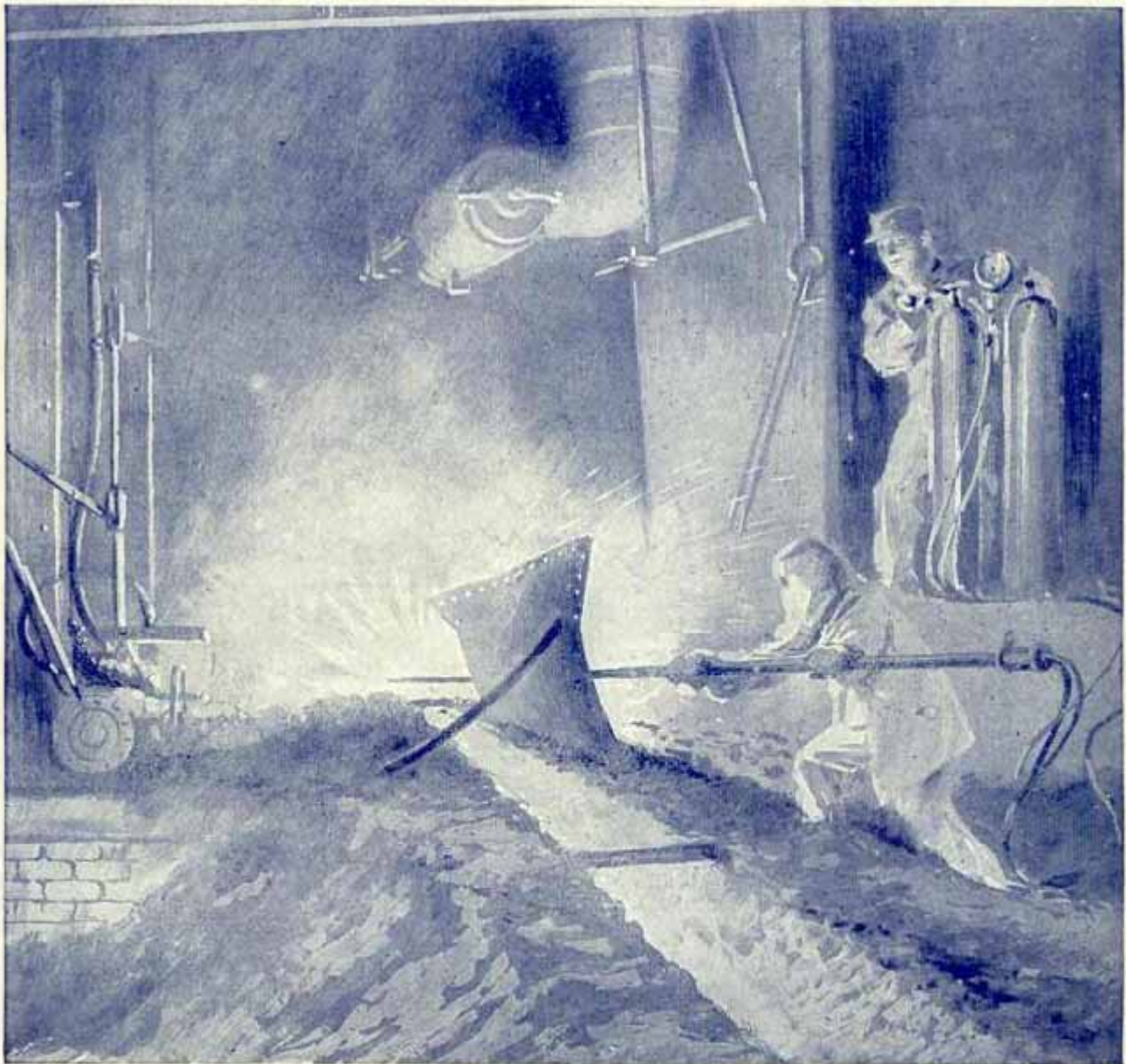


POPULAR MECHANICS

WRITTEN SO YOU CAN UNDERSTAND IT

PUBLISHED IN CHICAGO

LARGEST CIRCULATION OF ANY MECHANICAL PUBLICATION IN THE WORLD



A Critical Moment—Reviving a Big Furnace with Oxygen Gas—See Page 303

Save Half Your Plumber's Price

WE SELL DIRECT TO CONSUMERS

\$1.25 FOR A WHITE ENAMELED KITCHEN SINK



3,000 handsome, cast iron, flat rim, white porcelain enameled, brand new kitchen sinks, 16 inches wide and 24 inches long, with nickel plated strainer and collar for connection, all ready to install. Other sizes at correspondingly low prices. Kitchen sinks with backs, made in one piece at prices ranging from \$7.00 to \$15.

\$6.00 BUYS A WHITE ENAMELED BATH TUB

600 handsome, new, graceful shaped steel bath tubs, with the enamel baked on the inside, nicely painted on the outside, 4½ feet long. Price includes nickel plated strainer and waste and fancy designed iron feet. Other sizes from 4½ to 6 feet.

1,200 seamless white enameled, cast iron, heavy roll rim bath tubs, in sizes from 4½ to 6 feet, at prices from \$8.50 to \$30.00.



\$10.00 IS OUR PRICE ON THIS MODERN CLOSET

Sanitary, syphon acting, vitreous closet bowl, with a hardwood seat and tank, with all nickel plated fittings and connections. Usual price, \$20.00. All styles of closet outfits at prices less than cost to manufacture.

\$3.50 for a White Enameled Lavatory

In assorted styles and shapes for straight wall or corner of room. Our price is for the lavatory slab including waste plug, nickel plated overflow and brackets. Other



styles, including supply pipes, basin cocks and all nickel plated appliances, ranging in price to \$20.00.

We carry in stock at all times everything needed for installing plumbing for a building of any kind. No other concern on earth has such an enormous quantity of brand new material for sale. From the cheapest to the very highest priced plumbing outfits, including solid porcelain bath tubs, foot baths, urinal stalls and everything required for a high grade job.

OUR BOOK on PLUMBING MATERIAL CONTAINS CHARTS, DRAWINGS and DIAGRAMS

Shows how any ordinary mechanic can install our plumbing fixtures without wiping joints. Also tells how to secure perfect sanitation. We will send it free, if you mention where you have seen this advertisement.



STEAM and HOT WATER HEATING APPARATUS

We guarantee to save you from 30 to 50% on heating jobs of every kind. Send us sketch or diagram of your house for our estimate. Our plants are of the most modern construction. Our book on Cold Weather Comfort contains useful information. Tells you every phase of the heating question.

We Buy Our Goods at

Sheriffs' and Receivers' Sales

That's why we can sell you this material at such extremely low prices. No one else can compete with us. Absolute satisfaction is guaranteed and you need have no hesitation in dealing with us. If you buy any goods from us not fully up to your expectations, we cheerfully take them back at our freight expense, and refund your money.

Our 500-page catalogue No. A. F. 539 prices everything needed for the home, in the field, or in the factory. Includes Furniture and Household Goods, Office Fixtures and Appliances, Machinery and Roofing, Fencing, Piping, and in fact, almost everything under the sun. We will send it free if you will mention this publication. **1,000 Genuine Turkish Rugs at Half Price.**

CHICAGO HOUSE WRECKING CO.

35th and Iron Streets
CHICAGO, ILL.

A Start in Life

Young man, if you cannot afford to attend a Manual Training or Engineering School, nothing will give you so good a start in the world as four years **in the Navy.**

If you have no trade, you are given a course of instruction at a **Naval Training Station** before being sent to sea. If you have a trade—even though partially learned—you have an advantage in increased rating and pay from the beginning.

You receive regular wages, being credited with pay from the day you enter. Your board, lodging and medical attendance cost you nothing, and you are equipped with an outfit of uniform—worth \$60—at the expense of the Government.

There are **Trade Classes** for the instruction of men having some knowledge of electricity, stenography and typewriting, music, nursing, cooking, baking and the artificer trades. The recruit's pay continues during instruction in these classes, and if he is found proficient at the final examinations, he is usually advanced in pay and in rating before going to sea.

As there are practically no living expenses, there is **every chance to save;** and your savings may be invested with the Navy Paymaster at 4% interest, or they may be sent home without expense to you.

The work is healthful and interesting, and there is plenty of time for recreation or for study. Enlisted men are encouraged to fit themselves for advancement by learning the theory of their profession, and promotion usually awaits men who are qualified.

Ask for an Illustrated Booklet, telling more about the Navy.

Address any Navy Recruiting Station, or

BUREAU OF NAVIGATION

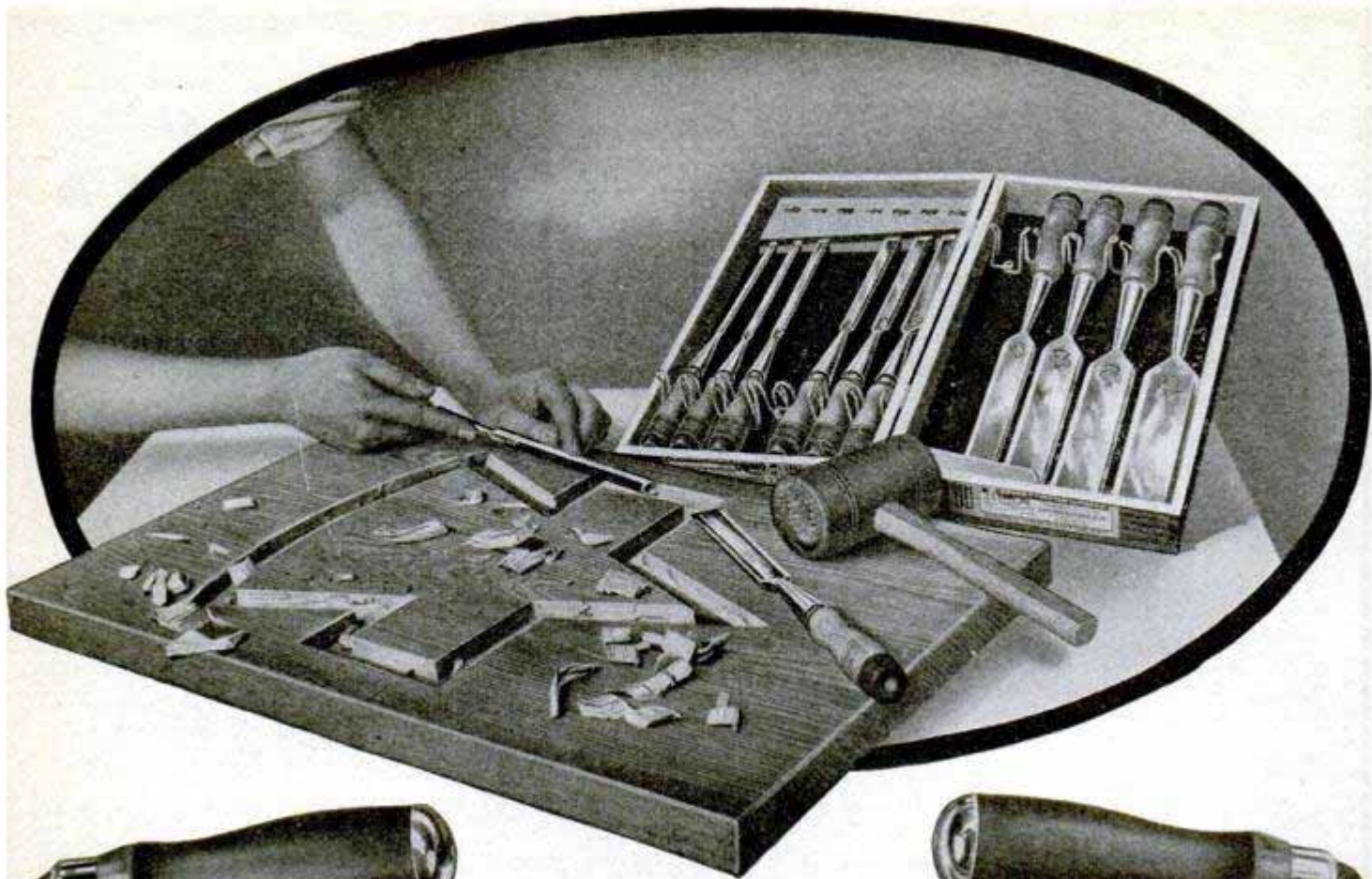
...DESK 69...

Navy Department

Washington, D. C.

This One





A Practical Trademark

The Keen Kutter Trademark is a practical one. It means something to you—it protects you—it makes an expert buyer of you—and it costs you nothing.

This trademark means, wherever or whenever you see it, that the tool upon which it appears is the best that can be bought—that it will outwear all others—that it is perfect in quality, temper, balance, adjustment, and adaptability.

KEEN KUTTER

QUALITY TOOLS



are made to work. They are thoroughly tested at the factory to make sure they will do their work, then stamped Keen Kutter.

The guarantee of the maker goes with them, protecting you and the dealer who sells them. They are the only tools you know before trying will give long, hard, satisfactory service.

"The Recollection of Quality Remains Long After the Price is Forgotten."

Trade Mark Registered.

—E. C. Simmons.

If not at your dealers, write us.

**SIMMONS HARDWARE
COMPANY, (Inc.)**
St. Louis and New York, U. S. A.

Please Mention Popular Mechanics

POPULAR MECHANICS

H. H. WINDSOR, Editor

225 Washington St., CHICAGO, U. S. A.

Copyrighted, 1909, by H. H. Windsor.

Exchange Editors are at liberty to quote from these pages by giving the usual credit.

CONTENTS FOR APRIL, 1909

Niagara's Power Curbed by Ice.....	293	Indian Women Run Ferry 80 Years.....	332
France Reverts to the Guillotine.....	294	African Musical Instruments.....	332
Overshoe Attachment for Automobile Brake.....	294	London Regulations for Taxicabs.....	332
Ingenious Door-Step Shoe-Cleaner.....	294	The "Flatiron" Building of the West.....	333
New Type of Parachute.....	295	Great Water Project in Brazil.....	333
Corsage Bouquet Shields.....	295	Steel Rails that Can Be Twisted.....	334
Ocean Tuberculosis Sanitarium.....	295	Aeroplanes to Take Place of Cavalry.....	334
Scales for Weighing Babies.....	296	The Double-End Wheelbarrow of Africa.....	335
Illuminating Signs Without Cost.....	296	Weighing Attachment in Refrigerator.....	335
Australia May Have Great Oil Field.....	297	Shoshone Bridge to Be 550 Ft. High.....	335
Emergency Jackets for Submarine Crews..	297	An Automobile House.....	335
A Boy-Girl Fancy Dress Costume.....	297	Concrete Work in a Temperature of 24 Be- low Zero.....	336
England's Champion One-Armed Golf Player	298	German Invention Combines Phonograph and Siren.....	336
Rolling Snow-Covered Roads with Auto....	298	Petroleum Production in 1908.....	337
Launching a Submarine.....	298	A Human Gyroscope.....	337
A Revolving Diamond Sunburst.....	299	The "American Special" in England.....	337
Trapping Speed Maniacs at Night.....	299	Yacht That Sails Itself.....	338
The Size of Ocean Waves.....	299	Uncle Sam's Derelict Destroyer.....	341
The Return of the World-Girdling Fleet... 300		Auto Lamps That Turn with the Forward Carriage.....	344
English Viaduct.....	300	Acquiring Oyster Farms in Texas.....	344
Wireless Telephone Room of U. S. Battle- ship.....	301	Battle Puzzle Furnished by Nature.....	344
America Rivals Norway in Skee-Jumping... 301		Fire-Fighting Through Long Line of Hose. 345	
An Automobile Stage Coach.....	303	Old Austrian Inspection Engine.....	345
Remarkable Oxygen Melting Process.....	303	Ten-Million-Pound Hydraulic Compression Testing Machine.....	345
The Building of Roads by Convict Labor... 305		Root Growth in a Sewer.....	346
Street Cars Help Heavy Loads Up Grade.. 308		A Few Gas Statistics.....	346
A Khedive's Private Car.....	308	Loaf of Russian Bread.....	346
A California Beach.....	309	Ten Years' Struggle to Reach Rock Salt... 347	
Reinforced Concrete Structural Work Cast on the Ground.....	310	Private Railway System.....	348
Electric Lighting Equipment for Autos.... 312		New Heavier-Than-Air Flying Machines... 349	
The Floating Palaces of the Rajahs.....	312	U. S. Homes for the Homeless in Stricken Italy.....	349
Remarkable Safe-Escape Act.....	315	Guarding the Golden Gate.....	350
Ingenious Motor Tractor for Farming.... 316		Separable Metal Barrels.....	350
Wealth Stored in Sand.....	316	One Result of a House-Cleaning Law..... 351	
Ammunition Supply Ships for Navy.....	317	Military Stretcher Cars in India.....	351
Manufacturing Salt with Bessemer Process 318		Pure Copper Nugget Weighing Three Tons. 351	
New York's New Auto Fire Wagon.....	318	Advertising with an Airship in Mexico... 352	
Whaling with Modern Methods.....	319	Japan a Breadless Country.....	352
New U. S. Turbine Torpedo.....	321	Largest Chrysanthemum in the World.... 352	
Engine Motion Detector for Steamships... 321		Germany's Modern War Automobiles.... 353	
Shingles from a Tree 1,100 Years Old.... 322		Floating Church in Germany.....	353
Bottle Floated 33 Years.....	322	San Francisco's Chinese Telephone Ex- change.....	353
Salt Water as a Weed Killer.....	323	Another Style of Mission Chair.....	354
The Palace of Mirages.....	323	Dressing the Clay Form of a Bear.....	356
Canadian Lobster Traps.....	323	A High School Aero Club.....	356
A Cure for Hot Boxes.....	324	Wrecked Ship Used to Build Village..... 356	
Woman Paints Great Sign High in Air... 324		Folding Automobile Seat.....	356
Mount Blanco the Largest Borate Deposit in the World.....	325	Toothpicks in Blocks.....	357
Woodpecker Holes in Telegraph Poles.... 326		The Dumb-Bell Game.....	357
Steerage Passenger Defined.....	326	How to Make a Roll-Top Desk.....	357
Signal Fires of the Austrian Frontier.... 326		Hollow Concrete Piles.....	359
Dummy Drill Gun on the U. S. S. "Con- necticut".....	327	Durable Incandescent Rods for Gas Lighting. 360	
Model of Wonderful Concrete House.....	327	Words and Sentences Changed by a New Mechanical Sign.....	360
Tilting a Bridge Into Place.....	328	Spectacle Holders for Young Children... 361	
Washing Away Part of Seattle.....	328	Mining and Preparing Meerschaum..... 361	
U. S. Navy Has Most Powerful Searchlight. 329		Chinese Attach Whistles to Pigeons..... 361	
Two Possibilities in Aerial Flight.....	330	An Emergency Waterworks.....	362
Unique Idea of Christening a Building... 330		Polluting Streams with Waste Material... 362	
Signboards for Airships.....	330		
Concrete Dyke to Protect Road.....	331		

(Continued on Page 6.)

Issued Monthly

SUBSCRIPTION:

Single Copy 10 Cents

In United States, and its possessions, and Mexico, per year, postpaid - \$1.00

To Canada and all countries in the Postal Union, per year, postpaid - 1.50

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

Eastern Advertising Office :: 116 Nassau St., New York

Entered as Second Class Matter Sept. 15, 1903, at the Postoffice at Chicago, Illinois, under Act of March 3rd, 1879
Published monthly by POPULAR MECHANICS CO.

The attention of prospective advertisers is called to the policy of this magazine in accordance with which the publisher waives all claim for payment of any advertisement appearing in any issue where the number of copies actually printed and circulated is less than the number printed on the front cover page.

A Portuguese Straw Raincoat..... 362
 A Kansas Airship..... 363
 Motor Headgear for Women..... 363
 Train Tears Off Corner of Four-Story Building 363
 Automobiles as Cowboy Steeds..... 364
 Home-Made Lawn Swing..... 364
 Derrick Car for Handling Railroad Rails... 365
 Great House for Aerial Warships..... 366
 Dirigible Airship for Carrying Freight.... 366
 A Wonderful Clock in San Diego..... 366
 Button Matcher 391
 Violin with Horn Attachment..... 391
 Lock Attachment for Milk Bottles..... 391
 Sweaters for Dogs..... 391
 Telephone Receiver for Lengthy Transactions 391
 Ingenious Hot-Drink Sign..... 391
 Finger-Developing Harness 391
 Anti-Snoring Device 391
 Tent-Cot for Many Purposes..... 391
 Sunshade Fastens to Shoulders..... 391
 An Electrically Vibrated Bed..... 391
 Lip Protector for Dental Work..... 391
 Crushed Bow of the "Florida"..... 392
 Save and Sell Waste Paper..... 392

SHOP NOTES.

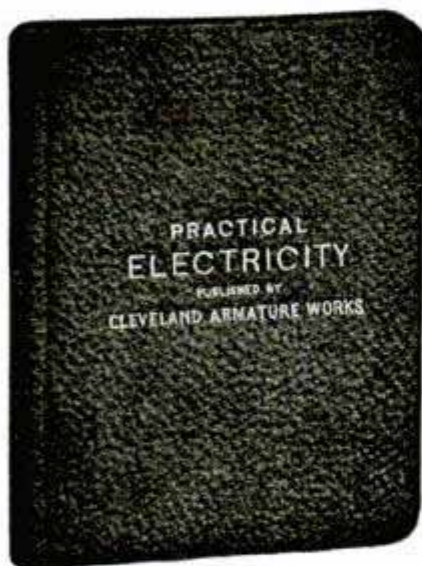
Cutting Tin with a Hand Saw..... 367
 Outside Pump Operated from Within a House 367
 Arc Lamps Hung on Coil Springs..... 367
 Erecting Windmills with an Automobile.... 368
 Home-Made Engine-Room Chair..... 368
 Moving a Tank by Floating in Artificial Pond 368
 Safe Way to Use Small Drills..... 368
 Stand for Holding Armatures While Repairing 369
 How to Construct a New Copper Gutter... 369
 Keeping Rats from Climbing Ropes..... 369
 Keeping Moisture from Fire Alarm Boxes.. 369
 How to Make a Brooder..... 370
 Proper Care of Reamers..... 370
 Repairing an Aluminum Intake Pipe on an Automobile Engine 371
 Home-Made Log Jack..... 371

Home-Made Split Pulley..... 372
 Repairing a Worn Carburetor Valve Stem... 372
 How to File Hand Saws..... 372
 Attaching a Funnel to a Measure..... 373
 A Concrete Cyclone Cellar..... 373
 Truing Up a Square or Saw..... 374
 Concrete Base for Wood Fence Posts..... 374
 Fire Extinguished with a Stream of Steam.. 374
 Truck for Carrying Car Axles..... 375
 Automatic Blower for the Forge..... 375
 Collapsible Mold for Making Concrete Sewers, Bridges and Culverts..... 376
 Home-Made Tapping Machine..... 377
 Temporary Repair on a Hammer Handle.. 377
 How to Fasten a Handle on an Umbrella... 377
 Furnace to Heat a Hotbed..... 378
 Piling Sacks of Cement..... 378
 Steaming Wood for Bent Work in Boats... 379
 Home-Made Road Grader..... 379
 Unfinished Hardwood Doors..... 379
 Road Embankments Along Streams..... 380
 A Gas Pipe Gate..... 381
 Throttle Valve Operated by a Float..... 381
 A Tile Soldering-Iron Heater..... 381
 Home-Made Beam Compass..... 382
 Extension Bed for a Planer..... 382
 Home-Made Tinner's Charcoal Stove..... 382
 A Nail Grip for Hammers..... 382
 An Automobile Cover..... 383
 Carbolic Acid as a Disinfectant..... 383
 Crude Oil Tire Heaters..... 384

AMATEUR MECHANICS—

How to Make a Simple Still..... 385
 Home-Made Mariner's Compass..... 385
 Quartz Electrodes Used in Receiving Wireless Messages 385
 How to Make a Glider..... 386
 Boys Representing the Centaur..... 388
 Home-Made Ladle for Melting Babbitt... 388
 How to Make a Flash Lamp..... 389
 Photographing the New Moon..... 389
 Old-Time Magic—Part II..... 390
 How to Make Sealing-Wax Hatpins..... 390

A School Within Itself



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

TABLE OF SUBJECTS:

<p>Chapter I—Wiring. II—Electric Batteries, Electro III—Magnetism. (Plating. IV—The Magnetic Circuit. V—Magnetic Traction. VI—Magnetic Leakage. VII—Energy in Electric Circuit. VIII—Calculation of Size of Wire for Magnetizing Coils. IX—Calculation of EMF's in Elec- tric Machines. X—Counter EMF. XI—Hysteresis and Eddy Currents. XII—Armature Reaction.</p>	<p>Chapter XIII—Sparking. XIV—Winding of Dynamos and Motors. XV—Proper Method of Connect- ing Dynamos and Motors— Self Excitation. XVI—Diseases of Dynamos and Motors, their symptoms and to Cure Them. XVII—Arc and Incandes. Lamps. XVIII—Measuring Instruments. XIX—Alternating Current. XX—Automobiles.</p>
--	--

A Dictionary of over 1500 Electrical Words, Terms and Phrases, giving a brief meaning of all which are in common use.

\$2.00 PER COPY—FOURTH EDITION—20,000 COPIES SOLD

The offer we make of refunding money if book is not satisfactory upon examination is AN UNUSUAL ONE in connection with the sale of a book. But we have no fear of its return. Your decision will be what thousands of others have been. Money would not buy it if it could not be duplicated. We could print testimonials by the hundreds. It is best to order and be your own judge of its merits.

CLEVELAND ARMATURE WORKS, Cleveland, Ohio.

Armatures and Field Wound—Commutators Filled,
 AMERICA'S GREATEST REPAIR WORKS



ADVANCE OF THE GRAND ARMY.

NAPOLEON'S name fills more pages in the world's solemn history than that of any other mortal. The advance of his Grand Army into Russia is the turning point in his career and marks the beginning of his downfall. The picture shown herewith from Ridpath's History, the original of which was displayed at the World's Fair, Chicago, marks but one event out of thousands which are fully described and illustrated in the world-famed publication.

Ridpath's History of the World

THE PUBLISHER'S FAILURE placed in our hands the entire unsold edition of this monumental work, BRAND NEW, down to date, bound in half morocco, which we must sell immediately. We offer the remaining sets

At LESS than even DAMAGED SETS were ever sold

We will name our price only in direct letters to those sending us the Coupon below. Tear off the Coupon, write name and address plainly, and mail to us now. Dr. Ridpath's family derive an income from his history, and to print our price broadcast, for the sake of more quickly selling these few sets would cause great injury to future sales.

THE REASON for Dr. Ridpath's enviable position as an historian is his wonderfully beautiful style, a style no other historian in any generation has ever equaled. Ridpath is never dull. Most people imagine that history-reading is not really entertaining—only instructive. That's true of most histories, but it is not true of Ridpath.

Dr. Ridpath might have been a great novelist if he hadn't chosen to be a great historian. He is by nature a story-teller, and in the history he makes real live people out of personages who had been nothing more than names before. He pictures the great historical events as though they were happening before your eyes; he carries you with him to see the battle of old; to meet kings and queens and warriors; to sit in the Roman Senate; to march against Saladin and his dark skinned followers; to sail the southern seas with Drake; to circumnavigate the globe with Magellan; to watch the line of Greek spearmen work havoc with the Persian on the field of Marathon; to know Napoleon as you know Roosevelt.

RIDPATH combines absorbing interest with supreme reliability, and makes the heroes of history real living men and women, and about them he weaves the rise and fall of empires in such a fascinating style that history becomes as absorbingly interesting as the greatest of fiction. Hundreds who read this have decided to buy Ridpath **some day, now is the time.** No need for us to tell you about Ridpath. The English-speaking world has pronounced this the only history of the world worth having. It is today in 200,000 American homes endorsed by Public Men Educators—Business Men—The Clergy and everybody who knows history. Send coupon today. The sample pages are free.



FREE COUPON
WESTERN NEWSPAPER ASSOCIATION

204 Dearborn St. Chicago, Ill.

Please mail, without cost to me, SAMPLE PAGES of RIDPATH'S HISTORY containing photogravures of Napoleon, Queen Elizabeth, Socrates, Caesar and Shakespeare, map of China and Japan, diagram of Panama Canal, etc., and write me full particulars of your special offer to Popular Mechanics readers.

Name.....

Address.....

Western Newspaper Association
CHICAGO

ELECTRICAL WORKERS

A Complete Electrical Workers' Library

POSITIVELY UP-TO-DATE AND WRITTEN FOR THE MEN WHO DO THE WORK

There is little that is theoretical, nothing historical, but everything useful and practical. Just what is needed to be known and nothing to confuse. The authors are men who are brought in daily contact with electrical workers, and who, therefore, are conversant with their needs and with the best methods of presenting the various subjects.

Modern Wiring Diagrams and Descriptions

Describes everything used in general practice: Bells, burglar alarms, batteries, dynamos and motors, meters, automobiles, arc and incandescent wiring, telephones, testing, trouble, etc.

Fits the owner for any kind of electrical work. Each diagram and explanation complete in itself, not requiring any previous knowledge of the subject to be able to understand it. A complete collection of diagrams covering every class of construction with which the electrical worker will be brought in contact. A book that can be carried on the job. Settles disputes and arguments.

Electrical Wiring and Construction Tables

This book contains the only practical Alternating Current Wiring Table published. Here is the old formula for drop in voltage:

$$\sqrt{[(E \times P \times F) + (I \times R)]^2 + [(E \times I \times F) + L]^2} = E'$$

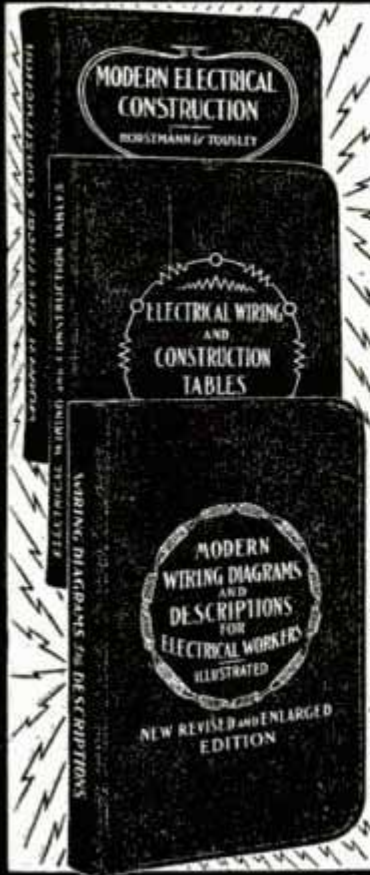
To do intelligent work you must use this formula to find the size of wire needed or consult the tables in this book. In the past most people have guessed. This book gives tables by which the proper size wire may be found without the use of mathematics. The tables do all the figuring. Trigonometry, algebra and the extraction of the square root are not necessary with these tables. Over 100 pages of tables. Single, two and three phase; any distance, any loss, any power factor, any voltage, any efficiency, 25, 60 and 125 cycles. All that are needed; none that are not needed. Will save, in time saved, their cost many times over. The tables showing the proper size wire to use according to the Underwriters' table of carrying capacity minimize the possibility of costly errors.

Modern Electrical Construction

The practical workman's handbook. Written by men in daily touch with the best class of work and the latest wrinkles. For those who desire to pass Civil Service Examinations, gain admittance to the Unions, become first class wiremen, know all the tricks of the trade. Detail information on all construction work. Every page full of practical information: nothing else.

Strictly up-to-date. Per set of three volumes bound in full Persian Morocco leather, red edges, round corners, \$4.00; single volumes each \$1.50. Sent to any address, all charges paid, upon receipt of price.

FREDERICK J. DRAKE & CO., 216 Fisher Building, Chicago, U. S. A.



25c.

A BOOK FOR BOYS

25c.

How to Make a Paper Boat—How to Make a Barrel Boat—How to Make a Water Wheel—How to Make Your Own Fishing Tackle—Temporary Camps and How to Build Them—Permanent Camps and How to Build Them—How to Build an Imitation Street Car Line—How to Make a Water Bicycle—How to Make a Miniature Windmill—How to Build an Ice Boat—A Novel Burglar Alarm—A Mechanical Ventriloquist and How to Make It—How to Make a Boot-Blackening Cabinet—Renewing Dry Batteries—How to Make Water Motors—How to Make "Antique" Clocks from Up-to-date Materials—Lettering a Clock Dial—How to Make a Windmill of One or Two Horsepower—How to Make a Trap for Rabbits, Rats and Mice—How to Make a Small Searchlight—Kites of Many Kinds and How to Make Them—Jug Fishing—How to Do Ornamental Iron Work—Ornamental Metal Guards for Open Fireplaces—How to Make a Propelling Vehicle—How to Make a Water Telescope—How to Make Paper Balloons—How to Make a Hectograph—Useful Articles and Ornaments Made of Old Bicycle Parts—Devices for Winter Sports,

Your Newsdealer will order it for you, or sent postpaid for 25cents by THE PUBLISHERS

MECHANICS FOR YOUNG AMERICA

How to Build

BOATS, WATER MOTORS, WIND MILLS, SEARCHLIGHT, ELECTRIC BURGLAR ALARM, ICE BOAT, WATER BICYCLE, CABINS, CAMPS, CLOCKS, FISHING TACKLE, KITES, IMITATION STREET CAR LINE, ETC.

The Directions are Plain and Complete


Reprinted from Popular Mechanics
COPYRIGHT 1914
POPULAR MECHANICS
CHICAGO

PRICE 25 CENTS

How to Make and Use Them—Coasting Sleds, Chair Sleighs, Toboggan Slides and Skis—How to Make Rubber Stamps—How to Make a Baggage Carrier for Bicycles—A Water Candlestick—Boy's Hand-Power Auto, How Made—How to Make a Pair of Dumb-Bells—How to Rid Your Yard of Cats—How to Make an Easel—To Light a Gaslight Without Matches—Things a Boy Can Make Out of Old Bicycle Parts—How to Make a Wind Propeller—Photographing from a Captive Balloon—How to Make a Simple Burglar Alarm—To Make a Binder for Popular Mechanics—How to Make a Ham-mock—Electric Rat Exterminator—How to Make a Miniature Steam Turbine—How to See Through Your Hand—How to Make a Wood-Turning Lathe Out of an Old Sewing Machine—How to Remove Stains from Marble—How to Make a Turbine Engine—How to Make a Lead Cannon—How to Make a Wireless Telegraph System—How to Make a Toy Battery Motor Lift a 10-lb. Weight—To Renew Old Dry Batteries—Weatherproofing for Tents—How to Make an Electric Furnace Regulator—How to Make a Simple Fire Alarm—How to Make a Bell Tent.

Published by
POPULAR MECHANICS
CHICAGO

Cyclopedia of DRAWING



Four volumes, 1,680 pages, size 7x10 inches; 1,500 illustrations, full-page plates, diagrams, tables, formulas, etc.; bound in half morocco.

Knowledge of drawing has given many young men opportunities to gain high salaried positions of responsibility and trust.

This Cyclopedia offers you an unusual opportunity to get a practical knowledge without the aid of a teacher. It is a Home Study Instructor, entirely free from purely technical matter; every section supplemented by practical test questions, "short cuts," etc.

READ THIS SPECIAL LIBERAL OFFER

We will send you a set of this great Cyclopedia, by prepaid express, without deposit or guarantee of any kind, if you mention the name of your employer and occupation. Keep the books five days, examine them carefully, give them every possible test. We want you to be the judge—you are under no obligations. If you decide the books are not what you want, advise us and we will have them returned at our expense. If you keep the books send us \$2.00 within five days, then \$2.00 a month until you have paid the special price of \$9.80. The regular list price is \$20.00. This special offer is good until May 1st.

IMPORTANT SUBJECTS COVERED

Mechanical, Architectural, Perspective, Isometric, and Freehand Drawing; Blue Printing; Mechanical and Architectural Lettering; Rendering in Pen, Ink and Wash; Water Color Hints for Draftsmen; Shades and Shadows; The Greek and Roman Orders of Architecture; Shop Drawings; Machine Drawing; Machine Design; Sheet Metal Pattern Drafting; Tinsmithing; Architectural Sheet Metal Work; Skylights; Cornices, Roofing; etc.

AMERICAN SCHOOL OF CORRESPONDENCE, CHICAGO, U. S. A.

Mention Popular Mechanics, April, 09



"HOW TO LEARN CHIROPRACTIC"

Our Free Book tells how you can detect disease and remove the cause by Howard method of spinal adjustment. The most simple and direct system of healing. Easy to comprehend. Only ordinary education required. Certain in results. Learned in spare time. Big opportunity. Operators earn \$50 to \$100 per week. Write today for special proposition and free book to first student in your town.

National School of Chiropractic
Dept. 32, 618 W. Congress St., Chicago

LEARN WATCHMAKING

Refined, profitable labor—Competent men always in demand. We teach it thoroughly in as many months as it formerly took years. Does away with tedious apprenticeship. Money earned while studying. Positions secured. Send for catalog.

ST. LOUIS WATCHMAKING SCHOOL, ST. LOUIS, MO.

WHEN YOU WANT ANYTHING AND DON'T KNOW WHERE TO FIND IT—WRITE BUREAU OF INFORMATION, POPULAR MECHANICS, CHICAGO.

POPULAR MECHANICS Shop Notes Index

A Complete 40 page Index to the 2,950 Articles contained in Shop Notes (Vols. I to V inclusive) is now ready and will be mailed free to any address upon request. Address

Book Dept., Popular Mechanics
225 Washington St. CHICAGO

9 X 12 INCHES, 132 PAGES



Published Monthly

\$1 A Year

YOURS

2 Years for \$1.50

AND YOU GET THIS VALUABLE TOOL FREE

PRACTICAL ENGINEER is the paper all engineers like. From cover to cover it is packed with good, live engineering information, interesting illustrated articles, snappy, helpful editorials, experiences and anecdotes of engineers, and the latest and most useful facts about power plant operation and machinery. It gives plain, practical instruction and information adapted to the needs of the man-on-the-job and every word is to the point, presented in clear, forcible, down-on-the-earth style easily understood by every engineer.

It is a Journal you need. It will make your work easier and help you to do it better by pointing the way to better methods and quicker results. In fact you can get from each issue of PRACTICAL ENGINEER more good, practical suggestions for improving your work, lessening labor and cutting cost than from any other source.

Only \$1.50, and PRACTICAL ENGINEER will be sent to you each month for two whole years and you will also receive this 6-inch Polished Steel Combination Square, the handiest tool you ever owned and you'll get it absolutely free.



This Steel Combination Square FREE

It is made of polished steel with engraved figures and takes the place of a whole set of try-squares. You can adjust it to any point within its length and it combines in one compact tool an adjustable square (accurate to a hair's breadth), a miter, depth gauge, level and a handy little scratch awl on the bottom. It is just the thing for the engineer. You'll find use for it constantly. And it's yours free with two year's subscription to PRACTICAL ENGINEER.

Simply send us your personal check, money order or \$1.50 cash. The Square and Current Number will be sent you by return mail. If, after receiving them, you do not think you have your money's worth, or if you are dissatisfied in any way, simply return the square and your money will be refunded at once.

PRACTICAL ENGINEER
The Popular Power Plant Monthly
357 Dearborn Street Chicago, Ill.
Canadian Subscribers send \$1.00 extra for postage

A VALUABLE BOOK

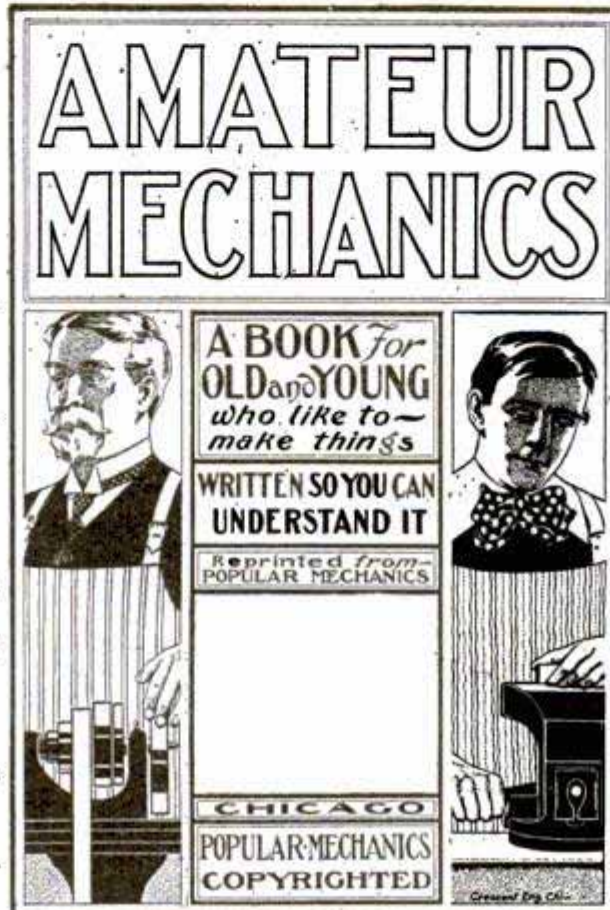
OF EXCEEDING INTEREST TO THE PRACTICAL MIND

FOR BOTH OLD AND YOUNG

PRICE 25 CENTS POSTPAID

CONTENTS:

Accelerometer, Simple
Acetylene Gas Generator, Home-Made
Alarm, Callers' Approach
Alarm, Cheap Fire
Alarm, Combined Door-Bell and Electric
Alarm, Handy Electric
Amber, Imitation
Ammeter, How to Make
Annunciator, Home-Made
Aquarium, How to Make an
Arc Light, Home-Made
Athletics for Young Men
Auto, Young Mechanic Builds Successful
Ball, Hollow, How to Make
Batteries, Connecting to Give any Voltage
Battery, Home-Made Grenet
Battery Switch
Battery, Thermo, How to Make
Battery Zincs, To Use Old
Bell, Return Call, with One Wire
Bicycle Power for Running Miniature Trains
Boat, Paddle, How to Make
Bob-Sled Hinge
Book Shelf, Easily Made
Bracket Saw, Cheap, How to Make
Brazing, Flux for
Cabinet, Home-Made Disc
Camera, Hand, Enlarging with a
Camera Holder, Blacklead for Grooves in
Camera, Pictures Without
Cannon, How to Make
Cannon, Toy, to Discharge by Electricity
Card Puzzle, Turning
Card Trick, Mechanical
Cards, Mechanical Tricks with
Chicken Feeder, Alarm Clock
Circuit Breaker for Induction Coils
Club-House, Underground
Cock, Three-Way, for Small Model Work
Compressed Air Phenomenon, Curious
Cup and Saucer Rack, How to Make
Cup, To Balance on a Knife
Current Reverser, Simple
Dogs and Cats, To Keep Away from Garbage Can
Dogs, To Drive Away
Door Opener, Electric
Draft Opener, Automatic
Electric Blue Light Experiment
Electric Lighting, Miniature
Electric Lamps, Experiments with
Electric Light Circuit, Easy Experiments with
Electrical Experiment, Interesting
Electricians' Don'ts
Electro-Plating, Easy Method of
Electroscope, How to Make
Fire Screen, How to Make
Foundry Work at Home
Part I—Equipment
Part II—How to Make a Mold
Part III—Melting and Pouring
Furnace, Door Opener for
Furnace Draft, Alarm Clock to Pull Up
Furnace, Small Brass, To Build
Furnace, Small Electric, How to Make
Galvanoscope, How to Make
Gasoline Burner for Model Work
Gear Wheels, Small, To Make Without a Lathe
Grape Arbor, How to Build
Gravity Batteries, Why Fail to Work
Grocery Memorandum, How to Make



CONTENTS:

Locomotive, Neat Model
Magazines, How to Bind
Magic, Parlor, for Winter Evenings
Medical Induction Coil, How to Make
Microscope Without a Lens
Motor, Battery, Controller and Reverse for
Motor, Controller for Small
Motor, Small, Reversing
Motors, Small, Direct-Connected Reverse for
Mouse Trap, Novel
Music Cabinet, How to Make
Nail Holes, Filling
Negative, To Make Without Plate or Film
Nickel, Polish for
Optical Illusions
Pantograph, How to Make
Pen, Breaking in a New
Pepper's Ghost Illusion, Miniature
Phonograph Horn, Paper, How to Make
Phonograph Music, To Transmit to a Distance
Photograph a Man in a Bottle, To
Photograph on Apples, How to
Photographs, "Freak," How to Make
Pictures, To Make Four on One Plate
Pipe Fittings, Uses for
Porch Chair, How to Make
Pottery Kiln, Home-Made
Powder, To Explode with Electricity
Prince Rupert's Drops
Pump, Rotary, How to Make
Railroad President, Youngest in the World
Rain Gauge, How to Make
Relay Made from Electric Bell
Reversing Switch for Electrical Experiments
Rheostat, Battery
Rheostat, Water, How to Make
Rheostat, How to Make a Simple
Sealing Wax Bent While Cold
Sheet Metal, To Lubricate
Silhouettes, How to Make
Spit Turned by Water Power
Squirrel Pest, Antidote for
Steam Engine Built in Amateur Shop
Steam Engine, Toy, How to Make
Stream, To Cross on a Log
Switch for Reversing Current
Table, Method of Lifting
Telegraph, Cheap, For Learners
Telegraph Key and Sounder, How to Make
Telegraph Line, One-Wire
Telegraph Line, Simple Open Circuit
Telephone Receiver, Home-Made
Telephone, Singing
Telescope, Farmer's Boy Builds
Time Switch, Automatic
Toboggan Sled, How to Build
Top, Optical
Trap for Small Animals
Trees, Burning Inscriptions on
Water-Colors, To Prevent from Crawling
Water Motor, Home-Made
Windmill, Musical
Window Boxes, Rustic
Window Conservatory
Wireless Coherer, Easily Made
Wireless System, Novel
Wireless Telegraph
How to Make an Efficient
Messages, To Receive with a Telephone
To Make a Jump Spark Coil for
Writing with Electricity, Etc., Etc.

Hammer, Experiment with Two-Foot Rule and
Hammock, Barrel Stave
Hydrogen Generator, Constant Pressure
Hydrogen Generator, Small Electrical
Hygrometer, How to Make
Ice Chisel, Handy
Ice, Peculiar Properties of
Incandescent Lamp, Lighting with Induction Coil
Ink, Black Ruling
Interrupter, How to Make an
Iron Rust, To Remove from Cloth
Jump Spark Coil, How to Make
Kite, Box, How to Make
Language, How to Make a New
Lathe, How to Make
Lightning Flash, Photographs
Lock, Another Electric
Lock, Automatic
Lock, Combination, How to Make
Lock, Electric, for Sliding Door
Lock, Home-Made Pneumatic
Lock, Simple Electric
Lock, Spring, Protection of
Locomotive, Model

CONTAINS 174 ARTICLES, 165 ILLUSTRATIONS

"Amateur Mechanics" is a thorough, practical book for old and young. Tells how to make hundreds of different articles of daily use. Is of exceeding interest. This book should be in every American home.

WRITTEN SO YOU CAN UNDERSTAND IT

For sale by all newsdealers or can be ordered direct from the Publishers

POPULAR MECHANICS

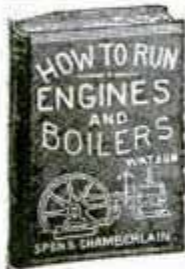
CHICAGO

Good 3 Books

MAKING WIRELESS OUTFITS

By NEWTON HARRISON, E. E.

The latest on Wireless Telegraphy. Full particulars for the construction and use of an inexpensive wireless equipment for sending and receiving up to 100 miles. Illustrated. 12mo., Cloth, Price, postpaid, 50 Cents.



How to Run Engines and Boilers

By E. P. Watson

A practical book with practical instructions for young engineers and steam users. Has chapters on cleaning boilers, removing scale, boiler fittings, throttle engines, slide valves, governors, eccentrics, etc. 160 pages illustrated.

Price, postpaid, \$1.00.

THE NEW EDITION OF

Manufacture of Alcohol

By F. B. WRIGHT

Second edition, revised and greatly enlarged, with New Law, Government Regulations, Authorized U. S. Formulas. Latest American Practice and Apparatus fully explained. 283 pages, 60 illustrations, and folding plates. 12mo. cloth. Price, postpaid, \$1.00.

SPON & CHAMBERLAIN

123 P. M. LIBERTY ST., NEW YORK

SPANGENBERG'S
PRACTICAL
ARITHMETIC
Self-Taught

ARITHMETIC

SELF
TAUGHT

Plain, easily understood volume for ALL who have not had the opportunity of learning this subject thoroughly, or who have forgotten what they once learned. 257 pages. Requires no teacher. Send 60c. (stamps accepted) for this great book in cloth.

Edition de Luxe, \$1.00

GEO. A. ZELLER BOOK CO.

4478 Belle Place, St. Louis, Mo. Est. 1870

We Don't Believe You would buy a book elsewhere if you had a copy of

OUR FREE BARGAIN LIST OF BOOKS

All kinds of high class books at from 10 cents to 50 cents on the dollar. Reasons why we sell books cheaper than you can possibly buy them elsewhere fully explained in our free bargain list. Write for it today and save more than 50 per cent on your purchases.

DAVID B. CLARKSON, - 105 BOSCH BUILDING, CHICAGO

PUZZLES

FAMOUS TRIPLE HORSE-SHOES, 10c

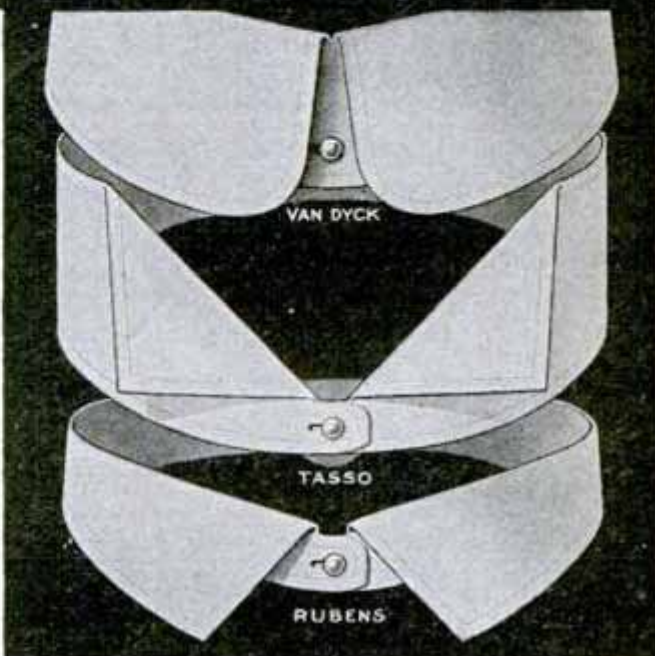
Link the Link 10c.—Star and Crescent 10c.—Vanishing Ball 10c.—Electric Button 10c.—Lightning Trick Box 10c.—Kellar's Magic Poker Cards 10c.—Wizards Cards 10c.—Choice any 3 for 25c, 7 for 50c or 15 for \$1.00. No two alike. Postpaid any place.

Western Puzzle Co., - St. Paul, Minn.

WHEN YOU WANT ANYTHING AND DON'T KNOW WHERE TO FIND IT—WRITE BUREAU OF INFORMATION, POPULAR MECHANICS, CHICAGO.

STAMP MARK your NAME or INITIALS on all your tools—(Steel or Wood)—with a STEEL STAMP. Initial Stamp 60 Cents Postpaid. Book Free. EDWIN PEASE, Winchester, N. H.

REVERSIBLE
“Linene”
COLLARS
MADE IN 10 STYLES.
10 collars for 25 cts. at stores. By mail 30 cts., or sample 6 cts. in stamps. Give size and style.
REVERSIBLE COLLAR CO., Dept. U9, Boston, Mass.



Will You Accept This Business Book if We Send it Free?

Sign and mail the coupon below. Send no money! Take no risk!

One hundred and twelve of the world's master business men have written ten books—2,079 pages—1,407 vital business secrets, ideas, methods. In them is the best of all that they know about

- | | | |
|----------------|---|--|
| —Purchasing | —Salesmanship | —Position-Getting |
| —Credits | —Advertising | —Position-Holding |
| —Collections | —Correspondence | —Man-Handling |
| —Accounting | —Selling Plans | —Man-Training |
| —Cost-keeping | —Handling Customers | —Business Generalship |
| —Organization | —Office Systems | —Competition Fighting |
| —Retailing | —Short-cuts and Methods for every line and department | —Hundreds and hundreds of other vital business subjects. |
| —Wholesaling | | |
| —Manufacturing | | |

A 9,059-word booklet has been published describing, explaining, picturing the work. Pages 2 and 3 tell about managing businesses great and small; pages 4 and 5 deal with credits, collections and with rock-bottom purchasing; pages 6 and 7 with handling and training men; pages 7 to 12 with salesmanship, with advertising, with the marketing of goods through salesmen, dealers and by mail; pages 12 to 15 with the great problem of securing the highest market price for your services—no matter what your line; and the last page tells how you may get a complete set—bound in handsome half morocco, contents in colors—for less than your daily smoke or shave, almost as little as your daily newspaper.

Will you read the book if we send it free? Send no money. Simply sign the coupon.

The System Co., 151-153 Wabash Ave., Chicago

If there are, in your books, any new ways to increase my business or my salary, I should like to know them. So send on your 16-page free descriptive booklet. I'll read it. 81-4

Name _____
Address _____
Business _____
Position _____

4 PRACTICAL WAY OF MAKING MORE MONEY

INCREASE YOUR SALARY

THIS BOOK FREE TO YOU

Book-keepers, Cashiers, Office Managers, Accountants, Auditors, Secretaries and Office Men—Increase your salary through our new system of education outlined in our sixteen page book prepared for you.

A Practical Way of Making More Money
 Be an expert. It requires only a few minutes of your spare time. The book is **FREE TO YOU**, and will be mailed promptly upon request. It tells you how you can earn **MORE PAY** and that is what you want. It's yours for the asking. **WRITE TODAY.**
COMMERCIAL WORLD CORRESPONDENCE SCHOOLS
 174 Galswold Street, Detroit, Mich.

\$3,000 TO \$10,000 A YEAR IN THE REAL ESTATE BUSINESS



We teach you by mail every branch of the Real Estate, General Brokerage, and Insurance Business, and appoint you **SPECIAL REPRESENTATIVE** of the oldest and largest co-operative real estate and brokerage company in America. Representatives are making \$3,000 to \$10,000 a year without any investment of capital. Excellent opportunities open to YOU. By our system you can begin making money in a few weeks without interfering with your present occupation. Our co-operative department will give you more choice, salable property to handle than any other institution in the world. A Thorough Commercial Law Course **FREE** to Each Representative. Write for 62-page book, free.
THE CROSS COMPANY, 2536 Reaper Block, Chicago

LEARN PLUMBING OR BRICKLAYING \$25

TUITION \$25.00 FOR SHORT TIME ONLY.
 The Original Coyne Bros.—not connected with N. Y. c. Chicago Schools. They conduct a Plumbing and Construction Co. in connection with St. Louis School. Students learn on contract work. Many earn \$6.00 a day while learning. Position guaranteed. Free catalog. **5182 Easton Ave. ORIGINAL COYNE TRADE SCHOOL, St. Louis, Mo.**

\$10 PER DAY EASILY EARNED AS A PIANO TUNER

The Tune-a-Phone Does It.
 We will teach you Piano Tuning, Voicing, Regulating and Repairing, quickly by personal correspondence. New Tune-a-Phone Method. Mechanical aids. Diploma recognized by highest authorities. School chartered by the State. Write for our handsomely illustrated free catalogue.
Niles Bryant School of Piano Tuning
 95 Maple Hall, Battle Creek, Mich.

WHY NOT BE AN ARTIST?

Our graduates are filling High Salaried Positions. Good artists **EARN \$25 TO \$100 PER WEEK** and upwards in easy fascinating work. Our courses of Personal Home Instruction by correspondence, are complete, practical. Eleven years' successful teaching. Expert instructors. Positions guaranteed competent workers. Write for Handsome Art Book, Free.
SCHOOL OF APPLIED ART (Founded 1898.)
 T 21 Gallery Fine Arts, Battle Creek, Mich.

LEARN TO DRAW

By mail at home or in our Resident School. Men and women artists earn good salaries at easy work. Individual, practical instruction. We guarantee proficiency or money refunded. Positions assured. **Illustrating, Cartooning, Commercial Designing, Mechanical, Architectural, and Sheet Metal Pattern Drafting** taught by instructors trained in Europe and America. Advisory Board approves lessons. Test work sent free to find out your needs and probable success. Tell course wanted.
ACME SCHOOL OF DRAWING 1995 S. St., KALAMAZOO, MICH.

\$450 TO \$800 A DAY AND WORK FOR ALL

To the young man working for a small salary we offer the opportunity of a lifetime. We teach the Electrical, Plumbing and Bricklaying trades in about three months' time by actual practice. We have the largest and best equipped practical school in America, and our graduates are always in demand at the highest wages in all parts of the country. Hundreds of our graduates have developed into contractors, and so can you. Write for free illustrated booklet. It will interest you.
COYNE NATIONAL TRADE SCHOOL,
 259 10th St., New York 832 N. Ashland Ave., Chicago

I TEACH Penmanship BY MAIL

I won the **World's First Prize in Penmanship.** By my new system I can make an expert penman of you by mail. I also teach Book-keeping and Shorthand. Am placing my students as instructors in commercial colleges. If you wish to become a better penman, write me. I will send you **FREE** one of my Favorite Pens and a copy of the Ransomerian Journal.
C. W. RANSOM, 3859 Euclid Ave., Kansas City, Missouri.

"I MADE \$2400.00 IN ABOUT 2 MONTHS"

writes one man a few months after becoming my representative in my big **CO-OPERATIVE REAL ESTATE BUSINESS.** No experience necessary; this man had none. I will teach you the business by mail and appoint you my **Special Representative.** You can work all or part of the time. A splendid opportunity for men **without capital** to become **independent.** Let me explain my offer and send you my **FREE BOOK.**
HERBERT HURD, Pres., Gray Realty Co., 165 R.liance Bldg., Kansas City, Mo.

DRAWING OUTFIT FREE

Illustrators and Cartoonists earn \$25 to \$100 a week
 We teach **Illustrating and Cartooning** by mail. Our students sell their work and hold positions. Women succeed as well as men. Send for our free booklet, "**Money in Drawing**;" tells how and gives the proof.
THE NATIONAL PRESS ASS'N, 77 THE BALDWIN, INDIANAPOLIS, IND.

LEARN PLUMBING

A trade that will make you independent for life. **Hours Shorter—Pay Bigger—Demand Greater** than any other trade. You need no previous experience. Our practical methods enable you in a few months to hold position as skilled plumber or conduct your own business. Catalog sent free.
St. Louis Trades School
 4430 Olive St. St. Louis, Mo.

BIG PAY SHORT HOURS

LEARN WATCHMAKING

Watchmaking pays and you can earn while you learn. Write for **FREE BOOK**, "How to be a Watchmaker." Postal brings it.
Stone's School of Watchmaking
 912 Globe Bldg., St. Paul, Minn.

LEARNED BY ANY MAN OR BOY AT HOME

VENTRILOQUISM

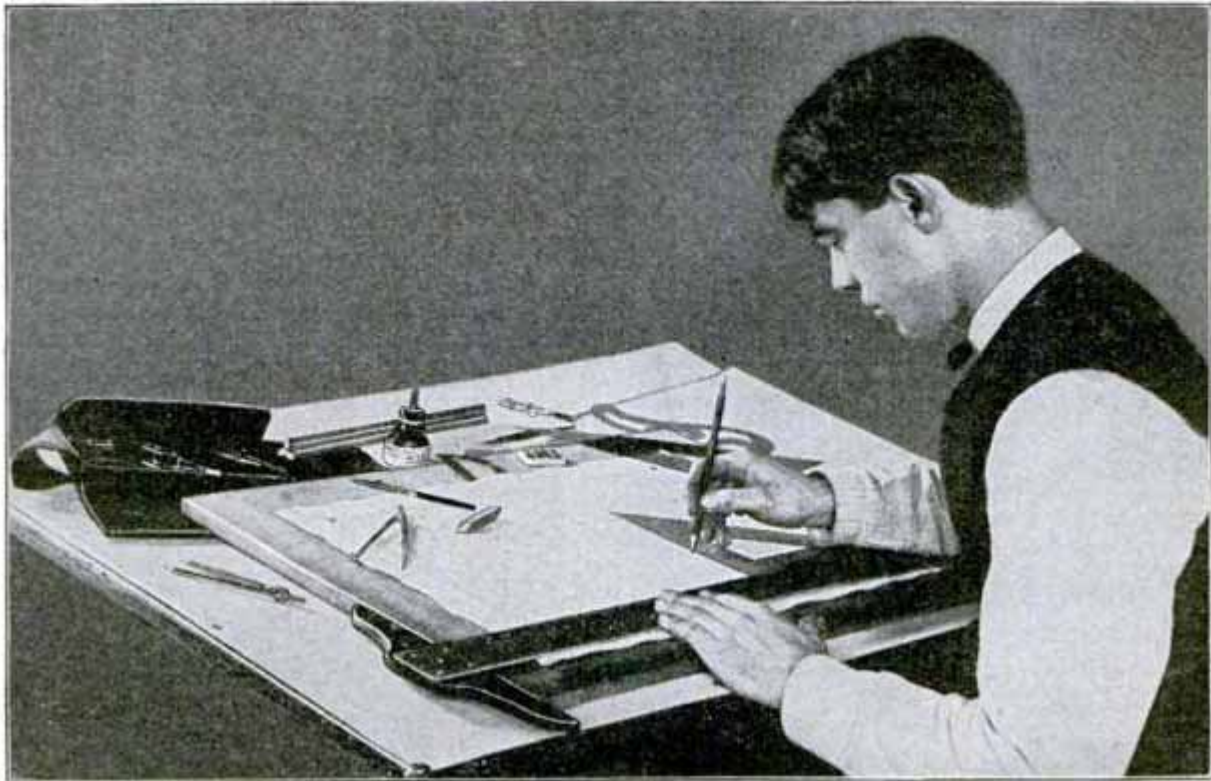
Small Cost
 Send today 2c stamp for particulars and proof.
O. A. SMITH, Room 1034, 2040 Knoxville Ave., Peoria, Ill.

MEN WANTED

Common Laborers at \$1.40 per day.

Men at ordinary trades at \$60.00 to \$75.00 per month.

ARCHITECTS, DRAFTSMEN and TRAINED FOREMEN } \$125.00 to \$300.00 per
 SUPERINTENDENTS and MANAGERS - - - } month



THERE ARE THOUSANDS of common laborers looking for work.
THERE ARE HUNDREDS OF MEN, with fair trades, looking for jobs.
THERE ARE HUNDREDS OF POSITIONS just waiting for men who can **DO HEAD WORK**
 in any large manufacturing or business enterprise.

WHICH KIND OF WORK DO YOU DO?

Our business is preparing men to get and hold high salaried positions. The above picture shows the way young and middle-aged men "get busy" in their own homes and, with our help, prepare to become Architects, Draftsmen, — Trained men, — able to take high salaried positions.

We furnish the drawing outfit as shown in the picture.

It makes no difference who you are, how limited your education is, what chance you **HAVE HAD**, — the point is this, — **WE OFFER YOU** a chance to use your spare time, where you are right now, to **STIR UP YOUR BRAIN POWER** and train your hands for finer work as your head — your brain power — develops.

The "**FREEPORT IDEA**" is the greatest improvement ever made in the methods of teaching by Correspondence. You begin with the first lessons to do the work you want to do, because our instructions are given in logical order and worded in **PLAIN ENGLISH**.

Send us the attached coupon and find out how to step out of uncongenial, poorly paid employment, into a position with good salary, interesting work, and fine social position.

If you are ambitious, but dissatisfied or misplaced, write to us.

On this coupon put a cross (x) before the position you wish you could get; then mail us the coupon.

While waiting for our reply, just **DREAM DAY DREAMS** of what you can become and we will see that your **DREAMS COME TRUE**.

FREEPORT CORRESPONDENCE SCHOOLS 604 Rice Bldg., Freeport, Ill.

I would like the position before which I have marked a cross (X). Please explain without cost to me, how I can get such a position and be sure to hold it.

- | | |
|-----------------------------|----------------------------|
|Mechanical Draftsman |Manual Training Instr. |
|Sheet Metal Draftsman |Bookkeeper |
|Architect |Stenographer |
|Architectural Draftsman |Electrician |
|Architectural Designer |Steam Engineer |
|Carpenter and Joiner |Stationary Fireman |

NAME.....AGE.....
 CITY.....STATE.....
 ST. or R. F. D.....OCCUPATION.....



LEARN INVENTING

Our lessons teach you the Laws of this mental-physical science. Our Inventional Problems teach you how to practice the art. Develop inventional power. Learn how to exercise initial ability; to create new ideas and designs. To excel in knowledge and surpass competition you must **BE FIRST.**

Order free descriptive circular of our correspondence course.

SCIENTIFIC SCHOOL OF INVENTION, PROVIDENCE, R. I.

Study Art At Home By Mail

Earn \$25-\$50 a week



Learn to draw or paint in Water-Colors, Oil and Decorate China.

BE AN ARTIST, Illustrator, Designer or Cartoonist. Enroll in our Home Study Art Courses. No previous experience necessary. Cost exceedingly small. Competent artists are in great demand. **YOU CAN EARN \$2,000 to \$5,000 A YEAR** and even more. We employ the same methods as those used in the famous Ateliers of Paris, and guarantee to teach you with complete success by mail or make no charges for tuition. Eminent teachers, graduates of leading European and American Art Academies. Write for our beautifully illustrated "PROSPECTUS." Tells "How to Learn Art at Home" and describes our methods. Sent FREE. Postage prepaid. Gives just the information

you want. Write for it NOW. Do not delay. Address:

The FINE ARTS INSTITUTE, Studio 324. Omaha, Neb.

I Teach Real Salesmanship



You can be a salesman. Increase your power to convince others, earn from \$1,200 to \$10,000 a year. I am the only man teaching salesmanship who is sales manager of a wholesale house and an official of United Commercial Travelers of America. Write for my free magazine, "The Salesman," and how you can perfect yourself in the art of selling. My graduates hold paying positions and I can assist YOU to profitable employment. Most practical, highly endorsed course in the world. No matter where you live, or what your occupation, write me today.

W. R. TROTTER, Dept. 14, Kansas City, Mo.

Practical Telegraphy

Taught by experts at my school. My institution only one graduating qualified operators. Thorough, practical, copy-right methods. Graduates assisted. Living expenses earned while learning. Easy payments. Correspondence course if desired. Catalog FREE.

Geo. M. Dodge, Pres.

Dodge's Institute of Telegraphy, Eighth Street, Valparaiso, Ind. Established 1874

YOUNG MAN—The Great RAILROADS WANT YOU

Learn telegraphy here. Situations furnished that lead to highest positions. Good wages. Many of our graduates are now R. R. Supts.

Expenses very low. Can earn your board if desired. 40-page book about it Free. Railroad wire in school.

VALENTINE'S SCHOOL OF TELEGRAPHY, (ESTAB. 37 YRS.) BOX 5, JANESVILLE, WIS.

I TEACH SIGN PAINTING

SHOW CARD WRITING or LETTERING by mail and guarantee success. Only field not overcrowded. My instruction is unequalled because practical, personal and thorough. Easy terms. Write for large catalogue.

CHAS. J. STRONG, President.

DETROIT SCHOOL OF LETTERING DEPT. PM. DETROIT, MICH.

"Oldest and Largest School of its Kind."

WANTED! YOUNG MEN! RAILROAD BRAKEMEN FIREMEN
Baggagemen, Electric Motormen, Conductors. Experience unnecessary. Instruction by MAIL. Application blank and book for stamp. **I. RAILWAY C. I. No. 99, INDIANAPOLIS, IND.**

YOU CAN EARN A BIG SALARY

as a Chauffeur, Auto Salesman or Garage Manager. We fit you to earn \$25 to \$100 a week. Practical instruction at our big New York School (only one recognized in the automobile trade). Our Home Study Course gives you all needed knowledge except actual road practice. No interference with present occupation. Our graduates are recognized as experts and positions seek them. Write to-day for free prospectus.

NEW YORK SCHOOL OF AUTOMOBILE ENGINEERS
130 West 56th St. New York

My BOOK FREE

Memory the Basis of All Knowledge
Stop Forgetting THE KEY TO SUCCESS
"HOW TO REMEMBER" You are no greater intellectually than your memory. Easy, inexpensive. Increases income; gives ready memory for faces, names, business details, studies, conversation; develops public speaking, writing, personality.
Dickson Memory School, 705 Auditorium Bldg., Chicago

Learn Watch Repairing

Be a watchmaker—you can learn this profitable trade by correspondence in a few weeks in your own home by the DeSelms Chart System. After you complete the course you will know a watch from A to Z. You will know just what the matter is and how to repair one. When you graduate you will be a practical watchmaker and repairer and competent to fill any position. Positions for our graduates.

Ask for our Free Book. It explains our system and terms.

THE DeSELMS WATCH SCHOOL
23 Perry St. ATTICA, INDIANA



STUDY LAW AT HOME

The oldest and best school. Instruction by mail adapted to every one. Recognized by courts and educators. Experienced and competent instructors. Takes spare time only. Three courses—Preparatory, Business, College. Prepares for practice. Will better your condition and prospects in business. Students and graduates everywhere. Full particulars and Easy Payment Plan free.

The Sprague Correspondence School of Law.

875 Majestic Bldg, Detroit, Mich.



LEARN TO WRITE ADVERTISEMENTS IF YOU ARE EARNING LESS THAN \$25 a WEEK

we can positively show you by mail how to increase your salary. Send for beautiful prospectus, mailed FREE.

PAGE-DAVIS SCHOOL, Dept. 112, CHICAGO, ILL.

LEARN JEWELERS' ENGRAVING

A high-salaried and easily learned trade, taught thoroughly by mail. We will teach the beginner better engraving than he can gain in years of rigid apprenticeship. We will also improve the skill of any engraver. Send for our catalog. **The Engraving School, Dept. 112, 90 Wabash Ave., Chicago Ill.**

STAMMERERS

GET THIS BOOK FREE



Learn about The Natural Method for the cure of Stammering. This is the Largest School in the World teaching Natural Methods. Write for Book and Special Winter Rates sent free to stammerers on request. The North-Western School for Stammerers, 606 Galena Street, Milwaukee, Wis.



Earn Up to \$75 a Week As a Watch Repairer

AND START A JEWELRY BUSINESS OF YOUR OWN

You can learn this money-making trade in a few weeks without leaving your home or interrupting your present occupation. Then in time we will help you start a jewelry business where there is no limit to amount you can earn.

We will teach you the watch repairing trade without any cost whatever. We furnish you, absolutely free, text books, necessary lessons, illustrated charts and photo prints showing exactly how to repair each job, step by step. There is no stock to buy—not one bit of expense, except to get a few tools when you need them.

Our lessons are so simple, so easily explained and diagramed that any ambitious man can learn the trade and become an expert. You can lift yourself from the wage earner or salaried man to the independent, successful merchant and

become your own boss—in your own business, under your own name in your home town.

We have hundreds of letters like this one from men whom we have established in a successful business and taught them a profitable trade. Before they started with us they had no capital, now they have stores of their own. We can do for you exactly what we have done for them, so don't continue to drudge for a mere pittance with this opportunity staring you in the face. Write to me personally at once—now!

CHAS. F. ELMORE

PRINCIPAL OF WATCHMAKING COLLEGE

ROGERS, THURMAN & CO.

35 MICHIGAN AVENUE - CHICAGO

READ MR. WARREN'S LETTER: 12-20-08.

ROGERS, THURMAN
& COMPANY.

GENTLEMEN: I thought I would write you a few lines to let you know how I was getting along. I am well pleased with my new business, and I am doing well for just starting. The business that I did yesterday amounted to \$86.10 (eighty-six dollars and ten cents). I have sold one of those Trifalla watches and I believe they would sell faster in a good screw wind and solid back silver case.

My sign came all right, but they had my name spelled wrong. They had it W. T. Warrent, so I rubbed out the "t," and it looks much better.

Yours truly,
W. T. WARREN.



The Problem Solved



How would you like to have a score or more of expert mechanical engineers at your beck and call - men who could solve all the difficult engineering problems that arise? That's just what you have in our new Seven Volume Edition

CYCLOPEDIA OF MECHANICAL ENGINEERING

3,276 pages, size 7x10 inches; 2,327 Illustrations, Plates, Diagrams, Tables, Formulas, etc.; bound in half morocco.

In these seven volumes we offer you the expert knowledge of thirty-nine men, every one a leader in the line of work he handles. They offer you the knowledge of recent time-saving inventions, practical information—they straighten out shop kinks, give you the inside information and short cuts which are generally found only in the private note-books of high salaried shop bosses.

The Cyclopedic covers the entire field of mechanical engineering—making and use of tools, machine shop work, construction and operation of boilers and engines, pattern making, foundry work, gas producers and gas plants, mechanical drawing and machine design. No branch too big to be treated in detail, no detail too small to be slighted.

These books are as plain to the student as they are helpful to the master workman.

Read This Liberal Offer

Upon receipt of coupon we will send you a set of this great Cyclopedic by prepaid express, without deposit or guarantee of any kind. Keep the books five days, examine them carefully, give them every possible test. We want you to be the judge—you are under no obligations.

If you decide the books are not what you want, advise us and we will have them returned at our expense. If you keep the books send us \$2.00 within five days, and \$2.00 a month until you have paid the special price of \$18.60. The regular list price is \$36.00.

This offer is good until May 1st

IMPORTANT SUBJECTS COVERED

Vertical Milling Machine - Motor Driven Shops - Shop Lighting - Forging - Electric Welding - Metallurgy - Manufacture of Iron and Steel - High-Speed Steel - Flaws in Castings - Electric Lifting Magnets - Magnetic Clutches - Making a Machinist - The Ideal Foreman - Automatic Coal and Ore Handling Appliances - Machine Parts - Types of Boilers - Boiler Accessories - Steam Pumps - Air Compressors - The Steam Engine - The Steam Turbine - Indicators - Valve Gears - Refrigeration - Automobiles - Elevators - Sheet Metal Work - Practical Problems in Mensuration - Drafting Room Organization.

FREE! Order at once and we will include for one year, as a monthly supplement, the

TECHNICAL WORLD MAGAZINE

A regular \$1.50 monthly, presenting twentieth century facts in plain English. Latest discussion on timely topics in science, invention, discovery, industry, etc. The strongest serial of the season, "WHO OWNS THE EARTH", appears in the April issue. JUST MAIL THE COUPON.

AMERICAN SCHOOL OF CORRESPONDENCE, CHICAGO, U. S. A.

FREE OFFER COUPON

American School of Correspondence:

Please send set Cyclopedic of Mechanical Engineering for 5 days' free examination. Also T. W. for 1 year. I will send \$2 within 5 days and \$2 a month until I have paid \$18.60, otherwise I will notify you to send for the books. Title not to pass until fully paid.

Name.....
Address.....
Occupation.....
Employer.....

(Pop. Mech. 4-09)

Be A Salesman

He is the most sought after and highly paid man in the commercial world, because he is the business producing and money making part of the concern. The man who produces business is never without a good position, and is always in demand because on the results of his work the success of the firm depends.

Why not be a producer yourself? Get out of the non-productive class. You can never talk an increase in salary to your employer until you can show him where you are making money for him.

In eight short weeks without interfering with your present position or employment, we can teach you by mail to become a first class Traveling Salesman, a producer, and then through our **Free Employment Bureau** we will assist you to secure a position where you can increase your earning power from two to ten times. Scores of our Graduates who had no former experience as salesmen, and who formerly earned from \$30 to \$75 a month, now earn from \$100 to \$500 a month and all expenses.

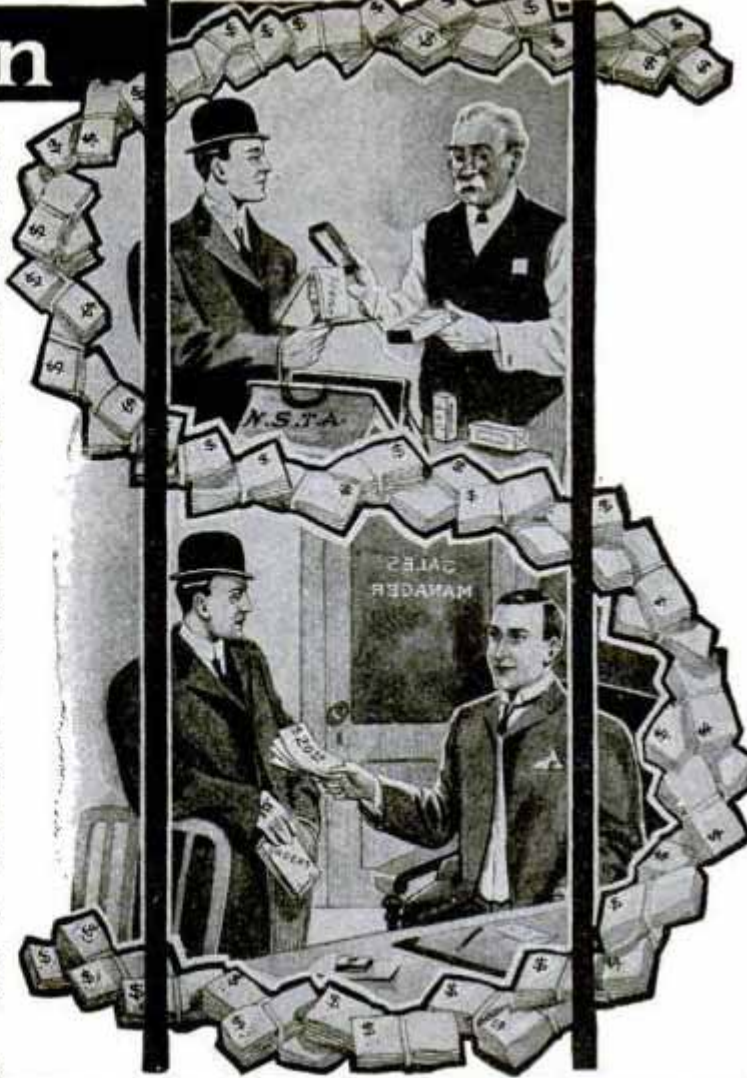
They have become successful salesmen because they were trained by experts—men who have made good on the road themselves, and who know the art of salesmanship from A. to Z.

Every member of our faculty is a top notcher in his profession, and the methods we use in teaching salesmanship are clear, easy, and interesting. It is not necessary that you have the least bit of experience. We can teach you this easy, lucrative, pleasant profession from the first rudiments to the final application and help you get a good position besides, as we have hundreds of calls for our graduates.

YOUR OPPORTUNITY IS HERE—Grasp it to-day by sending for our free booklet "A Knight of the Grip."

Every phase of the salesman's life is pictured therein and it contains interesting stories of the success of many of our graduates, who are now earning from two to ten times what they formerly did. Write our nearest office for it today. Address

Dept. 11 **NATIONAL SALESMEN'S TRAINING ASSOCIATION**
New York Chicago Kansas City Minneapolis San Francisco



HIGHLAND PARK COLLEGE

Des Moines, Iowa.

ENGINEERING

Civil
Electrical
Mechanical
Telephone
Steam
Traction
Gas & Oil
Machinists' Course
Mechanical
Drawing

Regular four-year Engineering courses completed in three years of 48 weeks each. Also one-year practical courses in Electrical, Steam, Telephone and Mechanical Drawing Courses. Three months courses in Traction and Gas and Oil Engineering. A one-year Machinists' Course. The best equipped machine shops in the country. Just a fair common school education is all that is required for entrance to all short courses.

Correspondence Courses in Electrical, Steam, Telephone and Traction Engineering. Also in Mechanical, Architectural, Sheet Metal Drawing and Lettering.

TELEGRAPHY

The only school in the U. S. that teaches Station work in connection with telegraphy. Miniature railroad representing 54 miles of block system. Main line wire runs through the offices. Students guaranteed positions. Course offered by correspondence also.

COMMERCIAL COURSE

A complete Business College using strictly up to date business college methods of teaching. A faculty of trained specialists and the largest and best equipped Business Exchange Room in the country. A combined course in business and shorthand. Correspondence courses offered also.

SHORTHAND and TYPEWRITING

The full course in Shorthand and Typewriting may be completed in six months. We guarantee to send all graduates to good positions. Correspondence courses offered also.

PENMANSHIP

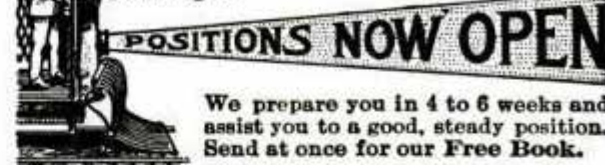
A complete course under Prof. L. M. Kelchner, the best all round penman in the U. S. Special courses in Lettering for engineers and draughtsmen. Courses by correspondence also.

Send for illustrated catalogue of work in which you are interested. Enter school any time. Expenses more reasonable than at any other standard college.

Address **O. H. Longwell, President,**
Highland Park College Des Moines, Iowa.

EARN \$60 TO \$100 A MONTH

AS AN
**ELECTRIC RAILWAY
MOTORMAN OR CONDUCTOR**
Steady city employment,
good wages.



We prepare you in 4 to 6 weeks and assist you to a good, steady position. Send at once for our Free Book.

NATIONAL RAILWAY TRAINING ASSN.,
Dept. M KANSAS CITY, MO.

LEARN TELEGRAPHY BOOK-KEEPING SHORTHAND

by mail, in a few weeks spare time home study, under our Practical Instruction—and a good paying, responsible position is yours; we are unable to supply the demand. Many energetic graduates have worked up to salaries of \$5,000 per year. We send complete outfit, and you **PAY US NO MONEY** for tuition until position secured. Write at once for special offer, stating which you prefer to learn.
MICHIGAN BUSINESS INSTITUTE, 689 Inst. Bldg., Kalamazoo, Mich

WHEN YOU WANT ANYTHING AND DON'T KNOW WHERE TO FIND IT—WRITE BUREAU OF INFORMATION, POPULAR MECHANICS, CHICAGO

HOROLOGICAL DEPARTMENT BRADLEY POLYTECHNIC INSTITUTE

Formerly Parsons Horological Institute
PEORIA, ILLINOIS.
**LARGEST and BEST WATCH SCHOOL
IN AMERICA**
We teach Watch Work, Jewelry, Engraving, Clock Work, Optics. Tuition reasonable. Board and rooms near school at moderate rates.
Send for Catalog of Information.



DO YOU LIKE TO DRAW?

THAT'S ALL WE WANT TO KNOW

Now we will not give you any grand prize—or a lot of free stuff if you answer this ad. Nor will we claim to make you rich in a week. But if you are anxious to develop your talent with a successful cartoonist, so you can make money send a copy of this picture with 6c in stamps for portfolio of cartoons and sample lesson plate, and let us explain.

THE W. L. EVANS SCHOOL OF CARTOONING,
321 Kingmoore Bldg., Cleveland, O.



EASY SIGN SYSTEM

The modern way to learn SIGN PAINTING

New system for making the "lay out" or blocking out and spacing the letters. Can you draw a straight line with the brush if we show you how? If so, we guarantee that you can make signs with this system. Get busy and increase your earning capacity. The price is only \$2. Send for booklet.

EASY SIGN SYSTEM, Nebraska City, Neb.
Reference, Otoe Co. National Bank.

SHORTHAND IN 30 DAYS

We absolutely guarantee to teach shorthand complete in only thirty days. You can learn in spare time in your own home, no matter where you live. No need to spend months as with old systems. Boyd's Syllabic System is easy to learn—easy to write—easy to read. Simple. Practical. Speedy. Sure. No ruled lines—no positions—no shading as in other systems. No long lists of word signs to confuse. Only nine characters to learn and you have the entire English language at your absolute command. The best system for stenographers, private secretaries, newspaper reporters and railroad men. Lawyers, ministers, teachers, physicians, literary folk and business men and women may now learn shorthand for their own use. Does not take continual daily practice as with other systems. Our graduates hold high grade positions everywhere. Send to-day for booklets, testimonials, etc.

CHICAGO CORRESPONDENCE SCHOOLS
969 Chicago Opera House Block, Chicago, Ill.



GRAND PRIZE CONTEST

An Unlimited Number of Prizes will be distributed among those who make a copy of this picture. If our Art Director decides that your copy is even 40 per cent. as good as the original, it will win an illustrated magazine **FREE OF CHARGE FOR SIX MONTHS**, showing the work of the most prominent artists of the country. **No Money Required to Win a Prize**—It will not cost you a cent to enter this contest. Sit right down now and copy this picture with either pencil or pen and ink. See how well you can do it. If you are a prize winner it will prove you have talent for drawing.

Copy This Picture and Win a Prize

Thousands of people now earning small pay have illustrating ability, but do not know it. If you will send your drawing to-day, we will tell you whether you possess this talent. If your drawing is even 40 per cent. as good as the original, you have this natural ability, and we can start you on the road to a comfortable and independent living, with pleasant, steady and profitable employment.

Correspondence Institute of America, Dept. 615 Scranton, Pa.

Intercontinental University

BOARD OF DIRECTORS



HON. DAVID J. BREWER



HON. MARTIN A. KNAPP



EDWARD EVERETT HALE

Includes Justice DAVID J. BREWER, U. S. Supreme Court; Hon. MARTIN A. KNAPP, Chairman, Interstate Commerce Commission and Senator CHAUNCEY M. DEPEW. EDWARD EVERETT HALE, Co-founder.

Instruction by mail in practically all lines of business, science and education. Law—Bookkeeping—Accounting—Civil Service—Engineering—Mechanical Drawing—Business Letter Writing. 160 separate courses. To be well educated is to be well paid.

We will help you to a better place in life.

Intercontinental University
1412 "L" Street,
Washington, D. C.

Please send the year book and catalog.

Ask for
Catalog
No. 10

I am interested in.....

GOVERNMENT APPOINTMENTS

1907	About 3,800 per month, nearly all based on easy Civil Service Examinations in common school branches. We quickly prepare applicants to pass. Salaries up to \$2,500. Get ready for the spring examinations in every State. Write for full detailed information to	46,712
1908		45,837

INTERCONTINENTAL UNIVERSITY, 1412 L ST., WASHINGTON, D. C.

ILLUSTRATING

- Law
- Pharmacy
- Cartooning
- Shorthand
- Bookkeeping
- Nursing
- Journalism
- Telegraphy
- Penmanship

Taught by mail and in our resident schools. Founded 1850. Income increased while learning. Graduates everywhere. Mark subject X. State your desire. Cut out ad. Get our free book—tells all.

NATIONAL CORRESPONDENCE SCHOOLS

40 N. Penn'a St., INDIANAPOLIS, U. S. A.



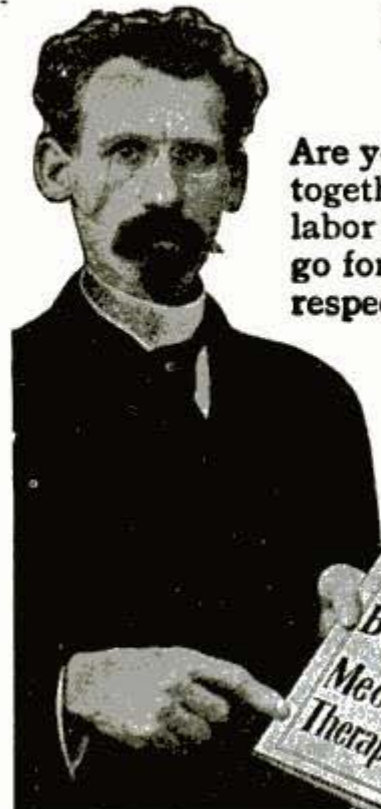
Don't Be a Wage Slave

Make \$3,000.00 to \$5,000.00 a Year
Be a Doctor of Mechano-Therapy

Are you tired of working for wages which barely keep body and soul together? Have you the ambition to enjoy the profits of your own labor? To gain social prominence and financial independence? To go forth among your fellow men with your head up—an honored and respected citizen of your locality?

THEN SEND FOR OUR FREE BOOK

Entitled "How to Become a Mechano-Therapist." It tells how every man and woman, with an ordinary, common school education, can acquire a profession within a few months which will insure financial independence for life. **GET OUR BOOK**—it costs you nothing.



What is Mechano-Therapy?

Mechano-Therapy is the art, or science, of treating disease without drugs. It is similar to Osteopathy, but far superior, being the latest, up-to-date method of treating disease by the Natural Method. It heals as Nature heals—in accordance with Nature's laws.

The Mechano-Therapist is a drugless physician and a bloodless surgeon. His medicines are not drugs, but scientific combinations of food, circumstance, idea, water and motion.

The Mechano-Therapist is skilled in compelling the body TO DO ITS OWN HEALING with its own force, rather than with poisonous drugs of the old school practitioner.

CAN I LEARN IT?

Have you asked yourself this question? We answer, unhesitatingly, YES.

If you have so much as an ordinary, common school education, you can learn.

If you have the ambition to better your condition—to earn more money—to have more leisure—you can learn.

Nor does this require years of patient study to learn Mechano-Therapy—we can teach you in a very short time, so that you may enter this profession—and when you do, you begin to make money. No text books are required, beyond those furnished by us. We supply all lessons and necessary text books free of cost to you. No apparatus is used. You do not even need a place to work. All you require is your two hands.

Read What Our Graduates Say

The statements of a few of our graduates below verify every claim we make. Read them carefully, and remember that what these men and women have done, you may do. The success they have made, you may make. We do not give the address of the people whose testimonials we print. Our graduates are meeting with remarkable financial success, and shrink from having their prosperity published broadcast. If you wish to communicate with any whose names are given below, write us and we will supply you with the address.

Treating Physician for Diabetes

Dr. Ellsworth says: I have all I can do, and at very good fees, and am at present treating an M. D. for Diabetes. It is impossible for me to speak in fitting terms of the wonderful success of Mechano-Therapy in the treatment of disease.

Considers Mechano-Therapy Better Than Osteopathy

Dr. B. E. French says: I consider Mechano-Therapy greatly superior to Osteopathy, and as it is a profession so very interesting and one so easily learned, I am surprised that more do not take it up, especially as the course in your college is so inexpensive.

An Enthusiastic Graduate Says Best Paying Profession

Dr. Stagle says: Mechano-Therapy is one of the cleanest, best paying, up-to-date professions. One that is remunerative from the start—one that is practical in every way—one that is not built on theory—one that is progressive—one that will make you prosperous while you are making others well and happy.

A Personal Word

From the President of the College.

Have you ever thought of going into business for yourself?

Then send for my FREE book. It will tell you how others are enjoying a life of luxury, while putting money away in the bank. How YOU can not only gain independence, but be a benefit to humanity and a highly respected citizen with an income of \$3,000 to \$5,000 a year.

All I ask is that you send me the coupon below for my FREE book. You can then decide, in the privacy of your own home whether you wish to embrace the opportunity which I offer you, or whether you will continue to plod along the balance of your days slaving for others.

We Teach You in Your Own Home

We can teach you an honorable and profitable profession in a few months, which will insure your financial independence for life. We can make you master of your own time—to come and go as you will—an honored and respected citizen, with an income of \$3,000 to \$5,000 a year. We teach you this pleasant, profitable profession by mail, right in your own home, at your own convenience, and without interfering with your present duties. It makes no difference how old you are, any person—man or woman—with just an ordinary common school education, can learn Mechano-Therapy. It is easy to learn and results are sure.

It is simply drugless healing. A common-sense method of treating human ills without dosing the system with poisonous drugs—that's all. We have taught hundreds of men and women who were formerly clerks—farmers—stenographers—telegraph operators—insurance agents—railway employees—in fact, of nearly every known occupation—old men of 70 years who felt discouraged and hopeless—young men of 20 years, who never had a day's business experience—salaried men, who could see nothing in the future but to become Oslerized—laboring men, who never realized that they had within themselves the ability to better their conditions. Write for our FREE book, which explains all—today.

Cut Out This Coupon and Mail It Today

AMERICAN COLLEGE OF MECHANO-THERAPY,
Dept. 748, 120-122 Randolph Street, Chicago, Ill.

GENTLEMEN:—Please send your book, "How to become a Mechano-Therapist," free of cost to me.

My Name.....

My Post Office.....

R. F. D. or St. No.....State.....

(Write name, town and state very plain)

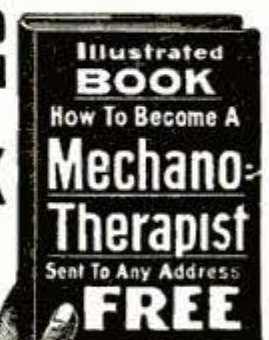


FREE BOOK

Try to realize what this opportunity means TO YOU. If you are contented, and willing to drudge for others all your life for a mere pittance, our proposition may not interest you. But if you have a spark of manhood or womanhood left—any ambition whatsoever to improve your condition socially and financially, learn this pleasant profession. It will make you independent for life. It is so easy—so VERY easy—to get all the details—without trouble or expense. Simply sign and send us the coupon now.

AMERICAN COLLEGE OF MECHANO-THERAPY
Dept. 748 120-122 Randolph St., Chicago, Ill.

SIMPLY SEND THE COUPON FOR THIS



Send for this Book Today, it is FREE

THE GREATEST BARGAIN EVER OFFERED

THE NEW
AMERICAN
ENCYCLOPEDIA
DICTIONARY

THE NEW
AMERICAN
ENCYCLOPEDIA
DICTIONARY

THE NEW
AMERICAN
ENCYCLOPEDIA
DICTIONARY

THE NEW
AMERICAN
ENCYCLOPEDIA
DICTIONARY

THE NEW
AMERICAN
ENCYCLOPEDIA
DICTIONARY

50 Cents Secures this Great Reference Library

This magnificent reference work, costing three-quarters of a million dollars to produce, is a dictionary and encyclopedia combined. In fulness of definitions, number of words defined and accuracy, it is superior to reference works selling for five times its price. It has been recently revised and enlarged by a staff of American editors. Its five big volumes contain an inexhaustible mine of information on every subject, defining 250,000 words. Our bargain offer takes off two-thirds the price, and we pass the work on to you at less than one-third the price of any other first-class reference work. We send the complete set to your home for examination without charge, and if you decide to keep it, a first payment of 50 cents secures the set.

\$5.00 ATLAS FREE

The Modern Atlas of the World sells regularly for \$5.00. It contains more than 100 maps in colors. There is a map of each state, territory and country. It gives the population of all cities of importance. This invaluable Atlas is bound in red cloth and is 10x13 inches in size. We will send it to you, absolutely free, if your order for the Encyclopedic Dictionary is received at once

FIVE MASSIVE VOLUMES

There are five volumes, each one foot tall, and strongly and handsomely bound in three styles of binding. The set contains 5,000 pages and thousands of illustrations. It is up-to-date in every particular. It is absolutely reliable; the names of its editors are among the greatest in every field of research. As a dictionary, it defines 25,000 more words than any other dictionary. As an encyclopedia, it treats 50,000 subjects, covering the whole field of human knowledge.

Mark and Mail This Coupon.

Half Leather Binding.

Free For Examination

If you reply at once, we will send you a complete set at once, all express charges prepaid for examination. And we will also send, absolutely *free of charge*, the Modern Atlas of the World. If you like the books and the Atlas you can pay for the Dictionary in little monthly payments. If you don't like them, return them to us and we will pay return charges

Mail the Coupon Today 

This is only a limited edition, and will not last long. You must reply promptly to take advantage of the bargain.

THE WERNER CO., Akron, O.

P.M. 4-69

THE WERNER CO., Akron, Ohio.

You may send me on approval for 10 days one set of the AMERICAN ENCYCLOPEDIA DICTIONARY, bound in the style indicated by having the "X" beside.

Full Sheep Binding. Regular price \$64.00. I will pay for the same, if I decide to keep the books, as follows: 50 cents after I examine them and \$2.00 a month until your special price of \$25.00 is paid.

Half Morocco Binding. Regular price \$56.00. I will pay for the same, if I decide to keep the books, as follows: 50 cents after I examine them and \$1.50 a month until your special price of \$20.50 is paid.

Library Cloth Binding. Regular price \$42.00. I will pay for the same if I decide to keep the books as follows: 50 cents after I examine them and \$1.25 a month until your special price of \$16.50 is paid.

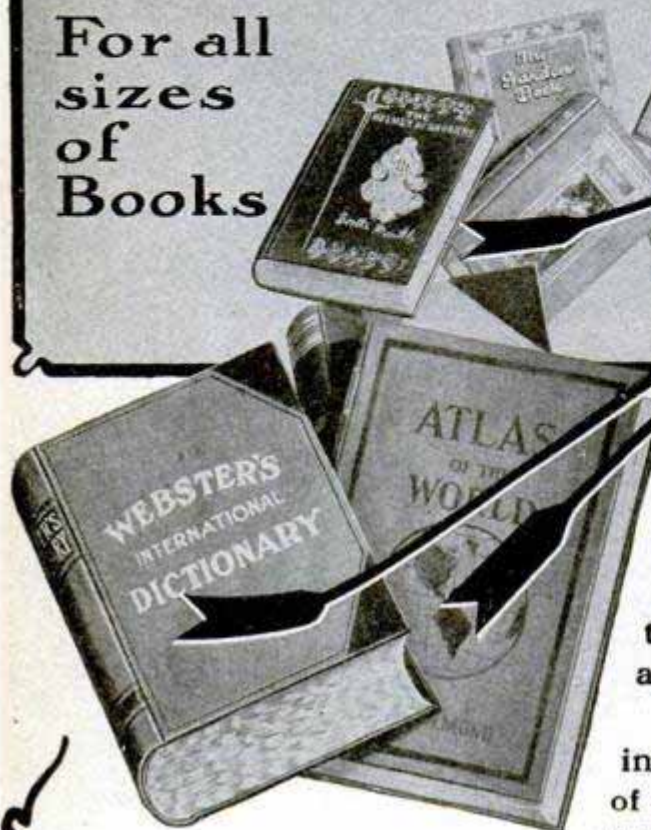
You are to send the set of five volumes and the Atlas of the World, delivery charges paid. If not satisfactory, I will return books and Atlas within 10 days after delivery, at your expense for return charges.

Name.....
Address.....
State.....

Globe-Wernicke

"Elastic" Book-Cases

For all
sizes
of
Books



There are Globe-Wernicke "Elastic" Book-case sections for all sizes of books—from the pocket size edition of Shakespeare, up to bound volumes 17 and 18 inches high.

It is not the *average* size book that causes trouble in a library, so much as it is the big and little volumes.

The big ones are usually shelved in some inaccessible spot under the table where they are of no practical value to any one, while the little ones get lost, strayed or stolen.

It's a real pleasure to assemble *all* shapes and sizes in Globe-Wernicke "Elastic" Book-cases—where they are get-at-able as well as presentable.

Carried in stock by nearly fifteen hundred authorized agents.

Where not represented we ship on approval—Freight paid.

Our catalogue containing 25 library interiors is full of easy solutions to library problems. Write Department 18 for free copy.

The Globe-Wernicke Co., CINCINNATI.

BRANCH STORES: New York, 380-382 Broadway. Chicago, 224-228 Wabash Ave. Boston, 91-93 Federal St.

POPULAR MECHANICS Book Catalogue

A 64-page catalogue of the latest and best

Practical Mechanical Books

It is free. A postal brings it. Address

POPULAR MECHANICS, BOOK DEPT., 225 WASHINGTON ST.
CHICAGO

THE INDEX TO VOL. 10 (1908) POPULAR MECHANICS

is now ready and will be mailed to
any address on receipt of 10c in stamps

Address POPULAR MECHANICS
Book Dept. 225 Washington St., Chicago

AROUND THE WORLD BUT NEVER OUT OF INK!

You Feel Safe
When Writing a
Cheque with



THE SMOOTHEST
WRITING INSTRUMENTS
IN THE WORLD

Are Ink Tight
In the Pocket
Others Leak Thro'
Vent at Back End

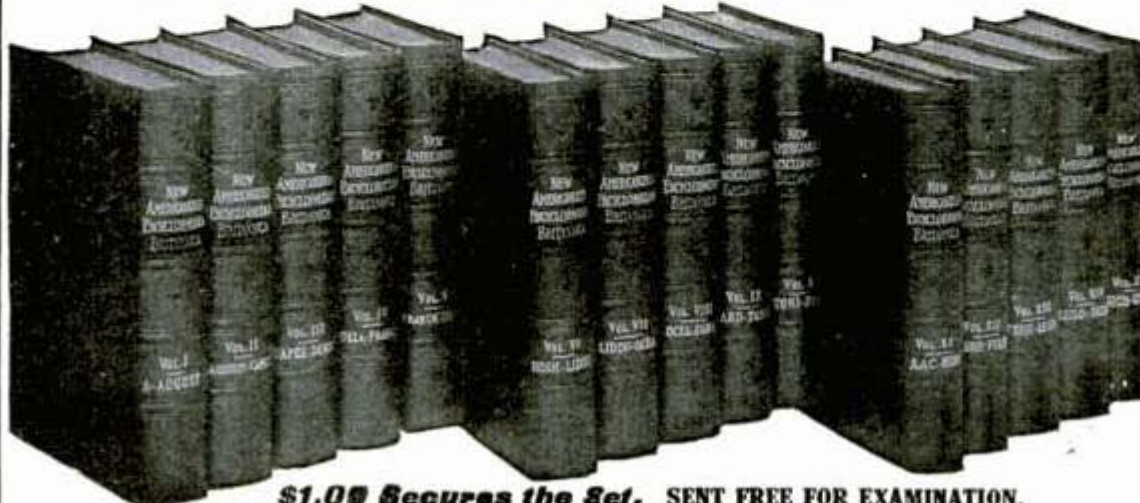
Note—Blair's are the only practical Ink Pencils. Take no chances on a substitute. Owing to U. S. and British Patents they can not be imitated. For Correspondence, Manifold, Ruling and Stenography. No leaky air tube, they fill easier. Holds 50 per cent more ink, and permits the use of Blair's Safety Ink-Making Cartridges, 10c extra. Saving cost of cheque punch, \$5.00. Point will last for years. Soon saves cost. PRICES: Plain, \$1.00; Chased, \$1.25; Chased and Gold Mounted, \$1.50; Red Cases, 3/4 in., \$1.25; Large Barrel, 4 in. or 5 in., \$1.50; 3/4 in., Silver Filigree, \$2.50; by insured mail, 8c more. Ordinary ink can be used. Blair's Fountain Pen Co., 6 John St., Suite 272, New York, 15 Bishonsgate St., without London, E. C. Get Agency

Webster's New \$8.50 Encyclopedic Dictionary FREE with each of the first hundred orders

MAGNIFICENT 1909 EDITION OF THE New Americanized Encyclopedia

FIRST IN WEALTH OF LEARNING, FIRST IN WEIGHT OF AUTHORITY, LATEST IN DATE OF PUBLICATION

Fifteen massive volumes, sumptuous binding, 10,000 double-column pages, 100 superb maps, 37,000 biographical references, hundreds of illustrations, colored plates of the rarest beauty.



"An intellectual ocean whose waves touch every shore of thought."

A Home University,
A College Education,
A Huge Library

\$1.00 Secures the Set. SENT FREE FOR EXAMINATION.

THE KING OF ALL ENCYCLOPEDIAS, AT PRICES NEVER BEFORE APPROACHED

You have always meant to get an Encyclopedia—every intelligent man does. NOW IS THE TIME. possession of this latest and greatest of all ENCYCLOPEDIAS puts you ten years ahead of your less enterprising neighbor.

Other books tell you about ONE thing; this tells you EVERYTHING. It includes every phase of human knowledge, discovery, experience and belief. It records every step in the stately march of human progress. It covers all epochs of literature, all forms of government, all systems of religion. All gallant deeds and stirring scenes, all victories of brain or brawn, all marvels of science and invention, all the glorious achievements that have made history luminous and civilization possible are found in the ten thousand teeming pages of these splendid volumes. Can YOU afford to do without it?

Its Matchless Authority.

The most brilliant thinkers of the century are enrolled as its contributors. To state even a few of their names is like calling the roll of the world's scholarship. The European writers include such men of world-wide fame as Matthew Arnold, James Bryce, John Morley, Andrew Lang, St. George Mivart, Canon Farrar, Edmund Gosse, John Stuart Blackie, Leslie Stephen, Edward Freeman, Lord Kelvin, Robertson Smith, Sir Norman Lockyer, Thorold Rogers, Saintsbury, Romanes, Sayce, Rawlinson, Wallace, Merivale, Murray, Caird, Tulloch, Geikie, Palgrave, Rossetti, Swinburne and hundreds of others no less celebrated. To insure, moreover, that American topics should receive their proper proportion of space and attention, thus making the work in the truest sense of the word "AMERICANIZED," the services of the ripest scholars in America have been called into requisition. Such names as Simon Newcomb, John Fiske, Cardinal Gibbons, John Bach McMaster, Admiral Melville, Thomas B. Reed, Carroll Wright, and others equally famous give it an authority so overwhelming, so incomparable that it reigns without a rival in the realm of scholarship.

Special Half Price Offer.

To emphasize the issue of the 1909 edition of this magnificent work we are making for a limited time only a special introductory offer of just ONE-HALF the regular price. The cloth set we price at \$37, the half morocco at \$46. Moreover, with each of the first hundred orders to reach us we will send absolutely FREE Webster's Huge New Encyclopedic Dictionary, retailing regularly at \$8.50. It is bound in Full Sheep, marbled edges, gold stamped and indexed. This combination of the world's most famous Cyclopedic and equally famous Dictionary gives you a magnificent reference library of enormous extent and unmatched value.

Send No Money Now.

Sign and mail the attached coupon and we will ship you a complete set for five days' FREE examination. You can return them AT OUR EXPENSE if they fail to give you entire satisfaction. We pay all transportation charges. Should you decide to purchase, then send us \$1.00 as first payment and pay the balance at the rate of \$2.00 per month for the cloth and \$2.50 per month for the half morocco.

Do Not Delay.

At these phenomenal prices the introductory sets will vanish like magic. It is the opportunity of a life-time. Enrich your mind, adorn your library, delight your family with this stupendous work. Write TODAY. Remember. No risk! No obligation! You purchase only if satisfied.

THE BOOKLOVERS' SOCIETY

156 Fifth Ave.

NEW YORK CITY

P. M.
Apr. '09

THE
BOOKLOVERS'
SOCIETY
156 Fifth Ave.
New York

Please send me for examination, prepaid, a complete set of the New AMERICANIZED ENCYCLOPEDIA in half morocco binding at your SPECIAL HALF Price offer of \$46.00. If the set is satisfactory, I agree to pay upon the purchase price the sum of \$1.00 in cash within 5 days after receipt of goods and \$2.50 each month thereafter for eighteen months. Title to remain in The Booklovers' Society until full purchase price has been paid. If the books are not satisfactory I am to notify you promptly and hold them subject to your order.

Also send me WEBSTER'S NEW ENCYCLOPEDIA, which I am to receive absolutely FREE should I retain the set.

Name.....
Address

If you prefer the cloth edition after \$46.00 to \$37.00 and \$2.50 each month to \$2.00.

Classified Advertisements

Advertisements in this section, 5 cents per word, payable in advance. To insure ads being inserted under proper classified head in the May issue, copy must reach this office not later than April 1.

AUTOMOBILES

FOR SALE—10 H. P. AUTO ENGINE, steering gear and other parts of auto. J. L. Moore, Fancher, N. Y.

\$1,100 TOURING CAR, fine shape, \$225. Thirty light electric plant, \$175. Thompson recording Watt-meter, new, \$20. Portable stage and fine oil painted scenery for vaudeville, cheap. Lock Box 886, Canal Dover, Ohio.

NEW TWO CYCLE MOTORS, water or air cooled. 2 cylinder, 16 h. p., \$130; 3 cylinder, 24 h. p., \$195. Butts, Oxford, N. Y.

SALE AUTO MOTORS CHEAP. Three cylinder, air cooled, with all accessories. Fifteen horse power, \$75. Also two cylinder, water opposed, ten horse power, \$40. Chas. Lapp, Station C, Pittsburg, Pa.

RAMBLER 2 cylinder, 5 passenger touring car in good condition, cost \$1,350; will sell to a quick buyer for \$350, no less. Box 889, Martinsburg, W. Va.

STANLEY STEAM RUNABOUT, like new. Dudley Harley, Martinsburg, W. Va.

FIVE PASSENGER, 2 cylinder, 20 h. p. Queen touring car, just completely, thoroughly overhauled, repainted, made like new, runs fine, powerful, tires good as new, fully guaranteed, snap, \$600. Shadegg Engine Co., Minneapolis, Minn.

NEW AUTOMOBILE, less engine, \$55. Incubator and brooder, 500 egg, \$20. Foot-power polishing and grinding lathe, \$8. Wills, Canal Dover, Ohio.

SAMPLE FREE. The Automobile Dealer and Repairer is the only journal in the entire field of automobile publications that makes a specialty of Repair Work and care of autos. Published monthly. \$1 a year. Sample copy free everywhere. Motor Vehicle Publishing Co., 26 Murray St., New York, N. Y.

AUTOMOBILES. JEWEL Runabout, practically good as new, \$175. Brand new 4 cylinder auto; will take smaller car as part payment. Box 275, Burlington, Wis.

AUTOMOBILE SCHOOL—Chicago School of Motoring; the original automobile school in Chicago. Four hundred and fifty graduates the past year, to whom we refer upon request. Automobile owners, prospective buyers and young men wanting to become expert chauffeurs will save a great deal of money and a lot of worry by studying the mechanism, care and repair of gasoline automobiles in our shop, where all parts are open so you can see how they are made, and how they operate. We give thorough and practical instruction. Competent chauffeurs supplied. Address Chicago School of Motoring, Dept. B., 1436 Wabash Ave., Chicago, Ill.

RENEW OLD DRY BATTERIES. Send 25c for tested recipes. Graham's Garage, Clyde, Kan.

FOR SALE—Nice, thoroughly rebuilt, modern, up-to-date automobiles. Some rare bargains. Write for list. Address Robert Holmes & Bros., Danville, Ill.

"AUTOMOBILE OWNER, Know Your Car." To get best results study the standard handbook on care and management, entitled "Homan's Self-Propelled Vehicles," sent postpaid for \$2. Money returned if not pleased. Order today. Audel & Co., Publishers, 63 Fifth Ave., New York.

AUTO SUPPLIES

FOR SALE—4 new solid Hartford tires, 36x3, also rims for same. Price, \$50 for set of 4. R. Roth, 1423 North Ave., Bridgeport, Conn.

HOSE BRACKET FOR GARAGE USE. The kind that doesn't leak; a time saver and a splendid money maker for agents and manufacturers. Substitute for rubber hose. As a buggy washer has no equal. We can safely guarantee them for five years. Giving perfect satisfaction where in use. Foreman Patent Swinging Hose Bracket Co., 317 S. 12th St., Omaha, Neb.

TEAMSTERS WILL ALWAYS give you the road if you use my Exhaust Whistle; \$7.50, with valve and foot lever. New chains take your car on any road; \$6.50 pair. Keep your carburetor free from dirt and water with gasoline strainer; \$1.75, with fittings. Wm. Parton, Flora, Ill.

FREE BOOKLET SENT on Automobile and Motor Boat Supplies. Our Electric Fire Alarm Horn protects your property. The Edgar Mfg. Co., 9 Kast Bldg., Boston, Mass.

FOR SALE—Locomobile Running Gear. 4 springs, 4 wire wheels for 28x3 tires, differential gear sprocket front and rear frame, side bars, side steering levers. Price, \$20. R. Roth, 1423 North Ave., Bridgeport, Conn.

HOSE BRACKET for garage use. A time saver and a splendid money maker for Agents. Liberal proposition to capable men. Takes the place of rubber hose for washing. Foreman Patent Swinging Hose Bracket Co., 317 So. 12th St., Omaha, Neb.

MOTORCYCLES—BICYCLES

MITCHELL MOTORCYCLE for sale or trade for gasoline or steam runabout. W. L. Wolff, Marshalltown, Ia.

'08 SPRING FRAME MERKEL MOTORCYCLE in good running order, \$150. H. A. Whittemore, Mayville, Mich.

1908 YALE CUSHION FRAME Gents' New Bicycle, G. J. tires, brake and steel rims, \$38. Ewing's, Decatur, Ill.

THE MOTORCYCLIST, a \$1.50 magazine, for 25c a trial year. Motorcycle Equipment Co., Hammondsport, N. Y.

40 PAGE CATALOG of new Motorcycle Accessories. Free for the asking. Motorcycle Equipment Co., Hammondsport, N. Y.

BICYCLE MOTOR CASTINGS and sets for the bicycle. Send stamps for catalog. Bicycle Motor Co., Hammondsport, N. Y.

CURTISS, 1908, 3½ h. p. Run 1,650 miles. With stand, \$120. Guy Webb, Battle Creek, Mich.

WANTED—GOOD SECOND HAND Motorcycle, Harley-Davidson preferred. Address A. Mohring, 2001 N. Hermitage Ave., Chicago.

WE HAVE A FEW BARGAINS in used Motorcycles. They will not last long. Write for particulars. Hendee Mfg. Co., 1251 Michigan Ave., Chicago.

FOR SALE—MOTORCYCLE FRAME, wheels, tanks, bars, coil, good condition. Price, \$18. Stine & Parks, Fremont, Ohio.

DOUBLE CYLINDER, powerful Indian Motorcycle, with tandem attachment, new last August, \$175. A. B. Porter, LaSalle, Ill.

WANTED—TO BUY, Second Hand Motorcycles. State prices. Hultz & Co., Toluca, Ill.

FOR SALE—Indian Motorcycle, 1907 model, tires good as new, machine in perfect running order. Bargain for \$95. R. C. Burton, Kellogg, Ia.

MOTORCYCLE FOR SALE; good condition. Merkel \$65. Snap. A. Ross, Webster, S. D.

3x3 MOTORCYCLE. Engine castings partly machined. \$15. Butts, Oxford, N. Y.

EXCHANGE—2¼ K. W. Dynamo or Motor for motorcycle. H. C. Rogers, 707 S. 5th St., Columbia, Mo.

MOTORCYCLE, \$115; ideal construction, tandem, stand. Stamp for description and photographs. Maldwyn Jones, Lebanon, O.

INDIAN MOTORCYCLES and first quality sundries. Careful repairing. Bargains in used machines; get list 3. C. C. Hopkins, Distributing Agent, 759 Gough St., San Francisco, Cal.

WANTED—SECOND HAND MOTORCYCLES. Send description and lowest price. Harry R. Geer Co., St. Louis, Mo.

M. M. SPECIAL, like new 1908 model. First \$110 takes it; guaranteed. Room 73, 217 West 125th St., New York City.

"CONSTRUCTION, MANAGEMENT and Care of Motorcycles." Full of suggestions and useful advice for every Motorcycle Rider, Beginner or Prospective Buyer. Sent prepaid for 25c stamps. Keller & Risque, St. Paul, Minn.

M. M. MOTORCYCLES for 1909 offer more profit to the dealer, more real value to the rider than all others combined. Secure territory now. Am. Motor Co., 740 Centre St., Brockton, Mass.

AERONAUTICS

FREE INFORMATION to parties interested in aerial navigation. New discovery for lifting power. No helicopter; no gas; no aeroplane. L. H. Lane, 609 Pacific Building, S. F., Cal. 2c for postage.

OWN A MINIATURE AEROPLANE involving principles of Wright machine. Flies 12,000 feet high. 50c prepaid. Aerial Sales Co., Dept. 3, Lewiston, Maine.

IF INTERESTED IN AERONAUTICS send dime for list of papers describing and illustrating aerial machines of all kinds. Aerial Sales Co., Dept. 11, Lewiston, Maine.

BOOKS AND PERIODICALS

BOOKS—"Lutes & Cements," 10c; "Trigonometry Simplified," 50c; "Lettering," 25c; "Structural Drawing," \$1. Lists free. National Book Co., Cleveland, O.

FOR SALE—50 Reference Libraries. All subjects. International Correspondence School, 5 vols., Shop Practice, \$12. Others in proportion. Send for list. Steam, gas, electric, civil, mechanical engineering. State subjects interested in. Clarence Cash, Elgin, Ill.

"OUR LITTLE BOOKS FOR LADIES," postpaid in plain cover, for 25c. (Tell what you want to know.) O. K. Pub. Co., Clerk 190, Decatur, Ill.

"HOWARD THURSTON'S Card Tricks" explains Thurston's sensational rising cards, his continuous front and back hand palming of cards, and many other new unpublished card tricks. 45 illustrations. Postpaid, any address, 25 cents, stamps. L. O'Donnell, 33 Collahie St., Toronto, Ontario.

PICTURES AND POSTCARDS

SIX BEAUTIFUL assorted cards, scenery, birthday, floral, etc., 10c. Dudley Co., Long Branch, N. J.

10 POST CARDS, 10c. Most beautiful line, Easter, floral, birthday, etc., at this price; deeply embossed in most beautiful colors; with catalogue. Star Post Card Co., 101 S. 8th St., Phila., Pa.

SIS HOPKINS post cards. Send 25 cents for complete set. "Nuf ced." Superior Co., 14 South 4th St., Philadelphia, Pa.

EASTER SOUVENIR POST CARDS, EMBOSSED. Very beautiful. 20 samples, 25c; per 100, prepaid, 85c. Others received \$1.25. Jones Supply Co., P2018 East Cumberland, Philadelphia, Pa.

FLORIDA POST CARDS, fifteen for 25c, selected views, postage paid. T. C. Imeson, 226 Hogan St., Jacksonville, Fla.

FREE—20 POST CARDS with 3 months' sub. at 10c to the largest, oldest 100 page monthly on Stamps, Post Cards, Coins, Relics, Old Books, Minerals. Phil. West, Superior, Neb.

CORRESPONDENCE CAMERA CLUB and Post Card Exchange. Members everywhere; prints and ideas exchanged; expert advice and information free; supplies at reduced prices; camera and lens exchange bureau; memberships 50c, short time only; send today. P. Mitchell, Sec'y, 217-221 W. 34th St., New York.

10 EASTER POST CARDS, beautifully embossed in gold, silver and colors, for 10 cents, stamps or coin. Wharton Post Card Co., Clifton Forge, Va.

50 ASSORTED POST CARDS in colors, all different, 25 cents; 20 for 10 cents. Wharton Post Card Co., Clifton Forge, Va.

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

MARY AND HER BEAR (a most comical novelty), 12c, sealed. Ewing's, Decatur, Ill.

TWELVE finest colored cards of Yosemite Valley or Yellowstone Park for 25c. Michigan Post Card Co., Dept. 141, Detroit, Mich.

FIFTY POST CARDS, 25c. New assortment, all different. Post Supply Co., D137, Waltham, Mass.

EDUCATIONAL AND INSTRUCTION

INSTRUCTIONS in WIRELESS TELEGRAPHY. Send 25c for the best wireless instruction book published. Construct your own wireless outfits. Spark Coils, Relays, Tapping Keys, etc. Facts only. No red tape. Complete instructions. Electrical Experimenters Supply House, R. 504, 622 Wells St., Chicago, Ill.

LEARN TO LETTER SHOW CARDS and earn from \$18 to \$25 per week. I teach you by a natural, easy method at a price within your reach. Full particulars mailed free. Bert L. Daily, Dept. A, Dayton, Ohio.

STUDY ELECTRICITY AT HOME—A complete electrical course at home, containing 30-page detail book, 220-page text-book, 200 experiments and over 100 pieces of apparatus. Price, complete, only \$5.60. Catalogue "PS" explains this and other remarkable offers. Thomas M. St. John, 848 Ninth Ave., New York.

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

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

CORRESPONDENCE INSTRUCTION in everything concerning pianos and automatic players. Dollar per lesson. Saunders Bros., 1021 Park Rd., Washington, D. C.

TRADE SCHOOLS

WANTED—The Master Plumbers' Trade School of St. Louis wants men and boys to learn the plumbing and gas-fitting trades, and will teach these trades and give practical experience on new buildings while learning, which is

something no other trade school in the country can do. The course covers from 3 to 4 months, and the tuition fee has been reduced from \$100 to \$50 for a short time only. For catalogue and full information address Master Plumbers' Trade School, 3415 Lindell Ave., St. Louis, Mo.

