



**Advertisements.**

**ORDINARY RATES.**  
 Inside Page, each insertion - - 75 cents a line  
 Back Page, each insertion - - - \$1.00 a line  
 For some classes of Advertisements, Special and Higher rates are required.

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.

**Star** Foot Power Automatic Lathes Screw cutting 9 and 12 inch Swing. New Designs. Novel Features. Send for Catalogue B. SENECA FALLS MFG. COMPANY, 695 Water St., Seneca Falls, N. Y.

**LATHES.** Shapers, Planers, Drills, Machine Shop Catalogue Free. SEBASTIAN LATHE CO., 120 CULBERT ST., CINCINNATI, O.

**CATALOGUES FREE TO ANY ADDRESS**  
 GEARS AND PARTS OF MODELS  
 GOODNOW & WIGHTMAN BOSTON

**Pumping Water by Compressed Air.**  
 We take pleasure in announcing that by arrangements made with J. G. Pohlé, we are enabled to furnish our customers with the

**POHLÉ AIR LIFT PUMP,**  
 protected by numerous American and Foreign patents. This department of our business will be under the personal supervision of Dr. Pohlé, the inventor and patentee. THE INGERSOLL-ERGANT DRILL CO., Havemeyer Building, 26 Cortlandt St., New York.

**ROCK DRILLS**  
 AIR COMPRESSORS &  
 GENERAL MACHINERY FOR  
 MINING, TUNNELING,  
 QUARRY & RAILROAD WORK  
 RAND DRILL CO. 23 PARK PLACE, NEW YORK

**ICE-HOUSE AND COLD ROOM.—BY**  
 R. G. Hatfield. With directions for construction. Four engravings. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 548. Price 10 cents. To be had at this office and from all newsdealers.

**TRADE MARKS.**

Braking powder, J. E. Pearson & Company..... 26,096  
 Boots and shoes, leather, Bouve, Crawford & Company Corporation..... 26,062  
 Butterine or oleomargarine, Braun & Pitts (Incorporated)..... 26,063  
 Carpets, high riding, S. J. East..... 26,090  
 China, earthenware and pottery for plumbers use and other purposes, Trenton Pottery Company..... 26,088  
 Cigars, Derck & Hoemer..... 26,064  
 Cigars, Joseph R. Peebles' Sons Company..... 26,065  
 Cigars and smoking and chewing tobacco, J. E. Cohen..... 26,067  
 Cleaning and polishing articles and preparations, John Oakley & Sons..... 26,079  
 Clothing for men and boys, Levy, Greenbaum & Company..... 26,061  
 Colors, prepared, Sartorius & Company..... 26,082  
 Cornmeal, H. D. McCord..... 26,086  
 Cream separators, United States Butter Extractor Company..... 26,092  
 Flour, wheat, National Milling Company..... 26,093  
 Guns, E. K. Tron, Jr. & Company..... 26,106  
 Hose, hydraulic, American Multiple Fabric Company..... 26,069  
 Lard compounds, Minnesota Packing and Provision Company..... 26,067  
 Laundry powder, Estate of Benjamin T. Babbitt..... 26,069  
 Medicinal preparation of extract of malt, W. H. Ward..... 26,070  
 Medicine for the cure of colic in horses, Colicure Laboratory..... 26,077  
 Milk, condensed, Helvetia Milk Condensing Company..... 26,084  
 Musical instruments, their parts, and cases therefor, wind, string, and percussion, Wulschner & Son..... 26,103  
 Oils, essential, H. H. Sawyer..... 26,083  
 Pills, Mercier Chemical Company..... 26,074  
 Plasters, corn, Johnson & Johnson..... 26,075  
 Potash, caustic, Estate of Benjamin T. Babbitt..... 26,067  
 Pulverizing mills, Bradley Pulverizing Company..... 26,091  
 Remedy for rheumatism, A. Mouron..... 26,072  
 Remedy for rheumatism, F. Schrage..... 26,071  
 Ribbons, Colcombet F's & Cie..... 26,060  
 Salve, J. F. Loreman..... 26,073  
 Shade rollers and brackets, Keystone Manufacturing Company..... 26,089  
 Sinks, machine and hand sewing, C. E. Gudbrod..... 26,104  
 Snuff, B. F. Weyman..... 26,063  
 Snuffs, twist, and smoking tobacco, Hansen Tobacco Company..... 26,069  
 Soap and toilet powder, toilet and medicinal, Winburgh Brothers..... 26,078  
 Soap powder, borax, Estate of Benjamin T. Babbitt..... 26,068  
 Soap, powdered potash, A. Conkling..... 26,081  
 Soap, toilet and laundry, Estate of Benjamin T. Babbitt..... 26,100  
 Tea, Wilson & Company..... 26,094  
 Tobacco and cigars and cigarettes, bar and pipe, S. Hyman..... 26,088  
 Tobacco, smoking and chewing, B. F. Weyman..... 26,102  
 Trusses and appliances for physical deformities, S. M. Van Alstine..... 26,076  
 Vehicles and spring gear for same, four-wheeled, H. H. Babcock Company..... 26,101

