

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.

Patent Lawyers, Experts, and Capitalists wanted to collect \$1,000,000 for infringements, at 50 per cent. Most valuable patent ever issued. Address 2,049 Euclid Ave., Cleveland, Ohio.

Best Wood Cutting Machinery, of the latest improved kinds, eminently superior, manufactured by Bental, Margedant & Co., Hamilton, Ohio, at lowest prices.

A Microscope with 100 mounted objects for one dollar; circulars free. Address D. L. Smith, Waterbury, Ct.

Vises, horizontal and vertical, illustrated on page 342. Sample sent prepaid in the U.S. on receipt of \$2. Patent for sale. W. X. Stevens, East Brookfield, Mass.

Cash Registering Machine required in every store. Patent rights for sale. Circulars, Box 619, Petrolia, Pa.

Wanted.—Persons prepared to Manufacture small articles of Brass (a coin tester). Please communicate with H. Maranville, Akron, Ohio.

Wanted.—A New or Second-hand Jeweler's Hand Power Drop, in good order. Address, with price, D. M. Williams & Co., Fort Worth, Texas.

Patent Right for sale of Sulky and Gang Plow; one that never was beaten on test. Apply to E. C. Eaton, Patentee, Pinckneyville, Ill.

Rubber Belting, Packing, Hose, and Manufacturers Supplies. Greene, Tweed & Co., 13 Park Place, N. Y.

Water Wheels, increased power. O. J. Bollinger, York, Pa.

Vertical Scientific Grain Mills. A. W. Straub & Co., Phila.

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

Vertical & Yacht Engines. N. W. Twiss, New Haven, Ct.

Cornice Brakes. J. M. Robinson & Co., Cincinnati, O.

Sperm Oil, Pure. Wm. F. Nye, New Bedford, Mass.

Power & Foot Presses, Ferracute Co., Bridgeton, N. J.

Painters' Metal Graining Plates. J. J. Callow, Cleveland, O.

Bolt Forging Machine & Power Hammers a specialty. Send for circulars. Forsaith & Co., Manchester, N. H.

For Town and Village use, comb'd Hand Fire Engine & Hose Carriage, \$350. Forsaith & Co., Manchester, N. H.

Zero Refrigerator, with cooler. Centennial award. Send for catalogue. A. M. Lesley, 372 Sixth Ave., N. Y.

F. Lunkenheimer's Brass Goods for Engine Builders, Automatic Oil Feeders, Glass Oil Cups, Cody Shaft Oilers, etc. Address Cincinnati Brass Works.

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.

1,000 2d hand machines for sale. Send stamp for descriptive price list. Forsaith & Co., Manchester, N. H.

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

Cheap but Good. The "Roberts Engine," see cut in this paper, June 1st, 1878. Also horizontal and vertical engines and boilers. E. E. Roberts, 107 Liberty St., N. Y.

Foot Lathes, Fret Saws, &c., 90 pp. E. Brown, Lowell, Ms.

For Shafting, Pulleys, Hangers, etc., send for price list and discount to Hilles & Jones, Wilmington, Del.

Improved Steel Castings; stiff and durable; as soft and easily worked as wrought iron; tensile strength not less than 65,000 lbs. to sq. in. Circulars free. Pittsburgh Steel Casting Company, Pittsburgh, Pa.

Wm. Sellers & Co., Phila., have introduced a new injector, worked by a single motion of a lever.

Valuable Invention to users of Steam Boilers. See advt., page 318, last issue. Address U. S. Automatic Stoker Co., No. 2 Chestnut St., Philadelphia, Pa.

Presses, Dies, and Tools for working Sheet Metals, etc. Fruit and other Can Tools. Bliss & Williams, Brooklyn, N. Y., and Paris Exposition, 1878.

For Shafts, Pulleys, or Hangers, call and see stock kept at 79 Liberty St. Wm. Sellers & Co.

