oil, and the car came home like a humming bird. I have driven my Saxon Roadster 5200 miles already, and it runs as sweetly and smoothly as any car could. It is certainly a wonderful car to drive and always rides comfortably. This car has given me less trouble than any car I have ever driven, and I have owned big ones of many kinds for ten years."—W. P. LUCAS, Oil City, Pa.

Averages 35 Miles to Gallon

"For complete service satisfaction my Saxon Roadster sets a standard. Recently I went from Bridgeport to Brockton, Mass., a distance of 175 miles, in 9 hours, averaging 35 miles to the gallon of gasoline. This is really a noteworthy performance when you consider that I carried a passenger and a heavy load in the car. Incidentally, there were a great many hills in this distance, but I experienced no trouble in making them 'on high.'"—S. L. LOUNDS, Boston, Mass.

Salesman Enthusiastic Over Saxon

"Early this spring I purchased a Saxon Roadster with full equipment, including electric starting and lighting system. I wanted to cover the southern and central parts of Minnesota and the eastern part of South Dakota with a line of merchandise, and I wanted to accomplish it as expeditiously and economically as possible. After considering all methods of transportation, and all kinds of cars, I finally came to the conclusion that Saxon Roadster was the best car from the standpoint of motor service, as well as the cheapest car to drive. What I believed then has been proved to me. As you probably know, the roads in this part of the country in the spring time are in a terribly bad condition, but my sturdy Roadster went thru every obstacle, and I kept to schedule time without one delay. My starter has never failed to work, and I have never been towed in. I have absolutely nothing but the highest praise for Saxon Roadster."—GEO. F. COOKE, Minneapolis, Minn.

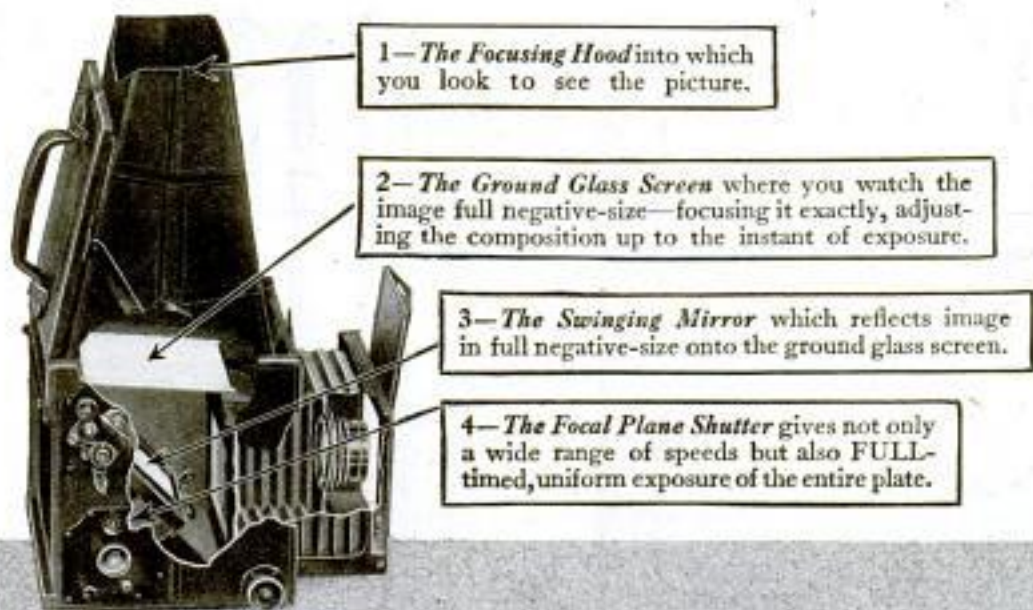
Saxon Makes Good With U. S. Mail

"When it comes to rural mail service, Saxon Roadster is certainly the ideal car. It has ample room, utmost ease of control and light weight combined with sturdy construction. I missed but three trips all last winter, and then the deep snow made it absolutely impossible for any kind of conveyance. My Saxon Roadster has gone thru mud up to the axles, and over freshly graded roads, and has never yet failed me. My wife drove over the route three weeks, and is just as enthusiastic over the Saxon Roadster as I am."—F. MANBECK, Marion, Md.

