

"Star" Foot and Power Screw Cutting Lathes

FOR FINE, ACCURATE WORK

SENECA FALLS MFG. CO.
695 Water Street,
Seneca Falls, N. Y., U. S. A.

ENGINE & FOOT MACHINE SHOP OUTFITS, TOOLS & SUPPLIES

SEBASTIAN LATHE CO. CINCINNATI, O.

Foot and Power and Turret Lathes, Planers, Shapers, and Drill Presses.

SHEPARD LATHE CO., 13 W. 24 St. Cincinnati, O.

GIANT STEAM SHOVELS

Toledo Ohio, U.S.A.

The Vulcan Iron Works Co.

THE NICKEL PLATE ROAD BETWEEN NEW YORK AND BOSTON AND CLEVELAND, FT. WAYNE AND CHICAGO

Lowest rates and elegant equipment makes this a favorite route between the above points. Through sleepers. Unexcelled dining car service. Individual club meals 35 cents to \$1.00 each. Also a la Carte. Full information on application to R. E. Payne, General Agent, 231 Main St., Buffalo, N. Y., or A. W. Ecclestone, D. P. A., 385 Broadway, New York City.

8 LIGHT DYNAMO \$26.50

Other sizes 3 to 300 Lamps

MOTORS

from 1-16 to 20 H. P.

Write for Bulletin

ROTH BROS. & CO.
27 S. Clinton St., Chicago

The Cushman Motor

never disappoints. The least weight for the power developed makes it the Best Boar and Auto Motor on the market. The New 1905 Model is better than ever. The engine proper is valveless. The cylinder, water jacket and head are cast in one piece. It is the simplest as well as the most efficient. Holds many speed records. Made in Single and Double Cylinder patterns. Prices make it economical. Cut shows 2 1/2 h. p. marine, weight 75 lbs. We make Auto Meters and Stationary Engines. Catalog free Agents Wanted.

CUSHMAN MOTOR CO.
2026 N Street, Lincoln, Neb., U. S. A.

PALMER MARINE and STATIONARY MOTORS

2 and 4 CYCLE

are no experiment, as they are in successful operation in all parts of the world. Launches in stock. Send for Catalogue.

PALMER BROS.,
Cos Cob, Conn.
New York Office, 34 W. 24th St.

Hydro-Carbon Motors

Headless Self-Contained

It is as easily controlled as a steam engine. Variable sparker. The only perfect moderate priced launch engine on the market. Let us convince you. Write to-day.

Grant-Ferris Co., Troy, N. Y.

THE CURTIS DOUBLE CYLINDER MOTOR

5 h. p. 60 lbs. Roller Bearings.

Capt. Baldwin's famous airship, the California Arrow, is propelled by this motor. Also our motorcycle, which holds the world's record of 10 miles in 8 min. 54 2/5 sec.

Catalog Free.

G. H. CURTIS MFG. CO.
Hammondsport, N. Y.

The WONDER ALTERNATOR

SOMETHING NEW

Just what you've been looking for. Only small cabinet alternating and direct current generator manufactured. The most interesting and useful piece of electrical apparatus ever offered. Can also be operated efficiently as a motor. Wound for any voltage up to 100. Weight 4 1/2 lbs. Send for descriptive circulars. Agents wanted.

THE R. M. CORNWELL CO.
406 S. Salina St., Syracuse, N. Y.

How To Increase Your Business

READ carefully, every week, the **Business and Personal Wants** column in the **Scientific American**

This week it will be found on page 330.

Some week you will be likely to find an inquiry for something that you manufacture or deal in. A prompt reply may bring an order.

Watch it Carefully

(9621) C. S. W. asks: It takes several years for light from the sun to reach the earth; the light we now see started from the sun years ago. If the sun's light were extinguished, would we continue to get sunlight for as long a time as it takes the light to reach the earth? On this theory, does an eclipse occur at the time we see it, or is it only the result that we see several years after the eclipse takes place? A. It requires 499 seconds for the light to come from the sun to the earth, and about one and one-third seconds to come from the moon to us. Hence, if the moon intercepts the light of the sun, we see the fact in one and one-third seconds after it happens. Whatever occurs on a distant star to affect its light, we see at such a time after it occurs as may be required for the light to pass over the space between us and that star. Anything that occurs on the sun is seen by us 8 minutes and 19 seconds after it occurs.

(9622) M. J. McC. asks: Does the part of a wagon wheel touching the ground while in motion stop while the other part of the outer rim revolve at the same velocity? I have heard this argued, but I confess I can't see how one part of the wheel could be in motion while the other was stationary. A. The part of the rim of a wagon wheel which is in contact with the ground is at rest while the rest of the wheel moves along in the direction in which the wagon is traveling, and the whole wheel moves around a line drawn through the center of the axle. Both statements are facts. We might add to this curiosity of motion that the top of the rim of the wheel moves forward in the direction in which the wagon is going twice as fast as the hub of the wheel moves. To understand the matter it is necessary to distinguish kinds of motion. The wheel has two certainly. It moves with a rolling motion over the earth; it rotates on its axle. Its motion of rotation as viewed by a fly which might be standing on one of the spokes is a continuous motion round and round, always repeating itself. The motion along the ground is of another kind. If a fly stood on the ground as the wheel passed by him, he would see a point of the rim come down to his side and stop. It would immediately begin to rise, and would go up high in the air only to descend again, and so on again and again. A point of a wheel in contact with the earth is not in motion with reference to the point of the earth on which it is pressing unless it is slipping backward, a condition which this case does not include. It is at rest therefore on the ground, but in motion around its hub or axle. Rest and motion are frequently relative. To some point a body may be at rest. To some other point it may be in motion. And it is sometimes quite puzzling to determine the rest and motion as it may be in reality. This is the case with some of the motions of the heavenly bodies. The motion of a wheel may be tested by taking a small circular disk and fastening a chalk crayon in a hole close to its edge. Then roll it along a fence in such a way that the chalk will mark a line on the boards. You will be interested in seeing its real path. You will see that it contains a point of rest. The curve traced by the crayon is called a cycloid.

INDEX OF INVENTIONS

For which Letters Patent of the United States were issued for the Week Ending April 11, 1905

AND EACH BEARING THAT DATE

[See note at end of list about copies of these patents.]

Adding machine, A. J. Postans.....	786,839
Advertising device, W. B. Hopkins.....	787,178
Air brake, Geltz & Hosack.....	787,329
Air compressor, hydraulic, W. G. Cox.....	787,350
Air ship, E. P. Wood.....	786,932
Anchor, J. W. Witmer.....	787,017
Animal trap, T. Bumann.....	786,949
Armor plate, F. G. White.....	787,065
Automobile, E. T. McKaig.....	786,916
Awning, W. L. Bundy.....	787,146
Axle box, car, W. F. Richards.....	786,993
Axle lubricator, J. Aden.....	787,255
Bag fastening, P. Rudisch.....	787,009
Bag frame, A. F. Fuller.....	787,165
Bag or the like, E. Greenbaum.....	786,804
Baling press, W. S. Bradshaw.....	786,948
Baling press, E. H. Taylor.....	787,008
Baling press, D. E. Darnell.....	787,052
Baling press, Kruse & Vanderwerth.....	787,194
Baling press, L. Trabue.....	787,235
Baling press feeder and packer, G. Christopher.....	786,873
Barrel, knockdown, W. E. Copithorn.....	786,875
Basin, W. Mattingly.....	787,202
Batteries, means for controlling the charging of storage, R. N. Chamberlain.....	787,024
Beating engine, J. E. Warren.....	787,063
Bedstead, invalid, W. C. Feely.....	787,162
Bicycles, etc., resilient handle bar for, M. Thiefelder, J. Hickler.....	786,857
Bit, See Drill bit.....	787,294
Blanket pin, S. Galloway.....	787,286
Blinder, E. Diedrich.....	786,878
Blower, steam jet, C. T. Coe.....	787,279
Boiler fire tube, steam, P. H. Seery.....	786,847
Boiler headers, apparatus for making serpentine, R. A. Barrett.....	786,794
Boll weevil exterminator, A. B. Carter.....	787,276
Bookcase, knockdown sectional, H. M. Amsden.....	786,940
Book hand rest, note, C. Arnold.....	787,140
Bottle, T. W. Russell.....	787,309
Bottle, non-refillable, G. T. Kenly.....	787,188
Bottle stopper, water, Schweinert & Kraft.....	787,118
Bottle storing case, J. J. Koons.....	787,300
Bottle washing machine, C. W. Desobry.....	786,877
Box-making machine, W. Corkhill.....	786,956
Brake, F. Davignon.....	787,151
Brake mechanism, N. T. Harrington.....	786,807
Brake shoe, E. P. Ollier.....	787,079

The Improved Method of FINISHING FLOORS

GRIPPIN MFG. CO. Newark, N. Y.

THE ELECTRICAL AGE

25 Cents a Copy

The Best Electrical Paper Published

THE ELECTRICAL AGE

3 West 20th Street, New York

LUFKIN TAPES AND RULES

ARE THE BEST.

For sale everywhere. Send for Catalog No. 16.

LUFKIN RULE CO.
Saginaw, Mich., U.S.A.
New York and London.

Every Gas Engine User

should learn about the Apple Automatic Sparker. Easily attached. No more belt, battery or commutator troubles. Increases power and speeds. For any kind of ignition apparatus write

The Dayton Electrical Mfg. Co.
98 Beaver Bldg. Dayton, Ohio.

BUFF

TRANSITS AND LEVEL

are used exclusively on the largest works where utmost precision is required. Send for new catalog No. 22.

THE BUFF & BUFF CO.
Boston, Mass.

Kerosene Oil Engine

Nothing but Kerosene Oil to run it

Simple, Safe and Efficient. Needs little attention, is less likely to get out of order, and is cheaper to run than any other engine manufactured. Economical and Easily Operated

International Power Vehicle Co.
Stamford, Conn.

