

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.

Valves and Hydrants, warranted to give perfect satisfaction Chapman Valve Manuf. Co., Boston, Mass.  
For Power & Economy, Alcott's Turbine, Mt. Holly, N. J.  
Caution to Manufacturers and Others.—The attention of those interested is called to the fact that materials for covering hot air and steam pipes, boilers, etc., which purport to contain asbestos, should bear the name of H. W. Johns, 87 Malden Lane, N. Y., who is the inventor, patentee and sole manufacturer of genuine asbestos materials, comprising paints, coatings, cements, sheathings, roofing, etc.  
Catalogues and Circulars of our latest Scientific Publications, mail free. E. & F. N. Spon, 446 Broome St., N. Y.  
Electro-Silver Plating Outfits complete. \$5 to \$300 each. Batteries, baths, solutions, wires, and connections, with full instructions accompanying each and every outfit. Union Silver Plating Co., Princeton, Ill.

Wanted.—A new or 2d hand Boring Lathe for Couplings and Pulleys. T. H. Ricker & Sons, Harrison, Me.  
For Sale.—Retiring Partner's interest in a Machine Shop and Foundry. J. Campbell, 49 South Canal St., Chicago, Ill.  
Manufacturers of Novelties please address G. Webster Peck, Manufacturers' Agent, 110 Chambers St., N. Y.  
Send P. O. order of 90 cents, and I will send Medicine which is a sure cure for Chlilblain. Dr. Geo. E. Huey, Alliance, O.  
Case Hardening Preparation. Box 73, Willimantic, Ct.  
Nickel Plating.—Wenzel's Patent Perforated Carbon Box Anode for holding Grain Nickel.  
H. Prentiss & Company, 14 Dey St., N. Y., Manufa. Taps, Dies, Screw Plates, Reamers, etc. Send for list.  
Needle Pointed Iron, Brass, and Steel Wire for all purposes. W. Crabb, Newark, N. J.  
Nickel Platers and Manufacturers use Bunnell's New Nickel Solution, warranted to be no infringement upon any patent. Its low cost, easy, rapid action, white and beautiful deposit on iron, brass, copper, etc., commend it as the best working solution yet produced. Materials for solution, which is easily made, together with prices, etc., furnished upon application. J. H. Bunnell, Electrician, 112 Liberty St., New York.

Hydraulic Elevators for private houses, hotels, and public buildings. Burdon Iron Works, Brooklyn, N. Y.  
Bolt Forging Machine & Power Hammers a speciality. Send for circulars. Forsaith & Co., Manchester, N. H.  
Best Turbine Water Wheel, Alcott's, Mt. Holly, N. J.  
For Sale Cheap.—Second-hand 8 foot Boring and Turning Mill, Lathes, Planers, Drills, Bolt Cutters, etc. Circulars. D. Frisbie & Co., New Haven, Conn.  
For Solid Wrought Iron Beams, etc., see advertisement. Address Union Iron Mills, Pittsburgh, Pa., for lithograph, etc.  
Alcott's Turbine received the Centennial Medal.  
Presses, Dies, and Tools for working Sheet Metal, etc. Fruit & other can tools. Bliss & Williams, B'klyn, N. Y.  
For Sale.—Brown & Sharp Universal Milling Machine; Bement Profiling Machine; first-class 2d hand Machine Tools. E. P. Bullard, 14 Dey St., N. Y.  
Pure Turkey Emery in 10, 60, and 250 lb. packages; all numbers; any quantity; lowest rates. Greene, Tweed & Co., New York.

Send for circulars of Indestructible Boot and Shoe Soles to H. C. Goodrich, 40 Hoynes Ave., Chicago, Ill.  
Nickel Plating.—A white deposit guaranteed by using our material. Condit, Hanson & Van Winkle, Newark, N. J.  
1,000 2d hand machines for sale. Send stamp for descriptive price list. Forsaith & Co., Manchester, N. H.  
Galland & Co.'s improved Hydraulic Elevators. Office 206 Broadway, N. Y., (Evening Post Building, room 22).  
Oak Tanned Leather Belting, Rubber Belting, Cotton Belting, and Polishing Belts. Greene, Tweed & Co., 18 Park Place, N. Y.  
Brush Electric Light.—20 lights from one machine. Latest & best light. Telegraph Supply Co., Cleveland, O.  
The Lathes, Planers, Drills, and other Tools, new and second-hand, of the Wood & Light Machine Company, Worcester, are to be sold out very low by the George Place Machinery Agency, 121 Chambers St., New York.

