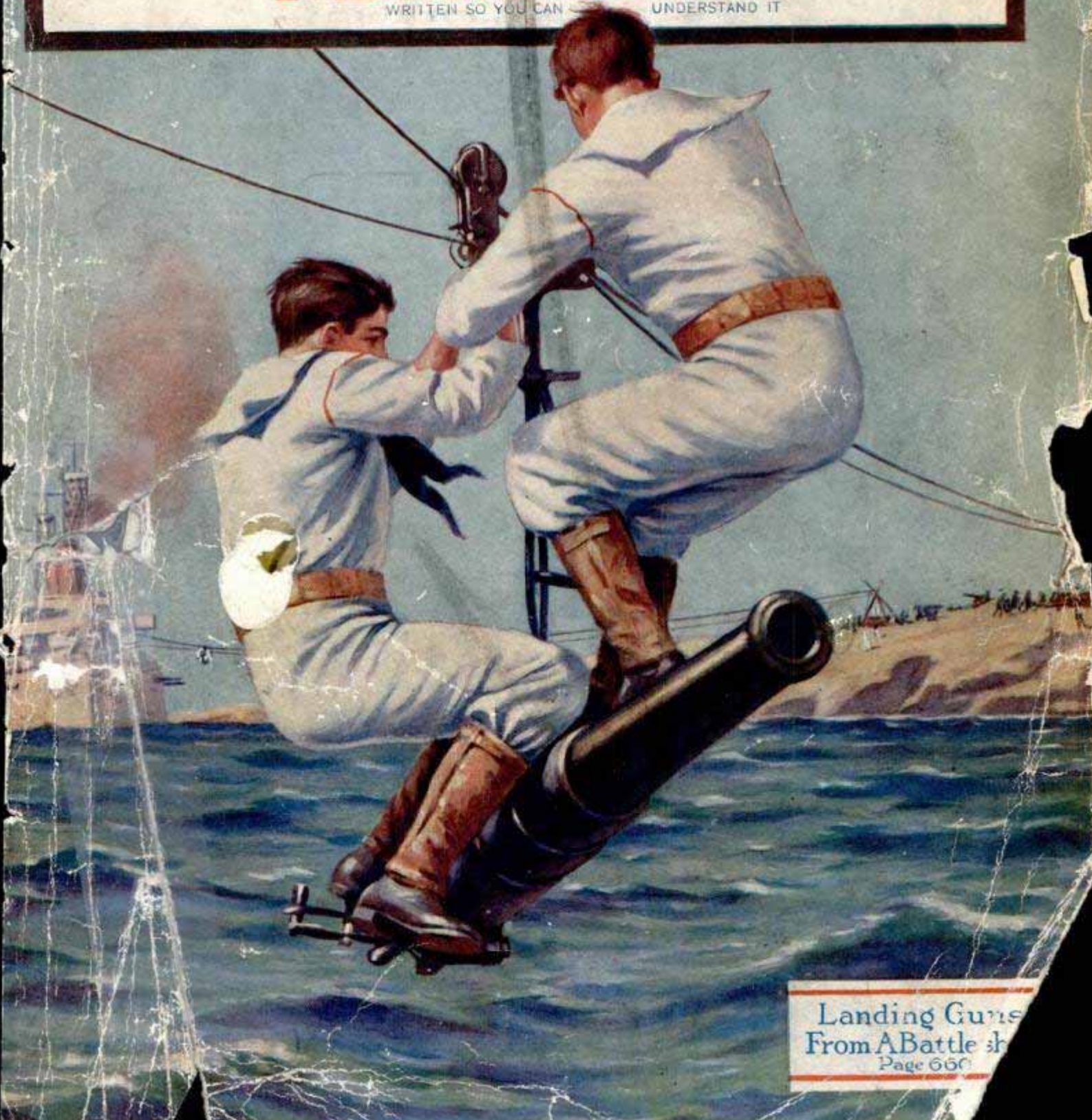


POPULAR MECHANICS MAGAZINE

WRITTEN SO YOU CAN UNDERSTAND IT



Landing Guns
From A Battle ship
Page 660

We Pay The Freight On These Houses

Design No. 73
Eight Rooms and bath all rooms convenient and roomy. Size 28x24 feet.



\$890

Design No. 93
Seven Rooms and bath, very attractive exterior; sleeping porch, balcony. Size 30x22 feet.



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Here is an opportunity for any man to own a home of his own, no matter how limited his means. Even if you have not definitely settled on any building plans, it will pay you big to take advantage of this sensational offer. Order the material NOW and build later. We are determined that the Fall of 1913 shall be the biggest, busiest

season in the history of this company. Hence these unprecedented offerings, the like of which have never before been made in the history of building material business.

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Nowhere else in all the world, can you duplicate these prices. We will save you from 1/2 to 3/4 what you would have to pay elsewhere. Look well at the illustrations of the 4 homes here shown—note the brief descriptions. We will furnish you the material needed to construct any of these homes strictly according to our Plans, Specifications and Material list at the prices quoted for each. But that is not all. We will deliver all this material right to your railroad shipping point, FREIGHT PREPAID BY US—no charges to be paid by you at all. You are not even required to pay one cent down. We ship subject to examination wholly at our own risk. We positively guarantee every item we send you to be high grade, brand new stock. We would not dare ship from \$500 to \$1,000 worth of material on these liberal, no-money-down, freight prepaid terms, were it otherwise.

Special Notice: These freight prepaid prices for all points in Illinois, Indiana, Ohio, Southern part of Michigan and Wisconsin and Eastern part of Iowa and hold good for these 4 designs only. Special freight prepaid prices to any point outside of above territory.

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Please remember, these prices quoted in this advertisement hold good only for 30 days. After that they will positively be withdrawn. If you are wise you will not let this chance go by as it may never come again. So be sure to write us today.

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Steam, Hot Water, and Warm Air. Let us estimate on your requirements. Big saving.



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We guarantee all brand new stock, sufficient quantity, prompt shipment. \$10,000,000 capital backs Guarantee.

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Design No. 60.

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the national joy smoke

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Here's a "dandy" Free Text Book for **"Home Carpenters"**

12 WORKING DRAWINGS
VOL. 36
CYPRESS
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GOOD CARPENTRY

"Short Cuts to Good Carpentry"
(Vol. 36, Cypress Pocket Library)

48 pages of authoritative instruction (simple, clear and stimulating) fully illustrated and with big Supplement, 24 x 36 in. with detailed Working Drawings that show how to make twelve "hard jobs" easy, safe and economical of both labor and Lumber. Read what "Rural Life," (Rochester, N. Y.) says of

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Popular Mechanics Magazine

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

EDITED BY H. H. WINDSOR

ISSUED MONTHLY

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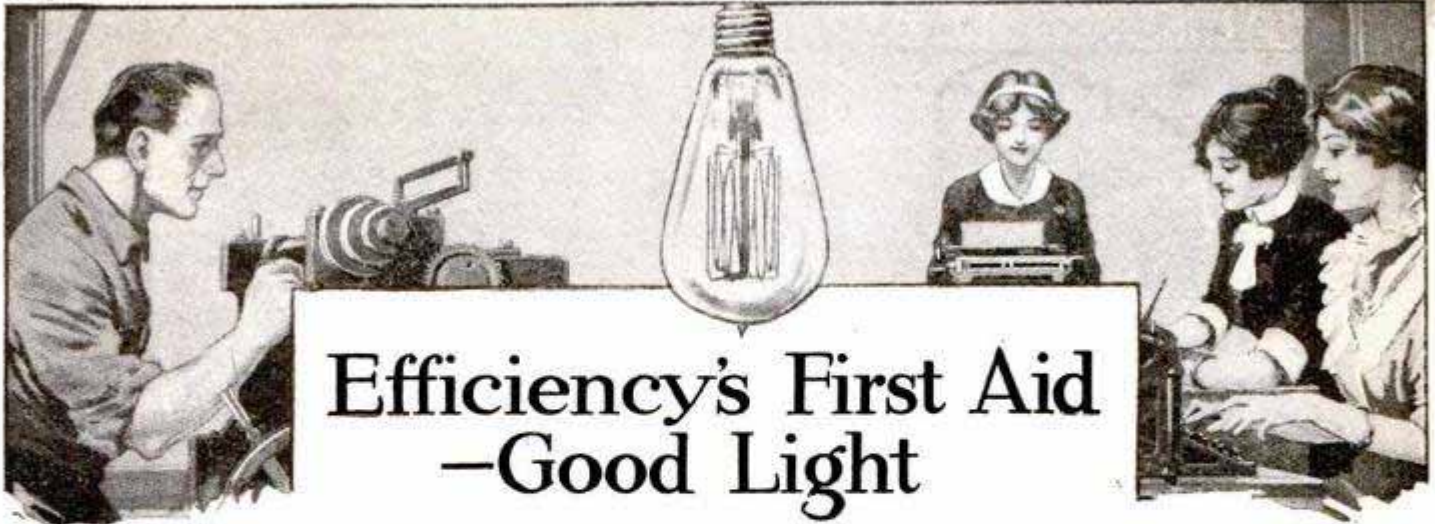
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Popular Mechanics offers no premiums; does not join in "clubbing offers," and employs no solicitors to secure subscriptions. It is for sale by nearly every newsdealer in the United States and Canada.



Efficiency's First Aid —Good Light

"You're working in the dark!" said a Western plant manager to his friend who had asked him to visit the latter's publishing offices in an Eastern Ohio town.

"How do you make that out?" asked the publishing man with a little astonishment. "We've had electricity here for five years."

"That may be," said the Western man. "And I don't mean that you can't see your hand before your face. But you haven't really emerged from the dark age. Honest, have you changed your lighting arrangements in those five years?"

The publishing man admitted that he hadn't.

"I thought so," said his frank visitor. "They were pretty poor to begin with, and they're entirely out of date. They're out of date because we're living in an age of really good light. More than half of your floor space is gloomy, partly because you use old-fashioned lamps—the Edison Mazda gives three times as much light with the same amount of electricity that is used in these ordinary carbon lamps—and partly because they are not placed to advantage. You're handicapping yourself and your entire force. You're putting a check on your office efficiency, which is bad business and you're wasting money on old methods which is bad business again. Good light is a big factor—it's efficiency's first aid. It would be worth all it costs even if it cost a lot of money. And yet it's cheaper than ever it was—been going down in price while the cost of everything else has been going up."

The result of this plain talk was that the publishing man got into communication with the local lighting company next day, and found himself keenly interested in the plans laid out by the electrical engineer who called to see him. Seven months later when he saw his friend again he declared: "You put it bluntly about my lighting, but you saved me money. My system now costs me no more, and you wouldn't know the place as it is now. It has put snap into all our work—I think we turn out fully thirty per cent. more

than we did, and we do it with fully fifty per cent. more comfort. I'm a light enthusiast from now on."

This incident reflects an experience in a certain type of business, but there is no sort of business to which the outspoken philosophy that stirred this particular manager might not apply with equal force. For manufacturer and merchant, banker, broker or business man anywhere, good light is a basic business factor.

Good light is good business. It brings people into a store, for example, and helps sell goods to those people. It helps the display of goods, and it affects not only customers but the selling force.

It affects equally the brain output and the physical output of every sort of business. It raises the percentage of sheer efficiency in every unit of a force, whether it is a small office force of a dozen or a large force of a thousand. That percentage of increase in efficiency would be considered highly important in a group of machines. It is even more so in a group of men or women.

Perhaps you have realized this fact in your business without guessing exactly how the thing might be worked out to meet your special needs and opportunities. It is possible that you have not ascertained the cheapness and facility of modern wiring—that you may not know of the growing cheapness of electric light itself.

These are matters which an electrical engineer knows, and can lay before you.

The electrical expert will tell you about the Edison Mazda lamp. He will show you the comfort—for you personally and for your force—and—he will show you the real economy that lies in modern ways of lighting.

Take up the matter today with your electric power and light company, or any General Electric Company agent in your vicinity. You will find them more than glad to co-operate with you, and no matter how complex your problem may be, they have at their command the service of any part of our organization that may be most helpful to them and to you.

*The Guarantee
of Excellence on
Goods Electrical*



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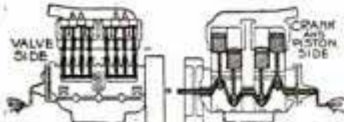


NOW AN AUTO MECHANICIAN DOING WORK AT HOMES OF AUTO OWNERS WAS A CLERK (BERT TIPPEY)

Everyone in the business is making money and every year it grows four times. **DON'T DELAY—START NOW.**

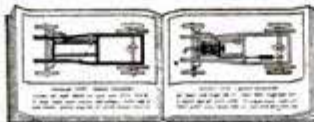
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BEST
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FOR

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The following cash prizes will be paid for the 20 best original articles suitable for publication in the Amateur Mechanics Department of Popular Mechanics Magazine.

| | |
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| First Cash Prize | \$35 |
| Second Cash Prize | 25 |
| Third Cash Prize | 20 |
| Fourth Cash Prize | 15 |
| Fifth Cash Prize | 10 |
| Sixth Cash Prize | 10 |
| Seventh Cash Prize | 10 |
| Eighth Cash Prize | 10 |
| Ninth Cash Prize | 10 |
| Tenth Cash Prize | 5 |
| Eleventh Cash Prize | 5 |
| Twelfth Cash Prize | 5 |
| Thirteenth Cash Prize | 5 |
| Fourteenth Cash Prize | 5 |
| Fifteenth Cash Prize | 5 |
| Sixteenth Cash Prize | 5 |
| Seventeenth Cash Prize | 5 |
| Eighteenth Cash Prize | 5 |
| Nineteenth Cash Prize | 5 |
| Twentieth Cash Prize | 5 |

Contest Closes December 10, 1913

To be available, the descriptive articles must be new, original and suitable for publication in the Amateur Mechanics Department. Where necessary to a better understanding by our readers, photographs, plans, or pencil sketches should accompany the manuscript. We do not want mere descriptions of things that have been done, unless they are such as young people generally would be likely to make and that can be built with ordinary tools and materials.

Contributors may submit as many articles as desired, but no one will be awarded more than one prize.

Articles failing to win one of the prizes, but suitable for publication, will be promptly paid for at usual rates; all others will be returned.

On December 15th, 1913, the articles will be judged and the prize money sent at once. Publication of the names of the winners will follow in the February, 1914, issue.

Mark your article "For Prize Contest Amateur Mechanics Dept.," and mail to Editor

Popular Mechanics Magazine
318 W. Washington St., Chicago

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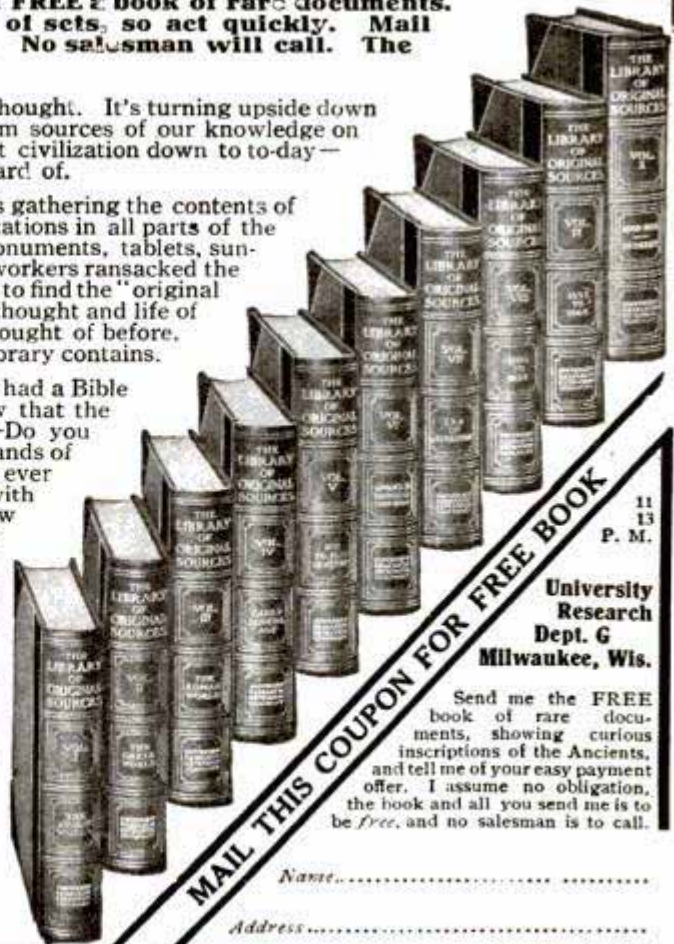
OVER 100 RESEARCH SPECIALISTS spent 10 years gathering the contents of this great work. Ancient and remote and forgotten civilizations in all parts of the globe were uncovered, and age-buried hieroglyphics on monuments, tablets, sun-baked bricks and palimpsests yielded their secrets; untiring workers ransacked the hidden literature of every age, ancient, mediæval and modern, to find the "original documents" that shaped the civilizations and influenced the thought and life of the world. Nothing like it has ever been attempted or thought of before. You'll be amazed at the wealth of information this unique library contains.

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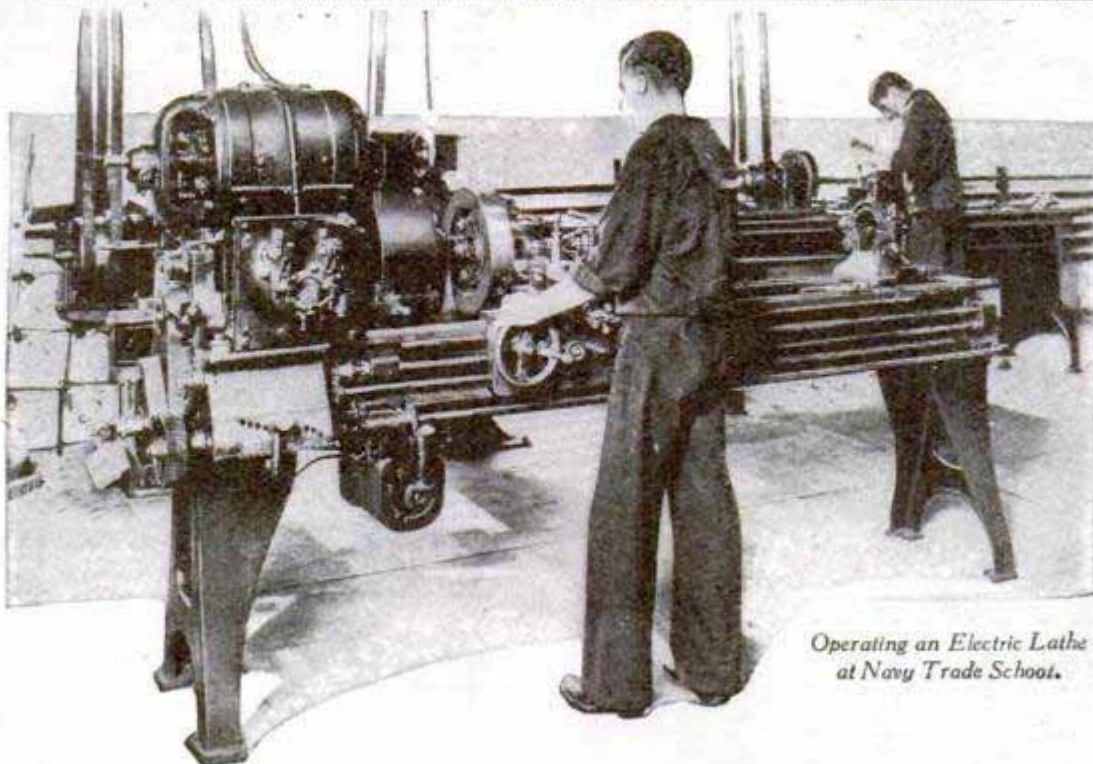
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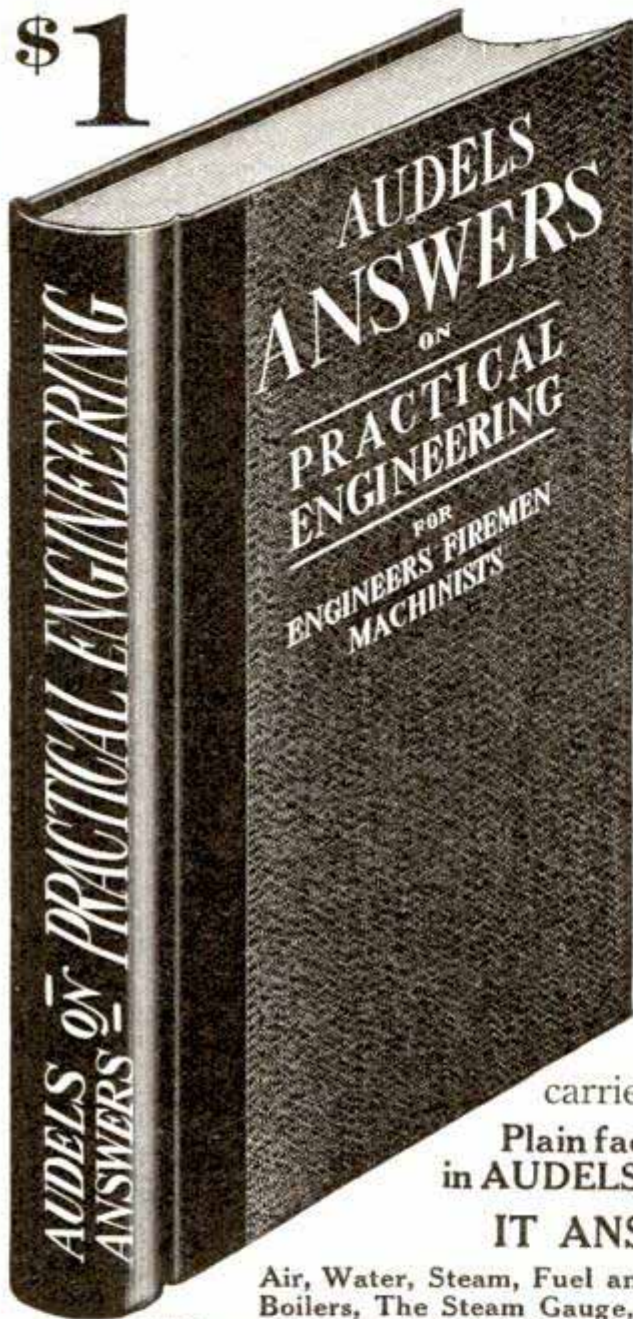
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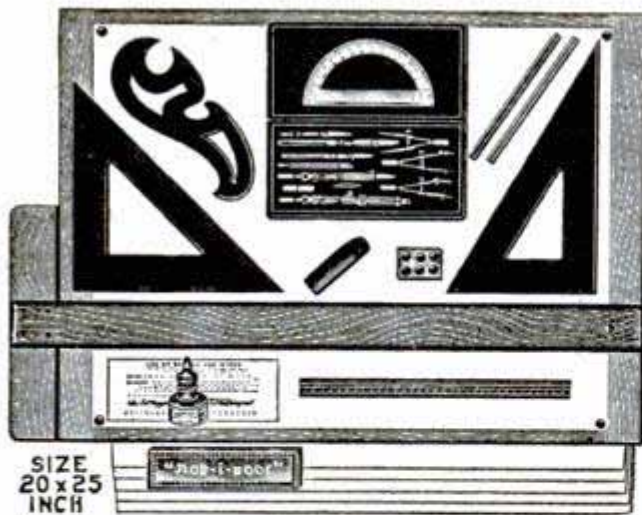
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\$5,000 BUSINESS Free—8 other monster money-makers free. Our free plans supply real money to start you in business. \$10 to \$125 actual cash advanced—no borrowing—no debts. Postal brings startling details—overwhelming proof. **Security Service Co.**, 1163 Spitzer, Toledo, O.

\$800 MADE distributing advertising matter in 7 months. Pleasant, healthful, outdoor work. Particulars for stamp. **Pulver Bros.**, Hudson, New York.

MAKE big money during spare time, mailing circulars. Complete instructions 12c. **George C. Fenner**, Louisville, Ky.

MAIL Order Propositions that Get the Money! Samples worth 70c, 25c. Literature free. **Bodolph**, Northwestern Building, Chicago.

MR. Mail-Order Man: Get quick returns. Established corporation supplies fast mail-order sellers; factory prices. Classy proposition. Beginners or established firms. Copyrighted Prospectus free. **Mississippi Valley Co., Inc.**, Box M929, Pittsburg, Kans.

WE start you in high-grade, permanent, profitable business. All or spare time. Any location. Men or women. Experience unnecessary. Write us. **Peerless Candy Co.**, 345 Knickerbocker Block, Denver, Colo.

IF you have \$216 I can show you how to get started in a business which will show you a gross profit of 233 1/3%. Only reliable men and women wanted. Must act as our local sales manager. Most wonderful money-making business. **W. F. Mitchell**, Suite 630, 1011 Chestnut St., Phila.

\$1 STARTS you in a paying mail-order business at home. Full particulars free. **Chapman Supply Co.**, Minneapolis, Minn.

WANTED—An idea for cash. **Patent News**, Washington, D. C.

"HOW to make good in the mail order business." Read our magazine, 10c copy. Three months 25c. The "Lever" Mail Trader, 44 Elizabeth, N. J.

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

AUTOMOBILE specialty business need in every town. Small capital required. We will start you and guarantee \$5 profit for every dollar invested. Send \$2 for full instructions and exclusive right in your territory. **G. E. Blaylock & Co.**, 2511 W. Pratt St., Baltimore, Md.

I WILL give you the famous \$50 lessons on selling by mail if you will sell my goods. **Fields**, Box 826, Kansas City, Mo.

RESILVER mirrors and make plenty of money. Full instructions, 25c. **Auburn Supply Co.**, Dept. R11, 7745 Peoria St., Chicago.

BE sure to read Miller's ad "Valuable Trade Secrets" in miscellaneous classified column.

BUILD a \$5,000 business in two years. Let us start you in the collection business. No capital needed; big field. We teach secrets of collecting money; refer business to you. Write today for Free Pointers and new plan. **American Collection Service**, 101 State St., Detroit, Mich.

ADVERTISE—28 words in 100 monthly magazines and 58 weekly newspapers for \$2.50. **Monarch Advertising Agency**, St. Louis.

IF you have money to invest in highly profitable manufacturing that is safe. Write **W. L. McLaughlin**, Consulting Engineer, Lomax, Ill.

COMPANIES incorporated anywhere. Stocks and bonds bought and sold. **Rosenbaum Company**, 259 Haight Building, Seattle, Washington.

AGENTS for Altamex Complexion Cream. Liberal proposition. 1819 Addison, Berkeley, Cal.

I WANT to send you proof of the wonderful pulling power of **Popular Mechanics** classified pages. What's your proposition? Write me today. **P. W. Johnson**, Classified Dept., **Popular Mechanics Magazine**, 218 W. Washington St., Chicago.

START in business for yourself, but first read "Mail Order Failures," the guide to the Mail Order Business. Price one dollar. A few dollars invested will make you independent, if you follow the advice given. Nothing else to sell. **Vernon Burr**, Norwich, New York.

"SCIENTIFIC Review," 419 First Avenue, N. Y. Trial subscription, six months, 10c. Before investing money in patents get this paper. Write-up \$7 column including 100 copies.

DO you want to sell quick? That's the secret millions of men and women would give a great deal to know; no school course or book lesson to sell or other fish to fry; I'm in the business; I know how; sell your own farm, business or property of any kind; make \$5,000 to \$25,000 year selling for others; \$1 puts you in now; \$5 if I have to answer correspondence. **Robt. McGinnis**, Nettleton, Ark.

LEARN to collect money by a sure, easy system. Big income. Quick results. No capital required. Send today for instructive free book, "Skillful Collecting." **Collectors' Ass'n**, Long Street, Newark, Ohio.

YOUR 25-word ad inserted in "Cartoons Magazine," 50c. One inch display, \$1. Circulation, 23,000 copies. Send copy now. **Cartoons (Classified Dept.)**, 322 W. Washington St., Chicago.

ANYONE anywhere, \$5 daily replating silverware. Samples free. **E. Fliske**, 101 Sheffield Ave., Buffalo, N. Y.

MAIL-ORDER Dealers: Send for our catalogue for brand new articles to sell. **Gordon Mfg. Co.**, Northwestern Bldg., Chicago.

BEST imported and domestic novelties, tricks, jokers, puzzles, etc., at lowest wholesale prices. Complete assortment, prompt shipments. Catalogue free. **Joseph Methieu**, 203 Court St., Brockton, Mass.

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

RAISE Ginseng, \$1 per ft. of ground; 1/2 acre, \$25,000. Write **Ginseng Gardens**, Sheboygan, Wis.

CASH for your business or property. I bring buyers and sellers together. Write me if you want to buy, sell or exchange any kind of business or property. Established 1881. **Frank P. Cleveland**, 1308 Adams Express Building, Chicago, Ill.

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

ASK Bode about Buying! Selling! Ad- Writing! Anything! Get acquainted "Now" **Bode**, 288p Main, Hartford, Conn.

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

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

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

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

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

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

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

AGENTS WANTED

AGENTS Wanted—If you know a chance when you see it you'll see one now. Big money—stylish, nifty clothes—little work—no experience or capital needed—can you beat that? We want agents everywhere to take care of our business in their localities and to advertise our nobby nifty suits by wearing them. We furnish everything complete and charge nothing for agents' outfit. The swellest dressers everywhere are our agents and all we ask is that you tell people who inquire about your fine clothes where and how they can get them. You make big money—\$10 a day—without trouble. Just a postal brings you full outfit free. Big, new sample book of up-to-the-minute suitings sent so you can pick out your first suit; also measuring blanks and everything you need. We pay express on everything—not a penny for you to pay. Send quick before some one else gets the agency there—mail postal today to American Woolen Mills Co., Dept. 1114, Chicago, Ill.

\$1,200 COLD Cash—Made, Paid, Banked in 30 days by Stoneman; \$15,000 to date. Join our famous \$1,000 class, which absolutely insures \$1,000 per man, per county. Korstad, a farmer, did \$2,200 in 14 days. Schleicher, a minister, \$195 first 12 hours after appointment. Ten inexperienced men divided \$40,000 within 18 months. Strange invention startles world. Agents amazed. Think what this invention does: Gives every home a bathroom with hot and cold running water for \$6.50. Abolishes plumbing, water works. Self-heating. No wonder Hart sold 16 in 3 hours—\$5,000 altogether; Lodewick 17 first day. Credit given—Come now—Investigate. Postal will do. Exclusive sale—requires quick action, but means \$1,000 and more for you. Allen Mfg. Co., 3781 Allen Bldg., Toledo, Ohio.

\$61.50 WEEKLY introducing and selling a new Gas Light Burner for Kerosene Lamps. Beautiful light. No chimney. No mantle. Perfectly safe. Simple in construction. Nothing to get broken or out of order. Will not burn out. Durable. Will last for years. Low price. Easy to sell. 200 per cent profit. Experience not necessary. Sample free. Why not try one on your lamp. Beware of imitations. No branch offices. Luther Manufacturing Co., Dept. 247, Cincinnati, Ohio.

AGENTS—Every household on farm, in small town, or suburbs where oil lamps are used needs and will buy this wonderful mantle lamp; burns common coal oil (kerosene), gives a light five times as bright as electric; one farmer cleared over \$500 in 6 weeks; hundreds earning \$100 to \$300 per month. Write quick for wholesale prices, territory and sample lamp for free trial. Mantle Lamp Co., 351 Aladdin Bldg., Chicago, Ill.

YOUNG man, would you accept and wear a fine tailor-made suit just for showing it to your friends? Or a Slip-on Raincoat Free? Could you use \$5 a day for a little spare time? Perhaps we can offer you a steady job. If you live in a town smaller than 10,000 write at once and get beautiful samples, styles and this wonderful offer. Banner Tailoring Company, Dept. 560, Chicago.

THE OIL, Dusting and Polishing Mop Industry offers the richest opportunities to Live Crew Managers, General and Local Agents. Annual sales now exceed Two Million Dollars. Our New Invention is rapidly revolutionizing the business. Largest factory in America. Highly remunerative contracts. Prompt action necessary. Frederick Mfg. Co., 465 Marbridge Bldg., New York.

GENERAL Agents—Capable of calling on the big trade themselves and handling canvassers for the house to house and office to office business, to sell the newest electrical specialty on the market; sold everywhere there is electricity, in the home, office, factory, store, hotel, liberal profits; sales-driving sample, weighs a pound, no experience or knowledge of electricity required; shows how to use one light instead of two and get the same results; sells for \$2.50, \$3.50, \$5.00 and saves the purchaser an investment of \$25. Write for particulars. The Handy Light Co., 160 Handy Light Block, Cincinnati, Ohio.

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

LIBERAL salary with cash commission and share in our profits. 50 valuable advertising premiums for customers bring quick sales. Your own 72-page catalogs furnished to start you in mail order business. Experience unnecessary. Best season now. Credit given. Write immediately. Best Manufacturing Co., Div. 13, Providence, R. I.

ENDLESS Neckties (Patented). Sell on sight. Big Xmas seller. Agents start early; write today for Sample Outfit. Look like any stylish necktie—tie in a different place each time; wear 20 times as long. Man made \$5.50 one hour—girl \$87 one week. Endless Necktie Co., Kansas City, Mo.

AGENTS, canvassers, crew managers, salesmen wanted in every community for our famous 7 and 8 cake \$1 soap assortments; advertising price, 25c; costs 12½c; attractive premiums given; everybody buys; lose no time getting our list money-getters. Moore Bros. Co., Manufacturers. Established 1890, 289 Greenwich Street, New York.

VACUUM Cleaner Agents, here it is; absolutely new design in wheel-operated, powerful bellows-type vacuum cleaner; new visible nozzle; exclusive appearance; sells quick at \$7.50; write for particulars about money-back guarantee now. D. Doty Company, Box 500, Dayton, Ohio.

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

G. STRATTON, Denver, made net profit \$134.40 on our rugs in 6 days. Working simple these rugs with colored illustrations other patterns, forwarded prepaid for \$1. Reference: Boylston Nat'l Bank, Boston. Dundee Mfg. Co., 46 Chauncy St., Boston, Mass.

BE Independent—Start a mail order business in your own home; we tell you how and furnish everything needed, wholesale; an honorable and profitable business for man or woman. Many make \$3,000 a year. Particulars free. Murphy Mfg. Co., East Norwalk, Conn.

AGENTS—Splendid money-maker. Sell chewing gum to dealers. Clean, profitable business established quickly with our new brands. Four flavors. Novel packages. Write for exclusive territory proposition. Helmet Gum Factory, 39 Opera Place, Cincinnati, O.

I WILL start you earning \$4 daily at home in spare time, silvering mirrors; no capital; send for free instructive booklet, giving plans of operation. G. F. Redmond, Dept. 396, Boston, Mass.

WE manufacture the most complete assortment of novelties, tricks, and puzzles in the world. Agents, dealers, supply houses and jobbers are making big money with our line. Fast sellers. Low quantity prices. Large illustrated catalogue free. Oaks Magical Co., Dept. 8, Oshkosh, Wis.

NECKTIE proposition for holiday trade. Beautiful premium to each customer. Ladies or gentlemen make \$10 a week from now until Christmas. Outfit free to workers. Be first in your neighborhood. D. Wilson Mfg. Co., Lancaster, Ohio.

BE independent. Work for yourself with our new invention. Just patented. No canvassing. 8c profit on every dime. Free circulars. International Metal & Ferro Co., Desk 44, Chicago.

500% PROFIT. Sliding casters. Necessity every home; child can attach. Saves floors, carpets, furniture. Hotels, restaurants buy gross lots. Cost 2½c, sell 15c. Agents making \$25 to \$100 every week. Samples free. H. O. Sliding Caster Co., 19 L.L. State St., New York City.

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., 1695 Hyde St., San Francisco.

LEARN Metalizing. Transform Roses, Carnations, Butterflies, etc., into exquisite jewelry novelties. Big profits. Dime brings rosebud pin and particulars. P. Benson, Stewartville, Minn.

GENERAL Agents Wanted—To sell double suction vacuum cleaner; greater suction than electric; special steel construction. Full Nickel Plated. Wizard Mfg. Co., Madison, Wis.

I NEED one energetic, dependable representative in every county to take orders for our new Popular Mechanics book for boys called "The Boy Mechanic." This is not a story book, but a wonderful and interesting collection of 700 things boys love to make and experiment with. A very large attractive book for the price, \$1.50. Every boy's father or mother will want to buy it for their son. Right now is the most opportune time to start on account of the approaching holiday season as this is an unusually attractive gift book. It sells itself. Good liberal commission and exclusive territory. You don't have to be a professional agent to be successful with this highly meritorious proposition. Work in and around your home town during spare time only if you cannot devote all your time to it. Write today for full particulars to Manager Book Dept., Popular Mechanics Co., 318 W. Washington St., Chicago.

AGENTS—Monthly Directory Illustrated contains details newest, best selling specialties, money-making propositions of responsible concerns. Two months, 10c. Robert Butler, 123 Cedar St., N. Y.

AGENTS—Here's a new, better dust mop. Its marked superiority interests every housewife and easy sales come quick. Big money in it for you. Why not get our profitable proposition at once. Dearborn Duster Co., Dept. C4, Chicago, Ill.

MAIL-ORDER Opportunities: 25 new Propositions. No competition! Make 95c profit on dollar order; complete outfit 10c. Mail Dealers Wholesale House, 521 Franklin Bldg., Chicago.

AGENTS—Portraits, 35c. Frames, 15c. Sheet Pictures, 1c. Stereoscopes, 25c. Views 1c. 30 days' credit. Samples and catalog free. Consolidated Portrait Co., Dept. 5243, 1027 W. Adams St., Chicago.

AGENTS for splendid high grade seller; easy to handle; large demand, big profits; particulars free. The Cinch Supply Co., 6 Marlowe St., Dorchester, Mass.

WE start you in big money-making business. We trust you for outfit. It costs money for you the minute you get it. 85c profit on every dollar. Circulars free. F. P. C. C. Works, Desk 43, 2231 W. 12th St., Chicago.

PHOTO Pillow Tops, Portraits, Frames, Sheet Pictures, Photo China Plates. Rejects credited. Prompt shipments; samples and Cat. free to agents. 30 days' credit. Jas. C. Bailey Co., Desk P2, Chicago, Ill.

AGENTS—Kerosene (Coal oil) Self-Heating Iron. Brand new. Absolutely safe, odorless, a winner. Every home needs it. Low priced. Big profits. Your territory open. Thomas Iron Co., 162 Neal St., Dayton, Ohio.

\$5 TO \$20 daily to agents who are hustlers, selling our new and wonderful line of goods. Our big capital backs you. Exclusive territory. Wm. J. Dick, Manager, Dept. C-4, Chicago.

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

AGENTS, best seller in Christmas season; very rare and newest Japanese novelties that we have ever seen. Sample 25c. Otuska Co., 223 So. Hill St., Los Angeles, Calif.

AGENTS—To sell the newest electric appliance on the market; sold everywhere there is electricity, in the home and office; liberal profits; sales-driving sample, weighs a pound, no experience or knowledge of electricity required; it shows how to use one light instead of two and get the same results; sells for \$3.50 and saves the purchaser an investment of \$25. Write for particulars. The Handy Light Co., 112 Handy Light Block, Cincinnati, Ohio.

STOP Canvassing! Make \$10 a day traveling for us without canvassing or selling to retailers. Splendid new plan. Write quick. Ziebarth, 4210 N. Evans Ave., Chicago, Ill.

AGENTS—Make big profits, high-class seller; every auto owner buys; easy to demonstrate; particulars free. National Supply Co., Box 233, Salisbury, N. C.

AGENTS for household article; good recaper; big profits; 10c for sample. Hayman & Campbell, 146½ View St., New Haven, Conn.

HOUSE-TOPS for milk bottles; self-lighting gas tips. Brand new. \$10 made daily. Write quick. Box 157, Waynesboro, Pa.

I WILL instruct you in the mail order business free if you will handle my goods. Crest Co., A., Atlantic City, N. J.

AGENTS Wanted—Right here is the one big chance of your life. If you want to make good money—\$10 a day or more, as easy as rolling off a log, and get your swell clothes free besides, you can do it by acting as our agent. We are the biggest people in the business and want our agents to make big money and be nifty, stylish dressers. Send a postal today for free \$10 outfit, including a big book of nobby suiting samples to select your swell agent's suit from. Then take orders from people who admire your nifty clothes. They come to you—not you to them. This is the way to get rich—the sure, easy way. Remember you need no money—everything is furnished by us free. We pay express on everything. Just send a postal, but do it today. You can't get started too quick, making this big money and wearing these stylish clothes. Address card to Paragon Tailoring Co., Dept. 1114, Chicago, Ill.

HOUSEHOLD Necessity—Saves 80%. Amazing results. Universal demand. Profit 125%. McLaughlan writes, "Averaged \$8.76 daily this summer." Sample 10c. Craig Brothers, Detroit, Mich.

AGENTS make bigger money selling our up-to-date novelty signs. Catalogue free. Novelty Sign Card Co., Desk A2, St. Louis.

AGENTS Wanted—50% more heat from "Coal" when treated with "Fl-o-lite." Try a 25c box, William Brameld, 22 Hopper St., Paterson, N. J.

OUR embroideries, ladies' apparel, hose and neckwear offer permanent income. Catalogue free. O. K. Novelty Co., Jersey City, N. J.

400 PER CENT profit selling "Rabbit-foot" sewing-machine attachment. Sample free to agents. Bunnell, 605 Blake, McFall Bldg., Portland, Ore.

AGENTS to handle an automobile specialty; sells on sight; large profits. Jones Electric and Engineering Co., Perry, Iowa.

AGENTS—I have best selling article on market; real money-getter; sample 10c. Walter B. Barth, Poughkeepsie, N. Y.

"**BOOSTER**" will show you how to make more money! Operate a good, substantial "Income Mail Business." Our "Silent Salesman" system can easily be worked during spare time. Don't invest any money until you read "Booster"—the magazine that has, for years, actually and accurately started others like you in business for themselves by publishing money-making propositions that get the dollars. Send 10c today for two months' trial—it's worth dollars to you. **Booster Magazine**, Northwestern Building, Chicago.

YOUR profit \$4 each sale. Just out, new gasoline saver for autos and motor boats. Guaranteed to save 25 per cent on gasoline bills. Auto owners buy on sight; nothing like it; a sensation. Just 3 sales a day nets you \$12. Territory now being assigned; write quick. The Parsons Mfg. Co., Toledo, Ohio.

AGENTS—Postal brings free illustrated directory; contains details newest, best selling specialties, money-making propositions of responsible concerns. Philip Butler Publishing Co., 123 Cedar St., New York.

RURAL Agents, write for our "10-day free trial offer to prospective agents" on our New Improved 1914 Model Vacuum Cleaner. We pay all express charges. Best and strongest suction cleaner made. Gets both germs and dirt. Guaranteed 5 years. Postal will bring offer. Warner Vacuum Cleaner Company, Dept. "Z," Muncie, Ind.

AGENTS—125% profit selling "Emanel," the best Vegetable Toilet Soap ever manufactured. Emanel Company, Box 965-X, Pittsburgh, Pa.

HAMMER steel attachment, single hand plants nails way up; everybody wants; agents' bonanza, sell wholesale; street demonstrators make \$5-\$10 hour. Sample dime. Large territories; money back. Guillemet, 3529 Mission St., San Francisco.

HURRAH! It's true. \$100 to \$500 a month sure. Want hustling man or woman in each locality—18 to 50 years. No canvassing—easy to do—makes you influential. Simply recommend us to your friends. You don't need high education nor experience—we teach you everything—all or part time. Valuable prize free to first acceptance from each place. Write for yours quick. The I. L. U., 1204 Covington, Ky.

RELIABLE Sales Agents—To sell and introduce Sterling Vacuum Cleaners. Exclusive territory assigned. Sweeper type, hardwood veneered, compact and efficient. Latest labor-saver. Approved Good Housekeeping Magazine. Appearance attracts; demonstrations clinch sales. Ask for proposition. Sterling Vacuum Cleaner Co., Worcester, Mass.

AGENTS Wanted—Automobile owners buy "Watch Dog" Auto Lock at sight. Nothing to install. Just deliver the lock and get the money. Price \$2 each. Cost to you \$7.50 per dozen. Sample sent prepaid for 75c. S. Breakstone, 1718 Michigan Ave., Chicago.

AGENTS average 200% profit. Territory to workers. New ironing wax; Starch gloss; Washing compound; Bluing. Best continuous sellers. Permanent business. E. Leibman, Richmond Hill, N. Y.

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

SALESMEN making small towns whole time or side-line, should carry our fast-selling pocket side-line. Special sales plan allowing return of unsold goods makes quick, easy sales. \$4 commission on each order. Something entirely new. Write for outfit today. **Burd Mfg. Co.**, 212 Sigel St., Chicago, Ill.

WIDE-AWAKE, active agents can secure special concessions and reap benefit from best money-making agency proposition on the market, by writing immediately for full particulars. **Hugo Manufacturing Co.**, 429 South Dearborn St., Chicago, Ill.

AGENTS—Our Wonderful Luminous Crucifix Solves that Christmas Gift Worry. Each crucifix will be put up in an attractive holly box, making same a most appropriate present. Thousands will be sold during the next two months. Let us show you our new "Dark Room" Demonstrating Carrying Case. Write or wire for prices and territory and start the New Year with a nice bank account. **Pioneer Portrait Co.**, 1259 W. 63rd St., Chicago.

SALESMEN—Traveling in Illinois, Indiana and Wisconsin; Good side line; takes only fifteen minutes to make sale; big commission; sample small and compact, weighing but five pounds. **Universal Sales Company**, 509 Harris Trust Building, Chicago.

DO you want to make money? Men—Women—Children. Fifteen cents stamps or cash brings you sure money maker proposition, sample outfit and article every member of your family can use. **Armagine Products Co.**, 116 Bedford St., Boston, Mass.

\$50 TO \$200 weekly. District supervisors who will appoint men, women, children agents for 20 specialties. Something good for every class of agent. Samples worth \$500 furnished without bond or deposit. **Perrine Associates**, Consumers Bldg., Chicago.

\$3,000 A YEAR guaranteed to five agents. 2132 Michigan Avenue, Chicago, Ill. **John A. Doxy**.

EXPERIENCED Agents. Show women how to do a half day's necessary work in 20 minutes. Unique household preparation and original "Entering Wedge" plan makes sales easy and big profits for you. Reliable men and women only. **Jiffy-Brite Laboratories**, Boston, Mass.

IF you want 100% to 500% profit quick, sell our assortment of practical and necessary articles for the home. Not found in any stores. Entirely new line at popular prices. Send today for descriptive catalog and terms to agents. **Specialty Mfg. Co.**, 20 Brigham St., Westboro, Mass.

AGENTS—Every merchant and professional man is a prospect. Sell our complete line of high quality, low-priced Window Letters, Glass Signs, Name-Plates and Wood Specialties. Write to us now for New 48 page catalogue and Sample Letter—Free. **Attracto Sign Co.**, 2655 North Clark St., Chicago.

MAIL order men, dealers who are now handling lightning sellers, tricks, joker articles, will never regret it. Get our wholesale prices. **Japanese Novelty Co.**, 451 6th Ave., New York.

WE furnish you capital to run a profitable business of your own. Become one of our local representatives and sell high grade custom made shirts, also guaranteed sweaters, underwear, hosiery and neckties, direct to the homes. **Write Steadfast Mills**, Dept. 10, Cohoes, N. Y.

\$7.68 PROFIT in half hour with my Creaso-Razor proposition. 25c package; price 10c. **Rudolph, Manufacturer**, Northwestern Building, Chicago.

AGENTS make big money selling Magic Vacuum Massager. Absolutely new. Sells on sight. Exclusive territory. **LaBrier Manufacturing Co.**, Pekin, Ill.

AGENTS—Something new—fastest sellers and quickest repeaters on earth. Permanent, profitable business. Good for \$50 to \$75 a week. Write for particulars. **American Products Co.**, 6718 Sycamore St., Cincinnati, O.

AGENTS—New 10c sellers furnished at 1c each. Send 12c for 10 10c samples. **Wm. Gaskins**, Gainesville, Va.

EMBOSSSED metallic gold sign letters—Instructions for making. Material cost \$1; 4½ inch, 35c. Why pay more? **Johnston Co.**, Quincy, Ill.

IMPROVED Automatic Razor Stripper. Something very fine for \$2. Agents wanted. **Auburn Supply Co.**, Dept. Z11, 7745 Peoria St., Chicago.

AGENTS—Sell 6 pair 25c socks \$1; six months guarantee. Great holiday proposition. Big profits. Write for samples. **Comer Hosiery Co.**, 1 King St., Dayton, Ohio.

COST 3c, sell 15c to 25c. Families buy 12 to 40 sets. Hotels hundreds. Free demonstrating sets. Anyone can attach. Evergrip gliding casters save carpets, floors, furniture. Carried in pocket. Agents earn \$25 to \$100 weekly. **Evergrip Co.**, 20 Warren St., N. Y., Dept. 104.

AGENTS in every town to sell Cinch Tire Repair Kit. Best selling auto article on the market. Large demand for goods; \$25 to \$50 a week; success assured; write today. **Hamilton Specialty Co.**, 615 S. Warren, Syracuse, N. Y.

WANTED—One high-school boy in each city of over 200,000 population to sell my labels for office binders—they are needed in every mercantile office; sell at 50c a dozen, 25 per cent commission. Particulars sent on request. **T. J. Golden**, Jacksonville, Fla.

MR. Mail-Order Man: Get quick returns. Established corporation supplies fast mail-order sellers; factory prices. Classy proposition. Beginners or established firms. Copyrighted Prospectus free. **Mississippi Valley Co., Inc.**, Box N629, Pittsburg, Kans.

SELL something new and in great demand. Savir Stove Lids save half of coal. Thousands used. Agents making big money. Write for free trial offer. **Pre-Heated Air Co.**, Suite 634, 1011 Chestnut St., Phila.

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

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

NU-TAN-FIN restores old leather bags or shoes. Wonderful results. Wanted in every family. Get agency for your section. **A. Phelps Mfg. Co.**, Providence, R. I.

CASH for names, information, formulas, ideas, etc. Steady home business. Instructive book for stamp. **Information System**, 309 Marietta, Ohio.

AGENTS—Sell high-grade tools. Every man needs them; quick sellers; good profit. Now being advertised. Write or call. **Mid-City Specialty Co.**, 36 W. Randolph St., Chicago, Ill.

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SAMPLE seven cents, great Christmas present, one dollar. **Rose**, 631 Hanover, Baltimore, Md.

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AGENTS—Weeping Doll, patented, very laughable. Lemon Company, Brighton, Mass.

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14 in. x 5 ft. LATHES, 3 hp. engine, cheap. 1714 Myrtle St., Erie, Pa.

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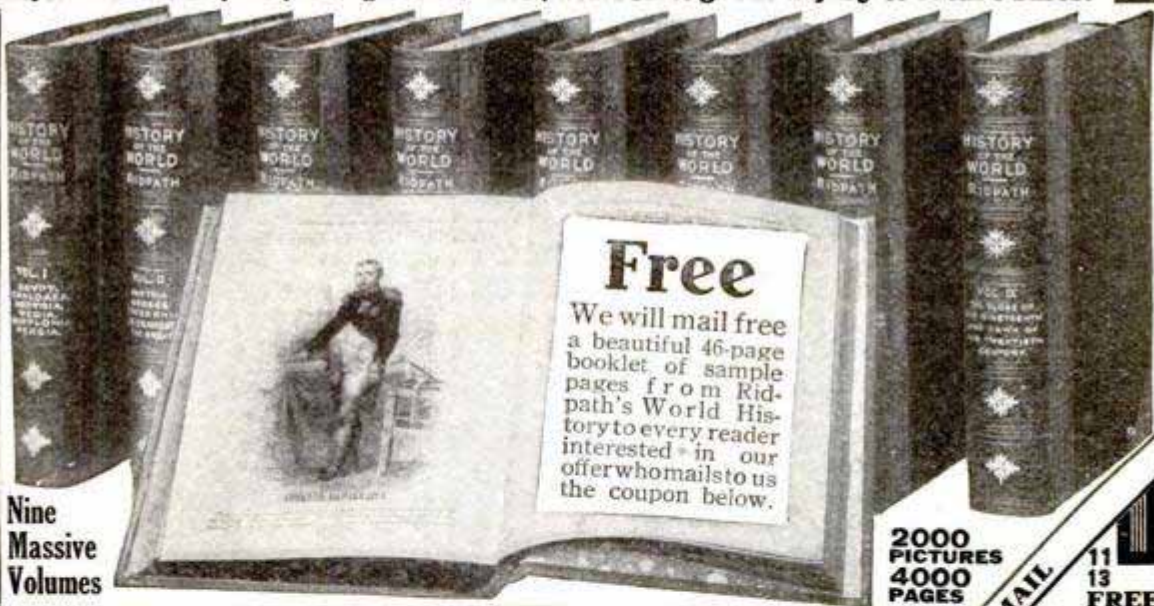
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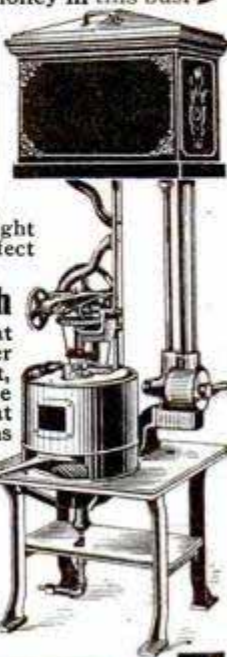
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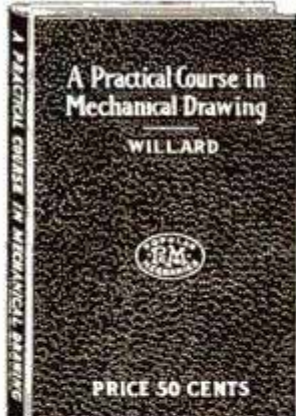
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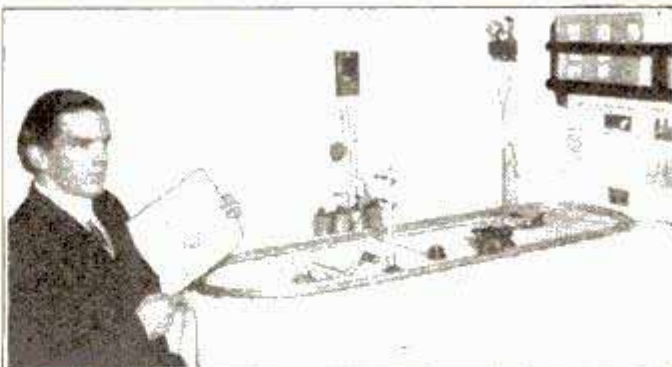
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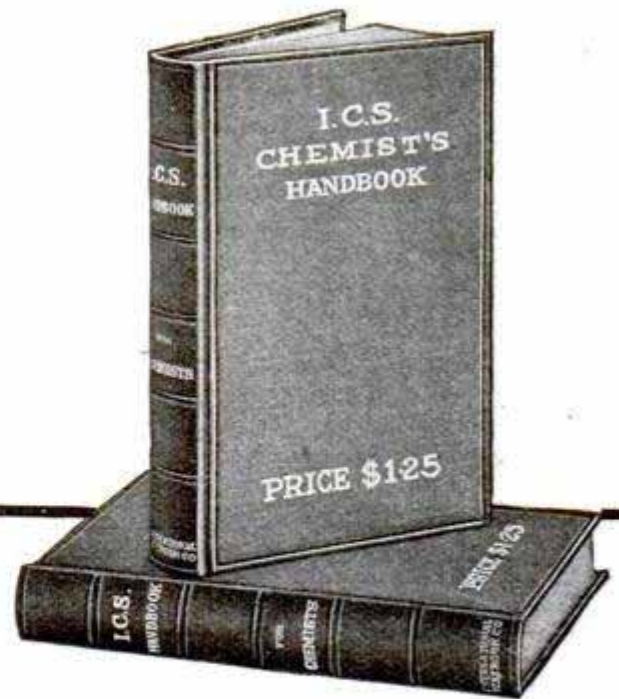
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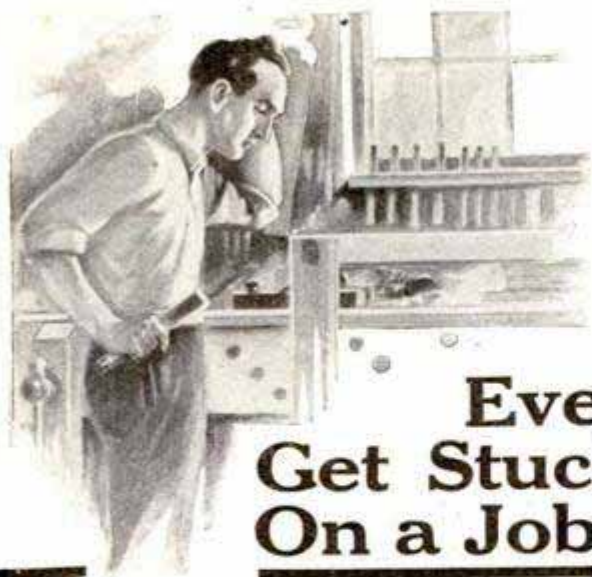
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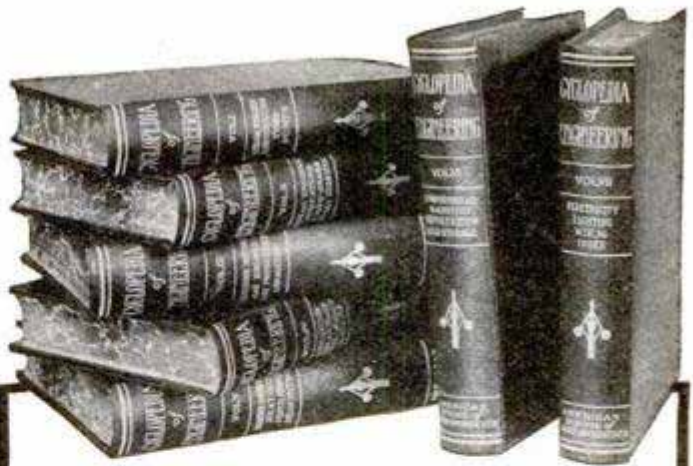
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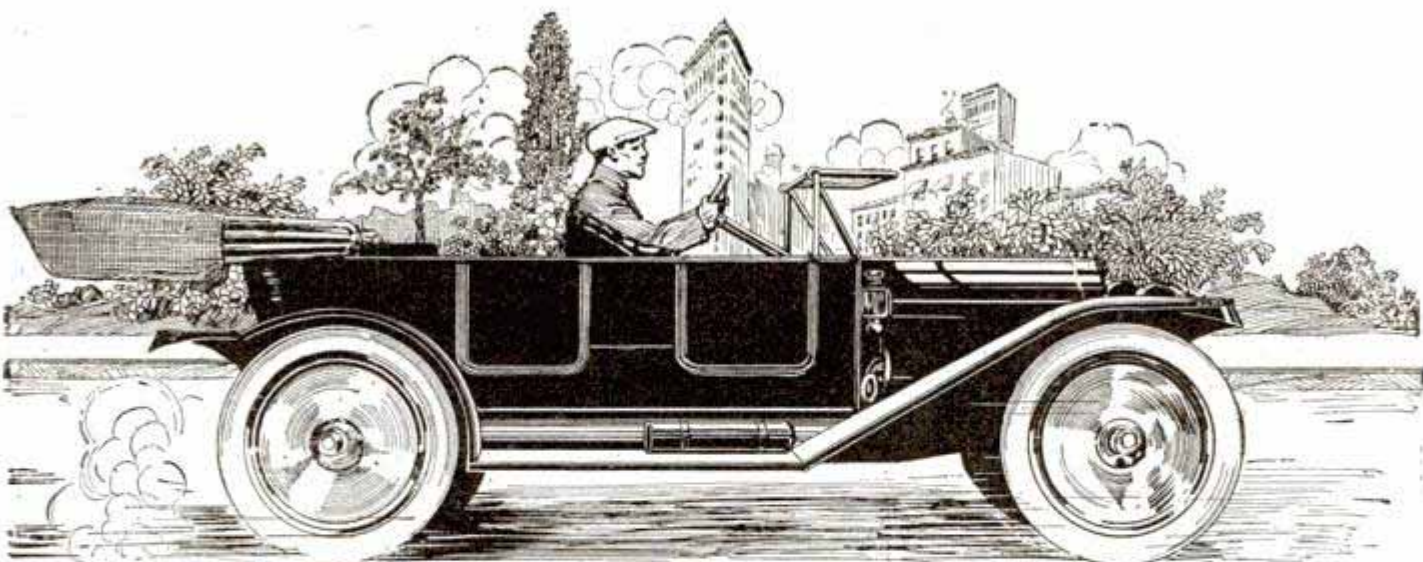


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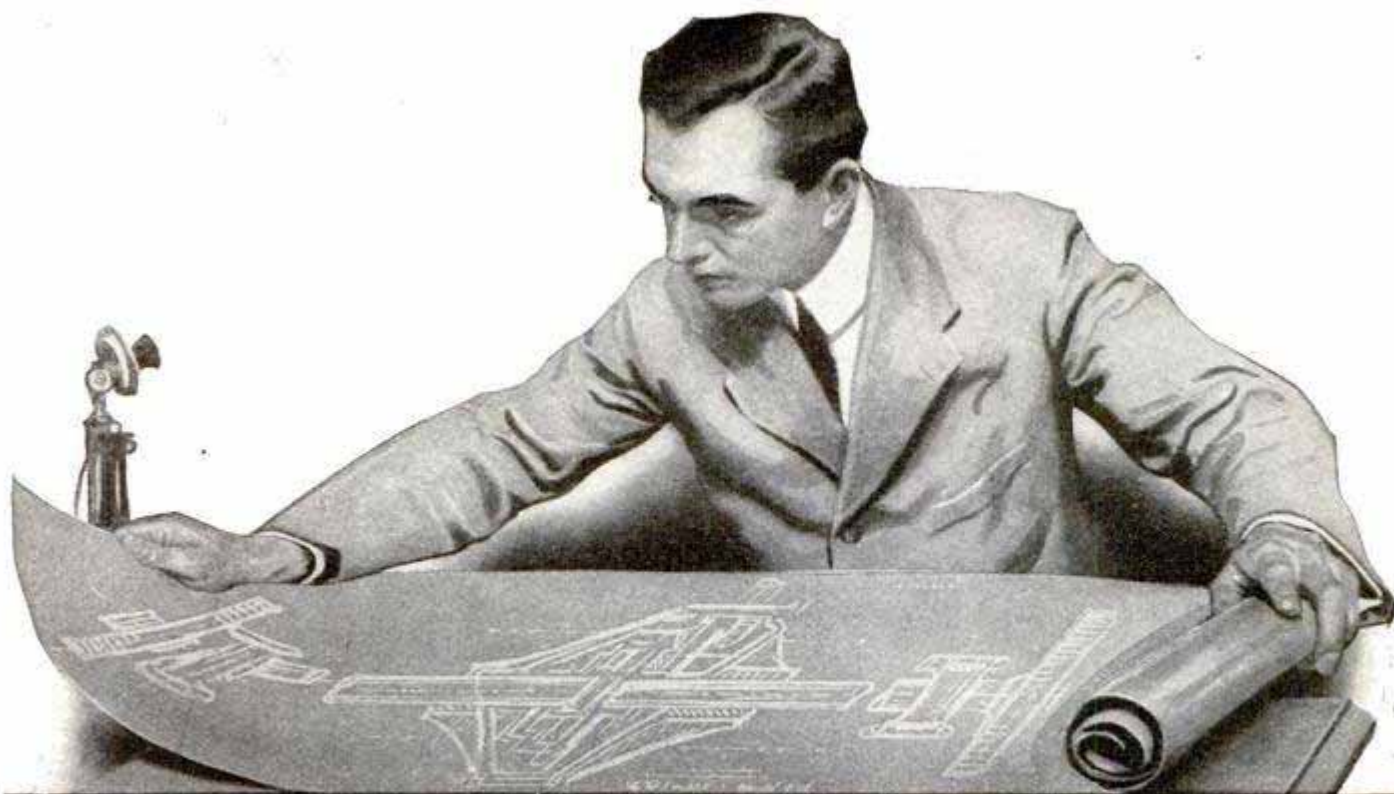
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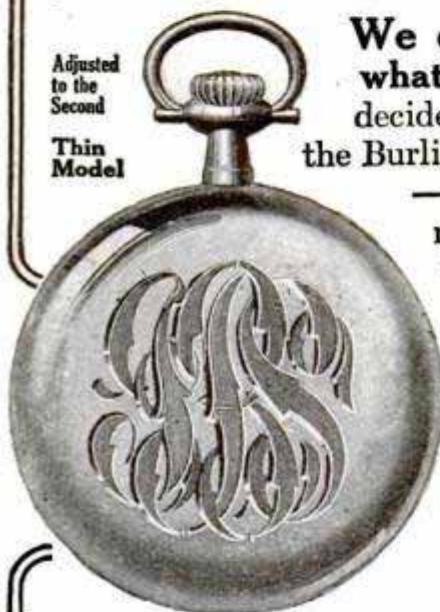
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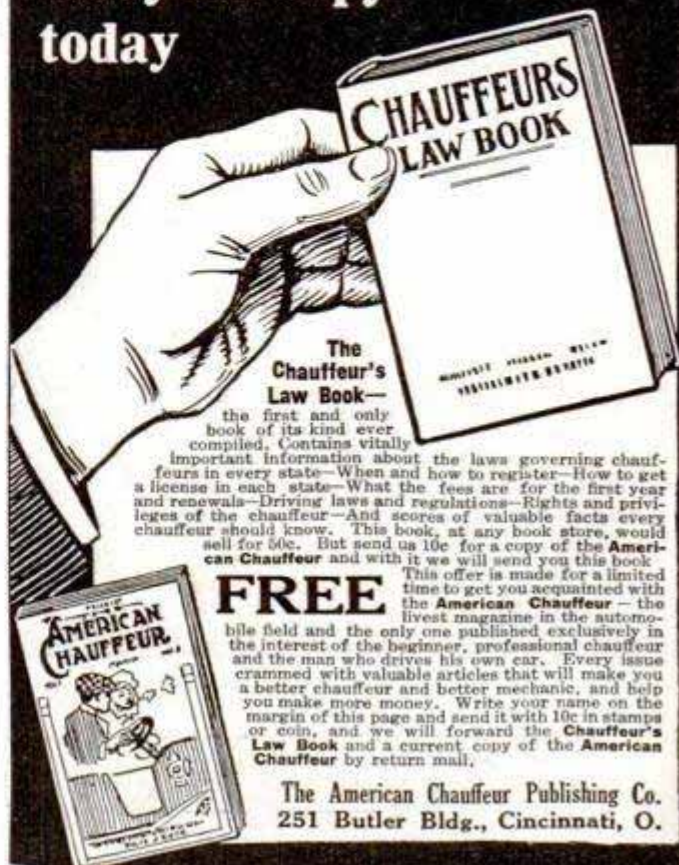
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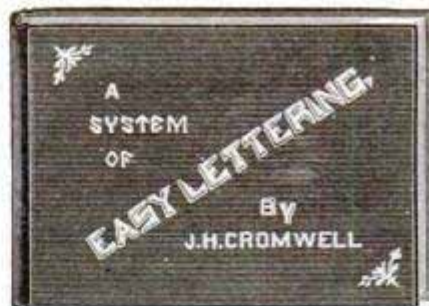
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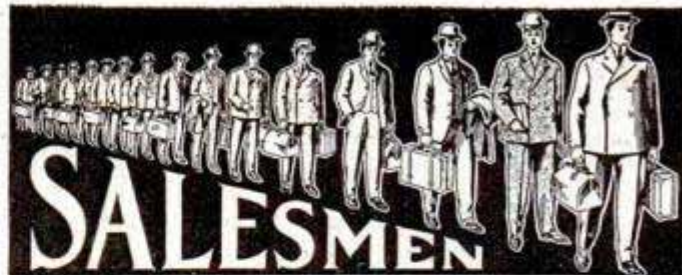
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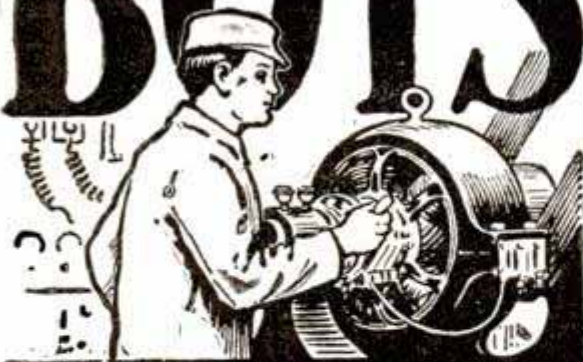
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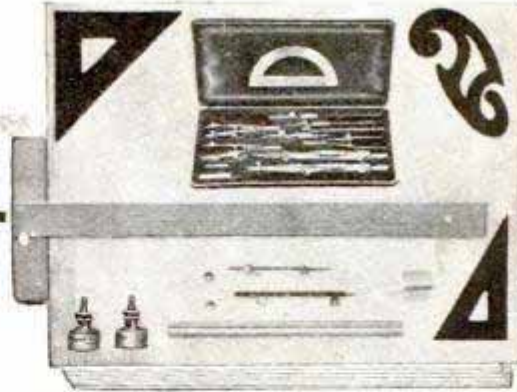
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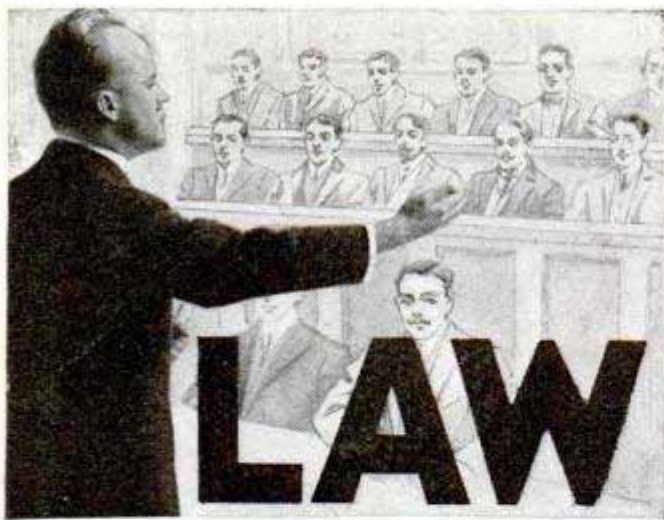
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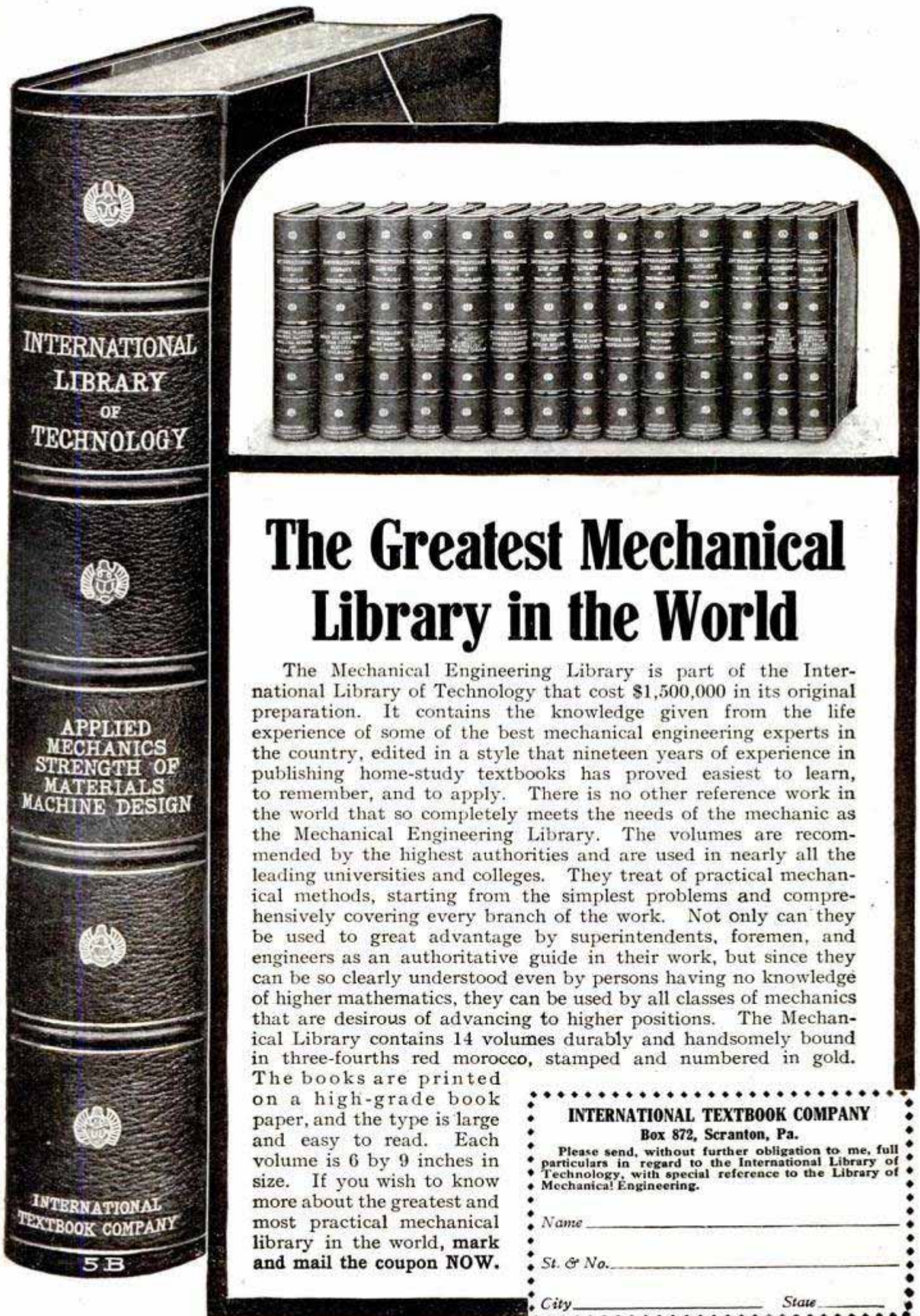
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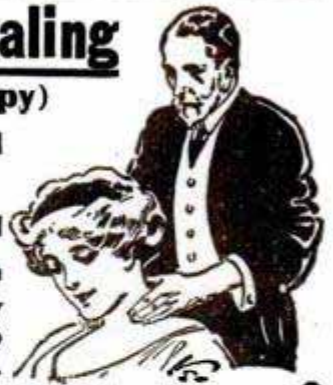
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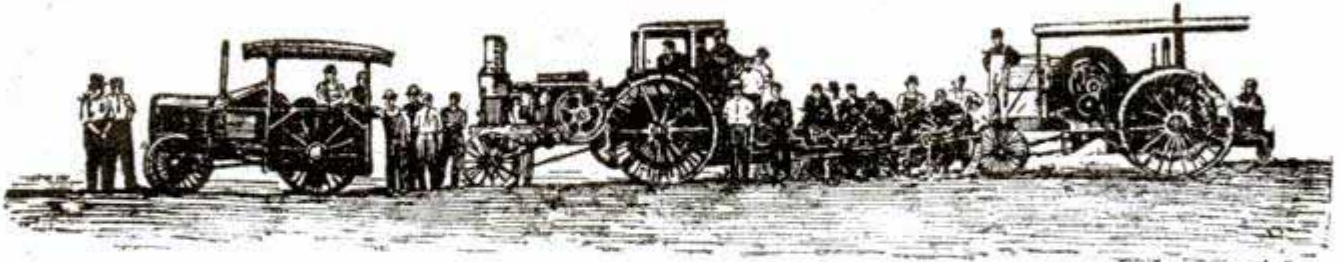
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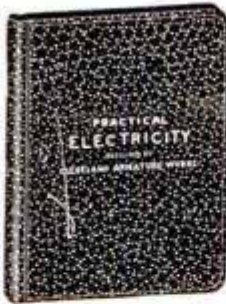
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Popular Mechanics Magazine

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Vol. 20

NOVEMBER, 1913

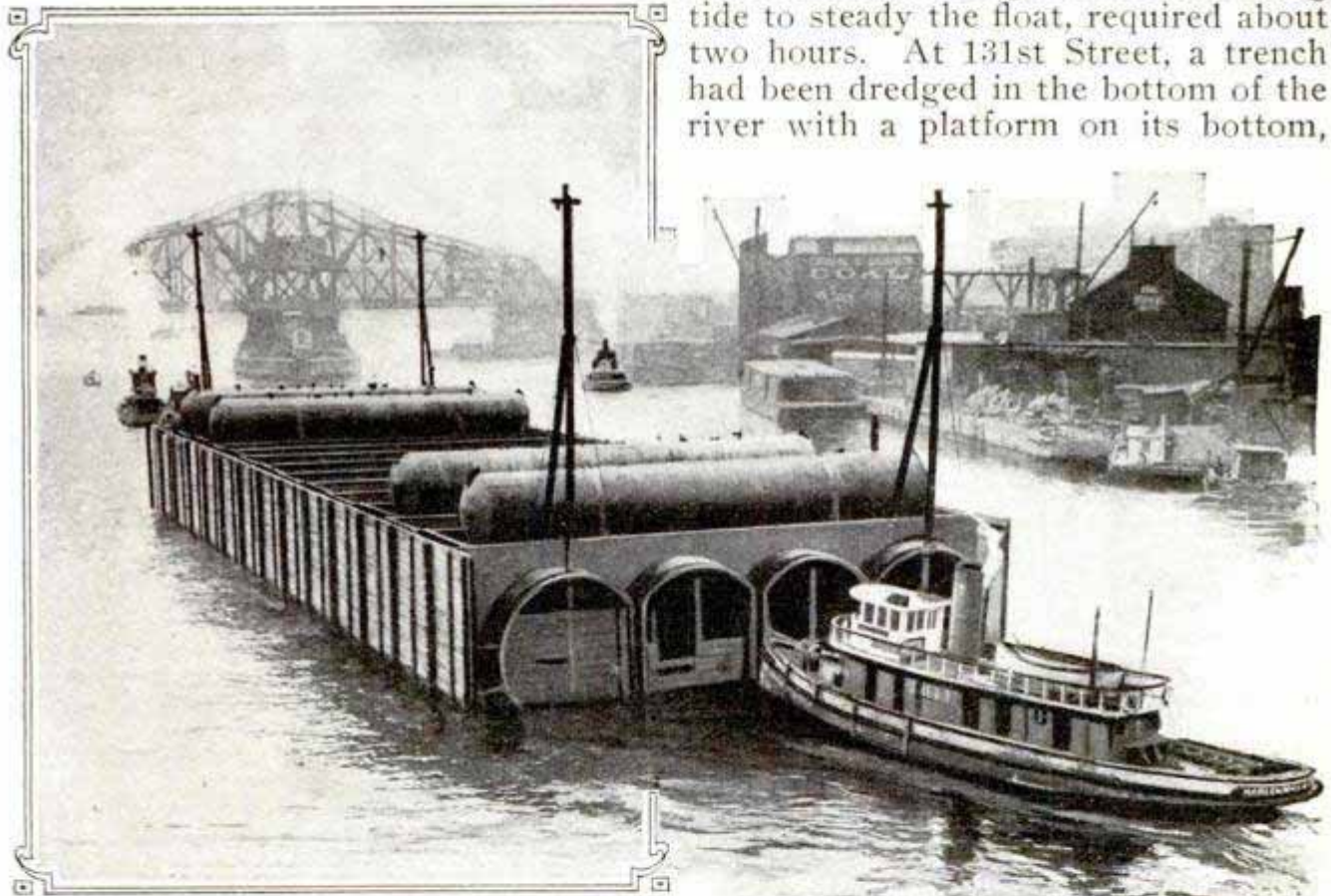
No. 5

From New York Sun for Aug. 30th 5260

Towing a Subway Tunnel on Harlem River

New York
THE first section of the new four-tube tunnel which is to carry the Lexington Avenue subway under Harlem River, New York City, was towed down the river and sunk in place on August 29. The four steel tubes, 220 ft. long, 19 ft. in height, and made of $\frac{3}{8}$ -in. plates, were floated in a wooden

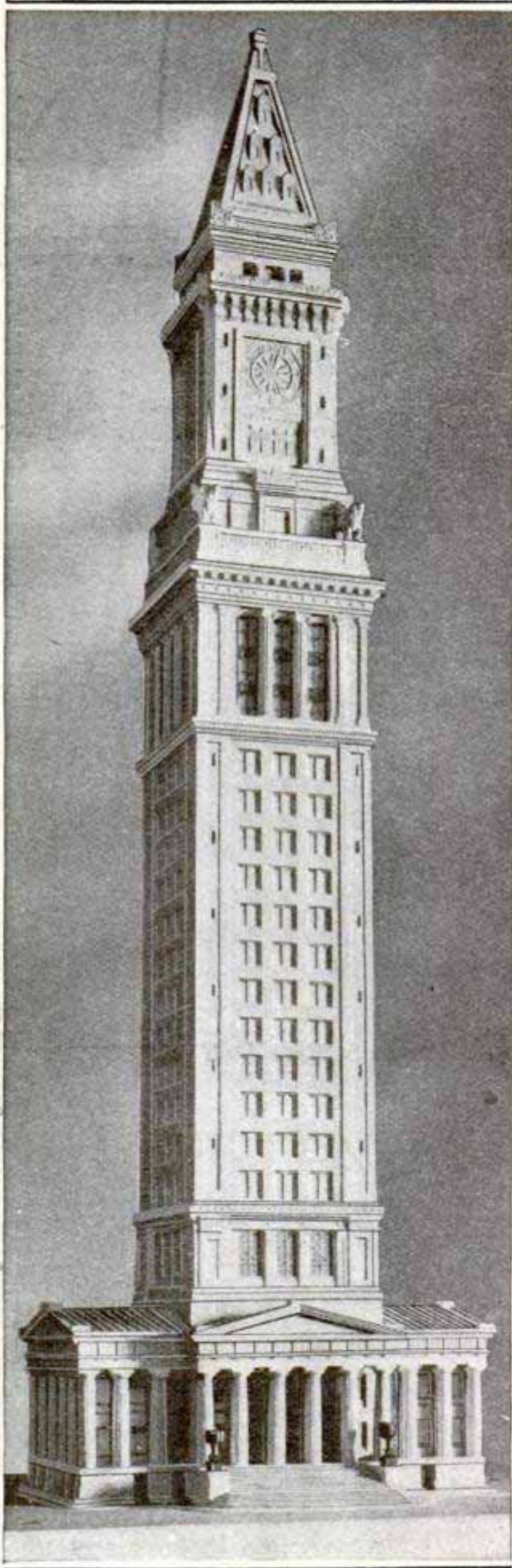
about them. Nine flatboats, placed under the float at low tide, carried it free from the falsework and, after they had been scuttled, it rested on the water ready for its trip. With two tugs towing and one guiding from behind, it moved slowly down the river to 131st Street. The trip of a little over a mile, made against the incoming tide to steady the float, required about two hours. At 131st Street, a trench had been dredged in the bottom of the river with a platform on its bottom,



Towing a Section of the Harlem River Subway Tunnel into Position to be Sunk to the Bottom of the River

box, 244 ft. long, 70 ft. wide, and 35 ft. high. They had been constructed on a temporary framework over the water in the slip at 152nd Street with bulkheads in the open ends, and a wooden float, in which some of the planks were 9 in. thick, had been built

58 ft. below mean high-tide level, to support the tunnel. As water was let into the tubes, the sinking was guided by derricks on flatboats and regulated by four air tanks, 65 ft. long and 10.6 ft. in diameter, on top of the float. Four steel masts were left sticking out



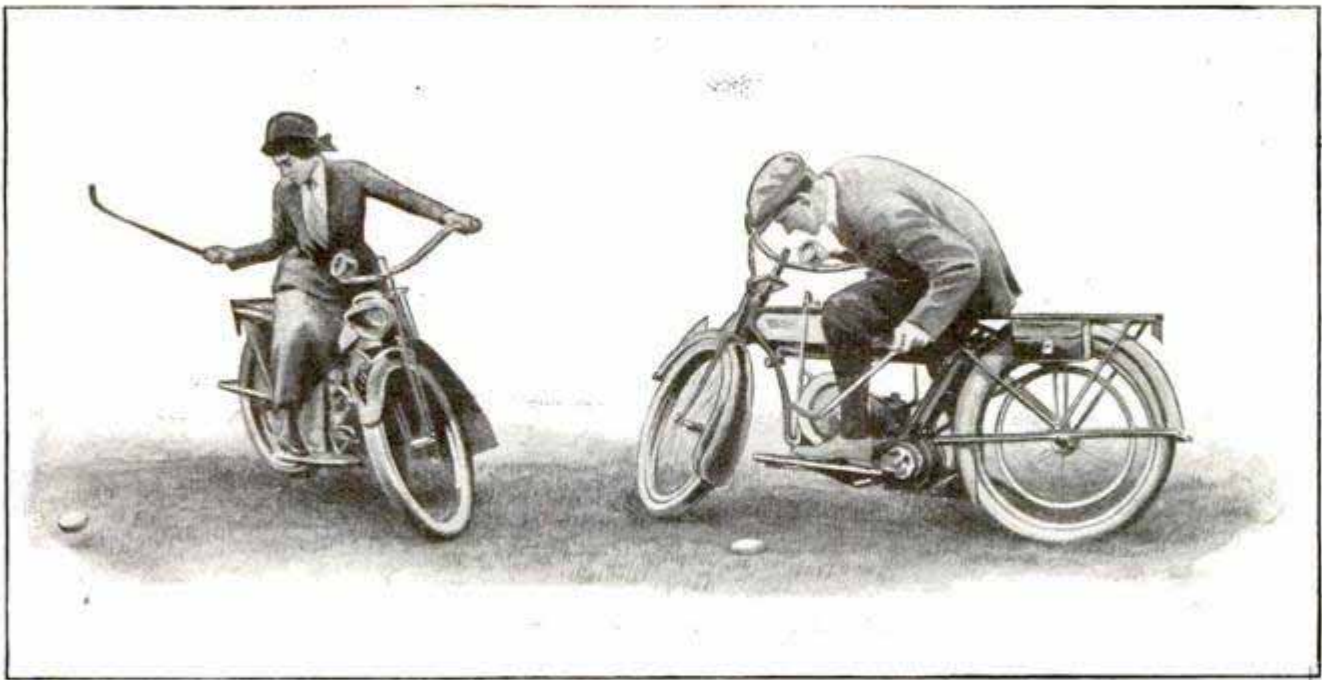
A New Type among Public Buildings:
the New Boston Customhouse

of the water to mark the tunnel's location and guide the engineers in placing the four other sections. The tunnel when it is completed will be 1,080 ft. long. The same method of construction was used in building the Michigan Central tunnel under the Detroit River and in another of New York's subway tunnels, but this is the first time that a four-tube section has been handled in this way.

THE NEW BOSTON CUSTOM- 5153 HOUSE

Unique among public buildings in America is the new customhouse which is being erected in Boston. It is to be a tower, 505 ft. high, and in design is virtually a monument to crown the pyramidal sky line of the city. The old pyramidal shape of the city with the golden dome of the Statehouse at its apex has been destroyed by the building of skyscrapers. Boston's building laws now forbid the erection of private structures more than 125 ft. high, and the new customhouse is designed to rise above its surroundings and form the dominating feature in any view of the city. Although the old customhouse has been torn down, the base of the new tower is an exact reproduction of the old building so that the 505-ft. tower appears to be rising from the roof of the former edifice. The simple Doric style of architecture used in the old customhouse and in its reproduction is followed out in the lines of the whole tower. Very little decoration is used, even in the superstructure that carries the clock faces. In the matter of convenient arrangement of floor space, the building is more or less of an experiment. Since a large amount of floor space is needed, it is thought that the arrangement of various departments on different floors, with rapid elevator service between, will give quicker intercommunication than is possible in a broad, low building. Wherever a department requires more room than one story, its several floors are arranged as galleries over a main floor.

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"HOCKEY-MO," THE NEW MOTORCYCLE SPORT

from London Graphic
A new sport known as "hockey-mo" is being introduced among English motorcyclists. At the start a ball is placed in front of the machine of each player, and at a given signal the motorcyclists start, each driving his ball forward until it passes through the goal about a hundred yards distant. The game is won by the player whose ball first passes the goal. Numerous possibilities in the way of collisions and upsets accompany the sport.

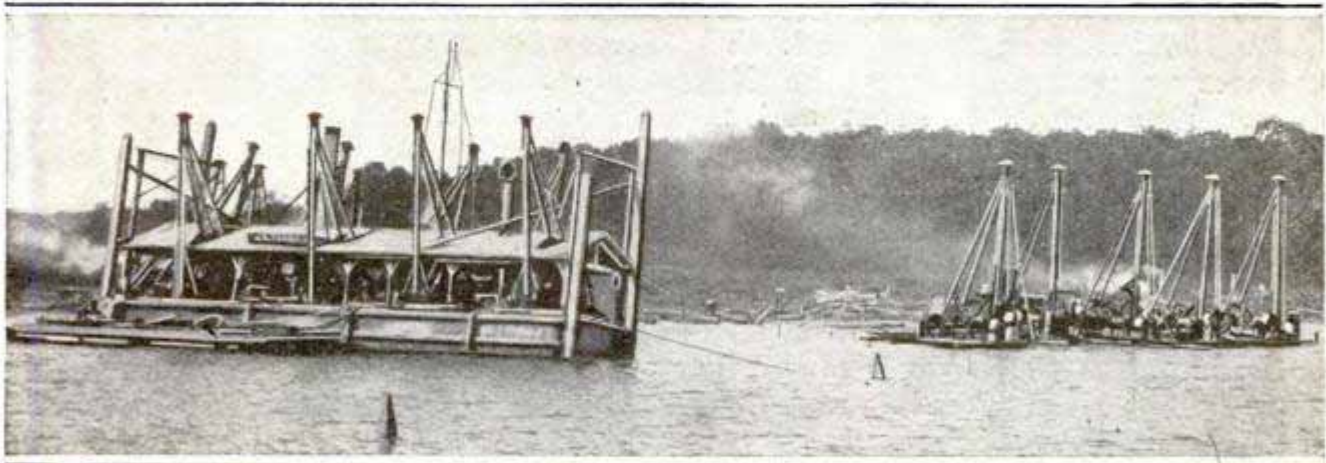
COAL POCKETS UNDER THE PANAMA CANAL

5128

Storage chambers for coal are being dug in the bottom of the Panama Canal. In time the question of coaling United States war vessels will be a vital one and coal pockets are being prepared now while the machinery is on the ground. The bottom of the canal has been chosen for the storage chambers so that the coal will be safely hidden from any possible enemy. A further advantage lies in the fact that coal deteriorates less rapidly under water than when exposed to the air. Several drills and dredges are now at work excavating the bottom of the canal and building the storage chambers.

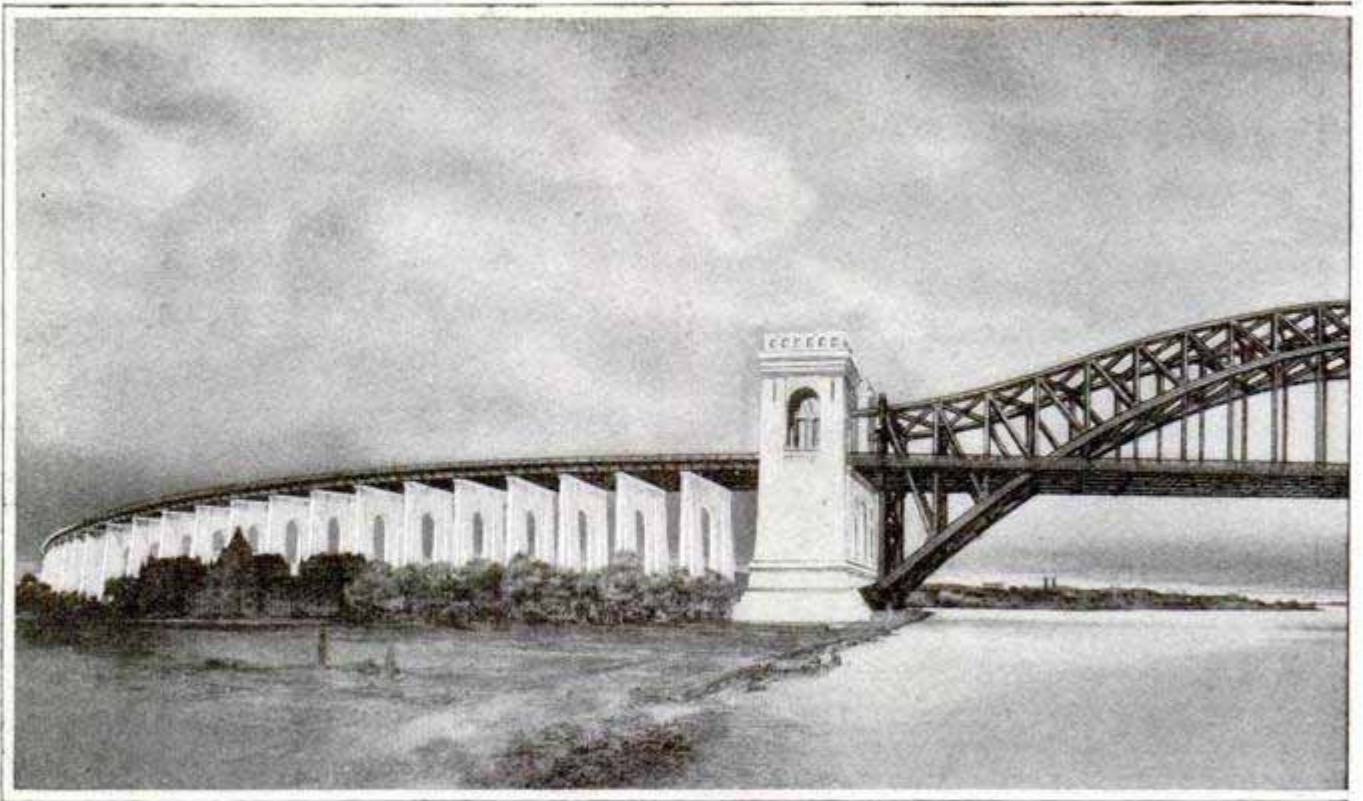
ⓄThe largest dry dock in America is being built at Quebec, at an estimated cost of \$2,750,000.

Merrill Street 37th St. New York City



Copyrighted by Underwood & Underwood, N. Y.

These Dredges are Excavating Chambers for the Storage of Coal in the Bottom of the Panama Canal



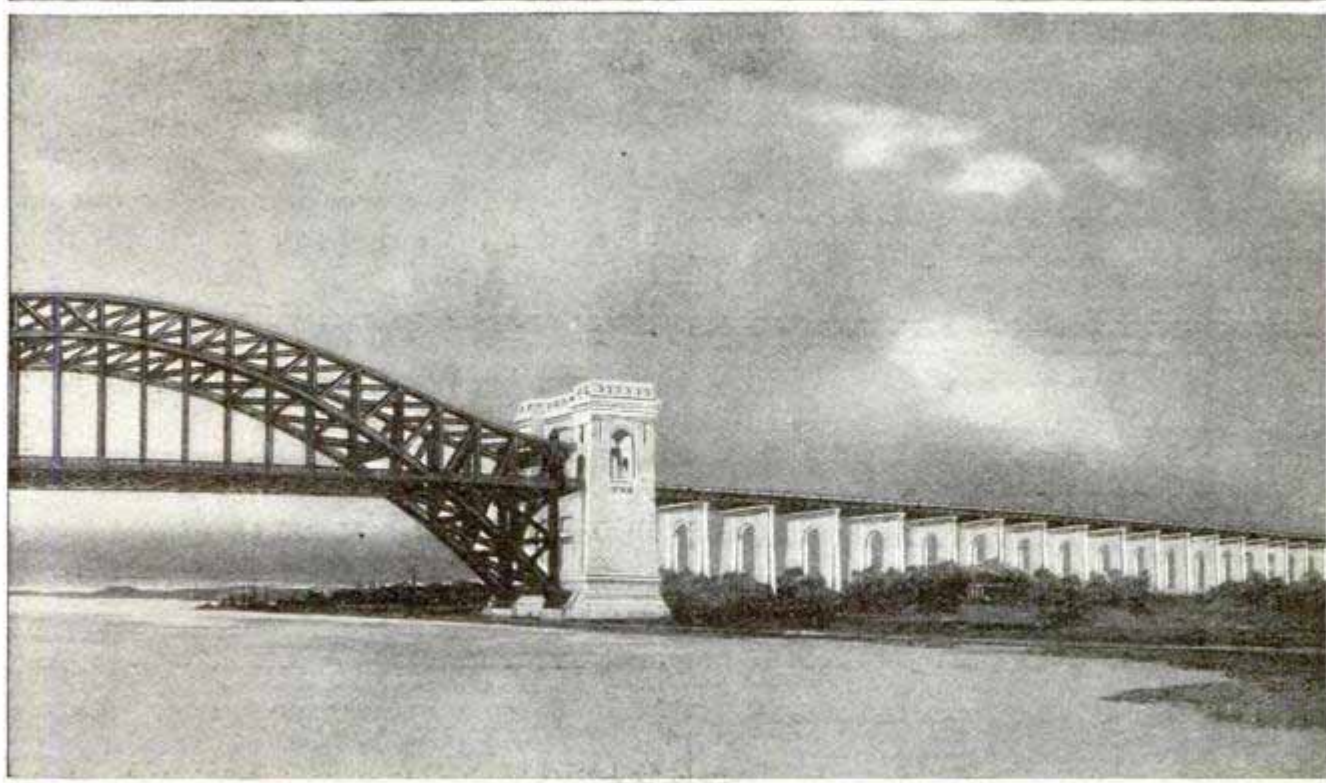
The Hell Gate Bridge Which will Span East River, New York, as a Part of the New Railroad,

4745 THE HELL GATE STEEL ARCH BRIDGE

Hell Gate Bridge, which is now being constructed across East River, New York, as a link to connect New England with the West and South, will contain the longest steel arch span ever built. The bridge is a part of the New York Connecting Railroad, built by the New Haven and the Pennsylvania systems, to carry traffic from north of Harlem River to Long Island, and to relieve the Grand Central Station. The road will have four tracks, will be 10 miles long, and will cost \$30,000,000. About 15,800 ft. of it will be carried on bridges and viaducts from 20 to 135 ft. above the ground. The connecting railroad leaves the New Haven line at 142nd Street and the Bronx on a fill and viaduct, 4,200 ft. long and from 20 to 65 ft. high, swings across Bronx Kill on a two-span bascule bridge, 490 ft. long, and skirts the eastern edge of Randall's Island on a viaduct, 1,960 ft. long and from 65 to 90 ft. high. A four-span truss bridge, 1,153 ft. 6 in. long, takes it across Little Hell Gate, and in a sweeping curve it crosses Ward's Island on a viaduct, 2,650 ft. long and from 105 to 130 ft.

high. From there the Hell Gate arch bridge carries it across East River to Long Island City. Then, for over a mile, it continues on viaducts and fills. The two passenger tracks will join the Pennsylvania lines in Sunnyside Yard, Long Island, and pass back to Manhattan Island through the present tunnel under East River to the new Pennsylvania terminal. Through trains will continue underground across New York, through the Pennsylvania tunnels under Hudson River, and out across New Jersey. The two freight tracks, after leaving the viaduct, will traverse Long Island to Bay Ridge, to meet the car ferries for Greenville, N. J. In these 10 miles of railroad practically all of the 3½ miles west of the river and a large part of the 6½ miles east of the river are carried on steel and concrete viaducts. Some 90,000 tons of steel, 450,000 cu. yd. of concrete, and 5,000 tons of reinforcing rods will be used. Standing at the eastern entrance to New York, the great Hell Gate arch bridge is designed, not only for strength, but for architectural beauty. The steel arch,

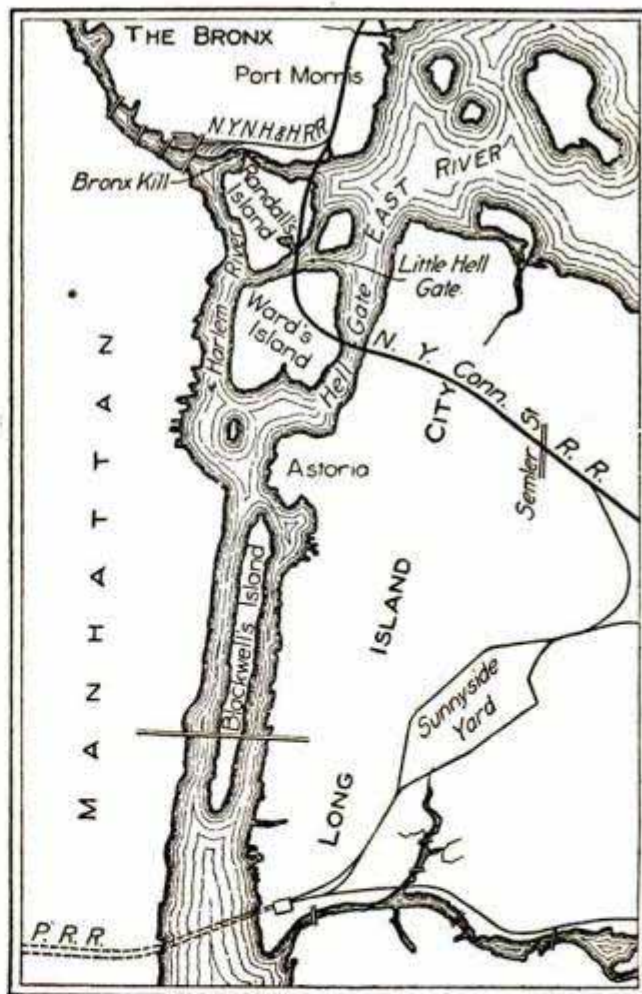
Edward S. ...



