

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.

Steam Tug Machinery. Engines, Boilers, Sugar Machinery. Atlantic Steam Engine Works, Brooklyn, N.Y.

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

Assays of Ores, Analyses of Minerals, Waters, Commercial Articles, etc. Technical formulae and processes. Fuller & Stillman, 40 & 42 Broadway, N. Y.

Jarvis Patent Boiler Setting, same principle as the Siemens process for making steel; burns screenings and all kinds of waste fuel, without blower. A. F. Upton, Agent, 48 Congress St., Boston, Mass.

Kimball's Catarrh Cigarettes, an instantaneous relief and a pleasant smoke. They contain no tobacco.

For Sale or Exchange.—A partly finished Foot Lathe, swing 10 x 30 inches. W. Bulkeley, Ballston, N. Y.

Ten years' experience has enabled Mr. A. H. Downer, 17 Peck Slip, N. Y., to produce a liquid for the prevention and removal of scale in steam boilers, which is perfectly safe and thoroughly effective. An honest trial will convince the most skeptical of its utility.

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

Lathes, Planers, and Drills, with modern improvements. The Pratt & Whitney Co., Hartford, Conn.

Important.—See Hogins' Patent Laundry Table, illustrated in last week's SCIENTIFIC AMERICAN. For State, Canada, or entire right, address A. H. Hogins, Box 15, Morrisania, N. Y.

Artists, call at 36 Platt St., N. Y., and see lantern with oil lamp for tracing card pictures to any size.

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

Mans. of Rubber Rolls, address A. T. Melvin, Pittsfield, Md.

For best Portable Forges and Blacksmiths' Hand Blowers, address Buffalo Forge Co., Buffalo, N. Y.

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

Makers of Hydraulic Motors and Elevators, please send circulars and price lists to C. L. Allen, Box 412, Worcester, Mass.

For Sale Cheap.—Second-hand 8 foot Boring and Turning Mill, Lathes, Planers, Drills, Bolt Cutters, etc. Circulars. D. Frisbie & Co., New Haven, Conn.

Wanted—A man to take charge of and run a Stove Foundry. Must be thoroughly competent. Address, with references, X. R., Baltimore P. O., Md.

Steel Stamping Figures, 1-16 to 1/4 in., \$1 per set. All work warranted. C. L. Alderson, Cleveland, O.

For Sale.—60 H. P. Engine, one 35 H. P. Boiler; A No. 1. Box 28, South Windham, Conn.

Manufacturers and other owners or occupants of large buildings, will conserve their interests by sending for samples and price list of H. W. Johns' Asbestos Liquid Paints. H. W. Johns Mfg. Co., 87 Maiden Lane, New York, sole manufacturers of genuine Asbestos materials.

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

Wanted—Second-hand Corliss Engine, 100 to 125 H. P. Address P. O. Box 128, New Haven, Conn.

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.

Gaume's Electric Engine. 171 Pearl St., B'klyn, N.Y.

Diamond Planers. J. Dickinson, 64 Nassau St., N. Y. Engines, 1/2 to 5 H. P. G. F. Shedd, Waltham, Mass. Case Hardening Preparation. Box 73, Willmantic, Ct.

Vertical Burr Mill. C. K. Bullock, Phila., Pa.

Sheet Metal Presses, Ferracute Co., Bridgeton, N. J. Excelsior Steel Tube Cleaner, Schuylkill Falls, Phila., Pa.

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.

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.

Send for Circulars of Indestructible Boot and Shoe Soles to H. C. Goodrich, 40 Hoyne Ave., Chicago, Ill.

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

Bewins & 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., 2318 Frankford Ave., Phila.

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.

Elevators, Freight and Passenger, Shafting, Pulleys, and Hangers. L. S. Graves & Son, Rochester, N. Y.

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.

Holly System of Water Supply and Fire Protection for Cities and Villages. See advertisement in SCIENTIFIC AMERICAN of this week.

Diamond Self-clamp Paper Cutter and Bookbinders' Machinery. Howard Iron Works, Buffalo, N. Y.

