Advertisements.

Inside Page, each insertion - - - 75cents 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. a the letter press Adver-isements must be received at publication office as early as Thursday morning to appear in next issue



H. W. JOHNS M'F'G CO., 87 MAIDEN LANE, N. Y. 175 Randolph St., Chicago; 170 N. 4th St., Philadelphia.

W

S



SANITARY EXAMINATION OF DRINK ing Water—By Prof. E. R. Angell. The odor of water, and how to detect it. Tests and their applications. Nitrates and Nitrites. Lead and iron. Test for lead. Tests for organic matter. A valuable paper. Contained in SCIENTIFIC AMERICAN SUPPLEMENT. No. 462, Price locents. To be had at this office and from all newsdealers.

PIPE COVERING.



SPECIAL FELT FOR ICE HOUSES. Fireproof Non-conducting Coverings for Steam Pipes, Boilers, and all hot surfaces. Made in sections three feet long. Easy to apply. Asbestos Materials— Fiber, Millbaard Packing, and Cement. CHALMERS-SPENCE CO. 419-421 Eighth St., New York.

NATURAL GAS.- A PAPER BY C E. Hequembourg, discussing the illuminating power and caloric value of natural gas as compared with that made from coal. Contained in SCIENTIFIC AMERICAN SUP-PLEMENT, NO 471. Price 10 cents. To be had at this office and from all newsdealers.

WESTON DYNAMO ELECTRIC MACHINE The undersigned, sole agents for the above machine

rot ELECTROPLATING AND ELECTROTYPING. refer to all the principal Stove Munufacturers, Nickel and SilverPlaters in the country. Over 1.500 now in use. Are also manufacturers of Pure Nickel Anodes, Nickel Salts, Polishing Compositions of all kinds, and every variety of supplies for Nickel, Silver, and Gold Plating; also, Bronze and Brass Solutions. Complete outfits for plating. Estimates and catalogues furnished upon application.



ICE-HOUSE AND REFRIGERATOR Directions and Dimensions for construction, with one fluctration of cold house for preserving fruit from senson to season. The air is kept dry and jure through-out the year at a temperature of from 32 to 35°. Con-tained in SCIENTIFIC AMERICAN SUPPLICAMENT NO. 116. Price U cents. To be had at this office and of all news-designs.

WM. A. HARRIS, Providence, R. 1. (Park St.) Sixminutes' walk Westfromstation. Original and Only Builder of the HARRIS-CORLISS ENCINE, With Harris' Pat. Improvements, from 10 to 1,000 H. P Send for copy Engineer's, and Steam User's Manual. By J.W. Hill, M.E. Price \$1.25.

PATENTS.



NEW HYDRAUL⁴C MOTOR.-FULL description, with nine illus, ative figures, of a novel bydromotor devised by Mr. Yagn for irrigating and other purposes. Contained in SCIENTRIC ANARICAN SUPPLEMENT, No. 463. Price 10 cents. To be had at this office and from all newsdealers.



HIGH EXPLOSIVES FOR WAR PUR-poses.--A paper by Prof. C. E. Munroe. U.S.N.A. dis-custing some receint experiments on the use of high explosives for war purposes. Contained in +OIENTIFIC AMERICAN SUPPLEMENT, No. 474. Price 10 cents. To be had at this office and from all newsdealers.



Published Weekly, \$8.20 a Year: \$1.60 Six Months. This unrivaled periodical, now in its forty-first year, ontinues to maintain its high reputation for exce and enjoys the largest circulation ever attained by any scientific publication.

Every number contains sixteen large pages, beautifully by each and the state of the state of the sents in popular sity is a descriptive regard of the most novel interesting, and important advances in Science, Arts, and Mapufac-tures. It shows the proprise of the World in Science and Mapufac-New Discoveries and Improvements, embracing Machinery, Mechanical Works, Engineering in all branches. Chemistry, Metallurgy, Electricity, Light, Heat, Architecture, Domestic Economy, Agriculture, Natural His-tory, etc. It abounds with fresh and interesting subjects for discussion, thought, or experiment; furnishes hundreds of useful suggestions for business. It promotes Industry, Progress, Thrift, and Intelligence in every community where it circulates.

The SCIENTIFIC AMERICAN should have a place in every Dwelling, Shop, Office, School, or Library. Workmen. Foremen. Engineers. Superintendents. Directors. Presidents, Officials, Merchants, Farmers, Teachers, Lawyers, Physicians, Clergymen, people in every walk and profession in life, will derive benefit from a regular reading of THE SCIENTIFIC AMERICAN.

