

Advertisements.

Inside Page, each insertion --- 75 cents a line.
Back Page, each insertion --- \$1.00 a line.
(About eight words to a line.)
Engravings may head advertisements 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.

The publishers of this paper guarantee to advertisers a circulation of not less than 50,000 copies every weekly issue.

Pitcher, ice, H. Vasseur	225,440
Planter, corn, J. W. Atkinson	225,318
Planter, seed, E. F. Dunaway	225,275
Planters, marking and dropping attachment for, W. F. Senter	225,426
Plow, A. L. Chubb	225,341
Plow, R. T. Semmes	225,425
Plow, reversible, J. L. & G. L. Woodbury	225,452
Plow, side hill, W. Strait (r)	9,116
Plow, sulky, L. Berthiaume	225,207
Pole and shaft, vehicle, M. T. Jackson	225,221
Postal card, H. E. W. Barton	225,319
Printing apparatus, cash controlling, C. Abele	225,208
Printing press delivery apparatus, J. T. Hawkins	225,280
Pulp machine, wood, J. W. Martin	225,292
Pump, D. C. Lee	225,398
Pump, L. D. Railsback	225,417
Pump, ship's, C. V. Decker	225,353
Rail joint, W. F. Ash	225,266
Reaction and direct action engine, Du Motay & Beckwith	225,245
Reaming bit, expansible, A. Arntz	225,265
Reapers and mowers, rake reel for, J. Amstutz	225,315
Reclining chair foot rest, R. & W. McCabe	225,280
Revolving screen, L. J. Bennett	225,206
Rheumatism remedy, P. J. Welch	225,248
Roof and pipe cutter, F. I. Maule	225,403
Rotary engine, R. Leuchsenring	225,226
Saddle, harness, C. Steinbach	225,242
Sailor's ditty box, Hitchcock, Jr. & Read	225,377
Saw tables, device for adjusting, J. Bennett	225,323
Screw cutting machine, B. Scott	225,305
Screw machine wood, J. H. Greenleaf	225,277
Service pipe box, Hummer & Gemmill	225,385
Sewer connection, M. Schmitt	225,424
Sewing machine, J. Bigelow (r)	9,112
Sewing machine roller presser, P. Diehl	225,274
Sewing machine spool case, Terrell & Travis	225,437
Sewing machine tucker, Johnson & Reynolds	225,390
Shelter, portable, G. I. Herbert	225,372
Shower bath apparatus, portable, J. E. Vansant	225,439
Skate, J. H. Forshay	225,276
Skate, roller, A. French	225,361
Skiving machine, F. M. Carter	225,340
Slate, school, N. Du Brul	225,215
Sliding gate, A. F. Miller	225,295
Smoke and dust arrester for railway cars, White & Henderson	225,448
Soap, fluid, E. W. Lincoln	225,400
Soap press, C. L. Ingalls	225,287
Sod cutter, M. S. Bettice	225,324
Spark arrester, Craig & Wyman	225,209
Spark extinguisher, G. L. Blewett	225,326
Spoke throating machine, Doane & Bugbee	225,355
Steam engine, J. D. Davies	225,351
Stove, C. H. Blanchard	225,218
Stove, heating, J. P. Oeth	225,234
Stove, steam, S. Silsbee	225,240
Straw stacker, L. N. Clark	225,344
Stud and button, P. Z. S. Bulot	225,337
Telephone line alarm, Barker & Eamonston	225,321
Telephone lines, signaling apparatus for, G. H. Bliss	225,327
Telephone transmitter, J. H. Irwin	225,388
Tether, W. H. Maxey	225,404
Thill coupling, W. H. Brace	225,333
Thrasher and separator, grain, M. Williams	225,450
Thread cleaner, T. Finigan	225,217
Tin vessel, J. Backus	225,204
Tire upsetting machine, J. W. Hudson	225,286
Tobacco, improving the color and quality of leaf, G. Robinson	225,422
Tobacco rolling and covering machine, C. A. Snyder	225,241
Umbrella covers, machine for cutting, G. F. Wachtershauer	225,443
Umbrella support, T. Mora	225,409
Undershirt, A. J. Wheeler	225,249
Valve, balance slide, E. Haag	225,370
Valve, globe, W. A. Hart	225,369
Valve, straightway, E. W. McCormick	225,229
Vehicle spring, G. Hubert	225,384
Velocipede, A. Vreeland	225,310
Wagon seat, J. H. Rhamy	225,420
Washing machine, J. Anderson	225,316
Washing machine, W. Haas	225,278
Washing machine, Wentworth & Colby	225,311
Watch barrel attachment, H. A. Riggs	225,421
Watches, winding arbor for stem winding, W. P. Hillick	225,220
Water closet, M. F. Gale	225,363
Water conductor, G. K. Reber	225,237
Water wheel, K. H. Higginbotham	225,373
Whiffletree, C. Hassinger	225,371
Whiffletree, H. M. Whitehead	225,250
Whip socket fastener, A. E. Hawley	225,281
Window screen, P. Howe	225,383

Advertisements.

