

A Move for Better Roads JUST READY.

Essays on Road Making and Maintenance and Road Laws, for which Prizes or Honorable Mention were awarded through the University of Pennsylvania, by a Committee of Citizens of Philadelphia, with a Synopsis of other Contributions and a Review by the Secretary, Lewis M. Haupt, A.M., C.E., Prof. of Civil Engineering, University of Pa. Also an Introduction by William H. Rhawn, Chairman of Committee. 8vo, cloth. 319 pages. Price, \$2.00.

By mail, at the publication price, free of postage to any address in the world.

A circular, 4 pages, 4to, giving the full Table of Contents of this important volume, sent free of postage to any one who will furnish his address.

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

THE LITERATURE OF The Textile Industries JUST READY.

A New and Complete List of the Leading and Latest Books on Bleaching, Dye Stuffs and Dyeing, Calico Printing, Cotton and Wool, and Cotton, Woolen, Worsted, and Flax Manufacture and Machinery, Weaving, Designing, Sizing, the Harmony and Contrast of Colors, etc.

Sent free, and free of postage to any one in any part of the world who will furnish us with his address. Also our new revised Descriptive Catalogue of Practical and Scientific Books, \$1.00, and our other Catalogues, the whole covering every branch of Science applied to the Arts, sent free and free of postage to any one in any part of the world who will furnish his address.

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

A NEW BOOK. The Steam Engine

By Daniel Kinnear Clark, C.E., M.I.M.E. With an introduction by Professor R. H. Thurston, Cornell University, Ithaca, N. Y.

The Standard book on the Construction and Performance of Engines and Boilers—Stationary, Locomotive, and Marine. Complete in 4 vols., cloth, at \$4 each, carriage prepaid. BLACKIE & SON, Limited, 73 Bible House, Astor Place, New York. Agents wanted.

NEW VICTOR, No. 0 Electroplating Dynamo. Designed for beginners. Suited for gold, silver or nickel plating. Gives a current of 10 volts. Runs 5 gallons of solution. Price, complete, \$30. See illus. notice in Sci. Am. Aug. 9th, p. 89. Complete sets of Electroplating Apparatus. Send 2c. stamp for illus. catalogue. FIOS, HALL, 19 Bromfield Street, Boston, Mass.

PATENTED NOVELTIES of merit sold for the manufacturer or inventor. H. B. HARBORD & SON, Office Rooms 9 & 10, Exchange Bldg., 181 Van Buren St., Chicago

Barrel, Keg, Hogshead AND STAVE MACHINERY. Over 50 varieties manufactured by E. & B. Holmes, BUFFALO, N. Y. ALSO A FULL LINE OF WOOD WORKING MACHINERY.

YOUR PAINT ROOFS WITH DIXON'S SILICA GRAPHITE PAINT. Water will run from it pure and clean. It covers double the surface of any other paint, and will last four or five times longer. Equally useful for any iron work. Send for circulars. JOS. DIXON CRUCIBLE CO., Jersey City, N. J.

BARNES PAT FOOT POWER MACHINERY. I feel so highly pleased with your Velocipede Foot Power with seat, that I wish to add my testimony to its superiority. I did not expect to like it, but having used the Velocipede Power, I would have nothing else. It so greatly lessens the fatigue of using foot power, in fact, it may be said to be almost without fatigue, and is a steadier motion. I only wish I had known of it sooner. Send for catalogue. W. F. & J. BARNES CO., 929 Ruby St., Rockford, Ill.

2nd MACHINERY N. Y. Mach'y Depot, Bridge Store 16, Frankfort St., N. Y.

NICKEL PLATING & POLISHING MATERIALS. ZUCKER & LEVETT CHEMICAL CO. NEW YORK, U.S.A. NICKEL ANODES, NICKEL SALTS, ROUGES, COMPOSITION, BUFFING WHEELS, ELECTRO & NICKEL PLATING OUTFITS.

PATENTS!

MESSERS. 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 forty-one 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, Labels, Reissues, Assignments, and Reports on Infringements of Patents. All business entrusted 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, 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. 622 and 624 F Street, Patent Building, near 7th Street, Washington, D. C.

