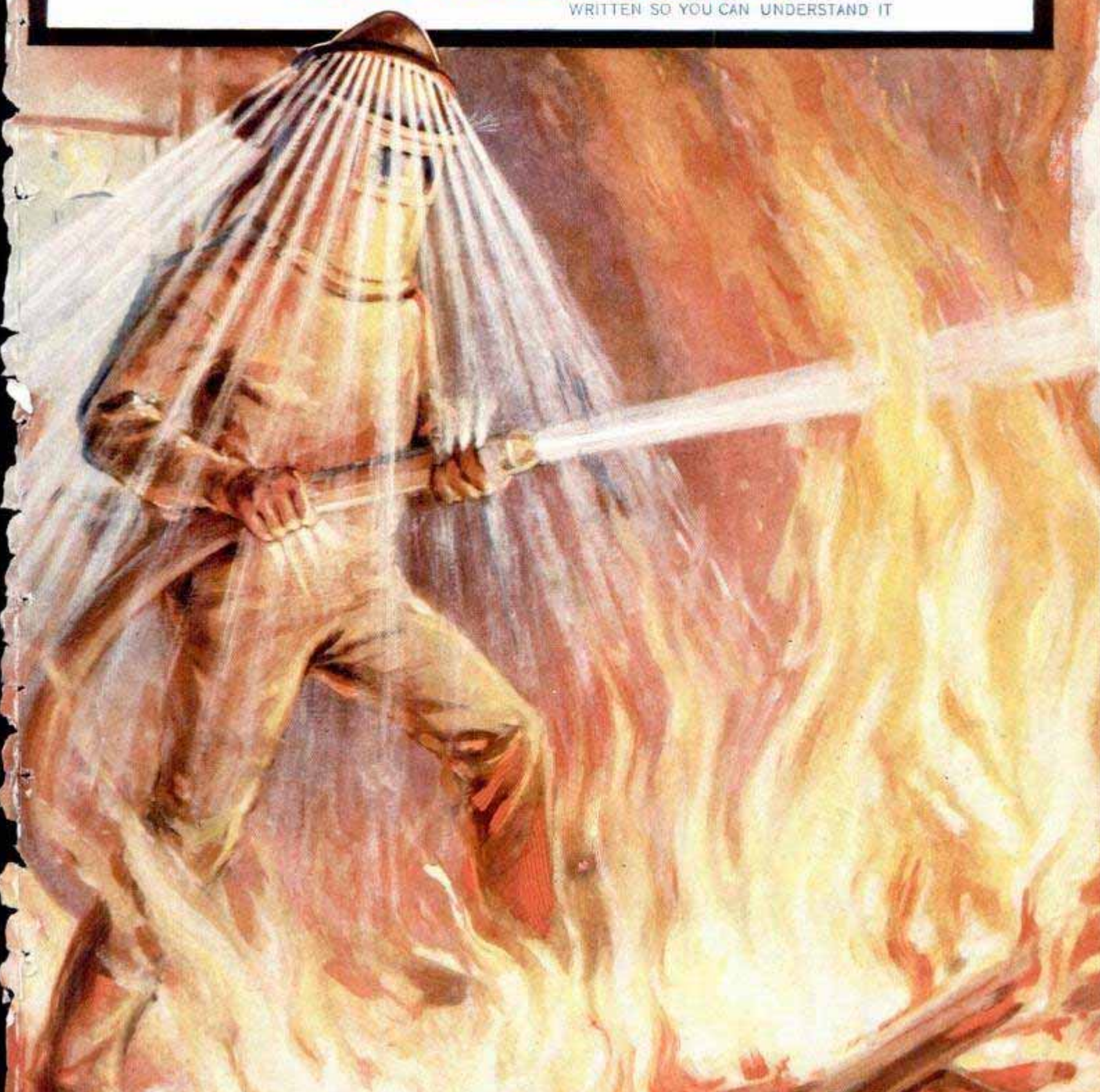


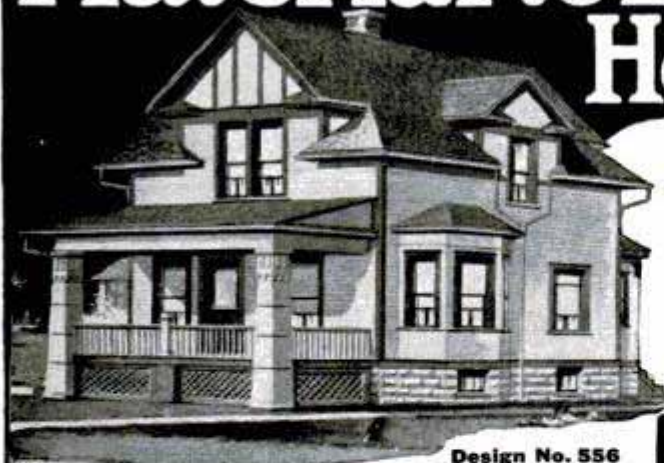
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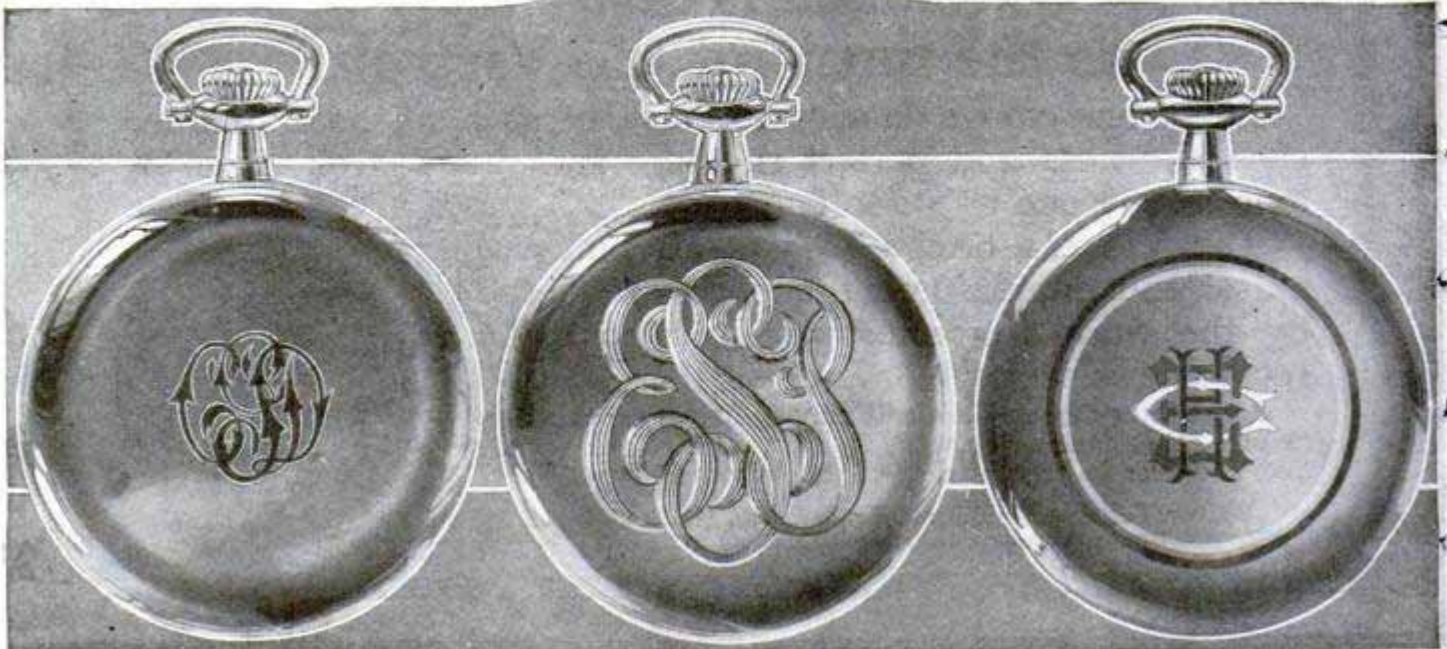
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# Popular Mechanics Magazine

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

EDITED BY H. H. WINDSOR

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## Contents for May, 1914

Aerial Machines, Transferring Articles to.....	667	Dam, Big Creek, Now Finished.....	725
Aeronautic Station, Naval, at Pensacola.....	644	Dam of Soda, Natural, in New Mexico.....	720
Aeroplane Control, New, Less Tiresome.....	626	Dinner, Upside-Down, Given to Airmen.....	662
Aeroplane Corps, Militia, California to Form....	623	Dishes, Pan and Rack for Drying.....	699
Aeroplane Flight, Long, German Airman Sets New Record in.....	652	Dog, Combination, for Lathes.....	702
Aeroplane Flights, Record-Making, by Russian..	648	Dolls, Mexican Indians Make.....	704
Aeroplane Hauled through City Streets.....	650	Drydocks, Great Floating, in German Shipyards..	630
Aeroplane Scouts in Warfare.....	720	Egg Tester to Replace Candle.....	720
Aeroplane, Transatlantic, to Have Silk Wings..	646	Electric Line, Curious Ceremony Opens.....	721
Air Gun and Target New French Toy.....	704	Electric Locomotives in Transit to Panama.....	621
Airmen, Government Puts to Rigid Tests.....	688	Electricity—High Power Lines, Protection against	625
Airship, German, to Fly at San Francisco Fair	656	Electromagnet, Strongest, is Built in France...	658
Alps, Iron Spikes Give Aid in Scaling.....	685	Eskimo Medicine Man Driving Out Evil Spirits..	708
Arc Lamp with a Chimney.....	700	Explosions, Mill Dust, Government Experts Study	691
Arch, Largest Masonry, under Construction.....	689	Exposition, San Francisco, Color Scheme for....	706
Atlantic, Trip across.....	677	Express Wagon, New System Calls.....	701
Automobile, Armored, for Mexican Rebels.....	643	Fan to Produce Changing Breezes.....	692
Automobile, Bungalow on.....	708	Feed Water Softener, German.....	702
Automobile, Cape-Cairo, Carries Large Gasoline Supply.....	620	Fences, Drift, on National Forest Ranges.....	662
Automobile Jacks, Foot Attachment for.....	703	Fire Engine Makes Long Pumping Record....	650
Automobile Military Field Kitchen, New.....	724	Fires in Mountain Forests, Watching for.....	671
Automobile Testing in a Modern Plant.....	638	Firemen, Salamander Suit Screens from Flame...	675
Automobile Tires, Jack for Relieving.....	706	Fireplaces of All the World—V, VI.....	732
Automobiles, American, Lead in Self-Starting Feature.....	668	Fire, Spectacular Night, Lives Lost in.....	648
Beads, Machine Strings Quickly.....	695	Fish, Bicycle, Seen in Hawaii.....	638
Bed Inclosed by Folding Screen Panels.....	693	Flax Straw, To Make into Yarn and Twine.....	718
Bicycle, New Standard to Support.....	663	Float is a Good Imitation of a General Smash-Up.	617
Bootblack, English, Has a Strange Customer....	632	Flood in Los Angeles, Results of.....	618
Boring a Hole, Eskimo's Method of.....	736	Flood, Protecting Bottom Lands from.....	672
Bridge, Suspension, Laying the Floor of.....	624	Flowers Lend Charm to Busy City Streets.....	726
Building, Tallest West of the Mississippi.....	657	Flying Boat has Novel Control.....	655
Bunsen Burners, Telescoping Attachment for....	705	Flying Boat, New, Has Inclosed Cabin.....	670
Bus, New Electric, Proposed.....	646	Flying Boat Weighs Five Tons.....	708
Camp, Portable, Carried on Automobile Running Board.....	628	Fog, Using an Oil Film to Prevent.....	675
Canals, How Martians Made.....	702	Forests, Replanting.....	632
Canoe Made of an Empty Barrel.....	734	Fossils, Quarrying in Wyoming.....	723
Car, Dump, Operated by Electricity.....	728	Furnace, Electric, for Making Glass.....	700
Cave, Artificial, for Cold Storage.....	734	Fuse Plug That can be Rewired.....	692
Chair, High, Folding Device Makes.....	717	Game Trap, Natural, Found in Northern Mexico	715
Cherries, Handy Bag for Picking.....	667	Garden of Eden, Irrigation to Restore.....	626
Circus Performers Hang by Their Hair.....	620	Gasoline Can Safety Device, Outdoor.....	695
Clock, Hotel Alarm, of Novel Construction.....	709	Goggles, Automobile, to Relieve Eyestrain.....	701
Coaling Device for Locomotive.....	717	Grain, Feterita is New.....	701
Coaling Station, Floating Naval.....	722	Grenade That is Fired from a Rifle.....	684
Colliers for Serving the Panama Canal.....	734	Gun Barrels, European, Proof Marks on.....	706
Comment and Review, by H. H. Windsor.....	639	Gun, Machine, on Armored Aeroplane.....	630
Concrete Form, Novel Bracing for.....	636	Guns, Great, How Hoisted.....	635
Cooking Utensils, Odorless.....	731	Hay, Curing Artificially with Steam Heat.....	670
Cork, Rubber Sleeve Holds in Bottle.....	704	Hedge Trimmer Operated by Electricity.....	659
Corn Popping Machine, Automatic.....	654	Horseshoeing in Paris Streets.....	635
		Hose, Ladies', Paris Sets New Style in.....	736
		House Plans—Brick Cottage of Moderate Cost...	770
		Ice Cream Freezer, Crankless.....	692
		Ice Saw, Power Driven, Recent Invention.....	663

[Continued on Page 6]

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.

## Contents—Continued

Iceberg Dangers, Use Motorboats to Scout.....	717	Water Thieves, Mexican Lookout Tower Foils.....	633
Indian Squaw Carrying Fowls to Market.....	690	Water Tower, Movable.....	703
Kipling's Prophetic Vision of Man's Conquest of Time and Space.....	645	Waterways, Artificial, in Many Lands.....	710
Laces, Pillow, Indian Women Make.....	726	Weapons, Confiscated, are Thrown Overboard.....	654
Lamp, Portable Electric, with Many Features.....	716	Wheel, Steel, for Motor Trucks.....	699
Language, World, Europe Feels the Need of.....	693	Wheelbarrow, Old Chinese, Hauls Big Load.....	651
Life Preserver That Fits the Neck.....	672	Wheelbarrow, Shock Absorber for.....	698
Lifeboat, Unsinkable, Has Novel Features.....	623	Window Boxes, Outside, of Metal.....	646
Lifeboat with Deck and Water-Tight Hold.....	715	Windsor, H. H., Comment and Review.....	639
Lifeboats are Equipped with Wireless.....	685	Wireless Aerials, Cathedral Spires Carry.....	674
Loading Device, Motor Truck.....	691	Wireless Heroes, Memorial to.....	659
Locomobile Designed to Burn Heavy Oil.....	731	Wreck—Collision Poises Car on Smokestack.....	622
Mahogany, Single Log Sells for \$8,000.....	707		
Manila Harbor to be Deepened.....	618	<b>SHOP NOTES</b>	
Medal of Honor Given to Colonel Goethals.....	622	Air Hose Uncoupling Lever.....	749
Medals That Army Men may Wear.....	634	Automobile, Heating.....	738
Mercury Vapor, Power Now Obtained from.....	716	Belt Holder for a Shaft.....	752
Military Salute Fired at Scene of Death.....	643	Belts, Lace Hole Marker for.....	749
Mine Rescue, Emergency Hoisting Cage for.....	724	Bolts, Homemade Expansion.....	751
Monument, Alpine, Erected to Captain Scott.....	668	Chalking a Line.....	749
Motorcyclist Saves African Explorers.....	648	Chuck Plate, Universal.....	739
Mountain, Sliding Down, New Alpine Sport.....	634	Clamp, Staging.....	747
Moving Pictures, Agricultural, for the Farmers.....	668	Cottage, Portable, How to Make.....	741
Moving Pictures, Automobile Smash-Up for.....	735	Cubic Contents of Irregular Object, To Find.....	737
Moving Pictures, "Faking" a Thriller for.....	628	Desk, Bed, for an Invalid.....	751
Mowing Machine Made into a Motor Tractor.....	717	Drawing Board Support, Universal Joint for.....	738
Mummy, Manufacturing in Ancient Egypt.....	669	Drawings, Tracing on Heavy Paper, Lighted Box for.....	748
Novel and Practical Things for Daily Use.....	696	Drill Jig.....	750
Odors, Orchestra, for New Concert.....	690	Drill, Twist, To Lengthen.....	749
Oil Mixer Attached to Egg Beater.....	705	Drinking Fountain, Sanitary, for a Shop.....	752
Oven, Baking, of Novel Construction.....	700	Fire Extinguisher.....	738
Panama Canal, Preparing for Sight-Seers at.....	658	Fireplaces, Proper Construction of.....	753
Panama Canal, Slide That Filled the Maw of.....	687	Flywheel Pattern.....	746
Panama Canal Views.....	660	Gas Stoves, Fireproof Stand for.....	745
Panama Canal, Working Model of, for San Fran- cisco.....	666	Gasoline Engine, Marine, Governor Attached to.....	737
Patents, Interesting New.....	768	Gauge, Emergency Pressure.....	745
Patrol Box, Light Calls Policeman to.....	652	Gears for Model Work.....	739
Photographers, Magnesium Lamp for.....	691	Glass Disks, Cutting.....	755
Post, Clothesline, Cheap Way of Building.....	688	Hay, Bales of, Binding on a Wagon.....	751
Posts, Wooden, Fastening to Concrete.....	668	Hook, Sheet Metal Lifting.....	747
Potatoes, New Device for Baking.....	623	Hopper, Clogged, Cleaning.....	755
Prize, \$10,000, for New Tire Material.....	676	Hydrogen Generator, How to Make.....	750
Raincoat, Mexican, Made of Palmetto Leaves.....	676	Key on a Ring, Singling Out.....	740
Rat Infested House, Model of.....	722	Lathe or Planer Tool, Combination.....	752
Refrigerators, Cold Radiator System in.....	698	Memorandum Book Holder.....	740
Resuscitating Apparatus for Forcing Respiration.....	724	Milcan Spout, Drip Catcher on.....	749
Rifle with Binocular Telescopic Sights.....	618	Paintbrush, Extension Handle for.....	747
Roads, Dynamometer Records Pull on.....	728	Phonograph Records, Wax, Used for Insulation.....	754
Rope Makers, Technical Terms Used by.....	686	Pill Dispensing Box.....	745
Sawmill, Primitive, Used by Filipinos.....	719	Pipe Line, Temporary, Attached to a Tank.....	748
Scale, Zigzag, Graduated Glass with.....	718	Pipe Threads, Holding in a Lathe Dog.....	756
Scissors, Automatic Hone Sharpens.....	705	Sand Bucket for Loosening Dirt.....	747
Seesaw, Novel, for the Children.....	694	Scraping Knife, Refuse Holder on.....	755
Shingles, Fireproof, Government Experts Seek.....	638	Silver, Removing Tarnish from, by Electricity.....	752
Ship Cut to Pieces with Oxyacetylene Flame.....	652	Soldering Iron, Shank for.....	756
Shoe, Fastener Holds Tongue in Place.....	692	Steam Engine Piston Rings, Placing.....	755
Sign, Motor Car, Carries "Red Hand of Ulster".....	656	Stock, Round, To Prevent Slipping on Planer Bed.....	747
Silos, Remarkable, Built of Concrete.....	714	Switch, Simple Electric Pull Socket.....	737
Skates, Rubber, Now Part of Soldiers' Kit.....	621	Tack Puller on a Putty Knife Handle.....	739
Sleeping in the Open, Practical Devices for.....	664	Threading Tools, Clearance Groove for.....	740
Soap, Liquid, Container for.....	694	Trestle, Adjustable Balancing.....	756
Soldering Iron, Compact Self-Heating.....	687	Violin Strings, Wire, To Prevent from Cutting Bridge.....	740
Soldering Iron, Electrically Heated.....	693	Wood, Tapering on a Joiner.....	756
Spring, Cantilever, Gives Flexibility.....	695		
Steam Engine, New Type of.....	699	<b>AMATEUR MECHANICS</b>	
Sundial, Large, Marks Time of Day in Park.....	647	Boats, Small, Landing for.....	761
Swimming Tank, Concrete, Easily Constructed.....	730	Bottle, Wash, for Laboratory Use.....	762
Tailors, Cairo, Iron with Their Feet.....	688	Developing Machine.....	760
Tangoing by Machinery Newest Feature.....	666	Drawer Guide, Nonsticking.....	767
Teeth, Austrian Inventors Find New Way to Make.....	629	Dry Batteries, Renewing.....	766
Telephone Line Strung on Kites.....	703	Fishhook, Automatic.....	765
Telephone, Traffic, in Germany.....	651	Heating Apparatus, Electrical, for the Home.....	763
Thumb Print to Identify Works of Art.....	670	Hoe, Pointed End on.....	762
Timekeeper, Automatic, Electrically Operated.....	707	Jelly Straining Stand.....	766
Tires, Automobile, Making Punctureless.....	700	Nails, Driving to Prevent Splitting.....	765
Tool, Convertible, Has Many Uses.....	636	Oilstone, Cleaning.....	761
Torpedo Boat in Storm Almost Submerged.....	720	Pails, Carrying Two in One Hand.....	766
Torpedo Practice, German Warship in.....	729	Paint, Preserving in Open Cans.....	766
Tractor, Egyptian Farm, 1914 B. C. Model.....	730	Pencil Sharpener.....	761
Trains, English Railway, Speed of.....	736	Purse, Puzzle.....	760
Tree, Eucalyptus, Water Hydrant Imbedded in.....	716	Sandpapering Machine, Emergency.....	760
Tree, Palm, Growing Through a Roof.....	662	Siphon, Starting.....	762
Trees, Big, Transplanting without Injury.....	714	Stove Wood Carrier.....	761
Tug, Powerful Seagoing, for Portland.....	689	Telegraph Code on Typewriter Keys.....	759
Tugs, Air Driven, to Tow Canal Boats.....	694	Typewriting on Card Stock.....	762
Tungsten Largely Used in Electricity.....	620	Windmill, Power.....	757
Turbines, Powerful, of the "Waterland".....	686	Workbench Equipment for a Table Top.....	767
Typewriter, Each, Has Its Own Characteristics.....	691		

# The Long Journey of Science in Search of Perfect Light



"Call me the link boy to  
light my way."—Old Play

Talks about MAZDA  
No. 3

"Not the name of a thing  
but the mark of a Service"



The MAZDA Lamp of  
today which gives three  
times as much light as  
carbon lamps. It em-  
bodies the results of  
MAZDA Service to the  
manufacturers.

**T**URN the button—flash!  
Many lifetimes' study of electricity is summed  
up for you in that quick and splendid radiance.  
Your forefathers had more trouble in getting the light  
of a single, dim candle. Yet we take this modern  
miracle for granted—this cheerful light summoned by the  
fingers, that is so many times more helpful, so many times  
cheaper per candle power than the cheapest candles.

Think of the ancient men conjuring the flame from  
the sapling, the pine knot,  
the grease from animal bod-  
ies, the oil of the earth.  
Think of the world's long  
struggle for more light and  
cheaper light, unguided in  
earlier days by an adequate  
knowledge or by any sys-  
tematic method of reaching  
the goal that was sought.

Think of the joy of the  
Dutch burgomaster von  
Guericke, more than two  
centuries ago, when he  
proved to scientists of his  
time that electricity had the  
power to give forth light.  
Think of these isolated  
experimenters turning cranks to produce light-flashes  
by friction, and of their endless groping to capture  
that light.

Think of Franklin (one hundred and sixty years ago  
this past summer) flushed with excitement on discover-  
ing that the electricity of the sky could be conducted  
by a kite string.

Think of the tremendous obstacles overcome in the  
production of Edison's first carbon incandescent light.

Electrical science was now to settle itself to the sys-  
tematic study of this vast problem which in earlier  
days had been left to slow, blind accidental, advance.  
And manufacture had begun to feel the impetus of  
help communicated by organized research, experiment  
and selection.

Think of that next big step—this time the use of  
filaments of *metal*, such as tantalum and tungsten.

But obstacles were still to be overcome. For example,  
the tungsten paste filament was fragile. The first  
MAZDA lamp gave more light and cheaper light, yet  
left something still to be added—greater sturdiness  
fully to meet the strain of everyday usage.

Then the triumph of the *drawn wire* filament in the  
MAZDA lamp of today—*three times as much light as*  
the old style carbon lamps, with the same amount of

electric current, and rugged enough  
in elements and construction to  
round out the full wonder of its  
practical efficiency.

The plodding scientists had climbed a step higher  
in the great world-journey between the humble candle  
and the ideal light.

Will they stop here?

Will that group of scientists in the Research Labor-  
atories of the General Electric Company at Schenec-  
tady be satisfied with these selected methods of con-  
struction revealed by the lamp marked MAZDA?

The mark MAZDA itself answers that question.  
MAZDA is the mark of a Service and it designates the  
great plan by which the MAZDA lamp shall continue  
to mean the highest achievement in incandescent lighting.

MAZDA Service means that the Research Laboratories  
are not only assembling the results of their own incessant  
and exhaustive investigations, and those of their associ-  
ates in the active developing and manufacturing centers  
at Cleveland and Harrison, but are keeping in close  
touch with great  
experimental lamp  
laboratories in Eur-  
ope.

MAZDA Serv-  
ice means also the  
furnishing to the  
General Electric  
Company factories,  
and to the factories  
of other Companies  
entitled to receive  
this Service, every  
new fragment of  
knowledge, from  
whatever source de-  
rived, which shall  
be selected in the

course of this service to the manufacturers for embodiment  
in the MAZDA lamp. In other words, the mark MAZDA  
on a lamp means that this world-wide MAZDA  
Service has been received by the makers of that lamp.

This is your assurance when you buy a MAZDA  
lamp—whether you buy it today, tomorrow, next  
month or at any future time—that you have the incan-  
descent electric lamp that sums up the latest efforts of  
the broadest lamp service in the world.



Even the shape of glass bulbs is a  
subject for constant experimentation



In one of the testing rooms  
of the Research Laborator-  
ies MAZDA Service in-  
volves unceasing tests and  
experiments with the aim  
that MAZDA shall always  
mean the furthest advance  
in metal filament lighting.



GENERAL ELECTRIC COMPANY

We Assist Students Getting Actual Driving Experience



## WOULD YOU GIVE 2 DAYS' PAY FOR A GOOD JOB IN THE AUTO TRADE?

THEN READ CAREFULLY

\$50 would not buy my course. After I got through Book 4 of instructions 13 and 14, 15 and 16, I had a job grinding valves. I did the job in four hours. Next day I put on four piston rings, which took six hours. These two jobs paid for my Course. I am now overhauling an engine for a party. I am not afraid to tackle any job now. If I get stuck I am sure I can find the remedy in the instructions. I knew nothing at all about an auto before, and I want to thank you for helping me.—Henry G. Ehredt, 523 E. 8th Ave., Homestead, Pa.

**DELO AND OTHER STARTING AND LIGHTING SYSTEMS. EXPLANATIONS SO CLEAR A CHILD CAN UNDERSTAND**

If we *prove* to you that we have started hundreds of others into the repair business and as chauffeurs—who had no previous experience and who knew no more about an auto than you do right now—you must admit we can do the same for you. Write me *today—now—and let me prove it.*

E. Dwyer, 31 N. Willow St., Montclair, N. J., 19 years old, receives \$25 a week and board.  
Harry J. Herbin, Jamestown, Kans., was a farmer, but has doubled his income repairing and selling autos.  
W. R. McClelland, Astoria, Ill., was an auto driver. Became professional chauffeur and more than doubled his salary.  
Donald Stewart, Oakland City, Ind., became a chauffeur at \$25 a week.  
H. M. Fawins and S. T. Slayback, both graduates, are now running a Garage and Repair Shop at Woodbine, Iowa.

And we could continue until we had filled this and several more pages.



Our book of testimonials, showing photos of students and their shops—free.

### All the Result of the Dyke System

We can thoroughly train you. Open a repair shop or drive a car and make many times more than you are making now. Don't forget, we help you get your start with our *Employment Plan*, if you want it.

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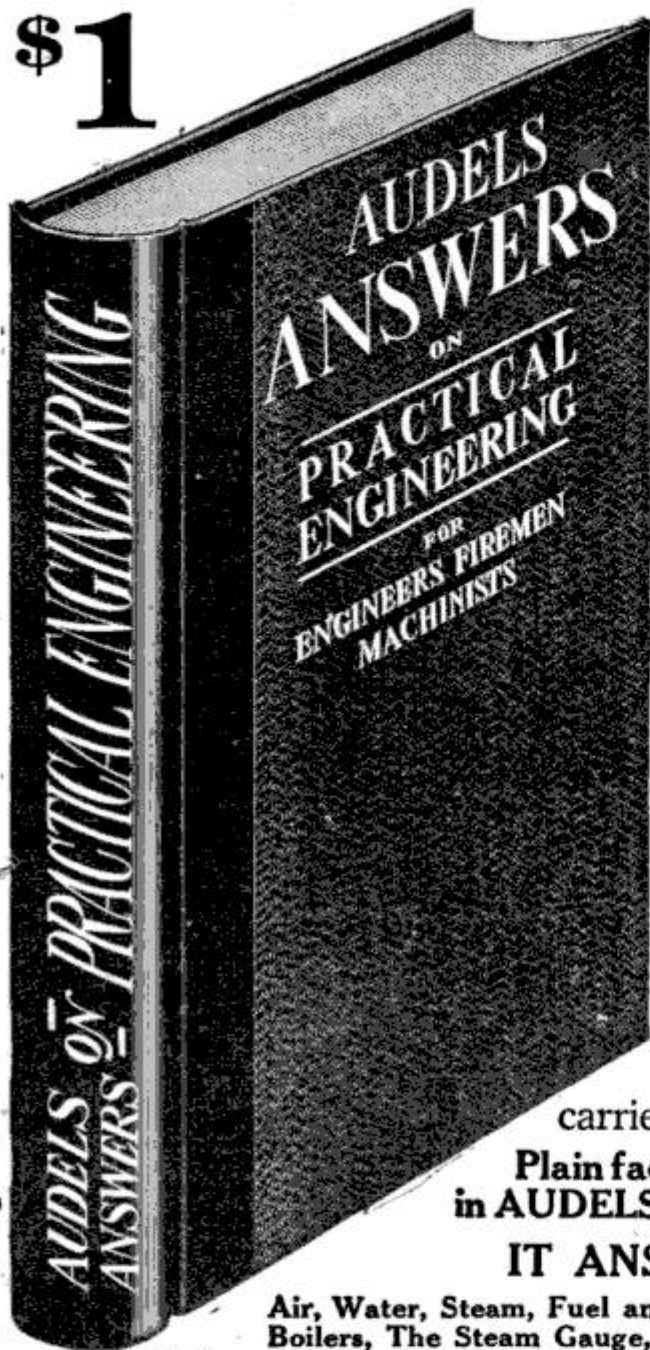


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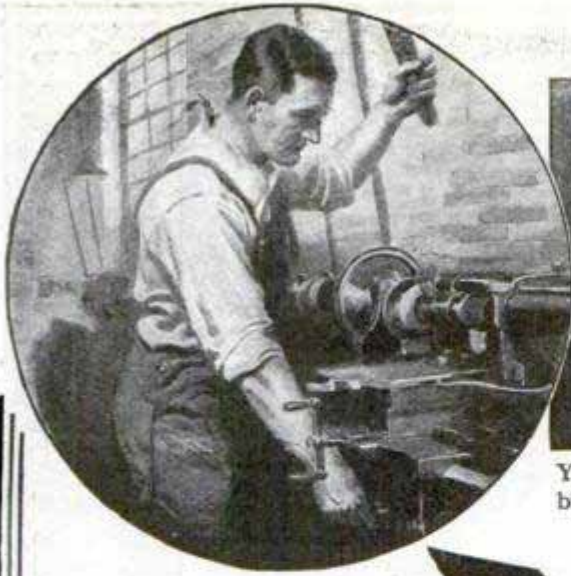
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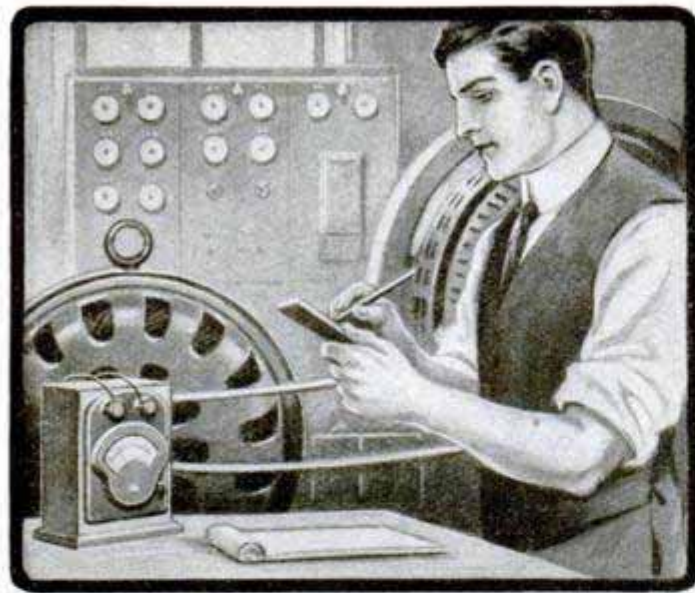
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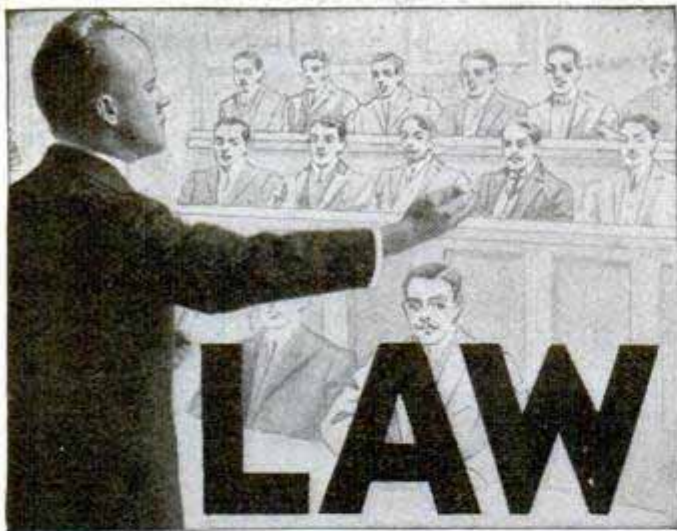
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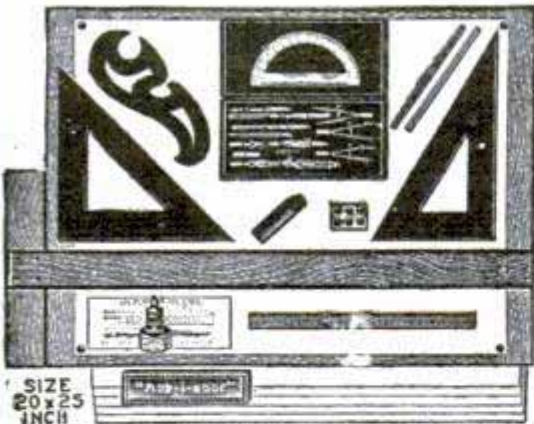
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ADVERTISERS—Special—5c per word places your ads in 133 different magazines. Send copy now for next issue. King's Magazine, Box 13-P, Little Silver, N. J.

30 WORDS in our big Postcard Monthly 25c. Display 50c inch. Elite Exchange, 3827 North Kenneth, Chicago.

**BARGAINS**—15-word ad, one year's subscription 25c; extra words one-half cent. Guaranteed 25,000 circulation. Digest, Grand Rapids, Mich.

THE Classified ad pages of the Denver Weekly Post will sell or swap anything that the human family uses. Reaches over 115,000 subscribers every week by Uncle Sam. No street or news-stand sales. A circulation not duplicated by any other medium. The largest and newest weekly newspaper between the Missouri River and the Pacific Coast. Classified ads—3c per word. Display—30c per line, \$4.20 per inch. One ad convinces. Write for sample copy. Subscription price 35c the year.

#### TO MANUFACTURERS

**ELECTONE**—To manufacturers: If you make electrical devices, write me. I have something new. Relates to vibratory treatment. Will make all existing devices of this character look like thirty cents. Can be secured for small sum. Plans and Drawings. Max Meloy, Excelsior Springs, Mo.

**WANT** Mail Order and General Agency Specialties from Manufacturers. Box 831, El Reno, Okla.

#### AGENTS WANTED

**AGENTS Wanted**—If you know a chance when you see it you'll see this 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. 514, Chicago, Ill.

**GENERAL Agents**—Capable of calling on the big trade themselves and handling canvassers for the house to house and office to office business, to sell the newest electric specialty on the market; sold everywhere there is electricity, in the home, office, factory, store, hotel; liberal profits; sales-driving sample, weighs a pound, no experience or knowledge of electricity required; shows how to use one light instead of two and get the same results; sells for \$2.50, \$3.50, \$5 and saves the purchaser an investment of \$25. Write for particulars. The Handy Light Co., 154 Handy Light Block, Cincinnati, Ohio.

**\$45 TO \$95 weekly** selling wonderful Air Cell Washers. New invention just out. Makes old-fashioned washboard useless. Every home buys. No power necessary. Costs nothing to operate. Lasts lifetime. Retail only \$1.50. Does work of outfits costing \$10, \$15 and \$25. Enormous demand, 200% profit. Sold on absolute money-back guarantee. Agents, salesmen, general agents wanted. Territory free. Get particulars. Air Cell Washer Co., 491 Valentine Bldg., Toledo, O.

**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. Write at once and get beautiful samples, styles and this wonderful offer. Banner Tailoring Co., Dept. 723, Chicago.

**AGENTS—Both Sexes**—We manufacture and control fastest selling household article ever invented. Connolly, 123 Liberty St., New York.

If we had your address we'd send free sample and show you how to make \$25, not one week but weekly. G. Mfg. Co., 20H Warren St., N. Y.

**OUR Steel Wardrobes** sell at sight; 200% profit. No nails or screws necessary. Ten hooks. Holds 150 lbs. Best spring and summer seller on the market. Peck Engineering Co., 2230 Mill St., Rochester, N. Y.

**OUR New Safety Razor** sells itself. Sample 25c. Particulars free. Andrews Specialty Co., Rochester, N. Y.

**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. 514 Chicago, Ill.

**VALUABLE Premiums and Big Profits** to Agents selling our order getting line of Guaranteed Pure Aluminum Goods. Our \$200,000 capital backs you. Write today for territory. Wm. J. Dick, Mgr., Dept. J 21, 20 W. Lake St., Chicago.

**EARN \$50 weekly** selling Genuine Gold Window Letters. 10c brings sample and particulars. Gold Letter Manufacturing Co., Wheeling, W. Va.

**AGENTS wanted.** Honest, hustling agents can make \$5.00 daily. Full particulars. Wilber H. Young, Austin, Texas.

**AGENTS wanted** for our patented Shoe Polishing Outfit. A sale can be made in nearly every home. Live workers make \$5 daily besides building up a large repeat-order business. Agent's sample outfit sent postpaid for 35c. Particulars free. Allan W. McKee, Plainville, Conn.

**AGENTS—Live wire proposition** offered hustlers; exclusive territory on profitable articles; write quick. Schiller Co., 414 Broadway Bldg., Chicago.

**AGENTS—Dealers.** We have the best proposition ever placed in your hands. Good chance for agents and jobbers to take a hand. Send 25c for sample and instructions. Cole, 1309 Madison, Chicago.

**MAKE and sell your own goods.** Formulas by expert chemists. We obtain your government serial number. Catalogue for stamp. B. Mystic Company, Washington, D. C.

**EXCLUSIVE territory.** New article. Big profits. Write for sample. Sweet, 1013 1/2 N. Main St., Los Angeles, Cal.

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

**AGENTS, economic home-dry-cleaning process;** chemical and instruction 35c; large profits, season on. U. S. Factories Company, Cincinnati, Ohio, sole distributors.

**BEST selling household necessity** of the season. Guaranteed. No talking needed—two minutes demonstration cinches sale. It's a poor one who can't make \$5 to \$10 daily. George Bohner, 1009P So. Wabash, Chicago, Ill.

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

**WE start you in a Soap and Toilet Goods business** without a dollar. Experience unnecessary. Carnation Toilet Co., 3024 Easton Ave., St. Louis, Mo.

**AGENTS—A full size 25c stick of razor strop paste** sent for 10c. M. O. Dolson, 207 East 25th St., Los Angeles, Cal.

**SELL safety razors.** 150% profit. Sample 15 cents. C. Beven, Roselle, N. J.

**LARGE income selling Specialty Rugs.** Colored illustrations and important information free. Sample rug forwarded prepaid, \$1.00. Reference, Boylston Nat'l Bank, Boston. Dundee Mfg. Co., 46 Chauncy St., Boston, Mass.

**GET rich quick—Vacuum washer plan** beaten. Opportunity seekers, 10 cents deposit brings convincing details. New—best proposition. Lettle, Plainfield, Ind.

**AGENTS Wanted—Agents make 500 per cent profit** selling "Novelty Sign Cards." Merchants buy 10 to 100 on sight. 800 varieties. Catalogue free. Sullivan Co., 1234 Van Buren St., Chicago, Ill.

**AGENTS, we furnish you samples and catalogue** absolutely free. Sell hosiery, underwear, shirts, and handkerchiefs, direct to homes. Write Madison Mills, 588 Broadway, New York City.

**AGENTS—Get particulars** of one of the best paying propositions ever put on the market. Something no one else sells. Make \$4,000 yearly. Address E. M. Feltman, Sales Mgr., 6718 Sycamore St., Cincinnati, O.

**AGENTS—Make 300% profit.** Sell high-grade line Art Show Cards. Every merchant buys. Send 10c for samples worth 50c and Catalogue. Merchants Specialty House, Chicago.

**AGENTS—New premium proposition;** make \$5 daily; experience unnecessary; 70c profit on \$1.20 sale; sample and particulars free. Le Beau Co., 3311 Belmont Ave., Chicago, Ill.

**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 B, Chicago, Ill.

**\$50.00 A WEEK** guaranteed selling Pure Spun Aluminum Cooking Utensils. We are manufacturers of the largest line in the world. First Aluminum Cooking Utensils made bears our trade-mark. Wanted live men at once for protected territory. Answer quick. Divn. PM. American Aluminum Mfg. Co., Lemont, Ill.

**AGENTS—24x28 Framed Pictures, 12c.** Hot sellers at 50c. Everybody buys. Also portraits, frames. Convex work. Pillow tops, 28c. Big profits. Cat. free. Peoples Portrait, Dept. B, 710 W. Madison, Chicago.

**AGENTS—A free course in General Salesmanship** is given to every man of our Sales Organization. This organization is a body of successful men selling the Handy Light; that unique electrical device which cuts the cost of electric lighting in half. Sells for \$3.50, is used in home, office store, factory; weighs only one pound. Sold by demonstration. All agents furnished with well-planned methods for gaining interviews. A high-grade business for a man of ability, and standing in his community. General Agents preferred. Inquire for our full proposition by addressing The Handy Light Co., 1102 Handy Light Block, Cincinnati, Ohio.

**THIS beats all the jobs going.** A new camera, just out, completely finishes 3 photo post cards of any subject in 5 minutes. No experience necessary to do it. Strong money maker, big profits, simplicity itself; complete outfit, \$3.75. Get a circular quick. Autovac Co., 301 Temple Bldg., St. Louis.

**RAY'S total commissions for 1913** over \$12,000. New Feeny Vacuum Cleaning Machine has got all others skinned forty ways. Good men wanted for general agents. Exclusive territory. You risk nothing. If wise, you will write before tomorrow. Feeny Manufacturing Co., Dept. C65, Muncie, Ind.

**AGENTS, earn \$10 per day,** sell three 50c ties \$1. Free Monogram gold cuff links and stick pin. Bowden cleared \$71—5 days. Cooper \$40—4 days. Free samples. Comer Neckwear Co., 3 Eighth St., Dayton, Ohio.

**ATTENTION Agents!** Clear \$30 weekly, year round, mailing music evenings. Why look further? Send 10c for proof, startling facts and elegant sheet music. Weber Music Publishing Company, Boston, Mass.

**AGENTS Wanted—Write for attractive proposition** on button hook puzzle. Latest thing out. Sells at sight. K. & Z. Specialty Co., Dept. F., 638 3rd Ave., Milwaukee, Wis.

**KANTBURN Kooker \$1.** Fastest seller ever invented. Over 100% profit. Exclusive territory. Savage Manufacturing Co., 303 N. Fifth Ave., Chicago.

**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., 16 Handy Light Block, Cincinnati, Ohio.

**AGENTS—Big profit.** Easy sellers. Name plates, House Numbers. Write today for free sample. "Real Flash," Silver Creek, New York.

**AGENTS—Write and learn how to build up a permanent paying business** selling "Quickerlightning" cleaner for the hands easy seller, repeat orders, exclusive territory, free samples. Joliet Novelty Co., Joliet, Ill.

**AGENTS—\$7,035 Culver's sales—\$3,517.50 profit** selling our small bottling outfit to saloons. Two sales a day, \$15 profit. Sample and Salesmanship Course free with first ten outfits. Write Simplex Mfg. Co., Keokuk, Ill.



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

AGENTS, Biggest Line, Biggest profit. Extracts, Jelly Powders, Spices, Baking Powder, Medicines, Perfumes, Toilet Specialties. Credit Given. Catalogue free. Western Laboratories, 2000 Van Buren, Chicago.

OPPORTUNITY to make \$5-\$10 daily, selling dressy, serviceable raincoats at less than inferior ready-made kind. Empire Tailored Raincoat Co., 2831 Third Ave., New York City.

200% PROFIT. You can't beat it. Free pocket sample. Sells everywhere. Everyone buys. Our reputation and big capital back you. Wm. J. Dick, Mgr., Dept. K4, 20 W. Lake St., Chicago.

If you live in a small town and have a little spare time, get our offer. Easy to make \$100 profit each season; still easier to get your own clothes out of the profit on a few orders. No extra charge for fancy styles, golf bottoms, pearl buttons, etc., makes sales easy. Write for free samples and our new offer. Knickerbocker Tailoring Co., Dept. 70, Chicago.

EARN \$25 to \$50 a week. We are manufacturers. Our co-workers sell the goods for us, mail order or local. Take advantage of our new co-operative "tested out" selling method. New spring and summer leaders, greatest repeat order specialties ever manufactured by us. Start spare time, experience unnecessary, big profits, dealers doing a big business. You need not take our "say-so." If you can personally call upon us do so, "Seeing is believing." If you cannot, write today for our Catalogue and Co-operative Manufacturers' Method, free limited coupon offer, positive proof and sworn statement. Kimo Mfg. Co., 238 Kimo Bldg., Buffalo, N. Y.

AGENTS—Sell Fibresilk Ties. Made by new process on patented machines in many rich, beautiful colors. Brilliant, silky lustre—washable. Sell quickly at 35 and 50 cents each—can sell for 25 cents and still net you 100% profit. Exceptional proposition for spare time and agents. Send 15 cents for sample tie (guaranteed). Fisher Knitting Co., 28 Whitesboro Street, Utica, N. Y.

WANTED—District Representatives to handle "The Bench Machinist," a combination \$750 Miller, \$100 Drill Press and \$150 Lathe. (Absolutely accurate.) Sells at \$125. No other machine like it in the world. Write for agent's inducement. Modern Appliance Co., Los Angeles, Cal.

THE Fuller Dustless Mop and Furniture Duster are advertised in leading magazines. We need live representatives for unoccupied territory. These articles contain exclusive features. Fuller Brush Co., 55 Hoadley Place, Hartford Conn.

SELL the newest and greatest household inventions. Absolute necessities. One a sure repeater. Big money-makers. Logan Mfg. Co., 2312 Lyndale, Chicago.

\$7.50 VACUUM Cleaners, \$2.75; Vacuum Sweepers, the \$10 kind, \$3.75. "Best yet" guaranteed, ball-bearing machines. \$10 daily easily made. Immediate shipments. United Vacuum Products Company, Chicago.

MEN and women wanted for Government jobs, \$65 to \$150 month. Vacations. Examinations everywhere soon. Common education sufficient. Sample questions and schedule of places—free. Franklin Institute, Dept. F22, Rochester, N. Y.

150 PER cent profit, representing exclusive manufacturer, ideal sanitary twisted wire brushes. Highest quality, lowest prices. 28 winners, \$5. Tappan Brush Company, 550 Temple Court, Minneapolis, Minn.

MAIL Order Dealers. Agents Supply Houses. Get our catalog. Best plated specialty in years. Tremendous demand; 25c article; enclose 10c for sample; refunded first order. Douglass Mfg. Co., 1230 Fulton St., Brooklyn, N. Y.

NEW—There is money in it. Swift Belt Splicer for endless belts; every shop, laundry needs one. Write Swift Machinery Manufacturing Company, Hornell, N. Y.

SIDELINE, 300% profit. Used in every home. Samples 10c. L. Flinker, 2631 N. Mozart Street, Chicago.

COST 1c, sell for 10c. Ready-made sign letters anyone can apply. Unlimited demand. Five samples, instructions, 10c. Particulars free. Everbrite Co., 982 Third Ave., New York.

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

AGENTS, get the latest. Combination egg separator, egg beater and cream whip. Agent's sample 25 cents coin. T. A. Burke, 203 S. Pearl, Galesburg, Ill.

SAFETY Self-Filling pen proposition. Laughlin, Detroit.

AGENTS Wanted—Live men who can make 150% profit on \$1.50 Sanitary Oil Mop or on our 75c American Fibre Broom. Address Columbia, 1434 W. 15th St., Chicago.

WANTED—Agent to act as manager in each county. \$150 month easily made. No canvassing. Success guaranteed. Big, expensive samples. Instructions, plans and starter, all 10c postage. Manager (Dept 48), Myers & Co., Cambridge, Ohio.

AGENTS—\$5.00 daily easily made, brand new household novelty that every woman wants and buys. Write for sample and particulars. R. F. Maddox, Brownsville, Tenn.

START a mail order business of your own. Small capital. Spare time. 27 plans. Send for particulars. Mutual Opportunities Exchange, Buffalo, N. Y.

10,000 AGENTS wanted. New article. Sells on sight. Record-breaking sales everywhere. Sample free. Allen Manufacturing Co., 202 East 99 St., New York City.

AGENTS—Best and fastest selling Aluminum articles on the market—big profits—exclusive territory. Write today. M. & K. Aluminum Co., Brockport, N. Y.

AGENTS make \$5 profit daily. Name Plates, House Numbers, Signs, Particulars free. Roscoe Lynch, Bausman, Pa., Dept. B.

PORTRAIT Agents—Write for prices on Solars, Bromides, Convexed Prints and Pillow Tops. We ship orders back in 24 hours. Try us. Horne Copying Co., 113 S. Jefferson St., Chicago.

RUN a Key Tag business right in your own home. Be your own boss. We sell you all the supplies and show you how to stamp the names on the Tags and Fobs. The work is very easy. Free instructions with each outfit. Pease Dye Works, Dept. M, Winchester, N. H.

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 N623, Pittsburg, Kan.

AGENTS—Genuine Panoramic Photographs of Panama Canal, 6 1/2 x 3 1/2 inches, on heavy paper; 20 different views. Samples 50 cents. Gordon Photo Co., 143 Baronne, New Orleans.

MONEY! Money! Money! If bang up agent and want easy money, send 10c for 25c package of "Quickbright" the wonderful polishing device. Exclusive territory (none free), great selling plan. Non-Nac B Mfg. Co., Rutherford, N. J.

AGENTS to take orders for Visiting and Business Cards; large profits; outfit free. Forman Printery, Waterbury, Conn.

AGENTS—Make \$5 to \$10 a day; used in every household; easy to handle; sales guaranteed. Write today for particulars. W. H. King, 810 Pennsylvania Ave., Detroit, Mich.

LEARN to Make Gold Sign Letters; \$30 to \$50 per week profit. Complete course \$1. Particulars free. Cushing, 2715 South Main, Los Angeles, Cal.

MAKE \$4 per day easy. Household article sells itself at 25c; cost 5c. Send for free sample and proposition. Douthat, 1802 E. 43rd St., Kansas City, Mo.

25-WORD advertisement in 100 magazines \$1; rates on newspapers; 2c brings lists. Gem Advertising Agency, 362 Appel Bldg., Denver, Col.

AGENTS—A new one: Concentrated soft drinks. Every home, church-fair, picnic, lawn fete, ball park, stand, etc., buys them. Whirlwind sellers. Great profits. Small package makes 32 glasses—orangeade, grape, raspberry, etc. Hurry—don't wait—be ready for the hot season. Write quick. American Products Co., 3011 Sycamore St., Cincinnati, Ohio.

WE need live wire representatives for unoccupied territory to handle The Fuller Sanitary Brushes. Our product is nationally advertised and covers every need. Your territory is valuable. Write for particulars. Fuller Brush Co., 33 Hoadley Place, Hartford, Conn.

LET us start you in a permanent business of your own selling Guaranteed Planto-Silk Hosiery and Underwear direct from factory to the homes. Capital and experience not necessary—we help you. Our representatives are making \$3,000 to \$5,000 a year. Write for spare time and full time plans. Malloch Knitting Mills, 506 Grandville Ave., Grand Rapids, Mich.

"BOOSTER" shows you how to make money! Operate an "Income Mail Business!" Booster's propositions can easily be worked evenings. Don't invest any money until you read "Booster"—the magazine that has actually and accurately placed men in business for themselves by publishing money-making propositions that bring the dollars. Send 10c for two copies worth cash to you. Booster Magazine, Northwestern Bldg., Chicago.

GENERAL Agents everywhere for our new "Sav-Ice" Cloth; especially prepared for preserving ice in refrigerators. Reduces ice bills one-half; exclusive territory to good, responsible parties. Harsch Mfg. Co., Box 654, Indianapolis, Ind.

50 ARTICLES constantly used in every home, all our own specialties; wonderful sellers; sure repeaters; big profits; exclusive agencies; credit given; chance of lifetime for capable, honest, energetic men and women to acquire a business of their own yielding fine, steady constantly increasing income. Write today. Saverio Products Co., 106-108 Reade St., New York.

AGENTS—Male or Female—We have one of the greatest sellers ever offered. A fine proposition, assuring you a big business and a steady income. Our proposition has been tried and proven a success. Write today for full particulars. James Specialty Mfg. Co., 13th Avenue, E. Auburn, N. Y.

SELL Ironing Tables, Step Ladders, etc.; nine wooden household articles. Davis Mfg. Co., Clinton, Maine.

READ the Agents Magazine and make more money. 2 issues 10c. Agent's Magazine, Chicago.

PERFECTION Ford Starters for Ford cars. Guaranteed to start any Ford car that is in running condition. Splendid proposition and inducement for state and county agents. The Perfection Auto Starter Co., 1461 Broadway, Denver, Colo.

ROYAL Incense—Most wonderful, satisfying fragrance known. Rediscovered product of Ancient Egypt. Drives away flies, mosquitoes, moths. Sample 10c; Large, 25c, with premium offer. Traffic Company, 11370 Sheffield Street, Pittsburgh, Pa.

EASY money made selling our Self-Filling Fountain Pen at 25c, regular price \$1.50. Cannot leak; no sweating or soiled fingers; simple self-filling device; flow of ink controlled by writer; 14k gold-plated pen point. Each pen put up in attractive box, and absolute satisfaction guaranteed. Send 25c for sample postpaid. Our Special May Offer tells how pen will cost you 9c each, in small trial quantities. Rollins & Co., Dept. 33, Boston.

\$10.00 A DAY selling \$25 Barnes Electric Suction Cleaners. One sale a day will make this. Write today for further information. Advance Mfg. Co., Kalamazoo, Mich.

NEW patent, \$10 daily. Experience unnecessary. Big income for years. Every housekeeper wants it. 35c starts you. Particulars free. Address Washtenaw Supply House, 1704 North Washtenaw, Chicago.

GOLD Sign Letters. Instructions for making. Johnston Co., Quincy, Ill.

GET cash for names, information, ideas, formulas. Instructive booklet for stamp. Information System, 212, Marietta, Ohio.

WE want representatives in every town. Excellent opportunity to earn big income. Write at once for full particulars. Beardsley Specialty Co., Rock Island, Ill.

LIVE wires make big money. Sell our vacuum cleaners and other articles. Experience unnecessary with our selling plans. General Sales & Mfg. Co., 121W, No. Wabash Ave., Chicago.

WE manufacture household remedies. Articles of merit that insure repeat orders. Live agents wanted to control exclusive territory and sub-agents. Write today. Peram Manufacturing Co., Perth Amboy, N. J.

AGENTS! Sell Maple Flower. 25c package makes 2 gallons delicious syrup. Sale in every home. Profits over 100 per cent. Sample 10 cents. Our agents coin money. Write at once. Wilmington Co., Y10, Cincinnati, O.

WOULD \$40 a week interest you? We seek a representative for old established brand of guaranteed hosiery; sold direct to consumers; protected territory; credit given. N. Parker Mills, 726 Chestnut St., Phila., Pa.

AGENTS and side line men are getting the money with our patented clip. Does away with back collar button. Permits tie to slide easily. Sample 10c. Comfort Collar Clip Co., 304 W. Van Buren, Chicago.

**FOUR-IN-HAND Tie Form.** Simplest made. Tied in 3 moves, 10c; with silk tie 25c. 3 forms 25c. Stanly, Cornhill, Boston.

**AGENTS**—Big money selling our combination aluminum beer pipe cleaners and water filters. Write for illustrated circular and terms. Critteron Company, Naugatuck, Conn.

**AGENTS**—Average \$5 to \$12 daily selling astonishing Aztec massage machine. New. Just patented. Different. No electricity or water power required. Nothing complicated. Affords exhilarating massage without cent expense. Lowest priced but best outfit. Retail \$2.50, allowing you big end of profit. Particulars and "beauty" folder free. Aztec Remedy Co., Dept. 132, Toledo, Ohio.

**\$40 WEEKLY** selling Keyless Lock. Guaranteed. Sells at sight. Sample 65 cents. Money back if wanted. Exclusive territory. Big Money Maker. Thief Proof Lock Co., Box P 1013, Dallas, Texas.

"**EVERYTHING** comes to him who goes after it." Hustlers make big money selling our improved carpet sweeper and vacuum cleaner combined. Most liberal proposition ever offered agents. Western Specialty Mfg. Co., 180 No. Dearborn St., Chicago.

**AGENTS Wanted.** Fancy cigar lighter; wear and looks like solid gold; guaranteed durable. Samples 25c. New Jersey Specialty Co., 16 Bergen Station, Jersey City.

**HUSTLING** agents everywhere to sell the latest, lowest priced, most satisfactory washing machine on earth. Be first in your territory. Diaphragm Washer Company, Detroit, Mich.

**STAMP** Names and Addresses on Key, Checks, Umbrella Plates, Watch Fobs, etc. We supply blank stock and stamping outfits, sample with name and address, 10c. Hart Mfg. Co., Desk 2, 303 Degraw St., Brooklyn, N. Y.

**YOUR** address on postal brings you the biggest money-making proposition you ever received. Try it. X. L. Products Co., 117 Worth St., New York.

**AGENTS Wanted**—Ladies or gentlemen. Two big propositions: one needed by every business firm; the other by every family. If you can sell anything you can sell these. Inland Mfg. Co., Topeka, Kans.

**AGENTS**—Three new games for Cigar Stores, etc. Retail \$1. Also line of new office specialties. Easy sellers. Particulars free. Poola Co., Dept. PM, Harrisburg, Pa.

**LIVE** Agents Wanted: Universal Polishing Cloth. Sells wherever shown. Full size sample and particulars 25c. Universal Specialty Co., Plainfield, N. J.

**ANSWER** this and get our free sample case offer. \$10 a day easy with our complete line of household necessities. Men or women. E. Roberts, 110 Roberts Bldg., St. Louis, Mo.

**LISTEN!** You can make \$15 weekly easy selling high-grade Jewelry 50c weekly. Washburn, 417 West 128 St., New York.

**AGENTS**—500% profit, free sample Gold and Silver Sign Letters for store fronts and office windows. Anyone can put on. Big demand everywhere. Write today for liberal offer to agents. Metallic Letter Co., 406 N. Clark, Chicago, U. S. A.

**WE** are absolutely making agents the best proposition of any manufacturer on our new Vacuum Sweepers; largest profit; sell easiest. Act quick. Manufacturers Home Supply Company, Detroit, Mich.

**AGENTS**—\$50 weekly. We manufacture the best needle case made; a wonderful seller; 200% to 500% profit; talking unnecessary; our "Trust Scheme" Envelopes do the work; general agents can make \$100 weekly; particulars free; 25c sample outfit for 10c; buy direct from the factory. Paty Needle Co., 102 Davis Sq., W. Somerville, Mass.

**THEODORE** Roosevelt is again writing for Scribner's. Magazine subscription solicitors can earn big commissions. Inquire Desk 15, Scribner's Magazine, 597 Fifth Ave., New York.

**HONEST** man wanted in each town to distribute free advertising premiums; \$15 a week to start; experience unnecessary; references required. Address McLean, Black & Co., 11 S. Beverly St., Boston, Mass.

**TO** the agent our perfected acetylene generating and storage system offers great possibilities. Field includes automobiles, motorcycles, horse-drawn vehicles and motor-boats. The Tank-O-Gas Co., 23 St. Ann St., Forest Hills, Mass.

**AGENTS**—Repeater; costs 5c; sells for \$1; sample 2c. Dr. Thornber, Ferris, Ill.

**AGENTS** wanted to handle remarkable money makers; easy to handle; easy to sell; many repeat orders; write quickly. H. Warwick, Dept. S, Box 306, Bridgeport, Conn.

**BIG** money selling Automatic Telephone Disinfectors. Write us. Eucalyptus Parfeno Co., New Bedford, Mass.

**AGENTS**—Streetmen—Eleven New money-makers. Profits exceed 50%. Latest "Live Wire Bulletin" free. Act quick. United Sales Factory, Newburgh, N. Y.

**MEN** Wanted, Handle Branch Agencies paying \$5 day upward. Give references, experience. Modern Specialties, Racine, Wis.

**AGENTS** in every city to handle our Triplex Folding Handbag; big profits; exclusive territory. Write for terms and free catalog. Other big sellers. S. V. Diamond & Bro., 35 West 21st St., New York City.

**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** would you take a steady job where you can clear \$20 to \$30 weekly to start and work up to yearly profits of \$3,000 or more? No experience required. Great crew managers' proposition. We manufacture. Middlemen profits saved. Get posted on our 1914 exclusive territory—business-building selling plans. Act quick. E. M. Davis, Pres., R64, Davis Bldg., Chicago.

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

**WIDE-AWAKE**, active agents or crew managers can secure special concession and reap the benefit from the best money-making agency proposition on the market by writing immediately for full particulars. Hugro Manufacturing Co., Chicago, Ill.

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

**SOAP** and Perfume Agents, write us. Big Profits. Goods Guaranteed. Hopfinger and Roth, 212 N. Second St., St. Louis, Mo.

**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.

**HOUSEHOLD** necessity recently invented sells at 75c. Costs distributors 25c. Nothing like it on the market. Tested and approved by Good Housekeeping Institute. Get your territory now. Hugro Mfg. Co., Chicago, Ill.

**\$1,000.00 OR \$400.00** a month—which? Agents make \$20.00 a day. Start in small way, grow to big money class. Kochler make \$12.00 first day, \$16.00 second day. "Positive Proof Sales Plan," combined with "Shakit," makes big money certain. Make your friends wonder at your success. Act Quick; particulars for postal. Nat. Dist. Co., 1674 Belmont Ave., Chicago, Ill.

**AGENTS:** We want, at once, a man or woman, one capable of earning good salary, in every community where we are not represented. Write us. Sun Mfg. Co., 309 Dean Bldg., South Bend, Ind.

**WE** have agents making \$200 weekly, selling our new specialty to merchants. Retail \$7.50, your profit \$5.00. No competition; exclusive territory. Samples and descriptive matter free. Sayers Co., 408 Olive St., St. Louis, Mo.

**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.

**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. Send for proofs. Voorhies, Desk C. R., Omaha, Neb.

**\$35 TO \$100** weekly made easily. Needed in every home and store; enables purchaser to save money and enjoy life. Rapid seller, profit from \$10 to \$50 each sale. Experience unnecessary; exclusive territory to hustlers. Write for full particulars. C. Hemple, Sales Mgr., 174-C, No. Sangamon, Chicago.

**\$5.00 RAINCOATS**—Agents wanted everywhere. You and many others in your section need Raincoats and would gladly pay Agent \$5.00 for one. Why not be that Agent? Boston Raincoat Company, Sales Dept., Boston, Mass.

**AGENTS** sell rich-looking imported 36x68 rugs \$1 each. Carter, Tenn., sold 115 in four days, his profit \$57. You can do as well. Write for sample offer and selling plan. Sample rug by Parcel Post, pre-paid, 98c. A. Condon, Importer, Stonington, Maine.

**AGENTS** make \$5.00 to \$10.00 a day on the start. Atkinson writes: "The best proposition I have found in my forty year canvassing." Permanent work. Household necessity. Saving 80%. Write today for General or Local Agents terms. Free sample. C. H. Stuart & Co., 16 Union St., Newark, New York.

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

**300 TO 400%** Profit to Agents selling our guaranteed U. S. Fire Extinguishers. Tremendous demand. Orders repeat. Exclusive territory to county and district managers. United Mfg. Co., 1025 Jefferson, Toledo, Ohio.

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

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

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

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

**AGENTS**—Sell the Primus, genuine Swedish wickless, coal-oil stoves. Smokeless, odorless. Twice the heat of gasoline at one-eighth the cost. No danger of explosion. Big profits. James Anderson & Sons, Sidney, Ohio, American distributors.

**OUR** Agents make good money and get repeat orders easily. Dept. A. Consumers' Direct Supply Co., Boston, Mass.

#### HELP WANTED

**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? Write us at once and get beautiful samples, styles and this wonderful offer. Banner Tailoring Co., Dept. 724, Chicago.

**WANTED**—Thoroughly trained mechanic to take charge of the hydraulic inspection and maintenance of a large Hydro-Electric Plant in the East. Should preferably have had similar experience in some other plant or in the installation of water wheels. State full particulars as to training and experience. P. W., 9th floor, 6 N. Michigan Ave., Chicago.

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

**MOTION** picture plays wanted. You can write them. We teach you. No experience needed. Big demand and good pay. Details free. Ass'd M. P. Schools, 67 Sheridan Rd., Chicago.

**WANTED**—Trustworthy people, either sex, to travel and exhibit our feature attraction, "Horrors of White Slavery" in picture theatres. Great chance to travel see the country and make from \$50 to \$100 weekly. Write us at once. Address Queen City Feature Co., Dept. 549, Carthage, Mo.

**A MONEY** Proposition—Co-operate with me in a profit-sharing mail-order business. Will place trial advertisement, furnish printed matter, goods to fill orders and divide the profits. Particulars. Desk 153. Hazen A. Horton, Tekonsha, Mich.

**BECOME Detectives—**Earn big money; easy work; wonderful opportunities. Write Wagner, 1243 Lexington Ave., New York. Dept. 301.

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

**300 TO 400% Profit to Agents** selling our guaranteed U. S. Fire Extinguishers. Tremendous demand. Orders repeat. Exclusive territory to county and district managers. United Mfg. Co., 1026 Jefferson, Toledo, Ohio.

**SPARE Time—**No canvassing. Report information, news, names, etc., to us. Markets waiting. Enclose stamp. "Nisco," HDB, Cincinnati.

**START a mail order business** of your own. Small capital. Spare time. 27 plans. Send for particulars. Mutual Opportunities Exchange, Buffalo, N. Y.

**AUTOMOBILE chauffeurs** get \$25.00 week and over. Demonstrators and Automobile Salesmen get big pay. Pleasant work. Many spring openings. Sample instructions free. Franklin Institute, Dept. F 803, Rochester, N. Y.

**GET Cash for Names, information, ideas, formulas.** Instructive booklet for stamp. Information System, 213, Marietta, Ohio.

**BE your own Master.** Stop wage slavery. Formulas and instructions for manufacturing 24 Big Sellers and many Business Opportunities sent for 10c. E. M. Reynolds, 937 E. 42nd Place, Chicago, Ill.

**BRAKEMEN, Firemen,** all railroads, \$100.00. Necessary signal instruction free. Send age, postage. Railway Association, Dept. 298, Brooklyn, N. Y.

**WANTED—**Circular distributors; enclose stamp. American Distributor Co., Blairsville, Pa.

**PARCEL Post means many Railway Mail Clerks** needed. Commence \$75.00 month. Examinations everywhere. Sample questions and schedule of places—free. Franklin Institute, Dept. F 21, Rochester, N. Y.

**GET a Government Job!** See ad on page 14. Write now—today. Patterson Civil Service School, Rochester, N. Y.

**"UNCLE SAM" wants employees.** Parcel post makes many vacancies. List of positions now available—free. Franklin Institute, Dept. F 21, Rochester, N. Y.

**\$5 DAILY** easily earned at home, spare-time, silvering mirrors. No capital. Free instructive booklet tells you how. Patterson & Co., Dept. 3, Brookville, Ky.

**\$5 To \$150 month** paid men and women in U. S. Government positions. Life jobs. Thousands of appointments coming during 1914. Common education sufficient. "Pull" unnecessary. Write today for free list of positions now available. Franklin Institute, Dept. F 21, Rochester, N. Y.

**RAILWAY Mail Clerk Examinations** coming everywhere. \$75 to \$150 month. Sample questions free. Franklin Institute, Dept. F 21, Rochester, N. Y.

**GOVERNMENT Jobs, \$100 month.** Vacations. List free. Franklin Institute, Dept. F 21, Rochester, N. Y.

**WANTED—**Railway Mail Clerks, \$75.00 month. Sample examination questions free. Franklin Institute, Dept. F 21, Rochester, N. Y.

**"MY Lady of Dreams,"** the coming big song success. A great song with an attractive title page. Ten cents in stamps or coin. Marks-Goldsmith Company, Department D, Washington, D. C.

**BE a detective.** Earn big money. Write John J. Gilles, Licensed and Bonded N. Y. State Detective. Retired Member N. Y. Police Dept. 22 years Experience. 254 Huguenot St., New Rochelle, N. Y. Investigation solicited.

**WRITE Moving-Picture Plays.** \$50 each. All or spare time. Correspondence course unnecessary. Details free. Atlas Publishing Co., 3045, Cincinnati, Ohio.

**PLEASANT Home Work—**Ambitious persons wanted for copying, addressing. No mail-order course or trash to sell. Send today addressed, stamped envelope for particulars. Box 17, Station H. G., New York.

**WANTED—**An Idea! Who can think of some simple thing to patent? Protect your ideas; they may bring you wealth. Write for "Needed Inventions" and "How to Get Your Patent and Your Money." Randolph & Co., Patent Attorneys, Dept. 144, Washington, D. C.

**BE a Detective—**Earn \$25 to \$75 weekly; chance to see the world with all expenses paid. Loraine System, Dept. 304, Boston, Mass.

**\$3,000 YEARLY** in your back yard! No ginseng, mushroom dope. New industry you never heard of. P. and S. F. Magazine explains; editor helps you. Trial copy with Editor's Special "tip," 10c. Mark Walter, Editor, 42 Hanselman Bldg., Kalamazoo, Mich.

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

**WANTED—**Distributors, Men and Women—to give away free pkgs. Perfumed Lorax Soap Powders; no money or experience needed; good pay. S. Ward & Company, 218 Institute, Chicago.

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

**BETTER Light** for 1/5 Cost of Electricity. Suitable for home or store. Easily installed; no experience necessary, big demand. Write for Free catalogue. Doud Lighting Co., 174-D, N. Sangamon, Chicago.

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

**LEARN automobile repairing, driving** on up-to-date cars; electrical, civil engineering, surveying; methods most practical; room and board while learning; positions secured; satisfaction guaranteed; catalog free. National School of Engineering, 2110 West Seventh, Los Angeles.

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

#### FOR SALE

**FOR Sale—**Nineteen Bi-Una wall type telephones with sixteen stations and a quantity of conductor cable in short and long pieces, used with these telephones, at one-fourth its cost before installation. This outfit is in good condition and just right for communicating around a small mill. Atlas Tack Co., Fairhaven, Mass.

**DUPLEX** drum shell, birdseye maple, perforated, 16"x3". New Jos. Beitz heads, nickel trimmings, a beauty, excellent tone and carrying power. Price with case and sticks, \$35. J. R. Sanford, P. O. Box 1157, Billings, Mont.

**TRAVELING Crane—**Wooden—For sale cheap. 15 ton capacity, 65'x0" span, suited for either motor or wire rope drive. Write G. T., 9th Floor, 6 N. Michigan Ave., Chicago.

**FOR Sale—**Holder for heating soldering irons over a gasoline torch. Will hold and heat ten six-lb. irons in ten minutes, \$2.50. C. E. Goulding, 610 Tampa St., Tampa, Fla.

**SHAPER—**Stroke 16". Cross Feed 1 1/2". Vise opens 8". Complete with countershaft \$225. Grammes Sons, Allentown, Penna.

**GENUINE Fantail Cigars,** box of 50, \$1.75 prepaid. Holst Cigar Co., New Albany, Ind.

**FOR Sale—**Fine Eight-Plate McIntosh X-Ray Machine Cheap. Joseph Fairhall, Jr., Danville, Ill.

**VACUUM** cleaning wagon cost \$2,500, will sell very cheap. 212 Broadway, Camden, New Jersey.

**THIRTY hp. tractor** with plow, 5 gangs, and huge truck wagon. Used but little. Unadapted to our hilly and low lands. A grand bargain. If interested write Flintstone Farm, Dalton, Mass.

**\$1,200 VACUUM** Cleaning Wagon, perfect condition, \$300. Reason. Willis May, Bethlehem, Pa.

**2-CYLINDER, 12-hp.,** air-cooled motor complete. 2-speed planetary transmission. First draft for \$40 takes it. W. F. Schmeltzer, Milbank, S. D.

**I. C. S. ELECTRICAL** Engineering Course. Half price. 834 1/2 33rd St., Milwaukee.

**VACUUM Cleaners.** All makes at half regular prices. Send for list, New York Vacuum Cleaner Exchange, 215 Grand St., New York.

**ONE small farm gas engine.** One Marine engine. Several good rebuilt motorcycles. G. W. Fagan, Cedar Falls, Ia.

#### GUNS, SPORTING GOODS, ETC.

**BARGAINS** in firearms, binoculars and watches; list for stamp. Heard, 126 West 23d, New York.

**OLD Pistols and Guns Wanted.** Will buy or give in exchange almost any sort of modern revolver, rifle or shotgun. Stephen Van Rensselaer, West Orange, N. J.

**FISH lines, 2 years' supply 20c,** including novelty catalogue. John H. Smith, Cohoes, N. Y.

#### WANTED

**MILITARY Band Organ** wanted; description, best cash price. T. S. Culp, Canton, Ohio.

**WANTED—**Patented articles to manufacture. Williams Mfg. Co., P. O. Box 808, Waterbury, Conn.

**WANTED—**Second-hand stone crusher to crush rock to size walnuts and smaller. Material wanted for building driveway on private estate. Machine must be in first-class condition and preferably in New England, as crusher will be used in Maine. Address with full particulars, "W," care Popular Mechanics Magazine, Chicago.

**WANTED** to purchase complete file of magazine (Wayside Tales) year 1904. Address W. T. c/o Cartoons, 6 N. Michigan Ave., Chicago.

**WANTED** United Cigar Store coupons. Send 2c stamp for prices and exchange list. Box 254, New Rochelle, N. Y.

#### SALE OR EXCHANGE

**SHORT lengths lumber,** any thickness, black walnut, oak, etc. Walnuts, young trees. Interest in seed harvester patent, want encyclopedia, reference books, lathe, light engine. Team and driver; harvest seed your locality. R. H. Oneill, R. 6, Cameron, Mo.

**EXCHANGE** Piano Player for high-power motorcycle. Berle Erwin, Britt, Iowa.

#### FLOUR & FEED MILLING MACHINERY

**SPECIAL** bargains in second-hand Attrition mills, burr mills, crushers, corn shellers, bran dusters, dust collectors, purifiers, reels, double, single, 2 and 3-pair high roller mills, sieve bolters, receiving separators, scourers, etc. Write for description and prices. Sprout, Waldron & Co., P. O. Box 429, Muncy, Pa.

#### MACHINERY, TOOLS AND SUPPLIES

**GASOLINE Engine Trouble Chart—**a sectional view showing clearly all parts of a typical four-cylinder gasoline engine of the four-cycle type and outlining distinctly all parts liable to give trouble. Also details the derangements apt to interfere with smooth engine operation. Invaluable to motorists. Size, 25x38 inches. Mailed on receipt of 25 cents by Popular Mechanics Book Dept., 6 No. Michigan Blvd., Chicago.

**ABSOLUTELY** new. Swift Belt Splicer and gluing clamp makes perfect splice—saves time, belting. Endless belts are preferred in every shop; send for circular; trial free. Swift Machinery Manufacturing Company, Hornell, N. Y.

**PULLEYS, Gears, Sprockets, Shafting, Hangers;** see page 132. W. A. Jones Foundry & Machine Co., Chicago.

**125-HP. BOILER** engine, two brick machines, pulleys, shafting. J. P. Vogan, Franklin, Pa.

**MOST** successful miller attachment for lathes, price \$40. Wm. Mielke, Hartford, So. Dak.

**VACUUM** cleaner pumps, tanks, hose and tools for stationary plant for house, flat or wagon. Prices wholesale. Assemble your own machine. Saves half. Vacuum Supply Co., Ann Arbor, Mich.

**SEND** for catalog of our new "Tango" concrete mixer for farmers and contractors. W. C. Kiernan & Co., Whitewater, Wis.

**WRITE** your name on anything, steel, iron, copper, glass, tin or zinc. Send 50c coin. Tells everything. Willis, Box 294, Desk K, Hagerstown, Md.

**LATHES:** 15" x 5 ft. Wagner, comp. rest, chuck, complete, \$135.00; 16" x 6 ft. Gray, comp. rest, \$165.00; 17" x 10 ft. Gray, comp. rest, turret, \$245.00; (4) 16" Shapers; one 6" Shaper. Particulars on application. Western Machinery Co., Cincinnati, Ohio.

**FOR Sale**—30 hp. 4-cylinder gasoline motor, new—completely equipped with carburetor, magneto. A high-grade motor at a bargain. Address D. W. Miller, 3305 Clinton Ave. S., Minneapolis, Minn.

**GET circular**, real Kerosene Mixers; more power, no smoke; for shop and portable engines. Earl W. Johnson, Westfield, N. Y.

**YOUR name** on steel stamp to mark your tools for \$1. Three initials for 50c. Gideon Pike, Attleboro, Mass.

**GODDELL** Pratt bench lathe, complete, \$20.00. Forge blower, \$5.00. Small saw table, \$15.00. Wanted: 12 or 14 inch short lathe. 90 Evans Ave., Ingram, Pa.

**COMPLETE** miniature experimental paper mill, used for experimenting with, and testing fibers and pulps in a practical manner, consisting of rotary digester, 50 pound beater, stuff chest and pump; screen, 18 in. cylinder paper machine, web end. Several dryers, small rotary cutter, calendering rolls, press, etc. E. W. B. 9th floor, 6 N. Michigan Ave., Chicago

**FOR Sale**—Complete rope-drive transmission with clutch, sheaves, hangers, etc., for use in straight or angle driving. Angsten-Koch Company, Chicago.

**10,000 FT.** of belt at 5 cts. per ft. Send for list No. 27. Lucas & Son, Bridgeport, Conn.

**HAVE** for sale several sizes of lathes, milling machines, drill presses, punch presses, shapers, planers, boilers, steam engines, oil, gas and gasoline engines and wood-working machinery. Pinner, 122 Water St., New York, N. Y.

**ENGINE** Lathe, swings 9 1/2", takes 25" between centers. Complete set gears cutting all size threads 3" to 40". \$43.50. Grammes & Sons, Allentown, Pa.

**HOW** to Run a Lathe. A 50-cent book for 10 cents postpaid. S. B. Lathe Works, South Bend, Ind.

#### ENGINES AND MOTORS

**BARGAIN**—One 4-cylinder, 2-cycle, 50-hp. gasoline engine complete from propeller to fly wheel, in excellent condition. Fitted with Bosch magneto, Lavigne oiler, Heinz coil, reverse gear, etc. Ready for inspection. Price \$390 F. O. B. Detroit. Also, one 30-hp., 4-cylinder, 4-cycle Cadillac engine with reverse gear. Price \$100 F. O. B. Detroit. C. W. Kotcher, 639 Gratiot Avenue, Detroit, Mich.

**FOR Sale**—A fully guaranteed 1 hp. B. & V. Hopper-Cooled engine never taken out of crate. The best engine B. & V. ever made. Will sell for \$31. Regular price \$50. Write R. M. Allen, 419 Sixth St., Elyria, Ohio.

**DYNAMOS**, Motors, Small Motors, dynamos, parts, storage batteries, for all purposes. Send for catalogue. Fred R. Hellman, 442 Niagara St., Buffalo, N. Y.

**WILL** sacrifice complete Gas Producer Power plant, including 60 hp. gas producer, 65 hp. triple cylinder, Vertical Westinghouse Gas engine, direct connected, 37 1/2" K. W. D. C. Generator, 125 volts, 300 R. P. M. In excellent condition, operated only a short period. Write for further information. E. W. B., 9th Floor, 6 N. Michigan Ave., Chicago.

**FOR Sale**—One small Universal variable speed motor for 110 volt circuit. Suitable for driving window displays or toy machinery. Price \$3. C. F. Smisor, 4808 Lake Park Ave., Chicago.

**WATER**-Cooled, 4-cylinder 3x3 1/2 engine, new, \$60. A. W. Banister, 629 E. 10th St., Erie, Pa.

**FOR Sale**—Guaranteed 2 1/2 hp. New-Way Engine. Has never been used. Will sell to first comer for \$78. Regular price \$125. Write me today. R. F. Peters, Box 189, Elyria, O.

**GUARANTEED** alternating current motors single phase, 1/4 hp. Holtzer-Cabot, \$25; 1 hp. Wagner, \$53; 2 hp. Wagner, \$67; three phase Westinghouse 1 hp. \$27; 3 hp. 1120 speed, \$50. Motors bought and sold. Fans. Guaranteed repairs. Hyre Electric Co., 613 So. Dearborn St., Chicago.

**1/6 HORSEPOWER** Direct Current Electric Motor, \$11, 110 volts. Dr. Utley, Canton, Pa.

**NEW** and second-hand engines for sale and exchange. Apply with stamps. B. W. Richardson, Peoria, Ill. R. 36.

**FOR Sale** at a Bargain. New 5x6 four-cylinder, governor-controlled engine, fully equipped with carburetor magneto. Will sell for much less than cost. Fred Hanson, 570 Prior Ave., St. Paul, Minn.

**12 STEAM** engines each \$12. Send for list 27. Lucas & Son, Bridgeport, Conn.

**COMPRESSION** restored without rebor-ing. Motor boats, automobiles, pumping and agricultural engines. Wille Adjustable Piston Company, 1534 Fulton St., Brooklyn, N. Y.

**REBUILT** Engines—We have on hand a number of rebuilt "Buffalo" engines, guaranteed, at greatly reduced prices. Write for bargain list. Buffalo Gasoline Motor Co., 1293-1305 Niagara Street, Buffalo, N. Y.

#### ENGINE CASTINGS AND BLUE PRINTS

**GASOLINE** Engine Castings, with drawings. Cheap. Catalog for stamp. Novelty Manufacturing Co., 853 West 6th St., Cincinnati, Ohio.

#### MANUFACTURING

**CLEVELAND** Specialty and Manufacturing Company, Cleveland, Ohio, design or make special articles to order. Inventions developed.

**WRITE** for our proposition on Blanking and Forming dies and metal press work. Complete equipment for all work in any quantity. S. D. Childs & Company, Chicago.

**WIRE** Goods, all kinds, made to order. Cooley Mfg. Co., 553 W. Monroe St., Chicago.

**WE** are equipped to build anything out of Iron and Brass. Builders' supplies, Structural Steel, Stirrups, Anchors, Iron, Brass, and Aluminum Castings. Practical Gas Engine & Machine Works, North Chicago, Ill.

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**PREMIER** enclosed motorboat switches. List \$1.50. Limited number, 60c. coin or stamps. Big value. Beebe Co., 336 York, New Haven, Conn.

**ROWBOAT**, 14 ft. \$12, 5 passenger. Particulars free. B. B. Co., 607 Barrister Bldg., Washington, D. C.

#### BLACKSMITHS

**BLACKSMITHS** who own automobiles or repair automobiles in their shops should subscribe for the "Automobile Dealer & Repairer." See "ad" under "Automobiles." Charles D. Sherman, 50 Windsor Road, Hartford, Conn.

**GOOD** blacksmiths are scarce and few learning the trade and the blacksmiths must make the tools for all—from surgeon to the safe blower. Buy Toy's Modern Methods Forging and Welding different kinds of steel solid, and doing all hard jobs easy, also hardening and tempering to a standard by colored charts. Any smith can be an expert that means good jobs and big money. All for one dollar. Send for valuable samples free. W. M. Toy, Sidney, Ohio.

#### CEMENT

**CONCRETE** Building Block Machines, \$25, slightly shop-worn; quantity limited. 5 Market St., St. Louis, Mo.

**IF** you want the best information on cement and concrete construction, subscribe for Concrete-Cement Age, leading cement and concrete monthly. Sample copy, 10 cents. Yearly subscription, \$1.50. Concrete-Cement Age, 135 Newberry Bldg., Detroit, Mich.

#### MECHANICAL ENGINEERS

**CONSULTING** Engineer—A. M. American Institute Electrical Engineers. Practical advice. Maximilian Weil, 2 Rector St., New York.

#### ELECTRICAL

**RENEW** old dry batteries; 3 best methods with complete instructions, 20c. Guaranteed. Formula Bureau, 3311-E, Belle-plaine Ave., Chicago.

**TRANSFORMERS**—New Star Type "A" rings eight 2 1/2-inch bells, \$1.75. Type "B" rings fourteen 2 1/2-inch bells, \$2.50. Dealers get discount. Star Device, 1253 Pittsfield, Mass.

**FLASHLIGHTS**, the \$1.25 kind, nickel case, 85c postpaid. H. Peters, 114 N. 13th, Philadelphia.

**DETECTIVE** Phone—Make one yourself. You can hear a whisper. Plans and information, 25c. Lobe Mfg. Co., 167 W. 102 St., New York City.

#### RARE COINS

**10 VARIETIES** foreign coins 12c, 20—25c; 50, \$1; 100, \$2.50. Burgess Co., 522 Beacon, Toledo, Ohio.

**OLD** Coins bought and sold. New spring catalog just out free to collectors only. Buying coin catalog quoting prices I pay 10c. Wm. Hesslein, Paddock Bldg., 101-B, Tremont St., Boston, Mass.

**WATCH** your change! Big money paid for old coins. Right now we offer \$100 for dime 1894, S. Mint; \$50 for 1853 half dollar, no arrows; \$750 for certain \$5 gold, no motto, and lesser amounts for thousands of others. Thousands valuable coins circulating. Get posted. Send only 4c. Get our Large Illustrated Coin Circular. It may mean much profit to you. Send now. Numismatic Bank, Dept. 8, Fort Worth, Texas.

**\$4.25 EACH** Paid for U. S. Flying Eagle Cents dated 1856. We pay cash premiums on hundreds of Old Coins. Send ten cents at once for New Illustrated Coin Value Book 4x7. It may mean your fortune. Clarke & Co., Coin Dealers, Box 15, Le Roy, N. Y.

#### STAMP COLLECTING

**FOREIGN** Stamps Free; 52 different foreign, including China and Venezuela, to all who apply for our high grade approval selections. Send two cent stamp for return postage. Edgewood Stamp Co., Dept. H, Milford, Conn.

**STAMPS**—U. S. Postage, Revenue and Department, on approval. Reference necessary. Mrs. Louise Kellogg, West Hartford, Conn.

**205 DIFFERENT** foreign stamps and McKele's Stamp Weekly, Boston, Mass. Six months only 25c. 101 United States, 60 Japanese, 50 Asiatic, 20 Persia, 25 Canada. Choose one.

**200 DIFFERENT** stamps, album and mounts 15c. Burgess Co., 522 Beacon, Toledo, Ohio.

**156 DIFFERENT** stamps from 50 countries, 12c. Edwd. Lufbery, Wallingford, Conn.

**100 DIFFERENT** stamps, cataloging 2c and up; our \$2.00 catalogue, 10c. California Stamp Exchange, Ontario, Cal.

**FREE**—25 stamps to approval applicants. "Hawkins," Raton, N. Mex.

**A POSTAL** brings Ohlman's Philatelic Advertiser. Fine stamps. Low prices. Ohlman, 75 Nassau, N. Y.

**CONFEDERATE** 10c stamp on original cover 25c. R. S. Deitrick, Lorraine, Va.

**TRY** 50% approvals; references. U. S. Local free! Biscayne Stamp Co., Buena Vista, Fla.

**STAMPS** on approval at 50% discount. Kankakee Stamp Co., Kankakee, Ill.

**FREE**—108 foreign stamps, album and catalogs for 2c postage. Payn Stamp Co., Los Angeles, Cal.

**PACKET** of 23 stamps; no two countries alike, 500 hinges. Set of \$1 and \$2 U. S. Rev., all for 5c. Mention paper. Mian. Stamp Co., Toledo, Ohio.

**STAMPS** Free—100 different for the names of two collectors and two cents postage. 10 different foreign coins 15c; 20 Russian stamps, 10c. Lists free. Toledo Stamp Co., Toledo, Ohio.

**STAMP** Album with 538 Genuine Stamps, including Rhodesia, Congo (tiger), China (dragon) Tasmania (landscape), Jamaica (waterfalls), etc., 10c. 100 diff. Jap., N. Zid., etc., 5c. Big list; coupons, etc. Free! We buy stamps. Hussman Stamp Co., St. Louis, Mo.

**25 DIFFERENT** British Colonials to applicants for stamps on approval who send 2c postage. Nickles, Box 2466, Washington, D. C.

**STAMPS**—105 China, etc., stamp dictionary and list, 2c. Bullard, Sta. A, Boston.

**STAMPS**, 10c, all different, free. Postage 2c. Mention paper. Quaker Stamp Co., Toledo, Ohio.

**24 VARIETIES** Cuban stamps, 10 cents. List of 6,000 low-priced stamps free. Chambers Stamp Co., 111 P. Nassau St., New York City.

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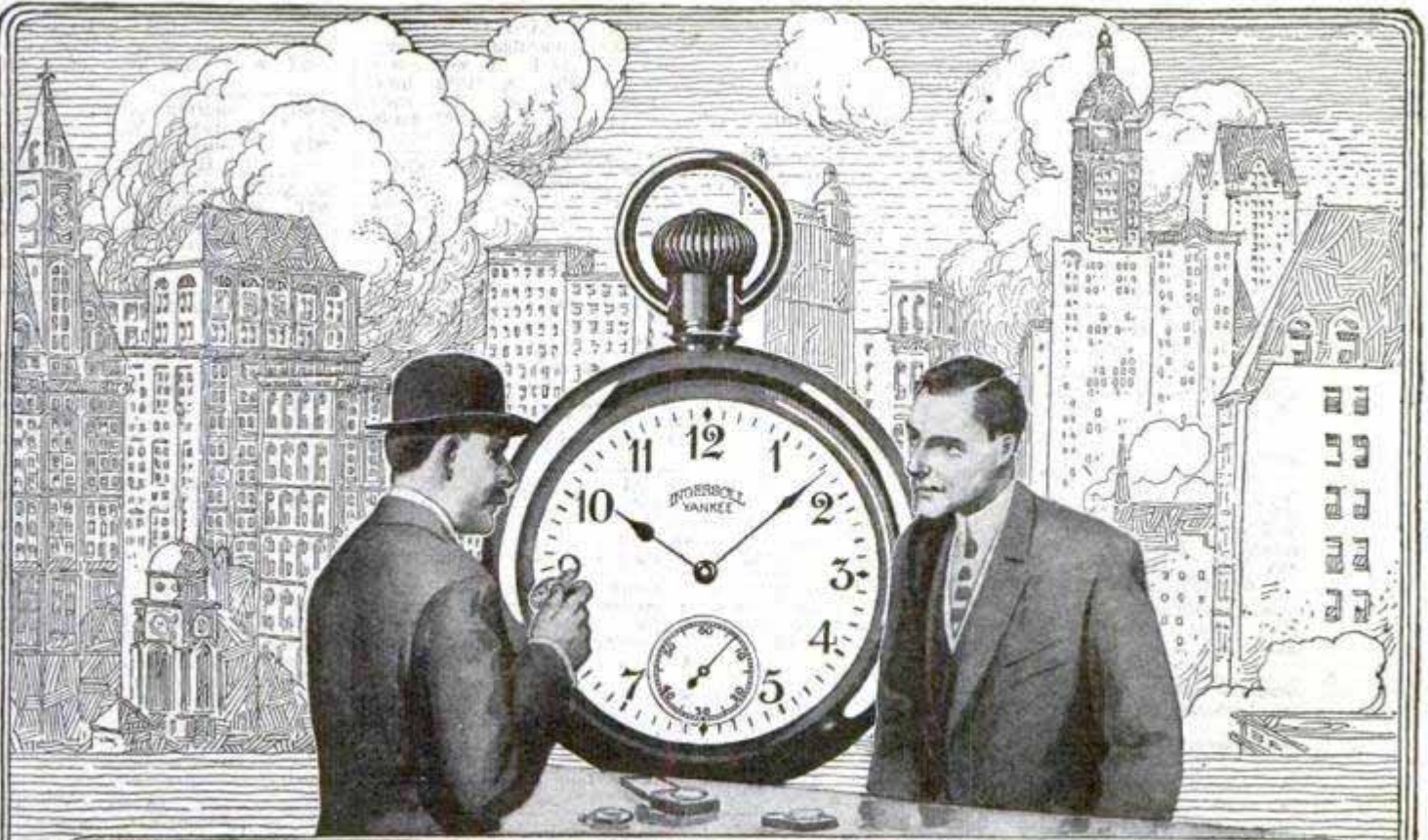
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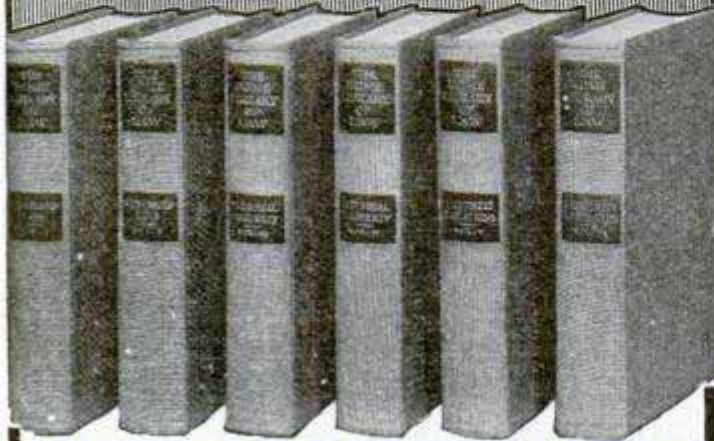
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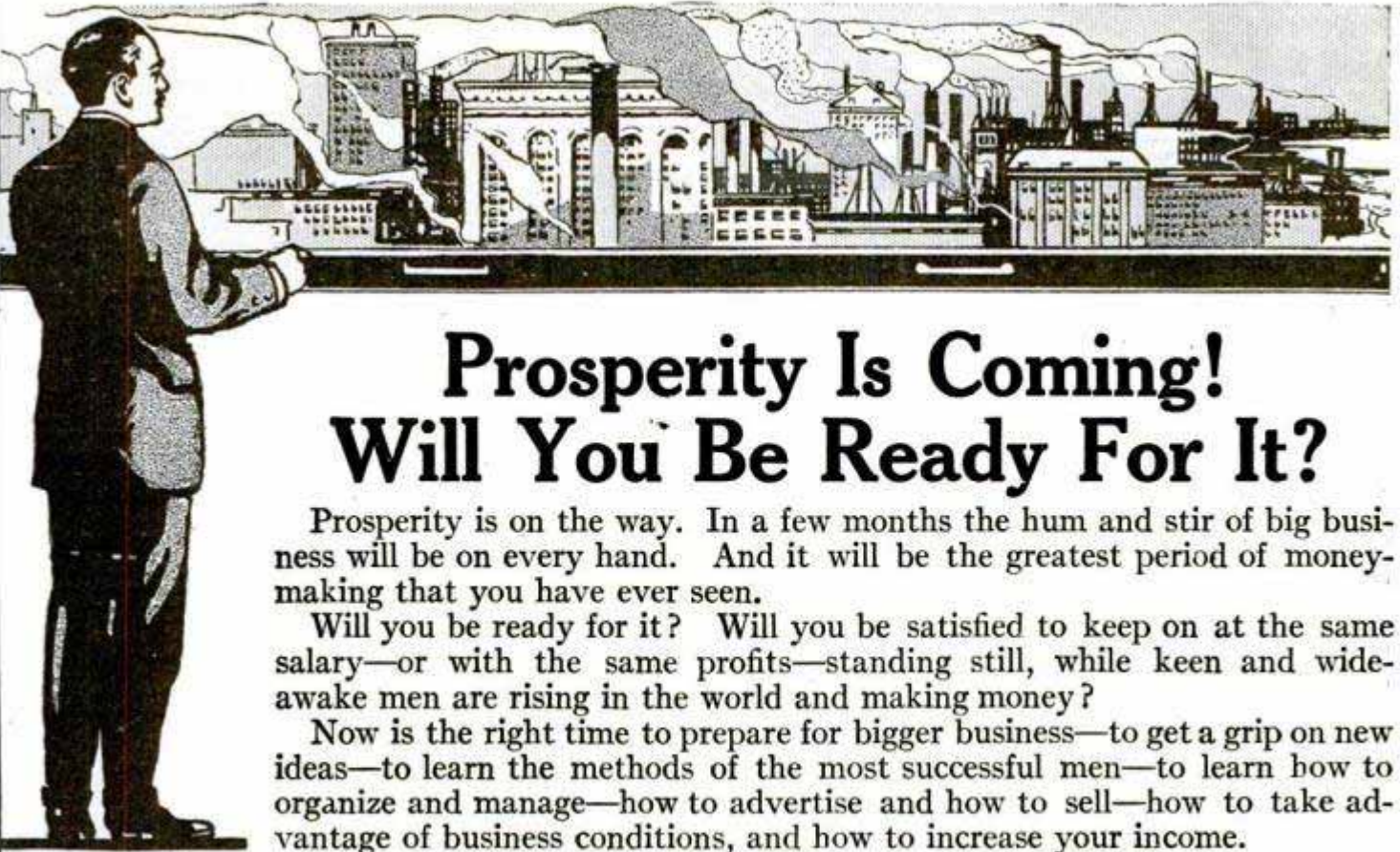
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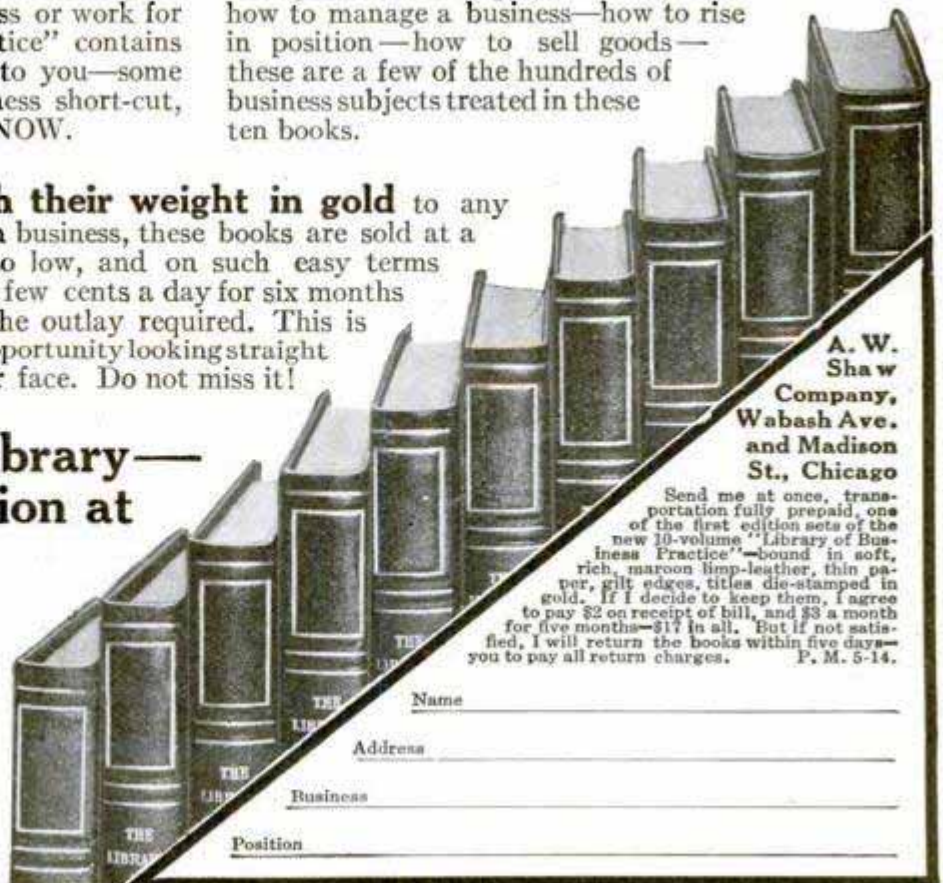
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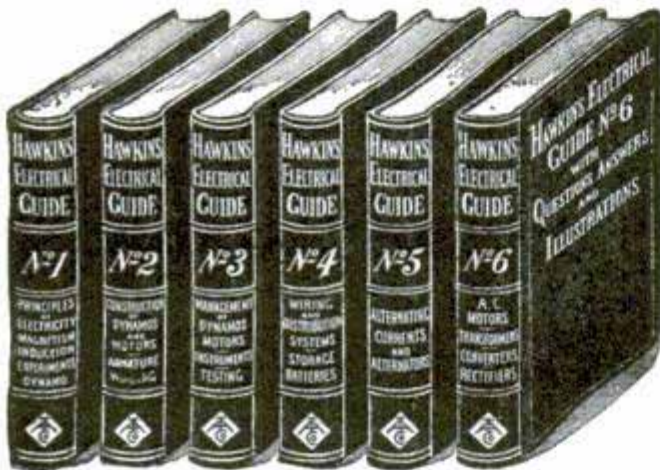
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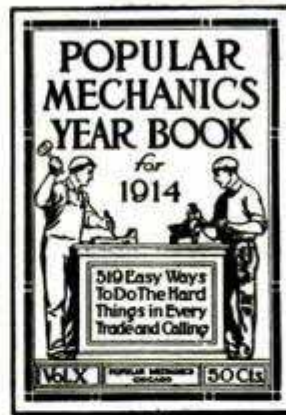
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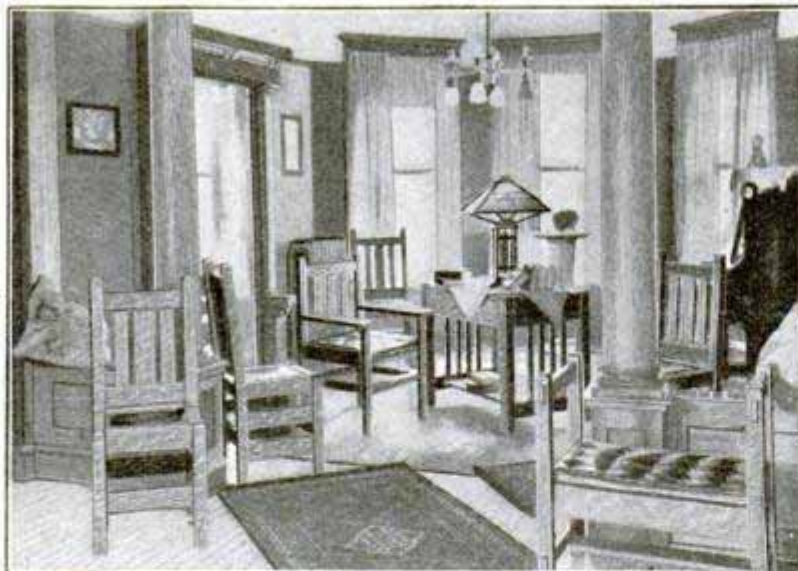
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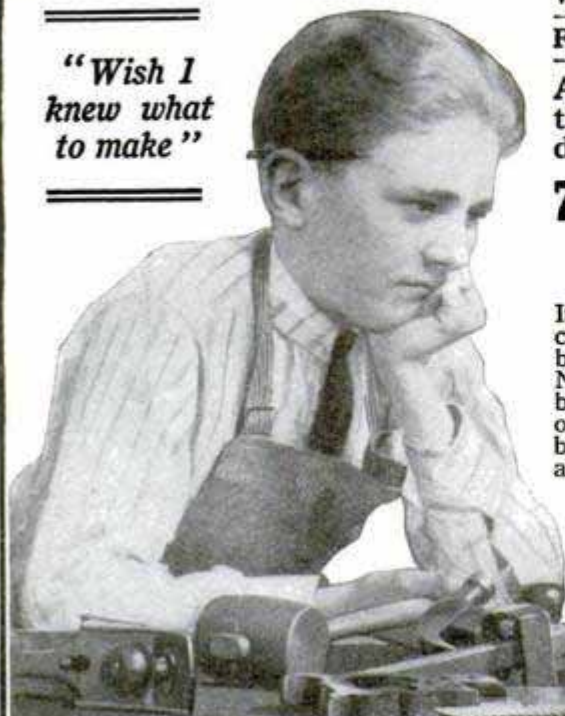
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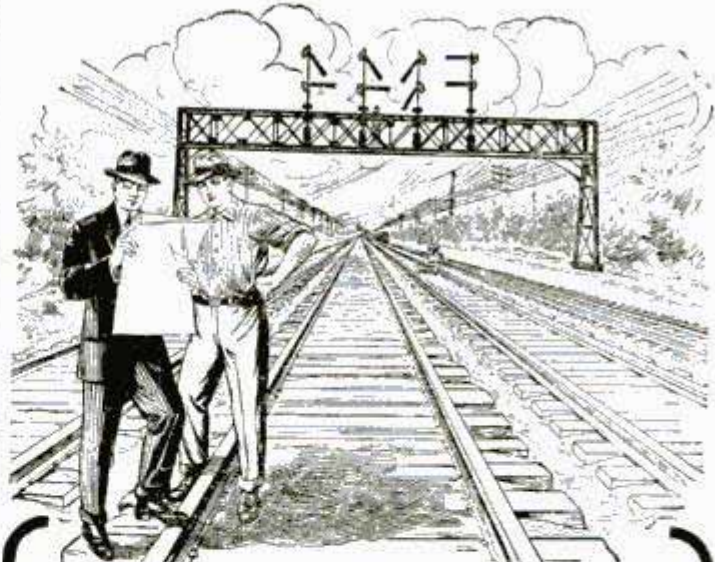
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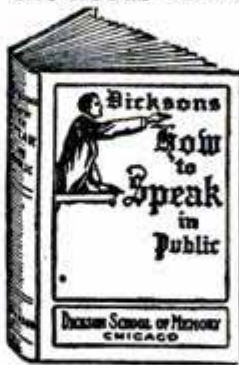
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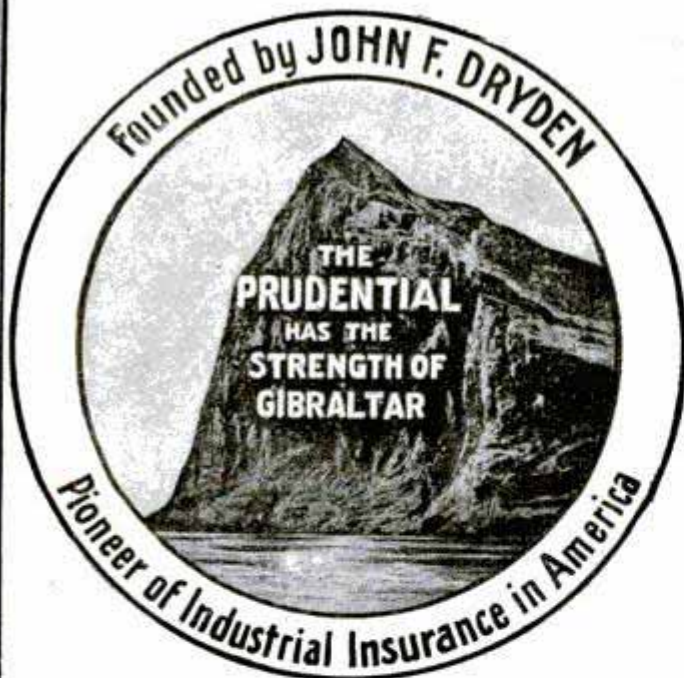
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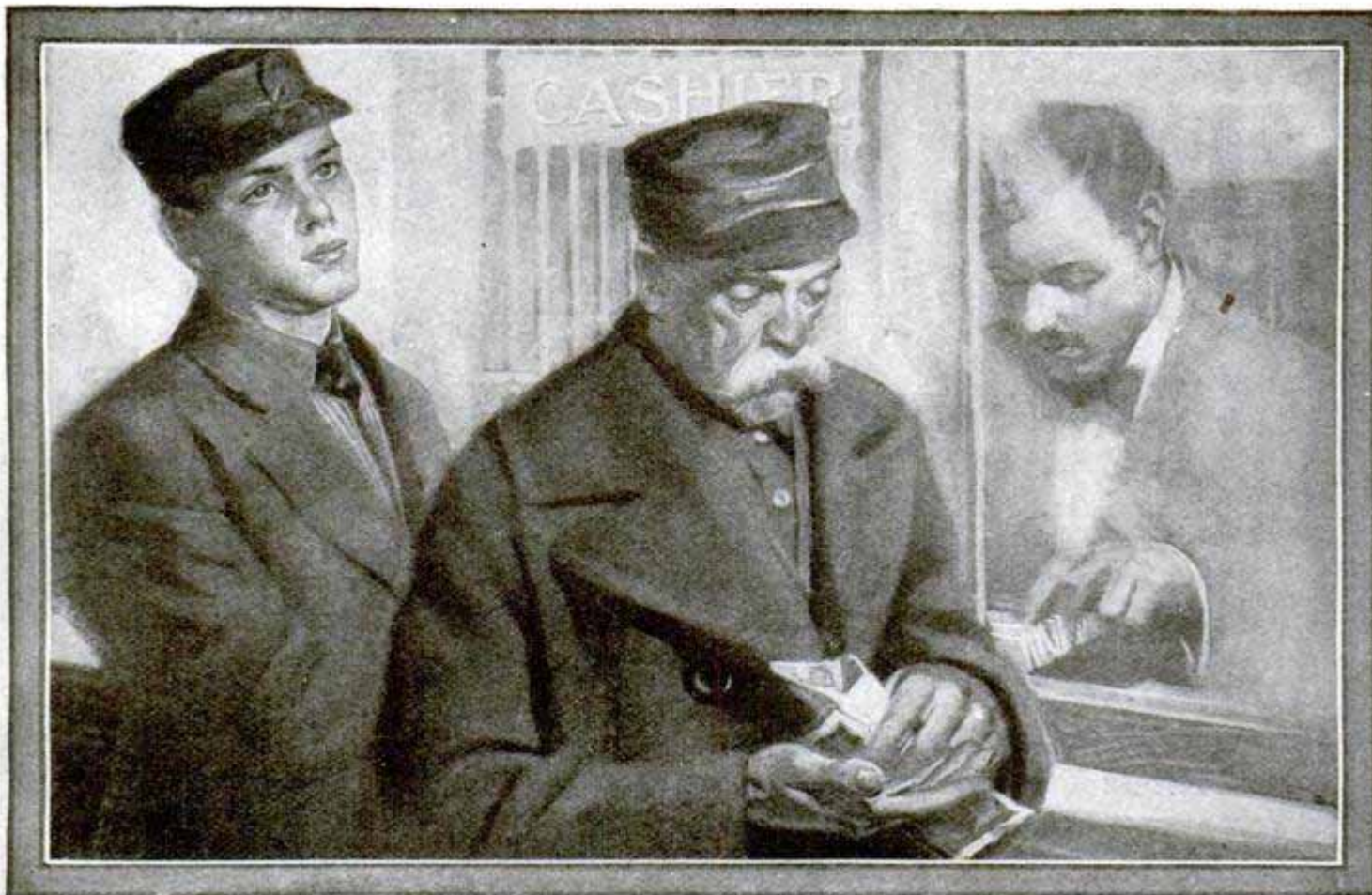
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Vol. 21

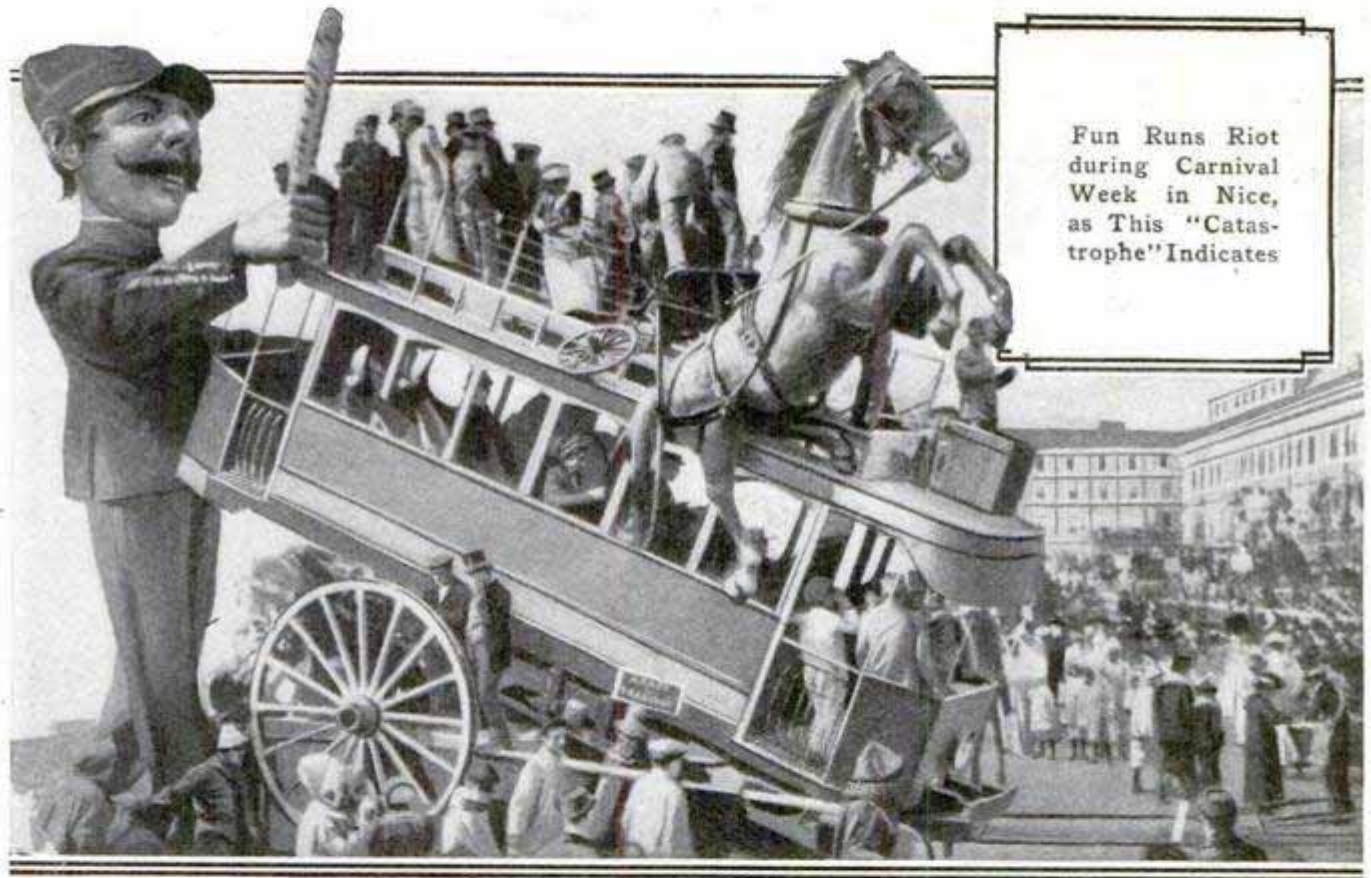
MAY, 1914

No. 5

## A Good Imitation of a General Smash-Up

**T**HE carnival season at Nice, the famous pleasure resort of southern France, is one continuous round of hilarity. The city is decked in gala attire and tourists from every land throng the streets. The parades, which are a feature of the occasion, display floats, some sumptuous, some

gendarme or policeman lifts the end of the car, as if to release the horse. The horse is stuffed, the figures of the passengers mostly "dummies" from some clothing store, but the conductor and some of the passengers are real persons, who lend "action" to the piece by their movements.