Connecting the New Haven and Pennsylvania Systems, Linking New England with the West and South

1,000 ft. long, is composed of two rigid chords, but the upper one has a reverse curve so that one chord is a pull and the other is a thrust, making the construction cantilever. It will be built out from the two sides toward the center and the floor will be pushed out at the same time to strengthen the towers. The stone and concrete towers will be 250 ft. high and 104 by 140 ft. at the base. The bridge floor will be 60 ft. wide, to carry four tracks, and 150 ft. above the river; the steel arches rise above it to 300 ft. above the river. With approaches, the bridge proper is 3,000 ft. long. Work on the connecting railroad began in the summer of 1912 and it is expected that the line will be complete in 1915. A large number of viaduct piers and abutments are completed, some 1,900 ft. of retaining walls for fills is finished, and work has begun on the towers of the Hell Gate arch.

CALL the white marble to be used in the buildings of the Australian Commonwealth, now being erected in London, will be shipped from Southern Australia. Some 210 tons have been ordered.



Route of the New York Connecting Railroad:
It is 10 Miles Long and Almost Half of
It is Carried on Bridges and Via-
ducts High in the Air

MEMORIAL TO THE PILGRIMS UNVEILED

A monument to the Pilgrim Fathers, erected at Southampton, England, in

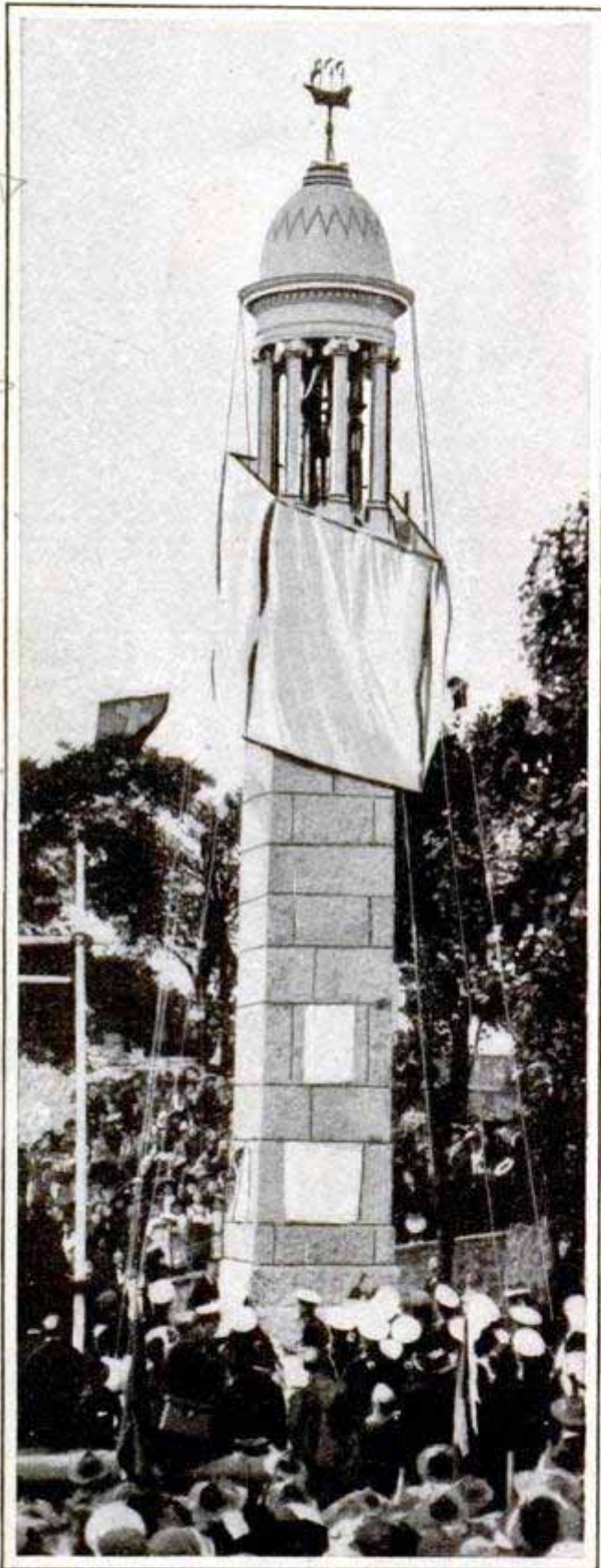


Photo by Paul Thompson

The Dedication of the Memorial to the Pilgrim Fathers at Southampton, England

memory of the departure of the "Mayflower" for America on Aug. 5, 1620, was unveiled on August 15. Ambassador Page represented the United States at the dedication. The tall stone shaft is crowned by a weather vane modeled after the little 180-ton ship in which the 102 venturesome pilgrims made their voyage of 63 days to America. The monument was erected at Southampton because it was from that port that the "Mayflower" and her sister ship, the "Speedwell," first set sail for America. A few days later both put into Plymouth Harbor and the "Mayflower" sailed away alone on Sept. 6, 1620.

5248 HARDENING SOFT FATS WITH HYDROGEN

Catalysis, which is a chemical process in which certain substances provoke or accelerate chemical reactions by their mere presence and without themselves undergoing any perceptible change, is finding constantly increasing use in various industries and has recently been applied in the manufacture of soap, stearin and various edible fats. It makes possible the change of soft, liquid fats or oils into hard fats with a high melting point. Thus an oil of the consistency of ordinary cotton-seed oil can, by catalysis, be converted into a firm, semisolid fat with many of the properties of lard. Incidentally catalysis, as used in this class of work, destroys all coloring matter and odoriferous substances, making further purification unnecessary. This process consists of introducing hydrogen into the soft fats in the presence of nickel or palladium, either in a pulverized form or in aqueous suspension, as the catalytic agent. During the process the fat is heated and in some cases a slight pressure is used. *Scientific American* 7/2

Over 350,000 persons, representing 100 counties, turned out in one day for the work of improving Missouri's highways. They accomplished about \$1,000,000 worth of work.

Catalysis

"Technische Rundschau"

R.- Ing. Dr. Benning

5270
10 Spence St. (no date)
New York City

Mr. M. N. Wood, Mechanical engr.
1405 Broadway New York City (Owns Am. Rights)

"Shooting Up" the Movies

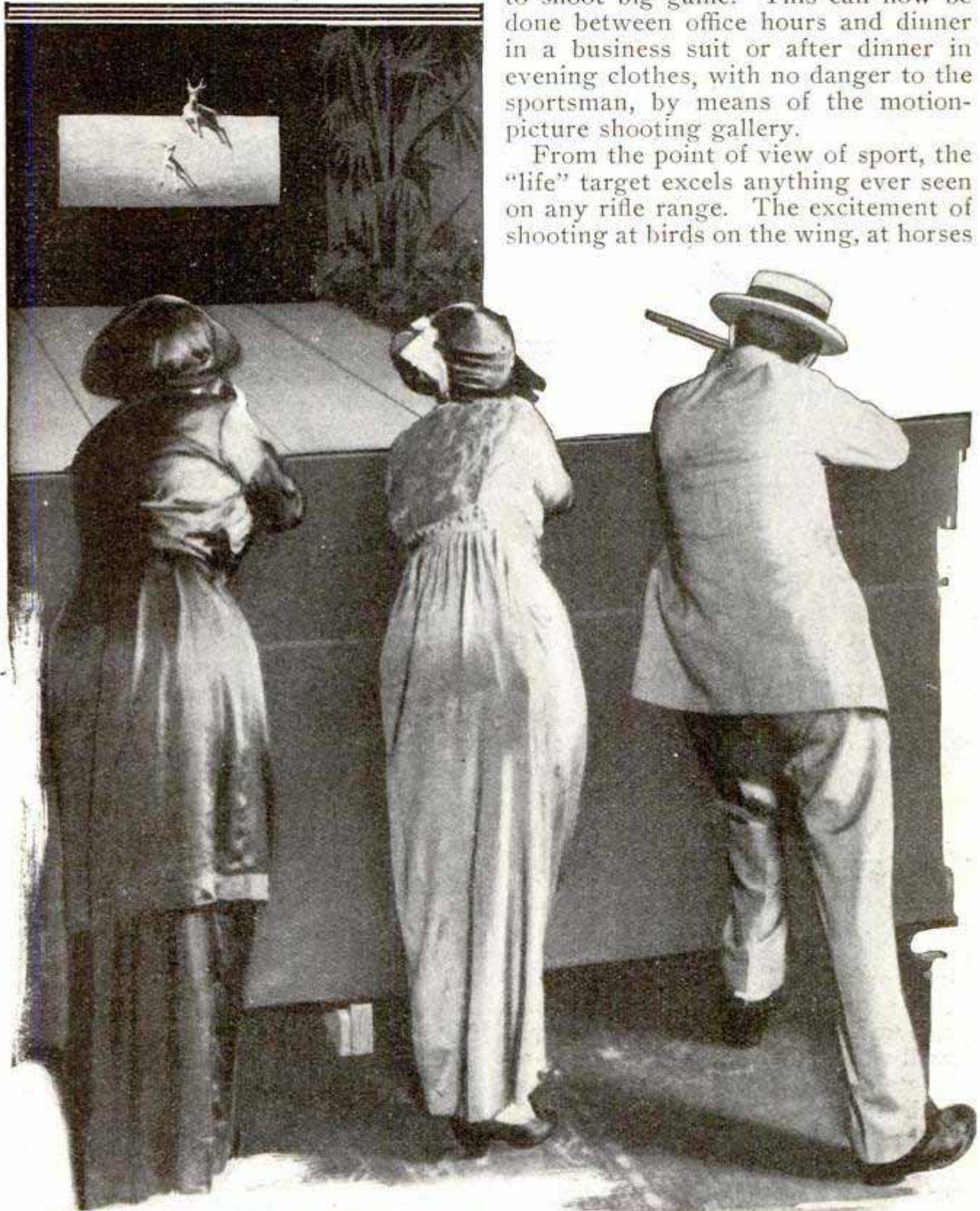
By Wendell Phillips Dodge

5259

SOCIETY this winter will have the delightful experience of shooting wild animals in the drawing room. No

longer is it necessary to go to the heart of Africa, the fastnesses of the Ural Mountains or the crags of the Rockies to shoot big game. This can now be done between office hours and dinner in a business suit or after dinner in evening clothes, with no danger to the sportsman, by means of the motion-picture shooting gallery.

From the point of view of sport, the "life" target excels anything ever seen on any rifle range. The excitement of shooting at birds on the wing, at horses



The Motion-Picture Shooting Gallery for Indoor Big-Game Hunting

leaping fences, airmen soaring and dipping, polar bears, Indians in ambush, lions and other beasts in the jungle, motorcycles racing, automobiles speeding, wild ducks taking to the water—almost anything in motion—cannot be appreciated without actual experience.

A New York theatrical manager, hunting for plays on the Continent last spring, fell upon the trail of the life-target shooting pictures. He took his first shot at them in Berlin, and from that day he has not been able to leave a rifle alone. He brought back with him the American rights in this latest "movie" craze.

The novelty of the device is that the instant the rifle cracks the moving film halts for a fraction of a second, just long enough for one to see where his shot has hit. Whether it is a seal slipping into the water from a rock, a springing lion or a leaping antelope, the instant the rifle cracks the moving object stops. Then, where the bullet pierced the white paper screen, a little hole appears, showing a red light. This glows for an instant; then the film resumes its motion.

Electrically and mechanically the cinematograph target is ingenious. The target coordinates four separate patents, each of which was developed originally for quite other purposes. The heart of the mechanism is a relay, originated for use in automatic signaling on railway trains. A telephone receiver is placed well above the firing line. When the shot is fired, the sound acts upon the telephone receiver, which operates the relay, which in turn controls the cinematograph machine by means of a band brake and a magnetic clutch. At the instant the shot is fired, the clutch is released and the brake is applied, bringing the picture to a standstill. To prevent the film from catching fire while stationary, a small direct-driven air compressor maintains a constant blast of cold air on the film.

The switchboard which carries the relay also carries a dashpot which controls the spot-extinguishing movement of the screen and the restarting of the

machine. The screen itself is formed by two sheets of stout paper, on horizontal rollers, and a third sheet, forming a stay, on vertical rollers. These screens are arranged to move a fraction of an inch—roughly the diameter of a shot hole—after each shot, thus obliterating the hole. This is done by a ratchet actuated by a solenoid. When the relay is brought into action by the sound of a shot, it closes the circuit of a timing dashpot, which rises slowly until the upper contacts close the circuit of the screen solenoid. During this interval the shot hole remains visible; but when the solenoid circuit is closed the hole disappears and the cinematograph machine is started again. The screen is illuminated from behind by several flaming-arc lamps hung clear of the firing line.

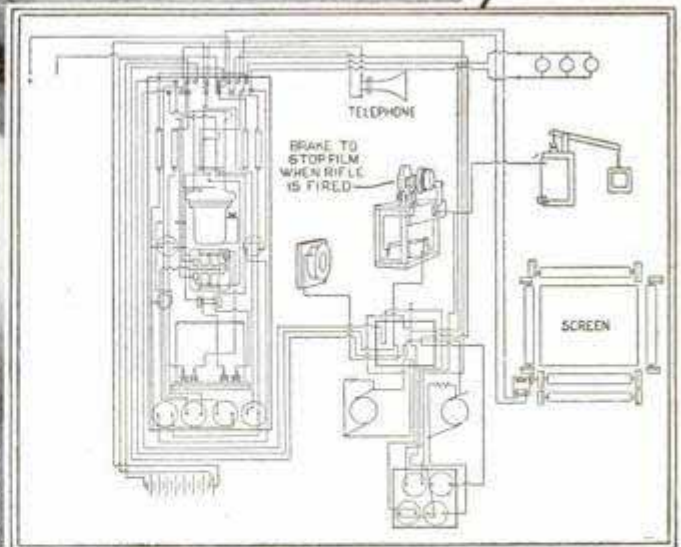
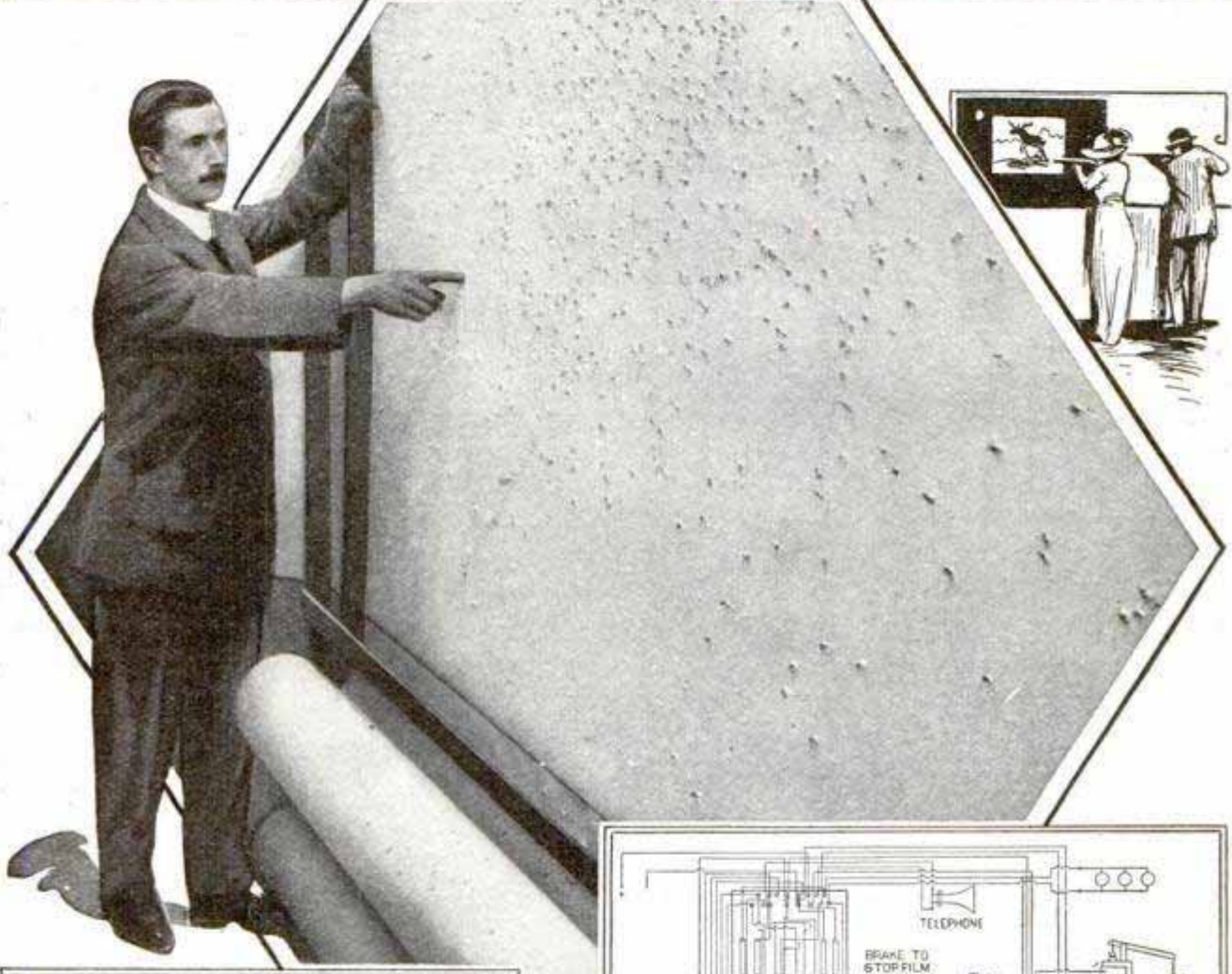
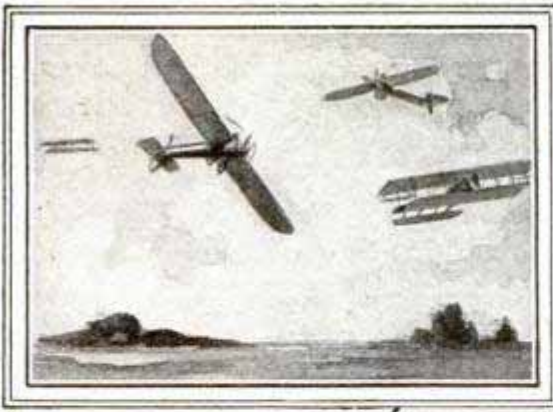
The life target provides the marksman with objects to shoot at under conditions as realistic as the modern cinematograph can make them. The pictures can be adapted to represent objects at any desired range and at any rate of movement, and the mechanism can be so adjusted as to take account of all the conditions of actual shooting; so that, in firing at a moving object 1,000 ft. away, the marksman must take into consideration the motion of the object between the moment of pulling the trigger and the moment the bullet would reach the mark.

For the training of military marksmen the cinematograph target has been approved by the British War Office.

NEW LONG-FLIGHT RECORD

5292 ESTABLISHED

The world's record for long aeroplane flights with a passenger was broken on August 26 by a German airman, Victor Stoeffler, who flew $77\frac{3}{4}$ miles in one day. Including two stops made on the way, the flight took 13 hours and 45 minutes. The airman, with one passenger, left Mulhouse at 5:45 a. m., in competition for the national aviation prize, and landed near Insterburg at 7:30 in the evening.



Some of the "Life Targets" for the "Shooting Movies" are Shown Here and in the Two Upper Pictures

Diagram Illustrating the Method Whereby the Sound of the Rifle Shot Stops the Mechanism

Behind the Screen on Which the Motion-Picture is Shown, as Well as the Rollers by Which the

Targets are Shown: the Bullet Holes are Noticeable, as Well as the Paper Screens are Shifted to Cover the Holes



California Tourists Watching Flying Fish Attracted from the Water by a Strong Searchlight Mounted on a Motorboat

conclave early in the summer. It was 710 ft. long, 410 ft. wide, and had seats for about 26,500 persons. Although it cost \$33,000 and contained over 1,000,000 ft. of lumber, it was erected in a little over a month. In comparison, the ancient Greek stadiums were never over 650 ft. long and the concrete stadium at Harvard University seats only 3,500 more spectators than the Denver amphitheater. In the parade shown in the picture, the black horses had silver hoofs, and a white horse ridden by the commander had gold-bronzed hoofs.

A SEARCHLIGHT TO ATTRACT FLYING FISH 4915

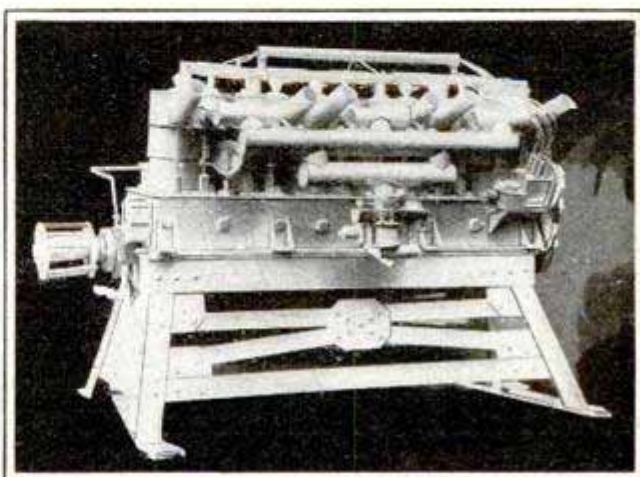
Watching flying fish from a motorboat equipped with a powerful searchlight is a new form of amusement provided at Avalon, Catalina Islands, California, to rival its famous glass-bottomed boat in which tourists gaze at the animal and plant life in the water beneath them. A large electric searchlight mounted on the new craft attracts hundreds of flying fish from the ocean, as the boat goes through the darkness, and the passengers can watch them leaping from the water and skimming along ahead of the boat, silvery and

dazzling in the bright light. The motorboat is 50 ft. long and its searchlight receives its current from a dynamo belted to the flywheel of the engine.

PAPER MODEL OF GASOLINE ENGINE 5147

Marcus Westergreen

A paper model of a gasoline engine has been made by a Boston inventor to illustrate the construction of a new type of aeroplane motor which he has devised. Ordinary writing paper and nothing else was used. The engine is a part of an aeroplane device designed to enable a pilot to throw off the motor, propeller, wheels, and gasoline tank of his flying machine in case of accident.



Model of Gasoline Engine Made of Sheet Paper

*Special Machine for
the purpose of
throwing off the
engine, propeller,
wheels, and
gasoline tank*

Standard Oil Co.

5297
no data

HITCHING ENGLAND TO EUROPE

By JOSEPH E. MURPHY

Associate Member, American Society of Civil Engineers

THE building of a tunnel under the English Channel is, like the digging of the Panama Canal, a project that will not down. It has come up for discussion and agitation periodically for nearly a century, and each time it has been defeated because of military considerations. Thirty years ago the tunnel came very near becoming an accomplished fact. Trial headings aggregating about one-tenth the total length of the tunnel were dug. Then the work was stopped on the same old plea that such a connection with the Continent might be used as a means of invasion in time of war.

This project is now being promoted again, and apparently with more likelihood than ever that it will be carried through to completion, owing to a pronounced change of attitude both on the part of the public and of the military authorities of England. Curiously enough, this change of attitude is due, not to any belief in the permanency of peace, but largely, if not entirely, to the development of the aeroplane and dirigible balloon as formidable instruments of war, with the consequent destruction of that "splendid isolation," in a physical sense at least, of which the British have always been so jealous. Dozens of airmen have already made flights over the channel, and it is apparent that in any future war the most serious menace would come from other sources than a tunnel. A bill now pending before the British parliament contemplates the immediate beginning of construction. The building of the tunnel will place London in direct railway communication with Paris and other cities of the Continent and will eliminate one of the most disagreeable features of European travel, the much dreaded channel passage.

The construction of the tunnel would be a big engineering job, but it would not be comparable in cost or in the difficulties to be overcome, with the

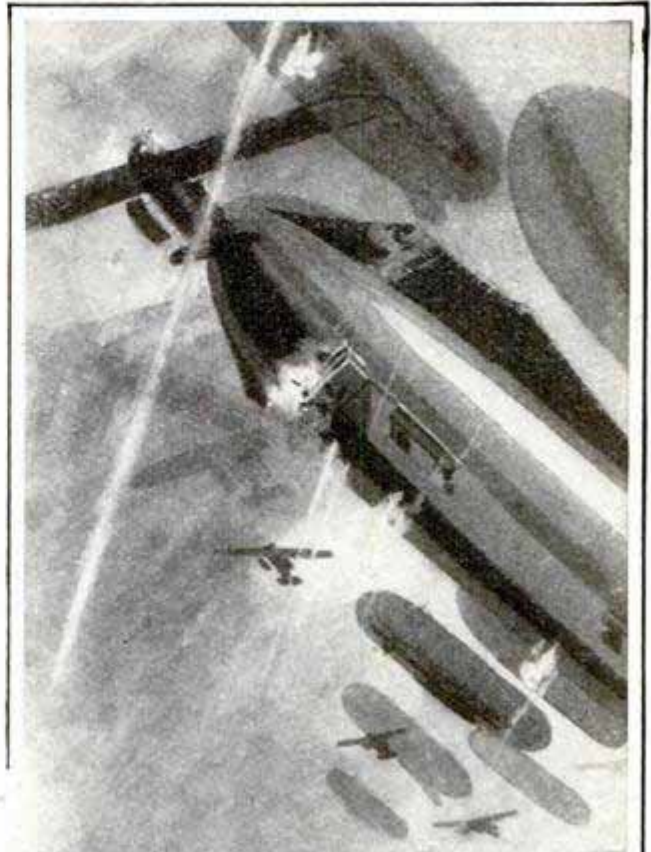
construction of the Panama Canal, and the conditions to be met are fully as well known in the case of the tunnel as they were at Panama before work there began. A surprising amount of reliable information has been gathered in regard to this project. The French alone made about 7,000 soundings in the bed of the channel and demonstrated beyond a doubt that the chalk strata that form the prominent feature of both the English and French coasts continue unbroken under the channel. Complete geological maps and sections have been worked out, and these show that favorable conditions exist for the construction of a tunnel.

A great many plans have been proposed, but the one that has been given the most consideration is that proposed by J. Clarke Hawkshaw, the head of the engineering firm that designed the Severn tunnel and carried it through successfully. Underlying the channel and continuing far inland on both sides are various layers of chalk. The top layer is a water-bearing white chalk. Below this is a layer of gray chalk, averaging 225 ft. in thickness, and practically dry and impervious to water, and through this it is proposed to drive the tunnel. This chalk is easily worked, as was demonstrated in 1882 when trial headings were driven successfully by means of a rotary cutting machine operated by compressed air. It was estimated at that time that a circular heading 7 ft. in diameter could be driven out from each shore to a meeting under the center of the channel in two years. In three years the tunnel could have been completed, since the "stopping," or enlarging the tunnel to its full section, and the excavation of ventilation and drainage galleries would have followed closely behind the driving of the headings in accordance with the usual tunnel practice.

The natural place for the tunnel is at the Strait of Dover, where the dis-

tance from coast to coast is only about 20 miles and where the average depth of water is about 120 ft. This narrow strip of water has always been one of the important international highways of the world and the traffic lines on both coasts converge to it. But it is also a most unsatisfactory highway on account of the swift currents and rough seas to which it is subject. The economic importance of the strait as a link between England and the Continent will never be altered, and it is therefore inevitable that a tunnel providing adequate railway transportation will finally be built.

The tunnel, as proposed, will run from the Shakespeare cliffs, near Dover, England, to Sangatte on the French coast, near Calais, and its total length will be a little more than 22



A Sudden Attack by Sea and Air might Make the Fortifications at the Mouth of the Tunnel Untenable for the Defenders



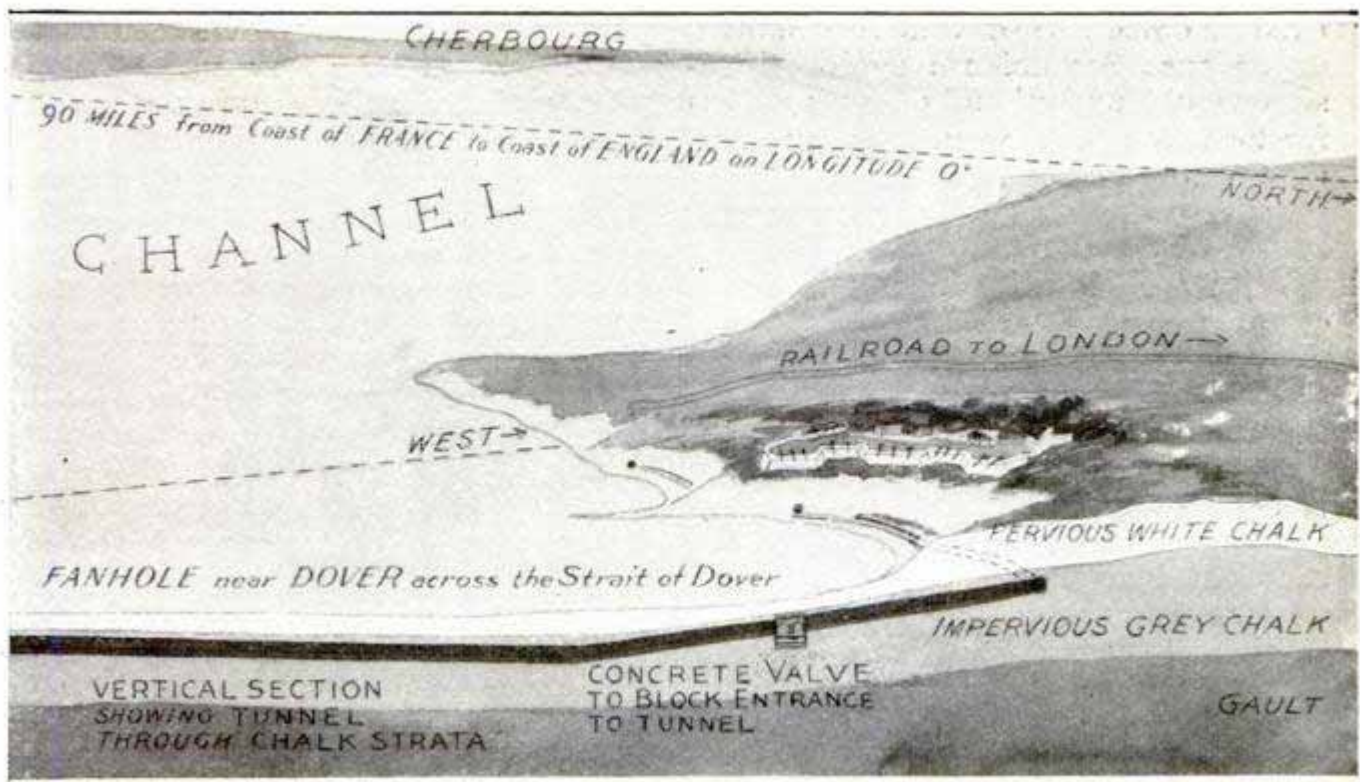


Geological Section Showing How Tunnel Connecting England and France could be

miles. On each side it will enter the cliffs at a short distance from the shore and drop down on a grade of 1 in 80 for about two miles into the impervious gray chalk under the strait. From each of these low points the grade will rise at the rate of 1 in 1,000 to a summit under the middle of the strait, the thickness of the gray chalk being great enough to permit this arrangement. The plan for placing a summit at the middle of the tunnel is solely for the purpose of drainage. Such a plan does away with the necessity for separate drainage tunnels, which would require a rather elaborate arrangement of shafts connecting the main tunnel with the drainage tunnels. At each of the low points near shore a collecting basin will be placed. The water will flow into these by gravity and will be removed by means of force pumps.

The plan now under consideration provides for two parallel tunnels connected by passageways at frequent intervals. It is difficult to see the necessity for this arrangement, since the builders would then have to drive two separate headings and the work of construction would become practically two separate tunnel jobs. The ap-

proved modern practice in building tunnels in rock is to drive one heading, excavate from this a tunnel wide enough for the two tracks and then support the center with a concrete wall, as is being done in the Mount Royal tunnel at Montreal. There is no apparent reason why this process would not be adapted as well to a tunnel in such a stratum of chalk as exists under the strait. The heading could easily be excavated by means of a rotary cutting machine, driven either by electricity or compressed air. If driven by compressed air, the exhaust from the machine, by introducing a constant supply of fresh air into the workings, would go far toward solving the problem of ventilation during the construction period. With such equipment as is now to be had, permanent ventilation after it was placed in operation would not be a difficult matter. The pistonlike action of the trains in passing through the tunnel would practically settle this question, although some auxiliary system of supplying fresh air through ducts to points near the middle would doubtless be necessary. In 1882, it was proposed to use compressed-air engines for hauling the trains, but at the pres-

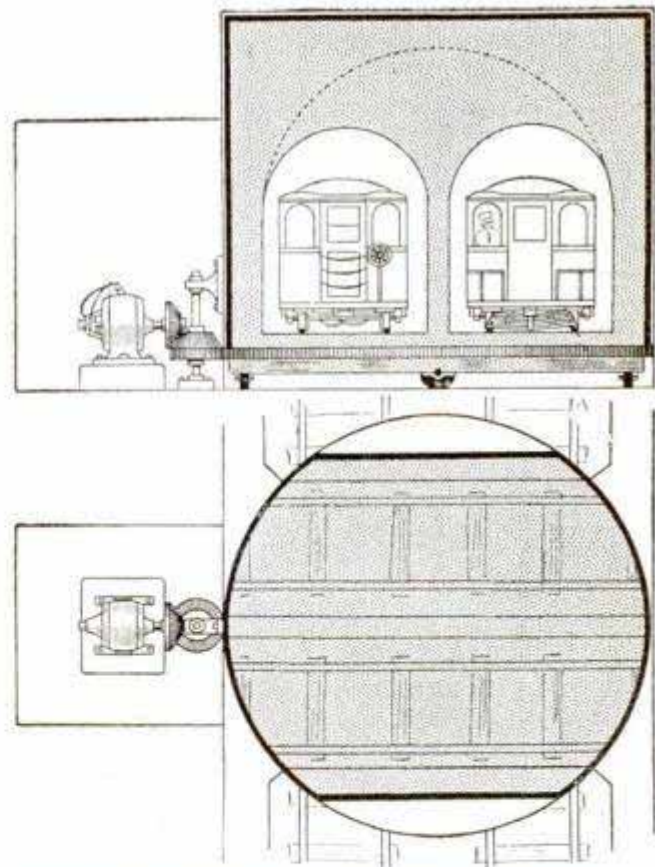


Built in the Stratum of Impervious Gray Chalk Underlying the Strait of Dover

ent time it is not likely that any power other than electricity would be thought of.

A careful estimate places the cost of the tunnel at \$80,000,000. Given the money and the permission to build it, the actual work of construction would not be as difficult as many engineering jobs that attract less attention. The critical feature is that of defense in time of war. Several methods have been proposed for blocking the entrance to prevent invasion. Such a tunnel as that outlined above could be flooded so that it would be impossible for an enemy to pass the low point in the grade. As an additional safeguard it has been proposed to build a device similar to a cross valve, placed within the tunnel at a suitable distance from the entrance. This device would consist of a massive block of concrete operated by a turntable mechanism and pierced with openings corresponding to the openings in the tunnel. Under ordinary conditions this would be set to permit the passage of trains, but in time of war it could easily be turned with the openings at right angle to the tunnel and thus block any attempt at invasion. But no mechanical device has

ever yet been made that it is not possible to tamper with and render inoper-



Concrete Valve Working on Turntable Mechanism, Which could be Turned to Block Exit from Tunnel

ative at the critical moment, and, it might be added, there is always the possibility of treachery by some

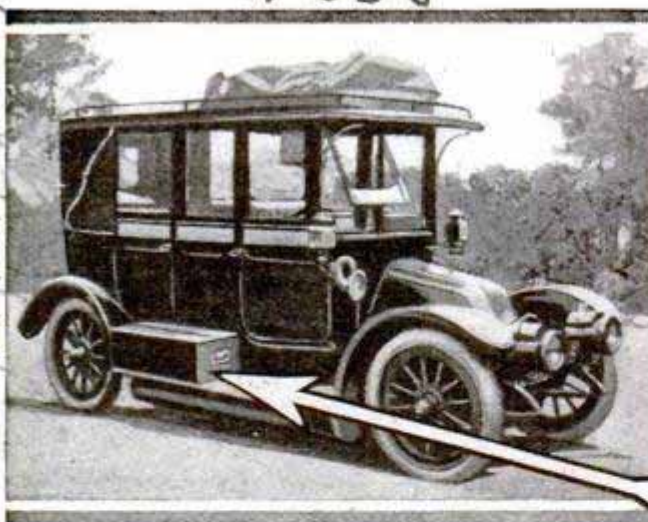
trusted officer. For this reason final dependence for defense against invasion would undoubtedly be placed on fortifications. It would be an easy matter to arrange batteries in such a way as to command effectually the mouth of the tunnel.

With such fortifications, it is inconceivable that an enemy would attempt to force an entrance into the country through the tunnel. The attack, if ever made, would be made in another way, and in considering the possibility of such a thing, it is well to look two generations ahead to a time when the east coast of the strait may be in possession of a power less friendly to England than is France at the present time, and when the whole art of warfare will have undergone a revolutionary change. The tunnel, while useless as a means for making the initial assault, would provide the best of all avenues for conveying troops into the invaded country, and the first step would therefore be to silence the de-

fenses commanding its entrance. There would be no necessity, in the first assault, for occupying these defenses beyond getting control of the devices used for blocking the tunnel. A sudden attack by air and sea, which would probably be made at night, might make the fortifications untenable for the defenders. With this condition maintained for six hours thousands of troops accompanied by several regiments of the terrible modern field guns could be rushed through the tunnel. The invaded country would then have a truly formidable situation to deal with, especially since the enemy, with full control of the tunnel, would have a practically unassailable base of supplies to draw from. But even with this possibility in view, the English, after the completion of the tunnel, would not have as much of a problem in defending their country as have the other great powers with their hundreds of miles of exposed land frontiers.

PORTABLE DINING ROOM FOR AUTOMOBILISTS

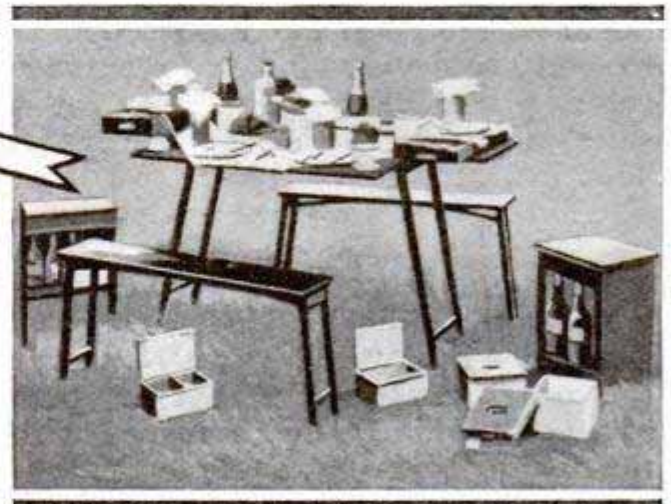
4635



This Complete Luncheon Outfit, Including Table and Seats, Packs into a Snug Little Box for an Automobile Running Board

The luncheon outfit shown in the accompanying picture, almost a complete dining room, packs into a box small enough to fit snugly on the running board of an automobile. Glass, cutlery, crockery, table, and seats for six persons, are included in the set, and

there is ample space for food and drinks. The outfit has been patented in England and was displayed at the International Horse Show. Smaller sets are being made for four and for two persons—the latter is intended to be carried on a motorcycle or side-car. The complete luncheon cabinet contains provision boxes, plates, tum-



Courtesy of the Car

The "Lundale" 2-4-6 person

Car for sale - 18/13, page 131

blers, condiment bottles, cups, saucers, vacuum bottles, knives, forks, spoons, tablecloth, napkins, and space for two champagne bottles.

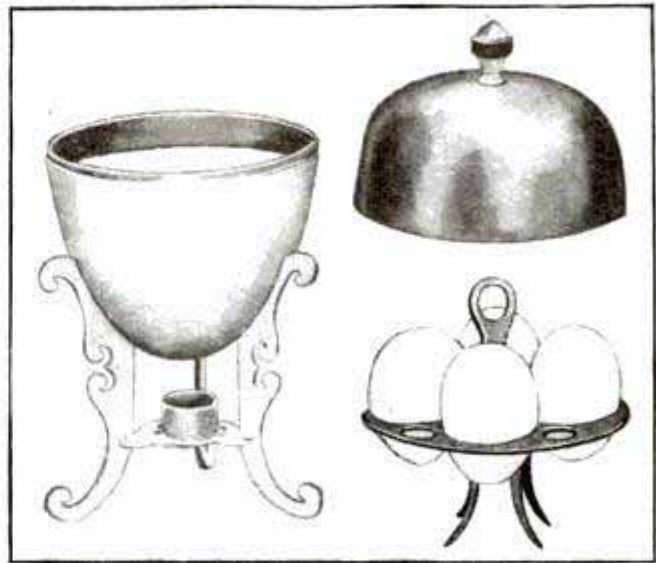
NEW EXPLOSIVE STRONGER THAN DYNAMITE 5253

Trotol is the name of a new high explosive which is twice as powerful as dynamite and very much safer to handle. Six ounces of trotol will do the work of 12 oz. of dynamite, but nothing will explode it except fulminate of mercury, and that can be stored within 6 in. of it without danger. When packed in a 12-in. shell and fired at armor plate 1,000 yd. away, trotol remained unexploded in spite of the terrific concussion. In appearance it resembles wet brown sugar and is made up in sticks. Unlike dynamite, trotol can be kept in water for years without deteriorating. The new explosive was discovered by an officer of the New York National Guard through the study of an old German book containing 2,000 formulas for high explosives. From one of these, taken at random, trotol was developed. The discovery is to be presented to the government without reward.

BURNING CUBES OF SOLID ALCOHOL 5180

Cubes of "solid alcohol" are coming into use in Germany and to some extent in America for cooking, heating curling irons or small amounts of water, and for any purpose which requires a small amount of heat for a short time. Put up in pills or small metal containers, solid alcohol is much more convenient than liquid alcohol, because it can be used on a sheet of metal or asbestos without a burner and the user knows just how much heat to expect. Some of the cubes are made of 60-per-cent alcohol worked up in a solid mass which looks like transparent soap, but the flame is not clean. Mixed with collodion, the solid alcohol

is transparent and more cleanly, but rather expensive. The cheapest and

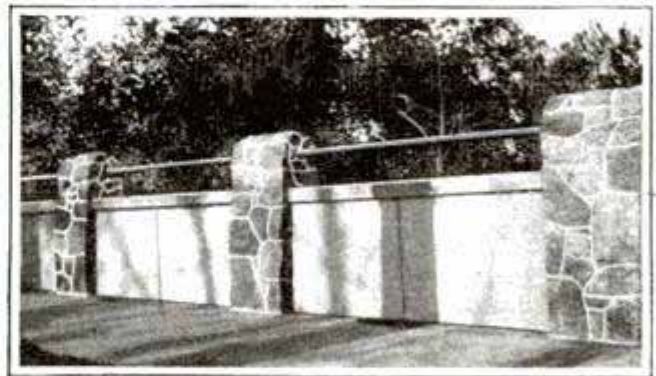


A Cooker Which Uses Solid Alcohol for Fuel, and Eggs Boiled in It

most useful tube is made of sawdust soaked in alcohol and mixed with tar.

CONCRETE SIDEWALK MADE INTO FENCE 5173

The material from an old concrete sidewalk which had outlived its usefulness was used by a resident of California in making a serviceable and artistic fence around his grounds. The concrete slabs were simply lifted from their bed and stood on edge to form the body of the fence. The fence was built in panels, each of which consists of two lengths of slabs, surmounted by a continuous concrete coping. The panels are separated by small piers composed of cobblestones cemented to-



The Panels of This Artistic Fence Are the Slabs from an Old Concrete Sidewalk

gether. The tops of the piers are joined by an iron rod which adds much to the attractiveness of the fence.

Lever Co. 44 Elizabeth N. J. 1880 No. 8 Dr. ch
 (No) 15. 16. Naillette

Mrs. P. M. Rice The woman
 in history, Calif.

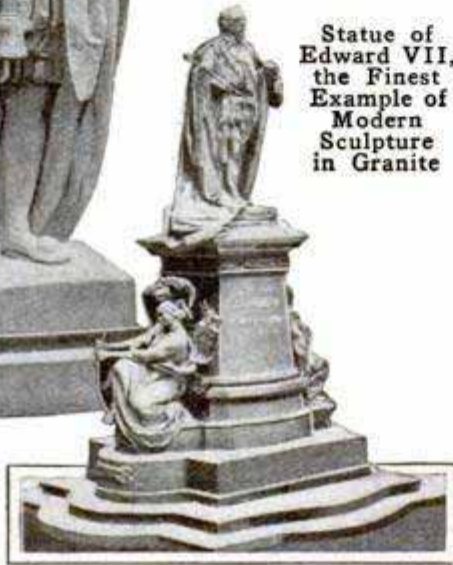
STATUE OF A KING CARVED 5172 IN GRANITE

A statue of King Edward VII recently dedicated in Aberdeen, Scotland, is, perhaps, the first granite statue of a ruler erected since the days of the Pharaohs. It is carved out of a solid block of granite and is polished like marble. Aberdeen claims the



distinction of rediscovering the art of sculpturing granite, after it had been lost for 30 centuries, and has developed an industry based upon the discovery. The first granite statue of modern times, a likeness of the Duke of Gordon, stands in Aberdeen. The new statue of Edward the Peacemaker, the finest piece of granite carving ever executed in Great Britain, is 10 ft. 6 in. high and stands upon a granite base and pedestal 14 ft. high. On either side of the pedestal are bronze figures, 6 ft. high, representative of Edward VII's personality.

Statue of Edward VII, the Finest Example of Modern Sculpture in Granite



It was the same French airman, Pégoud, who on Aug. 19 made a thrilling drop from an aeroplane in the safety-pack parachute invented by M. Bonnet. With the safety pack secured to the top of his flying machine's tail

AIRMAN FLIES SAFELY

5224 UPSIDE DOWN

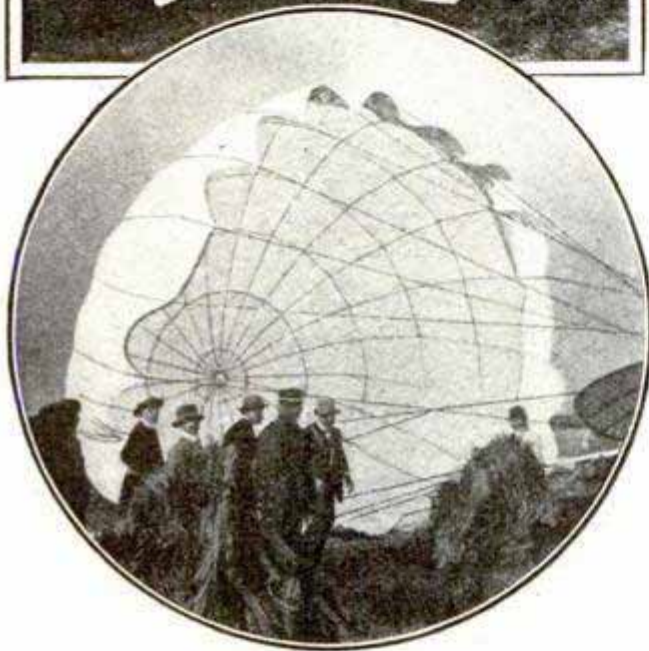
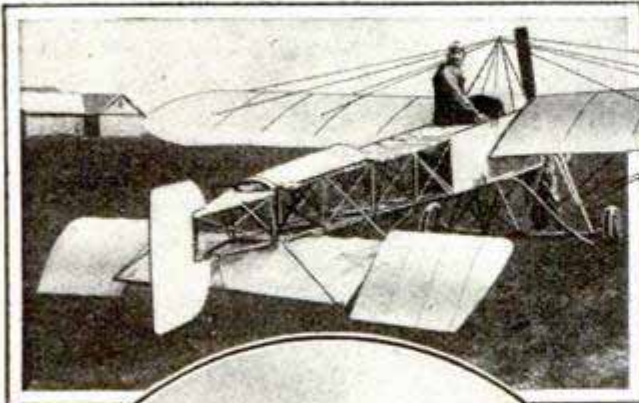
By flying upside down in an aeroplane and regaining his original position after describing an S-shaped figure in the air, the French airman Pégoud has proved that the ordinary aeroplane, not fitted with any special device, possesses much greater stability than is generally believed and can usually be righted, if the pilot keeps his presence of mind. Pégoud performed this aerial feat in a Blériot monoplane at Juvisy, France, on Sept. 1, and then repeated it near the Buc aerodrome on Sept. 2, to show that his first performance was not merely a lucky accident. Before rising for the second flight, Pégoud indicated the part of the sky in which he would fly, head downward. Then he rose in a spiral to a height of 3,000 ft. Turning his aeroplane into a vertical position he drove toward the earth like an arrow. When he had descended to an altitude of 1,500 ft. he swung out horizontally, upside down, on the first part of a letter S. For 50 seconds he flew with his head downward and the wheels of his machine pointing up in the air. Then he turned again toward the earth and swung back to a horizontal position with his machine right side up, finishing a huge letter S in the air. An easy spiral brought him to the earth. The flight lasted 10 minutes and the feat was performed with the motor running at quarter speed.

The same feat was performed unintentionally by an English airman, Kent, on Sept. 9. While he was flying at a height of 2,000 ft. near Farnham, Eng., his motor stopped and he lost control of his machine. The aeroplane turned four complete somersaults, but the pilot regained control and righted it in time to make a safe landing in a steep spiral.

It was the same French airman, Pégoud, who on Aug. 19 made a thrilling drop from an aeroplane in the safety-pack parachute invented by M. Bonnet. With the safety pack secured to the top of his flying machine's tail

♣ Toledo recently cut 300 tons, or \$3,600 worth, of hay from unimproved sections of its parks, including 30 acres in Navarre Park and 60 acres in Otawa Park.

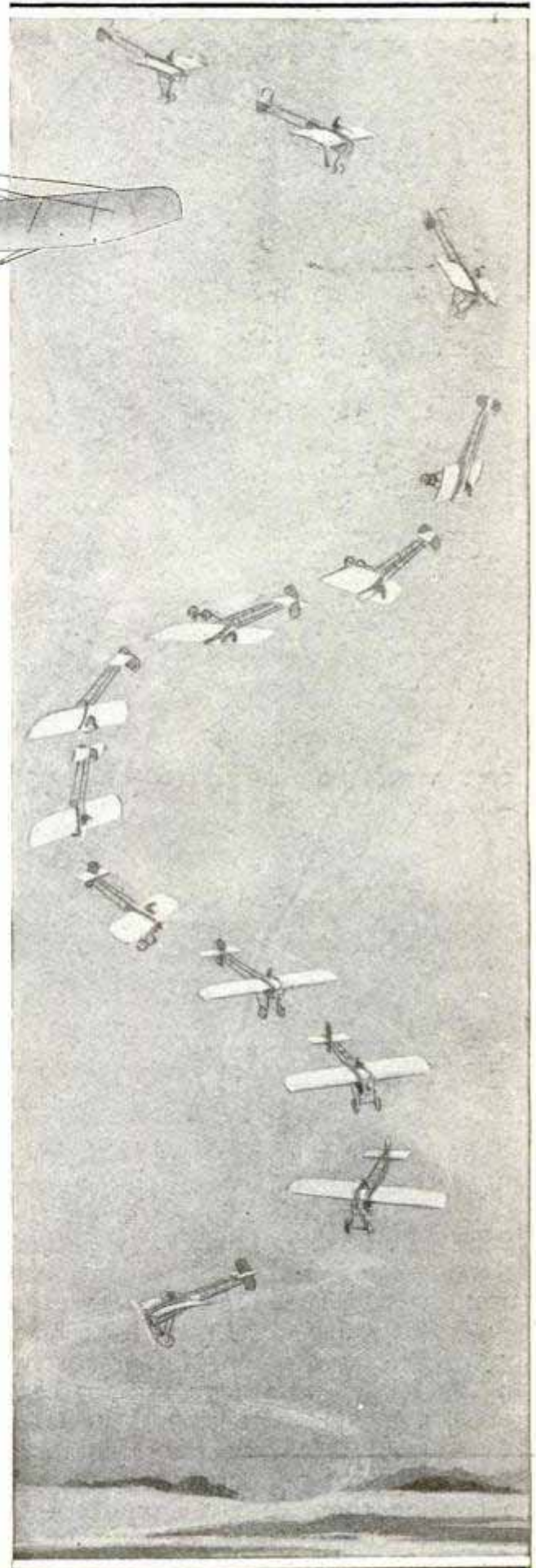
and the rope about his shoulders, he flew to a height of 650 ft. over the Chateaufort aviation field. Facing the wind and allowing his machine to



Safety-Pack Parachute in Which Pégoud Dropped 650 Ft. on August 19: During a Flight the Parachute is Packed on the Aeroplane's Tail

slacken speed and drop slightly, he released the parachute and was jerked out of his seat as it opened out. The pilotless aeroplane started ahead and mounted higher than the parachute, then slipped back, recovered its equilibrium, and started ahead again. After repeating this maneuver several times, the machine finally reached the earth without serious damage. The airman, balancing himself in the parachute, floated down and alighted safely in a tree top. A novel feature of this parachute is the method by which it is forced to open, through the explosion of a cartridge, at the instant of release.

CA new process for casting copper is causing cast copper to replace forged copper in much electrical work.



The Path Described by Pégoud While Turning a Somersault in an Aeroplane: On the Horizontal Curve of the S the Pilot Flew Upside Down

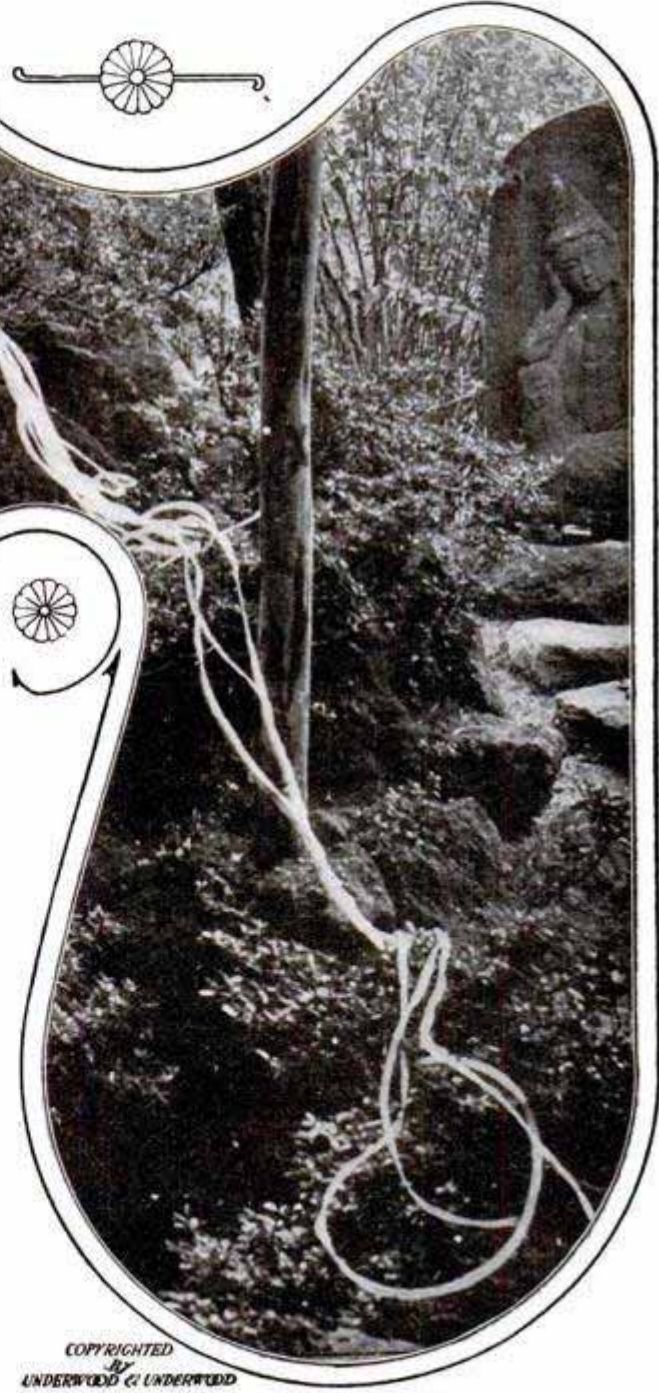
not turn around in it. When he is taken out for exercise every day or so, he is carefully watched by an attendant, and from time to time his plumage is carefully washed and dried. The rooster in the picture belongs to a dealer in antiques at the famous mountain resort Miyanoshta, on the island.

MANY ARTESIAN WELLS IN
528 **LONDON** *in date*

Because of the high charge made for water service in London, 52 artesian wells have already been sunk in that city, and this number is likely to



This Rooster, Bred on an Island in Japan, Has Tail Feathers 18 Ft. Long



THE LONG-TAILED ROOSTERS
5264 **OF JAPAN**

The breeding of roosters with long tail feathers has long been the pastime of the natives of Shinewara, on the island of Shikoku, Japan. By patient selection of a breed of fowls, continued through 100 years, the tail feathers of the ordinary barnyard cock have been lengthened until some of the roosters on the island now have tail feathers measuring 18 ft. The hens of the same breed have tail feathers only 8 in. long. In breeding the roosters it is necessary to confine them in close quarters so that the feathers cannot wear out or be molted. Through a careful routine, the fowl lives his eight or nine years of life in a cage so narrow that he can-

*Underwood & Underwood
 12-2-23 37-11-27
 new York*

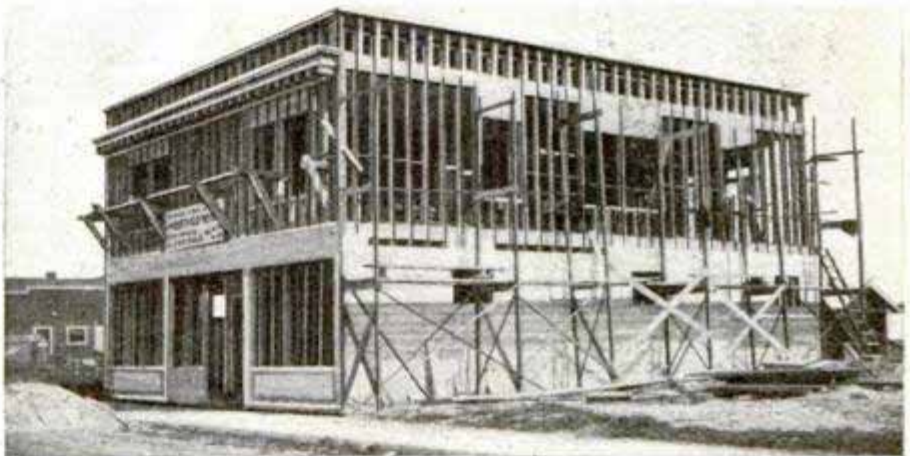
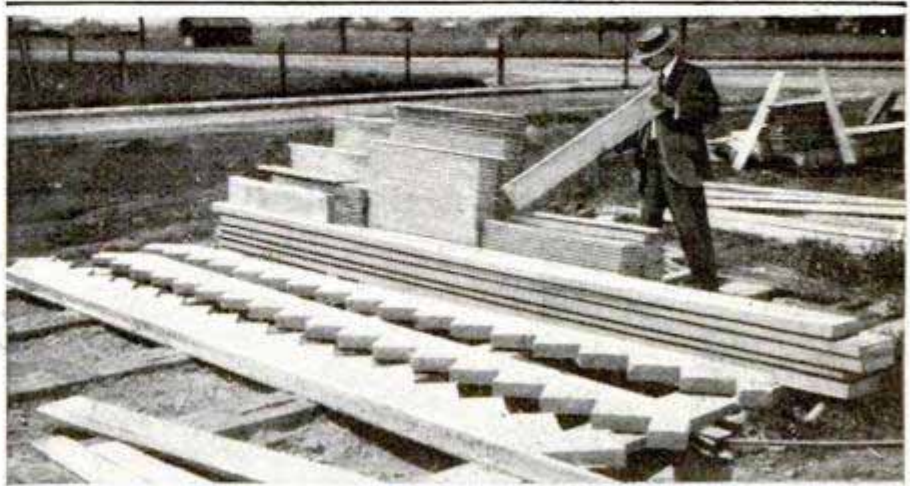
increase greatly in the future, especially since such wells are now included in the specifications for all new buildings over a certain value. It has been thought that some alteration in the water level might result from the increased demand on the water-bearing strata, but so far there is no indication of this.

FRAME HOUSE REPRODUCED IN CONCRETE 4854

Concrete joists, clapboards, window frames, etc., were used in the

CHANGING THE COMPOSITION OF IRON 4993

Castings and forgings of soft iron can be quickly transformed into hard steel by a newly patented electrical process for changing the composition of iron or steel. By the use of an electrical furnace the entire mass of metal or any depth of surface can be hardened and tempered in a few minutes. The old process of changing the composition of iron or steel by cementation is extremely slow; and the more rapid process of casehardening with potassium cyanide, or some other tempering substance, produces only a thin superficial skin of harder metal. Both are faulty because of the difficulty of applying the carbonizing substance while the iron is heated near the melting point. In the new process, the iron or steel is completely inclosed in a hardening mixture in a small furnace and an electrical current passing through it heats it above the welding point so that the change in composition takes place in a few minutes.



Top View: A Pile of Boards and Timbers Reproduced in Concrete; Center View: A Reinforced-Concrete House Put Together Just Like a Frame Structure Except That All Its Parts are Made of Concrete; Bottom View: Molds for Making Cement Clapboards

construction of a reinforced-concrete house, which was built just like a frame structure, in Los Angeles, Cal., recently. All the parts of a frame house were reproduced in concrete,

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D. W. C. Ford, Chile. Pat. 12/09 471870 (Cl 219-11)

E. R. Ed. ...
4824 ...
St., San Angeles, Calif.

and put together with nails or wire as if made of wood. The joists and timbers, reinforced with twisted iron rods, were fastened together with sockets and pins. Thinner cement boards were strengthened with wire mesh and pro-

vided with nail holes so that they could be nailed to strips of wood wired on the joists. The parts were cast in molds at the building site to save transportation. Much less material was required than for solid poured walls.

**NEW TRAP FOR DESTROYING
5055 MOTHS**

Millions of brown-tail moths were destroyed in Auburn, Me., last July



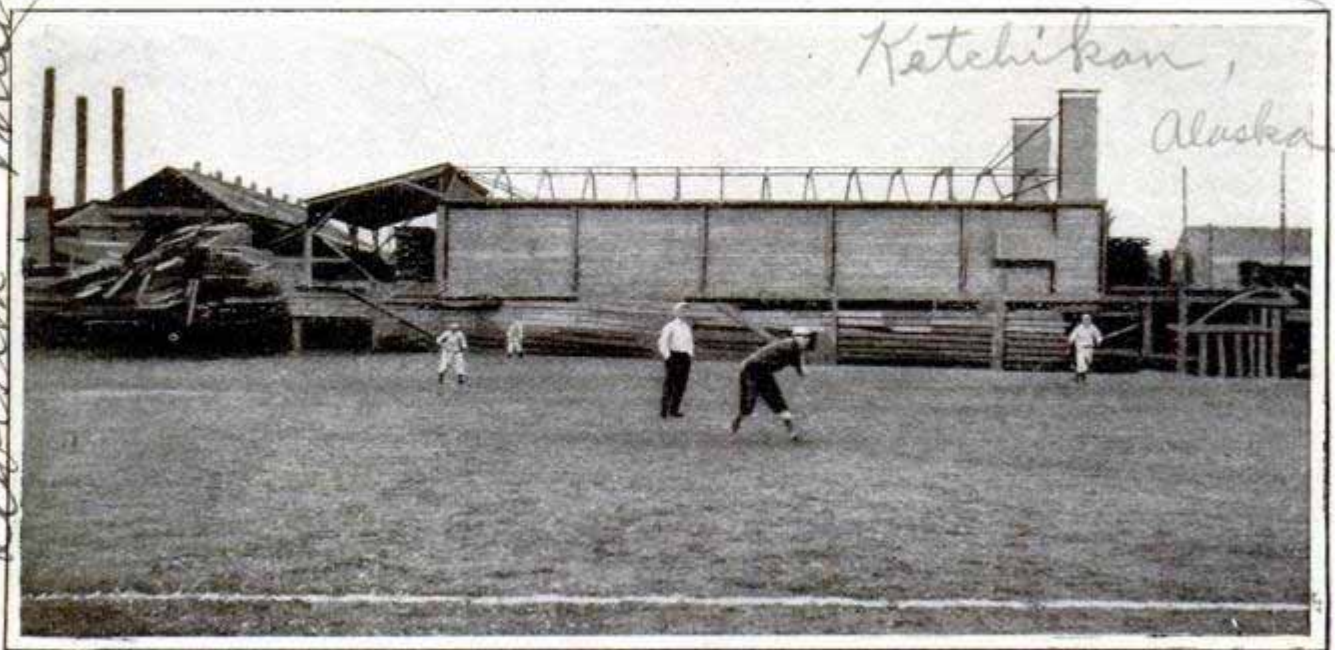
Traps for Catching and Destroying Brown-Tail Moths

during a two weeks' trial of 45 moth traps of a new design used in connection with arc lights. Each trap consisted of a broad, flat pan with the top

edges turned over inside to keep the moths from crawling out. The pan was half filled with water and placed directly under an arc light. Moths flying about the light were attracted by the mirrorlike reflection of the water, fell into the trap, wet their wings, and could not escape. A night's catch for each of the traps was about two quarts, some 10,000 moths.

**BALL GAME AND CANOE RACE
5144 ON SAME GROUNDS**

A ball ground at Ketchikan, Alaska, is in one way the most remarkable in the world, since it can be used alternately for ball games and canoe races. On one day recently ball games were played early in the morning and late in the afternoon, while during the intervening period, an exciting canoe race was held over the same grounds. The explanation of this seeming paradox is that the grounds are located on the tide flats, and at high tide are completely submerged. *C. R. Fickle*



Alaskan Ball Ground Which is Used at High Tide for Canoe Races

180 Sabattus St., Lewiston, Me.
Chas. E. H. Kimball
Lewiston, Me.

Ketchikan, Alaska

COMMENT AND REVIEW

THE world-wide importance of refrigeration and its manifold utilities were presented to public attention when the triennial meeting of the International Association of Refrigeration held its convention in Chicago recently. Every well-known nation was represented, and the delegates who passed through Washington were shown marked attention at both the White House and Department of State.

Growth of Refrigeration

From a limited use in a single industry only a comparatively few years ago, mechanical refrigeration has expanded and developed until it has become one of the great modern necessities. Fruits and food products are carried across oceans and reach their destination in perfect condition; poultry, fish, game and meats are stored during the season of the year when at their best and kept for months and even years, which otherwise could be had during a few weeks only. Our theaters and public dining rooms are cooled even to a degree of discomfort in the hottest weather; towns of moderate size, in places where water never freezes out of doors, now have their dependable daily supply of ice, with the regularity of sunrise and at a price no higher than charged for natural ice in long-winter lands. In modern offices ice water flows from a pipe in every room of tallest skyscrapers, while far below the beds of rivers engineers bore great tunnels through treacherous quicksands, made safe and solid by artificial freezing.

This great engine of beneficence and utility is not in the public eye and mind like the telephone and the electric light, but its loss to the world under present-day conditions of city life would be almost as great a disaster as to be deprived of both. One feature suggesting the tremendous potentiality of the industry was the banquet with which the congress closed its labors. Two thousand plates were spread; 500 waiters served—as many as the entire number regularly employed in cities as large as Cleveland or Minneapolis—and the menu was printed in three languages. Under each dish was given the cold-storage history of the food products used in its preparation, length of time in storage, etc.; for practically everything came out of cold storage. The banquet cost \$20,000.

Surely a long step in progress since the day when mother hung the butter in the well.



BIG business makes in many ways for large economies; at the same time there is such a thing as being so large that fearful wastes occur as a result of size. An interesting example occurred recently which illustrates this.

How Big Business Loses

A certain steamship line, operated in connection with a trunk line of railway, shortened its time to the Orient, and spent thousands of dollars advertising the improvement in daily papers throughout the country. Great quantities of expensive illustrated literature were prepared and sent to all its offices. A gentleman who for some time had contemplated the trip, seeing the announcement, con-

cluded he would go. Accordingly he called at the company's office in Chicago for detailed information. The ticket clerks knew nothing about the change, had not seen the big advertisements in the morning papers, and took no interest in the prospective passenger, whose fare would amount to about \$600 for the round trip. He insisted on a search being made, and the reluctant clerk finally found a circular giving the dates of sailing, which he tossed out with the utmost unconcern. The passenger, an experienced traveler, then called for a printed description of the several ships showing tonnage and the various appointments and conveniences, or lack of them, of each vessel. No, they didn't have anything; but finally the insistent seeker after ocean travel succeeded in having a further search made, which produced an elaborate booklet giving fullest information. Casting this at the passenger, the clerk turned away to avoid further bother from so persistent and annoying a person. But the man examined his literature in vain for the diagram of the cabins, and another tussle resulted before this was found.

As my friend remarked, he believed he could have joined a club, a church or the Army with half the effort he spent trying to become a passenger on one of these ships. Of course somebody, or several of them, had slipped a cog, but how absurd to pour out money in advertising and then fail to have all employes concerned, from the highest to the lowest, instructed in advance, not only of the coming date of the advertising, but schooled in what to say to prospective passengers; for a man seldom makes inquiry at a steamship or railroad office without a fairly definite idea of making a voyage or taking a trip.

Unless he wakes up and changes his methods that young clerk will never get to be an official; in fact, he will not hold his job very long. If he were ambitious he would have seen the advertisement, and, realizing the inevitable result, would have posted himself and been able to promptly answer every question the passenger asked. There are other concerns besides railroad and steamship offices where the young men are asleep at the switch regardless of the fact that the world is full of splendid opportunities for him who is willing to earn and deserve them. All great and successful men became such by application and earnest work, and not by knowing as little as possible about the things they were set to do.



IN contrast to the above incident, one electric corporation has a trouble doctor who is stationed just inside the main entrance, whose sole business it is to smooth out wrinkles. He is keen, discerning and diplomatic, and can tell at a glance whether the customer is leaving in a dissatisfied frame of mind. He must not let anyone depart feeling sore. So far as the company is concerned it is just as unfortunate to let a customer depart thinking he has been misused—even when he has not—as if the company were in the wrong—and often the company finds itself at fault, in which case its policy is to make restitution. In short, corporations are finding it pays them, quite as much as it pays

*The
Trouble
Dispeller*

the individual, to see that its customer as well as itself gets a square deal. And so the trouble doctor diagnoses each case, most of which he can cure with the remedies of his own knowledge, and those aggravated cases which he cannot are taken in to the proper official, who considers no reasonable amount of time wasted in straightening out a tangle. Even the smallest business can adopt this policy; it is not necessary to have an expert specially detailed for the purpose, every one in the place can help; but the man at the head must decide on this policy and live up to it himself before he can get anything of the spirit of a square deal instilled into his employes.



THE New Haven wreck, in which an obsolete signal system and antiquated wooden sleeping cars furnished the reason for such fearful loss of life, cannot fail to shorten the time when those railroads which do not voluntarily remove these risks to human life will be forced by law to provide greater safeguards. Only a few days later, on another road, a passenger train traveling at even faster speed left the track and overturned. Though some of the passengers were injured, no one was killed. The steel cars withstood the shock.

*Standard
Freight
Cars*

While the wreck of freight trains involves a much smaller loss of life and usually money, the losses from this source run into millions of dollars yearly. President Ripley, of the Santa Fe, in a recent article discusses a condition which has not occurred to the layman. As we all know, under the system of interchange of cars in this country, one almost never sees a freight train composed entirely, or even largely, of cars belonging to the road over which it is running. On the contrary, a long passing freight is a kaleidoscope of names and initials of railroads located in almost every state, with cars built by numerous builders; a confusing collection of cars of various sizes, types and age. Under our system of through shipments this is inevitable, and, no matter how careful any one road may be to maintain its own rolling stock in a condition of efficiency and safety, there is the constant danger of a decrepit car from some other line breaking down and causing a wreck. Under the Interstate Commerce regulations this has been safeguarded to some extent by heavy-penalty regulations which require each road to inspect every car received from another before accepting it. If in bad order in certain parts, it must be repaired before proceeding.

This helps some, but, as Mr. Ripley states, there are essentials which no eye can measure. Who can see into a wheel or car axle, for instance, and discern the crystallization which means a break at the first unusual strain or shock? Some roads, short of both money and cars, when in the market for new equipment, naturally get the largest number of cars they can for the funds available. It is self-evident that \$1,200 will build a better car than \$800, yet each is expected to carry the same load. The railroads have been having an anxious time of late years, and it is impossible to throw away the hundreds of thousands of cars which must fall below a certain desirable standard.

The traffic of the country would be blocked. It does seem possible, however, to decide on a certain standard for each type of freight car, and thereafter to require all new cars to be built in accordance. At present each car builder has certain features of his own which differ from the other builders. This largely and unnecessarily increases the cost of repairs, on account of the great variety of parts which must be kept on hand.

Mr. Ripley says: "I suggest a standard car uniform in all essential details, to be arrived at by agreement, if possible—arbitration, if necessary. If in addition we could establish a freight-car pool, or an equipment company, the stock of which should all be owned by the railroads, so much the better."



THE very practical and successful demonstration made by Warden Tynan, of Colorado, of using his better class of convicts for road building, under an honor system in which the men work without guards is beginning to bear fruit. Illinois is trying the plan in a small way, with about 40 convicts, who are improving a road near Dixon. Here also the men are placed upon their honor, and a liberal reduction in their term has been promised by the governor to those who make good. The men fully appreciate the outdoor life and would gladly accept the work if for no other reason. It will be interesting to watch the result of this experiment, because it is being conducted near a city. Warden Tynan purposely took his men—a much larger number—far away from the temptations of town or city.

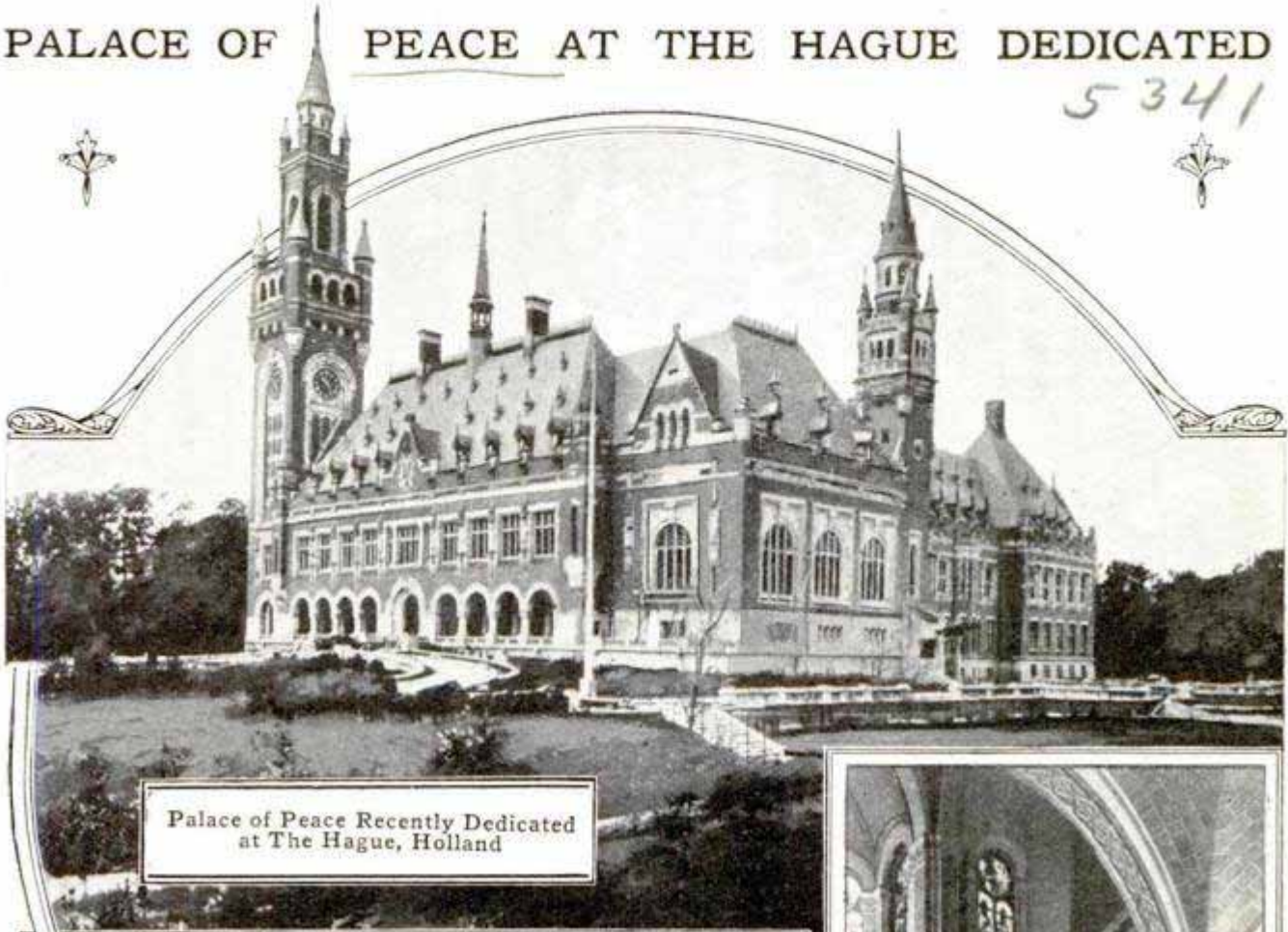
*Convict-
Built
Roads*

So far the scheme is working satisfactorily, although a condition that the Colorado warden feared arose. Naturally considerable interest was aroused, and numerous visitors came out from town to watch the men at work. Some sentimental citizens thereupon planned automobile rides and a theater party for the convicts. Governor Dunne immediately and very properly issued orders that nothing of the sort be permitted. There is a decided difference between allowing a convict to indulge in outdoor work under conditions calculated to make a man of him again and silly sentiment that would set him on a pedestal. A prison sentence should not be revengeful; it should be reformatory; but reform will not be secured by pink teas. The very object which is aimed at may easily be defeated by what is intended for sympathy. The dignity of the law and the respect for it which the prison sentence contemplates cannot be best attained by rapid steps. It is right and proper that the convicts have reasonable recreation, but let the entertainment be brought to them and not they taken to it. Governor Dunne's prompt and firm orders in this matter are for the good of the men themselves, for a too generous letting down of the bars is likely to deter other states from giving the plan a trial, and every state should use as many convicts as possible in road working. But to make light of a prison sentence would be a very grave mistake.

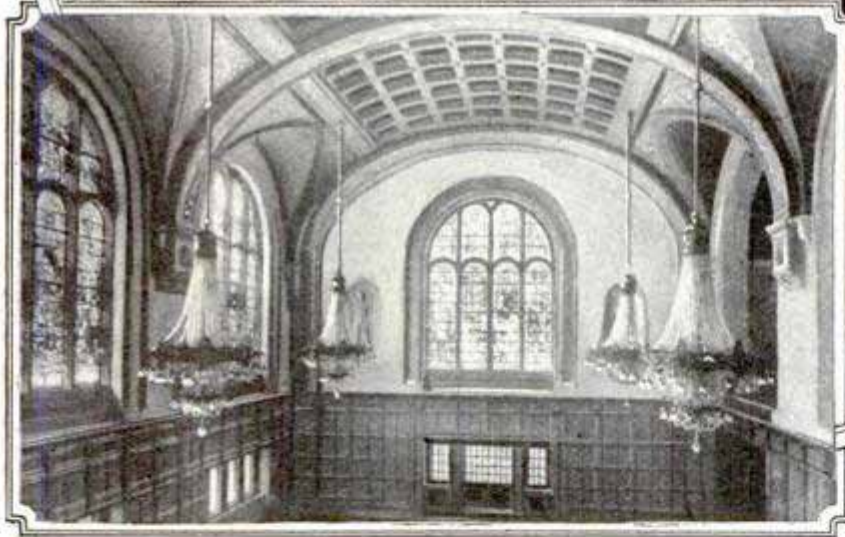
H. H. WINDSOR

PALACE OF PEACE AT THE HAGUE DEDICATED

5341



Palace of Peace Recently Dedicated
at The Hague, Holland



Great Hall of the Palace of Peace, Showing Stained-Glass
Windows Contributed by Great Britain



Stairway at the Main Entrance
to the Palace of Peace

The Palace of Peace, the biggest of the world's monuments to progress, was dedicated at The Hague on Aug. 28, 1913. The provision of a permanent home for the International Peace Conference, which had its beginning in a suggestion of Nicholas II of Russia in 1899, is due to the generosity of Andrew Carnegie, who, in 1903, donated £500,000, equivalent to nearly \$2,500,000, for the construction of the building. The building was erected

from the plans of L. M. Cordonnier, a French architect, following an international competition, held in 1911. The occasion for the dedication of the building was the twentieth Peace Conference, which was attended by 950 delegates representing all the civilized nations of the world.

Although this building was made possible by the fund donated by Mr. Carnegie, many of the leading nations contributed liberally to the construc-

Edwin Lewis

tion, and particularly to the decoration. Great Britain contributed the stained-glass windows, while France contributed tapestries. Granite was contributed by Denmark, Norway, and Sweden, and marble by Greece and Italy. Belgium furnished the forged iron and several of the South American countries sent costly woods, while sculpture was sent by the United States, embroideries by Japan, and

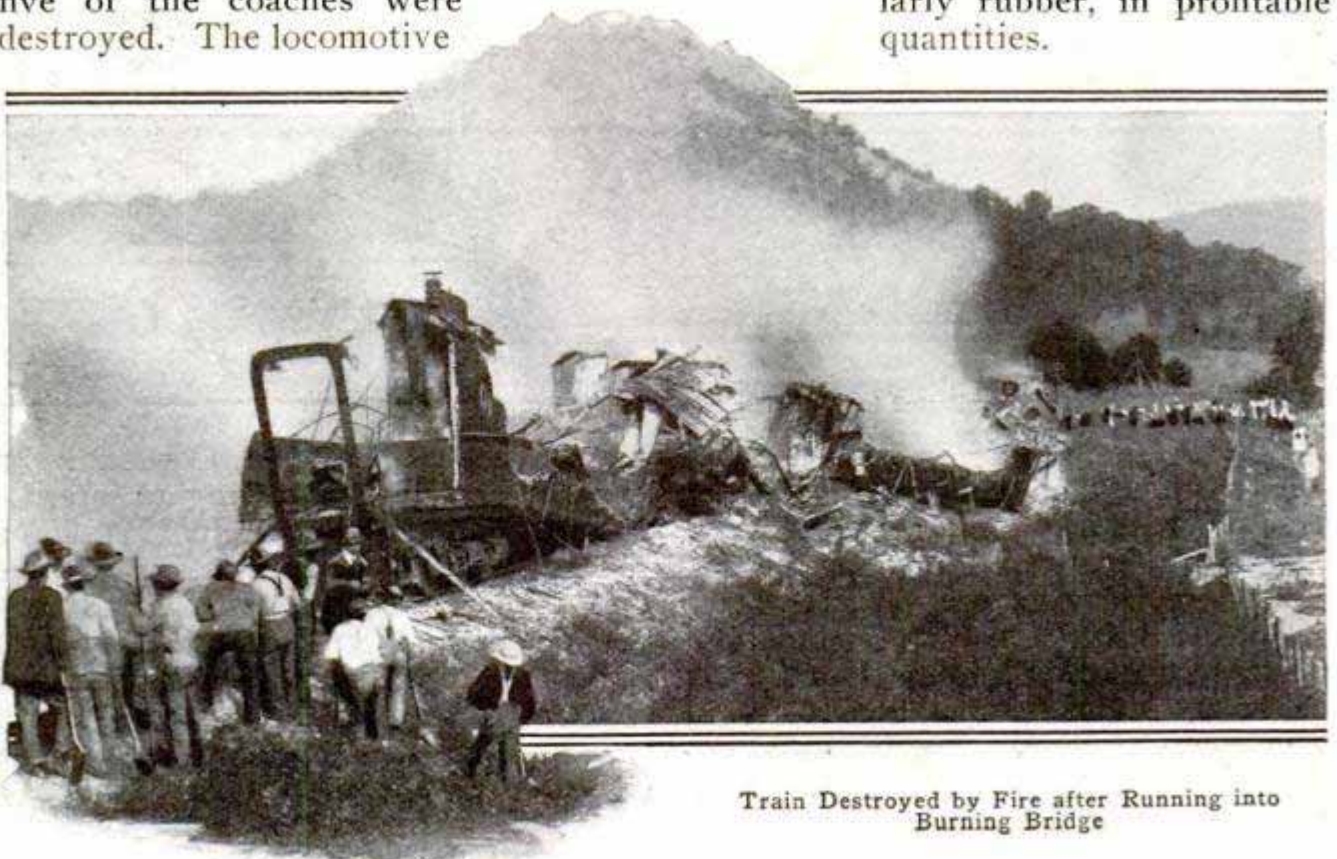
paintings by Holland. The result is that the building is not only as good structurally as it can be made, but is beautifully decorated throughout. The Peace Conference is not confined to the settlement of international disputes, as is commonly supposed, but covers the widest field, devoting much of its time to such questions as the laws and customs of war and the rights and duties of neutrals in time of war.

5431 **TRAIN DESTROYED BY
BURNING BRIDGE**

While running at a speed of 53 miles an hour, and immediately after rounding a curve that prevented the engineer from seeing the danger, a limited train, bound from the Pacific coast to Chicago, ran into a burning bridge a few miles south of Winona, Minn. Owing to the fact that the bridge was only partly burned, the locomotive and baggage car passed over safely, but the first car behind the baggage car was derailed. The train immediately caught fire from the burning bridge with the result that five of the coaches were destroyed. The locomotive

and baggage car were safely out of the fire, and the three rear coaches were saved only with the greatest difficulty. It is said that the financial loss to the railroad company will exceed a quarter of a million dollars. The remarkable feature about this unusual accident was that no one was killed, although several of the passengers were severely injured.

Chemical experiments have brought out the fact that sagebrush contains rubber, alcohol, and acetic acid, and efforts are being made to discover some system of treatment for extracting these constituents, and particularly rubber, in profitable quantities.



Train Destroyed by Fire after Running into Burning Bridge

AIRMAN FLIES ACROSS THE 5444 MEDITERRANEAN SEA

The world's record for oversea flying was broken by the French airman Garros on Sept. 23, 1913, when he flew across the Mediterranean Sea from St. Raphael, France, to Bizerta, the most northerly port of Tunis. The distance in a straight line between these two points is 484 miles, and the time consumed in making the flight was 7 hours 53 minutes, the airman leaving St. Raphael at 5:52 in the morning and arriving at Bizerta at 1:45 in the afternoon. Garros refused to accept the advice of other airmen that he should affix floats to his aeroplane as a precaution in case he was forced to descend to the water, and also declined the offer made by the French naval authorities to station torpedo-boat destroyers at intervals along the route. The flight is regarded by airmen and military authorities as one of the most remarkable ever made.

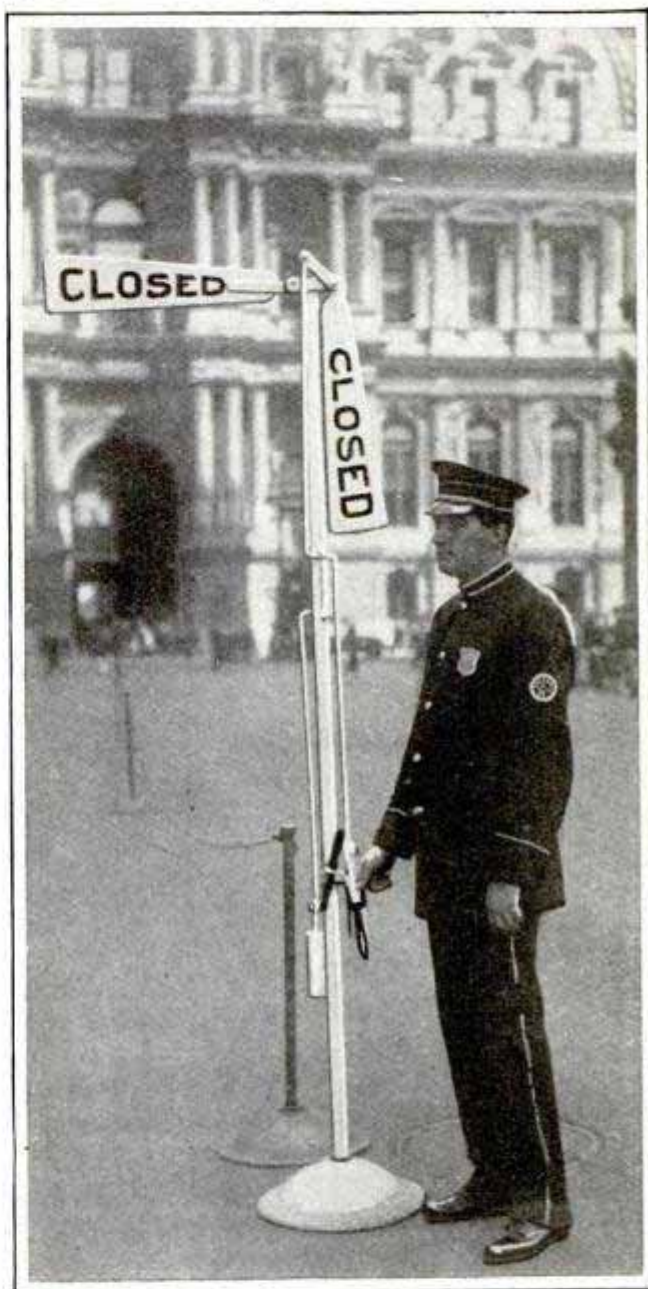
MACHINERY HALL LAST OF 5454 ITS CLASS

Machinery Hall, now being built for the Panama-Pacific Exposition, with a floor space of more than eight acres, and an extreme height of 135 ft., will not be constructed of steel and concrete, but of timber! The engineers found that the forests of the coast offered satisfactory lumber at low cost and decided that the vast monumental structure should be built of native timber. Over 7,500,000 ft. of lumber will enter into its construction, and it is more than probable that this will be the last great building in which wood will constitute the constructive material.

SEMAPHORE FOR REGULATING 5409 STREET TRAFFIC

A semaphore signal is being tried successfully in Philadelphia as a substitute for the policeman's whistle in regulating traffic at street crossings. The policeman stands at the base of

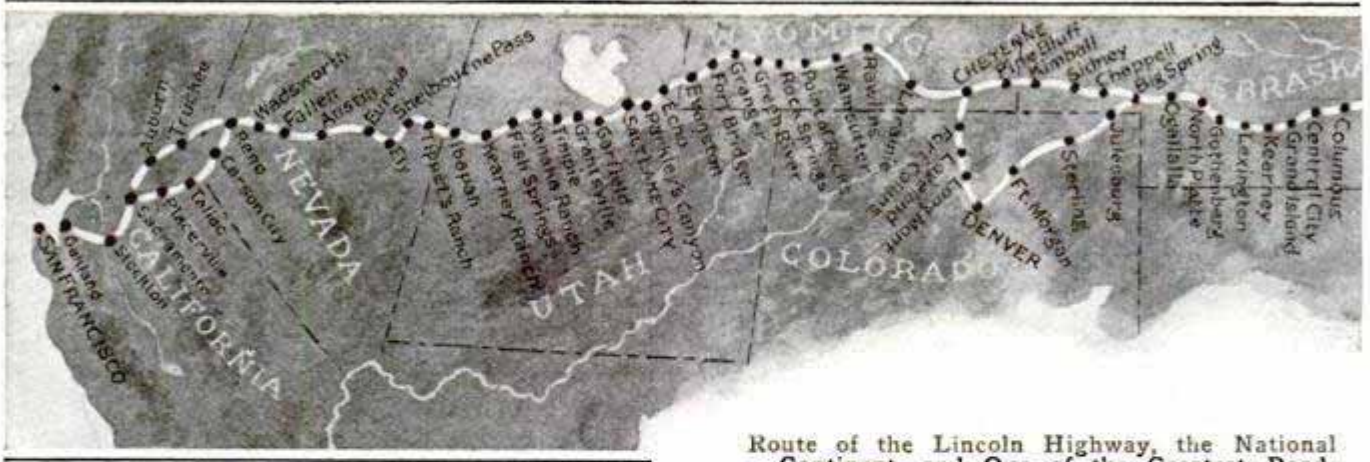
the semaphore and halts or starts traffic simply by pulling a lever. The word "closed" painted on the arm can



Officer Controls Traffic by Pulling Lever, Which Raises or Lowers Signal Arm

be seen a block away, and the policeman is relieved of the duty of watching individual drivers to see if his signal is understood, as is always necessary when the whistle signal is used.

ⒸThe United States superdreadnought No. 39, to be built at the Brooklyn navy yard, will have a displacement of over 31,000 tons and will be one of the most powerful battleships in the world. The ship will eventually be named after one of the states, probably North Carolina or New Mexico.



Route of the Lincoln Highway, the National Continent, and One of the Greatest Road-

4844

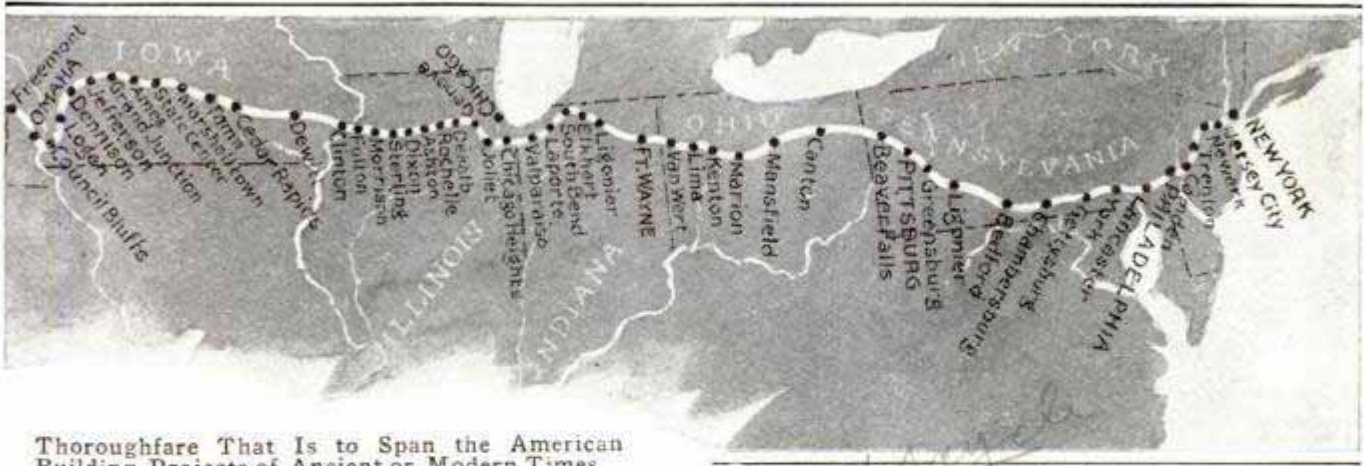
LINCOLN HIGHWAY FOLLOWS HISTORIC TRAILS

Construction work is soon to begin on the greatest road-building project ever attempted since the time when the Caesars, in building the highways which are still the main thoroughfares of Europe, gave rise to the saying that "All roads lead to Rome." The modern counterpart of these ancient roads is the Lincoln Highway, a national thoroughfare that will extend 3,100 miles across the American continent from New York to San Francisco. Unlike the Roman roads, which were a manifestation of imperial power, the Lincoln Highway is the result of a popular movement and is to be built by popular subscription. After over a year of careful investigation and after numerous conferences with the officials of the different states that the highway is to pass through, the route has been definitely decided on, while, of the \$10,000,000 needed for carrying out the work, over \$4,000,000 has already been subscribed. Twelve states will be crossed by this highway which is to serve to future generations as a fitting memorial to the martyred president whose name it bears.

Although the general route of the highway has been known for some time, the exact location through the different states, owing largely to the rival claims of local communities, furnished a big problem, and has only recently been determined. In each case the final decision was made mainly on the basis of directness of route, but with due regard to scenic and historic in-

terest. Starting at New York City the highway runs in as direct a route as is practicable through the states of New Jersey, Pennsylvania, Ohio, Indiana, Illinois, Iowa, Nebraska, Wyoming, Colorado, Utah, Nevada, and California, to the western terminus at San Francisco. West of the Mississippi a large part of the route lies over the historic Overland Trail. At two points, one in eastern Colorado and the other on the west border of Nevada, the highway will comprise two separate routes. In the first instance the object was to include Denver, which lies off the direct route, on the highway, and a branch was therefore planned to run from Big Spring, Nebraska, through that city and to a connection with the main highway at Cheyenne, Wyo. At Reno, Nev., the highway again divides, one route running north and the other south of Lake Tahoe to a connection at Sacramento, Cal.