The great Wheelock Engine, which furnishes the power to the machinery of the American Exhibit at the Paris Exposition this year, is lubricated by Patent Lubricene and Cups. Our exhibit will equal that which we made in Philadelphia in 1876. R. J. Chard, 134 M. Lane, N. Y. city.

Friction Clutches for heavy work. Can be run at high speeds, and start gradual. Safety Elevators and Hoisting Machinery a specialty. D. Frisbie & Co., New Haven, Ct.

Wrenches.—The Lipsey "Reliable" is strongest and best. Six inch sample by mail 60 cents. Roper Caloric Engine Manufacturing Co., 91 Washington St., N. Y.

The Cameron Steam Pump mounted in Phosphor Bronze is an indestructible machine. See ad. back page.

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

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.

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

Climax Washing Machine. Reliable Agents wanted. Descriptive circulars furnished. N. C. Baughman & Co., York, Pa.

We make steel castings from 1/4 to 10,000 lbs. weight. 3 times as strong as cast iron. 12,000 Crank Shafts of this steel now running and proved superior to wrought iron. Circulars and price list free. Address Chester Steel Castings Co., Erelina St., Philadelphia, Pa.

Blake's Belt Studs, the best fastening for Rubber and Leather Belts. Greene, Tweed & Co., 13 Park Place, N. Y.

Hand Fire Engines, Lift and Force Pumps for fire and all other purposes. Address Rumsey & Co., Seneca Falls, N. Y., U. S. A.

The Turbine Wheel made by Risdon & Co., Mt. Holly, N. J., gave the best results at Centennial test.

Scroll Saws.—Three 2d hand, Cordesman, Egan & Co. make. Send for cuts. Steptoe & Co., 214 W. 2d St., Cin. O.

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.

Bound Volumes of the Scientific American.—I have on hand bound volumes of the Scientific American, which I will sell (singly or together) at \$1 each, to be sent by express. See advertisement on page 380. John Edwards, P. O. Box 786, N. Y.

NEW BOOKS AND PUBLICATIONS.

PRINCIPLES OF MACHINE CONSTRUCTION. By Edward Tompkins. With volume of Plates. G. P. Putnam's Sons, Publishers, 182 Fifth avenue, New York.

This work belongs to Putnam's Advanced Science series. It is an exceedingly clear, well arranged and well edited treatise, simple enough for the student of mechanical engineering at the outset, and at the same time it will prove a useful manual of reference to the practicing engineer. We can commend the book as one which embodies a great deal of information which too often by the free use of the higher mathematics is made unnecessarily obscure. No extensive knowledge on the part of the reader is here presupposed. The author begins with simple drawing apparatus, and devotes his initial chapter to the rudiments of draughting. He then advances through various geometrical constructions, development of surfaces, etc., and finally in the chapter on "Motion" enters upon the application of the principles laid down. Elementary combinations of mechanism, a discussion of materials, modes of construction, a good clear exposition of the difficult subject of gearing, and lastly the practical building of machine tools, make up the rest of a volume which impresses us as excellent from beginning to end.

PINE PLANTATIONS ON THE SAND WASTES OF FRANCE. By John Croumbie Brown, LL.D. Edinburgh: Oliver & Boyd, Publishers.

Dr. Brown has published a number of valuable work on sylviculture, which contain strong arguments against the destruction of forests and in favor of reclaiming waste lands by tree planting. The present work relates mainly to the attempts at arresting and utilizing the sand drifts on the waste regions in France by the plantation of the pine and other trees or grass, the suitability of which is indicated by the nature of the soil and atmospheric conditions.

A MANUAL OF INDUSTRIAL CHEMISTRY. Edited by B. H. Paul, Ph.D. New York: John Wiley & Sons, 15 Astor Place. Price \$10.

This work is based upon a translation of Stohmann and Engler's German edition of Payen's "Précis de Chimie Industrielle." It is copiously illustrated, and the editor has added some chapters on the chemistry of the metals. As a manual for general reference it will probably serve instead of larger and more costly works, as it contains much useful information in condensed form.

PROTECTION AND REVENUE IN 1877. Published by G. P. Putnam's Sons, 182 Fifth avenue, New York.