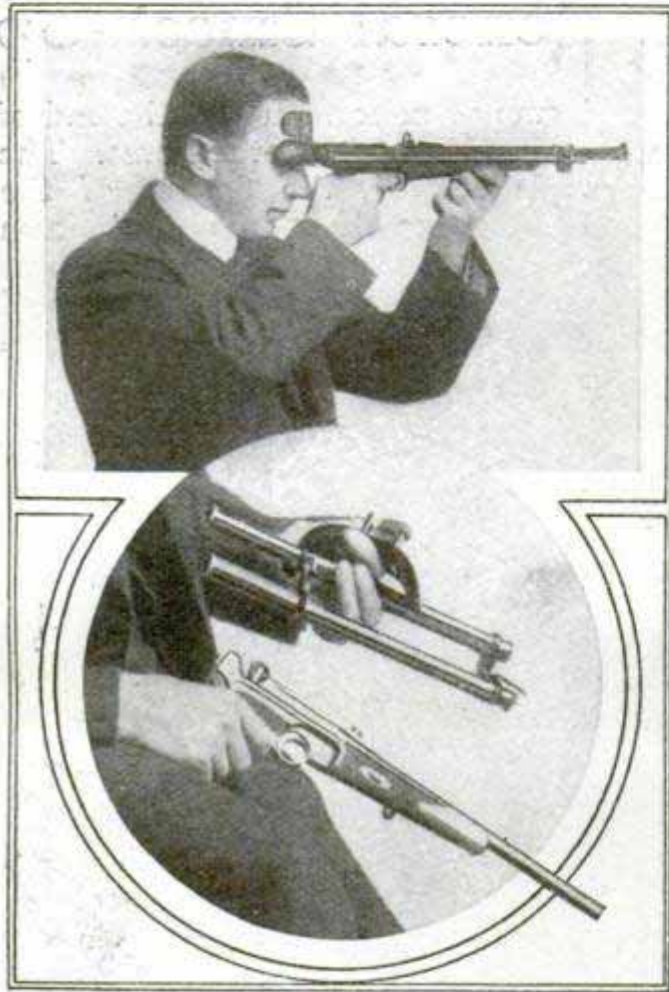


huge bouquets of blossoms, and some so mirth provoking that their progress through the streets is marked by waves of laughter. One of the most curious of these funny floats at the last carnival depicted an unusual collision between a street car and a horse cart, with the horse and cart poised upon the roof of the car, the frightened passengers in every posture of surprise and terror, and the horse plunging to disengage himself from the wreckage. At the rear, a gigantic

Below is a signpost much seen on traffic streets in France, bearing the legend "Arrêt du Tramway," which is the equivalent of our signs "Street Cars Stop Here." Inasmuch as motormen in France, as in other countries, frequently neglect to stop where the sign is displayed, occasioning annoyance equal to that in similar cases on this side of the Atlantic, the addition of the signpost on the float provoked much merriment when it was hauled through the crowded streets.

## RIFLE WITH BINOCULAR TELESCOPIC SIGHTS

A new rifle has been invented which the sportsman rests against his forehead instead of against his shoulder.



Telescopic Rifle for Shooting Game at Long Range

der. Two telescopes form the sighting device, by means of which accurate shooting is possible at distances impossible with the usual type of gun. The inventor, an Ohio sportsman, in experimenting, used a gun having a range of about 1,500 yd. and a penetration of  $\frac{3}{8}$  in. of boiler steel. A binocular telescope of peculiar design is combined with the gun and makes it unnecessary to squint the eye in sighting. A padded plate shaped to the forehead is so arranged that the recoil of the shot is entirely taken up by flat springs. Rifle and telescope may be taken apart in a few minutes. The eyepieces of the binocular are easily adjusted to different widths between the eyes of

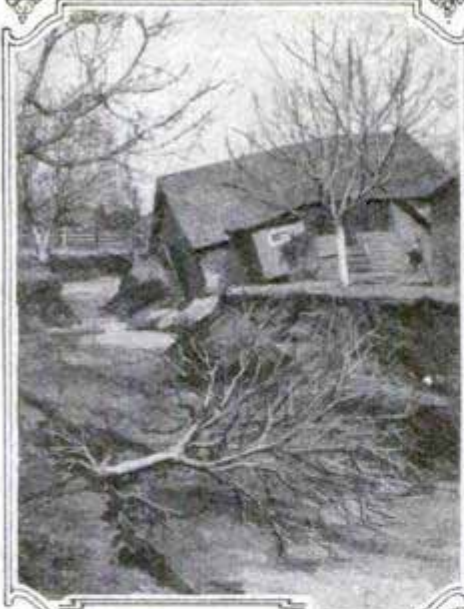
individual users. The focusing of the telescope actuates the mechanism for raising or lowering the gun for different ranges in accordance with the focus.

## MANILA HARBOR TO BE DEEPEINED

The inner harbor at Manila is to be deepened to 32 ft. at low tide, the government having bought a huge suction dredge with a capacity of 1,000 cu. yd. per hour for that purpose. A difference of 5 ft. between high and low tide in the harbor makes it possible for the mammoth freighter, "Minnesota," the largest ship navigating the Pacific, heavily loaded, to dock at the government piers, as after the deepening of the harbor 37 ft. will be provided. At present work is being done nearest the piers, where the churning of the screw propellers has accumulated much mud, making navigation difficult and rendering the docking of large vessels almost impossible. After the Manila job is completed the dredge will be sent to Iloilo to deepen the harbor there.

## RESULTS OF THE FLOOD IN LOS ANGELES

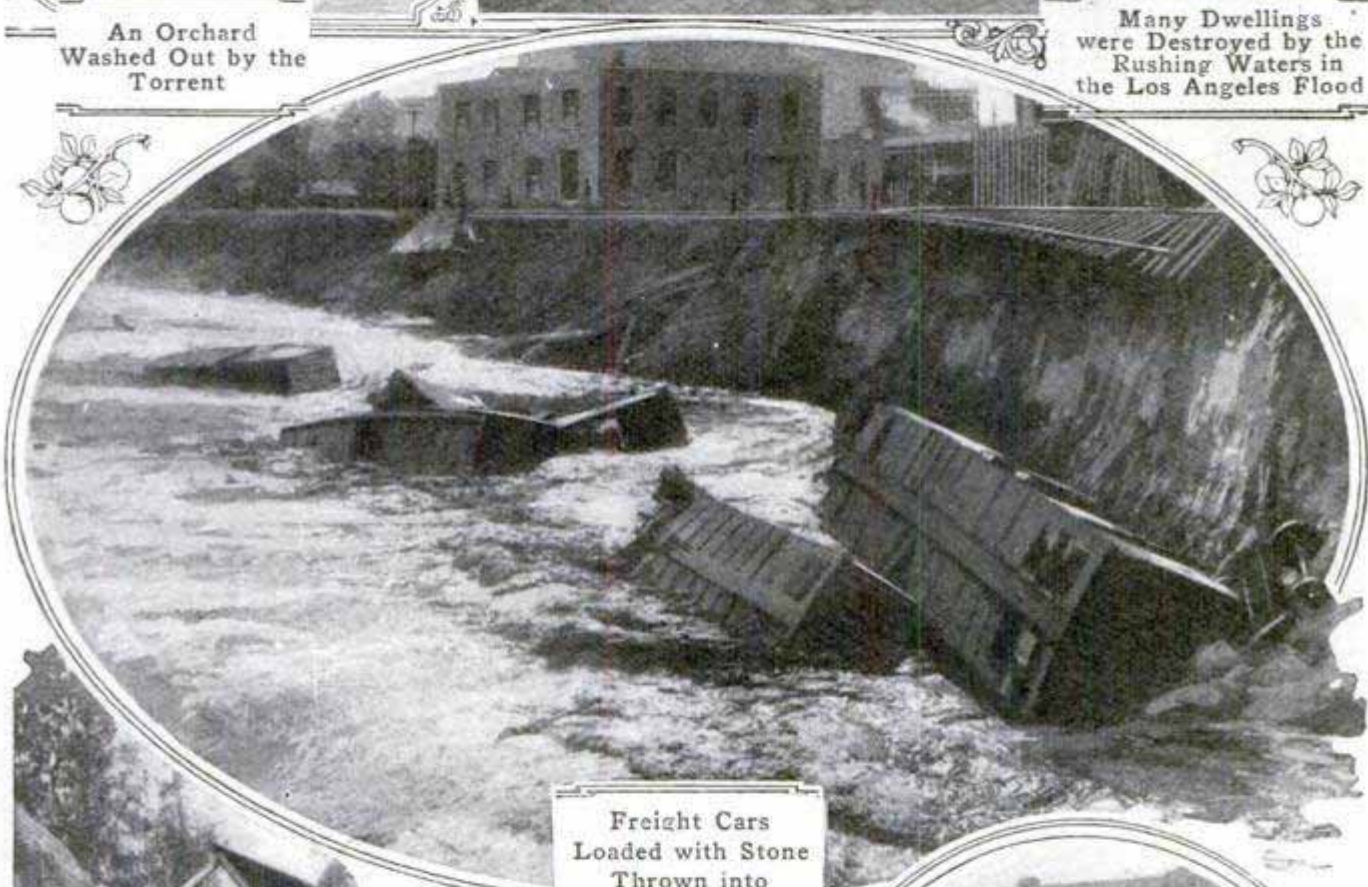
When a most unusual rainfall occurred on the slopes of the Sierra Madre range in southern California recently, the flood swept down the Los Angeles River, and transformed the Arroyo Seco, a dry ravine, into a torrential watercourse, spreading wreck and ruin to the very edge of San Pedro Bay. The rush of waters ate its way into the banks of sand and loam, toppling houses to destruction, fortunately with little or no loss of life. In an effort to prevent the Los Angeles River from cutting away its tracks, one railroad company dumped 10 freight cars, heavily loaded with rock, down the bank at Macy Street. After a brief period of flood, the waters subsided almost as rapidly as they rose, leaving a trail of wreckage totaling many thousands of dollars.



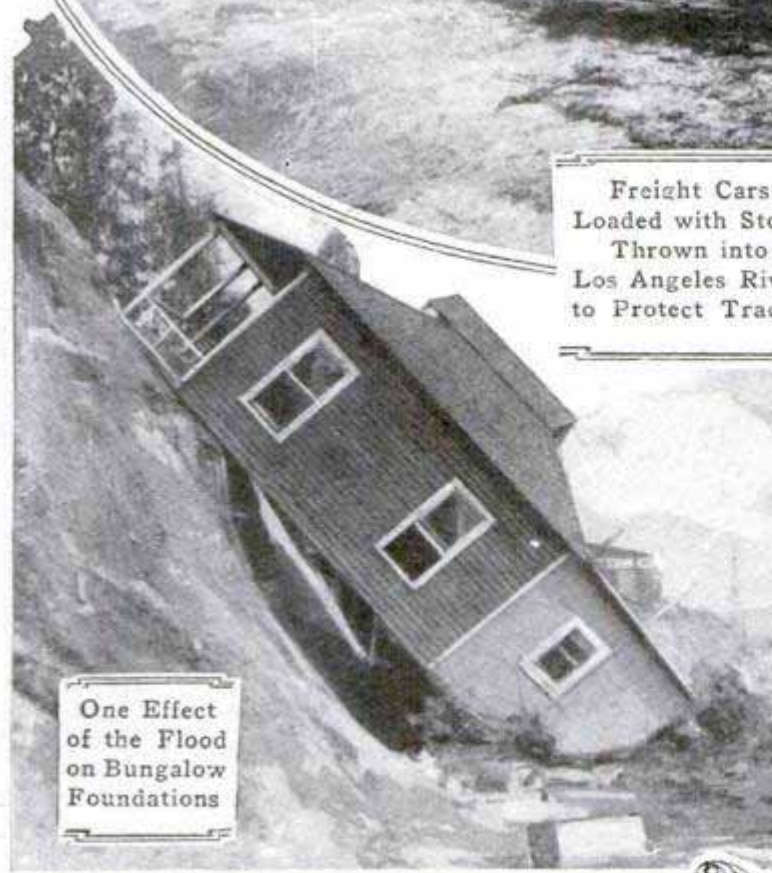
An Orchard  
Washed Out by the  
Torrent



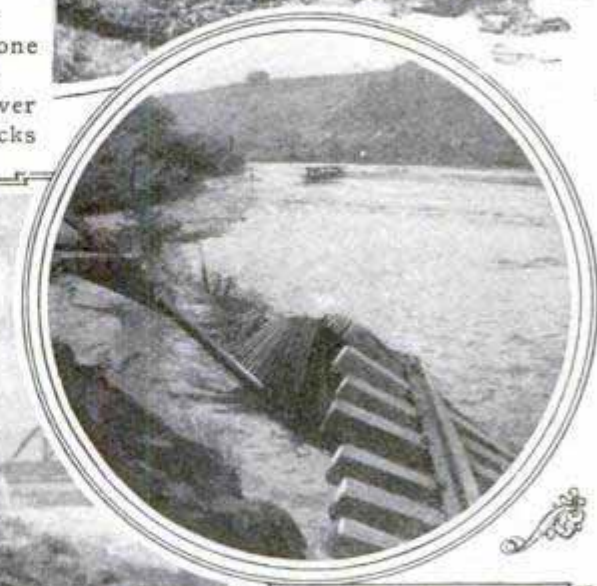
Many Dwellings  
were Destroyed by the  
Rushing Waters in  
the Los Angeles Flood



Freight Cars  
Loaded with Stone  
Thrown into  
Los Angeles River  
to Protect Tracks



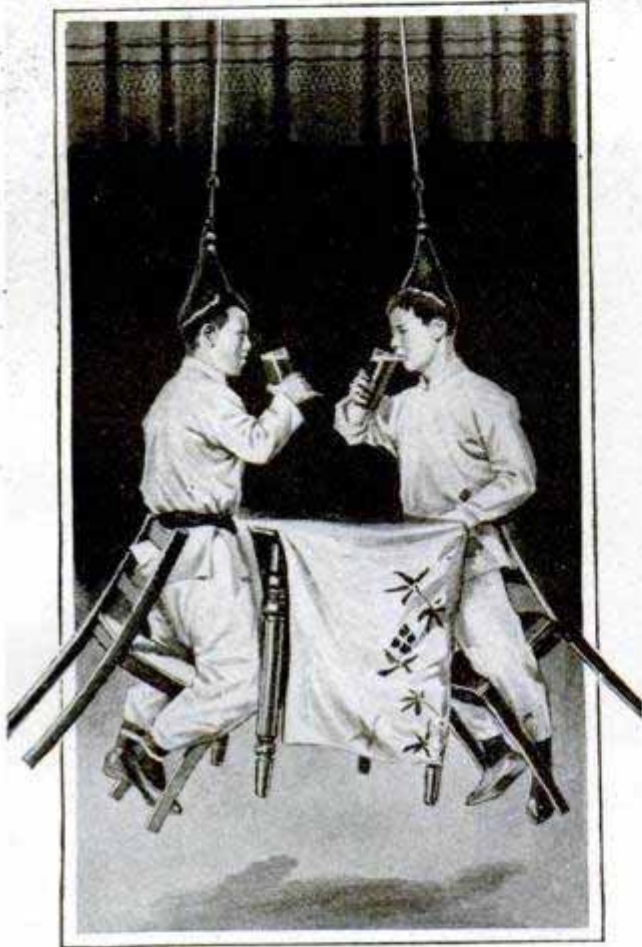
One Effect  
of the Flood  
on Bungalow  
Foundations



A Curious Effect  
of the Flood

## CIRCUS PERFORMERS HANG BY THEIR HAIR

A remarkable feat was accomplished by two members of a troupe of Chinese performers in a circus, ex-



Novel Stunt by Chinese Circus Performers

hibiting in Berlin recently, when hooks connected with ropes swung from the flies were caught in their queues, lifting the performers, the table at which they sat and their chairs high in the air. Here they swung, all the while calmly drinking, for several minutes.

## TUNGSTEN LARGELY USED IN ELECTRICITY

Although the commercial use of tungsten is so recent that it is barely mentioned in most textbooks, it already has an important place in the electrical industry. It has been found advantageous to use tungsten in the targets of X-ray tubes, on account of its high melting point, 3100° Centigrade, which enables it to withstand

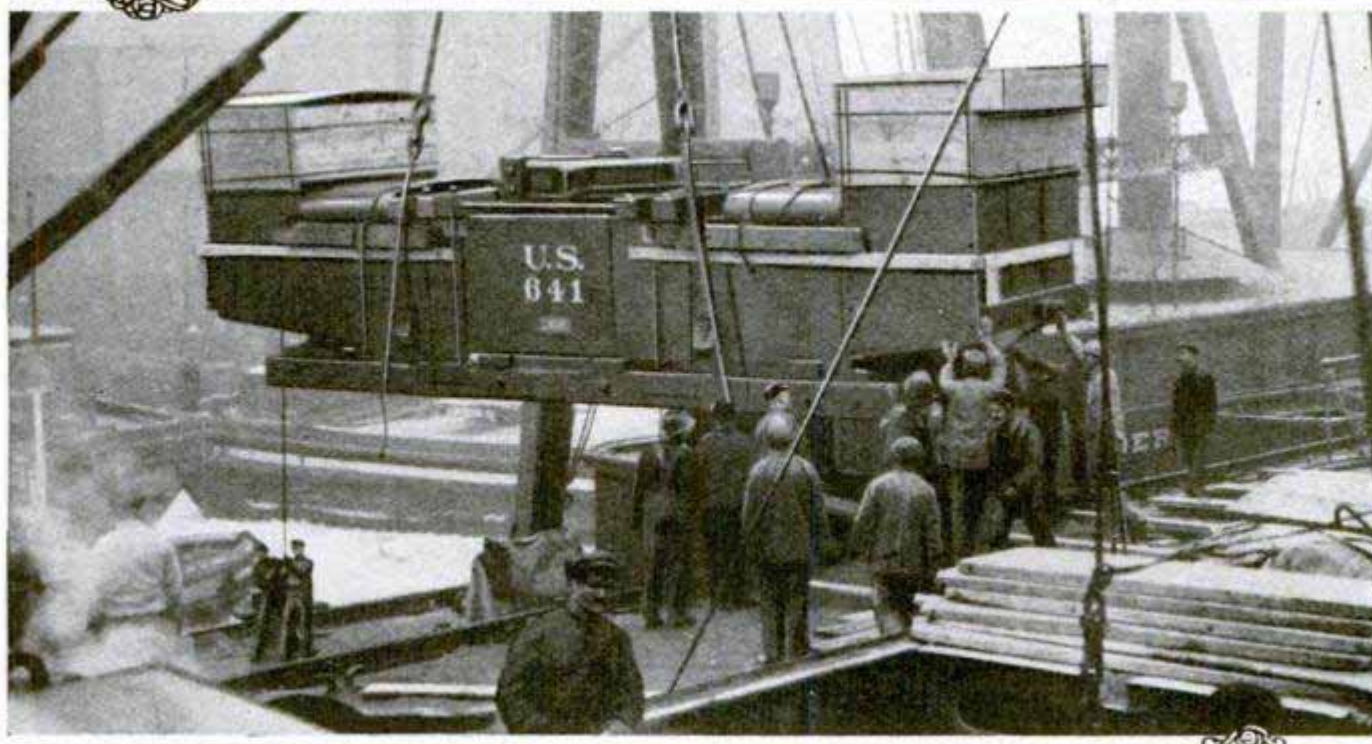
the terrific bombardment of the cathode rays, and the consequent high temperatures attained in modern high-speed skiagraphy. In electric furnaces tungsten is used both in strips for winding coils and in tubes. Automobile manufacturers are using more and more of it for sparking points, and some are even adopting tungsten for all electrical contacts. In the form of gauze, tungsten is highly efficient for separating solids from acid baths, as the metal is insoluble in most common acids. Tungsten is slightly heavier than gold, and its use as an alloy for steel is well known, as also is its household usage as a filament for incandescent lamps.

## CAPE-CAIRO CAR CARRIES LARGE GASOLINE SUPPLY

The automobile in which representatives of the Belgian government are to ride from the Cape of Good Hope to Cairo, in the transafrican trip, is equipped with two tanks, one on either side, at the front end of the running board. In these tanks 80 gal. of gasoline may be carried, auxiliary to the usual supply tank at the rear. With this supply, it is believed the 16-hp. car will have no difficulty in making the long runs between stations.



How an Extra Supply of Gasoline is Carried for Long Journey



The First of Forty Electric Locomotives being Shipped to Colon

## ELECTRIC LOCOMOTIVES IN TRANSIT TO PANAMA

Marking the last stages in the completion of the Panama Canal, 40 electric locomotives which are to tow the vessels through the locks, are now being shipped to the Canal Zone. These "electric mules," as they are called, weigh 50 tons each, and demonstrate amazing power when installed upon proper tracks. The towing lines are wire ropes, each 400 ft. long, and four locomotives will be used for each vessel at each lock, two hauling on ropes attached to the bow and two at the stern, to steady it. These wire ropes are an inch in diameter and are composed of six strands of high-tension wire around a hemp core. The specifications call for a breaking strength of 37 tons each, and tests show a strength of more than 10 per cent in excess of that called for in the specifications.

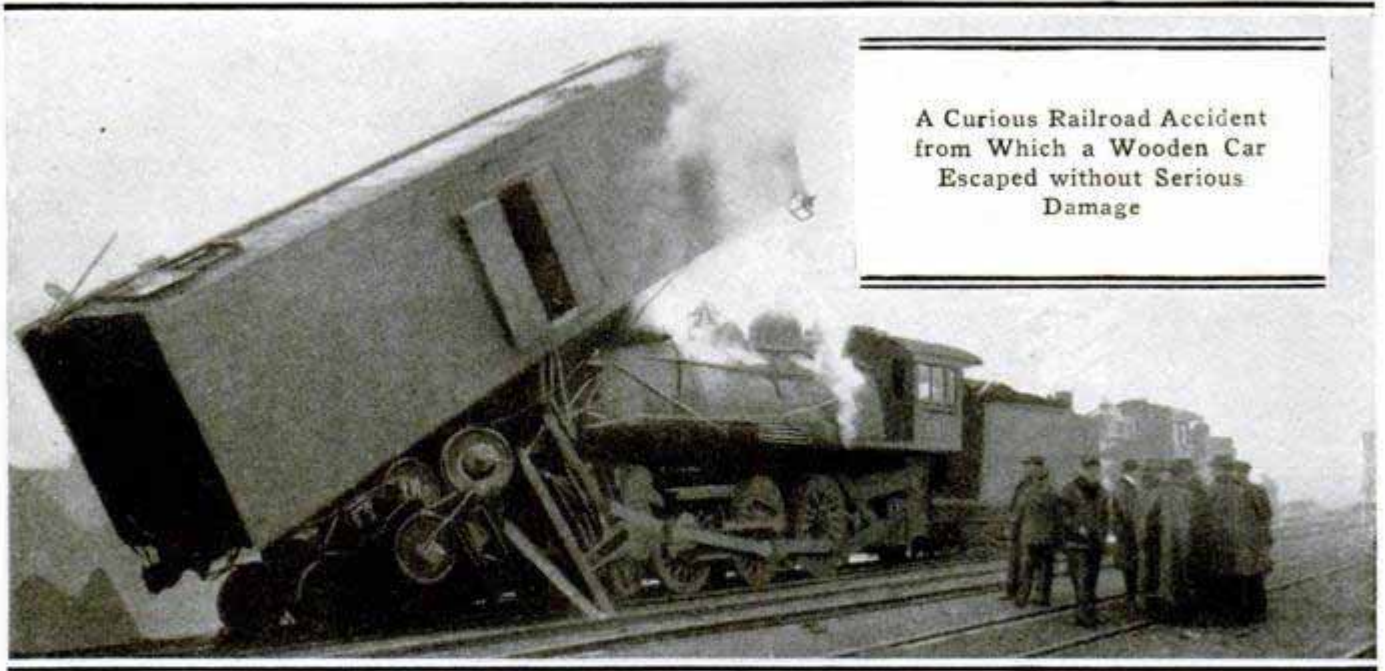
A trolley line is to be built from Jerusalem to Bethlehem, a concession having been granted by the Turkish government to a French banking firm. At the same time electric current will be used to light the city of Jerusalem.

## RUBBER SKATES NOW PART OF SOLDIERS' KIT

Experiments have been carried on by German military authorities with a pair of cigar-shaped foot pontoons, or skates, made of rubber, by which it is believed a soldier may be equipped to walk across rivers, carry heavy loads on the water, and fire his rifle with as much steadiness as on land. The device is about 6 ft. long, and is fastened on the foot like a snowshoe. The motion resembles skating rather



Courtesy India Rubber World  
German Soldier Equipped with Rubber Skates



A Curious Railroad Accident  
from Which a Wooden Car  
Escaped without Serious  
Damage

than walking, and because of this the name of rubber skates or water skates has been given the device. A number of these skates fastened together make a very serviceable raft, or they may be used as a basis for a pontoon bridge.

### MEDAL OF HONOR GIVEN TO COLONEL GOETHALS

In appreciation of the distinguished services rendered to the nation by Col. George W. Goethals as Chief Engineer of the Panama Canal, a gold medal was presented to him by the Civic Forum of New York, on March 4th, last. The presentation was made by the head of the New York state department of education, in the presence of army and navy officials of the highest rank, national, state and city dignitaries, and an immense audience.



### COLLISION POISES CAR ON SMOKESTACK

A curious railroad wreck occurred in Chicago recently, when a special train on one road struck a freight train on another at a crossing. Both trains were moving, and the freight was struck near the middle. One car was lifted on the locomotive of the speeding special, and carried quite a distance down the track, nicely balanced on the smokestack. An interesting phase of the accident is the fact that the car was a wooden one and was not materially damaged by its adventure.

### NEW VARIETY OF COTTON IN EGYPT

A new cotton has been developed in Egypt which is said to be stronger than any variety heretofore produced in that country. Careful selection of seed, and particular attention to securing the best plants of each successive growth, after the best modern agricultural practice, is responsible for the long fiber and the silky texture. The plants are short and are covered with bolls, as many as a hundred having been found on a single plant. The cotton is brown in color, and its superior strength, together with its abundant bearing, makes it a most valuable addition to this important family.

## CALIFORNIA TO FORM A MILITIA AERO CORPS

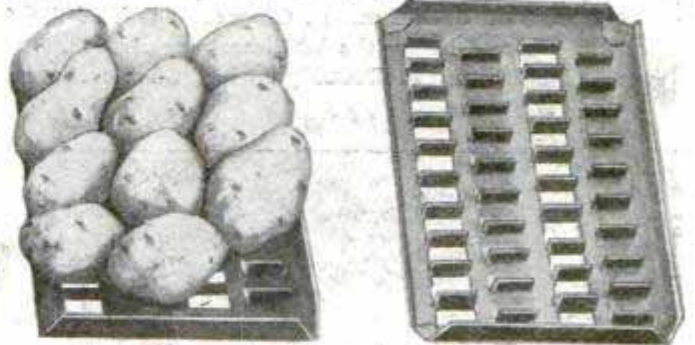
The second state to enlist men in a militia aero corps is California, New York having previously recognized this arm of the service by a duly organized body of fliers. A recruiting office has been opened in Los Angeles where enlistments for the latest branch of the state-militia organization are being received. The corps will be recruited to a full strength of 39 men and five officers. Its first equipment will be two machines with automobile tenders, which will be augmented later to four machines, each with an auto tender. The aeroplanes will be regular two-passenger scout machines, and will be equipped with wireless, if experiments now being conducted prove the feasibility of the idea.

## UNSINKABLE LIFEBOAT HAS NOVEL FEATURES

Recently an English inventor exhibited upon the Thames a lifeboat which is claimed to be unsinkable. It is a cylinder, pointed at both ends, with sliding doors which may be tightly battened, and affords a refuge in emergency for 80 people. This strange-looking craft may be launched in a few seconds, according to the inventor, and is buoyant in the extreme, carrying its large load easily and safely in a heavy sea. Air is supplied to the interior by means of a small pump.

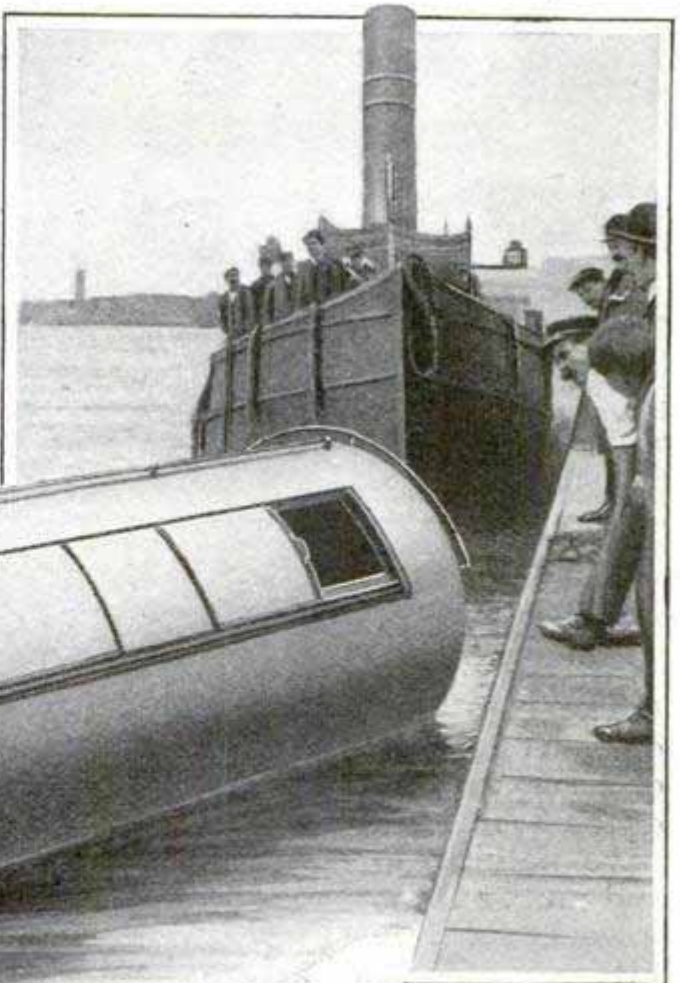
## NEW DEVICE FOR BAKING POTATOES

A potato baker recently placed on the market consists of a bottomless pan having a grate-like top on which



New Baker with Metal Strips That Hold the Potatoes in Place

the potatoes are laid. At the edges of the openings are upright metal strips which serve to hold the potatoes in place and prevent them from rolling together, while the openings permit a free circulation of hot air for baking. This device is designed to be used in an oven.



Cylindrical Ark of Refuge Offered by English Inventor as Nonsinkable Lifeboat

Erecting Floor of the Manhattan Bridge over East River, between New York City and Brooklyn. The Floor is Built Out from the Towers and Secured, Piece by Piece, to the Heavy Steel Bars Suspended from the Main Cables. This is the Newest of the Bridges Connecting Manhattan Island with the Borough of Brooklyn. It Crosses North of the Old Brooklyn Bridge and below the Williamsburg Bridge. The Photograph, Taken from the Brooklyn Side, Shows Manhattan in the Distance



Copyrighted by Irving Underhill

## LAYING THE FLOOR OF A SUSPENSION BRIDGE

The most interesting and dangerous-looking stage in the construction of a suspension bridge is the building of the floor. In this work the builders have nothing to rest their work on and must build out each way from the towers, securing the floor, piece by piece, to the heavy steel bars suspended from the main cables far above. The work is done with derricks that

are equipped with booms long enough to reach out ahead of the finished structure and hold the girders suspended while they are being riveted in place. As each section of the floor is completed, the derricks are moved ahead and the construction of the next section is begun. The sagging of the completed portion of the floor, which may be detected in the accompanying





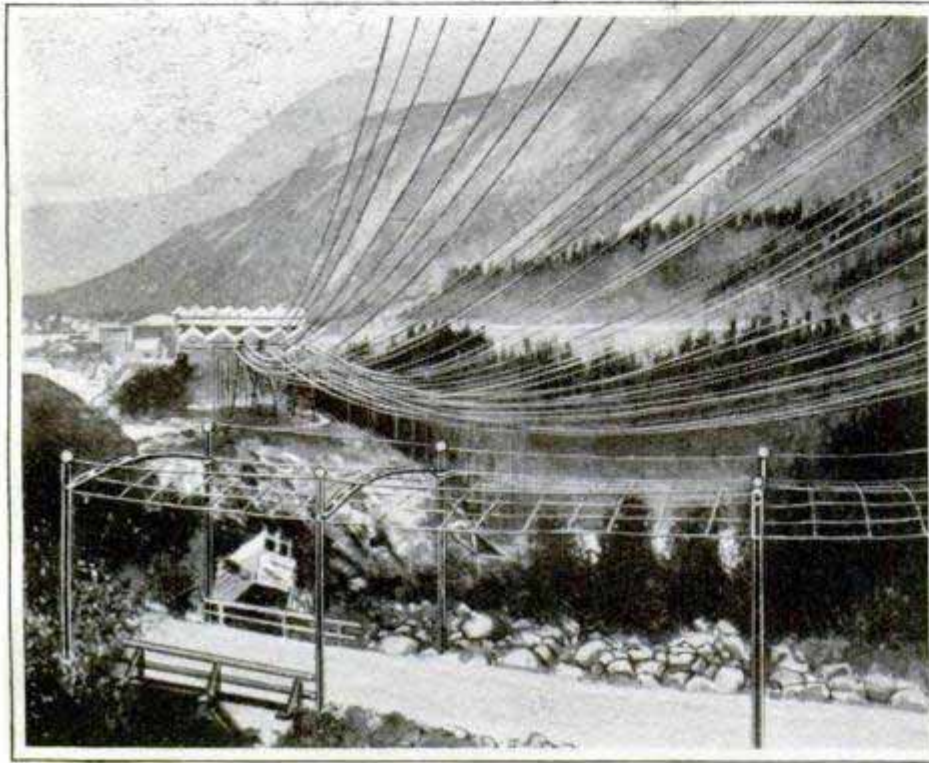
illustration of the new Manhattan bridge at New York City, is caused by the unbalanced weight of the structure, which pulls the main cables down slightly in the vicinity of the towers. With the entire floor in place, the weight is evenly distributed and the cables take the catenary curve intended by the engineers.

☞The Japanese are making waterproof boots, shoes, bags, and trunks from the tanned hides of sea lions.

### PROTECTION AGAINST HIGH-POWER LINES

Where high-power transmission lines cross roadways there is always present the possibility that stress of wind or sleet will break the cable and endanger travelers. To safeguard the lives of those using the roadway, the aluminum cables which transmit 170,000 kw. from the power station to the nitrogen factories at Saaheim, Norway, have arched supports built over the road wherever

the transmission lines cross. These wire networks could scarcely be supposed to prevent the highly charged cables, entirely uninsulated, from burning through the slight screen, but it is believed that such resistance would be



Safeguarding the Traveler on Norwegian Roads

offered as would permit the escape of whoever might be underneath when the cable broke.

Florida buttonwood is highly prized for cooking on ships, as it burns slowly with an even heat and makes little smoke or ash.

## NEW AEROPLANE CONTROL LESS TIRESOME

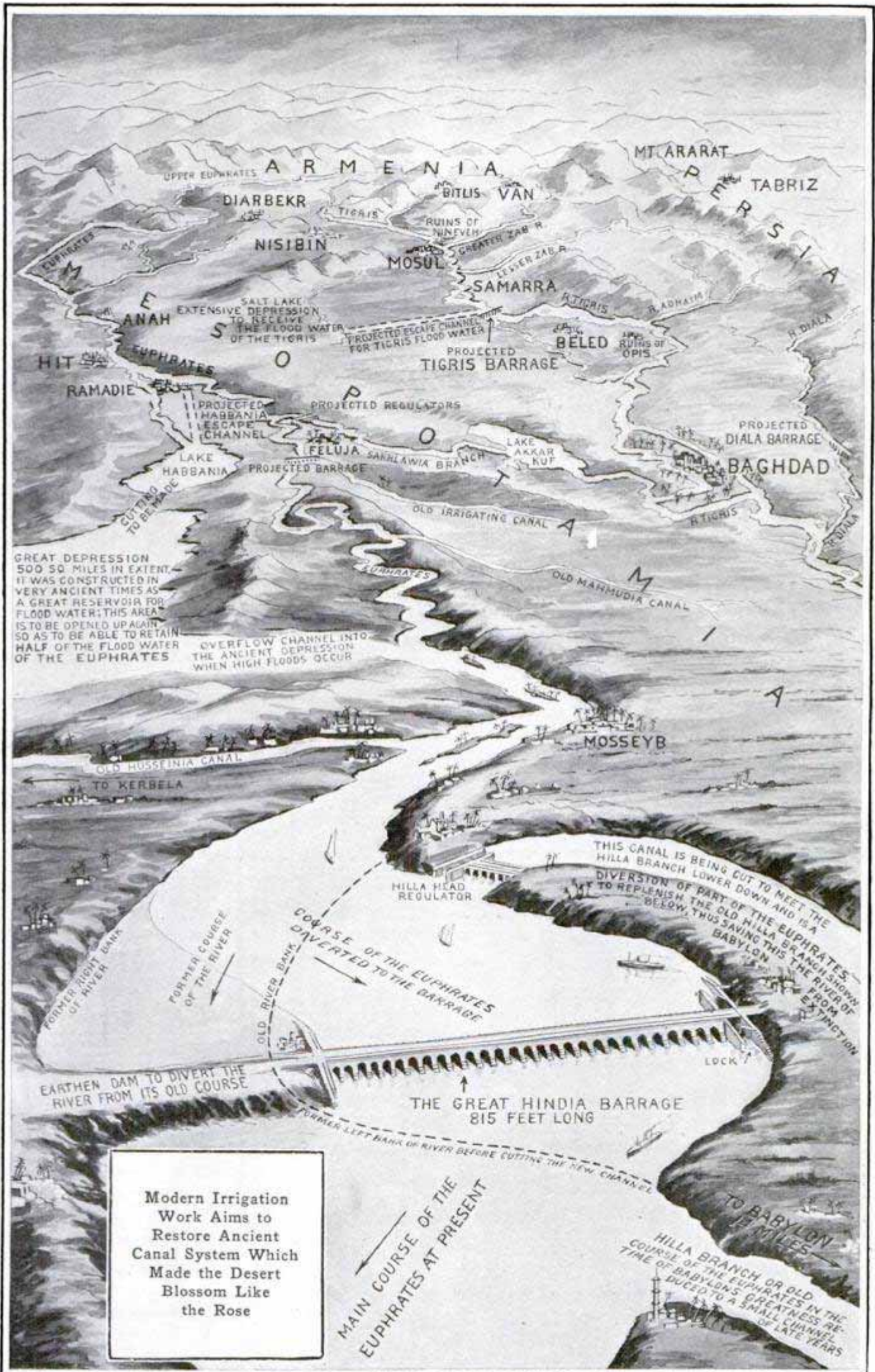
After five years of lever control, by which both hands of the pilot were continuously engaged in manipulating the forward and backward movements of the warping and turning mechanisms, the makers of the Wright aeroplanes have now adopted the automobile type of steering wheel. The lever system, proved in practice, after it had been once mastered, a very precise method, but in long-distance flights operators found it exceedingly tiresome. The new control, which has been quite generally adopted in Europe, is termed "instinctive," as the movement forward and back of the steering wheel falls in with

the natural movements of the body in accommodating one's self to upward and downward motions of the aeroplane. The wheel also is utilized for turning, banking and wheeling, the rudder being actuated by partially revolving the wheel, as in steering an automobile.

## IRRIGATION TO RESTORE GARDEN OF EDEN

Lying between the Euphrates and the Tigris Rivers is today a desert where once was fertility so abundant that it passed into a proverb; Mesopotamia, the land was called, and here, "Between the Rivers," as the name may be translated, was the traditional location of the Garden of Eden, the original home of the human race. Huge irrigation works, of which the great Nahrwan Canal, and its counterpart, the Dijail, are still traceable, brought the waters of the Tigris to the fields of grain, two thousand years ago.

But these and other great works perished and were swallowed up in the shifting sands long centuries since. Recently, under the direction of an eminent English engineer, the Turkish government has built a dam, or barrage, across the Euphrates, 14 miles above Babylon, as the first step in a vast scheme of irrigation to redeem half a million acres, transforming the desert into a garden spot. The barrage will divert the course of the Euphrates into canals, from which the water will be distributed over a vast territory of



GREAT DEPRESSION  
500 SQ MILES IN EXTENT.  
IT WAS CONSTRUCTED IN  
VERY ANCIENT TIMES AS  
A GREAT RESERVOIR FOR  
FLOOD WATER; THIS AREA  
IS TO BE OPENED UP AGAIN  
SO AS TO BE ABLE TO RETAIN  
HALF OF THE FLOOD WATER  
OF THE EUPHRATES

OVERFLOW CHANNEL INTO  
THE ANCIENT DEPRESSION  
WHEN HIGH FLOODS OCCUR

THIS CANAL IS BEING CUT TO MEET THE  
HILLA BRANCH LOWER DOWN AND IS A  
DIVERSION OF PART OF THE EUPHRATES  
TO REPLENISH THE OLD HILLA BRANCH  
BELOW, THUS SAVING THIS THE RIVER OF  
BABYLON FROM EXTINCTION

Modern Irrigation  
Work Aims to  
Restore Ancient  
Canal System Which  
Made the Desert  
Blossom Like  
the Rose

MAIN COURSE OF THE  
EUPHRATES AT PRESENT

HILLA BRANCH OR OLD  
COURSE OF THE EUPHRATES IN THE  
TIME OF BABYLON'S GREATNESS RE-  
DUCED TO A SMALL CHANNEL  
OF LATE YEARS

highly fertile farming country. Other river-conservation schemes are provided for in the full plans, which are designed to enable the government to conquer the Euphrates as it was mastered by the ancients. The Tigris is also included in the full project, which is estimated to cost in its entirety something like \$75,000,000, though years must elapse before the whole scheme is worked out.

### OUTING HOME CARRIED ON RUNNING BOARD

A portable camp outfit, carried in a neat box upon the running board of an automobile, or fastened behind the seat of a buggy or wagon, forms a complete outing home when set up. A folding spring bed of standard size is provided, which, when set up, affords substantial support for the framework of a tent, whose center pole is clamped to either end of the bed. One side of the canvas covering may be raised and supported to form a porch, while the box in which the outfit is packed forms a table. The case and outfit complete weigh 130 lb. and occupy a space of 10 by 16 by 48 in., packed.

### "FAKING" A THRILLER FOR THE "MOVIES"

The thrilling scenes depicted upon the screen at the "movies," although the result of actual photographs, may not be always what they seem. A recently produced "movie" film shows a dare-devil detective using a dirigible to overtake an express train in which is riding, in fancied security, the criminal who seeks to escape him. The picture shows the detective climbing down a knotted rope from the dirigible to the roof of the speeding train. Few scenarios have called for a more hazardous feat. When shown upon the screen it is so realistic that the spectators involuntarily clutch at their chairs, scarcely breathing until the act is completed in safety.

The making of this film, however, while it involved some risk, was not as hazardous as it appears. The owner of a little airship kept it at an aerodrome in England, alongside of which run the tracks of the Midland Railway. A moving-picture concern hired the airship and the owner took an acrobat with him, cruising about until he saw a train coming. Then he brought his dirigible around to the proper spot and

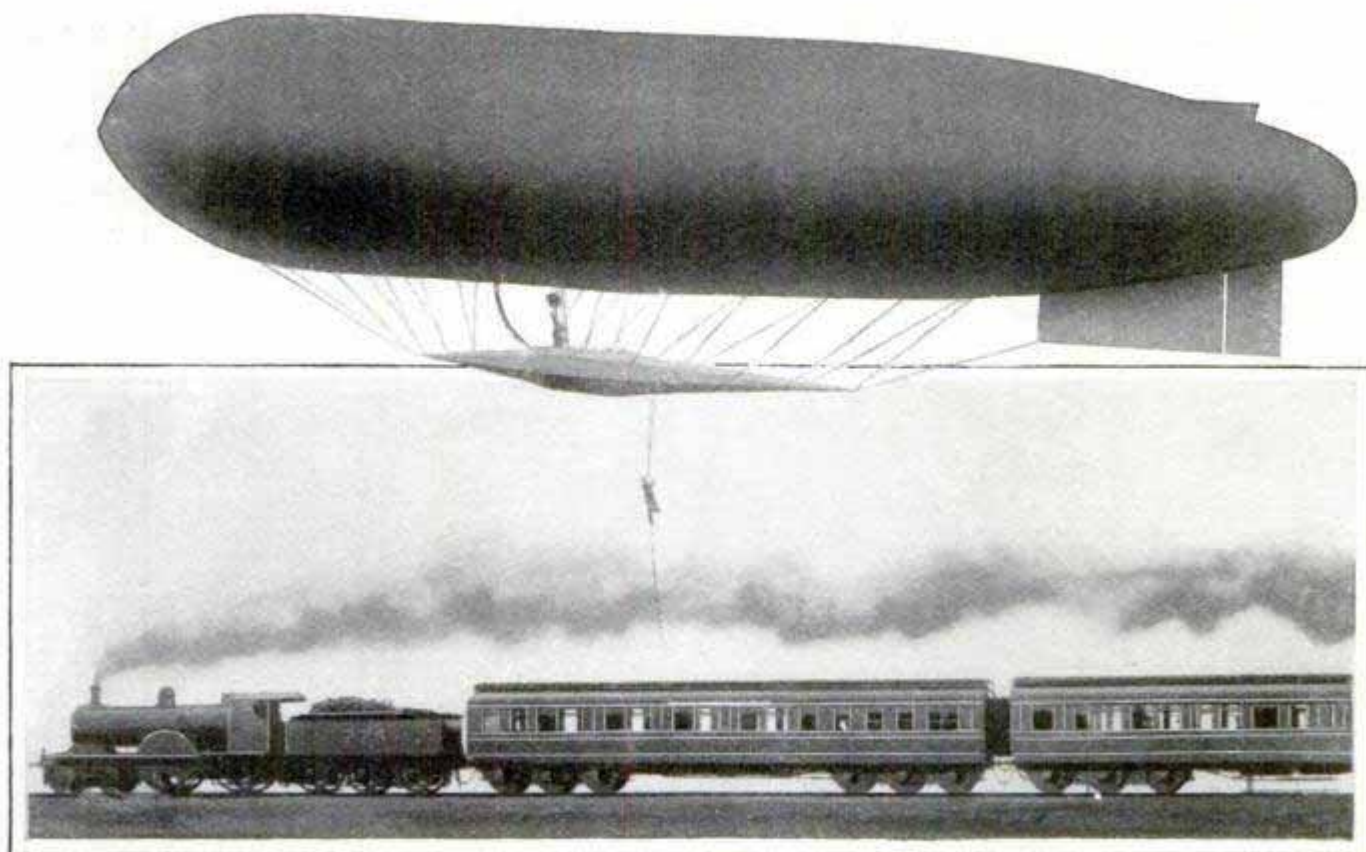


Tent Set Up,  
and Table Formed  
from the Box

Dinner Time in  
the Outing Home.  
Tent Open,  
Showing Bed



Camp Outfit  
Carried on the  
Running Board



A Real Incident in the Making of a Moving-Picture Film, Which is Only "Make-Believe" Made Possible by Cleverly Cutting Out a Gap in the Film between the Dirigible and the Train

waited for the train. The acrobat climbed down the knotted rope. Just as the train sped beneath, the moving-picture machine was started, and in a few seconds the scene was "filmed." As the dirigible owner considered it far too risky to bring the airship close down over the train, the film showed a large gap of sky between the tail of the rope and the roof of the train. So the gap was "cut out" and the film shows the man within a reasonable distance of the roof, in fact right in the steam and smoke.

The film people, not being satisfied with showing the man climbing down the rope, determined to show him actually alighting on the roof of a railway car. Unable to obtain permission from the English railway authorities to complete what they considered a good scene, they finished the film in France, where a more complaisant set of officials were found. The finished picture shows an English Hawkshaw climbing down from an English airship toward an obviously English train, and alighting on the top of an undeniably French railway carriage from a French dirigible!

Incidentally, airmen say that if a man did climb out of a dirigible and let go, the airship would shoot up to a height of several thousand feet before it could be brought under control. By turning the moving-picture shutters slowly when the picture is being taken and then turning the handle at normal speed when the film is being shown, a very slow train and an almost stationary dirigible can be made to give the effect of great speed on the screen.

### AUSTRIAN INVENTORS FIND NEW WAY TO MAKE TEETH

Machines for casting artificial teeth of various metals have been open to objection in that uniform density could not be obtained, and defects developed owing to lack of proper control of pressure. Two Austrian engineers have lately constructed a device at Prague, which, it is claimed, eliminates such defects. The pressure is automatic, always uniform, and is exerted vertically, something heretofore regarded as impossible in casting the molten metals in such small molds.

## MACHINE GUN ON ARMORED AEROPLANE

French military authorities are experimenting with the first armored army aeroplane, equipped with a



Latest Addition to the French Aerial Navy

machine gun mounted over the engine. Bullet-proof plates of hardened steel protect the working parts of the aeroplane, and a V-shaped shield screens both the gunner and the ammunition. The pilot is seated behind the gunner, and the gun is mounted high enough to eliminate any possibility of hitting the propeller when it is fired. The aeroplane itself is of unusually substantial construction, designed to withstand hard usage and to fly fast and far. The present experiments are directed toward ascertaining the influence of the gun fire upon the stability of the aeroplane, and so far the results have been satisfactory.

This Five-Masted Sailing Ship, an Uncommon Type of Vessel, is Longer Than the L-Shaped Floating Drydock on Which It has been Lifted Out of Water

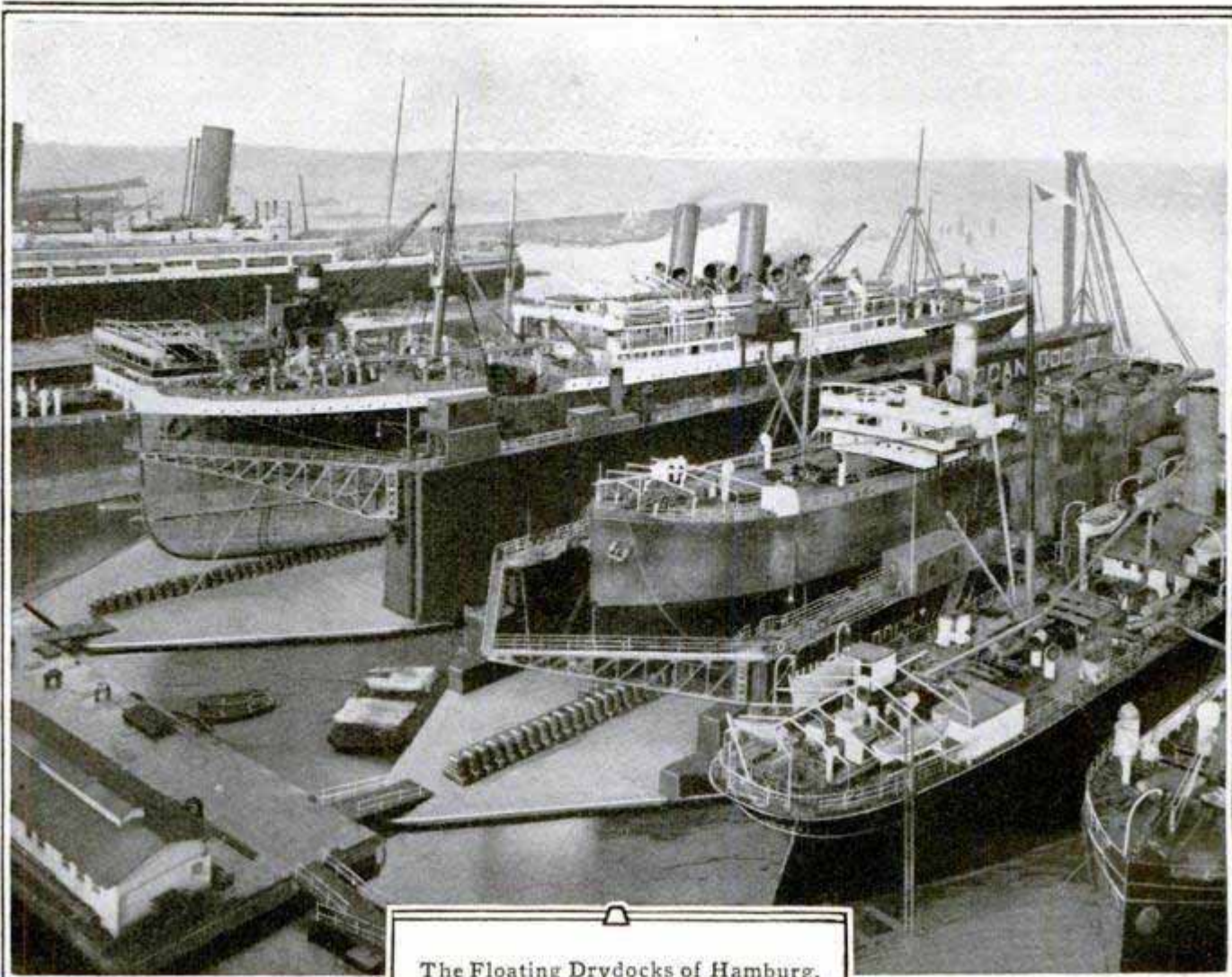
It is believed that the armored aeroplane equipped with machine guns will be the most formidable antagonist the military dirigible will have to face in the next great war.

## GREAT FLOATING DRYDOCKS IN GERMAN SHIPYARDS

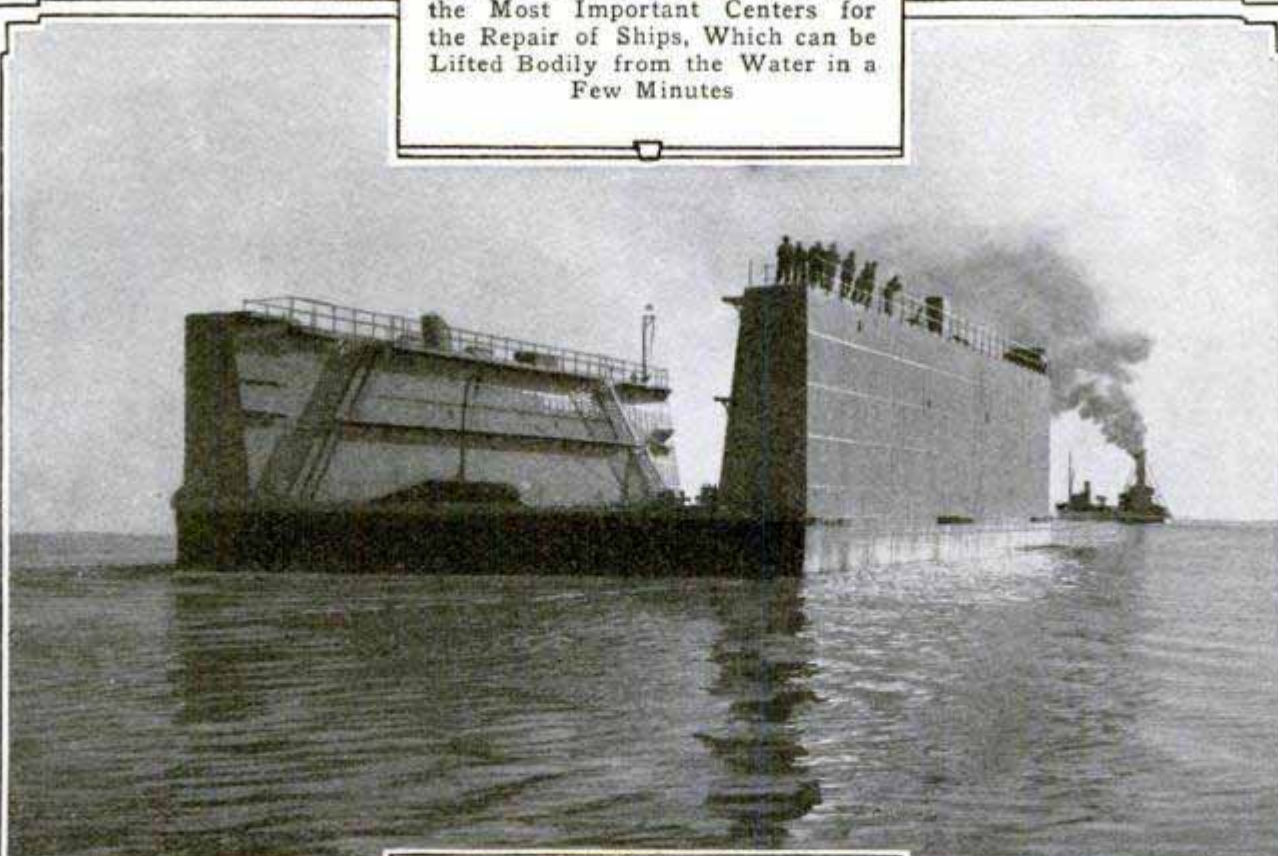
The latest floating drydocks in Hamburg Harbor show improvements in convenience and capacity over older installations. Not only is the size increasing, made necessary by the greater tonnage of the newer vessels, but the mechanical arrangements shorten the time required for docking the great vessels, and lighten the labors of the men employed in that arduous occupation.

These docks are of two designs, the "L" and the "U" types, as they are called, both of which have the decided advantage of permitting the docking of ships whose length greatly exceeds that of the dock. For instance, in a 280-ft. dock, the Hamburg steamer "Modestis" was docked, the vessel projecting 30 ft. fore and aft over the last keel blocks, while in exceptional cases





The Floating Drydocks of Hamburg, Germany, Make This Port One of the Most Important Centers for the Repair of Ships, Which can be Lifted Bodily from the Water in a Few Minutes



Towing a Section of a U-Type Floating Drydock through the Kaiser Wilhelm Canal: These Docks are Built in Separate Units in Order to Facilitate Their Transportation from Port to Port

vessels 240 ft. longer than the dock have been handled. The floating drydocks are built in two or more sections, to facilitate towing through canals when it is desired to bring them to other ports. So powerful are the pumps with which these floating docks are equipped that it is but a matter of 40 or 50 minutes after the vessel is secured in its place that the dock has lifted it out of water, in shape for overhauling. Huge traveling cranes, capable of lifting 150 tons, are mounted on the sides of the drydocks. Jib and shear cranes of enormous lifting power may be erected at either end on the sides of the docks, so that the mas-

sive machinery with which the largest vessels are now equipped may be readily handled; great propeller shafts, monster boilers and gigantic engines may be removed, overhauled and again installed.

Large as are these newest floating drydocks of the great German port, already plans are being drawn for still larger ones, and so rapidly can they be built that, keeping pace with the construction of naval and commercial dreadnoughts, adequate drydock facilities, beyond anything now known, can be provided promptly.



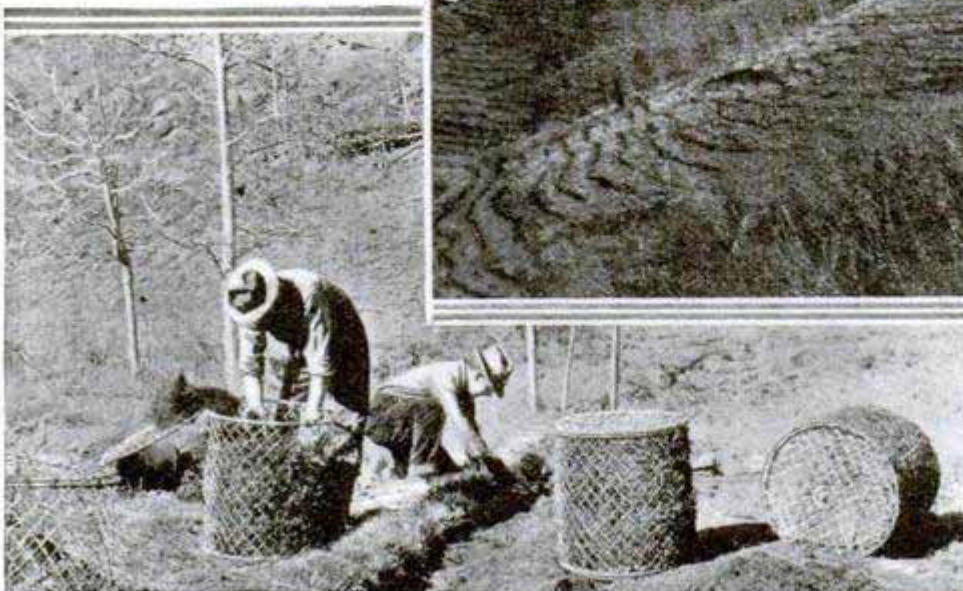
Carrying the Trees to the Planters

### REPLANTING THE FORESTS

The Forest Service of the United States, among its many activities, is engaged in replanting much timber in the national forests of the West. Near Colorado Springs, great areas were fire-swept some years ago. The soil is much eroded and a replanting scheme of considerable magnitude was projected. At Monument, a point on the mesa not far from Manitou, there is conducted a nursery. As soon as the



The Wavelike Rows in This Picture Show Where Tree Planting has been Done



Putting the Young Trees in Baskets for Transplanting



trees are ready for planting they are shipped to the forest station, where they are carefully separated, each young tree having its roots swathed in sacking. A number are then placed in wire baskets and carried on the backs of assistants up the mountain, where the individual trees are distributed to those in actual charge of the planting. The work is carefully done by expert tree planters, who cover a large area in a single day. This reforestation of Pike's Peak is the largest and most important project of the kind yet attempted by the Forest Service.

### ENGLISH BOOTBLACK HAS A STRANGE CUSTOMER

A London tailor believes that the "dummy" upon which he exhibits his latest creations should have his boots blacked regularly, and has engaged a bootblack to shine the shoes every week. The spectacle is one which attracts the attention of every American who passes while the shoes



Copyrighted by International News Service  
Bootblack's Odd Customer Takes Weekly Shine

are being polished. A clerk holds the dummy upright while the bootblack performs the necessary operations.

### MEXICAN LOOKOUT TOWER FOILS WATER THIEVES

A short distance southeast of Mexicali, Mexico, an irrigation ditch brings the water to reclaim half a million



Irrigation Ditch Guarded by Mexican Soldier

acres of the Imperial Valley. The water is taken from the Colorado River, on the Mexican side, and brought into California for use. Unscrupulous persons have been tempted to cut the dikes at night, or throw open gates, by which means great quantities of water might be diverted to other lands. The protection of this ditch falls upon the Mexican company which was formed in conjunction with the American corporation at the beginning of the project, and in order that water thieving may be reduced as far as possible, a watch tower has been built at the point where the water is measured out to the American company. This lookout tower is built of poles, thatched with arrow weed, and interwoven cane stalks form the sides. A notched log forms the stairway, and a uniformed Mexican guard stands in the doorway.

A toll road 20 miles long and costing \$5,000 to the mile has just been completed in Texas.

## SLIDING DOWN A MOUNTAIN NEW ALPINE SPORT

The latest Alpine sport is "volplaning" down a mountain railway in a little car resembling a steamer chair. The machine, which is called an Alpine aeroplane, is built of steel tubing, the

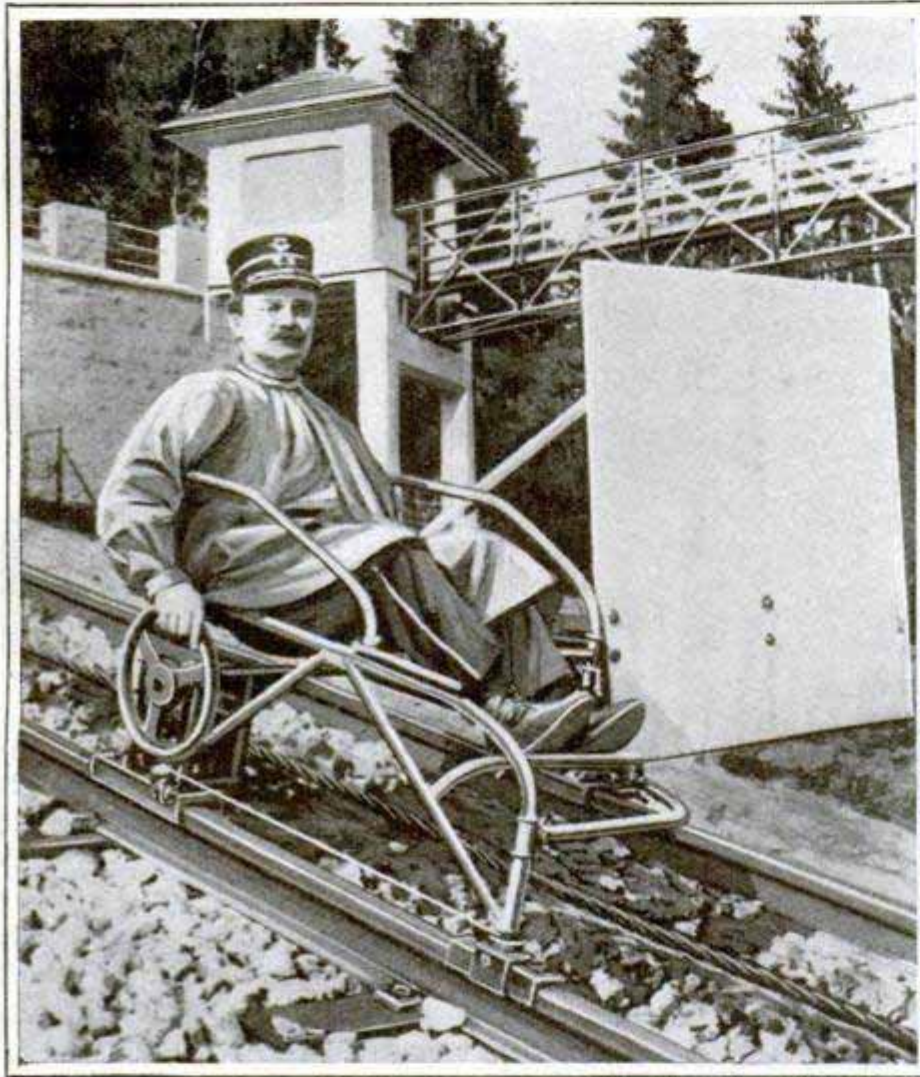


Photo by Edwin Levick

A Railroad Employee Volplaning Down an Inclined Railway

steel supports gripping the rails, and controlled by a powerful brake operated by a side wheel. In front a windbrake, consisting of a square yard of steel plate, may be used as an additional speed control. Over 80 miles an hour has been made on this contrivance, which is fast becoming popular.

¶ In replacing a railroad trestle recently burned along the north shore of Great Salt Lake, engineers found the piles perfectly sound after 43 years of service, due to the timbers being impregnated with salt from the lake.

## MEDALS THAT ARMY MEN MAY WEAR

The military decorations which may be worn by officers and enlisted men of the United States army and navy are strictly limited by orders of the War Department. Even honorary decorations presented to

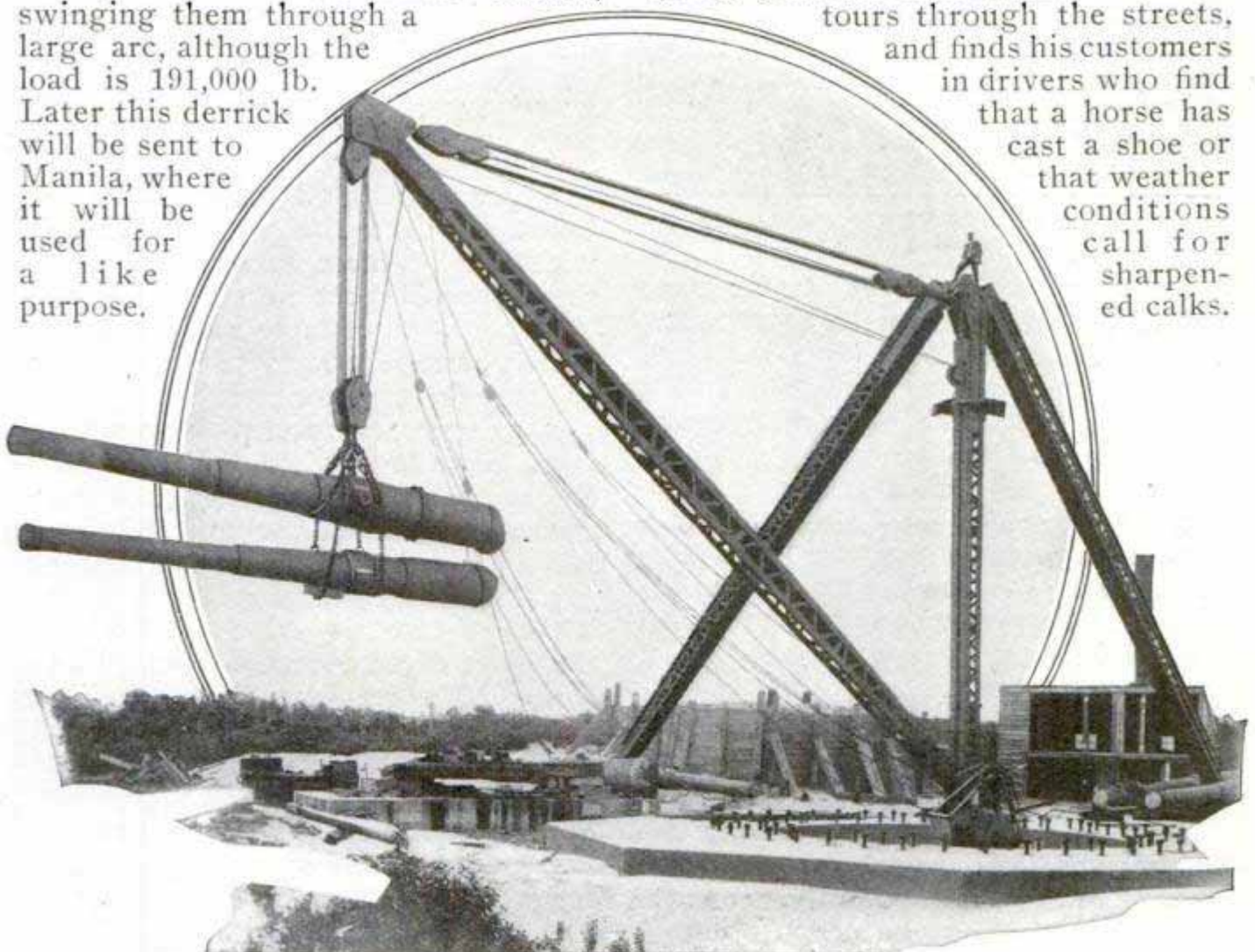
military attachés or visiting officers by foreign governments, may not be accepted nor worn except by an act of Congress. The Medal of Honor, granted for distinguished services by the authority of Congress, is the highest military decoration conferred in this country. Upon occasions of ceremony it is worn pendant from the neck, the ribbon passing between the upper and lower hooks of the coat collar, so that the medal hangs about an inch below the opening of the collar. The Certificate of Merit Badge, the medals commemorating the battle of Manila Bay, of various engagements in the West Indies, special meritorious medals for service during the war with

Spain, other than in battle, and the Philippines Congressional medal are worn on the left breast of the coat, in a certain order of precedence. Life-saving medals of gold and silver issued by the Treasury Department, as well as good-conduct medals, and such insignia as airmen's and marksmen's badges, may also be worn in uniform. The badges of military societies, such as the Grand Army of the Republic, or societies commemorative of the wars of the United States, including the Philippine Insurrection and the China Relief Expedition and of the Regular Army

and Navy Union, corps and division badges of the Civil War and of the war with Spain, as well as that of the Enlisted Men's Abstinence League, are among the permissible decorations.

### HOW THE GREAT GUNS ARE HOISTED

The huge rifle cannon which are designed to guard our coasts, to protect our harbors and to insure the workings of the Panama Canal in time of war, are of enormous weight, and placing them in position is no easy task. To handle these mammoth pieces, the derrick shown in the accompanying illustration has been built. Weighing over 80 tons, the derrick was first erected at the government proving grounds at Sandy Hook, where the guns are tested before they are dispatched to the coast fortifications for which they are designed. It lifts with ease two rifled cannon, swinging them through a large arc, although the load is 191,000 lb. Later this derrick will be sent to Manila, where it will be used for a like purpose.



Handling the Big Guns at the Government Proving Grounds

### FARRIER PLIES HIS TRADE IN PARIS STREETS

On the streets of Paris is seen a portable smithy which does a profitable



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A Street Horseshoer at Work in Paris

business during the winter. The farrier takes his tools with him on his tours through the streets, and finds his customers in drivers who find that a horse has cast a shoe or that weather conditions call for sharpened calks.

## NOVEL BRACING FOR CONCRETE FORM

When a concrete retaining wall, 34 ft. high, was to be built in San Diego, the problem of bracing it strongly without



Ingenious Idea for Temporarily Bracing Retaining Wall

interfering with street traffic was solved by an ingenious scheme. The braces are made of 2 by 6-in. clear Oregon pine, which are sunk in the ground at the street level and fastened at the top to planks, one end of which is secured to stakes driven in the ground above the cut. Ordinary bracing could not be considered in this case, owing to the narrow space allotted. The wall when completed will be 700 ft. long.

## BUREAU OF STANDARDS TO TEST WATCHES

Regular testing of watches for the public was inaugurated by the U. S. Bureau of Standards recently, thus taking up the testing and certification of watches in a similar manner to that

carried on in the Kew observatory in England, the Besancon observatory in France and the Geneva and Neuchâtel observatories in Switzerland. Preliminary tests upon the various types and makes of American watches have already been made, the results of which have been the modification of European testing methods, and the establishment of certain standards of tolerances for practical service. The possession of a government certificate will enable the owner of a "certified watch" to know that he has a time-piece which conforms to the average and reasonable performances of high-grade adjusted watches. The fees for tests will merely cover the actual cost of the trials.

## CONVERTIBLE TOOL HAS MANY USES

Twenty-two different implements may be constructed from the units of a combination tool recently invented by an Englishman. It is so constructed that it can be changed and interchanged quickly for service in mining, hunting, farming, camping, scouting, and practically all outdoor occupations. In fact, the pioneer equipped with one of these instruments has a regular tool chest in small compass. The parts are simple and easily renewed or repaired, and the absence of any weak or intricate parts, nuts, springs or screws to break or get lost is of advantage when far from cities or towns. Weighing less than 5 lb., constructed of tool steel and aluminum, and equipped with an insulating cover of soft rubber for use in handling live wires, the tool is found of service in the most diverse occupations. In the hands of a soldier, it may be used either for offense or defense; it may be used to chop down trees, dig trenches, cut, tighten or twist wire, even when the latter carries an electric current of high voltage, or as a screwdriver, pliers or can opener, as nail puller, nut key or wrench, spanner, pickax, or foot rule.



Shoeing a Horse



Used as a Cutter for Fence Wire



Practical Can Opener



As a Weapon of Offense and Defense



The Reversible Blade Makes an Adz

Tool of a Score of Uses and How It is Carried



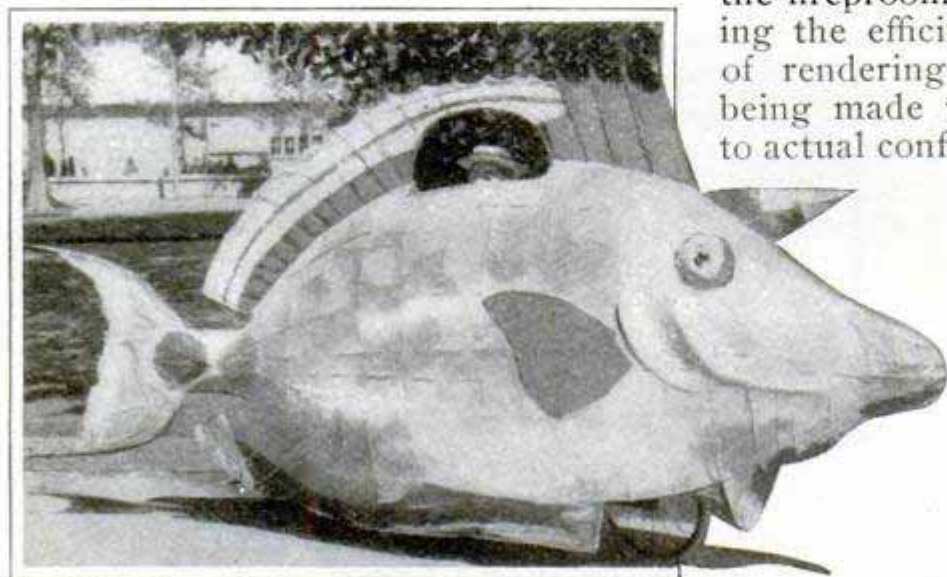
As a File



New English Combination Tool in Use as a Trench Digger and Shield

## BICYCLE FISH SEEN IN HAWAII

One of the curious floats seen in the parade during the floral festival in Hawaii recently was a canvas affair,



Novel Painted Float for Parade

brilliantly painted to represent one of the varieties of brightly colored fishes which abound in the waters about that island. The means of locomotion was an ordinary bicycle, as may be observed upon closely examining the picture. The head of the rider protrudes from a hole in the top.

## GOVERNMENT EXPERTS SEEK FIREPROOF SHINGLES

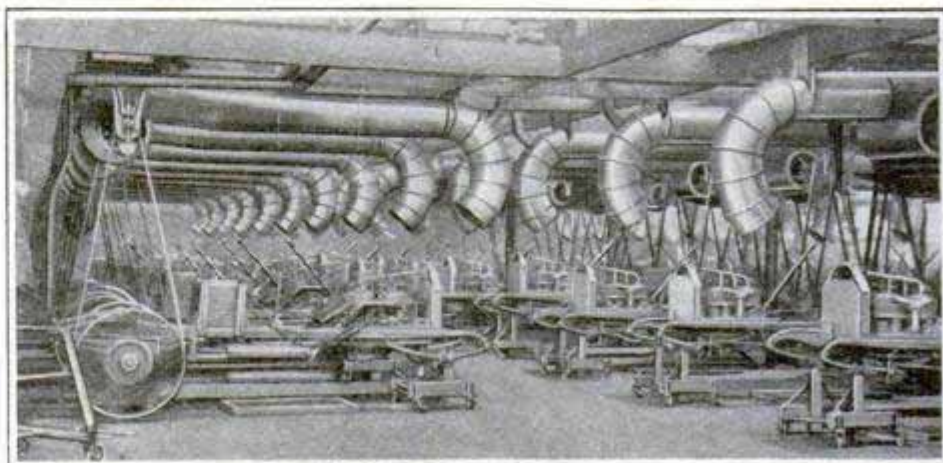
At the Forest Products laboratory in Madison, Wis., experts of the Department of Agriculture are studying the fireproofing of wood. Tests showing the efficiency of various methods of rendering wood fire-resistant are being made under conditions as near to actual conflagrations as possible. An electric furnace is used, with a pilot flame of gas to simulate conditions usually existing in a fire. Woods of different kinds are dried, weighed, impregnated with metallic salts, and subjected to rigid tests in these investigations. Just now the work is being directed toward

rendering shingles fireproof. While it is comparatively easy to force ammonia sulphate and ammonia phosphate into a shingle, rendering it very resistant to fire, the problem is complicated by the fact that shingles so treated must be exposed to sun and rain, and the salts are leached out.

## AUTOMOBILE TESTING IN A MODERN PLANT

In one large automobile factory a curious method of testing the machinery previous to putting on the bodies is used. The motor and chassis are assembled complete with the exception of the wheels. In place of the rear wheels, two large pulleys are hung on the axle, and belts are run over them up to overhead fans. Pipes from these fans are led to the front of the chassis and curved downward so that air is blown down upon

the motor, radiator and chassis. In this way the motor drives an actual load, accurately determined, similar to a road test, while at the same time it cools itself just as if it were speeding along the highway at 30 or 40 miles an hour.



Automobiles That Cool Themselves

# COMMENT AND REVIEW

**H**UMAN life is valuable—some more than others, of course—but after all the great problem is how to get the most of real worth out of life. Some do not even try; they are, in business parlance,

## *Prisons as Schools*

called "dubs." As the other extreme I know a man, a real worker, who actually begrudges every hour he is obliged to spend in sleep, because for want of time he cannot do nearly all the things he would like to accomplish. However, the men who do things in the world are those who conserve their time, and do not spend an hour at some task they can perform in twenty minutes. About the most worthless thing in human life, for years past, has been the time of a convict in our states' prisons. In spots they have been farmed out to contractors, and recently they have built some excellent roads—by far the most logical use of their time. Not all convicts, however, are qualified for that work, and little can be done on roads in winter, so at best there is a lot of time going to waste.

Prisons and jails have been considered schools of crime, but the warden of the state penitentiary of Nebraska is trying to make his place a school in which to learn useful knowledge. A correspondence course has been established there, the studies including all the regular University of Nebraska educational extension work and all the common-school branches. The university remits all fees and gives regular credits for examinations. The experiment is promising thus far, and, in view of the splendid record of correspondence schools generally, Warden Fenton has every reason to believe results will fully justify his expectations.



**F**OR several years past airmen have hopefully looked to "next year" as the one in which the Atlantic Ocean would be crossed in a vehicle of the air. Each year has brought its disappointment;

## *Via Air to Europe*

and while the feat will undoubtedly be accomplished some day, it seems unlikely that 1914 will be able to credit that milestone to its records. In some respects the event seems even farther off than three years ago. While experienced explorers are at this moment battling with untried routes in the Antarctic, none of them has either a dirigible or aeroplane in his outfit. They have air-propelled sledges, but no air craft.

To the layman the dirigible, though slower in its movement than a plane vehicle, seemed the more likely to succeed; but the destruction of the *Vaniman* and several Zeppelins in mid-air has made him skeptical. At present the only suitable gas for the purpose is hydrogen, the explosive dangers of which are well known. It has even been questioned whether a dirigible may not, under conditions of very cold, dry air, by its own passage generate something in the nature of the pale blue flame sometimes seen in cold weather on fast-

moving belts. In which case a very small spark and a very minute gas leak would be as efficiently deadly as a thunderbolt. In aeroplanes, construction is stronger than three years ago, the power is greater and much more dependable, and long-flight records have been made. The Mediterranean has been spanned in flight; mountains with their great variety of atmospheric conditions have been crossed. However, as yet no airman has made a flight of 1,700 consecutive miles over water. To the innocent bystander, who is not supposed to know anything about flying, it would seem sensible, though commonplace, for some one to fly his machine 1,700 consecutive miles over some inland water, like Lake Erie, for example, before casting off the dock lines on a trip across the big pond.

In the opinion of Sir Hiram Maxim, the dirigible, in war at least, is a failure. He says: "We have come to the end of our tether in dirigible balloons; they are useless and practically impossible. It is nothing less than madness to sacrifice any more lives and treasure in attempting what is manifestly an impossibility."

Some day a vehicle will fly the gap; it may even be perfected in time to qualify for the \$150,000 prize offered by the San Francisco Exposition for an around-the-world flight. However, the day, predicted by Kipling, when air craft landing inland will take New York as a port off the map may be considered as sufficiently remote to cause no immediate anxiety.



**T**HE Safety-First movement has now spread over the entire country, and is gaining strength steadily. People are beginning to realize that certain specially hazardous occupations are not wholly

*Safety*

*First*

fateful, and that hundreds of lives can, and already are being saved, through precautions easily taken. In a very large number of cases the result is accomplished by the workman himself; in others, by greater care on the part of those whose carelessness endangered not themselves, but some one else. We are beginning to recover from the speed mania which so long obsessed us, and to realize that the few minutes gained do not compensate for the risk involved; and that a dollar saved in faulty construction eventually costs a hundred when the crash comes. We are dull to learn; and schoolhouses, theaters and factories crushed or burned to death their hundreds, to save a few posts or the cost of a few more stairs or doors, before we learned the dreadful lesson.

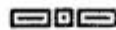
With more coal mines and miners than ever before, the safety precautions of the Bureau of Mines alone are saving as many lives as are rescued by all the life-saving crews on our entire seacoast. In many cities Safety-First Day is observed in the public schools, with addresses by experts from police and fire departments.

One of the interesting developments of the movement is the committee of one hundred, which is at work in one of our large cities. These men are carefully selected from among the leading business



and professional men of unquestioned standing, who themselves own motor cars. Their identity is known only to the appointing board. Their province is to report any flagrant violation of safe operation of automobiles and motor trucks which they personally observe. For example, a reckless driver speeds around a busy corner, missing a pedestrian by a few inches. A report is made out and sent in to the Safety Board, with details of time and place. A letter is sent the offender, politely calling attention to the offense, requesting greater care in future, and telling of the committee of one hundred. Usually this is sufficient; but if in a few days a second offense is reported, then a letter couched in stronger terms is sent, with the promise that a third offense will cause the three reports to be sent to the police department. This establishes a previous bad record if the offender is ever arrested, which seriously counts against him. Except in cases of certain absolutely reckless drivers — who sooner or later are bound to come to grief anyway — the cautionary letters, and the feeling that every car he passes may contain one of the unknown one hundred, serve to make the otherwise regardless driver much more careful. In London, when a chauffeur's license is issued, there is a space for entering a report of any previous arrest or accident which occurred to the applicant. I once saw such a license which contained a report of a collision the driver had five years previously. If he should have another accident, the police instantly get a line on his record by demanding his license, which must be carried when driving.

The above are only suggestions of perfectly simple, practical plans, which do not impose onerous restrictions or limitations on the law-abiding, but which apply the brake to the reckless.



**E**ACH year finds the farmer more of a mechanic, as machine after machine appears to take the place of the decreasing supply of manual labor. The up-to-date farm now has its machine shop and farmer machinist. The farmer complains that for five years past he has been obliged constantly to purchase new labor-saving machinery. On the other hand, had it not been for these new inventions, many would have been obliged to go out of business.

*Steam-  
Dried  
Hay*

The latest thing is steam-cured hay, which makes the farmer independent of cloudy or rainy weather in haying time. The green grass is hauled to the hay factory, unloaded at one end of the plant and, 30 minutes later, emerges at the other end perfectly cured, ready for the barn or bale press. In case of rain, a canvas cover insures arrival at the barn without wetting. The farmer has about given up his time-honored trip to the "grist mill," and here comes the hay mill. Frequent showers make good grass, but much of this is ruined in the process of sun-drying. The steam drier is independent of weather, and moreover turns out a better product, and can work nights. Maud Muller might get a job checking the loads, but there isn't very much romance about watching the steam gauge and a lot of conveyor belts.

**F**IVE years of movies among the tough districts of New York's East Side has produced a very marked improvement. This is vouched for by Frederic C. Howe, director of the People's Institute, doubtless the most cosmopolitan platform in this country, and who also is chairman of the National Board of Censors who pass on the new films. All the best film producers voluntarily submit their new films to this board for approval before allowing them to go out to the public.

*Movies  
a  
Civilizer*

The movies have brought the world to the East Side—the great world of snow-capped mountains, sparkling brooks, great trees and beautiful flowers. It may be hot and stifling in the small, crowded room next the flat roof, but even the poorest may occasionally spare five cents for an hour in which mountain and lake are brought to those who have never been to either. So, too, the works of art from every land, noble buildings, mighty steamships and other great feats of engineering; statues of the world's great men; even the notable events of their lives, in which self-sacrifice and lofty ideals are reproduced, are seen and unconsciously absorbed. The dullest cannot fail to be aroused to some small stimulation of ambition or renewed effort at the swift, graphic story of what high-minded men and women have accomplished. And through it all runs the golden thread of the better things and better life, which inevitably elevates and broadens; for in every life, however narrow, there is some chord which must respond, be it ever so slightly, when the right key is touched.

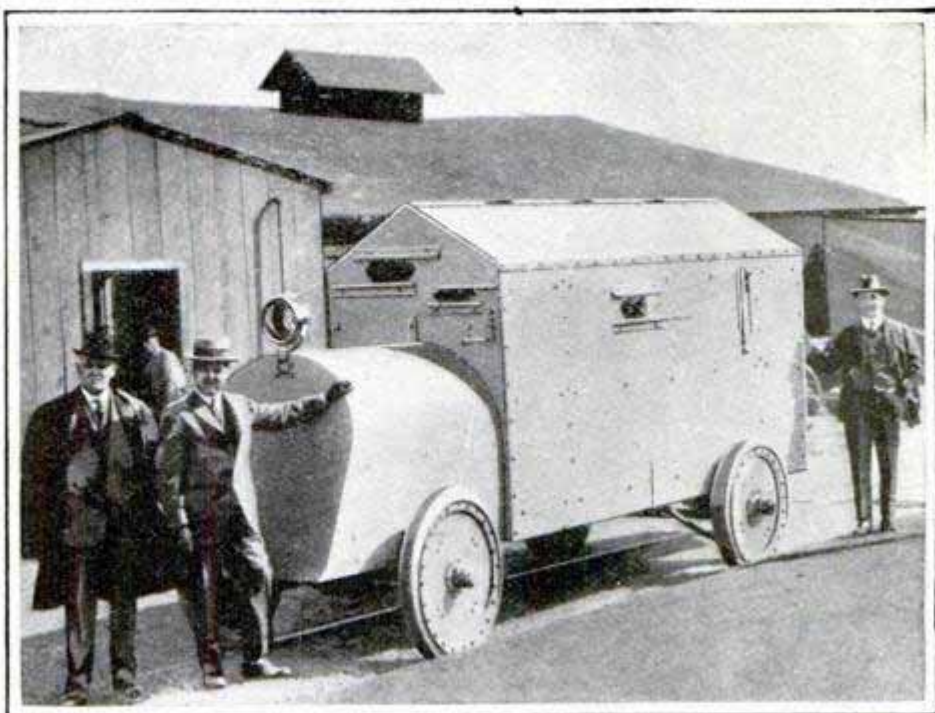
Of all the inventions, of all the ages, not oratory—the ignorant cannot comprehend it; nor music—the deaf cannot hear it, the moving picture today doubtless possesses and can exert the largest, strongest, quickest influence. With many acknowledged defects, that influence is unquestionably one for good.

H. H. WINDSOR



## ARMORED AUTOMOBILE FOR MEXICAN REBELS

An automobile of a curious type is that recently completed for the use of the "constitutionalist" army operating in northern Mexico. This car is completely protected by heavy steel plates, is provided with port-holes, and is apparently proof against everything but artillery fire. Its principal use is to be the transportation of field guns and other equipment in time of battle. It has space sufficient for seven machine guns.



Armored Automobile for Mexican Rebels: Proof against Everything but Artillery Fire

## MILITARY SALUTE FIRED AT SCENE OF DEATH

A remarkable and impressive scene occurred in England recently in connection with the funeral services of a petty officer and a signalman of the British navy, who lost their lives at their posts of duty in the great dockyard fire. The military salute, usually fired over the graves of the dead, was

in this case fired amid the charred ruins where these men met their death.



State of Dockyard after Fire

Such a procedure is unusual, although it is not an uncommon thing to fire a salute over the water in honor of officers who have lost their lives at sea.

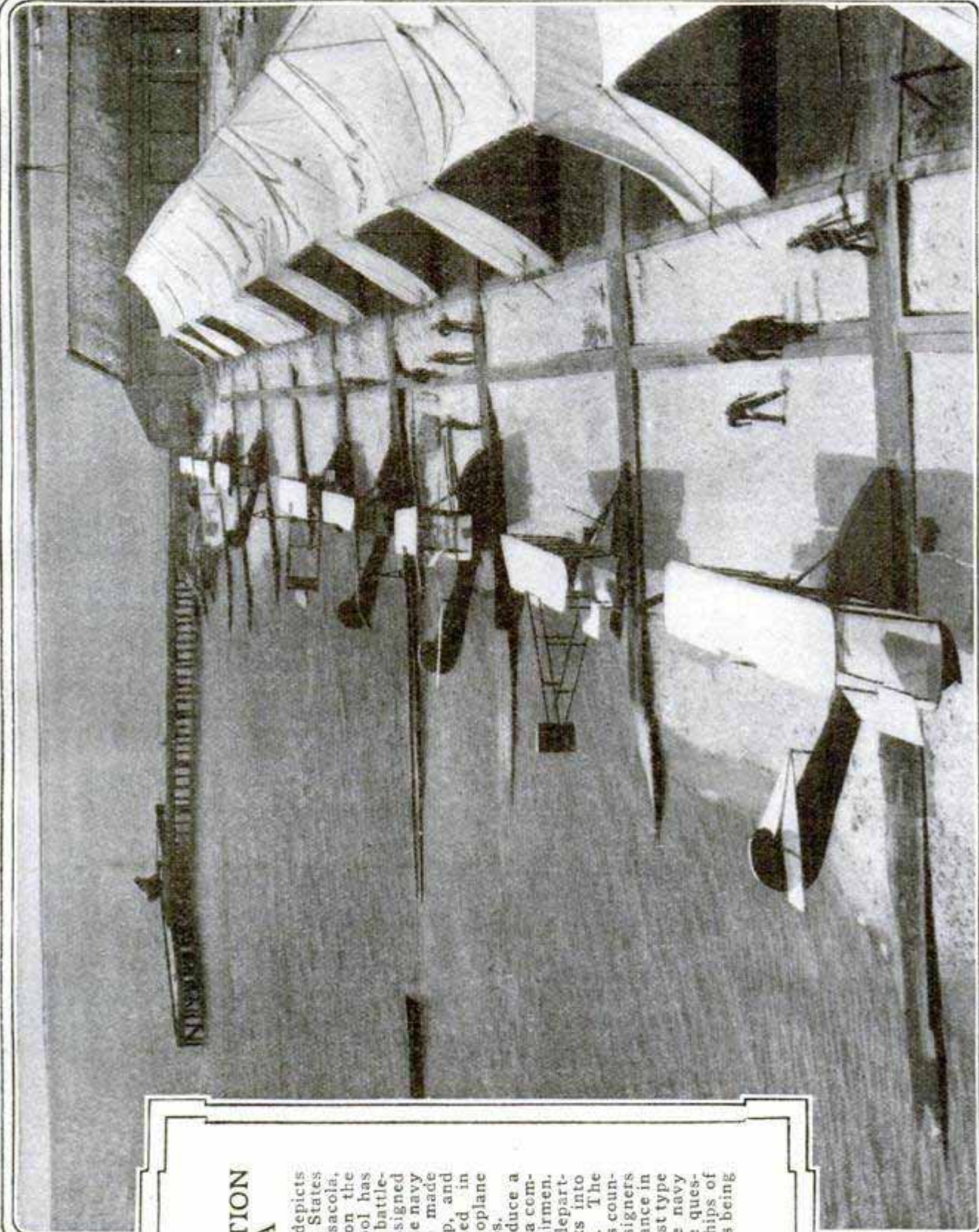
Photos by Paul Thompson

Firing Squad from British Warship "Neptune," Firing Salute in Honor of Comrades Who Lost Their Lives in Dockyard Fire

## THE NAVAL AERONAUTIC STATION AT PENSACOLA

**T**HIS picture graphically depicts the air fleet of the United States Navy in quarters at Pensacola, where hangars are ranged on the beach. A navy aviation school has been established here, and the battleship "Mississippi" has been assigned to Pensacola for the use of the navy flying men. Flights will be made from the deck of the warship, and other experiments conducted in developing the use of the aeroplane in connection with battleships.

The school will aim to produce a trained personnel and evolve a complete system of training for airmen. It will also be the aim of the department to bring outside experts into close touch with the work. The manufacture of air craft in this country is to be encouraged and designers will be given financial assistance in providing for our navy the best type of air craft obtainable. The navy now has no dirigibles, but the question of the addition of airships of this type to the naval force is being considered.



# The "LOST PORT" of NEW YORK

RUDYARD KIPLING'S *Prophetic Vision*  
of Man's Conquest of Time and Space.

[No one has visualized so graphically as Rudyard Kipling the changes that the development of aerial navigation is bound to bring about in human relations and human conceptions. Man's mastery of time and space, with which he dealt so imaginatively and convincingly in "With the Night Mail," furnished the theme of an address recently delivered by this most famous of living English writers before the Royal Geographical Society, from which the following extracts are taken.—Editor]

THE time is near when men will receive their normal impressions of a new country suddenly and in plan, not gradually and in perspective; when the most extreme distances will be brought within the compass of one week's travel; when the word "inaccessible," as applied to any given spot on the surface of the globe, will cease to have any meaning.

Naturally, so long as we travel by sea, we must embark from a port and look out for the landfalls. But the time is not far off when the traveler will know and care just as little whether he is over sea or land as we today know and care whether our steamer is over forty fathoms or the Tuscarora Deep. Then we shall hear the lost ports of New York and Bombay howling like Tarshish and Tyre. Incidentally, too, we shall change all our mental pictures of travel.

The men of the present are already scouting and reporting along the fantastic skyline of the future. Nearly all that can be accomplished by the old means of exploration has been won. The old mechanism has been scrapped; the moods and emotions that went with it must follow.

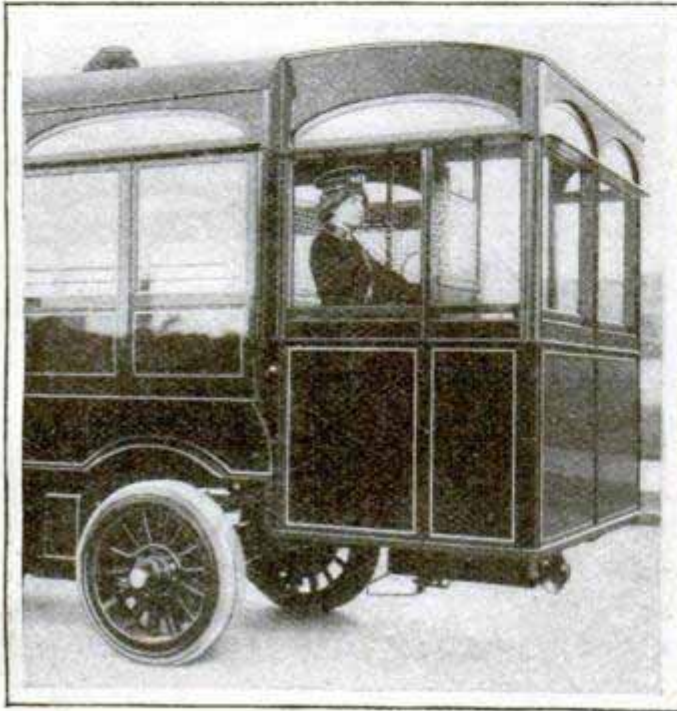
Up to the present we have been forced to move in two dimensions by the help of the three beasts of burden and a few live coals in a pot. Now we perceive that we can move in three dimensions and the possibilities of our new freedom distract and disturb us in all our relations. This is because our minds are still hobbled and knee-haltered by inherited memories of what were held to be immutable facts—distance, height and depth, separation, homesickness, the fear of accident and foul weather.

Month by month the earth shrinks actually and, what is more important, in imagination. For the moment, but only for the moment, the new machines are outstripping mankind. We have cut down enormously, we shall cut down inconceivably, the world's conception of time and space, which is the big flywheel of the world's progress. What wonder that the great world-engine which we call civilization should race and heat a little!

Only the spirit of man carries on unaltered and unappeasable. There will arise—they are shaping themselves even now—risks to be met, as cruel as any that Hudson or Scott faced; dreams, as worldwide as those Columbus or Cecil Rhodes dreamed, to be made good or to die for; and decisions to be taken, as splendidly terrible as that which Drake clinched by Magellan or Oates a little farther south. There is no break in the line, no loads are missing. The men of the present have begun the discovery of the new world with the same devoutly careless passion as their predecessors completed the discovery of the old.

## NEW ELECTRIC BUS PROPOSED

Designs have been accepted and a full-sized model made of an electric motor bus, to run on the streets of



New Motor Bus for Residence Districts of New York

New York not covered by street-car lines. The body is of the semiconvertible type, with comfortable seats. Storage batteries give light, heat and power. The car is a "pay-as-you-enter" style, and it is proposed to have young women in uniform to take up the nickels, for the motor-bus line is to be operated on a five-cent basis. Routes are proposed throughout residence districts, where the noise and dirt of street-car traffic would be objectionable.

## TRANSATLANTIC FLIER TO HAVE SILK WINGS

Silk instead of canvas will be used in the covering of the planes of the flying boat which Glenn Curtiss is building to try for the Lord Northcliffe prize for a flight from Newfoundland to Ireland this summer. The silk will be coated with a preparation similar to collodion. The saving in weight will be 20 lb. As gasoline weighs 6.15 lb. a gallon, this will enable the machine to fly nearly 25 miles

farther, for it is calculated that each gallon will carry the craft eight miles. The flying boat will be painted a bright red, to make it conspicuous, so that captains of ocean liners, who will constantly be on lookout, may be able to make it out at the greatest possible distance, either in the air or on the water. Trial flights will be made at Hammondsport, N. Y., for a month, and the machine will then be sent to Newfoundland, where after a careful "tuning up" it will be prepared to make the attempt as soon as weather conditions are favorable.

## OUTSIDE WINDOW BOXES OF METAL

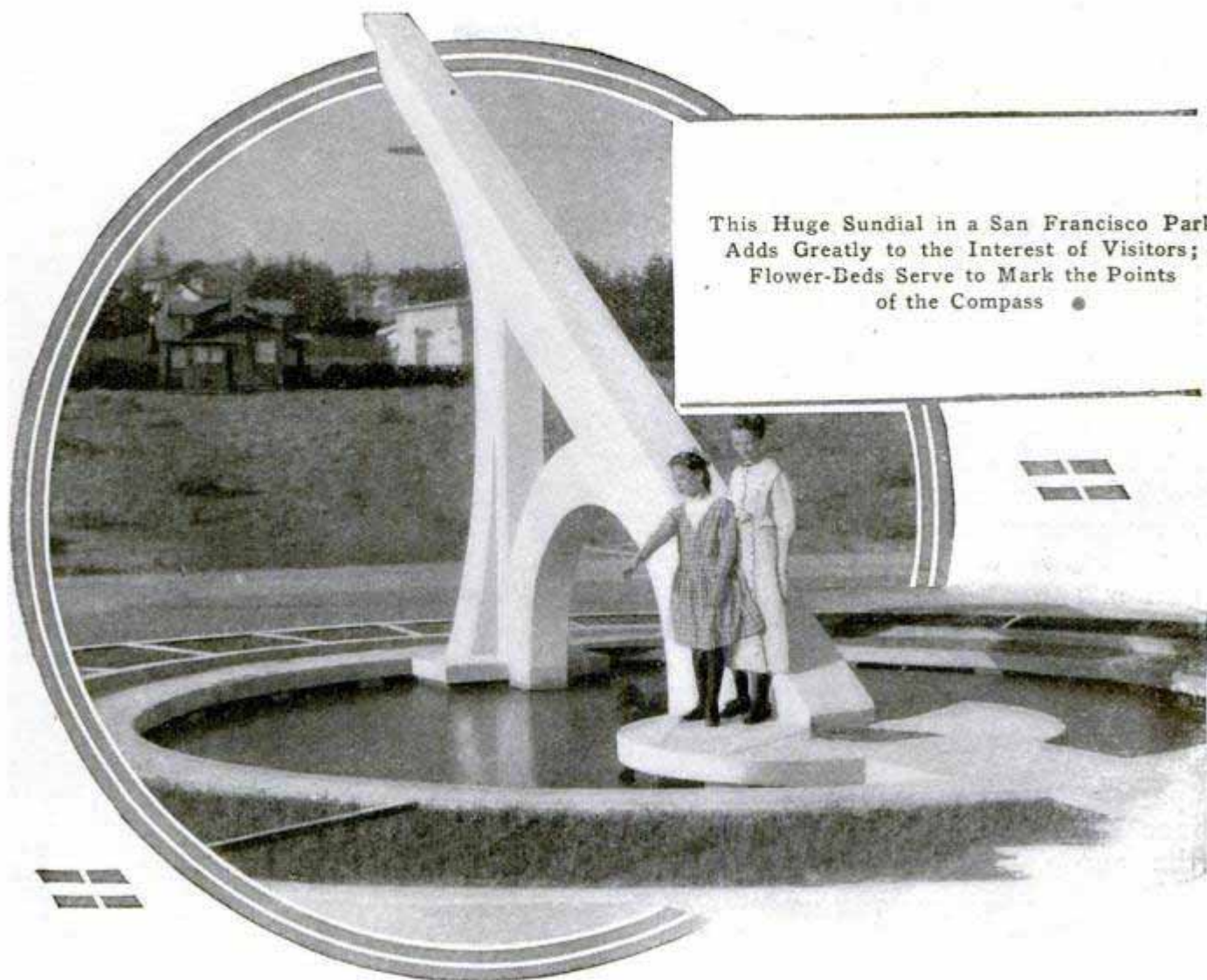
Metal window-sill boxes for kitchens that have no pantries and for homes that have no gardens have been put on the market. They are made of flat galvanized wire and can be screwed to the window frame in a moment. During the winter such a box can be



A Metal Substitute for Wooden Window Boxes

used as an outdoor refrigerator and during the summer a few flower pots placed in it make a garden outside the window.

## LARGE SUNDIAL MARKS TIME OF DAY IN PARK



This Huge Sundial in a San Francisco Park Adds Greatly to the Interest of Visitors; Flower-Beds Serve to Mark the Points of the Compass ●

In one of the San Francisco parks a sundial of unusual size attracts attention. The park itself is 150 ft. in diameter, and within, the sundial is 34 ft. across. The gnomon, or index, of the dial, which by its shadow shows the time, is 28 ft. long; the Roman numerals are 4 ft. long. The points of the compass are indicated by initials

in flowers on a closely cropped lawn. Intermediate with these are symbolical columns representing Childhood, Spring and Morning; Youth, Summer and Noon; Manhood, Afternoon and Autumn, and Old Age, Winter and Night. Bronze vases adorn the tops of these columns, and convenient seats of concrete provide resting places.

### GIGANTIC RUBBER TREE IN BOLIVIA

What is probably the largest rubber tree in the world exists in Bolivia, near the frontier of Acre. It is 27 ft. in circumference at the base and towers upward to a vast height. Its recorded yield for 120 days averaged 22 lb. a day, which, at the current price for gum, represents more than \$2,160 per

annum. When it is remembered that, usually, rubber trees do not exceed from 10 to 15 ft. in circumference, while many varieties grow no larger than 8 ft. around, this veritable giant of the forest is a rare exception. The superintendent of the plantation upon which this tree is growing is making a study of the soil, in the hope that he may be able to stimulate the growth of other rubber trees under his supervision.

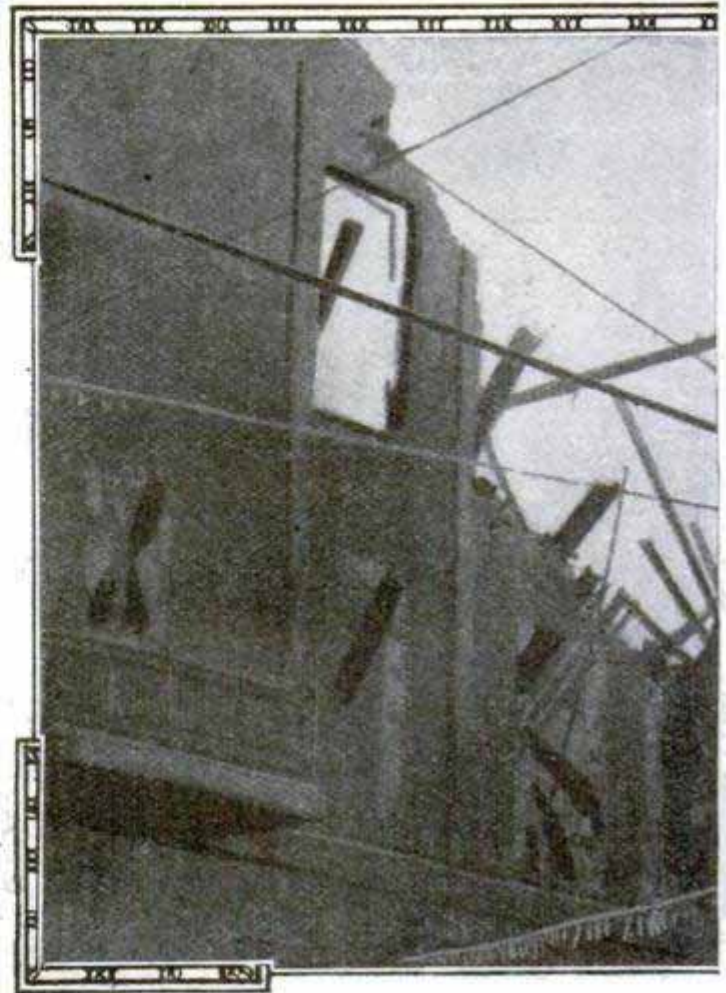
## RECORD-MAKING FLIGHTS BY RUSSIAN BIPLANE

An enormous biplane made by the Russian builder, Sikorsky, has succeeded in making a flight of 18 minutes' duration with 16 passengers on board, the weight of the passengers and crew carried in this remarkable flight being 2,640 lb. Even more sensational was a cross-country flight made by the same machine when it had the pilot and eight passengers on board and maintained an average height of 3,000 ft. for a period of 2 hr. 6 min. This establishes a record both for duration and altitude for an aeroplane carrying nine persons. This machine is of peculiar construction and is similar to the first one of its type, described in the November, 1913, number of this magazine. The span of the upper plane is 114 ft., while the fore-and-aft length of the aeroplane is 62 ft. The wings are spaced 9 ft. apart and have a total supporting surface of 1,820 sq. ft. The weight of the aeroplane when empty is 8,250 lb. It is fitted with four motors of 100 hp. each, and provision is made for installing a fifth motor if desired.

## MOTORCYCLE SAVES AFRICAN EXPLORERS

When the rear axle of their automobile was damaged, a party of Englishmen who are exploring the dark continent from the Cape to Cairo were saved from disaster through the possession of a motorcycle. One of the party, mounting the "single-tracker," started backward over the jungle paths for an outpost of civilization, where repairs could be obtained, eventually returning in triumph with the necessary parts. The party is equipped, in addition to usual supplies, with a motion-picture machine, with which to record events of special interest.

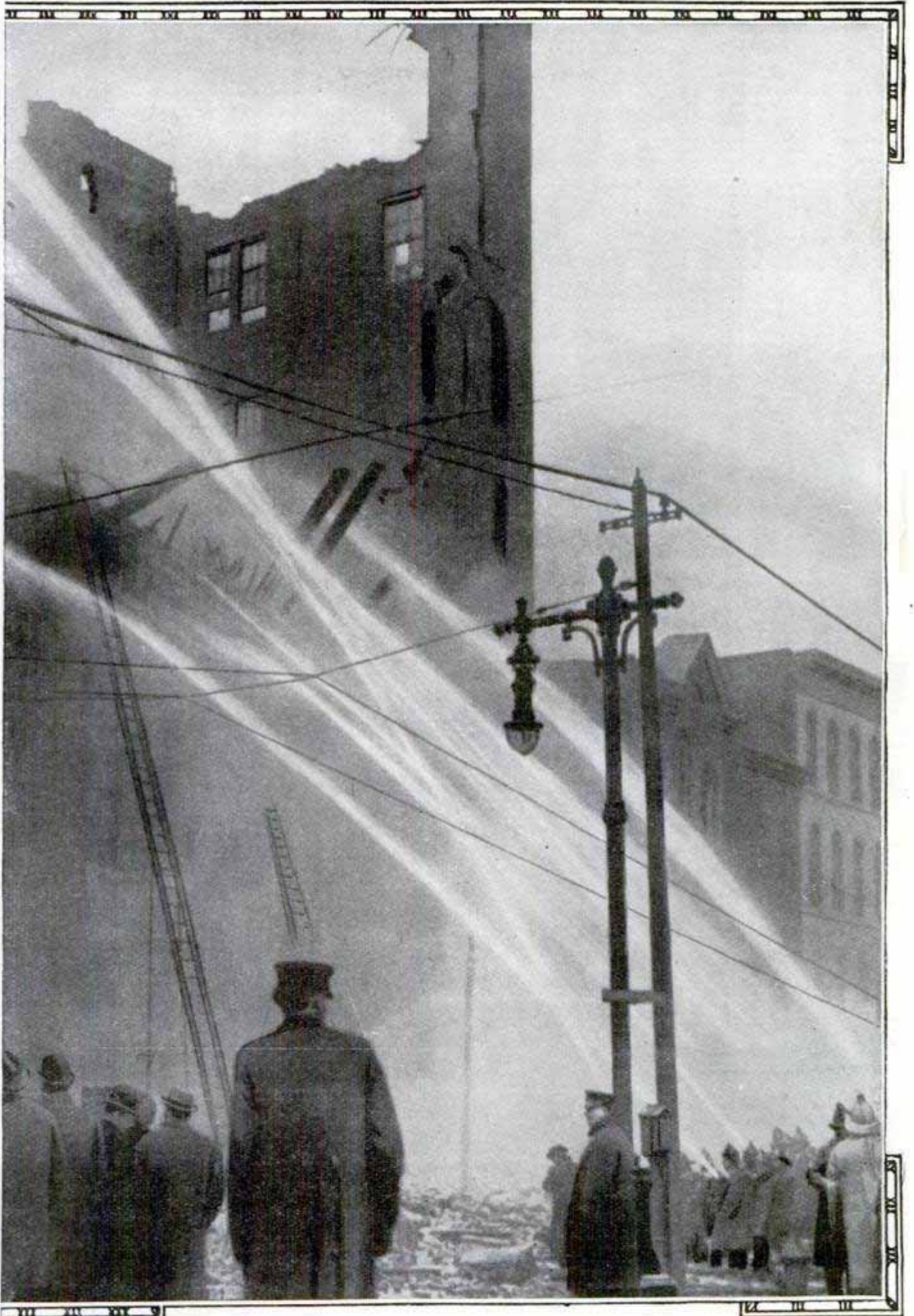
CA motor cargo boat with a capacity of 70 tons is in service on the Leeds Canal, England.



## LIVES LOST IN SPECTACULAR NIGHT FIRE

Early on the morning of March 9, fire was discovered on the third floor of the Missouri Athletic Club, St. Louis. Despite the efforts of the firemen, the entire building was destroyed, and many lives were lost. The first floor was occupied by the Boatmen's Bank, while the upper floors, originally intended for commercial purposes, had been reconstructed for club use. Here nearly a hundred members were asleep when the fire broke out. So rapid was the spread of the flames that many perished in their rooms. Others, jumping from the upper floors, were dashed to death upon the pavement beneath. Thirty-seven are believed to have died in the disaster. A week later, one of the walls collapsed while a crowd watched the workmen exploring the ruins for the dead, and one man was killed beneath the crashing masonry, and 20 more injured. The accompanying view is from a photograph made the morning after the fire.

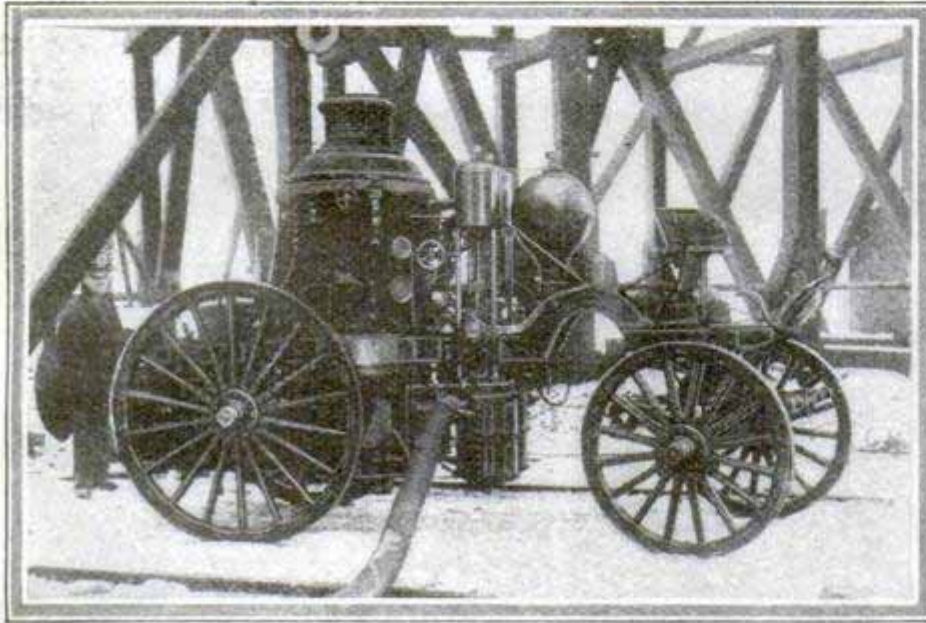




The Burning of the Missouri Athletic Club, St. Louis, in Which Thirty-Seven Lives were Lost

## FIRE ENGINE MAKES LONG PUMPING RECORD

A fire in one of the great coal docks at Superior, Wis., proved to be a stubborn one. A fire engine made a



Engine Which Pumped Water on One Fire for Three Months

remarkable record for continuous performance in playing upon this fire, when it pumped from Nov. 18, 1913, until Feb. 18, 1914, just three months, shutting down but five times for repairs. The grates burned out, which caused one of the stops; broken valve springs required three stops, and a broken piston follower was the cause of the other shutdown. Repairs, however, were quickly made, and, as compared with the total length of run, did not amount to anything. The same engine made another long run in 1912 at a similar fire.

