

Founded by Mathew Carey, 1785.
HENRY CAREY BAIRD & CO.
 INDUSTRIAL PUBLISHERS, BOOKSELLERS & IMPORTERS
 510 Walnut St., Philadelphia, Pa., U. S. A.
 Our New and Revised Catalogue of Practical and Scientific Books, 90 pages, 8vo., and our other Catalogues and Circulars, 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.

GATES ROCK AND IRON BREAKERS
 OVER 3000 THROU THE WORLD
 GREATER CAPACITY USING LESS POWER THAN ANY OTHER ON EARTH
 MODERN MINING MACHINERY OF EVERY DESCRIPTION
 GATES IRON WORKS DEPT. T
 50 S. CLINTON ST. CHICAGO.

REPAIR BICYCLES FOR A LIVING.
 Easy way to make GOOD living.
 Full outfit—
 Bellows, Blowpipe, Vice, Files, Nippers, Spike Threader, Solder, Brass, Spoke Wires, Full outfit for factories. Send 2-cent stamp for full Catalogue of Tools. **FRASSE CO., 21 Warren St., New York.**

No More Dull Shears!
 The **DIAMOND SHEARS** and **SCISSORS SHARPENER**. For Barbers, Tailors, Dressmakers, and every woman in the land.
 Warranted to sharpen any size Shears or Scissors in 10 seconds. Leaves a keen and lasting edge. Beautifully nickeled.
 Price 25 Cents.
DIAMOND CUTLERY CO.,
 64 Broadway, NEW YORK CITY.

EDGE TOOLS
 are often nearly ruined by using a grindstone not adapted to the work. Our quarries produce a large variety of grinds suitable for grinding any tool.
 May see some of our Catalogue, which will give you some information?
GRAFTON STONE COMPANY,
 No. 28 River Street, GRAFTON, OHIO.

"DIETZ" TUBULAR DRIVING LAMP.
 IT is the only practicable and perfect driving lamp ever made. IT will not blow out. IT gives a 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.

FUNDAMENTAL PRINCIPLES OF BUSINESS; Their Application in Practice.—A lecture delivered in the Sibley College Course by T. Dunkin Paret. A very interesting presentation of the subject, full of practical suggestions as to the conditions necessary to obtain business and professional success. Contained in **SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 995 and 999.** Price 10 cents each. To be had at this office and from all newsdealers.

IMPROVED LEVELING INSTRUMENT
 The best low cost, general purpose instrument made for grading, excavating, measuring heights, getting any desired angle, etc. It will cover more points than any other instrument of twice its cost, and in many places will do the work usually done with very expensive instruments. Special inducement. Send for Cir.
JOHN W. HARMON,
 65 Haverhill St., BOSTON, MASS.

NATIONAL TYPEWRITER
 IRRESPECTIVE OF PRICE THE BEST TRIAL PROVES IT.
 Surpasses in many features, and is made and sold in the world at any price. Catalogue and Specimen of Color Work FREE.
NATIONAL TYPEWRITER CO.,
 23 & Arch Sts. Phila. Pa. U. S. A.

DEAFNESS CURED! THE EAR VAPORATOR CURES DEAFNESS
 SCIENTIFIC principles. Satisfaction guaranteed or money refunded. No drums. Made of gold. Circulars free.
EAR VAPORATOR CO., Y. M. C. A. Bldg., Chicago, Ill.

WATER MOTORS
GAS ENGINES & VENTILATING FANS
 The best Motor in the world for driving all kinds of light machinery, noiseless, neat, compact; invaluable for blowing church organs, running printing presses, coffee mills, ventilating fans, ice cream freezers, meat choppers, etc. In use the world over, and recommended by water companies everywhere. Address for circulars, Backus Water Motor Co., Newark, N. J., U. S. A.

The Protean Tent
 Patented Jan. 23, 1893.
 Best all around tent known. Light, compact, roomy, well ventilated, easily pitched. Only one pole required. Pole made in spots with telescopic joints, which saves going outside to adjust guys. Patent light iron telescopic poles and carrying, with shoulder straps, when folded for travel. Highest Award at World's Fair, Chicago, 1893. 25-page catalogue, free on request, fully illustrated, describes every piece, size and weight.
A. S. COMSTOCK, Evanston, Ill.

The Electric Candle
 for Magic Lanterns. Absolutely the newest and least expensive device for scientific or popular projection by electricity. Send for special circular.
QUEEN & CO. (Incorporated),
 1010 Chestnut St., Philadelphia, U. S. A.