Inside Page, each insertion --- 75 cents a line.
Back Page, each insertion --- \$1.00 a line.
(About eight words to a line.)
Engravings may head advertisements 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.

The publishers of this paper guarantee to advertisers a circulation of not less than 50,000 copies every weekly issue.

DEAFNESS.

Dr. JUDGE'S easy and pleasant method of treatment for Deafness, Catarrh, Asthma, Consumption, Bronchitis, Coughs, Colds, Nervousness, and lung complaints is well deserved of success. Send for pamphlet or call and see letters from all parts of the country. Trial free at our office. No charge for consultation, by mail or in person. Sent by express everywhere. Dr. J. D. JUDGE & Co., Physicians, 79 Beach St., Boston, Mass. Ladies' entrance to Parlors, 79 1/2, opposite United States Hotel.

Wanted in every Family.

Splendid combination. Step ladder, height 5 feet; clothes bars, 20 feet; best ironing or skirt board, all neatly combined in one compact, durable article. Can be carried in one hand. Weighs only 28 lb. Customers say: "Well pleased." Send for sample. Price \$2. Agents' terms a bonanza. Rights for sale. Address J. H. MARTIN, Hartford, N. Y. See illustration in SCIENTIFIC AMERICAN, March 20, 1880.

THE BLAKE "LION AND EAGLE" CRUSHER,

A patented improvement of the former "New Pattern" Blake machine. It has greater strength and much greater efficiency than the old. It will about half the power to drive, and is transported at much less expense (the size most used weighing 5,000 lb. less than the unimproved machine). It requires less than half the time in oiling and other manipulation, and less than half the expense for repairs. Address E. S. BLAKE & CO., Pittsburg, Pa. Sole Proprietors and Manufacturers.

STEAM PUMPS.

HENRY R. WORTHINGTON.

239 Broadway, N. Y. 83 Water St., Boston. 709 Market St., St. Louis, Mo.

THE WORTHINGTON PUMPING ENGINES FOR WATER WORKS—Compound, Condensing or Non-Condensing. Used in over 300 Water-Works Stations.

WORTHINGTON STEAM PUMPS of all sizes and for all purposes.

Prices below those of any other steam pump in the market.

WATER METERS. OH. METERS.

BECKER & PECK,
Successors of MILO PECK, Manufacturers of PECK'S PATENT DROP PRESS.

Regular sizes Hammer from 50 to 2,570 lb. Special attention given to making of Drop Dies, Drop and Machine Forgings. New Haven, Conn.

WANTED, ONE FOREMAN MACHINIST and one Pattern Maker and Draughtsman. Address I. E. HALTEMAN & Co., Manufacturers of Steam Engines and Mill Machinery, 1611 South 3d Street, St. Louis, Mo.

PROGRESS OF INDUSTRIAL CHEMISTRY.—By J. W. Mallet. The latest and most approved processes, and the latest experimental results in the manufacture of the following important commercial products: Nitric Potassium Chloride, Potassium Sulphate, Potassium Chlorate, Pyro-Chromate, Potassium Ferro-Potassium, Potassium Cyanide, Sodium Chloride, Sodium Nitrate, Sodium Sulphate, Borax, Ammonium Chloride, Calcium Chloride, Calcium Chlorate, and Magnesium Sulphate. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 214. Price 10 cents. To be had at this office and from all newsdealers.

The Premium DUC'S IMPROVED ELEVATOR BUCKET.

Made in sizes from 3 1/2 to 20 inches. For use in FLOUR, GRAIN, MALT, CORES, COAL, BROKEN STONE, SAND, DRUGS, SPICES, PLASTER, etc., etc. These buckets are struck out from the best charcoal iron, and are almost indestructible. No corners to catch. No seams to burst. Run with great ease and fill full every time. No interior corners to clog up.

T. F. ROWLAND, Sole Manufacturer, Brooklyn, N. Y.

WANTED,
A competent and reliable man as "Time Keeper" in a general machine shop and foundry employing 30 to 400 men. Must be thoroughly experienced. Address: I. W. Box 773, New York.

ELECTRO-MAGNETS,
1 1/2 in. long, 3/4 in. diameter. Silk wound wire, by mail, 25 cents. J. H. HINGLE, Rutherford, N. J.