MAXIMUM POWER—MINIMUM COST

If you use a pump for beer, lard, acids, starch, petroleum, brewer's mash, canner's linter, any acid or fluid, hot or cold, thick or thin you want to get the **TABER ROTARY PUMP** which does the most work at the least expense. Simply constructed. Can be run at any desired speed. Perfectly durable. All parts are interchangeable. Needs no skilled workman. Defects guaranteed. Catalogue free.

TABER PUMP CO., 32 Wells St., Buffalo, N. Y., U. S. A.

STEAM TURBINES.—THEIR CONSTRUCTION, OPERATION and Commercial Application.

SCIENTIFIC AMERICAN SUPPLEMENTS 1306, 1307, 1308, 1422, 1400, 1447, 1370, 1372. The articles have all been prepared by experts in steam engineering. Price 10 cents each, by mail. Munn & Co., 361 Broadway, New York City, and all newsdealers.

Bargains in Marine Engines

1 H. P., \$90.00
2 H. P., 111.00
3 H. P., 132.00
4 H. P., 156.00

Engine complete with everything ready to run. Write us at once.

Michigan Motor Co.
Grand Rapids, Mich., U.S.A.

If You Want the Best Lathe and Drill

GHUGKS

BUY WESTCOTT'S Strongest Grip, Greatest Capacity and Durability, Cheap and Accurate.

Westcott Chuck Co., Oneida, N. Y., U. S. A.
Ask for catalogue in English, French, Spanish or German.
FIRST PRIZE AT COLUMBIAN EXPOSITION, 1893.

Mark Your Tools

Here is a Marking Outfit with which tools of all shapes and sizes, hard or soft, can be neatly marked without injury. The outfit consists of a pointed steel scriber, one bottle of varnish, one bottle of etching fluid, one bottle of cleaning fluid, a camel's hair brush and full directions for using. All packed in a neat wooden box. Price \$15. Send for catalogue

SAWYER TOOL MFG. CO., Fitchburg, Mass.

The Patent Equalizing Driver

is one of the distinct and valuable features of Pratt's Improved Positive Driving Drill Chuck. Self-adjusting. Permits to enter and align drill accurately in chuck. Always true and impossible to slip while working. Patented taper steel sleeve. Every part constructed for durability.

PRATT CHUCK CO., Frankfort, N. Y.
European Representatives—Selig, Sennenthal & Co., 55 Queen Victoria St., London, England.

TERROR TO THIEVES!

ONE FREE

The cheapest and most effective Burglar Alarm ever made. Rouses entire household. Agents write for territory. Guaranteed article. Good money. Send stamp.

PERRY AUSTEN MFG. CO.,
320 Park Place, New York

Valuable Volumes

JUST OUT

Modern Gas-Engines
and
Producer-Gas Plants

By R. E. MATHOT, M.E.

314 Pages Bound in Cloth 152 Illustrations
Price \$2.50, Postpaid

A Practical Guide for the Gas-Engine Designer and User.
A book that tells how to construct, select, buy, install, operate, and maintain a gas-engine.
No cumbersome mathematics: just plain words and clear drawings.
The only book that thoroughly discusses producer-gas, the coming fuel for gas-engines. Every important pressure and suction producer is described and illustrated. Practical suggestions are given to aid in the designing and installing of producer-gas plants.
Write for descriptive circular and table of contents.

JUST PUBLISHED

American Tool Making and Interchangeable Manufacturing

By JOSEPH V. WOODWORTH

This is a complete practical treatise on the Art of American Tool Making and System of Interchangeable Manufacturing as carried on to-day in the United States. In it are described and illustrated all of the different types and classes of small Tools, Fixtures, Devices and Special Appliances which are or should be, in general use in all machine manufacturing and metal working establishments where economy, capacity and interchangeability in the production of machined metal parts are imperative.
All of the tools, fixtures and devices illustrated and described have been, or are, used for the actual production of work, such as parts of Drill Presses, Lathes, Patented Machinery, Typewriters, Electrical Apparatus, Mechanical Appliances, Brass Goods, Composition Parts, Mould Products, Sheet Metal Articles, Drop Forging, Jewelry, Watches, Metals, Coins, etc.
The treatment of each tool described and illustrated is such as to enable any Practical Man to Design, Construct and use Special Tools, Dies and Fixtures, in general the Rapid and Accurate Production of Metal Parts interchangeably.
To the Machinist, Tool Maker, Designer, Die Maker, Superintendent, Manager and Shop Proprietor this book shows the 20th Century Manufacturing Methods and Assists in Reducing the Expense and Increasing the Output and the Income. A book on the System of Interchangeable Manufacturing—The System that has Won for the United States the Industrial Supremacy of the World.

535 Pages Bound in Cloth 600 Illustrations
PRICE \$4.00

MECHANICAL MOVEMENTS

Powers, Devices, and Appliances

By GARDNER D. HISCOX, M.E.

Large Svo. 402 Pages. 1,649 Illustrations, with Descriptive Text. Price \$3.00.

MECHANICAL APPLIANCES

Mechanical Movements and Novelties of Construction

By GARDNER D. HISCOX, M.E.

Being a Supplementary Volume to the Author's Work entitled MECHANICAL MOVEMENTS, POWERS AND DEVICES. Contains 1,000 Special Made Engravings. 400 pages. Cloth Bound.

Price \$3.00.

The above two volumes sold together for \$5.00 postpaid.

A Complete Electrical Library.

By PROF. T. O'CONNOR SLOANE.

An inexpensive library of the best books on Electricity. Put up in a neat folding box, as shown in cut. For the student, the amateur, the workshop, the electrical engineer, schools and colleges. Comprising five books, as follows:

Arithmetic of Electricity 138 pages, \$1.00
Electric Toy Making, 140 pages, \$1.00
How to Become a Successful Electrician, 189 pages, \$1.00
Standard Electrical Dictionary, 692 pages, \$3.00
Electricity Simplified, 158 pages, \$1.00

A valuable and indispensable addition to every library.
Our Great Special Offer.—We will send prepaid the above five volumes, handsomely bound in blue cloth with silver lettering, and inclosed in a neat folding box, as shown in illustration, at the special Price of \$5.00 for the complete set. The regular price of the five volumes is \$7.00.

JUST PUBLISHED

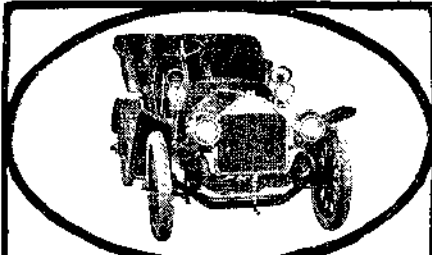
American Estates and Gardens

By BARR FERREE

4to. 11 x 13 1/2 inches. Illuminated Cover and 275 Illustrations. 340 Pages. Price \$10.00

Special circular of contents of these volumes sent free

MUNN & CO.
361 Broadway New York City



PEERLESS Direct Drive TOURING CARS

are justly celebrated for the correctness of their mechanical construction. Every mechanical detail of the 1905 models has been simplified and perfected.

The new Peerless motors are of unique design, simple in construction and instantly accessible. They are exactly like the motor in the famous "Green Dragon," the holder of all world's records. These new motors show wonderfully increased power and have created a decided sensation.

Write for 1905 Catalogue

which shows the graceful lines of the new Peerless models, explains the Peerless mechanical simplicity and gives the reasons for the greater efficiency of the new Peerless motors.

24 H. P. \$3,200 35 H. P. \$4,000 60 H. P. \$6,000

The Green Dragon booklet, giving a complete record of the Peerless racing season is sent on request.

PEERLESS MOTOR CAR CO. 38 Lisbon St., Cleveland, Ohio Member Association Licensed Automobile Manufacturers.

THE ELECTRICAL AGE 25 Cents a Copy The Best Electrical Paper Published THE ELECTRICAL AGE 1 West 29th Street, New York

\$39.50 BUYS THIS We save you dealer's profits. Ship on approval 30 days free trial. Money back if not satisfactory. Send for 200 page Style Book containing 152 wonderful bargains. UNION BUGY CO. Dept. 849 Pontiac, Mich.

8 REASONS WHY THE Locomobile is "Easily the Best Built Car in America" 1. Standard design. 2. No freak features. 3. Special material. 4. All material analyzed. 5. Forgings throughout. 6. Interchangeable parts. 7. Solid forged axles. 8. Indestructible bearings. Locomobile Co. Bridgeport, Conn.

GLOBE MARINE GASOLINE ENGINE Thoroughly Reliable Simple in Construction Unsurpassed as Auxiliary Power Suitable for Launches or Working Boats WRITE FOR CATALOGUE PENNSYLVANIA IRON WORKS CO 5009 Lancaster Avenue, PHILADELPHIA, PA.

\$95.00 Buys our Fishing Launch 12 or 14-ft. Equipped with our celebrated 3/4 H. P. motors. Known over the world as the "Bull Pup." Complete catalog of engines for asking. FAIRFIELD MOTOR WORKS, Fairfield, Conn.

The Nickel Plate Road between New York and Boston and Cleveland, Fort Wayne and Chicago. Lowest rates and elegant equipment make this a favorite route between the above points. Very low Colonist rates to the Pacific Coast and the far West until May 15th. Famous dining car service. Individual Club Meals 35 cents to \$1.00. Also a la Carte. A. W. Ecclestone, D. P. A., 385 Broadway, New York City.

A MONEY MAKER Hollow Concrete Building Blocks, Best, Fastest, Simplest, Cheapest Machine. Fully guaranteed. THE PETTYJOHN CO. 513 N. 9th Street, Terre Haute, Ind.

THE Nalite Vapor Lamps For Home, Store and Street We also manufacture Table Lamps, Wall Lamps, Chandeliers, Street Lamps, Etc. 100 Candles Power seven hours ONE CENT. No Wicks. No Smoke. No Odor. Absolutely safe. THEY SELL AT SIGHT. Exclusive territory to good agents. Write for catalogue and prices. Chicago Solar Light Co., Dept. G, Chicago

Table listing various mechanical items and their prices, including Brake shoes, Bread preserving device, Brush cleaner, Building blocks, and many others.