J. C. Hoadley, Consulting Engineer and Mechanical and Scientific Expert, Lawrence, Mass.  
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.  
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.

Wanted.—The address of Sheet Metal Stamping Manufacturers. Address Thuston Vandenberg, Findlay, O.

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.

Bevins & Co.'s Hydraulic Elevator. Great power, simplicity, safety, economy, durability. 94 Liberty St., N. Y.  
For Town and Village use, comb'd Hand Fire Engine & Hose Carriage, \$350. Forsaith & Co., Manchester, N. H.  
Hydraulic Presses and Jacks, new and second hand. Lathes and Machinery for Polishing and Buffing Metals. E. Lyon & Co., 470 Grand St., N. Y.  
Inventors' Models. John Ruthven, Cincinnati, O.  
Sheet Metal Presses, Ferracuthe Co., Bridgeton, N. J.  
Machine Cut Brass Gear Wheels for Models, etc. (new list). Models, experimental work, and machine work generally. D. Gilbert & Son, 212 Chester St., Phila., Pa.

Special Planers for Jointing and Surfacing, Band and Scroll Saws, Universal Wood-workers, etc., manufactured by Bentel, Margedant & Co., Hamilton, Ohio.  
Steel Castings true to pattern, of superior strength and durability. Gearing of all kinds. Hydraulic cylinders, crank shafts, cross heads, connecting rods, and machinery castings of every description. For price list and circular, address Chester Steel Castings Company, Evelina St., Philadelphia, Pa.

Diamond Drills, J. Dickinson, 64 Nassau St., N. Y.  
Elevators, Freight and Passenger, Shafting, Pulleys, and Hangers. L. S. Graves & Son, Rochester, N. Y.  
Holly System of Water Supply and Fire Protection for Cities and Villages. See advertisement in Scientific American of this week.  
Howard's Bench Vice and Schleuter's Bolt Cutters. Howard Iron Works.  
Johnson's Universal Lathe Chucks; the best are the cheapest. Lambertville Iron Works, Lambertville, N. J.  
Mellen, Williams & Co., 57 Kilby St., Boston, Mass. Wiegand Sectional Steam Boiler. Etna Rocking Grate Bar.  
Best Power Punching Presses in the world. Highest Centennial Award. A. H. Merriman, W. Meriden, Conn.  
Cutters shaped entirely by machinery for cutting teeth of gear wheels. Pratt & Whitney Co., Hartford, 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.  
Hand Fire Engines, Lift and Force Pumps, for fire and all other purposes. Address Rumsey & Co., Seneca Falls, N. Y., and 73 Liberty St., N. Y. city, U. S. A.

For Shafts, Pulleys, or Hangers, call and see stock kept at 79 Liberty St. Wm. Sellers & Co.  
Wm. Sellers & Co., Phila., have introduced a new Injector, worked by a single motion of a lever.  
Sir Henry Halford says Vanity Fair Smoking Tobacco has no equal. Received highest award at Paris, 1878.  
Jarvis Patent Boiler Setting burns wet peat, screenings, without blast. A. F. Upton, Agent, 48 Congress St., Boston, Mass.

NEW BOOKS AND PUBLICATIONS.

CORONA FUNEBRE.—We recently published an eloquent extract from the writings of Ogier concerning the remarkable beauty and power of the Spanish language, whether employed in prose or poetry. A very striking exemplification of our author's estimate now comes to us in the form of a handsome little volume of Spanish poetry, sent to us by the editors of *La Academia* of Madrid. The volume is entitled "Corona Funebre," the Funeral Crown. It is a collection of recent verses and poems, by more than seventy different authors, commemorative of the virtues of the youthful Queen Mercedes, and expressive of the universal sorrow caused by her untimely death, July, 1878. These contributions have been selected from the pages of *La Academia*, which is one of the largest and finest illustrated journals in the world.

