

Founded by Mathew Carey, 1783.

HENRY CAREY BAIRD & CO., INDUSTRIAL PUBLISHERS, BOOKSELLERS & IMPORTERS 810 Walnut St., Philadelphia, Pa., U. S. A.



DISTANCE READING THERMOMETERS. INQUIRE OF THE TRADE FOR OUR GOODS. IF NOT IN STOCK, SEND TO WARD & DORON ROCHESTER, N.Y., U.S.A.

HIGH GRADE ONLY. Warranted. Contractors desiring a trustworthy Jack Screw, address RUMSEY & CO., Ltd., Seneca Falls, N.Y.

DEAFNESS AND HEAD NOISES relieved by using Wilson's Common Sense Ear Drums

Wilson's Common Sense Ear Drums New scientific invention, entirely different in construction from all other devices.

MALLEABLE AND FINER WRAI THAN ANY STEEL CASTINGS FROM SPECIAL PATENT THOMAS DEVLIN & CO.

OIL FUEL FOR BOILERS. Description of the assemblage of the water tube, oil-fired boiler, which supplied the motive power for the Chicago Exposition.

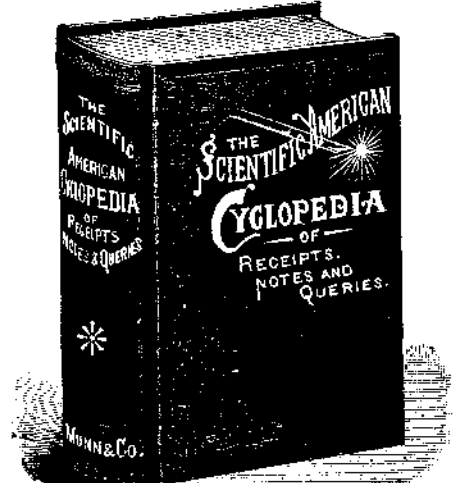
Riggs Patent Medicated Hair Cloth Lined HAIRNESSE PAID for sore throats and necks on horses.

WANTED. Mechanics, Engineers, and those similarly qualified can materially add to their income by specifying or soliciting orders in every town and city in the United States for a steam specialty.

VANDUZEN STEAM PUMP THE BEST IN THE WORLD. Pumps Any Kind of Liquid. Always in Order, never Clogs nor freezes. Every Pump Guaranteed.

\$2.75 Boys and \$9 Natural Finish Baby Carriage complete with plated steel wheels, axle, springs, and one year's work.

A New and Valuable Book.



12,500 Receipts. 708 Pages. Price \$5. Bound in Sheep, \$6. Half-Morocco, \$6.50. This splendid work contains a careful compilation of the most useful Receipts and Replies given in the Notes and Queries of correspondents as published in the Scientific American during the past fifty years.

MUNN & CO., Publishers, SCIENTIFIC AMERICAN OFFICE, 361 Broadway, New York.



NEPERA PAPER.

A New Printing-Out Ready Sensitized Paper. PERMANENT PRINTS, Better Results, Easier Obtained. No Ice, No Hot Water Treatment, No Lead Salts, No Alarm of other hardeners endangering the durability of the image.

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.

DYNAMOS AND MOTORS AND PARTS OF SAME ALL KINDS OF PRICES OF PARTS TELEPHONES ELECTRICAL SUPPLIES. PALMER BROS., CHICAGO, ILL.

ELECTRO MOTOR. SIMPLE. HOW TO MAKE. By G. M. Hopkins.—Description of a small electro motor devised and constructed with a view to assisting amateurs to make a motor which might be driven with advantage by a current derived from a battery.

Photo Engraving Co. 67 & 71 PARK PLACE NEW YORK. ENGRAVING FOR ALL ILLUSTRATIVE AND ADVERTISING PURPOSES.

RAMS. The Double Acting Rams open the valves as well as shut them off with the power of the water.

"THE DENSMORE" is pronounced "The World's Greatest Typewriter" by its users because of its conveniences and the number of ends attained.

MESSRS. MUNN & CO., Solicitors of Patents, have had nearly fifty years' continuous experience. Any one may quickly ascertain, free, whether an invention probably is patentable by writing to Munn & Co.

The McCONNELL Germ Proof Filters REMOVE MICROBES. All Kinds of Disease Germs. Is a Filter and Cooler Combined. The ice as it melts is filtered. No other gravity filter does this.

DEAFNESS & HEAD NOISES CURED BY INVISIBLE Tubular Catheters. Have helped more to good hearing than all other devices combined.

THE "MUNSON" TYPEWRITER. This machine is an "evolution," the outgrowth of years of experience and the best results of scientific work.

TELESCOPES. PATENTED NOVELTIES. AGENCIES WANTED. CURRAN BROS., 1335 Broadway, New York.