This Box of Cigars Free to You We want to send you a sample box of La Reclama Examiner Cigars without any cost except postage. There is no charge whatever for these trial cigars. We know from experience that a trial will make you a permanent customer.

We Want Every Smoker In The UNITED STATES To Know LA RECLAMA CIGARS With such demonstrated success we now, to introduce our Examiner Cigars, make this original and startling offer of a sample box absolutely FREE. Year in and year out we get thousands of testimonials from all parts of the United States.

MICROSCOPES New Students' Compound Microscope, full outfit, \$6.00 New Small Laboratory Microscope, full outfit, \$9.00 New Large Laboratory Microscope, full outfit, \$18.00

SAFETY FOR CYCLISTS. "When cycling do not trouble borrow. But brake yourself with the safe MORROW." Every wheelman in the country ought to know that the greatest security for himself and his machine is afforded by the attachment of THE MORROW BRAKE.

Mullins Stamped Steel Boats Can't Sink Motor Boats, Row Boats Hunting and Fishing Boats Staunchly built of strong, rigid steel plates, with air chambers in each end like a life boat—buoyant—strong—safe—speedy. They don't leak, crack, dry out, wear out or sink.



Among all automobiles the Cadillac stands pre-eminent for its low cost of maintenance. Simple, durable, common-sense construction makes it truly the "Car of Economy."

Because of simplicity of power-development and efficiency of transmission there is practically no energy lost in the Cadillac—a feature which alone reduces by a big percentage the cost of fuel, lubrication, etc.

The Cadillac mechanism is designed with a view to making it virtually trouble-proof, with the result that the liability of damaging the motor or its connections through a mistake in manipulation is reduced to a minimum. Absolute control at all times and under all conditions is maintained more easily—with fewer things to think of—in the Cadillac than in any other machine. This means that the Cadillac is the safest, the most reliable and most easily operated of all motor cars.

Model F—Side-Entrance Touring Car shown above, \$950.
Model B—Touring Car, with detachable Tonneau, \$900.
Model E—Light, stylish, powerful Runabout, divided seat, \$750.
Model D—Four-Cylinder, 30 h. p. Touring Car, \$2,800.

All prices f.o.b. Detroit.

Write for Catalog N, and address of nearest dealer, where you can see and try a Cadillac.

CADILLAC AUTOMOBILE CO.,
 Detroit, Mich.
 Member A. L. A. M.

THE ELECTRICAL AGE
 25 Cents a Copy
 The Best Electrical Paper Published
THE ELECTRICAL AGE
 3 West 29th Street, New York

A. W. Faber
 Manufacture Established 1761.
 Lead-Colored Slate Pencils, Rubber Bands, Erasers, Inks, Penholders, Rubbers, Water Colors, Improved Calculating Rules.
 Send for descriptive Circular S.
 44-60 East 23d Street, New York, N. Y.
 Grand Prize, Highest Award, St. Louis, 1904.

HAYNES
 Model M Convertible \$1500

FEATURES
 Shaft drive with "Haynes" Sprocket and Roller Gear no chain drive and noise nor breaking links—four times the strength of beveled gears.
 The only Roller Bearing Motor in the world—will develop 20 horse power.
 One piece Nickel Steel rear axle. Weldless steel front axle. Cast Aluminum Seats.
 Roller Bearings throughout.
 The very best Hand Buffed Leather and Curled Gray Hair used in upholstery.
 Eighteen coats of paint and varnish.
 Three speeds ahead and reverse.
 Single lever control.
 Built in an Automobile factory.
 Compare these features with the entire market—then buy where you get the best value.
 Haynes cars are the result of 12 years' experience in motor car building. Send for descriptive catalogue—visit the factory or let's arrange for a demonstration with our nearest agent.
The HAYNES-Apperson Co., Kokomo, Ind.
 Member A. L. A. M.
 PIONEER BUILDERS OF GASOLINE CARS IN AMERICA
 1715 Broadway, New York 1490 Michigan Ave., Chicago

Fruit gathering device, E. Tatum.....	786,855
Fruit picker, F. Fisher, Jr.....	787,164
Fumigator and insect-destroyer, J. A. Frazier	786,965
Furnace door, E. E. Slick.....	786,851
Furnace hearths, means for protecting blast,	
Dinkey & Brassett.....	787,282
Furnaces, reversing valve for regenerative,	
J. Reuleaux.....	787,222
Game apparatus, E. Fall.....	787,161
Game, ball and bat, E. Rosenthal.....	786,907
Garment supporter, H. E. Crandall.....	786,870
Gas burner, W. McLaughlin.....	786,830
Gas burner, F. M. Ashley.....	787,321
Gas furnace, J. C. Swinell.....	787,131
Gas-lighting device, A. F. Williams.....	786,928
Gas retort stand pipe, J. H. Taussig.....	787,061
Gas safety valve mechanism, automatic, E.	
Leadbeater.....	787,195
Gate, Van de Walker & Jenney.....	787,242
Gate operating mechanism, J. E. Stinton.....	787,129
Gates, variable counterpoise for, Hawkes-	
worth & McCulloch.....	787,175
Gear, transmission, G. R. Albrecht.....	786,939
Gear, variable speed, F. W. Schroeder.....	786,845
Gearing, S. H. Hanson.....	787,330
Gearing, compensating, E. C. Doolittle.....	787,085
Gearing, variable speed, W. C. Conant.....	787,080
Glass molding machine, E. Miller.....	787,050
Glass strips, splitting longitudinally scored,	
P. Semmer.....	787,122
Gooseneck connection, A. W. Nicholls.....	787,211
Governing device, R. B. McGowan.....	786,984
Grading implement, R. S. Shelton.....	786,848
Grain conditioner, C. E. Oliver.....	787,108
Grain spout, A. W. Hamler.....	787,291
Grinding and polishing wheel, hood, H. N.	
Middleton.....	787,340
Gun carriage, recoil, A. H. Emery.....	786,964
Guns, mounting and operating, A. H. Emery	
Hair drying comb, T. P. Cheevers.....	787,148
Hammer attachment, drop, R. F. Massa.....	787,339
Hammer, power, Heinrich & Dorsch.....	787,331
Harrow, Smith & Kindred.....	787,004
Harrow, O. Tower.....	787,011
Harrow and cultivator, J. A. Beard, Sr.....	787,263
Harvester and husker, corn, E. Hollis.....	786,811
Harvester attachment, corn, J. Wilcox.....	787,246
Harvester, hook, C. Beal.....	787,282
Hat and coat hanger, W. E. Arlingst.....	786,869
Hat frame forming device, E. A. Howe.....	787,042
Hats, portable holder for ladies', M. S. Hell-	
man.....	787,098
Hay press, H. M. Tallman.....	787,132
Headlight, dash, F. W. Dressel.....	787,158
Heat storage box, C. N. Rounseville.....	786,999
Heater. See Water heater.	
Heating systems, etc., drain attachment for	
steam, Gifford & Nistle.....	787,094
Heel, boot or shoe, J. O'Meara.....	786,986
Heel, detachable, F. B. Moss.....	787,306
Heel plate, felt, D. Smith.....	787,226
Hide or leather working machine, G. W.	
Baker.....	787,259
Hinge cutting machine, G. B. Taylor.....	787,232
Hoisting apparatus, J. Spelman.....	787,058
Hoisting machines, automatic safety switch	
for, O. S. Hertzog.....	786,809
Honey extractor, F. G. Marbach.....	787,104
Horse detacher, D. C. Bruner.....	787,270
Horses, device for the breaking in of, H.	
Schuleter.....	787,116
Horseshoe, E. A. Hennessy et al.....	786,966
Horseshoe, metal, C. Heart.....	787,007
Hydraulic coupling, J. J. Delephant.....	787,154
Incandescent-lighting fixture, L. R. Hopton	
Indexing, book, R. C. Pohl.....	787,111
Injector, Kremer & Alderfer.....	786,906
Inking device for numbering or marking	
machines, etc., F. W. Merrick.....	786,910
Inkstand, E. Davis.....	786,959
Insulator, telegraph or telephone wire, Mc-	
Daniel & Graves.....	787,107
Iron from ore separating tanks, means for	
recovering magnetic, E. S. Bennett.....	786,946
Japanning small articles, machine for, T.	
A. Perrins.....	787,213
Juice extracting machine, J. W. Hyatt.....	786,982
Juice extracting machine link and chain, J.	
W. Hyatt.....	786,903
Keyhole guard, R. I. Robeson.....	786,842
Knee rest or support, E. C. Bispham.....	787,068
Knitting machine, J. W. Adams.....	786,938
Knitting machine stop motion, G. W. Ruth	
Knockdown box or crate, J. R. Thomas.....	787,115
Ladder handle forming machine, J. S. Stev-	
enson.....	787,128
Lamp air baffler, T. S. Leese.....	787,196
Lamp, alcohol, Sternau & Strassburger.....	787,006
Lamp, electric arc, B. Jackisch.....	787,043
Lamp, gas, J. & G. G. Doorenbos.....	787,086
Lamps, automatic safety extinguisher adapt-	
ed to single and duplex burners for oil,	
W. H. Keefe.....	786,917
Lantern pinion, E. W. Horn.....	787,041
Laundry dampening tool, H. M. Forbes.....	786,889
Lawn-trimmer, J. H. E. Peters.....	787,214
Leg, artificial, C. B. Winn.....	787,250
Lintel construction, J. Kahn.....	786,820
Locomotive fire box, C. Sandenbilit.....	787,241
Log turning device, D. Simmons.....	787,125
Loom protecting mechanism controller, J.	
Robinson.....	787,114
Loom shedding motion, P. Dietz.....	787,026
Loom take-up mechanism, Crompton & Fit-	
ton.....	787,281
Lorry or dumping-car, Wellman & Seaver.....	786,926
Lubricator, C. Callahan.....	786,871
Lubricator, E. Denegre.....	787,155
Marker and punch, interchangeable, E. J.	
Hansen.....	787,348
Match deliverer, lighter, and cigar cutter,	
combined, P. La Belle.....	787,334
Mattress, pneumatic, R. B. Wiltis.....	786,930
Mattresses, etc., stay for pneumatic, F.	
Webb.....	787,137
Mechanical movement for controlling thread-	
ing dies, F. H. Easby.....	786,882
Metallic leaf, machine for forming package	
rolls of, W. H. Coe.....	786,953
Milk, condensed, S. R. Kennedy.....	787,044
Milk cooler, A. W. Lichtfeld.....	786,822
Mine-curtain raiser, G. W. Manlove.....	787,200
Miner's dumping cage, F. C. Kerst.....	787,189
Mirror support, adjustable, J. Banderob.....	787,260
Miter box, F. Stuebe.....	787,030
Molding machine, E. D. Misher.....	787,030
Molding machine, A. Cheliniere.....	787,078
Molding machine, D. W. Lloyd.....	787,198
Motor. See Car motor.	
Motors, operating alternating current, W.	
A. Layman.....	787,336
Movement cure apparatus, M. E. Gibson.....	787,168
Music leaf turner, B. Burke.....	787,272
Musical instrument, stringed, F. X. Audet	
Nail feeding mechanism, J. L. Perkins.....	786,835
Nail holder, J. E. Plank.....	787,217
Napping machine, H. S. Greene.....	787,098
Nut lock, T. B. & M. F. Earhart.....	787,048
Oil burner, Kipling & Worden.....	787,045
Opera chair, A. Lazarus.....	787,337
Ophthalmoscope, H. L. De Zeng.....	787,083
Ore concentrator, P. H. Craven.....	786,799
Ore roasting furnace, A. C. Johnson.....	786,905
Ores or compounds preparatory to smelting,	
treating sulfid, Huntington & Heberlein	
Organ, reed, D. Schustek.....	786,814
Oven deflector, J. F. Bixler.....	786,947
Packing, metallic, W. H. Law.....	786,976
Packing washer, C. G. Ette.....	787,160
Palette and color dish, combined artist's,	
R. W. Semple.....	787,123
Paper machine, K. E. Rogers.....	786,996
Partition construction, R. Markgraf.....	786,826
Pasting box, H. G. La Sor.....	786,975
Pen fountain, S. H. Hooges.....	786,967
Pen, self-filling fountain, J. T. Davidson.....	787,152
Pencil sharpener, E. Woodbury.....	786,933
Pendulum mill, J. Wustenhofer.....	787,018
Phase-rotation indicator, R. F. Schuchardt.....	787,345
Photographic plates or the like in open day-	
light, developing, J. N. Ludwig.....	787,103
Piano actions, bracket for grand, E. Born-	
hoef.....	787,069
Piano, etc., back, J. Breckwoldt.....	787,268
Pianos, coin-controlled actuating mechanism	
for automatic, A. J. Hobart.....	786,899
Picture-exhibiting apparatus, R. Cohen.....	786,954
Picture book, B. Lehman.....	786,977
Pie-making machine, J. C. Hutchison.....	786,816
Pipe connection, sewer and soil, W. F. J.	
Lutz, reissue.....	12,337
Pipe or hose coupling, W. J. Williams.....	786,929