**DESIGNS.**

Badge, W. C. Finck..... 24,043  
 Book cover, P. Cox..... 24,045  
 Brush back, C. Easton..... 24,044  
 Card, etc., E. S. Hall..... 24,047  
 Carpet, C. F. Gedney..... 24,050  
 Carpet, J. B. Nell..... 24,051  
 Carpet, A. F. Reddie..... 24,052  
 Carpet, A. M. Rosse..... 24,049  
 Carpet, H. Warner..... 24,048  
 Carpet sweeper casing, L. Gohlke..... 24,055  
 Glass dish, A. E. O'Connor..... 24,060  
 Grave marker, M. D. Jones..... 24,059  
 Hatchet, Ives & Hotchkiss..... 24,066  
 Post cap or nail, W. V. Robbins..... 24,065  
 Slop tub leg, C. Graham..... 24,058  
 Type, font of printing, R. H. Smith..... 24,061

A printed copy of the specification and drawing of any patent in the foregoing list, or any patent in print issued since 1865, will be furnished from this office for 25 cents. In ordering please state the name and number of the patent desired, and remit to Munn & Co., 361 Broadway New York.

Canadian patents may now be obtained by inventors for any of the inventions named in the foregoing list, provided they are simple, at a cost of \$40 each. If complicated the cost will be a little more. For full instructions apply to Munn & Co., 361 Broadway, New York. Other foreign patents may also be obtained.

**WELL DRILLING MACHINERY,**  
 MANUFACTURED BY  
**WILLIAMS' BROTHERS,**  
 ITHACA, N. Y.  
 MOUNTED OR ON SILLS, FOR  
 DEEP OR SHALLOW WELLS, WITH  
 STEAM OR HORSE POWER  
 SEND FOR CATALOGUE  
 ADDRESS WILLIAMS BROS. ITHACA, N. Y.

**ARTESIAN WELLS—BY PROF. E. G. SMITH.**  
 A paper on artesian wells as a source of water supply. Essential geological conditions of artesian wells. Some chemical features of artesian well supply. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 943. Price 10 cents. To be had at this office and from all newsdealers.

**OIL WELL SUPPLY CO.**  
 Manufacturers of everything needed for  
**ARTESIAN WELLS**  
 for either Gas, Oil, Water, or Mineral Tests, Boilers, Engines, Pipe, Cordage, Drilling Tools, etc. Illustrated catalogue, price lists, and discount sheets on request.  
 Pittsburg, Old City and Bradford, Pa.  
 Also, 32 Cortlandt St., New York.

**A. W. FABER**  
 Manufactory Established 1761.  
 LEAD PENCILS, COLORED PENCILS, SLATE PENCILS, WRITING SLATES, STEEL PENS, GOLD PENS, INKS, PENCIL CASES IN SILVER AND IN GOLD, STATIONERS' RUBBER GOODS, RULERS, COLORS AND ARTISTS' MATERIALS.  
 78 Reade Street, - - - New York, N. Y.  
 Manufactory Established 1761.