There is to be little or no opening of new roads, the whole route being laid out with the idea of connecting a series of local highways into one great transcontinental highway, but it is estimated that on about 2,000 miles of the route it will be necessary to carry out extensive improvements and in some cases complete reconstruction. Such work will be done in cooperation with local communities, which will be asked to bear a fair portion of the expense. Several of the states, including Illinois and Ohio, have agreed to divert a large proportion of their annual



Thoroughfare That Is to Span the American Building Projects of Ancient or Modern Times

road appropriation to the counties along the route. Existing highways that have been improved will be used as they are, provided their condition and type of construction meet with the approval of the engineers of the Lincoln Highway Association, who will consider permanency as well as other important details. The specifications of the association provide for roads of concrete construction, patterned after the concrete roads of Wayne County, Mich., which are said to be the finest in the United States. In any case where the association bears a portion of the expense of improving or rebuilding a road these specifications will be insisted upon, with the ultimate purpose of securing permanent concrete construction from end to end of the highway, excepting sections where a natural rock floor makes such construction unnecessary.

Of the fund already pledged, a large part comes from automobile and cement companies, while the citizens of one city alone, in Indiana, have pledged \$7,500. In addition to this, over one hundred business concerns between New York and San Francisco have each agreed to contribute an amount equal to one-third of one per cent of their gross sales for three years. The remainder of the fund, about \$5,000,000, is being raised by popular subscription. The treasurer of the Lincoln Highway Association is Emory W. Clark, President of the First National Bank of Detroit, to whom contributions may be sent. Membership certificates are furnished to contributors.

SIDECAR HOOD FOR STORMY WEATHER 5194

Sidecar hoods with celluloid windows in front are coming into use in England to protect sidecar passengers from rain. The hood is three-sided and extends down to the shoulders, forming a waterproof covering for the



Storm Hood with Celluloid Front for Sidecar Passengers

head. The square celluloid window in front is held away from the passenger's face by guy ropes running down to the footboard, and the back is open for fresh air. The hoods are designed to be used in conjunction with a storm apron which has a hole for the passenger's head and covers the whole sidecar. In some cases the storm hood

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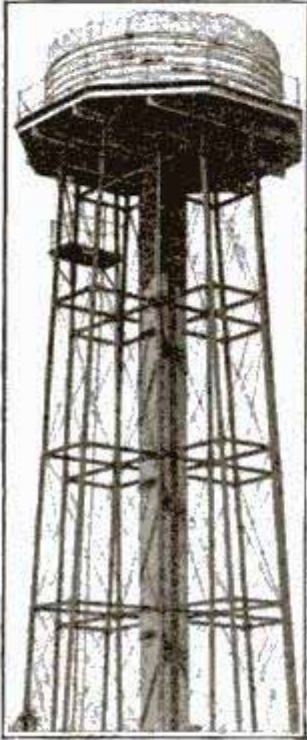
Fireman's Hand

is sewed upon a second apron that covers the usual storm apron. When not in use, the hood and apron are stowed under the sidecar seat.

A WOODEN WATER TANK

5202 THAT BURST

Rusty hoops caused the bursting of a large water tank in Calmar, Iowa, not long ago. The tank was used in connection with the city's water supply and had a capacity of 60,000 gal. The hoops had become rusty and badly weak-



The Lower Part of the Tank Was Unbroken and is Still in Service

ened during its 17 years of service and were being replaced, but before the repairing had proceeded more than a few feet from the bottom, the upper part of the tank burst. The new hoops kept the lower end of the tank water-tight and, after the wrecked upper portion had been cleared away, the sawed-off stub was kept in service. The tank was 20 ft. high, 24 ft. in diameter, and built of $2\frac{3}{4}$ -in. staves. It stood on a steel tower 80 ft. above the ground.

☞ Direction signs for aviators are to be painted on the roofs of gasometers throughout France.



City Water Tank Which Burst Because of Rusted Hoops

STANDPIPE MAKES FIRE

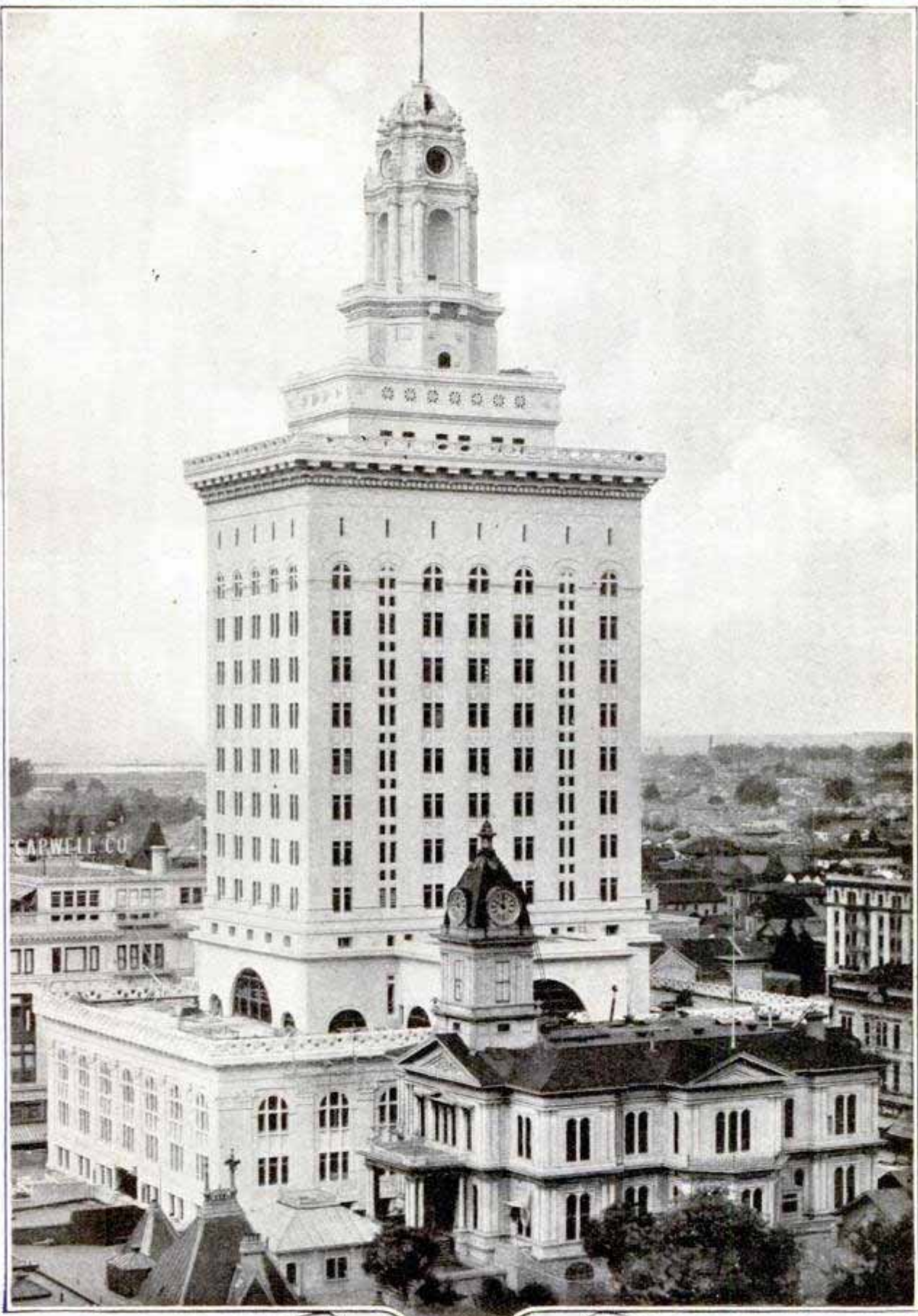
5278 FIGHTING SAFE

An ingenious standpipe that relieves the fireman of the dangerous duty of entering a building to carry the hose to a burning room has been invented and has proved efficient in practical tests. The building in which the test was made is a five-story structure and the standpipe is placed in the center. At each floor is a valve with a $1\frac{1}{8}$ -in. opening, controlled by a lever at the base of the standpipe on the main floor of the building. In case of a fire, the firemen first attach the engine hose by means of a valve at the base of the standpipe. If the fire is on the third floor the valve on the third floor is opened by pulling the corresponding lever, and the engine is started pumping. Each valve is so made that the force of the water causes it to revolve and throw the water in every direction, and in this way has some of the merits of a sprinkler system. The standpipe may also be connected to a water tank on the roof to insure immediate action before the arrival of the fire department.

OAKLAND'S NEW PRISON IS

5388 UP IN THE AIR

Modern penology has largely banished the dark underground cells and gloomy dungeons, except in backward communities, as a place for holding offenders. But the city of Oakland, Cal., has stepped at once into the front rank of up-to-date cities by placing the city prison on the top floor of its beautiful new municipal building, nearly 300 ft. above the street. Here, in sanitary, light and well ventilated quarters the city's prisoners are held in safety, and that criminal must be beyond redemption whose soul is not softened by the view from the windows. The new municipal building rises 14 stories and is visible from points in seven counties. Standing on the upper observation platforms one can observe on a clear day nineteen cities and towns.

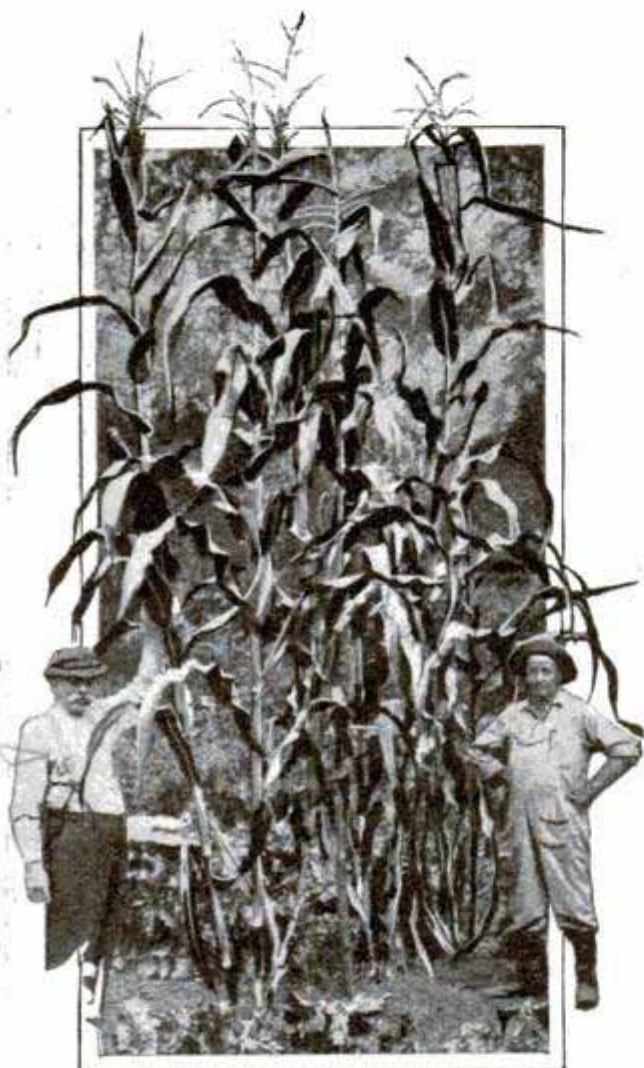


View of Oakland's New Municipal Building, on Top Floor of Which
is Placed the City Prison

CORN STALK AS TALL AS

5407 THREE MEN

The tallest corn ever grown in Illinois was raised last summer on a farm near Downer's Grove. It reached an



This Corn Is 17 Ft. 2 In. High and Bears About 40 Ears to the Stalk

average height of 17 ft. 2 in., and carried about 40 ears to the stalk. The corn was grown from seed furnished by the government experiment station at a price of 25 cents a kernel. It was Indian corn unearthed in an old Indian mound in Southern Colorado.

THE FIRST OIL-BURNING

5249 SUPERDREADNOUGHT

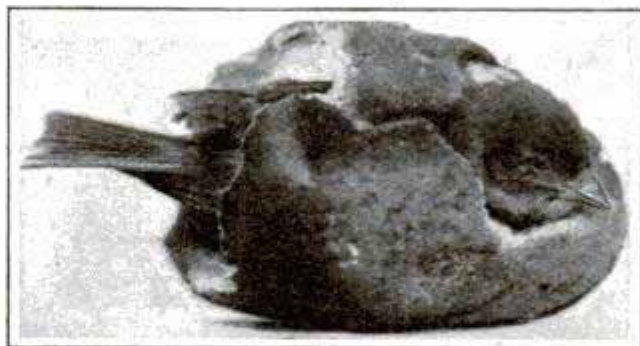
The first oil-burning superdreadnought in the world will be launched this fall. It is the "Queen Elizabeth," one of the five latest battleships of the British navy, which are to be "oil only." The new battleship is being

built without any coal bunkers and will carry the oil fuel for her furnaces in a sealed double bottom. The furnaces will receive the oil in the form of a thick spray at great pressure and intense heat. She will have funnels like coal-burning battleships, but the space occupied by bunkers for 3,000 tons of coal is given over to more cabin room. The chief advantage of oil fuel for battleships is that a vessel can go 40 per cent farther on oil than on the same weight of coal, and liquid fuel can be transferred by hoses from a tank steamer in much less time than the bunkers can be replenished from a collier. Smoke is also practically eliminated, and stoking and trimming are unnecessary.

BIRD CAUGHT IN A PIECE

5335 OF BREAD

A hard bun, combined with a hearty appetite, made a trap that caught an English sparrow not long ago in Washington, D. C. The sparrow found the bun on the White House grounds and liked it so well that it ate its way in one side and out of the other. By the time it had eaten its way halfway through the bun the bird had swelled up so much that it could not back out and evidently concluded that the only thing to do was to eat its way out the other side. The sparrow had succeeded in gorging itself enough to get its head out when a park policeman found it.

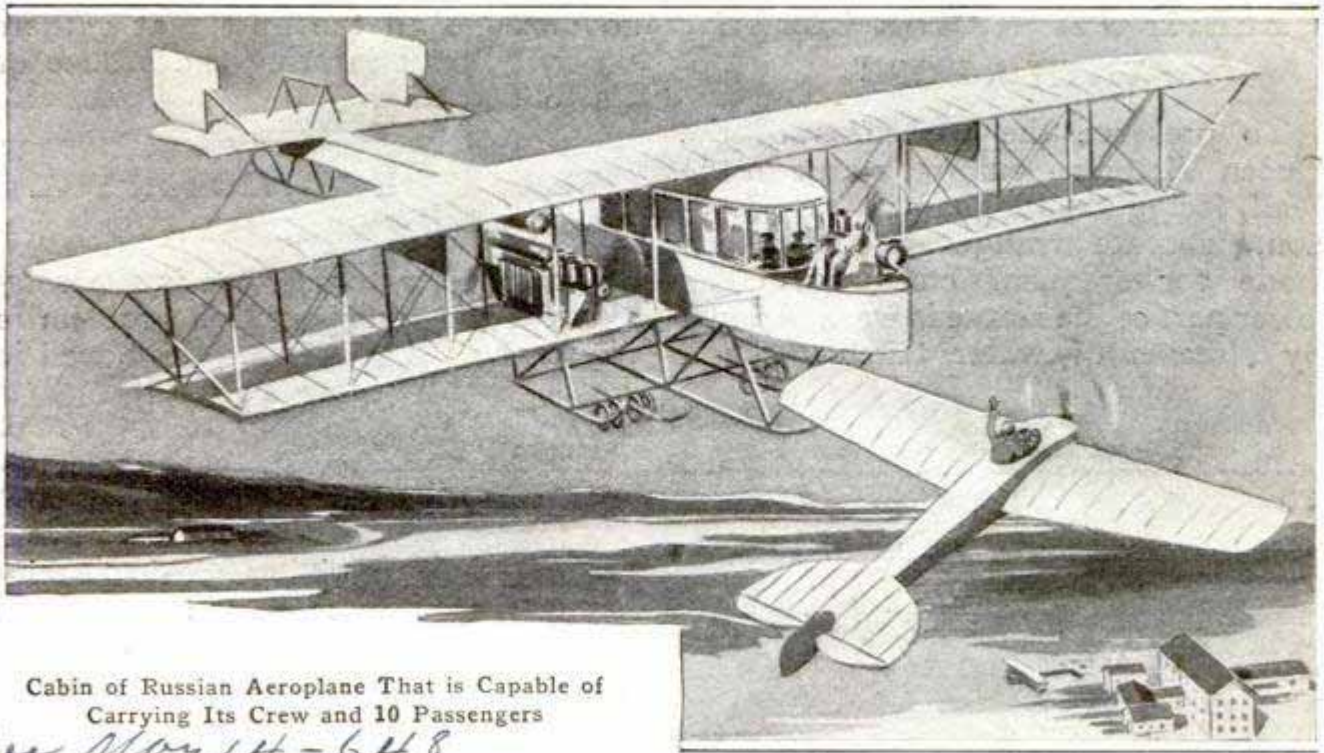


A Sparrow Trapped in a Bun While Trying to Eat Its Way Through

But its appetite was not gone. When the bun was broken open, it fluttered about for a moment and then flew away to join its friends in a feast of peanut crumbs stolen from the squirrels.

Vertical handwritten notes on the left margin, including "W. W. Copple", "422 So. Dearborn", "Chicago", and "7. Edg. in the".

Vertical handwritten notes at the bottom right, including "Louis" and "P. Brown".



Cabin of Russian Aeroplane That is Capable of Carrying Its Crew and 10 Passengers

See May 14 - 648

RUSSIAN BIPLANE LARGEST 5063 EVER MADE

An aeroplane so large and powerful that the first accounts of its size and performance were disbelieved by the experts has been making a series of remarkable flights in the vicinity of St. Petersburg, Russia, during the past summer. This enormous machine is a biplane of a peculiar type, and its upper plane is much longer than the lower. The upper plane has a span of $88\frac{1}{2}$ ft. and a surface of 1,400 sq. ft., while the total weight of the aeroplane is 6,600 lb. It is capable of carrying, besides its crew and 10 passengers, enough fuel for a flight of 20 hours, and an additional load of 1,760 lb. Four 100-hp. motors which drive four propellers furnish the motive power, the motors being of the tractor type, placed two on each side of the cabin and supported on the lower plane. One of the remarkable features of this craft is the cabin, which provides ample room for 10 passengers and the crew, and is entirely inclosed by glass windows. At the front of the cabin is an inclosed space large enough for two pilots and equipped with duplicate steering and controlling apparatus, while forward of this is an open platform for the lookout. At the rear of the cabin is a space

for the storage of provisions and tools. The framework of the machine is of wood.

This aeroplane can fly with two of the engines out of commission, giving the mechanic an opportunity to examine the machinery and make repairs if necessary while the machine is in flight. In one flight a speed of over 84 miles an hour was made. During a recent flight, lasting two hours and made at a mean height of 1,650 ft., the passengers moved about freely in the cabin and even went out to the lookout platform without disturbing the balance of the machine. Some Russian airmen see in this craft a formidable rival, if not a successor, to the dirigible balloon.

ANNOUNCES X-RAYS ARE RAYS OF LIGHT 5449

Announcement was made at the Birmingham meeting of the British Association for the Advancement of Science that X-rays are the most extreme rays of light in the ultraviolet end of the spectrum. The velocity is the same as light, and the spectral distribution was found to be uniform like fluorescence, and the absorption was found to follow a definite law for all substances.

KEEPING A STATUE CLEAN

5206 WITH A HOSE

To preserve the whiteness of the Queen Victoria memorial statue in the Mall, facing Buckingham Palace, London, elaborate arrangements have been made for frequent cleanings. The lower part of the statue is washed down by streams of water taken through

to dislodge all the dust that gathers on it, without injuring the bronze or its gold coating.

ELEVATOR SERVICE IN THE
5244 NEW SKYSCRAPERS

Graded elevator service is the solution for the transportation problem in skyscrapers that is being developed in

New York City. In a building of 35 to 40 stories, with a work-day population of 8,000 to 10,000 persons, all arriving within 15 minutes of the same time in the morning and departing together in the evening, the elevators must be arranged so as to take each person to his floor, whether it is the 6th or 26th, in the same length of time and with a wait of not more than 30 seconds for a car. To do this, the elevators are divided into groups, each group serving a certain number of floors and running at different speeds. In a 36-story building now under construction, there are to be 48 elevators, divided into six groups of eight elevators each, to handle the 8,300 occupants. One group serves 10 floors, from the 2d to the 11th; another serves the 12th to the 18th; another, the 19th to the 24th; another,



Courtesy of the Graphic

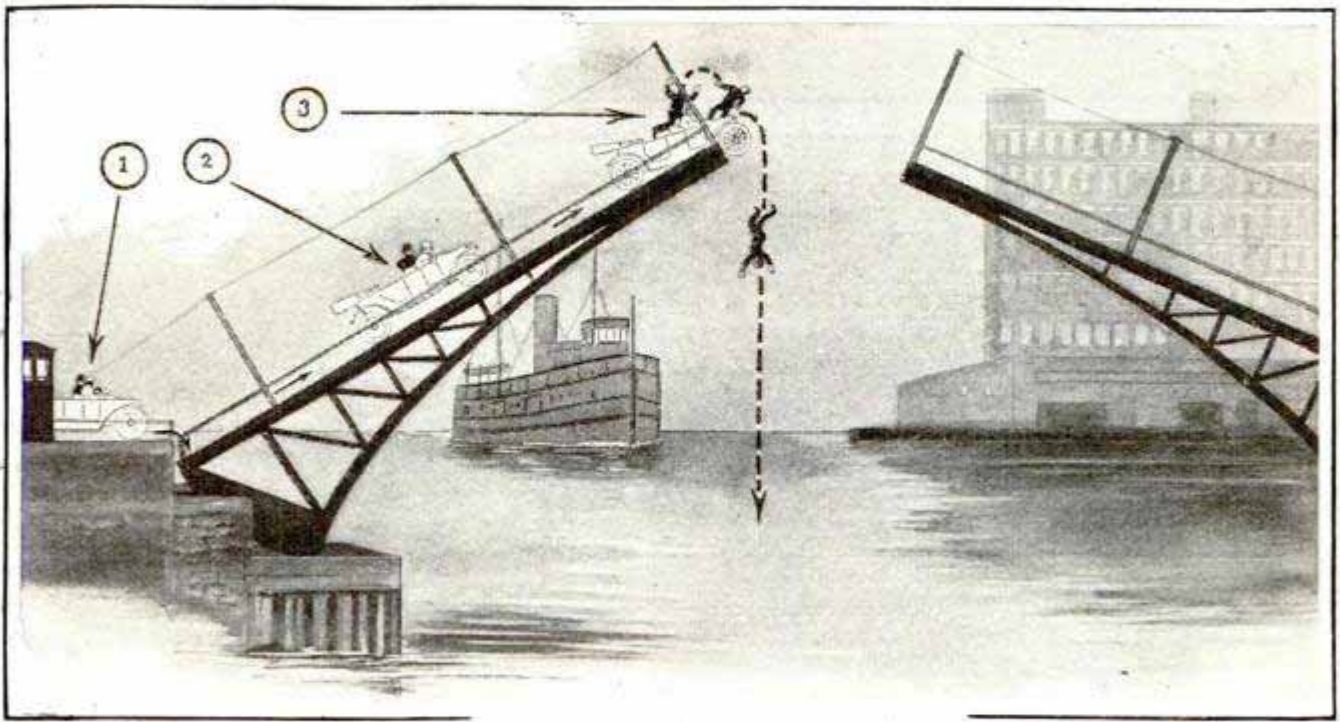
Apparatus That is Used to Clean the Victoria Memorial Monument, London

standpipes and flexible hose from a water main which encircles the entire monument. To reach the gilt figure of Victory on top, 80 ft. above the ground, a special pump driven by an electric motor has been installed. It will throw 100 gal. a minute to the top of the monument with sufficient force

the 25th to the 30th; another, the 31st to the 36th. The last group is auxiliary, carrying passengers to all floors and the roof. The number of floors served and the size of the cars decrease toward the top of the building where greater speed is required. All cars run on schedule and every car

The Graphic
8/2/13

Scientific



Automobile Hanging by Its Front Wheels on the Edge of a Bascule Bridge After Climbing the Incline While the Bridge was Opening

in the building makes a round trip from the ground to its own floors in the same number of seconds. To increase the amount of office space, each elevator shaft has doors only on the floors that it is intended to serve. Intercommunicating doors in the sides of the cars release passengers if a car is stuck in the shaft. Besides the passenger service, elevators have to be installed to handle 50 tons of coal and 12 to 15 tons of ashes each day.

5296 **AUTOMOBILE CLIMBS OPEN BASCULE BRIDGE**

Perched on the end of one leaf of a Chicago bascule bridge after a dash up the steep incline as the bridge opened, a heavy automobile not long ago hung by its front wheels until the bridge could be lowered. One of its occupants was thrown from his seat by the sudden stop high in the air and was drowned in the river. The driver had not noticed the warning bell and red lights as he approached the bridge at a high rate of speed late at night, and did not realize that the bridge was opening until his machine had started to climb the rising incline. While he struggled with the brakes, the car mounted to the end, 30 ft. above the

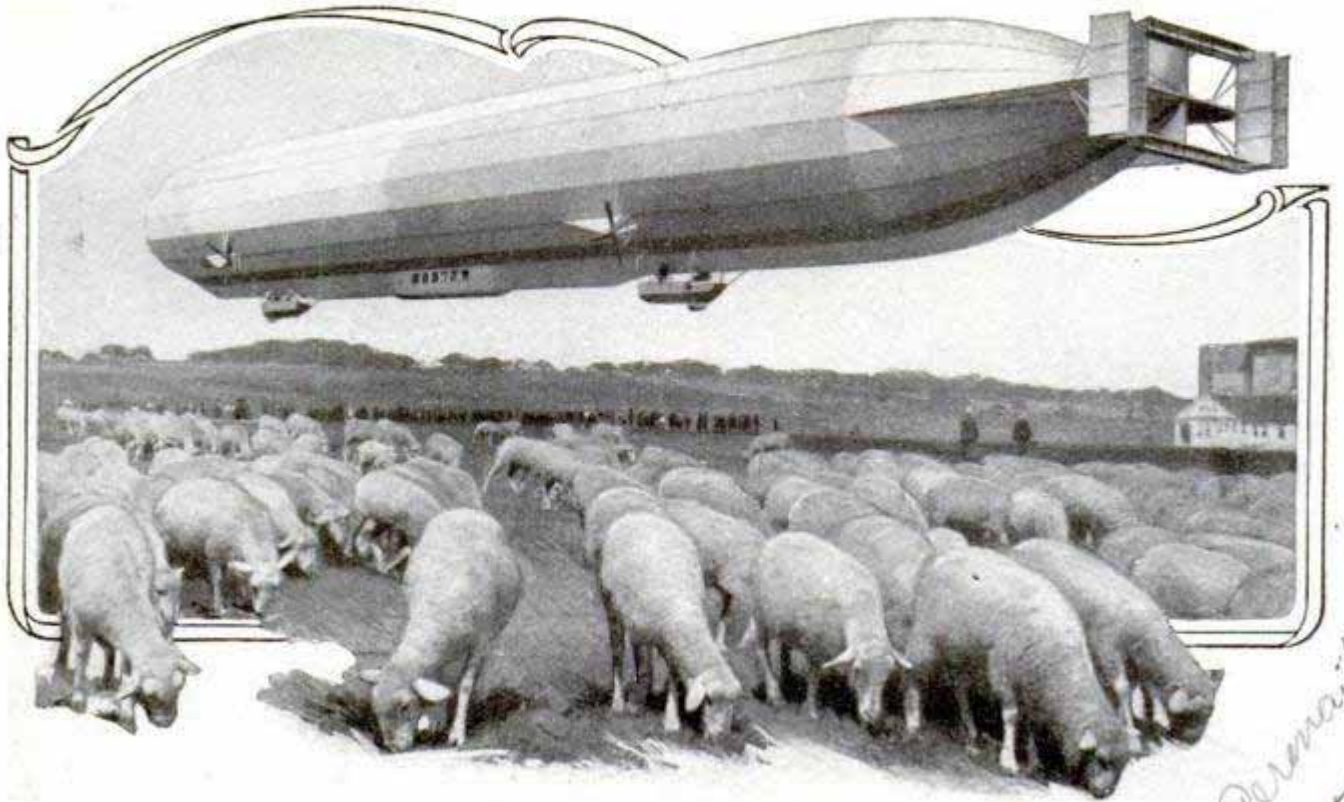
river, and stopped with its front wheels hanging over the edge. The bridge tenders reversed the machinery and lowered the bridge slowly so that the car kept its position until it was brought down with its front wheels on one leaf and its rear wheels on the other.

SLIDING BED FOR OUTDOOR SLEEPING 5161

Outdoor and indoor sleeping in the same bed are made possible by a sliding bed which a resident of Tropic, Cal., has built in his bungalow. The



Outdoor Bed Which Slides through a Hole in the Side of the Bungalow



The Largest German Dirigible, the "Z-2," in Flight over the Proving Grounds at Friedrichshafen

bed is arranged to slide through an opening in the wall of a ground-floor bedroom to a concrete platform outside the house. In fair weather the bed stands on the outside platform with no covering, but on stormy nights it is pushed inside. The opening under the wall is beneath a row of three casement windows and, as the headboard and footboard of the bed are the same size, either forms a tight door in the wall of the house. The concrete platform is 7 ft. wide and 10 ft. long, and its top is 18 in. above the ground.

BUREAU OF STANDARDS

5443 TESTS ENGINES

Block tests on aeroplane and automobile engines will now be made at the U. S. Bureau of Standards, where a complete gasoline-engine testing plant has been installed. For a nominal fee the bureau will give each engine tested a certificate, giving the power for varying speeds, and gasoline and oil consumption. The tests will be made on an electric dynamometer, but no flying tests in aeroplanes or flying boats will be made unless so decided by the chief signal officer of the army.

ACCIDENT TO LATEST GER- 5315 MAN DIRIGIBLE

The new German naval dirigible balloon, the "Z-2," narrowly escaped destruction recently when it was wrenched free from the hands of 150 men and carried aloft by a sudden gust of wind, while undergoing a series of trial flights at Friedrichshafen. Four soldiers became entangled in the ropes when the airship broke away. One of these succeeded in extricating himself, another was hauled up into the gondola, while the other two fell to the ground from a height of 500 ft. and were instantly killed. The night before this accident the "L-1," the sister-ship of the "Z-2," was destroyed by a hurricane in the North Sea with an accompanying loss of 13 lives. The new airship is the largest ever built, and carries motors aggregating 900 hp. Its length, practically 500 ft., is the same as that of the other Zeppelins, but its diameter is about 33 ft. greater. The gas capacity of the new airship is 950,000 cu. ft., while that of the "L-1" was 810,000 cu. ft. The crew consists of 19 men, or eight more than is required for the other Zeppelins.

BIG WIRELESS STATION AT HONOLULU

5445

The mid-Pacific station of the Marconi system, located at Honolulu, which is now in construction, will send messages to the Philippines, six thousand miles away. The building of the new station is the first step in the Marconi plan to cross the Pacific from California to the Philippines, thence to Hong Kong, to Bangalore, India; to Aden, to Cairo and to England.

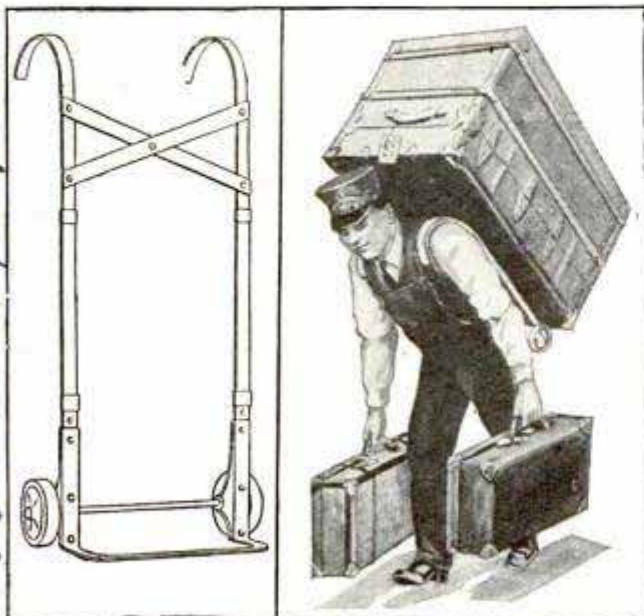
EXTENSION BAGGAGE TRUCK

542 / CARRIED ON SHOULDERS

The steel baggage truck here shown has several interesting features, foremost of which is the fact that it may be hung from the shoulders, resting against the back of the user. It is an extension truck that can be instantly extended or shortened, is made of hard steel and equipped with solid rubber-tired wheels, and weighs but 11 pounds.

The illustration shows clearly the use to which this little truck is put. Carried upon the back, with a trunk as its load, the expressman's hands are left free for the carrying of hand baggage or to steady himself as he climbs stairs. The trunk, so carried, is not likely to do damage to walls, woodwork, and the like.

Extension Hand & Baggage Truck
K. Stone, Box 56
Foster, Calif.



The Extension Baggage Truck and Method of Its Use

MONSTER HORSE A FEATURE OF DENVER STREET

5419

When the Knights Templar gathered in Denver last summer, they were greeted by an imposing array of street



Street Decoration for Knight Templar Conclave in Denver

decorations which were both original in conception and bold in design. Perhaps the one which caused the most comment was a colossal Templar on horseback, forming an archway across the entire street. From the pavement to the top of the helmet was 54 feet, and the horse he bestrode measured 50 ft. from nose to tail.

LENS FOR RAILWAY SIGNALS

497

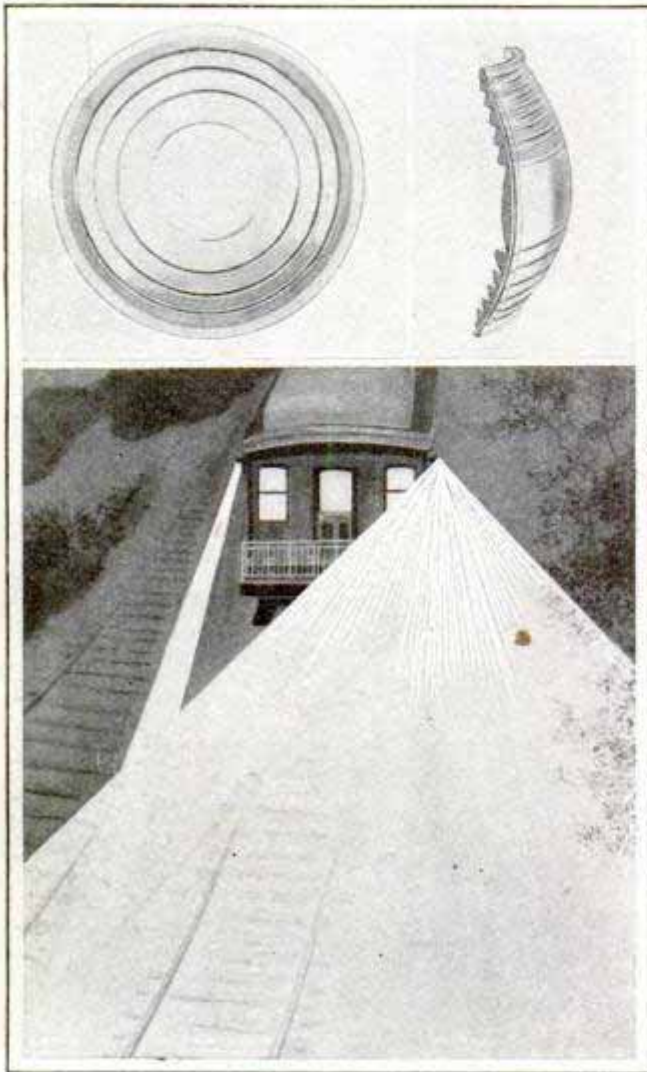
THROWS WIDE BEAM

A new type of lens designed to be used with railway switch and signal lights, tail lights and engine classification lights has been introduced, and apparently eliminates a serious defect heretofore connected with equipment of this kind. The ordinary lens throws a beam of light having a spread, usu-

E. J. MacLaine
423 Madison St.
Denver, Colo.

The lens for railway signals...
The lens for railway signals...
The lens for railway signals...

ally, of not more than 18 deg. This made it necessary to adjust signal lights with a great deal of care so that



Comparative Effectiveness of Tail Lights Equipped with Old and New Types of Lens

they could be seen by approaching trains, particularly where the track was curved, and often made it difficult for the engineer on one train to see the tail lights of a train ahead. The new lens is so shaped that it throws a beam having a spread of 90 deg., making the light plainly visible under any conditions that are likely to occur, and without the necessity for special adjustments.

NEW FURNACE LINING HAS UNUSUAL PROPERTIES

As a result of a recent discovery a new material that is practically immune to chemical change and resists the highest heat of the electric arc is now available for lining furnaces, re-

torts and chemical containers. This material is known as boron nitride and may be produced by one of several comparatively simple chemical processes. It has an extremely high resistance to the passage of electrical current, even at the temperature of the carbon arc, and has no chemical tendency to unite with any material likely to be used as a charge in an electric furnace. When finely divided, this material has the property of being self-bonding, so that no binder is needed when it is used as a lining for furnace or container.

5064 ULTRAVIOLET-RAY TREATMENT FOR TUBERCULOSIS

An apparatus for treating pulmonary tuberculosis, recently brought out by a Danish physician, utilizes the discovery that air after being submitted to the action of ultraviolet rays contains certain elements that have a healing effect on the skin and mucous membranes. This apparatus, which has met with some success, consists of a cabinet containing a mercury-vapor lamp and having a respiration tube at each corner connecting with the interior. The air inside the cabinet is subjected to the action of the ultraviolet rays thrown out by the mercury-vapor lamp, and is then inhaled through the tubes, while the rays themselves do not reach the membranes of the patient.



Tuberculosis Patients Inhaling Air That has been Subjected to Action of Ultraviolet Rays

General Electric Co.

L. Th. B. ...

USE OF ALUMINUM FOIL INCREASING

Aluminum foil is partly displacing tin foil for wrapping cheese, chocolate sweets, and tobacco, now that improved methods of manufacture have lowered the cost. The rolling is accomplished in six stages, the last of which yields a foil .0016 in. in thickness. Several sheets are laid together and either rolled or beaten like gold leaf, and are finding considerable use in the manufacture of electrical condensers.

MUSIC TRANSMITTED BY WIRELESS TELEPHONE

In connection with experiments in wireless telephony now being carried on at the wireless station at Nauen, Germany, operators at that point have succeeded in maintaining conversations with Cologne, Metz, Strassburg, Wilhelmshaven and Vienna, and with a cruiser in the North Sea. The instrument used in these experiments has also been employed successfully in transmitting songs and instrumental music.

MONUMENT TO FIRE HEROES OF NEW YORK CITY

In acknowledgment of the bravery of her firemen, New York City has erected a memorial monument at 100th Street and Riverside Drive which is at once an appreciation of the heroic sacrifices made by those men who died at the post of duty, and an inspiration to those members of the department, "Soldiers in a war that never ends," in whose instant response to the alarm the confidence of a whole city rests. The monument was designed by Magonigle and executed by Attilio Piccini.



Monument to Firemen Erected by the City of New York. The Inscription Reads: "To the Men of the Fire Department of the City of New York, Who Died at the Call of Duty, Soldiers in a War That Never Ends, This Memorial is Dedicated by the People of a Grateful City"

London Eng 8/27 5441

5280
Ex. rec. J. J. 9-2-13

W. D. ...
527 Street 124th St.
New York

relli. The photo shows the side upon which is the inscription; the opposite side, facing Hudson River, is a bas-relief representing a horse-drawn fire engine, under which a mask spouts a stream of water into the fountain basin.

SEWING CHAIR WITH HIDDEN DRAWER

A very convenient place for needles, thread, and other sewing materials is provided in the new hidden-drawer



A Convenient Drawer for Sewing Materials

sewing chairs. There is a roomy drawer, divided into handy compartments, hidden under the seat ready to be drawn out whenever any article is needed. It slides in and out of the side and fits snugly so that it is unseen when closed. There is no handle on the drawer, but it is opened or closed by a thumbscrew on the side of the chair.

On account of drifting snow, houses, 8 or 10 ft. above ground level and connected by elevated bridges, will be built for the workmen engaged in the construction of the Roger's Pass tunnel through the Selkirk Mountains in Canada.

PRESERVING WOOD WITH GRANULATED GLASS

Coating wood with an imperishable surface of granulated glass is a late method of preservation tried out with success in England. The deposited granules are rolled down to any desired fineness and the surface of the glass is then painted or enameled to the desired polish. This process may be applied to other substances, and has been used on the cylinders of locomotives for the purpose of preventing erosion and heat radiation. The glass coating lasts as long as the metal and corrosion is absolutely impossible.

DIMINUTIVE ENGINE MARVEL OF WORKMANSHIP

Following a fashion that seems now to be much in vogue, that of making the "smallest steam engine in the world," an American inventor has produced a horizontal engine that is truly a marvel, not only because of its diminutive size but on account of the extreme delicacy and refinement of its parts. This engine which is a perfect working model of a horizontal reciprocating engine, is $\frac{9}{16}$ in. long and $\frac{5}{16}$ in. wide over all. The diameter of the flywheel is $\frac{5}{16}$ in., and that of the driving pulley $\frac{1}{16}$ in. Some of the parts are so minute as to be scarcely visible, and were made with the aid of a microscope and the finest of jewelers' tools. The throttle valve is a diminutive globe valve, perfect in shape and finish. While this engine is made as a steam engine, it will be impossible to run it as such, owing to the cylinder condensation of the steam, and com-



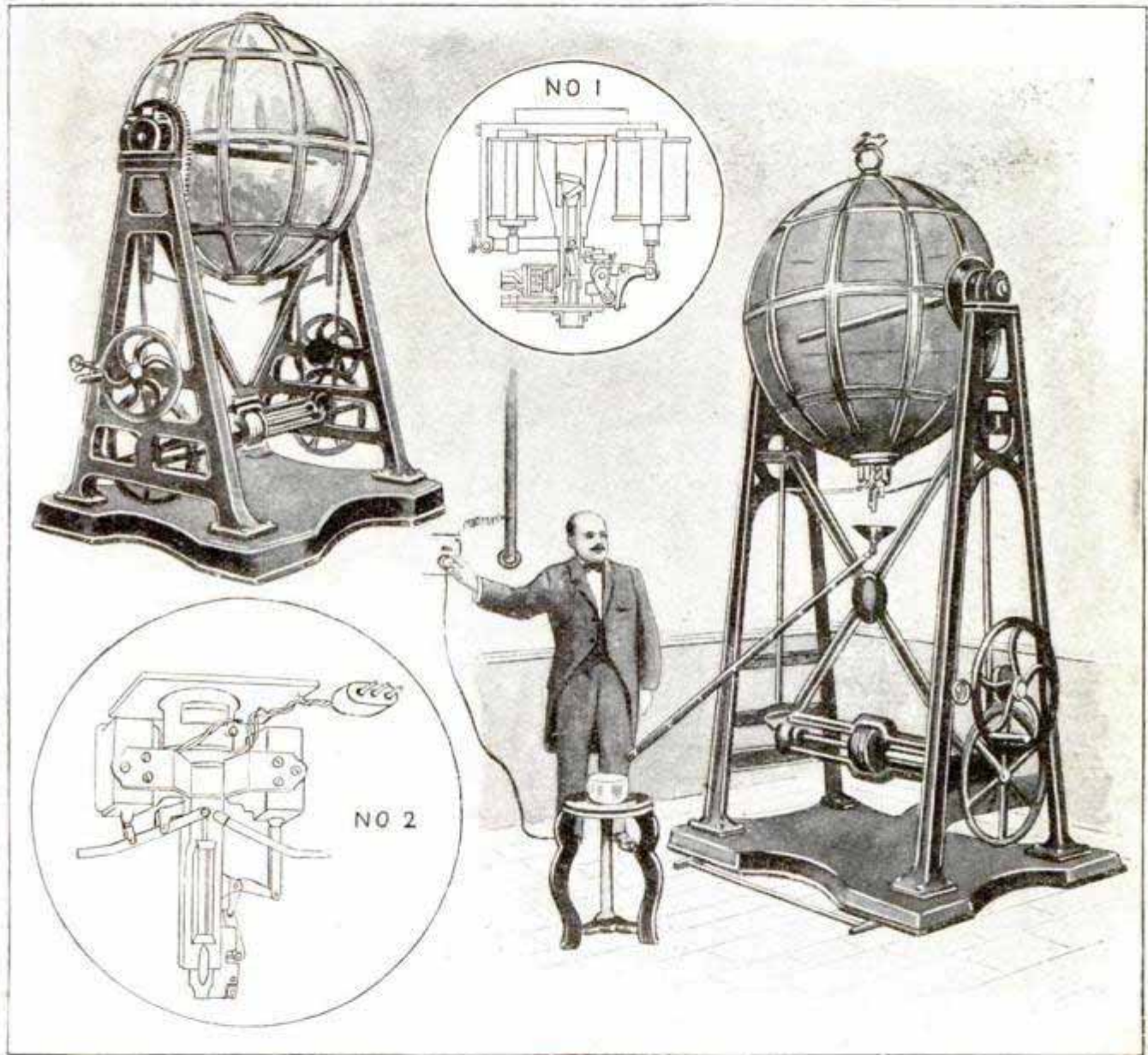
Horizontal Reciprocating Steam Engine with a Rating of "One Flea Power"

pressed air will be used as a motive power. It has been given a rating, by the inventor, of "one flea power."

4726 LOTTERY MACHINE FOR RETIRING BONDS

Lottery methods are used in France for the periodical retiring of government and other bonds that do not run for stated periods. Formerly the numbers of the bonds to be retired were drawn by hand from a drum, but a

of the globe is a releasing device, consisting of a plunger, an oscillating tube and a fixed glass tube, worked by electromagnets controlled by an operator, which drops out the boxes one at a time, counting them as they go. On



Top, Left: Automatic Lottery Device Full of Bond Numbers to be Drawn
Lower Left: The Electric Valve Which Releases and Counts the Bond Numbers

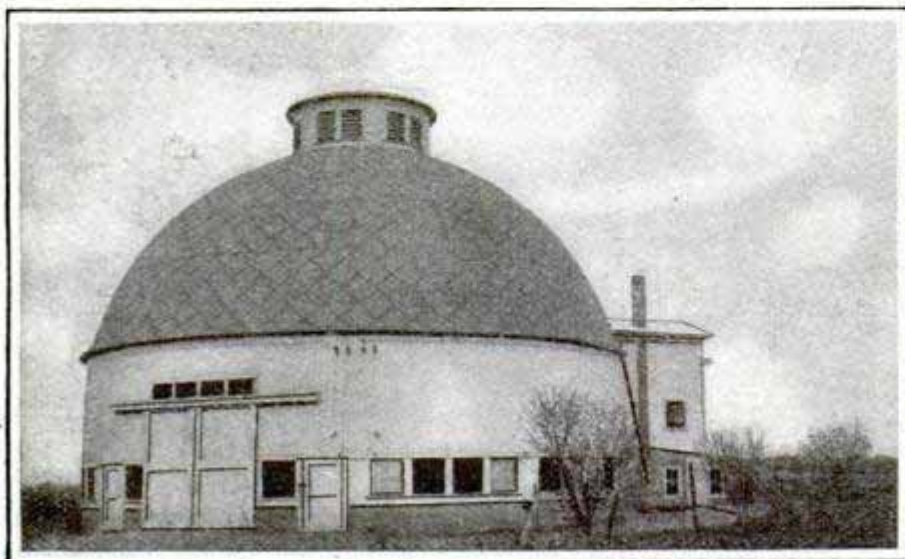
Top, Center: Cross Section of Release Valve Showing Number Boxes Ready to Drop Out, One at a Time
Lower Right: Drawing Bond Numbers One at a Time

machine has recently been adopted by the city of Paris and the Crédit Foncier for choosing the bonds automatically. It consists of a large glass globe, rotating on a horizontal axis, into which are placed a large number of tiny pasteboard boxes, each containing a bond number. On one pole

the other pole is a smaller globe arranged for delivering the number boxes several at a time. The whole globe is revolved occasionally to shake up the boxes inside. The apparatus is controlled from a distance and the bond numbers are delivered through a tube into a container near by.

CIRCULAR BARN AND SILO 4820 COMBINED

Time and money in the care of cattle are saved by the novel arrangement of a circular barn built by a Maine



Circular Barn with Cattle Stanchions Grouped around a Central Silo

farmer. In the center of the barn is a silo with plenty of floor space about it, and stanchions for 50 head of cattle are built around the circumference, facing the silo. Only a few steps are necessary to feed all the cattle. The hay loft is in the second story and has a bridge leading over the cattle so that a wagon can be driven in from the outside. The barn is 42 ft. high, and has a diameter of 56 feet.

WEATHER FORECASTS FROM 4913 STUDY OF SUN

That it will soon be possible to determine general weather conditions six months or longer in advance by careful observation of solar conditions is the belief expressed by Professor Frost, of the Yerkes observatory, who has just completed an exhaustive series of studies relating to variations in the amount of heat sent out by the sun. Such advance forecasts would revolutionize agriculture all over the world. The amount of heat sent out by the sun varies slightly from day to

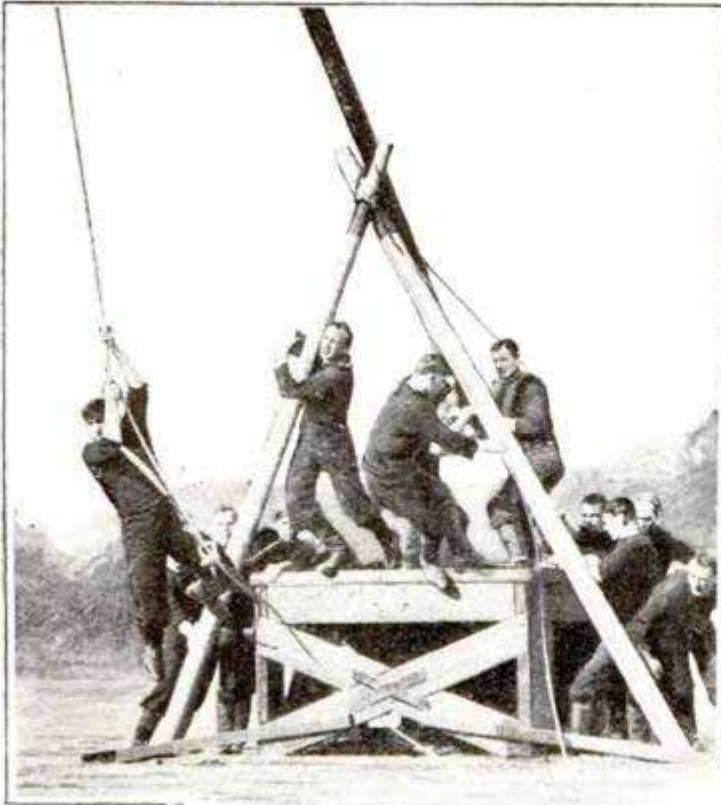
day, but the big variations, which are the ones that affect weather conditions, occur in cycles of months or years. The presence or absence of sun spots is the most important indication of future weather conditions, and these have been found to come in cycles of 11 years. The radiation of heat is high when the sun spots are numerous, and low when the sun spots are few or absent.

5199 LANDING FIELD GUNS FROM A BATTLESHIP

(No data)

The landing of field guns and munitions of war on shores which vessels cannot approach closely is one of the exciting tasks for the men on the warships of the world's great navies. The maneuver is especially necessary in the navies of the colonial powers which must be in readiness to land fighting forces on any of the unapproachable shores of their colonies. British, German and French sailors have long been trained in making such landings and since the United States has become a colonial power the crews of American battleships are likely to be called upon for similar service. Several pictures on the opposite page illustrate the land-

ing of field guns by aerial cableway. The battleship or transport carrying the guns anchors as near the shore as possible and a cable is stretched from the vessel's deck to a tripod derrick on shore. A two-wheeled trolley from which are suspended the various parts of the guns is drawn along the cable by a rope running to the men on shore. The guns are dismantled and several trips are necessary to land all the parts of one gun. The most thrilling part of the work is carried on by the men who ride on the load to keep it from swaying or becoming unfastened from the trolley. In a rough sea this is a truly perilous undertaking.



Landing
Field Guns from a
Battleship: Tripod
Which Supports the Shore End
of the Aerial Cableway from
the Battleship's Deck

Riding to Shore on a Field Gun



Hauling Gun into Position After It has been Put Together

The Gun's Two Wheels
Make One Load
for the Aerial Trolley

Photos Copyrighted by Topical

HANDY PICKING BAG FOR FRUIT GROWERS

5200

Many Florida fruit growers are using a new patent fruit-picking bag designed for handling oranges, lemons,

Allen's Patent Fruit Picking Bag



Fruit-Picking Bag Designed for Picking Oranges, Lemons, Apples, etc. The Bag's Contents Just Fill Half a Regulation Orange Box

apples, etc., with a minimum of bruising. The bag is made of tough canvas on an iron frame and holds enough fruit to fill one-half of a regulation orange-field picking box. A carrier strap about the picker's shoulders holds the bag at his side with the open top conveniently near his hands. The open bottom of the bag is wedge-shaped and is closed by a rope and snap which catches it up against the outside of the bag.

INSTRUMENT FOR EXAMINING PRECIOUS STONES

5121

To assist jewelers in examining and testing precious stones, an English jeweler has invented a little device, called the gemmoscope, for holding the various instruments used in the test.

For jewelers to use -

It is a hinged stand with an adjustable arm, attached at right angles, to hold a turntable or push-piece stone tongs. In the upright of the stand is a telescopic holder for a microscope. Below is a disk, black on one side and white on the other. As the turntable and tongs are arranged to revolve, the jeweler can adjust his magnifying glass and then turn the gem in any direction for examination.

5089

NEW LINEMAN'S TORCH FOR SOLDERING JOINTS

To lessen the danger connected with the telephone or telegraph lineman's task of soldering wires near the tops of poles, a safety soldering torch which requires the use of only one hand has just appeared on the market. Ordinarily the lineman has to hold his torch in one hand and his solder in the other, clinging to the post with his legs meanwhile. The new torch hangs upon the wire with the joint to be soldered inside over an alcohol flame, so that the lineman has one hand to hold on with while he applies solder with the other. The torch is held on the wire by two

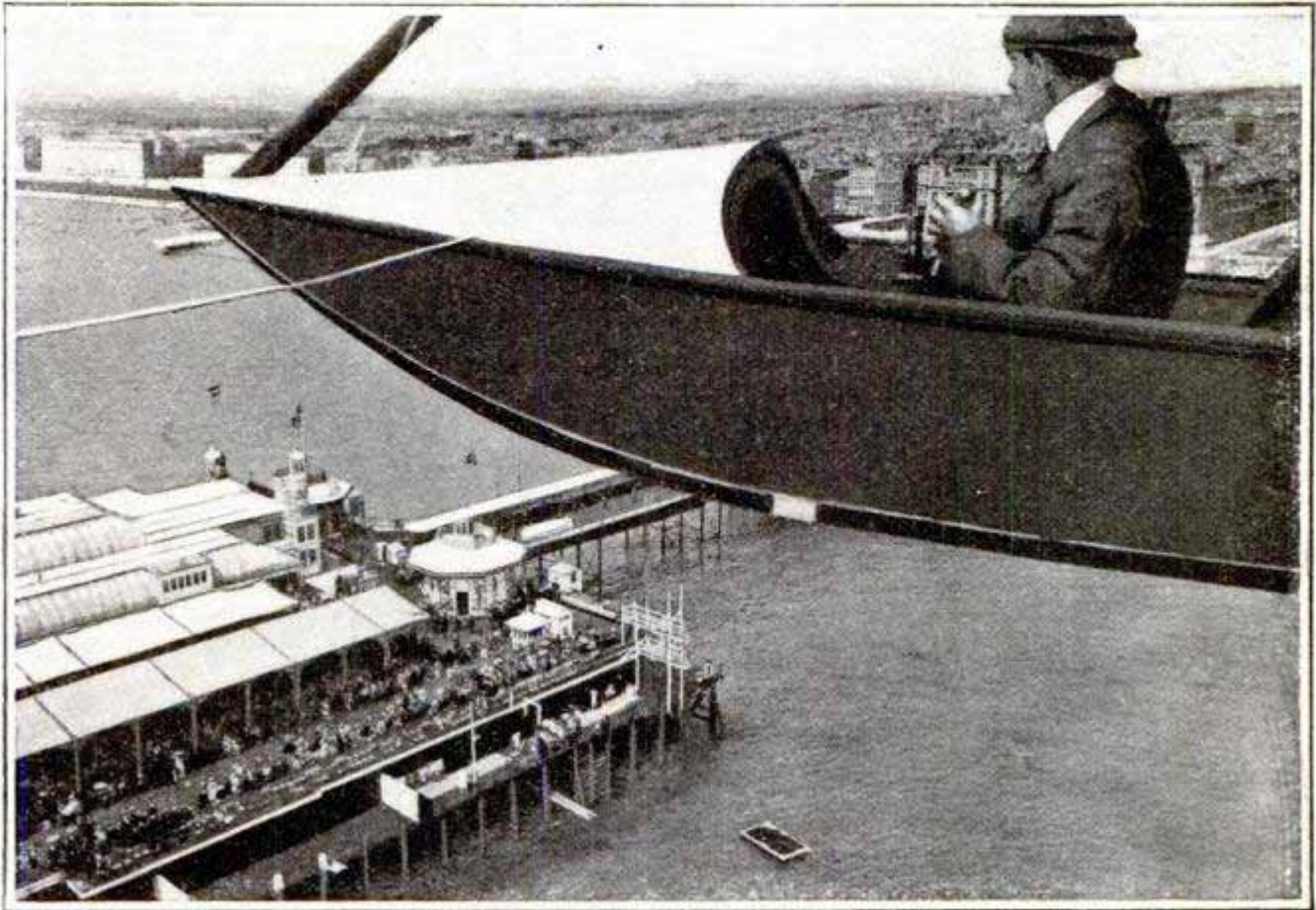


New Lineman's Torch Which Hangs on the Wire to be Soldered, Requiring the Use of Only One Hand

Two Parts of Torch; Left Is an Alcohol Burner and Right Is the Guard with Slots Which Attach the Torch to the Wire

broken slots in the upper rim; a half turn of the body of the torch secures or releases it.

Not in plain view



Courtesy Flying

This Photograph of Brighton, England, Taken from a Flying Boat, Shows How Much an Airman can See While Flying

Aerial
PHOTOGRAPH MADE FROM FLYING BOAT

A remarkable photograph was taken from a flying boat recently as it flew over Brighton, England. This flying boat is a biplane, and the photograph was taken by a camera attached to the top plane. The resulting view shows not only the peculiar construction of the boat, but gives a good idea of the true bird's-eye view afforded the airman while flying.

5-156
MOTOR HANDCAR SUPPLIES BRANCH-LINE SERVICE

W.L. Burdette
 A unique branch-line service is in effect on a spur leading from Benson Mines on the main line of the New York Central Railroad to the village of Wanakena, N. Y., in the Adirondack Mountains. Only one train a day goes into Wanakena, while at Benson Mines there is a good train service consisting of several trains a day. To meet the demand for a more frequent service out of the village an ingenious

native secured a handcar, painted it, installed a 6-hp. gasoline motor, and then arranged with the railroad company for permission to operate over the tracks. This unique track automobile will carry six persons at a fair rate of speed and is at the call of anyone wishing to make a quick trip to the city. It is fitted with an automobile horn for use at crossings and is known locally as the "mosquito flier."



Handcar, Converted Into Track Automobile, Used for Branch-Line Service

W.L. Burdette

5027

SYMBOLICAL STATUARY GIVES TOUCH OF BEAUTY



Negro Servitor



Model of Eagle Used Extensively in Decoration of Machinery Hall



Arab Falconer



Colossal Group "Nations of the East." From Left to Right the Figures are: Arab Sheik, Negro Servitor, Egyptian, Arab Falconer, Elephant Repre- senting India, Chinese Buddha Carried in Howdah on Back of Elephant, Mohammedan, Negro Servitor, Thibetan Warrior, Llama.

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Representative Figures in Group "Nations of the East:" "The Egyptian" at the Left; "The Mohammedan" at the Right

TO BUILDINGS OF THE PANAMA-PACIFIC EXPOSITION



Figure of Rain, over Entrance to Court of the Four Seasons



Spring, One of the in Court of the Four Seasons



Figure of Sunshine, over Entrance to Court of the Four Seasons

THESE PHOTOS ARE COPYRIGHTED 1913, BY THE PANAMA-PACIFIC INTERNATIONAL EXPOSITION CO.



Figure Symbolical of Star, in Colonnade of the Sun and Stars



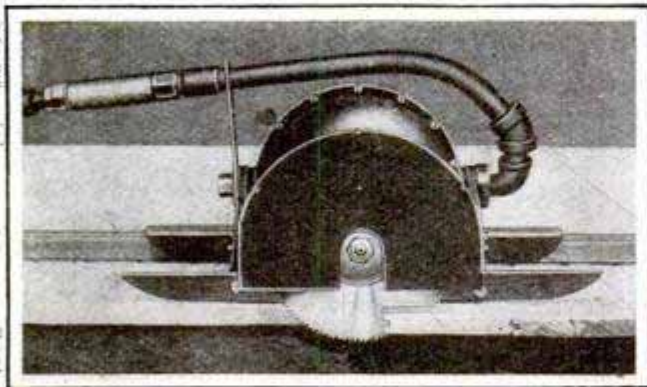
Arab Sheik, One of the Figures in the Group "Nations of the East"



Chinese Llama, Figure in Group "Nations of the East"

CIRCULAR SAW TO TRIM CAR ROOFS

Portable buzz saws, designed especially for trimming car roofs, have been put on the market recently. Run-

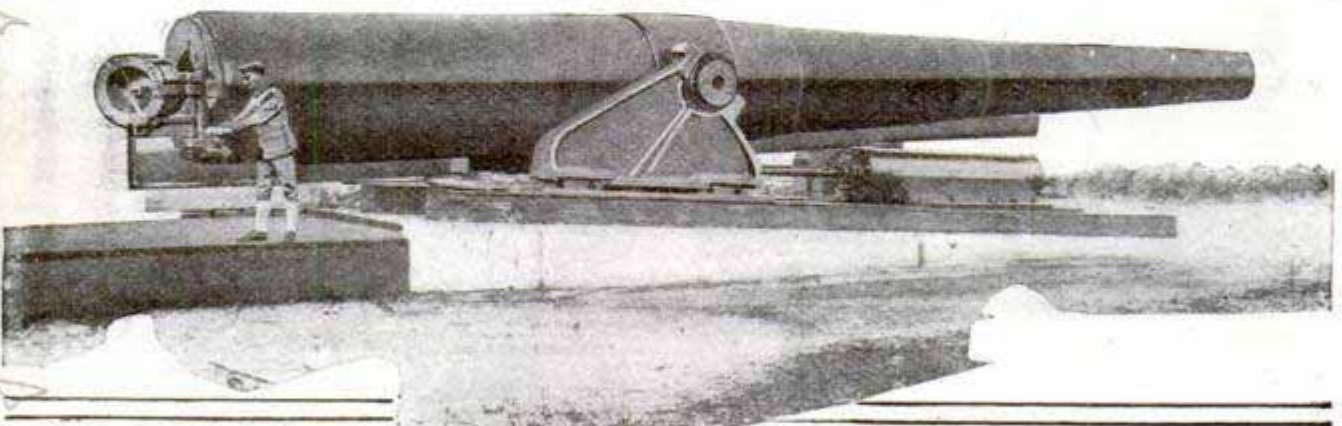


Portable Circular Saw Used for Trimming Car Roofs

ning at a speed of 2,200-revolutions per minute, the 8-in. circular saw trims one side of a 60-ft. roof in 1½ minutes. The saw and its motor rest on two long shoes, one of which is grooved to fit over a guide strip nailed to the car roof at the proper distance from the edge. The equipment shown is run by compressed air, but an electric motor can be used with the saw when compressed air is not available.

NEW SIXTEEN-INCH GUN TESTED

The first 16-in. gun for coast defense at Panama was tested at the Sandy Hook proving ground late in August. The gun alone weighs 127 tons and is 49.25 ft. long. Its powder chamber is 19 in. in diameter and 8 ft. long. The projectile travels through 39.32 ft. of



The First 16-In. Gun Mounted on a Proof Carriage at Sandy Hook Proving Ground

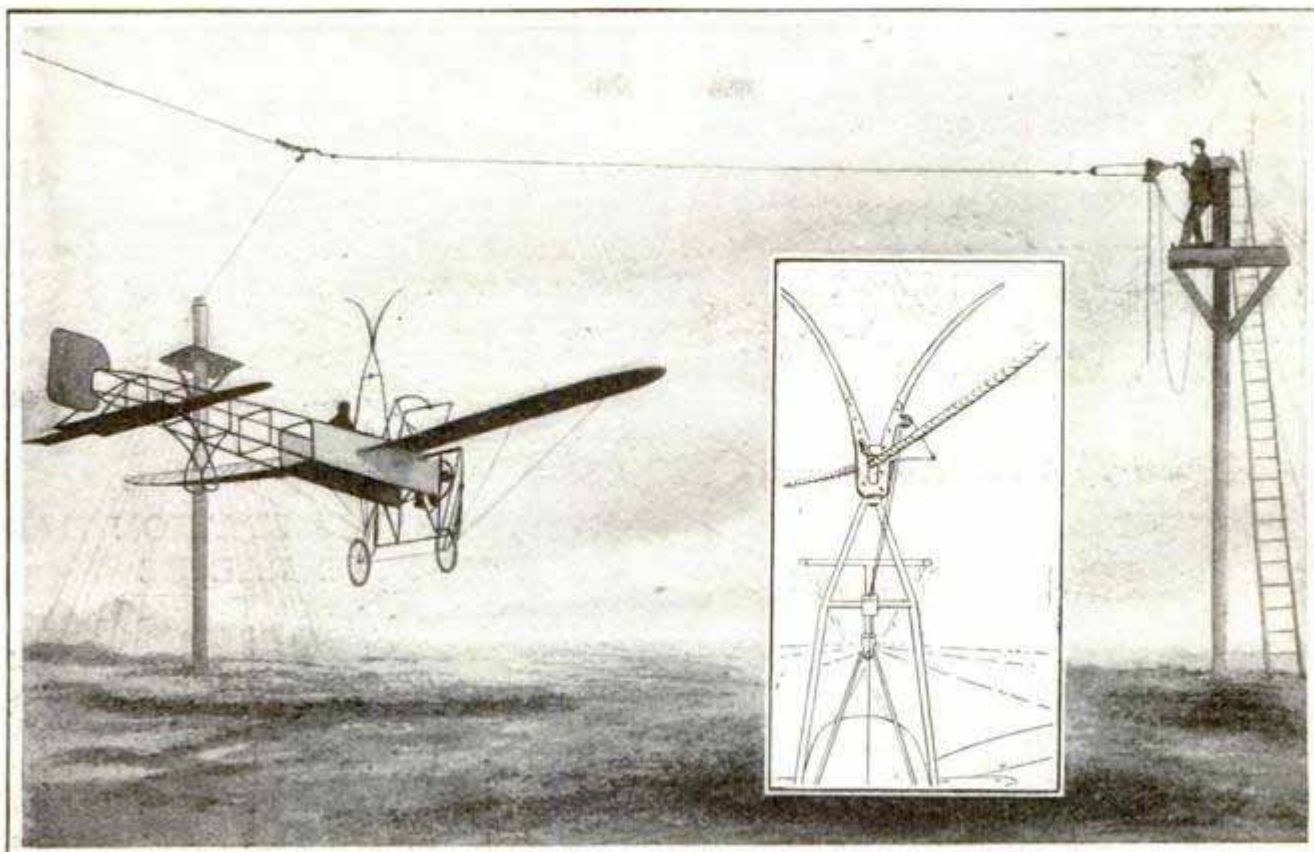
the 16-in. bore, which is rifled with 96 lands and grooves having a twist increasing from one turn in 66.6 ft. at the breech to one turn in 33.3 ft. at the muzzle. The armor-piercing shell used in the gun weighs 2,400 lb., is 64.5 in. long, and contains a high-explosive bursting charge of 140 lb. A charge of 650 lb. of smokeless powder, including 16.5 lb. of black-powder igniter, gives a muzzle velocity of 2,250 ft. a second, with a pressure of 38,000 lb. per square inch in the powder chamber and 84,328 foot-tons of striking energy. The shell will penetrate 21 in. of hard-faced steel armor at a range of 5,000 yd. Fired with an elevation of 15 deg., the gun has a range of 11 miles, and at an elevation of 42 deg., a range of 20.9 miles.

MOORING AEROPLANES ON A CABLE

Aerial anchorage on an overhead cable is being tested in France as a possible solution for the problem of stopping and starting aeroplanes or flying boats when no suitable landing place is available. The French aeroplane constructor, Louis Blériot, has conducted several successful experiments with an overhead anchorage device at the Buc aerodrome. The landing place which he uses is a metal cable, about 85 yd. long, stretched tautly a few yards above the ground or along the side of a ship. The anchor carried by the aeroplane is a pair of wooden arms, shaped like an open V and provided with a spring

1010 Fisher Bldg. 1348 W. 1st St. S. A. Sandy Hook Proving Ground, Sept. 11, 1911

5226



Copyrighted by Topical

Overhead Cable Mooring for Aeroplanes: The Flying Machine is Maneuvering to Catch the Cable with Its V-Shaped Fork. The Catch Which Grips the Cable can be Released by the Pilot

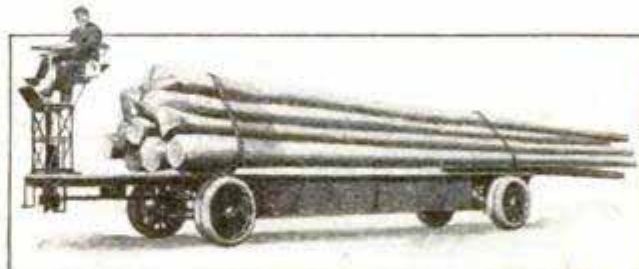
catch in the angle, mounted on top of the flying machine's frame. To land on the cable, the airman flies underneath the anchorage until he catches the cable in the open V; the spring catch grips the cable and the aeroplane hangs in the air. To leave the anchorage, the airman starts his motor and glides along the cable until he has acquired speed enough to fly; then he pulls a cord, releases the spring catch and flies away.

the center. A compartment back of the center is utilized for carrying tools. The length of the truck, over all, is 31 ft. 6 in. The rear wheels are steered by a separate steering mechanism, which enables the truck to make short turns when necessary, but this mechanism can be locked when not in use and the truck steered entirely with the front wheels.

The loading and unloading of poles is accomplished by means of an electric winch located in the center of the truck. This winch is wired so that it

AN ELECTRIC TRUCK FOR 4337 HAULING POLES

An electric truck has been put into service by an electric company of Philadelphia for hauling and distributing poles, which not only compares favorably with the old method of hauling with horses, but is serving as an effective advertisement for the company's central-station service as well. This truck has a capacity of six tons, and weighs, unloaded, about 12,000 lb. It is operated by a 4-motor drive, the batteries being located in a compartment under the bed of the truck forward of



This Electric Truck Hauls All the Poles for a Philadelphia Electric Company and Serves as a Central-Station Advertisement

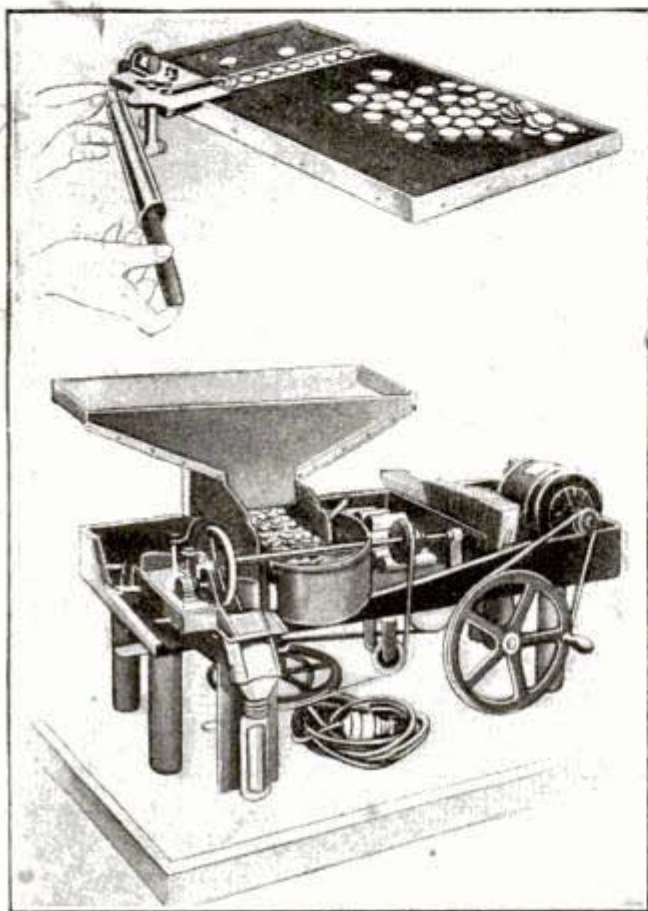
can be controlled from switches under the seat or from either side of the truck, and when the winch is in operation the control of the truck itself is cut out.

Electric Truck Advertisement

**MACHINES FOR COUNTING
COINS**

4749

For the convenience of banks and other institutions where it is necessary to count coins and inclose them in



Machine that Counts Coins Automatically and Drops Them into Stacker Tube; Upper View Shows Hand Device for Counting Coins, for Which No Power is Required

wrappers, two machines, one automatic and the other semiautomatic, have been placed on the market. These machines are designed to provide a count that is absolutely accurate as well as to relieve the attendant of the fatiguing labor of handling each individual coin. In the automatic machine the coins are placed in a sort of hopper at the bottom of which is a revolving disk. When the disk is revolved the coins are discharged singly by centrifugal action through an outlet in the wall of the hopper to a rotating carrier wheel which passes them through the counting mechanism and thence to the stacker tube. The machine can be set to stop at any desired number of coins from 5 to 250. At the end of each count the coins are removed from the

stacker tube and the machine started on a new count.

The semiautomatic machine consists of a shallow box having a slot leading to a small counting machine, below which is suspended the stacker tube. The coins are moved along the slot to the counter by hand, no other power being required for operating the device. This machine can also be set to stop after a given number of coins have been counted.

**NEW WIRELESS STATION HAS
5252 3,000-MILE RADIUS**

The Darien wireless station, which is being built at Caimito, Panama, will have a sending and receiving radius of 3,000 miles and will be able to talk to San Francisco or the Arlington station, near Washington. When it is finished, government messages from Washington will be sent to the Canal Zone direct, without the present relay at Key West. It is being built exclusively for government business, principally as a relay station for communicating with ships of the navy in southern waters. It will be able to talk to Valdivia, 421 miles south of Valparaiso, and with Buenos Aires. It could reach a vessel anywhere along the eastern coast of the United States, halfway to Gibraltar, or near the Island of St. Vincent, 500 miles west of Africa. Its antennae will be supported by three 600-ft. towers standing on bases 180 ft. above sea level, and will span an arm of Gatun Lake which will form good electrical grounding. The Poulsen wireless apparatus, using sustained oscillations, is to be installed, making it a 100-kilowatt plant.

**NEW STATUE IS LARGEST IN
5205 THE WORLD**

The largest statue in the world is now being carved in Japan. It is a recumbent effigy of Nichiren, a Japanese patron saint, cut from a natural granite rock on a hillside on the island of Ushigakubi, or "The Cow's Head,"

The Abbott Coin Counter is 107-9 William St., New York City

7-30-10

Patented

London News

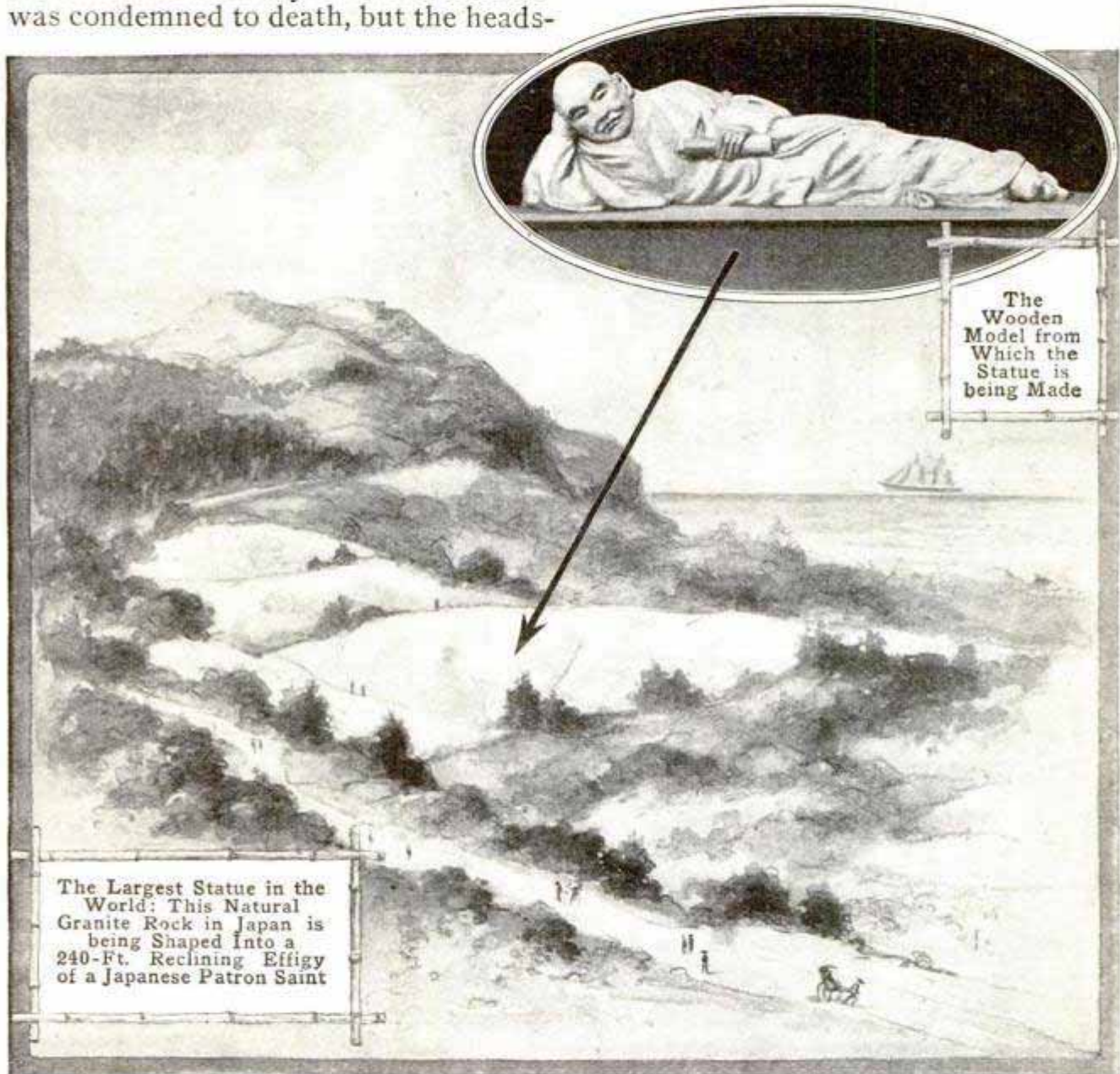
Europe

in the inland sea of Seto, Japan. The stone image will be 240 ft. long from head to foot, 60 ft. longer than the Sleeping Buddha statue at Pegu, Burma, and considerably longer than the Sphinx, in Egypt. Nichiren, whose name means "Lotus of the Sun," was a religious teacher who lived during the thirteenth century. At one time he was condemned to death, but the heads-

ENGLAND TO HAVE AIRSHIP SERVICE
5018 SERVICE

Airship service in England, including a regular line between London and Paris, is to be established in the near future by an English company. Sheds are to be erected on the outskirts of

Illustration of the statue of Nichiren



Courtesy Illustrated London News

man's sword was unable to decapitate him. One of his present-day worshippers, a wealthy Japanese, is having the huge statue carved in the saint's memory.

CA system of auxiliary fire protection is to be installed in three of the largest government buildings at Washington to protect valuable records.

London and some of the provincial cities, and other lines from London to Brighton, and to commercial centers, such as Manchester and Birmingham, will be included in the system. The company has a capitalization of \$1,250,000 and a 12-year contract with one of the largest European balloon-envelope makers giving it the sole right to handle the envelopes in the British Empire.

TOPIARY GARDENING BEING INTRODUCED IN AMERICA

5163

By L. WILLIAM THAVIS

One of the most ornate and fantastic schemes in landscaping effects is topiary work in box, yew and privet bushes, which are trained and trimmed to resemble various subjects of nature and art. Although topiary work has been usually associated with the magnificent gardens of England for many years, it is in reality a part of the Roman gardens of antiquity as early as the time of Christ.

In such countries as France, Italy, Greece, and Holland, this kind of "sculpture" is centuries old. There, in numerous royal and private gardens, are seen a great variety of designs and figures carried out in shrubbery, notably specimens of men, women and children, wild animals, hunting scenes, and even whole fleets of ships are shaped by skillful shears. Particularly in English gardens Biblical subjects are notably represented, where a large variety of pyramids, columns, and other creations of yew and box are found. This system of cutting trees invests a garden or park with attractive quaintness.

Topiary work is practically new to this country, Kansas City, Mo., being the only city so far to adopt this form of decoration in beautifying its parks. Comparatively few such specimens are to be found elsewhere, and they are only to be seen on the lawns of private residences, mostly in the eastern and New England states. The United States has decided to adopt this mode of adorning numerous parks, circles and small reservations in Washington, D. C. A number of designs have been imported, including huge birds, peacocks, chickens, swans, spirals looking like large snakes, cones, pyramids, center tables, globes, tankards, vases, etc.

These specimens came from Holland. They were "carved out" of yew, privet and box. It requires from 5 to 25 years for hedges of this variety to fully mature. The branches of the plant, in its infancy, are trained by being

twisted and tied in the shape of the design desired, and constantly trimmed. When the plant reaches its maturity it only requires slight trimming twice a year—spring and late summer. It then survives for many years in almost any climate. This form of decoration is very expensive because of the time and work required to produce intricate designs.

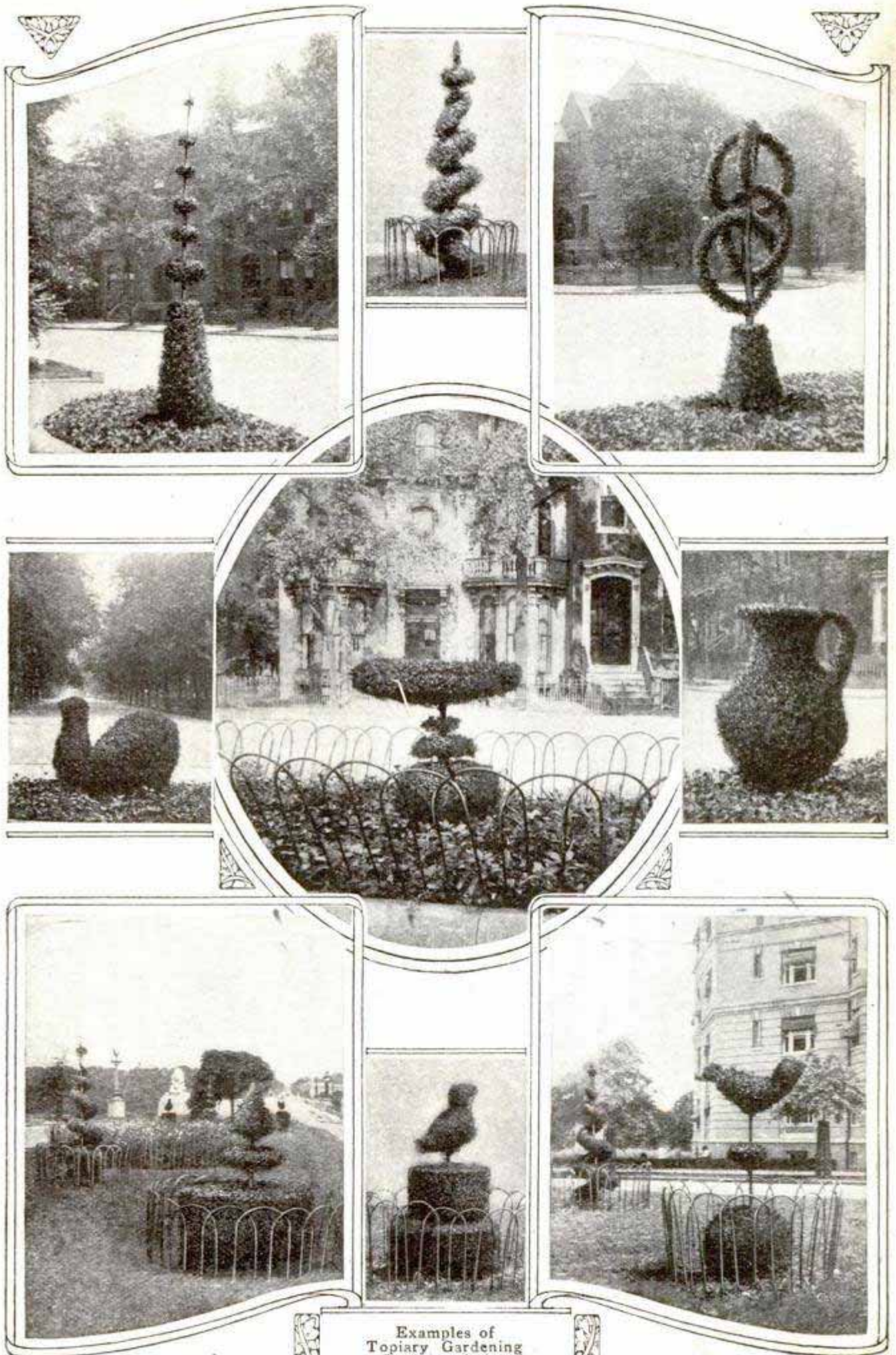
Topiary work should be used in landscape surroundings exactly as sculpture would be used. What is lacking in exactness of architectural line or sculptural form is more than offset by the unusual interest of the material. Topiary pieces always need a formal setting as do statues, and should never be placed at random. They best serve as objects of interest accentuating or emphasizing lines of design. By that it is meant that a topiary piece may be used as a terminal motive at the end of a long walk, in place of a statue at the end of a vista, or in some other well-defined position.

The peacock is the form into which the trees of England are most commonly cut. This fowl, in a velvety green of gigantic size, is frequently seen sitting sedately among the flowers of magnificent gardens and churchyards.

Some of the early topiary work in England represented resemblances of Adam and Eve, Noah's Ark, the Tower of Babel, etc. Near Paris there is today an intricate piece of this kind of work that represents the siege of Troy. In gardens at Chartres, France, the Seven Wise Men of Greece, the Labors of Hercules, and the Three Graces are exquisitely executed in box and yew.

The topiary work being installed in the parks and circles of the national capital has already aroused general admiration, and this innovation of landscape decoration bids fair to be readily adopted generally by the larger cities of the United States, wherever there are formal parks to be embellished.

William Thavis
 514 Murray Bldg., Wash. D.C.



Examples of
Topiary Gardening
as Introduced in the
Parks of Washington, D. C.

LOOKOUT TOWER OF NOVEL CONSTRUCTION

4822

The remarkable qualities of reinforced concrete were shown in a look-



Cantilever Tower Built to Demonstrate Qualities of Reinforced Concrete

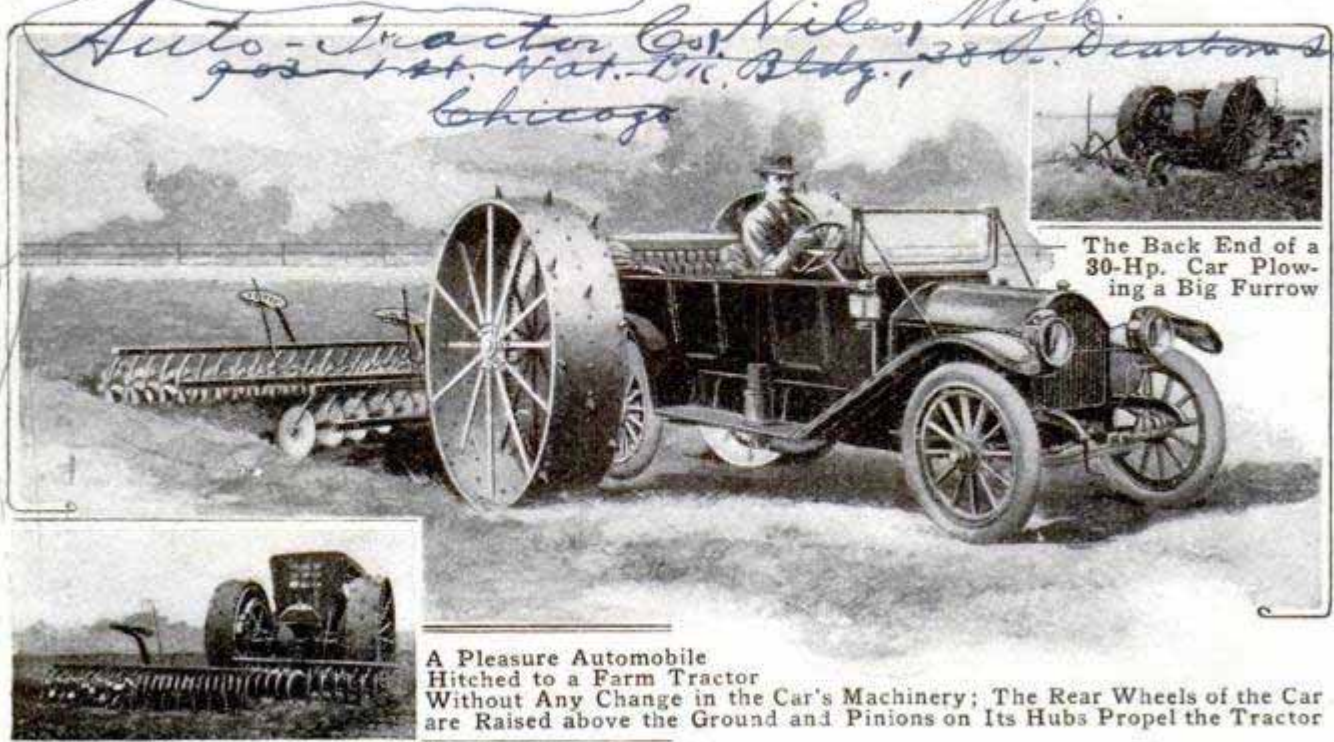
out tower which was one of the striking features at a recent cement show at Koeslin, Germany. This tower con-

sisted of two inclined cantilevers, one supporting the other, without pillars or arches of any kind. The lower flight of stairs, terminating in a landing, rests on an underground foundation. The second flight of stairs is supported on this landing and terminates in a roomy pavilion, 35 ft. above the ground. In spite of its light appearance and peculiar construction, this tower has a carrying capacity of 125 lb. per square foot.

HITCHING AN AUTOMOBILE TO A PLOW

5091

Many automobiles have been "hitched" to plows and converted into improvised farm tractors during the last year or two, but in most cases the "hitching" has involved a serious rearrangement of the car and its machinery. A tractor has now appeared which utilizes the power of a pleasure automobile with no alteration of the car except in the rear hubs. The owner simply drives to the field in his car, backs it into the two-wheeled tractor, does his plowing, unhitches the automobile, and drives back home, without changing or injuring the car. The tractor consists of two 6-ft. spiked wheels which support the rear end of the automobile's frame, carrying it 6 in. above the ground. Power is trans-



The Back End of a 30-Hp. Car Plowing a Big Furrow

A Pleasure Automobile Hitched to a Farm Tractor Without Any Change in the Car's Machinery; The Rear Wheels of the Car are Raised above the Ground and Pinions on Its Hubs Propel the Tractor

Engineering Record 3-22-13

Tractor Atlas

All May 1913 2684

Auto-Tractor Co., Niles, Mich.
902 1st. Nat. Bldg., 286. Dearborn St.
Chicago

C. J. Edson

mitted by a series of gears on the tractor which mesh with pinions attached to the automobile's rear hubs. When a 30-hp. pleasure car is hitched to the tractor and driven with an engine speed equal to 25 miles an hour on the road, it will draw the tractor two miles an hour and develop enough tractive power to do the work of several spans of horses.

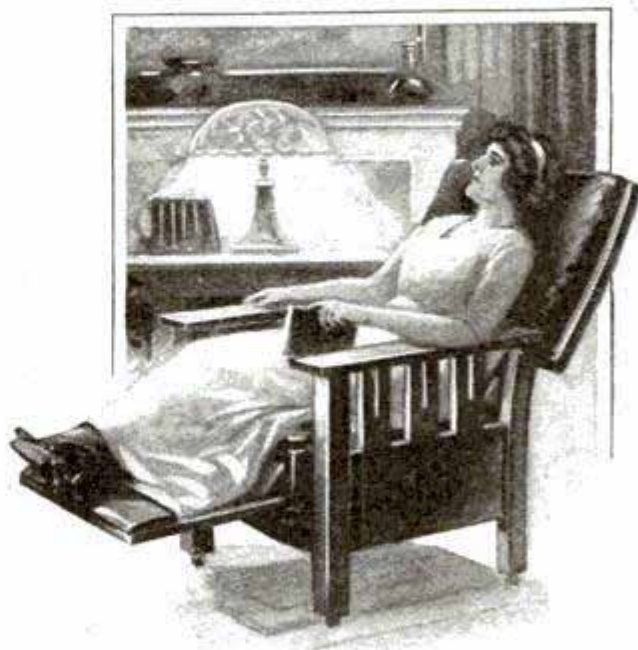
ARMY AVIATION SERVICE TO 5228 BE DEVELOPED

8/23/33
If plans now being perfected are carried out, the army of the United States will be provided with an aviation service comparable with that of the other great powers. These plans provide, among other things, for 30 extra officers for aviation duty, and it is recognized that if officers are to be detailed to the Signal Corps, additional vacancies in the line should be created. The limited experience of the War Department in aviation demonstrates that considerable difficulty will be experienced in securing military airmen and that special inducements must be offered to secure eligible officers for aviation duty, and it is a recognized fact that airmen without some knowledge of military tactics would be practically useless in war. In view of these facts it is urged that officers on aviation duty should be given additional rank as well as increased pay, and that they should be promoted again, after they have secured a military airman's license, at the end of five years. The plans provide not only for an adequate aviation personnel but also for a sufficient number of aeroplanes and modern dirigible balloons.

RECLINING CHAIR THAT IS 5086 AUTOMATIC

No adjusting of levers or back rods is necessary with the new automatic reclining chairs that are now seen in the furniture stores. The back of the chair automatically assumes a reclining position as the occupant leans against it, and comes back to a verti-

cal position when released. The pressure of a button brings out a padded



The New Automatic Reclining Chair

rest for the feet; when the foot rest is not in use it is hidden under the seat behind a flap on the front of the chair.

WINDMILL TO WITHSTAND 5101 SAHARA WINDS

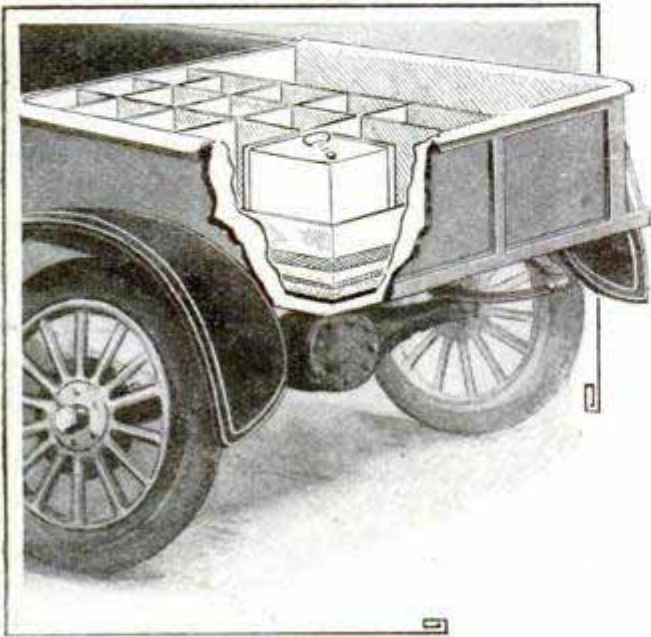
A special type of windmill has been invented by the Italians for use in Tripoli, where the hurricane-like winds which blow from the Sahara Desert at certain seasons of the year make it impossible to use a n y ordinary type of windmill. The wheel consists of five blades of exceptional strength, which are widely spaced to allow room for the passage of surplus wind. This is mounted on a steel tower which is specially designed to withstand the high wind velocities of the simoon.



AUTOMOBILE TRANSPORTS

4622 NITROGLYCERIN

An automobile, provided with a special body designed to cushion the jolts



Automobile Equipped for Carrying Nitroglycerin in the Oil Fields of Oklahoma

and to protect the explosive fluid from heat and leaks, is being used in the

transportation of nitroglycerin in the oil fields of Oklahoma. At best the transportation of this sensitive explosive is a ticklish job resulting rather frequently in disastrous explosions, and this automobile is so designed as to minimize this danger to as great an extent as possible. A framework of yellow pine spans the entire loading space of the car. This is covered by a layer of asbestos, for protecting the nitroglycerin from the heat of the engine, and on top of this there is a solid floor of pine. A rubber mat tops the pine floor and on this there is a copper pan with sides 5 in. high, the rubber mat serving to reduce the jolts and the copper pan preventing the fluid from reaching the chassis in case of leakage. The nitroglycerin is contained in small cans which are carried isolated from each other in the cells of a wooden frame resting in the copper pan. In "shooting" a well one of these cans is lowered to the bottom and a weight, called a "go-devil," is dropped upon it, a simple means that always brings about the desired explosion.