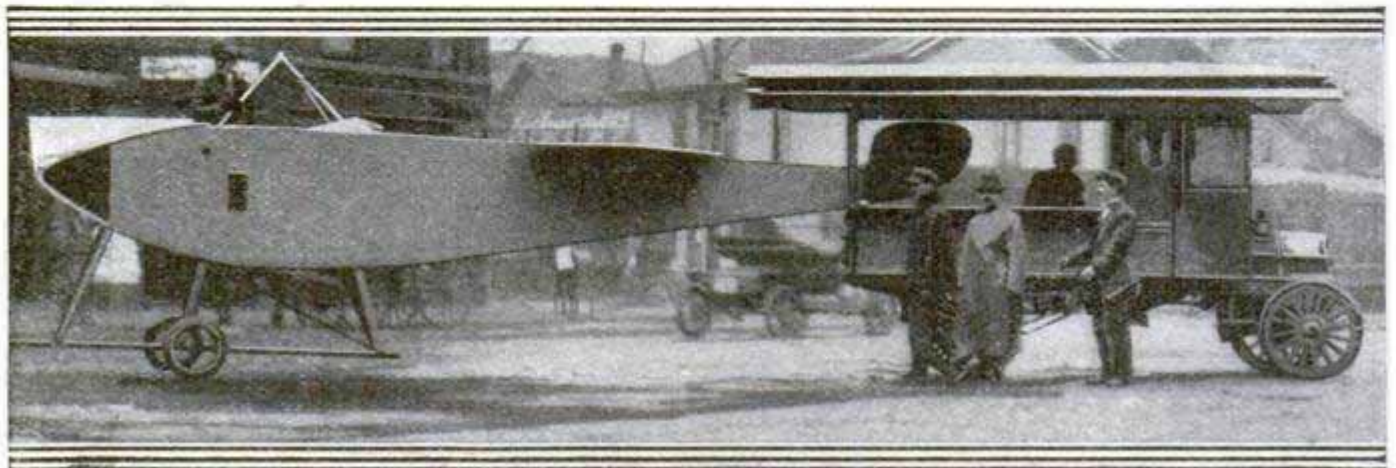
## ABANDON THE SUNKEN SUBMARINE "A 7"

The British Admiralty having decided to abandon further efforts to raise the submarine "A 7," which failed to rise when maneuvering on January 16, last, funeral services were held over the spot in Whitsand Bay in the English Channel, where the unfortunate vessel lies submerged in 23 fathoms of water. A procession of ships left Devonport Harbor with flags at half-mast. When the buoy which marked the scene of the disappearance of the "A 7" was reached, the funeral service was read for the 11 men who perished in the

disaster, volleys were fired over the water by the marine guard, and a wreath of flowers was cast over the side of the ship by the little son of one of the engineer officers who died in the ill-fated vessel.

## HAUL AEROPLANE THROUGH CITY STREETS

An unusual spectacle was presented when a truck was seen hauling an aeroplane through the streets of Chicago. The plane was dismembered, the broad wings having been removed



An Aeroplane being Towed by an Automobile is an Unusual Sight in a Busy City Street

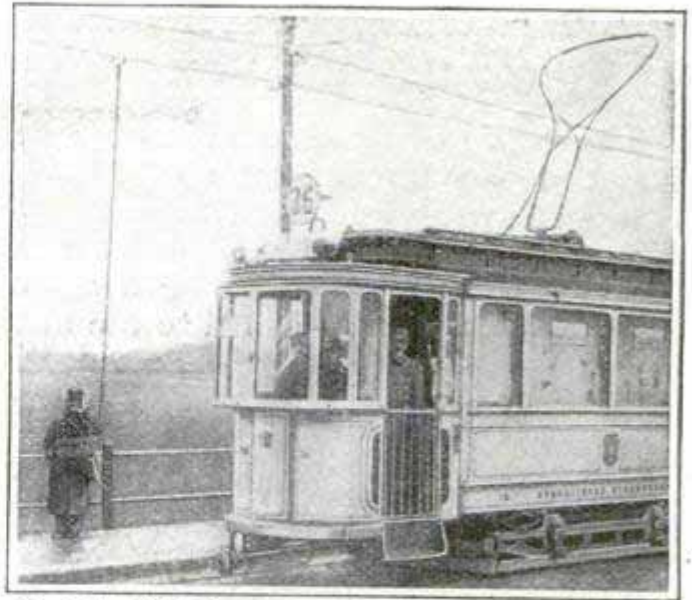
and the propeller taken off and carried in the truck. The rear end of the plane was placed in the truck and carefully fastened. The weight of the flying machine was borne upon its two small rubber-tired wheels, and a passenger rode in the pilot's seat during the trip across town.

### HOW FAR A MAN CAN SEE DISTINCTLY

Some interesting experiments have been made in the German army with the object of discovering at what distance the recognition of one soldier by another is reliable. For soldiers with good eyes it was found that a person seen once before could be recognized at a distance of 80 ft., while an acquaintance could be recognized at a distance of 300 ft., and an intimate friend or relative, at a distance of 500 ft. The various parts of a man's body can be distinguished and any decided movement can be detected by an expert rifleman at a distance of 300 ft. At 1,800 ft. a man appears as a spot on the landscape and cannot usually be seen if he keeps still or if his dress does not contrast with the background. Sailors, hunters and farmers can usually see twice these distances, probably on account of their constant training in making out the nature of distant objects.

### TRAFFIC TELEPHONE USED IN GERMANY

An electric street railway in Frankfurt-on-the-Main has recently supplied its lines with a portable telephone to enable the conductors or motormen to report troubles directly to the main office. The telephone is of ordinary construction, but the connection has novel features. A long pole, equipped with uninsulated hooks, is carried on the car, and when connection is desired the pole is taken out and hung on the telephone wires at the side of the track. The battery case and phone is so constructed that it may be easily carried during conversation, straps be-

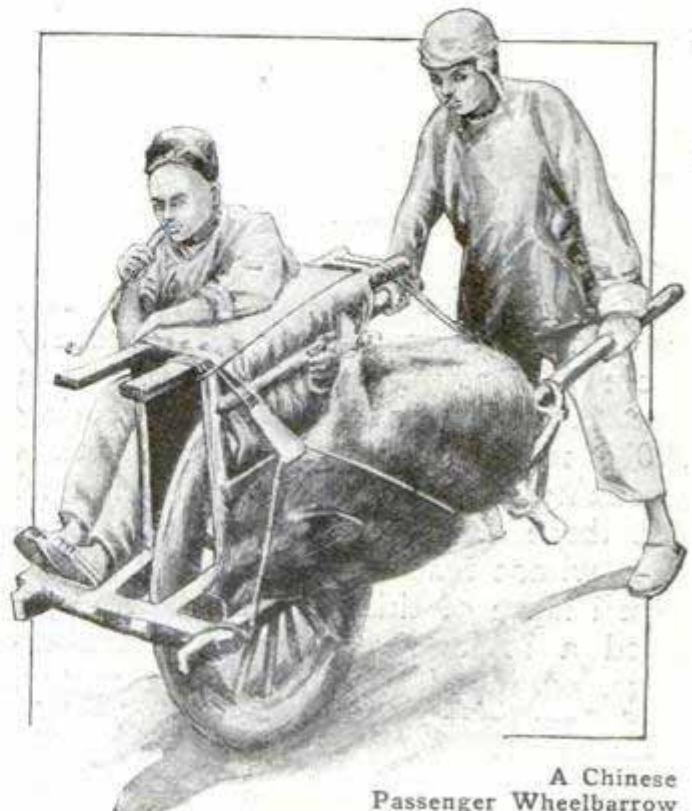


Portable Telephone-Connection Apparatus Used on German Street-Railway System

ing provided for suspending the apparatus over the shoulder.

### ODD CHINESE WHEELBARROW HAULS BIG LOAD

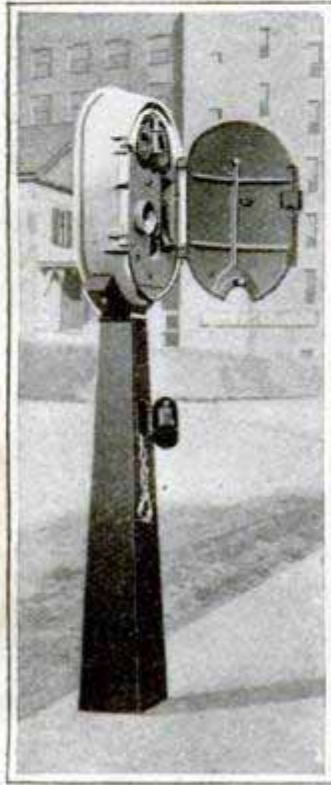
A barrow with a wheel as big as that used on a wagon is used in some parts of China, and loads of considerable weight are hauled upon it. The box or bed of the barrow is divided, so that the wheel occupies the central space, the load being piled or fastened on either side. Such well-balanced loads as that shown in the illustration are not uncommon.



A Chinese Passenger Wheelbarrow

## LIGHT CALLS POLICEMAN TO PATROL BOX

The police of Brockton, Mass., have installed an ingenious signal box equipped with an electric light by which a patrolman may be called to the box by the central office and information given quickly regarding suspects who may be in his vicinity. Beneath the main box is a small compartment, opened by a push button, containing a pair of handcuffs securely chained to the post. These are used when a prisoner becomes unmanageable, or when



two persons are arrested and one escapes. By hitching one to the post the patrolman is able to pursue the other, and often to capture him. The box was invented and is patented by the electrician of the Brockton Police Department.

## GERMAN AIRMAN SETS NEW LONG-FLIGHT RECORD

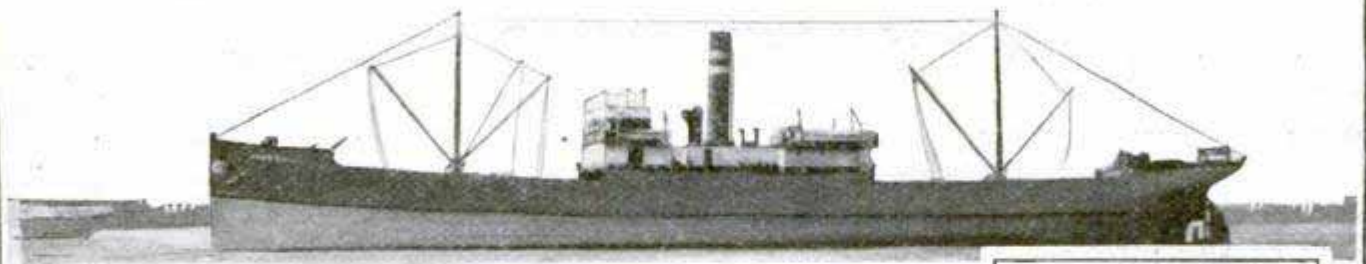
Maintaining an average speed of nearly 65 miles an hour, Karl Ingold, a German airman, flew continuously from 7:35 a. m. until 11:55 p. m. on the 7th of February, 1914, covering 1,056 miles in 16 hr. 20 min., thus breaking the previous nonstop record set three days before by Bruno Langer, whose feat was mentioned in the April issue of this magazine. Langer used a biplane of German manufacture, equipped with a 100-hp. motor, and flew from Mühlhausen to Munich, several hours of his flight being made in the dark.

## SHIP CUT TO PIECES WITH OXYACETYLENE FLAME

The hull of the "Alum Chine," the British freight steamship which was destroyed by a dynamite explosion in Baltimore Harbor, as described in the May, 1913, issue of this magazine, has been raised from the bottom of the harbor, cut to pieces by means of the oxyacetylene flame, and sold for scrap.

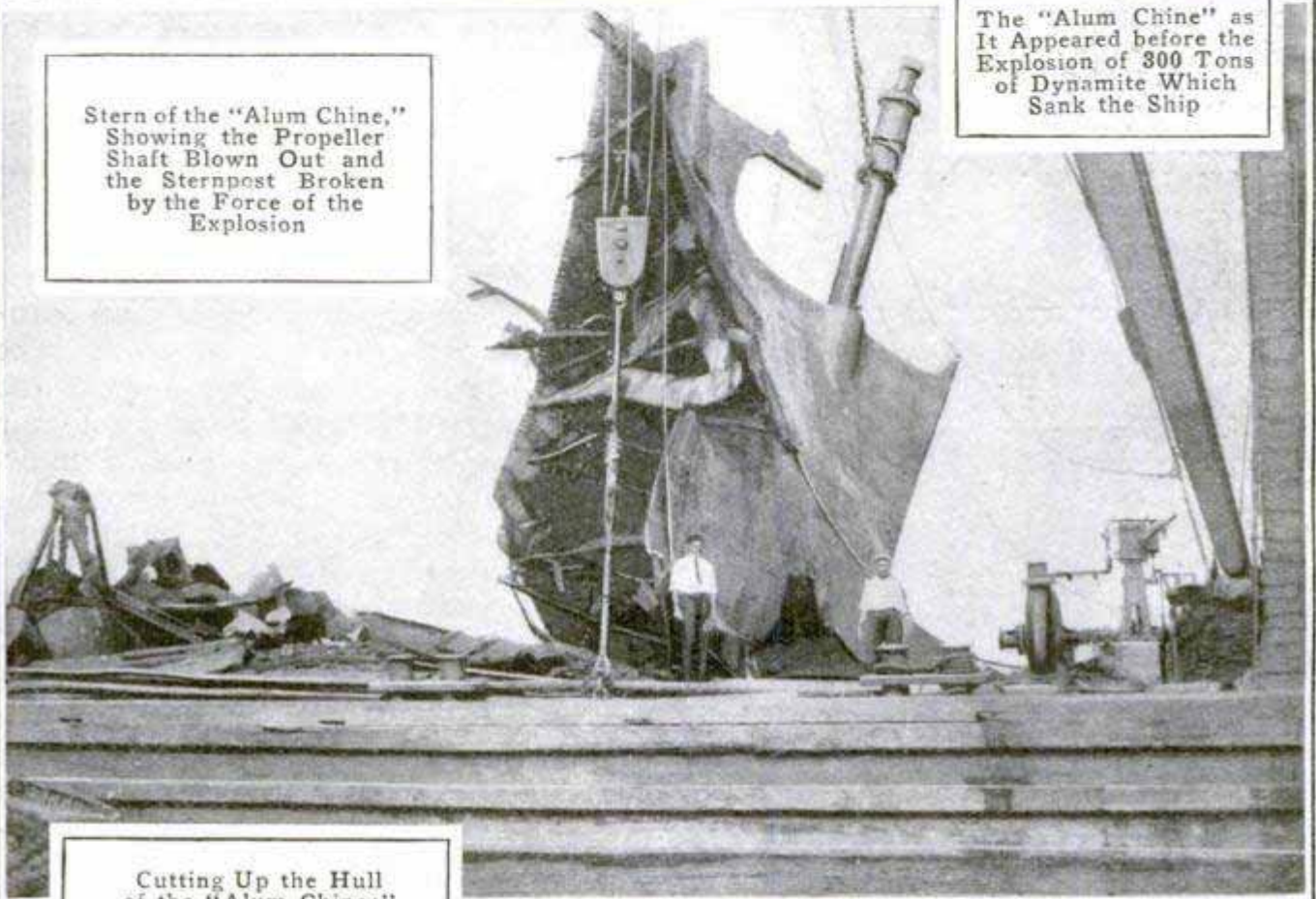
The 1,800 tons of warped and tangled steel which sank to the bottom in 33 ft. of water when 300 tons of dynamite exploded, constituted a serious menace to navigation. Divers laid strings of dynamite which blew the ship into pieces that could be handled by a floating derrick. The plates and beams were so twisted and bent that ordinary methods of cutting up the scrap would have been hopelessly expensive. By employing the oxyacetylene process, however, the entire hulk was utilized. To this flame, scarcely 3 in. long, plates, beams and rivets formed no serious obstacle, the flame eating its way along at the rate of about a foot a minute until all the scrap had been reduced to pieces small enough to be loaded on wagons. The high temperature of the oxyacetylene flame, about 6,300° F., fuses the metal rapidly, while a jet of pure oxygen injected through the center of the flame against the hot surface oxidizes the steel so that it runs away in a thin stream, leaving a clean, narrow cut in the metal.

The violence of the explosion that wrecked this vessel was almost beyond belief. The entire forward part of the ship was blown away and the deck and upper works were reduced to fragments, pieces of steel from 3 to 5 ft. long being found at distances of from two to three miles from the wreck. The naval collier "Jason" was so seriously damaged by the explosion that it took three months to repair it. The collier had just been completed and was still in the hands of the contractors. It was to depart on the following morning on the preliminary acceptance trials. After the explosion the

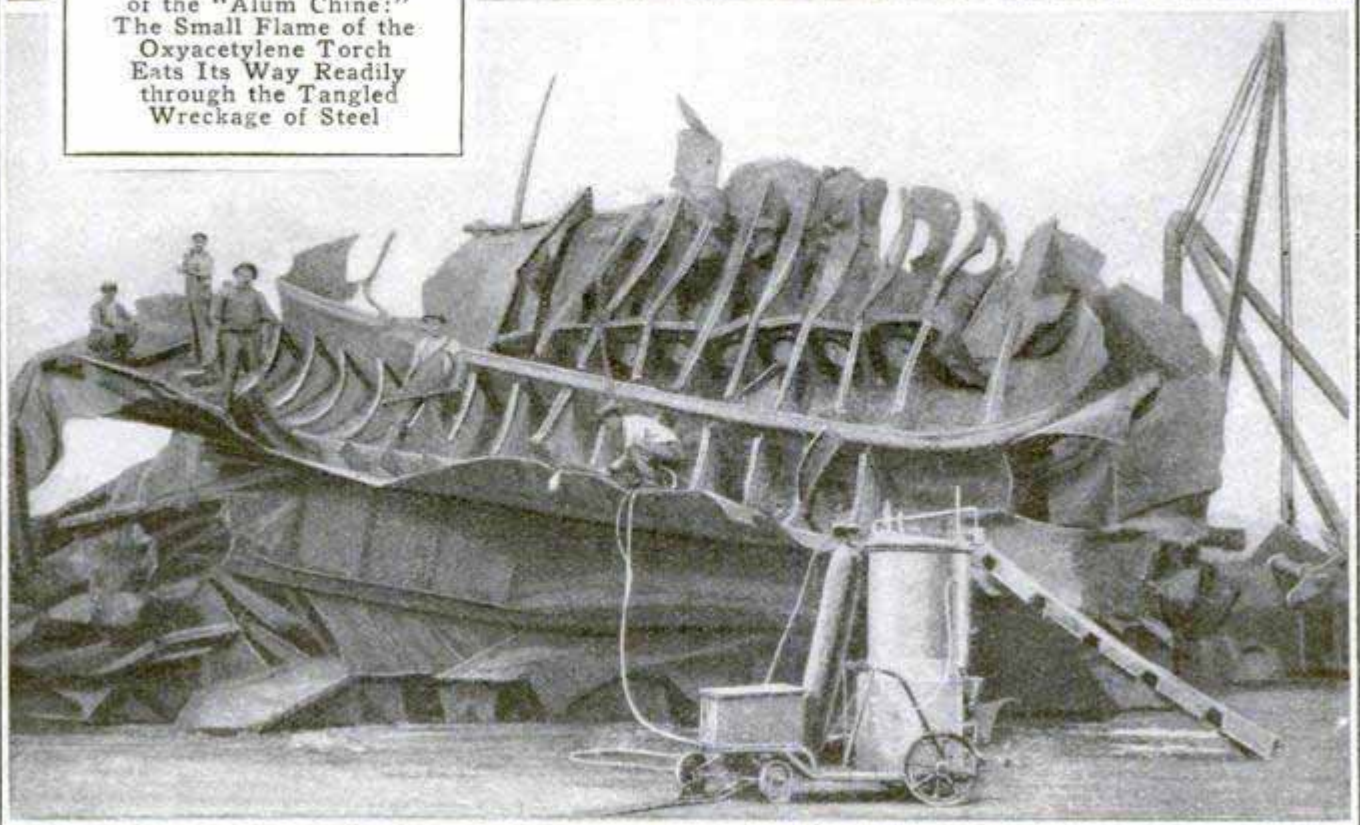


The "Alum Chine" as It Appeared before the Explosion of 300 Tons of Dynamite Which Sank the Ship

Stern of the "Alum Chine," Showing the Propeller Shaft Blown Out and the Sternpost Broken by the Force of the Explosion



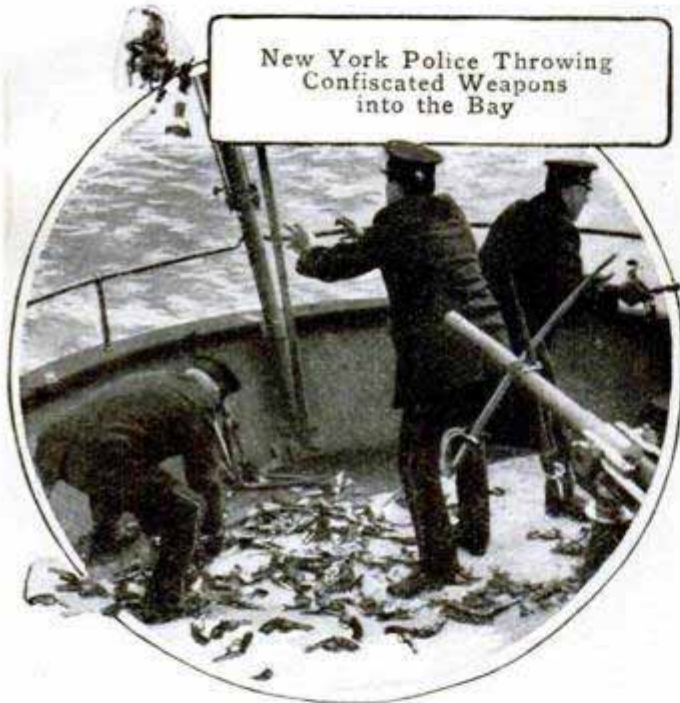
Cutting Up the Hull of the "Alum Chine:" The Small Flame of the Oxyacetylene Torch Eats Its Way Readily through the Tangled Wreckage of Steel



"Jason" had the appearance of a ship that had passed through a severe bombardment. The hull was pierced in many places and much of the steel plating was badly dented. The superstructure was wrenched and twisted, the side bulkheads bulged, and the rigging cut to shreds, while the woodwork of the interior was reduced to a mass of splinters.

### CONFISCATED WEAPONS ARE THROWN OVERBOARD

Every year the harbor patrol of the New York police department takes a



consignment of confiscated firearms, knives, razors, brass knuckles and burglar tools down the bay, and officers cast them overboard by the armful. While the laws of New York prohibit the purchase or possession of firearms by any citizen without a permit, other states are not so particular, and thugs have little trouble in refurbishing their armories. When arrested in New York, their weapons are confiscated and thrown into the bay. Weapons worth \$5,000, or more, were so disposed of recently.

☞The San Francisco-Hawaii cable cost \$20,000,000, while wireless stations for the same service cost only \$500,000.

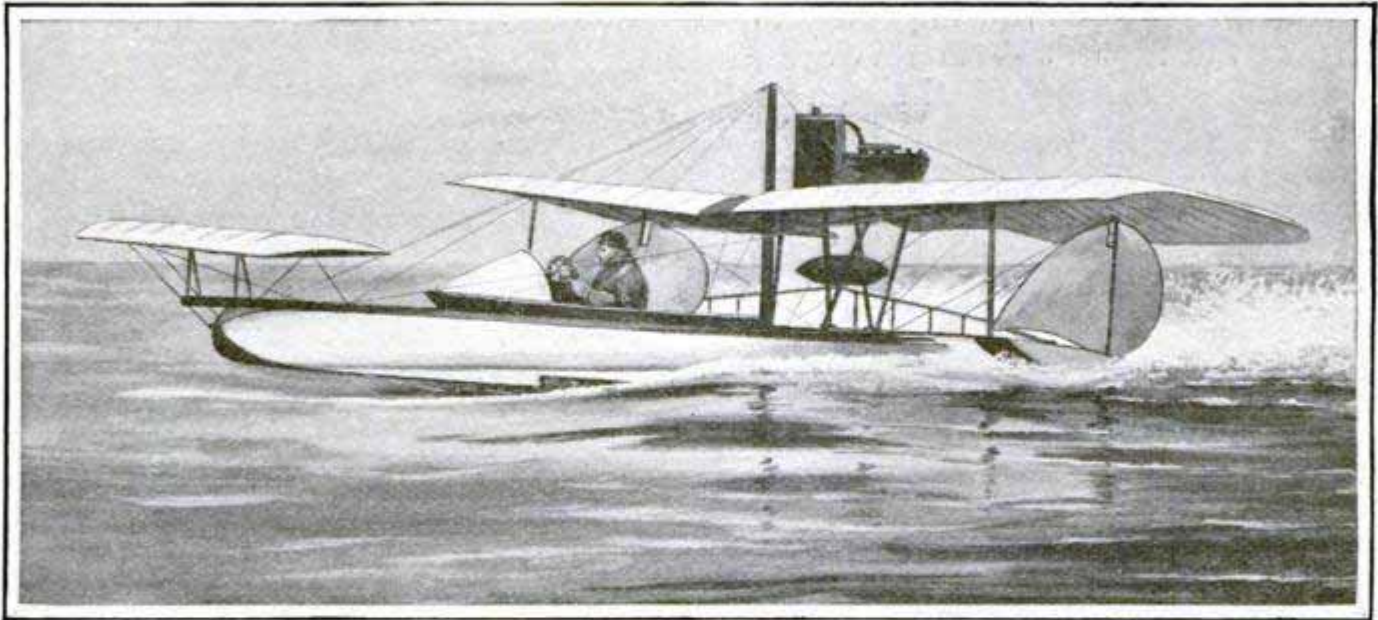
### BATHROOM LIGHTS SHOULD BE IN CEILING

An extended inquiry has been made by some French scientists, for the Society of Legal Medicine, into accidents from electric shock occurring in bathrooms. Here, it is found, there is peculiar danger, owing to the fact that when the surface of the body is moist, it offers far less resistance to the current than when dry. Currents of as low tension as 46 volts were found to be dangerous, and might even be fatal in such cases. As it is customary to install lighting fixtures in side walls, at such a height that they may be touched by a person standing in a bathtub, or on the floor, a warning was given that this common danger might be eliminated. The logical place for electric-lighting fixtures for the bathroom, so it is stated, is in the ceiling, with a perfectly insulated flush switch just inside the door.

### AUTOMATIC CORN-POPPING MACHINE

Popcorn must be freshly popped to be palatable. This necessity has long kept this popular commodity from being vended in nickel-in-the-slot machines, but at last an inventor has found a way to surmount the difficulty. An automatic corn popper is now on the market which delivers freshly popped corn upon placing a coin in the slot. The machine consists of an upright case, within which a complicated mechanism is started by the revolution of a handle outside the machine, and completes the process automatically. An elec-





Rudderless Flying Boat Steered by Movable Jibs

tric contact is made, the motor starts revolving the popping cylinder and measures into it just the amount of corn required for one bag. An electric resistance mesh, which lines the cylinder, provides the heat necessary to pop the corn. A paper bag is pushed out for the customer, who holds it beneath the spout, from which the freshly popped kernels are delivered. Unpopped kernels are shunted into a receptacle within the machine. After the corn has been put in the bag, the customer may, if he desires, season it by holding the bag beneath another chute, from which, upon pressing two buttons, butter and salt flow in measured quantities. A plate-glass window in the front of the machine enables the customer to see the corn popping. The case is about 5 ft. high and about 2 ft. square. It must, of course, be connected to a source of electric supply by wire.

### FLYING BOAT HAS NOVEL CONTROL

A tailless flying boat with a jib control which has novel features was exhibited at the motorboat show. Instead of a vertical rudder, used in conjunction with devices for warping the wings, two jibs arranged at the extreme ends of the planes may be partially revolved about an oblique axis

from the lower end of the forward strut to the upper end of the rear strut. By pulling or pushing the steering wheel forward or backward, the pilot turns the jib on the side he desires, toward the engine. This produces a drag in the air on that side and the down pressure results in "banking" the machine, which thereupon makes a turn with the operated jib on the inside, toward the center of the circle. No rudder is necessary, the jibs permitting complete control to be exercised. A small "elevator" is set at the fore end of the hull, by which means the pilot is enabled to rise clear of the water, or direct the machine in climbing.

### MORE DAYLIGHT WORKING HOURS FOR CLEVELAND

A practical way to obtain more daylight during the working day has been worked out in Cleveland, Ohio, by the simple expedient of changing from standard central to standard eastern time. With central time the Cleveland clocks are 33 minutes slower than sun time, while on eastern time they run 27 minutes ahead of the sun. It is estimated that, as a result of the change, 201 more hours of daylight a year will be available between the hours of 6 a. m. and 10 p. m., and that 201 more hours of darkness will be

provided for sleep during the early part of the night. With this system the earliest setting of the sun will occur at 4:55 p. m., so that nearly all factories will close before sunset even during the shortest day, while during the spring, summer and fall, a total of 234 additional daylight hours will be available after 5:30 p. m. for outdoor recreation. The dividing line between central and eastern time is now at Buffalo and Pittsburgh.

### MOTOR-CAR SIGN CARRIES "RED HAND OF ULSTER"

How deep into the past the feelings of the Irish people reach in the present home-rule contest is indicated by



Courtesy The Sketch

the sign carried by the motor-car corps of the Ulster Volunteer Force. On the sign are the shamrock, a crown and the "Red Hand of Ulster." The emblem of the red hand had its origin in the ancient days when Ireland was ruled by rival chieftains who were often at war with each other, and dates from a battle in which the Ulster forces were led by one of the O'Neills. The battle was going against the Ulster forces, and to add to their misfortunes the chieftain's right hand was cut off by a well-aimed blow from the sword of one of the opposing force. Picking up the severed hand, O'Neill threw it as far as he could into the ranks of the enemy and ordered his men to recover it. The fury of the attack of the Ulster army in carrying out this command turned the tide of battle in their favor, and gave them also a symbol of their determination to remain a district distinct from the remainder of Ireland.

### GERMAN DIRIGIBLE TO FLY AT SAN FRANCISCO FAIR

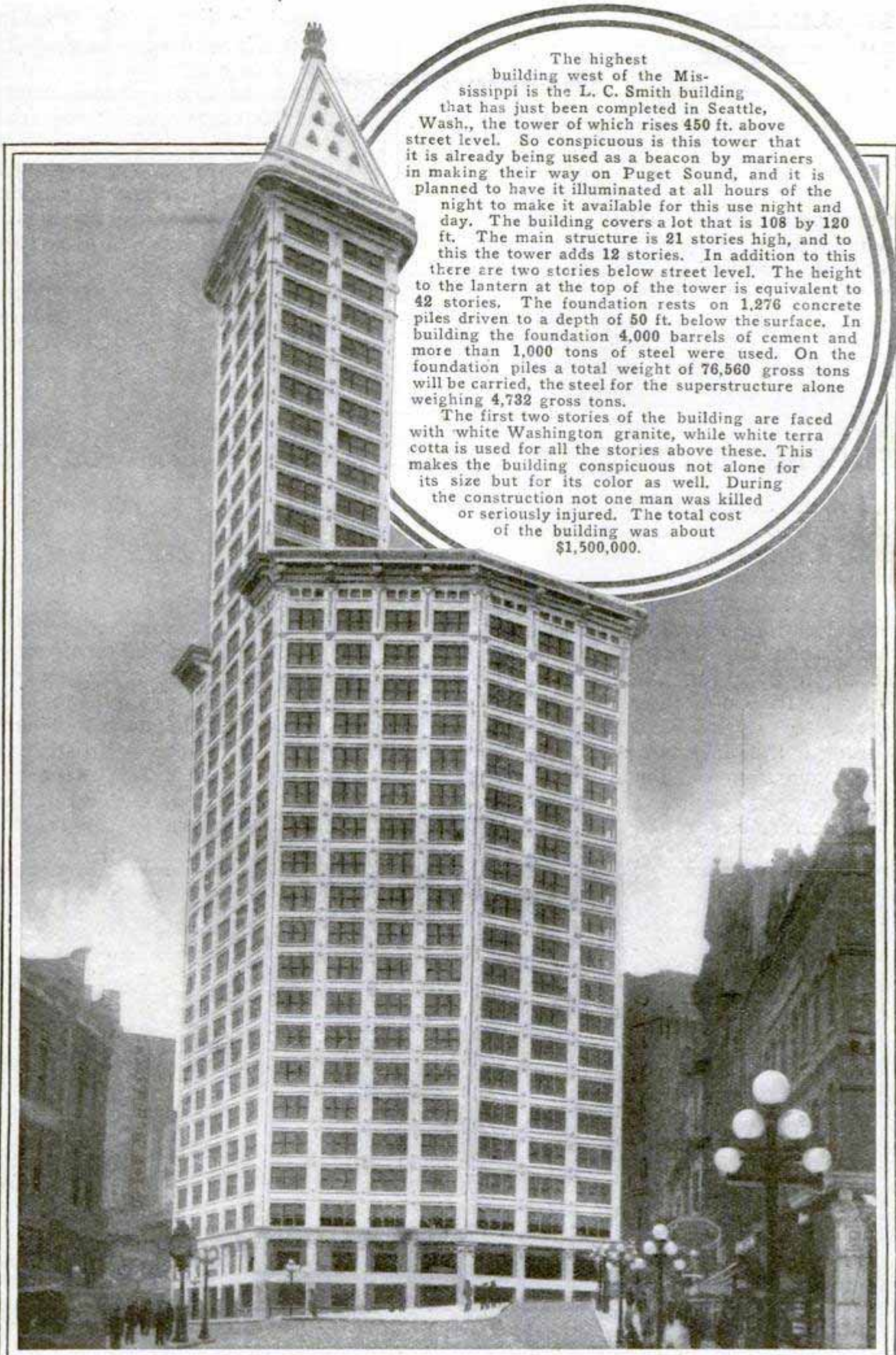
What is expected to be the largest dirigible balloon ever built will be sent to the Panama-Pacific Exposition by a German firm and will be operated as a passenger carrier, on a daily schedule. The dirigible, of the Parseval, or semi-rigid, type, will have a length of 480 ft., a diameter of 80 ft., and will cost more than \$250,000. A portable hangar is to be brought from Germany, along with two licensed crews of eight men each, who are to operate the big airship. A complete gas plant will also be built for the sole use of the German craft. Trips of about 50 miles will be made, the rate being fixed at \$25 each. When not making trips, the dirigible will be on exhibition in its hangar, where exposition visitors will be allowed to inspect it, going through the interior, seeing the observation rooms, sleeping quarters, diner, kitchen, bath and smoking rooms, which make it a modern transportation palace. Passenger dirigibles are familiar sights in northern Europe, but a novelty in America.

### SHALLOW-DRAFT WARSHIPS BUILT BY BRITISH

In striking contrast to the super-dreadnoughts launched by the British Admiralty in the last two years is a new type of battleship with shallow draft and guns especially mounted for attack on aeroplanes and dirigibles. The "Royal Oak" is the first of this type. It will be armed with 5 and 6-in. guns built to be trained almost perpendicularly. These are mostly rapid-fire guns and are expected to give a good account of themselves in action. The shallow draft is designed to present as small a target as possible against submarines. The new vessels are to be of but 25,000 tons and maintain a speed of 28 $\frac{3}{4}$  miles an hour. Both coal and fuel oil will be carried, and a platform will be built from which to launch flying boats.



# TALLEST BUILDING WEST OF THE MISSISSIPPI



The highest building west of the Mississippi is the L. C. Smith building that has just been completed in Seattle, Wash., the tower of which rises 450 ft. above street level. So conspicuous is this tower that it is already being used as a beacon by mariners in making their way on Puget Sound, and it is planned to have it illuminated at all hours of the night to make it available for this use night and day. The building covers a lot that is 108 by 120 ft. The main structure is 21 stories high, and to this the tower adds 12 stories. In addition to this there are two stories below street level. The height to the lantern at the top of the tower is equivalent to 42 stories. The foundation rests on 1,276 concrete piles driven to a depth of 50 ft. below the surface. In building the foundation 4,000 barrels of cement and more than 1,000 tons of steel were used. On the foundation piles a total weight of 76,560 gross tons will be carried, the steel for the superstructure alone weighing 4,732 gross tons.

The first two stories of the building are faced with white Washington granite, while white terra cotta is used for all the stories above these. This makes the building conspicuous not alone for its size but for its color as well. During the construction not one man was killed or seriously injured. The total cost of the building was about \$1,500,000.

## STRONGEST ELECTROMAGNET IS BUILT IN FRANCE

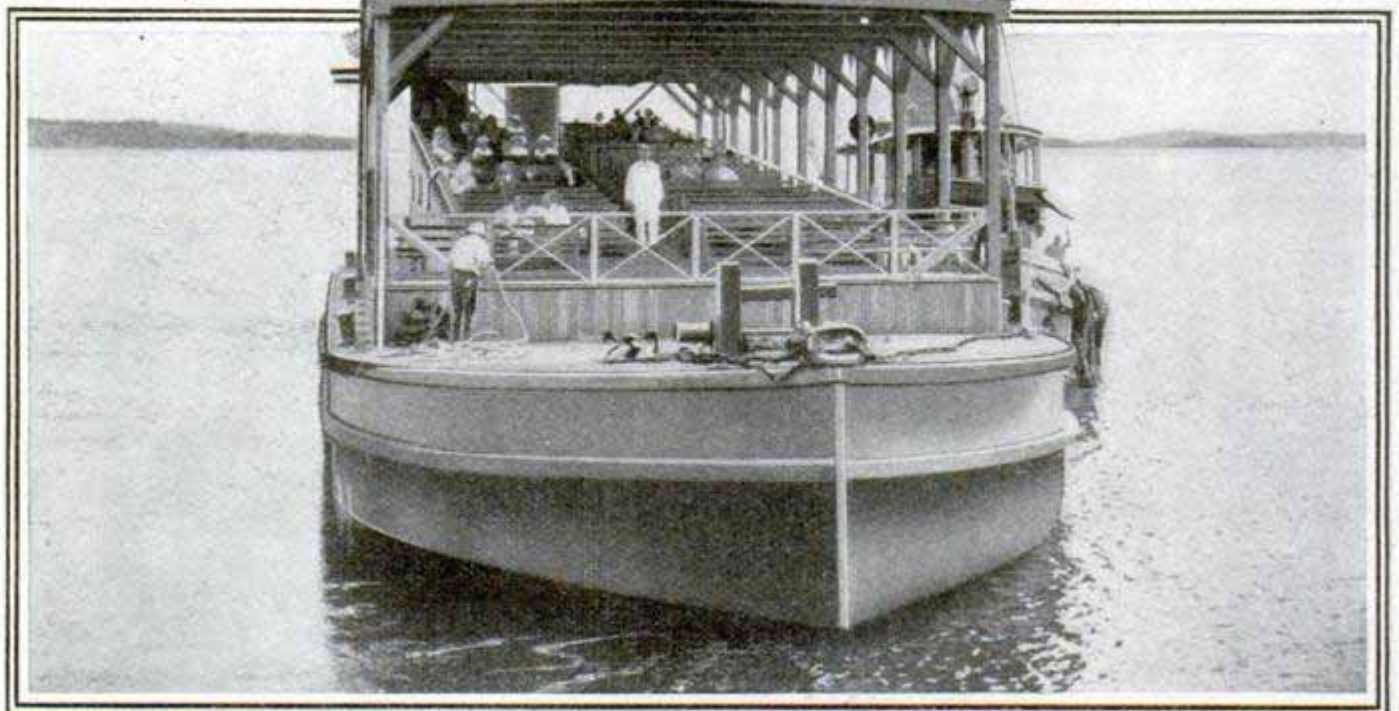
Recently two French scientists exhibited before the Academy of Sciences in Paris an electromagnet of remarkable power, but the usefulness of which is limited to scientific work. It differs from previous magnets in that the windings are made of metallic ribbons of almost infinitesimal thinness, which are cooled by a circulating bath of gasoline at very low temperature. To give a concrete idea of its power it may be stated that ordinary electro-

magnets used in lifting pig iron in foundries operate with a magnetic-field intensity of from 8,000 to 14,000 units, while the new magnet produces 52,000 units, and a still larger one is projected which will employ 75,000 units. Yet the additional power shown is gained at such a cost that it cannot be commercially utilized. In experiments with polarization of light through the magnetic field, or in deflecting the cathode rays from the X-ray machine, such an electromagnet might have a laboratory value, but otherwise it has only a scientific interest.

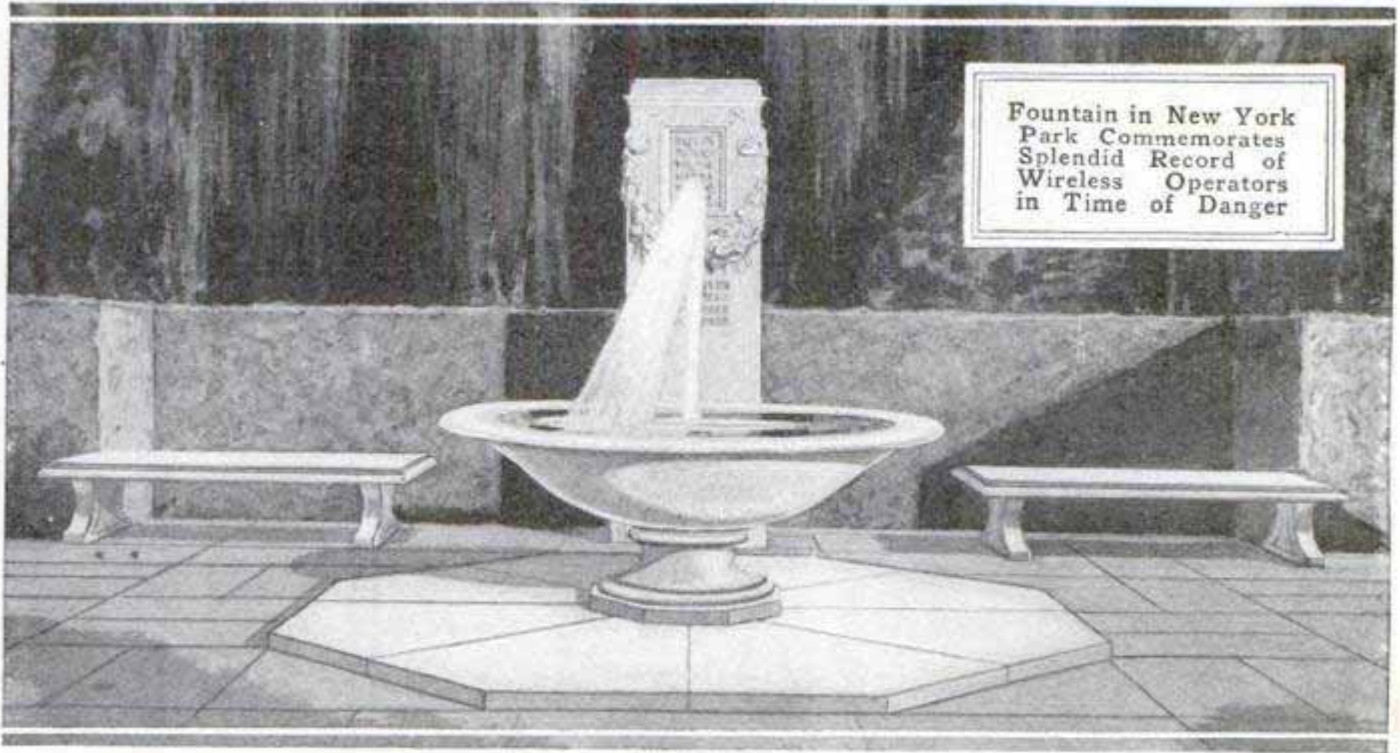
## PREPARING FOR SIGHT-SEERS AT THE PANAMA CANAL

For the thousands who will visit the Isthmus to view the completed Panama Canal, ample provision is being made. Special sight-seeing trains are scheduled to leave Colon and Panama on alternate mornings through the week, reaching the opposite end of the canal in time for lunch. Passengers may return on the ordinary trains if they so desire. Excursion trips through the lake, from Gamboa to Gatun, are made on a sight-seeing barge which has been converted for

passenger service by the addition of a main deck, sloping from rear to front, and provided with comfortable seats, while above, an upper deck may be reached by stairways. Nearly 300 sight-seers can be accommodated on the barge, which has a full equipment of life preservers and safety appliances. The fare for the trip on the lake is fixed at \$1.50, and a like sum is charged for the railroad trip along the shore, from one end of the canal to the other.



The Excursion Barge from Which the Wonders of the Canal may be Seen: The Rear Seats are Raised So That the View is Unobstructed



### MEMORIAL TO WIRELESS HEROES

In Battery Park, New York, will soon be erected a memorial fountain dedicated to the wireless operators who have lost their lives at sea. In most of the recent accidents on the ocean, where the wireless has called to rescue work vessels from a distance, the operators in their wireless stations have stuck to their posts to the last, often going down with the ship, and showing a heroism in aiding women and children to escape a watery grave, which betokens a high order of valor. The fountain, which has been designed by famous architects of New York, will keep alive the memory of these courageous men.

### THE CHINESE METHOD OF PRESERVING EGGS

Covering eggs with a thin layer of sea salt and vegetable ashes, made into a paste with water, the Chinese succeed in so preserving them that they do not spoil quickly, and may be shipped long distances. The paste is put on about a quarter of an inch thick, and the eggs are then piled up and allowed to dry. When required for use, they

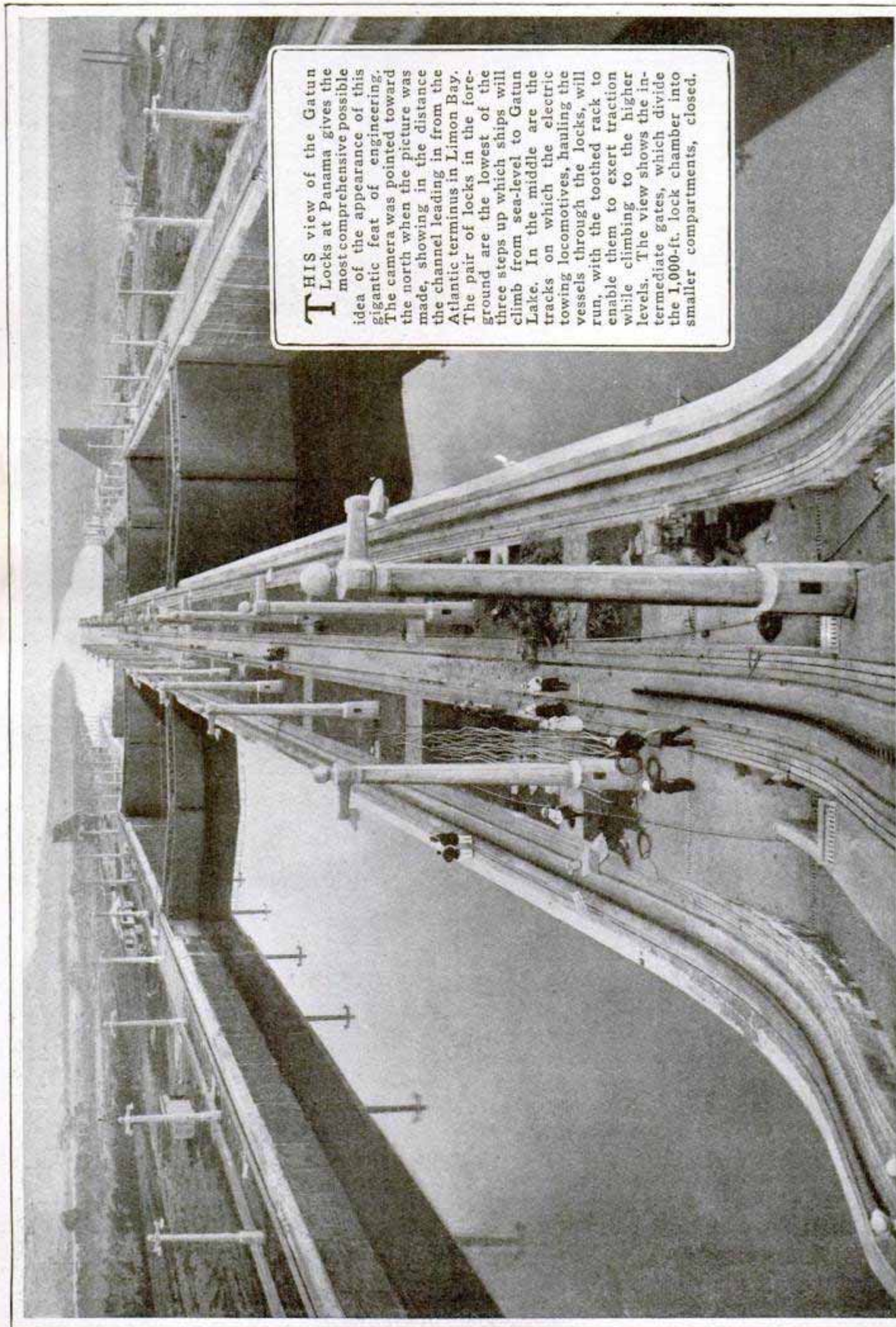
are placed in water, and the paste dissolves readily. It is found that the salt penetrates the shell and inner membrane, giving a decidedly saline taste to the egg, hence they are used for purposes where the salty taste is not objectionable.

### HEDGE TRIMMER OPERATED BY ELECTRICITY

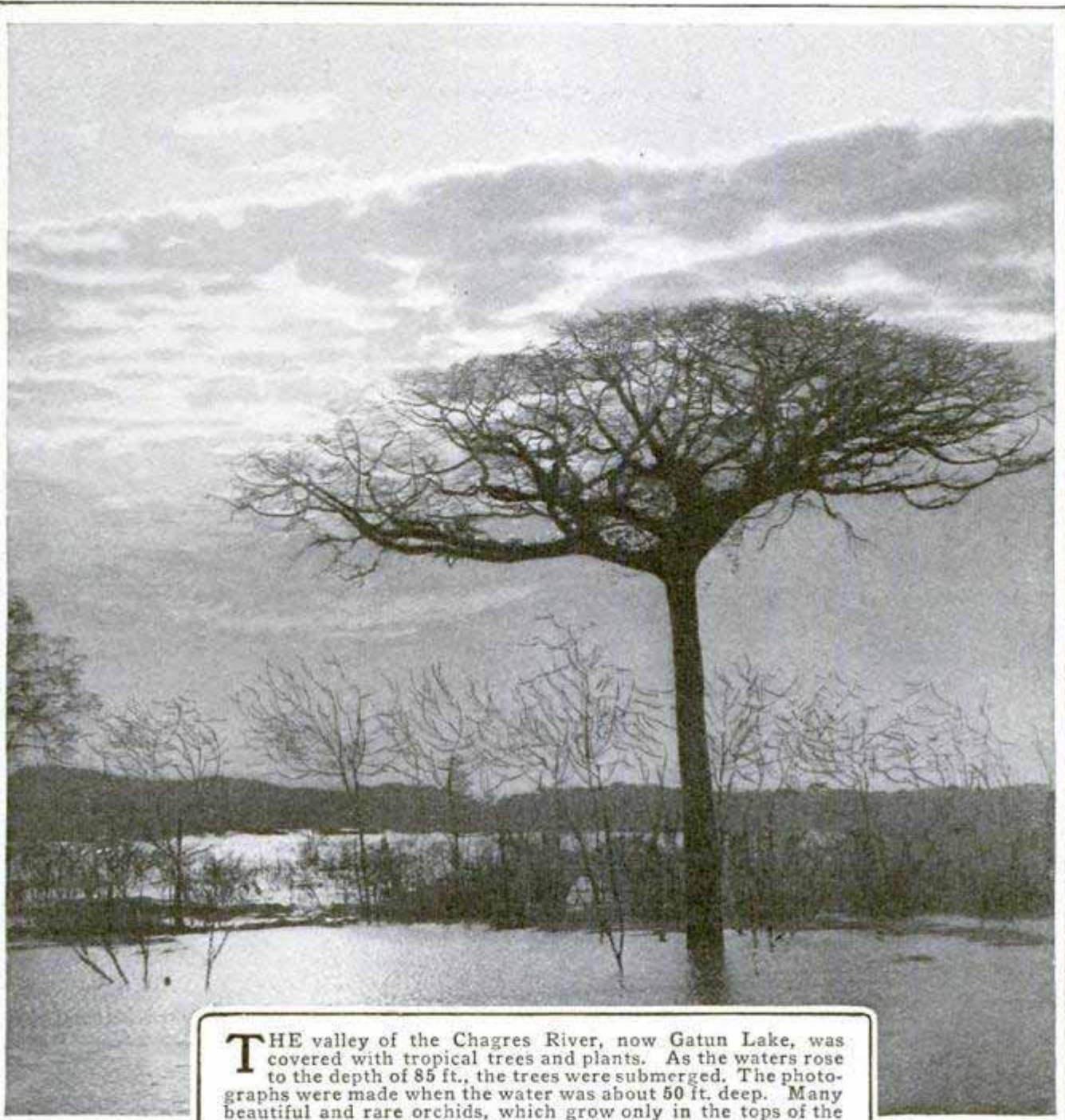
A machine for trimming hedges has been invented which carries an electric motor. The operator passes the trimmer over the surface to be shorn after the manner of a horse clipper. The machine is built of aluminum with a casing containing the motor. The gear case is completely inclosed so that no dirt can enter the mechanism, and the trimmer is arranged to be used on either side of the hedge, cutting top and sides equally well. The power is controlled by a switch on the handle, operated by the thumb.



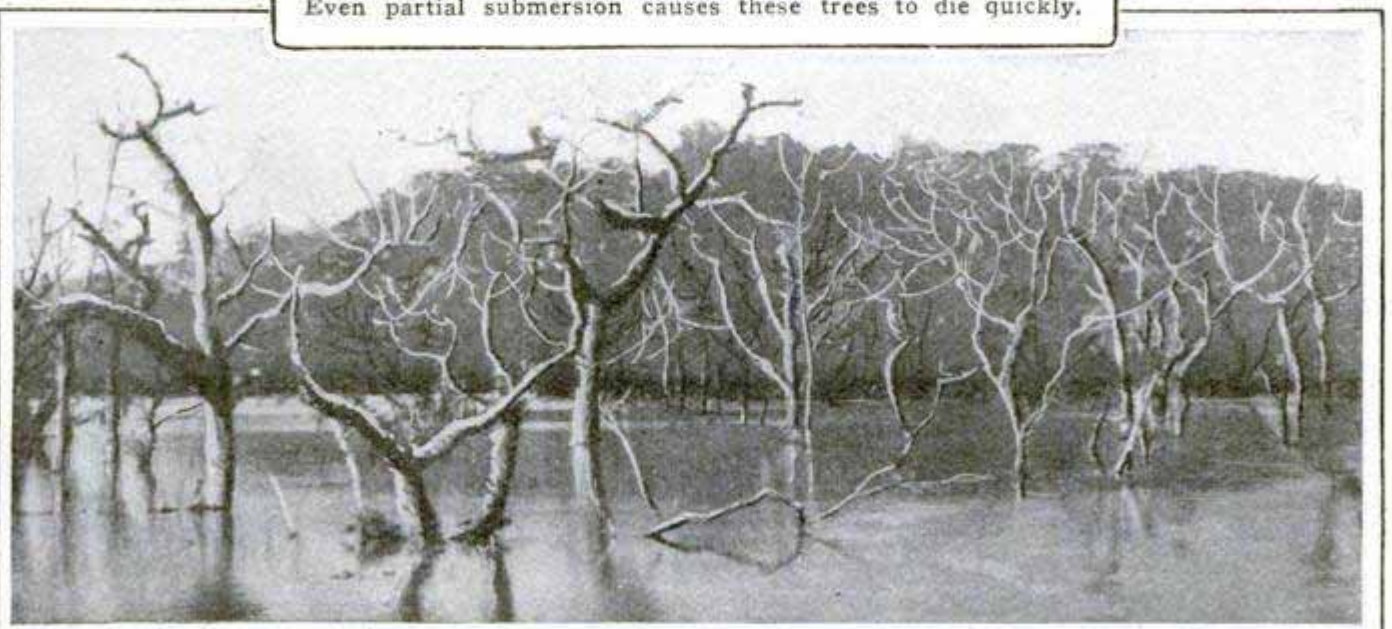
**T**HIS view of the Gatun Locks at Panama gives the most comprehensive possible idea of the appearance of this gigantic feat of engineering. The camera was pointed toward the north when the picture was made, showing in the distance the channel leading in from the Atlantic terminus in Limon Bay. The pair of locks in the foreground are the lowest of the three steps up which ships will climb from sea-level to Gatun Lake. In the middle are the tracks on which the electric towing locomotives, hauling the vessels through the locks, will run, with the toothed rack to enable them to exert traction while climbing to the higher levels. The view shows the intermediate gates, which divide the 1,000-ft. lock chamber into smaller compartments, closed.

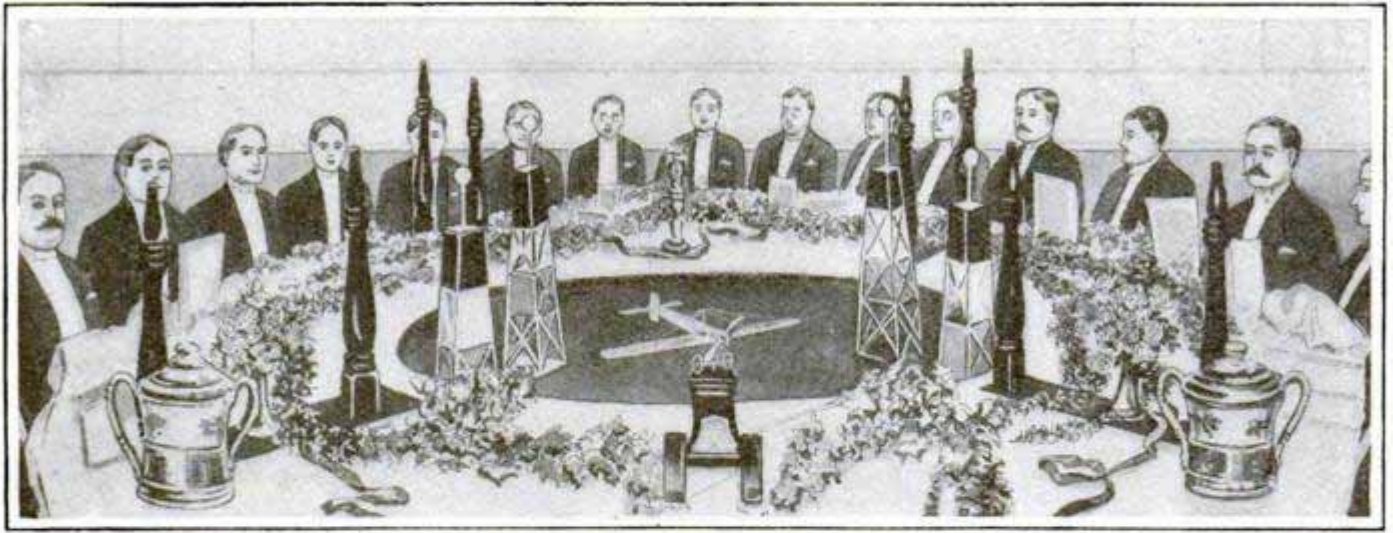


# THE SUBMERGED FORESTS OF GATUN LAKE



**T**HE valley of the Chagres River, now Gatun Lake, was covered with tropical trees and plants. As the waters rose to the depth of 85 ft., the trees were submerged. The photographs were made when the water was about 50 ft. deep. Many beautiful and rare orchids, which grow only in the tops of the tallest trees, were gathered with small boats as the water rose. Even partial submersion causes these trees to die quickly.





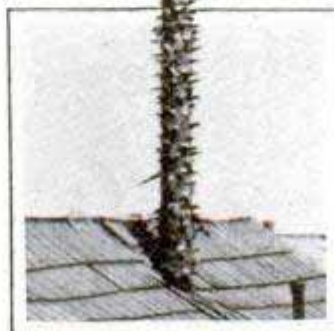
A Topsy-Turvy Banquet in London

### “UPSIDE-DOWN” DINNER GIVEN TO AIRMEN

English airmen were summoned to attend a dinner in honor of several of their profession who had achieved distinction in the art of flying, and appropriately enough, in view of the fact that one of the honored guests had just “looped the loop” with a passenger, the entire dinner was served “upside down.” The photograph shows the table legs in the air, the banquet being spread upon the bottom of the mahogany. The menu was reversed, and instead of eating “from soup to nuts,” toothpicks and black coffee opened the repast, while the fish was the last course. To be sure, the speeches were reserved for the last, but the dinner was otherwise entirely a topsy-turvy affair.

### PALM TREE GROWING THROUGH A ROOF

A building in Los Angeles has a “roof tree” which is one of the sights of that city. Years ago the tree, one of the varieties of palm so plentiful in California, stood before a sightly mansion, built when that part of the city was far from the center of business. When the growth of the city turned



that residence section into a “downtown” district, it became necessary to build upon the property. The tree, then 60 ft. high, was left, and the structure built around it, a hole in the roof giving it access to light and air. Since then the tree has continued to grow, unaffected, seemingly, by the encroachments of commerce, and is a beautiful and stately landmark.

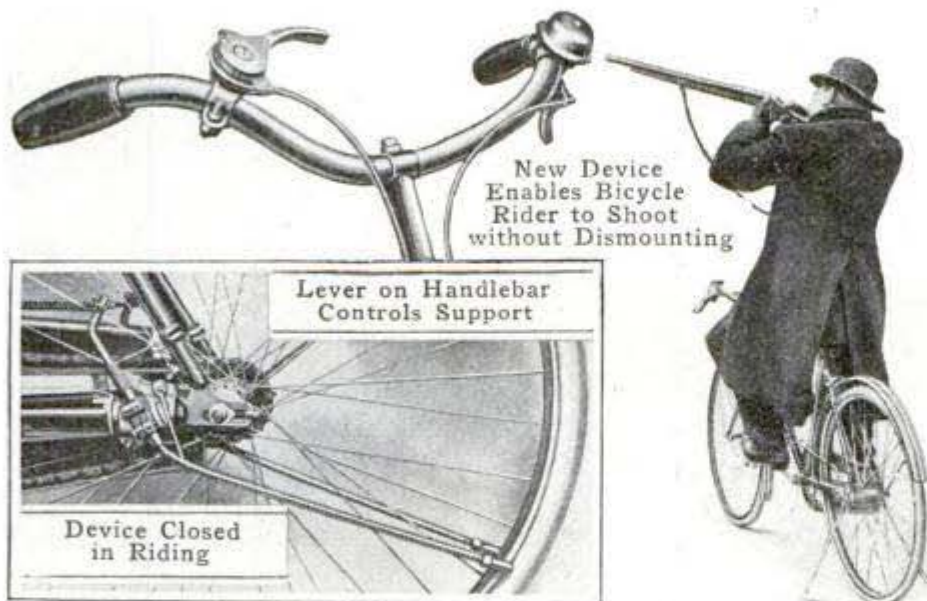
### DRIFT FENCES ON NATIONAL FOREST RANGES

Many miles of “drift” fences have been built by the government in recent years for controlling the movements of stock, grazed under permits on the national forest lands. These fences do not serve to inclose areas, but are simply intended to prevent the animals from going in certain directions, or “drifting,” to use a cattlemen’s expression. In many cases they are used to restrict the animals to certain areas for the summer and to other areas during the winter, as well as to prevent grazing on lands where poisonous plants are found. In one case, five miles of drift fence was built to protect a city water supply from contamination by forest-range cattle. In one forest, a  $4\frac{1}{2}$ -mile fence was built to keep cattle on one range and

horses on another. On the latter range was an abundance of larkspur, a poisonous plant which cattle will eat but which horses will not touch, while on the cattle range there was practically no larkspur. The fences are built of wire in a substantial manner and are so placed that passage from one range to another can only take place at certain well-established gateways.

### NEW STANDARD TO SUPPORT BICYCLE

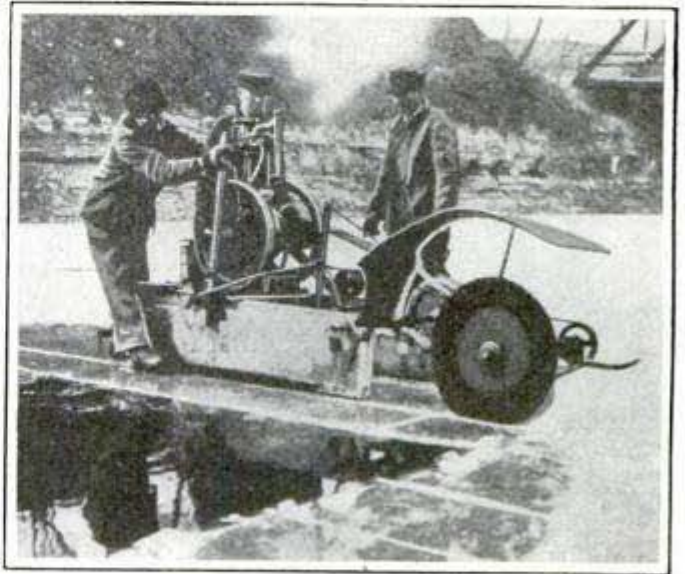
A quick-acting support for bicycles has been placed on the market in France, by means of which a rider may stop his wheel and without placing his feet on the ground, sit quietly, or perform such actions as shooting, sketching, taking photos, or the like, without falling. The device consists simply of two steel rods, bent in such a manner that on being rotated they describe a conical surface, resting close to the rim of the wheel when not in use, and forming a wide base line when spread out. The device is brought into play by a lever, which is self-acting and easily released, on the handlebar, connecting with wire cables to the supports. Springs bring the rods back to normal position when the lever is released. It is proposed to equip military bicycles



and motorcycles with this appliance, in order to permit soldiers to stop and shoot without getting down out of their seats.

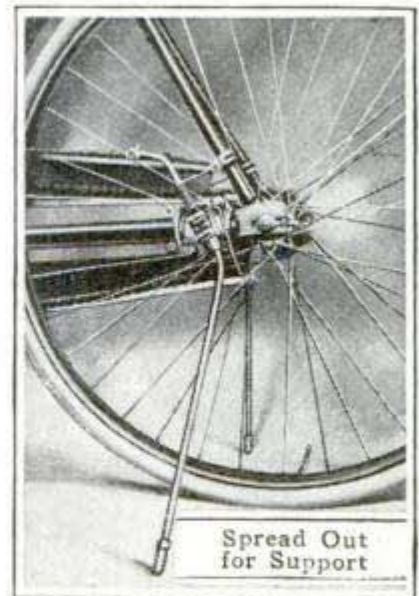
### POWER-DRIVEN ICE SAW RECENT INVENTION

Mounted on a large sled, a 4-hp. gasoline engine furnishes the power to run a circular saw, capable of cut-



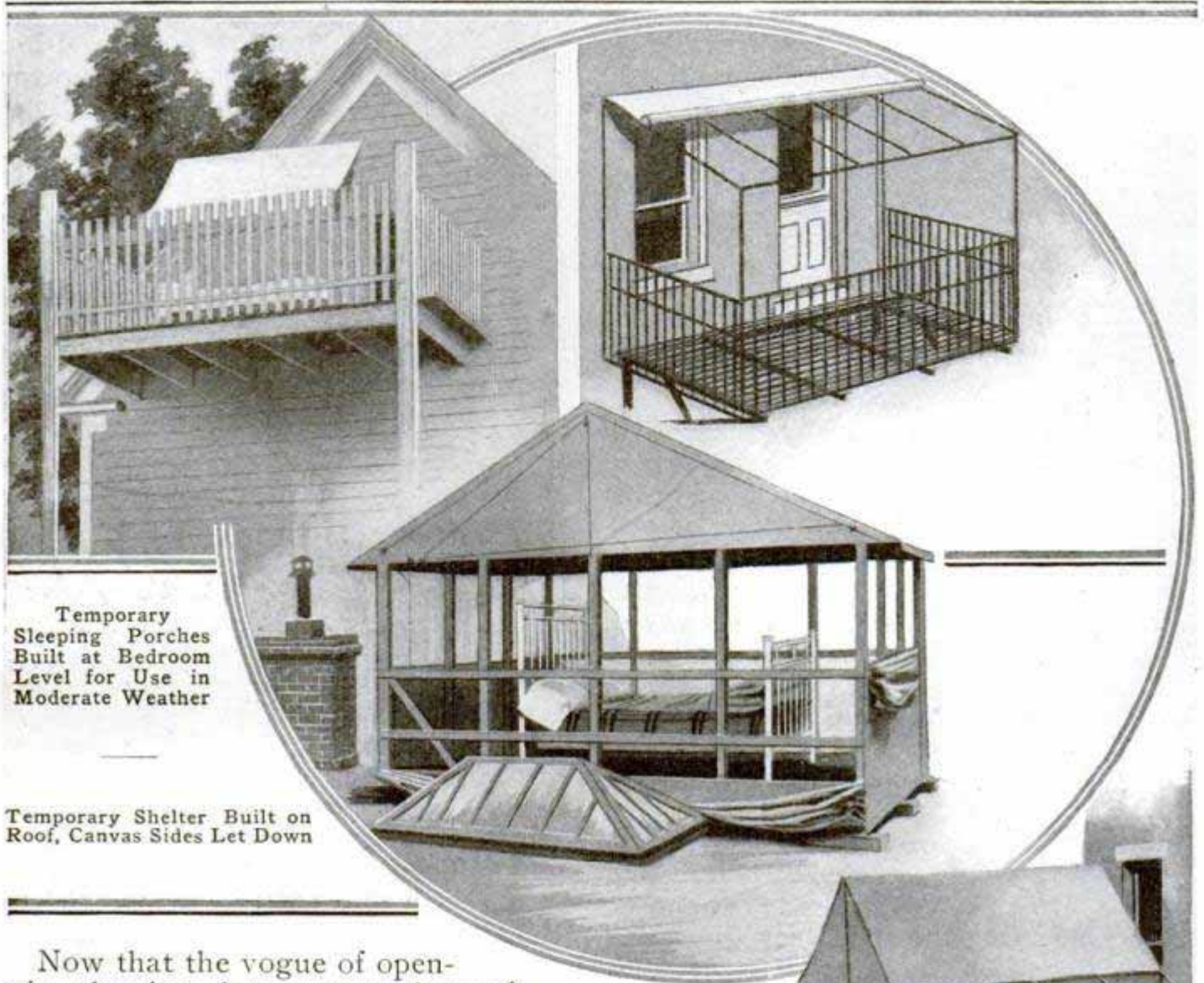
Circular Saw Rapidly Eats Its Way through the Ice

ting 10-in. ice rapidly. The saw is held in a flexible extension of heavy gas pipe, and a chain-and-sprocket device connects with the jackshaft, which in turn is belted to the engine. The machine is kept in line by means of a thin steel shoe fastened to the runner, which travels in the groove made by an ordinary ice marker. The machine propels itself as the



saw takes hold of the ice in cutting. With this machine, the builders state, three men can cut as much ice in one day as 30 men with hand saws.

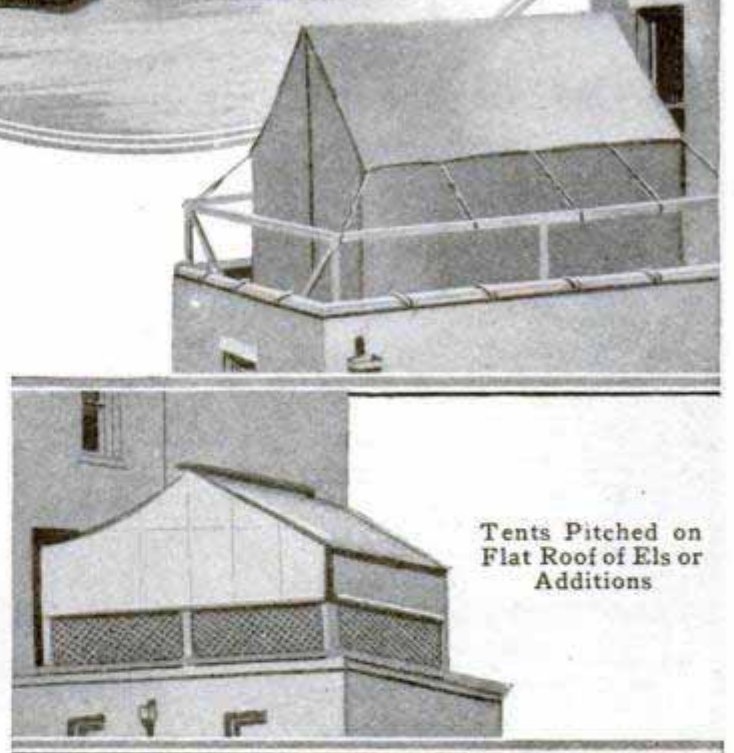
## PRACTICAL DEVICES FOR SLEEPING IN THE OPEN



Temporary  
Sleeping Porches  
Built at Bedroom  
Level for Use in  
Moderate Weather

Temporary Shelter Built on  
Roof, Canvas Sides Let Down

Now that the vogue of open-air sleeping has grown beyond the stage of a "treatment" and interests those who want to keep well as much as it does those who want to get well, it is interesting to see how simple, inexpensive and adequate shelter may be provided in or on the ordinary dwelling. A substantial support of scantling, floored and fenced, may be built against the side of the house at the level with a sleeping-room window. Over this a light awning may be drawn for protection against the weather. Here, upon bed or cot, or swinging in a hammock, real open-air sleeping may be indulged in the year around. In brick apartment buildings within fire limits, it may be necessary to make the support of iron, building it like the ordinary fire escape, and supporting it, not from the ground as

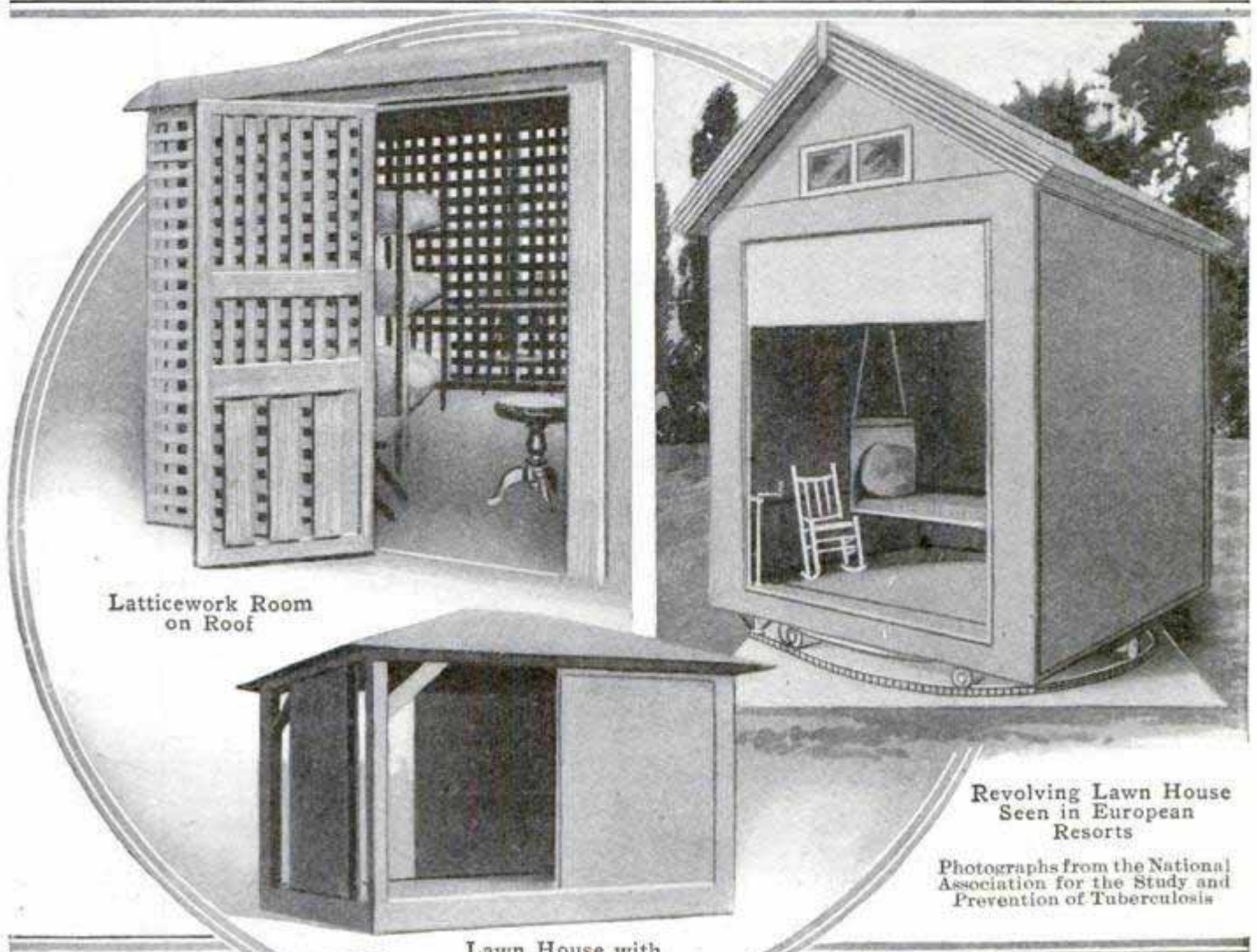


Tents Pitched on  
Flat Roof of Ets or  
Additions

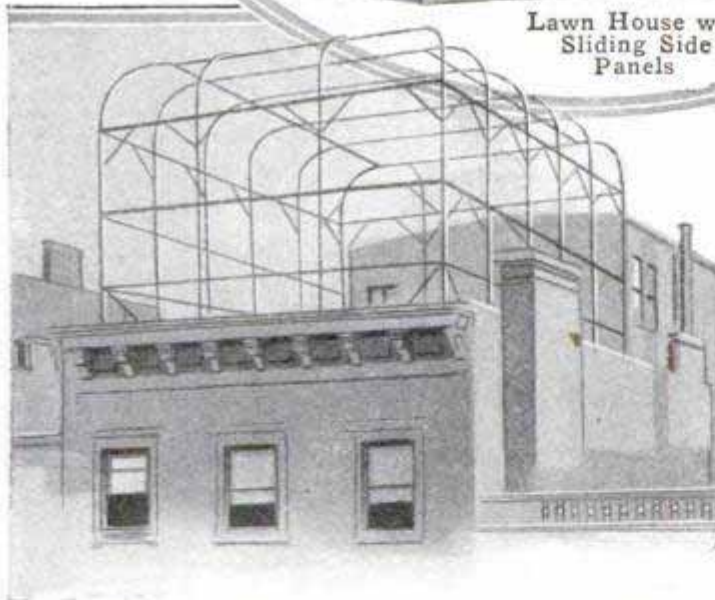
in the case of the wooden shelter, but by iron rods firmly fixed into the brick walls. Where the roof is flat, or only slightly tilted, the building of a shelter is a very easy matter. A



## WHICH ARE SIMPLE AND FEASIBLE IN EVERY HOME

Latticework Room  
on RoofRevolving Lawn House  
Seen in European  
ResortsLawn House with  
Sliding Side  
Panels

Photographs from the National  
Association for the Study and  
Prevention of Tuberculosis



Framework on Roof Supports Canvas Cover by Night,  
and Wire Screens by Day, Affording Playground  
for Children as Well as Sleeping Quarters

light wooden framework, supporting a canvas roof or tent, makes an ideal place for sleep. Usually there is such additional shelter given by chimneys, eaves or side walls, that driving mists

and rains or drifting snows can be avoided.

Often a low addition, or the flat roof of a kitchen or shed, will be found available to erect a tent, the ropes being lashed firmly to a wooden railing or to eyelets set into the roof. A more permanent form of this roof tent has lattice-work sides, the canvas being brought only partially down below the roof. In this type of shelter a maximum of ventilation is always attained. To those who do not care to trust themselves to canvas shelters, a roof room made entirely of latticework appeals, the roof only being substantial and covered with thin boards and roofing paper. This gives a permanent sleeping room, to which many conveniences may easily be added. A more flexible form of roof shelter may be obtained by arched supports of iron pipe, over

which canvas may be drawn, and wire screening on the sides may give a playground by day as well as sleeping quarters at night.

Where a roof is not available, the lawn sometimes offers a solution, and a type of lawn house, very popular in Europe, is built upon a platform, having a circular track upon which the house may be turned in any direction, avoiding annoying winds, or giving access to sunlight when desired. A

much simpler lawn house has sliding panels of wood, or composition, by which it may be entirely closed, or only one side left open. Such a shelter has all the advantages of the revolving lawn house, with much less expense in construction. With the exception of the iron fire-escape type, these shelters can be constructed very economically, especially when second-hand lumber is used, and the work is done by home talent.

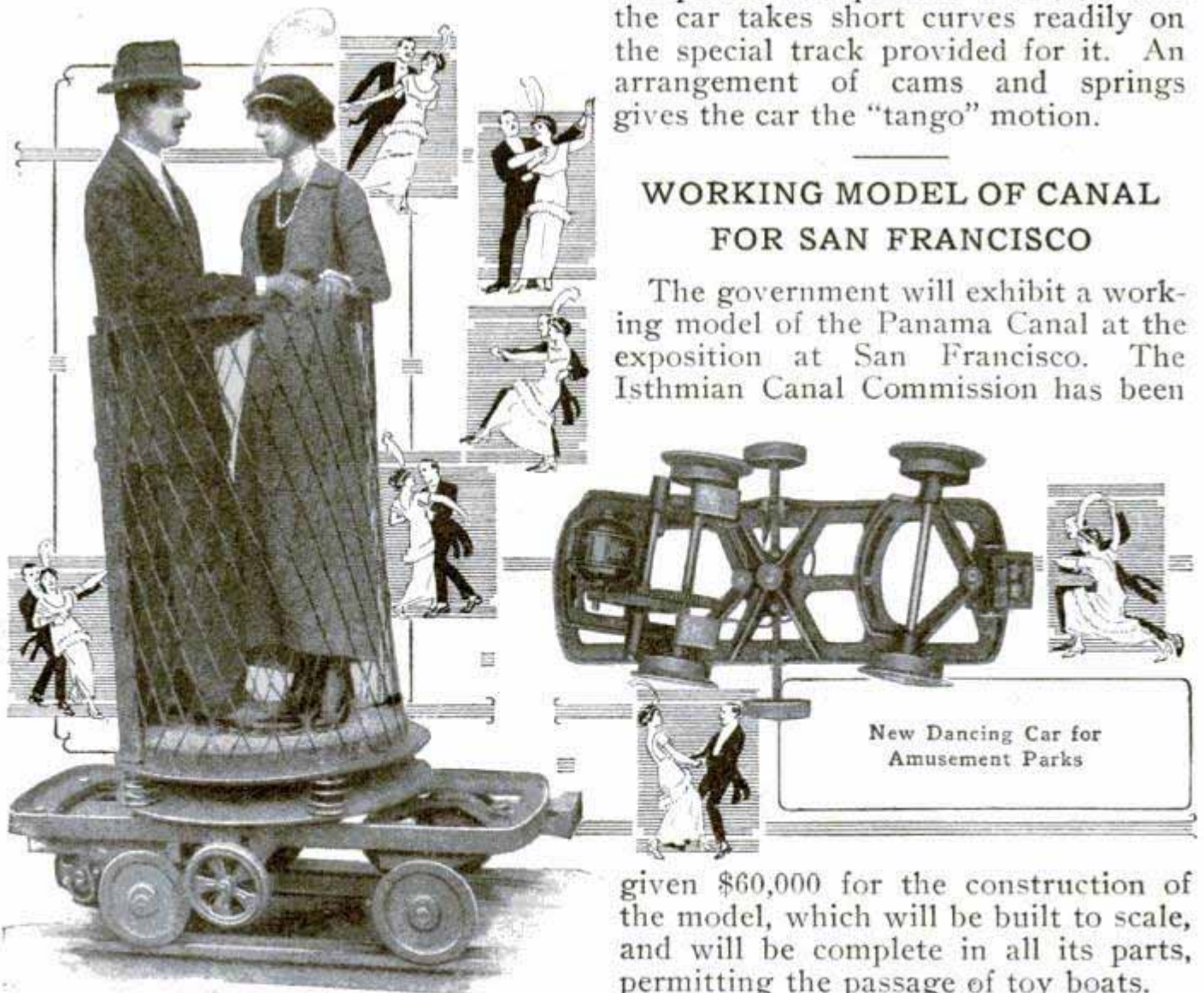
### TANGOING BY MACHINERY NEWEST FEATURE

The present popularity of dancing is the excuse for the invention of a mechanical device for use in amusement parks, by means of which a couple, while riding on a small car, are made to revolve, dip, glide and

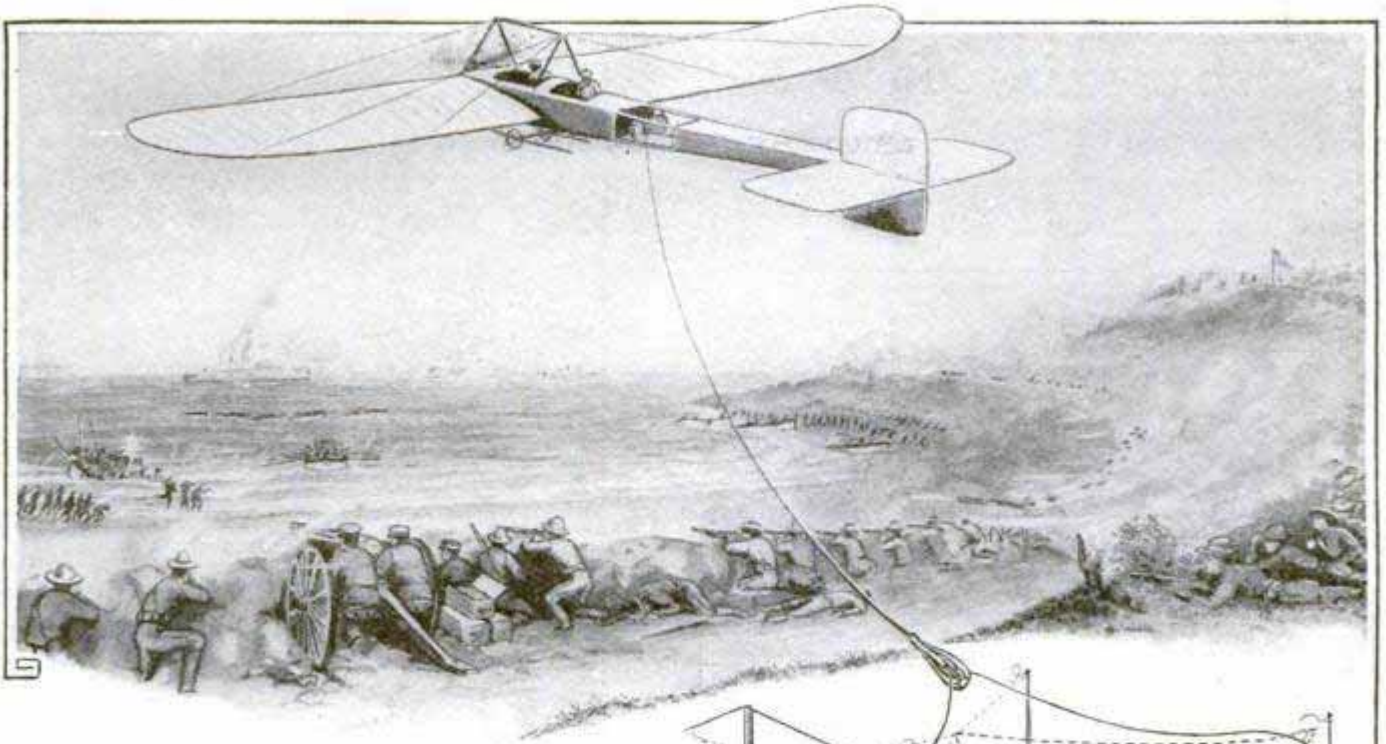
whirl much as dancers do on a ball-room floor in the newer dances. A door admits to a wire-screened basket, firmly supported upon a platform, which itself rests upon springs connected with the truck. The car is equipped with an electric motor attached and geared to the rear axle. The front wheels are mounted upon a separate and pivoted truck, so that the car takes short curves readily on the special track provided for it. An arrangement of cams and springs gives the car the "tango" motion.

### WORKING MODEL OF CANAL FOR SAN FRANCISCO

The government will exhibit a working model of the Panama Canal at the exposition at San Francisco. The Isthmian Canal Commission has been



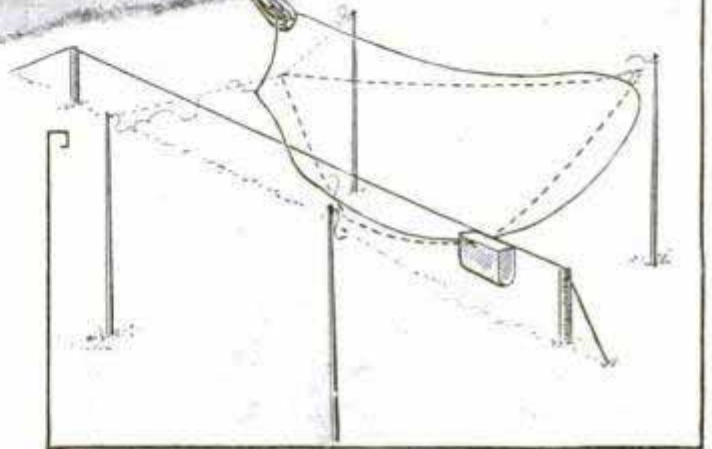
given \$60,000 for the construction of the model, which will be built to scale, and will be complete in all its parts, permitting the passage of toy boats.



Military Aeroplane Picking Up Dispatches on Field of Battle

## TRANSFERRING ARTICLES TO AERIAL MACHINES

A device designed to solve a troublesome problem in connection with aviation, that of transferring dispatches or other articles to aerial machines in flight, has been patented in England. This device consists of a grapnel, suspended from the aerial machine by a cable, which engages a loop attached to a pannier in which the article is placed. The pannier is carried on a float, or trolley, so that it may be trailed for a short distance before it is hauled up. The cable is operated by a winding drum on the aerial machine, which is put in action automatically by the initial pull of the cable when it engages the load. Danger to the machine is prevented by the slipping of the friction clutch in the winding drum when the winding stress reaches a certain maximum, while if this stress continues, the cable unwinds freely from the drum and falls to the ground. The loop to which the pannier is attached is held extended by being lightly attached to posts, as shown in the illustration. This loop is so connected to the pannier as to operate a brake on the trolley, if it tends to underrun the machine. For use at sea, the stores or dispatches



are placed on a float carrier, and the loop is suspended on spars extending from the ship.

## HANDY BAG FOR PICKING CHERRIES

A Michigan mail carrier has invented the contrivance illustrated to aid him in picking cherries. It is a canvas bag, held open by a wooden or metal ring at the top. A small leather strap passes around three fingers of the left hand, and from this the bag is suspended by a hook. Most growers who still adopt the plan of cutting the stems of the cherries with small scissors find the new bag a great convenience. It is patented.



## ALPINE MONUMENT ERECTED TO CAPTAIN SCOTT

At Lautaret, in the French Alps, Captain Scott, the English explorer who lost his life on his return from



French Scientist Raises Monument to Former Pupil

the South Pole, took his first lessons in ice scaling. Here a simple monument has just been erected by his old instructor. It consists of stones heaped in the form of a rude pyramid, and surmounted by a pole. A wooden framework holds the loose rock in place amid the drifting snows.

## AGRICULTURAL FILMS FOR THE FARMERS

The Department of Agriculture is presenting series of films depicting in detail the right way to handle many problems of farm management. Through the Rural Organization Service these films are being sent throughout the country for the instruction of farmers in such subjects as chicken raising, bee culture, rice and cotton planting, and many phases of the dairy

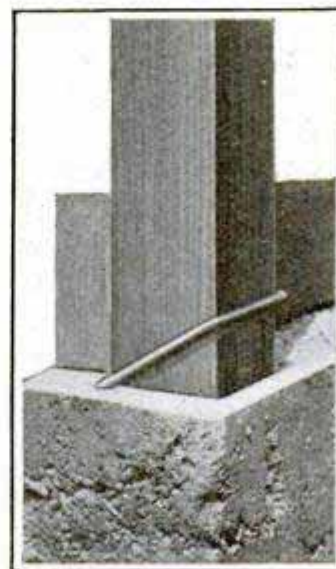
industry. From the southern states, where the present films are being shown, the officials are receiving optimistic reports of large and enthusiastic audiences of farmers who drive in, night after night, with their families and help, to learn better farming methods.

## AMERICAN CARS LEAD IN SELF-STARTING FEATURE

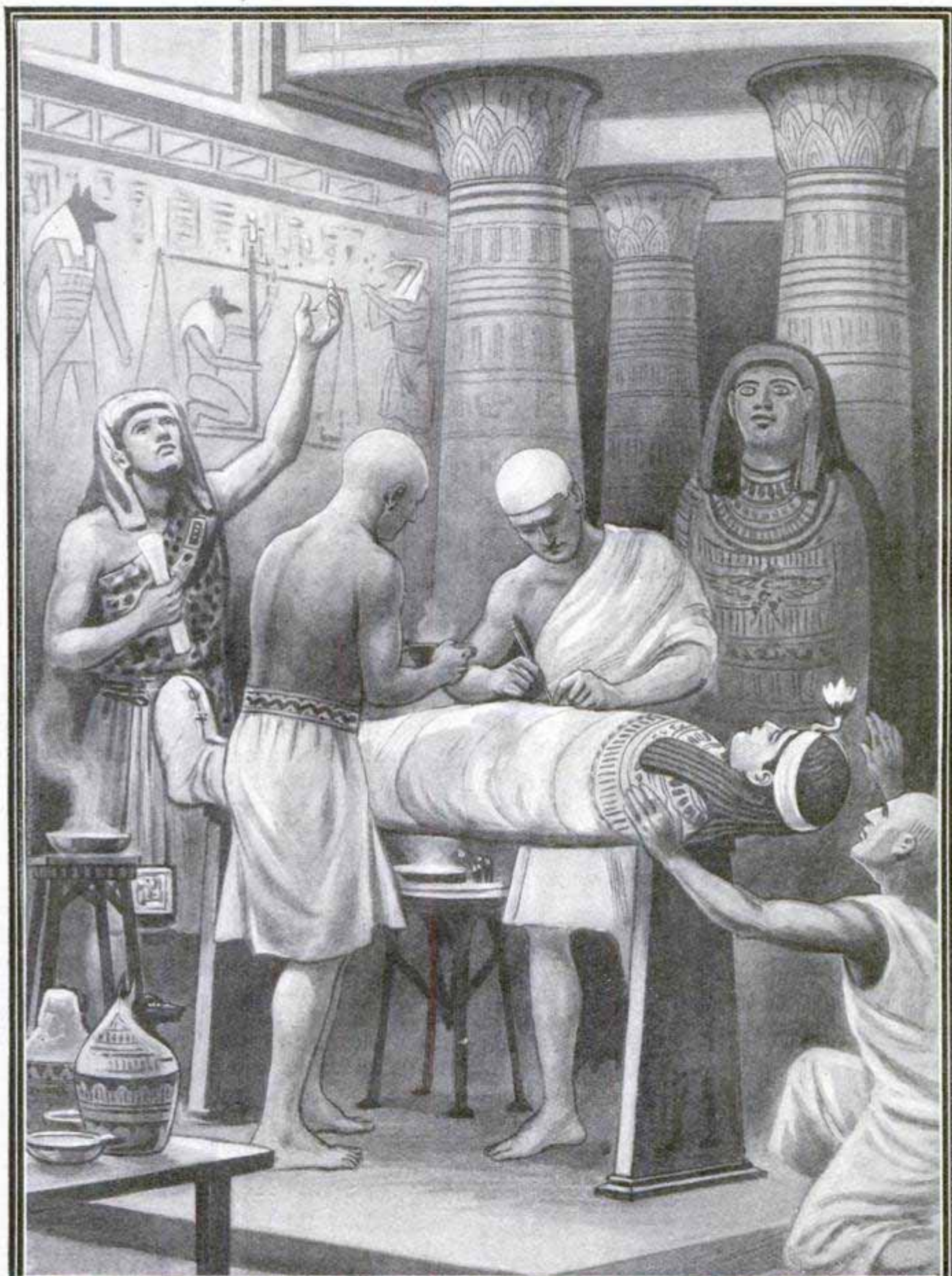
Only five automobiles in every hundred shown at the recent American automobile shows were without some form of engine-starting equipment. The Paris and London shows, on the contrary, reversed these figures, and but five per cent of the automobiles shown there had some form of engine starter. At the American show, 87 per cent of cars produced in this country had electric starting devices as standard equipment, with provision made in the construction of the chassis for adequately housing the mechanism. Air starters were seen on about four per cent of the American-built cars, while the acetylene type of starter was shown on but one per cent of the cars.

## FASTENING WOODEN POST TO CONCRETE

The problem of fastening wooden posts to a concrete wall has been solved in one instance by the use of U-bars firmly imbedded in the concrete, while their loop encircles the post at an angle. The U-bar may be, and often is, homemade. It holds as well when turned out by the village blacksmith as when bought from a city supply house, the main thing being that it holds the post rigidly in place.



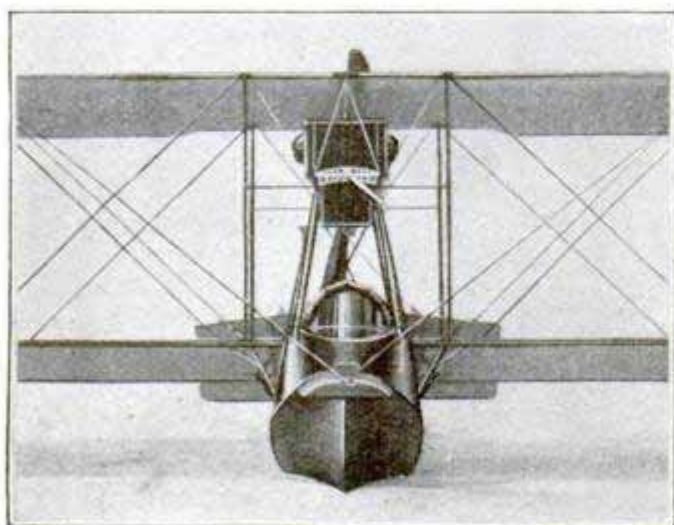
# MANUFACTURING A MUMMY IN ANCIENT EGYPT



**T**HE ancient Egyptians preserved the bodies of their dead in order to give the soul a home on its return to earth. The preservative climate of Egypt and the use of nitron, asphaltum and gums enabled mummifiers to achieve marvelous results, hundreds of thousands of mummies having been found which were embalmed thousands of years ago. Originally intended as a ceremony only for royalty, the custom spread to include the courtiers, and then the servants and slaves of the latter, as well as the royal guard. Bodies were wrapped in strips of linen, smeared with asphaltum. Within the cavities were placed pungent spices, and designs were painted upon the outer wrappings. The mummy was then placed in a case carved to represent a human figure.

## NEW FLYING BOAT HAS INCLOSED CABIN

Satisfactory tests have just been made on Lake Keuka, N. Y., of a flying boat, differing from the usual type



Flying Boat for Cruising

in that it has an entirely closed cabin. An oddly shaped hull, planked with crotch mahogany, is longer and higher in the bow, the seats are arranged in tandem, and celluloid windows protect the passengers and pilot from the elements. Indeed, the body of the boat is designed to afford adequate shelter, even if waves dash entirely over the craft. During the tests, a speed of from 60 to 65 miles an hour was attained.

## CURING HAY ARTIFICIALLY WITH STEAM HEAT

Experiments extending over five years have demonstrated that hay cured by steam heat is preferred by stock to the sun-dried article, and



Farmers may Make Hay Whether Sun Shines or Not

chemical analysis confirms this practical test by showing that the percentage of protein is higher in artificially cured hay. The method calls for a complete steam plant, where steam heat is secured from the exhaust of the engine. The freshly mown hay is drawn under a shed and pitched onto conveyor belts which carry it to the top of the building used in steam drying. The hay is carried back and forth over steam coils underneath the conveyors seven times. An even heat of 240° F. is maintained, and the hay remains on the conveyor from 20 to 40 minutes. When it is discharged it is well cured, of better color, and the leaves are preserved in better shape than hay cured in the fields in the ordinary way. The method lends itself to cooperative action among farmers.

## THUMB PRINT TO IDENTIFY WORKS OF ART

Fraudulent copying of works of art and passing them as genuine simply because of a forged signature upon the canvas, has led several French artists to agree that henceforth they will sign their works in thumb print, in order to prevent such frauds. The idea originated with one of the professors of the Sorbonne, the chief French center of learning. It is proposed that the artist shall press his thumb upon the moist paint in some inconspicuous part of the canvas. Sculptors will make their mark on statues by first impressing their thumb in gold powder for bronze statues, or in dye for marble, while engravers could put the print on the back of engravings. The artists will deposit impressions of their thumb prints with the minister of fine arts, and catalogs containing photographs thereof would be in the possession of all dealers. Identification would thus be easy, for even the cleverest swindlers would be unable exactly to duplicate the print of a master's thumb.

¶The total money in circulation in the United States at the beginning of 1914 was \$3,447,368,355.

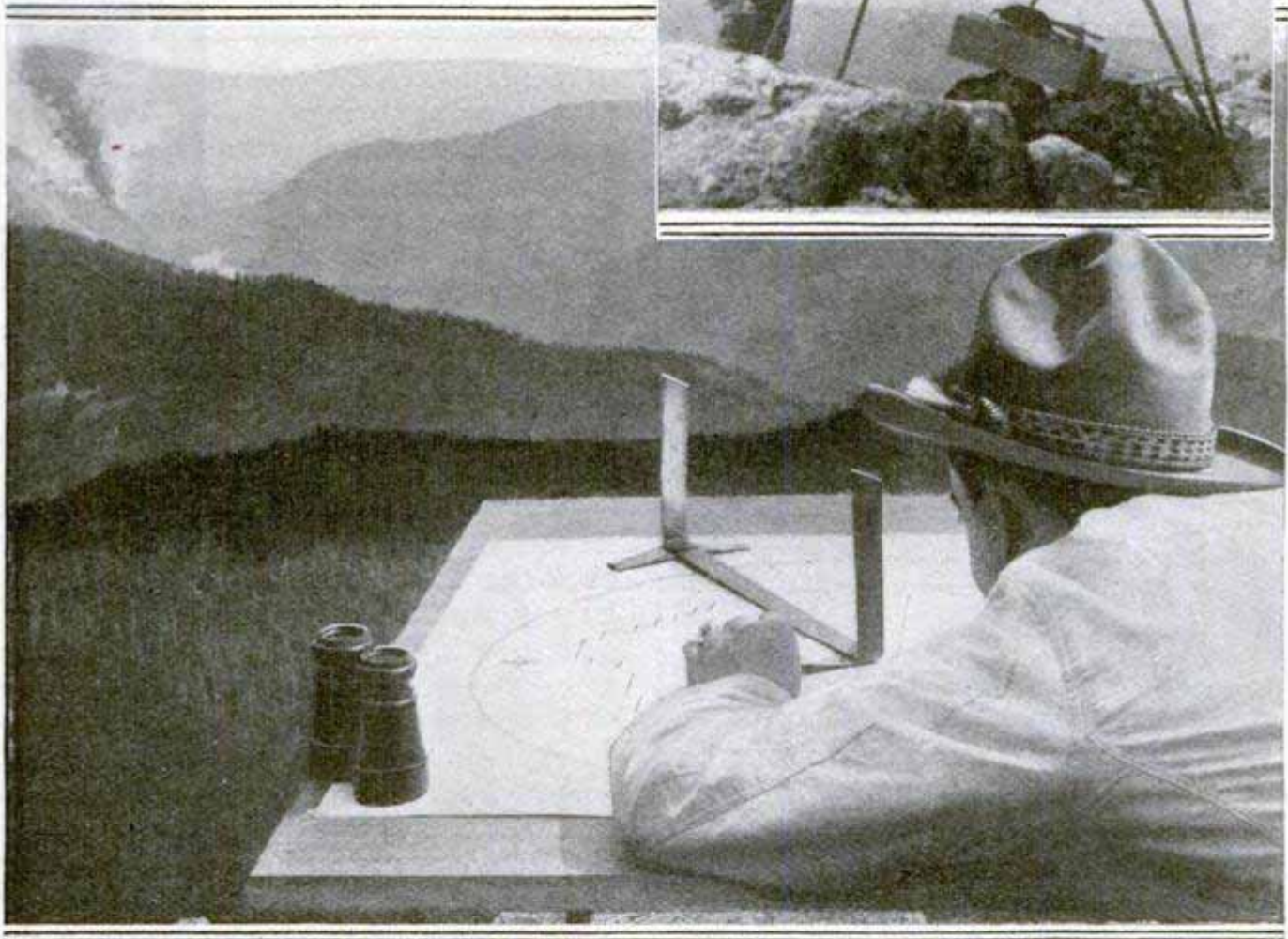
## WATCHING FOR FIRES IN MOUNTAIN FORESTS

Every man in the National Forest Service knows what it means to let a fire get a good start. A few hours spent in fighting a small fire may save days of the hard and dangerous work

indication of a fire is discovered. Each lookout station is equipped with a plane table covered with a map on which a large circle, divided into 360 degrees, is drawn. Over this is placed

At Right: Lookout Station on Harney Peak, South Dakota. The Iron Legs of the Table are Fixed in Solid Rock

Below: Lookout in Cabinet Mountains, Montana, Sighting to a Column of Smoke That Reveals the Location of a Small Fire



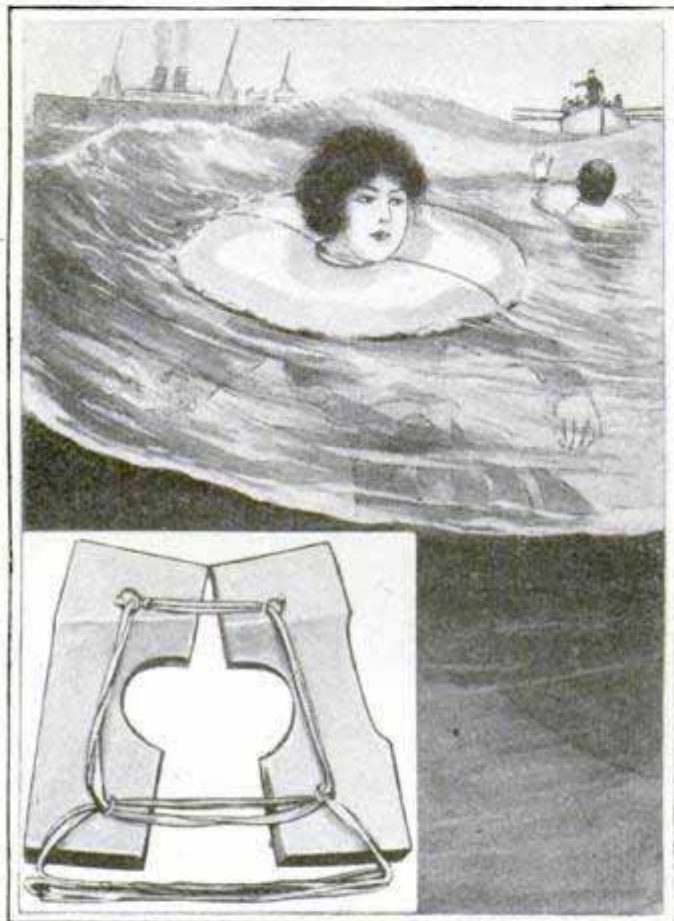
that follows when a fire is allowed to gain headway. The fire-fighting force in the national forests is therefore organized to detect and locate a fire accurately, the moment the first wisp of smoke appears, as well as to get to it and start fighting it without delay. In the mountain forests lookouts are placed on peaks that command extensive views of the forest, a constant watch is kept during the danger season by men equipped with binoculars, and in this way the first

a straightedge which carries two standards for sighting, the straight-edge being pivoted at the center of the circle. When a fire is discovered this instrument is sighted to it and the angle is read at the point where the straight edge intersects the circle. This angular measurement is telephoned to the supervisor's office, and, in combination with a similar measurement from another lookout, serves to locate the fire definitely on the map in the supervisor's office; the

location being found by drawing out the sight lines from the two lookouts to an intersection with each other.

### LIFE PRESERVER THAT FITS THE NECK

A cork life preserver which fits around the neck rather than under the arms and is designed to support even



A Cork Life Preserver Which Fits around the Neck and will Support an Unconscious Person

an unconscious person has recently been placed on the market. The advantage claimed for the new life-saving device is that it does not permit the body to overturn and keeps the head above water under any circumstances. The life preserver is made of block cork covered with cotton drill and has under-arm straps arranged so that the body's weight is carried from rust-proof burrs on top.

As the result of several bad explosions due to sparks, most mine owners now forbid the use of a trolley motor for hauling a car containing powder.

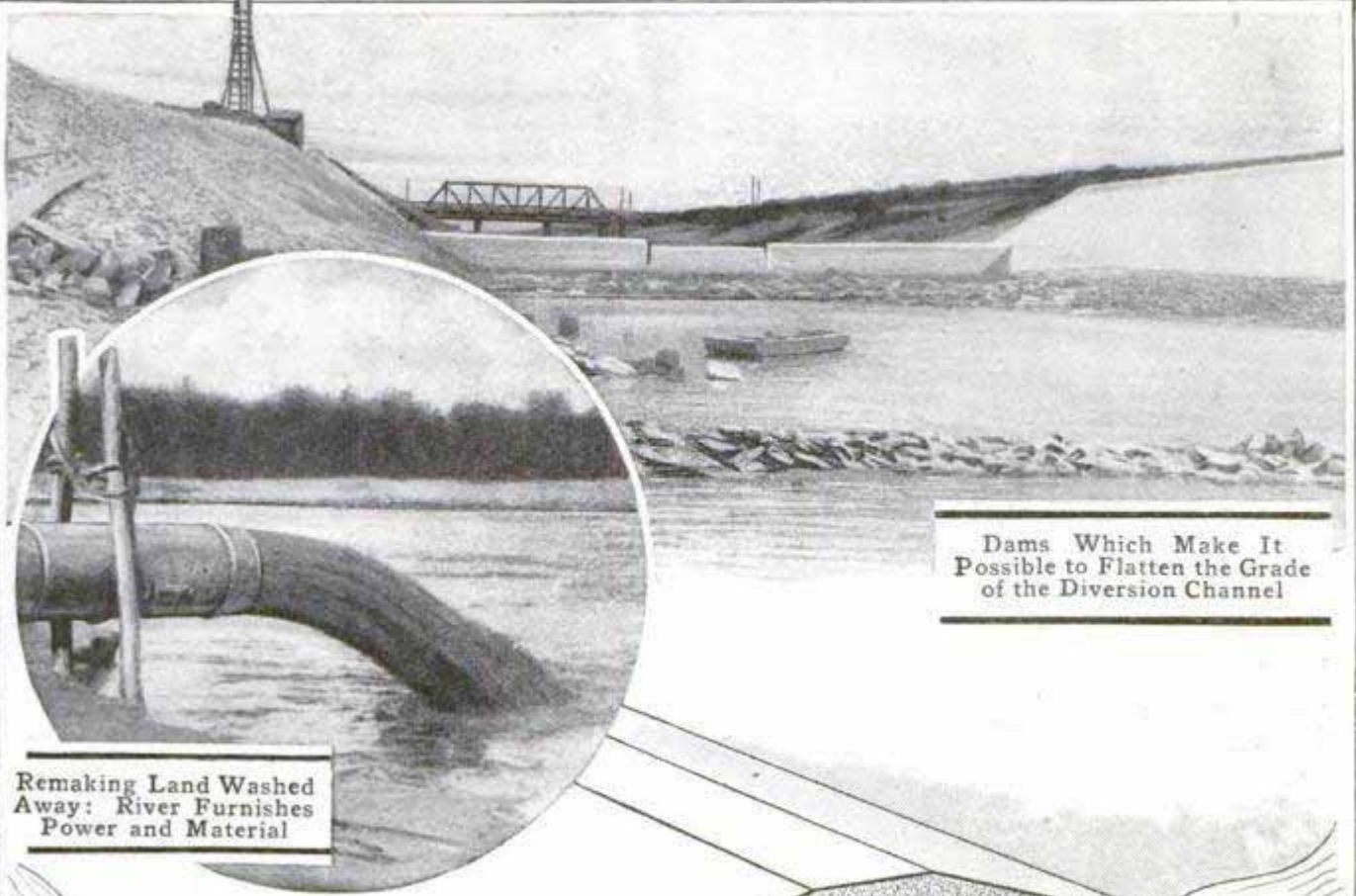
### PROTECTING BOTTOM LANDS FROM FLOOD

Almost every kind of problem that can be met with in flood-protection work was encountered in the work of leveeing and draining the 150 square miles of Mississippi River bottom lands that spread out in a fan-shaped area to the north, east and south of East St. Louis, Ill. This district lies along the east side of the Mississippi River. Through the middle of it flows a small stream known as Cahokia Creek, which drains a 200-square-mile section of upland lying to the east and northeast. In time of flood this ordinarily insignificant stream brings down enormous quantities of water from the hills and becomes almost as great a problem as the Mississippi itself. When the two are in flood at the same time the result is likely to be a disastrous overflow, such as that of 1903 when many lives and millions of dollars worth of property were destroyed. Protection work has just been completed at a cost of \$6,500,000.

Although about 31 miles of levee were required, the problem of holding back the flood waters of the Mississippi was comparatively simple. The real difficulty lay in protecting the district from floods in Cahokia Creek. This was accomplished by means of a diversion channel, 100 ft. wide and 20 ft. deep, which taps the creek at the point where it comes out of the hills and carries its waters west along the northern edge of the district to the Mississippi. This channel is much shorter than the old, and if built on a straight grade, would cause the water to flow at a dangerously high velocity. To overcome this, two dams, both heavily protected with concrete and riprap, were placed near the lower end of the channel, and with the direct fall thus provided it was possible to build the remainder of the channel on a safe grade of 2 ft. per mile.

