

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.

The Morehouse Carbureter uses only heavy oils for enriching gas and reduces the consumption about 50 per cent. For rights address Morehouse, Sage & Shaw, 456 Main St., Buffalo, N. Y.

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

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

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

Galland & Co.'s Improved Hydraulic Elevators. Office 206 Broadway, N. Y. (Evening Post Building, room 23.)

Consumption cured.—An old physician, retired from active practice, having had placed in his hands by an East India missionary the formula of a simple vegetable remedy for the speedy and permanent cure of consumption, bronchitis, catarrh, asthma, and all throat and lung affections, also a positive and radical cure for general debility and all nervous complaints, after having thoroughly tested its wonderful curative powers in thousands of cases, feels it his duty to make it known to his suffering fellows. The recipe will be sent free of charge, to all who desire it, with full directions for preparing and successfully using. Address, with stamp, naming this paper, Dr. J. C. Stone, 146 South Eighth Street, Philadelphia, Pa.

Wanted.—Parties to furnish money to take out valuable patent in foreign countries. No competition. American patent allowed. Geo. W. Stephens, Denison, Iowa.

Foot Lathe, 8 1/2 in. x 3 ft., for sale; also 4 x 5 Upright Engines. G. F. Chappell, 86 Pike St., N. Y.

Wanted.—Foundry that casts small articles of malleable iron. Please send circulars to P. Armstrong, Camden, Wilcox Co., Ala.

It will be to the interest of inventors of Mop Heads to correspond with C. B. Warner, Burlington, Vt.

To Users of Steam.—Hundreds have been deceived by worthless compounds sold by unscrupulous parties for Asbestos Steam Pipe and Boiler Coverings, which have proven unsatisfactory and have cost from 50 to 100 per cent more than the genuine, which are the most effective and economical non-conductors in the world, and are manufactured only by the H. W. Johns Manufacturing Company, 87 Maiden Lane. Be sure and note the address, and send for samples, prices, and estimates of cost of applying, before making contracts.

Interstate and International Mechanical Exchange, 20 E. 13th St., N. Y., U.S.A. A. S. Gear, Manager. An equitable purchasing and selling agency and bureau of practical knowledge. Reliable information concerning machinery, supplies, patents, and employees. Purchases made, sales effected, help furnished.

If you are troubled with leaky valves, use the Chapman. Warranted to give satisfaction. Chapman Valve Manufacturing Company, Boston, Mass.

For Fire or Power Pumps, address the Gould's Manf. Co., Seneca Falls, N. Y., or 15 Park Pl., N. Y. city.

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

Rheumatism, Dyspepsia. Cure guaranteed. Brunton's Digestive Fluid and Absorbent, 50c. Dr. Brunton, London, Canada.

For Sale.—A set of Machinery and Tools for making full plate watches; will be sold very low. Address P. O. Box No. 3100, N. Y.

The only Engine in the market attached to boiler having cold bearings. F. F. & A. B. Landis, Lancaster, Pa.

Patentees and Manufacturers of articles of real value desiring the same introduced and sold, address Morehouse, Sage & Shaw, 456 Main St., Buffalo, N. Y.

Brush Electric Light.—20 lights from one machine. Latest & best light. Telegraph Supply Co., Cleveland, O.

The Hancock Inspirator received a gold medal at Paris, as being the best boiler feeder ever made, and the Old Colony Railroad (who have twenty-three machines in constant use) have just given it their unqualified indorsement, as the cheapest and most effective feeder ever used on their locomotives. Those interested are referred to their letter of recommendation, which may be found in our advertising columns.

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

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.

For the best advertising at lowest prices in Scientific, Mechanical, and other Newspapers, write to E. N. Freshman & Bros., Advertising Agents, 186 W. 4th St., Cin. O.

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

Brick Presses for Fire and Red Brick. Factory, 309 S. 5th St., Philadelphia, Pa. S. P. Miller & Son.

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

Punching Presses, Drop Hammers, and Dies for working Metals, etc. The Stiles & Parker Press Co., Middletown, Conn.

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

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

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

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.

Nickel Plating.—Wenzel's Patent Perforated Carbon Box Anode for holding Grain Nickel. A. C. Wenzel, 114 Center St., New York City.

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

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

To Manufacturers.—Messrs. Signal & Ostrander, 806-808 N. 2d St., St. Louis, Mo., have added to their present establishment a Machinery Department, from whence the wants of the Western machine-using public will be supplied. Manufacturers will do well to correspond with them.

24 x 48 in. Wright's Automatic Engine, with 16 foot band wheel, 30 in. face, for sale. Price low. Atlas Works, Indianapolis, Ind.

