





PERFORATED METAL OF EVERY DESCRIPTION AND FOR ALL USES. THE HARRINGTON & KING PERFORATING CO., 725 N. UNION ST., CHICAGO, ILL., U.S.A.

"Patent Steel" Wire Rope. HAS NO SUPERIOR FOR HOISTING OR HAULAGE. BRODERICK & BASCOM ROPE CO., ST. LOUIS, MO.

Some paints dry dead; others are so dead dry they crack or chalk off. Patton's SUN-PROOF Paint lives with a lustre. Guaranteed to wear for five years.

EASIER TO ROW ABSOLUTELY SAFE. Price 15 foot boat, \$29.00.

Mullins' Galvanized Steel Pleasure Boats. Made of steel. Practically indestructible. Air chamber each end. Cannot sink.

MORAN FLEXIBLE JOINT for Steam, Air or Liquids. Made in all sizes to stand any desired pressure.

I Print My Own Cards. Circulars, newspaper. Press \$5. Larger size, \$15.00.

Will Make Hair Grow EVANS' Vacuum Cap. This appliance will massage the scalp and force a free and healthful circulation.

SALESMEN AND AGENTS WANTED. BIG WAGES. Har- rison Blue Flame, Wickless, Fuel Oil Stoves for cooking and heating.

ROTARY ENGINES.—ARTICLES ON this type of engine, giving many details and illustrations, are contained in SUPPLEMENT Nos. 1158, 1186, 1193 and 1309.

MARINE Gasolene MOTORS. Experts for years have ranked our engine with the highest grade, and it is now being copied by other builders.

DRY BATTERIES.—A PAPER BY L. K. Bohm, treating of open circuit batteries, historical dry batteries, modern dry batteries, Hulleisen's battery.

OLDEST INCORPORATED CO. In U.S. Making Automobile Boilers. Truck Boilers a specialty.

THE BICYCLE: ITS INFLUENCE IN Health and Disease.—By G. M. Hammond, M.D.

TOOLS FOR MECHANICS. Send for Free Catalogue No. 16 B. The L. S. Starrett Co., Athol, Mass., U. S. A.

Table listing various items and their prices, including sawing apparatus, sewing machines, and electrical components.

WONDER Acetylene Burners ARE THE BEST. Sold by good dealers or write 56c STATE LINE MFG. CO.

A SKIN GAME IS GRE-SOLVENT. THE GAME IS TO GET THE GREASE AND GRIME OFF WITHOUT REMOVING THE SKIN.

Dearborn Junior TYPEWRITER TABLE CABINET. Guaranteed the most complete Typewriter Table Cabinet ever sold.

SENSITIVE LABORATORY BALANCE. By N. Monroe Hopkins. This "built-up" laboratory balance will weigh up to one pound.

LOCKE ADDER. ONLY \$5.00. ADDS SUBTRACTS MULTIPLIES DIVIDES.

The Apple Automatic Igniter. For Jump Spark or Touch Spark. For any gas engine, stationary, automobile or marine.

ACETYLENE GAS AND CARBIDE OF Calcium.—All about the new illuminant, its qualities, chemistry, pressure of liquefaction.

For PIPE-THREADING OR CUTTING. THERE IS NO MACHINE on the market that can compare for ease of operation and excellence of work with FORBES PATENT DIE STOCK.

Rider Agents Wanted in each town to ride and exhibit sample bicycles '03 Models high grade \$9 to \$15.

50 Years' Experience PATENTS Trade Marks, Designs, Copyrights, Etc.

The Scientific American Building Monthly

Volume XXXV. January to June, 1903. Pages 123 Price \$2.00 Illustrations 256

AN INVALUABLE book for those who are about to build. It will stimulate ideas on home planning. No Architect or Builder can afford to be without it.

THE HOUSEHOLD TALKS ON HEATING ROOFS AND ROOFING THE KITCHEN FIRE PROTECTION THE GARDEN FURNITURE NEW BOOKS PATENTS

Special attention is given to architectural details, such as Doorways, Halls and Stairways, the Porte Cochère and Bow Windows.

