

Advertisements.

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

Engravings may be ordered at the same rate per line, by measurement, as the letter press. Advertisements must be received at publication office as early as Thursday morning to appear in next issue.

Mill Stones and Corn Mills. We make Burr Millstones, Portable Mills, Smut Machines, Packers, Mill Picks, Water Wheels, Pulleys, and Gearing, specially adapted to Flour Mills. Send for catalogue.

J. T. NOYE & SON, Buffalo, N. Y.

Working Models. And Experimental Machinery, Metal or Wood, made to order by J. P. WILKINSON, 62 Centre St., N. Y.

MICROSCOPES, Opera Glasses, Spectacles, Meteorological Instruments, at greatly reduced prices. Send three stamps for Illustrated Catalogue. R. & J. BECK, Philadelphia, Pa.

VALVE REFITTING MACHINES. ALL USERS OF GLOBE VALVES SHOULD HAVE ONE. GRISCOM & CO., POTTSVILLE, PENN.

I CHALLENGE THE WORLD to produce an ointment that will cure more than the Golden Healing Ointment manufactured by J. L. Beattie. Patent rights for sale or lease by C. J. BEATTIE, of Pueblo, Colo.

Kaplan Satchel-Desk. A combined valise and secretary. Unique, compact, light and durable. Indispensable to every traveler. Invaluable as a bureau desk or seaside companion and as a portable case for commercial travelers. Send stamp for price and description to THE KAPLAN SATCHEL-DESK CO. (Name this Paper.) 115 W. Fourth St. Cincinnati, O.

VENUS, THE EVENING STAR. AN interesting and valuable paper. By Camille Flammarion. Containing a resume, in popular form, of the latest knowledge concerning this wonderful planet, which is nearly of the same size as the earth and only twenty-six millions of miles distant from us.

PATENT Steam Friction Crane. Will coal locomotive in three minutes. Two machines will load or unload 1,000 tons per day of coal or ore. The best and cheapest. NOBLE & HALL, Erie, Pa.

Mechanical Department of Ohio State University. Best facilities in the West. Tuition free. Fully equipped Mechanical Laboratory. Address: PROF. S. W. ROBINSON, Columbus, Ohio.

EMPIRE THRESHER MANUFACTURED AT HAGERSTOWN, Md. BY THE HAGERSTOWN STEAM ENGINE & MACHINE CO. THE BEST IN THE WORLD. SEND FOR CIRCULARS.

The George Place Machinery Agency. Machinery of Every Description. 121 Chambers and 103 Reade Streets, New York.

H.W. JOHNS' ASBESTOS. Liquid Paints, Roofing, Boiler Coverings, Steam Packing, Sheathings, Fire Proof Coatings, Cements, &c. H. W. JOHNS M'FG CO., 87 MAIDEN LANE, N. Y.

HOW TO REMOVE STAINS AND SPOTS from Linen, Cotton, Woolens, and Silk. Being a Table of Specific Directions, showing how to proceed in removing from each of the above kinds of goods any stains of the following character or color: Stains of Sugar, Glue, Blood, Almonds, Grease, Varnish, Oil, Paints, Stearins, Vegetable Colors, Red Wine, Fruit Stains, Red Ink, Alizarine Ink, Iron Rust, Ink made with Galls, Lime, Lye, Alkali Stains, Tannin, Green Nut Stains, Coal Tar Stains, Wagon Grease, Acid Stains, etc.

Patent Spark-Arrester. 8-H.P. Mounted, \$650. 10 " " 750. 12 " " 1000. 2-H.P. Eureka, \$150. 4 " " 250. 6 " " 350. B.W. Payne & Sons, Corning, N. Y.

WIRE ROPE. Address JOHN A. ROEBLING'S SONS, Manufacturers, Trenton, N. J., or 117 Liberty Street, New York. Send for circular.

Park Benjamin's Scientific Expert Office, 37 PARK ROW, NEW YORK. Examines and reports on novelty and value of inventions.