5222 WHALEBACK CLIMBS ASHORE ON RIVER BANK

Navigation on land was attempted by a 300-ft. Great Lakes whaleback steamer which swerved from its course



A 300-Ft. Whaleback Steamer Which Tried to Climb Out of the St. Clair River

down the St. Clair River, crashed through a dock, tore off the end of a small warehouse, and drove its bow high and dry on the shore at Marine

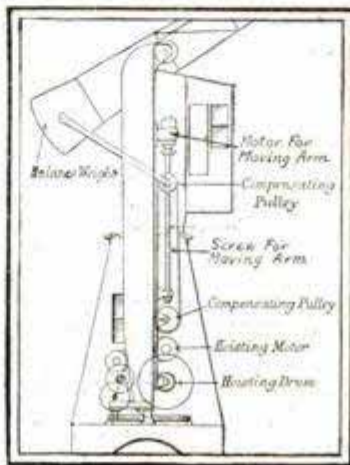
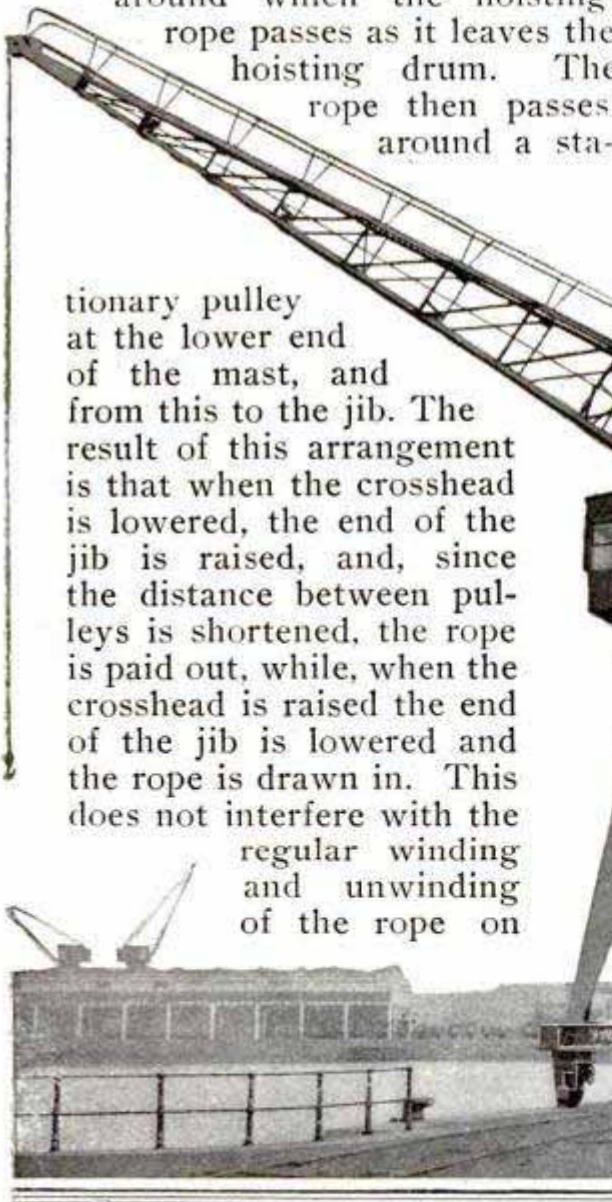
City, Mich., on Aug. 17, 1913. As the vessel, the "Antikoken," was passing down the river without cargo, its steering gear became disordered, and before the engines could be reversed, it turned suddenly toward the shore. Striking the dock head-on, it plowed through the timbers, cut away the end of a warehouse in its path, and did not stop until its bow had been pushed high on land. Except for a few dented plates, the whaleback was not damaged and was pulled back into the water by tugs the next day. No one was injured, although the crew of 22 men stood ready to leap overboard should the vessel show signs of rolling over.

4646

LATEST TYPE OF CRANE FOR HEAVY SERVICE

An electric jib crane designed for the heaviest service, recently brought out in England, has a counterbalanced jib and is provided with a system of pulleys arranged in such a way that the load swings level when the end of the jib is raised or lowered. The crane jib is built on the cantilever principle, having an extended weighted arm at the rear end to which is attached the rods for raising and lowering. The lower end of each rod is coupled to a traveling crosshead which is raised and lowered in a vertical line by a screw operated by the motor. The most ingenious part of the device is the compensating mechanism. On the traveling crosshead is a pulley around which the hoisting rope passes as it leaves the hoisting drum. The rope then passes around a sta-

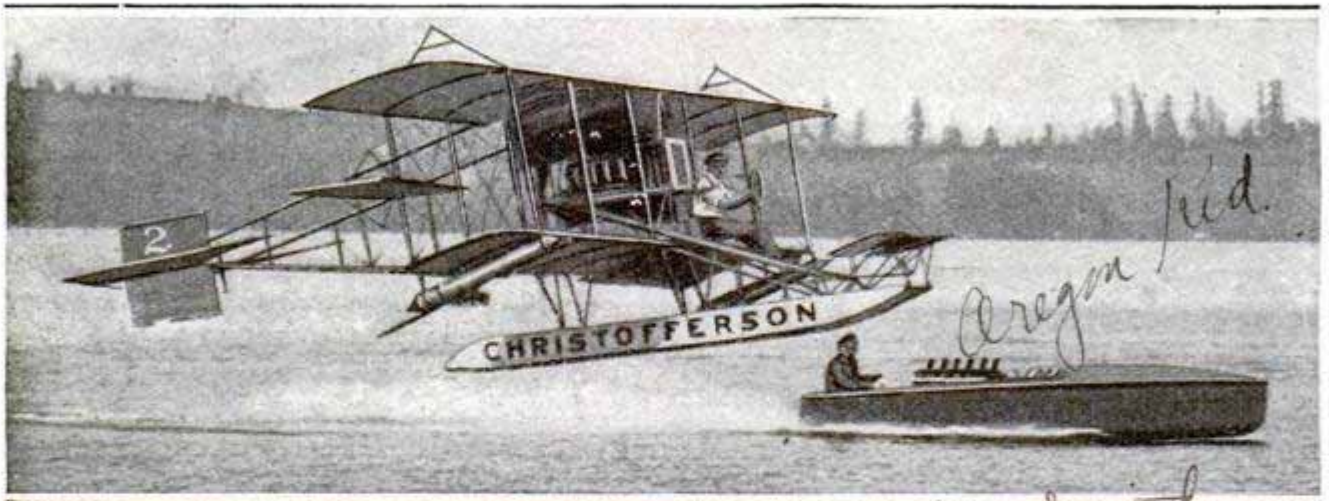
tionary pulley at the lower end of the mast, and from this to the jib. The result of this arrangement is that when the crosshead is lowered, the end of the jib is raised, and, since the distance between pulleys is shortened, the rope is paid out, while, when the crosshead is raised the end of the jib is lowered and the rope is drawn in. This does not interfere with the regular winding and unwinding of the rope on the drum, but is simply designed to keep the load level as it is swung in or out. By means of this compensating gear the ranges of lift above and below the rail level are the same for all positions of the jib, and the crane hook can be lowered to the bottom of a ship's hold when the jib is at a steep angle, as well as when it is extended and lowered for a long reach. The range for the size of crane shown in the illustration is from 35 ft. below



Details of Mechanism Which Causes Load to Swing on Level Line as Jib is Raised or Lowered

tionary pulley at the lower end of the mast, and from this to the jib. The result of this arrangement is that when the crosshead is lowered, the end of the jib is raised, and, since the distance between pulleys is shortened, the rope is paid out, while, when the crosshead is raised the end of the jib is lowered and the rope is drawn in. This does not interfere with the regular winding and unwinding of the rope on

Electric Jib Cranes in Position for Work at Avonmouth Docks



Ten-Mile Race between a Flying Boat and a Racing Motorboat, Won by the Flying Boat in 13 Minutes

quay level to 65 ft. above, or a total lift of 100 ft. This crane is operated by a 40-hp. motor and has a hoisting speed of 200 ft. per minute with a 2-ton load.

Owner - Melton Smith
FLYING BOAT BEATS FAST
5771 MOTORBOAT

A flying boat recently won a 10-mile race with one of the fastest racing motorboats in the United States. The motorboat has developed a speed of 54 miles an hour and holds the record for boats of its class on the Pacific coast. In the 10-mile race the flying boat finished in 13 minutes, just a few seconds ahead of the motorboat.

4772 RAVAGES OF HAWAIIAN BOOK WORM

A book worm which has been prevalent for some time in the Hawaiian Islands has been destroying the books in the public buildings and has damaged the royal paintings, relics of the former monarchy, to such an extent that they are beyond repair. The bound volumes of



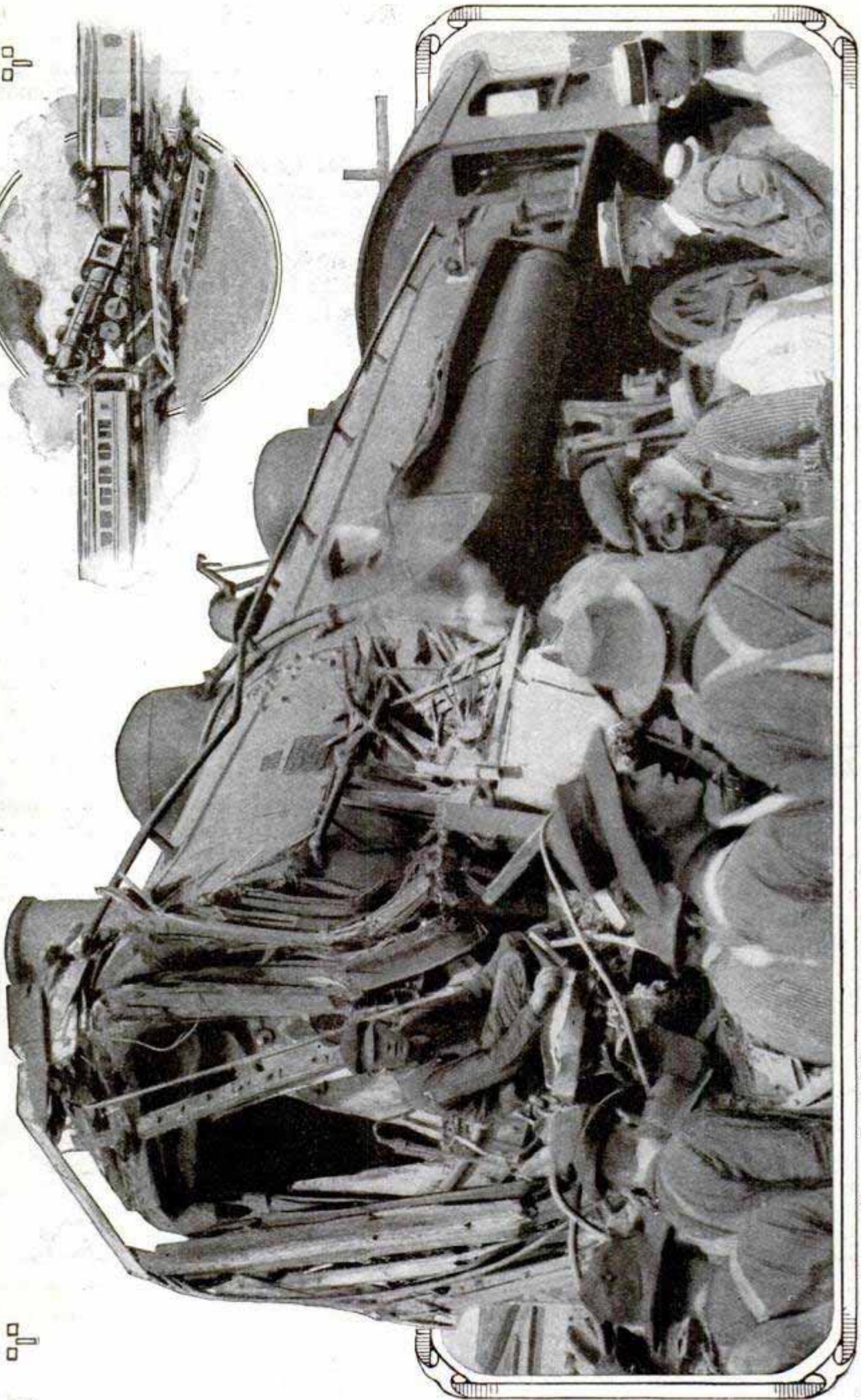
the senate journal for 1907, of which an illustration is given, is a good example of the ravages of this worm. The large blotch at the corner of the cover is a space about $\frac{1}{8}$ in. deep eaten out by the worm. From this point channels branch off in different directions. Where these channels seem to end the worm gets down to real business and drills a hole straight through the book, continuing in this way through a succession of books placed together on the shelf.

5254 TO FIND A USE FOR THE AILANTHUS TREE

The ailanthus, sometimes known as the paradise tree or tree of heaven, is becoming so abundant in the east, especially in the Ohio and Mississippi valleys, that the United States forest service is conducting experiments to find a commercial use for it. It has been naturalized from some specimens introduced from China and is now becoming more abundant than some native species. But as yet it has not been used except in small quantities for boxes and crates. The Indiana Board of Forestry tried to use ailanthus for making excelsior, but found that it was not springy enough and tended to break and crumble, perhaps because it was kiln-dried. Further experiments are to be made with air-dried wood. Excelsior is not the product of wood waste, as is usually supposed, but must be made of wood with certain characteristics.

E. D. Brown
 1007 Steam F. St., Seattle, Wash.

See by newspaper Hotel



Copyrighted by Brown and Dawson, Stamford, Ct.
 Wreckage of a Wooden Sleeping Car on the Front of the Locomotive of the White Mountain Express Which Crashed into the Rear End
 of the Bar Harbor Express on the New Haven Line on September 2, Killing 21 Persons

LOCOMOTIVE IN NEW HAVEN

5263 WRECK

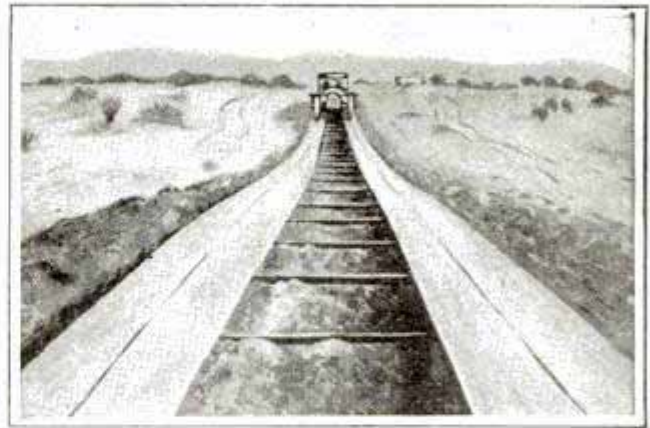
The terrific destruction resulting from a rear-end collision of modern high-speed trains is illustrated by the picture, on the opposite page, of the locomotive of the White Mountain Express which plowed through the last sleeper of the Bar Harbor Express on the New York, New Haven and Hartford Railroad near New Haven, Conn., on September 2, killing 21 persons and injuring many others. The front end of the engine's boiler is crushed in, laying open the smoke box inside, and the steel framework of the sleeping-car vestibule is pressed about the boiler head as if it had been forged there. The wreck was caused by the failure of the engineer on the White Mountain Express to see the danger signals as he plunged through a fog at high speed. The use of wooden cars on the other train is blamed for the great loss of life.

DESERT ROADWAY FOR MOTOR

4471 TRUCK SERVICE

Road work of an unusual character has been done in preparing a route for motor-truck service between Blythe, Cal., and a railway junction 50 miles away, where a large part of the route lies over a sandy desert. Over the worst section, where there is loose and shifting sand, plank wheel ways supported on railway ties were built, as shown in the illustration, and are giving satisfactory service. When the planks were laid they were given a coating of crude oil, to prevent warping under the intense summer heat and to give a better traction surface for the rubber tires. The cost of this construction was about \$1,500 per mile. On other parts of the route a roadbed was formed by placing a layer of arrowweed brush for a foundation and covering this with sand, a form of construction that is said to form a solid base when compacted by the passage of wagons and motor trucks. Formerly, freight teams required a week to make

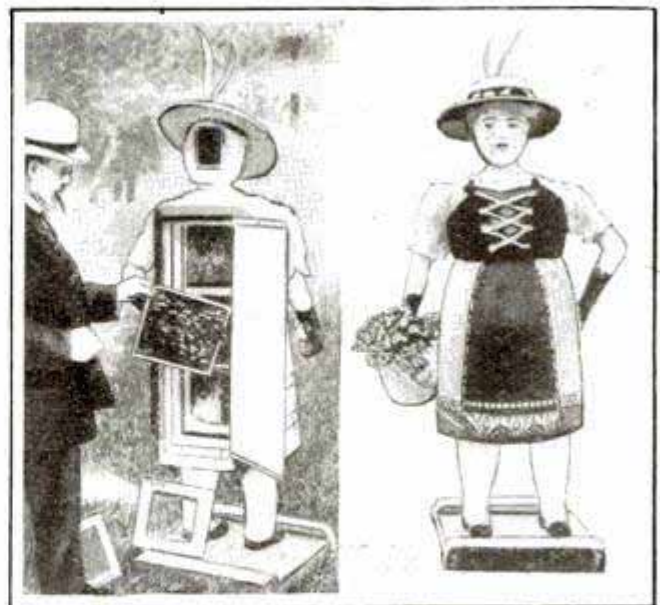
the round trip and the charge for hauling was \$20 per ton. Now, a motor



Motor-Truck Roadway across a Desert in California truck carrying 6 1/2 tons makes the trip one way in a day and the charge for hauling is but \$7.50 per ton.

THE WOMAN WHO KEEPS THE BEES

A German beekeeper has resorted to feminine charms to encourage his bees in collecting honey. He has built for his bees a hive in the form of a comely woman. She stands out in the garden with a hat on her head and a basket of flowers in her hand. From the front she looks like an ornamental statue by an unskilled wood carver. But from behind she is nothing but a



Courtesy of the Graphic A German Beekeeper's Idea of an Ornamental Beehive

beehive. The bees enter the hive through a hole in the back of her head.

Photo - Farmer - Lawson - etc. etc. Blythe Junction, Calif. Eng. Louis, Vol. 69 No. 22 page 1126

the woman who keeps the bees (2/11/13)



SIGNS TO GIVE THE RULES OF THE ROAD

5095

To relieve traffic congestion in the streets of Los Angeles, Cal., an ordinance has been passed forbidding drivers to leave their vehicles standing at the curb within 120 ft. of a street intersection. But the regulation is not simply written on the statute books like the "rules of the road" in many cities. Posted conspicuously on lamp-posts, 120 ft. back from every corner, are large, legible signs, reading: "Vehicles Must Not Stand Between Here & Next Corner."



Los Angeles, Calif.

AIRMAN FAILS IN FLIGHT AROUND BRITAIN

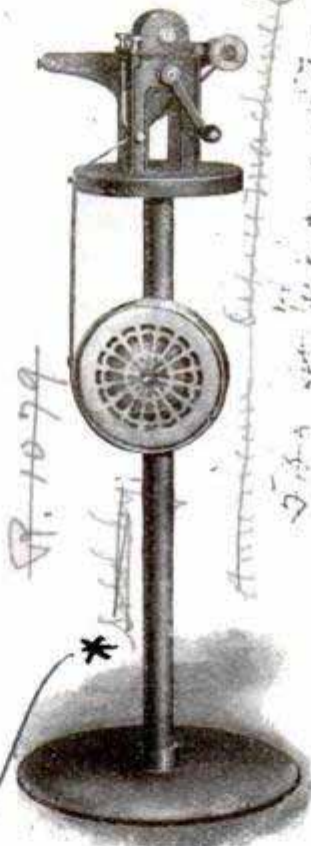
5295

Because his foot slipped off a pedal, Harry G. Hawker, an English airman, failed in an attempt to win the London Daily Mail's prize of \$25,000 for a flight around Britain in an all-British flying boat within 72 hours. After he had covered 1,043 miles of the 1,540-mile journey and had broken all records for oversea flight, he fell into the sea, 15 miles from Dublin, and wrecked his machine. With a mechanic as passenger, he had left Southampton on Aug. 25 and had succeeded in flying around the east coast of England and across the northern end of the island to Oban, on the west coast of Scotland, by the evening of Aug. 26. Waterlogged floats and engine trouble forced repeated landings all the next day. At 1:15 while he was spiraling

down at Lough Shinny, near Dublin, Ireland, his oil-covered rubber shoe slipped off the rudder bar and he fell into the sea from a height of 50 ft. Fatigue probably caused the accident. His machine was shattered, his passenger was seriously injured, but Hawker was not hurt. He received a consolation prize of \$5,000 and England considered the flight a great triumph, since it was made in a British machine with a British engine.

* RIBBON-INKING MACHINE 4793 FOR THE OFFICE

Ribbons for typewriters, adding machines, cash registers, time clocks, etc.,



can now be re-inked or manufactured in the office through the use of a ribbon-inking machine that has recently been patented. Typewriter ribbon fabric of any width is fed through the machine by a crank and comes out on a standard typewriter spool ready for use, at the rate of one ribbon a minute. Inside the machine, the ribbon first passes through a reservoir of ink and then between

two rollers that squeeze out the surplus ink. The complete machine occupies less than a square foot of table space and works a considerable saving in office supplies.

ⒸThe Isle of Wight is to be connected with the mainland by an electric subway four miles long. The tunnel will run from Stokes Bay on the mainland to Ryde on the island and will cost \$3,750,000.

** A. J. Hawker*

See later covered ribbon-inking machine



Aerial Cableway for Transporting Milk Cans on a Large Dairy Farm

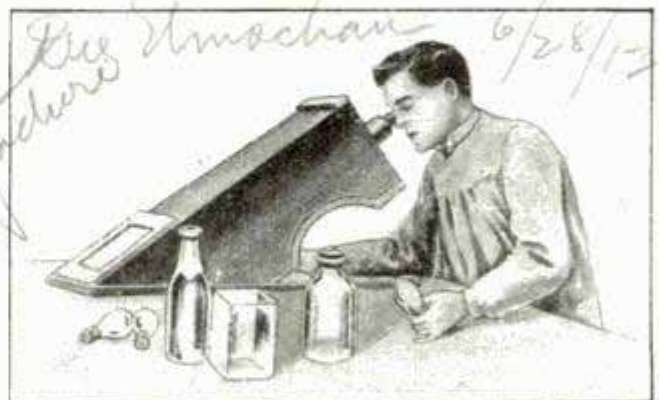
AERIAL CABLE TO CARRY MILK CANS

An aerial tramway is used for transporting milk cans on a large dairy farm near Biltmore, N. C. The cableway leads from the milking barns to the ice dairy house and twice each day great quantities of milk are sent over the line to be pasteurized and packed away for shipment. Two large cans make one load for the two-wheeled truck which runs along the heavy cable. Gravity furnishes the motive power for the cableway; the supports at each end of the line are arranged so that either end of the cable can be raised or lowered.

APPARATUS FOR DETECTING DEFECTS IN GLASS

Defects in glass due to improper cooling may now be detected and the extent of the defects definitely determined by means of an apparatus recently invented and patented in Germany. This apparatus is based on the principle that glass containing defects of this kind will show, when

placed in a polarizing apparatus, the same color effects as birefractive substances, the depth and nature of the coloring depending on the amount of stress in the glass. The apparatus consists of a cabinet having a dead-black interior and provided with a lens in one end for examining the glass and a small window in the top for admitting light. By comparing the colors in the glass with a color scale the extent of the stress may be accurately determined. While the method may



Glass is Studied Through a Lens and Coloring Due to Refraction is Compared with Color Scale

be used for glass of any kind, it is designed for studying glass that is to be used for laboratory purposes.

Asheville, N. C.
5140
for 2.50
Feb. 1913

5065 DEFECTS IN GLASS *manufactured*

transported at

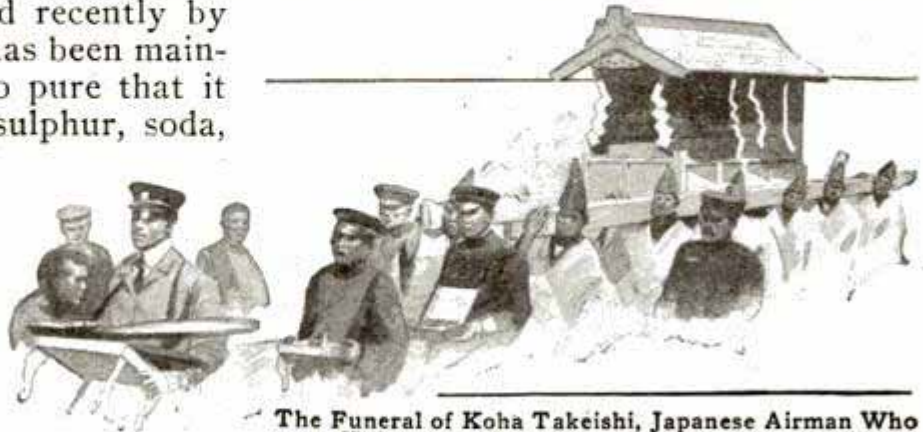
**TARNISHING OF GOLD LEAF
5020 ON LEATHER**

Whether gold leaf can be made so pure that it will not tarnish when stamped on leather is a question that has been much discussed recently by shoe manufacturers. It has been maintained that no gold is so pure that it cannot be tarnished by sulphur, soda, and similar chemicals, and that "solid gold" jewelry will tarnish when worn by persons whose systems have an excess of these chemicals. Gold-leaf manufacturers contend that no metal can be stamped on leather and not tarnish except gold and aluminum, and, if copper is used in the alloy, gold will tarnish if it is less than 23 karats. On the other hand, if pure silver is used in the alloy, gold of 18 karats can be used without tarnishing.

*American Sh...
Fig. 113*

**FUNERAL OF A JAPANESE
4811 AIRMAN**

The funeral of Koha Takeishi, the Japanese airman who was killed near the Fukakusa Parade Grounds in the

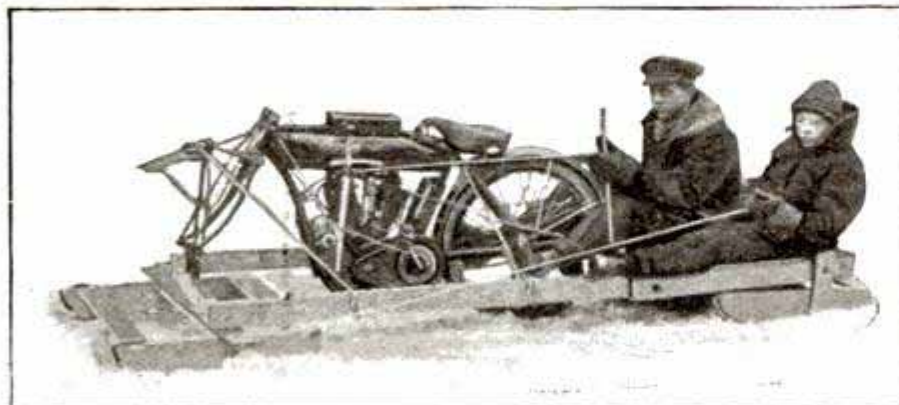


The Funeral of Koha Takeishi, Japanese Airman Who was Killed at Fukakusa, Japan: The Coffin is Borne by 12 Pallbearers and the Airman's Brother is Marching Ahead with a Piece of Broken Propeller

Japanese city-to-city flight, was the occasion for an impressive procession in his honor at Osaka recently. The airman had just returned from America and at the time of his fatal accident had nearly accomplished the city-to-city flight in a monoplane named "Shirahato," or "White Dove." His flight attracted nation-wide interest in Japan.

**MOTOR SLED THAT TRAVELS
1217 AT GREAT SPEED No Data**

A motor sled that is claimed to be capable of traveling at the rate of 40 miles per hour with two passengers, under favorable road conditions, has been constructed by a resident of Illinois. It will be observed that the front



Sled Propelled by a Motorcycle with Its Front Wheel Removed

wheel of the motorcycle is detached, thus throwing more weight upon the rear wheel for the purpose of securing a stronger grip upon the snow.

**LONG SERVICE RECORD OF AN
5255 ELECTRIC BULB**

Over 50,000 hours of service is the record made by a carbon-filament electric bulb in Bancroft, Ontario. For 11 years and 6 months the lamp has been burning at least 12 hours every night. It began service in March, 1901, and was used continuously until January, 1912, when the Bancroft power station was destroyed by fire. In November, 1912, the current was turned on again and the lamp took up its work once more. It was still in use in August, 1913, and showed no signs of breaking, although its light was becoming rather dim.

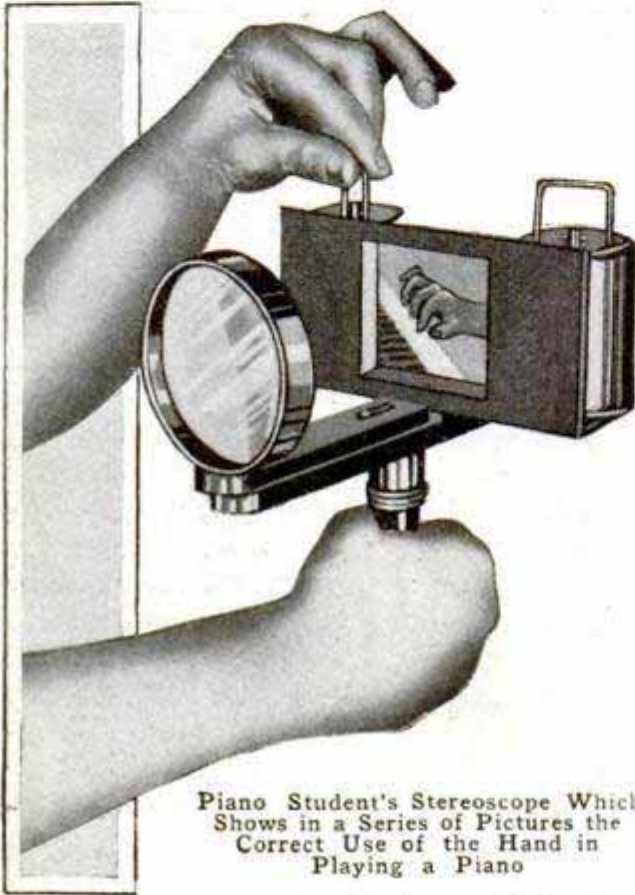
See in...

Washington, D.C.

STEREOSCOPE FOR PIANO

4861 **STUDENTS**

To show piano students the correct position of the fingers and wrist, when they are studying without a teacher,



Piano Student's Stereoscope Which Shows in a Series of Pictures the Correct Use of the Hand in Playing a Piano

is the purpose of a device which has recently appeared on the market. In construction, it resembles a small stereoscope with two spools arranged like the spools in a film camera. A series of pictures, showing the various positions and movements of the pianist's hand, are mounted on a ribbon, which winds from one spool to the other and passes across a square opening behind a lens.

ROUND-THE-WORLD TICKETS

5258 **NOW SOLD CHEAPLY**

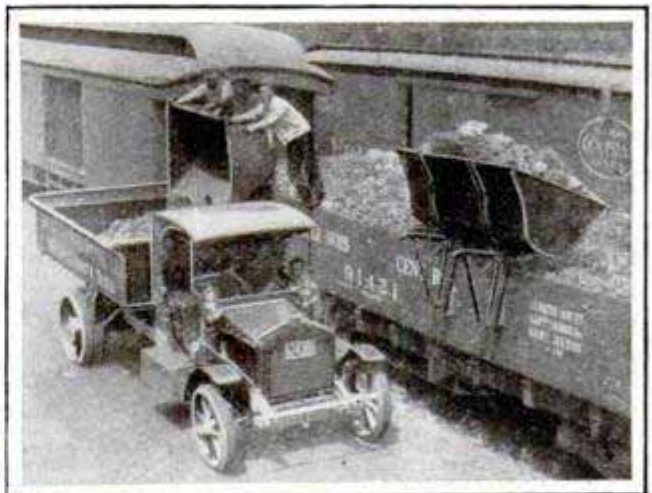
Through a coöperation of railways and steamship lines, round-the-world tickets can now be bought for very moderate sums. A first-class ticket for a two-year tour, with stop-overs at all interesting points, can be purchased in America at prices varying from \$639.10 to \$827.40, depending upon the route followed and the cities visited.

In general the trip leads from San Francisco to Japan via Hawaii, then to China, Ceylon or Australia, and to England, by way of the Suez Canal and the Mediterranean. Any boat can be taken across the Atlantic to America and any route by rail to San Francisco. Side trips to India can be arranged for a small additional sum, and many variations are allowed in the route. The rates cover passage, berth and meals on all parts of the journey except those taken by rail.

DEVICE FOR LOADING COAL TRUCKS

4525

An ingenious loading device has been put into service in Chicago for loading coal from gondola and flat cars into the motor trucks that haul coal for the various departments of the city government. This device consists of a hopper of peculiar shape, mounted on a pair of steel rails fitted to the top of the side of the railway car, which is filled by the loaders while the truck is away. The rail part of the device is like a pair of shelf brackets, placed over the car-body side as shown, a T-rail forming a connecting rail across the top. The outside bracket is hinged so that, when not in use, it can be folded flat against the car. The hopper is made of steel, the bottom being in the shape of a half circle so that



Device for Rapid Loading of Coal Trucks

it can be tipped toward the workmen while it is being loaded. To dump the hopper, the catch is released and a

slight lift on the low side rolls it over, causing it to dump into the motor truck standing at the side of the car. A chain prevents the hopper from rolling too far. Each hopper holds about one ton of soft coal. With several of these hoppers a 5-ton motor truck can be loaded in four minutes.

5276 **LIVES LOST IN WRECK OF GERMAN DIRIGIBLE**

Permanently
 The worst of the many disasters that have overtaken the Zeppelin airships occurred on the evening of Sept. 9, 1913, when the new German naval dirigible "L-1" was wrecked while flying over the North Sea from the German mainland to the island of Helgoland. In this disaster 13 lives were lost, and although it is the twelfth accident to befall the Zeppelin airships, it is the first to be accompanied by loss of life. The "L-1" had been ordered to take part in the night maneuvers of the German battleship fleet off Helgoland, and in spite of stormy conditions the flight to the island was undertaken. According to incomplete reports, the airship, after completing about half the voyage, ran into a hurricane and was either hurled into the sea by the force of the wind or sank to the surface of the water after its buoyancy had been reduced through the contraction of the gas by a sudden drop in temperature following the storm. It is also stated that the airship was carrying a greater number of passengers than it could safely sustain in stormy weather. An hour after the accident wireless signals sent out by the disabled airship were heard at the station on the island and torpedo boats were immediately dispatched to the rescue. The vessel was found broken in two, with heavy seas breaking over the aluminum framework. The airship carried a crew of 20, and of these only seven were rescued. The 13 that were drowned are thought to have been caught in the cabins, which, owing to their position, were submerged the moment the airship touched the water.

4748 **STEAM SHOVEL CONVERTED INTO PILE DRIVER**

A small steam shovel was used successfully as a pile driver in the construction of a covered ditch at Utica,



Small Steam Shovel Converted into Pile Driver for Working in Crowded Space

N. Y. After this shovel had completed the excavation it was found difficult to use an ordinary pile driver owing to the limited working space. The bucket was removed from the shovel and a pair of 26-ft. leads were bolted to the boom and in these a 2,800-lb. steam hammer was mounted. The thrusting arm was bolted to the leads so that when it was fully extended the leads were in a vertical position, and the back end of the shovel was weighted down with about 400 lb. of iron. An average of 19 to 20 piles were driven in a 10-hour day. After the completion of the driving the leads were removed and the bucket replaced in less than three hours.

Maumbury Rings, the old Roman amphitheater at Dorchester, Eng., is being excavated and explored.

U. P. Beebe, Utica, N. Y.

4974 NEW FAST MAIL-EXCHANGE SYSTEM

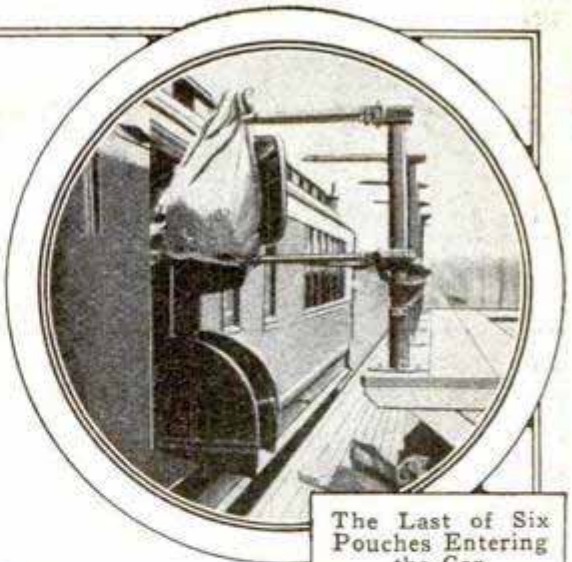
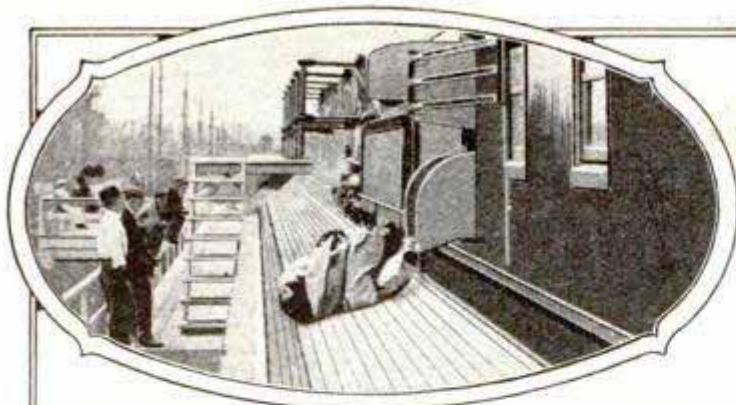
An automatic mail-exchange system, to take the place of the old catcher arm used on mail cars to pick up mail sacks while going through stations at high speed, has recently been invented and tested in various parts of the country. It not only picks up any number of the largest mail sacks without damaging their contents, but deposits other bags gently in a trough beside the track. The entire operation is automatic and requires no attention from the mail clerks in the car. With this mail-exchange system a train could run from New York to San Francisco without a stop except for coal and water and the postal cars could be loaded and unloaded at every station without the mail clerks going near the doors. The apparatus with which the mail car is equipped consists of a steel delivery basket and a steel receiving chute built into the door on each side of the car and geared to the car axle. On the station platform there are from one to twenty two-arm delivery cranes for holding the outgoing mail bags, and a receiving trough, 150 ft. long, to catch bags dropped off the train. The apparatus on the car is operated by an automatic mechanism geared to the axle and set in motion by a trip placed beside the track, 390 ft. from each station. As the mail train approaches a station, the trip starts the mechanism, and the car door is opened, the mail bags are exchanged and the door closed, without any attention from the clerks. The gearing is such that the car travels 180 ft. while the door is being opened. In the next 180 ft. the receiving chute is extended, in the next 180 ft. the delivery basket drops its mail bags into the station trough, in the next 180 ft. each is returned to its former position, and 180 ft. farther the door is closed. In contrast with the present receiving arm, which cannot receive much more than 25 lb. of mail, the automatic system can handle bags weighing 500 lb., and the number that it picks up is limited only by the number of cranes at the station.

Its chief advantage, however, is that it eliminates all danger to mail clerks and handles the mail bags without damage. The receiving arm is made of three iron bars so shaped that the friction of the mail bags checks their speed as they enter the car, and the chute which receives them guides them into a pile on the car floor. The two-arm station cranes hold the bags by the top and bottom and automatically yield to the motion of the train, so that a large amount of the shock is eliminated. In dropping mail bags, the automatic system deposits them in a wooden trough where their momentum is stopped gradually by friction. In some of the recent experiments, bags containing boxes of eggs have been exchanged without damage to the contents, while the mail car was traveling at a speed of 60 miles an hour.

EXPLOSION FORMS CAVITY

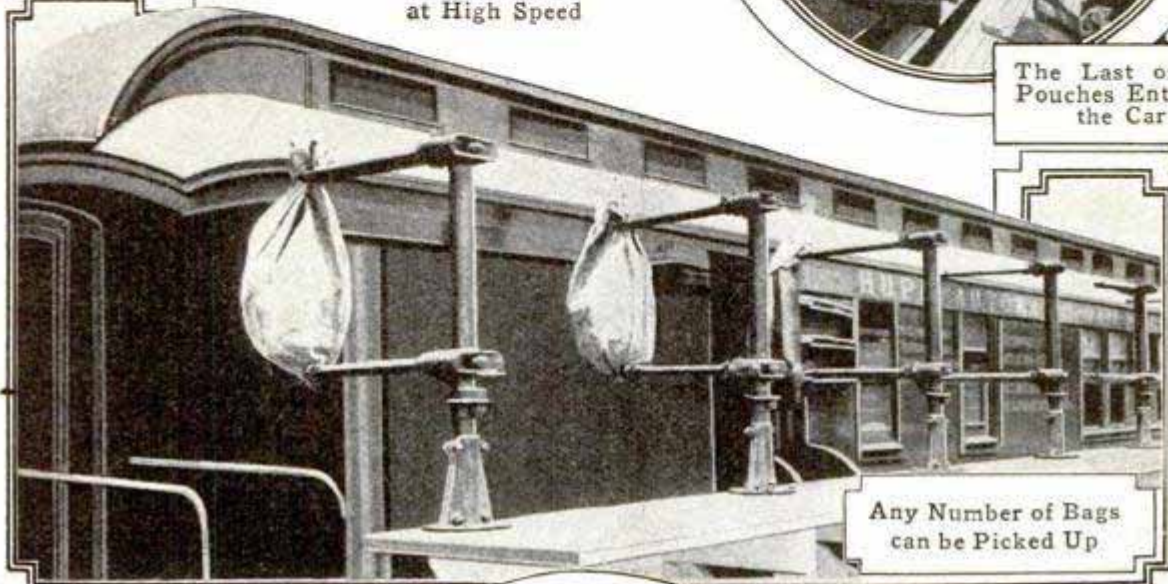
5229 FOR PILE BASE

A novel method of spreading the concrete to form the enlarged bottom of a pedestal concrete pile has been developed and is being introduced in Switzerland. An iron tube containing a wooden pile with an iron point is first driven into the ground to the required depth. The wooden pile is then removed, a cartridge provided with an electric detonator is lowered to the bottom of the hole, and the iron tube is filled with wet concrete. Following this operation the tube is drawn up a few feet to prevent damage from the explosion, and the charge is fired. The force of the explosion compresses the surrounding material and forms a cavity which is filled by the concrete contained in the tube. The tube is again filled with concrete and is drawn up gradually as the filling progresses until the pile is completed to the desired height. It is claimed, apparently on good grounds, that better compression and a larger base can be produced in this way than by any other method.



Exchanging Mail at High Speed

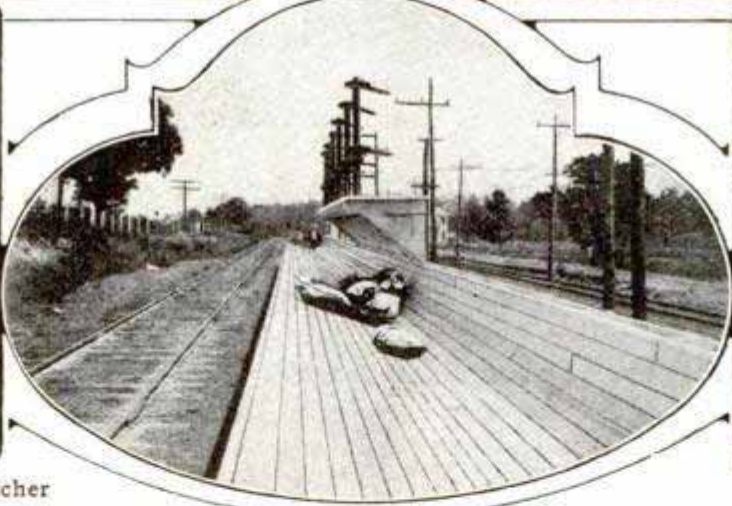
The Last of Six Pouches Entering the Car



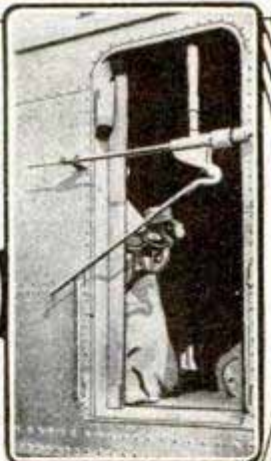
Any Number of Bags can be Picked Up



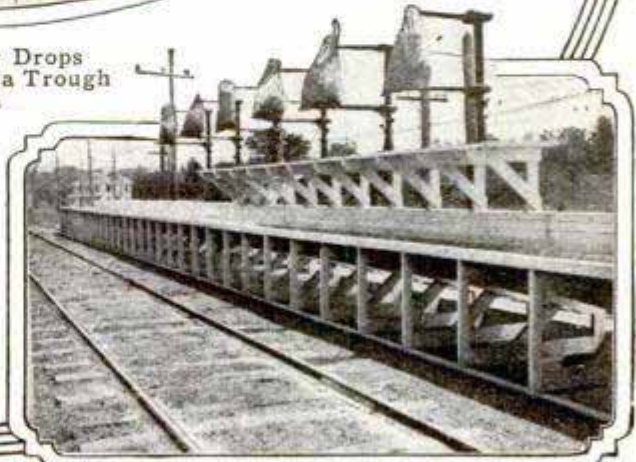
The Mail-Bag Catcher Arm Now in Use



The Mail Car Drops the Bags into a Trough at the Station



Examining a Box of Eggs Which Was in One of the Bags



Automatic System of Fast-Mail Exchange: Receiving Trough and Mail-Bag Cranes at Station

ELECTRIC PROPULSION FOR 4935 FIRE ENGINE

A fire engine driven by a storage battery has been in service in the New York City fire department for over a



Courtesy The Edison Monthly
Electrically Driven Fire Engine in Service in the New York City
Fire Department

year and has, in that time, stood all tests satisfactorily. This engine was originally a horse-drawn steam pumping engine of the ordinary type, and had seen 10 years of service before it was converted into an electric machine. Some alterations in the frame were made, and the engine was equipped with an 80-cell storage battery, with driving and steering apparatus and with a controller of the type used with trolley cars. Only the motive power is electric, the pumping being by means of the standard boiler and pump equipment. In a series of speed trials this machine made a 6-mile run through the city streets in 23 minutes, and over one stretch developed a speed of over 20 miles an hour.

Elevators were used in the imperial palace at Rome, 2,000 years ago, archaeologists believe. The kind of power used is not known.

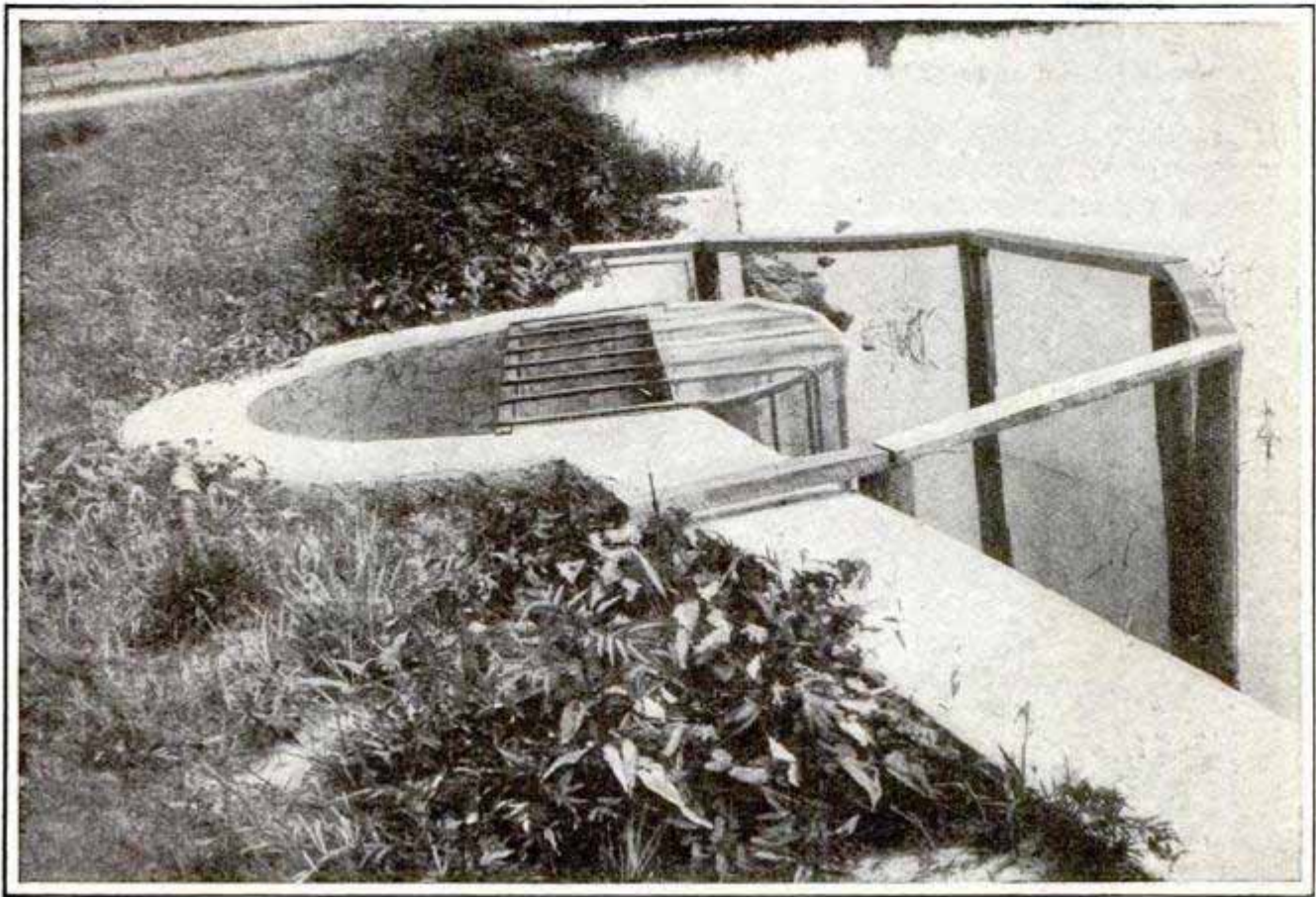
STORAGE-BATTERY CARS ON 5235 GERMAN RAILWAYS

The practicability of storage-battery railway cars is being demonstrated in a striking manner by the practice of the Prussian State Railway. Without any marked change in the design or construction of the cars, that German railway has gradually increased the number of such cars in use from six, in 1907, to 200 at the present time, and it is now maintained that the accumulator cars can be operated at a much lower cost per mile than steam locomotives or gasoline-electric cars. The type of vehicle in use consists of two cars coupled together, with seats for 100 passengers. The storage batteries are carried at the extreme ends of the train, and two of the six-wheel axles carry 85-hp. motors. One charge of the batteries carries the train about 62 miles at a speed ranging from 37 miles an hour, on the level, to 22

miles an hour, on a 2.5-per-cent grade. The two cars weigh about 55 tons, of which the batteries are responsible for about 17½ tons. The cost of a two-car train is about \$18,000. The total cost of operating such a train, allowing for maintenance, depreciation, etc., is about 17 cents per mile, of which about 4.6 cents is charged to current.

OVERFLOW DAM TO PREVENT 4667 ESCAPE OF FISH

An ingenious dam for controlling the overflow of a pond and preventing the escape of the fish is shown in the accompanying photograph. The pond, on a farm near Pilot Knob, Mo., had a habit of washing away the earth dam and overflowing with all its fish after every hard rain, and the owner built this dam to prevent it. The overflow dam consists of a concrete well, 12 ft. deep and 6 ft. in diameter, protected by



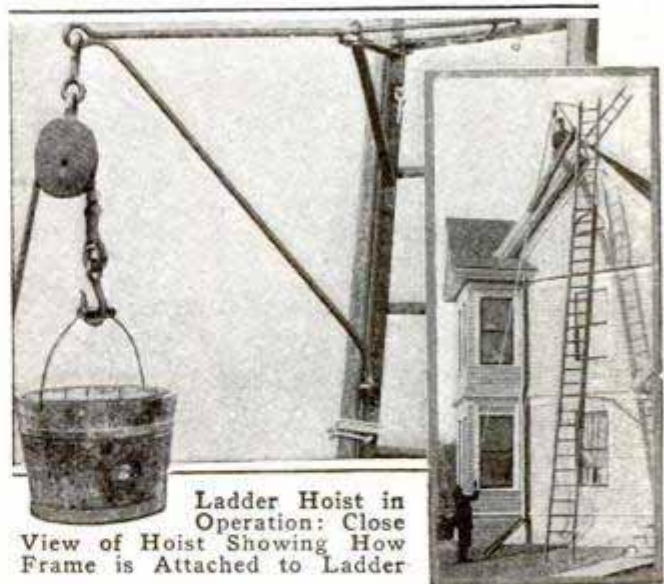
This Dam Controls the Overflow of a Fish Pond

concrete wings on each side. A large concrete tunnel leading from the bottom of the well carries off the surplus water, and an iron door at its bottom, on the pond side, makes possible the lowering of the water level. The receiving side of the well is 2 ft. lower than the top and a large quantity of water can escape in a short time. Two sets of screens keep the fish from leaving the pond. During the last four years the dam has not washed out.

**NEW DEVICE FOR HOISTING
 5154 BUILDING MATERIAL**

A hoisting frame designed to be attached to an ordinary ladder and thus do away with the necessity for erecting a special frame to support block and tackle is one of the latest improvements in building-construction equipment. The frame, weighing only 15 lb., can easily be carried to the top of the ladder by a workman, and is capable of sustaining even more weight than an ordinary ladder. The upper part of the frame has two hooks which hook over the top rung of the ladder. A small

steel beam runs down the side of the ladder, resting on the rungs, and is secured to the ladder at the lower end by means of a cord. The swinging boom on which the block is carried has two arms, one running to the top



Ladder Hoist in Operation: Close View of Hoist Showing How Frame is Attached to Ladder

and the other to the bottom of the frame. With this device the load is hoisted clear of the ladder, which serves simply as a support for the hoist. When not in use the frame can be folded compactly for storage.

NOVEL INTAKE FOR WATER-SUPPLY MAIN

5155

To insure a free flow of water into the supply main at Marquette, Mich., where the water supply is taken from



Completed Intake for Marquette, Mich., Water-Supply Main: Intake on Scow Ready to be Lowered by Derrick into Final Position

Lake Superior, a novel form of three-way intake has been installed. Each branch of the intake consists of a pipe, 36 in. in diameter, which is the size of the supply main, and has its opening protected by heavy steel-wire mesh. The branches are curved upward so as to stand clear of the lake bottom. The entire intake weighs about 17 tons, and was placed in position on the lake bottom in water 68 ft. deep.

THE SKYSCRAPER OF THE FUTURE

4843

Skyscraper building is changing and progressing so rapidly that the tall buildings of today are evidently in a transition stage. While skyscrapers not yet 30 years old are being torn down because they are out of date

and innovations are appearing in each new building, prophecies of the future city office structure, characteristic of American life, are coming from engineers and architects. That it will be a community building is the common belief—and that it will be large. It will cover half or all of a city block, perhaps 50,000 to 100,000 sq. ft. of area. Its ground floor will be a network of corridors and arcades to accommodate shops, and it will have subway and aerial, as well as street, entrances.

But the change that is most confidently expected is greater lightness and economy of construction. This is to be accomplished first by a change in the steel skeleton. The use of harder steel—nickel, chrome nickel, or vanadium steel—will reduce the weight of the skeleton and probably its cost. Added to this is the abandonment of masonry. The modern skyscraper, it is claimed, needs only a screen to protect it from weather, water, and fire; heavy masonry is useless. A sheathing of from 4 to 8 in. of vitrified clay or concrete will supplant the stone walls and the resulting lightness of the steel framework will reduce the weight of the building by 50 per cent. Foundations will thus be relieved and become cheaper. But a new style of architecture must be evolved, employing smooth, as well as thin, outer walls, for joints in the vitrified sheathing are as unnecessary to the skyscraper as masonry.

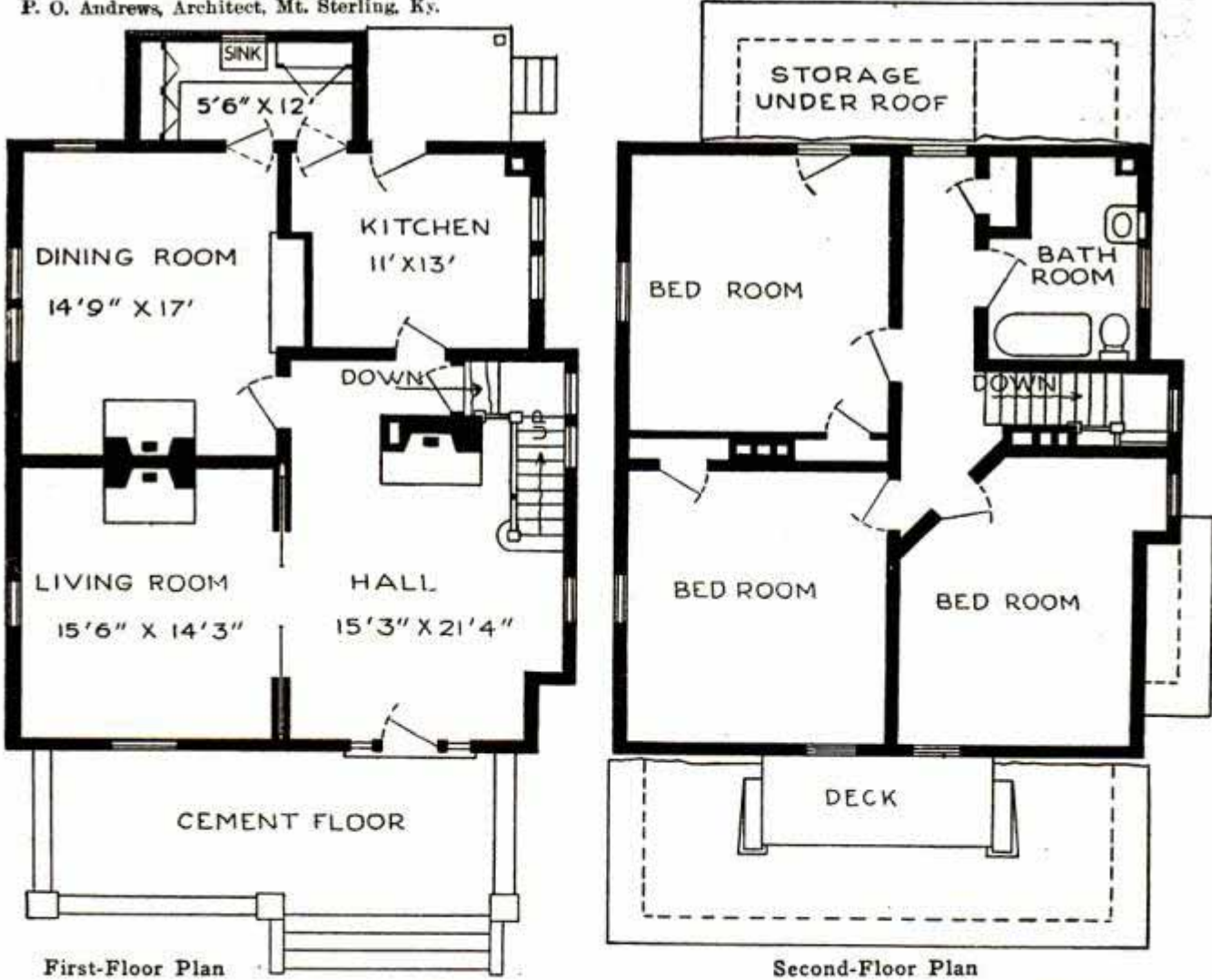
The money that will be saved in the economy of materials will be devoted to interior improvements. The future skyscraper will have a climate of its own; its heating, lighting, and ventilating machinery will keep it at a constant temperature. And since the building itself has become fireproof, wooden finishings and furniture will soon disappear.

While the locomotive was crossing a bridge, an English railway employe recently jumped direct from the foot-board of the locomotive into the river below to rescue a boy from drowning.

ATTRACTIVE RESIDENCE OF MODERATE COST



P. O. Andrews, Architect, Mt. Sterling, Ky.

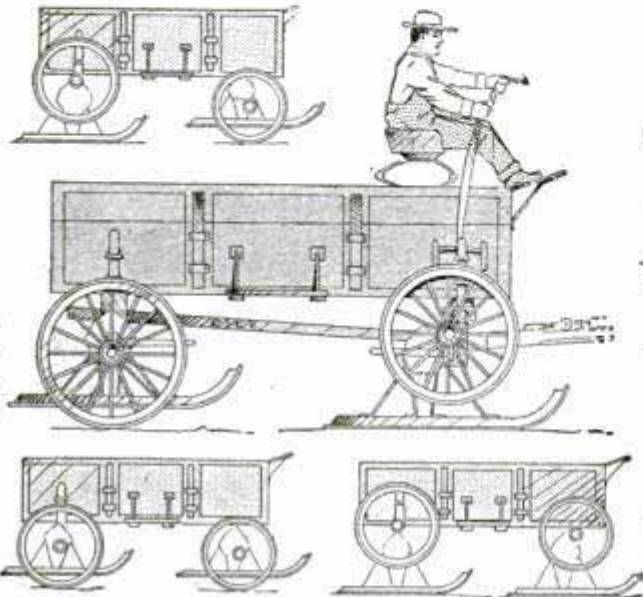


One of the chief merits of the seven-room residence shown above is its simplicity and convenience of arrangement. This building, which cost about \$3,100, has concrete foundations and a base formed of yellow brick laid in cement mortar, the upper portion being of frame construction. The first floor is finished in red oak and the second floor in pine. The floor and steps of the front porch are of concrete.

3478

A WAGON WITH SLED RUNNERS

A vehicle which may be used as an ordinary wagon or converted into a sled has been patented by a resident



A Combination Wagon and Sled

of Michigan. The wagon has wheels and runners attached to its front and rear axles in such manner that, by simply pressing a lever connected to each axle, the four wheels or four runners may be raised or lowered together, or in pairs, as desired. That is, the front part of the wagon may be made to rest upon runners, while the rear section remains upon wheels, or vice versa, or all four wheels or the complete set of runners may be used.

LIFE-SAVING CREW MOUNTED ON A MOTORCYCLE

Motorcycle life savers have been installed at Redondo Beach, Cal., to rescue drowning persons. The crew consists of two men mounted on a two-cylinder motorcycle with a sidecar and a pulmotor. The rescuing is effected by means of a life-saving reel and 500 yd. of fine steel cable snapped to a light torpedo-shaped buoy, which will support 200 lb. and can be dragged through the water very rapidly. One of the guards swims out to the drowning person to be rescued, taking the buoy along, and then the other guard winds

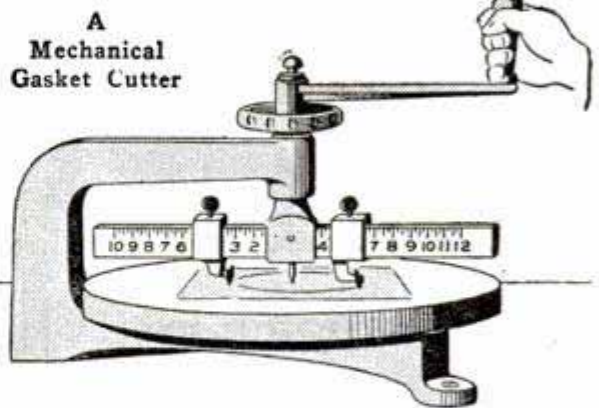
in the cable on the reel, dragging the rescued and rescuer to the shore. A 7-ft. stretcher on the sidecar furnishes quick transportation to the nearest hospital. In the locker under the stretcher are blankets, first-aid apparatus, and a pulmotor for artificial resuscitation.

PLATINUM-PLATED WARE FOR CHEMICAL WORK

Platinum-plated dishes, crucibles and other utensils for chemical laboratories can now be made to take the place of costly solid-platinum apparatus. Platinumware is necessary in the laboratory on account of its resistance to chemical action, and until the present process of platinum-plating was patented no substitute had been found. In this process platinum is welded to a base of steel or nickel and rolled into a sheet. The resulting plate is then spun into the desired shapes and platinum is fused on the edges to cover up the exposed base metal.

GASKET-CUTTING MACHINE OPERATED BY HAND

A gasket cutter for cutting sheet asbestos, fiber cloth, copper, lead, or other metallic packings, any size from 1 1/2 to 12 in. in diameter, has been patented by a Chicago man. A cast-iron arm supports a hand crank, cutters and



A Mechanical Gasket Cutter

gauge, over a hard-maple table upon which the material to be cut is placed. Turning the crank lowers the cutters and continued motion gives the incision. The cutters, of tool steel, are dished and set at an angle.

Hessell, Trench.
Albert Clements Hill
1,052,059 - Albert
Serial 711,654873
(U.S. 21-96)

5122
Patented in U.S. 1914
Mr. Byron Eldred
Patent Attorney

LOCAL ADVISORY BOARDS FOR FOREST USERS

4926

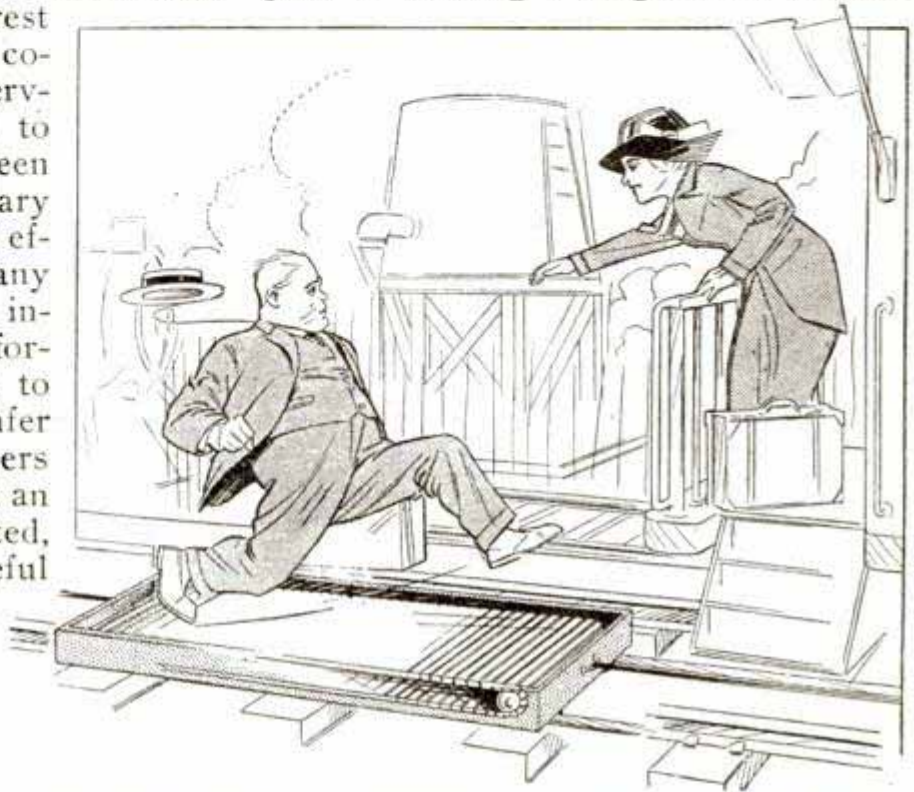
To give local users of the national forests a voice in the regulation of the forests in which they are interested, local organizations of forest users are to be formed to cooperate with the forest service. A new regulation to this effect has recently been drawn up by the secretary of agriculture to go into effect at once. It permits any local organization which includes a majority of the forest users in the locality to select a committee to confer with the local forest officers in an advisory way. Such an arrangement, it is expected, will insure a more careful consideration of local interests by forest officers and in the end promote the general welfare. The western users of the national forests will thus cease to feel that they are dealing with a far-away bureau over which they have no control, represented by local officers whose actions cannot easily be protested against. The plan will be an extension of the cattle and sheep growers' associations already in existence.

U.S. Dept. of Agriculture

DEVICE FOR PRODUCING STAGE ILLUSION

4502

An ingenious device recently invented enables an actor to go his best pace in chasing a stage train without



Actor Chasing Stationary Train Which is Apparently in Rapid Motion

any danger of catching up with it, although the train is standing still on the stage throughout the scene. The actor simply runs on a track consisting of an endless band which is adjusted to run backward as fast as the runner goes forward. To add to the illusion the background is made in the form of a translucent screen, on which a moving landscape is projected by a lantern. A foreground screen of open-meshed fabric is placed at the front of the stage, and on this pictures representing rain or snow are projected. The resulting illusion is that of a rapidly moving train.

INCREASED USE OF SILENT GEARING

4991 "Citizen" System

Silent gearing for high-speed and heavy-duty work has been developed to such an extent that it is now being installed on ocean steamships. Work extending all the way from the steering of ships to transmitting power in huge dredges and rolling mills is now being done with gears that will run at a speed of 4,000 ft. per minute with practically no noise. On some of the new turbine battleships, four pairs of silent gears have been installed to transmit 68,000 hp. Some gears of this type have been turned out with a diameter of 30 ft. and a face 10 ft. wide.

A. Citizen et al

A FOLDING STAIRWAY FOR INFREQUENT USE

4805

A folding stairway designed to provide convenient access to attics, lofts and other portions of a building that are infrequently entered, has been patented and placed on the market. The feature of this stairway is that, when not in use,

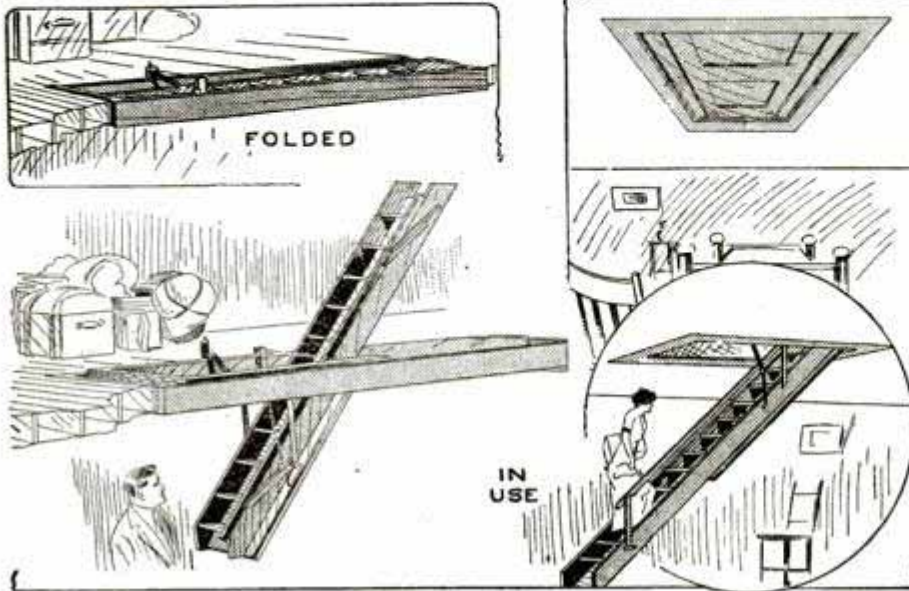
115/100 A known... advertising

nautilus

it may be folded up into the ceiling, where it fits compactly and has the appearance of a ceiling panel, so that it does not occupy any valuable floor space. The operation is entirely automatic, the stairway being handled by

MARINE PRESSURE RECORDER
4431 OF NEW TYPE

An instrument designed to give an accurate record of the steam pressure maintained during a voyage of any duration is one of the latest developments in steamship equipment. These instruments are made in two types, single and duplex. In the duplex type two recorders are mounted in one case, and make a record on separate charts rotated on the same clock drum. They are arranged so that one instrument records the pressure in the boiler or main steam pipe and the other the pressure in the engine valve casing. In this way the records



Stairway Which may be Folded into the Ceiling When Not in Use

spring rollers concealed under the landing, which first pull the stairway half-way up and then flatten it into the ceiling through the action of a counterbalance. Friction is eliminated by roller bearings located between the stairs and the ceiling. A light push is all that is needed for folding the stairway, while a pull on a chain brings it down.

show how the steam pressure has been maintained, whether there has been a drop in pressure, and what has been the effective steam pressure at the engines. The clock requires winding every eight days, and can be stopped at will by a special contrivance, so that the recorder can be put out of action when the vessel is in port.

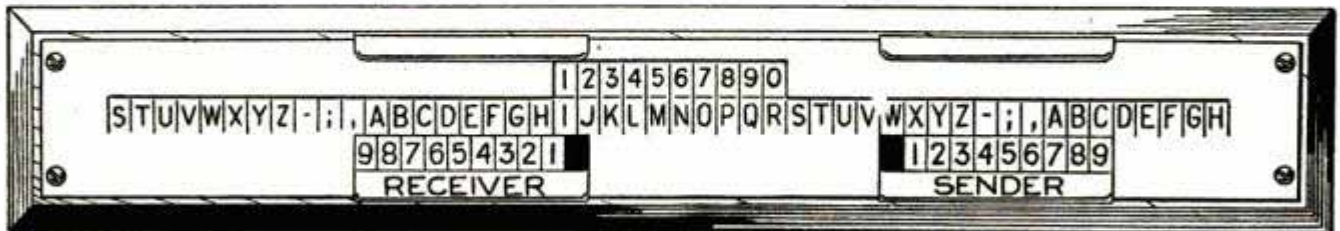
Recorders - Duplex type

5066

A SLIDE RULE FOR CIPHER MESSAGES

The tedious work of writing and translating ciphers and secret-code messages has been reduced to a mechanical operation by a code slide rule now in

use in France. It is adapted to the use of an infinite number of secret codes and its messages are practically undecipherable. The apparatus consists of a ruler,



French Slide Rule for Writing and Translating Secret-Code Messages

like an engineer's slide rule, with two movable scales. The letters of the alphabet, punctuation marks, and figures to be used in messages are written

in a long line on the face of the ruler. Below this line are two movable slides, one for writing and the other for translating. Each of these slides contains

France

the figures from 1 to 9 with a blank space, or "finder," next to the figure 1. To use the code slide rule, two correspondents must first decide upon a key consisting of several figures—for example, 2947. This key must be

**AN ADJUSTABLE FOOTRAIL
3609 FOR RADIATORS**

A radiator footrail that can be quickly adjusted to any height and attached to radiators of various lengths is

Secret Key -- 2947

Message to be Sent -- P O P U L A R - M E C H A N I C S - M A G A Z I N E

Key Written under Letters -- 2 9 4 7 2 9 4 7 2 9 4 7 2 9 4 7 2 9 4 7 2 9 4 7 2 9
Resulting Code Message -- R X T ; N J V E O N G O C W M J U G Q H I J A P P N

To Translate Code Message -- R X T ; N J V E O N G O C W M J U G Q H I J A P P N

Key Written under Letters -- 2 9 4 7 2 9 4 7 2 9 4 7 2 9 4 7 2 9 4 7 2 9 4 7 2 9
Translation -- P O P U L A R - M E C H A N I C S - M A G A Z I N E

A Message Written in Secret Code and Translated

known to both correspondents. In preparing a code message, the sender first writes out his message in plain English and then places the key under the various letters and figures, repeating it in succession from left to right, as in the accompanying example. Then he is ready to find the code letters with the slide rule. In this message the first letter is P and its corresponding key number is 2. Accordingly he moves the slide marked "sender" so as to bring the blank space under P and takes the letter over 2 on the slide—in this case it is R. Then he moves the slide until the blank space is under O and takes the letter over 9—in this case, X. And so on through the message. The person who receives the message uses the slide rule in the same way to translate it, placing the key under the code message and finding the letters with the slide marked "receiver."

☐The construction of a new deep-water port on the Atlantic coast of the Republic of Uruguay, to be located near Coronilla, is now under way. It is to be called Atlantida and is to serve as an outlet for the vast interior of the country tapped by a railway extending across the republic.

among the latest appliances for increasing the comfort of the home. The footrail is made of heavy brass tubing, with nickel trimmings, and provides a convenient method of warming the



A Handy Footrail for Radiators

feet without scorching the toes, or defacing the finish of the heater by pressing the shoes against it.

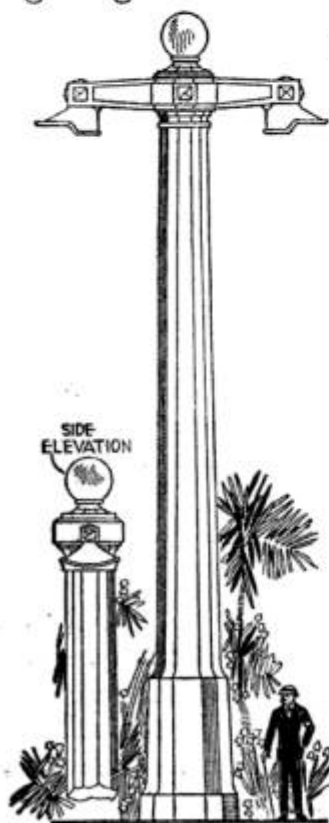
☐One railroad uses old locomotive-boiler tubes pieced together for piping water and air about its yards.

Renters in the United States

LIGHTING STANDARDS FOR PANAMA CANAL

4856

Final designs for the lamp standards, brackets and reflectors to be used in lighting the locks of the Panama Canal



have been made and have received the approval of the Fine Arts Commission. The posts, including the ornamental ball, will be of reinforced concrete cast in iron forms manufactured in the Gorgona shops, and a total of 511 standards carrying single or double-arm brackets will be required. The reflectors will be placed 29 ft. 6 in. above the ground

and 4 ft. 3 in. from the center of the standard. Each concrete double-arm bracket with reflectors will weigh approximately 1,610 lb., and the solid ball, weighing 730 lb., will be used to counterbalance the weight of the single-arm brackets on the middle locks.

PEAT USED PRINCIPALLY AS FERTILIZER

4692

By far the most important use of peat in this country is as a fertilizer, the consumption for that purpose in 1912 being 41,080 tons, while only 1,300 tons were used for fuel, 3,000 tons for stock food, and 2,000 tons in the manufacture of paper. In preparing peat for use as a fertilizer the field bearing the peat deposit, unless it is already under cultivation, is thoroughly drained, and plowed and planted for one or two seasons with some crop which destroys or disintegrates the coarse material and aerates and improves the upper layers of the

peat. The peat is then plowed and harrowed and allowed to dry thoroughly, and, after being scraped into windrows, is hauled to the factory for further drying or storage. The drying is completed by passing the material through long rotary cylindrical driers, through which the heated air and gases from furnaces are forced by fan blowers. This process requires a somewhat expensive plant. In preparing peat for fuel it is made into the form of cylinders.

A NEW RULE FOR FINE MEASUREMENTS

3627

An improved rule for machinists and others having use for a scale graduated down to 64ths of an inch has been placed on the market.

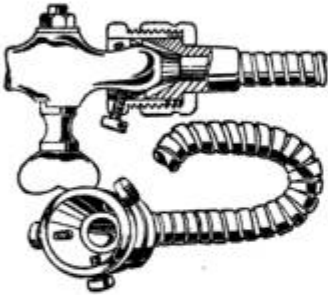
The lines on the new rule are so arranged that the difficulty of obtaining accurate measurements in laying out work requiring fine graduations is entirely eliminated, and all eye-strain formerly incident to reading such graduations repeatedly is done away with. The new rule, although measuring accurately at 64ths, has only 16 lines to the inch.



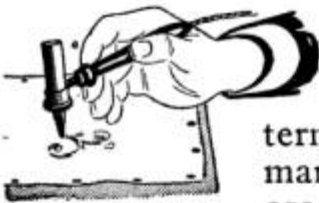
CA cement-manufacturing concern has been experimenting to ascertain whether or not it is possible to transport cement in bulk, like sand or gravel. A truck load of cement was recently sent out without packing of any kind, the interior of the truck body being first lined with waterproof paper. The truck arrived at its destination with absolutely no signs of leakage.

ALL-METAL FLEXIBLE**3566 GAS TUBES**

A metal flexible gas tube now being marketed in Paris has all-metal connections instead of rubber ends, for attachment to the source of gas supply and to the lamp or gas plate. The metal joints are so constructed that they will not leak when fastened in place upon the gas-fixture nipple by the three screws provided.

**3611 WAX-FOUNTAIN PEN FOR COLORING FABRICS**

An electrically heated wax-fountain pen has been perfected for use in ornamenting silk, velvet, cotton, and other fabrics, as well as wood, leather, metal, etc., with patterns or designs in permanent dyes and colors. When the fabric is dyed the wax-covered surface is not affected by the dyestuff. The wax is then dissolved in benzine or otherwise removed.

**4312 COMBINED SPRING AND SHOCK ABSORBER**

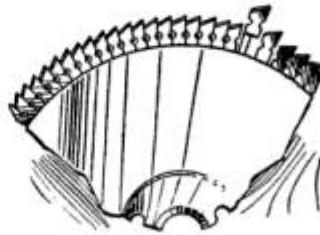
An automobile spring with a shock absorber built into place in such a way that it becomes a part of the spring itself has been put on the market. The top member is of a special silico-manganese steel, and the two small cylinders at the bottom, upon which the action of the spring depends, are made of cold-rolled seamless steel tubing. They inclose vanadium-steel springs and pistons, and a quantity of oil. The



resiliency of the device is imparted by the steel springs within the cylinders, and its shock-preventing properties result from the comparatively slow passage of the oil past the pistons under the control of a ball check valve.

3603 A CIRCULAR SAW WITH REMOVABLE TEETH

A circular saw, the teeth of which may be removed and others inserted in case of breakage, has been placed on the market. The body of the saw is made of ordinary tough steel and the teeth may be quickly adjusted in position or removed. An automatic sharpening machine for teeth of this type has also been designed by the manufacturers.



Courtesy Die Export Woche

3610 ELECTRIC CIGAR LIGHTER FOR AUTOMOBILES

This electric cigar lighter is so constructed that it may be plugged into the same socket that is generally used for a trouble lamp on a motor car, and a cigar can be lighted while the vehicle is in motion. The device is small enough to be carried in the vest pocket.

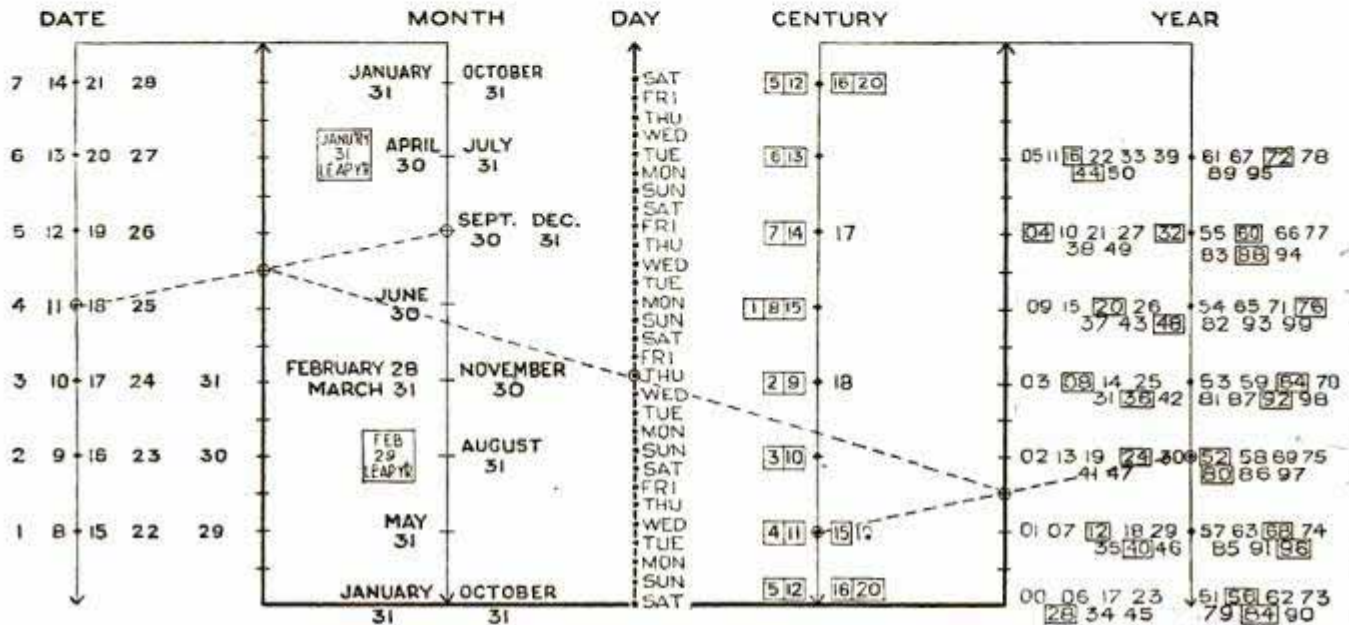
**5075 PERPETUAL CALENDAR IN GRAPHIC FORM**

The perpetual calendar for determining the week day on which any date will fall, or has fallen, is the latest nomographic table that has come from France. Like other nomograms, it is simply the graphic representation, by lines and symbols, of a mathematical or mechanical law, by which certain

results from given data can be found without calculation. The nomographic calendar is made up of four columns of known data—date, month, century, year—and one column of data sought, week days, in the center, as in the accompanying drawing. The two rules without data simply assist in the cal-

NEW MACHINE FOR TESTING STRENGTH OF PAPER

A machine for testing the strength of paper is shown in the accompanying illustration. The paper to be tested is inserted in the clamp and is secured in place by turning the milled disk to

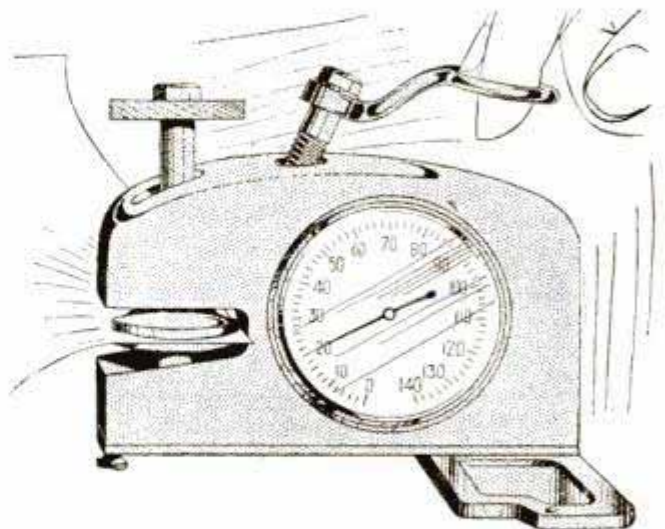


Perpetual Nomographic Calendar for Dates in the Past or Future

ulation, and the figures in squares indicate leap years. For example, to find the day of the week on which December 25, 1913, will fall, draw a straight line from the mark opposite 25 in the date column to the mark opposite December in the month column and mark the point where it crosses the left-hand auxiliary rule. Then draw a line from 19 in the century column to 13 in the year column, marking the point where it crosses the right-hand auxiliary rule. A straight line connecting these two points intersects Thursday in the day column. In the same way any other date in the past or future can be found.

The operation might be reversed; the table would indicate the dates of all the Tuesdays in November, 1913, and other similar data.

the right. This clamp is independent of the registering mechanism. The bursting of the paper is accomplished by means of a metal plunger operated by a crank as shown. The head of the plunger is cup-shaped, so that the paper is broken over a ring of about 1/4-in.



All-Metal Paper-Testing Machine

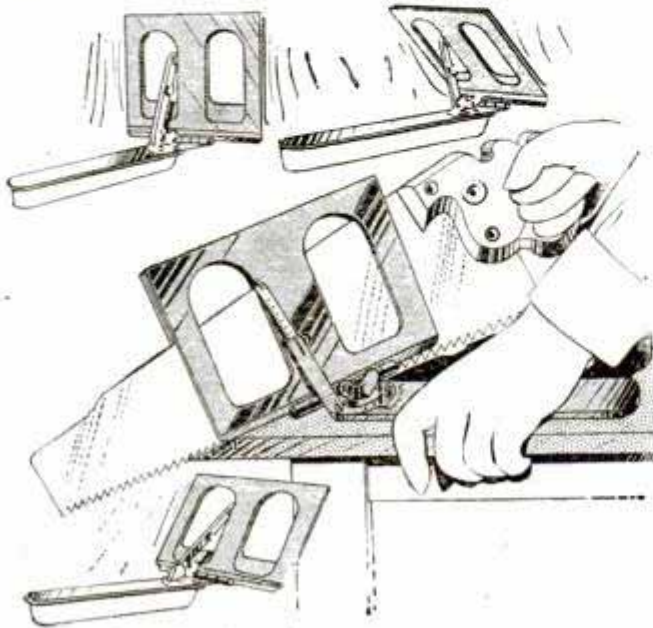
What is said to be the largest street-car barn in the world is located at Philadelphia. This barn is 611 ft. long and 377 ft. wide.

diameter. Results are indicated on the dial in pounds per square inch. All parts of the machine are of metal.

A NEW BEVELING-SAW GUIDE

3680

A new type of beveling-saw guide recently placed on the market is also adapted to all the purposes for which



Beveling-Saw Guide for Carpenters

a miter box is employed and can be used on lumber of any width. The illustration shows its operation clearly.

CENTURY-OLD ENGINE STILL RUNNING

5023

For over 100 years, the same steam engine has been at work pumping water out of the mines of the Shipley-colliery, Cornwall, England. It is an old-fashioned beam engine, so ancient that no one knows its exact age nor the name of its builder, but it is still in service and has not been repaired for 23 years. Until recently, it has been running night and day at a rate of eight or nine revolutions a minute, but now it pumps only in the daytime. Its horsepower is about 45, and the two pumps operated by it raise some 53,000 gal. of water per hour to a height of 192 ft. The piston has a diameter of 52.2 in. and a stroke of 84 in. and works on low-pressure exhaust steam from the other mine engines. The beam, which weighs about 10 tons, would be considered rather light now, but it has never broken in its century of service.

STRENGTH OF PULLEYS OF DIFFERENT MATERIALS

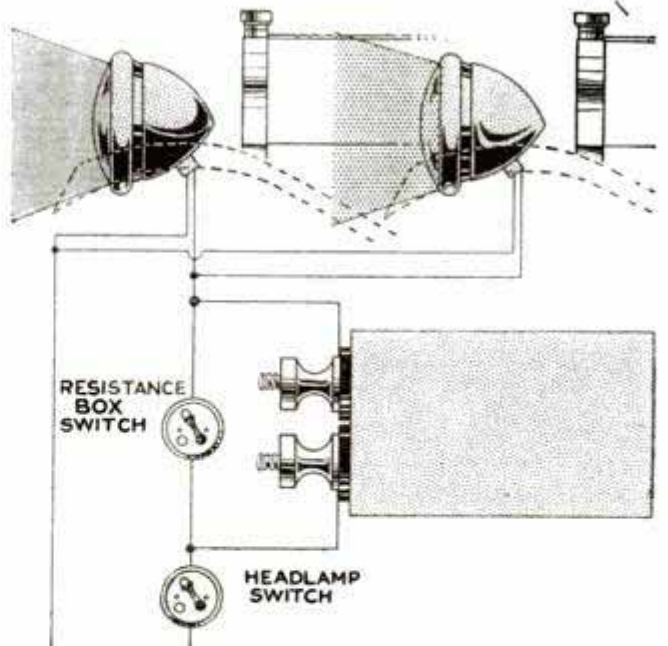
4918

As a result of a series of exhaustive tests made at Purdue University for determining the breaking strength and principal points of weakness in pulleys of different materials, the following important conclusions were reached: Rim joints midway between the arms are serious defects and materially lower the speed at which it is safe to run the pulley; the paper wheel with solid web and rim will safely withstand a peripheral speed of as much as 106 ft. per second; wood pulleys with solid rims have an ample factor of safety at a peripheral speed of 90 ft. per second, if the wood is of good quality; steel wheels of the split-rim type are unsafe at greater peripheral speeds than 80 ft. per second.

CONTROLLER FOR MOTOR-CAR HEAD LAMPS

3706

A new appliance has been designed for controlling the light of electric head lamps. The device enables the motorist to reduce the candlepower of the



Glare Remover for Motor-Car Head Lamps

lamps by turning a switch mounted near the driver's seat, which sends the current through a resistance coil. The appliance is made for lamps of various candlepower.

No data in file

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SCHOOLHOUSE BUILT ON UNIT PLAN

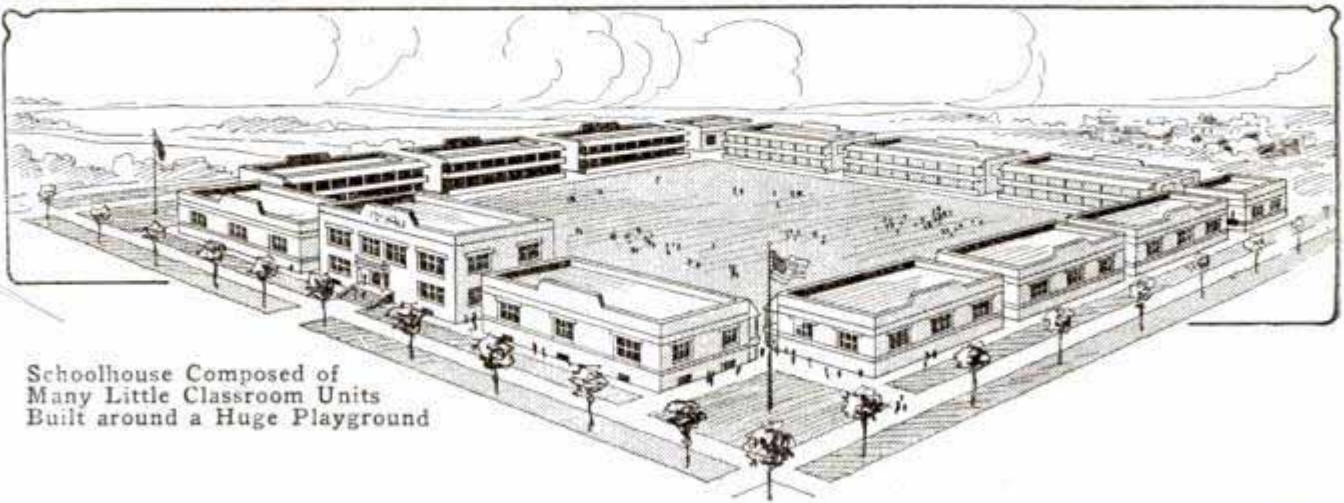
4618

A schoolhouse in which the classrooms are distributed among a number of small buildings erected about a play-

PROJECTILE WITH FOLDING TAIL

4614

A projectile equipped with a telescoping tail to prevent the formation of a vacuum behind it to impede its



Schoolhouse Composed of Many Little Classroom Units Built around a Huge Playground

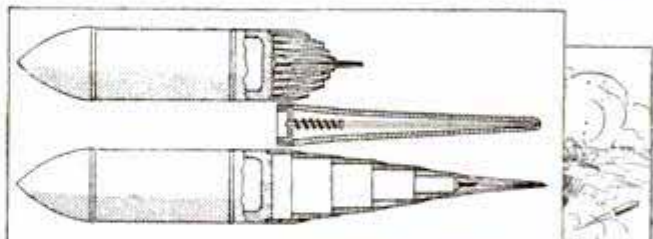
ground, 300 ft. square, has been planned for Tulsa, Okla., in accord with the new social-center idea. The two-room, one-story units, built along the four sides, open directly upon the square and have no corridors, halls, or street doors. A two-story assembly hall on the street side and gates at the four corners give entrance to the quadrangle and a concrete arcade around the edge serves as a cloakroom. The heating and ventilating plant is in the assembly building. This plan gives a central playground, 200 ft. square, surrounded by an amphitheater which will seat several thousand people. A swimming pool in the basement is to be open to the public at certain hours.

A FAST-BLACK DYE FOR COTTON CLOTH

4995

Fast-black and fast-gray cotton-cloth prints can now be made by the use of a dyeing mordant that has just been patented. Any shade from light gray to deep black, if printed on cotton or any vegetable fiber with the new dye, cannot be faded by washing or by sunlight; but the same mordant will not make a fast black on woolen cloth. Cotton cloth that is printed with this new dye can be identified by the fact that it yields red to violet solutions in concentrated sulphuric acid.

flight has been patented in England. The tail forms a practically flat base on the shell, when it is closed, and is extended by expanding gases as the shell leaves the gun. The projectile can be used in guns of various calibers, smooth-bore or rifled. The tail is made up of a series of gradually decreasing conical rings, arranged to telescope each other and fold together loosely on the base of the shell, as shown in one of the pictures. Inside the series of rings, is the tail proper which has a spindle and spring inside and a small opening in the end. Normally the opening is closed by the spring, but when the gun is fired gases force their way in, are confined by the reaction of the spring, and in turn act upon the annular grooves in the con-



The Folding Tail on This Projectile Extends as It Leaves the Gun and Prevents Formation of a Vacuum behind the Shell



ical rings to force them out and extend the tail, as the shell leaves the muzzle.

Gene Bohm

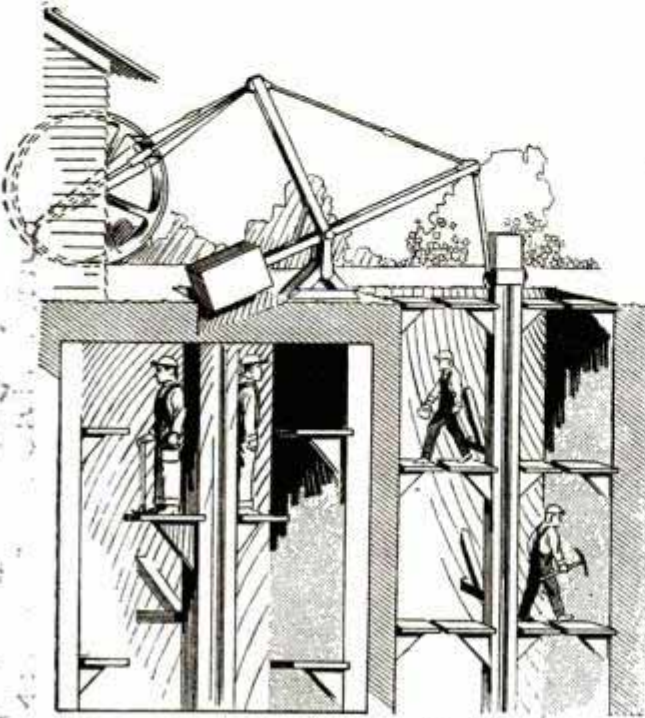
Manheim

Pat. Linder 6/21/19
Pat. Linder in Journal of Machinery - page 865

"MAN ENGINE" USED IN

4252 CORNISH MINE

In one of the tin mines of Cornwall, England, a curious device, known as a "man engine," is in use for conveying



Descending a Cornish Mine Shaft on the "Man Engine"

the miners to and from the deep workings. Near the mouth of the shaft is a large walking-beam engine. To the rim of the flywheel of this engine a driving rod is attached, and by means of a pivoted connection, the motion of the wheel is transmitted to a vertical lifting rod in the mine shaft, as shown in the illustration. The lifting rod has a vertical movement of 12 ft. At intervals of 12 ft. platforms are supported both on the lifting rod and on the side of the shaft, and the sets of platforms are so arranged as to be at the same level at the high and low position of the rod. In descending, the miner steps on the moving platform when it is at the end of the up-stroke, and is carried down 12 ft. He then steps off and waits for the next up-stroke, when he is carried down another 12 ft. This process is continued until the bottom of the shaft is reached. For ascending, this process is reversed. Platforms on opposite sides of the shaft enable one set of men to descend while another set is ascending, without interference.

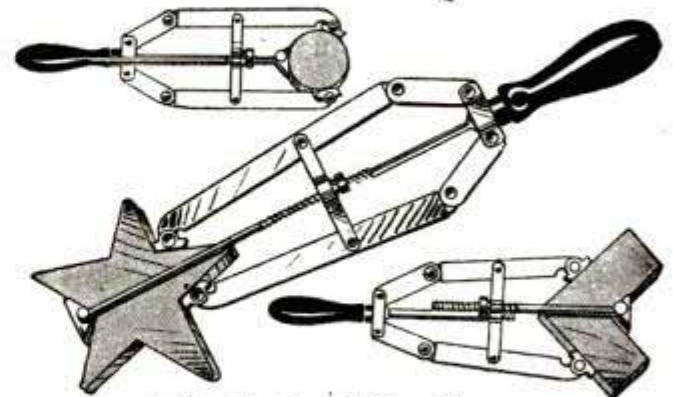
LIQUID AIR FOR QUARRY

4927 BLASTING

Liquid air, in combination with a combustible material, is being used for blasting limestone in a quarry at Rundersdorf, Germany, and the success of the method indicates the availability of a new explosive that is of great power and safe to handle. The new cartridge is made of pasteboard packed with petroleum and clay, around a narrow tube of gauze which is filled with liquid air. When the liquid air has thoroughly penetrated the clay and oil, the cartridge can be exploded with an electric detonating cap. Increased safety results from the fact that the liquid air soon evaporates if the charge misses fire and there is no danger of a delayed explosion. The scientific basis of the process is that liquefied air under pressure can be exploded by a violent shock, such as that of a detonating cap, and the presence of a combustible material, such as oil, results in a secondary explosion caused by the combination of the free oxygen in the liquid air with the combustible material.