MUNN & CO., Publishers, 361 Broadway, New York

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

Our New and Revised Catalogue of Practical and Scientific Books, 94 pages, 50c (May 15, 1903), a Catalogue of Books on Metallurgy, Mining, Prospecting, etc., on Geology, Assaying, Analysis, etc., a Catalogue of Books on Steam and the Steam Engine, Machinery, etc., a Catalogue of Books on Sanitary Science, Gas Fitting, Plumbing, etc., and our other Catalogues and Circulars, the whole covering every branch of Science applied to the Arts, sent free of charge by post to anyone in any part of the world who will furnish his address.

WHAT Schapirograph? THE DUPLICATOR that clearly multiplies anything written with pen or typewriter, also music, drawings, etc. One original gives 100 copies. BLACK ink in 15 minutes. AVOIDS smudging, washing, drying, and aromatic supplies. Folds, handles, and carries easily. \$8.00. Lists for years. Sent on 5 DAYS' FREE TRIAL without deposit. THE S. A. SCHAPIROGRAPH CO., 265 Broadway, New York.

ROSE POLYTECHNIC INSTITUTE Terre Haute, Ind. A College of Engineering. Mechanical Electrical, Civil Engineering, Chemical, Architecture. Extensive shops. Modernly equipped laboratories in every department. Expenses low. 21st year. For catalogue address C. L. MEES, President.

A STRENUOUS MUSCLE BUILDER For young or old, child or adult. Agnota Vest Punching Bag (Patented Sept. 30, 1901, and Dec. 11, 1900) It will provide numerous hours of recreation for the entire family, but especially the children—and so to health you will be astonished at its efficiency as a muscle developer. 25c. BY MAIL. THE M. LINDSAY RUBBER CO. Manufacturers, 298 1/2 Broadway, New York.

A.W. FABER Manufacturing Established 1761. LEAD PENCILS, COLORED PENCILS, SLATE PENCILS, WRITING SLATES, INKS, STATIONERS RUBBER GOODS, RULERS, ARTISTS' COLORS. 78 Reade Street, New York, N. Y. GRAND PRIZE. Highest Award, PARIS, 1900.

BABBITT METALS.—SIX IMPORTANT FORMULAS. SCIENTIFIC AMERICAN SUPPLEMENT 1123. Price 10 cents. For sale by Munn & Co. and all newsdealers. Send for catalogue.

MIENNEN'S BORATED TALCUM TOILET POWDER A Positive Relief FOR PRICKLY HEAT, CHAFING, and SUNBURN, and all affections of the skin. Removes all odor of perspiration. Deodorizes the skin. Sold everywhere. Mailed on receipt of 25c. Get Mennen's (the original). Sample Free. GERHARD MIENNEN COMPANY, Newark, N.J.

THE "BEST" LIGHT COSTS 2c A WEEK Gives more light than 10 Electric Lights or 6 Kerosene Lamps A brilliant, pure white steady light. Conforms to insurance underwriters' rules. No Smoke—No Grease—No Odor Safe as a candle. Send for catalogue. Agents wanted. Liberal Commission Exclusive Territory THE BEST LIGHT CO. Owners of Original Patent. 87 E. 5th St., Canton, Ohio.

We manufacture gears and bodies suitable for all purposes. We also sell supplies and can furnish any part or all the parts for a gasoline or steam rig. See our late catalogue, FREE. NEUSTADT-PERRY CO., 526-530 S. 18th St., St. Louis, Mo. Sales, T. Hows & Co., 51 Hudson St., New York, Export Agents.

TO KEEP COOL you must have a whirling fan to drive the heated, impure air from your rooms. Will you pay \$15 or more for an electric fan, or will you buy our famous Water Motor Fan which makes 2,000 revolutions a minute and throws a current of air as strong as does an electric fan yet costs only \$1.50 It can be attached to any spigot direct, or connected by rubber hose and attached to wall in same or another room. Can be adjusted by anyone—even a child—quickly and easily. The fan is ten inches in diameter. Requires but low pressure the motor being fed through a 1-1/2-inch hole. Runs smoothly, without noise or annoyance—especially desirable for the sickroom. Cannot get out of order. Price Complete \$1.50 Booklet Free Good Agents Wanted to sell the Water Motor Fan to the thousands who have been waiting for a perfect fan at a low price. DELAWARE RUBBER CO., Dept. 107, 631 Market Street, Philadelphia, Pa.

Table listing various mechanical parts and their prices, including washing machines, weighing machines, wire drawing machines, and various tools.

DESIGNS. Table listing various designs and their prices, including ash receivers, brooches, grave markers, and stove ranges.