DO YOU USE GRINDSTONES?
 If so, we can supply you. All sizes mounted and unmounted, always kept in stock. Remember, we make a specialty of selecting stones for all special purposes. Ask for catalogue.
The CLEVELAND STONE CO.,
 2d Floor, Wilsbire, Cleveland, O.

THE DENSMORE "THE WORLD'S GREATEST TYPEWRITER."
LIGHTEST TOUCH, HANDIEST, QUICKEST, STRONGEST.—Adopted by U. S. Government.
 Represented in more than 200 Cities in the United States, and in
 LONDON, 85 Queen Street.
 FRAG, AUSTRIA, 55 Mariengasse.
 GOTHENBURG, SWEDEN, Mr. A. Lefler.
 AUCKLAND, NEW ZEALAND, 14 Victoria Arcade.
 TORONTO, 37 Adelaide Street, East.
 WINNIPEG, MANITOBA, 48 Main Street.
 Active, Responsible Dealers Desired in all Foreign Cities.
DENSMORE TYPEWRITER CO., 202 BROADWAY, NEW YORK.

BARNES' New Friction Disk Drill FOR LIGHT WORK.
 Has these Great Advantages: The speed can be instantly changed from 0 to 1600 without stopping or shifting belts. Power applied can be graduated to drive with equal safety the smallest or largest drills within its range—a wonderful economy in time and great saving in drill breakage.
 Send for catalogue.
W. F. & JNO. BARNES CO.,
 1559 Ruby St., Rockford, Ill.

ENGINEERING FALLACIES.—AN ADDRESS to the graduating class of the Stevens Institute of Technology, by President Henry Morton, on certain popular fallacies likely to be encountered by young engineers, and which may sometimes lead even able men astray when met with in a new guise. With 2 figures. Contained in **SCIENTIFIC AMERICAN SUPPLEMENT, No. 994.** Price 10 cents. To be had at this office and from all newsdealers.

NICKEL AND ELECTRO-PLATING
 Apparatus and Material.
 THE **Hanson & VanWinkle Co.,**
 Newark, N. J.,
 81 LIBERTY ST., N. Y.
 35 & 37 S. CANAL ST., CHICAGO.

MATCH * MACHINERY.
 Latest improved. Complete plants furnished. **JOS. C. DONNELLY,** 1209 Buttenwood Street, Philadelphia, Pa.

Watchman's Improved Time Detector
 with 12 or 24 Keys, with Safety Lock attachment. Patented 1875-6-7. My inventions, and will see all concerns selling or using the Safety Lock attachment, according to Decision of Circuit Court of U. S. for S. D. of N. Y.
 Send for circulars to
EL. IMHAUSER, 206 Broadway, New York, P. O. Box 2875.

MONITOR VAPOR ENGINE AND POWER COMPANY,
 8 ERIE STREET, GRAND RAPIDS, MICHIGAN.
CASOLINE LAUNCH ENGINES AND LAUNCHES

THE ELECTRIC LAUNCH CO.
 OFFICE AND WORKS.
MORRIS HEIGHTS, NEW YORK CITY.

HYPNOTISM My original method \$2. 100 pp. pamphlet 10c. One on Personal Magnetism 10c. Dr. Anderson, S. A. 4, Masonic Temple, Chicago.

PATENTS
 taken through Munn & Co. receive special notice in the *Scientific American*. This splendid weekly paper, elegantly illustrated, has the largest circulation of any scientific work. \$3 a year. Specimen copies free.
 Address **MUNN & CO.,**
 New York, 361 Broadway.

10c. CIGAR CAMERA
 Makes Photos while you smoke. Put white paper in Cigar Holder and in 1 minute take out beautifully developed picture. Holder and 6 nice undeveloped photos Postpaid with Novelty Catalogue for 10c.
INGERSOLL & BRO., 65 CORTLANDT ST., N. Y. CITY.

FOOT POWER MACHINERY
 Sewing, Saws, Tools, Drills, Presses, etc. Send for catalogue. **WILLIAMS CO., 82 RANDOLPH ST., CHICAGO.**

For Catalogue of the Musical Instrument you think of buying. Violins repaired by the Cremona System. **C. STORY, 26 Central St., Boston, Mass.**

Telephones
 Sold outright. Cannot get out of order. Guaranteed free from infringement. Suitable for exchanges or private plants. Send for Testimonials and Prices. Some good territory left for reliable agents.
MASON TELEPHONE CO., RICHMOND, VA.

Chain 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.