Columbia Bicycle. A practical road machine. The velocipede of 1870 is no more to be compared with the present bicycle than a spavined donkey with a blooded horse. THE POPE M'FG CO., 89 Summer Street, Boston, Mass.

SCIENTIFIC AMERICAN SUPPLEMENT. Any desired back number of the SCIENTIFIC AMERICAN SUPPLEMENT can be had at this office for 10 cents. May also be had or ordered through booksellers and news-dealers everywhere. MUNN & CO., Publishers, 37 Park Row, New York.

\$10 to \$1000 Invested in Wall St. Stocks makes fortunes. Free examining everything. Address BAXTER & CO., Bankers, 17 Wall St., N. Y.

20 H. P., \$250. "RELIABLE" Vertical and Horizontal Engines, with Water's Governor, equal to any made in simplicity, durability, and efficiency. HEALD, SISCO & CO., Baldwinsville, N. Y.

Wood-Working Machinery, Such as Woodworth Planing, Tonguing, and Grooving Machines, Daniel's Planers, Richardson's Patent Improved Sash Machines, Mortising, Moulding, and Re-Saw Machines, Eastman's Pat. Miter Machines, and Wood-Working Machinery generally. WITHERBY, RUGG & RICHARDSON, 26 Salisbury Street, Worcester, Mass.

IMPORTANT FOR ALL CORPORATIONS AND MAN'G CONCERNS. - Buerker's Watchman's Time Detector, capable of accurately controlling the motion of a watchman or patrolman at the different stations of his beat. E. BUEKER, P. O. Box 979, Boston, Mass.

"VICTOR." THE BEST IN THE WORLD. Send for Descriptive Circular and Price List to HAGERS-TOWN AGRICULTURAL IMPLEMENT MFG. CO., Hagers-town, Md. State where you saw advertisement.

NEW AND 2ND-HAND ENGINES AND BOILERS CHEAP for cash. O. B. GOODNOW, Oil City, Pa.

HAND SAW MILL, SAVES THREE MEN'S labor. S. C. HILLS, 78 Chambers St., N. Y.

THE EMERSON PATENT INSERTED TOOTH & DAMASCUS TEMPERED \$100. GOLD PREMIUM SAWS ARE SUPERCEDING ALL OTHERS. SEND YOUR FULL ADDRESS TO SAWYERS & BOOK (FREE) TO BEAVER FALLS PA.

THE Scientific American, Export Edition. PUBLISHED MONTHLY.

The Scientific American, Export Edition, is a large and splendid periodical, issued once a month, forming a complete and interesting monthly record of all Progress in Science and the Useful Arts throughout the World. Each number contains about one hundred and large quarto pages, profusely illustrated, embracing: (1) Most of the plates and pages of the four preceding issues of THE SCIENTIFIC AMERICAN, with its splendid engravings and valuable information. Every number has from seventy-five to one hundred new engravings, showing the most recent improvements and advances in Science and the Industrial Arts. (2) Prices Current, Commercial, Trade, and Manufacturing Announcements of Leading Houses. In connection with these Announcements many of the Principal Articles of American Manufacture are exhibited to the eyes of the reader by means of splendid engravings; the whole forming an elegant printed Standard Catalogue, or Permanent Directory, of the Latest and Best American-made Goods, always under the eye of the foreign buyer, constantly influencing his preferences and purchases.

The Scientific American, Export Edition, has a large guaranteed circulation in the principal Cities and Commercial Centers of the World. It is regularly received and filed for public examination by nearly all U. S. Consuls. Go into almost any American Consulate in any quarter of the globe, and the objects of greatest interest there to be found are the numbers of THE SCIENTIFIC AMERICAN. Foreign Merchants, Buyers of Goods, and others are always referred to the Consular Officials to the pages of this Journal, as containing the most recent announcements of the best reliable American Goods and Manufactures. THE SCIENTIFIC AMERICAN is also on file in the Principal Cafes, Club Rooms, and Exchanges. Among the regular subscribers for THE SCIENTIFIC AMERICAN, Export Edition, are leading Commercial Houses in foreign cities, Engineers, Directors of Works, Government Officials, and other prominent influential persons. Regular files of this paper are also carried on all the principal lines of STEAMSHIPS, foreign and coastwise, leaving the port of New York.