ANY MAN OR WOMAN CAN GET IT FOR NOTHING AND IT IS JUST WHAT YOU WANT. OUR CATALOGUE FREE. The Best and Finest ever issued. To Any Address. A ONE CENT POSTAL CARD WILL GET IT FOR YOU. WRITE FOR IT NOW. Delays Are Dangerous. THE CELEBRATED CORNISH ORGANS & PIANOS sold direct from factory at wholesale prices for cash or upon an easy installment plan to suit all pockets. ONE SMALL PROFIT ON THE ACTUAL COST—That is ours. 3 or 4 Big Profits and Commissions Saved—THEY ARE YOURS. THREE BIG FACTS: The Best, Cheapest, Most Durable. THEY HAVE TRIUMPHANTLY STOOD THE TEST OF A QUARTER OF A CENTURY. Address the Manufacturers. WRITE TO-DAY. CORNISH & CO. (Old Established and Reliable) Washington, New Jersey.

SMALL ELECTRIC MOTOR FOR AMATEURS.—By C. D. Parkhurst. Description in detail of a small and easily made motor powerful enough to drive a ten or twelve inch brass fan and to give a good breeze. With 15 figures drawn to a scale. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 767. Price 10 cents. To be had at this office and from all newsdealers.

HARMON'S IMPROVED Leveling Instrument. With or without Compass. For Engineers, Contractors, and all others requiring a low price leveling instrument for grading, measuring heights, squaring, or getting any desired angle. Illustrated circular sent on receipt of stamp. JOHN W. HARMON, 65 Haverhill St., Boston, Mass.

THE PENNA. DIAMOND DRILL & MFG. CO. BUILDERS OF HIGH CLASS STEAM ENGINES, DIAMOND DRILLING AND GENERAL MACHINERY. Flour Mill Rolls Ground and Grooved.

COMPLETE STEAM PUMP 10 SIZES FROM \$7 TO \$75 FOR WATER SUPPLY TANKS, FIRE PUMPS & ETC. WRITE FOR PRICES AND DESCRIPTIVE CIRCULARS. VAN DUZEN & TIFT, CINCINNATI, O.

WORKING LOCOMOTIVES WITH Petroleum Fuel.—By Thomas Urquhart. An interesting account of the recent results of the author's experience in the use of petroleum refuse as fuel on an unprecedented scale upon the Great & Tarranton Railway, South-east Russia. With 52 illustrations. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 769 and 770. Price ten cents each. To be had at this office and from all newsdealers.

AUTOMATIC IN FUEL AND WATER SUPPLY. The Shipman Automatic Steam Engine STATIONARY AND MARINE. Petroleum, Kerosene Oil, and Natural Gas Fuel. 1, 2, 4, 6, and 8 Horse Power, Single. 8 and 22 Horse Power, Compound. For Elevating Water, Creameries, and all Manufacturing Purposes. SHIPMAN ENGINE CO., 210 Summer St., BOSTON

The Sherburne Mfg. Co. built Works four years ago that cost \$19,000. The Company has an established trade and has manufactured Sash, Doors, Blinds, and Novelties. The Company is winding up its business and will sell the plant on most favorable terms. The machinery cost \$3,000 and the lands and buildings \$9,000, all as good as new. There is connected a first-class saw mill. The D. L. & W. R. E. bounds one side of the property. For particulars, inquire of C. A. FULLER, Sec'y., Sherburne, N. Y.

Cheap Printing. Do it yourself. Circular press \$8. Size for small newspapers, \$4. Every thing easy printed to factory. KELSEY & CO., Meriden, Conn.

Portable GASOLINE Engines. For Threshing Machines, Hay Presses, Corn Shellers, Pile Drivers, Well Diggers, &c., our newest and latest Engine a 1 tle wonder and a giant to work. Send for prices. Mention this paper. Van Duzen Gas & Gasoline Engine Co. CINCINNATI, OHIO.