Towers, Tanks and Tubs. PATENT SECTIONAL ALL IRON TOWERS. PLAIN ALL WOOD TOWERS. ELEVATED TANKS.



W. E. CALDWELL CO. 219 E. Main Street, LOUISVILLE, KY., U. S. A.

GATES ROCK & ORE BREAKER Capacity up to 200 tons per hour. Has produced more ballast, road metal, and broken more ore than all other breakers combined.

EXPERT MODEL MAKING. Established 1867. J. C. RYAN, Prop., Chicago Model Works, Chicago, Ill. 719 E. Madison St.

A TAILOR-MADE SUIT FOR \$10.00. Equal to any to all tailor's \$18.00 suit for \$10. Express charges prepaid. Other suits just as cheap.

AMERICAN STEM-WINDERS \$2.00. Not French, German or Swiss, but AMERICAN! Made at the rate of a watch every minute.

The Improved Monitor Incubator. Hundreds of testimonials as to its merits over all other makes. MEDALS AND DIPLOMA AWARDED AT THE WORLD'S FAIR.

A TAILOR-MADE SUIT FOR \$10.00. Equal to any to all tailor's \$18.00 suit for \$10. Express charges prepaid. Other suits just as cheap.

New Books

- Animal and Vegetable Fixed Oils, Fats, Butters, and Waxes: Their Preparation and Properties, and the Manufacture therefrom of Candles, Soaps, and other products. By C. A. Alder Wright. 570 pages, 144 illustrations, 8vo, cloth, 1894. \$7.50
Breakdowns at Sea, and How to Repair Them. By A. Ritchie Leask. With 80 illustrations. 12mo, cloth, 262 pages. London, 1894. \$2.00
Concrete. Notes on Concrete and Works in Concrete. Especially written to assist those engaged upon public works. By John Newman. Second edition, revised and enlarged. 12mo, cloth, 240 pages. London, 1894. \$2.50
Coppersmithing. Art of Coppersmithing. A practical treatise on working sheet copper into all forms. By John Fuller, Sr. 8vo, cloth, with portrait and illustrations. N. Y., 1894. \$3.00
Dynamo and Motor Building. For Amateurs. With working drawings. By C. D. Parkhurst. 12mo, cloth, 163 pages, illustrated. N. Y., 1894. \$1.00
Dynamics. Practical Management of Dynamoes and Motors. By Francis B. Crocker and S. B. Wheeler. With a special chapter by H. A. Foster. Second edition, revised and enlarged. 205 pages, 95 illus. 1894. \$1.00
Electricity and Magnetism. Elementary Course. By C. G. Knott. 239 pages, 175 illustrations. 1894. .75
Electricity Up To Date. For Light, Power, and Traction. By John B. Verity. 12mo, 226 pages. London, 1894. .75
Electrician at Home. In two parts. Part I. Electro-Plating at Home. By Geo. Edwinson. Part II. Electric Bells. By Geo. Edwinson. Illustrated with numerous diagrams and explanatory sketches. Edited by Francis Chilton-Young. 12mo, cloth, 126 pages. Illustrated. 1894. .50
Electric Transformation of Power, and Its Application by the Electric Motor; including Electric Railway Construction. By Phillip Atkinson. 12mo, cloth, 240 pages, 96 illustrations. 1894. \$2.00
Gas Lighting and Gas Fitting. Including Specifications and Rules for Gas Piping, Notes on the Advantages of Gas for Cooking and Heating, and Useful Hints to Gas Consumers. Second edition, rewritten and enlarged. By Wm. Paul Gerhard. 16mo, boards, 190 pages. 1894. .50
Gold. A Handbook of Gold Mining. By Henry Louis. One volume, 12mo, cloth, 504 pages. Illustrated. London and N. Y., 1894. \$3.25
Helical Gears. A Practical Treatise. By "A Foreman Pattern Maker." Illustrated with 100 engravings and frontispiece. 127 pages, 12mo, cloth. London, 1894. \$2.00
Induction Coils and Coil Making. A Treatise on the Construction and Working of Shock, Medical and Spark Coils. By F. C. Allsop. Fully illustrated with 118 diagrams. 12mo, cloth, 162 pages. 1894. \$1.25
Inventions, Researches, and Writings of Nikola Tesla. With special reference to his work in Polyphase Currents and High Potential Lighting. By Thomas C. Marten. Editor "The Electrical Engineer." 496 pages, 311 illustrations, 8vo, cloth. 1894. \$4.00
Locomotive Mechanism and Engineering. By H. C. Reegan, Jr. 236 pages, 144 illus. 1894. \$2.00
Metal Work. Elementary Metal Work. A Practical Manual for Amateurs and for use in Schools. By Charles G. Leland. One volume, 8vo, 124 illus., 111 pages, ornamental board cover. London and N. Y., 1894. \$1.50