No export publication sent from the United States reaches so many readers as THE SCIENTIFIC AMERICAN, Export Edition. It is by far the most splendid, satisfactory, and superior Export Journal ever brought before the public. Its pages are so arranged as to permit the publication, at very low prices, of large and handsomely illustrated advertisements of American Goods and Manufactures, with Engravings, which are always attractive to foreign purchasers. The SCIENTIFIC AMERICAN, Export Edition, already enjoys the advertising patronage of many of the Great Manufacturing Establishments of this Country, who find it to be an UNRIVALLED MEDIUM FOR SECURING NEW ORDERS AND EXTENDING TRADE. If you wish to increase your business, try a handsome advertisement for one year, continuously, in THE SCIENTIFIC AMERICAN, Export Edition. Rates, \$50 a year for a full page; half page, \$30; quarter page, \$17; one-eighth page, \$10. Half-yearly rates in slightly increased proportion. Published about the 20th of each month. Single numbers of THE SCIENTIFIC AMERICAN, Export Edition, 50 cents. To be had at this office and at all the news stores. Subscriptions, Five Dollars a year; sent, postpaid, to all parts of the world.

MUNN & CO., PUBLISHERS, 37 PARK ROW, NEW YORK.

SHEET METAL DRAWING PRESSES. STILES & PARKER PRESS CO., Middletown, Conn.

WIRE ROPE. Address JOHN A. ROEBLING'S SONS, Manufacturers, Trenton, N. J., or 117 Liberty Street, New York. Send for circular.

HARTFORD STEAM BOILER Inspection & Insurance COMPANY.

W. B. FRANKLIN, V. Pres't. J. M. ALLEN, Pres't. J. B. PIERCE, Sec'y.

Bookwalter Engine. Compact, Substantial, Economical, and easily managed; guaranteed to work well and give full power claimed. Engine and Boiler complete, including Governor, Pump, etc., at the low price of \$215 00. Put on cars at Springfield, O. JAMES LEFFEL & CO., Springfield, Ohio, or 110 Liberty St., New York.

THE DRIVEN WELL. Town and County privileges for making Driven Wells and selling Licensed under the established American Driven Well Patent, leased by the year to responsible parties, by WM. D. ANDREWS & BRO., 235 BROADWAY, NEW YORK.

The J. L. Mott Iron Works, 88 and 90 BEEKMAN ST., Manufacturers of DEMAREST'S PATENT WATER CLOSETS. Simple in construction, perfect in operation, thoroughly excluding all sewer gas, and cleanly in every way.

MINING MACHINERY. Engines, Boilers, Pumps, Coal and Ore Jigs, Dust Burning Appliances. Drawings and advice free to customers. Lehighville Iron Works (J. C. Haydon & Co.) Address: HOWELL, GREEN, Supt., Jeanesville, Luzerne Co., Pa.

DYKES' BEARD ELIXIR. A Wonderful Remedy for Itch, Ringworm, and all other eruptions of the skin. It cures the most obstinate cases of itching, and restores the hair to its natural color and growth. Price 25 cents per bottle. Sold by all Druggists.

MACHINISTS' TOOLS. NEW AND IMPROVED PATTERNS. Send for new illustrated catalogue. Lathes, Planers, Drills, &c. NEW HAVEN MANUFACTURING CO., New Haven, Conn.

WIRE ROPE. J. LLOYD HAIGH, Manufacturer of WIRE ROPE. of every description for Railroad and Mining Use, Elevators, Derricks, Rope Tramways, Transmission of Power, etc. No. 81 John St., N. Y. Send for price list, Plans and Estimates furnished for Suspension Bridges.