Rushton **Canoes**
 ORDER NOW
INDIAN GIRL MODEL
 Combines speed with lightness, strength with gracefulness, and is built throughout of seasoned white cedar covered with best quality canvas. Lengths 15, 16, 17, 18 feet. Price, packed, \$32 to \$44. Send for catalogue of pleasure boats, all-cedar and canvas-covered canoes, oars, paddles, sails and fittings.
J. H. RUSHTON, 819 Water Street, Canton, N. Y.

IN CASE OF ACCIDENT
 IT IS GOOD POLICY
 To have for immediate use
 Our U. S. Emergency Case
 containing all necessary
 appliances and remedies.
 Sterilized and antiseptic.
 Neatly arranged in beauti-
 ful handy metal case—
 with full instructions for
 "First aid to the injured."
 Indispensable to the traveler, autoist, work-
 shop and the home. Sent to any address on
 receipt of \$1.00. Agents Wanted.
U. S. EMERGENCY CASE CO.
UTICA, NEW YORK

WILLIAMS' SHAVING SOAP
 "The only Real Shaving Soap"
 Williams' Shaving Sticks, Shaving Tablets, Toilet Waters, Talcum Powder, Jersey Cream Toilet Soap, etc., sold everywhere.
 Write for booklet "How to Shave"
THE J. B. WILLIAMS CO.
 Glastonbury, Conn.

THE "BEST" LIGHT
 The most brilliant, economical light made. Our light gives 100-candle power at the small cost of 2c per week.
 Is portable and there is no dirt, grease, odor or smoke. Over 100 different styles every one warranted.
 Agents wanted Everywhere.
THE BEST LIGHT CO.
 Successors of Original Inventors.
 87 E. 3rd St., Canton, O.

Agents Wanted
 in every locality. Attractive inducements for permanent, profitable occupation. Previous experience not required.
KEYSTONE Fire Extinguisher
 Examined and approved under the standard of the National Board of Fire Underwriters—the cheapest and best approved extinguisher. In some localities this agency can be carried with other business interests. Write to-day for booklet and full particulars.
JAMES BOYD & BROTHER
 18 N. Fourth Street, Philadelphia, Pa.
 Mfrs. of Fire Protection Equipment.

THE IDEAL LAWN MOWER GRINDER
 This machine will grind a lawn mower perfectly in 15 minutes, and is destined to revolutionize the whole business. Greatly improved over old models, and is now perfection. Energetic men and boys make \$10 per day using it. Nothing like it on the market.
 For prices, etc., address the manufacturers.
THE ROOT BROS. CO., Plymouth, Ohio

HOW TO MAKE AN ELECTRICAL Furnace for Amateur's Use.—The utilization of 110 volt electric circuits for small furnace work. By N. Monroe Hopkins. This valuable article is accompanied by detailed working drawings on a large scale, and the furnace can be made by any amateur who is versed in the use of tools. This article is contained in SCIENTIFIC AMERICAN SUPPLEMENT No. 11, 1905. Price 10 cents. For sale by MUNN & CO., 361 Broadway, New York City, or by any bookseller or newsdealer.

BUILD YOUR OWN BOAT BY THE BROOKS SYSTEM

THERE is no reason why you cannot own as good a boat as the best boat factory can produce if you will use your leisure time to advantage and build it yourself. The fact that anyone using the **Brooks System**, no matter how inexperienced he is in the use of tools, can build his own boat at the cost of a little lumber and a few nails, has brought boats within the reach of all. All the boats built last year, by all the boat factories in the United States, combined in one fleet, would not equal the number of boats built during the same time by novices using the **Brooks System**. You will find pages of testimonials from these successful amateur builders in our catalogue.

The **Brooks System** consists of exact size printed paper patterns of every piece that goes into the boat, a complete set of half-tone illustrations, showing an actual picture of each step of the work properly done, detailed instructions to build, covering the entire construction of the boat, and an itemized bill of all material required and how to secure it.

We tell you how to lay the pattern of each particular part the proper piece of material and exactly how to cut—you cut. We then tell you how to fasten each part in its right place—what kind of a nail to use—how to drive it—your drive it.

You need no mechanical ability, the **Brooks System** supplies this—how is shown in the catalogue.

Many professional men are taking up the **Brooks System** for mental relaxation—for the pleasure of working with their hands and for exercise.

We have started hundreds in the boat-building business. One man built sixteen boats from one set of patterns last season—another built ten—the materials cost very little—we furnished the design—they did the work and sold the boats at a big profit.

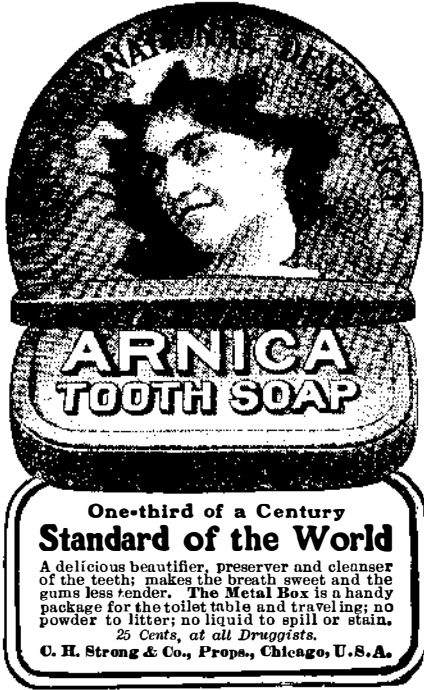
You need buy nothing from us but the patterns. We have them of all kinds and sizes, from a small rowboat to a 51-foot cruising yacht.

Over six thousand amateurs successfully built boats by the **Brooks System** last year.

When so ordered, Patterns are Express, the Charges Prepaid, C. O. D., Allowing Examination.

KNOCK DOWN BOATS COMPLETE
 from keel to cushions and fittings. We send you a complete Knocked Down Boat, even to the paint, at a cost of very little more than the cost of the raw material.
 Catalogue with full particulars free. For 25 cents, 100-page catalogue, showing several working illustrations taken from the instructions of each boat and a full set for one boat; also valuable information for the amateur yachtsman, rules for sailing, steering, passing, fog and engine signals, etc.

BROOKS BOAT MFG. CO.
 ORIGINATORS OF THE PATTERN SYSTEM OF BOAT BUILDING
 404 SHIP STREET, BAY CITY, MICH.. U. S. A.



ARNICA TOOTH SOAP

One-third of a Century Standard of the World

A delicious beautifier, preserver and cleanser of the teeth; makes the breath sweet and the gums less tender. The Metal Box is a handy package for the toilet table and traveling; no powder to litter; no liquid to spill or stain.