PERFECT NEWSPAPER FILE. The Koch Patent File, for preserving newspapers, Magazines, and pamphlets, has been recently improved and price reduced. Subscribers to the SCIENTIFIC AMERICAN and SCIENTIFIC AMERICAN SUPPLEMENT can be supplied for the low price of \$1.50 by mail, or \$1.25 at the office of this paper. Heavy board sides; inscription "SCIENTIFIC AMERICAN" in gilt. Necessary for every one who wishes to preserve the paper. Address MUNN & CO., Publishers SCIENTIFIC AMERICAN.

PULLEYS HANGERS, FRICTION CLUTCHES. PROGRESS MACHINE WORKS, A & F. BROWN, 44 Park Place, N. Y.

THE FRED'K CRANE CHEMICAL CO. SHORT HILLS, N. J., BOX 91A. ZAPONS, BRUSH & DIP, LACQUERS, VARNISH, SHELLAC, BLACKS, EPIPLANT & DEAU, JAPANS, AIR DRYING, ENAMELS, TRANSPARENT, FOR METAL AND WOOD, PROOF AGAINST ACIDS AND ALKALIES. WRITE FOR CATALOGUE.

THE SMITH PREMIER TYPEWRITER

Important Improvements. All the Essential Features greatly perfected. The Most Durable in Alignment. Easiest Running and Most Silent. All type cleaned in 10 seconds without soiling the hands. The Smith Premier Typewriter Co., Syracuse, N. Y., U. S. A. Send for Catalogue.

Small Electric Motor for Amateurs. Illus. in Sci. Am. Supp. 783. Materials and directions for making sent by mail, \$1.25. Difficult parts finished. Any one can make it. W. S. BISHOP, Mfr. of Electric Machinery, 356 Grand Ave., New Haven, Conn.

THE EAGLE THE EASIEST RUNNING BICYCLE IN THE WORLD. Speed, Comfort and Safety. AGENTS WANTED. Large Illustrated Catalogue sent Free to Any Address. THE EAGLE BICYCLE MFG. CO., STAMFORD, CONN.

BLUE PRINT Paper. Superior Quality. Photographic Supplies. Send for catalogue. T. H. MCCOLLIN & CO., 1030 Arch Street, Philadelphia.

REFRACTORY MATERIALS.—BY T. Eggleston, Ph.D.—A valuable review of the question of the refractory substances used in modern metallurgy. Refractory substances, fire brick materials, mixtures and treatment, Lemping's fluxes, essential qualities of good fire bricks, etc. Investigations of refractory materials. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 769 and 770. Price 10 cents each. To be had at this office and from all newsdealers.

CUSHMAN CHUCKS Complete line for all uses shown in new illustrated catalogue, free to all. Cushman Chck Co., Hartford, Conn.

BARGAINS IN NEW BICYCLES. Easy Payments, with no extra charge. Mfrs Price Ours Mercury Diamond Safety, ball bearings \$80 \$70 Springfield Roadster, headers imposs " \$100 \$75 Amer. Champion, highest grade, " \$100 \$60 Others as cheap all makes new or 2nd hand, lowest prices Catalogue, Rouse, Hazard & Co., 16 G St., Peoria, Ill.

Have you a Thought That you want to make work? The way to make it work (or find out that it won't work) is to put it into a machine. We have a shop on purpose. Will send a primer first. THE JONES BROTHERS ELECTRIC CO. CINTI, O.

WANTED. Selling Agents for Electrical Novelties. Battery Motors surprise electrical experts. Stamp for catalogue. \$10 per day made. BUSH CO., 24 Park Place, New York.

BURGLAR ALARM.—Price \$1.50, by mail. Territorial Rights for sale. Agents wanted. Address with stamp, Rev. E. W. Wilt, Clifton Mills, Preston Co., W. Va.

