

**TO INVENTORS.**

An experience of more than thirty years, and the preparation of not less than one hundred thousand applications for patents at home and abroad, enable us to understand the laws and practice on both continents, and to possess unequalled facilities for procuring patents everywhere. In addition to our facilities for preparing drawings and specifications quickly the applicant can rest assured that his case will be filed in the Patent Office without delay. Every application, in which the fees have been paid, is sent complete—including the model—to the Patent Office the same day the papers are signed at our office, or received by mail, so there is no delay in filing the case, a complaint we often hear from other sources. Another advantage to the inventor in securing his patent through the Scientific American Patent Agency, it insures a special notice of the invention in the SCIENTIFIC AMERICAN, which publication often opens negotiations for the sale of the patent or manufacture of the article. A synopsis of the patent laws in foreign countries may be found on another page, and persons contemplating the securing of patents abroad are invited to write to this office for prices, which have been reduced in accordance with the times, and our perfected facilities for conducting the business. Address MUNN & CO., office SCIENTIFIC AMERICAN.

**Business and Personal.**

*The Charge for Insertion under this head is One Dollar a line for each insertion; about eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in next issue.*

**Going Abroad.**—Any family intending to visit Europe this summer, and desiring the services of a competent and experienced courier, can hear of an honest and obliging man, who speaks most of the Continental languages, to accompany them, by addressing the editor of this paper, P. O. Box 773, New York.

**Linen Hose.**—Sizes: 1 1/2 in., 20c.; 2 in., 25c.; 2 1/2 in., 30c. per foot, subject to large discount. For price lists of all sizes, also rubber lined hose, address Eureka Fire Hose Company, No. 13 Barclay St., New York.

**Valves and Hydrants,** warranted to give perfect satisfaction. Chapman Valve Manuf. Co., Boston, Mass.

The reason why Downer's Anti-Incrustation Steam Boiler Liquid is so successful, lies in the fact that it is a scientific preparation. It meets all cases. When properly used it cannot fail. Is not injurious to iron. Office 17 Peck Slip, New York.

Try the new fragrant Vanity Fair Cigarettes, both plain and halves. Most exquisite of all.

**Walrus Leather for Polishing Agricultural Implements** and all kinds of metal. Greene, Tweed & Co., N. Y.

The 1879 Pennsylvania Lawn Mower.—Light draught and easily adjusted. Machines warranted. See illustrated editorial, Sci. Am., No. 14. Lloyd, Supplec & Walton, Philadelphia, Pa.

**Wanted**—To sell—Patent for a simple and novel Weight Scale, adapted to desk and counter use. Address P. O. Box 581, Pittsburg, Pa.

**Special Notice.**—Send for Electroplater's Catalogue and Price List to Patrick & Carter, Philadelphia, Pa.

2 H. P. Reversible Launch Engine, \$65; other sizes and prices. Boilers, Fittings, Propellers, etc., New and Second-hand Launches and Machinery. S. E. Harthan Worcester, Mass.

**Wanted**—A 100 H. P. Variable Cut-off Engine. Address P. O. Box 1208, New Haven, Conn.

**Sutton's Patent Pulley Cover.**—If you are losing power, get it again by using these covers. Calculate how much power you are losing and find the gain you will make in your work by adopting a positive remedy. Send for a circular. Address Joseph Woodward, proprietor and manufacturer, P. O. Box 3419, New York.

The Improved Asbestos Roof Coating, as applied to H. W. Johns' Asbestos Roofing, or to any other suitable foundation, forms a fibrous waterproof covering, partaking of the nature of a felt and a paint. It can be applied with a brush or a trowel to any desired thickness, and forms the most durable and economical roofing in use for mills, factories, warehouses, railroad buildings, bridges, etc. H. W. Johns Mfg. Co., 87 Maiden Lane, New York, sole manufacturers.

For Standard Emery Wheels, and all kinds of Emery Wheel Machinery, at reduced prices, address Lehigh Valley Emery Wheel Co., Weissport, Pa.

**Wanted**—By a large manufacturing concern, a draughtsman competent to make working drawings from sketches and dimensions furnished him. Address, stating age, experience and salary expected, Draughtsman, P. O. Box 1961, New York.

For Punches, Patent Bending Rolls, Radial Drills, and Angle Iron Shears, Hillis & Jones, Wilmington, Del.

**Wanted**—To buy for cash, Machinery for manufacture of Macaroni and Vermicelli. Address Chas H. Flach & Bro., 112 Court St., Cincinnati, Ohio.