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

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

WANTED—1,000 CHAUFFEURS and Repair Men. Our demand for automobile engineers exceeds the supply; calls for men of intelligence and mechanical bent, commanding \$100 to \$150 monthly, upon graduation. Resident courses, \$15 to \$50. Home correspondence courses completed by practical road and shop work at any of our branches or affiliated schools, highly successful. Look This Up. Auto Schools of America, 742 7th Ave, New York City, or 1642 Michigan Ave., Chicago.

BUSINESS OPPORTUNITIES

WE START YOU in a permanent business with us and furnish everything. Full course of instructions free. We are manufacturers and have a new plan in the mail order line. Large profits. Small capital. You pay us in three months and make big profit. References given. Sworn statements. Pease Mfg. Co., 1011 Pease Bldg., Buffalo, N. Y.

WE ARE AN ESTABLISHED FIRM, doing business in every state, and wish to increase our line. Have necessary capital and every facility to market an article of merit. Address Kelso & Co., 40 West Quincy St., Chicago.

BE INDEPENDENT! Start a mail order business in your own home. We tell you how, and furnish everything needed wholesale. An honorable and profitable business for man or woman. Particulars free. Many make \$3,000 a year. Murphy Mfg. Co., South Norwalk, Conn.

\$3,000 TO \$10,000 YEARLY easily made in real estate business. No capital required. We teach the business by mail, appoint you special representative, assist you to success. Valuable book free. The Cross Co., 2534 Reaper Block, Chicago. See our other advertisements in this magazine.

NOTICE—MANUFACTURERS. We want five novelties to introduce in Old Mexico. Nothing but general agency considered, as our agents cover republic. Give full particulars. Stoner & Ball, Salvatierra, Gto, Mexico.

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

MEN: CLEAN WALL PAPER. Pays \$4.50 to \$12 per day. Successfully worked in every town. Particulars free. Rufus S. Justice, 428 The Arcade, Cleveland, Ohio.

\$15 FOR ONLY \$1. I have just secured five of the best money making plans ever sold. These sold for \$15, but while my supply lasts, I will send the five complete plans (\$15 worth) for only \$1 cash, to those who order before my supply is exhausted. S. H. Brown, 161 St. Pauls Ave., Jersey City, N. J.

GREATEST RECENT ELECTRICAL INVENTION. Buy stock now; profitable investment. Circulars free. Universal Motor Co., Indianapolis, Ind.

I HAVE PARTIES desiring information regarding good patent which would be money maker. Wish to hear only from inventor who wishes to sell outright or on royalty basis direct to buyer. Give price and brief description. Address T. M. Clark, Box 595 I, Buffalo, N. Y.

MY BOOK, "BUILDING A BUSINESS," tells how big agency business can be started with small capital, how to conduct the business and make several thousand dollars annually. Robert Hicks, St. Louis, Mo.

SECRETS of French Dry Cleaning and Dyeing taught by mail. Start a big paying business of your own; no capital needed. Particulars free. Ben-Vonde Co., Dept. C, Staunton, Va.

AGENTS—I have a corking good receipt for making Dustless Dust Cloth, a chemically treated cloth that is making thousands for me. Sells everywhere for 25c, costs 4c. I am selling the goods now. For \$1 will send the formula to you, or sell you the goods so you make 100% profit. Sample article, 25c. G. W. Paul, Box 2656, Boston, Mass.

"MAKE RICE CRISP," the new confection; costs 1c per package; sells like hot cakes for 5c. Profits \$10 a day sure. Machines and instructions, \$10 to \$20. Send 10c for samples and literature. Shaw Mfg. Co., 900 Laguna St., San Francisco.

DON'T wear dirty glasses—give Gould's antiseptic eye glass cleaners lens-wipe a trial; you will always want them. 3 cleaners, 10c. Pirard Co., 1306 Wabash Ave., Chicago.

START A MAIL ORDER BUSINESS. Fortunes and big incomes made by many. Send immediately for free details entitled, "Mail Order Truth," exposing the "outfit" scheme and showing right way of starting. Address "The Mail Order News," Publicity Dept. 10, Fordham, New York City.

PATENT rights on a high class, fully developed, well advertised article of merit already introduced on more than fifty R. R. and interurban lines and in hundreds of fine homes in U. S., Canada and Mexico. Quick sales. Easy to manufacture. Good working stock on hand. Particulars to parties actually interested. Address G. R. Stanton, 1302 West Main St., Decatur, Ill.

BE INDEPENDENT. "THE MANUFACTURER" starts you in clean, profitable business. No capital required. Price, 50c. A. Franke, 314 Linden St., Brooklyn, N. Y.

START A BUSINESS of your own; no capital required. Lots of money to be made. We teach you by mail the Dyeing, Cleaning and Pressing business. Our instructions are easy. Write for our booklet; write today. The J. L. Neher Co., School of Dyeing and Cleaning, Nappanee, Ind.

CHAMPION VENDING MACHINES. Built especially for Outdoor Trade. Durable and attractive. A small investment establishes you in a business of your own. Start now and get the good trade of the spring and summer. Propositions for small and large investors. Write now. Boston Coin Machines Co., Boston, Mass.

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

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

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

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

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

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

AGENTS WANTED

AGENTS, LOOK! Women and Men. We have just added four new big sellers. Rockford, Ill., agent worked 3 days, then ordered 100 doz. Write for particulars and \$2 free offer. Fair Mfg. Co., Box 146, Racine, Wis.

DOOR-KNOB AND PUSH BELL COMBINED. Looks like regulation metal door knobs and replaces them. Fits any door—need screwdriver only. Handsome bronze. Agents, liberal proposition. F. B. Black Co., Station A, Kansas City, Mo.

AGENTS WANTED—We want a few good, live agents for the Excelsior Auto-Cycle, the best made and best advertised motorcycle on the market. We want established agents; no curbstone brokers. See ad page 136, Agents' Department. Excelsior Supply Co., 233-237 Randolph St., Chicago, Ill.

MERRY WIDOW HANDKERCHIEFS. The joke of the season. 'Nuf said! 15c postpaid. Ewing's, Decatur, Ill.

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

AGENTS—Lady or Gentleman. \$80 to \$125 month. Egg Separator. Sample, 14c; wonderful seller; sold through agents only. Slavish Supply Co., 15 Hubbard, Mt. Clemens, Mich.

GUM TISSUE, STIKIT BRAND. Large package sells 10 cents. Gross lots, \$3; per dozen, 30 cents, delivered. Space for agent's name. The Stikpatch Co., Box 3294, Boston, Mass.

GET BUSY. Ventilating burglar locks. Windows locked with 6-inch opening. 15c each; 4 for 50c. Agents wanted. Cannon Mfg. Co., 1522 Kenmore Ave., Chicago, Ill.

NO-KE LOX sell on sight. Good profits for agents. Write us. No-Ke Lock Co., Port Chester, N. Y.

ACETYLENE USERS can get one German Steatite Alco High Efficiency burner free for each name and address supplied us of men selling or installing acetylene house lighting generators. Alco Burner Co., Chattanooga, Tenn.

OUR TRANSFER FLUID MAKES pictures from newspapers. Sample, 10c. Picture 4. Agents wanted. Eastern Mds. Co., Newton Upper Falls, Mass.

HERE'S YOUR OPPORTUNITY! Double your income. Shoes for flatirons, keyless door locks, new skirt fasteners—sell fast everywhere. \$25 weekly and expenses easily made. Address Dexter Supply Co., 334 Dearborn, Chicago.

LEARN MIRROR, SPECIALTY AND NOVELTY MNGF. at home, spare time, immense profits, all your own. 5 formulas free. Nothing trashy. Stamp brings sample and advice. Start at once. Eagle Supply Co., D. 18, Mattoon, Ill.

GENERAL AGENTS—\$3,600 made by J. Harper, Delhi, N. Y., and his agents on Diozo Disinfecting Cabinets. Most of it this year. Diozo Phone Disinfectors just out; a still bigger seller. General agents wanted to appoint agents in exclusive territory. To man with limited capital Diozo affords wonderful opportunity for making big money quickly. See our display advertising on page 147 of this issue. Parker Chemical Co., Chicago.

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

"LITTLE SHAVER" Pencil Sharpener. Effective, low price; meets every requirement, large or small office, home and school. Bonanza for agents; territory. Sample on approval, \$1, postpaid. Get in line—more reliable than \$4 machines; money refunded if not satisfactory. Address United Specialty Association, 116 Cal. St., San Francisco. Do it now.

AGENTS—Start hosiery business selling goods that are replaced free when hole appears. Biggest moneymaker known. No capital required. Write at once to secure exclusive territory. Triplewear Mills, Franklin and Girard, Phila.

\$2.50 WILL start you in the tea, coffee and spice business. For particulars, write Burns & Reed, importers, 209 Hudson St., New York.

BIG MONEY EASILY MADE SELLING our household specialty. Sample, 25c. Write today. Conn. Sales Co., Box 153X, Torrington, Conn.

SALESMEN, use your spare time selling fire-proof safes to business men and farmers. Experience unnecessary. Quick sales. Big profits. Alpine Safe Co., Station N, Cincinnati, O.

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

AGENTS wanted for our household specialties, jewelry, etc. Write for terms. McGruder & McGruder Specialty Co., Plymouth, O.

STOP WORKING for others. Our prospectus shows the way. Very little capital starts you. Write. Barr Mercantile Co., Crafton, Pa.

MONEY EASILY MADE. We have five good plans for making money worth \$1. We will send all for 25c, stamps or coin. Mgr., Box 796, Albany, Ga.

MEN, WOMEN, Boys and Girls see World's Fair at Seattle, Wash.; send 10c in silver for particulars. "WAX-ALENE" address, Belleisle Bros., Bellingham, Wash.

AGENTS write today for free information of our fast selling Specialties. Make \$5 a day easy. Write now to Dept. 2, Central Specialty Company, Quincy, Ill.

AGENTS—We offer you no fortune, no fabulous income, but if you are willing to become a General Agent or a mail dealer, operating our new and wonderfully successful plan, a good living is assured. Write us for our free instructions and stop "grinding" for others. It's really "alive." L. Y. Wolf, Reading, Pa.

STOP WORKING! Get out of the rut! Work for yourself instead of putting money into the other fellow's pocket! February "Booster Magazine" puts you "next" to a 600% Profit Mail Order Business. Also gives details of our Automatic Moneymaker that is clearing others \$65 weekly. Other big features galore. In a class by itself. Schemers wild. February number, 10 cents, March included free. Get wise to something Alive! Z. W. Burdick, 351 Dearborn St., Chicago.

WANTED—Agents to sell "Tats Grit Soap" to people who have dirty hands—that's everybody. Send 10c for large can and special premium offer. Agents wanted in large machine shops. Tatlock Bros., Inc., Rochester, N. Y.

EVERYBODY that is out of employment send for free booklet called "The Almighty Dollar," and salesmen leaflets; \$3 to \$75 a day occupations. G. Process Mfg. Co., Salina, Kan.

AGENTS AND CREW MANAGERS—The Romafin Casserole is the best selling household specialty made; low price and talking points that make quick sales; repeat orders on merit; a 16 year old boy or girl can make from \$3 to \$5 per day. The Romafin Co., 7 Linden Ave., Zanesville, O.

BOY AND GIRL Agents—Sell 24 5-card packages of Souvenir Post Cards for us at 10c each pkg., and receive a beautiful camera or fountain pen free. Write today to Little Giant Co., Dept. 11, 226 N. Waller Ave., Austin, Chicago, Ill.

PORTRAIT AGENTS—Will make you first-class enlarged portraits with frame, glass and back, complete. F. O. B. Chicago, thirty-seven cents. Hot sellers at \$1.98. Chicago Copy Company, 425 Milwaukee Ave., Chicago, Ill.

DOLLARS in horse sense and new patented, unbreakable Harness Klingsnap. Agents make over 200 per cent on retail and 50 per cent on wholesale orders. Sales made in one minute. Sample pair by mail, ten cents. Pease Mfg. Co., Dept. G, Cincinnati, Ohio.

THE YALE DOLLAR ADDING MACHINE is a big seller for agents and M. O. men. Made of steel, nicked. Over 2,000 in U. S. postoffices. No competition, new model just out. If you want a business proposition, no fake, write for agent terms. Yale Mfg. Co., Sales Dept., Newark, N. J.

AGENTS—My plan is a winner, and gets the dollars. Full particulars for stamp. T. F. Coughlin, Dept. C, Box 523, Troy, N. Y.

AGENTS TO SELL \$2 adding machine in unoccupied territory; liberal proposition; golden opportunity for hustler. Smith Supply Co., B-7, Los Angeles, Cal.

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

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

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

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

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

THE LIGHTNING MULTIPLIER POST CARD will solve problems in multiplication quick as a flash, with absolute accuracy. Indispensable to every person who uses figures. Cannot get out of order. Send for one, and you will wonder how you ever got along without it. Agents wanted. Sample, 10 cents in stamps. The Simplicity Co., Chicago.

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

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

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

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

EXCEPTIONAL OPPORTUNITY for energetic solicitors with grit and selling power. Article absolutely new and guaranteed. Tremendous seller. Everybody buys if shown. 60c to \$2 profit each sale. Virgin field awaits hustlers everywhere. Write today. Sanitax Co., 2309 Wabash Ave., Chicago.

AGENTS to sell Dutch Cooking Set; sells every house. Write us. Pace Bros. & Sons Pottery Co., Roseville, Ohio.

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

WALL CLOTHES DRYER, Grand Seller, Particulars Free. Adjustable Clothes Dryer Co., Leipsic, Ohio.

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

AGENTS are coining money selling our great combination tool, the Washington Hatchet. Ten tools in one. Sells at sight to farmers, housekeepers, storekeepers, etc. We can show you how to make from \$3 to \$10 a day; experience unnecessary. Write today for our agents' offer. H. Thomas Mfg. Co., 120 Barney Block, Dayton, O.

WANTED—AGENTS: Capable men to act as exclusive agents to sell well known, high class, fuel and labor saving boiler specialty. Unlimited field. Excellent testimonials. Necessary on all boilers. Splendid opportunity for a man who can sell. Price, \$50. Liberal contract. Diamond Power Specialty Co., 234 Fort St. West, Detroit, Mich.

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

WE MANUFACTURE GLASS PAPER. Plain glass windows made to look like real stained glass. Easily applied. Something new for agents. Big money maker. Sells on sight. Samples of this paper with catalogue in colors sent on receipt of 10c. S. H. Parrish & Co., Lakeside Bldg., Chicago.

IN SIX MONTHS a boy made \$1,000 with our great Soap and Toilet Combinations. Be a Davis agent—work six hours a day—make \$200 a month. Get our profit sharing plan. Davis Soap Co., 80 Union Park Ct., Chicago.

AGENTS: Our Dashboard Line Holder will make you rich. Just shipped Texas agent 10 gross, being 3rd order in 30 days. Sample, 30c, silver, prepaid. Wholesale Supply Co., Dept. 15, Valdosta, Ga.

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

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

MALE HELP WANTED

WANTED—RAILWAY Mail Clerks. Salary, \$800 to \$1,400, payable twice each month. Examinations will be held everywhere on May 15th, by the United States Civil Service Commission. Over 2,000 appointments will be made from these examinations. Every citizen between 18 and 36 can try. Common education is sufficient. Political influence not necessary. Country and city residents stand equal chances. Short hours and annual vacation with full salary are absolutely certain. Government employees are never "laid off" because of poor times. We prepare candidates free. Write immediately for free catalog and schedule of examinations. Franklin Institute, Dept. D22, Rochester, N. Y.

WE EXPECT to have positions for a number of men as automobile car drivers and interurban railroads; promotions guaranteed. Only sober and reliable men need apply; experience unnecessary. Send four-cent stamp for applications. The Western Transportation Co., American National Bank Bldg., St. Paul, Minn.

SALESMEN WANTED—for the best Cement Block and Post Machine on the market; straight commission; good for \$300 to \$400 per month; a good side line for implement men; territory reserved. Address Geo. A. Black, Gen. Sales Agt., 1209 Union Ave., Kansas City, Mo.

WANTED—Railway Mail Clerks. \$800 first year. Examinations everywhere, May 15th. Preparation free. Franklin Institute, Dept. D22, Rochester, N. Y.

SALESMEN—We want a man in every town and village to look after new and renewal subscriptions to Practical Engineer, the popular power plant monthly. Read exclusively by the Superintendents, Engineers and Master Mechanics of steam and electric power plants. Subscription price, \$1 a year. You can devote all or part of your time to the work and make big money. See display ad. on page nine of this issue, then write for our liberal offer to agents. Technical Publishing Company, 357 Dearborn St., Chicago, Ill.

WANTED—Railway Mail Clerks. Salary, \$800 to \$1,600. Examinations everywhere, May 15th. Common education sufficient. Candidates prepared free. Write immediately. Franklin Institute, Dept. D22, Rochester, N. Y.

MEN WANTED QUICKLY by big Chicago mail order house to distribute catalogues, advertise, etc. \$25 a week, \$60 expense allowance first month. No experience required. Manager, Dept. 78, 385 Wabash Ave., Chicago.

SALESMEN—We want ten clean cut men to handle a rattling new post card proposition. 20% commission. Five dollar deposit required. The Congress Company, 45 Warren St., New York City.

YOU CAN MAKE \$563 monthly in spare time no matter where you live. No capital. I guarantee to show you how. Free particulars. Frank C. Voorhies, Desk BL, Omaha, Neb.

WANTED—Railway Mail Clerks. Salary, \$800 to \$1,600. Examinations everywhere, May 15th. Common education sufficient. Country residents eligible. Candidates prepared free. Write immediately for schedule. Franklin Institute, Dept. D22, Rochester, N. Y.

EARN \$75 to \$125 a month driving an automobile; my book explains thoroughly how to operate one; explains all gasoline engine trouble. Practical information. Satisfaction guaranteed. 25c, postpaid, stamps or silver. George N. Pearson, Bala, Pa.

TOBACCO HABIT CURED or no cost. Safe, sure, permanent. NIKO CO. Cure, Wichita, Kan.

WANTED—Railway Mail Clerks. Salary, \$800 to \$1,600. Short hours. Annual vacation. No "layoffs." Examinations everywhere, May 15th. Everyone over 18 is eligible. Country residents are eligible. Common education sufficient. Candidates prepared free. Write immediately for schedule. Franklin Institute, Dept. D22, Rochester, N. Y.

EXPERT SALESMEN to travel and sell to stock and poultry men on salary or commission. C. Kertell, 1001 East 14th St., Oakland, Cal.

HUSTLING REPRESENTATIVE wanted in every town; no canvassing; call on retail trade; big money to hustlers. The Re-Nu Co., Box 1051, Jacksonville, Fla.

WANTED—Railway Mail Clerks, Customs Clerks, Clerks at Washington. Yearly salary, \$800 to \$1,600. Short hours. Annual vacation. No "layoffs." Salary absolutely certain twice each month. Examinations everywhere, May 15th. Over 2,000 appointments to be made during 1909. Everyone over 18 eligible. Country residents eligible. Common education sufficient. Candidates prepared free. Write immediately for schedule. Franklin Institute, Dept. D22, Rochester, N. Y.

SALESMEN—Biggest money making fire extinguisher proposition ever offered; exclusive agency, \$36 week fairly certain; sells easily; pays big. Address Mr. Freet, Mgr. (Personal), 34 Murray St., New York.

WANTED—House to house canvassers capable of handling a first class line of perfumes, extracts and toilet requisites. We advertise extensively and our agents earn big commissions. We give credit. Write today. Dept. P. M., Box 200, Rochester, N. Y.

WE WANT A MAN to represent us in every city. A hustler can make \$5 a day. Write for proposition. Antislash Filter Co., Owen Sound, Canada.

SALESMEN—To sell our Office Specialty. Fastens papers without clips. Sample, 25c. Gregory Co., Merrill Bldg., Milwaukee, Wis.

AGENTS WANTED for our new 25c Darning Machine; just out. Weaves new heel or toe in sock in a few minutes. One agent sold 288 in one day. Send 15c for sample or \$1.25 for doz. Hutton Co., Walnut St., Desk 2, Philadelphia, Pa.

WANTED

WANTED—You to list your Second Hand Machinery with me to sell; that is my business. M. C. Suttle, McLeansboro, Ill.

WANTED—10 h. p. Throttling Gasoline Engine, standard make. W. L. Rathbone, Randolph, N. Y.

WANTED—Newly patented machinery of merit from mfr., for mail order and agents. G. Sempel, 421 Sherman St., Spokane, Wash.

WANTED—4 to 8 h. p. air or water cooled auto engine; must be cheap; repairs no objection. F. G. Yonker, 20 Florida St., Sistersville, W. Va.

WANTED—An article to manufacture. Have nicely equipped shop for rapid and cheap production of sheet metal and cast articles. Joseph Pollak, 215 Sydney St., Boston, Dorchester, Mass.

WANTED—2 H. P. BIKE MOTOR; must be cheap; give description and price in first letter. Stine & Parks, Fremont, O.

WANTED—REMINGTON TYPEWRITER; will trade I. C. S. Text-books, Telephone Engineering. In fine condition. Harry Clark, care Burbanks Printshop, Atchison, Kan.

WILL BUY GOOD modern camera, 5x7; send description. Dixon, Rolla, N. D.

WANTED—To know of firm to manufacture patented steel bracket, contract or royalty; no special machinery necessary. L. D. Carter, Roseville, Cal.

WANTED—SECOND HAND Gasoline or Oil Engine, 5 to 9 h. p., farm use. Box 75, Newark, N. J.

WANTED—Brush runabout or Brush engine. Jos. Kajut, New Kensington, Pa.

WANTED—TO BUY, patents or state rights on novelties and household specialties. Articles of merit only considered. No agents. Teske Novelty Works, Denver, Colo.

PARTNER WANTED—I will sell and assign 1/2 interest in two patents, viz., cross-tie construction and nut-lock, both practical and test assured. Write. A. Cotton, Chillicothe, Ia.

WANTED—Small printing press and type; also rubber stamp outfit. Box 296, Selma, Ala.

WANTED—TO BUY, wire wound auto boilers, any condition if one end is good. J. L. Lucas, Bridgeport, Conn.

PARTNER WANTED to develop cross-tie construction patent. Privilege of test guaranteed. Will assign half interest for \$1,000. Write C., P. O. Box 74, Chillicothe, Iowa.

FOR SALE

I. C. S. Mechanical Engineering Course, with ten volumes; only slightly used; cost \$130; take \$50 cash. I. W. Coulter, Mannington, W. Va.

FOR SALE—Auto Running Gear, steel frame and wheels, chain drive, differential on rear axle, 3" tires, good as new; make offer. F. G. Yonker, 20 Florida St., Sistersville, W. Va.

FOR SALE—7 h. p. single cylinder marine engine, 10 h. p. steam auto engine, a 6, 7 and 8 h. p. stationary gasoline engine; typewriter, standard make; 2 power back saws and large quantity blades; a 40 light acetylene generator. Low price on all above. F. Booth, Stanley, N. Y.

SAW MILL cheap. Drawer 24, Payne, O.

28 H. P. CHARTER Gasoline Engine, like new, \$450. Butts, Oxford, N. Y.

WIDOWER HAS PIANO purchased three months ago. In perfect condition, hardly been used. Was \$375. Would take \$130 cash. Satisfaction guaranteed. References exchanged. C. F. House, 3649 Prairie Ave., Chicago.

FOR SALE—SECOND HAND Box Ball Alleys; guaranteed good as new; all crated, ready for immediate shipment. For prices, Lock Box 221, Keota, Ia.

FOR SALE—GEARED EMERY GRINDER and polishing machine, for small shops and household use. Clamps to any bench. Price, \$1.50 cash, or send for description. Hunt Dyar, Kenilworth, Ill. Write for agents' proposition.

KEYLESS DOOR LOCKS can be placed on any door without tools; steel and malleable iron. Nickel-plated sample, mail, 25 cents. Hoosier Novelty Co., Indianapolis, Ind.

NEED THE MONEY. Will sell Remington Typewriter for \$20; nearly new; perfect order. Sent subject to examination, \$3 deposit. Great bargain. J. B. Ogden, Lynchburg, Va.

MONARCH 100 LB. carbide feed acetylene gas generator; good as new; price, \$35. Also 10 lb. generator, \$10. Paul Babson, Seward, Neb.

FOR SALE—Modern Machine Shop Practice, third edition, by Joshua Rose, M. E. Half morocco binding, good condition, cost \$25; will sell for half. Robert Paton, Peru, Ill.

FOR SALE—Cyclopedia of Engineering, 4 volumes. Cost \$18; want \$8. Robert Paton, Peru, Ill.

FOR SALE—I. C. S. Electrical Engineering books, \$10. Box 75, Burrville, Ct.

BARGAIN—NEW 7 horsepower, 2 cylinder Curtis airship engine. Jos. Kajut, New Kensington, Pa.

FOR SALE—19 ft. Gasoline Launch, 2 1/2 h. p. John I. Smith, DeGraff, O.

CAMERA—WIZARD, 4x5, folding, \$10. Midget Dynamo, \$3. Pr. Telephones, \$3.50. Robert Ward, Ypsilanti, Mich.

NEW 3 H. P. Climax air cooled engine, outside fly wheel and all accessories, \$35. J. Lewis Peacock, 202 Chapel St., Atlanta, Ga.

FOR SALE—1 Lambert 12 h. p., 1 Flower City 30 h. p. motor, using both gasoline and kerosene; almost new (reasons), I installed elect. power. J. Roth Stamping & Tool Co., La Crosse, Wis.

FOR SALE—160 neat, black-covered cardboard boxes with covers, reinforced corners and edges, 6 3/4 inches deep, 9 1/2 inches long and 2 1/2 inches wide; suitable for use in shipping books by express; brand new; have never been removed from original packages in which they came from the manufacturer. Will sell for less than half what they cost, viz., \$1 per hundred. Popular Mechanics Co., 225 Washington St., Chicago.

ANY AND ALL I. C. S. Lesson Papers with examination questions sent prepaid for \$1 per copy. Box 22, San Francisco, Cal.

GASOLINE LAUNCH, 30x6; 16 h. p. opposed engine, covered; 10 miles; seats 20; very seaworthy; \$600. Compound Steam Automobile Engine, 5 h. p.; 16" boiler, burner and fittings, \$37. 4 h. p., 2 cylinder launch engine, complete outfit, \$60. Fairbanks 2 h. p. launch engine, reverse wheel, complete, \$40. Papworth, E. C. Stearns & Co., Syracuse, N. Y.

FOR SALE—Advance threshing outfit, clover huller and corn sheller. Also an automobile in fair shape. R. D. Litwiller, Etna, Ill.

SECOND HAND SAFES for sale; all makes; and agent for Alpine Safe & Lock Co. Thos. W. Evans, 832 Howard Ave., New Orleans, La.

FOR SALE—New High Grade Shot Gun. Clint Lauer, 213 4th St., Evansville, Ind.

FOR SALE—New 12 gauge L. C. Smith shotgun. March picture frame mitre box, clamps and saw. H. C. Lauer, 213 Fourth St., Evansville, Ind.

FOR SALE—TOKHEIM GLASS DOME gasoline outfit No. 4, 290-gal. tank. Fred Peulecke, 9237 Houston Ave., Chicago.

FOR SALE—Two Davis Calyx Core Drills, direct connected, 12 h. p. boilers, mounted on steel trucks, located at Goldfield, Nev. Also model L Maxwell runabout. James A. Gordon, Oxford, N. Y.

WOULD SELL MY "White" sewing machine; latest style drop-head; cost \$70; only slightly used. Would take \$25 cash. Guaranteed. Bargain. Address C. Lenark, 3744 Indiana Ave., Chicago.

CASTINGS, for 35 h. p., 4 cylinder water cooled gasoline engine, \$50. Castings, 2 cylinder, opposed, 16 h. p., \$30. Robt. Perrine, 3944 Olive St., St. Louis.

FOR SALE—MECHANICS' TOOLS. Salesman's samples of high grade tools; never used; fine condition; a bargain for somebody. Sold singly or as a whole. Write for list. L. F. Grammes & Sons, Allentown, Pa.

STEAM CAR OWNERS—Subscribe for Steam Motor Journal, monthly devoted to steam cars. 1409 Welton St., Denver, Colo. Price, 15 cents copy, \$1 year.

SMITH-PREMIER TYPEWRITERS, \$23 each. Largest stock. Finest machines. Trial allowed. Smith-Premier Smith, Waterford, N. Y. "Nothing but Smith-Premiers."

FOR SALE—50c. Blueprints of 8" foot lathe; cuts threads. Why pay more? F. Seaberg, 1496 Newport Ave., Chicago.

SEND 50 CENTS in stamps and we will send you one good Emery Wheel 5"x1"; 1/2" hole; of medium grade. Postpaid. List price \$2.20. Francis Reed Co., Worcester, Mass.

WELL DRILL for sale. Entirely new. Latest improvements. E. R. Good, Monroe St., Tiffin, Ohio.

SALE OR EXCHANGE

FOR SALE—1-20 1-6 h. p. engine, steam; 1-20 h. p. boiler; 1 4x5 compressor. Frank Wells, Great Bend, Kan.

\$75 GRAPHOPHONE OUTFIT to exchange for second hand motorcycle or motor. E. J. Algire, 2314 Mersington Ave., Kansas City, Mo.

ABOUT 40 VOLUMES Medical Books, new and old; cash, motorcycle or typewriter. R. C. Longbothum, Mansfield, Pa.

FOR SALE—Plating outfit for tableware, etc. Fred J. Kappler, 1146 22nd St., Moline, Ill.

FOR SALE OR EXCHANGE for Indian or Thor Motorcycle, our S. & P. 2 cycle, 3 h. p. motorcycle, motor patterns, with drawings complete. Stine & Pattens, Fremont, Ohio.

FOR SALE—STAR SCREW CUTTING, 9 in., foot power lathe with chucks and tools. Outfit cost \$275 and is brand new. Or will trade for good launch. L. L. Herr, Box 10, Louisa, Ky.

I. C. S. MECHANICAL ENGINEERING COURSE for 2 1/2 h. p. gasoline engine, lathe, drill press or cash. 3 yrs. to complete. Wm. E. Matthews, Brainards, N. J. P. O. Box 3.

LATHE for Orient Buckboard, or will sell. Floyd Dunlap, Urbana, Ohio.

AUTOMOBILE, Motorcycle, Gun, Light Plant, Phonograph. Want Buckboard, automobile, cash or what. R. Hendley, Wolcottville, Ind.

I. C. S. TELEPHONY ENG. COURSE for Motorcycle or Edison Phonograph. Clyde Kelly, Newkirk, Okla.

FOR SALE—14 H. P. Traction Engine and Separator, first class shape. Part trade. Want automobile, motorcycle attachment. U. D. Fortier, St. Anne, Ill.

COMPLETE BOWLING ALLEY outfit. Make offer. J. B. Reed, Texarkana, Ark.

MACHINERY FOR SALE

5 H. P. WHITE & MIDDLETON GAS ENGINE, complete with tank, shafting, pulleys, etc.; engine alone cost \$300; is like new, and will sell to a quick buyer for \$150. Walter W. Trout, Martinsburg, W. Va.

HAND POWER GRINDER. Size emery wheel, 4 in. diam, 1 in. face. Machine cut gear and pinion; a well made machine. Weight, boxed, 10 lbs. Price, \$2.25. Send for circular. Agents wanted. A big seller. North Wales Machine Co., Inc., North Wales, Pa.

FOR SALE—One 24 h. p. single cylinder stationary gasoline engine, also one Garvin milling machine with division head; will be sold separately and very cheap. J. H. Allen & Co., St. Paul, Minn.

W. A. JONES FOUNDRY & MACHINE CO., 140 W. North Ave., Chicago, are extensive manufacturers of Pulleys, Shafting, Hangers, Boxes, Gears, Friction Clutches, etc.; fact, anything in the iron or steel lines or engineers' mill and foundry supplies. See our display ad on page 148 of this issue or send for our power transmission catalogue, pocket size (A17).

FOR SALE—SEVERAL SMALL AIR COMPRESSORS, steam pumps, hot air engines, lathes and oil engines. Geo. J. Adams, 39 South St., New York.

FOR SALE—1 Simplicity concrete block machine with 180 pallet boards, complete with all accessories; 1 20" Barnes drill press, automatic feed; 1 lot of pulleys and hangers; 1 emery grinder stand and counter shaft complete; 1 bolt cutting machine. Sell cheap for cash. For particulars, T. K. Smith, Main St., Sistersville, W. Va.

FOR SALE—Resaw, Shaper, Handle Lathe, two Water Wheels, 1,200 ft. Transmission Rope, with Sheaves, Expansion Sash Head, Door Head with Copes. C. A. Artman, Dansville, N. Y.

FOR SALE—Motorcycle, Marine Engine, Buckboard, Engine Castings, Gasoline Light System. Trade for heavy lathe, motor, drill press, grinder. Halstrom, 236 Elm St., Chicago.

NOT A TOY—"Atlas Water Motors." 1/4 h. p. Runs sewing and washing machine; small dynamo, lathe, grinding, polishing, etc.; cast-iron case; bronze shaft; bab-bitted bearings. Fits threaded or plain house faucet. Pulley for 1 in. flat and 1/4 in. round belt. Price, complete, including emery wheel and 6 ft. of leather belt, \$1.50. Brooks Machine Co., 203 So. Court St., Rockford, Ill.

FOR SALE—One 6, one 8, one 18 h. p. steam engines, two steam pumps, one No. 0 Sturtevant blower. Irwin Bros., Steubenville, O.

FOR SALE—10 h. p. air cooled engines, double opposed, \$65. Other small singles, \$15 up. Air compressors, \$10 to \$20. Tri-Car Co., Detroit, Mich.

FOR SALE—"Little Elgin" 1 h. p. 2-cycle air cooled gasoline engines; weight, 30 lb.; for washing machines, boats, etc. Price, \$35. Write for catalogue. R. A. Warren, Elgin, Ill.

FOR SALE—10x36 Shephard screw cutting, No. 4 Barnes lathes; 1 h. p. stationary gasoline engine. A. W. English, Wyocena, Wis.

MINIATURE RAILWAY OUTFIT; 15 inch gauge locomotive complete and three cars; suitable for park amusement; also three 4 horsepower Acme boiler and engine outfits. Homer Bowes, Machinery Dealer, Pittsburg, Pa.

COMPLETE LIGHTING PLANT, consisting of Fairbanks 1 h. p. gas engine, \$80; Western Electric dynamo, 1/2 kw., with field rheostat, \$40; Brocksmith dynamo, 300 watts, \$25; Pignolet voltmeter and ammeter, each \$7, or complete switchboard holding switches, pilot light and two meters wired, \$24. Plant used three months; guaranteed in perfect condition. Complete or separately. E. H. Steenken, 381 Park Pl., Brooklyn, N. Y.

5 H. P. SENGCO frost-proof horizontal gasoline engines, \$125; 4 h. p. marine, full equipment, \$66; to introduce; goods new; guaranteed. Shadegg Engine Co., Minneapolis, Minn.

FOR SALE—Gasoline engines for automobile, marine and stationary work; also castings and a few second-hand engines, cheap. Apply, with stamps, B. W. Richardson, R. 36, Peoria, Ill.

SLIGHTLY USED MACHINERY at bargain prices. Screw Cutting Lathes, Shapers, Planers, Milling Machines, Drill Presses, Gas and Gasoline Engines, Steam Pumps, Electric Motors, Dynamos, Steam Engines and Boilers, Hot Water Heaters and Radiators, Pumps for all kinds of Water Supply, Ice Machines, Electric Lighting Plants for Private Residences, Woodworking Machinery, Marine Engines, Automobiles, and everything else in the machinery line. When ready to buy, write for description and price on the size machine you want. We can save you money. All kinds of machinery bought. The R. W. Herfurth Company, 39-41 Cortlandt St., New York.

SOMETHING NEW in Concrete Block Machines, Mixers, Pier and Ornamental Molds. Write for circulars and prices. Proctor Bros., 2522 Isabella St., Evanston, Ill.

FOR SALE—Engine lathe, swings 9 1/2 in., takes 25 in. between centers. Complete with full set change gears to cut all size threads, 3 to 40 in.; price only \$43.50. Address L. F. Grammes & Sons, Allentown, Pa.

FOR SALE—Complete set of castings with all material and screws with blueprint for 3/4 h. p. horizontal stationary gasoline engine with governor; price, \$10. Comet Motor Wks., 17 W. Madison St., Chicago.

SOMETHING NEW in Concrete Block machines; Pier and Ornamental Molds. Write for circulars and prices. Proctor Bros., 2522 Isabella St., Evanston, Ill.

THE CENTRAL MACHINERY & SUPPLY CO., 2599 Archer Ave., Chicago, offer the following material at away down prices: 12 Screw Cutting Lathes, 2 Small Planers, 3 Milling Machines, 8 Drill Presses, 16 Small Boilers and Engines, 12 Emery Stands. Also large engines and boilers of every description. We also carry a full line of pipe, fittings, roofing, heating apparatus, belting, pulleys, shafting, hangers, etc. Will mail free catalogue No. 220 on request.

A. H. McDONALD. New and second-hand engines and engine repairs. 60 W. Monroe St., Chicago.

THE BEST and cheapest Concrete Block Machine manufactured, \$16.50. Write for particulars. Proctor Bros., 2522 Isabella St., Evanston, Ill.

MODELS AND PATTERNS. Quick service; satisfaction guaranteed. Manufacturing in small quantities. Michael Woll, 6439 Ladin St., Chicago.

WE WANT for manufacturing, dies, stamping, spinning, casting, plating; have special facilities for manufacturing patent articles, special machinery, tools. Do metal work in all its branches. Let us develop your idea; get our estimate; if made in metal, we make it. National Stamping & Elec. Works, 157-161 Jefferson St., Chicago. See display ad on p. 125.

HAVE YOU GOT A PATENT FOR SALE? Let us make you a working model that will bring high price for your invention. We make models in wood or metal; also experimental tools, dies and machine work. Franke Machine Model Shop, 214 Illinois St., Chicago.

RIFE AUTOMATIC HYDRAULIC RAM. Pumps water by water power. No attention; no expense; 2 feet fall elevates water 50 feet, etc. Guaranteed. Catalogue free. Rife Ram Co., 2131 Trinity Building, New York City.

ALL KINDS of light machine work, metal specialties. E. B. Bronson & Co., Blue Island, Ill.

METALLIC PACKING

SWAIN METALLIC PACKING for Piston Rods and Valve Stems. Steam—Air—Ammonia. Packed perfectly. Durable, effective. Swain Lubricator Company, 250 E. Lake St., Chicago.

PATENTS FOR SALE

U. S. AND CANADA patent on monkey wrench; no screw, no notches, quick acting, sure grip, strong braced handle; easily made. W. J. Stenger, Mohall, N. D.

CANADIAN PATENT on mechanism for raising and lowering disc or shoes of grain drills. Positive in action and adjustment. J. S. Stoland, Mohall, N. D.

ATTACHMENT TO LATHE. Saves 75 per cent of skilled labor. H. Vogel, 823, 112 S. Clark St., Chicago.

"A CRACKER-JACK" TOY. Just patented. U. S. patent for sale. A. Tytler, Basin, Wyo.

FOR SALE—At a bargain, U. S. Patent No. 808701. Steam separator, with automatic shut-off for high speed engines. For particulars, address Streeper & Oelenschlager (Patentee), 150 West Main St., Norristown, Pa.

VALUABLE PATENT for sale. Combined step and extension ladder. Nothing like it. Can undersell all others. Address I. M. Harpster, Ladysmith, Wis.

BUY STATE RIGHTS. New aerial toy; boys' delight; circulars and prices upon request, also sample if 75 cents accompanies for packing and expressing. Parachute Arrow Co., Box 908, Spokane, Wash.

STEAM TURBINE patent for sale; or some arrangement made to put it on the market. David Lumgan, Bay City, Mich.

MODELS made for inventors. Low prices. Howard Merryman, Towson, Maryland.

WE CAN SELL you patents. Hundreds of clients waiting. New novelties. Write for particulars. International Sales Co., Dexter Bldg., Chicago.

PATENTS

PATENTED ARTICLES MANUFACTURED to contract. Don't let your patent lie idle; we make dies and tools, and manufacture your article ready for market. Why not write now? Southern Stamping & Mfg. Co., Nashville, Tenn.

PATENT ATTORNEYS

PATENTS. \$15 down and \$5 per month after application is filed. Highest references. Long experience. Book free. Obed Billman, Patent Attorney, Main Office, Cleveland, O.

PATENTS of all countries obtained, sold, manufactured; established 25 years; unexcelled reputation; inventors' book free. American Patent Market, St. Paul, Minn.

IMPORTANT NOTICE—Read my one-half page ad. on page 122 of this Magazine, relative to patents, trademarks, etc. Special offers contained in the ad. E. E. Vrooman, Patent Lawyer, Washington, D. C.

PATENTS—H. W. T. Jenner, patent attorney and mechanical expert, 608 F St., Washington, D. C. Established 1883. I make an investigation and report if patent can be had, and the exact cost. Send for full information. Trade-marks registered.

PATENTS FOR PROFIT must fully protect an invention. Be careful in selecting an attorney. Mason, Fenwick & Lawrence, Patent Lawyers, Est'd 47 years, Washington, D. C., Box S. Booklet free. Careful work. Highest references.

TWO BOOKS FREE. Shepherd & Campbell, Patent Attorneys, 214A McGill Bldg., Washington, D. C.; 246 Canal St., New York; Kimball Bldg., Boston. Patents sold on commission. Prompt service, moderate rates.

ORCHARD HOMES in the famous Uncompahgre Valley, Colorado. Ten-acre tracts; easy terms. Crops never fail. Write for particulars. W. W. Phelps, 505 Exchange Bldg., Denver, Colo.

RELIABLE INFORMATION ON CALIFORNIA furnished for \$1. Write us what you want to know about. Southern California Information Association, Room 206 Frost Bldg., Los Angeles, California.

OKLAHOMA FARMS. Send for new map of Oklahoma. Improved farms, \$30 to \$50 per acre. J. H. Fuss, Medford, Oklahoma.

GOVERNMENT FARMS FREE. Our 112-page book, "Vacant Government Land," describes every acre in every county in U. S. How secured free. 1909 diagrams and tables. All about free irrigated farms. Price, 25c, post-paid. Webb Pub Co., Dept. 385, St. Paul, Minn.

CO-OPERATIVE HOME SECURING. Our Florida Club is now locating on fine tract at \$10 per acre. New club of over 200 members already enrolled; are considering Texas location. Co-operative Homestead Company, Toledo, Ohio.

WE SELL LAND in Southern Alberta, the famous Hard Winter Wheat District of Western Canada. Average 1908 yield, 45 bushels per acre. Railway fares refunded purchasers. Write for particulars. Imperial Development Co., Ltd., Winnipeg, Canada.

WANTED—To locate homesteaders on 160 acres government land; no gravel; Wyoming; reasonable rates. Chugwater Realty Company, Cheyenne, Wyoming.

OUR FIRST MORTGAGE FARM LOANS are safer than a bank. Land prices from \$10 to \$25 per acre; have fine list of wild and improved lands; several small stock ranches at bargain prices. Pierre Land Co., Pierre, S. D.

FOR SALE—Bargain—640 acres in Lincoln County, Nebraska, at \$5 per acre. Finely located in one of the best counties in the state, growing rapidly and increasing in value. A good investment to hold for anyone who does not wish to develop it. Address W, 1026 Forest Ave., Evanston, Ill.

BUSINESS CARDS

EVERY ENGINE works better when packed with "Eureka Packing." Your dealer will furnish it.

BLACKSMITHS

BLACKSMITHS—No Time Lost. A bad weld makes an expensive break. With my methods and welding compounds every heat will be a solid weld. Also seventy-five modern, easy ways to do hard jobs. Also two colored tool-tempering charts. Chart A explains annealing and hardening. Chart B explains tempering all tools to a standard. All for One Dollar. Valuable samples free. Send to-day. W. M. Toy, Sidney, Ohio.

CEMENT

IF YOU WANT the best information on cement and concrete construction, subscribe for Concrete, leading cement and concrete monthly. Sample copy, 10 cents. Concrete, 135 Newberry Bldg., Detroit, Mich.

CONSULTING ENGINEERS

MECHANICAL PROBLEMS SOLVED. Ideas and inventions developed to their correct mechanical or patentable form. Unsuccessful patents and complicated, troublesome machinery redesigned, simplified and made mechanically perfect. Examinations, reports, drawings, estimates and advice. Power and machinery equipments a specialty. Address Engineering Dept., Industrial News Bureau, Ithaca, New York.

MECHANICAL AND ELECTRICAL ENGINEER. Special machinery and power plants designed. Expert advice given on engineering problems. Patterns and machine work furnished. Patents secured. Fair treatment. All correspondence confidential, and answered promptly. H. L. Bishop, 616 Corn Exchange, Minneapolis, Minn.

H. VOGEL, M. E., 823, 112 S. Clark St., Chicago. Practical, economical and accurate working drawings for special machinery of any description. Inventions perfected.

ENTERTAINMENTS

PLAYS, dialogues, recitations, and all kinds of entertainment books; largest assortment in the world. Send for free catalogue. The Dramatic Publishing Company, 358 Dearborn St., Chicago.

MAGIC POCKET TRICK FREE, including Illustrated Catalogue. Sent to any one inclosing 4c stamps. Magic School, Dept. 10, 270 West 39th St., New York.

HOW TO BE AN ACTOR. Complete make-up outfit and cut book on "Making Up." Price, \$5, pp. Ewing's, 190 Thatcher Place, Decatur, Illinois.

FLOOR AND HAND SCRAPERS

WE SELL Floor Scrapers that do the work of four men. Write for our special factory cost offer. General Mfg. Co., 129, 406 Michigan St., Milwaukee, Wis.

LAUNCH AND STEAMBOAT MACHINERY

COMPLETE specifications, blueprints, instructions and bill of materials, 21 ft. speed launch, \$5. Sample design, 25c. Special designing done reasonably. Naval Architect, Box 252, Saginaw, Mich.

SAFE AND SURE, therefore NOT gasoline. Economical and long-lived, therefore STEAM. Nothing complicated or uncertain. Built to order to meet conditions. Catalogue free. Marine Iron Works, N. Halsted Station, Chicago.

LUBRICANTS

LUBRICANTS, asbestos, graphite and mica candles for loose pulleys and shaftings; no drip; no dirt; economical. Swain Lubricator Co., 250 E. Lake St., Chicago.

MUSIC

60C SHEET MUSIC, 10c. Merry Widow Waltz, Toreador, Rosary, Palms, Anchored, Calvary, Lost Chord, Jerusalem, and 1,500 others, 10c each. Catalogue free. National Music Emporium, Mechanics Dept., Albany, N. Y.

WRITE THE WORDS FOR A SONG. My music is accepted by the best publishers. Free Booklet tells how to succeed. Send your poem; expert criticism free. First-class music only (my personal work). Satisfaction guaranteed. Arthur A. Penn, 9 Daly's Theatre Bldg., N. Y. City.

RARE COINS AND STAMPS

\$5.75 PAID FOR RARE DATE 1853 quarters. Keep all money coined before 1875, and send 10 cents at once for a set of two illustrated Coin and Stamp Value Books. It may mean your fortune. C. F. Clarke & Co., Dept. 21, LeRoy, N. Y.

OLD COINS. Send 10c for our large Illustrated Buying List of gold, silver, copper and nickel coins. We also buy smooth, plugged and mutilated money. Michigan Coin & Stamp Co., Detroit, Mich.

RAZOR SHARPENING

DOES YOUR RAZOR PULL? Guaranteed not to if you use "Razor Edge." Year's supply, with full directions, 25c. Wm. Curtis, 225 Sylvia St., W. Lafayette, Ind.

DISCARDED GILLETTE RAZOR BLADES made "good as new, some say better," at two cents the blade. Send your address. We send you our mailing wrapper. Keen-edge Co., 230 Henrietta Building, Chicago.

TELEGRAPHY

TELEGRAPHY taught quickly. R. R. wire in school. Living expenses earned. Graduates assisted. Correspondence course if desired. Catalogue free. Dodge's Institute of Telegraphy, 40th St., Valparaiso, Ind. Established 1874.

TYPEWRITERS

REPAIRABLE TYPEWRITERS, from \$1.50 to \$5. Ready sale when repaired. Also perfect typewriters for sale cheap. A. E. Atchison, 2110 W. 21st St., Chicago.

REMINGTON, Oliver, Underwood and Smith-Premier, \$100. Typewriters rebuilt new and sold for \$60; payable \$30 cash and \$30 in work; making list of prospective typewriter buyers in your town, for circularizing. Rebuilt Typewriter Co., Holland Bldg., Factory, St. Louis, Mo.

TYPEWRITERS. All makes. Calligraphs, \$6; Hammond, Yost, Williams, Densmore, \$10; Remington, \$12; Oliver, \$24; Underwood, \$30. Year's guarantee. Send for catalogue. Harlem Typewriter Ex., Dept. E. 1, 213 W. 125th St., New York.

MISCELLANEOUS

YOUR NAME ON RUBBER STAMP, 10c; with address, 15c; pad, 12c; dater, 15c. Stamps, 10c per line, postpaid. National Stamp Works, 108 Fifth Ave., Chicago. Agents wanted.

HAIR GROWS when our Vacuum Cap is used a few minutes daily. Sent on 60 days' free trial, at our expense. No drugs or electricity. Stops falling hair, cures dandruff. A postal brings illustrated booklet. Modern Vacuum Cap Co., P. 561 Barclay Block, Denver, Colo.

FOUR-ROOM COTTAGE. Complete blueprint plans, details and bill of material, \$1, postpaid. O. A. H., 526 N. Y. Life, Omaha, Neb.

GUARANTEED TELESCOPES, 3 brass slides; see 10 miles; 50c, postpaid. L. McCarthy Co., Main St., Ogdensburg, N. Y.

ORIGINAL Yankee Ink Powder, 12c; enough to make a quart of blue-black indelible writing ink. Shaler Engraving Co., Portland, Maine.

WELL DRILLING MACHINERY. Modern in every particular. Effective, durable, convenient. Absolutely unequaled. Loomis Machine Works, Box K, Tiffin, Ohio.

IF YOU HAVE any article to put on the market, write us for particulars. We organize corporations and raise money for working capital. G. W. Venable & Co., 203 Broadway, New York.

WATCHES. \$2.15 buys our "Winner" watch. A solid nickel 3-oz. case, fitted with a 7-jeweled "Winner" movement. A watch that will stand hard usage. Our 128-page catalogue free. The Crown Jewelry & Novelty Co., Watertown, N. Y.

PATENTS SOLD for 5 per cent. We force sales by constant advertising. Send for plan. Patent Sales Co., Merchantville, N. J.

CUMMINGS BRAZING COMPOUND or Cherry Heat Welding Compound will save you money. Sample, 15c each. Cummings-Barry Mfg. Co., 733 Woodward, Detroit, Mich.

FLOWERS, LEAVES, INSECTS changed to metal. Preserves them forever. Makes beautiful hat and stick pins, jewelry and curios. Simple process, \$1. Book over 2,000 valuable formulas, \$1. R. Austin, 2809 Cal. St., San Francisco, Cal.

BOYS—Make money. Real moving picture machine, 25 show bills, only 35c, prepaid. McCarthy Co., Main St., Ogdensburg, N. Y.

PERSPECTIVE DRAWINGS. Two blueprints and complete directions how to make, postpaid, 50 cents. O. A. H., 526 N. Y. Life, Omaha, Neb.

1,000 SHARES International Recording Co. stock at 50 cents per share. Par value, \$1.00. This company has patent vending machines selling accident insurance policies. Great opportunity for doubling your money quick. Also have on hand 20,000 shares Dean Rapid Telegraph Co. stock. Will sell for 5 cents per share. This is greatest opportunity ever offered. Cash or easy payments. Write me for particulars, either stock. Arthur L. Jelley, 1113 Commerce Bldg., Kansas City, Mo.

I HAVE over 100 different I. C. S. courses and bound volumes listed with me that I can sell very cheap for cash or easy terms. M. C. Suttle, McLeansboro, Ill.

ICELESS REFRIGERATION. Costs little to build, nothing to maintain. Superior to ice. Guaranteed. Complete instructions, 25c. Kershner, 1736 N. H. Ave., Los Angeles, Cal.

YOU SHOULD USE ACME CUTS. They have merit. There's a reason. Write for prices. Acme Photo-Engraving Co., Medina, Ohio.

HIGH GRADE BELGIAN HARES. Breeders, \$3 pair; young stock, \$2 pair. Wills Rabbit Farm, Canal Dover, Ohio.

FRATCHER'S INSTANTANEOUS CALCULATOR multiplies and divides instantly; five times as rapid as \$400 machines; invaluable to merchants, bankers, mechanics, students, bookkeepers, etc.; easy to operate; positively correct. Size, 11x14. Worth its weight in gold. Price, 50c. Money order or stamp. Safe delivery guaranteed. Michigan Novelty Co., Detroit, Mich.

PORCELAIN MINIATURES OUR SPECIALTY. A porcelain miniature, oval, 2½x3 inches, tinted in water color, or sepia tone, copied from any photograph for \$1. Free booklet. Jeffres, Lafayette Ave., Baltimore, Md.

EXPERIMENTAL. Graphite resistance units, 50 to 5,000 ohms, 15c each, 4 for 50c. L. Miller, 382 Brooklyn, Detroit, Mich.

COMPLETE SETS OF CASTINGS and blueprints for 1½ h. p. four-cycle stationary or marine engine. W. R. School, 25 N. Jefferson St., Chicago, Ill.

STOGIES. BETTER THAN CIGARS. Send \$1.40 and I will send you 50 of my Big Havana Stogies, prepaid; \$2.50 for 100. Bert M. McCartney, Lock Box 742, McDonald, Pa.

ART PHOTO KNIVES. A handsome two-blade transparent handle pocket knife with four entrancing art photos on handles. Every knife warranted. Price, 50c (no stamps). Free—Order today and we will include a stunning art study entitled "The Bather." Thomas & Co., Morris, Ill.

VEST-POCKET "UNIVERSAL KNIFE SHARPENER"; latest out; postpaid, 10c. John Curtis, 6440 Jackson Ave., Chicago.

EVERYONE USING DRY BATTERIES, send 25c for scientific instructions. Renew exhausted batteries cheaply; last longer than new. Fairmount Telephone Co., Leighton's Corners, N. H.

LEARN ORIENTAL PANEL WORK. Work for yourself. Make all profits. 10c for circular and samples. F. D. Mathewson, Morgan Hill, Cal.

RARE BARGAIN. Part of bankrupt stock consisting fountain pens and check punches. One dollar brings both, prepaid. If sold out, will refund. Tucker Co., Brokers, 519 Main St., Cincinnati, Ohio.

of simple material. Complete drawings, 25c. Electric Power, 55 Mich. Ave., Adrian, Mich.

WIRELESS TELEGRAPH. How to make practical outfit cheaply. Details and diagrams sent prepaid for one quarter. William Kishpaugh, Harrisburg, Pa.

TOBACCO HABIT CURED or no cost. Harmless home treatment. Pay when cured. Write today. The NI-KO King, Wichita, Kan.

AMATEUR PHOTOGRAPHERS—I teach retouching by mail. Learn to retouch your work, and go into the business right. You can make big money conducting a studio of your own. Drop a card to Kirnan, Glenwood Springs, Colo.

LEARN TO SILVER and resilver mirrors. For particulars address J. Gschwind, Room 1104, 128 Broadway, N. Y. City.

BOYS—Five excellent tricks, with complete apparatus, 15c. Rider's, South Norwalk, Conn.

PREPARED SIGN LETTERS for Store and Office use. Many different kinds. Catalogue free. P. Johnston Mfg. Co., Quincy, Ill.

SEND NO MONEY. Your name and address will give you free trial of a McKenna \$1.75 High Grade Razor. McKenna Cutlery Co., 69 Wm. St., Geneva, N. Y.

PHOTO PILLOW TOPS made from any photograph for only 50 cents. Your photograph returned with order, postpaid. Guaranteed work. Give us a trial. Photo Pillow Top Co., Maywood, Ill.

BOOKS ON THE MAIL BUSINESS (eight of them); agents' supply and home compounding business, ad writing, advertising schemes. Twenty-page catalogue free. No postals. Puritan P Book Co., Buffalo.

SNAPS IN HIGH GRADE TOOLS. Inch Micrometers, \$2.65; 5/16 Jacobs Chucks, \$3.25; 2, 3 and 4 inch Inside or Outside Calipers and Dividers, 40c; 6 inch Tempered Steel Rules, 29c; T Tap Wrench, 40c; 25 Drills, all different, \$1; 12 different Taps, \$1; Best 8 inch Hack Saws, 40c dozen; 50 ft. Wire Belt Lace, 20c; 100 assorted Machine Screws, 25c; 100 Cotters, 20c. All prepaid. Everything warranted. Job Lot List for asking. Van Dervoort, The Tool Man, Lansing, Mich.

500 GUMMED STICKERS, 7/8x2, printed to order and sent postpaid for 25c. Eskew Job Print, Portsmouth, Ohio.

FIRELESS COOKERS are the latest household necessity. Big profits in making them for yourself and neighbors. Anyone that can handle tools can make them. Will send accurate drawings with complete instructions for 50 cents. Teske Novelty Works, Denver, Colo.

BUILD A \$200 PIANO PLAYING ATTACHMENT in your spare time. We control exclusive rights on a self-player that for simplicity of construction and ease of control can't be beat. A couple of dollars buys all material. No marring of the piano to install, as its size and style admit of its being placed in the lower part of any piano, and can be made to play any make of music. We send full size working drawings, going into every detail, and showing the workmanship step by step with book of complete instructions, so that anyone handy with tools can construct one. Price of drawings and instruction book, \$1. Teske Novelty Works, Denver, Colo.

ALLIGATOR BAGS AND PURSES REASONABLE; made from genuine horn-back alligators; buy direct from Florida and get the real article. Catalogue free. T. C. Imeson, 226 Hogan St., Jacksonville, Fla.

SOMETHING NEW. How to write on glass and steel. Unerasable. Send 15 cents. A. Shanley, Ames, Iowa.

COMPLETE CASTINGS with blueprints for a 2 1/2 h. p. automatic steam engine. Send 10 cents for photo. Frank Ross, Martins Ferry, Ohio.

BOOKS THAT TEACH the mail business, supply manufacturing, ad writing, advertising schemes, etc., 10c to \$1. Twenty-page catalogue free. No postals. Puritan Book Co., Buffalo, N. Y.

EVERY GAS ENGINE OPERATOR should have a battery tester (ammeter); \$1.50 each. New De Dion type spark plugs, \$3 doz., or 30c each, postpaid. Get list second-hand engines, etc. W. T. Shoemaker, 744 W. Church St., Elmira, N. Y.

OUR NEW Full Morocco Desk Blotter Pad mailed postpaid on receipt of price, \$1. Address The Bindery, Box 23, Staunton, Va.

THE TONOPHONE is a wonderful little device which greatly enhances the pleasure and enjoyment derived from the Phonograph. Adapted to machines of any size using cylinder records. Write for descriptive pamphlet. The Tonophone Mfg. Co., Montgomery, Ala.

INVENTORS—We advise you free of charge regarding patterns, models, manufacturing, patent solicitors, etc. Write us. Chattanooga Pattern Works, Chattanooga, Tenn.

BRAZE CAST IRON with Universal Fluxine. Satisfaction guaranteed; 50c per pound. Universal Fluxine Co., Urbana, Ohio.

GET THE CLOCK that winds itself. Price, \$12. Address Box 569, St. Louis, Mo.

or persons who are about to purchase an Electric Breast Drill, I will pay you a commission on every sale I make. Oscar P. Wodack, Sales Manager, 1340 Old Colony Bldg. Chicago.

500 MONEY MAKING SECRETS for 25 cents silver, or 5 for \$1. Regular price, \$1 each. One receipt alone cost \$1,000. Address The Colorado Collection Co., Inc., Box 501, Cheyenne, Wyo.

MAKE YOUR OWN ELECTRIC CLOCKS. We furnish a guaranteed electric movement for \$6. Box 569, St. Louis, Mo.

CACHOO (the stuff that makes people sneeze), a most amusing joke, 12c; doz., 80c. Our catalogue Puzzles and Jokes for stamp. Ewing's, 190 Thatcher Place, Decatur, Illinois.

I MAKE NEAT DRAWINGS from rough sketches; reasonable. Write. W. W. Daniels, 4609 Nat. Edge. Rd., St. Louis, Mo.

SPECIAL OFFER. To introduce our goods, we will send one of the famous "Real Dwarf" Ink Pencils for 85c. Retail everywhere for \$1.50. Order one today, as this offer may be withdrawn. Our 168-page catalogue free with order. Crown Jewelry & Novelty Co., Watertown, N. Y.

WIRELESS EXPERIMENTERS—1,200 Ohm Receivers, each \$3! The first 25 sold will be fitted with headbands free of charge. Guaranteed sensitive. W. C. Getz, 345 N. Charles St., Baltimore, Md.

WIRELESS OUTFITS, supplies, motors. World's Headquarters. Two catalogues and sample arc wire, 4c. Meyers' Electrical House, 48 First St., Evansville, Wis.

COLLECTION OF INDIAN RELICS for sale. Sidney Coss, Palmyra, Wis.

ANYBODY CAN MAKE GOOD CUTS with my simple zinc etching process; price, \$1; specimens and particulars for stamp. T. M. Day, Box M, Windfall, Ind.

BROTHER—Accidentally have discovered root that will cure both tobacco habit and indigestion. Gladly send particulars. F. Stokes, Mohawk, Fla.

AM MAKING \$8.00 to \$20.00 weekly at home, evenings. Honest, dignified business proposition, easily handled by anyone. No mail-order scheme. Particulars, 50c; worth \$25.00 to any live person. Have nothing to sell you. Box 198, Waterford, N. Y.

"THE AD WRITER'S ASSISTANT"—Book of 350 phrases, headlines, suggestions, interesting opening chapters, each illustrated with appropriate cut, mailed, 25 cents. Cuts supplied. F. S. Ailes, 737 Drexel Bldg., Philadelphia.

WING PIANOS best toned and most successful. Established 40 years. Recent improvements give greatest resonance. Sold direct. No agents. Sent on trial—freight paid; first, last and all the time by us—to show our faith in our work. If you want a good piano, you save \$75 to \$200. Very easy terms. Slightly used "high-grades," Steinway, 3 Chickering, etc., \$75 up. Taken in exchange for improved Wing pianos—thoroughly refinished. Send for bargain list. You should have anyway—"Book of Complete Information About Pianos." 152 pages. New York World says: "A book of educational interest everyone should have." Free for the asking from the old house of Wing & Son, 358-397 W. Thirteenth St., New York.

WATCH FOB FOR MECHANICS. Leather strap with a fine solid nickeloid emblem of your trade attached. Emblem is a miniature tool, and may be used as a chain charm. Price, 25 cents, postpaid. Agents wanted in every factory. Ask for catalog. National Selling Co., Allentown, Pa.

CIRCUMFERENCE and diameter table, 1/8 to 80 inches, mailed for 10c. Bell Odometer Works, Oakmont, Pa.

MAGIC Automatic Fish Hook; something interesting to every fisherman; 25 cents, coin or stamps. Agents wanted. Brown & Co., 633 10th St., N. E., Washington, D. C.

CIGAR BANDS—Imported direct from Europe; entirely different from American bands; 3,000 kinds, all new, stamped with real gold, beautifully colored. Samples, 10 cents, or 40 cents per 100 (no duplicates), postpaid, including illustrated catalogue on professional plate making, order quick. National Selling Co., Allentown, Pa.

TYPEWRITER BARGAINS. Caligraphs, \$8; Hammonds, \$10; Blickensderfers, \$12; Remingtons, \$15 up; Smith-Premiers, \$18 up. All makes 1/4 to 1/2 price. Get illustrated catalogue and bargain list. Minnesota Typewriter Exchange, 317 Hennepin Ave., Minneapolis, Minn.

OPEN a Mirror Factory. We teach and trust you. 10c brings booklet and particulars. None without \$25 daily. Hullinger's Mirror School, Francesville, Ind.

PRODUCTS OR DIVIDENDS is a new system of calculating that beats any means or machine. Costs \$3 and is worth 30 times \$3. Full particulars free. Box 22, San Francisco, Calif.

"OUR LITTLE HANDY BOOK" for 10c, while they last; containing valuable information and workshop receipts; and new, useful, handy tools for any mechanic. Address Handy Tool Co., Bellevue, Ohio.

THE PERFECTION WRENCH. The newest and best wrench made. All steel, great strength. Instantly adjusted. Easily and quickly operated. Positive grip. Immense time, trouble and temper saver. Indispensable to automobilists. Best "all around" tool ever offered for sale. Must be seen to be appreciated. You'll want one when you see it. For circular address The Perfection Wrench Co., Box 426V, Port Chester, N. Y.

CHEMICAL RECTIFIER—How to make, 25 cents. Slate in any shape, cheaper than wood. Electro-Shop, Barker, New York.

WANTED—Every boat builder to know that I carry a complete line of boat fittings and supplies. Write for catalogue. Chas. Kaufmann, Oshkosh, Wis.

SEND 20 CENTS. Get your name in our directory permanently and get mail from all parts of the world. The Retlaw Supply, 905 Fulton St., Chicago, Ill.

SEND ME YOUR TROUBLES. Upon receipt of \$2 I will mail you a specially typewritten letter explaining "in Popular Mechanics style," or sketched so you may understand it, anything you may wish to know about Mechanics, Engineering or Electricity. Managers, Superintendents and Business Men will find it profitable to consult me. Thirty years' experience and still "up-to-date." Reference, editor Pops. Address Geo. W. Richardson, E. E., 2181 W. 24th Place, Chicago, Ill.

FREE—OUR LATEST Illustrated Catalogue of tricks, novelties, puzzles, books, etc. Peerless Trick & Novelty Co., 3146-3148 State St., Chicago, Ill., Dept. E.

MAKE MONEY AT HOME faster and easier than you ever dreamed possible. Russell's New Confection, Dairy Cream Crisp, sells like wildfire, from stores, on the street, or on trains. The more they eat the more they want. Profits, \$5 to \$10 a day, sure. Proceeds from a single batch pays for the formula, all raw material, and then some. A child can make it. Formula with full instructions, \$1, postpaid to any address. Special: Until further notice, all orders will receive, free, my up-to-date method for making State-Proof Salted Peanuts; also my book, Straight Talk on Candy. Address Chas. Russell, 716 Clybourn St., Milwaukee, Wis. P. S.—Over 30 years a candy-maker.

COMMERCIAL ARTIST, Designer, Illustrator. David Ryerson Morford, Mason, Mich.

HOW TO BUILD UP FURNACE EFFICIENCY. The only work in print devoted exclusively to the problem of getting the most steam from the least coal consumption. 50 cents, postpaid. Jos. W. Hays, Combustion Engineer, 602 Hartford Bldg., Chicago.

WORK FOR YOURSELF. Make all profits. Our booklet is complete. Ten cents. Lenox Pub. Co., 586 Lenox Ave., New York City.

FOR ONE DOLLAR CASH we will send you directions how to make Vest Pocket Lamp at small cost, and also send you a copy of our valuable book, Five Hundred Things Worth Knowing. Address Rockford Jobbing Co., Rockford, Ill.

FOR SALE—The Fox Wire Fence Tools, 75 cents per set. Agents wanted. Send stamp for circular. J. L. Lucas, 3 Fox St., Bridgeport, Conn.

I MAKE DRAWINGS, Tracings, Blueprints, etc. D. Tappan, Watervliet, N. Y.

WIGS and make-ups, 50 characters. Write for catalogue, magic theatre goods and 100 plays free. Bates Play Co., Dept. 5, Boston, Mass.

"MAGICAL Presto-Change" Wonder Pictures. Change while you're looking. Also 6 beautiful postcards, 25c. Stover's, 197, Millersburg, Pa.

FARMABRA BRAZING COMPOUND, \$1. Costs 10c per pound to make. Nothing like it for sale. New discovery. F. W. Stevens, 701 East Murdock, Wichita, Kas.

TOO LATE TO CLASSIFY

GET YOUR GAS AND ELECTRIC FIXTURES at wholesale prices, and save big money. Put them up yourself and save more money—it's easy. Or get your local gas-fitter or electrician to put them up for you, and still save good money. Write for our catalog sheets and see. State whether you want gas only, or combination gas and electric fixtures. Western Chandelier Co., Mail Order Department, 156 East Lake St., Chicago.

THE HUB PUZZLE (the marvel of the age), 12c. pp. Cat. 100 other puzzles for stamp. Ewing's, Decatur, Ill.

All Safety Razor Blades 2¹/₂c
Including all double-edged blades especially. You can't afford to throw away your dull blades. We sterilize, resharpen and return your own blades better than new at this trifling cost. State make of blades and we will send you a convenient mailing package free. WRITE TODAY. Address
KEENEDGE CO. 230 Keenedge Bldg., Chicago

THE MATCHLESS SHADE ADJUSTER

A new invention, good substitute for awnings and also used for regulating light. By its use it permits the opening of windows from top and bottom for ventilation. Excellent for offices and public buildings. Also insures privacy in your homes at the same time permits of light and ventilation. Good live agents and dealers wanted everywhere. Exclusive territory can be given. Write for particulars.
SURE-STOP-PULLEY-CO., RACINE, WIS.

WANTED

ADVERTISING MEN, WRITERS, DESIGNERS, ILLUSTRATORS AND SOLICITORS. Send stamp for free particulars explaining how to get in touch with the business world.

C. F. WILHARM
926 Chestnut Street Philadelphia, Pa.

3000 FORMULAS and TRADE SECRETS

are contained in my 368 page, cloth bound, fully indexed book of recipes. Its 7 departments cover nearly every trade. Special price, only 40c, prepaid (42c. in stamps) worth many dollars.—absolute satisfaction guaranteed or money refunded.

WILEY SANDERSON, Dept. M, YPSILANTI, MICH.

SALESMEN MAKE \$15 PER DAY



selling Anchor Vacuum Window Sign Frames and Universal Vacuum Clips, held absolutely secure on glass or any smooth surface by means of rubber suckers. Sample Frame \$1.50, Clip 15 cents. Write for special terms to agents.

METAL SPECIALTIES MFG. COMPANY
29 W. Randolph Street, Chicago, Ill.

AGENTS' NEW INVENTION

AUTOMATIC CURRY COMB and other new self-sellers. Indispensable. Make their own demand. First applicants control unlimited sales. Large profits. Write for proof and trial offer.
Box 27. **CLEAN COMB CO. Racine, Wis.**

BIG DEMAND EVERYWHERE

The Automatic Pocket Lighter
A wonderful addition to your personal equipment. No need to hunt a match. This sensational adaptation of a scientific fact has produced a little instrument that is ready to give a generous flame whenever called upon, and does it surely, quickly, safely, without smoke, dirt or offensive odor. An indispensable convenience for the smoker. Sent in handsome full nickel finish to any add. on receipt 50c.
CHAS. A. BEACH, 49 Hamilton Street, Newark, N.J.

THE MAGNETIC EYE CLEANER

You may not need this many times, but if you should have use for it—it's worth its weight in gold.



PRICE
25c
POSTPAID

Highly Polished and Nickel Plated. Genuine Leather Case. Manufactured only by **THE NOVEL-IDEA CO. (INC.) ORANGE, MASS., U.S.A.**

WHEN YOU WANT ANYTHING AND DON'T KNOW WHERE TO FIND IT—WRITE BUREAU OF INFORMATION, POPULAR MECHANICS, CHICAGO

Making Money on the New Line

Fertile land at reasonable prices, a mild and healthful climate, crops of excellent quality and markets for them, transportation facilities—are some of the advantages of the country along the line of the

Chicago, Milwaukee & Puget Sound

Railway

There are splendid opportunities along this new line in the Dakotas, Montana, Idaho, and Washington for the farmer, fruit grower, stockman, dairyman, poultry raiser, business man, and professional man. Descriptive book No. 34 free.

F. A. MILLER, General Passenger Agent
Chicago, Milwaukee & St. Paul Ry.
Chicago





There's Always a Chance Ahead

for the ambitious man to obtain a technical education without leaving home or giving up his work.

THE CYCLOPEDIA OF CIVIL ENGINEERING

is adapted for Home Study because it is compiled from text books prepared especially for the American School of Correspondence Courses. This set of books has more up-to-date, accurate money-saving information on Reinforced Concrete, Irrigation and Water Power Development than any other similar set of books. Also contains complete and authoritative information on Steel Construction, Railroad Engineering, Cost Analysis, Bridge Analysis and Design, Highway Construction, Sewers and Drains, and Sanitation, in fact it covers thoroughly every branch of Civil Engineering, big or little.

Just to introduce our methods of Correspondence Study, we are offering these books at a special price of \$24.00, payable \$2.00 down and \$2.00 a month. The regular price is \$48.00. If the books are not what you want, return them at our expense. We will pay transportation charges both ways.

IMPORTANT SUBJECTS COVERED

Plane Surveying—Mechanical Drawing—Plotting and Topography—Railroad Engineering—Statics—Strength of Materials—Roof Trusses and Mill Building Construction—Cost Analysis in Relation to Engineering—Masonry and Reinforced Concrete—Steel Construction—Practical Problems in Construction—Bridge Engineering—Highway Construction—Hydraulics—Water Supply—Irrigation Engineering—Water Power Development—Sewers and Drains—House Drainage and Sanitation—River and Harbor Improvements.

Order promptly and we will include FREE for one year as a monthly supplement, the

TECHNICAL WORLD MAGAZINE

a live, up-to-the-minute, dollar-and-a-half monthly, crowded with special articles on the most recent applications of the principles covered in the Cyclopaedia; splendidly illustrated with scores of special photographs.

AMERICAN SCHOOL OF CORRESPONDENCE
CHICAGO, U. S. A.

Pop.
Mech.
4-09
A. S.
of C.
Please
send set
Cyclopaedia
of Civil En-
gineering for
5 days' free ex-
amination. Also
T W for one year.
I will send \$2 with-
in 5 days and \$2 a
month, until I have
paid \$24.00; otherwise
I will notify you and
hold the books subject to
your order. Title not to
pass until fully paid.

FREE OFFER COUPON

NAME.....
ADDRESS.....
OCCUPATION.....
EMPLOYER.....

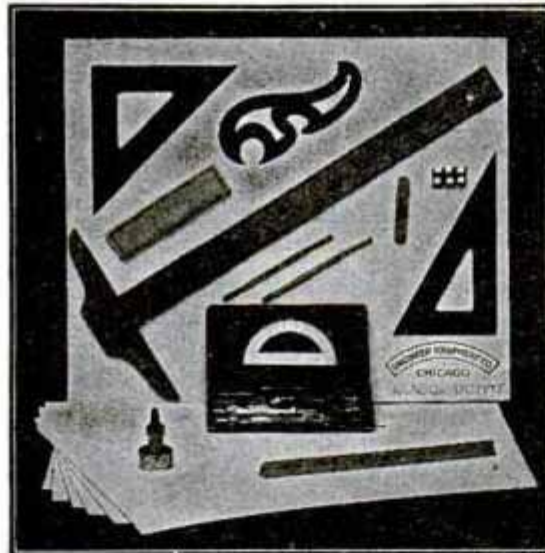
SUCCESSFUL DRAFTSMEN

Drawing \$125 to \$250 Monthly

ARE NOT MADE in Schoolrooms—
And NOT MADE by reading books
And NOT MADE by making Copies
And NOT MADE at home drawing pictures
from printed book lesson.

NOT On Your Tintype

It requires actual practical
DRAFTING-ROOM WORK to train YOU
to gain the PRACTICAL EXPERIENCE
that your employer will demand of you



FREE

This \$13.85

**DRAWING
OUTFIT**

and

Free Position



**Chief
Drafts
man**

As CHIEF DRAFTSMAN of Engineering Firm I know exactly the Quality and Quantity of knowledge, practical training and experience you must have, and will personally prepare a few ambitious workers in few months' Home Instruction and actual DRAFTING-ROOM WORK for above paying position.

**INSTRUCTION UNTIL COMPETENT
and PLACED IN POSITION FREE**

DON'T waste TIME and MONEY trying to learn from books or printed "STUFF," you can only learn on PRACTICAL WORK which I furnish you.

Address CHIEF DRAFTSMAN,
Div. 19, Eng's Equip't Co. (Inc.), Chicago

POPULAR MECHANICS

Vol. XI.

APRIL, 1909.

No. 4

NIAGARA'S POWER CURBED BY ICE



Appearance of American Falls During the Jam

For the first time in modern history the power of Niagara has been effectually checked, at least on the American side, this remarkable condition being caused by nothing more nor less than its own frozen water. The photograph was taken from Goat Island, looking toward the American side, and shows the American falls almost completely blocked, its crest, usually a mighty volume of water, for the time being a passageway for pedestrians.

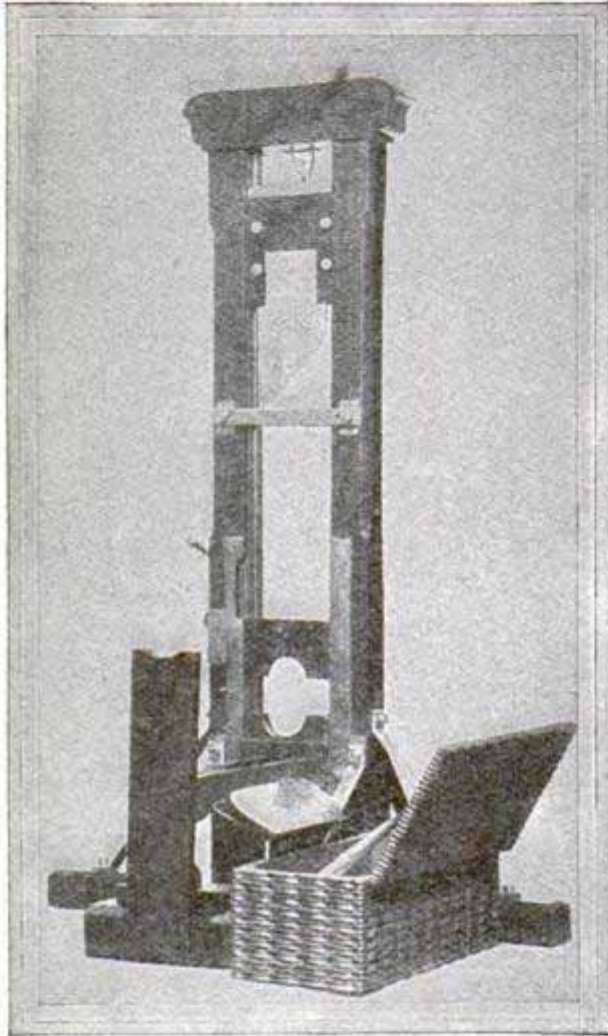
Although temperatures of 40 below zero have been experienced at the falls, such a jam of ice has never before occurred. The great amount of frozen slush ice, and a wind up river were responsible. The jam holding back the water did not start to form near the

crest of the falls, but a considerable distance back in the channel at a point in direct line with the American mainland and the upper end of Goat Island.

On Feb. 16, as well as on a number of other days, pedestrians were able to cross at the point where the jam started, as well as on the very crest of the falls and along the ridge of ice in the gorge almost under the point where the great volume of water usually tumbles. During the period of the jam the water in the gorge was 40 ft. below its average level. The great electric companies which have harnessed Niagara on the American side fought the jam with dynamite in an attempt to keep enough water running to provide them with the required power.

FRANCE REVERTS TO THE GUILLOTINE

The great advance in the record of murders in Paris and other parts of France following the abolishment of



Guillotine Again Used in France

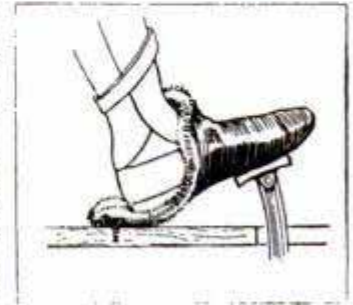
capital punishment has made it necessary for the French government to again set up the guillotine in an attempt to stem the tide. A number of murderers have already been put to death by this bloody instrument of execution, made so famous during the first French revolution, and the lower order of Parisians have gone mad with the blood lust. In view of the wild scenes that are taking place when executions occur it is probable that the French law which makes it necessary for executions to take place in public will be revoked.

To the Anglo-Saxon the idea of the electric chair or the hangman's rope is much preferable to the letting of blood in executions, but the French tempera-

ment is such that the former methods would not prove as effective in curbing crime as the latter.

OVERSHOE ATTACHMENT FOR AUTOMOBILE BRAKE

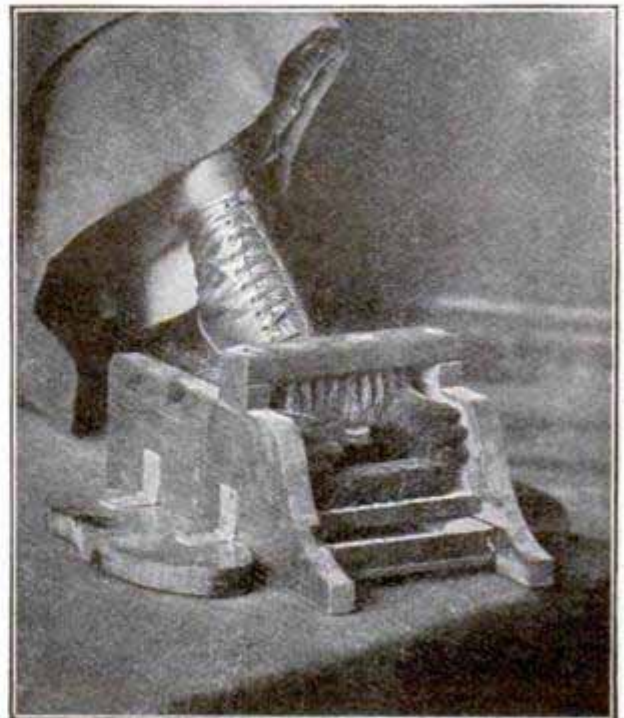
In winter automobiling all parts of the body need special protection, especially if the machine is running at a high speed against the wind, but no one part needs more protection or is surer to become cold than the foot that works the brake. The



padded overshoe shown in this illustration is ample protection for this member. The heel is screwed fast to the footboard, and the shod foot of the driver of the automobile is simply slipped into it.

INGENIOUS DOOR-STEP SHOE- CLEANER

The ordinary door mat is something of a nuisance, although better than none at all. The dirt works through and litters up the porch or hallway, and



New Shoe Cleaner

its scope is confined to the bottoms of the shoes. This device is a door-step cleaner which will remove the dirt from all parts of the shoe. The foot is passed back and forth between the brushes, and the dirt and dust drops into a little drawer at the bottom. This is withdrawn and emptied when full.

NEW TYPE OF PARACHUTE

The parachute in its present form has been used for many years without any material change in its construction. It is a large disc of canvas or

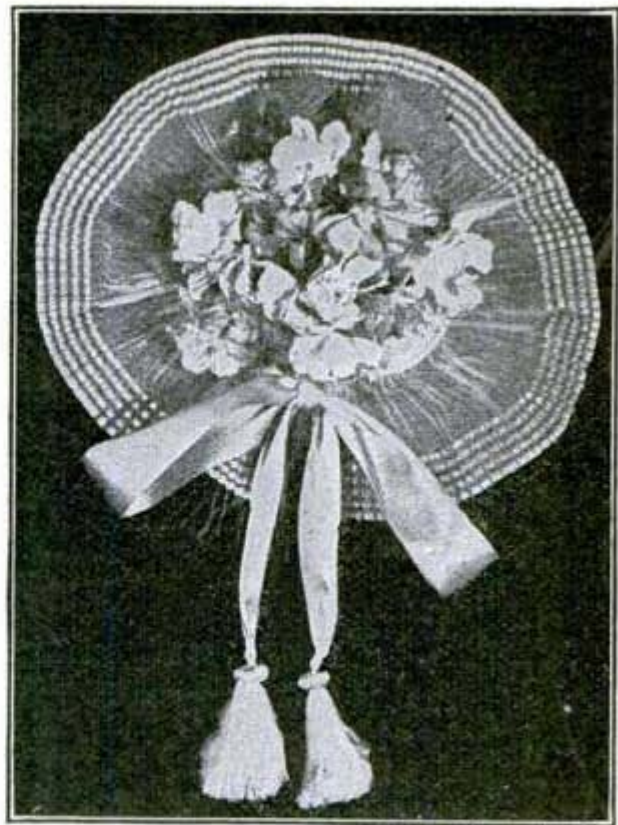


cotton fabric with a good sized hole in the center, and ropes passed over it to sustain the weight of the body whose fall it is to retard. The disc diameter to carry one man should be 30 ft. when arched out. The rate of fall depends upon the size of the hole in the center, for the parachute is governed by the

velocity of the air escaping through the opening. If the opening is too small, the air will escape around the outer edges and cause the parachute to oscillate dangerously; if too large the fall is not sufficiently retarded.

It is this problem that the inventor of the parachute shown in the illustration has solved. He enlarged the opening and attached a second small parachute over the opening. By this means the escaping air reacts on the small parachute and adds largely to the retarding of the drop.—By Rankin Kennedy in *Aeronautics*.

It cost about \$130,000 to bring the American fleet of world-girdling battleships through the Suez canal.



Courtesy Florists' Review

CORSAGE BOUQUET SHIELDS

The corsage shield for bouquets of violets or other flowers has a body and handle composed of fibre, covered with satin and surrounded with lace or plaited silk chiffon with satin edges. When the bouquet is in place the shield is covered, the lace or chiffon forming a rich background. One of the features of the shield is that its handle is fastened to the dress, not the stems of the flowers. The bouquet is tied to the shield with ribbon or silk cord.

OCEAN TUBERCULOSIS SANITARIUM

Plans are being discussed in England to provide an ocean sanitarium for tuberculosis. The suggestion is to fit up a sailing vessel of about 2,000 tons, for not more than 50 patients, each to be provided with a large, private, and well-ventilated cabin. The deck would be used for what is commonly called the "veranda treatment." If the plan is carried out, the ship will cruise in the neighborhood of the Canaries, where it will have the advantage of the trade winds and an even climate.

SCALES FOR WEIGHING BABIES

If there is a baby in the house it is wise, according to medical men, to have a pair of scales at hand so that the infant can be weighed regularly every day. The scales shown in the illustration are made especially for this purpose, being fitted with a dainty wicker



For Exclusive Use of the "Boss"

basket for the infant to rest in, and a white enamelled indicator arrangement which is in keeping with the rest of the equipment. Any kind of scales will do, of course, but these are specially designed for the purpose.

The infant should increase in weight gradually, for a moderately fat baby is in better condition than a very fat one. But the main point is that the infant should not lose weight. In usual cases a doctor is not necessary when the scales show a small but steady addition of weight as the days pass, but if the scales indicate a loss of weight the doctor is a wise precaution.

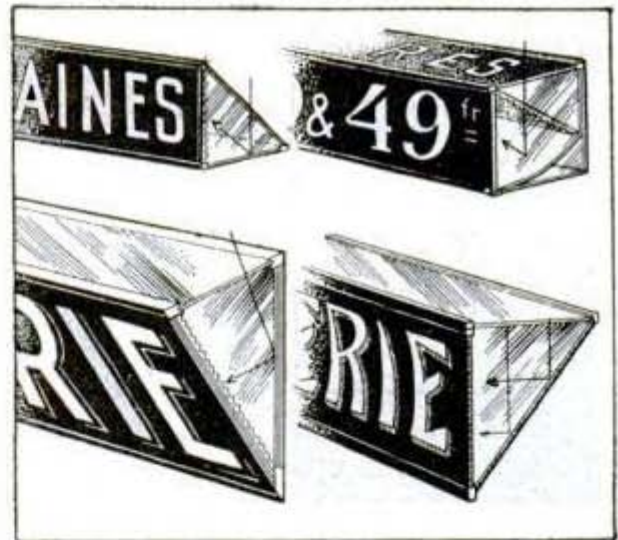
ILLUMINATING SIGNS WITHOUT COST

Gathering up second-hand light that is lying around loose in a street and using it for illuminating signs is possible if the sign in question is of this type. The device makes use of prismatic glass and reflecting mirrors in such a way as to gather up the diffused light from street illumination by night or from the sky by day and concentrate

it upon the sign. The result is illumination startlingly like that of a sign lit by electric or other lamps. One of these signs, consisting of one letter, placed at the fifth story of a Paris building, appears exactly like one of the luminous letters of the large signs we are all familiar with.

Take, for instance, a sign intended for the front of a store. The arrangement will have a triangular section, formed of a metal box, with one of the sides adjoining the right angle in front. This is a vertical glass plate, bearing the words of the sign. Behind this is a plate of parallel prisms. The oblique side of the triangle is a plate of thin glass, used simply as a protection, the light-rays traversing it and striking the prism-glass. Other rays fall upon a horizontal mirror and thence reach the prisms. Thus a series of light rays are collected and concentrated.

Very simple forms are made of a



Showing Arrangement of Mirrors

metal frame in which are set three parallel sheets of glass, one in front of the other and a prism glass. There is no mirror, but the prisms are turned toward the light, receiving it on their faces and condensing it even when the whole device is hung against a wall. Such an arrangement is inexpensive, and becomes luminous as soon as it is inclined at a proper angle to the light.

A bill prohibiting the wearing of hatpins more than 10 in. long has been passed by the Oregon legislature.

AUSTRALIA MAY HAVE GREAT OIL FIELD

The most important development in the small business of oil production in Australia is recorded at Roma, North Queensland, even though the assistant state geologist reported that he had been unable to find any indications of oil in that district. The drill of an oil company struck a large volume of gas, which immediately ignited. The flame from the hole burned furiously for a week, shooting 80 ft. into the air with a roar and dazzling glare which caused the residents of Roma to consider evacuating the town. The day after the fire started oil began to exude in small quantities, and in a day or two the flow was considerable.

EMERGENCY JACKETS FOR SUBMARINE CREWS

Many different kinds of devices to make it possible for the crews of submarines to reach the surface safely and float there in case of accident are being experimented with, but none seem to be more feasible than the combination rubber helmet and coat being tested by the crew of the U. S. submarine "Octopus". It is easily put on and fastened over other clothing and contains enough air to float the wearer quickly to the



Device for Saving Submarine Crews

surface and make breathing possible for a limited time. Provision is made for opening the helmet quickly on reaching the surface.

A BOY-GIRL FANCY DRESS COSTUME

There is hardly a fancy dress ball given that some man does not bedeck



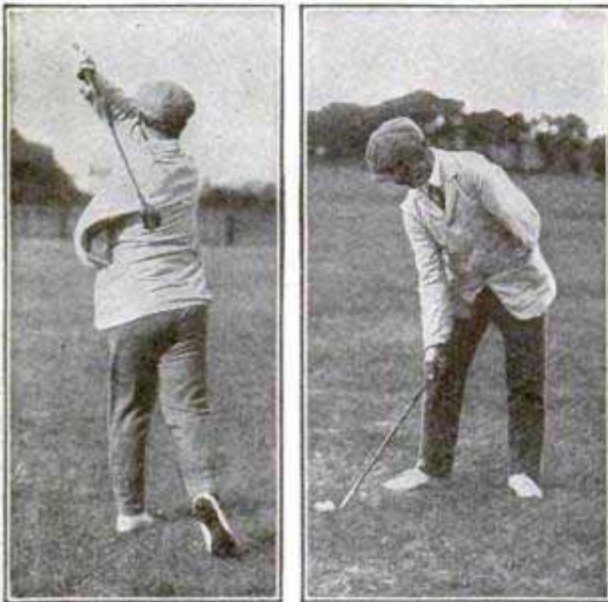
The Sex Is in Doubt

himself in the finery of a woman and that a girl does not appear in the more or less modern habiliments of a man, but it is quite certain that such a costume as this is not often seen at an American fancy ball. It is an in-

genious boy-girl costume, one half or side of the person being clothed in man's attire and the other half in a girl's. The idea is carried out to the minutest detail, even to the man's glove and walking stick on one side, to a woman's white lisle glove and a sunshade on the other. On one side of the head rests a man's soft hat and on the other a neatly coiffured arrangement of feminine hair.

ENGLAND'S CHAMPION ONE-ARMED GOLF PLAYER

These photographs show John Haskins, the champion one-armed golf



Snap Shots of Haskins

player of Great Britain, just finishing the execution of a long drive, and ready for an approach shot. Mr. Haskins will play in America this summer.

ROLLING SNOW-COVERED ROADS WITH AUTO

After a recent snow storm in Reading, Pa., in which the roads were left in a bad condition, an energetic manufacturer conceived the idea of attaching an ordinary land roller to his automobile, and started out to roll the road for the six miles between his factory and his home. A road commissioner accompanied him on the trip, which was made in an hour. The demonstration proved that a really fine winter

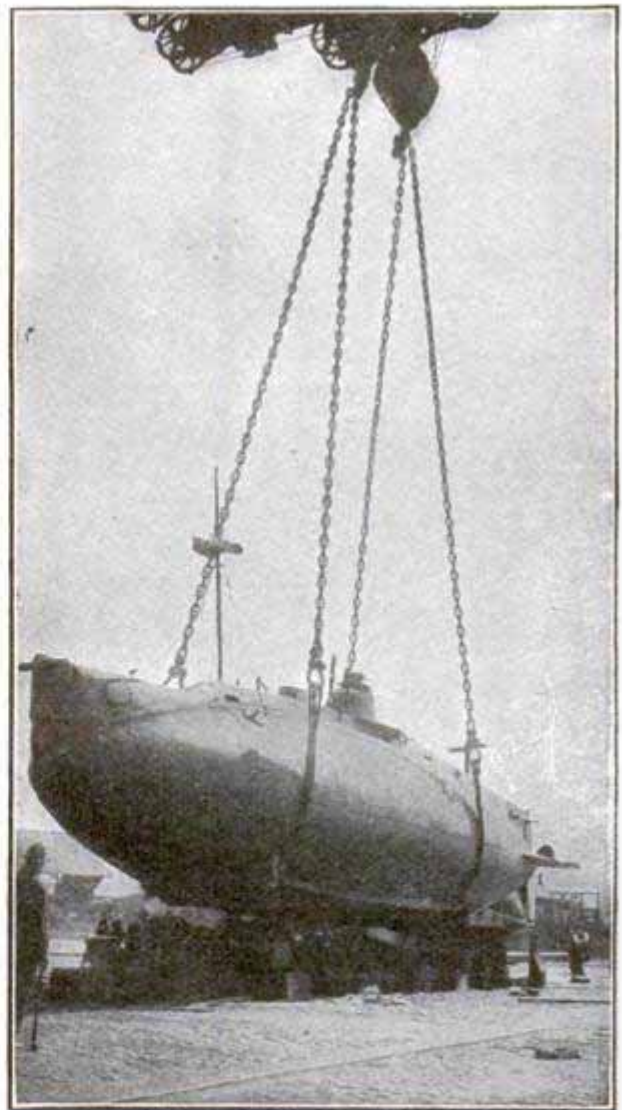
road can be made by rolling after each snow storm.

In upper New York state the farmers roll the snow down by attaching two large iron kettles of the type used for making soft soap behind a team of horses or oxen. This method is not perfect, as it leaves a core in the center of the road.

More than one-eighth of the fires in New York during 1908 were directly traced to carelessness with matches.

LAUNCHING A SUBMARINE

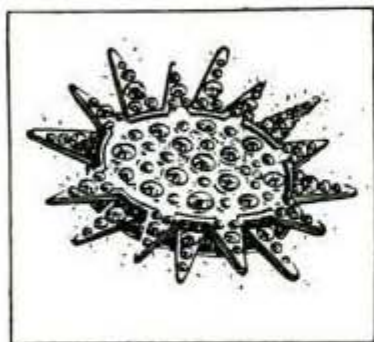
This submarine is the famous "Plunger" in which Ex-President Roosevelt took a dive off Oyster Bay. It is being lifted by the great 100-ton derrick at the New York Navy Yard preparatory to being dropped back into the water again after undergoing an overhauling.



Lifting an 80-Ton Submarine

A REVOLVING DIAMOND SUNBURST

An ingenious English society woman, Mrs. Paget, has had a diamond sunburst made to revolve by means of minute



clockwork secreted in the back of the setting. The sunburst is set with overlapping rows of points, each round or set of points revolving

on its own pivot. When the diamonds commence to revolve, one row of points over the other, the sight is truly dazzling. The sunburst will revolve all the evening without rewinding.

TRAPPING SPEED MANIACS AT NIGHT

Although the representatives of the law have succeeded in checking the speed of motor maniacs during the hours of daylight on many of the highways most frequented by automobiles, these restrained enthusiasts let out the notches as soon as night falls, secure in the knowledge that the stop-watch is not effective in the dark. To remedy this condition the automobile police of one municipality have been provided with the electric flashlight shown in the illustration.



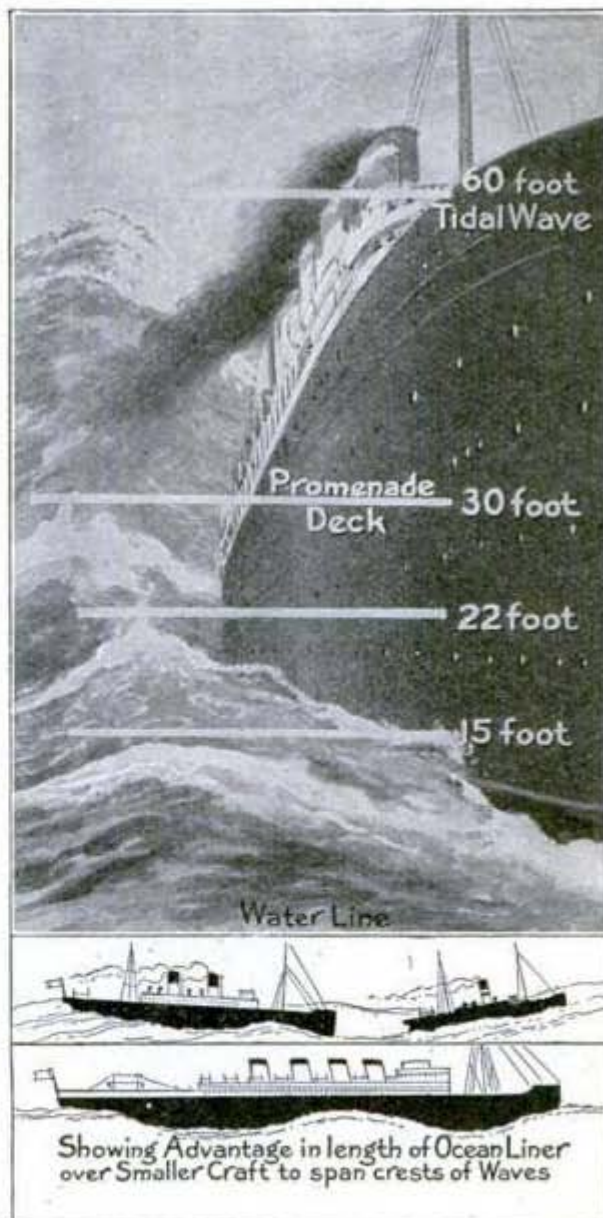
Flash Timing

Standing with the flashlight behind his back, so that its glare will not be too pronounced, the policeman flashes it when an automobile enters the trap. The policeman at the other end of the trap sees the flash and catches the time of the automobile over

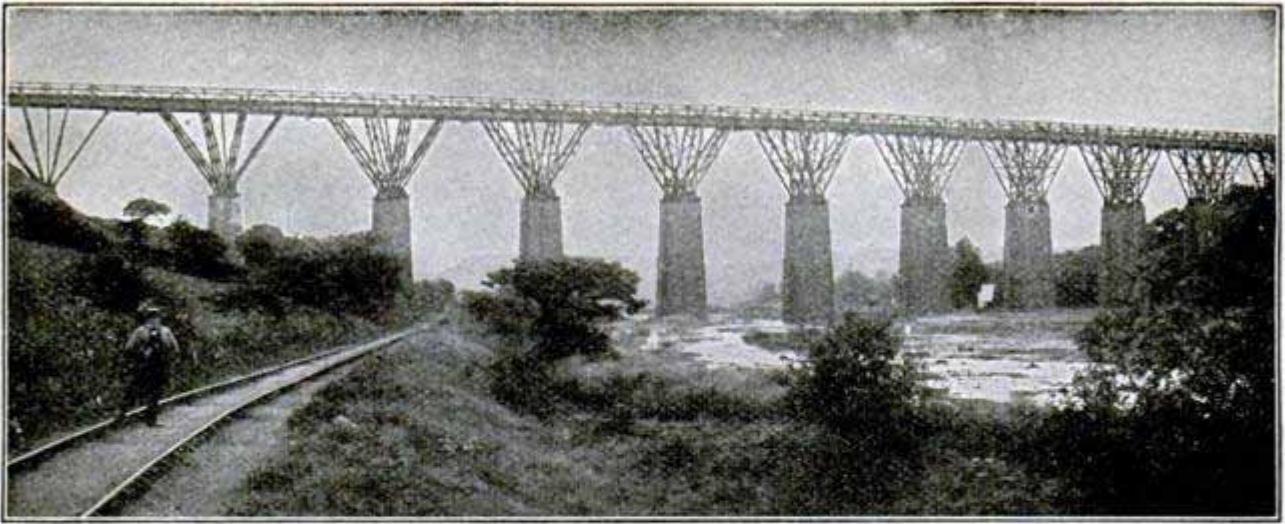
the measured course. If the speed is in excess of the ordinance he flashes his own light, this being the signal for another policeman further down the course to intercept the machine. This he does by stepping into the middle of the road.

THE SIZE OF OCEAN WAVES

The size claimed for waves in great ocean storms is often exaggerated, for science has shown that the biggest wave caused by a gale does not exceed 30 ft. Tidal waves have been known to reach heights of 60 ft., but they are an exception. With the increase of size of ocean steamers, the point of sight of the passenger has been raised, and it requires the roughest kind of a sea to



Height of Ocean Waves Compared with "Mauretania" and Smaller Craft



This photograph shows an interesting timber viaduct or bridge on one of the Cornish branches of the Great Western railway in England. The framework extensions on the top of the solid piers are curious.

show a broken horizon from the promenade deck of the "Mauretania" and her sister ship. In both, the pitch of the vessel is largely eliminated, although their decks, high above the highest waves of the most severe storms, have been washed by water thrown upward because of the opposition offered to the advance of a great wave by their hulls.

On the decks of the small steamers of past years, where the point of sight was low, the waves often appeared mountainous. The illustration shows how the illusion of "waves mountain high" arose.

THE RETURN OF THE WORLD-GIRDLING FLEET

The story of the triumphant return of America's fleet of powerful fighting ships after its wonderful world-girdling cruise of 45,000 miles is familiar to every American. The ovation will go down in history as the closing event of a history-making accomplishment that made the whole world applaud. An ovation as great as any ever accorded any fleet of any nation after great naval victories bravely fought and bravely won.

All the more does the fleet's accomplishment stand out because its mission was a bloodless one, directed against no warring foe, nor for any purpose of conquest other than that which

brings nations and peoples in closer and warmer touch with each other through the potency of mutual admiration and respect. Such respect and admiration the fleet has gained for the United States in distant countries where her naval power was sometimes heard of, but oftener discounted because of the absence of demonstration. This is a reason in itself sufficient to have made such a cruise advisable, but the fleet's greatest victory was its mastery over self.

No matter how efficient the fleet was when it started out on its cruise the lessons learned have been many and wholesome. That of self-sustainment at sea is one of the greatest. The additional experience gained by every man, from the greenest recruit to the fleet commanders is another, and one that undoubtedly makes the 14,000 or more men who made the cruise as fine, if not a finer body of sea-fighters than any other in the world. Still another great lesson was economy of coal consumption. An authority of high degree in the fleet has made the assertion that in five years the amount of coal that will be saved on American battle-ships, as the result of economies that were learned and practiced on the trip, will more than pay for the entire amount of coal used from the moment the ships left Hampton Roads in December, 1907, until their return February 22, 1909.

As wonderful as the efficiency and deportment of the men was the mechanical and sea-going efficiency of the ships. Such a cruise means great wear and tear on battleships, but on the last leg of the voyage there were almost no minor breakdowns, a fact that is extraordinary. No serious accident marred the record of the cruise. Every part of the ships, including engines and boilers, behaved excellently. Among such repairs as were made necessary were many heretofore thought impossible on board ship, with a result that will mean greater independence of navy yards in the future. The tribute of President Roosevelt, now ex-president, as he welcomed the sailors home, is a fitting summing up: "As a machine of war the fleet comes home in better shape than it went out."

WIRELESS TELEPHONE ROOM OF U. S. BATTLESHIP

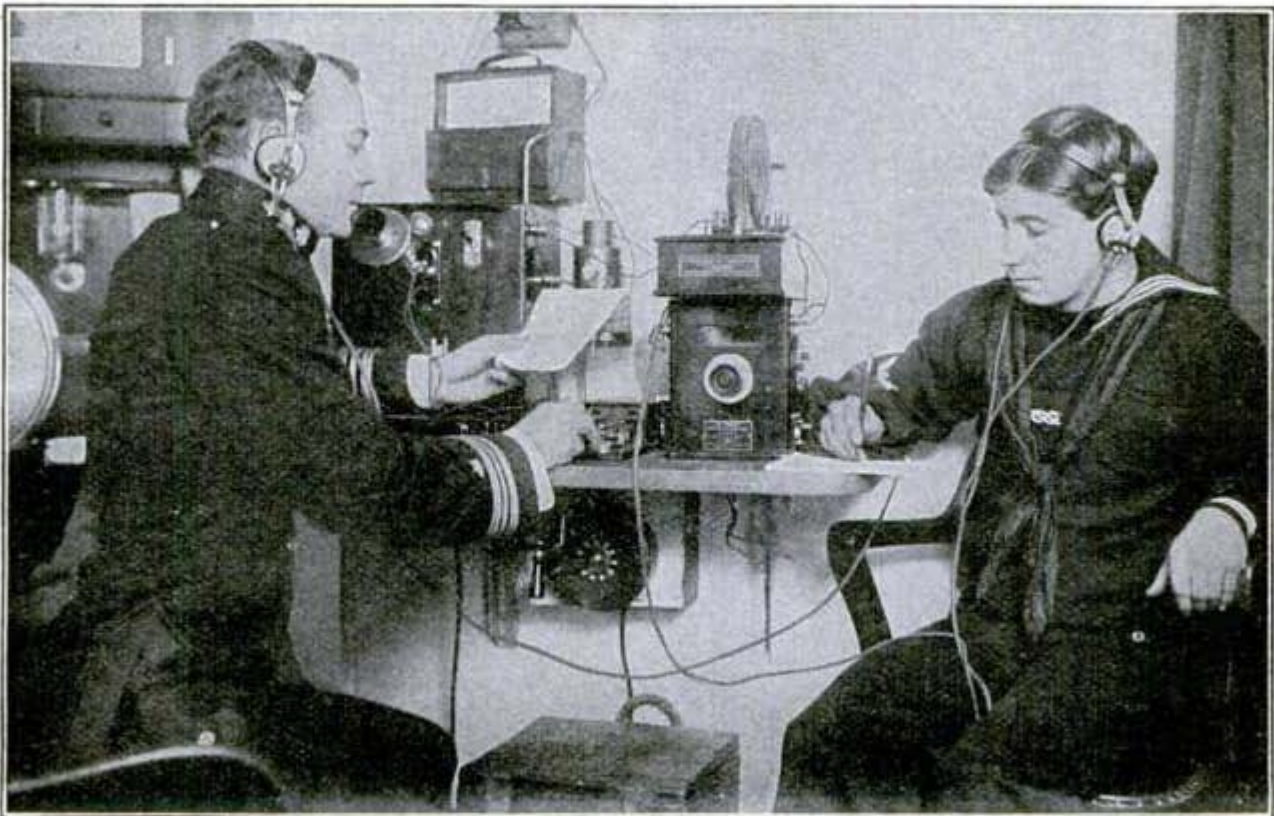
The wireless telephone equipment of the United States "battle fleet", which just completed its successful "round-the-world" cruise, is one of the most wonderful in the world. Conversa-

tions have been clearly transmitted from 25 to 50 miles distant. The illustration shows the wireless telephone room of the flagship "Connecticut." The flag officer is just about to send a wireless telegraph call signal to a distant ship. When this is responded to, the wireless phone will be used for conversation. The signal boy takes down the conversation on a pad.

The street railways in Birmingham, England, owned by the city, pay conductors \$6.08 per week the first year, and \$7.54 per week after the fifth year. Motormen receive a few cents more.

AMERICA RIVALS NORWAY IN SKEE-JUMPING

Although handicapped by the fact that there are very few natural inclines in America adapted to skee-jumping, thus necessitating the building of structures not unlike giant toboggan slides, the sport is gaining in the United States with great strides. In the northern parts of Norway and Sweden the



Wireless Telephone Room in U. S. Battleship "Connecticut"

sport forms a part of the daily routine for nearly nine months of the year, and natural inclines are very numerous.

From the scaffolding shown in one of the illustrations Oscar Gunderson jumped 138 ft. in a scheduled tournament at Chippewa Falls, Wis., adding another great record to the long list held by American athletes. Mr. Gunderson's flight into the air upon leaving the scaffold was conceded by skee experts and enthusiasts to be as pretty a jump as has ever been witnessed. Pushing himself from the guard rails at the top he gracefully began the descent, gaining momentum at every foot until he had attained a terrific speed. As he reached the "bump" he crouched for the spring and suddenly raising himself he leaped into the air. Before alighting he propelled himself forward three times with his arms and body.

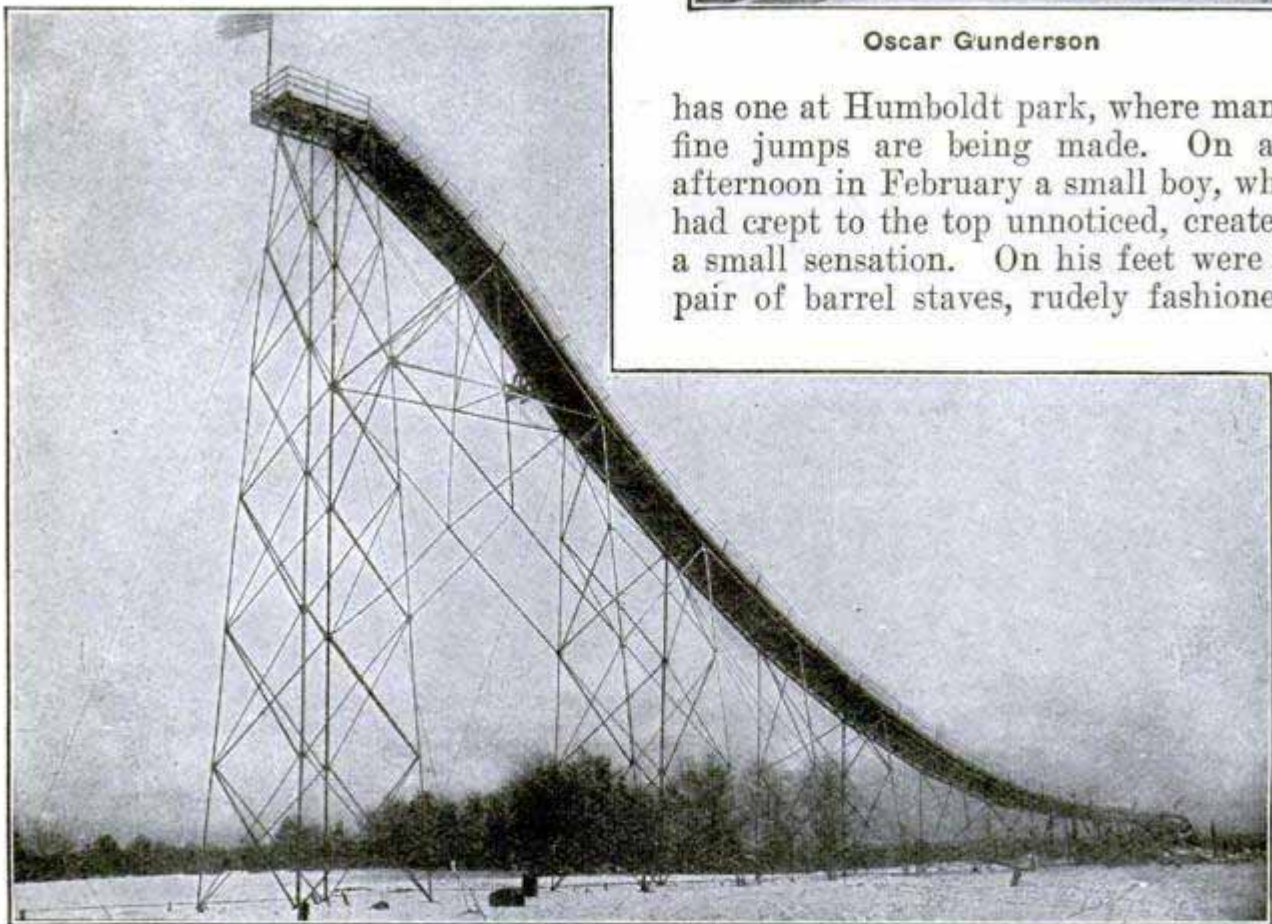
When the length of jump was accomplished a greater feat still remained. This was a successful landing and the crisis, for if the jumper falls it is a failure. For a moment Gunderson wavered as his body plunged downward,

but by efforts which bordered on the superhuman he righted himself and continued down the slope past the "dead line."

Scaffolds for skee jumping are now being built in many states. Chicago



Oscar Gunderson



First Steel Slide Ever Built, Where Record Was Made

has one at Humboldt park, where many fine jumps are being made. On an afternoon in February a small boy, who had crept to the top unnoticed, created a small sensation. On his feet were a pair of barrel staves, rudely fashioned



Making the Big Jump

into skees. He started down the incline with the dismayed shouts of a startled crowd of spectators ringing in his ears, but when he had accomplished a jump of some 40 odd feet, successfully, the dismay turned to admiration.

AN AUTOMOBILE STAGE COACH

This novel automobile body can in no better way be described than as a double automobile-coach, its shape and the outside seats reminding one of the early stage coaches. The interior is finished in the most luxurious manner, the roof being lined with bird's-eye maple, and the lower portion being upholstered

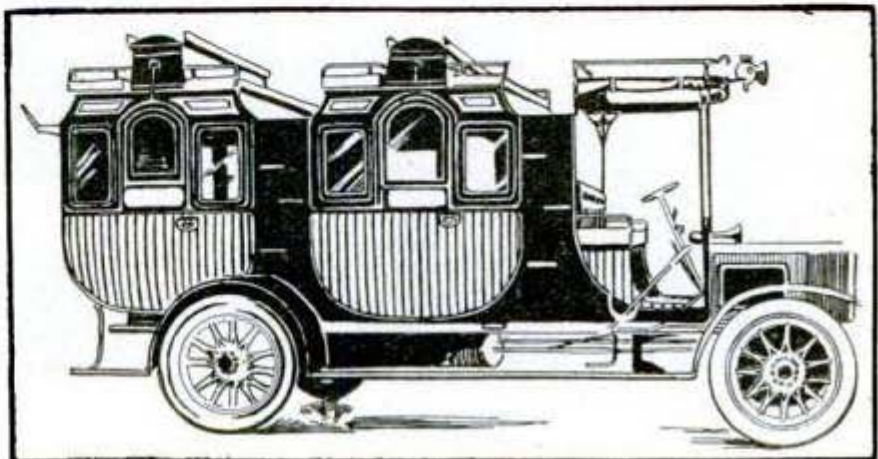
in leather. Folding card tables, racks, pockets and cupboards are features of the interior equipment. The seats on top of the body are detachable.

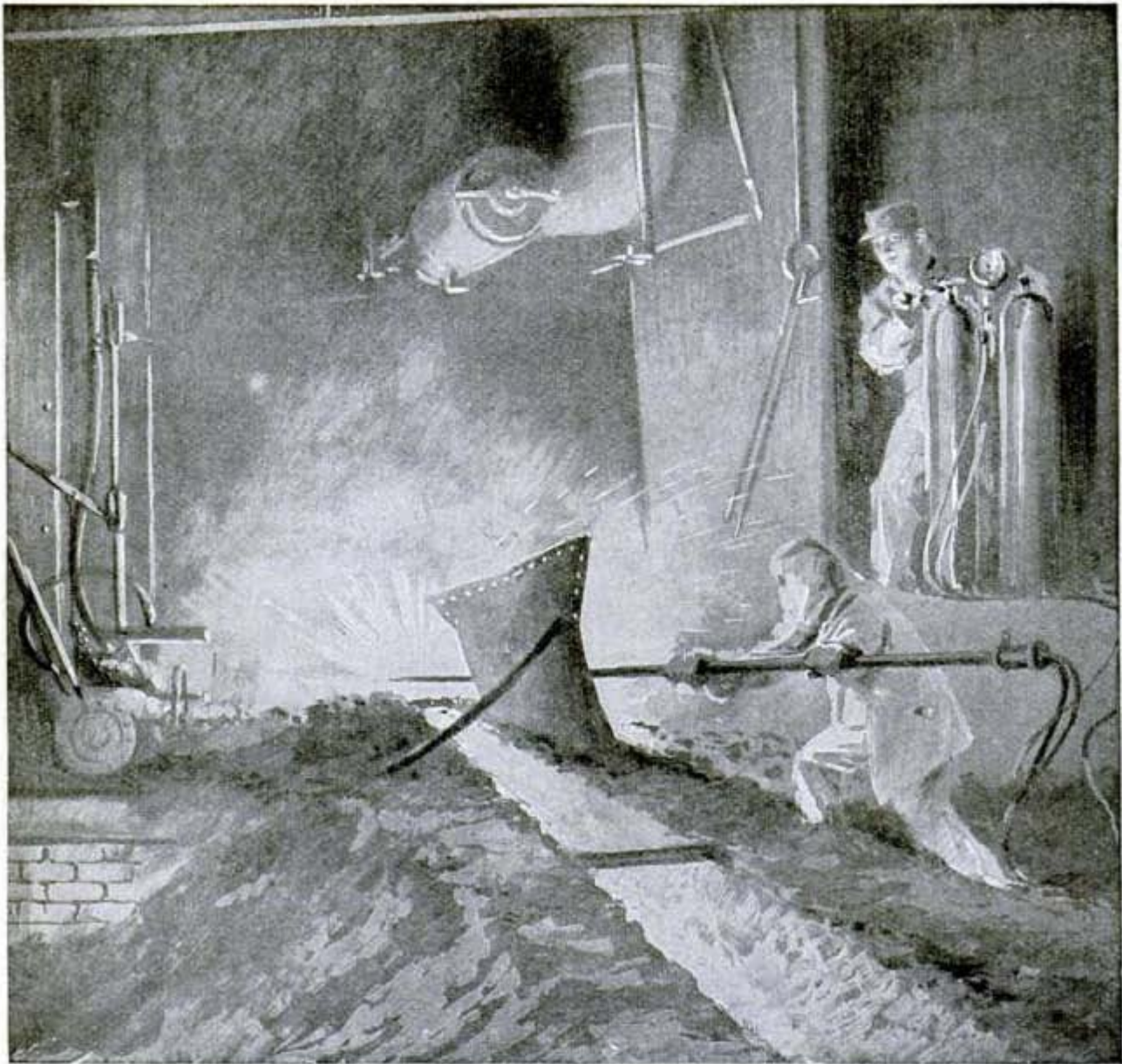
REMARKABLE OXYGEN MELTING PROCESS

A wonderful process of melting steel and iron, in which a blast of pure oxygen is the prime factor, has been invented by a German savant and tried out with remarkable results in both the United States and Germany. One of its uses is to clear the chilled iron from the taphole through which the blast is delivered to the interior of blast furnaces. A chilled taphole is one of the most serious troubles to be combated with in a steel mill. It can also be used to great advantage in cutting sinking heads on castings and cobbles, in dismantling and cutting up large castings, and for piercing steel plates. It is stated that at the Homestead works of the Carnegie Steel Company the oxygen outfit pierced an 18-in. armor plate in less than a minute.