This is a lecture delivered before the New York Free Trade Club by Professor Sumner of Yale College. It adds many cogent arguments to one side of a controversy in which it is not the province of this journal to participate.



(1) G. W. S. asks: Can any saving be made in battery material of Callaud cells by breaking circuit when not needed for use? A. If the circuit remains open any length of time the blue (copper) solution reaches the zinc; soluble zinc sulphate is then formed and the copper deposited on the zinc. The Smee or Leclanché cell is better suited for open circuit lines.

(2) C. B. P. asks: 1. What is the title of M. Peclet's work, so often quoted in Rankine's treatise on the steam engine? A. "Traité de Chaleur," par M. Peclet, Paris. 2. Who are the standard authorities on locomotive engineering? A. Colburn, Clark, Holley, and Forney are authors of standard treatises on the locomotive. 3. Does an engineer, who makes a specialty of locomotives, require to be well versed in the higher branches of mathematics, such as calculus, trigonometry, or conic sections? A. Some of the most successful builders have been ignorant of the higher analysis, but such knowledge is frequently of great assistance.

(3) O. J. B. asks: Which will transmit more power, a polished cast iron pulley or a rough one? A. A polished pulley.

(4) W. M. J. writes: I wish to build a 16 x 25 foot drying room for green lumber 25 feet from my engine, using the exhaust steam from the engine, which is 25 horse power. It takes all the power to do the work required of it with a free exhaust through a 2 1/2 inch pipe. I am fearful of the back pressure. Will it do to enlarge the pipe 1/2 inch, and if so, how many coils of pipe will be necessary? A. You can regulate the back pressure to a considerable degree by using large heating pipes. With 3 inch pipe and 8 or 9 coils, which would probably be sufficient for your purpose, the back pressure ought not to be increased more than from 1 1/2 to 2 lbs. per square inch.

(5) G. & H. ask how to galvanize sheet iron. A. The iron should be cleaned by immersion in an acid bath (sulphuric acid and water, equal parts), and then scrubbed with sand or emery. When clean, it is

to be placed in a bath of melted zinc, covered with sal ammoniac. If desired, it may then be placed in a bath of melted tin, or may be used at once, after receiving the zinc coating.

(6) R. J. B. writes: Occasionally I am in the habit of laying my pen, without cleaning, on the writing desk (which is of mahogany) and by so doing have spotted the desk in many places. What will remove the stains? A. The ink may be removed by the application of strong aqueous solution of oxalic acid or a solution of calcium hypochlorite in acetic acid. Apply wet blotting paper to remove excess of solution, and then a dry blotter. After the wood is dry apply a little boiled oil. The spotting cannot be altogether obliterated.

(7) G. S. C. writes: By using oxalic acid with Prussian blue for laundry purposes, it gives the water a greenish tinge. What can I use that will give the water a purplish tinge or a purplish blue? A. Use potassium ferrocyanide instead of oxalic acid, in proportion of about 3 to 20 of the Berlin blue. See p. 969, SCIENTIFIC AMERICAN SUPPLEMENT, No. 61.

(8) E. B. asks whether spur or bevel wheel gearing is preferable, in cases where either kind can be applied. A. Spur gearing is best.

(9) W. & K. write: We have difficulty with a belt in our office. On which will a leather belt slip least, smooth iron, rough iron, or a turned wood surface? A. Smooth iron. As a general rule the best way to prevent the slipping of belts on smooth faced pulleys, is to increase the area of the friction surface by using pulleys of larger diameter or width of face, and belts of a corresponding size.

(10) J. F. N. asks: Will a tin tube answer as a core upon which to wind an induction coil for electrical purposes; would the tin cause any diminution of the current? A. It is not advisable to use the tin tube for the core; it is better to wind the primary coil directly on a core or bundle of parallel iron wires, covered with one or two layers of clean paper soaked in paraffin.