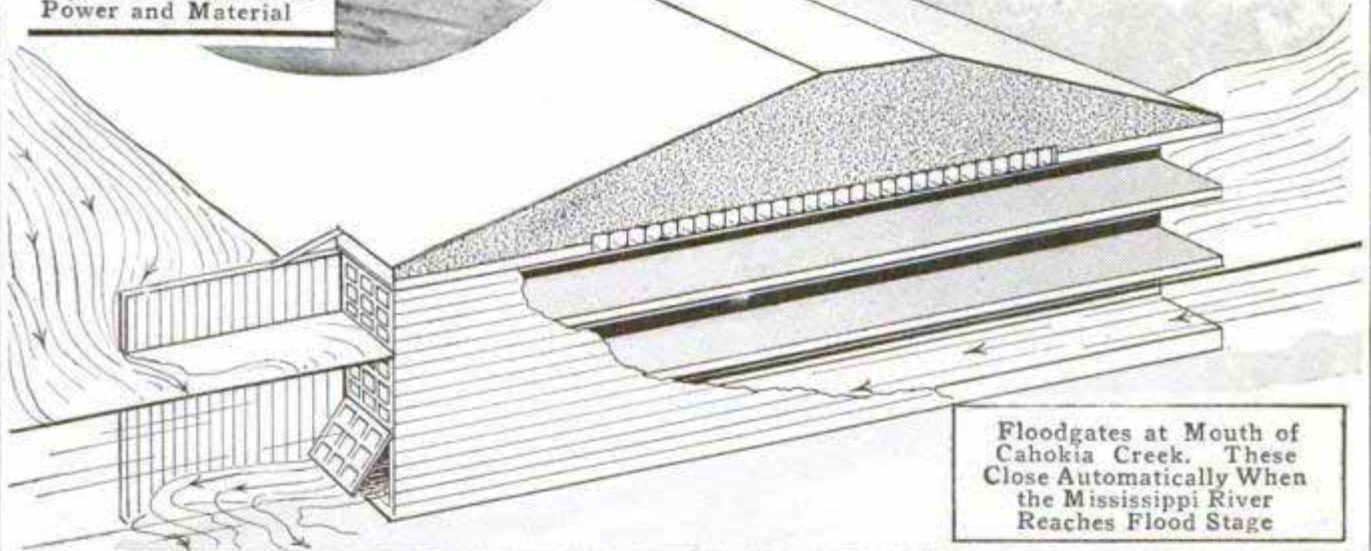
Cahokia Creek is still required to carry to the river most of the local drainage within the district. Where this creek passes through the levee are



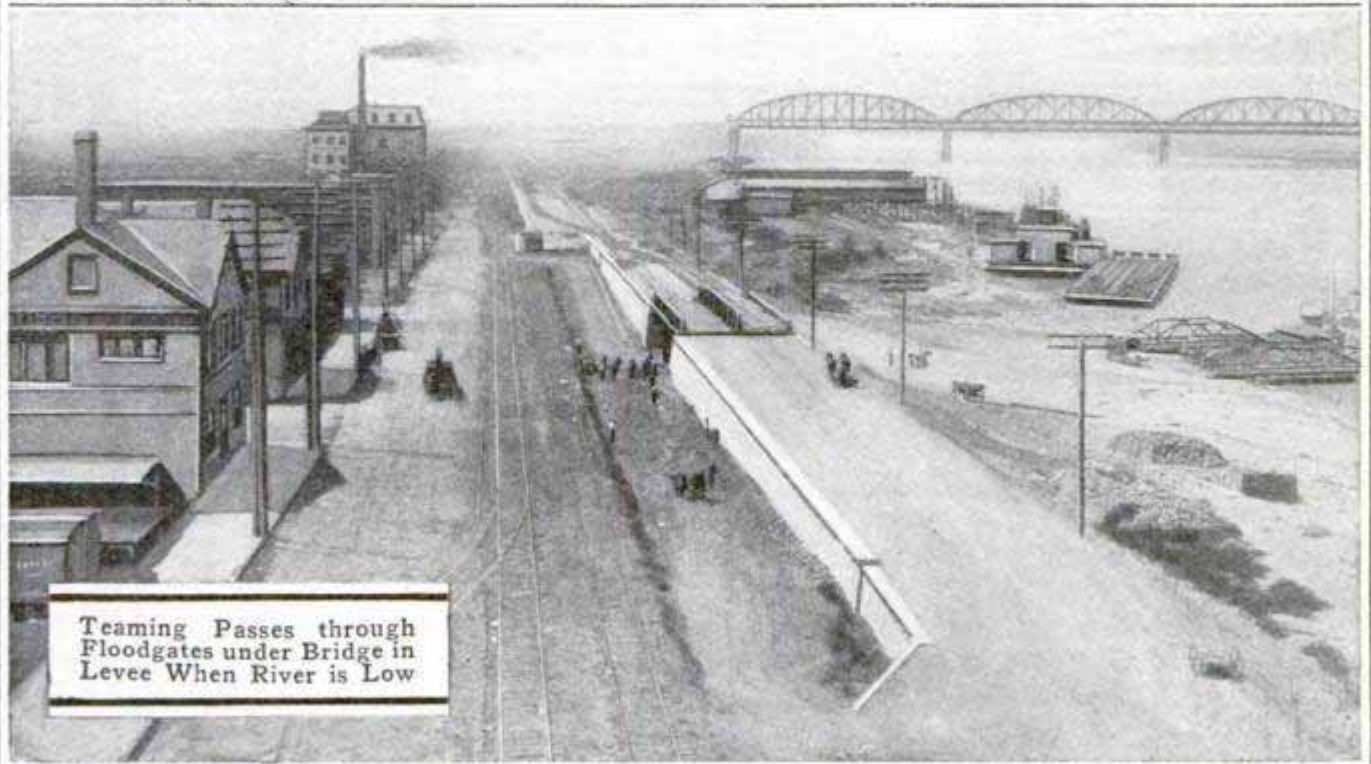


Dams Which Make It Possible to Flatten the Grade of the Diversion Channel

Remaking Land Washed Away: River Furnishes Power and Material



Floodgates at Mouth of Cahokia Creek. These Close Automatically When the Mississippi River Reaches Flood Stage



Teaming Passes through Floodgates under Bridge in Levee When River is Low

three steel floodgates, each 20 ft. high and 25 ft. wide, which permit the creek to discharge its waters through the levee at ordinary stages of the river, but close automatically to shut out the floods of the Mississippi. These gates

are hung vertically and operate like transoms. At one point a large area of land lying behind the levee was raised an average of 25 ft. by a hydraulic dredge pumping sand and silt from the bed of the river.

### CATHEDRAL SPIRES CARRY WIRELESS AERIALS

Recent destruction of the land lines and cables of the Mexican telegraph system by the rebels has brought wireless telegraphy to the forefront as



Wireless Aerials Strung between the Spires of a Mexican Cathedral

the only remaining means of telegraphic communication in that troubled country. At the time the wireless stations were erected, the appropriations were not sufficient to establish the elaborate type of installations common in the United States and Europe, but they are much better than nothing at all, and supplemented by the powerful wireless apparatus of the American and British war vessels scattered up and down the east

and west coasts of Mexico, fairly satisfactory results are obtained.

The intense heat of the tropical days precludes the operation of the wireless on account of the peculiar effect of the sun upon the atmosphere, but at night, messages are sent through the air to all parts of Mexico. Mazatlan, on the Pacific coast, is one of the busiest communication centers, as a great deal of relay work from all directions focuses there. Mazatlan is located in a valley, and a serious obstacle arose in the question of the aerial. To operate a wireless station with any degree of efficiency, the aerial wires must be at least 75 ft. above the instruments. This obstacle was overcome by stringing the aerial wires between the spires of the Mazatlan cathedral. The wireless apparatus is located in a small building in the plaza at the base of this structure.

### PILLARS WILL SUPPORT SINKING TOWN

Vast underground workings of big coal mines, beneath the town of West Scranton, so weakened the supporting strata that alarming sinkages were noticed within the city limits. Two coal companies have agreed to place supporting pillars underground, which, it is believed, will stop the dangerous condition, and prevent further sinking. The barrier pillars will be 100 ft. wide in each of 10 veins which have been mined, and will inclose three sides of a rectangle. The engineers estimate that five years will be required to complete the project.

It is estimated that the mails of the whole world carry nearly 6,000,000,000 picture postcards each year.

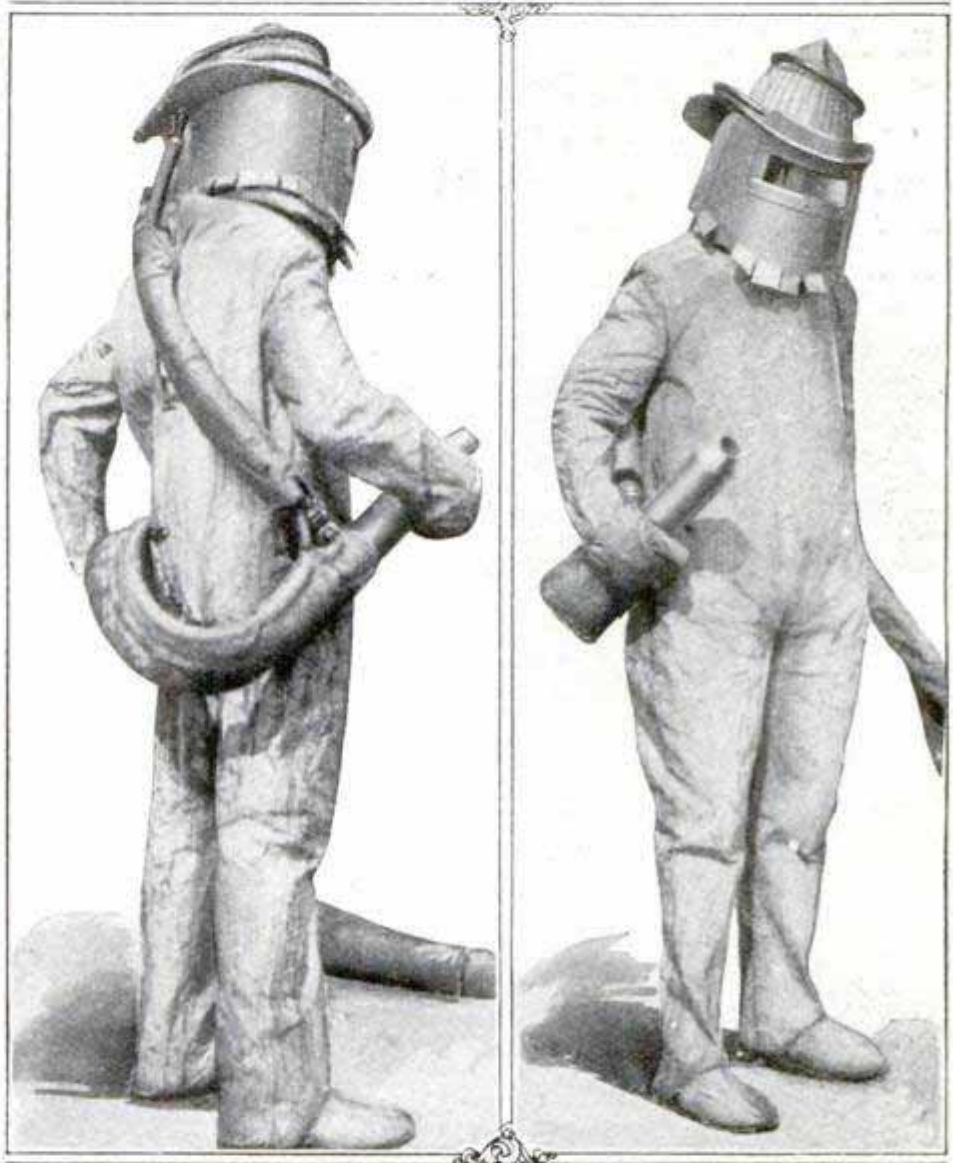
## USING AN OIL FILM TO PREVENT FOG

The city of Lyons, in the south of France, has long been subject to local fogs, which investigation has traced to the evaporation from the two important rivers which join at that point. French scientists who have studied the conditions, propose to float a thin film of oil over the surface of these rivers, preventing evaporation, and eliminating the humidity to which the fog is due. Sufficient funds have been provided by the municipality to experiment with various oils, in the endeavor to obtain such a combination of tenacity and resistance to wave action, as will prove of service. In practice, tow is soaked in oil and submerged in each river a distance above the city, and the oil, rising to the surface, spreads to a thinness of not more than one one-hundred-thousandth of a millimeter, a mere film, which is yet sufficient to stop evaporation of the water beneath, thus preventing fog

## SALAMANDER SUIT SCREENS FIREMEN FROM FLAME

A fireproof suit, consisting of two layers of specially prepared canvas, with space between for flowing water, has recently been invented, by which firemen are enabled to penetrate to the very heart of quite an intense fire without danger. Water connection with the suit is furnished by a half-inch connection with the fire hose, and a perforated ring of brass encircles the

neck through which the water flows down through the walls of the double suiting, and out at the finger tips and soles of the feet. Another perforated ring, surmounting the metal helmet, showers water continually over the



Fireproof Uniform Enables Fire Fighters to Defy the Flames

head and shoulders. Plenty of fresh air is forced into the helmet from an outside supply, pumped by a water motor through a  $\frac{1}{2}$ -in. line of hose spliced onto the fire hose, the motor and air hose being attached to a special section of regulation fire hose which is coupled to the main line. The novel suit can be donned in two minutes, and as it weighs but 25 lb., the wearer is not hampered by the weight. The helmet has mica eyepieces, and its lower part fits under the suit about the neck, making it impossible for steam, smoke or hot gases to penetrate.

The advantage of being able to direct the water directly upon the fire, instead of being obliged to stand at a great distance, is so obvious that the new appliance is interesting fire chiefs the country over.

### MEXICAN RAINCOAT MADE OF PALMETTO LEAVES

The mountaineers of Mexico who have to endure the torrential rains of their climate, wear a serviceable cover-



Mexican Rurale in Palmetto Raincoat

ing made of palmetto leaves, which proves thoroughly waterproof, and is cheaply constructed. A closely woven cloak hung from the shoulders, with a fringe of leaves extending downward from the collar, protects the body of the wearer, while the great hat, its brim turned down, makes a cupola for the

head, and the whole outfit sheds water like a duck. Another advantage is that the palmetto leaves blend so perfectly with the grass and soil, that the wearer is inconspicuous and makes a poor target in a land where targets are perforated on the slightest provocation. The photograph is that of a member of the "rurales," or constabulary, of Mexico.

### MEMBERS OF CONGRESS MAY VOTE BY ELECTRICITY

A subcommittee of the House of Representatives is considering a proposed system of recording and registering the votes of members by means of an electrical device, operated by a series of buttons placed on the desk of each member. A member of Congress from New Jersey, himself an electrician, has evolved the system, which seeks to eliminate the waste of time necessitated by the long roll calls, in which not less than 40 minutes is consumed, while by the installation of the new system not more than five minutes will be necessary to record and tabulate the vote and announce the result. One of Thomas A. Edison's earliest inventions was a device for recording votes electrically, but at the time it was made, more than 40 years ago, he could get no encouragement for its development.

### \$10,000 PRIZE FOR NEW TIRE MATERIAL

A nonrubber automobile tire which will be cheaper than the present kind, yet possess certain standard resiliency and durability, is being sought by the war department of Austria, and a prize of \$10,000 will be awarded to the person who fulfills the conditions, submitting a small or working-size model suitable for motor freight wagons, on or before June 30, of this year. Besides the specific attributes of pure rubber, such as adhesiveness and elasticity, the new material must not be heavier than pure rubber, and it must be more economical in use.

# A TRIP ACROSS THE ATLANTIC

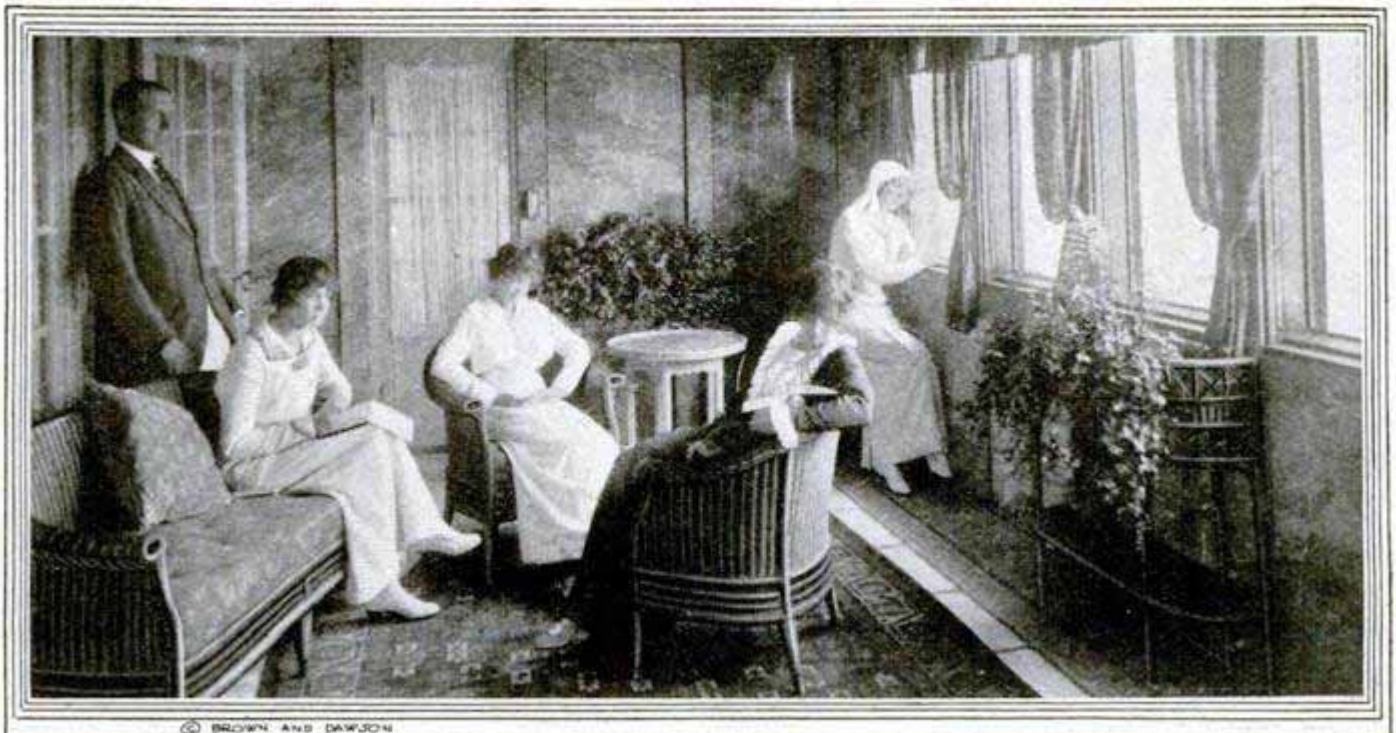
II



Sand Boxes on the Deck  
Provide Amusement for the  
Younger Children.

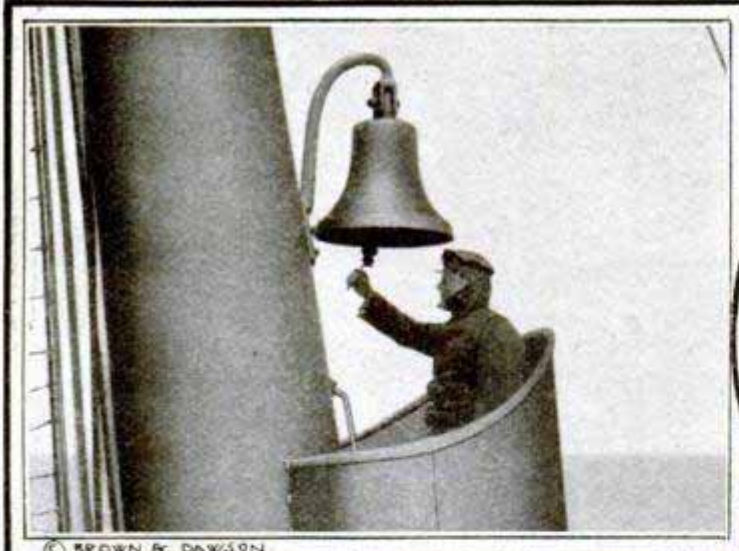
**I**N THIS second series of photographs illustrating a voyage across the Atlantic in a great modern passenger steamship, some of the more interesting and elaborate provisions for the safety, comfort and entertainment of the passengers are shown. Today ocean travel is more luxurious than ever before, but its cost has not increased proportionally to the accommodations provided.

Few people realize how much less expensive it is to travel by sea than on land. The first-class railroad rate from Chicago to San Francisco, for instance, is \$59.75, to which must be added the cost of a Pullman berth and of meals en route. This figures out at nearly  $4\frac{3}{4}$  cents a mile for transportation alone, while the first-class rate for the 3,300 miles between New York and Southampton, which includes both meals and comfortable sleeping quarters, amounts to less than four cents a mile, and the second-class rate on the largest ships takes the traveler across the ocean, feeds him and provides his bed, all for less than  $2\frac{1}{2}$  cents a mile.



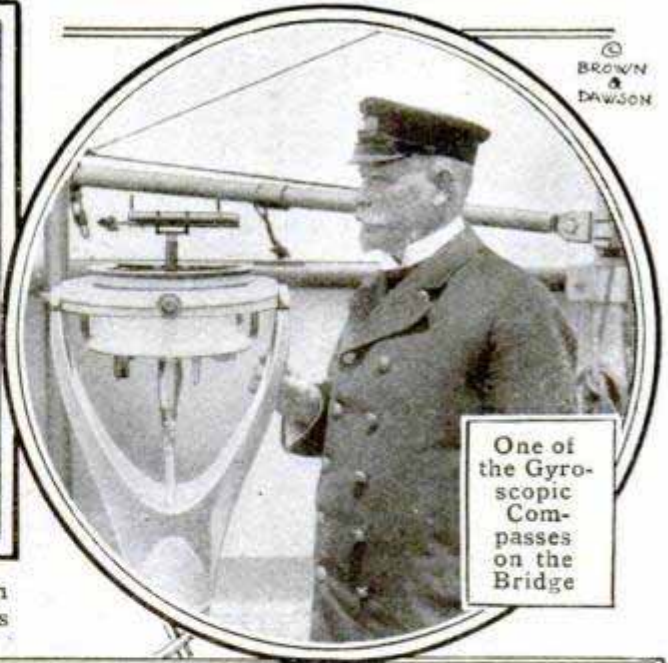
© BROWN AND CAWTON

This View of One of the First-Class Suites Gives an Idea of the Luxury Attainable in Modern Travel

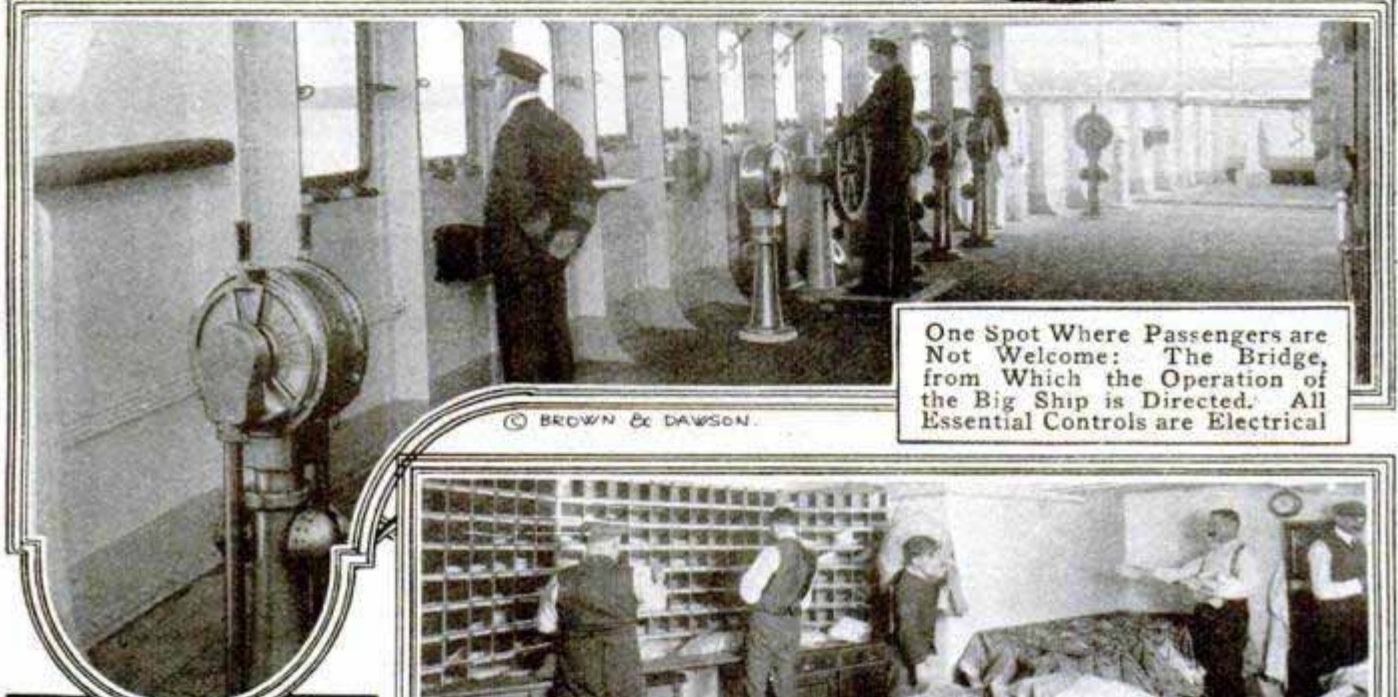


© BROWN & DAWSON

"All's Well." The Lookout in the "Crow's Nest" on the Foremast Watches for Icebergs and Other Ships



One of the Gyroscopic Compasses on the Bridge



© BROWN & DAWSON

One Spot Where Passengers are Not Welcome: The Bridge, from Which the Operation of the Big Ship is Directed. All Essential Controls are Electrical



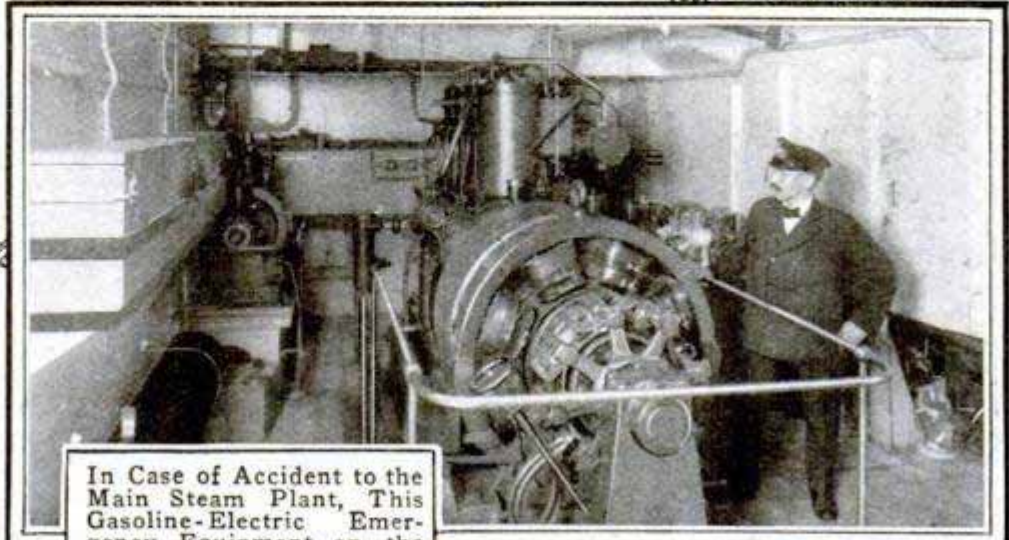
The Sea Post Office, Where American and European Postal Clerks Route All Mail

© BROWN & DAWSON



© BROWN & DAWSON

A Telephone Booth: One may Talk to Any Part of the Ship



In Case of Accident to the Main Steam Plant, This Gasoline-Electric Emergency Equipment on the Upper Deck would Keep Lights and Wireless Going

© BROWN & DAWSON



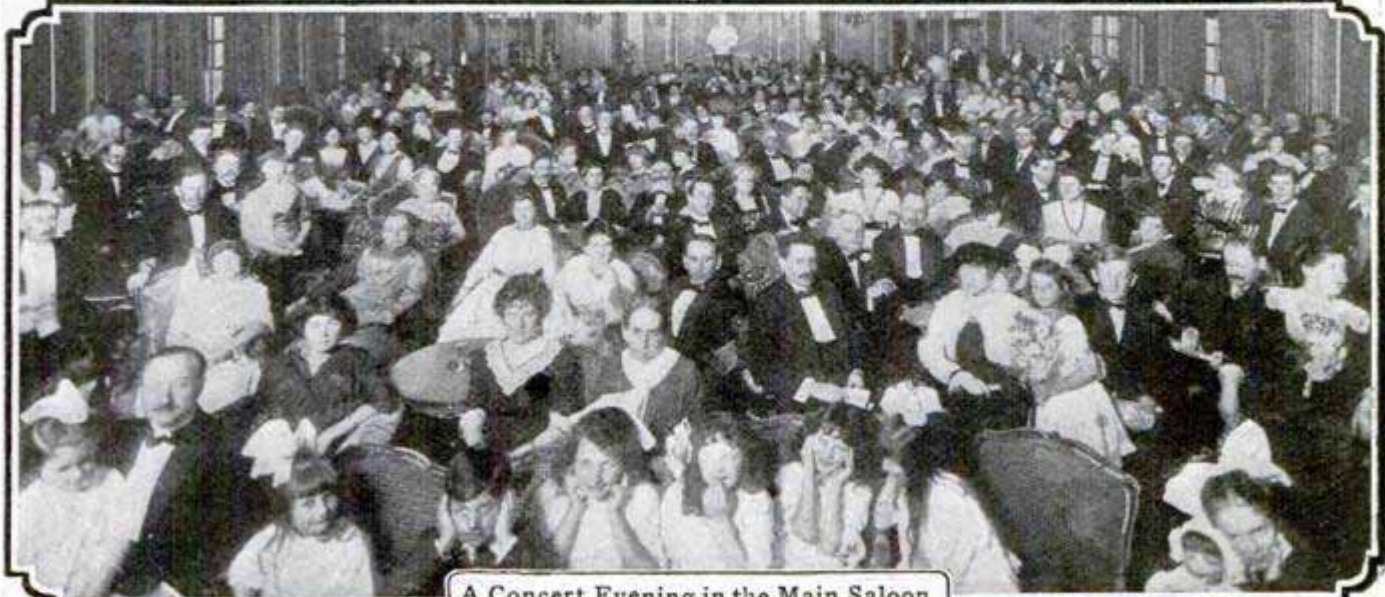
BROWN AND DAWSON PHOTO

Third-Class Passengers are Not Barred from the Comforts of Deck Chairs



BROWN AND DAWSON PHOTO

A Scene in the Third-Class Smoking Room—Plain but Comfortable



A Concert Evening in the Main Saloon

© BROWN AND DAWSON

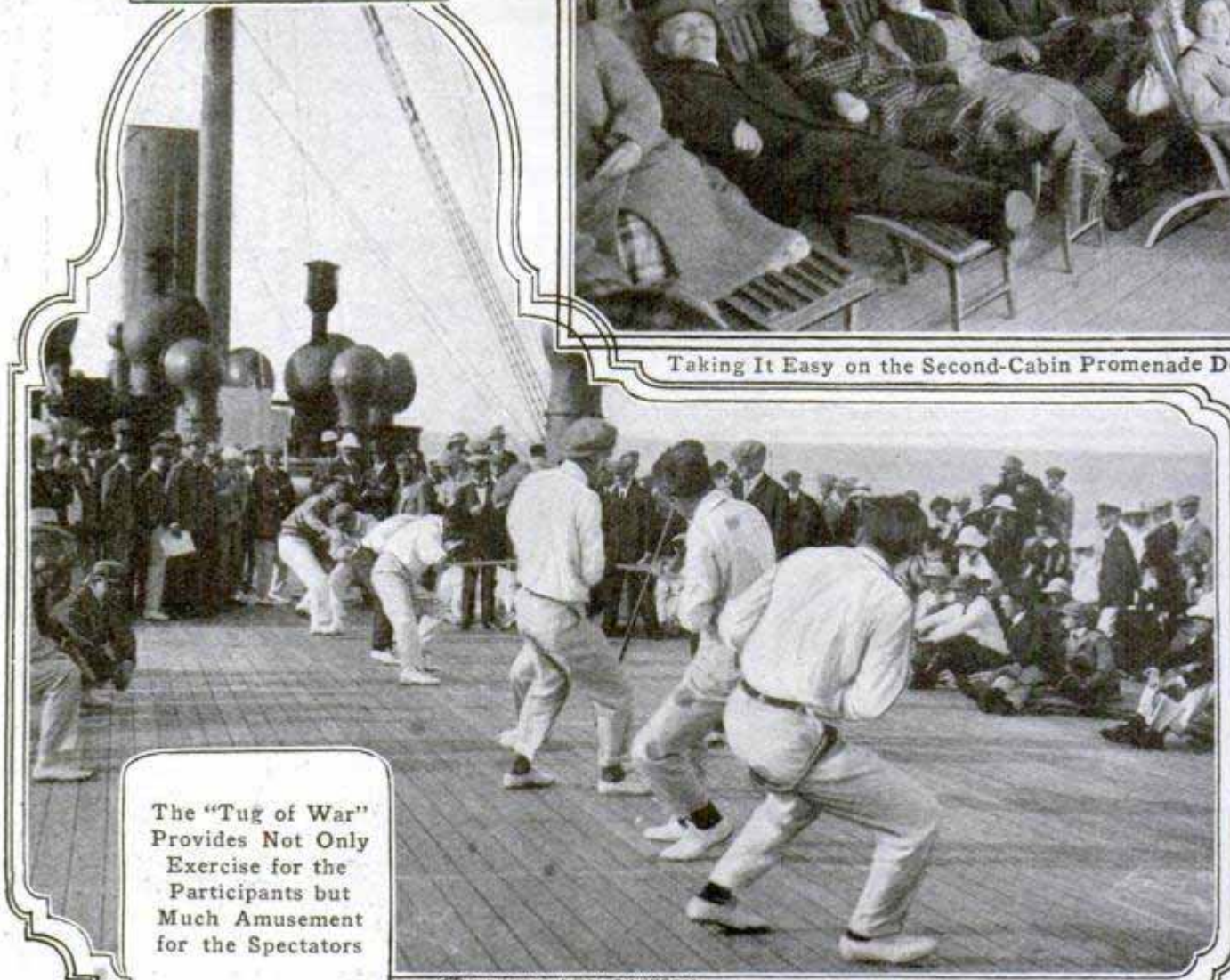


© BROWN AND DAWSON

Sports and Games Break the Monotony of the Days at Sea: A Three-Legged Race on Deck



Taking It Easy on the Second-Cabin Promenade Deck



The "Tug of War" Provides Not Only Exercise for the Participants but Much Amusement for the Spectators

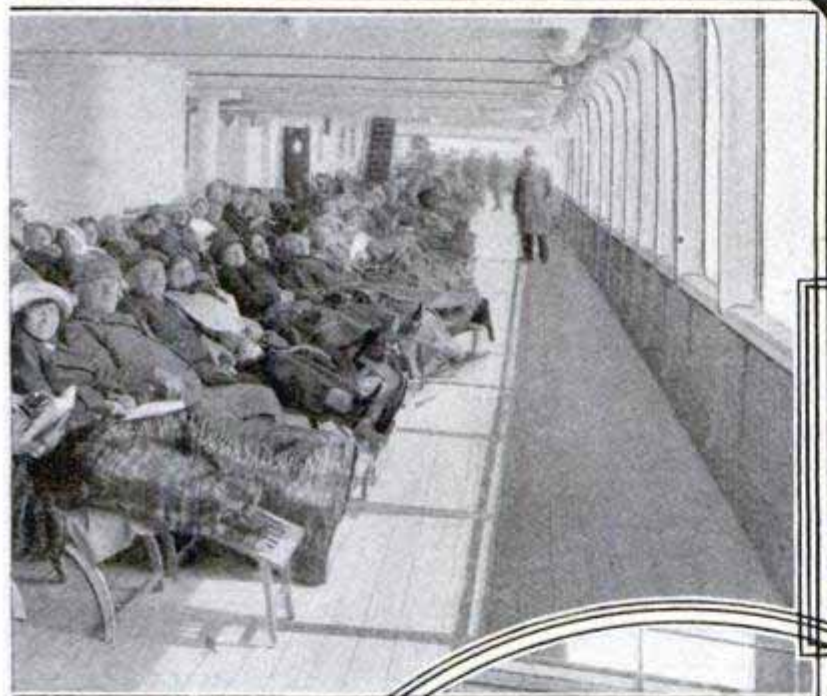
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PHOTO BY BROWN AND DAWSON

First-Cabin Passengers Watching a Girls' Potato Race on a Sunny Day at Sea



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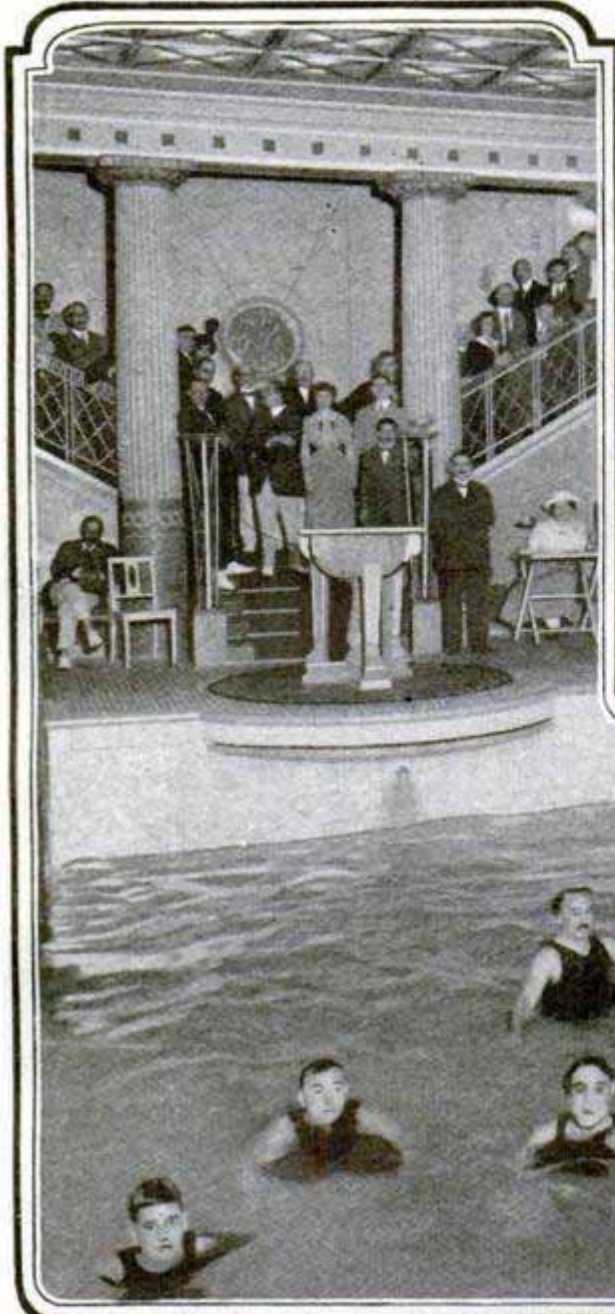
PHOTO BY BROWN AND DAWSON

The Children Enjoy Listening to the Stories the Social Director Tells Them

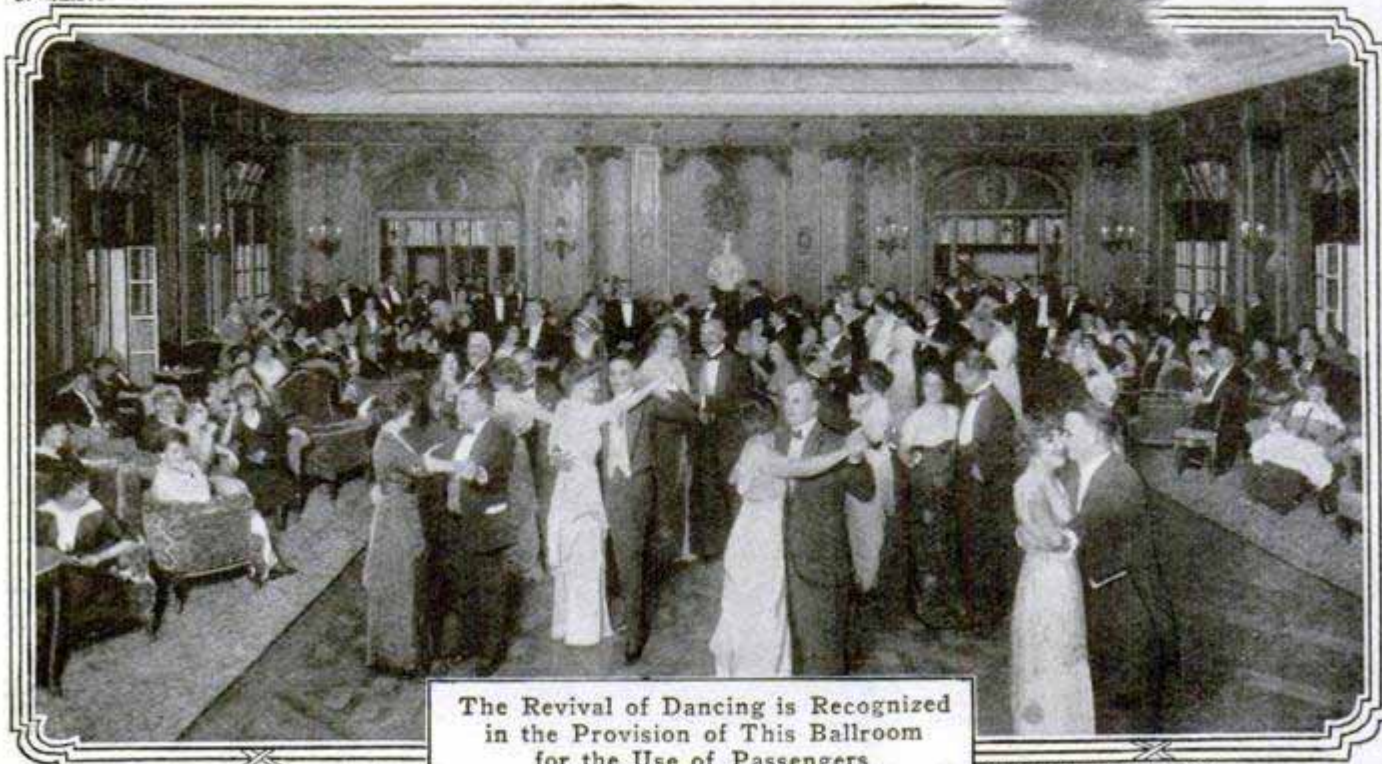


Fresh Flowers can be Had Every Day from the Greenhouse on Deck

© BROWN AND DAWSON



In the Marble Swimming Pool of the Roman Baths



The Revival of Dancing is Recognized in the Provision of This Ballroom for the Use of Passengers

Luncheons  
between Meals  
and Afternoon  
Tea are Served  
by Stewards  
on the Decks



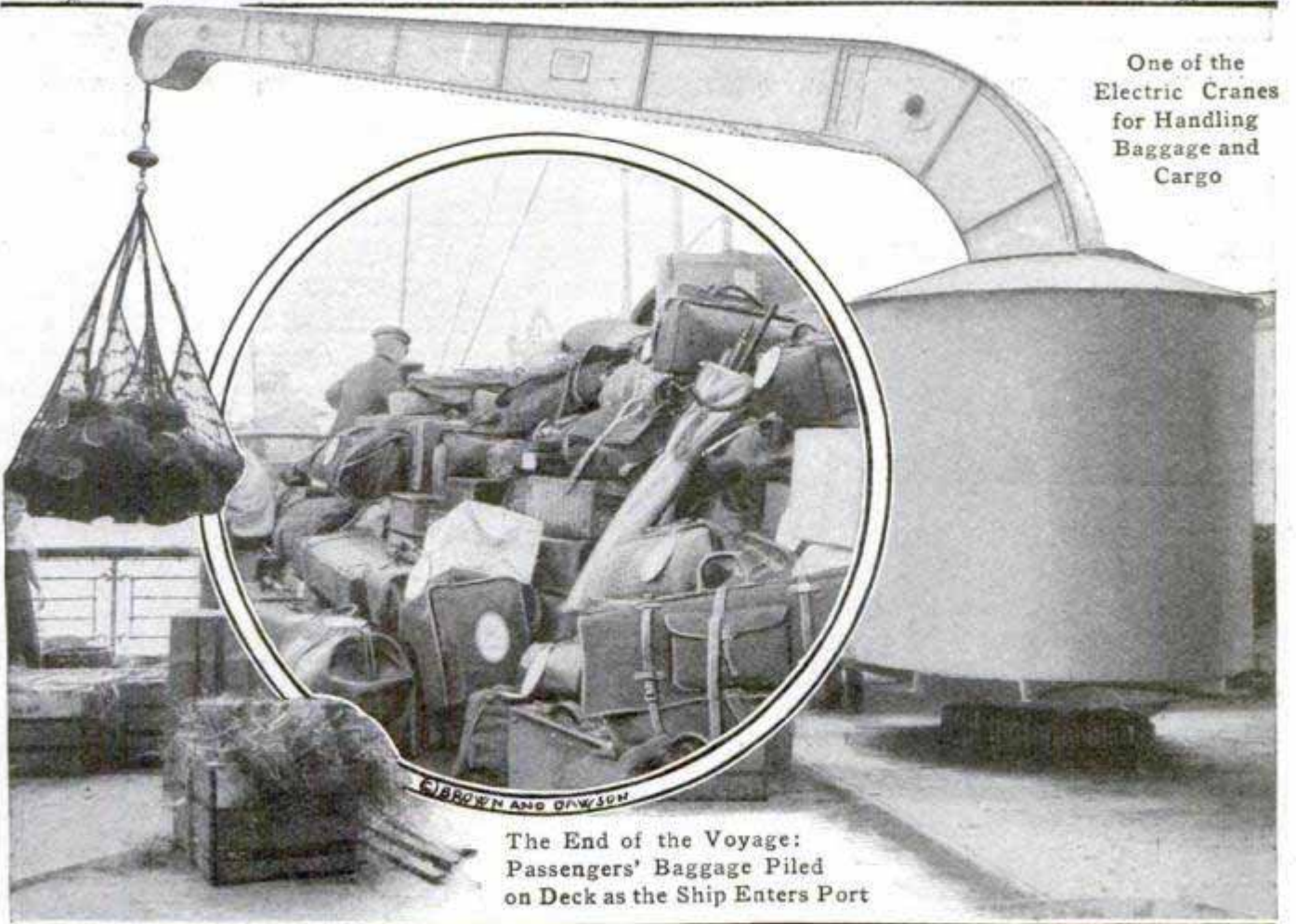
The After  
Deck Gives  
Fresh Air  
and Quiet

BROWN AND DAWSON



BROWN  
AND  
DAWSON

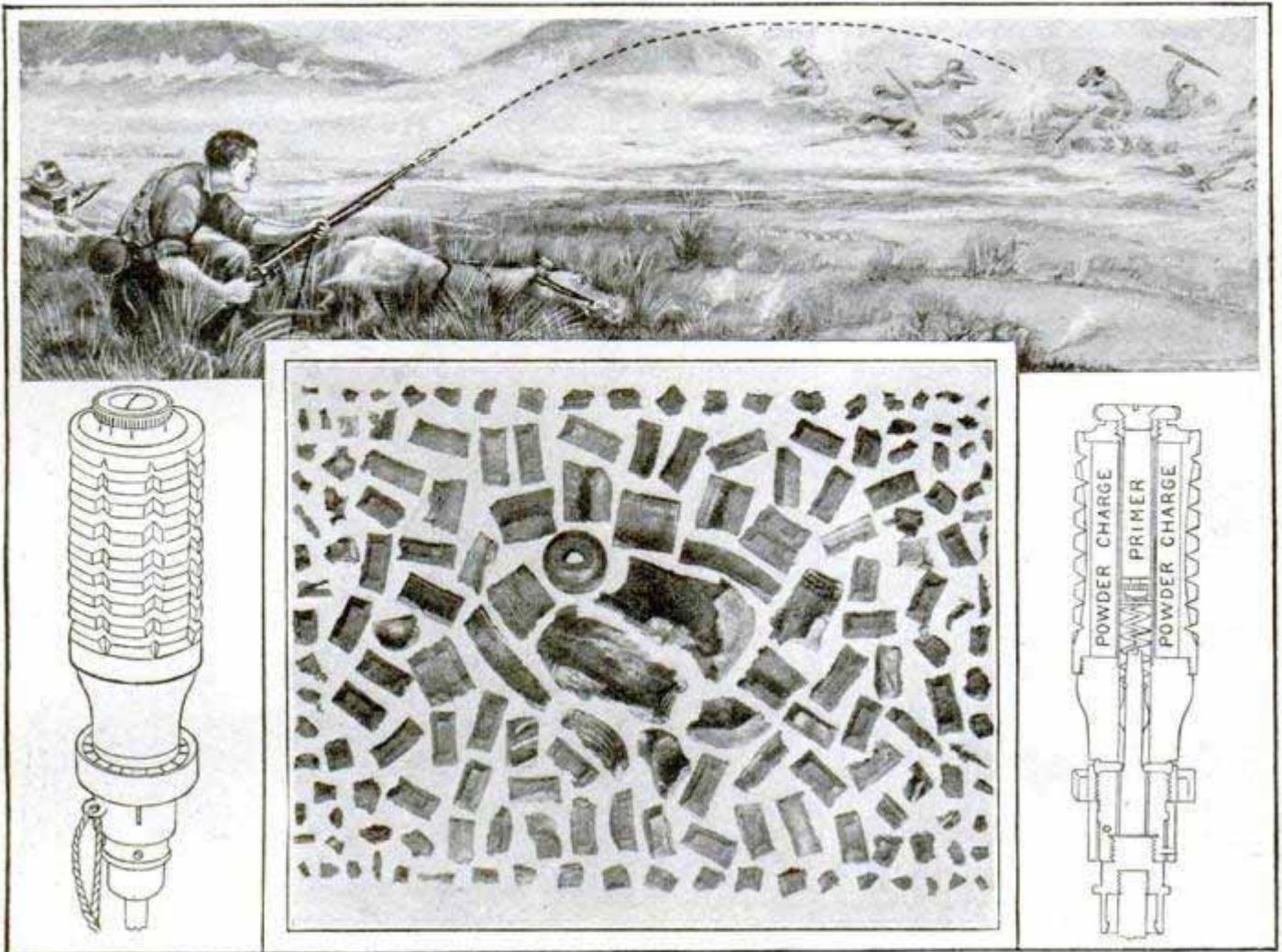
One of the  
Electric Cranes  
for Handling  
Baggage and  
Cargo



The End of the Voyage:  
Passengers' Baggage Piled  
on Deck as the Ship Enters Port

PHOTO BY BROWN AND DAWSON

## GRENADE THAT IS FIRED FROM A RIFLE



A New Type of Explosive Grenade That is Fired from a Rifle and can be Carried by Infantry Troops

With the development of the rifle grenade to the point where it may be fired without danger of premature explosion and with practical certainty that it will explode when it hits the ground, even at a sharp slant, so effective an instrument of offense and defense has been provided that it is likely to bring about important changes in military tactics. Before the advent of long-range guns, when opposing troops would often get close enough to each other to make it possible to use such missiles effectively, the hand grenade was one of the indispensable implements of warfare. Now, it appears, the same implement, fired from a rifle, is to become more important than ever.

The rifle grenade has already been adopted in some countries as an integral part of the soldier's equipment, and is likely to come into general use

among the armies of the world. It is expected that it will to a great extent supplant the use of the bayonet and do away with the necessity for close-quarter fighting, as it will provide a means for attacking trenches and covered positions and rendering them untenable without recourse to hand-to-hand combat. The grenades can be fired singly or in volleys and the effect of volley firing with such weapons would probably be astounding. In hilly country especially, where the bringing into action of field pieces is extremely difficult, the use of the grenade will prove of incalculable benefit to the troops equipped with it.

This new man-killing device consists of a cylindrical metal case with a rod projecting from one end for insertion in the barrel of the rifle. Inside the metal case, which is deeply serrated so that it will break into

numerous fragments when exploded, is a cylindrical mass of some explosive. Through the center of the explosive is a hole for the detonator and the firing pin, which are arranged so that the pin will be thrown against the detonator and will explode it when the grenade strikes the ground or other object. The firing pin is provided with a shoulder near the lower end, and is held rigidly in place by transverse pins that bear against this shoulder. When the grenade is fired from the rifle the impact against the air sets a small vane wheel in motion, which draws the pins out of contact with the shoulder and releases the firing pin, but not until the grenade has reached a point 15 yd. from the muzzle of the gun. The firing pin is then free to plunge against the detonator and explode it the instant the grenade strikes any object. In this way all danger of premature or accidental explosion is prevented, while the grenade is made a reliable and effective weapon for use against the enemy. For effective work, especially at close range, the rifle is fired at a high angle with a resulting dropping fire, after the manner of a mortar, the desired angle of elevation being obtained by means of a combined sight and angle-measuring instrument fitted to the rifle stock just below the back sight.

### LIFEBOATS ARE EQUIPPED WITH WIRELESS

The latest application of wireless as an aid to navigation is the equipment of the lifeboats of the new transatlantic liner "Aquitania" with Marconi apparatus. With a skillful operator on board and with the storage batteries well charged, there need now be no danger of a lifeboat loaded with refugees drifting away, out of the steamship lanes, to dreadful death. The rapid increase of wireless operators may make this plan of high service, although its complete utilization calls for the extreme limit of efficiency and preparedness in the ship's company.

### IRON SPIKES GIVE AID IN SCALING THE ALPS

The difficulties encountered by Alpine climbers make the ascent of the famous peaks an arduous undertak-



Alpine Climbers on a Stairway of Spikes

ing, even under the most favorable circumstances. In some dangerous spots helps in the shape of iron steps, or ladders formed by driving spikes into the steep sides of the mountain, are resorted to. Even with these aids, the men and women who attempt the feat must be prepared for strenuous exertions. The way to the top is difficult and often dangerous. Many lives are lost every year. The view given here shows how the iron spikes are driven into a mountain side.

## POWERFUL TURBINES OF THE "VATERLAND"

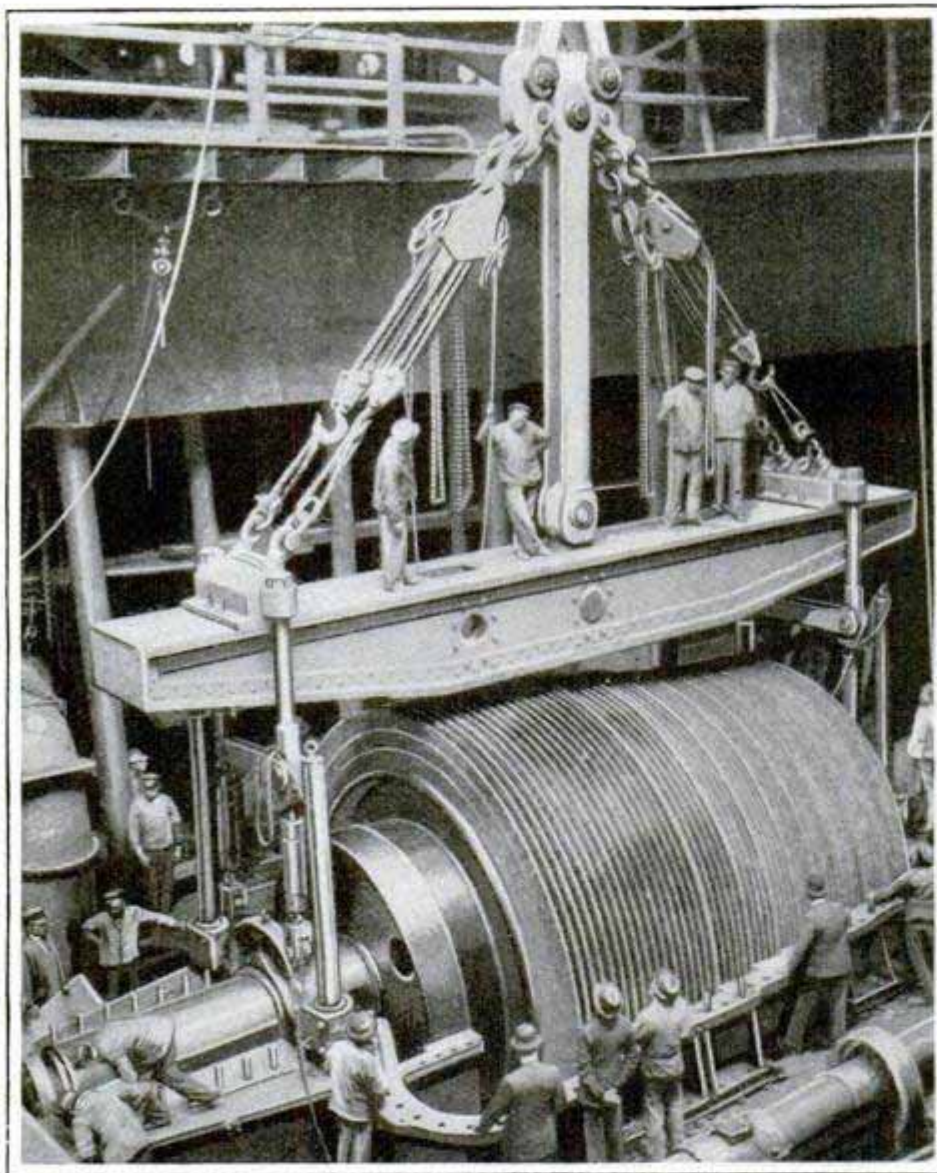
The most powerful steam turbines ever installed aboard ship are those for propelling the "Vaterland," the largest ship in the world, which is now being completed at Hamburg, Germany. The turbines and the last of the other heavy machinery are being placed in position and it is expected that this vessel will make its first trip across the Atlantic early this summer. The turbines are of the Parsons type. Some idea of their size may be obtained from the illustration showing one of the rotors being lowered into position in the ship. This rotor is  $17\frac{1}{2}$  ft. long and 17 ft. in diameter, weighs

from the fraction of an inch at the small end to nearly two feet at the large end of the turbine. The turbine of which this rotor is a part is capable of developing over 22,000 hp. The "Vaterland" is a sister ship of the "Imperator," which entered the transatlantic service in the summer of 1913, but surpasses that ship in every dimension, being 950 ft. in length, 100 ft. in beam, and having a carrying capacity of 58,000 tons.

### TECHNICAL TERMS USED BY ROPE MAKERS

With the average man a rope is simply a rope. But among makers, as well as among sailors and other expert

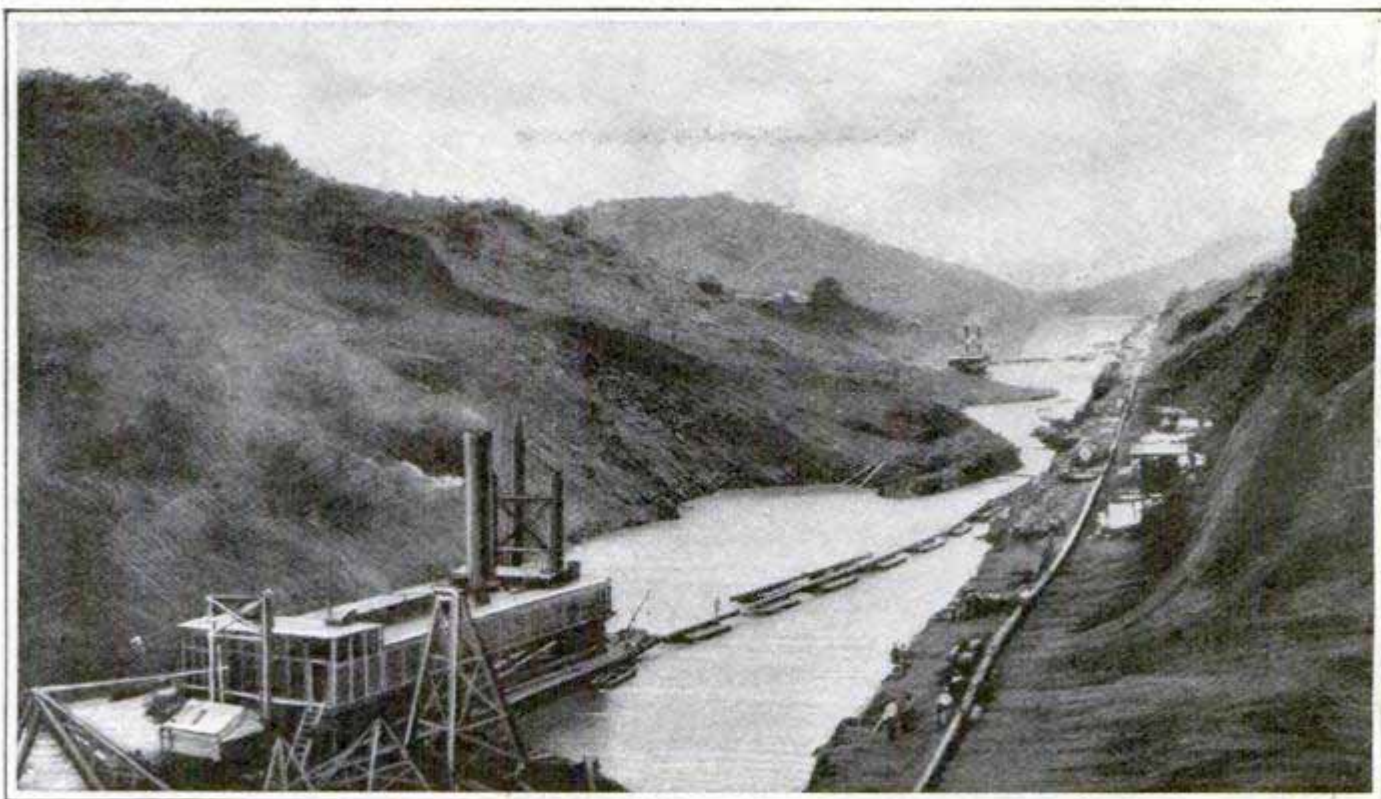
users, a number of exact technical terms are in use for distinguishing the different parts and types of this common commodity. One curious feature is that fiber and steel ropes are measured in different ways. When the size of a fiber rope is given, the dimension refers to the circumference, while with a steel cable it refers to the diameter. Thus a 5-in. fiber rope is one having a diameter of about  $1\frac{9}{16}$  in. In the manufacture of fiber rope, three or more strands twisted together form what is called a common-laid rope. Each of these strands, in turn, has been made by twisting together two or more yarns or threads, the latter consisting simply of a number of fibers twisted firmly together. The strand has a twist opposite to that of the



Lowering a 135-Ton Rotor into the Hold of the "Vaterland." The Turbine of Which This is a Part is Capable of Developing over 22,000 Horsepower

135 tons, and is studded with thousands of blades varying in length

yarns or threads, while the rope has a twist opposite to that of the strands



Dredging a Channel through the Cucaracha Slide in the Panama Canal

that compose it. The degree of twist is designated as the lay, which is a term used for giving the number of twists per foot of rope. The more twists to the foot, the harder will be the rope, and the lay is therefore often given as varying degrees of hard and soft. Where the strands are twisted together in a clockwise direction the resulting rope is right-laid. If the twist is in the opposite direction the rope is left-laid. A hawser and a hawser-laid rope are not the same thing. The first is simply a large common-laid rope suitable for towing, while the hawser-laid or cable-laid rope is made of three or four common-laid ropes twisted together. A piece of rope 1,200 ft. long is called a coil, while one half that length is called a half-coil.

### SLIDE THAT FILLED THE MAW OF PANAMA

Cucaracha slide has been the bane of Panama. Lying toward the southern end of Culebra Cut, the earth here has slipped and slid, as the canal was deepened and widened, until the so-called "angle of repose" was reached, where it was supposed no more movement would take place. But the pressure of

the masses of earth, at Gold Hill and on the opposite side of the canal, was so great that apparently the softer under strata of earth flowed out toward the canal, and an earthen glacier moved hundreds of thousands of cubic yards into the cut. The photograph gives an accurate view of the slide, and shows the dredges attacking it from either end. In less than two months the slide had been cleared sufficiently to permit the passing of vessels.

### COMPACT SELF-HEATING SOLDERING IRON

A particularly compact self-heating soldering iron is here shown.



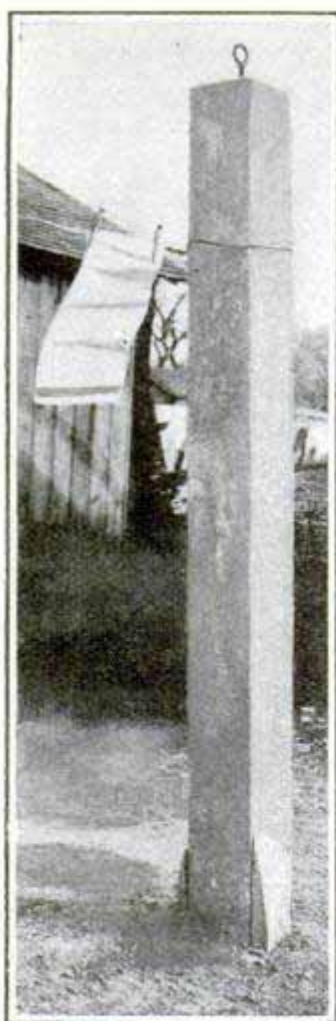
The fuel is carried in the handle. Any degree of heat may be had in a few moments, and the operating cost is about two cents a day. The iron can be converted into a torch by attaching a brazing burner to the generator, and may also be used as a branding iron.



Curious Sight in Cairo Tailor Shop

### CHEAP WAY OF BUILDING CLOTHESLINE POST

A good example of economical construction is shown in a concrete clothesline post



as shown, and serves as a hold for the clothesline.

made by an enterprising suburbanite. The cement and crushed stone were obtained from the surplus left after building a sidewalk, while the reinforcing consists of old wagon end-gate rods dug out of a scrap heap. The form for molding the post was made from old boards that were lying about the place, and the work was done by the owner. One of the end-gate rods was allowed to stick out at the top,

### CAIRO TAILORS IRON WITH THEIR FEET

Of all the curious sights marked by travelers in the East, none occasions more comment than the strange custom observed in the bazars of Cairo, where tailors still use their feet in ironing and pressing clothing. A broad flatiron with a long handle is used, and a block of wood is fitted over the hot iron, upon which the tailor places his foot. He manipulates the iron by means of the iron handle. The posture assumed by these workmen appears to be awkward in the extreme, but it seems to cause them no inconvenience.

### GOVERNMENT PUTS AIRMEN TO RIGID TESTS

Before granting a certificate to airmen, the U. S. Army Signal Corps requires the applicant to pass certain tests of proficiency. He must make a cross-country flight of 20 miles, or more, at a height of at least 1,000 ft. With the wind blowing not less than 15 miles an hour, he must fly for five minutes. Again he must show his proficiency by carrying a passenger to a height of 500 ft. and, on landing, bring his machine to rest not more than 150 ft. from a designated spot, with his



engine entirely shut off before reaching the ground. He must volplane to the ground from a height of 500 ft. with the engine shut off, in another test, stopping the machine within 300 ft. of some point marked by the umpires. The last test required is a military reconnaissance flight of not less than 20 miles, bringing back information concerning the lay of the land, or other specific matters upon which he is ordered to report. In this flight he must maintain an average height of 1,500 ft. above the ground.

Apple wood is used for making saw handles and also for making many of the so-called brier pipes.

## POWERFUL SEAGOING TUG FOR PORTLAND

To enable the largest type of vessels and steamers to negotiate the Columbia Bar, the Port of Portland Commission has authorized the construction of a powerful tug, which will rank with the largest on the Pacific coast. The new vessel will be 165 ft. long, with 30-ft. beam and a draft of from 17 to 20 ft., and will be equipped with a triple-expansion engine of 2,000 hp., two boilers, a powerful towing machine, together with a wrecking pump and a steel boom forward, capable of lifting 15 tons. The new vessel will also have a complete wireless outfit.

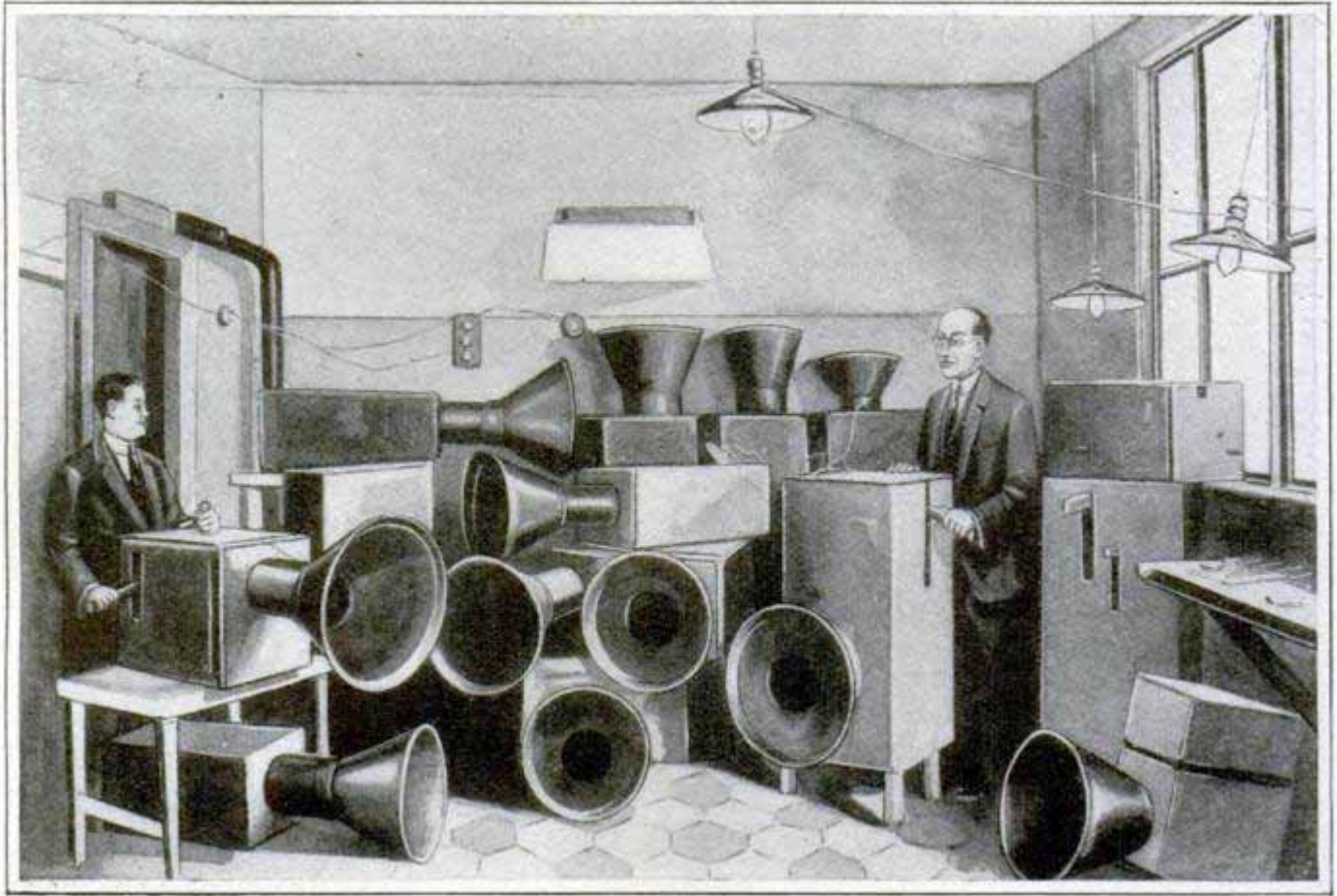
## LARGEST MASONRY ARCH UNDER CONSTRUCTION

A fine example of scaffolding is shown in a bridge recently constructed in Switzerland. The bridge itself is about 950 ft. long, and the central arch, shown in the photograph, is over 205 ft. high, with a span of 330 ft., making it, for the moment,

at least, the largest masonry arch in the world. The graceful fan-shaped supports of the scaffolding, while by no means unusual in bridge building, are infrequently seen by others than bridge engineers and construction men. A railway will run over this bridge when completed.



Archway for Viaduct at Langwies, Switzerland



This "Orchestra of Odors" Produces a "Symphony of Scent"

### INDIAN SQUAW CARRYING FOWLS TO MARKET

The Mojave Indians, living on the outskirts of Needles, Cal., engage in poultry farming, and dispose of their product in the city markets, trudging long distances with the chickens tied to boards which the squaws carry on their heads. The fowls are bound with broad linen bands, so as not to interfere with circulation. The Indians, it is said, do not eat



chickens, owing to a superstition, although they do not hesitate to sell them to people who do eat them.

☐ In the foundry of one big automobile factory an average of 18,000 lb. of aluminum is used each working day.

### ORCHESTRA OF ODORS FOR NEW CONCERT

An Italian has invented an electrically operated machine for propelling distinctive odors by which he purposes to produce in a Milan theater a "Symphony of Odors." The inventor insists that a degree of harmony may be sensed through the olfactory nerve not unlike that sensation we term music when sensed through the auditory nerves. Instead of a "Polonaise in E Flat," he would give a "Fantasie in Violets," or a "Nocturne in Apple Blossoms." By combining a number of these instruments, he declares he is able to produce arpeggios of perfume, harmonics of fragrance and haunting nuances of scent which will rival, if not surpass, the crashing chords and melodious phrases of master musicians.

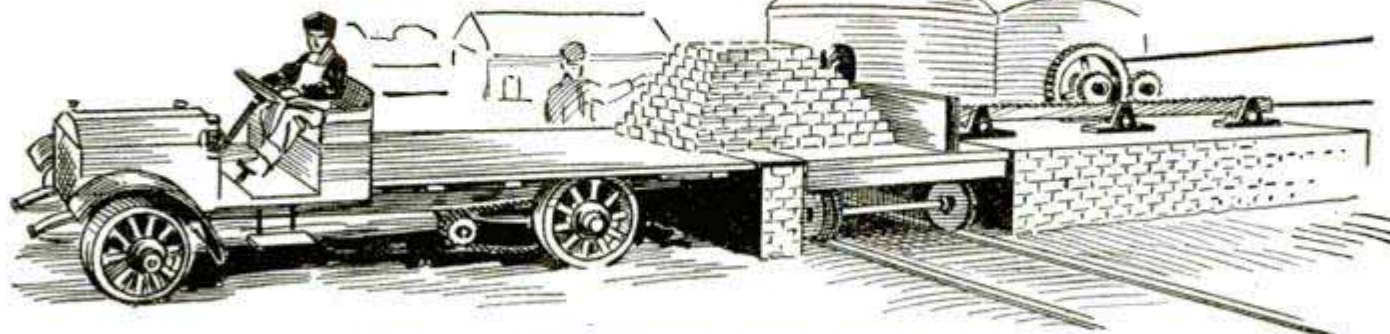
☐ Machinery and equipment used in building the Panama Canal are to be sent to Alaska for railway and coal-mining work.

## EACH TYPEWRITER HAS ITS OWN CHARACTERISTICS

Handwriting experts have been able to solve many mysteries, but the advent of the typewriter was supposed to present insurmountable difficulties to investigators because of the supposed lack of individuality in the writing machine. In a recent trial in New York, however, the question of authorship of a certain telegram became important, and the original copy from the files of the telegraph company was submitted to typewriter experts, together with the machine upon which it was supposed the copy was written. Without difficulty they found certain distinguishing features about the letters and marks on this machine, which were not present on others, and identified the original copy as having been written as alleged. Upon the presentation of this evidence in court, the man suspected admitted that the findings of the experts were true.

## GOVERNMENT EXPERTS STUDY MILL-DUST EXPLOSIONS

Engineers from the Bureau of Mines are investigating all dust explosions where two or more fatalities have resulted. These take in both mine and mill accidents. The explosion in a grain mill in Buffalo not long since, in which 33 lives were lost, was traced to the fine dust engendered in grinding grain for feed. The government experts are working in conjunction with the National Milling Association to

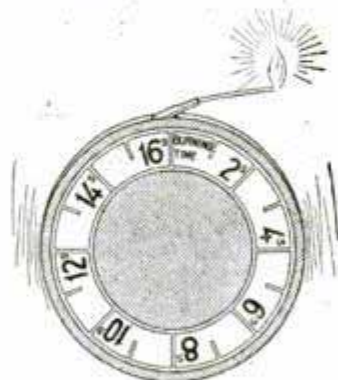


German Method of Loading Brick without Breakage

further investigate conditions, and devise preventive measures relating to inflammable dust.

## MAGNESIUM LAMP FOR PHOTOGRAPHERS

A contrivance is in use in Europe by photographers by which illumination for timed exposures is given by burning magnesium. A certain length of ribbon burns a predetermined time as shown on the dial of the apparatus. The magnesium ribbon is wound within the receptacle, upon the rim of which definite lengths are indicated to burn a certain time. The ribbon is pulled out as far as desired and then lighted, burning till the aperture is reached, when it goes out.



## MOTOR-TRUCK LOADING DEVICE

From Germany comes an ingenious method of loading brick from kiln to motor truck without handling individual brick, thus saving breakage. A low wall separates the truck from the track upon which the car from the kiln is run. A mechanically operated rammer at the same level as the top of the wall, which is also the level of the car platform and the floor of the truck,

pushes the load of brick from the car across the wall, directly upon the truck.

## FAN TO PRODUCE CHANGING BREEZES

Pleasant, changing breezes and gentle puffs of fresh air, instead of a hard, steady blow, are produced by an intermittent electric fan, just brought out in England. The fan not only varies the intensity of the air current continually, but reverses its blades at intervals to drive the air in the oppo-

site direction. The intermittent breeze is produced by reversible blades, automatically rotated on their stems so that they are continually changing their angle.



## FASTENER HOLDS TONGUE OF SHOE IN PLACE

An invention by a Canadian is designed to prevent the tongue of a shoe from slipping down out of place. The contrivance consists of a ball-and-socket fastener, the ball portion being on the tongue and fitting into the socket, which in a man's shoe is part of the hook itself, while in a woman's shoe, where the eyelet is employed, a separate socket is inserted.



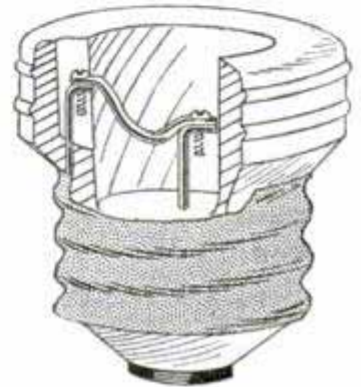
## CURIOUS "SHEEP HUNT" SPORT IN RUSSIAN TURKESTAN

A horseman carrying a sheep and pursued by thousands of mounted men constitutes a popular sport in Russian Turkestan, where the "sheep hunt," as it is called, takes the place of football as a national sport. The owner of the swiftest mount has a sheep tied to his saddle, and then gallops away. He is

chased by the other riders until one or another has captured the sheep. This game is carried on before thousands of the half-wild tribesmen, whose knowledge of the game, whose love of the horse and whose sporting proclivities are aroused to the highest pitch of excitement by the chase. It is usually a feature of the Mohammedan New Year festivities.

## A FUSE PLUG THAT CAN BE REWIRED

Ventless electric fuse plugs that can be refilled and used repeatedly after the fuse has blown out may now be bought. In construction they are exactly like the usual fuse plugs except that the short piece of fusible wire, instead of being soldered to the connections, is held in place by binding screws just inside the mica cover. When the old-style fuse plug burns out it must be thrown away, but the patented refillable plug is ready for use again as soon as a new fuse wire has been inserted.



## A CRANKLESS ICE-CREAM FREEZER

No weary cranking is necessary in making ice cream at home, if one has one of the new crankless freezers. It is simply packed with cracked ice and the rest of the operation is automatic. The can which holds the cream, or sherbet, to be frozen has an inside section to hold cracked ice, and all the cream in the narrow space between the two walls is thus brought in close



contact with the melting ice and quickly frozen. The frozen cream comes out of the can in cylindrical form with a hole down the center, so that it can be sliced up into "frozen doughnuts."

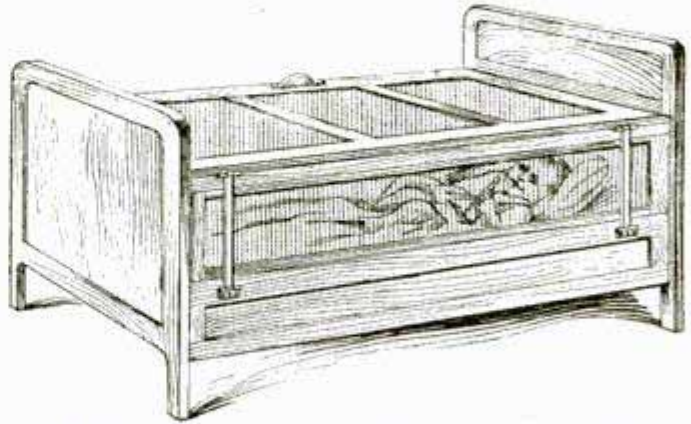
### EUROPE FEELS THE NEED OF A WORLD LANGUAGE

In America we hear little of a world language and feel less the need of such than Europe where 20 nations back up into each others' yards, and not less than 27 languages are spoken, beside innumerable dialects and patois, the idioms of limited areas. The United States Consul at Berne, Switzerland, in a recent report, discusses the objects of the Association for the Creation of a Universal Language Bureau which has been founded for the avowed purpose of stimulating interest in an auxiliary language. It is not sought to drive out any existing language, but rather to introduce a tongue which may bring about an easier understanding among all nations, especially for use in commerce. No propaganda is urged for any of the various international systems already established, among which are systems bearing the names Bolak, Esperanto, Europal, Ido (reformed Esperanto), Latino sine flexione, Neutral (reformed neutral), Pankel, Perfect, Romanal, Tutonish, Viva and Volapük. The immediate aim of the association is to induce the government of Switzerland to summon an international diplomatic conference to discuss the advisability of officially recognizing some international language. Should such negotiations be successful it is planned to have a commission examine existing systems of artificial languages, select the most suitable and lay down the lines for future development.

☞ Pajamas of cheap quality are a staple article of commerce in Afghanistan, and lamp ware, fountain pens, barbed-wire fencing and corrugated iron are also in demand.

### BED INCLOSED BY FOLDING SCREEN PANELS

Folding screen panels to protect beds and cribs from flies and mosquitoes are the interesting part of a patent

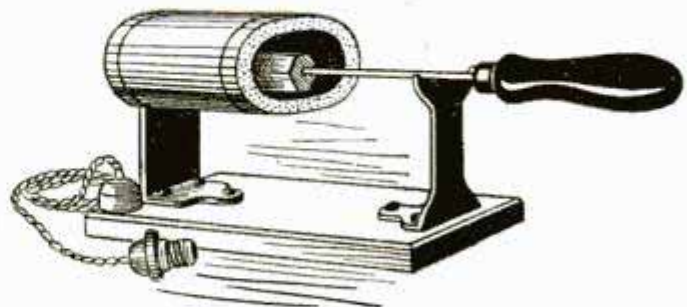


Folding-Screen Cover to Keep Flies off a Bed

recently taken out. The screen arrangement is designed especially for babies' cribs, but it can be built on a larger scale for any bed. It consists of two screened panels fastened permanently above the sideboards of the bed and another screen panel which serves as a cover. An ingenious hinged-lever arrangement is fastened to one side of the cover so that it can be folded down on one side, out of the way.

### ELECTRICALLY HEATED SOLDERING IRON

A portable electric furnace for heating a soldering iron is one of the late applications of utilizing the electric current for mechanical heating, where gas, oil or gasoline have heretofore been employed. The fact that the appliance

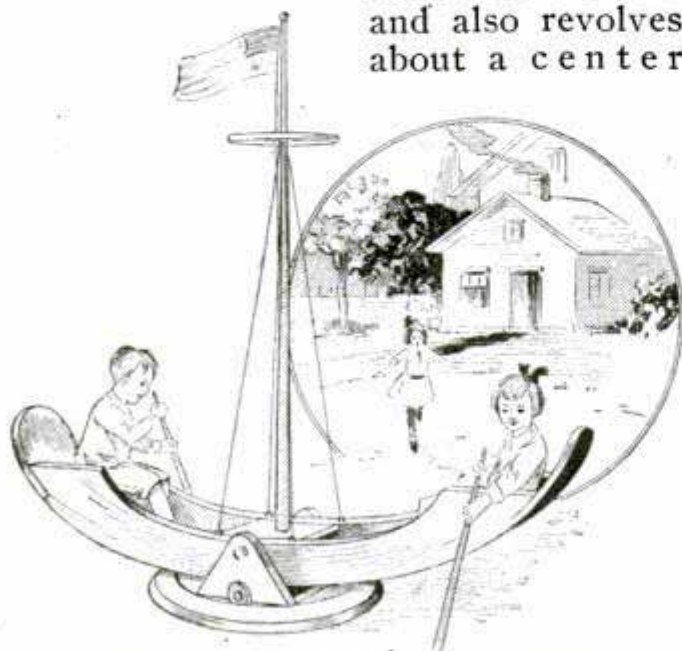


Portable Electric Furnace for Soldering Irons

may be plugged in on any 110-volt lighting circuit makes it convenient in repairing plumbing, soldering wires, and other household adjustments.

## NOVEL SEESAW FOR THE CHILDREN

A novel accessory for the amusement of children while playing on the lawn is a seesaw in the form of an ancient boat that rocks and also revolves about a center



Revolving Boat That is Also a Seesaw

post, which is securely fastened on a circular base. It is a merry-go-round as well as a seesaw and furnishes entertainment for little folk of all ages. At night it may be lighted with Chinese lanterns suspended from the crosstree of the mast, and bells may be hung about it to jingle, if so desired.

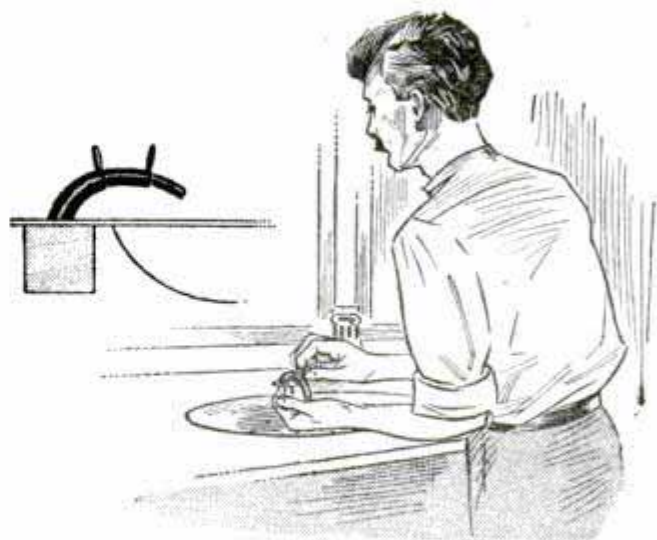
## AIR-DRIVEN TUGS TO TOW CANAL BOATS

The air drive, after exhaustive tests on barges propelled by aerial screws on the Surrey Canal by an English syndicate, is to be used on steel tugs towing cane scows on the canals in British Guiana. Some 30 of these steel tugs, having a draft of but 10 to 12 in., will be built, each capable of towing about a dozen punts or scows, each weighing some six or seven tons loaded. From the data obtained in the trials it is believed that in actual practice a load of 50 or 60 tons could easily be towed at four miles an hour by means of the specially designed air screws, which consume 16 hp., without in any way straining the motor used.

Four miles an hour, it is pointed out, could readily be maintained on a busy canal, for the air-drive tugs and their loads could not only easily overtake other barges moving in the same direction, which must hug the towpath, but could at any moment use the whole width of the canal for turning, if necessary. No difficulty is feared from the possible interference of these air-driven tugs with each other in passing, nor in damaging other craft. The propellers used in the trials were less than half as long as the barge was wide, and the danger and impediment arising from the propeller was only trivial.

## NEW LIQUID-SOAP CONTAINER

A new liquid-soap container, coming into use in the wash rooms of passenger coaches, is a great improvement over the type of container which consists of a glass bottle that exudes the soap when rocked. In the new arrangement, the soap container, a jar holding a quart of the liquid, screws up under the wash stand. A nickel fixture, not unlike an ordinary water faucet in appearance, rises from the top of the stand and protrudes over the washbowl. The user places the palm of one hand under the soap faucet and presses together, between the



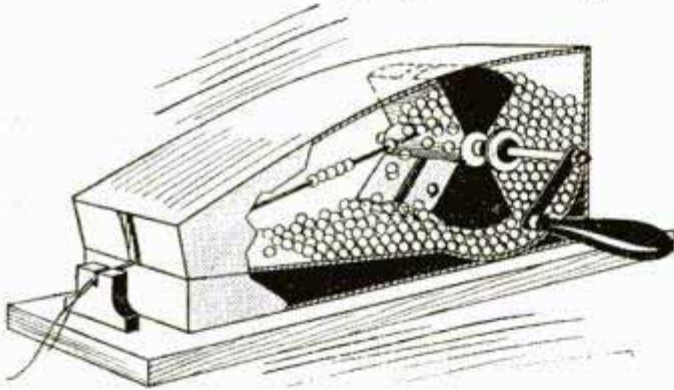
Device That Pumps Liquid Soap

thumb and forefinger of his other hand, the two little tabs or projections shown in the illustration. This action

pumps a certain quantity of soap into the palm of the hand. All but the faucet is out of sight under the wash-stand.

### MACHINE STRINGS BEADS QUICKLY

An ingenious little machine is used in Germany for stringing beads, such as are a part of many embroideries. A hand-revolved axle bears two metallic wings, set something like the blades of a propeller, but with a narrow space between. Inserted in this space a long needle lies on the axle, the point projecting a trifle above the surface. As the machine is turned the beads placed within the receptacle are constantly agitated, and at each revolution one or more beads, striking against the point



Machine Makes Stringing Beads Easy

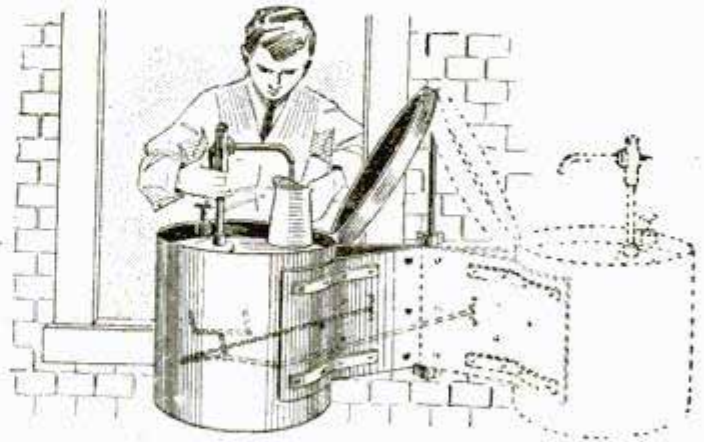
of the needle at the proper angle, are impaled, and so continue on down along a thread placed to receive them.

### ANCIENT PRINTING BLOCKS IN KOREA

Thousands of printing blocks have recently been discovered in an old barn back of the Buddhist monastery Hainszu, in Hyopdshong, Korea. These blocks are believed to be more than 800 years old, and refer to old Buddhist religious precepts. The barn was built, according to the Buddhist monks of the monastery, 1,100 years ago, and is surrounded by great maple trees which have attracted tourists by their beauty. So far as known, these printing blocks are the oldest in existence and are of enormous artistic and historical value.

### OUTDOOR GASOLINE-CAN SAFETY DEVICE

The peril of fire, always present when gasoline is kept in quantities within factories or shops, may be in

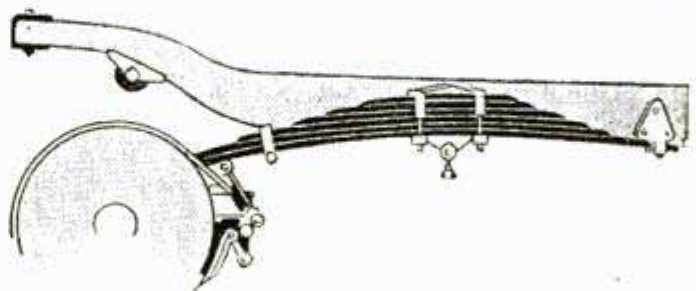


Gasoline Can within Easy Reach of Shop Window

large measure avoided by the use of an outdoor attachment recently patented. The can, which is of the ordinary pump type, swings on a hinged support fastened outside the window. A lever arrangement worked from the inside brings the can around in easy reach when wanted, or swings it back again out of the way. The can is fitted with a hinged cover, excluding rain, snow or dust.

### CANTILEVER SPRING GIVES FLEXIBILITY

An automobile spring pivoted to the frame at the center and shackled at the front end is clipped to the axle at the rear end. This gives true cantilever support and affords a high de-



Cantilever Spring for Automobiles

gree of flexibility, when the spring itself is an inverted semielliptic one. This form of support lends itself to the use of a shock absorber also if desired.

## NOVEL AND PRACTICAL THINGS FOR DAILY USE

An aluminum tea bob for use with an earthen teapot has an air chamber at the bottom. Tea leaves are placed on this and boiling water poured in, which drips through small holes upon the tea, and then runs out into the bottom of the teapot. When



Tea Bob Makes a Perfect Beverage

the water has all run out, the bob, relieved of the weight, rises, carrying the tea leaves with it.

Radiators may be converted into convenient stands for various purposes by means of a wooden shelf of suitable size, supported upon metal brackets which are fixed to the radiator firmly. Dishes, silver, or table china may be placed on the shelf; or telephone, filing cabinets and books; flowers and growing plants; or the shelf may be used as a substitute for a mantelpiece.



Radiator Table Easily Made and Convenient

Washing the baby is something of a task in the ordinary household, requiring considerable preparation and resulting usually in a mussy floor. A small enameled bathtub has been devised which is arranged to be placed on the big tub in the bathroom. A broad support also rests on the tub, so the baby may be easily dried and dressed.



Bath Kit for the Baby Relieves Mother

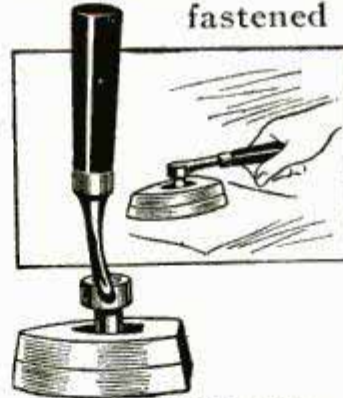
The kitchen table is often too high or too low for comfortable use. An adjustable table, which may be easily raised or lowered, makes it equally convenient for rolling out pastry or for ironing. Steel rods concealed in the wood give it rigidity.



Adjustable Kitchen Table Saves Backache

A practical self-heating flatiron, convenient for travelers, has been brought out, the top of which is in two parts. By turning the iron over, the upper section, which is hollow, may be revolved and filled with alcohol, by which the iron can be heated quickly.

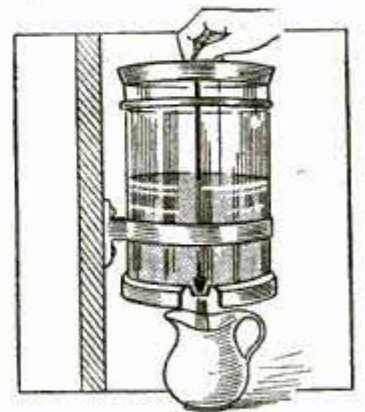
A patented household cream separator consists of a 2-qt. glass container fastened by a ring within the refrigerator. A rod extends through a detachable cover to the bottom, where it plugs a small hole in the glass. Milk poured into the container is separated through gravity. Upon slightly lifting the rod,



Handy Self-Heating Flatiron for Travelers

skim milk flows out of the bottom into a pitcher or pan, while cream may be obtained from the top of the container, or drawn out after the skim milk.

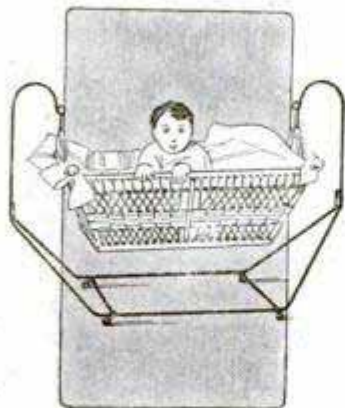
A framework of springy steel rods affords yielding support for the baby basket and is light and easily put out of the way. The frame



Gravity Cream Separator for Family Use

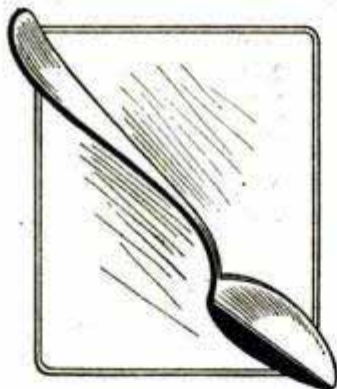


is broad enough to give stability, and no swinging of the basket can overturn it. Casters at the corners make it readily movable, while a slight rocking of the basket will, by reason of the springiness of the support, continue the rocking motion for a long time.



Springy Frame Rocks Bassinet Safely

Measuring a teaspoonful is easy enough, but to get exactly half a teaspoonful was almost impossible before the invention of the half-spoon illustrated here. Upon an ordinary handle, the half of a teaspoon bowl is fixed, a wall of silver cutting the usual bowl in two lengthwise. Its use in the kitchen, in the sick room, or where accurate measuring is desired, safeguards against error.



Kitchen Device for Measuring Half Teaspoonfuls

Much coal can be recovered from the ashes drawn from furnace or heater if a sifter is used. Too often the device used leaks dust and makes the task a most unpleasant one.

Recently a dustless revolving sifter

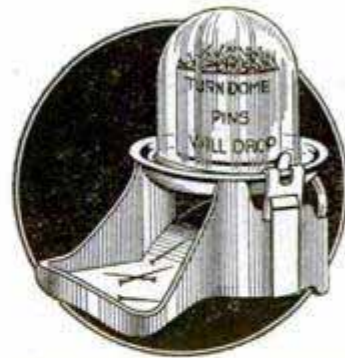
has been put on the market with a seamless cover fitting over the outside, keeping all the fine dust in, yet affording easy access to the sifter for putting in the unsifted ashes and taking out the coal.



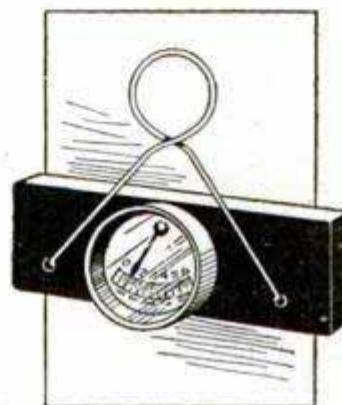
Rotary Ash Sifter Rendered Dustless by Cover

When pins are used in any quantity the desire to "have them handy" results most often in a

dust-catching receptacle from which by dint of pricked fingers one may sometimes obtain a pin. A novel pin fountain is manufactured with a glass dome for a top, which holds a quantity of pins, but by an ingenious device the dome, upon being revolved, drops a few pins into a convenient tray, from which they may be picked up readily.



Durable Pin Tray Keeps Out Dust



Handy Heat Gauge for Soapstone Disks

how hot the soapstone slab is to be used. A brass plate with steel racks operating a pinion carrying the indicator is the basis of the device. It registers the heat quickly, and when not in use may be hung conveniently near the cooker.

There are few more exasperating things than to lock something securely and then be unable to find the key when required. This unpleasant condition may be avoided by using a keyless padlock. Eight projecting knobs actuate tumblers within the padlock. By pressing certain knobs, forming the combination, the lock opens instantly.

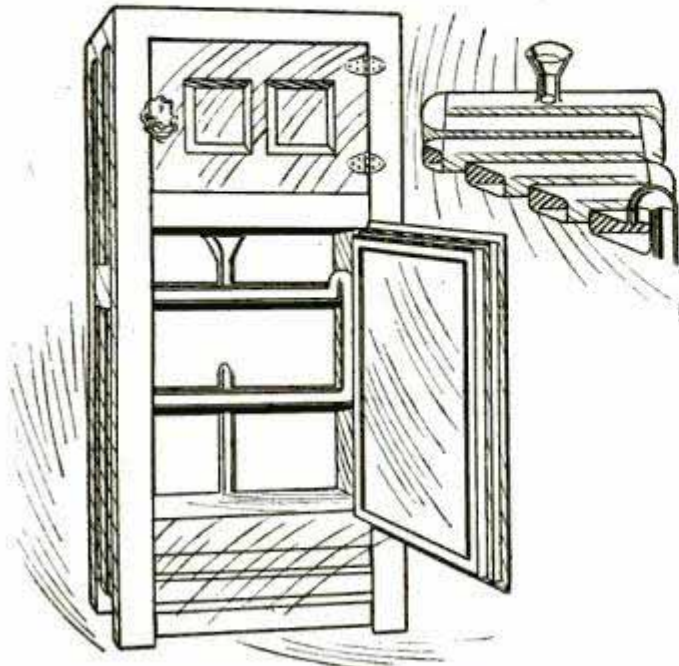


This Lock Requires No Key

the combination, the lock opens instantly.

## COLD-RADIATOR SYSTEM IN REFRIGERATORS

A device made of rectangular tubes in the form of shelves adapted to the interior of a refrigerator has been in-



Automatic Ice Saver for the Household

vented. These tube shelves catch and circulate the water dropping from the melting ice, always remaining full of water, and, by gravity, circulating the water to the overflow. The increased cold surface and heat absorption afforded by two gallons or more of ice-cold water is stated to add materially to the value of the refrigerator, cooling the food much more quickly, and maintaining a reduced temperature in the food compartment. The device may be installed in any refrigerator, old or new.

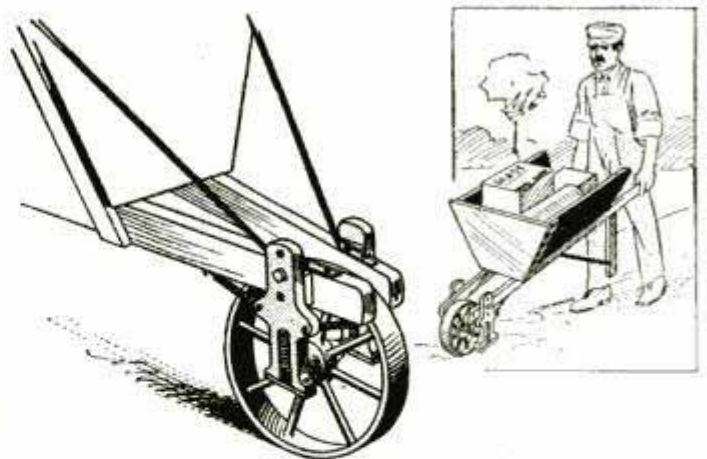
## RATS IN COPPER MINES ARE SCAVENGERS

In the copper-mining district of Michigan rats are highly regarded for the valuable aid to underground sanitation they give. Rats are the scavengers of the mines. They keep the levels clear of refuse. They are protected and made pets of by the men who often share their dinner pails with the rodents. So accustomed to the presence of human beings are these rats that they frisk about the miners

without a shadow of fear. Underground they indulge in no depredations, existing as they do within the rock-bound walls, inclosing nothing possible for them to destroy. That they are largely dependent upon the food furnished by the scraps and leavings from the miners' meals is evident from the fact that the prolonged strikes which occurred in the copper district resulted in thinning out the number of rodents very largely. Not only was their food supply cut off, but many were drowned when the pumps draining some of the levels were put out of commission, and the workings filled with water.

## SHOCK ABSORBER FOR THE WHEELBARROW

A gold medal was recently given in France for a shock-absorbing attachment for the common or garden variety of wheelbarrow. The shock absorber consists of two uprights, one on each side of the wheel, at the bottom of which the axle is inserted so as to bear against vertically supported springs. The device is intended not only to save any fragile load carried on the wheelbarrow, should an obstruction be struck



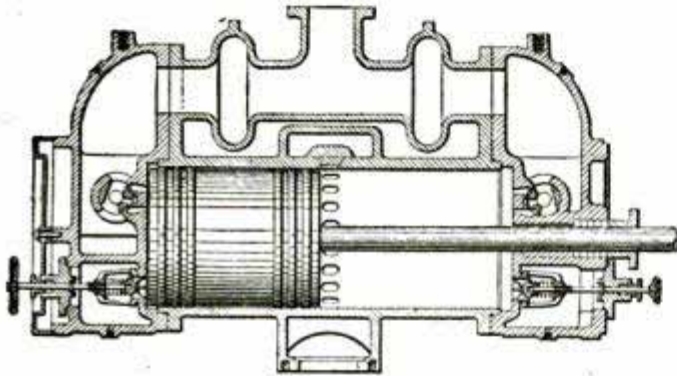
Humble Wheelbarrow Now Has Shock Absorber

on the road, but also to lessen the jar on the hands of the laborer when handling heavy loads on uneven ground.

Alaskan reindeer meat is becoming a popular food in Pacific coast cities.

## A NEW TYPE OF STEAM ENGINE

In the attempt to produce a steam engine that would be more economical of steam, a German professor has developed a new type, called the "uni-flow" engine. The difficulty which he has overcome is the initial cylinder condensation of steam because of the location of the exhaust valves in the ends near the intake valves. In the ordinary engine, the piston in driving out the exhaust steam reduces the temperature of the cylinder head to that of the exhaust steam, and the incoming live steam meets cold walls and is partly condensed. In the new engine, the exhaust ports are placed in the middle of the cylinder, where they



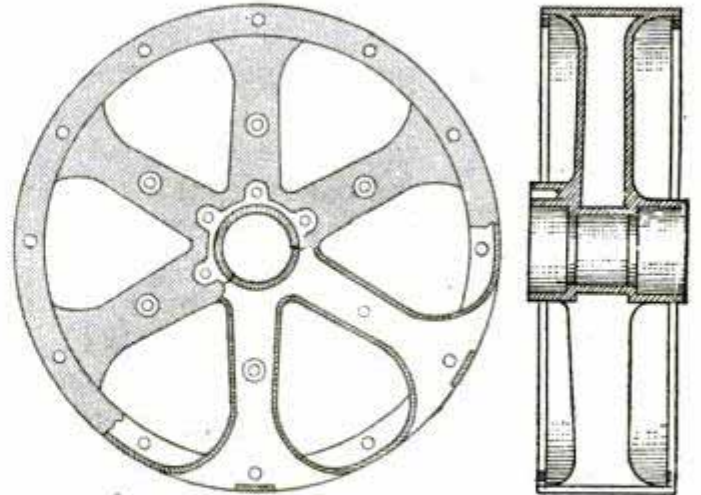
Cross Section of the New Uniflow Steam-Engine Cylinder

are uncovered by the piston at the end of the stroke, and the intake valves are at the ends. Thus there is always a flow of steam from the ends of the cylinder toward the center and the cylinder heads are kept at a more uniform temperature. A single-cylinder uniflow engine which is in use in Germany produces 6,600 horsepower.

## NEW STEEL WHEEL FOR MOTOR TRUCKS

The making of a cast-steel truck wheel that will have both the strength and resiliency required for the severe service to which such vehicles are subjected is a difficult matter owing to the unavoidable weakness of castings of all kinds at the junction of the rim and spokes. This weakness is apparently overcome in a new type of wheel

recently placed on the market. The rim of this wheel is of a channel section, while the spokes are hollow and



Curved Junction of Spoke and Rim Makes Steel Truck Wheel Strongest at What is Usually the Weakest Point

have sides curved in such a way as to join the rim without a sudden change in direction. This wheel is somewhat lighter than a wood wheel of the same carrying capacity.

## PAN AND RACK FOR DRYING DISHES

A new device for drying dishes consists simply of a pan, 20 in. square, fitted with a removable wire rack to hold the dishes on edge while draining, and to keep them out of the dripping rinse water. After the dishes are washed they are set on edge in the rack, scalding water is poured over them and they are allowed to dry, the

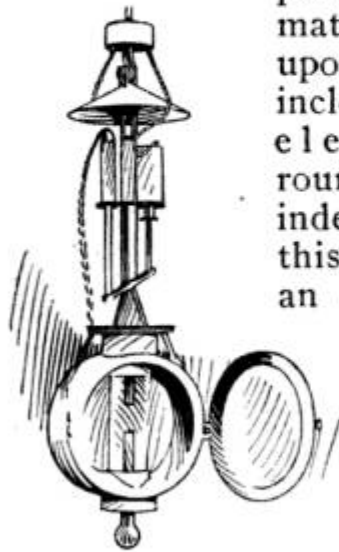


Dish Drier That Consists of Pan with Wire Rack for Holding Dishes on Edge

idea being to eliminate the use of the towel for drying. By this method the dishes are both cleaned and sterilized.

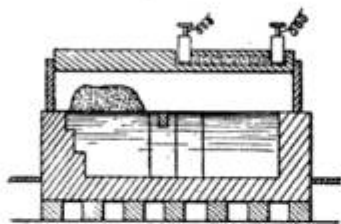
## AN ARC LAMP WITH A CHIMNEY

High efficiency is claimed for this arc lamp because of the method of preventing a deposit of material from the arc upon the inside of the inclosing glass. The electrodes are surrounded by a glass cylinder or chimney, and this, in turn, is held in an outer part consisting of a metal ring piece with concave glasses on each side, one of which is hinged. The ring piece is so made as to form a hollow or annular chamber. The air circulates between the chimney and annular chamber, depositing all suspended matter upon the cold metal walls of the chamber. The latter is protected on the inside by a nonoxidizing coating.



## NEW ELECTRIC FURNACE FOR MAKING GLASS

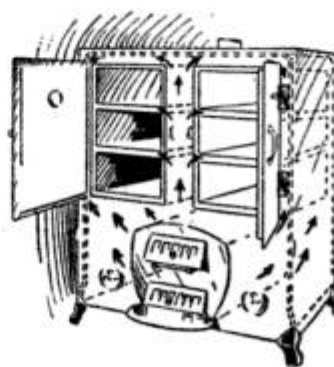
An electric furnace for the manufacture of glass, patented recently by a French inventor, makes possible a continuous process of manufacture, combining all the operations of melting and refining within a single furnace supplied by one source of heat. The furnace consists of two chambers separated by a dam which floats on the molten glass. The electrodes for melting the glass are in one chamber and close enough together so that only a low-tension current is needed. As the raw materials are fed into this chamber, they float on top of the molten glass until they are melted down and refined. At the same time, refined glass at the bottom passes under the



floating dam into the other chamber. As the temperature of the whole furnace is not extremely high, blowpipes can be inserted directly into the second chamber to take out the molten glass ready for working into commercial shapes.

## BAKING OVEN OF NOVEL CONSTRUCTION

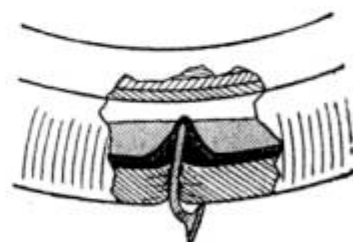
A baking oven that embodies a number of novel features is shown in the accompanying illustration. From the



fire box, which is placed at the base of the oven, the heat passes up through a central flue placed between two tiers of compartments, then over the tops of the compartments and down the sides of the oven to the fire box. The passages between the compartments are so proportioned that each receives the same amount of heat, and receives it uniformly from the sides, top and bottom. The smoke and gases from the fire box do not circulate through the flues, but are carried into the chimney through a pipe located in the center flue. For ease of access in cleaning, all compartments and partitions are removable.

## MAKING AUTOMOBILE TIRES PUNCTURELESS

A new way of attacking the pneumatic-tire problem is to make inner tubes punctureless by increasing their elasticity. Rubber tires, after they have been molded, are covered with sulphur or pumice stone to harden them for handling. This treatment also makes them less elastic and more easily punctured.



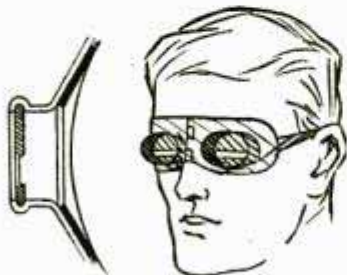
To restore their elasticity, an Iowa man has patented a mixture to be poured into the tire for dissolving the sulphur and softening the rubber. It makes the inner surface of the tube so elastic that when a nail is driven into the tire the rubber stretches and expands about the end of the nail without breaking.

### FETERITA IS A NEW GRAIN OF THE SORGHUM GROUP

A new grain and silo crop is assured by the introduction of "feterita" by the U. S. Department of Agriculture, whose experts are constantly searching the byways of the world for crops which can be adapted to conditions within the United States. Feterita is an early ripening sorghum, valuable for grain and forage, rising on slender stems 5 to 7 ft. high which are fairly juicy and slightly sweet before ripening, much relished by stock. The grain ranks with the kaffir corns and milo as a fatterer, but the addition of a small amount of cottonseed meal is recommended to increase its efficiency as a flesh grower. For use in silos, feterita is claimed to be equal to any of the sorghums. It was first introduced from Alexandria, Egypt, into the United States, but later obtained in quantity from the Sudan, and is adapted to arid regions.

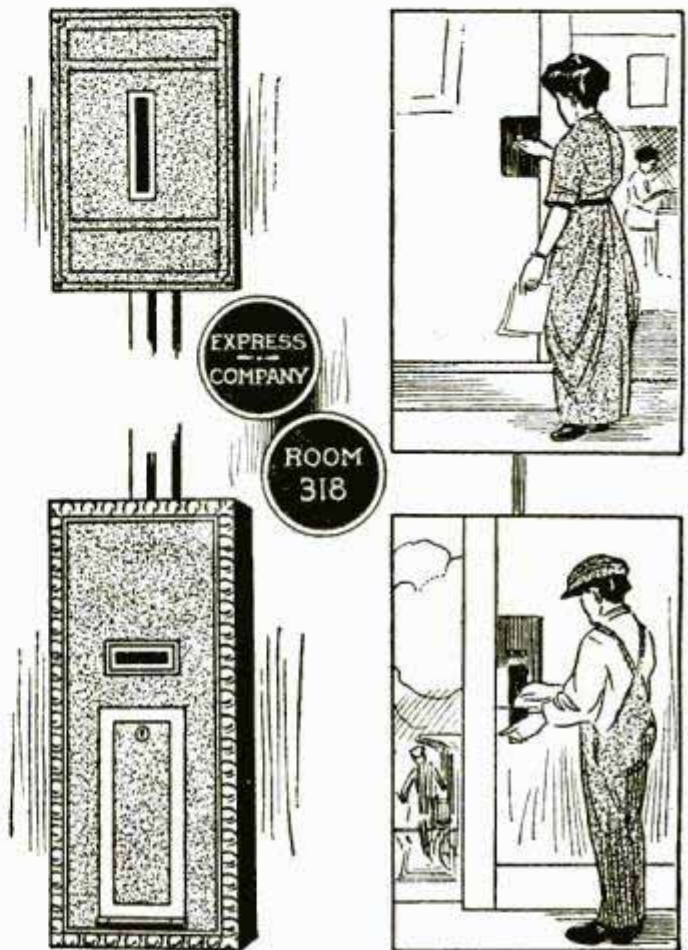
### NEW AUTOMOBILE GOGGLES RELIEVE EYESTRAIN

A recent invention is goggles for use by motorists in which the glasses have portions of different thickness and color, whereby one portion is clear and the other more or less clouded. The field of vision is limited to the clear-glass portion while the glare and flicker is measurably removed by the colored glass in the remaining portions.



### NEW SYSTEM CALLS EXPRESS WAGON PROMPTLY

Each tenant in a new office building in New York is provided with a number of small metal disks or checks,



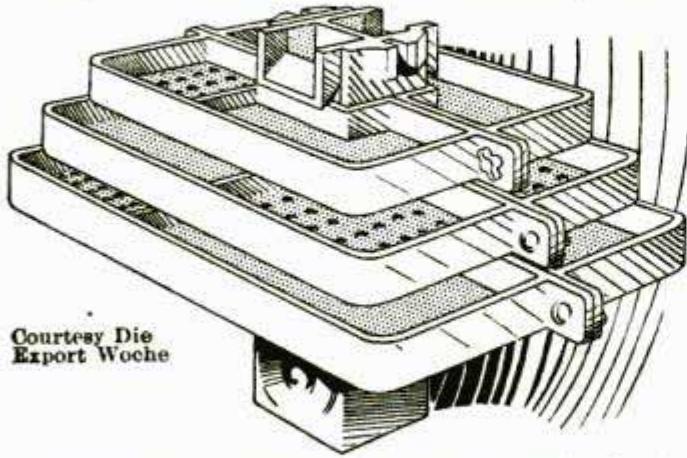
Units Used in Novel Call System for Expressmen

bearing on the one side his room number, and on the reverse, the name of an express company. When he desires to have an expressman call at his office for a package, he deposits a check in a special chute in the elevator wall, and the check drops down to the first floor, where an authorized employe of the building opens the box, records the room number and notifies the proper expressman he is to call at that room. The expressman takes with him the check as evidence of his authority to receive the package.

ⓄThe sledges for Sir Ernest Shackleton's trip to the South Pole, built of a light but strong composition metal, weigh 60 lb. less than wooden sledges and are therefore able to carry that additional weight of food.

## GERMAN FEED-WATER SOFTENER

A new feed-water softener for steam boilers, recently brought out in Germany, is said to be particularly effi-



Courtesy Die Export Woche

An Efficient Feed-Water Softener Brought Out in Germany

cient. The apparatus consists of several superimposed shelves, divided into compartments, some of which have perforated bottoms. The water, pre-heated to a temperature of about 300 deg. F., zigzags through these perforated bottoms. All the gases in the water are driven off by the high temperature and the scale is quickly and completely separated, forming as a loose deposit which can be blown out easily.

## A COMBINATION DOG FOR LATHES

This combination dog for turning shaftings holds securely all kinds of crankshafts, eccentrics, and straight work of every description, and can be used



wherever the common lathe dog has formerly been employed. The tool may be adjusted from a 2-in. up to a 6-in. swing.

Rock said to be suitable for lithograph work has been found on the Angat River, in the Philippines.

The only quarry where lithograph rock is obtained in any quantity is in Bavaria.

## HOW THE MARTIANS MADE THEIR CANALS

That the canals on the planet Mars were constructed, not by excavation but by building walls or dikes, is the latest theory put forth by astronomers to account for the enormous size of these waterways. These canals, first discovered by the Italian astronomer Schiaparelli, have given rise to much speculation on the question whether the planet is inhabited. Astronomers now quite generally accept the theory that the canals are the product of intelligent action, artificial aids to agriculture, irrigation projects on a scale impossible on the earth's surface. Instead of being dug, as was once believed, it is now considered by some observers that they are built, or made between two walls on the surface, as they have to be higher than the vast fields they are intended to irrigate. It is obvious that it would cost no more to build up the walls of a canal 20 or 40 miles wide than it would for one only one mile wide, while the volume of water carried and consequently the area of land watered would be far larger. According to this theory, the mountains of Mars have been taken down, the rivers dammed or canalized, and the sea, into which no more fresh water is permitted to run, is evaporating itself, adding to the volume of fresh water. Thus Mars has been transformed into a gigantic garden where the most economic and intensive cultivation is the order.