The chilled iron that often blocks the taphole of a blast furnace can be pierced in a few minutes, even though the mass of metal has reached a depth of two or three feet. The chilled mass is first heated to combustion by the use of a gas flame and then the blast of oxygen is turned on. Under the high pressure of oxygen the molten mass is removed almost instantly, without any damage to the taphole.

All that is necessary for the opera-





Tapping a Furnace with Oxygen Blast

tion of the process is a tank of compressed oxygen and another of coal gas. The blast of oxygen is directed against the metal through a long pipe-like nozzle, connected with the compressed oxygen tanks by hose. The heat is so intense that the operator who handles this nozzle must be clothed in an asbestos suit. Asbestos gloves cover his hands, an asbestos face mask and hood, fitted with an isinglass visor in front of the eyes, protects his neck and head, while a steel shield, placed midway between his position and the taphole of the furnace, helps to break the heat.

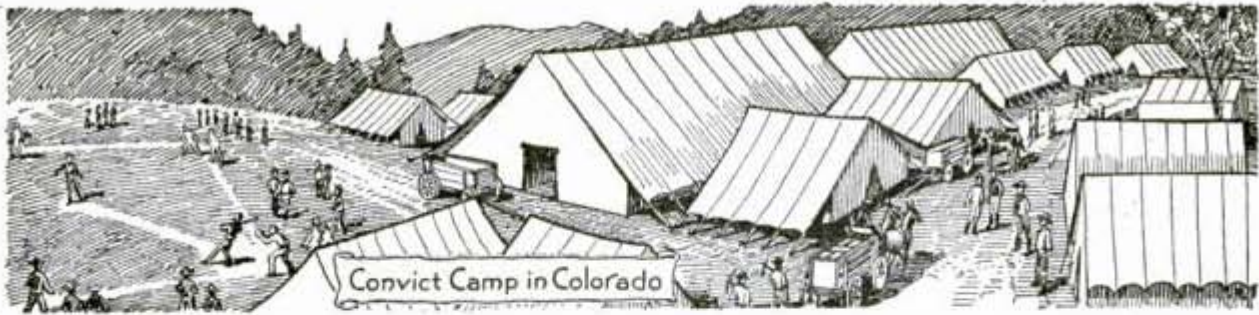
Many examples of the power of the apparatus have been given in American steel mills. In one instance a chill that had extended to a depth of nearly 5 ft., and had been worked upon by a

gang of men for nearly two hours without success, was opened in four minutes with the expending of only 50 cu. ft. of oxygen. In less than two minutes, with about the same amount of oxygen, the molten metal was started running at the taphole of a furnace in Cleveland, Ohio. It was estimated that a depth of 4 ft. was pierced.

The tapholes of furnaces of the open hearth construction are readily opened in from 10 to 12 minutes, a most difficult operation, as the mixture consists of steel, slag, and magnesite.



If a cellar is dark, paint the lower stairstep white. This may save a fall and also relieve the strain of feeling for the last step when going down.



THE BUILDING OF ROADS BY CONVICT LABOR

Economical and Effective Improvement of Country Roads Made Possible by Convict Labor—Actual Road Work Means Fresh Air and a Closer Companionship for the Prisoner with the Invigorating Influence of Nature at Her Best—Also Solves in Part the Problem of Prison Labor

By Francis M. Buzzell

The problem of good roads, a cause championed for many years by the people of the rural and outlying districts of the United States, often with misdirected zeal, and the problem of prison labor, in which organized free labor has been arrayed in a bitter fight against state and prison officials, would not have seemed to have a close and vital connection a few years ago. But a general movement, now well launched in many states, and steadily growing in strength, means that the solving of the one problem will be the partial solution of the other. This movement is the building of good roads by convict labor.

The movement has not been devoid of strife, nor has the opposition come only from "convict" brokers and contractors. Criticism has come from public officials, and even from voters, who, although demanding better roads, fought the convict labor proposition strenuously. In the state of Alabama, for instance, the use of convict labor upon roads was, and still is, being fought with bitter opposition and the severest criticism, but opposition cannot long stand before the reasons in favor of the movement.

According to experts who have studied the problem of good roads and the problem of prison labor jointly, the building of public works which could not otherwise be undertaken is the sole occupation in which convicts can be employed which will not encroach upon free labor, and which will actually immeasurably increase the demand for the services of free labor, benefiting at the same time the criminal and the free man. No influence more destructive upon human character can be imagined than enforced idleness, while to allow the activity of the convict to be employed in making products for sale at prices below the normal market is degrading to American labor. Not only are these assertions made by those who have studied the subject, but also that there is no branch of public improvement of such general importance to all the people as the making of improved highways. The activity of the convicts in the United States constitute in the aggregate an enormous force, and how to use these activities most effectively in constructing highways is a vital question.

The list of states now using convict labor on the highways is too long to mention in detail, but Colorado, New Mexico and Wyoming are using such labor to construct a great highway which will run through the three states, and Washington, Oregon, North Carolina and Georgia, as well as several other states, have gangs at work. Illinois is using a number of her convicts in crushing stone for the roads, believing this one of the most practical ways of employing such labor

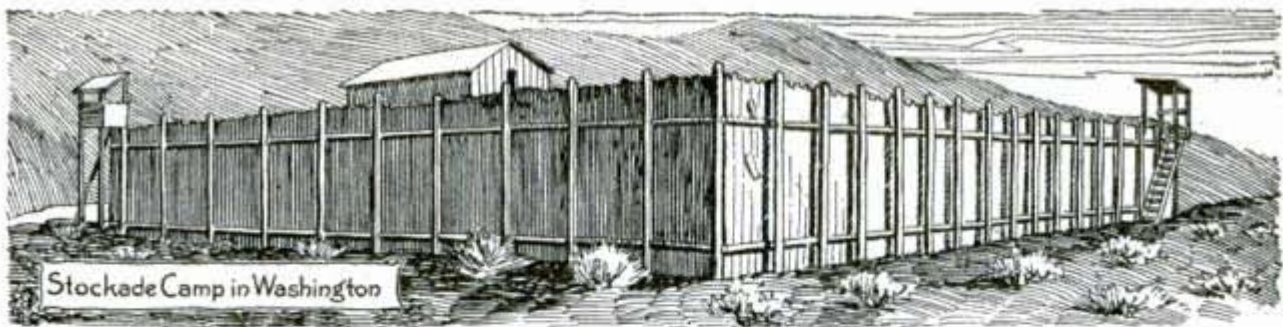
in road construction, although not as beneficial for the prisoners, perhaps, as actual road work.

The reports from public officials on the success of the movement in the different states are too lengthy, although vitally interesting, to be given here in full, but enough space must be allowed to give at least an idea of the cheapness with which roads can be constructed with convict labor, a few of the causes for opposition, and the methods of controlling the convicts while doing such work. The fact that it takes prison-confined men, be they petty or hardened criminals, into the open country where they gain a closer companionship with nature, is not the least important phase of the problem.

The convict road-gang at work in the southern part of Colorado numbers 88 men—enough to form a big company of soldiers. They toil peacefully through a magnificent valley near the New Mexican line, and the glorious beauty of their surroundings makes it almost inconceivable that among them are criminals whose names have been bywords in the criminal history of Denver, Pueblo and other towns of Colorado. Still more incongruous is this fact when it is realized that these men wear no distinguishing badge in the way of clothing, and that no armed guards are to be seen anywhere. If a man wishes to escape from such a camp it is conceded that he can easily do so, but that he may be overtaken elsewhere follows as a matter of course, and the penalty—one which is dreaded by any convict who has had a taste of open work—means that his activities will from then on to the end of his term be confined within the prison walls. Only five officers are in charge of the camp, which is composed of tents. The convicts sleep in one big tent, and during the day are divided into five gangs, each officer having charge of a gang. Eight hours of road work constitute a day's labor, and the men must go to bed promptly at 9 o'clock every night except Saturday, on which they are allowed an additional hour. Amusement is allowed to all in the camp. Some of the convicts own and are able to play musical instruments. Cards are also allowed. Some spend their time pitching quoits, and a ball game is usually played every evening before darkness sets in.

The method of guarding the convicts working on the roads in the state of Washington is a little more strict, but amusements are just as numerous. The provision allowing the convicts to do such work in that state was passed in 1907, and the point selected for making the first experiment was one of the most remote from the penitentiary, the idea being to give the new system the most severe test possible. The work selected was the building of a wagon road along the face of a nearly perpendicular rock bluff, the work involving the handling of a large

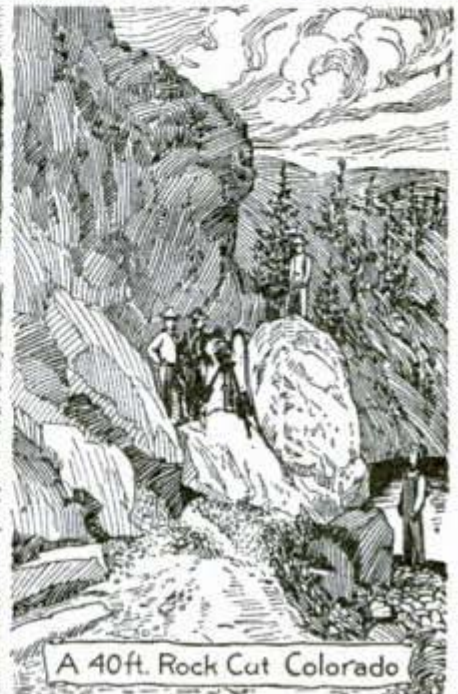




Stockade Camp in Washington



Convict Road Workers in N. Carolina



A 40ft. Rock Cut Colorado

amount of dynamite by the convicts. The character of the rock encountered was extremely hard, making drilling very slow. Nevertheless, the average daily work accomplished by each man amounts to 2.42 cu. yd. of solid rock moved and 1 cu. yd. of earth and loose rock moved. As the lowest bid received for moving the rock was \$1.50 per cubic yard and for loose rock and earth 40 cents, the average daily work of a convict was valued at \$4.03. The camp established for the care of the prisoners consisted of a stockade, 80 by 125 ft., inside of which was erected a barracks, 18 by 48 ft. On the outside of the stockade and adjoining it, was built the guard-house. The number of convicts employed at the camp has never been more than 30, guarded by five officers. One of the illustrations shows this stockade, and another illustration shows a convict camp and stone crushing shed in Oregon.

A communication from J. M. Penn, judge of probate, Etowah county, Alabama, gives a clear insight into the conditions of convict road-building in that state.

"We have been using convicts upon the roads for a number of years," says Judge Penn, "against bitter opposition and the severest criticism, and are convinced that, if for no other reason, the benefit to the convict is sufficient to continue them at the work, even though we could have hired them out for mining purposes at \$45 per month. But the injury to health, the severe treatment, as well as the association with the worst criminals, was sufficient inducement for us to keep them on the roads. Our convicts on the roads are only the ones convicted of misdemeanors for which no sentence is longer than two years for a single offense. We are now using about 40 such convicts, guarded by officers whose combined salaries do not amount to more than \$180 per month. The gang is equipped with 16 mule teams, graders, scrapers, etc. The men are housed and moved from one part of the state to another in railroad cars built for the

purpose. We carry all equipment, including barns and blacksmith shop, with us. Bloodhounds are taken along to run down escaping convicts, but we don't require them more than two or three times a year. We have just completed a mile stretch of road on which we placed 3,862 wagons of gravel and rock. This stretch cost \$696, including cement culverts, and it is safe to say that the same stretch could not have been made by any one else for less than \$1,500."

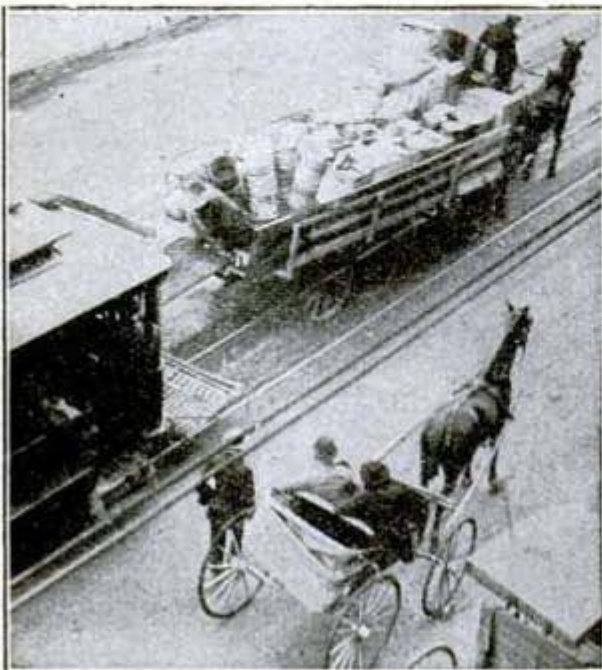
As a contrast to the policy of the state of Colorado in not clothing the road workers in convict's garb the prisoners working on the roads of North Carolina wear the prison stripe, as is shown in one of the illustrations.

The building of good roads in Georgia by convict labor was brought about, not because of an irresistible popular sentiment for good roads, but because of the recent overthrowing of the "convict lease" system. There had developed in Georgia a system whereby the convicts were leased to "convict brokers" at a nominal sum. These brokers, in turn, leased out the convicts to the owners of mines, but the abuse of this system became so pronounced that an influential Atlanta newspaper started a crusade which resulted in an extra session of the legislature and the annihilation of the statute.

The employment of convict labor in crushing stone within the prison walls for road making is claimed to be one of the most practical methods of using such labor for road construction. As far as the construction of roads is concerned this method may be excellent, but the influence and good to the prisoners themselves is no different than that of any other occupation within the prison. As an argument in its favor, however, the Illinois highway commission, in its annual report, states that in most sections of the country there is a natural prejudice against exposing convicts on the public roads, contending that it does not seem justifiable to place the opportunity for escape so alluringly before the prisoner and to impose as a penalty on his very natural desire to escape the risk of being shot by armed guards.

STREET CARS HELP HEAVY LOADS UP GRADE

When a heavily loaded truck gets stalled on a grade on the street car



tracks of Los Angeles the motormen do not become excited and use violent language, but calmly take a heavy plank, with which the forward ends of all the cars are equipped, place it against the offending wagon, and turn on the power. All the horses have to do is to keep out of the way, the cars providing all the power necessary.

Sometimes drivers of heavy loads show consideration for their horses, if not for the street car company, by purposely running onto the tracks when grades are to be climbed so that the first car to appear will lend a helping hand.

A KHEWIVE'S PRIVATE CAR

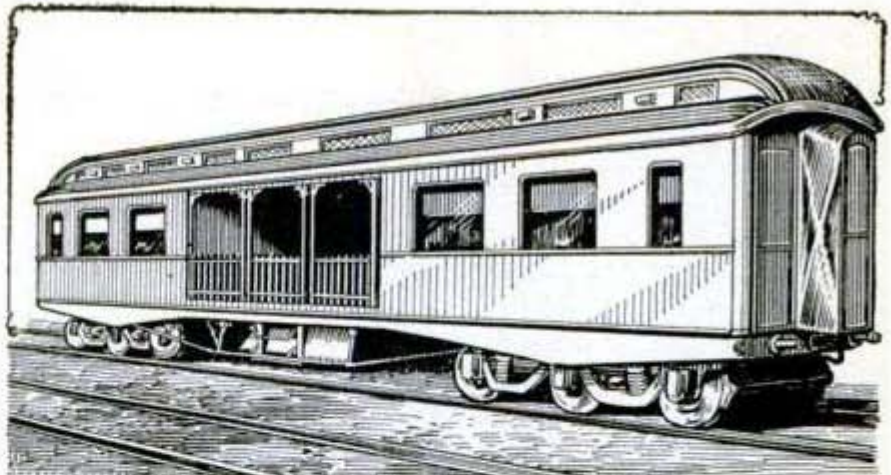
The new private car constructed for the Khedive of Egypt, the title given the ruler of that country, has many interesting features, the most important being the observation platform. This

opens out of the center of the car instead of being at the end, as is the case on American railroads. A wooden screen jetting out from the forward end of the opening keeps the platform clear of flying dirt and dust.

The interior of the car is handsomely decorated and furnished. The body is framed in teak, covered with aluminium panels, and mouldings, the whole of the interior being painted ivory white, relieved by gilt lines. All windows and doors are fitted with dust excluders. The car is entered through the gates of the observation platform by folding brass steps. The platform divides the car into two apartments, one of which is for the Khedive and the other for his ministers.

A CALIFORNIA BEACH

This illustration shows one of the numerous bathing beaches along the coast in California. The pavilion has

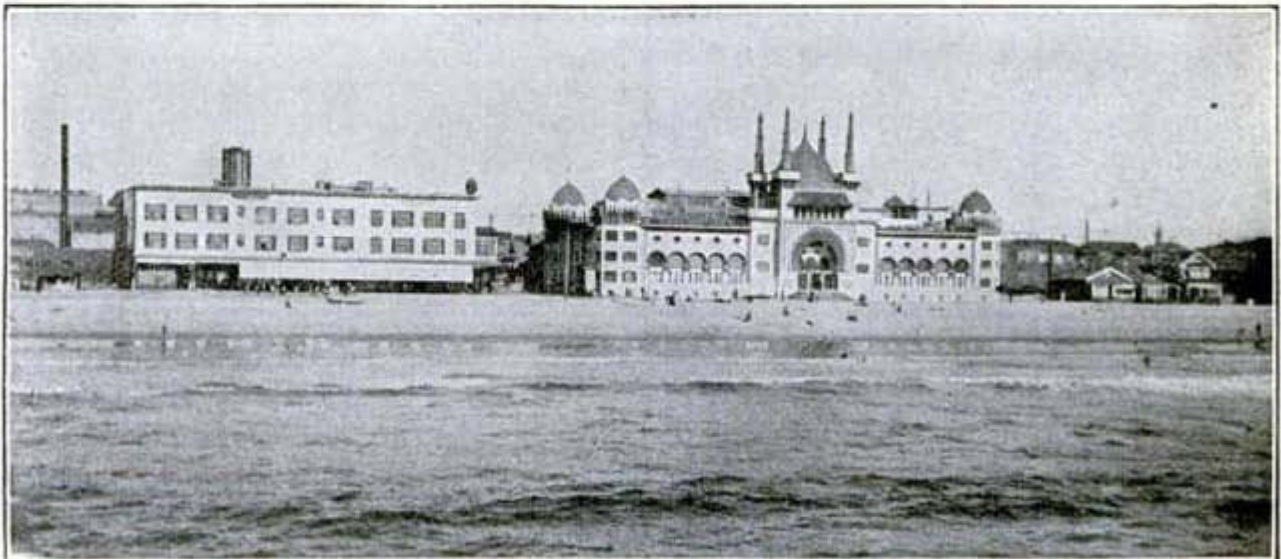


Courtesy Locomotive, London

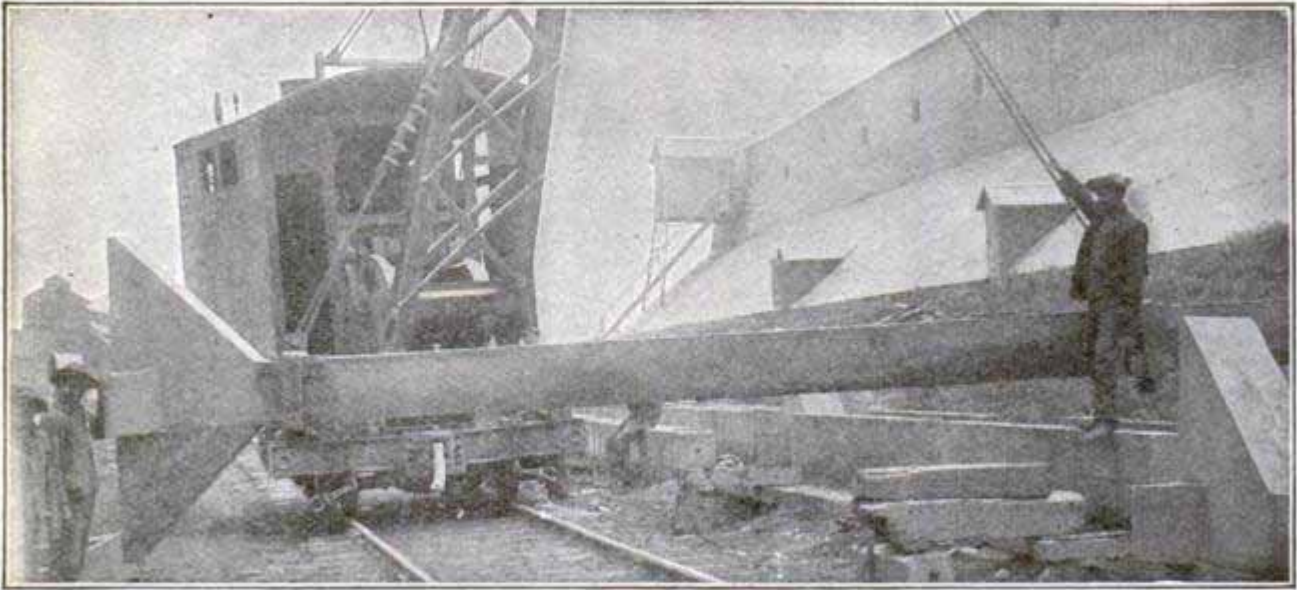
New Private Car for the Khedive

400 dressing rooms. A fee of 25 cents entitles a bather to a room, a bathing suit, and the use of the hot water plunge as well as the ocean.

In two recent night flights made by Henry Farman in his aeroplane he carried an acetylene light so that his course could be marked from the earth.

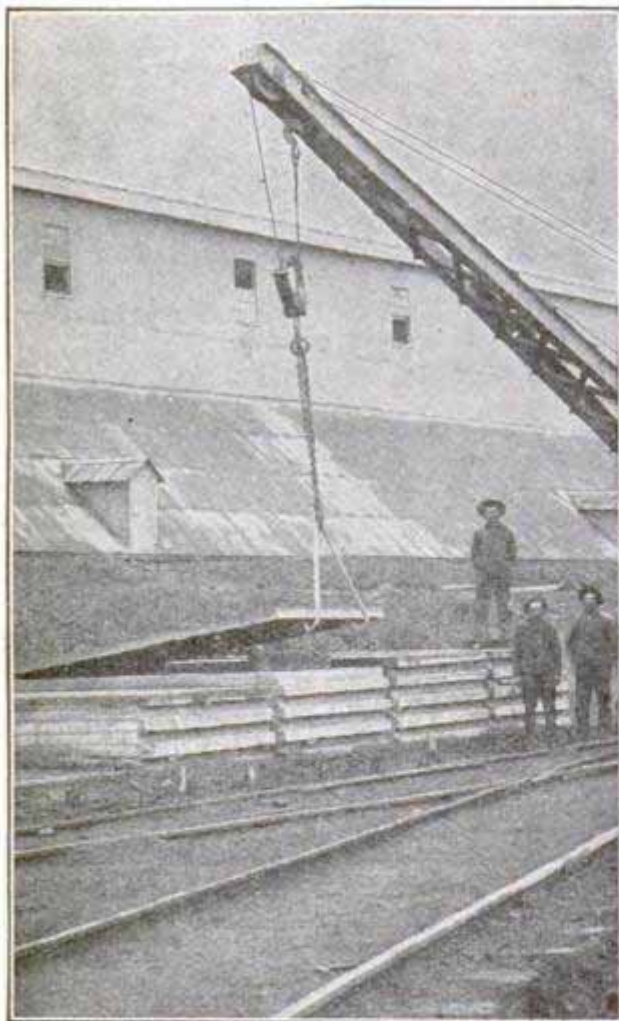


REINFORCED CONCRETE STRUCTURAL WORK CAST ON THE GROUND



Reinforced Concrete Columns Cast on the Ground

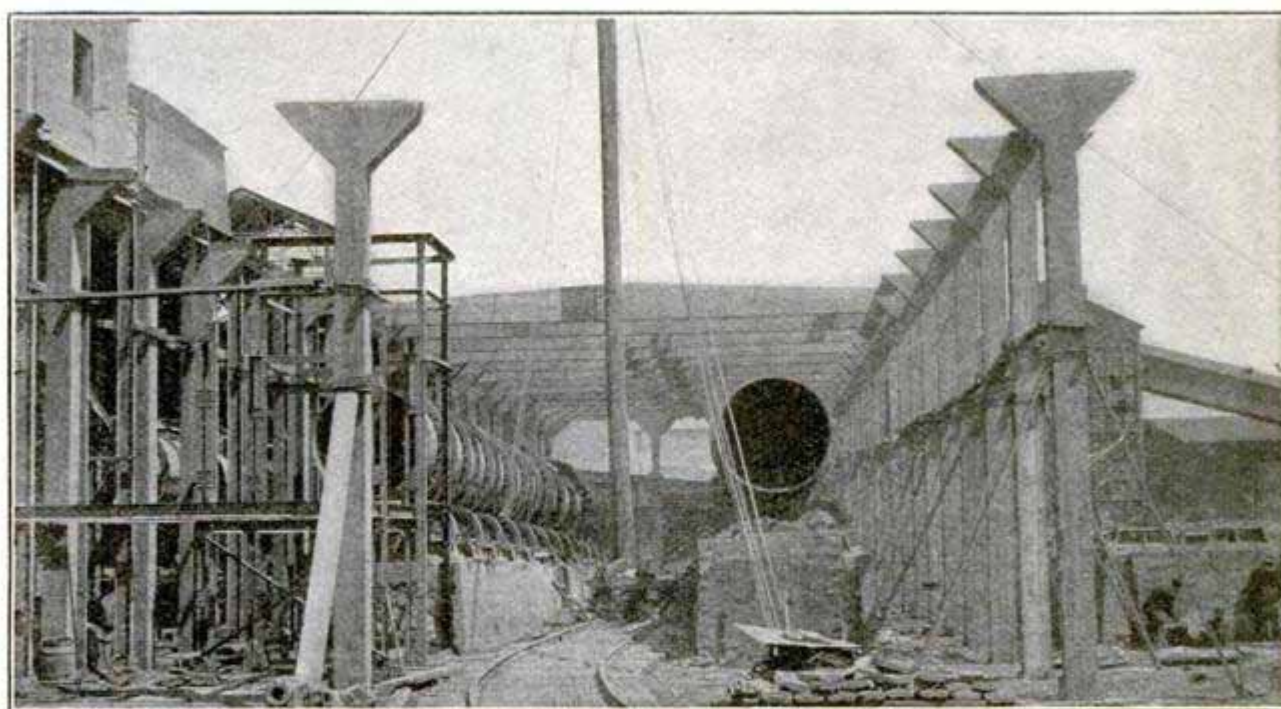
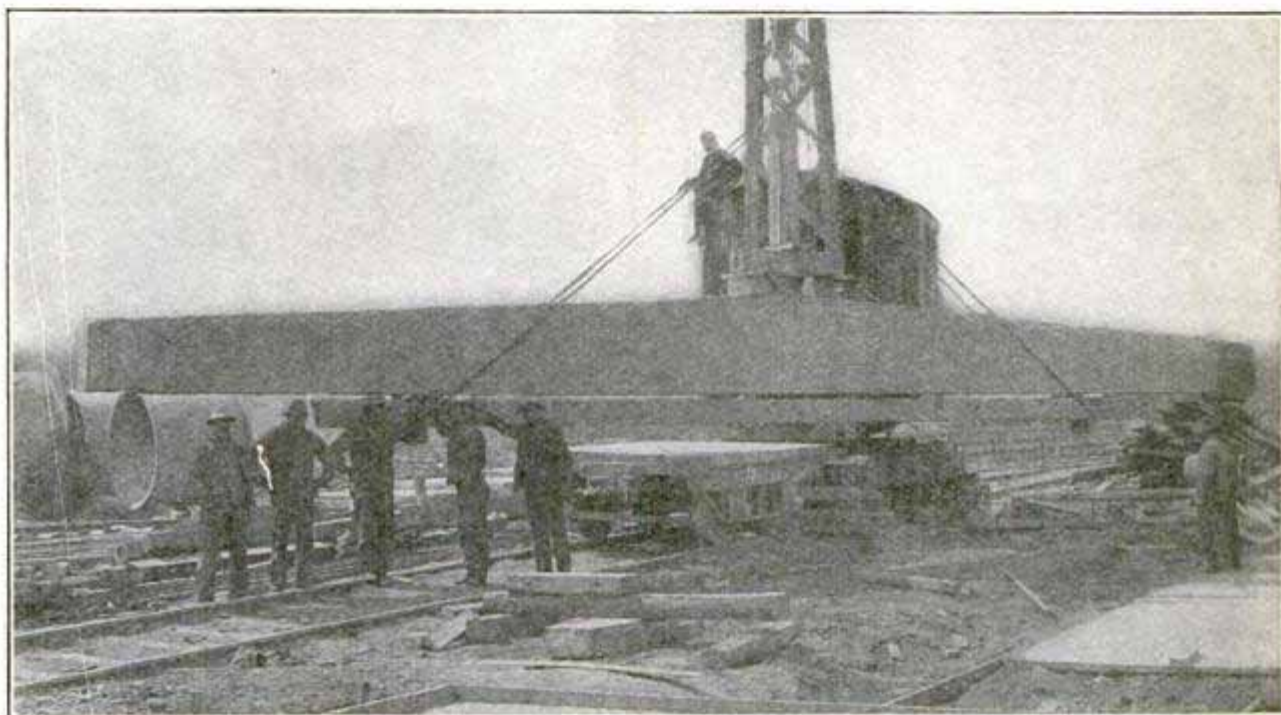
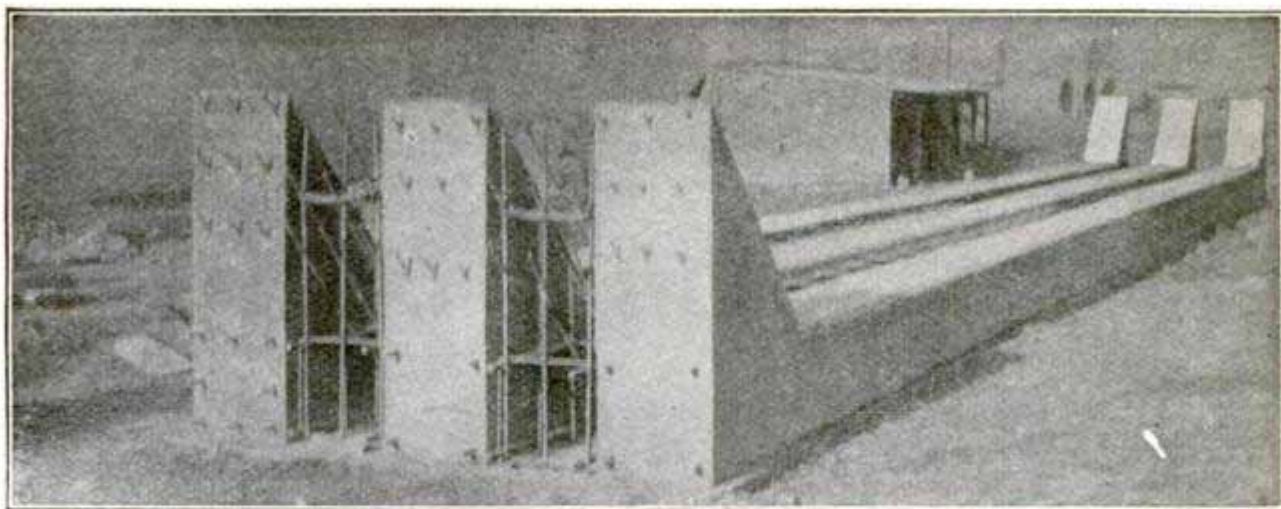
When reinforced concrete first became an important factor in building construction its application was direct,



Concrete Roof Slabs Ready for Transportation

or, in other words, it was cast in the position it was to occupy in the structure. But gradually the idea of constructing reinforced concrete buildings by erecting separately cast members, such as columns, roof-girders, longitudinal struts, roof slabs, and other parts, all cast on the ground, has been adopted, until, as shown in the December, 1908, issue of this magazine, whole walls have been thus molded and tilted into position.

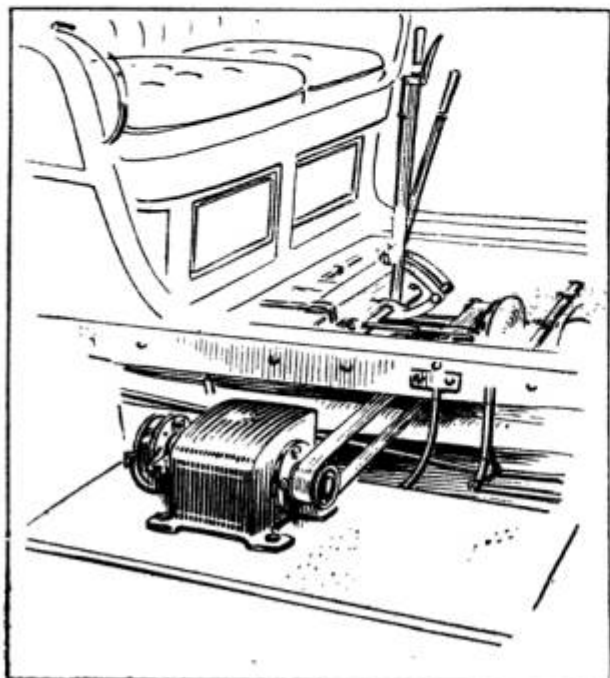
Five of the illustrations published with this article show the different parts of a reinforced concrete building erected at New Village, N. J., by this method of separate casting. The first illustration shows a derrick raising one of the 29-ft. columns from the casting bed for transportation to the building site. The second illustration gives a clear idea of the concrete slabs for the roof. They are 12 ft. long by 6 ft. 3 in. wide. The first illustration on the following page shows three of the side wall columns on their casting bed, the middle illustration gives an excellent view of the great 50-ft. roof girders, and the third gives the general appearance of the building with the columns set in place, part of which have been topped by the roof girders.



Side Wall Columns on Casting Bed - Some of the Huge Roof Girders - Concrete Columns in Position

ELECTRIC LIGHTING EQUIPMENT FOR AUTOS

Although the use of small dynamos for the lighting of automobiles is not new, this apparatus has a governing device which is unique in principle, consisting of the application of a se-



Small Dynamo for Automobiles

ries of make-and-break platinum contacts operated by a cam on the armature shaft. In addition to this there is a switch, which automatically connects the dynamo up to a battery consisting of six storage cells, keeping them fully charged so that light is as available when the car and engine are at rest as when running. This regulation is accomplished by the make-and-break mechanism, the cells beginning to fill when the speed of the dynamo suffices to generate 12 volts.

The dynamo is fitted on the running board of the automobile and is driven by a 1½-in. belt from a flanged pulley on the shaft connecting the clutch and gear box. The apparatus is enclosed by a detachable cover, and takes up no more room than the ordinary tool box often carried on the running board.

“Perflate” is a new word gaining a great circulation in England. It means to blow through and is used in the place of “ventilate.”

THE FLOATING PALACES OF THE RAJAHS

To Americans, and, for that matter, the people of the progressive nations of Europe, who stay at home and busy themselves with keeping up with the times—a somewhat strenuous task at present—the entire world seems to be undergoing evolution at a speed which is almost frenzied, but after all North America and Europe are only a small part of the world. On some sections of the globe the dignitaries who lived and breathed one or two thousand years ago could come back today, if such were possible, and find many conditions with which they were familiar, although politically there has hardly been a country of any importance left unchanged.

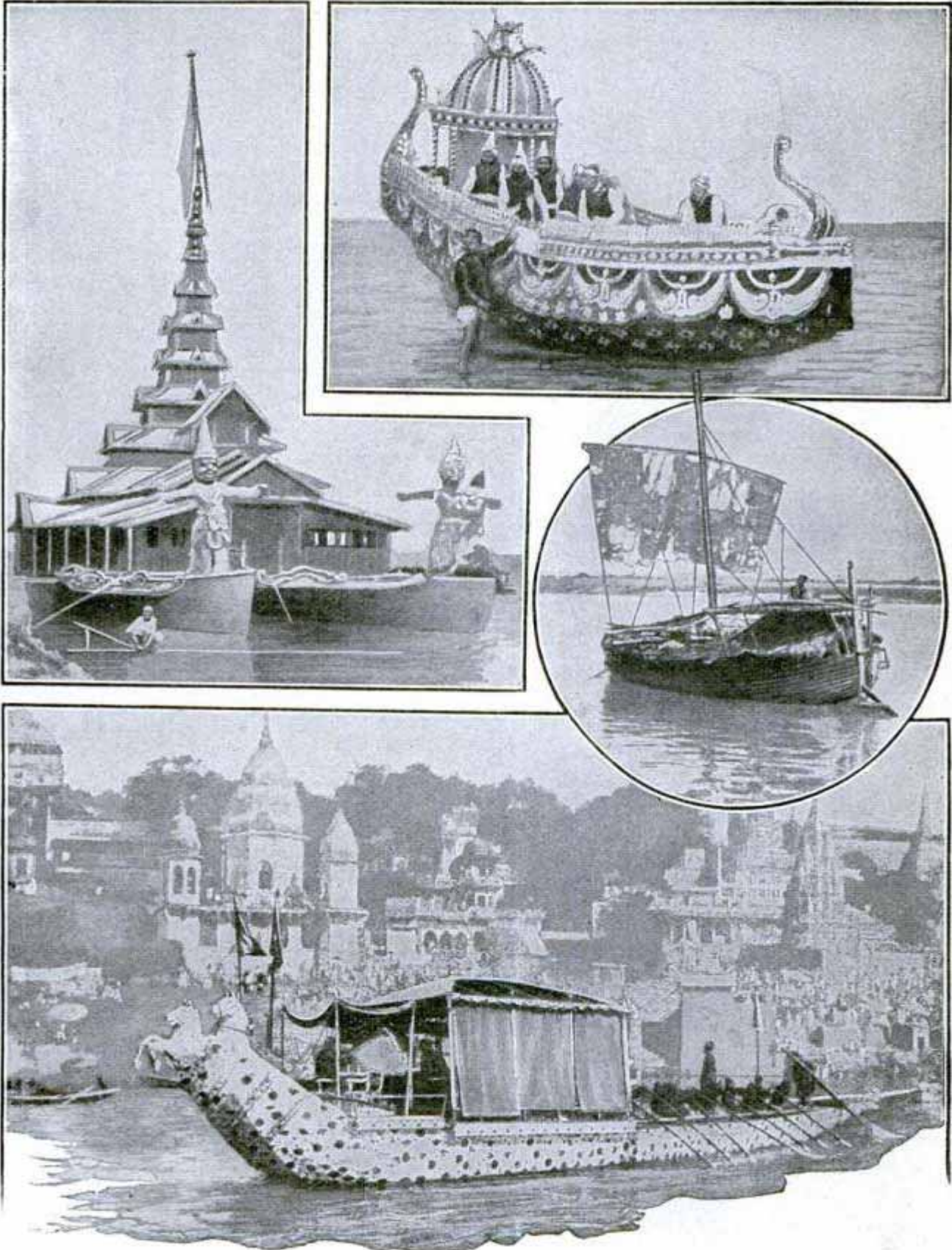
Notwithstanding the fact that India has for many years been under the rule of England, the conditions and manner of living have not greatly changed in many parts of it. On the Ganges river in the Northwest provinces, the tourist will see, if he approaches Benares at the right time, the same type of craft that carried pilgrims to this most sacred of Hindu cities hundreds of years ago. Three of the illustrations show modern floating palaces or magnificent galleys on which three Rajahs journey to Benares, and which serve as a test of their pious zeal. These galleys differ hardly an iota from the vessels used for the same purpose by Rajahs who died centuries past. Incrusted with gold, silver, and pearl, and decorated with tapestries embroidered with precious metals and jewels, these wonderful modern-ancient vessels lend a festive touch to the river scene. But their sumptuousness does not prevent the richest Rajah who possesses one, from bathing in the same water and surrounded by a half million poorer pilgrims, even though the sacred river is thus piously filled with myriads of microbes. And he will fill great jars with the water in which the pilgrims have washed their bodies, and drink it.

In contrast to these floating palaces

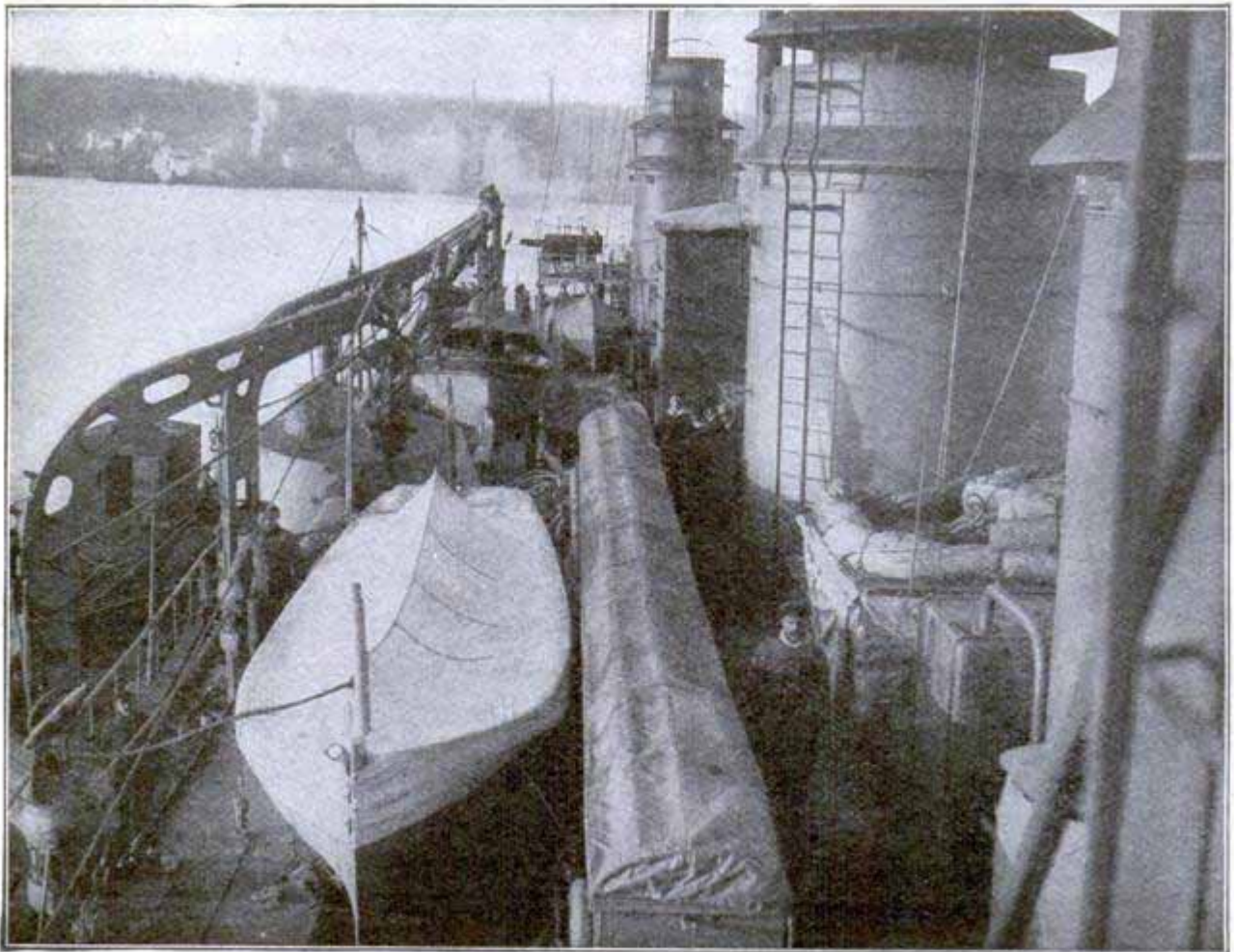
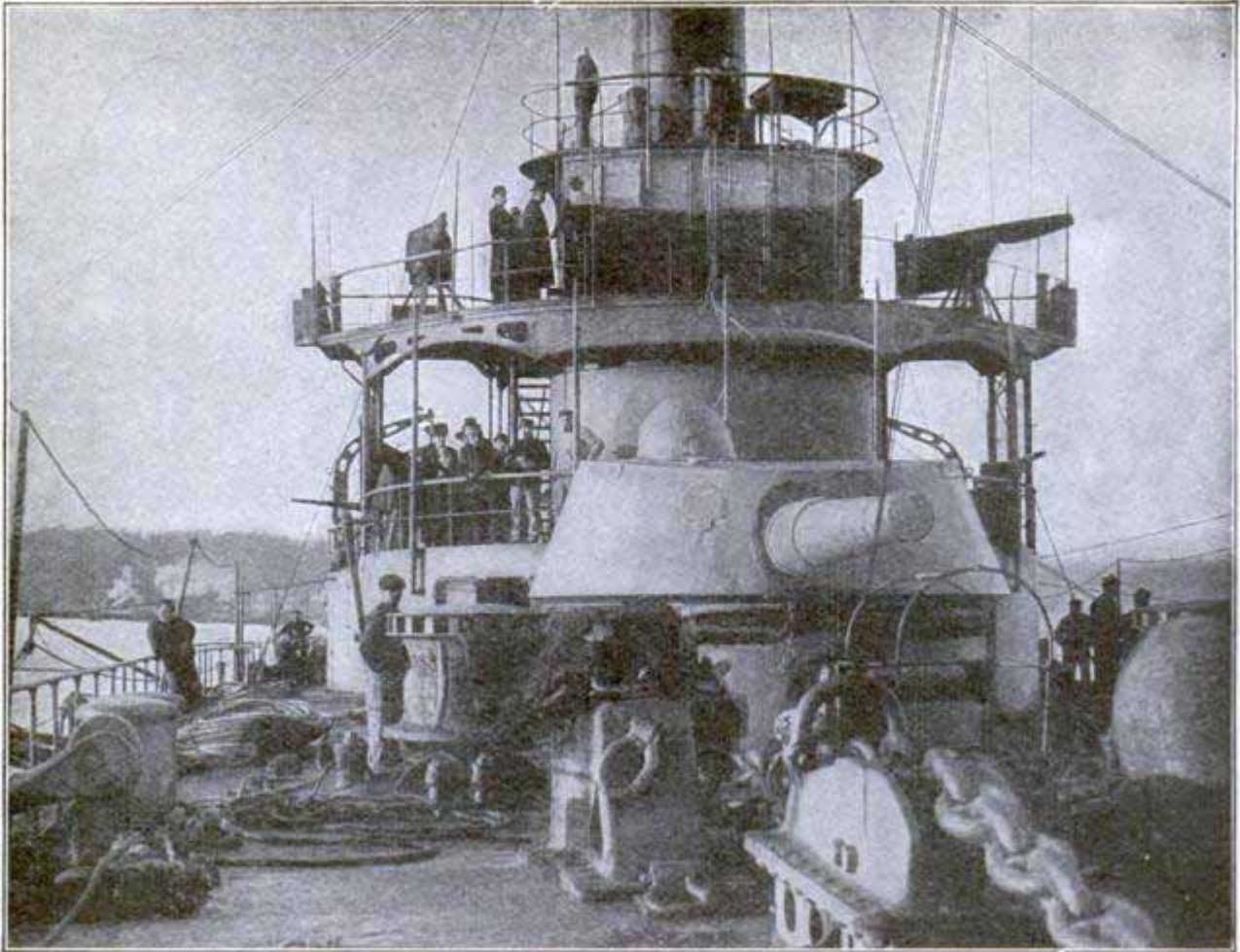
is shown one of the many barges of the poorer classes. The system of casts in India imposes upon the riverman the obligation of living on the water as his ancestors lived, so his shabby looking craft is also his home. Usually he has in his floating house a small

chapel dedicated to a secondary divinity who personifies the river on which he exists.

A temporary shutting down of the America-Niagara water-power plants showed that they only lowered the water level $2/5$ in.



A Pilgrimage Galley with Silver Incrustations—Ingenious Galley Roofed Over Like a Pagoda—A Barge of the Poorer Classes—A Rajah's Galley at Benares



French Cruiser "Amiral Aube"—Recently In New York Harbor



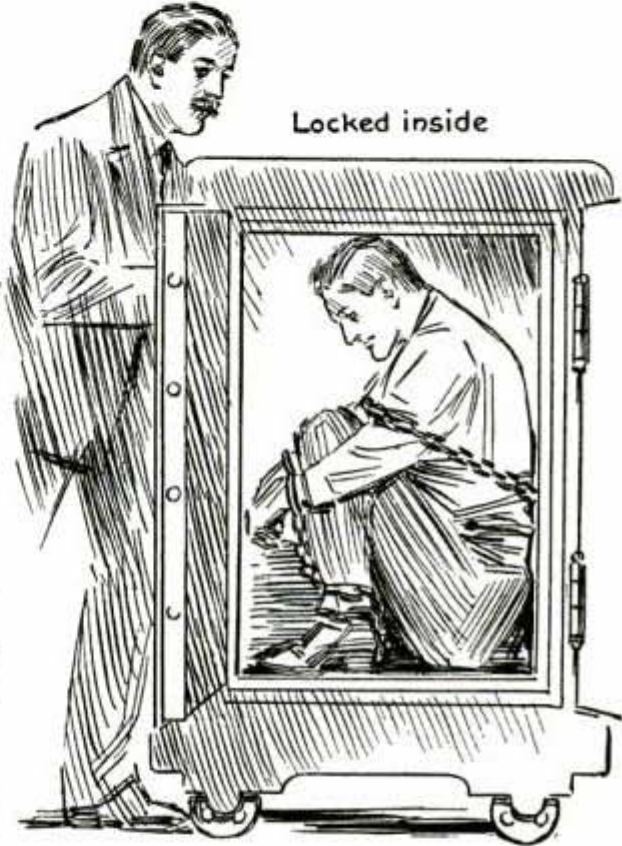
Shackling his Wrists and Ankles



REMARKABLE SAFE-ESCAPE ACT

All acts of magic on a stage are tricks, many of which are very simple when you know how, but this act is one that has kept safe experts and the chiefs of many police departments guessing. The perpetrator of the act is W. H. Dilger, and the safe is always one borrowed for the occasion from some reputable business firm or safe company in the city where the act is being staged. The prisoner, for such Dilger is for a few minutes, is handcuffed and shackled about the ankles by the chief of police, if he will do this service, and then he is locked within the safe by the local representative of some safe company. In some instances the shackles have been placed around the ankles and riveted by a blacksmith. Three or four minutes later the prisoner is found outside the safe with the shackles and handcuffs held out in one hand for inspection. Dilger always gives orders to open the safe from the outside in case he does not escape within five minutes, as he would become insensible from want of air if confined longer.

Another interesting handcuff feat is



Locked inside



Liberates himself in Four Minutes.



Jumping Manacled into River

that of a performer known as "The Handcuff King." He dives manacled into a river, if one is available, otherwise into a pond, and remains below the surface of the water while freeing himself of his fetters.

INGENIOUS MOTOR TRACTOR FOR FARMING

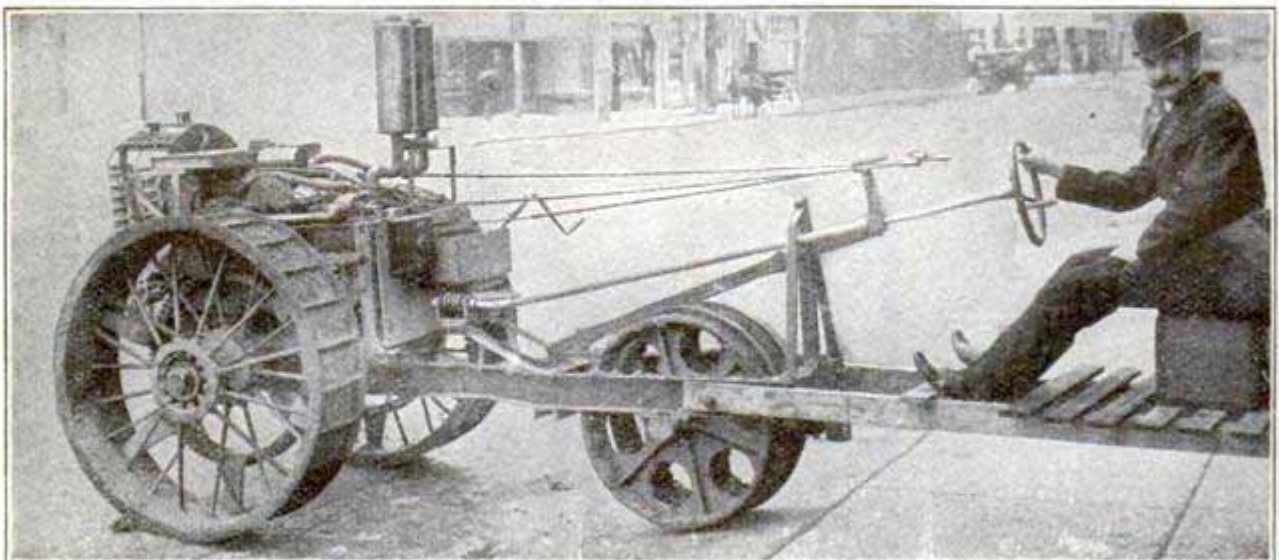
This new gasoline tractor was suggested by the growing demand for a light farm tractor to take the place of

the two, four, or six-horse teams used for plowing, harrowing, and hauling on western ranches. The special feature of the machine is that it may be driven from the seat of the ordinary wheel plow or harrow, enabling one man to drive the tractor and to operate the levers of the tilling implement at the same time.

The machine is particularly an orchard tractor, having low, wide wheels, narrow tread, short wheel base, and a short running radius. To obtain the greatest efficiency the front wheels are the traction as well as steering wheels, a novel departure in this type of machine. It sells for \$1,000.

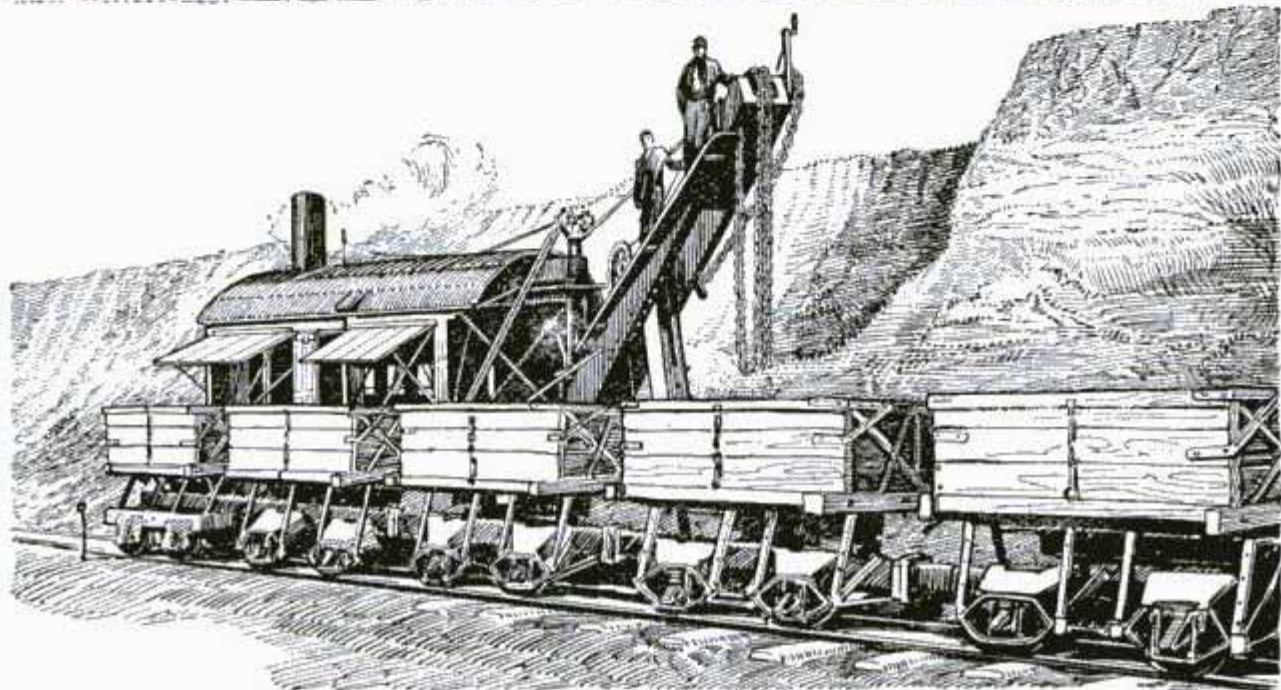
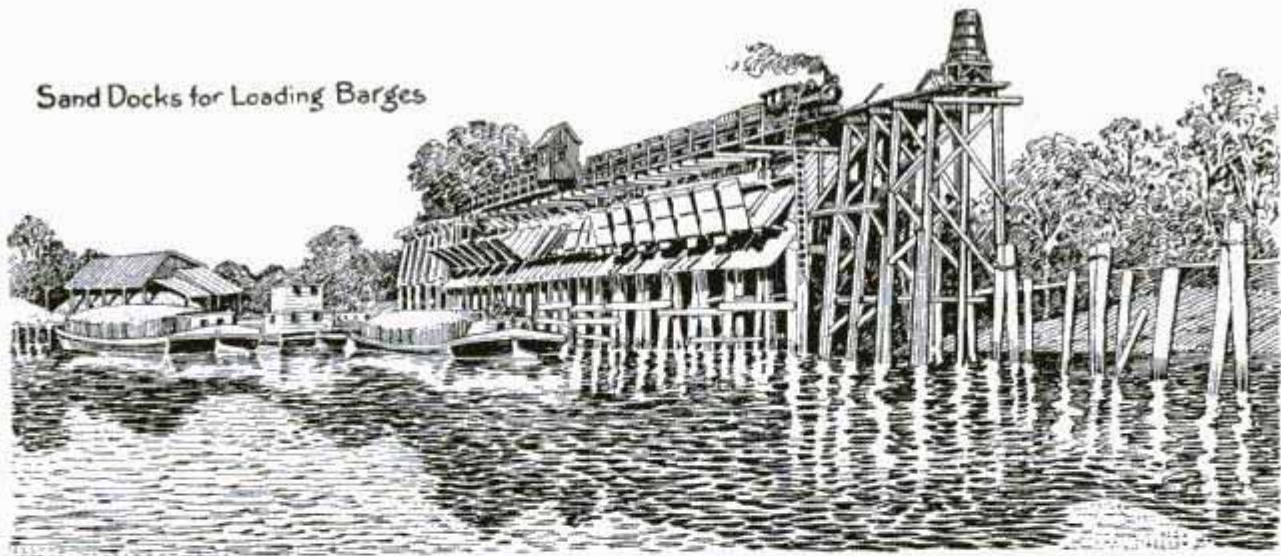
WEALTH STORED IN SAND

Throughout the southern counties of New Jersey great stretches of glass sand are found, affording the material most in demand for the manufacture of flint glass and furnishing a livelihood for thousands of glass workers in both bottle and plate glass factories. To the northward, in Burlington county, chiefly along the banks of the shallow Rancocas river, there are great banks of building sand, with an occasional deposit of the more valuable sand needed in the filtration plants of large cities. A fortunate purchase of a deposit of the latter by a Pennsylvania railroad conductor has enabled him to retire to enjoy the pleasures of auto-



New Type of Farm Tractor

Sand Docks for Loading Barges



Digging the Sand with a Steam Shovel

mobiling, with an occasional ride in a special train over the very rails over which he collected tickets for many years.

Farms around Hainsport that a few years ago were yielding their owners only a meagre living now are amassing fortunes for those wise enough to retain the titles to them. It is an easy matter for the sand to be scooped out by great steam shovels, and run through washeries to remove the decayed vegetable matter before being dumped into scows or railroad cars. It is not unusual for scores of these mines or diggings to ship 16,000 tons of sand in a day, and the mining is carried on by truly scientific methods, borings being made frequently in search of more valuable deposits underlying the surface sand. New diggings are being

continually opened, but the great supply of valuable sand seems almost inexhaustible.

AMMUNITION SUPPLY SHIPS FOR NAVY

If the recommendation to be made by Rear-Admiral Mason, chief of the Bureau of Ordnance, is adopted the United States navy will have two ammunition supply ships, one for the Atlantic and the other for the Pacific. These ships would be virtually floating naval magazines. The necessity for such vessels was clearly shown in the recent cruise of the fleet. It was found difficult to get explosives to the ships through other transportation means than colliers and storeships, which was considered unsatisfactory.

MANUFACTURING SALT WITH BESSEMER PROCESS

It seems a far cry between the manufacture of salt and the manufacture of steel, yet, by a new method, the Bessemer process is now being used for the former as well as the latter. Dirty rock salt is discharged into special furnaces and quickly converted into a molten condition. It is then run into a receiver through which a current of compressed air is forced, causing all the impurities in the molten mass to either be blown away or forced to the bottom of the vessel, leaving an almost transparent liquid. The latter is poured off

of the quarried salt in water, together with its numerous impurities, and the running of this mixture into evaporating pans. Fire beneath the pans evaporates the water, and some of the impurities, leaving the deposit of salt.

NEW YORK'S NEW AUTO FIRE WAGON

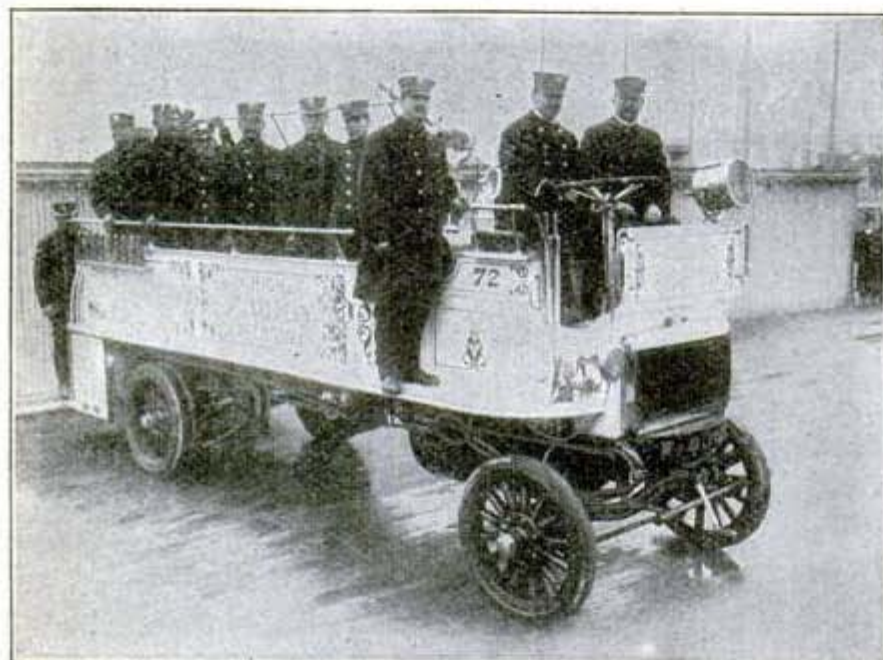
An interesting test was recently made of New York's new automobile fire wagon by linking it with the high pressure service. The test was made at the foot of Gansevoort street, with the fire boat "Thomas Willett" supplying

the pressure through two leads of high-pressure hose. Under a test of 300 lb. pressure the swivel nozzle of the fire wagon threw a powerful stream a distance of 125 ft. at all angles, from directly upright to directly down, and sweeping entirely around the compass.

The apparatus, which was built to order, weighs 5 tons, and is guaranteed to carry a load of 5 tons and run at a speed of 30 miles per hour over city pavements. One of the most interesting features

of the test was the run through the streets, with Fire Chief Croker watching the handling of the wagon from his automobile, which followed. The speed made by the fire wagon down Broadway and Fifth Avenue to 12th Street was 26 miles an hour, its siren warning horn giving it a clear track and drawing crowds to all the cross walks. Twenty firemen were on the wagon during the run.

The trip of the auto fire wagon from the shops at Springfield, Mass., to New York was made overland, the machine being halted a few hours in all the larger towns en route to give demonstrations of its fire-fighting power.



Courtesy Knox Auto Co.

Ready for a Run

in moulds and allowed to cool and solidify, forming a block that can be sold in this condition as rock salt or can be broken up and ground in the various sizes required for domestic use.

Salt thus turned out is not only thoroughly cleansed, but bleached as well. The extent to which the cost of salt manufacture is reduced by the converter is claimed to be great, it being asserted that by the evaporation method a ton of coal yields only 1½ tons of salt, while the new method yields 15 tons of finished salt for each ton of coal used.

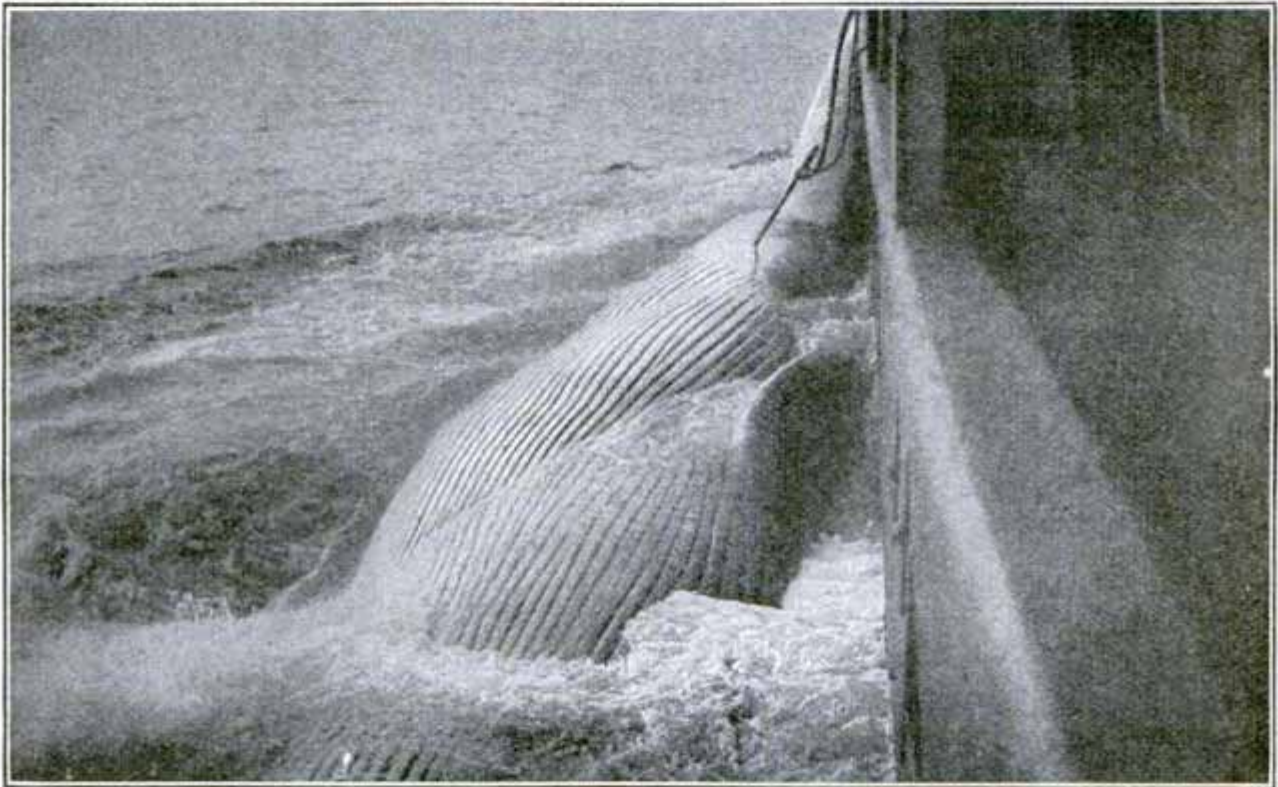
The ordinary process of salt manufacture, and one which has been used for many centuries, is the discharging

WHALING WITH MODERN METHODS

[Condensed from World's Work, London]

Whaling with modern methods in Alaskan waters is an exciting game, especially for those who are new to the business. The modern whaling steamer is a little vessel almost round on the bottom, which enables it to be turned and managed with the greatest ease. Mounted at the bow is a small cannon that shoots a harpoon weighing more

heard, as they blew and went down, leaving a long patch, or "slick" of smooth water where they sank. We stopped over the slick left by the largest of the whales, and lay gently rolling from side to side. Sorenson, the gunner, stood as rigid as a statue behind the harpoon-gun, swinging the muzzle slightly from side to side, ready for



Inflating a Dead Whale with Air

than 100 lb., and having an explosive head, called the "bomb." If the shot is a good one and the harpoon is planted squarely behind the fin, the bomb crashes into the lungs, killing instantly; if not, the struggle may last for several hours.

The description of the capture of a "finback" whale is given in an interesting manner by Roy Chapman Andrews in *The World's Work*, London. Mr. Andrews was hunting whales with a camera.

"The first whales we sighted were only two miles away, and soon we were so close that the loud, whistling "who-oo" of the spouts could be plainly

instant action. Fifteen minutes had passed, when, way off on the starboard quarter, rose four spouts of white vapor almost together. The steamer was got under way and swung in a long circle, but the whales were down before we reached them. The vessel again stopped on the slick where they disappeared and again began the tense strain of waiting. Six minutes passed and then in four emerald-green patches only 20 ft. away the water began to boil. The gunner, half stooping, swung the heavy gun about and sighted along the barrel at a great purplish body, arching itself for the dive. Just as the fin came into view he pressed the



The Modern Harpoon Gun

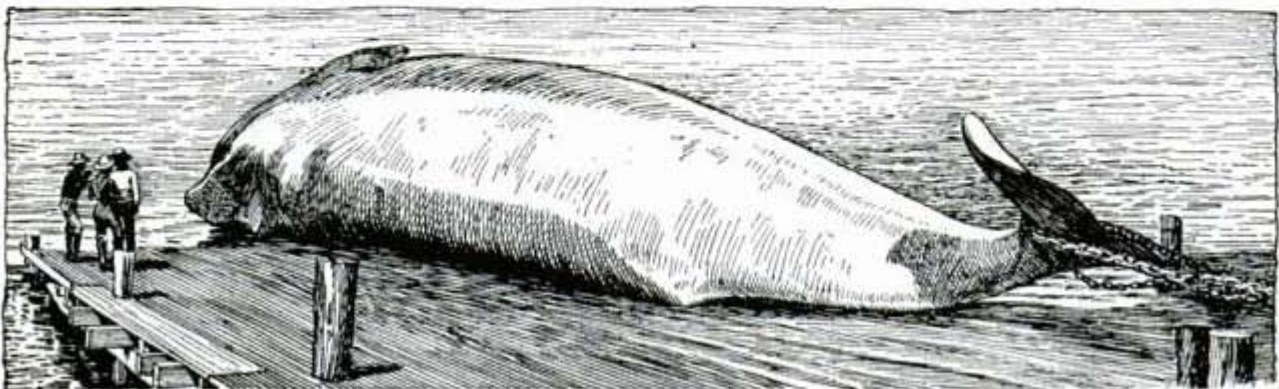
trigger, the explosion shaking the little vessel from stem to stern. The whale sank in a swirl of green water, and an instant later we heard the muffled report of the bomb. The taut line hanging straight down from the bow told that the huge animal was dead with never a fight for life.

"Then began the work of bringing the whale to the surface and blowing it up so that it would float. Taking a hitch about a convenient post, the rope was slacked and run through a pulley-block at the mast-head to relieve the strain of raising the great body. The winch was set in motion and for 15 minutes nothing was heard save the monotonous grind as fathom after fathom of line was wound in. When the body was brought alongside the lobes of the flukes were cut off and lifted to the deck. Then a long coil of small rubber hose, one end of which

was attached to a pump and the other to a hollow, spear-pointed tube of steel with perforations along its entire length, was brought into play. The spear was jabbed well down into the whale's side, the air pump was started, and the body slowly filled with air. When inflated sufficiently to keep it afloat, the tube was withdrawn, the incision plugged with oakum, and the chains cast off. A buoy with a flag was then attached to the carcass, and the whole set adrift to be picked up at the end of the day's hunting."

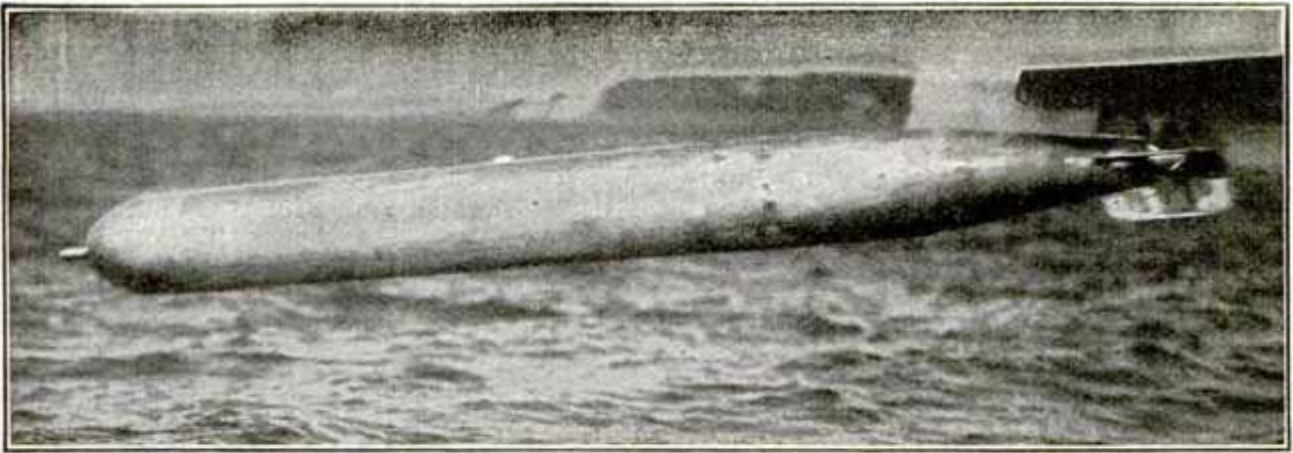
The whaling station is a group of buildings, situated in a bay or cove near enough to the feeding grounds to allow the steamer to come in each night with the day's catch. The whales are anchored at a buoy in front of a long, inclined platform, upon which they are drawn tail first by means of a steam winch.

The saying that every part of the pig but the squeal is now of market value is also a fact with the whale. Not a particle of the animal is wasted. After the skeleton is stripped of flesh it is disarticulated and the bones chopped in pieces. The blubber is "tried out" for oil, and the meat and bones are boiled for the same purpose. Later the flesh is artificially dried and sifted, making a fine guano, and the bones are ground up for fertilizer. Even the blood is boiled and dried with the flesh, and the water in which the blubber has been tried out makes excellent glue. The fins and tail, after being sliced into thin strips, are salted and barrelled and shipped to Japan as an article of food.



Drawn Up on the Slip Tail First

Courtesy World's Work, London



NEW U. S. TURBINE TORPEDO

This illustration shows a deadly torpedo starting on its mission of destruction. It is one of the new 21-in. turbine torpedoes of the U. S. navy, and has just been fired out of the tube of the "Morris" at Newport, R. I. The range of this torpedo, which is sometimes called an "automobile turbine torpedo," is 5,000 yd., nearly three miles. The cost of the new torpedo is \$5,000, and it will be made at the new government factory at Newport.

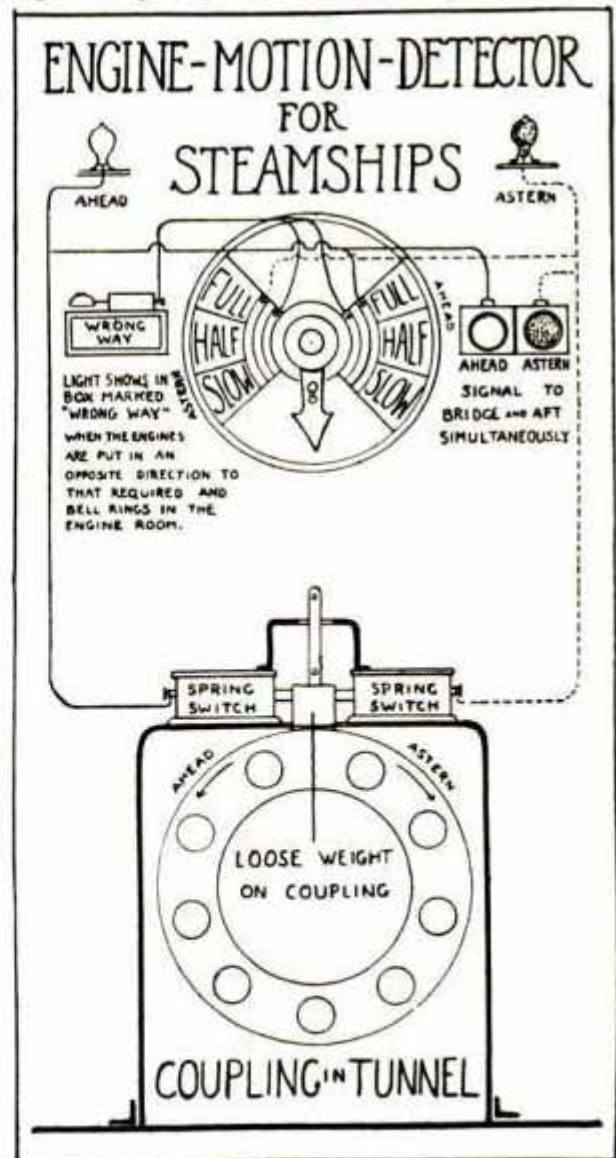
ENGINE-MOTION-DETECTOR FOR STEAMSHIPS

Many accidents at sea have been traced directly to wrong interpretation of orders issued from the bridge to the engine room, a cause of trouble which is claimed to be almost impossible if the ship is equipped with the new device here shown.

The general arrangement and operation of the device can be readily seen in the illustration. It consists of a switch at either side of a weight resting on the coupling of the tunnel shafting. The shaft, in revolving, tends to throw the weight sideways, this movement putting into operation a switch which lights an electric lamp. When the shaft ceases to revolve, a spring pushes the weight back into place and the light goes out, and if the shaft is revolved in the opposite direction the weight swings in that direction, thus lighting another lamp, or series of lamps. It is obvious that if one lamp,

or series of lamps, is red and the other white, only one series of which can be alight at once, that the direction in which the shaft is revolving can be at once detected in any part of the ship where a signal lamp is installed.

With such a device, the navigator of a ship, in giving an order to the engine room, can at once detect any irregularity in its execution, and will



Courtesy of "Marine Engineer"

have time to warn the engineer that he is not obeying the order before any damage is done, whereas at present he has to wait and watch the result of his order in the movement of the ship.

In one system recently installed, not only do the signals on the bridge tell the captain whether or not his order to the engineer has been properly executed, but another set of signals arranged directly in front of the place occupied by the engineer who is working the engines tells him automatically if he has made a mistake. If the order indicated on the board is "go ahead" and he puts the engines astern, a large notice, "wrong way" is illuminated and a bell rings furiously.

SHINGLES FROM A TREE 1,100 YEARS OLD

A lumber company at Buckley, Wash., recently sent out a number of



A Tree 1,100 Years Old

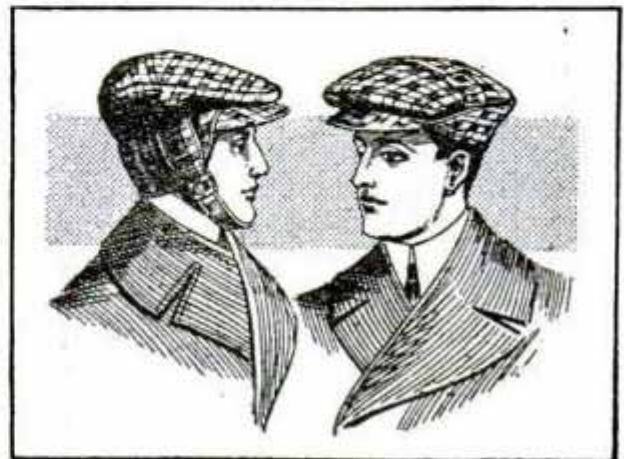
souvenir shingles that were cut from a tree 1,100 years old. Scattered through the forests of Washington are gigantic cedar trees that fell untold ages ago and have laid buried in moss and decaying vegetation for generations. The moss upon these fallen monarchs has provided lodgment for seeds of other trees, and they have sprouted, taken root and grown.

The tree from which the shingles were cut is the one on which the dog is standing. Many people, without

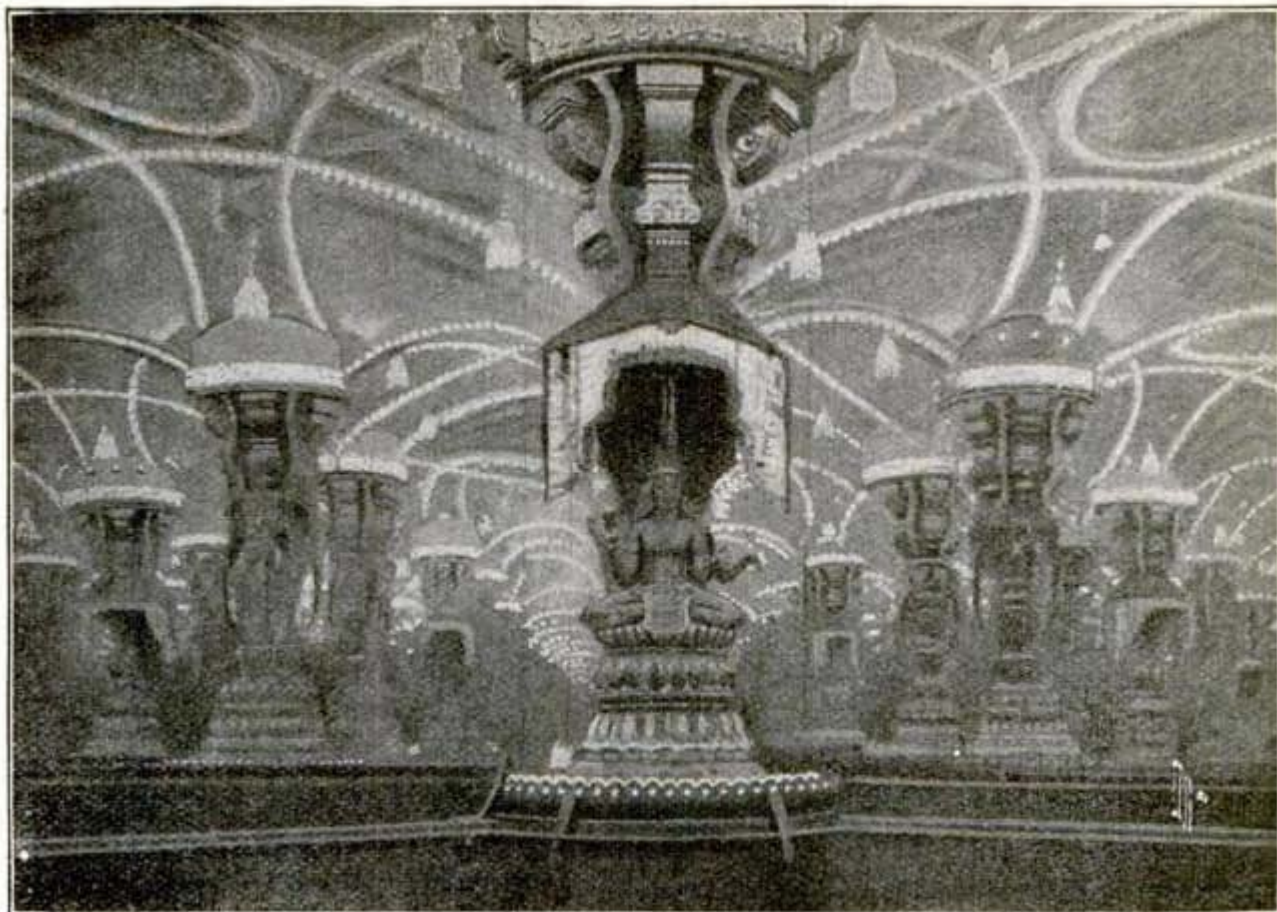
stopping to think, would say that the huge stump in which the tree is lying was part of a much more ancient tree, but they are mistaken by at least 350 years. The prostrate trunk has 350 rings, which fact denotes that it was 350 years old when it fell. The stump of the tree which grew over it has 750 rings, and as this could not have started to grow until some time after the first fell, it is practically certain that it was thriving in A. D. 800, which was 700 years before the discovery of America, and 300 years before William the Conqueror was crowned King of England. This tree grew, fell, and was lying covered with moss during the time of the third crusade, and nearly 300 years before the burning of Joan of Arc.—Contributed by W. R. Dickson.

BOTTLE FLOATED 33 YEARS

Bottles containing messages thrown overboard from vessels have been picked up after drifting about for long periods, but in all probability the bottle picked up last summer at a point in the Atlantic three miles south of Monomy Point, Mass., holds all records. The paper within the bottle stated that it had been thrown overboard from the ship "Hattie E. Tapley" April 13, 1874, a little to the eastward of the Cape of Good Hope. Capt. George H. Tapley, in command of the ship at that time, recently stated that when the bottle was thrown overboard the ship was on her way from Bassin, India, to Falmouth, England.



English Motoring Caps



The Reflectors Apparently Increase the 1800 Lights to 64,800

SALT WATER AS A WEED-KILLER

The Oregon Short Line railroad has been using salt water for ridding its roadbed of weeds, a process which is very inexpensive for that company because of its exceptional facilities for getting the brine. The water of the Great Salt Lake is approximately 22 per cent salt, and it is only necessary to pump this water into tank cars and haul them over the line to accomplish the task. The roadbed is sprinkled in the ordinary manner, with the train moving at a fair speed. The salt water kills the grass and weeds in a satisfactory manner.

THE PALACE OF MIRAGES

The designer of the Palace of Illusions, which was one of the novelties of Paris a few years back, has devised a new place of amusement called the Palace of Mirages. It is composed of a room of six sides and six angles, the

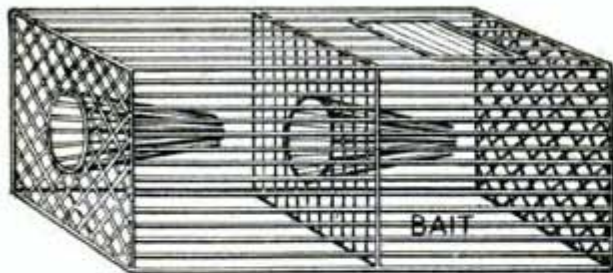
walls of which are formed of glass. Six glass columns are also in the room. The first reflection of the glass produces six more rooms, the second 12 rooms, and the third 18 rooms. The spectator standing in the center of the real room sees 36 rooms, and outside these great direct perspectives the geometrical disposition of the six columns open to the gaze as many as 18 long avenues in all directions.

When this real room, with its many other rooms, is illuminated with the 2,500 diversely colored electric lamps provided, 1800 of which can be used at the same time, the exhibition is remarkably interesting. The illumination thus gained in the room by the three reflections is equal to that produced by 36 times 1,800, or 64,800 lamps.

CANADIAN LOBSTER TRAPS

During the closed season the Canadian fisheries in the vicinity of Nova Scotia make their own lobster traps. Each man has his own idea of what

kind of trap is best, and not infrequently a family or a community has its own particular style. In general,

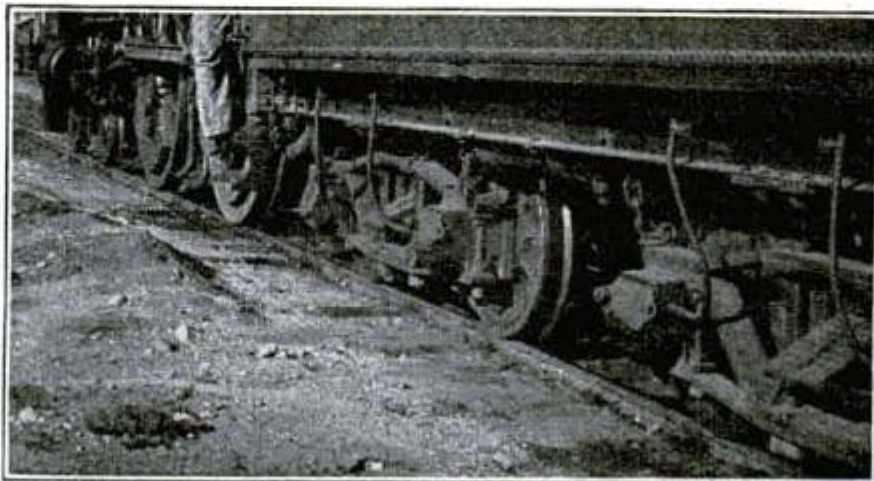


Lobster Trap Used in Nova Scotia

however, the traps are of three main kinds, the one most common in use being a plain rectangular box. The frame is made of 2 by 1½-in. lumber, covered by narrow spruce lath, laid lengthwise. The average trap is 4 ft. long, 2 ft. wide, and 18 in. high. At one end of the trap is an entrance hole about 7 in. in diameter, to which is attached a funnel-shaped, woven-rope bag, open at both ends. In the middle partition is a similar opening which extends into the compartment known as the "bedroom." It is in this compartment that the bait is placed and in which the lobsters are imprisoned until taken out by the fishermen. Fastened to one of the lower corners of the trap is a line made fast to a buoy, which is usually a log about 2 ft. long, hewn to a point at one end. When this buoy is nearly out of sight the fisherman knows that the trap is full.

A CURE FOR HOT BOXES

The axle boxes on this tender are connected with a water pipe by a short hose, and when a hot box is materializing the opening of a valve allows cold water to play upon it. The device is not new, but it is quite probable that many people have passed it by without seeing or at least without knowing its purpose. The locomotive is No. 8 on the Salt Lake railway.



Hot Boxes Cooled Automatically

WOMAN PAINTS GREAT SIGN HIGH IN AIR

As the result of an election bet, which she lost, Miss Florence Sands, a Detroit artist, painted the advertisement of a haberdasher on a great sign-board 120 ft. above the street. Straps and a couple of uprights made fast to the scaffolding afforded the young woman protection from falling. The



Courtesy Signs of the Times

Painting 120 Ft. Above Street

sign faces the busy square in the center of Detroit's business district, and thousands watched her work.

King Alphonse of Spain is interested in Maxim's invention for silencing the report of a rifle.



MOUNT BLANCO THE LARGEST BORATE DEPOSIT IN THE WORLD

By R. E. Rinehart, Prescott, Arizona

Since the discovery of borate deposits in Asia Minor, California Colemanite, or borax, has a formidable rival for the supremacy of the world's borax supply. But whether or not these European fields have as great a store of borate deposits as those yet untouched in the barren hills of Death Valley, it is doubtful if any single deposit will be found that can compare in size and quality with that contained in the formation of Mount Blanco.

With the exception of the Grand Canon, there is probably no more famous locality in the west than Death Valley, known as the "Vale below the sea," and, although there are a number of Mount Blancos in the great American desert, the Mount Blanco of Death Valley is the greatest of its name. It rises like an enormous white breast against the terra cotta ridge of Funeral Range, close to Furnace Creek Canon, a great rent that cleaves the east rampart of Death Valley. Around it is a rolling waste of bald yellow hills, none of which are mere knolls, and it towers a good 1,000 ft. above them. The low land of Death Valley, sinking for several miles westward, is probably 2,500 ft. lower.

No one ledge or series of ledges anywhere in the world contains the immense amount of borate quartz shown on the surface of this mountain of Colemanite. It is a body of ore measuring 1,000 ft. in width and 5,000 ft. in length, pitching into the mountain range at a 33-deg. angle. It is a borax quarry whose limitations cannot be even roughly conjectured, but it must exceed by thousands of tons any known borate deposit.

Death Valley is a region of whimsical contrarities and Mount Blanco has not broken away from the nature of the place. By a capricious coincidence this largest of Colemanite deposits was the first Colemanite found, and as yet it is untouched. Previous to its discovery, American borax was all obtained from ulexite, a borate of sodium and calcium found on California and Nevada desert marshes, generally in the form known as "cotton-balls."

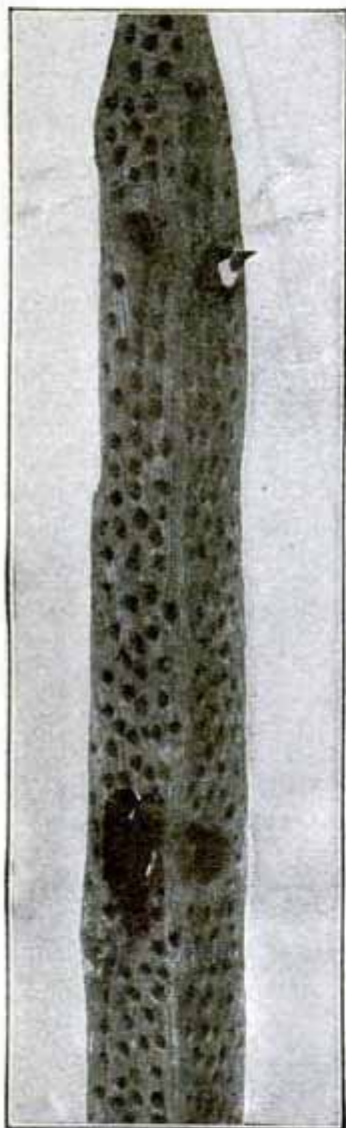
It was during the harvesting of borax from the Death Valley sump that Mount Blanco was discovered. Philander Lee, better known around Death Valley as "Cub" Lee, was the prospector who found borax in the mountain, and

added Colemanite to mineralogy. The discovery was made in 1881, when Lee was rambling about the hills as a retainer of W. T. Coleman, the proprietor of a borax works. Lee sold the claim to Coleman for \$4,000, and thus the ore received the name of Colemanite.

Great, however, as was the supply of borax contained in Mount Blanco, it was destined to lie idle. Deposits elsewhere were found, notably a large ledge near Daggett, Cal., where it was more accessible. This took operations away from Death Valley. Present indications point to the opening of borax operations in Death Valley on an extensive scale within the near future.

WOODPECKER HOLES IN TELEGRAPH POLE

A most interesting study of the industry of woodpeckers is shown in this illustration of a section of a telegraph pole



which stood beside the track of one of the great trans-continental railroads of this country. The large holes are entrances to the nests or homes of the birds, and the thousands of smaller ones were made in the search for bugs, and as convenient and safe places for the storage of such bird foodstuffs as acorns.

STEERAGE PASSENGER DEFINED

In the bill restricting the trans-Atlantic steerage traffic, which became effective on January 1, the expression "steerage passenger" is considered to mean all passengers except cabin passengers, and persons shall not be deemed cabin passengers unless the space allotted to their exclusive use

is in the proportion of at least 36 clear superficial feet to each passenger.

SIGNAL FIRES OF THE AUSTRIAN FRONTIER

Every fortified position in Bosnia-Herzegovina is provided with a "rauchkugelnofen," which means literally a smoke-ball oven. This signal device has proved of great service in cases of raids made by natives on the Austrian garrisons, and would be brought into play if the threatened hostilities in the Balkans should materialize. The oven is of stone and in it is an iron grating upon which the smoke-ball rests. The ball is composed of pine wood, shavings



Signaling for Help

and other inflammable material. Before it is set on fire it is dipped in a certain solution and sprayed with saltpeter and sulphur. Each ball weighs a little over 50 lb., and burns for an hour. The dense column of smoke can be seen for miles around, both in the daytime and at night, being lit up by the glare of the fire below when it is dark. On noting the signal the nearest posts send half their garrisons to the aid of the post signaling.

DUMMY DRILL GUN ON U. S. S. "CONNECTICUT"

Naval officers report that the astonishing and record-breaking performances in the rapid firing of the big guns at target shooting during the cruise of the "Battle Fleet" around the world, was mainly due to the constant drill carried on daily with the dummy loading apparatus. The dummy drill gun here shown is on the U. S. S. "Connecticut." It is made of brass, and the breech is a facsimile of the real guns on board, having all the mechanisms, etc.

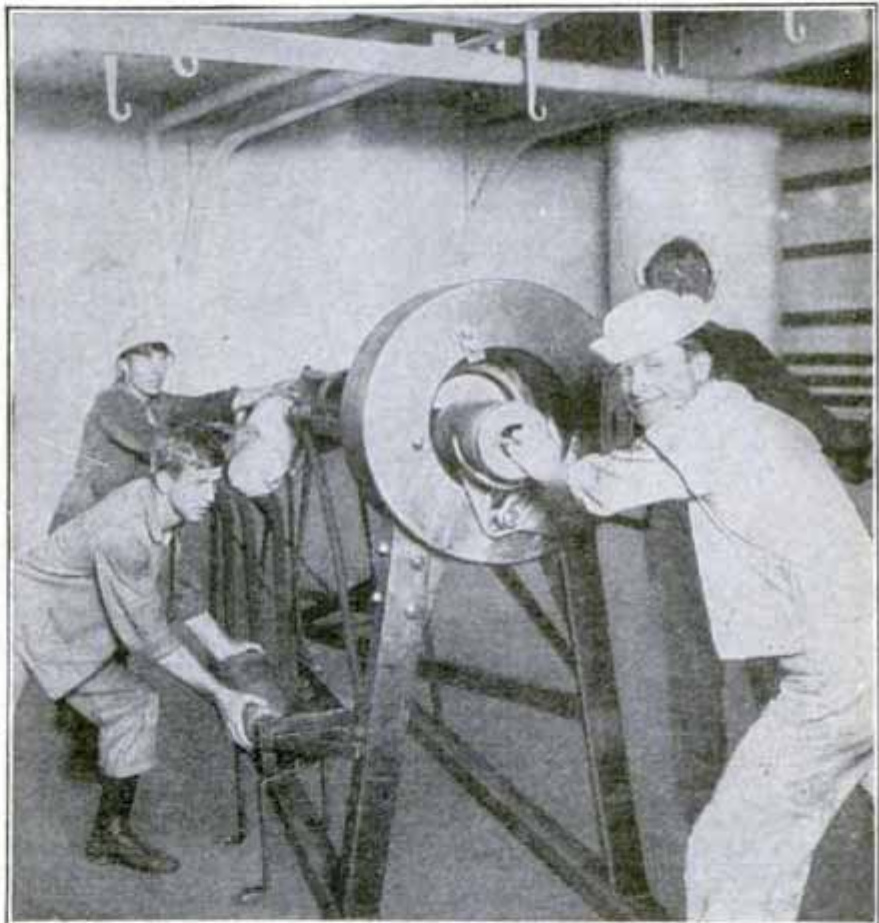
In practicing, the gunners grab up the heavy shell and the dummy charge of powder and shove them down the trough-like chamber. The closing of the breech block completes the operation. The shell and the powder bag are slid down a gravity chute at the end and are immediately used over again.

The smile on the face of the "Jackie" shoving the shell into the breech seems to signify that the gunners enjoy the practice, but it may be that it is because he is facing the camera. Facing the guns of an enemy might also bring

forth a smile, but it would undoubtedly be of a sterner nature.

MODEL OF WONDERFUL CONCRETE HOUSE

The model of the new ideal sanitary concrete workman's home, awarded the gold medal at the International Tuberculosis Congress recently held in Washington, D. C., is shown in this illustration. The entire building, with the exception of the tile decoration of the roof and the cast-iron window frames is of concrete, cast in forms. It



was designed by a Washington architect, and can be built for \$1,200.

The great feature of the house is the extraordinary arrangement for perfect sanitation. To clean the rooms a hose is turned on the walls and floors and the water is drained off by tiled spouts discharging on the lawn outside. There is no handling of coal or ashes, no shelter for vermin or insects, and waste heat from the cooking range warms the house. Coal is hoisted by chain block,



Sanitary Concrete House for \$1,200

dumped through a coal hole in the roof, and fed automatically into the stove. Ashes drop from the firebox into a can and are then removed from the outside. Garbage is disposed of in a cast-iron chamber in the smoke flue, where waste is dried, then dumped by use of a damper into the firebox. A roof-garden furnishes outdoor sleeping apartments.

A block of these houses is now being built in Washington.

TILTING A BRIDGE INTO PLACE

One of the greatest problems met with in building a railroad line in Yunnan, the extreme southwest province of China, was the bridging of the deep gorge here shown. On both sides

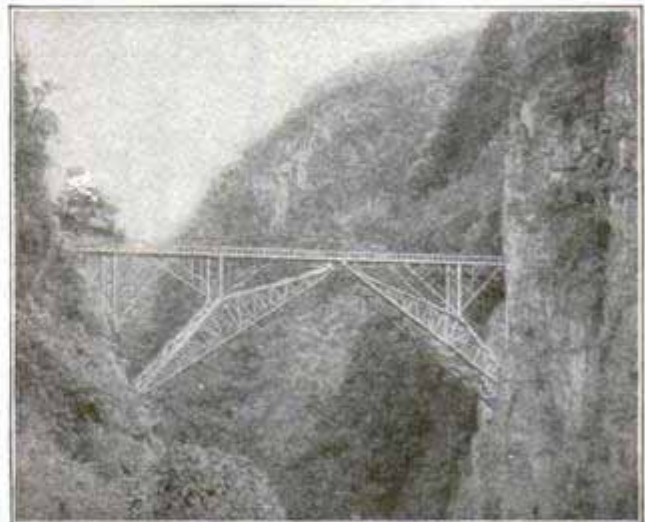
the line strikes the ravine through tunnels, and the space which had to be bridged was 500 ft. wide. The task was accomplished by French engineers in a manner absolutely original as well as novel. The truss was made in two parts, one on each side of the chasm, and then these legs were tilted over until the outer ends came snugly together. The method is clearly shown in the illustrations.

WASHING AWAY PART OF SEATTLE

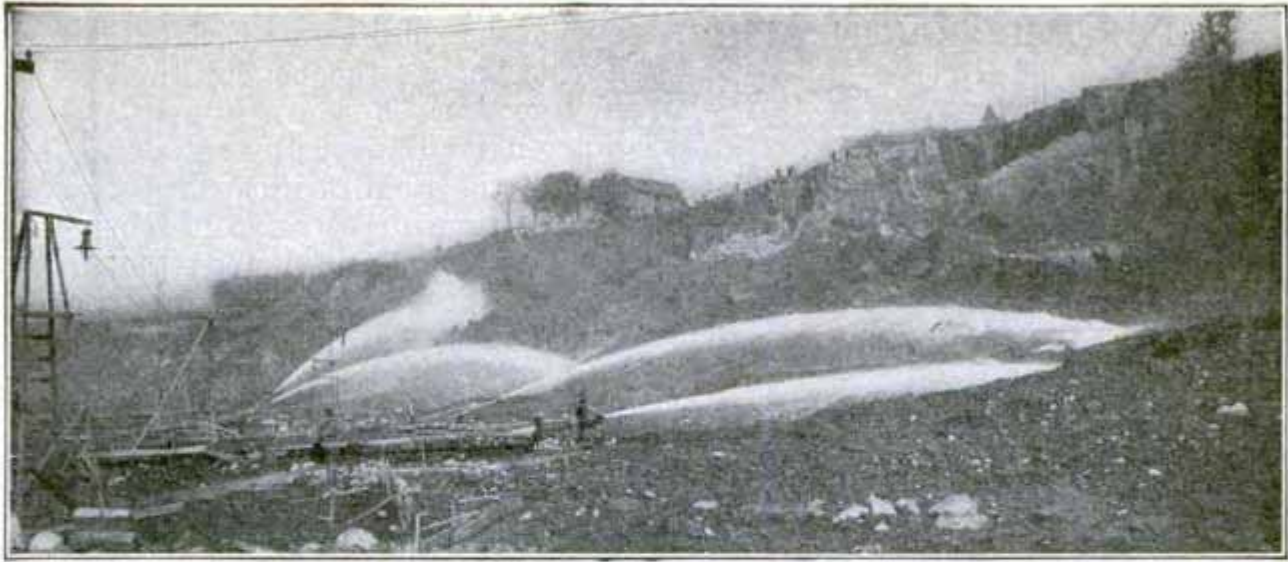
The work of washing away huge hills, some 75 ft. high, in the center of Seattle, Wash., described in the December issue of this magazine, is now more than half completed. The work is extraordinary in many ways, embodying many features that make it undoubtedly one of the greatest and most interesting regrading projects ever attempted in any part of the world, and the first instance in which hydraulic mining methods have been adopted for such a colossal task.

The work involves the leveling of a great hill which contains 374 city blocks, more or less built up. Hundreds of houses had to be moved out of the regrade district, schools, churches and business buildings had to be torn down or remodeled, and pavements, sewers and water mains were torn up.

Already the powerful streams of water, shown in the illustration, have



Bridging a Gorge in China



City Excavation by Hydraulic Methods

leveled more than 250 blocks of the 374, and when the great task is at last completed more than 10,000,000 cu. yd. of earth will have been sluiced away. It is estimated that the cost of the work will be close to \$1,400,000.

The water forced out of the hydraulic giants not only tears the earth away, but carries it through a specially built tunnel extending from the hill to a point near the bay. This tunnel empties into an elevated flume or sluice box which runs above the railroad tracks to the marsh district along the bay. In this way the hill properties are greatly enhanced in value, at the same time making valuable lands of former marshes.

U. S. NAVY HAS MOST POWERFUL SEARCHLIGHT

The flagship "Connecticut," of the United States navy, is now equipped with the most powerful searchlight in the world. It has a strength of 180,000,000 candlepower, which, for the sake of comparison, is 179,998,000 candlepower more powerful than the ordinary street arc lamp. The great mirror is 5 ft. in diameter, and was made for the government in Germany. The searchlight will throw such an immense beam of light that it will be able to detect a submarine or torpedo boat at a distance of 10 miles. Searchlights of the same great power are to be in-

stalled on the new American "Dreadnoughts." Their cost is about \$5,000 each.

With a number of such searchlights mounted on the tops of a city's skyscrapers, bombardment from aerial craft would be made rather difficult.



Will Throw Beam of Light 10 Miles

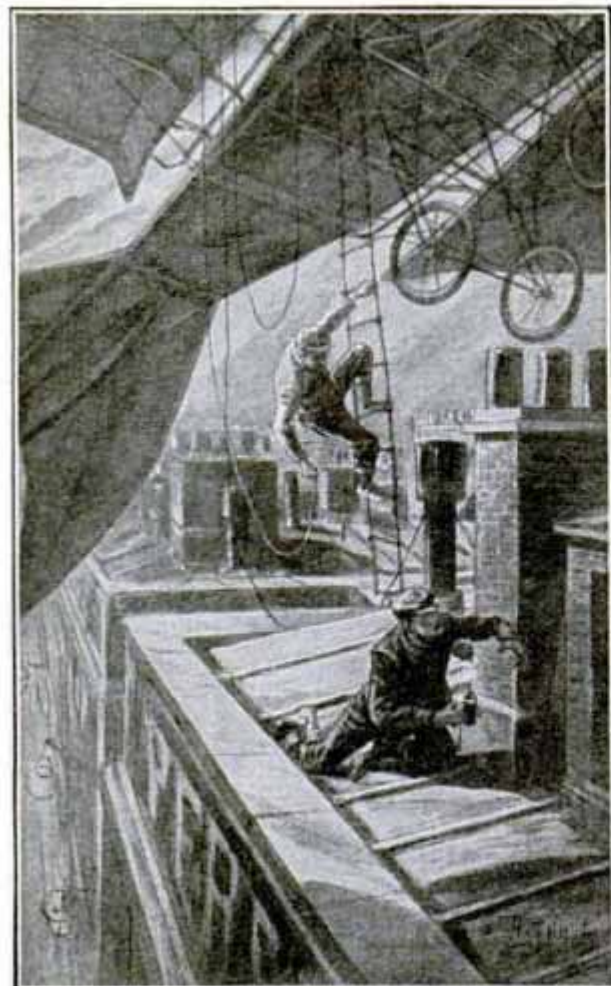
The illustration shows the new searchlight with a smaller one, for ordinary use, beside it.

Contracts have been let for \$7,000,000 of electrical installation on Japanese railroads.

TWO POSSIBILITIES IN AERIAL FLIGHT



Aerial Rescue Work



Courtesy the Sphere

Aerial Pirates

The possibilities of aerial flight are great, but all the possibilities are not for good, as is shown by one of these imaginary drawings by one of the artists of the English illustrated weeklies. It depicts a night scene in which burglars have descended upon the roof of a house from the air to rob it of its valuables. The other imaginary drawing shows the possibility of rescuing lost mountaineers on the peaks of the Alps.

UNIQUE IDEA OF CHRISTENING A BUILDING

The unique idea of starting a building out on its career with a formal christening, as is the fashion in launching ships, is claimed to have originated with Mrs. C. E. Atkinson, the owner of a new apartment building in Chicago. Two little granddaughters, each eight years of age, took the principal part in the christening. "Good luck to this building. I name thee 'The Atkinson,'" exclaimed one of them as both dashed a bottle of champagne against the building.

SIGNBOARDS FOR AIRSHIPS

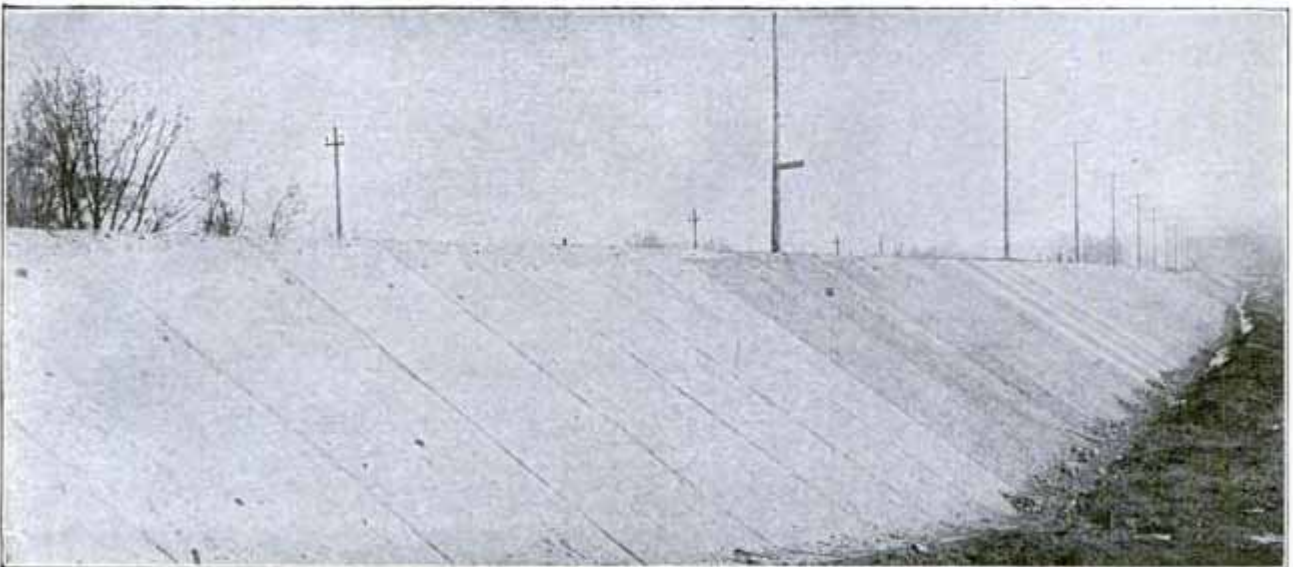
Now that it is practically certain that dirigible airships flying above German soil will be numerous enough within the next few years to make some means of signaling necessary, Major von Frankenberg, president of the German Aero Club, advises that huge signboards shall be placed on the roofs of church towers and high buildings, with a certain code of signals, visible from airships aloft, inscribed upon them. He also suggests that the frontiers of the different European countries shall be marked by the same method, and that at night the signs shall be illuminated in such way as to make them visible. Aeronauts would carry a signal code-book, enabling them to decipher the meaning of the signals. The club is now conducting experiments to test the value of such signals.

CONCRETE DYKE TO PROTECT ROAD

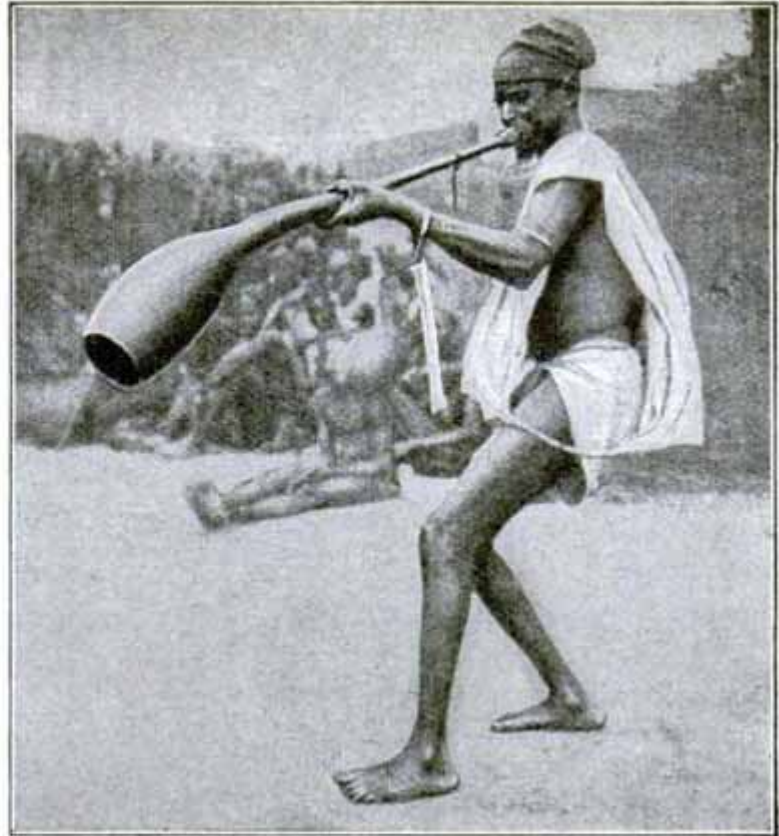
To prevent the Ohio river, during a flood stage, from sweeping away a road-bed and to protect farm-lands, the city of Cincinnati is spending over \$100,000 in building a concrete dyking along the sides of the roadway. The big dyke will be over a mile long when

completed and represents one of the largest pieces of concrete work ever done in that vicinity. The concreting slopes at an angle of 45 degrees and varies in height from 15 to 35 ft.

Illustrations show a section of the completed work and a scene at the lay-



Laying the Slope—Section of Finished Work



Musical Instruments that Torture the Civilized Ear

ing of the concrete on the sloping sides of the roadway. The concrete is laid in strips 6 ft. wide so that the men can work the surface conveniently. When one set of strips is sufficiently hard to bear the weight of the men, the intervening spaces are filled in.

INDIAN WOMEN RUN FERRY 80 YEARS

Two Indian women, known as "Sal" and "Cynthia," members of the camp at Ehrenberg, Ariz., lay claim to the distinction of being the oldest ferry proprietresses on the face of the globe. They are twins, 101 years old, and since the time of the presidency of Andrew Jackson, 1829, have eked out a daily existence pulling the oars of a flat-bottomed, home-made scow on the Colorado river. The legends of the tribe have it that the two women first established the ferry at the request of a chieftain of the Mojaves, the tribe that once ruled on the reaches of the Colorado.

A Baltimore church has a big electric "Welcome" sign over its main entrance.

AFRICAN MUSICAL INSTRUMENTS

The music made by the African tribes is a curious conglomeration of sounds, usually repellent to civilized ears, and the instruments from which the music is blown, strummed, or pounded forth, are unique. The harp shown in the illustration is one of the chief musical instruments of the Bayas, and gives sounds that are very hoarse but carry a great distance. The trumpet made of a gourd has a tone that is more ear-splitting and aggravating than the honk of an automobile horn.

LONDON REGULATIONS FOR TAXICABS

Two new police regulations concerning the operation of taxicabs have been put into effect in London. The first of these makes it compulsory to have a lamp fitted near the taximeter, so that the passenger may read the dial at night, and the second ordains that the taximeter must be driven by the front wheel of the cab. It is assumed

that the object of the latter regulation is to prevent the distance skidded by the rear wheels being registered by the meter.



THE "FLATIRON" BUILDING OF THE WEST

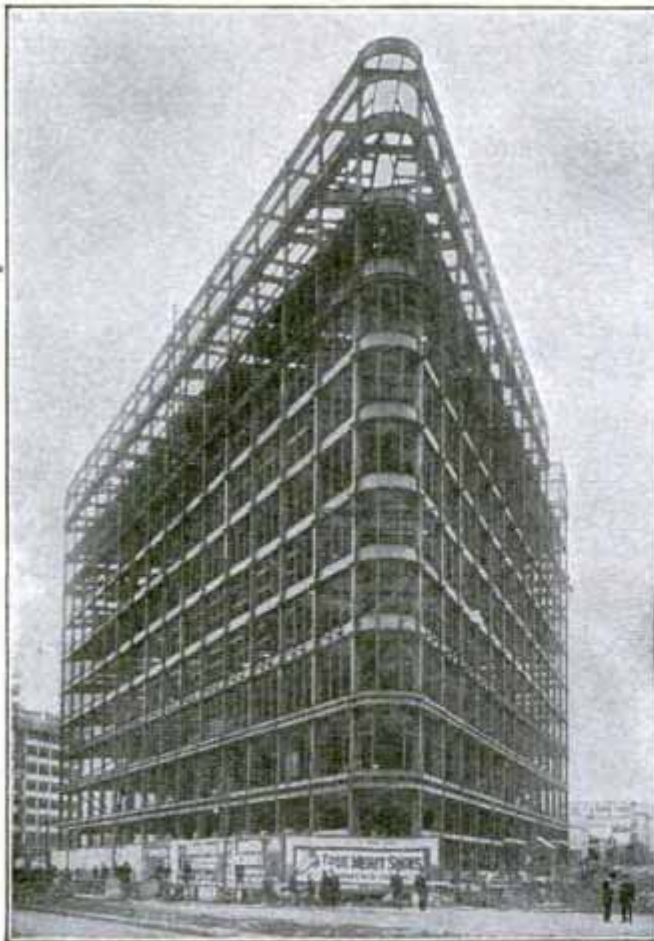
One of the greatest single features of San Francisco's rehabilitation is the new building at Market and O'Farrell streets, known as "the Flatiron Building of the Pacific Coast." The total cost of the structure, including the purchase price of the land on which it stands, was nearly \$3,000,000, and it is claimed to be one of the most solidly constructed buildings in the world. In building the heavy steel skeleton more than 6,200 tons of structural steel was used, 1,300 tons of which is imbedded below the basement floor in massive piers of concrete.

According to the specifications, the building is not only fireproof, but earthquake-proof. The exterior work is terra cotta.

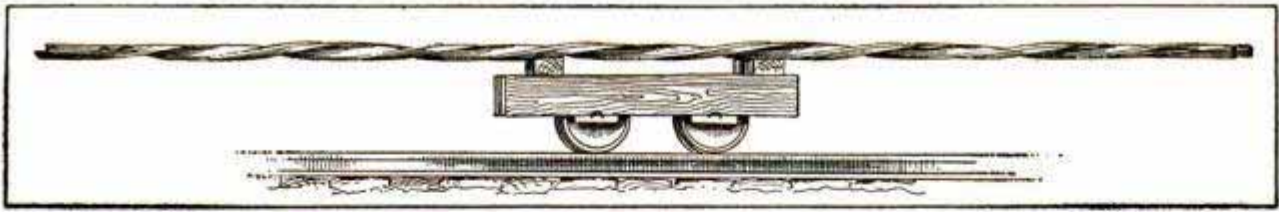
GREAT WATER PROJECT IN BRAZIL

A project now before the Brazil congress, devised to open up and improve river navigation, aims also at the agricultural irrigation of parched lands, the reclaiming of swamps, the preventing of inundations by the regulation of the water courses, and the utilization of water for power. The financial and economic aspects of the proposition are rather interesting.

A company is to be formed to carry out the work for the government, and for all services rendered to those who make use of the canals and bridges, or whose lands are benefited by the regulating of the water supply, this company will collect rates established by law. The Brazilian government will only have the right to order the execution of works where they are sure to prove remunerative, or, in other words, where the influence of such work upon local agriculture will be such as to enable the owners of the land to pay the



San Francisco's "Flatiron" Building in Course of Construction and Completed



Rolled Manganese Steel Rail Twisted Cold

rates. The company will undoubtedly acquire large tracts of land in the territory to be benefited, and the resale of these lands after the improvements are made will be a great item of profit to the company.

