

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.

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, 45 Congress St., Boston, Mass.

The new fragrant Vanity Fair Cigarettes. New combinations of rare Old Perique and Virginia.

Save Fuel by using Steam Boiler Damper Regulator. National Iron Works, New Brunswick, N. J.

Walworth Mfg. Co., Boston, Mass., make Pipe Fittings under Patent No. 196,375.

Artificial Stone.—Wanted to buy receipt for making. Address Wm. A. Morrison, Alton, Ill.

New Gear Cutting Attachment for Lathes. Lace Leather Cutter. Something new. Send for lists. Jackson & Tyler, Baltimore, Md.

Oval Spools.—L. F. Beals, of Marquette, L. S. Mich., wishes to correspond with parties who make them.

Brass Tubing Dealers please send address to L. N. Chapin, New Lisbon, N. Y.

Outfits for Nickel and Silver Plating, \$5 to \$200. Union Silver Plating Company, Princeton, Ill.

Best Turbine Water Wheel, Alcott's, Mt. Holly, N. J.

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.

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

Wanted—Pattern Maker and Wood Worker. Address Red Wing Iron Works, Redwing, Minn.

Our Imp. Steam Governor is far in advance of all others; prices reduced. Huntton Gov. Co., Lawrence, Mass.

An Electrician of ten years' practical experience, engaged in manufacturing electrical apparatus, desires a situation as superintendent or electrician for some telephonic exchange. Address H. W., Carrier 38, Cin., O.

For Sale.—Brown & Sharpe Universal Milling Machine; 4 horse; Baxter Engine. W. E. Lewis, Cory, Pa.

For Sale.—One Putnam Gear Cutter, Brown & Sharp Miller, Screw Machines, and other good second-hand machinery. E. P. Bullard, 14 Day St., New York.

Kinney Bros.' New Cigarette. Sweet Caporal, fine, mild, and sweet, are becoming extremely popular everywhere.

For Power & Economy, Alcott's Turbine, Mt. Holly, N. J.

Circulars for Inventors and Manufacturers. Pamphlets on machinery, price lists, etc., written, illustrated, and printed; estimates furnished. Park Benjamin, Ph. D., Editor Appleton's "Cyclopedia of Applied Mechanics," 37 Park Row, New York.

Two of the handsomest and best Guns ever brought to this country, but little used, for sale for less than half their cost. One a double-barreled breech-loading shotgun, and the other a double express rifle. A rare chance to procure two valuable weapons. See advertisement on back page.

A Cupola works best with forced blast from a Baker Blower. Wilbraham Bros., 2318 Frankford Ave., Phila.

Shaw's Noise Quieting Nozzles and Mercury Pressure Gauges. T. Shaw, 915 Ridge Ave., Philadelphia, Pa.

For Steam Pumps send to Dean Bros., Indianapolis, Ind.

Little Giant Screw Plates, Adjustable Dies, Taps, etc. Wells Bros., Greenfield, Mass.

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

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

Corliss Engines. Watts, Campbell & Co., Newark, N. J.

Case Hardening Preparation. Box 73, Willimantic, Ct.

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

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

Belcher & Bagnall, 25 Murray St., N. Y., have the most economical Steam Engines, Boilers, Pumps, in market; also improved wood and iron working machinery.

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

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

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

Alcott's Turbine received the Centennial Medal.

Parties furnishing Machinery for making Truck or Plain Barrels cheaply, address P. O. Box 3234, N. Y. city.

Safety Linen Hose.—New machinery enables us to offer this Hose lower than ever. Greene, Tweed & Co., New York.

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

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

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

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.

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

Walrus Leather, Walrus Wheels; all kinds of Polishing Supplies, in quantities to suit. Greene, Tweed & Co., New York.

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.

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.

Mill Stone Dressing Diamonds. Simple, effective, and durable. J. Dickinson, 64 Nassau St., N. Y.

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.

"Vick's Floral Guide" contains a colored plate, 500 illustrations, 100 pages, descriptions of the best flowers and vegetables, and how to grow them; all for 5 cents; in English or German. Add. James Vick, Rochester, N. Y.