## DEVELOPMENT IN ALUMINUM REMARKABLE

The rapid increase in the production of aluminum has not kept pace with its extension into different fields of art and manufactures. The fact that copper is cheaper than aluminum and that it is a far better conductor has not served to keep aluminum out of the electrical field, for by combining it with steel strands, huge cables carry high-voltage currents over long distances as satisfactorily as copper would.

Cooking utensils of aluminum, although not superseding enamel ware, are rapidly growing in favor, while the automobile industry is demanding more and more of this metal which, being light and easily workable, is ideal for use in bodies. The powdered metal is used in painting, lithographing and printing, and as a constituent of explosives. The manufacture of aluminum tubing is gaining rapidly. An increase in consumption of aluminum from 46,000,000 lb. in one year to 65,000,000 lb., almost 33 per cent, all the while increasing in price, is evidence that the new plants in course of construction both here and abroad have their work cut out for them.

### FOOT ATTACHMENT FOR AUTOMOBILE JACKS

"Jacking up" an automobile is an easy matter, so far as mere muscular exertion is concerned, when a modern jack is used. But the operation is often marred by the dust and grease which are almost inseparable adjuncts. A device which enables the motorist to avoid these consequences, by operating any auto jack with his foot, is the product of a Chicago manufac-

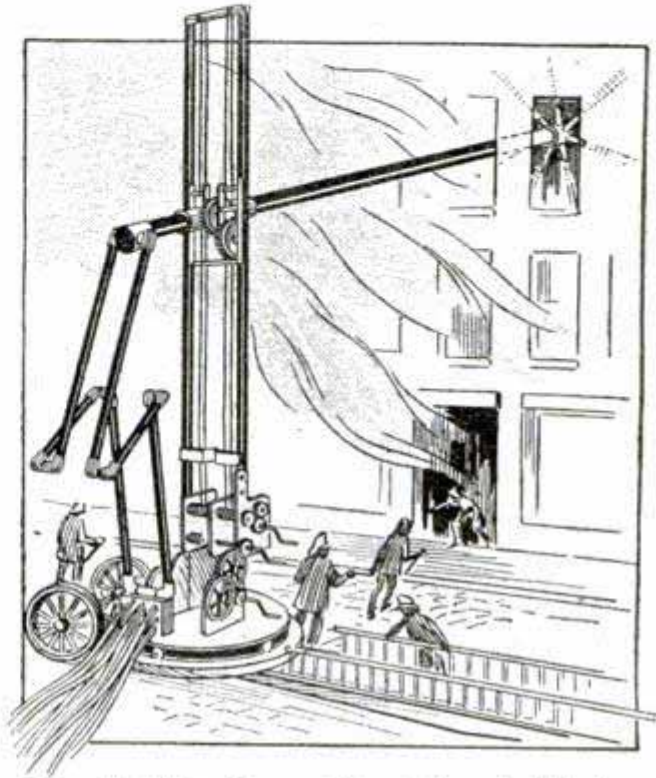


Keeps Grease and Dirt  
Off the Automobilst's  
Clothes

turer, whose foot-stirrup attachment may be quickly adjusted and is easily operated in a standing position.

### NOVEL MOVABLE WATER TOWER

Differing from the usual form of water tower, which throws only one stream of water upon the roof or inte-



Movable Water Tower Thrust through Window

rior of a burning building, a new type has been invented designed to throw a number of streams of water in various directions against the flames. The discharge pipe of the new tower is constructed so that it may be projected into a window or other opening, the end being equipped with a number of nozzles presented in different directions. The pipe may be raised or lowered, or tilted at any angle.

### TELEPHONE LINE STRUNG ON KITES

During a recent storm in California, a large amount of telephone line was destroyed, and communication between many points cut off. The repair crew was halted at the Salinas River, where the entire line of supports was washed away. Immediate establishment of communication being necessary, and the high water and lack of materials prohibiting the construction of a temporary line in the usual fashion, several large kites were built and flown. On

these a wire was strung and carried across the river. The entire telephone business of the section was carried on over this one wire until a permanent cable could be installed. So successful was the experiment that the repair department of the telephone company now includes kites as a part of its regular equipment.

### RUBBER SLEEVE HOLDS CORK IN BOTTLE

The disheartening experience in traveling, of finding the cork out of a bottle in grip or trunk, is not an uncommon one. A little device of pure rubber which slips over the top of a bottle, holding the cork securely in place, has been invented to obviate the trouble. It consists of a sleeve which slips tightly over the neck of the bottle, and has a band portion engaging the cork, preventing its removal until the band is pushed off.



### MEXICAN INDIANS MAKE TINY DOLLS

Dolls not more than a quarter of an inch in length are made by the Mexican Indians. First a framework of wire is wound with silk thread until the figure is of proper shape. The costumes, cut to represent some character, are then fitted and sewed on. With the smallest-size needles and almost invisible thread, various designs are embroidered on the dolls' clothing in silk, and so clever are these dusky workers that even when viewed under a powerful glass the details appear perfect.

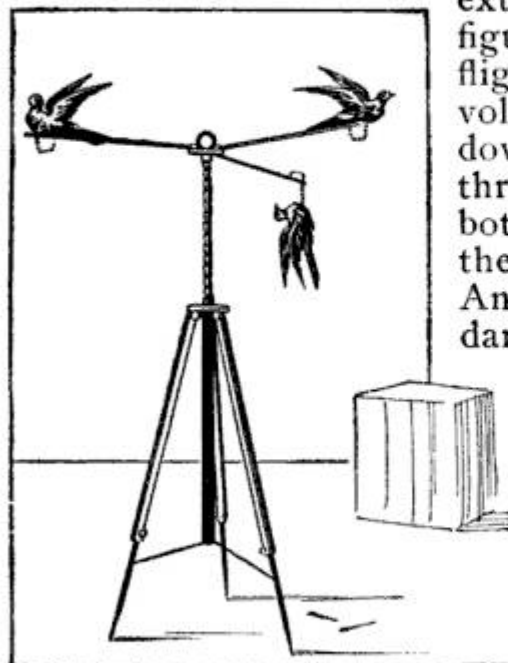
The hair is put on after the doll is properly dressed, the braids are tied with ribbons of appropriate hue, and then the eyes, nose, mouth, and the hands and feet are formed. Some dolls are equipped with tiny baskets of flowers, fancy sombreros, or water jars. The baskets are woven of hair, the pottery is of clay in exact imitation of the practical articles, and the flowers are of silk worked with genuine artistry.

### AIR GUN AND TARGET NEW FRENCH TOY

A revolving target upon which toy pigeons are perched, is a sporting device recently brought out by a French

inventor. A tripod with extension legs is provided with a sliding vertical screw, at the top of which three arms

extend, each bearing the figure of a pigeon in flight. These arms revolve as the screw slides downward through a threaded nut until the bottom is reached, when the screw is raised again. An air gun with rubber darts is used, and when a hit is made the pigeon falls off and hangs by a chain from the arm.



Pigeon-Shooting Toy for Boys



## MOTOR-VEHICLE CENSUS RECENTLY TAKEN

An English automobile magazine recently compiled a census of motor-driven vehicles in the United Kingdom which may be considered authoritative. From data in the hands of license officials in the various cities and towns of Great Britain, it was learned that the total number of motor vehicles of all types in the United Kingdom is 425,838, of which motor cars comprise 227,907; motorcycles, 179,926, and heavy vehicles, 18,005. The same authority gives the number of motor vehicles in France as 90,959; Italy, 20,470; Germany, 77,116; Austria, 14,300; Belgium, 13,250; Switzerland, 10,370; Canada 34,793, and the United States, estimated, 1,435,000.

## OIL MIXER ATTACHED TO EGG BEATER

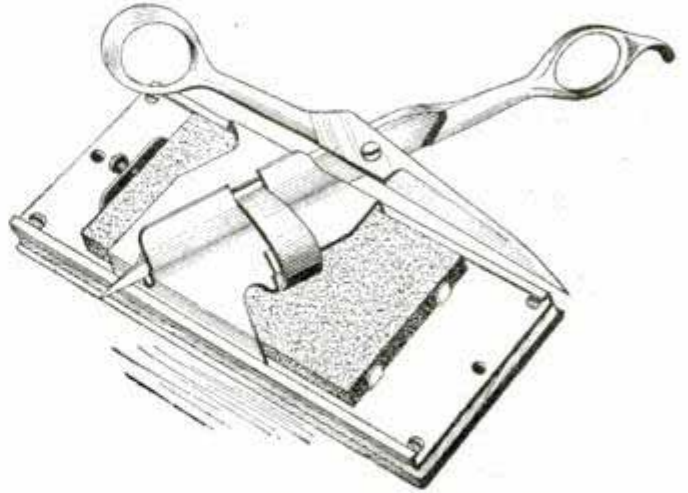
Oil can be stirred into mayonnaise dressing very quickly by the use of an improved egg beater now on the market. The new mixer is simply a whirling egg beater with a detachable oil funnel hung on one side of the handle. A screw valve in the funnel makes it possible to add the oil a drop at a time, early in the beating, and increase its flow to a steady stream as the mixing progresses.



## AUTOMATIC HONE SHARPENS SCISSORS

A hone with an automatic guide that holds the blade of a pair of shears in the right position by means of a clamping and pressure spring, has been placed on the market and appears to be

simple in operation and sure in results. The base, upon which the carriage slides, is of steel, and so ar-

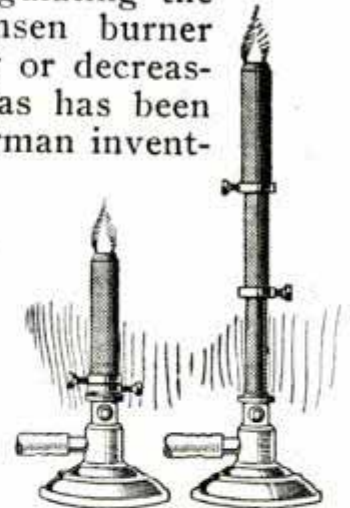


A Shear Hone for Household Use

ranged that the carriage can move only so far. A clamped guide holds the blade of the shear at the right angle upon the surface of the hone. Once fixed in position, the shear is moved back and forth until properly sharpened, as the springs give the requisite pressure and hold the blade rigidly while honing.

## TELESCOPING ATTACHMENT FOR BUNSEN BURNER

A device for regulating the heat from a Bunsen burner without increasing or decreasing the flow of gas has been perfected by a German inventor. This device consists of a telescoping upright by which the work may be done at the proper distance from the flame for securing the degree of heat desired. The principal advantage claimed is the elimination of the back-firing that often occurs when the flow of gas is reduced.



Water that flows from an artesian well at a temperature of 100° F. is used for heating purposes in a South Dakota town.

## PROOF MARKS ON EUROPEAN GUN BARRELS

Following an ancient custom dating back almost to the invention of fire-arms, all European gun makers stamp

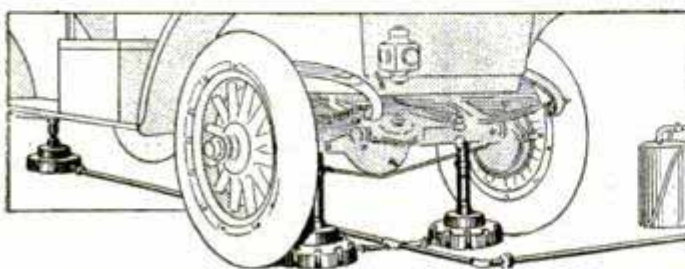


Proof Marks Used by European Gun Makers to Indicate the Quality of Their Guns

their gun barrels with graded proof marks indicating the quality of material and workmanship. Before and after each gun is finished, its barrel is subjected to firing tests and to several examinations for defects. All guns that pass the proving tests are graded according to quality, and their barrels are stamped with the maker's proof marks. As every gun maker has five or more proof grades, it is possible to tell from the proof mark on a foreign gun how good a gun it is.

## JACK FOR RELIEVING AUTOMOBILE TIRES

The automobile relief jack provides means for relieving the tires of motor fire trucks, and other apparatus, from



Taking Dead Weight of Motor Car Off Tires by Means of Relief Jack

the constant dead weight resting on a small surface of the tire while the apparatus is in the fire station. The device consists of a heavy diaphragm made of ducking treated with rubber, placed between two concave plates, one fixed in position and the other acting as a piston. The jack is operated by forcing water or other liquid through piping into the diaphragm, which is then locked in position.

## COLOR SCHEME FOR FAIR AT SAN FRANCISCO

In no exposition has the color scheme been more carefully studied than the great Panama-Pacific Exposition to be held in San Francisco in 1915. After prolonged study of local conditions, in which every shadow upon the Marin Hills across the bay were taken into consideration, the yellowish-white tint known as "old ivory" was chosen as the basic color for the buildings. Buff, deepening into rich brown, will be used to accentuate architectural features and secure the antique effect considered desirable. Then eight colors have been added for other decorations. These are French green, used in lattices, flower tubs and small doors; deep cerulean blue, for recessed panels and vaulted ceilings; pinkish red, for flag poles; reddish brown, for colonnades and for interior courts; golden burnt orange, for capitals of columns, smaller domes and architectural moldings; terra cotta, for other domes and roofing material, combined often with copper-green; gold, for groups of statuary surmounting the great courts and the dominant towers which are to be covered with gold and verd antique; a mottled green with pale yellow and black streaks, for the fountains, urns and vases.

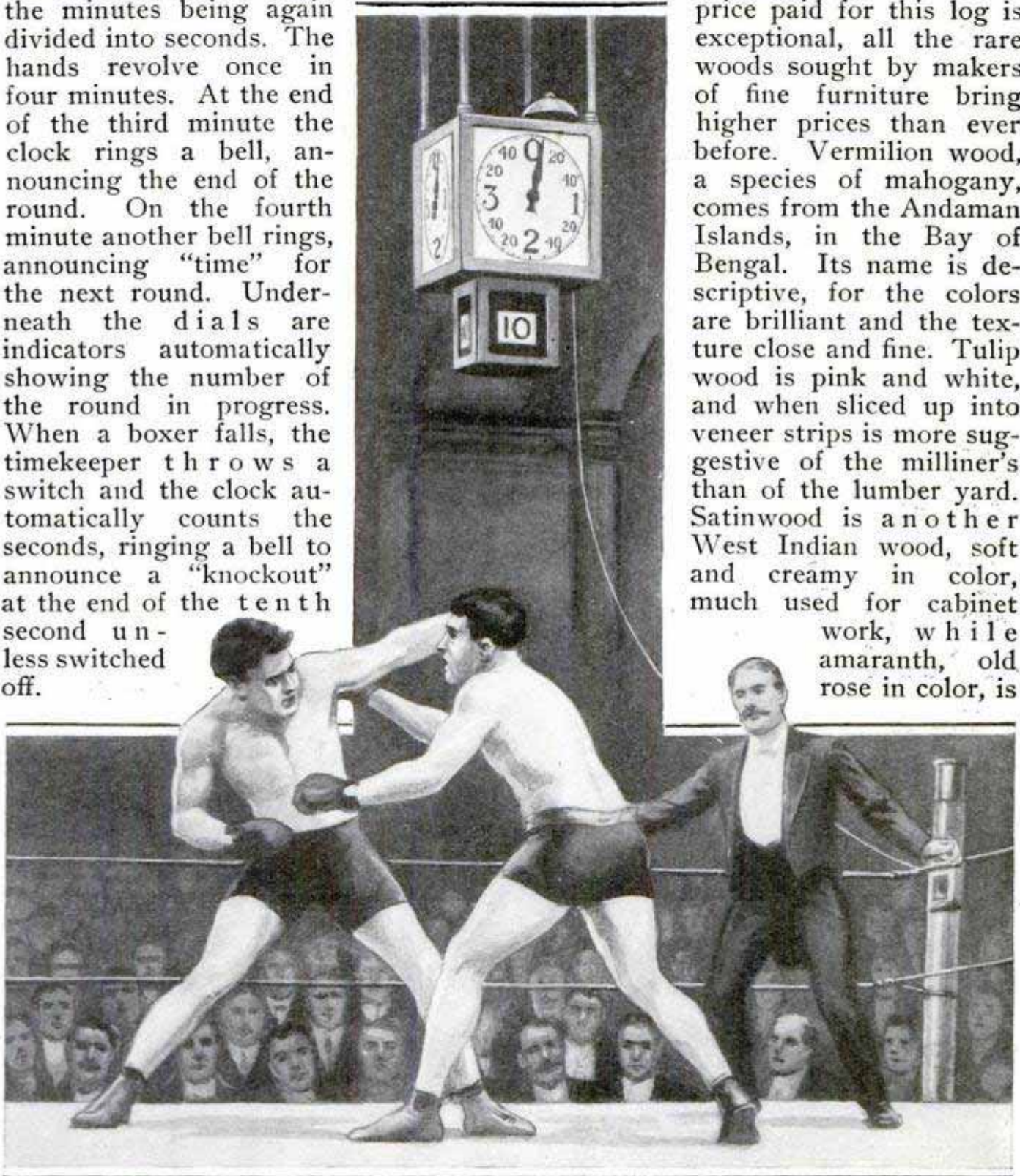
Ⓒ Moving-picture exhibitions on trains is an innovation proposed by a French concern to the officials of the Trans-Siberian Railway. It is believed that such installation would be appreciated by everyone who is obliged to undergo the tedium of that long journey.

## AN AUTOMATIC TIMEKEEPER ELECTRICALLY OPERATED

Directly above the center of the ring in the Sydney stadium, where Australian sports are housed, an automatic timekeeper for boxing matches is bolted to the girders, in plain view from every seat in the edifice. It is a four-dial clock, operated by electricity. The dials are 30 in. in diameter and are divided into four minutes, the minutes being again divided into seconds. The hands revolve once in four minutes. At the end of the third minute the clock rings a bell, announcing the end of the round. On the fourth minute another bell rings, announcing "time" for the next round. Underneath the dials are indicators automatically showing the number of the round in progress. When a boxer falls, the timekeeper throws a switch and the clock automatically counts the seconds, ringing a bell to announce a "knockout" at the end of the tenth second unless switched off.

## SINGLE LOG OF MAHOGANY SELLS FOR \$8,000

A mahogany log, 4 ft. square and 24 ft. long, was recently sold in London to a New York firm for \$8,000. This particular log came from Africa, where the mahogany forests have not been exhausted, as have those in Santo Domingo, from which some of the finest mahogany of the past was procured. While the price paid for this log is exceptional, all the rare woods sought by makers of fine furniture bring higher prices than ever before. Vermilion wood, a species of mahogany, comes from the Andaman Islands, in the Bay of Bengal. Its name is descriptive, for the colors are brilliant and the texture close and fine. Tulip wood is pink and white, and when sliced up into veneer strips is more suggestive of the milliner's than of the lumber yard. Satinwood is another West Indian wood, soft and creamy in color, much used for cabinet work, while amaranth, old rose in color, is



A Clock Which Keeps Track of the Seconds in Boxing Contests

considered one of the most beautiful woods in the whole list. Teakwood, which is a yellowish-greenish white in its natural state, turns dark after years of exposure, and is usually stained dark brown before being made up. Teak is largely used in battleship construction, the floors and doors being almost wholly made of this wood, which does not splinter on impact.

### DRIVING OUT THE EVIL SPIRITS

Treatment of the sick among the Eskimos is a matter of driving out evil spirits, and the job is not always an



Eskimo Medicine Man Driving the Evil Spirits from a Sick Boy

easy one for the medicine man, according to observers who have witnessed the process. In exorcising the evil spirits the grotesque costume shown is

considered an absolute necessity, while to make the cure effective the medicine man must stand in one position for days at a time or until the patient has recovered.

### BIG FLYING BOAT WEIGHS FIVE TONS

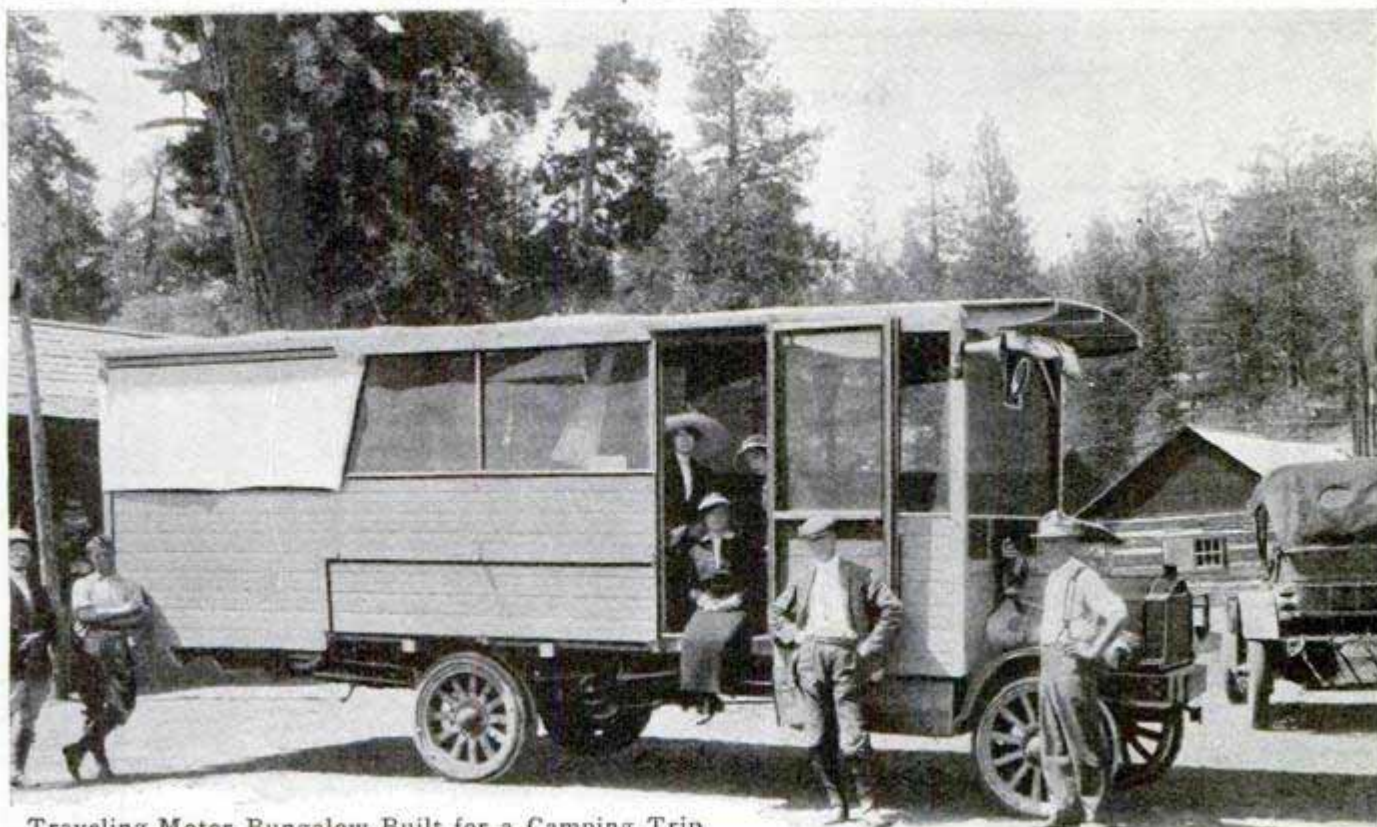
Recently the first trial trip was made upon the Seine, near Paris, of a flying boat, 29 ft. long and 9 ft. wide. Two planes, each 89 ft. in length, give a lifting power sufficient to raise the boat with two pilots, two mechanics and enough gasoline, oil and machinery to make its total weight five tons. Two motors, of 200 hp. each, operate a screw 16½ ft. long, and while no effort was made to establish a record for speed, enough was seen to warrant the belief that the craft would be able to negotiate long distances and at fair speed. The engineer is reported to have expressed his intention to build a larger machine next year, and attempt a transatlantic flight.

### KILLING GROUND SQUIRRELS WITH A MOTORCYCLE

A farmer in a western state whose fields had been overrun with ground squirrels, discovered a cheap and effective way of ridding himself of the pests by taking his motorcycle out to the infested fields, and connecting the exhaust of his machine with the burrows by a piece of rubber hose. He then starts his engine and fills the holes with deadly gas. By using a cheap distillate, he finds the method a great saving over older processes, and it is very efficient.

### TRAVELING BUNGALOW ON MOTOR TRUCK

A motor bungalow, mounted on the chassis of a 2-ton truck, was the uncommon conveyance built recently to carry a party of several persons on a three weeks' trip from San Diego, Cal., to Big Bear Valley. Although it con-



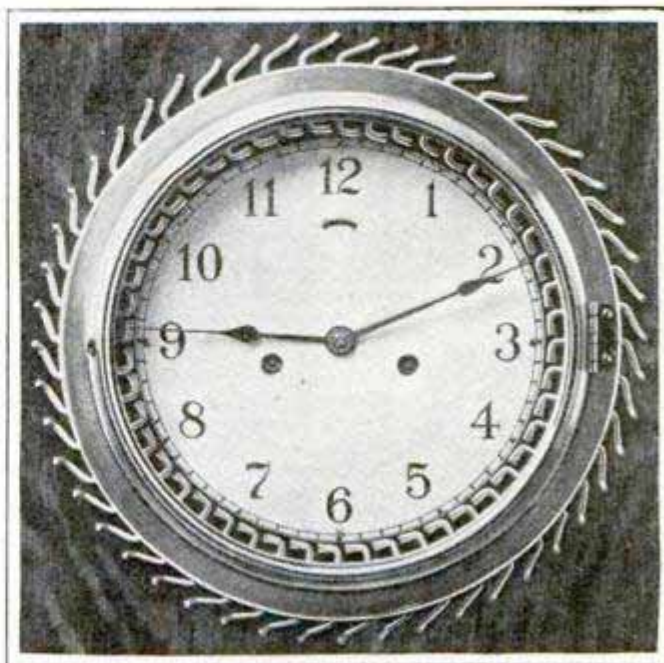
Traveling Motor Bungalow Built for a Camping Trip

tained three roomy compartments, the traveling bungalow was only 26 ft. long, 6½ ft. wide, and 6 ft. high, inside. The four walls were boarded up for about 3 ft. from the floor and screened above, with canvas roll curtains to cover the screens. The roof was made of oiled canvas and had an extension that could be spread over an area, 10 by 22 ft., behind the car to shelter a dining table and several folding cots. The forward compartment, back of the driver's seat, contained four sleeping-car berths. Back of this was a small dressing room and a large observation platform with lockers for cooking utensils and provisions. Folding steps at the back furnished an entrance to the bungalow on wheels.

### HOTEL ALARM CLOCK OF NOVEL CONSTRUCTION

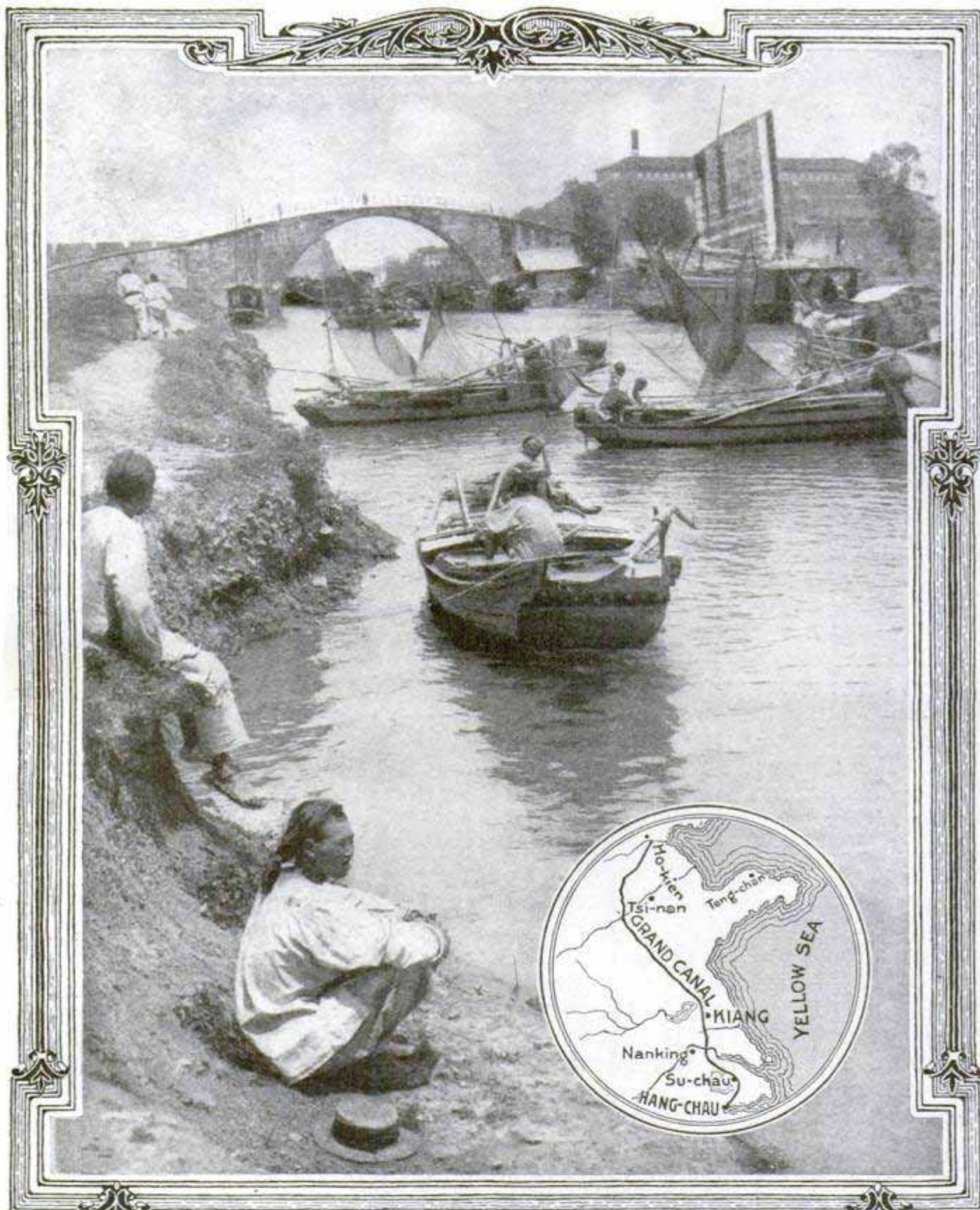
Around the dial of a new "reminder" clock, intended for use in hotel offices, 48 levers are arranged, which permit of setting the alarm to ring at any desired time by an electrical connection. Each lever may be set in three different positions, either up-

right or at 45° either way. If the lever is set upright, the alarm will ring either on the hour, the half or the quarter, as the case may be. If the lever is set at an angle, the alarm will ring five minutes earlier or later, as may be desired. Any number of "calls" may be set up with the certainty that the clock will ring the bell for each in turn. Dry cells furnish the energy to operate the alarm.



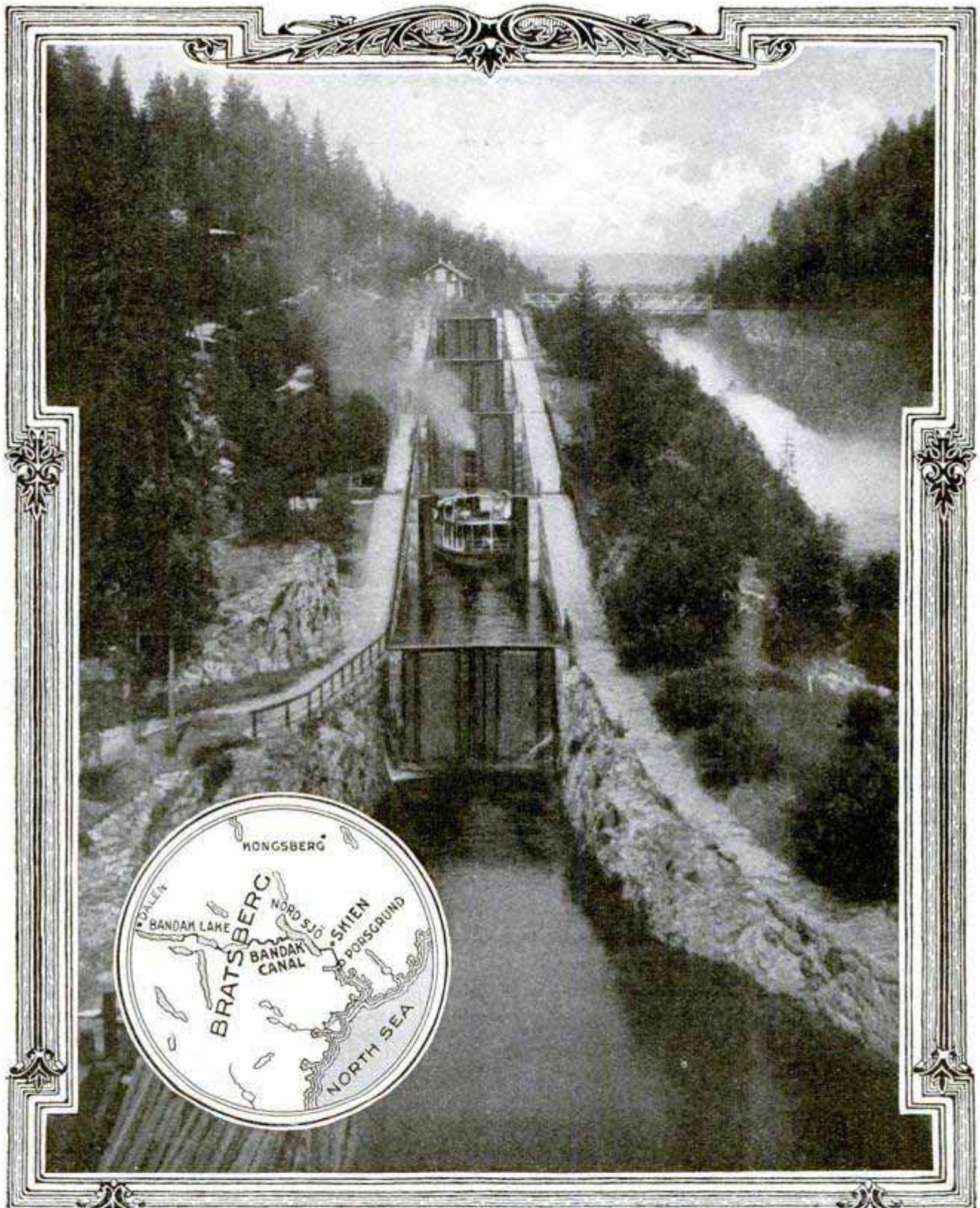
Novel Arrangement of Levers in Alarm Clock

# ARTIFICIAL WATERWAYS IN MANY LANDS



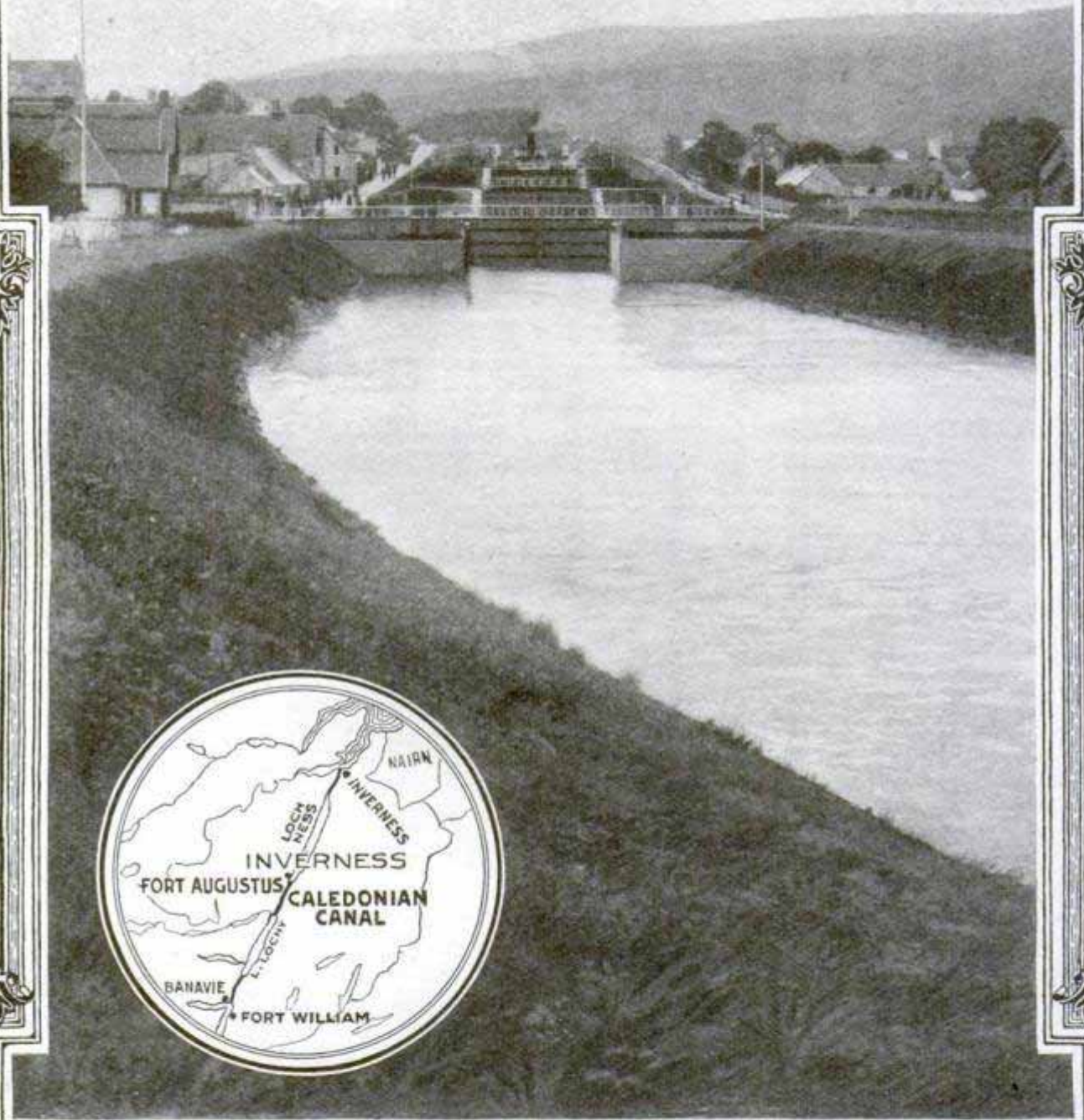
"YUN-HO" is the Chinese name for the Grand Canal, an artificial waterway nearly 1,200 miles long, connecting Hang-Chau with Ho-Kien, Tientsin, and thus providing inland water communication between eastern China and Peking. The depth ranges from 7 to 13 ft., and for long distances it is more than 100 ft. wide. There are no locks, since canal locks are a modern invention, having been devised by Leonardo Da Vinci, who was a contemporary of Columbus, while the Grand Canal was begun about 486 B.C., when the middle section was constructed. The southern part was built about 600 A.D. and the northern part in 1280 A.D. Instead of locks, there are many "barrages," or inclines, up which the flat-bottomed boats are hauled by windlasses, sometimes negotiating a difference of 20 ft. or more in levels. The traffic on the Grand Canal is very heavy, but nowadays mainly local.

## ARTIFICIAL WATERWAYS IN MANY LANDS



**F**EW of the swift rivers of picturesque and mountainous Norway are navigable for any considerable distance, owing to the innumerable falls and rapids, so inland water traffic has to depend upon the numerous large lakes and a few canals connecting some of them. The Bandak Canal, which gives the city of Dalen water communication with Skien, is narrow and shallow. It climbs several flights of locks on the route from Langesund Fjord to Bandak Lake. Small steamers can thus travel from the Skagerrack, an arm of the North Sea, more than 75 miles into the interior of Norway, both freight and passenger traffic being thus provided for. The photograph shows a vessel climbing the locks at the Vrangfos Falls.

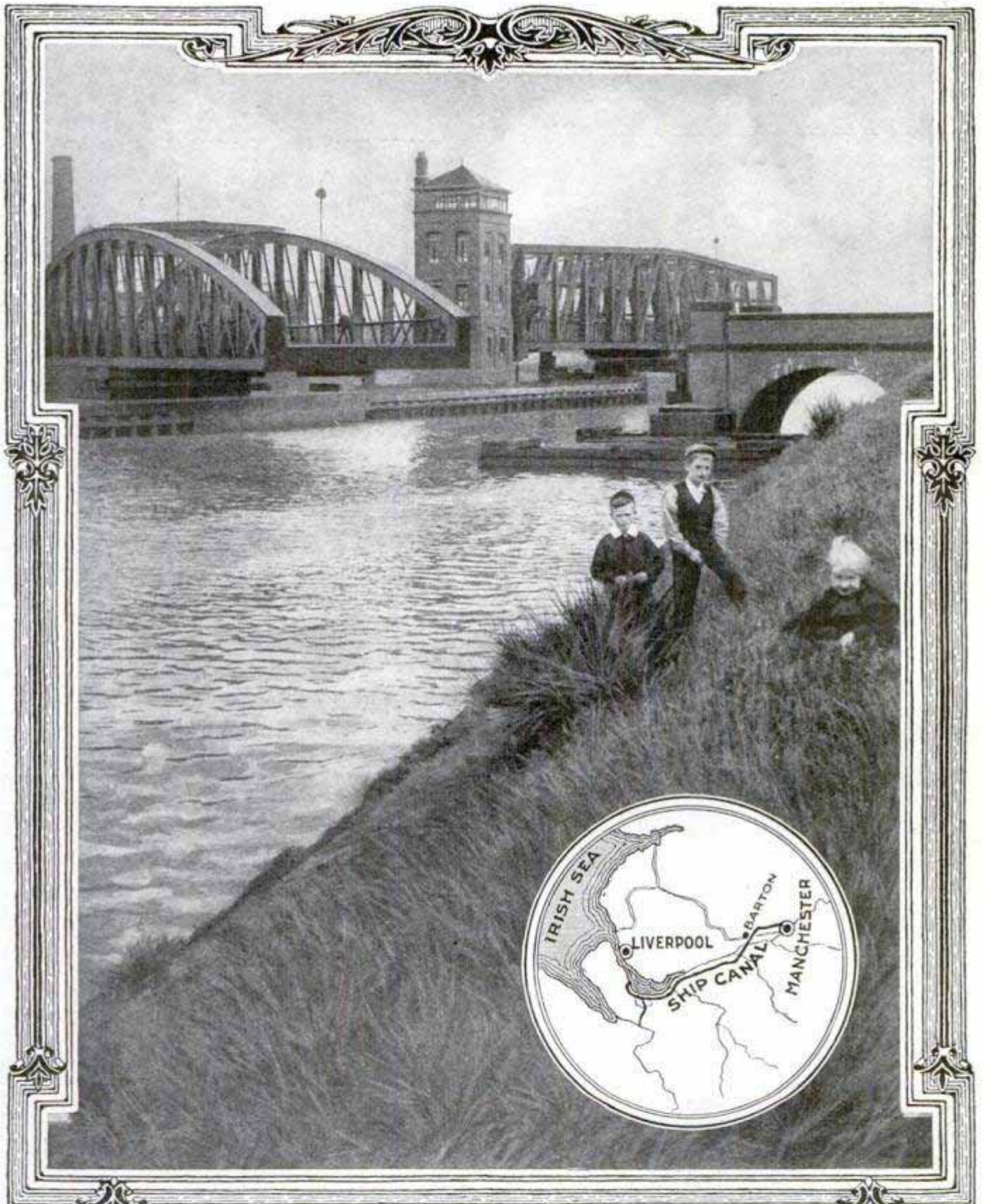
# ARTIFICIAL WATERWAYS IN MANY LANDS



**R**UNNING in almost a straight line across Scotland from the Firth of Beauly, on the northeast coast, to Loch Linnhe, 60 miles to the southwest, the Caledonian Canal cuts off the northern third of Scotland. It was constructed to enable vessels sailing between the North Sea and the Irish Sea to avoid the 400-mile voyage around the north of Great Britain. James Watt, inventor of the modern steam engine, made the first surveys for this canal in 1773, and the work was begun in 1803 under the engineering direction of Thomas Telford, inventor of the system of road building which bears his name. Only 22 miles of artificial channel was found necessary, large lakes being utilized for 38 miles of the distance. There are 28 locks, each 160 ft. long, 38 ft. wide and with 15 ft. depth of water, the average lift being 8 ft. The photograph shows the locks at Fort Augustus.



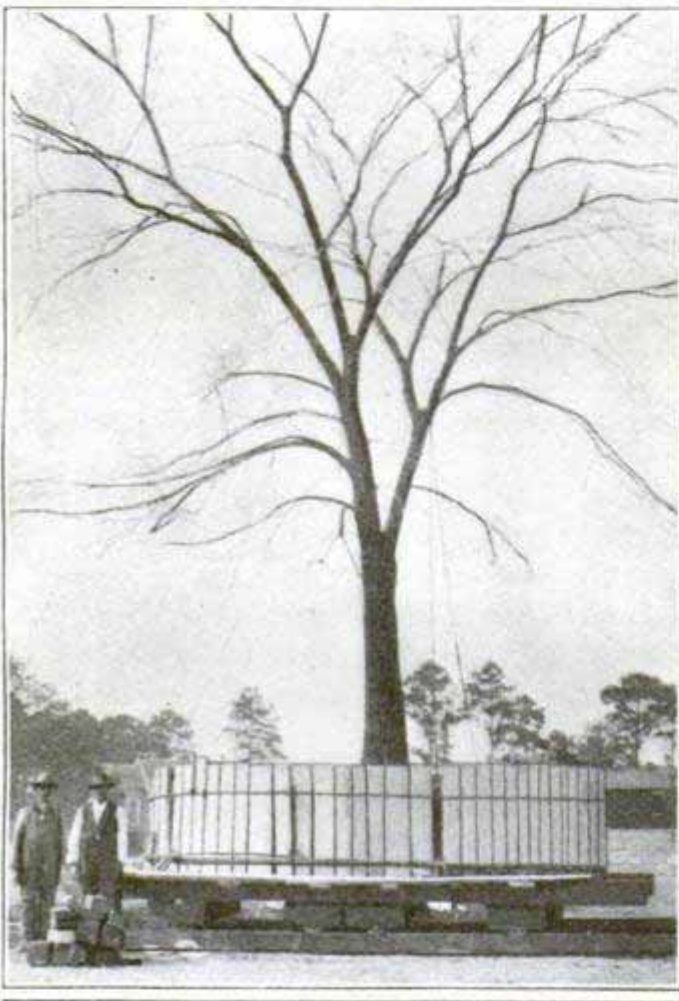
# ARTIFICIAL WATERWAYS IN MANY LANDS



**T**HE famous Manchester Ship Canal, constructed for the purpose of enabling sea-going vessels to reach Manchester, England, was begun in 1887 and opened for traffic on Jan. 1, 1894. It is 35½ miles long and cost \$75,000,000. It connects with salt water at Eastham, on the Mersey River, about 6 miles from Liverpool. Originally 26 ft. deep, it has been dredged to a minimum depth of 28 ft. Ships 550 ft. long, with a 61-ft. beam, a height above water of 70 ft. and a draft of 27 ft. can use this canal. There are five sets of locks with a total lift of 58½ ft., the highest lift being 16 ft. Thirteen barge canals connect with the ship canal, which handles about 6,000,000 tons of freight a year.

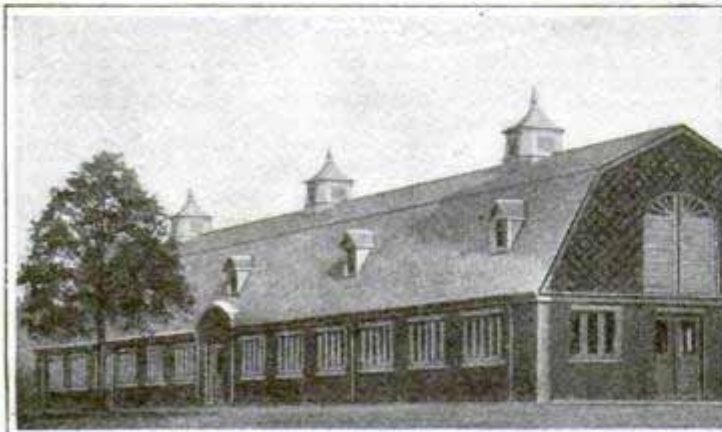
## TRANSPLANTING BIG TREES WITHOUT INJURY

In securing full-grown trees for his new residence, a citizen of Americus,



Method of Moving Big Trees

Ga., adopted a method of transplanting elms and other large and heavy trees without injuring them in the slightest degree. A circular trench was dug around the tree, about a yard deep and with a radius of 3 yd. Boards were placed in the trench and secured by steel cables. The tree was then



undermined, floored with heavy plank and jacked up. Small roller trucks were placed under the cylindrical box thus formed and timbers laid for a temporary track. Along this improvised roadway the big trees rolled to their new locations, and were planted in pits prepared for them.

## REMARKABLE SILOS BUILT OF CONCRETE

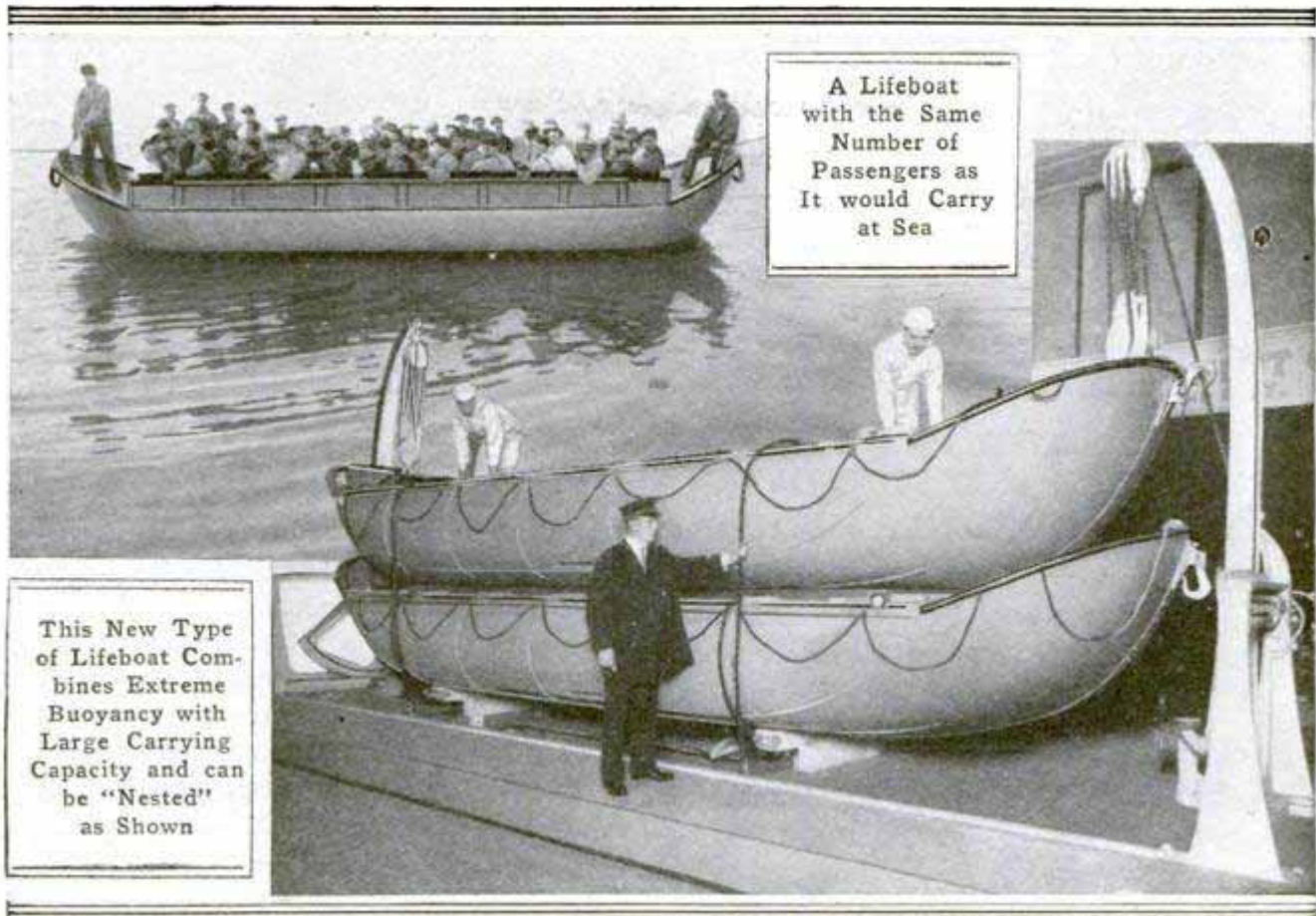
Twin silos, 72 ft. high, are the feature of the dairy barns at the Ohio State Hospital at Dayton. The one on the left has a capacity of 450 tons, while its mate is a combined water tower and silo, the top 11 ft. being used for a water tank, from which water under high pressure is supplied to all parts of the barn. The barns are of monolithic concrete with asbestos shingles, and are practically fire-proof. A similar structure near Aurora, Ill., is a combined water tank and silo. Its height is given as 79 ft. These structures are carried to a great height, while their diameter is kept small in order that as little space as possible shall be wasted at the top, by reason of the settling of the silage. Experience has demonstrated that concrete silos, even if high in pro-



portion to the diameter, stand uninjured even when adjoining buildings are damaged or demolished by violent storms.



These Twin Silos are Built of Concrete and Stand 72 Ft. High



### LIFEBOAT WITH DECK AND WATER-TIGHT HOLD

One result of the succession of startling sea disasters of recent years is the activity shown by shipbuilders in an attempt to devise a lifeboat that will be both unsinkable and unsmashable. A lifeboat for which the claim is made that it meets these conditions as nearly as any boat can has recently been put into service. This boat is completely decked, the space below the deck being water and airtight, and is provided with gunwales that project a sufficient height above the deck to prevent danger of passengers falling overboard. The cross section is wide and low, the bottom of the boat being nearly flat. This construction is designed to enable the boat to ride the roughest sea without capsizing. To prevent, as nearly as possible, the danger of smashing the boat against the side of the ship as it is swung from the davits, the boat is built of the strongest materials throughout, and is provided with a

system of heavy cross bracing in the space between the deck and bottom. Each of these boats is capable of carrying from 60 to 65 persons.

### NATURAL GAME TRAP FOUND IN NORTHERN MEXICO

A hole in the rocky plateau of Pajarito, near the recently excavated community house of Puye, in northern Mexico, becomes filled with noxious



Poisonous Gases Make Cave a Natural Animal Trap

gases which are of sufficient power to overcome a man if he should venture within. This strange natural phenomenon has been used by native Indians as a game trap for many years. A freshly killed rabbit or other small animal placed in the hole serves as bait, luring coyotes, badgers, porcupines, and other wild animals, to descend, where they are overcome before they can scramble out.

### PORTABLE ELECTRIC LAMP WITH NOVEL FEATURES

A number of new features designed for greater convenience in using are embodied in a new portable electric lamp that has recently made its appearance on the market. This lamp has a hook by which it may be hung up, a spring clamp for attaching it to an upright of a bed or chair, and, most important of all, a rubber suction cup by which it may be fastened in a horizontal position to any smooth surface, such as a mirror or wall. It is supplied with a cord, 10 ft. long. This cannot become tangled, as the portion not in use coils up automatically in a receptacle in the base of the lamp.



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### POWER NOW OBTAINED FROM MERCURY VAPOR

The latest source of power for commercial use is mercury vapor. Experiments by a large electric company have demonstrated that by heating mercury and using its vapor to drive engines just as steam is used, the capacity of a

steam plant may be increased by 66 per cent, with a gain of 44 per cent in output for each pound of coal burned. Mercury is vaporized at 677° F. in a specially designed boiler, from which the vapor is conducted to the nozzles of a turbine. The power having been exhausted in revolving the wheels, the vapor is condensed in coils within a steam boiler, where the heat released through its condensation is utilized to convert water into steam, and other turbines are turned with the steam thus made. The condensed mercury, now in its ordinary liquid form, is drawn off and runs back by gravity to the mercury boiler, where the process is repeated. This combination, it is figured, gives a fuel economy very close to that obtained by Diesel engines, while its mechanical simplicity gives it, it is contended, an advantage over the internal-combustion engine.

### WATER HYDRANT IMBEDDED IN EUCALYPTUS TREE

The rapidity with which the eucalyptus tree grows is illustrated in the yard of the old Hoyt's School at Menlo Park, Cal. The pipe seen in the center is a 2-in. water hydrant and is still in use, although the tree has grown entirely around it. The trunk of the tree measures 19 ft. in circumference at the level of the valve.



In power-transmission ropes, failure generally begins at the core, where the most severe rubbing of fiber against fiber occurs, and not, as is generally believed, at the surface.

## USE MOTORBOATS TO SCOUT ICEBERG DANGERS

Steamships of a line cruising between Liverpool and Montreal are now equipped with motorboat ice scouts, as a precaution against an encounter with icebergs. Each vessel carries two motorboats, the size of a lifeboat, fitted with 30-hp. motors, with wireless and with submarine signaling devices. In foggy weather, these motorboats are sent ahead to act as scouts, to report to the liners by wireless the approach of icebergs or other dangers. In the event of a collision, the motorboats will be available for towing the lifeboats, should it be necessary to abandon ship. Other transatlantic steamers are likewise to be equipped with these small patrols.

## FOLDING DEVICE MAKES ANY CHAIR A "HIGH CHAIR"

A device which converts any chair into an infant's high chair has been invented. When not in use by the child it may be quickly detached and put out of the way. The device is a seat with straps, and hooked attachments for grasping the back of the chair. The grips are covered with rubber so as not to mar the finish of the chair, while holding the seat securely in place. A strap in front permits the youngster to be fastened so that there is no danger of a fall.



## MOWING MACHINE MADE INTO A MOTOR TRACTOR

A homemade farm tractor that is a combination of an old mowing machine and a gasoline engine is being



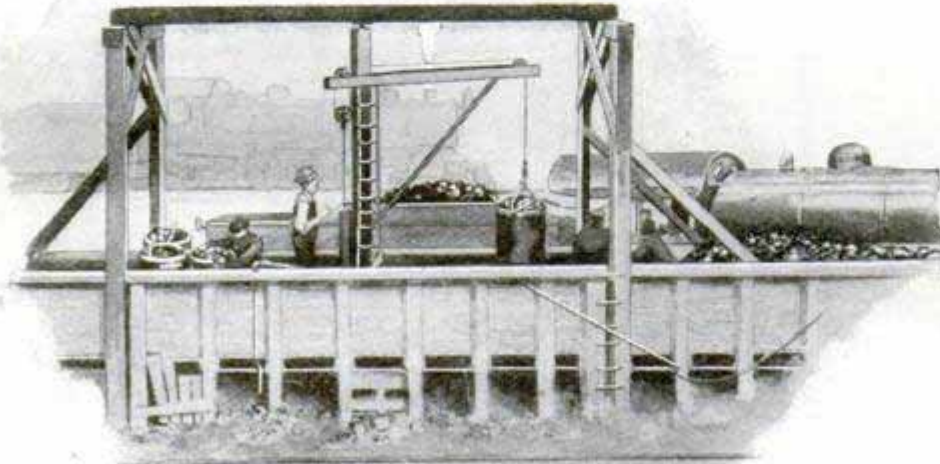
Homemade Farm Tractor Built of an Old Mowing Machine  
Plus a Marine Engine

used to draw a plow on a farm near Newell, S. D. It is crude in appearance, but will draw a 12-in. breaking plow, 5 in. in the ground, at a rate of about two miles an hour. The old mowing machine, stripped of its knives and machinery, is propelled by a 2-cycle 4-hp. marine engine bolted to the frame just back of the seat. Power is transmitted by a chain running over the old gears of the mower. A solid wooden wheel, mounted in an iron fork and provided with a gas-pipe "tiller," is pivoted on the end of the sawed-off pole to serve as a steering gear. Circulation to cool the motor is provided by a bucket of water on the platform behind, a coil of pipe hung under the pole, and three pieces of hose connected with the engine pump.

## COALING DEVICE FOR LOCOMOTIVE

In a large switchyard where many locomotives coal, one railway has installed a coaling device which operates quickly and with a minimum of labor. Between the tracks is the coal pit, into which is dumped from time to time coal for the tenders. As each engine draws up, buckets filled with half-ton

loads of coal are hoisted by a pneumatic lift and swung over to the tender, dumped, and returned quickly. The entire operation takes but a fraction of the time hand coaling requires, and the actual labor involved is limited to fill-

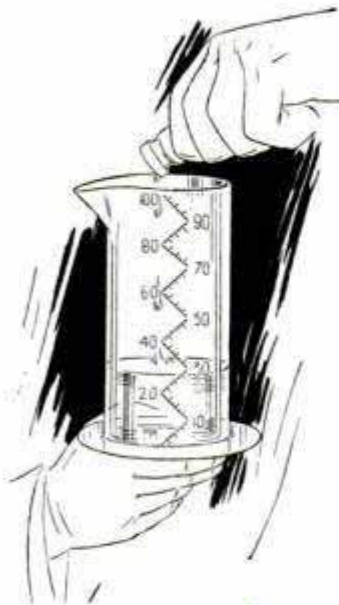


A Simple Contrivance for Coaling Engines Quickly

ing the buckets, a number of which may be loaded at dull times and held in readiness for the rush hour.

### GRADUATED GLASS WITH ZIGZAG SCALE

A graduated measuring glass having the divisions marked on a zigzag line instead of on a vertical line, as has been



the common practice, has been brought out recently in Germany. It is thought that increased accuracy and ease in reading the measurements can be secured with a scale arranged in this way.

A 35-mile telephone cable is being laid between Vancouver and Vancouver Island, Canada. It weighs 560,000 lb., cost \$100,000, and \$20,000 will be spent in laying it.

### TO MAKE FLAX STRAW INTO YARN AND TWINE

Tests made at English mills on flax straw grown in Montana indicate that this material, heretofore regarded as practically a waste product, can be made successfully into all varieties of yarn and twine, including binder, packing and shop twines. The process of manufacture is simple and inexpensive, the flax straw being taken direct from the field and treated rapidly, then dried in the sun and passed through special machinery that forms it into yarn or twine. It is believed that this treatment can

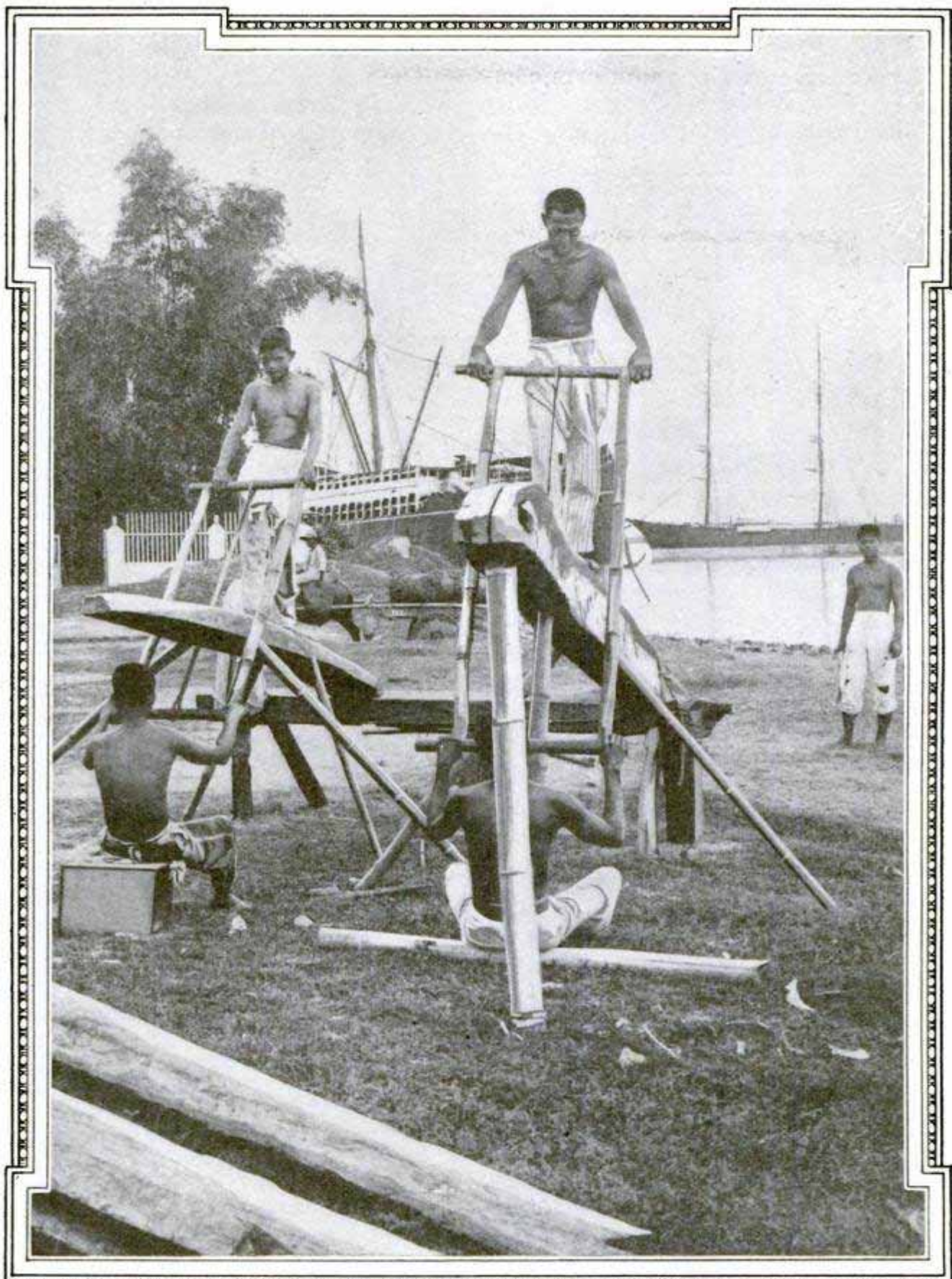
be applied with commercial success to flax straw grown in any part of the United States. If this proves to be true, a profitable addition will be made to the resources of American farmers. In 1912, about 3,000,000 acres were in cultivation under flax in the United States.

### BIG GLASS TANK USED BY DIVERS BURSTS

A glass tank holding 8,000 gal. of water, which was part of the equipment of the Bermuda aquarium, burst when being used by two moving-picture performers in staging a diving scene. The rush of water drew the performers across the jagged edges of the broken glass, injuring them severely. It is believed that the sudden strain caused by the plunge of the divers caused such pressure within the tank that the glass could not resist it, and one side gave way with disastrous results.

A tube containing \$5,000 worth of radium, lost in a Liverpool infirmary, was found in the garbage of the institution. It had been swept up unnoticed.

# PRIMITIVE SAWMILL STILL USED BY FILIPINOS



**S**AWMILL installations in the Philippine Islands do not require a large investment. The timber is braced at an angle by bamboo pieces, the lower end resting on a crosspiece of timber. One sawyer mounts the piece to be cut, while his mate seats himself beneath the stick. A saw blade mounted in a bamboo frame is worked back and forth by the two men.



## NATURAL DAM OF SODA IN NEW MEXICO

There is a curious natural dam composed of crystallized soda in the heart of the Jemez Mountains of New Mex-

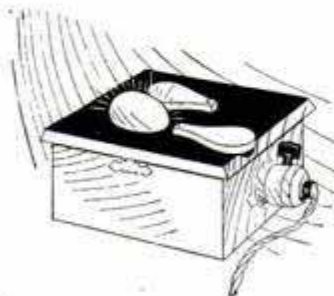


Natural Dam of Soda Deposited by Mineral Springs in  
New Mexico Mountains

ico. The deposits of some mineral springs have gradually accumulated until they have piled themselves into a snowy-white wall 30 ft. high. The entire surface of the dam is overlaid with beautiful leaf designs, and its edges are fluted with stalactites hanging in little groups. Under the edge of the dam a little mountain stream flows out from the rocks behind.

## EGG TESTER TO REPLACE CANDLE

A compact egg tester has been patented to take the place of the rude contrivances used by many chicken raisers and grocers. An electric light in a neat box,  $6\frac{1}{2}$  by 6 by 3 in., shines through two beveled-edged slots in the top. The outside of the box



is covered with black felt cloth and the inside is lined with white asbestos. The strong light shining through eggs placed in the slots makes it possible to judge their quality even in daylight.

## AEROPLANE SCOUTS IN WARFARE

The various kinds of aeroplanes best fitted for different duties in war and the number of machines of each kind that should accompany an army in the field have been discussed at length by an officer in the British Royal Flying Corps. At the beginning of a campaign fast single-seated machines that have a large radius of action are needed to ascertain the strength of the enemy. Larger two-seater aeroplanes that can readily be transported on the road when the weather is bad he considers much the best for reconnaissance of the enemy's position during the campaign.

As an army in the field would require machines of both types, he has given the total number of aeroplanes needed by a field army as 15 squadrons of 12 machines each. They are parceled out, according to his plan, among the various divisions as follows: Two squadrons of fast single-seater monoplanes to accompany the army troops; one squadron of two-seater monoplanes to go with the cavalry divisional troops; six squadrons of two-seater biplanes and six squadrons of fighting machines to work with the divisional troops, one squadron of each with each division.

## TORPEDO BOAT IN STORM ALMOST SUBMERGED

The low freeboard of torpedo boats renders them particularly subject to the action of the huge waves met with in storms. A photograph taken from the fighting top of a battleship shows clearly the plight of the torpedo boat in heavy weather. Tons of green water break upon the low deck, washing overboard everything not firmly





The Torpedo Boat is No Place for a Fair-Weather Sailor, as This Photograph Clearly Shows

Courtesy London Illus. News

lashed. First the bow and then the stern are lifted clear, taxing the rigidity of the frame to the utmost.

However tightly the hatches are battened down, considerable leakage results.

## CURIOUS CEREMONY OPENS ELECTRIC LINE

The opening of the first electric street-car line in Constantinople recently was marked by a curious ceremony, in which

two lambs were sacrificed upon the tracks, the rails being smeared with the sacrificial blood while prayers were offered by Mohammedan priests for the success of the undertaking. The officials of the new line took part in the



Sacrificing Lambs upon the Rails of the New Street-Railway Line in Constantinople

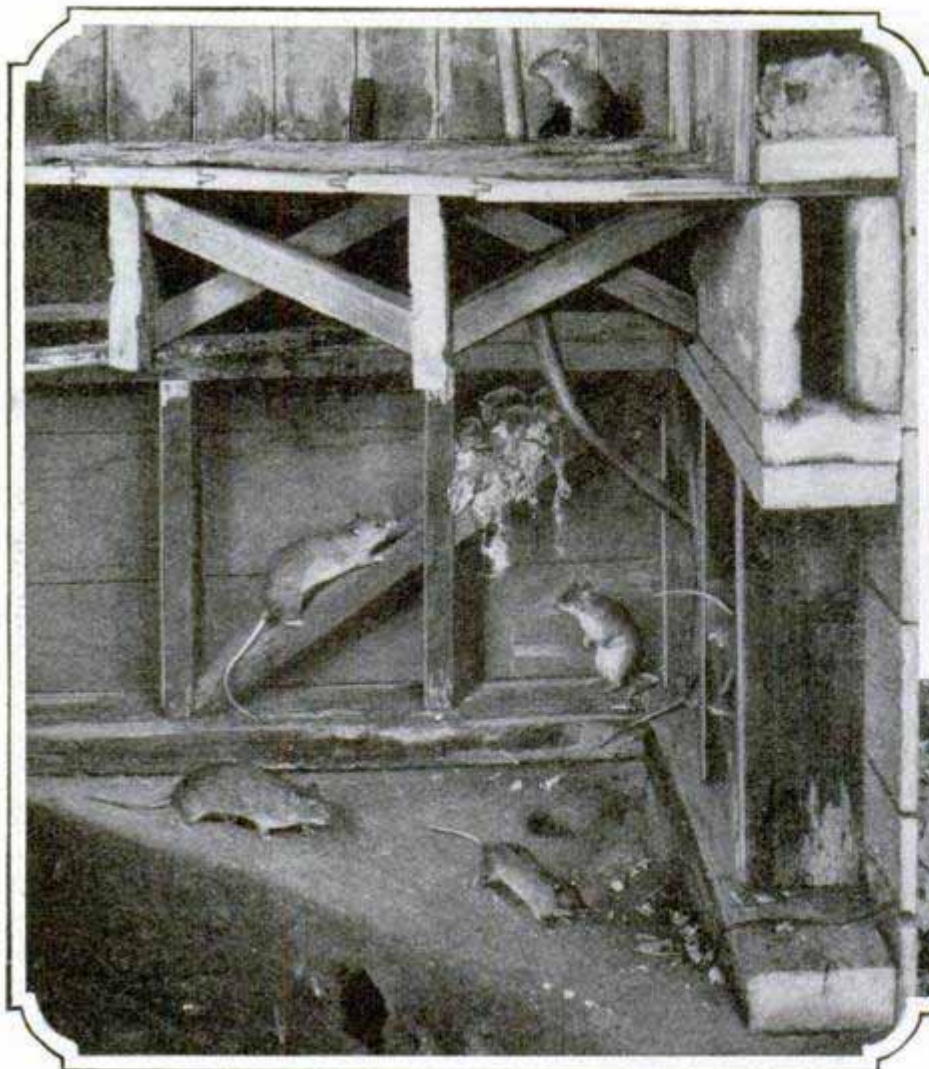
ceremony and are shown in the photograph with their hands extended, the attitude of invocation. This ancient rite with its modern adaptation presents strange contrasts. The car line runs from the Karakeny bridge to Sirkedji, within the Ottoman capital.

### MODEL OF RAT-INFESTED HOUSE

A model of a rat-infested kitchen and cellar in San Francisco has been installed in the American Museum of Natural History as an example of what happens when proper precautions are not taken for the exclusion of these disease-bearing animals. Side by side with this model is one showing a house and barn protected by rat-proof construction. The importance of such protection is evident in view of the fact that rats are known to be the carriers of the germs of some of the most dreaded diseases, including the bubonic plague.

### FLOATING NAVAL COALING STATION

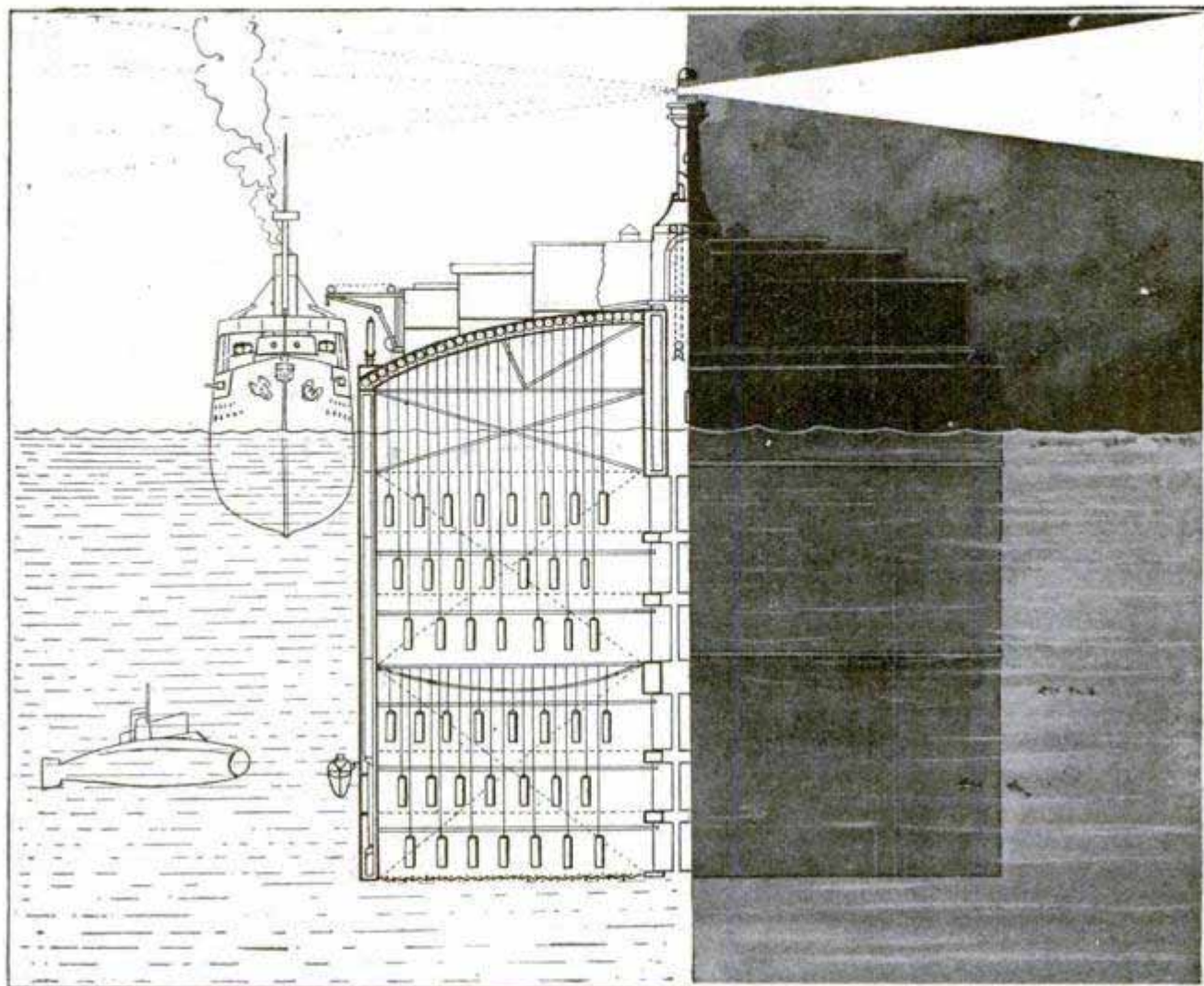
For nations that need naval coaling stations in distant parts of the world where they have no colonial possessions, a Russian inventor has designed a floating storehouse for fuel and other supplies. Manned by a small crew of men, the floating naval base can be towed to any advantageous position and anchored, ready to receive supplies from colliers and distribute them to warships. On the approach of a hostile fleet, the entire naval base, crew and all, can be sunk out of sight, to reappear again as soon as danger is past. As patented, the floating storehouse is very much like a huge diving bell, cylindrical in shape, with double walls and roof containing compressed-air tanks for regulating its height in the water. It has no bottom except a wire netting and is usually partly filled with water. All coal, petroleum, and other naval supplies are received



Model in American Museum of Natural History Showing Cellar and Kitchen Where Rats have Taken Almost Complete Possession



Photo by Am. Museum of Natural History



A Floating Naval Coaling Station Which can be Anchored Anywhere and Sinks Out of Sight Whenever Danger Approaches

and stored in small water-tight drums. From the receiving cranes on the roof, the drums are moved to a well in the center, lowered to the proper depth, and shunted off through windows in the well upon concentric tracks, where they remain suspended in the water until needed. All the handling is done by automatic machinery.

## QUARRYING FOSSILS IN WYOMING

The bones of many antediluvian monsters have been found in the rocks of Wyoming, and regular fossil quarries exist, where bones and often a complete skeleton of extinct creatures may be exhumed. Uncovering these fossil remains, however, is the least of the task confronting the scientist. Each bone must be inclosed in a

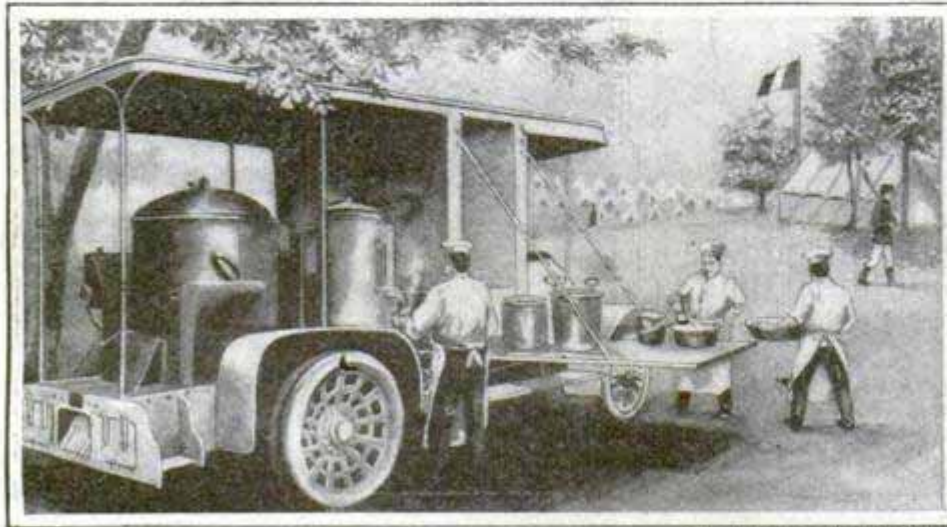
protective cast of plaster, carefully wrapped and numbered with exactness. Bones shipped without such precautions would surely be broken before they reached their destinations in the laboratories or museums of scientific institutions.



Taking Out the Bones of Prehistoric Monsters from a Wyoming Quarry

## NEW AUTOMOBILE MILITARY FIELD KITCHEN

A military field kitchen mounted on a large automobile truck, as shown in the accompanying picture, has been



Courtesy of the Sketch  
A French Automobile Military Kitchen Ready to Follow the Army in the Field

designed for the French army. The cooking boilers are mounted on a platform back of the driver and protected by a canopy, and the fully equipped kitchen, in such compact form, is able to follow the rapid movements of the army in the field.

## EMERGENCY HOISTING CAGE FOR MINE RESCUE

To aid in mine-rescue work when the regular hoisting apparatus has been damaged or disarranged, an emergency portable and collapsible hoisting cage has been patented and dedicated to public use by the chief mining engineer of the U. S. Bureau of Mines. The emergency cage consists of a collapsible frame of two flat bars, approximately elliptical in shape and welded together at the ends so that they serve as uprights and as top and bottom frame parts.

Bolted inside of this frame are a number of horizontally arranged hoops which brace the frame and form skeleton sides. The collapsible cage can be easily transported and can be put together ready for use in a few minutes.

## APPARATUS FOR FORCING RESPIRATION

The one-man resuscitating apparatus which was described in Popular Mechanics Magazine some time ago is illustrated by the picture shown here. Its purpose is to enable one man to revive a person who has been nearly

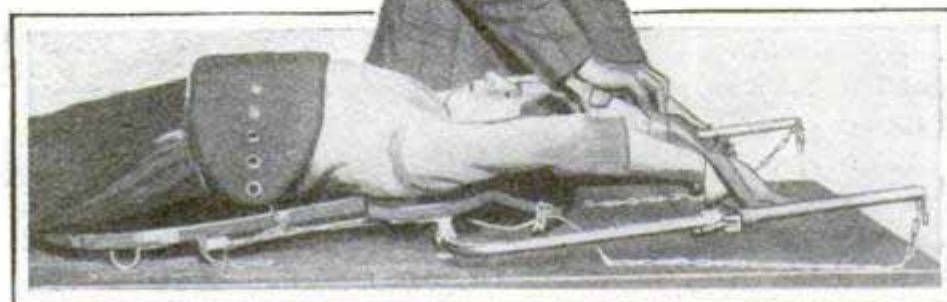


Photo by Paul Thompson  
Life-Saving Apparatus for Reviving Unconscious Persons

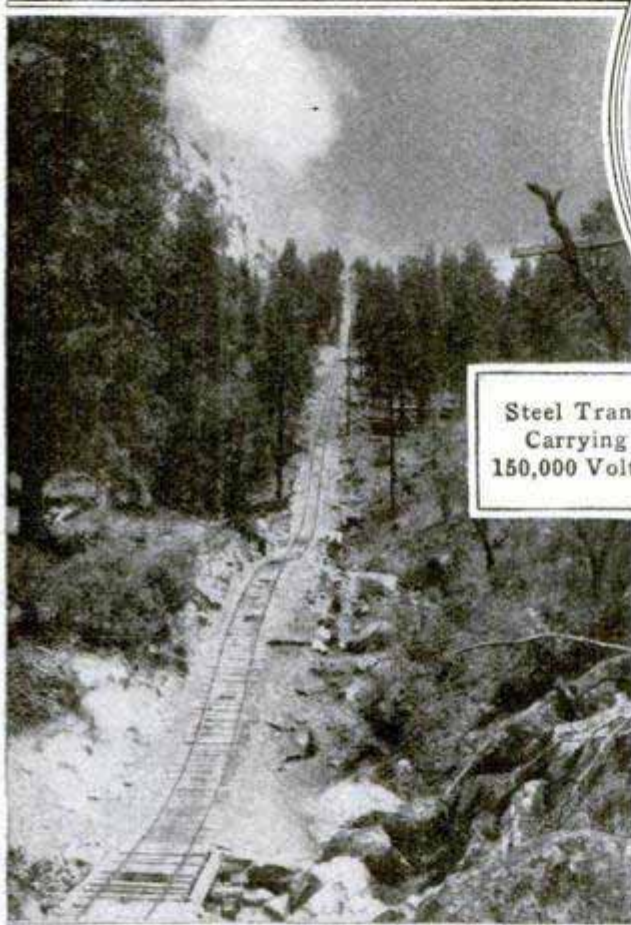
drowned, by moving his arms and compressing his abdomen with a rhythmic motion to force respiration. The apparatus consists of a flat, inclined rest for the trunk of the body and two metal arms pivoted under the shoulders. The person to be resuscitated is stretched out on the apparatus with his hands over his head strapped to the pivoted arms. A broad strap placed across the lower chest and abdomen is fastened to ropes which draw it tight when the arms are swung to a vertical position. As the arms are moved up and down the victim's chest is alternately expanded and compressed. One man can

operate the apparatus with one hand while, with the other, he holds the victim's tongue to prevent it from falling back into the throat and obstructing the air passages.

force. Carrying the electric current, at a pressure of 150,000 volts, to Los Angeles, two lines of aluminum on steel towers form one among the longest commercial-transmission lines in

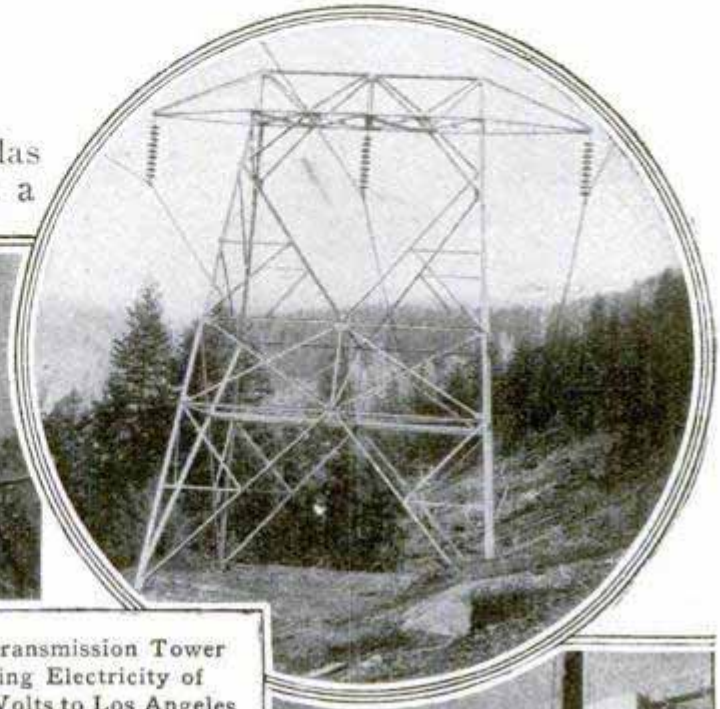
### BIG CREEK DAM NOW FINISHED

East of Fresno in the Sierra Nevadas lies the Big Creek basin, where, at a

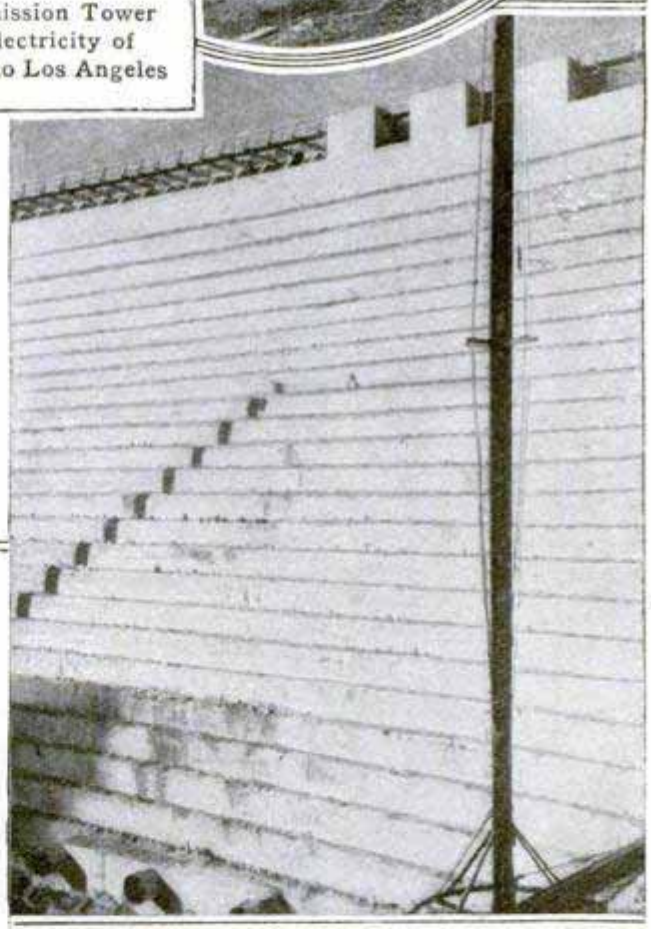


Mountain Railroad Showing Heavy Grades

cost of over \$12,000,000, a great dam has been built, which transforms Big Creek, a branch of the San Joaquin River, into a great reservoir, supplying the power to light the city of Los Angeles, 241 miles away. To build this dam it was necessary to construct a mountain railroad with heavy grades, to make a wagon road a hundred miles in length, and to drill a 12-ft. tunnel six miles through solid rock. Two concrete power houses stand sentinel on either side of the great dam, and water, dropping 2,000 ft. in steel pipes, strikes the wheels with enormous



Steel Transmission Tower Carrying Electricity of 150,000 Volts to Los Angeles

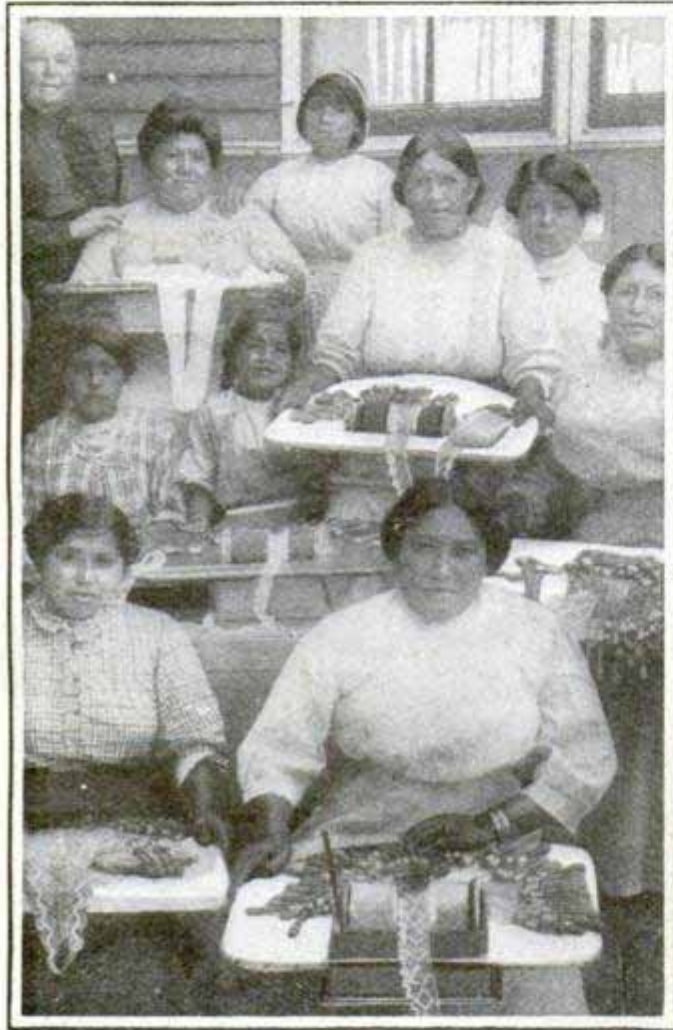


Completed Dam with 6-Ft. Steps

America. The first current was sent over the new line on November 7, 1913, and 80,000 hp. are now available for use.

## INDIAN WOMEN MAKE FINE PILLOW LACES

Teachers provided by the Indian Bureau have been successful in teaching Indian women on the reservation



Indian Lace Industry at Pala, California

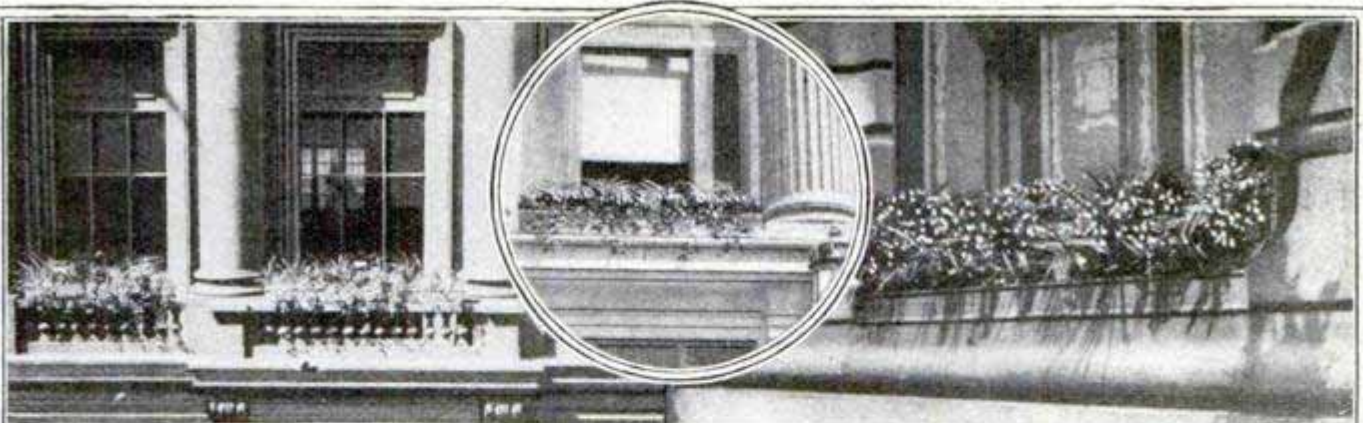
near Redlands, Cal., to make fine pillow laces. It was noted that these women were remarkably proficient in making baskets, and as there seemed to be no reason why their dexterity and eye for color and design might not be directed along lace-making lines, the experiment was undertaken in the expectation that they might be able to supply a portion of the American demand for fine laces now seeking the products of France, Italy and Belgium. The new industry is well under way, and the women are turning out some beautiful designs.

## FLOWERS LEND CHARM TO BUSY CITY STREETS

The floral window box, which has become an established feature in the business districts of many of the larger cities, is a form of ornamentation that has taken, and is likely to retain, a strong hold on the sympathies of city dwellers. The practice of using miniature flower gardens in this way for relieving the monotony of the brick and terra cotta and asphalt of business sections has developed in this country within the last few years, although it has been common in Europe for a considerable period. Apparently, this movement is only in its beginning, since each year sees more boxes installed, and more foliage and flowers ornamenting the entrances and drooping from the window ledges of business buildings. Last summer there was scarcely a block in the loop district of Chicago, famous as one of the most congested districts in the world, that was not provided with one or more of these refreshing floral displays. The foliage of the window box, however, is not exclusively a summer feature, since in many of the boxes the flowering plants are replaced with evergreens on the approach of winter. There is also a tendency to install plants for the benefit of the workers in a building, and many flower boxes placed in positions too high to be seen from the street are being maintained for the influence they have on the employes and clients of business firms.

Experience has shown that growing plants can be maintained with little trouble in the windows of the downtown buildings, but that a better type of box is required than is commonly used in the home. The boxes are nearly always of metal, to avoid the annoyance and damage from leakage. Sometimes the metal box is incased in a stone or terra-cotta box that is ornamented in an artistic way and made an architectural feature of the building, and in some of the latest buildings this feature formed an important point in the design. The best results in the culti-

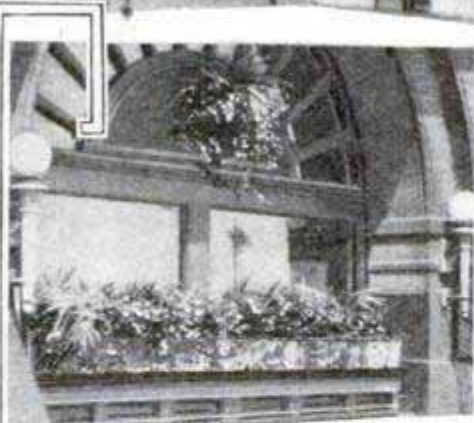
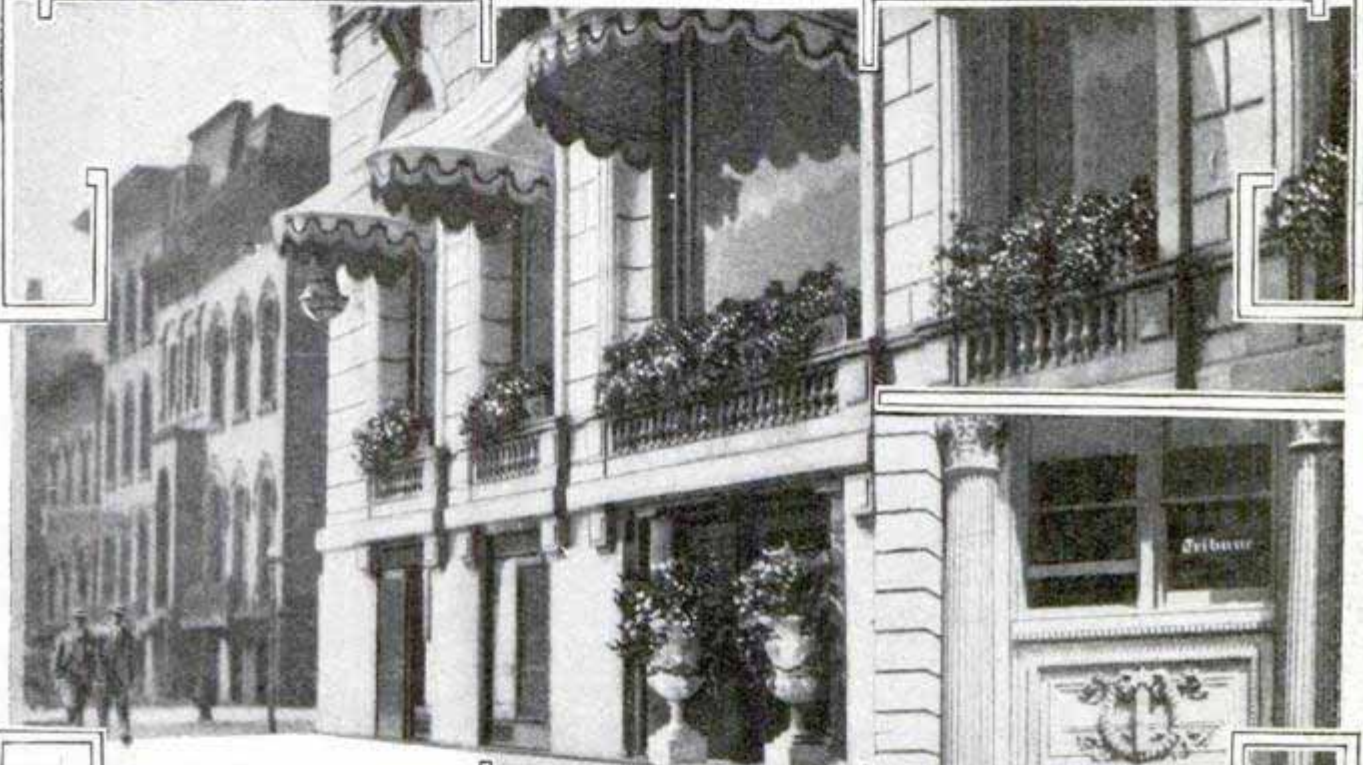
☐ Waste used in street-car journals in Denver is cleaned and used over again.



Window Boxes Brighten Windows of Bank Building

Flowers in Bloom over Entrance to Hotel

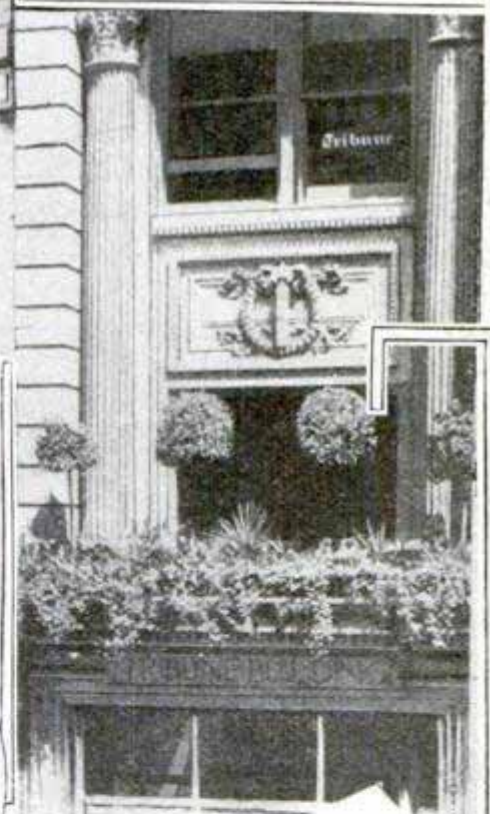
Below: Elaborate Floral Display of Chicago Hotel



Arch of Hotel Lobby



Artistic Window Box



The Front of a Newspaper Building



Terra-Cotta Window Boxes That Form Architectural Feature of Mercantile Building

vation of plants seem to have been secured with subirrigated boxes, largely because these require a minimum of attention. With this class of box the water is poured through a tube into a false bottom from which it is drawn up through sponges into the earth around the roots of the plants. In planning window boxes the tendency was formerly to use a miscellaneous selection of plants without much attention to grouping or effect, with a result that was seldom satisfactory. The expert florist is now more often called in, and an attempt is made to secure strong effects, consideration being given even to the direction in which the window faces. For winter foliage various kinds of evergreen are used, such as arbor vitae, Norway spruce, box and pine.

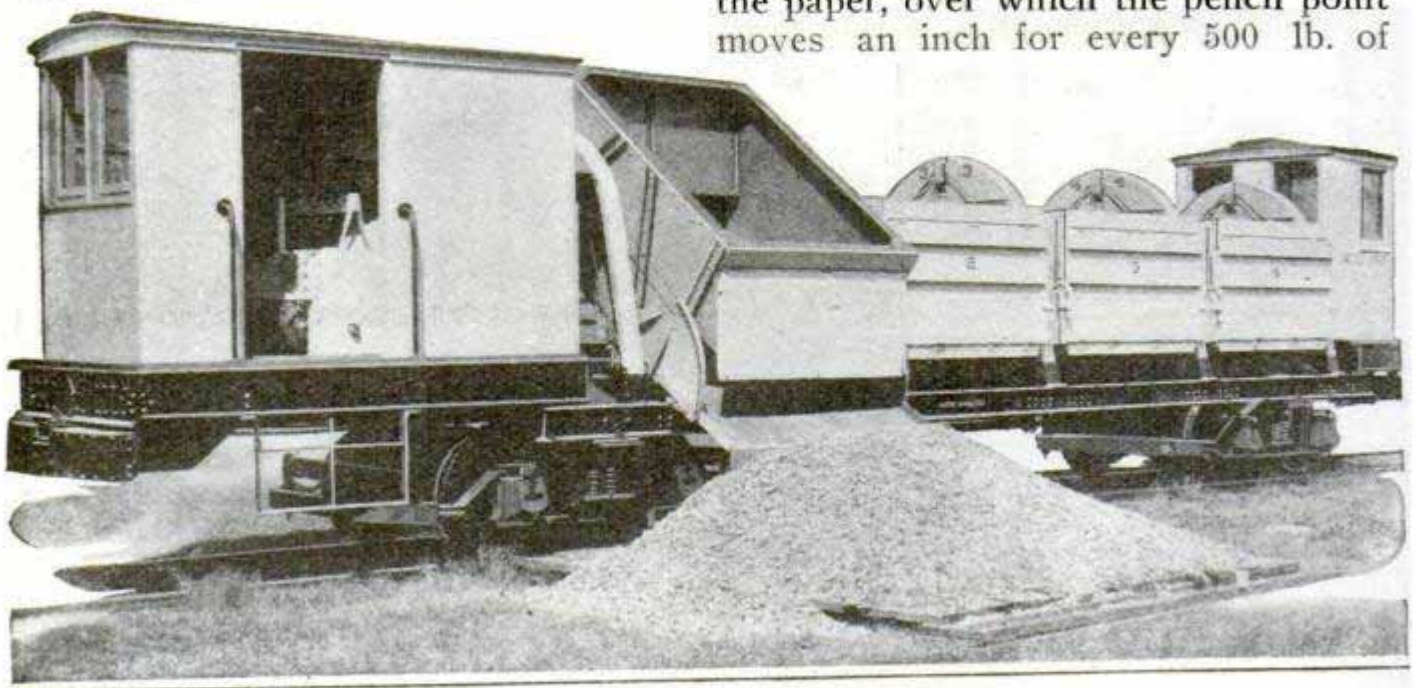
### NOVEL DUMP CAR OPERATED BY ELECTRICITY

A Connecticut interurban system, operating a network of electric lines throughout the state, has adopted a multiple-body electric dump car having several novel features. Four separately operable compartments, each of 6-cu.-yd. capacity, are so hinged that they may be dumped over either side of the track. In the cab is a 10-hp. motor designed for tilting the com-

partments in unloading, and any one or all of them may be dumped at a time. It takes less than one minute, it is stated, to unload the car when the compartments are dumped separately. The car is self-propelling, four 40-hp. motors giving sufficient power to drive the loaded car at approximately 12 miles an hour. Only two men are required to operate this car, resulting in a direct labor saving.

### DYNAMOMETER RECORDS PULL ON ROADS

The newest machine acquired by the United States Department of Agriculture for gathering data is a dynamometer for recording the "pull" that is required of horses or other motive power to draw vehicles over a given road. The dynamometer is nothing more than a standard city dray, from the bed of which are suspended two coil springs connected with a shaft, rack and pinion; a band wheel, carrying a pencil motion; a platen and a series of feed rolls, over which a metallic-surfaced paper is drawn. A chain and gearing from the hub of a rear wheel operates the mechanism. The pull on the tongue of the dray is transmitted through the coil springs, the compression of which measures the power necessary. This is shown on the paper, over which the pencil point moves an inch for every 500 lb. of



Multiple-Body Dump Car Used by Connecticut Electric Line





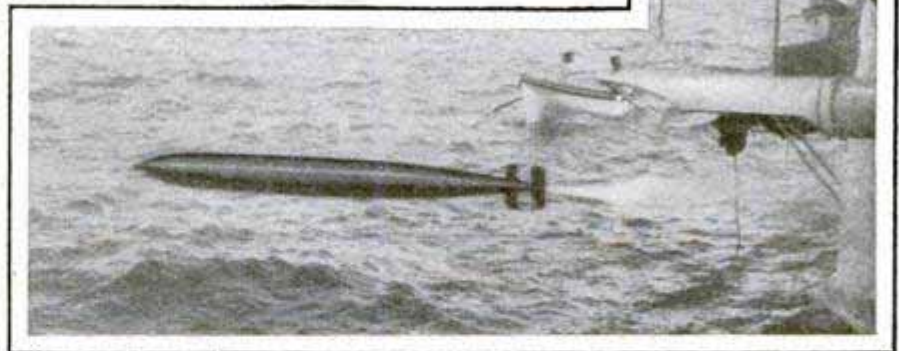
draft exerted. A record of 20 ft. of paper represents one mile of travel. All sorts of street-cleaning machinery, water sprinklers, garbage, dump and ash carts, and the like, may be tested by hitching them on behind the dynamometer, the pencil marking accurately the power needed to move them at varying speeds and over all sorts of road surfaces.

### SOME VALUABLE SECRETS AWAITING DISCOVERY

A fortune awaits the man who can produce artificial gutta-percha in large quantities at a price sufficiently low to warrant its use instead of the genuine article, the supply of which is fast diminishing. Cork is another substance of everyday use for which no satisfactory imitation has been provided, the only substitute thus far produced being paper treated with paraffin wax, but this material cannot be used for corking wine bottles. One of the most valuable processes unknown to us is the production of iron that will not rust or decay. That this secret was known to the ancients is proved by an iron monument at Delhi, India, which has stood exposed to the weather for centuries without rusting or decaying.

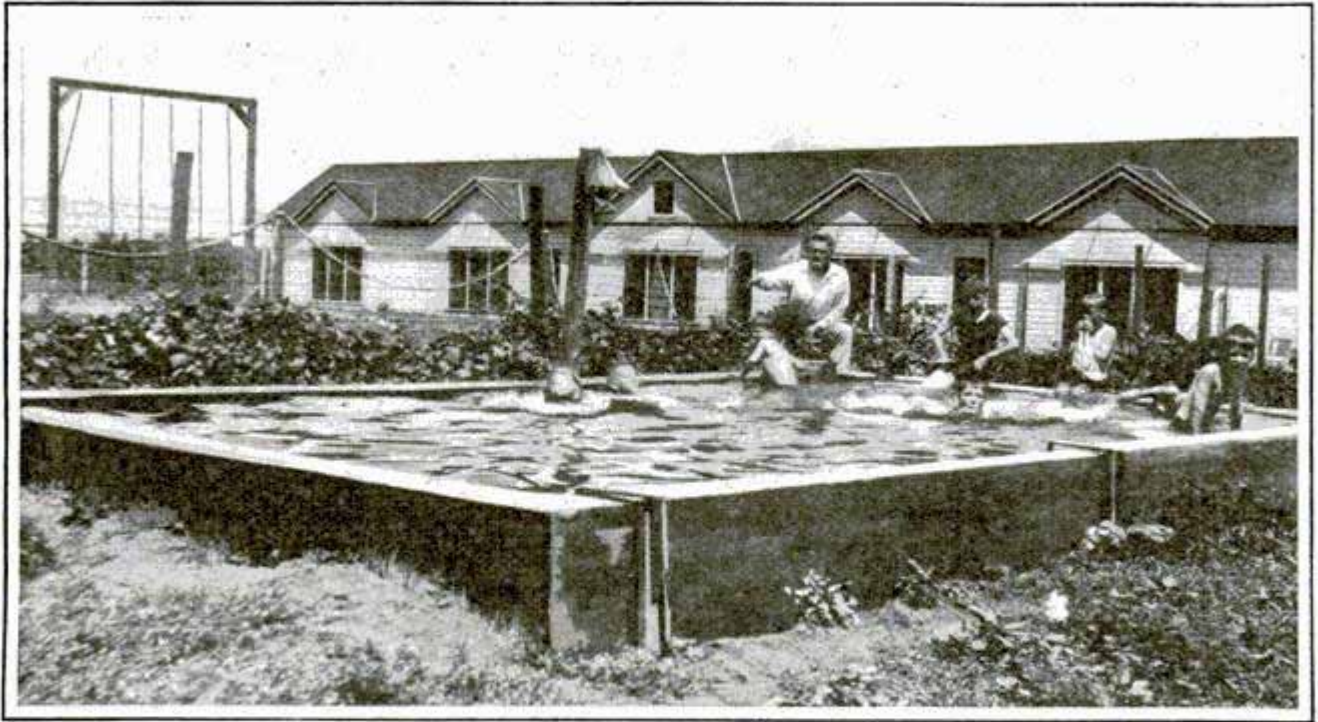
### GERMAN WARSHIP IN TORPEDO PRACTICE

Owing to the fact that the destruction of a torpedo means an expenditure of about \$2,000, the torpedoes used in practice carry no explosive, and when the force is spent they are recovered and towed back to the ship. The accompanying illustration shows a torpedo being discharged from a German warship. The two sailors in the boat are about to set out in pursuit of it.



Torpedo Photographed at the Moment of Discharge  
from a German Warship

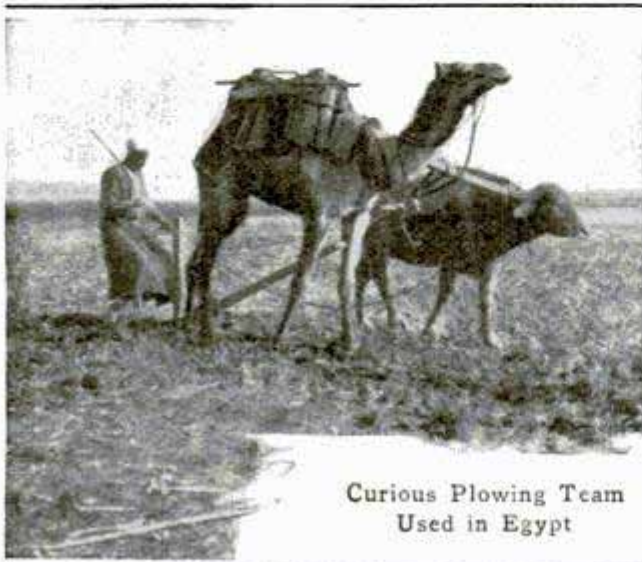
The escape of the compressed air, which launches the torpedo, and the whirl of the propellers in the air before the plunge into the water produce an uncanny noise having a decidedly plaintive note, which creates a weird and "creepy" feeling in the novice who chances to hear it for the first time.



Fun in the New Swimming Hole, Made of Concrete, in the Back Yard

### EGYPTIAN FARM TRACTOR 1914 B. C. MODEL

Agriculture in Egypt is still conducted along old lines, and the sight of a "fellah," as the lower-class rural natives are called, plowing with a camel and a water buffalo yoked together, is not uncommon. The plow is of wood and of the simplest possible construction. It scarcely more than scratches the surface of the soil, but because of the unrivaled fertility of the alluvial deposits along the course of the Nile the crops raised are fairly large.



Curious Plowing Team  
Used in Egypt

### CONCRETE SWIMMING TANK EASILY CONSTRUCTED

Cement walls 8 in. thick, not reinforced, form this swimming tank, which is 12 by 20 ft. in size. It is 4 ft. deep at one end and slants to 5 ft. at the other. The water is pumped in by a gasoline engine used in farm work, and there is a valve at the bottom of the tank connected with a tile so that the water may be changed, and the tank scrubbed as often as need be. The whole thing cost but \$90, and is far better for the children than swimming in open ponds or small creeks.

### SEEK OLD GUNS BENEATH THE SEA

A thousand brass cannon, sunk in May, 1692, when the combined English and Dutch fleets worsted the French fleet in the battle of La Hogue in the English Channel, will be raised if the French ministry of the marine receives satisfactory bids. For 222 years these old guns have lain at the bottom of the channel, and only recently a salvage contractor asked permission to raise them. Upon investigation the naval authorities of France concluded that the project was feasible.

## ONE CAUSE OF THE HIGH COST OF LIVING

According to a report from the United States Department of Agriculture the present high cost of living is partly due to the decreasing number of beef and farm cattle raised and their increased cost during the past two years, as follows: Compared with January 1, 1912, milch cows decreased 202,000; other cattle, 1,230,000; sheep, 880,000, and swine, 4,232,000. The price of these various animals increased, however, in average value per head, as follows: Milch cows increased \$5.63; other cattle, \$5.16; sheep, \$0.48, and swine, \$1.86. In total value milch cows increased \$107,369,000; other cattle, \$159,581,000; sheep, \$21,609,000, and swine, \$79,781,000.