"HARTMAN" WIRE FENCE
 For FIELD and FARM
HUMANE—STRONG—VISIBLE—ECONOMICAL
 Holds but DOESN'T HARM your stock. Can be built to STAY TIGHT all seasons. Get circulars & estimates from dealers or
HARTMAN MFG. CO., 217 BROADWAY, NEW YORK, 50-2 MANHATTAN BLDG., CHICAGO. Factories: ELLWOOD CITY, Penna. For Beautiful Calendar, send 4 cts. in stamps.

SENT FOR EXAMINATION BEFORE PAYMENT BICYCLES
 We make handsome, highest grade \$100 wheel MEN'S and LADIES' direct from factory for \$50. Illustrated catalogue explains our new plan. Send for it. **F. S. WATERS & CO., 155 W. WASHINGTON ST., CHICAGO, ILL.**

The INTERNATIONAL HIGH GRADE AUTOMATIC INJECTOR.
 New Principles Applied. Wonderful Results Obtained. Working Range, 15 to 250 lbs. steam. Grading Capacity, 60% per cent.
WORLD SPECIALTY CO., 119 Seventh St., Detroit, Mich.

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 GOVERNOR MACHINE CO., Gouverneur, N. Y.

GASOLINE ENGINES.
 12 to 75 horse power. For Propelling Boats of all kinds. Cleanest Fuel. Absolute Safety. No Licensed Engineer. Simple Construction. Handsome in Success. Use. Write for illustration and catalogue.
GLOBE GAS ENGINE CO., Market Avenue & 3rd Street, PHILADELPHIA, PA.

MONITOR VAPOR ENGINE AND POWER COMPANY,
 8 ERIE STREET, GRAND RAPIDS, MICHIGAN.
CASOLINE LAUNCH ENGINES AND LAUNCHES

Parson's Horological Institute.
School for Watchmakers
 ENGRAVERS AND JEWELERS.
 Send for Catalogue and References.
PARSON'S HOROLOGICAL INSTITUTE,
 302 Bradley Avenue, PEORIA, ILL.

PATENT STEEL SKELETON LEGS
 ARE THE BEST!
 Established 1849.
D. W. KOLBE & SON, 133 Arch St., Philadelphia.

RED CEDAR TANKS
 Up to 30 ft. Diameter.
 WHITE PINE, CYPRESS, REDWOOD.
 16 Murray St., New York. 36 S. Market St., Boston. 321 Vine St., Philadelphia.
WILLIAMS MFG. CO., Kalamazoo, Mich.

ELECTRIC TELEPHONE
 Sold outright, no rent, no royalty. Adapted to City, Village or Country. Needed in every home, shop, store and office. Greatest convenience and best seller on earth.
 Agents make from \$5 to \$50 per day. One in a residence means a sale to all the neighbors. Fine instruments, no toys, works anywhere, any distance. Complete, ready for use when shipped. Can be put up by any one, never out of order, no repairing, lasts a life time. Warranted. A money maker. Write **W. P. HARRISON & CO., Clerk 10, Columbus, O.**

VOLNEY W. MASON & CO.
FRICION POLLEYS, CLUTCHES, and ELEVATORS
 PROVIDENCE, R. I.

MADE TO FIT YOU.
 Imported cloths—Suits and Overcoats from \$10 to \$20—the style and material you select. We are direct importers—guarantee perfect fit, superior workmanship and finest trimmings. We pay express charges to any part of the United States. Goods sent C. O. D. with privilege of examination. Write for free catalogue, samples and measuring instructions.
THE PROGRESS TAILORING CO., 282 and 284 State St., Dept. 24, Chicago, Ill.

We would not have expended HUNDREDS OF THOUSANDS OF DOLLARS doing galvanizing, for which we made no extra charge, had there not been merit in it. Galvanizing consists in coating the strong but most perishable (in thin sheets) metal, steel, with the almost indestructible (even when very thin) metals, zinc and aluminum. If there were not great merit in galvanizing, no one would pay 1/2 more for galvanized barbed wire or sheet iron than ungalvanized costs. If we were making painted windmills to-day, we should furnish an