Pulverizing Mills for all hard substances and grinding purposes. Walker Bros. & Co., 23d & Wood St., Phila., Pa. Inventors' Models. John Ruthren, Cincinnati, O.

The Lawrence Engine is the best. See ad. page 413.

North's Lathe Dog. 347 N. 4th St., Philadelphia, Pa.

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

Sir Henry Halford says Vanity Fair Smoking Tobacco has no equal. Received highest award at Paris, 1878.

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

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

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

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

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.

Cutters shaped entirely by machinery for cutting teeth of gear wheels. Pratt & Whitney Co., Hartford, Conn.

Holly System of Water Supply and Fire Protection for Cities and Villages, is fully described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 140.

Howard's Bench Vise and Schleuter's Bolt Cutters Howard Iron Works.

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

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

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

(1) J. H. M. asks: What is the best time ever made on a velocipede? A. Ninety miles in 9 1/2 hours is the best time for a long stretch of which we have any knowledge. See SCIENTIFIC AMERICAN, No. 6, current volume.

(2) E. A. S. asks: Can you tell me how the wood of the white oak (*Q. alba*) may be ebonized? A. Immerse the wood for about 48 hours in a hot saturated solution of alum in water, and then brush it over with a logwood decoction as follows: Boil 1 part of best logwood with 10 parts of water, filter through linen, and evaporate at a gentle heat until the volume is reduced one half. To every quart of this add from 10 to 15 drops of a saturated neutral solution of indigo. After applying this dye to the wood rub the latter with a saturated and filtered solution of verdigris in hot concentrated acetic acid, and repeat the operation until a black of the desired intensity is obtained.

(3) W. H. E. writes: I am using oil of cloves to scent lard oil. Can you tell me of a better article, to cost about the same? I would like to have a scent which would smell more like cologne. A. You will find a number of good receipts on p. 1031, SCIENTIFIC AMERICAN SUPPLEMENT, No. 65.

(4) W. W. C. asks: What is the best motive power for driving a No. 2 jeweler's lathe? A. A foot power is undoubtedly the best, but you might use a small water motor or an electric motor.

(5) W. C. E. asks how to prepare what is commonly called millboard or academy board, used by artists. A. a. Apply to junk board a coating of size; when dry spread on thick paint with a pallet knife. b. Size heavy manila paper, apply to two sheets a thick coat of paint, place the painted sides together, then pull them apart. This will give the board a roughened surface or tooth.

(6) S. B. McC. asks: What number of inches is generally allowed in the measurement of charcoal per bushel? A. The standard bushel contains 2150-42 cubic inches; equivalent in volume to 77-627413 lbs. avoirdupois of distilled water at its maximum density.

(7) C. E. B. asks: What is the process for transferring common wood engravings to wood, so that copies of them may be engraved on the wood block without the labor of drawing them with the pencil? A. Take a saturated alcoholic solution of potash, pour the solution on the engraving, and immediately remove all the superfluous liquid by means of blotting paper. Lay

the engraving while damp on the wood or other material to which it is to be transferred, and place it in a press (a copper plate press is the best). The transfer will be obtained immediately. The engraving must be immersed in clear cold water after removal from the potash bath. Wooden blocks must be moistened on the back to prevent warping.

(8) F. H. M. asks for a good practical way for tempering small taps and reamers. A. Heat them to a low red in a charcoal fire, plunge in cool (not cold) water; draw the temper to a dark straw color by holding the tap in an alcohol or gas flame, or in a piece of gas pipe heated to redness.

(9) G. W. C. asks (1) why a cannon ball when shot up perpendicularly from the earth does not have the same velocity or force in coming down as in going up. A. The difference in velocity is due to the resistance of the air. 2. If shot up in a vacuum would not the ball returning strike the cannon's mouth with a force equal to that which it had when it started? A. Yes. 3. Is not the resistance of the air greater in the downward course of the ball than in the upward? If so, does not the fact of the air being between the weight of the ball and the earth make the air in a measure compressed or more dense? A. We think not, perceptibly.

(10) C. A. R. writes: I have been informed that Lake Superior has a tide which rises and falls the same as the ocean tide. Is this so? A. Lake Superior has no tide; though level of water varies with the wind, possibly by other unexplained causes.

(11) H. J. M. writes: I have a great desire to understand and to study electricity. 1. What are the best books on the subject? A. A beginner should study some good elementary work on physics. Ganot's "Physics" can be recommended. Prescott's "Electricity and the Electric Telegraph" is a good work. 2. Will a piece of thin common tin do to make a diaphragm for a telephone or a phonograph? A. Yes.

