

Advertisements.

ORDINARY RATES.

Inside Page, each insertion -- 75 cents a line
Back Page, each insertion ---- \$1.00 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 advertisements at the same rate per agate line, by measurement, as the letter press. Advertisements must be received at Publication Office as early as Thursday morning to appear in the following week's issue.

WOOD or METAL WORKERS
without steam power can save time and money by using our
Foot and Hand Power Machinery
SEND FOR CATALOGUES--
A--Wood-working Machinery.
B--Lathes, etc.
SENECA FALLS MFG. COMPANY,
695 Water St., Seneca Falls, N. Y.

AMERICAN PATENTS.—AN INTERESTING and valuable table showing the number of patents granted for the various subjects upon which petitions have been filed from the beginning down to December 31, 1894. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 1002. Price 10 cents. To be had at this office and from all newdealers

POWER & FOOT LATHES.
SHAPERS, PLANERS, DRILLS,
MACHINE SHOP OUT-FITS, TOOLS
AND SUPPLIES. CATALOGUE FREE.
SEBASTIAN LATHE CO., 170 CULBERT ST. CINCINNATI, O.

TRANSITS AND LEVELING INSTRUMENTS.
NICKEL PLATED ELECTRIC LEVELS
SIZES, 2 and 3 inches. Prices, 25 and 30 cents.
For Book on the Level. C. F. RICHARDSON & SON,
P. O. Box 977, Athol, Mass., U. S. A.

Water Emery Tool Grinder
Has no pump, no valves. No piping required to supply it with water. Always ready for use. Simplest in construction, most efficient in operation.
Send for catalogue and prices.
W. F. & JNO. BARNES CO.,
1999 Ruby St., Rockford, Ill.

Bicycle Spoke Threading Machines
Will roll thread on wire 3-16 inch diameter, one inch in length, and 1/4 inch standard thread 1/2 inch in length. Made in five sizes. Capacity 45 spokes per minute.
Send for circular.
BLAKE & JOHNSON,
P. O. Box 7, Waterbury, Conn., U. S. A.

GATES ROCK & ORE BREAKER,
Steam Ore Stamp,
Mining Machinery,
50 years experience as builders.
GATES IRON WORKS,
Dept. C, 650 Elston Ave., Chicago.

THE ORNAMENTAL IRON INDUSTRY.—Description of the method of manufacturing wrought iron into ornamental and artistic forms. With 9 illustrations. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 1020. Price 10 cents. To be had at this office and from all newdealers.

POWER PRESSES
for Cutting, Stamping, Wiring, and Lettering
SHEET METAL BLANKS
Spoons, Bulboms, Locks, Hinges, etc. of every description
in the manufacture of Metal Goods. Improved Clutch Relief, no clicking. Presses changed to order to suit any special requirements. Send us full particulars, stating what you wish to stamp. Machines fitted with Automatic Feed and Ejectors.
F. S. & G. L. BROWN,
27-29 Fort Avenue, BALTIMORE, MD.

ONLY ALL WROUGHT STEEL
Shafting & Pulley
in the world. Unbreakable, light, perfectly balanced. Cheap first cost, and a power saver. Patented and patents pending this and foreign countries. Write for description and price.
AMERICAN PULLEY CO.,
18th and Hamilton Sts., Phila., Pa.
See SCIENTIFIC AMERICAN, Feb. 6, 1897, page 84.

WE LEAD ON
WIRE COAT
AND
HAT HOOKS
SELL THE MOST.
MAKE THE MOST.
We have the Machines to do it.
AMERICAN WIRE GOODS CO., - LOWELL, MASS.

If You Are a Manufacturer of Sheet Metal articles, you are naturally interested in New Machinery, and it will cost only a 2c. stamp to request us to forward any of the following illustrated circulars:
No. 1. ROLLING MILL MACHINERY FOR SHEET METAL
No. 2. TUBE AND WIRE MILL MACHINERY
No. 3. SILVERWARE AND COINING MACHINERY
No. 4. HARDWARE AND BRASS GOODS MACHINERY
No. 5. BICYCLE MACHINERY
ADDRESS
THE WATERBURY FARREL FOUNDRY & MACHINE CO.
WATERBURY, CONN.

PERFORATED METAL
OF EVERY DESCRIPTION
THE HARRINGTON & KING PERFORATING CO.
224 PEARL ST. NEW YORK

AUTOMATIC DROP PRESSES
33 1/3 INCREASE IN PRODUCTION.
SEND ADDRESS FOR BOOK.
MOSSBERG & GRANVILLE MFG. CO. PROVIDENCE, R.I.