STEEL RAILS THAT CAN BE TWISTED

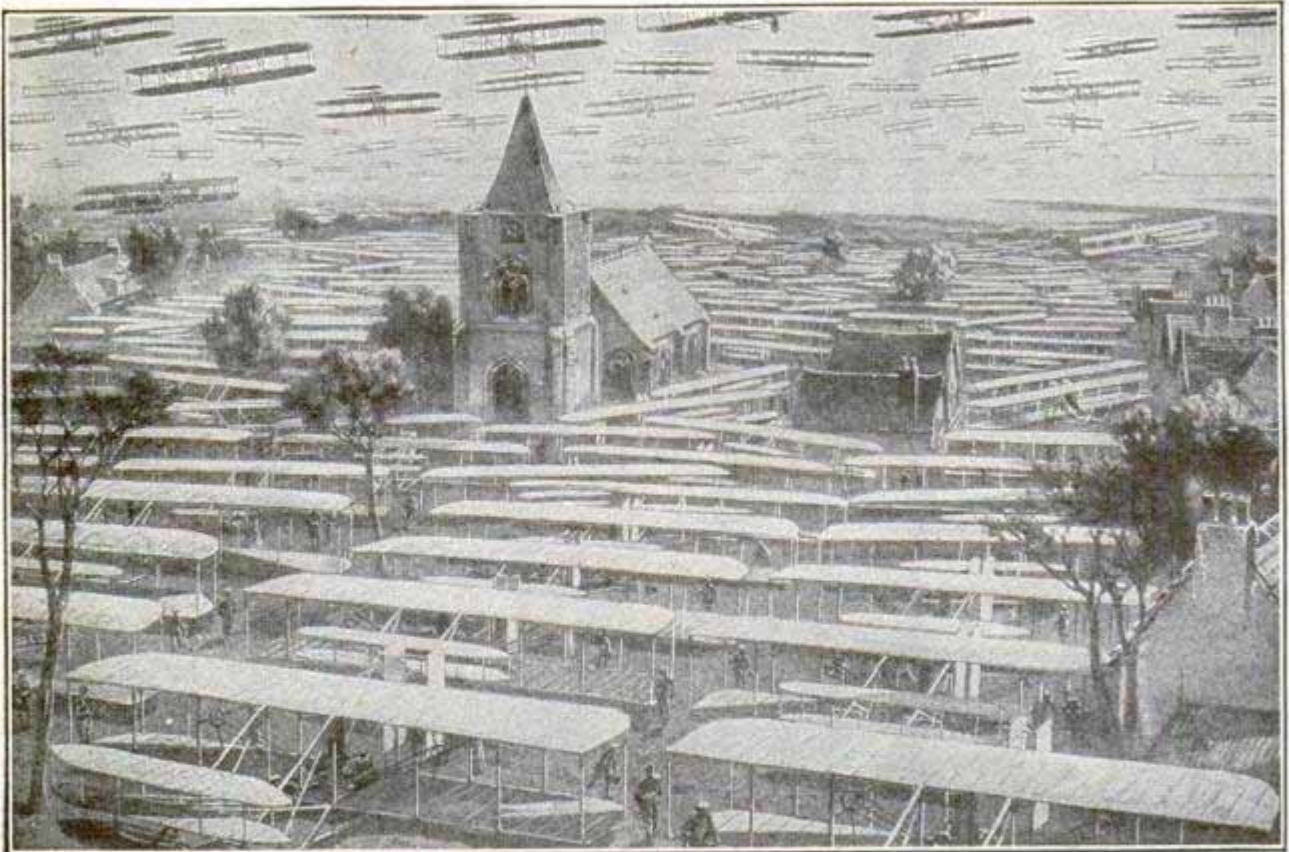
A steel company in Hillburn, N. Y., rolls a manganese steel rail that can be bent, twisted, and distorted cold without breaking or developing cracks. It has a high elastic limit with an ultimate strength of about 140,000 lb., and is so hard and tough that its life is claimed to be extraordinary. The manganese steel rail cannot be drilled or machined commercially, yet the rail can be cut to any length by a friction

saw and holes punched and drifted accurately for joint bolts and bonding.

AEROPLANES TO TAKE PLACE OF CAVALRY

The flying-machine, according to Wilbur Wright in an interview with the representative of an English magazine, is in the main a military proposition. Pleasure or sport as an incentive will abound to a certain extent, but only in a limited degree, and commercialism, other than in the manufacture and sale of flying-machines, will be still more limited.

"The future I see for the flying-machine," said Wright, "is with armies. Every army will have not one, but hundreds of them, carrying three or four men and ammunition, and capable of keeping the enemy continually

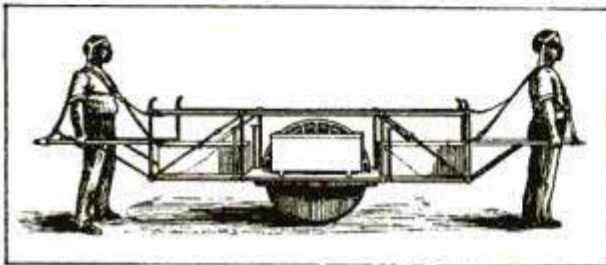


"Every Army Will Have Hundreds of Them"

harassed. Naturally, these machines will take the place of cavalry, and will be very much more effective than that branch of military service now is." The London Illustrated News portrays its conception of Wright's prediction in the illustration of such a fleet.

THE DOUBLE-END WHEELBARROW OF AFRICA

This curious vehicle is used in the French colonies of Africa for transportation, often carrying the supplies of parties on long distance trips. The one large wheel in the center has a wide wooden rim, covered with leather. The body, the framework of which is

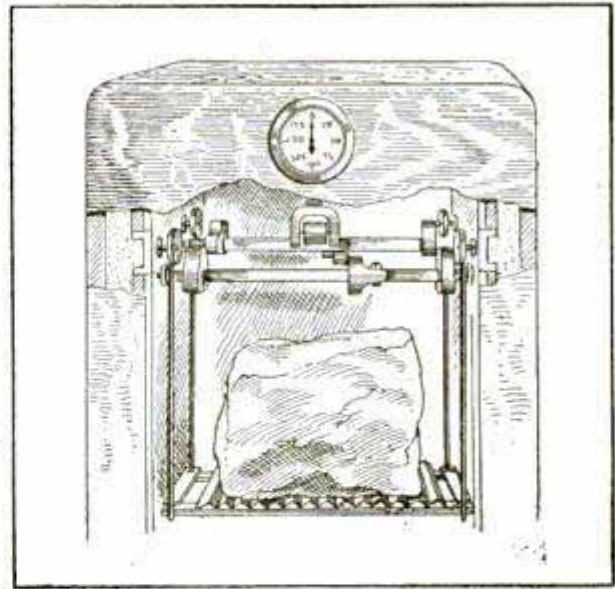


Curious African Vehicle

composed of bicycle tubes, rests upon springs. The man in the forward shaft pulls and the one in the rear shaft pushes. The man-power is applied, and the equilibrium of the vehicle is maintained, more by the leather harness in which the two men work than by their hands on the shafts. This harness is not only fitted over their shoulders, but over their heads as well. The one wheel makes the vehicle run much easier over the rough roads and trails than would be the case if there were two or more wheels. The framework is easily taken apart if desired.

WEIGHING ATTACHMENT IN REFRIGERATOR

By the attachment shown in this illustration the possibility of the iceman short weighing in the amount of ice he places in the refrigerator is impossible. The ice rack is the platform of the scale and the dial registers the amount of ice at all times. The rack



A Tab on the Iceman

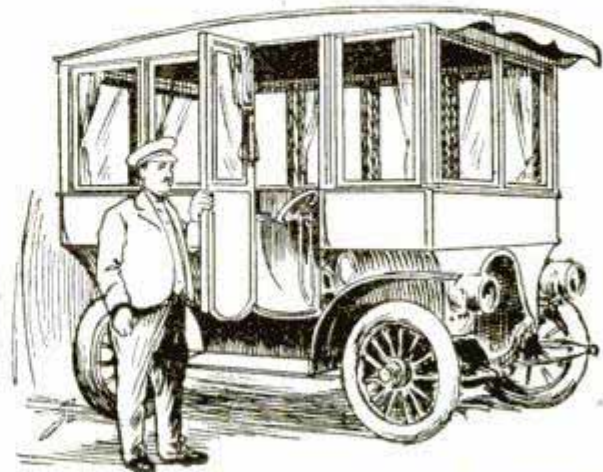
can also be used for weighing other articles under 200 lb. by removing the ice.

SHOSHONE BRIDGE TO BE 550 FT. HIGH

One of the highest bridges in the world is about to be constructed across the Snake River cañon, a few hundred feet from the great Shoshone Falls in Idaho. The span of the bridge will stretch for 1,140 ft. from cliff to cliff, at a height of 550 ft. above the surface of the water, and afford a grand view of the falls.

AN AUTOMOBILE HOUSE

The body of this automobile was built by a Florida man, who wished a machine in which he could live as well as ride around the country. Not only is



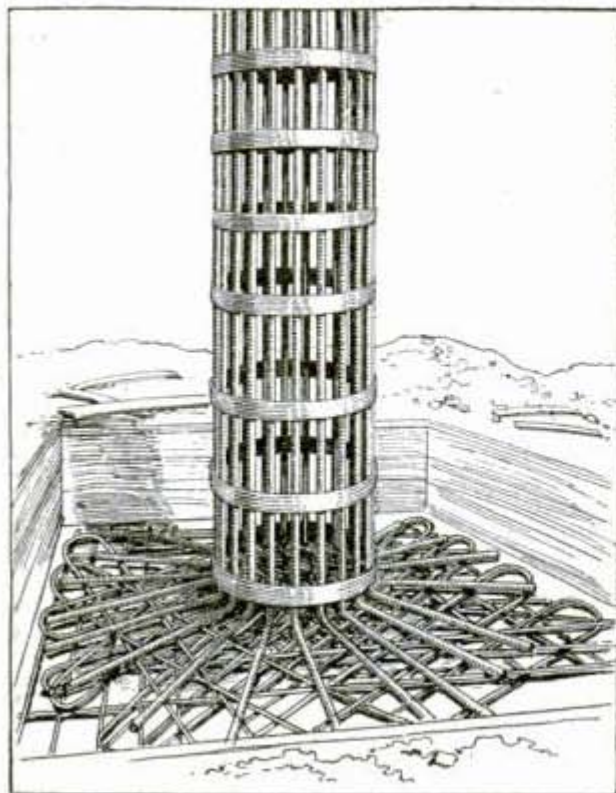
Courtesy The Automobile
Combination Touring Car, House, and
Business Office

it used to ride in and live in, but also as a place of business, being so arranged that it may in less than a minute be converted into a working, a sleeping, a dining, or a library car. It has an interior of mahogany, plate glass windows, silk curtains, electric lights, and other modern conveniences.

The body of the car was built by the owner himself. Working on it one-half of each day it took 15 months to build, and cost \$3,700. Despite its fittings the car weighs but 2,300 lb. and is very fast.

CONCRETE WORK IN A TEMPERATURE OF 24 BELOW ZERO

The massive reinforcement which is often used in concrete columns is excellently shown in this illustration of a concrete building in St. Paul, Minn. It is interesting to note that the work shown was executed during the cold weather, a large part of the heavy retaining walls having been put in at temperatures ranging from 22 to 24 degrees below zero. Heat was supplied from the boiler plant of the company, and the materials, both sand and stone, were heated before mixing the concrete.



Courtesy Concrete

Concrete Column Reinforcement

GERMAN INVENTION COMBINES PHONOGRAPH AND SIREN

Its Words Can Be Heard Miles Away—
May Have Future as Musical
Instrument

By Thomas H. Norton, U. S. Consul at
Chemnitz

The methods for recording sound have reached a higher stage of perfection than those employed for its production, the chief difficulty encountered in the present systems of reproducing conversation, and especially music, from records being caused by the friction of the needle. The needle produces a more or less noticeable buzzing or rumbling sound, which interferes materially. A German inventor has patented an instrument, however, in which friction is completely avoided. It combines the leading elements of the phonograph and the siren, its chief feature being the substitution of a current of compressed air for the needle now commonly used.

Openings of various sizes in a siren allow the production of all musical notes with any desired degree of intensity or length. In the new instrument, perforations in the disk of a siren are replaced by incisions on the surface of a large record cylinder. A second perfectly smooth cylinder rests close upon the surface of the first cylinder and revolves in unison with it. A constantly varying succession of minute openings between their surfaces is presented, due to the incisions on the record cylinder, and when a powerful blast of compressed air is directed upon the line of contact between the two cylinders, at such an angle as to be an exact tangent to the surfaces of both, sounds are evoked identically the same as in the case of an ordinary siren. It is thus possible to communicate signals and even words which can be heard miles away.

It is already evident that a field of usefulness is open to this new invention as an adjunct to the equipment of sea-going vessels, but its availability, on a smaller scale, for musical purposes

has not yet been tested sufficiently to determine whether it can successfully vie with the ordinary phonograph. The cylinders thus far employed are about ten times as large as an ordinary phonograph record, and this fact renders the instrument somewhat clumsy in its present design. The requirement of a current of compressed air may also stand in the way of its widespread domestic use, although such a current can be supplied by a comparatively inexpensive attachment to a water tap where the water supply is under considerable pressure.

PETROLEUM PRODUCTION IN 1908

The production of petroleum in the United States in 1908, according to the geological survey, amounted to nearly 180,000,000 bbl., an increase of nearly 9 per cent over the 166,000,000 bbl. produced in 1907. The total value of the product showed an even greater proportionate gain, for the price of oil increased in California and remained steady in other fields except the Gulf. The increases are attributed to steady growth in production in Illinois and California.

A HUMAN GYROSCOPE

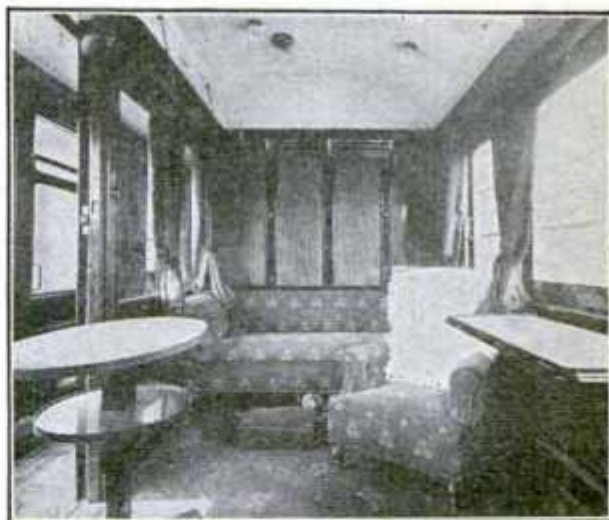
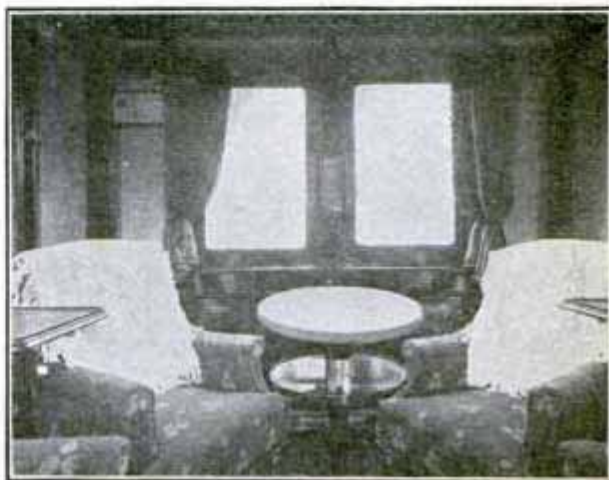


One of the most thrilling acts now being staged is called the "Human Gyroscope," the performer causing the top, of which he is part, to spin by pedaling. The rope at the top of the frame in which he braces himself sustains the weight only at the start and at the finish, hanging loose most of

the time while he is whirling around on the top of the rod.

THE "AMERICAN SPECIAL" IN ENGLAND

One of the most luxurious trains in England is the new "American Special," which carries the passengers of the Trans-Atlantic liners from the west



English "American Special"

coast of England to London. The interior views show the fittings of the English cars that correspond to the "Pullman" cars in America.

A Russian anarchist recently planned a means of attempting to assassinate the czar from an aeroplane.

Wilbur Wright may establish a permanent aeroplane station on the French Riviera.

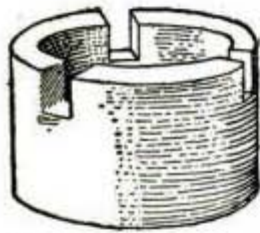
YACHT THAT SAILS ITSELF

No Electricity, Steam, Springs, Gas or Other Engine—This Mechanical Curiosity Sails, Steers, Tacks, Trims Sails and Returns to Landing with No Skipper But the Wind

By Herbert Consterdine

First of all, it would be well to understand that all the automatic actions are for and during actual sailing; that is, when she is moving through the water; she does not hoist and lower her sails on land or in dock.

While sailing, there is a small screw or "ship's log," trailing aft, attached by suitable flexible cord about 18 in. long to a small shaft on deck, which projects about 1 in. beyond the stern, so while vessel is sailing the screw is revolving and gives motion to the central shaft. On the forward end of this shaft is a worm, geared with a large worm wheel.



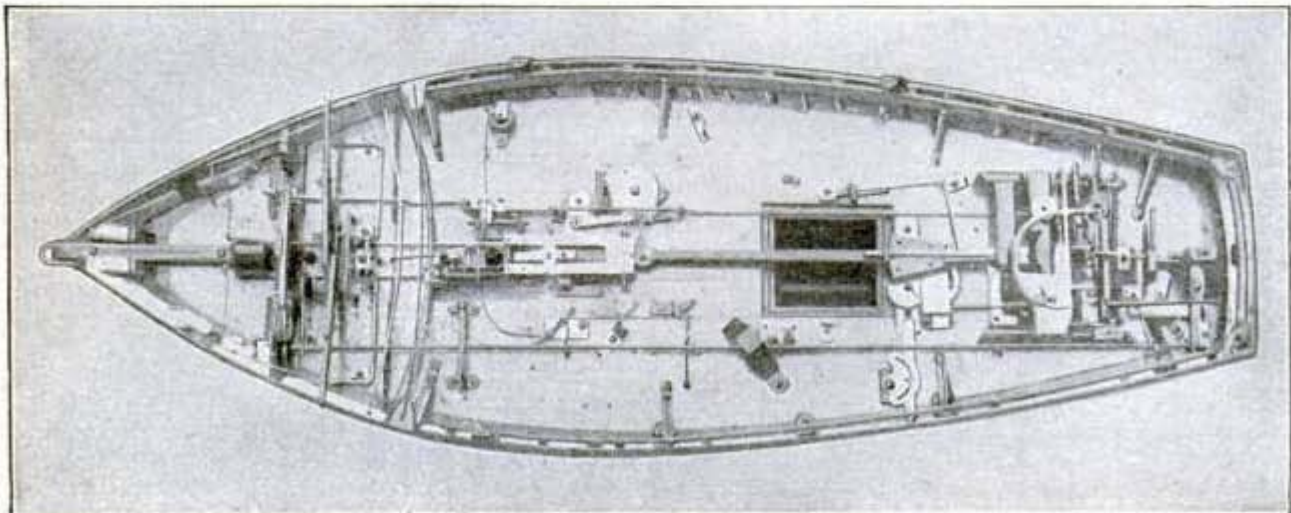
This worm wheel lies horizontally—its shaft is upright; on top side of the worm wheel is what I call a turret (see cut) revolving

slowly with the worm wheel.

The inner or swinging end of tiller passes immediately over this turret and only just clears it. A metal peg sticking downwards from under side of tiller engages in the inside of turret. The main "sheet" (or cord) from main boom is attached to the tiller instead of to bits on deck; consequently, there

is always a good pull on tiller to leeward, which of course changes from starboard side to port side alternately as vessel is tacking to windward. As this turret is revolving slowly, the peg under the tiller will escape or pass through one of the three openings in the side of the turret because of the pull of mainsail sheet; and helm will be pulled over as far as the arrangements permit. This of course takes place at the end of the tack. Besides putting the helm hard down to turn the vessel around on to the other tack, a motion is carried to forward end of the deck by means of the central connecting rod, one end of which works on a pin on the top side of the tiller, and so pulls the connecting rod aft when the tiller moves either to starboard (right) or port (left), and pushes the connecting rod forward when the tiller comes back into central position. Of course the tiller cannot get past the central position until the turret has revolved a considerable distance (one-sixth of a revolution), and thus escapes out of the opening on the other side; and so on alternately as she completes her starboard and port tacks.

On the deck, well forward of the

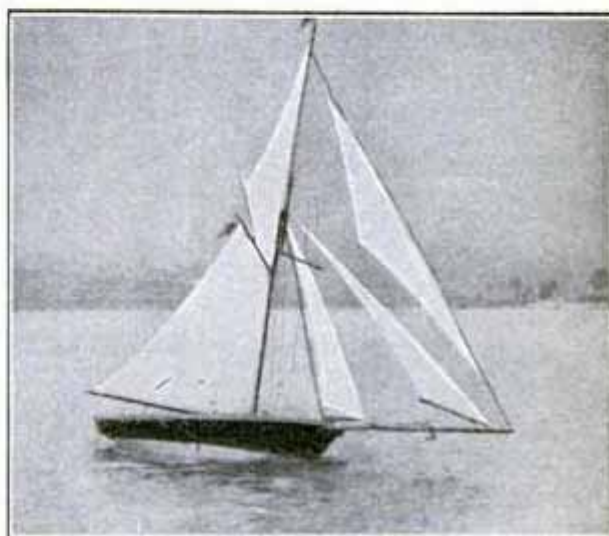


Deck View Showing Mechanism for Working Sails and Rudder

hatch, are two brass slides. If the tiller moves to the right the connecting rod engages with the right brass slide; if the tiller moves to the left it engages with the left brass slide. The movements of these slides work the foresail and jib sheets. When the helm is moved to starboard at end of port tack, or to port, at end of starboard tack, the forward sail sheets are released or slacked away to flap in the wind; consequently these forward sails being slacked away in conjunction with the helm or rudder at the stern (both working for the same object), the vessel is bound to answer and swerve around on to the next tack. Besides the slacking away of the forward sails; to assist in bringing her head around, the foresail is held out at an angle for the wind to strike it in this position, until its object is accomplished, that of bringing the head around. When this is done, the wind blows on the other side of the vessel to what it did before—these actions worked the change—so now the wind will blow the mainsail right over the deck as far as the main sheet will permit, and this rope being attached to the tiller will bring tiller back into central position into the turret through the same opening it escaped through two or three seconds before. At the same time, the mechanism operating the forward sails, being worked from tiller through the connecting rod, releases their temporary holdings and allows the sails to take their respective positions (to leeward) on new tack.

The turret can be moved slightly forward or aft to alter the proportion of length of one tack to the other, viz., by moving an eccentrically slotted segment (shown in deck photo, $1\frac{1}{4}$ in. from stern and at extreme left). The wheels near this slotted segment and in centre of deck are for reducing the speed of revolution between the log screw and turret wheel.

The wheel for controlling the number of tacks made against the wind, before returning home again running before the wind, is a register wheel, shown on the cut $2\frac{1}{2}$ in. from stern, just above



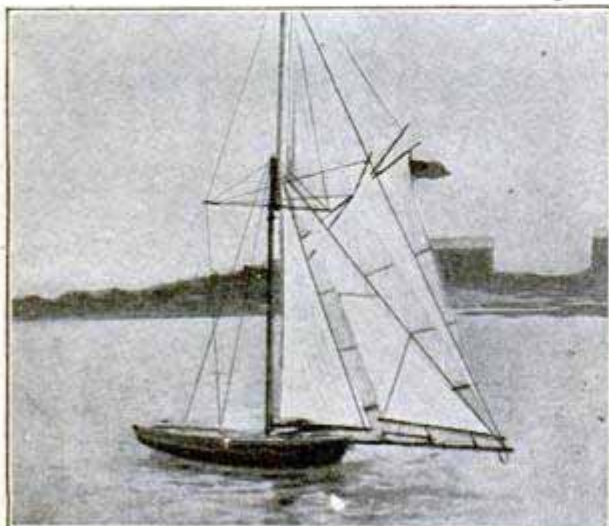
1—Nicely under sail. 2—End of starboard tack; helm is put down; forward sails are slacked away in order to bring her head up into the wind, or "luff." 3—End of port tack; helm is put down and forward sails are slacked away to change tack.

after end of the brass slides. One tooth is taken on this wheel for every two tacks completed; the catch is worked by a motion transmitted from tiller and connecting rod; catch is shown immediately beside the wheel, between it and the brass sliding pieces. It is loose-



The foresail is held out at an angle to catch the wind and pull head of boat over onto port tack; then foresail is released and all sails and helm take their proper positions and another tack is commenced.

ly attached to a lever worked from forward end of connecting rod; this lever is shown at a slight angle near to the brass slides and register wheel. A peg is fixed in this register wheel on the upper side, which gradually works around until it comes in contact with a projection on a sliding rod extending from forward mechanism to rudder mechanism aft; when this long rod is moved forward by the register wheel peg, it releases mainsail sheet so the mainsail will blow out nearly square with the yacht for running home before the wind. It also releases a pair of holders for holding foresail exactly amidship fore and aft. This foresail held in this position is now the controlling power for *steering* the yacht *dead before* the wind; thus if the wind

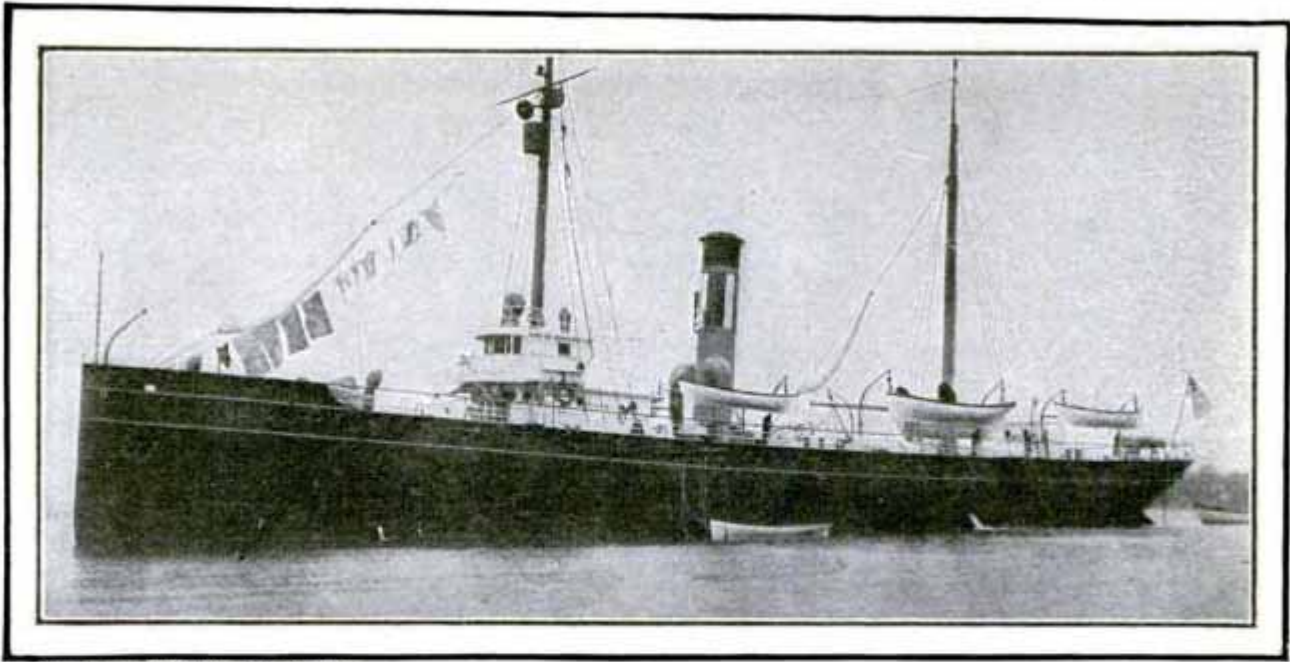


Coming Home—Running Before the Wind

is playing about on both sides of foresail, that is all right, the yacht is dead on her course to leeward. If the action of wind on mainsail standing out to port side, causes yacht to turn slightly to her right, the right side of foresail will then get the wind, and the sail will press to the left side and move the sail holders slightly to the left. This motion is conveyed aft by a rocking shaft to the first or primary motion shaft, being turned by the little screw-log in the water trailing after the yacht. By means of a pair of gear wheels, a small one on primary motion shaft and a larger one on a barrel shaft, the barrel is caused to turn, and by means of a cord around the barrel or drum, the tiller is pulled to steer, and counteract the action of the wind pressing against mainsail. As soon as the yacht is thus put again *dead* before the wind, the wind ceases to press against right side of foresail, so now the pressure (keeping the steering wheels in gear) no longer is effective, and the wheels are disengaged and the helm is eased back to normal, and thus this beautiful and harmonious action continues until the home shore is gained.

It will be readily seen that the ability of this yacht to beat to windward is practically unlimited; so long as there is wind she will move through the water, her log will turn and revolve the turret, the same wind will press the sails, and tack after tack will continue until the weather shore is made, no matter how many tacks are required to do it. Of course if an abnormal number of tacks are anticipated it would be advisable to disengage the catch operating the register wheel, because if this is not done she will only accomplish the number of tacks in accordance with the "distance back" the register wheel peg is set at commencement of cruise.

This yacht, the "Nydia," is not large enough to carry a man, being only about 5 ft. long on deck and 9 ft. long over all spars, but I see no reason why the same construction will not work fully as well in a larger boat.



Copyright, 1908, Waldon Fawcett

UNCLE SAM'S DERELICT DESTROYER

A Remarkable Cruiser Just Added to the U. S. Fleet of Vessels—Its Mission Is to Succor Imperiled Navigators, to Repair Disabled Ships, and to Destroy Abandoned Wrecks

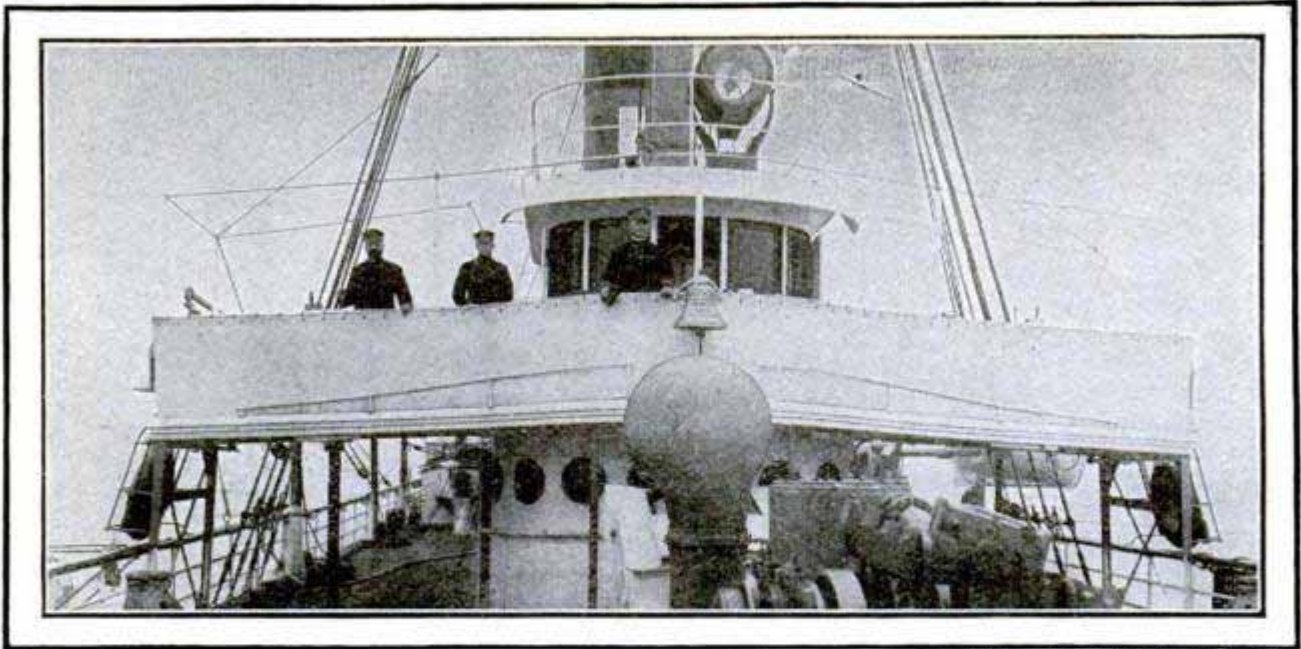
A ship extraordinary has just been added to the United States government fleet of vessels in the derelict destroyer "Seneca," and not only is she a novelty among American ocean-going craft, but the only vessel of the kind ever designed or constructed by any country. The main reason for the "Seneca" is, of course, indicated by her title of "derelict destroyer," but the usefulness of the powerful vessel is by no means to be confined to the removal of derelicts, wrecks, or other menaces to navigation.

Quite as important to maritime interests is her role as a missionary of relief at sea. The need of such a vessel has been keenly felt for years, the more so because, with the increase of the commerce of the world, there has been a proportionate increase in the number of derelicts sighted each year. A derelict is a



Copyright, 1908, Waldon Fawcett

Fire Drill on Board the "Seneca"



Copyright, 1908, Waldon Fawcett

Wrecking Machinery and the Bridge of the Ship

submerged hulk that floats hither and thither with the ocean tides, constituting the most serious menace to modern navigation and the one most difficult to avoid.

The new ship, which is already spoken of as "The Good Angel of the High Seas," is under the jurisdiction of the U. S. Revenue Cutter Service, and it is appropriate that she is in this maritime department of the government. During recent years the revenue service has devoted a steadily increasing amount of attention to the destruction of derelicts and relief work of all kinds at sea.

The "Seneca" cost \$250,000, and is well equipped for the service she is to render. Her steaming radius is exceptional, a most important consideration in derelict hunting, and she will carry enough coal at all times to enable her to steam across the ocean in her chase after derelicts. She is a spar-deck vessel, 204 ft. over all in length, 34 ft. beam, and is schooner-rigged with two pole masts without gaffs.

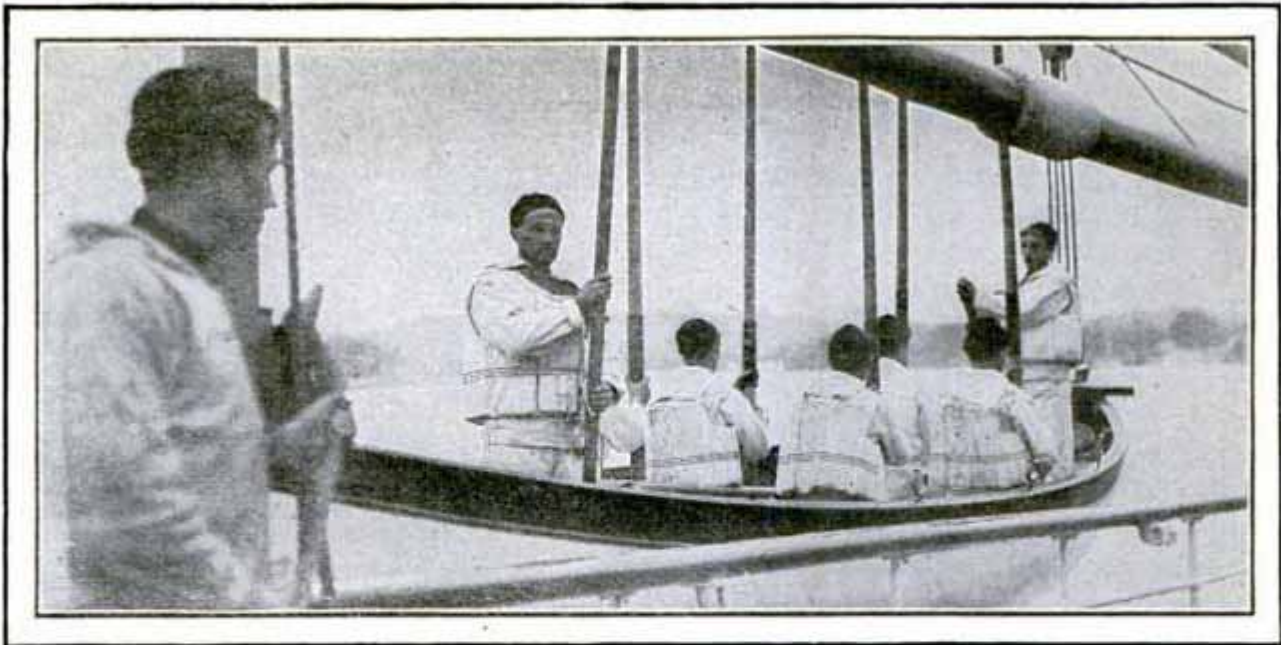
In appearance she is thoroughly distinctive, it being important that she be readily recognized at a distance. The hull is a dark green, with upper and lower shear mouldings light in color from stem to stern. The upper works and lifeboats are white, and the spars and smokestack yellow, the latter having a black band at the top, and red, white and blue vertical stripes running to the lower guy band. To make her still more easily distinguishable, the foremast carries a signal yard, from which is displayed a black spherical shape about 3 ft. in diameter. These can be seen in the illustration, which shows a full view

Heaving the Lead on the "Seneca"



Copyright, 1908 Waldon Fawcett

Wireless Telegraph Station



Copyright, 1908, Waldon Fawcett

Life-Savers Ready for Rescue Work

of the vessel. At night she displays a distinguishing signal in the form of two truck lights, red on the foremast and white on the mainmast, with simultaneous 15-second flashes. Finally, a wireless telegraph outfit enables communication with all ships similarly equipped, and with shore stations.

The equipment the "Seneca" carries was never before found on any one vessel. Foremost among these accessories is a varied assortment of explosives for the destruction of derelicts. The magazine in her hold can accommodate sufficient dynamite to blow up a fleet of ships.

Complete as are the facilities of the ship for destructive purposes, they are excelled by her means of aiding disabled vessels. There is a machine shop manned by men of experience in making quick repair work, a powerful derrick and other appliances which make her the equal of any wrecking tug, diving apparatus for making under-water repairs, and a full complement of steel and manila cables for towing purposes. A hospital, thoroughly modern in equipment and in charge of a skilled surgeon, cares for the shipwrecked and injured.

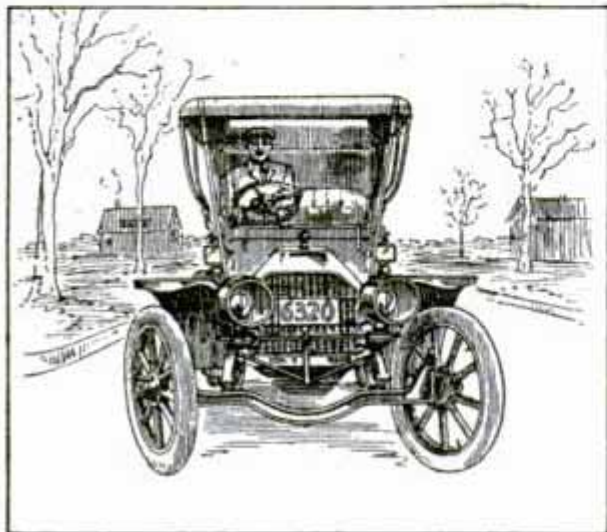
The "Seneca" is also a floating life-saving station, as well as a destroyer of derelicts and a repairer of ships. She has line-carrying guns, breeches buoys, life and surf boats, and, in short, all the utensils of a modern life-saving corps. Her boat crews are trained to handle heavy-sea working boats under all the conditions likely to be encountered. Moreover, the "Seneca" will at all times carry an extra supply of provisions for suffering mariners, and has surplus quarters where rescued persons may be accommodated until they can be landed at some convenient port.

The new ship is as powerful as she is staunch, a highly essential detail, as she must be capable of steaming 5,000 miles if need be, without once stopping to replenish fuel or other supplies. Her 1,800-hp., triple expansion engines may, at any time, be called upon to put forth the extra force necessary to drag a ship much larger than herself through long leagues of unruly seas, and energy must also be furnished to operate extra powerful wrecking and fire pumps. Incidentally it may be noted that the crew is as thoroughly drilled for fighting a fire on other ships as a fire of her own, and a fire on a ship at sea will be robbed of its menace once the "Seneca" has steamed alongside in response to an alarm sounded by wireless telegraph.

The Atlantic ocean is a large expanse of water to be patrolled by one ship of this type, but the government expects the "Seneca" to make her name famous.

AUTO LAMPS THAT TURN WITH THE FORWARD CARRIAGE

A device which makes possible the turning of automobile lamps with the steering apparatus, so that the track taken by an automobile in running around curves will be as well illuminated as a straight stretch of road, has been patented by an Ohio inventor.



Lamps That Light the Curves

With automobile lamps stationarily attached to the frame of the machine, as is now customary, the illuminated stretch, when going around a curve or a circular track is away off in the fields or on the side of some one's house instead of on the path the machine is taking.

The apparatus is attached to the steering wheel, so that the turning of this wheel not only swings the forward wheels but the lamps as well.

ACQUIRING OYSTER FARMS IN TEXAS

To become an oyster farmer on the coast line of Texas it is first necessary to assure the United States government that you are a resident of the state. After this formality the government gives the person wishing to locate a farm the riparian right to locate as many as 50 acres of land, covered by water. He must pay a surveying fee of \$10 and a rental of 10 cents per acre for the first five years, after which his yearly rental is 25 cents per acre. So

long as his rent is promptly paid he is amply protected, and he is also permitted to gather seed oysters from certain reefs for planting.

After locating and marking the boundaries of his farm with stakes, in order to avoid disputes with other planters, the oyster farmer prepares for planting. All debris and snags are cleared away, mounds are leveled and hollows filled. If it is necessary to build stockades to protect the oysters from fish this step is next in order, and then the bottom is strewn with oyster and clam shells, or gravel and sand, thus serving the double purpose of preventing the oysters from sinking into the soft soil of the bottom and of offering a place of attachment for the spat.

The cost of transportation of oysters is less than 15 cents per barrel, and as the market price of good oysters is from 75 cents to \$1.25 per barrel, a good margin is left for the expense of gathering and marketing. Owing to the mildness of the climate and the long growing season in Texas, the oyster is specially prolific there. Of the 40 bays, lakes and coves along the coast of Texas, there are few, if any, without a natural oyster bed, so there is no lack of seed oysters within easy reach of good grounds.

BOTTLE PUZZLE FURNISHED BY NATURE

Many ingenious bottle puzzles, devised by men, baffle the brain in the attempt to discover how the



contents were inserted, unless accomplished when the bottle was blown, but this puzzle is one of nature's own making. The tree is a locust growing in Rockford, Ill, and it

is presumed that the large, green bot-

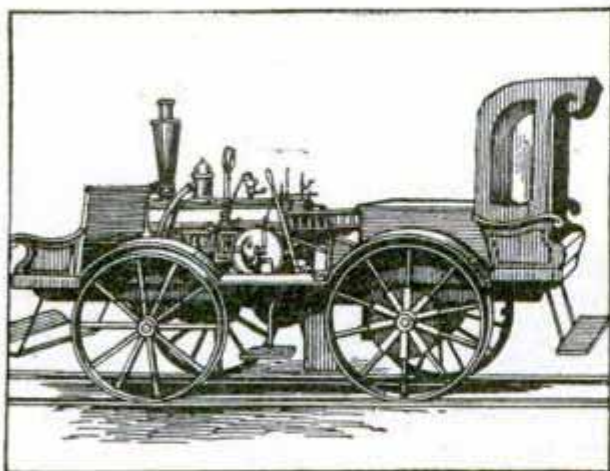
tle-neck was lying on the soil from which the tree sprouted and was carried upward as the tree grew.

FIRE-FIGHTING THROUGH LONG LINE OF HOSE

As far as has been ascertained by a firemen's magazine the longest line of hose ever used to fight a fire had a length of 3,200 ft. The fire was near the center of a 1,900-ft. railroad tunnel about 20 miles distant from Knoxville, Tenn. The Knoxville fire department responded to the request for aid and a fire engine was shipped to the scene of the trouble. The engine drew water from a pond some distance from the tunnel, and for two days and nights drove it through the 3,200 ft. of hose.

OLD AUSTRIAN INSPECTION ENGINE

The curious inspection engine shown in this illustration was built in 1876, not quite so long ago as the appearance of the engine would lead readers to believe, for a railroad line in Austria. The driving shaft had two heavy flywheels connected by belts with two pulleys on the axle of the rear pair of wheels. By means of this gearing a speed of 20 miles an hour could be maintained on a level roadbed. Seats



Courtesy of Locomotive, London

Inspection Engine, 1876

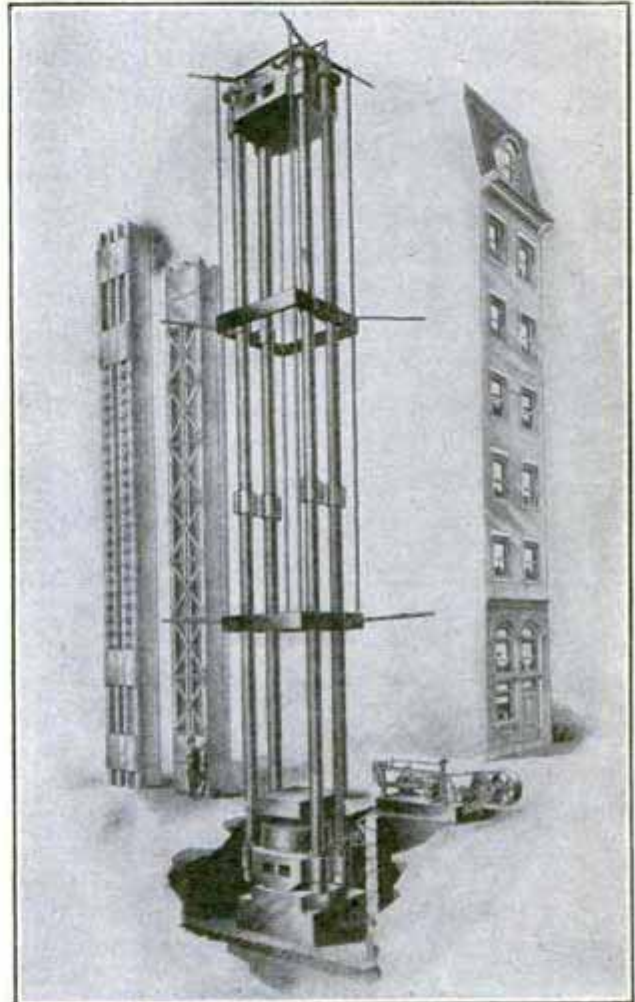
in front and in the rear accommodated the inspection officers, the rear seat having a quite ornate wind screen.

TEN-MILLION-POUND HYDRAULIC COMPRESSION TESTING MACHINE

Constructed by U. S. Geological Survey for Testing Built-Up Structures — Largest in the World

By R. L. Humphrey, Engineer in Charge

A vertical hydraulic compression testing machine of 10,000,000-lb. capacity,



Machine for Testing Built-Up Structures

the largest in the world, is being constructed for the structural materials testing laboratories of the United States Geological Survey. The machine has a gross weight of over 200 tons, and an extreme height above its foundation of about 80 ft. A better idea of its huge size may be obtained from the accompanying illustration in which is shown one of the chords of the Quebec bridge which collapsed, a still larger chord used in the Blackwell's Island bridge, and an 8-story building, the latter being shown for comparison only. It is readily apparent that the machine is

capable of testing built-up structures of even greater size than the bridge chords.

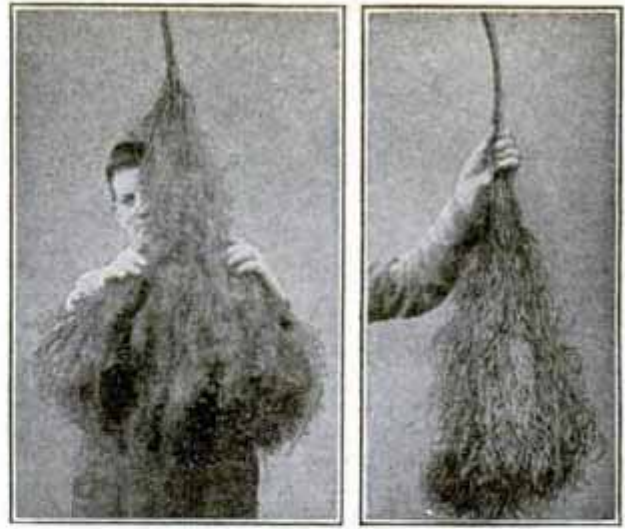
The machine or hydraulic press consists of a base containing the main cylinder, with a sectional area of 2,000 sq. in., upon which rests the lower platform or head, provided with a ball and socket bearing. The upper head is adjustable over four vertical screws, 13½ in. in diameter and 72 ft. long, by means of gearing operating the four nuts, with ball bearings, upon which the head rests. The shafting operating this mechanism is connected with a 15-hp. motor which operates the triple plunger pump which supplies the pressure to the main cylinder. Connected with the press is a weighing device consisting of a set of standard levers upon which is weighed 1/80 of the total load on the main cylinder. The weighing beam is balanced by an automatically operated poise weight and is provided with a device for applying successive counterweights of 1,000,000 lb. each.

The great weight of the principle parts of the machine is interesting. The castings for the base and top head weigh approximately 50,000 lb. each, and each main screw weighs over 40,000 lb. The lower platform weighs about 25,000 lb., and the main cylinder about 16,000 lb.

The machine was primarily decided upon for the purpose of studying the effects of flaws and defects in large blocks of natural stone, but in order to compile data relative to the strength of structural columns of brick, concrete, and structural steel, the original clearance between heads was increased from 25 to 65 ft.

ROOT GROWTH IN A SEWER

The illustrations show a root taken from a 6-in. sewer in Greenfield, Mass. The main root is only ½ in. in diameter, but from it more than a thousand small roots, about the size of coarse thread, branch out. The illustrations give an excellent idea of the resultant tangle by which the sewer was clogged.



Roots Often Stop Up Sewers

Such growths are the cause of many instances of sewer trouble.—Contributed by Lloyd Morgan.

A FEW GAS STATISTICS

According to the reports of the geological survey, 58,000,000,000 cu. ft. of coal gas was made in the United States during 1907 by 513 companies. Of this product 54,600,000,000 cu. ft. was sold for \$36,327,897, and the remaining 3,400,000,000 cu. ft. was "lost, strayed, or stolen." The average value of the 1907 product was 66 cents per 1,000 ft. The product of 1906 averaged 81.4 cents per 1,000 ft., which shows that gas is becoming cheaper.

LOAF OF RUSSIAN BREAD

Russian bread, owing to its peculiar shape, is called "handle bread." The shape is due to the liking among the Russians for crust, and the protruding lip between the handle and the body of the loaf is simply a means of increasing the amount of crust



Courtesy Northwestern Miller

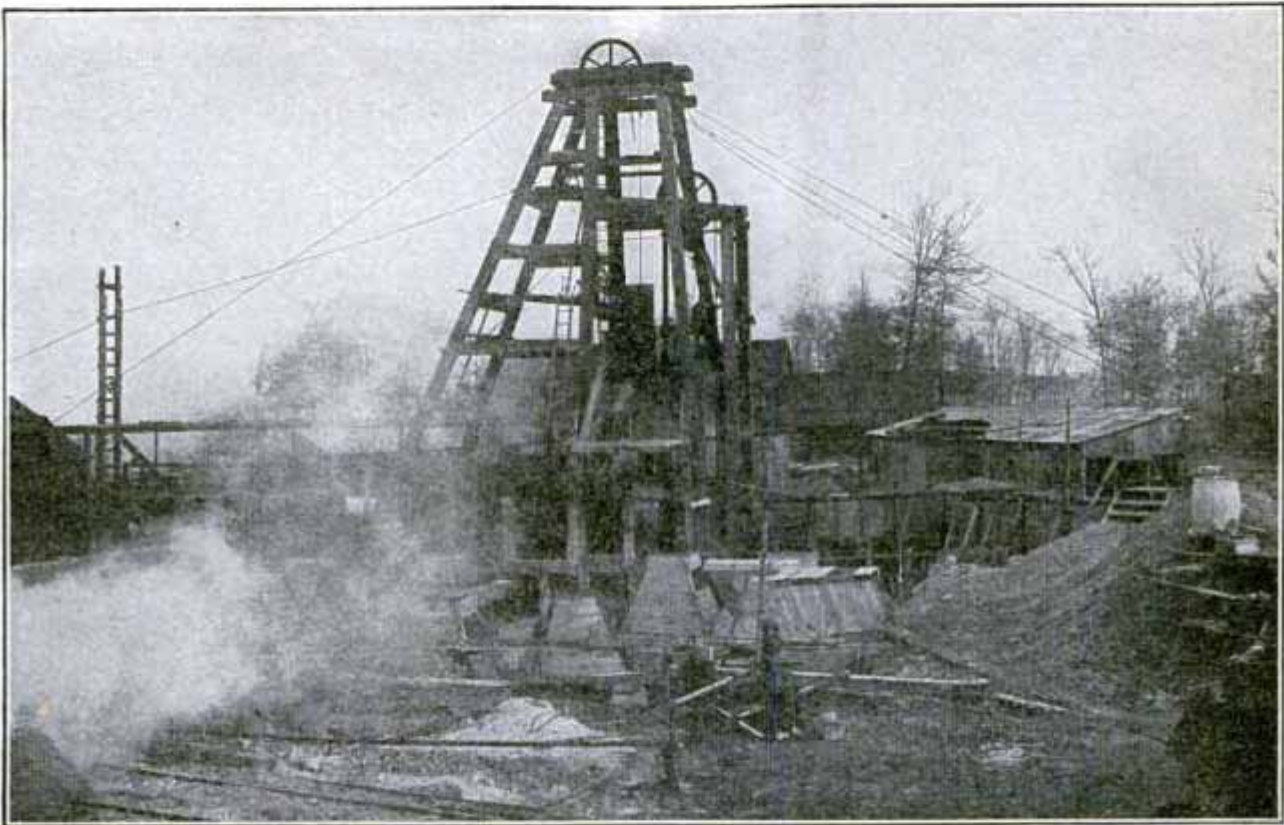
surface in each loaf. The bread is made of durum wheat flour, better known in the United States as macaroni flour.

TEN YEARS' STRUGGLE TO REACH ROCK SALT

Remarkable Persistence Shown in Attempt to Sink Shaft to Deposit of Rock Salt, and End is Not Yet—Problem After Problem Has Had to Be Solved and Lives Have Been Lost, but Work Continues

From the sinking of the first test well 10 years ago to the present time a constant fight against heavy odds has been made in an attempt to sink a shaft to vast deposits of rock salt which lie 900 ft. beneath the ground near Detroit. No sooner was one problem disposed of than another presented itself.

posed shaft. Everything progressed favorably until the 6-in. bit struck sulphur water about 200 ft. down. This was not considered bad, but when another flow was struck 40 ft. further which filled the hole and shot 500 gal. per minute out of the top, the contractor withdrew from the proposition.



Top of Shaft Where Many Lives Have Been Lost

At every turn difficulties undreamed of appeared, driving the workers away like chaff before a wind.

Mining rock salt is a different proposition from procuring the common or table variety. With the latter the deposits are pierced, water is pumped in, and brine thus formed pumped out, and the salt regained by evaporation. Rock salt is mined much the same as coal, necessitating the sinking of a shaft large enough to permit the easy access of workmen and the handling of the product.

It was first necessary to sink a test well adjoining the location of the pro-

posed shaft, and weeks were devoted to a study of how to shut off the water. A barrel of exceptional strength was procured and filled with limestone particles secured from the sulphurous flood. Pipes were inserted and the conditions at the bottom of the test well were duplicated as closely as possible. Then, by means of a strong pump, a thin solution of cement was forced into the barrel, combating the flood of water that flowed through it. This was the test on which all depended, and it was successful. A few hours after the cement was forced into the flood of water



There are a number of large estates or residence parks owned by millionaires in America, but few of them are large enough to warrant the building of a miniature railroad to carry guests from one part to another, even though not taking into consideration the fact that the automobile offers a more satisfactory and economical means. This little train runs on the great estate of a member of the English nobility, and is probably considered more as a fad by the owner than a practical means of carrying guests to the show places of his estate. It will carry eight people at a speed of 15 miles an hour.

the barrel was knocked to pieces, and instead of the loose limestone it was found to contain a mass of concrete firmly set.

Hardly had the actual sinking of the shaft been started when quicksand and silt were encountered in quantities. One day there came a warning crack from the bottom of the shaft, and the great timbers, seemingly capable of withstanding any strain, were split into kindling, and the shaft buckled and closed up from the bottom. Where a few moments before had stood a solidly constructed shaft was a mass of broken timbers and dirt that ruined months of hard labor.

Again the contractors refused to continue, and another contracting company was organized. A bell-shaped shield with a knife extending some distance below the timber frames was employed, and inside this shield, which because of its peculiar shape and great weight lowered itself as rapidly as the dirt was taken from beneath, the workers toiled.

Limestone was at last struck, but this presented more difficulties. There was constant danger of striking a flood of water that would fill the shaft, but by means of an ingenious drilling device it was possible to keep watch of developments 25 ft. or more below the bottom of the shaft and guard against danger from this source. Immediately water was struck the valves at the top of the drilling device were closed. Down at the 150-ft. level a stream was encountered that spurting high into the air.

Several holes were drilled in a circle about the outer edge of the shaft, running well down past the source of trouble, and extending outward. These were filled with a solution of cement, which was permitted to harden. When this was accomplished it was found that the cement, mixing with the limestone, formed a solid wall, as the barrel test had indicated, effectually cutting off the water.

Two hundred feet underground, however, a flow of water was struck that could not be so easily controlled, and closely following the workers as they escaped, the water filled the shaft to the top and flowed over. Great pumps had to be installed and a stubborn fight waged. Inch by inch the water receded until a diver was able to descend, the hole was plugged up with cement, and the men were ready for another try. Other accidents have occurred, many workmen have been killed—six only recently—but the work continues, and the promoters are confident of yet successfully reaching the rich deposits of rock salt for which such a tenacious fight is being made.

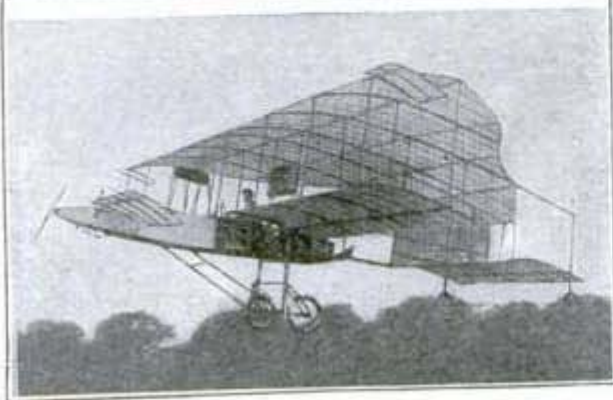
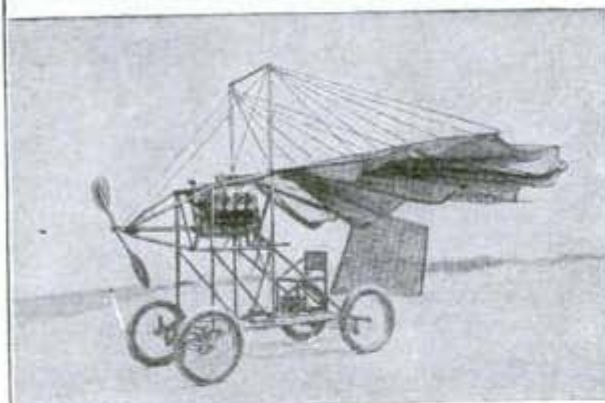


A task of considerable magnitude has been undertaken by the Automobile Club of America in sign-posting all routes marked in the club's tour book. More than 25,000 yellow metal arrows, bearing numbers corresponding to the numbers of the routes in the book will be used.

NEW HEAVIER-THAN-AIR FLYING-MACHINES

These illustrations show three of the latest heavier-than-air flying-machines built by European aviators. One of them is spoken of as "The Floating Green-house" because its planes resemble to some extent the glass roofs of such buildings. It has a double set of planes and was invented by Albert and Emil Bonnet-Labranche.

Another illustration shows the Vinar machine with its wings or planes folded. In this position the wings resemble those of a locust. The third illustration to be commented upon is the novel multiplane aeroplane which



Aeroplane Known as "The Floating Green-house"—Flying-Machine with Locust-Like Wings—A Novel Multiplane Aeroplane

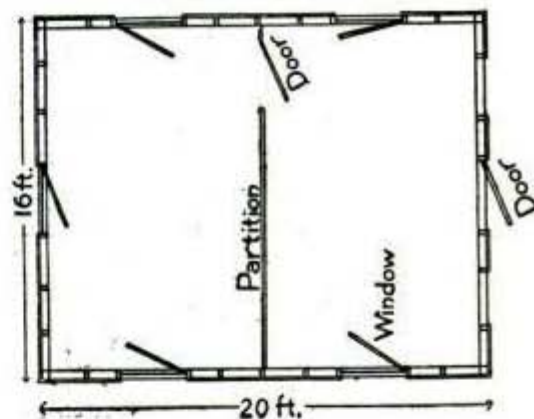
is being experimented with by the Marquis d'Ecquevilley.

U. S. HOMES FOR THE HOMELESS IN STRICKEN ITALY

In the Italian earthquake story published in the March issue mention was made of the aid extended to stricken



U.S. Government Cottage in Stricken Italy



Italy by the people of the United States and the United States government. The most important part of the government program was the plan of sending and constructing 2,500 cottages in the earthquake zone, this plan meeting the desire of the Italian government. The work was carried out with the utmost dispatch, for Uncle Sam played the role of architect, builder and boss carpenter all in one.

The cottages, as shown by the plans, were of the 2-room type, with ample windows and doors. In their construction only six different sizes of lumber were used. The rafters, the studding, the caps and the corner posts were 2 by 6-in. pieces of lumber, the posts consisting of two such pieces nailed together. The sills were made of 2

by 6-in. material, and the floor beams were of 2 by 10-in. material laid with 12-in. centers. The siding was 6-in. bevel, laid 4 in. to the weather, and the floors were constructed of ordinary planed pine boards, one inch thick.

The windows of the cottages are single sash, opening inward on side hinges. Seven such windows were built into each cottage. Sufficient glass, cut to the required dimensions, accompanied the sashes. Framing for the windows and doors were supplied in the required lengths for putting in, and hinges and locks were fitted to the doors, in order to save all possible time in construction. The roof of each cottage was covered with a single layer of patent roofing, made fast by wooden strips, or by cement and roofing nails, supplies of both being sent. All nails required, and tools for the workmen were sent with the other supplies.

The general supervision of the work was undertaken by a superintendent of carpenters and his assistants, sent out by the United States Navy, under whose auspices the work was done. Immediately upon the arrival of the first steamer at the place where the buildings were erected, a model cottage was built by the United States carpenters as an example of how the work should be done, and to show that two good workmen could erect such a house in three days and have ample time to spare.

In the construction of the cottages, each of which is 16 ft. wide by 20 ft. long, more than 7,500,000 ft. of American lumber was required. The approximate cost of each cottage was \$150, whereas a portable house of similar size would cost \$300, a saving by Uncle Sam of 50 per cent.

The specifications and instructions for the men employed in constructing the cottages were printed on the plans in Italian as well as English, as it was necessary to have Italian carpenters do part of the work. Reports say that one of the streets on which the houses were constructed will be given an American name.

GUARDING THE GOLDEN GATE

The "Mile Rock" lighthouse, guarding the southern side of the entrance to San Francisco harbor, rises straight from the ocean when the tide is in, as

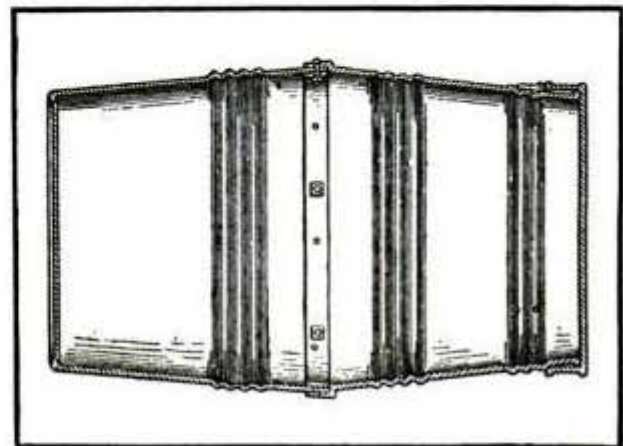


its foundation is then entirely under water. It was built on a sharp pinnacle of rock, and its lower part is a steel cylinder filled with concrete. This cylinder is elliptically-shaped, and rises to a height of 40 ft. The upper part of the lighthouse is constructed of structural steel. The height of the light from the surface of the water is 100 ft.

The total cost of the work, which was only recently completed, exceeded \$100,000. The structure is exposed to all the gales of the open sea, the fury of the breakers and the powerful tidal currents that sweep through the Golden Gate.

SEPARABLE METAL BARRELS

An economical retainer in which to ship products such as cement, lime and plaster has been a problem with manufacturers for some time. A package of barrel form is ideal, but wooden barrels are constantly increasing in cost and are good for only one shipment,



For Shipping Cement, Lime, Plaster, Etc.

as the cost of returning empty wooden barrels to the shipping point is prohibitive. The metal barrel shown in this illustration goes a long way toward solving the problem, as the halves are separable and can be nested in a compact form for the return journey. The cost of the barrel is about \$1, which is a little more than twice that of a wooden barrel, but they are claimed to be good for at least 15 round trips, and the room they occupy when empty cuts down the shipping bill one-half.

ONE RESULT OF A HOUSE-CLEANING LAW

No one would ever again doubt the excessive cleanliness of the Japanese as a race if compelled to traverse one of the streets of a town during house-cleaning time. The Japanese authorities take the greatest possible care to prevent the spread of the plague or other diseases, and in Kobe, which is one of Japan's seaports, every house is cleaned under the supervision of the sanitary authorities twice a year.

In Kobe one street is dealt with at a time, and everything is taken out

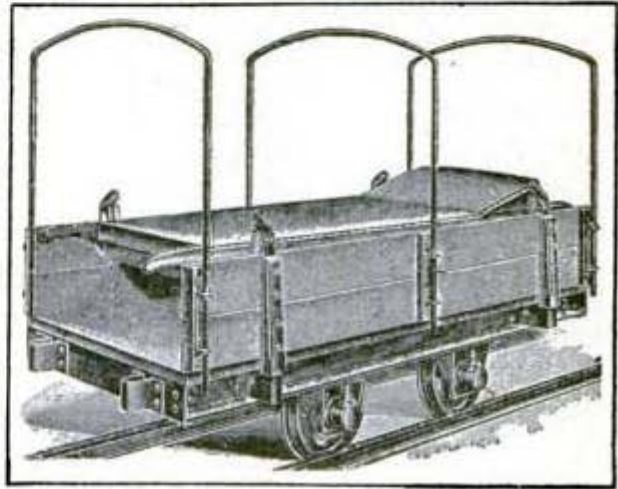


Cleaning House in Kobe

of the buildings and piled in the roadway. Dust and refuse are carted away and burned. In six months more than 56,000 homes were cleaned in Kobe alone.

MILITARY STRETCHER CARS IN INDIA

The stretcher car or truck shown in this illustration is designed for military purposes and a number of them are included in the rolling stock of the



Used in India

narrow-gauge or "light" railways of India. The road upon which they run has a gauge of only 2 ft. 6 in. As this is the same gauge as the portable railways for mining and on tea plantations in India the stretcher car can be used on these as well.

The stretcher is suspended upon springs, steel loops being attached to the sides of the body of the car for securing an awning.

PURE COPPER NUGGET WEIGHING THREE TONS

A pure copper nugget weighing 6,000 lb. was found recently in the Chittina district of Copper River Valley, Alaska, and its finder and owner is undertaking to transport the huge 3-ton lump of metal to Seattle for exhibition at the Alaska-Yukon-Pacific exposition. It is claimed that the nugget is the largest lump of pure copper ever found in any part of the world. Its trans-

portation from its native bed to Valdez was the most difficult part of the task. According to the contract, this part of the journey alone cost the owner of the nugget \$1,800.



ADVERTISING WITH AN AIRSHIP IN MEXICO

A hustling tobacco firm in Mexico, not satisfied with covering the land with advertising, has chartered an American dirigible airship, and its inventor, to make a number of flights each week in different parts of the Mexican republic. Banners fastened to both sides of the gas bag advertise the company's latest brands of cigarettes.—Contributed by Alphonse F. Arce, Mexico City.

The English railroads have not killed anyone during the past 15 months.

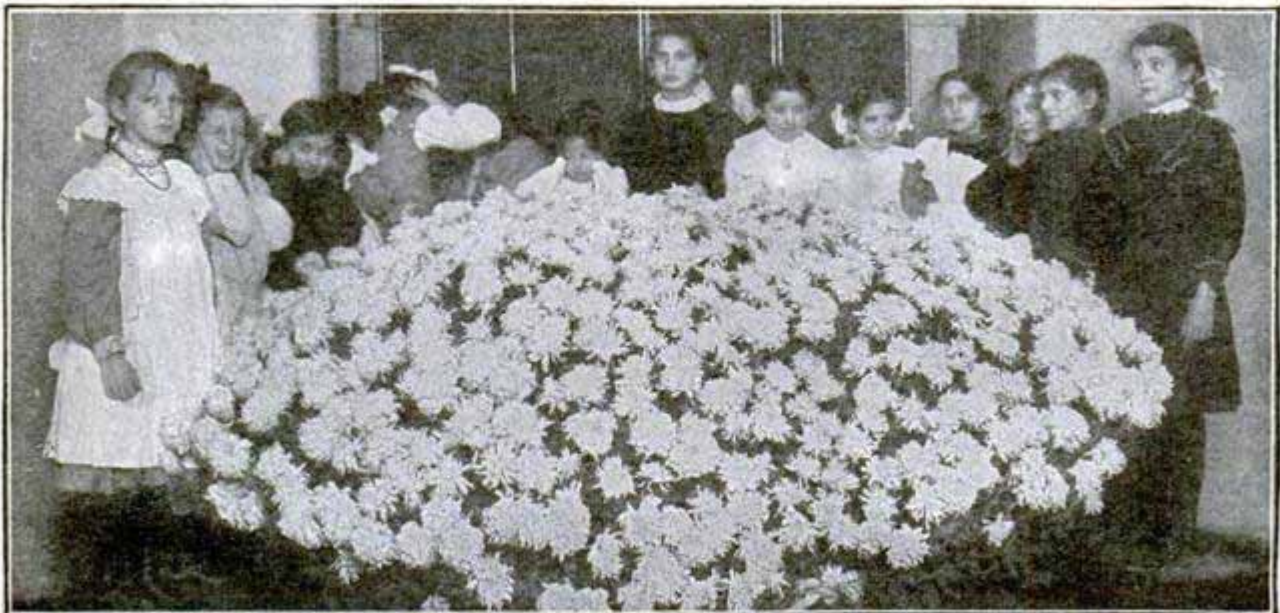
JAPAN A BREADLESS COUNTRY

Japan always has been and is yet practically a breadless country. The "staff of life," older than Christianity, and the main food of many classes and nationalities, was not known in Japan until the Portuguese first entered that country in 1542. Rice, beans, fish, eggs, and millet were and are still the chief articles of food. In 1890 there was a rage for foreign bread in Tokio, even among the coolies, and piles of it were seen in every little cook-stall, but the fashion subsided like a fever, and ordinary Japanese victuals resumed their wonted place. The American boy looks for a piece of bread, often well buttered and sugared, on his return home from school or play; the Japanese boy expects rice.

The German navy department has ordered "hurry-up" work on six new submarines.

LARGEST CHRYSANTHEMUM IN THE WORLD

The largest chrysanthemum plant in the world, grown by a lover of flowers living at Greyston-on-Hudson, N. Y., was recently exhibited in New York. It is of a Japanese species, and although but one year old, is 10 ft. in diameter and has 1,200 blossoms.

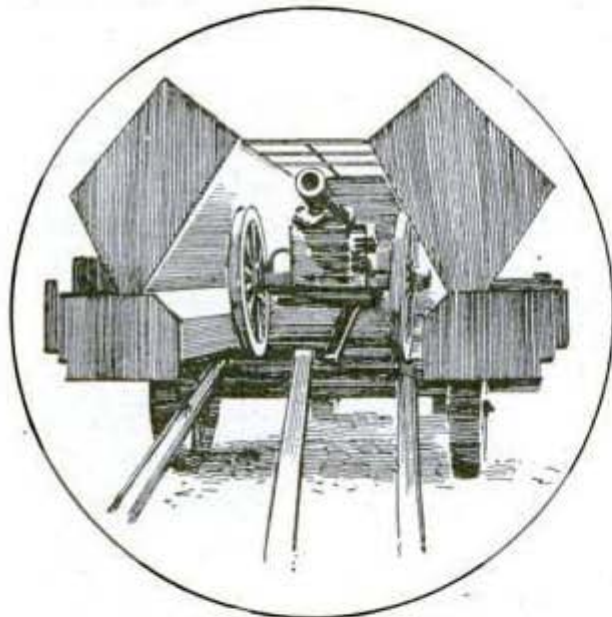


A Plant with 1,200 Blossoms

GERMANY'S MODERN WAR AUTOMOBILES

A year or two ago Germany commanded the attention of the world in her military experiments with automobiles. Today the world is following as closely as possible—and permissible—her progress in building a fleet of aerial fighters. Whether or not Germany will hold supremacy over the other powers in this last move has yet to be demonstrated, although she is far in advance now, but without doubt her equipment of military automobiles is, and always has been, greater and more varied than that of any other two, perhaps three, powers combined.

One of the most interesting of these is an armored car for use either as a



One of Germany's Military Autos

moving battery, or as a transport for light field guns from place to place in the zone of fire. It is a cumbersome vehicle, but protection rather than speed was the consideration.

FLOATING CHURCH IN GERMANY

One of the most curious boats on the River Spree in Berlin is the floating church here illustrated. It has a fine altar and many seats for the accommodation of the bargemen and their families, the majority of whom cannot be



A Floating Church on the River Spree persuaded to go into the churches on land.

SAN FRANCISCO'S CHINESE TELEPHONE EXCHANGE

One of the most interesting features of the rebuilding of San Francisco's famed Chinatown is the new telephone exchange building to handle the large number of calls from that quarter. The building is designed on Oriental lines, and, when completed, will be ornamented with dragons and other symbolical Chinese characters.

The Chinese are great users of the telephone, as their language is cumbersome, and they would rather talk



Courtesy Jour. of Electricity

Chinese Telephone Exchange

over the 'phone than write letters. The operators will be Chinese boys, Chinese girls being at a premium.



ANOTHER STYLE OF MISSION CHAIR

The material necessary to make a mission chair as shown in the accompanying illustration may be secured from a planing mill with all four surfaces squared and sandpapered. The mill can do this work quickly and the expense will be nothing compared with the time it takes to do the work by hand. The following is the stock list:

- 4 legs, $2\frac{1}{2}$ by $2\frac{1}{2}$ by $32\frac{1}{2}$ in.
- 2 bottom end rails $\frac{7}{8}$ by $5\frac{3}{4}$ by $23\frac{1}{2}$ in.
- 2 bottom side rails $\frac{7}{8}$ by $5\frac{3}{4}$ by $28\frac{1}{2}$ in.
- 2 top end rails $\frac{7}{8}$ by $4\frac{1}{2}$ by $23\frac{1}{2}$ in.
- 1 top back rail $\frac{7}{8}$ by $4\frac{1}{2}$ by $28\frac{1}{2}$ in.
- 2 cleats $\frac{7}{8}$ by $2\frac{1}{2}$ by $26\frac{1}{2}$ in.
- 7 slats $\frac{1}{2}$ by 2 by 24 in.

This design was purposely made simple. If it is considered too severe and the worker has had some experience in woodwork, it can easily be modified by adding vertical slats in back and sides. These should be made of $\frac{1}{2}$ -in. stock and their ends should be "let into" the rails by means of mortises.

Either plain red oak or quarter-sawed white oak will do. Begin by squaring up one end of each leg, marking and cutting them to length and planing up the second ends so that they shall be square. Both the top and bottom of each leg should be beveled or rounded off about $\frac{1}{4}$ in. so that they may not splinter or cause injury to the hand.

When all of the legs have been made of the same length, set them on end

in the positions they are to have relative to one another and mark with pencil the approximate locations of the mortises. Next, place them on the bench, side by side, even the ends and square sharp lines across to indicate the ends of the mortises. The drawing shows the dimensions to use. A sharp pencil should be used for this marking and the lines should be carried entirely across the two faces of each piece.

Set the gauge for the side of the mortise nearest the face edge. With this setting, mark all the mortises, then set for the second side of the mortise and complete the gauging.

There are two ways of cutting small mortises in common use. One is by using a chisel of a width just equal to that of the mortise. The other is by using a smaller chisel after the mortise has first been bored with the brace and bit. In the first method the cutting is begun at the middle of the mortise where a V-shaped opening is made the full depth of the mortise that is to be. Continuing from the middle, vertical cuts are taken first toward one end then toward the other. The chips are pried out as the cutting proceeds. In making the last cut this prying must be omitted, otherwise the edge of the mortise would be ruined. It will be necessary to stand so as to look along the opening in order to get the sides plumb.

This method of cutting, when once the "knack" has been attained, will be found much easier, quicker and more accurate for small openings, such as these, than the usual method. The second method, which is the usual one, needs no description.

The rails should next have the tenons cut on their ends. It may not be out of place to remind the amateur that the lengths of the various like pieces can best be laid off by placing them on the bench, measuring off the proper distances on one of them and then with try-square marking across the edges of all of them at once. This not only saves time in that but one set of measurements need be made, but it insures all of the pieces being similarly laid

off. In measuring off for the shoulders of the tenons, begin at the middle of the length of the rail and measure half of the distance each way. By doing so, if there are any slight differences in the lengths of the pieces this difference will be divided between the two tenons and no harm will be done.

In gauging the tenons take the precaution to mark a working face and joint edge, even if all the surfaces were finish-planed at the mill. It is very important that all tenon gauging be done from these faces. The same is true of the legs or posts, and the slats if there are to be any.

To avoid confusion it is well to number each tenon by means of the chisel with a Roman numeral and its corresponding mortise with the same. This will prevent the fitting of one tenon into more than one mortise.

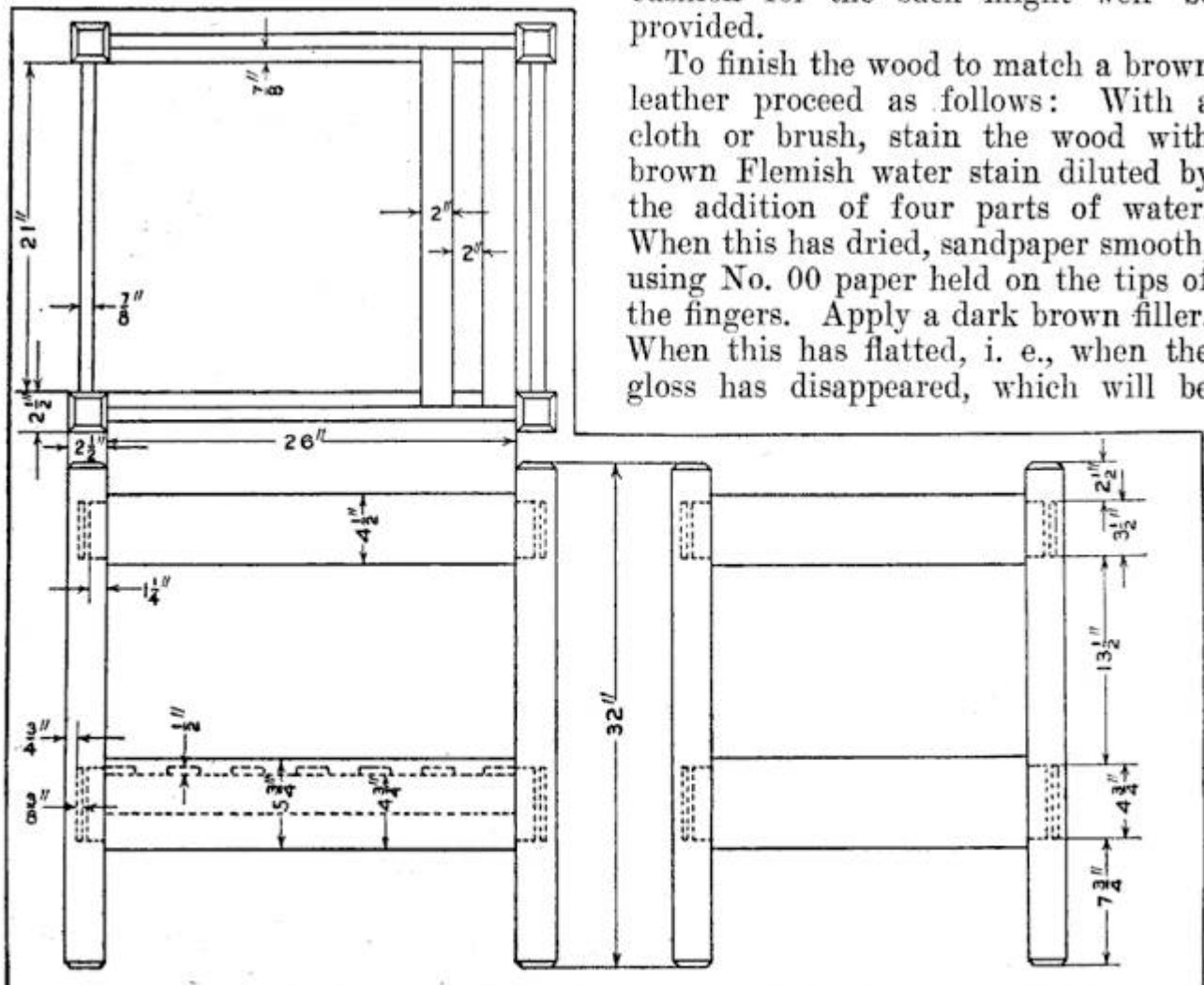
Put the parts together with warm glue if it can be had, otherwise use the prepared cold glue. In cold weather the wood ought to be warmed before

the glue is applied. Put the ends of the chair together first. When the glue has set on these put the other rails in place.

When clamping up the second set of rails make sure the frame of the chair is square. The best way to test for squareness is to measure the diagonals with a stick. Spring the frame until they measure alike, using a brace to hold the frame in position until the glue can harden.

Before staining, scrape off any surplus glue, for stain will not adhere to glue and a white spot will be the result of failing to remove it. Fasten cleats to the front and back rails with screws. To these cleats fasten the slats as shown in the drawing. A cushion of Spanish leather, such as is shown in the photograph, can be bought at the furniture store or the upholsterer's. It can be made by the amateur quite easily, however. The two parts are fastened together with leather thongs and the filling is of hair or elastic felt. A cushion for the back might well be provided.

To finish the wood to match a brown leather proceed as follows: With a cloth or brush, stain the wood with brown Flemish water stain diluted by the addition of four parts of water. When this has dried, sandpaper smooth, using No. 00 paper held on the tips of the fingers. Apply a dark brown filler. When this has flattened, i. e., when the gloss has disappeared, which will be



in the course of ten or fifteen minutes, wipe off clean with excelsior and then with waste or a cloth. Allow this to dry over night, then apply two or three coats of wax. Polish each coat with a flannel cloth by briskly rubbing it.

A settle can be made after this design by using longer front and back rails. Rails 42 in. between shoulders will make a good length for a settle.

DRESSING THE CLAY FORM OF A BEAR

The days when the skins of animals were stuffed with rags, straw, etc., for exhibition purposes, is long passed, and in the new taxidermy, the forms of large animals are entirely modeled in plaster and the skin is permanently glued on. These casts are durable, hard and waterproof and, being an exact facsimile of the original shape and muscular build of the animal's body, every bit of the anatomy can be satisfactorily brought out.

This skin, when alive, belonged to a giant bear in Alaska, which was shot after a dangerous fight. It is mounted in the Museum of Natural History, New York.

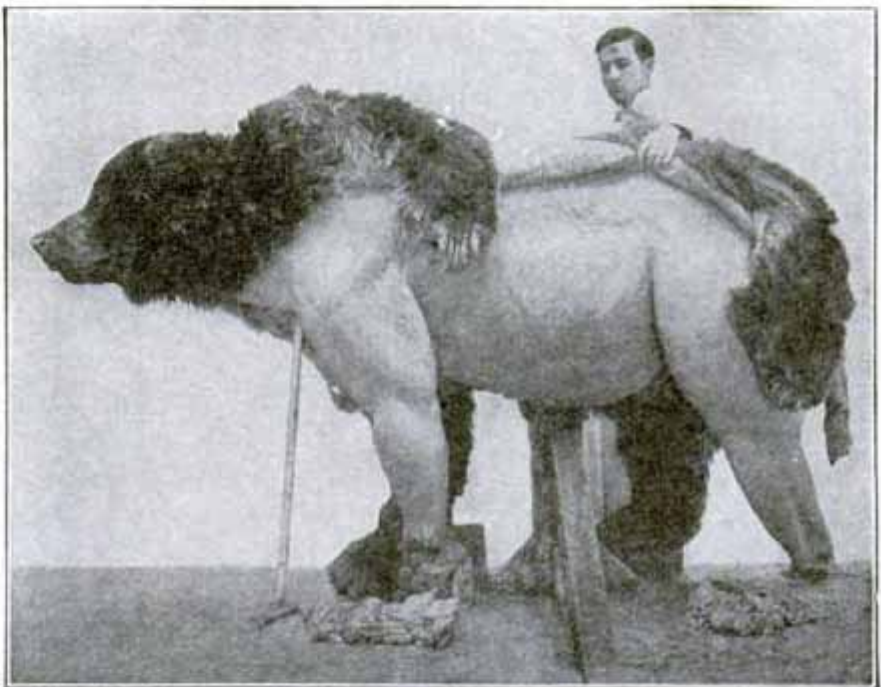
A HIGH SCHOOL AERO CLUB

A young men's aero club, affiliated with the Aero Club of California, has been organized by the students of the Los Angeles Polytechnic High School. The club has 40 members, divided into two sections, each of which is building a glider to be entered in the first meet of the Aero Club of California.

President Taft approves the lock system on the Panama canal.

WRECKED SHIP USED TO BUILD VILLAGE

That Robinson Crusoe was not the only man to avail himself of the opportunity offered by a wrecked ship to make his condition more livable on a tropical island, is clearly demonstrated by the thrift of the natives of the Island of Palmerston, far down in the South Seas. Following the wreck of a ship the natives began a rehabilitation of their village. Reed huts are torn down, and spars, oaken doors,

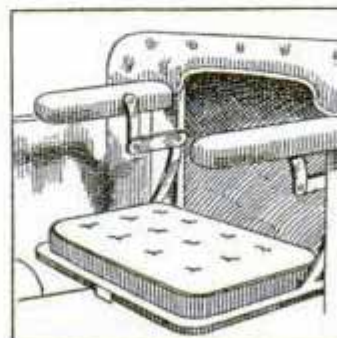


Modern Methods in Taxidermy

hatches, partitions, and other flotsam cast upon the shore used in fashioning new huts.

FOLDING AUTOMOBILE SEAT

An ingenious folding seat, part of the interior arrangement of a touring

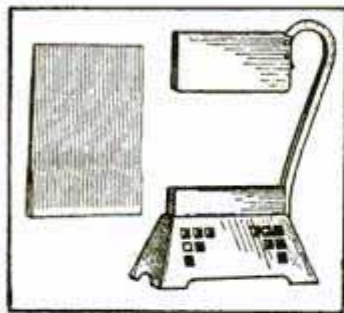


car of the double phaeton type with high doors, is creating considerable interest. The seat folds up entirely flat against the panel, the under side of the seat

being so arranged as to appear as part of the panel when closed up.

TOOTHPICKS IN BLOCKS

The toothpicks found in many of the French restaurants are in blocks,

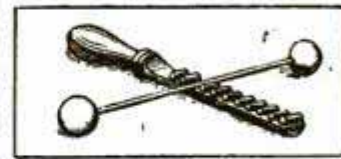


held in standards of the type shown in the illustration. The blocks are sliced into toothpicks, only the very bottom of the block being solid.

When the customer wishes a toothpick he breaks one off of the block.

THE DUMB-BELL GAME

The idea of the game is to incline the stick so that the dumb-bell will run down it, and to bring it up with a jerk that will leave the dumb-bell balancing in the last hollow. Great dexterity is required to accomplish this, as the dumb-bell either runs off the stick altogether or comes to rest on the stick before it reaches the last notch. All parts are of wood.



HOW TO MAKE A ROLL TOP DESK

The materials for this roll top desk can be purchased from a mill dressed and sandpapered so the hardest part of the work will be finished. The wood must be selected to suit the builder and to match other articles of furniture. The following list of materials will be required:

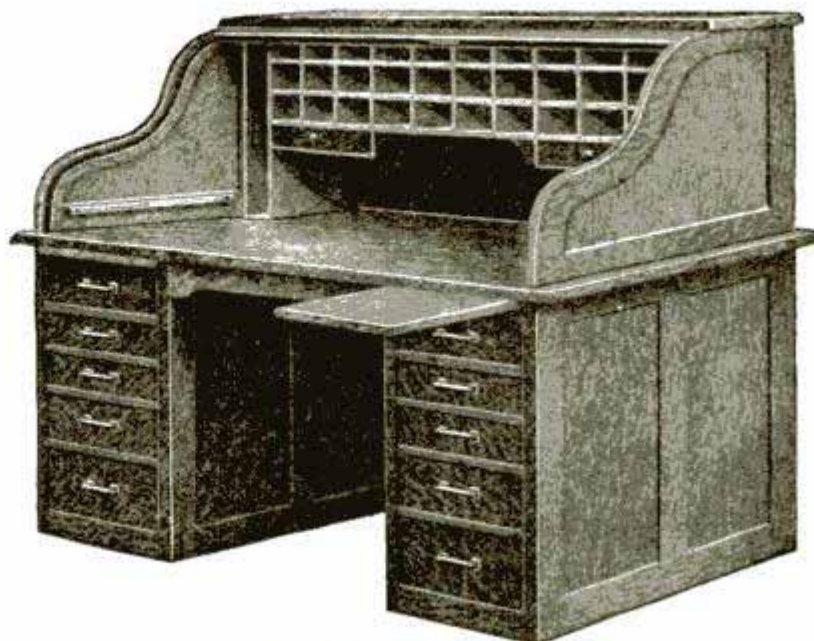
- 68 lineal ft. of 1 by 3 in. hardwood.
- 65 lineal ft. of 1 by 2 in. hardwood.
- 3 lineal ft. of $\frac{1}{4}$ by 24 in. hardwood.
- 45 lineal ft. of $\frac{1}{4}$ by $10\frac{1}{2}$ in. hardwood.
- 36 lineal ft. of 1 by 12 in. hardwood.
- 35 lineal ft. of $\frac{3}{8}$ by 9 in. soft wood.
- 100 sq. ft. of $\frac{1}{2}$ by 12 in. soft wood.
- 1 piece 34 in. wide and 54 in. long hardwood.
- 30 pieces 1 by 1 in. 48 in. long.

The upper and lower back panels are constructed very similar, the only difference being in the height. The inside edge of the 3-in. pieces are plowed with a $\frac{1}{4}$ -in. plow $\frac{3}{8}$ in. deep exactly in the center and also both edges of each 2-in. piece. The 16-in. pieces in the upper back panel and the 24-in. pieces in the lower back panel must be cut $\frac{1}{2}$ in. longer and a $\frac{1}{4}$ -in. tongue made on each end to fit into the plowed groove and form a mortise joint.

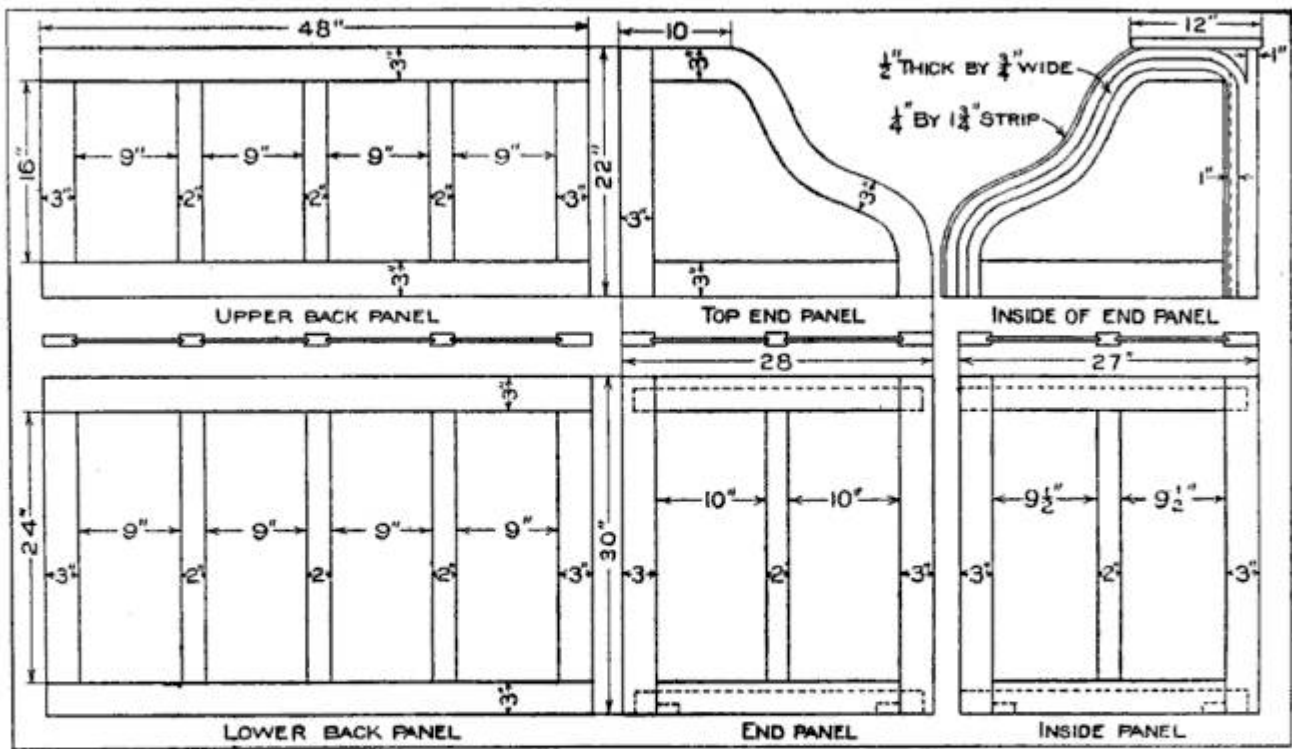
The upper back panel is filled in with four boards $9\frac{1}{2}$ in. wide and $16\frac{1}{2}$ in. long, while the four boards

in the lower back panel are $9\frac{1}{2}$ in. wide and $24\frac{1}{2}$ in. long cut from the $\frac{1}{4}$ -in. hard wood. When the grooves are cut properly, the joints made perfect and the boards fitted to the right size these two panels can be assembled and pressed together in cabinet clamps. This will make the outside dimensions as given in the drawing.

The end panels are made very similar to the lower back panel, the only difference being in the width of the filling boards, which are $10\frac{1}{2}$ in. for the outside end panels and 10 in. for the inside panels. One end panel and one



The Desk Complete



inside panel make the sides of one pedestal. As the end panels are 1 in. wider than the inside panels they overlap the back panel and cover up the rough end of the boards. A 1-in. piece 2 in. wide is fastened at the top and bottom of each end and inside panels as shown by the dotted lines. The lower back panel is fastened on by turning screws through the back and into the ends of these pieces. The bottom pieces have 2-in. notches cut out, as shown, into which to fit two cross-pieces across the bottom of the pedestal for holding the casters. The top end panels are made as shown in the drawing, the inside edge of the pieces being plowed out, making a groove the same size as in the other pieces of the panels. The panel board is cut to the proper shape from the $\frac{1}{4}$ -by-24-in. material. The length given in the material list will be sufficient if the pointed ends are allowed to pass each other when laying out the design.

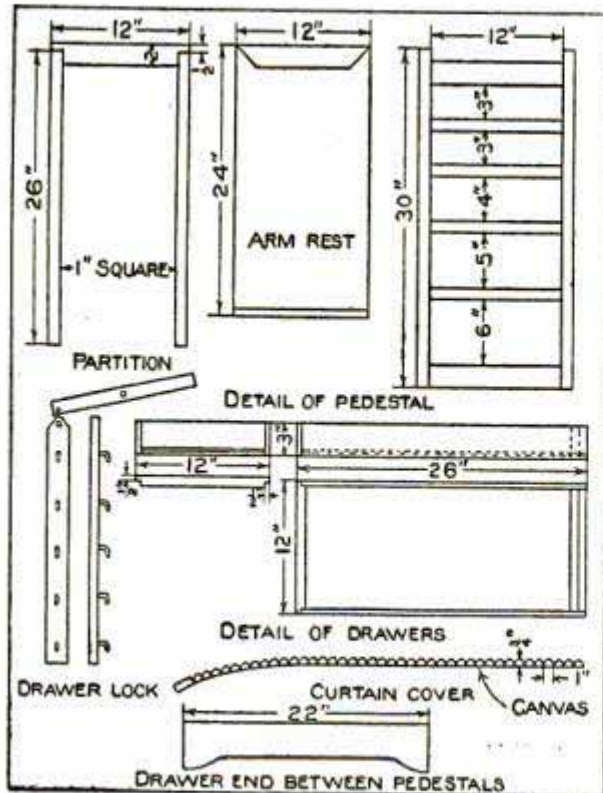
Instead of cutting a groove for the roll top curtain, one is made by fastening a $\frac{1}{2}$ -by- $\frac{3}{4}$ -in. strip $\frac{7}{8}$ in. down from the edge and on the inside of the panel. A thin $\frac{1}{4}$ -by-1 $\frac{3}{4}$ -in. strip is bent to form the shape of the edge and fastened with round-headed brass screws. A 1-in. piece is fastened at the back and a groove cut into it as shown

by the dotted line into which to slide a $\frac{1}{4}$ -in. back board. The top is a 12-in. board 54 in. long.

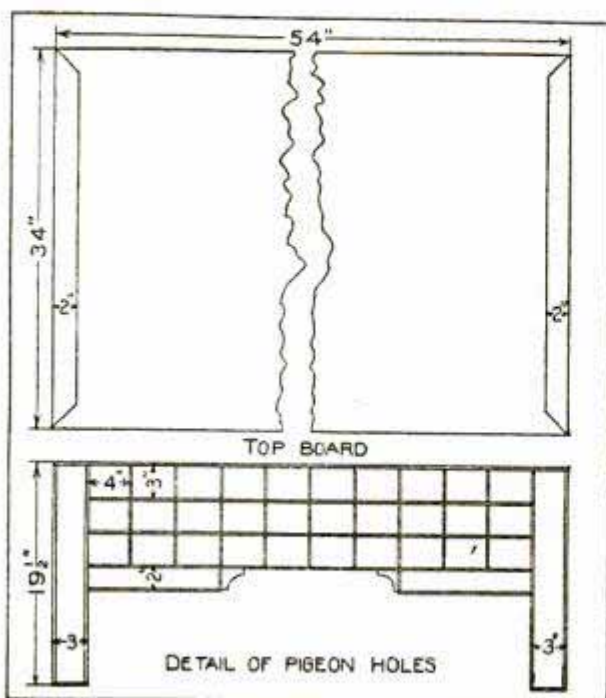
As both pedestals are made alike the detail of only one is shown. The partitions upon which the drawers slide are made up from 1-in. square material with a 2-in. end fitted as shown. Dimensions are given for the divisions of each drawer, but these can be changed to suit the builder. The detail of one drawer is shown, giving the length and width, the height being that of the top drawer. The roll top curtain is made up from 1-in. pieces $\frac{3}{4}$ in. thick and 48 in. long, cut in an oval shape on the outside, tacked and glued to a piece of strong canvas on the inside. The end piece is 2 in. wide, into which two lift holes or grooves are cut and a lock attached in the middle of the edge. A drawer lock can be made as shown and attached to the back panel and operated by the back end of the roll top curtain when it is opened and closed.

The top board, which is 34 by 54 in., can be fitted with end pieces as shown or left in one piece with the edges made rounding.

At this point in the construction of the parts they can be put together. The sides of each pedestal are fastened together by screws passed through the 1-in. square pieces forming the parti-



tion and into the sides of the panels. When each pedestal is put together the lower back panel is fastened to them with screws turned into the pieces provided as stated in making the end panels. The top board is now adjusted with equal edges projecting and fastened in position with finishing nails. As the top panels cover directly over where the nails are driven, the heads will not show. The upper back panel is fastened to the curved ends and the whole top held to the top board with

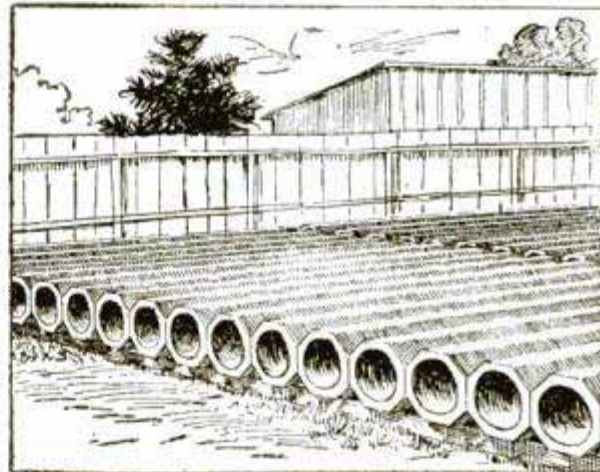


cast corner brackets that can be purchased at any hardware store. The top should not be drawn together too close before the $\frac{1}{4}$ -in. back board is put in the grooves and the roll top curtain placed in position.

The detail showing the pigeon holes gives sizes for 30 openings 3 by 4 in., two book stalls at the ends 3 in. wide and two small drawers. This frame is built up as shown from the $\frac{3}{8}$ -in. soft wood, and fastened in the back part of the top with small brads.

HOLLOW CONCRETE PILES

The hollow concrete piles shown in this illustration are used in a new seawall in the harbor of San Francisco.



Used in a New Seawall

They are octagonal, and have an outside diameter of 24 in., and a circular inside diameter of 19 in. Reinforced longitudinally with twelve $\frac{3}{4}$ -in. steel bars and circumferentially with a spiral of No. 1 wire, they stand driving surprisingly well. A number of them were driven under a hammer weighing 4,600 lb. with an 8-ft. drop. They were cast horizontally, the concrete being wheeled directly over the forms and poured into the spaces for the piles.

That the use of aerial tramways is not limited to short distances is shown by one constructed at Grand Encampment, Wyoming, having a length of 16 miles.

DURABLE INCANDESCENT RODS FOR GAS LIGHTING

The ordinary incandescent gas mantle, so easily destroyed by a strong current of air or by being otherwise jarred, has a much more durable substitute in a new incandescent "bushlight" now being demonstrated in England. The



actual incandescent material takes the form of a series of rods, clustered as shown in the illustration.

Besides the consideration of the light the clusters give, which is greater

than that of the ordinary incandescent mantle, the most important feature of the system is the exceptional durability of the rods. Although sufficiently fragile to be broken by a deliberate attempt, it requires a very severe shock from without to affect them. Their rigidity, also, is said to render them practically immune from the effects of a severe draught and the destructive action resulting to the mantle from the continual lighting up and extinguishing of the burners.

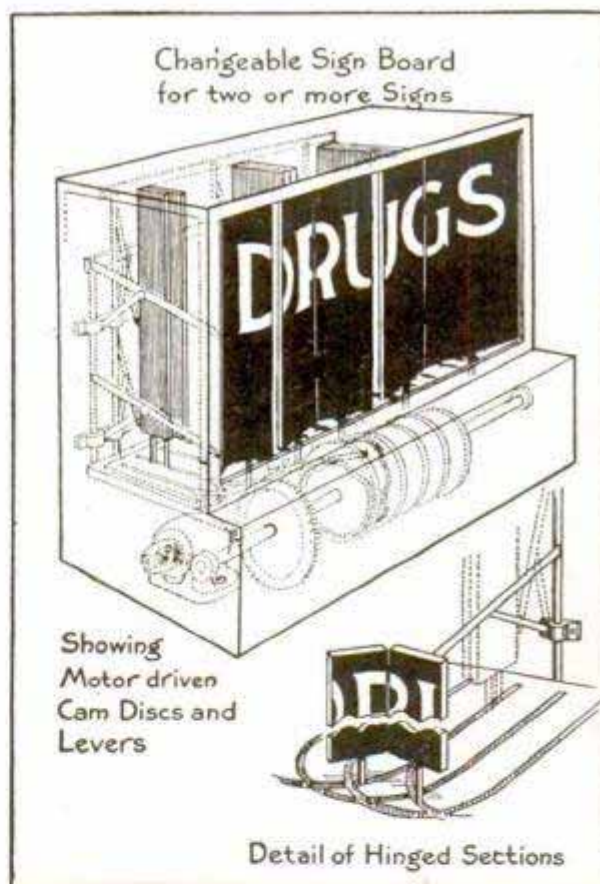
Although the rods shown are the most common form of the new fixture it is stated that the filaments can also be constructed as stars, baskets of flowers, or other desired shapes, and that the color of the lights can be varied by altering the chemical composition, thus making possible interesting schemes of decoration.

More than 400 fox skins were harvested on an Alaskan island fox farm recently. The pelts averaged \$60 apiece.

WORDS AND SENTENCES CHANGED BY A NEW MECHANICAL SIGN

Various kinds of signs have been invented to attract attention of the passing public. Electric flash signs that will spell out a name of a short sentence have proven to be the best sort of street advertising. These signs have the one disadvantage of being used only at night. Herewith is illustrated a machine that may be constructed with any number of changes in spelling out of words and used as a sign for both day and night.

The mechanism is run by a small electric motor. Cams are fitted to a shaft in the lower part of the sign, and these cams operate levers which in turn operate hinged doors which are carried



For Both Day and Night

on the levers to the front. While one set of levers carrying hinged doors are going forward another set are returning, thus changing the letters stenciled on the hinged doors. This makes an appearing and disappearing action that does not fail to attract attention.

SPECTACLE HOLDERS FOR YOUNG CHILDREN

When very young children squint, or for other reason require glasses, doctors are often at a loss to know how to arrange them so that they will be held in their proper position without putting undue pressure on the delicate bridge of the nose. An English specialist, says Optical Journal, solves the problem by fastening a piece of tape, which may or may not be elastic, around the back of the head. This tape passes through eyes formed at the ends of the straight temples of the glasses.



Journal, solves the problem by fastening a piece of tape, which may or may not be elastic, around the back of the head. This tape passes through eyes formed at the ends of the straight temples of the glasses.

MINING AND PREPARING MEERSCHAUM

The great meerschaum mines of the world are in Turkey, Asia Minor, but they are only great in the size of the white clay-like mineral found there, not in the manner of its mining. They are worked in the most primitive manner by a foreman and two to five workmen with picks. Sometimes the red earth in which the meerschaum is found is only a few feet, but ordinarily it is at a depth of from 60 to 120 ft.

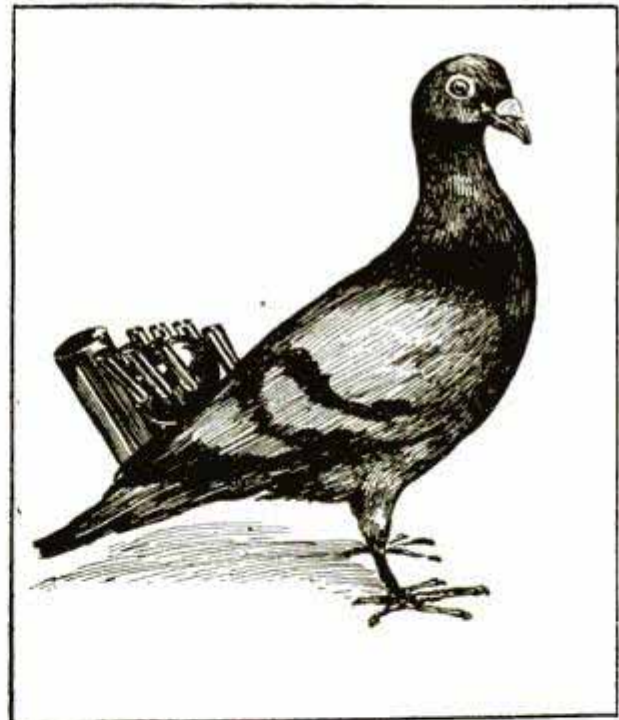
These mines are not owned by private individuals, and permission to mine them is received on request to the Turkish administration. The pits at Nemlau are said to have been worked in this manner for the past 2,000 years.

The size of the nuggets of meerschaum rarely exceeds 12 to 16 cu. in., and the greater number are of the size of a walnut. The mines, which at one time reached from Kahe to Mihalitch, on the Sea of Marmora, are today reduced to about 1,300 pits, giving employment to but little more than 5,000 miners.

When the meerschaum is brought to the surface it is first cleaned by scraping with a special knife, and in this state it is sold to the local merchants, who dry and clean it, polish it with wax, and then sort it into qualities and sizes. There are 13 recognized qualities. The annual exports amount to 5,000 cases, with an approximate value of \$260,000.

CHINESE ATTACH WHISTLES TO PIGEONS

In China it is not uncommon to hear a melody of soft sounds, and on looking upward to locate them, discover that they are made by flying pigeons. Pigeon whistles are much favored in China, especially in Peking. They are made of bamboo tubes, or of gourds, and attached to the tail-feathers of the birds, the sounds being

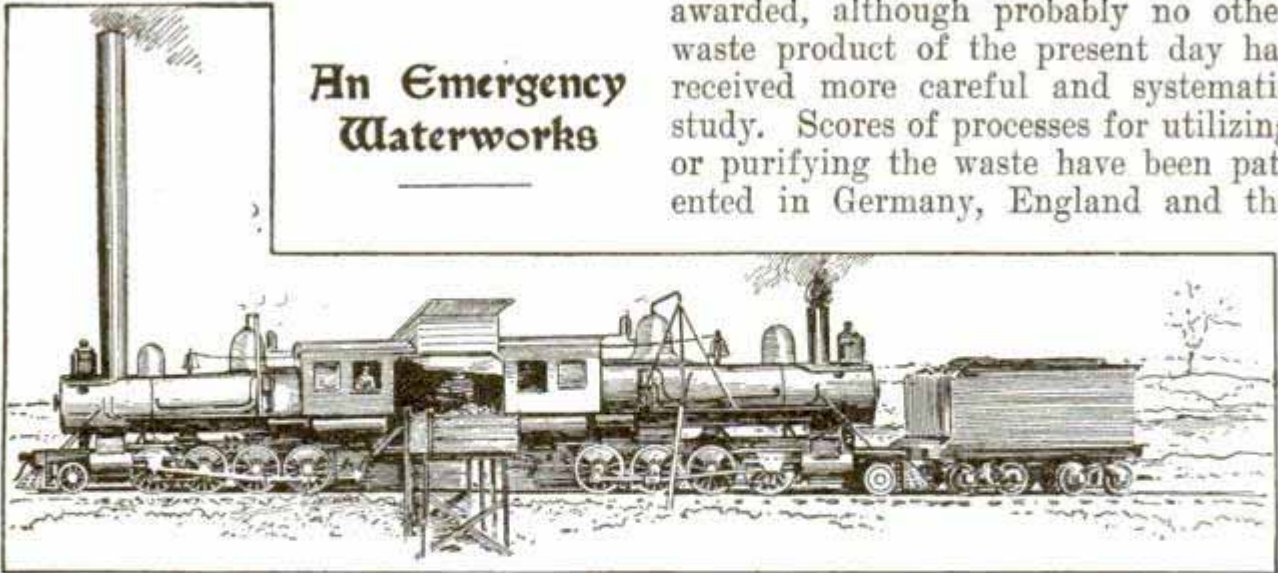


Whistles in Flight

made by the rush of air through them while the pigeons are in flight.

The shipbuilding plants in Baltimore turned out 39 ships during 1908, the total value of which amounts to \$1,476,900.

An Emergency Waterworks



awarded, although probably no other waste product of the present day has received more careful and systematic study. Scores of processes for utilizing or purifying the waste have been patented in Germany, England and the

During the water famine last summer and fall, caused by the exceptional dry spell, the officials of the railroads had to develop considerable ingenuity to meet the demand for water in the shops and roundhouses.

One of the most novel pumping stations thus made necessary was installed by the Pennsylvania railroad at Lloyddell, Pa. Two engines were backed together, with tenders removed, on a siding running along the edge of a stream of water, and a staging was built between them for coal. To get the necessary draft for the engines' fireboxes, a stack 50 ft. high and 2 ft. in diameter was fitted over the stubby funnel of one of the engines, and for the same purpose a steam jet was placed in the funnel of the other. Two pumps were placed in position and connected by steam pipe lines to the domes of the engines.

POLLUTING STREAMS WITH WASTE MATERIAL

More than 3,000,000,000 gal. of waste liquors resulting from the manufacture of paper pulp by the sulphite process are annually discharged into the streams of the United States. Of this enormous amount 10 per cent by weight, or more than 2,500,000,000 lb., is solid matter, mostly organic and of an extremely undesirable character. A prize of \$2,500 was offered in 1894 by Denmark for the best means of preventing this pollution, but it still remains un-

United States, but none of them has been sufficiently successful.

A PORTUGUESE STRAW RAINCOAT

In some parts of Portugal the shepherds and sometimes men of other vocations wear mantles made of straw. These garments envelop the entire body and keep out the heaviest rain. Straw

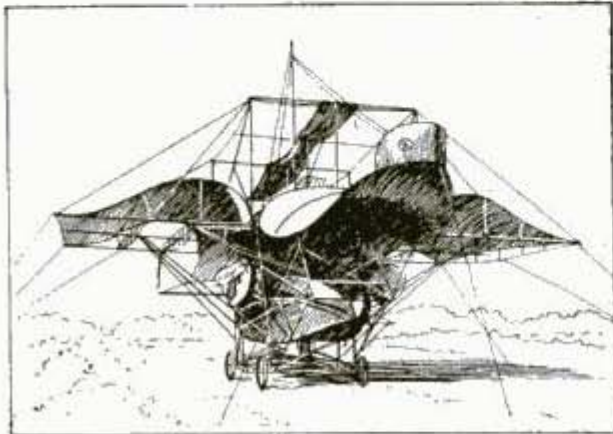


Shepherd Wearing Straw Coat

has been used for many ages as a protection from rain, the straw-thatched roof being the most familiar example, and it is a well-known fact that a properly constructed stack of wheat sheds water and protects the interior.

A KANSAS AIRSHIP

The Girard flying-machine, invented by Henry Lawrence Call, will soon be tested at Chanute, Kansas. The machine weighs 3,000 lb., and has



A Curious Idea

a canvas sustaining surface of 2,300 sq. ft. Seven adjustable planes are grouped around one central plane. The machine is driven by four propellers, operated by two 40-hp. gasoline engines, one on a side.

MOTOR HEADGEAR FOR WOMEN

Along with the first crude automobile came automobile headgear of all kinds and varieties for women, but every hat was as hideous as the cars were crude, serving only for protection and lacking as a chic adornment. Gradually the styles of automobile headgear changed,



New Style Motor Hats—From Motor, London

as is shown by these illustrations of a number of hats recently exhibited at the London automobile show. All of them are designed for the hard usage a hat necessarily receives on automobile trips, and some are as rakish as a gentleman's roadster.

TRAIN TEARS OFF CORNER OF 4-STORY BUILDING

In a collision caused by a switchman inadvertently turning a string of moving freight cars into a short spur track the corner of this 4-story office building of the Atlantic Coast Line railroad at

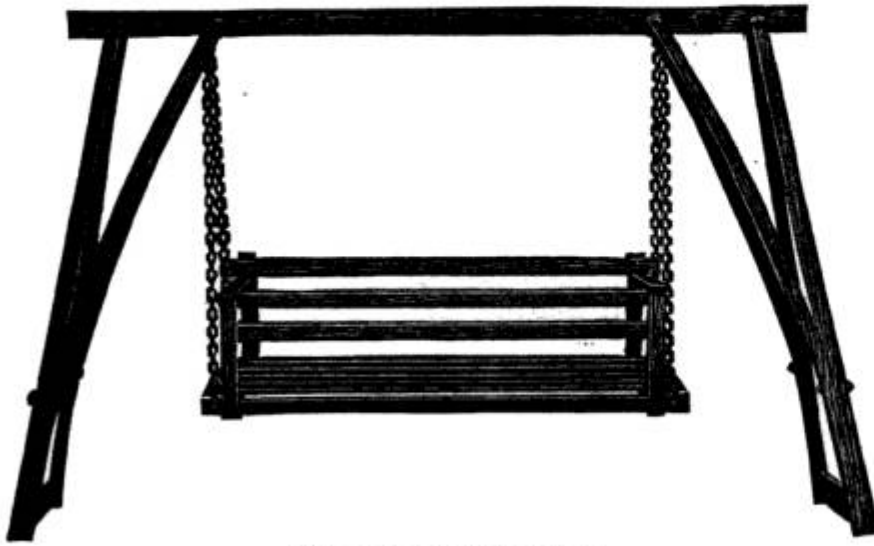


An Unusual Accident

Wilmington, N. C., was torn off for its entire height. The train of loaded cars was a long one and, it being dark, the crew of the engine which was pushing it was unaware that it had left the main track until the first car had struck and

mounted the abutments, with the results shown.

The production of Portland cement in the United States for the year 1908 is estimated at 40,000,000 bbl.



The Completed Swing

AUTOMOBILES AS COWBOY STEEDS

Senator Warren in a recent discussion in the U. S. Senate declared that on his ranch in Wyoming automobiles are used to hunt up and save horses that have strayed, and that on several occasions his automobiles have been driven 200 miles to round up and save sheep that otherwise would have perished.

The statement was brought forth in the discussion attending the increase of pay and the expense allotment for the President, in which Senator Bailey, of Texas, offered an amendment to eliminate the words "other vehicles" so as to prevent the purchase of automobiles. He delivered a glowing tribute to the horse in which he said that it is the noblest of God's dumb animals and that he did not want to see it supplanted by a senseless machine.

According to other participants in the discussion Senator Bailey did not take into consideration the fact that a horse tires if driven a long distance on a hot day, and that the automobile saves this noble animal when substituted for him under such conditions.

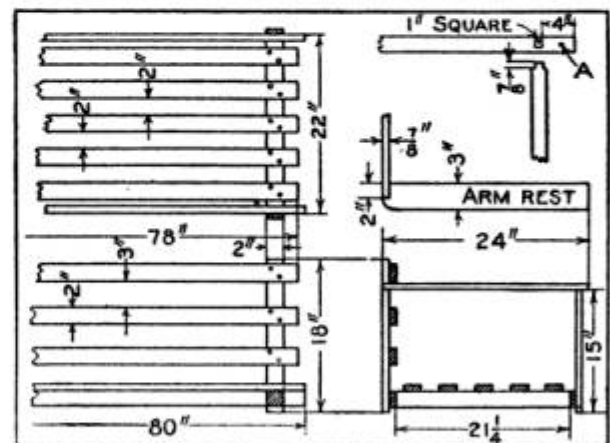
HOME-MADE LAWN SWING

The coming of spring and summer calls forth various kinds of porch and lawn furniture. A porch or lawn swing to accommodate two or more persons is a thing desired

by most people. The lawn swing as shown in the picture is portable and does not need stakes to hold it to the ground. While this swing is substantial and rigid it can be moved from place to place on the lawn, or the chains can be fastened with heavy hooks to the ceiling of a porch instead of using the stand. Either ropes or chains may be used to hang

the swing and should be of such length that the seat will be about 20 in. from the ground or floor.