## NEW ODORLESS COOKING UTENSILS

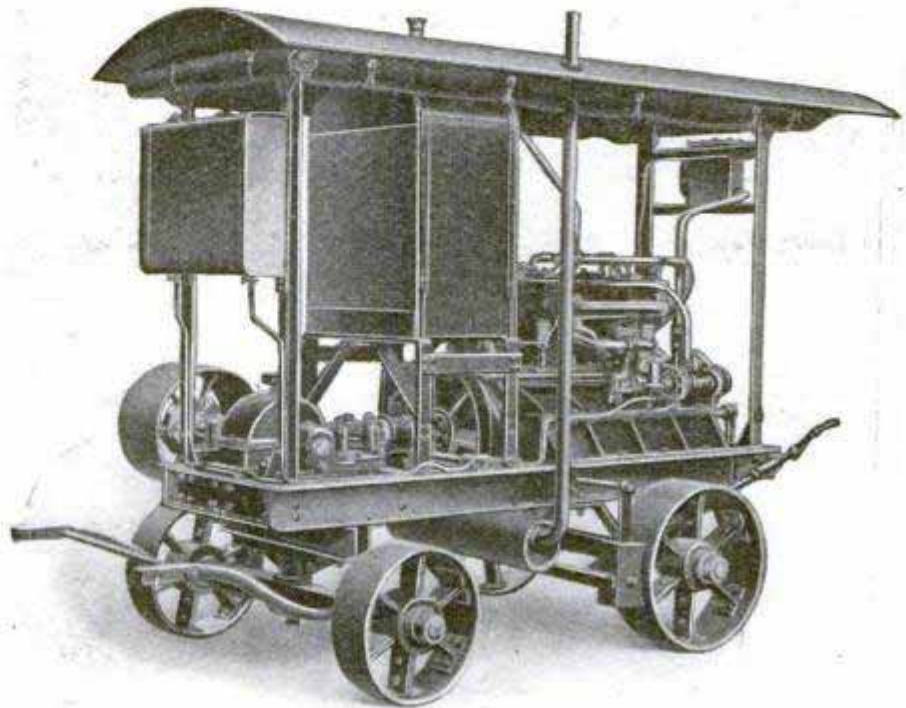
In the new down-draft cooking utensils which have just been patented no odors are allowed to escape and cooking is made entirely odorless. Each utensil has a tightly fitting cover and a tube running down through the center to a hole in the bottom, to carry all odors and vapors back into the stove.



The tube has an added advantage in furnishing a larger heating surface. The down-draft idea is to be applied to odorless saucepans, double boilers, frying pans, and other common cooking utensils.

## LOCOMOBILE DESIGNED TO BURN HEAVY OIL

Among the recent developments in engine construction in France is a locomobile, or portable power plant, so de-

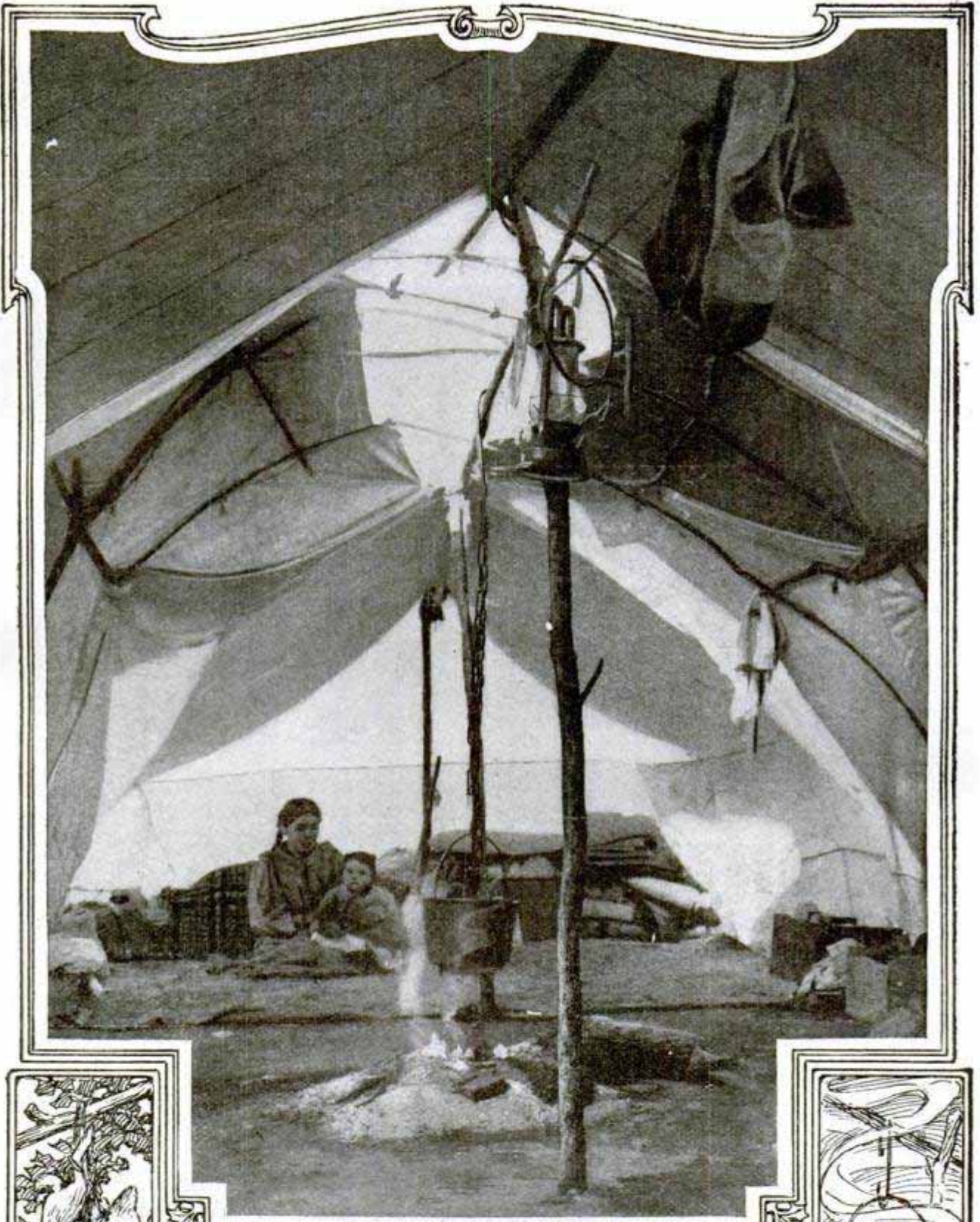


French Locomobile That Burns Heavy Oil

signed that it will readily burn the heavier grades of oil. This improved form of motor is of practically all-metal construction, and is mounted on wheels with wide steel-tired rims. This type of locomobile is built with capacities ranging from 3 to 50 horsepower.

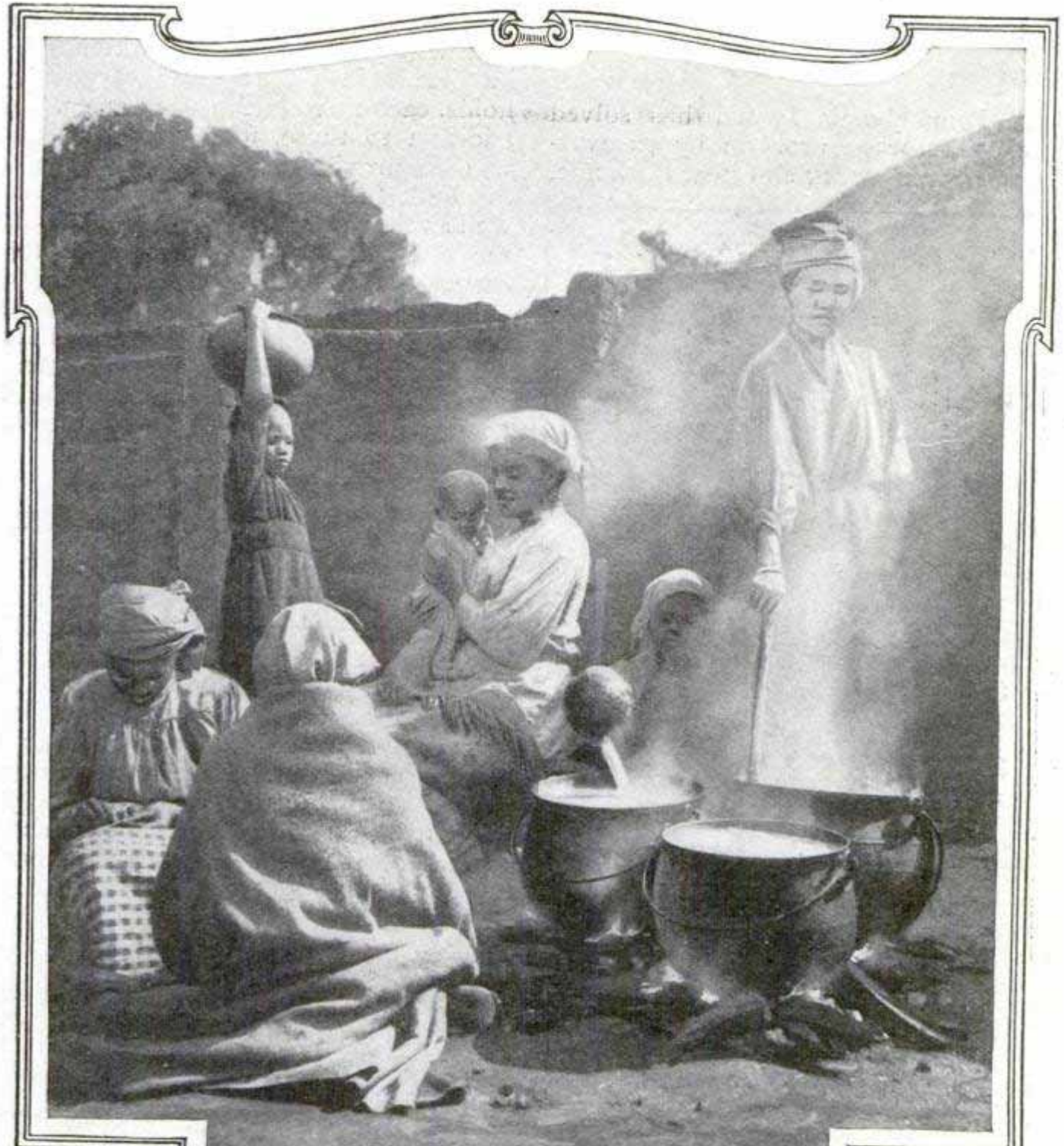
## PIPE LINE TO SUPPLY OIL FOR NAVAL VESSELS

A bill has been presented in Congress providing for the construction of a pipe line from the oil fields of Oklahoma to a port on the Gulf of Mexico, which is designed to bring directly to naval vessels of the United States the fuel oil which they are using in rapidly increasing quantities. Over 400,000 bbl. of oil were required for naval use in 1913, and it is estimated that 700,000 bbl. will be needed for 1914. A national pipe line under the control of the Navy Department will tend, it is believed, to reduce the cost of this fuel to the government.



ON the western reservations, many of the American Indians still live in tents which differ in few important respects from the tepees of their ancestors. Woven fabrics manufactured by white people have replaced the deerskins of which the aboriginal tents were made, and larger shelters are thus possible, but they still retain the primitive methods of housekeeping. Food is cooked in kettles over a wood fire, and the hole in the center of the roof to let the smoke out is as much a feature of a modern canvas tent as of the "wigwam" of a hundred years ago.





**A**MONG the most curious and interesting of the natives of Africa are the members of the Baralong tribe of the Bechuana race. For many years they were almost constantly in arms against the white settlers in South Africa, but now profess allegiance to the British crown and are governed by a British protectorate with headquarters at Mafeking, Cape Colony. The Baralongs are the most accomplished blacksmiths of all the South African natives, the metal iron being their tribal fetish. The photograph shows a typical group of Baralong women cooking over a wood fire outside of one of their characteristic dwellings, a mud hut with thatched roof.



## ARTIFICIAL CAVE FOR COLD STORAGE

A Pennsylvania farmer has solved the cold-storage problem by excavating a cave in a rock cliff near his home.



Rock Cliff and Entrance to Artificial Cave Made by Pennsylvania Farmer

This artificial cave is in the form of a room 10 ft. square and 12 ft. high, and is provided with a strong door and a lock.

## COLLIERS FOR SERVING THE PANAMA CANAL

Two colliers of a special type are to be built for transporting coal to the Panama Canal for government uses. Each of these vessels is to have an over-all length of 522 ft., beam of 62 ft., and a draft of 28 ft. when fully loaded. They will have twin screw propellers and will be capable of making a sea speed of about 16 miles an hour under full load. The designs provide for the carrying and handling of both cargo coal and fuel oil. The vessels are to be built with double bottoms throughout and will be fitted for

carrying water-ballast tanks. They will also be divided by water-tight bulkheads into four large cargo-coal holds, each fitted with two hatches. In addition to these, four compartments will be provided at the forward end for bulk freight or oil, and these, as well as the machinery compartments at the stern, will be separated from the cargo holds by cofferdams. These ships will carry wireless equipment and will have comfortable quarters for officers and a crew of about 146 men. Each vessel, equipped with overhead coaling gear, is expected to cost a trifle more than a million dollars.

## CANOE MADE OF AN EMPTY BARREL

With an empty barrel, a chunk of iron, and a saw, a small boy at an inland resort in Michigan made himself a seaworthy craft to paddle about the lake. A square hole cut in one side turned the inside of the barrel into a roomy cockpit and a heavy weight attached to the bottom kept it from capsizing. A cork life preserver furnished a comfortable seat back. As the pas-



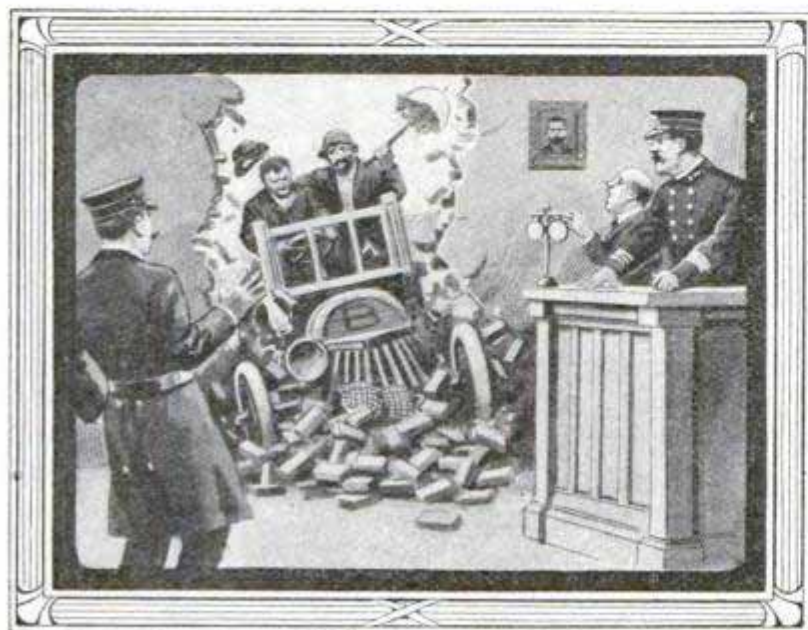
Empty Barrel Converted into a Seaworthy Canoe

senger's position raised the front end of the barrel almost out of water, the craft was easily propelled and maneuvered with a canoe paddle, as shown in the illustration.

## AUTOMOBILE SMASH-UP FOR THE "MOVIES"

A moving-picture film depicting in a humorous way the dream of a tramp who built an automobile out of odds and ends, and at last dashed in his

clock; a trombone provided the warning signal; a window sash formed the windshield, and a lamp, the headlight. The film showed a real station, but this



A Simulated Catastrophe for a Funny Film



Photograph Showing How a "Police Station" for a Comedy Film was Set Up in the Open

car through the wall of a police station, was staged at the racetrack at Santa Monica, Cal., recently. The car's hood was made of barrel staves, the speedometer was an old alarm

photograph shows that it was only a false brick wall on the field. The bricks were pieces sawed from a pine scantling, and the plaster was sand and flour.

### HOW AN ESKIMO BORES A HOLE

Naturally of a mechanical turn of mind, the Eskimos are excellent workmen with the crude tools they man-



Eskimo Drilling a Piece of a Walrus Tusk

age to make from odds and ends. They pierce the hard walrus tusks with an ingenious brace and bit which is quite primitive in construction but very effective in practice. A strip of wood is curved like the top of a crutch, and in the convex side a hole is driven to hold a piece of hard wood which constitutes the bit stock. A drill is inserted in one end of this stock, and the curved piece placed against the operator's teeth. A bow-and-string device causes the bit stock to revolve rapidly when the string is drawn back and forth, and a clean hole is drilled in the refractory ivory in short order.

ⒸA flying boat which fell into the water at Stockholm, Sweden, was brought to land by a submarine which dived under the wreck and raised it out of the water.

### SPEED OF ENGLISH RAILWAY TRAINS

Perfect roadbeds have given English railways a solid advantage over their American rivals until a few years ago, and the records made by some of the great trains on the London and North Western, the Midland and the Great Western lines for a long time were standards. The 44 $\frac{1}{4}$  miles between Darlington and York are covered by a North Eastern train in 43 minutes, from start to stop, a speed of 61.7 miles an hour. Another quick run is that between Leicester to Nottingham, 22 $\frac{1}{2}$  miles, which is negotiated in 22 minutes, at a speed from start to stop averaging 61.3 miles an hour. Of long nonstop runs, that from Paddington to Plymouth, 225 $\frac{3}{4}$  miles is accomplished in 4 hours 7 minutes, a speed of 54.8 miles an hour being averaged. The London and North Western fast train between Euston and Rhyl, 209 $\frac{1}{2}$  miles, makes the trip from start to stop in 3 hours 58 minutes, an average of 52.7 miles an hour.

### PARIS SETS NEW STYLE IN LADIES' HOSE

Embroidering on their dainty silken



hosiery the names of their favored suitors is a new Parisian fashion for young women. The use of light or contrasting colors makes the embellishment conspicuous. The novelty is not one of wide appeal, but the fact that it has been adopted at all may be regarded as a sign of the times.



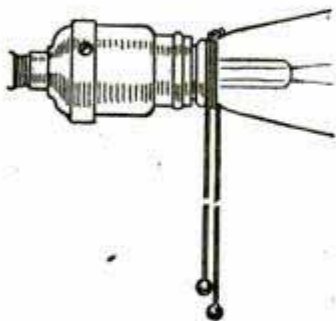


### To Find the Cubic Contents of an Irregular Object

Desiring to measure the cubic inches in some rocks, I knew of no way to calculate it, but after some thought I decided to use the following method: A vessel large enough to admit the rocks was procured and filled with water to such a height that the rocks would be covered when they were placed in it. The water level was marked and after putting the rocks in, the level was again marked. I used a square vessel, and the cubic contents was easily obtained by measuring the height to which the water rose and multiplying this dimension with the inside area of the vessel, both expressed in inches.—Contributed by Ernest Range, Johnson City, Tenn.

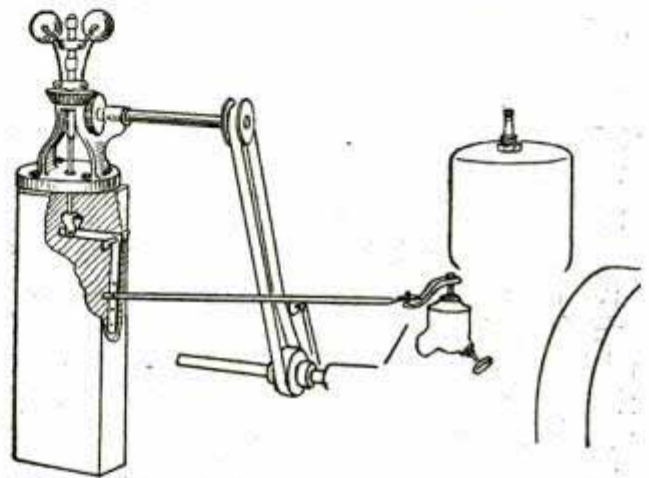
### A Simple Electric Pull-Socket Switch

A simple pull-socket switch may be made by tying a strong cord around the base of the electric globe, then screwing the globe into the socket just tight enough to secure a connection. The knot should be at the upper side with one end of the string hanging down on either side. By pulling one end of the string, the globe will be turned outward, thus breaking the connection, while a pull on the other end closes the connection.—Contributed by Paul W. Trier, Maywood, Ill.



### Governor Attached to a Marine Gasoline Engine

Desiring to use a marine gasoline engine for stationary work, I found, after installing it, that I had a very



The Speed of the Gasoline Engine is Regulated by the Use of a Steam-Engine Governor

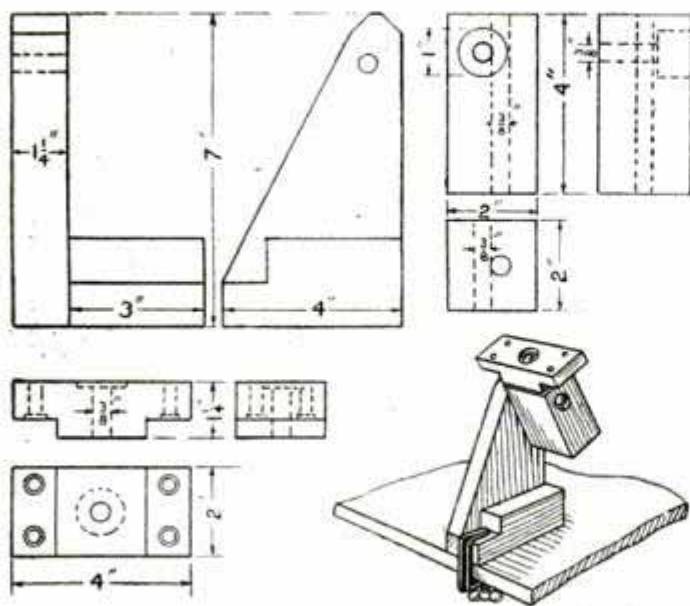
uneven power owing to the lack of a governor. To remedy this trouble, I attached an ordinary steam-engine governor, as shown in the illustration. I purchased the governor from a dealer in junk. As the governor did not have a sufficient stroke, I made a bell-crank lever with the vertical arm of sufficient length to secure the desired throw of the rod. The extending rod is connected to the throttle lever on the carburetor. The illustration clearly shows its application.—Contributed by James Hughs, Mexico, N. Y.

### Universal Joint for a Drawing-Board Support

The device illustrated is fastened securely with screws to the center of the back on a drawing board. The construction of the universal joint permits the board to be revolved and

tilted to any desired angle. The materials are easily obtained, and the making not difficult.

The joint and holder consists of four



The Universal Joint Permits the Board to be Set at Any Angle Desired

blocks of wood, having the dimensions given in the drawings. When these are fastened to the board and joined with bolts, the device is ready to be clamped to the edge of a table or any other convenient place.—Contributed by Arthur C. Hetrick, Bucyrus, O.

### Heating an Automobile

Working as a chauffeur for a private family and driving a car of the limousine type without front doors, but equipped with complete curtains, I suffered very much from the cold until I constructed a heating device that is very simple to make. The engine pan extended back under the body of the car to the front seat, and all that was necessary to do was to obstruct the heated air passing over the motor and force it up through holes in the foot-board. A piece of wire-insert asbestos was procured and fastened to an old shade roller, which was cut the width of the body under the front seat, the curtain part being made long enough to touch the engine pan. A new floor board was made to prevent mutilating the one in the automobile, and 1-in. holes were bored in it, about 3 in. apart, and the heater was complete.

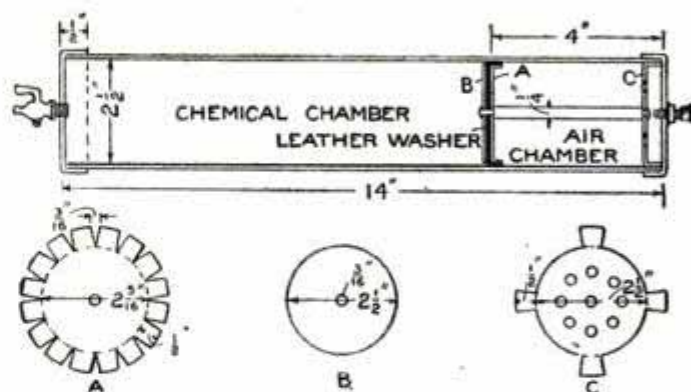
All the fresh air drawn through the radiator thus was forced to pass over the motor and through the holes entered the front of the automobile in a heated condition. With the side curtains up and the window open into the rear part, a temperature of about 45 deg. could be maintained in zero weather; and by closing the window a temperature of about 60 deg. was obtained in the front of the car.

A very fine mesh screen is attached under the floor board, to catch any dust that may be in the air. In moderate weather, the curtain can be rolled up and the automobile will not become too warm. As the exhaust opens up in the rear, there is no trouble with gas fumes.—Contributed by Walter Broeker, Chicago.

### A Fire Extinguisher

A simple and effective fire extinguisher may be constructed as follows: A piece of brass tubing, 14 in. long by  $2\frac{1}{2}$  in. in diameter, is fitted with a screw cap at each end. One end is drilled and tapped for a petcock and the other for an automobile-tire valve. A cross section of the assembled parts is shown.

The pressure disk, or piston, consists of a cupped leather held in place by a flanged brass plate, A, on one side, and a brass disk, B, on the other, like that used in a bicycle pump but



A Chemical-Filled Tube with Driving Disk and Air-Pressure Compartment for Extinguishing a Fire

larger, with a guide disk, C, fastened to it with a  $\frac{1}{4}$ -in. rod, about  $3\frac{1}{2}$  in. long.

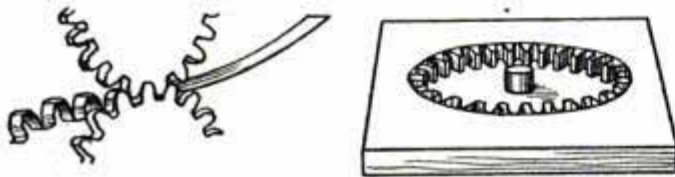
Fill the chemical chamber with 1 qt.

of carbon tetrachloride and pump up a pressure of about 80 lb. with a tire pump. The extinguisher is now ready for "fire only" and, if well made, will retain pressure indefinitely to throw a 25-ft. stream.—Contributed by H. W. Loweree, New York City.

### Gears for Model Work

If a pair of gears of any size with teeth of small pitch are at hand, it is an easy matter to make gears of various sizes for experimental or model work. Procure a strip of light tin of a width suitable for the face of the desired gear, and run it through the gears. This will give the shape of the teeth to the tin.

Bore a shallow hole in a block of wood with a carpenter's expansive bit to the size of the gear wanted, and carefully fit the tin in the circle so that all the teeth will touch the wood.



The Tin is Formed by Running It through Gears, and is Then Used in a Mold to Form the Gears

It will be necessary to make a perfect tooth where the ends of the tin meet. Coat the inside of the tin with soldering flux and pour it full of melted babbitt or babbitt and solder, half and half. If the size of the bore is known, a core of wood can be pointed and driven in the center made by the feeder of the expansive bit. The tin should be weighted to hold it in the mold when the melted metal is poured.—Contributed by Edwin M. Davis, Philadelphia, Pennsylvania.

### A Universal-Chuck Plate

The plate shown in the sketch is for use in a universal chuck, to face work against or to prevent the work from pushing back into the chuck. When holding a shaft in the chuck while a cut is being taken, the shaft is apt to work back into the chuck and the cen-

ter drop from the tailstock. Its principal use is for chucking washers or small pieces having one true surface.

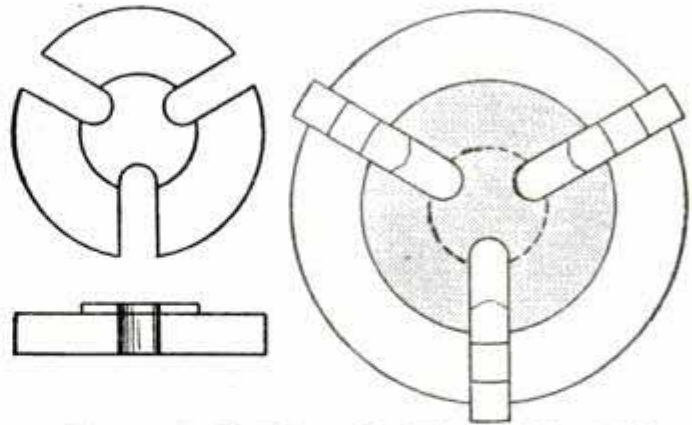
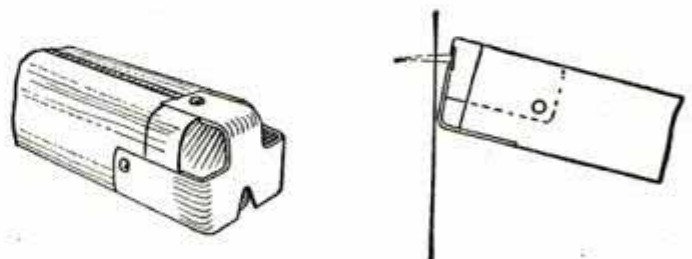


Plate to be Used in a Chuck for Holding Thin Stock to be Faced

The plate is made of a disk, perfectly true on both surfaces and slotted to fit the jaws of the chuck. The slots should be only long enough to allow the jaws to grip the smallest piece to be worked, so that the plate may not be made too weak. The thickness and outside diameter will depend on the kind of work for which it is to be used.—Contributed by L. F. Calhoun, Los Angeles, Cal.

### Tack Puller on a Putty-Knife Handle

The putty knife is the only tool carried by painters outside of brushes and is often used for pulling tacks, nails, etc. The blade of a putty knife is too thin for this purpose and is usually damaged beyond repair. It is better to make a tack puller and attach it to the upper end of the knife handle. Such a puller can be easily made from a piece of sheet steel,  $\frac{1}{16}$  in. thick, bent to

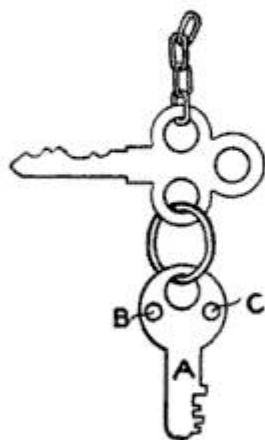


The Puller is Made of Sheet Metal and Attached to the End of the Putty-Knife Handle

shape and fastened on the handle end. The illustration clearly shows the manner of attaching it to the handle and of pulling a tack.—Contributed by J. V. Loeffler, Evansville, Ind.

### Singling Out a Key on a Ring

The latchkey on a ring is usually the one most difficult to find, but if it is attached to the ring as shown in the sketch, it will come out, right side up, ready for use.



A chain saves one the annoying experience of reaching home to discover that the keys were left at the office, but for those who do not like a chain, an extra ring may be attached to the important key in place

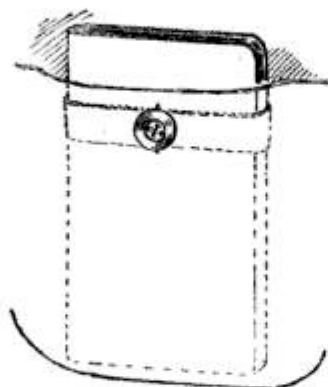
of the chain. It is then easy enough to find the ring among the keys, even in the dark, and on getting hold of it, a slight shake brings the desired key in position for use.

If the head of the key should be of the type shown at A, it will be necessary to drill two holes, C and B, to make the combination work.—Contributed by F. R. Cunningham, Denver, Col.

### A Memorandum-Book Holder

The handiest place to carry a memorandum book is in the upper vest or outer coat pocket, but it is easily dropped out when stooping, and thus valuable data may be lost. The method shown in the sketch of insuring against this loss is simple and effective.

Most vests have a button sewed at the top of the pocket with a buttonhole in the outer part forming the pocket. Remove the button and sew it on a short length of  $\frac{3}{4}$ -in. elastic band, then sew the ends together, thus forming a loop of such



diameter as to fit snugly around the book to be carried. After the elastic has been placed around the book, the whole is put in the pocket and buttoned. To release, simply unbutton and withdraw the book and elastic. A buttonhole can be easily made in the outside part of the pocket.—Contributed by Victor Labadie, Dallas, Texas.

### To Prevent Wire Violin Strings from Cutting Bridge

In using a wire E-string on a violin, it soon cuts into the bridge and lowers its position so that the bow hairs will wear on the side of the violin. The gut string causes a great deal of trouble and will not wear long, and the silk string does not produce the right sound.

Where it is necessary to use a violin from 5 to 8 hours a day, a wire E-string is almost a necessity. To prevent this string from cutting into the bridge, I insert a piece of ivory into a slit cut with a jewelers' saw in the upper edge of the bridge, as shown by the dotted lines. Such a piece may be put in the entire edge for all four strings, but it is only necessary for the E and A-strings.—Contributed by Roy Douglas, Terre Haute, Ind.

### Clearance Groove for Threading Tools

A groove turned in the rod, or shaft, at the termination of the thread will give the tool clearance at the end of the cut. Threads can then be cut without



close attention and the breaking of tool points. The groove should be cut no deeper than the depth of the finished thread.—Contributed by J. Harger, Honolulu.

## How to Make a Portable Cottage

By FRANK L. RUSSELL

The summer camp that provides a shelter for the toiler during vacation days has become one of a more substantial nature, and the cottage has taken the place of the tent. But the short season a cottage can be used increases the expense of a vacation trip, even though the vacationist owns it, as taxes and interest on the investment amount to no small sum, in fact, equal to quite a large rental. Then, too, a cottage naturally is a permanent affair, and if one desires new scenes and surroundings, it cannot be readily moved. This calls forth a desire to have some-

thing better than a tent, more along the cottage line, yet something that can be taken up, stored and easily made ready in a new location, where it can be set on a bit of

ground obtained for a few weeks at a nominal sum.

Many attempts have been made to construct what is called a portable house, originating from the making of portable garages, but when these were set up they were found to be more of a permanent nature than portable. When the time came for a removal many nails and screws had to be withdrawn, which left the parts in bad condition and sometimes so broken that new ones had to be procured. To avoid all these troubles and to make a really portable house in which the parts are almost entirely interchangeable, the building shown in the illustration was designed. A close examination of the drawings will reveal the fact that the sections, when taken apart, can be laid together flat and crated for shipment. Also, that the

door and window sections have the same width and the same joint, so that they can be set in at any place desired, and the building changed from year to year. The manner of construction makes it possible to build a house of two or more rooms, as desired, for as the sections are the same, it only requires a few more of them to add another room. The floor plan, Fig. 1, shows a good size for a three-room cottage.

The description of this portable house being more in detail of the construction of the sections, the stock

list in general will be left to the builder. However, in making it of flooring boards, he should remember that these come in thicknesses and widths of 1 by 4 in.,

and 1 by 6 in., in white pine; and that when finished, they will measure only  $\frac{13}{16}$  by  $3\frac{1}{4}$  in., and  $\frac{13}{16}$  by  $5\frac{1}{4}$  in., respectively. Yellow pine can be had in various widths, but taking only the two mentioned sizes into consideration, the builder can estimate how much material he will require and get the price at which the different kinds of lumber are quoted from a local lumber dealer.

Take the first mentioned size, for instance, 1 in. thick and 4 in. wide. This is the basis on which the lumber dealer figures his selling price, so that while one pays for a certain gross amount of board feet, the space this amount will cover must be reduced in accordance with the finished dimensions of the lumber; in this instance to  $\frac{13}{16}$  in. in thickness and  $3\frac{1}{4}$  in. wide. It is best to figure how many boards will



The Cottage as It Appears with the Front Entrance on the Side, Which can be Changed at Will to Any Other Part of the House to Best Suit the Location

be required at the finished width, namely  $3\frac{1}{4}$  in., then multiply by the gross width to find the amount of board feet for the cost.

4 and 5, are made in the same general manner as the wall section, Fig. 2. The window consists of an eight-light, 8 by 10-in. glass sash, commonly



Floor Plan of the Cottage as Illustrated, with the Large Living Room in the Center

The sections are designed to take lumber of standard lengths and the cost will not be excessive on this account. The side-wall section, shown in Fig. 2, illustrates the general construction of all the sections for the outside, including the gables, also any partitions. The boards are of matched lumber, preferably of good flooring, fastened to battens, one at the top and bottom, and one in the center, the edges being reinforced with upright battens, which project on one side and recede on the other, 1 in. in width. This forms a lapping joint where the parts are set together. The upper cross batten is fastened with its upper edge 4 in. from the top of the wall boards. This provides a place for a 2 by 4-in. piece—finished size,  $1\frac{5}{8}$  by  $3\frac{5}{8}$  in.—to be set on, and makes a depression for the batten on the roof section to be set against when it is hooked. This detail is shown in Fig. 3. The lower batten, Fig. 2, is fastened so that its lower edge will be  $1\frac{3}{4}$  in. above the lower edge of the wall boards. The batten is set on the top of the floor and the ends of the wall boards extend down over the floor boards on the outside.

The window and door sections, Figs.

known as storm sash. A frame for the sash is made of  $\frac{7}{8}$ -in. material, with a width equal to the thickness of the wall boards and the battens combined. The sash is hinged at one side and has a catch at the other. This construction permits these sections to be placed between two wall sections, and the glass is in a safe place where it will not be broken in shipment.

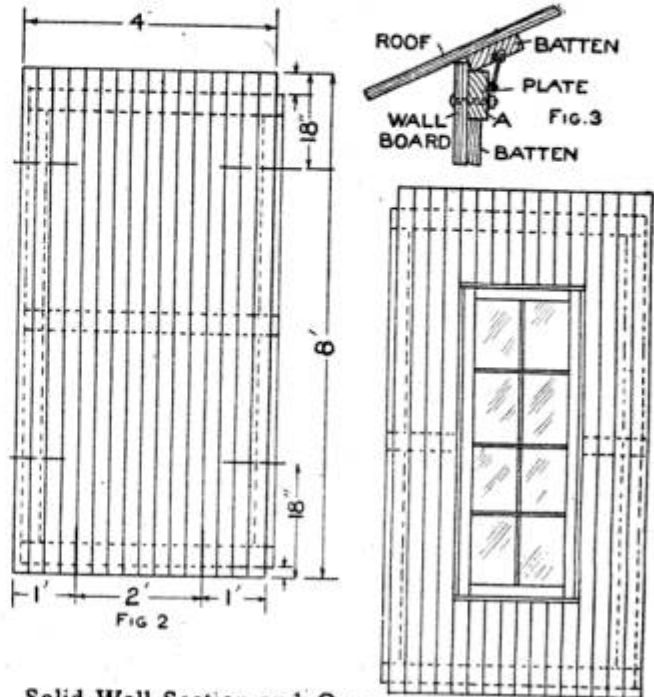
The door is set in a frame in the same manner as the sash, except that the bottom cannot be joined. This makes it necessary to crate the door sections with care, to prevent racking of the whole section. The part with the door will lie flat just as the other sections, but the lock will have to be removed.

The gable sections are made like the wall sections except that the battens are put on to fit the slope of the roof. The outline of the positions the battens take is shown in Fig. 6. The dotted lines in the sketch show the positions the wall boards will occupy. The upper batten, on the center section, is set in such a position that it will form a support for the end of a 2 by 4-in. ridge piece. Dimensions for these sections are given in Fig. 7. The notches at the top should be accurately

cut, after the sections are made, so that they will receive the battens that are fastened to the roof boards. Cross lines are shown on the upright battens, at the edges of the wall and gable sections and at the bottoms, with dimensions giving the location of holes for bolts that are used to fasten the sections together. The detail of this construction, with the bolt A, is shown in Fig. 8. These locations should be accurately laid out and  $\frac{3}{8}$ -in. holes bored so that the sections can be used at any place around the building. The end sections are the same as the sides, and the gable boards overlap the walls, as shown by the lower dotted line in Fig. 6.

The roof sections are constructed in the same manner as the walls, the battens being located as shown in Fig. 9. This is the only place where it becomes necessary to depart from the same general width of the sections. All sections in the roof, save two, are 4 ft. wide. Two sections must be 2 ft. wide, so that an extra 1 ft. will be provided for the eave at the gable ends. The narrow widths should be placed in the roof at the center of the building, so that a wider section will

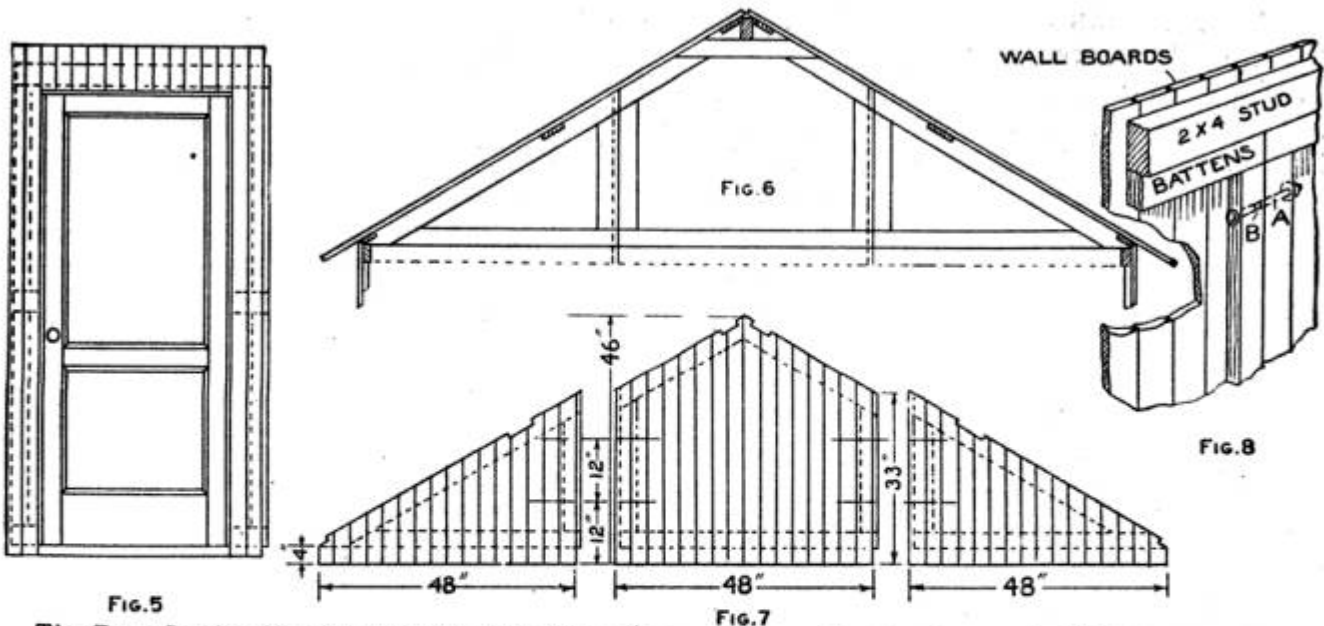
same general construction except that all battens run crosswise, and that they are flush with the edges. The number of battens on these sections



Solid Wall Section and One with a Window, Both Having Same Outside Dimensions; and the Plate Detail

can be determined by the builder and depends on what is intended to be used as a foundation.

In building up the floor, which is the first thing to set up, it will be found



The Door Section Has the Same Outside Dimensions and Same Construction as the Wall Section, But Those of the Gable are Somewhat Different, the Battens being Cut to Fit the Slope of the Roof and the Boards Fitted to Them in the Same Section Widths

come at the end and three-quarters of it will lie on the plate and the ridge, to hold the projecting edge.

The floor sections, Fig. 10, take the

that in placing the corners of the wall boards, as shown in Fig. 11, there will be a space of about  $\frac{7}{8}$  in. at two side and two end corners. This can be taken

care of by tacking a lath on the sides of the sections, also on the ends of both end floor sections.

A  $\frac{3}{8}$ -in. hole is bored through the

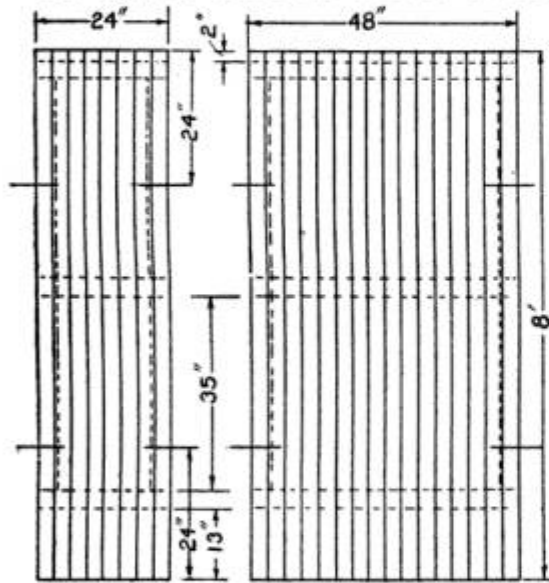


FIG. 9

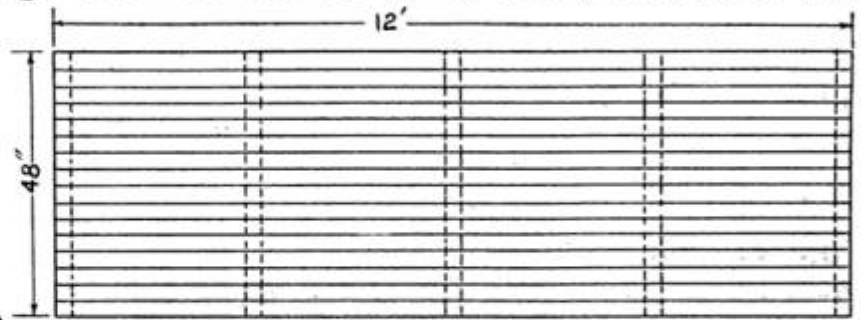


FIG. 10

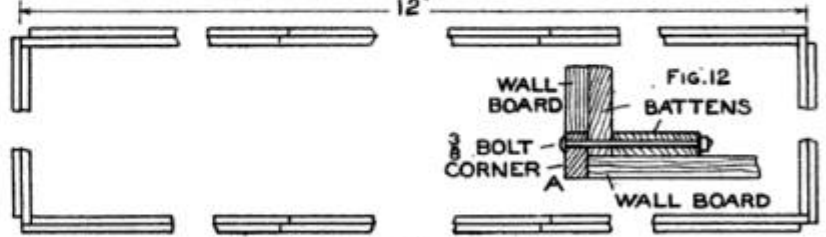


FIG. 11

Two of the Roof Sections are Half-Width, to Provide Eaves at the Ends. On the Floor Sections, Which do Not Lap, the Battens are Flush with the Edges. How the Empty Spaces at the Corners are Filled, and Manner of Joining a Corner

upright battens, as shown at B, Fig. 8, so that if a section is placed with its projecting edge at the corner, a bolt can be used to hold the joint and the corner board A, Fig. 12.

At equal distances apart, on the upper ends of the wall boards,  $\frac{3}{8}$ -in. holes are bored, and holes of the same size are also bored in the plate, or the 2 by 4-in. piece, A, Fig. 3, for bolts to draw them together. These plate pieces should be as long as possible; for instance, for a two-room house that is 20 ft. long, they should be 10 ft. long, two on a side. Those used across the ends should be the length of the width of the house. These plates must fit closely at the corners, one end butting against the side of the other piece running at right angles to it. Where they butt end to end in the center another piece should lap the joint, and longer bolts should be used through the wall boards and plate in the  $\frac{3}{8}$ -in. holes.

Ordinary hooks and eyes are used, in the manner shown in Fig. 3, throughout the construction, and especially for the roof sections in holding them to the ridge and plate. To keep the eyes out of the way for shipment, they should be set in a groove, as shown, or, if possible, in the edge of

the batten. The battens across the lower ends of the wall boards are evenly spaced for bolt holes and bored to receive  $\frac{3}{8}$ -in. bolts; and holes are

also bored in the ends of the flooring boards to match them. Bolts placed in these holes will hold the wall sections to the floor.

If the cottage is to be set up in the woods, small, straight trees can be cut, dressed and laid on a level place, on which to lay the floor sections. As many poles, or joists, are used as there are battens on the sections, and they are located so that the battens will lie on their upper surfaces. If care is taken in placing the underpinning, the floor will be quite solid. Dressed timbers, 2 by 6 in., or 4-in. square, can be used for joists.

All side-wall boards, roofing and floor boards are fastened to the battens with well-clinched nails, but at a trifle higher cost and by expending a little more time, they can be fastened with screws, which will make a much better and more solid section. The roof sections are covered with prepared roofing of good quality, and after placing them in position, a strip of roofing is fastened over the joints, and a strip lapping over the ridge is also attached.

The partitions are made in the same manner as the wall and gable sections, the only difference being that the extending upright battens and the ends of the battens projecting on one sec-



tion will have to be removed, as well as the  $1\frac{3}{4}$ -in. projection of the boards below the lower batten. They will then fit inside of the building at any place. A small notch is cut out of the central gable section to admit the ridge.

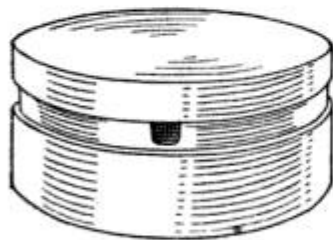
A porch can be attached by using sections for a roof held up by porch columns at the outer edge, and by a 2 by 4-in. piece bolted to the house at the end, or under the eave at the side, as the case may be. This can be determined when the location and manner of setting the window and door sections are laid out. Three roof sections and two floor sections will make a good porch. All sections should be well painted and the floor oiled.

### Fireproof Stand for Portable Gas Stoves

To deflect the heat thrown down by a gas stove, I built a low stand, having a sheet of asbestos millboard sandwiched between the wood base and the sheet-metal top. This was secured in place with tacks, fastening the top and passing through the asbestos into the wood base. This device prevents excessive heat on the floor near the stove, and is a safeguard against a possible fire as well.—Contributed by James M. Kane, Doylestown, Pa.

### Pill-Dispensing Box

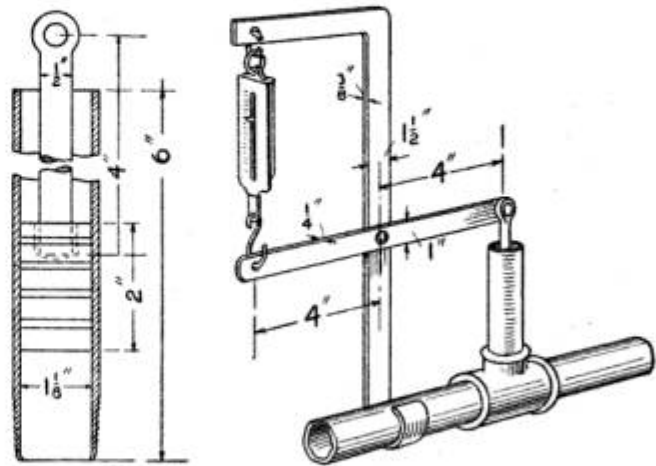
After having considerable difficulty in dropping a certain number of pills from the box into my hand I hit upon the idea of fixing the box as shown, to drop the pills one by one. A notch, the size of a pill, was cut in the edge of the box, then by



raising the cover partly one pill at a time could be dropped out.—Contributed by Wm. H. Patten, Belleville, New Jersey.

### An Emergency Pressure Gauge

In a case of emergency I used a pressure gauge made as follows: A tee-joint was inserted in the line, and



A Pressure Gauge Applied to a Pipe Line Where a Scale Registers the Pressure

in the side outlet of the tee, a piece of pipe,  $1\frac{1}{8}$  in. in diameter and 6 in. long, was fitted. This pipe was bored out smooth, and a piston, made of cold-rolled shafting, was fitted in the bore. The piston was about 2 in. long, and several grooves were cut in its surface for packing. The upper end was drilled to receive a  $\frac{1}{2}$ -in. rod end loosely. The upper end of the rod was shaped into an eye which was attached to a lever, crossing a vertical standard fastened to the pipe. The opposite end of the lever was attached to a spring scale suspended from the right-angle projecting end of the vertical standard.

The inside area of the  $1\frac{1}{8}$ -in. pipe will be so close to 1 sq. in., that the reading on the scale will be direct. To prevent the piston from dropping into the tee, the lower end of the pipe should be turned in a trifle. The dimensions given will make a correct-working gauge.—Contributed by Lee B. Green, Cleveland, O.

☐ In making window screens, put white netting on the outside of the frame and black on the inside; thus the vision of a person inside will not be obstructed while no one on the outside can see through the screens.

### A Flywheel Pattern

There are several methods used in the construction of wheel patterns. They differ mainly in the way the

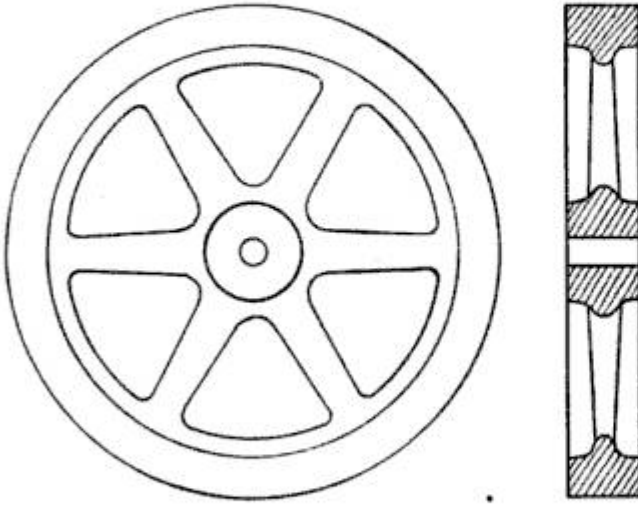


Fig. 1

Design of a 48-In. Flywheel to be Made in a Pattern for the Foundry

arms are fastened together at the hub and in the manner in which they are secured to the rim. The pattern shown in Fig. 1 has stood the test of time and the hard usage of the foundry. A wheel about 48 in. in diameter is shown with arms of the usual elliptic section. The pattern is easily and quickly made in the following manner:

The first thing to be considered is the arms. The stock for these should be planed up to a parallel width and thickness and long enough to extend from the center to a point halfway through the rim. They are then fitted together at the center with the joints running at an angle of 30 deg. to the center line of each piece. These pieces should be fitted on a perfectly smooth surface, or faceplate, to which they are securely fastened with screws. The arms are then laid out and numbered 1, 2, 3, 4, 5, and 6. The arm No. 1 is first removed and cut out on a band saw to the layout lines, and then the taper is laid out and dressed off the flat way of the arm. A flat place, about 1 in. wide, is left on the bottom side of each arm, at the rim end. This is to keep the end from dropping down when the arm is put back into place on the board or faceplate, and the flat surface is trimmed off after the arms are

glued together. This part of the work is shown in Fig. 2. Each arm should be completely finished before it is returned to its place. It is much easier to work the oval, or elliptic, section on each arm separately, than it is to try to shape them up after the arms are fastened together permanently. Arms 3 and 5 are then finished and put back where they belong. Those numbered 2, 4, and 6 are next in order, and are glued in place as soon as they are finished.

While the glue is drying on the arms, a suitable faceplate is turned up in the lathe, and the rim built up. If the arms are not too thick, one course of segments will do for the bead that is to be turned on the inside of the rim, but if the arm is thick, like the one illustrated, two courses will be necessary. The rim is built up and turned, as shown in Fig. 3, the joint between courses 1 and 2 being the center of the rim. One-half of the bead is finished in this operation, a template being used to get it the proper shape.

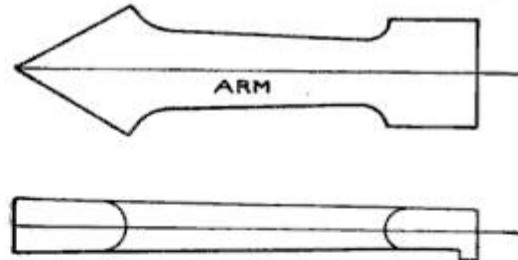


Fig. 2

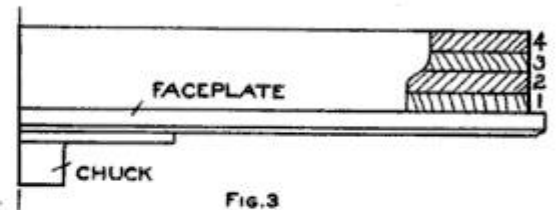


Fig. 3

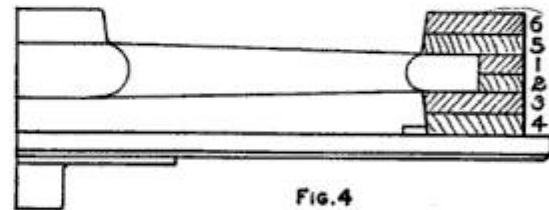


Fig. 4

Layout for the Arms, and the Manner of Building Up the Rim Segments

When the rim has reached this stage, it is taken from the faceplate and re-chucked on thin segments, which are fastened with brads to the faceplate

and turned to fit the finished side of the arm. The other half of the bead is then finished to the template.

The next operation is to fit the arms to the rim. This is done by cutting recesses through the segment courses 1 and 2, to receive the arm ends. If the job has been carefully laid out and turned, the joint between the segment courses 2 and 3 will be the bottom of these recesses.

The cope hub is a loose one and is turned separately and pinned to the arms, but the novel hub should be fastened to the arms before the latter are fastened in place in the recesses cut for them in the rim. A screw with glued surfaces, through each arm, secures the hub and gives added strength where it is most needed. The work proceeds as shown in Fig. 4, by applying the courses 5 and 6, and then finishing the inside and outside, and turning the hub to size.—Contributed by J. A. Shelly, Brooklyn, N. Y.

#### To Prevent Round Stock from Slipping on a Planer Bed

It is frequently necessary to cut a key seat in a long shaft and the work must be done on a planer. There is always a possibility of the shaft sliding along with the tool, even though it is well clamped in one of the slots in the planer bed. A holding device may be had by fastening a lathe dog on the shaft where the dog will rest against the rear end of the table. Of course, if the shaft is short enough, or the key seats so located that a stop can be placed on the front end, it will hold much better.

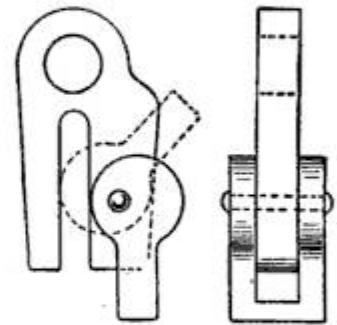
#### Sand Bucket for Loosening Dirt

Where a sand bucket is used in digging wells the pounding sometimes packs the dirt or sand instead of loosening it. The dirt may be easily loosened and small stones dislodged more readily if the lower edge of the sand bucket is cut in sawtooth fashion.—Contributed by J. V. Day, Stratton, Nebraska.

#### Sheet-Metal Lifting Hook

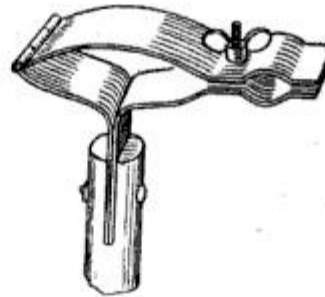
The illustration shows a hook for lifting and carrying sheet metal in a vertical position. The construction of

this hook makes the grip draw tighter as the load increases. The hook can be made in any size to suit the kind of work. The face of the clamping lever can be corrugated or smooth, as desired.—Contributed by Joseph K. Long, Renovo, Pa.



#### Extension Handle for a Paintbrush

Desiring to use an extension on my paintbrush handle, I quickly made one with the use of an old bicycle-lamp bracket clamp. A discarded broom handle was slotted to receive the shank of the clamp, and a small bolt held it in place. The thumb nut on the bolt of the clamp made it easy to clamp the brush handle in the opening.—Contributed by Elvin L. Hartlett, Wausau, Wis.

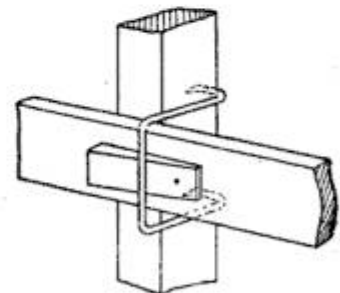


#### Staging Clamp

The illustration shows a clamp which will save much time and many nails when erecting staging. This clamp is made of  $\frac{5}{8}$ -in.

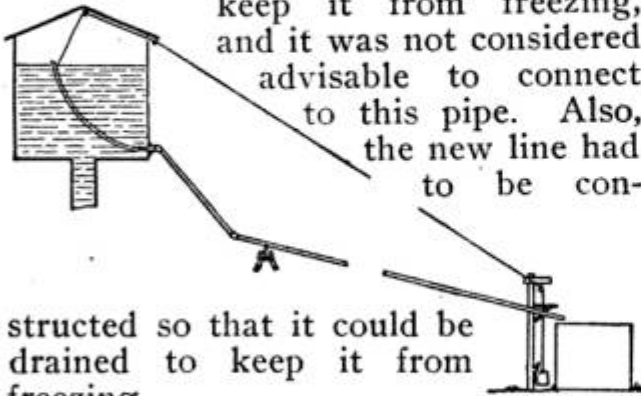
round iron rod. It is applied to the studding, and the board it holds is clamped firmly by driving a wedge between the board and the rod.—

Contributed by Abner B. Shaw, N. Dartmouth, Mass.



### Temporary Pipe Line Attached to a Tank

A certain piece of work made it necessary to use water temporarily from a tank. The outlet pipe was insulated to keep it from freezing, and it was not considered advisable to connect to this pipe. Also, the new line had to be constructed so that it could be drained so that it could be drained to keep it from freezing.



constructed so that it could be drained so that it could be drained to keep it from freezing.

The water was run out of the tank until a man could wade in it with rubber boots, and a hole was cut in the tank near the lower edge and pipe connections made from this point. A long hose was attached to the pipe on the inside of the tank so that its open end could be raised above the water level. A rope was attached to the end of the hose and run over pulleys to a weight near the place where the water was to be used. A shelf was provided for the weight, and when water was wanted, the weight was placed on the shelf. This lowered the hose into the water and started it to run. When the hose was raised out of the water the line drained itself quickly.—Contributed by James E. McCormack, Haliburton, Ontario.

### Lighted Box for Tracing Drawings on Heavy Paper

In the drafting room of a railroad office it was necessary to make copies of a large number of tracings on sheets of thick and hard paper. The paper was too thick to trace through in the usual way, and as it would have taken a great deal of time to copy each drawing, the arrangement shown in the sketch was made, to light the drawing from the under side.

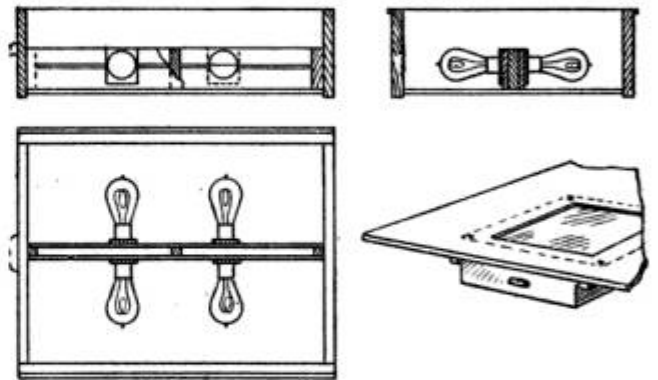
An ordinary drawing board was used for the top, and a hole, 22 in. square,

was cut in the center. A piece of plate glass, 24 in. square, was procured and the wood of the board cut away to let it in flush with the top. A drawer was then made and fitted to hold four 40-watt tungsten globes, placed horizontally under the glass. The tracing to be copied was placed on the glass and the paper over it. When the current was turned on, the lines to be traced could be easily seen through the heavy paper.

The globes were held in sockets of the ordinary wall type, which were mounted on blocks of wood, the latter being fastened with  $\frac{1}{4}$ -in. bolts on two boards, 4 in. wide, which were placed lengthwise through the center of the drawer, as shown. These boards were made with a  $\frac{1}{4}$ -in. longitudinal slot extending to within 1 in. of the ends. The bolts of the socket mountings were passed through this slot. With this arrangement the lights can be slipped to any desired position in the drawer and held tightly with the bolts.

The sockets were connected up, and the terminal ends run out through a hole in the bottom of the drawer and attached to a standard plug. The drawer was 8 in. deep, 22 in. wide and 30 in. long, inside measurements. The entire interior was painted with a gloss white.

The device is useful not only for tracing through heavy paper, but also



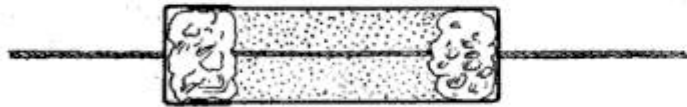
The Lamps in the Drawer beneath the Glass will Light a Drawing on Heavy Paper Sufficiently

for making tracings of indistinct blue-prints, where the white lines would not show through the tracing cloth.—Contributed by J. C. Jacobs, Freeport, Illinois.

### Chalking a Line

A line must be coated with dust from a piece of charcoal or chalk before it can be snapped, which alone requires some time when there are many lines to be made. The sketch shows a simple method of making a chalker for a line, which is of great assistance to a scenic artist, but equally applicable to other work.

Procure an empty tin box, remove the cover, and punch a hole in its center with a nail; also make a hole in the center of the bottom in the same man-

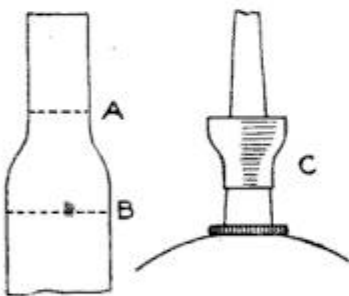


The Coloring Powder is Evenly Distributed on the Line by Drawing It through the Box

ner. Run the line through these holes. Place a small moistened sponge in the bottom of the box and fill the box on top of the sponge with lampblack, or any dry, powdered paint, then place another piece of sponge on top and put on the cover. In chalking the line, it is only necessary to run the box the entire length of the line. The sponges will prevent too much color from adhering to the line. As the color has no binder, it is easily brushed off when dry.—Contributed by Mrs. Harry Marcelle, Honolulu, Hawaiian Islands.

### Drip Catcher on an Oilcan Spout

The drip of an oilcan spout running down on the outside keeps the can covered with grease and in an unclean condition. To catch this drip, I

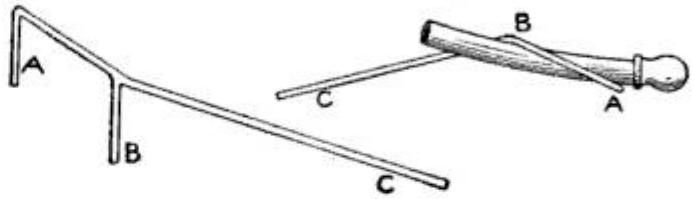


made a cup from a large cartridge shell, cut off on the lines A and B and attached to the spout with solder, as shown at C. A little

clean waste or cotton packed in the cup will catch any oil that runs down on the outside of the spout.—Contributed by Chas. G. England, Washington, Pa.

### Air-Hose Uncoupling Lever

When uncoupling passenger coaches it is very difficult to disconnect the air hose without a leverage. With the

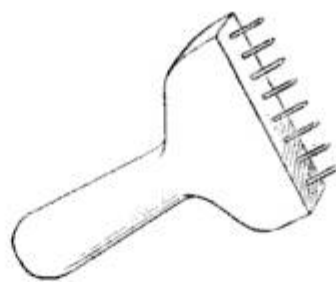


Lever to Use in Disconnecting the Air Hose When Uncoupling Railroad Passenger Coaches

device shown, the proper leverage may be had by placing the prong A under the hose and the prong B above, and bearing down on the handle C. This raises the coupling and loosens the connection. The device is made of  $\frac{5}{8}$ -in. round iron.—Contributed by Benjamin H. Baird, New York City.

### Lace-Hole Marker for Belts

A very practical tool for laying off holes to be punched for wire lacing in belts is shown in the illustration. The



tool is made of hard wood,  $1\frac{1}{2}$  in. thick, 4 in. wide and 6 in. long. A row of wire nails or brads, spaced  $\frac{3}{8}$  in. apart, are driven part way

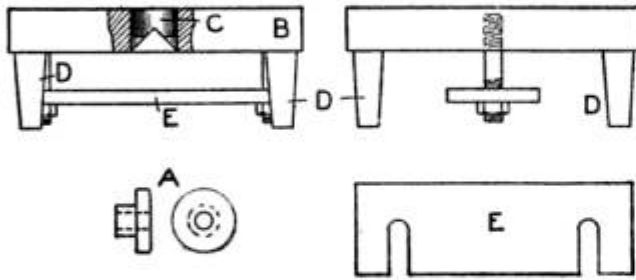
into the end and lined up evenly, whereupon the heads are filed off and the ends pointed. Finish the block to make a handle, as shown. I find this simple tool very rapid and accurate in scribing holes for punching.—Contributed by John M. Pipp, Muncie, Ind.

### To Lengthen a Twist Drill

Sometimes when drilling a hole in a difficult piece of work, it is found that the drill is just a little too short. The drill can be easily extended to cut through the metal by wrapping the shank with a layer of fine emery cloth or several layers of paper before inserting it into the taper hole.—Contributed by John A. Cook, Birmingham, Alabama.

### A Drill Jig

A simple drill jig that will locate holes centrally in a shaft, or other round stock, accurately and quickly is shown in the sketch. It may be pro-



A Jig to Use on a Drill Press for Drilling Holes in Round Stock Centrally

vided with any number of hardened and ground slip bushings, A, to take various sizes of drills and reamers.

The body B is a gray-iron casting with a 90-deg. angle groove machined the full length of it. A permanent bushing, C, is hardened, ground and located exactly in the center of the groove. The result of the work depends on the accuracy of the location of this bushing. The legs D are made of cold-rolled steel and pressed into holes drilled in the corners of the plate.

The clamp E should be slotted, as shown, for rapid work. A small pin may be located close to the lower edge of the bushing C, to prevent the slip bushings A from turning while in use. A slot is made in the bushing A to accommodate the pin.—Contributed by A. Dane, Pottstown, Pa.

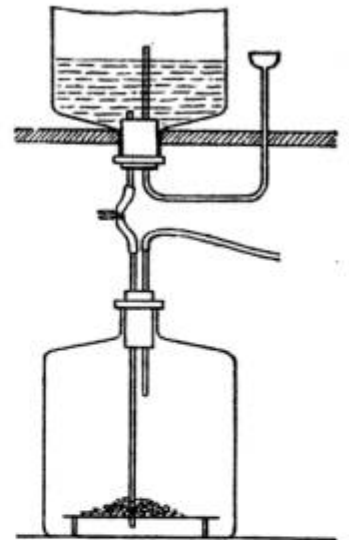
### How to Make a Hydrogen Generator

The hydrogen-gas generators used in establishments where a great deal of lead burning is being done, such as storage-battery plants, usually consist of two wooden boxes, one being mounted about 3 ft. above the other. The lower box is made air-tight, but it is connected to an opening in the bottom of the upper box by means of a piece of rubber tubing which is provided with a stopcock or pinch valve, and the upper box is usually partly open. These boxes are both lined with some material, such as lead or

rubber paint, that is not acted upon by the sulphuric acid used in the production of the hydrogen gas. The operation of the device is as follows:

A small quantity of commercial zinc is placed in the lower box through an air-tight opening provided for this purpose, and the upper box is partly filled with sulphuric acid diluted with about 10 volumes of water. When the valve in the tube connecting the two boxes is opened, the acid runs down into the lower box and a reaction takes place, the result of which is zinc sulphate and hydrogen gas. If the outlet from the lower box is closed, a pressure will be established, due to the hydrogen gas, which will force the excess acid back into the upper box—the tube into the lower box should extend inside and the end almost touch the bottom—and reduce or stop the chemical action of the acid on the zinc. As the gas is drawn from the lower box the acid is allowed to run down and again start the chemical reaction.

The arrangement shown in the sketch operates in the same manner, and its construction is a great deal less troublesome. Instead of two boxes, use two 5-gal. water bottles. One bottle should be supported in an inverted position at least 3 ft. above the other. Each bottle should be provided with a large rubber stopper with two openings in them, through which small glass tubes may be inserted. The proper length and arrangement of these tubes is shown in the sketch. The inside end of the air inlet in the upper bottle should extend up to within a very short distance of the bottom of the bottle; while the acid inlet into the lower bot-



tle should almost touch the bottom. The remaining two tubes should extend just inside the corks. A pinch cock should be provided in the tube conducting the acid from the upper bottle to the lower. Some kind of a small, light support should be made from thin lead and placed on the bottom of the lower bottle, to hold the zinc above any acid that cannot be forced back up into the upper bottle.

Be very careful to get all the air out of the lower bottle before any attempt is made to light the gas, as an explosion is sure to follow if any air remains.

The gas thus generated may be used in many ways, but especially in producing a pure, hot flame. For this purpose a burner is required, which may be purchased at most chemical houses, and a foot bellows to supply air pressure. The air pressure can be produced by using a large can and connecting it to the water faucet; when the water is turned on, the air is forced out.

### Trapping Killies

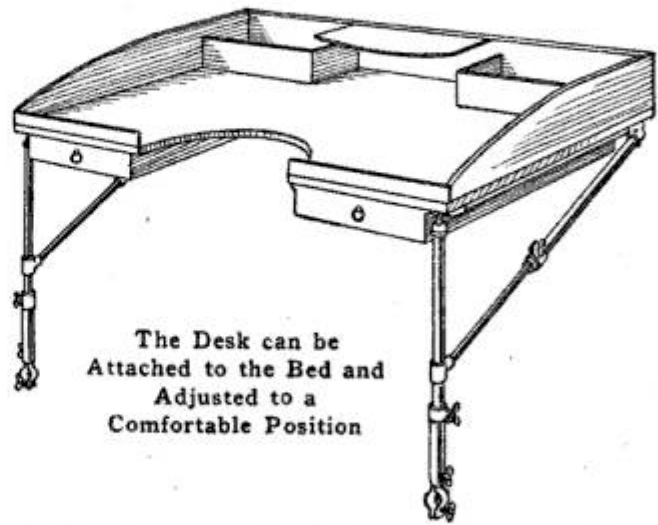
While out catching crabs one day, we ran short of meat and could get no other bait than killies, but had no net. Having an empty milk bottle in our lunch box, it was tied to a line so that it would hang in a horizontal position. A piece of meat was weighted and placed near the bottom end. The bottle was then hung over the side of the boat. The killies would enter the neck and nibble the meat and thus attract others, and as a result we caught plenty to bait the crabs.—Contributed by Robert Meier, Lynbrook, L. I.

### Binding Bales of Hay on a Wagon

In hauling baled hay on rough roads, the bales can be bound together to keep them from slipping off with wood pins, about 4 in. long, sharpened on both ends and stuck into a bale about halfway before placing another bale on top of it.—Contributed by Ray C. Evans, Meyers Cave, Virginia.

### Bed Desk for an Invalid

An adjustable desk or table for an invalid or convalescent can be made as shown in the sketch. The arrangement

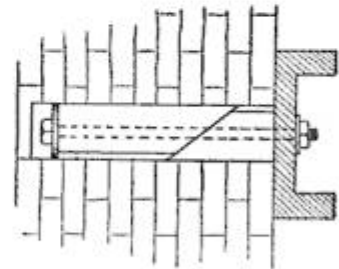


The Desk can be Attached to the Bed and Adjusted to a Comfortable Position

of the top may be in this or any other manner to suit the maker. The length of the desk should be the same as the width of the bed. Two vertical standards made of two pieces of tubing, one telescoping in the other, are used as the supports. Clamps are attached to the upper ends of the larger, or outside, tubes for use in holding the desk at the height set. A brace, also made of two telescoping tubes, is used at each end to adjust the rear part of the desk to a comfortable height for the user. Thumb nuts are used to clamp the desk to the bed.—Contributed by Louis Stankewitz, New York City.

### Homemade Expansion Bolts

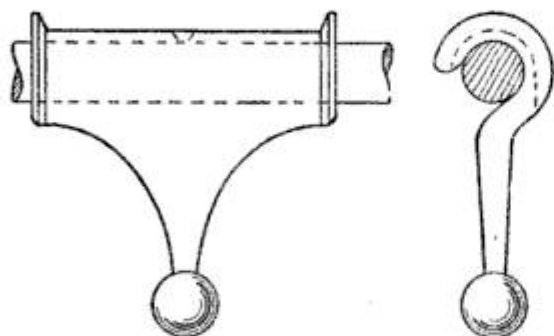
When expansion bolts are not available, substitutes can be made of pieces of gas pipe of the required size, each cut slanting with a hacksaw to divide it into two pieces, as shown. A bolt is passed through the center and a large washer holds the bolt head.



When drawn up, the sloping parts clamp on the sides of the hole.—Contributed by James E. Noble, Toronto, Canada.

### Belt Holder for a Shaft

The unused belt, when there is no loose pulley to shift it on, is usually hung on the running shaft or attached

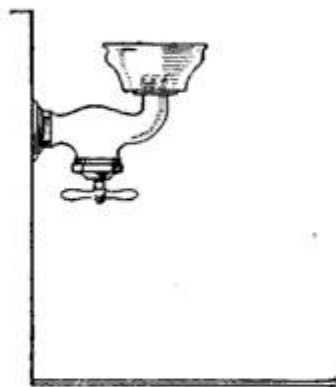


The Holder Swings on the Shaft and is Ready to Carry the Belt When Not in Use

to a wire fastened to the ceiling or joist. A much better way is to make a belt hanger, as shown in the sketch, to hold the belt. It consists of a piece of wrought iron, forged out as shown, to fit over the shaft and an extending end to prevent its turning with the shaft. An oil hole is provided to keep the bearing well lubricated. When a belt is hung on this holder there is no danger of its catching on the shaft and being wound up and broken.—Contributed by S. Gulbransen, Chicago.

### Sanitary Drinking Fountain for a Shop

Wishing to install some sanitary drinking fountains as cheaply as possible, I struck on a very good idea which proved both satisfactory in every respect and strictly sanitary. There were three large wash sinks in the shop, and each was fitted with three plain bibbs and one hose bibb. I merely turned the



hose bibb around, allowing the hose end to face upward. I then secured three vitreous-china drinking cups which fitted snugly over the hose end and then, by screwing a locknut on the top, the cups were held secure. Each fountain head had four small

holes to allow the water to drain and was so constructed as to make it impossible for the lips to come in contact with the bibb, thus making the device just as sanitary as any drinking fountain on the market.—Contributed by D. Marcus, Madisonville, Ohio.

### Combination Lathe or Planer Tool

The lathe or planer tool illustrated is one that holds cutters made of self-hardening steel,  $\frac{1}{4}$  by  $\frac{3}{8}$  in. These cutters will stand more rough usage and take heavier cuts than a like sectional volume,  $\frac{1}{2}$  by  $1\frac{1}{2}$  in. in size, used on combination tool holders. A wedge instead of a setscrew is used for holding the cutters. The wedge has more bearing on a cutter than a screw and it will not break. If there is any wear, the wedge will take it up.



A Combination Tool Holder Using a Wedge Instead of a Screw for Clamping the Cutter

For cutting-off tools, place two pieces,  $\frac{1}{8}$  by  $\frac{3}{4}$  in., side by side in the holder, allowing the one ground for the cutter to project farthest from the holder.—Contributed by Fred B. Stoner, Mason-town, Pa.

### Removing Tarnish from Silver by Electricity

There is no solvent for silver sulphide, or tarnish on silverware, that is not a better solvent for the silver itself. Therefore the tarnish cannot be removed in a solution. However, this coating can be removed electrically. Make a dilute acid solution, 1 part chemically pure sulphuric acid to 10 parts of water, and use a carbon electrode. The tarnish will disappear in a few minutes without injury to the silver.

In the absence of a battery, suspend the silverware in the solution and bring a piece of aluminum in contact with it. This will restore the luster.



## Proper Construction of Fireplaces

By E. C. KNOPP

After a generation of wood and coal stoves, the open fireplace with its glowing wood fire is again coming into its own, this time taking a permanent place in the home life of those who realize the comfort and enjoyment it lends to a living room or den.

There is a distinct charm about a crackling fire in an open grate, possessed by no other feature of our grandfathers' home life. Colonial furniture, china or architecture are out of place in modern city and suburban life, but the glowing fire of the hearth awakens a spirit that mere age or style of material cannot conjure up. This is nowhere more forcefully seen than in the thousands of homes whose elaborate heating systems, to combat the severe cold of northern winters, are supplemented by the open-grate fire to add cheer to the home. Nor is it out of place among the most modern house furnishings. But the greatest demand for these gloom chasers is in those mild-winter regions where it is desired to heat only one or two rooms.

It has been found, however, that along with some other things which the pioneers did, such as building log houses, the construction of fireplaces which will give satisfactory heating service has become a lost art. Modern masons, with their training based on the demands of modern methods of heating, are not to be censured for their lack of knowledge along this line, any more than the carpenters who do not know how to build a log house.

Out of the large number of fireplaces I have examined, only one—and that one in a mountain camp—was found which possessed the correct principles of construction. In a suburb of a western city, having a district covering a half square mile, 14 fireplaces were found and not one of them was giving satisfaction. Either the smoke came into the room with the heat or both went up the flue together, or it took too much fuel to get the required heat. As a consequence some of these were

closed and stoves installed. If it were not for these disadvantages, there would be three fireplaces to every one now in use.

Having for many years made a study of the principles of fireplace construction, I submit the following plans which have been found to give entire

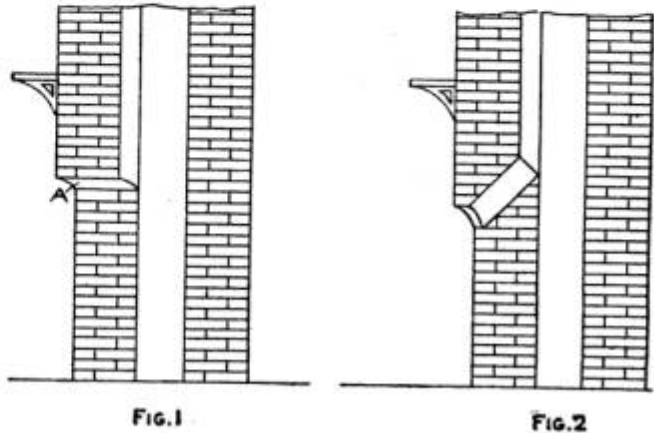


FIG. 1  
FIG. 2  
The Most Common Faults of Fireplace Construction  
Wherein the Heat and Smoke cannot  
be Controlled

satisfaction. Built on these lines, a fireplace will heat as well as a stove, with the same amount of fuel, and no smoke will enter the room. There are many ways which might be illustrated as the wrong method, but the two most frequently found are shown in Figs. 1 and 2. A cross section of one in which the draft carries all the heat up the flue is shown in Fig. 1. The smoke from the front wood strikes the broad, flat arch A, and some of it goes out into the room. In the one shown in Fig. 2 the heat as well as the smoke will pass up the flue.

A properly constructed fireplace is shown in cross section in Fig. 3. The throat is long and narrow, being gradually shortened as it widens into the flue, as shown by the dotted lines in Fig. 4. For the average-sized fire box, the width of the throat A, Fig. 3, should be about 3 in. at the narrowest part, where the point of the shoulder B comes nearest the apron C. The apron should extend at least 6 in. below the point of the shoulder, so as to catch the smoke. In a large fire box, in which

the apron is 5 ft. or more above the hearth, this drop of apron should be at least 1 ft. It may be of arch form, but should not be over 2 or 3 in. thick up to the turn in the throat. Beyond this point it gradually thickens, and the

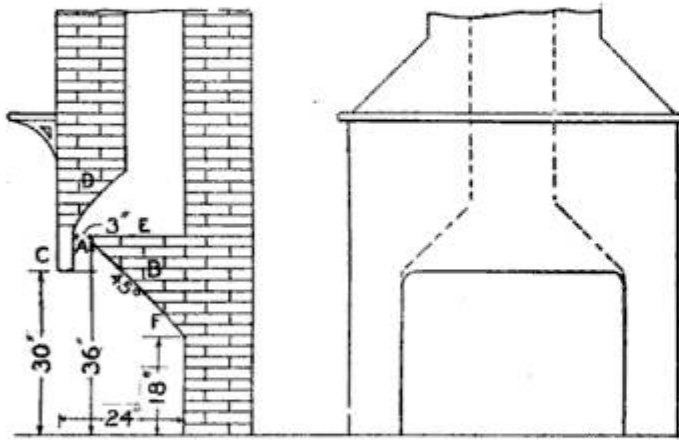


FIG. 3

FIG. 4

Fireplace Construction Where the Heat Enters the Room and the Smoke Goes Up the Chimney

thick wall D, just above the apron, should be built strong enough to support the section of chimney above it. The shelf E is left flat, to stop any down drafts of air from gusty winds. The principle of construction is based on the fact that heat, acting quicker than smoke, strikes the inclined surface F and is deflected into the room while the smoke traveling slower goes up the flue.

The inclined surface, F, of the shoulder, which carries the smoke and heat toward the apron, whether built on a curve or a straight line, should be at an angle of 40 to 45 deg. from the perpendicular. For a fire box 3 ft. wide, the height from the hearth to the apron should be at least 2½ ft. with a 6-in. apron, and the depth should be 2 ft., from the front of the apron to the back of the fire box.

The walls of the throat and flue should be as smooth as possible. If rough stone or broken brick are used, they should be plastered to make a smooth surface. The chimney should extend at least 2 ft. above the ridge of the roof, to insure against down draft in the flue.

☞As the weather gets warmer and the automobile bearings run hot, use thick oil, greases and graphite.

## Wax Phonograph Records Used for Insulation

When sealing up some windings, such as magnets, resistance coils, etc., and not having a sufficient quantity of wax or paraffin for the purpose, I made use of a few broken wax phonograph records. I was much surprised at the properties of this wax. In the first place it was very hard compared with paraffin and had a rather high melting point, so that it would not soften and bend as paraffin, that is, it could not be made as flexible. I used this wax in constructing and repairing electrical instruments by coating the outer windings of the magnets, coils, etc., and then shaving down the wax. This looked exactly like hard rubber and had the advantage of being firmly fastened to the wire. I also used it in repairing broken magnet covers, filling the spots chipped out with the wax, with the result that it would take a close examination to detect the repair. Similarly it was used as insulation in constructing a 1-in. coil, and, although I could not test its dielectric properties, I have had no trouble from leakage.

This wax may be used for innumerable other purposes, as it can be melted and the article soaked in it, but it also can be handled in a more convenient manner, similar to soldering, by melting it with a piece of hot iron and applying it where needed, whereupon it is finished with a file and sandpaper, or turned in a lathe.

The wax can be obtained from any dealer in phonographs, especially those keeping record exchanges. Be sure to get the wax records, not the indestructible ones made of vulcanized composition, as these will not melt. Various colors may be had, but black resembles hard rubber and gives a better appearance. The final finish may be done by polishing with a little benzine on a rag.—Contributed by Arthur Worischek, New York City.

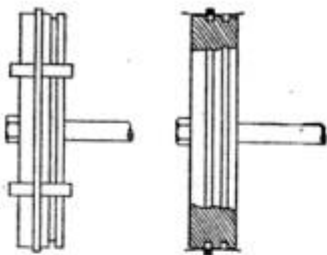
☞A pneumatic or rubber tire placed on a buoy will prevent it from marring the hull of a boat.

### Cutting Glass Disks

The small shop, not equipped with a circular glass cutter, can cut disks for steam and pressure gauges in the following manner: Fasten a wood disk to the faceplate of the lathe, the disk having a diameter larger than the glass to be cut. Apply a thin coat of glue to both the surface of the wood and of the glass. Place a piece of paper on the glued surface of the glass and then apply both to the glued surface of the wood disk. Rotate the lathe spindle by hand and at the same time hold a common glass cutter on the glass at such distance from the center as to make a disk of the proper size. The glass disk can be removed easily before the glue has time to harden.—Contributed by Arthur Hoem, Butte, Mont.

### Placing Steam-Engine Piston Rings

It is sometimes necessary to put packing rings on a solid head without disconnecting the piston from the crosshead to get the rear rings in place. The rear ring must be sprung over the head and slipped over the first ring groove. It is almost impos-

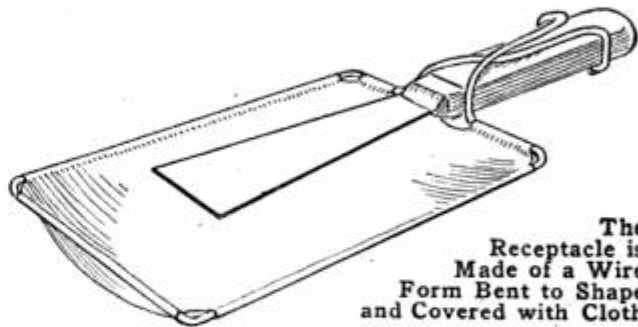


sible to keep the ring from getting into the first groove and sometimes a number of rings are broken before this is accomplished. The sketch shows how some small pieces of sheet iron can be put under the ring to keep it from dropping into the first groove. The ring can then be easily pushed over the strips of iron to its place in the rear groove.—Contributed by F. W. Bently, Milwaukee, Wis.

☐ When a small pipe connection or a petcock becomes so worn or loose that it leaks, never try to remedy it by soldering the joint, but tin the entire length of the threads, and the wear will be taken up.

### Refuse Holder on a Scraping Knife

When scraping calcimine from a ceiling, the dust, scraps, etc., may be prevented from falling to the floor by using a receptacle shaped like the one

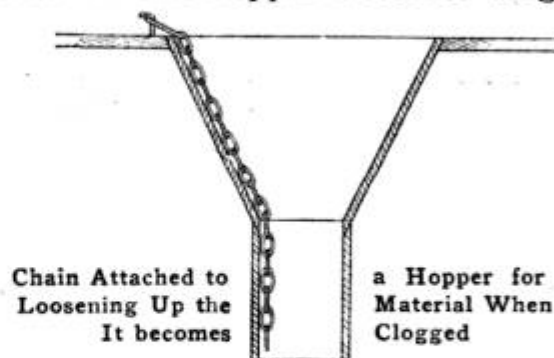


The Receptacle is Made of a Wire Form Bent to Shape and Covered with Cloth

shown in the sketch. The receptacle is made of a wire, about  $\frac{1}{8}$  in. in diameter, bent in the shape shown. A piece of cloth or canvas is then fastened to the wire frame. When necessary the knife can be released and the contents of the receptacle removed.—Contributed by Chas. J. La Prella, Flushing, L. I.

### Cleaning a Clogged Hopper

Any substance like coal or concrete, in passing through a hopper, is liable to clog the narrow portion and prevent any of the material from passing until it is cleaned out. A very good plan to prevent the clogging is to attach a chain at the upper rim of the hopper and allow it to hang on the inside. If the hopper becomes clogged,



Chain Attached to Loosening Up the It becomes

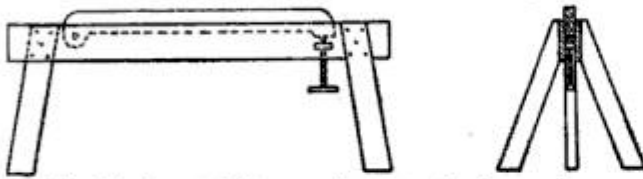
a Hopper for Material When Clogged

pull on the chain slightly and it will start the material.—Contributed by G. Goodwin, Jr., Ottawa, Can.

☐ A scale filed on a bit, beginning at the cutter end, will save the trouble of pulling out the bit every few turns to see if the hole is deep enough.

### An Adjustable Balancing Trestle

The trestle has three legs so that it can be set on any surface, no matter how uneven it may be. The top hori-

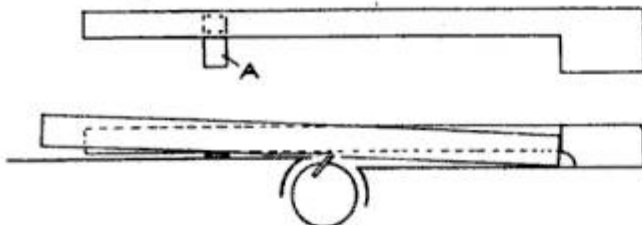


The Horizontal Bar on the Trestle Crosspiece can be Easily and Quickly Set Level

zontal piece is provided with a metal bar, hinged at one end and having an adjusting screw at the other. A spirit level is attached to the bar. A pair of these trestles will enable one to do rapid work, as the leveling surfaces can be quickly set level.—Contributed by John E. Elwing, McCleary, Wis.

### Tapering Wood on a Jointer

Many attempts have been made to cut tapers on a jointer, but as the knives cut too deep at the point where the taper starts, a poor job results, says a correspondent of the Wood-Worker.



The Form Holds the Work and Starts the Feed, Preventing the Knives from Cutting Too Deep

A form made as shown in the sketch, with a piece of zinc, A, attached will start the feed right and produce nice work.

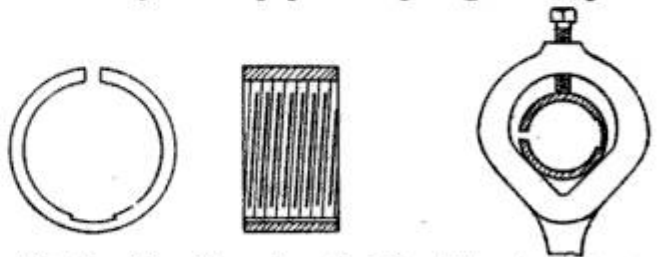
### To Make a Lusterless Finish on Paint

If it is desired to paint a surface with oil paint and yet have it a lusterless finish, apply a coat of skimmed milk or strained buttermilk over the dry oil paint, or a very thin coat of laundry starch, cooked, which should also be stippled. The advantage is twofold, as it allows the use of oil paint, is easier to apply than flat or turpentine paint, and the protective flat coating can be washed off when it becomes soiled with dust or smoke, leaving the clean oil

paint intact, over which another coating of milk or starch can be applied. This is done very often where soft coal is burned. In this way the oil paint may be preserved indefinitely, barring accidents.

### Holding Pipe Threads in a Lathe Dog

In cutting pipe threads in a lathe I could not grip the pipe with a dog without damage to the threads, so I made a little holder to overcome the difficulty. A pipe coupling was pro-

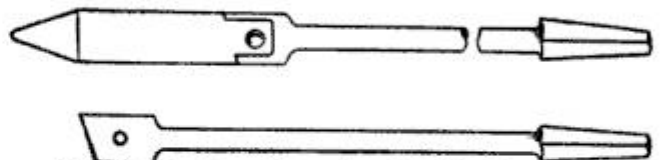


The Coupling Turned on the Pipe Threads Protects Them from the Setscrew of the Lathe Dog

cured and cut to fit in the dog, then a  $\frac{1}{4}$ -in. slot was cut in one side, as shown, and the opposite side filed down thin to allow it to spring slightly. The holder is turned on the threads of the pipe and then the lathe dog is clamped over it.—Contributed by John P. Kolar, Ithaca, N. Y.

### Shank for a Soldering Iron

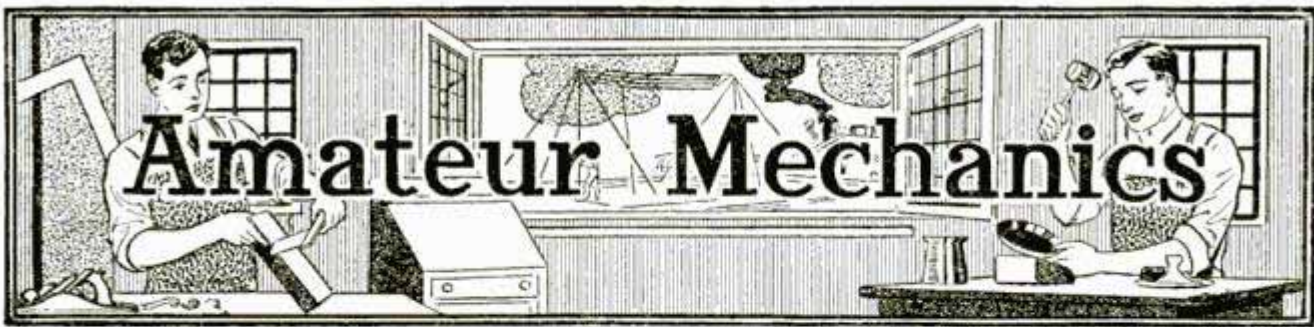
The sketch shows how I made a very serviceable soldering iron from a discarded extension-bit shank. A large piece of copper was drawn to a point on one end, and the other end was



The Shank of an Extension Bit Used as Shank for a Soldering Iron

shaped to fit the shank of the extension bit. A large rivet served to hold the parts together. The square end of the shank was flattened to receive a wood handle.—Contributed by George M. Crawley, Jr., Newark, N. J.

¶ In scouring steel cutlery, use a large cork instead of a cloth; it will wear longer and give better results.



## A Power Windmill

The windmill shown is somewhat different from the ordinary kind. It is not a toy, nor does it approach in size the ordinary farm windmill, but is a compromise between the two, and in a good strong wind, will supply power enough to run a washing machine, a small dynamo, an emery wheel, or any other device used in the home workshop. The wheel is about 5 ft. in diameter, with eight blades. The over-all length is about 6 feet.

The windmill is easily made and the cost is within the means of the average boy. There is not a part used in its construction that cannot be found about an ordinary manual-training shop. The most difficult parts of the construction will be described in

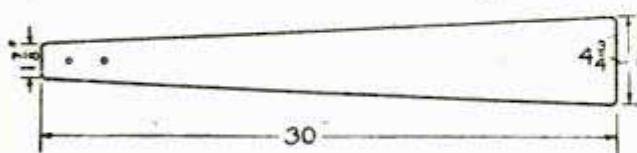
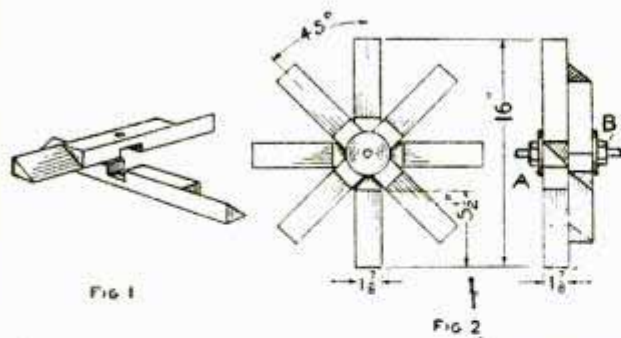


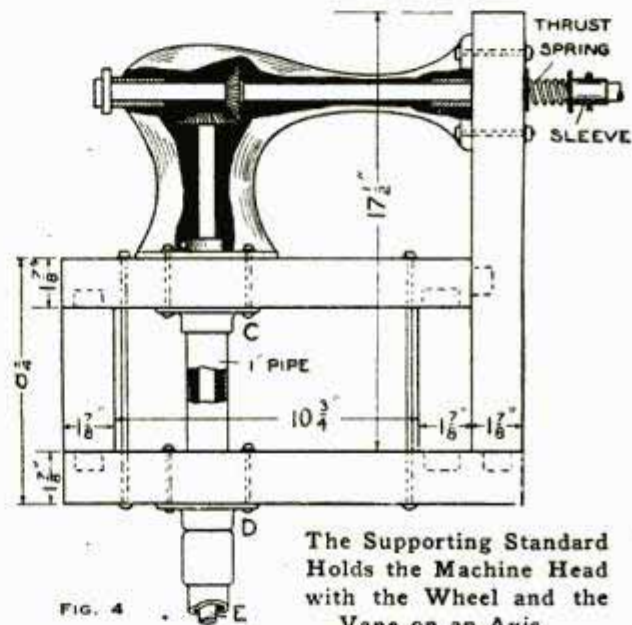
FIG. 3

The Hub Consists of Two Parts, Each Having Four Arms for Holding the Blades

detail. Symmetry and smoothness of design should be preserved and the parts made as light as possible consistent with strength and durability.

### The Wheel

As shown in the drawings, the wheel has eight blades. Ordinarily the use of eight blades makes it difficult to



The Supporting Standard Holds the Machine Head with the Wheel and the Vane on an Axis

construct a hub of sufficient strength to carry them. Where so many blades radiate from a common center it is almost impossible to provide an anchorage for each blade. To provide a maximum of strength coupled with simplicity of design, the plan of using two hubs of four arms each was adopted in the construction of this mill. The ordinary hub of four arms is simple to make and quite strong. Four pieces of straight-grained oak, each 16 in. long and  $1\frac{7}{8}$  in. square, are used in constructing the hubs. The manner of notching each pair of pieces together is shown in Fig. 1. The slope for the blades is made to run in opposite directions on the ends of each crosspiece. The slope is formed

by cutting out a triangular piece, as shown.

The two hubs, thus formed, are mounted on the shaft, one behind the other, in such positions that the arms will be evenly divided for space in the wheel circle. These details are shown in Fig. 2. The blades, Fig. 3, are made of thin basswood or hard maple, and each is fastened in its place by means of two  $\frac{3}{8}$ -in. bolts, in addition to which a few brads are driven in to prevent the thin blades from warping.

#### The Gears

This windmill was designed to transmit power by means of shafts and gear wheels, rather than with cranks and reciprocating pump rods, such as are used on ordinary farm mills. To obtain this result, an old sewing machine head was used. Such a part can be obtained from a junk dealer or a sewing-machine agent. The head is stripped of its base plate with the shuttle gearing; likewise the needle rod, presser foot, etc., are taken from the front end of the head along with the faceplate. The horizontal shaft and gear wheel are taken out and the bearings reamed out for a  $\frac{1}{2}$ -in. shaft, which is substituted. The shaft should be 2 ft. in length, and 8 or 10 in. of its outer end threaded for the clamping nuts which hold the two hubs in place, as shown at A and B, Fig. 2. The gear wheel is also bored out and remounted on the new shaft.

The supporting standard is constructed of oak, with mortise-and-tenon joints, as shown in Fig. 4. The width of the pieces will depend on the kind of sewing-machine head used. It may be necessary also to slightly change the dimensions. The machine head is fastened on the support with bolts. A sleeve and thrust spring are mounted on the shaft, as shown. The sleeve is made of brass tubing, of a size to fit snugly on the shaft. A cotter will keep it in place. The sleeve serves as a collar for the thrust spring, which is placed between the sleeve and the standard. This arrangement acts as a buffer to take up the end thrust on the shaft caused by the

varying pressure of the wind on the wheel.

#### The Vane

To keep the wheel facing the wind at all times, a vane must be provided. It is made of basswood or hard maple, as shown in Fig. 5. It is not built up solid, air spaces being left between the slats to reduce the wind resistance. Unless built in this manner, the vane is liable to twist off in a gale. The horizontal slats are  $\frac{1}{4}$  in. thick, and the upright and cross braces  $\frac{3}{8}$  in. thick, while the long arm connecting the vane to the supporting standard is  $\frac{1}{2}$  in. thick.

The supporting standard, carrying the wheel and the vane, must revolve about a vertical axis with the changes in the wind, and this vertical axis is supplied in the form of a piece of gas pipe which runs through the supporting standard at the points marked C and D, Fig. 4. Ordinary pipe fittings, called flanges, are bolted to the frame at these points. The coupling in the gas pipe beneath the supporting standard serves as a stationary collar to support the weight of the whole mill. The vane should be placed correctly to balance the weight of the wheel.

The shaft passes through the framework of the mill on the inside of the pipe, as shown at E. A  $\frac{3}{8}$ -in. soft-steel or wrought-iron rod is satisfactory for the shaft, as no weight is supported by it and only a twisting force is transmitted. The use of a larger rod makes the mill cumbersome and unwieldy. The upper end of the shaft is fastened to the shaft that projects from the under side of the machine head by means of a sleeve made of a piece of  $\frac{3}{8}$ -in. pipe. Two cotters hold the shafts and sleeve together.

At the lower end of the shaft, inside the workshop, the device shown in Fig. 6 is installed. The purpose of this appliance is to provide a horizontal shaft upon which pulleys or driving gears may be mounted. The device is constructed of another sewing-machine head similar to the one already described. The head is cut in two and the separate parts mounted

on suitable supports. The gap between the sawed portions permits a pulley to be fastened on the shaft to serve as the main drive. The wheel propelled by the treadle of the sewing

sewing-machine belts will serve to transmit the power.

#### The Tower

The tower can be built up in any manner to suit the conditions. Ordi-

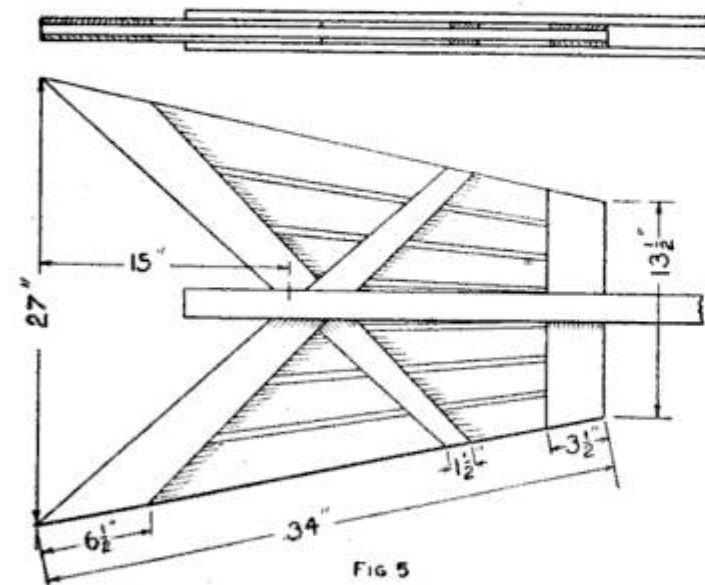


FIG 5

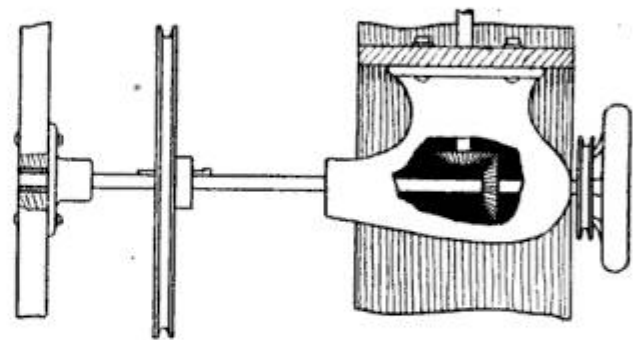


FIG 6

The Lower End of the Shaft has a Horizontal Shaft Geared to It for the Drive Pulleys. The Vane Construction and the Manner of Building the Tower on Which the Supporting Standard Revolves

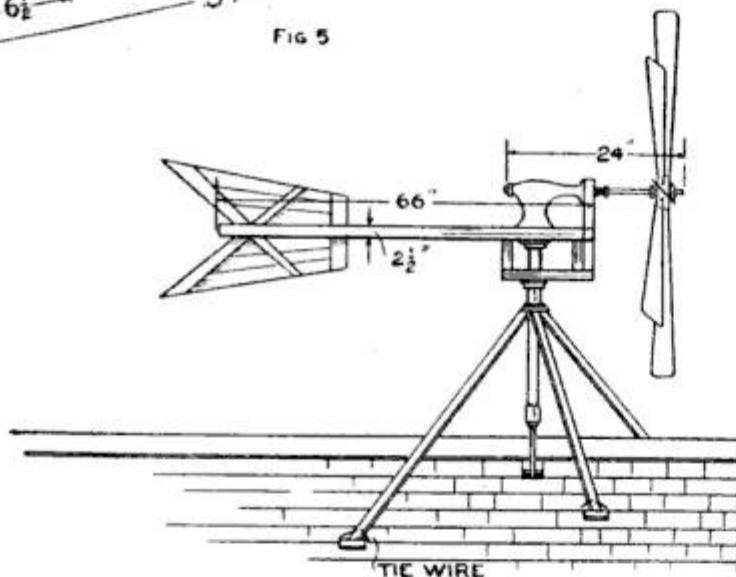
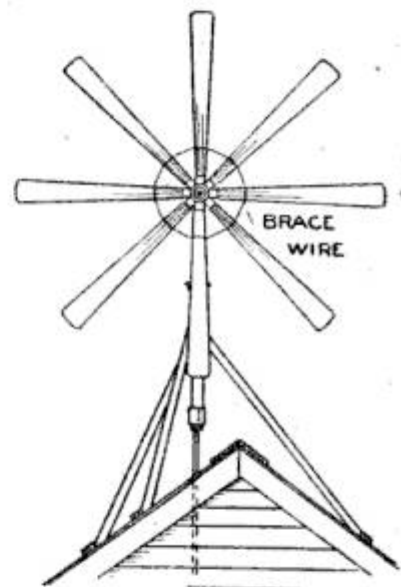


FIG 7



machine will make a good drive wheel. The small handwheel, originally mounted on the machine-head shaft, is left intact. This arrangement gives two sizes of drive wheels. Heavy

narily sticks, 2 in. square, are suitable. These are well braced with wire and fastened securely to the roof of the shop. The arrangement of the tower with the mill is shown in Fig. 7.

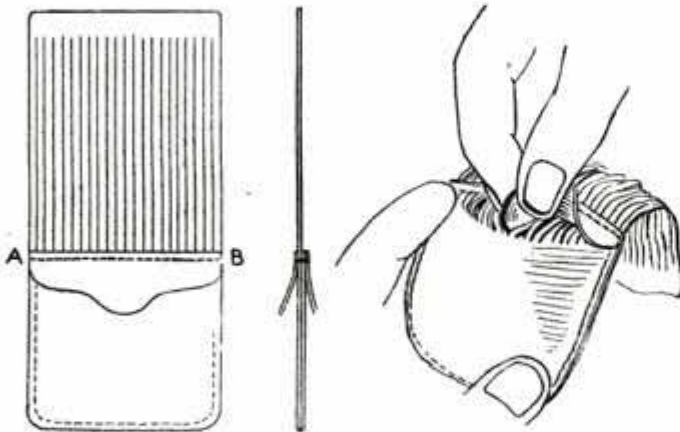
#### Telegraph Code on Typewriter Keys

A very simple and practical method of transcribing wireless time and other messages on the typewriter without having such perfect knowledge of the Morse system as to be able to immediately translate it into the common alphabet is the following: The characters of the Morse system are inscribed on small slips of paper—thus, three dots (...), for the letter S; two

dashes (- -), for the letter M, etc.—and these slips are pasted on the corresponding keys of the typewriter. The operator puts on his receiver, and the proper key is struck as he hears the corresponding Morse letter. As there are no capitals, spacing between words, or even punctuation, the manipulation of the typewriter is much simplified, and it is easily learned to record the signals as fast as they are heard.

### A Puzzle Purse

The puzzle purse is made of four pieces of chamois, two of the pieces being merely flaps, one on each side at the upper edge. One of the pieces



The Strips of Leather Sliding through the Stitches Make the Puzzle Part of the Purse

forming one side of the purse extends upward for about twice the height of the purse part. The part above the purse has a number of slits cut in it to make the width of each strip  $\frac{1}{8}$  in. These slits should be accurately cut in order that the purse may be opened easily. The other half is only the size of the purse proper. The upper edge of the latter piece and the flap on that side are stitched together to the flap on the opposite side, the threads of the stitches running between the strips of the long piece. These stitches are made on the line AB and around the edge.

To open the purse, take hold of each side on the purse part and draw the pieces apart. In doing so, the strips are drawn through the stitches so that they may be separated and a coin taken from the purse. A pull on each end will close the purse.—Contributed by Chas. Motton, Toronto, Ont.

### An Emergency Sandpapering Machine

While doing some work I had several small pieces to be finished with sandpaper. They were so small and of such a shape that it was impossible to do the work by hand. Not having a sanding machine, I used a disk talking machine for the purpose. I placed a sheet of sandpaper over the disk and

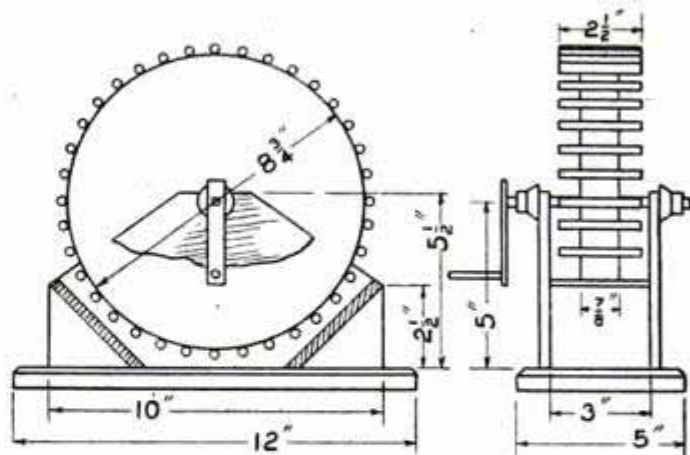
fastened it to the felt at the corners with pins. The machine was then set going at its highest rate of speed, and the articles were smoothed by holding them on the disk.—Contributed by Fred S. Barnard, Los Angeles, Cal.

### A Developing Machine

The base of the developing machine consists of a wood tray with sloping ends and high sides, which is placed at the center and provides bearings for the wheel axle. The dimensions given in the sketch are for making a machine to develop a film about 29 in. long. The disk, or wheel, is cut from a board,  $\frac{7}{8}$  in. thick, and the attached cross-pieces are cut from  $\frac{1}{4}$ -in. dowels to make them  $2\frac{1}{2}$  in. long. These are placed about 1 in. apart on the circumference of the disk.

An axle, fastened solidly in the wheel and adjusted in the bearings, is kept from slipping sideways by bushings made of a spool. A crank is attached to one end of the axle. Hot paraffin is applied to the inside of the tank part, to make it liquid-tight. Two pins or hooks are attached to one of the crosspieces to catch into the film end. If the wheel is the correct size, the same pins can be used for fastening the other end of the film.

The film is first attached to the



The Entire Length of Film is Placed on the Wheel Where It is Run through the Developer

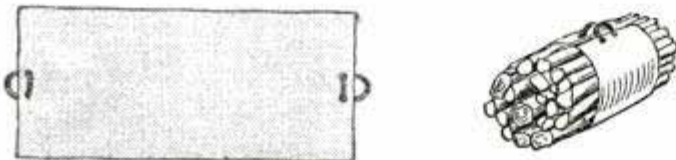
wheel; then, while turning slowly, the developer is poured into the tray. Keep on turning the wheel until full development is obtained, then pour out the liquid and turn in fresh, clear



water, and turn the wheel to wash out the developer. Remove the film and place it in the hypo bath.—Contributed by Raymond M. Bealer, Baltimore, Md.

### A Stove-Wood Carrier

A handy wood carrier, for bringing wood and kindling from the basement or yard to the wood box in the house, may be made from a grain sack, as shown in the sketch. Use a complete sack and make rope handles at each end. When used, place only sufficient wood or kindling in it to permit the handles to come together over the top of the load. This will make a comfortable grip and it is no harder to carry than a medium-weight suitcase. When the wood is removed the carrier can be taken to the back yard and



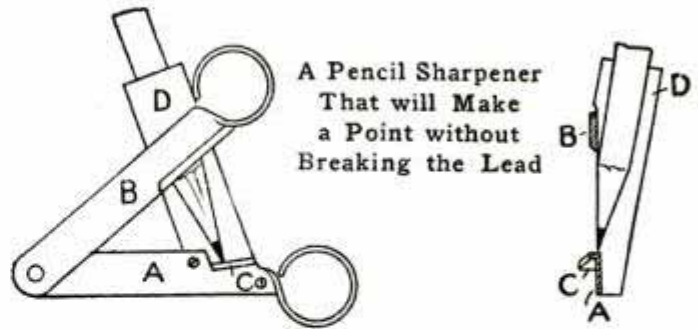
The Ropes at the Ends of the Sack Make a Handle to Carry It Like a Grip

shaken out, thus doing away with the dirt that usually results from other methods of filling wood boxes.—Contributed by Walter Nelson Kidston, Seattle, Wash.

### A Pencil Sharpener

A pencil sharpened with the device shown will have a better point and one that will not break easily while being sharpened. The lower arm A is made from a strip of sheet steel,  $\frac{1}{16}$  in. thick. An extension,  $\frac{1}{4}$  in. wide, is cut and bent in a circle to form the lower finger hold. The upper arm B forms the cutter, which is made from a piece of hacksaw blade. The teeth are ground off and the temper is drawn from the extension that forms the upper circle. A portion of the arm A is bent over, as shown at C, to form a support for the pencil point to rest upon. A hole, large enough for a pencil to turn in, is bored through a stick of hardwood, D, and tapered so that the center of the

hole meets the inner edge of C. It is fastened to the lower arm with screws. A sharp cutting edge is ground



on the blade which is then attached to the arm A with a rivet loosely enough to swing freely.—Contributed by J. V. Loeffler, Evansville, Ind.

### Cleaning an Oilstone

Use kerosene oil and a sprinkling of emery flour and proceed to sharpen tools. It is not necessary to clean a stone thus treated before placing the tool on it, as the emery and kerosene will make a good surface on the stone as well as assisting in producing a sharp edge on the tool.—Contributed by James M. Kane, Doylestown, Pa.

### Landing for Small Boats

Not having a landing for my small boat, I made a series of sectional platforms, rising 2 ft. above the bottom, which served the purpose well and were inexpensive. Each section is about 15 ft. long, 3 ft. wide, and 2 ft. high. The frame is made of material 2 in. thick and 4 in. wide, and on top is a floor made of boards, while the bottom consists of 2 by 4-in. cross-pieces, nailed on 6 in. apart. Stones are laid on these crosspieces to moor it down in place. The whole landing is simple to make and it lasts a long

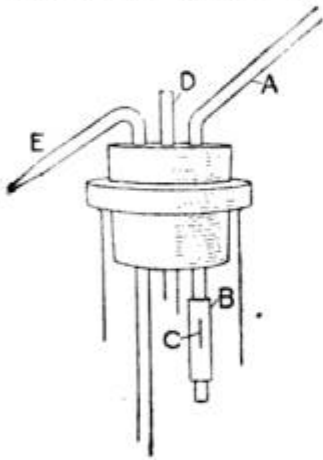


The Series of Platforms Make a Good Small-Boat Landing on a Slanting Beach

time, as the sections can be drawn out and stored during the winter.—Contributed by Henry Briggs, Lexington, Massachusetts.