8 Ft. for \$15
 That is a good price for an 8-foot painted windmill. WE BUILD FOR THE AGES. WE WOULD NOT SELL YOU A POOR, PAINTED WHEEL, FOR ONE MADE OF METAL GALVANIZED BEFORE BEING PUT TOGETHER, IF YOU WOULD PAY US DOUBLE PRICE FOR IT. We build the best we know, and knowing that painted thin sheets are practically worthless, we have nothing to do with them. The enormous cost of preparing to do galvanizing, and of doing it well on a large scale, deters others. SOME BUY GALVANIZED SHEETS AND PUNCH AND SHEAR AND MAKE THEM UP AFTERWARD. WHEELS OR FANES MADE OF GALVANIZED SHEETS BUT NOT PUT TOGETHER BEFORE THE PUNCH, JOINTS, AND EDGES, AND ARE, THEREFORE, NOT SO GOOD AS PAINTED ONES. How any concern can get our prices for painted windmills and painted towers, or those made up of galvanized material, cut, sheared and punched after the galvanizing is done, can only be explained by the fact that people who buy them are ignorant of the value of galvanizing. We now galvanize everything after it is completed, even bolts and nuts. We galvanize with the most improved processes and in the most perfect known and attainable manner.
 The process: When a section of an American Windmill is riveted up, completed and cleaned of rust and impurities, it is immersed in melted zinc and aluminum and left there until it becomes as bright as that metal, and until every crack, crevice, pore and opening is closed up and saturated with molten metal, and the whole 23 pieces composing the windmill and tower become together as one piece, the joints are as strong as the metal, and it is expensive to do, and small year's end to another. The zinc and aluminum covers every part of the windmill and tower, it is first put on, but after a chemical combination or melting it is practically as one piece, and we talked of towers, but in the way of articles and putting PERIOD SHAPE AT A BIRDHOUSE SHAPE. THE OFFER OF AN ALL-STEEL VERY SUPERIOR FEED LETTER, WORTH \$40 AS PRICES GO, AT \$10. IN OUR NEXT AD. WE SHALL OFFER YOU SOMETHING OF STILL GREATER INTEREST. **Armstrong Co., Chicago.**
 Please mention SCIENTIFIC AMERICAN.

"THE STANDARD" DRIPLESS STRAINER
 THE ONLY in the world. No drip to soil table linen. No wires to clog spout. No falling off. Beautifully nickel plated. Sent to any address on receipt of price, 25c.
Standard Strainer Co., 316 Maiden Lane, New York City.

TURBINE WATER WHEELS.
 Send for Pamphlet.
JAMES LEFFEL & CO., Springfield, Ohio, U. S. A.

INCUBATORS
 Self-Regulating Brooders. Most Perfect Machines. Best Material and Workmanship. Our Thermo Regulator is so accurate that thermometer can be dispensed with. 15 breeds high-class poultry. Full stock poultry supplies. Send for large illustrated catalogue. Peerless Incubator & Brooder Co., 515 Ohio Street, QUINCY, ILL.

INCUBATORS
 The Improved, Self-Regulating "Gold-Standard" has no superior. Write for 6-page circular and new 12-page Healthy Guide and Catalogue for 1895. Postage and Stamp paid. Address: **W. P. HARRISON & CO.,** 100 BRADLEY AVENUE, PEORIA, ILL.

DEAFNESS
 and HEAD NOISES relieved by using Wilson's Common Sense Ear Drums. New scientific invention, entirely different in construction from all other devices. Assist the deaf when all other devices fail, and where medical skill has given no relief. They are safe, comfortable, and invisible; have no wire or string attachment. Write for pamphlet.
WILSON EAR DRUM MFG. CO., Louisville Trust Co. Bldg., Louisville, Ky., and 1122 Broadway, New York City.

14 KARAT GOLD PLATE.
 CUT THIS OUT and send it to us with your name and address and we will send you this beautiful gold finished watch by express for examination. You examine it at the express office, and if you think it a bargain pay our sample price \$2.75, and it is yours. It is beautifully engraved and equal in appearance to a genuine Solid Gold watch. A guarantee for five years with every watch, write to-day, mention whether you want gent's or ladies' size.
THE NATIONAL MFG. & IMPORTING CO., 334 Dearborn St., Chicago, Ill.

MONEY MADE
 selling Beveridge's Automatic Cooker. Best cooking material. Food can't burn. No odor. Saves labor and fuel. Fits any kind of stove. Agents wanted, either sex. Good Pay. One agent sold 1730 in one town. Write for terms.
W. E. BEVERIDGE, Baltimore, Md.

WOODEN TANKS.
 For Railroads, Mills and Manufacturing. Builders of Steel Towers and Tanks. La. Red Cypress Wood Tanks a specialty.
W. E. CALDWELL CO., 217 E. Main Street, Louisville, Ky.

Engineers and Firemen Send 2c. stamp for 24 page pamphlet containing a list of questions asked by a board of examining engineers. **Stromberg Pub. Co., St. Louis, Mo.**

MORSE UNIVERSAL DRAWING TABLE
 THE LARGEST AND MOST COMPLETE LINE OF DRAWING ROOM FURNITURE MANUFACTURED BY
MORSE MACHINE CO. ROCHESTER, N.Y.