Microscopy. Practical Methods in Microscopy. By Charles H. Clark. 12mo, cloth, 219 pages. Illustrated. 1894. \$1.75
Microscope and Microscopical Methods. By Simon Henry Gage. Fifth edition, rewritten, greatly enlarged, and illustrated by 103 figures in the text. One vol., 8vo, cloth, 165 pages. 1894. \$1.50
Plumbing-American Plumbing. By Alfred Revell. For Master Plumbers, Architects, Builders, Apprentices and Householders. A Complete Compendium of Practical Plumbing from Soldermaking to High Class Open Work. 12mo, cloth, 138 illustrations, 225 pages. 1894. \$2.00
Pistols. Modern American Pistols and Revolvers. An account of the Development of Pistols and Revolvers in America. Description of the Varieties Manufactured. Manner of Shooting them. Work accompanied with these arms. Departments of Pistol and Revolver Shooting. Impressions formed by studying these Arms and Rules governing Pistol and Revolver Competitions. By A. C. Gould (Ralph Greenwood). 222 pages, 118 illustrations. New revised edition, 1894. \$2.00
A Pocket Book of Marine Engineering. Rules and Tables for the Use of Marine Engineers, Naval Architects, Designers, Draughtsmen, Superintendents, and all engaged in the Design and Construction of Marine Machinery, Naval and Merchant. By A. G. Seaton and H. M. Roundthwaite. With diagrams. 16mo, morocco binding, gilt edge, 426 pages. 1894. \$3.00
Poultry for Profit. By Major C. F. Morant. 16mo, boards, 144 pages. Illustrated. London, 1894. .50
Puzzles, Old and New. By Prof. Hoffman. 394 pages, 621 illustrations, cloth. 1894. \$1.50
Sandow. His System of Physical Training, for Men, Women and Children. A study in the Perfect Type of the Human Form. Compiled and edited under Mr. Sandow's direction, by G. Mercer Adams. In one handsome volume, 4to, cloth, embellished by upward of 80 half-tone illustrations and 150 marginal drawings. 241 pages. N. Y., 1894. \$3.50
Sanitary Science Simplified. American Practical Hygiene of To-day. By C. Gilman Currier, M.D. Copiously illustrated. 488 pages, 8vo, cloth, 1894. \$1.50
Sewage Disposal in the United States. By George W. Rafter and M. N. Baker. One volume, 8vo, cloth. Illustrated. 600 pages. 1894. \$6.00
Steam Engine User. Being Practical Descriptions and Illustrations of the Stationary Steam Engine in its various forms, together with Descriptions and Illustrations of Heat Prime Movers other than the Steam Engine; such as the Gas Engine, the Hot Air and the Petroleum and Spirit Engines. By various writers. Edited and arranged by R. Scott Burn. With about 150 illustrations. 402 pages, 8vo, cloth. 1894. \$2.00
Surveying and Surveying Instruments. By G. A. T. Middleton. 12mo, cloth, 116 pages. London, 1894. \$1.25
Telephone Lines and their Properties. By Wm. J. Hopkins. New edition, revised and enlarged. 12mo, cloth, 272 pages. Illustrated. N. Y., 1894. \$1.50
Telescope. Amateur Telescope's Handbook. By Frank M. Gibson. Illustrated. 12mo, cloth, 166 pages. N. Y., 1894. \$1.25
Tinmith's Pattern Manual. Patterns for Tinmiths, Plumbers, Zinc Workers and Sheet Metal Workers generally. 248 pages, 96 illustrations, 5 plates. 1894. \$1.50
Water or Hydraulic Motors. By Philip R. Björling. With 205 illustrations. 12mo, cloth, 287 pages. London and N. Y., 1894. \$3.50
Wines. A Treatise on Wines. Their Origin, Nature, and Varieties, with Practical Directions for Viticulture and Vinification. By J. L. W. Thudichum. 387 pages. London, 1894. \$1.75
Woolen Spinning. A Text-Book for Students in Technical Schools and Colleges, and for Skillful Practical men in Woolen Mills. By Charles Vickerman. 12mo, cloth, 363 pages, Illustrated. 1894. \$1.75
Work Table Companion. Containing Accurate and Full Instructions for Knitting, Crochet, Macramé Lace, and other Fancy Work. Edited by Ellen M. Masters. Profusely illust'd. 192 pages, 4to, paper. 1894. .50

FREE. Our entirely new Catalogue of Scientific and Technical Books, containing over 3,000 titles, and embracing more than 300 different subjects, with Authors' Index, will be mailed free on application to any address in the world. Address MUNN & CO., Publishers of the "Scientific American," 361 Broadway, New York.