AN EASILY MADE SMALL, STRONG, AND CHEAP BOILER for little Steamboats. By H. K. Stroud. With an engraving. This excellent little boiler is made of wrought iron mercury flasks, which may be readily obtained, ready for use. Seven flasks are screwed together with ordinary gas fittings. This boiler has been used for a year past with much success, in the steam Sharpie yacht *Mannetta*. Length of boat, 16 ft. 5 in.; beam, 4 ft. 6 in.; propeller, 16 inches diameter. For further description of boiler, boat, and engine, with method of securing the propeller shaft in stern post, see SCIENTIFIC AMERICAN SUPPLEMENT, No. 182. Price 10 cents. To be had at this office and of all newsdealers.

\$10,000. SAFETY LAMP.

Mailed Free for 35 Cts. \$10,000 will be paid to any person who can explode it with our PATENTED SAFETY ATTACHMENT. May use any lamp or burner. Prevents dripping and heating. Send for samples, with size of collar and depth of your lamp. S. S. Newton's Safety Lamp Co., 13 West Broadway, New York. Factory and Office, Binghamton, N. Y.

Steel Castings

From 1/2 to 15,000 lb. weight, true to pattern, of unequalled strength, toughness, and durability. 15,000 Cast Iron Shafts and 10,000 Gear Wheels of this steel now running prove its superiority over all other Steel Castings. Send for circular and price list. CHESTER STEEL CASTINGS CO., 407 Library St., Phila., Pa.

Forster's Rock & Ore Breaker and Combined Crusher and Pulverizer.

The simplest machine ever devised for the purpose. Parties who have used it constantly for six years testify that it will do double the work of any other Crusher, with one-third the Power, and one-half the expense for keeping in repair. The smaller sizes can be run with Horse Power. Address TOTTEN & CO., Pittsburg, Pa.

WE MAKE a Good Strong STEAM ENGINE,
Cylinder 12x15 inches; 35 Horse Power; with Fly Wheel or Pulley and Governor. All complete. New. Price, \$600. Address W. P. DUNCAN & CO., Bellefonte, Pa.

FIRE BRICK TILE AND CLAY RETORTS ALL SHAPES
23 1/2 ST. ABOVE BORGNER & O'BRIEN
CINCINNATI, O.

WANTED.—A Second-hand Upright Boiler, 2-horse power. NIMS & BEACH, Lexington, Mich.

Ammoniacal Liquor and Coal Tar.
Sealed Proposals will be received at the office of the Cincinnati Gas Light and Coke Company, Cincinnati, Ohio, until 12 o'clock noon, May 1st, 1880, for the Ammoniacal Liquor produced at the works of said Company, extending over a period of five (5) years from July 1, 1880. The Liquor will be delivered in car-tanks on sidetrack, in tank-barges on the river, or at any point on the line of the Gas Company's premises. The strength to be of the same average as at present. The strength to be of 2,000 pounds of coal carbonized. Payments to be made monthly. Security in the sum of \$10,000 will be required. The Company reserves the right to reject any and all bids. If desired by the successful bidder, arrangements can be made for the purchase of the Coal Tar produced during the same period. Address ROBERT BROWN, JR., Sec'y, Cincinnati Gas Light and Coke Co., Cincinnati, O.

WANTED.—A SECOND-HAND STEAM HAMMER, 700 lb. or upward. Give price and name maker. A. MATTISON, 824 S. Halsted St., Chicago, Ill.

MAGNETIC REACTIONS.—By THEO. du Moncel. An interesting and instructive paper, by one of the most eminent of French electricians, demonstrating that the effects of magnetism, like those of electricity, are of two different natures, according as magnets act as currents or as charges in the static state. Static action and dynamic action defined. How static magnetism is distributed in a simple magnetic system shown by magnetic phantoms. The effects which result from reactions exchanged between a magnet and its armature. Apparatus for showing that Magnetism, from a static point of view, shows to behave like electricity in a condenser. Magnetic condensation. Remanent Magnetism, and how it differs from Condensed Magnetism. Illustrated with 11 figures. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 217. Price 10 cents. To be had at this office and from all newsdealers.

PIANOS \$150 TO \$400.—All strictly first-class.—Sold at Wholesale factory prices. Highest Honors at Centennial Exhibition, Mathematics Scale for Squares, Grand Fine Arts Light in America, \$2.00 in use. Catalogue of 48 pages, free. JUBILEE ORGANS, the best in the world. An 8 stop organ only \$65; \$120; \$18. Circular free. All sent on 15 days' trial, freight free if unsatisfactory. Factory, 57th St. and 14th Ave. SHEET MUSIC at 1/3 price. Catalogue of 3,300 choice pieces sent for 5c stamp address. MENDELSSOHN PIANO CO., Box 2058, N. Y.