25 Cents, at all Druggists.

C. H. Strong & Co., Props., Chicago, U.S.A.

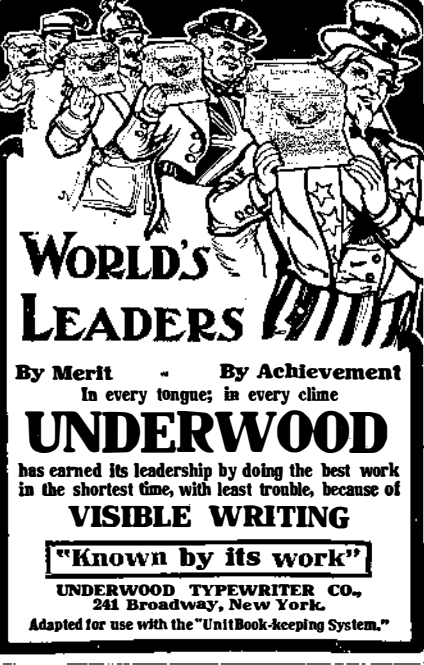
THE ELECTRICAL AGE

25 Cents a Copy

The Best Electrical Paper Published

THE ELECTRICAL AGE

3 West 29th Street, New York



WORLD'S LEADERS

By Merit - By Achievement

In every tongue; in every clime

UNDERWOOD

has earned its leadership by doing the best work in the shortest time, with least trouble, because of

VISIBLE WRITING

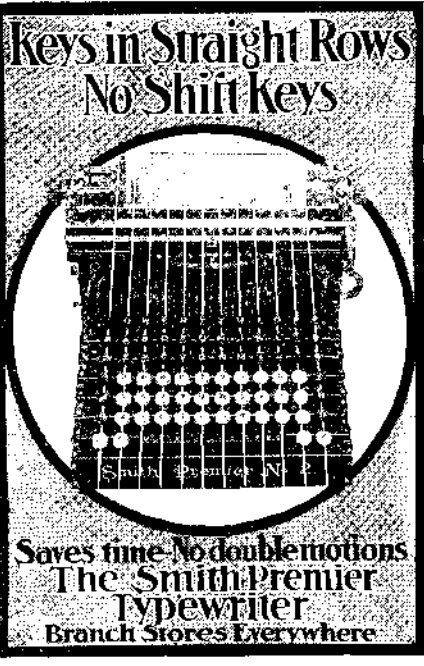
"Known by its work"

UNDERWOOD TYPEWRITER CO., 241 Broadway, New York.

Adapted for use with the "Unit Book-keeping System."

Keys in Straight Rows

No Shift keys



Saves time No double motions

The Smith Premier Typewriter

Branch Stores Everywhere

TYPENRITERS ALL MAKES

All the Standard machines SOLD or RENTED ANYWHERE at HALF MANUFACTURERS' PRICES. Shipped with privilege of examination. Send for list.

Typewriter Emporium, 90 Nassau St., Chicago

To Gas Engine Operators

Dynamo Ignition.

Motsinger Auto-Sparker

No battery to start or run. The original speed controlled friction-drive Dynamo. Driven parallel with engine shaft. No belts. No bevel pulley or beveled fly wheel necessary. For make and break at jump-spark system. Water proof dust proof. FULLY GUARANTEED.

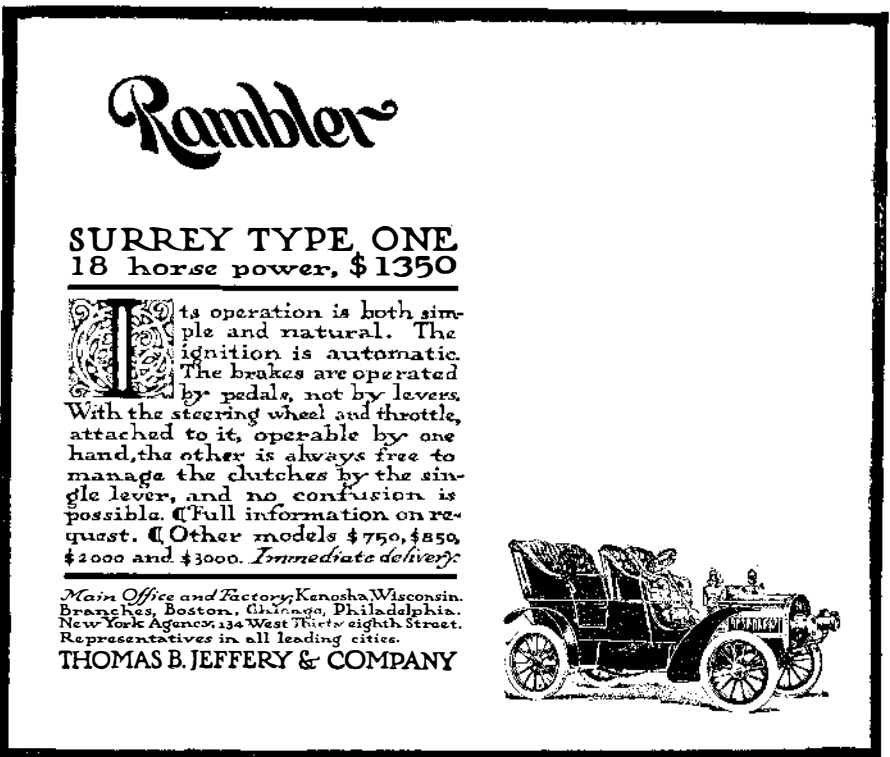
MOTSINGER DEVICE MFG. CO., 14 Main Street, Piquette, Ind., U.S.A.

Pipe or like joint, F. W. Buhne.....	787,074
Pipe union, J. Broppson.....	787,144
Pipe wrench, A. E. Powell.....	786,992
Plane, E. A. & A. F. Schade.....	787,654
Plow, A. G. Perry.....	786,536
Plows, adjustable scraper for rotary disk, W. O. Wimer.....	787,016
Potato digger, M. Altstock.....	786,792
Powder, means for manufacturing multiperforated bodies of smokeless, H. Maxim.....	787,105
Press, valve-operating mechanism, J. M. Stuart.....	787,007
Printing, color, M. A. McKee.....	787,209
Printing machine offset mechanism, H. M. Barber.....	787,141
Printing machine, stencil, C. L. Burdick.....	787,271
Printing of calendars, cash and ticket blocks, etc., machine for the, H. Stamm.....	786,852
Printing press, J. E. Cass.....	786,872
Propulsion of ships, apparatus for, W. T. Donnelly.....	787,084
Pulley, self-lubricating, S. W. Wardwell.....	786,864
Pulley, sheet metal sash, P. Dosh.....	786,861
Pump, J. Scholl.....	787,117
Pump, D. M. Watson.....	787,244
Pump, Wilson & Mansell.....	787,247
Pump, W. M. Price.....	787,305
Pump, centrifugal, Smith & Sherrerd.....	786,922
Pump, centrifugal, E. G. Harris.....	787,039
Pump, current operated, Dawson & Hamilton.....	787,153
Pump-governing device, R. B. McGowan.....	786,915
Pump, oil, F. J. Young.....	786,937
Pumping jack, oil well, R. G. Strother.....	786,854
Punch, W. Ross.....	787,052
Punch-cutting machine, J. W. Lewis.....	787,197
Punching machine, F. Nutting.....	786,834
Punching machine, J. A. Groebli.....	786,890
Punching machine, multiple, E. A. Stickey.....	786,853
Puzzle, J. D. Midson.....	787,204
Quilting frame, C. Carter.....	787,277
Radiator, J. F. Flaherty.....	786,886
Radio-active substances, instrument for rendering visible the luminous effects produced by, F. H. Glew.....	787,170
Rag cutter mechanism, C. W. Griffin.....	787,290
Rail joint, J. T. Quak.....	787,220
Rails, compound hinge for depressible, C. J. Diebold.....	787,326
Railway bumping post, B. Haskell.....	786,805
Railway carriage coupling, automatic, J. Willison.....	786,868
Railway collisions, apparatus for preventing, H. Gerstmann.....	787,029
Railway construction, C. S. Seitz.....	787,003
Railway, elevated, J. Cooper.....	786,874
Railway rail guard clamp, E. H. Johnston.....	787,186
Railway signal, O. W. Hart.....	786,894
Railway switch, H. Phillips.....	787,216
Railway tie, Earnest & Gilchrist.....	786,962
Railway tie, McElfatrick.....	786,982
Railway tie, M. H. Mahar.....	787,040
Railway track appliance, C. A. Sanborn.....	786,919
Ratchet drill, F. C. Torrance.....	787,234
Razor, safety, B. Hirschfeld.....	786,895
Razor strop, G. E. Maier.....	787,304
Reel, See Fishing reel.....	
Refrigerator, F. A. Hickson.....	786,810
Register system, A. Fevola.....	787,163
Respirator, W. G. Gates.....	787,167
Rheostat, F. E. Goodall.....	787,092
Ride magazine attachment, M. H. Cotton.....	786,798
Rock crusher, E. C. Bacon.....	787,322
Rocking chair, G. F. Hall.....	787,171
Rocking chair, C. D. Koester.....	787,299
Rods and their supports or other similar devices together, means for attaching, F. M. Seamans.....	786,846
Rotary engine, J. R. Scofield.....	787,224
Rubber patch, C. O. Tingley.....	787,010
Sad iron, P. C. Greenawalt.....	787,289
Sad iron, O. Tveraaahl.....	787,316
Sash fastener, adjustable, L. Morrish.....	786,909
Sash fastener, R. C. Wright.....	786,936
Sawmill set works, W. H. Trout.....	787,135
Scaffolding, A. Tingley.....	787,233
Screen, A. V. Siler.....	787,312
Screw-cutting tool, C. W. Phillips.....	786,990
Scribing tool for carpenters, etc., D. M. Barnett.....	787,142
Seaming sheet metal bodies, machine for end, M. J. Kenny.....	786,973
Separator liner, centrifugal, C. A. & O. W. Hull.....	787,179
Sewed article seamer, R. G. Woodward.....	786,934
Sewing machine, buttonhole, J. T. Hegan.....	787,177
Sewing machine feed mechanism, F. W. Merrick.....	786,909
Shackle, spring, F. E. Geibel.....	787,288
Shade and curtain hanger, window, M. Van Boxel.....	787,239
Shade hanger, W. A. Worthington.....	787,252
Shearing machine valve, E. H. Carroll.....	787,324
Sheathing plate, H. Mortenson.....	787,207
Sheet metal vessels, dies for drawing, E. R. Stodard.....	787,059
Ships, hydraulic support for, G. & K. Prochazka.....	786,840
Show case, F. Pollard.....	786,837
Show case, H. J. S. Lewis.....	787,048
Show case bracket and fixture, G. C. Wright.....	786,935
Signal device, electric, L. S. Walle.....	787,318
Signaling and telephoning on electric trolley or other systems, means for, C. R. Van Trump.....	786,925
Signaling system, electric, Robinson & Broadhurst.....	786,843
Skate ankle supporter, A. J. Scriven.....	787,290
Skate clamp, S. W. Finch.....	787,290
Smoke-consuming furnace, L. C. Mooney.....	787,106
Soap dispensing machine, W. B. Moore.....	787,342
Solar motor, E. P. Brown.....	787,145
Sound record tablets, composition of matter for, J. Sanders.....	787,001
Soundings at sea, apparatus for taking, J. W. Gillie.....	787,030
Speed limiting device, H. F. T. Erben.....	787,284
Spinning ring frame, O. Dumas.....	787,087
Sprayer for the wounds of animals, M. F. Havens.....	787,174
Square, R. C. Wilson.....	786,824
Square, G. L. Wilson.....	787,248
Stamp stem guide, F. W. Hooper.....	786,969
Steam engine, J. A. Tooley.....	787,134
Steam generating appliance and adaptation of same to locomotives, C. Vanderbill.....	787,240
Steam trap, R. G. McAuley.....	786,981
Steel trap, H. T. Tweed.....	787,013
Stereopticon slide carrier, F. C. Edmonds.....	786,883
Sterilizing milk or other fluids, C. de Jong.....	786,819
Stitches of finished seams, separating and indenting, J. B. Hadaway.....	786,891
Stone setting device, free, S. Voss.....	786,861
Stop motion, electrical, G. B. Cocker.....	786,797
Store front, M. Salomon.....	787,053
Stove, C. Schweizer.....	787,310
Stove and ash-sifter, combined, S. Maas.....	786,825
Stove door and name plate, E. W. Anthony.....	786,793
Stove, gas cooking, M. Ehrsam.....	787,159
Stove, heating, A. J. Koontz.....	786,821
Stove steam cooking and water heating attachment, J. P. Hutchison.....	786,815
Stove, vapor burning, R. C. Barrie.....	786,944
Stoves or furnaces, air feeding device for, T. A. & W. G. Twyman.....	787,014
Stovepipe fastener, R. T. O. Scott.....	786,801
Strap fastener, W. D. Lambert.....	787,335
Swinging gate, A. Tarris.....	787,315
Switch lock electric, C. L. Buschmann.....	787,147
Table, See Cigar-rolling table.....	
Tag, F. Bachmann.....	786,943
Talking-machine, J. E. Beatty.....	787,264
Tank cleaner, J. W. Bivins.....	787,266
Tar dehydrator, E. A. Moore.....	786,828
Tea leaves or the like, apparatus for breaking and grading made, H. M. Allyn.....	787,066
Telegraph transmitter, wireless, H. Shoemaker.....	787,057
Telephone bracket, desk, T. O. Scott.....	787,119
Telephone exchange system, J. C. Hubinger.....	786,901
Telephone exchange system apparatus, J. G. Roberts.....	787,113
Telephone exchange trunk line, Scribner & McBerty.....	787,120
Telephone receivers, jointed adjustable support for, E. D. McLean.....	787,307
Tendon pulling machine, G. A. Congdon.....	787,025
Thread cutter and tier, J. B. Underwood.....	787,238
Threshing machine grain weighing device, L. M. Thomson.....	787,009

