Scientific American.

BRAIDED PACKING, MILL BOARD, SHEATHING, CEMENT, FIBRE AND SPECIALTIES. CHALMERS-SPEINCE CO., FOOT E. BTH ST., N. Y.

Advertisements.

110

Iron

Nov. 2, 1996. 142 UNION ST., Worcester, Mass. L. W. POND, Supt.

Inside Page, each insertion - - - 75 cents a line, Back Page, each insertion - - - 75 cents a line. The above are charges per agate line-about eight words per line. This notice shows the width of the line, and is set in agate type. Engravings may head adver-uisements at the same rate per agate line. by measure-ment, as the letter press. Advertisements must be received at publication office as early as Thursday morn-ing to appear in next issue.



Owners of the United States and foreign patents, 152 Front Street, New York Copyrighted. States and foreign patents, St DRY AIR REFRIGERATING MACHINE.

H.W. JOHNS LIOUID PAINTS.

PIPE COVERINGS

Made entirely of ASBESTOS.

Absolutely Fire Proof.

Asbestos Roofing, Building Felt, Steam Packings, Boiler Cove ings, Fire Proof Paints, Cements, Et Samples and Descriptive Price Lists Free. H. W. JOHNS MFG CO., 87 MAIDEN LANE, N. Y.



VELOCITY OF ICE BOATS. A COLLEC. tion of interesting letters to the editor of the SCIENTIFIC AMERICAN on the question of the speed of ice boats, de-monstrating how and why it is that these craft sail faster than the wind which propels them. Illustrated with loczplanatory diagrams. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 3214. Trice 10 cents. To be had at this office and from all newsdealers.

H. W. JOHNS' LIQUID COACH BLACK PREPARED READY FOR USE One coat will make your carriage, wagon or sleigh look like new. Dries with a gloss. Varnishing not necessary. One dollar can, sufficient for painting an ordinary wagon. H. W. JOHNS M'F'G COMPANY. SOLE MANUFACTURERS OF H. W. Johns' Liquia Paints, Colors in Oil, Varnishes, Asbestos Roofing, Steam-Pipe & Boiler Coverings, &c. 87 MAIDEN LANE, NEW YORK. PHILADEL PHIA LONDON ICE-HOUSE AND COLD ROOM .- BY R. G. Hatfield. With directions for construction. Four engravings. Contained in SCIENTIFIC AMERICAN SUP-PLEMENT, 59. Price '0 cents. To be had at this office and of all newsdealers. TIGHT&SLACK BARRELMACHING JOHN GREENWOOD & CO. ROCHESTER N.Y.

& CO.,

*1*2

OR WRITE

TO US FOR PRICES.





Cabinet Specimens, Paper Weights, Watch Charms, etc., made of silicited wool from Chalcedony Park, Arizona. Nature's incomparable handiwork in colorings, polished with mirror finish. Send for Circular and Price List.

Drake Company, Drake Block, St. Paul, Minn.

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, and renders each individual user of telephones not furnished by it or its licensees responsible for such unlawful use, and all the consequences thereof, and liable to suit therefor.



CAN wil be supplied gratis for every club of five subscribers at \$3.00 each; additional copies at same proportionate rate.

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, seidom goes astray, but is at the sender's risk. Address all letters and make all orders, drafts, etc., payable to

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. THE SCIENTIFIC AMERICAN SUPPLEMENT is published week y, and includes a very wide range of contents. It presents the most recent papers by eminent writers in all the principal departments of Science and the Useful Arts, embracing Biology, Geclogy, Mineralogy Natural History Geography, Archaeology, Astronomy, Chemistry, Electricity, Light. Heat, Mechanical Engineering, Steam and Railway Engineering, Mining, Ship Building, Marine Engineering, Photography, 'aechology, Manufacturing Industries, Saritary Engineering, Agriculture, Horticulture, Domester Econo-my, Biography, Medicine, etc. A vast amount of fresh and valuable information pertaining to taese and allied subjects is given, the whole profusely illustrated with engravings.