3577 —
A CONVERTIBLE TWO-JAW AND THREE-JAW CLAMP

A three-jawed lifting clamp, so designed that the middle sliding jaw can be removed when only a two-jaw clamp is desired, has been placed on the market. The clamp, which is especially



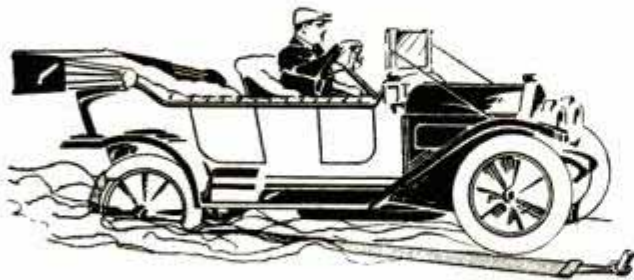
A Combination Lifting Clamp

adapted for gripping firmly irregularly shaped articles of various sizes, is made of steel and is opened and closed by simply turning the handle.

July 16-90
 3671 **DEVICE FOR PULLING AUTOS**

OUT OF DEEP MUD

A device for pulling motor cars onto solid ground when their rear wheels



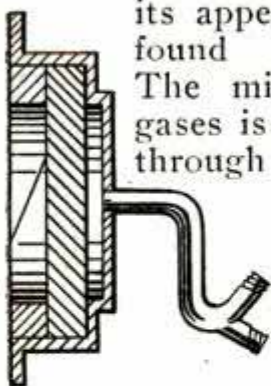
Device for Extracting Motor Cars from Mud Holes

have sunk into mud holes or deep mud, and the car cannot be moved by its own power, is here shown. In using the appliance one end of it is attached to the front of the rear wheel and when the motor is started, the device, which somewhat resembles a large razor strop, is dragged under the wheel. The loose end of the appliance is then carried forward and fastened to a stake in the ground. Upon starting the motor a second time the car is quickly drawn out of the mud and onto solid ground.

June 14-792-4992
FLAMELESS INCANDESCENT

3243 **GAS BURNER**

A gas stove or burner that becomes incandescent but has no flame has made its appearance in Europe and found various applications. The mixture of combustible gases is forced under pressure through a porous, refractory material. When ignited, the gas will burn without flame to a slight depth within this material, thus causing it to become incandescent.



It is a felony for the driver of a motor vehicle to run away from an accident without giving his name, according to a decision rendered in the New York courts.

4928 **WATERPROOFING POWDER**

FROM LILY LEAVES

A waterproofing powder made principally from the leaves of lilies has been invented and is said to be successful as a means of making fabrics of various kinds impervious to water. This invention was suggested by the fact that drops of water or dew are not absorbed by lily leaves, but either evaporate or slide off the leaf, and it occurred to the inventor that the same substance that made the lily leaf waterproof might be used in waterproofing fabrics. In use, the powder from the leaves is mixed with water, and the fabric to be waterproofed is immersed in this mixture.

AIR RIFLE OF HIGH POWER

1143 **HAS SAFETY DEVICE**

This practical, high-power air rifle, which is a take-down model, is provided with a positive safety device that prevents the trigger mechanism from setting the gun off until desired. The



High-Power Air Rifle for Sportsmen

operation of the rifle is comparatively noiseless and all its parts are easily accessible for inspection, repair or other purposes.

APPLYING THE GYROSCOPE

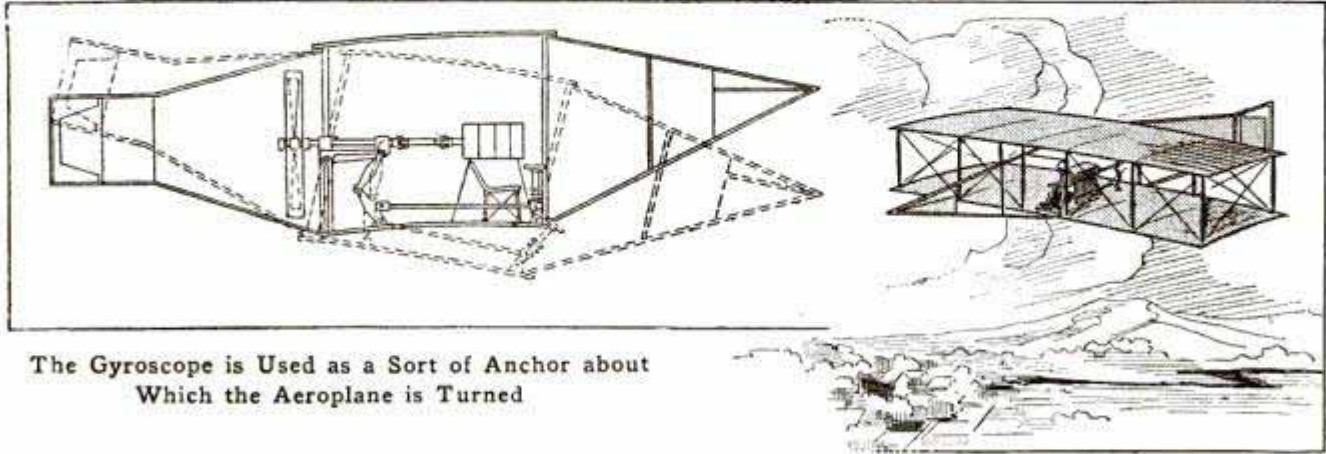
4538 **TO AEROPLANES**

A new device for stabilizing aeroplanes makes direct use of the mechanical force of a gyroscope for holding the aeroplane level or for tilting it up or down, on much the same principle that this instrument is used in stabilizing a ship, and without the intervention of valves or other mechanism for warping the wings. A wheel with a heavy rim, which constitutes the gyroscope, is placed on the shaft with the propeller and is rotated by the same motor as the propeller. The con-

nection is such that if the motor should stop, the gyroscopic wheel is free to rotate independently of the propeller, and will keep on rotating until the force of its momentum is exhausted. The critical feature about this device is that, by means of a flexible shaft and

A NOVEL KIND OF SAFETY
4964 LIFEBOAT

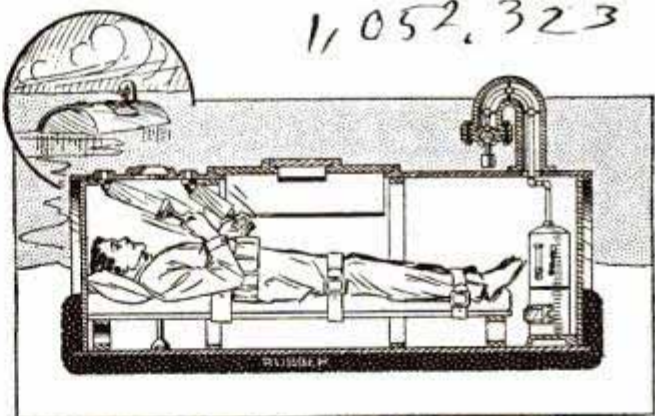
To overcome the dangers and hardships of an open lifeboat, a life-saving vessel has been patented in which a shipwrecked person can drift about un-



The Gyroscope is Used as a Sort of Anchor about Which the Aeroplane is Turned

a system of levers for controlling it, the gyroscope may be used as a sort of anchor about which the aeroplane is turned up or down or is held level as desired, this being made possible by the mechanical tendency of the gyroscope to remain in its original plane of rotation under all conditions. One of the advantages claimed for this device is that it not only stabilizes the machine under ordinary conditions, but furnishes a quick and certain means of turning the machine to a position for volplaning in case the motor stops or momentum is lost from any other cause.

til rescued. It is a cylindrical metal tank just large enough to accommodate one person lying on a couch inside. A water-tight door in the top gives access to the interior and an automatic

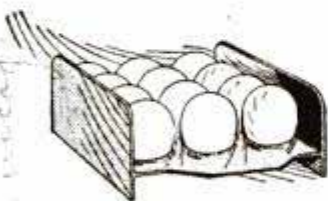


Life-Saving Vessel, Built Like a Cylindrical Tank in Which a Shipwrecked Voyager can Drift About the Sea for Days

SANITARY METAL HOLDER

4906 FOR EGGS

A one-piece enameled-metal egg holder is now being manufactured to be used about the kitchen instead of a bowl or cardboard case. Each holder is large enough for a dozen eggs and as each egg is held in a separate hole the air circulates freely about them. One egg can be removed without disturbing the others, and the high sides protect the eggs when the holder is placed in an icebox.



valve admits fresh air without letting in any water. As the voyager lies strapped to the couch, an alcohol stove at his feet keeps him warm, a glass skylight above his head gives him light, and two pumps near at hand enable him to pump out water or stale air. Food is stored under his couch and a rubber pad on the bottom prevents his craft from being dashed to pieces on the rocks.

(About \$6,000,000 worth of diamonds were shipped from Amsterdam to the United States during the first five months of 1913.

For further particulars of this invention...

1,052,323

3881 STOVE THAT USES HOT-AIR PIPES

The heating stove shown in the illustration in a manner combines the advantages both of the ordinary stove, due to radiation, and of the furnace, due to the circulation of heated air. Air is drawn from the room into pipes on both sides of the stove, is heated to a high temperature, and is then discharged, from the top of the stove, either into the room in which the stove is located or into pipes leading to the upper floor.

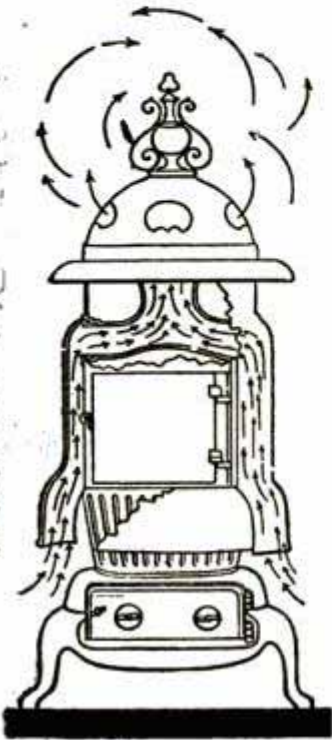


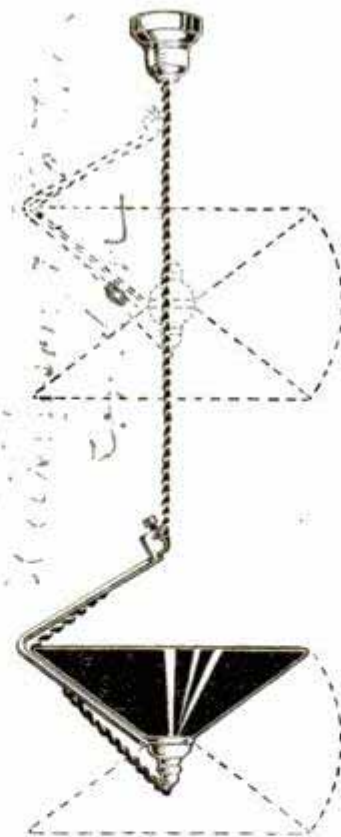
Fig. 8. Tale. H. H. H. H. H.

5036 A STUDY OF FISH BASED ON THEIR SCALES

Year rings on fishes' scales are being used in Norway as an aid in the study of the sardine supply. On every fish scale there is a series of concentric ridges which increase in number as the fish develops, and from these rings it is possible to determine the speed of growth of various kinds of fish. Tables giving the size of fish and the corresponding development of scale rings have been prepared in Norway so that it is possible to tell from a fish scale how old the fish is, whether it has reached complete growth, and when it will spawn. This method has now been adopted also in France.

3574 ADJUSTABLE PENDANT FOR ELECTRIC LAMPS

An improved pendant for electric lamps that may be raised or lowered to any desired degree by simply pressing a spring attached to one end of the device, is being manufactured. The pendant is also arranged so that all the advantages of an indirect light may be had from an ordinary lamp pendant, to which the invention can be attached in a few minutes without any rewiring.



¶The piers of the second largest bridge in Oregon, the

Southern Pacific bridge across Coos Bay, will rest on sand. Test holes sunk 90 ft. failed to strike bedrock, and sand at that depth is considered sufficiently stable.

5107 MAIL CARRIERS FOR SMALL POST OFFICES

The carrier-delivery service in post offices of the second and third class, which was tried on a small scale last year, is to be extended during the coming year. Congress appropriated \$100,000 last year for experiments with one or two mail carriers and one or two deliveries a day in towns that are too small to be eligible for city-delivery service. In the 106 towns in various parts of the country where the service was tried, the results were so satisfactory that Congress has appropriated \$150,000 more for the same purpose. The service was greatly appreciated by post-office patrons and in some cases stimulated the postal business to such an extent that more carriers were needed.

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¶A diploma and \$500 have been offered in England as a prize for a safety kerosene lamp for home use.

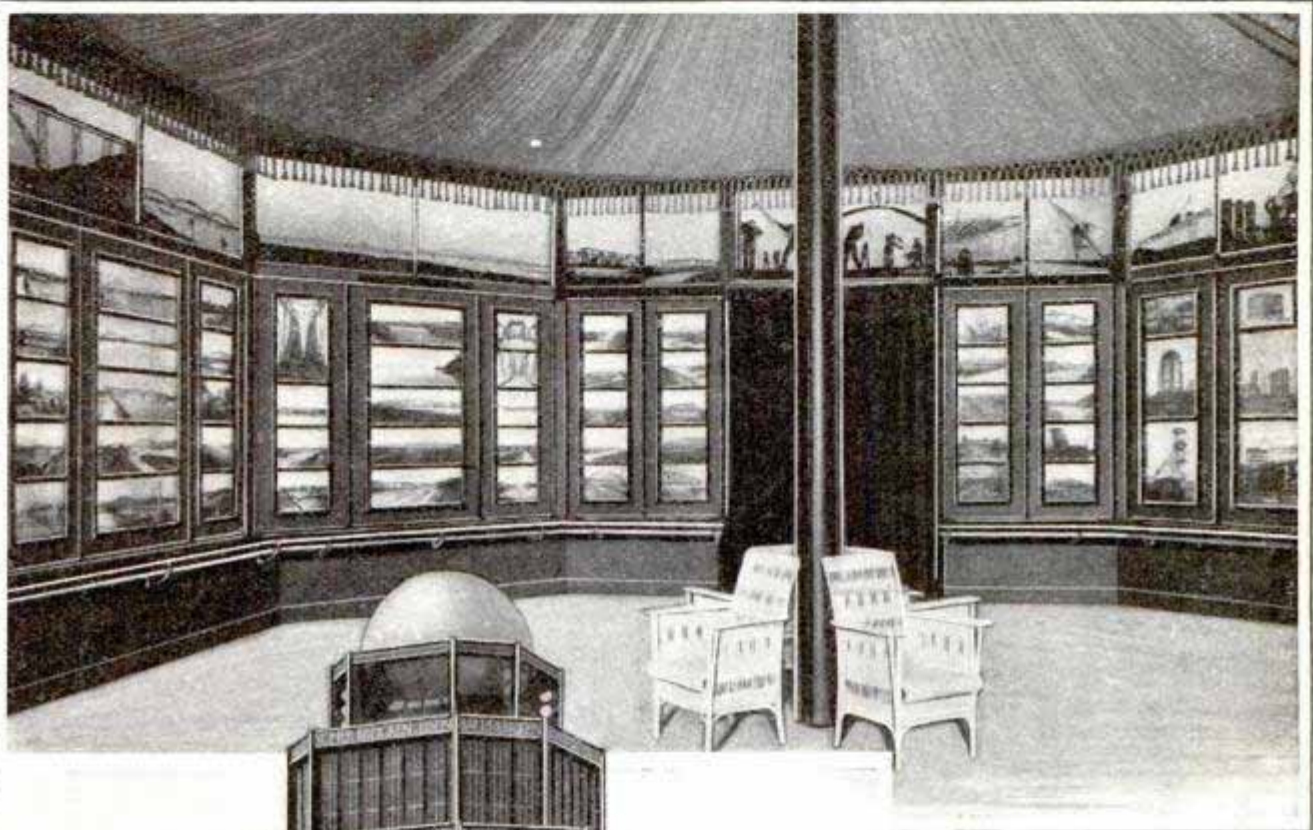
5094

16 West Street, Berlin - Friedenau, Germany

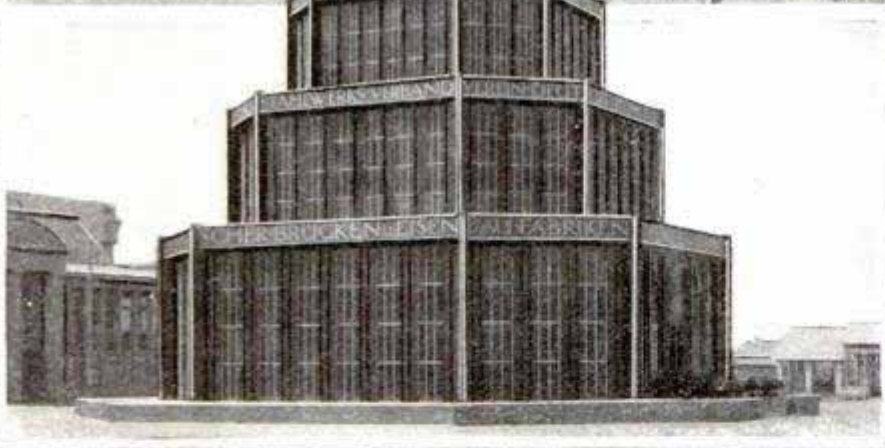
IRON MONUMENT FOR THE IRONWORKERS

A monument of iron was erected at the International Building Exhibition in Leipzig this summer to symbolize the iron and steel industry of Germany. Its builders were the Association of Steelworks and the Society of German

are lined with black, dead-glazed slabs adorned with maxims relating to iron, spelled in gold-enamel letters. Opposite the entrance, a huge carpetlike decoration, in ceramic work, depicts a Bessemer converter at work. An orna-



Diaphany Hall on the Main Floor Decorated with Silhouette Pictures on Frosted Glass



Monument of Iron Symbolizing the German Iron Industry at Leipzig Exhibition: It Is Built of Heavy Girders and Crowned by a 30-Ft. Golden Ball

Bridge and Railway Builders, which, combined, control the entire German iron market. The iron monument is strictly geometrical in design and mainly consists of girders, in the form of a stepped pyramid, about 90 ft. high, crowned by a golden sphere, 30 ft. in diameter. Every line, even in the windows, is intended to express strength and weight. Just inside the main entrance is a large reception vestibule, paved with Skyros marble with rich bronze incrustations. Its walls

mental network of girders, with rich tiles and moldings, forms the ceiling. Adjoining the vestibule is a gallery, 26 ft. wide and 23 ft. high, filled with photographs and diagrams relating to the iron industry. The center of the ground floor is occupied by Diaphany Hall, an octagonal room 34 ft. in diameter. Its walls are covered with large diaphanous pictures and a silhouette frieze in black varnish on frosted glass, illustrating recent iron structures. Above the main floor is a moving-picture gal-

lery with doors leading to the terrace. Its ceiling is supported by eight girders brilliant as silver, and in the center is a convex mirror recalling the golden

sphere above. The hall is 46 ft. in diameter, and its decorations, while rich, are subdued and heavy to typify the massive construction.

APPARATUS FOR ATTACHING 4800 MOTOR-CAR TRAILERS

An apparatus for attaching trailing vehicles to automobiles, invented by

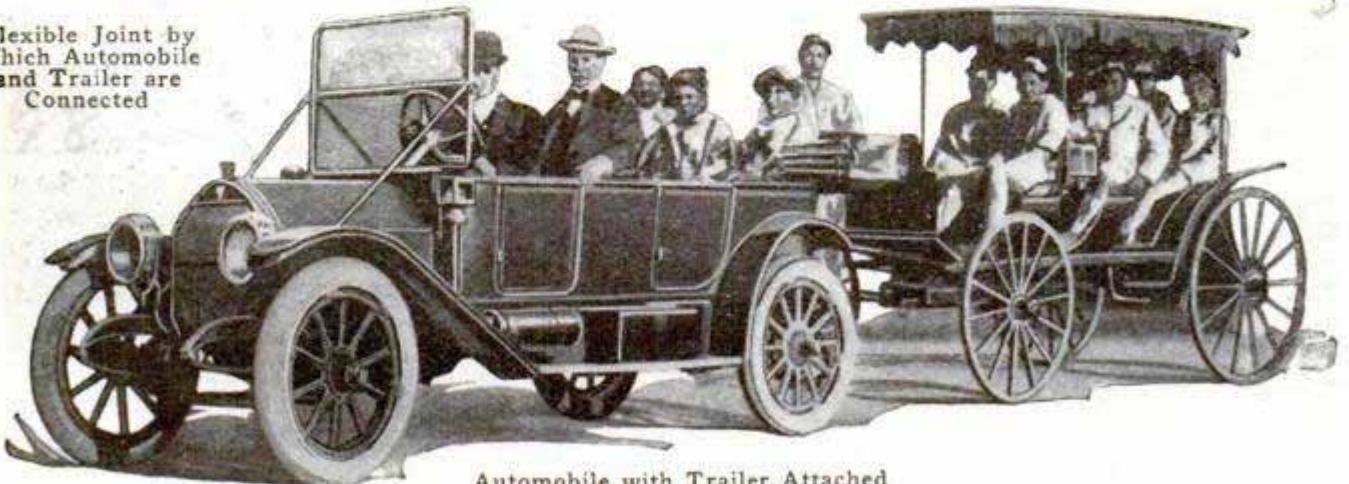


an 18-year-old boy in California, has proved successful in practical tests. This apparatus is simple, consisting of a steel fork, a double-acting spring buffer, and a drawbar with an oscillating joint. One end of the device is attached to the rear axle of the automobile by collar bolts, which can be detached in less than two minutes, while similar collar joints fasten the fork at the other end to the front end of the trailer. The whole device is so flexible that the trailer follows the automobile easily around the sharpest turns. At present this device is used only for hauling picnic parties, but it appears to be adapted as well to the heavier duty of attaching trailers to motor trucks.

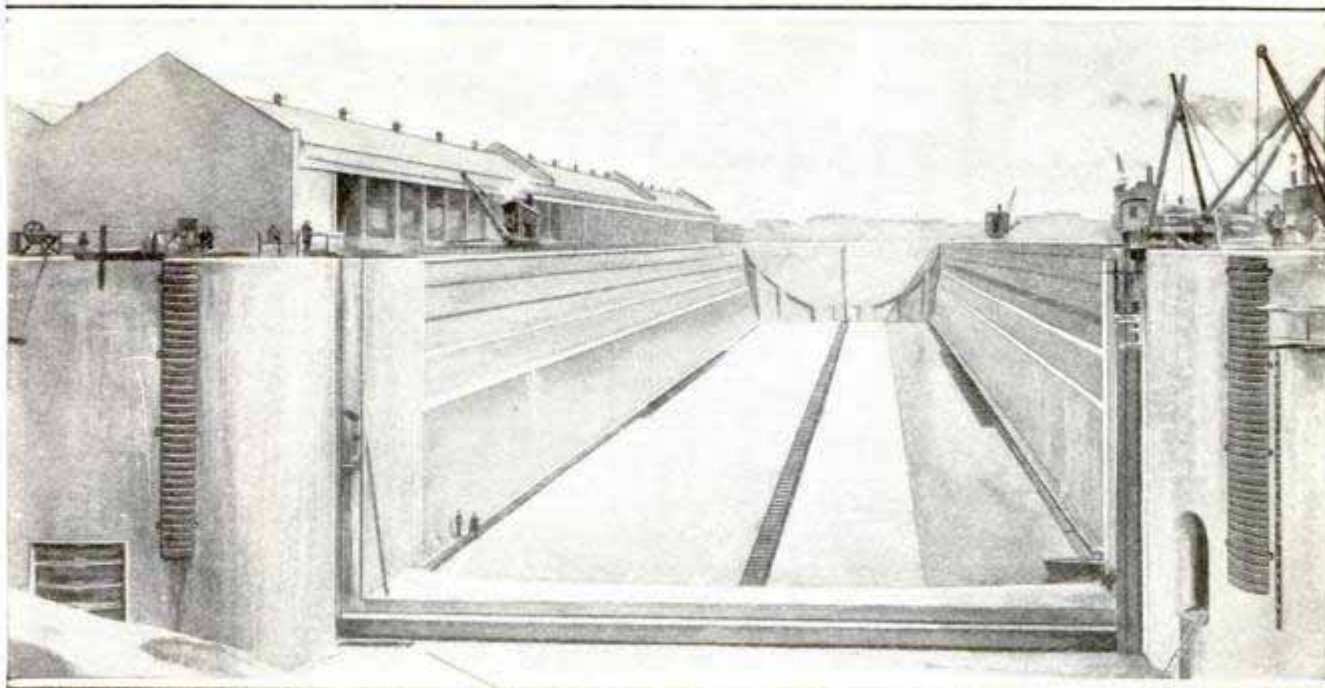
WORLD'S LARGEST DRY DOCK 988 FOR NEW LINERS

The Gladstone Dock at Liverpool, the largest dry dock in the world and the only one that can accommodate the "Imperator," or any of the other new 50,000-ton liners, was completed early this summer. It is a part of Liverpool's \$20,000,000 dock-extension scheme to provide loading and berthing space for five 50,000-ton vessels at the same time. The new dock is 1,020 ft. long and 155 ft. wide at the water line, and is entered through a bell-shaped channel, 400 ft.

Flexible Joint by
Which Automobile
and Trailer are
Connected



Automobile with Trailer Attached



Courtesy The Graphic

The Largest Dry Dock in the World, Recently Completed at Liverpool to Accommodate the New 50,000-Ton Liners

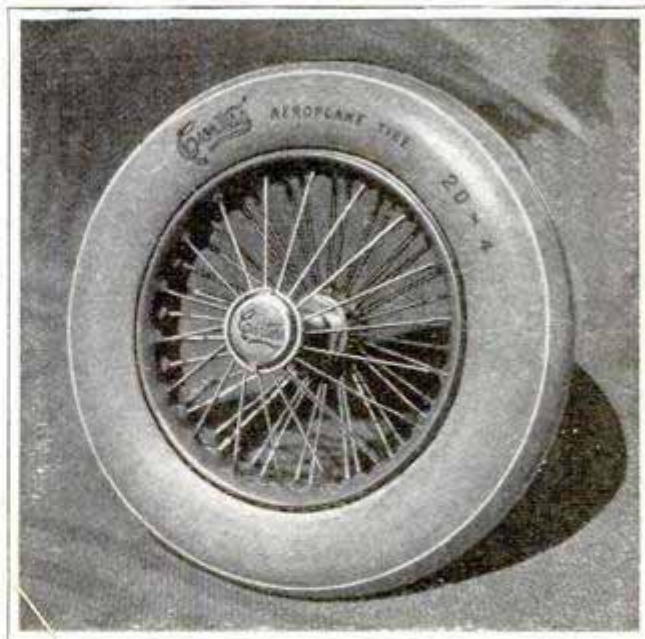
wide, from the river Mersey. When the dock is full, the water stands 45 ft. deep, but the 5,000-hp. pumping plant will empty it in 2½ hours. The caisson, or sliding gate, which closes the entrance, is 132 ft. long, 50 ft. high, 25 ft. wide, and weighs 1,200 tons. It is built of steel girders and plates with greenheart-timber runners to slide on polished granite steps; two 150-hp. electric motors operate the gate. The dock cost \$2,500,000, and two and a half years have been spent in building it. About 1,500,000 cu. yd. of sand and rock were removed from the site. The army of workmen employed received over \$1,000,000 in wages.

EXTRA-STRONG WHEELS FOR
4862 **AEROPLANES**

So many aeroplane wheels have been smashed in difficult landings at high speed or on rough ground, that a heavy-duty wheel and tire especially designed for flying-machine use has appeared on the market. The wheel is 20 in. in diameter and carries a heavy 4-in. pneumatic tire. Three rows of

THIEVES TAKE COVERING OF
5239 **CHURCH SPIRE**

The stealing of a church spire in the German village of Sackheim, near Koenigsberg, Prussia, represents, with the possible exception of the case of the "red-hot stove," the acme of ingenuity in this kind of enterprise. The spire was faced with gilt copper, and scaffolding had been erected for making repairs. Taking advantage of this convenient means of access, thieves stripped off all the copper, carrying off even the weathercock that surmounted the spire.



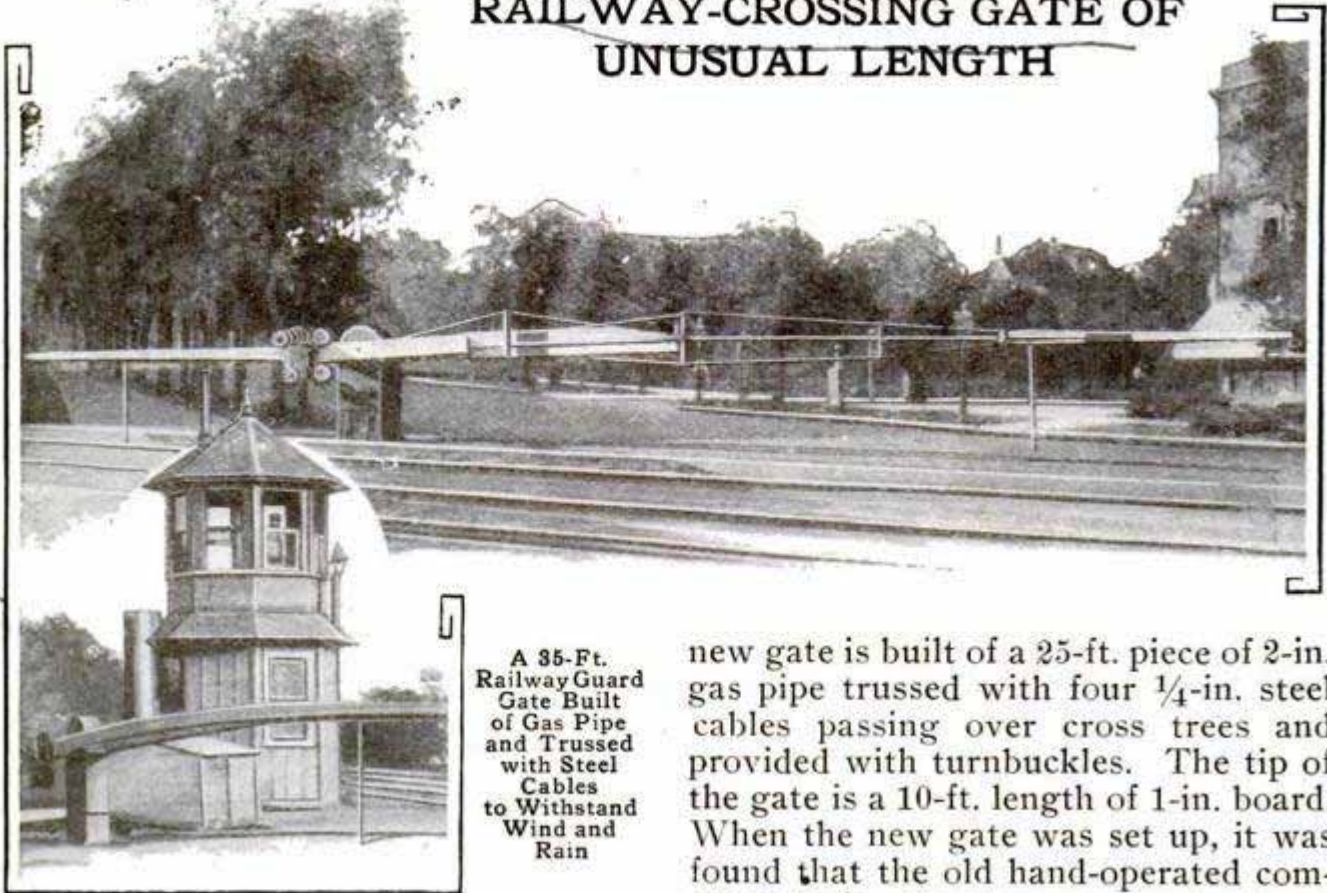
New Heavy-Duty Wheel and Tire for Flying Machines

heavy wire spokes and an extra hub give it great strength. It is designed to be used on a large axle.

*Curtis Aero-Tire
Hammacher Schlemmer*

4634

RAILWAY-CROSSING GATE OF UNUSUAL LENGTH



A 35-Ft. Railway Guard Gate Built of Gas Pipe and Trussed with Steel Cables to Withstand Wind and Rain

A railway guard gate of unusual construction is used to span the 35-ft. central drive of a Chicago boulevard. It was designed after many experiments with wooden gates which showed that any gate built of wood in the usual way was sure to be warped by the rain and snapped off by the first storm. The

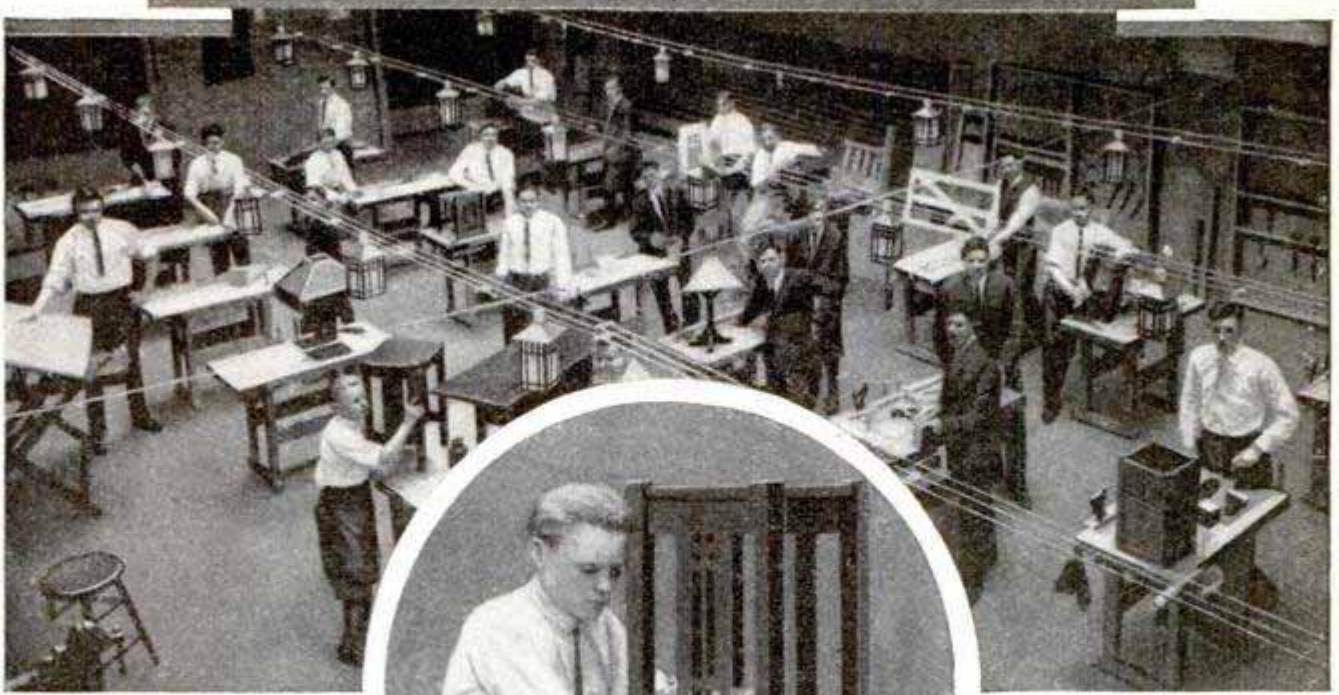
new gate is built of a 25-ft. piece of 2-in. gas pipe trussed with four $\frac{1}{4}$ -in. steel cables passing over cross trees and provided with turnbuckles. The tip of the gate is a 10-ft. length of 1-in. board. When the new gate was set up, it was found that the old hand-operated compressed-air elevator was not strong enough and the pumping apparatus out of an old electric elevated car was installed in the tower house.

Rotterdam, Holland, will have the largest artificial harbor in the world, with an area of 766 acres and a depth of 28 feet.

5165 SELF-SUPPORTING MANUAL-TRAINING SCHOOL

Vocational training took a step in a new direction in Wisconsin last summer through the initiative of the manual-training students in the Waukesha High School. Sixteen of the students organized themselves into a coöperative company and turned the manual-training rooms of the high school into a manufacturing plant during the summer vacation. The plan was originated and carried out by the students under the advisory supervision of the city superintendent of schools. They furnished their own materials and paid rent for the use of the manual-training quarters. Their training thus became not only self-supporting, but yielded a small profit for the students. The

work carried on consisted in building furniture along mission lines, doing odd jobs as carpenters, and taking contracts to build sheds, chicken coops, farm gates, and other small structures. One boy designed a farm gate which has been patented. Their company was organized along businesslike lines, with officers and directors. Certain students acted as bookkeeper, timekeeper, or purchasing agent, and three others were sent out as traveling salesmen. The workers were paid for their time on the basis of the profits of the company and the head of the manual-training department, who acted as shop superintendent, received a salary in proportion.



Manufacturing Plant Organized by the Manual-Training Students in Waukesha High School: The Main Workshop of the Students' Company

An Example of the Work Turned Out by the Shop



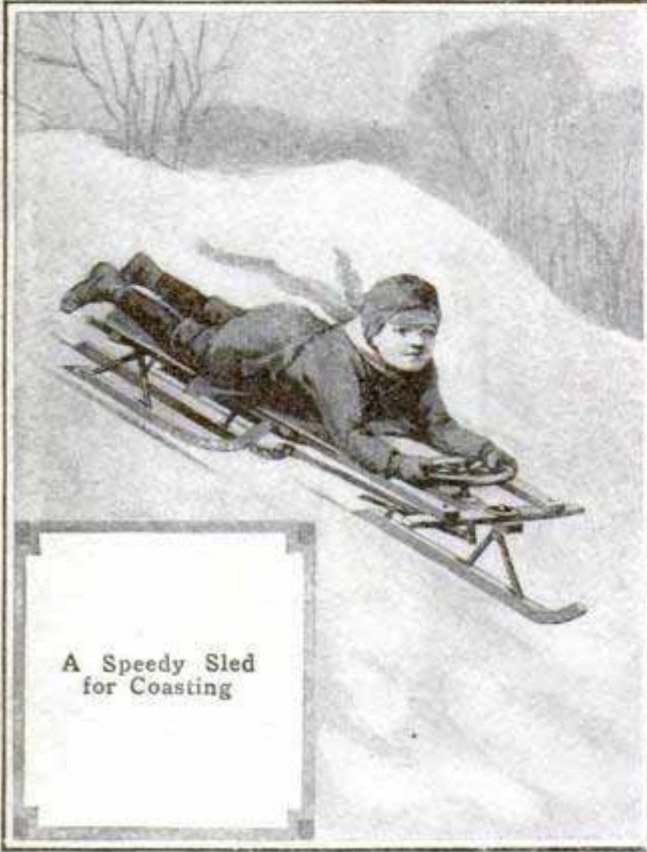
The Kind of Furniture the Students Build

The Outside of Their Manual-Training Quarters



**MONORAIL SLED BALANCED
3555 LIKE BICYCLE**

This new type of sled has a steering wheel for controlling the runner in front of the two main runners, between



A Speedy Sled for Coasting

which is placed an extra runner for the purpose of permitting the sled to glide downhill upon two runners instead of four. By simply pulling the steering wheel toward him the boy depresses the extra runner and the sled glides along upon the front and extra rear runner like a bicycle, thus reducing the friction and enabling the rider to out-distance his rivals upon the old-fashioned types of sleds.

**SOLDIERS TAUGHT TO FLY
4998 IN AUSTRALIA**

Australia is about to establish a military flying school to train her militia officers to become aeroplane pilots. Four flying machines have already been ordered, and two instructors have been appointed; the aerodrome, power house, and workshop of the school will be located about 20 miles from Melbourne. Six militia officers will probably be in

training at the same time and it is expected that six or eight months of continuous work will be necessary to make them competent airmen. After they have received pilot's certificates, four ascents a year will be required to keep up their efficiency. Permanent officers will be trained as mechanics, and a motor truck will be provided to follow the maneuvers with a full equipment of repair parts.

**4979
COAT FOR SURVEYORS HAS
AMPLE POCKET ROOM**

When engaged in surveying or other fieldwork, civil engineers are usually compelled to carry with them a miscellaneous collection of field books, notebooks, and other articles. An enterprising garment manufacturer has now designed a coat that is intended to meet the resulting urgent need for pocket room. The advantages of the various flaps and pockets are apparent to the experienced surveyor. Two pockets on each side are made of the right size and shape for field and notebooks, while two other pockets of such a size as to take almost anything the wearer is likely to carry are placed across the back of the coat. Even the needs of the smoker are fully provided for, there



Coat Provided with Pockets for Note Books and Other Articles Which Surveyors are Compelled to Carry

Courtesy Engineering News

GENERAL UTILITY POCKET EXTENDS CLEAR ACROSS BACK

12" X 12" CROSS SECTION BOOK POCKET

READING GLASS POCKET

TWO EXTENSION POCKETS FOR TRAUTWINE OR FIELD BOOKS

being inside pockets for pipes, tobacco, etc., on both sides of the coat, with a small inside pocket designed for matches.

(5/26/13) Ser. Am. 7/13/13

(5/26/13) Ser. Am. 7/13/13

Original

5040

NEW SHELL EXPLODES GAS IN DIRIGIBLES

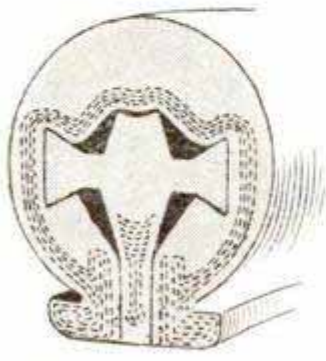
Italy's extensive experiments with guns and projectiles to be used against war dirigibles have developed a new shell, which not only tears a large hole in a balloon but completely destroys it by exploding its gas. Experiments with high-velocity guns fired at captive balloons, towed at a height of 6,000 ft. by torpedo boats going at full speed, have shown that it is not a difficult matter to hit the balloon, if a shell is used which leaves a trail of smoke behind it to assist the gunners in aiming and finding the range. But it has also been found that a balloon is able to escape even after several shots have been fired through it. To destroy the dirigible completely, the new shells are equipped with percussion caps filled with oxygen and platinum-sponge heads that are heated red hot by contact with the balloon's gas. When the projectile enters the balloon, the oxygen in the cap mixes with the hydrogen in the balloon envelope and the mixture is exploded by the red-hot platinum.

McCarthy 7/30/13

3769

PUNCTURELESS TIRE HAS MALTESE-CROSS CORE

An automobile tire having an inner core shaped like the Maltese cross, interlocked with the outer casing, has been brought out recently. There is no pneumatic tube, and the outer shoe is very thick with a fabric foundation. Great resiliency and long-wearing qualities are claimed for the tire which, of course, cannot be deflated through puncture.



LIBRARY TABLE AND BED 4809 COMBINED

A combination library table and folding bed has just appeared on the market. It is a solid, compact piece of



A Combination Folding Bed and Library Table: As It Looks When Used as a Library Table

The Bed Opened Out Is Large Enough for Two Persons

furniture that can be used as a library table during the day-time, without the slightest

suspicion of its other use, and can be opened out into a strong, comfortable bed for two persons at night. When it is folded up it makes a table 50 in. long, 30 in. wide, and 31 in. high, with a broad bookshelf underneath. The springs, which fold up inside of it, open out into a bed 76 in. long, 48 in. wide, and 21 in. above the floor, with the head resting on the table frame and the foot supported by two pairs of light metal legs. There is space inside the folded bed to store its bedding.

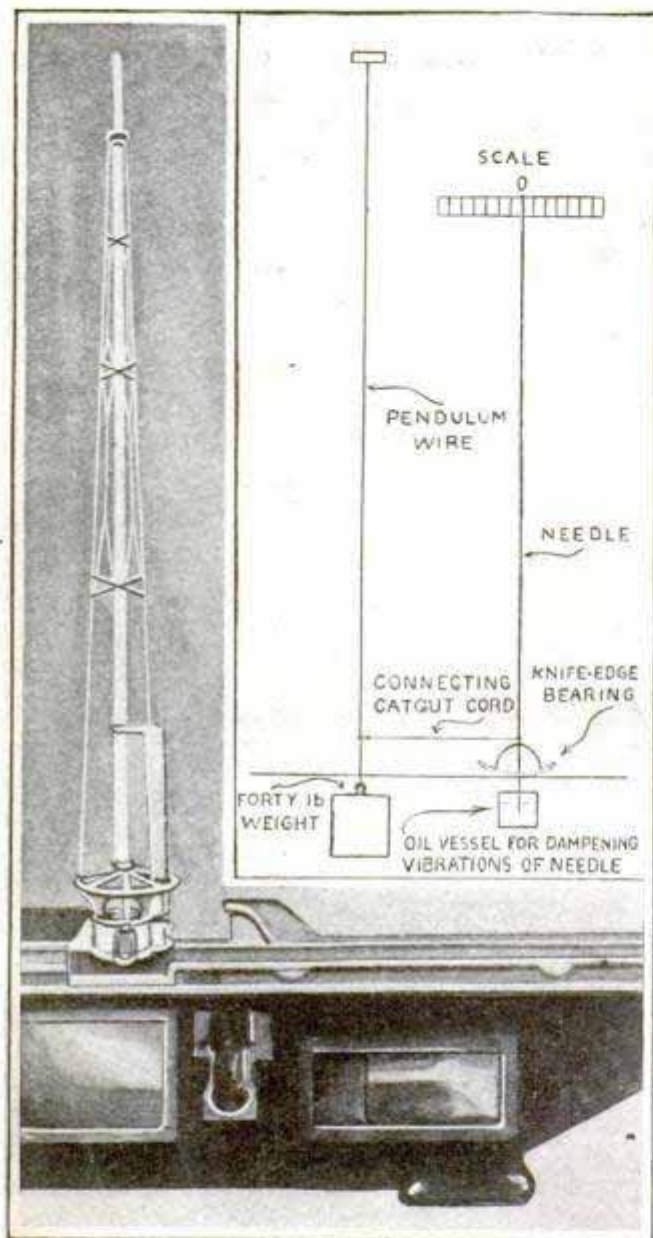
INSTRUMENT FOR TESTING MACHINE BEDS 447

A sensitive instrument for testing the surfaces and grooves of grinding-machine beds, and of other shop machines where great accuracy is necessary, has been invented and is now in practical use. This instrument is known as the pendulometer, and magnifies errors in the machine bed as much as 500 times, so that they are easily read on a scale.

Although the name of this instru-

401 Mc Cormick Bldg. Factory 326 So Clinton St.

ment is somewhat formidable, the device is exceedingly simple in construction and operation. It has an



Pendulometer in Place for Testing the Surface of a Grinding-Machine Bed, and a Diagram Showing How the Movement of the Pendulum is Magnified by Needle

aluminum base, provided with three points of support, and carrying a mast of steel tubing some 10 ft. high, which is securely braced. Each support is provided with a hardened and ground steel plate, accurately surfaced, so that the instrument can be moved over a surface plate, or other part, to test its accuracy. Fastened at the top of the mast is a piece of fine piano wire which passes downward through the tube and has attached to the bottom a lead weight of about 40 lb. This is the pendulum feature.

The indicating parts of the instrument consist of two upright needles which magnify any movement of the pendulum due to inequalities of the surface being tested, and which swing in vertical planes at right angles to each other. Each needle is supported on a delicate knife edge at a level just above that of the top of the weight, and projects vertically upward. A short distance above this support a fine catgut cord connects the needle to the pendulum wire, the needle being delicately weighted so that it will swing away from the pendulum except as it is held by the cord. By this arrangement the top of the needle swings in the same direction as the pendulum, and serves to register its deflections. The top of the needle is shaped to a fine point which swings along a graduated scale, and in this way any deflection of the pendulum is read. The distance from the support to the point where the cord is attached is $\frac{1}{50}$ of the total length of the needle, so that any movement of the pendulum, as indicated by the needle, is magnified 50 times. The pendulum, being 10 ft. high and being supported on a base about 1 ft. wide, magnifies inequalities in the surface being tested about 10 times, making a total magnification of about 500 times. In other words, if one of the bearings of the instrument is raised $\frac{1}{1,000}$ in., the needle point will make a distance of $\frac{1}{2}$ inch.

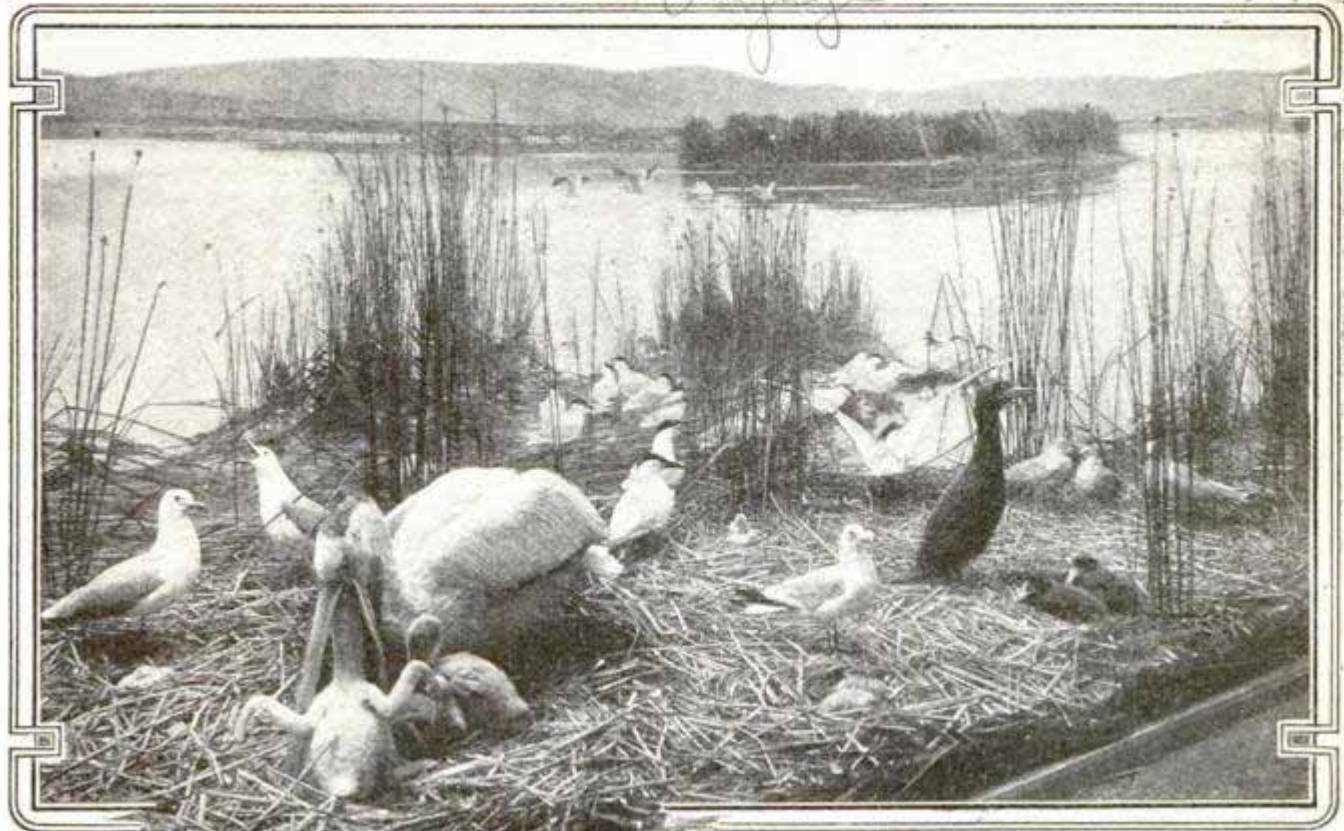
In practice, the pendulometer is used for making selected points on a surface true, and intermediate points are then tested with a straightedge laid between these points.

PARIS BANS THE GASOLINE 5251 AUTOMOBILE

The gasoline automobile has received its first setback in the city which was first to welcome it. Paris has forbidden the appearance of gasoline cars of any kind on its most fashionable drive, the Avenue des Accacias, leading to the Bois de Boulogne, between the hours of eleven and one.

SAVING NATIVE BIRDS ON RESERVATIONS

4752



Habitat Bird Group Reproducing the Life of the White Pelican, Caspian Tern and Cormorant on the National Bird Reservation at Klamath Lake, between California and Oregon

Photo by American Museum, New York

Since the setting aside of Pelican Island, Florida, as a national bird reservation in 1903, to protect the brown pelicans and other nongame birds nesting on the island, the saving of native birds has developed into a country-wide movement.

There are now 61 bird reservations in the United States, scattered through 19 states and territories, from Florida and Porto Rico to Alaska and the Hawaiian Islands. They are divided into six districts, each under an inspector aided by wardens. Most of the bird refuges are small, sandy, marshy, or rocky islands, of little agricultural value and attractive to birds because of their isolation. Another type of reservation, which has been established on the reclamation projects of the West, consists of a narrow strip of land bordering on the reservoir to afford a resting place for birds traveling north or south. One-third of the bird refuges belong to this class. In most cases the chief protection is provided by the isolation of the refuge—some of them

are almost inaccessible. But in other instances wardens have been appointed, provided with motorboats, and in some far-away reservations naval tugs and revenue cutters take a hand in repulsing plumage hunters. The birds that are protected are chiefly marsh birds or waterfowl which nest in colonies: gulls, terns, pelicans, herons, grebes, petrels, auklets, and, in the Hawaiian



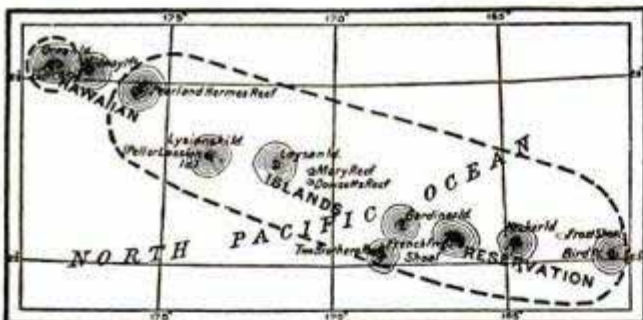
Map Showing the Districts for Regulating the National Bird Reservations. The Alaskan and Hawaiian Districts are Not Shown

Islands, albatrosses, shearwaters, etc. The reservations afford protection not only to feathered inhabitants, but to



Aleutian Islands Reservation, Alaska, Which Protects Reindeer and Fur-Bearing Animals as Well as Birds

native animals, especially water mammals, as well: seals, porpoises, and even buffalo, deer, and larger game. While preventing the extinction of rare native birds, the safety of the refuges is taming them so that their habits can be studied and recorded. As a result much of the bird life on the national reserva-



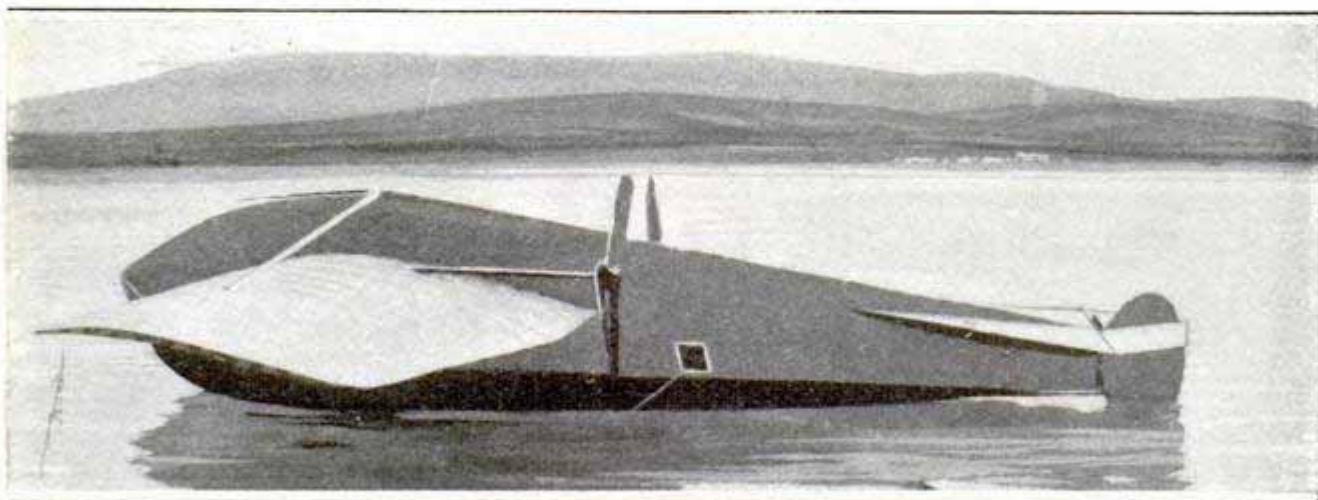
Hawaiian Islands Reservation for the Protection of Birds: It Includes the Reefs and Islands Embraced by the Broken Lines

tions is being reproduced in permanent bird-habitat groups in the American Museum of Natural History, New York.

Hydro-airplane
FLYING BOAT WITH FISHLIKE BODY

5730

Low head resistance is the chief characteristic of the new Gallaudet flying boat which has just been completed. Its body is built in the form of a fish with streamline wings and two propellers, mounted close to the body just back of the wings. The hull is built of $\frac{1}{4}$ to $\frac{5}{16}$ -in. three-ply mahogany, strengthened with steel tubing and divided into 30 water-tight compartments. Above the deck, the body is built of ash ribs and battens covered with varnished linen. One long tubular steel spar, stretching through the body from tip to tip and braced by three stays, supports the two wings. Power is supplied by a 50-hp. Gnome engine. The roomy cockpit has seats for a pilot and one passenger behind him. The flying boat's dimensions are:



Courtesy Flying

New Gallaudet Flying Boat with Fish-Form Body and Streamline Wings to Reduce Head Resistance

Spread, 36 ft.; length, 27 ft.; wing surface, 234 sq. ft.; beam of boat, 4 ft., and draft at 1,500-lb. displacement, 12 inches.

SILENCER FOR THE NOISY

8256 TYPEWRITER

The noisy clicking of the typewriter will soon be no more than a disagreeable memory, if the typewriter silencer which a Cleveland man has just invented proves a success. It does not make the typewriter absolutely silent, but it reduces the sharp click to a soft, dull thud which is not so hard on the nerves. The noise is so much reduced that an operator can receive dictation given in a natural tone of voice while the machine is running. The silencer consists of a core for the platen which eliminates the greater part of the noise made by the type striking the paper.

MAKING HYDROGEN PEROXIDE

4994 OUT OF WATER

Water is converted into hydrogen peroxide without any consumption of chemicals by a new continuous-cycle process which has been patented by two German chemists. It consists simply in oxidizing water by means of chemicals which, after having given up part of their oxygen, are easily regenerated for continued use. The old method results in a waste of chemicals through the formation of by-products, and the yield is never more than a 20-per-cent solution. In the new process, on the other hand, up to 30-per-cent solutions of hydrogen peroxide are produced with practically no loss.

DANISH FOUNTAIN OF THE

4722 DANCING GIRLS

A fountain in honor of the Royal Danish Ballet, called "The Well of the Dancing Girls," is one of the recent monuments set up in Copenhagen. It was designed by the sculptor Rudolf Tegner, and stands in the gardens of

Rosenborg Castle. Three dancing girls, in bronze, thinly draped and hold-



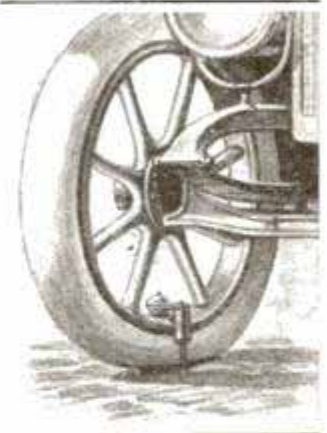
"The Well of the Dancing Girls" Erected in Copenhagen in Honor of the Royal Danish Ballet

ing hands, are shown dancing about the brim of a large bronze fountain bowl.

DEVICE FOR DETECTING

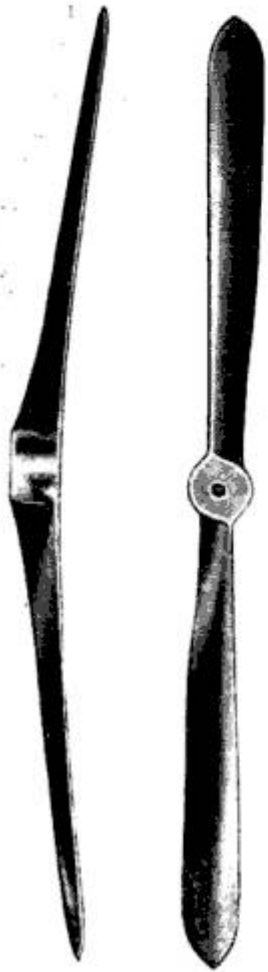
SLACK TIRES 5097

One of the latest features in automobile equipment is a device for detecting imperfect inflation of tires. This consists of a U-shaped strip of metal, the ends of which form plungers for striking a small bell when the tire is loose, the whole device being placed over the tire as shown in the illustration. As long as the tire is fully inflated the device is held rigidly, but as soon as leakage occurs the tire flattens under the weight of the car and the plunger is forced against the bell, causing a distinct sound which is repeated at each revolution of the wheel.



AEROPLANE PROPELLER OF

4472 NOVEL SHAPE



A propeller blade of a novel shape has been developed recently and is being used extensively on German airships and aeroplanes. When viewed from the front this blade is seen to be extremely narrow, but does not appear to be unusual in any other particular. But when looked at edgewise the tips of the blade are seen to have a distinct forward trend or curve, as shown in the illustration. This is the distinguishing feature of the blade. When revolving at full speed the centrifugal force of the blade tends to straighten out the curve at the tip, which, it appears, not only adds to its efficiency, but makes it less likely to be broken by the strain crosswise of the grain of the wood.

4981 MODERN GLOBES FOR THE BUSINESS MAN

To keep pace with the increasing importance of geography in commercial matters, many interesting globes and charts are appearing, intended especially for the business man. As rapid transportation has reduced the distance between various parts of the earth, business men's markets now embrace almost every part of the world. And the modern globe is designed, not so much for the theoretical geographer, as for the business man. One interesting globe, invented by an American railroad man, but manufactured in Germany, is almost a complete commercial geography in itself. It gives not only

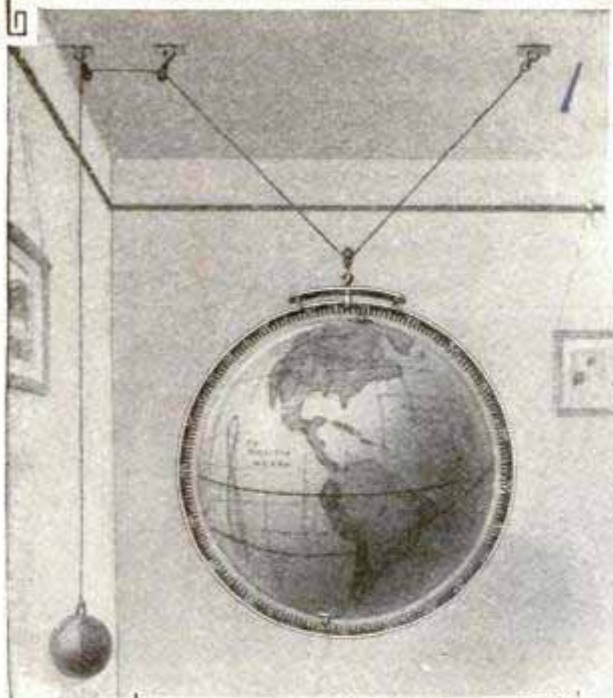
the outlines of the various continents, but all the steamship routes, all the sailing routes, all the railroads, all the cables and telegraph lines, and the location of all German consulates. Fourteen different kinds of lines are used to indicate the nationality of the ships sailing various routes. The various dry docks, repair yards, coaling stations, and their capacities are all indicated. Figures on the globe give ocean depths, and enlarged maps, laid out on the broad ocean spaces, show the details of important cities and harbors. Other marks indicate the presence of more or less frequent earthquakes, tidal waves, ocean currents, trade winds. The population of every nation is stamped upon it and heavy meridians follow the changes in time around the world. A movable brass strip, marked in miles and kilometers, is supplied with the globe for determining the great-circle routes between various ports.

Another interesting globe is made in relief to indicate the varying altitudes in different parts of the world. It shows not only the topography of the land but the depth of the ocean bottom, with its shelves and reefs, as far as they are known. For greater clearness the vertical relief is exaggerated to a scale of 16 to 1.

An ingenious sidereal globe is built in connection with a clock so that it makes a revolution a day. A scale around the equator provides means to determine the time at other points in the world corresponding to the time shown by the clock. The globe's axis is tilted to illustrate the changes in seasons and a rotating brass disk gives the date and month. For school purposes, a globe is now provided with pulleys so that it can be hung from the ceiling to give the impression of the earth's position in space.

¶The oldest and slowest ship in the world, the "Anita S.," built in 1548, was recently broken up in the Canary Islands. She was practically a duplicate of Columbus' caravel "Santa Maria."

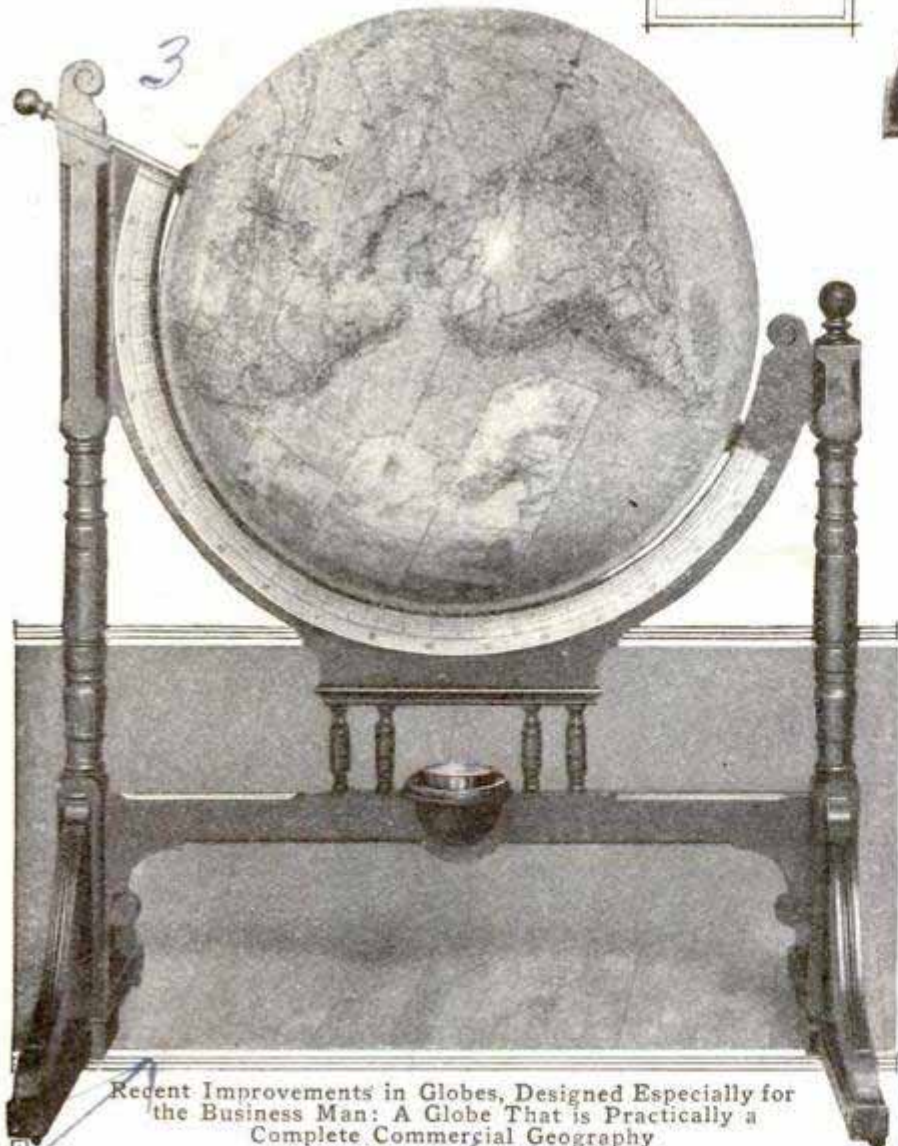
Chicago



Hanging Globe for Illustrating the Earth's Position in Space



Relief Globe Showing Land Elevations and Ocean Depths



Recent Improvements in Globes, Designed Especially for the Business Man: A Globe That is Practically a Complete Commercial Geography



Sidereal Globe Which Indicates the Time in Various Parts of the World

Mr. John Die & Sons
817 W. Madison St.
Chicago

Samuel Hill
Put them on

BUILDS DYNAMITE-STORAGE HOUSE IN LAKE

5048

As a matter of safety, as well as for complying with the Chicago city ordinance limiting the quantity of ex-

AMERICA'S GUNS FOR AERIAL DEFENSE

5109

All American field guns in the future will be equipped for firing at aeroplanes and other kinds of aerial attack. Other nations are developing special guns for this kind of defense, but the Ordnance Department has decided that a better policy will be to modify all its guns and carriages. Experiments with the Deport gun, which has a split trail and recoil system, indicate that a slight modification of its carriage fits it for firing at an angle of 45 deg., and that a new type of gun and carriage can be developed from it which can be used for an angle of 90 deg. Some modifications in the gun itself will have to be made also. It will be



Storage House in Which Dynamite is Kept at Safe Distance Off Shore

plosive that can be kept within the city limits, one contractor has erected a storage house in Lake Michigan, several hundred feet from the shore, in which his supply of dynamite is kept. Ordinarily, the explosive is transferred to the shore, as needed, in boats, but when the water is too rough for this method of transfer, the suspension footbridge shown in the illustration is used.

given a greater horizontal range and will be mounted in such a way that it can be fired at a greater angle laterally than at present, without moving the carriage.

NEW SCHOOLHOUSES OF SOLID CONCRETE

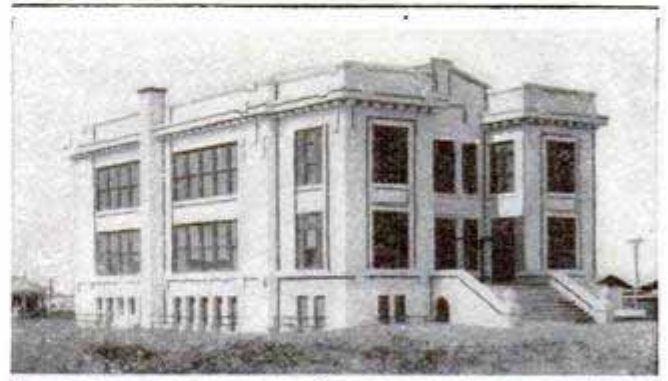
5212

A new type of school building has been adopted in El Paso, Texas. The new schoolhouses are built of solid concrete and have large windows of

LARGE WATER-POWER PLANT IN ICELAND

5110

Dettifalls, the largest waterfall in Iceland, has been purchased by an English company for the development of power to be used in the manufacture of fertilizer. It is 35 miles from the coast in the River Jökulsa, which flows across northern Iceland and empties into the Arctic Ocean. The company will build a railway from the coast and erect a 400,000-hp. plant at the falls.



One of the New Solid-Concrete Schoolhouses Recently Built in El Paso, Tex.

Vertical text on the left margin: "Nitrogen Products & Cartridge Co." and "Chicago".

Vertical text on the left margin: "Chicago".

opalescent glass. The walls are very white, the roofs are flat, and the general design gives the buildings a monumental appearance. The raising of the main floor a half story above the ground gives the buildings the floor space of three stories with the main entrance on the second floor.

HOODS WORN BY JAPANESE PRISONERS

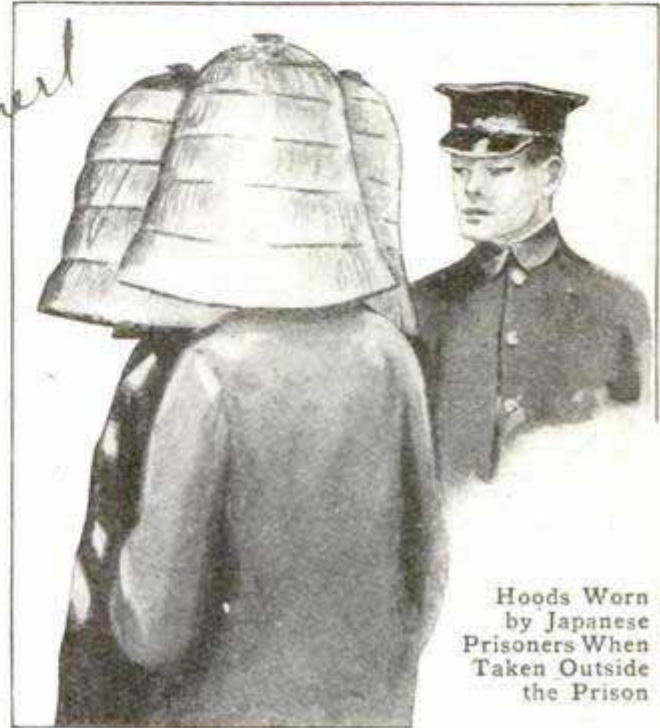
4519

An ancient and somewhat barbarous custom that still prevails in Japan is that of compelling prisoners to wear basketlike hoods when taken from the

AN UNDERWATER TELEPHONE FOR DIVERS

By carrying on a telephone conversation from the bottom of the Hudson River, an inventor recently demonstrated the practicability of his telephone apparatus for divers—the first telephone ever used in a diving outfit. With two receivers inside the helmet, fitted over his ears like earmuffs, and a transmitter in front of his mouth, he lay on the bottom of the river, 40 ft. under water, and carried on a conversation for 20 minutes with his helper on the pier. He is designing a telephone cable which will take the place of the old rope life line.

Amsterdam, with over half a million inhabitants, had a death rate of 10.94 per thousand in 1912, the lowest among the large cities of the world.



Hoods Worn by Japanese Prisoners When Taken Outside the Prison

prison for any reason. The prisoners shown in the illustration are being taken to court to be tried on a charge of setting fire to police stations.

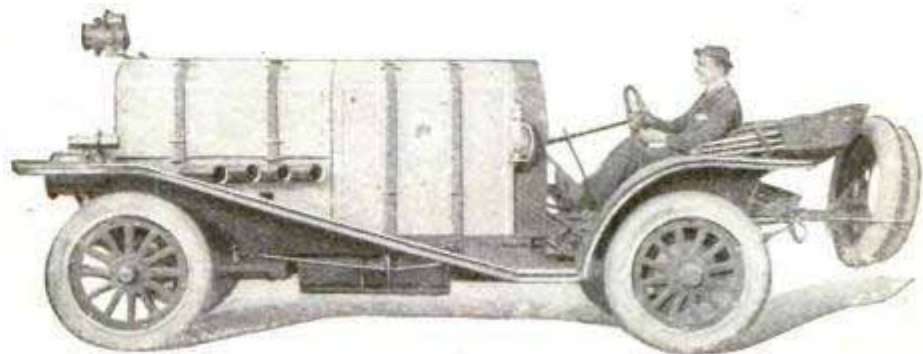
A RACING AUTOMOBILE "MONSTROSITY"

721

A racing automobile with a hood so large that it is impossible to see the roadway over it has been designed and built by a speed enthusiast of Canton, Ohio. The top of the hood has a height of 5 ft. 8 in. above the ground and is 7½ ft. long. The steering post is so long, due to the unusual length of the hood, that a universal knuckle is required. The only direct view of the road the driver can obtain is to the front along one side, but, by means of a system of mirrors, he re-

ceives a view of all the road in front, as well as a view behind.

Within the monster hood is a specially designed 90-hp. engine which, the owner believes, will make a speed of 137 miles an hour possible.



A 90-Hp. Racing Automobile with a Hood so Large That It Is Impossible to See the Road over It

L. P. Blackiston

from S. H. Swearingen

41
See page 8/12/13

6/10/13



"The Best Lighted Building in the World," So-Called, and Its Reflection in a Show Window

PENNY-IN-THE-SLOT TICKET MACHINES

4355

Automatic machines for the issuing of platform tickets have been installed

in a London railroad station, and persons desirous of seeing their friends off in the trains are required to place a penny in the slot and obtain a ticket before they are allowed to pass the barrier. The people call them "Good-bye Tickets."



To reduce the danger to pedestrians and to other vehicles when one motor car is towing another, it is proposed to require the forward car to carry signals, as is done by boats, to indicate that another car

is following not under its own power.

LIGHT EFFECTS CAUGHT BY A CAMERA

4825

Some remarkable light effects are shown in the accompanying photograph of what is frequently spoken of as "the best lighted building in the world" and its reflection in large show windows. The picture was taken during a light rain at 10:30 p. m. with the camera standing under an awning. The double image in the show windows is probably due to reflections from the inner and outer surfaces of the plate glass, and the distortion probably resulted from the vibration of the glass caused by passing cars. The streaks of light in the middle of the street were made by the headlights of passing trolley cars. The building is the Denver Gas and Electric Building and 13,000 incandescent lights, aggregating 200,000 cp., are used in the illumination.

NEW WIRELESS STATION USES EIGHT TONES

5232

A new wireless station established on the Island of Caterina, on the coast of Brazil, is equipped with the alternating "vielton" system and is intended to provide communication with the shipping to Buenos Aires, La Plata and Cape Horn, and with neighboring land stations. Ranges of between 600

*The Fleet Agency
152 Fleet St.
London, E.C. 4, Eng.*

*H. K. Stout
117 So. Logan St.
Denver, Colo.*

Electrical Review

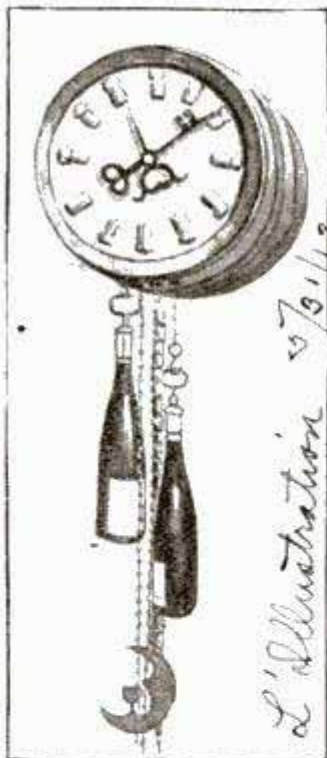
and 700 miles have already been attained and regular communication has been established with Rio de Janeiro. The station differs essentially from most wireless stations in being able to make use of eight different tones in close succession without resort to any complicated arrangement. The apparatus which effects the tone variation is like a piano keyboard, the tones being produced by pressure on the different keys. The command of a number of tones is of great importance in South America on account of atmospheric disturbances, and this station is expected to possess great advantages over stations having command of only one tone.

Illustration

CLOCK CARRIES EMBLEMS OF WINE INDUSTRY 4740

A clock in which each visible feature is an emblem of the wine industry was one of the gifts received by Kaiser

Wilhelm's daughter at her marriage recently. This curious gift was presented by the City of Hamelin, celebrated as the home of the legendary Pied Piper, and the center of an important wine-producing district. The hands of this clock are peculiarly shaped corkscrews, the weights are wine bottles, and the pendulum is composed of



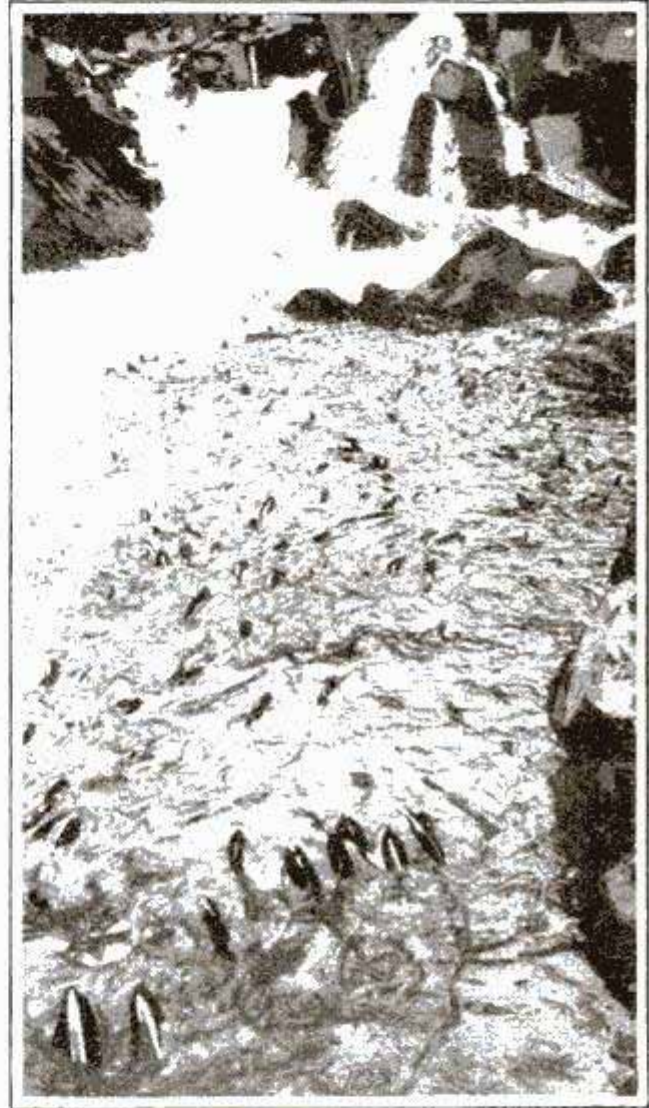
L'illustration 7/3/18

Courtesy L'illustration

corks strung on a rod and carrying a pendulum bob representing the man in the moon with a wine glass. The case consists of half a small keg, the end of which forms the dial. The hour numbers are painted on small raised figures representing champagne corks.

SALMON RUNNING UP AN ALASKAN CREEK 4873

Salmon are so numerous in the little creek shown in the accompanying photograph, that a man could almost walk



*C. P. Tickle
Ketchikan, Alaska*

A Small Alaskan Stream Congested with Salmon Running Upstream to Spawn

across the stream on their backs. It is a small creek near Ketchikan, Alaska, and the salmon, thousands of them, are running upstream to spawn. At this particular spot they are rather congested because the waterfall ahead impedes their progress; jumping from level to level in the falls is slower work than swimming in the swiftly flowing stream. After spawning, the salmon die and are washed back down the creek into the sea.

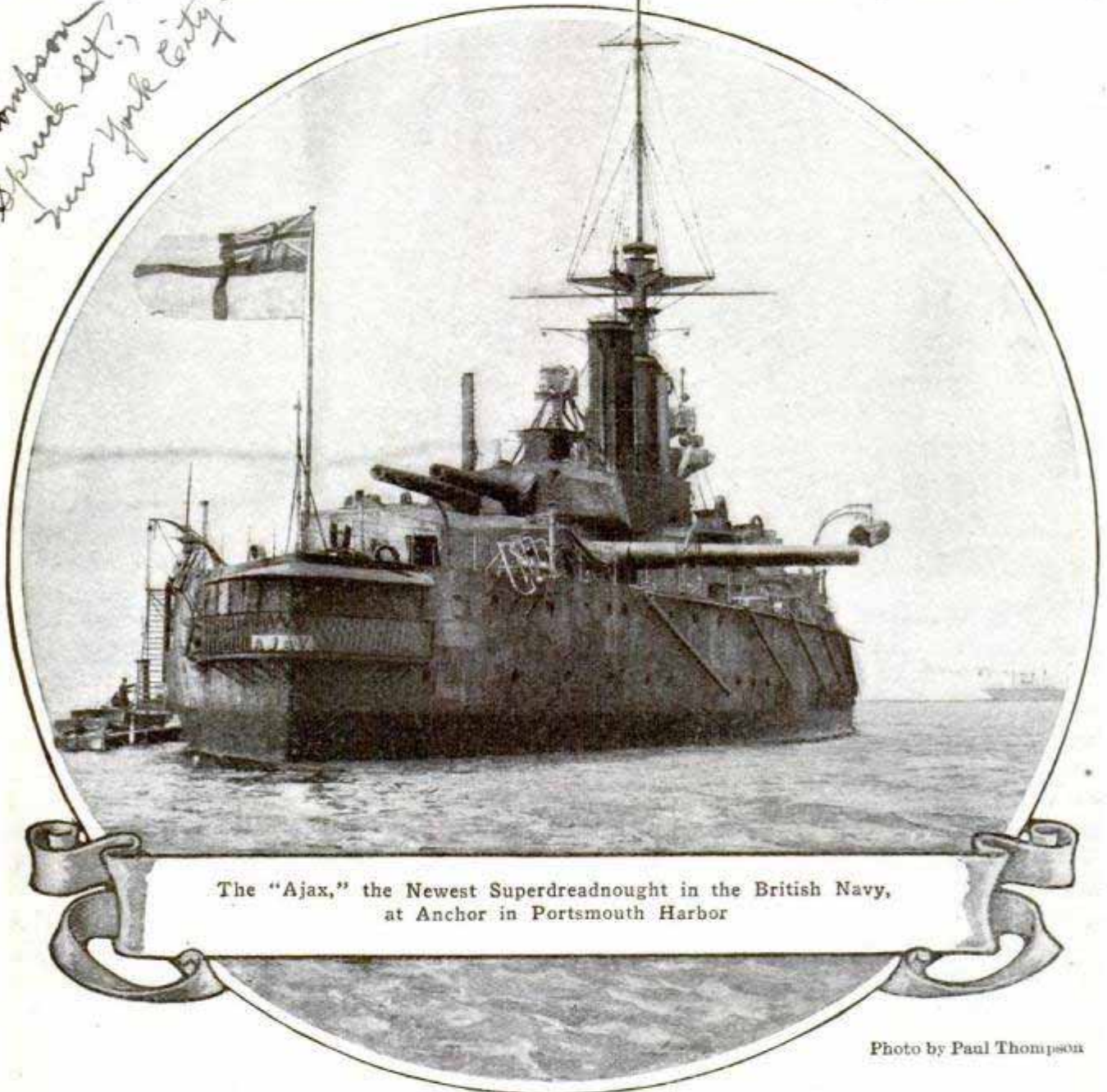
Ⓒ No aeroplanes will be allowed to fly over the Canal Zone without written permission from Washington.

**NEW SUPERDREADNOUGHT
IN BRITISH NAVY**

4953
England's latest superdreadnought, the "Ajax," is shown in the accompanying photograph lying at anchor after her arrival at Portsmouth. She is not the largest superdreadnought, for both England and the United States

**BALEARIC ISLANDS NOTED
FOR MESH PURSES**

5017
The making of silver and gold mesh bags and purses is an industry peculiar to the Balearic Islands. The 12 factories on the islands of Majorca and Minorca not only supply the home demand, but export to France,



have larger battleships. Her displacement is 23,600 tons and her 31,000-hp. engines enable her to make a speed of 21 knots (24.18 miles an hour). Ten 13½-in. guns, in five turrets, and sixteen 4-in. guns make up her armament.

ⒸAbout 56,000,000 tons of steel rails are now in use in the United States.

America and other countries. Formerly the purses were made by women in small establishments in the country towns and the gold and silver wire and mountings were imported from France, but now the entire process is carried on in the islands, mainly in factories. The annual output is valued at about \$180,000.

THE ART OF MODERN TAXIDERMY

By HENRY L. WARD

Director of the Milwaukee Public Museum

4223

To most people the word "taxidermy" conveys the idea of stuffing the salted skin of an animal, and very little else. This method, however, has been entirely supplanted in modern museum practice. The mounted animals seen in up-to-date museums are hollow papier-mâché forms, covered with the thin-shaved skins of the animals, but so carefully molded and modeled as to convey the impression of life and action.

The mounting of a large mammal group may be taken as exhibiting the modern methods of taxidermic procedure. We will presume that the taxidermist has gone to the Pacific coast to obtain specimens and material for a group of sea lions; for, of course, having seen these animals in their native haunts, having measured and skinned them himself, he is much better prepared to reproduce a lifelike group than if he lacked this intimate, personal knowledge of the species. Having found a good workable rookery, he makes photographs of the herd and of the locality in general that will serve for guides in painting the panoramic background that the group will probably require. Other photographs will show smaller numbers or individual animals at closer range and with more recognizable details such as are required in modeling. Sketches and notes will supplement these photographs and permanently register his observations. When a sea lion is killed for preparation careful measurements are taken before it is skinned so that the exact location of the main anatomical features can be determined with certainty in the model to be later constructed. These measurements are taken as carefully as a tailor measures a man for a suit. They include length of head and body, distances between various recognizable points on the skin, circumferences of head, neck, body, and flippers at various points, sundry diameters, etc. The animal is then skinned, the

necessary cuts being made where they will be most hidden when the skin is mounted, and the skin is freed from blubber and thoroughly salted for transportation.

The requisite specimens having been prepared, samples of rock and any other characteristic features of the rookery are collected for exact reproduction in the laboratory.

If convenient, it would be desirable to make a sketch model in clay of the proposed group and color sketches of the locality, on the spot, and in the presence of the live sea lions; but it is seldom feasible to do this and, therefore, the taxidermist should take back with him detailed records that will leave little to the uncertainties of memory in working up the group.

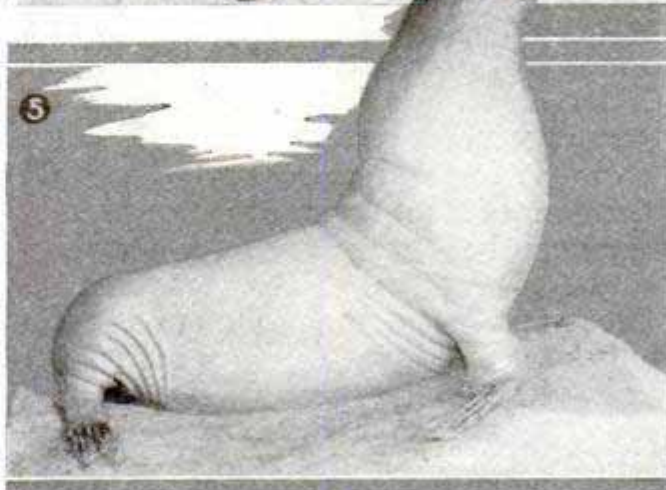
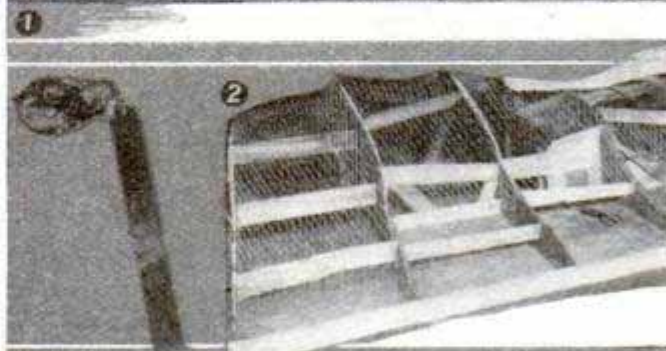
Back in his laboratory, the taxidermist proceeds to compose the group; making a small scale model in plastic composition which shows the relative placement and attitude of each individual upon the rocks of the rookery, all with sufficient accuracy of detail that the effect of the finished, large group may be seen and all needed adjustments made before the latter is begun. The rock work on which the animals are to stand is then built up in sections: a light framework of wood covered with wire netting and surfaced with papier-mâché.

The skeletons of the limbs, and the skull are then fastened to a wooden frame, so that each occupies its correct position according to the measurements taken in the field. This is accommodated to the surface of the rock section upon which it is to stand, and the rough, approximate contour of the animal obtained by the use of wire netting, stiffened and held in place with stucco or plaster of Paris. Upon this foundation the taxidermist proceeds to build up, in potter's clay, an exact reproduction of the animal as it would appear in the flesh, but making allowance for the modifying effect of

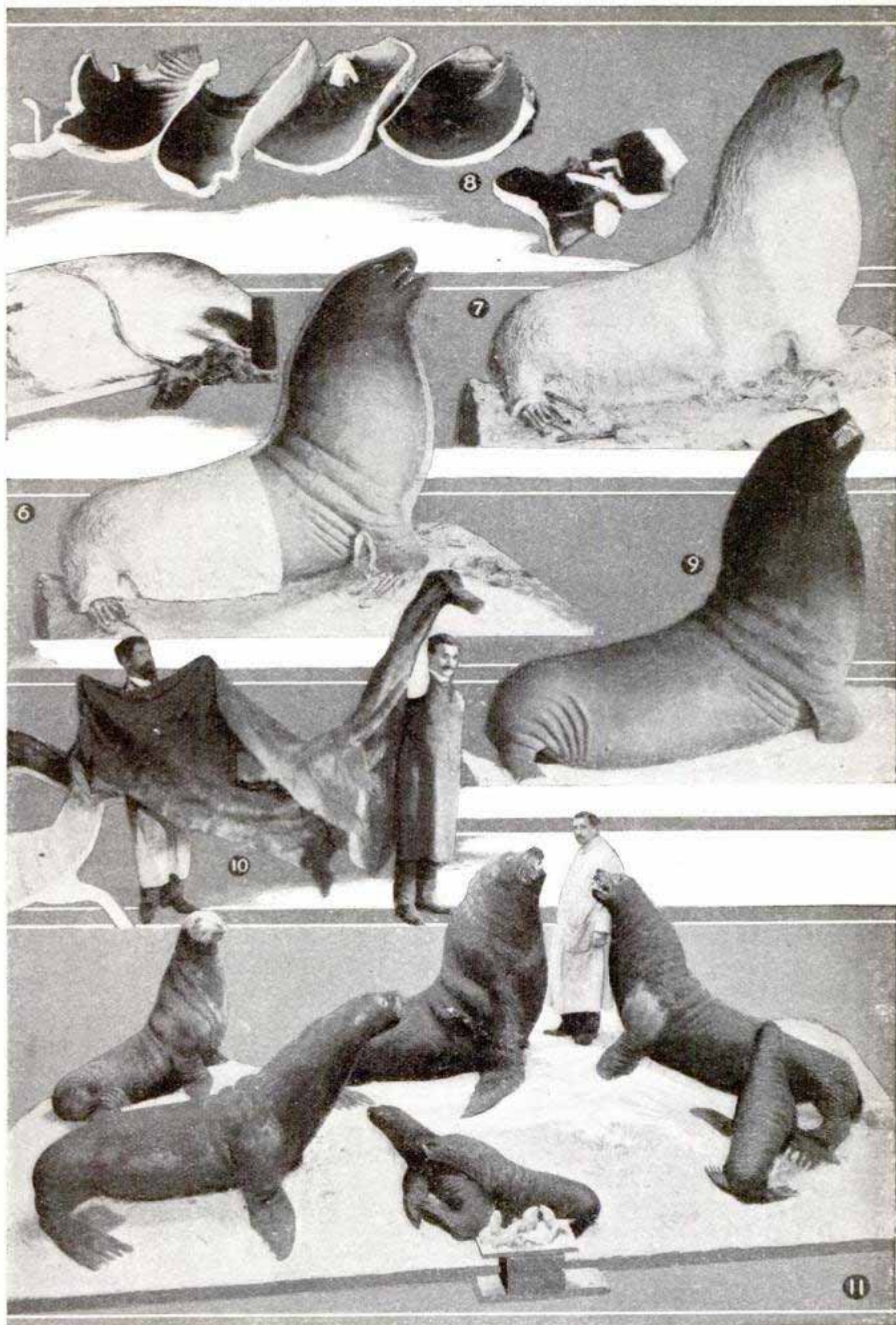
the skin. Every feature that is to show, all wrinkles, muscular swellings, etc., are to be brought out now or never. It is not necessary to model the extremities of the flippers, as these are so thin between the layers of the skin in the interdigital spaces that a cast would be hardly practicable and these parts can be better modeled in place in the skin.

The photographs and measurements taken in the field serve as guides in determining the form of this clay model. During its preparation the clay is kept in workable condition by covering with damp cloths. The model being finished, it is soaped and oiled and a plaster piece mold made from it. These pieces are removed, dried and shellacked. They are then coated with papier-mâché, either directly or with coarse burlap or other fabric intervening between the mold and the plastic material; wire netting to afford greater strength and stiffness is worked into the papier-mâché, and strengthening transverse ribs of netting may be added. When the casts are dry enough they may be removed from the molds and, after thoroughly drying, their interior surfaces are to be shellacked, the pieces wired and glued together and cloth pasted over the seams. In case the mouth of the animal is to be left open, portions of the jaws carrying the teeth are cut away from the skull and inserted in the papier-mâché head. The model is now complete and should be given a heavy coat of shellac to make it impervious to moisture. This model is light in weight but very strong and rigid. There is no possibility of any of its prominences flattening down from ordinary pressure or handling.

The skin has been shaved very thin and soft-tanned by the tanner and is ready to be applied to the form. This is covered with flour paste mixed with glue and arsenic, the skin placed over it and, as it is worked into place, the seams are sewed up, great care being exercised that all parts of the skin are brought thoroughly into contact with the form. It is best to bind or otherwise fasten concave surfaces so that they will remain in close contact with



Preparing a Group of Sea Lions for Museum. Some Genuine Bones Attached. 4, Wire Netting and Making the Plaster Mold from the Life-Size Model. the Plaster Mold. 10, The Skin Ready to be Stretched



Exhibition: 1, The Small Clay Model. 2, How the "Rocks" are Built Up. 3, The Wooden "Skeleton," with Stucco to Fill Out the Natural Contours. 4, The Life-Size Model, Built to Accurate Measurements. 5, The Plaster Mold. 6 and 7, Sections of the Plaster Mold. 8, Hollow Papier-Mâché Model Formed by Casting a Thin Layer Inside on the Papier-Mâché Model. 9, Finished Group of Sea Lions with Original Small Clay Model in the Foreground

the form while the paste is drying. The glass eyes are placed in their sockets, imbedded either in papier-mâché or in putty. When mouths are left open, their interiors, including roofs, tongues, etc., are modeled in papier-mâché coated with colored wax.

The completed group of sea lions will go into a glass case with a scenic background depicting a particular locality these animals have chosen for a rookery.

It will be readily appreciated that in the type of taxidermy described the operator is not hampered by the necessity of working within an enveloping skin, upon an unstable, yielding base, nor with a skin that will shrink and pull, and change much that he does. His details of form are all made upon

the surface, free from the interference of any covering and with the assurance that, barring the modifying effect of the thin skin and the hair, all of which he has taken into account, they will show and remain exactly as he has modeled them.

The aim of group work is to exhibit some characteristic features in the lives of animals and depict their habitats. The former is attained in the attitudes, individual and relative, given to the animals. The latter is obtained by accessories, as water, soil, plants, and scenic paintings. Swamp, desert, mountain, or plain can be indicated and the few square feet contained within the walls of the museum case may, by a skillful artist, be made to carry the eye over miles of characteristic country.