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(81)

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Very truly yours,
(Signed) R. H. Pousma

Moreover, you don't have to buy it to try it! We will send one to you on Ten Days' Trial. Write all you please on it for ten days and then if you are not *perfectly* satisfied, send it back at *our* expense. What's more, if you do not care to buy, you may rent it at our low monthly rates. If later you want to own it, we will apply *six months'* rental payments on the low purchase price. Any national bank in Chicago, or any Dun's or Bradstreet's Agency anywhere will tell you that we are responsible. Learn all the facts about this remarkable offer. Write us today—send us your name and address on the attached coupon—or a post card. Ask for Offer No. 52.

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Immediate Results

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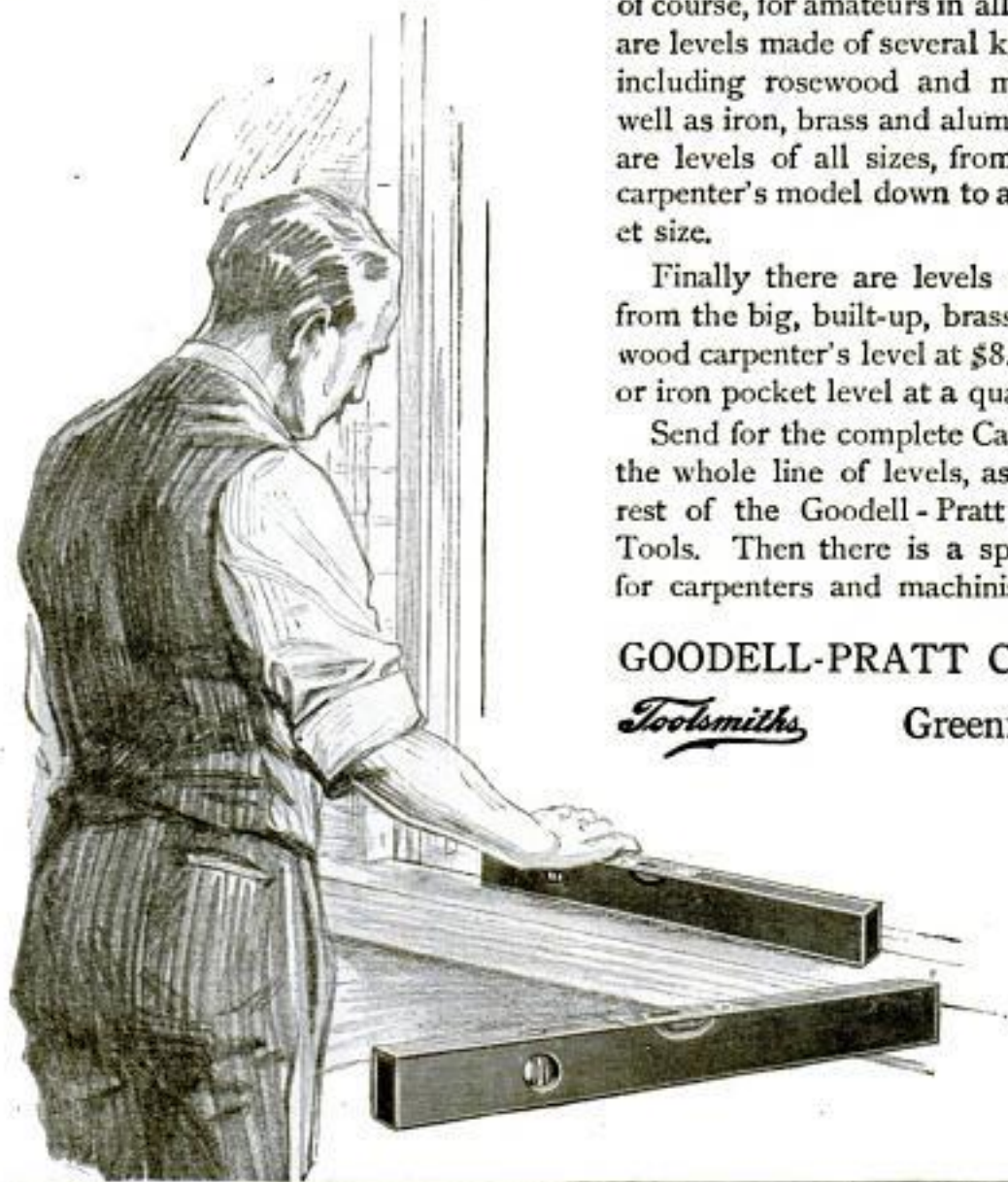
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Amateur Bench Lathe