The most important Engineering Works, Mechanisms and Manufactures at home and abroad are represented

Th

MESSRS. MUNN & CO., in connection with the publi-cation of the SCIENTIFIC AMERICAN, continue to ex-amine improvements, and to act as Solicitors of Patents for Inventors.

the inventors. In this line of business they have had forty one pears experience, and now have unequaled fucifies for the preparation of Pattent Drawines, Specifications, and the presention of Applications for Fatents in the United States, Canada, and Foreign Countries. Mesers Munn & Co. also attend to the preparation of Caveats, Copyrights for Books, Labels, Reissues. Assignments, and Reports on Infringements of Patents. All business intrusted to them is done with special care and promptness, on very reasonable terms.

reasonable terms. A pamphlet sent free of charge, on application, con-taining full information about Patents and how to pro-cure them; directions concerning Labels, Copyrights Designs, Patents, Appeals, Reissues, Infringements, As-signments, Rejected Cases, Hints on the Sale of Pa-tents, etc.

We also send, *free of charge*. a Synopsis of Foreign Pa-tent Laws, showing the cost and method of securing patents in all the principal countries of the world.

MUNN & CO., Solicitors of Patents,

361 Broadway, New York. BRANCH OFFICES.-No. 622 and 624 F Street, Pa- Shafting and Gearing, Textile Machinery, THOS. WOOD & CO. ELEVATORS, ETC.



USEFUL BOOKS.

Manufacturers, Agriculturists, Chemists, Engineers, Me chanics, Builders, men of leisure, and professiona men, of all classes, need good books in the line of their respective callings. Our post office department permits the transmission of books through the mails at very small cost. A comprehensive catalogue of useful books by different authors, on more than fifty

A new article in Berting which is made of small Leather Links ioned togethere with steel bolts. They have been remarkably suc-cessful for hard working machin-ery and belts run half crossed. For prices and particulars write to CHAS. A. SCHIEREN & CO., f Ferry St., New York: 416 Archi St., Phila; 56 Federal St., Boston.

Leather Link Belt Co.

TELESCOPIC OBJECTIVES AND MIRrefaced with a short history of the manufacture of glass. Contained in SCINTIFIC AMERICAN SUPPLY and 549. Price, locatis and the software of the start of the short history of the manufacture of glass. Contained in SCINTIFIC AMERICAN SUPPLEMENTS, Nos. 548 and 549. Price, locatis each. To be obtained at this office or from any newsdealer. emplo prefac

ASK YOUR STATIONER FOR THE

free circulation at the office of this paper. Subjects classified with names of author. Persons desiring a copy, have only to ask for it, and it will be mailed to them. Address, **MUNN & CO., 361 Brondwny, New York**. HISTORY OF THE ELECTRICAL ART

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 AM-ERICAN and one copy of the SUPPLEMENT, both mailed for one year for \$7.00. Address and remit by postal order, express money order, or check,

MUNN & Co., 361 Broadway, N. Y., Publishers SCIENTIFIC AMERICAN.

To Foreign Subscribers.-Under the facilities of the Postal Union, the SCIENTIFIC AMERICAN is now sent by post direct from New York, with regularity, to sub-scribers in Great Britain. India. Australia, and all other British colonies; to France, Austria, Belgium, Germany, Russia. and all other European States; Japan. Brazil, and all States of Central and South America. Terms, when sentto foreign countries, Canada and Mexico, excepted, \$4, gol1, for SCIENTIFIC AMERICAN, one year; \$9, gold for both SCIENTIFIC AMERICAN and SUPPLEMENT for one year. This includes postage, which we pay. Remit by postal or express money order, or draft to order of MUNN & CO., 361 Broadway, New York,

PRINTING INKS. THE "Scientific American" is printed with CHAS ENEU JOHNSON & CO.'S INK. Tenth and Lom-bard Sts., Phila., and 47 Rose St., opp, Duane St., N.Y.