Lathes, Planers, Shapers. Drills, Bolt and Gear Cutters, Milling Machines, Special Machinery. E. GOULD & FERRIBARDT, Newark, N. J.

THE CARPET BEETLE AND OTHER domestic insect pests. An interesting and instructive paper read by Dr. H. A. Hagen before the Boston Society of Natural History. Giving the complete natural history of the new carpet beetle, where it came from originally, how it has spread, its destructive habits, and how its ravages may be prevented. A description of the Attagenus Megatoma—a new relative of the Carpet beetle, just as destructive, and which, although not well known to the public, is really equally as common as the latter. The Common Flea and its rapid increase during the last few years. The recent increase in the number of Cat Fleas and the annoyance that they have caused housekeepers in the Eastern States. Fleas in Poland and the remedy against them in that Country. Polish Flea-traps described. The present variety of the Hessian fly and Wheat Midges. How insects, like plants, are introduced into and distributed through New Countries. The home of the Cockroach and the insect's immigration westward. The introduction of plants and insects by emigrants, and the gradual change of a country's insect fauna by a change of its flora. Butterflies that have made the trip around the world. Insects constantly brought from Europe by steamers; the grain weevil, the rice weevil, and the asparagus beetle. Contained in SCIENTIFIC AMERICAN SUPPLEMENT 161. Price 10 cents. To be had at this office, and of all newdealers.

TIGHT & SLACK BARREL MACHINERY. A SPECIALTY. JOHN GREENWOOD & CO., ROCHESTER, N. Y.

ICE AT \$1.00 PER TON. The PICTET ARTIFICIAL ICE CO., LIMITED, Room 51, Coal and Iron Exchange, P. O. Box 303, N. Y.

THE FORSTER-FIRM GOLD AND SILVER AMALGAMATING COMPANY of Norristown, Pa., will grant state rights or licenses on easy terms. This system works up to assay, and recovers the mercury rapidly. Apply as above.

60 Cards—20 Chromo, 10 Malto, 30 Ocean Shells, Snowflake, etc. Name on box. Clinton Bros., Clintonville, Ct.

PERFECT NEWSPAPER FILE. The Koch Patent File, for preserving newspapers, magazines, and pamphlets, has been recently improved and price reduced. Subscribers to the SCIENTIFIC AMERICAN and SCIENTIFIC AMERICAN SUPPLEMENT can be supplied for the low price of \$1.50 by mail, or \$1.25 at the office of this paper, and a side description "SCIENTIFIC AMERICAN" in gilt. Necessary for every one who wishes to preserve the paper. Address MUNN & CO., Publishers SCIENTIFIC AMERICAN.

THE TANITE CO., STROUDSBURG, PA. EMERY WHEELS AND GRINDERS. LONDON—9 St. Andrews St., Holborn Viaduct, E.C. LIVERPOOL—42 The Temple, Dale St.

ROCK DRILLING MACHINES AND AIR COMPRESSORS. MANUFACTURED BY BURLEIGH ROCK DRILL CO., FITCHBURG, MASS. SEND FOR PAMPHLET.

PATENTED ARTICLES, MACHINES, etc., manufactured in France according to the Laws by the Société Anonyme pour l'Exploitation de Brevets, 11 Rue de Flandre, Paris, France. References: Mackay Sewing Machine Association, Boston, Mass.

\$3 Printing Press. Prints cards labels &c. (Self-inker \$5) 18 larger sizes. For 1000 or more, please send for circular. Do your own card-making and printing. Call on us for press, type, cards, etc., for 2 stamps. Kelsey & Co., Meriden, Conn.

FORCE OF WIND. HOW TO ESTIMATE the Necessary Strength of Roofs, Towers, Tall Chimneys, etc., to withstand the Wind. The Solution of all Problems of the kind, with numerous Formula. Contained in SCIENTIFIC AMERICAN SUPPLEMENT No. 109. Price 10 cents. To be had at this office and of all newdealers.