Rambler

SURREY TYPE ONE

18 horse power, \$1350



Its operation is both simple and natural. The ignition is automatic. The brakes are operated by pedals, not by levers. With the steering wheel and throttle, attached to it, operable by one hand, the other is always free to manage the clutches by the single lever, and no confusion is possible. (Full information on request. Other models \$750, \$850, \$2000 and \$3000. Immediate delivery.)

Main Office and Factory, Kenosha, Wisconsin. Branches, Boston, Chicago, Philadelphia, New York Agency, 134 West Thirty-eighth Street. Representatives in all leading cities.

THOMAS B. JEFFERY & COMPANY

MILLIONS WASTED ON HAIR TONICS

There is But One

HAIR GROWER

GUARANTEE BACKED BY THE BANKS

Failure of tonics to grow hair is due to the fact that such treatment does not reach the seat of the trouble. The hair roots must be nourished before the hair will grow and this can be accomplished only by the presence of blood in the scalp. A vigorous rubbing of the scalp produces a pleasant sensation but it does not open up the veins which supply food to the follicles. Use tonics if you want to soften the hair and make it glossy, but if you want to grow hair or keep it from falling out you must cultivate the roots. Hair falls out for the same reason that a plant dies—lack of nourishment—therefore to preserve it, you need only supply nourishment to the hair roots. This can be done only by the Evans Vacuum Cap.

Our Guarantee

We will send you by prepaid express an Evans Vacuum Cap, to use thirty days, and all we ask of you is to deposit the price of the appliance in any bank in St. Louis during the trial period, subject to your own order. If you do not cultivate a sufficient growth of hair within this time to convince you that this method is effective, simply notify the bank and they will return your deposit. The effect of the Vacuum is pleasant and exhilarating. It gives the scalp vigorous exercise without rubbing and induces a free and active circulation without the use of drugs and lotions.

Illustrated book free on request.

EVANS VACUUM CAP CO., 425 Fullerton Building, St. Louis

EVERYTHING FOR THE AUTOMOBILE

YANKEE GRADE-METER

Price \$7.50

Gives the grade accurately up to 40 per cent. up and down. Easily read from the seat.

Yankee Mica Spark Plug

Closed End, \$1.50

Open End, 1.00

Both guaranteed 90 days

Mammoth Catalog for 10c. in stamps

E. J. WILLIS CO., 2 Park Place, N. Y.

Catch Fish by Electricity

\$1.00 Complete OUTFIT

The Electricure

Any kind of fish may be caught by this new method and will. No State in the Union has passed any law against this practice; it's sure every time and great sport, without danger to operator (it fools the big fish). The original sample cost us \$1.00. Only a limited number of these outfits can be made this year, so order early. Outfit all complete only \$1.00 with full instructions. Can be carried in the fisherman's ordinary tackle box. By express prepaid, 50 cents extra. Dealers and agents make big money selling these. Send for catalogue of fishing tackle, etc., **The VIM CO., Dept. 19, 68 E. Lake St., Chicago, Ill.**

The R. & C.

Magnetic Liquid Indicator

SHOWS AT A GLANCE

the amount of LIQUID in a tank. For Motor Car tanks, Motor Boat tanks, Storage tanks, etc. Gasoline, Oil or Water. Operated under PRESSURE—or gravity feed. Absolutely reliable and guaranteed.

(Can be applied to the Filler Opening of Motor Car tanks in place of ordinary Cap, or separate. For Motor Car tanks, or any tank up to 16 in. in DEPTH.

Price, \$5.00

Write for full description and illustrations.

Manufactured exclusively by the

R. & C. INDICATOR CO., Inc.

BRIDGEPORT CONN., U. S. A.

ELECTRIC SEWING MACHINE MOTOR

The instructions and numerous illustrations of details contained in this article will enable any mechanic of average ability to build an efficient motor that will operate a sewing machine. The cost of materials for this machine should not exceed five dollars. See SCIENTIFIC AMERICAN SUPPLEMENT No. 1210. Price 10 cents by mail, from this office and from all newsdealers.

"HIGHEST AWARD"

Don't forget to ask for a **PELOUZE POSTAL SCALE**

It means you will get the best postal scale money can buy. Received highest award at World's Fair.

They give instantly exact cost of postage in cts. on all mail matter Warranted.

"Save time and stamps." For sale everywhere by leading dealers.

Catalog, P.

National 4 lbs. \$3.00
 Union 2 1/2 lbs. 2.50
 Columbian 2 lbs. 2.00
 Star 1 lb. 1.50
 Crescent 1 lb. 1.00

PELOUZE SCALE & MFG. CO. CHICAGO.

U. S. A. LIQUID PISTOL

Will stop the most vicious dog (or man) without permanent injury. Perfectly safe to carry without danger of leakage. Fires and reloads by pulling the trigger. Loads from any liquid. No cartridges required. Over 10 shots in one loading. All dealers, or by mail, 50c. Rubber-covered holster 5c. extra.

PARKER, STEARNS & SUTTON, 226 South St., New York

DO YOU USE GRINDSTONES?

If so we can supply you. All sizes mounted and unmounted, always kept in stock. Remember, we make a specialty of selecting stones for all special purposes. Send for catalogue "Y"

The CLEVELAND STONE CO.

2d Floor, Wilshire, Cleveland, O.

WELL DRILLING Machines

Over 70 sizes and styles, for drilling either deep or shallow wells in any kind of soil or rock. Mounted on wheels or on skids. With engines or horse powers. Strong, simple and durable. Any mechanic can operate them easily. Send for catalog.

WILLIAMS BROS., Ithaca, N. Y.

Automobile Tires

All new and first class, contracted for before the raise in price, and you are offered the benefit.