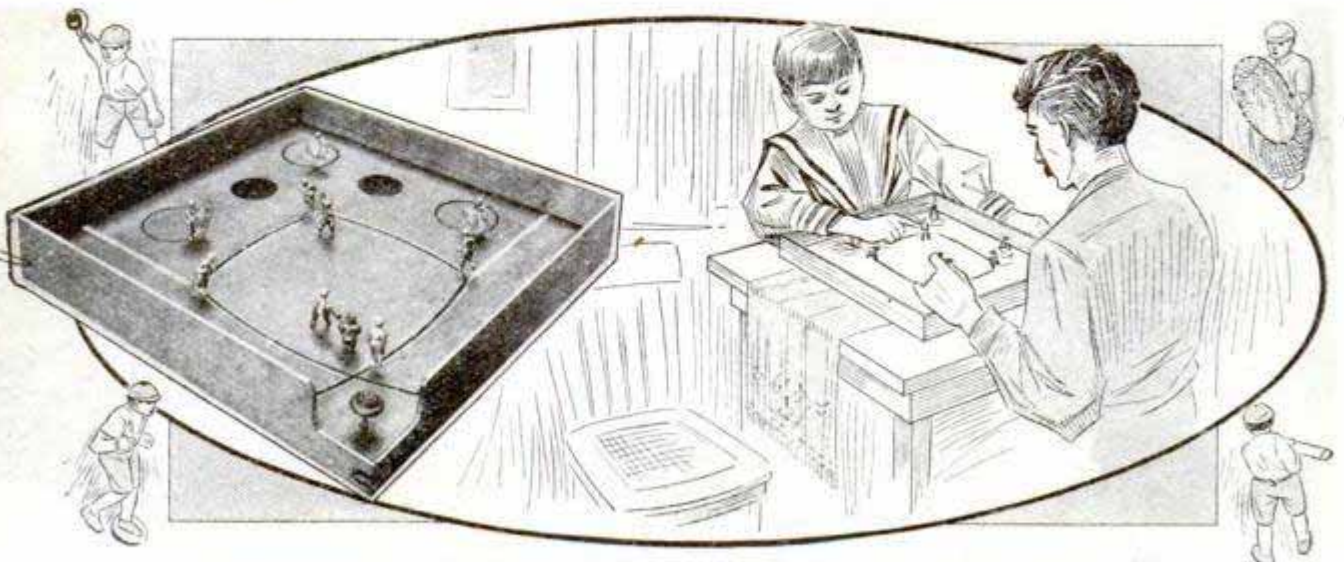
A MINIATURE BASEBALL

4629 GAME

Real baseball can be played by two persons with a mechanical toy which has just been patented and placed on the market—tiny players representing the contestants pitch, bat, catch, and run bases. The field is a board, 3 ft. square, with a rim around it and a groove following the base lines. The pitcher, batter, and catcher are fixed in their places, but four runners are arranged to run around the groove, guided by revolving arms under the board. Each fielder, with a net in his hands, is equipped to run around a

small circle to catch the ball. When the game is being played, one of the contestants puts a ball in the hollow of the pitcher's hand and twists the manikin's body to wind up his spring; a touch of a trigger at his back causes him to throw the ball. The other contestant in the same manner causes the batter to swing. If the batter makes a hit, one contestant starts the runners around the bases while the other manipulates his fielders to catch the ball. Regular baseball rules are followed.

Over \$16,250,000 has been appropriated for next year's work on the Panama Canal.



Mechanical Toy on Which a Miniature Baseball Game can be Played

C. L. Dellenbarger, Co.
625 W. Jackson Blvd., Chicago.

WHERE DONKEYS TAKE PLACE OF COMPASSES

746

Fog at high water is considered bad in the Burry estuary, Wales, but even worse at low water, for then there are men as well as ships to become fog-bound, and, at the worst, ships can anchor and wait for the lifting of the fog, while men cannot.

At low water in Burry estuary cockle gatherers ply their trade on the miles of flat sand and mud, and the coming of fog means inconvenience. It is true that the cockle gatherers might, like ships, carry compasses, but they hardly ever do, and it would be no use to wait for the fog to lift with the flood tide making. The cockle gatherer has, however, to the best of his knowledge, a surer means of finding the way in than a compass, and this is his invariable companion, the donkey. When the first of the tide begins to show, he loads up the sacks, catches hold of the donkey's tail, and follows where the beast may lead, which is a fairly straight line for home. The donkey not only heads the right way in the densest fog, but also avoids areas of quicksands.

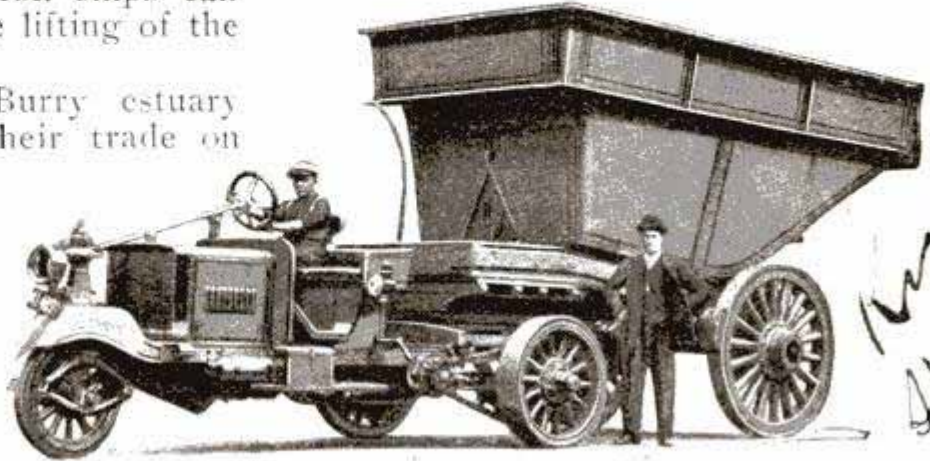
Shipping World 10/23/13

Burry Estuary Mr. P. R. Slane

MONSTER TRUCK OPERATES IN TIGHT PLACES

No DATA

A powerful gasoline-driven tractor attached to an ash wagon, of 15 tons capacity, the combination making what is said to be one of the largest motor



This 26-Ft. Motor Truck Can Dump Loads in a 14-Ft. Alley

trucks in the world, being 12 ft. high and 26 ft. long, is shown herewith.

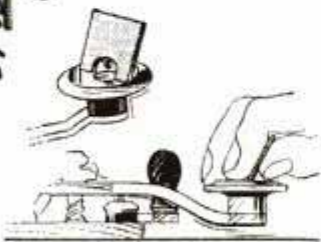
The motive power of the truck is contained in the three-wheeled vehicle shown in the front, which may be attached to the front axle of any wagon designed to be drawn by horses. The single-wheel steering apparatus enables the driver to manipulate the wagon in narrow places, and it was possible with this truck to drive into a 14-ft. alley and turn so as to dump a load of coal into a chute running to the basement of a building, a feat practically impossible with a wagon drawn by horses. By separating the load-carrying part of the truck from the power section the load is carried on easy-riding springs.

Max Autom... Springfield

NEW FORM OF TELEGRAPH-KEY KNOB

4769

A telegraph-key knob has been patented which, it is claimed, does away with much of the nervous strain connected with the work of the telegraph operator. This device has a finger piece and annular base, as shown, and is so designed as to furnish an easy and natural hold for the fingers. It is made of vulcanized rubber and is readily attached to any telegraph key.



Patented May 17, 1913

Mr. H. C. Dauphinais

AUTOMATIC APPARATUS FOR RESUSCITATION

4737

For resuscitating the victims of drowning or asphyxiation a German scientist has developed an apparatus which compresses and expands the chest automatically, and which places the body in a variety of positions so as to stimulate the circulation of the blood. The victim is strapped securely to the table while it is in a horizontal position. By means of a lever the table

Prometheus 15-17-13

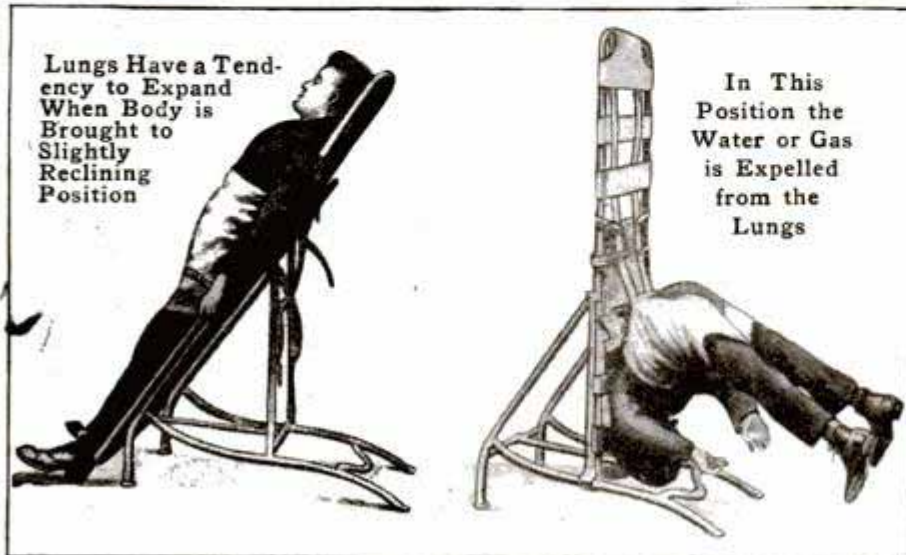
the bar #580 Page 257 "H.W.H."

is brought to a vertical position and the chest is compressed through the weight of the body as it is supported against the straps. This causes the expulsion of the water or gases in the lungs. After 20 or 30 seconds another

INGENIOUS TYPE OF GAS

4719 TURBINE

Much ingenuity has been expended in an attempt to develop an efficient gas turbine, and a machine has been invented recently which appears to solve most, if not all, of the problems connected with this difficult subject. In this device air under pressure from the blowers enters the combustion chamber, clearing out the products of the previous explosion. With the combustion chamber full of air, gas is blown in through another valve, and, by reason of the pressure behind it, eddies and thoroughly mixes with



movement of the table brings the body to a slightly reclining position as shown in the illustration, a position in which the chest has a natural tendency to expand. The reversal from one position to the other is continued as long as may be necessary. This apparatus not only applies the proper motion to the chest, but, through the somewhat violent changes in the position of the body, stimulates the heart action.

LEMON-JUICE EXTRACTOR

4868 MADE OF WIRE

The commonly used glass lemon squeezer has been reproduced in wire in a newly patented utensil for extracting the juice of lemons and oranges. A cone of wire, just the size and shape of half a lemon, separates the juice as effectively as glass and is unbreakable. The utensil is sold in two forms: one mounted over a strainer that fits the top of a drinking glass, and the other fastened to the end of a wooden handle.



the air. The mixture of gas and air is exploded by means of an electric spark. Simultaneously with the explosion a flap valve opens allowing the resulting gases to expand and exert their full force against the rotor which is attached to the driving spindle of the machine. In order to secure sufficient rapidity in the explosions several combustion chambers are arranged in a circle, and operate in succession against the rotor. The gases are compressed by a three-stage blower and are exploded at a pressure slightly greater than that of the atmosphere.

TWO-WHEELED AUTOMOBILE

5028 - A NEW TYPE

The latest development of the motorcycle is a heavy three-passenger automobile mounted on two wheels, with small side wheels to balance it. In every detail of design, it resembles a rich, commodious, high-powered roadster. The pressed-steel frame is hung close to the ground, pivoted on a heavy spring fork in front and underslung from springs on either side of the rear wheel. Inside the doors of the aluminum body are seats for three passen-

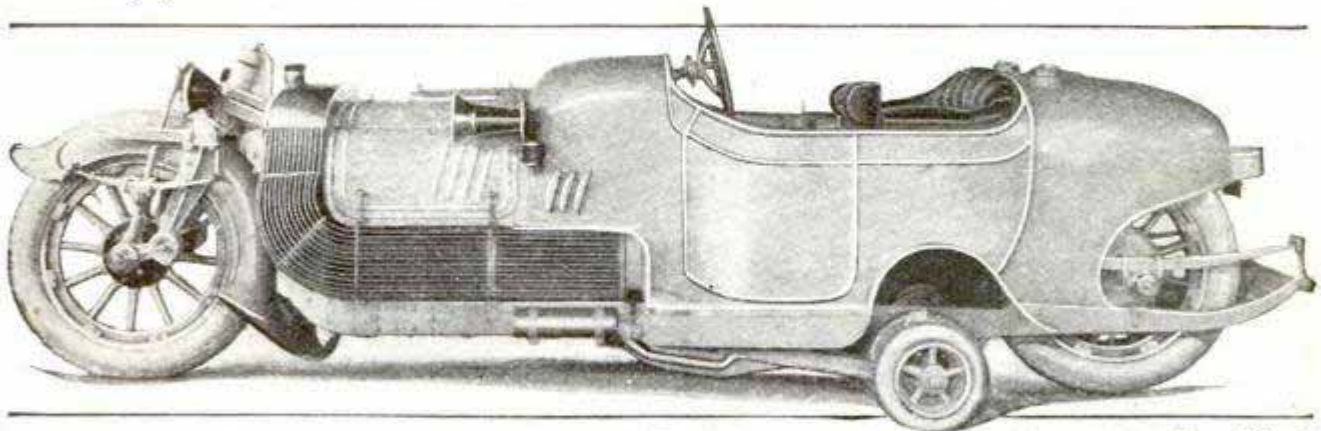
*"Biantogo" motor cycle
Jac. Scripps Booth Designer*

*W. H. Cook, 1903 A. Atlantic Ave.
Brooklyn, N.Y.*

*the Gas Turbine
by Hans Holger
"H.H. Supplies" - English -
frank. Crosby, Dockwood Co.*

gers, two on a broad transverse seat and the driver on a smaller seat in front of them. When the car is standing still or running slowly it is balanced by pairs of 15-in. wheels on the

They are dry now, of course, but the picture shows how one of them might have looked in Nero's day when the fishermen were dragging out fish for Nero's dinner and a kitchen attendant



New Motorcycle Which is Really a High-Powered, Three-Passenger Automobile, Mounted on Two Wheels

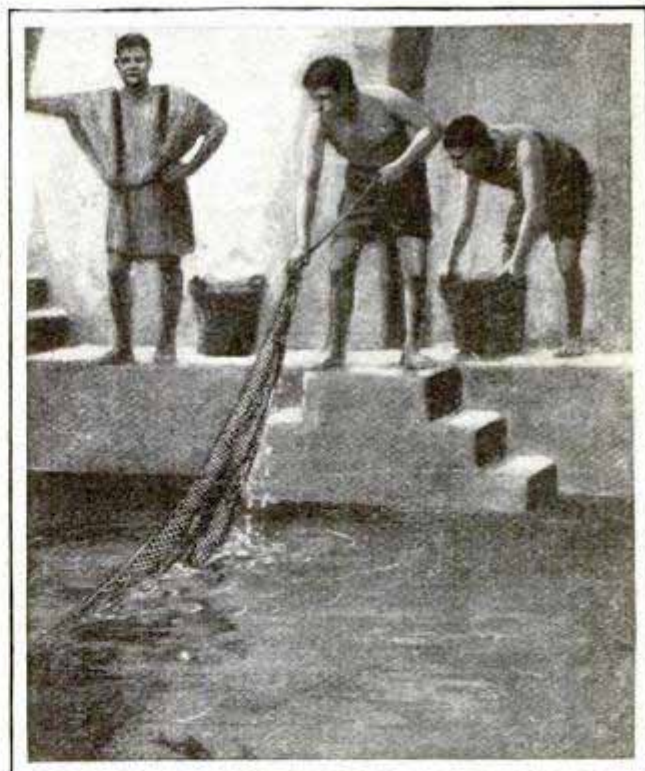
ends of levers on either side of the body. The side wheels have a caster motion on their levers and are automatically lifted from the ground when the speed reaches 20 miles an hour. The dashboard, steering wheel, and control are designed in imitation of the latest automobiles. Back of the seats are two large tanks for oil and gasoline, on either side of the rear wheel. Power is supplied by an 8-cylinder, V-shaped motor, with cone clutch and transmission for four speeds forward and one reverse. Compressed-air starter, magneto and dual ignition, and a complete electric-lighting system are included. The motor is cooled by water with a radiator consisting of 450 ft. of 1/2-in. copper tubing in coils on either side of the hood. The car is mounted on 37-in. wheels and has a wheel base of 140 in., and a tread of 48 in. with the side wheels down; its over-all width is 50 in., 15 in. less than a four-wheeled car. With its passengers it weighs about 3,200 lb., and its center of gravity is very near the ground.

NERO'S PRIVATE FISH TANK

4723

A reconstructed view of one of the piscinae, or private tanks for live sea fish, which were found in Nero's palace during the recent excavations on the Palatine hill, Rome, is shown here.

Illustrated London News



Courtesy Illustrated London News

These Fishermen are Casting Their Nets in the Private Fish Tanks under Nero's Palace; an Attendant is Waiting to Cook the Fish for Nero's Table

their tables. Just how sea water was brought to the piscinae is not now known.

DIAL FOR NEW FRENCH

4732 TIME SYSTEM

The adoption in France of the system of numbering the hours up to 24 has made necessary the use of special dials, of which a number have been invented, for indicating the time in accordance with this method. What appears to be the most practical and satisfactory dial is the one shown in the illustration. The face of the timepiece is provided with openings at the proper places for the hour numerals. Under this is a movable dial bearing the numbers from 0 to 23, which is shifted automatically back and forth between two positions by the clock mechanism. The figures are spaced in such a way that from midnight to noon, when the dial is in the first position, only the consecutive numbers from 0 to 11 are visible. At noon the plate shifts so these numbers are hidden and the numbers 12 to 23 come into view, the dial shifting to the right position at the end of each 12 hours. In this way the use of double sets of numbers on the dial, as well as the necessity for doubling the minute divisions, is avoided.

Illustration



ically back and forth between two positions by the clock mechanism. The figures are spaced in such a way that from midnight to noon, when the dial is in the first position, only the consecutive numbers from 0 to 11 are visible. At noon the plate shifts so these numbers are hidden and the numbers 12 to 23 come into view, the dial shifting to the right position at the end of each 12 hours. In this way the use of double sets of numbers on the dial, as well as the necessity for doubling the minute divisions, is avoided.

NEW WATER-POWER PERMITS
5112 REGULATE RATES

To regulate the price of water power to consumers, the government has established a new policy in granting water-power permits. A maximum charge of six cents per kilowatt-hour is

Christian Science Monitor

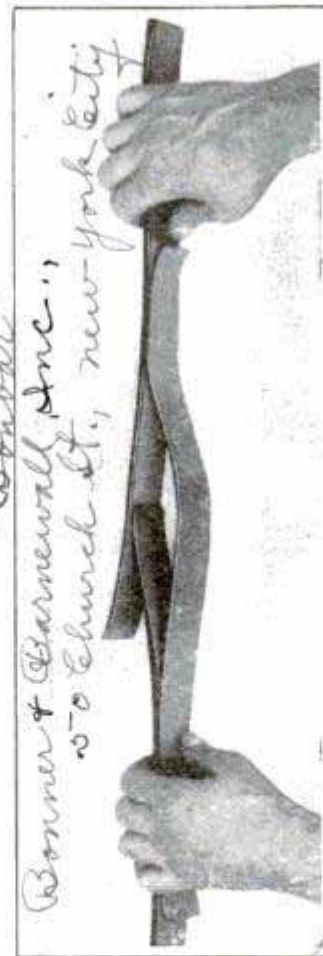
7-30

fixed by the terms of the permit, and the lower the power rate charged by the company, the lower will be the water rate collected by the government. Lower rates on water are to be charged for power used for certain purposes, such as making nitrates for fertilizers, and decreasing rates as more power is developed. This will not only protect the consumer, but encourage the fullest development of water power. The first application of the new policy was in the recent permit granted for the development of an electrical project with an ultimate capacity of 350,000 hp. on the Pend d'Oreille River, Washington.

REINFORCED LEATHER

3256 BELTING

An improved type of reinforced leather belting, which is claimed by the manufacturers to be more uniform in strength and to stretch less than belts of ordinary construction, has been placed on the market. It is said that the new belting will pick up the load quicker and also lessens the possibility of slipping or sliding on the pulley faces. The improvement is obtained by reinforcing every other lap of the belt, as shown in the illustration.



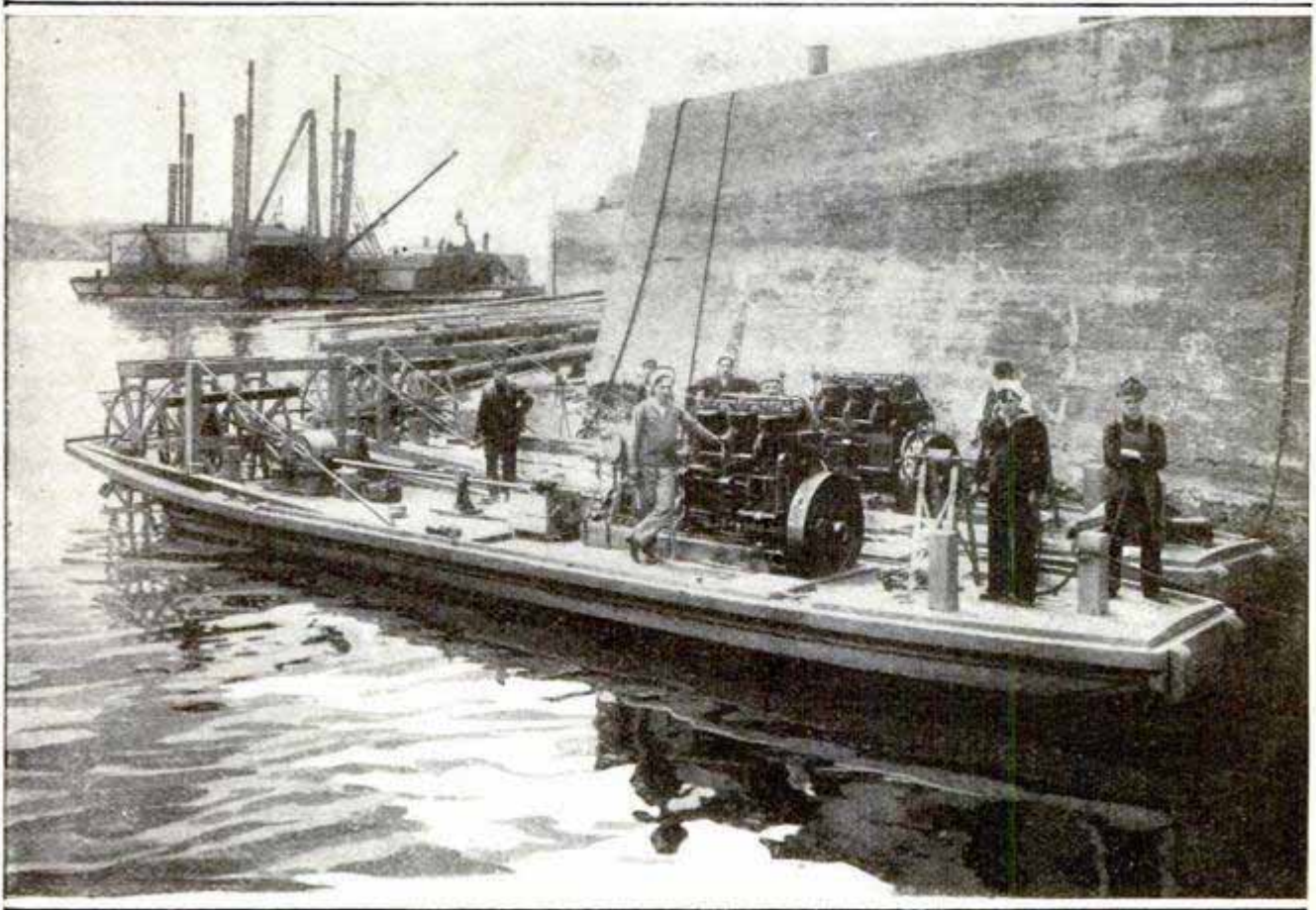
"Bonbar"

*Bonner & Barnwell, Inc.,
50 Church St., New York City*

CA celluloid-like material, said to be much clearer and tougher than celluloid, with a

higher glaze, is being used in England for automobile windshields. It resists scratching to a remarkable degree.

*Dover, Ltd. New York
Northampton, Mass.
Exonite*



Powerful Motorboats for Towing Barges on Alaskan Rivers

**GASOLINE-DRIVEN BOATS FOR
4444 ALASKAN RIVERS** (no data)

The two stern-wheel river boats shown in the illustration are to be used by the expedition investigating the availability of Alaskan coal for naval uses and are particularly designed for hauling loaded barges in the shallow but swift rivers of Alaska. They are of the flat-bottom type, drawing about 30 in. of water. Each boat is 49 ft. long, with a beam of 10 ft., and is driven by a 50-hp. gasoline engine. In their trial trips each of these boats made a speed of 13.8 miles an hour. Since they are to be used only for towing, all the space in the hulls is used for the storage of gasoline. No deckhouses are provided, the boats being complete as shown in the illustration.

According to the latest statistics there are now 1,100,000 automobiles in the United States, which is an average of about one for every two miles of country road.

**AN ADJUSTABLE COVER FOR
4650 MANY PANS**

A cover that will fit any cooking utensil, pan, skillet, or kettle, of any size, has recently been patented and offered for sale. By extension and contraction, it can be adjusted to any size and takes the place of many covers of various sizes. Instead of resting on top of the kettle, it springs against the inside near the food and keeps all drippings inside the vessel and off the stove. Its dome shape confines the steam and insures even cooking on top. Turned over, it can be used to receive the food.



The Scott-Johnson Co.,
120 & 122 ... to B...

W. L. Tidston, 810 W. 61st St. Seattle, Wash.

NEW FILLER FOR PACKING

5142 EGGS

Another solution of the problem of packing eggs so that they can be shipped without danger of breakage has been offered by an Oregon inventor, who has developed a packing material consisting of sheets of molded pulp board. Each sheet has holes evenly spaced and of such a diameter as to fit firmly over an egg

a short distance from the end. When packed, each egg projects slightly through two adjacent sheets, the spacing of the holes being such that no two eggs are in contact. A case packed with hand-made sheets of this kind was loaded over the rear wheels of an express wagon, hauled rapidly over a rough-plank logging road, and dumped as a package of unbreakable freight would be handled, on the station platform. Only one egg out of the 50 doz. contained in the case was broken, and this, it was claimed, was due to an imperfection in the hand-made sheet. Owing to the stiffness of the pulp board it is possible for a man to stand on the top sheet of a case without breaking any of the eggs.

CA court in Hungary has decided that an aeroplane cannot be seized to pay an airman's debts, as it is a scientific instrument necessary to the owner for his livelihood.

TO STOP LAND SLIDES IN

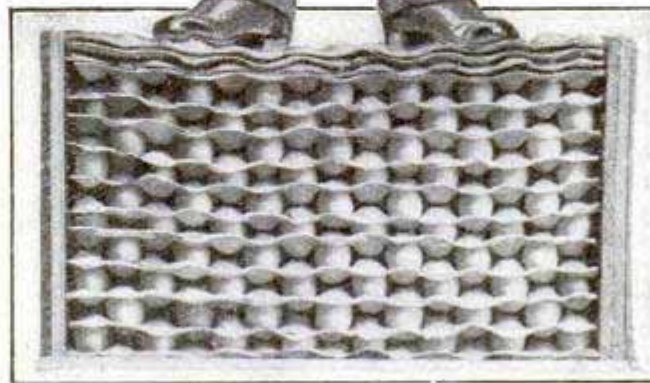
5247 CULEBRA CUT

An underground system of reinforced-concrete posts and tie rods has been proposed as a possible means to prevent land slides in the Culebra Cut of the Panama Canal. The plan involves setting a row of underground posts in a line parallel with the banks of the canal and bracing them with other posts set at an angle against

them. To set the underground posts, it is proposed to drill holes from the surface of the loose strata to the firm rock below the level of the canal bottom. After the bottoms of the holes had been "sprung" with dynamite to form enlarged cavities in the firm strata for anchorage, steel rods would be placed in the holes for reinforcement. Then cement grouting would be forced into the holes under a pressure of 750 to 1,000 lb. per square inch, so that the concrete would penetrate all the fissures in the rock and form a secure anchorage. The vertical piles would form a secure foundation for a retaining wall and the inclined posts would

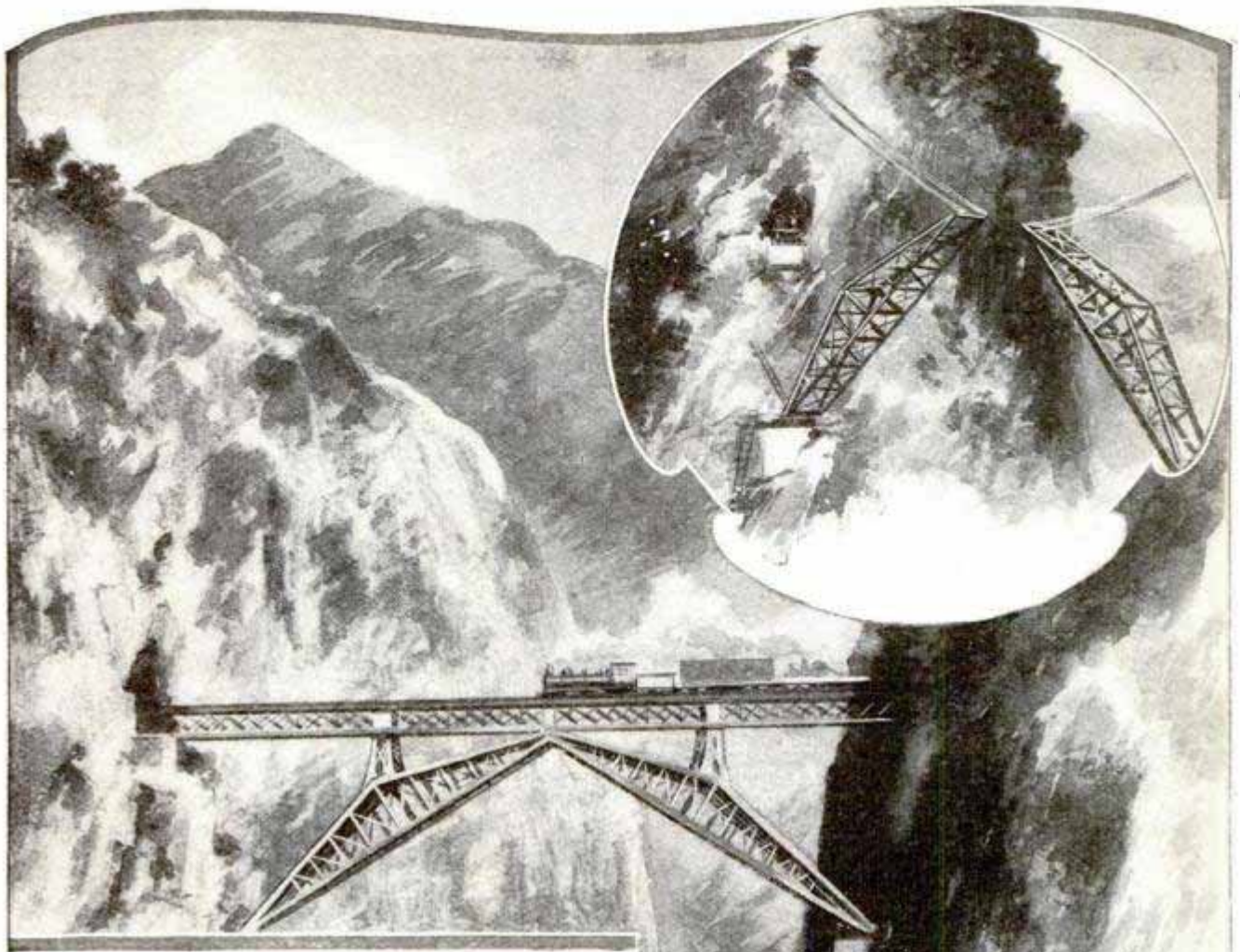
act as the diagonals of a strong dam of triangular cross section. Combined with this, adequate drainage and subdivision of the slope and an underground dam to protect the edge of the slope from wave action are

also suggested as means of preventing trouble in the future.



Test of the Efficiency of New Filler for Packing Eggs

Economy copy see page 734
 C. J. Voorhies, Portland, Oregon
 181 - 6th St.
 G. Weatherway, Aberdeen, Wash.
 C. J. Voorhies, Aberdeen, Wash.



UNIQUE RAILWAY BRIDGE IN 4795 INDO-CHINA

One of the most interesting railway structures of the world is the bridge over the Faux Nam-Ti gorge in Indo-China, where, owing to the peculiar difficulties in the way of building a bridge of any type, it was necessary to adopt a special design suited to the only method of erection that seemed to be possible. The sides of the gorge are practically vertical and give no chance of approach to the bridge from either side except through tunnels. The track grade is 335 ft. above the river, so that no system of falsework could be used in building the bridge, while cantilevers were out of the question owing to lack of "elbow room." The design finally adopted consisted of two steel trusses, each hinged at the cliff side, which were erected in a vertical position and then lowered so that the ends met, forming a structure of

Railway Bridge
over the
Faux Nam-Ti
Gorge
in French Indo-
China;
Top View,
Lowering the
Trusses
into Position
with Cables

inverted V-shape. The ends of the two trusses were firmly connected, steel towers were erected on the humps of the trusses and on this support the steel deck truss carrying the track was placed. At the beginning of the work it was necessary to let the workmen down by ropes from the tunnel mouth to pre-

pare the foundations of the supporting trusses. The track trusses were built in the tunnels and were then moved into position on rollers. From end to end this bridge measures 220 ft. 4 in., while the distance between the heels of the supporting trusses is 180½ feet.

subroad cars

AN ELECTRIC FISHHOOK FOR POLICEMEN

4658

Poles shaped like inverted fishhooks are used to support the new electric police signals in San Diego, Cal. Each pole carries a police-patrol telephone box, a double gong for calling the nearest policeman, and a red light on the point of the hook over the street. When a patrolman is wanted on the police telephone, the gong rings and the lantern, showing red 12 ft. in the air over the traffic, calls him if he is out of earshot.



C. Edholm - 4624 - Figueroa St., Los Angeles, Calif.

test the effect of Antarctic "dark days" on the electrical waves. Night messages were sent 4,800 miles.

Russia imported 600 automobiles from America last year.

STEEL PASSENGER EQUIPMENT INCREASING

5236

In connection with pending legislation in Congress requiring the replacement of wooden passenger equipment with steel equipment inquiries have been made of all railways engaged in interstate commerce in the United States as to progress in the construction of steel and steel-underframe cars. Replies from 247 companies, operating a total of 252,472 miles of line, show that between January 1 and July 1, 1913, orders were placed for 1,064 steel cars and 76 steel-underframe cars, a total of 1,140. In the four years preceding January 1, 1913, the number of steel passenger cars in service increased from 629 to 7,271, while the number of steel-underframe cars increased from 673 to 3,296. The cost of replacing with steel cars all the wooden cars used in passenger trains is estimated at over \$600,000,000.

*8-18-13
C. Edholm - 4624 - Figueroa St., Los Angeles, Calif.*

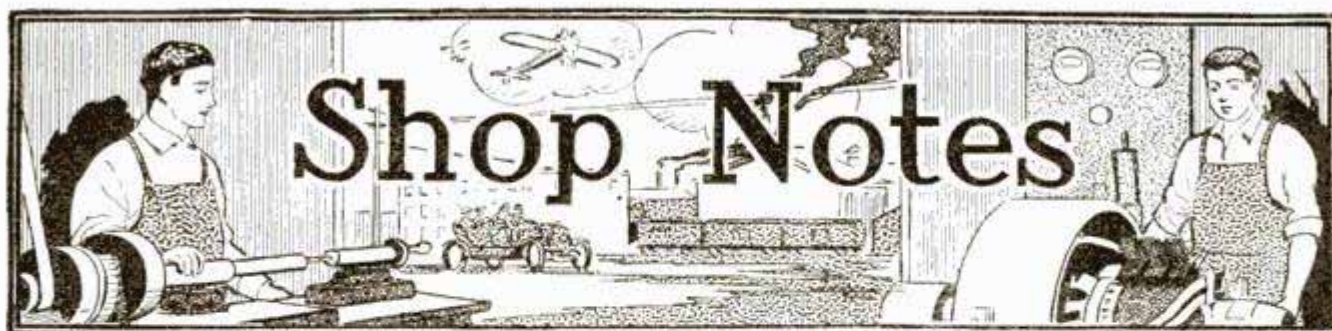
THE MAKING OF MIRRORS WITH HYDROGEN

4919

Metal-backed mirrors can be produced in 30 seconds by a new process of electrodeposition. A glass plate for the mirror, in juxtaposition to a sheet of metal to be used as backing, is inclosed in a glass bell resting on a ground-glass plate. When, after the bell has been exhausted of air, hydrogen is passed through the bell simultaneously with an electric current, the metal is disintegrated and deposited in a thin film on the glass plate, producing an opaque mirror. Gold, silver, platinum, copper, nickel, iron, palladium, or iridium can be used as the metal backing.

*6/18
Current Topics, Franklin Inst. J. Nov.*

H. Rumelin, Physikalische Zeitschrift, XIII, 1222 - Prof. Dr. Friedrich Krüger,

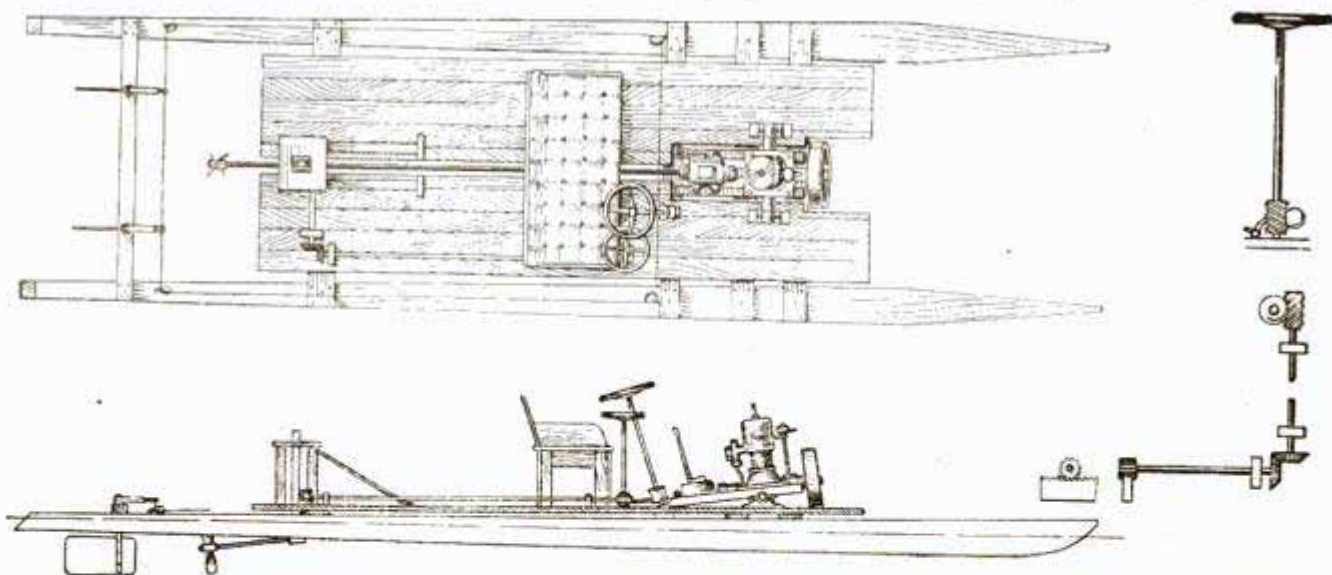


Power-Driven Catamaran

The catamaran shown was constructed especially for use in the waters at a sawmill. The construction permits the shaft and propeller to be lifted out of the water at a moment's notice without stopping the engine. The floats being made of solid cedar logs, there is no danger in running into sunken logs, rocks, or on a beach. These features are of great advantage where the catamaran is used.

The logs are 18 ft. long, cut from dry cedar timber, the bark being first removed and the large end sharpened and smoothed so that they offer the least resistance. Larger logs could be

used, $4\frac{1}{2}$ in. in diameter, being set so that the center of gravity will be over the center of the roller when on a level. The engine is bolted to the roller and the roller is free to turn in sockets on either end, that is, to slightly revolve when the driving shaft is raised, otherwise it is secure. There is one stuffing box used at a point about 18 in. ahead of the propeller, and this box is fastened to the lower end of a vertical rack that slides through a slot and is controlled with a pinion driven by rods, gears and a handwheel at the seat. This construction permits the propeller to be quickly raised clear of



AN Engine-Propelled Catamaran for Use in Shallow Water Where There are Numerous Submerged Obstructions That would Injure an Ordinary Boat and Soon Ruin Its Propeller

used to make a catamaran that would carry more freight or a larger engine. The logs are placed 5 ft. apart and crosspieces bolted on their upper sides. A platform is built on the crosspieces as shown in the illustration, leaving an open space in the center for the driving shaft.

The engine is placed on an oak rol-

ler, the water or lowered to a depth of 18 inches.

The engine, steering and shaft control are all operated from the seat. The rudders are twin, both responding to the same wheel. There is no rail, but one could be placed around the platform to make it quite safe.

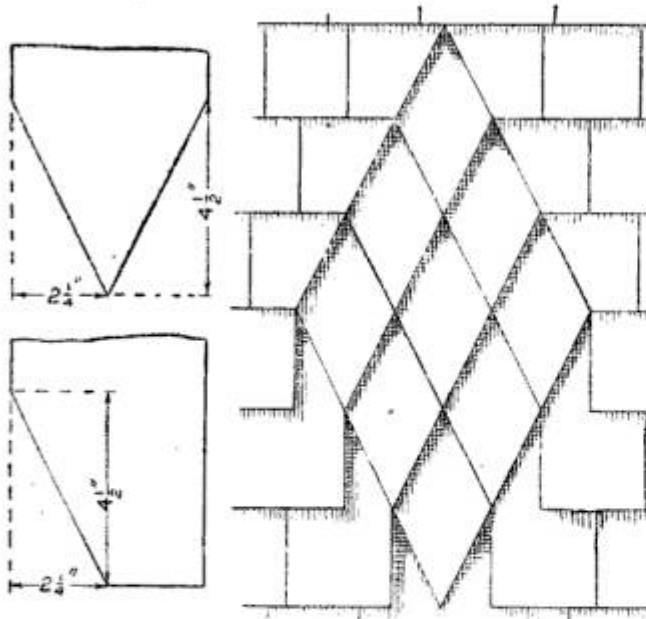
The conditions of the body of water

are suited to the craft. It is a lake with narrow shores with a great many curves on the line, suggesting a large river. It is impossible for a heavy sea in a storm. The lake is 10 miles long and has been used for driving logs for at least 20 years and, consequently, there are numerous sunken logs with their ends at or near the surface. Many times these logs cannot be seen until one is near them. An ordinary boat could not stand these conditions.

The catamaran was inexpensive outside of the engine, as the parts were taken from discarded machinery. The boat would be of no use on a large body of water, as a heavy sea would wash over it and a large wave would tend to capsize it, but for use on inland waters it is worth while to make it.—Contributed by Clifford W. Johnston, Parry Sound, Can.

Shingling to Produce a Diamond Shape

There are many carpenters that do not know how to lay shingles in a gable or between windows on side walls in diamond shape. This is very easily accomplished if the shingles are laid as shown in the sketch. It will require but little more time than



Method of Cutting Shingles so That When Placed They will Make a Diamond Shape

plain shingling. All the joints are broken as in regular shingling. The diamond shingles should be sized, that is, as wide as the courses are laid. The

sketch illustrates a course, $4\frac{1}{2}$ in. to the weather. These shingles are placed in the courses until the required width is obtained. The other shingles joining the diamond are beveled on one side.—Contributed by Ernest S. Yawger, Ithaca, N. Y.

An Alarm for a Lathe Boring Tool

After the boring tool on my lathe had run into the faceplate several times, I devised an attachment that would not only prevent this, but also give an alarm when the tool was almost through the work. I first fastened a small piece of metal, about $\frac{1}{4}$ in. thick and 1 in. wide, with a bolt having a wing nut to the bed of the lathe just ahead of the carriage, and a like piece of metal on the carriage. I procured the hard rubber stem from a discarded tobacco pipe and fastened a piece of this to each of the pieces of metal. The rubber pieces served as insulators on which the ends of insulated wire were attached, and were bored so that a contact would be made when the two came together. Two dry cells and an electric bell were attached in the circuit.

When the metal clip was adjusted to the right location on the bed of the lathe, the metal clip on the carriage would make the contact when the tool in the tool post would be almost through the work, and the bell would sound the alarm.—Contributed by D. G. Hardy, Milltown, Mont.

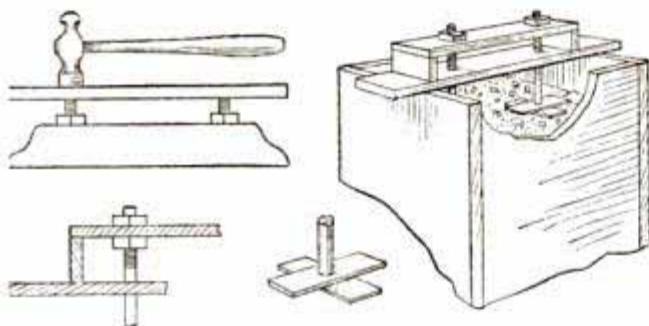
Reducing the Glare of an Automobile Lamp

The disagreeable glare of the electric headlights on automobiles may be eliminated by covering the upper half of the glass with a cream metal polish and allowing it to dry. When dry, it gives the appearance of frosted glass. To make an even line across the center of the glass, a small piece of cardboard with a straight edge should be held tightly against the surface when applying the substance. Of course, the coating should be applied to the inner surface of the glass so that it will not be

washed off in a rain. This treatment does not in the least affect the amount of light cast upon the road.—Contributed by E. K. Marshall, Oak Park, Illinois.

Setting Bolts in Concrete to Hold a Machine

When anchoring bolts in a concrete pier, I found that the location of the bolts could be more easily determined with a piece of soft pine placed on the bolts of the machine and struck with a hammer than with a rule. Holes were bored at the location of the dents made by the bolt ends and a skeleton base made as shown. This kept the bolts in their right places while pouring the concrete. If this is done in the man-



A Skeleton Base for Holding the Bolts in Their Right Places Until the Concrete Sets

ner illustrated, the machine will fit on the bolts perfectly.—Contributed by James M. Kane, Doylestown, Pa.

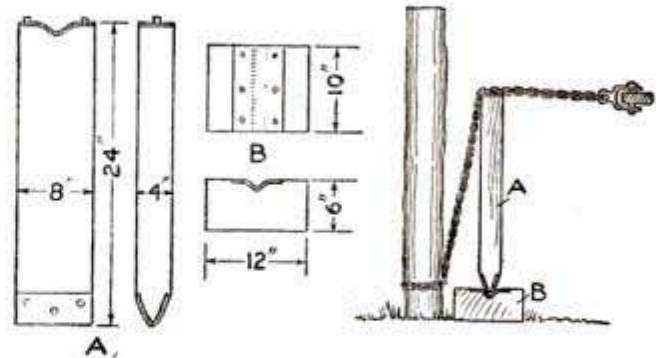
A Fence-Post Puller

The lower portion of a wooden fence post after it has been in the ground for a long time becomes so set that it is almost an impossibility to draw it out, necessitating the use of a spade or shovel to remove it. When it is necessary to withdraw a considerable number of posts, the usual method is extremely laborious and expensive.

The sketches in general detail illustrate an excellent and simple jig for instantly and easily pulling the posts from the ground, no matter how securely time may have set them into the earth.

A hitch is taken on the post near the ground by means of a small chain, the

free end passing over a fulcrum stick, A, to the doubletree behind a team of horses. The point of bearing, or axis,



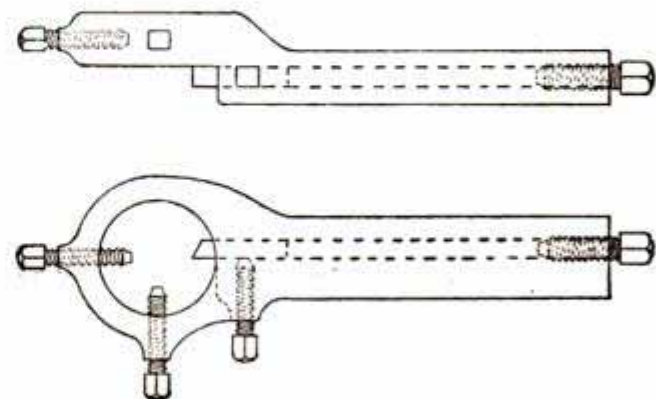
A Fulcrum Stick Used to Draw Out Firmly Set Fence Posts with a Chain

of the stick is supported by the base block B, which is easily thrown with the fulcrum stick from post to post as the work progresses along the fence. A moderate pull on the chain will draw out any post.

Combination Tool Holder and Steady Rest

A tool of the kind shown in the sketch is very handy for turning small and long bars of steel or brass. The steady-rest part is offset from the part that holds the tool. The shank of the tool is set in the tool post so that the steady-rest part is central with the centers on the lathe. The tool is adjusted with a screw in the end of the shank.

The tool is set and a cut taken to reduce the stock to the desired diameter on the end of the bar, then the screws on the steady rest are adjusted on the turned part and the feed of the

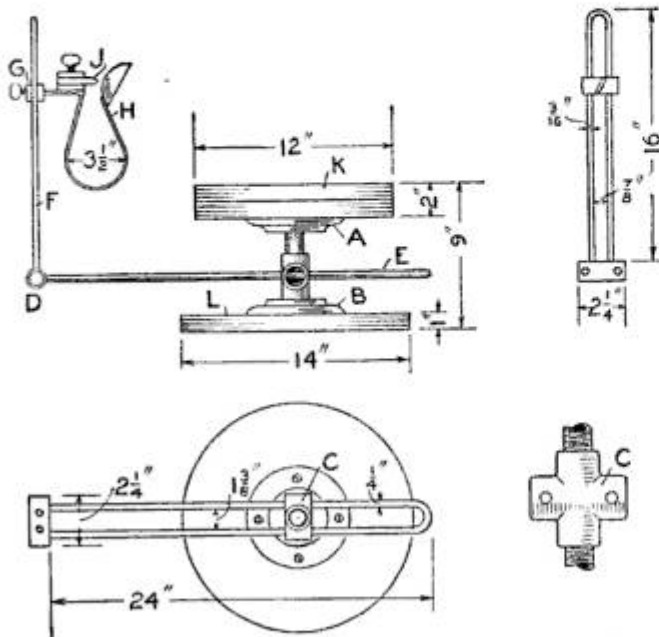


The Steady Rest Being Part of the Tool Holder, Prevents the Stock from Springing

lathe started. It is obvious how the tool works.—Contributed by Chas. Homewood, Cedar Rapids, Iowa.

Homemade Skirt Marker

Procure a piece of $\frac{3}{4}$ -in. gas pipe, 6 in. long with a thread on each end, and two flanges, A and B, to fit on



Homemade Skirt Marker for Making a Line on the Goods Encircling the Lower Edge

the threads of the pipe, as shown. Remove the threads from a $\frac{3}{4}$ -in. cross, C, so that it will slip on the $\frac{3}{4}$ -in. pipe. Bore two $\frac{1}{4}$ -in. holes through the ends of one way of the cross, allowing $1\frac{3}{4}$ -in. space between them. A piece of $\frac{1}{4}$ -in. round iron is bent into U-shape and the ends are run through the holes drilled in the cross. A $\frac{3}{8}$ -in. round end piece, D, is drilled to receive both ends of the U-shaped horizontal piece E, also the U-shaped upright piece F, which is made of $\frac{1}{8}$ -in. round iron, and all four ends are riveted in the piece D. Make a clamp, G, with a setscrew to hold the marking device H at any desired position. The marking device consists of a round disk of brass and a chalk holder, J. Two disks are cut from wood, 1 in. thick, the upper, K, 12 in. in diameter and the lower, L, 14 in. in diameter.

The horizontal rods E move through the cross from right to left while the cross turns on the $\frac{3}{4}$ -in. pipe standard. The clamp G holds the adjustment vertically.

The one being fitted with a skirt stands on the upper disk K, and the lower edge of the skirt is placed between the chalk and the brass disk, so

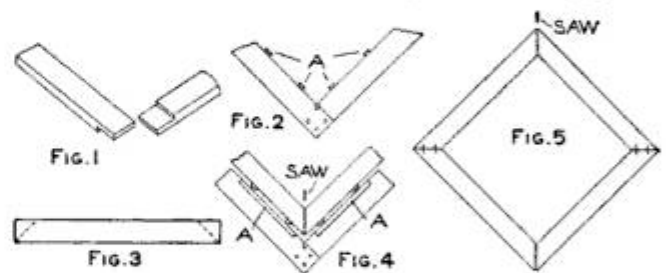
that by taking hold of the chalk with one hand and the skirt with the other and turning the rods E, a line is marked on the outside of the goods at the bottom.—Contributed by Mrs. Harriet M. S. Kerbaugh, Allentown, Pennsylvania.

Cutting Miters on a Band Saw

Where a number of pieces are to be mitered and there is no power-driven miter saw in the shop, the band saw will do the work, if the machine is supplied with an attachment for holding the pieces at right angles while the cut is being made. The attachment consists of a holder made of two pieces of hard wood, each $1\frac{3}{8}$ in. thick, 3 in. wide and 14 in. long. A shoulder is cut on each piece, as shown in Fig. 1, and then they are joined together to make a right angle, as shown in Fig. 2. Adjusting screws are placed in the inside edges of the pieces, as shown at A. Ordinary wood screws are used and they are allowed to project about $\frac{1}{4}$ inch.

The material to be mitered is laid out with a miter square, as shown by the dotted lines in Fig. 3, then it is cut roughly on these lines. The pieces are then placed in the holder, as shown in Fig. 4. The material is sawed two or more times, each time closing the pieces together on the point. It makes no difference if the cut is not straight, the joint will be a perfect fit.

To aid in holding the stock when pushing the holders back and forth on the saw table, two strips, A A, $\frac{1}{4}$ in.



Form for Holding Pieces to be Cut for a Miter Joint on a Band Saw

thick and $\frac{1}{2}$ in. wide, are nailed to the top surfaces of the holder sides. Each pair, as mitered, should be kept together. When finished, they are nailed

together with corrugated fasteners and the halves are placed together, as shown in Fig. 5. These are placed in the holder and jointed in the same manner. In roughing out the material, the joints may not fit perfectly and there is apt to be an opening either at the outer or the inner edges. Always start this opening on the saw when cutting the joint on the two halves.

This same principle can be applied when getting out segments for circles to be turned for patterns, or caps and bases for columns. Dress the material on both sides to make it the desired thickness and mark each segment, as shown in Fig. 6. Cut out the segments on the band saw, place the miters of each pair together and cut through the joint, as shown in Fig. 7. Both sides at the joint are then fastened with corrugated staples. After all the segments are jointed and fastened in pairs, two



FIG. 6

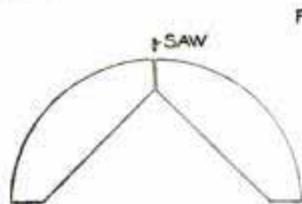


FIG. 7

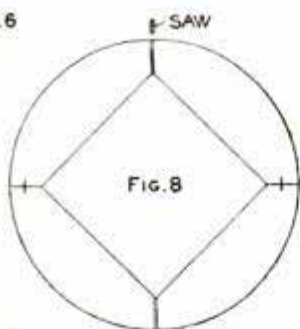


FIG. 8

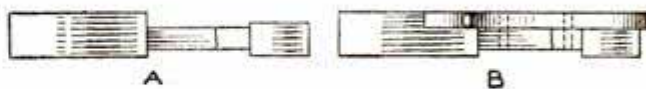
Segments for Pattern Work or Porch Columns can be Mitered in a Similar Manner

halves are placed together and the joints cut on the band saw, as shown in Fig. 8. When fastened together they are ready for turning.

Repairing Magneto Arm

A magneto that is used quite extensively on automobiles has an extending arm for retarding or advancing the spark, and this arm was broken accidentally. Instead of waiting for a new part the old one was repaired quickly and in such a way that a new piece was unnecessary. The break in the arm was as shown at A. The parts were joined closely and held with a piece of $\frac{1}{8}$ -in. brass, as shown at B. The brass was cut to fit over the extension on

the hub and fitted to the curve of the larger circle. Holes were drilled and tapped for two screws, and holes were

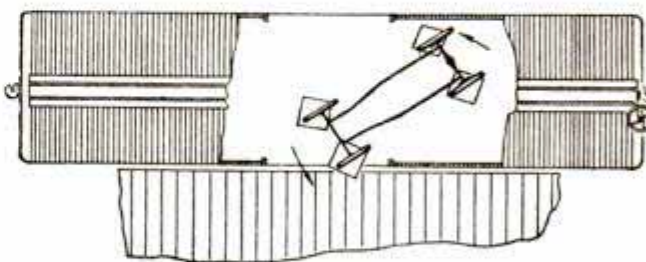


Repairs on a Magneto Arm That Saved Time and the Cost of a New Piece

also drilled and pins inserted to hold the parts together.—Contributed by Donald A. Hompson, Middletown, New York.

Greased Plates Used for Unloading Automobiles

The loading of automobiles into box cars, or unloading of them, is a very difficult job for those inexperienced in handling the large machines, especially where two are placed in together. The turning of a long-wheel-base car will not permit it to pass through the freight-car door, and the ordinary process is to lift it with a force of men or block and tackle. A very easy method is to place sheets of metal—these are usually found about freight houses—on the floor of the freight car where the automobile wheels will run on them, as shown in the diagram. Before running the wheels on the sheets, smear hard grease over their surfaces, and one person can easily push that end of the car over so that it will pass out of the freight-car door, the wheels sliding easily on the grease. Longer wheel

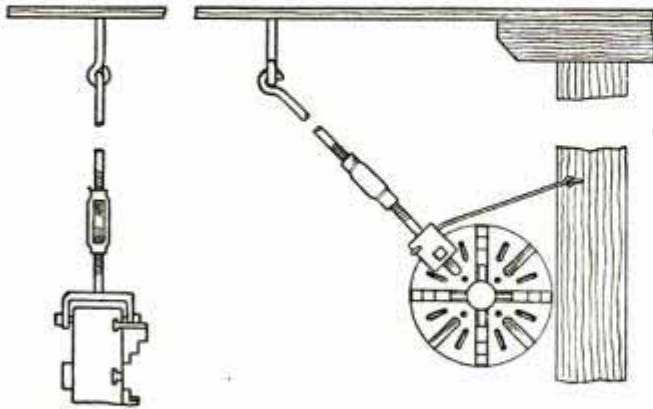


Manner of Placing Greased Plates on a Freight-Car Floor for Sliding Automobile Wheels

bases may require plates placed also under the rear wheels so that they may be slid over in like manner.

Hanger for a Lathe Chuck

One of the best methods of caring for a lathe chuck is to arrange a hanger for holding it when not in use. An

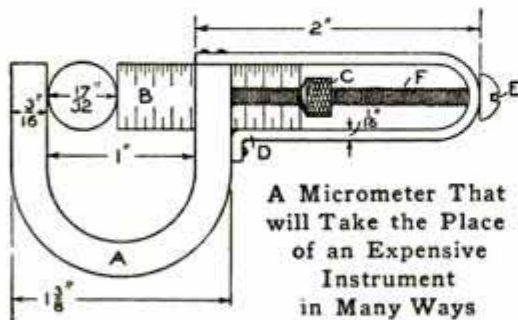


The Chuck is Easily Taken from One Position to the Other as Occasion Demands

eyebolt fastened in an overhead cross-beam or joist, a turnbuckle, and a clevis, or a U-shaped piece of metal with a bolt, to fit over the chuck, not only constitute a hanger for holding the chuck when not in use, but provide an easy means of swinging it into position on the lathe spindle. The illustration clearly shows the hanger as it is used.—Contributed by J. Harger, Honolulu, H. I.

Homemade Micrometer

Desiring to have something a little different in the way of tools from other mechanics, I constructed a very useful measuring device that takes the place of a micrometer. The jaw A is made of $\frac{3}{16}$ -in. square, cold-rolled steel, heated and bent as shown. This is slotted on one side to admit a piece of scale, B, $1\frac{3}{16}$ in. long. Before slotting



A Micrometer That will Take the Place of an Expensive Instrument in Many Ways

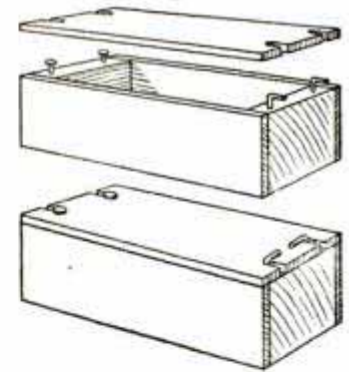
the jaw a hole is drilled centrally in the location of the slot and tapped for a 10-32 machine screw, F. A $\frac{1}{8}$ -in. hole is drilled through the entire

length of the screw in the center and it is also slotted $1\frac{3}{16}$ in. to receive the scale. The head end of the screw is supported by a yoke, D, made of $\frac{1}{16}$ -in. steel, $\frac{3}{16}$ in. wide and fastened with rivets to the jaw A. The knurled nut C is used for adjustment. A small closed spring made of .013 spring wire, wound on a rod measuring .085 in. in diameter, is inserted in the $\frac{1}{8}$ -in. hole in the screw and fastened at one end to the scale and at the other with a pin, E, in the slot of the screw head. This provides a tension on the scale to keep it against the knurled nut C. The measurement is read on the scale between the outside surface of the jaw A and the nut C.—Contributed by J. J. Kolar, Maywood, Ill.

Box-Cover Fasteners for Parcel-Post Packages

Many kinds of packing cases and boxes have been invented for use in the mails after the parcel-post law went into effect.

When packages must be examined it requires no little time, in most cases, to undo the fastenings. The illustration shows a cover that can be quickly detached and re-



placed. The cover is slotted at its edges to admit the nails on one side of the box, and screw hooks are used at the other side. In making the examination, it is only necessary to turn the screw hooks so that their ends will pass through the slots and then slide the cover off.—Contributed by D. L. Merrill, Battle Creek, Mich.

Cleaning the Hands of Aniline Stain

To clean the hands after handling aniline stain or dye, first wash them with a little bleaching powder, then with alcohol, and follow with a good soap, such as sand or pumice-stone.

Air Circulation in Furnace Heating

The many faults of a hot-air furnace for residence heating usually arise from an inefficient layout, or lacking study of the conditions concerning the house to be heated due to incompetence of the one installing the plant. A few things must be considered in regard to the location of the furnace as well as the circulation of the air currents. One of the most frequent errors is that the fresh-air supply is not adequate, so that the rooms will become overheated with dead air, producing a stuffy atmosphere.

An insufficient air outlet will cause the same trouble. As much heated air must be admitted to a room as that which passes out, whether through leakage around the windows and doors or through an opening provided for its free circulation.

If a hot-air duct has a register opening into a room without other air outlet than cracks at window and door openings, only little air will be in circulation, as shown in Fig. 1. One method of arranging the inlet and outlet is shown in Fig. 2. While this method causes a complete circulation of air, it does not admit fresh, pure air from the outside.

One of the best arrangements to pro-

vide a good circulation is to construct a furnace so that the heated air will pass into the room, or rooms, from the center, while the return air passes back around the outside of the register, as shown in Fig. 3. The returning cold air will be partly heated as it passes over the jacket of the hot-air space in the furnace. In this method the air currents will take the course shown by the arrows. This method, however, while causing free circulation of the air, does not supply fresh air.

Those desiring pure, fresh air in a residence, or, especially, in halls and schoolrooms which are occupied by many people at a time, must provide some means to supply a continuous circulation of air, taken from the outside, heated, delivered to the rooms through ducts, and then expelled to the outside. While this may be an expensive method, it produces an atmosphere in the room equal to that outdoors on a summer day. Such a system may be modified where fewer persons are concerned, only a small portion of the air being taken from the outside, or a sufficient amount to keep pure heated air inside. This system is shown in Fig. 4. The inlet duct A should have the same area as the combined areas of the ducts delivering heated air to the rooms, or even larger. The warm-air ducts B should enter the

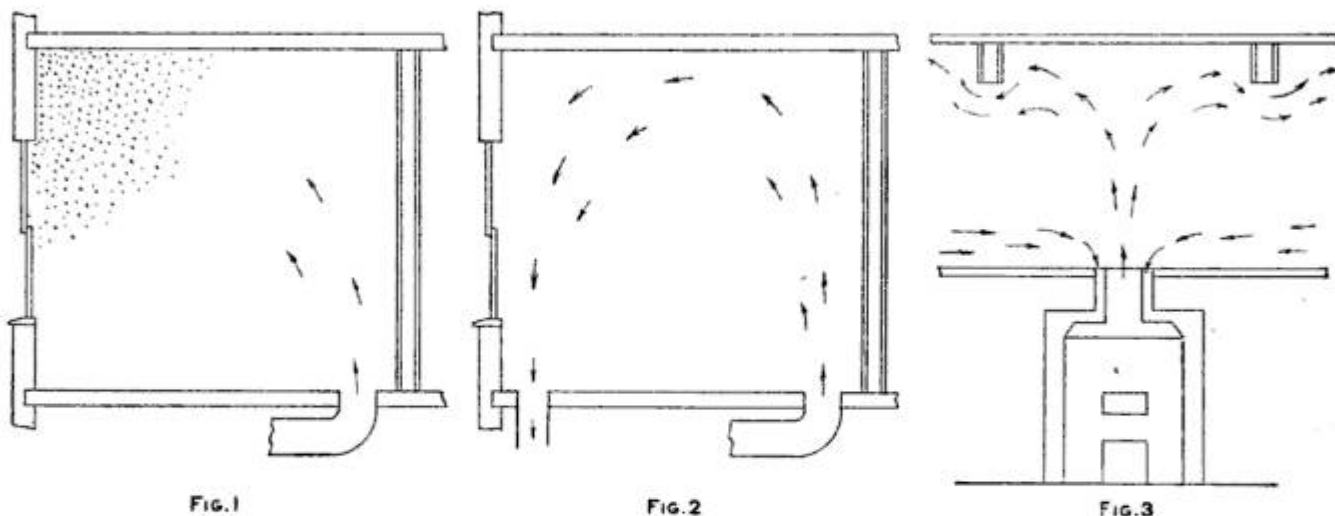


FIG. 1 The Circulation of Air is Impeded by Not Having a Cold-Air Outlet, the Free Circulation being Obtained by a Proper Outlet, Which is Further Aided with Proper Arrangements for Receiving the Cold Air Back into the Furnace

vide a good circulation is to construct a furnace so that the heated air will pass into the room, or rooms, from the

rooms at a height above the average person's head, and the dead or cold, spent air should be expelled through

small registers, C, in the baseboard, into ducts leading to a chimney. This chimney may be one provided for the

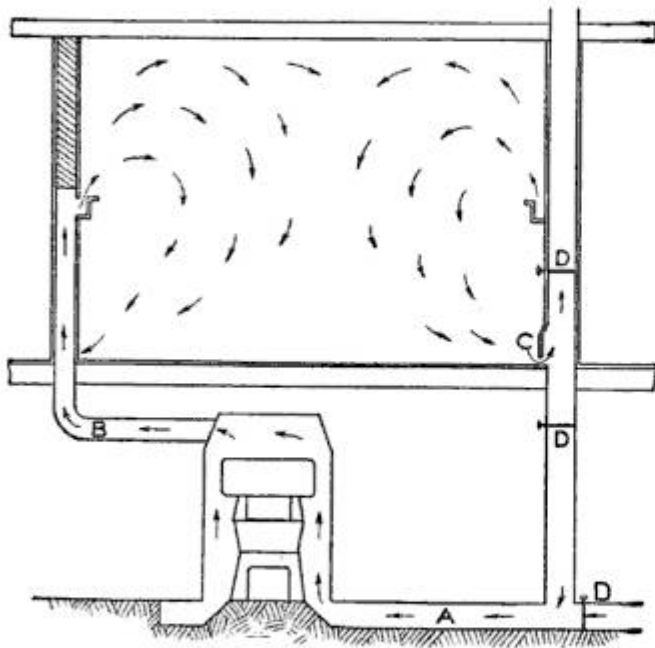


FIG. 4

The Passage of Either Outside or Inside Air, or a Part of Both, through the Furnace is Controlled with Dampers

purpose, but it is better to use a division in the smoke chimney.

The opening into the rooms for the heated air may be made more or less invisible by having them long and narrow, and hiding them with a plate rail or paneling. If the same method is used at the baseboard, nothing will show the presence of the apparatus in the building.

To use only a part of the fresh air from the outside and a part of the cold from within, it is only necessary to have several return ducts from the openings C, to pass the air back to the furnace, and provide dampers, D, to control both the incoming air and the return air.

The outside opening should be located where no high wind can blow into it, and so that the eddies of air will have no tendency to draw the air out of the duct rather than let it pass in freely without being blown in.

Be sure to wipe out a tire casing thoroughly with a damp cloth to remove any grains of sharp sand, as these will scratch and score the inner tube and sometimes cause a leak.

Rubber Cement Used for Pasting Papers

Rubber-patching cement will be found very useful for pasting papers where it is desired to avoid wrinkling or curling, the method being very simple. Use thin rubber-patching cement, which can be further diluted with gasoline or benzine, giving each part to be pasted one or two coats and, when the cement is thoroughly dry, pressing the parts firmly together. It is not necessary to be careful about smearing over the edge, as the dry cement forms a thin film that can be readily removed by rubbing lightly with the fingers.

In making corrections on thin-paper tracings, cut out the part to be changed and fill in with a patch of thin tracing paper, using about 1¼-in. lap. The patch will only show slightly in the finished blueprint. Temporary patches can be removed by moistening with gasoline.—Contributed by H. M. Warren, East Orange, N. J.

An Oil-Hole Cleaner

The gummed and caked oil that plugs an oil hole is not easily removed, and sometimes a bearing runs hot because no oil reaches the moving surfaces. A cleaner for the purpose, much better than an awl, is one having a revolving spindle with an awl or screw point, which can be made as follows: The handle consists of a large file handle to which is attached a spring lever carrying an arc cut from an old egg-beater cog. The spindle revolves in the handle and is kept in place by a washer soldered to it at a point where it will fit



Revolving Spindle will Quickly Loosen and Remove Any Dirt or Caked Oil in a Hole

under another washer fastened to the end of the handle.

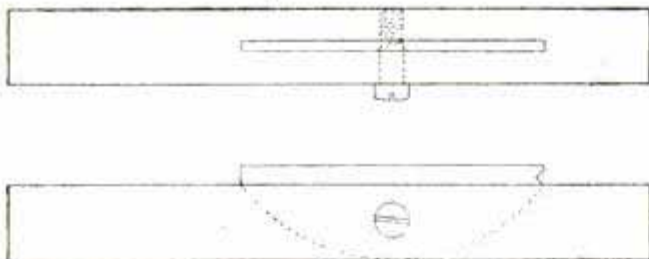
The small cog, also taken from the egg beater, is attached to the spindle where it will mesh into the cogs on the arc. The spring to which the arc is

attached is fastened, as shown, in a slot cut in the handle. This allows the arc of the cogwheel to be moved back and forth by finger pressure, and it is readily seen how easily and quickly caked oil can be removed from an oil hole with this cleaner.—Contributed by Roy Kauffman, Goshen, Ind.

A Burring Tool for Brass Tubing

In cutting a large quantity of brass tubing, a bur was formed on the ends which had to be removed and a slight bevel cut with sharp edges. The cutting of this bevel required a special tool, which was made in the following manner: A piece of round cold-rolled steel, 4 in. long, was procured, a $\frac{1}{16}$ -in. slot milled in its center, as shown, and a piece of $\frac{1}{16}$ -in. tool steel was then fitted to it as a cutting tool. The steel had a notch filed in it to shape the end of the tube as desired.

The tool was placed in the chuck of a drill press which was run very fast.



Tool Used for Removing Burs Formed by Cutting Tubing with a Roller Cutter

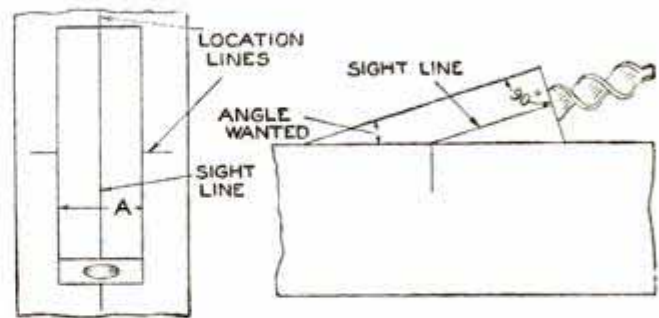
The pieces of tubing were pushed on over the end of the cold-rolled steel and up against the rapidly revolving tool which removed the bur and beveled the edges.

Boring Holes in Wood at an Angle

The hole to be bored is located by squared lines as in ordinary work, then the jig is made, the thickness A being twice the size of the bit, the other sides depending on the angle, which is cut as required. Lines are drawn on the faces of the block so that it can be readily set on the work where it is fastened with nails.

The device can be used repeatedly, if a dowel point, about $\frac{1}{2}$ in., is in-

serted in the longest face and cut off at the correct angle. The dowel holds the block while the bit starts into



An Angle Block for Holding a Bit to Bore a Slanting Hole in Wood

the work.—Contributed by Edwin E. Hahn, Philadelphia, Pa.

A Support for a Breast Drill

It often occurs that the drill point of a breast drill breaks, especially if it is small, and hard material is worked. This difficulty seems to be effectively overcome by attaching to the drill the device shown herewith. It consists of a clamp having in its upper flattened end a slot through which the handle of the drill is inserted and screwed tightly, and at a lower point a screw clamp fitting just above the drill chuck. In a sleeve, in one piece with or otherwise attached to the clamp, slides a rod, the movement of the latter being controlled by a spring within the sleeve. This rod forms a second support for the drill and as the latter penetrates into the material, the rod is backed up into the sleeve, while the spring, acting contrary to this motion, holds its end firmly against the work or



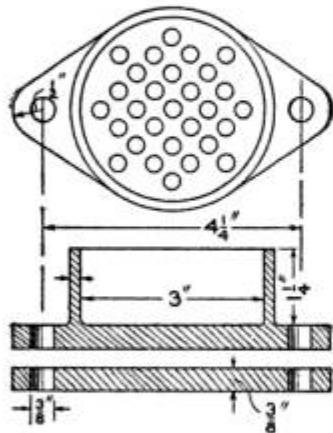
The Support on a Breast Drill for Preventing the Breaking of Small Drills

some surface beside it. The vibration of the drill bit, which is the cause of breakage, is eliminated by this double support.

CA 5-gal. can with a tapering top and the bottom removed makes an excellent funnel for filling automobile tanks.

A Pneumatic-Tire Vulcanizer

The base of the vulcanizer can be made of a piece of iron, about $\frac{3}{8}$ in. thick, but it is best to make a pattern



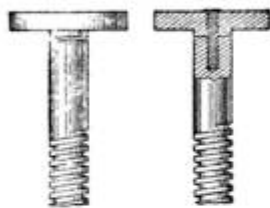
and have one cast so that it will finish to the dimensions given. After being machined, 29 holes, each $\frac{3}{16}$ in. in diameter, are drilled in the base of the cup as nearly equidistant as possible. Pins are inserted tightly in these holes with their upper ends flush with the top. Make a plate, the same size as the base of the cup, and drill holes to match those in the ends of the cup base so that this and the plate can be clamped together with the tube or tire between them. Fill the cup with gasoline and light it, and the heat generated will vulcanize the rubber nicely.—Contributed by G. Crawford, Jr., Schenectady, N. Y.

Temporary Repair on a Broken Valve Spindle

The breaking of a brass valve spindle is of no uncommon occurrence and the break invariably takes place at or near the top of the shoulder that secures the valve seat, or disk, to the spindle.

When such a break happens on a piece of machinery far from a repair shop the repair can be made on the spot, as taps and drills of some kind are almost invariably to be found in the engine room, and with these tools it is a simple matter to temporarily repair the spindles.

File off the lower end of the broken spindle squarely and remove the part remaining on the shoulder plate. Center the two pieces and drill a hole, for the size of tap to be used, through the plate and a short distance into the

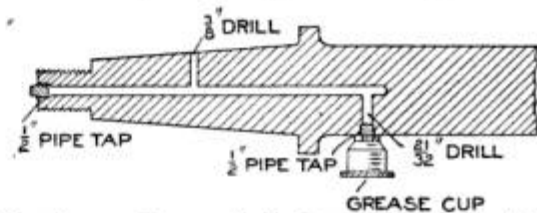


spindle. Tap both holes and connect the parts with the threaded end of a common machine bolt, and cut it off to allow sufficient end for beading over a small portion against the shoulder plate. This method will often permit a valve to give efficient service until a new spindle can be made.—Contributed by F. W. Bently, Milwaukee, Wis.

Grease Cup for Wagon Wheels

Drill a hole, $\frac{3}{8}$ in. in diameter, in the center of each axle and connect it with a hole of the same size just back of the shoulder on the spindle and on the under side of the axle. This is the right size hole to tap for $\frac{1}{2}$ -in. fittings. The center of the spindle is drilled with a $\frac{3}{8}$ -in. drill to make a hole intersecting the horizontal one.

A $\frac{1}{2}$ -in. plug is turned into the end of the hole, and a grease cup fitted on



The Grease Cup as It is Attached to the Skein of a Wagon

the under side, as shown. In greasing the wheel, turn the cup down sufficient to force the grease into the axle.—Contributed by W. E. Crane, Cleveland, O.

A Preventive of Grimy Hands

A thorough scrubbing will not remove the grime and dirt that seem to work right into the skin on the hands when handling some makes of electric wires or working about machines that are covered with oil and dirt. A correspondent of Electrical Review uses a coating thoroughly rubbed on the hands before starting to work which prevents the grime from entering the pores of the skin. The preventive consists of 4 oz. of grain alcohol, 3 oz. of glycerin and 3 oz. of water. The mixture quickly dries on the skin, and after work a washing with soap and water will quickly remove all the dirt.

— D. N. X 1 U 5)
2, 15

A Windmill *S. N. X 1 (15) 2151*

By WINTON BALL

A windmill, or motor, that will run in any direction of the wind, and one that requires only ordinary mechanical skill to construct, may be built as hereafter described and, if properly constructed, will prove efficient for all purposes for which a windmill may be used.

Make two semicircular disks of strong boards with a radius one-third of the size of the wheel wanted. Cleat them together securely so that one point of each half will touch at the center of the other, as shown in Fig. 1, the points A, B, C, and D being equal distances apart. The center E is located exactly midway between points A and D, and, consequently, also between B and C. The mill will require four such parts, two of which are fitted with cast-iron flanges with holes to fit on the shaft to be used. One of the flanges is shown in position at F. The remaining two wood parts are bolted together at right angles to each other, as shown in Fig. 2. These two parts can also be fitted with a flange, if desired.

Place the two single parts, one on either side of the double one, allowing a space of about 2 ft. between them,

Fasten them together with ceiling boards, or preferably sheet iron, nailed

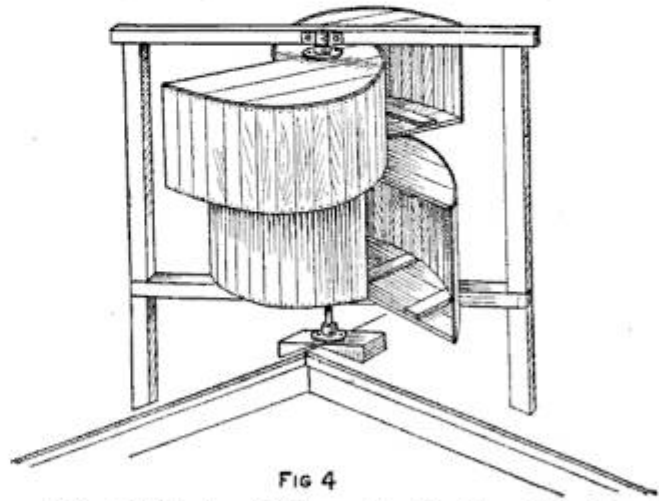


FIG 4

The Mill, being Built on the Turbine Principle, can be Run in Any Air Current

to the periphery of the disks. Good canvas may be used if a flange is fastened to the center part, so that the three parts of the frame can be securely fastened to the shaft.

The straight sides are left open for the air currents to pass through the S-shaped openings, thereby counterbalancing almost all the back pressure on the returning side of the wheel, as shown by the arrows in Fig. 3. The construction of the wheel makes two S-shaped chambers at right angles to

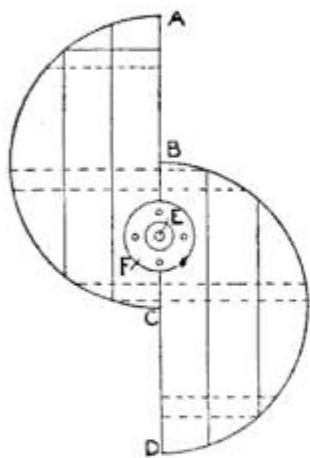


FIG. 1

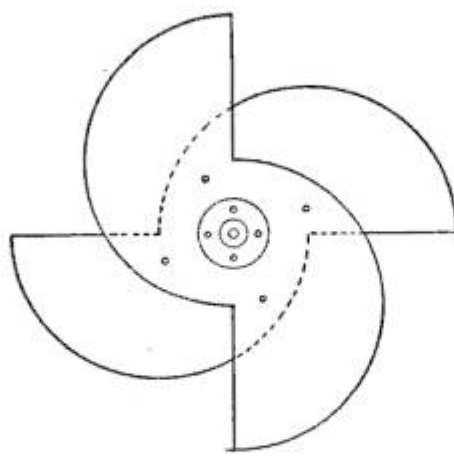


FIG. 2

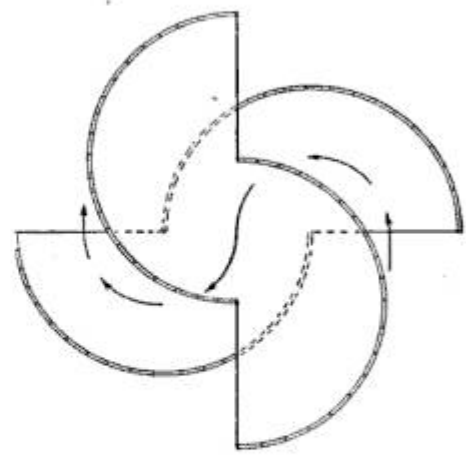


FIG. 3

Detail of the Parts to Construct Air Chamber That Directs the Outgoing Air against the Inner Surfaces of the Part Returning toward the Wind, thus Counteracting the Back Pressure on the Outside

with all the arcs corresponding. The distance these parts are separated will vary according to the size of the wheel.

each other. A large wheel must be assembled on the tower. The windmill complete is shown in Fig. 4.

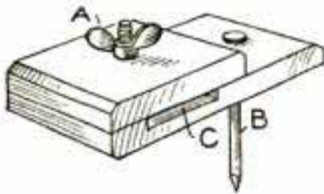
Scribing a Line Encircling Round Stock

In cutting pieces $\frac{1}{2}$ in. long from round bar stock with a hand hacksaw, it was almost impossible to cut them off squarely, but I found that I could follow a line with the saw blade if it was scribed straight, encircling the bar. This I accomplished with the aid of a visiting or postal card, wrapped on the bar so that one edge was at the right place, and by using a scribe against it as with a straightedge.—Contributed by Robert Adams, Philadelphia, Pa.



Clamps to Hold Rugs While Beating Them

The clamp shown in the sketch is for holding a rug straight on a lawn while beating it. One clamp is used at each corner of the rug. Each clamp consists of two blocks of wood, one spike and a bolt with a thumb nut. The thicker part of the rug at the edge is placed into the notch C, and the bolt A is tightened on the clamp. The spike B is easily pushed into the ground when the rug is laid out flat.—Contributed by H. W. Hahn, Chicago, Ill.



Tile-Outlet Cover

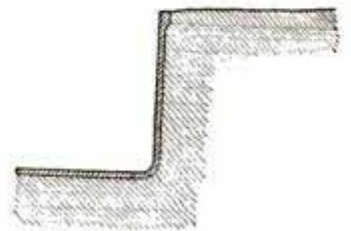
A great deal of trouble is caused by small animals entering the tile at the outlet of drainage systems where they are apt to get stuck in the narrow opening and stop the flow of water. It is very difficult to locate the point of obstruction and much expense is often incurred in finding it. The trouble may be prevented very easily by attaching a wood frame over



the outlet and hinging a wood door to it at the upper edge. This door will be held open by the outflowing water and, while not obstructing the flow, prevent any animal from entering. When there is no flow of water the door covers the outlet completely.—Contributed by Thos. L. Parker, Wibaux, Mont.

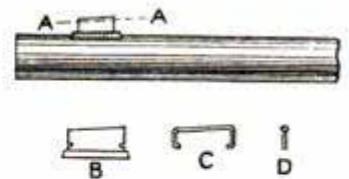
Making Section Lines for Patent-Office Drawings

When making drawings for the patent office the conventional symbols and cross-section lines must be closely followed. One of the rules that must be carried out is the wavy line showing earth, and a correspondent of American Machinist draws these lines rapidly by using a piece of bristol board the straight edge of which is nicked with the thumb nail. This is used as a ruler, which draws wavy lines as shown in the sketch.



A Gold Front Sight for a Rifle

The salt spray present in the air along our coasts is ruinous to metal gun sights, but an efficient and inexpensive gold-crowned front sight may be made as follows: The top of the plain front sight is filed down about $\frac{1}{16}$ in., as shown by the line AA in the sketch. Two notches are cut in the base of the sight, as shown at B. Using a heavily plated nose piece of a pair of eyeglasses, a bracket, C, is formed to fit the prepared sight snugly. Solder is applied to the ends only. This will prevent any discoloration on top of the sight. A good bead effect is obtained by cutting off the sides of the bracket, as shown at D.—Contributed by C. F. Heizer, Falfurrias, Tex.



Cleaner for Aluminum Ware

The following formula will be found useful in making a solution for removing the tarnish from the inside of aluminum pots and pans: Dissolve 2 oz. of lump ammonia in 1 qt. of water; 2 oz. of salts of tartar in 1 qt. of water, and a 10-cent can of potash in 2 qt. of water, while boiling. Add to the latter solution the ammonia, then the salts-of-tartar solutions, in order named, and boil the whole mixture for 30 minutes. This solution is kept in jars for use at any time.

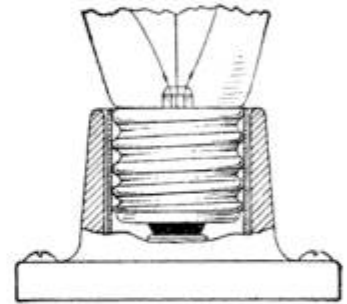
Place a small quantity of the solution in the vessel to be cleaned, set it on a fire and allow it to boil, but be careful not to let it boil over on the polished surface. Keep it boiling for about two minutes, then rinse out and use any good cleaner to scour the surface. This will restore the satin finish as when new.—Contributed by Nellie Dempsey, New York City.

Preventing Needles from Rusting

Workmen repairing sails or doing similar work outside can prevent their needles from rusting in the following manner: Fill a brass shotgun shell with a thick grease that will not run and insert the needles in it. If a 12-gauge shell is used, a cover can be made of a 10-gauge shell.—Contributed by Forrest Clark, Coronado, Cal.

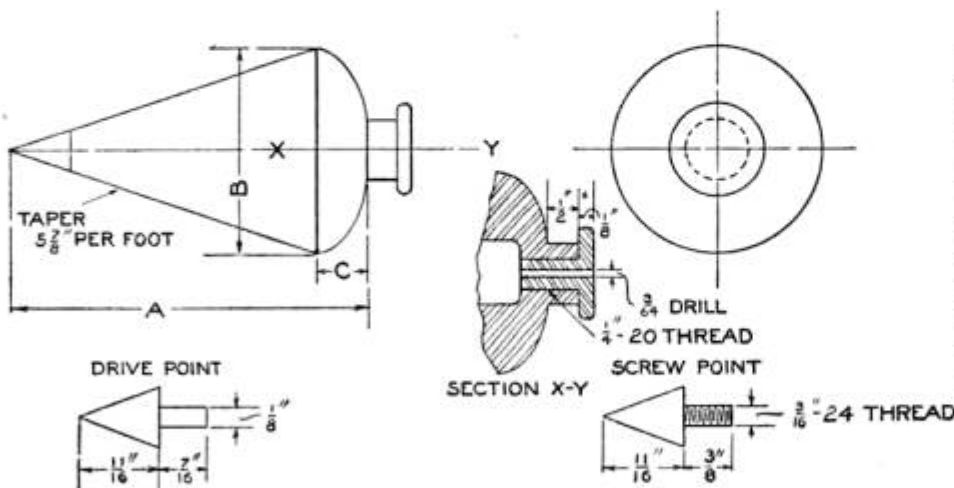
Electric-Lamp Tester

Where a large number of incandescent lamps are used a great deal of time is consumed in turning the lamps into and out of an ordinary socket for testing the filaments to see that they are not broken. The following device eliminates the disadvantages of the threaded socket and effects a great saving in time.



The device consists simply of an ordinary porcelain lamp socket, that has had the inner screw shell removed and the threads hammered out on a piece of 5/8-in. pipe and then replaced. The inside diameter of the shell after it is hammered out should be large enough to permit the threaded base of the lamp to slip into it. Lamps may be rapidly tested by sliding them into this socket and there is no more likelihood of a short being produced on the line than there was before the socket was changed. A partial cross section of such a socket is shown in the accompanying sketch.

Beeswax or soap placed in a screw slot will make it stick to the screw-driver blade for starting.

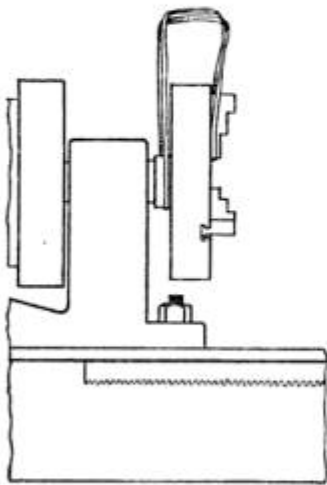


| SIZE | A | B | C |
|----------|--------|-------|-------|
| 4 3/4 OZ | 2 1/2 | 1 1/8 | 7/32 |
| 6 " | 2 3/4 | 1 1/4 | 1/4 |
| 7 1/2 " | 3 | 1 3/8 | 9/32 |
| 9 1/2 " | 3 5/8 | 1 1/2 | 5/16 |
| 12 1/2 " | 3 5/8 | 1 5/8 | 11/32 |
| 14 " | 3 7/8 | 1 3/4 | 3/8 |
| 19 " | 4 3/16 | 1 7/8 | 3/8 |

Drawings, with a List of Dimensions, for Making a Series of Plumb Bobs, Each of Which Has the Right Proportion for Its Size and Weight

How to Remove Large Chucks from Machines

An easy and convenient way to remove a chuck from a turret lathe, or other machine, is to form a sling of belt lacing to hold it



with one hand while the other turns the spindle by the belt.

In the ordinary way one has to hold the chuck while turning the belt. This lets the chuck fall when it comes loose and sometimes results in cutting or bruising the hand.

It is much better and quicker to take two lengths of belt lacing and tie the ends together to form an endless piece. Place one loop around under the flange of the chuck and the other under one jaw. This forms a sling which can be taken in one hand over the chuck while the other pulls the belt to turn the machine spindle to unscrew it from the threads.—Contributed by Chas. A. Thissell, Beverly, Mass.

ing and a piece of rod in the smaller one. The clamping is done in the ordinary manner. I have used such a clamp on pressures up to 200 lb. without a single failure.—Contributed by Wm. G. Toplis, Philadelphia, Pa.

Repairing a Worn Plunger

A pitted or corroded plunger or rod may be repaired by cleaning out the corroded portions and filling them with solder, babbitt metal, or block tin a little higher than the surface of the rod. The uneven portions can then be filed or turned down in a lathe to a level with the surface of the rod. A brass rod can be repaired easier than one of iron, as the solder adheres to it more readily.

Pole-End Clasp for Handling Ceiling Globes

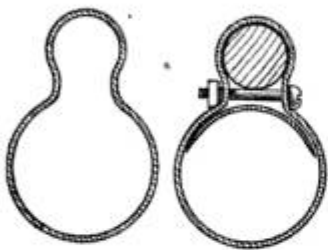
The incandescent globes, comprising a rigid ceiling cluster, or the individual light, are often located at a height from the floor which renders them inaccessible for removal without the aid of a stepladder or scaffolding of some kind.

The sketch shows a simple device by means of which lights, located at almost any distance from the floor, can be easily and readily removed. The four grip fingers are of $\frac{1}{16}$ -in. spring steel and are bolted at their lower ends to a 1-in. pipe coupling. Their upper ends are wrapped with tape, which gives a strong frictional grip on the glass so that the lamp can be turned from its socket in spite even of corrosion which often covers the coarse thread of the screw.



A Hose Clamp

The hose clamp illustrated herewith will hold high-pressure hose securely. It is easy to construct, being made of seamless brass tubing, about $1\frac{1}{2}$ times the diameter of the hose. The wall of the tube should be about $\frac{1}{16}$ in. thick. A section



is cut from the tubing about 1 in. long for ordinary sizes and placed on the hose, then bent to fit the latter loosely, making the shape similar to a figure 8. A hole is drilled through both walls of the metal, at the narrowest part, to admit a large stove bolt loosely. The hose is placed in the larger open-

The handle can be made in sections, if necessary, to reach a ceiling of any height. With the assistance of this simple and inexpensive device the removal and application of incandescent globes in any overhead location is an easy task.

Practical Telephony

By HAROLD HINTON

Part VII—Laying Out the Telephone Plant

Laying out a telephone plant is a very complicated operation and requires a great deal of thought, expense, and planning on the part of the engineering force. First it is necessary to obtain a franchise to operate the system within certain boundaries, the franchise usually providing a tariff prohibiting the company from raising its rates after it has gained a foothold in the territory. The franchise procured, a "development study" of the vicinity where the company is to start operations comes next. This development study is made to ascertain and determine, so far as possible, what the future growth of the community will be and what direction, or directions, it will take. From this development study the plans are made for laying out the plant, and these plans must not only take care of the present population, but be so arranged that they can be readily extended to care for the future as well.

When the Bell Telephone Company first entered the field of telephony such things as lead-covered cables were unknown, and almost unthought of, in telephone construction. The method of construction in vogue at that time

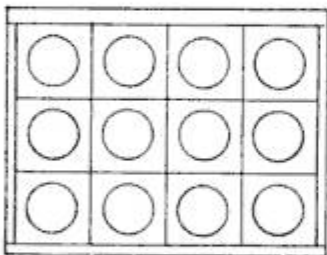
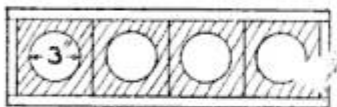


Fig. 43

was simply open-wire, the wires starting from the roof of the central office and being led down the outside walls of the exchange and across the ceiling of the terminal room to the arresters. This method was all right for a time, but with the growth and advancement of the country, it was soon inadequate for the company's needs, and about the year 1883 the first 50-pair lead-covered cable was placed.

This was a great step in advance, and the cable proposition looked so good that it was rapidly developed until now there are, in the larger cities, 800-pair

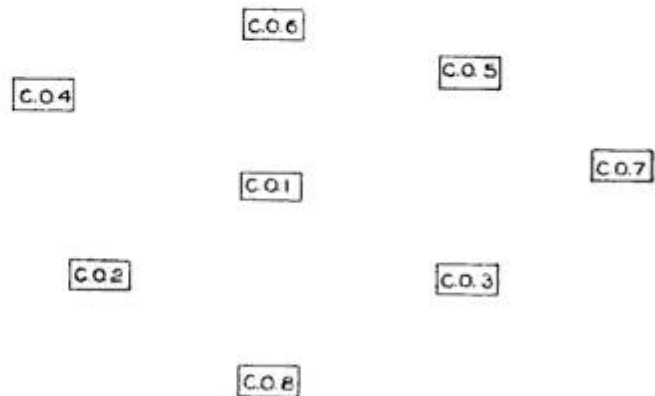


Fig. 44

The Manner of Locating Several Central Offices to Take Care of Increased Business

underground, lead-armored cables. What this means can be realized when one reflects that 800 pairs of wire would occupy one hundred and sixty 10-pin crossarms in open-wire construction, whereas, in cable form, they readily pass through one 3 $\frac{1}{4}$ -in. hole. Of course, when cables first came into use, they were not made as the cables of today, but were heavily insulated with paraffined cotton instead of paper, and, consequently, the old 50-pair cotton-insulated cable was as large as, and a great deal harder to bend and set up than our present-day 200-pair paper-insulated cables. The coming of the cable made necessary the heavy expense of the underground-conduit systems, or subways, in which to carry it, and these were constructed of creosoted-wood ducts, called "pump logs," which were boxed in with creosoted plank, as shown in Fig. 43. These subways were built and the cables drawn in and spliced up as fast as the finances of the company would permit, and the overhead construction was removed as these underground cables were ready for use. This method remained in use until the number of subscribers in the

central office became so great that there was no available room for more equipment, and other exchanges must be

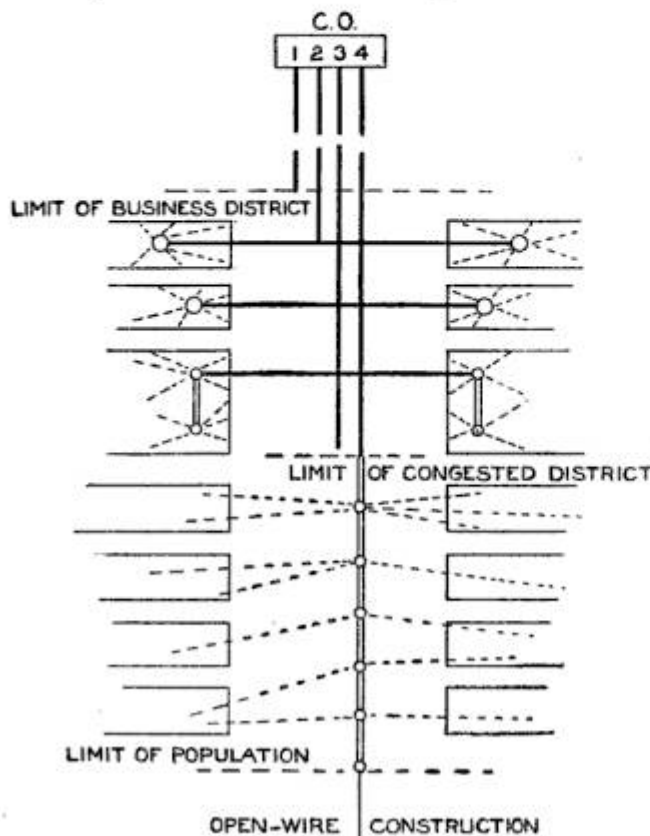


FIG. 45

Underground Cables, Aerial Cables and the Open-Wire Construction in a Straight Line from the Central Office

built, and "trunking circuits" established between them and central. Figure 44 shows the order in which the exchanges were usually built, one at a time, and added to the existing plant. Central office No. 1 is intended to show the original office which was, of course, located in the heart of the old business section, and numbers 2, 3, 4, 5, 6, 7, 8, etc., were added to the plant as the town grew and more telephone equipment and better facilities were required. It is in the laying out of the exchange districts that the experience of the engineer who made the development study is brought into play, as when one central office is built it is necessary to make arrangements for the next one, which may not be built for 10 or 20 years, and see that the ducts and pole lines run in the general direction, so far as possible, of the future exchange.