No. 125



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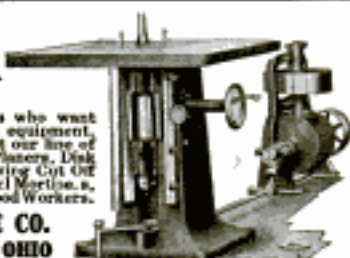
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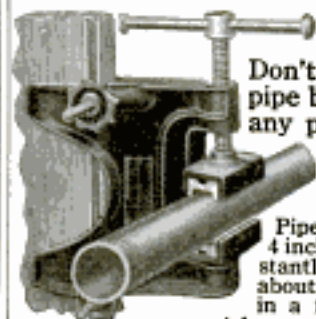


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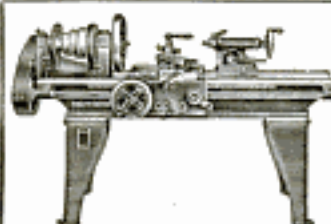
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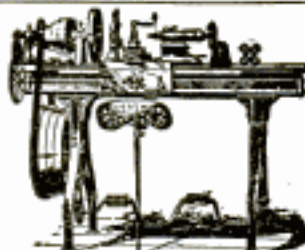
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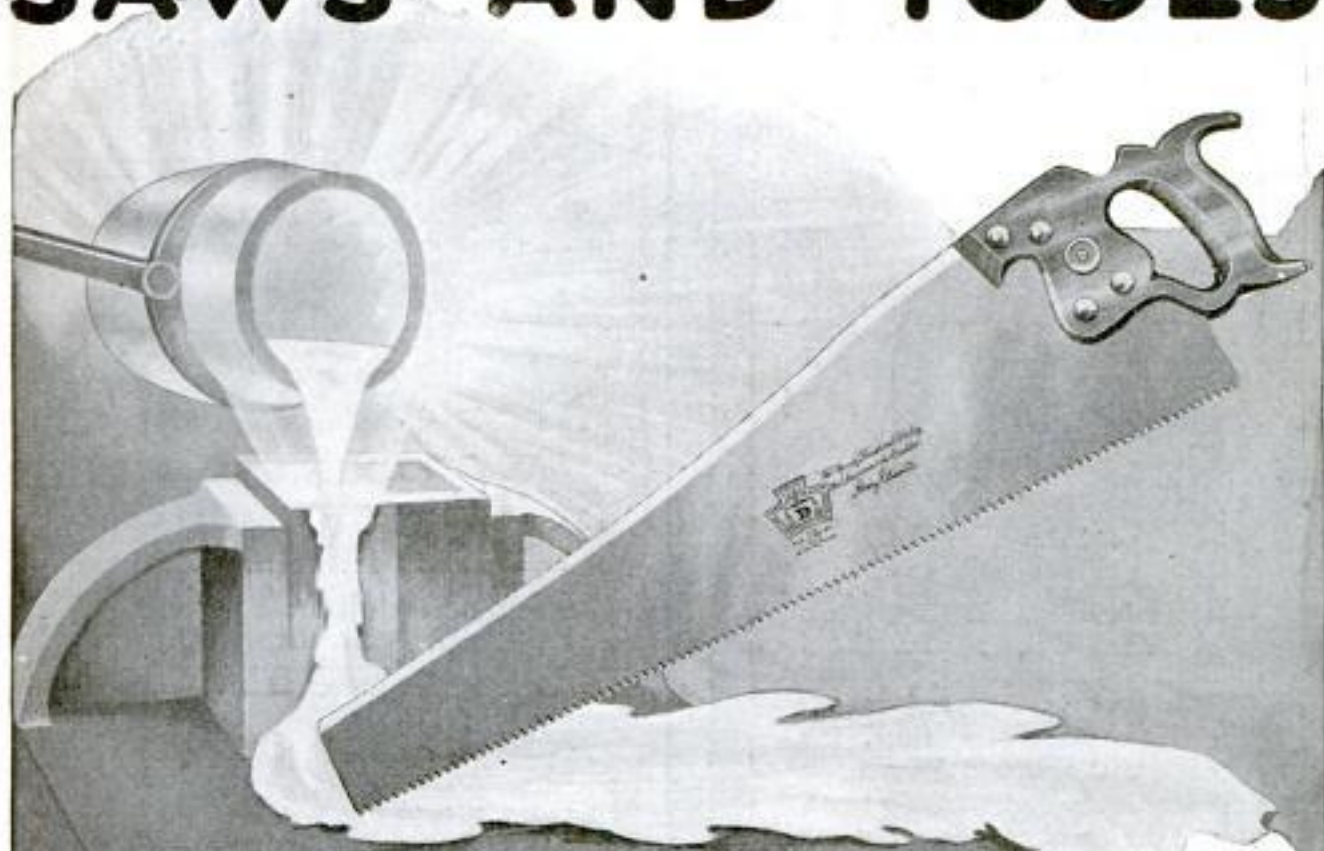