**Milling, Profiling, Cam Cutting, Revolving Head Screw Machines.** Pratt & Whitney Co., Hartford, Conn.

S. C. Forsyth & Co., Manchester, N. H., and 213 Center St., New York. Specialties—Bolt Forging Machines, Power Hammers, Combined Hand Fire Engines and Hose Carriages, new and second-hand machinery. Send stamp for illustrated catalogues, stating just what you want.

**For Sale**—Right of United States or single State for Todd's Flexible Horseshoe. Best invented. Entire satisfaction given. Geo. H. Todd, Montgomery, Ala.

Belcher & Bagnall, 75 Murray St., N.Y., have the most economical Steam Engines, Boilers, Pumps, in market; also improved wood and iron working machinery.

The Lehigh Valley Emery Wheel Co. has agencies at 104 Duane St., N. Y., 206 Walnut Place, Phila. Pa., 59 S. Canal St., Chicago, Ill., and 51 Kilby St., Boston, Mass.

Gutta Percha, pure and sheeted, for sale in quantities to suit. Anderson & Reynolds, Salem, Mass.

17 and 20 in. Gibed Rest Screw Lathes. Geo. S. Lincoln & Co., Hartford, Conn.

New Pamphlet of "Burnham's Standard Turbine Wheel" sent free by N. F. Burnham York, Pa.

Clipper Injector. J. D. Lynde, Philadelphia, Pa.

Caume's Electric Engine. 71 Pearl St., B'klyn, N.Y.

Engines, 1/2 to 5 H. P. G. F. Shedd, Waltham, Mass.

Eagle Anvils, 9 cents per pound. Fully warranted.

Diamond Saws, J. Dickinson, 64 Nassau St., N. Y.

Sheet Metal Presses, Ferracute Co., Bridgeton, N. J.

Rubber Hose, Suction Hose, Steam Hose, and Linen Hose: all sizes. Greene, Tweed & Co., 18 Park Pl., N. Y.

Mundy's Pat. Friction Hoist, Eng., of any power, double and single. Said by all to be the best. J. S. Mundy, Newark, N. J.

**Wanted**—A manufacturer to make on contract 500,000 improved Screw Wrenches. Address Lock Box 146, Athol, Mass.

American Watch Tool Co., Waltham, Mass. Lathes for Watchmakers, Dentists, and Jewelers. Special machinery for watch and clock factories.

**For Sale.**—7 foot bed Putnam Planer, \$350. A. A. Pool & Co., Newark, N. J.

Bevins & Co.'s Hydraulic Elevator. Great power, simplicity, safety, economy, durability. 94 Liberty St., N.Y.

A Cupola works best with forced blast from a Baker Blower. Wilbraham Bros., 238 Frankford Ave., Phila.

Shaw's Noise Quieting Nozzles and Mercury Pressure Gauges. T. Shaw, 95 Ridge Ave., Philadelphia, Pa.

**For Solid Wrought Iron Beams, etc.,** see advertisement. Address Union Iron Mills, Pittsburgh, Pa., for lithograph, etc.

H. Prentiss & Company, 14 Dey St., N. Y., Manufs. Taps, Dies, Screw Plates, Reamers, etc. Send for list.

Presses, Dies, and Tools for working Sheet Metal, etc. Fruit & other cant tools. Bliss & Williams, B'klyn, N. Y.

**Nickel Plating.**—A white deposit guaranteed by using our material. Condit, Hanson & Van Winkle, Newark, N.J.

Hydraulic Elevators for private houses, hotels, and public buildings. Burdon Iron Works, Brooklyn, N. Y.

The Lathes, Planers, Drills, and other Tools, new and second-hand, of the Wood & Light Machine Company, Worcester, are being sold out very low by the George Place Machinery Agency, 121 Chambers St., New York.

Hydraulic Presses and Jacks, new and second hand. Lathes and Machinery for Polishing and Buffing Metals. E. Lyon & Co., 470 Grand St., N. Y.

Solid Emery Vulcanite Wheels—The Solid Original Emery Wheel—other kinds imitations and inferior. Caution.—Our name is stamped in full on all our best Standard Belting, Packing, and Hose. Buy that only. The best is the cheapest. New York Belting and Packing Company, 37 and 38 Park Row, N. Y.

Portland Cement—Roman & Keene's, for walks, cisterns, foundations, stables, cellars, bridges, reservoirs, breweries, etc. Remit 25 cents postage stamps for Practical Treatise on Cements. S. L. Merchant & Co., 53 Broadway, New York.

Needle Pointed Iron, Brass, and Steel Wire for all purposes. W. Crabb, Newark, N. J.

Manufacturers of Improved Goods who desire to build up a lucrative foreign trade, will do well to insert a well displayed advertisement in the SCIENTIFIC AMERICAN Export Edition. This paper has a very large foreign circulation.