TRADE MARKS. Table listing various trade marks and their prices, including antiseptics, buttons, flour, food, hair wavers, and various other goods.

LABELS. Table listing various labels and their prices, including cigars, punch, absinthe, beer, and various other products.

PRINTS. Table listing various prints and their prices, including typewriter ribbons, adhesive paste, absorbent cotton, and various other items.

TWELVE PASSENGER BRAKE A GREAT MONEY MAKER These Vehicles are very popular and are adapted for Hotels, Summer Resorts, Golfing, Park Touring and Business Travel. Bodies are furnished for the above No. 5 Gear, suited to every kind of commercial delivery. Write for Catalogue B. CHICAGO MOTOR VEHICLE CO. 370-372 Wabash Avenue CHICAGO, ILL. Factory: Harvey, Ill.

BICYCLE MOTORS Bicycle Motor Castings We have a complete line of motors, castings and accessories from 1/2 to 3 h. p. for Bicycle, Machine, Automobile and Stationary. LOWEST PRICES. Send stamp for catalogue. Stryker Mfg. Co. 2720 Brown Street, Philadelphia, Pa.

GAS ENGINE DETAILS.—A VALUABLE and fully illustrated article on this subject is contained in SUPPLEMENT No. 1292. Price 10 cents. For sale by Munn & Co. and all newsdealers.

CRESTMOBILE \$750 The most logically constructed car made. Write for cat. Other models at \$500 and \$550. CREST MFG. CO., Cambridge, Mass., U.S.A.

RUBBER STAMP MAKING.—THIS article describes a simple method of making rubber stamps with inexpensive apparatus. A thoroughly practical article written by an amateur who has had experience in rubber stamp making. One illustration. Contained in SUPPLEMENT 1110. Price 10 cents. For sale by Munn & Co. and all newsdealers.

The Franklin Model Shop. Experimental work for inventors; anything in metal from a single piece to a complete working model. Apparatus for colleges. Exhibition models. Introduction samples of patented articles. Special tools for making metal novelties. Inventions perfected. Drawings and designs worked out from inventors' ideas. Send for circular. PARSELL & WEED, 129-131 West 31st Street, New York.

COLD GALVANIZING Save all the Spelter consumed in galvanizing by the hot process by using our Patent Cold Galvanizing Process, as the amount of spelter lost as dross in the hot process if used in our process will give sufficient protection to any kind of work to make it rust-proof even against salt. Our licenses include U. S. Government, The Standard Oil Co., Herreshoff Boat Building Co., Townsend & Downey, Armour Packing Co. Licenses granted on royalty basis. Sample and custom work done at our factory, 108-110 W. 118 St., Main Office, 345 Broadway, 1 to 9 Park Avenue, Brooklyn. U. S. ELECTRO-GALVANIZING CO.

Best American Made Motor F. N. Roehrich & Co. Machinery 102 FULTON STREET, NEW YORK. Designing, Mechanical Drawing. Telephone No. 2440-A JOHN.

CONRAD MOTOR CARRIAGE CO., Buffalo, N. Y. It is now thoroughly understood among automobilists everywhere that no machine made in this country can equal CONRAD Gasoline Motor Vehicles for simplicity, durability, speed, safety and economy. These vehicles are beautifully finished and give the greatest satisfaction everywhere. Illustrated descriptive booklet free on application.

Volt Ammeters Pocket size, but large enough for accuracy and practical use. Various ranges for testing batteries, electric light, telephone and other circuits, etc. Also Voltmeters and Ammeters for general measurements. Send for Circular. L. M. PIGNOLET, 80 Cortlandt Street, New York, N. Y.

GAS ENGINE IGNITERS LATEST TYPE. BEST MADE Price, \$15.00 For Marine, Automobile or Stationary Engines. Fully Guaranteed. Write for Circular. The Carlick & Finch Co., 233 E. Clifton Ave., Cincinnati, Ohio.

The Waterless Knox SIMPLICITY RELIABILITY CONVENIENCE The success of our patent air cooling system has been thoroughly demonstrated in years of use. Many details improved in 1903 car. Catalogue on application. KNOX AUTOMOBILE CO., Main Office and Works, SPRINGFIELD, MASS. NEW YORK AGENCY:—H. M. Davis, 146 West 39th St. BOSTON AGENCY:—Reed-Underhill Co., 41 Stanhope St. SAN FRANCISCO AGENCY:—Nat'l Automobile and Mfrs. Co., 26 Fremont St. PHILADELPHIA & PITTSBURGH AGENCIES:—Banker B Os. Co. CHICAGO AGENCY:—A. C. Banker, 466 Wabash Ave.