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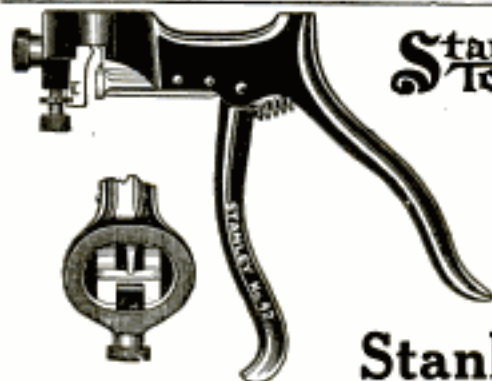
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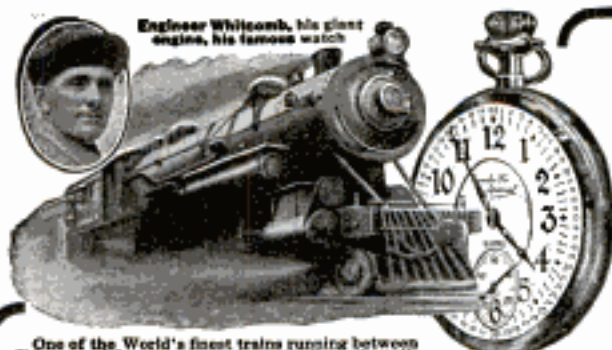
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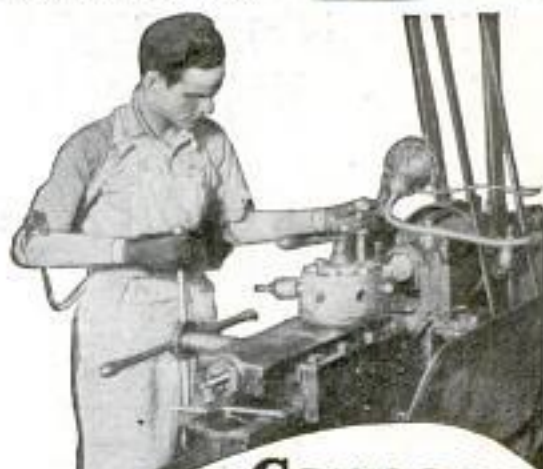
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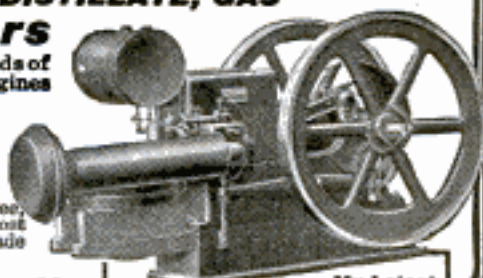
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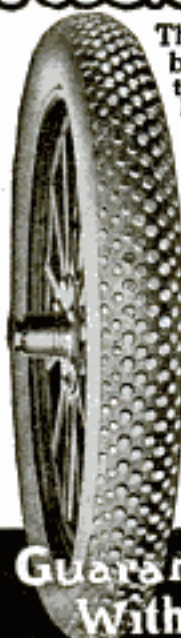
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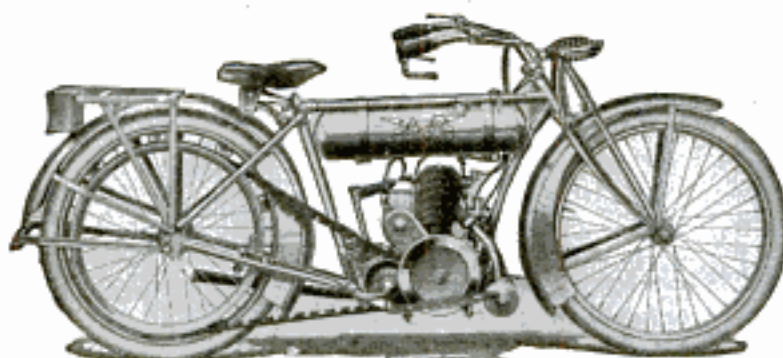