Best Power Punching Presses in the world. Highest Centennial Award. A. H. Merriman, W. Meriden, Conn.

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. Pittsburg Steel Casting Company, Pittsburg, Pa.

Electro-Bronzing on Iron. Philadelphia Smelting Company, Philadelphia, Pa.

Hand Fire Engines, Lift and Force Pumps, for fire and all other purposes. Address Rumsey & Co., Seneca Falls, N. Y., and 93 Liberty St., N. Y. city, U.S.A.

Vertical and Yacht Engines. F. C. & A. E. Rowland, New Haven, Conn.

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

Shaw's Noise Quieting Nozzles and Mercury Pressure Gauges. T. Shaw, 915 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 can 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.)



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.

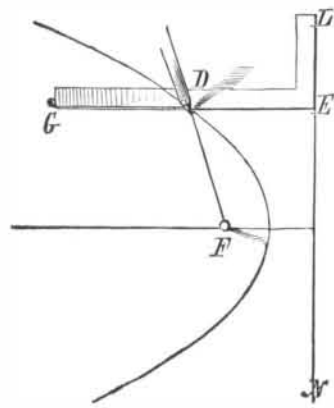
Any numbers of the SCIENTIFIC AMERICAN SUPPLEMENT referred to in these columns may be had at this office. Price 10 cents each.

(1) J. E., Jr., writes: I have a bichromate battery composed of 12 cells; after 2 weeks I find that the carbon plates are covered with crystals; they interfere with the working of the battery. My belief is that I saturated the solution with too great an amount of bichromate. The battery is constructed after the form published in SCIENTIFIC AMERICAN, No. 146, consisting of porous cup, zinc, and carbon; the solutions are salt and sulphuric acid. A. They are crystals of potassium-chromium alum ($K_2Cr_2(SO_4)_4 \cdot 24 H_2O$). They invariably form after a time in the bichromate battery when the acid bichromate solution becomes partially exhausted and concentrated by evaporation. The bichromate solution should be more frequently renewed.

(2) L. B. asks: How many horse power is a boiler, 10 feet long, 42 inches diameter, with 36 3/4-inch tubes, or an engine, 8 inch cylinder, 12 inch stroke, making 150 revolutions a minute, at 60 lbs. pressure? A. Boiler, 16 horse power nominally. Engine, 20 horse power.

(3) C. N. M. asks how the preparation is made now used by manufacturers of colored, glazed, and plated papers, to render the article partly waterproof, or to resist, in a measure, the rubbing away of the color when slightly moistened. A. The paper is heavily sized with a prepared glue size, and the printed colors protected by the subsequent application of a thin, colorless spirit varnish.

(4) A. G. asks how to describe a parabola by mechanical means. A. Place a straight edge to the directrix, E N, and apply to it a square, L E G; fasten



at G one end of a cord equal in length to E G; fix the other end to the focus, F; slide the square steadily along the straight edge, holding the cord taut against the edge of the square by a pencil, D, and it will describe the curve.

(5) W. B. M. asks: 1. Could a double dynamo-electric machine be made after the plans in SCIENTIFIC AMERICAN SUPPLEMENT No. 161, by placing two similar machines together end to end, and connecting the two armatures so as to form a continuous shaft, with the commutators at the outside end; and so winding the magnets as to bring dissimilar poles into juxtaposition? A. It might be done, but a single large magnet would be better, using an armature made in two sections, one shorter than the other, the shorter one being used to excite the magnet. 2. Could the current from one machine, arranged to work either with or without a battery, be used to excite the magnets of the other machine, and thus, as it were, multiply one machine by the other? A. This has been done in several different machines. 3. Could a dynamo-electric machine made with permanent magnets be coupled on to one of the other kind in a manner similar to the above, with a great advantage in the way of power of current produced from the second machine? A. Yes; Wilde's machine is arranged in this way.

(6) R. A. G. asks: Can copper be so refined by removing the sulphur that it will not tarnish more than tin or nickel? If so how refined so that it will tarnish the least? A. No; chemically pure copper quickly tarnishes in the air unless protected by a lacquer.