Terms for the United States and Canada. \$3.20 a year: \$1.60 six months. Spe Postal Order or Check. Specimen copies free. Remit by

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

THE

Scientific American Supplement.

THE SCHENTIFIC AMERICAN SUPPLEMENT is a separate and distinct publication from THE SCIENTIFIC AM-ERICAN, but is uniform therewith in size, every number containing sixteen large pages. THE SCIENTIFIC AM-ERICAN SUPPLEMENT is published weekly, and includes a very wide range of contents. It presents the most recent papers by eminent writers in all the principal de-partments of Science and the Useful Arts, embracing Biology, Geology, Mineralogy, Natural History, Geography, Archæology. Astronomy, Chemistry, Electricity, Light. Heat, Mechanical Engineering. Steam and Railway Engineering, Mining, Ship Building, Marine En-gineering, Photography, Techhnology, Manufacturing Industries, Sanitary Engineering, Agricutture, Tiortculture, Domestic Economy, Biography, Medicine, etc. A vast amount of fresh and valuable information pertaining to these 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

SUPPLIES FROM HYDRANT PRESSUR! Becaused of the construction of the series of the construction and conset, and in quantities from 5 Course for the series of No extra insurance, no coal compact, steady; will work water MOTOR water MOTOR ower. Prices from \$15 to \$300. Sent for circular to THE BACKUS WATER MOTOR CO., Newark, N.J.



WATER MOTOR

SUPPLIES Medical Batteries, Inventors' Models, Experi-mental Work, and fine brass castings. Send for catalogue C. E. JONES & BRO. Cincinnati, G. Lis important to us that you meation this paper.



THE NEWARK FILTERING COMPANY, 141 COMMERCE ST., NEWARK, N. J.

> SHEPARD'S NEW \$60 Screw-Cutting Foot Lathe. Foot and Power Lathes, Drill Pressos, Scholl-saw Attach-ments, Unicks, Madrels, Twist Drills, Dugs, Chippers, etc. Lathes on trial. Lathes on payment. Send for catalogue of Outfits for Amateurs of Artisans.

Address H. L. Shepard, Agent, 134 E. 2d St., Cincinnati O.

Martin Brick Machine.

LATEST AND IMPROVED BRICK MACHINERY

FOR BOTH STEAM AND HORSE POWER,

BOOKWALTER ENGINE. Compact. Substantial. Econom-ical, and easily managed; guar-anteed to work well and give full power claimed. Engine and Boiler complete, including Gov-ernor, Pump, etc., at the low price of price of 3 HOLSE POWER....... \$240 00 280 00

MESSRS. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN continue to examine improvements, and to act as Solicitors of Patents

In this line of business they have had forth years' er. prince, and now have unequaled facilities for the prep-aration 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, 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.

A pamphlet sent free of charge, on application, containing full information about Patents and how to procure them; directions concerning Labels, Copyrights, Designs, Patents, Appeals, Reissues, Infringements, As signments, Rejected Cases, Hints on the Sale of Patents, 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, Pacific Building, near 7th Street, Washington, D. C.



860

<u>¶≕~ä</u>

SEBASTIAN, MAY & CO.'S.

IMPROVED \$60

165 West 2d Street, Cincinnati, Ohio.

BLAKE'S



PHILLIP SEMMER, AMERICAN Screw Cutting Lathe. PLATE and SHEET GLASS DEPOT Designed for actual work; no oy. Lathes for wood or metal. Drill Presses, Chucks. Drills, Dogs, and machinists' and ama-eurs' outfits. Lathes on trial. Catalogues mailed on applica-ation. Headquarters for American Polished Plate, French and English Silvering Quality Plate Glass, Beveled and Plain Mirrors, Beveled, Ground, and Embossed Plate and Sheet Glass, Cathedral Colored, Single and Double Strength Window Glass, $\#_i$ in, $\#_i$ in, and 1 in. Polished Plate, etc. All thickness Skylight and Flaor Glass. 6.8. and 10 Desbrosses Street, New York. ESTIMATES PROMPTLY FURNISHED.

IMPROVED PIPE HANGER.

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-ENICAN and one copy of the SUPPLEMENT, both mailed for one year for \$7.00. Address and remit by postal 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 subcribers in Great Britain. India. Australia, and all other British colonies; to France, Austria, Belgium, Germany, Russia, and all other European States; Japan. Brazil, Mexico, and all States of Central and South America. Terms, when sent to foreign countries, Canada excepted, \$4. gold. 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 order or draft to order of MUNN & CO., 361 Broadway, New York.

IT IS THE CHEAPEST AND BEST HANGER IN THE MARKET.

71 JOHN ST., NEW YORK.

R