**Rock Drills**  
 AIR COMPRESSORS &  
 GENERAL MACHINERY FOR  
 MINING, TUNNELING,  
 QUARRY & RAILROAD WORK  
 RAND DRILL CO. 23 PARK PLACE, NEW YORK

**"DIETZ" TUBULAR DRIVING LAMP.**  
 IT is the only practicable and perfect driving lamp ever made.  
 IT will last long out.  
 IT gives clear white light.  
 IT looks like a locomotive head light.  
 IT throws all the light straight ahead from 200 to 300 feet.  
 IT burns kerosene.  
 Send for Book.  
**R. E. Dietz Co.**  
 77 Laight Street, New York.

**"THE DENSMORE"**  
 "The World's Greatest Typewriter."  
 It has the Most Conveniences and Runs the Easiest. Other manufacturers acknowledge its superiority by imitating, but not equaling, its essential features.  
 The U. S. War Department adopted it in 1893, and has just renewed the contract FREE—Descriptive Pamphlet, with opinions from such leading concerns as the CARNEGIE STEEL COMPANY, WHO USE 25 DENSMORES.  
**DENSMORE TYPEWRITER CO., 202 Broadway, New York.**

**BUY TELEPHONES**  
 That are good—not "cheap things." The difference in cost is little. We guarantee our apparatus and guarantee our customers against loss by patent suits. Our guarantee and instruments are BOTH GOOD!  
**WESTERN TELEPHONE CONSTRUCTION CO.,**  
 440 Monadnock Block, CHICAGO.  
 Largest Manufacturers of Telephones in the United States

**ROUND BASE SURFACE GAUGE**  
 With Fine Adjustment.  
 Base turned and polished and is lapped true on the bottom. No better Surface Gauge made. Furnished with extension nut when so ordered. Increasing capacity as follows:  
 6 in., \$2.25; with extension to 9 in., \$2.75  
 12 " 3.50; " " 21 " 4.00  
 Sent, charges paid, on receipt of price.  
**Mechanics' Fine Tools of all kinds.**  
 Send for Illustrated Catalogue B.  
**Standard Tool Co., - Athol, Mass.**

**SCIENTIFIC AMERICAN DYNAMO.**  
 Description of a plain shunt-wound dynamo of simple construction, capable of supplying a current of from 60 to 75 110-volt incandescent lamps, or of being used as a 5 h. p. motor. This machine was constructed especially for the benefit of the readers of the Scientific American, by Mr. W. S. Bishop, of New Haven, Conn. It is designed to meet the wants of mechanics and amateurs who desire to construct a simple dynamo for their own use, but who do not care to enter into the subject scientifically. With 24 illustrations. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 545. Price 10 cents. To be had at this office and from all newsdealers.

**THE "CLIMAX" Stereotyper and Moulding Press**  
 combined, for making perfect Celluloid Stereotypes to be used in place of metal stereotypes. Also for making Rubber Stamps. Should be in use in every printing office.  
 See Sci. Am., Dec. 30, 1893. Send for circular to  
**THE J. F. W. DORMAN CO.**  
 217 E. German St., Baltimore, Md.  
 Manufacturers of Rubber Stamps, Vulcanizers, Stereotype Machinery and Supplies.

**SINTZ GAS ENGINE CO.**  
 GRAND RAPIDS, MICH., U. S. A.  
 Manufacturers of the Sintz Stationary and Marine Gas and Gasoline Engines. Especially adapted for Boats and Electric Lighting. Runs with manufactured or natural gas—Boats and launches. Prices within the reach of all. Send for Catalogue. Mention this paper.

**BELTING of Various Styles, ELEVATORS, CONVEYORS, COAL MINING and HANDLING MACHINERY.**  
 The **JEFFREY MANUFACTURING CO., COLUMBUS, O.**  
 Send for late Catalogue "C." Branches: CHICAGO—NEW YORK.