Combination Pliers Drop Forging
In all its branches done to order.
Send us samples to figure on. Our work is equal to the best done in this country. We make a specialty of very intricate work.
BAGNALL-LOUD BLOCK CO.,
162 Commercial Street. - - BOSTON

"Queen" Builder's Transit \$100
IMPROVED TRANSITS AND LEVELS
Graduated entirely on our large dividing engines. Special award at World's Fair. All kinds of Engineering, Surveying and Drafting Instruments and Materials. 230 p. Illustrated Catalogue mailed free only if this ad. is mentioned.
QUEEN & CO. Inc.,
1011 Chestnut St., Philadelphia

The Van Norman Universal Bench Lathe.
A Lathe, Milling Machine, Screw Cutter and Universal Grinder in one tool. The best tool made for all kinds of small work. Made by Walbrham Watch Tool Co., SPRINGFIELD, MASS.
WELL DRILLING MACHINERY,
MANUFACTURED BY
WILLIAMS BROTHERS,
ITHACA, N. Y.
MOUNTED ON OR SILLS, FOR DEEP OR SHALLOW WELLS, WITH STEAM OR HORSE POWER
SEND FOR CATALOGUE
WILLIAMS BROS. ITHACA, N. Y.

ICE MACHINES, Comice Engines, Brewers, and Batters' Machines. THE VITTE MFG. CO., 89 Clinton Street, Milwaukee, Wis.

Experimental & Model Work
Circulars & advice free. Gardam & Son, 96 John St., N. Y.

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.
In this line of business they have had nearly fifty 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, Copyrights for Books, Trademarks, Reissues, Assignments, and Reports on Infringements of Patents. All business entrusted to them is done with a special care and promptness, on very reasonable terms.
A pamphlet sent free of charge on application, containing full information about Patents and how to procure them: directions concerning Trademarks, Copyrights, Designs, Patents, Appeals, Reissues, Infringements, Assignments, Rejected Cases. Hints on the sale of Patents, etc.
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.
MUNN & CO., SOLICITORS OF PATENTS,
361 BROADWAY NEW YORK.
BRANCH OFFICES.—No. 62 and 62 F Street, Pacific Building, near 7th Street, WASHINGTON, D. C.

On receipt of five 2-cent stamps we will send you, post-paid, one of our
1/2-INCH AUGER BITS
A fine cutting tool, perfect clearance, especially good in hard wood and for end boring.
Send for Circulars "S. A." Free.
THE FORD BIT CO., HOLYOKE, MASS.

ARMSTRONG'S * PIPE * THREADING
—AND—
CUTTING-OFF MACHINES
Both Hand and Power.
Sizes 1 to 6 inches.
Water, Gas, and Steam Fitters' Tools, Hinged Pipe Vises, Pipe Cutters, etc., and Live universally acknowledged to be THE BEST. Send for catalog.
THE ARMSTRONG MFG. CO.,
Bridgeport, Conn.

Model Locomotives
Complete Sets Castings for Latest Design Express Locomotives, N. Y. Central & Hudson River. Send for Catalogue.
G. H. OLNEY, 165 Herkimer Street, Brooklyn, N. Y.

COMET ROCK BREAKERS.
HEAVIEST DUTY. LIGHTEST THROST.
ONLY ADJUSTABLE CRUSHER MADE.
SPECIALLY ADAPTED FOR MACADAM AND BALLAST.
PERFORATED SCREENS, MINING MACHINERY.
NO. 6 AND 7 DESCRIPTIVE CATALOGUES.
FRASER & CHALMERS, CHICAGO, ILL. U.S.A.

"My Well and what came out of it."
A story by the novelist Frank R. Stockton.
"Your Well and what will come out of it."
By the
Pohlé Air Lift Pump
Bulletins to tell you will be sent on application.
The Ingersoll-Sergeant Drill Co.
Havemeyer Building, 26 Cortlandt Street, New York.

ECO MAGNETO WATCHMAN'S ELECTRIC CLOCK.
Indorsed by all Insurance Companies.
Write for Catalogue.
ECO MAGNETO CLOCK CO.
624 Atlantic Ave., Boston, Mass.

PATENT SCREW CUTTING TOOL
Has been made and used for two years. Has few parts and can be manufactured cheaply. A good chance for manufacturers having facilities to obtain control of a good device. Entire patent for sale or on royalty. Patent No. 555,889. Address for further particulars, Henry Hans & Son, 351 West 35th St., N. Y.

1 and 1/2 H. P. Gas or Gasoline Engines.
Well made, practical machine suitable for any kind of light work, and so simple that a boy can operate them. No fire. Furnished with electrical igniter. Send stamps for descriptive matter and prices. All sizes up to 35 h. p. PIERCE ENGINE CO., 17 N. 17th St., Racine, Wis.