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

Excelsior Steel Tube Cleaner. Schuykill Falls, Phila., Pa.

Deoxidized Bronze. Patent for machine and engine journals. Philadelphia Smelting Co., Phila., Pa.

Wheels and Pinions, heavy and light, remarkably strong and durable. Especially suited for sugar mills and similar work. Pittsburgh Steel Casting Company, Pittsburgh, Pa.

Self-feeding upright Drilling Machine of superior construction. Drills holes from 1/8 to 1/2 in. diameter. Pratt & Whitney Co., Manufs., Hartford, Conn.

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

Mellen, Williams & Co., 57 Kilby St., Boston, Mass. Wiegand Sectional Steam Boiler. Etna Rocking Grate Bar

Howard Patent Safety Elevators. Howard Iron Works, Buffalo, N. Y.

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

Inventors' Models. John Ruthven, Cincinnati, O.

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

NEW BOOKS AND PUBLICATIONS.

GREAT INDUSTRIES OF GREAT BRITAIN. Vol. 1. Illustrated. London and New York: Cassell, Petter & Galpin. \$3.

A handsome volume, devoted mainly to the popular description of the industries based on cotton, hemp, flax, jute, wool, and worsted, iron and steel, and ship-building, with well written descriptions of the leading English establishments devoted to each. In addition the well known biographer Robert Smith tells the life story of several eminent English manufacturers; Mr. Fox Bourne discusses the conditions and prospects of foreign rivalry with English mining and manufacturing industries; Dr. Gordon Hogg, late Senior President of the Royal Medical Society of Edinburgh, has three papers in relation to health and disease in industrial occupations; and Mr. James Henderson, assistant inspector of factories, discusses the factory system and other phases of industrial legislation. Though prepared especially for English readers this work will be found instructive as well as entertaining to all interested in great industries everywhere.

THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1879.

This excellent little annual is now before us, brimful of valuable information for the photographer and all who are interested in the progress of this most useful art. All the new photo processes and improved formulae brought to light during the past year are here given together with hundreds of recipes, hints, diagrams of new instruments, scientific information concerning light-colors, illumination, and many other appropriate subjects. Edited by J. T. Taylor. New York. E. & H. T. Anthony, Broadway, New York.

(1) R. J. F. writes: I have some carbons and porous cups of an old Leclanche battery. What shall I do to prepare them for use in a bichromate battery? A. Soak them a day or so in warm water. 2. In the SCIENTIFIC AMERICAN SUPPLEMENT of February 8, No. 162, on page 3577, there is described an electric light under this head, "No. 29, A Simple Electric Light." Please give me the size of the carbon used. A. One sixteenth inch diameter, three quarters inch long

3. How shall I reduce the size of a piece of carbon if it is too large? A. File it or grind it. 4. It was also stated under that head that the person used 3 or 4 cells of a bichromate battery. How many cells of a Watson battery would be needed to do the work? A. 12 probably.

(2) J. H. P. writes: I am building a steam yacht after plans taken from your paper, and I wish to ask of what quality of iron should the boiler be made to stand the Government inspection. A. The rule of the United States Inspectors is as follows: "Every iron or steel plate intended for the construction of boilers to be used on steam vessels, shall be stamped by the manufacturers in the following manner, namely: At the diagonal corners, at a distance of about four inches from the edges, and also at or near the center of the plate, with the name of the manufacturer, the place where manufactured, and the number of pounds tensile strain it will bear to the sectional square inch."

(3) R. G. asks: 1. Can you give me the best method of setting buggy axles? A. You should consult some good treatise on the subject, as any instructions that we could give you in our limited space would be of little service. 2. Give a good mixture for welding plowshares. A. Mix the powdered borax with 8 or 10 per cent of finely powdered quartz sand or flints, or what is better, dry powdered water glass—silicate of soda—and a little powdered charcoal, lampblack, or argol.