The drawing giving the dimensions for constructing the seat shows how the parts are put together. The front and back apron pieces are mortised to receive a 1-in. square tenon cut on the crosspieces that support the slats. Each end of the apron pieces extends 4 in., and a hole is bored at A into which the hanging ropes or chains are fastened. If ropes are used, bore the holes to fit the rope and when the end of each rope is put through a hole it is tied in a knot to keep from slipping out. Chains can be fastened with eye



Details of Seat

bolts. Small carriage or stove bolts are used to hold the slats on the framework and cross pieces. The arm rests are fastened with wood screws.

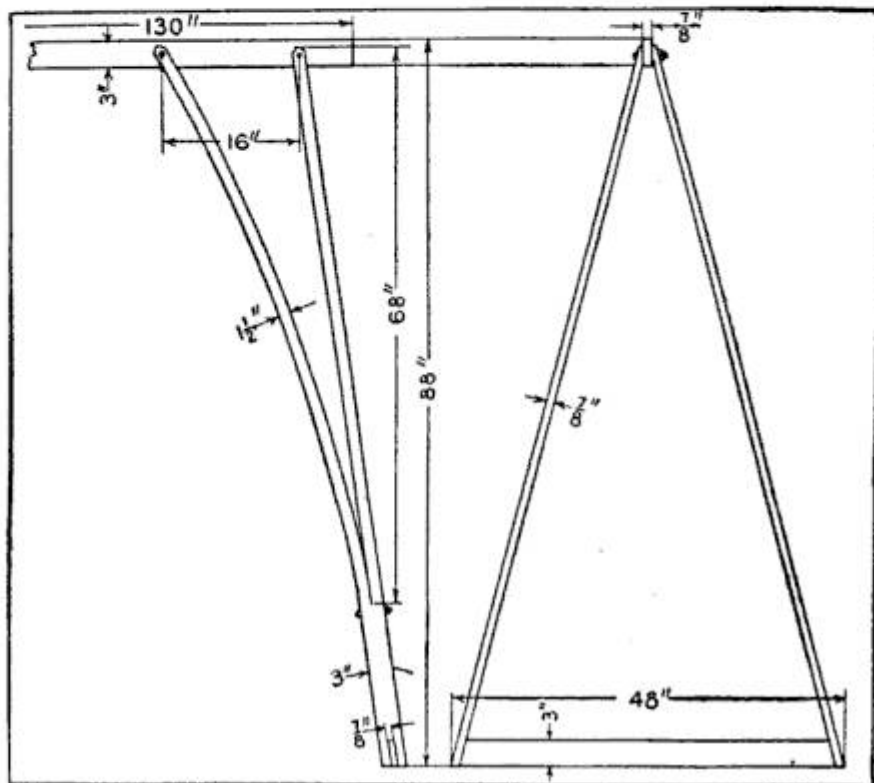
The drawing for the stand gives all the dimensions for its construction.

Split the upright pieces or legs with a saw cut to the length as shown. A bolt should be put through each piece edge-wise at the end of the saw cut, to keep the wood from splitting any farther when the ends are spread to receive the bolts through the cross pieces at the top. The upper ends of the ropes or chains are fastened close to and under the bolt holding the inside forks of the uprights. This bolt can be long enough to fasten a clevis that will hang underneath for this purpose. The whole swing can be painted with a forest green color which is very suitable for summer outdoor furniture.

DERRICK CAR FOR HANDLING RAILROAD RAILS

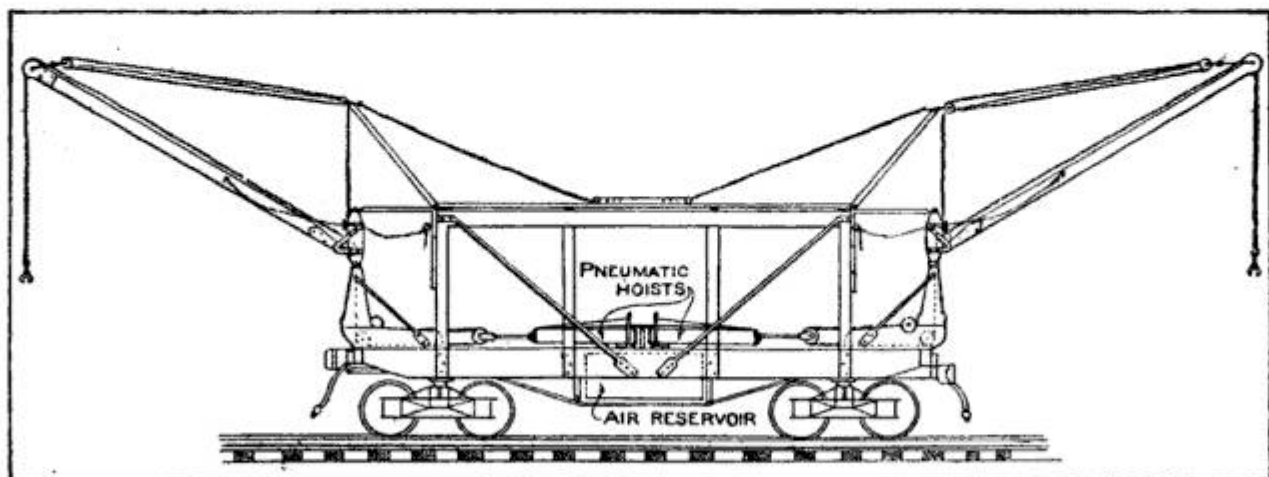
The increase in the weight of railroad rails in recent years makes the use of machinery for handling them a necessity. A number of railroads have appliances for this purpose, but an

unusual type is adopted by an eastern railroad. The machine consists of a flat car with a derrick at each end which is worked by a pneumatic hoist, taking air from the brake system. The car carries an air reservoir connected di-



rectly with the train line, and when this tank is to be filled the engineer allows the air pump to run the pressure up to 80 lb. When the train is moved a valve is closed, shutting off the connection between the train pipe and the reservoir. The reservoir will hold sufficient pressure to handle 20 rails after being shut off from the train line.

The accompanying illustration shows the construction of the derricks. Each cylinder operating a derrick has a pis-

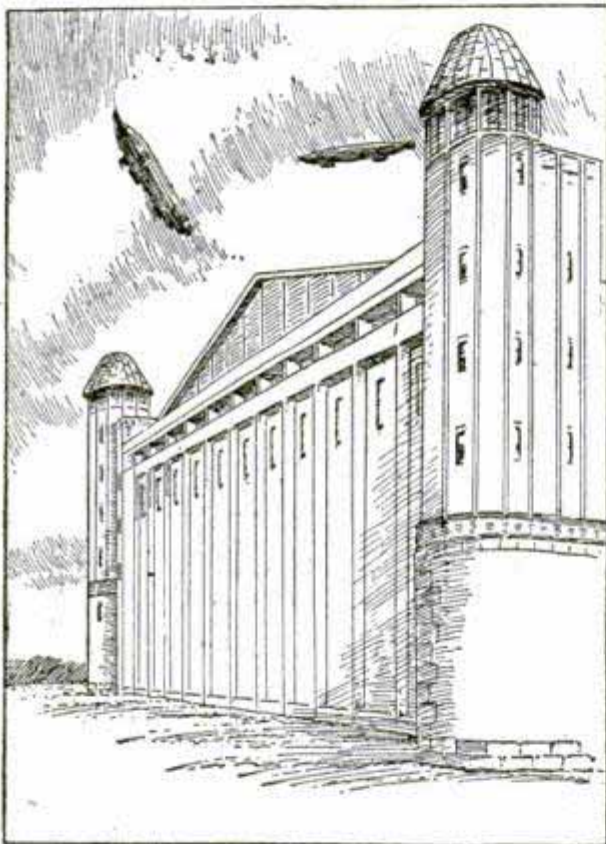


Car for Handling Rails with Compressed Air

ton with a travel of 7 ft., and a pulley is attached to the end of the piston rod. A full movement of the piston pulls the hoisting cable 14 ft. The hoisting cylinders for the two derricks are independent, each being worked by a separate air cock. Both derricks can be worked simultaneously in loading or unloading rails.

GREAT HOUSE FOR AERIAL WARSHIPS

So sure is Germany that the dirigible airship will be of great value in times of war that she is not only preparing to



Proposed Airship Garage

build a number of airships of the Zepelin type, but plans have been made for a great garage or house in which to house her aerial fleet. It is proposed to erect the building at Friedrichshof.

DIRIGIBLE AIRSHIP TO CARRY FREIGHT

A new dirigible airship, invented by Professor Schuette, of the Technical high school at Danzig, Prussia, is designed to carry between 4,000 and 5,000 lb. of freight, in addition to the

usual outfit and crew. The balloon will be 310 ft. long and about 50 ft. in diameter, and the skeleton frame will be made of double diagonal wooden ribs, instead of aluminum. The car or basket will be 120 ft. long and 12½ in. wide. The propelling force will be generated by two 150-hp. engines.

A WONDERFUL CLOCK IN SAN DIEGO

San Diego, Cal., has a wonderful clock with 20 dials, which tell simultaneously the time in all parts of the world, also the days of the week and the date and month. It stands 21 ft. high and four of its dials are each 4 ft. in diameter.

The master clock is enclosed in plate glass, so that every action can be seen, and the whole is illuminated every night. It is jeweled with tourmaline, topaz, agate and jade, and took 15 months to build. The motive power is a 200-lb. weight, which winds itself automatically. The cost of the clock was \$3,000.



A ship recently sailed from Germany with 5,000 cats for Japan. They will be used to kill rats.

Work on the two 860-ft. White Star liners was commenced in January. They will be the largest ships afloat.

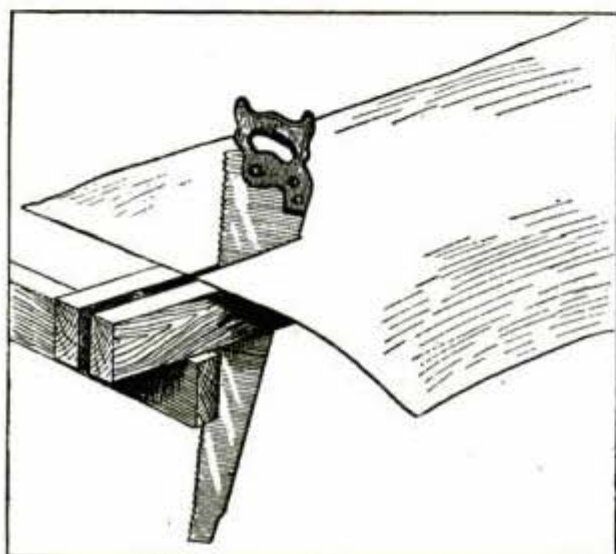


SHOP NOTES



Cutting Tin with a Hand Saw

A carpenter's kit of tools does not usually contain a pair of tin snips, and when he is putting on siding or finishing a fancy gable, he finds it necessary to use some tin strips. The tin can be cut with the back of a hand saw. Place two pieces of material having straight edges together on a pair of

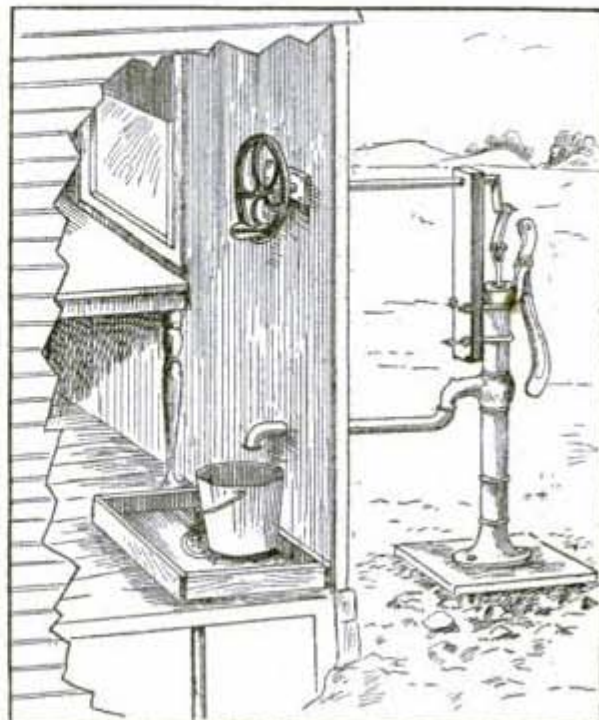


The Saw Blade Cuts the Tin

horses. Nail another piece across the bottom of the parallel pieces and put the saw in between them. Place the tin flat on top of the pieces back of the saw and pry down on the saw handle, as shown in the sketch, and the back of the saw blade will cut as good as tin snips.

Outside Pump Operated from Within a House

The accompanying sketch shows a method of operating a pump situated outside of a building while the operator is on the inside. This device can be used on a pump where the well is close to the house. A shaft and crank operates a pitman that drives the pump rod. The shaft is fitted with a hand crank wheel on the inside of the build-

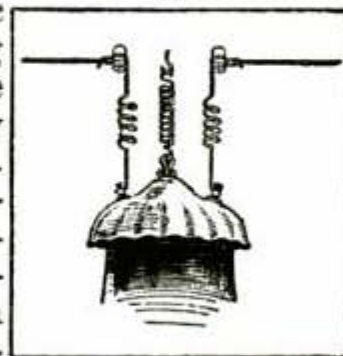


A Shaft Operates the Pump

ing. An extension spout allows the water to run in the sink inside the house.—Contributed by Harry R. Bowers, Altoona, Pa.

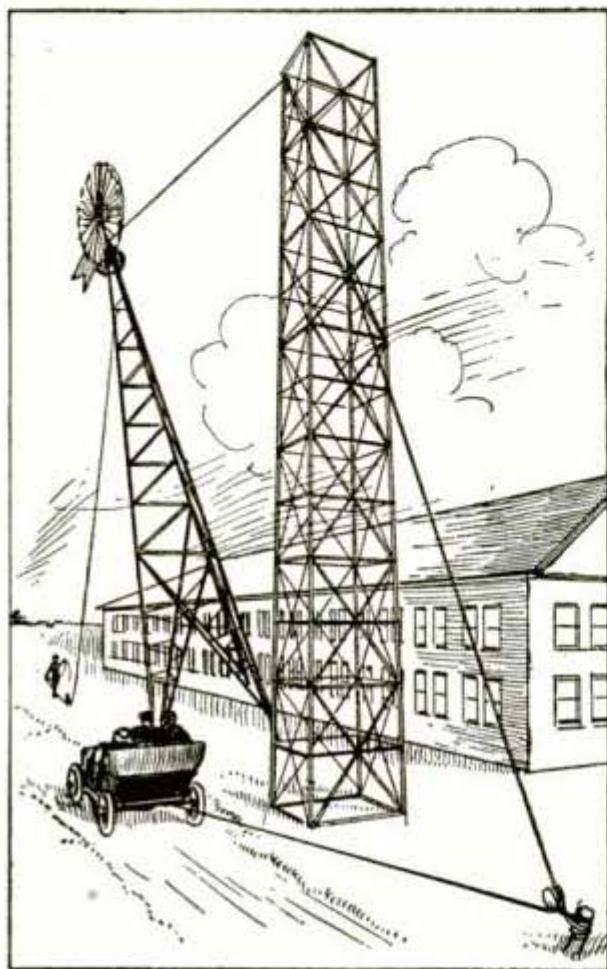
Arc Lamps Hung on Coil Springs

Considerable trouble was experienced in a textile mill with the upper carbons in inclosed arc lamps slipping through the clutch caused by the vibration. This was remedied in an inexpensive manner, as shown in the accompanying illustration. The lamps were suspended on a coil spring 6 in. long. Springs used for this purpose must be made in such size as to carry the weight of the lamp and yet have sufficient resiliency to take care of the vibration.



Erecting Windmills with an Automobile

The accompanying sketch shows how an automobile assisted in erecting a



Hoisting the Windmill

tower for a high windmill. Instead of using horses and a windlass the rope was attached to the rear end of a 20-hp. automobile which hoisted the tower into position easily. The rope ran over single pulleys and no tackle was necessary.

Home-Made Engine Room Chair

Secure an old sugar barrel and saw out a part of one side as shown in the sketch. Bore $\frac{1}{2}$ -in. holes 2 in. apart on the line where the seat and back are to be placed and make a network of baling rope to hold the cush-



ions by running the rope through the holes. The cushions are made from excelsior and covered with burlap or cloth.

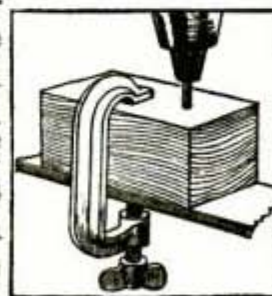
Moving a Tank by Floating in Artificial Pond

The timber foundation of a steel water tank in Pittsburg, 25 ft. high and 40 ft. in diameter, with a capacity of 235,000 gal., became decayed after 10 years of service, and it became necessary to substitute a concrete foundation in its place. To allow of this the tank was moved horizontally from the wooden foundation by an ingenious method of floating.

Calculations were first made to determine how much water would be required to float it, and marks were made on the side of the tank to indicate the draft. An embankment was accordingly built large enough to surround the existing and the temporary foundation and posts were driven in the ground to form its temporary resting place. Water was then let into the artificial pond from an adjoining tank, and the first tank was floated over the posts. Before the water was let in the wooden foundation was pinned down with long drift bolts driven through into the ground. The water was then allowed to escape and the concrete foundation was constructed. When this was sufficiently set the pond was filled again and the tank floated back to its original position.

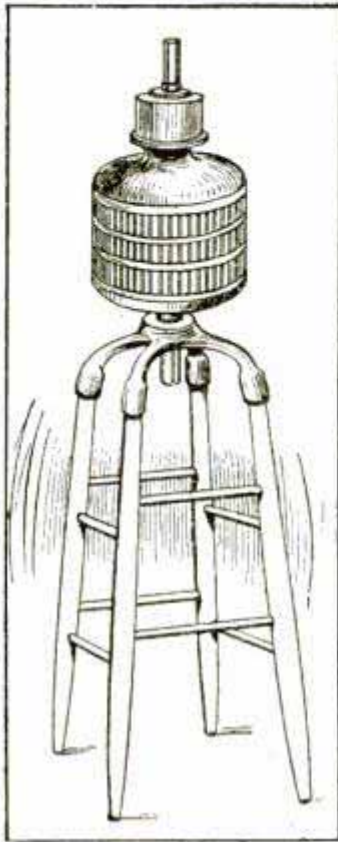
Safe Way to Use Small Drills

A small twist held in a breast drill chuck is very liable to break when drilling metal because of the pressure and the uneven pull on the gear wheel. Clamp a block of wood to the metal as shown in the sketch and drill the hole through both wood and metal and you will avoid the breaking of drills.



Stand for Holding Armatures While Repairing

When repairing, soldering wires to commutator bars or rewiring armatures the work is difficult unless you have

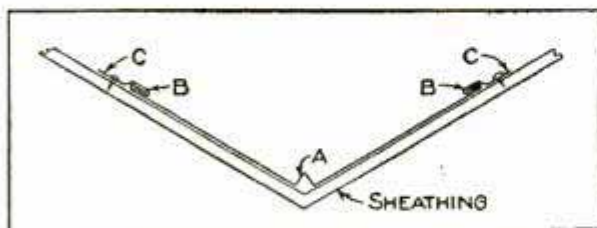


your shop equipped with the necessary appliances. An armature is easily accessible when standing on end. This can be done by placing one end of the shaft in a hole bored in the bench for that purpose. The accompanying sketch shows a device used by an electrician which is even better than a hole bored in the bench. This person uses an old desk stool after

removing the seat part. The armature shaft fits into the casting of the stool and holds the armature in a vertical position. Any part of the armature can be reached without having to turn it around.

How to Construct a New Copper Gutter

The gutters on large buildings are liable to buckle and crack, which will cause a leak, says the American Artisan. As there is no way of repairing



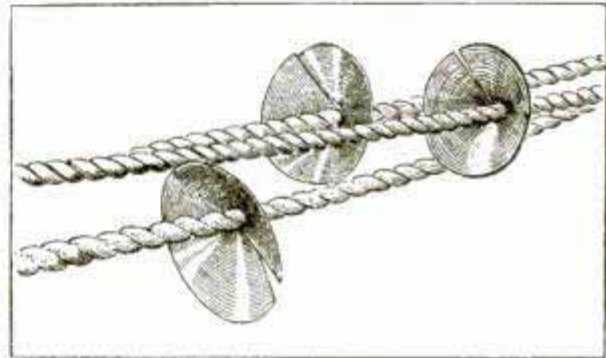
A Gutter That Will Not Crack

old copper gutters except by soldering, the sketch shows the proper way to build a new one. The copper sheet is

bent with a crimp in the lowest part of the gutter as shown at A, and fastened with a $\frac{1}{2}$ -in. turn over seam B to a clip C that is $1\frac{1}{2}$ in. wide. This clip is fastened to the sheathing with copper tacks.

Keeping Rats from Climbing Ropes

The ropes used for tying boats to wharves provide a means for rats to enter the boat. Illustrated herewith is a device to place on ropes that will block the way of the rodents. A piece of tin is cut circular with a diameter of about 12 in. and a hole made in the center the size of the rope on which it



Rats Cannot Pass the Tin Disks

is to be used. A three-cornered piece is cut out from one side so the tin can be slipped over the rope. When placing the metal on the rope, bend it slightly cone-shaped.

Keeping Moisture from Fire Alarm Boxes

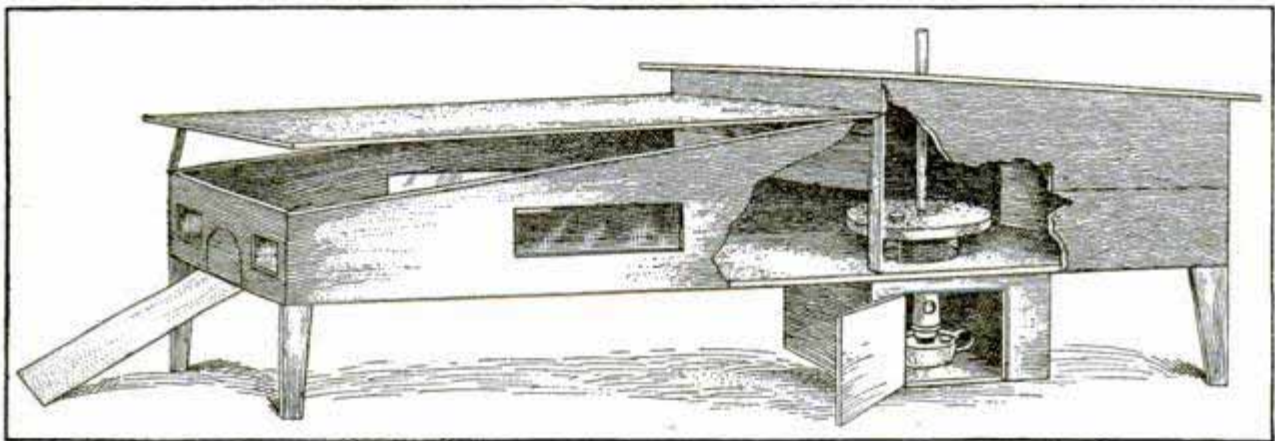
Fire alarm, police telegraph and all other metal boxes containing mechanism of any kind and which are exposed to the weather are not only liable, but do collect moisture, causing the different working parts to rust. This makes the instruments unreliable and greatly shortens their life. This fault can be easily overcome by placing heavy blotters in the boxes to take up the moisture. These blotters should be changed from time to time and the ones removed thoroughly dried out.—Contributed by Warren E. Fastnacht, York, Pa.

How to Make a Brooder

A brooder is necessary to care for little chickens after they come from the incubator. The beginner in the poultry business can make a brooder that will answer every purpose for the little chicks. First secure two boards 12 in. wide and 8 ft. long. From one end of each board make a mark $3\frac{1}{2}$ ft. and cut the edges sloping toward the end, leaving the end 10 in. wide. Saw down 2 in. deep on the $3\frac{1}{2}$ -ft. line and cut the edges from that point toward the other end, leaving that end 8 in. wide. The end pieces are cut 2 ft. wide and of the proper width for their respective places. When these pieces are nailed together this will form the outside of the

center of such a diameter as to fit over a metal lamp chimney. The lamp chimney extends up into this cylinder and a small pipe is put through the disk and soldered. This allows the heat to pass through both cylinder and disk and the heat is then carried out through the cover with another extension of the small pipe. A heavy screen is cut and formed into a cylinder 4 in. high and of a diameter sufficient to keep the chicks away from the hot tin.

A box about $1\frac{1}{2}$ ft. square is made and fastened to the under side in which to place the lamp. This box should be provided with a hinged door and also some holes should be bored in the sides near the bottom for air. A common incubator lamp is used for making the



The Brooder Keeps an Even Temperature

brooder. Boards are cut to the proper length and nailed to the straight edges of the sides to form the bottom. The top consists of two hinged covers made of boards held together with cleats and covered with oilcloth to shed water.

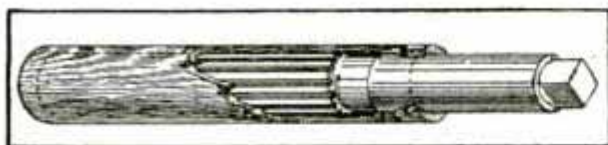
Cut a hole in the center of the bottom in the smallest compartment 5 in. in diameter. Holes are cut and glass supplied for windows in the larger division as shown. The windows in the sides are 4 by 10 in. A small hole is cut and a door fitted in the end, and a board, covered with coarse cloth, extends to the ground to provide a runway. Windows may be put in on each side of this door if desired. The heating device consists of a hollow disk or pan made of galvanized iron with a hollow cylinder soldered to the bottom. This cylinder has double walls with the

heat. The legs are 23 in. long, of which 8 in. are used in nailing to the sides of the brooder. A partition should be put in, filling the space to within 4 in. of the floor and between the compartments. The right temperature can easily be obtained by regulating the lamp.—Contributed by Charles E. Euret, Logansport, Ind.

Proper Care of Reamers

Great care should be taken to keep the flutes in reamers from sand or dirt that may collect in the place where they are stored. Sometimes reamers are kept in drawers where they can roll about striking together, causing the edges to become nicked or worn by the dirt. A simple method of keeping reamers in good condition is shown in

the illustration. A piece of hard wood is bored to the size of the reamer and then turned up on the outside, leaving



Receptacle for Reamers

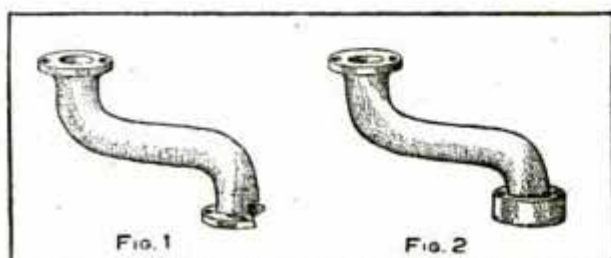
about $\frac{1}{8}$ in. of material as a shell. This forms a round covering into which the reamer can be inserted before storing away. Reamers kept in receptacles of this kind will cause no trouble in boring to the proper size.—Contributed by H. D. Chapman, Washington, D. C.

Repairing an Aluminum Intake Pipe on an Automobile Engine

An automobile was brought to our shop with the aluminum intake pipe broken on the end that is held to the cylinder with cap screws. One-half of the flange and a piece about 1 in. square was broken out, as shown in Fig. 1. Our man, who does the aluminum soldering, was not in and the car had to be ready for a long trip the same evening. We could not get a duplicate of the pipe from the agency of the machine, so it was for us to fix it, or, as Bill said, "to make good."

We first put a piece of heavy asbestos in the end of the pipe, then fastened the pipe upright to a smooth piece of sheet iron by means of a bolt through the one good hole left in the flange. We then made a mold of ordinary tin to fit the unbroken half of the flange, reversed it to the broken side and bent the tin to make the other half-circle around the unbroken side.

The flange was $\frac{3}{8}$ in. thick and broken

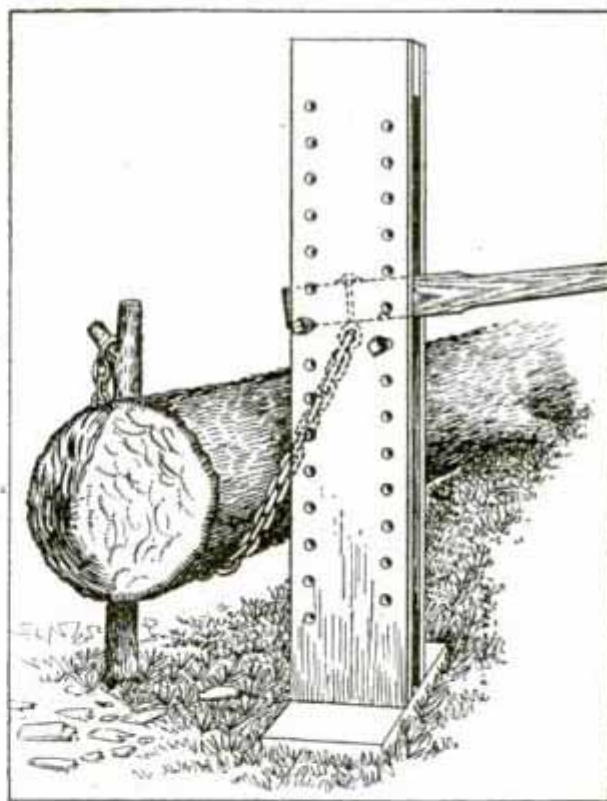


Repair on the Aluminum Pipe

part extended 1 in. above the flange. The ends of the tin were soldered together to form a complete circle around the flange and extending $\frac{1}{2}$ in. above the broken part. We then poured hot babbitt metal into the mold thus formed, and when cold the two holes were drilled through the babbitt and the pipe put on the engine with longer screws. As far as the repaired part of the intake is concerned the pipe is as good as a new one.—Contributed by G. H. Loose, San Francisco, Calif.

Home-Made Log Jack

The accompanying sketch shows a device to raise logs to be cut in stove wood or post lengths. Two boards are bolted together at each end with a 2-



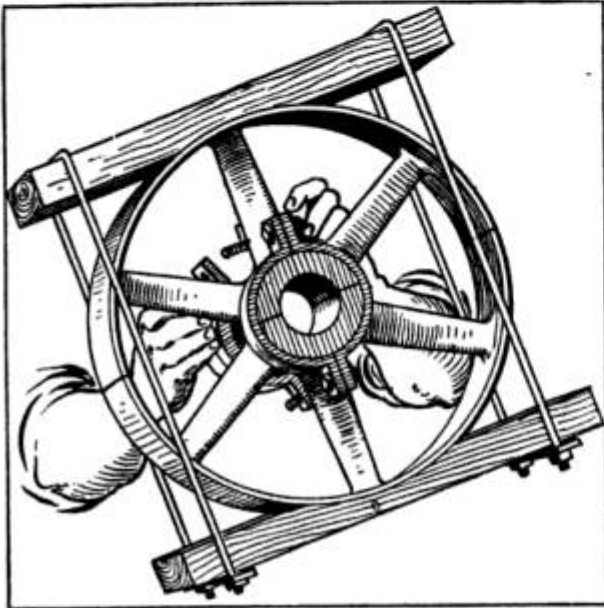
Hoisting a Log

by 4-in. piece between them. This forms an opening into which a lever is fitted and worked on pins thrust through holes bored at intervals in the two boards as shown. A chain is fastened to the lever with an eye-bolt, the end passed under the log and the large link at the opposite end hooked over one limb of a crotched stick. As the lever is worked up and down the pins

are pulled out and replaced in their turn farther up on the boards. A log can easily be raised to the proper height for sawing.

Home-Made Split Pulley

An old pulley on a line shaft in a mill broke and to supply a new one would necessitate considerable delay, says the American Miller. An unused

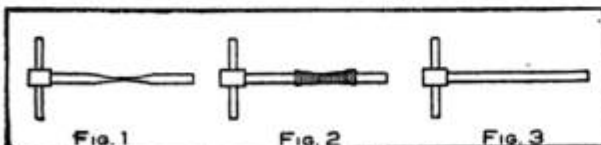


Putting the Split Pulley Together

pulley was found having the proper size, but it was not a split pulley and could not be put on the shaft. In order to make this pulley serve the purpose the pulley was sawed in half and bolted together with $\frac{1}{2}$ -in. straps on the hub. Wooden cleats were used on the face of the pulley, as shown in the illustration, to draw the parts together and make a perfect fit when the straps were bolted.

Repairing a Worn Carbureter Valve Stem

The gasoline valve stem on my automobile engine carbureter became worn, as shown in Fig. 1, by the action of the compensating valve. Instead of getting a new stem I wrapped the worn

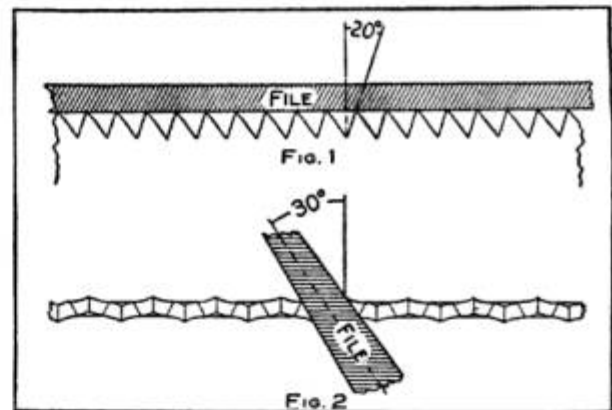


Worn Place Filled with Small Wire

part level with fine brass wire, Fig. 2, and applied solder. After filing level and smooth the stem, Fig. 3, was as good as new.—Contributed by Dr. T. V. Simpson, Yorkton, Saskatchewan, Canada.

How to File Hand Saws

Hand saws for sawing across the grain of the wood such as are in daily use by carpenters, cabinet-makers and others engaged in similar work are sharpened in the following manner: The first consideration is to properly set the teeth. This means to spread the teeth alternately on each side of the blade, so that when in use the blade will not bind in the kerf or cut made by the teeth. Setting is done with a saw set, which can be purchased from any hardware dealer. Be careful that the teeth are spread or set alike on both



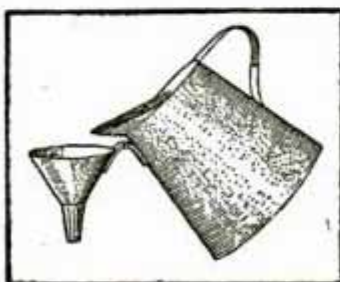
Proper Angles for Filing the Teeth

sides, else the saw will not run in a straight line. Sufficient set is more or less a matter of judgment, founded on experience, and is relative to the character of the lumber to be sawed. Dry lumber requires very little set of teeth; just sufficient to let the blade nicely clear when in the wood to its full depth. Too much set is objectionable, for two reasons: The saw makes a very rough cut and in addition requires hard labor in removing unnecessary stock. Saws for green lumber require one-fourth more set than for dry. After setting, the next step is to straighten up the points of the teeth. This is known as jointing and is usually done with a 12-in. flat mill file; a file single

cut with a medium fine pitch of teeth. Use the file lengthwise of the saw blade as near as possible, as shown in Fig. 1, and not crosswise. Now file the teeth, using a three-cornered file for all saws, except the very finest tooth saws. For these a Stubs file should be used, as it has a much sharper corner. Hold the file slightly elevated at the point and filing across the teeth at an angle of about 30 degrees, as shown in Fig. 2. Bring them up to a keen point, going over all the teeth on one side from end to end before attacking those on the other side. Be careful to keep the teeth all of one size. Do not by careless filing get every alternate tooth large and small. The back slant of the teeth should be about 20 degrees, varying somewhat upon the thickness of the lumber. Saws for very thin lumber require more back slant than for heavier work. Saws for sawing lumber lengthwise of the grains are called rip saws, and their teeth should be filed with very little angle across the tooth and practically straight up on the cutting side of the tooth. Keyhole saws have the same teeth as a rip saw. After filing the teeth properly, lay the blade flat upon the work bench, and with the 12-in. mill file lightly touch the teeth on the flat sides to remove the burr caused by cross filing. A little practice will soon enable one to file saws so they will do good smooth work and run straight.

Attaching a Funnel to a Measure

A very handy device for filling oil cans, bottles and other receptacles with small openings is shown in the accompanying sketch. A funnel is attached to a measure with a small hinge. One end of the hinge is soldered to the

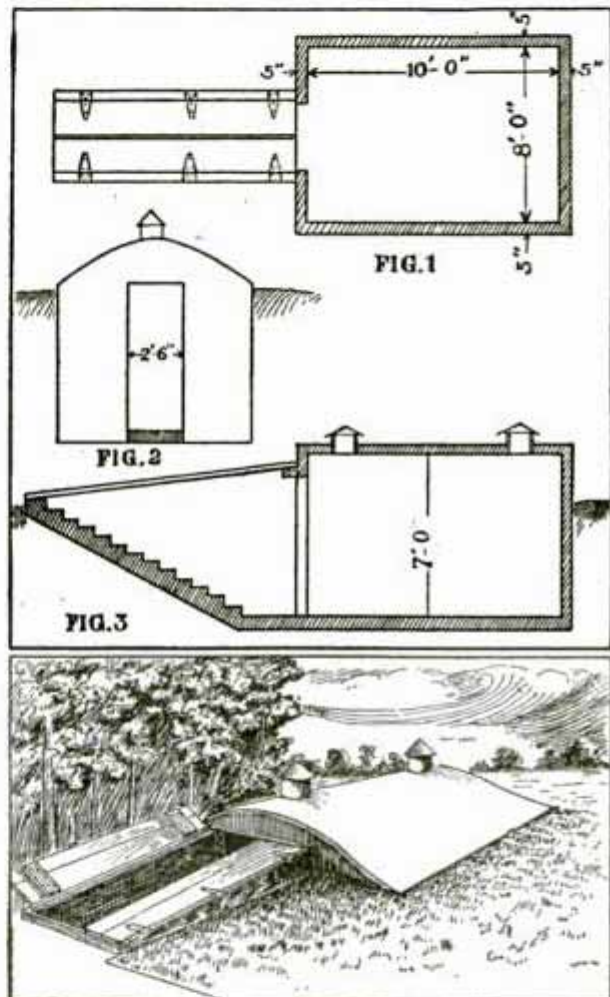


funnel and the other to the measure. By using this device you have the two nec-

essary articles always together, and in pouring the liquid is not easily spilled.—Contributed by Clarence F. Cooksen, Brooklyn, N. Y.

A Concrete Cyclone Cellar

Many farmers on the western plains have cyclone cellars. When boards and timbers are used to construct the walls the wood will rot out in a few years and have to be renewed, says Concrete Re-



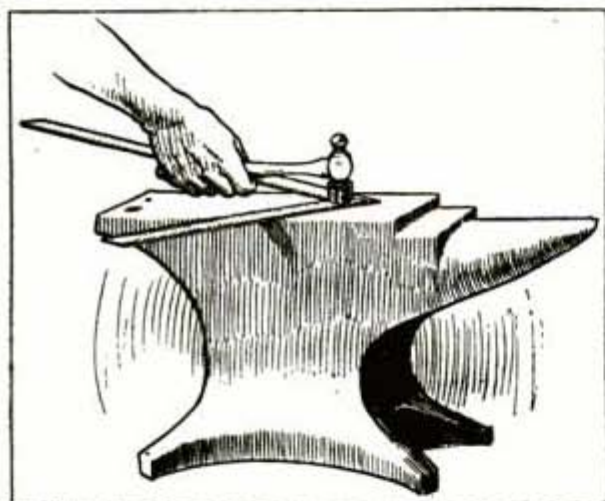
Plans for the Cellar

view. The accompanying illustration shows a cellar whose walls and roof are built of concrete. The walls are 5 in. thick and can be made by digging the hole sufficiently large to construct false work and leave an open space of 5 in. for the concrete. The roof is arched and the concrete can be put on false work to the proper thickness and smoothed over on the outside with a trowel. Tile with metal coverings over one end are fitted in the top

of the arch for vents. Fig. 1 shows the plan of the cellar with proper dimensions, Fig. 2 the doorway and Fig. 3 a cross section through the center. There is no danger of the roof blowing away or being caved in with a piece of flying timber.

Truing Up a Square or Saw

When a square is found to be out of true it can be straightened by the following method: If the arm of the square hangs out from the body part, or tends toward forming an obtuse angle, lay the square flat on an anvil, or other hard surface, and tap lightly with a small hammer, beginning at the inside corner as shown in the illustration, and increasing the force of the



Hammering the Square

blows gradually as you proceed toward the outer corner. Continue the pounding in this manner until the arm is brought back to its proper place. If, instead of hanging out, the arm hangs in, tending to form a triangle, the treatment should be reversed. Go through the same operation as above described, only begin at the outer corner.

Kinks may be taken out of cross-cut saws in the same way. Sometimes saws are thrown away on account of the back being expanded too much, which will form a twist in the saw. Such a saw can be straightened if it is laid flat on an anvil and beginning at the end just back of the teeth hammered with even

light blows until the other end is reached. Going over the saw a few times in this way will make the necessary expansion to straighten the blade. —Contributed by N. J. McLean, West Bay City, Mich.

Concrete Base for Wood Fence Posts

The difficulty of fastening the fencing material to cement or stone posts makes this kind of post objectionable. Herewith is illustrated a new idea in making fence posts. This post consists of a root or bottom of the post made of cement and the main post of wood. The wood is kept up from the ground and is not liable to decay, and if it does, another can be substituted easily, says a correspondent of the "Rural New-Yorker." The cement part is cast with a corner out, as shown, into which the wood post is placed and bolted with two bolts. When molding the concrete, run two smooth round sticks through the mold to make holes for the bolts.

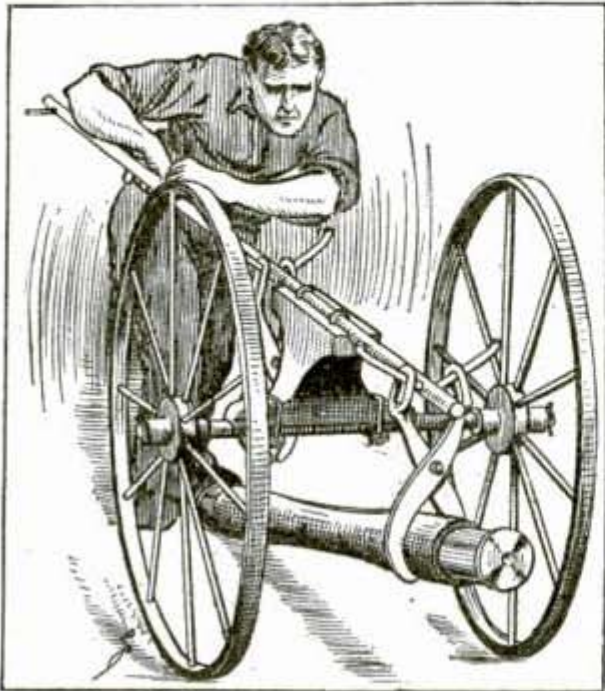


Fire Extinguished with a Stream of Steam

An overhead stack started a fire in the tarred roofing paper and threatened the whole plant of a large steam laundry. The owner conceived the idea of using steam for a fire extinguisher and soon had the flames subdued without the aid of the city fire department, says the *Laundry Journal*. Reducing flames by steam driven with force on a burning part of a building has been demonstrated before, but this is the first time that it has been used to a good advantage in a laundry fire.

Truck for Carrying Car Axles

This truck is a very useful and labor saving device for railroad shops. The main rod or tongue of the truck is 5 or



Picking Up an Axle

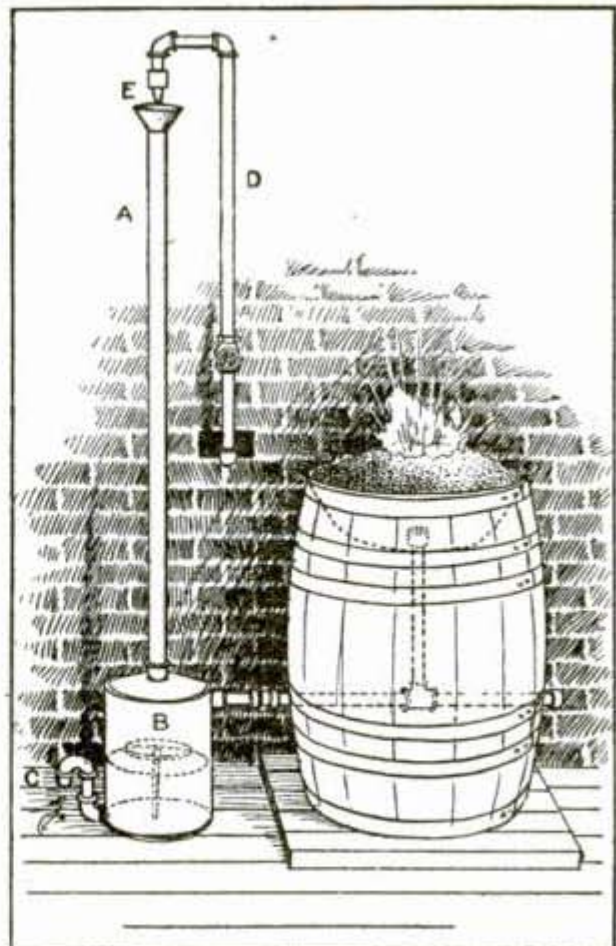
6 ft. long and of sufficient size to carry the weight of the largest axle. The wheels have a tread of $2\frac{1}{2}$ in. and are from 2 to 3 ft high. The axle of the wheel is rigidly secured to the tongue with an anvil shaped casting as shown in the sketch. The horns for the tongs are welded to the tongue at an angle of 45 deg. and slightly bent at the ends to prevent the tongs being pushed off when picking up an axle. The sketch shows the truck tilted to pick up one end of the axle. When the ends of the tongs bear down upon the axle they are opened by the handles slipping up the slope on the horns. When the tongs slip over the axle they are closed by the weight of the axle, which also prevents it from falling out.

Automatic Blower for the Forge

A method for producing air pressure for use in blowing a forge fire is shown in the accompanying illustration. This device can be used where a water pres-

sure of 30 lb. or more can be obtained. A 2-in. tin or galvanized iron pipe, A, is soldered into the top of a 5-gal. oil can, B. A 1-in. coupling is soldered into the side and at the top of the can, and a 1-in. pipe fitted into this coupling leads to the forge fire.

As a certain amount of water must remain in the can B at all times, a trap, C, made from pipe fittings is soldered in the side and at the bottom of the can. This will keep the water level to the height shown by the dotted line in the can B. The water main, D, is connected up to a place directly over the galvanized pipe, A, and fitted with a nozzle, E, that will reduce the water stream to $\frac{3}{16}$ in. There should be a space of 2 in. between the nozzle E and the opening in the tube A. The water entering the top of the tube A will carry some air with it and the water seal in B keeps a constant pressure in the can under the weight of the inflowing water. The pressure obtained will depend on the height of the tube A and the depth of the seal in the can.



Water Pressure Produces the Air Pressure

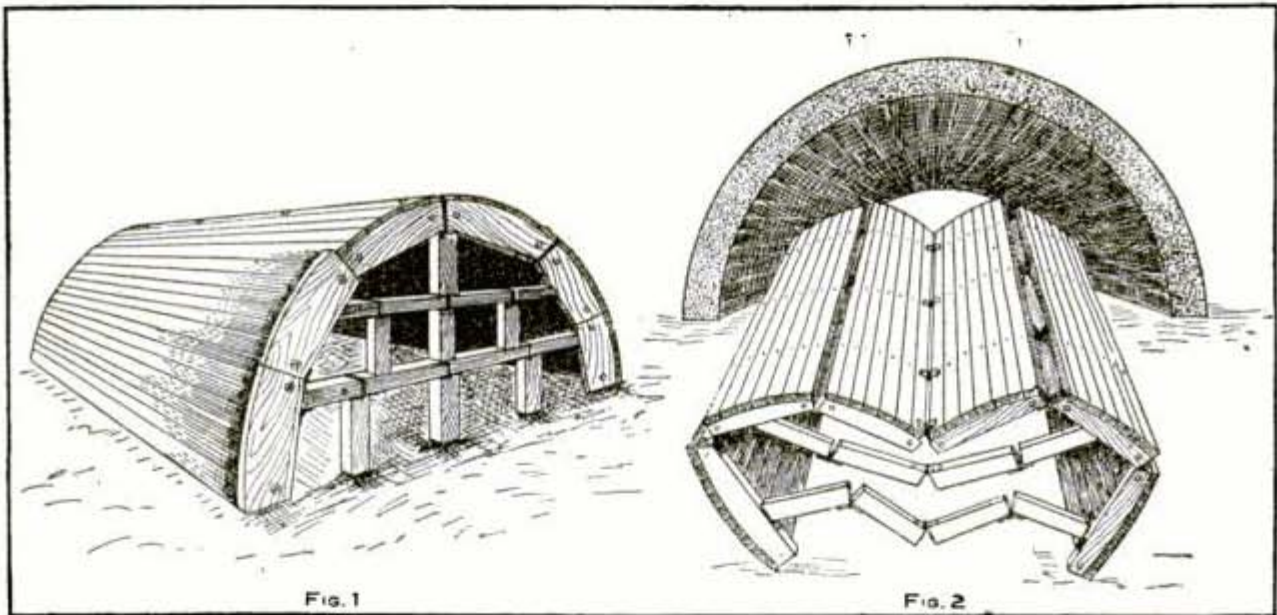
Collapsible Mold for Making Concrete Sewers, Bridges and Culverts

By A. A. Houghton, in *Cement Era*

The necessity of setting up and taking down forms in making molds for sewers, bridges and culverts of concrete work is a great waste of time, in addition to the great amount of lumber required. With the simple form described and illustrated herewith, which can be constructed by any one in a short time and at a slight expense, the labor in handling forms when molding all classes of bridges, culverts and sewers will be saved, as in a few min-

1½-in. space draw a curved line from the marks at each end, so as to bring the highest point of the curve in the center of the top edge of the piece. This will make one-twelfth segment of a circle of the desired diameter. In mitering the ends mark a point 1½ in. from each end along the bottom of the piece; then draw a line from this mark to the end of the oval line at the top and when this three-cornered piece is cut off the correct miter is obtained for the purpose.

If the length of the completed section is to be 12 ft. use lumber 2 in. wide and 1½ in. thick, of this length, lay four of the segments of circle with oval sides up at equal distance apart and cover



Removable Concrete Sewer Forms

utes' time the form can be placed in position to mold a section, and by simply removing the key blocks the form will neatly fold together so that it can be removed and used again without delay in construction.

The manner of construction for a culvert 6 ft. 9 in. wide and 3 ft. 4½ in. high when completed is to use for each section 24 one-twelfth segments of a circle, as four sets of six each are used as supports to each section. The best way to make these is to cut 24 pieces of 8-in. plank, 2 in. thick and 19½ in. long; take one of these pieces and make a pattern by marking on each end 1½ in. from the top on one side. In this

with the 12-ft. lumber, nailing on top. The oval segments should be so covered as to leave ½ in. projecting on each side, this is planed down on one edge, in a bevel, even with the ends of the supporting timbers so as to make a tight joint when they are joined together.

After completing the six sections in the above manner join them together with a hinge on each support as illustrated in Fig. 1 and Fig. 2, requiring 20 hinges. As illustrated in Fig. 2, the hinges are all placed on the bottom side of supports, except those in the center on top; these must be on the outside to enable it to fold together. By using a flat strap hinge for this, there

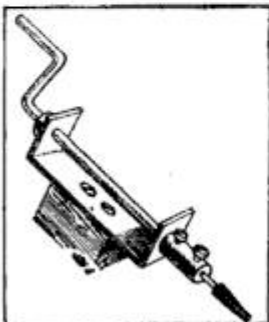
will be very little mark left in the completed work. For the cross supports cut four pieces of 2 by 4-in. lumber 4 ft. 10½ in. long. Each one of the bottom pieces is cut 1 ft. from each end and the balance of strip cut in the center, making four pieces; join together with three hinges as illustrated in Fig. 1 and Fig. 2, putting one hinge on top of the strip and two on the bottom, at the joints, and then fasten to the bottom supports with hinges, at bottom of the strip and fasten to the support at about the center. This allows these cross supports to break down as illustrated in Fig. 2, and thus folds the section together.

The top cross pieces or supports are cut from the same lumber 3 ft. 6 in. long, and are divided into four pieces, in a proportionate manner as the bottom cross supports, and are hinged together and fastened to sections in the identical manner as the bottom ones. This allows both cross supports to fold down alike, and thus draw in the sections together, so that it can be removed from the completed work in a very short time and without damage to the concrete.

As illustrated in Fig. 1 blocks are used to hold the cross supports in position while the section is in use. These should be at least 4 by 4 in. and the proper length to closely fit into the spaces. As illustrated, seven of these are used at each set of supports.

Home-Made Tapping Machine

This machine is designed to be used for small taps which are too small for a large machine. The body is made from ½-in. sheet metal bent into the shape shown. A wood block can be fastened to the bottom with wood screws for holding the machine in a vise. The main shaft and crank consist of a ¼-in. rod bent to

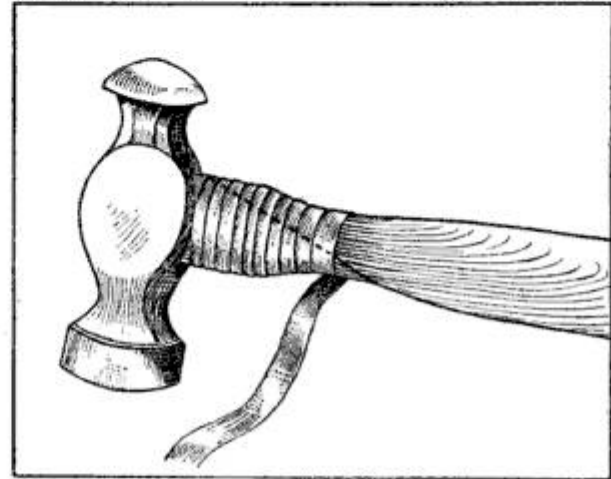


For Small Taps

the proper shape. Chucks are made from short pieces of ½-in. rod drilled in one end to fit the main shaft and the other to fit the desired tap. Several chucks are necessary for the different sized taps.

Temporary Repair on a Hammer Handle

Hammer handles usually break near the hammer. If the break is not shattered and can be joined together, as



Hammer Handle Wrapped with Tape

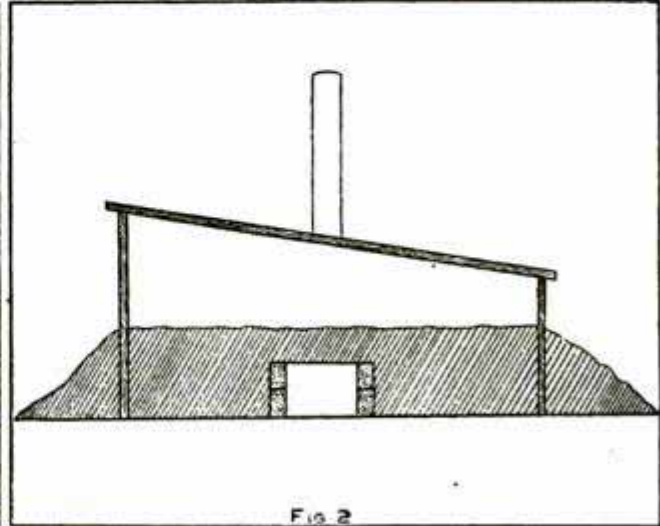
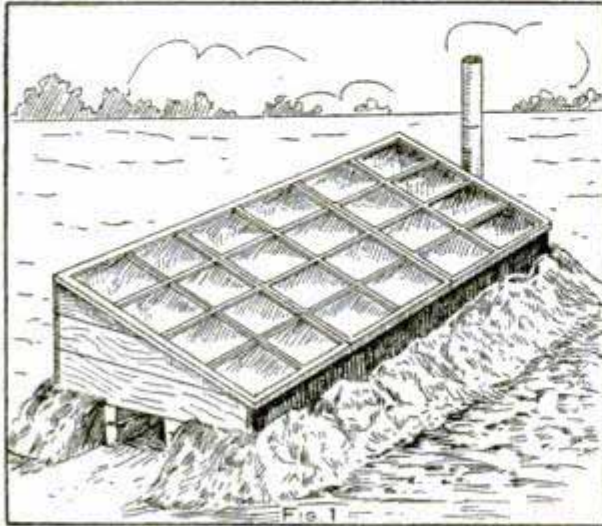
shown by the dotted line in the sketch, friction tape can be used to make the temporary repair. Wind the tape tightly around the handle, covering the break. I have used a hammer handle repaired in this way over a year.—Contributed by Ernest H. Alberty, Dyberry, Pa.

How to Fasten a Handle on an Umbrella

Sometimes a person would like to change some expensive umbrella handle to another umbrella and fasten it on solid. This can be done by cleaning out the hole left in the handle from the old rod and fill the hole with powdered sulphur. Place the handle in a solid upright position, and after heating the umbrella rod red hot push the rod down into the hole containing the sulphur. The hot rod fuses the sulphur and when cold it will hold the rod solid. This method may be applied to fastening rods into stone, iron or wood.—Contributed by Richard A. Booth, Providence, R. I.

Furnace to Heat a Hotbed

The satisfactory way to produce early plants is with a hotbed. The manipulation of a hotbed with manure is a very uncertain thing and the failures are many with those who first use them,



Artificial Heat Applied to a Hotbed

says a correspondent of the Country Gentleman. A hotbed constructed as shown in the illustration will give the best results, and the heat may be regulated with very little practice. This hotbed is built up in the ordinary way with window frames, as shown in Fig. 1, the only difference is that it has a small furnace at one end and a common stovepipe at the other. A cross section of the hotbed is shown in Fig. 2.

The furnace may be constructed of brick, stone or cement, and extends the entire length of the bed, with a small door at the end opposite the pipe. This door must fit tight, so that the draft may be controlled. An incubator thermometer should be used, by placing it in the top of the soil, and the bed should be supplied with a fire for several days before any seed is planted.

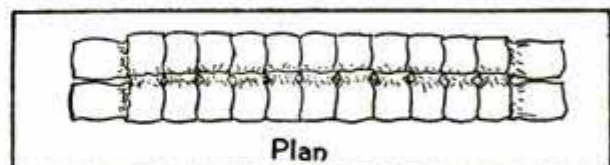
Piling Sacks of Cement

When building a dam on the North Platte river in Wyoming the engineers desired a system of storing cement in sacks which has many advantages over the old methods. Sheds 18 ft. wide, 8 ft. high at the eaves and 400 ft. long

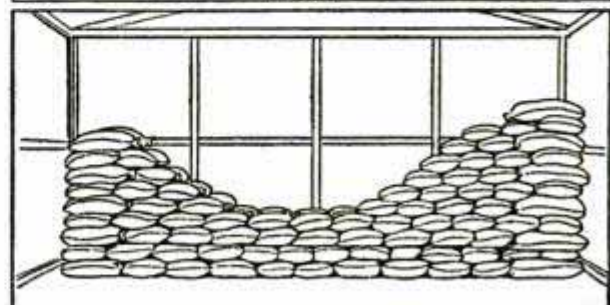
were used for the storing place. As their construction was the lightest and the cheapest possible, sacks of cement resting against the walls of the shed would bulge the walls out under the pressure. There would be considerable loss in cement caused by the breaking

of weak sacks and some that would come untied.

The new system adopted for piling the sacks is shown in the accompanying sketch. Two tiers of sacks are built up at a time, the knots of the sacks overlapping, as shown in the plan, and the sacks laid flat. These double tiers are so bonded that they stand alone to a height of 10 ft. and should a sack become untied there is no waste of cement as it can be readily picked up, says the Cement Era. The ends of tiers are corded in such a way that no pressure comes against the sides of the shed, and an air space of from 4 to 6 in. is left between the cement and the walls. The



Plan

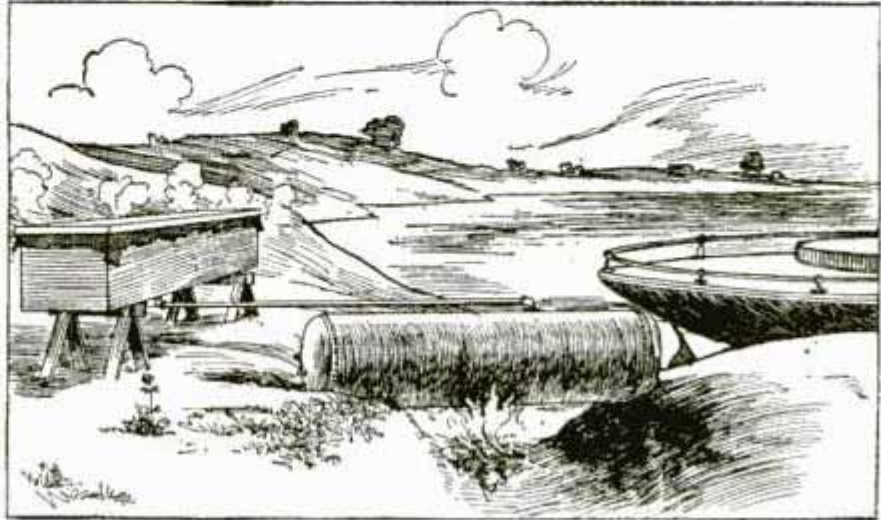


Method of Piling the Sacks

weight all comes on the floor, and a maximum quantity of cement can be stored in a minimum space.

Steaming Wood for Bent Work on Boats

Some of the pieces of wood must be steamed in order to bend them to the proper shape when building a new boat or repairing an old one. The accompanying illustration shows how a range boiler was placed across an excavation for a fireplace and used to generate steam for steaming the wood. A 1-in. pipe connects the boiler and box where the pieces of wood are placed to be steamed. Any old discarded boiler may be used so long as it is steam-tight. Fill extra holes with pipe plugs.

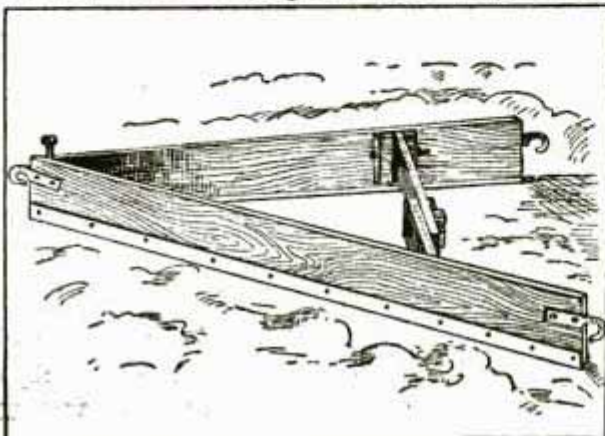


Steaming the Boards

Home-Made Road Grader

A simple form of a road grader is shown in the accompanying sketch. Two 2- by 12-in. oak plank 12 ft. long are hinged together at one end and held apart at the other by an adjustable device made from two pieces of 2- by 6-in. oak 6 ft. long. Band iron strips are bolted to the bottom edges of the plank. The grader is drawn by a team hitched to the hooks attached to both ends of the plank as shown.

When grading roads, follow in each furrow after the plow and adjust the



The Grader Has Adjustable Blades

center clamp so the dirt is moved to the place desired. After the road is graded hitch teams to the rear hooks, uncouple the front end and attach a chain so the opening will not be too wide and draw the grader over the center of the road. This will fill up the hollow places and work the dirt toward the center of the road.—Contributed by Charles H. Ensign, Payette, Idaho.

Unfinished Hardwood Doors

A new house just completed should be thoroughly dried out by artificial heat before the rooms are fit for occupancy. As mortar contains large quantities of water the plastering must be thoroughly dried out before putting on the interior finish or there will be warped casings and doors. All wood is porous and the drier and more thoroughly seasoned wood will readily absorb any moisture. When an unfinished hardwood door is placed in a damp room it quickly absorbs the moisture and expands or swells, and when the wood again dries out the door is warped and twisted and the joints left open. After doors are hung and no more fitting to be done, the best plan is to cover the ends of the stiles, both top and bottom, with at least one coat of paint or varnish. This will prevent any moisture from entering the end pores of the wood.

Add a little powdered chalk to common glue to make the glue stronger.

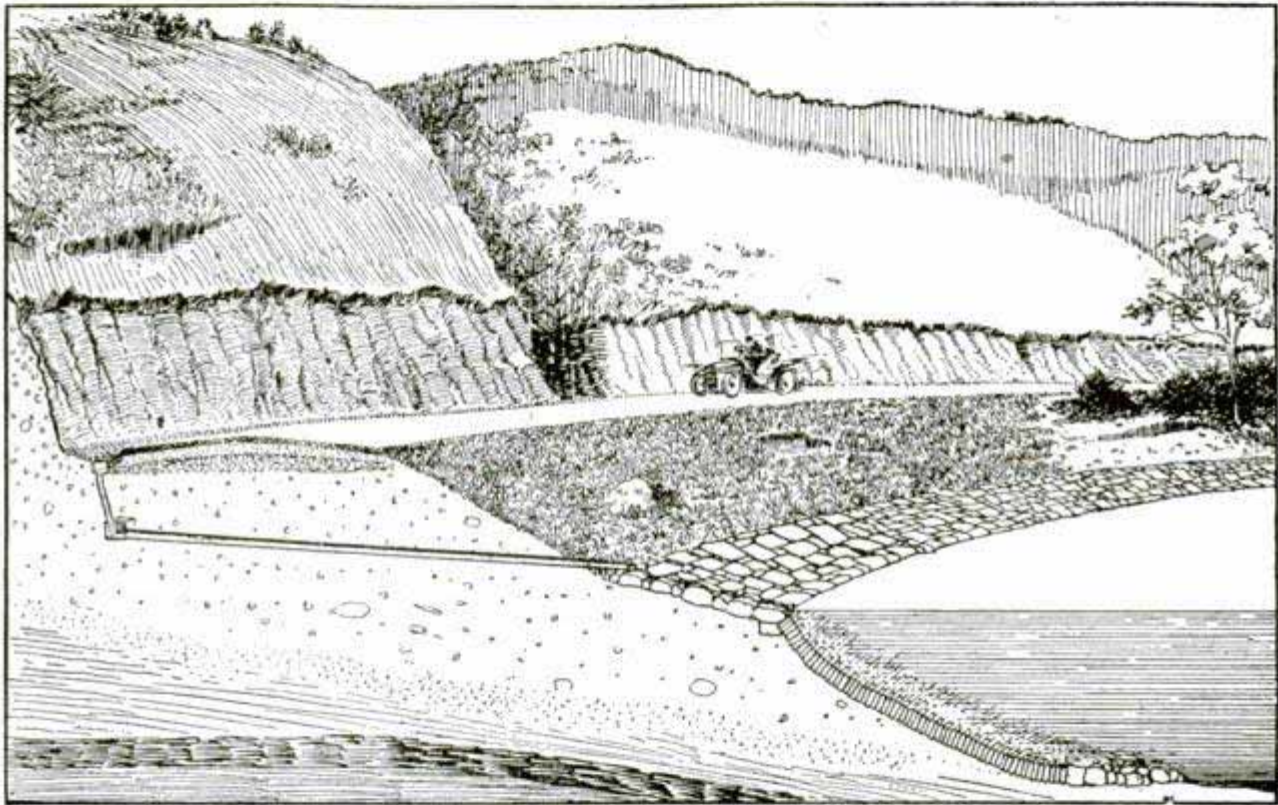
Road Embankments Along Streams

Embankments where roads traverse streams or lakes are subject to many destructive agents, and will not last long unless they are carefully and intelligently constructed.

Along rivers, and especially at bends, the current is continually carrying away loose soil, and is as continuously loosening more to carry along. In the spring the ice, breaking up, tears and cuts the banks as it passes along down

allowed to stand in ditches by the side of the road, as it will finally seep under the road and get to the river, thus softening the foundation and causing wash-outs, says a correspondent of The Country Gentleman. Cast-iron or concrete culverts should be used, of sufficient size to carry off the water quickly.

The slope of the bank depends upon the material. When heaped up the side of a pile of earth forms a natural slope called the "angle of repose." The approximate angle of repose for differ-



Proper Protection for a River Road Bed

the stream. This action takes place high up on the river bank at the spring high water mark. Bodies of moving ice in the lakes crowd the shores with great pressure, cutting the coast badly where the water is deep close up to the shore line. When a heavy sheet of ice is once set in motion by the wind or current it has stored up in it enormous power.

Above the high water mark of the stream, or along lakes above the line of wave action, the banks are cut by the surface water. But this should amount to very little if the surface water of the surrounding country is kept off the road. Water should not be

ent materials is given below, the ratio of slope being the proportion of the horizontal to the vertical:

Material.	Angle Repose.	Ratio Slope.
Dry sand	30°	1.43 feet to 1 foot
Damp clay	45°	1.00 " " 1 "
Wet clay	15°	3.73 " " 1 "
Clayey gravel ...	45°	1.00 " " 1 "
Gravel	38°	1.28 " " 1 "
Firm loam	36°	1.38 " " 1 "
Vegetable	35°	1.43 " " 1 "

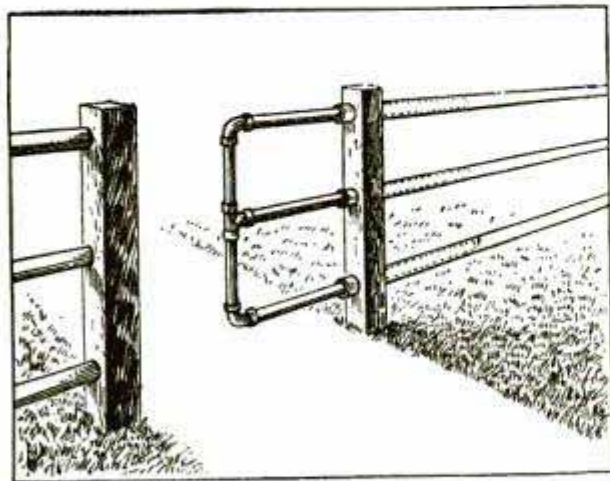
In practice the earth is put in at a trifle flatter slope than given above. Below the water line the slope should be still flatter, running as flat as $3\frac{1}{2}$ to 1, and even 4 to 1. Earth under water has a much smaller angle of repose than the same earth above water, as shown in the table in regard to wet and damp clay.

From the high water line on the river bank, or wave line on the lake shore, down to the bottom of the slope, the bank should be protected by a layer of riprap or flat stones. If large stones are available they should be placed loosely along the bottom of the bank to afford some foundation for the riprap and to break the force of the current. Sometimes large stones are put in at the water line to catch the impact of the waves and ice. Where they are so placed it might be well to have very little slope just at the water line, as shown in the illustration.

Riprap may be laid in different ways, but the practical and really the only good method of putting in the stone is to place them with the long way of the stone at right angles to the slope of the bank. In this way the weight of each stone presses firmly against the bank, with the flat sides of the stones fitting solidly against each other.

A Gas Pipe Gate

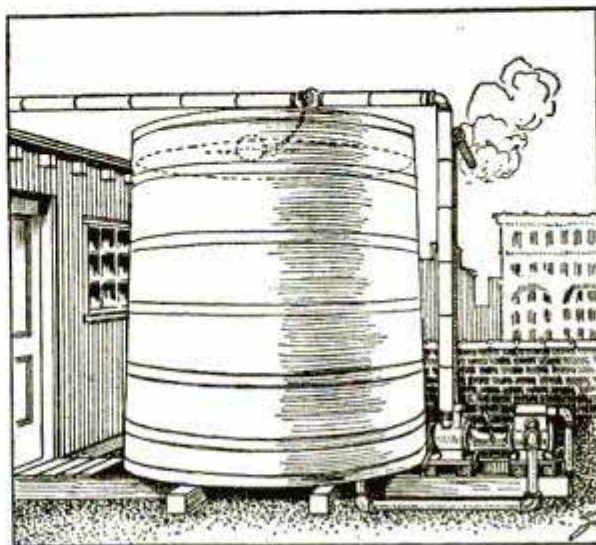
Where gas pipe or tubes are used for fencing a good construction of a gate is to use gas pipe and fittings. In this particular case, as shown in the cut, the gate was made from two $\frac{3}{4}$ -in. ells, one $\frac{3}{4}$ -in. tee and $\frac{3}{4}$ -in. pipe cut in lengths to suit the opening. The fence was made from three $1\frac{1}{2}$ -in. tubes and the gate pipes slipped inside of them. The long pipes of the gate were made 2 ft. longer than the gate opening to keep the gate from sagging when closed.



Sliding Gas Pipe Gate

Throttle Valve Operated by a Float

The water supplied to a large woolen mill came from a tank that had to be kept full of water at all times. In order to have the steam pump start and

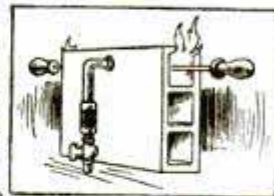


The Float Regulates the Water Level

stop without attention the steam supply pipe with the throttle valve was placed directly over the tank and the valve operated by a float. The throttle valve consisted of a steam cock with the lever of the float attached to the valve stem. The steam was only supplied to the pump when the water was below a certain level in the tank.

A Tile Soldering-Iron Heater

The accompanying sketch shows a soldering-iron heater for the shop. This heater is constructed from a common three section building tile.

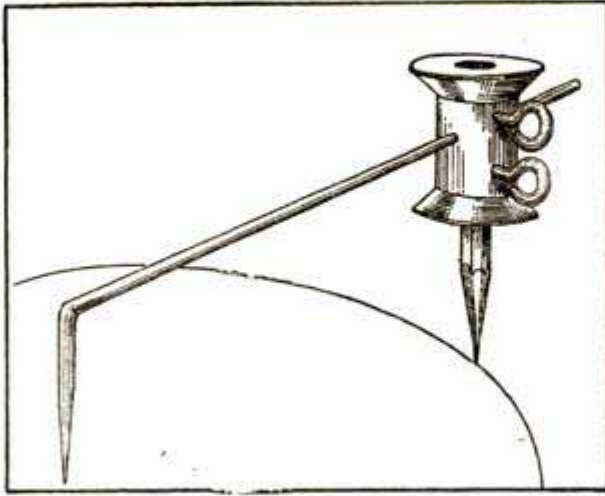


A hole is made in the side of the section for the flame from the gas burner to enter. Any number of sections in building tile may be used for this heater.

Dip a pine stick into plumbers' melted solder, remove the stick immediately and if it comes out scorched the solder is hot enough for ordinary purposes.

Home-Made Beam Compass

The main part or beam of this compass consists of a piece of $\frac{3}{16}$ -in. wire with $3\frac{1}{2}$ in. of one end bent at right

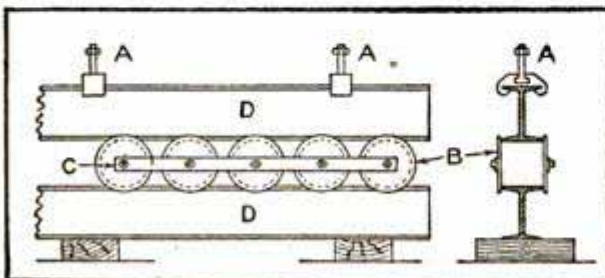


Made to Draw Any Size Circle

angles and filed to a point. A hole is bored through the side of an ordinary spool and two screw eyes fitted as shown in the illustration. One screw eye holds the pen or pencil and the other holds the spool on the wire. The wire can be cut to any length suitable for the work.

Extension Bed for a Planer

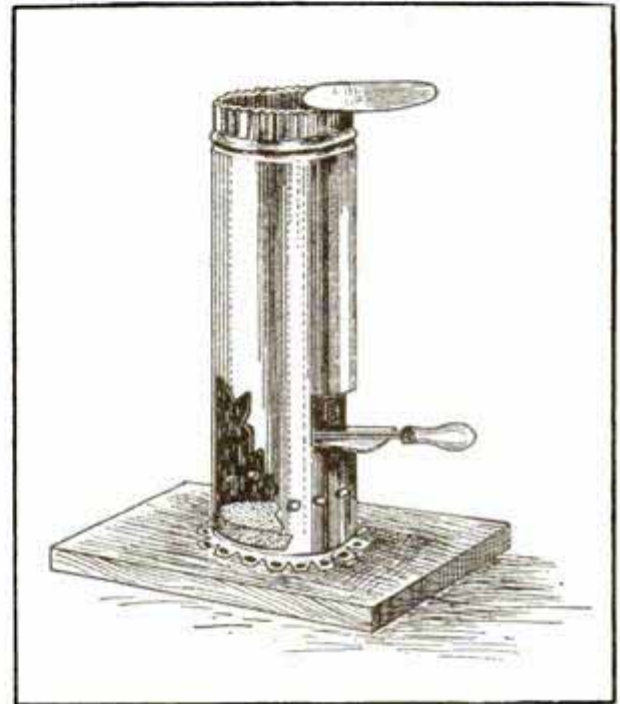
The accompanying sketch shows an attachment for a planer when planing long castings. The I-beams, D D, are placed on blocks parallel with the bed of the planer. Several flanged rollers, B, are placed in between the I-beams and kept at a certain distance apart by one $\frac{1}{2}$ - by 2-in. iron bar, C, placed on each side of the rollers and a bolt run through each roller for an axle. The clamps, A, are used to fasten the casting to the top I-beam. This I-beam will move back and forth with the planer bed.—Contributed by Oscar Lewis, Oshkosh, Wis.



Will Hold Extra Long Castings

Home-Made Tinner's Charcoal Stove

The large end of a 5- or 6-in. ordinary stovepipe is cut so as to form three-cornered notches about 1 in. deep. The remaining parts of the metal are turned out and nailed to a board as shown in the illustration. The bottom part is filled with a 3-in. layer of clay and a few $\frac{1}{8}$ -in. holes made in the metal just above the clay for the draft. Three sides of a rectangular piece, 2 in. wide and 3 in. long, are cut in the pipe and

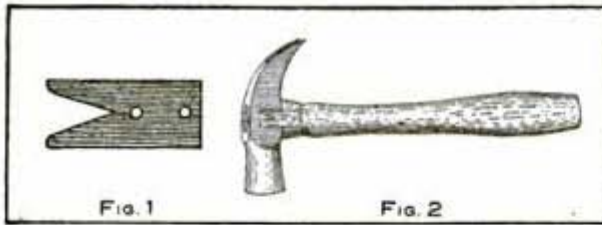


Charcoal Soldering Iron Heater

the metal within turned down. This forms the door and hearth for the soldering irons. A circular piece of metal laid over the top controls the draft.

A Nail Grip for Hammers

A carpenter often wishes to drive a nail at a point just a little higher than he can reach with both hands up. Sometimes a nail can be started and driven at a high point by holding the nail against one side of the hammer, clutching both nail and hammer in one hand, and striking the blow that will start the nail, but herewith illustrated is a device that will start a nail at a much higher point. A small piece of spring $\frac{3}{4}$ in. wide and 2 in. long is notched



The Nail Fits Into the V-Clip

at one end in the shape of a V and fastened to the metal shank of the hammer with two rivets. The V-shaped notch will hold the head of the nail and the point out straight so the starting blow can be made by holding the hammer at the end of the handle.—Contributed by E. H. Grasing, Englewood, N. J.

An Automobile Cover

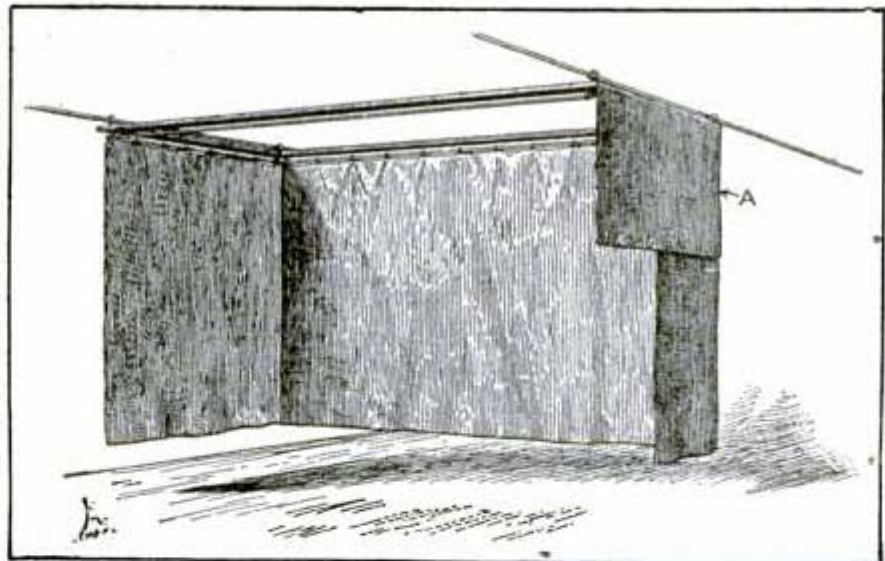
A cover that can be put in place over a car by one person without dragging the cloth on the ground or floor of the garage, is shown in the accompanying sketch. Two light steel ropes are fixed the length of the garage or place where the car is kept, and these are tightened with turnbuckles at one end. A very light frame of wood is then made just a little larger than the size of the car and is suspended from the steel ropes by four hoops, thus allowing the frame to travel the length of the garage, says the Automobile Dealer and Repairer. This frame is covered with cloth, which is allowed to extend over the sides and back of the frame and hang down far enough to cover the space between the frame and the side curtains. When the car is driven backward into the garage, the cover can be immediately pushed exactly over it with the aid of a stick.

On the under side of the frame light iron rods are fixed on the two sides and back, so that the back piece of the cover, which is fitted with rings at the top, can be suspended from the rod and

is easily detachable for cleaning at any time. The sides are made like curtains, fitted also with rings at the top, and when unfastened from the front piece, A, they can be pushed up against the back wall of the coach house. They are buttoned to the back piece of the cover, and are made sufficiently wide to extend around the bonnet of the car, and be buttoned to the flap A, which is fixed to the front side of the traveling frame. This flap is brought down low enough for a man to button on the extensions of the side curtains, as shown, without using any steps. The illustration shows the car cover without the top covering of the frame with its overhanging part, to show the rods which carry the curtains at the sides and back.

Carbolic Acid as a Disinfectant

Pure carbolic acid is solid at ordinary temperatures and crystallizes in long white needles. It may be pur-



Curtain Cover for an Automobile

chased in this form or as liquefied carbolic acid. The latter form is prepared by adding 1 part of water to 9 parts of the crystals and is employed by pharmacists on account of convenience in dispensing. Carbolic acid must not be confused with "crude carbolic acid" and "liquid carbolic acid."

For disinfecting purposes carbolic acid is generally used in watery solution, though powders containing it are

sold. A 5 per cent solution of crystallized carbolic acid in water is recommended for general use, for, although weaker solutions have been found efficient for destroying many nonspore-bearing bacteria, the conditions found in practice vary widely and in some cases hinder the action of the disinfectant. As carbolic acid dissolves slowly, the 5 per cent solution should be prepared with warm water, using care to see that all is dissolved before use. For disinfecting large surfaces a spray may be used, as the disinfectant should be applied liberally. Garments or implements to be disinfected should remain in the 5 per cent solution for at least one hour.

Crude Oil Tire Heaters

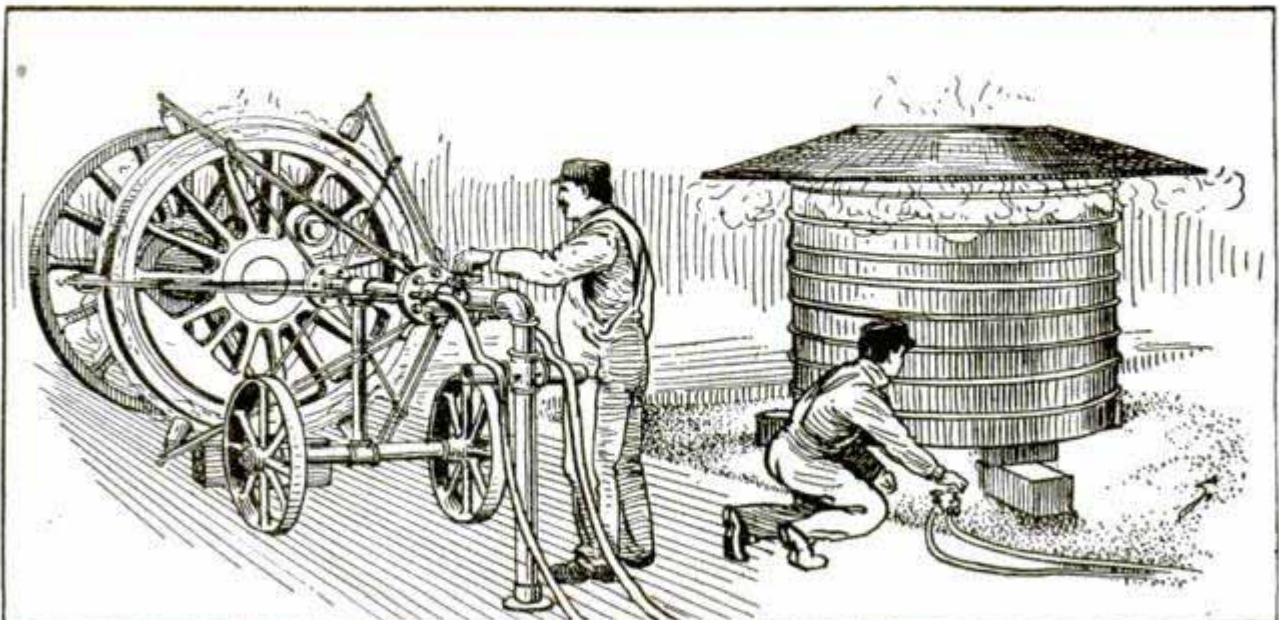
The Lehigh Valley Railroad company has recently introduced crude oil tire heaters at their system shops at Sayre, Pa., which have been found far superior to the former method of using gasoline and perforated rings for the application and removal of tires.

The heater for removing tires consists of six oil burners mounted on an adjustable frame, being able to adjust the burners to any desired diameter. The frame consists of an arrangement of wrought-iron pipe mounted on a pair of wheels. On the main part of the

frame a combination air and oil chamber is arranged to slide forward and back, and, in conjunction with a six-point star, the various adjustments of the burners are produced. On the front side of the supply chamber six ball-joint connections are made to the oil supply, also six connections are made to connect the air supply with the burners and piping arranged to connect the burners with the supply chamber.

When using gasoline for removing tires two men would use from 20 to 50 minutes in removing a tire, while with this heater from 7 to 11 minutes are required. While the old tires are being removed new ones are piled up on three cast-iron blocks and a large crude oil burner is placed underneath, the burner having the capacity to fill the inside of eight tires with flame and heat them for application in 20 minutes. Inasmuch as both heaters are comparatively smokeless, there is perfect satisfaction. During a test six old tires were removed and six new tires were applied in 1 hour and 52 minutes.—Contributed by J. M. Hamm, Machine Foreman, Sayre, Pa.

If a large hole is to be soldered in tin or enameled ware, hold several sheets of paper over the hole on the opposite side from where the soldering is done and the solder will bridge over and cover the hole.

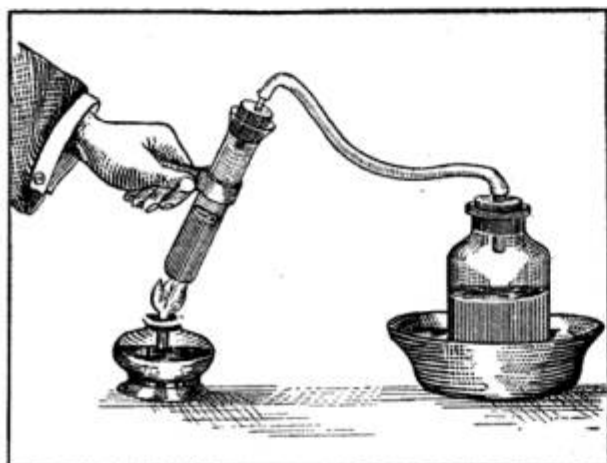


Removing Engine Wheel Tires

Amateur Mechanics

How to Make a Simple Still

A still to distill water can be made from a test tube, some heavy rubber hose and an ordinary bottle. Secure a stopper for the test tube, and bore a hole through the center, into which fit a small hollow tube. The bottle is also fitted with a stopper containing a hollow tube, and both bottle and test tube connected with a hollow rubber tube. The test tube is partially filled with water and supported or held over an alcohol lamp. The bottle should stand in a basin of cold water. When the

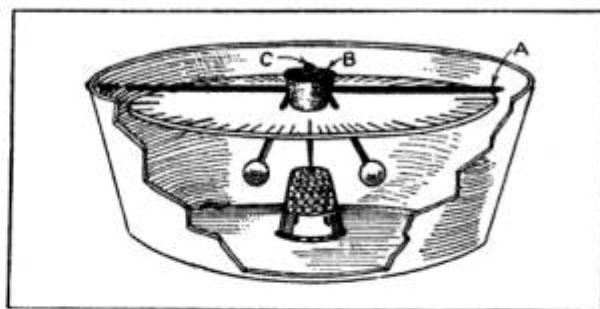


Distilling Water

water in the test tube begins to boil the steam passes over to the bottle, where it condenses. The basin should be supplied with cold water as fast as it begins to get warm. The rubber tube will not stand the heat very long and if the still is to be used several times a metal tube should be supplied to connect the test tube and bottle.

Home-Made Mariner's Compass

Magnetize an ordinary knitting needle, A, and push it through a cork, B, and place the cork exactly in the middle of the needle. Thrust a pin, C, through the cork at right angles to the needle and stick two sharpened matches in the sides of the cork so they

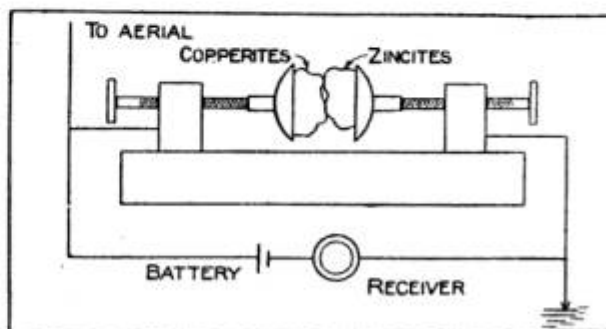


Magnetized Needle Revolving on a Pin

will project downward diagonally. The whole arrangement is balanced on a thimble with balls of wax stuck on the heads of the matches. If the needle is not horizontal, pull it through the cork to one side or the other, or change the wax balls. The whole device is placed in a glass berry dish and covered with a pane of glass.

Quartz Electrodes Used in Receiving Wireless Messages

Wireless messages have been received at Washington, D. C., from Key West, Florida, a distance of 900 miles through a receiving instrument in which two pieces of quartz of different composition were used on the electrodes. In making an instrument of this kind the quartz can be purchased from a dealer in minerals of which one piece must contain copperites and the other zincites. The electrodes are made cupping to hold the minerals and each to have a screw adjustment to press the quartz in contact with each other. The connections are made as



Details of the Receiving Instrument

shown in the illustration, using a high resistance receiver.—Contributed by Edwin L. Powell, Washington, D. C.

How to Make a Glider

By Carl Bates

A gliding machine is a motorless aeroplane, or flying-machine, propelled by gravity and designed to carry a passenger through the air from a high point to a lower point some distance away. Flying in a glider is simply coasting down hill on the air, and is the most interesting and exciting sport imaginable. The style of glider described in this article is known as the "two-surface" or "double-decked" aeroplane, and is composed of two arched cloth surfaces placed one above the other.

In building a glider the wood material used should be straight-grained spruce, free from knots. First prepare from spruce planks the following strips of wood. Four long beams $\frac{3}{4}$ in. thick, $1\frac{1}{2}$ in. wide and 20 ft. long; 12 crosspieces $\frac{3}{4}$ in. thick, $\frac{3}{4}$ in. wide and 3 ft. long; 12 uprights $\frac{1}{2}$ in. thick, $1\frac{1}{2}$ in. wide and 4 ft. long; 41 strips for the bent ribs $\frac{1}{16}$ in. thick, $\frac{1}{2}$ in. wide and 4 ft. long; 2 arm sticks 1 in. thick, 2 in. wide and 3 ft. long; the rudder sticks $\frac{3}{4}$ in. square and 8 ft. long; several strips $\frac{1}{2}$ in. by $\frac{3}{4}$ in. for building the vertical and horizontal rudders. The frames for the two main surfaces should be constructed first, by bolting the crosspieces to the long beams at the places shown by the dimensions in Fig. 1. If 20-ft. lumber cannot be procured, use 10-ft. lengths and splice them, as shown in Fig. 3. All bolts used should be $\frac{1}{8}$ in. in diameter and fitted with washers on both ends. These frames formed by the crosspieces should be braced by diagonal wires as shown. All wiring is done with No. 16 piano wire.

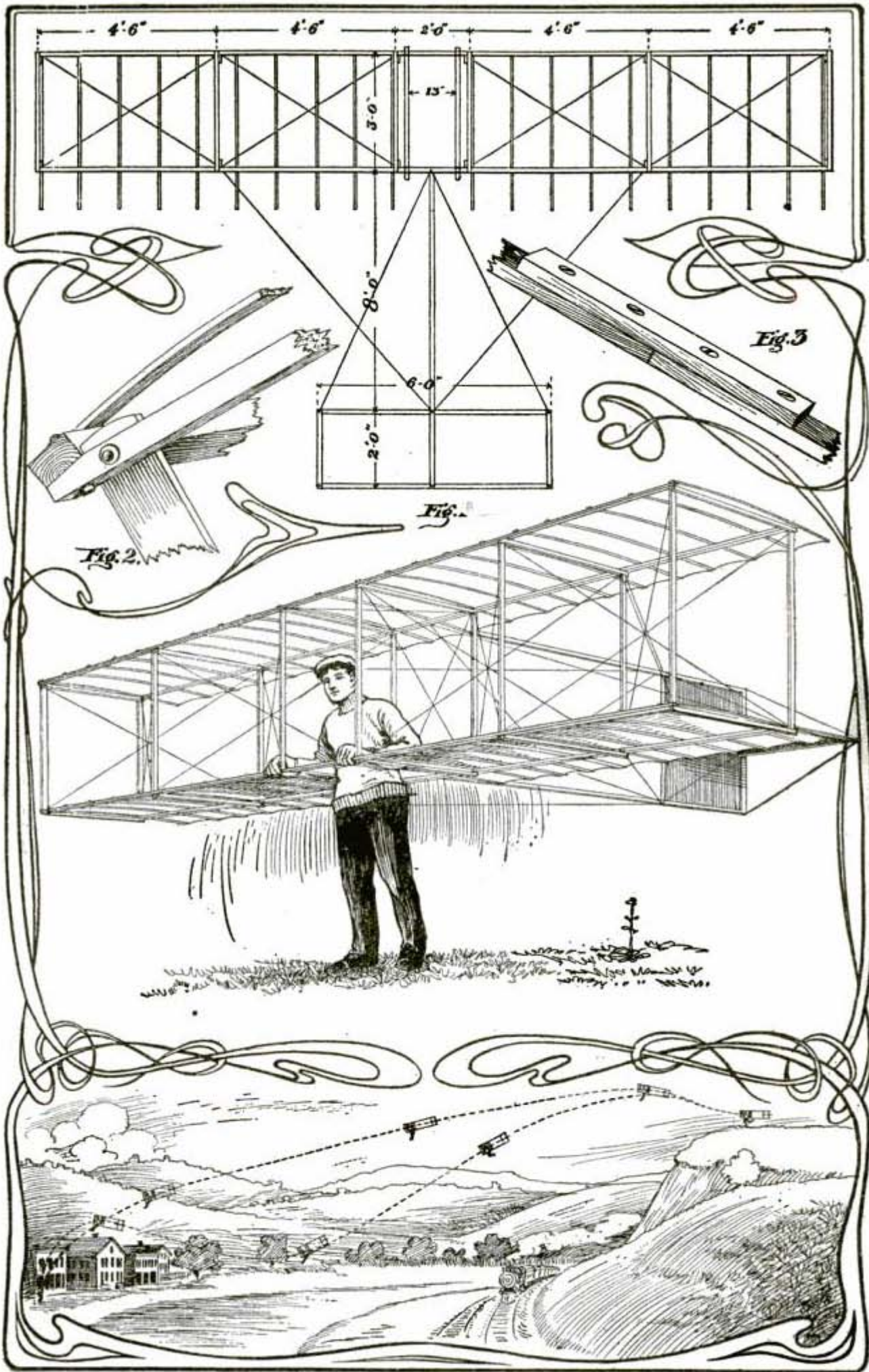
The 41 ribs may be nailed to the main frames on the upper side by using fine flat-headed brads $\frac{7}{8}$ in. long. These ribs are spaced 1 ft. apart and extend 1 ft. beyond the rear edges of the main frames, as shown in Fig. 1. After nail-

ing one end of a rib to the front long beam, the rib is arched by springing down the loose end and nailing to the rear beam. The ribs should have a curve as shown in Fig. 2, the amount of curvature being the same in all the ribs.

The frames of the main surfaces are now ready to be covered with cloth. Cambric or bleached muslin should be used for the covering, which is tacked to the front edge, stretched tightly over the bent ribs and fastened securely with tacks to the rear ends of the ribs. The cloth should also be glued to the ribs for safety. In the center of the lower plane surface there should be an opening 2 ft. wide and 4 ft. long for the body of the operator. Place the two main surfaces 4 ft. apart and connect with the 12 uprights, placed in the corner of each crosspiece and beam. The uprights are fastened by bolting to the crosspieces, as shown in Fig. 2. The whole structure is made strong and rigid by bracing with diagonal wires, both laterally and longitudinally.

The vertical rudder is to keep the machine headed into the wind and is not movable. This rudder is made of cloth stretched over a light wooden frame, which is nailed to the rudder sticks connecting to the main frame. The horizontal rudder is also made of cloth stretched over a light wooden frame, and arranged to intersect the vertical rudder at its center. This rudder is held in position and strengthened by diagonal wires and guy wires. The horizontal rudder is also immovable, and its function is to prevent the machine from diving, and also to keep it steady in its flight. The rudders are fastened to the glider by the two rudder sticks, and these sticks are held rigid by diagonal wires and also by guy wires leading to the sides of the main frames as shown in Fig. 1. The two arm sticks should be spaced about 13 in. apart and bolted to the long beams in the center of the opening in the lower plane where the operator is to take his position.

The glider should be examined to see



Details of the Glider

that the frame is not warped or twisted. The surfaces must be true or the machine will be hard to balance when in flight. To make a glide, take the glider to the top of a hill, get in between the arm sticks and lift the machine up until the arm sticks are under the arms as shown, run a few steps against the wind and leap from the ground. You will find that the machine has a surprising amount of lift, and if the weight of the body is in the right place you will go shooting down the hillside in free flight. The landing is made by pushing the weight of the body backwards. This will cause the glider to tip up in front, slacken speed and settle. The operator can then land safely and gently on his feet. Of course, the beginner should learn by taking short jumps, gradually increasing the distance as he gains skill and experience in balancing and landing.

The proper position of the body is slightly ahead of the center of the planes, but this must be found by experience. The machine should not be used in winds blowing faster than 15 miles an hour. Glides are always made against the wind, and the balancing is done by moving the legs. The higher the starting point the farther one may fly. Great care should be exercised in making landings, otherwise the operator might suffer a sprained ankle or perhaps a broken limb. The illustration shows two lines of flight from a hilltop, the glider travels on the upper line caused by the body of the operator taking a position a little back of the proper place, and on the lower line he changes his position from front to back while flying, which causes the dip in the line.

Boys Representing the Centaur

This is a diversion in which two boys personate a Centaur, a creature of Greek mythology, half man and half horse. One of the players stands erect and the other behind him in a stooping position with his hands upon the first player's hips, as shown in Fig. 1. The

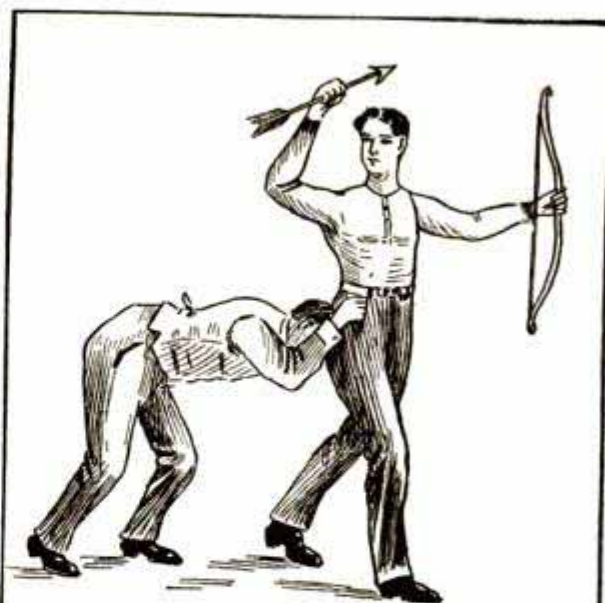


FIG. 1



FIG. 2

Making Up the Centaur

second player is covered over with a shawl or table cover which is pinned around the waist of the first player. A tail made of strips of cloth or paper is pinned to the rear end of the cover. The first player should hold a bow and arrow and have a cloak thrown loosely over his shoulder as shown in Fig. 2. Imitation hoofs of pasteboard may be made and fastened over the shoes.

Home-Made Ladle for Melting Babbitt

Secure a large sized old bicycle bell and rivet a heavy wire or strap iron on one side for a handle. When heated a little, hammer out the edge on one side for a lip to pour from. This makes a good ladle for melting small amounts

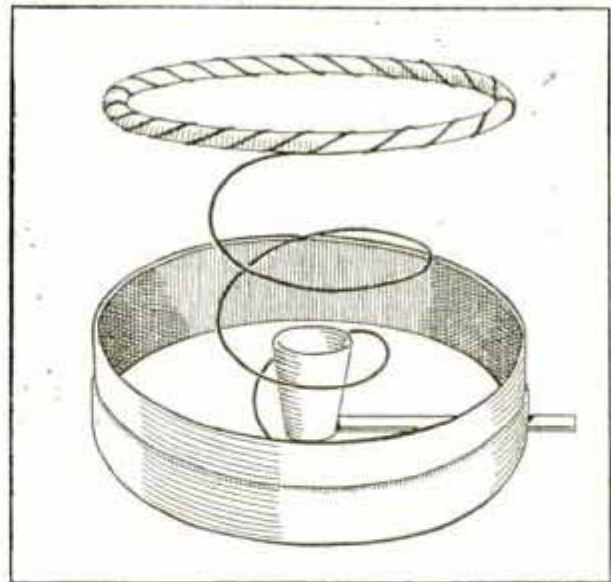
of babbitt or lead.—Contributed by L. M. Olson, Bellingham, Wash.

How to Make a Flash Lamp

Indoor photographs are made much better with the use of a flashlight than by depending on light from windows. The lighting can be made from any direction to suit the operator. If lighting flash powder when not in a regular flash lamp the flash cannot be depended upon and in some instances is dangerous. To make a simple and inexpensive flash lamp, first secure from your druggist an empty salve box about 3 in. in diameter. While at the drug store get 3 ft. of small rubber tubing; this will cost about 15 cents. Now visit the tin shop and get a small piece of scrap tin 3 or 4 in. square; a piece of brass or steel wire, about the size of stove pipe wire, 14 in. long. These with a strip of light asbestos paper and some small iron wire, about the size of door screen wire, will complete the material list.

Carefully punch a hole through the salve box on one side near the bottom with a 10-penny nail. Cut a strip of tin 2 in. long and about $\frac{3}{8}$ in. wide and roll this around an 8-penny nail so as to form a small tube which will just fit the hole made in the salve box. Next roll up a strip of tin $\frac{1}{2}$ in. wide into a small cup about $\frac{3}{8}$ in. in diameter at one end and $\frac{1}{4}$ in. at the other.

Place the tube in the nail hole so that one end comes almost to the center of the box inside and the other end projects about $\frac{1}{2}$ in. outside the box. Cut out a little place for the tube to enter the cup at the small end and then solder the tube and cup to the bottom of the box as shown in the illustration. The tube and cup should be well soldered on the seams to make them airtight. Bend a ring on one end of the larger piece of wire, making it $2\frac{1}{2}$ in. in diameter and form the remaining portion of the wire into a spiral, soldering the end in the bottom of the box near the cup. Wrap the ring at the top of the spiral piece of wire all the way



Made from a Tin Salve Box

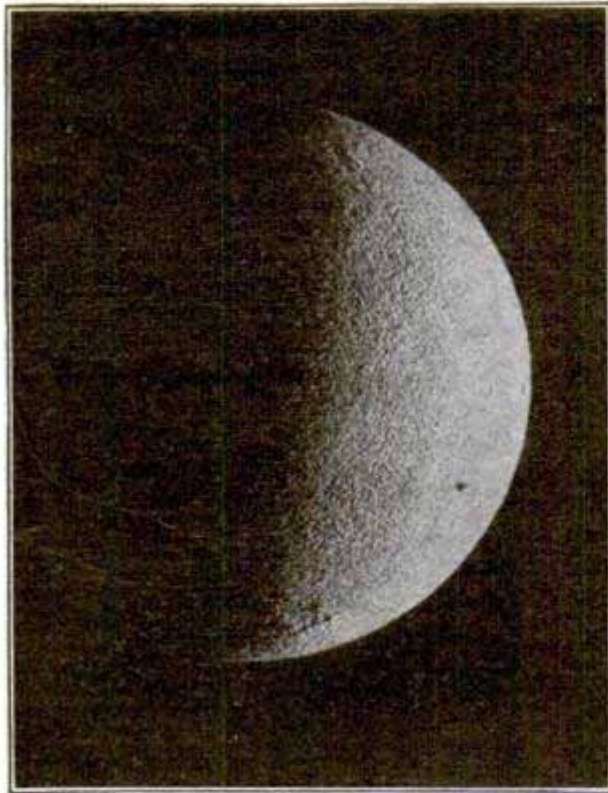
around with the strip of asbestos paper, wrapping them together over and over until the entire ring is covered. Slip the end of the rubber tube over the tin tube on the side of the box and the flash lamp is complete.

To make a flash with this lamp fill the little cup in the center with flash powder and moisten the asbestos ring with alcohol. When all is ready for the picture the alcohol is lighted and a quick blow of the breath through the rubber tube will force the flash powder upward into the flame and cause the flash.

When through with the lamp place the cover over it, pushing the asbestos ring down inside the box. Wind the rubber tubing around the box and you have a neat outfit that can be carried in the pocket.

Photographing the New Moon

To make a photograph of the moon is quite difficult and no good picture can be made without an expensive apparatus. At home and with your own hand camera you can make a good picture of the new moon by the use of a flash light on a tennis ball, the tennis ball taking the part of the moon. The ball is suspended in front of a black cloth screen, the camera focused by holding a burning match near the ball and the exposure made by burning a



Tennis Ball Photographed

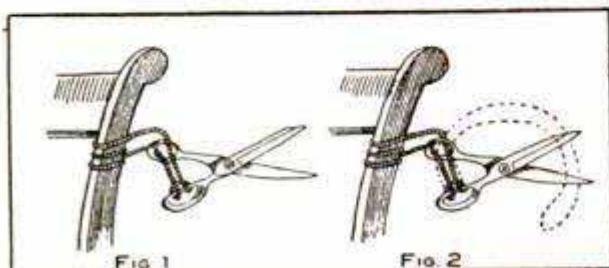
small quantity of flash powder at one side and a little below the ball. The light from the flash only striking one side of the ball gives the effect of the new moon.—Photo by M. M. Hunting, Dayton, O.

Old-Time Magic—Part II

Removing Scissors from a Cord

A piece of strong cord is doubled and fastened to a pair of scissors with a slip knot, as shown in Fig. 1. After passing the ends of the cord through the thumb hole of the scissors they are tied fast to a chair, door knob or any other object that may be of sufficient size to make the ends secure. The trick is to release the scissors without cutting the cord.

Take hold of the loop end of the cord in the lower handle and drawing it first

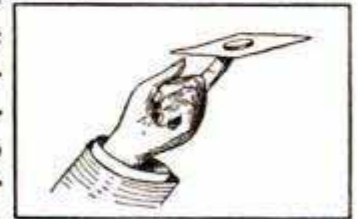


How the Scissors Are Removed

through the upper handle and then completely over the blades of the scissors, as shown in Fig. 2. This is very simple when you know how, but puzzling when the trick is first seen.

Coin and Card on the First Finger

This is a simple trick that many can do at the first attempt, while others will fail time after time. It is a good trick to spring upon a company casually if you have practiced it beforehand. A playing card is balanced on the tip of the forefinger and a penny placed on top immediately over the finger end, as shown in the sketch. With the right-hand forefinger and thumb strike the edge of the card sharply. If done properly the card will fly away, leaving the penny poised on the finger end.



How to Make Sealing Wax Hat Pins

Select a stick of sealing wax of the desired color for the foundation of the hat pin. Hold the end of the stick over a flame until the wax is soft enough to drop; then put it on the hat-pin head. When sufficient wax has adhered to the pin, hold the lump over the flame, revolving the pin at the same time so the wax will not drop and the head will form a round ball. The head can be made in any shape desired while warm. When the desired shape has been obtained, cool thoroughly in cold water and dry carefully.

Stripes and designs may be put on the foundation by applying drops of other brilliant colored wax, and by careful manipulation the wax when warm can be made to flow around the pin head and form pretty stripes and designs. If a certain color is to be more prominent, the wax to make this color must be applied last and the pin put through the flame again. Cool in water and dry, as before, and pass once more through the flame to obtain the lustrous

BUTTON MATCHER.—This device, patented by a Chicago inventor, is designed to aid in the matching of buttons. The buttons are sewed upon the supports spanning the openings. In matching a button, the board is placed upon the cloth, the openings revealing enough of the material to make possible an accurate comparison with the buttons. (Fig. 1.)

VIOLIN WITH HORN ATTACHMENT.—A curious musical instrument, fashioned after a violin but provided with horns not unlike those of a phonograph, has been patented by a musician in Prague, Okla. Sound boxes are connected to the strings of the instrument, and it is from these that the two horns lead. One of the horns lies straight along the body of the instrument and the other inclines outwardly. The idea of the horns is to add to the volume of the music. (Fig. 2.)

LOCK ATTACHMENT FOR MILK BOTTLES.—The possibility of having the early delivery of milk stolen by thieving cats or tramps is provided against by this milk-bottle lock. It is screwed to the window sill, and when the neck of the bottle is pressed into the arm it locks automatically and holds the bottle secure. (Fig. 3.)

SWEATERS FOR DOGS.—The dog sweater is a welcome addition to the already long list of dog furnishings, especially for any dog that lives in a college town. The sweaters are made in various colors to suit the taste of customers. (Fig. 4.)

TELEPHONE RECEIVER FOR LENGTHY TRANSACTIONS.—Holding an ordinary telephone receiver to the ear when the conversation over the wire is a lengthy one is tiring, but with this arrangement both hands are left free and the ear cups rest solidly in place. The steel holder slips over the head. (Fig. 5.)

INGENIOUS HOT-DRINK SIGN.—The illustration shown in Fig. 6 is an ingenious sign for advertising hot drinks. It consists of a cup and saucer connected to a source of steam supply by a pipe, this pipe also acting as a support. The steam rises from the cup as long as the supply of steam is left open.

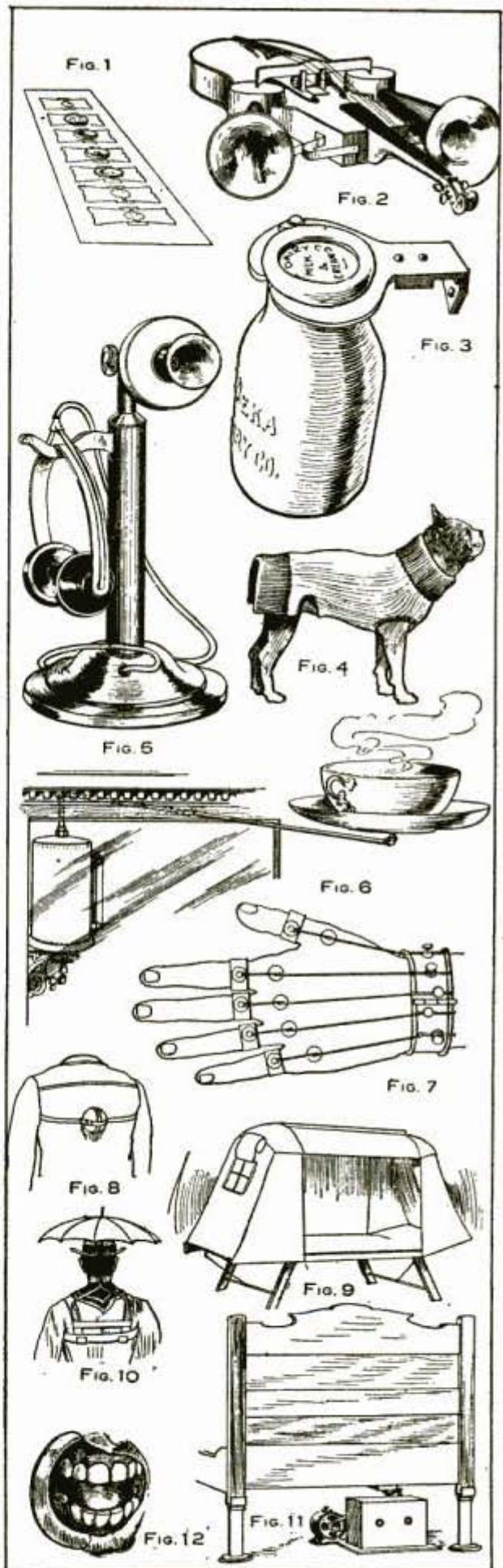
FINGER-DEVELOPING HARNESS.—Figure 7 is an appliance designed to strengthen the muscles of the fingers, and is the invention of a Mexican. It consists of a steel or leather wristband to which are attached five steel rods which run over the back of the hand to the base of the fingers. At the ends of these rods are rings that slip over the fingers and thumb, and upon these rings are secured small, detachable weights. These weights rest just forward of the first joints of the hand, and on the rods just back of these joints is another set of weights. The weights offer resistance to the muscles when the fingers are moved, thus developing them.

ANTI-SNORING DEVICE.—The ball attachment shown in Fig. 8 was recently patented as an anti-snoring device. It is fitted with a strap and harness which holds it just between the shoulder blades, and awakens the wearer should he lie upon his back. The ball is of the hollow, compressible type.

TENT-COT FOR MANY PURPOSES.—The tent-cot shown in Fig. 9 is something new in the line of camp supplies. The cot frame is of hard maple, and the covering of the cot, as well as the canopy or tent, is of brown duck. The openings at the side and ends are provided with adjustable flaps, which may be raised or lowered as the occupant desires. The whole outfit folds compactly and does not exceed over 30 lb. in weight.

SUNSHADE FASTENS TO SHOULDERS.—A little more than a year ago this magazine published an illustration of a German sunshade which fastens to the shoulders and leaves the hands free for work or pleasure. This sunshade, patented by a Texas inventor, embodies the same idea, but in this instance the sunshade is of the ordinary design, while the German invention consisted of a steel frame over which a piece of cloth was stretched in gable form. (Fig. 10.)

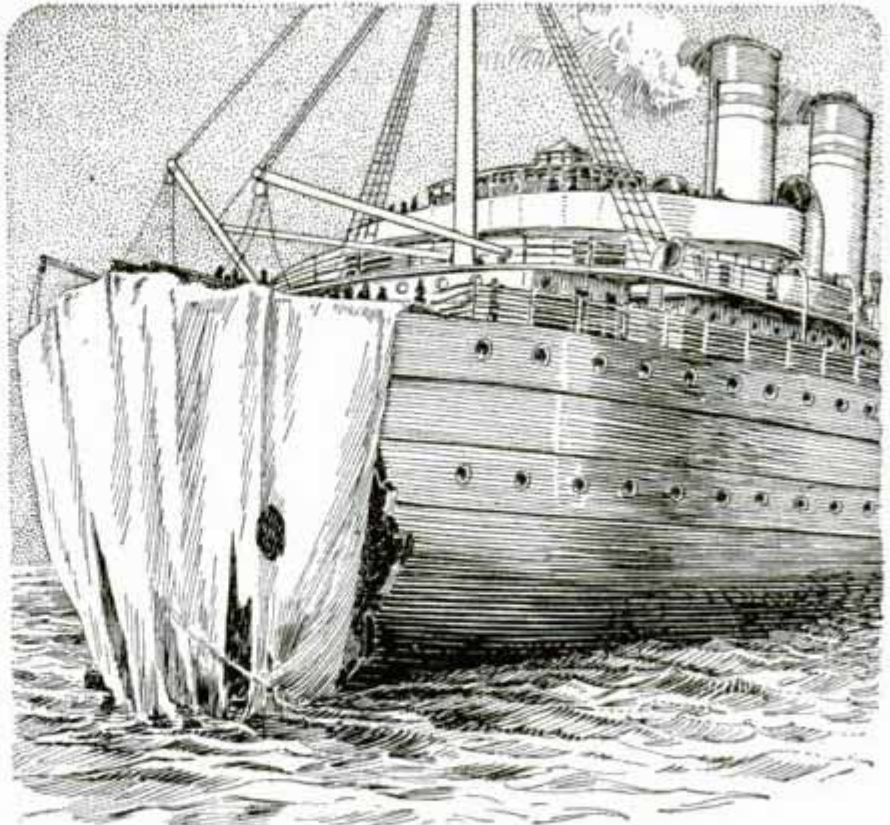
AN ELECTRICALLY VIBRATED BED.—The electric vibrator as a producer of health and vigor is too well advertised to need reiteration here. A large number of electric vibrators to be used directly upon the body or to be attached to chairs have been patented and placed upon the market, and to this list is added the bed vibrator shown in Fig. 11. The bed is equipped with spring legs, and is vibrated by means of a motor placed at the foot.



LIP PROTECTOR FOR DENTAL WORK.—The lip-protector shown was patented by a Wisconsin inventor, and is designed for use in dental work. It is crescent shaped, and when placed in position holds the lips back from the teeth. (Fig. 12.)

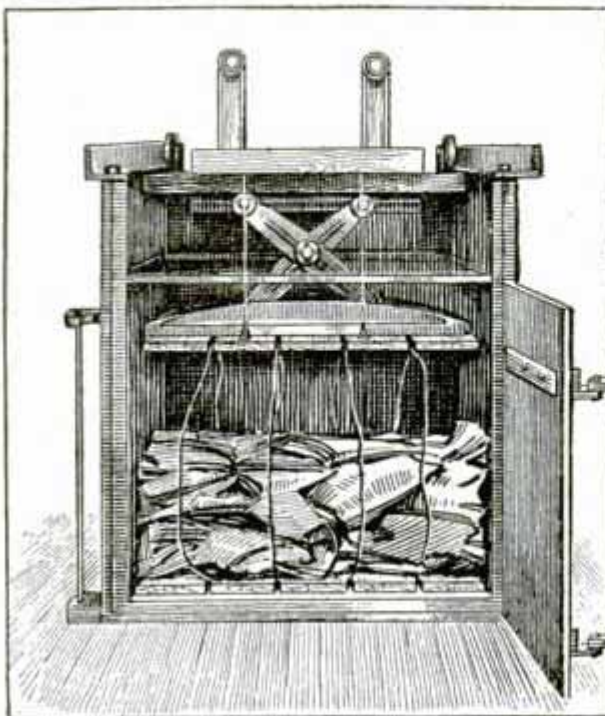
CRUSHED BOW OF THE "FLORIDA"

The damage sustained by the Lloyd Italiano Co.'s "Florida" when she rammed the White Star liner "Republic," eventually sinking her after a dramatic interplay of wireless messages which brought aid to passengers and crew, is clearly shown in this photograph, taken after she had limped into port. The bow was crushed in like an egg shell, the bulkheads alone saving her from meeting the same fate as the "Republic."