George P. Rowell & Co.'s American Newspaper Directory for January, 1879, has made its appearance. From it we learn that the total number of periodical publications in the United States is 8,703. There are 13 more daily and 307 more weekly newspapers than were reported in the edition for January, 1878. The total increase in the United States of all sorts is 363. The Centennial year, 1876, has been the only one within the period covered by the eleven annual issues of the Directory in which the number of publications had not increased.



- (1) P. J. B. asks for a receipt for making bar soap. A good common soap is prepared by saponifying about 50 lbs. of tallow or well rendered grease, from 4 to 7 lbs. of palm oil, and 8 or 9 lbs. of rosin, with 7 or 8 lbs. of caustic soda, or something over 6 gallons of lye 24° to 30° B. The rosin is usually saponified by boiling it with about a gallon of the strong lye, and afterward adding it to the oil and grease when partially saponified by boiling with a larger portion of the somewhat diluted lye. The mass must be constantly stirred during the whole operation. When saponification is complete the pasty mass is transferred to frames, allowed to cool, and finally cut into bars with wire tools or stamped into cakes. These soaps are often largely adulterated with starch, clay, silicate of soda, etc., for the purpose of causing them to retain a large per cent of water without affecting their appearance or hardness when ready for market.  
(2) O. F. L. asks how the oil can be extracted from the cod liver. A. Heat the fresh livers to about 192° Fahr., subject them to a moderate pressure, collect the oil which escapes in warm water, and, after brisk agitation, for a few minutes allow the oil to separate and filter it. Bleached by exposure to sunlight under glass and sometimes by filtration, while warm, through fresh granular animal charcoal.

(3) F. G. R. asks: By what compound liquid or otherwise can impure air in sleeping rooms be shown? A. A small quantity of clear lime water shaken up with a large measured quantity of air will become turbid from the absorption of carbonic acid, and the degree of this turbidity compared with a previously prepared scale will serve to roughly indicate the amount of that gas present in the atmosphere of the room. Carbonic acid may, however, be considered the least dangerous impurity in an ill ventilated sleeping apartment. There are no ready means, beyond the oppressive sensation experienced by one coming directly from the outer or purer air into such an atmosphere, by which the amount of poisonous carbonic oxide, organic exhalations, etc., contaminating it, may be readily ascertained.

(4) G. M. A. asks: What will remove antimony from a person's system? A. It has lately been established that antimony, unless taken in extremely large doses, will quickly eliminate itself from the system.

(5) J. L. K. asks: 1. How can I prepare crude gypsum for plastering, and will it answer for rough coating instead of mortar mixed in the usual way? A. The gypsum is ground in a mill to flour like powder, and then heated over a suitable furnace in large stout iron kettles capable of holding a number of barrels at a time. The powder is constantly stirred by revolving arms until the tumultuous disengagement of vapor subsides, when it is bolted usually into three grades, super-fine, casting, and common, and packed in paper-lined barrels for market. The mean temperature in the calcining vessels should not exceed 272° Fahr. Plaster of Paris is used for moulds in potteries, for glazing porcelain, and for filling fireproof safes. It is made into mortar with lime and sand, used for cementing floors, vaults, etc.; it is extensively used as a fertilizer and for the manufacture of a number of valuable cements. It is also much used in foundry work for stereotyping, etc. You will find an interesting article on the subject on pp. 173-178, *Science Record*, 1874. 2. How can I put mercury in a barometer (siphon) tube? A. When the tube has been thoroughly cleaned and dried pass a piece of very narrow rubber tubing down the short leg just over the curve, and, after inverting, force through this the purified mercury about a thimbleful at a time, heating each addition in the tube nearly, or quite, to the boiling point. Continue this operation until the tube is well filled.

(6) M. I. asks how to make artificial cider. A. The Western cider is prepared as follows: Sugar, 1 lb.; tartaric acid, one half ounce; good yeast, 2 table-spoonfuls; water, 1 gallon; agitate to effect solution and allow to ferment for 12 hours or more. Your other question will be answered subsequently.