DEAFNESS AND HEAD NOISES CURED by Peck's Invisible Ear Cushions. Whispers heard. Successful when all remedies fail. Sold by F. Hoxar, 353 B'way, N. Y. Write for book of proofs FREE

THE ZELL SAFETY BOILER. MOST ECONOMICAL STEAM GENERATOR. IMPROVED SAFETY BOILER. MANUFACTURED BY THE CAMPBELL & ZELL Co. SEND FOR CIRCULARS ESSEX & BURKE STREETS, BALTIMORE, MD.

PROPOSALS.

Proposals for Building Dike.—ENGINEER OFFICE, U. S. ARMY, Nashville, Tenn., January 27, 1891. Sealed proposals, in triplicate, will be received at this office until 3 P. M. Friday, February 7, 1891, for furnishing materials and constructing Dike at Smithland, Ky. Bidders are invited to be present at the opening of the bids. The United States reserves the right to reject any or all proposals. The attention of bidders is invited to the Acts of Congress approved February 26, 1885, and February 23, 1887, Vol. 23, page 332, and Vol. 24, page 414, Statutes at Large. Specifications and blank forms for proposals will be furnished on application at this office. J. W. BARLOW, Lieut.-Col. of Engineers.

A BOON TO THE DEAF!

Osgood's No. 1 Hearing Horn is the only instrument that will help the deaf. Made from best bell metal, and will last for years. Carried in the pocket and used in public without attracting attention. Price \$1.00. Sent C. O. D. May be returned after 2 weeks' trial if not found satisfactory. OSGOOD BROS., Cor. 7th St. & Broadway, Oakland, Cal.

The most Successful Lubricator for Loose Pulleys in use. VAN DUZEN'S PATENT LOOSE PULLEY OILER. Highly recommended by those who have used them for the past four years. Prices very reasonable. Every user of machinery should have our "Catalogue No. 56," sent free. Mention this paper. VAN DUZEN & TIFT, Cincinnati, Ohio.

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, and which would have sufficient power to operate a foot lathe or any machine requiring not over one man power. With 11 figures. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 641. Price 10 cents. To be had at this office and from all newsdealers.

STEEL TYPE FOR TYPEWRITERS. Stencils, Steel Stamps, Rubber and Metal Type Wheels, Dies, etc. Model and Experimental Work Small Machinery, Novelties, etc., manufactured by special contract. New York Stencil Works, 100 Nassau St., N. Y.

ALANSON CARY SPRINGS. MANUFACTURER OF FLAT STEEL OF EVERY DESCRIPTION 240 & 242 W. 29TH ST. NEW-YORK

Useful Books!

Manufacturers, Agriculturists, Chemists, Engineers, Mechanics, Builders, men of leisure, and professional men, of all classes, need good books in the line of their respective callings. Our post office department permits the transmission of books through the mails at very small cost. A comprehensive catalogue of useful books by different authors, on more than fifty different subjects, has recently been published for free circulation at the office of this paper. Subjects classified with names of author. Persons desiring a copy, have only to ask for it, and it will be mailed to them. Address, MUNN & CO., 361 Broadway, New York.

OUR MAGIC LANTERNS WITH OIL LAMPS HAVE NO EQUAL. VIEWS OF ALL SUBJECTS. EASTERN PRICES GUARANTEED. L. MANASSE 88 MADISON ST. CHICAGO ILL

Board of Trade Newburgh, N. Y.,

have facilities to offer manufacturers desiring to change location.

A descriptive pamphlet will be sent on application.

Address SECRETARY BOARD OF TRADE.

The Scientific American PUBLICATIONS FOR 1891.

The prices of the different publications in the United States, Canada, and Mexico are as follows. RATES BY MAIL. The Scientific American (weekly) one year \$3.00 The Scientific American Supplement (weekly), one year 5.00 The Scientific American, Spanish Edition (monthly) one year 3.00 The Scientific American, Architects and Builders Edition (monthly), one year 2.50 COMBINED RATES. The Scientific American and Supplement, \$7.00 The Scientific American and Architects and Builders Edition, 5.00 The Scientific American, Supplement, and Architects and Builders Edition, 9.00 Proportional Rates for Six Months. This includes postage, which we pay. Remit by postal or express money order, or draft to order of MUNN & CO., 361 Broadway, New York.