(11) G. M. W. asks: What volume of steam, at atmospheric pressure, is procurable from the evaporation of a unit volume of water, and what would be the ratio of decrease in the volume of steam under added pressure? A. According to Professor Rankine, whose calculations agree quite well with the experimental investigations of Fairbairn and Tate, the relative volume of steam, compared with that of water, is as follows:

Pressure in Atmospheres.	Relative Volume.
1.....	1646
2.....	850
3.....	580
4.....	440

(12) C. W. M. asks: 1. How can rusty steel tools be made bright? A. Clean them with oiled emery paper. 2. How can a soldering iron be tinned when the tin is off, so that the solder will adhere to the iron? A. Heat the soldering iron, and file the end down to the clear copper, then rub it in resin and solder mixed by the heat of the iron. You may have to file the iron twice.

(13) F. L. M. asks: 1. In what kind of water will most likely be found animalcules for low power microscopes from 20 to 100 diameters? A. Any stagnant water. 2. How can I obtain some "paste eels"? A. Allow flour paste to stand two weeks or more in a moderately warm place, in contact with the air. 3. What power is required to distinguish human from other blood? A. Not less than 500 diameters; one fifth inch objective with B eyepiece. It is questioned by some microscopists whether the distinction is always possible.

MINERALS, ETC.—Specimens have been received from the following correspondents, and examined, with the results stated:

H. A. J.—It is hornblende.—W. M. B.—The fire clay is not of excellent quality. It is of little value as a pigment. Properly tempered it might serve as material for drain pipes, tiles, common pottery, soft bricks, etc.—J. N., Jr.—The glittering particles in the powder are of mica. Not valuable.—A. B. T.—The sandstone and red Jasper contain nothing of value.—J. S., M.D. We do not consider the pebble of value; it is milky quartz.—C. & R.—The sample of quartz does not appear to be auriferous. The other specimen contains silica, clay (aluminum silicate), lime, magnesia, and a little sodium and iron.—E. A. S.—The samples of native magnesium sulphate received. We should be pleased to have further particulars respecting the deposit.—E. McD.—The samples consist principally of lime carbonate with a little sulphate and a trace of potassa, strontium, and phosphoric acid.—D. E.—It is a fair quality of fire clay.—J. D.—Nos. 1, 2, and 3 are argillaceous limestones. Nos. 4 and 5 contain calcium carbonate with a little barite and strontia. No. 6 is calcareous clay. No. 7 is clay slate. No. 8 is a variety of hematite. No. 9 is a concretionary formation of calcareous clay. We cannot judge from the specimens of the proximity of coal. No. 1 might be used as a building stone, but is rather soft.—W. J. C.—It is zinc blende—of some value as a source of zinc.—W. J. T.—The curious hair-like substance formed on the coke is similar to the mineral wool now largely made from molten blast furnace slag by the contact with a jet of hot air or steam. In composition it is an iron-lime-alumina silicate, containing a little graphitic carbon. Its formation would require an unusually high temperature in the retort.

COMMUNICATIONS RECEIVED.

The Editor of the SCIENTIFIC AMERICAN acknowledges with much pleasure the receipt of original papers and contributions on the following subjects:

Singular Locomotive Accident. By W. J. T.
The Jury at the Paris Exhibition.
Storm and Flood Signals. By A. W.
Set ing Boilers. By F. B. C.
Money. By J. A.
Iron Mining and Manufacture. By M. I. H.
The Phonograph.
Ink Wipers. By C. F. S.
Price of Machinery. By J. C. H.

OFFICIAL.

INDEX OF INVENTIONS

FOR WHICH

Letters Patent of the United States were

Granted in the Week Ending

April 23, 1878,

AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

A complete copy of any patent in the annexed list, including both the specifications and drawings, will be furnished from this office for one dollar. In ordering, please state the number and date of the patent desired, and remit to Munn & Co., 37 Park Row, New York city.

Amalgamator, S. F. Charles.....	202,703
Amalgamator, Firmin & Forster.....	202,804
Animals, shelter for, W. Heaton.....	202,648
Auger, earth, O. H. Polley.....	202,864
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