(7) W. E. G. writes: We have a vertical engine, diameter of cylinder 7 inches, 15 inches stroke, boiler pressure 60 lbs., 100 revolutions per minute, 4 foot balance wheel, 9 inch face, 4 foot drum, 9 inch belt, diameter of live steam pipe, 2 inches, diameter of exhaust pipe 2½ inches. We propose to put on another cylinder on the other side: I wish to know if live steam or exhaust pipe will have to be larger, will the governor answer for both cylinders, and how much more power will we gain? A. It would be well to use pipes of about twice the cross section of the present ones. Unless the present governor is unusually large, it will not answer. You can calculate on doubling the power, if the change is properly made.

(8) C. B. asks: 1. What is the best and more economical battery for electrotype? I want to deposit copper on plaster or wax moulds measuring from 300 to 300 square inches. A. The Smee cell with carbon negative or one of the forms of copper sulphate batteries is generally preferred. 2. How many cells would it take? A. From three to five 3 quart couples will suffice to make the surface of zinc exposed in the battery equal to or slightly in excess of the surface of the work to be plated. 3. How strong should be the solution? A. If the Smee form is used, 1 of acid to about 5 or 6 of water. For the bath use a saturated aqueous solution of copper sulphate. The copper in the Daniell form of battery is surrounded by a similar solution, the zinc by dilute aqueous solution of zinc sulphate. 4. How often should the solution be changed? A. It will depend altogether upon the amount of work done. 5. Is it more economical to amalgam the zinc plate? A. In the Smee battery, yes. In the sulphate of copper battery the zinc need not be amalgamated.

(9) G. W. L. asks for a recipe for making a good cement for filling large openings in millstones. A. Emery of the proper grain mixed with melted borax in slight excess has been used.

(10) T. F. V. asks what is the best pipe to use for conveying drinking water. A. In many cases lead and galvanized iron pipes are very objectionable. Iron or enameled iron is better, but where circumstances will admit of its use, wood is preferable to any of these.

(11) I. T. H. asks why lime slaked will prevent steel from rusting. A. Caustic or quick lime (not slaked lime), owing to its attraction for moisture, keeps the metal embedded in it perfectly dry.

(12) P. asks how to remove mildew from light kid gloves without injury to them. A. The following treatment will generally suffice: dry the gloves thoroughly, stretch, rub the spots well with a moderately stiff brush, and then with a moderately small quantity of egg albumen or flour paste.

(13) F. G.—SCIENTIFIC AMERICAN SUPPLEMENT No. 162 contains instructions for making several forms of telephone call.

(14) J. H. W. writes: 1. Bird says in his work on steam engines, to get the horse power multiply by number of revolutions; does not piston speed mean twice that number? A. Piston speed in feet per minute = stroke in feet × twice the number of revolutions per minute. 2. Should the smoke stack to a locomotive or agricultural steam engine equal the area of the flues in boiler where we use a blower? A. It is well to give it that proportion.

(15) T. E. C. asks: 1. Why is it, that if a locomotive is allowed to get stone cold, then reversed

and another locomotive of equal weight and power shackled to it, it can draw it but a short distance ahead before getting stalled? A. When the engine is reversed and drawn ahead it acts as an air compressor, drawing in the external air and compressing it to such a degree as to offer great resistance to the motion of the piston. 2. And also, why if a locomotive, moving down grade and using no steam, is reversed and no steam given, the engine will sound as if steam were being used? A. The air rushing into the exhaust to fill the vacuum formed in the cylinder by the action of the piston, makes the sound referred to.

(16) C. D. C. asks: What is the best and cheapest material for giving agricultural irons a permanent and durable black finish, something that will be cheaper than paint, and quicker put on, also give me the process of applying it? A. Good common asphalt varnish will probably answer your requirements. It may be prepared by dissolving asphaltum in naphtha, benzine, or turpentine. If not used too thick it dries quite rapidly. Dip the articles, or apply the varnish with a brush.

(17) S. S. S. asks how to make ammonio-sulphate of nickel. A. Dissolve nickel sulphate in a small quantity of hot water, add strong ammonia water until the light precipitate at first formed is redissolved, and concentrate by a gentle heat the blue solution until crystals of the double salt form.