28 x 2 1/2 inch single tube, \$12.50
 30 x 3 " " " " 16.50
 30 x 3 " " " " 20.00

Every accessory and part for an automobile builder or user equally low. You miss it if you don't get our large FREE Catalogue.

J. H. NEUSTADT CO., St. Louis, Mo.

ARTESIAN

Wells, Oil and Gas Wells drilled by contract on any depth from 50 to 3000 feet. We also manufacture and furnish everything required to drill and complete same. Portable Horse Power and Mounted Steam Drilling Machines for 100 to 1200 feet. Write us stating exactly what is required and send for illustrated catalogue. Address

PURCE WELL ENGINEERING AND SUPPLY CO.

130 LIBERTY STREET, NEW YORK, U. S. A.

SPECIAL ANNOUNCEMENT

To be published on July 1, 1905: A NEW PUBLICATION

entitled

American Homes and Gardens

(Successor to SCIENTIFIC AMERICAN BUILDING MONTHLY)



THIS new monthly magazine will be much broader in scope than its predecessor. It will have the word "HOME" for its keynote. The man to whom this word has no meaning will have no interest in this new publication. It is the intention of the Editor to take the reader with him to various parts of the country and show him how the better class of people live, whether the house may have cost \$3,000 or \$300,000. Good taste is, perhaps, more necessary in the building and furnishing of a house of small cost than in a mansion of importance.

The Editor will not leave you on the outer doorstep, however, but will take you within, where you may see how the house is furnished and decorated and how the owners live. Then you may have a walk through the garden, and then to the summer house, where, perhaps, the plan of the formal garden culminates.

There will be published articles on room decoration and furnishing, showing how the furniture may be arranged to produce the best effects, what pictures may be hung, and what bric-a-brac, inherited from some former mansion, may with advantage be discarded. In short, the new publication is intended to be

OF INTEREST

To the one who has a Home.

To the one who has not a Home, but who intends to have one.

To the one who wishes to improve the Home and make it more attractive.

To the one who appreciates that the Garden and the House should form part of an harmonious scheme.

Each issue will contain an article on some important mansion, showing, if possible, various views of the exterior, the interior, and the garden. Plans are published with most of the residences shown.

The new publication will be issued monthly, and will be somewhat smaller in page size than the "Building Monthly," viz.: 10½ x 14. It will have a handsome colored cover. It will have about 50 pages each issue. Price, 25 cents each issue; \$3 a year.

SPECIAL OFFER TO READERS OF THE "SCIENTIFIC AMERICAN"

To any one subscribing before May 1, 1905, the subscription price will be \$2.50 for "American Homes and Gardens" for one year from July 1, 1905, to July 1, 1906, and the subscriber will receive free of charge the "Scientific American Building Monthly" for May and June.

To any one subscribing before June 1, 1905, the same terms will be offered, with a free copy of the June issue included.

To any one subscribing after June 1, 1905, the subscription price, without exception, will be \$3.00 a year.

Subscribe at once and obtain the most favorable terms.

CONTRACTS FOR ADVERTISING SPACE IN "AMERICAN HOMES AND GARDENS" may now be secured. Write at once to "Scientific American" Advertising Department and secure preferred locations.

MUNN & COMPANY, Publishers, 361 Broadway, New York

FIFTH REVISED EDITION. Langbein.—Electro Deposition of Metals JUST READY.

A Complete Treatise on the Electro-Deposition of Metals; Comprising Electro-Plating and Galvanoplastic Operations, The Deposition of Metals by the Contact and Immersion Processes, The Coloring of Metals, Grinding and Polishing, Voltaic Cells, Dynamo Electric Machines, Thermopiles, The Materials and Processes Used in Every Department of the Art. From the 5th German Edition of George Dr. Langbein. With additions by William T. Brannt. Fifth Edition, in great part re-written and much enlarged, 170 Engravings, 694 pages. 8vo. Price \$4.00, free of postage to any address in the world. An elaborate illustrated circular of this important book, 8 pages, quarto, will be sent to any one furnishing his address.

HENRY CAREY BAIRD & CO. INDUSTRIAL PUBLISHERS, BOOKSELLERS & IMPORTERS 810 Walnut St., Philadelphia, Pa., U. S. A.

The Wizard Engine With Pump OLDS ENGINES Economical Power Insending out their last specifications for gasoline engines for West Point, the U. S. War Department required them "to be Olds Engines or equal." This speaks volumes for our engines. It means they excel all others or the U. S. Government would not demand them.

New York Agents, R. H. Day & Co., Binghamton, N. Y.

KLIP-KLIP BEST EVER MADE A perfect manicure Quick, easy, simple and strong. The Original, made in German silver, 25c. Klip-Klip Jr., nickeled, 15c. At dealers or mailed. Accept no substitute.

HIGH GRADE TELEPHONE Apparatus and Supplies Our instruments adapted to Exchange and Long Distance Service. Miners, Lumbermen, Farmers and Factories. Everyone needs Telephone. Free Instruction Book and Catalogue.

THE EJECTOR MUFFLER The Greatest Advance in the Gasoline Age For particular, write to The Motor and Manuf'g Works Co., Ithaca, N.Y.

PATTON'S SUN-PROOF PAINT From Sunburn to Sunned spot paint cracks and crumbles in heated weather. The paint that endures. Lasts for years. We are always glad to advise on any paint question. Book free.

WEBER Gas and Gasoline Engines For Marine and all power purposes. Workmanship the highest, price per H. P. the lowest. The kind that will run smooth and keep running. Not an experiment but tested out by four years' continuous running. Guaranteed for one year and to give absolute satisfaction. Agents wanted.

50 Years' Experience PATENTS Trade Marks, Designs, Copyrights, Etc. Anyone sending a sketch and description may quickly ascertain our opinion free whether an invention is probably patentable. Communications strictly confidential. Handbook on Patents sent free. Oldest agency for securing patents. Patents taken through MUNN & Co. receive Special Notice, without charge, in the Scientific American

Table listing various mechanical items and their prices, including: Tile, building, A. Pfeiffer; Tin can, L. Diesel; Tire, G. H. Hastings; Tire set, Kelly, N. McComb; Tire, vehicle wheel, E. A. Scribner; Tool, P. M. Vance; Tool, combination, G. E. Hassen; Tool, hand, S. J. Welter; Tool handle, pneumatic, J. H. Templin; Toy, H. T. Turner; Toy, B. Palladine; Trace, short harness, D. K. Bellis; Trolley catcher and retriever, C. E. Gierling; Trolley device, A. F. Flierboom; Trolley stand, B. A. Grasberger; Trolley stand, J. A. Grasberger; Trolley wheel, E. W. Clark; Trolley wire guide, S. P. McMullen; Trolley wire replacer, W. Peck; Trousers press and suit hanger, F. J. Gruhl; Trunk, Turner & Hyman; Tube cleaning apparatus, B. S. & C. T. Hughes; Tube expander, J. M. Brown; Tubes, forming, L. C. Smith; Tug, hame, W. L. Stringer; Turbine, elastic fluid, O. Junggren; Turbine, steam, J. Stumpf; Turpentine receptacle, L. D. Byrd; Type casting and composing machines, intermittent clutch device for, M. Wehrin; Type-writing machine, Fay & Hochkassen; Type-writing machine, E. E. Barney; Umbrella, G. Turner; Valve, G. W. Denief; Valve, A. J. Caldwell; Valve, emergency brake, F. B. Corey; Valve, float, J. B. Hawkins; Valve gear, engine, O. Schwade; Valve, inflation, J. E. Keller, Jr.; Valve mechanism, engine, J. H. Moore; Valves, etc., mechanism for, operating, H. E. Warren; Vanner, mineral, H. C. Krause; Vehicle gear, Wilcox & Hickok; Vehicle top support, S. M. Buchanan; Vehicles, power transmission for, motor, S. H. Hanson; Velocipedes, etc., driving and change speed gear for, L. J. B. Savy; Vending machine, R. D. Work; Vest protector, R. Spurgin; Vise, J. P. Emmert; Voting machine, J. I. Haynes; Wardrobe, G. W. Warren; Warp-beam brake, C. E. Buschmann; Washer, See Packing washer; Washing machine gear, J. H. & J. B. Taylor; Watchmaker's device, W. D. Smith; Water closet, C. Pfau; Water heater, S. L. Wottring; Water heater with garbage burner, M. E. Herbert; Water motor, W. W. Keweenaw; Water pipes, device for automatically reducing pressure in, G. H. Dworzek; Water tube boiler, H. L. Wilson; Wave motor, J. Hutchings; Weather strip, H. E. Kenny; Weight, J. B. Arthur; Wheel, J. B. McMullen; Wheel fender, T. H. Quinn; Whiffletree coupling, J. R. Pring; Wind wheel, M. A. & B. H. Sharp; Window machine, S. W. Wardwell; Window, storm, G. E. Harsh; Wine stretcher, L. W. Bay; Wood slicing machine, G. S. Mather; Woodworking machine, N. P. Coffey; Wrench, A. Johnson; Wrench, W. J. Sanders; Writing appliance, J. Jaakson; Yoke and pole coupling, neck, I. F. Brown.

DESIGNS. Fabric, textile, W. B. McMechen; Pocketbook, J. C. Ryerson; Spoon, fork, or similar article, J. J. Condon; Spoons, forks, or similar articles, handle for, F. Haensack; Stove, M. R. Lehman; Stove, heating, M. R. Lehman; Stove or range, cooking, F. J. Frey; Stove, or range, cooking, M. R. Lehman; Toy bank, A. C. Williams; Type, font of, W. Bradley.

