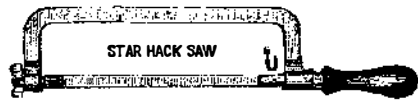


Advertisements.

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



These Hack Saws will cut Iron and Steel beyond all expectation. Iron working mechanics everywhere must and will use them.

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



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

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.

SYSTEMS OF DISTRIBUTION OF Electricity.—Lecture by E. H. Thomson, delivered in the Sibley College course.

TO INVENTORS AND MANUFACTURERS

The 57th Annual Exhibition OF THE American Institute of the City of New York Will Open OCTOBER 3, 1888.

The DUNNING BOILER

Oldest and Best FOR Steam and Hot Water HEATING. Over 13,500 in use.

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.

MALLEABLE AND FINE GRAY IRON ALSO STEEL CASTINGS FROM SPECIAL PATTERNS

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 Original Unvulcanized Packing. CALLED THE STANDARD—As it is the Packing by which all others are compared.

H. W. JOHNS' Asbestos Patented Roofing FIRE-PROOF.

This is the perfected form of Portable Roofing manufactured by us for the past thirty years; is adapted for use on steep or flat roofs in all climates.

INVENTORS and others desiring new articles manufactured and introduced, address P. O. Box 84, Cleveland, O.



PRESERVATION OF MEAT Without Cans—Egg shell method.

CAMERA BELLOW.—FULL DESCRIPTION. With 12 figures, by means of which any amateur can easily make a camera bellows for himself.

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

New Gas Engine "The Baldwin" Exhibited at the late American Institute Fair, New York. A four-horse-power engine in connection with storage battery, running 84 incandescent electric lights.

Scientific Book Catalogue

RECENTLY PUBLISHED. Our new catalogue containing over 100 pages, including works on more than fifty different subjects.

GOING INTO THE POULTRY BUSINESS.—A paper by P. H. Jacobs, reviewing the commercial aspects of poultry raising, and giving many useful hints upon the subject.

STEAM ENGINES Upright and Horizontal, Stationary, Portable and Semi-Portable. 3 to 16 Horse Power.

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.

DELAFIELD'S PAT. SAW CLAMP

With saw for cutting metals. Saves all the broken back-saw blades. In use over two years in all parts of the country.

THE VOLKER & FELTHOUSEN MFG. CO. MANUFACTURERS OF BUFFALO DUPLEX STEAM PUMPS. For Sale at Factory Prices by A. Allen, N. Y. Walworth Construction & Supply Co.

ICE and REFRIGERATING MACHINES The Pictet Artificial Ice Company (Limited), Room 6, Coal & Iron Exchange, New York.

CHALLENGE EMERY GRINDING

HOW TO MAKE AN INCUBATOR.—Full directions, illustrated with 7 figures. Also directions for operating the apparatus.

SYRACUSE MALLEABLE IRON WORKS

BRASS WORK Small Brass Work & Models A Specialty. Also Nickel Plating.

AUTOMATIC CUT OFF ENGINES

GEOLOGY EXPLAINED IN ITS SIMPLEST FORM.—An interesting object lesson in geology. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 610. Price 10 cents.

Steam! Steam!

We build Automatic Engines from 2 to 200 H. P., equal to anything in market. A Large Lot of 2, 3, and 4-H. Engines.

ERIE ENGINE WORKS

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.

The safest way to remit is by Postal Order, Draft, or Express Money Order. Money carefully placed inside of envelopes, securely sealed, and correctly addressed, seldom goes astray.

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.

The most important Engineering Works, Mechanisms, and Manufactures at home and abroad are illustrated and described in the SUPPLEMENT.

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.

Builders Edition.

THE SCIENTIFIC AMERICAN ARCHITECTS' AND BUILDERS' EDITION is issued monthly. \$2.50 a year. Single copies, 25 cents.

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.

PRINTING INKS. THE "Scientific American" is printed with CHAS. T. BENEY JOHNSON & CO.'S INK.