SAVE AND SELL WASTE PAPER

Waste paper is no inconsiderable item in the receipts of a large office building, but in many instances, especially in the smaller cities, it is given away, and in the majority of instances in which it is handled by the building managers for a profit, only a few proceed in a scientific and thoroughly modern manner.



Hand-Baling Press for Waste Paper

Waste paper, stuck into a bin or room every night and sold loosely at the end of a week only brings from 20 to 25 cents per 100 lb., to say nothing of the fire danger from such a method. The modern method is to install a small hand-baling press in the basement, or, if the building is a busy one, a larger press. The size of press which seems the most popular has a capacity of about 300 lb. As fast as the waste paper is received it is dumped into the press and kept there until enough is accumulated to make a bale. The lever is then applied and a neat, compact bale is the result. Baled waste paper brings from 30 to 50 cents per 100 lb.

The manager of a paper company in Chicago estimates that \$500,000 worth of old paper is taken from the waste paper baskets in that city every year. Chicago waste baskets are relieved of 300 tons of paper every night. In some of the larger downtown structures as much as \$20 per day is thus realized, but in many of the smaller buildings the waste paper is burned in the furnaces.

Have You Ten Dollars Or More?

Principal and Ten Per Cent Dividends Guaranteed

Invest any amount from \$10 up to \$1,000 (in multiples of \$10), and I will give you a written guarantee to pay you at least 10 per cent interest, and return you the full amount of your money, if you wish it, at the end of three years, with a premium of 5 per cent; so that if you send me \$100, you will receive at least \$30 interest during the next three years, and then \$105 in cash, or a total of \$35 profit on your \$100, if you wish to withdraw your money. If you had been able to secure an investment of only \$100 in Munsey's Magazine, that investment would now be paying an income of \$1,000 every year, and would be worth at least \$10,000 in cash. Those who had the opportunity to become interested with magazines when they first offered their stock to the public have become wealthy. I shall tell you all about my own magazine, "Home Life," and offer you the opportunity of becoming interested in it, and I can truthfully say that to one who is seeking a safe investment, whether it be \$10 or \$1,000, such an offer has never been made before. For your convenience I sub-divided the information into the following sections, and suggest that you read them consecutively; they will give you full particulars to base your own judgment upon, or to lay before your banker or any other authority in whose judgment and business ability you have confidence:

1. Profits in Magazine Publishing.
2. A Brief Story of "Home Life."
3. The Balch Publishing Company.
4. Present Condition.
5. Future Outlook.
6. What I Am Offering.
7. Terms and Conditions.
8. Why I Offer You the Shares.
9. Why You Should Invest.
10. Guaranty.
11. References.
12. Business Under Your Own Supervision.
13. Conclusion.
14. Table of Costs and Profits.
15. Application Blanks.

1. Profits in Magazine Publishing

Frank A. Munsey started in the magazine business with a capital of \$40; his business now pays a profit of \$1,000,000 a year. The stock of the S. S. McClure Company is worth \$1,000 a share. The income of the Curtis Company from the Ladies' Home Journal and the Saturday Evening Post is nearly \$6,000,000 a year. The annual income from the Cosmopolitan magazine is about \$1,500,000. The property is now owned by Will-

iam Randolph Hearst, who bought it from John Brisben Walker. Mr. Walker had made several fortunes from the magazine. The profits of Everybody's magazine are estimated as being as high as \$800,000 a year. Other American magazines are large profit earners. A well known English author about ten years ago accepted \$2,000 worth of McClure's stock in payment for a story; recently he sold this stock for \$20,000. During the time when he held the stock it paid him dividends of \$14,000, making a total of \$34,000 cash for the \$2,000 worth of fiction manuscript.

2. A Brief Story of "Home Life"

Eighteen years ago "Home Life" first saw daylight at Caro, Mich. I became connected with it in 1900, and moved the magazine to Chicago. In September, 1900, "Home Life" had 20,000 circulation. One year later it had 100,000. At the end of five years, 500,000, and now the circulation of "Home Life" is 900,000 copies each issue, mailed directly every month into the homes of 900,000 well-to-do American families, and read by more than 4,000,000 people. At the end of this year (1909) the monthly circulation should cross the million mark. Home Life is not sold on news stands, but has a steady circulation by subscription in the rural districts, which according to Government Census contains 70% of the entire population of the United States.

With ample funds, the same results could have been accomplished in a brief space of time, but my capital was limited. I had no backing. Some shrugged their shoulders and some seemed more ready to "pull back" than to "boost," but I had a purpose, and I had faith in the purpose, and faith in the public, so I plodded along from one year into the next, and—it doesn't really matter how rocky the road may have been, as long as the destination is reached. The trials and efforts incidental to the task have been more than repaid by the results accomplished.

3. The Balch Publishing Company

"Home Life" is owned by the Balch Publishing Company, of which I am President. It is incorporated under the rigid laws of Illinois, the state in which it is located. The authorized capital stock is \$150,000, divided into 15,000 shares of \$10 each; \$50,000 or 5,000 shares are common stock, and \$100,000 or 10,000 shares are preferred stock to the extent of 10 per cent. For myself I hold the common stock because I know the business sufficiently well to require no preference or guarantees. To you I am offering the preferred stock, because you are not as fully

acquainted with the business, and therefore entitled to preference. While the preferred stock is guaranteed only 10 per cent, it participates in the additional earnings as follows:

The first 10 per cent of the profits are paid on the preferred stock; then 10 per cent is paid on the common stock. The balance is divided equally between the two. Based upon the present volume of business the Company should earn at least \$65,000 per year. Each preferred share you may hold would therefore first receive a dividend of \$1 a year, amounting to \$10,000 on the entire 10,000 shares of preferred stock; then the common stock would receive \$1 a share, amounting to \$5,000 on the entire 5,000 shares of common stock, making a total of \$15,000 on both preferred and common. Deducting this from \$65,000 leaves a balance of \$50,000 to be divided equally between the 15,000 shares of common and preferred stock, which would amount to \$3.33 per share, in addition to the \$1 as provided for above; consequently each share would draw a total profit of \$4.33 a year without figuring upon future growth.

4. The Present Condition of the Balch Publishing Company

My fiscal year runs from October 1st. Taking the figure for the first four months of the fiscal year from October 1, 1908, to February 1, 1909, the income from advertising and subscriptions during that period of four months was \$109,735.46, and the expenses for the same period were \$88,138.25, showing earnings of \$21,597.12 for four months, which is at the rate of \$64,791.63 for twelve months, equal to 43 per cent of the entire capital of \$150,000.

November and December are hard months on a magazine publisher, inasmuch as a great deal of money has to be spent on advertising and other purposes to hold the circulation. My own expenditures for that purpose during said four months aggregated nearly \$30,000; if that expense were eliminated, instead of earning only \$21,597.12, the earnings would have been \$51,597.21, for the four months, equal to \$154,791.63 per annum, or more than 100 per cent on the entire capital of the company.

My receipts from the Chicago postoffice show that during the four months ending with January, 1909, I mailed 634,895 pounds of magazines.

The average issue of "Home Life" will run $5\frac{3}{4}$ copies to each pound, and the total number of copies mailed during the past four months is, therefore, approximately 3,675,000, slightly in excess of 900,000 monthly.

The value of a magazine is usually figured on the basis of \$2 per circulation unit, which would make "Home Life" with its 900,000 circulation worth \$1,800,000. Figuring, however, on a basis of only 50 cents per unit, my magazine is worth \$450,000, which is three times as much as the company is capitalized for.

5. Future Outlook

In the above paragraphs I have given you the facts, and my books are open to the inspection of any one in the least way interested. I shall now give you an estimate of how much more I expect the business to pay in the future, to which additional profits you would be entitled as a shareholder.

The subscription price of "Home Life" is 25 cents per year. With a fully paid list of 900,000 subscribers the income from subscriptions would be \$225,000 a year. The advertising rate of "Home Life" is \$3.60 a line, and the cost per page is \$1,764 for one issue, and you must realize that a magazine capable of commanding a price of \$1,764 per page for advertising must be well established and have considerable influence. During the past four months "Home Life" carried 37,515 lines of advertising, which is an average of $9,378\frac{3}{4}$ lines per month, showing an average monthly income of approximately \$25,000, after deducting discounts and agent's commissions.

On a basis of \$25,000 per month, the annual income from advertising would be \$300,000, and adding to this \$225,000, as above, the total annual income would equal \$525,000.

My fixed expenses are for paper, printing, mailing, editorial and office purposes. During the four months ending February 1, 1909, they were \$58,861.68, averaging \$14,715.42 per month, or \$15,000 in round figures, which would make the fixed expenses \$180,000 for twelve months. Adding to this \$120,000 a year for advertising the magazine and increasing circulation, the total annual expenses would be \$300,000, and, based upon an estimated annual income of \$525,000, it would show a net profit of \$225,000 a year, which is 150 per cent on the total \$150,000 capital of the company. An investment of \$100 would then pay \$150 a year profit: \$500 would pay \$750 a year profit, equal to \$62.50 per month; \$1,000 would pay \$1,500 profit a year, or \$125 a month, and other amounts proportionately.

6. What I Am Offering

I offer for investment 10,000 shares of the 10 per cent preferred stock of the Balch Publishing Company at their face value of \$10 per share.

The character of the preferred stock is described more fully in Section 3 under the heading "Balch Publishing Company."

The offer is made subject to a guarantee, for the particulars of which you are referred to Section 10 under the heading, "Guarantee," and further subject to the following:

7. Terms and Conditions

1. Subscriptions must be made upon either of the three application blanks provided in Section 15, as follows:

Form A—Cash. Remittance of \$10 per share in full payment to accompany the application.

Form B—Installment. Remittance of \$2.50 for each share subscribed to accompany application, balance of \$7.50 per share in three equal monthly payments.

Form C—Option. Remittance of \$1 for each share subscribed to accompany application; balance of \$9 per share in six equal monthly payments.

2. No application for more than 100 shares (\$1,000) will be accepted from any one subscriber.

3. The Balch Publishing Company reserves the right to reject any application or to reduce the amount thereof, in either of which events money will be promptly refunded.

4. The shares will be allotted in rotation in which the applications are mailed, as shown by the postmark, and the money will be promptly returned to unsuccessful or late applicants.

5. All applications must be accompanied with the required amount of money, and all checks, drafts or money orders should be made payable to the order of the Balch Publishing Company and mailed to 43 Dearborn Ave., Chicago, Ill. All letters containing currency should be registered.

6. Subscribers under Form B failing to complete their payments will receive shares for the full amount paid in, at the rate of \$10 per share.

7. Subscribers under Form C failing to make the second payment will forfeit their first payment of \$1 per share, but in the event of discontinuing payments at any time after second and subsequent payments, they will be entitled to as many shares as the amount already paid in will buy at \$10 per share, the same as under Form B.

8. Dividends will commence from the date of your investment, and will be paid semi-annually on September 1 and March 1 of each year.

8. Why I Offer You the Shares

“Home Life” has at present a circulation of 900,000. I want to make it 2,000,000 by giving the public the best home magazine in the country. It will take money to do that. I am now placing every dollar of the earnings back into the business to increase the circulation, which leaves me but little money to improve the magazine itself. I could ultimately accomplish my aim from the profits of the business, but it would take a considerable length of time. Since I have demonstrated my ability to build up a paying business, I feel justified in asking the public to invest in the stock of my company: A big magazine does not die; it passes from generation to generation, as long as people continue reading. It is to the direct advantage of a magazine publisher to have the reading public financially interested in the magazine, as it will then be to your own interest not only to subscribe for it yourself, but to recommend it to your friends, which will save us considerable of the money that has to be spent now for advertising and premiums to secure

scribers for one \$10 share each, or ten for \$100 each, than one sending me \$10,000, as it would mean more friends for “Home Life” and more widely scattered.

9. Why You Should Invest in the Balch Publishing Company

First of all, it is an established business, so that you know in advance that there will be no experimenting with your money; secondly, your money will be used in the continued development of the business—to make it earn greater profits. The stock which I am offering you for investment is preferred, and you will receive 10 per cent interest before I receive anything on my own stock.

The remaining profits will be divided equally between us. This is provided for, and so stipulated on each certificate of stock. Your investment is, therefore, secure, and certain to receive at least 10 per cent. As stated in paragraph 4, the value of the business based on but 50 cents per circulation unit is estimated at \$450,000, which, on the total capitalization of \$150,000, would show a value of \$3 for every \$1 worth of stock. And last, but not least, I would ask you to realize that I am offering you an interest on the basis of \$150,000 capitalization, which is very small in proportion to the expected earnings, but being a publisher and not a promoter, it is not a question with me of how much money I can get from the public, but how little I can get along with to carry out my plans and how much interest we can save; that is why I capitalized the business for a small amount. The certificate which I will send you for as many 10 per cent preferred shares as you subscribe and pay for, contains my signed guaranty, of which the following is a copy:

10. Guaranty

“I, the undersigned, herewith undertake and guarantee to pay, for three years from the date hereof, out of the profits of the Balch Publishing Company, or my personal estate, at least 10 per cent dividends, in lawful money of the United States, at the rate of 5 per cent, payable semi-annually, on September 1 and March 1 of each year, on the full amount of money paid for the shares (being their face value) of the stock of the Balch Publishing Company represented by the within certificate, and upon receipt of notice within thirty days after the expiration of the three years to redeem the said shares of stock for \$1.05 in cash on every \$1 paid for said shares.”

To further make good this guarantee in the event of my decease, I agree to take out sufficient additional life insurance to protect the shareholders, and have already made arrangements to do so.

You are, therefore, guaranteed at least 10 per cent on your money for three years, and then your money back if you want it, with a

in the next three years I expect to accomplish my plans with reference to improving the magazine, all of the earnings will then be available for distribution in dividends, and I can tell you in advance that when the three years are over you will not want to surrender the shares, for the simple reason that they will pay so well and be worth so much more money that you will wish to retain them as a permanent income-producing investment for yourself, or else to sell them on the open market at a considerably greater premium than 5 per cent. As we expect to carry a surplus of about \$50,000, I shall be glad to loan you money on the stock should you need it before three years are over.

11. References

It seems almost superfluous to point out references. In Chicago my business is known to everyone prominently connected with magazines and newspapers. I transact business with Birmingham & Seamen Paper Co., Tribune Bldg., Chicago; Currier Publishing Co., Colonial Trust and Savings Bank, Pilcher-Hamilton Co., Manz Engraving Co., and many other Chicago firms. My magazine is known to 900,000 homes in the United States. It is listed as one of the leading home monthlies in every newspaper and magazine directory and known to every advertising agency in the country, many of them sending us advertising orders. Any one of those pointed out above can tell you about my business, and plenty more specific references, if you want them.

12. Business Under Your Own Supervision

The income is derived from circulation and advertising. The circulation is always stated in the editorial heading. The advertising pages can always be counted up and computed.

You can always figure out for yourself, approximately, how much income is derived every month. As long as you remain a shareholder I will also send you every six months, with your dividend check, a complete statement of the business, showing receipts, disbursements and earnings.

13. Conclusion

Before concluding I want to call your particular attention to the following points:

1. Beyond a paragraph on the profitable character of magazine publishing, I am not indulging in generalities, but am giving you facts and figures of what I have done, am doing and propose to do.

2. I am not a promoter and there is not a solitary share of promotion stock.

3. The stock is being sold direct by the company, and every dollar received, less the expense of selling, goes into the business.

4. Although the business now shows earnings at the rate of 6 per cent on a million dol-

lars and is estimated to be worth \$450,000, the entire capital stock of the company is only \$150,000.

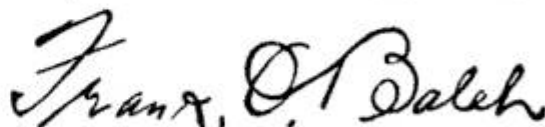
5. Practically all of my money is in the business—to stay there. I turned the entire business over to the company for \$50,000 of common stock and am to receive no further consideration either in cash or stock. I will not sell a share of my own stock.

6. Our magazine, "Home Life," is making good to advertisers, and the advertising patronage constantly grows, the present income from that source alone approximating \$25,000 per month.

When you consider every phase of the investment carefully, you will realize how much superior it is to the average investment offered to the public. There is no promotion stock, no heavy promotion expenses, the money goes back into the business, dividends and principal are guaranteed, the capitalization is small, the earning capacity great and certain to increase, the magazine established a number of years, well and favorably known, it represents my life-work and could not be managed more economically or conducted more to our mutual interest if you were in personal charge of it yourself.

This announcement will be published in "Home Life" and two or three other publications; it will be read by more than a million people; as the investment will appeal to the intelligent, conservative and non-speculative element and there are only 10,000 shares at \$10 each, I have every reason to believe that they will be promptly applied for. I would suggest that you read the terms and conditions, and then fill out and mail one of the applications on the next page with your remittance as soon as you can possibly do so—right now is the best time. If you are in time, the shares will be allotted you; if too late—your money will be promptly refunded.

I have given you a fair presentation of the situation and have no other inducements to offer. Should there be anything else upon which you may desire to be informed, I shall be glad to give you the information at any time. As dividends will commence from the date upon which full payment for the shares is received at our office, it is to your advantage to subscribe on Form A, or if subscribing on Form B or C, to complete payments as soon as you can conveniently do so, as you have the privilege of paying the balance in advance of the time specified in the said two forms.



President.

Baleh Publishing Company,
43 Dearborn Ave., Chicago, Ill.

Feb. 24, 1909.

See Next Page for Table of Cost and Application Blanks

14. Illustrative Table of Cost, Dividends and Values

NUMBER OF SHARES	FORM A	FORM B		FORM C		ANNUAL DIVIDENDS			VALUE OF SHARES		
	CASH WITH APPLI-CATION IN FULL	CASH WITH APPLI-CATION	AND MONTHLY FOR 3 MONTHS	CASH WITH APPLI-CATION	AND MONTHLY FOR 6 MONTHS	GUARAN-TEED	ESTIMATED ON BASIS OF 43%	ESTIMATED ON BASIS OF 150%	GUARAN-TEED	ESTIMATED ON 10% BASIS WITH EARNINGS OF 43%	ESTIMATED ON 10% BASIS WITH EARNINGS OF 150%
1	\$ 10.00	\$ 2.50	\$ 2.50	\$ 1.00	\$ 1.50	\$ 1.00	\$ 4.33	\$ 15.00	\$ 10.50	\$ 43.00	\$ 150.00
2	20.00	5.00	5.00	2.00	3.00	2.00	8.66	30.00	21.00	86.00	300.00
5	30.00	7.50	7.50	3.00	4.50	3.00	12.99	45.00	31.50	129.00	450.00
5	50.00	12.50	12.50	5.00	7.50	5.00	21.65	75.00	52.50	215.00	750.00
7	70.00	17.50	17.50	7.00	10.50	7.00	30.31	105.00	73.50	301.00	1,050.00
10	100.00	25.00	25.00	10.00	15.00	10.00	43.30	150.00	105.00	430.00	1,500.00
15	150.00	37.50	37.50	15.00	22.50	15.00	64.95	225.00	157.50	645.00	1,250.00
20	200.00	50.00	50.00	20.00	40.00	20.00	86.60	300.00	210.00	860.00	3,000.00
25	250.00	62.50	62.50	25.00	37.50	25.00	108.25	375.00	262.50	1,075.00	3,750.00
50	500.00	125.00	125.00	50.00	75.00	50.00	216.50	750.00	525.00	2,150.00	7,500.00
75	750.00	187.50	187.50	75.00	112.50	75.00	324.75	1,125.00	787.50	3,225.00	11,250.00
100	1,000.00	250.00	250.00	100.00	150.00	100.00	433.00	1,500.00	1,050.00	4,330.00	15,000.00

15. APPLICATION BLANKS

FRANK O. BALCH, Esq.,
President Balch Publishing Company,
43 Dearborn Avenue, Chicago, Ill.

Form "A"—Cash

DEAR SIR: Subject to your offer and guaranty to pay me 10 per cent dividends and refund me the full amount of money with 5 per cent premium at the end of 3 years, upon demand, I herewith apply for shares of the preferred stock of the Balch Publishing Company at Ten (\$10.00) Dollars per share, face value, and enclose herewith \$. In full payment therefor, I reserve, however, the privilege of retaining the shares at the end of three years as a permanent investment.

Please acknowledge receipt of my remittance, and send me certificate and guaranty to

Name

Address

[Write Plainly.]

FRANK O. BALCH, Esq.,
President Balch Publishing Company,
43 Dearborn Avenue, Chicago, Ill.

Form "B"—Installment

DEAR SIR: Subject to your offer and guaranty to pay me 10 per cent dividends and refund me the full amount of money with 5 per cent premium at the end of 3 years, upon demand, I herewith apply for shares of the preferred stock of the Balch Publishing Company at Ten (\$10.00) Dollars per share, face value, and enclose herewith \$., being at the rate of \$2.50 for each share, and agree to pay the balance of \$. in 3 equal monthly installments, commencing at the end of 30 days from this date. In the event of failure to complete payments, I will accept stock at \$10.00 per share for the amount paid in.

I reserve the privilege of retaining the shares at the end of three years as a permanent investment.

Please acknowledge receipt of my remittance, and when full payment is made issue and send certificate and guaranty to

Name

Address

[Write Plainly.]

FRANK O. BALCH, Esq.,
President Balch Publishing Company,
43 Dearborn Avenue, Chicago, Ill.

Form "C"—Option

DEAR SIR: Subject to your offer and guaranty to pay me 10 per cent dividends and refund me the full amount of money with 5 per cent premium at the end of 3 years, upon demand, I herewith apply for an option on shares of the preferred stock of the Balch Publishing Company, at Ten (\$10.00) Dollars per share, face value, and enclose herewith \$., being at the rate of \$1.00 per share, and agree to pay the balance of \$. in 6 equal monthly installments, commencing 30 days from this date. In the event of failure to complete payments I will accept stock at \$10.00 per share for the amount paid in.

I reserve the privilege of retaining the shares at the end of three years as a permanent investment.

Please acknowledge receipt of my remittance, and when full payment is made issue and send certificate and guaranty to

Name

Address

[Write Plainly.]

How many different things are there that will make a journal run hot?

Nothing is done so well but it might be better, nor so badly but it might be worse.

A poor blowpipe system is better than none, but a good one is the best investment.

It takes a good man to work out another's ideas as enthusiastically as he would his own.

Have you ever stopped to think that maybe you are running your emery wheel too fast?

A little hole in a roof can do a big lot of damage, especially if it is over betting or machinery.

Men who are not well balanced are like machines that are not in balance—they make lots of noise.

Constantly complaining about a machine doesn't make it do any better work, nor put the operator in shape to make it do it.

When a chain conveyer gets to breaking links continually, it is generally cheaper to buy a new chain than to keep patching in with new links.

If you turn back every time you meet with disadvantages, you will be kept so busy turning back that you won't have time to accomplish much.

Maybe the foreman can think better by sitting down in the factory, but it is not a good example to set for the others with thinking tendencies. If your thoughts weigh too heavily for you to stand up, go to the office and sit down.

You may not think your boss has any special interest in your well-being, but you can be sure that he has a deeper interest than the political stump speaker, and generally he is much more worth listening to.

It may seem a little strange, but it is a fact just the same, that some men who know how to file saws have neglected to learn how to use a file. It is not uncommon to hear a file rubbing on the return stroke, and there is little else so harmful to the file; it shortens its life by half and it doesn't do as good work while it lasts. Lift your file just a little, and cut on the forward stroke only; you will do twice the work and do it better. It is noticeable that most men who have this rubbing habit lean over on the work and thereby increase their own labor as well as that of the file. There is a big difference in the two ways, and if you have never tried it, do so next time you work on a saw, and see how much easier it is.

The submarine's a tricky little shaver,
With fifty-seven different brands of wiles;
She mutters "glug" and sinks beneath the water,
And journeys down below the waves for miles;
When it comes to diving stunts she is a wonder—
She can sit on oyster beds and eat her lunch;
But when it comes to work in time of trouble,
The battleship's the lady with the punch.

The torpedo boat's a spiteful little vixen:
She is long and slim, and saucy as a witch;
She can set the green and slippery sea a foaming
And can throw a tube and never drop a stitch;
Her elder sister's yonder grim destroyer;
She can show her heels to all the navy's bunch;
But both of them stand back when work is needed—
The battleship's the lady with the punch.

The cruiser is a most engaging damsel;
She can flit across the seas just like a gull,
And when it comes to repartee, she's lively—
The line of talk she hands is never dull;
But cruiser, submarine and all the others
Must flee when dogs of war begin to crunch;
You grand dame is the belle of Neptune's socials—
The battleship's the lady with the punch.
—Denver Republican.

OUR BOY.—Put a proper boy and girl in separate rooms, and the newcomer may locate them by listening at the doors. One room will sound like a machine shop and the other like a nursery, for the boy will hammer, if he has to use his shoe, while the girl will croon her lullaby to her folded kerchief with a string tied about it for a neck.

We offer no suggestions as to training the girl, but let us say a word for the boy.

Don't make a girl of him!
Give him a knife as soon as his desire comes, and the same may be said of the whole kit of tools. Nurture the little seed of mechanical inclination like you would a precious flower, for it may bloom and make his whole life fragrant in his usefulness to his generation.

The byways are choked with doctors, lawyers and ministers, and that supply will come anyway, but conserve every trait in childhood that points to mechanics, for civilization has need of applied science, and the whole modern world has been built from a beginning of childish, mechanical impulse.

The only interesting phase, in our opinion, about the Little Lord Fauntleroy, was the utter incongruity of his garb and his character. He was certainly a poet's license, for no "kid" with a girl's impeding curls could ever hope to reach maturity by any sane route.

Do not think that we advocate an onslaught on the parlor furniture with knife or hammer, or the dislocation of the rosewood banisters with the juvenile saw, but let us tell you that he who trains scientific and mechanical genius into its logical groove has done more for this world's good than will the coming astronomer who may write the complete history of Mars.

There is no dearth of mollycoddles, for they spring up in the hot-houses of the self-appointed exploiters of degeneracy, who train their young as they do their poodles; but this age needs brains sustained by healthy bodies in which the blood runs red, brains that contribute to its further upbuilding.

The men who do things are in demand!—Contributed.

JIM HILL'S TELEPHONE.—One of the boasts of James J. Hill, the railroad magnate, has been that he has no telephone in his house. "My office is the place to do business," he has declared, "and my office hours the time in which to do business. When I am behind the door of my home I am safe from the world."

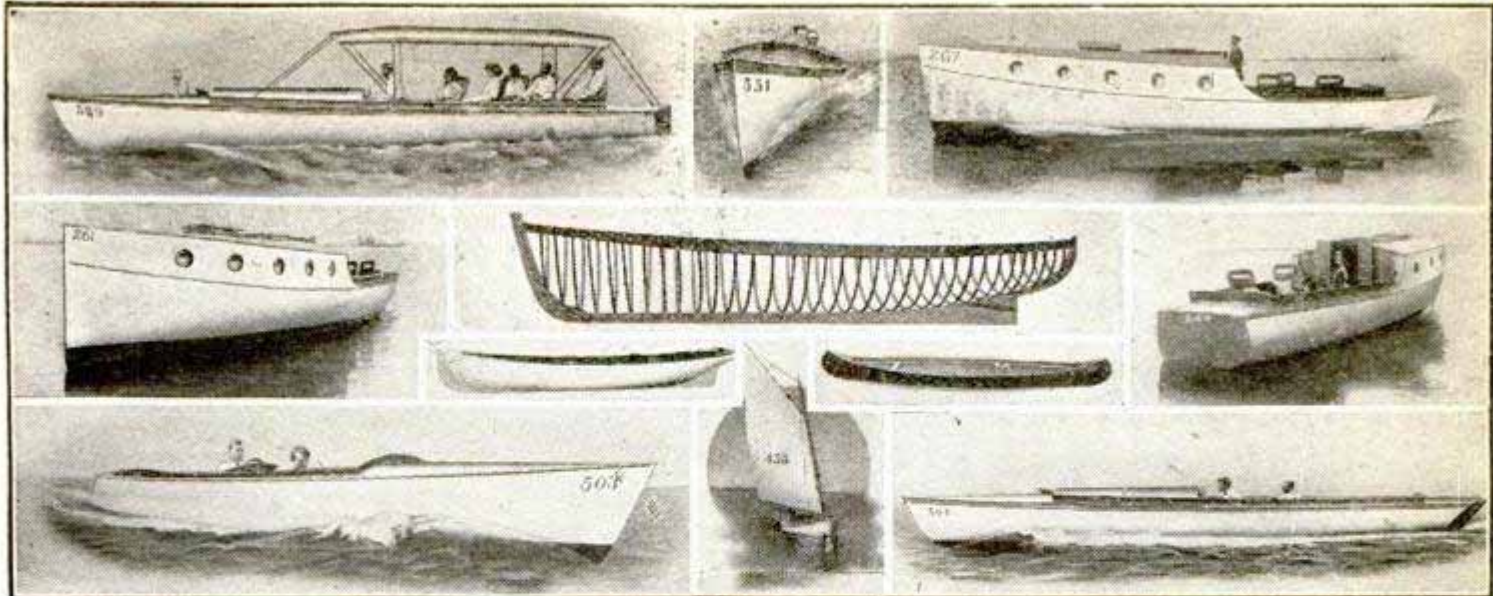
He has been, too, as can be proven by many a reporter who tried to interview him there at night. The best the reporter ever got was a sarcastic grin from the butler, who butted the reporter out to the cold world and a hot city editor. But the other day, according to Mr. Hill's own statement, his butler approached him. "The man is here to put in the telephone," said the butler.

Mr. Hill promptly wilburwrighted. He wanted no telephone, he said. He would have no telephone. He regarded it as a piece of gross impertinence on the part of the telephone company to assume that he wanted a telephone. "Why didn't you tell him so?" he demanded of the butler. Now you would think that this menial, convicted of error, would have wilted beneath the magnate's frown. He did not. "Hi told 'im, sir," said the butler, calmly, "that this telephone was wanted by the servants, sir. Hi told 'im you didn't desire hit, sir, but that we 'ad to 'ave it."

James J. Hill, magnate, looked at Mr. Hill's butler's impassive face. He twiddled his fingers for a moment on the mahogany desk. Then, confronted with the certainty of a servants' strike, he weakened. "Put it in, then," he said, and, with a return of courage, he growled at the butler: "But if I'm ever bothered by it I'll fire every one of you."

And the butler bowed in meekness and said: "Very good, sir." Cincinnati Times-Star





Build Your Own Boat and Save Two-Thirds

ANYONE can put together my knock-down boats or build the boat from rough lumber, by using my exact size printed paper patterns and illustrated instruction sheets. I can sell you a boat for about one-third what a factory would charge. If you want to know how it can be done, send at once for my new catalog.

Over One Hundred New Models

Each one embracing all the requirements of the thoroughly up-to-date pleasure boat, the result of twenty-three years' experience in building and sailing boats—from a paddling canoe to a large cruiser.

Right today there are more boats being built by my system than in all the boat factories put together, and mostly by inexperienced men and boys.



YOU TAKE NO RISK
I absolutely guarantee that you will be perfectly satisfied with everything you purchase of me, or your money will be instantly refunded.
C. C. BROOKS.

Why forego the pleasure of owning your own boat, when my system places it within your means?

Eight years ago I originated the patterns and knock-down system of boat-building. It has revolutionized the boat-building business. Boats built by my system are now found in every civilized corner of the earth, and they have been built by amateurs at a saving of just about two-thirds of what they would have cost if bought from a boat-builder or factory.

Send Today For My New 1909 Catalog (No. 22)

It quotes prices on knock-down frames, patterns, complete knock-down boats, motors, boat hardware and fittings, knock-down boat-houses, and completed boats ready to run.

In addition to our former lines, it shows a line of speed, semi-speed, and family launches of the

“V-in,” “V-out” and “V-plumb” stern types. Also a line of sea-going cruisers and light draught tunnel sterns, length up to 45 ft., beams up to 9 ft.

I can supply you with the framework for your boat, shaped and machined, every piece fitted ready to put together, for less money

than most lumber dealers would charge you for suitable rough lumber. Patterns and instruction sheets to finish sent free with knock-down frames.

I can save you (1), the boat builders' profit; (2), labor expense; (3), big selling expense; (4), $\frac{7}{8}$ the freight.

Figure it out yourself.



We also manufacture Knock-Down Boat and Auto Houses, fully described in Catalog 22.

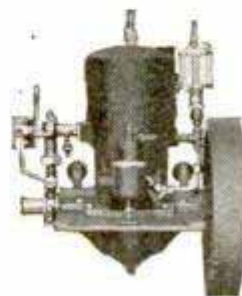
C. C. BROOKS, President
Brooks Manufacturing Co.

3704 Ship Street

Saginaw, Michigan

Originators of the Pattern and Knock-Down System of Boat Building

ESTABLISHED 1901



My engines are best described in Catalog No. 22, which also gives a combination discount when your order includes engine and K.-D. frame.



No. 01
Height 35 in.
Depth 31 in.
Width 32½ in.
Price, k. d., \$6.50



No. 03 DAVENPORT
Height 35 in.
Depth 31 in. Length 84½ in.
Price, k. d., \$17.00



No. 16.
MORRIS CHAIR.
Height 46½ in.
Depth 37 in.
Width 33 in.
Price, k. d., \$11.25



No. 415.
CELLARETTE.
Height 31 in.
Width 17½ in.
Depth 14 in.
Price, k. d., \$4.25



No. 27.
ROCKER.
Height 40 in.
Depth 24½ in.
Width 29½ in.
Price, k. d., \$8.50



No. 02. SETTEE.
Hgt. 35 in. Dph. 31 in.
Length 57½ in.
Price, k. d., \$11.75

ORDER DIRECT FROM THIS PAGE

Buy it Knock-Down and Save Two-Thirds

When you buy my knock-down furniture—shipped in sections—you save: 1st, all the dealer's profit; 2d, three-fourths of the freight; 3d, the cost of finishing; 4th, expense in crating and packing; 5th, in the factory cost, and 6th, in the factory profit. **Figure it out yourself.**



No. 0301,
LIBRARY TABLE.

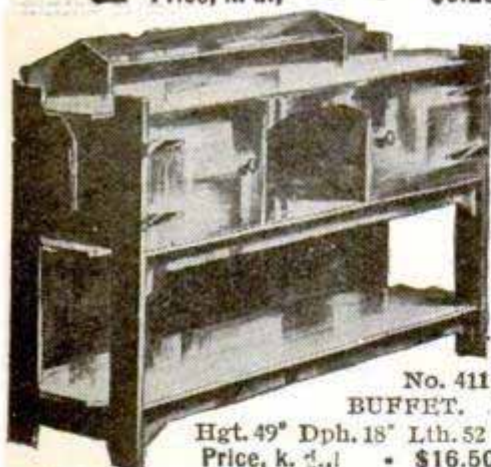
Height 30 in.
Top 43x28 in.
Price, k. d., \$9.25

SHIPPED IN SECTIONS, NOT IN PIECES

NOW, RIGHT NOW,
While you are interested, we want your order. Don't put it off. The effectiveness of the designs is apparent.



The furniture itself will surpass your expectations, and will more than back up every claim I make for it. Why not furnish your den, library or dining-room?



No. 411
BUFFET.
Hgt. 49" Dph. 18" Lth. 52"
Price, k. d., \$16.50

As you receive it with cushions made, ready to drop in place.

Easy to put together—can be assembled by a woman as well as by a man—no sawing—no holes to bore—no tool work necessary—no skill or special knowledge required—simply fit the assembled sections together in the grooves provided—a few minutes' work in staining and the piece is finished. The only tools necessary are a hammer and screw driver.

TERMS:—At least 25 per cent of the amount involved must accompany all orders, balance to be C. O. D. when shipped by express, or collected by draft attached to bill of lading when shipped by freight.

BROOKS MANUFACTURING COMPANY

3704 Ship Street, :: SAGINAW, MICHIGAN, U. S. A.
Established 1901



No. 310
Exten'n
Dining
Table.
Height 30 in.
Top closed 48x48", ext. 48x84"
Price, k. d., \$12.50

If genuine leather is desired, add to the prices quoted on Nos.

- 26, 27, 025, 10, 11.....\$2.25
- 16, 17..... 6.50
- 013..... 4.50
- 015..... 8.50
- 01, 04..... 3.00
- 02, 05..... 6.00
- 03, 06..... 9.00
- 0307..... 3.50



No. 409
HALL CHEST.
Hgt. 20". Wth. 19". Lth. 47½"
Price, k. d., \$8.25



No. 0407.
WRITING
DESK.
Height 45 in.
Width 38 in.
Depth 24 in.
Price, k. d., \$10.25



No. 013. No. 015.
DINING CHAIRS
Height 39 in.
Depth 18 in.
Width 17½ in.
013 price, k. d., \$16.50



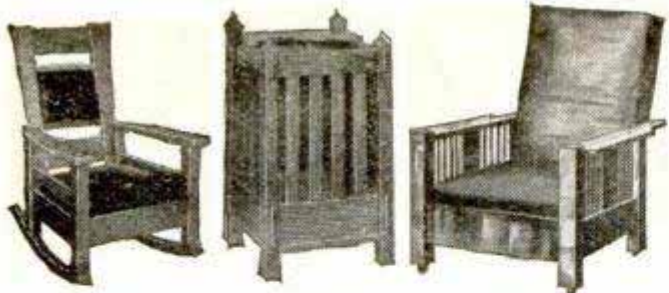
015,
price, k. d. \$18.00
Sold in sets of 6 only.



No. 300
CENTER
TABLE
Hgt. 30 in.
T'p 25½" sq
Price, k. d., \$4.00



No. 413.
HALL CLOCK.
Height 75 in.
Depth 14 in.
Width 17½ in.
Price, k. d. \$24.50



No. 025. **ROCKER.** Height 40 in. Depth 25 in. Width 30 in. Price, k. d., \$7.25
 No. 416. **UMBRELLA STAND.** Height 31 in. Width 17½ in. Depth 14 in. Price, k. d., \$3.75
 No. 17. **MORRIS CHAIR.** Height 46½ in. Depth 36 in. Width 33 in. Price, k. d., \$12.25



No. 06. **DAVENPORT** Height 35 in. Depth 30½ in. Length 88 in. Price, k. d., \$18.50
 No. 04. Height 35 in. Depth 30½ in. Width 36 in. Price, k. d., \$7.50

ORDER DIRECT FROM THIS PAGE

Satisfaction Guaranteed or Money Refunded

These illustrations do not half do it justice. It is massive, simple and always in good taste, of a style that never changes. This furniture will pass down to your children's grandchildren, increasing in beauty and doubling in value with each generation, as the oak of the country becomes exhausted.

EVERY PIECE SOLID OAK

YOU TAKE NO RISK.

My guarantee protects you. Note dimensions. Some of the pieces are too massive for very small rooms.



MY GUARANTEE.

I absolutely guarantee that you will be *perfectly satisfied* with everything you purchase of me, or *your money will be instantly refunded.*

C. C. BROOKS

Be careful, remember you must be satisfied, or I am to send your money back. Select the piece or pieces you want, remit according to the terms mentioned and order today.

The prices given include all fastenings, casters, stain, wax, brushes, together with **Spring Seat CUSHIONS COVERED WITH IMITATION LEATHER**, grained or pebbled effect, in red, brown, green or black, as ordered. **THE FREIGHT RATE** from Saginaw to New York City, per 100 lbs. is \$.46; New Orleans, \$.95; San Francisco, \$1.85. Extreme points are given merely for comparative purposes. Shipping weights on chairs, rockers, center tables, 100 lbs.; settees, dining and library tables, davenports, wardrobe, and buffet, 100 to 200 lbs.

BROOKS MANUFACTURING COMPANY

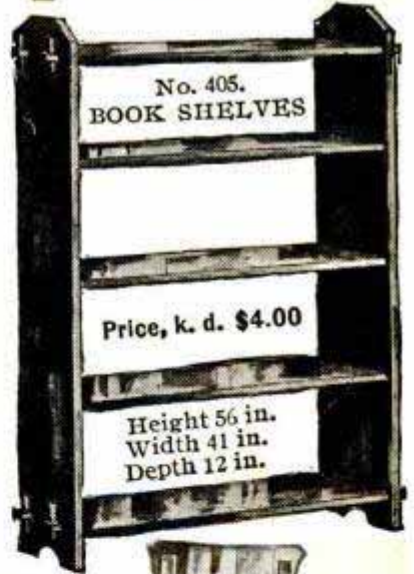
3704 Ship Street, :: **SAGINAW, MICHIGAN U. S. A.**
 Established 1901



No. 05. **SETTEE.** Hgt. 35 in. Dph. 30½ in. Length 62 in. Price, k. d., \$13.50



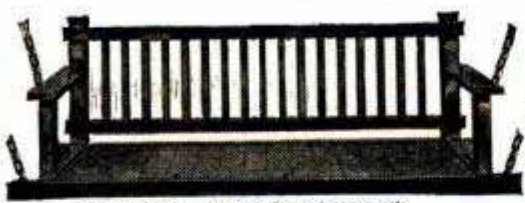
No. 0300. **LIBRARY TABLE** Price, k. d., \$10.50
 Height 30 in. Top 43x28 in.



No. 405. **BOOK SHELVES** Price, k. d. \$4.00
 Height 56 in. Width 41 in. Depth 12 in.



No. 414. **DEN CLOCK.** Height 75 in. Depth 14 in. Width 17½ in. Price, k. d. \$23.50



No. 0404. **PORCH SWING.** Hgt. 24 in. Dph. 24 in. Lgth. 60 in. Price, k. d., \$5.00



No. 0307. **CENTER TABLE.** Height 30 in. Top 34 in. diam. Price, k. d., \$8.50



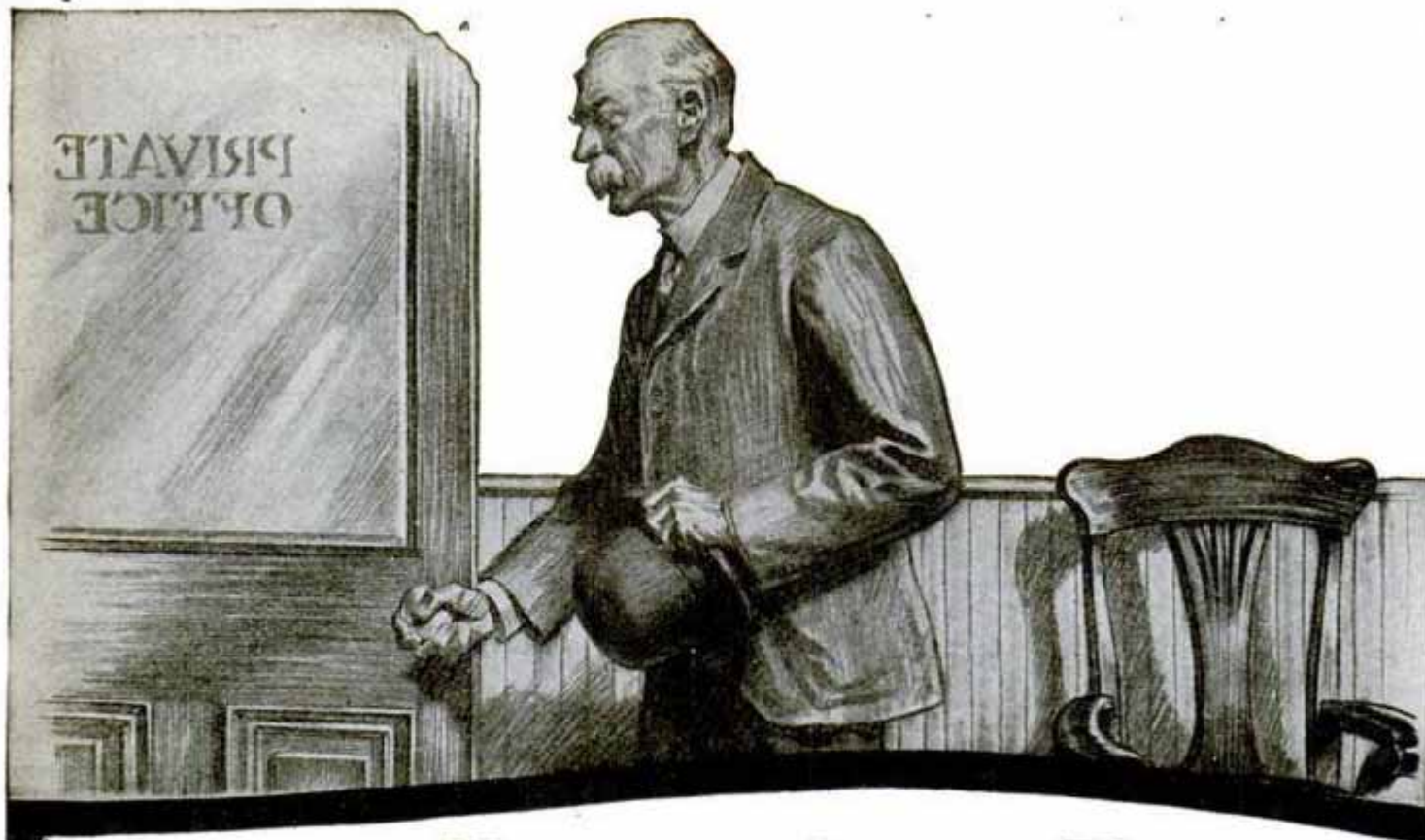
No. 11. **CHAIR.** Hgt. 37½ in. Dph. 23½ in. Width 31 in. Price, k. d., \$6.25



No. 10. **ROCKER.** Hgt. 37½ in. Dph. 23½ in. Wth. 31 in. Price, k. d., \$7.50



No. 12. **SETTEE.** Hgt. 37½ in. Dph. 23½ in. Length 67 in. Price, k. d., \$10.75



Stepping Down

There comes a time when the employer *must* choose between faithful but inefficient service and ABILITY—with the invariable result that the old-in-service *untrained* man must step down for some man better qualified to do the work.

Lack of training will tell against you in the long run. Success is a matter of *knowing how*, of being an expert, of thoroughly understanding your work, of being able to *do things* where others fail. Yet this does not necessarily mean that you must have an elaborate education. What it *does* mean is that you *must* have a *practical knowledge of your work*—knowledge that can be easily acquired at home, *in your spare time*, through the help of the International Correspondence Schools of Scranton.

Mark the attached coupon and have the I. C. S. tell you how it can be done. *Marking the coupon in no way binds you and puts you to no expense.* Mark it now.

Some Men Who

I was employed as an apprentice carpenter when I first became an I. C. S. Student. I have since advanced to a place as a member of a contracting firm and my earnings are now from seven to ten times what they were when I enrolled.

J. C. SATTERLEE,
1816 Market St., Oakland, Cal.

The I. C. S. has been of great benefit in enabling me to advance from a position as a laborer to that of Inspector of Construction. My earnings are of course very greatly in advance of what they were when I enrolled.

H. O. REYNOLDS,
6035 Pine St., Philadelphia, Pa.

At the time I enrolled for an I. C. S. Course of Training, I was employed as a second hand. I am now Overseer of spinning in the Mobile Cotton Mills, and my salary has been raised about \$50 per month. I knew practically nothing about mill calculations or the adjustment of mill machinery when I enrolled.

J. B. McCrackan,
Mobile Cotton Mill,
Mobile, Ala.

I was an office boy when I enrolled for your Complete Architectural Course. Now I am Chief Draftsman and have full charge of the work with an increase in salary of 600 per cent. No Correspondence School but the I. C. S. could have so fully equipped me for my present work.

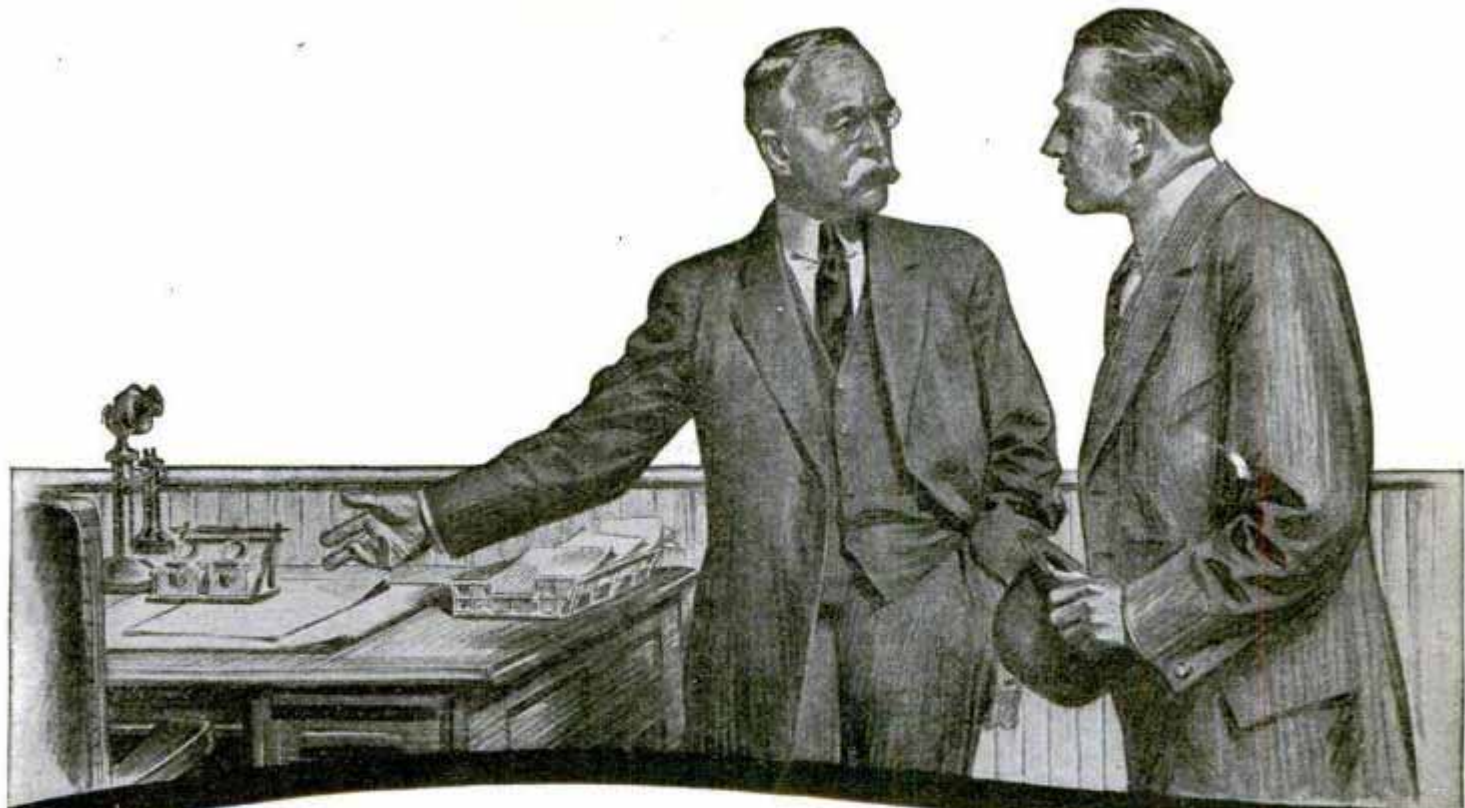
JNO. H. BOSSONG,
429 80th St.,
Bay Ridge, New York.

I enrolled in the I. C. S. when I was working as a clerk. My Course was of immeasurable benefit to me in advancing my position. I am now working as a Traveling Salesman and my salary is \$75 a month more than it was when I enrolled.

SETH S. SWIFT,
534 E. 5th Ave., Fremont, Neb.

My I. C. S. instruction has been responsible for my advancement from a position as traveling salesman to that of Advertising Manager for the H. D. Lee Mercantile Co. I now have an interest in this business and my income has of course been very greatly increased.

J. M. MITCHELL, Saline, Kan.



for a Better Man

I. C. S. training will count for you from the start. It will bring you more congenial work, will raise your salary, will provide against your making way for someone else. If you can read and write there's an I. C. S way for **YOU**—regardless of where you live, what you do, or how little you earn. Mark the coupon. *That's* the first step toward joining the thousands of men who have won high positions through I. C. S. help. Mark the coupon.

Successes due entirely to I. C. S. training are **VOLUNTARILY** reported by an average of 300 students every month. During December the number heard from was **327**. Mark the coupon.

Don't be the man to *step down*. Be the better man—the man who is paid for what he knows—whose position brings more than a mere living wage.

Take the first step to-day—Right NOW—Mark the coupon..

Have Stepped UP

The instruction I received from my I. C. S. Course of Training has been a great help in enabling me to advance from my work in a Casket factory to Foreman of a Pattern Shop. My salary is about three times what it was at the time of my enrollment.

CHARLES HILL,
422 N. California St., Indianapolis, Ind.

While working as a laborer I enrolled for an I. C. S. Course. Your instruction I found to be most satisfactory. It has enabled me to advance to a position as Draftsman doing experimental work for the Page Woven Wire Fence Co. and to almost double my earnings.

EDWARD F. ULRICH,
110 Chestnut St., Adrian, Mich.

When I was a machinist apprentice I enrolled in the I. C. S. Through the excellent instruction of my Course I was enabled to rise to a position as Foreman at the Cedar Falls Iron Works and I am now earning \$45 a month more than I did when I enrolled.

P. C. PETERSON,
631 Grant St.,
Cedar Falls, Ia.

SALARY-RAISING COUPON

INTERNATIONAL CORRESPONDENCE SCHOOLS

Box 872 D, Scranton, Pa.

Please explain, without further obligation on my part, how I can qualify for employment or advancement in the position before which I have marked **X**

Bookkeeper	Mechan. Draughtsman
Stenographer	Telephone Engineer
Advertisement Writer	Elec. Lighting Supt.
Show Card Writer	Mech. Engineer
Window Trimmer	Plumber & Steam Fitter
Commercial Law	Stationary Engineer
Illustrator	Civil Engineer
Civil Service	Building Contractor
Chemist	Architect
Textile Mill Supt.	Structural Engineer
Electrician	Banking
Elec. Engineer	Mining Engineer

Name _____

Street and No. _____

City _____ State _____



LOOK at this happy home scene, all enjoying the Edison Phonograph. The Edison has indeed been rightly called the king of entertainers for the home.

Why Don't YOU Get This PHONOGRAPH on

For almost four years I have been making the most liberal phonograph offer ever known! I have given hosts of people the opportunity of hearing the genuine Edison Phonograph right in their own homes without charging them a single penny.

Think of it! Thousands and thousands and thousands of people have been given the opportunity to hear in their own parlors concerts and entertainments by world famous musicians—just such entertainments as the greatest metropolitan theatres are producing.

So far you have missed all this. Why? Possibly you don't quite understand my offer yet. Listen—

MY OFFER: I will send you this Genuine Edison Standard Outfit (the newest model), complete with one dozen EDISON MOULDED AND AMBEROL RECORDS, for an absolutely free trial. I don't ask any money down or in advance. There are no C. O. D. shipments; no leases or mortgages on the outfit; no papers of any sort to sign. Absolutely nothing but a plain out-and-out offer to ship you this phonograph together with a dozen records of your own selection on a free trial so that you can hear it and play it in your own home. I can't make this offer any plainer, any clearer, any better than it is. There is no catch about it anywhere. If you will stop and think just a moment, you will realize that the high standing of this concern would absolutely prohibit anything except a straightforward offer.

WHY I Want to Lend You This Phonograph: I know that there are thousands and thousands of people who have never heard the Genuine Edison Phonograph. Nearly everyone is familiar with the screechy, unnatural sounds produced by the imitation machines (some of which though inferior are very expensive). After hearing the old style and imitation machines people become prejudiced against all kinds of "Talking Machines." Now there's only one way to convince these people that the Edison is superior and that is to let the people actually see and hear this remarkable instrument for themselves. THAT IS WHY I AM MAKING THIS OFFER. I can't TELL you one-twentieth of the wonders of the Edison, nothing I can say or write will make you actually HEAR the grand full beauty of its tones. No words can BEGIN to describe the tender, delicate sweetness with which the genuine new style Edison reproduces the soft, pleading notes of the flute, or the thunderous, crashing harmony of a full brass band selection. The wonders of the new style Edison defy the power of any pen to describe. Neither will I try to tell you how, when you're tired, nervous and blue, the Edison will soothe you, comfort and rest you, and give you new strength to take up the burdens of life afresh. The only way to make you actually realize these things for yourself is to loan you a Genuine Edison Phonograph free and let you try it.

LOOK FOR THIS TRADE MARK ON EVERY INSTRUMENT

Thomas A. Edison

F. K. BABSON EDISON PHON. DISTRIBUTERS CHICAGO
EDISON BLOCK, SUITE 1194

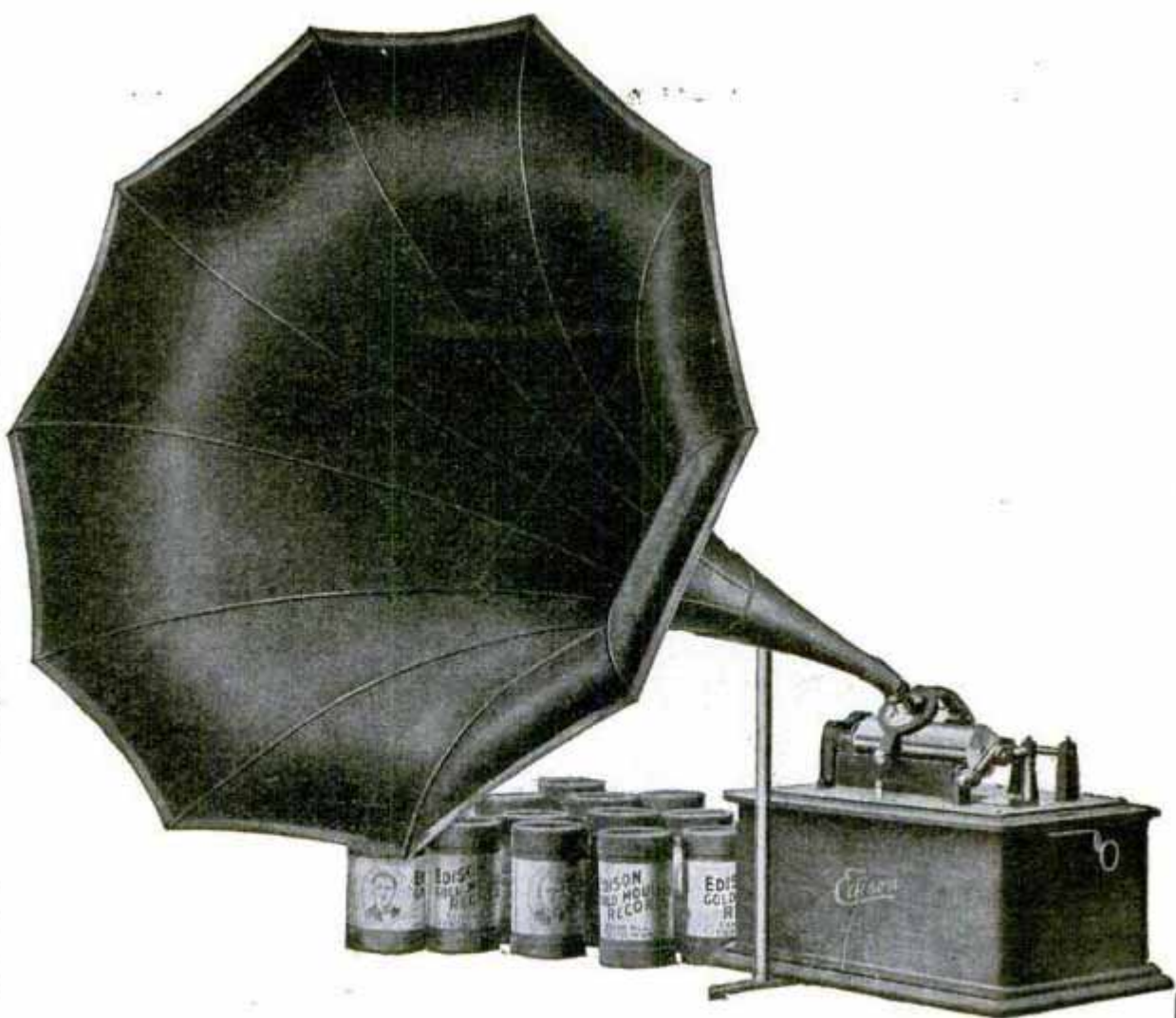
**Owners of
Edisons —**

**1909 Model
Equipments
Now Ready!**

All those who already own an Edison Phonograph can wonderfully improve their old machines, making them almost like the new 1909 machines, and can also get the SUPERB new 1909 Edison Amberol records, the loudest, clearest, most beautiful records ever made, playing TWICE AS LONG as any of the records heretofore made.

**Owners of
Edisons —**

Write for free circular AA, describing all this.—F. K. BABSON, Manager.



FREE TRIAL

You Don't Have To Buy It: All I ask you to do is to invite as many as possible of your friends to hear this wonderful new style Edison. You will want to do that anyway because you will be giving them genuine pleasure. I feel absolutely certain that out of the number of your friends who will hear your machine there will be at least one and probably more who will want an Edison of their own. If they don't, if not a single one of them orders a Phonograph (and this sometimes happens) I won't blame you in the slightest. I shall feel that you have done your part when you have given these free concerts. You won't be asked to act as our agent or even assist in the sale of a single instrument. In fact, we appoint no such agents, and at the rock-bottom price on this wonderful new outfit we could not allow any commission to anyone.

If You Want to Keep The Phonograph—that is if you wish to make the Phonograph your own, you may do so, but it is not compulsory. I am asking you merely to send for a free demonstration. I won't be surprised, however, if you wish to keep the machine after having it in your own home. If you do wish to keep it, either remit us the price in full, or if you prefer, we will allow you to pay for it on the easiest kind of payments.

Our Easy Payment Plan There are so many people who really want a phonograph but who do not have the ready cash to pay for it all at once that I have decided on an easy payment plan that gives you absolute use of the phonograph while paying for it. \$2.00 a month pays for an outfit. There is absolutely no lease or mortgage of any kind, guarantee from a third party, no going before a notary public, in fact, no publicity of any kind, and the payments are so very small and our terms so liberal that you never notice the payments.

Get the Latest Edison Catalogs

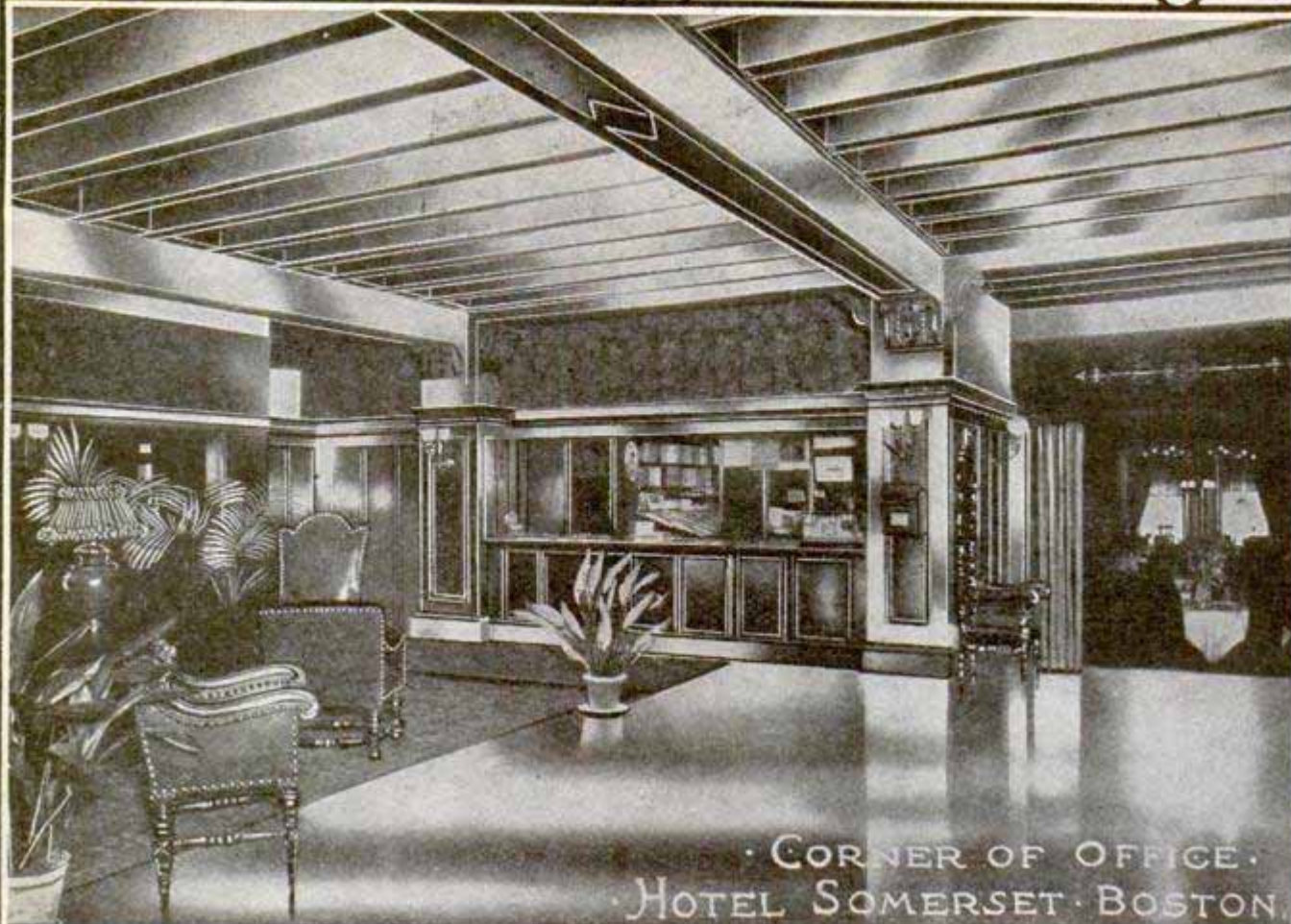
Just sign your name and address on this coupon now and mail it to us. I will send you our superbly illustrated Edison Phonograph Catalog, the very latest list of EDISON MOULDED AND AMBEROL RECORDS (over 1,500 of them) and our Free Trial Certificate entitling you to this grand offer. Sign this coupon now, get these catalogs and select your records at once. Remember the free concerts. Sign this coupon right now or send a postal card or letter if you prefer. But do it now. No obligations, just get the catalog. Sign the coupon and mail it to us right away before you forget it. Address F. K. Babson, Edison Phonograph Distributors, Edison Bldg., Suite 1194, Chicago.

**F. K. BABSON, Edison Phonograph Distributors,
Edison Bldg., Suite 1194, Chicago, Ill.**

Please send me without any obligations, your 1909 Edison Phonograph Catalog, list of Edison Moulded and Amberol Records and Free Trial Certificate entitling me to your grand offer, all free.

Name.....
Address.....
.....
.....

**Sign and Mail
this Coupon
Today.**



CORNER OF OFFICE.
HOTEL SOMERSET BOSTON

LIQUID GRANITE

IS THE VARNISH BEST SUITED

for interiors in public buildings and private houses, especially such as receive hard wear.

LIQUID GRANITE always gives complete satisfaction. As its name implies, it adds a lustre and brightness to woodwork combined with a hardness and durability that is unequalled.

"**LIQUID GRANITE** makes poor floors feel rich." Indeed, the same may be said of all woodwork, whether indoors or out, or in fact, of all other materials on which any varnish can be used.

For restoring oil-cloth and linoleum **LIQUID GRANITE** is unsurpassed. Anyone can apply **LIQUID GRANITE** easily; everyone will find it difficult to mar or deface.

Ask your dealer for **LIQUID GRANITE** and insist on what you ask for. If he does not keep it have him order it and accept no substitute.

Send for literature on wood finishing and home varnishing. One of our wonderful cut-out paper toy wagons sent free to any address.

Put up only in cans of convenient size, from $\frac{1}{2}$ -pint to 5 gallons



New York
262 Pearl St.

Boston
530 Atlantic Ave.

Philadelphia
26-28 No. 4th St.

Baltimore
29 S. Hanover St.

BERRY BROTHERS, Limited

Varnish Manufacturers

ESTABLISHED 1858

DETROIT

Canadian Office and Factory: Walkerville, Ont.

Chicago
25 Lake St.

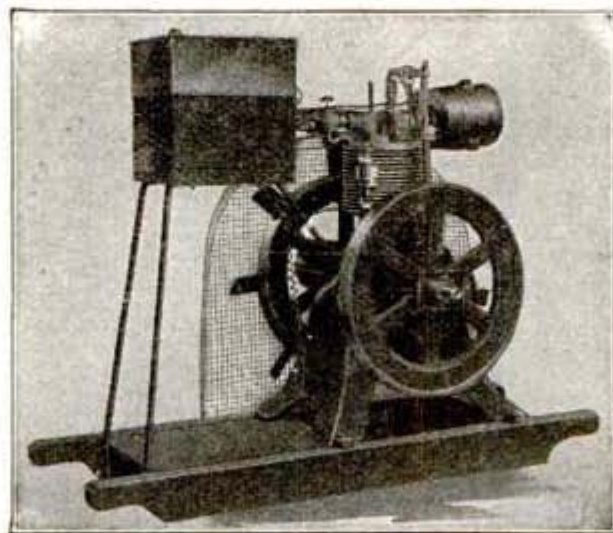
Cincinnati
420 Main St.

St. Louis
112 So. 4th St.

San Francisco
668 Howard St.

Economy—Reliability—Convenience

are the qualities which you demand in a gasoline engine



THE

White Lily Gasoline Engine

is **ECONOMICAL**

Because it represents a small investment. Every dollar you pay for this engine goes into value. You pay a fair price for what you get, but you pay for nothing else. The White Lily is economical, also, because it uses but little gasoline and electricity and cuts down the consumption of both in proportion to the work to be done.

It is **RELIABLE**

Because of its excellent materials and design, and the care with which it is built, and the rigid tests that are made of each engine while building.

To prove to every purchaser the truth of every representation, *every engine is sold on 30 days' trial.*

The White Lily is **CONVENIENT**

Because it is small, light and air-cooled. Two men can carry it anywhere, yet it always gives full 3 H. P. The feature of air-cooling does away with weight, cost, and complication and prevents every trouble of cooling, summer or winter.

Ask for Free Illustrated Catalog and full particulars **today.**

White Lily Manufacturing Company

1554 Rockingham Road

Davenport, Iowa

Fighting the Trust

READ

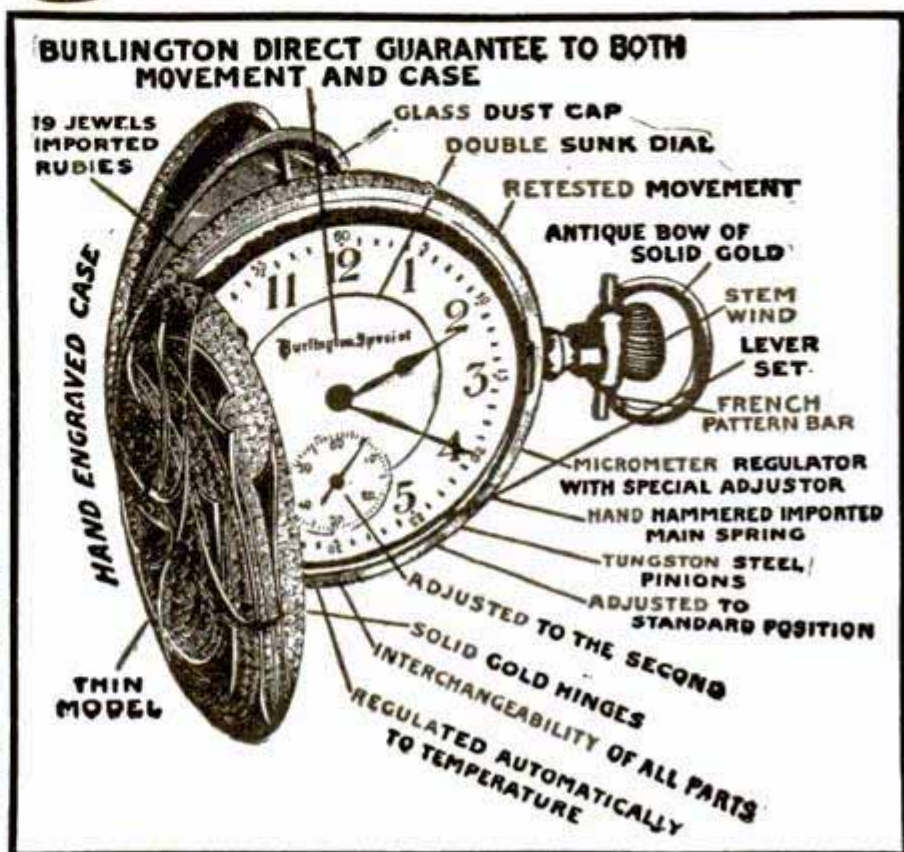
A Watch Offer Without Parallel!

WRITE for our free book on watches; a book that posts you on "selling systems," and explains the reasons for our most remarkable rock-bottom-price offer DIRECT TO YOU on the highest grade Burlington.

IF YOU WANT a highest grade watch (ladies' or gentlemen's), or if you ever expect to own such a watch, write NOW for the free Burlington book. See coupon below.

We won't "knuckle down" to selling systems among dealers, so we have decided to make such a tremendous and wonderful offer direct to the public on a first-class time piece, that no trust, no dealers under contract will or can stop us. You too will seize this opportunity to get the "Burlington Special" direct on this wonderful offer.

YOU should not buy a worthless watch just because it is cheap. Nor need you pay trust prices now for a top-notch watch. The free Burlington book explains.



\$2.50 A MONTH AT A NO-TRUST PRICE!
 \$2.50 a month for the world's most superb time piece! The easiest payments at the rock-bottom—the no-trust price.

To assure us that everybody will quickly accept this introductory direct offer, we allow cash or easy payments just as you prefer.

NOW WRITE for the free book. It will tell you what you ought to know before you even examine a watch. It will tell you the inside facts about watch prices, and will explain the many superior points of the Burlington over the double priced trust products. Just send your name and address.

NO MONEY DOWN: We ship the watch on approval, prepaid (your choice of lady's or gentleman's open face or hunting case). You risk absolutely nothing—you pay nothing—not one cent—unless you want the great offer after seeing and thoroughly inspecting the watch.

Get the FREE Burlington Book

THIS BOOKLET will quickly convince you too that you DO want a no-trust watch—made in the independent factory that is fighting the trust as best it can by giving better quality and superior workmanship throughout; we will quickly convince you that the Burlington watch, on which there is only one rock-bottom price (the same rock-bottom price everywhere) is THE watch for the discriminating buyer; that it is THE watch for the man or woman who wants, not the largest selling brand which everybody has, but the best watch, the watch bought by experts, THE watch that is absolutely perfect in its many points of superiority—the Burlington Watch.

You will be posted on inside facts and prices when you send for the Burlington Company's free book on watches.

BURLINGTON WATCH CO.
 SUITE 1194,
 MILLARD STATION,
 CHICAGO, ILL.

Please send me (without obligations and prepaid) your free book on watches and copy of your \$1,000.00 challenge to the Waltham or Elgin with full explanations of your cash or \$2.50 a month offer on the Burlington Watch.

Name.....
 Address.....

BURLINGTON WATCH COMPANY
 SUITE 1194,
 MILLARD STATION,
 CHICAGO, ILLINOIS,
 U. S. A.

No Letter Necessary; Coupon Will Do.

Please Mention Popular Mechanics

Refinish a Piece of YOUR Furniture at OUR Expense

Let us send the
Materials Free



WE WANT a sample of wood finishing done with our preparations in your home. We will send the materials to do the work. Here they are:

A bottle of Johnson's Electric Solvo to quickly remove the old finish—

A bottle of Johnson's Wood Dye (you to choose the color from our 14 different shades) to color the wood—

A sample of Johnson's Prepared Wax to give that

beautiful "hand-rubbed" effect—

And our illustrated guide book for home beautifying which includes complete color card and tells how to finish and refinish wood.

No doubt you have some piece of furniture that you prize highly, yet do not use on account of the worn condition of its finish, or because it does not harmonize with other furniture or decorations.

Use this outfit, which we want to send you free, for refinishing it, and you will be surprised to learn how easily the work is done and the beauty of the result.

May we send you these three packages, and the valuable six-color book, free at once? Learn from the test the beautiful effect obtained from the use of

Johnson's Wood Dye

It is not a mere stain. It is a deep seated dye—sinking into the pores of the wood and bringing out the beauty of the grain. When finished with Johnson's Prepared Wax you have a permanent finish of real beauty and most artistic effect. We want to give you these three packages at once. Send ten cents to partially pay cost of packing and postage—using coupon below for your convenience.

Johnson's Wood Dye comes in 14 Standard shades:

- | | |
|------------------------|-----------------------------|
| No. 126 Light Oak | No. 130 Weathered Oak |
| No. 123 Dark Oak | No. 131 Brown Weathered Oak |
| No. 125 Mission Oak | No. 132 Green Weathered Oak |
| No. 140 Manila Oak | No. 121 Moss Green |
| No. 110 Bog Oak | No. 122 Forest Green |
| No. 128 Light Mahogany | No. 172 Flemish Oak |
| No. 129 Dark Mahogany | No. 178 Brown Flemish Oak |

Half-pints, 30c.; pints, 50c. Johnson's Prepared Wax, 10c and 25c packages. Also sold in large sizes.

For sale by all leading paint dealers.

Send coupon today to

S. C. Johnson & Son, Racine, Wis.

"The Wood Finishing Authorities"

Please Use This FREE COUPON — I accept your offer and enclose ten cents to partially pay postage and packing on Free Booklet, Edition PA-4, one sample bottle of Johnson's Wood Dye, Johnson's Prepared Wax, and a sample of Johnson's Prepared Wax.

Name.....
Address.....
Name.....
Address.....

Everything for Furnace Work



**On Free Trial At Our
Expense**
Until Jan. 1st, 1910

Our story is quickly told. We will send you a Hess Steel Furnace and complete heating outfit, including pipes, registers, fittings and everything needed, for from \$25 to \$100 less than you can buy from dealers, and deliver it at your station, freight prepaid. You may place the purchase price in the hands of your local banker who will hold the money until Jan., 1st, 1910, while you test the heater.

These
Important
Heating
Books
FREE

If the test is not satisfactory to you in every way, you may return the goods at our expense and have your money back, we to pay cost of removal and freight charges both ways. Ask us more about it. There's money in it for you. Our great co-operative plan makes you a partner in our success. We explain this with every estimate. This offer also applies to heating equipments for all buildings. We manufacture and sell from our Factory direct to you.

No 45
**"Leader" Steel
Furnace**
Price \$49 Pipes and
Registers Extra
Delivered any station east of Omaha
and north of the Ohio River.

Heating Plans Free! Write for Booklets!

Send us a rough sketch of any building that you wish to heat and—without any charge or obligation on your part, we will have our experts prepare a simple, clear plan, which you can easily understand, showing every detail of the furnace, pipes, registers, etc., in their proper places, with the exact cost to you of the complete equipment.

The Hess Furnace will burn any fuel. Besides any kind of coal, or wood;—chips, twisted straw, corn cobs or any other waste fuel can be utilized and money saved.

Our free booklets, "Modern Furnace Heating" and "These Bear Witness," give valuable information about heating any building perfectly and economically. Write today for these booklets.

Hess Warming & Ventilating Co.,
910 Tacoma Bldg., Chicago



**JOHNSTON'S BEST
WATER SYSTEM**
affords you every convenience of City water. Fire protection, adds value to property, cuts out water tax and labor. Freight prepaid. Write for complete literature.
JOHNSTON MFG. CO.,
A-2 Walnut Kansas City, Mo.

Cheap as Wood.

We manufacture **Lawn and Farm FENCE**. Sell direct shipping to users only, at manufacturers' prices. No agents. Our catalog is Free. Write for it to-day.
UP-TO-DATE MFG. CO., 924 10th St., Terre Haute, Ind.

BUILD WITH CEMENT

Do it yourself with our
\$16.50 HOLLOW BLOCK
MACHINE SAVE MONEY

We give complete instructions
Catalog Free
BOOK OF DESIGNS and Floor Plans,
10 cts. in silver or stamps

REED MFG. CO., BOX 118, SPRINGFIELD, OHIO

"ELECTRIC SLEEP."—To the Editor: "In the January, 1909, number, on page 21, you have an article on 'Electric Sleep.' I can endorse what you say most fully, as I have used electricity for this purpose for over twenty (20) years. I used it first on my wife, who could not sleep on account of pain. By using a rapidly vibrating current (intermittent) the pain would soon be unnoticed and a sleep of from 3 to 6 hours would follow. The current used was so small in amperes and voltage that it was not felt in any way and yet always gave the needed rest and sleep, never in any way doing harm."—Yours very truly, C. G. Evans, Chicago.

A Really SAFE Refrigerator

The Monroe is the only refrigerator with inner walls, made in one piece from unbreakable solid porcelain an inch thick with all corners rounded, no cracks or crevices anywhere. It never corrodes—as metal lined refrigerators do, and will not check or "craze" like tile. It, alone, can be sterilized and made germlessly clean in an instant by simply wiping out with a cloth wrung from hot water. Every time it is washed it becomes in reality a new refrigerator. For these reasons The "Monroe" is installed in the best flats and apartments, occupied by people who care—and is found today in a large majority of the very best homes in the United States, also in our leading hospitals and sanitariums. The health of the whole family is safeguarded by the use of a Monroe Refrigerator. Nothing anything like The Monroe or anywhere so good can be bought in any store. It is sold direct from factory to you.

The "Monroe"

You save dealer's profit. Thus get a good refrigerator in The Monroe for the price the dealer would charge for a cheap, insanitary article. To learn all about this wonderful refrigerator, why it is so much better and how it is sold on **60 Days Free Trial**, ask for our handsome, fully illustrated catalogue—today.

MONROE REFRIGERATOR CO. Station Chicago

NOTE—You can not buy a Monroe Refrigerator or any-

THIS DOLLAR BOOK SENT FREE

Our 1909 Book—Newer Styles—Lower Prices



SAVING OF 15 TO 50 PER CENT

We guarantee on every article a saving of 15 to 50%. We don't refer to your local store prices, for they are enormously high. We refer to catalog houses, selling for cash, and claiming to undersell us. Get our goods on trial. If you don't find that we undersell everyone else, simply send our goods back. Ask others to send goods on approval, as we do, and keep those which cost the least.

CAPITAL \$7,000,000

This is the largest concern of its kind in existence. Our combined capital is \$7,000,000. We have 450,000 customers. Our mail order buildings cover six acres of ground. In addition, we own 25 mammoth retail stores, in the heart of the largest cities, where we meet the fiercest competition in America. The only way in which we have grown to this size is by underselling all competition. Now we dominate the field. We control the output of scores of factories, and our enormous buying power enables us to practically fix our own costs. It would bankrupt any lesser concern to attempt to meet our prices.

You may pay cash if you want to, but we have no discount for cash. You may as well buy on credit, as half of the world is doing. You gain nothing by paying cash.

FOUR FREE CATALOGS

Our General Catalog gives pictures, prices and descriptions of everything for the home—of 3,000 things like these:

Furniture, Chinaware, Sewing Machines, Carpets, Rugs, Silverware, Washing Machines, Draperies, Lamps, Clocks, Baby Cabs, etc.

Our Stove Catalog shows 70 styles of Empire stoves and ranges, costing from 89c up. Any one of these stoves will pay for itself in fuel saving before you finish paying us.

Our Piano Catalog shows the very finest grades of pianos, as low as \$175.00. We accept no money down, but simply send the piano and let it sell itself. This book will save you at least \$100 on any piano you want.

Columbia Graphophones are shown in a separate catalog—all styles and all records. We will send you a machine with 12 records on 30 days' free trial.

SEND NO MONEY—NO STAMPS

Simply mail us the coupon printed below. Or write us a postal, if you prefer. We will then mail you this great book, now fresh from the presses, picturing more than 3,000 new-style things for the home. A part of the pictures are in actual colors. This book shows a greater variety of Furniture, Carpets and House-furnishings than is shown in any retail store in Chicago. On each article it quotes a price lower than you ever saw. It shows the newest creations in furniture, draperies, etc. And it offers you credit on everything. Have whatever you want, at our lowest cash prices, and pay us a little each month.

WE TRUST YOU FOR

Furniture
Carpets—Rugs
Silverware
Chinaware
Lamps—Clocks
Refrigerators

Sewing Machines
Washing Machines
Pianos—Stoves
Talking Machines
Baby Carriages
Draperies, Etc., Etc.

We sell goods on credit at lower prices than ever were quoted for cash. You can have these home comforts now and begin at once to enjoy them. No need to wait for the money. Simply pay as you can. We charge no interest and ask no security. Our dealings are all confidential. Any person who wants to make home more attractive is the right sort of person, and his credit is good with us.

OVER A YEAR TO PAY

Pay a few cents down on each dollar. Then take the goods, use and enjoy them, and pay us a little each month. On the average we allow a year to pay. On pianos, two years. If misfortune comes, or loss of work, we do what we can to help out. Our whole effort, from the time you first deal with us, is to make you a permanent customer. And you will be. You will never buy housefurnishings elsewhere, and pay others' prices, after you once deal with us.

30 DAYS' FREE TRIAL

Whatever you select can be used for one month before you decide to buy it. Every article is sent on approval. You not only see it, but use it. You compare it with other similar articles, and compare our prices with others. If the article, for any reason, is unsatisfactory, simply send it back. You are under no obligation. The month's use will not cost you one penny.

FACTORY CASH PRICES

Cash mail order houses will try to convince you that credit costs more than cash. See for yourself if it does. Get our catalog and compare the prices. See who sells the lowest. The fact is, we sell on credit exactly as low as for cash. Our cash customers get not a penny of discount. To all we sell at factory prices, plus our one small profit. No middlemen of any kind get profit on our goods. We defy any other mail order house to show one price as low as we offer on a similar piece.

CUT OUT THIS COUPON and mark which catalog you want. Please do it now—before you forget it. Let us prove at once that credit costs you less than cash.

SPIEGEL, MAY, STERN CO., 1899 35th St., Chicago

Please mail me the catalogs marked.

—General Catalog.

—Piano Catalog.

—Stove Catalog.

—Graphophone Book.

Name _____

Postoffice _____

State _____ R. F. D. _____

SPIEGEL, MAY, STERN CO., 1899 35th St., Chicago

\$39.00 For this Complete Set of HIGH-GRADE Bath Room Fixtures

We Sell Direct to the Consumer

This is our No. 5 bath room combination, regularly listed in our catalog for \$45. We are making a special offer to readers of the Popular Mechanics on this of \$39.

The Bath Tub is 5 ft. long, 30 inches wide with three-inch graceful rolled rim. The entire tub is white porcelain enameled inside and over the rim, and is trimmed complete with full nickel trimmings.

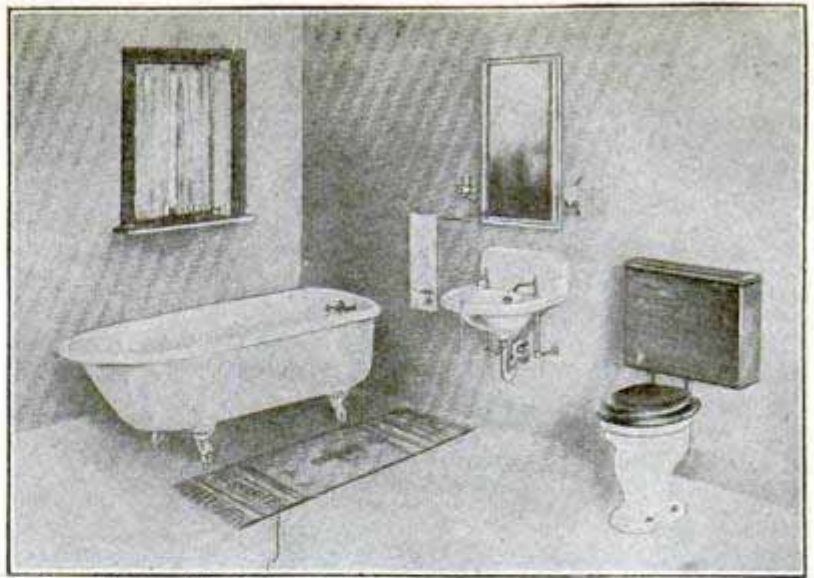
The Lavatory is cast iron, heavy white porcelain enameled and trimmed complete with full nickel trimmings.

The Closet is high grade, sanitary, vitreous syphon wash down bowl with polished oak copper lined tank and seat and cover to match. All parts high grade.

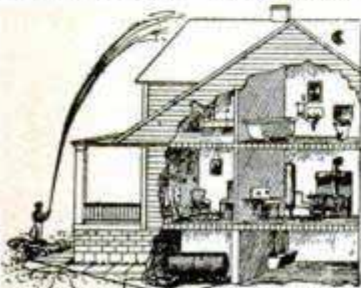
This offer is for a limited time only!

OTHER BATH ROOM OUTFITS FROM \$24.50 TO \$125.00

Our perfect All Iron Pipe system of plumbing will enable any handy mechanic to install the material on farm or in city. Send us a list of your needs. All we ask is an opportunity to figure on your wants. We carry everything necessary for installing



this class of work. Soil pipe, lead and water pipe and fittings of all kinds, etc.



Pneumatic Water Supply Systems

We will furnish you with a complete pneumatic or air pressure water supply outfit that will furnish you running water the same as city water works. Prices range from \$40 upward.

We will furnish you complete house plumbing outfit like shown in this picture, including the pneumatic water supply system, the bath room outfit, the kitchen sink and range boiler and all the pipe and pipe fittings to install from \$125 upward.

Ready Roofing GALVANIZED, RUBBER AND ASPHALT.

We offer the entire lot of factory mill ends of prepared roofing strictly high grade, brand new, at less than cost of manufacture. There are from two to four pieces of galvanized rubber or asphalt roofing to each roll of 108 sq. ft. This is \$2 and \$3 grades of roofing. It is suitable for all climates and all ready to lay. The only tools needed are a hammer and a jack-knife. This roofing will impart no taste to rain water, and can be laid over old shingles. We guarantee every roll to be as represented or money back.

PRICE, - - - 95 CTS. PER ROLL OF 108 SQ. FT.

Let Us Quote You a Price on a Complete Hot Water or Steam Heating Plant for your Home

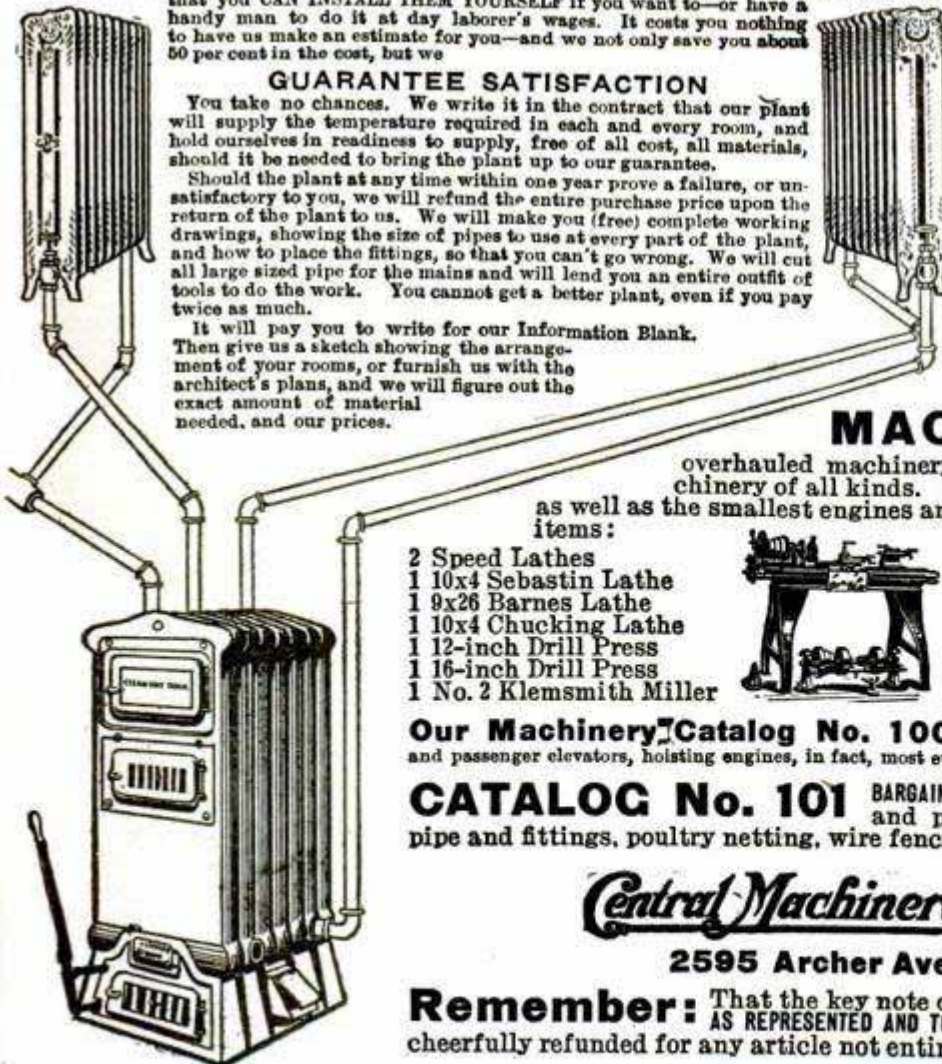
Sold Direct to You at Manufacturer's Price. Don't say you can't afford a heating plant for your home until you GET OUR PRICES. They will surprise you—and we furnish plants in such convenient form that you CAN INSTALL THEM YOURSELF if you want to—or have a handy man to do it at day laborer's wages. It costs you nothing to have us make an estimate for you—and we not only save you about 50 per cent in the cost, but we

GUARANTEE SATISFACTION

You take no chances. We write it in the contract that our plant will supply the temperature required in each and every room, and hold ourselves in readiness to supply, free of all cost, all materials, should it be needed to bring the plant up to our guarantee.

Should the plant at any time within one year prove a failure, or unsatisfactory to you, we will refund the entire purchase price upon the return of the plant to us. We will make you (free) complete working drawings, showing the size of pipes to use at every part of the plant, and how to place the fittings, so that you can't go wrong. We will cut all large sized pipe for the mains and will lend you an entire outfit of tools to do the work. You cannot get a better plant, even if you pay twice as much.

It will pay you to write for our Information Blank. Then give us a sketch showing the arrangement of your rooms, or furnish us with the architect's plans, and we will figure out the exact amount of material needed, and our prices.



STEEL ROOFING

Only \$1.50 per 100 sq. ft. Fifty thousand squares of steel roofing, size 2 feet 6 inches wide by 5 feet 6 inches long (30x66 in.)

These sheets were used about 30 days in connection with the manufacture of soap. This material was never exposed to the weather and was never nailed. Every sheet is clean and free from nail holes and practically as good as new. EXTRA HEAVY. From 24 to 28 gauge. Every sheet is coated on both sides with red "gelatine," a new discovery in paint that prevents rust. Will last longer than light weight galvanized roofing. Just the thing for barns, ware-houses, factories, sheds and buildings of all kinds, or for ceiling and siding. Satisfaction guaranteed or money back.

PRICE FLAT, FOR 100 SQ. FT., . . . \$1.50

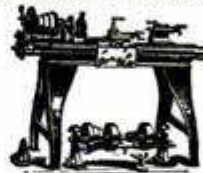
CORRUGATED, PER 100 SQ. FT., . . . 1.75

In writing about this, mention Roofing Offer No. 98.

MACHINERY We are one of the largest dealers in

overhauled machinery in the United States. We have machinery of all kinds. Heavy engines and large power boilers as well as the smallest engines and small boilers. Below we list a few items:

- 2 Speed Lathes
- 1 10x4 Sebastin Lathe
- 1 9x26 Barnes Lathe
- 1 10x4 Chucking Lathe
- 1 12-inch Drill Press
- 1 16-inch Drill Press
- 1 No. 2 Klemsmith Miller



- 1 24-inch Shaper
- 1 1 1/2-inch Pipe Machine
- 3 4-inch Forbes Hand Pipe Machines
- 1 2 H. P. 220 Volt Motor
- 2 1 H. P. 220 Volt Motors
- 2 50-light Dynamamos
- 10 Assorted Emery Grinders

Our Machinery Catalog No. 100 and passenger elevators, hoisting engines, in fact, most everything you can think of in machinery.

CATALOG No. 101 BARGAIN BUILDING MATERIAL, including bath room and plumbing supplies, heating apparatus, pipe and fittings, poultry netting, wire fencing, roofing material, etc., FREE.

Central Machinery & Supply Co.

2595 Archer Avenue, Chicago

Remember: That the key note of our business is EVERY ARTICLE GUARANTEED AS REPRESENTED AND TO BE SATISFACTORY. Your money will be cheerfully refunded for any article not entirely satisfactory.



What! Again

THE PECK-WILLIAMSON COMPANY UNDERFEED HEATING WAY is the ONE SURE WAY of escaping *big* and frequent coal bills. The UNDERFEED System of Heating—applied either to warm air furnaces, steam or hot water plants—makes it possible to get from *cheapest* slack, not *burnable* in other plants, as much clean, even heat as *highest grade* anthracite will yield.

Peck-Williamson } Furnaces—Warm Air UNDERFEED } Boilers—Steam and Water Save 1/2 to 2/3 of Coal Bills

Coal is fed from below. All the fire is on top. Smoke and gases *must* pass thru the flame and are consumed. This UNDERFEED Coal-burning plan *solves* the smoke nuisance, insures clean homes and better health. Ashes are few and are removed by shaking the grate bar as in ordinary furnaces.

Illustration shows furnace without casing, cut away to show how coal is forced up under fire, which burns on top.

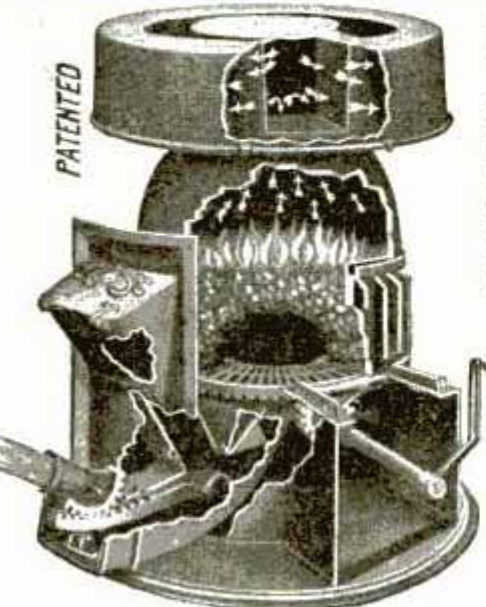
This illustration shows the Steam and Hot Water Underfeed Boiler.

Dr. E. B. Doan, of West Carrollton, O., clearly defines what UNDERFEED economy really means. He writes:

“There was at one time a thing called a furnace in the basement of my house. It consumed from \$40 to \$60 worth of good coal each winter in a vain endeavor to heat the house to 65 degrees. Nearly two years ago you installed an UNDERFEED furnace and during the past two winters we have had more heat than we needed at a cost of about \$25 per winter and less than half the work the old furnace required.”

We've hundreds of letters just like this. We'd like to send a lot of them in fac-simile, with our Underfeed Booklet for warm air heating or our Special Catalog of Steam and Hot Water Underfeed Boilers.

Heating plans and services of our Engineering Department are yours—ALL FREE. Write to-day, giving name of local dealer with whom you prefer to deal.



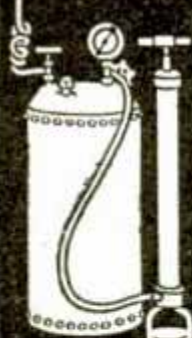
The Peck-Williamson Company,
398 West Fifth Street,
CINCINNATI, O.
Furnace, Hardware Men and Plumbers are invited to send for our New Selling Plan.

THE "BEST" LIGHT

The "Best" Lights are made of fewest possible parts; no wires to ground, no danger of asphyxiation, nothing to get out of order. ☞ Brighter than electricity, and costs less than kerosene. No grease, dirt or odor. ☞ Catalog and estimate of the cost of installing the "Best" System in church, public and office buildings, stores, factories, residences, etc., furnished on request. Any number of lights. Lamps from 100 to 2,000 candle power. ☞ Agents wanted everywhere. Write to-day.

THE BEST LIGHT CO.
324 EAST FIFTH ST., CANTON, OHIO

OWN YOUR OWN GAS PLANT



Factories Waste Coal

BY THROWING IT AWAY IN CINDERS

One client of ours was dumping cinders containing 39 per cent of unburned coal. At the end of our series of tests the cinders carried 20 per cent of unburned coal.

Just the moral effect on the firemen of knowing the chemist was checking them up, saved this factory three tons of coal a day.

Do you know how much of your coal goes to waste with the cinders? Send us a sample and find out. Better have your coal and water tested at the same time.

IT PAYS TO KNOW

Write for prices and sampling instructions

The Miner-Lawrie Laboratories

CONSULTING CHEMISTS TO POPULAR MECHANICS

355 Dearborn Street - CHICAGO

IF YOU ARE INTERESTED IN ANY KIND OF A FIREARM, WRITE FOR OUR BEAUTIFUL "Gun Guide and Catalog" **FREE** for 1908. It's

Gives more points on guns than any catalog published
Gives best prices and most complete line

THE HOPKINS & ALLEN ARMS CO.
32 Chestnut Street Norwich, Conn., U. S. A.

You cannot cure hams with a hammer,
You can't weigh a gram with a grammar,
Mend socks with a socket,
Build docks with a docket,
Nor gather up clams with a clamor.
You can't pick locks with a pickle,
You can't cure the sick with a sickle,
Pluck figs from a figment,
Drive pigs with a pigment,
Nor make your watch tick with a tickle.
You can't make a mate of your mater,
You can't get a crate from a crater,
Catch moles with a molar,
Bake rolls with a roller.
But you can get a wait from a walter.
You cannot raise crops with a cropper,
You can't shave your-chops with a chopper,
Break nags with a nagger,
Shoot stags with a stagger,
Nor pop to a girl with a popper.

—Boston Transcript.



Water Motors
Water Motor Grinders
Water Motor Forge Blowers
D-C Steam Jet Pumps



WRITE FOR PRICES

FRANK C. DOUDS & CO., New Castle, Pa., Since 1880



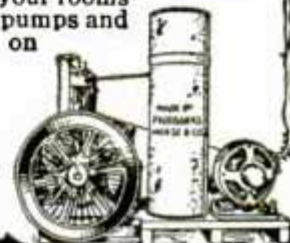
Make Your Own Electric Light A Fairbanks - Morse Electric Light Outfit

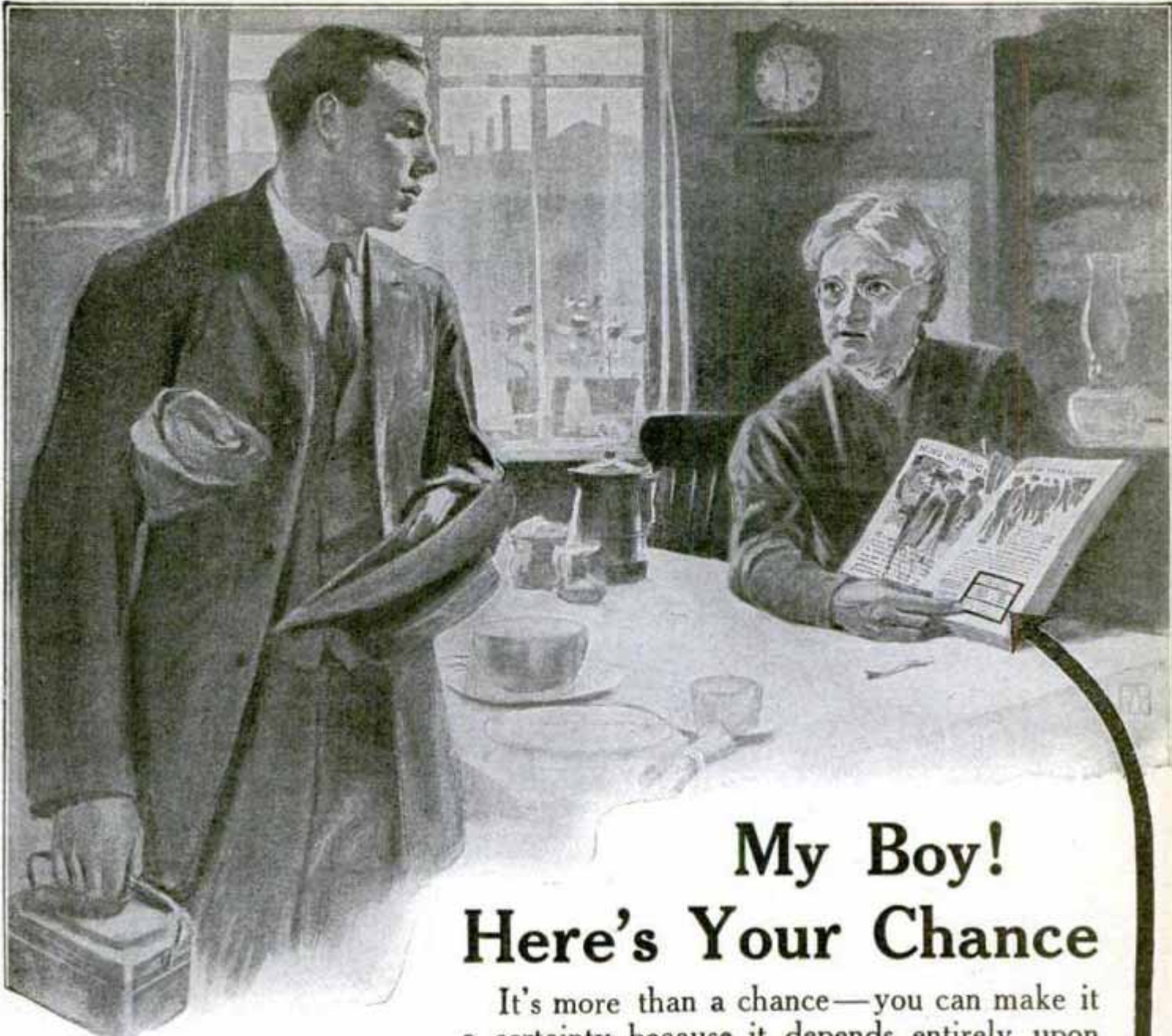
will give you all the light, water and power you need for your farm or country place, at a surprisingly low cost. Engine can be left running for hours after starting without attention, and stopped by pressing a button. The safest, most convenient and healthful light known. It is restful to the eyes and does not consume the life-giving oxygen in your rooms as do lamps or gas. Same engine runs pumps and other machinery. Engine operates on gas, gasoline, kerosene or distillate.

Cut out complete advertisement and send for special catalog No. C A 449

Fairbanks, Morse & Co.

CHICAGO, ILL.





My Boy! Here's Your Chance

It's more than a chance—you can make it a certainty because it depends entirely upon yourself. It's your opportunity to rise to one of the countless positions open to the trained man and obtain a trained man's salary.

The man who sits in his private office and "hires and fires" and lays out your work, was no more qualified to fill that position a few years ago than you are to-day. He saw **his chance** and made the most of it. He obtained his training and knowledge by study. You can do the same—the American School will help you.

You don't want to remain in the "time-clock and dinner-pail" class all your life—don't be satisfied with just a common job at small pay. Show the boys at the shop that you have it in you to advance—you owe it to yourself and to your family.

Don't be afraid to mail the coupon, you won't be bothered by agents or collectors. Like all strictly educational institutions the American School depends, for growth, upon reputation and the success of its students.

Don't let a little thing like filling in and mailing a coupon stand between you and success, congenial work and more pay. **Accept your chance to-day.**

WE HELP MEN HELP THEMSELVES

American School of Correspondence
CHICAGO, U. S. A.

FREE INFORMATION COUPON

American School of Correspondence:
Please send me your free Bulletin of engineering information and advise me how I can qualify for position marked "X"

<ul style="list-style-type: none"> ... Electrical Engineer ... Draftsman ... Civil Engineer ... Mechanical Engineer ... Stationary Engineer ... Structural Engineer ... Municipal Engineer ... Railroad Engineer 	<ul style="list-style-type: none"> ... Structural Draftsman ... Heating & Ventilating Engr. ... Plumber ... Architect ... Hydraulic Engineer ... Textile Boss ... Sheet Metal Pat. Draftsman ... College Preparatory Course
--	---

NAME

ADDRESS

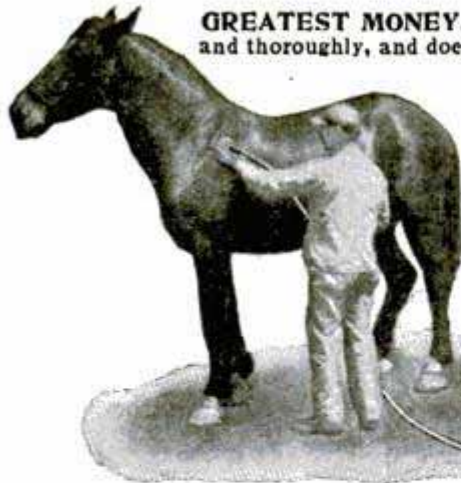
OCCUPATION

Popular Mechanics 4-09.

SANITARY HORSE CLEANING DEVICE

CONRAD HAMMER, Patentee

GREATEST MONEY, TIME AND LABOR SAVER. The only Apparatus which removes all dirt instantly and thoroughly, and does not allow it to fly all over the stables. Requires about 3/4 horse power Steam or Gas Engine or Electric Motor to run this Machine.



It is the only really Sanitary Horse Cleaning Device on the Market

Removes every particle of dust, loose hair, dandruff or scurf. Opens the pores. Prevents disease. Does the work in one tenth the time.

ADVANTAGES

This apparatus possesses the following unique advantages:

It removes all the dirt on the animal's skin, cleansing both the surface and the pores and creating a perfectly clean and sanitary condition.

It improves the animal's health by opening and thoroughly cleaning the pores of its

Enables the owner of horses to obtain better results at a smaller cost.

It is easy to manipulate. Takes but a few minutes to acquaint your help with the handling of this apparatus.

Has connections for from 1 to 4 tubes enabling the cleaning of 4 horses at the same time. Tubing can be led to any part of the stable.

skin and removes all microbes of disease.

It cures skin diseases by removing their cause.

It is thoroughly hygienic and sanitary.

Not only is the animal's coat cleaned more perfectly than by any means heretofore known, but the particles removed are conveyed to a closed receptacle instead of being scattered and disseminated around the stable. Produces a perfectly sanitary and healthful condition in the surroundings.

DOES THE WORK IN ONE-TENTH THE TIME

A horse can be thoroughly cleaned in from three to five minutes by this improved apparatus while with the present currycomb and brush it takes from twenty minutes to an hour of vigorous rubbing and then it is not thoroughly cleaned and if the workman is lazy or tired the horse is only superficially brushed and curried to brighten up his skin.

For further particulars and Prices write

Sanitary Horse Cleaning Device Mfg. Co.

OFFICE, 1621 BROADWAY
BUFFALO, N. Y., U. S. A.

CONCRETE HOUSES

Cost Less Than Wood

More handsome than Brick. Durable as granite. A Pettyjohn \$35.00 concrete block machine, sand gravel and cement are all that is needed. **Simple, easy and quick.** We furnish full instructions. Save money for yourself or make money by selling blocks.

Write for catalog and suggestions.



THE PETTYJOHN CO., 682 N. Sixth Street, TERRE HAUTE, IND.

"The Fence That Lasts Forever!"

CHEAPER THAN WOOD



Ornament your front yard by installing a beautiful Iron Fence. Our Iron Fence has Style, Finish and Durability, and in cost we compete with the World. 100 Choice Designs. Address Dep't P for prices. CINCINNATI IRON FENCE CO., (Incorporated) FREE Catalogue. CINCINNATI, OHIO. AGENTS WANTED in every town. EASY TO SELL



REED FLIPJACK Used for Reservoir and Stream Fishing

Made of brass and copper, all sizes. Highly polished, shines like gold. Bass go after it like hungry wolves. A great killer as a troller for bass, muskellunge, pike, pickerel, trout, etc. If you wish a successful fishing season write for circular, describing the REED FLIPJACK. We tell you how to catch bass, the gamest fish that swims.

REED NOVELTY CO.

Box 201

Springfield, Ohio

TIM'S JOKE.—"Did yez notice about th' joke me brother Tim played on wan av thim chauffeurs?"
"I heard a turrible thing happened to him. Poor Tim."
"Poor Tim, th' divyle! He had a shutick av dinnamite in his pocket when he wor run over."

\$4.24 Paints this House with "Tower" Paint

BEST PAINT IN THE WORLD Body and trimmings, two coats. Your choice of colors. Then you will not need to paint again for about 8 years. That is 53 cents a year for improving the looks and value of your property. This low priced and long lasting paint is only procurable of us. It is the highest grade paint in the world. We have other paint much cheaper than this and much cheaper than any other house can sell, as low, in fact, as \$2.50 for a house like this. But it will not look as good nor last as long as our reliable "Tower" paint at \$4.24, though fully as good as other firms sell for their best paint at a much higher price.



WHAT SIZE BUILDING ARE YOU GOING TO PAINT?

Let us tell you in dollars and cents our low price for paint enough for body and trim two coats, to do the job in a perfect manner and at least cost. We make no charge for this information. **GET OUR PAINT BOOK NOW.** Figure out the cost, best colors, etc. A copy will be sent free. Just write us a postal card or letter and say: "Send me your new House and Barn Paint Book and Color Card." or cut out this ad., write your name and address on the margin and mail to us.

MONTGOMERY WARD & CO.

Branch House 10th and Campbell Sts., KANSAS CITY

Michigan Ave., Madison and Washington Sts. CHICAGO (76)

Before you buy get our big 1909 PAINT BOOK AND COLOR CARD

It tells you how to estimate cost of paint for any building, how to combine colors, how to save money and do the job right—in fact what you ought to know about buying and using paint. Color Card shows about 125 actual samples of our paint.

17 JEWEL \$14.50 ON ELGIN 14 - CREDIT



WRITE TODAY for our Big Free Watch Catalog. It tells all about our Easy Credit Plan and how we send Elgin 19 Jewel B. W. Raymond and 21 and 23 Jewel Elgin Veritas everywhere on Free Trial without security or one cent deposit. **Positively Guaranteed to pass any Railroad Inspection.**



**Let me
send you this
High-Grade, Genuine Elgin
17-Jewel Watch in Hand En-
graved Case on Free Trial**

This watch has 17 genuine ruby jewels, micrometric regulator, patent Breguet hairspring; is Factory tested, finely finished throughout and regulated to the second.

**Its Our Big Special
this month at \$14.50**

P. S. HARRIS,
President Harris-Goar Company.
Mr. Harris and the Harris-Goar Co. are well known to the publishers of this magazine and we take pleasure in recommending them.—Publishers.

We ask no security and no interest—just plain honesty among men. Our Elgin Watches are so well known and our CREDIT PLAN so Easy, Simple and Fair, that no matter where you live or how small your wages, we will trust you, so that you and every honest man and woman can own a High-Grade Elgin Watch in a beautiful Guaranteed 25-year Gold Case and wear it while paying for it in such small payments that you never miss the money.

Every Watch Sent Prepaid NO MONEY DOWN

You assume no risk whatever in dealing with us, because before you buy or pay one cent, we place the watch right in your own hands and let it do its own talking. Elgin Watches are made strong and accurate. They will stand hard usage and last a lifetime. This is the reason we can send them on approval and Guarantee Safe Delivery. If we were handling a flimsy, off-brand watch we could not make this guarantee and sell them on credit.

You cannot afford to buy an Unknown, Off-Brand Watch at all!

You cannot afford to buy a watch of any kind until you have our Catalog and Prices, for we are the LARGEST WATCH HOUSE IN AMERICA.

We Sell Only Genuine Elgin Watches, and our Catalog contains the True Factory Description of every High-Grade Elgin Watch made. It is Free.

BARGAINS FOR WOMEN

EVERY woman should send for our Free Catalog, because **it will pay you** to have our Prices and Easy Credit Plan. It enables you to buy Diamonds, Watches, Solid Gold Jewelry, Silverware, etc. and pay for them out of your pin money. **Write Today for Catalog.** Do it now!

HARRIS-GOAR CO.

Just Your Name and Address on a Postal or the COUPON

will bring you our **BIG FREE CATALOG** and a photograph and history of the Elgin Factory, the Largest in the World.

HARRIS-GOAR Co.,
1469 GRAND AVENUE,
KANSAS CITY, MO.

JUST YOUR NAME AND ADDRESS WILL DO.
HARRIS-GOAR CO., 1469 Grand Avenue, Kansas City, Mo.
Please send me your Free Catalog of Elgin Watches and Inside Facts on Fake Watches. Also your Easy Credit Plan of Selling Elgin Watches No Money Down, \$2.00 a Month.

NAME _____
POST OFFICE _____
STATE _____ R. F. D. _____

PATENT ^{WHAT} YOU INVENT THIS BOOK



Giving full information in Patent Matters, and two others telling what to invent and a history of successful inventions,

MAILED FREE

SEND US A SKETCH

of an invention for our opinion as to patentability which will be rendered without charge. If we believe it to be new, we will issue a contract under which

WE REFUND ALL FEES IF WE FAIL TO OBTAIN A PATENT

We advertise Patents of our clients for sale in prominent dailies at our expense

CONSCIENTIOUS SERVICE

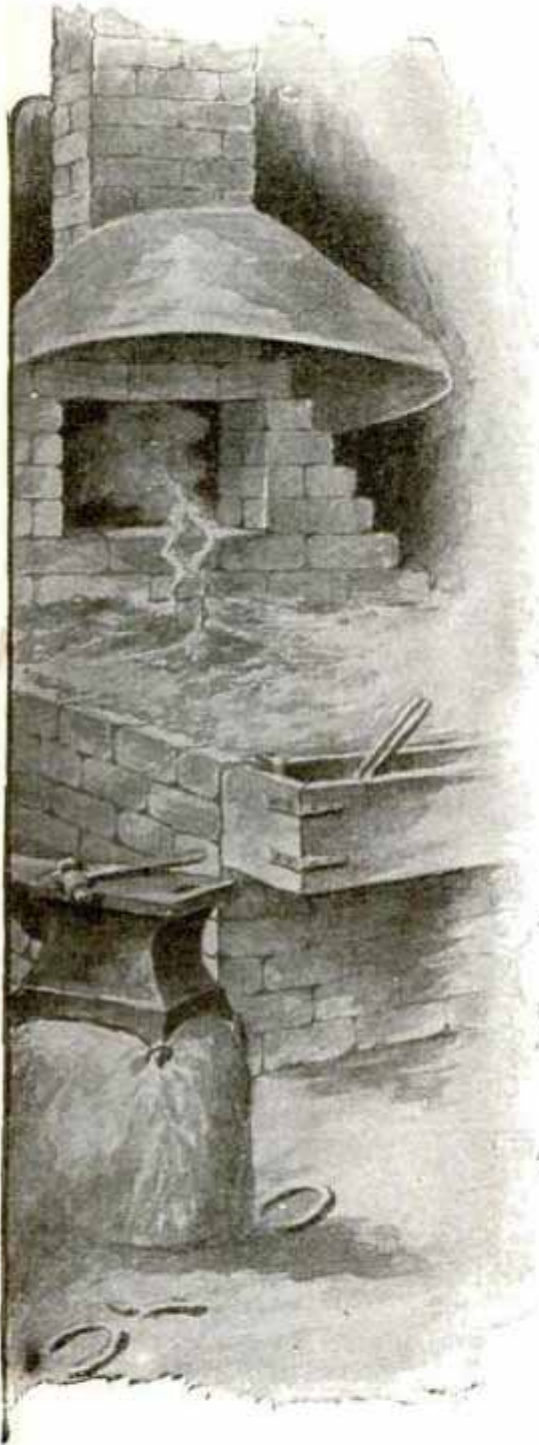
Write for Our Books

WOODWARD & CHANDLEE

Registered Attorneys

1255 F Street, Washington, D. C.

Four-fifths of a Blacksmith's Troubles



come from a faulty fire. How does *your* fire burn? Is it sometimes hot and sometimes not? Does it come up very fast and then lose its heat? Is the red flame edged with blue? Is the coke formed dark-colored and crumbling? Do you have trouble making good solid welds? Then—

You're Using the Wrong Coal

Try these simple tests on the coal you are now using:

1—Take several pieces the size of your fist and crack them open. If little white scales or brown deposits appear between the layers, they are sulphur. It is bad for any iron or steel, and absolutely prevents making good welds. Webster Smithing Coal contains no such white scales or brown deposits, because it is practically free from sulphur.