Galland & Co.'s improved Hydraulic Elevators. Office 206 Broadway, N. Y., (Evening Post Building, room 22.)

Telescopes of all sizes manufactured; also telescopes carefully corrected and repaired at short notice. I have testimonials from Lewis M. Rutherford, 175 2d Ave., N. Y., certifying to the perfection of my telescopes. John Byrne, 31 E. 21st St., New York.

C. M. Flint, Fitchburg, Mass., Mfr. of Saw Mills and Dogs, Shingle and Clapboard Machines. Circulars.

The best Friction Clutch Pulley and Friction Hoisting Machinery in the world, to be seen with power applied, 95 and 97 Liberty St., New York. D. Frisbie & Co., New Haven, Conn.

Hydraulic Cylinders, Wheels, and Pinions, Machinery Castings, all kinds; strong and durable; and easily worked. Tensile strength not less than 65,000 lbs. to square in. Pittsburgh Steel Casting Co., Pittsburgh, Pa.

The new "Otto" Silent Gas Engine is simple in construction, easy of management, and the cheapest motor known for intermittent work. Schleicher, Schumm & Co., Philadelphia, Pa.

Wood-working Machinery, Waymouth Lathes. Specialty, Wardwell Patent Saw Bench; it has no equal. Improved Patent Planers; Elevators; Dowel Machines. Rollstone Machine Company, Fitchburg, Mass.

Pulverizing Mills for all hard substances and grinding purposes. Walker Bros. & Co., 2d & Wood St., Phila., Pa.

The SCIENTIFIC AMERICAN Export Edition is published monthly, about the 15th of each month. Every number comprises most of the plates of the four preceding weekly numbers of the SCIENTIFIC AMERICAN, with other appropriate contents, business announcements, etc. It forms a large and splendid periodical of nearly one hundred quarto pages, each number illustrated with about one hundred engravings. It is a complete record of American progress in the arts.

**NEW BOOKS AND PUBLICATIONS.**

**NINTH ANNUAL REPORT OF THE STATE BOARD OF HEALTH OF MASSACHUSETTS.** 1878. Boston: Rand, Avery & Co., printers.

The Massachusetts State Board of Health justly ranks as the model institution of the kind in the country. Its reports are always valuable. Among those of 1878, three or four are of general as well as permanent interest; namely, Drainage and Health; Dangers from Color Blindness; The Filtration of Potable Water; School Sanitation; Scarlet Fever.

**REPORTS ON THE PHILADELPHIA INTERNATIONAL EXHIBITION OF 1876.** Vol. III. London: printed for the Government. 1878. Price 5s.

Vol. III. of the British reports on the Centennial Exhibition contains a list of awards to British and Colonial exhibitors, with the specific recommendations by the judges on which the awards were based; General reports on groups 1, 6, 8, 9, 11, 12, 13, 18, 20, 21, and 25, and the report of the director of the Bureau of Medical Service. These volumes contain a vast amount of matter of permanent scientific and industrial interest.

**VAN NOSTRAND'S SCIENCE SERIES:** New York: D. Van Nostrand, 1879.

The recent numbers of this useful series are No. 40, The Transmission of Power by Compressed Air, by Robert Zahner, M.E.; No. 41, The Strength of Ma-

terials, by William Kent, M.E.; and No. 42, Voussior Arches applied to Stone Bridges, Tunnels, Domes, and Ground Arches, by William Cain, C.E. Price of each 50 cents.

**AMERICAN ALMANAC FOR 1879.** Edited by A. R. Spofford, Librarian of Congress. New York: American News Co., 12mo., pp. 420. Price \$1.50.

This, the second issue of Mr. Spofford's valuable and convenient treasury of facts, is fully equal to its predecessor. The index covers ten closely printed columns, and refers mainly to skillfully tabulated statements of statistical, financial, and political facts of general and timely interest. Only those who do not read the newspapers will find it easy to do without it.

**A POPULAR TREATISE ON THE CURRENCY QUESTION:** written from a Southern point of view. By Robert W. Hughes, U. S. Judge of the Eastern District of Virginia. New York: G. P. Putnam's Sons.

An able argument against inflation and in favor of the national banking system. Judge Hughes is a bi-metallist, but wants a silver dollar to be all that it pretends to be—a full dollar; and holds that gold and silver have demonstrated their title to be the only material for money by successful competition with all other materials.

**HOW TO READ, AND HINTS IN CHOOSING THE BEST BOOKS.** By Amelia V. Petit. New York: S. R. Wells & Co.

A book likely to be useful to young readers with unformed critical taste, who wish to read wisely but lack knowledge and experienced guidance.

