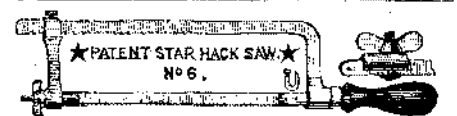


Advertisements.

Inside Page, each insertion --- 75 cents a line. Back Page, each insertion --- \$1.00 a line.



Both the Frames and Blades of our Star Hack Saws are now as perfect as human skill can make them.

MILLERS FALLS CO., 93 Reade Street, New York.

STEEL BALLS.

For Anti-Friction Bearings, of Best Cast Steel, Hardened, Ground, and Burnished, from 3-16 in. to 2 in. diameter.

Simond's Rolling-Machine Co., Fitchburg, Mass.

ICE-BOATS — THEIR CONSTRUCTION and management. With working drawings, details, and directions in full.

THE KODAK CAMERA

Makes 100 instantaneous Pictures by simply pressing a button. Anybody can use it who can wind a watch.

Price, \$25.00. Reloading, \$2.00.

The Eastman Dry Plate & Film Co., Rochester, N. Y.

LEAD SMELTING.—A FULL DESCRIPTION of the Lewis Bartlett process, by William Ramsay.

Barnes' Foot-Power Machinery. Complete outfits for Actual Workshop Business.

TO BUSINESS MEN.

The value of the SCIENTIFIC AMERICAN as an advertising medium cannot be overestimated.

WIRE ROPE

Address JOHN A. ROEBLING'S SONS, Manufacturers, Trenton, N. J., or 117 Liberty Street, New York.

PATENTS.

MESSRS. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN, continue to examine improvements, and to act as Solicitors of Patents for Inventors.

THE GUTTA PERCHA & RUBBER MFG. CO.

The Largest Manufacturers of Mechanical Rubber Goods in the World. ESTABLISHED 1855. Packing, Belting, Hose, Mats, Matting, etc.

THE MODERN ICE YACHT. — BY Geo. W. Polk. A new and valuable paper, containing full practical directions and specifications for the construction of the fastest and best kinds of Ice Yachts of the latest, most approved forms.

JENKINS' AUTOMATIC AIR VALVE. We do away with the expansion of metal, and depend on an expandible elastic plug of Jenkins' Packing, made especially for the purpose, thus insuring a perfect seat.

Scientific Book Catalogue

Our new catalogue containing over 100 pages, including works on more than fifty different subjects. Will be mailed free to any address on application.

STEAM ENGINES. Upright and Horizontal, Stationary, Portable and Semi-Portable. 8 to 16 Horse Power.

INVENTORS and others desiring new articles manufactured and introduced, address P. O. Box 86, Cleveland, O.

GUILD & GARRISON

BROOKLYN, N. Y., U. S. A. Builders of Steam Pumps for Liquids or Semi-liquids. High Grade Vacuum Pumps, Filter Press Pumps, Air Compressors, Acid Blowers, Feed Pumps, Agitators, Condensers for Fans, Engines, Steam Pumps, Vacuum Apparatus, etc.

Advertisement for 'New Striped Rose' featuring a rose illustration and text describing it as 'The Greatest Novelty'.

PULLEYS, HANGERS, FRICTION CLUTCHES.

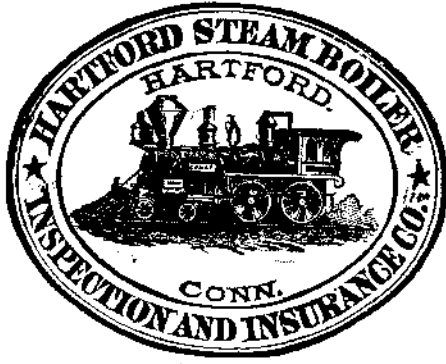
COPPER TUBES, SHEET BRASS, BRASS WIRE.

TRAMWAY, COMPRESSED AIR.—Description of a Tramway recently constructed between Vincennes and Ville Evard.

A 10 or 12 in. Perfect Screw Wrench, also 1 Perfect Pipe Wrench, 2 Perfect Wrenches with extra paid for \$1.00.

MARVIN'S FIRE & BURGLAR SAFES. ESTABLISHED HALF A CENTURY. HAVE MANY PATENTED IMPROVEMENTS NOT FOUND IN OTHER MAKES.