WANTED.—STRUCTURAL STEEL WORK Draftsmen and Assistant Structural Steel Work Draftsmen, \$3.50 to \$5.00 per diem. An examination will be held at the Navy Yard, Washington, D. C., July 24 and 25, 1903, for the purpose of establishing a register of eligibles for the above positions. For application and further information address "Commandant, Navy Yard, Washington, D. C."

THE SCHWERTLE STAMP CO. STEEL STAMPS, LETTERS & FIGURES BRIDGEPORT CONN.

"THIS BEATS NEW JERSEY." Charters procured under South Dakota laws for a few dollars. Write for Corporation laws, blanks, by-laws and forms to PHILIP LAWRENCE, late Asst. Sec. of State, Huron, S. Dak. or Room K, 20th floor, 220 B'way, N. Y.

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

INVENTIONS DEVELOPED WALTER K. FREEMAN, M.E. Special machinery, electrical and chemical apparatus made on short notice. Good accommodations for inventors. 403 E. 23d St., New York.

BUILDERS of Special Machinery, Models, Experimental work. Inventions developed. THE PENN-SADLER MACH. CO., Hartford, Conn.

MATCH MACHINERY. BIG MONEY IN MATCHES. We manufacture everything pertaining to the business. The Very Latest Process. We will furnish a manager or teach any purchaser the business. F. W. MURPHY & BRO., 1118 Ashland Block, Chicago, Ill., U. S. A.

NOVELTIES & PATENTED ARTICLES Manufactured by Contract. Engraving Dies, Special Machinery. E. Konigslow & Bro., 151 Seneca St. Cleveland, O.

WE MAKE OR PLATE ANYTHING IN METAL. SEND SAMPLE FOR ESTIMATE. THE T. F. MOORE CO. 334 DEARBORN ST. CHICAGO, ILL.

Save all the Spelter consumed in galvanizing by the hot process by using our Patent Cold Galvanizing Process, as the amount of spelter lost as dross in the hot process if used in our process will give sufficient protection to any kind of work to make it rust-proof even against salt. Our licenses include U. S. Government, The Standard Oil Co., Herreshoff Boat Building Co., Townsend & Downey, Armour Packing Co. Licenses granted on royalty basis. Sample and custom work done at our factory, 108-110 W. 118 St., Main Office, 345 Broadway, 1 to 9 Park Avenue, Brooklyn. U. S. ELECTRO-GALVANIZING CO.

F. N. Roehrich & Co. Machinery 102 FULTON STREET, NEW YORK. Designing, Mechanical Drawing. Telephone No. 2440-A JOHN.

ICE MACHINES, Corliss Engines, Brewers' and Butters' Machinery, THE WILDER MFG. CO., 339 Clinton Street, Milwaukee Wis.

MASON'S Pat. Friction Pulleys and Clutches Starting Machinery without shock and connecting line shafting. Most reliable and durable. Mason's New Pat. Whip-Hoist effective and simple. Manfd. by VOLNEY W. MASON & CO., Inc. Providence, R. I., U. S. A.

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

Magical Apparatus. Grand Book Catalogue. Over 700 engravings, 25c. Parlor Tricks Catalogue, free. MARTINKA & CO., Mfrs., 436 Sixth Ave., New York.

SPECIALLY DRAWN METAL TUBING to order any size or shape up to 3/4-in. outside diameter. Small Metal manufacturing. M. T. HORN CO., 86 Park Place, New York.

DRYING MACHINES. S. E. WORRELL, Hannibal, Mo.

Webb's hinge joint belt hooks inserted with a pier—send for circular Webb hinge belt hook co.—boonton n. j.

Dies, Tools and Special Machinery, Models and Experimental Work. General Machine Work. FR. J. BENDER & SONS, Inc., 47 Frankfort St., New York

TYPE WHEELS, MODELS & EXPERIMENTAL WORK, SMALL MACHINERY, NOVELTIES & ETC. NEW YORK STENCIL WORKS 100 NASSAU ST. N.Y.