**A POCKET BOOK FOR CHEMISTS, CHEMICAL MANUFACTURERS, METALLURGISTS, DYERS, DISTILLERS, BREWERS, SUGAR REFINERS, PHOTOGRAPHERS, STUDENTS, ETC.** By Thomas Bayley. New York: E. & F. N. Spon.

Well packed with information of use to chemists, and fairly well indexed. Rather too ambitious and comprehensive for a pocket book, but all the better for a handy book of reference for the student's or the working chemist's table.

**THE DESIGN GENERALLY OF IRON BRIDGES OF VERY LARGE SPAN FOR RAILWAY TRAFFIC.** By T. C. Clarke, M. Inst. C.E. Edited by the Secretary of the Inst., James Forrest, London: Wm. Clowes & Son.

The Telford prize paper (with discussion) read before the meeting of the British Institution of Civil Engineers, May 21, 1878, by Thomas C. Clarke of Philadelphia. The paper attracted much attention during and after the meeting of the Institution, and was noticed in the SCIENTIFIC AMERICAN. It makes a valuable addition to the literature of civil engineering.

**NAUTISCH-TECHNISCHES WOERTEBUCH DER MARINE:** Deutsch, Italienisch, Französisch und Englisch. Bearbeitet von P. E. Dabovich, k. k. Schiffbau-Techniker. Herausgegeben von der Redaction der "Mittheilungen aus dem Gebiete des Seewesens," Pola, Austria.

Of this dictionary the first part of vol. I, has appeared. Whoever from necessity or inclination has had occasion to peruse our modern literature on maritime matters, has no doubt felt the want of a dictionary explaining concisely the technical terms occurring in the different branches of naval science. In the above mentioned work this seems to have been successfully accomplished.

Part I, of Vol. I., which covers the terms from "A" to "Ausblasen," contains the synonymous terms for about fifteen hundred German and Italian words in English and French. The Italian synonyms were added, no doubt, because they are of special importance to Austrian mariners, and, although of minor value to us, will be found a valuable addition, especially as the expressions are also given (in brackets) in the peculiar dialect of Austro-Italian seafaring men. The work will be published in two volumes, one of which contains, arranged in alphabetical order, the German and Italian, the other the English and French terms. Each volume will consist of about 8 parts, of about 80 pages each.

**THE PRINCETON REVIEW,** now one of the strongest periodicals published, gives in its March number nine long and able papers by the late Professor Taylor Lewis, of Union College; Principal Dawson, Montreal; Rev. Phillips Brooks, Boston; Edward A. Freeman, England; E. de Pressense, France; President McCosh, Princeton; P. G. Hamerton, France; Rev. R. M. Patterson, Philadelphia; and Sir Julius Vogel, New Zealand. Of these contributions the second—"The Genesis and Migrations of Plants"; the sixth—"Final Cause"; and the ninth—"The Islands of the Pacific," are of special interest to scientific readers. The Review is now published bi-monthly, in New York (37 Park Row), and gives the matter of a first rate quarterly at the price of a cheap magazine, \$2 a year.

**THE GOULDS MANUFACTURING COMPANY,** of Seneca Falls, N. Y., have issued the 17th edition of their descriptive catalogue of pumps, engines, rams, and other hydraulic machinery. It makes a book of 224 pages, abundantly illustrated, and handsomely printed. Their list embraces a large assortment of suction and lift cistern and well pumps, force pumps, rotary force and fire pumps, rotary gas exhausters for gas works, gas pumps for oil wells, hydraulic rams, garden engines, patent chilled skains an dboxes, steel amalgam bills, Burrall's corn shellers, and other iron goods.

**THE BULLETIN OF THE NATIONAL ASSOCIATION OF WOOL MANUFACTURERS FOR 1878** contains, in addition to the proceedings of the annual meeting of the association, the address of John L. Hayes, LL.D., on the resources of the United States for sheep husbandry and the wool manufacture, delivered before the National Agricultural Congress at New Haven, Conn., August 29, 1878; also an article on sheep husbandry and wool production in the Argentine Republic, communicated by E. Ollendorf, late Commissioner of Agriculture in that Republic.

**Notes & Queries**

**HINTS TO CORRESPONDENTS.**

No attention will be paid to communications unless accompanied with the full name and address of the writer.

Names and addresses of correspondents will not be given to inquirers.