(12) H. H. writes: I wish to heat a room 40 x 60 feet, situated 10 feet below a 40 horse power boiler. If I connect one end of the system of heating pipes with the steam dome, and the other end with the boiler below water line, will the water from condensed steam find its way back into the boiler by the attraction of gravitation? A. It will be necessary to use a pump or boiler feeding trap.

(13) F. J. K. asks whether there is a gratuity or prize offered in France or elsewhere to anyone who first squares the circle. A. No.

(14) C. E. B. asks if steam will pass through a coiled pipe with greater force than it will through a straight one. A. No.

(15) E. H. writes: I have an engine 2 1/4 bore by 6 inches stroke. Will it run a boat 17 feet long in still water? A. We think it will answer.

(16) S. H. G. asks if nickel is mined, or is it a composition. A. Nickel is an elementary substance. It does not occur native but in combination with other substances, as arsenic, antimony, and sulphur, and as associated with cobalt, copper, iron, manganese, etc.

(17) E. F. writes: I have a copper evaporator or air moistener, placed against the pipe of a stove in a living room. On the sides of this considerable verdigris collects. Will any of this verdigris pass off in the vapor so as to be injurious to health? A. No; copper salts are not volatile under such conditions.

(18) G. S. writes: If two cubic feet of air at atmospheric pressure are compressed to one cubic foot, what will be the pressure per square inch? Also having one cubic foot of compressed air at 60 lbs. per square inch, how many pounds will it raise one foot high if all the power in it is expended? I want the pressure above atmosphere, or what would show on a steam gauge. A. Supposing the air to expand or be compressed, at constant temperature, the pressure varies inversely as the volume, and the mean pressure during expansion, calling R the ratio of expansion, and P the initial pressure, is $P \times \frac{R}{R-1} \log_e R$.

(19) W. T. S. asks: What is properly termed back pressure? A. The pressure opposed to the motion of the piston.

(20) F. E. M. writes: I have a boat 50 feet long by 9 feet beam, drawing 3 feet of water; my engine is 8 1/4 (dia.) x 7 3/4 (stroke) inches, with a light link motion. Is the engine large enough to drive the boat 12 miles an hour with a suitable sized wheel? What size wheel would you recommend? What size boiler? Would running the engine high or low pressure make any difference in speed? A. Make a propeller 3 feet in diameter and 4 feet pitch—boiler with about 250 square feet of efficient heating surface. It will be necessary to carry a high pressure of steam to make the speed you desire.

(21) A. C. writes: 1. I am building a tank to run a Backus water motor: how many feet square and high shall I make it to get from 40 to 60 lbs. pressure? A. Each foot in height produces a pressure of about 0.433 pound per square inch. 2. How fast should a drag saw run to saw successfully? I want to attach one to my horse power (for thrashing). Would it run too fast? A. We think this will answer very well.

(22) C. P. B. asks: What is the best flux to use in welding steel on to cast iron, our object being to weld a thin steel on to the cast iron jaw of a vise in the process of manufacture? A. Powdered anhydrous borax or boric acid mixed with twice its weight of anhydrous sodium carbonate is among the best.

(23) F. S. writes: A communication in your journal of the date of 9th ult., having reference to the performance of small steam yachts, leads me to mention the fact that last spring I built a yacht, 25 feet long, 4 feet 9 inches beam. The frame of oak, sawn to form, 1 1/4 inch square, and planked with 1/2 inch pine and calked. She has a boiler 3 feet high, and 2 feet 2 in. diameter, firebox 1 ft. 3 in. high and 1 ft. 11 in. diameter, with 49 2-inch tubes. The engine is one of S. M. Maxim's 3 x 3 inches, same as the Flirt (after which I called mine); the wheel is three bladed, 22 in. diameter, 2 ft. 6

in. pitch. The speed attained was very good, she having made a straight run of 56 miles in six hours and a quarter. This, of course is not a simple spur of a mile or two, and therefore is a better test of her running capacity. I might also mention that our river is very much obstructed by refuse from the saw mills, in some places the cuttings and sawdust are several inches thick and somewhat interferes with the speed as well as choking the pump; then again the blocks sometimes get into the wheel, as they did on the occasion mentioned, and twice brought the engine to a sudden stand, thereby straining the engine. She ran under an average pressure of 160 lbs. She was well loaded, having fuel for a journey of 160 miles, as well as 3 men on board. (We are glad to receive letters like this, and hope that other readers having steam launches, whose performance is satisfactory, will send us particulars.—Ed.)