### Wash Bottle for Laboratory Use

A large-mouth bottle neck is provided with a stopper, having three brass or glass tubes as shown, the



tube A being fitted with a thick piece of rubber tubing, B, stoppered at its lower end. A slit is cut at C, and allows the air blown in through the tube A to pass into the bottle, but will close

automatically and hold the pressure within the bottle.

If the relief tube D is closed with the thumb the water is forced out in a steady stream through the nozzle E. The water will continue to run for some time after the lips are removed from the air tube, but the removal of the thumb from the tube D will stop the flow of water instantly.—Contributed by W. Schilling, San Francisco, Cal.

### Typewriting on Card Stock

Anyone having tried to typewrite on cards or heavy stock has doubtless experienced much trouble in getting the card to feed properly. If at all heavy, it will resist the curving so strongly that it will not be carried around the platen, and the edge of the card is very apt to catch on the pressure rolls and cause the platen to slip.

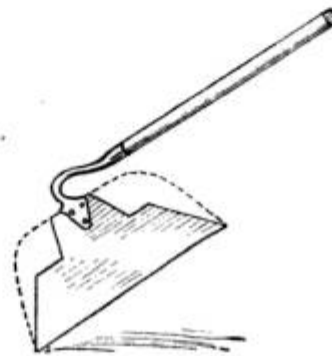
The remedy is very simple and consists in running a sheet of paper through ahead of the card until an edge of about  $\frac{1}{2}$  in. remains, then inserting the edge of the card inside of the projecting edge of the paper and turning the platen. The paper overlapping the card prevents the edge of the latter from catching on the pressure rolls and keeps it in close contact with the platen so that it will pass through without trouble.—Contributed by Thos. L. Parker, St. Paul, Minn.

### A Furniture Polish

A homemade furniture polish that will compare with any known polish, is composed of the following chemicals and oils. Mix 3 oz. of turpentine very gradually with 6 oz. of linseed oil, then add 3 oz. of grain alcohol, 3 oz. of 5-per-cent acetic acid, and  $\frac{1}{2}$  oz. of butter of antimony. Apply with a cloth and use a good friction. As the substance might prove harmful to children if taken internally, see that it is kept out of their reach.—Contributed by Loren Ward, Des Moines, Iowa.

### Pointed End on a Hoe

The rounding end on the ordinary



hoe is useless in many instances for getting under growing plants, to cut out the weeds and to loosen up the earth. I find that shaping the hoe ends as shown in the

sketch is very effective in getting up close to a plant and under spreading vines.—Contributed by R. F. Pohle, E Lynn, Mass.

### Starting a Siphon

Roll up a soft rubber hose tightly so that it will be flattened to force out all the air and drop one end into the liquid, then let the coil unwind as it falls down on the outside. The uncoiling causes a slight vacuum in the hose and the liquid follows it up and starts the flow instantly.—Contributed by L. J. Monahan, Oshkosh, Wis.



☞ Paint spots on window glass can be readily removed with a penny.

# Electrical Heating Apparatus for the Home

By ARTHUR MOORE

## PART III—An Electric Foot Warmer

The construction of the foot warmer here described is very simple; the materials required are easily obtained, and if proper care is exercised in carrying out the instructions, excellent results will be obtained in the operation of the completed device. The foot warmer consists of two main parts: the containing case and the heating element, and the construction of each will be treated separately.

The containing case should be made of a fairly heavy piece of Russian iron, similar to that used in stovepipe but about three times as thick, if a piece of such thickness can be procured. For a case to correspond with Fig. 1, the outside dimensions of this piece should be at least 18 by 17 inches.

Draw two lines, A and B, on the piece of iron parallel with the 18-in. dimension,  $3\frac{3}{4}$  in. and  $4\frac{3}{4}$  in. from the two edges, respectively, and two other lines, C and D, parallel with the 17-in. dimension, both 3 in. from the edges. The rectangle formed by these four lines will be the top of the case. On each side of this rectangle lay out two figures identical in shape and dimensions with those shown, also lay out the two parts above and below the rectangle. All the projections marked E should be bent down along the dotted lines at right angles to the surfaces from which they project. These projections are to be used in fastening the case together. Bend the main projecting pieces, at the right and left of the rectangle, down along the dotted lines C and D, until they are at right angles to the surface of the rectangle. These pieces will form the ends of the case, and the upper and lower projections from the rectangle are bent around the curved ends to form the sides. They are fastened in place by means of small rivets or stove bolts that pass through holes in the lugs on the end pieces and holes in the side

pieces. The side pieces should be just a little larger than the horizontal dimension of the rectangle so that they project perhaps  $\frac{1}{16}$  in. beyond the surface of the end pieces, thus giving

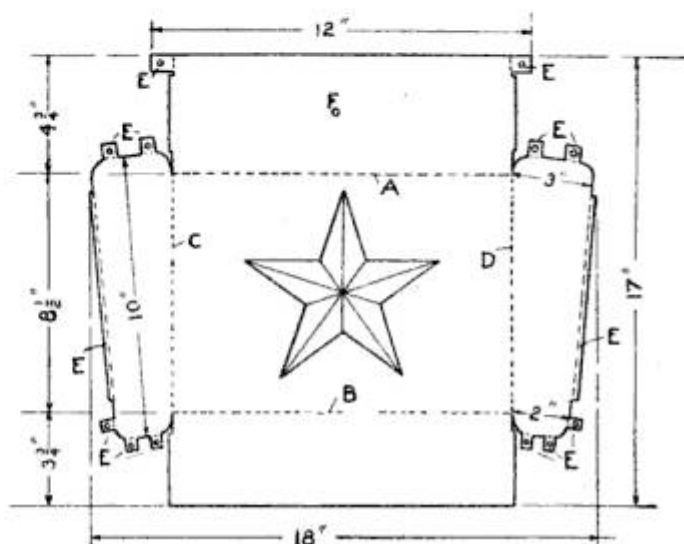


FIG. 1

The Containing Case is Cut from One Piece of Russian Iron and Bent into Shape

a much better construction and presenting a better appearance.

Considerable care should be exercised in handling the sheet of metal to see that it is not bent out of shape or dented. In bending down the lugs and other projections, it would, no doubt, be best to securely clamp the metal between two surfaces with straight edges, such as two boards of hard wood, so that the angle formed will be as near perfectly square as possible.

This case is to contain the heating element, and in order that the heat generated in it may readily pass out of the case, it will be necessary to drill numerous holes in the top portion. These holes may be made in any promiscuous manner, but the appearance will be greatly improved if they are laid out according to some definite design. It is not advisable to drill too many holes, as this would weaken the case and perhaps cause trouble later. A suitable design for the center

in the form of a star is shown, and other designs may be added as desired.

A hole, F, is drilled in the case, as shown, for the conductor leading from the source of energy to the heating

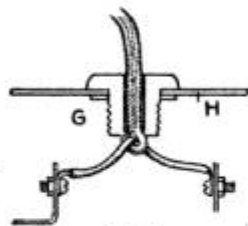


FIG. 2

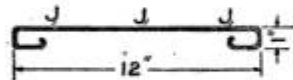


FIG. 3

The Support and Parts for the Heating Element and the Electrical Connections

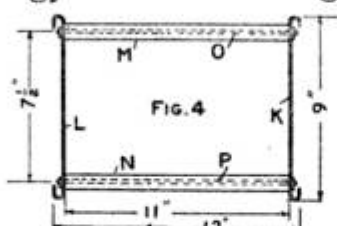


FIG. 4

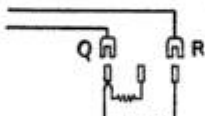


FIG. 5

element. The diameter of this hole should be large enough to take a porcelain bushing with an opening in it of sufficient size for the duplex conductor. The porcelain bushing, which is shown in Fig. 2, is held in place by a copper nut, G, screwed onto the bushing inside of the metal case H.

On account of the temperature of the heater, it will be necessary to support it on suitable legs so that it will not damage the surface upon which it may be resting. These legs can be made from a piece of strap iron,  $\frac{1}{8}$  in. thick and  $\frac{3}{4}$  in. wide, and should have a form and dimensions similar to those shown in Fig. 3. Three holes, J, large enough to take a small stove bolt, are drilled in each piece.

The under side of the containing case is closed by means of a piece of sheet metal, 12 in. long, and wide enough to extend about 1 in. over the edge of each side piece. This piece may be fastened in place by the same bolts that hold the legs, and holes should be drilled through it and through the side pieces to correspond to the holes in the pieces forming the legs. The holes in the case should be smaller and threaded, so the stove bolts can be screwed into them from the inside and will not fall back into the case when the legs and piece of metal are being fastened in place.

The heating element is constructed as follows: The frame upon which the

resistance wire is to be wound is shown in Fig. 4. It consists of two pieces of strap iron, K and L,  $\frac{1}{8}$  in. thick and  $\frac{5}{8}$  in. wide, of the dimensions and form shown, and two porcelain tubes, M and N, mounted upon two rods, O and P, that connect the pieces K and L. The outside diameter of the porcelain tubes should be at least  $\frac{1}{2}$  in., and the length of the frame should be such that it will just slip into the containing case. Two holes are drilled in each end of the containing case to correspond to those in the ends of the pieces K and L. These holes are drilled in such a position that the upper surface of the heating element is parallel with the top of the containing case and about 1 in. beneath it.

A thin sheet of asbestos is wound around each porcelain tube, about two turns, and fastened in place by means of some temporary wires until the resistance wire is in place. The edges of the sheets of asbestos should be on the outside of each tube.

Procure about 60 ft. of No. 24 gauge "advance" resistance wire and proceed to wind it on the frame as follows: Take a turn around one tube, about  $\frac{1}{4}$  in. from its end, and tie the wire by twisting the end of the wire around the main portion so that about 2 in. of the end is free to make a connection. Wind the wire around the tube, spacing the turns about  $\frac{1}{8}$  in. apart. This spacing may have to be changed in order that the wire be properly distributed, but this can be determined after a few turns are in place. The winding should terminate at the opposite end of the tube upon which it started and about 2 in. of free wire be left to make a connection.

A piece of No. 14 gauge asbestos-insulated copper wire, about 10 in. long, is fastened to each end of the resistance wire by means of two very small bolts and washers.

The cord leading to the heater is put through the porcelain bushing, and a knot tied in it, so as to take care of the strain, as shown in Fig. 2. The ends of this cord are then fastened

by small bolts to the pieces of copper wire leading to the heating element. These joints should all be insulated with asbestos sleeving. A heavy sheet of asbestos is placed inside the containing case, so that it will be between the heating element and the bottom of the case. The legs and bottom are then fastened in place.

With the arrangement of the heating element described, the heat generated cannot be varied. An arrangement of heating elements, similar to that shown in Fig. 5, makes it possible to obtain three degrees of heat. Either resistance may be used alone or the two in series. If it is desired to arrange the heater according to the scheme shown, two heating elements, either separately or on the same frame, must be constructed. The resistance of one of these elements should be one-half that of the other. If it is desired that the input to the heater, when connected for the maximum heat, should be about 330 watts, the resistance of the lower element should be about 33 ohms, when operated on a 110-volt circuit, and it should be capable of carrying 3 amperes. If the resistance of the other element is made 66 ohms, its input, on a 110-volt circuit, when connected alone, will be 165 watts. By connecting these two elements in series, the combined resistance will be 99 ohms and the input will be 123 watts. The current-carrying capacity of the 66-ohm element should be 1.5 amperes.

Three plugs may be mounted at some convenient place on the containing case and the heating elements connected to them as shown in Fig. 5. These plugs must all be insulated from the containing case with an insulation that is not affected by the heat. Two clips, Q and R, are then attached to the supply circuit, and the combinations of resistances described above can be obtained by various connections of the clips and plugs. These clips and plugs are easily constructed, or may be purchased from almost any electrical supply house.

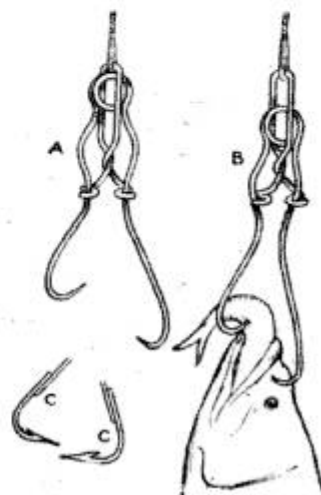
The cord used in connecting the

heater should be of a better grade than the ordinary lamp cord, and should have a much heavier insulation and larger copper conductors.

### An Automatic Fishhook

The hook A is made of tempered brass or steel wire of a gauge sufficient for the size of the fish to be caught.

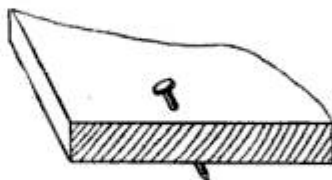
A wire of No. 18 gauge is about right for ordinary fishing, with a No. 20 or 22 gauge for the trigger. Hooks, C C, can be soldered on the points to angle for larger fish. Barbs are not required for smaller fish.



Such a hook will catch the fish, even if they only nibble, and is especially good for fishing through the ice. Use a bob and a pole, and bait the short hook with a minnow or worm. The extreme length of a hook for catching a 1-lb. fish should be 3 in. Fasten the line as shown at B.—Contributed by Robert C. Knox, Waycross, Ga.

### Driving Nails to Prevent Splitting

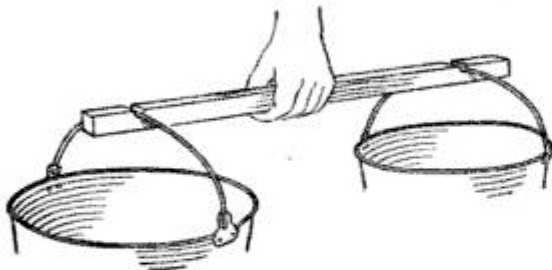
A nail driven so that it crosses the grain, as shown in the sketch, is not likely to split the board through which it passes. The splitting often results when the nail is driven straight. The nail should be started at different angles according to the grain of the wood.—Contributed by Chas. G. England, Washington, Pa.



CA razorlike edge can be put on a knife blade by carefully stropping it without lubricant on a piece of smooth aluminum after first whetting on an oilstone.

### Carrying Two Pails in One Hand

When it is necessary to carry two small filled pails in one hand and a package in the other it will be found a



Two Filled Pails can be Readily Carried by Placing the Bails on the Ends of a Stick

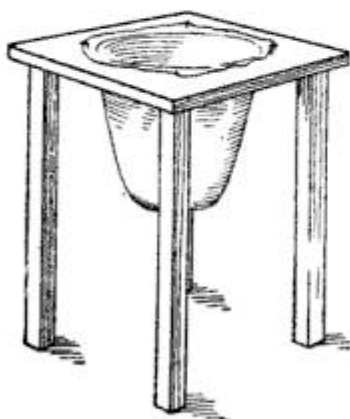
very difficult job, if the contents are liquid. Procure a stick of sufficient size to carry the weight of the pails and cut a small notch in each end to admit the bail. Place a pail on each end of the stick and take hold in the center, or, if the pails are not equally filled, a little to one side of the center.

### Preserving Paint in Open Cans

To keep paint from drying out in an open can it is necessary to exclude the air from the oil. This can be done by procuring an air-tight paper sack, which is tested by blowing into it. Set the can into the sack and tie it tightly with a cord. Mixed paint will be kept in a working state in this manner.

### Jelly-Straining Stand

Procure a board,  $\frac{7}{8}$  in. thick and 18 in. square, and cut a hole, about 1 ft. in diameter, in the center. Fasten



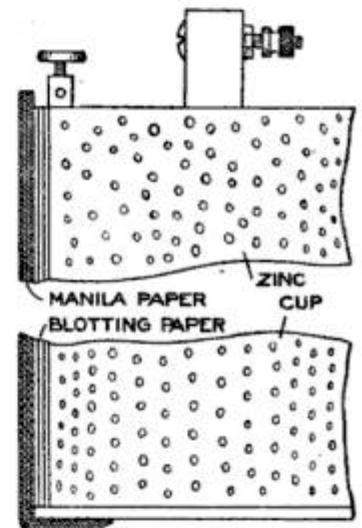
beneath to catch the juice.

posts, 4 ft. long, to each corner. Screw hooks are located around the edge of the hole to catch into the cloth used for holding the fruit. The stand is high enough to be convenient and admit a vessel

### Renewing Dry Batteries

It is a well-known fact that dry cells commence to deteriorate from the time they are manufactured, and it is a matter of considerable uncertainty in purchasing cells to know whether they will continue to be efficient for their supposed natural life under the existing conditions of service, or for only a small part of this period. When the voltage of a dry cell falls below a certain value it is usually discarded and replaced by a new one, which often means quite an expense. The following simple suggestion will enable one to renew the prematurely exhausted cell with very little trouble and slight expense, so that its period of usefulness will be extended for a length of time, at least equal to that for which it could be used if put into service immediately after its manufacture.

The procedure in renewing the cell is as follows: A casing is placed outside of the zinc-containing case, having inside dimensions



a little greater than the zinc cup. The space between the zinc cup and case is filled with a dry electrolyte, which, upon the addition of moisture, sets up a chemical action with the exterior surface of the zinc, and the latter having been perforated, causes electrical action to be again produced.

The casing, or cup, to be used outside the zinc cup should be made of a waterproof material. The electrolyte instead of being placed between this cup and the zinc in a powdered form, as might be expected, should be held by several layers of blotting paper, formed into a cylinder of the proper diameter to fit snugly on the outside of the zinc cup. This porous cup should be impregnated with a solution containing the following materials in the approxi-

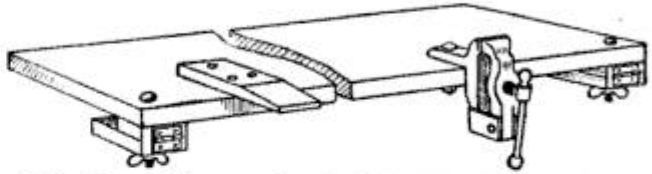
mate amounts given: Muriate of ammonia, 10 parts; bichromate of potash, 4 parts, and chloride of sodium, 4 parts. After the porous cup has thoroughly soaked in the above solution it should be dried by passing a roller over its external surface when it is mounted on a wooden cylinder of proper diameter. The moisture-proof cup may be formed outside the porous cup by covering the latter with several coats of waterproofing paste and winding on several thicknesses of common manila paper, each layer of paper being treated with the paste. A disk of cardboard, properly treated, should be placed in the end of the cylinder to form the bottom, and the edge of the manila paper folded in over it and pasted in place.

The pasteboard covering surrounding the zinc cup of the cell should be removed and the surface of the zinc thoroughly cleaned. The coal tar in the top of the zinc cup should be removed by tapping around the edge with a hammer, and a large number of small holes should be made in the walls of the cup with a sharp instrument. Then put the cell within the porous cup and fill the top with clear water, preferably rain water. A chemical reaction will immediately take place between the outer surface of the zinc and the chemicals contained in the material forming the porous cup, and the terminal voltage of the cell will be practically the same as it was when the cell was new. The water, of course, must be replenished from time to time on account of evaporation, and the useful life of the cell can be prolonged for a considerable time. A part cross section of a cell treated as described above is shown in the accompanying sketch.

### Workbench Equipment for a Table Top

The average home mechanic with a few tools seldom has a place to work and is usually without a workbench. As this was my case, I constructed a bench equipment that I could easily clamp to the kitchen or other table and

thus have the necessary tools at hand for work. A plank, 2 in. thick, 10 in. wide and 18 in. long, was planed and



The Bench Top can be Quickly Attached to Any Table Top without Harming It

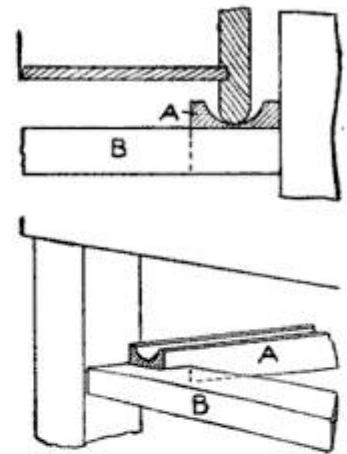
smoothed up on all sides, and a vise and a bench pin were fastened on one edge.

To the under side of the same edge two blocks were securely fastened, as shown, and to these blocks two other pieces were fastened with hinges. With a bolt, running through from the top, and a thumb nut used underneath, these pieces are used as clamps for holding the bench to the table top. The top can be removed and set away in a closet when not in use.—Contributed by Wm. H. Hathaway, Nutley, N. J.

### A Nonsticking Drawer Guide

The guide shown is nonbinding and has been found thoroughly practical after several years' use on furniture.

The guide A consists of a piece of wood, about  $1\frac{1}{8}$  in. square, with a concave cut in its upper edge, the width being about  $\frac{3}{4}$  in. and the depth such as not to cut through the extending end projecting over the crossbar B.



The drawer sides have a half-round edge on the bottom edge to run in the groove in the guide. The difference in width between the groove in the guide and the rounding edge on the drawer side causes the drawer always to ride snugly without binding as the wood expands or contracts with changes in the weather.—Contributed by Herman Hermann, Portland, Ind.

## INTERESTING NEW PATENTS



FIG. 1

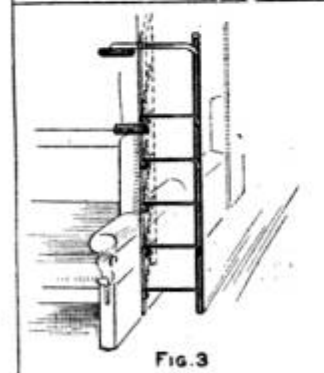


FIG. 3

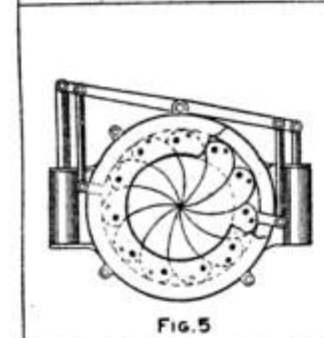


FIG. 5



FIG. 7

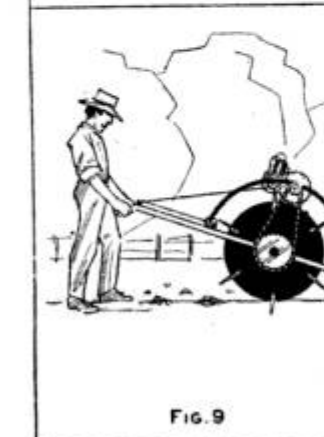


FIG. 9

**SUGAR-DISTRIBUTING BOWL (Fig. 1)**—When the vertical shaft in the center is turned the sugar block is dropped into the hand or into the tea or coffee cup through the aperture in the bottom of the bowl. The lower part of the shaft carries a number of sloping partitions at the bottom, which divide the space into small compartments. Each of these compartments has an opening at its outer edge large enough to admit one block. When the compartment is over the aperture, this opening is closed by a stationary cover supported on the side of the bowl.

**NOVEL PROPELLER FOR ROWBOAT (Fig. 2)**—In this device paddles are carried at the ends of two shafts which work independently of each other, each being supported on the gunwale and a pillow post at the center of the boat. The paddles are cup-shaped and are attached to the ends of rods which slide in openings in the paddle head, the paddles dropping out of the way when in the high position and falling to engage the water when in the low position.

**FOLDING LADDER FOR SLEEPING-CAR BERTHS (Fig. 3)**—With this device a Pullman-car passenger is enabled to get into or out of the upper berth without waiting for the porter to bring the ladder. It consists of a series of steps which are pivoted to the berth partition and to a vertical support that rests on the floor when in use. When not in use, the whole device is folded compactly against the berth partition.

**GRASS SHEARS (Fig. 4; British patent)**—These grass shears are apparently designed for cutting in corners, around trees and shrubbery, and in other places where the use of a lawn mower is difficult. The double-edged cutting blade is pivoted to work closely over the fixed toothed blade and is operated by a swinging bar.

**DIMMER FOR AUTOMOBILE HEADLIGHT (Fig. 5)**—Spiral plates pivoted to the outer flange of the case are arranged to overlap each other in such a way that, when swung inward, they partly or wholly close the front of the case, as desired. When the case is entirely closed, the only light emitted is that which passes through the slots in the plates. The device is operated by a circular wire pivoted to all the plates.

**DEVICE FOR HOLDING DOOR IN OPEN POSITION (Fig. 6; British patent)**—This device consists simply of an arm rigidly attached to the door or other hinged object and provided with notches along its outer surface, used in connection with a spring bolt, supported on the door casing and arranged to engage the notches of the arm.

**TONGS FOR EXTRACTING FRUIT SEEDS (Fig. 7)**—The ends of the tongs are provided with cutters which are easily forced into the fruit. The seed is grasped and held in a depression in one of the arms, being forced into this depression by the pressure of the opposite arm.

**GAS TURBINE (Fig. 8; British patent)**—An explosive mixture of gas and air is introduced into each pocket in succession through the large inlet at the top of the casing, and is fired when the pocket reaches the electric spark plug at the left. The explosion reacts at an angle against the side of the casing and causes the rotor to revolve. The products of explosion escape when the pocket reaches the outlet at the right.

**REVOLVING PLOW (Fig. 9)**—This is a novel attempt to use a motor in the work of plowing. The motor is mounted at the top of the arched frame and drives the cutting wheel by means of a chain and sprocket.

**COMBINED SHOVEL AND HOE (Fig. 10)**—The blade of this tool is pivoted to the handle and is readily secured by a latch in either of two positions, practically at right angle to each other, being used as a shovel in one position and as a hoe in the other.



FIG. 2

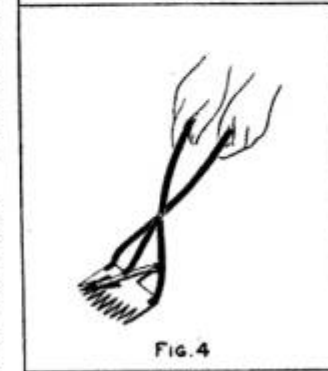


FIG. 4

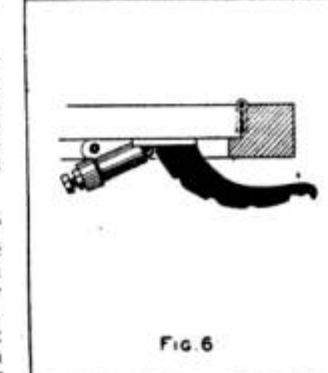


FIG. 6

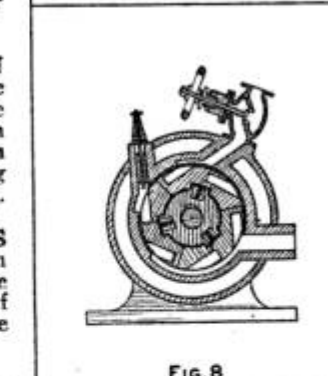


FIG. 8

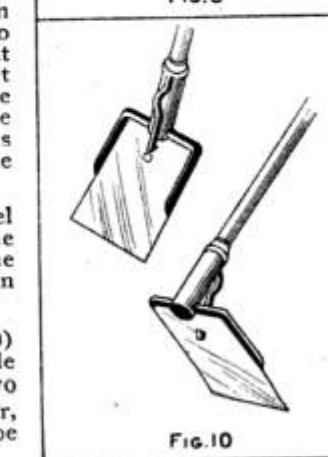


FIG. 10





Fig. 11

**DEVICE FOR LEADING DANGEROUS BULL** (Fig. 11)—The body of this "lead" is a metal tube, 4 ft. in length, provided with a handle on one end and a hook on the other. Inside the tube is a rod, which is pressed against the inner side of the hook by a spring, but is easily released by a pull on the ring at the opposite end of the rod. The user simply stands at a safe distance and clamps the device over the sensitive central wall of the bull's nose. In case of necessity it can be used effectively as a club.

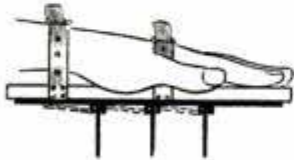


Fig. 13

**SHEARS FOR RIPPING SEAMS** (Fig. 12)—This device works after the fashion of ordinary shears. The blades have vertical cutting edges and project in opposite directions from the arms, the seam being spread and the threads cut at one operation.

**SWIMMING DEVICE** (Fig. 13)—This device, apparently designed as an aid to inexperienced swimmers, consists of a block which is strapped to the hand and on which is carried a number of hinged wings. These wings lie flat against the block during the forward reach, but spread out and engage the water during the propelling stroke.

**APPARATUS FOR SPREADING OIL ON THE SEA** (Fig. 14; British patent to a German)—The purpose of this invention is the calming of the sea in the lee of a vessel so that boats can be launched safely. A number of floating oil-distributing tanks are attached to a cable, and the ends of this cable are connected by other cables to the bow and stern of the ship. A board forming the junction of the cables at each end is placed at such an angle that the apparatus spreads out in a curved line under the action of the wind and waves, scattering oil over a wide area.

**BOOK HOLDER FOR RECLINING READER** (Fig. 15)—This device has a glass panel carried in an adjustable frame, which in turn is supported by a rod attached to the side of the bed. The book is laid face downward on the glass panel, and may then be comfortably read by a reclining reader.

**SAFE-DEPOSIT SHOE HEEL** (Fig. 16)—This curious invention is intended to enable the user to carry valuables in the safest possible way. The receptacle in the heel of the shoe can be reached only from the top. It is closed by a metal disk over which a thin inner sole is laid.

**NOSE-BAG SUPPORT** (Fig. 17)—The interesting features of this device are the brace that runs to the lower part of the hames, and the flexible support attached to the top of the hames. The invention is intended to enable the horse to eat from the bottom of the bag without being compelled to brace it against the sidewalk or other solid object.

**AUTOMATIC GAS CUT-OFF** (Fig. 18)—The valve that supplies the burner is so designed that it shuts off the gas in case the light is accidentally extinguished, being controlled by a spring that keeps it normally closed. When the gas is turned on a pivoted lever engages a ratchet on the valve and holds it open. The other end of this lever is connected with a metal bar having a high coefficient of expansion and placed in position to be heated by the flame. When the flame is extinguished, the bar contracts and draws the lever out of engagement with the ratchet. The spring then closes the valve, shutting off the gas.

**SELF-LEVELING BUNK FOR SHIPS** (Fig. 19; American patent to an English woman)—The bunk is suspended in such a way as to remain practically level regardless of the rolling of the ship. The frame is supported by a toothed rack and sector, while a restraining spring prevents too great a movement.

**GUN CARRIAGE THAT LEVELS FIELD GUN** (Fig. 20; German patent)—The purpose of this apparatus is the placing of the gun in a horizontal position when it is being fired from a hill side. The axle is made in two pieces that are joined together by a pivot at the center. The gun is leveled by tilting the axles with reference to each other by means of a screw jack, as shown.

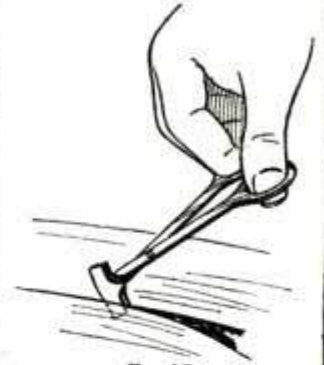


Fig. 12



Fig. 14

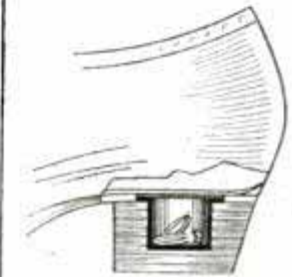


Fig. 16

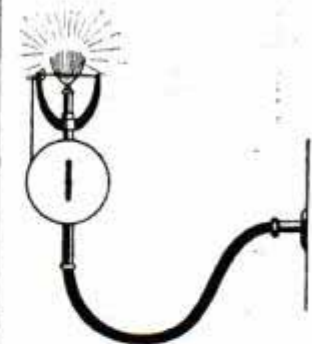


Fig. 18

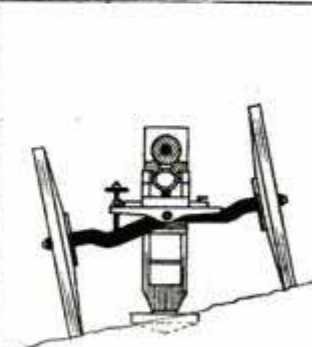


Fig. 20



Fig. 15



Fig. 17

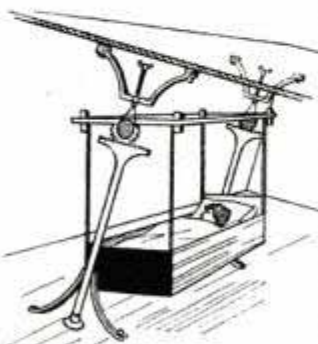


Fig. 19

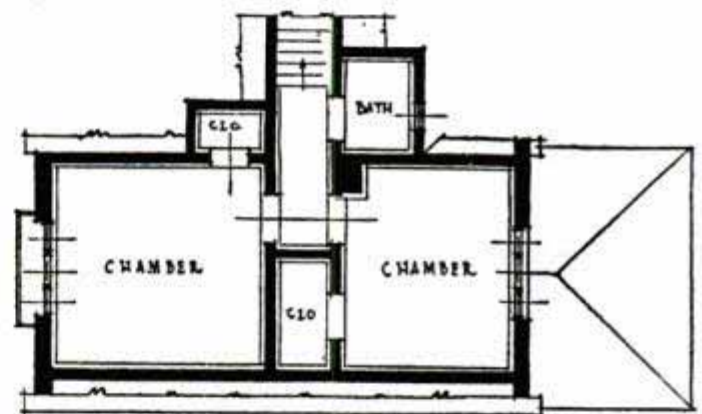
## A BRICK COTTAGE OF MODERATE COST



Ernest C. Redstone, Architect, Boston, Mass.



First-Floor Plan



Second-Floor Plan

This attractive dwelling, in which the best of material was used throughout, was built at a cost of only \$3,500. It is 28 ft. wide and 36 ft. long, and seems well adapted to a lot as small as 50 by 100 ft. A cellar with a ceiling height of 7½ ft., which provides ample space for storage, furnace, coal, and cold room with preserve closet, extends under the entire

rear portion of the house, the space under the living and dining room being unexcavated. The outer walls are built of full-range red "texture" brick, laid with a cream-colored ½-in. rough-cut joint. Owing to the rough surface of these brick, they do not reflect the light, and the result is an unusual softness and delicacy of tone.

An interesting feature of the first floor is the combination living and dining room, which extends the full width of the building. The dining room can be screened off if desired, while the arrangement makes an unusually large room available for special occasions. In addition to this room, the first floor contains the kitchen, pantry, entrance hall and an 8½ by 11-ft. chamber, the latter being provided with ample closet room. The stairway to the basement is in the entrance hall under the main stairway. A distinctive feature of the living and dining room is the fireplace, built of "texture" brick similar to those used in the outer walls. The second floor contains the bathroom and two chambers. One of the chambers is 10 by 11½ ft. and the other 12 by 12 ft., and each is provided with a large closet. The ceiling height is 8 feet.

The floors in the living and dining room and in the entrance hall are of hard wood, while the walls are of plaster, rough-floated and tinted. The remainder of the building has pine floors and plastering of a hard white finish. The interior finish is cypress, stained brown.



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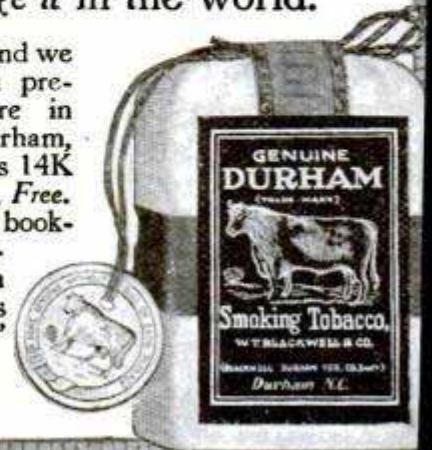
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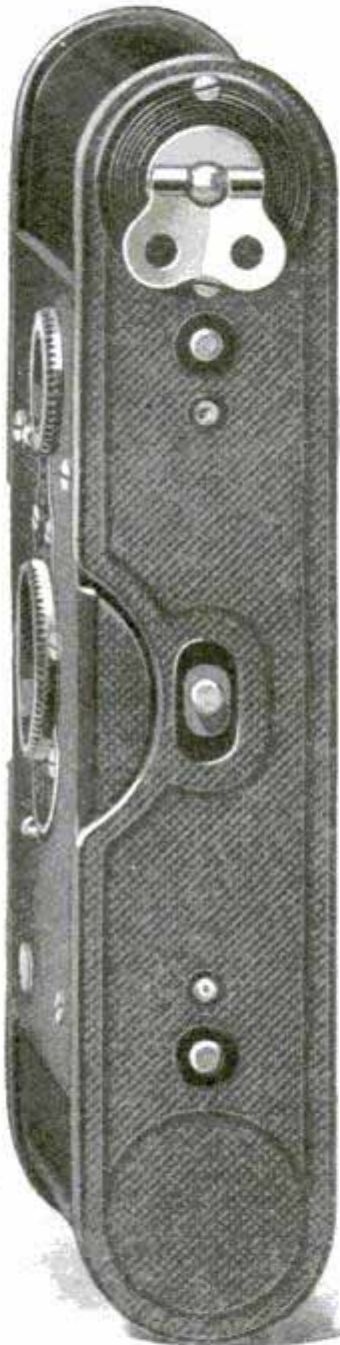
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(45)

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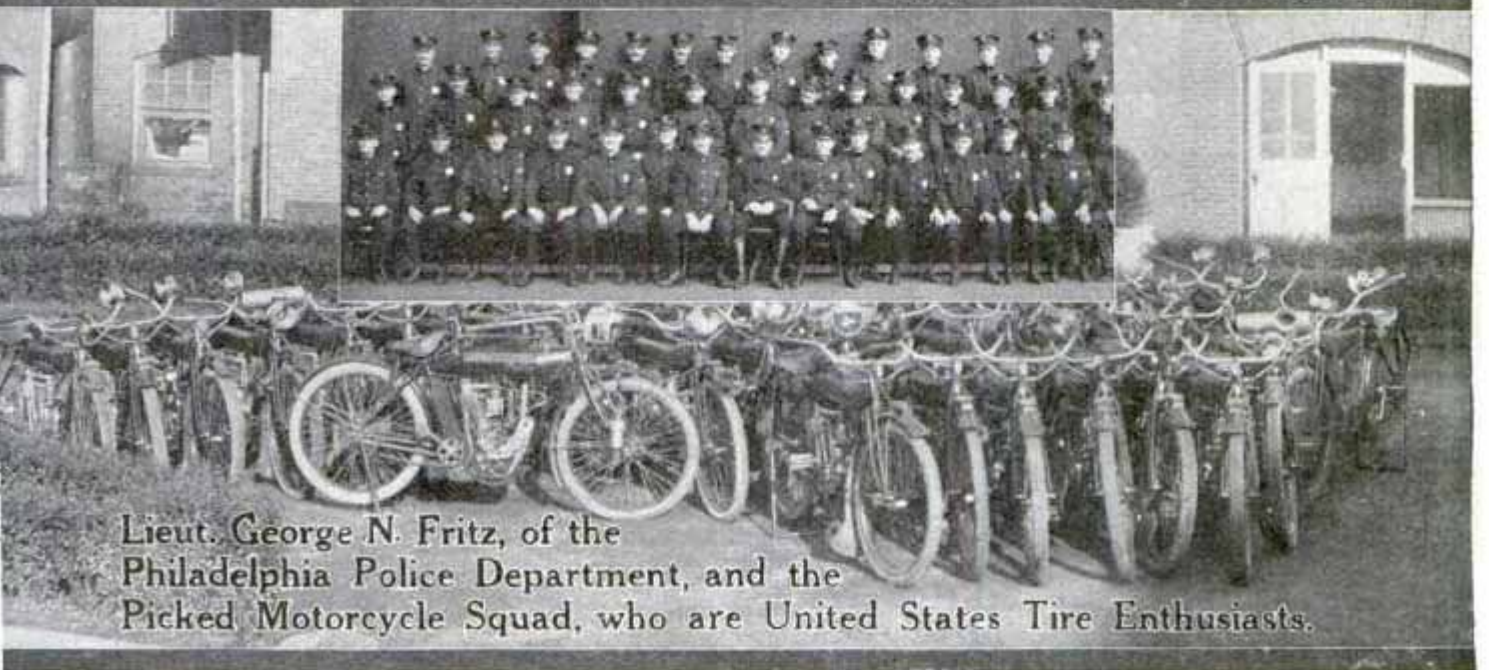
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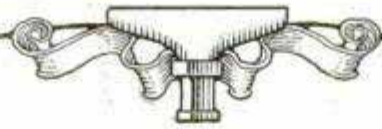
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Herr Wendel, in *The German Diet*.

"I refer here to Freiberg. There the entire telephone service is interrupted at 9 o'clock p. m. Five minutes after 9 o'clock it is impossible to obtain a telephone connection."

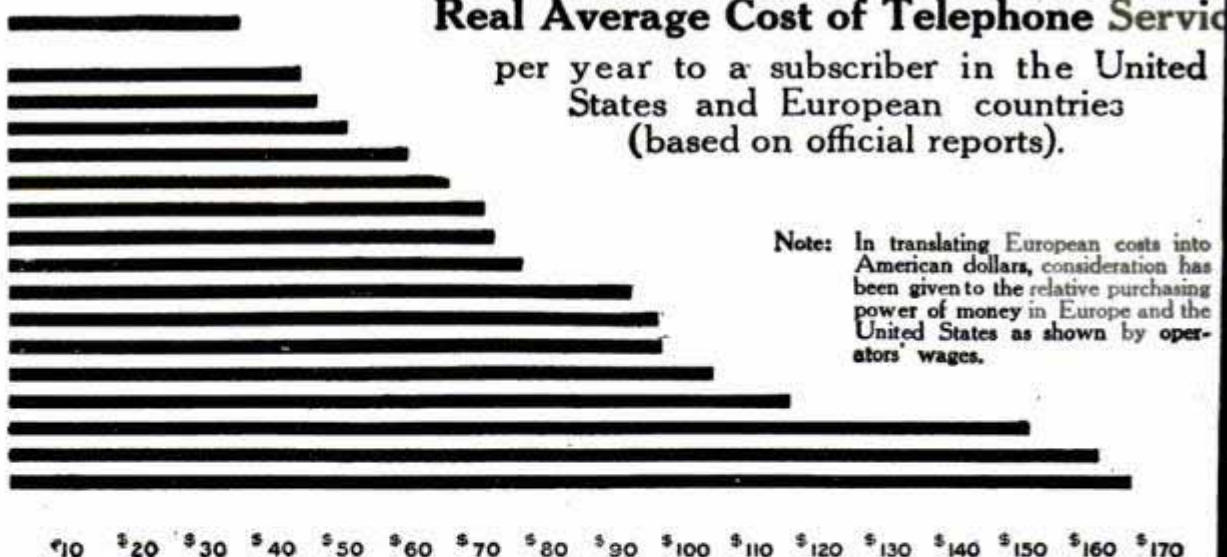
Herr Haberland, Deputy, in the Reichstag

"The average time required to get a connection with Berlin is now 1½ hours. Our business life and trade suffer considerably on account of this lack of telephone facilities, which exists not only between Düsseldorf and Berlin and between Berlin and the West but also between other towns, such as Strassburg and Antwerp, etc."

Dr. R. Luther, in the *Dresdner Anzeiger*

"In the year 1913, 36 years after the discovery of the electro-magnetic telephone, in the age of the beginning of wireless telegraphy, one of the large cities of Germany, Dresden, with half a million inhabitants, is without adequate telephone facilities."

- UNITED STATES
- SWITZERLAND
- NETHERLANDS
- NORWAY
- SWEDEN
- RUSSIA
- DENMARK
- GREAT BRITAIN
- GERMAN EMPIRE
- FRANCE
- ITALY
- HUNGARY
- AUSTRIA
- BULGARIA
- BELGIUM
- SPAIN
- PORTUGAL



Note: In translating European costs into American dollars, consideration has been given to the relative purchasing power of money in Europe and the United States as shown by operators' wages.

**These are the reasons why there are twelve times as many telephones for each hundred persons in the United States as in Europe.**



**AMERICAN TELEPHONE AND TELEGRAPH COMPANY  
AND ASSOCIATED COMPANIES**

**One Policy**

**One System**

**Universal Service**

Please Mention Popular Mechanics



## The Up-to-date Farmer

knocking about his place finds a mighty big lot of pleasure in a chew of "PIPER." There's something about the open air, the stimulating life of the country that calls for a rich, satisfying chew. And he uses

# PIPER Heidsieck

CHEWING TOBACCO—Champagne Flavor

This is the tobacco that has that famous wine-like flavor. There's no other like it in the world!

PIPER Heidsieck is beyond the shadow of a doubt the *highest grade* of chewing tobacco on the market. It is made by experts who have demonstrated that the leaf used in "PIPER" is the *ripest and mellow-*

*est* that nature can grow and the craft of man improve.

This selection of the best leaves from the cream of the world's crop gives "PIPER" its wonderfully *satisfying and lasting taste*.

Try chewing "PIPER" for a week or two and you will never use any other.

**FREE** Send 10 cents and we will send a full-size 10 cent cut of "PIPER" in a handsome leather pouch FREE to any address in U. S. Also a little folder telling about PIPER Heidsieck tobacco. The tobacco, the pouch and mailing expenses will cost us 20 cents and we are glad to spend the money to get you to try "PIPER." We know that once you have started, you will become a permanent friend of this wonderfully wholesome, healthful and satisfying tobacco. In writing please give name of your tobacco dealer.

Sold by dealers everywhere, in all size cuts from 5c up—also in handy 10c tin boxes

THE AMERICAN TOBACCO COMPANY, Room 1168, 111 Fifth Ave., New York City

# 3-IN-ONE OIL MAKES

The Strop  
Softer—



The Razor  
Keener—



The Shave  
Smoother



It's your face. Why abuse it with a razor that pulls, scrapes and starts the hairs to growing under your skin? What's the sense of that?

Save your face, razor and temper and have perfect joy shaves by always doing this before and after shaving.

Draw your "safety" or "ordinary" blade between your thumb and forefinger, moistened with a little 3-in-One oil. Also put a few drops on your strop or automatic stropping device. Then strop as usual and secure keenest barber edge. Your razor will glide over your face as smoothly as silk. 3-in-One also prevents the soap from burning or itching. There's a scientific reason for all this—the "Razor Saver" bulletin, sent free, explains it to you, and shows you how to really take care of your razor.

**NOW, DON'T SCOFF.** Fill out the coupon and try some 3-in-One Joy Shaves, free! Judge for yourself.

*Library Slips packed with every bottle.* Each slip is worth the equivalent of 5c on every dollar you spend for 3-in-One. Save the slips. 3-in-One is sold everywhere in 3 size bottles: 1 oz., 10c; 3 oz., 25c; 8 oz., ½ pint, 50c. Also in new patented Handy Oil Can, 3½ oz., 25c. This is the real Handy package for shavers—always ready—patented spout—can't leak. If your dealer hasn't Handy Oil Cans, we will send you one full of 3-in-One, by Parcel Post, for 30c in stamps.



**Three-in-One  
Oil Co.,**

42 CNR. Broadway,  
NEW YORK

Send me, without one cent of cost, a generous sample of 3-in-One, "Razor Saver" Bulletin and the 3-in-One Dictionary—all free.

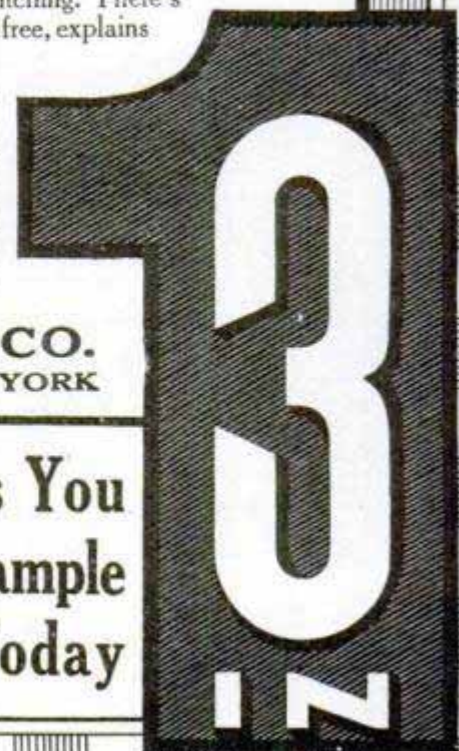
Name.....

Street and No.....

City..... State.....

**THREE-IN-ONE OIL CO.**  
42 CNR. Broadway NEW YORK

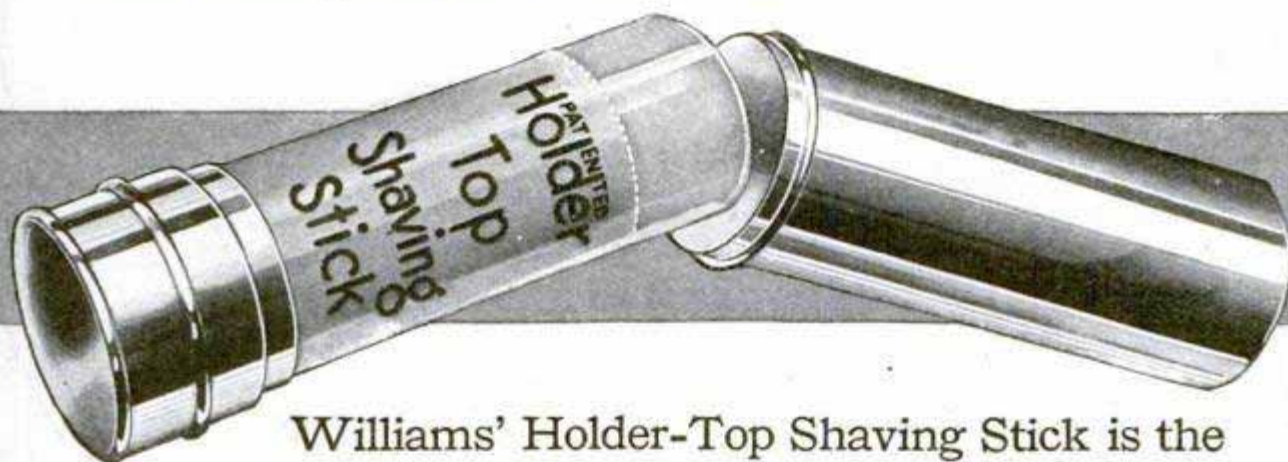
**This Coupon Brings You  
a Generous FREE Sample  
Fill it Out Send Today**



# Williams'

## PATENTED Holder Top Shaving Stick

Nothing ever touches this soap but your face. You hold the shaving stick by the metal holder, which allows you to use the last available bit of soap as conveniently as the first.



Williams' Holder-Top Shaving Stick is the last word in convenience and economy. Add to these qualities the absolute purity of the soap and its rich, creamy, lasting, abundant lather and you have a shaving luxury that is unsurpassed.

THREE OTHER FORMS OF THE SAME  
GOOD QUALITY:



Stick

Cream

Powder

Williams' Shaving Stick Hinged-Cover  
Nicked Box

Williams' Shaving Powder Hinged-Cover  
Nicked Box

Williams' Shaving Cream (in tubes)

A miniature trial package of any one of these four shaving preparations will be sent postpaid for 4c. in stamps.

THE J. B. WILLIAMS COMPANY  
Dept. A Glastonbury, Conn.

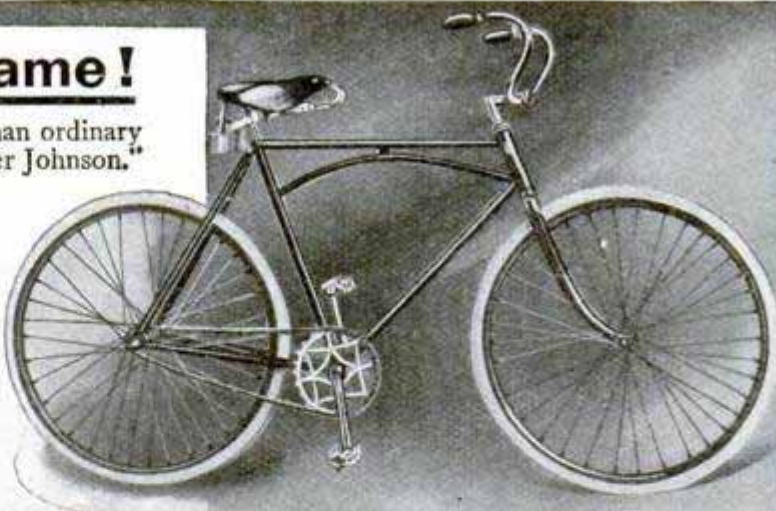
WILLIAMS' JERSEY CREAM SOAP and our extensive line of Toilet soaps have the same softening, creamy, emollient qualities that have made Williams' Shaving Soaps so famous. Ask your dealer for them.

## You Pay for the Name!

The Iver Johnson costs about \$5 more than ordinary bicycles. You pay that \$5 for the name "Iver Johnson."

For if the prestige of our name were not at stake we could use welded instead of seamless tubing; castings instead of drop forgings; hastily tempered bearings instead of the finest bearings that ever went in a bicycle; cheap paint and varnish instead of five coats of hand-rubbed enamel.

You pay \$5 extra because the name "Iver Johnson" guarantees a standardized, well made, fast and durable bicycle. Prices, \$30 to \$55. Juveniles, \$20 to \$25.



# IVER JOHNSON

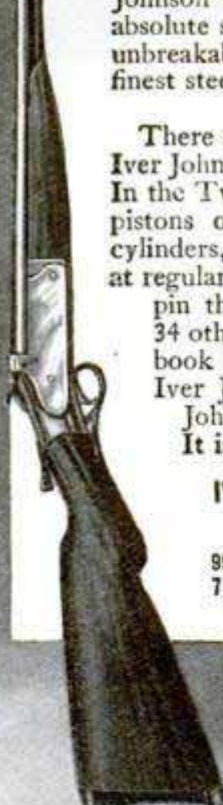
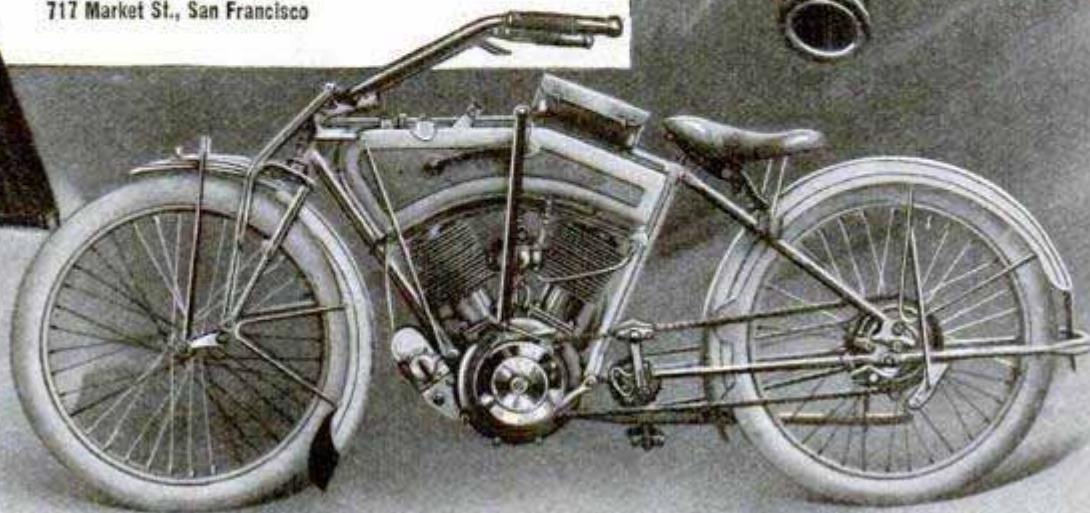
The same argument holds good on Iver Johnson Revolvers.

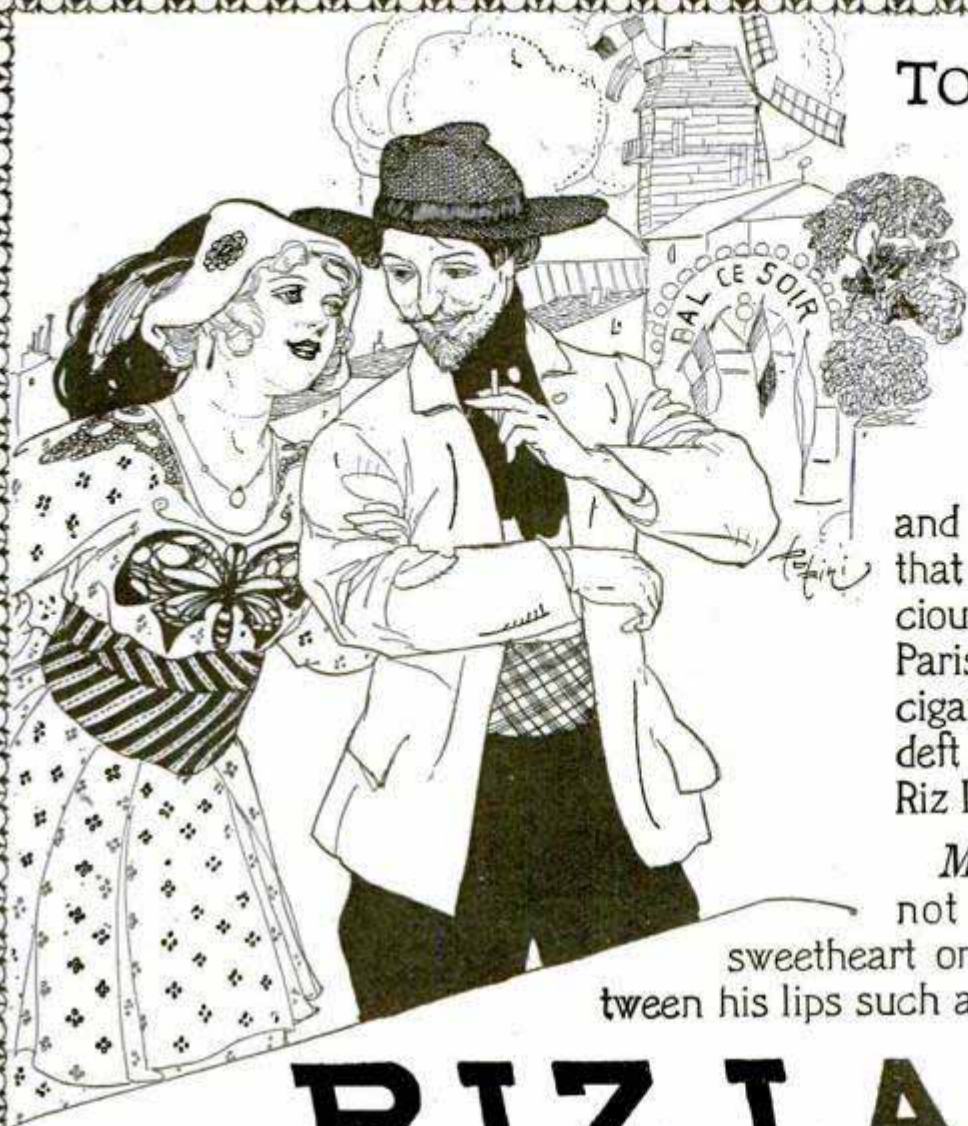
You can buy for much less a revolver that is just as shiny, hard and heavy as the Iver Johnson. You pay the difference because you know that the name "Iver Johnson" stamped on the barrel assures you of absolute safety, positive accuracy, a full equipment of unbreakable, permanent tension wire springs and finest steel and workmanship.

There are 35 points like the following wherein the Iver Johnson Motorcycle differs from other machines. In the Twin motor there are two crank pins. Both pistons occupy relatively the same positions in the cylinders, with the result that the power strokes come at regular intervals. In other motors with one crank pin the power strokes are at irregular intervals. 34 other superiorities are explained in our 82-page book (stiff board covers). This book also tells of Iver Johnson Safety Automatic Revolvers, Iver Johnson Champion Shotguns and Bicycles. It is free.

**IVER JOHNSON'S ARMS & CYCLE WORKS**  
307 River Street, Fitchburg, Mass.

99 Chambers Street, New York  
717 Market St., San Francisco





## TOUJOURS GAI!

"Always gay!"

Such is the motto of Paris, from the dance mill on the hill (the Moulin de la Galette on Montmartre) to aristocracy in the Bois; and part and parcel of that gaiety, light, fugacious, aromatic, is the Parisian's cigarette—the cigarette rolled by his deft fingers in the paper Riz La Croix.

*Mais oui!* Who could not be gay with his sweetheart on his arm, and between his lips such a cigarette?

# RIZ LA CROIX

(Pronounced: REE-LAH-KROY)

## FAMOUS CIGARETTE PAPERS

have instigated the new *mode*: the making of your own cigarettes from your own favorite tobacco, rolled in these exquisite papers.

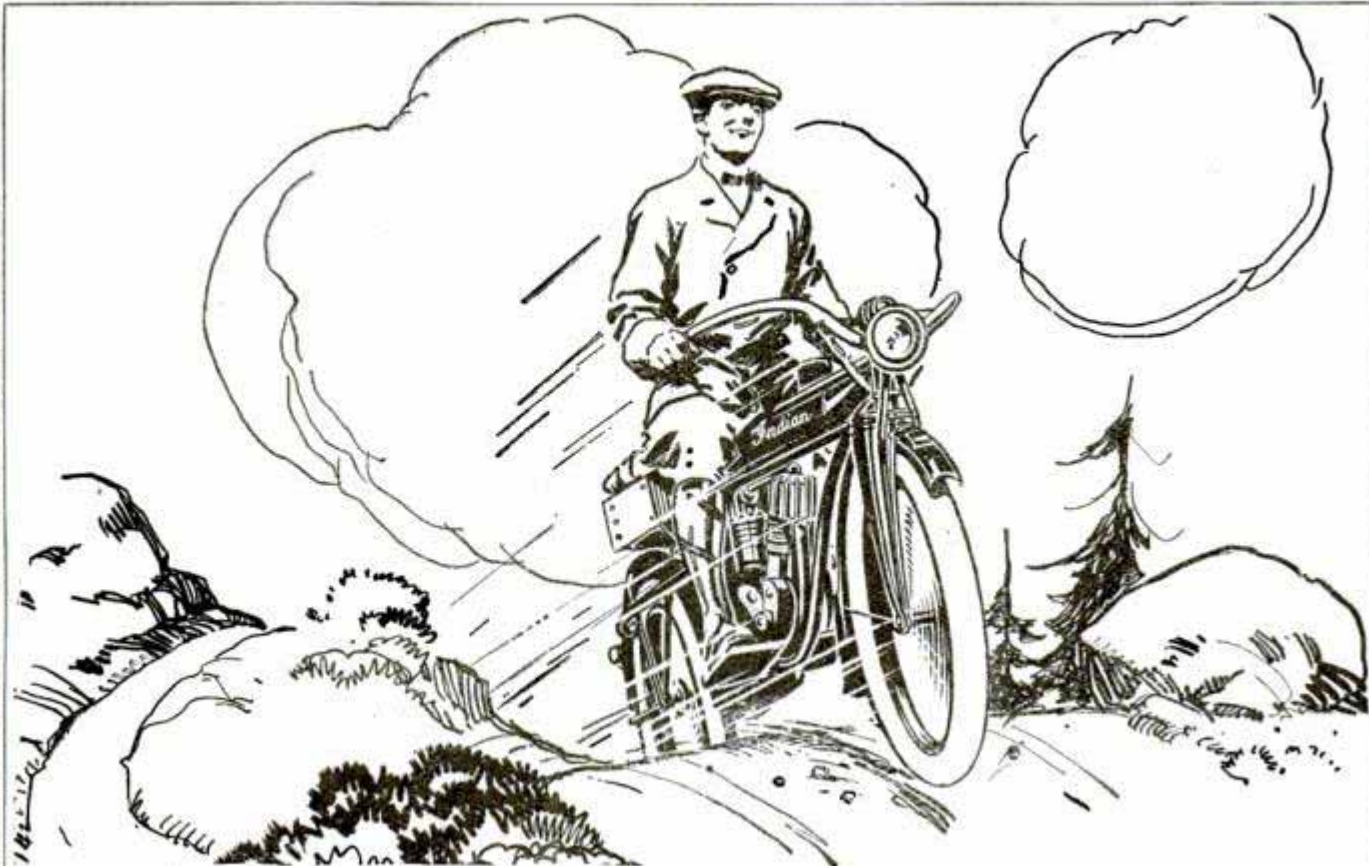
Paris has set the fashion; the rest of the world follows cheerfully.

Riz La Croix are the lightest—thinnest—finest—strongest cigarette papers in the world.

With them you can make the *perfect* cigarettes—of your own tobacco, always fresh, always exactly to your liking.



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**All Roads are Level Roads  
to the**

# *Indian* Motorcycle

"Rushing" a hill is an unknown experience to the Indian rider. "A twist of the wrist" silently gives the command to the motor for more power. And the power is there. It responds instantly. The rider feels that peculiar "bite"—a thrilling, assuring sensation of the answering motor!—and then the speed deftly picks up—picks up—picks up—without a moment's hesitation. The steepest grade offers no trouble to the Indian-mounted man.

Rough roads, too, mean nothing to the Indian tourist. With his machine fitted with footboards and that incomparable, inimitable comfort feature, the Cradle Spring Frame, shocks and jars are dispelled. Indian riding is smooth riding, whatever the condition of the highway.

*With stupendous power—with perfected comfort devices—all roads are level roads to the Indian*

Write for the 1914 illustrated Catalog showing models priced from \$200 to \$335 F. O. B. Factory

**Hendee Manufacturing Co., 816 State St., Springfield, Mass.**

*(Largest Motorcycle Manufacturers in the World)*

Branches and Service Stations

Chicago Dallas Kansas City Minneapolis Denver San Francisco Atlanta Toronto Melbourne London





## He Mops In Misery Without B.V.D.

**A** TYPICAL summer day—a typical office scene—a round of smiles at the mingled *discomfort* and *discomfiture* of the man who hasn't found out that B.V.D. is "*the first aid*" to coolness. *You*, of course, have B.V.D. on or ready to put on. If not, march to the nearest store and *get it*.

For your own welfare, fix this label firmly in your mind and make the salesman *show* it to you. If he can't or won't, *walk out!* On every B.V.D. Undergarment is sewed

*This Red Woven Label*



*(Trade Mark Reg. U. S. Pat. Off. and Foreign Countries)*

B.V.D. Coat Cut Undershirts and Knee Length Drawers, 50c., 75c., \$1.00 and \$1.50 the Garment.

B.V.D. Union Suits (Pat. U. S. A. 4-30-07) \$1.00, \$1.50, \$2.00, \$3.00 and \$5.00 the Suit.

**The B.V.D. Company,**  
NEW YORK.

London Selling Agency: 66, Aldermanbury, E. C.

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O-G  
Spring  
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O-G  
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Caementum is a liquid porcelain cement which sets rapidly and becomes absolutely insoluble. It is impervious to steam, water, heat or acids. It repairs everything from the finest china and glass to steam pipes and automobile radiators. With it you can build missing parts of china articles, stop leaks in pots and pans, repair woodenware or metals. Its uses are almost unlimited. It is made in France and is the only preparation of its kind on sale in America.

At dealers or by  
mail postpaid **25c**  
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Dept. A BALTIMORE, MD.  
Sole Agents for U. S. and Canada

AMERICAN CORN IN ENGLAND—There are indications that the old prejudice against green corn as a staple article of food is giving way in England. Sweet corn, on the cob and canned, is appearing on tables, and canned corn is displayed in grocers' windows. Up to

## Shirley President Suspenders

Light as down on  
tender shoulders

50¢

"Satisfaction or money back"  
Be sure "SHIRLEY PRESIDENT" is on buckles  
The C. A. Edgarton Mfg. Co., Shirley, Mass.

## There's Money in Agricultural Blasting

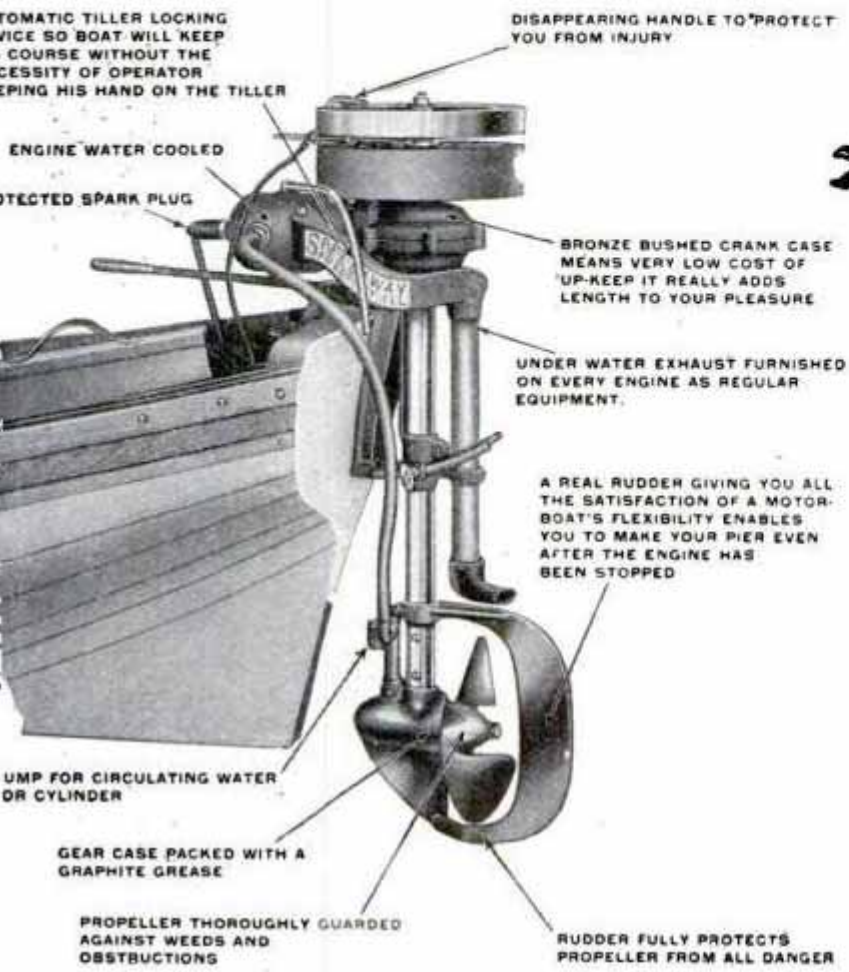
WE TEACH YOU FREE

Our extensive national advertising yields thousands of inquiries from farmers, orchardists, etc., who need blasters to clear land, blast ditches, holes for tree planting, tight subsoils, etc. More than twenty million pounds of agricultural dynamite used in 1913. We refer all inquirers to nearest blaster, supply free advertising matter and help you get the business. We want to start in this independent business, reliable men who have \$200 capital for tools, magazine, and running expenses. Write for free booklet No. 248-B.



Agricultural Division, Du Pont Powder Company, Wilmington, Del.

**\$50—** (manufacturers cost plus 10%) buys a **\$70**



**Speedaway**  
*Detachable*  
**Rowboat Motor**

fully equipped with a noiseless underwater exhaust, automatic self-locking tiller, accident preventing crank-handle, protected spark-plug and circulating water-cooling cylinder pump.

**We Eliminated Dealers**

The Speedway sold at \$70.00 through dealers until now, but our dealers wanted larger profits, allowances for local advertising, special printed matter and other concessions.

The manufacturing cost of this \$70.00 motor would not justify these demands, so we **eliminated the dealer entirely**, and inaugurated the Factory to Consumer Plan whereby

cycle 2 h. p. reversible motor, speed of 8 to 10 miles per hour. Completely equipped with noiseless underwater exhaust, automatic self-locking tiller, disappearing crank-handle and protected propeller.

**You Actually Get the Dealers' \$20 Profit**

Only by eliminating the dealer can we sell this \$70.00 Speedway for \$50.00. The Speedway is a Perfect Motor designed and constructed by a \$500,000.00 organization of mechanical experts who have been building machinery for nearly fifty-five years. Its special features for which you pay nothing additional are **noiseless underwater exhaust, self-locking tiller, disappearing crank-handle, protected spark-plug, water-cooling cylinder pump** and a **real rudder** which enables you to make a landing after the propeller has stopped.

No matter where you live or where you go, there are streams, rivers or lakes. The Speedway makes these waters a constant source of pleasure which starts before breakfast and ends after the moonlight ride. A child can operate it—simply open the gasoline tank, give the crank handle a turn and you're off forward or reverse—up stream or down—in shallow water or deep—it's only up to you.

**Fill in the Coupon—Mail Now!** and we will re-ceive your Motor for either present or future delivery. Do not delay for while we produce a lot many Speedaways each day, you should get your order at once to insure prompt delivery. Enclosed money order or draft for \$12.50—balance C. O. D. Mail the Coupon NOW—the rivers and streams are open and Summer is coming fast.

**COUPON** P. M. May

Speedaway Boat Motor Co.,  
 165 Chicago St., FREEPORT, ILLINOIS

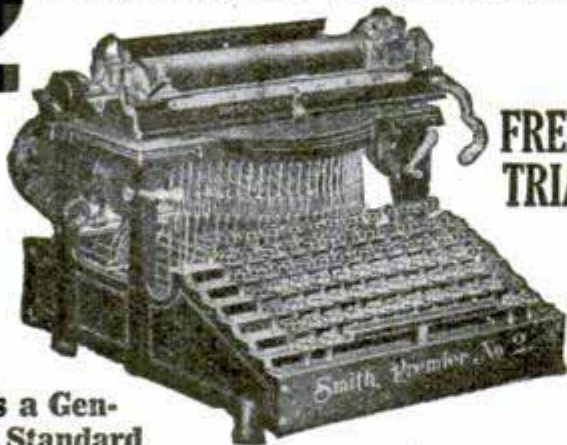
GENTLEMEN: { draft }  
 Enclosed find { money order } **\$12.50** to apply  
 on one complete motor. Ship C. O. D. \$37.50  
 (now) by { express. }  
 { freight. }

Name .....

Address .....

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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. Cash price \$27.40. Thousands of people have paid \$100.00 cash for Smith-Premiers. It's standard, by many considered the best typewriter ever built. A key for each character, so each character is always the same, a type brush for cleaning the type built into the machine; the tilting carriage throws all previous writing in plain sight of the operator. Comes to you with two color ribbon, complete operating instructions, tools, waterproof cover, practice paper, everything, ready. It runs beautifully. Writes as perfect and clean cut a letter as quickly and easily as any machine bought for \$100.00. It's wonderfully simple, a child can operate it with half an hours practice and rapidly attain speed. It's strongly built and will give you years and years of honest service and complete satisfaction.

**Send the Coupon and We Will Ship You this Smith-Premier Typewriter**

When the typewriter arrives, deposit with the express agent \$8.80 and take the typewriter three days and try it. If you find it to be the best typewriter you ever saw, satisfactory in every respect, keep it and send us \$2.00 each month, until our special price of \$26.80 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.

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This coupon states the terms. Fill it out, send it now, today. You can't lose, and it's the greatest economical typewriter opportunity you will ever have.

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Ship me a No. 2 Smith-Premier, f.o.b. Chicago, as described in this advertisement. I will pay you the \$20.00 balance of the special \$28.80 purchase price, at the rate of \$2.00 per month. The title to remain in you until fully paid for. It is understood that I have three days in which to examine and try the typewriter. If I choose not to keep it I will carefully repack it and return it to the express agent. It is understood that you give the standard guarantee for one year.

Name .....

Address .....

Pop. Mech. May

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recent period, an attempt to offer green corn in form for sale in England, or even to speak of it a desirable article of food, met with ridicule, except am

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Biggest, quickest seller ever offered agents. Sell sight. Nothing else like it. No keys to lose, knobs to turn, no clicks to count. Simply push buttons and lock flies open. 40,000 different combinations, 100,000 in use. Operated as easily dark as daylight. Big demand. Agents make 100% profit. No competition. Write quick for

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Examples:	Schaefer Upright	\$140	Hallet & Davis	\$1
Briggs Upright	90	Hinz Upright	145	Kimball Upright
Coiby Upright	90	Fisher Upright	165	Steinway Upright
Emerson Upright	110	Whitney Upright	185	Kimball Upright
Decker Bros. Upr't	135	Chickering Upright	175	Knabe Upright

We ship anywhere to reliable people on easy payment terms. Write Today For Complete List, Prices, and Terms and Beautiful Illustrated Musical Herald **FREE**, and catalogue New Kimball Pianos.

**W. W. KIMBALL COMPANY, 1295 Kimball Hall, Chicago,**

## \$19.50 BUYS THIS ENGINE

Your boy wants this H. P. Gas Engine. Practical and reliable—operates with gas or gasoline. Will run small dynamo, lathe, drill, coaster, wagon, cream separator or washing machine—useful and instructive. Price \$19.50. Write for circular and prices on larger engines.

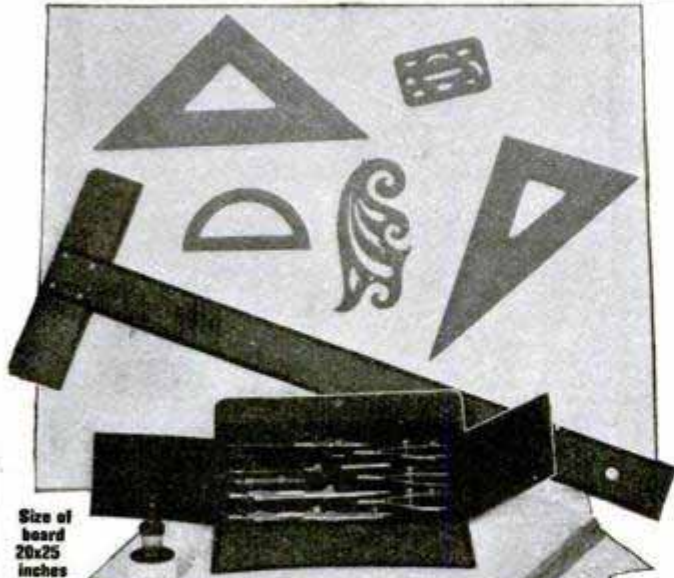


**SIEVERKROPP ENGINE CO.**

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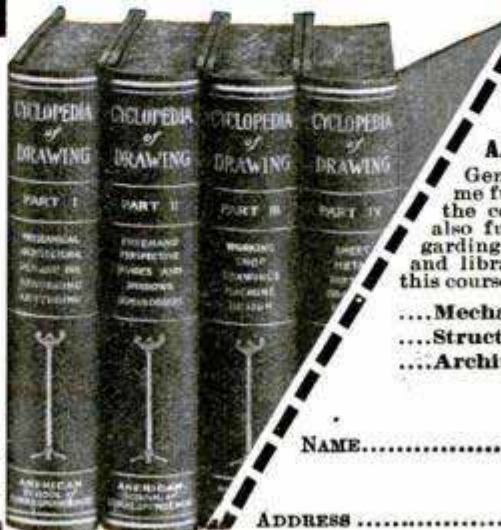
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Pop. Mech. 5-14

NAME.....

ADDRESS.....

Please Mention Popular Mechanics



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Here at last is the very Camera the world has waited for—just the camera you have always wanted. No experience needed to make pictures with our sure-shot picture-taker. This new, amazing invention enables any man, woman—yes, even children—to make finished post card photos in one minute. Think of it! Finished pictures made in a minute's time—taken and finished right on the spot.

## The "Mandel-ette"

A new one minute camera. Gives all the joys of picture-taking without the usual labor and expense. Does away with films and plates—trays, tanks and trouble. No inconveniences. No fuss or muss. The "Mandel-ette" cuts down the cost of making finished pictures to one-tenth of what it costs with the ordinary camera. No developer worries. No usual expensive camera accessories. The greatest camera invention of our age. Your vacation is not complete unless you have a "Mandel-ette." Use it for all occasions. You simply can't afford to be without it. Read this

## Special Money Back Offer

We are the inventors and manufacturers of the "Mandel-ette," patterned after the famous "Mandel" Camera. We sell it direct to you at rock bottom price. We want everybody to own a "Mandel-ette" so we make you this special money back offer. Order your outfit right from this ad; make pictures with it by following our simple instructions, and if you find that the "Mandel-ette" will not do everything that we claim for it, send it back and your money will be refunded. Isn't this a fair offer?

## \$5.00 Complete Outfit Free Book

(Add 50c for Parcel Post)

This outfit includes the Mandel-ette" Camera and everything that is needed to make 16 finished post card photos. You begin making finished pictures as soon as outfit arrives. No waiting. If you want a tripod, send \$1 additional. Extra post cards, 25c per package of 16. Send postal or express money order, draft or personal check. Don't wait. Order your outfit right from this ad. Do it now.

Write for this book. Learn all about this new and wonderful process of taking and finishing pictures in one minute. Realize what a big advantage the "Mandel-ette" gives you over the ordinary camera. Consider the time and money you can save. You can make money too by selling these one minute pictures. Each finished picture costs you 1 1/2 c, sells for 10c. Big profits and great fun await you. Order the "Mandel-ette" whether you want it for pleasure or profit, or send for the book today.

### THE CHICAGO FERROTYPE COMPANY

A173 Ferrottype Bldg. Chicago, Ill. or Dept. A173 Public Bk. Bldg. 89-91 Delancey St. New York, N.Y.

This wonderful camera makes pictures DIRECT ON POST CARDS without films, plates, printing or dark room. Camera weighs about 24 ounces and measures about 4 x 4 1/2 x 6 inches; size of pictures, 2 1/2 x 3 1/2 inches. Loads in daylight with 16 or 50 cards at one time—no dark room necessary. Universal focus lens produces sharp pictures at all distances. Perfect working shutter. Combined "3-in-1" Developer eliminates any other solution. Pictures develop automatically in less than a minute—can't over-develop. Plain instructions with each outfit enable you to begin making pictures the very hour outfit arrives. SEND FOR THE OUTFIT TODAY.

## WE TRUST YOU \$2.95 Brings You This Suit BE WELL DRESSED

Thousands of men have charge accounts with us and take six months to pay. You, too, can have a credit account with us and we want you for a new customer—your credit is good—we'll trust you.



### We Give You 6 Months to Pay Guarantee Satisfaction

Remember, we save you big money on made-to-order clothes that are better in quality than can be bought elsewhere. No matter who you are or where you live, we'll sell you order made clothes on credit.

Stanley-Rogers Show You How to Take Your Own Measurements—Don't Hesitate—It's Easy—Order Blank Shows All.

We have the easiest special system of taking measurements ever used. You'll like it when you see the simple instructions.

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Write for book showing latest styles and fabrics being worn by swell dressers all over the country. Get your copy now. It's Free. Send a postal for it today. Write to

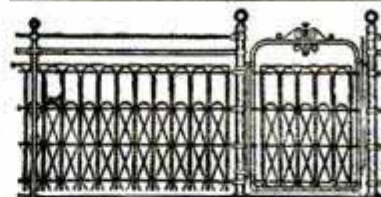
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the more intelligent class. The working class look upon corn as good solely for animal consumption. No however, the nutritious qualities of green corn gradually being admitted and its cheapness as an article of food recognized by all classes. As usual in England the practice of using it is dropping down from the high to the lower class.

The total number of establishments in the silk industry in the United States in 1909 was 852.



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Greatest values ever offered in fences and gates for lawn and cemetery, farm, field and poultry yards. WRITE TODAY FOR FREE CATALOG AND PRICE LIST. DWIGGINS WIRE FENCE CO., 237 Dwiggins Ave., Anderson,

FINDS THEM!
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## SKAT SOAP

Quickly removes grime, grease, dust, etc., from hands, leaving white and soft. Needed in every household, garage, office and factory. A great cleanser—injures nothing, 10c cans everywhere; out if your dealer hasn't it, send his name for free sample.

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AGENTS AND DEALERS  
Write for liberal terms.

## WURLITZER

see years of instrument making

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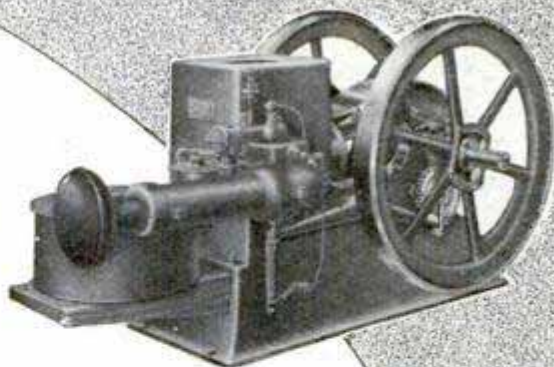
Your name and address is enough. We will send you our big new Band Catalog absolutely free. 250 pages. Thousands of instruments described. Write for it today.

Get any instrument you want on Free Trial. Only a few cents a day. Rock-bottom, direct-from-manufacturer price. We supply the U. S. Government. Generous allowance for instruments. Write at once stating instrument in which you are interested.

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S. Wabash Ave., Chicago



# Engine Prices Again Reduced



**WITTE Kerosene Engine—Stationary**  
Burns Kerosene, Distillate, Solar Oil, Toppings and all fuels of like grades. Also Gasoline, Naphtha and Gas.

My manufacturing advantages, an important one of which is free gas for power, have always enabled me to manufacture and sell a better engine for less money than anyone else in the business.

Recently I have invested many thousands of dollars in specially designed machinery of the latest types for a more rapid production of my engines and these increased factory facilities have made possible another cut in **WITTE Engine** prices while still maintaining the well known **WITTE** quality.

When I started making engines, 27 years ago, the gasoline engine business was new. Today my factory is the only one which has come through successfully under the continuous management of the man under whom it was started. **WITTE** engine-quality is the **only** thing that did it, because I had nothing else to begin with, and have had nothing except what I have earned. I challenge anyone to show stronger proof of reliable engine-quality.

## WITTE ENGINES

Kerosene, Distillate, Gasoline, Naphtha and Gas  
**Look At These Latest Prices**

*DIRECT FROM FACTORY TO USER*

<b>2 H. P. \$34.90</b>	<b>4 H. P. \$69.75</b>	<b>6 H. P. \$99.35</b>
<b>8 H. P. 139.65</b>	<b>12 H. P. 219.90</b>	<b>16 H. P. 298.80</b>
<b>22 H. P. 399.65</b>	<i>Portable and Sawrig styles priced proportionately low</i>	

### 60 DAYS' FREE TRIAL

You can't buy a better engine at any price and none so good for my price! So why pay two prices for any other good engine or take chances on a poor one, or an unknown engine, when the **WITTE** costs so little and saves you all risk? Every **WITTE** Engine is sold direct from my factory to the user. There is no middleman between me and the buyer of a **WITTE** Engine anywhere on earth. You get, direct from me and backed

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You should have a copy of my new Engine Book—the finest in the business. Explains fully my liberal easy terms and sales plans—tells how to judge an engine—how little it costs—how to start it and keep it running. Mail coupon today and I will send you the whole **Witte** story by return mail.

**ED. H. WITTE**  
**WITTE IRON WORKS CO.**  
1743 Oakland Ave., Kansas City, Mo.



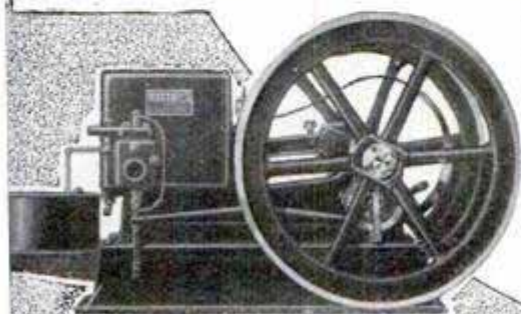
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is doubled—your home made more cozy and attractive—your electric bills cut down—by  
**The D'LIGHT**

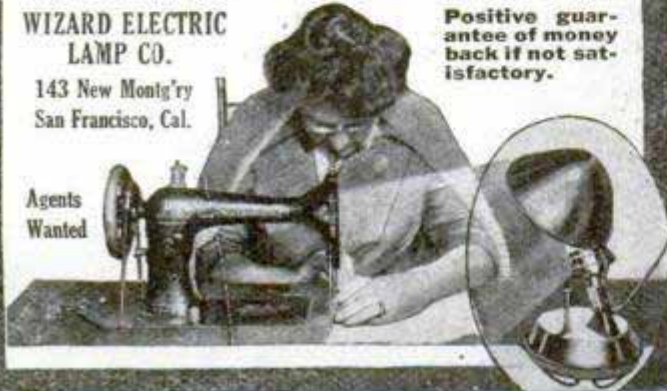
This small portable electric lamp will stick to a mirror. Has an invisible spring clamp that holds it to the back of a chair, head of a bed—anywhere you want the light—an adjustable shade CONCENTRATES THE LIGHT, bringing it directly upon any object. For shaving, dressing, sewing and reading—saves your eyes and light bills—is a COMFORT in homes, offices and stores; a JOY TO TRAVELERS—can be packed in your grip. At dealers. Sent prepaid complete for \$5.00.

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Agents  
Wanted

Positive guar-  
antee of money  
back if not sat-  
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Because we are manufacturers! Own the largest plant of its kind in the world. Not a mail order house or jobbers or wholesalers. We turn the raw materials into finished furniture—and sell Direct. You save every cent of the Dealers' and Jobbers' big profits. What's more, our sectional method—we are the originators—saves 3-4 the packing costs, 2-3 the freight and 1-2 the factory floor and storing space usually required. These are 3 more reasons why you can save 1-2 your furniture expenditure by buying direct. We make everything in home, office or club furniture. Money back guarantee. Write for big book. Learn about the wonderful furniture.

Height, 36 in. Width, 30 in. Depth, 24 in. Price includes cushions and back pillow covered with Marokene leather. Shipping weight, 100 pounds.

Shipped in Easily Assembled Sections.  
It's Play to Put Together This Furniture!



**ROCKER No. 23**  
Retailers' Price, \$18.00  
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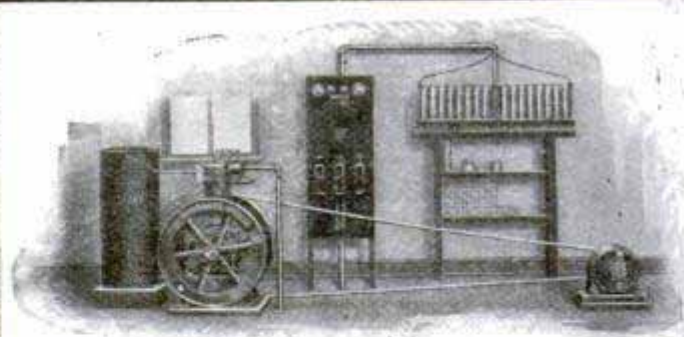
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No. 308**  
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Our Factory Price **\$11.50**

Height 30 ins. Width 28 ins. Length 43 ins. Top 1 in. thick. Legs 2 1/2 in. square. Shipping weight 140 lbs. Write for big book.

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Largest Plant of Its Kind in the World. Originators of the Pattern System of Boat Building

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Every Room in House

Please Mention Popular Mechanics



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Electric Light is easiest on the eyes—clean and absolutely safe. A convenience that can now be enjoyed in the country as well as in the city.

## Fairbanks-Morse Electric Light Plants

are complete independent plants, large enough to supply all the lighting needs of a clubhouse or country home. Set includes Kerosene Engine, Dynamo, Switchboard, and Storage Batteries. Easy to install—easy to care for.

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German foresters are experimenting with Douglas from the United States, trying to find a variety which will combine the fast-growing quality of the Pacific Coast form and the hardiness of the Rocky Mountain form.

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Best bait for attracting all kinds of fish ever discovered. It sure does get 'em! Seems as though they just can't keep away from it. Will keep you busy hauling in the fish. Makes fishing a REAL pleasure. Use Magic Fish Lure and you'll catch a big string every time while the other fellows go home empty-handed. Fishing at your "luck." Good any season. Won't stop. Not unlawful to use. Send 25c for box containing enough for 500 baits. Money back if not satisfied. Valuable catalog sent FREE. Write for it today.

Lotz Bros. 155 N. Main St., St. Louis, Mo.

## Get Your Canadian Home From The Canadian Pacific

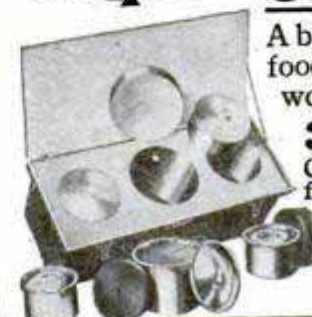
One-twentieth down—the balance in 19 equal annual payments. Good land in Western Canada—every kind of farming—\$11 to \$30 an acre.

## \$2,000 Improvement Loan

20 years to pay—only 6% interest. Best livestock supplied, actual cost. Expert demonstration work at your service. FREE BOOKLETS on Manitoba, Alberta-Saskatchewan, Irrigation Farming. Write today.

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Complete outfit aluminum utensils free. Covers and cooking compartments lined with pure aluminum. Dust-proof, odorless. Write for Free Book and direct-from-factory price.

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# Get Your Canadian Home *from the* Canadian Pacific



The Home-maker



**Y**OUR new home is ready for you in the fertile Canadian West, with its magnificent soil, good climate, churches, public schools, good markets, good hotels, unexcelled transportation. Take 20 years to pay. And call on us for a long time loan of \$2,000 for farm improvements, if you want it.

This land is offered only to farmers or to men who will actually occupy or improve it. We make our prices, terms and development assistance so attractive because we want to interest settlers. Come where you can own 10 acres for every acre you now own or farm; where *every* acre will produce *double* what a worn-out acre produces anywhere. Mother Earth provides no better land than this rich virgin Canadian soil. The enormous crop yield

per acre *proves* this every season.

## We Give You 20 Years to Pay

We will sell you rich Canadian land for from \$11 to \$30 per acre—in irrigation districts from \$35 to \$55. You need pay only *one-twentieth* down. Think of it—only *one-twentieth* down, and the balance in 19 equal annual payments with interest at 6%. Long before your final payment comes due your farm will have paid for itself over and over again. Many good farmers in Western Canada have paid for their farms with one crop. Here are some of the startling features of the most remarkable land offer you have ever read:

## We Lend You \$2,000 for Farm Improvements

This offer of a loan up to \$2,000 is for farm development only, with no other security than the land itself, and shows our confidence in the fertility of the soil and in your ability to make it produce prosperity for you and traffic for our lines. This loan will help you in providing buildings, fencing, sinking well and breaking, and you are given twenty years in which to fully repay this loan. While enjoying the use of this money, you pay only interest at six per cent.

### Advance Live Stock on Loan Basis

The Company, in the case of the approved land purchaser who is in a position and has the ability to take care of his stock, will advance cattle, sheep and hogs up to the value of \$1,000 on the basis of the settler's note with interest at eight per cent, to enable him to develop more rapidly, on the right basis of mixed farming.

### Farm Made Ready by Experts if Desired

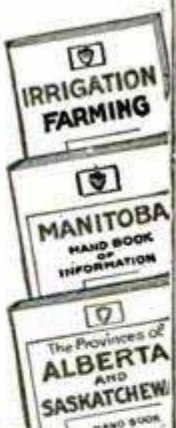
If you want a place already established, select one which our Department of Agricultural Experts has developed. On our improved farms, house and other buildings are up, well is dug, farm fenced, fields cultivated and in crop. All waiting for those who want an immediate start and quick results—all planned and completed by men who know—our own agricultural experts. Take 20 years to pay if you want to. We give *free* service—expert service—the valuable assistance of great demonstration farms, in charge of agricultural specialists employed by the Canadian Pacific for its own farms. This service is *yours—free*.

### This Great Offer is Based on Good Land

The Canadian Pacific offers you the finest land on earth for grain growing, cattle, hog, sheep and horse raising, dairying, poultry, vegetables and general mixed farming—irrigated lands for intensive farming—non-irrigated lands with ample rainfall for mixed and grain farming. Remember, these lands are located on or near established lines of railway, near established towns. And you can start on an irrigated or non-irrigated farm, improved or unimproved.

Your new home and your fortune are ready for you in the famous, fertile Canadian West, with its magnificent soil, good climate, churches, public schools, good markets, good hotels, unexcelled transportation—and 20 years in which to pay for your farm and repay the improvement loan.

Here is the Last Best West—where your opportunity lies. Don't delay. Mail the coupon here at once. The best land will be taken first—so time is precious to you. Write today.



<input type="checkbox"/> Irrigation Farming	<input type="checkbox"/> Book on Alberta-Saskatchewan
<input type="checkbox"/> Book on Manitoba	<input type="checkbox"/> Information on Business and Industrial Opportunities

(Make a cross in the square opposite the book wanted.)  
**G E THORNTON, Colonization Agent,**  
 Canadian Pacific Railway, Colonization Department, 112 West Adams St., Chicago  
 Please send the books indicated above.

Name.....  
 Address.....  
 Town..... State.....

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**Canadian Pacific Railway, Colonization Department**  
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FOR SALE—Town Lots in all growing towns, on lines of Canadian Pacific Railway. Ask for information concerning Industrial and Business openings in these towns.



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Write for  
FREE Book

Electricity or Water-Power Does the Work

Just a "Twist of the Wrist" Starts or Stops the Machine!

The 1900 Motor Washers are now at work in thousands of homes. They are doing the work formerly done by women, at a cost of 2c a week for power! Saving thousands upon thousands of dollars in wash bills. Saving worlds of wash-day troubles. Leaving the women free to do other work while the machines are doing the washing.

## The 1900 Motor Washer

1900 Water Motor Washer  
Can be connected with  
any water tap instantly

Washes a Tubful in Six Minutes!

Handles Heavy Blankets or Dainty Laces

The outfit consists of the famous 1900 Washer with either Electric Motor or Water Motor. You turn on the power as easily as you turn on the light, and back and forth goes the tub, washing the clothes for dear life. Then, turn a lever, and the washer does the wringing. All so simple and easy that it is mere child's play.

**A Self-Working Wringer Sent With Every Washer!**

The motor runs Washer and Wringer. We guarantee the perfect working of both. No extra charge for Wringer, which is one of the finest made. Write for FREE BOOK and 30 Days' FREE TRIAL OFFER! Don't doubt! Don't say it can't be done. The free book proves it can. But we do not ask you to take our word for it. We offer to send a 1900 Motor Washer on absolute Free Trial for an entire month to any responsible person. Not a cent of security—nor a promise to buy. Just your word that you will give it a test. We even agree to pay the freight, and will take it back if it fails to all we claim for it. A postal card with your name and address sent to us today will bring you the book free by return mail. All correspondence should be addressed



Doing the wringing with  
1900 Electric Motor Washer



**1900 WASHER CO., 6145 Court St., BINGHAMTON, N. Y.**  
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Automobile exports from the United States are times as great as a decade ago. Reports of the value of automobiles and parts thereof sent out of the United States in the 11 months ended with November, 1913, justify the statement that the total for the year will approximate \$40,000,000, against less than \$2,000,000 in 1903, a decade earlier. Meantime the imports of automobiles show a marked decline. The total value of automobiles and parts thereof imported in 1909 were nearly \$4,000,000, and in 1913 about \$1,500,000.

### BRASS AND STRINGED INSTRUMENTS

Biggest line of band and orchestra instruments for home use. Cornets, trombones, clarinets, drums, violins, guitars and all wind and stringed instruments. Send for a free catalog of any instrument you may want—we can save you money. We give you a fifty lesson certificate FREE with each instrument. Write today mentioning instrument in which you are interested.

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To educate your children, support a family, pay off a mortgage, buy a home or dress better. Then do as thousands of others are doing. Make money selling World's Star Hosiery and Klean Knit Underwear in your home town.

No previous experience is necessary. We show you how to make money in an easy, congenial and profitable way. Two lady agents began in their home town in California and each made over

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## UTILITY

The ONLY 5-Ply Wall Board

Think of five layers of tough fibre board, cemented into one permanent sheet with hot asphalt under tons of pressure—thoroughly moisture proofed outside. We use 5 layers because it gives us that much more strength than the usual 2 or 3 layers. It is a simple, easy matter to nail Utility to studding and joints, anywhere in the house where plaster could be used. Never chips, checks, cracks or falls off. Takes calomine or flat tone paints beautifully.

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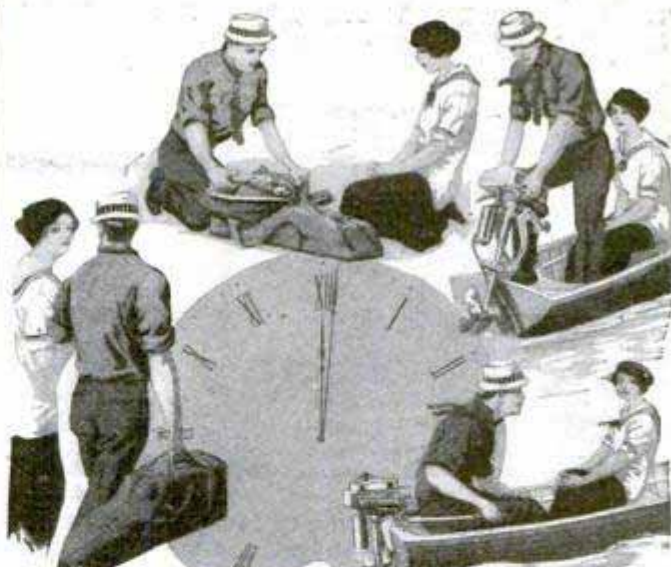
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Rowboat in Less Than One Minute

Turn any rowboat into a motor-boat with an



Starts with one-twelfth  
turn of fly-wheel; no  
cranking.

Drives a rowboat 8  
miles an hour—a canoe  
12 miles.

So simple to operate that women and children are "Evinruding" everywhere. Why not get one for *your* vacation? By special arrangement we have procured as an exclusive feature, the

### Famous Maxim Silencer

and can apply it to either 1913 or 1914 models. The "Evinrude" has always been practically silent in operation, but this addition makes it a veritable triumph. No similar motor can use the Maxim Silencer. It has been added to the already long list of exclusive "Evinrude" features. It is the only marine motor in the world having a

### Built-in Reversible Magneto

This magneto is not affected by rain, waves or even complete submersion. The "Evinrude" is built by the largest manufacturers of rowboat motors in the world. Capacity for 1914, 60,000 "Evinrudes".

Has been adopted by twelve governments, including the U. S. A. Weight about 50 pounds, may be carried like a suit case. For sale at Hardware and Sporting Goods Dealers everywhere.



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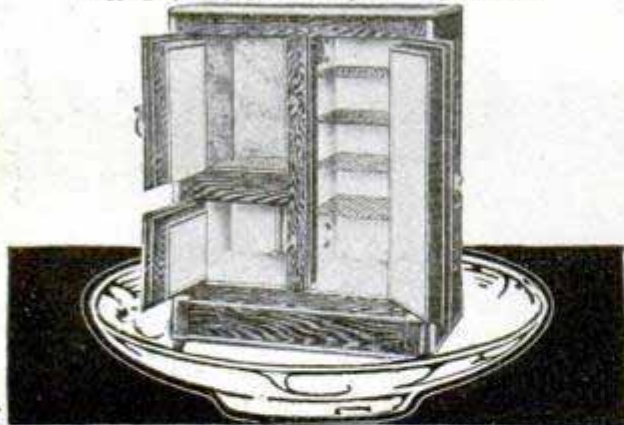
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Please Mention Popular Mechanics

# Like a clean china dish

Copyright, 1914, by Grand Rapids Refrigerator Co.



Superb Porcelain Lined—the delight of every woman's heart—the pride of every housekeeper. Here's that famous Refrigerator with the seamless, scratchless, dish-like lining, the genuine

## Leonard Cleanable

Don't confuse this wonderful sanitary lining with paint or enamel. I will mail you—free—a sample of Leonard Porcelain that will quickly show you the difference. You can't scratch it even with a knife. It's everlasting—easily kept beautifully sweet and clean. You'll never be satisfied with anything else.

Style shown is No. 4, in polished oak case. Size 35x21x45 **\$35.00**

**50 Styles, \$15.00 up; Freight Paid**

to Ohio and Mississippi Rivers. I take the risk; send for catalog today. Money returned if you are not perfectly satisfied. Ask for sample of porcelain and I'll mail my booklet, "Care of Refrigerators." Every woman should have a copy of this valuable book.

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It Really  
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Nothing  
to  
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"THE BEST IRONER"

In fact, you will be money in pocket, figuring the many hours of time and labor you will save 52 weeks a year for many years. Not to mention the easier work, better finish and longer wear of goods ironed.

If you fully realized the many advantages of using the "Simplex" Ironer you would get one immediately as have many thousands of progressive housewives.

The "Simplex" will do the greater part of your ironing. It will iron a table cloth in 3 minutes that would take you 20 by hand and do it better. It will do an average ironing at two to four cents expense.

Six sizes. To heat by gas, gasoline or electricity. To turn by hand, by engine power or motor.

Write for name of our Local Dealer,  
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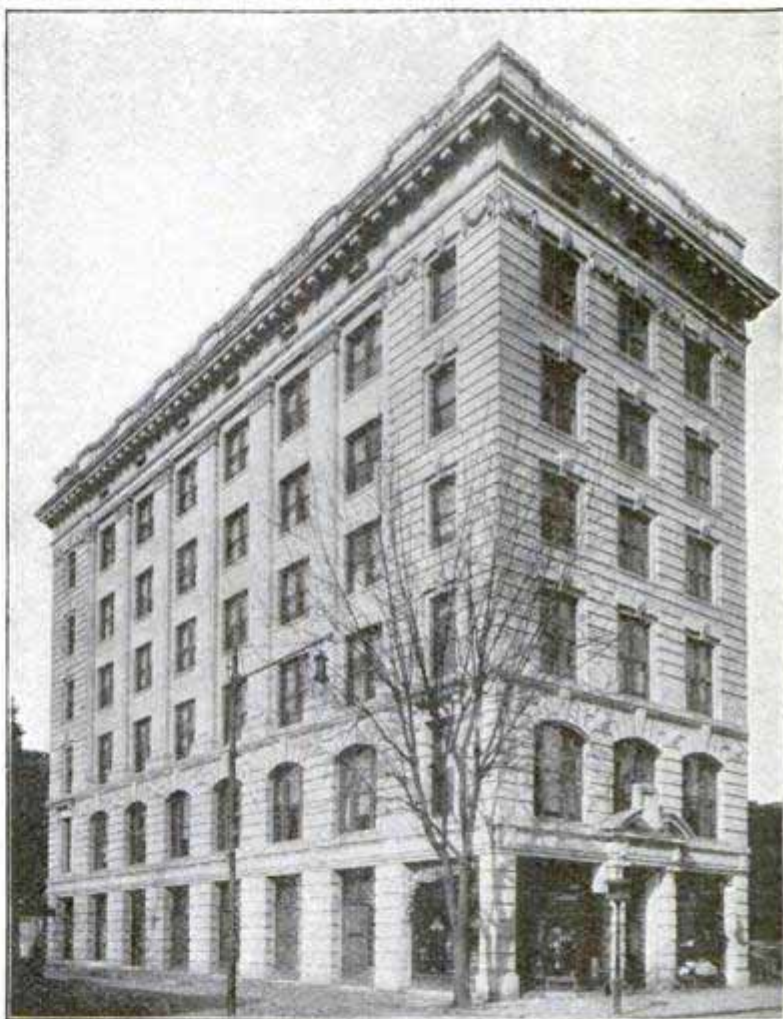
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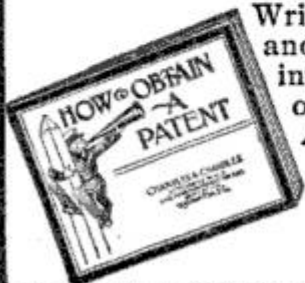
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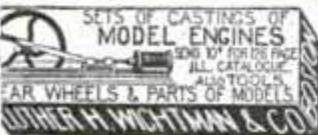
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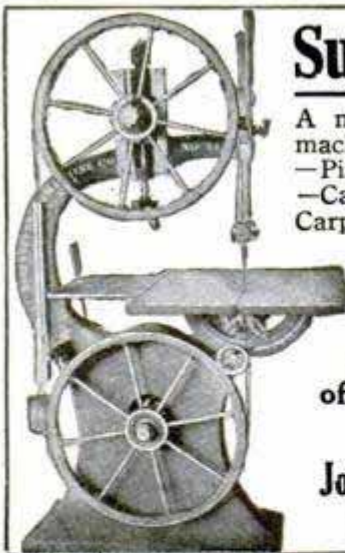
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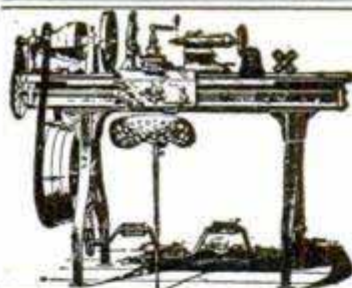


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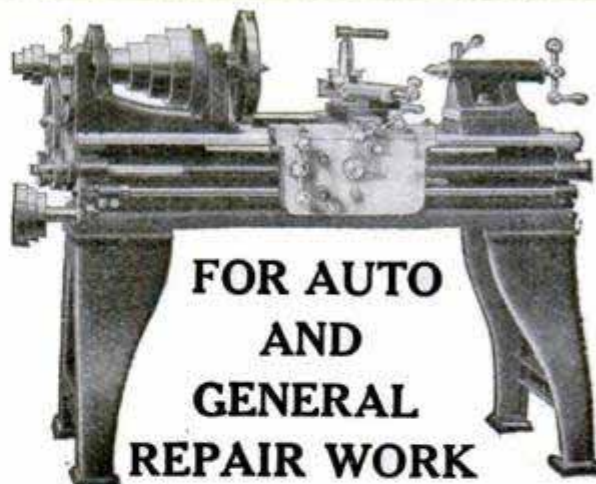
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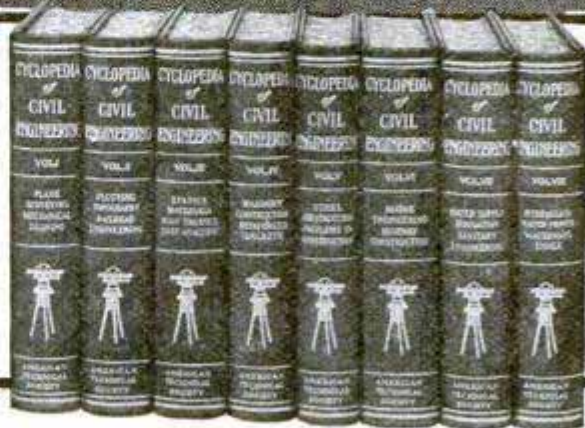
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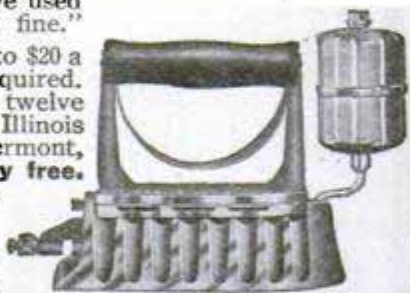


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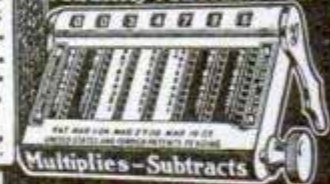
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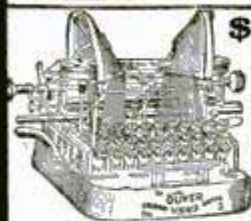
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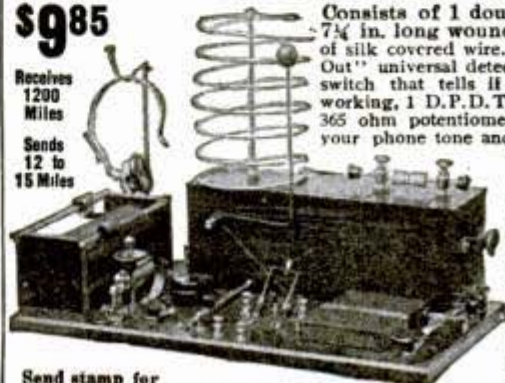
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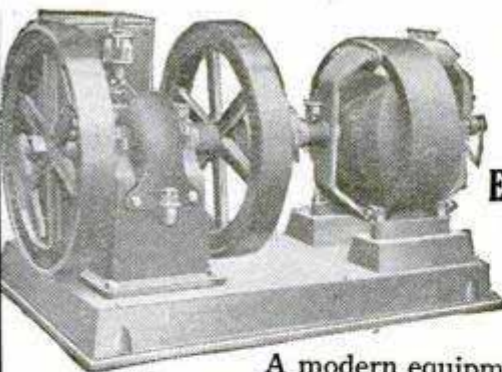
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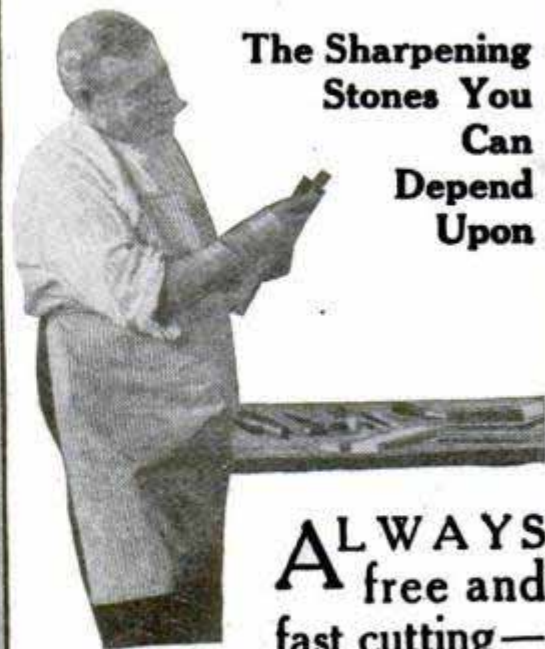
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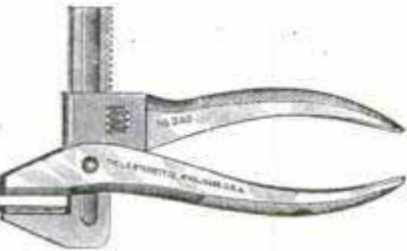
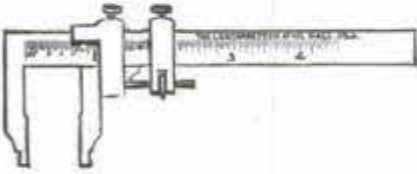
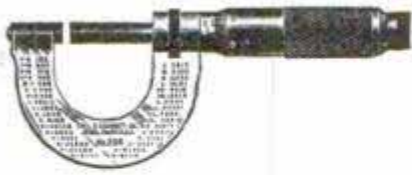
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The measuring tools—rules, gages, caliper-squares, micrometers, vernier calipers, etc., are the last word in accuracy. Work measured with them is right, and the other tools for general purposes, such as the expansion pliers, cut nippers, screwdrivers, etc., are made to give a wide range of service and to last a lifetime. An advertisement can't do Starrett Tools justice.