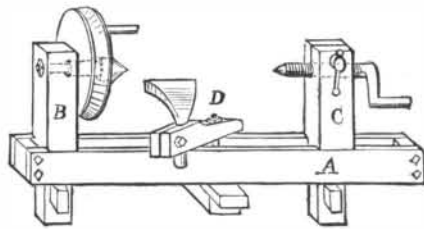
We renew our request that correspondents, in referring to former answers or articles, will be kind enough to name the date of the paper and the page, or the number of the question.

Correspondents whose inquiries do not appear after a reasonable time should repeat them.

Persons desiring special information which is purely of a personal character, and not of general interest, should remit from \$1 to \$5, according to the subject, as we cannot be expected to spend time and labor to obtain such information without remuneration.

Any numbers of the SCIENTIFIC AMERICAN SUPPLEMENT referred to in these columns may be had at this office. Price 10 cents each.

(1) L. F. C. asks if a lathe can be made entirely of wood excepting the centers. A. The accompanying cut shows a lathe made almost entirely of wood. The bed, A, consists of two wooden bars separated by



blocks at the ends, and fastened together by bolts. The head block, B, consists of a single piece of wood having a tenon which fits between the wooden bars of the bed and is secured by a key. In the head block is fixed a center, on which turns a grooved pulley. This pulley may be used as a face plate, and the chucks used in turning may be attached to it. The tail stock, C, has a threaded spindle passing through it, which may be clamped by the transverse screw to prevent it from turning, the tail stock being split to permit of drawing it together against the spindle. The tool rest is secured in the rest support, D, in a similar way, and the latter is secured by a cross piece and wedge suspended by a bolt. For wood and soft metals this lathe will answer very well.

(2) B. S. writes: Given a cylinder of 100 square inches and 32 inches stroke; steam is admitted at 1,000 lbs. and expanded 32 times. 1. What is the mean pressure per square inch? What the aggregate pressure? What the aggregate pressure without cutting off? Same for 100 lbs. steam, expanded 10 times? What is the economic effect and why? Instead of cutting off the 1,000 lbs. at 1 inch, suppose we admit the steam through a very small valve and expand 32 times as the piston travels, will the economic effect be the same? If not, give the reason why. A. Mean pressure 125 lbs., assuming no loss by radiation, condensation, or back pressure. We do not understand your term "aggregate pressure." The mean pressure of 100 lbs., expanding 10 times, is 33 lbs. We do not know of any method of comparing the results of "wire drawing" steam to the cylinder, with those of working steam expansively; but it is known in practice that "throttling," as it is called, will produce higher results with a given consumption of fuel, with an engine working either whole stroke or expansively. 2. Steam is said to be decomposed at 1,000° F., and upward. If we make 14,000 thermal units with 1 lb. of carbon, and use 4,000 units to decompose water into half a pound of hydrogen and 8 lbs. of oxygen, which, on burning, makes 16,000 thermal units, have we not 26,000 units for 1 lb. of coal instead of 14,000 units? Where is the fallacy of the statement? A. For reply to your second query we refer you to Clark's "Manual for Mechanical Engineers," or Rankine's "Steam Engine." 3. Do you know of any experiments testing the amount of steam that maybe used to create a draught without injury? The books claim that it costs as much to decompose steam as it is worth. Is this so? A. We know of no such experiments, but we do know that it is the most expensive mode of using steam for producing artificial draught.

(3) W. L. writes: I am a constant and instructed reader of your most valuable paper as well as SUPPLEMENT. I seldom find error, but most reliable information that has given me great pleasure, profit, and satisfaction. In the issue dated March 15, 1879, I find that, in answer to a question by R. B. R., as to the weight of locomotives, you fall into what seems to me grave error. You say the Janus weighed 84 tons. I knew the engine well—saw her wrecked by her destruction. Without positive data, I will say that 84,000 lbs. was her extreme weight. I mean the simple engine, without tender, water, or fuel. I further beg to say that I do not believe that there was ever a locomotive built that weighed over 60 tons, if so much—I mean, as above, the simple locomotive. My experience is that no locomotive of that weight could be made to endure. No steel rail can be made to sustain the running wear of such a weight, nor could metal be found for tire that would stand such a stress. I mean an engine stout enough to make the curves of our American railroads. The Lehigh Valley Railroad Company, at their shops at Weatherly, under the supervision of Philip Hoeffcker, the master mechanic, has built several colossal machines, some 10 drivers connected, some 8 drivers connected, with a truck under the front, that do not weigh more than 75,000 lbs., that work on the 150 foot grade and do double the work that the "Janus" did on the same grade. Mr. Hoeffcker, as well as all well informed mechanics and railroad men, believe that they are the maximum weight for economy and endurance of the best rail and metal now extant. I would not have written this did I not desire to see the SCIENTIFIC AMERICAN always right. A. You are probably correct; the weight of the engine