THE SKINNER & STATIONARY ENGINES—PORTABLE & GOVERNORS. First Class & Economical. SKINNER & WOOD, ERIE, PA. SEE ILLUSTRATED ADVERTISEMENT.

LIGHT DRAUGHT, FAST, STERN Wheel, Steam Yachts. These yachts are 34 feet long, 8 feet 2 inches beam; draught, 16 inches; speed, 7 miles an hour. Designed under direction of Col. F. W. Farquhar, U. S. A., by M. Meigs, U. S. Civil Engineer, U. S. Works, Rock Island, Ill. With working drawings, dimensions, and particulars of vessel, engine, boiler, and wheels, furnished by the inventor. The serviceable character of these boats, their simplicity of construction, roominess, and light draught render them very desirable, especially for shallow waters. Contained in SCIENTIFIC AMERICAN SUPPLEMENT No. 179. Price 10 cents. To be had at this office and of all newdealers.

Model Engines. Complete sets of CASTINGS for making small Model Steam Engines 1 1/2-2 in. bore, 3 in. stroke, price, \$4; ditto 2 in. bore, 4 in. stroke, price, \$10, same style as cut. Gear Wheels and Parts of Models. All kinds of Small Tools and Materials. Catalogue Free. GOODNOW & WIGHTMAN, 176 Washington Street, Boston, Mass.

PATENTS. CAVEATS, COPYRIGHTS, TRADE MARKS, ETC. 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.

In this line of business they have had over THIRTY YEARS' EXPERIENCE, and now have unequalled facilities for the preparation of Patent Drawings, Specifications, and the Prosecution of Applications for Patents in the United States, Canada, and Foreign Countries. Messrs. Munn & Co. also attend to the preparation of Caveats, Trade Mark Regulations, 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 moderate terms.

We send free of charge, on application, a pamphlet containing further information about Patents and how to procure them; directions concerning Trade Marks, Copyrights, Designs, Patents, Appeals, Reissues, Infringements, Assignments, and Reports on Infringements of Patents. All business intrusted to them is done with special care and promptness, on very moderate terms.

Foreign Patents.—We also send, free of charge, a Synopsis of Foreign Patent Laws, showing the cost and method of securing patents in all the principal countries of the world. American inventors should bear in mind that, as a general rule, any invention that is valuable to the patentee in this country is worth equally as much in England and some other foreign countries. Five patents—embracing Canadian, English, German, French, and Belgian—will secure to an inventor the exclusive monopoly of his discovery among about ONE HUNDRED AND FIFTY MILLIONS of the most intelligent people in the world. The facilities of business and steam communication are such that patents can be obtained abroad by our citizens almost as easily as at home. The expense to apply for an English patent is \$75; German, \$100; French, \$100; Belgian, \$100; Canadian, \$50.

Copies of Patents.—Persons desiring any patent issued from 1836 to November 26, 1867, can be supplied with official copies at reasonable cost, the price depending upon the extent of drawings and length of specifications. Any patent issued since November 27, 1867, at which time the Patent Office commenced printing the drawings and specifications, may be had by remitting to this office \$1. A copy of the claims of any patent issued since 1836 will be furnished for \$1. When ordering copies, please to remit for the same as above, and state name of patentee, title of invention, and date of patent. A pamphlet, containing full directions for obtaining United States patents sent free. A handsomely bound Reference Book, gilt edges, contains 140 pages and many engravings and tables important to every patentee and mechanic, and is a useful hand book of reference for everybody. Price 25 cents, mailed free. Address MUNN & CO., Publishers SCIENTIFIC AMERICAN, 37 Park Row, New York.

BRANCH OFFICE—Corner of F and 4th Streets, Washington, D. C.

THE "Scientific American" is printed with CHAS. ENEU JOHNSON & CO.'S INK, Tenthand Lombard Sts., Philadelphia, and 50 Gold St., New York.