The layout of the telephone plant, in most cities today, consists of under-

ground cables which are either taken directly into the building to be fed, or run up the rear wall of the building, where the connections are made from a terminal box to the various instruments within the building, the terminal boxes, in some instances, being placed on a pole in the center of the block and all drops in that block run from this terminal; underground block cables in the thickly populated residence districts; aerial cables in the more thinly populated districts, and open-wire construction in the suburbs. A straight-away section of cable from the central office to the far-off suburbs is shown in Fig. 45. The heavy lines represent the underground cables; the double lines, aerial cables; the single lines, open-wire construction, and the dotted lines, the method of grouping the drops, or wires, which run from the terminal to the instrument.

The independent companies, on the other hand, had the big advantage of having the population settled before they started to lay out their plants, and were, therefore, in better shape to arrange things so that the whole equipment could be installed in one central office instead of half a dozen, or more, as is necessary when building up with the town. This naturally means a large saving in the erection and equipment of a number of branch exchanges; places one force of men in charge of the terminal room instead of having separate forces, each consisting of from three to six men, in each branch exchange; does away with all the "trunking operators"; eliminates all but one chief operator; reduces the number of supervisors, etc. The independents also had the advantage of having built up their plants, in the majority of cases, with underground and block-cable construction in the first place, so that they have not the heavy expense of building underground and then cutting over the lines and removing the old open-wire construction. (Cutting over the lines into the new underground cable and removing the old pole line usually amount to from 30 to 50 per cent of the cost of the new construction.) The

independents were also enabled to install, at no greater expense to themselves, a more modern and, in some ways, a more efficient system, and greatly reduce the operating expense, which is one of the largest items of expenditure in connection with any telephone system.

The method of construction which the independents were required to follow in most cities which they entered in the last 10 years is shown in Fig. 45. They were not allowed to run aerial cables or build open-wire leads on any street in the congested or thickly populated districts, nor on any street in the better class of residence streets, but were required to use a system of "block construction" which removes their poles almost entirely from the streets by running branch cables down the center of the block which they desired to feed, and always carrying their cables underground when crossing the street. Blocks, lettered "A," show long blocks where the cable is carried underground to a pole in the interior of the block and then in the air to a pole at the other end of the same block where it again enters the ground. In blocks, marked "B," the cable is carried underground continuously, except at the pole, where

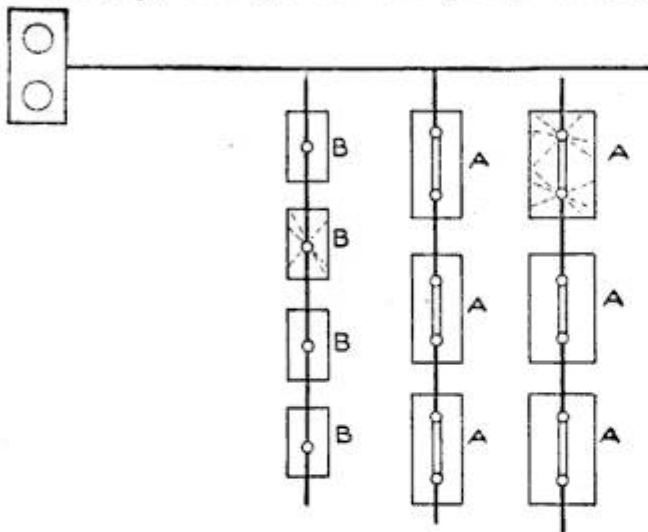


FIG. 46

The Method of Underground Block Construction, Used by Independent Companies in Laying Their Cables

a small manhole, handhole, or service box is constructed so that a cable may be run up the pole to a terminal and spliced into the underground block

cable at the foot of the pole. The meaning of the heavy, light, and dotted lines is the same in Figs. 45 and 46.

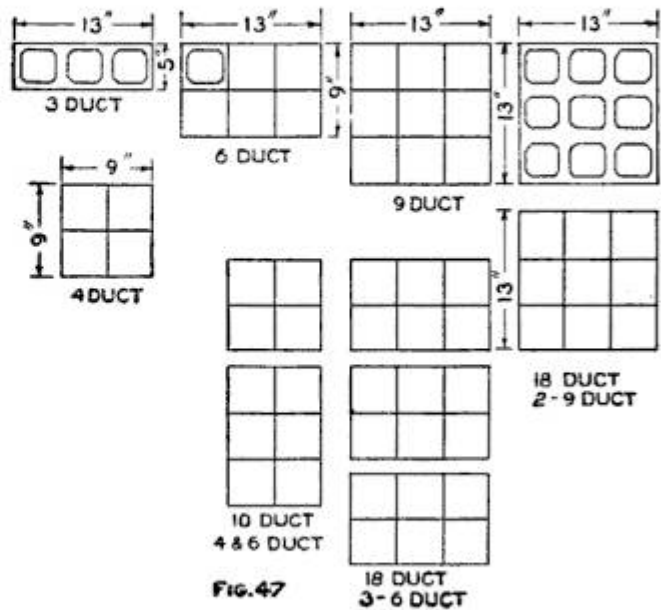


FIG. 47

Vitri-fied-Clay Tile Used to Take the Place of the Old Pump Logs in Underground Ducts

Of course, the system of placing the wire plant underground is the best for all concerned, but the initial cost is greatly in excess of pole-line construction, although the subway will pay for itself in a few years by the saving in maintenance charges and replacement of poles, etc., which is necessary with an open-wire or aerial-cable lead. The writer has, when building new subway of vitri-fied-clay tile, forms of which are shown in Fig. 47, excavated old pump-log subway which has been underground for over 25 years, and was greatly surprised to find it still in excellent condition. The large cables of the present day, however, require a subway which has larger ducts and smoother interior surface than the pump logs, although the latter are still used extensively for small lateral cables, running from the main cable to a pole or building, which are seldom larger than 200-pair, and usually from 26 to 76-pair.

Even when a subway is figured on for running the cables in, there is still considerable work for the engineers connected with it in locating the "run," or position it is to take in the street. Most city engineers try to keep all sub-surface work on one side of the street, and picking a location is a hard propo-

sition, as there is usually a water main; a sewer; one or two gas mains; the opposition telephone company's subway; the electric-light company's subway; the Western Union and Postal Telegraph Companies, each with its own subway; and sometimes the city fire-alarm subway, although the city

usually reserves a duct in one of the telephone company's subways for its fire alarm. Sewers are usually placed in the center of the street with the water main laid in the same trench and will, therefore, as a rule, be encountered only when making a street crossing.

(To be continued)

Reversed Action of Oars

The ordinary oar of a rowboat makes the rower sit facing astern with the back toward the way the boat is traveling. The inconvenience of not being able to see in the direction the boat is going is similar to walking backward. In striving to overcome this difficulty I constructed the device shown in the illustration to give a reversed action to the oars.

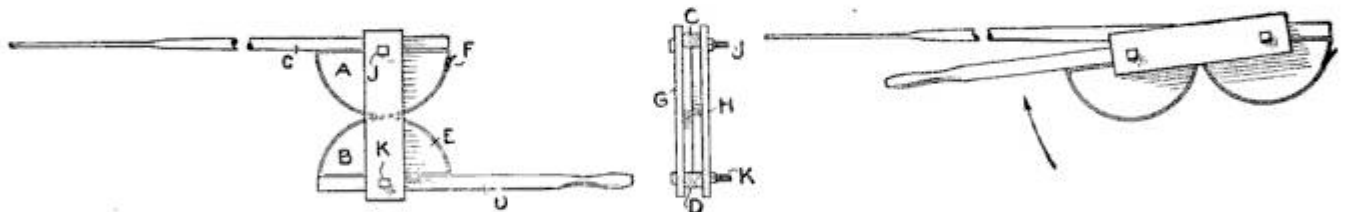
The apparatus consists of two wood segments of circles A and B, cut from material 2 in. thick with a radius of 8 or 10 in. The oar C and handle D are attached as shown. Around the two segments, and almost making a figure 8, is a 1-in. leather strap, E, fastened with a buckle, F. This single belt passes around both segments, crossing over itself at the point where the segments touch. The action is similar to a reversed belt connecting two pulleys with their faces close together, but in this case the leather is nailed down on the flat side of each segment. This forces the segments to move closely together without the slightest slip, producing the same effect as a pair of perfectly constructed cog wheels.

These bolts should be long enough to have extending ends which fit into holes bored in the gunwale and of a size to receive them loosely. This will give the up-and-down motion to the oar.

The oars are used in exactly the same manner as in ordinary rowing, and as the leather is quite flexible and there are only two pivots there is little friction. If the leather stretches, it can be taken up with the buckle which is on the slack side. The entire arrangement can be lifted out as an ordinary oar, and it has the additional advantage that it may be folded up, as shown.—Contributed by Sam Gluck, New York City.

Preserving Ox Gall

Users of ox gall in the paper-ruling trades find that, two or three days after dissolving the deodorized ox gall in hot water, it will turn to slime, which will render its further use impossible. For a number of years I have been throwing this mixture away, making a fresh one, but by experiment I put in a teaspoonful of liquid ammonia to each quart of mixture and was surprised to see it clear almost instantly.



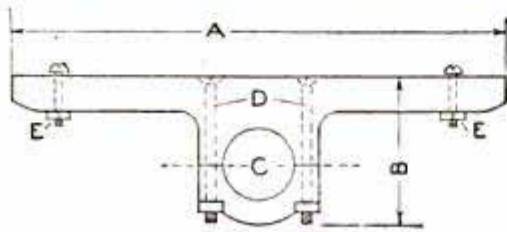
Arrangement of the Parts to Give a Reversed Action to the Oar, Permitting the Rower to Sit in the Boat Facing the Direction of Travel

The connecting or cross strips, G and H, are made of hard wood. The bolts, J and K, hold the crosspieces and each makes a bearing for one segment.

The ammonia seems to increase its efficiency rather than to be harmful.—Contributed by Rudolph I. Wilson, St. John, Can.

Number Holder for Automobiles

A number holder can be cut from a piece of hard wood that will serve the purpose as well as one made of metal, and the work can be done with ordinary tools. The shape of the holder is shown in the sketch, the distance A being the length of the number plate and the distance B wide enough to allow the plate to hang in front of the radiator when the holder is fastened to the radiator neck. A hole, C, is bored through the wood to fit the radiator neck and the wood sawed in two on the dotted line. Bolts, D, are used in

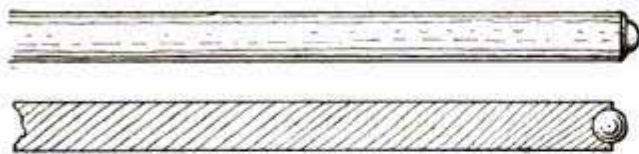


A Number-Plate Holder Made of Hard Wood and Fastened to the Radiator Neck

clamping the parts on the neck. Small bolts, E E, are used to fasten the number plate on the holder.—Contributed by Earl R. Hastings, Corinth, Vt.

Holding Pearls While Drilling Them

Hollow out the end of a piece of peg wood and fill the cavity with gum shellac. Imbed the pearl in the cement as shown in the sketch and, after filing a



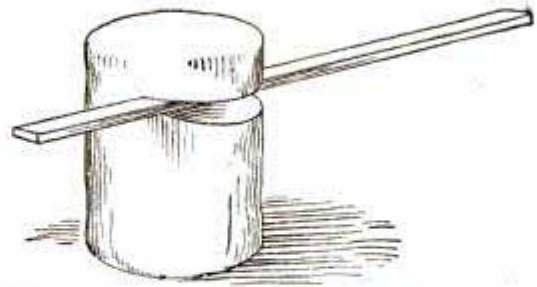
The Pearl is Securely Held in the End of the Wood While Drilling the Hole

little to make a flat surface, the drill is easily started.—Contributed by Wm. A. Jones, Raleigh, N. C.

A Wood-Breaking Block

Firewood, such as scraps of boards, is often more easily broken up into stove wood than if sawn or cut with an ax. I rigged up a block, about 15 in. high, and cut a notch about 8 in. deep, tapering from 2 in. in width at the outside to 3/4 in. at the bottom. By plac-

ing the firewood into the notch, as shown, the pieces are easily broken with an ax or hammer. The block

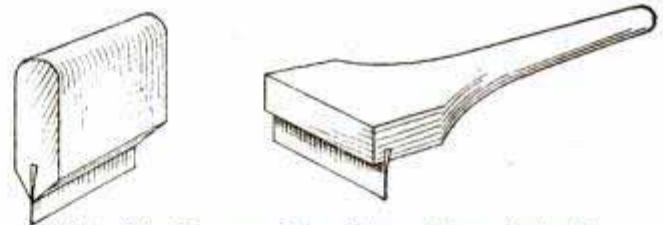


Block for Holding Firewood for Breaking It Up into Stove Lengths

should be fastened solidly.—Contributed by John V. Loeffler, Evansville, Indiana.

A Wood Scraper

A useful wood scraper and stencil-mark remover can be made by attaching a handle of the desired shape to a discarded safety-razor blade. The tool will be found very handy in a cabinet shop. The opening for the blade should be a close fit, so that a new one can be

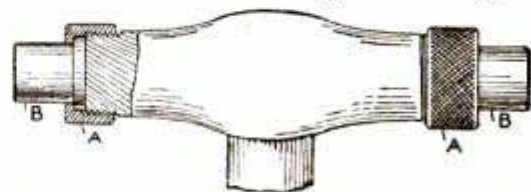


The Handles may be of Any Shape Suitable for the Work at Hand

easily inserted when necessary.—Contributed by W. A. Jaquythe, San Diego, Cal.

Soft Faces for a Hammer

The head of the hammer is made of soft steel with threaded ferrules, A A, to hold the soft faces B B. The ferrules are knurled to make them easily turned with the fingers. Any kind

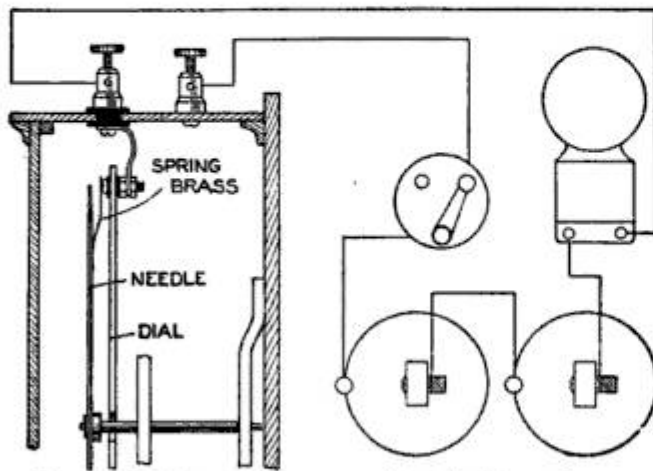


Any Kind of Soft Metal Face can be Used on the Hammer Head

of a soft face made of fiber, leather, copper, or brass can be turned up and kept on hand for different work.

An Automatic Pressure-Gauge Alarm

Any ordinary pressure gauge may be easily equipped with a simple, home-made contact device operated by the needle on the gauge, which may be



Contact Points as They are Attached to a Gauge for Closing a Bell Circuit

connected in series with a vibrating bell and battery, so that the combination will serve as an automatic alarm, giving the engineer an audible signal when the pressure has exceeded or dropped below a previously determined value. A contact device for this purpose may be constructed as follows:

Carefully remove the glass front of the gauge, and then the needle from its spindle. The end of the shaft upon which the needle or pointer is mounted is usually tapered and the needle simply forced on, so that great care should be exercised in removing the needle to make sure the shaft is not bent, nor its bearings or other parts of the gauge injured. Then, on the under side and at the outer end of the pointed end of the needle, fasten a very light piece of spring brass that is to wipe over a contact to be mounted on the face of the instrument. This contact is fastened on the face in such a position that the spring on the needle is in contact with it, when the needle indicates a pressure corresponding to the value at which the alarm is to be given; and it should, of course, be insulated from the dial and in turn connected to a binding post mounted on the outside of the frame, or containing case, of the gauge and insulated from it. A second binding post is mounted

on the case and electrically connected to it. These two posts form the terminals of the contact device and are connected in series with the bell battery and a small single-pole switch.

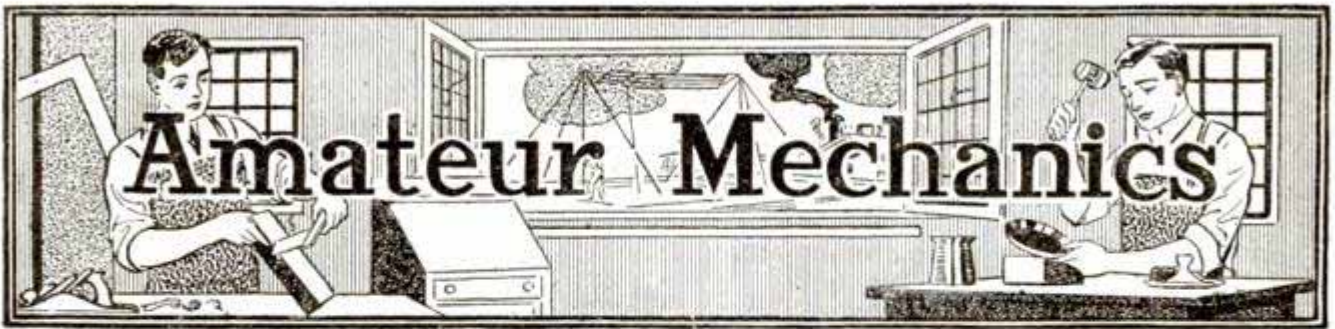
In remounting the needle make sure that it occupies the same position on the dial when there is no pressure acting on the gauge that it did before it was removed. The spring on the under side of the needle should be very light and flexible, and so adjusted that it will wipe over the contact on the dial with a minimum friction. It would, no doubt, be best to mount a small piece of platinum both on the end of the spring and on the contact where they touch each other, to reduce the trouble due to corrosion and arcing.

A diagrammatic sketch of the contact device and circuit is shown herewith. One or more additional contacts may be mounted on the dial and connected to other binding posts, which in turn may be connected in series with bells of different tones. If two contacts are used, one may indicate an excessive pressure and the other a reduced pressure.

A Bench Stool on Wheels

In my regular work, consisting in repairing electric fans, smoothing irons and other small appliances, I find that walking back and forth in front of a 22-ft. bench to get certain tools and materials required for the particular work in hand becomes more tiresome than the work itself. To remedy this, I conceived the idea of putting my stool on small flanged wheels to roll on a hardwood track laid on the floor in front of the bench. It is now an easy matter to reach the test set, at one end of the bench, or the vise, at the other, without leaving my seat. To insure steadiness and permit rapid rolling, the wheel base should be about 3 ft. long.—Contributed by Chas. K. Theobald, Vicksburg, Miss.

ⒸNever rub a polished varnished surface with a dry chamois skin, as it will surely scratch it.



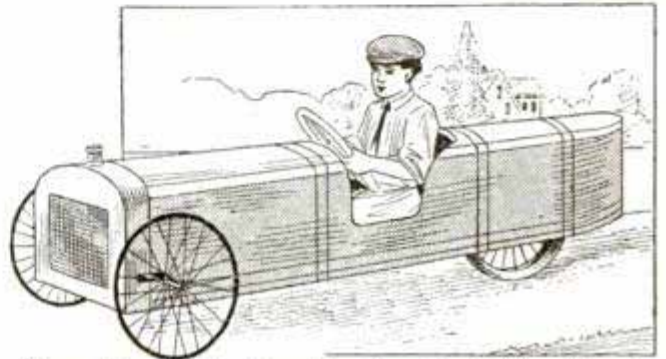
A Cyclemobile

By FRANK PFEFFERLE

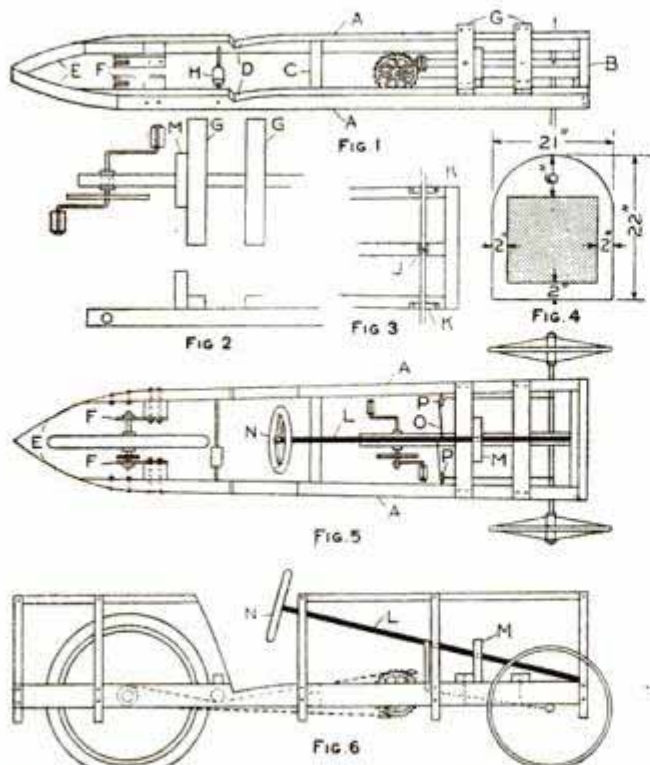
The cyclemobile is of the three-wheeled type and can be easily constructed in the home workshop with ordinary tools. The main frame is built up of two sidepieces, AA, Fig. 1, each 2 in. thick, 4 in. wide, and 7 ft. long, joined together at the front end with a crosspiece, B, of the same material, 17 in. long. The sides are placed slightly tapering so that the rear ends are 11 in. apart at the point where they are joined together with the blocks and rear-wheel attachments. A crosspiece, C, 13 in. long, is fastened in the center of the frame.

The place for the seat is cut out of each sidepiece, as shown by the notches at D, which are 2 ft. from the rear ends. Two strips of wood, E, $\frac{1}{2}$

in. thick, 4 in. wide, and 22 in. long, are fastened with nails to the rear ends of the sides, as shown. The rear wheel



Three-Wheeled Cyclemobile Propelled Like a Bicycle and Steered as an Automobile



Detail of the Parts for Constructing an Automobile-Type Foot-Power Car

is a bicycle wheel, which can be taken from an old bicycle, or a wheel may be purchased cheaply at a bicycle store. It is held in place with two pieces of strap iron, F, shaped similar to the rear forks on a bicycle, and each piece is bolted to a block of wood 3 in. thick, 4 in. wide, and 6 in. long, which is fastened to the sidepiece with the same bolts that hold the strap iron in place. The blocks are located 20 in. from the rear ends of the sidepieces.

The pedal arrangement, Fig. 2, consists of an ordinary bicycle hanger, with cranks and sprocket wheel set into the end of a piece of wood, 2 in. thick, 4 in. wide and 33 in. long, at a point 4 in. from one end. The pieces GG are nailed on across the frame at the front end of the car, to hold the hanger piece in the center between the sidepieces, as shown in Fig. 1. A small pulley, H, is made to run loosely on a shaft fastened between the sidepieces. This is used as an idler to keep the upper part of the chain below the seat.

The front axle is 30 in. long, pivoted as shown at J, Fig. 3, 6 in. from the front end of the main frame. Two small brass plates, KK, are fastened with screws on the under edge of each sidepiece, as shown, to provide a bearing for the axle. The front wheels are taken from a discarded baby carriage and are about 21 in. in diameter.

A good imitation radiator can be made by cutting a board to the dimensions given in Fig. 4. A large-mesh screen is fastened to the rear side to imitate the water cells.

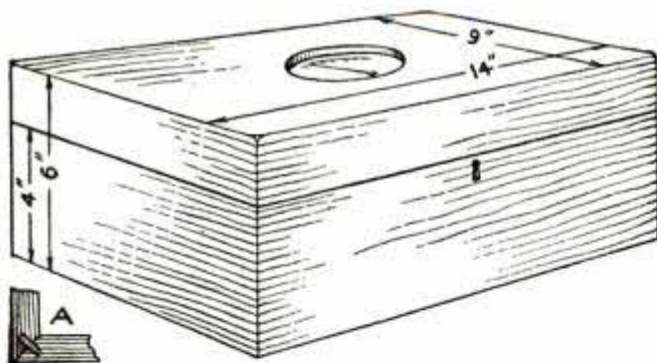
The steering gear L, Fig. 5, is made of a broom handle, one end of which passes through the support M and fits into a hole bored into the lower part of the imitation radiator board. A

steering wheel, N, is attached to the upper end of the broom handle. The center part of a rope, O, is given a few turns around the broom handle, and the ends are passed through the openings in screweyes, PP, turned into the inner surfaces of the sidepieces AA, and tied to the front axle.

The seat is constructed of $\frac{1}{2}$ -in. lumber and is built in the notches cut in the main frame shown at D, Fig. 1. The body frame is made of lath, or other thin strips of wood, that can be bent in the shape of the radiator and nailed to the sidepieces, as shown in Fig. 6. These are braced at the top with a longitudinal strip. The frame is then covered with canvas and painted as desired.

How to Make a Humidor

The humidor is an ideal gift for any person who smokes. The wood for making one, as shown in the illustra-



The Amount of Moisture within the Box is Shown on the Dial in the Cover

tion, may be of Spanish cedar, mahogany, or quartered oak, as the builder desires. The box and cover are made and glued together in one piece, then the cover is sawed off to insure a perfect fit. A strong corner connection is shown at A. A piece of a strawberry box or peach basket makes a good key to glue in the grooves. Care must be taken to run the grain with the width and not with the length of the strip.

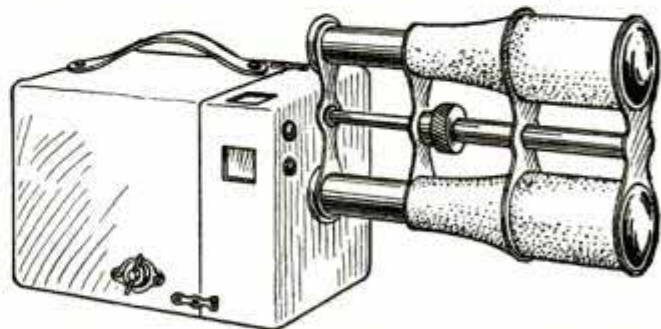
Finish the outside of the box with two coats of the desired stain, then cover with a coat of wax, shellac, or varnish. The inside should be finished with one coat of white lead and two or

three coats of white enamel, to make the wood impervious to moisture.

In the center of the cover top is set a piece of glass and to the under side of the latter a hygrometer is attached with a little glue. This instrument tells the relative humidity, or the amount of moisture, in the air within. The moisture may be regulated by adding a few drops of water, as needed, to a piece of ordinary blotting paper placed on the inside.—Contributed by James T. Gaffney, Chicago.

Telephoto Attachment for a Hand Camera

It is not necessary to purchase an expensive telephoto lens for a box or hand camera if the owner has a pair of



A Field Glass Placed in Front of a Camera Lens will Increase the Diameter of the Photograph

opera or field glasses. First focus the glasses on the distant object to be

photographed and then set the camera. One of the glasses is placed directly in line with and in front of the camera lens, as shown in the sketch. If the camera is of the focusing type, it is focused in the ordinary manner. Box and other cameras are set as usual.

The glasses should be well supported in front of the camera lens, as any slight move will be quite perceptible on the ground glass. As the light rays are largely reduced in passing through the field glass and camera lens, it is necessary to give a much longer exposure. This can only be determined by trying it out, as lenses have different speeds.—Contributed by Charles Leonard, St. John, Can.

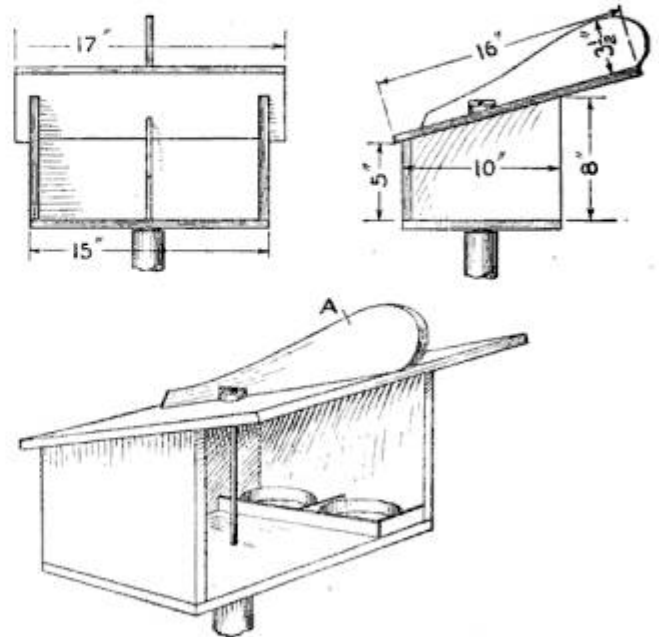
A Turn Feeding Table for Birds

Never in the past has the public at large taken so great an interest in protecting and furthering the well-being of birds as at present. In addition to protective legislation, clubs everywhere are organizing to promote bird life and many citizens, old and young, are making bird houses and feeding tables.

One of the best forms of feeding tables which I have ever seen is shown in the sketch. It possesses a great advantage over the average table in being turned automatically, whirling about by the action of the winds and always keeping its open front on the lee or protected quarter. This is a good feature especially in the fall and winter, the very time when birds need and seek protection from storms and cold winds.

To make such a feed table almost any kind of boards can be utilized. The shelter may be of any shape or size to suit the tastes of the maker, but one constructed to the dimensions given will be found to work well in most localities. Along the center of the roof is attached a wing, A, which is an active aid in causing the wind to keep the open front turned away. The shelter turns upon a wood or iron rod which passes from the end of a post up through the central bottom

and central roof of the structure. If wood is used for the rod, it should be about 1 in. in diameter and of hard



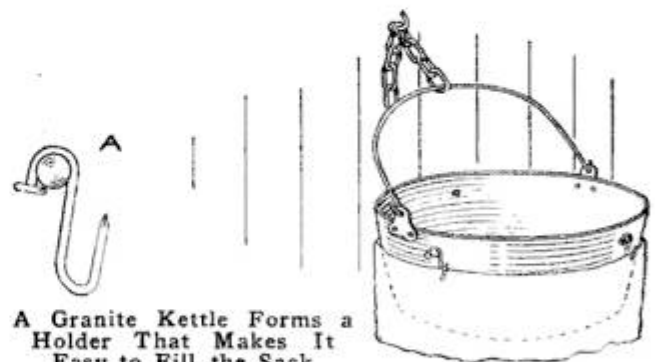
A Feeding Table for Birds That will Keep Its Open Side Protected from the Storms

stock. An iron rod may be somewhat smaller. Keep the holes well greased.

The house should be given a couple of coats of white, red, or green paint, and the post painted to correspond. Feed and water are placed in shallow dishes on the floor and they should be blocked to keep them from sliding out.—Contributed by C. C. Fraser, Saginaw, Mich.

A Sack Holder

An old granite kettle or tin pail with the bottom cut out and three 8-penny wire nails bent and fastened on with rivets, as shown at A, makes as good a sack holder as one could desire. A



A Granite Kettle Forms a Holder That Makes It Easy to Fill the Sack

chain attached to the handle makes it conveniently adjustable to the proper height for the sack.

Rubber-Band-Change Trick

The trick of changing a rubber band from the first and second fingers to the third and fourth, if done quickly, can

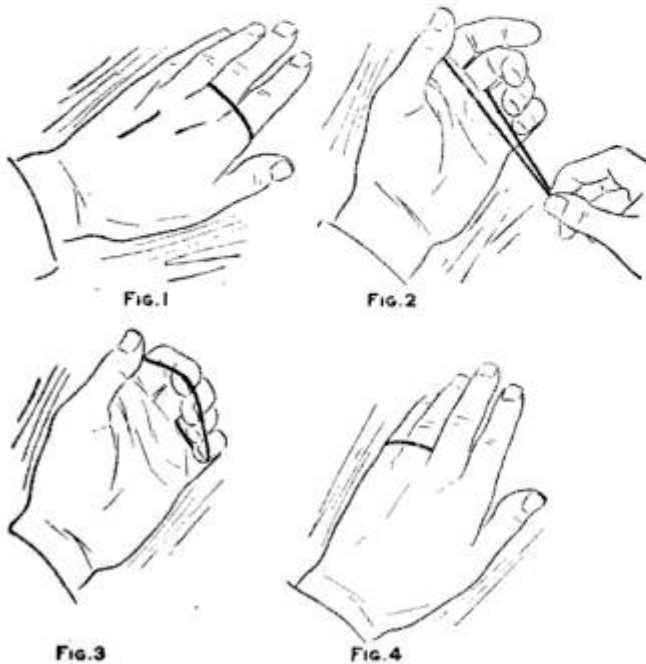


FIG. 3
FIG. 4
Transferring Rubber Band from the First Two Fingers to the Last Pair, Like Magic

be performed without detection by any one. The band on the first two fingers is shown to the spectator as in Fig. 1, with the back of the hand up. The hand is then turned over and the band drawn out quickly, as shown in Fig. 2, in a manner as to give the impression that the band is whole and on the two fingers. While doing this, quickly fold all the fingers so that their ends enter the band, and turn the hand over and let go the band, then show the back with the fingers doubled up. In reality the fingers will be in the band, as in Fig. 3, and the back will still show the band on the first two fingers. Quickly straighten out all the fingers, and the band will snap over the last two fingers, as shown in Fig. 4.—Contributed by E. K. Marshall, Oak Park, Ill.

A Swinging Electric-Light Bracket

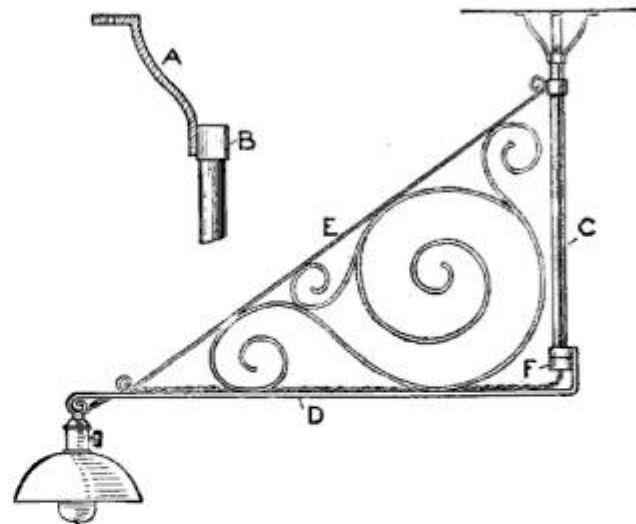
The light bracket shown is both ornamental and useful and can be swung from one side of the room to the other in an instant, a feature that is of great value in a dimly lighted kitchen. It can be made of either brass or soft iron, but, for the sake of convenience, the

description will be for one made of brass.

Procure four pieces of brass, 1 in. wide, $\frac{1}{8}$ in. thick and 7 in. long, and bend them to the shape shown at A. These are to form the ceiling bracket. A $\frac{3}{16}$ -in. hole is drilled in the end of each piece to be against the ceiling. The other end is bent slightly concave and soldered to a brass collar, B, which is threaded on the inside. This collar must be of such a size that it will screw on the end of a brass pipe, C, 1 in. in outside diameter. The length of this pipe should be 18 or 20 inches.

The base D of the bracket is made of a brass bar, $\frac{1}{8}$ in. thick, $\frac{1}{2}$ in. wide and 45 in. long, a scroll being turned on 6 in. of its length at the globe end, and 3 in. of the other end turned up at right angles and soldered to a ring made of $\frac{1}{8}$ -in. brass that acts as a bearing around the pipe.

The upper brace E is made of $\frac{1}{8}$ -in. brass, the same width as the base piece and about 48 in. in length. Each end is turned into a scroll and then riveted or soldered to the base D and to the upper brass ring. The space between the base D, the brace E, and the pipe C is filled with any style of scroll or other brace that may suit the taste of the



A Bracket Forming a Pendant and Swinging Arm to Change the Location of the Electric Light

maker, but the base D must be at right angles to the pipe C before the scroll is fastened in place.

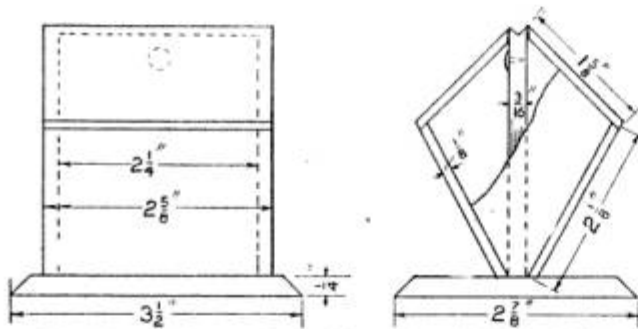
A cap, F, is screwed to the lower end of the pipe, to keep the bracket in place. Ordinary flexible light cord is

used to connect to the light which is swung to the scroll end of the base.—Contributed by F. L. Matter, Portland, Oregon.

Match Safe to Deliver One Match at a Time

A match safe that will deliver only one match at a time is constructed of two parts, the box or holder and the base, with slider. The box is diamond-shaped and of the size shown by the dimensions. The base, with slider, consists of two pieces, the baseboard and a standard which runs through the box diagonally on the longest dimension in a vertical position. A thumb-tack is inserted in the standard near the top to prevent the box from being lifted entirely from the base.

The matches are filled into the box



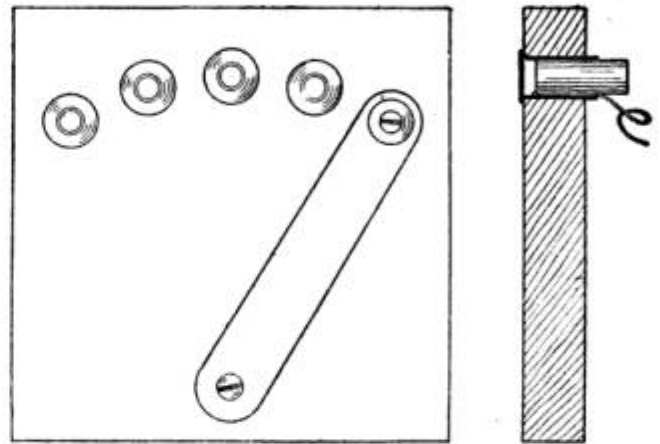
The Box Delivers Only One Match When It is Raised and Lowered on the Standard

on both sides of the standard. When a match is wanted, lift the box up and let it down again, and one match will be caught in the notch and raised out of the box. To prevent the box from tipping sideways when it is raised up, small pieces can be glued to the box ends on the inside and on both sides of the standard.—Contributed by A. S. Barrows, New Britain, Conn.

Cartridge Shells Used for Electrical Contacts

In making small switchboards, rheostats, and other electrical devices, I found a good use for old center-fire cartridge shells as shown in the sketch. A hole a little smaller than the diameter of the shell is made in the board and the shell is forced in. The proper wires are then soldered to

the metal on the inside, or the wire may be placed inside of the shell and

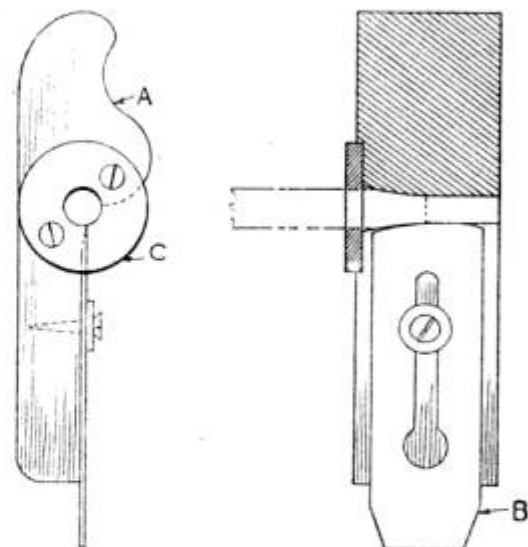


The Heads of the Cartridge Shells Make Good Contacts for a Switch Lever

held in contact by driving a wood plug in as indicated.—Contributed by W. O. Nettleton, Washington, D. C.

A Dowel-Turning Tool

The owner of a wood or metal lathe can easily construct a tool that will turn dowels of any size quickly. This tool, as described by a correspondent of Work, London, consists of a block of wood, shaped as shown at A, and a plane bit, B, attached with a wood screw. The hole in the collet C must be of such size that it will admit the rough stock freely but also prevent it from wobbling as the stick turns. The

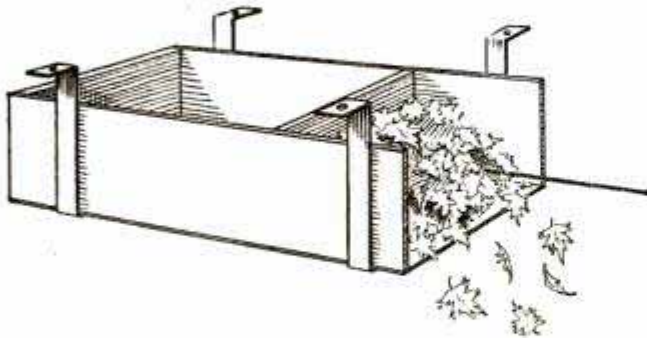


The Tool is Very Similar to a Plane and is Used with a Lathe for Turning Dowels

stock is chucked in the ordinary manner and the tool is run on the outer end.

Falling Leaves in a Nature Scene

Use an ordinary pasteboard box, a shoe box or larger, and cut out one end. Fasten the box to the ceiling by



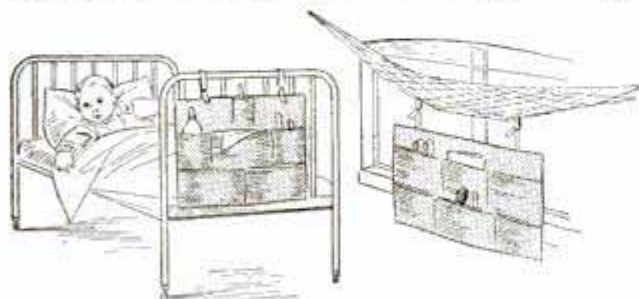
The Box as It is Prepared to Fasten on the Ceiling for Dropping the Leaves

means of pasteboard strips. One end of these strips is pasted on the bottom of the box and the other ends tacked to the ceiling. Fit a piece of board, $\frac{1}{2}$ in. thick, into the open end of the box so that it will slide easily back and forth on the inside. Place this slide in the back of the box, attach a string to it and run this through double tacks placed in the ceiling and to the side wings.

Have the box almost full of autumn leaves, and when the slide is pulled slowly by the operator, they will be pushed, one or two at a time, out of the open end, and will drift down to the stage as naturally as if falling from trees, making quite a realistic scene.—Contributed by Miss S. E. Jocelyn, New Haven, Conn.

Home or Traveling Utility Bed Pocket

The pocket is made of cretonne with wire hooks attached on the upper edge.



Various Pockets for the Change Garments for Use at Home or in Traveling

The compartments are arranged as needs may require. It can be hooked

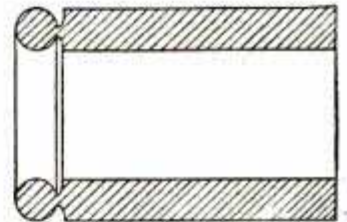
on the head, foot or side rail of the bed or used, as shown, in a sleeping car. It provides a place to keep the slippers, gown and other necessities, and can be rolled up and put in a bag.—Contributed by Harriette I. Lockwood, Philadelphia, Pa.

A Paper Perforator

In an emergency an ordinary hack-saw blade may be made to serve very acceptably as a paper perforator. The toothed edge is applied to the paper and the reverse edge tapped with a mallet or hammer. A considerable number of sheets may be perforated at one time, depending of course on the thickness and softness of the paper.

Turning Brass Rings

Occasionally an amateur has need of brass rings of round cross section, and if their construction is not understood, the task is a difficult one. If a piece of brass tubing, an old bushing or a cored piece is at hand, a part of the work is already done. If not, a piece of stock with large enough outside diameter should be chucked in the lathe and drilled out with the right size of drill. A tin or pasteboard template should be prepared the size of the ring section—a half circle is best, and it is easiest made by drilling a hole in the tin and cutting it in two. An inside boring tool and a turning tool are necessary. It is preferable to shape the inside first, cutting it out roughly and checking up with the template. The amount of inside cutting is shown in the drawing. A hard scraper and emery cloth may be used for smoothing and polishing.



Turn and polish the outside and finally turn as far down on the inner quarter as can be done without cutting off the finish, then polish and cut it off. It only requires a little filing to smooth up the rim of rough metal left.

How to Make a Small Series Motor

The motor here described has been constructed and found to give very good results. It is simple to build and the materials required can be easily obtained. The armature core and field, or frame, are made of laminated iron, instead of being cast as is often done by the manufacturers, which is a decided advantage, as certain losses are thereby reduced, and its operation will be improved by this type of construction especially if used on an alternating-current circuit.

The machine will be divided into three main parts, the construction of each of which will be taken up in turn and the method of procedure discussed in detail. These parts are the completed armature, the field and bearings, and the brushes together with suitable terminals and connections.

The armature core is constructed from a number of pieces, having dimensions that correspond to those given in A, Fig. 1. These pieces are cut from thin annealed sheet iron, in sufficient number to make a pile, $\frac{3}{4}$ in. high, when placed on top of each other and firmly clamped. It would, no doubt, be best to first lay out one of these pieces very carefully and then cut it out and mark out the other pieces with the first one as a pattern, being careful to file off all the rough edges on each piece.

Now obtain a piece of $\frac{1}{4}$ -in. iron or brass rod, $3\frac{1}{4}$ in. long, that is to serve as a shaft upon which to mount the armature and commutator. This rod is threaded for a distance of $\frac{7}{8}$ in. on one end and $1\frac{7}{8}$ in. on the other. Procure five brass nuts, $\frac{1}{8}$ in. in thickness, to fit the threads on the rod. If possible have the ends of the rod centered before the threads are cut, for reasons to be given later. Place one of the nuts on that end of the shaft that is threaded for $\frac{7}{8}$ in., and in such a position that its inner surface is $\frac{3}{4}$ in. from the end of the rod. Solder this nut to the rod when it is in the proper place and remove all extra solder. Drill a $\frac{1}{4}$ -in. hole in each of the

armature stampings and place them on the shaft, clamping them together with three small clamps, one on each ex-

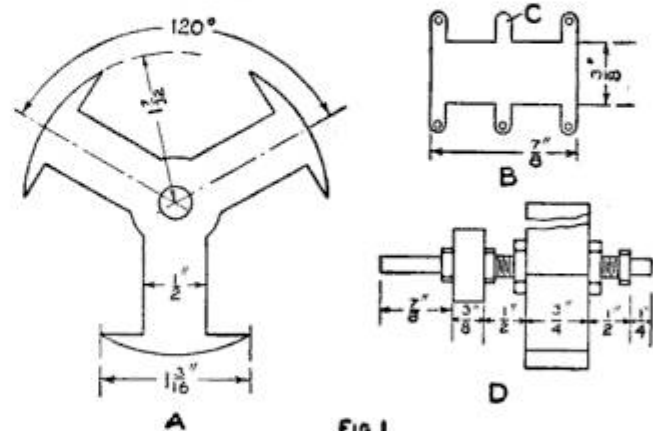


FIG. 1
Details of the Armature Laminations and the Commutator Segments, and the Method of Mounting Armature Core and Commutator

tension or pole. Then place a second nut on the shaft and draw it up tight against the last stamping placed in position, and solder it to the shaft. Next wind two or three layers of good strong tape around each of the rectangular portions of the armature and then remove the clamps. Make sure that all the edges of the different laminations are perfectly even before applying the tape.

The shaft is then placed between two centers to determine whether the core is approximately balanced and runs true. If the armature core is unbalanced or not true, the trouble should be corrected before proceeding with the remainder of the armature construction. The armature winding is not to be put on the core until the commutator has been constructed and mounted on the shaft.

The commutator consists of three pieces of thin sheet brass similar to that shown at B, Fig 1, mounted on the surface of a cylinder of insulating material, $\frac{3}{8}$ in. long and $\frac{7}{8}$ in. in diameter. A $\frac{1}{4}$ -in. hole is drilled lengthwise through the cylinder of insulating material. Bend the pieces of brass around the outside of the cylinder, and turn all the lugs, except the center one, marked C, over at right angles and put a small nail or screw through the holes in the ends of the

upper holes in the field frame and place a nut on each end and draw them tight, leaving an equal length of rod protruding from each side.

Obtain two pieces of $\frac{1}{8}$ -in. brass, $\frac{5}{8}$ in. wide, one $4\frac{3}{4}$ in. long and the other $5\frac{3}{4}$ in. long. Bend these pieces into the forms shown at A, Fig. 3. Drill a $\frac{1}{16}$ -in. hole in each end of both pieces so that they may be mounted upon the ends of the rods protruding from the field frame. The exact center of the space the armature is to occupy is then marked on each of these pieces, and a hole is drilled in each, having the same diameter as the ends of the armature shaft.

The extensions on the outside laminations are bent over at right angles to the main portion of the frame, thus forming a base upon which the motor may rest. Holes may be drilled in the extensions after they are bent over to be used in mounting the frame upon a wooden base.

Procure about $\frac{1}{2}$ lb. of No. 18 gauge single-cotton-covered copper wire and wind it on the lower center portion of the frame until the depth of the winding is about $\frac{1}{2}$ in. Be careful to insulate the winding well and, to insure mechanical protection, place a layer of adhesive tape outside. About 4 or 5 in. of wire is allowed at each end for making connections. It is best to have these ends terminate on the commutator side of the frame.

The brushes for the machine are made from some thin sheet copper or brass, and are shaped and dimensioned approximately as shown at B, Fig. 3. Two pieces of hard rubber, or fiber, $\frac{1}{2}$ in. square and $\frac{7}{8}$ in. long, serve as mountings for the brushes. These pieces of insulation are mounted in the corners of the armature support, at the commutator end, by means of two small screws in each. Mount the brushes on these pieces so that their free ends bear on the commutator exactly opposite each other. One brush is mounted on the upper end of its support and the other brush on the lower end of its support. This is shown at C, Fig. 3. Two small binding posts

are mounted at the same time as the brushes, and are electrically connected to the brushes, thus affording an easy means of making a connection to the

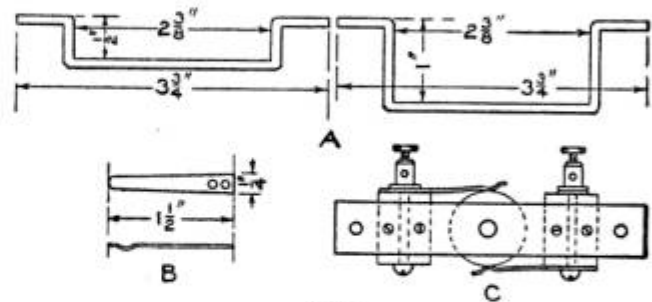


FIG. 3

Detail of the Armature Supports and the Brushes, and the Manner of Mounting the Brushes

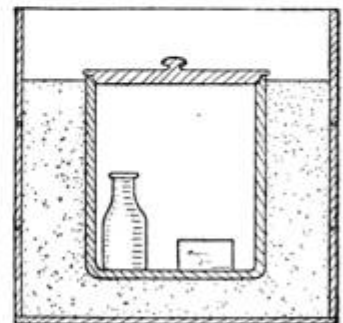
armature. The brushes are so mounted as to bear firmly upon the commutator.

To operate the motor, connect the armature and field windings in series, and the combination to a source of electromotive force of several volts. If it is desired to reverse the direction of rotation, reverse the connections of either the armature or field windings, but not both. The motor may be mounted on a neat wooden base and the connections all brought down to a reversing switch, which may also be mounted on the same base as the motor. The speed can be varied by changing the impressed voltage, or by connecting a variable resistance in the armature circuit, such as a wire rheostat.

A small pulley may be made and attached to the armature shaft so that the motor may be used in driving various kinds of toys.

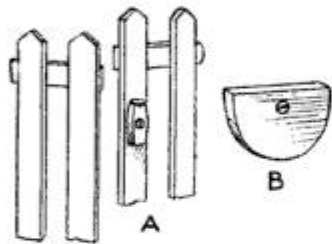
Cooler for Milk and Butter

An earthen jar or crock, with a cover, set in a box containing moist sand will keep butter and milk in hot weather better than a refrigerator. The sand must be kept moist at all times. — Edwin J. Bachman, Jr., Fullerton, Pa.



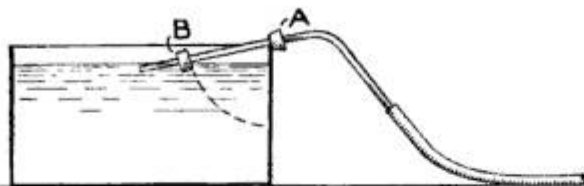
Gate Fasteners

Buttons on gates or small doors are apt to become loose and then drop down, thereby allowing the gate or door to become unfastened. The ordinary button is shown at A where it is loose and turned by its own weight. If the button is cut as shown at B, it will remain fastened, even if it is loose on the screw or nail.—Contributed by A. S. Thomas, Amherstburg, Ont.



A Compensating Siphon

The homemade siphon shown in the sketch consists of two rubber corks and a glass tube with a rubber hose connected to it. The cork A is used as a bearing and support on the edge of the tank. The position of the cork B on the tube determines the distance that the mouth of the tube will be under the surface of the liquid, also to some extent the sensitiveness of the apparatus. However, the principle of the device is the buoyant effect of the



The End of the Pipe is Kept Just under the Surface of the Liquid at all Times

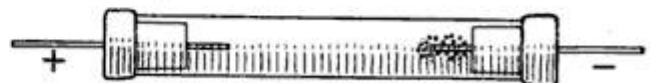
water and the lever action of the rubber tube which is attached.

The one that I made had a tube 14 in. long, and the cork B was $1\frac{3}{4}$ in. in diameter, 1 in. thick, and weighed about $\frac{1}{10}$ of a pound. The practical application of this siphon will be found in sieve tests where it is necessary to collect the residue on the bottom of the tank while drawing off the liquid at the surface, also in oil-storage tanks where it is not wished to disturb the dirt or other residue which collects on the bottom of the tank.—Contributed by James Hemphill, Jr., Duquesne, Pennsylvania.

A Polarity Indicator

Lines in a cable or the ends of connections at a distance from the battery must be tested to determine the polarity. Where a large amount of this work is to be done, as in automobile and motorboat repairing, it is necessary to have an indicator to save time. A cheap indicator for this purpose can be made of a 6-in. test tube having its ends sealed and inclosing a saturated solution of ammonium chloride (sal ammoniac) and water. The sealed ends are made by inserting a piece of wire through a cork and, after forcing this tightly into the end of the test tube, covering it with sealing wax.

To use, connect the terminals to the

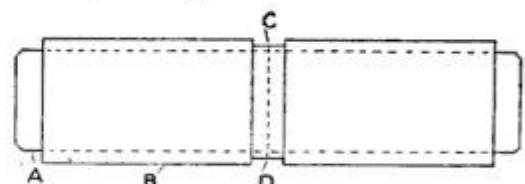


A Simple Pocket Indicator for Finding the Negative Wire in Battery Cable Lines

battery lines, and the end of the wire in the solution giving off bubbles is the negative wire.—Contributed by H. S. Parker, Brooklyn, N. Y.

Small Steam-Engine Cylinders Made from Seamless Brass Tubing

In making a small steam engine it was desired to use seamless brass tubing for the cylinders. To have them exactly alike a piece of tubing of the right size and of sufficient length for both cylinders was fitted on a wood mandrel, A, and the ends trued up in a lathe. As these cylinders were to fit into holes bored in a steel bedplate, it was necessary to have a flange at one end. A groove was turned in the tubing B in the center, and as a final operation a parting tool was used on the



A Wood Mandrel Used to Face the Ends and Turn Flanges on Tubing for Cylinders

line CD. This resulted in a pair of cylinders flanged to fit the bedplate.—Contributed by Harry F. Lowe, Washington, D. C.

An Electric-Light Bulb as Barometer

To use a discarded electric bulb as a fairly reliable barometer the point is broken off with a pair of pliers while holding the bulb under water. As the bulb is a vacuum, it completely fills with water. If the bulb is now suspended from a wire or thread fastened at the socket end, the water will not run out of it in fair weather when the atmospheric pressure is normal or high, but if the pressure falls, as happens when bad weather is approaching, the water will begin to bulge out of the small opening and sometimes a small drop may even fall off. When, with returning fair weather, the atmospheric pressure increases, the water can no longer bulge or drop out of the bulb.

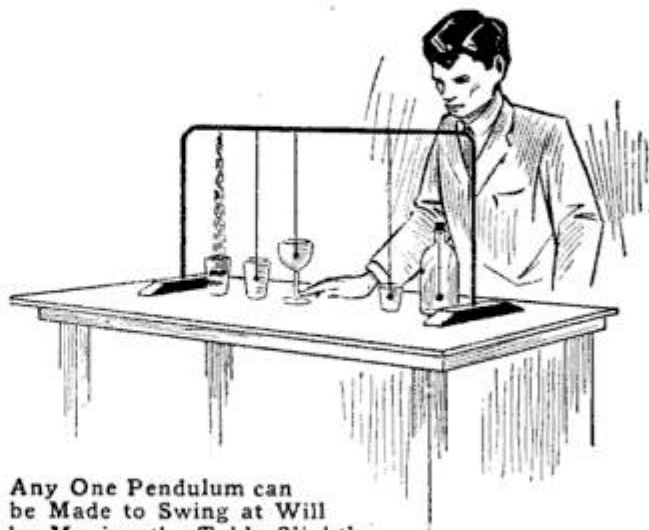
A Swinging-Pendulum Trick

To swing a pendulum, picked out from a number of them at random, without touching it is a very puzzling trick. The articles necessary are a medium-sized table and a number of pendulums, some of which are suspended from a rod with their lower weighted ends inside of water and wine glasses placed on the table, and others attached to corks so that they will hang inside of bottles.

The spectators gather around the table which can be in full light. The performer sits at one side of the table with his hands flat on the top. A person may pick out any pendulum and ask him to swing it, which he will proceed to do without touching it, also making it strike the glass while it swings. Another pendulum may be pointed out and he will start that one apparently by looking at it, while the other one stops.

This may seem to be impossible, yet it is very easy. It will be seen that no two pendulums have the same length. A pendulum makes a certain number of swings in a given time, depending on its length. A long pendulum requires more time to complete its swing and will, therefore, make a less number of swings than a short one

in the same time. It is only necessary to move the table slightly and watch the pendulum picked out until it be-

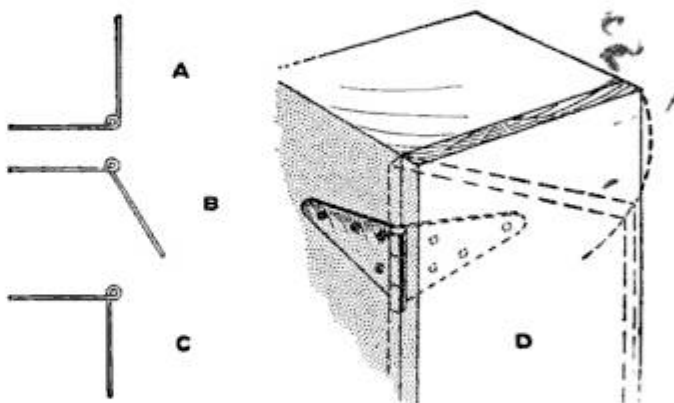


Any One Pendulum can be Made to Swing at Will by Moving the Table Slightly

gins to swing independently of the others, which soon happens. To make the longer pendulums swing, longer movements of the table top must be made. With a little practice anyone can become a skilled medium in pendulum swinging.—Contributed by James A. Hart, Philadelphia, Pa.

Applying a Strap Hinge

An ordinary strap hinge can be applied to a door or box cover in such a way that only one wing will show. Ordinarily the hinge opens as at A, and, on reversing it, the hinge will open to the limit as shown at B. If one wing is bent toward the other, as shown at C, the hinge may be applied as shown



Reversing a Strap Hinge So That When It is Applied Only One Wing will Show

at D. As this process reverses the hinge, the screw holes must be countersunk on the opposite side.

INTERESTING NEW PATENTS

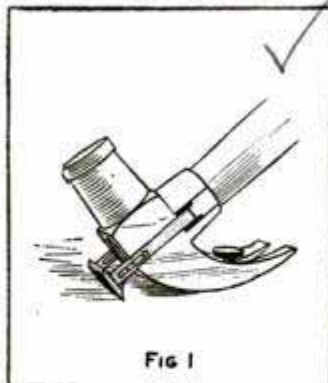


FIG 1

HAMMER FOR DRAWING LONG NAILS (Fig. 1)—The ordinary claw hammer is ill adapted to pulling long nails because it does not have a good fulcrum. This hammer has an extension on the head with a sharp point which makes a secure fulcrum for drawing nails, long or short. The extension is U-shaped and straddles the head so that it can be pushed back and held by a spring pawl when not in use.



FIG 3

EGG-CUP HOLDER (Fig. 2; British patent by an Italian)—This egg cup is made of metal and is intended to be fastened to the edge of a porcelain plate. The end of the handle is bent in the form of a hook to slip over the edge of the plate, and a metal tongue cut from the handle holds it in place.



FIG. 2

AEROPLANE PARACHUTE (Fig. 3)—Many parachutes have been designed to save a birdman when his flying machine becomes disabled. Here is one which is intended to save the aeroplane as well as its pilot. When not in use it is carried in a little box over the pilot's head with ropes attached to the ends of the wings and the frame, ready for instant use. If the aeroplane is disabled, the driver ejects the parachute from the box and it spreads out overhead to carry the machine gently to the earth.

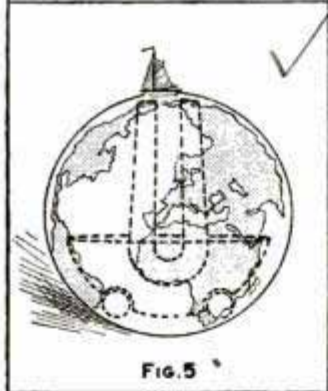


FIG. 5

KITCHEN REMINDER (Fig. 4)—No pencil is necessary with this kitchen reminder to make out the daily list of groceries. All of the common items are already printed on the list and also on metal flaps normally covering the items. Turning one or more flaps outward indicates that the commodities uncovered are wanted.

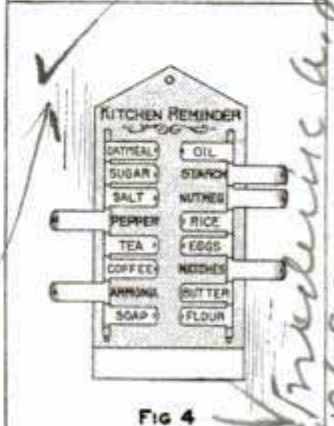


FIG 4

GEOGRAPHIC TOY (Fig. 5)—As the globe is turned in any direction, the little ship sails over the seas on its surface. It may sail over the land, also, for whatever position the globe is in, the ship is always directly on top. Inside the globe there is a strong magnet, mounted on ball bearings and ballasted so that its poles are always toward the top. The ship is the keeper of the magnet and stands still on top when the globe is turned.

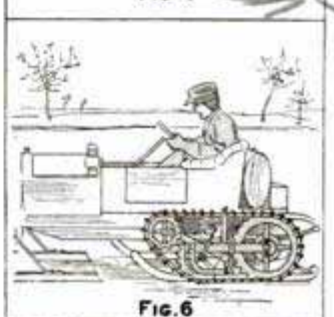


FIG. 6

SLED ATTACHMENT FOR AUTOMOBILES (Fig. 6)—A spiked-chain drive to propel an automobile mounted on sled runners is shown here. The sled runners slip over the ends of the axles after the wheels have been taken off, and the chain drive gets its power from the rear axle. The chain is carried on a rocking framework pivoted on the large sprocket which takes the place of the automobile wheel on the axle.

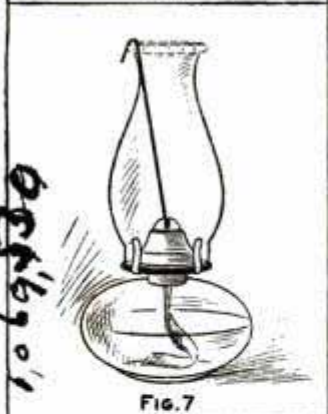


FIG. 7

LAMP LIGHTER (Fig. 7)—It is not necessary to remove the chimney to light a kerosene lamp with one of these lamp-lighting rods. The rod is made of some inflammable material, such as celluloid, and a flame is carried down to the wick as soon as a match touches the end of the rod bent over the top of the chimney.



FIG. 8

COMBINED TAPE AND PLUMB LINE (Fig. 8)—A plumb bob attached to the end of the tape and a brake applied to the spool inside adapt this spring tape line for use as a plumb line. When the brake is released the tape can be drawn out as far as desired. A little pressure on the brake button presses a wedge into a toothed wheel on the spool and holds the line securely.



FIG. 9

FOLDING PHONOGRAPH HORN (Fig. 9; U. S. patent by a Canadian)—This phonograph horn is arranged to telescope into a very small package for shipment. It is made of a number of sections with beads, or shoulders, at the end so that the sections fit together firmly.

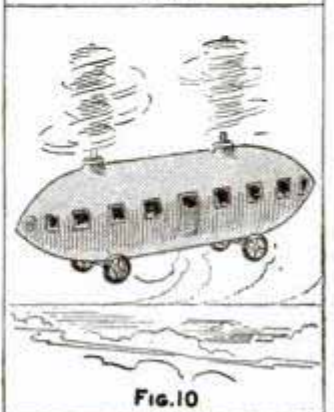


FIG. 10

FLYING MACHINE WITH HELICAL PROPELLERS (Fig. 10)—This is a new application of the helicopter, with spirals instead of bladed propellers to support it. Steering and maneuvering is accomplished by changing the angle of the propeller shafts. Each shaft extends into the body of the flying machine and its lower end is mounted so that it can be moved sideways or longitudinally. Flexible shafts connect the vertical shafts with the motor.

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New Orleans, La.*

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758429
1069530*

*Frederic A. Barberman N.Y.
1068207*



FIG. 11

SNOW BICYCLE (Fig. 11)—Sled runners take the place of the two wheels on this velocipede so that it can travel on snow or ice. A spiked wheel with cranks on its shaft is mounted at one side of the front runner. The novel part of the driving mechanism is that the spiked wheel slides up and down in the fork so that it can be raised off the ground for coasting downhill.



FIG. 12

FOOT REST ON WHEELS (Fig. 12)—The foot rest of this rocking chair is mounted on wheels so that it moves back and forth with the rocking motion of the chair. It is made of telescoping rods and folds up under the chair when not in use. The chair's bottom has tracks for the rods to slide on, and there are two extra rungs near the front end of the rockers for the wheels to rest on.

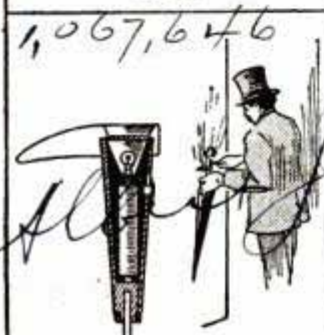


FIG. 13

BACK REST FOR INVALIDS (Fig. 13)—Here is a substitute for pillows to prop up an invalid in bed. The back rest is a broad strip of canvas gathered together at the ends and attached to straps which pass around the rods of the foot-board. A table for a tray or a book can be hooked over the top edges of the canvas over the sick person's lap.

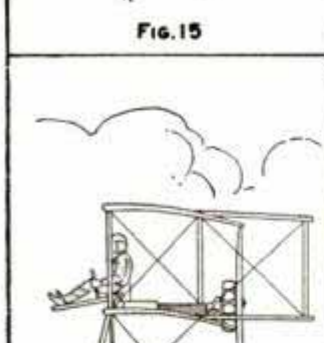


FIG. 14

FISH-HOOK ANIMAL TRAP (Fig. 14)—Attached to a flat, heavy base are two staggered rows of large barbed fish hooks for catching small animals. The hooks are so close together that the victim in trying to extricate itself from the hook becomes ensnared in several others and is held fast. The shape of the base makes it possible to conceal the snare in long grass more effectively than a spring trap, and it does not need to be baited.

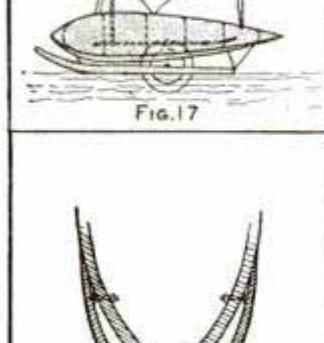


FIG. 15

UMBRELLA-HANDLE SEARCHLIGHT (Fig. 15)—A flashlight is imbedded in the handle of the umbrella so that it is always ready for use. The contact button is on one side close to the end directly under the little finger and the light shines out of the end of the handle. For opening up the lantern, a new battery or bulb, the crosspiece on the end unscrews from the handle.



FIG. 16

ADJUSTABLE BRACELET (Fig. 16)—This bracelet will slip over any hand and cling tightly to any arm without being unlocked or opened. It consists of two long narrow circlets hinged together like a pair of shears. Spiral springs in the two pivots normally spread the circlets far apart so that they cling to the arm. When the circlets are pressed together the diameter of the bracelet becomes large enough to pass over the hand.



FIG. 17

PONTOONS FOR FLYING BOATS (Fig. 17; British patent)—The usual floats attached to flying boats are not buoyant enough to support a flying machine and keep it from sinking when it is standing still on the surface of the water. These floats have pontoons attached to them to overcome the difficulty. The pontoons are cigar-shaped and filled with air. A number of compartments are arranged inside the pontoons so that a puncture will not disable them.

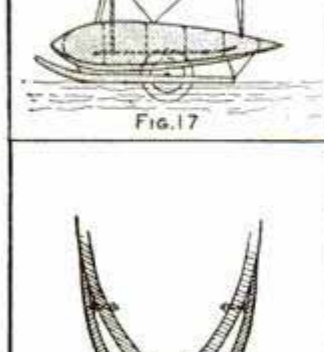


FIG. 18

DRINKING SPOUT FOR FAUCETS (Fig. 18)—Drinking from a water faucet is a difficult matter. This little device turns the stream of water upward to form a drinking jet. It is simply a semi-circular channel pivoted so that it can be swung under the stream.

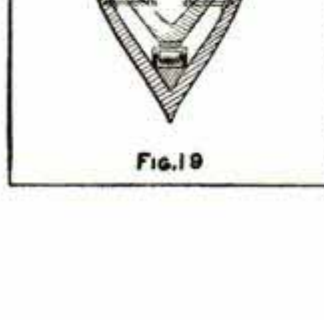


FIG. 19

DETACHABLE KEEL FOR SHIPS (Fig. 19; British patent)—When a vessel wearing one of these false keels runs aground it can extricate itself without assistance. The false keel covers the entire bottom of the vessel and is held in place by bolts which can be unscrewed from inside. If the ship runs aground, the false keel is released and the ship slides out of it on rollers under the ship's own bottom.

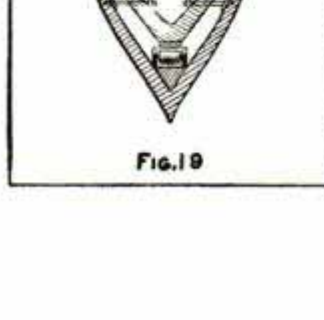


FIG. 20

CONVERTIBLE VISE (Fig. 20; German patent)—Reversible jaws fit this new vise for holding either flat or wedge-shaped objects. The two jaws slip out sideways from the cylindrical holders. In one position the faces of the jaws are parallel as in an ordinary vise; when they are reversed they form a wedge-shaped opening which automatically adjusts its angle to the shape of the object to be held in the vise.



FIG. 12

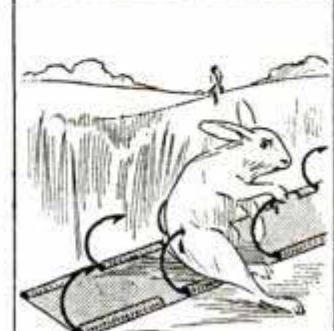


FIG. 14



FIG. 16

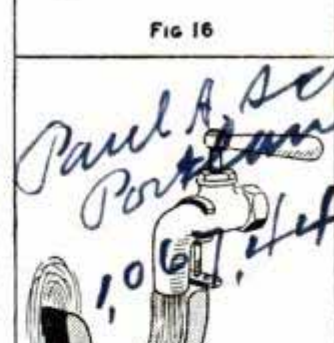


FIG. 18

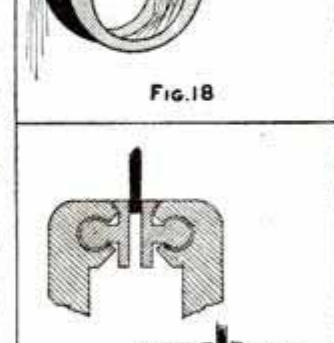


FIG. 19

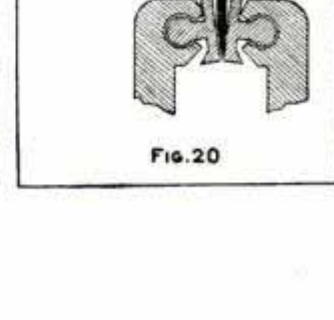


FIG. 20

card

*Paul A. Schuchman
Portland, Ore.
1,067,643*

"YES," said the quiet little man in the corner, as the conversation turned to sport, "I've had a good deal of experience in running, cycling, etc." "Ever had any luck?" asked an athletic-looking young man. "Oh, yes; once took the gold cup for ten miles running championship." "Anything else?" sneered the other. "At one meeting I took six cups; in fact, all the prizes that were offered." "Now, look here, mister," said the athlete, "you can't expect me to believe that." "It's a solemn fact, nevertheless," answered the little man. "You see, I'm a photographer."—*Australasian Traveler.*

"Come right on in, Sambo," the farmer called out. "He won't hurt you. You know a barking dog never bites."

"Sure, boss, ah knows dat," replied the cautious colored man, "but ah don't know how soon he's going to stop barkin'."—*Marine Journal.*

An Atlanta man tells of an amusing experience he had in a mountainous region in a southwestern state, where the inhabitants are notoriously shiftless. Arriving at a dilapidated shanty at the noon hour, he inquired as to the prospect for getting dinner.

The head of the family, who had been "resting" on a fallen tree in front of his dwelling, made reply to the effect that he "guessed ma'd hev suthin' onto the table putty soon."

With this encouragement the traveler dismounted. To his chagrin, however, he soon discovered that the food set before him was such that he could not possibly "make a meal." He made such excuses as he could for his lack of appetite, and finally be-thought himself of a kind of nourishment which he might venture to take and which was sure to be found in any locality. He asked for some milk.

"Don't have milk no more," said the head of the place. "The dawg's dead."

"The dog!" cried the stranger. "What on earth has the dog to do with it?"

"Well," explained the host meditatively, "them cows don't seem to know 'nough to come up an' be milked theirselves. The dawg, he used to go for 'em and fetch 'em up."—*Lippincott's.*

"How do you tell the difference between a yacht and a sailboat?" said the girl with the inquiring mind.

"By lookin' into the pantry," replied Captain Cleet. "If she carries plenty of refreshments and seegars, she's a yacht. If it's mostly plain victuals, she's a sailboat."

"My husband bought an automobile because he said he needed it in his business."

"What has he made with it?"

"Forty-five miles an hour is all, I think."—*Detroit Free Press.*

"When I was shipwrecked in South America," said Captain Bowsprit, "I came across a tribe of wild women who had no tongues."

"Mercy!" cried one of his listeners of the fair sex. "How could they talk?"

"They couldn't," snapped the old salt. "That's what made 'em wild."—*Pathfinder.*

Little Elizabeth and her mother were having luncheon together, and the mother, who always tried to impress facts upon her young daughter, said: "These little sardines, Elizabeth, are sometimes eaten by the larger fish."

Elizabeth gazed at the sardine in wonder, and then asked: "But, mother, how do the large fish get the cans open?"—*Judge.*

Dubbleigh's car lay flat on its side and deep in the mud in a freshly-plowed field, having skidded off the road, through the low stone wall, to get there.

"Ah!" cried a passer-by from the roadside. "Had an accident?"

Dubbleigh tried to hold his tongue, but the strain was too much for him.

"No, of course not," he replied coldly. "I have just bought a new car, and have brought my old one out here to bury it. Got a pickax and a shovel in your pocket you could lend me? I can't seem to dig very deep with my motor horn."—*Harper's Weekly.*

Mr. Slimson—Willie, didn't you go to the trunk-maker's yesterday and tell him to send round the trunk I ordered?

Willie—Yes, pa.

Mr. Slimson—Well, here is the trunk, but no strap.

Willie—Yes, pa; but I told him I thought you hadn't better have any strap.—*Philadelphia Inquirer.*

A colored man was on trial for felony. The judge asked him if he desired the appointment of a lawyer to defend him. "No, sah," said Sam. "I's gwine to throw myself on the ignorance of the co't."—*Youth's Companion.*

"What little boy can tell me the difference between the 'quick' and the 'dead'?" asked the Sunday-school teacher.

Willie waved his hand frantically.

"Well, Willie?"

"Please, ma'am, the 'quick' are the ones that get out of the way of automobiles; the 'dead' are the ones that don't."—*Ladies' Home Journal.*

On his teacher's request that he give the class his ideas on the subject of "Bravery," little Johnny delivered himself of the following:

"Some boys is brave because they always plays with little boys, and some boys is brave because their legs is too short to run away, but most boys is brave because somebody's lookin'."—*School Board Journal.*

"Now, this car is so constructed," said the agent, "that it can't possibly turn turtle."

"Well, I should say not!" said Jinks. "At the price you ask for it, it oughtn't to turn anything short of diamond-backed terrapin."

Father—Will our boy get any prize this year?

Teacher—Sure, he is going to get it in arithmetic.

Father—Thank God, then we will have some one in the family that can read the taximeter.—*Le Figaro.*

She—George, dear, here's a scientist who says the earth is wobbling on its axis. What do you suppose they can do about it?

George, absently—Open the muffler, reverse the lever, shut off the power, lubricate the bearings, and tighten the wheel cap.—*Cleveland Plain Dealer.*



"Don't mind these jolts, Auntie. You'll get used to them!"

—*Punch*

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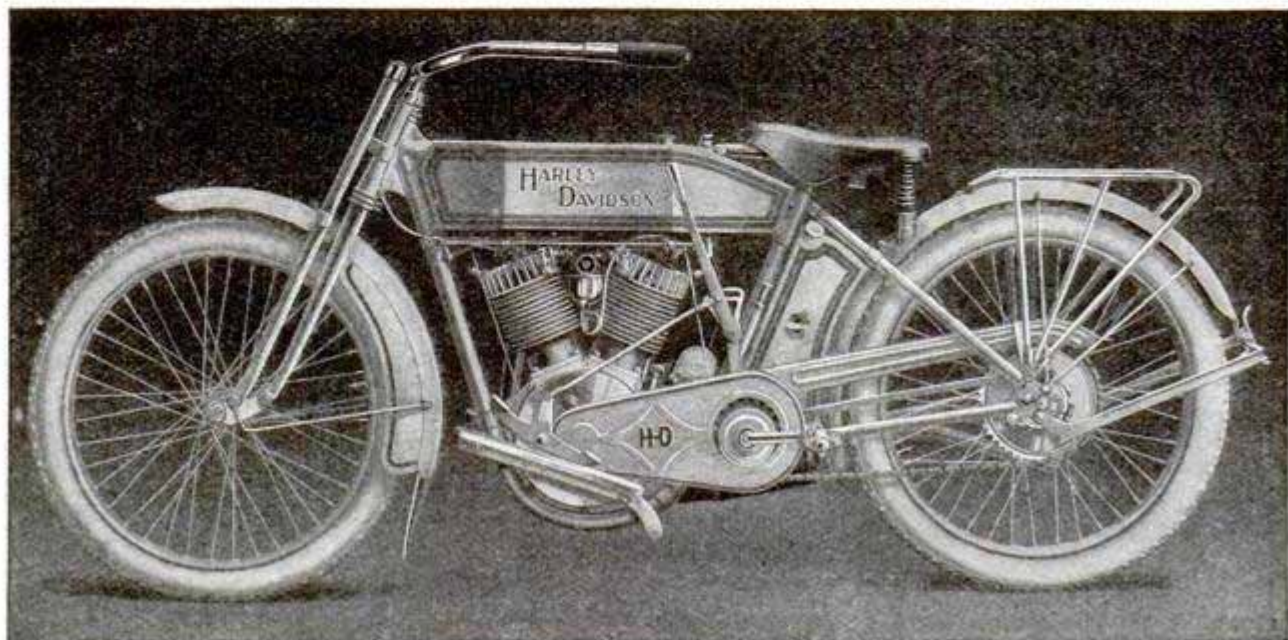
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P.A.11

Startling Exclusive Improvements

Step Starter — Selective Two-Speed — Double — Folding Foot Boards — Ful-Floteing



THE Harley-Davidson models for 1914 are marked for the innovations they present. Innovations, but not experiments, for every feature, every improvement, every refinement has stood the test of months and months of hard road service, for the makers of the Harley-Davidson never have and never will foist onto the public any so-called improvement in an experimental stage.

Step Starter Starts Machine With Rider in the Saddle and Both Wheels on the Ground.

The step starter—another new and exclusive feature of the Harley-Davidson furnishes the only practical method of starting a motorcycle yet offered to the public.

A downward push on either pedal spins the engine sufficiently to start it. This does away with the necessity of putting the machine on the stand to start, as the step starter can be used when both wheels are on the ground.

If the motor becomes stalled at any time it is no longer necessary to hold up traffic in a crowded street, find a level place in the road, get off in the mud, and set the machine on the stand to start it. A simple push on the pedal and the engine again begins to throb.

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Brake Control—Double Control of Free Wheel Seat—Other Important Improvements.

Selective Type of Two-Speed

The Harley-Davidson selective type of two-speed we believe to be not only the most simple but the most compact and efficient that has been placed on the market. It is located inside the rear hub, thus avoiding dust, dirt or damage. Its speeds are selective and the rider can shift from low to high or high to low or to neutral at any time whether the machine is standing still or in motion. After thousands and thousands of miles of use on experimental models we are absolutely convinced that this is without question the most satisfactory type of two-speed that has ever been built.

Double Brake Control

The brake on the new Harley-Davidson can be operated either by a foot lever on the right foot board or by back pedaling on either pedal. All models are equipped with the Harley-Davidson band brake.

Double Control of Free Wheel

Free Wheel Control now can be operated either by foot lever on the left foot board or by a hand lever. The foot lever control is an innovation which does away with all fumbling or feeling for the control lever and permits a much more rapid engaging or dis-engaging of the Free Wheel Control by the rider.

Folding Foot Boards

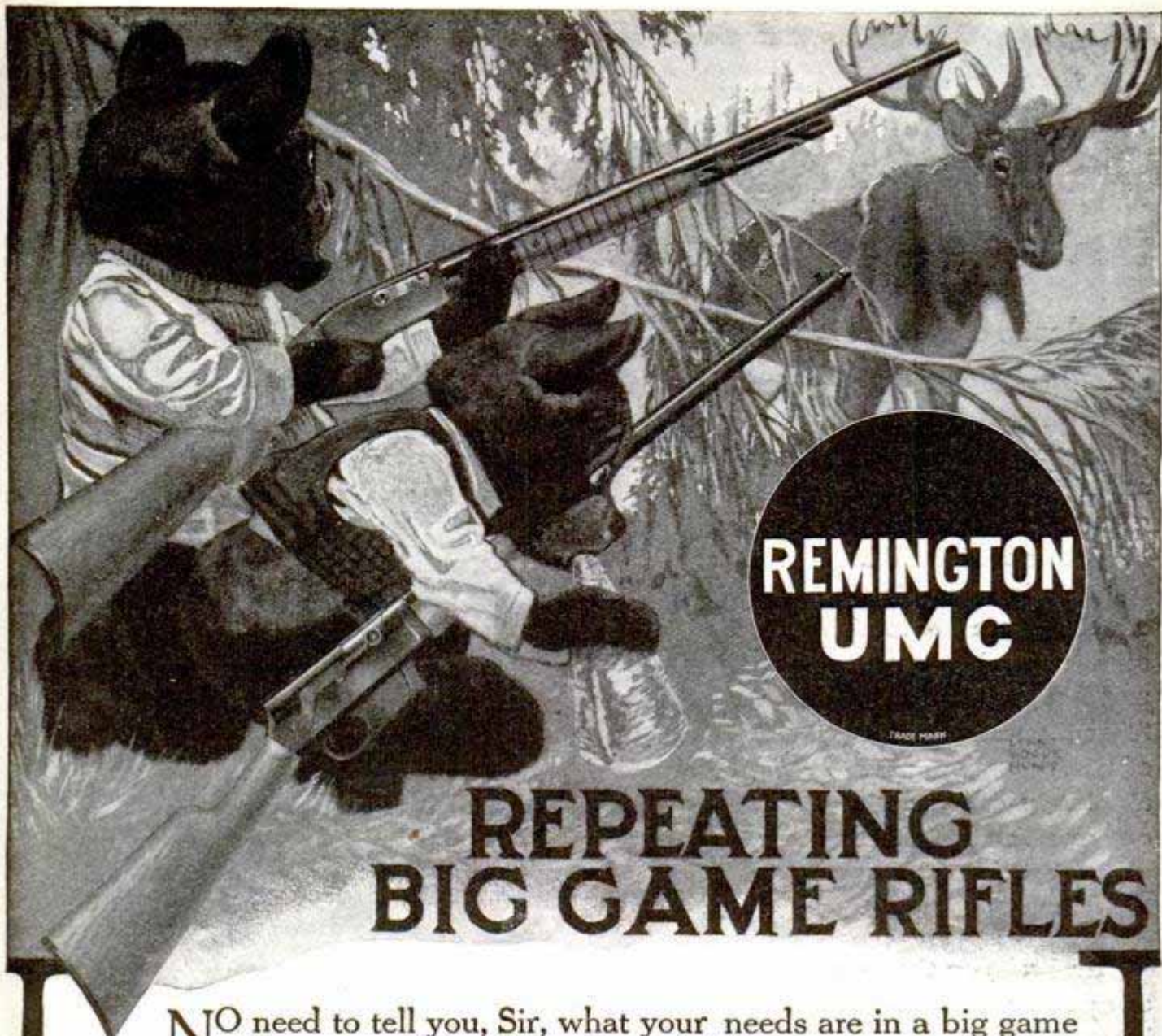
All models are equipped with folding foot boards. In addition to the foot boards the pedals are retained. The foot boards are unusually long thus permitting a great variety of positions according to the height of the rider. This overcomes the great objection to the ordinary type of foot boards. They were built to fit the ordinary man and consequently the purchaser who was a little taller or a little shorter had to suffer from the uncomfortable position his height forced him to assume.

Ful-Floteing Seat

After building over 24,000 Harley-Davidsons incorporating the Ful-Floteing Seat, no possible method of improvement has suggested itself. This seat has proven itself absolutely to be the greatest comfort device ever offered. Floating, as it does, the weight of the rider between two concealed, compressed springs it assimilates all the jars and vibrations due to rough roads. It is equally sensitive to the small rut and big bump. It is impossible for it to strike bottom and there is no rebound.

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There's nothing accidental about it. It isn't luck or genius, but hard work, concentration, and experience. We live in an age of specialists. Specialists lead the world, and easily outdistance the straddlers, the floppers, the men who do not know their own minds well enough to stick to *some one thing*.

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It's so in every profession, every business, and especially in the complicated automobile business, where a single mistake can ruin a season's output. That's why some cars are up one year and down the next. Also, that's why so many makers are forced to announce sweeping changes from year to year.

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One Maker's Method

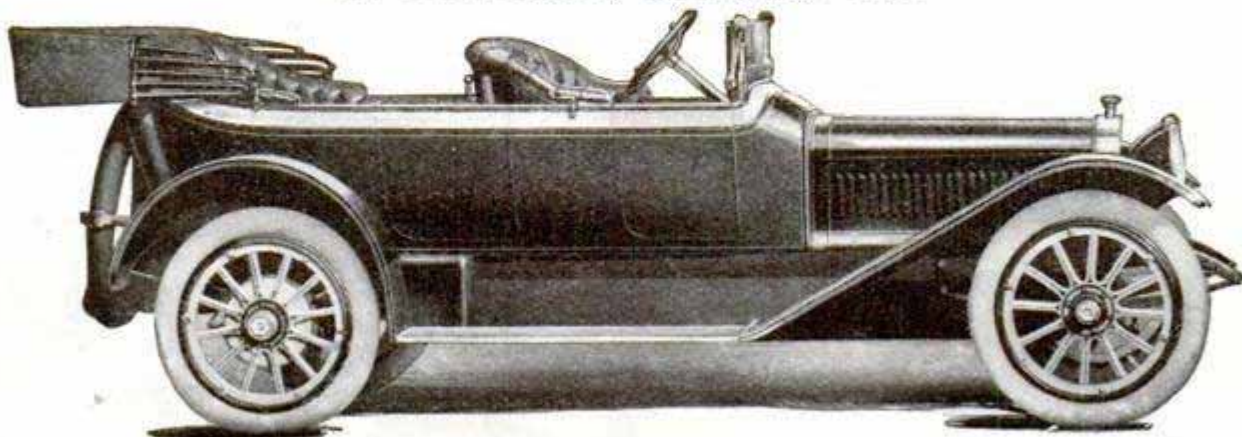
Mr. Winton never tried to make more cars than any other maker. He never tried to see how many different models he could make. He did not flop around from one thing to another, trying to monopolize the entire automobile market. But, on the contrary, for longer than seven years, he has devoted himself to a single object — the perfection of one six-cylinder car, the Winton Six.

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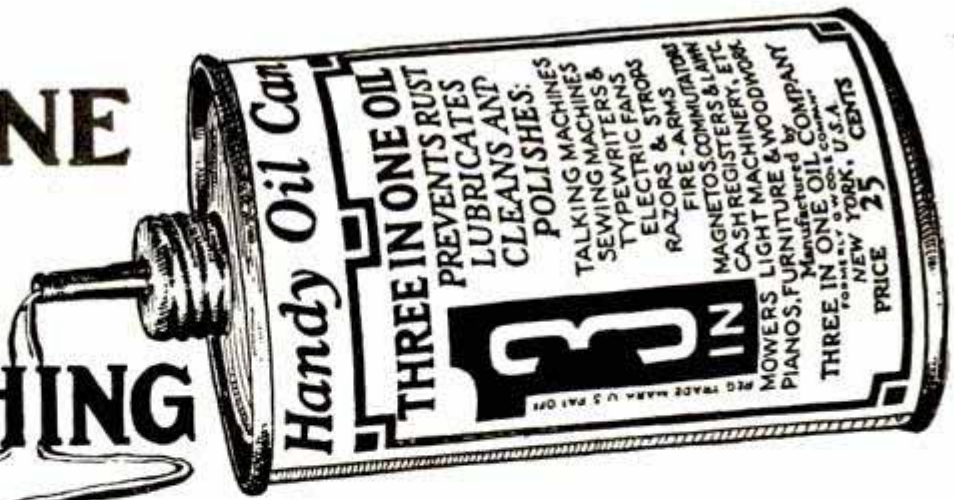
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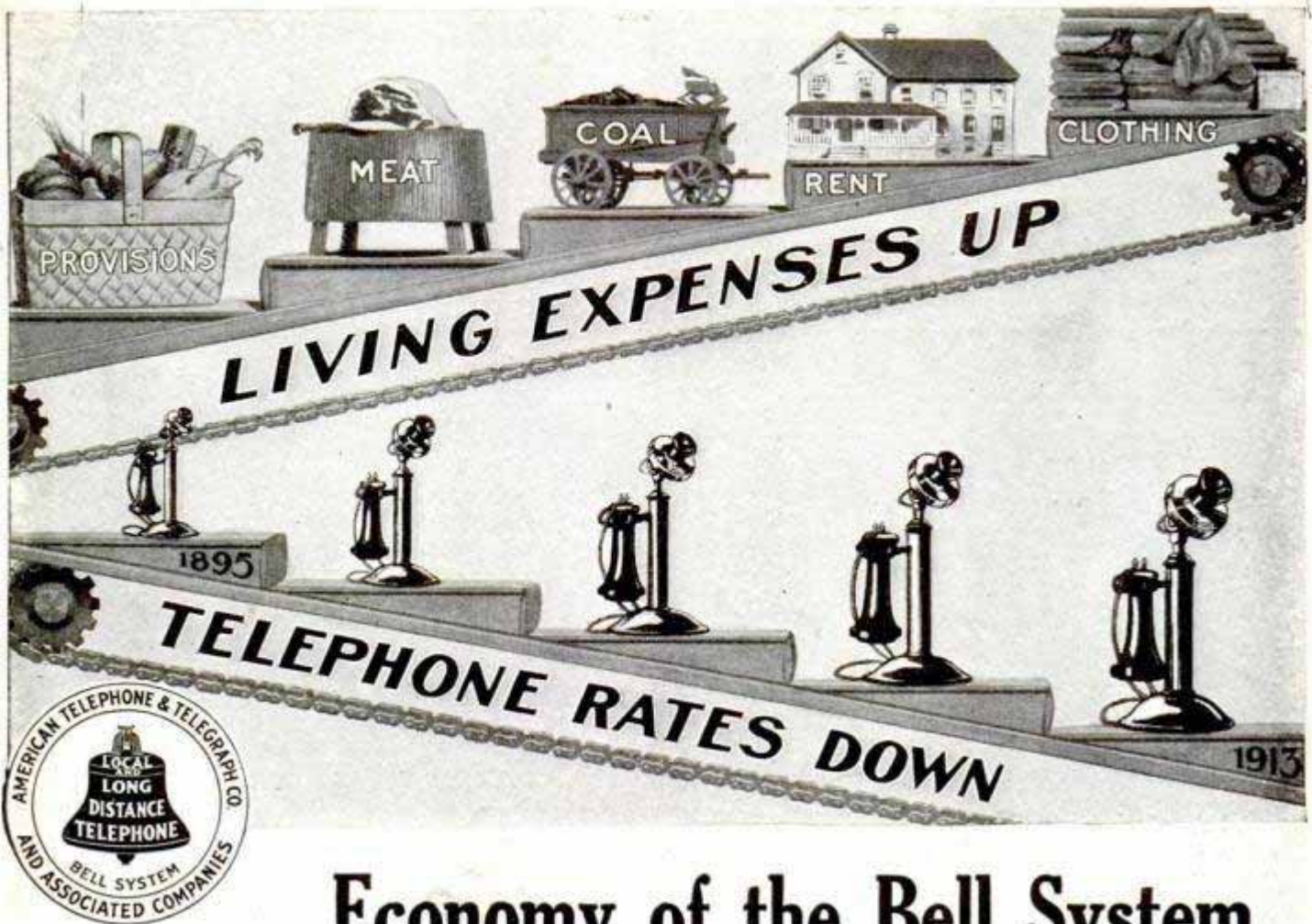
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Our "Grand" Regent Oak Heater. At the price we quote this elegant heater, is a value absolutely beyond duplication, and is a great heat radiator. Very economical as to consumption of fuel. Is built of cold rolled steel and heavy ornamental cast iron. Has heavy grate and 14-inch fire pot of best material. Stands 50 in. high. Price only



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A Bargain
Dining Room Set.

It consists of seven pieces. The pedestal extension table has a large 42-inch top and extends to 6 ft. It is finished in American quartered oak and shows the flaky grain of finest oak. Entire table is expertly polished to a mirror-like brightness. The six elegant panel back chairs are also finished in American quartered oak, strongly built and handsomely polished. This splendid set is a sample of the wonderful money-saving opportunities offered in our new free book. Price, set complete **\$15.65**

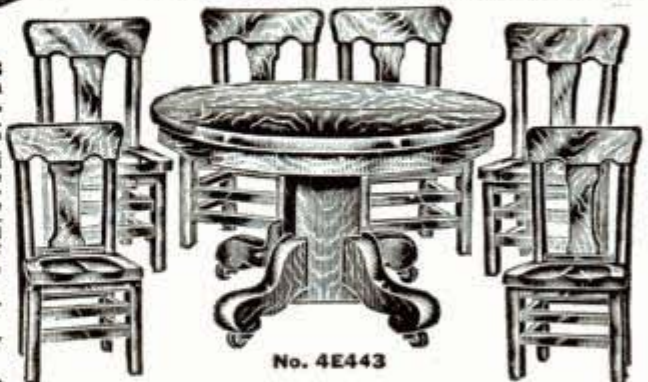
Terms, \$1.00 Cash, \$1.00 monthly.

Price of Table alone \$7.15

Terms, \$1.00 cash, 75c monthly

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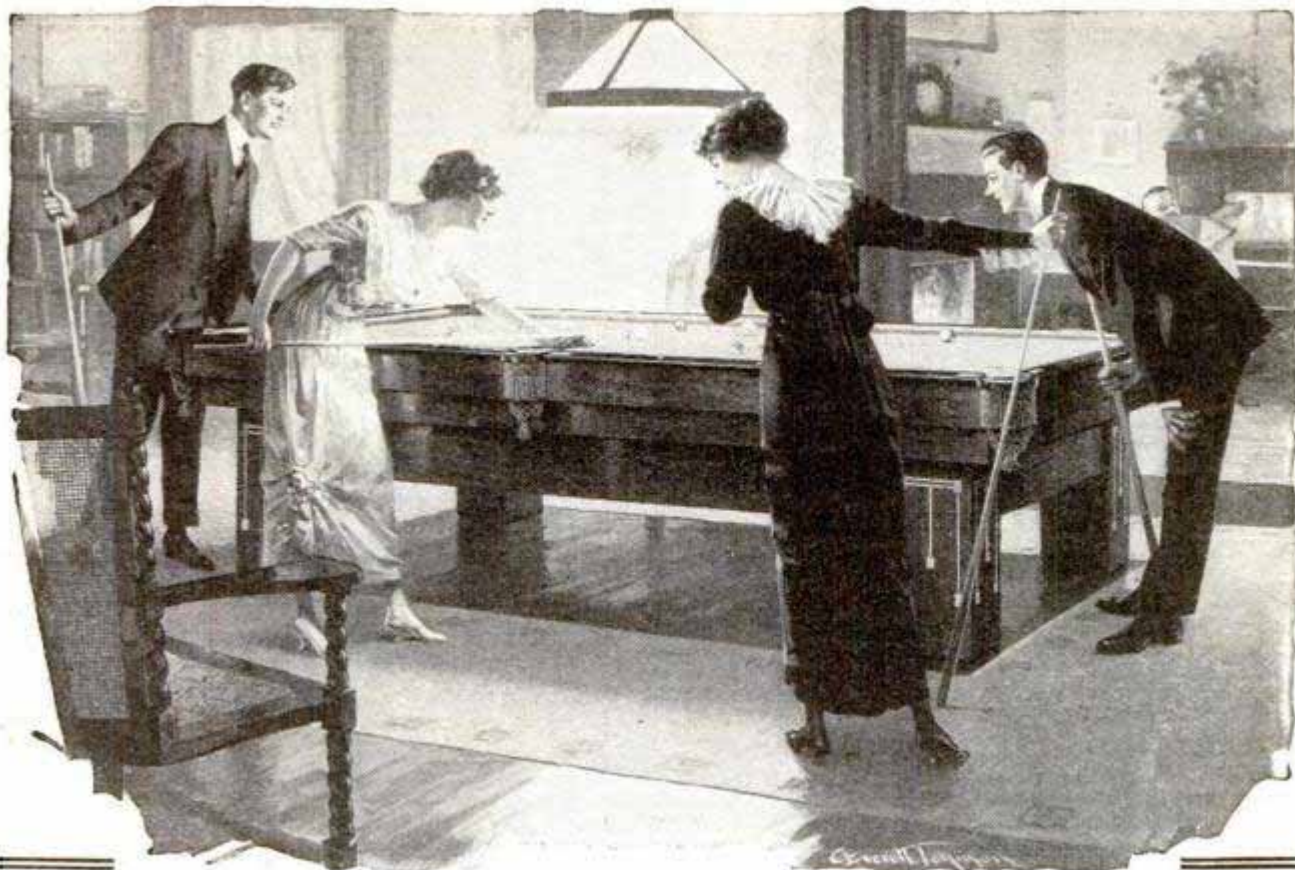
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In homes of refinement, billiards rank highest among all indoor amusements for young folks. This grand old game is ever new—ever replete with interest and charm.