WEITMYER PATENT FURNACE. Description of Every IDE Automatic Engines, Traction and Portable Engines, STEAM ROAD ROLLERS.



THERMO-MAGNETIC GENERATOR and Motor.—Description of an apparatus devised by Mr. Menges for the purpose of generating electricity by the direct conversion of heat.

SAWS Wanted 50,000 Sawyers and Lumbermen to send us their full addresses for a copy of Emerson's Book of SAWS.

WELLS BROS. & CO. GREENFIELD, MASS. Manufacturers of Screw Cutting Machinery and Tools.

FOR SALE.—STATE RIGHTS. For the Best Water Closet in the World. SANITARY PLUMBING MFG. CO., 910 Webster Street, Oakland, California.

Advertisement for 'The Standard' boiler coverings by H.W. Johns & Co., featuring an illustration of a boiler.

PROGRESS MACHINE WORKS, A. & F. BROWN, 44 Park Place, N. Y.

THE COPYING PAD.—HOW TO MAKE and how to use, with an engraving. Practical directions how to prepare the gelatine pad, and also the ink by which the copies are made.

THE CUSHMAN Patent 3 Pinion Geared Scroll Chucks with their latest improvements are unexcelled.

A NEW CATALOGUE OF VALUABLE PAPERS. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, sent free of charge to any address.

CHEMICAL AND ALLIED INDUSTRIES.—By Watson Smith. An elaborate report upon the objects illustrative of the progress, advance, and present position of the chemical industries shown at the Manchester Royal Jubilee Exhibition.

MACHINISTS' SUPPLIES. SEND 15 CENTS FOR ILLUSTRATED CATALOGUE. MONTGOMERY & CO. 105 FULTON ST. N. Y.

SYRACUSE MALLEABLE IRON WORKS

THE AMERICAN BELL TELEPHONE CO. 95 MILK ST., BOSTON, MASS.

This Company owns the Letters Patent granted to Alexander Graham Bell, March 7th, 1876, No. 174,465, and January 30th, 1877, No. 186,787.

The transmission of Speech by all known forms of Electric Speaking Telephones infringes the right secured to this Company by the above patents.

ERIE ENGINE WORKS

JAMES B. EADS.—AN ACCOUNT OF the life and labors of this eminent engineer. With a portrait. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 592. Price 10 cents.

MALLEABLE AND FINE GRAY IRON ALSO STEEL CASTINGS FROM SPECIAL PATTERNS

THE Scientific American

ESTABLISHED 1846. The Most Popular Scientific Paper in the World.

Only \$3.00 a Year, including Postage. Weekly, 52 Numbers a Year.

This widely circulated and splendidly illustrated paper is published weekly. Every number contains sixteen pages of useful information and a large number of original engravings of new inventions and discoveries.

Terms of Subscription.—One copy of the SCIENTIFIC AMERICAN will be sent for one year—52 numbers—postage prepaid, to any subscriber in the United States or Canada, on receipt of three dollars by the publishers; six months, \$1.50; three months, \$1.00.

Clubs.—Special rates for several names, and to Post Masters. Write for particulars. The safest way to remit is by Postal Order, Draft, or Express Money Order.

MUNN & CO., 361 Broadway, New York.

THE Scientific American Supplement.

This is a separate and distinct publication from THE SCIENTIFIC AMERICAN, but is uniform therewith in size, every number containing sixteen large pages full of engravings, many of which are taken from foreign papers, and accompanied with translated descriptions.

Price for the SUPPLEMENT for the United States and Canada, \$5.00 a year, or one copy of the SCIENTIFIC AMERICAN and one copy of the SUPPLEMENT, both mailed for one year for \$7.00. Single copies 10 cents.

Building Edition.

THE SCIENTIFIC AMERICAN ARCHITECTS' AND BUILDERS' EDITION is issued monthly. \$2.50 a year. Single copies, 25 cents. Forty large quarto pages, equal to about two hundred ordinary book pages.

A special feature is the presentation in each number of a variety of the latest and best plans for private residences, city and country, including those of very moderate cost as well as the more expensive.

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

PRINTING INKS.

THE "Scientific American" is printed with CHAS. T. ENRU JOHNSON & CO.'S INK. Tenth and Lombard Sts., Phila., and 47 Rose St., opp. Duane St., N. Y.