**THE "MUNSON" TYPEWRITER**  
 This machine is an "evolution," the outgrowth of years of experience and the best results of scientific work. Its principles appeal at once to the educated mechanic. It is light, small, compact, easily operated, with universal key-bar.  
**INTERCHANGEABLE STEEL TYPE WHEEL,**  
 durable and easily kept in order. 30 keys, 90 characters. Weight, with carrying case, 16 pounds. Special wheels for different languages.  
 Highest Medal Awarded, World's Fair, Chicago, 1893. Send for circular to  
**The Munson Typewriter Co., 171 E. Division Street, Chicago, Ill., U. S. A.**

**ELECTRICITY**  
 Mechanics, Steam Engineering, Mechanical Drawing, Architecture, R. E. and Bridge Engineering, Plumbing, Heating, Mining, English Branches. Send for free circular, stating subject wish to study or your trade. Correspondence School of Industrial Sciences, SCRANTON, PA.

**MACHINERY WANTED.**  
 We furnish verified news before orders are placed, where machinery and equipment are wanted, giving full particulars. Serve some of the largest firms in the country, to whom we refer. Trial solicited, especially from those who have used other sources of advance information. Our system is different from others. Special service for each client to cover just the lines and territory desired. **LORDS' SPECIAL SERVICE,** 620 Atlantic Avenue, BOSTON. Branches, NEW YORK, PHILADELPHIA, PITTSBURG.

**ROBERT POOLE & SON CO.**  
 ENGINEERS & MACHINISTS.  
 TRANSMISSION MACHINERY  
 MACHINE MOULDED GEARING  
 SPECIAL FACILITIES FOR THE  
 HEAVIEST CLASS OF WORK  
 BALTIMORE, MD.

**The Scientific American Reference Book.**

A most useful little bound book of 150 pages, comprising, probably, the most extensive variety of standard, practical, condensed information ever furnished to the public for so small a price, only 25 cents.

Among its contents are: The Last Census of the United States (1890), by States, Territories, and Counties; Table of Cities having over 8,000 inhabitants; Map of the United States—miniature outline; The Patent Laws (full text); The Trade Mark Law (full text); The Copyright Law (full text); The Principal Mechanical Movements—illustrated by 150 small diagrams—of value to inventors and designers of mechanism; Medallion Portraits of Distinguished American Inventors; Valuable Tables relating to Steam, Electricity, Heat, Metals, Weights, and Measures.

Send by mail to any address on receipt of price, 25 cents.

**MUNN & CO., Publishers,**  
 361 Broadway, New York.

**RACINE BOAT MFG. CO.**  
 RACINE, WIS., U.S.A.  
 DE SIGNERS AND BUILDERS  
 PRICES 25% BELOW MARKET  
 SAILING YACHTS LAUNCHES ROW BOATS CANOES

**ESPARTO.—AN INTERESTING PAPER**  
 upon this valuable grass, discussing its uses, the method of making it, etc. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 718. Price 10 cents. To be had at this office and from all newsdealers.

**SAFETY THRUST COLLARS**  
 SOLID AND SPLIT.  
 Of character and at price to suit the most critical buyer. Dealers in shafting will consult their interests in writing for Price List and Discounts.  
**THE GOUVERNEUR MACHINE CO., Gouverneur, N. Y.**  
 NOW READY!

**Fourteenth Edition of Experimental Science**

**EXPERIMENTAL SCIENCE**  
 REVISED AND ENLARGED.  
 120 Pages and 110 Superb Cuts added.

Just the thing for a holiday present for any man, woman, student, teacher, or anyone interested in science. In the new matter contained in the last edition will be found the Scientific Use of the Phonograph, the curious optical illusion known as the Anorthoscope, together with other new and interesting Optical Illusions, the Optical Projection of Opaque Objects, new experiments in Projection, Iridescent Glass, some points in Photography, including Hand Cameras, Cane Cameras, etc.; Systems of Electrical Distribution, Electrical Ore Finder, Electrical Rocker, Electric Chimes, How to Color Lantern Slides, Study of the Stars, and a great deal of other new matter which will prove of interest to scientific readers.

840 pages, 782 fine cuts, substantially and beautifully bound. Price in cloth, by mail, \$4. Half morocco, \$5.

Send for illustrated circular.

**MUNN & CO., Publishers,**  
 Office of the SCIENTIFIC AMERICAN,  
 361 BROADWAY, NEW YORK.