It calls for skill and concentration, yet permits a running fire of repartee and jest—it is set to the music of laughter.

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The Brunswick "Baby Grand" Billiard or Pocket-Billiard Table

This superb billiard table is made of genuine San Domingo Mahogany, fitted with high-grade Slate Bed and the celebrated Monarch Cushions. Equal in accuracy of angle and cushion-action to our regulation tables, used exclusively by the world's cue experts.

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These ingenious Billiard or Pocket-Billiard Tables are made in three styles—Dining-Billiard Tables, Library-Billiard Tables and Davenport-Billiard Tables. No extra room needed. Unexcelled playing qualities.

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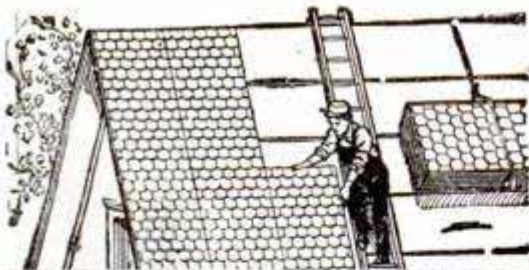
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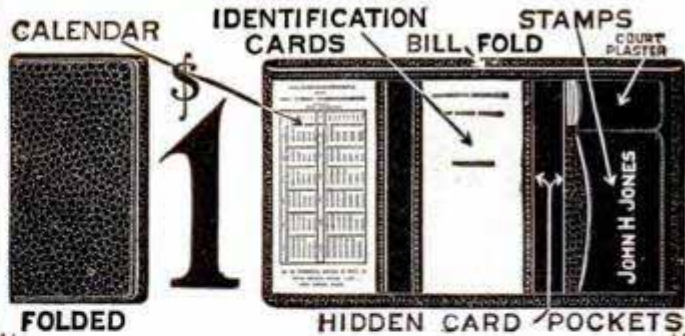
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The most remarkable offer ever made in high-class leather goods. A new three-fold combination case which it is absolutely impossible to duplicate elsewhere at anything like our direct-to-you factory price, \$1.00, prepaid. Made of genuine beautiful black seal grain leather with real moire lining. Most skillful workmanship. With your name stamped in pure gold leaf entirely free. Stamping alone would cost from 25 to 35 cents elsewhere. Measures 3 x 5 inches folded. Seven useful pockets with two transparent compartments. Emblem of any order stamped for 25c extra. We guarantee satisfaction or refund your money without question. If you want one of these \$1.00 billfolds, order it at once. Inclose \$1.00 or good postage stamps.

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I know what boys like—so I made this to imitate real square steel girders like you see in bridges and buildings. It has 20% more parts than any other building toy. It's durable, strong and easy to build with. Prices \$1 to \$25 a set. Write for my new 24 page

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Hello Boys!
MAKE LOTS OF TOYS

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Flying Boat

We have accurate scale drawings and knock-down parts of all man-carrying aeroplanes for class-room demonstrations, exhibition purposes, etc. Students of aeronautics, everyone with an inquiring turn of mind, should construct one of these fascinating models.
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Never Again

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But never again a genuine Illinois watch—with 17 jewels and a 20-year gold-filled case—at \$13.75. And never again, in all probability, will anyone else offer you a like opportunity.

10,000 Watches

We are going to sell ten thousand of these watches at this amazing price. About half the number have already been sold.

They are made by the Illinois Watch Company, Springfield, Ill.—one of the greatest American watch makers. The best jewelry stores all over the country feature this Illinois watch.

The price is not below our cost. We make a trifling profit on each watch. But only because our order was the largest ever placed for a jeweled watch.

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We have an enormous Jewelry Department, and we want you to have an account with it. To get you started we offer this watch at a price which you can't refuse.

But this offer ends—and forever—when these 10,000 watches are sold. And none at this price, in any event, will be sold after Dec. 15th. So if you ever want a watch of the highest grade we urge you to order now.

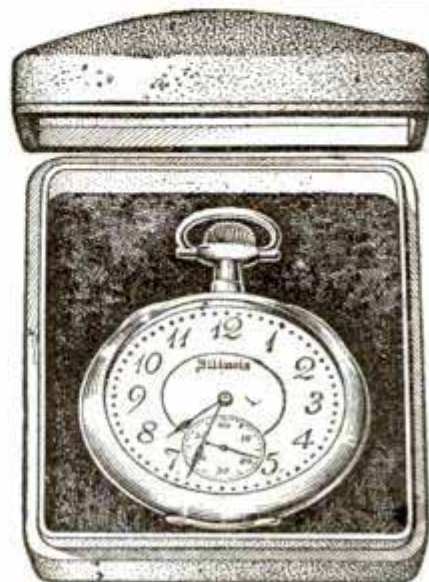
Send Only \$1.00 — 30 Days' Trial

Send with your order only \$1.00. Then send us \$1.00 each month. We will trust you. Express will be prepaid.

Carry the watch for 30 days before you decide to keep it. If you don't want it then send it back to us, and your \$1.00 will be returned. But see if you want it. The only way to get this price is to send your order now. If the watch fails to meet your ideas of a fine watch you are welcome to send it back. Use this coupon. And, to make sure of the bargain, please send it at once.

Spiegel, May, Stern & Co.

3572 Wall Street, Chicago



Our Price \$13⁷⁵ Only \$1.00 Down A Whole Year to Pay

This watch has a 17-jeweled movement—it is a perfect timekeeper. The price seems impossible. But we guarantee this watch to have 17 fine jewels, and to be a genuine Illinois watch, exactly the same as sold in jewelry stores.

The case is a 20-Year Gold-Filled Case. That is, it is warranted for 20 years. It is open-face and a beauty. The back is handsomely engraved. It has a screw back and bezel, so it is positively dust-proof.

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SPIEGEL, MAY, STERN CO.

3572 Wall Street, Chicago

I enclose first payment of \$1.00, for which send, express paid, the 17-jewel Illinois Watch No. X1277, described in your advertisement. If I keep it I will pay \$1.00 each month until \$13.75 has been paid. If I return it within the 30-day trial period you are to send me back n.y \$1.00.

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Postoffice.....

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JEWELRY CATALOG FREE—It contains everything that is new in watches, diamonds and jewelry—all sold on our easy credit plan. Just drop us a postal and it will be mailed you free. But don't fail to use the coupon and send us \$1.00, as this wonderful watch offer will never be made again. (442)

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 Buys a genuine Standard No. 2
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Never before has anything like this been attempted. Dealers get \$3.00 a month rent for this make of machine not nearly as perfect as the one we will send you, and you pay only **Two Dollars a Month and Own It.**

Send the Coupon and We Will Ship You This Smith-Premier Typewriter on Approval

When the typewriter arrives, deposit with the express agent \$8.80 and take the typewriter three days and try it. If you find it the best typewriter you ever saw, satisfactory in every respect, keep it and send us \$2.00 each month, until our special price of \$28.80 is paid. If you don't want to keep it, return it to the express agent, and he will give you back your \$8.80, and return the typewriter to us. We will pay the return express charges. You won't want to send this machine back after you have seen it and tried it. You can't imagine the perfection of these machines till you see one, and the price is \$71.20 less than the catalogue price, and it is guaranteed just as if you paid \$100.00.



Perfect machines only, complete outfit, nothing extra to buy, no strings of any kind to this offer. Just think of buying such a typewriter for \$8.80 down and \$2.00 a month. Thousands of people have paid \$100.00 cash for Smith-Premiers. It's standard, by many considered the best typewriter ever built. A key for each character, so each character is always the same; two color ribbon; a type brush for cleaning the type built into the machine; the tilting carriage throws all the previous writing in plain sight of the operator; comes to you with tools, rubber cover, complete operating instructions, everything ready. It runs beautifully. It's wonderfully simple and strong. It will last a lifetime. I sold a similar supply of these beautiful machines about a year ago to everybody's satisfaction.

Act Today to Be Sure

Only 200 typewriters can be shipped on this offer, so tear off coupon—mail it today—the typewriter will come to you promptly without any formalities. You can't lose and it's the greatest economical opportunity you will ever have. **Send Now—Today.**

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They are invaluable because every card can be used, and every card has a smooth edge when detached. No card can be lost and every one is smooth and free from crushing. The engraving is approved by the users.

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while they last. Write for cut rate prices, and **Free Trial Offer**
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Mostly sold by recommendation. **For Personal Desk or General Office.**

It checks mental calculations. Handsome Morocco case free. **Buy Thru Your Stationer.**

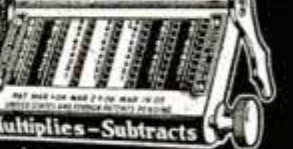
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Golden Gem \$10

Portable Adding Machine



Multiplies - Subtracts

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FOR 1914

To say that the original of this new Pabst Calendar is the work of C. Allan Gilbert is to make everybody want one, for the "Gilbert Girls" are known far and wide as the highest type of modern art. The figures are beautiful, attractive, winsome—the colorings artfully and harmoniously blended. To fully appreciate this beautiful work of art, you must see the calendar itself.

As usual, the calendar is absolutely *free from advertising* on the front, even the months being printed on the back.

The Calendar is FREE

All you have to do to obtain one is to send us 10c in stamps or silver (coin preferred) to cover the cost of packing and mailing. The demand for these beautiful calendars grows greater each year, so send for yours at once to avoid disappointment.

The illustration herewith gives but a faint idea of the beauty of this handsome calendar. Picture in your mind's eye, the *real* calendar in panel form, seven inches wide and thirty-six inches long, printed in twelve harmoniously blended colors. The shape lends itself to the decoration of those odd places so hard to fill; and the color scheme is sure to harmonize with the furnishings of any room. Framed or unframed it will prove an ornament to your home.



In past years the Pabst Extract American Girl Calendar has won the enthusiastic approval of lovers of things beautiful and the 1914 "American Girl" is sure to receive equally as hearty a reception because of its true artistic merit. We have one all ready to send you, merely awaiting your order. And in sending you this calendar we hope it will prove more than an ornament to your home. We want it to remind you, and others, that

Pabst Extract The Best Tonic

"brings the roses to your cheeks"—that it is a natural tonic which enriches the blood, rebuilds the wasted tissues of the body, steadies the nerves and tones the entire system. Being a perfect blending of choicest malt and hops, it is nature's own builder and reinvigorator—a splendid tonic, recommended by leading physicians for nursing mothers, convalescents, anaemics, all who are run down from any cause, and as a revitalizer for the aged.

The United States Government specifically classifies Pabst Extract as an article of medicine—not an alcoholic beverage.

Order a Dozen from
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Insist Upon It Being "Pabst"



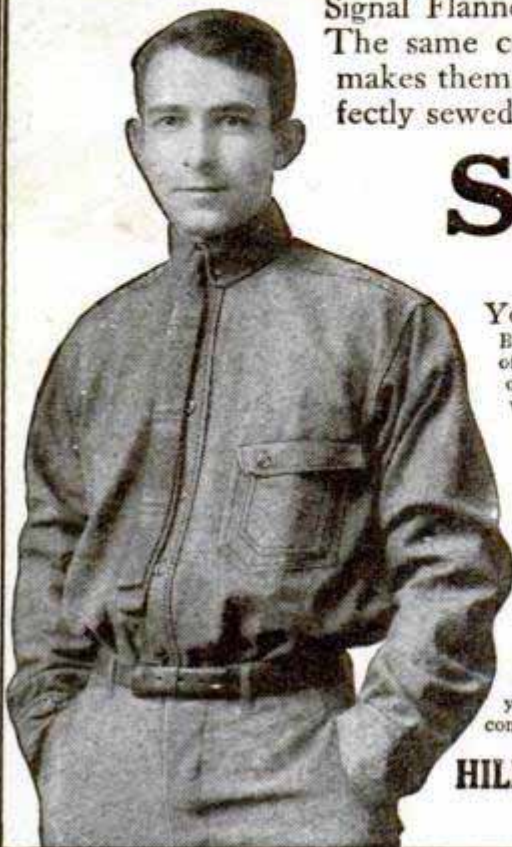
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Dept. 1

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Signal Flannel Coatshirts are collar and shoulders above the others. The same company that manufactures the widely worn Signal line, makes them of first class, quality-tested flannels, carefully cut and perfectly sewed by expert union workmen.

Signal FLANNEL Coatshirts

UNION MADE

You know what these unusual, ingenious comfort features mean:

Big armholes, roomy elbows, full length sleeves, wide cuffs, and a gathered yoke at the back of each shoulder. You couldn't get greater arm-freedom with your shirt off. Flaps that overlap each other a full 3 inches in front. Combination watch and handkerchief pocket with a flap you can button. Cut coat style with full length body. Extra button at bottom of breast plait to prevent gaping. Satin-lined military collar.

Signal Flannel Coatshirts fit to perfection and give stylish appearance. Shirts can't be made to wear longer or feel more comfortable while you wear them.

Signal Flannel Coatshirts are sold in a variety of desirable patterns by most dealers at \$2.00, \$2.50, \$3.00 and \$3.50. Whatever you pay, figure on twice that much in money's worth.

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"THE TEXVELOUR" — a different velour.

An absolutely original design, worked out in finest velvet-velour, the hat-material of the hour. Stitched brim, silk lining; silk band—with bow at back. Colors: Dark Brown; Black; Dark Gray; Dark Green. Easily worth \$3. We charge \$2 PREPAID. Money back if you don't like it. Order now—simply state size and color and enclose \$2. Write for "1913 Fall and Winter Style Book"—FREE. **FRENCH CO., 271 Arch Street, Philadelphia, Pa.**

000,000 lb. and exceeded by 500,000,000 lb. the figures of the former high-record year, 1912. These figures indicate that the United States is clearly at the head of the list of sugar-consuming countries, the figures of

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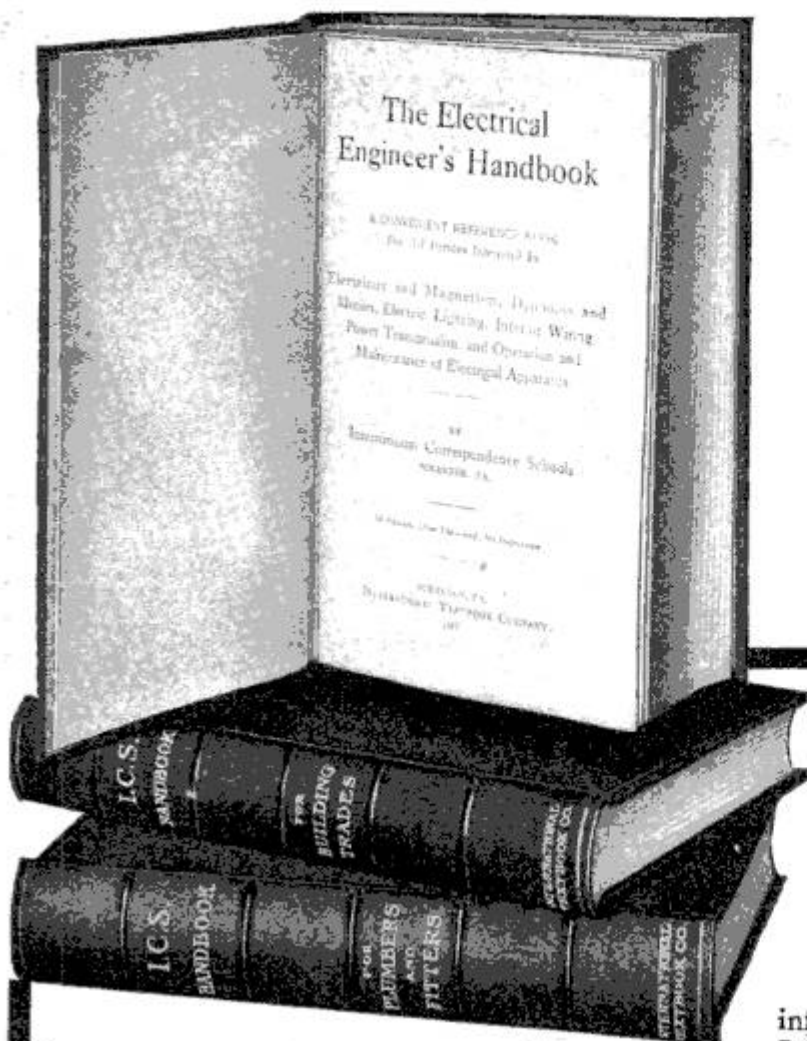
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A good standard make used piano is a better investment than a cheap new piano. We carry a large stock of used standard make pianos, taken in exchange as part payment on new Starck Pianos and Player Pianos. Prices \$75.00 to \$195.00. 30 days' free trial; easiest payments; **50 FREE MUSIC LESSONS.**

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WHEN the boss asks a puzzling question—when an unusual piece of work comes along—THEN it pays to be able to put your finger on the exact rule, formula, or bit of information that holds the key to the situation. For it's at these critical moments that the boss finds out who is "onto his job"—who is in line for promotion.

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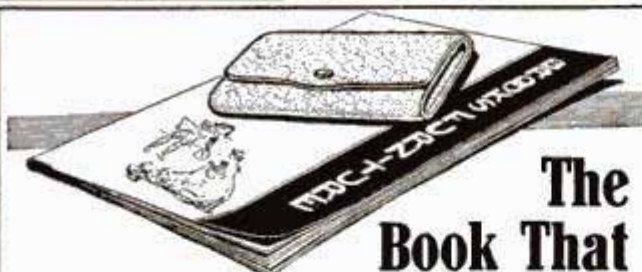
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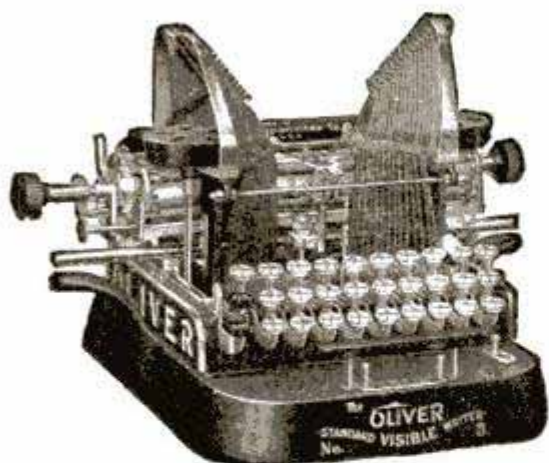
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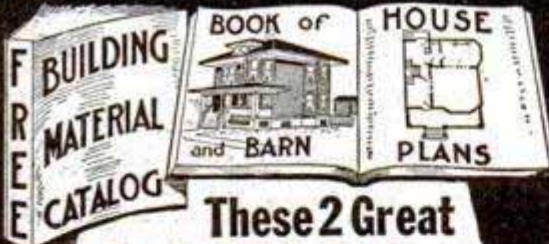


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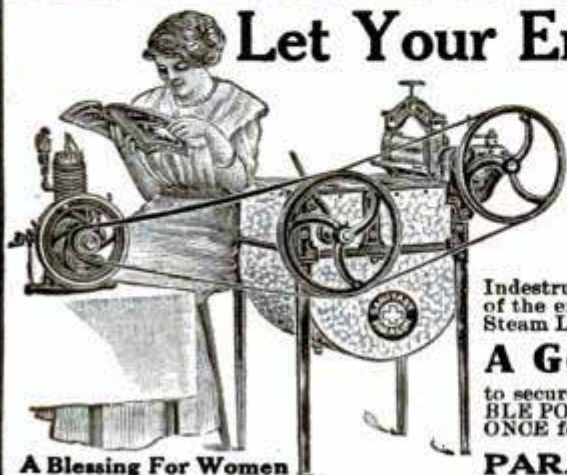


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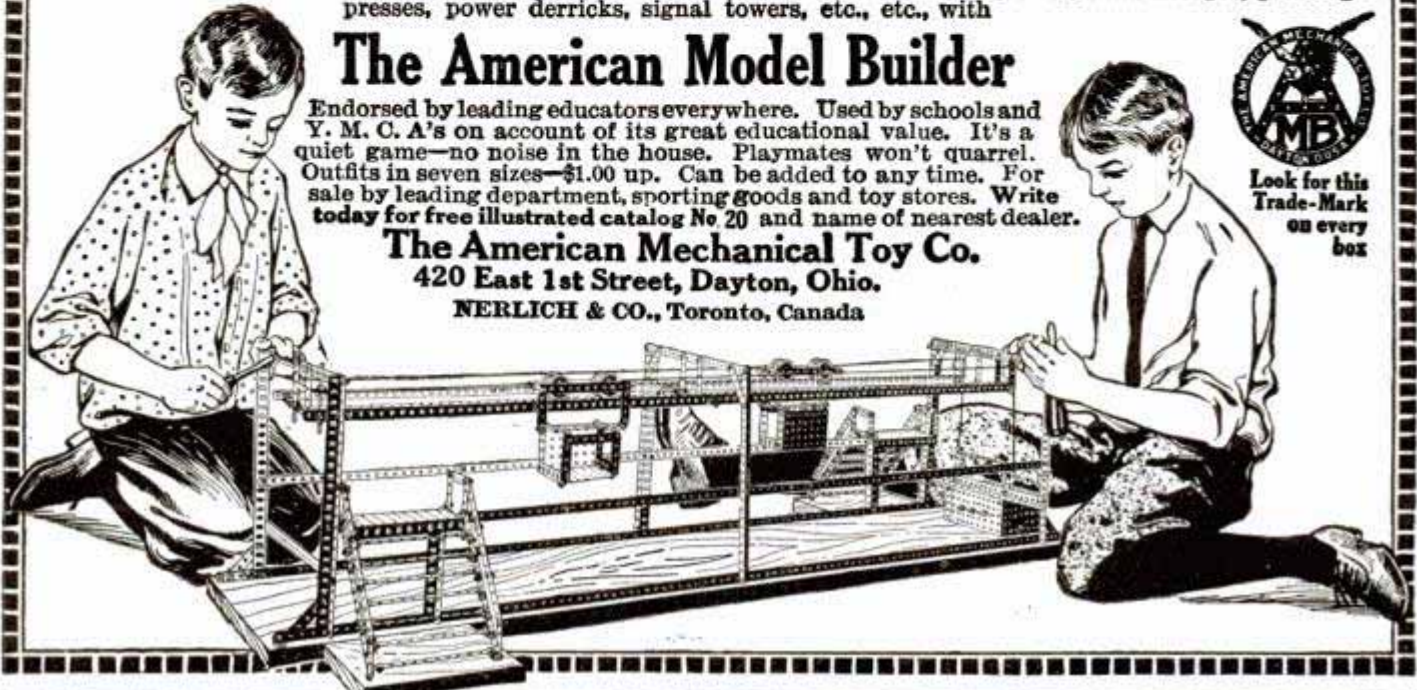
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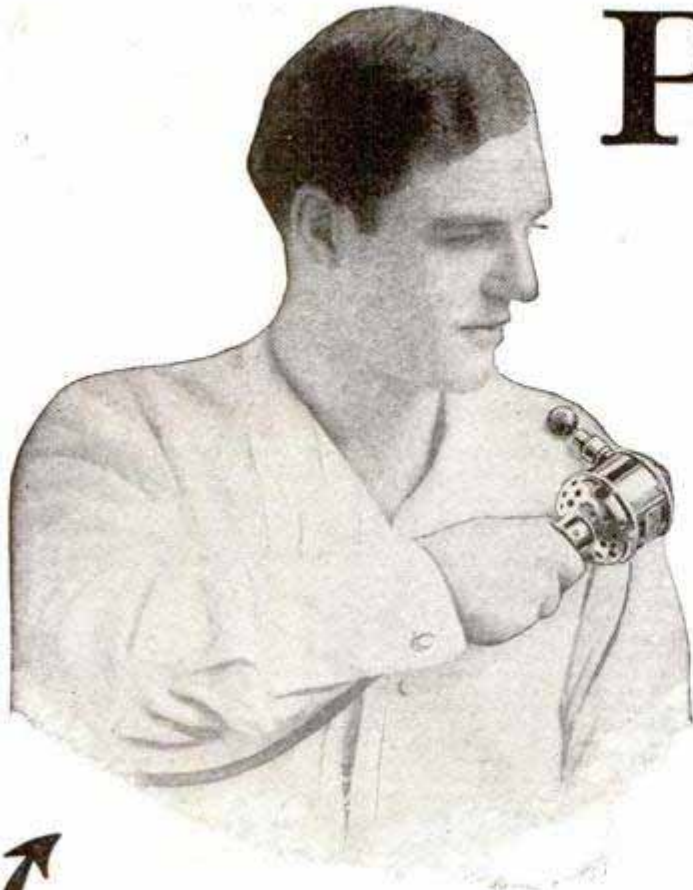


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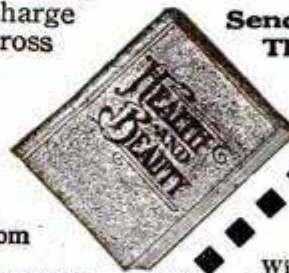
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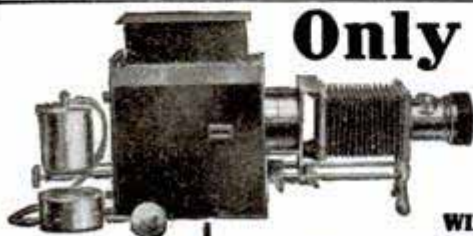


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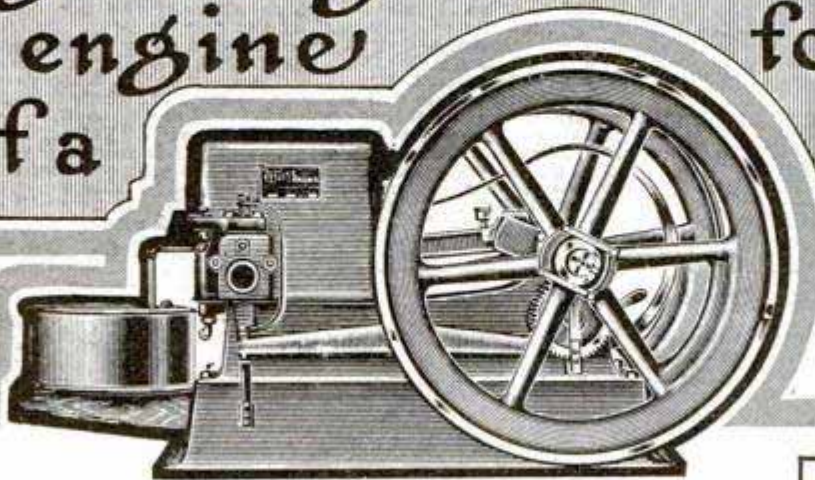
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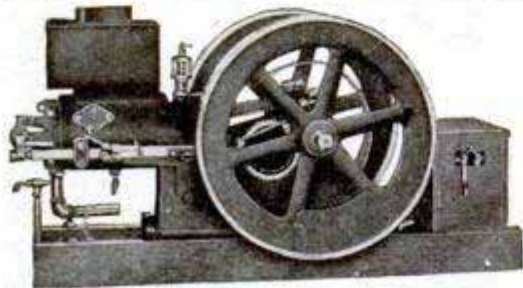
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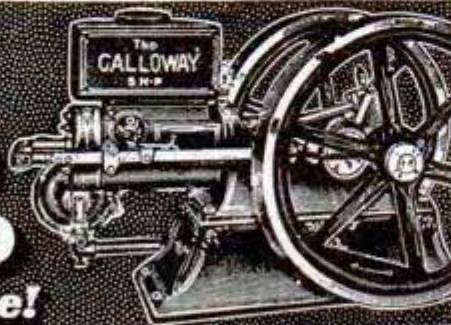
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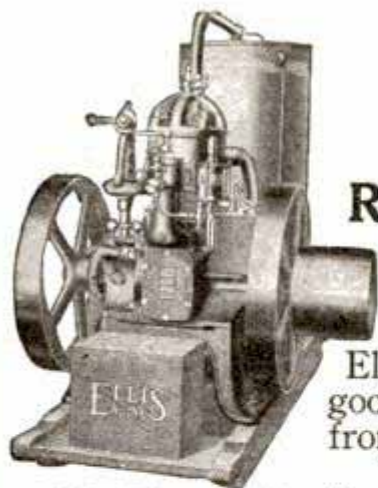
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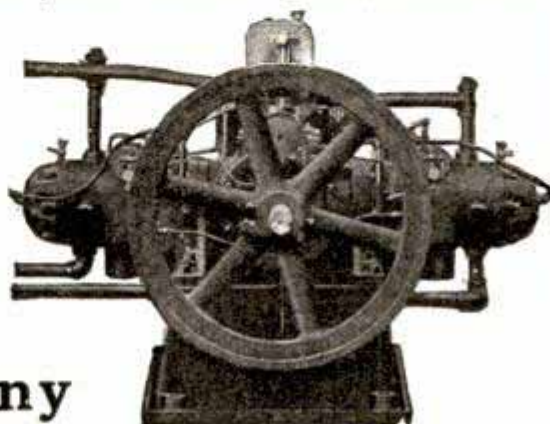
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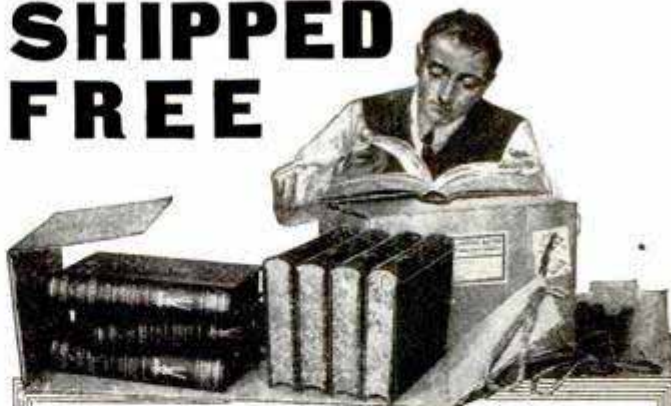
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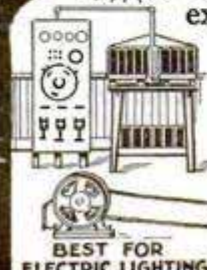
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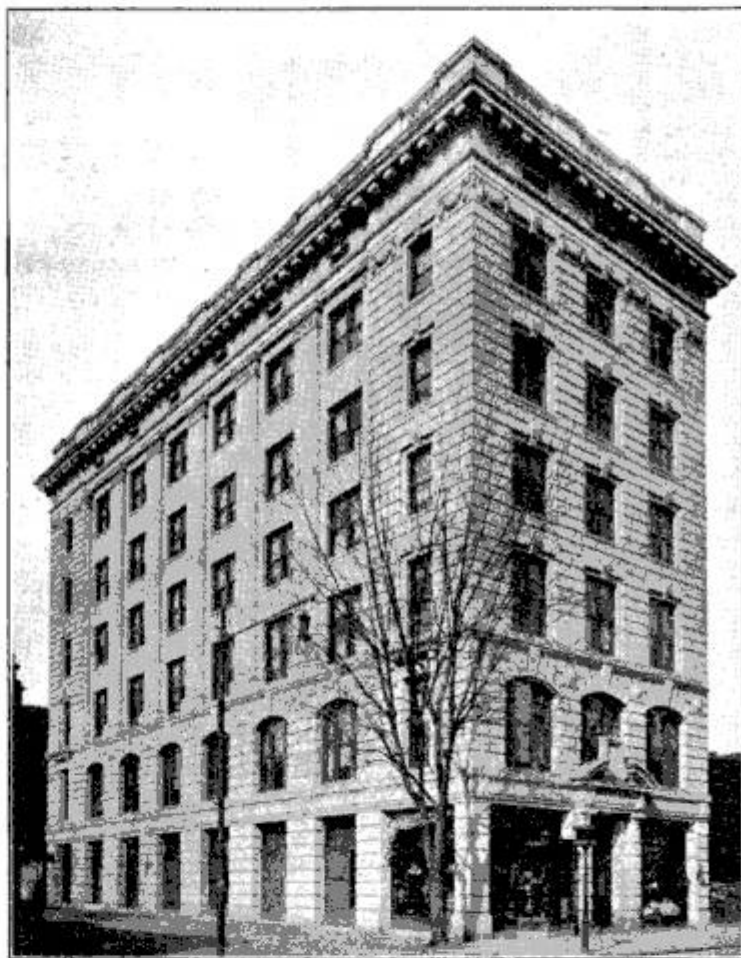
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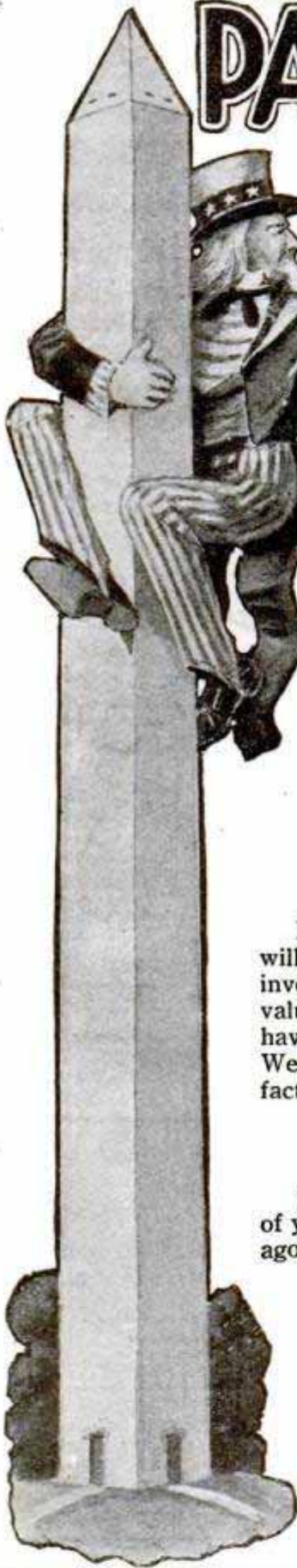
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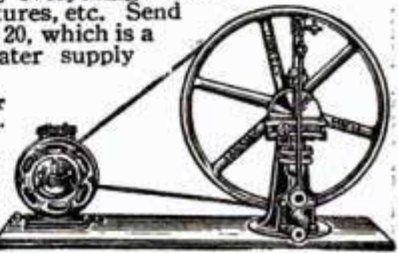
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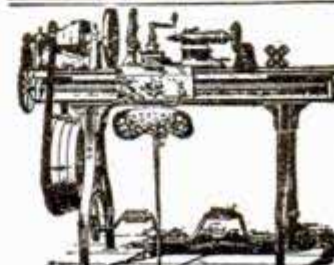
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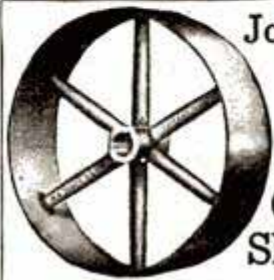
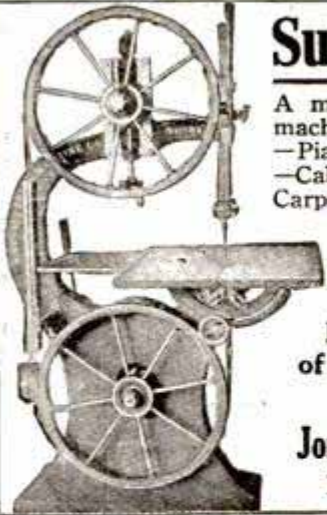
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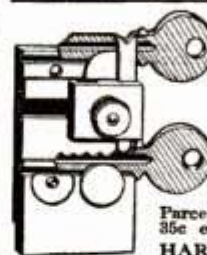


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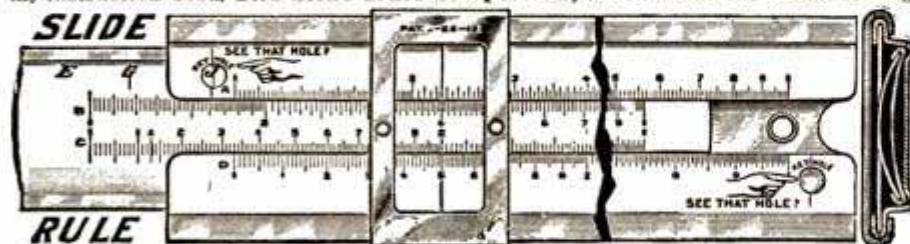
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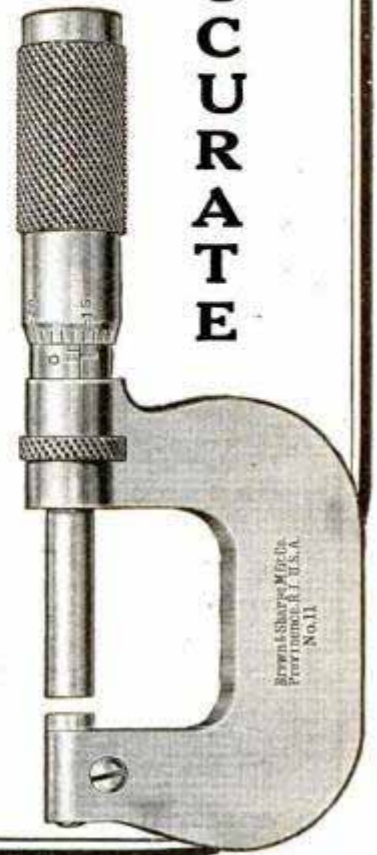
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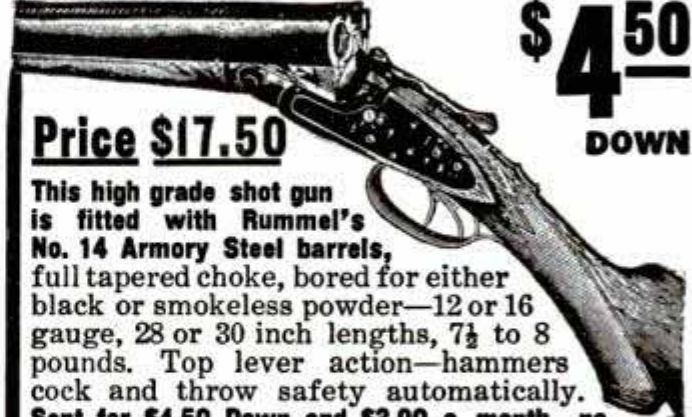
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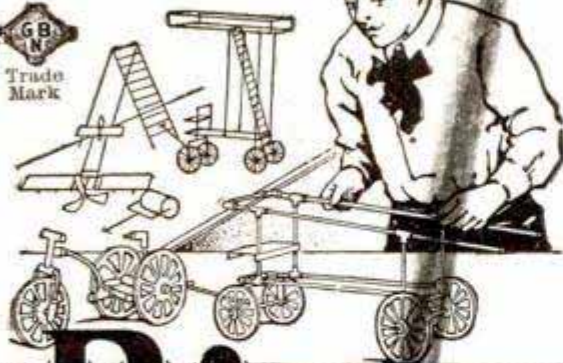
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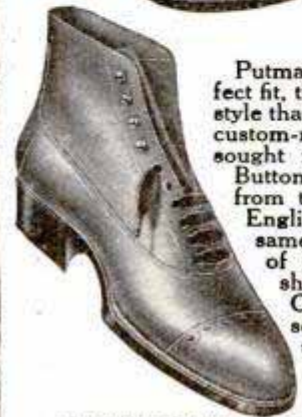
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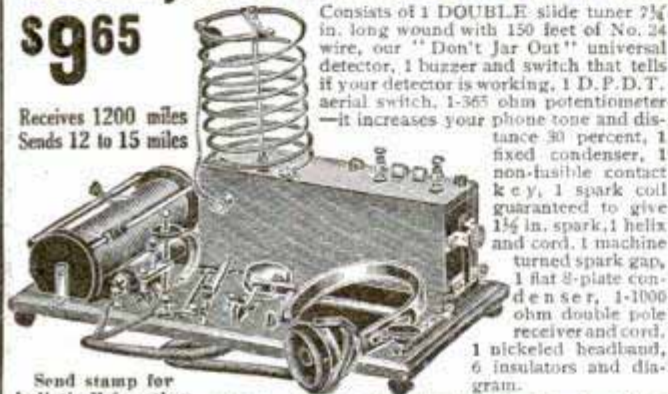
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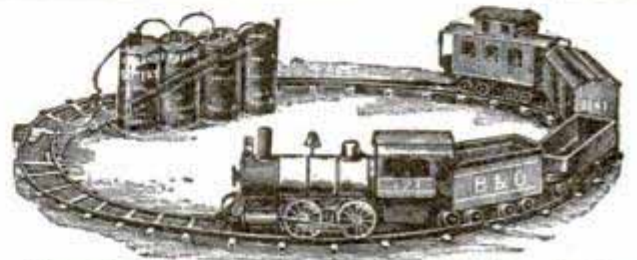
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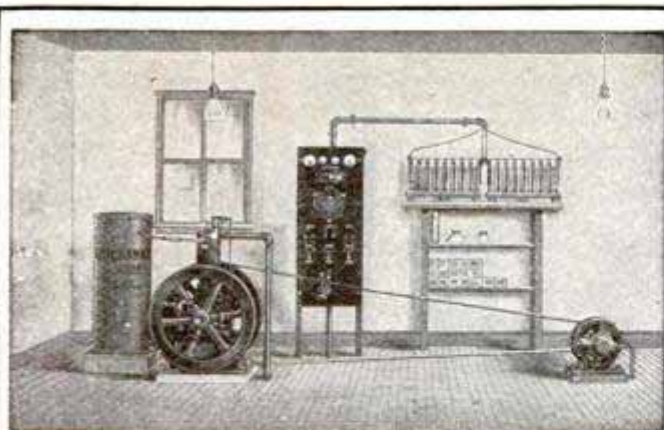
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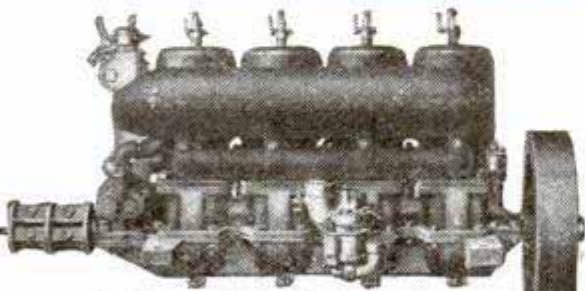


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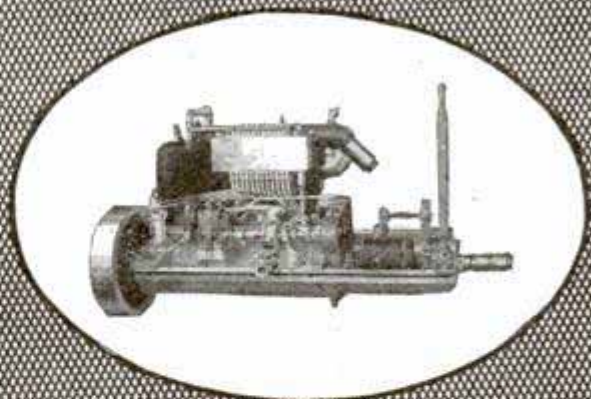
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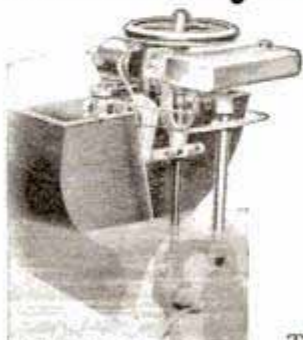
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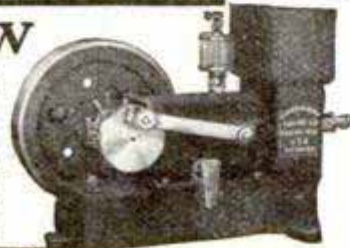
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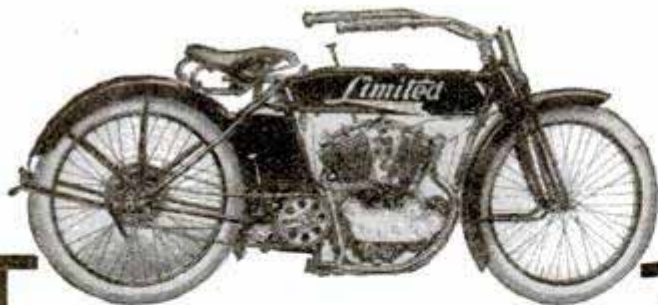
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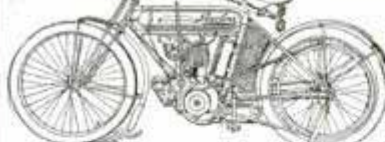
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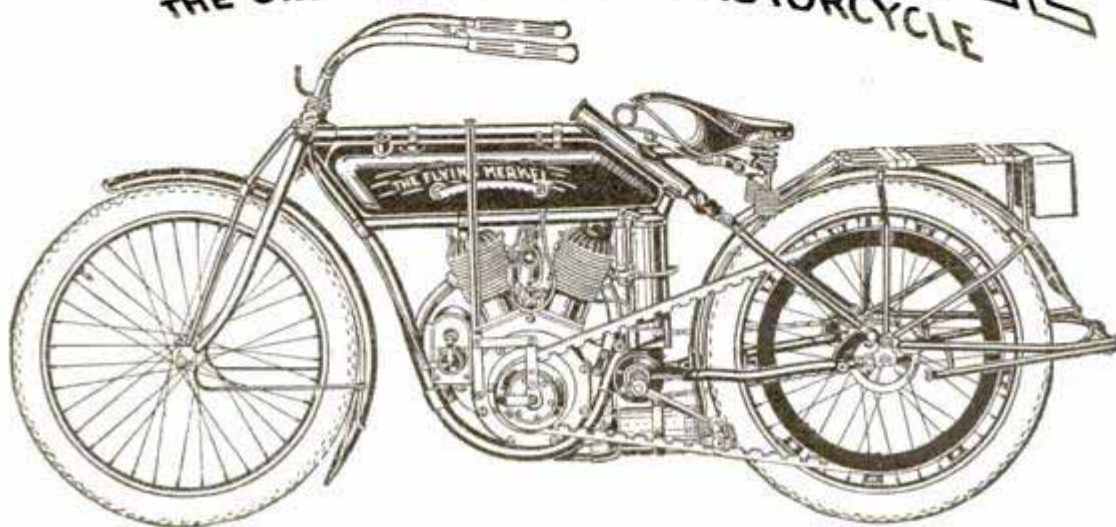
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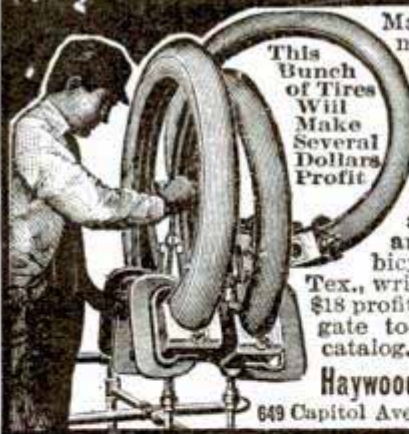
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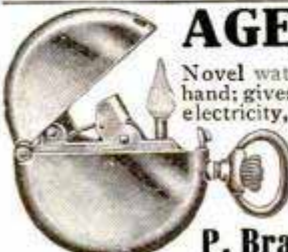
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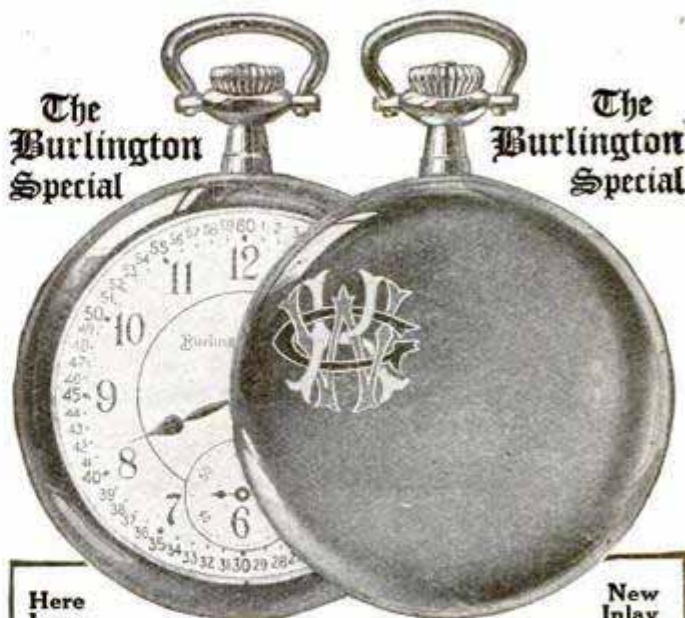
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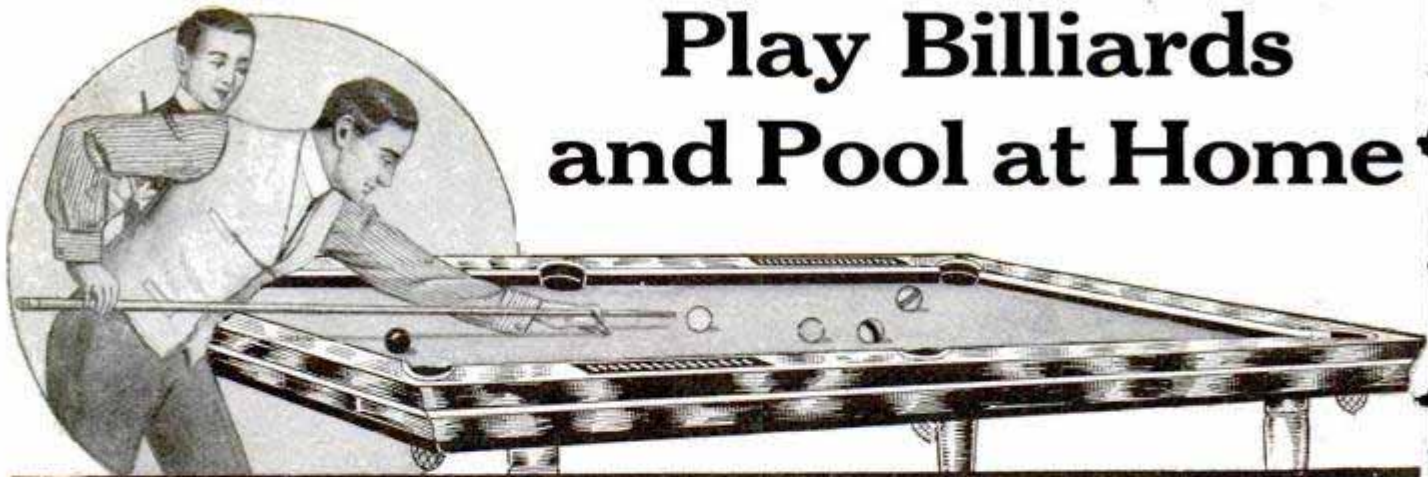
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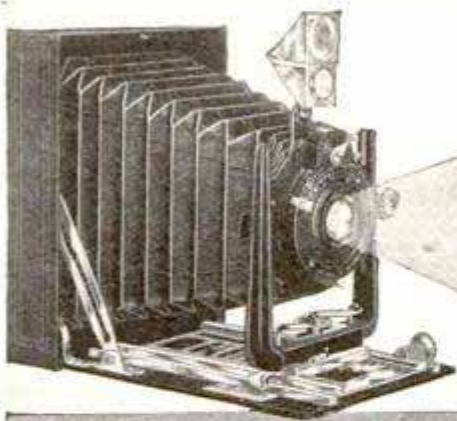
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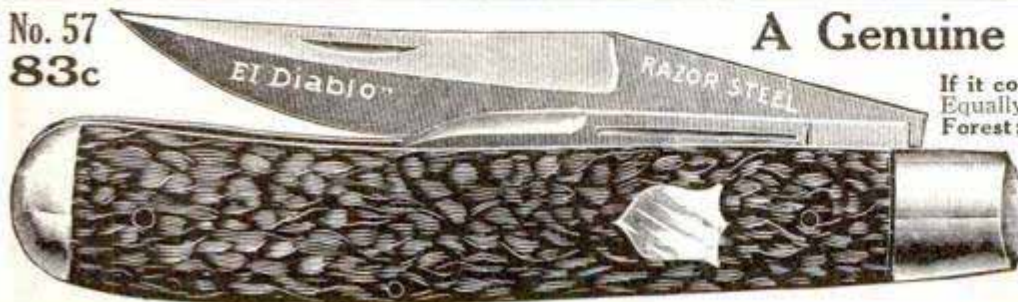
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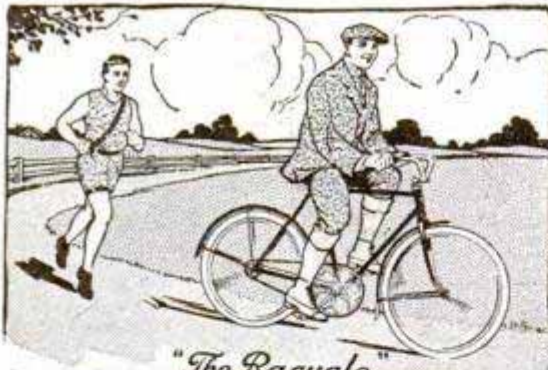
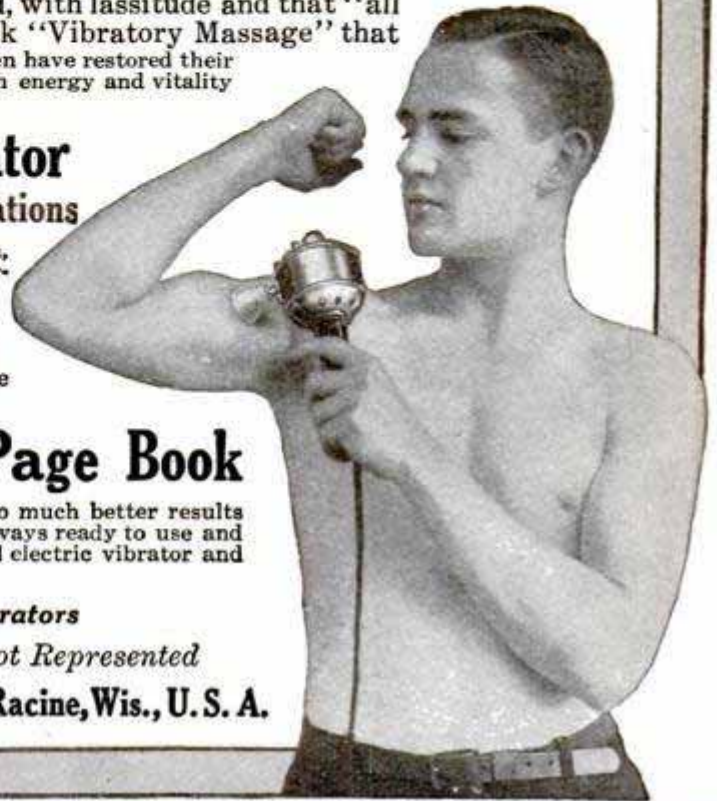
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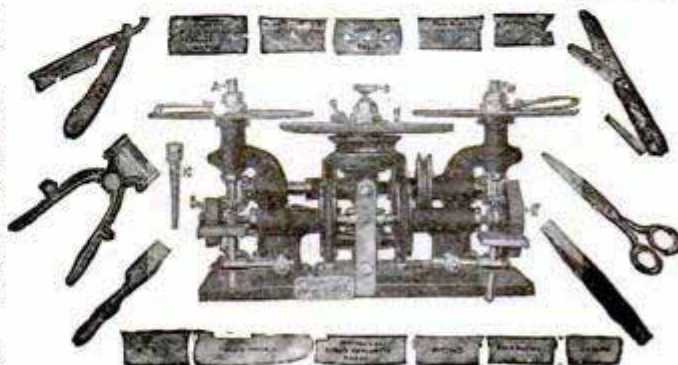
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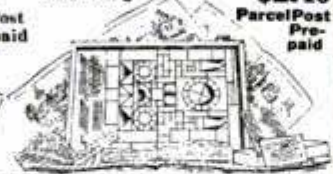
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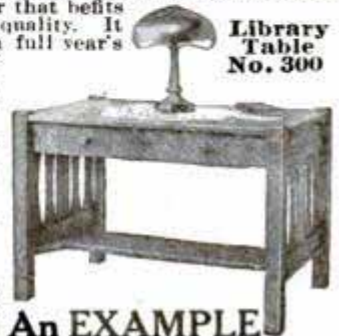
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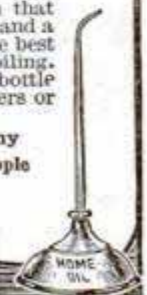
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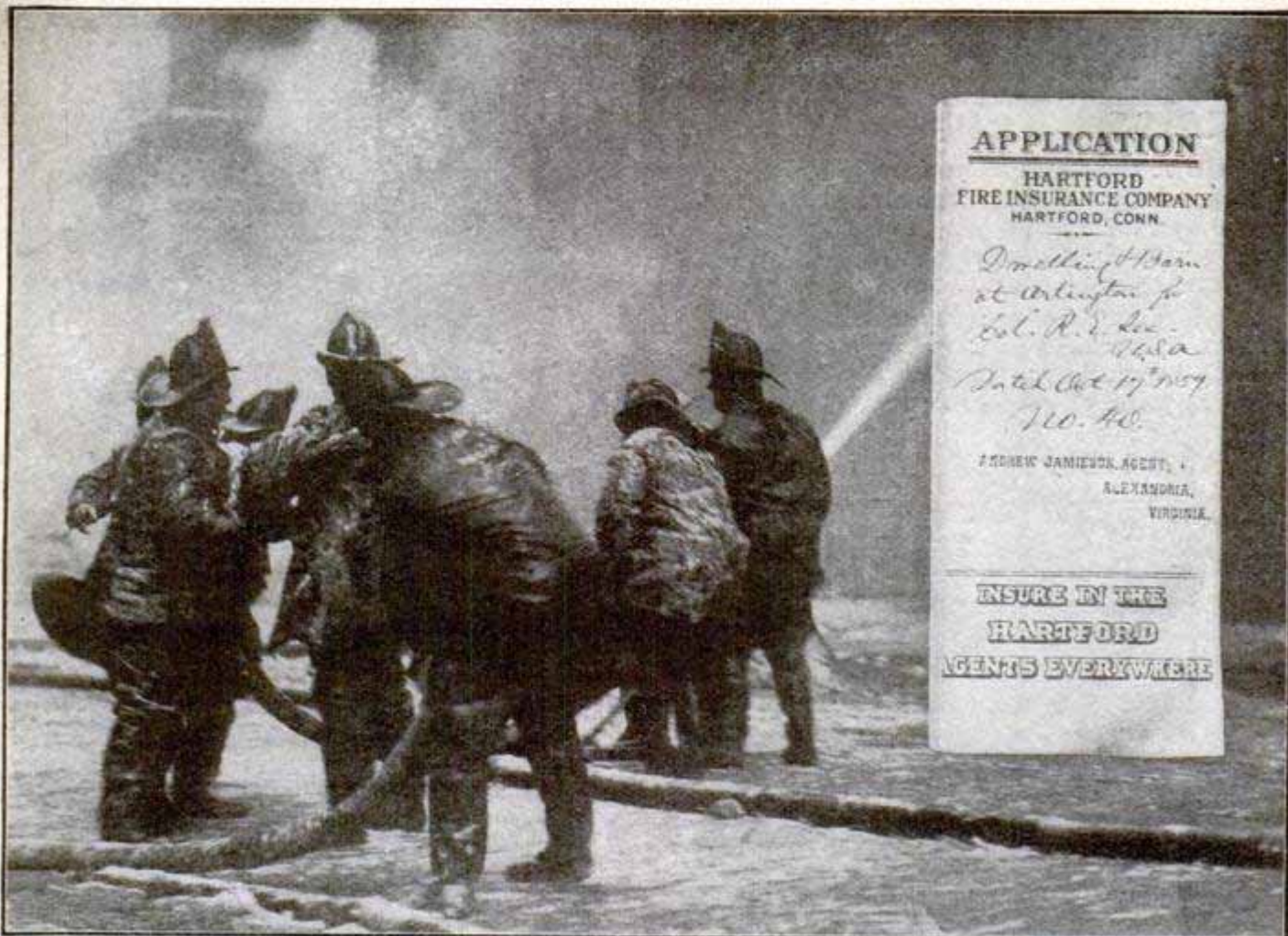
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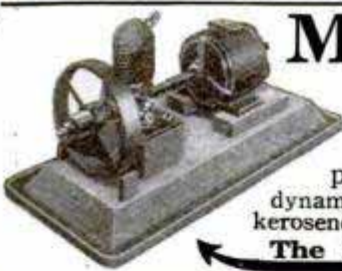
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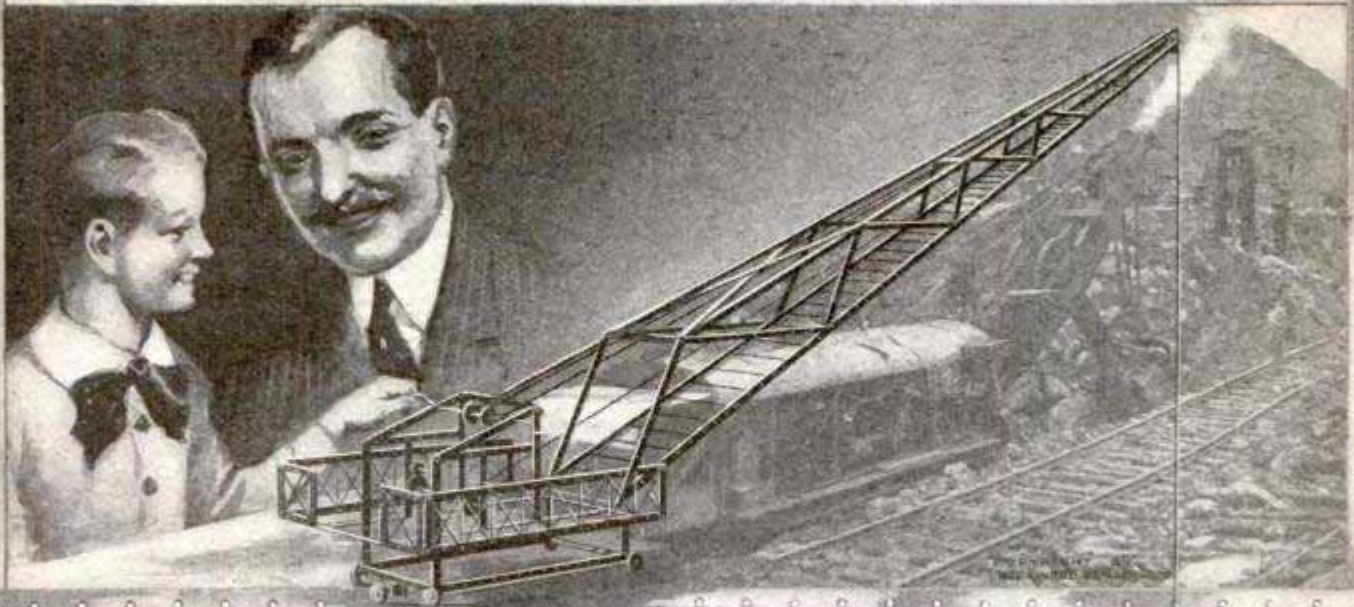
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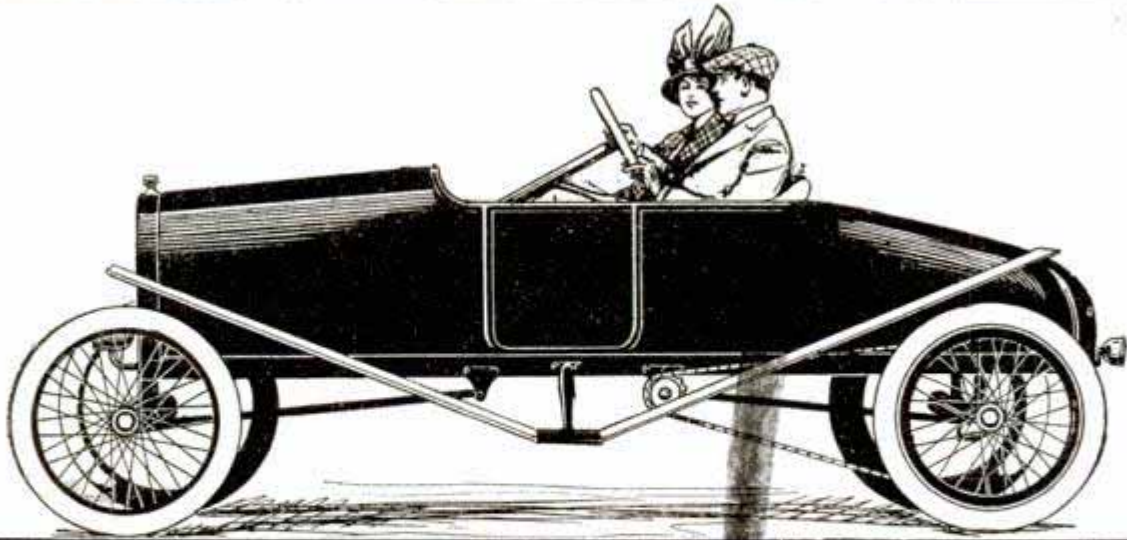
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Rayfield Cyclecar

A real automobile for only \$375

Carries two passengers comfortably, seated side by side. Has standard tread—56 inches—same as the biggest cars. Wheelbase 96 inches. Big, liberal springs insure easy riding on rough roads. Wire wheels and pneumatic tires 28 x 2½ inches. Left side drive; center control. Two speeds forward; one reverse. Air cooled motor, two cylinders, 9-12 horsepower. Speed 2 to 50 miles per hour—30 to 40 miles on a gallon of gasoline. Silent chain drive. Road clearance 12 inches. Weight 450 lbs. Climbs any hill with ease. Price includes lamps and tools. Made by a concern of known responsibility and having years of experience in making motors and cars.

Agents! Magnificent Opportunity!

Eager Buyers Waiting in Untouched Field

The cyclecar has taken Europe by storm. America is now awake to it. Everybody can afford a cyclecar and everybody wants one. Here is the only perfected cyclecar made in America. We have facilities for making quantities of them. We are ready for you and you can

our profits with you on a plan never before offered to car agents. If you want to establish a big profitable business of your own

**Be Our Distributor
in Your Locality**

if you act quickly enough. Our agents' proposition is unusual and extremely liberal. It will permit you to establish sub-agents in your territory on a profitable basis. We even share

**Get Our Proposition
Write or Wire Us Today**

There is no time to lose. Don't write us unless you want to be our distributor in your territory and can get the money to swing it—say \$500. If you can do that tell us **today, now**, before some other wide-awake man beats you to it. Write or wire now. Just say: "Send agency proposition for _____ county."

Rayfield Motor Company

Write us at the General Office, 1710 FISHER BLDG., CHICAGO **Factory:** CHRISMAN, ILLINOIS

GROW MUSHROOMS



**It's Easy to Add \$5.00 to \$60.00
a Week to Your Income**

**Here is What You Have Been Looking For
You Can Start with Practically Nothing
Your Whole Family will Be Interested
Little Care Necessary—It will Not Interfere
with Your Regular Occupation**

1. Mushrooms bring 50c to \$2.00 a pound, and 100 pounds raised on beds 5x10 feet, which cost practically nothing to start. You can readily see the profits in this business.
2. The demand always exceeds the supply, and I tell you how and where to market them.
3. I have started more people in this business and made more successful growers than any man in the world.
4. I have seen people start at home with little beds in basements, barns, sheds, etc., and increase their planting until they got to a point where they devoted their entire time to the mushroom business.
5. Beginners with my instructions often have better crops than old experienced growers. If you can read English, you can by my method grow mushrooms successfully.

Women succeed in mushroom business as well as men. Mrs. Mary Bonar, Ohio, writes: "I know a woman can raise mushrooms successfully, for I have tried it and succeeded." Mrs. Guillaumne, Wis., says: "Can sell all I have at 80 cents per pound." Boys find a "sure enough" gold mine in mushrooms. Herbert Fickenworth, 12 years old, Chicago, writes: "I am picking and selling mushrooms every day." Webster Jones, aged 14 years, Little Rock, Ark., says: "Any boy who is willing to follow directions can learn to grow mushrooms. Growing mushrooms is just the kind of work a boy likes, and I know I can make more money out of it than anything else."

MUSHROOMS MAKE MONEY

Just read these extracts from letters such as I am receiving every day:

1. "From my first bed of 50 square feet, I raised 80 pounds of mushrooms which I sold at 70c a pound." It cost \$2.00 to spawn this bed and this customer sold \$56.00 worth of mushrooms, leaving a profit of \$54.00 on an investment of \$2.00.
2. "From the last \$20 worth of spawn I bought of you I sold \$300 worth of mushrooms."
3. A customer who started in 1910 writes me in 1913: "I have never failed yet to grow mushrooms by your method and with your spawn."
4. One of the oldest and largest growers in England writes as follows: "I have read everything that I could find on mushroom growing and I congratulate you most heartily on having produced the best book, in my opinion, on the subject, ever published."
5. Every State Agricultural School in the United States has my book of instructions as a reference book. One of the biggest crops that I ever heard of was grown at one of the Experimental Stations by my method of growing and with my spawn.
6. Two of my customers in Arlington Heights, Ill., last year invested \$75 in the mushroom business and raised \$680 worth of mushrooms in the basements of their homes, leaving a clear profit of \$605 on an investment of \$75.

I Will Tell You the Facts About This Business

I spent 20 years in the mushroom business. I owned and operated for years the largest plant in America, and I am now associated with the biggest Mushroom Company in the world. We have spent up to date \$100,000.00 building and equipping our plant for growing mushrooms.

I know how to grow them and I can show you how to make larger profits on smaller investments, growing mushrooms, than anything else you can take up.

I have put the facts about this business into a beautifully illustrated booklet, entitled "Money in Mushrooms," telling you when, where and how to start, the kind of spawn (or seed) to plant, etc. Information worth many dollars to you, sent absolutely free.

Put your name and address on coupon and mail to:

A. V. JACKSON

FALMOUTH MUSHROOM CELLARS, Inc.

129 Gifford St.

FALMOUTH, MASS.

**A. V.
Jackson
Falmouth
Mushroom
Cellars, Inc.
129 Gifford St.
Falmouth, Mass.**

Please mail me your book "How to Make Money in Mushrooms," and also give me full information as to the best way to start, cost, etc. All this to be entirely without cost or obligation on my part.

Name.....

Address.....

Town.....

State.....

TEAR OFF THIS COUPON AND MAIL TODAY

PROOF!

For four years I have been telling Popular Mechanics' readers of the money-making possibilities in my Popcorn Crispette Machine. I herewith submit the proof from men, women, and boys.

F. C. Thompson, Ore., "The big popper sits up by the window and thro' us out an aroma that stops everyone who passes. I took in \$575 first 27 days, and this month am doing as well."



Mrs. L. E. Fuller, Tenn. "I have been using the little popper since January and like it better and better. Thank you very much for your kind information."



Mr. Jackson, of Ohio, says, "My boy is getting along fine. Saturday he got his first batch of 120 packages. Sold them all, Monday 140, Tuesday 180, all gone."

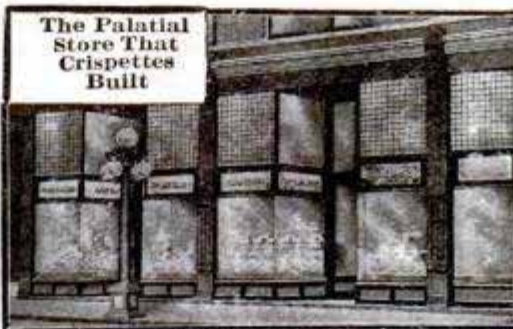


Oscar Johnson, Montevideo, Uruguay, Aug. 16, '12. "I am doing fine with your popcorn crispette outfit. Send me one of your latest catalogues as I want more outfits in a short time. Please send me a lot of formulas for candy also."

Dr. L. F. Inman, Nev. "It has been one month since I started to manufacture. I have not wasted any material and make the crispettes in full batches. The people seem to be satisfied with my goods. I have good success with the popper. I have not wasted or burned any corn and think on the whole I am not so slow to pick up a new business as some others. Everything works well with me, and for a small town am selling as much as could be expected."

Raymond W. Hekox, N. Y. "Am well pleased with crispettes because everyone who has tried them claim they are perfect and never had anything better, and I can say that myself."

C. M. Pinkston, Ga. "I am adding candies and would be glad if you would send me the formulas for making peanut and cocoanut candies. I am getting along nicely with crispettes. Several parties said they knew the crispettes were made on a Long machine."



A Recent Picture of My Big Store in Springfield

George Sutherland, Idaho. "Had fine demonstration of crispettes at leading grocery, served it with milk. Business is developing finely. I may need another outfit to set up 3 miles from here."

W. A. Furlong, Pa., Pop. 2,000. "I want to tell you, your machine is all right. Popped all of the 160 pounds of corn the first week."

John Byrod, Pa., bought a machine and placed it in a shoe store. Tells us the business paid for the machine in quick time. He states he is going to quit the shoe business and sell crispettes only. Mr. Byrod invites our prospects to come to Sunbury.

We shipped a machine to Rochester. The man never saw a machine before. Writes as follows about his first attempt. "I must have followed your directions pretty good. The crowd blocked the sidewalk and many came in the store. They bought as fast as two of us could wrap. Say, it is like a circus. Every one who tasted said, best they ever ate."

Crispettes Built This "Big Store" for me and made me wealthy—
W. Z. Long



Crispette Machine and Long's Secret Formula—

To the man of limited means the Crispette business is a safe, strong and proven foundation for rapid mounting to influence and fortune. I have numerous letters on file to bear out this statement. It is clean, dignified, requires no canvassing. **You become a merchant**—the entire community your patrons. It is a business which with my complete system and great secret formula, needs no other experience or other expense, to make it successful.

Follow Carefully the Amazing Facts

Answer to Yourself These Pertinent Questions

What salary do you **earn**? What do you **get**? Stop a minute and consider. You know that what you receive from your employer represents but a small portion of what you really earn. Get on the other side! If your earning power amounts to thousands every year—then **earn it—and keep it yourself.**

Come to Springfield at MY expense. Let me **PROVE** every word in this advertisement.

STOP! You have followed the rut too long. You have accepted only what others care to give. Get on the other side. Take only **WHAT YOU WANT!**

Palmer, Pa., cleared \$500.00 last Labor Day. E. H. H. Penn., sold 12,000 rolls in two weeks, etc. Just a sample of the letters received from "Crispette" merchants from all parts of the country. Our greatest money barons began with a far less advantage than I offer you today. So write **NOW**—for my handsome illustrated 48 page free booklet, "How To Make Money In The Crispette Business," or

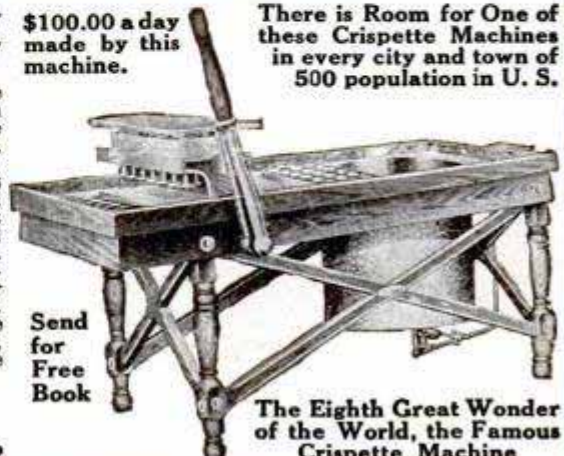
Send a Card Today to
W. Z. LONG
794 High St., Springfield, Ohio

Almost the Enormous Profit of 400%

\$1.00 in cash returned you for every 20 cents spent. NOT theory! NOT "guess work"! NOT "imagination"! But the actual, bona fide, proven record of profits of "Crispette" producers, from Coney Island to Oregon and from Canada to the Argentine Republic in South America.

\$100.00 a day made by this machine.

There is Room for One of these Crispette Machines in every city and town of 500 population in U. S.



Send for Free Book

The Eighth Great Wonder of the World, the Famous Crispette Machine



What's the Matter?

SOMEBODY HURT. An automobile turning a corner struck a man crossing the street who had become confused and did not get out of the way. The crowd is gathering to see the ambulance carry the man away.

Every hour of the day such accidents are happening on the streets. The carelessness of others and your own hurry puts you in constant danger of accidental injury.

There are a thousand causes of accident. Not the least numerous are those at home, office, travel and recreation.

A \$3,000 accumulative accident policy, the best on the market, costs at the rate of about 4 cents a day.

You need accident insurance. You need it now.



MORAL: Insure in The TRAVELERS

The TRAVELERS INSURANCE CO., Hartford, Conn.

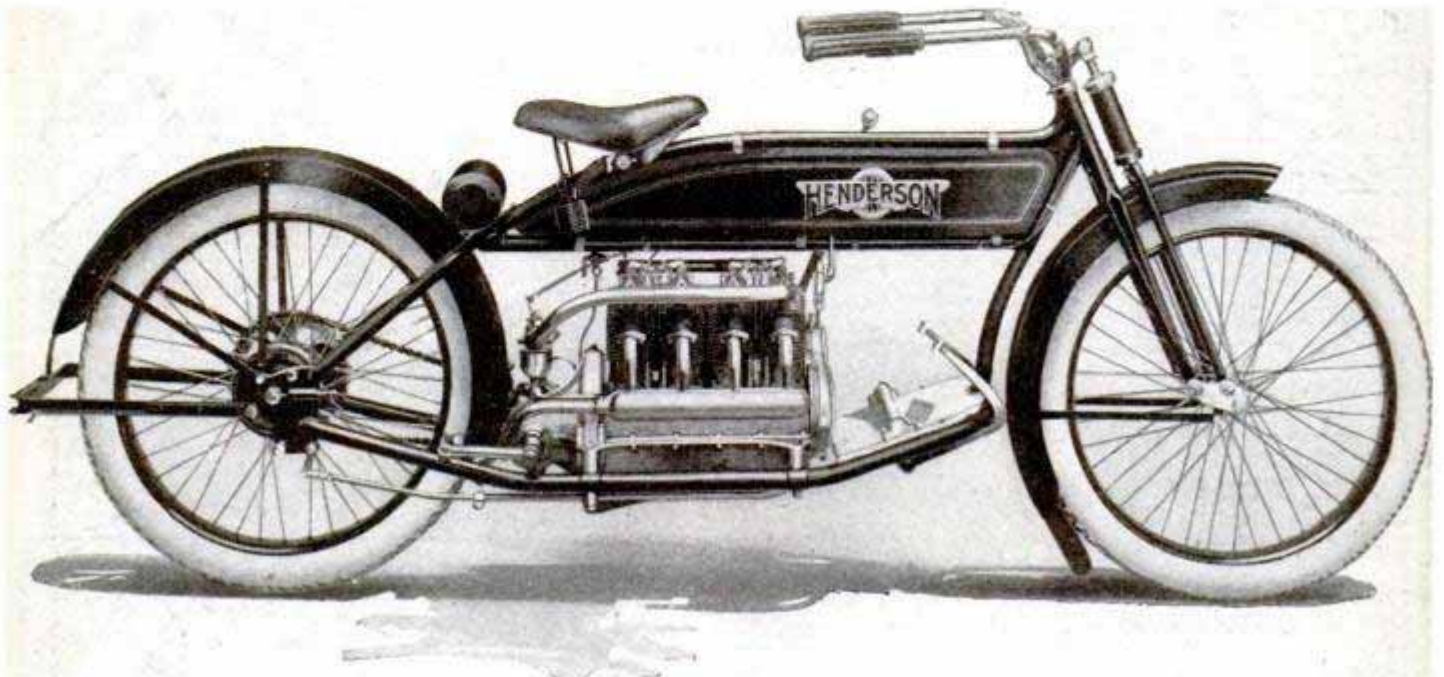
Pop. Mech. N

Tear off

Please send me particulars regarding Accident Insurance. My name, address and date of birth are written below:

1914 HENDERSON

Ready for you now



8 H. P., 4 cylinders, \$325. Two-speed model with Thor two-speed Hub, \$365. Tandem attachment complete, \$20.

Next to the news about the machine itself, the best thing about this 1914 Henderson announcement is that you can have immediate delivery of the new model.

We have delayed our announcement until the new models should be ready for shipment in quantities and each Henderson dealer have a specimen.

The 1914 Henderson is differentiated from every other motorcycle by its four cylinder design, its freedom from motor vibration and stuttering power, its long wheel-base and low center of gravity, its three-inch tires and powerful brake, and its general comfort and easy riding, which are admittedly unsurpassed.

These are fully described in the catalog, which we will be glad to send, or can be seen at the Henderson dealers'.

A marked advantage, in addition to these, is the saddle adjusting plate, which enables every rider to vary the saddle spring tension to suit his own weight and requirements.

The friction surface of the clutch having been almost doubled, smoother action and a saving of power result.

The motor speed and flexibility are increased because each piston has been lightened; and no automobile has finer crank-shaft and connecting rod bearings of babbitt-lined bronze than those that distinguish the Henderson.

There are other improvements the details of which we cannot give here, but which will serve to emphasize and increase the Henderson's leadership among the more careful motorcycle buyers.

Henderson Motorcycle Company, 1158 ^{Dept. C} Cass Avenue Detroit, Mich.

AETNA-IZED?

WHEN some Engineer runs past a signal and many lives are lost in the wreck, that is the time to remember that railroad travel is not the most important hazard against which the average man needs accident insurance.

The AETNA COMBINATION POLICY
Furnishes Insurance Protection against the multitude of hazards every man runs every day

\$3,250 INSURANCE FOR \$10

In extent and variety of protection this policy is exclusive and without a rival.

For \$10 a year (in "Preferred" Occupations) this Policy pays:

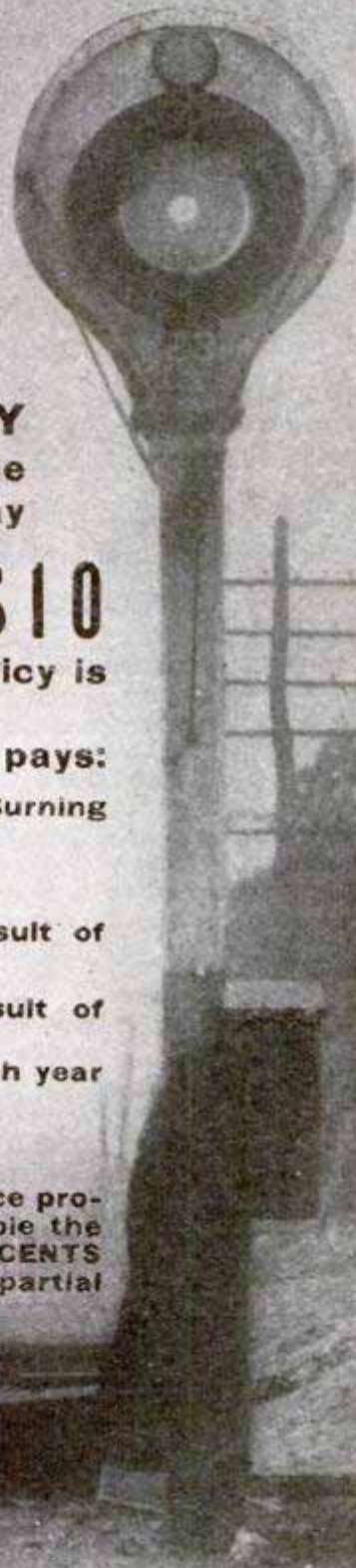
- \$2,000** for death from Travel, Elevator or Burning Building Accident.
- \$1,000** for death from Ordinary Accident.
- \$2,000** for loss of limbs or sight as a result of Travel Accident.
- \$1,000** for loss of limbs or sight as a result of Ordinary Accident.

The above amounts accumulate Ten Per Cent. each year for five years without additional cost.

\$250 FOR DEATH FROM ANY CAUSE
(No Medical Examination Required.)

The Accumulations, Double Benefits and Life Insurance provided by this Ten Dollar Combination make possible the payment of \$3,250 at a cost of less than **THREE CENTS A DAY** in addition to weekly indemnity for total or partial disability from accident.

SEND IN THE COUPON TO-DAY



AETNA LIFE INSURANCE CO., (Drawer 1341), Hartford, Conn.

Pop. Mech.

I am under 55 years of age and in good health. Tell me about Aetna \$10 Combination. My name, business address and occupation are written below.

Young Men Wanted

To **Become Draftsmen and Designers** At Once

The constant demand for trained men always exceeds the supply. Positions paying Big Money are open now. Some weeks over 250 positions paying the highest salary in all parts of the country stay open. Let me send you one of my regular weekly "Draftsmen Wanted" lists. You can have one of these positions. I'll give you just the training you need.

\$125 to \$175 Per Month to Start

You can make it. I have trained the highest priced draftsmen and know exactly the kind of training those men need who draw the biggest salaries. Send the coupon.



Chief Draftsman Will Train You Personally and Instruct You Properly

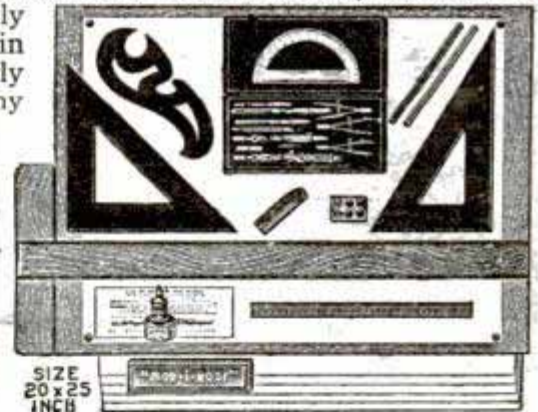
On practical Drafting room work until you are absolutely competent in every respect as a first-class Draftsman and until you are in a permanent paying position at a salary paying at least \$125 per month. This is a most exceptional opportunity for just a limited few selected ambitious men, between the ages of 16 and 40, whom I will train personally and give individual instruction as required in order to fill the constant demand for properly trained men in this line. I give each of my

students my own personal attention—therefore, I limit the number of my students and if you desire such an opportunity then get busy now and write to me at once. Don't wait till tomorrow, do it today. You can earn more than I charge for my time and personal training.

I Guarantee

To instruct you until competent and in a permanent paying position at a regular Draftsman's salary of at least \$125 to \$175 per month and guarantee to furnish you free the complete Draftsman's working outfit at once from the start.

This \$15.00 Draftsman's Working Outfit Free



These are regular working instruments—the kind I use myself. I give them free to you if you enroll at once. Send the Free Coupon today.

You Can Earn While Learning

Yes, that's exactly what I mean. As soon as you become my student you can begin earning a handsome income while learning at home. I mean just what I say. This is a special offer I am making. Absolutely no obligations of any kind in sending the coupon. But you must write at once, as I will take the names in the order I receive them.

Mail FREE Coupon at once for my book "Successful Draftsmanship," also list of open positions and for the free offer to be earning good money at once while learning at home. This offer is positively limited and in order to benefit thereby you must act at once.

CHIEF DRAFTSMAN
ENGINEER'S EQUIPMENT CO. (Inc.)
Div. 9198 CHICAGO

FREE BOOK and EARNING while LEARNING OFFER COUPON

Chief Draftsman,
Engineer's Equipment Co.
Div. 9198 Chicago, Ill.

Without any obligation to me whatsoever, please mail your book "Successful Draftsmanship" and full particulars of your liberal "Personal Instruction" offer to a few students. It is understood that I am obligated in no way whatever.

Name

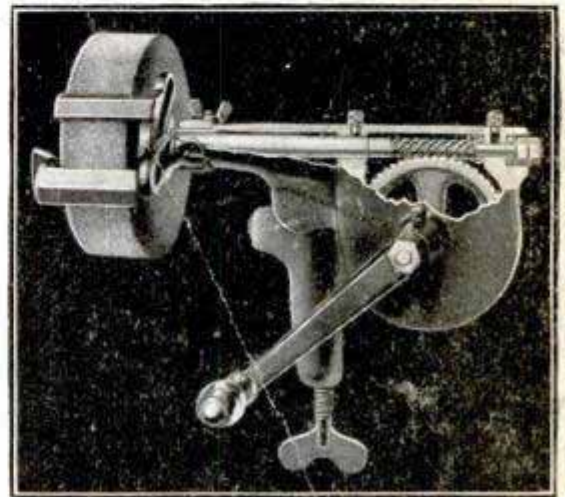
Address

Makes Tool Sharpening Speedy, Easy and Accurate

No other hand tool grinder can compare with Luther's "BEST MAIDE" in efficiency. It is the speediest, smoothest, quietest, most accurate and easiest running tool sharpener possible to produce. The secret of its success lies in its wonderful DIMO-GRIT wheel, its ball-bearings, its worm gear and shaft and the tilting frame.

Ball Bearing

The worm gear and shaft on the Luther "BEST MAIDE" Grinder are perfect in every detail. We cut them from solid steel with special machines of our own designing. Not even the very highest priced cream separators are supplied with better or smoother gears. "BEST MAIDE" gears and shafts are of extra large diameter, which means greater wearing surface. The grinding wheel held by this extra heavy shaft must run true and without vibration. Ball bearings are used to take up all end thrust and give as perfect and easy running a piece of mechanism as it is possible to build.



Horizontal Position—Sectional View
Showing Worm Gear and Shaft

Tilting Frame

The Luther "BEST MAIDE" Grinder can be tilted so that any side of the grinding wheel can be utilized. No matter how awkward a tool may be to "get at," it is easy to sharpen it with this adjusting feature. Our new patented arrangement for swivelling the frame allows quick and accurate adjustment to ANY ANGLE—horizontal or vertical—and holds the machine rigidly in any position.



Upright

Double Faced Sharpening Wheel

The "BEST MAIDE" has a double-faced sharpening wheel. The body is of medium grit for quickly bringing a tool to an edge. The smooth and keen edge finishing is done on the side face of the wheel, which is of very fine grit, like a finishing hone. This "two in one" feature is exclusive with the "BEST MAIDE" Grinder.



With Chisel and
Plane Bit Guide

Dimo-Grit Wheels

DIMO-GRIT, the wonderful new artificial diamond sharpening substance, used in the "BEST MAIDE" Grinder Wheels, cuts steel as emery cuts soft copper. It makes tool sharpening so easy that your tools are always in perfect edge, your work speeds up and production is increased. Will outwear any number of emery wheels. No water needed—no danger of spoiling a tool as DIMO-GRIT will not draw temper. Guaranteed for 5 years.

Carried by Leading Hardware Stores

Luther's "BEST MAIDE" Grinders are on sale by leading Dealers everywhere. If, after inquiry, you find your Dealer does not handle them, and you will write us stating why he does not; and will also give us the name of the line of grinders he does carry, we will send you—FREE—a handy little Dimo-Grit Pocket Hone in handsome leather case. Descriptive Folder of "BEST MAIDE" Grinder Free on request.

Luther Grinder Mfg. Co.

715 Point Street Milwaukee, Wis.

Mail this FREE Coupon

Luther Grinder Mfg. Co., 715 Point St., Milwaukee, Wis.

Please send me Free your Special Folder illustrating and describing Luther's "BEST MAIDE" Tool Grinders.

Name.....

Address.....

SPECIAL FREE HONE COUPON

In compliance with your condition for Free Hone, I make the following report:.....

.....

Dealer's Name.....

Grinder Handled.....



The minute-men of to-day are in the army of **Good Teeth-- Good Health**

Boys and girls—men and women—
—who wish to guard their health,
give their teeth a minute's care
twice-a-day. These minute-men—
and women—are ready to do their
best at work or play.

Enroll to-day—make the common-
sense care of your teeth a pleasure by
using Colgate's Ribbon Dental Cream.

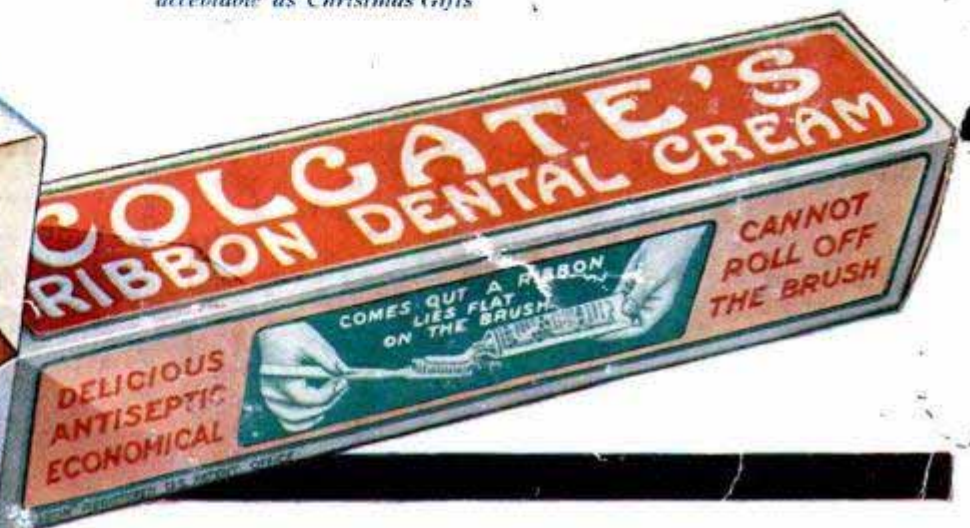
There should be a tube for every
member of your household—just as there
is a tooth-brush for each. Get it at your
dealer's or send 4c for a generous trial tube.

COLGATE & CO.

Dept. 81 199 Fulton Street New York City

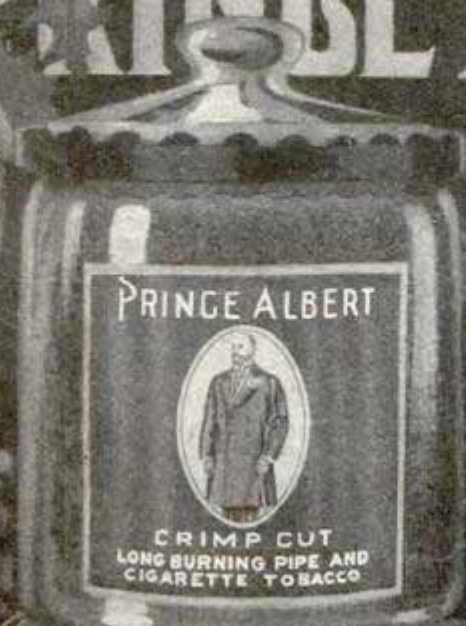
Makers of Cashmere Bouquet Soap—curious, lasting, refined

*Colgate Preparations are most
acceptable as Christmas Gifts*



PRINCE ALBERT

*the national
joy smoke -*



THE others are going to give him neckties and slippers and handkerchiefs and what not. If *you* are stumped and just don't know *what* to get, take this little tip from Santa Claus—just you slip around to any tobacco shop and tell the man you want a one-pound glass humidor full of Prince Albert. He will fix you up a spanking fine Christmas package and you can slip it on the mantel *for Him*. Maybe you don't know what a crackerjack Christmas present P. A. makes, but take it from your Uncle Nicholas—that father, husband, brother or sweetheart of yours will make a mental note that “there's one woman who understands a man.” The pungent, spicy aroma of P. A. adds to the Christmasy smell of the house. *He* will be glad you chose P. A., because he knows he can smoke all he wants during his holiday without a burned tongue or parched throat. Prince Albert can't bite anyone's tongue. Our patented process removes the bite. Buy that package now while the stores have plenty.

P. A. is also sold in 10c tidy red tins; 5c toppy red bags and in pound and half-pound tin humidors.

R. J. REYNOLDS TOBACCO CO., Winston-Salem, N. C.



This box was made by a society girl of New Orleans

can be *made by yourself* into scores of useful and uniquely beautiful things for Christmas Giving at the mere cost of a few thin boards of Cypress, "the wood eternal," and "a little pleasant labor lovingly done."

Why Not Make HIM a "SUGI" Cypress Box?

—to keep his cigars in? Or, why should not **YOU** put in a little time and a little easy and *interesting* work and make **HER** a royal serving tray of Sugi Cypress—that will add real distinction to your dining room and delight her more than any conventional gift of greater cost. First thing to do is to

Get the 64-page Cypress "SUGI" Book:

(incl. 2 inserts in India Tint.) "The Most Usable Free Book Ever Printed for Folks Like You and Us" It tells not only *how you* can reproduce perfectly the rare and coveted Antique Japanese Driftwood effects by *scorching* and *brushing off* a piece of Cypress (working in your own kitchen or cellar) but also why Cypress is **the only wood the Sugi treatment will work on**. You do no designing, tracing or coloring—simply *bring out the natural beauty* and distinction of Cypress. The book lists numberless suggestions as to What to Make—from glove box to library panelling.

DON'T DELAY. WRITE FOR VOL. 26—FREE

When planning a Mansion, a Bungalow, a Farm, a Sleeping-Porch, or just a Fence, remember— "With CYPRESS you BUILD BUT ONCE."

Let our "ALL-ROUND HELPS DEPARTMENT" help YOU. Our entire resources are at your service with Reliable Counsel.

SOUTHERN CYPRESS MANUFACTURERS' ASSOCIATION

1219 HIBERNIA BANK BUILDING, NEW ORLEANS, LA.

INSIST ON CYPRESS AT YOUR LOCAL DEALER'S. IF HE HASN'T IT, LET US KNOW IMMEDIATELY

CROSBY, CHICAGO

Build Her a Little Greenhouse: Now

Plenty of time to beat old Winter to it, if you start soon. Do not consider any material but Wood—nor any wood but CYPRESS, "The Wood Eternal." Any responsible greenhouse manufacturer will tell you *why*. With metal sash-bars and concrete benches you must use fuel enough to keep the temperature fully 5 degrees higher than if you build of wood in order to keep your soil at a given warmth. Greenhouse use is the most severe test to which you can put wood; CYPRESS has no rival in meeting it.



Vol. 20 of the famous Cypress Pocket Library (never **FREE** before advertised in this magazine) contains among many other items of special value, a Detailed Plan and Working Drawing, for a splendid little *practical* greenhouse (like picture at left) that *you can build yourself*. Don't miss this. Write tonight for Volume 20—also ask for Volume 3—all about greenhouses.

The John C. Moninger Company, Chicago, Greenhouse Builders, say:—"The greenhouses built by us of clear Cypress, free from sap, 21 years ago are being used today by their owners and the wood is perfectly preserved and *free of any decay or rot*."

Let our "ALL-ROUND HELPS DEPARTMENT" help YOU. Our entire resources are at your service.

SOUTHERN CYPRESS MANUFACTURERS' ASSOCIATION

1219 HIBERNIA BANK BUILDING, NEW ORLEANS, LA.

INSIST ON CYPRESS AT YOUR LOCAL DEALERS. IF HE HASN'T IT—LET US KNOW QUICK