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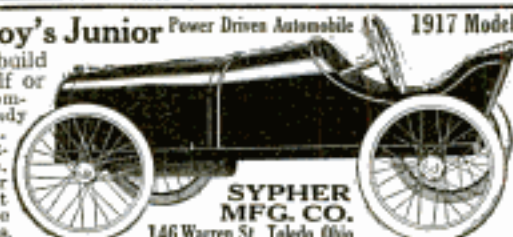
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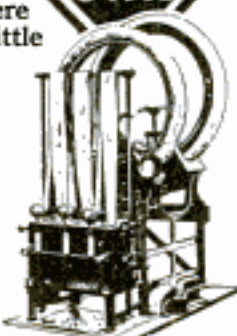
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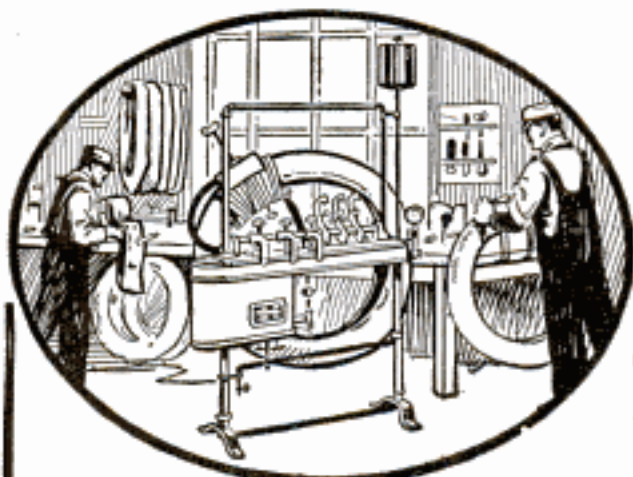
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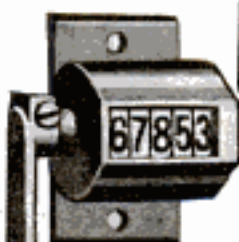
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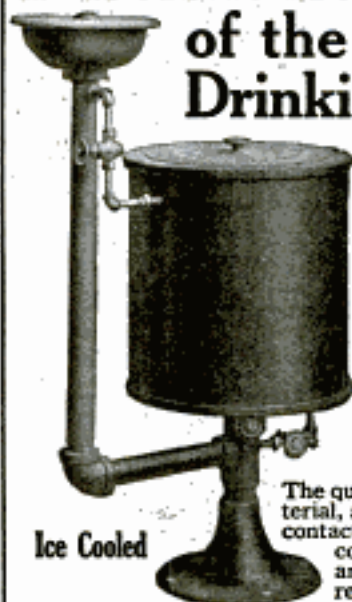
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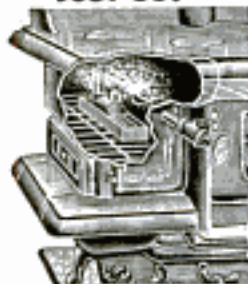
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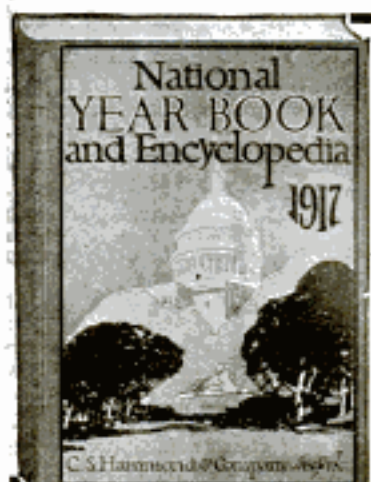