(24) H. S. asks: If I add cane sugar to the grape juice in order to make the wine sweet, is the wine still a natural wine? A. Wines are subject to various causes of deterioration, termed maladies, one of which is the "souring." This defect, if not excessive, is overcome by the addition of sugar, and does not constitute the wine an artificial one. The sugar in this case simply dissolves without change.

(25) O. K. asks: Is there such a thing as nitrate of oxygen? A. We know of no such compound. 2. Can you tell me what two gases combined will make an explosive liquid? A. Nitrogen chloride is formed by the reaction of chlorine and ammonia, both of which are gases when dry. For its preparation see p. 219 (16), current volume, SCIENTIFIC AMERICAN.

(26) Will M. G., M.D., send his P. O. address?

(27) F. H. P. asks (1) what the small paper caps (explosive) used by boys on toy pistols are made from. A. Usually a mixture of finely powdered potassium chlorate and sulphur with a little sugar or charcoal. 2. Can they be made to explode by piercing with a sharp pointed instrument? A. Yes; the mixture for igniting the cartridges of the needle gun consists either of potassium chlorate and black sulphide of antimony, or a compound containing fulminate of mercury. The following is a good preparation: Potassium chlorate, 16 parts; black sulphide of antimony, 8 parts; flour of sulphur, 4 parts; charcoal powder, 1 part; moistened with gum or sugar water and a very little dilute nitric acid (a few drops) added. The mixture is ignited by the friction produced by the sudden passage of the needle through it.

(28) A. S. H. asks: Can wood be ignited by steam? A. Under ordinary circumstances it cannot.

(29) W. B. P. asks for a recipe for deodorizing kerosene oil. A. The oil cannot be completely deodorized, but the characteristic odor may be somewhat cloaked by the addition of strongly scented substances or perfumes. The odors may also be rendered less objectionable by agitating the oil for some time with about 20 per cent of good (moist) chloride of lime—bleaching powder—and then with a little dry calcium chloride.

(30) J. L. J. asks: Of what is phosphor bronze made? A. To bronze containing 90 to 91 per cent of copper and 9 to 10 per cent of zinc is added, while in the pot, and just before cooling, from one half of one to two per cent of phosphorus wrapped in a little paper and quickly forced to the bottom of the pot. In a few minutes the alloy is ready for casting. Care is necessary in handling and adding the phosphorus to avoid accident.

(31) J. L. W. asks how aneroid barometers are compensated for temperature. A. A small thermometer is generally attached to each instrument; from its indications a correction is made for temperatures according to an empirical scale specially constructed for each instrument.

(32) J. W. B. asks if a practical civil engineer (not having received the degree of "C. E.," from any college) has a right, or is it lawful, to put "C. E." after his name. A. Such a person, in our opinion, only uses the title by courtesy, and not by right, legal or otherwise.

(33) B. L. asks: 1. What is the average annual rain fall in New York State? A. 36 to 40 inches. 2. In what places in the United States and Canada is Prussian blue manufactured? A. In New York city; we do not know that it is made in Canada. 3. What is the origin of the light in the voltaic arc? A. Some physicists attribute it to a succession of very bright sparks passing from one carbon to another; others, to the incandescence of particles of carbon.

(34) L. B. P. asks which side of a belt should run in contact with the pulley. A. You can transmit more power, and the belt will wear better, if you run it with the surface or smooth side to the pulley.

(35) W. G. asks: With what can I fill cracks in a hard finished wall? A. Plaster of Paris mixed into a paste with cold water and about 1 part of fine sharp quartz sand answers very well. A little alum water is often added to prevent the mixture setting too quick.

(36) H. D. asks how to make serpents' eggs. A. To solution of ammonium sulphocyanate, add mercuric nitrate solution; thoroughly wash and dry the white precipitate of mercuric sulphocyanate, make it into small cones, and dry these at a gentle heat. These are the so-called serpents' eggs. For details concerning the economic manufacture of sulphocyanates, see pp. 152 and 581 *Pharmaceutical Journal*, 2d series, vol. vii.

(37) J. A. W. asks (1) how the composition used for pads in post offices may be made. A. Take a piece of inch board previously planed smooth, 5 inches square, cut pieces of very heavy cashmere goods the same size, and place them in layers, say an inch deep, on the block, and smear the ink on alternate layers of the cloth. Then sew overall a piece of the same cloth, tacking around the outside edges of the block to hold the outside cloth firm. 2. In the office at New York a pad is made with the felt stuck on to the gum composition; how is it done? A. A hot solution of gelatin in glycerin is used, we are informed.