(7) B. R. J. asks: What is the cause of the drumming noise in some furnaces when the door of the boiler is closed tightly? I am now running a boiler which shakes the building to the foundation when the door is closed tightly. A. It is generally due to uneven firing, holes being formed through which the air rushes with great velocity. The noise can generally be stopped by the judicious application of a little coal.

(8) J. S. B. asks: 1. Has the State of New York awarded the prize offered for best method of obtaining rapid canal navigation without injury to the canal? A. Yes. 2. Was this prize offered simply for best method of preventing the washing away of the banks by the waves from the canal boat? A. No; it was found by experience that this washing was not caused by any of the boats that were tried, at the slow speed that they developed.

(9) G. G. asks: Can the telephone be worked by using a small creek in place of the second or return wire? A. Yes.

(10) D. E. J. asks where to find out how to make a small stationary engine. A. Consult the back numbers of the SCIENTIFIC AMERICAN and SUPPLEMENT.

(11) C. M. P. asks: Why will a locomotive having an air pump, pump more pressure of air into the air drum than there is steam pressure on the boiler? I have also noticed that a steam fire engine will also show more pressure of water in the hose than there is steam pressure in boiler. A. The pressure which an air pump will deliver against, will depend on the diameter of the pump and power applied.

(12) J. R. F. asks if refined petroleum has ever been tried in marine boilers as a preventive of priming, and if considered safe to use with steam at 50 or 60 lbs. pressure, and if so what has been the general results. A. We are not aware of the use of petroleum for checking foaming in boilers, but from the well known effect of the use of other oils in such cases, should expect beneficial results. We would advise introducing it in small quantities at first, and that its effect be closely watched.

(13) A. E. W. asks: 1. Has the phonograph been perfected so that a speech, sermon, or a musical piece may be registered by having the speaker a few feet from the instrument, say 15 or 20 feet? A. We think not. 2. Has there ever been a telephone invented in which a diaphragm and artificial magnet are placed in the circuit of a common electrical battery? A. Yes.

(14) W. H. C. asks: Can you inform me if there is a cheap residuum of the distillation of petroleum of which can be made a cheap black varnish, and if so what solvent is used? A. The pitchlike residue remaining in the stills, where the distillation is not forced at the last, is sometimes sold as an artificial asphalt. It is soluble for the most part in oil of turpentine, benzine, or benzole.

(15) A. B. H. asks: 1. How to make a first class aniline black ink, something that will flow easy,

and will not get thick when left standing a long time. A. Triturate 1/4 ounce of commercial soluble nigrosine and 1 drachm of alum, with about 1/4 pint of hot water, and digest for an hour in the water bath at 212° Fah., strain the resulting solution through a piece of fine cotton cloth, and dilute with a little hot water, if necessary, for use. It is well to add a few drops of clove oil to prevent alteration. 2. How to make a good blue ink. David's blue ink is just the color I want, but the trouble with it is, it won't flow when it gets a little old. I would prefer an aniline ink if there is any that will give a rich deep blue. A. Use Nicholson's soluble aniline blue in place of nigrosine as above. 3. How to make an aniline red. A. Warm gently 3 drachms of Porrier's soluble scarlet or red scarlet with about 1/2 ounce of water, and add a few crystals of tin salt (stannous chloride), or use a strong slightly ammoniacal aqueous solution of aurine or coralline. Address the chemists who advertise in these columns. 4. Would it be practicable to produce an electric light, the machinery to be driven by a weight? How large a weight would it take to produce electricity enough to light a room 15x20 feet with as much light as 3 or 4 gas burners would make the weight to fall 10 feet in five hours? A. With the Werdermann or Sawyer-Man lamps we think it would require the fall of about a ton weight through from 6 to 8 feet a minute.

(16) J. J. C. asks: If a rifle be shot off perpendicularly on a moving railroad car, where will the ball fall? A. By "perpendicular" we suppose you mean "vertical"; if so, when leaving the rifle the ball would have the same progressive velocity as the car, but the moment it leaves the rifle, its progressive speed (as well as its vertical velocity) is gradually reduced, and its path will be a curved one; the ball striking the ground in advance of the point from which it was fired and in rear of the position of the rifle at the instant of the ball striking the ground, as the latter has continued to advance with the train and with velocity unretarded.