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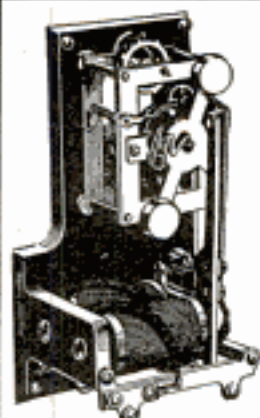
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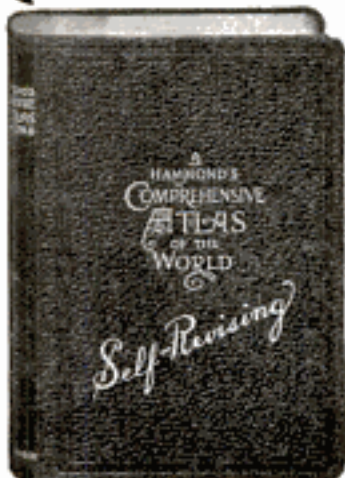
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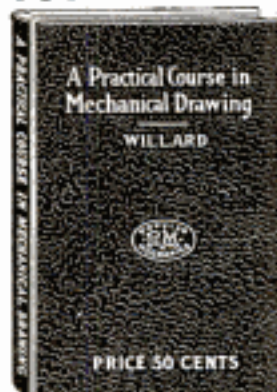
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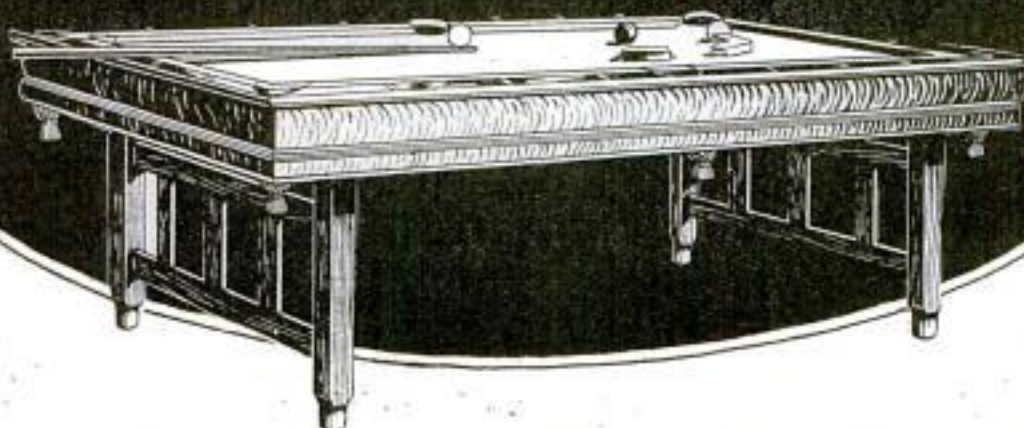
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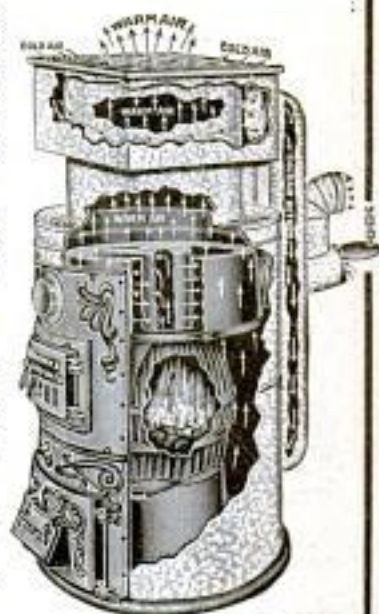
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To make the economy of the Oliver Nine available for everyone, we have arranged a simple plan. Here it is:

We ship an Oliver Nine to you for five days' free trial. Use it in your office or at home. Try it out without anyone to influence you.

If you want to keep it, send us \$3.00 per month until the \$49 is paid.

That is the entire plan. Simple, isn't it? You are the sole judge. At no time during the trial are you under the slightest obligation to buy. We will even refund transportation charges if you decide not to keep it. This is not a cheap machine in any particular—except the price.

Follow This Suggestion

Fill out and mail the coupon now. It will bring a free-trial order blank, our latest catalog and an amazing book. All free.

You may then have an Oliver for trial, if you wish. And own it for 50 per cent less than other standard makes. Surely no economy could be greater. And you would make no sacrifice in quality nor performance.

Don't wait—know all the facts now—all the inside secrets exposed for the first time. Fill out the coupon below—tear it out and put it in the mail. It does not obligate you.



THE OLIVER TYPEWRITER COMPANY
109-A Oliver Typewriter Bldg., Chicago, Ill.
Mail me your book—The High Cost of Typewriters—The Reason and the Remedy, the facts, figures and further information—all free and without obligation to me.
Name _____
Street Address _____
City _____ State _____
Mail Now

Get Your Fan Early

HOT, sultry days are coming! Last year, thousands kept cool, slept better—and did better work because they had "The Breezer" Electric Fan. But, we could not supply the entire demand.

This year, *you* can have "The Breezer" if you order it early.

This remarkable electric fan is built of the finest materials and best workmanship. It can be used either as a desk or wall fan, adjustable to any angle. It is handsomely nickel-plated and makes a beautiful addition to the most elegantly furnished home. This 8-inch fan can be operated at three speeds so you can regulate the cooling breeze to suit yourself.

Yet, the price is only \$8.75.

For the Chicago fan, illustrated below, you need pay but \$7.75. However, this fan has only one speed and is not adjustable. Both fans come complete with 6 feet of cord. Send the coupon today.

Shipped Free!

To get "The Breezer" fan all you need to do is to send the coupon below with your name and address. Don't send a penny. See this handsome "Breezer" fan for yourself before you decide whether you wish to buy or not. See how thoroughly it is made. Connect it with the electric light socket and turn the switch and feel its cooling breeze. Compare it with any other electric fan you have ever seen—even fans much larger—then, if you do not think it is the most remarkable electric fan value ever offered, send it back at our expense. If you decide to keep it, pay only the net transportation charges and the price of \$8.75 to the express agent. Don't miss this big offer. Write today.

Send the Coupon

Get one of these fans for your home—your office or your store. Do not delay. Thousands of people were disappointed last year. They couldn't buy a fan any place at any price. Send the coupon today if you want to get one of these handsome fans at the rock-bottom price. Act immediately. The output is limited. The demand, tremendous. Send the coupon now.

Lindstrom-Smith Co. Dept. B119—Chicago, Ill.

Dealers and Agents Write



Nickel plated, size 12 1/2 inches high, 8 1/2 inches wide. Operates on either direct or alternating current. 2 to 120 volts, any cycle, can be adjusted to any angle. Three speeds—regulated by lever in back of fan. Base provided with rubber feet. Guard made from heavy drawn metal.

Lindstrom-Smith Company
1100-1110 S. Wabash Av.
Dept. B119 Chicago, Ill.

Gentlemen:—Please send me a "Breezer" electric fan, complete with cord and ready to be connected. To be operated on _____ volts, _____ cycle. (State here the voltage and how it is to be operated on.) After I have seen it and examined it, I will either return it to you or pay the express agent the net transportation charges and the price of \$8.75.

Name.....

Address.....

Electrical Dealer's Name.....

If you want Chicago fan merely write "Chicago" in place of "Breezer" change price to \$7.75. Size 11 1/2 inches high, 8 1/2 inches wide.

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