(18) E. D. W. asks for a process for ebonyizing cherry wood so that it will admit of a high polish. A. Brazil wood, powdered nutgalls, and alum are boiled in water until a blackish color is obtained; the liquid is filtered and applied to the wood, which is then washed in a liquor made by digesting strong vinegar and a little oil of vitriol for some time with excess of iron turnings; thoroughly wash the wood, dry and oil. For staining fine woods the following is applicable: 4 ozs. of gallnuts, 1 oz. powdered logwood, one half oz. green vitriol, and one half oz. verdigris are boiled with water, and the solution, filtered hot, is applied to the wood, which is then coated with a solution of 1 oz. fine iron filings dissolved by digestion in a small quantity of hot wine vinegar. See also pp. 191 and 219, volume 38.

(19) F. C. S. writes: To make a Leyden jar, I took a glass jar (3 quart), and covered the inside and bottom with tin foil, and also the outside within two thirds of the top. I closed it with a cork, covered with paraffine, through which I passed a copper wire terminating with a chin which touched the bottom. I connected the inside and outside with an electro-magnetic machine, but could not collect any electricity in the jar; what is wrong about it, and how many such jars, properly made, would it take to produce a shock that would kill a cat? A. The Leyden jar is properly made, but it should have a knob on the outer end of the wire. You cannot charge it with a magneto machine; a frictional machine or an induction coil will be required. To kill a cat you would require a battery of several such jars, having an aggregate tin foil surface of about four and a half square yards.

(20) J. L. asks for the best method to galvanize iron work. A. The iron is cleaned by pickling in dilute sulphuric acid and scouring with sand if necessary, rinsed in water, dipped in a concentrated, slightly acid aqueous solution of zinc chloride, and immediately after in a bath of molten zinc covered with sal-ammoniac.

(21) W. L. C. asks for the name of something that will prevent wood or woody fiber from drawing together or shrinking after being swelled in water or steam? A. We know of nothing—the shrinking is due to loss of the water absorbed during the swelling process.

(22) H. J. H. asks how to transfer a signature, or to transfer a monogram drawn with lead pencil, to a block for engraving. A. Make a tracing of the signature or monogram on a good quality of tracing paper with a fine pointed pencil; place the tracing face down on the block, and follow the lines (as seen through the paper) with a hard well pointed pencil, the lines of the tracing will be in this way transferred to the block.

(23) A. B.—SCIENTIFIC AMERICAN SUPPLEMENT No 158 contains a large number of cement receipts, among which you will find one for your purpose.

(24) B. E. C. asks: 1. Will an engine 12 inch, 24 inch stroke, be power enough to drive a 56 inch saw, and if so at what speed? A. Such an engine, if well proportioned, will drive a 56 inch saw at full speed, about 650 revolutions a minute. 2. Does the water in a well remain the same temperature in summer as winter? If not, what is the difference? A. Generally there is little if any difference.

(25) J. D. M. asks: Will you please tell me how to make permanent soap bubbles? A. See reply to Maudie on page 41 of current volume.

(26) E. & J. W. S. ask: How were the piers for the iron bridge at St. Louis built? A. Caissons were used, the water being prevented from entering at the bottom by the action of compressed air.

(27) H. W. S. writes: Our engine, 12x22, makes 92 revolutions=337 feet per minute, cuts off steam when piston has traveled 18 inches. Could we save steam by running faster and cutting off at one half stroke? What speed and what cut off would you recommend? It is a well built engine. A. The change would be desirable. As you do not send steam pressure, indicator diagram, or similar data, we cannot answer your question in detail.

(28) H. C. B. asks: What is the horse power of an engine, 6 inches stroke, 2¼ inches cylinder, 120 revolutions per minute, 50 lbs. mean pressure in cylinder? A.  $\frac{3 \cdot 98 \times 50 \times 120}{825} = 572$  of a horse power.

(29) E. A. W. asks: 1. Can the gas with which streets are generally lighted be compressed, and held so? A. Yes. 2. What material should the reservoir be made of? A. Sheet or cast metal. 3. Why are the cylinders of some locomotives on the incline? A. The arrangement is generally made, we believe, on account of some real or fancied advantage in the details, or to suit some peculiar form of locomotive frame or running gear.