LABELS. "Anti-Fade," for a certain named preparation, J. Schutt, Jr.; "Bioslin," for bleached cotton goods, John S. Brittain Dry Goods Co.; "Bon Ten," for hose supporters, Carson, Pirie, Scott & Co.; "Boy's Friend," for boots and shoes, M. J. Mullen; "Colonial Chocolates," for confectionery, Reymer & Brothers; "Excelsior Record," for talking machine records, International Record Co.; "Fagan's Compound Wine of Tar," for proprietary medicine, T. F. E. Fagan; "Gold Cream," for evaporated cream, Hires Condensed Milk Co.; "Goose," for cigars, E. Stutz; "Japanese Rapid Headache Powders," for medicine, Japamer Pharmaceutical Co.; "Jin-Jitsu Water—Little Jap' Foot Ease," for medicine, W. M. Brock; "Little Lady," for brooms, Crites Broom Manufacturing Co.; "Little Star," for brooms, Crites Broom Manufacturing Co.; "Mexican Rheumatic Oil," for rheumatic oil, Maar & Johnson; "Ovarino," for medicine, W. F. Bente; "Reulette Cards," for playing cards, A. K. Ferris; "Singles Hair Strength," for medicine, B. Singley; "Talpa," for medicine, T. Dyer; "Tampa Custom House," for cigars, D. A. Switzer; "U. S. Fancy Patent," for flour, Covington Grocery & Grain Co.; "Union Twist," for cigars, Batastini and Facella Co.; "Wendel's Swiss Lozenges," for Swiss Lozenges, H. E. Lozeng.

PRINTS. "Chew and Smoke Mail Pouch," for tobacco, Blech Brothers Tobacco Co.; "Have You Vitos, Good," for wheat food, Pillsbury-Washburn Flour Mills Co.; "Maverick," for cigars, W. Fachteler; "Pillsbury's Vitos," for wheat food, Pillsbury-Washburn Flour Mills Co.; "Prince Albert and English Walking Frocks," for clothing, Brokaw Brothers; "Swift's Return Tubular Portable Boiler," for boilers, E. H. Swift; "U. S. Score Pad for the Game of Five Hundred," for score pads, United States Playing Card Co.; "Wine of Carol," for medicine, Chattanooga Medicine Co.

A printed copy of the specification and drawing of any patent in the foregoing list, or any patent in print issued since 1863, will be furnished from this office for 10 cents, provided the name and number of the patent desired and the date be given. Address Munn & Co., 361 Broadway, New York. Canadian patents may now be obtained by the inventors for any of the inventions named in the foregoing list. For terms and further particulars address Munn & Co., 361 Broadway, New York.



WINCHESTER TAKE-DOWN REPEATING SHOTGUNS No matter how big the bird; no matter how heavy its plumage or swift its flight, you can bring it to bag with a long, strong, straight shooting Winchester Repeater loaded with Winchester Factory Loaded Shotgun Shells. Results are what count. This combination, which is within reach of everybody's pocket-book, always gives the best results in field, fowl or trap shooting. Winchester guns and Winchester cartridges are made for each other. FREE Send name and address on a postal card for our large illustrated catalogue. WINCHESTER REPEATING ARMS COMPANY - NEW HAVEN, CONN.

THE HARRINGTON & KING PERFORATING CO. PERFORATED METAL OF EVERY DESCRIPTION FOR ALL USES. 225 NO. UNION ST. CHICAGO, ILL.

SPECIAL MANUFACTURING. DIES AND STAMPINGS TO ORDER. SPEC. L. MACHINERY—MODELS—EXPERIMENTAL WORK. DROP FORGING DIES AND DROP FORGINGS. HARDWARE SPECIALTIES ETC. MANFD. TO ORDER. SEND SAMPLES OR DRAWINGS FOR ESTIMATES. WRITE FOR OUR BOOKLET, "THE GLOBE MACHINE & STAMPING CO. 370 HAMILTON ST., CLEVELAND, OHIO."

ICE MACHINES. Corliss Engines, Brewers' and Bottlers' Machinery. THE VILTER MFG. CO. 899 Clinton St., Milwaukee, Wis.

MODELS & EXPERIMENTAL WORK. Inventions developed. Special Machinery. E. V. BILLARD. Fox Bldg., Franklin Square, New York.

Dies, Tools, Models and Special Machinery. Metal Specialties and Stamping Machinery. HOEFT & MOORE, CHICAGO, U. S. A. OFFICE: 131 FIFTH AVENUE. WORKS: BRIDGE ST., FRANKLIN SQUARE

BALLOONS Aeronaut L. Stevens, Box 351 Madison Sq., N. Y.

PATENT AND WORKING DRAWINGS. G. M. MAYER, M.E., Monadnock Bld., Chicago, Ill.

Model Machinery and Experimental Work. W. H. CRAWFORD 134 Broadway, New York City.

STAMPING CO. STEEL STAMPS, LETTERS & FIGURES. TYPE-SETTING BRIDGE ST., CONN.

Manufacturers HARDWARE SPECIALTIES Contract Manufacturers and will market articles of merit. LARIMER MFG. CO., 155 S. Jefferson St., Chicago

RUBBER Expert Manufacturers Fine Jobbing Work PARKER, STEARNS & SUTTON, 228-229 South St., New York

NOVELTIES & PATENTED ARTICLES MANUFACTURED BY CONTRACT. PUNCHING DIES, SPECIAL MACHINERY. E. KONIGSLOW STAMPING & TOOL WORKS, CLEVELAND, O.

ORNAMENTS mounted, soldered and finished, in work solicited. Good and silver plating. J. H. ARTHUR CO., 45 Bldg St., Providence, R. I.

Experimental & Model Work Cir. & advice free. Wm. Gardam & Son, 45-51 Rose St., N.Y.

INVENTORS.—Our specialty is practically developing inventions. Design and build special, plain and automatic machinery, presses, dies, models, patterns and fixtures. Send for Booklet No. 5. A. NACKE & SON, 236-42S. 9th St., Philadelphia, Pa.

INVENTORS We manufacture METAL SPECIALTIES of all kinds to order; largest equipment; lowest prices. Send sample or model for low estimate and best expert advice FREE. THE EAGLE TOOL CO., Dept. A., Cincinnati, O.

INSTRUMENTS OF PRECISION HIGH GRADE MACHINERY Inventions Perfected P. A. GEIER COMPANY, 50 High St., Cleveland, O.

MASON'S NEW PAT. WHIP HOIST for Outrigger hoists. Faster than Elevators, and hoists direct from teams. Saves handling at less expense. Manfd. by VOLNEY W. MASON & CO., Inc. Providence, R. I., U. S. A.

BUBIER'S POPULAR ELECTRICIAN Fifty Cents per year. Electrical Books for beginners. 10c, 25c, 50c. Sample copy and catalogue FREE. BUBIER PUB. CO., S. C. - Lynn, Mass.

ROCHESTER ELECTRIC MOTOR CO. 10-12 FRANK STREET ROCHESTER, N. Y., U. S. A. QUALITY ECONOMY DYNAMOS WRITE US MOTORS

"STANDARD" Two-Speed Automatic Coaster Brake Hub Makes wheeling a delight, eliminates the drudgery. Do not waste money on experiments when you can buy a perfect attachment all in one hub. Our little booklet tells all about it and is mailed free. Write to-day. STANDARD SPOKE AND NIPPLE CO. - Torrington, Conn.

PROPOSALS FOR FURNITURE FOR BACHELOR QUARTERS, HOTELS, ETC. Office, Isthmian Canal Commission, Washington, D. C., March 29, 1905. Sealed proposals, in triplicate, will be received at the office of the Purchasing Agent, Isthmian Canal Commission, Washington, D. C., until 10.30 A. M., April 28, 1905, at which time they will be opened in public, for furnishing above mentioned furniture. Bids and full information may be obtained from this office, or offices of Asst. Purchasing Agent at Custom House, New Orleans, La. H. J. Gallagher, Major, U. S. A., Purchasing Agent.

AUTO STORAGE BATTERIES ALL KINDS THE WILLARD STORAGE BATTERY CO. CLEVELAND, O.

Send for this Print your own cards, circulars, etc. Press \$5. Small newspaper press \$18. Money-saver. Print for others, big profits Typesetting easy, printed rules sent. Write to makers for catalog, press, typesetting paper, etc. THE PRESS CO., MERIDEN, CONN.

Magical Apparatus. Grand Book Catalogue. Over 700 engravings. 25c. Parlor Tricks Catalogue, free. MARTINKA & CO., Mrs., 498 Sixth Ave., New York.

Are you interested in Patents, Model or Experimental work? Our booklet entitled WHAT WE DO—HOW WE DO IT will be sent to you on request. KNICKERBOCKER MACHINE WORKS, Inc., 8-10-12 Jones Street, New York.

Telegraphy Circular free. Wonderful automatic teacher, 5 styles \$2 up. OMNIGRAPH CO., Dept. 52, 89 Cortlandt St., New York.

SLIGHTLY USED FURNITURE from the INSIDE INN and ten other leading World's Fair hotels. AT ONE-FOURTH COST Iron Beds, 50c; Dressers, \$2.50; Extension Tables, \$3.50; Chairs, 25c; Sheets, 10c; 9x12 Rug, \$5.00; and everything in proportion. All good as new. Our Big Warehouse is Overflowing Room must be made to handle our contracts. The greatest Bargain Clearing Sale ever held. Complete Catalogue sent FREE. Dept. C. N. LANCAN & TAYLOR, St. Louis, Mo.

WORK SHOPS of Wood and Metal Workers, with-out steam power, equipped with BARNES' FOOT POWER MACHINERY allow lower bids on jobs, and give greater profit on the work. Machines sent on trial if desired. Catalog Free. W. F. & JOHN BARNES CO. Established 1872. 1999 RUBY ST. ROCKFORD, ILL.

THE EUREKA CLIP The most useful article ever invented for the purpose. Indispensable to Lawyers, Editors, Students, Bankers, Insurance Companies and business men generally. Book marker and paper clip. Does not mutilate the paper. Can be used repeatedly. In boxes of 100 for 25c. To be had of all booksellers, stationers and notion dealers, or by mail on receipt of price. Sample card, by mail, free. Manufactured by Consolidated Safety Pin Co., Box 121, Bloomfield, N. J.