2—Look at the coke formed around the edge of the fire. If it is not solid and of a clear gray color, the coal contains a large quantity of dirt. Webster Smithing Coal forms a clear gray coke, of even grain, which when burned over, makes a hot, steady fire.

3—A blue edge around the flame indicates a large amount of the injurious sulphur. Webster Smithing Coal, being practically free from sulphur, makes a pure red and yellow flame.

4—Look closely at your coal-pile and see how many pieces of dull gray slate you can pick out, *just from the surface of the pile*. Slate is not coal. It will not burn itself, and it keeps even the coal with which it is mixed from burning freely. Webster Smithing Coal is not slate. It is pure Coal.

5—If your fire is hot in spots, or for a short time, and then "drops out"—the coal is low in heat efficiency—is not adapted to smithing. Webster Smithing Coal maintains a high, clear heat for a remarkably long time, because it is all pure heat-giving coal, specially selected and specially prepared for smithing,

It pays a blacksmith to use Webster Smithing Coal. Pays him in dollars saved on his coal bills. Pays by avoiding all those fire troubles and welding troubles which commonly spoil his work and ruffle his temper. Pays him in the quality and quickness of his work.

Webster Smithing Coal is mined in Cambria County, Pennsylvania, right in the heart of the region noted for high grade smithing coal. It is especially adapted for forge use, and its superiority for this purpose is easily shown by comparing it with any other coal. Webster Smithing Coal may be obtained from local coal dealers at points in the United States and Canada in bags, in bulk or car load lots. Write for prices and further particulars, and remember—

It pays every Blacksmith wherever located to use Webster Smithing Coal

PENNSYLVANIA COAL & COKE COMPANY

T. H. WATKINS, Receiver
Whitehall Building, New York

Philadelphia, Land Title Bldg.

Boston, 141 Milk Street

FREE
TWO BOOKS:
84-Page
"Inventor's Guide"
AND
80-Page "Proof of
Fortunes in Patents"
"What and How to Invent"

FREE:

The above-entitled books will tell you How to Secure Money to "Patent" Your Invention; How to Sell Your Patent, and ALL about the

Great Success of My Clients.

Trade-Marks, Copyrights
Prints, Labels
Registered

ADVICE FREE

Correspondence Solicited

Protect Your Idea!
PATENTS THAT PAY
"My Trade-Mark"

"Your business will have my personal attention." E. E. V.



SPECIAL OFFER:

Send me sketches or drawing or model and description of your idea or invention for FREE examination of U. S. PATENT OFFICE Records and report as to patentability of the same;—to find out as to whether you are entitled to a patent will not cost anything;—then, if your invention is new, upon receiving instructions, I will prepare ALL necessary (application) papers. DO THIS AND SAVE TIME AND MONEY!

WRITE NOW!

References:

- American National Bank, Washington, D. C.
- Little Giant Hay Press Co., Dallas, Texas.
- Gray Lithograph Co., New York City, N. Y.
- Farmers M'fg Co., Norfolk, Va.
- New Era M'fg Co., Fairfield, Iowa.
- The Parry Stationery Co., Oklahoma City, Okla.
- Bell Show Print Co., Sigourney, Ia.
- The Camp Conduit Co., Cleveland, O.
- The Iowa Mfg. Co., Oskaloosa, Ia.
- B. F. Avery & Sons, Louisville, Ky.
- The Garl Electric Co., Akron, O.
- Superior Mfg. Co., Sidney, O.
- Tidnam Tel. Pole Co., Oklahoma City, Okla.
- Bernhard Furst, Vienna, Austria-Hungary.
- Compound Motor Co., Brooklyn, N. Y.

MY FEE RETURNED IF "PATENT" IS NOT ALLOWED!

(See above List of References—THEY TALK!)

HIGH-CLASS WORK.

EXCELLENT TESTIMONIALS.

Successful Clients in Every Section of the U. S.

Expert—Prompt Services.

Highest References.

1171 F St., N. W.

E. E. VROOMAN, Patent Lawyer. Wash., D. C.

REGISTERED PATENT ATTORNEY. PATENT LITIGATION.

PATENTS
TRADEMARKS AND COPYRIGHTS
SECURED OR FEE RETURNED

Send model or sketch and description of your invention for free search of the U. S. Patent Office records.

Our Four Books mailed Free to any address. Send for these books; the finest publications ever issued for free distribution.

HOW TO OBTAIN A PATENT

Our Illustrated eighty page Guide Book is an invaluable book of reference for inventors and contains 100 mechanical movements illustrated and described.

FORTUNES IN PATENTS

Tells how to invent for profit and gives history of successful inventions.

WHAT TO INVENT

Contains a valuable list of Inventions Wanted and suggestions concerning profitable fields of invention. Also information regarding prizes offered for inventions, among which is a

PRIZE OF ONE MILLION DOLLARS

offered for one invention and \$10,000 for others.

PATENTS THAT PAY

Contains fac-similes of unsolicited letters from our clients who have built up profitable enterprises founded upon patents procured by us. Also indorsements from prominent inventors, manufacturers, Senators, Congressmen, Governors, etc. WE ADVERTISE OUR CLIENTS' INVENTIONS FREE in a list of Sunday Newspapers with two million circulation and in the *World's Progress*. Sample Copy Free.

VICTOR J. EVANS & CO.

(Formerly Evans, Wilkens & Co.)

Main Offices, 615 "F" Street, N. W., Washington, D. C.



PATENT YOUR IDEAS

\$100,000 for one invention; another \$8,500. Book "How to Obtain a Patent" & "What to Invent" sent free. Send rough sketch for free report as to patentability. We advertise your patent for sale at our expense. Patent Obtained or Fee Returned. CHANDLEE & CHANDLEE, Patent Att'ys, 930 F. Street, Washington, D. C.

HOW CORNCOB PIPES ARE MADE.—Up to the present day the raising of corn for corncob pipes has been confined to four counties of Missouri, in one of which Washington is situated. There the turner made the first corncob pipe, and there is the heart of the industry today. The factories are obliged to locate near the fields where the corn is grown to save the heavy transportation charges upon the cobs to distant points.

These cobs grow to an enormous size. A diameter of 3 in. without the corn and 12 in. long is not uncommon. Buyers for the pipe factories will not accept cobs less than 1 3/4 in. in diameter. Naturally there is a great deal of corn on such a cob, and the crop yields a double profit to the farmer. The corn must all be shelled by hand so as not to mutilate the cobs in a corn-sheller, and thus the farmer has for market the finest grade of hand-shelled corn.

After being shelled the cobs are thrown into a bin and allowed to dry. Then the cobs must be exposed six months to fit them for their purpose, and the colder the weather the more perfect their condition. Hauled to a factory, the cobs are then carefully counted like so many eggs, and sell at from 30 to 50 cents per 100, according to the grade.

The first process in the factory sends the cobs to a

PATENTS

Careful attention given to the prosecution of business before the patent office. Patents procured and no attorney fee called for until patent is allowed. (23 years experience.) Write for "Inventor's Guide." Address

Franklin H. Hough

Washington Loan & Trust Bldg., Washington, D. C.

PATENTS

Secured Promptly and with special regard to the legal protection of the invention

HAND BOOK FOR INVENTORS AND MANUFACTURERS SENT FREE UPON REQUEST

C. L. PARKER, Patent Lawyer

Patents, Caveats, Trade Marks, Copyrights, Reports as to Patentability, Validity and Infringement. Patent Suits Conducted in all States

REFERENCES: American Tire Co., Lippincott Pencil Co., Automatic Vending Machine Co., International Ore Treating Machinery Co., Globe Machine and Stamping Co., Metal Manufacturing Co., Builders Iron Foundry, Morgan Machine and Engineering Co., Berkshire Specialty Co., Stewart Window Shade Co., Macon Shear Co., Acme Canopy Co., Oakes Manufacturing Co., Cox Implement Co., Columbus Buggy Co., National Index Co., Handy Box Co., Irga-Ola Co., By-Products Chemical Co., Alabama Brewing Co., National Offset Co., Antiseptic Supply Co., Floor Clean Co., Fat Products Refining Co., Richmond Electric Co., Railway Surface Contact Supplies Co., National Electric Works, Modern Electric Co.

Mr. Parker on November 1, 1903, after having been a member of the Examining Corps of the U. S. Patent Office for over five years, resigned his position as examiner to take up the practice of patent law.

Address 210 MCGILL BUILDING

WASHINGTON, D. C.

PATENTS

Promptly obtained, sold, bought, leased, mfgd.; models made; inventors assisted. Est. 25 years in our own buildings; unexcelled reputation. Send sketch or model for free examination; large book free how to properly patent and reduce ideas to cash. Write AMERICAN PATENT MARKET, St. Paul, Minn. Mention this paper. Write English, German, Swedish or Norwegian, as you choose.

high-speed saw, where they are sawed into lengths required for the size of pipe it is intended to make. The sawyers become very expert. The best workers can saw 10,000 cobs in a day of 10 hours. From the sawyers these sections of cobs are carried to a boring machine, which disposes of the pith in the center, making a hole which in the finished pipe will hold the tobacco, but not boring quite through, as the bottom of the pipe must be left intact.

From the boring machine the pipe passes to the turner, who places it on a turning plate, the spindle of which revolves 4,000 times a minute. This spindle just fits the bored hole, and with a chisel held in the hand the cob is deftly shaped into a pipe in scarcely half a minute's time. An expert turner can turn from 1,000 to 1,500 pipes per day.

The pipes are filled outside with plaster of paris, then polished off.

INVENTIONS SAVED

to their inventors through proper counsel and assistance. Most patent lawyers see only the legal end. Professional advice as to the protection and perfection of your incomplete invention—or the means of disposing of it, patented or unpatented—is what I specialize in. Will write you fully regarding my methods upon request. Address,

F. W. WEEKS, Counsellor to Inventors
130 A West 57th St., :: New York City

PATENTS and TRADE-MARKS

Good work at small cost

H. A. ROBINETTE, Registered Patent Attorney,
McGill Bldg. Wash. D. C.

Patents Trade-Marks Designs Copyrights

YOUR ability to protect your patent from infringement depends largely on the presentation of the original application.

The market value of your patent depends on the manner in which the invention is set forth in the claims. Let me tell you more about it.

Send for my booklet on Patents, Trade-Marks, Designs, Copyrights.

LANGDON MOORE,

9th and F Sts. WASHINGTON, D. C.

Ex-Asst. Examiner U. S. Pat. Off.

PATENTS THAT PROTECT and PAY

Send for FREE 85-page book. Advice free. Terms reasonable. Highest references. Best results.

Recommended Patent Lawyer in the Bankers' Register and special list of selected lawyers. Also in Martindale's Law Directory, Sharp & Alleman's Directory of Lawyers, The Gast-Paul Directory of Lawyers, and Kime's International Law Directory.

ALL BUSINESS GIVEN PROMPT AND PROPER ATTENTION

Member of the Bar of the United States Supreme Court and all of the other Courts in the District of Columbia

A large list of strong recommendations furnished free

WATSON E. COLEMAN, Patent Lawyer, 612 F St., N.W., Washington, D.C.

BENJAMIN & BASSETT

Successors to Popular Mechanics Patent Bureau

204 Dearborn St., Chicago, Ill.

UNITED STATES AND FOREIGN PATENTS
TRADE MARKS

MR. INVENTOR:

Chicago, Ill., March 1, 1909.

EVERYWHERE, U. S. A.

Dear Sir:—In reference to getting a patent on your invention we beg to say that if you have not made a real improvement over other devices or machines of a similar character, you had best not spend any money for a patent. Unless your ideas can be covered by a patent that cannot be easily evaded, and unless there is a probable commercial demand for such an invention, don't try to get a patent. If you want to know whether your invention is new, safely patentable and likely to be a money maker, write to us before you have spent any money on models or patents, and tell us what you have invented.

If you want to know how to protect your invention before getting a patent, how to sell your patent when obtained, and other information that will save you money and worry, write for our booklet containing plain truths about Patents.

Yours truly,

Branch Office,
514 F Street,
Washington, D. C.

PATENTS

Valuable Book on Patents FREE. Tells how to secure them at low cost. How to sell a Patent and What to Invent for Profit. Gives Mechanical Movements information. NEW BOOK FREE to all who write.

O'MEARA & BROCK, Patent Attys.,

918 F. STREET.

WASHINGTON, D. C.

THE INVENTOR'S UNIVERSAL EDUCATOR

TELLS ALL ABOUT PATENTS,
HOW TO SECURE THEM. HAS

600 MECHANICAL MOVEMENTS
also 50 PERPETUAL MOTIONS

Every inventor should have a copy. Price \$1.00 by mail
Address _____

F. G. DIETERICH, Ouray Bldg., Washington, D. C.

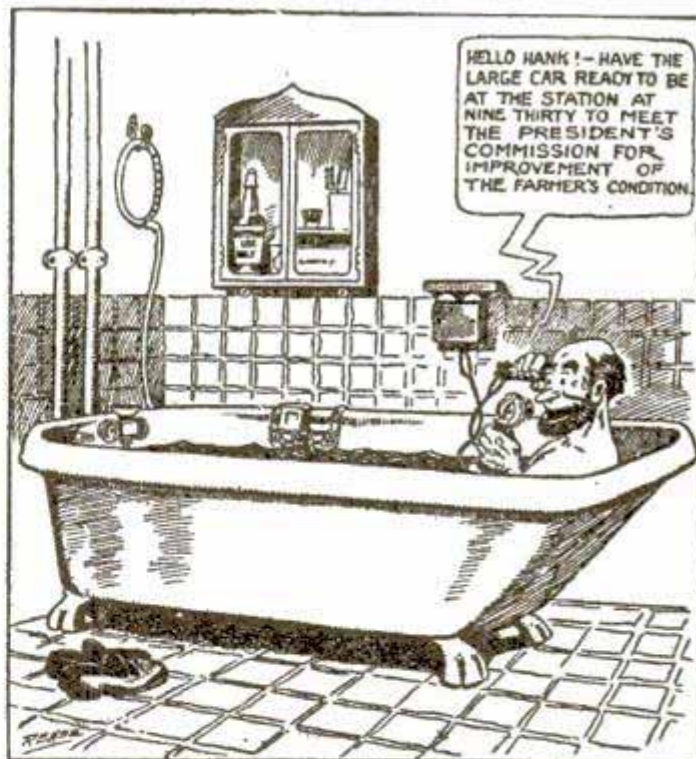
PATENTS that PROTECT

Our 3 books for inventors mailed on receipt of 6 cts. stamps
R. S. & A. B. LACEY, Washington, D. C. Estab. 1869.

We give you PROOF of the money value of the patents we procure.—L. & L.

PATENTS

secured or fee returned. WRITE FOR \$5.00 Free Coupon discount on Attorney's Fee. Free report as to patentability. Send sketch of your invention
HIGHEST REFERENCES R. A. BOSWELL & CO.
LONG EXPERIENCE Practor Building, Washington, D. C.



From "Omaha News."

WANTED INFORMATION REGARDING GOOD PATENT

which would be money maker. Only inventor, who wishes to sell outright or on royalty basis, need apply. Give price and brief description.

L. DARBYSHIRE, Box 19A Rochester, N. Y.

WE MANUFACTURE TO ORDER Dies, Tools and Automatic Machines

ALSO HARDWARE SPECIALTIES AND PATENTED NOVELTIES

Estimates furnished on Expert Model Work.

Send Drawing or Sample.

Booklet Free.

Write Today.

STAMPING & TOOL CO.

LA CROSSE, WISCONSIN

Let Us Be Your Factory

We manufacture Novelties and construct Special Machinery to order; do Model and Experimental Work also. Write us today about that Idea. Our advice and prices free for the asking.

ACORN BRASS MFG. CO.

51 North Peoria Street

CHICAGO, ILL.

"MODELS and SUPPLIES"

We make working models of your invention after drawing and description and charge moderate and fixed prices for them. Experience, skill and modern equipped shop enable us to satisfy and assist you. Send us for our illustrated catalogue of appliances for models.

THE PIERCE MODEL WORKS

85 5th Ave.,

Industry Building,

Chicago, Ill.

METAL E. KONIGSLOW STAMPING & TOOL WORKS STAMPING

CLEVELAND, O.
DIE MAKERS. HARDWARE SPECIALTIES.



GEARS

INTERNAL and
EXTERNAL of all kinds

Ask for Catalog

Grant's "Treatise
on GEARS" a dollar

Philadelphia GEAR Works, Inc.

GEO. B. GRANT, Pres. & M. E.

Philadelphia

Let Us Make Your Metal Parts

We make anything to order—Stampings, Sheet Metal work—anything a good machine-shop should do—we do—because we're good ones. We publish "The Silent Partner." Ask for a sample copy. Write us.

THE GLOBE MACHINE & STAMPING CO.
3610 Hamilton Avenue, N. E. • Cleveland, Ohio

WHEN YOU WANT ANYTHING AND DON'T KNOW
WHERE TO FIND IT—WRITE BUREAU OF
INFORMATION, POPULAR MECHANICS, CHICAGO.

REGAL MODEL WORKS

J. T. H. PATERSON, PROP.

192-194 S. CLARK ST., CHICAGO

Working Models; Experimental Work; Special Machinery; Metal Specialties; Electrical Mechanism; Mechanical Motion; Instruments; Implements; Metal Patterns; Gear Wheels; Dies; Tools; Exhibits; Novelties; Designs; Mechanical Supplies; Demonstrative Models for Salesmen and Patent Office; Patents and Inventions Developed and Completed, Etc.

INVENTORS Our Brain Belongs To You

We have helped a great many over mechanical difficulties. Our Ideas are Free of Charge. All we want in return is to build your Model, Special Machinery or Tools to manufacture sheet-metal goods or novelties of any kind. We are expert mechanics and our experience covers over thirty years. Consultation free, also our Booklet No. 16.

A. NACKE & SON, 240 S. 9th Street, Philadelphia, Pa.

Mechanical and Electrical Engineer

Power plants designed, either steam, electric, hydraulic or any combination. Plants which now run poorly redesigned and brought up to date. Patents secured and shop drawings furnished on short notice of patented articles to be manufactured. Special machinery designed and expert advice given on engineering subjects. Complicated patterns and expert machine and model work furnished. Blue prints, and blue line prints supplied. Fair treatment. All correspondence confidential and answered promptly. **H. L. Bishop, 616 Corn Exchange, Minneapolis, Minn.**

Gasoline Soldering Iron Blow Torch.



WHY play hide and seek with your coppers and a furnace? Our tool puts the heat right to the spot. Send for Catalogue.

EMMELMANN BROS. MFG. CO.

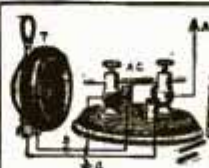
INDIANAPOLIS, IND., U. S. A.

MODELS and GEARS INVENTIONS PERFECTED

CATALOGS FREE SEND 4¢ STAMPS

UNION MODEL WORKS, 191 South Clark St., Chicago, Ill.

Wireless



A complete receiving station for \$1.50, sent post-paid. Not a Toy. WE ABSOLUTELY GUARANTEE that you can catch wireless messages up to 300 miles. Over 500 government and commercial wireless stations in the U. S. One is near you. Catch the messages. Outfit comprises:

The famous "Telim Auto Coherer," 75 Ohm telephone receiver, bottle mercury, 5 coherer plugs, wiring, directions and list of stations. Send 2-c¢ stamp for our 114-page Electrical Cyclopaedia Catalogue No. 5, containing valuable electrical information, wireless codes, diagrams, etc. "EVERYTHING FOR THE EXPERIMENTER."
ELECTRO IMPORTING CO., 80a, West Broadway, NEW YORK

Ann Arbor Lighting System

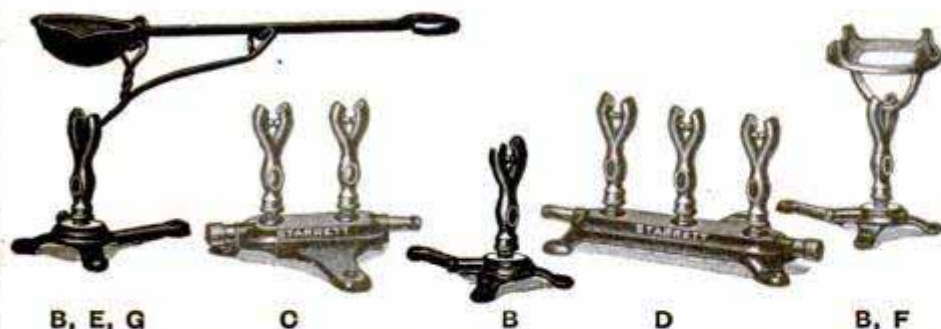
The most up-to-date and complete lighting system on the market. Beautiful fixtures for the home. Attractive high candle power inverted arcs for stores, halls, etc. The best proposition going for hustling agents. Write today for agents' terms and territory. Handsome catalog free.

SUPERIOR MFG. CO.

204 Second St., Ann Arbor, Mich.

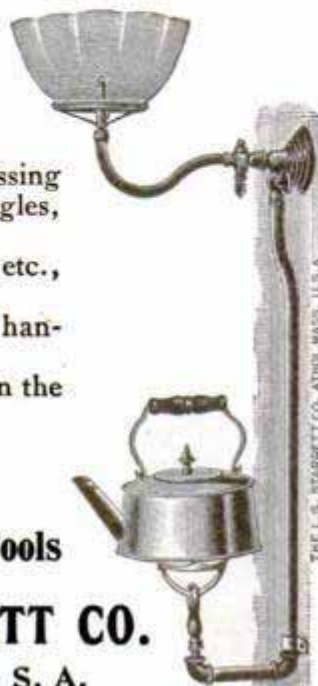
**DIE WORK MODELS SPECIAL
WORK TOOLS MACHINERY
NATIONAL STAMPING AND ELECTRIC WORKS**

STARRETT GAS HEATER



Mechanics
Plumbers
Dentists
Tinsmiths

For
Housekeepers
Electricians
Jewelers
Barbers



The gas and air become thoroughly mixed for perfect combustion while passing through deflectors in base of tubes. The flames penetrate each other at cross angles, producing a clean, intense heat, free from smoke and with no waste of gas.

Useful in the machine shop for tempering small tools, melting lead, babbitt, etc., and as a forge for light work. For laboratory and household use it has no equal.

Over it a quart of water will boil in six minutes. Soldering irons with short handles can be used without fear of heating the handle.

The two and three burner heaters are made with a graduated adjusting tube on the end to supply the gas to one or more burners as desired.

Sent prepaid on receipt of price

No. 100 A	Burner only without base	\$0.75
No. 100 B	One burner with base	1.00
No. 100 C	Two burners " "	2.00
No. 100 D	Three " " "	3.00
No. 100 E	Tool holder only15
No. 100 F	Dish holder25
No. 100 G	Ladle only, 14 ins. long, 12 ounces in weight. .25	
No. 100 H	One burner with base (B), with tool holder (E) and dish holder (F)	1.40

Ask for free Catalog
No. 18 AP of Fine
Mechanical Tools

THE L. S. STARRETT CO.
ATHOL, MASS., U. S. A.



THE UNIVERSAL CABINET

for Machinists, Electricians, Merchants. For Business Houses and Homes. For everyone with many small articles. It's a systematizer and the most convenient article ever possessed. The cabinet is substantial and well finished. The drawers are 8x3x2 1/4 inches. Three removable partitions in each drawer. Cabinet with 25 drawers, \$6. Cabinet with 50 drawers, \$10. 100 drawer Cabinet, \$18.
The American Fixture & Mfg. Co., Troy, Ohio

REQUISITES FOR CLEAR TITLE TO MINING CLAIM IN MEXICO.

The Mexican Mining Journal, in a recent issue, thus sums up the general procedure involved in the obtaining of clear title to mining property in Mexico:

(1) Presentation of the petition in duplicate to the stamp office of the town in which the agency is located, and payment of the sum of \$5 per hectare (2.47 acres). The petition is returned, together with a duplicate receipt for the money deposited. Then the petition is presented in duplicate to the agent of the Department of Fomento, together with the deposit receipts. The agent will inspect the papers, and if found correct he will register the originals and return to the owner the duplicates, with the date of entry, the page and the agency stamp endorsed upon it. This duplicate petition and the stamp office receipt are the only evidences the claimant can offer as proofs of his right to the claim, until he receives his patent from the government.

(2) Survey of the claim by an approved engineer, who will be nominated by the agent, usually according to the suggestion of the petitioner. The application for a certain engineer is included in the petition for the claim.

(3) Receipt of the "aviso," or notice for publication, and the insertion of the same in the "Periodico Oficial"

NO MONKEYING

If you Use Our Ever-Ready Self-Adjustable Household, Farm and Mechanics' Wrench.



The harder you pull, the tighter it holds, no matter how

small, how badly battered, what shape or size or condition the nut, bolt or pipe, is in, the wrench is ready and does the work quickly. Sample 12-in. Wrench, \$1. Express charges paid. Mechanics, Farmers, etc., wanted as agents. Big Money; universal seller. The Lake Superior Wrench Co., Saulte Ste. Marie, Mich

HIGH GRADE BENCHES AND TOOLS

Our No. 166 Bench, which we illustrate herewith, is not a toy, but well constructed from fine hard maple. Length 4 feet, exclusive of vises; width 20 inches; height 32 inches; glued up maple top, 1 1/4 inches in thickness.

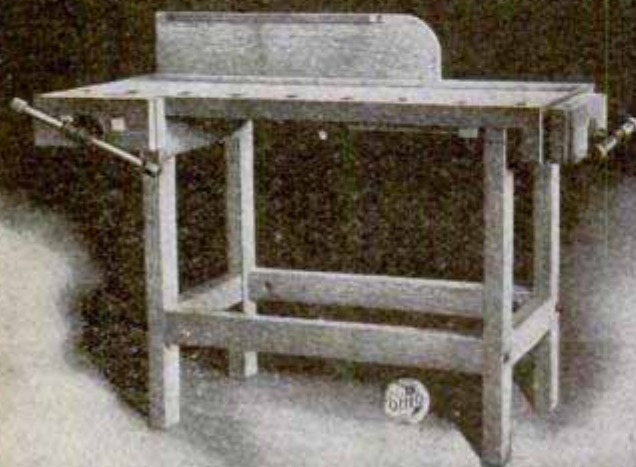
We also furnish a full line of larger and more expensive Benches.

TOOLS

We also manufacture a full line of Planes (both Iron and Wood), Chisels, Drawing Knives, Gouges, Auger Bits, Spoke Shaves, Bench and Hand Screws, etc.

Every "Ohio" Tool is covered by a broad guarantee. Write for Catalogue No. P.

OHIO TOOL COMPANY
COLUMBUS, OHIO



EVERYBODY NEEDS THIS DRILL



About the house, in the office, and around the workshop, small holes are continually required. For this purpose nothing equals the

No. 108 Goodell-Pratt Drill

It will make a clean round hole in plastering and will bore any kind of wood absolutely without splitting.

SPEED? Well say, we have put 15 holes in 10 seconds through a 1-inch board.

Better get our catalog, it shows othe. interesting tools. Free.

GOODSELL-PRATT COMPANY, Greenfield, Mass., U.S.A.

CARPENTERS Ready Reference for Roof Framing

Is a copyrighted book that gives lengths of common hips, valleys and jack rafters, and the figure to use on square for all cuts for following pitches:

1-1-1-3-5-3 Also octagon rafters for same pitches and a 4-3-2-8-8-4 scale for polygon miters up to ten sides. Can be carried in vest pocket. A handy and time-saving book for anyone to have. Sent postpaid for 25c.

E. OHERLE, 2567 Dodge Street, OMAHA, NEB.

or state newspaper. The mining agent will send this "aviso" to the petitioner immediately upon receipt of notice that the engineer, whom he has asked to serve, accepts. It is the duty of the claimant to have this paper published within 40 days from the date of "denouncement" or petition. A copy of each issue must be forwarded at once to the agent for filing.

(4) The engineer will present to the mining agent inside the term of 60 days his report, "Informe" and his plans in triplicate. These will also then be filed with the other papers pertaining to the claim in question.

(5) Four months from the date of the petition the agent will send the bulk of the papers and plans to the offid. of Fomento. The latter will compare the plans, check them and return them, if necessary, for correction to the owner. If found correct they will be passed to the Secretary of Fomento and the Presidente of Mexico for patent. The latter will then be forwarded to the owner through the local agent.

(6) The owner must appear in person or by attorney before the agent to receive the title.—Mining Science.

YOU NEED THE READY

because it combines all the principal drawing instruments in one piece in a form convenient to carry in your vest-pocket. Just the thing for Bankers, Lawyers, Real Estate Men, Manufacturers, Business Men, Inventors, Amateurs, in fact Everybody needs the Ready. \$1.00 prepaid. Ready Mfg. Co. Dept. B. Rochester, N. Y.



THE HOLDALL BRACE

IT'S NEW and has jaws which adjust themselves to the shape of the shank. They grasp and hold securely straight, taper, round and square shanks.



The sleeve is correct in shape for comfort to the hand and to obtain the firmest grip. Every part of the Brace is made with the greatest care. We say without hesitation that the HOLDALL is the most perfect tool of its kind yet offered. Made in usual sizes with 8, 10, 12 and 14 inch sweep.

Ask for catalog giving further description.

MILLERS FALLS CO., - 28 WARREN STREET, NEW YORK



THE AMERICAN Combined Level and Grade Finder

All Progressive and Up-to-date Mechanics as well as Manufacturers having use for a Level are getting one. An instrument with which at one glance you can get the true slant on any line or grade either in degrees, inches or percentage, or all at the same time, and will at once give the exact distance need to plum up to a true level. A Civil Engineer that you may have with you at all times. The most practical, durable and convenient instrument of the day. The longitudinal recess which is shown in cut is well worth the low price of the instrument. Write AT ONCE for large list of Testimonials from all over the United States and Special Introductory Price, given only to First Applicants with privilege of taking agency. Address, **EDWARD HELB Box 75 Railroad, Penna.**

WHEN YOU WANT ANYTHING AND DON'T KNOW
WHERE TO FIND IT—WRITE BUREAU OF
INFORMATION, POPULAR MECHANICS, CHICAGO.

LINEMAN'S AND ELECTRICIAN'S TOOLS

We are Manufacturers, Jobbers and Retailers, and in this particular branch, carry the fullest assortment. Klein tools bear a good reputation.

MATHIAS KLEIN & SONS, 98 W. Van Buren Street, Chicago, Illinois



Send 7c stamp for 60-page catalogue

Are You Handy with Tools?



GET OUR NEW "YANKEE" TOOL BOOK—IT'S FREE

A book full of new time and labor-saving "YANKEE" TOOLS for all classes of mechanics. Tools that interest every man who ever has occasion to use tools of any kind. The book is the embodiment of Yankee ingenuity, illustrated with photographic reproductions of the tools in use. It's worth having. Send today.

A POSTAL BRINGS IT if you say "Popular Mechanics."

Your dealer sells "YANKEE TOOLS."

NORTH BROS. MFG. CO. Sta. Q. Philadelphia, Pa.

The "BABY" TORCH

Absolutely Necessary to Complete Any Repair Kit

Price Postpaid \$1.25



A powerful, compact Torch for use in shop and emergency repair on automobiles and power boats; by Electricians, Doctors, Dentists, Jewelers, Telephone and Telegraph Line Men, Painters, Typewriter Repairers and everyone in need of an intensely hot flame. It is purely automatic, works without air pressure, lights with a match and has none of the objectionable features of other torches. Burns two hours with one filling.

IT WILL PAY YOU TO WRITE US

CRESCENT COMPANY, Valparaiso, Indiana

\$8.50 BUYS AN ADJUSTABLE PIPE STOCK



Cutting $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{4}$

With Opening Dies and Self Centering Guides

THE OSTER MFG. CO.,
2100 East 61st St. Cleveland, Ohio

WE SHIP ON APPROVAL



It is only a question as to whether you have work to do that comes within the range of our tools. If so, you can't afford to be without them. 10 days trial allowed free. We think this is a liberal offer. Write us today for complete catalogue of **HAND POWER ANGLE BENDERS, EYE BENDERS, RING BENDERS, PIPE BENDERS, HINGE EYE BENDERS, ETC.**

WALLACE SUPPLY COMPANY, 31 So. Jefferson St., Chicago

Fulton Hack Saw Blades

and other Tools are described in our catalog. Send your name and address on postal for catalog.

MONTGOMERY & CO.

103 Fulton Street, New York City

KIPLING'S POETIC TRIBUTE.

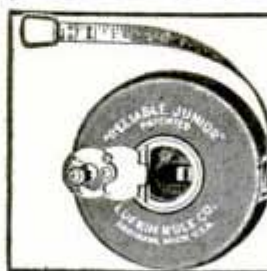
Kipling once inscribed on the fly-leaf of one of the volumes of an edition of his works, and addressed to Admiral Evans, the following lines:

"Zogbaum draws with a pencil
And I do things with a pen,
But you sit up in a conning tower
Bossing eight hundred men.

"Zogbaum takes care of his business
And I take care of mine,
But you take care of ten thousand tons
Sky-hooting through the brine.

"Zogbaum can handle his shadows
And I can handle my style,
But you can handle a ten-inch gun
To carry seven mile.

"To him that hath shall be given,
And that's why these books are sent
To the man who has lived more stories
Than Zogbaum or I could invent."



LUFKIN
TAPES AND RULES

ARE THE BEST
FOR SALE EVERYWHERE SEND FOR CATALOG No. 26

THE LUFKIN RULE CO.

SAGINAW, MICH., U.S.A.
NEW YORK, LONDON, ENG., AND WINDSOR, CANADA



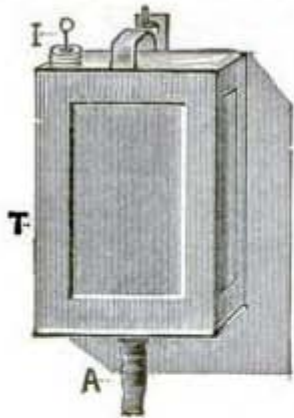
Will Not Clog. Will Bore in End or Side of Wood
Strongest, Easiest, Fastest Boring Bits Made.

The "IRWIN" Auger-Bit Is The ONLY SOLID CENTER STEM Auger-Bit Made In Every Style and Size. So The "IRWIN" Is The ONLY Auger-Bit That CAN and Will Give You Absolutely SATISFACTORY SERVICE FOR EVERY PURPOSE. Insist On "Irwin" Trade Mark—Buy No Other.

THE IRWIN AUGER-BIT COMPANY, Department D12, WILMINGTON, OHIO

Please Mention Popular Mechanics

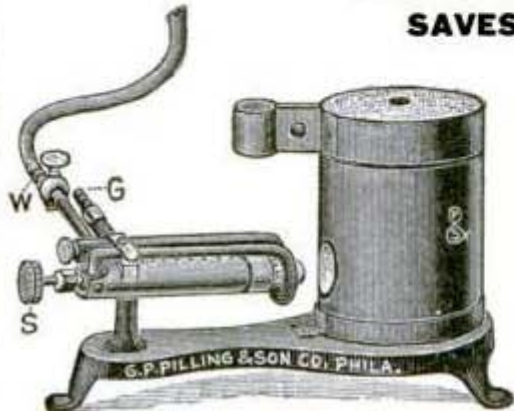
REVELATION GAS FURNACE



ENTIRELY
NEW.

No Bellows or
Compressor
Necessary.

SAVES TIME.
SAVES MONEY.



Send
Today
for
Price
List

G. P. PILLING & SON CO., Philadelphia, Pa.

CARBORUNDUM Sharpening Stones

Keep tools in perfect condition—
Sharpen anything from a razor to
an ax—Cut faster and last longer
than any other sharp-
ening stones.

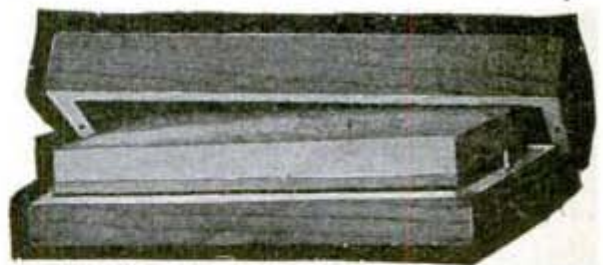


Niagara Scythe
Stone
By mail 25c

Carborundum Niagara Scythe Stone

Grass hooks or scythes
never need to be ground
if the Niagara Scythe
Stone is used—the only
really efficient scythe
stone ever produced.

Every man who owns a
grass hook needs it.



Combination Stone—one side coarse, one side
fine—in wooden case, by mail \$1.25

Carborundum Combination Stone

For carpenters, mechanics or general
household use—one side is coarse for
rough work, the other fine for making
a keen, lasting edge—unquestionably
the best all-round stone ever produced.

Carborundum Sharpening Stones are sold by pro-
gressive hardware dealers everywhere. If YOUR
dealer does not have them, send direct.

Ask for the Sharpening Stone booklet

THE CARBORUNDUM COMPANY
Niagara Falls, N. Y.

COMBINATION PLIER

Drop forged from an extra fine grade of
steel. The handles are so designed that
they fit the palm of the hand, thereby
making it an easy cutting tool.

SIX USEFUL TOOLS IN ONE

WIRE CUTTER, WIRE GRIP, FLATNOSE PLIER,
SIDE CUTTER, REAMER, SCREW DRIVER

A household tool that is constantly
needed in all trades and professions.
No. 700, 7 inch, sent prepaid to any ad-
dress in the United States on receipt of
90 cents. We can also furnish this tool
in the nickel-plated finish for \$1.25.

Every Tool Guaranteed.

ASK YOUR DEALER FOR UTICA TOOLS

Only the Genuine Bear This Mark



Write for Catalog. It contains our com-
plete line of Pliers and Nippers

UTICA DROP FORGE
& TOOL CO.,

73 Genesee St., UTICA, N. Y.

Heller's Cabinet

No. 1700



This is a general sundry cabinet for Garage, Mechanics, Electricians, Business Houses, Tool and Stock Room, Office and Factory use; is the most practical cabinet made in the United States.

Is finished in Golden Oak, has steel back and 54 steel drawers 3x2x10, 4x3x10, 4x4x10 and 6x6x10, complete with Pulls and Card Frames; including divisions.

Special Price during months of March and April **\$15.00**. When cash is sent with order we prepay the freight to any point in the United States.

30 other sizes of cabinets carried in stock; also 50 different sizes of steel shelf boxes carried in stock. Send for booklet.

W. R. HELLER & CO.

Montpelier, - - - - - Ohio

Own a Home Bench



It pays to own a home work bench. It pays for itself in a short time, because it furnishes a convenient place to do all the little repair jobs needed about every home, and which you usually turn over to a carpenter. Do them yourself, using a home work bench. Then, too, it will provide fun and healthy exercise for that lusty boy of yours. Let him work off surplus energy in a wholesome manner.

Our bench catalog will be gladly sent on request.....Write today.

Grand Rapids Hand Screw Co.
920 Jefferson Ave., Grand Rapids, Mich.

THE STAR SCREW ANCHOR WILL HOLD IT

If "IT'S" to be fastened to Brick, Stone, Marble, Slate, Tile, Concrete, Wood—or Any Material.

FAST, STRONG AND SOLID

Drill hole, insert anchor (Fig. 2), put screw (Fig. 1) thru attachment, into inserted anchor, and fasten tight. Then you have a real fastening (Fig. 3). Time and labor-saving devices for mechanics are our specialty.

WRITE FOR CATALOG AND SAMPLES
Star Expansion Bolt Co.
BAYONNE, N. J.



Fig. 1.



Fig. 2.



Fig. 3.

Mound Tools and Chisels



for Engineers, Electricians, Machinists and Millwrights. Our new set of No. 20 Tools and Chisels are conveniently arranged in polished oak cases—Contents containing an assortment of high grade Flat, Cape, Diamond Point, Round Nose, Half Cape, Bent Grooving, Sheet Metal Chisels, Oil Groove Scraping Tool, Square Punch, Rivet Punches, Nail Set, Pick Punch, Center Punch and Drift. **No. 20 Set of 20 Tools and Chisels, \$4.00.**

Book "Mound Tools" free. Address Dept. M

Mound Tool & Scraper Co., 1606-08 N. Broad'y, St. Louis, U.S.A

FIGHTING BUGS WITH BUGS.—The state horticultural commission of California is fighting fruit-destroying bugs with bugs that feed upon the former and are not harmful to the fruits. Such bugs are called parasites, and millions of them are being propagated in a building in Sacramento called an "insectary." These bug-devouring bugs are let free in orchards and vineyards where they wage a merry war upon the fruit pests.

Fractional Adding and Subtracting Rule

Price \$1.00



A practical, useful and time-saving device for students in engineering schools, machine designers, mechanical and civil engineers, etc. Adds and subtracts fractions for you, eliminating tiresome figuring and insuring absolute accuracy. You can't make a mistake.

Full directions for using. Your money back if not in every way satisfactory. Endorsed by leading instructors in mechanical schools, and by practical mechanical men in all fields. Send today. Price \$1.00. Address

BURGESS & SAUERBERG

103 Kortlander Building GRAND RAPIDS, MICH.

Price

\$1.00 Each



CHANDLER'S ADDING AND SUBTRACTING SCALE

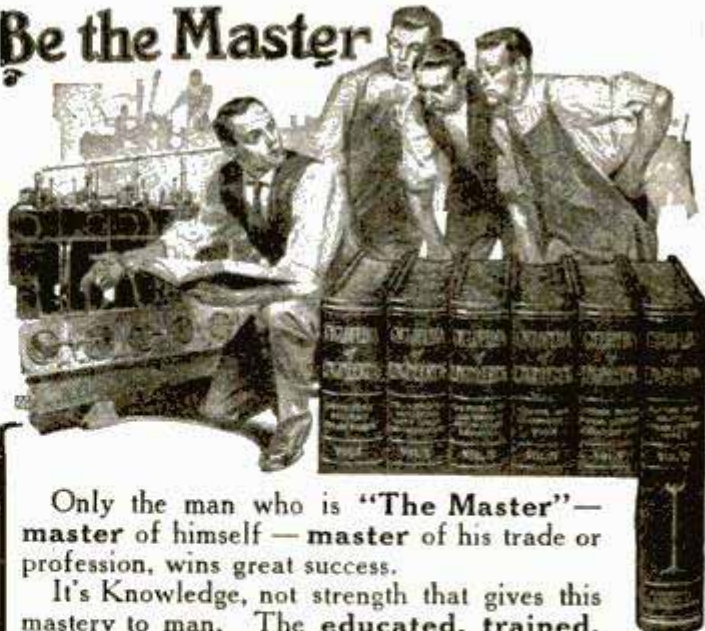
FOR MECHANICAL ENGINEERS, DRAUGHTSMEN, STUDENTS, ELECTRICAL ENGINEERS, CIVIL ENGINEERS, MACHINISTS, BOOKKEEPERS.

Price \$1.00 each.

The most efficient and simple calculator on the market. Made of celluloid, printed in plain figures and enclosed in handsome leather case and will fit the vest pocket. It is indispensable to the professional and business man who wishes to save time. The answers in addition and subtraction are given in fractions and their decimal equivalents insuring absolute accuracy. All chances of mistakes eliminated. Saves time—money—work. Sent prepaid with full instructions upon receipt of \$1.00. Satisfaction guaranteed.

J. S. BARRON, (Barron Bldg., Dept. 132.) New York City

Be the Master



Only the man who is "The Master"—master of himself—master of his trade or profession, wins great success.

It's Knowledge, not strength that gives this mastery to man. The educated, trained, thinking workman is in demand.

You can educate yourself—you can prepare for advancement by using a portion of our Great Specialized Engineering Library:

Cyclopedia of Engineering

A practical, general reference work on steam boilers, steam, gas and oil engines, marine and locomotive work, mechanical drawing, management of dynamos and motors, electric lighting and wiring, etc.

These six volumes contain 3,200 pages, size 7 x 10 inches, and over 2,000 full-page plates, drawings, diagrams, formulas, tables, etc. Also contains a series of practical test questions, with solutions, and is carefully indexed for ready reference.

IT COSTS NOTHING TO LOOK

Upon receipt of coupon we will send you a set of this great Cyclopedia by prepaid express, without deposit or guarantee of any kind. Keep the books five days, examine them carefully, give them every possible test. We want you to be the judge—you are under no obligations.

If you decide the books are not what you want, advise us and we will have them returned at our expense. If you keep the books send us \$2.00 within five days, then \$2.00 a month until you have paid the special price of \$18.60. The regular list price is \$36.00.

This Special Offer is good until May 1st.

IMPORTANT SUBJECTS COVERED

Calorimeters—Pumps—Elevators—Indicators—Valve Gears—Turbines—Compression and Absorption Refrigeration—Gaseous and Liquid Fuel—Condensers—Navigation—Air Brakes—Machine Shop Work—Ventilation—Heating—Air Compressors—Principles and Management of Direct Current Dynamometers and Motors—Storage Batteries—Automobiles, etc.

FREE! Order at once and we will include for one year, as a monthly supplement, the

TECHNICAL WORLD MAGAZINE

A regular \$1.50 monthly, presenting twentieth Century facts in plain English. Latest discussions on timely topics in science, invention, discovery, industry, etc. The strongest serial of the season, "WHO OWNS THE EARTH," appears in the April issue. JUST MAIL THE COUPON.

American School of Correspondence, Chicago, U. S. A.

FREE OFFER COUPON

American School of Correspondence: Please send set Cyclopedia of Engineering for 5 days' free examination. Also T. W. for one year. I will send \$2 within 5 days and \$2 a month until I have paid \$18.60; otherwise I will notify you and hold the books subject to your order. Title not to pass until fully paid.

NAME.....
 ADDRESS.....
 OCCUPATION.....
 EMPLOYER.....

Pop. Mech. 4-09

A LITTLE HIGHER UP

in the estimation of your prospective customer, is what you gain by sending in a perfectly smooth edged

Peerless Book Form Business Card

How you can detach a card bound in book form and have no possible indication of its having been detached may possess some elements of mystery to you, but our patented process makes it possible and perfect.

Send for Sample Tab and see for yourself

There is nothing like it

OUR SMART CARD IN CASE



The JOHN B. WIGGINS CO.

Sole Manufacturers

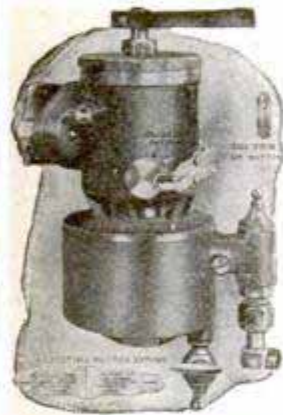
Engravers Plate Printers Die Embossers
 17-19 East Adams St., CHICAGO

SERVICE BREEZE CARBURETER

The Throttle Does The Work

Two Buttons for All Adjustments

The adjustments are the simplest known; turn one button marked "High" for perfect high speed results and turn the other button marked "Low" for perfect low speed results; THAT'S ALL. The adjustments once made are then permanent.



The main and auxiliary air supplies are fixed, require no adjusting. The fuel cut-off is positive, simplest made, fewest parts. The auxiliary air valve is away from dirt, water and oil; cannot stick. The throttle operates a compensating fuel mixture. ALL the air encircles and breaks the mixture. You don't study out how to do it—Just turn the

buttons and the throttle does the work.

Motor owners ask your dealer for a "SERVICE" Breeze Carbureter. If he hasn't got what you want, **Write us direct.**

Entirely different from any other carbureter in looks, construction and results. It's very compact, saving of space.

Patents applied for

Send 10c for Text Book, "Carbureters and Engine Troubles."

Representatives wanted

Breeze Carbureter Company

245 Halsey St.,

Newark, N. J.

\$400



High Wheel
Motor
Vehicles!

YES—
WHY
NOT?

They are reliable, comfortable and stylish. First cost low, small upkeep. No tire troubles. Punctures and blowouts impossible. Travel any road, in any weather. Go through mud, snow, sand. Great hill climbers. Go anywhere a horse and buggy can. Go anywhere a regular automobile can and many places they cannot.

McIntyre

is the World's standard. The *only* complete line of high wheel Motor Vehicles built in America. One, two and three-seated passenger cars. Open and Covered Delivery Wagons. 20 Models to choose from. Prices to suit everyone. Air cooled planetary transmission, chain and shaft drive, solid rubber tires, two and four-cylinder. 12 to 30 H. P. Write for catalog No. 10.

W. H. McINTYRE CO. AUBURN, IND.

Standard Mfrs. A. M. C. M. A.

256-257 Broadway
NEW YORK CITY

Tudhope-McIntyre Co.
ORILLIA, ONT.

1730 Grand Ave.
KANSAS CITY, MO.

Write for This Book on This
Full 18-20-Horse Power
Car That Always

Goes The Route



Not "an engine in a buggy" but built up from highest type Chassis carrying powerful water-cooled motor. Speed, 1 to 30 miles. Goes average 25 miles on 1 gallon of gasoline.

The Invincible SCHACHT

Handsome lines and finish—regular auto appearance—High wheel style best for all roads—sand, mud and mountain climbing. Economy of first cost and long life—durability. Quick control from Steering Wheel—Friction drive—Double chain to each rear wheel—Absolutely gearless and clutchless—Puncture-proof Goodrich solid rubber tires—Timken roller bearings—Schebler Carburetor, etc.—All of very highest quality.

Write for prices—free books or Special Offer to Agents.

The Schacht Mfg. Co., 2702 Spring Grove Ave., Cincinnati, Ohio

THE AUTOMOBILE HAND-BOOK

L. Elliott Brookes.

New Enlarged Edition—470 pages—over 180 illustrations. Full Leather \$1.50; Red Morocco, \$2.00, postpaid. Gives practical information on road troubles, motor troubles, carburetor troubles, ignition troubles, battery troubles, clutch troubles and starting troubles.

Popular Mechanics Book Dept., 225 Washington St., Chicago



Write
for
Cata-
log.

START YOUR GAS ENGINE WITH THE Motsinger Auto-Sparker

and run it without the aid of batteries. Not a cheap magneto but the original high grade speed controlled friction driven dynamo. Perfectly insulated, "water and dust-proof." Fully Guaranteed. Operates

the "make and break" and "jump spark." Charges all storage batteries for ignition and lighting on a small scale, perfectly with our special switch board in the circuit. Ten years actual service with over 36,000 Auto-sparkers in operation to testify to its merit.

MOTSINGER DEVICE MFG. CO.

128 Main St., Pendleton, Indiana, U.S.A.

"GO"

\$375.00

\$450.00

2 to 25 miles
per hour—30
miles on 1 gal-
lon gasoline.



AS FAR
AS YOU LIKE

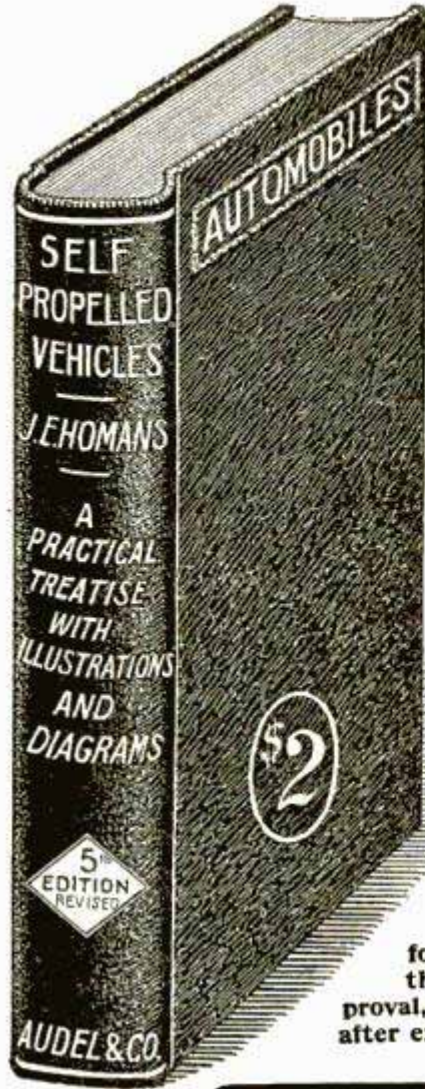
—Up hill or through mud.

—At prices right to suit you for a

BLACK MOTOR RUNABOUT

Guaranteed every way—Safe—Dependable—Handsome finish—Most durable materials and workmanship. Engine 10 H. P., 2 cylinders, air cooled—Chain drive rear—Double brake. Also top motor Buggies and Surreys. Free Catalog No. 304 shows all—write.

BLACK MFG. CO., 124 East Ohio Street, Chicago, Ill.



Learn To Run An Auto

THIS work is now the accepted standard on the practical care and management of motor cars—explaining the principles of construction and operation in a clear and helpful way, and fully illustrated with many diagrams and drawings, making it of value to the intending purchaser, driver and repair man.

The subjects treat of the needs of the man behind the wheel, and are presented clearly, concisely and in a manner easy to understand by the reader, be he a beginner or an expert. This good book will be sent to any address in the world, postpaid, upon receipt of two dollars.

Contains 608 pages, over 400 diagrams and illustrations, printed on fine paper, size 5 3-4 by 8 1-2 inches, with generously good binding. Highly endorsed. Specimen pages free on request.

SPEAKS FOR ITSELF

Enclosed find check \$2 for your valuable book. It is just what I have been looking for for some time. Thanks for your examination privilege. (Signed) J. H. SPENCER, Spencer Model Works, St. Louis, Mo.

AFTER LOOKING IT OVER

Please send me, c. o. d., "Homans' Auto," price \$2. This is the eighth copy I have bought to make presents to prospective auto owners. (Signed) H. H. ROLFFES, 63 Green St., New York.

SPECIAL OFFER

To any reader we will send free, for a limited time only, a copy of the above work, subject to approval, to be paid for immediately after examination, or returned.

No money in advance required, sign and return to
Theo. Audel & Co., 63 Fifth Ave., New York
 P. M.
 Date.....
 Kindly mail me copy of Homans' Auto, and if found satisfactory I will immediately remit \$2.00, or return book to you.
 NAME.....
 ADDRESS.....

Are You the Owner of an AIRSHIP—AUTOMOBILE—LAUNCH—OR—MOTOR-CYCLE?

FLY

A Monthly Aeronautical Magazine of Value to all interested in Air Ships, Balloons, and Aeroplanes. For \$1.50 I will send all the back numbers, and twelve months' subscription and as a special inducement will send you a VEST POCKET SAFETY RAZOR which sells for one dollar. Sample copy of Magazine 10 cents; or I will send



The VISE and "FLY" for \$2.00

This Vise with Every Subscription to THE CYCLE AND AUTOMOBILE TRADE JOURNAL

I want you to become a subscriber because it gives to the reader a thorough knowledge on all subjects of interest to Automobile, Motorcycle and Motor Boat pleasure-seekers, as well as to the business man who must eventually use automobiles for delivery purposes. THERE ARE FIVE OR SIX SPECIAL NUMBERS issued each year. IT IS THE LARGEST JOURNAL devoted to automobiles in the world. IT HAS MORE PAGES OF READING MATTER each issue than any other automobile publication in the world.

Subscription \$2.00. Sample, 20 cents I will send the VEST POCKET RAZOR if preferred.

PERLIN M. READ, 903 Lippincott Bldg., Philadelphia, Pa.

A. B. C. AUTOMOBILE Simple Name—Simple Machine

\$600

A fine hill climber. Speeds up to 25 miles an hour. Most practical, powerful and durable automobile of its class. Is made easy to operate—no complicated parts—no tires to puncture—no repairs. Safest machine made. Built for 2, 3 or 4 passengers. 12 to 14 h. p. Price \$600.

Write today for particulars.

A. B. C. MOTOR VEHICLE CO., 3932 Morgan St, ST. LOUIS, MO.



THE CENTER FIRE SPARK PLUG

The Plug of Clean Combustion. Increases power 10 per cent. The Racing Machine Plug. Right in center of combustion, allowing explosion to travel in all directions at same time. Plug is always kept clean by its rushing fresh charge. Samples at \$1.00 each for limited time.

GENERAL ACCUMULATOR AND BATTERY CO., 124 Second St., Milwaukee, Wis

Please Mention Regular Mechanics



1909 YALE 3 1/2 H. P. MOTORCYCLE—\$200

Made for men with good red blood

An American betterment of the finest foreign models.
Easy running, powerful, reliable, swift.
Don't decide before you learn all about the '09 Yale. It has no rival at anything near the price.

2 3/4 H. P. YALE-CALIFORNIA MOTORCYCLE, \$125

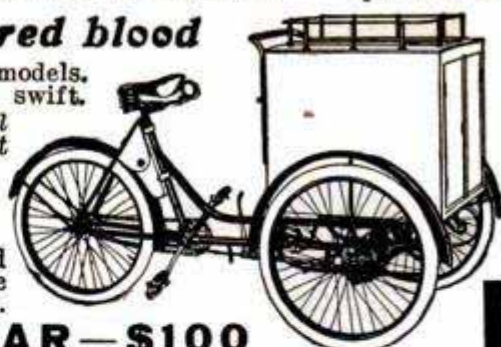
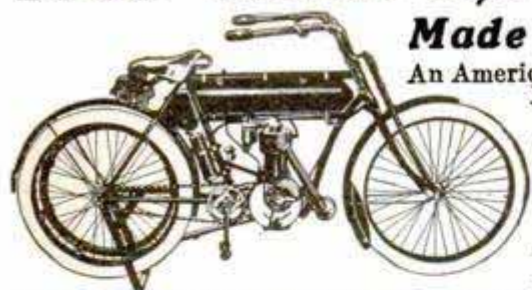
YALE & SNELL BICYCLES fitted with Hussey Handle Bars are the

acknowledged leaders the country over. 1909 Catalogues show why.

THE CONSOLIDATED PACKAGE CAR—\$100

Solves the problem of small deliveries at a profit. A money-saver for every retail business. Ask to-day for FREE CATALOGUE, naming the type of vehicle you wish to know about.

THE CONSOLIDATED MFG. CO., 1730 FERNWOOD AVE., Toledo, O., U. S. A.



The Erie Motorcycle

3 H. P. Price \$175. Agents wanted.

Send stamps for our Catalog M and Special Offer to introduce the Erie.

Motorcycle Equipment Co. Hammondsport, New York

GEER MOTORCYCLES



5-H. P. 2-CYLINDER GREEN EGG.....\$225.00
4-H. P. BLUEBIRD..... 200.00
2 1/2-H. P. GEER Model 4..... 150.00
USED MOTORCYCLES..... 40.00

We have the largest line of new and used Motorcycles in the country at the lowest prices. Every machine guaranteed. Repairs a Specialty. Motors and Castings for Air Ships. Motors for railway velocipedes. Send for Catalog.

H'RRY R. GEER CO., 888 McLaran Ave., ST. LOUIS, MO

BICYCLE MOTOR CASTINGS



To introduce our goods we offer for a limited time only, Bicycle, Light Stationary R. R. Car and Experimental Castings to make a 20 lb. 2 1/2 H. P. Motor of the latest design.

SPECIAL PRICE, \$8.00 PER SET

Price of complete outfit, including the motor castings and all other parts, finished to convert the bicycle into a motorcycle, \$23.00.

WE GUARANTEE the castings are the finest material we

can buy. They are exceptionally smooth and about one-half the work to machine that other castings are, because they are cast from the highest priced up-to-date scientific patterns.

Send stamps for circulars describing wonderful bargains.

BICYCLE MOTOR CO. Hammondsport, N. Y.



THE AUTOMOBILE OF THE MASSES

Speed—5 to 60 miles an hour. Fast enough for the most daring; slow enough for the most cautious. Governed and controlled entirely with the handle grips—mechanism concealed and protected. Easily mastered by a novice. Practical for pleasure or business. Can outdistance fastest automobiles and all rival motor cycles. Takes any mountainous road at slow or high speed. The Thor, without any repairs, was the only one of the 9 contestants to complete the 1116-mile cross country endurance test of Chicago Motor Cycle Club.

Models—\$150 to \$300. Motors—2 1/2 H. P. to 6 H. P. Agents Wanted in Every City and Town.

Largest Motor Cycle Plant in America. Over 10,000 Thor motors in use. Features not on any other motor cycle. Catalogue with our liberal proposition free.

AURORA AUTOMATIC MACHINERY CO.
Dept. D, Aurora, Illinois, U. S. A.

(Continued from page 132)

On the transport dock all these condemned weapons of war are spread out in long rows, properly segregated, for some of the stuff goes to Rock Island, some to Frankfort and some to Springfield. The guns and cartridges occupied most of the space in the "Sheridan's" hold, and amounted to about 1,300 tons. While the rifles and ammunition are all "dead horse" to Uncle Sam, and will never be used by him or any of his soldiers in the regular army, the rifles, or some of them, are not to be destroyed if they can be sold.

Many amateur military organizations are supplied with guns once condemned by the Government, and some academies throughout the country may stock up on the Springfield now being returned. The guns and ammunition are good, but the new model Springfield, adopted last year for the army, is better in some respects, and that accounts for the condemnation of the series of 1903.

The new Springfield rifles, to the number of about 35,000, and new cartridges of 30.30 caliber, to the number of more than 30,000,000, have already been shipped to the Philippines this year.

Make a Motorcycle of Your Bike



at small cost, by using our Attachable Outfit. It fits any bicycle. Send stamp for catalog. Send 15 cents for "The Motorcycle Manual." It treats of motorcycles; how to get more power, etc.

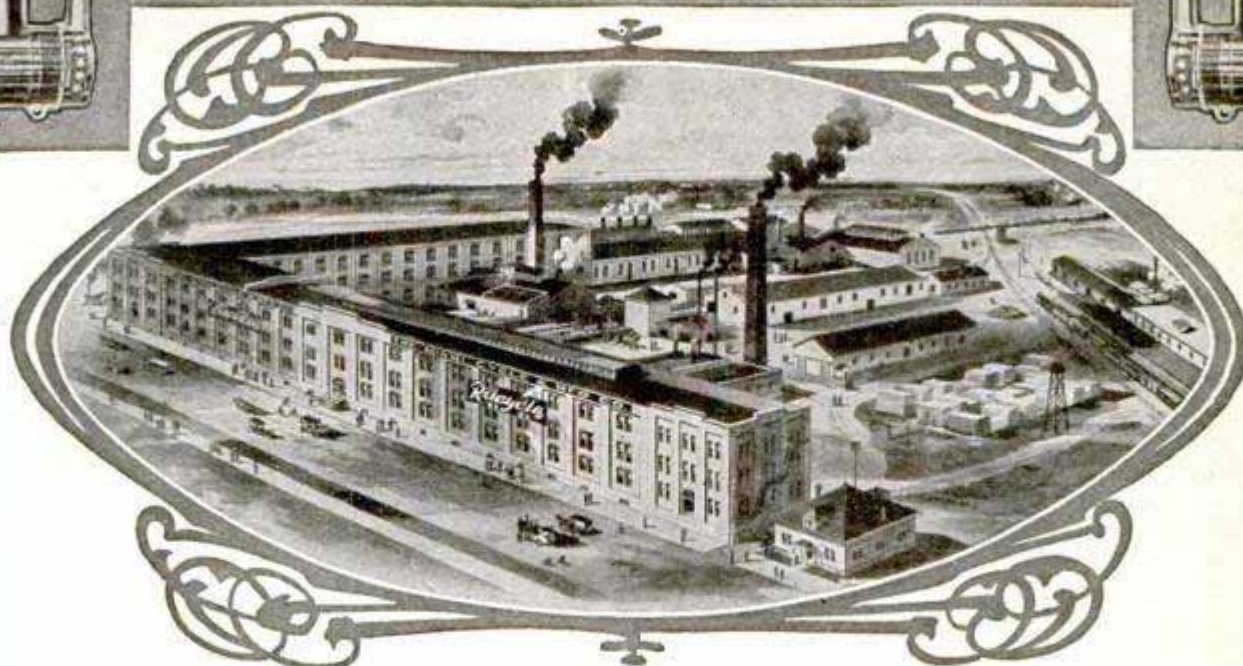
SHAW MFG. CO., Dept. B, Galesburg, Kan.



Convert Your Bicycle into a Motor-Cycle

using our Attachable Outfit. Fits any wheel. Also Marine and Stationary Motors and Finished Castings. Stamp for catalog. STEFFEY MFG. CO., Girard Ave. and 30th St., PHILADELPHIA, PA.

IT'S ALL IN THE CRANK HANGER



THE HOME OF THE RACYCLE

THE RACYCLE has won and holds on both hemispheres the deserved rank of leader among Bicycles. It is the wheel which pushes farther and with less energy than any ordinary bicycle. Last year increased demand for Racycles compelled us to enlarge our factory, and we are now devoting 500,000 square feet of floor space to the manufacture of high-grade wheels.

The **Racycle** Best
World's **Bicycle**

has 27.9% less pressure on the evenly balanced Crank Hanger than any ordinary bicycle. The "Bond Behind the Factory" offers \$10,000 in cash and \$50,000 worth of stock in The Miami Cycle & Mfg. Co. to any one who can prove that the solution of the Crank Hanger Problem, as published in our pamphlet—"The Three Reasons" has been figured incorrectly. Send for a copy of bond.

It's All in the Crank Hanger

Hill climbing is a pleasure on the Racycle—the easiest running wheel in the world. The secret of Racycle supremacy rests in the evenly balanced Crank Hanger. This season's construction makes the Racycle Crank Hanger unbreakable. In our 1909 models we are making head, seat clusters and crowns in frame construction all of Drop Forged Steel, and head fittings turned from solid bar stock—features not found in any other bicycle.

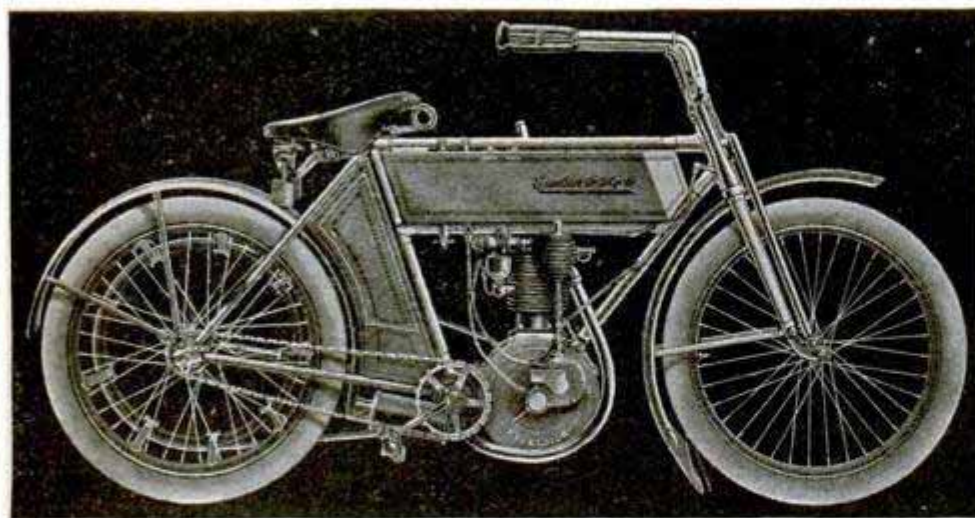
The Racycle Red Rideabout—new this season—is equipped with a 70 tooth, one-half inch pitch front sprocket and roller chain, and the Racycle Pacemaker is furnished with roller chain

Beautiful 1909 Catalog and Pamphlet—"The Three Reasons"—which fully explains conditions of Prize Problem, mailed for 2c stamp—sent FREE if you mention this publication. We make no cheap Racycles, but you can secure yours cheap by getting us an agent.

The Miami Cycle & Mfg. Co.
Middletown, Ohio, U. S. A.

IT'S ALL IN THE CRANK HANGER

EXCELSIOR AUTO CYCLE



The Machine Without a Weak Spot

Tried in Every Big Road Event of 1908, and made good every time.

PERFECT SCORES

In every Reliability Run, including the F. A. M. New York-Chicago and many others.

The big, powerful motor, broad, flat belt drive, positive lubricating system, scientifically designed, straight line frame, low, comfortable saddle position, and other valuable features, make this a perfect mount for touring and hard service, as well as for pleasure riding in cities or on good roads.

POSITIVELY RELIABLE, ECONOMICAL, POWERFUL, SPEEDY and SAFE

Three Models, all described in our new catalog MC-149. Write for it today.

EXCELSIOR SUPPLY COMPANY

Established 1876.

233-237 RANDOLPH STREET, CHICAGO, ILLINOIS

THE "WAGNER" \$175 to \$210

Write for Descriptive Catalog "M"

Wagner Motorcycle Co.

St. Paul, Minn.

CURTISS DOUBLE CYLINDER MOTORCYCLES WERE FIRST IN AMERICA
They're still first in everything

First in Speed: World's Record (61 cu. in.) 1 Mile 46 2-5 sec.
First in Reliability: Only DIAMOND MEDAL 1907 F. A. M. Endurance run. Highest Award "Both Classes" 1908 F. A. M. Endurance Run.



First in the Double Bar Frame, the long Wheel Base, the Vertical Engine with stripped cylinders, the Anti-Friction Bearings, V-Belt and numerous other so-called "new" features we have used for years. Get the original and Know you're right. The 1909 models represent a combination of speed, power, strength, durability and simplicity never before equaled. Send for Catalog C and further particulars.

G. H. CURTISS MFG. CO.

HAMMONDSPORT, N. Y.

Electric Motor Watch Charm
A genuine Electric Motor, inclosed multipolar type. Runs 2000 revolutions per minute. Highly polished and plated. A powerful "Pocket Battery" with every outfit. Postpaid, \$1.00.

DESPATCH MFG. CO.
112 N. 1st St., Minneapolis, Minn.

HUNTING ANTELOPE IN AN AUTOMOBILE.—M. Fuqua, of St. Louis, Mo., tells of witnessing an exciting capture of two young antelope in Texas by hunters in an automobile. The chauffeur was an ex-cowboy and understood the nature of the game. The hunter stood on the running board of the car, and at the right moment when just abreast of the fleeing antelope, he skillfully dropped the noose of a lariat over its head and thus held it. The second antelope was captured in the same way.

WATER MOTOR
RUNS AT HIGH SPEED IS VERY POWERFUL **50c** Agents Wanted
SAMPLE PREPAID
Empire Electric Works, 841, Bridgeport, Ct.

Order Your New Bicycle Equipped with INDIANAPOLIS **G & J TIRES**

Highest Grade Bicycle Tires Made
They wear the longest, ride the easiest, and are less liable to punctures. Cost just a trifle more than cheap tires but are worth it, and are the most economical in the end. Don't accept imitations or substitutes. Insist upon Original G & J—the trade mark tells. For sale by all local dealers and will be supplied on new Bicycles when you specify them. Write for free catalogue 18, G & J TIRE CO., Indianapolis, Ind.



Saves Time, Rent, Carfare

Home from work at a mile a minute on the R-S Motorcycle. Out where the air is pure, the fields green, and the rents cheap; at less cost and in less time than by any other means.

The "R-S" will carry you 20 to 50 miles on 5 cents worth of gasoline. **No limit to speed but the law.** Easy to own, ride, and maintain. Simple, durable and economical. America's best motorcycle, as racer, roadster, climber or coaster. We build no "special" machines, because there can be no "special" that will excel the regular

R-S Motorcycle

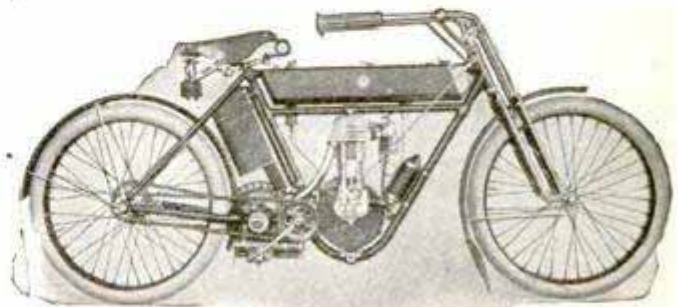
Built and Tested in the Mountains

The "R-S" is the only motorcycle that ever climbed Pike's Peak. It made the climb and descent without faltering, and without using the limit of its power

14 "R-S" models for 1909. $3\frac{1}{2}$ to 7 h. p. Single and twin cylinders. Belt or chain drive. Battery or magneto ignition. Many exclusive features. Mechanical intake valve that increases power without adding weight. New and perfect pneumatic spring fork. New arrangement for insuring perfect cooling.

Agents wanted where we have no representatives. Catalogue free.

READING STANDARD CO.
405 Water St., Reading, Pa.



Hudson



Hudson Efficiency

There's no secret about the well-established efficiency of Hudson Bicycles. The D. & J. Hanger is largely responsible for their established reputation. The steel sleeves enclosing bearings make it possible to adjust cones tightly, giving perfect bearing at all times. D. & J. Hangers can be had on Hudson Bicycles only. In ordinary wheels the cone *wedges* between the balls, simply grind around and destroy the purpose of the ball bearing. All D. & J. Hangers are

Ball Bearing without the Use of Ball Retainers

Dust-Proof without the Use of Felt Washers

Hudson frame construction enables the rider to *get best results from his energy.*

We'll send our handsome 1909 Hudson Catalog for a 2c stamp—FREE if you mention this publication. If you want a Hudson cheap, secure us an agency.

THE MIAMI CYCLE & MFG. CO.
Middletown, Ohio, U. S. A.



GOOD CUTS

ENGRAVED BY ALL PROCESSES TO ILLUSTRATE ADS, CATALOGS, ETC. IT COSTS NO MORE TO PRINT A GOOD CUT THAN A POOR ONE. WE MAKE CUTS THAT PRINT CLEAN AND SHARP ON ANY PAPER. NO CUTS IN STOCK - ALL WORK DONE TO ORDER - ASK FOR SAMPLES. ACME ENGRAVING CO., 155 WASHINGTON STREET, CHICAGO.

PHOTOGRAPHS WANTED

Photographs of new and interesting subjects, suitable for publication in this magazine, may be submitted to its editor and those accepted will be paid for promptly.

Editor Popular Mechanics
225 Washington St. Chicago



Print Your Own Cards, circulars, book, newspaper. Press \$5. Larger \$18. Save money. Print for others, big profit. All easy, rules sent. Write factory for press catalog, type, paper, etc.
THE PRESS CO. MERIDEN, CONNECTICUT

WANTED—A RIDER AGENT IN EACH TOWN



Model "Ranger" bicycle, furnished by us. Our agents everywhere are making money fast. Write for full particulars and special offer at once.

NO MONEY REQUIRED until you receive and approve of your bicycle. We ship to anyone, anywhere in the U. S. without a cent deposit in advance, *prepay freight*, and allow **TEN DAYS' FREE TRIAL** during which time you may ride the bicycle and put it to any test you wish. If you are then not perfectly satisfied or do not wish to keep the bicycle you may ship it back to us at our expense and *you will not be out one cent.*

FACTORY PRICES We furnish the highest grade bicycles it is possible to make at one small profit above actual factory cost. You save \$10 to \$25 middlemen's profits by buying direct of us and have the manufacturer's guarantee behind your bicycle. **DO NOT BUY** a bicycle or a pair of tires from anyone at any price until you receive our catalogues and learn our unheard of *factory prices* and *remarkable special offers to rider agents.*

YOU WILL BE ASTONISHED when you receive our beautiful catalogue and study our superb models at the *wonderfully low prices* we can make for 1909. We sell the highest grade bicycles for less money than any other factory. We are satisfied with \$1.00 profit above factory cost. **BICYCLE DEALERS**, you can sell our bicycles under your own name plate at double our prices. Orders filled the day received.

SECOND HAND BICYCLES. We do not regularly handle second hand bicycles, but usually have a number on hand taken in trade by our Chicago retail stores. These we clear out promptly at prices ranging from \$3 to \$5 or \$10. Descriptive bargain lists mailed free.

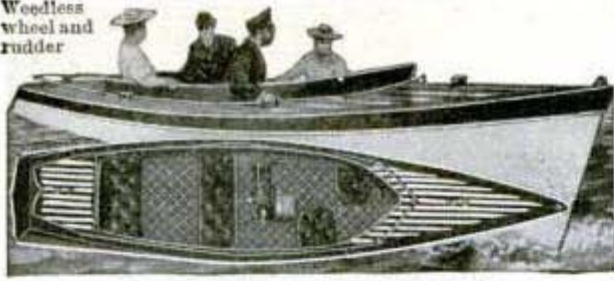
TIRES, COASTER-BRAKES, single wheels, imported roller chains and pedals.

DO NOT WAIT, but write today and we will send you **free** by return mail our **large catalogue**, beautifully illustrated and containing a great fund of interesting matter and useful information; also a *wonderful proposition* on the first sample bicycle going to your town. It only costs a postal to get everything. **Write it now.**

MEAD CYCLE COMPANY Dept. D 108 CHICAGO, ILL.

Please Mention Popular Mechanics

Wheelless
wheel and
rudder



Copyright 1909, C. T. Wright Engine Co.

for Free Boat Book

Four Great Launch Bargains

Only \$121⁰⁰

For this Complete Prince William 16-foot Launch and 2½ H. P. Guaranteed Self-Starting Engine, 9 miles per hour.

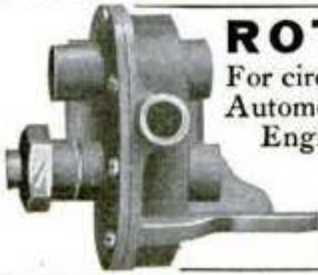
\$144 for 9½ miles per hour "Speedaway"

\$153 for the Canopy Topped "Winner"

\$160 for the Auto Topped 3 H. P. "Comfort" Launch

For a limited time we offer to ship you, *on approval*, for \$121, this graceful, substantial, ready-to-launch Motor-Boat—an ideal craft for Fishing, Hunting and Pleasure Boating. Safe for family and children. Steady and seaworthy. This Launch is the result of 30 years' successful experience in boat building, is a scientific compromise of the auto boat and flat bottom. Seating capacity, 6 to 8; 16 feet long, 42 inch beam, 9-16 in. dressed planking. Can change seats and move about without danger of tipping. Boat is propelled at a speed of 9 to 10 miles per hour by a powerful Gile self-starting, odorless, noiseless, reversible, 2½ H. P. Engine of the Single Cylinder, 2 Cycle type. Controlled absolutely by one single Lever which starts, stops, reverses, etc. Develops full 2½ H. P. at 500 rev. per minute; 3 H. P. at 700 rev. Construction simple, no cams, springs or gears to get out of fix. 40-page catalog explaining Engine in detail sent free. Guaranteed to give perfect satisfaction. **Send your name on a postal today** for detailed description of this beautiful, ready-to-launch Motor-Boat. Investigate before buying any launch. Our special \$121.00 Price with *Immediate Shipment Guaranteed* is offered for a limited time only. This launch is complete—nothing more to buy, ordinarily sells for \$200.00.

C. T. WRIGHT ENGINE COMPANY, - 1004 Washington Street, Greenville, Michigan



ROTARY PUMPS

For circulation of Water and Oil on Automobile, Marine or Stationary Engines and for bilge purposes.

SEND FOR CATALOGUE

THE LIPMAN MFG. COMPANY
300 PLEASANT STREET, BELoit, WIS.

THE MANUFACTURE OF COMPRESSED OXYGEN.—The various processes are founded upon three entirely different principles, the use of barium dioxide, electrolysis and the fractional distillation of liquefied air. By means of the rectifier of Linde, pure oxygen can be continuously produced from air, while oxygen from the Brin process is contaminated with air, and that produced by electrolysis often contains hydrogen. The consumption of oxygen has increased in the last six years in Germany, and in other countries proportionately, from 5,000 to 400,000 cu. m. per year. The costs of installation of plants and production by the Brin, Schuchert and Linde systems are com-



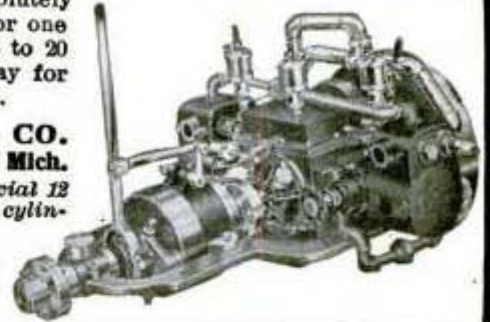
2 CYLINDER OPPOSED MARINE ENGINE

Full Brake Horse Power Guaranteed

Please don't buy a Marine Engine until you have investigated the "Stintz." Then you won't want any other. Absolutely guaranteed for one year. All sizes, 8 to 20 H. P. Write today for catalog F, sent free.

GUY L. SINTZ CO.
Desk H Marshall, Mich.

We also build special 12 to 14 horse power, 2 cylinder opposed engines for replacing the Cadillac single. Price \$150 complete



GRAY MOTORS

3 to 20 H. P.

\$60.00 and upwards.

Complete in every detail, all ready to install in your boat.

Made in the largest and most up-to-date plant in the world devoted exclusively to the manufacture of 2-cycle marine motors.

1, 2 and 3 cylinder. Write for story of how these motors are made and catalog.

GRAY MOTOR CO. 61 Lieb St., Detroit, Mich.



PIERCE MOTOR BOATS AND MOTORS

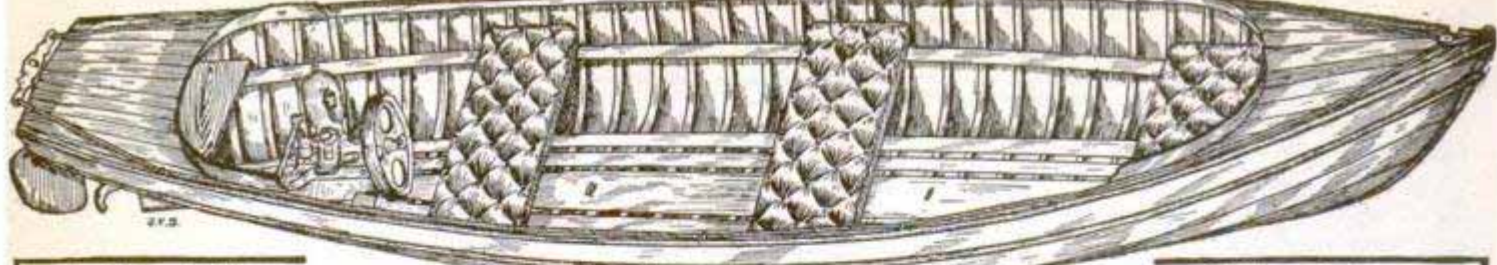
"Always Dependable"

Superior to all others for Safety, Comfort, Durability and Speed. Our 24 years' experience enables us to give you the best for the least money. 88 sizes and styles of Motor Boats ranging in price from \$75.00 to \$4,000.00. Motors only, 2 to 20 H. P.

Knocked Down Boat Frames with Machinery. Row Boats and Canoes. Write today for full particulars. We can save you money.



PIERCE ENGINE CO., Tenth Avenue, Racine, Wis.
SIEGEL-COOPER CO., New York City, Eastern Agents



Swift and Silent

Safe and Strong

Pierce Power Dories

Manufactured Complete by the Pioneer Gasoline Motor Builder.
14 ft. Speed 7 miles, \$75—16 ft. Speed 7½ miles, \$87.50

PIERCE Dories are noiseless, speedy and so simple the boys and girls can operate them. The 14 ft. dory will carry 5 people, has 3 seats, as pictured above. The 16 ft. dory has 4 seats and will carry 7. All are made stiff, strong and staunch. Motor works on the water, preventing vibration. Weight is little more than that of a strong row boat. Costs what a good row boat did a few years ago. Ideal for hunting and fishing. **We Guarantee Pierce Dories** to give perfect service. We furnish free any defective part within Five years. 2 gallons of fuel will run one 18 hours. For a safe, durable and entirely sea worthy small Dory nothing can equal these 14 and 16 ft. PIERCE Boats. We make other boats up to 40 ft. If interested send 4 cts.

Pierce Engine Co. 11th Street in stamps and we will send our complete Motor Boat Catalog. Motor and Dory Catalog sent free.
Racine, Wis.

IT'S THE SERVICE
YOU GET OUT
OF AN ENGINE
THAT COUNTS

Stover Motors



Easy to start. Develop full power. Run quietly and smoothly. Nothing "trapry" in their appearance. Nothing complicated. Not a "cheap" motor, but a low priced one.

Marine Engine.

2 cycle, 3 port, 4-6-8 and 12 H. P.

Write for catalogue and prices to

STOVER MOTOR CAR CO., Freeport, Ill.

Skipper Marine Engine

Runs on
KEROSENE, ALCOHOL or
GASOLINE

Simple, Powerful, Speedy

Price		
2 H. P.	4 H. P.	6 H. P.
\$39	\$64	\$94

Complete including Boat Fittings.

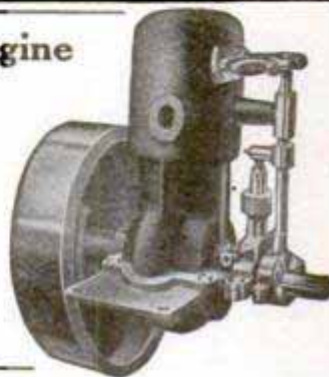
GRAY - HAWLEY MFG. CO.

Detroit, Mich.

Makers of Gray Mufflers, Auto Chimes,

Valves, Whistle Outfits, etc.

Send for catalog P. M.



pared with results decidedly favorable to the Linde process. By electrolysis 1 cu. m. of oxygen costs about 12 cents, while by the Linde process about 3.2 cents. Compressed oxygen is now largely used for medical and hygienic purposes and for producing high-flame temperature in glass works, for perforating and trimming glass, and in blast furnaces for melting out tap holes and cleaning out tuyeres clogged with iron. The greatest use is for purposes of welding, in which an excess of hydrogen, five to one, is required to prevent burning the iron to oxides. Fouché's

LAUNCH AND MARINE SUPPLIES STUFFING BOXES, PROPELLERS

Engines for every purpose
Everything in Boats and
Fittings.

J. C. SHADEGG ENGINE CO.

314 THIRD ST., S., MINNEAPOLIS, MINN.



ATTENTION: BOAT OWNERS AND BUILDERS!
It will pay you to send six cents for our Catalog D, Boat Hardware. A saving on all boat supplies. **C. KAUFMAN, OSHKOSH, WIS.**

DOMAN

DOMAN MARINE MOTORS are known all over the world for their superior quality.

Write for Catalog
"S 1."

"The Motor of
Quality"

THE H. C. DOMAN CO.

OSHKOSH, WIS., U. S. A.

The High Grade Engine Builders



One Man Control

Our new models designed by Whittelsey & Whitaker of New York, the most successful naval architects in the United States, embody the most advanced ideas of this celebrated firm in launch and motor boat designing.

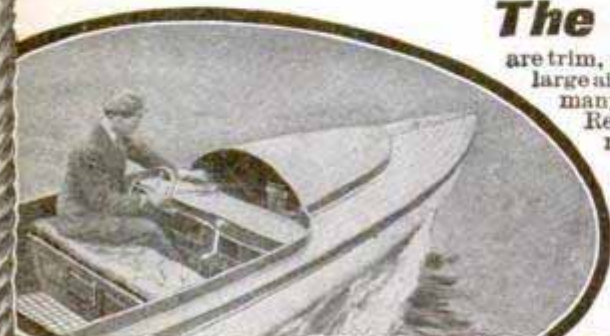
The New Mullins 1909 Models

are trim, fast, safe and seaworthy. Built of steel like torpedo boats and fitted with large air chambers like life boats; they are speedy and absolutely safe. They have many new improvements—concealed machinery—**one man control**—Improved Reversible Engine, Mullins Silent Underwater Exhaust, etc. Made of the best materials—perfect in mechanism, construction and finish, superior to any other craft built, whether of wood or steel. We want you to know the full specifications of these remarkable new models—to understand their patented construction—"Why" they are better than any other launches. When you want your boat you will want it immediately—not three months later, so

Write Today For Our Catalogue

of Launches, Motor Boats, Marine Engines, Row Boats, Hunting and Fishing Boats. Our 1909 Models offer exceptional value at very reasonable prices. Better write now.

W. H. MULLINS CO., 151 Franklin St., Salem, Ohio.

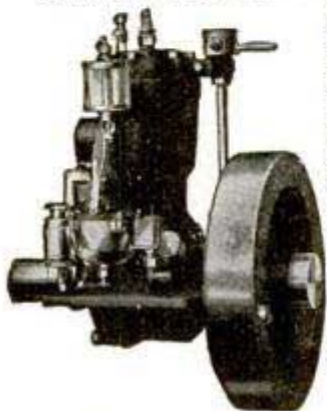


This FREE OFFER is for YOU
if You Want to Know

about the most modern types of Marine Engines. We are the largest manufacturers and have larger factory facilities than any other maker. To tell you about the advantages of our motors, we issue free a handsome

BOOK This book gives you the opportunity to study motors for all kinds of boats—the kind you have or want to own. It shows 1, 2 and 3 cylinder engines from 3 to 25 HP. It gives you the opportunity to investigate before you buy, not after you have found you have made a mistake.

Ferro motors are used the world over—more were sold last year than any other 2-cycle engine. We want to show you what cannot be told in a magazine advertisement—the many advantages of the Ferro



3-HP. FERRO—Special

Besides our regular line we are building 5,000 special 3-HP. motors to sell at a low price, \$60 the lowest ever made on a good motor. Latest design, best material and workmanship. Just the motor for launch, dingy, canoe or auxiliary yacht. Quantity brings down the cost.

Write for this FREE BOOK.

**The Ferro
Machine & Foundry Co.**

813 Superior Ave.

CLEVELAND, OHIO.



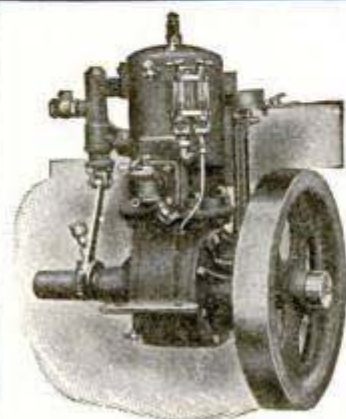
Yale Air Compressors

Supply abundant air for your Boat Whistle, Air Brush Work, or any similar work.

We Guarantee It

Baird & Henselwood Mach. Co.
112 Raynor St. Detroit, Mich.

discovery of the use of acetylene with oxygen in the proportion of 0.7 parts to 1 of oxygen enables a shorter and more intense flame to be produced and obviates the difficult transportation of bulky hydrogen. The acetylene-oxygen flame will weld plates up to 1 in. thick. Units of installation for the use of the Fouché process have increased in the oxygen production. The production of cheap oxygen on a large scale has made practical use of the old experiment of burning iron in oxygen with astonishing results. Oxygen is now used for cutting out manhole openings, plates, locomotive frames, cutting off sprues from cast steel and hardened castings and for all purposes which formerly required the chisel and shears.



**T & M
REVERSIBLE
MARINE MOTORS**

Neat and original design. High quality; moderately priced. Various types and all sizes from 2 to 150 horsepower. Every engine guaranteed to develop full rated power. Investigate carefully before buying. Beautiful '09 catalog gives full description and general treatise. Ask for a copy.

Termaat & Monahan Co.
OSHKOSH, WIS.

**Roberts
Motors
Win**

Designed by E. W. Roberts, M. E., one of the most expert mechanical engineers in the United States and constructed under his personal supervision. **ROBERTS MOTORS** (1½-60 H. P.) are infinitely superior to every other marine motor made. They are simple in construction and mechanically perfect.

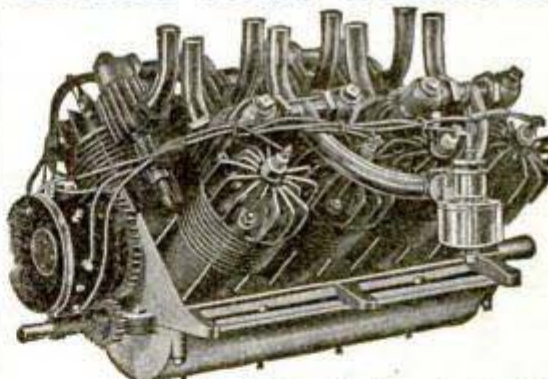
**Roberts Motors
Are Trouble Proof**

No "freak" ideas—no base explosions, economical in use of fuel—interchangeable parts that fit perfectly—no gaskets—thoroughly tested in the best testing room in the United States. Every **ROBERTS MOTOR** is fully guaranteed. Write for Free Catalogue and "Book of Testimonials." Read what actual users of **ROBERTS ENGINES** say. Good Agents Wanted.

ROBERTS MOTOR CO.

1419 Columbus Ave. Sandusky, Ohio, U.S.A.

CURTISS LIGHT WEIGHT MOTORS



Adopted by the U. S. War Department and used by all prominent Aeronauts.

Absolutely essential where great power and light weight are required.

One to eight cylinder. Two to one hundred H. P.

Send stamps for catalogue X.

G. H. CURTISS MFG. CO., Hammondsport, N. Y.

**Little Giant
GASOLINE MOTORS**

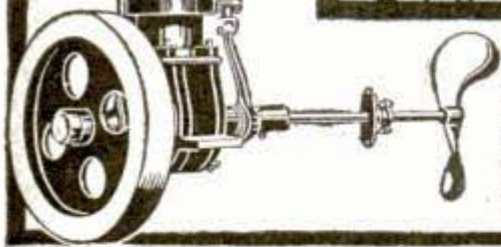
Pushes your boat like a giant—takes up room of a dwarf. Most powerful engine of its size ever built. Not a toy—but a real live wire among marine engines. Sold all over the world. Simple, speedy and sturdy. Two cycle—two and three port; best motor—\$40 up to 16 H. P. Get our Catalog and send 10 cents stamps for "Ignition and Vaporization," the neatest little booklet ever issued for the benefit of gasoline engine users.

UNITED MFG. CO.
175 W. Woodbridge St., Detroit



2 H.P. Detroit Engine \$29⁵⁰

3-5-7-10-12-14 and 40 H. P. at proportionate prices.



Starts without cranking; no cams, valves, springs or sprockets. Only three moving parts. Uses alcohol, gasoline, naphtha, distillate, kerosene, coal oil, etc. All bearings babbitted. Cylinders and piston ground. Crank shaft forged steel. For your Row Boat, Sail Boat, Launch. 10,000 in use. All sizes ready to ship. Send for testimonials and free catalog.

DETROIT ENGINE WORKS, 1271 Jefferson Ave., Detroit, Mich.

Get a copy of our new booklet which fully describes the Regal Engine. The engine, as a customer refers to it, "that is perfectly satisfactory in every respect—that has run 7000 miles without one minute stoppage and runs as smoothly as a watch." Isn't that the engine you want in your boat this summer?

REGAL MARINE ENGINES

are built on SOUND PRINCIPLES by PRACTICAL MEN and our record — not a single engine returned to us in the last two years — proves the reliability and durability of Regal Engines. We make Regal Engines in high speed, and heavy duty engines from 3 H. P. to 45 H. P. and from 2 to 4 cylinders. Our advice on your motor problems will be cheerfully given. Send us your name and address for a copy of our new booklet 18, before the supply is exhausted. Regal Gasoline Engine Co., 67 W. Pearl St., Coldwater, Mich.

SCRIPPS MOTORS

are equal in workmanship and material to the finest automobile engines made. They are all of the four-cycle type, which in automobile and marine practice has proven its superiority. Scripps Motors can be had in any desired size and power, from 4 to 100 H. P., one to six cylinders. Our handsome catalog sent on request, tells what Scripps Motors are and what they have done.

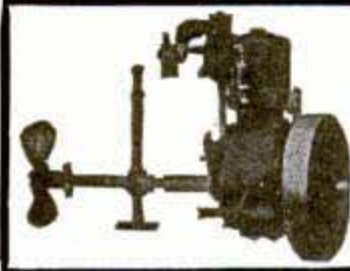
SCRIPPS MOTOR CO., 650 Lincoln Ave., Detroit, Mich.
New York Agents, NEPTUNE MARINE CONSTRUCTION CO., 1133 Broadway



16 FOOT STEEL LAUNCH \$96

With 2 H.P. Engine Complete

18-21-25 foot launches at proportionate prices. All launches fitted with two cycle reversing engines with speed controlling lever; simplest engine made; starts without cranking, has only 3 moving parts. Steel rowboats, \$20.00. All boats fitted with water-tight compartments; cannot sink, need no boat house. We are the largest manufacturers of pleasure boats in the world. Orders filled the day they are received. We sell direct to user, cutting out all middle-men's profits. Free Catalogue. Michigan Steel Boat Co., 1271 Jefferson Ave., Detroit, Mich.



High-grade MARINE and AUTOMOBILE ENGINES 2 to 20 H. P. 2 and 4-cycle, latest improvements; best material; lowest prices. Also sell castings, with blue print drawings. Send for catalogue and state size wanted. A. J. HOULE MOTOR WORKS, 528 Bridge St., Holyoke, Mass.



Rowboat \$20⁰⁰

20 Different Designs. Can ship immediately in any quantity. Need no Boat House. Never Leak, Rust, Check, Crack or Rot. Every boat has water tight compartment, so cannot sink. Write for FREE Illustrated Catalog and Special Prices. Michigan Steel Boat Co., 156 Bellevue Ave., Detroit, Mich.



AS STRONG AS A SOLID WHEEL NO SOLID WHEEL IS SPEEDIER

For safety your boat must have a reverse gear or reversing propeller. Cheap gears are worthless. Good ones cost like blazes—and a good gear is not as strong nor as desirable as a "Sintz" Reversing propeller, and the "Sintz" costs less money. Sounds pretty strong, but let us prove it. In the "Sintz" Reversing Propeller are combined perfect control over both speed and direction; adjustable pitch, elimination of grease, dirt, wasted space and power. We are dead certain that the "Sintz" is king of all reversing devices—that it will satisfy you. We'll back up that statement by refunding purchase price on any "Sintz" Wheel that does not satisfy, paying freight both ways. Write for our booklet, "A Tale of a Trail of Trouble." It contains the whole proposition in concise form. WILMARTH & MORMON CO., 610 CANAL ST., GRAND RAPIDS, MICH.



ELECTRIC SWITCHES

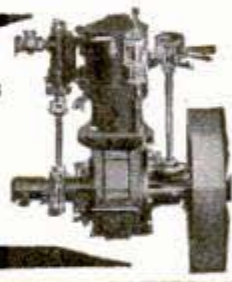
For Launches, Autos and Wireless Stations, sent Prepaid for 40c. Empire Electric Works, 841, Bridgeport, Ct.

WHEN YOU WANT ANYTHING AND DON'T KNOW WHERE TO FIND IT, WRITE BUREAU OF INFORMATION POPULAR MECHANICS CHICAGO.

PERFECTION MARINE ENGINES

2 H.P. \$45
6 H.P. \$95
Complete

The most complete, efficient and successful motor yet produced. Simple, serviceable and guaranteed satisfactory. None run smoother. Always ready to go and likes hard work. Starts on quarter-turn of flywheel. Correct design. Best materials, workmanship and finish. Write at once for handsome catalog which illustrates every part in detail, and gives concise, practical information that every engine buyer should have. Find out for yourself about our "Square Deal" plan which pleases every buyer. Postal brings full information. THE CAILLE PERFECTION MOTOR CO., 1311 2nd Ave., Detroit, Mich.



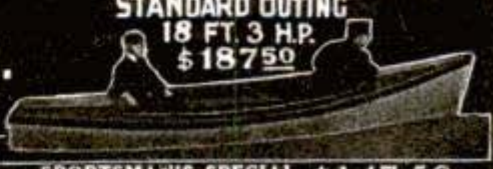
14 FT. MOTOR BOAT WITH 2 H. P. MOTOR \$98.00

DON'T CHEAT YOURSELF—Compare outing boats with others before making your selections



OUTING BOAT CO.

KANKAKEE, ILL. ASHLAND, WIS. After March 18 Free Catalogue

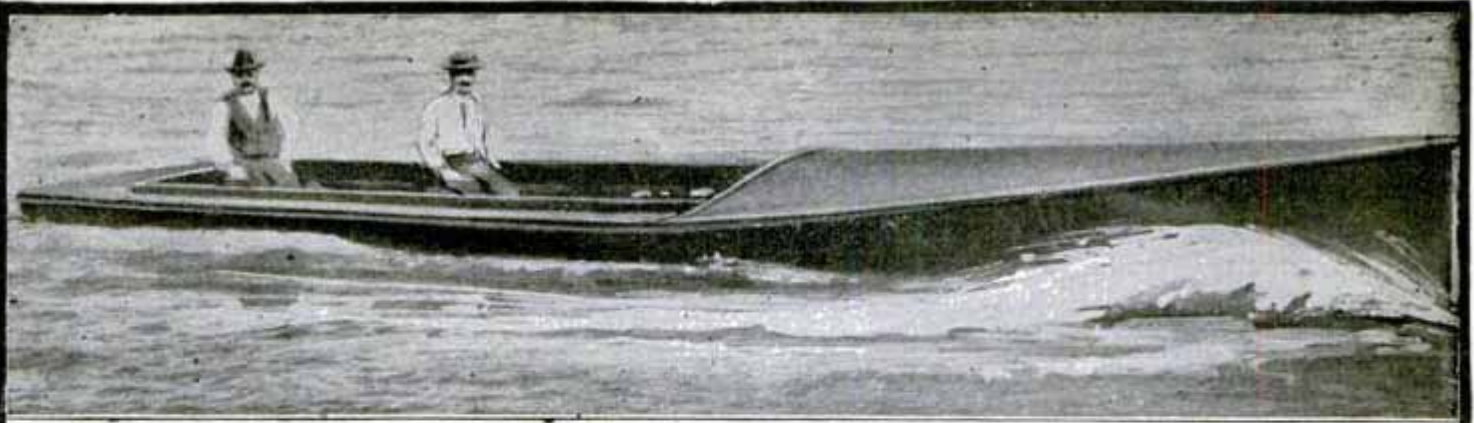


STANDARD OUTING 18 FT. 3 H.P. \$187.50

OUTING RUNABOUTS \$320 to \$725 20, 22 and 24 feet

We sell direct to users at net prices DEP. 6

SPORTSMAN'S SPECIAL \$147.50 16 ft., with 3 H. P. Motor



15 Miles an Hour With 2-Cyl., 12 H. P. Gasoline Engine

DU BRIE Marine Motors Kerosene Gasoline Distillate

Correct design, accurate mechanical work, best material, thorough testing and best equipment insure maximum performance of all our types of boat and the pleasure, comfort and satisfaction of owners and passengers.

The above illustration shows the "Magnolia," a 27-foot boat owned by C. L. Hunt, of Paducah, Ky., equipped with a 2-cylinder, 12 horsepower DuBrie gasoline motor, making 15 miles an hour. It has beaten speed boats of 18 and 24 horsepower.

The picture below shows a DuBrie boat of the same power, pushing a 53-foot schooner. These illustrations are actual proofs of results.

The motor that produces these results in hulls so widely different, will do the same in any hull.

Power, Speed, Economy

Gasoline Motors

Thousands of these are in use. They start easily, are always ready. Wonderful economy of fuel, dependability, bulldog persistence and a reasonable price for a strictly high-grade product, have made these motors intensely popular with those who know values. Made in ten sizes— $2\frac{1}{2}$ to 27 h. p.—one, two and three cylinders. Ask for descriptive catalog.

Kerosene Distillate or Gasoline Motors

Because of our vaporizing device, kerosene and distillate may be used in the DuBrie kerosene motor.

A pint of kerosene per horsepower keeps you going full speed for an hour. There's more power in kerosene or distillate. It's vastly cheaper. None of the fuel can escape to cause odor or muss. These engines always start easily and run smoothly and persistently. They cost but little more than the gasoline motor and far less than other kerosene motors. Made in all sizes

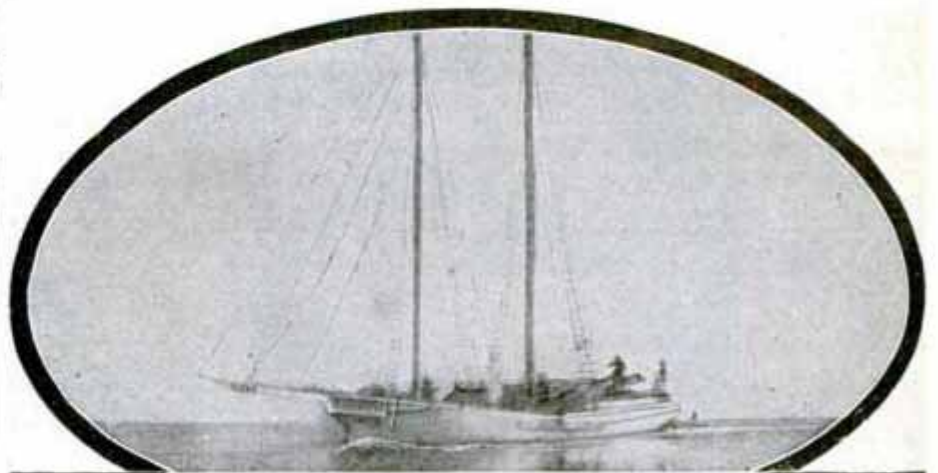
from 4 to 27 horsepower—1, 2 and 3 cylinders. Our catalog gives all details. Ask for it.

There's more power per gallon in these cheap fuels than in gasoline. You easily save \$15 to \$20 a season.

Introductory Boat Bargain—We have procured a few speedy boats at a bargain, which we have equipped with 6 H. P. Du Brie engines, and are selling, while they last, for **less than the hull alone would cost.** Write quickly if interested.

Boat is 18 feet long, seats 10, and makes 10 miles per hour. **ACTUAL Price \$225.00.** Complete—ready to run

DuBrie Motor Co.
425 Guoin Street
Detroit, Mich.



CAPTAIN NORMAN EVANS, of Millville, N. J., has one of our TWO-CYLINDER, TWELVE HORSEPOWER KEROSENE MOTORS installed in a small boat which pushes his large schooner, used in the oyster fishing trade. He pushes the large boat 7 miles an hour in still water; 9 miles with the tide. When there is a fair wind, he hoists the small boat on deck and uses sail. In a straight pulling contest with a 12 h. p. weighing 1,000 lbs., Capt. Evans won handily.

Pioneer Perfect Frames

and Boat Parts are

The Standard



of Boat Construction. We do all the hard part for you. Every frame is set up by an expert boat builder, trued and tested before taking apart for shipment. All ribs are bent to exact shape fitted and beveled for plank-ing. Not a shaving need be taken off anywhere. With every frame we furnish all necessary

patterns, illustrations and instructions for building the completed boat. Every piece is numbered. Any one can reassemble them.

We also furnish when desired every part and thing necessary to complete the boat ready for the water.

We will furnish frames and parts for any kind of modern boat. Our boats are in service in every civilized country. The U. S. Government is among our patrons.

Our frames and material to finish will save you **TWO-THIRDS THE COST** of a similar completed boat. The saving on freight alone is very great.

Write for Free Catalogue or send 25c for 104-page Boat Builders' Book—300 illustrations. Satisfaction Guaranteed or Money Refunded.

PIONEER BOAT & PATTERN CO.

Wharf 350 :: :: BAY CITY, MICHIGAN

Make a Motor Boat of Any Boat in Five Minutes



You can do it with the Waterman Outboard Motor, which you can quickly attach (and detach) to the stern of any skiff, row boat, dinghy, punt, sail boat, and have a good motor boat. It is not a toy, but a reliable 2 H. P. Marine Motor that will drive an 18-foot row boat 7 miles an hour, 4 hours on gallon gasoline. Simplest motor made. Weight 40 lbs. Equipped with Schebler Carburetor. Four years' successful results behind it. Send for Catalog C.

Canoe Motors, 1, 2, 3, 4 Cylinders—Catalog K.

Standard Type Motors, 1 to 30 H. P.—Catalog A.

Waterman Marine Motor Co.

1507 Fort Street, West, Detroit, Mich., U.S.A.

GET THIS CATALOGUE

SAVE MONEY The largest in the World on SAVE MONEY

SPEED PROPELLER WHEELS, REVERSE GEARS, and MARINE HARDWARE
Everything New and Up-To-Date

We want every man who builds, owns or sells a boat to get our 60 page Free Catalog. Prices Right, Satisfaction Guaranteed. Immense Stock, Prompt Shipments. Save money by getting catalog to-day.

MICHIGAN WHEEL CO.
Dept. M, Grand Rapids, Mich.



Holley Carburetor

60,000 in use



For Automobile, Marine and Stationary Gasoline Engines

It will increase the power of your engine and decrease the amount of gasoline used. It automatically gives the correct fuel mixture to the engine and having only one adjustment, it cannot get out of order. When engine stops running, gasoline is shut off by float valve in carburetor. All sizes.

Prices \$7.50 to \$9.00

Satisfaction guaranteed.

Write for catalogue

HOLLEY BROS. CO.

661-675 Beaubien St.

DETROIT, MICH.

Your Safety Demands

Baldrige

Reverse Gear

Every motor boat owner wants a reverse gear; you will want a Baldrige if you investigate the matter. Simplest in design and operation; compact; completely enclosed, made of the finest steel by high-grade mechanics. Baldrige Reverse Gears are made in the largest factory of its kind in the world. Every gear is tested in water before shipment. Liberally guaranteed. No user of a Baldrige has ever discarded it for another make. Prices and descriptive matter sent on request.

THE SMITH & BALDRIDGE MACHINE CO.
62 Amsterdam Avenue
Detroit, Mich.

Agents wanted.



INVENTIONS—How to Protect, Sell and Buy Them

by F. B. Wright. Price 25c postpaid

POPULAR MECHANICS BOOK DEPT., - - CHICAGO

NOTHING EXTERNAL REVOLVES

Detroit REVERSE GEAR

STARTS REVERSES INSTANTANEOUSLY STOPS

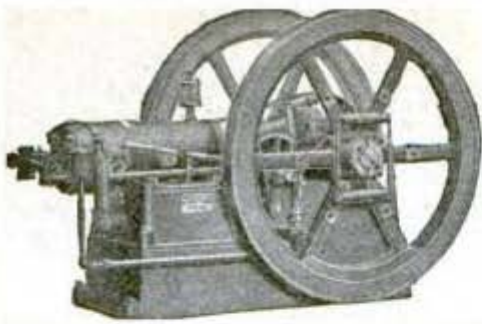
Designed and manufactured under the personal direction of Gies Bros. All in an oil tight case

The Simplest, Most Reliable, Most Compact and the Smallest Perfect Marine Reverse Gear ever offered.

No outside moving parts to throw the oil or grease, tear the skirts, bruise the hands or catch waste. No noise; manufactured in sizes for from 2 to 30 H. P. We carry all sizes in stock for immediate shipment. Guaranteed for 1 year. Write for specifications.



Detroit Engine Works
24 Beaufait Ave., Detroit, Mich.



RELIABILITY COMES FIRST

Before you buy an engine you should be satisfied that it can be depended upon in every way.

An engine that is frequently out of order when most needed, that requires constant readjusting and replacing of worn out parts, is a poor investment. Save yourself time and money by installing a power plant built by a company that cannot afford to send out engines that fail to give perfect satisfaction.

I. H. C. GASOLINE ENGINES

are built on such simple lines that an inexperienced person has no trouble in mastering their management. Thousands of them are at work today, their years of service telling of thorough efficiency.

Vertical in 2, 3 and 25 horsepower.

Horizontal (Portable and Stationary) 4, 6, 8, 10, 12, 15 and 20 horsepower.

Air-Cooled in 1 and 2 horsepower.

Also a complete line of Famous engines mounted on skids or ready for mounting by the purchaser.

Sawing, spraying and pumping outfits, and jacks.

Call on the International local agent for catalog and particulars, or write the home office. Valuable book, "300 Years of Power Development," sent on request.

INTERNATIONAL HARVESTER COMPANY OF AMERICA (Incorporated)
16 Harvester Building, CHICAGO, ILL.



It isn't the things that you really do,
It's the things you leave undone,
Which gives you a bit of a heartache
At the setting of the sun,
The tender word forgotten,
The letter you did not write,
The flowers which you might have sent
Are your haunting ghosts at night.

The stone you might have lifted
Out of a brother's way;
The bit of kindly counsel
You were hurried too much to say,
The loving pressure of the hand,
The gentle and friendly tone
That you had no time or thought for,
With troubles enough of your own.

For life is short—too awful short,
And sorrow is all too great,
For all our slow compassion
That waits till it is too late,
And it is not the things you really do;
It's the things you leave undone
Which give you the bitter heartache
At the setting of the sun.—Optical Journal.

RELIABLE AS STEAM REMINGTON OIL ENGINE

Will not carbonize. Cost to operate $\frac{1}{4}$ as much as gasoline. This is **not** a gasoline engine supposed to run on kerosene.

IT IS A KEROSENE ENGINE

Send for Catalogue "P."

The Remington Oil Engine Co., Stamford, Conn.



The Motor of Merit

Single and Double
Cylinder

Get Our Literature.

CUSHMAN MOTOR CO.

20TH AND N. LINCOLN, NEB.



GAS POWER A MONTHLY MAGAZINE

Devoted exclusively to the gas and gasoline engine subject. It will tell you how to keep your engine running and save you money in expensive repairs. Its contents are of a semi-technical character that cannot fail to interest people operating or contemplating the purchase of a combustion engine.

The Practical Gas and Oil Engine Hand Book

Presenting the primary principles of Gas and Oil Engines in simple language—but supplying enough practical knowledge to successfully operate a gas engine.

Regular subscription price of Gas Power \$1.00 a year.

The Practical Gas and Oil Engine Hand Book sells for \$1.00 a copy.

A special limited offer is now open of GAS POWER, one year, and one copy of The Practical Gas and Oil Engine Hand Book for \$1.00.

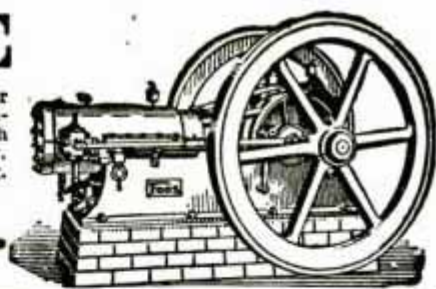
Mail Orders at once to

Gas Power Publishing Co., 320 Court St., St. Joseph, Michigan

There is Use in a FOOS GAS ENGINE

Buy certainty. Foos Engines have been on trial over 20 years. They are never found wanting. Get the engine which experience has shown to be right and which is backed by the world's greatest gas engine factory. You can see the Foos superiority if you study our catalog. Write for book No. 50.

The Foos Gas Engine Co.
Springfield, Ohio



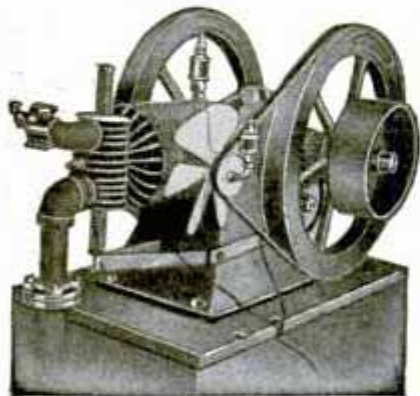
AIR COOLED MOTORS

1 1/2 H. P. to 10 H. P.

1 1/2 and 2 1/2 H. P. equipped with short connections for spray pump and walking beam attachment for pumping water from wells. Will work against 200 pound pressure all day without heating. Gasoline in base of engine.

Write for agency

AIR COOLED MOTOR CO., Lansing, Mich.



Your Credit Is Good On This "WATERLOO"

Buy a powerful, durable, Open-Jacket, Frost-Proof Waterloo Gas Engine on credit and get permanent satisfaction for least money. Every Waterloo flatly guaranteed for at least 5 years. Get a postal and that shows why and how the WATERLOO leads

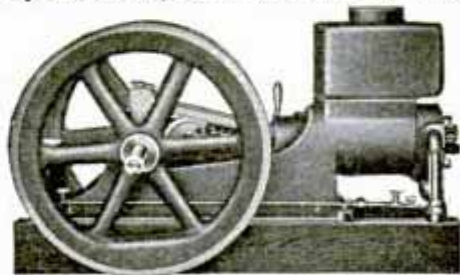
WRITE NOW FOR FREE BOOK that shows why and how the WATERLOO leads them all. Book is Complete Cyclopedia. Gives all Engine Facts in a nutshell. Sent absolutely Free on receipt of name and address. Write this today to the

Waterloo Gasoline Engine Company

1021 Cedar Street

WATERLOO IOWA

5 Year Guaranty



REINHOLD "NO FLUX" ALUMINUM SOLDER

Good size sample bars sufficient for test and repairing, 25 and 50 cents by mail. Small samples of work included. Live agents wanted among the metal trades and manufacturers. Send today. **E. M. & R. CO., Sunday Call Bldg., Newark, N. J.**

We are now filling orders for the wonderful new "No Flux" aluminum solder. The sensation of the day in mechanical circles. Aluminum soldered to aluminum and other metals by the most ordinary and simple methods.

1 H.P. "A LITTLE GIANT" GASOLINE ENGINE

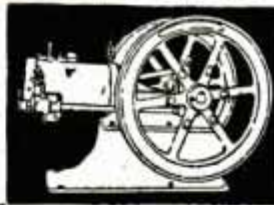


Built especially for Washing, Churning, Cream Separating or any kind of light, house machine work. Price complete ready to run, f. o. b. Des Moines, \$45.00. Write us.

MONARCH MACHINE CO.
DES MOINES, IOWA

THE BADGER is the Gasoline Engine FOR YOU

All types and sizes, 2 1/2 to 50 H. P. Send for free illustrated catalog **C. P. & J. LAUSON CO.** 30th St., Milwaukee, Wis.



DON'T BUY GASOLINE ENGINES

Until you investigate "The Master Workman" a two-cylinder gasoline, kerosene or alcohol engine, superior to any one cylinder engine; revolutionizing power. Its weight and bulk are half that of single cylinder engines, with greater durability. Costs Less to Buy—Less to Run. Quickly, easily started. Vibration practically overcome. Cheaply mounted on any wagon. It is a combination portable, stationary or traction engine. SEND FOR CATALOGUE.

THE TEMPLE PUMP CO., Mfrs., Meagher and 15th Sts., Chicago. THIS IS OUR FIFTY-THIRD YEAR

The publishers of Popular Mechanics have on hand a limited number of complete

VOLUMES OF POPULAR MECHANICS FOR 1907 AND 1908

These include one copy of each of the twelve issues from January to December, inclusive. These volumes are unbound and will be sent to any address, postage prepaid, on receipt of \$1.00.

PALMER MOTORS

1 1/2 to 25 Horsepower; One, Two and Four Cylinder; Jump or Snap Spark Ignition; Two or Four Cycle. Send for Catalog.

PALMER BROTHERS, COS COB, CONN.

New York, 31 East 21st St. Philadelphia, The Bourse Boston, 85 Union St. Portland, Me., 48 Portland Pier Seattle, Wash., 800 1st Av. Vancouver, B. C., 1600 Powell St.



2 H.P. Stationary Engine \$29.50 ENGINE ONLY

2 1/2 to 8 H.P. Proportionate Prices.

For use on the farm and in the shop. Runs cream separators, churns, pumps, grist mills, corn shellers, washing machines, lathes, printing presses etc. Burns kerosene (coal oil), alcohol, gasoline, naphtha, distillate, without change of equipment, starts without cranking, throttling governor, drop forged crank shaft, best grade babbit bearings. Free catalog tells how to save half cost of hired help. Testimonials, 10,000 in use. All sizes in stock ready to ship. 218 Bellevue Ave. DETROIT ENGINE WORKS, DETROIT, MICH.



PLAIN GAS ENGINE SENSE by E. L. Osborne. 136 pages—price 50c postpaid. For the Beginner POPULAR MECHANICS BOOK DEPT., - - CHICAGO

Best grade cedar canoe for \$20

Best Grade of Cedar Canoe for \$20.00. We sell direct, saving you \$20.00 on a Canoe. All canoes cedar and copper fastened.