Watchmaking a Trade for Young Men and Women
Parsons' Institute for Watchmakers, Engravers and Opticians in New Quarters.
Send for 1897 Catalogue.
111 BRADLEY AVE., PEORIA, ILLINOIS

Architecture
Architectural and Mechanical Drawing; Electricity; Mechanic; Plumbing; Mining; Civil Engineering in all Branches; Steam Engineering (Loco., Staty and Marine)
The International Correspondence Schools
To Carpenters,
Machinists, Electrical Workers, Plumbers, Steam Fitters, Pattern Makers, Steam Engineers, Draughtsmen, Miners, Civil Engineers, etc. References Everywhere. Free Circular. State Subject you wish to Study.
B 949 Scranton, Pa.

Krueger's Automatic Self-Registering Lumber Measure
Saves Time and Mental Wear and Tear. Avoids costly mistakes measuring lumber. Being exact, it prevents controversies over invoices between buyer and seller. Does away with all slow methods. Easy to understand and operate. One trial convinces of its value.
THE JOHNSTOWN SPECIALTY CO., Johnstown, Pa.

"WOLVERINE" GAS AND GASOLINE ENGINES, and MARINE.
The "Wolverine" is the only reversible Marine Gas Engine on the market. It is the lightest engine for its power. Requires no licensed engineer. Absolutely safe. Manufact'd by
WOLVERINE MOTOR WORKS,
12 Huron Street, GRAND RAPIDS, MICH.

DO YOU USE POWER?
All right; you need CHEAP Power. One Cent per Horse Power per Hour is CHEAP. Weber Gasoline Engines run anything. "Economy in Power" is our motto.
Send for Catalogue.
WEBER GAS & GASOLINE ENGINE CO.
402 Southwest Boulevard, Kansas City, Mo.

This beats Wind, Steam, or Horse Power. We offer the
WEBSTER 2 1/2 actual horse power GAS ENGINE
for \$150. less 10% discount for cash. Built on interchangeable plan. Built of best material. Made in lots of 100 therefore we can make the price. Bored for shipment, weight 400 pounds. Made for Gas or Gasoline.
Write for Special Catalogue.
WEBSTER M'FG CO.,
1074 West 15th Street, CHICAGO.

POWER? POWER?? POWER!!!
Fifty per cent. increase at no additional expense.
Victor Vapor Engine.
Emphatically the Twentieth Century Gas Engine.
Send stamp for catalogue "A"
Reliable agents wanted.
THOMAS KANE & CO.
64-66 Wabash Ave., Chicago.

DYNAMOS
FOR ELECTRIC LIGHTING.
Special low prices to boom business.
8 light 16 c. p. 110 volt dynamo \$26.50
10 " 16 " 110 " " \$38.00
Other sizes, up to 75 lights, 16 c. p. High grade machines. Satisfaction guaranteed. Electric motors 1/2 to 1 h. p. any voltage. Storage batteries for all purposes. Both Bros. & Co., 30-34 Market St., Chicago, Ill.

THE IMPROVED GAS ENGINE.
Two cylinders in one casting. Occupies less space and weighs less for its power than any engine made. Can be used wherever power is required. Either stationary or marine. No fire. No heat. No smoke. No licensed engineer required.
Send for catalogue.
SINTZ GAS ENGINE CO.,
Grand Rapids, Mich., U. S. A.

ELECTRICAL SUPPLIES
AT MANUFACTURERS' PRICES.
Medical Battery, Finely Finished, guaranteed.
3 Currents \$3.25
CLYMER & HEILMAN, Reading, Pa.

SPEED INDICATOR
for ascertaining the correct speed of Dynamos, Steam Engines, Shafting, Floor Machines, etc. Adapted to hollow or pointed centers and are absolutely correct. Send for Circular "S. A."
H. WOODMAN MFG. AND SUPPLY CO.,
53 Oliver Street, Boston, Mass.

Do You Manufacture Anything?
If so, you must be interested in the machinery that makes your own goods and those of your competitors. You would like to see and read about improvements in such machinery, to hear of new mechanical inventions that will be a boon to you by increasing your facilities and reducing your expenses. To keep up with the times in all such matters, and in every branch of science, you should subscribe for the

Scientific American
which is the acknowledged leader of all publications in the world devoted to science and mechanical arts. Published weekly, 16 pages, illustrated. \$3.00 a year postpaid, \$3.50 for six months. \$1.00 for four months. Remit by check, draft or P. O. order payable to
MUNN & CO., Publishers,
361 Broadway, New York City.