(17) H. J. L.—We give below 19 patented fillings for safes: No. 1. Residuum of soda water manufacture. No. 2. Soapstone. No. 3. Tiles, alum and clay. No. 4. Alumina and ammonium alum. No. 5. Copperas and gypsum. No. 6. Starch, water, gypsum. No. 7. Alum in small pieces embedded in gypsum. No. 8. Epsom salt and gypsum. No. 9. Cement, lime, sawdust, and silicious mortar. No. 10. Paper pulp and alum. No. 11. Steam and water vessels. No. 12. Removable water vessels between the casings. No. 13. Moistened sponge and powder. No. 14. A system of fusible pipes with water. No. 15. Sulphuric acid in bottles with fusible plugs, and sodium carbonate to liberate carbonic dioxide on contact with the acid. No. 16. Paper pulp and alum. No. 17. Raw cotton, sawdust, and whiting. No. 18. Asbestos, plaster cement, chemical salts, and alum. No. 19. Asbestos, marble dust, pipe clay, gypsum, glycerine, mucilage, magnesium and sodium sulphates, borax, alum, sal soda, and paraffine.

(18) C. W. C. asks (1) if a tank lined with sheet lead would have any poisonous or injurious effect upon the water in case it was used as a cistern for rain water. A. Water stored in such a reservoir would not be fit to drink. 2. Can you inform me of any paint that can be used to paint the inside of a rain water tank so that water may be kept in it? A. Several well dried coats of good asphaltum varnish may be applied; but it would be better and safer to collect the water in clean wooden hogheads or cemented cisterns.

(19) R. H. H. writes: A French burr mill-stone has come apart just between the face and the plastering. Can I cement it together with plaster of Paris without taking it all apart? A. A good cement can be made of alum and powdered burr-stone. Plaster of Paris is generally used to cover the stone after making the joints with the cement.

(20) D. & C. write: 1. We run our mills with a Leffell wheel. The wheel is situated 60 feet from mill shaft and connected by a shaft 60 feet long. Will we gain any power by putting water house and wheel nearer, and how much? A. The gain will be very slight, and will hardly justify the expense of moving. 2. Please tell us how to bend rims, buggy shafts, plow handles, etc., cheaply, without the use of a steam boiler. Can they be bent by simply boiling? A. They can be softened by boiling, but the operation is more tedious than when a steam box is used. 3. How can we mix up Portland cement mortar to resist the action of water? A. You can make a mixture of 1 measure cement and 2 measures of sand.

(21) W. S. writes: To try a proposed experiment, I will need a bi- or tri-chloride of sodium. Can this be obtained, or made cheaply, and what process? A. Sodium is a monad metal, and combines with but one equivalent of chlorine. You will not succeed in procuring a di- or tri-chloride.

(22) H. writes: 1. I want to build a steam launch 47 feet long, 10 1/2 feet beam, slanting at sides 8 inches each side, and in front about 10 feet of bottom flat; will a 6 horse power boiler and engine propel it in the swift water of our Western rivers, the Ohio and Wabash, say a fair rate of speed 5 or 6 miles up stream? The boat will be built light, one deck, boiler and engine 1,400 lbs. empty. The boat will not draw light with boiler and engine in place more than 6 inches. A. No, a 6 horse power (actual) would not drive it more than 5 or 6 miles per hour in smooth water. 2. What position of wheel would be most advantageous, on sides or at stern? A. Stern. 3. Would belt gearing answer as well as cogwheel? A. Belting would not do as well as gearing; it would become wet and slack, and slip. 4. Could wire belting be made available? A. No.

(23) W. H. W.—The plant is the evergreen or pyracantha thorn (*Crataegus pyracantha*), a native of the south of Europe, distributed several years ago in the United States as a hedge plant. It is excellent for the latter purpose, in a climate no more severe than that of Virginia. An accidental variety with white berries has proved hardly near New York in the most severe winters. The plant is propagated by cuttings, although dealers in shrubs and trees might possibly have seeds for sale.