Universal Hand Planer, Judson's Patent.
Model makers, jewelers, and metal workers generally, find this tool of great value. Prices reduced. Send for illustrated catalogue of Planers, Iron Cutters, Shears, Punches, Turn iv or s s a l Ratchet Drills, etc. Manufactured exclusively by OLD COLONY RIVET CO., Kingston, Mass.

Universal Hand Planer, Judson's Patent.
Model makers, jewelers, and metal workers generally, find this tool of great value. Prices reduced. Send for illustrated catalogue of Planers, Iron Cutters, Shears, Punches, Turn iv or s s a l Ratchet Drills, etc. Manufactured exclusively by OLD COLONY RIVET CO., Kingston, Mass.

COMPARATIVE VALUE OF GAS AND COAL.—By Geo. S. Dwight. An interesting paper, giving some curious speculations about the waste of coal due to the extravagant methods now in vogue in all civilized centers in obtaining the thermal effects of this fuel; showing how a reformation of so glaring an evil may be effected, and how the losses may be reduced; and pointing out the advantages to be derived from the use of water-gas, which the author believes is destined to become the "fuel of the future." Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 216. Price 10 cents. To be had at this office and from all newsdealers. The same number contains a valuable article on the "Heating Power of Coal Gas," by Dr. Wm. Wallace.

A MANUFACTURER WANTED TO make Selxas' Patent Weighted Horse Shoe, as described in this journal Feb. 14th. Address J. S. BROWN, Galveston, Texas.

SEND STAMP FOR CATALOGUE.

TAPES, DIES, VISES, FILES, LATHES, SHEARS, CUTTERS, STAMPS, STENCILS, AND ALL KINDS OF TOOL CUTTING.

TALLMAN & MCFADDEN-PHILADELPHIA.

TILE EAR.—By CHAS. H. BURNETT, M.D. A valuable paper, giving a report of four cases, among many others, in which is shown the beneficial effect derived from the prolonged and uninterrupted wearing of cotton pellets as artificial drum-heads, and which the author claims are the only useful kind of artificial drum-heads that have ever yet been devised. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 217. Price 10 cents. To be had at this office and from all newsdealers.

A NEW 8 IN. x 8 IN. BOAT ENGINE FOR SALE. Apply W. WALTER, 541 West 35th St., New York City.

BIG Inducements to active agents to sell our goods. Terms and circulars free. Address the manufacturers, GEO. VAN SANDS & Co., Middletown, Conn.

SPY GLASSES
FIELD GLASSES,
MICROSCOPES,
JAMES W. QUEEN & CO.,
924 CHESTNUT ST., PHILADELPHIA, PA.

Catalogues sent on application.
Part 1.—Mathematical Instruments.
Part 2.—Optical Instruments.
Part 3.—Magic Lanterns.
Part 4.—Philosophical Apparatus.

STEAM PUMPS.
THE NORWALK IRON WORKS CO.,
SOUTH NORWALK, CONN.

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 newsdealers everywhere. MUNN & Co., Publishers, 37 Park Row, New York.

VALUABLE MACHINERY.
Large Rolling Mill in East St. Louis, Ill., for sale at retail—consisting in part of rail train, muck train, squeezers, punches, slotters, rail straightener, roll lathe and fixtures, engines and boilers. Address early. POPE IRON & METAL CO., St. Louis, Mo.

SUPERINTENDENT WANTED—FOR A 16-Set Woolen Mill. Only those thoroughly competent need apply. Give references, experience, and salary expected. Address Box 1926, Post Office, New York.

Jobbing in Wood Work.
Fine machinery used, and the best of workmen. C. C. SHEPHERD, 204, 206, and 208 W. Houston St., New York.

NEW ILLUSTRATED CATALOGUE, 1880, on Foot Lathes, Machinists' Tools, Gear Cutting Attachment for Lathes, Improved Work Holder, Twist Drills and Chucks, etc. Tyson Vase Engine—small Steam Motor; no boiler; no danger. Suitable for running Light Machinery. Address JACKSON & TYLER, 27 German St., Baltimore, Md.

WATCHES From \$2 up; other goods FREE in proportion. Mammoth Illustrated CATALOGUE. E. NASON & CO., 111 Nassau Street, New York.

Shafts, Pulleys, Hangers, Etc.
Full assortment in store for immediate delivery. WM. SELLERS & CO., 79 Liberty Street, New York.

PATENTS
CAVEATS, COPYRIGHTS, LABEL REGISTRATION, 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, Registration of Labels, 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 Labels, Copyrights, Designs, Patents, Appeals, Reissues, Infringements, Assignments, Rejected Cases, Hints on the Sale of Patents, etc.

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 to 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, 1877, 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 September 11, 1866, 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 7th Streets, Washington, D. C.