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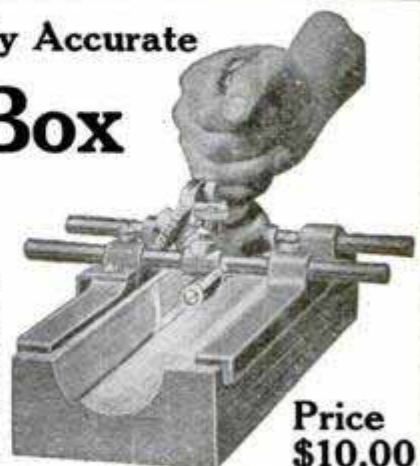


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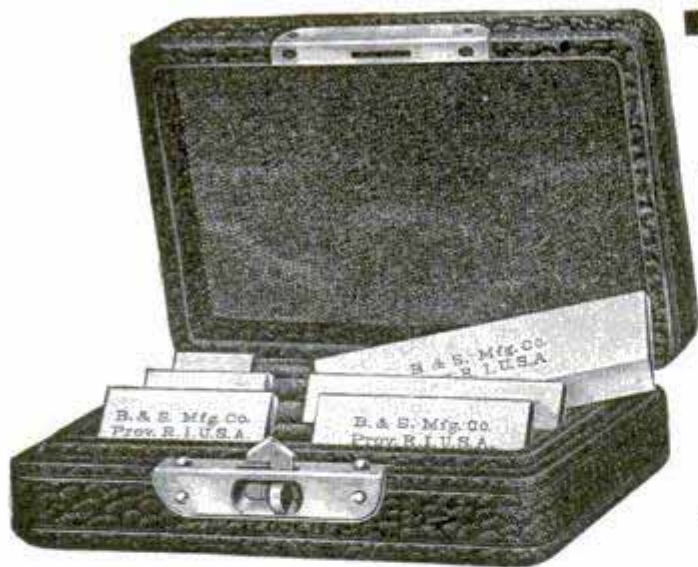
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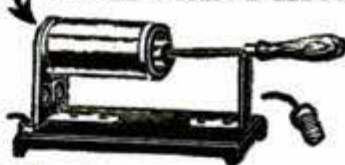
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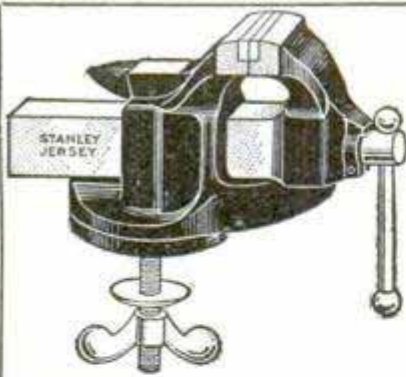
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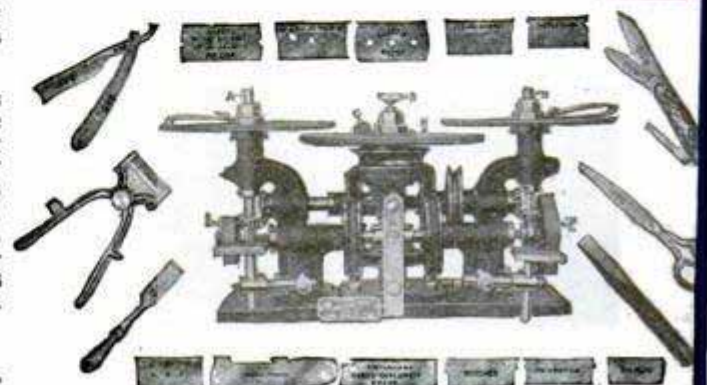
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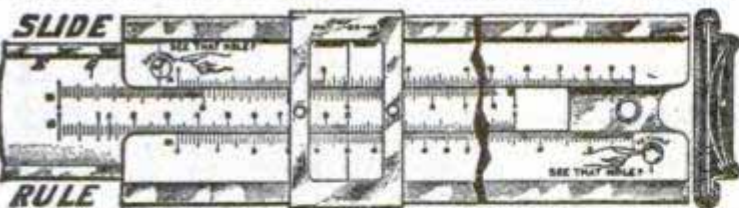
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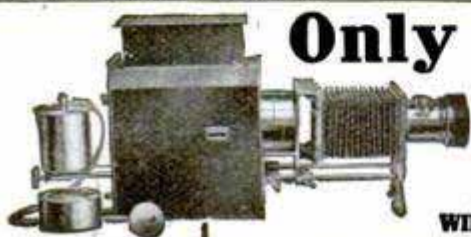
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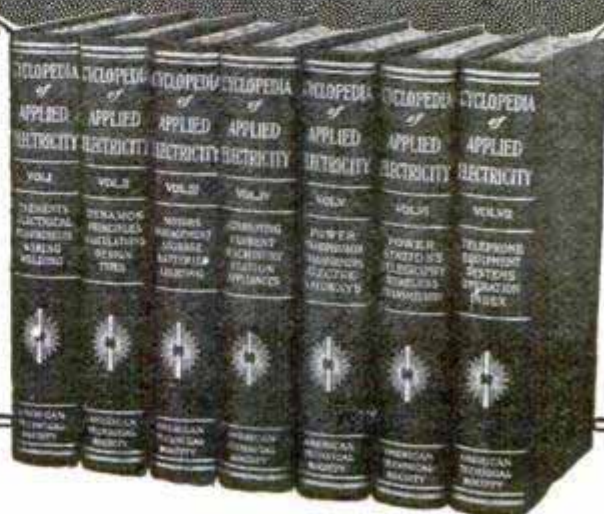
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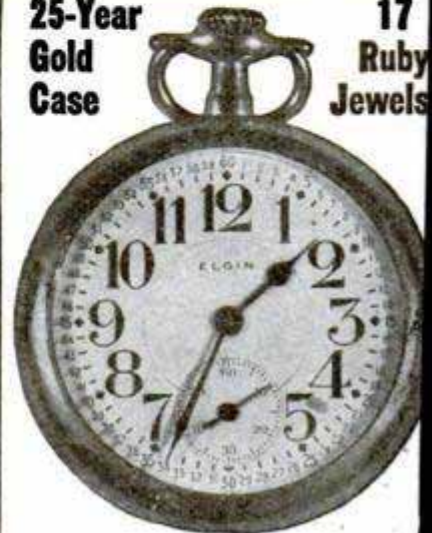
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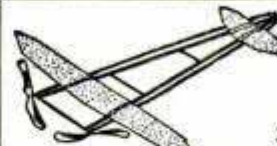
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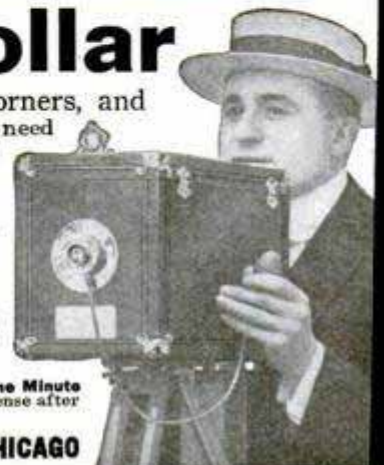
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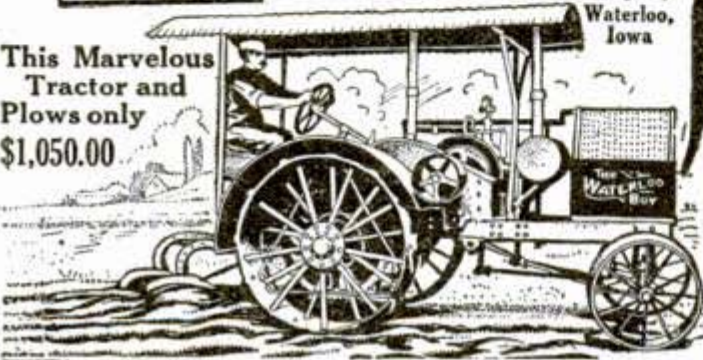
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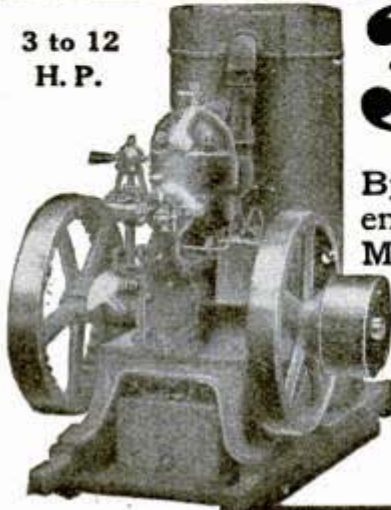
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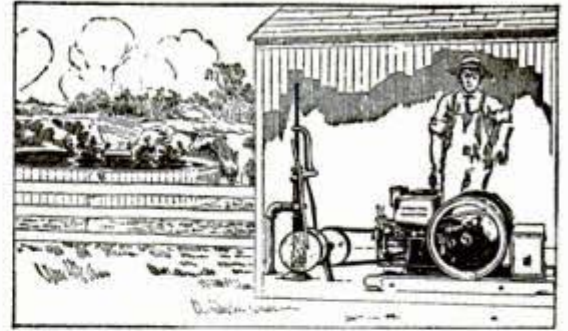
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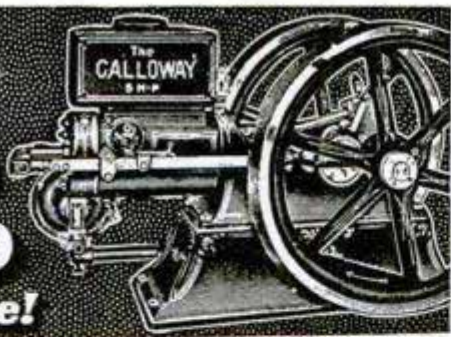
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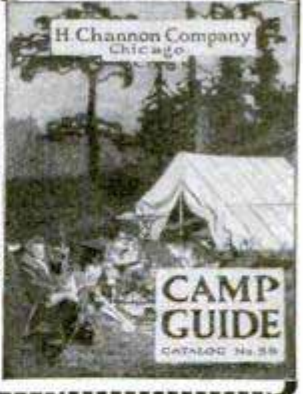
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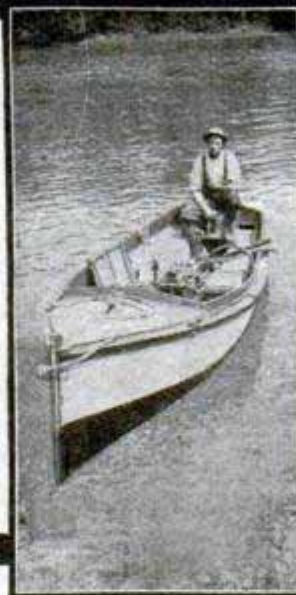
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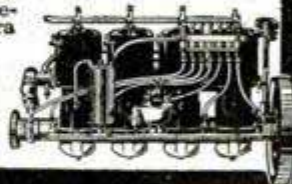
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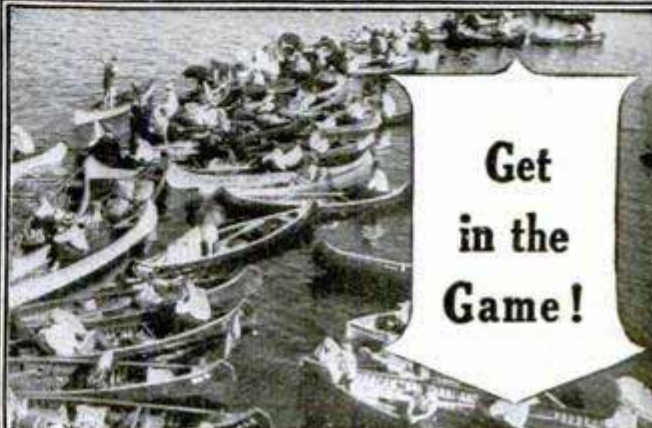
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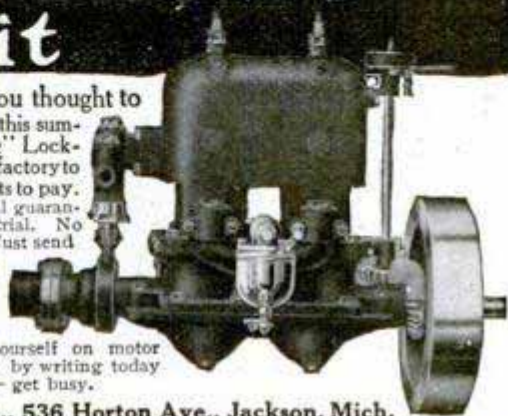
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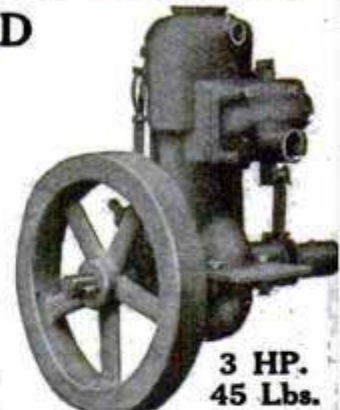
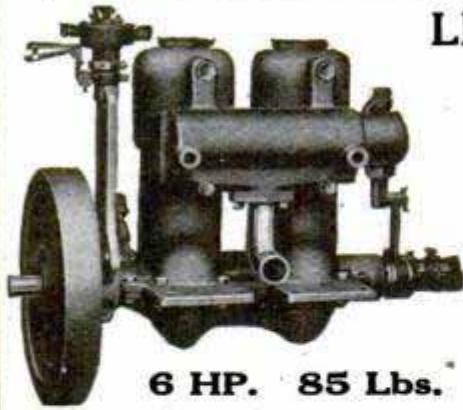
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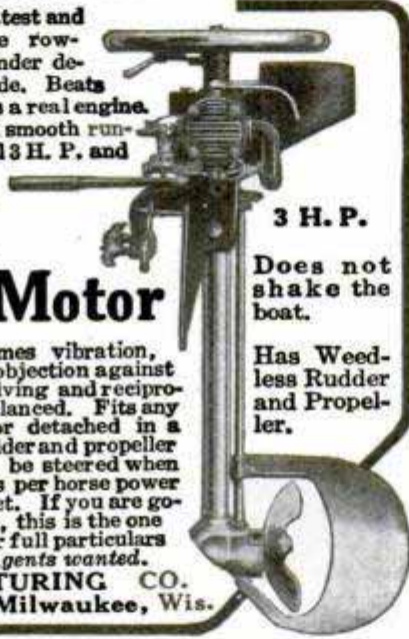
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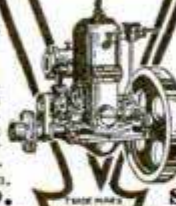
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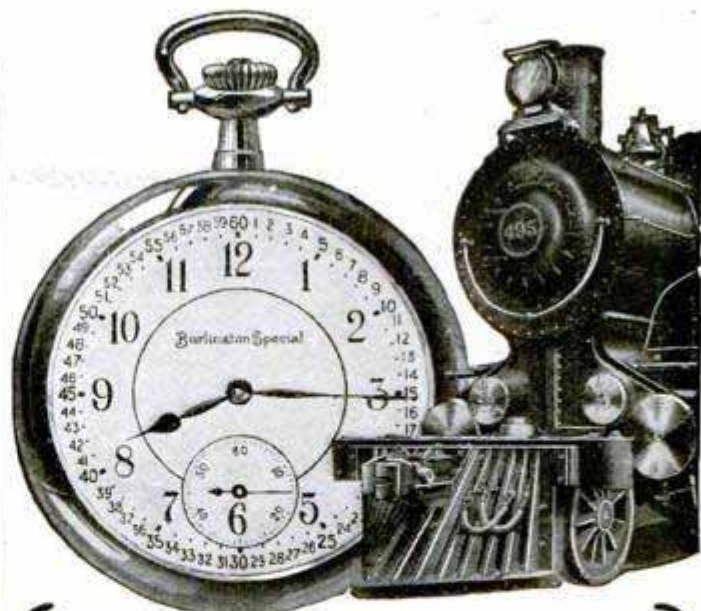
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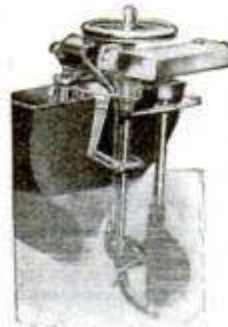
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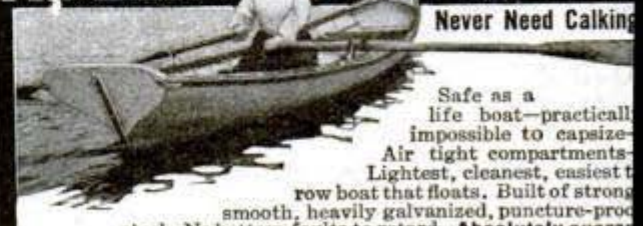
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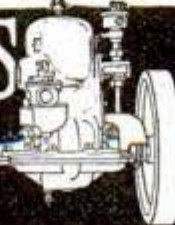
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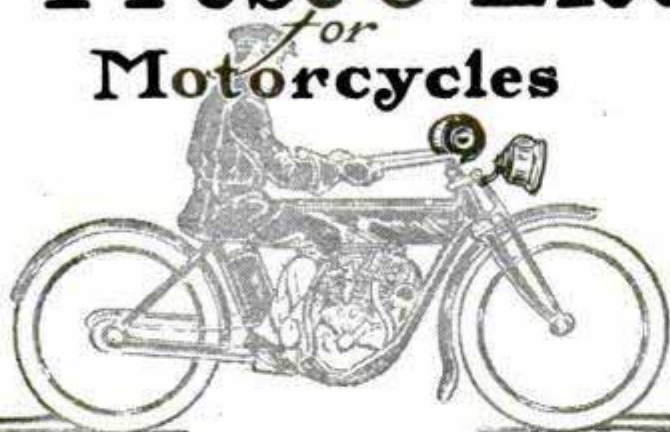
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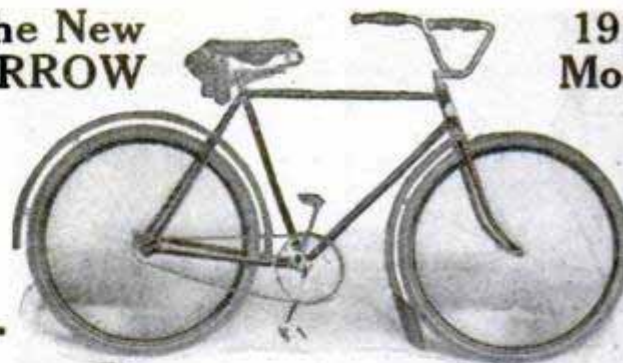
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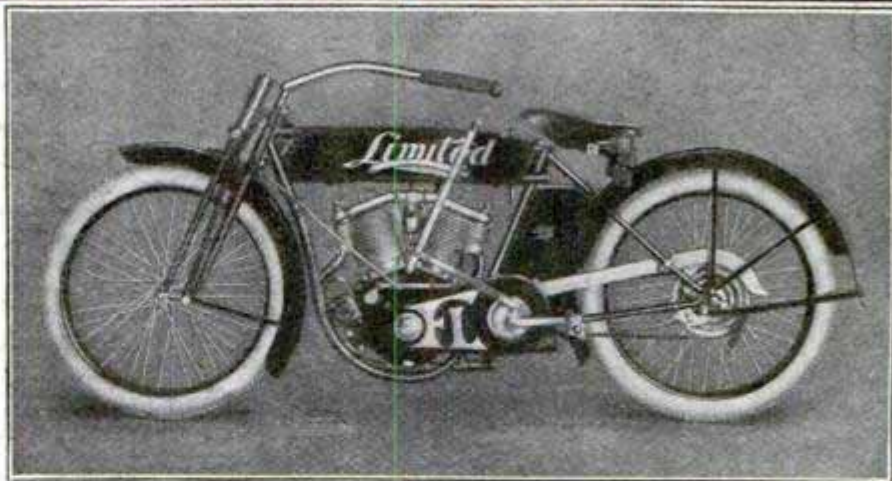
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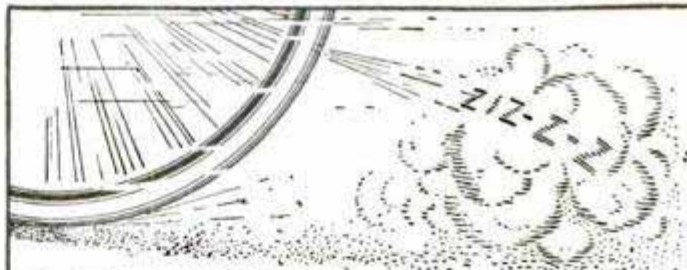
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**CANNOT SEND COINS IN LETTERS**—Under the British postal laws letters containing coins or other valuables may not be sent through the mails unless registered. This rule, which differs from the American postal practice, results in much confusion in international mails. Every month hundreds of letters sent by Americans in response to advertisements of English concerns, are returned to the writers by the British postal authorities because they obviously contain small coins but are not registered.

Rider, be our representative in your town. **EARN \$40.00 PER WEEK.** Get our **FREE CATALOG** and compare prices with your local dealer. Introduce our electric bicycles and our wonderfully improved everlasting puncture proof tires \$10.00; Sample pair \$5.00. Guaranteed one year. **Park Row Motorcycle Co.,** Dept. A31, No. 36 Vesey St., New York  
*Largest Eastern Supply House*



## This Will Never Happen If You Treat Your Tires with **NEVERLEAK**

Don't be bothered with aggravating punctures and porous tires. Just use NEVERLEAK Tire Fluid—it will save you time and money. Instantly heals punctures on the run and doubles the life of your tires for it actually preserves the rubber.

### The Old Stand-by

Be sure you get the genuine NEVERLEAK, used and sold for 18 years by repairmen and dealers everywhere. It is the one reliable preparation guaranteed to give satisfaction. Put up in handy self-injector tubes, 25c each.

**BUFFALO SPECIALTY COMPANY**  
BUFFALO, N. Y.



## Garage \$49.50

Genuine "Edwards." Ready-made, fire-proof garages. Quickly set up any place. Direct-from-factory prices—\$49.50 and up. Postal brings illustrated 64-page catalog.

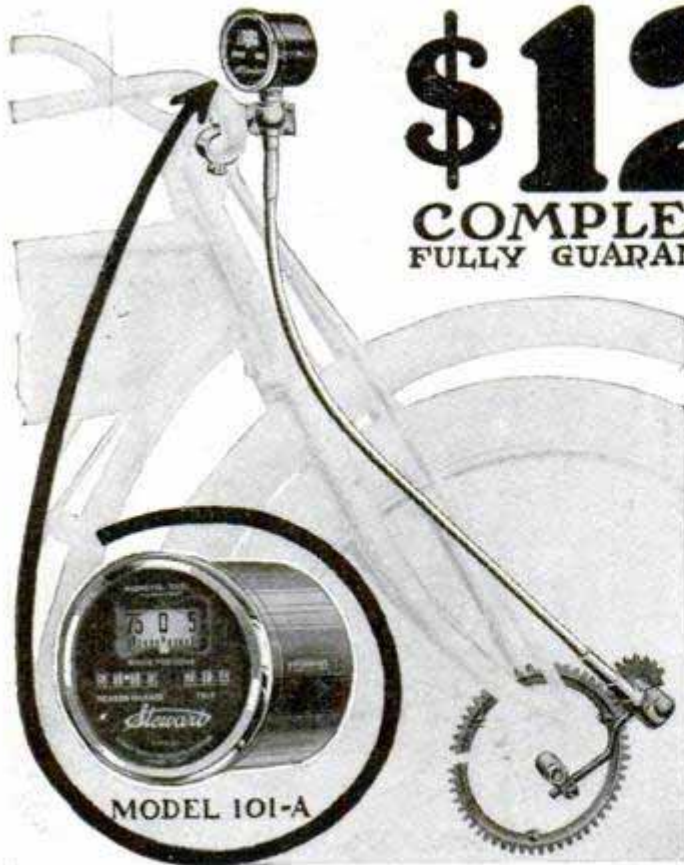


THE EDWARDS MFG. CO., 320-370 Eggleston Ave., Cincinnati, Ohio

## RIDER AGENTS WANTED

In each town to ride and exhibit sample 1914 model. Write for Special Offer. Finest Guaranteed 1914 Models \$10 to \$27 with Coaster-Brakes and Puncture-Proof Tires. 1912 and 1913 MODELS ALL OF BEST MAKES..... \$7 to \$12  
**100 Second-Hand Wheels**  
All makes and models, good as new  
Great Factory Clearing Sale. \$3 to \$8  
We Ship on Approval without a cent deposit, pay the freight & allow **10 Days' Free Trial**  
**TIRES** coaster-brake wheels, lamps, and sundries, half usual prices. **DO NOT BUY** till you get our catalogue and offer. Write now.





**\$12**  
**COMPLETE**  
**FULLY GUARANTEED**

**Stewart**  
**Motorcycle**  
**Speedometer**  
MAGNETIC PRINCIPLE

**Absorbs Shocks Mechanically**

**T**HE Stewart is the only front wheel drive motorcycle speedometer that has an absolutely unfailing means for taking up front fork shocks. This is the *rigid tube* through which the drive shaft operates. In all other types and makes, the flexible shaft has to stand these strains — and soon goes to pieces.

The "RIGID TUBE" on the Stewart Front Drive Model supports the bracket which holds the angle joint and fibre pinion. The bracket swings free on a swivel on the front wheel axle. With every up-and-down movement of the wheel, the pinion simply rides up and down on the sprocket. Thus all the destructive front fork action is taken up without any injury whatsoever to the rigid tube.

Don't consider a *rear* wheel driven speedometer. They all record false mileage due to slippage and "tuning-up." The Stewart Front Wheel Drive model alone insures satisfaction. It has our famous *magnetic* type speedometer — yet costs but \$12.

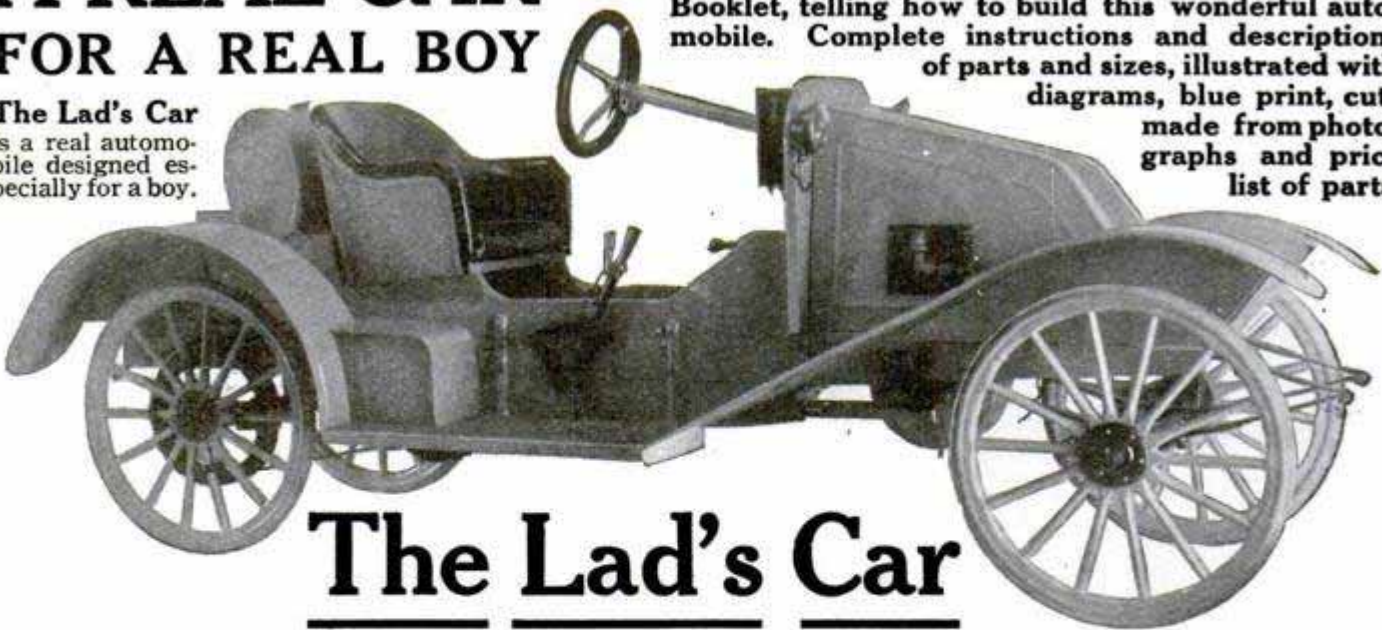
Season odometer registers 10,000 miles and repeat; trip odometer registers 100 miles and repeat. All speeds indicated (even fractions of a mile) from 0 to 80 miles an hour.

**Stewart-Warner Speedometer Corporation, Executive Offices: 1906 Diversey Blvd., Chicago**  
**Factories: Chicago and Beloit, Wisc. 17 Branches. Service Stations in all cities and large towns**

**A REAL CAR**  
**FOR A REAL BOY**

**The Lad's Car** is a real automobile designed especially for a boy.

**Send for Booklet!** **BOYS:** Send 20 cents to-day for Booklet, telling how to build this wonderful automobile. Complete instructions and descriptions of parts and sizes, illustrated with diagrams, blue print, cuts made from photographs and price list of parts.



**The Lad's Car**

The illustration will give you a good idea of the sturdy construction and the completeness in detail of the Lad's Car. We supply it as shown, or furnish all necessary parts with instructions from which any boy can assemble the complete car.

Under the racy hood is a five horse power, four cycle engine. It will carry a passenger farther and cheaper on a gallon of gasoline than any other machine known. The car is equipped with a leather cone clutch and a powerful foot brake, which makes its operation perfectly safe.

**SPECIAL INDUCEMENT AWAITING YOUR INQUIRY**

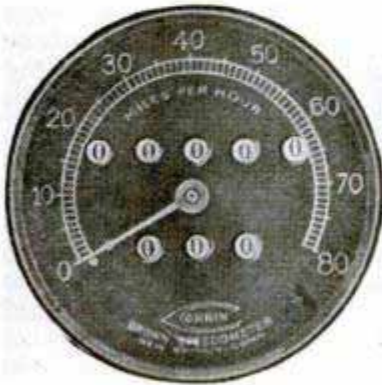
Factory prices direct to you; send 20 cents to-day and learn how to assemble and operate your own car.  
**NIAGARA MOTOR CAR CORPORATION, Dept. A, NIAGARA FALLS, N. Y.**

# ORBIN-BROWN

## SPEEDOMETER

"The Speedometer of Absolute Accuracy"

### For Motorcycles



**\$15<sup>00</sup>**

Built with the accuracy and precision of a high grade watch.

Has either front or rear-drive attachment which prevents recording of mileage while machine is being tuned up on stand.

More sold in 1913 than any other make. Guaranteed for twelve months from date of sale. We will replace any defective parts due to mechanical defects or workmanship, if returned prepaid to our factory subject to inspection.

Write for new 1914 Catalog

# ORBIN BRAKES for

## Motorcycles and Bicycles

**Corbin Duplex Band Brake for Motorcycle.** The equipment of more than sixty-five per cent. of all the motorcycles in use during 1913.



**Corbin Duplex Coaster Brake**—You coast at will and save your energy. You stop wheel gradually or instantly as occasion demands.

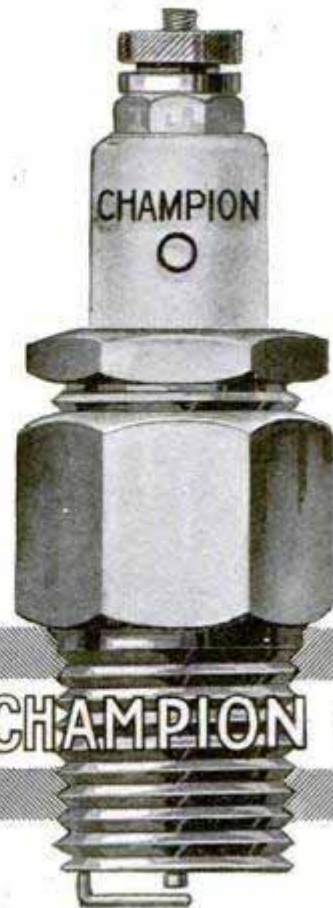
**Corbin Two-Speed Coaster Brake**—Two gears always at your command. You change from high to low instantly by simply changing your foot pressure.

Sold and equipped by bicycle and hardware dealers everywhere.

Write for new 1914 Catalog

### The Corbin Screw Corporation

The American Hardware Corporation, Successors  
201 High Street - New Britain, Conn.



## This Is The Spark Plug With Which All Overland Cars Are Equipped At The Factory

The "Champion O" was designed especially for this season's Overlands. For Overlands of 1910, '11, '12 and '13, ask for the "Champion Long."

In designing these spark plugs, we were required to take into account every feature of the Overland motor.

Then the factory experts tested, tested and tested, until absolutely sure that "Champions" gave the highest possible efficiency to their motors.

75% of American made cars, including the Ford, Overland, Studebaker, Maxwell and Metz, are being equipped at their factories with specially designed Champion Spark Plugs.

The high quality of these plugs comes not only from the use of superior materials, but from our own special manufacturing processes.

"Champions" are oversize. They are built to stand the grief.

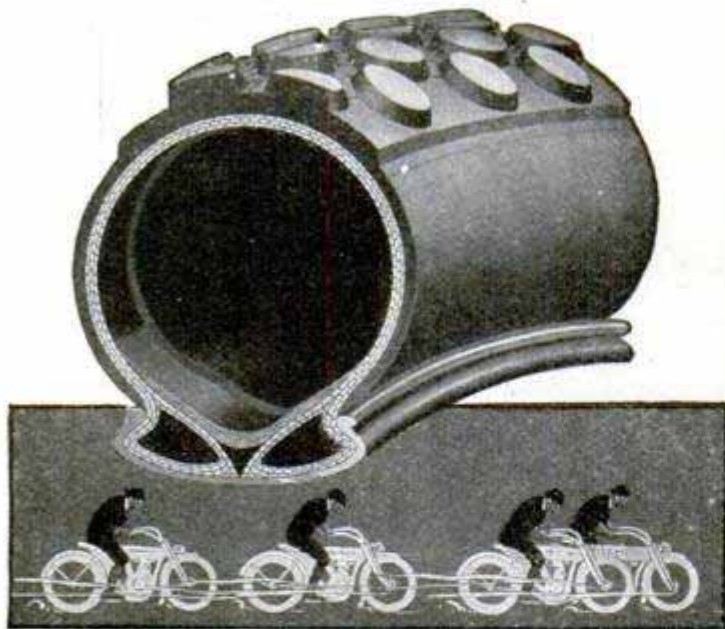
Ask for the special 1/2 inch Champion X for your Ford car. It's 75c. The Overland plug sells at \$1.

Consult with your dealer on this important subject. He will advise you as to the "Champion" you should use for your Motor Car, Motor Truck, Motorcycle, Motor Boat, Aeroplane or Stationary Motor.

(Licensed under the Canfield Patent No. 612,701, October 18, 1898)

### Champion Spark Plug Co.

407 Avondale Ave. Toledo, Ohio  
Export Representative, AUTOMOBILE SUNDRIES CO., 18 Broadway, NEW YORK



## Three Out of Four Have Come to These Motorcycle Tires

Every road condition is actually anticipated and met in the making of Goodyear Motorcycle Tires. Thus, at the *outset*, you are assured utmost mileage, durability, comfort, economy.

### Choice of Thousands

Three out of every four 1914 motorcyclists have been won to Goodyears. This year Goodyear will tire-equip a total of 115,000 motorcycles. This great output means a minimized producing cost—highest quality tires for the same money.



### Learn More of These

There is a booklet on Goodyear Motorcycle Tires. It is free. Gives the *how* and *why* of Goodyear supremacy. Tells of the exact Goodyear methods and materials that have minimized tread separation, blowouts and other tire troubles. Explains the wonderful machines that distribute all tension exactly throughout the tire carcass. Tells about the machines that test Goodyears against other tires, under actual road conditions, and by which Goodyear leadership is maintained.

### Goodyear Dealers Everywhere

Consult the nearest Goodyear dealer in your town. Also write for the booklet. Getting the right tires *first* means fullest pleasure and service from your motorcycle. And in Goodyears you get the tires that also hold every world's record in speed and durability tests.

The Goodyear Tire & Rubber Company, Akron, O.  
Toronto, Canada London, England Mexico City, Mexico

DEALERS EVERYWHERE

Branches and Agencies in 103 Principal Cities (1503)

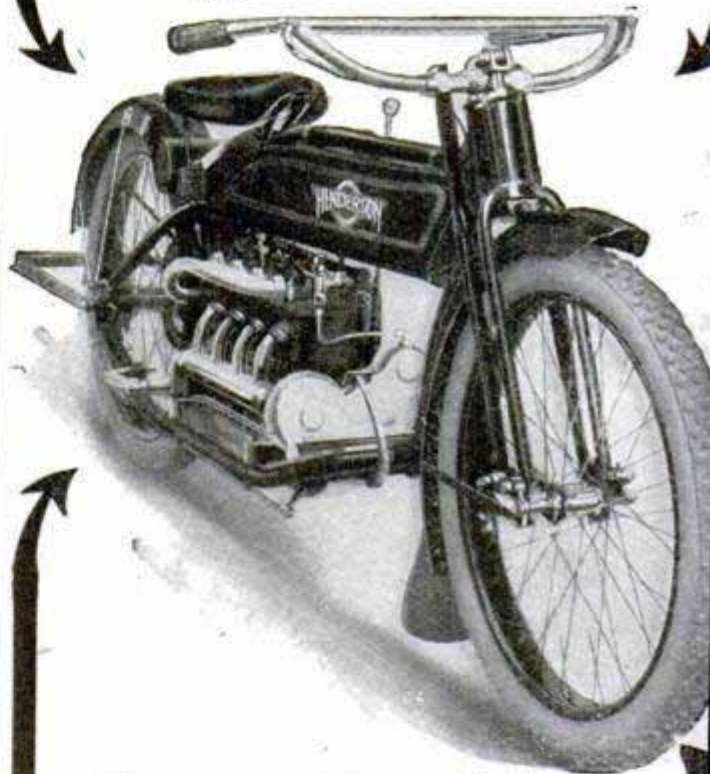
## YOU WILL RIDE A HENDERSON

When you Learn of its Advantages

There is the starting device—a neat folding crank at the right side of the motor which responds to a mere "twist" without the aid of a stand.

The special Henderson padded saddle with spring adjustment and so placed as to carry the weight evenly distributed between the wheels.

The exclusive foot position on a comfortable running board in front of the motor away from all heat and moving parts.



The powerful four cylinder motor that is capable of developing twelve horsepower and entirely dispenses the noise and vibration.

The smooth sensitive control that permits you to climb the dangerous grades slowly, under full power.

These are but a few of the exclusive Henderson features described in our beautiful illustrated catalogue.

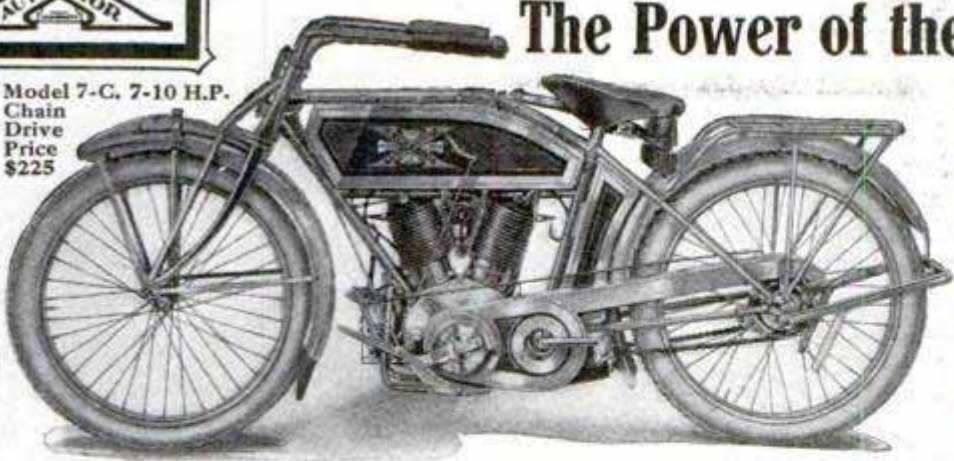
"We Mail It on Request"

**Henderson Motorcycle Co.**  
Detroit, Michigan



# The Power of the "X"

Model 7-C, 7-10 H.P.  
Chain Drive  
Price \$225



The POWER, SPEED and ENDURANCE of the **EXCELSIOR AUTO-CYCLE** have been proven beyond question. **NOW FOR THE REASONS WHY**

**FIRST**—A motor that is correct in design, perfect in workmanship and that has been brought to the highest degree of efficiency through six years of scientific development.  
**SECOND**—A rigid straight line frame that insures absolute alignment of every component part of the power-transmitting mechanism, a condition that cannot be attained in any frame built up of springs, hinges or other flexible parts.  
**THIRD**—A large and efficient multiple disk clutch located on the motor shaft, where it renders the highest degree of efficiency.  
**FINALLY**—A perfect balanced combination of a big, powerful motor, correctly designed and efficient transmitting mechanism, and a frame that is staunch and absolutely dependable under all circumstances.

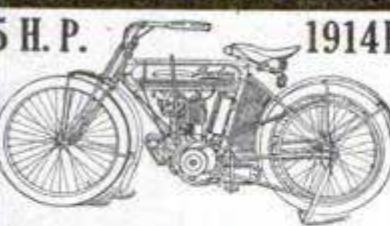
Add to the above combination the extremely low center of gravity attained through the Excelsior open bottom frame; the great degree of comfort derived from a low saddle position, large, correctly located folding foot rests, the Excelsior Kumfort Kusion seat post and Complete Grip Control of all operating functions—and you have the nearest approach to perfection obtainable in a motor-cycle.  
Seven models for 1914, ranging in price from Model 4B, a single cylinder belt drive at \$190, to Model 7TS, seven H.P., twin two speed, at \$260.  
Our catalog or the nearest Excelsior dealer will give you full details. If you don't know a dealer, write us for catalog. We will do the rest.

## Excelsior Motor Manufacturing & Supply Co. 2202-2250 South Union St., CHICAGO



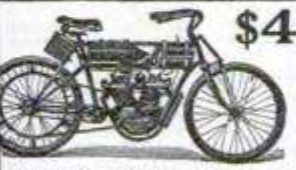
**Convert Your Wheel Into a Motor-Cycle** Motor fits any wheel. BEST, MOST RELIABLE. Best Hill Climber. More STEFFEYS in use than any others. Send stamp for circulars. **STEFFEY MFG. CO.**, Girard Ave. and 30th St., Phila., Pa.

**HONEST MAN WANTED**  
In each town for special advertising work; \$15 a week to start; experience unnecessary; references required.  
**LEAN, BLACK & CO., 18 E. Beverly St., BOSTON, MASS.**



**5 H.P. 1914 Peerless Motorcycle**  
With Free Engine Idler and Bosch Magneto, together with the best there is in motorcycle construction—Power, Silence, Endurance, and those Wearing Qualities so essential for low cost of maintenance.  
**5 MILES FOR ONE CENT**  
Agents Wanted—Liberal Discounts

**PEERLESS MOTORCYCLE CO., 179 Huntington Ave., BOSTON, MASS.**



**\$40 Motorcycle**  
We have the largest line of new and used Motorcycles in the country at the lowest prices. We also have a thoroughly equipped repair department and are in position to furnish repairs for any machine. Send us your machine to be overhauled. We pay cash for second hand motorcycles. *Send for Catalog.*  
**HARRY R. GEER CO., 888 McLaran Ave., ST. LOUIS, MO.**



**SAFETY FIRST - MOTORCYCLISTS!**  
**"PERFECTO" TAIL LAMPS**  
AVOID REAR-END COLLISIONS  
The old reliable that you can depend upon. Complies with all state and city ordinances, in illuminating license number, etc. **PERFECTO REGULAR SELF-LIGHTING MODEL**, with Pet Cock Regulator, at the left. Fits all makes of motorcycles. Cuts your carbide and Prest-o-lite bills in two. **PRICE, \$2.00.**  
AT YOUR DEALER OR SENT DIRECT. **FREE CIRCULARS. WRITE US**  
**J. W. ERICKSON MFG. CO.**



**TWO Phonographs For ONE**  
Have you a Victor Victrola or a Columbia Graphophone? If so, these wonderful new quick-attachable **UNION Reproducers** (with diamond points) will enable you to play the beautiful new **EDISON Disc Records**—the sweetest music of their kind—without altering your machine. They give you **Two Phonographs for One**. Order one on trial—there's no risk—your money refunded, if desired, any time within two weeks.  
**UNION Reproducer for Victor or Columbia**  
**PRICES** Gold-plated . . . . \$9.00  
Nickel . . . . . \$8.00  
Sapphire points, \$1.50 less

For descriptive folders write **THE UNION SPECIALTY & PLATING CO.**  
411 Prospect Ave., N.W.  
Cleveland, Ohio  
Or ask your dealer.  
Find enclosed \$..... for **UNION Reproducer** for..... Disc Machine on two weeks' trial.  
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ADDRESS.....  
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Use the coupon to get descriptive folders

# Peerless Portable Power For All Purposes—With Flexible Shaft

This Peerless Combination Power Machine is quickly changed from a Floor Finishing Machine to a Portable Power Machine, and gives you an outfit with a wide range of usefulness. As a Floor Surfer and Polisher it is a most effective, time-saving, labor-saving, money-saving machine; for finishing hardwood, marble, tile and terazzo floors, doing the work better in one-third the time it can be done by hand. It is economical to operate and always under perfect control.

As a  
Floor  
Surfacing  
and Polishing  
Machine



As a  
Portable  
Buffer and  
Polisher



**TWO MACHINES  
for  
PRICE of ONE**

Surfacing, Grinding,  
Polishing, Drilling, Sawing, etc.

Converted into a Portable Power Machine, with its various attachments, its field of usefulness is almost unlimited—it becomes a buffing, grinding, sandpapering, polishing, boring and sawing machine for use on wood, marble and metal. Just the machine for office buildings and hotels—for marble, tile and terazzo floor layers, and for hardwood floor finishers. Nothing to get out of order—gears require no oil. Each machine positively guaranteed for a year. Made in two sizes. **SENT ON 10 DAYS FREE TRIAL.** Write today for Free Booklet and prices.

United Manufacturing Company 1051 Commerce Trust Building  
KANSAS CITY, MO

Both  
ways,  
this Grinnell  
**REZISTOL**  
Glove is a wonder

—in resisting current and resisting wear. It has been tested to resist a current of 4,000 volts—and though soft and pliable, is the toughest horsehide and wears like iron. That's why we call it "Rezistol." Washable in soap and water or gasoline—comes out like new. Outwear any gloves you ever had on and free and easy as your bare hand's to work in. Get a pair on approval. If your dealer doesn't carry Grinnell Gloves, send us his name.

Morrison-Richer Mfg. Co., Established 1856, 153 Broad St., Grinnell, Iowa

4315 P. R. F.  
Prepaid \$2.00



We will send your selection on approval. Style book and leather samples free on request.

## MONEY IN MUSHROOMS

Add \$10 to \$50 a Week to Your Income  
Grow Mushrooms

at home in your basements, barns, sheds, etc., without interfering with your regular occupation. Small beds, 5 x 10 ft., costing practically nothing to start often produce 60 to 100 lbs., selling at 50c to \$2.00 a lb. Your whole family can help in raising them. Others are making money growing mushrooms. Why don't you? My illustrated booklet telling how to start, how to see etc., sent free. Write today.

A. V. JACKSON, Falmouth Mushroom Cellars, Inc., 196 Gifford Street, Falmouth, Mass. The largest modern mushroom farm in the world.

## WIN NEXT \$1,200

We tell you how; \$40,000 already won by ten inexperienced people. Stoneman received \$1,200 one month; \$15,000 to date; Korstad \$2,200 in two weeks; Schleicher \$195 first 12 hours. Strange invention, startles the world. Gives every home bathroom with hot and cold running water for \$6.50; abolishes plumbing, water works; self-heating; little wonder Hart 16 in 3 hours, \$5,000 to date; Lodewick 17 first day. Credit given. Investigate today. Beat others to exclusive sale; means fortune. **ALLEN MFG. CO., 3649 Allen Bldg., Toledo, O.**

MAKE MONEY HERE

## AGENTS! DROP DEAD ONES. AWAKE! GRAB THIS NEW INVENTION! AGENTS! THE 20th CENTURY WONDER

LEARN the NEW WAY

Get started in an honest, clean, reliable, money-making business. Sold on a money-back guarantee

World's magical gift realized by this new invention. The **BLACKSTONE WATER POWER VACUUM MASSAGE MACHINE** for the home. No cost to operate. Lasts life-time. Price within reach of all. No competition. New field. New business. That's why it's easy. Removes blackheads, wrinkles, rounds out any part of the face or body and brings back Nature's beauty. Endorsed by leading doctors and masseurs. Listen: Parker, Okla., says, "8 orders first day." Margwarth, Pa., writes, "I am making \$19.00 per day." Shea, "First order 12, second 36, third 72." Schermerhorn, Ia., orders eight dozen machines first month. Shaffer, Va., "selling 4 out of 5 demonstrations." Vaughn, Wash., orders one dozen. Four days later wires "Ship 6 dozen by first express." Spain, Tenn., started with sample. Orders one dozen, then 2 dozen, next 3 dozen. Lewis, Ind., sells 3 machines first hour. Says "Best article he ever saw for merit and money-making." No experience necessary. Territory with protection given free to active workers. Nothing in the world like it. Best agent's article ever invented.

We own all U. S. and foreign patents. Big book entitled, "The Power and the Love of Beauty and Health" Free. Investigate now, today. A Postal will do. A big surprise awaits you. Address **BLACKSTONE MFG. CO., 696 Meredith Bldg. TOLEDO, O.**





# READY Our Big Book of Spring Fashions and Woolens FREE

"We Have No Agents"

Just off the press! Our Big Book of Spring Fashions, a complete guide to correct dress; handsomely illustrated in colors. Contains dozens of samples of newest spring and summer woolens—foreign and domestic fabrics in plain and fancy suitings, explains our new tailoring system, tells how we can make you an

## All Wool Made-to-Measure \$15 Blue Serge Suit for Only \$15

Yes, individually tailored to your measure, that for real style, fit, tailoring and material cannot be duplicated in the ordinary way for less than \$25. Why pay \$25 to \$30 for merely ordinary "ready-made" garments when you can get our classy, made-to-measure, all wool worsted serge suit for only \$15, in light blue, dark blue, gray or black. Up-to-the-minute in style; guaranteed perfect fitting. We satisfy you or you don't pay us one cent.

## \$4 Satin Lining Free

we want your business and in order to get it we are going to line the first suit you order with our regular \$4 Satin Lining, fully guaranteed, without 1 cent extra charge. Be a tailor-made man.

### Spend 1c — Save \$10

Send now, today, for your copy of our Big Book. Contains most wonderful tailoring values ever offered. Mail that postal this minute, right now before you forget it. Your copy of our Big Fashion Book will come by return mail.

**BERNARD, HEWITT & COMPANY**

Desk 25, 564-6-8 W. Monroe St., Chicago



Send for the big book to-day.

Statement of the ownership, management, etc., of Popular Mechanics Magazine, published monthly at Chicago, Ill., required by the Act of August 24, 1912: Editor, H. H. Windsor, 6 N. Michigan Avenue; Managing Editor, F. P. Stockbridge, 6 N. Michigan Avenue; Business Manager, H. H. Windsor, 6 N. Michigan Avenue; Publisher, Popular Mechanics Co., 6 N. Michigan Avenue; Owner, H. H. Windsor, 6 N. Michigan Avenue. Known bondholders, mortgagees, and

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Moth-proof



Free Trial

Any Piedmont Southern Red Cedar Chest in our catalog shipped on 15 days free trial. A Piedmont protects furs, woolens and plumes from moths, mice, dust and damp. Useful, beautiful and economical in every home. Pays for itself quickly in what it saves. Finest birthday, wedding or graduation gift. Low factory prices. Freight prepaid. Write today for big, illustrated catalog and book, "Story of Red Cedar." Postpaid, free to you. Piedmont Red Cedar Chest Co., Dept. 97, Statesville, N. C.

Removes INK Instantly leaving No Trace

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FLEXIBLE DIAMOND BRUSH  
Has over 10000 Diamond points  
That's the Reason

Made of Aluminum and Silver  
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Indispensable to Typists, Bookkeepers, and all users of pen and ink. The new and better way to erase. Big Money Maker. Sent prepaid for 50c with name of Stationer. Guaranteed Satisfactory or Money Back. Dealers and Side Line Men write today.

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## Ruby for Your Name

To quickly introduce our dazzling blue white Mantec Gems (United States Letters Patent) and to distribute our beautiful art catalog, "The Story of the Mantec Gem." We will, for only 2 two cent stamps to cover cost of mailing, send you free a genuine uncut Navajo Ruby bought from the Navajo Indians together with our low cost-price offer for cutting and mounting. Write today—now. (Sellers of Genuine Gems since 1908.)

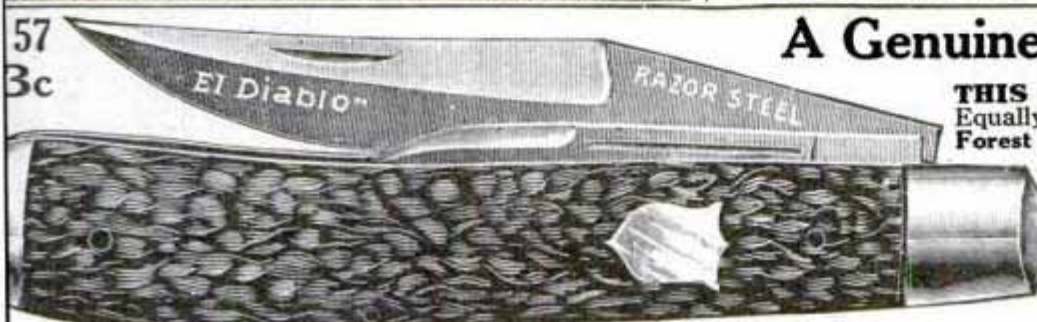
FRANCIS E. LESTER CO., Dept. E.T.5R, Mesilla Park, New Mexico

**HELP BOOST!**  
PANAMA PACIFIC EXPOSITION

25c 50c

Wear one of these beautiful San Francisco 1915 Watch Fobs. The 25c fob is a swell article. The 50c fob is made of white metal, high class and artistic. An ideal souvenir. Send 25c or 50c coin or stamps. Mailed anywhere.

E. M. JACOBS, 114A Sansome St., San Francisco, Cal.



## A Genuine \$2 Knife for 83c

**THIS KNIFE HAS BRAINS IN IT.** Equally good in the Shop, the Farm, or Forest; light but extra strong; resharpened easily. Stag handle, German silver finish; blades file tested, hand forged razor steel and warranted. Sample 83c, 3 for \$2, postpaid. Choicest Pearl, \$2 each.

Send for 80-page Free List and "How to Use a Razor"



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**Coca-Cola**

—it answers every  
beverage require-  
ment—vim, vigor,  
refreshment,  
wholesomeness.

*It will satisfy you.*

THE COCA-COLA COMPANY  
ATLANTA, GA.



Demand the genuine  
by full name—  
Nicknames encourage  
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Whenever  
you see an  
Arrow think  
of Coca-Cola

**ASTOUNDING BARGAIN!**

In order to get you acquainted with us, we will for a limited time send prepaid this high-grade compass, warranted to be accurate, for the ridiculous price of 10c. This compass sells everywhere for 25c. It measures 1 1/4" in diameter, glass cover, nickel plated band, dial in two colors. Instructions tell how to use this instrument for orientation purposes, telling polarity of magnets, tell if an electric wire is "alive" or "dead," making a voltmeter with this compass, etc., etc. You cannot afford to be without this wonderful little instrument, AND at no extra charge we will send you absolutely free our famous comprehensive electrical cyclopedia No. 12 containing over 450 illustrations and over 1600 electrical apparatus and supplies. Book contains 16 page "Treatise on Wireless Telegraphy" also 16 page copy of the new magazine "The Electrical Experimenter." Ask for our **FREE** 160 page "Wireless Course" in twenty (20) lessons.

*If you don't wish the compass send 3c. postage for the electrical cyclopedia.*

Electro Importing Co., 233A Fulton St., N.Y.C.  
**"Everything for the Experimenter"**

**Voltamp Motors**  
"Little Dickie" Prepaid \$1.10

**Special Offer, 30 Days**

U. S. or Canada on receipt of \$1.10. Every boy and grown-up should have the new VOLTAMP Catalog.—just the book for the experimenter. Wireless, Telegraphs, Telephones, Motor Dynamos, Transformers, Rectifiers, Miniature Railways and Parts, Raw Materials and hundreds of others. Sent only for 6c in stamps or coin. Largest Electrical Mail Order House in U.S.

**VOLTAMP ELECTRIC MFG. CO.**  
Voltamp Block BALTIMORE, MD

other security holders, holding 1 per cent or more of amount of bonds, mortgages, or other securities: No

H. H. WINDSOR, Editor

Sworn to and subscribed before me this 23rd day March, 1914.

J. GRAHAM,  
Notary Public.

(My commission expires June 17, 1914)

**Ten Days' Free Trial**

allowed on every bicycle we sell. We Ship on Approval and trial to anyone in the U. S. and prepay the freight. If you are not satisfied with the bicycle after using ten days, ship it back and don't pay a cent.

**FACTORY PRICES**

Do not buy a bicycle at any price until you receive our latest Art Catalog of high grade bicycles and sundries and learn our heard-of prices and marvelous new special offers.

**IT ONLY COSTS**

everything will be sent FREE by return mail. You will get much valuable information. Do Not Wait; write it NOW!

**TIRES, Coaster-Brake, rear wheels, lamp parts, repairs and sundries of all kinds at half usual price**

**MEAD CYCLE CO. Dept. T108 CHICAGO**



**SAFETY FIRST**

**Yale Electric Lantern**

and Combination House Lamp  
Search and Flash Light

This is NOT a Toy Turn a switch and you get a flood of light. The safest, handiest, most simple around light for autoists, campers, sportsmen, merchant, farmer, etc. Eliminates: Filling, matches, oils, greasy smoked chimneys, trimming of wick and other troubles. Always ready when wanted.

A sample will be sent prepaid parcel post receipt of remittance.

**Introductory Price \$3.50**

introductory price. Or sample and agents' proposition now—be the first. Sold on money-back guarantee. A big money-maker agents. AGENTS WANTED EVERYWHERE

**YALE MANUFACTURING CO.**  
20-22 So. Clinton St., Chicago

Special  
BARGAIN  
SALE

**"EVERYBODY'S DOING IT"—BUYING  
DIAMONDS, WATCHES, JEWELRY, on CREDIT  
YOU SAVE ONE-THIRD**

**Diamonds  
Watches  
on Credit**

Send for FREE  
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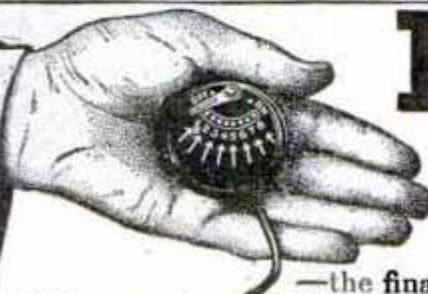
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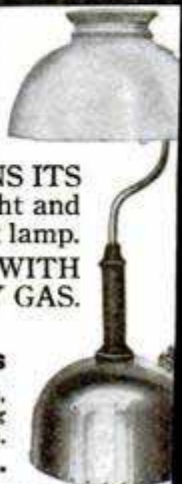
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It's the last word in typewriter construction and not since the introduction of visible writing has such a notable advance been recorded.

Every Corona is equipped with two color ribbon, back spacer, stencil cutting device, universal keyboard, etc., in fact every worth while feature of its more cumbersome ancestor. It's only in weight, dimensions and price that it's different.

Years of experiment were necessary before the perfected Corona was put on the market. Then the news spread like wildfire—travelers, authors, teachers, scholars, business institutions and even the United States and foreign governments investigated. Yes, and after the investigation they bought—there is hardly a department at Washington but that is already equipped with Coronas.

Think of the convenience a Corona would mean to you. It comes in a small fabric leather case—the typewriter 6 lbs. light, and the case but 2 3/4 lbs. more. Everywhere you go you can take the Corona along.

Send for full particulars—you should be fully informed regarding this invention. Write for catalog No. 21—today.

**STANDARD TYPEWRITER CO., GROTON, N. Y.**  
New York Office, 1493 Broadway  
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**For the Handy Man's Tools**

**I**F you are lucky enough to enjoy using tools at home, you're the sort of man to enjoy sharp edges. Expert mechanics, big machine shops and leading manual training schools now insist on




**PIKE INDIA OILSTONES**

Recent laboratory tests prove that they sharpen faster and hold their shape longer than any others. If properly oiled, they won't glaze and even dropping won't break them.

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**FREE** Send us your dealer's name and 4 cents for packing and mailing and we will send you a Pike India Vest Pocket Stone for pocket knives, etc. Also our book "How to Sharpen." You will be pleased. Write today.

**PIKE MFG. CO., 64 Main St., PIKE, N. H.**



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and we will ship you the **Great Ingento Outfit**  
For Personal Examination

Yes, we will send you a genuine Ingento Camera, equipped with the wonderful new Acutic Lens, complete with films, ready to take pictures on receipt of a \$2.00 deposit. Examine it yourself, see the new Acutic Lens that has brought these master instruments within the reach of all. Satisfy yourself that it is the greatest camera value in the country today, pay the balance of the rock bottom price, and the great Ingento Camera Outfit is yours.

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are scientifically constructed by master camera makers—they are the result of 25 years of research and study. Equipped with the genuine Acutic Lens—the latest automatic high speed Ingento shutter that can be timed to 1/100 of a second—a distinct advance in camera making. New compact model—light aluminum case handsomely finished with genuine Seal Grain leather. Takes pictures 2 1/2" x 4 1/4" clear, sharp and brilliant. Ingento Cameras are made in a host of sizes and prices. Write today for New Camera Book.

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On this great offer we will develop and print the films included in the outfit absolutely free. Our corps of experts are at your service. If you wish to ask any questions they will gladly give you the benefit of their years of experience. Just think what this offer means to you. Send the coupon for the new Camera Book.

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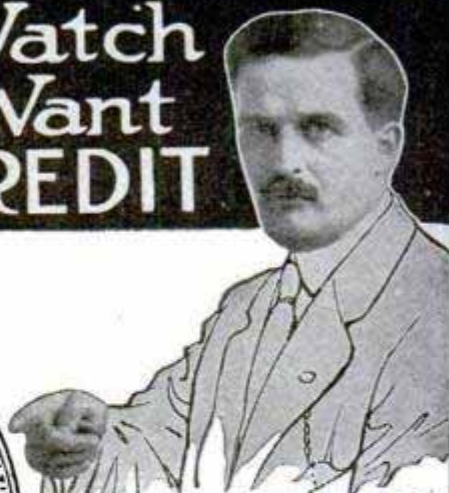
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Fits any boat. Ball-bearing Engine. 10 1/2 inch Weedless Propeller. 3-ring Piston, same as in Packard car. Copper Water Jacket, same as in Cadillac car. Kingston Carburetor, same as in highest grade auto and marine engines. Silent Under-water Exhaust, same as in highest priced launches. Steers from any part of the boat. Perfect control from trolling to racing. Sends 18-foot boat 8 to 9 miles per hour. Uses gasoline and oil mixed. No vibrations. No noise. Runs and keeps on running day after day. Guaranteed for life. Money back without argument if not satisfied. Write for free catalog and special 30 day price.



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UNION MADE

Wear well—keep their style—last a long while. Big arm holes that will never bind, roomy elbows, extra long sleeves, wide cuffs. Snug-fitting yoke that allows plenty of shoulder play. Satin-lined, non-irritating military collar that fits comfortably. Three-inch over-lapping flaps in front. Combination watch and handkerchief pocket, with a flap you can button. Extra button at bottom of breast plait to prevent gapping. Prices \$1.50 up.

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Manufacturers of the Famous Signal Overalls, Coats and Shirts

Satin-Lined  
Military Collar



Always look for this trade mark—it's the "Safety First" sign in buying shirts and overalls.



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The "Greyhound of the Road." Renold imported chain drive; Bosch magneto; Eclipse multiple disc clutch; Pope celebrated rear spring suspension; twin stem handlebars; double operated brake; comfortable foot boards; extremely low saddle position; Pope overhead valves.

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Owners report daily profit of \$20 and upwards. Some as high as \$50. One reports \$2,430 in 90 days; another a \$90,000 government contract after severe tests on product. Start a concrete factory and do as well. Little capital and no experience required. Only machine necessary is

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80,000 lbs. pressure, no tamping, easy work, automatic, makes highest grade cement blocks and brick known at greatest speed and lowest cost. 1000 blocks or 10,000 brick daily. Salable everywhere. You should know about



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## A MESSAGE TO FORD OWNERS

Big-Car-Luxury is now a reality for owners of Ford Cars. E. Z. Rider Shock Absorbers give that smooth, floating restfulness.

If you would enjoy your FORD to the utmost, learn about these E. Z. Rider Shock Absorbers—and learn what they SAVE you and your Ford

→ **SAVES**—the humps, jumps, vibrations and irritations of rough roads and pavements. The sensitive coiled springs make all roads seem smooth.

→ **SAVES**—wear and tear on your Ford by absorbing the shock and vibrations. E. Z. more than save their cost, by saving car repairs.

→ **SAVES** engine trouble by protecting the delicate mechanism from rousous jar and vibration. Saves you delay, trouble and expense, and E. Z. Rider saves tires by easing the traction strain and preventing bound and rebound.

### Try E. Z. Rider Shock Absorbers 10 Days

We want to send every Ford Car Owner a set of E. Z. Rider on 10 days trial. If not pleased, return E. Z. and receive your money back. Once you know E. Z. you'll never drive without them.

Dust proof, trouble proof, long wearing, fully guaranteed.

Set weights only 20 pounds.

Easily and quickly installed—you can do it, we send all instructions.

\$15 set of four (front and rear) F. O. B. Cleveland

Order a set today for your Ford

The Forest City Electric Co.  
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Reference—Bradstreets



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TRADE MARK

LACES IN THREE MINUTES

and show him that you are alive to his best interests. Every employer is quick to recognize the man who takes enough interest to suggest plans to increase the production of the plant. Tell your employer of the advantages of the "Clipper"

Ask him to write for our 30 days' free trial, with return privilege. After he has given it a trial and sees machine-time and man-time saved you'll be repaid.

The "Clipper" will lace a belt 6 inches wide in three minutes and do it better in the hands of a strong boy than a high priced expert can in 20 minutes by hand the old raw-method. Wider belts in proportion. No skill necessary.

Send for our story, "How Scotchie Made Good." It may mean a lot to you.

Clipper Belt Lacer Co.  
1032 Front Ave. GRAND RAPIDS, MICH.

# I WANT 200 SALES AGENTS AT \$1200 TO \$3600 A YEAR

To introduce my new **Compress and Vacuum Washing Machine** to every home in the country, I want 200 additional representatives to begin work at once in their home counties. I consider this machine the most brilliant inventive achievement of the age in household necessities. It is selling faster than anything I have ever heard of—**going like wildfire.**

## PROFITS START FIRST DAY

No waiting or guessing. The price of only \$1.50 makes a sale at every house—cash business at 200 per cent profit to you. The biggest opportunity ever offered. I want hustlers—men and women who want to make money quick and fast. No large investment needed—**business supplies the capital.**

**NO EXPERIENCE REQUIRED** Just follow instructions. Failure impossible. **Success assured.** Frank Greene sold 45 first three days—profit \$45. Mrs. L. C. Marrick made \$90 first three weeks in spare time only. J. H. Goddard took 18 orders first three hours. **No talking necessary.** Just show it—the order is yours right on the spot.

H. F. WENDELL, Pres., Wendell Vacuum Washer Co., 245 Oak St., Leipsic, O.



The Wendell Compress and Vacuum Washer  
Washes Tub of Clothes in Three Minutes

Every machine sold on money-back guarantee. A child can use it. Saves labor of wash day. Women do \$15 and \$20 machines for it.

### MAIL YOUR APPLICATION TODAY

Don't delay. Get your county under contract, charge for territory. To wait means to lose. Write a letter or a postal card today. If you are honest and want to work I will give you the position. **Do not let someone else get in ahead of you.** I want agents, agents and managers. Write today—then you will do your part. **Do it right now. Address**

6034-\$50.

Only 20% down

and 10% a month

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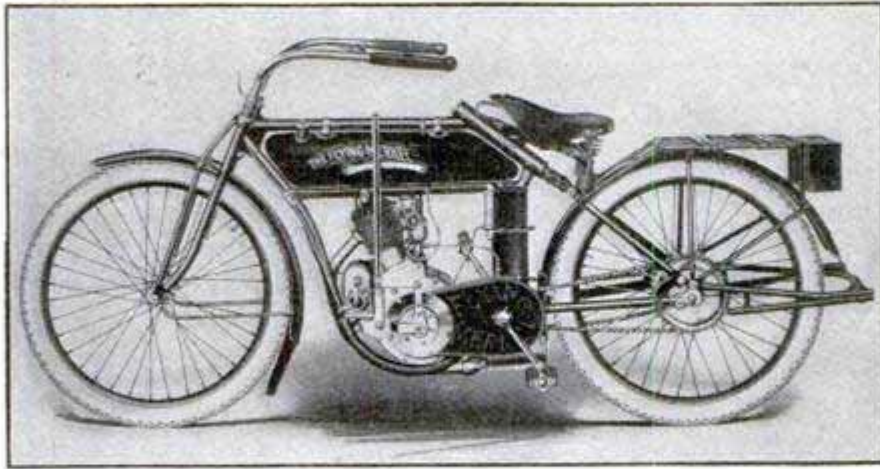
6226 \$35

6211 \$100

6211 \$100



# The World's Greatest Motorcycle



## The Flying Merkel

is the oldest existing motorcycle sold on the American market today. For fourteen years it has set a standard that other manufacturers vainly have attempted to reach. The Flying Merkel still stands supreme in the art of motorcycle construction.

Every feature found on other motorcycles today that is recognized as standard was first inaugurated by the Flying Merkel, and 1914 models contain features that are years ahead of any other motorcycle.

The illustration above shows our single cylinder 4 H. P. model at \$210.00. The regular seven horsepower standard model, in either belt or chain drive, lists at \$225.00, and the same models fitted with foot boards, and dual combination brake system, also with luggage carrier, lists at \$240.00.

The many mechanical features of the Flying Merkel are fully described in our latest catalogue, copy of which may be had by simply addressing a post card.

### DEALERS WANTED

On account of a big increase in our productive facilities we will be able to increase our selling organization by the addition of wide-awake men who desire to represent the best motorcycle in the world in a comprehensive manner. The motorcycle business presents more interesting phases than any other vocation, but we want to be sure of obtaining the proper representation. If you are prepared to sell motorcycles, write today for our proposition. If we are already represented in your locality it will pay you to investigate the Flying Merkel before purchasing any machine, and we will be glad to mail you a FREE DEMONSTRATION COUPON if you will just say the word.

## The Miami Cycle & Manufacturing Co.

Largest Producers of High Grade Bicycles and Motorcycles in the World

570 Hanover Street

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# Big Money in Pop Corn Crispettes and Candy

## We Will Start You in the Business

Tell you how to make the most money with the least effort—how to get the crowds—how to cash in BIG from the very start! We'll help locate you, too, if you wish, and make it so easy that you can start at once and

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Hundreds of men and women everywhere are making BIG money in the ever-popular Pop Corn, Crispette and Candy Business. We will gladly do for you what we have done for hundreds before you. We make the terms so easy that a very small amount is sufficient to start you.

**\$600.00 in 3 days** that's what one man took in at Braidwood, Ill. Another made \$225 in one day. A young woman in St. Louis cleared \$50 in 1 1/2 hours. Think of it! Did you ever hear of such a wonderful business? Yet, you, too, can do as well in this easy business of BIG PROFITS. Now then, don't wait—don't think you haven't enough money, for with our easy payment plan very little is needed.

**Dellenbarger's Kettle-Popped Pop Corn**  
A new process means—large, light, fluffy and tender kernels that melt in your mouth. Makes Crispettes wonderfully rich and delicious—the kind that "wins" the "Come-back-to-get-more" crowds.

#### Start at Once—NOW!

Send for our big, generous co-operation offer. FREE catalogues and full particulars explaining how we start you on easy payments.

**Write Today, SURE!** Now is the time to get started. Our big offer sent by return mail. It's up to you NOW to act—DO SO! Address

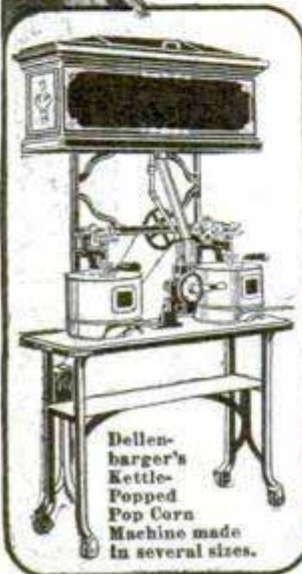
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NOTE! We also make Complete Wagon Outfits for Transit purposes. Our booklet describes them.



Dellenbarger's Improved Automatic Crispette Pop Corn Ball Machine Made in several sizes



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A remarkable typewriter, carried in grip or overcoat pocket. Standard keyboard. Does all that higher-priced machines do. Over 34,000 in use.

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Handiest typewriter built. Easy to operate. Built in famous Elliott-Fisher Billing Machine factory, sold on money-back-unless-satisfied guaranty. Guaranteed one year. Weight 4 1/2 lbs. You can carry for home use, business, trips, or anywhere. Send for catalog and

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It combines great lighting Power Economy and Durability, needing no expense for Upkeep.

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We need a man over 21 in every town, lighted by gas or electricity, to represent us. Give us all or part of your time and make a good income, \$100 to \$300 a month. Sell to people building houses, to churches, stores, etc. You can get the business with our line because you undersell competition 1/4 to 1/3. Start small and grow to a big business of your own. Write today, giving age and references.

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Five Room House \$298



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Have you decided on a home, the cost, style and size? Are you saving for this home? You can build it today for less. Aladdin Houses are artistic—modern dwellings, cozy bungalows—cost you less. You get better lumber. One dollar for every knot found in our Red Cedar Siding is the 1914 Aladdin guarantee to you.

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This House \$1,286



Complete Material

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Highest actual resistance to the grinding wear and tear of continuous road usage.

Greatest structural strength to withstand the strains and stress of the swift stop or the quick turn.

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Oilproof—through and through the rubber. You can ride V. C.'s right behind the oil wagon without danger of treads softening.

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*Go through the season on V. C.'s. Your dealer will demonstrate these superb tires, or write us direct for catalog.*

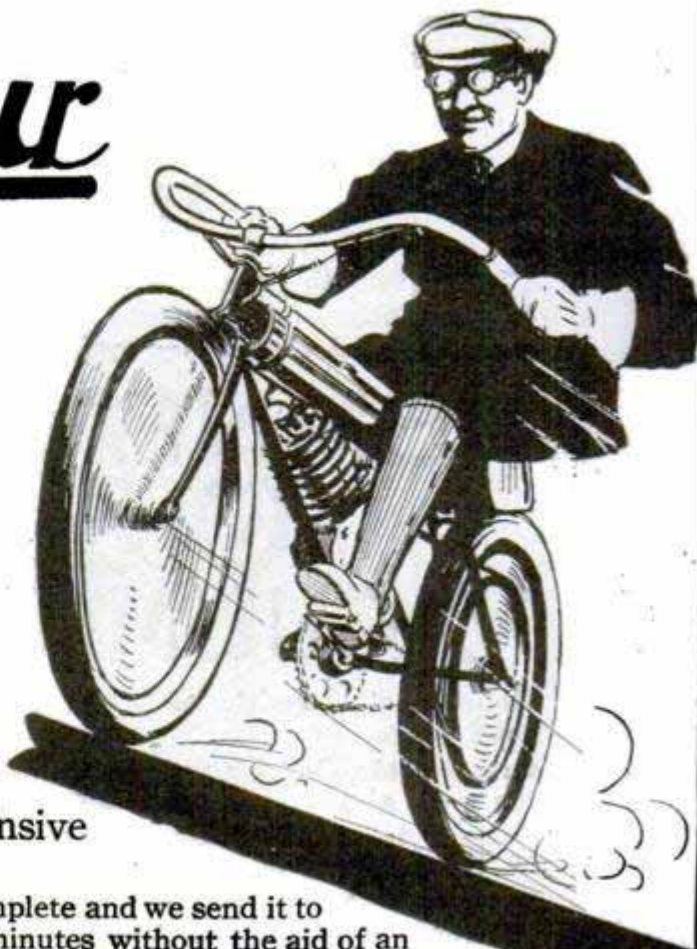
### Pennsylvania Rubber Co., Jeannette, Pa.

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Chicago Pittsburgh Minneapolis Dallas  
Cleveland Detroit Omaha Atlanta  
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*An Independent Company with  
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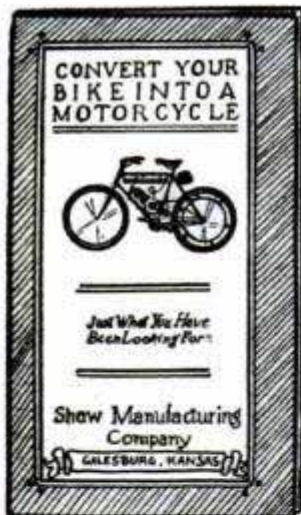


# Make Your "Bike" a Motorcycle



Yes, thousands of others have turned their old-fashioned bicycles into up-to-date, swift, sure, easy riding, high power motorcycles with the easily attached, inexpensive **Shaw motorcycle attachment!**

Fits bicycles of any make or size. Everything is complete and we send it to you all ready to attach to your bicycle in just a few minutes without the aid of an expert mechanic and without any special tools—just an ordinary wrench and screwdriver. Built of highest grade, most serviceable materials; every part guaranteed; plain easily understood directions sent with each equipment. Thousands of enthusiastic owners everywhere. Here is your chance to get a powerful, dependable, durable, fine looking and speedy motorcycle at a price so small you will wonder how you ever got along with the old-fashioned "leg power" machine!



## Read What These Users Say of the Shaw Motorcycle Attachment

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The SHAW Motor which I purchased of you about a month ago, is doing excellent work. I have ridden it about 300 miles with about 40 cents expense. It is certainly the cheapest and best running machine I ever saw. Having ridden several makes of motorcycles, I find it the simplest and easiest controlled of any of them.

W. N. HARMISON, Blockton, Iowa.

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I have climbed hills with your motor that large motor cars get stalled on; the sand is several inches deep.

ERNEST PEDEN, Carleton Place, Ont., Canada.

### "Power, Speed and Reliability"

I received my attachment from you in first-class condition. The motor was easily attached and runs fine. It does not take an experienced person to run the SHAW. I recommend it to anyone desiring, at small cost, a motorcycle for power, speed and reliability.

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### "Very Useful"

I have found your motor attachment to be all you claim. Have been using the one I bought for six months, have bought no repairs for engine at all. I find it very speedy and powerful, and very useful in many ways.

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### "Perfectly Reliable Outfit"

The motor which I ordered of you in the summer of 1910 has proved to be a perfectly reliable outfit. I have had no trouble whatever with the engine. The cam and gears show no wear, and I have probably ridden it 2000 miles. I can honestly recommend the SHAW Motor to anyone that wants a motorcycle at a small cost and have a satisfactory motor.

OSCAR L. THOMPSON, Cedar Lake, Iowa.

**SHAW**  
Manufacturing Co.  
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Thousands In Use All  
Over America and  
Europe

Please send me, free and postpaid, copy of your book illustrating and describing the SHAW Motorcycle Attachment as advertised in the April issue of POPULAR MECHANICS. Quote me your lowest net cash, factory price.

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We want to send you, free and postpaid, a copy of our booklet illustrating and fully describing the SHAW Motorcycle Attachment. When you read about the simplicity and the low cost of the SHAW attachment you will no longer be satisfied with your old-fashioned, slow-going, tiresome bicycle, but will want to send and join forces with the thousands of other go-getters who are now hitting the high speed trail with a SHAW!

Send name on the coupon or postal card for the free booklet today.

**Shaw Manufacturing Co.**  
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1810

1914



The

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From small beginnings in 1810 the Hartford Fire Insurance Company has, in 1914, reached its present preeminent position in the insurance field. Its steady growth in strength has been unreddeled by the enormous losses it paid to its policyholders both the great conflagrations of American History and in those

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Willingness to adjust losses fairly, ability to pay fully and readiness to pay promptly are the three great fire insurance virtues and they are the explanation of the "Hartford's" growth and prosperity.

**When you need Fire Insurance  
Insist on the "Hartford"**

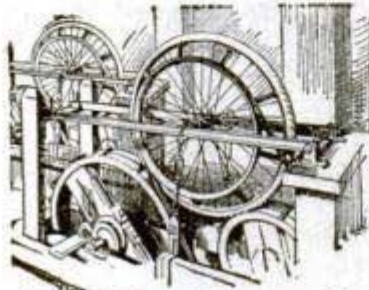


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## A Wonderful Bicycle Tire

### This Brutal Test Proves Its Worth



**T**HIS sketch shows our service testing machine. The tire is held by pressure against the rapidly revolving drums. These drums are uneven, with cleats nailed at intervals, patches of sand-paper, etc., thus reproducing hard road conditions. The best tire we ever made, prior to Vitalic Tires, stood this test for 1200 miles before wearing through and yet our tires have always been famous for endurance.

### Vitalic Bicycle Tires have stood this brutal test for 7200 miles!

Backed by such extraordinary evidence of quality and endurance, are you surprised that we dare to make the unlimited, unqualified Vitalic Guarantee?

#### VITALIC BICYCLE TIRE GUARANTEE

If Vitalic Tires do not,—in your judgment and to your entire satisfaction,—prove all we claim for them, you may return them to us and get your money back, or new tires.

There are two basic reasons for Vitalic endurance: An unbreakable tire fabric and the purest rubber obtainable.

We have at last found a way of compound-

ing pure rubber so that it has all the toughness and wear-resisting qualities formerly secured by introducing a lot of foreign materials, at the same time preserving the elasticity and life of pure rubber.

#### Write for FREE Testing Sample of Vitalic Bicycle Tire

Prick the inner tube with a pin—test the pure rubber—examine the rugged tread, then you'll know why Vitalic Tires can be guaranteed. Our booklet, "The Truth from Tube to Tread," tells all the facts about these wonderful tires.

**CONTINENTAL RUBBER WORKS, 19th and Plum Sts., Erie, Pa.**

*Largest Single Maker of Bicycle and Motorcycle Tires in the World*



12  
Tools  
In  
One

#### AGENTS! MAKE \$4,000 A YEAR

Everyone needs one of these new tools. Lifts or pulls 3 tons.

#### Automatic Combination Tool

A lifting jack, wire stretcher, wire mender, post and stump puller, etc. Get big circular. Write quick!

HARRAH MFG. CO., Box 201, Bloomfield, Indiana



1 1/2¢ a Night

A bright, clean, clear, safe Electric Light for your home, store or church. Send for book which tells the story.

#### UNIVERSAL BATTERY CO.

307 N. Peoria St., Chicago

We make all kinds of storage batteries for the trade.

Electric

for  
Light

## Mathematics Made Easy

FOR ALL, BY

### ROPP'S CALCULATOR

Shows the Answer as quickly as a Watch shows Time, to all practical Examples likely to occur in Office, Store, Shop, Bank, Farm or Factory. Over 20 editions—each adapted to some special line of business.

Elucidates and simplifies the science of Arithmetic, Mechanics and Mensuration.

Greatest Time and Labor-saving work on Figures used in the commercial world.

Desk size, \$1.25; Pocket, leather, \$1.00; Pocket, imitation leather, 50c; Vest-pocket, 50c. New 1912 copyright edition.

#### POPULAR MECHANICS BOOK DEPT.

6 N. Michigan Ave., CHICAGO



## Why the Two-Speed Harley-Davidson is the Ideal Machine for Sidecar Use

The two-speed Harley-Davidson is not simply adapted for sidecar use—it is built for it. Five features are extremely desirable on a motorcycle to render efficient service when used in connection with a sidecar—a satisfactory starter, a sturdy two-speed gear, double brake control, double clutch control, and a Ful-Floteing seat. The Harley-Davidson is the only motorcycle offering the advantages of these features.

### Step-Starter

With a sidecar it is decidedly awkward and almost impossible to lift the machine on to the stand for starting. With the Harley-Davidson Step-Starter this is unnecessary. A simple downward push on either pedal starts the motor.

### Two-Speed

The Harley-Davidson two-speed is the simplest, lightest and the most powerful two-speed on the market. Either speed can be engaged by the shifting of a convenient lever, whether the machine is standing still or in motion.

*The many desirable features of the 1914 Harley-Davidson are described in our new catalog, a copy of which will be mailed on request*

### Double Brake Control

With the sidecar the brake must necessarily be extra large in order to handle the double load. The Harley-Davidson auto type band brake may be operated by either foot or, in fact, by both feet if desired. The large Harley-Davidson brake carries a safety factor of more than 200% and is built large enough to stop an automobile.

Perfect control of any vehicle is essential to the safety of its occupants. We believe that the Harley-Davidson has the largest and most powerful

brake of any self-propelled vehicle on the road.

### Double Clutch Control

The Clutch on the Harley-Davidson is operated by hand lever or foot pedal at the option of the rider. It is not necessary to remove either hand from the handlebars in order to engage or release the clutch. This is a decided advantage in heavy sand or mud.

### Ful-Floteing Seat

For the third successive year, every Harley-Davidson incorporates the Ful-Floteing Seat. This patented device absorbs all jolts, jars and vibrations due to rough roads.

# HARLEY-DAVIDSON MOTOR COMPANY

*Producers of High Grade Motorcycles for More Than Twelve Years*

386 B Street

Milwaukee, Wis.

**MAKE \$250.00 A MONTH**

**Repairing AUTO-MOBILE Tires**

Sounds like a lot of money  
**—IT IS—A WHOLE LOT of MONEY**  
 to be earning CLEAR every month—yet it's  
 what hundreds of men we have established in the  
 Automobile Tire Repair Business are making.

You let down the DRAW BRIDGE for SUCCESS to enter into  
 your career by getting into business for yourself. The business for  
 you is the one where investment is small—the returns quick and for cash  
 —where the margin of profit is large—the demand for your PRODUCT or  
 SERVICE constant and ever on the increase.

**A Haywood Tire Repair Equipment**

answers to all of these requirements of Old Dame Fortune—the certainty of success in this  
 business is as sure as anything in this world can be—Each year adds thousands of new  
 Automobile Owners—they need YOU to keep their tires in service.

**Here Is Your Opportunity!**

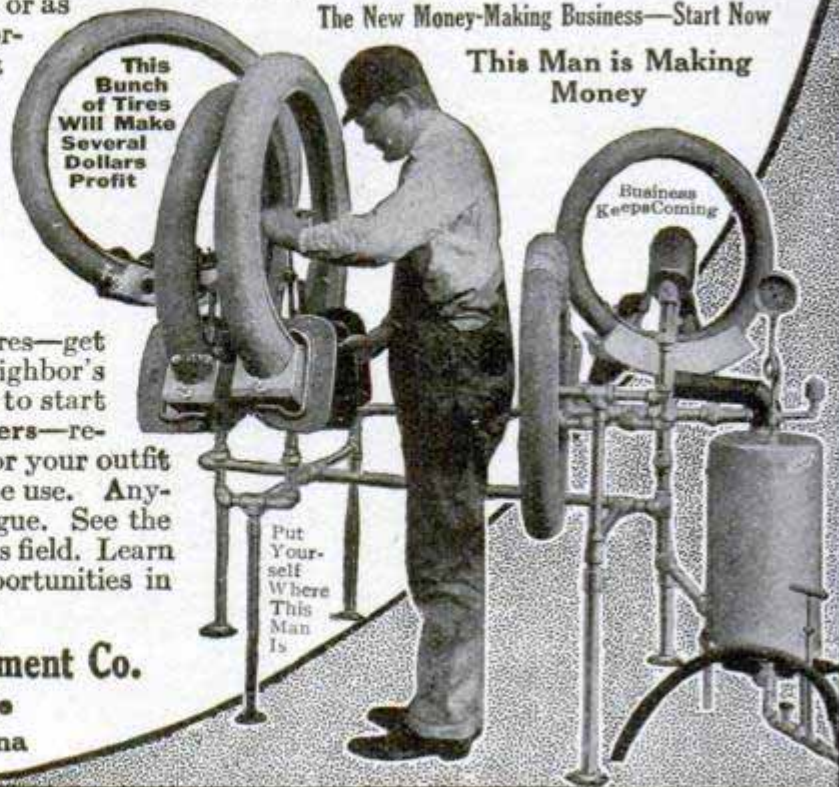
Be first to enter this new big paying business in your town. Open your pockets. Let the dol-  
 lars pour in. Act quick. Every auto sold means more tires to mend. Automobile business is  
 growing fast—enormous field for tire repairing. Punctures and blowouts are common. Tires need  
 retreading and vulcanizing. Something going wrong all the time. Thousands forced to buy new  
 tires because they can't get old ones fixed. Think of the old bicycle days—repair shops on every  
 corner—all making money—busy day and night. Autos make same proposition over again—only  
 ten times bigger and better. Users of Haywood Tire Repair Plants are making big money. Johnson,  
 Tex., writes: "I have made as high as \$18 in a day." Another man who bought a plant Septem-  
 ber, 1911, writes he has cleared over \$3000.00. That's going some! Operate a plant as side line  
 in connection with auto business—garage or as  
 an independent business. Find neighbor-  
 hood where there's a bunch of autos—get  
 all the steady business besides transient  
 work. Experience unnecessary. You learn  
 quick. Simply follow directions—practice  
 a few days on a couple of old tires and  
 you'll be ready to coin money Business  
 comes fast and easy.

The New Money-Making Business—Start Now

This Man is Making Money

This Bunch of Tires Will Make Several Dollars Profit

Business Keeps Coming



Put Yourself Where This Man Is

**Repair Tires At Home.**

Young men! and boys repair father's tires—get  
 money he pays garage man. Get the neighbor's  
 work. Make money to attend college or to start  
 a garage and repair business. Auto owners—re-  
 pair your own tires—save money—pay for your outfit  
 in short time. We have outfits for home use. Any-  
 how investigate. Send today for catalogue. See the  
 wonderful possibilities in this marvelous field. Learn  
 of the enormous money-making opportunities in  
 this fascinating new business.

**Haywood Tire & Equipment Co.**

729 N. Capital Avenue  
 Indianapolis, Indiana

# SAXON \$395

A Good Low Priced Car



Not a Cycle Car

The price of \$395 includes Top, Windshield, Lamps and Tools

## Everybody *Ought* to Own a Car— Now Everybody *Can* Own a Car

A good car is an economy—not a luxury. It means saving to the business man—ease in getting about—promptness in making appointments. It means health for himself, his wife and children—health and outdoor recreation. It increases efficiency.

Everybody ought to own a car. Now everybody can own a car—a good car; for the Saxon is a high-grade, well-designed, carefully built automobile, with four-cylinder motor, left drive, center control and standard features throughout, produced by an experienced organization, sound financially and in business to stay.

The first cost of a Saxon is less than a good horse and buggy; the upkeep costs far less. Its maintenance is almost negligible. The tires cost little. A gallon of gasoline takes it 25 miles and more. It is so simple that it scarcely ever needs readjustments or repairs. Saving in time considered, it is cheaper than riding on street cars.

### Good—and Good-Looking

The Saxon is the answer to the insistent demand for a low priced car that is not only good, but good-looking. It is a big car for the price—96-inch wheel base, standard head, roomy body, holding two people easily, ample leg room, generous doors. There is nothing skimpy or cramped about

Molded oval fenders, tapered bonnet, and streamline body with graceful, sweeping curves make it a delight to the eye.

The Saxon is amply powered. The high-speed, four-cylinder motor gives great thrilling power and flexibility. It throttles down to five miles an hour or speeds over the road at 40—and without unpleasant vibration or jarring.

### Mail Coupon for Free Demonstration

Prove the Saxon by riding in it. Sign your name on the coupon and mail it now; we will direct you to the Saxon dealer in your locality, and send you, free, a booklet telling the story of this great achievement in the science of motor car development. Also Arthur Brisbane's editorial on automobiling. Accepting our demonstration offer obliges you in no way—costs nothing. If you wish the booklet without demonstration—indicate it on the coupon. But find out more about the Saxon—now.

**SAXON MOTOR COMPANY, DETROIT, MICHIGAN**

## FREE Demonstration and Booklet

SAXON MOTOR COMPANY, DETROIT, MICHIGAN

Please direct me to the nearest Saxon dealer. I understand that a ride in a Saxon will cost me nothing and will obligate me in no way.

Also send me your free booklet telling the story of the Saxon, and Arthur Brisbane's editorial on automobiling.

NAME .....

ADDRESS .....



## The First Born

is a mighty important creature. It is vital that mother's health and strength be maintained so that baby can be properly nourished. The people of America have a true friend in

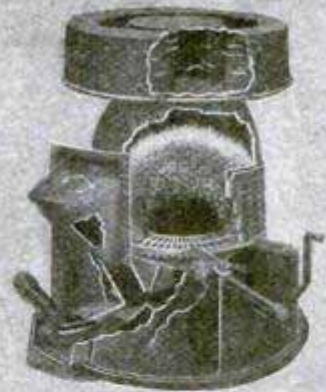
ANHEUSER-BUSCH'S  
*Malt-Nutrine*

To delicate women it has proven a blessing because of its food and tonic properties.

For sale by all druggists and grocers

Malt Nutrine, when mixed with milk or sparkling water, makes a most palatable and healthful drink.

ANHEUSER-BUSCH · ST. LOUIS, U.S.A.



Cut-Out View  
Underfeed Furnace

## Coal Bill Cut From \$90 to \$17<sup>50</sup> With An Underfeed

H. C. Laird, Norfolk, Va., says: "I am using your Underfeed in my residence of thirteen rooms, and two bath rooms, and my total coal bill will be about \$17.50 per winter. I have divided my coal bill by five, and can not recommend your Underfeed system too highly. I spent \$90.00 last winter heating a house one-half the size of above." This is strong money-saving Underfeed evidence, isn't it?

### Government Uses Underfeeds

The United States Government put the Underfeed through the hardest possible tests and *proved* that the following statements *were absolutely true*: "Coal bill \$16.22 for 7 rooms;" "\$5.50 to heat 4 rooms;" "Reduced coal bills from \$109 to \$53;" "Underfeed reduces coal bill 60 per cent;" "Have cut coal bill \$70 each winter for 9 years;" "Saved \$122 a season;" "Even temperature with no smoke or dirt."

Now the Government *specifies* Williamson Underfeeds wherever possible. There are over 25,000 Underfeeds in successful use. May we send you the names and addresses of over 2,000 Underfeed users—some right in your neighborhood—who *know* by experience that *clean, even, economical* heat is obtainable *only* with the Underfeed?

### The Underfeed Is Different

The Underfeed system of heating is *different* from all other systems—it's better. With the Underfeed coal is fed from below. All the fire is on top, causing perfect combustion. Smoke and gases are burned up, making more heat with *no* smoke, smell, clinkers and very little ashes. You can use cheap slack soft coal or pea and buckwheat hard coal and secure same heat as highest priced coal. The Underfeed is adapted to warm air, steam and hot-water systems in homes, stores, churches, schools, halls and other buildings.



Cut Coal Bills 1/2 to 2/3

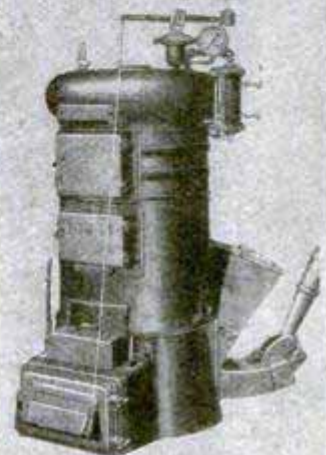
#### READ THIS GUARANTEE

Every Underfeed Furnace or Boiler, when properly installed and operated, is guaranteed to effect a saving of 50 per cent in coal bills. This is backed by a \$1,000,000 corporation. The strongest guarantee ever put behind any heating system is behind the Underfeed. If you are going to build or want more heat at less cost, send the coupon for full particulars. It will pay you well.

#### THE WILLIAMSON HEATER COMPANY

Successor to The Peck-Williamson Company

201 Fifth Street (20) CINCINNATI, OHIO



Underfeed Boiler

Get This  
Book



### The Coupon Brings All The Facts

THE WILLIAMSON HEATER COMPANY,  
201 Fifth Street, Cincinnati, Ohio

I would like to know *how* to cut my coal bills from one-half to two-thirds with an Underfeed.

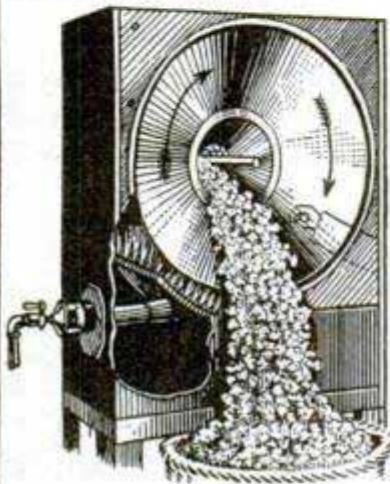
Warm Air.....Steam or Hot Water.....  
(Mark an X after system interested in.)

Name .....

Address .....

My dealer's name is .....

# \$1500<sup>00</sup> MADE with Long's



This picture shows the fire in a rotary corn-popper. The fire plays on the corn with an intense heat, like small blow pipes. As it pops, the popped corn is thrown out automatically. By this process the corn comes from the popper dry and not shriveled by the heat. Professional candy makers—the men who know—use this process only, for corn which is to be candied. Any other method is not satisfactory, usually adding grease to the corn which makes it tough. Greasy corn makes soggy Crispettes. Long-popped soggy Crispettes are never soggy.

one will spend a nickel—everyone likes Crispettes—children—parents—old folks. You don't need any experience—you can start anywhere—in a store window, a small store room where rent is cheap, or the kitchen of your home. The Crispette machine and Long's secret formula to the man of limited means is a Gold Mine—a sure way to independence and fortune—to make money from the start.

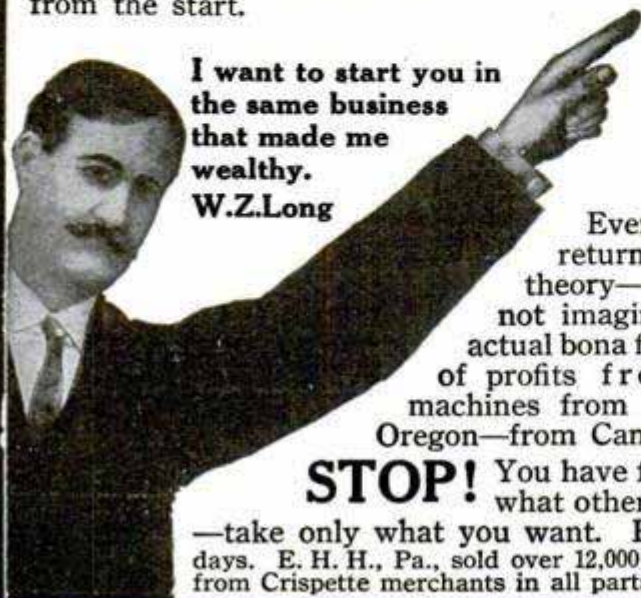
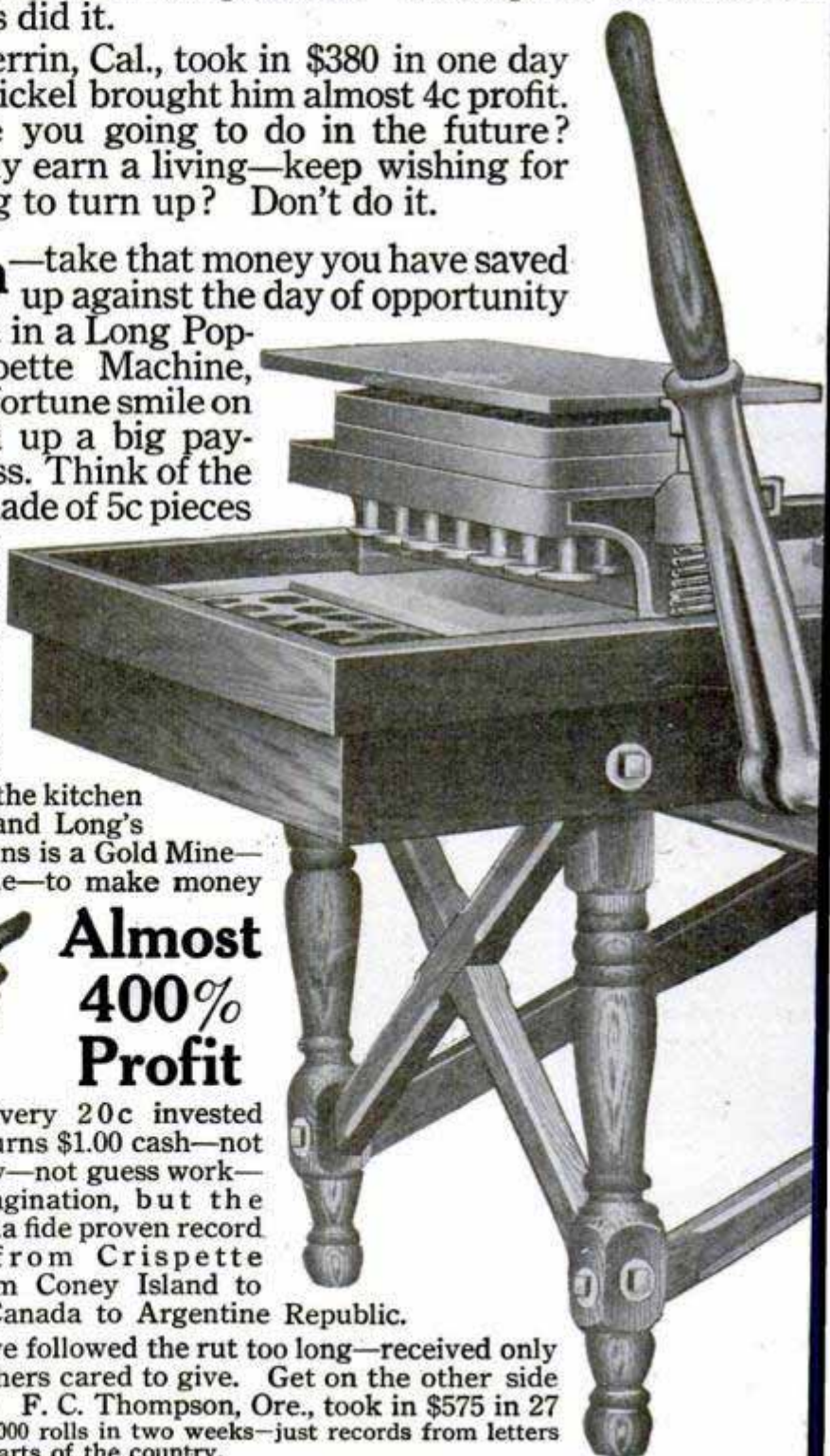
That's what Mr. Eakins made—paid his last \$10 for rent of a store window—at the end of 30 days had \$1500 in the bank—today he is independent. A Crispette machine and Crispettes did it.

Mr. Perrin, Cal., took in \$380 in one day—every nickel brought him almost 4c profit. What are you going to do in the future? Just barely earn a living—keep wishing for something to turn up? Don't do it.

**Listen**—take that money you have saved up against the day of opportunity

—invest it in a Long Pop-corn Crispette Machine, and make fortune smile on you—build up a big paying business. Think of the fortunes made of 5c pieces

- street cars
- moving pictures
- 5 and 10c stores. Every-



I want to start you in the same business that made me wealthy.  
W.Z.Long

**Almost  
400%  
Profit**

Every 20c invested returns \$1.00 cash—not theory—not guess work—not imagination, but the actual bona fide proven record of profits from Crispette machines from Coney Island to Oregon—from Canada to Argentine Republic.

**STOP!** You have followed the rut too long—received only what others cared to give. Get on the other side—take only what you want. F. C. Thompson, Ore., took in \$575 in 27 days. E. H. H., Pa., sold over 12,000 rolls in two weeks—just records from letters from Crispette merchants in all parts of the country.



# IN ONE MONTH

# *Crispettes*

# *BY THIS MAN*

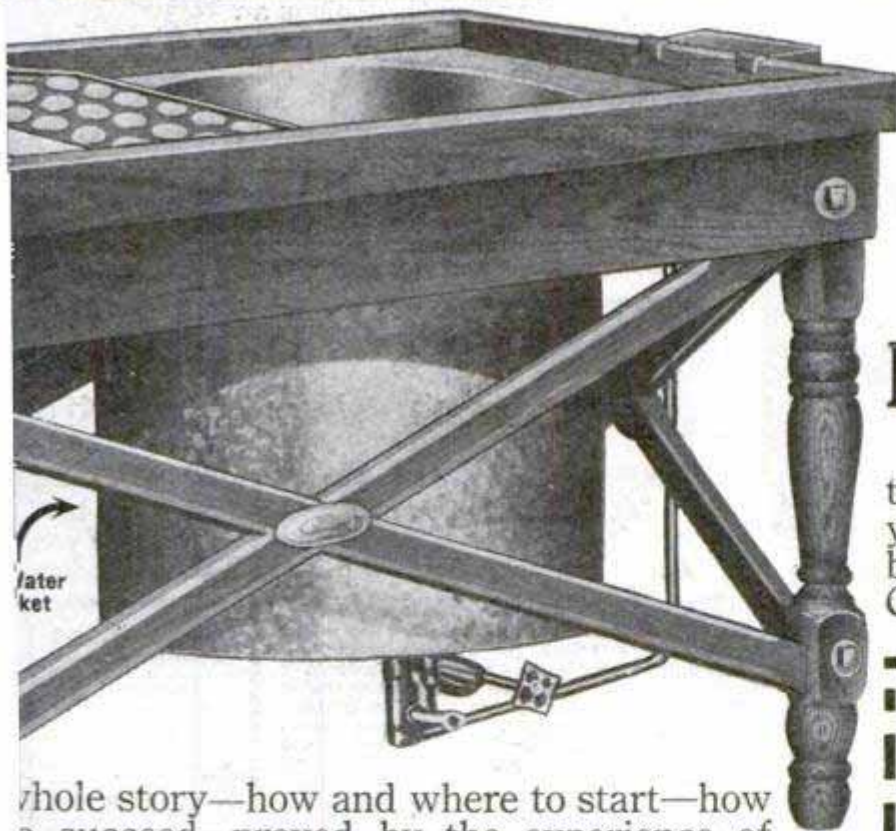
The money barons began with much less advantage than I offer you today. Write NOW for my handsomely illustrated 48 page free booklet, "How To Make Money in the Crispette Business," or

## **Come to See Me at My Expense**

It's unnecessary to write that you are coming—just drop in any time. I will pay your traveling

*This machine did it*

expenses within a 300 mile radius if you buy a machine. I will give you reference after reference from responsible merchants, bankers, citizens—satisfy yourself and then go over the Crispette business with me.



## **Go Into This Business Now—**

The big spring and summer trade is waiting for you right in your own city. Send for my free booklet "Dollars & Sense In The Crispette Business." It tells the

**W. Z. LONG,**  
(885) **Springfield, O.**  
Please send me free, full particulars about Crispette Machine and how to start a big paying business.

Name .....  
Address .....  
.....

whole story—how and where to start—how to succeed, proved by the experience of others. It's worth reading even if you don't start. If you are looking for a good thing and easy money, send for this book—today.

**W. Z. LONG** 885 High Street, SPRINGFIELD, O.

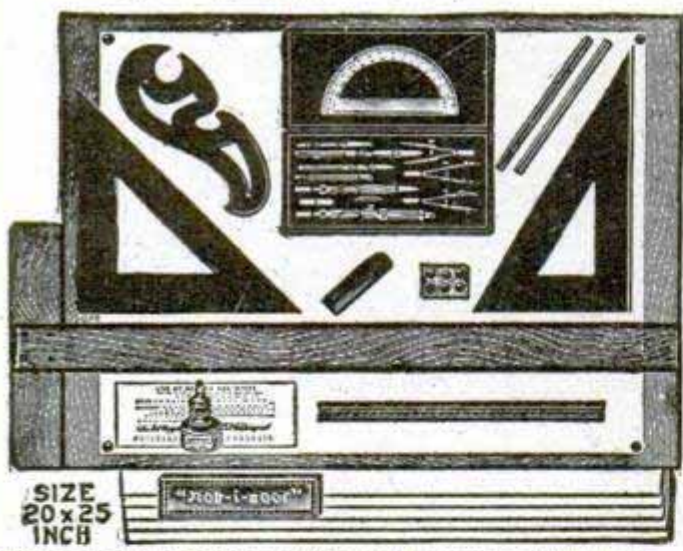
# \$1500 to \$3000 a Year Drafting and Designing

This is the salary that good first class Draftsmen and Designers draw and that is what you can earn if you have any ambition and will let me train you on practical Drafting room work.

## \$125 a Month

Starting salary according to my agreement and guarantee. Draftmen's work is pleasant and profitable.

Positions are open to intelligent men in the best surroundings. They are open everywhere. Thousands of men are needed who have just the kind of training I can give you. You can get this training during spare time in your own home.



There is a constant and urgent demand for the best trained men in this line of work and I can train you to fill such a position in a reasonable length of time. Send the coupon below for my special offer. Send it today.

## Chief Draftsman Will Train You Personally

on practical Drafting-room work until you are competent and until you are in a permanent position at a salary paying at least \$125 per month. This is an exceptional opportunity for a few selected ambitious men, between the ages of 16 and 40, whom I will train personally.



**Free Book—Write Today** Your name and address on a postal or letter or coupon is enough. I will send you absolutely free and prepaid my big new book "Successful Draftsmanship" and full particulars of my great offer.

## FREE—this \$1500

### Draftsman's Working Outfit

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.

### Realize Your Ambition

Don't "just dream" of the days when you will be the man who gets the fat pay envelope. Act! All those little luxuries that you have wanted for so long—all those little extravagances you have wanted to afford are now within your reach. The Drafting profession is open to you. The first step toward realizing your ambition—and getting the fat pay envelope is to send the free coupon. Do it now.

### Mail the 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 limited and in order to benefit thereby, act at once—NOW.

### 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 complete Draftsman's working outfit at once.

## Free Offer Coupon Chief Draftsman Dobe

Engineer's Equipment Co. Dept. 9195 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 .....

## CHIEF DRAFTSMAN DOBE

Engineers Equipment Co. (Inc.) Div. 9195 Chicago

# GENUINE PERFECT CUT DIAMONDS

## The Basch Trade-Mark is Your Personal Safe-Guard!

for it tells in briefest sign-language the **ONLY WAY** to buy diamonds **RIGHT!** First, note that price—**\$97.50 per carat**—the world's lowest for Genuine Perfect Cut Diamonds—full \$160 per carat retail value! "Established 1879" means 35 year tested **RELIABILITY!** "Money Back Guarantee"—described more fully below—means **CASH FOR YOUR DIAMOND** if you need it or want it!

## Send No Money—Not Even a Deposit!

You **see** the diamond before you **decide!** We ship any diamond set in your own choice of mountings; allow fullest examination—all at our expense—all without obligating you to buy! We stand **ALONE** in the **conveniences** we offer you, just as we stand **ALONE** in **price!**

## Basch Money Back Guarantee

issued with every diamond—a legal written contract to **REFUND FULL PRICE IN CASH**, less 10% any time within 2 years; to allow **FULL PRICE** on exchanges **ANY TIME!** Carat weight, quality and value legally certified. No equal guarantee in the whole diamond business! "See that your Diamond is Basch Guaranteed."

## A Valuable "Tip" to Diamond Buyers

Always buy diamonds **by the carat!** Jewelers always buy **by the carat.** Why do 999 out of 1000 jewelers refuse to sell by the carat? Simply because they daren't let you know the **tremendous price per carat** they are asking—because they daren't allow you to make a comparison with **BASCH IMPORTERS' PRICES!** Here again **L. Basch & Co.** stand **ALONE!** We have sold diamonds **by the carat** for 35 years!

## These Basch Prices Defy All Competition

C1—14K. Solitaire, 1 carat dia. <b>\$101.25</b>	C8—14K. Ears-crows, Two $\frac{3}{8}$ c. dia. <b>\$138.00</b>
C2—14K. Fancy Ring, $\frac{3}{8}$ c. dia. <b>35.50</b>	C9—14K. Eardrops, Two $\frac{3}{8}$ c. dia. <b>115.50</b>
C3—14K. Twin Ring, Two $\frac{3}{8}$ c. dia. <b>67.50</b>	C10—14K. 6 tooth, $\frac{3}{8}$ carat dia. <b>50.50</b>
C4—14K. Engraved, $\frac{3}{8}$ carat dia. <b>22.50</b>	C11—14K. Belcher, $\frac{3}{8}$ carat dia. <b>73.00</b>
C5—14K. Pierced, $\frac{3}{8}$ carat dia. <b>12.00</b>	C12—14K. Flat Belcher, $\frac{3}{8}$ c. dia. <b>91.25</b>
C6—14K. Fancy Ring, $\frac{3}{8}$ c. dia. <b>35.25</b>	C13—14K. Lion's Paw, $\frac{3}{8}$ c. dia. <b>38.25</b>
C7—14K. Solit. Stud, 1 carat dia. <b>99.75</b>	C14—10K. Cuff Links, 2 diamonds <b>1.75</b>
C15—10K. Tie Clasp, 1 dia., Special <b>\$1.00</b>	

## If you expect to buy a Diamond, do it NOW!

Diamond prices have gone up 25% within the past year! While our tremendous buying power enables us to continue our old price, \$97.50 per carat—conditions may compel an increase any day. **Act quickly** if you want to share in future increases—if you would avoid paying very much higher prices.

## 128 page De Luxe Basch Diamond Book FREE!

The costliest, most complete diamond guide yet produced. Thousands of illustrations. More than a catalogue, for it contains information about diamonds acquired in a life-time of specializing by recognized diamond experts. Enables you to judge diamond qualities, to compare values, to buy intelligently. Shows most artistic new and fashionable ideas in diamond mountings—14K. solid gold, platinum, onyx, inlaid, etc. Full particulars of the Basch Plan, importers' prices and money back guarantee. Shows a complete line of Watches and Jewelry of all standard makes, catalogued at **FACTORY** prices—these prices by comparison are startling.

MAIL COUPON OR WRITE TO

**L. BASCH & CO.**  
Dept. P247, State & Quincy Sts., CHICAGO

**\$97.50** Per Carat  
**DIAMONDS**  
**BASCH**  
**CHICAGO**  
**MONEYBACK GUARANTEE**  
(TRADE MARK)



Please mail me Free, copy of your 128 page De Luxe Basch Diamond Book illustrated in colors. I am not obligated in any way in requesting this book.

Name.....

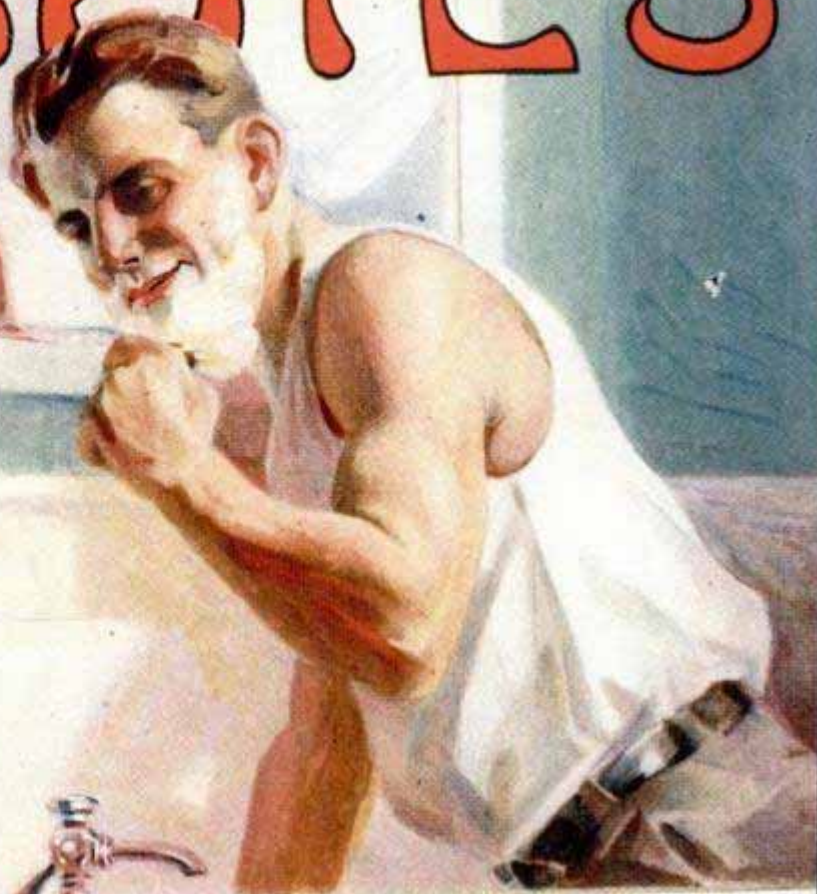
Address.....

Mail to **L. BASCH & CO.,**  
Dept. P247, State & Quincy Sts., Chicago

**\$97.50** Per Carat  
**DIAMONDS**  
**BASCH**  
**CHICAGO**  
**MONEYBACK GUARANTEE**  
(TRADE MARK)

# COLGATE'S

## SHAVING LATHER



"Papa, why do some people use other kinds of shaving soap?"

"Because they've never used Colgate's."

Learn the comfort of a Colgate Shave. On receipt of 4 cts. in stamps we will send you a trial size of Colgate's Shaving Stick, the Magic Wand of Shaving; Rapid-Shave Powder, the Powder that Shortens the Shave; or Perfected Shaving Cream. Mention your preference.

**Colgate & Co.**

Dept. 81

199 Fulton St.,  
New York

Makers of Cashmere  
Bouquet Soap—luxur-  
ious, lasting, refined.



ANDREW  
LOOMIS