We make all sizes and styles, also power canoes. Write for free catalogue giving prices with retailers' profit cut out. We are the largest manufacturers of canoes in the world. DETROIT BOAT CO. 156 Bellevue Ave., Detroit, Mich.



Death in the Phone!

She Doesn't Know



YOU TELL HER that if she presses her lips against the mouthpiece of an undisinfected Phone she takes chances of becoming infected with loathsome and incurable diseases.

SCIENTIFIC TESTS PROVE

that the mouthpiece of every undisinfected Phone swarms with malignant Germs, which she may inhale and thus contract Tuberculosis, Diphtheria, Typhoid, Pneumonia, or even a more revolting disease! The diaphragm of the Phone, upon which the breath of the user condenses in large drops, forms an ideal incubator for GERMS; Guinea pigs inoculated with such drops developed Tuberculosis of the lungs.

Even the healthy mouth harbors Germs of dread disease which might prove fatal if transmitted to a person susceptible to disease!

Scores use your Private Phone; it may infect you even though your lips do not touch it—for you cannot use it without inhaling the exhalations of others. See the drops on the diaphragm; smell it. Ask your Physician or any Bacteriologist! Write us for convincing proof. Take no chances; equip your Phone with a

DIOZO PHONE DISINFECTOR

& Deodorizer. It KILLS Germs—Destroys odors. Keeps the mouthpiece constantly DISINFECTED. Applied in less than a minute! Guaranteed for 1 year. No care, trouble or recharging. It does not interfere with the operation of the Phone. Attractive in appearance; made entirely of metal, aluminum finish and filled with solid DIOZO—no LIQUID. We mail one to any part of the world, postpaid, for 50c.

PARKER CHEMICAL CO., 230 Market St., CHICAGO



It's Knowledge that Directs

THE CYCLOPEDIA OF ARCHITECTURE, CARPENTRY AND BUILDING

is the most exhaustive, comprehensive and authoritative work on the building trades ever published. Thoroughly covers every branch of building construction, from plans to finishing touches. Contains 4,670 pages, size 7 x 10 inches, printed on special paper, in large, clear type.

Examine These Books At Our Expense

To show you just what the books are and how necessary they are to every man connected with the building trades, owners, real estate agents, etc., we will send a full set, express prepaid, for five days' FREE examination. Just fill in and mail the coupon. The books can be returned at our expense if not what you want.

Special Features are: Plans, color plates and photos of buildings completed and in the course of construction. Diagrams and sections showing all details. Over 400 full page plates. 3,000 detail drawings, diagrams, etc. Just the thing for the student. A practical guide for the experienced carpenter and an ever ready reference for the expert.

SPECIAL OFFER: To introduce our Correspondence Courses, from which the Cyclopedic is compiled, we offer this set of books at the special price of \$24.00, payable \$2.00 after 5 days and \$2.00 a month. Regular price is \$50.00. This offer is good until May 1st. Order now and save over 50 per cent.

IMPORTANT SUBJECTS COVERED

Reinforced Concrete—Estimating—Contracts and Specifications—The Law of Contracts and Liens—Building Superintendence—Building Materials—Masonry—Carpentry—Stair Building—Hardware—Plastering—Painting—Heating—Ventilation—Wiring for Door Bells—Burglar Alarms—Steel Construction—Elevators—Sheet Metal Pattern Drafting—Mechanical, Architectural, Freehand and Perspective Drawing—Lettering—Blue Printing—Shades and Shadows—The Greek and Roman Orders of Architecture—Rendering in Pen and Ink and Wash—Water Color Hints for Draftsmen.

Without Extra Cost, we will include for One Year, as a Monthly Supplement, the

TECHNICAL WORLD MAGAZINE

\$1.50 is the regular price. A thoroughly reliable, clean, up-to-date monthly. Gives you an insight into the real things of life—things that every one should know. Covers the latest developments in science and discovery in a popular and interesting manner. Read the new serial "WHO OWNS THE EARTH," which began in the January issue. Back copies supplied free of charge.

AMERICAN SCHOOL OF CORRESPONDENCE, CHICAGO, U. S. A.

FREE OFFER COUPON

American School of Correspondence:

Please send set Cyclopedic of Architecture, Carpentry and Building for 5 days' free examination; also Technical World for 1 year. I will send \$2.00 within 5 days and \$2.00 a month until I have paid \$24.00; otherwise I will notify you and hold the books subject to your order. Title not to pass until fully paid.

NAME.....
ADDRESS ..
OCCUPATION.....
EMPLOYER.....

Pop. Mech., 4-09

The *Ann Arbor* Lighting Systems
"GASOLINE WIRE TEST"

A Complete Lighting System for Homes, Stores, Churches, etc.

Ann Arbor Lighting Systems are brighter than gas, steadier and clearer than electric light, and cost about one-tenth as much to operate. Each lamp gives 300 to 500 candle power for less than 1/4 cent per hour. Fuel is gasoline; perfectly safe.

Price \$10 up, according to number of lamps desired. We make inverted arcs especially adapted for use in stores, halls, factories, etc.

WE WANT AGENTS who will push our line. Special terms to those who write early. Catalog and prices on request.

SUPERIOR MFG. CO.,
294 Second St., Ann Arbor, Mich.

BARODA DIAMONDS

Flash like the genuine—at 1/30 the cost
SOLID GOLD MOUNTINGS

Stand acid test and expert examination. See them first, then pay. Catalog FREE. Patent Ring Gauge included for 5 two-cent stamps. The Baroda Co., Dept. M, 230 North State St., Chicago





Get Our Prices on What You Need

We are Extensive Manufacturers of

Everything Needed in Your Factory or Power Plant

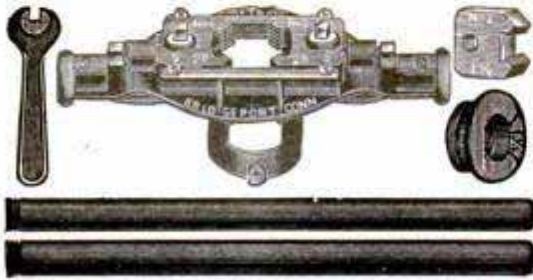
We carry a Complete Line of

Pulleys, Shafting, Hangers, Boxes, Gears, Friction Clutches, Sprocket Wheels, Chain Belt, Leather and Rubber Belt, Iron, Brass and Aluminum Castings, Hardware Specialties, Engineers' Mill and Factory Supplies, Bar Steel, Sheet Steel, Pipe and Fittings. Anything in the iron or steel line. We operate our own Foundry and Machine Shop.

**NO ORDER TOO LARGE TO EXECUTE
NO ORDER TOO SMALL for ATTENTION**

Send for our A 17 (pocket-size) Power Transmission Catalog. ADDRESS

W. A. Jones Foundry & Machine Co., (Mail Order Dept.) 140 W. North Ave., Chicago



**Genuine Armstrong Stock and Dies
Are Standard in Workmanship**

Manufactured only by

THE ARMSTRONG MFG. CO., 315 Knowlton St., Bridgeport, Conn.

STEEL BRASS BALLS

**BALL BEARING
All-Steel and Rubber-Tired
Skate Rolls**

"Knipe" Pat.

BALL BEARINGS

1-4 in. Shaft and up.
No fitting, just push them on.
10 cts. in stamps for sample.

Pressed Steel Mfg. Co., 454 The Bourse, Philadelphia, Pa.

There is no need of paying more money for a wood working machine than the price of a

CRESCENT

Band Saws	Swing Saws
Saw Tables	Disk Grinders
Jointers	Planers
Shapers	Planer & Matcher
Borers	Band Saw Blades

The Crescent Machine Company
93 Columbia St., LEETONIA, OHIO, U. S. A.



ORE SPECIMENS Wouldn't you like to know what the ores look like from which we get our gold, silver, copper, lead, tin, zinc, nickel, iron, graphite and sulphur? These 10 specimens boxed, and labeled, sent postpaid, 50 cts. Single specimens 10 cts. (no stamps).
G. B. MACLAUGHLIN, Civ. Eng. SHARPSVILLE, PA.

A PRE-HISTORIC DEATHTRAP.—The University of California is investigating a remarkable deposit of animal remains in southern California.

Near Los Angeles there is a small lake, the waters of which are highly impregnated with natural coal oil and bitumen. Around its borders evaporation leaves a sticky substance which gradually solidifies into asphaltum. Near by are large deposits of asphalt thus formed that are used for commercial purposes. This lake is a natural death-trap. Unsuspecting water fowls light on its surface and soon their wings are tarry and useless. Attempting to wade out, they are caught in the asphaltum and in a little while perish. In some parts of the asphalt deposits animal bones are so numerous as to render it worthless for commerce.

It is not entirely clear how the remains of the more



**Something NEW in STEAM
1-10 H. P.**

Send 3 cents in stamps for catalog

**THE MINIATURE ENGINE MFG. CO.
ELGIN, ILLINOIS**

More Water Raised Than By Any Other Method

and 25 per cent. more water than is delivered by any other pump of the same type is produced by the

"American" Centrifugal Pump

The reason is, there is no sudden change of direction of the water in passing through the pump, the impeller is accurately machined to the casing and there is a perfect cut-off at the outlet, transmitting nearly the entire mechanical force directly to the raising of water.

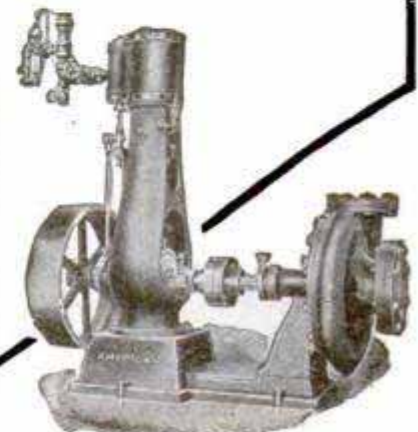
This enables the single stage pump to attain a mechanical efficiency of 60 to 80 per cent. against heads up to 65 feet and the two stage pumps to operate against heads up to 250 feet. For irrigation projects, fire protection, factory supply, mines and contractors' use American Centrifugals are the most efficient pumps yet devised.

Tell us your water problems. We are the world's oldest and largest makers of pumping and well drilling machinery and can save you money. Catalog for the asking.

The American Well Works

General Office and Works, Aurora, Ill., U. S. A.

Chicago Office, First National Bank Building



It Cleans the Boiler Flues

and leaves them like new



The Perfection Flue Cleaner

cuts all the soot and scale and does not injure the tube. Owing to its construction the blades are self-sharpening. Sizes 1 1/4 to 6 inches. Let us send you one on a 30-day trial. If satisfactory, pay us; if not return it at our expense. Write for our 150-page stock list.

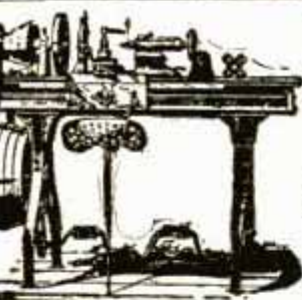
IT'S FREE

Scully Steel & Iron Co.

Halsted and Fulton Streets

Sept. 16

Chicago, Ill.



LATHES

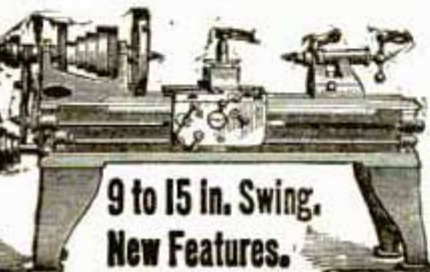
9 to 13 inch Swing

List price, \$75.00 and up according to size. When ready to buy send for Lathe Catalog and prices

W. F. & John Barnes Co.
100 Ruby St., : : Rockford, Ill.

Powerful animals came to be buried with the water fowls. Possibly in past ages the water contained a poison, or, possibly, the carnivora came to feed on the entrapped water fowls and so were always present to take advantage of the temporary embarrassment of the stronger herbivora. It is reported that the bones of animals resembling the following modern animals have been found: Elephants, seals, giant sloths, wolves, bears and sabre-tooth tigers. We have all heard the weird tales of the Dead Sea in Palestine and of Death Valley in California, it being said that any bird attempting to fly across either expanse would become asphyxiated by the noxious gases and fall on the other side was reached. It is needless to say that such stories are not true; at least, not under present conditions. But here was a lake that seems to have been a well-constructed deathtrap for many ages.—Engineering Service.

WHEN YOU WANT ANYTHING AND DON'T KNOW WHERE TO FIND IT—WRITE BUREAU OF INFORMATION, POPULAR MECHANICS, CHICAGO



9 to 15 in. Swing.
New Features.

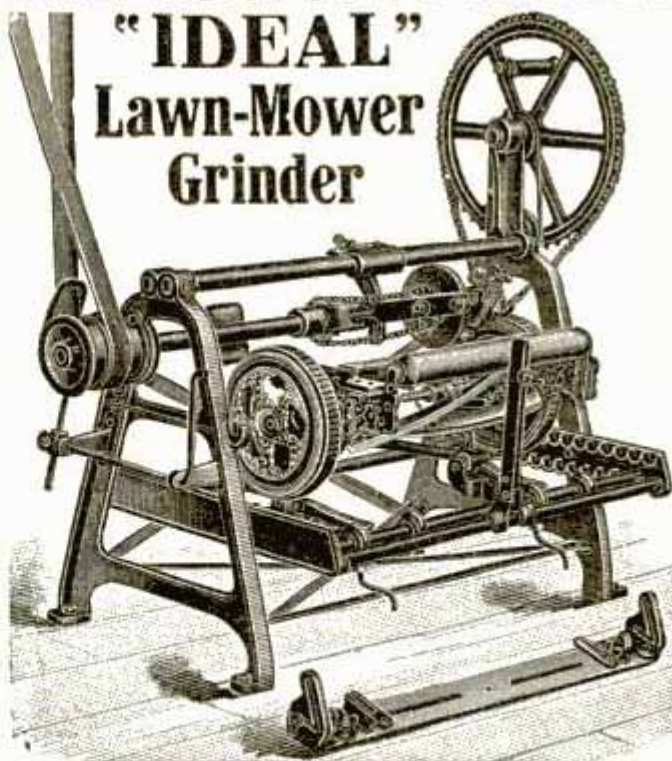
If It's a Sebastian, It's a Good Lathe

BUILT UPON HONOR—ACCURACY, EFFICIENCY, MODERATE PRICES.

Foot and Power Lathes, all sizes. Send for Catalogue.

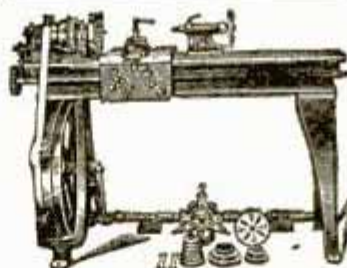
Sebastian Lathe Company, 107 Culvert St., Cincinnati, O.

THE NEW 1909 MODEL "IDEAL" Lawn-Mower Grinder



Grinds the reel knife to fit either a crooked or straight lower blade—something never done before. Nothing like it on the market. Sharpens a mower perfectly in 15 minutes. The biggest money-maker you can have in your shop. Write for circular and price TODAY.

THE HEATH FOUNDRY & MFG. CO.
(Successors to The Root Bros. Co.) PLYMOUTH, OHIO



ELEVEN-INCH SCREW CUTTING LATHE

For foot or power as wanted. Has power cross feed and compound rest. A strictly high-grade modern tool. We also build a 9-inch lathe. Descriptive circulars of each lathe upon request.

Rockford Drilling Machine Co.
Rockford, Ill.

FOOT and POWER

AND TURRET LATHES, PLANERS SHAPERS AND DRILL PRESSES ::::

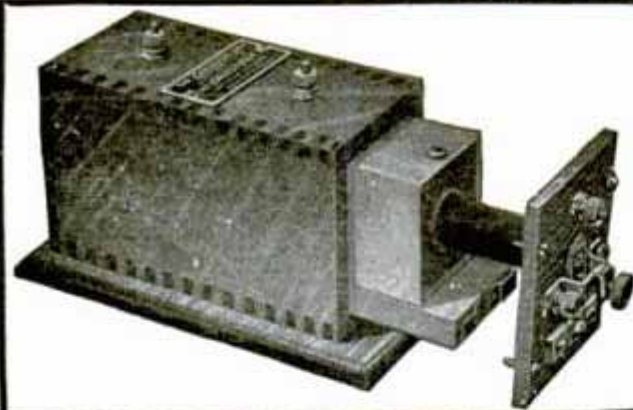
SHEPARD LATHE CO.

A131 W. 2d St., Cincinnati, Ohio

Dixon's Flake Graphite

Gives you "positive principle" lubrication. Good for steam or gas cylinders, bearings, gears, and all friction surfaces. Free booklet 194-C, gives full information.

JOSEPH DIXON CRUCIBLE COMPANY
JERSEY CITY, N. J.



THE CARTRIDGE COIL

get the name from the fact that they are made so as to permit the replacement of all parts that heretofore have been a mystery, to coil makers. Any part can be replaced in five minutes and are available.

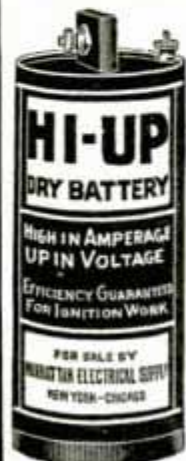
PRICE \$6.00. Order now. Every Coil is Guaranteed.

WIRELESS TELEGRAPH COILS ARE SUPPLIED IN CARTRIDGE FORM.

THE CHICAGO COIL COMPANY

30-34 La Salle Street

CHICAGO, ILL.



Electrical—Supplies

This Battery is guaranteed to give satisfaction for Ignition Work

3 Sizes	Price
A 2½x6¾ in.	-\$0.25
B 3 x7½ in.	-.50
C 3½x8½ in.	-.60

Send for our Catalog 24P, "Something Electrical for Everybody," 168 pages, with NET prices.

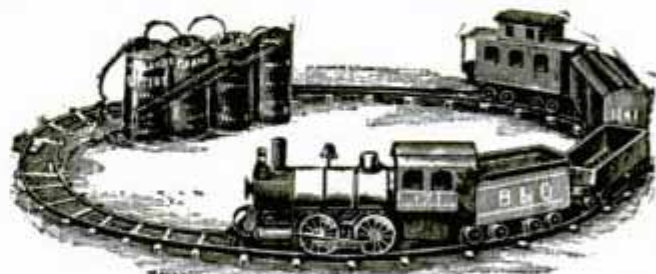
The following are a few of them:

Red Seal Dry Battery, "A" 2½x6¾ in., all kinds open circuit work.....	\$0.20
Mesco Dry Battery, 2½x6¾ in., Call Bells, Telephones, etc.....	.15
Elite Battery Ammeter.....	2.00
Marine Weatherproof Primary Coil.....	1.25
Marine Weatherproof Jump Spark Coil.....	4.00
Ignition Switch, Removable Lever.....	.50
Electric Call Bell Outfit.....	.60
Burglar Alarm Trap.....	.13
Floor Tread for Servant's Call.....	.75
Pony Telephone Receiver.....	.38
Battery Call Telephone, each.....	2.50
Eureka Telegraph Instrument.....	1.15
Battery Rheostat, 20 ohms resistance.....	.65
Sta-There Battery Connectors, per dozen.....	.36
Mesco Current Tap and Socket.....	.25
Electric Vibrator (3 styles).....	\$5.00, \$10.00 and 15.00

MANHATTAN ELECTRICAL SUPPLY CO.

New York—17 Park Place

Chicago—188 Fifth Ave.



Electrical railways, tracks, switches, trolley cars, dynamos, motors, dynamo castings, gas engine castings, everything for the young electrician. Send for our complete catalog "B."

The Carlisle & Finch Co.

262 E. Clifton Ave.

Cincinnati, Ohio

ANYTHING ELECTRICAL

A 2c stamp secures

OUR LATEST CATALOGUE—100 PAGES OF ELECTRICITY—FLASHLIGHTS, MOTORS, DYNAMOS, ELECTRIC HEATING DEVICES, WIRELESS OUTFITS, ETC. ALSO GREAT GERMAN TOYS.

J. J. DUCK

TOLEDO, OHIO

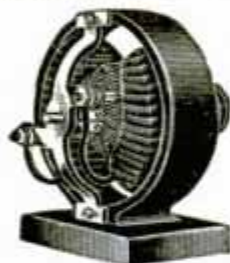
ELECTRIC LANTERNS, BATTERY LAMPS, NOVELTIES.

Catalog of 200 Free. If it's

electric we have it. Big Catalog 3c.

OHIO ELECTRIC WORKS, Cleveland, Ohio

The World's Headquarters for Dynamos, Motors, Fans, Toys, Batteries, Belts, Bells, Lamps, Books. Undersell All. Want Agents.



DYNAMO-MOTOR \$3.85

(A Dynamo and Motor in One)

As a dynamo, it will develop 40 C. P. easily operate induction coils; charge storage batteries; decompose water; electroplate, etc. As a motor, will operate sewing machine, jewelers lathes, emery wheel, circular saw, advertising devices, and other useful appliances.

Send stamp for our 1909 catalogs Nos. 9 and 10 of new things electrical.

ARROW ELECTRIC CO.

105 South Canal Street,

Chicago, Ill.



WORKING MODEL ELECTRIC CAR

30 inches long. Copy of drawings and full description 10c.

Empire Electric Works
841 Bridgeport, Conn.



Every Boy His Own Toymaker

Greatest boys' book ever written. Tell how to make a Steam Engine, a Camera, Windmill, Microscope, an Electric Telegraph, Telephone, Magic Lantern. Bosts of every kind, kites, balloons, electrical and mechanical toys, traps, fishing tackle, rustic cottages, 200 illustrations. Every boy should have this great book. Price only 10 cents, postpaid, 3 for 25 cents.

WESTERN PUZZLE CO.,
St. Paul, Minn.



Miniature Electric Railway Motor

Working Drawings and Full Instructions for making it 25 cents. EMPIRE ELECTRIC WORKS 841 Bridgeport, Conn.

A Demonstrated Fact

Any motor that requires electrical ignition can be operated more reliably, more economically and better with **SPLITDORF** Ignition Apparatus than with any other kind. Ask Dept. M for catalog.

C. F. SPLITDORF

Walton Ave. and 138th St.

NEW YORK



CANNON BALL PEN

A HIGH GRADE PEN

For people who think their own time and trouble and patience are worth saving. The Aluminoid "Cannon Ball" pen brings you speed, ease and comfort. It writes on anything, cannot rust, corrode, catch or splutter.

For sale by Stationers
Samples sent for 2 cents' postage.
A. L. SALOMON & CO.,
347 Broadway, New York.

EUGENE DIETZGEN CO.

**Drawing Material
Surveying Instruments**

181 Monroe Street, Chicago
New York San Francisco New Orleans
Toronto

Catalogue "P" on application

A full line of

Drawing Paper
Tracing Paper
Tracing Cloth
Blueprint Paper

Everything for

Drafting and Surveying



SHOCK RECEIVED THROUGH A METAL TAPE.—Dennis Murphy sued the Hudson River Telephone Company for injuries arising in a curious manner. The superintendent of the company gave him a tape measure constructed of copper wire to use in measuring the distance between its wires and high wires belonging to other companies where they crossed each other. The tape appeared to be of ordinary linen, but inside it were a number of small copper wires extending through its entire length. Murphy was injured by the electric current coming in contact with the metal tape. Upon his suing the company he was given a judgment, which was affirmed by the Supreme Court of New York, on the ground that the company was negligent in furnishing the tape, although it was brought into contact with the electric wire by the act of his fellow servant.

TYPEWRITER BARGAINS



\$10.00 to \$65.00. Many of these machines have been in use less than sixty days, are as good as new, and we guarantee them to give exactly the same service. Write us before you buy, stating make of machine you prefer. We will give you the best typewriter bargains ever offered, shipped subject to examination.

McLaughlin Typewriter Ex.
188 Ozark Bldg. St. Louis, Mo.

TYPEWRITERS

ALL MAKES REBUILT at 1/4 to 1/2 manufacturers' prices. Rented anywhere or sold on 3 months' approval. Write for our money back guarantee, also Catalogue and special Price List.



ROCKWELL-BARNES CO., 907 Baldwin Bldg., Chicago, Ill.

TYPEWRITERS ALL MAKES

All the Standard Machines **SOLD** or **RENTED** ANYWHERE at 1/4 to 1/2 MFR'S PRICES, allowing RENTAL TO APPLY ON PRICE. Shipped with privilege of examination. Write for Illustrated Catalogue. **TYPEWRITER EMPORIUM** 92-94 LAKE ST., CHICAGO



BUY IN NEW YORK AT WHOLESALE PRICES!

EVERYTHING FOR HOME AND SHOP

WRITE NOW For 700-Page Catalog



Just write us—Postal or letter—for this our Free 700-page illustrated 1909 Buyers' Guide or lowest wholesale prices on over 75,000 reliable articles needed for the home—office—or shop. As the oldest mail-order house in America, we refer to any Bank or Publishing House in the country. We show you

75,000 Reliable Articles

- Watches
- Jewelry, Clocks
- Silverware
- Knives, Razors
- Seeds, Patents
- Pipe and Fittings
- Freezers
- Ice
- Elect'l Supplies
- Tool Cabinets
- Stoves, Ranges
- Hats, Shoes
- Sweaters
- Fishing Tackle
- Skates, Sleds
- Ice Tools
- House Furnishing Goods, Etc.
- Fancy Goods
- Lamps
- Groceries
- Whips
- Carriages
- Wagons
- Hardware
- Revolvers
- Rifles
- Shot Guns
- Traps
- Shells
- Cartridges
- Farm Tools
- Incubators
- Brooders

This 700-Page **FREE** CATALOG

You Positively Save 1/4 to 1/3

on local dealers' prices anywhere. Safe, prompt delivery and absolute satisfaction or money back Guaranteed. For nearly a century, since 1818, we have dealt with the people everywhere direct to their homes through our big catalogs. We also send you list of 100 Valuable Premiums Free. Also our grocery list of guaranteed Food Products of highest quality saves you one-third. Just write us. Then you'll prove by a first trial order that it pays to have our Grand Free Catalog No. 94 all the year round. It costs us \$1 to print it, but it's free to you.

White, Van Glahn & Co., 30 Barclay St., New York City
Oldest Mail-Order House in America, Estab. 1818



Price \$12.00

SAVE ROOM, TIME, MONEY

Most convenient and practical low-priced Typewriter Stand on the market. Made of selected seasoned Oak, fine Golden finish, 44 in. long, 24 in. wide. Typewriter Table is 27 in. long, 26 in. high; Pedestal 39 in. high; has three drawers and extension slide; Paper Cabinet Shelves 14 x 8 x 1 1/2 in.; Cabinet has Roll Curtain Front and Copy Holder. Shipped K. D.; put together with screws. Price \$12.00 at factory.

Ask for our big Catalog #11—(new)—with money saving prices on Office Desks, Chairs, etc., etc.

We make School, Church and Opera Seats, Lodge and Bank Furniture.
E. H. STAFFORD MFG. CO., 248 Adams St., CHICAGO, ILL.

The Fountain Pen with a Lead Pencil

Double value service THE FOUNTAIN. Instant use ink or lead. Indispensable to the business world, the school and home. Traveling salesmen take note. Fred'k R. Wells, Mfr., 103 Halsey St. Boro, Brooklyn, New York City, N. Y.



One less article to carry. Gives new and practical features never before possessed by any single writing-instrument; warranted 14-K gold best in diamond pen points. Pen's part gold mounted click device, holding varying diameter leads. Guaranteed. With each Fountell a box of four 2-inch leads and an ink filler. No. 2 Fountell, plain, \$2. No 4 Fountell, chased, \$2.50. Sent direct, postpaid.

POSTAL SCALE \$1.00

Tells at a glance postage in cents on all mail matter. Capacity, 1 pound by half ounces, 3 inches high. Cuts down the stamp bill. We make several styles for the office, store and large business houses, as well as the individual desk. Catalogue \$ free, showing 12 styles.

PELOUZE SCALE & MFG. CO.
403-413 Ohio Street CHICAGO



GET THIS \$1200.00 NEXT MONTH!

WHAT A BLESSING TO ALWAYS HAVE MONEY IN ABUNDANCE.



You can, it's easy. **Hundreds Getting Rich the "New Way."** Said to be world's greatest and surest money maker. One man actually made **\$1281.00 IN ONE MONTH, \$51.50 IN 15 MINUTES, \$800 IN 8 DAYS.** Not a fairy tale, fake or humbug, but absolutely true—sworn statement. New, wonderful discovery. Causing great enthusiasm. Readers, listen, see, read how this invention has made, is making thousands of dollars for others:

Does \$1200 Monthly INTEREST YOU? "My sales \$1281.00 one month, \$1118.00 another. Best thing ever sold. Not one complaint from 2000 customers." **SWORN STATEMENT BY M. G. STONEMAN, MONT.**

"SOLD \$2212.00 IN 2 WEEKS. Not one dissatisfied user," writes Korstad & Mercer, Minn. "My sales \$1680.00 IN 73 DAYS," writes C. D. Rasp, Wis. "Canvassed 60 PEOPLE—GOT 55 ORDERS. Sold \$320.00 in 16 days," writes W. H. Reese, Pa. "Enclosed order for \$115.00 FIRST DAY'S WORK. Best thing I ever worked," writes L. H. Langley, N. D. "Everybody thinks apparatus finest thing. Sold 15 one afternoon," writes Miss Eva Edwards, Nev., after ordering 73. "I averaged \$164.25 WEEKLY for three months, undoubtedly best line on market," writes J. W. Beem, Kas. "Finest seller I ever saw, catches the eye. Don't want anything better. SELL 8 OUT OF 10 HOUSES," writes Wm. Maroney, Okla. "A man that can't sell your outfit couldn't sell bread in a famine, send 48 more," writes J. B. Cashman, Minn. "I make \$100 DAILY," writes J. Sevegne, N. Y.

HUNDREDS, MEN AND WOMEN TELL OF WONDERFUL SUCCESS equipping town and farm homes with Allen's Portable Bath Apparatus. 50,000 already sold. Acknowledged best thing ever happened for humanity. Nothing like it. Gives every home a modern bath room for only \$5.00. Think of it! Costs nothing to operate. Used wherever water in any form exists. So energizes water that 1 gallon does more than tub full old way. Gives cleansing, friction, massage, shower baths all together or separately. Cleanses almost automatically. Makes bathing 5 minute operation. Only clean, running water touches body—no immersion. No tubs, buckets, bowls, wash-rags or sponges—no plumbing. Insures cleanliness without drudgery—prolongs life—prevents disease. Small but mighty—carried in grip. Endorsed by famous Battle Creek sanitarium and other celebrated authorities. Most popular, easiest, quickest, surest selling household article going.

Let us give you an appointment worth \$40.00 to \$60.00 weekly plus freedom from drudgery, long hours, wage earning, bossism, job hunting. We want more AGENTS, SALESMEN, MANAGERS, either sex, at home or traveling, all or spare time to fill orders, appoint, supply, control sub-agents. Hustlers getting rich. EXPERIENCE UNNECESSARY. Simply supply enormous demand already made—that's all. Every customer anxious to boost your business. No easier, quicker, certain way to make money. Exciting business—big profits—popular goods, guaranteed by an old reliable \$50,000.00 house—no competition—exclusive territory—co-operation and assistance. **CREDIT GIVEN—SEND NO MONEY**—only your name and address on a postal card today for world's greatest agency offer, valuable booklets, credit plan, proofs of phenomenal success—ALL FREE. COSTS NOTHING TO INVESTIGATE. MEET US THAT FAR ANYHOW.

"SEE IT ENERGIZE."
Sec. view Comb, Portable and Bathroom Outfit.

THE ALLEN MFG. CO., 496 ALLEN BLDG., TOLEDO, OHIO.

FREE BOOK ON CONCRETE



Write today for our great free book on concrete. There is money in concrete for everyone. We want to tell you all about it. We want to tell you, too, of the world-famous Helm Concrete Machinery. We want to show you how, with a very small amount of money, you can start a concrete factory and be a manufacturer of concrete products. \$35.00 for Machine to Build this House. This wonderful

Helm Press is only one of the many opportunities we offer, either for the man who wants to make concrete blocks for use in his own house or for the man who wishes to make concrete bricks and blocks to sell to others. Should you want to build the 6 or 8-room cottage shown here you can save \$250 by making your own blocks—and the machine with which you can do this costs but \$35. Also Free—a complete set of plans for this cottage, with working details. Write today for free concrete book, which explains. Do not delay. Here is a big opportunity. Write **HELM BRICK MACHINE CO. Dept. 124 TRAVERSE CITY, MICH.**

Safety Razors FREE



To quickly introduce the celebrated Ideal Shaving and Complexion Soap which beautifies, removes pimples, blotches and all facial eruptions, leaving skin soft & clear & to prove what we claim is true, we will send a box of soap together with the latest new Improved Safety Razor outfit in a fine handsome case all complete for shaving. ABSOLUTELY FREE to any one answering this advertisement at once & enclose 10c. silver or stamps to help pay boxing, packing, mailing, etc. Address, **THE AMERICAN SOAP WORKS, 95 Chambers St., N. Y. City.**

BALLOON RACE FOR CHICAGO.—Arrangements have been perfected for a mammoth balloon race in Chicago of May 30. The Chicago Aeronautic Club has made arrangements for a new park and an aerodrome is soon to be erected. All clubs in the country are eligible to enter balloons.

E. E. Young, U. S. consul at Saloniki, Turkey, writes that there are only two automobiles in that city. Salonik is the second city in the country and has a population of 105,000.



There Is Power In Every Household Water Faucet

Let our back geared water motor harness it, and do your work. 40 pounds pressure will operate your washing machine, and do a hundred other things. THE ONLY back geared motor with gears running in oil. Price \$10. Send stamp for catalogue. Good live agents wanted.

Cherington Manufacturing Company Waukegan, Illinois

WHEN YOU WANT ANYTHING AND DON'T KNOW WHERE TO FIND IT—WRITE BUREAU OF INFORMATION, POPULAR MECHANICS, CHICAGO

BUY PLUMBING SUPPLIES AT WHOLESALE



Will save you 30%. Don't pay retail prices. Full stock on hand for prompt shipment. Send for free catalog. **B. P. KAROL 235 W. Harrison Street. CHICAGO**

JUBILEE SELF-HEATING FLAT IRON



Best in the world—Construction—simplest and most practical. Automatic cleaning device. Burner entirely of brass. Lasts a life time. Cost of fuel Three Cents for 10 hours. Gives perfect satisfaction. Write for free Booklet.

Jubilee Mfg. Company, 14th and Howard, OMAHA, NEBR.



CREDIT GIVEN TO EVERYBODY

We ship goods everywhere in the U. S. and give the most generous credit that allows the use of goods while paying for them. Why not trade with us — America's Great Original House-furnishing Concern, who for over a quarter of a century has furnished satisfactorily thousands of happy homes?



Pay \$1.00
CASH,
50c Monthly

OUR GREAT CATALOG FREE

Sewing Machine Catalog No. 95 Just Out. Get it now, FREE

simply for the asking. It gives all information and tells you how to save money on house-furnishings, such as Furniture, Carpets and Rugs in actual colors, Curtains, Stoves, Washing Machines, Crockery, Silverware, Office Desks, Baby Carriages, Refrigerators, Fire... Cookers, Musical Instruments, etc.

Send \$1, and we will ship this elegant, massive Rocker, golden quartered oak finish, us \$4.95, elaborately carved. The front of seat and sides of back are ruffled, upholstered with Boston Leather. Exactly like this illustration.

Satisfaction guaranteed or money refunded

\$4.95 **STRAUS & SCHRAM**
Inc.
1095 35th St., Chicago, Ill.

Order Chair No. 188. Price.....

Making—

CONCRETE

Sewer Pipe and Drain Tile

is the **BIGGEST MONEY MAKING** business for small capital and limited experience necessary to make a success that we know of.

We will prove it to you FREE

Just the business for the young man of push—as every community buys sewer pipe—and tile is used by progressive farmers everywhere. It pays for itself first year.

\$50 Starts a Business
We will tell you how FREE



LARGE 28-PAGE BOOK


55 illustrations—with full details of How to Mix Concrete—tests of strength, compared with clay tile—cost of production, usual selling prices, etc., all in plain simple style—valuable to all.

Free on request for book S-09.

MIRACLE PRESSED STONE CO.
Largest Makers of Concrete Machinery in the World
1557 WILDER STREET MINNEAPOLIS, U. S. A.

LET THE RED DEVIL WATER MOTOR DO YOUR WORK

Improved construction, absolutely perfect, runs your washing machine and a hundred other things. Power for small tools. $\frac{1}{2}$ horse power on $\frac{1}{2}$ -inch pipe, 80 pounds pressure; 1 horse power on 2-inch pipe, 60 pounds pressure. New net price, \$5.00 cash with order.



No. 1492 4-inch Motors for grinding, polishing and buffing. Runs sewing machines, fans, bottle washers, etc. Price with emery, buffing wheel, silver polish and pulley, \$3.00. No. 1493 Motor and pulley only, \$2.50. $\frac{3}{4}$ -horse power on 80 pounds pressure. Improved construction. Speeds, 3,000 to 5,000 revolutions per minute. Only scientifically and mechanically perfect small water motor manufactured. Patented construction makes it possible. Tremendous output warrants the price. Money back for any reason.

CATALOGUE AND LARGE SHEET FREE

DIVINE WATER MOTOR CO.
Dept. R. Utica, New York, U. S. A.

For the name of your local hardware or tool dealer, we will send you free booklet on "Theory and Design of Water Motors."

PLUMBING AND STEAM GOODS



Maker to consumer, saving you 30 to 75%. Complete Bath Room Outfit, \$24.95 upwards. Our all iron pipe system of plumbing will enable any handy mechanic to install our material.

GET OUR FIGURES ON COMPLETE HEATING OUTFITS

\$24.95 Upwards GET CATALOG **JOHN HARDIN CO.,** $\frac{1}{4}$ CENTURY AT 4545 COTTAGE GROVE AVE., CHICAGO **FOUNDED 1876**

Geisha Diamonds

THE LATEST SCIENTIFIC DISCOVERY

Bright, sparkling, beautiful. For brilliancy they equal the genuine, standing all test and puzzle experts. One twentieth the expense. Sent free with privilege of examination. For particulars, prices, etc., address

THE R. GREGG MFG. & IMPT. CO.
Dept. H. 52 58 W. Jackson Bldg. Chicago, Ill.

IRON AND WIRE FENCES

DATA-LOC FREE HIGH GRADE FOR ALL PURPOSES



ENTERPRISE FOUNDRY AND FENCE COMPANY
436 South Senate Avenue Indianapolis, Ind

DIAMONDS on CREDIT

20% DOWN — 10% PER MONTH

Why wait for your Diamond until you have saved the price? Why not have the use and pleasure of same immediately and pay for it by the Lyon Method? Lyon's prices are fully 20% lower than any others. Lyon's Diamonds are guaranteed perfect blue-white, imported in the rough, cut and polished here to save import duties and middlemen's profits. A written guarantee accompanies each Diamond. You have the option for exchange at any time at full purchase price. All goods sent prepaid for inspection. Send now—today—for our Catalogue No. 3., splendidly illustrated. *Established 1843.*



J.M. LYON & CO. 71-73 NASSAU ST. NEW YORK

I EARNED \$10 PER DAY

Selling Golden Rule Cutlery

Sworn Statement of Chas. Spencer.



AGENTS

earn big money selling our Shears and transparent handle pocket knives and razors. Goods fully warranted. Experience unnecessary. We teach you how.

Write today for full particulars and become one of our successful salesmen. Outfit free. Golden Rule Cutlery Co. Dept. 2, 9 Wendell St. Chicago

\$60.00 A WEEK

is being made from \$388.00 investment by men operating the Red Star Sanitary Peanut Vending Machine. The receipts on one machine usually range from 25 cents to \$2.00 per day. Peanuts cost \$.09 per pound, machine sells them for 35c.

Every Cigar Store, Billiard Hall, Hotel, etc., will want one. Jobbers and operators wanted everywhere.

Write today for booklet, investigate thoroughly and immediately. The cost so small and profits so great that you cannot afford to pass up our proposition.



RED STAR

Sanitary Vending Machine Co. DAVENPORT, IOWA

Make \$30 to \$60 a Week

and more in your spare time. Install a few of our "Trade Stimulator" Machines with your home merchants. Increase business for them and make big profits for yourself. Everybody wants to use them in Cigar Stores, Drug Stores, Billiard Halls, Resorts, etc. New catalog and full particulars of our plan free. Write today.

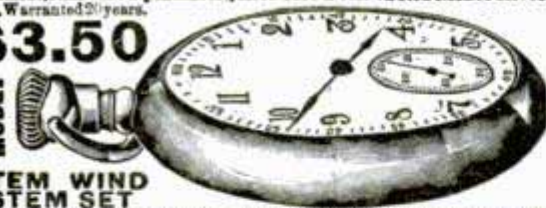
PURITAN MACHINE CO., 76 Brush St., Detroit, Mich.

ELEGANT Thin Model OPEN FACE WATCH

The popular 16 size for men and boys. An accurate time-piece, ruby jeweled lever movement, stem wind & pendant set, screw back & bezel. Solid Nickel Silver case. Warranted 20 years.

\$3.50

THIN MODEL



STEM WIND STEM SET

IF YOU SEE IT YOU WILL BUY IT. Let us send it C.O.D. by express for examination at your nearest express office, and if you think it a bargain pay the express agent our special sample price \$3.50 and express charges and it is yours. M. C. FARBER, B22, 223 Dearborn St., CHICAGO, ILL.

TWO MARITIME CONDITIONS.—The German Reichstag in February granted the North German Lloyd Steamship line an annual subsidy of \$125,000 for reopening a line of steamers between Singapore, New Guinea, and Australian ports. As if to emphasize the necessity of this comes the information that the Boston Steamship Company, finding it impossible to operate American-built steamships profitably without government assistance, decided on the same day that the German subsidy was granted to discontinue its steamship line in the Pacific.

The Strubler Computing Scale Co., Elkhart, Indiana, have special territory open for experienced scale men only. Address, STRUBLER COMPUTING SCALE CO. SAL'S DEPARTMENT. ELKHART, IND.

ROTARY CYLINDER PRINTING PRESS

Price, \$3 to \$10

PRINTS CARDS, LETTERHEADS, PROGRAMS, CIRCULARS, BILLS OF FARE, Etc

A practical press (with complete outfit—type, ink, tweezers, bronzing puff, roll of paper) in 4 sizes, \$3, \$5, \$7.50 and \$10.

Write today for Catalog No. 2. Make money in your spare time with this wonderful little press.

L. M. CARROLL & CO., 160 Washington St., Chicago



Be Your Own Boss!

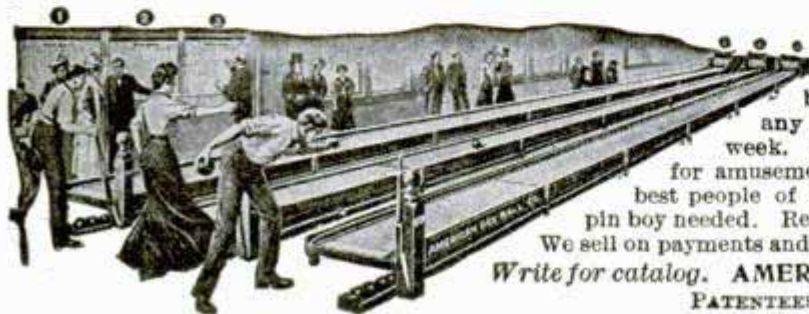
START A MAIL ORDER BUSINESS AT HOME. Devote whole or spare time. We tell you how. Very good profit. Everything furnished. No catalog. outfit proposition. Write at once for our "Starter" and free particulars. M. P. KRUEGER CO., 155 Washington St., Chicago, Ill.



Electric Power Motor

Sample Prepaid for Agents Wanted **35** cents
Empire Elec. Works, 841 Bridgeport, Ct.

\$513 CLEAR PROFIT IN 51 DAYS FROM AN INVESTMENT OF \$150



Is the result from the operation of one American Box Ball Alley in Sullivan, Ind. Why not go into this business yourself? It is the most practical and popular bowling game in existence. It will make big money in any town. These alleys pay from \$25.00 to \$65.00 each, per week. This is no gambling device, but a splendid bowling game for amusement and physical exercise. Liberally patronized by the best people of both sexes. Quickly installed, conveniently portable. No pin boy needed. Receipts are nearly all profits. Nearly 5,000 sold to date. We sell on payments and our catalog is free.

Write for catalog. AMERICAN BOX BALL COMPANY, PATENTEES, 1375 Van Buren St., Indianapolis, Ind.

Please Mention Popular Mechanics

Diamonds ON CHARGE ACCOUNT AT CASH PRICES



These Are Samples of the Diamond Bargains We Offer

- 90—Daisy Pattern Ring 260
- 91—Belcher Scarf Pin 50
- 92—Tiffany Bel. Ring 25
- 93—Fancy Tooth Ring 42
- 94—Embossed Tiffany Bel. 35
- 95—Diagonal Tiffany 55
- 96—All Diamond Cluster 40
- 97—Tiffany Ear Screws, pair 60
- 98—Belcher Stud 40
- 99—Tiffany Solitaire 45
- 100—Heavy Carved Bel. 75
- 101—Flat Belcher 90

Just write us which one of these beautiful, sparkling, Pure White Gems you would like to see. No deposit required—we'll send it at once. If it isn't the finest and snappiest Diamond you ever saw, send it back at our expense. If it pleases, pay one-fifth down, balance monthly to suit your convenience. What a beautiful present for your loved one, whether she be sweetheart, wife, mother, sister or daughter—or wear one yourself—you can afford to on our terms. Order today or write for FREE CATALOGUE OF DIAMONDS, WATCHES and JEWELRY.

THE WALKER-EDMUND CO.

Importers and Manufacturers 1116 State St., Chicago

Get this Free Book Telling How Others Made \$1400.00 Per Month Profit



ASK FOR SPECIAL CATALOG DESCRIBING PEANUT, POP-CORN AND ICE-CREAM CONE MACHINES

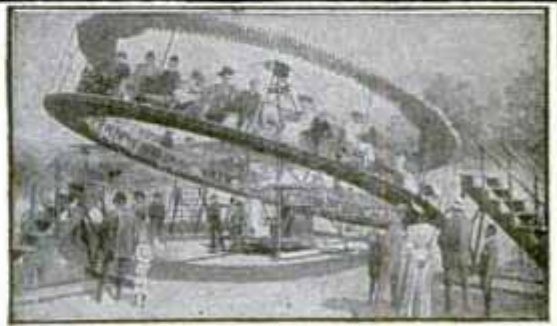
Find out how for 4 years others have made splendid success making "Candy Floss" at Conventions, State Fairs, Race Tracks, Parks, Picnics and Resorts all over the world with "Empire" Candy Floss Machines. Presidential Year is just the time. Only small space needed near any place people meet. No experience necessary—pays for itself in a few days. Write today for book showing what others are doing with

Empire Candy Floss Machines

Start at once. Work only part of time. Quickly makes a little ordinary grocery sugar into Candy Floss filling big packages of most enticing sweetness. Sells on sight. Profits very large. Will pay you to write today for Book 12.

Empire Candy Floss Machine Comp'y, Fisher Bldg., Chicago, Ill.

Over \$400 Made in One Day



Operating the

CIRCLING-WAVE AMUSEMENT DEVICE. Read this

Armitage & Guinn: At Egerton, Ind., away back from no place we got in \$350.00 in six hours' run. At Crawfordsville, Ind., we had a \$402 day: BOOHER BROS.

IF BOOHER BROS. DID THIS, WHY CAN'T YOU?

Let us tell you all about this marvelous CIRCLING WAVE, and its wonderful money-making power. Address,

ARMITAGE & GUINN, Dept. I, Springville, Erie Co., N.Y., U. S. A.

PLAIN GAS ENGINE SENSE

by E. L. Osborne, 156 pages—price 50c postpaid, for the beginner POPULAR MECHANICS BOOK DEPT. - CHICAGO

GROW MUSHROOMS

BIG AND QUICK PROFITS Small Capital to Start A Safe Business



Over 12 years' experience enables me to give practical and reliable instructions in the business. From a start with only a few dollars capital I built up the largest mushroom farm in America. No matter what your occupation is or where you are located, here is an opportunity to acquire a thorough knowledge of this paying business. I have shown thousands of men and women how to grow mushrooms successfully and will gladly show you. Send for

book giving particulars and information, how to start, cost, etc. Enclose 2c stamp. Address JACKSON MUSHROOM FARM 3169 N. Western Ave. Chicago, Illinois

Holsman Automobiles

High Wheels Travel all roads, Because all Roads are made to be traveled by High Wheels.

Oldest and largest makers of high-wheeled automobiles in the world. World's record for Hill-climbing and Reliability contests in this class.



Only all ball-and-roller-bearing motor made.

New friction-chain direct drive—no gears. Roadability and Reliability are the reasons for high wheels and solid rubber tires. Send for our catalogue and learn more about these popular, intensely practicable vehicles and their low cost.

HOLSMAN AUTOMOBILE CO. Suite 111 Monadnock Block, Chicago.

Go Anywhere

\$200.00 PER MONTH

was the average earnings of more than 500 of our customers who were operating and demonstrating our

"WONDER CANNON"

Automatic Photo Button Machine, last season.

ONLY \$30.00

cash required to start you in this profitable business.

Our \$30.00 outfit is complete and includes Wonder Cannon, Tripod, 1000 Plates, 1 gross Gilt Frames and enough Developing Powders for one month's work.

Our Cannon takes, develops and finishes Photo Button in 30 seconds, ready to wear.

No experience required. Can be set up in 20 seconds, ready to operate. A big money maker at Fairs, Carnivals, Picnics, or Celebrations. Sent upon receipt of \$5.00, balance C. O. D. Write for Free Catalog.

CHICAGO FERROTYPE CO., R 102 Ferrotpe Bldg., Congress & Laflin Sts., Chicago, Ill.



DIAMONDS ON CREDIT LOFTIS SYSTEM

BUY YOUR EASTER GIFTS ON 8 MONTHS' TIME



Send for our handsomely illustrated 1909 catalog containing 1500 beautiful reproductions of all that is correct and attractive in Diamonds, Watches, Jewelry. Then, in the Privacy of your home or office, select whatever you desire. We make your credit as good as the millionaire's and give you the advantage of the lowest possible prices. We make \$5 or \$10 do the work that \$50 does in a cash store, and give a written guarantee of value and quality. Catalog free. Write today. It will pay better than stocks, bonds or savings bank interest, for Diamonds. Invest in a Diamond. Increase in value 10 to 20% annually, and your security is absolute. If considering a Diamond or Watch as a gift, you will find the Loftis System a great and timely convenience on anniversaries, birthdays, weddings, holidays, etc. Descriptive catalog is free. Write today. Do it now.

LOFTIS BROS. & CO. Estd 1858 | The Old Reliable, Original | Dept. D173, 92 State St. | Diamond and Watch Credit House | Chicago, Illinois, U. S. A.



FOR FORTY YEARS A STANDARD PIANO.



WING PIANOS

are made by us and are sold direct from our own factory and in no other way. Dealers' and agents' profits and every unnecessary cost eliminated.

Every dollar is piano value through and through, the best that 40 years of experience can produce.

AN ABSOLUTELY FREE TRIAL

for 20 days, in your own home, no cost or obligation. ALL FREIGHTS PAID and all risks assumed by us. Pioneers of the direct plan of piano selling, our unparalleled success has brought forth many imitators, but no competitors, either as to the excellence of our product or the integrity and economy of our methods. Forty years of daily increasing business and 45,000 satisfied buyers testify to this.

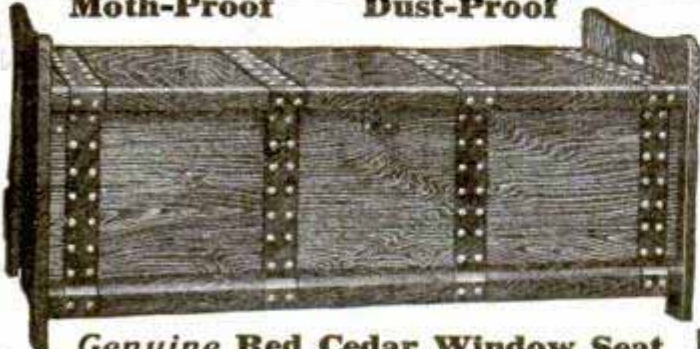
Ask a Wing customer what he thinks of Wing Pianos and Wing methods. We will send you names in your locality for the asking.

FREE "THE BOOK OF COMPLETE INFORMATION ABOUT PIANOS."

A copyrighted book of 152 pages with many illustrations. A complete reference book on the piano subject. History of the piano, descriptions of every part, how to judge good and bad materials, workmanship, etc. Teaches you how to buy intelligently. You need this book. Free for the asking from the old house of

WING & SON, 365-395 W. 13th St., New York

Moth-Proof Dust-Proof



Genuine Red Cedar Window Seat

or hall chest made of solid Southern Red Cedar. Reinforced with heavy copper bands. Studded with flat-headed old-fashioned copper nails. Provided with heavy hinges and lock. Safest place in which to store winter furs or summer finery. A beautiful Wedding or Birthday gift. Freight charges prepaid. We pay return charges if unsatisfactory. Send for prices and illustrated catalog describing our many styles of chests.

Piedmont Red Cedar Chest Co., Dept. 81, Statesville, N.C.

RED OR "VULCAN" STYLO PENS

The ONLY perfect, non-leakable stylo pens at a moderate price.



\$1.00

Agents Wanted

By mail, postpaid upon receipt of price.

Two sizes 4 1/4 and 5 1/2 inches, \$1.00
Extra Size, 8 inches (Black Only), \$1.25

J. C. ULLRICH & CO., Manufacturers
Thames Building 135 Greenwich Street, NEW YORK

LAND OPENING!

Kansas City, Mexico & Orient Railway
IRRIGABLE LANDS IN THE FAMOUS PECOS VALLEY
PECOS COUNTY, TEXAS
No Homestead or Residence Requirements

These lands may be entered in tracts of ten acres or multiples thereof at \$40 per acre on terms of \$16 down and \$8 per month—no interest—no taxes for five years, including perpetual water right and proportionate ownership of the immense irrigation works, now building. Filings made without leaving home.

The "Orient" road now has over 800 miles built and in operation between Kansas City and the Pacific Coast in Mexico and will soon be in operation over its entire length and through these lands which will then command \$100 to \$500 per acre.

For full information regarding these lands and the "Orient" road enclose four cents in stamps to the

BOARD OF LAND COMMISSIONERS
742 Victor Bldg. Kansas City, Mo

Greatest of All Scissors

18 Tools Combined. Only \$1.00

- | | | |
|--------------------------|--------------------------------|-------------------------|
| 6. Ruler. | Actual size 4 1/2 inches long. | Hammer. 12. |
| 1. Scissors. | | Penknife. 13. |
| 7. Measure. | | Glass Cutter. 14. |
| 8. Nail File. | | Glass Breaker. 15. |
| 9. Screw Driver. | | Marking Wheel. 16. |
| 2. Button Hole Scissors. | | Cartridge Extractor 11. |
| 3. Gaspipe Tong. | | Cigar Box Opener. 10. |
| 4. Cigar Cutter | | Ink Eraser 17. |
| 5. Wire Cutter. | | Stereo-scope. 18. |



Save yourself a thousand inconveniences in the home, in the office, in the camp, in travel.

ing or anywhere. Carry a pair of our 18-tools-in-1 Scissors. Put up in elegant leather metal-tip sheath. Money refunded if not pleased.
Wm. C. Hoeking & Co. 464 Marine Bldg. Chicago



Don't Be A Drudge!

Our Automatic Machines Earn Money For You

The Automatic Talking Scale is a remarkable new automatic machine that speaks your weight in a clear tone. It does not get out of order, and is a big money maker.

The Automatic Card Printer prints twelve neat business or calling cards for 5c and is one of the best money making automatic machines on the market. L. J. Dinkler, Macon, Ga., made \$120.00 from three talking scales in ten days. H. S. Donnerd, Indianapolis, Ind., made \$24.36 from one talking scale in one day. They are big money makers, and we have several other new automatic machines that are equally as good.

DON'T WORK ON A SALARY!

but use your head and earn more operating automatic machines in one day than you can perhaps earn on a salary in one month. Automatic machines work all the time—day and night—earning money for you. All you do is to take out the money. **\$5 to \$50 a day easy** and there is not the slightest element of gambling connected with any one of our automatic machines.

If you have a little money, one of these new automatic machines will soon pay for itself and after that you will have a regular income.

WRITE US QUICK!

This is the BEST opportunity for making money you ever had. We mean exactly what we say, and our catalogue will prove it. Send for our book "How to Make Money Without Work." It tells the secret—gives the actual facts, testimonials, and explains how you can make \$5 to \$50 a day without working. You ought to investigate this.

THE UNITED VENDING MACHINE CO.

133 Caxton Building

CLEVELAND, OHIO



\$20 to \$35 AND EXPENSES WEEKLY



At Home or Traveling, all or spare time. Easily Learned

GET MONEY—I DID—GOT \$301.27

worth of plating in two weeks, writes M. L. Smith, of Pa. (Used Small Outfit)

George P. Crawford writes:—"Made \$7.00 a day." J. J. S. Mills, a farmer, writes:—"Can easily make \$5.00 a day plating." Thos. Parker, school teacher, 21 years, writes:—"I made \$9.80 profit one day, \$9.35 another." Others making money—you can do the same.

Costs Nothing To Investigate. Write Today

LET US START YOU

in the Gold, Silver, Nickel and Metal Plating business. \$5 to \$15 a day can be made doing plating with Prof. Gray's new line of guaranteed Plating Outfits. Unequaled for plating watches, jewelry, tableware, bicycles, all metal goods. Heavy plate. Warranted. No experience required. We do plating ourselves. Have years of experience. Use same materials we sell. Materials cost about 10c to do \$1.00 worth of plating. Manufacture only practical outfits, including all tools, lathes and materials. All sizes complete. Ready for work when received. Guaranteed. We teach you the art, furnish recipes, formulas and trade secrets free. The Royal, Prof. Gray's New Immersion Process. Quick, Easy, Latest method. Goods dipped in melted metal, taken out instantly with fine, brilliant, beautiful plate, ready to deliver. Thick plate every time. Guaranteed 5 to 10 years. A boy plates from 100 to 200 pieces tableware daily, \$10 to \$30 worth of goods. No polishing, grinding or electricity necessary. Demand for Plating is Enormous. Every family, hotel and restaurant have goods plated instead of buying new. It's cheaper and better. Every store, jeweler, shop, factory, has goods needing plating. Agents have all the work they can do. People bring it. You can hire boys cheap to do your plating, the same as we, and solicitors to gather work for a small per cent. Replating is honest and legitimate. Customers delighted. We are an old established firm. Been in business for years. Capital, \$100,000.00. We know what is required. Our customers have the benefit of our experience, so that failure is next to impossible. We Are Responsible and guarantee everything. Reader, here is the chance of a lifetime to own and boss a business of your own. WE START YOU. Now is the time to make money. Call or write today. Our new plan. Samples of plating, testimonials and circulars FREE. Don't wait. Send us your address, anyway.

2c a Week Pays Wash Bill!

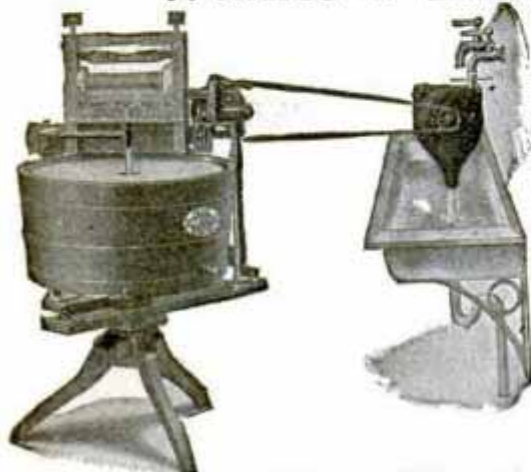
Write for
FREE Book

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 2 cents 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 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. And it's all so simple and easy that overseeing its work is mere child's play.

A Self-Working Wringer Free 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** that 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 do 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**. Address, The 1900 Washer Co., 3325 Henry St., Binghamton, N. Y. Or, if you live in Canada, write to the Canadian 1900 Washer Co., 355 Yonge St., Toronto, Canada.

1900 Electric Motor Washer
Can be connected with any ordinary
Electric Light Fixture

1900 Water Motor Washer
Can be connected with any water tap instantly

The Great Fault With the Ordinary Revolver is its uncertainty—not when you want to use it, but when you don't.

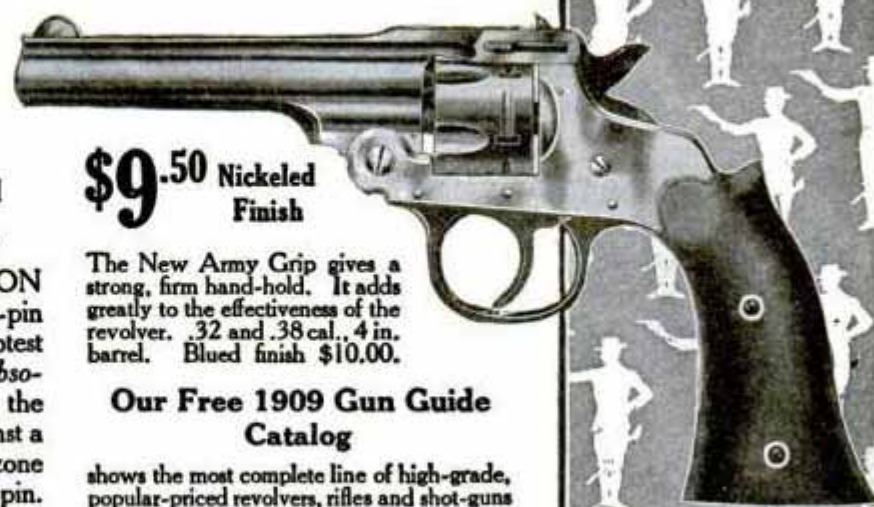
The HOPKINS & ALLEN Triple Action SAFETY POLICE

(Trade Mark)

shoots hard and true when you want it to; when you don't, *nothing can discharge it.*

The Triple Action is the Safety Action and this is the only Triple action in existence.

The third movement of the TRIPLE ACTION prevents the hammer from striking the firing-pin until you actually pull the trigger. The remotest chance of accidental discharge is thus made *absolutely impossible*. Immediately after firing, the hammer slides up mechanically and rests against a solid frame of steel, safely out of the danger-zone—not in any way in contact with the firing-pin. It is held there, firm, fixed and immovable, until the second discharge. The third movement eliminates wholly and finally *even the supposition of danger.*



\$9.50 Nickered Finish

The New Army Grip gives a strong, firm hand-hold. It adds greatly to the effectiveness of the revolver. .32 and .38 cal., 4 in. barrel. Blued finish \$10.00.

Our Free 1909 Gun Guide Catalog

shows the most complete line of high-grade, popular-priced revolvers, rifles and shot-guns made. Write for this book now. It's free.

Ask your dealer to show you this revolver. If he doesn't sell it, we will send it to you direct, charges paid, on receipt of price.

The Hopkins & Allen Arms Co.

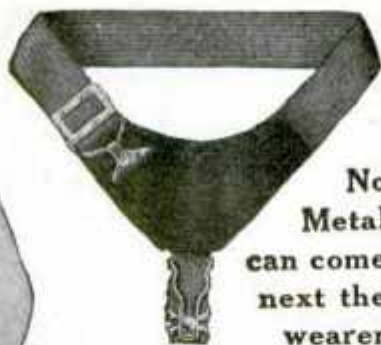
32 Chestnut Street

Norwich, Conn.

PARIS GARTERS



Copyrighted
1908



No
Metal
can come
next the
wearer

*You need them
with Knee-Drawers.*

This garter is made
to conform absolutely
to the shape of the leg.

*PARIS is the only
garter that fits so
perfectly you wear it uncon-
sciously.*

25 and 50 cents at dealers, or direct if
you don't find them.

A. STEIN & CO., 204 Center Ave., CHICAGO

Savings Invested in Bonds

insure a liberal and certain interest return—
Ample security of principal—
And—if it becomes necessary to raise money
quickly at any time, good bonds can always
be used as collateral for a loan, or can be
readily sold outright.

We are now offering thoroughly sound con-
servative bonds, yielding $4\frac{1}{2}$ to 6 per cent.,
in donominations of \$100, \$500 and \$1,000.

*Let us send you particulars
Address Dept. J*

J. S. & W. S. KUHN, Inc.
INVESTMENT BANKERS

Bank for Savings Building, Pittsburgh

JAMES S. KUHN,
President

WM. S. KUHN,
Vice-Pres.

L. L. McCLELLAND, Sec. & Treas.



The Big Three In Electricity

Franklin Discovered It—Edison Devel-
oped It—The Cyclopaedia Applies It

CYCLOPEDIA of APPLIED ELECTRICITY

is a practical guide for every man who wants informa-
tion regarding electrical appliances. This work pre-
sents in compact, practical form and in simple, non-
technical language, the results of the best work of
the best men in the electrical profession; it lays the
foundation of electrical progress for years to come.

This Cyclopaedia covers the whole electrical field more completely than
any other group of volumes. It comprises 2,896 pages of up-to-date,
authoritative information; it treats of 23 general subjects; its detailed in-
dex includes over 4,000 different topics. It contains hundreds of special
photographs, diagrams, sections, etc., besides condensed tables and formu-
las, containing information that it would require years of time and a
fortune to collect. The pages are 7x10 inches in size, printed on special
paper, in large, clear type, carefully bound in half morocco.

The Young Man who has not yet chosen his life's work, will find
it a valuable guide to one of the greatest money
making professions of the present and future age. The development of
this vast science has just begun. There is plenty of room at the top for
inventive genius and new discoveries that will bring fame and fortune.

The Electrical Worker, whether "troubleshooter" or ex-
pecially valuable as an index to what he knows and a ready reference to
what he has forgotten.

The Business Man and House Owner can gain
from it a
knowledge of electricity that will save him many a dollar.

Free for Examination. Fill in and mail the coupon. We will
send you a set of these practical books
for five days' FREE examination. Examine the books carefully. If satisfac-
tory send \$2 within five days and \$2 per month until you have paid the
special \$18.60 price. The regular list price is \$36. If you don't keep
the books, advise us and we will send for them. Remember! You can
examine the books without expense or obligation—we pay all charges.

IMPORTANT SUBJECTS COVERED

Electric Telegraph—Theory, Calculation, Design
and Construction of Generators and Motors—Ele-
vators—Dynamo-Electric Machinery—Alternating
Current Machinery—Wireless Telegraphy—Stor-
age Batteries—Wireless and Automatic Telephony
—Power Stations and Transmission—Electric
Lighting and Wiring—Electric Railways—Tele-
graphone—Direct Current Motors—Direct-Driven
Machine Shop Tools—Single-Phase Electric Rail-
way—Electric Welding—Management of Dynamos
and Motors—Central Station Engineering—Central
Station Design.

FREE! IF YOU ORDER PROMPTLY

With all orders received before May 1st, we will include
FREE for one year, as a monthly supplement, the

TECHNICAL WORLD MAGAZINE

An ideal American family monthly—regular price, \$1.50. Clean, instructive,
helpful and true—with the whole round world as its field. Present
day, scientific facts and inventions are treated in a manner so clear and
comprehensive that any one can understand and every one can learn.

AMERICAN SCHOOL OF CORRESPONDENCE, CHICAGO, U. S. A.

FREE OFFER COUPON

American School of Correspondence:
Please send Cyclopaedia of Applied Electricity for FREE examination,
also Technical World for 1 year. I will send \$2.00 within five days and
\$2.00 a month until I have paid \$18.60; otherwise I will notify you and
hold the books subject to your order. Title not to pass until fully paid.

NAME

ADDRESS

OCCUPATION

EMPLOYER

Pop. Mech. 4-09

SHOP NOTES FOR 1909 Vol. V

224 Pages, 461 Illustrations

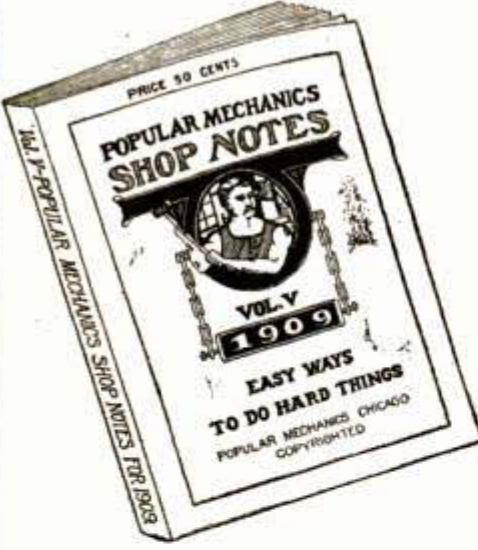
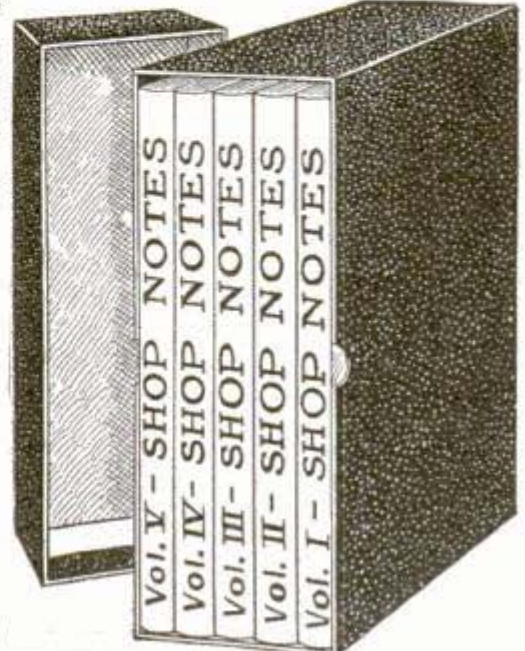
Containing matter entirely different from Volumes I, II, III and IV and comprising plainly written, labor-saving "kinks" and mechanical information for practical men. Complete your set by adding the new volume to it. Price 50c of all newsdealers, or sent postpaid upon receipt of price by the publishers.

Shop Notes Sets, 5 Volumes, \$2.50

The Five Volumes Contain 1092 pages, and 2517 Illustrations.

These books are a perfect gold mine of information for every one interested in mechanics, or who uses tools for pleasure or as an occupation. Of equal value and help to the professional mechanic and the amateur.

This set comes in a handsome black case, and is acknowledged to be an unequalled value among works of its character.



case, and is acknowledged to be an unequalled value among works of its character.

Vol. I. Shop Notes for 1905

200 pages; 385 illustrations

Vol. II. Shop Notes for 1906

228 pages; 555 illustrations

Vol. III. Shop Notes for 1907

228 pages; 580 illustrations

Vol. IV. Shop Notes for 1908

212 pages; 536 illustrations

Vol. V. Shop Notes for 1909

224 pages; 461 illustrations

For sale by all Newsdealers, or sent express prepaid, by the publishers:

POPULAR MECHANICS COMPANY, - - - CHICAGO

"STRELINGER" MARINE ENGINES



You appreciate the mechanical excellence, fine design and high compression of the "Strelinger" when pulling up stream - it gets there when all others fail. It has the POWER that drives - and pulls; steady and smooth as clockwork. The kind of engine it's a pleasure to own because "you can bank on it." Eight years' success. Sixty per cent of our sales replace other makes. Records show that average repair cost of "Strelinger" per year does not exceed \$3.00. Uses 40 per cent less fuel than 2-cycle, and 10 to 15 per cent less than any other 4-cycle engine. Designed and built for heavy duty. New throttle permits slowing down for trolling. Why not enjoy the best?

NEW CATALOG shows complete line, 1 to 100 H. P.; 4-cyle - one to six cylinders. \$95 to \$1350. Free on request.

STRELINGER MARINE ENGINE CO.
45 Congress West, DETROIT, MICH.



**8,000
Flashes
75c**

New Electrical Flash Light, Vest Pocket Size, Tantalum Lamp, High candle power, Prism Lens, Lock Switch, Nickel Plated. Ready for use, 75c; or with 2 extra batteries \$1 postpaid. Big catalog of latest Electrical Novelties at lowest prices, free. Discounts to dealers.

ELECTRICAL NOVELTY CO., Mfrs. & Imps.
Washington Nat. Bank Bldg. Pittsburg, Penna.

LUMO KEROSENE BURNER



**BURNS A MANTLE LIKE GAS,
ODORLESS, NOISELESS
AND ABSOLUTELY SAFE**



This wonderful burner represents the latest improvement in modern lighting; it has the highest efficiency of any light known. Think of it - **100 candle power light 6 hours on 1 quart of kerosene.** Scientists have pronounced it the most wonderful invention of modern times. Oculists say it is the easiest light for the eyes, and above all it is so simple any child can operate it with perfect safety. It requires no generating, has no subwicks, indicators or stops to get out of adjustment. Light it same as any kerosene lamp and you have a brilliant and beautiful light instantly.

We offer the most attractive agent's proposition on the market. Write today for free catalog and particulars.
JOHN S. NOEL, 151 S. DIV. ST., GRAND RAPIDS, MICH.

WASHABLE WALL PAPER. - A mixture of sulphuric ether, denatured alcohol, benzine, gutta percha, glycerin and amyl acetate is being used by a Paris manufacturer for impregnating cloth, paper, wood, etc. It is claimed to strengthen and preserve the materials and also makes them washable. For washable wall paper the composition is mixed with an adhesive substance and a powdered pigment before applying to the paper.

**WHEN YOU WANT ANYTHING AND DON'T KNOW
WHERE TO FIND IT - WRITE BUREAU OF
INFORMATION, POPULAR MECHANICS, CHICAGO**



14 Ft. LAUNCH \$94⁵⁰ WITH 2 H.P. ENGINE

16-18-21-25 and 30 footers at proportionate prices. Let us send you testimonials from people who are using them. Boats and engines guaranteed one year. Shipment made the day we receive order. Motor the simplest made, starts without cranking, anyone can operate them. We are the largest builders of pleasure boats in the world and sell direct to user. Free catalog.

DETROIT BOAT CO., 1100 Jefferson Ave., Detroit, Mich.

Something New—Different

Readers listen sharp, don't miss! Investigate—the best thing ever happened. Astonishing, yet true.

Ingenious Ohioan invents a new device that cleans family washing in 30 to 50 minutes, while you rest.

No rubbing, no chemicals, no motor.

No such device sold in stores—different from anything you have seen. Nothing else like it—great seller—enormous demand. Customers delighted. R. O. COWAN, N. Y., placed 13 in 6 hours, (profit \$39.00). MRS. J. BROWN, Pa., sold 10 in 3 days, (profit \$30.00). You can do the same.

Miracles don't happen now, but listen—wash day troubles wiped out. Good-bye to wash boards, washing machines, troubles, etc.—Their day is passed. "Easy Way" of cleaning clothes is here to bless our dear women. Invention that killed wash day called "Easy Way." Has awful appetite for dirt—goes after all the dirt in all clothes at same time. Small, but mighty—silent, but powerful.

SEE HOW SIMPLE, EASY, DIFFERENT

Operated on stove—water inside, then soap, then clothes—move knob occasionally. Dirt lets go as hot water, suds, scalding steam and vapor begin movements. **8 to 10 minutes**—clothes clean—rinse, dry, that's all! Next batch same operation—same water—**30 to 50 minutes family washing clean.** You just wait between batches—child can do it. Laundries clean clothes without rubbing—the "Easy Way" does the same at your home. No wood, all metal. sanitary, should last lifetime, light, easily handled. Cleans laces, white goods, bed clothes, woollens, colored clothes, etc., without injury—no rubbing—no chemicals—Women's God-send. Saves drudgery, clothes, labor, fuel, health and looks. No experiment—going on daily—you can do it. Customers everywhere delighted and praise it.

LAURETTA MITCHELL, Ohio, writes:—"Done big washing with "Easy Way" in 45 minutes. Sold 3 already." J. W. MEYERS, Ga., orders 12 more, says:—"Easy Way" greatest invention for womanhood, forever abolishing miserable wash day." F. E. POST, Pa.,—"Done 2 weeks washing in 45 minutes. Clothes cleaned without rubbing." J. H. BARRETT, of Ark., after ordering 38, says:—"Grandest invention ever heard of."

Price Only \$6.00 Complete

Ready to use—sent anywhere—not sold in stores. **GUARANTEED SATISFACTORY, OR YOUR MONEY REFUNDED. SEND NO MONEY, SIMPLY YOUR NAME AND ADDRESS. WRITE TODAY.**

FREE SAMPLE TO AGENTS

SALESMEN—MEN—WOMEN—all or spare time—at home or traveling—showing—taking orders—appointing agents—"Easy Way" new. Wonderful seller—agents reaping harvest of dollars. When operated, people stop, look. 12 see, 10 buy. C. O. GARRETT, of Ohio, showed 7 families, sold 6, (profit \$18.00). A. B. VERRETT, of La., sold 8 one day, (profit \$24.00). Mrs. GERRISH ordered sample—then dozen—then 100, (profit over \$300) Write for FREE Sample, 1909 Offer, etc. Cost nothing to investigate—write today.

HARRISON MANUFACTURING COMPANY,

Circulars, Testimonials FREE
897 Harrison Building
CINCINNATI, OHIO.



BUILD YOUR OWN ENGINE

Complete sets of Castings and Forgings, with full Shop Drawings for the four cycle

PENINSULAR MARINE ENGINES

Sizes 2½ to 24 H. P.

Send for information and prices.

SINTZ-WALLIN CO.

Grand Rapids, Mich.

Agents New Invention; never before sold in your territory, horse owners wild about them; automatic horse fastener sells at sight; coin money; a fortune in your territory; free sample to workers; write at once. Automatic Fastener Co., H-259, Cincinnati, Ohio.



BEST HOT WATER RESIDENCE HEATING BOILER MADE

Guaranteed and Sold Direct to Consumer!

Capacity of Heater nearly doubled without additional fuel by use of Center Pipe carrying water up through the center of deep fire pot. Heats from all sides.

I want to sell you a heater Write me today.

T. L. PHILLIPS, 116 Fox St., Aurora, Ill.

\$18 to \$30 A WEEK SURE

Farmers' "Ever-Ready" 10 TOOLS Tool Kit does it

Agents going wild over results. M. Snyder made \$46 in two hours. Joseph Pine took 65 orders in two days. M. D. Finch sold 42 in nine hours. Had no experience. You can do it. To show it means a sale. FREE SAMPLE to workers.

FOOTE MFG. CO., Dept. 860, Dayton, O.

HYPNOTISM

Learned at home; small cost; 2c stamp for particulars. O. A. SMITH, Room 34B, 2040 Knoxville Ave., Peoria, Ill.

WE SAVE YOU MONEY ON HIGH GRADE CUSTOM TAILORING

Furnishing cloth at actual mill prices, adding only absolute cost of our high grade hand tailoring done in our own work-rooms, and our small profit, which owing to our enormous business, is so small we can make a suit or overcoat to your individual measure for \$12.00 to \$22.50—prices that are positively less than other tailors must pay for the cloth alone. Anyone can take your measures. Style, fit and satisfaction guaranteed. Send a postal today—right now—for our great outfit. Our customers are the best and most economically dressed men in their communities.

60 WOOLEN SAMPLES

THE HOMEBUYERS TAILORING CO. Established 1880 205-213 W. Jackson Boulevard, CHICAGO

Newest styles, cloth tape measure, 35 fashion plates of latest Spring styles, self-measurement instructions, securely packed, all charges prepaid. SENT ABSOLUTELY

FREE

Send Us \$1.50

with your name and address and we will send you prepaid the best safety razor money can buy, a



UNIVERSAL STROPPER and twelve keen, finely tempered blades made by our secret process, from the finest razor steel in the world, conveniently packed in a handsome plush-lined leatherette case.

WIZARD Safety Razor

shaves better than any other razor made, regardless of price—we know because we've tested them all. It is simple in construction, having only two parts—a handsome silver plated handle and a keen, finely tempered blade that gives a delightful, smooth, clean, velvety shave. It's easy to use—easy to clean, sanitary, and soon pays for itself many times over. Send us your order—try it 30 days—if not satisfied, you can have your money back.



UNIVERSAL STROPPER Sharpens Any Safety Razor Blade

whether single or double edge. The only practical and convenient stropper made. Price 50c each prepaid. Guaranteed satisfactory or your money back without asking any questions.

Ask your dealer OR WRITE FOR OUR FREE BOOKLET

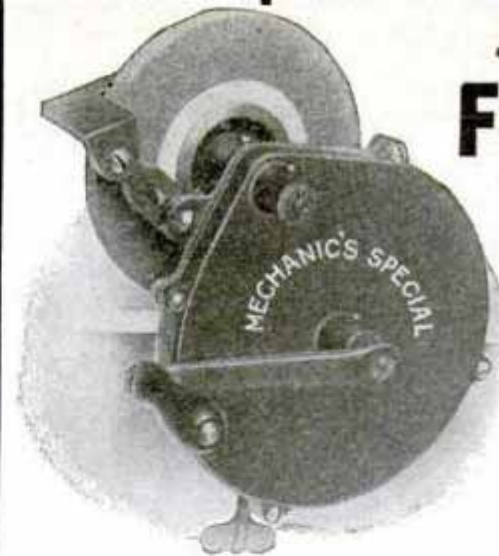
FREMONT CRESCENT MFG. CO., 336 OHIO AVE., FREMONT, O., U. S. A. We also make the "Witch" Safety Razor.

Mechanics' Special Tool Sharpener

Sent on

FREE Trial

Write today for our Free Catalog NEVER GETS OUT OF ORDER WILL LAST A LIFETIME



A tool grinder built the same as a high class lathe. A machine that should be a part of every mechanic's tool chest. In efficiency equal to a power driven grinder. All gearing cut from solid blank and encased and absolutely dust proof. Bearings run continually in oil, insuring long life to the machine. Has bronze bearings. Has adjustable tool rests permitting the correct sharpening of plane, bits, chisels, etc. Carborundum non-heating grinding wheel used. Size, 7 x 1 inch. It can be instantly clamped to any bench or table and as instantly put out of the way when through using. Shipped ANY PLACE for a free trial—no money down—returnable at our expense if you don't want to keep.

Write today for prices and catalog of the most complete line of grinding machines made.

LUTHER BROS. CO., DEPT. A, MILWAUKEE, WIS., U.S.A.

WATER SUPPLY for COUNTRY HOUSES THE PROBLEM SOLVED

No elevated tank to freeze or leak. Tank located in cellar. Any pressure up to 60 lbs. The ideal fire protection. Send for Illustrated Catalogue 39.



Let our Engineers figure out your needs LUNT-MOSS COMPANY, 43 S. Market St., Boston

THE TROUBLES OF THE TELEPHONE SUBSCRIBER.—Why should a man, simply because he can get the loan of a telephone, be permitted to interrupt the most private and important conversation and business deal? What he wants is often only a favor for himself. Sometimes it is a mere idle query. Men ring up business men just to tell a funny story, and clerks and other employes are rung up in the busiest part of the day just to make social engagements. Of course, it is sometimes possible for the man of many affairs to have his private secretary answer the phone and call him only when the business justifies it, but there is danger in this system, as people are touchy and apt to think him discourteous when he is only acting in self-defense.

THE SIMPLEX WATER POWER WASHER

(Complete \$17.—Motor only \$12.50)



Operated by Water Motor placed on the lid of the machine being driven by the City Water pressure connected to the ordinary faucet by means of hose. Simple in construction, self oiling and will last a life time. If you already possess a hand operated machine we can furnish the motor to attach to old machine. Write for further details. SIMPLEX WASHER CO., Milwaukee, Wis.

A Rare Tobacco Direct from Factory

FRENCH'S MIXTURE is a wonderfully delicious, fragrant blend of North Carolina's far-famed "Golden Leaf" Tobacco, which has been scientifically propagated and developed since the old colony days. It is thoroughly matured and hand-made from choice leaf carefully selected by connoisseurs, and exquisitely blended by experts of many years training. It is sold only

Direct from Factory to Smoker,

pure, clean, fresh and absolutely in perfect condition. It never "bites" but is mild, rich and mellow; truly "The Aristocrat of Smoking Tobacco," whose infinite charm and delight never lessen through years of constant use.

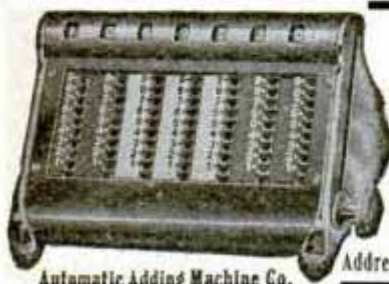
French Tobacco Co.

DEPT. 88 STATESVILLE, N. C.



Send 10c for large sample pouch and interesting booklet. Both will delight you.

INVENTIONS—How to Protect, Sell and Buy Them by F. B. Wright. Price 25c postpaid POPULAR MECHANICS BOOK DEPT., - - CHICAGO



Automatic Adding Machine Co.

\$15 "GEM" Adding Machine

Free 10 Day Trial at Our Expense Has an Automatic Carrier and a Resetting Device that clears the dial to zero. Does the work of high-priced machines. 2 years' Written Guarantee. Special offer to agents.

Address E. GANGRER, 332 Broadway, N.Y.



Hawaiian Diamonds

We carry both solid gold and gold-filled stock. No. 120 1k Hawaiian Diamond in solid gold mounting, sent C.O.D. on deposit of 50c prepaid cash in advance. Send for catalog.

W. H. HOLLISTER & CO., Dept. 407, 42-44 River St., Chicago, Ill.

Set in new and novel designs. We sell at wholesale prices, allowing our customers to make good profit on sales.

\$5.00 PRICE



THE KEWANEE SYSTEM OF WATER SUPPLY



The Advantages of a Good Water Supply

always possible with the

Kewanee System of Water Supply

Plenty of water at an even temperature, under good strong pressure, delivered to all parts of the house—bath-room, kitchen, laundry, etc.,—to the barn, garden, lawn—anywhere.

Running water, ready for use at all times. All the conveniences and comforts of the best city water work system are at your service if you install the

Kewanee System of Water Supply

With the Kewanee System there is no elevated or attic tank exposed to all extremes in weather conditions. No freeze-ups in winter and no warm stagnant water in summer. Instead, a **Kewanee Pneumatic Tank** is located in the **cellar**, or buried in the **ground**. It cannot leak, freeze, overflow or collapse.

Pump the water from your well, cistern or other source, into the tank; and it will be delivered to the fixtures and hydrants under **air pressure**. First class fire protection assured for your buildings.

Over 9000 Kewanee Systems in operation, supplying water for country and suburban homes, farms, schools, public and private institutions, etc.,—over 9000 water supply problems solved with absolute success.

The Kewanee System is the **original** water supply system, involving the use of **air pressure** instead of gravity pressure. There are imitations now—avoid them. Get the genuine and you will take no chances—we guarantee that. Look for our trade-mark **KEWANEE** and name plates on **KEWANEE** tank and pumping machinery.

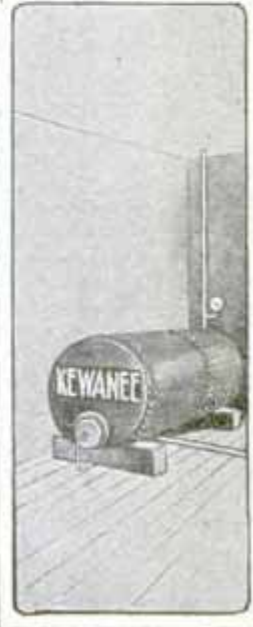
Kewanee Pumping Outfits

Kewanee pumping outfits are furnished for any special pumping requirements. The same technical skill and practical knowledge required to develop and perfect complete Kewanee Systems, are devoted to the solution of individual pumping problems.

No charge for expert engineering service. Let us help you solve your water problem. Write for our 64-page illustrated catalogue No. 14 . It is free.

Kewanee Water Supply Company, Kewanee, Illinois

1566 Hudson-Terminal Bldg., 50 Church St., New York City, N. Y.
1212 Marquette Building, Chicago, Illinois.
305 Diamond Bank Building, Pittsburg, Pa.





An Extra Servant for 2 Cents a Week

The Thor Electric Washes and Wrings by Electricity

The THOR is a complete Home Power Laundry. It combines the duties of tub, boiler-heater, washer and wringer. Easier to move than a chair. Does a family wash for two cents and pays for itself in a few months.

A gas burner beneath the machine keeps the water hot—saves carrying hot water. The clothes go into a wooden cylinder like those in all big laundries.

The cylinder revolves in the hot suds a number of times in one direction—then in the other—repeating until stopped. The clothes can't pack in a tight wad like they do in other washers.

A new surface is constantly being exposed to the cleansing streams of hot suds forced through hundreds of holes bored in the cylinder.

Delicate laces and heavy blankets are thoroughly and beautifully cleansed without wear or strain. They never touch metal.

Clothes wear twice as long. No rubbing of wrist, collar or skirt edges. Wash day becomes rest day.

The Reversible Three-Roll Wringer furnished with the machine is a great labor-saver—wrings from either side. You just feed the clothes.

We also furnish a simple shaft instantly connecting the THOR motive power to an ironing machine, freezer, meat chopper, emery or buffing wheel, churn, etc. Saves time—labor—expense.

We also manufacture the THOR ball-bearing Hand Washer and furnish the THOR Power with gasoline engine.

30 Days' Free Trial

We ask no money in advance—no deposit or security from any responsible person.

We will ship you any style THOR you wish to try. It will reach you all ready to start washing the minute you get it. Nothing for you to do but put in the water and clothes—and turn a knob.

Put it to every test for 30 days. Wash and wring—operate all the utensils you wish. Prove to your own satisfaction that it will save its cost **three times over** in the first year. And every year for a lifetime.

If you are **not fully satisfied**, return it at our own expense. You risk nothing. If there is any risk we take it. If you are satisfied you may pay us.

HURLEY MACHINE COMPANY
169 S. Jefferson Street, Chicago
1013 Flatiron Bldg., New York City

"COME-PACKT" TRADE FURNITURE MARK

"It comes in SECTIONS, not in pieces."

You CAN'T Be Fooled

"Come-Packt" Sectional Furniture comes "in the white" and the finished sections are ready to put together. You see just what you get—and you get QUARTER-sawed WHITE Oak every time. No chance to disguise defects or substitute cheap woods. A few minutes only needed to fasten the sections and apply whatever stain you select—we include it free. It's a pleasure and a satisfaction to KNOW you have the best obtainable.



And You Save OVER HALF

We manufacture and ship direct to you at lower prices than dealers pay. Why pay middlemen's profits, store rents, clerk's wages, etc., as well as high freights and costly packing—all items that add to the PRICE, not the VALUE of store furniture. Try our way ONCE—that's the proof. "Your money back if you say so."

WRITE TODAY for free catalogue of 100 other handsome pieces for Library, Dining-room, Hall, Porch, etc.

International Mfg. Co., 401 EDWIN ST., ANN ARBOR, MICH.



Killing the Collar

A collar gets most worn when not worn—chewed up and rubbed to death at the laundry. Here's the difference:

LITHOLIN Waterproofed Linen COLLARS and CUFFS

need no laundering as they can be wiped white as new with a damp cloth. See what that saves in wear and tear. Will not wilt or fray. The same collar you have always worn, only waterproofed. All styles and sizes.

COLLARS 25c. CUFFS 50c.

Always sold from a RED box. Avoid substitution

If not sold at your dealer's, send, giving styles, size, how many, with remittance, and we will mail, postpaid.

THE FIBERLOID COMPANY, DEPT. 25, 7 WAVERLY PL., NEW YORK

STYLE
ECONOMY



FIT
COMFORT

Please Mention Popular Mechanics



**for 10 Days with this
New Vacuum Cleaner
FREE**

Read below our Special Trial offer—Ten Days' trial before you buy—then \$2.50 a month.

**NO ELECTRICITY
NO PUMPING
So Easy to
Work**

AT LAST!

The Perfect Vacuum Cleaner!

Just natural motion by ONE person, and PERFECT suction—simply WONDERFUL cleaning power—easier to work than a carpet sweeper. AND AT A PRICE WITHIN THE REACH OF ALL! The vacuum (cleaning problem solved at last!) WRITE FOR BOOKLET sent free, which explains our 10 day free offer to housewives, also our \$2.50 A MONTH terms to those who do not want to pay all cash. INTRODUCTORY OFFER: THE ROCK BOTTOM price on time as well as for cash. Write today for special price and free booklet.

ALLEN VACUUM CLEANER COMPANY
1901 California Ave. Dept. 1194 CHICAGO

New Invention!

Nothing Else Like It

THE MOST WONDERFUL STOVE EVER INVENTED

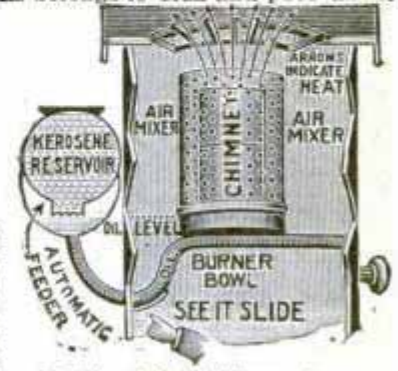
**Consumes 395 Barrels of Air to
One Gallon Common Kerosene Oil**

Causing Great Excitement Wherever Exhibited

Fuel drawn principally from atmosphere. Uses 395 barrels of air while consuming one gallon of oil. Wood and coal cost money. **ONLY FREE FUEL IS AIR.** Supply unlimited. No trust in control. Air belongs to rich and poor alike.

Harrison's Valveless, Wick- less, Automatic Oil-Gas and Air- Burner Stove

Automatically generates gas from kerosene oil, mixing it with air. Burns like gas. Intense hot fire. Combustion perfect. **To operate—turn knob—oil runs into burner—touch a match: it generates gas, which passes through air mixer, drawing in about a barrel of air to every large spoonful of oil consumed. That's all.** It is self-regulating, no more attention. Same heat all day or all night. For more or less heat, simply turn knob. There it remains until you come again. To put fire out turn knob, raising burner—oil runs back into can, fire's out. As near perfection as anything in this world. No dirt, soot or ashes. No leaks—nothing to clog or close up. No wick—not even a valve, yet heat is under proper control. **D. CARN, IND., writes: "It costs me only 4 1/2 cents a day for fuel."** **L. NORRIS, VT., writes: "The Harrison Oil-Gas Generators are wonderful savers of fuel, at least 50 to 75 per cent. over wood and coal."** **E. ARNOLD, NEB., writes: Saved \$4.25 a month for fuel by using the Harrison Oil-Gas Stove. My range cost me \$5.50 per month, and the Harrison \$1.25 per month. Objectionable features of other stoves wiped out.**



Sectional Cut of Generator.



**NOT LIKE THOSE SOLD
IN STORES**

One, two or three burn-
er sizes—
with or
without
oven.

Ideal for cooking, roasting, baking, ironing, canning fruit, picnics, cottages, camping, also for heating houses, stores, rooms, etc., with radiating attachment. No more carrying coal, kindling, ashes, soot and dirt. No hot fiery kitchens. Absolutely safe from explosion. Not dangerous like gasoline. Simple, durable—lasts for years. Saves expense, drudgery and fuel bills.

ALL SIZES. PRICES LOW—\$3.25 and up. Sent to any address. Send no money—only send your name and address. Write today for our 30-day trial offer—full description—thousands of testimonials. 1909 Proposition. Circulars FREE.

EXCITING BUSINESS FOR AGENTS

SALESMEN—MANAGERS—MEN OR WOMEN at home or traveling, all or part time—showing—taking orders—appointing agents. MESSRS. HEAD & FRAZER, TEXAS, write: "Enclose order for \$81.00. RUSH. Sell like hot cakes. SOLD 50 STOVES IN OUR TOWN." B. L. HUESTED, MICH., writes: "BEEN OUT ONE DAY AND SOLD 11 STOVES." This patent new. NOTHING LIKE IT. Demand enormous. Agents reaping great harvest. Where operated people stop on street, leave their homes, places of business, miss trains to watch this generator—excites curiosity—watch it as 'though a thing of life. Show a dozen—sell ten. WRITE TODAY FOR SPECIAL AGENTS' NEW PLAN. SEND NO MONEY. World unsupplied. Get in early for territory.

THE WORLD MFG. COMPANY
7145 World Bldg., CINCINNATI, OHIO

THE WHAT THE WHY THE WAY

IF you want to get well and stay well, the chances are 9 to 1 that you can—without drugs or medicines of any kind. Learn the wonderful mission of the

INTERNAL BATH

My free booklet proves that 90 per cent of human ailments are due to one easily removable cause, and tells you how to remove the cause. Write to

CHAS. A. TYRRELL, M. D.
321 A Fifth Ave., New York



"IT ROLLS THE PAIN AWAY"

THE OLIVER ELECTRO-ROL

It is a combination of the two greatest Therapeutic agencies known to Medical Science for the relief of pain and suffering. Has never failed to relieve the pains of RHEUMATISM and LUMBAGO, in two to three treatments. **INSOMNIA, INDIGESTION and HEAD-ACHE** instantly yield to its action.

Easy to Operate—Anyone can use it.

Strongly endorsed and used by Hospitals, Physicians and other prominent people. Every outfit includes specific instructions for use. Money refunded, if not satisfactory.

Booklet of valuable information **FREE.**

OLIVER ELECTRIC & MFG. CO., 1015 Walnut St., PHILADELPHIA, PA. \$5

Do You Hear Well?

The Stolz Electrophone—A New, Electrical, Scientific and Practical Invention for those who are Deaf or Partially Deaf—MAY NOW BE TESTED IN YOUR OWN HOME.

Deaf or partially deaf people may now make a month's trial of the Stolz Electrophone at home. This personal practical test serves to prove that the device satisfies, with ease, every requirement of a perfect hearing device. Write for particulars at once, before the offer is withdrawn, for by this personal test plan the final selection of the one completely satisfactory hearing aid is made easy, inexpensive for everyone.



MRS. C. LIDECKA, 238 12th Ave., Maywood, Ill., wears an Electrophone. Less conspicuous than eye glasses.

This new invention, the Stolz Electrophone (U. S. Patent No. 763,575) renders unnecessary such clumsy, unsightly and frequently harmful devices as trumpets, horns, tubes, ear drums, fans, etc. It is a tiny electric telephone that fits on the ear and which, the instant it is applied, magnifies the sound waves in such manner as to cause an astonishing increase in the clearness of all sounds. It overcomes the buzzing and roaring ear noises and, also, so constantly and electrically exercises the vital parts of the ear that, usually, the natural unaided hearing itself is gradually restored.

What Three Business Men Say.

The Electrophone is a very satisfactory. Being small in size and great in hearing qualities makes it preferable to any I have tried, and I believe, I have tried all of them. M. W. HOYT, Wholesale Grocer, Michigan Ave. and River St., Chicago.

The Stolz Electrophone Co., Chicago, Ill.

Gentlemen—I have used your Electrophone since July, 1908. It enables me to hear speakers over 50 feet away. Without it I could not hear their voices. It has improved my natural hearing at least 50 per cent, and has stopped the head noises which were so annoying. Refer to me at any time. Yours truly, E. P. ROGERS, Suite 908, 159 La Salle Street, Chicago, Ill.

I have now used your Electrophone over a year, and know that it is a first-class, scientific hearing device. Without it people have to shout directly in my ear to make me hear. With it, I can hear distinctly when spoken to in an ordinary tone. Best of all, IT HAS STOPPED MY HEAD NOISES, which were a terrible aggravation. LEWIS W. MAY, Cashier, 100 Washington St., Chicago.

Write to, or call (call if you can) at our Chicago offices for particulars of our personal test offer and list of other prominent endorsers who will answer inquiries. Physicians are cordially invited to investigate aurists' opinions.

Stolz Electrophone Co., 1736 Stewart Bldg., 7th Floor, Chicago
Branch Offices: Philadelphia, Cincinnati, Seattle, Los Angeles, Pittsburg, Louisville, Cleveland, Indianapolis, Des Moines, Toronto.
Foreign Office: 82-85 Fleet St., London, Eng.

12 Art Panels 50c



exquisite portrayals of
"WOMAN BEAUTIFUL"

You can have no conception of the beauty of these pictures without seeing them.

Beautiful Photo Tone Reproductions

SIZE, 7 x 10

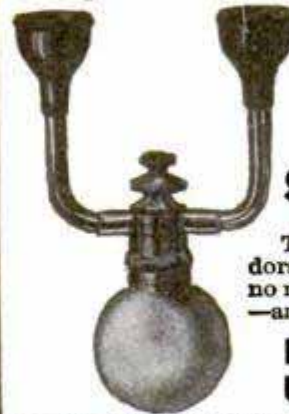
This new set of beautiful pictures surpasses anything we have heretofore produced and you can't help but be pleased with them. With this set of 12 panels we will send our complete catalog showing many illustrations of other beautiful art pictures. Send 50 cents, coin Money order or U.S. Stamps. Money back if not satisfied.

FLORENTINE ART COMPANY
1429 Belmont Ave. Dept. U-4 Chicago

FREE "The Bather," a beautiful picture in colors, will be sent absolutely Free with each order. (No catalogs sent except with orders.)

WEAK EYES

ARE MADE STRONG—Smarting, Sore, Aching, Irritated, Inflamed, Watery, Diseased Eyes are speedily restored to perfect eye-health by our **Simple Inexpensive Home Treatment**



of gentle vacuum-massage and soothing, healing, medicated vibration, as applied by means of the

Natural Sight Restorer

This system is prescribed and endorsed by practicing physicians—costs no more than one pair of good glasses—and in most cases

Renders Glasses Unnecessary.

If your eyes trouble you, —or your sight is failing—you should investigate this successful method at once. Neglected eye troubles frequently result in total loss of sight. Write today for **FREE BOOK ON CARE OF THE EYES**; this book also gives full particulars regarding our special offer of

3 Months' Treatment Free

to every purchaser of the **Natural Sight Restorer.**

Address

NATURAL SIGHT RESTORER CO.
53 Broadway, Detroit, Mich.



TO DESTROY THE FLY.—Of course flies are not a troublesome in winter as in summer, but they are just a dangerous. Health officials everywhere are calling attention to the necessity of destroying them when possible and of bakers always screening against them.

Dr. Delamarre, an eminent French army surgeon, has just published the result of his investigations concerning the contagion-bearing qualities of the ordinary house fly. Without hesitation he condemns that familiar insect to death. He points out that numerous plans for executing this sentence have been evolved by scientists of all time and of every country, but flies are apparently as numerous as ever.

He suggests a mixture composed of one part formalin to nine parts water. This may be put in ordinary plates and placed wherever flies are likely to congregate. Twenty-four hours later, says the doctor, not only the plates themselves, but a considerable space around them will be covered with flies and mosquitoes which the mixture and the emanations from the mixture have poisoned. The insects are attracted by the solution as though were sugar. To be perfectly effective, it should be changed every twenty-four hours.

Dr. Delamarre says that he has been using this insecticide in the hospitals under his control for the past ten

ALCOHOLISM

For allaying the feverish desire for drink, and in sustaining those who wish to give up the liquor habit,

Earl's Antol Treatment

is a demonstrated success in this country as well as abroad. It is daily receiving the grateful testimony of those whom it had benefited. No absence from business, no inconvenient conditions, or bad after-effects. Correspondence strictly confidential.



THE COST IS VERY MODERATE

Write at once for Booklet No. 5, containing full particulars and terms, to **JOHN C. EARL, Montclair, N. J., U. S. A.**, Sole Agent for U. S. A. and Canada.

Vibrate Your Body And Make it Well

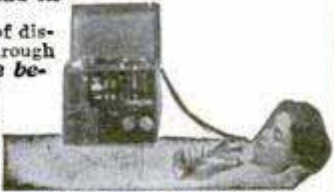
You have no *right* to be sick. Pain, suffering and disease are unnatural, they are *wrong*. It is your *duty* to be well. Don't try to *stand* pain—**CURE IT**. No matter what ails you—even if others have told you that your case was *incurable*—**DON'T GIVE UP HOPE**. The great natural forces, *Vibration and Electricity*, are curing more people today than all the drugs and doctors in the world put together.

THE WHITE CROSS ELECTRIC VIBRATOR combines both of these great natural curative agents. It gives you your choice of Vibration, Faradic and Galvanic Electricity, either separately or in combination, just as you wish. It relieves pain *instantly*, and its cures are permanent.

The White Cross Electric Vibrator cures the cause of disease. It sends the rich, red blood leaping and coursing through your veins and arteries *straight to where the disease begins*. It tones up your nerves and muscles and every vital organ. It makes you *fairly tingle with the joy of living*. Don't neglect the **FIRST** symptoms. If you feel "ran down," "out of condition," if you just feel "out of sorts" generally, *something is wrong*. The most serious diseases creep upon you unawares. The White Cross Electric Vibrator fills your body so full of vigorous, robust health that pain and disease cannot find a foothold.



Curing Stomach Trouble with Vibration.



Combined Electric Bath and Vibratory Treatment.



Making the Hair Beautiful with Vibration.



VIBRATION FOR THE RACKING BACKACHE OF WOMEN

FREE BOOK "Health and Beauty"

SEND TODAY for the magnificent free book, "Health and Beauty." This valuable work tells you all about the human body in health and disease in terms so plain, so clear, that anyone can understand. It tells you how you can get well and keep well, no matter what your trouble is. This book was not written for surgeons and physicians, but for you. Every page, every line, is thrillingly interesting.

Besides, this book tells you all about the wonderful White Cross Electric Vibrator—what it has done for thousands of others and what it will do for you. It tells you about the very special offers which we are making, for just a short time, on this wonder-working instrument, and how you can get a White Cross Electric Vibrator on a genuine free trial. Your name and address brings this intensely interesting book by return mail. Sign the coupon and mail it to us at once.

CURES THESE DISEASES AND MANY OTHERS

- | | |
|-------------|------------------|
| Headache | Nervous Debility |
| Catarrh | Bright's Disease |
| Insomnia | Heart Trouble |
| Toothache | Deafness |
| Indigestion | Stomach Trouble |
| Rheumatism | Scalp Disease |
| Neuralgia | Constipation |
| Earache | Lumbago |

All these and dozens of other chronic and acute diseases instantly relieved and permanently cured by Vibration and Electricity. Get our wonderful free book, "Health and Beauty." THEN you will know.

Vibrating Chair Free

With the White Cross Electric Vibrator, you can transform any ordinary household chair into a Vibrating Chair, equal in every respect to those used in the big hospitals and sanitariums. You can give yourself the same treatments, including the famous Swedish Movement treatments, that specialists and sanitariums charge \$2.00 to \$3.00 apiece for. This is only one of the many marvelous things that can be done with the White Cross Electric Vibrator exclusively.

Send Coupon Today For Free Book

DON'T DELAY A MINUTE. Whether you are sick or well, you should send for this book *anyway*. You cannot tell when you may need it and need it badly. When you do there will be no time to send for it. Learn *today* what vibration will do for you—for all your loved ones. Learn all about its wonderful health-giving powers. Learn how you can save all doctor bills and cure yourself right at home without expense.

SEND NO MONEY. just your name and address on the coupon. *But write today.*

LINDSTROM, SMITH CO.
253 LaSalle Street
Dept. 1024 CHICAGO

LINDSTROM, SMITH CO.,
253 LaSalle St.,
Dept. 1024 CHICAGO

Without obligations on me, please send free, prepaid, your book "Health and Beauty," on treatment of disease by Vibration and Electricity. Also free trial offer.

Name

Address



SIGN AND MAIL THE COUPON TODAY



We Cure Eye Troubles



SEND FOR OUR **Free Eye-Book** THEN TREAT YOUR OWN EYES

It doesn't matter what your eye trouble is, or how serious or chronic it may be, this great Eye-Book will show you how to treat your own eyes at home. No knife. No pain. No trouble. Not necessary to see a doctor.

Our book about eyes, sent free, tells all about it; things you ought to know, but which your doctor has never told you, and contains letters from many who have been cured.

A postal card will get the book and we will give you our free advice if you will write us a short description of your case.

Write now while you think about it. Address

North American Eye Specialists

2452 North American Building CHICAGO, ILL.

years and has never known it to fail. In a single room there were killed during one summer an average of 4,000 flies a day.—Bakers' Helper.

DEAFNESS

Successfully Treated
BY "ACTINA"



Ninety-five percent of the cases of deafness brought to our attention are the result of chronic catarrh of the throat and middle ear. The inner ear cannot be reached by probing or spraying, hence the difficulty to effect cures by old methods. That there is a scientific treatment for deafness and catarrh is demonstrated every day by the use of "Actina". "Actina" is also very successful in the treatment of asthma, bronchitis, sore throat, weak lungs, colds, headache and other ailments that are directly or indirectly due to catarrh. "Actina" will be sent on trial postpaid. Write us about your case. Our advice will be free as well as a valuable book—Prof. Wilson's Treatise on Disease. Address Actina Appliance Co., Dept. 320 D, 811 Walnut St., Kansas City, Mo.

your case. Our advice will be free as well as a valuable book—Prof. Wilson's Treatise on Disease. Address Actina Appliance Co., Dept. 320 D, 811 Walnut St., Kansas City, Mo.

6 Salome Poses, 50c

Beautifully Printed in Colors

The Famous SALOME DANCE

Especially posed as executed on the stage by Miss Gertrude Hoffman. Photos copyrighted by F. C. Bangs. One of the handsomest series of Poses ever printed. The complete set of six on ecru embossed photo mats, size 7x10, carefully packed and prepaid, only 50c. Also 4 entrancing Merry Widow Posters in colors after original designs by George McManus. The latest craze, 50c. Size 9x12.

Free Send \$1.00 for the four Salome Poses and four Merry Widow Posters at once, and we will include free Bryson's latest picture in ten colors entitled "The Devil." Size mounted, 9x14.

GORDON ART CO., Dept. D6, Chicago

EYES CURED

By New Discovery

Grateful Patrons Tell of Almost Miraculous Cures of Cataracts, Granulated Lids, Wild Hairs, Ulcers, Weak, Watery Eyes and All Eye Diseases—Send Your Name and Address with Two-Cent Stamp for Free Trial Bottle.



The cures being made by this magic lotion every day are truly remarkable. I have repeatedly restored to sight persons nearly blind for years.

Ulcers, wild hairs, granulated lids disappear almost instantly with the use of this magic remedy. Weak, watery eyes are cleared up in a single night and quickly restored to perfect health. It has repeatedly cured where all other remedies and all doctors had failed. It is indeed a magic remedy and I am glad to give this free trial to any sufferer from sore eyes or any eye trouble.

Many have thrown away their glasses after using it a week. Preachers, teachers, doctors, lawyers, engineers, students, dressmakers and all who use their eyes under strain find with this Magic Lotion a safe, sure and quick relief. If you have sore eyes or any eye trouble write me to-day. I am in earnest in making my offer of a free trial bottle of this lotion. I am glad to furnish proof in many well-proven and authentic cases where it has cured cataract after the doctors said that only a dangerous and expensive operation would save the sight. If you have eye trouble of any kind you will make a serious mistake if you do not send for my great free offer of this Magic Eye Lotion. Address with full description of your trouble and a two-cent stamp, H. T. Schlegel Co., 3253 Home Bank Bldg., Peoria, Ill., and you will receive by return mail, prepaid, a trial bottle of this magic remedy that has restored many almost blind to sight.

NO MORE BALD HEADS



When our VACUUM CAP is used a few minutes daily. We accept no pay until you have tried the Cap 60 days and are satisfied. The Vacuum Cap is an appliance that draws the blood to the Hair Roots and starts a new healthy crop of hair. It cures Dandruff, stops hair from falling out.

Bought by Doctors and men who

know that it is the only reasonable HAIR GROWER known to science. No Drugs Used. Write for application blank, testimonials, and booklet on "HAIR," sent sealed in plain envelope, FREE.

THE MODERN VACUUM CAP CO.

O, 559 BARCLAY, DENVER, COLO.

FREE ASTHMA TREATMENT

For five years I have been filling at my Drug Store, a Private Prescription for Asthma and Chronic Bronchitis that has worked wonders in the most stubborn cases. Those who have been helped and cured have recommended it to their suffering friends, and today it is going to every state in the Union. I am going to make it possible for every one afflicted to try my prescription. I will send eight days' TREATMENT FREE to every sufferer who will send me 10c to pay postage and packing. This Sample Treatment will relieve the most stubborn case. One man who had not slept in bed for years, was cured with my prescription. It will help you. Try it NOW. Send today, asking for prescription No. 9976. Address Claude O Jones, R. P., 6 C St., Battle Creek, Mich.

FREE DEAFNESS CURE

A Remarkable offer by one of the leading ear specialists in this country, who will send two months' medicine free to prove his ability to cure Deafness, Head Noises and Catarrh. Address DR. G. M. BRANAMAN, 126 East 12th Street, Kansas City, Mo.



**MONEY MEANS FREEDOM, LIBERTY,
INDEPENDENCE AND THE
POWER FOR GOOD**

Of the announcement on this and the opposite pages, justifies you in investing 10 cents in a book which may mean the making of your fortune

Just write your name & address right here



Name

Address

READ THESE LETTERS:

Thos. C. Land, General Manager, Con way Telephone Co., Pawnee, Okla.: I have read the book and consider it one of the best books published. It is worth more than its weight in gold. I would like to see every young man read this book. I can certainly recommend it.

O. A. Jackson, Mason City, Iowa: It is a great and good book.

James T. Castle, Manager Buckeye Engine Co., Pittsburg, Pa.: Have read the "Law of Financial Success" and find it of so much interest I want you to send me one-half dozen copies, as I would like to distribute same among my friends.

Harry A. Fries, Newark, N. J.: Book is O. K.; worth twice the money with \$10.00 added to it.

Chas. K. Mervine, of Mervine Bros., Philadelphia, Pa.: I have read it carefully and believe it should be read by every man. The price is out of all proportion to its value; after reading it I felt I owed you money. Enclosed find 50 cents in stamps for which mail five copies.

E. W. Potter, Rochester, N. Y.: It's a wonder, a think producer.

W. L. Wagner, of the Foos Gas Engine Co., Webb City, Mo.: I have read it through several times and some of the chapters a dozen times, each time with renewed interest. It teaches the way plainly how to live and make life really a pleasure under all conditions, beside the profit that naturally arises from the practice as taught. I cannot tell you in words just how well pleased I am with the book.

John G. Gretzinger, Fullerton, Cal.: It is worth its weight in gold to me, far better than I expected.

E. E. Byers, of the Brinson, Ricketts Realty Co., St. Louis, Mo.: My vocabulary is devoid of words to express my appreciation of your book, entitled "The Law of Financial Success."

Tear out this page, wrap a dime or stamps in it, enclose in an envelope & mail it to

THE FIDUCIARY COMPANY

Publishers

964 Tacoma Bldg.

Chicago, Ill.

and

Do it now

The book will be promptly sent postpaid. Whenever you wish to part with it, return it, and the 10 cents will be instantly refunded.

SEE OPPOSITE PAGE

Please Mention Popular Mechanics

Money Is The Symbol Of Nearly Everything That is
Necessary for Man's Well-being-With it, He Opens the Door To All
Sorts of Opportunities-Without it, He Does nothing Worth While.
SEND FOR THIS VALUABLE BOOK TODAY AND
LEARN THE LAW OF FINANCIAL SUCCESS

MAILED TO ANY
ADDRESS FOR

10
CENTS

Get This Book

MONEY IS YOUR BEST FRIEND

Every man and woman realizes it in this day and age.

It works for you through health and sickness and stands by you through thick and thin.

If you are unable to accumulate money—

If your spare money or savings are idle—

If you cannot make your money earn more than savings bank interest—

If you desire to be able to distinguish between good and bad investments, and secure the best profits, or

If you want to better your financial condition generally

You should get this book immediately and learn the laws governing success in the accumulation of money.

MAKING MONEY

is not difficult for the man who follows the instructions contained in the 16 chapters of this most successful book of the year. The tremendous editions enable the publishers to sell the book at 10 cents, a price at which no man can afford not to have a copy any more than he can afford to refuse payment for his work or services.

Put your name and address in hand on opposite page.

The Fiduciary Co.

964 TACOMA BLDG., CHICAGO, ILL.

THE LAW OF ... Financial ... SUCCESS

TELLS YOU IN PLAIN ENGLISH
THE DEFINITION OF MONEY AND ITS USES

HOW to place your mind in condition for proper judgment on matters pertaining to investments.

HOW to avoid fear and worry, and acquire the faith necessary for success in money making.

HOW to guide your ambition and utilize your latent abilities.

HOW to create and realize the desire for better financial circumstances.

HOW to concentrate upon your aim and persist until you achieve it.

HOW to help you analyze and develop the dormant or lacking attribute essential to success.

HOW to make money safely and judiciously, etc.

100,000 COPIES SOLD

104 PAGES

16 CHAPTERS

SPECIAL POCKET EDITION **10 CENTS**
PAPER BOUND.

SEE OPPOSITE PAGE

GREATEST

HISTORY OFFER

Complete Set
Sent to Your
Home
Free

Just Sign and
Mail the
Coupon
Now



HALF PRICE

Sent for **FREE** Examination

YOU KEEP ENTIRE WORK BY PAYING 50c DOWN

UNION BOOK COMPANY FAILS!

Here is the greatest opportunity ever offered our readers—an opportunity to secure at less than half price these fifteen beautifully bound volumes of the **Library of Universal History**. This is a brand new handsome edition, all printed from large new type, embellished with over 100 double page maps and plans, 700 full page illustrations, many of which are in colors, and more than 5,000 pages of solid reading matter, beautifully written.

The failure of the publishers, the **Union Book Co. of Chicago**, enables us to make this offer. Hundreds of sets of this splendid work have been sold for \$60, but we now name you a rock-bottom, bankrupt price of only 50 cents after examination in your own home and \$2.00 a month for 14 months. Only \$29.50 for this elegant library. We must close out the few remaining sets quickly.

We don't want you to buy this work until you give it a thorough examination in your own home. We send you the books themselves—not misleading sample pages. You see with your own eyes just what the books are. You examine them in the privacy of your own home. We pay the transportation charges. There is nothing for you to pay. If you don't want the work after the examination is ended just let us know and we will tell you how to ship them back to us at our expense. We show you these books as willingly as we would show them to you if you came into our store. And we make it easier because we ship the books to your own home.

We want you to sit down in your own home and read these books. Keep them for a week. Begin at the dawn of civilization and thread the paths down to the hour in which you live. And see in passing the men and events as you would have seen them if you in person had lived through all the ages that have passed. This splendid work should be in every home. The errors of the past teach a vital lesson. They are the danger signals along the pathway of progress. History foretells destiny. The same forces which caused the downfall of the "glory that was Greece and the grandeur that was Rome" are at work in America today. You should know them—your children should know them. Send the coupon and take advantage of this greatest offer ever made—this biggest opportunity to put a great historical work into your home.

The late Ex-President Cleveland said: "I am sure this history will find an important place among the publications intended to give wider familiarity with historical literature."

Dr. Frank W. Gunsaulus, President of Armour Institute of Technology, says: "It is a work of rare genius. Its thought is clear and vigorous, its English pure and elegant."

SEND THIS COUPON TODAY SEND NO MONEY.

This Coupon Brings the Books to Your Home FREE

Just send us the coupon—that is all you need do. We don't want you to send any money. The books will be sent to your home, transportation charges prepaid. We advise you to send the coupon today for certainly hundreds will take advantage of this extraordinary offer. Send now. Remember, a free examination for a week—books returnable at our expense if you do not wish to keep them. If you do wish to keep them, pay only 50 cents down and then only \$2.00 a month for fourteen months. Send the coupon today. You should see these books anyway.

American Underwriter's Corporation

240 Wabash Ave., Dept. 1144, - CHICAGO

AMERICAN UNDERWRITERS' CORPN., DEPT. 1144
240 WABASH AV., CHICAGO
Without expense or obligation, I would like to examine a set of the Library of Universal History in my home free for a week. If satisfactory, will keep and pay your special price, otherwise books to be returned at your expense.
Name
Address