(4) C. W. L. writes: 1. I have a small engine, and wish to use a cast iron or rather an iron casting 8 1/2 inches diameter by 9 inches height, three sixteenths of an inch thick. How much pressure would you risk to the square inch? A. If, as we suppose, you refer to a boiler, we would not be inclined to take any risk with one of that kind. 2. Describe a small pump to feed above with. A. You do not send sufficient data. 3. If I use a small round dish of iron lined with asbestos, and saturate it with kerosene, is there any danger of explosion while burning? A. With ordinary care, no. 4. Do all the small yachts and propellers used by private individuals for pleasure, etc. (the same as one would use his horse and buggy, not kept for hire or used as a money making concern), have to be inspected by the United States Inspectors, carry a full complement of life preservers, buckets, etc., and have their men licensed? A. Yes.

(5) S. writes: 1. The area of a pipe is 6.010 foot, what is the diameter of same in inches? A. 1.354 inch. 2. Give formula for reducing the area of circles in feet to the diameter in inches. A. Divide the area by 0.7854, and multiply the square root of the quotient by 12.

(6) J. R. L. writes: We want to put up a steam engine on the table land, 40 feet from the brow of the hill. The spring from which we must get water to supply the boiler is about 40 feet below, at an angle of 45 degrees. What is the best method and machinery to raise the water that height and distance? A. If you have enough water, you can use a hydraulic ram. But if this is impracticable, use a steam pump, or place a force pump at the foot of the hill and drive it with a wire rope.

(7) W. H. F. asks: What is the horse power of an engine with 9 inches cylinder, 14 inches stroke, 100 lbs. mean pressure, making 350 revolutions per minute? Working by a rule given in the AMERICAN of January 4, I find it to be 157 horse power. Am I right? A. Your answer is correct.

(8) C. R. G. asks: What is the best material for covering a 2 1/2 inch steam pipe and a 1 1/2 inch return pipe, each about 100 feet long, passing through a cold cellar to a radiator in the room above? Would there be any saving of steam in having them covered? A. You will effect a saving by covering both pipes. There are numerous coverings in the market that answer well. We refer you to our advertising columns.

(9) I. W. S. asks who was the inventor of the Monitor. A. The question is in dispute, but the credit is usually given to a Mr. Timby.

(10) "Engine" asks: Can I acquire a knowledge of mechanical engineering by home study, and what books and time are required to accomplish it? A. We think it is very doubtful whether you can become proficient without some practical experience in the shops and elsewhere.

(11) E. L. W. asks: What is the best thing to put on a steam boiler to make it look well and prevent rusting? A. A black varnish made from petroleum.

(12) "Reader" asks whether the car wheels made of papier mache have a metallic tire? A. Yes.

(13) J. W. asks: What is the average weight of English locomotives, also the heaviest used there? A. They are made as heavy as 70 tons or more. Average weight, between 40 and 50 tons.

(14) J. H. asks: What is the pressure of lake water to the square inch at a depth of 25, 50, 100 feet, etc. A. The pressure is about 0.433 lb. per square inch for each foot of depth. 2. How many cubic feet of air must an iron box or chest, weighing 3 tons or 60,000 lbs., and closed on all sides, contain, in order to keep one sixth of its bulk floating above water and five sixths submerged below water? A. The data are insufficient. The box will float as specified, when it has such dimensions that five sixths of its volume will displace an amount of water equal to the total weight of the box. 3. Where may I obtain an account of the various kinds of diving armor and appliances used in submarine work? A. You will find accounts of some of the appliances in any good encyclopedia, but you can probably obtain full particulars by addressing manufacturers.

(15) G. C. E. writes: I use a 2 1/2 inch stream of water for condensing purposes, but as I take it from a brook, in the summer months I do not get the condensing power necessary on account of the temperature. How can I reduce the temperature to about 35° or 40° in the summer? Would running it through pipes in an ice house reduce it to the required temperature?

If so about what length of pipe? Iron or wood pipes? A. Use iron pipes. You do not send sufficient data to enable us to give the amount of pipe, but it would probably be sufficient if it encircled the ice house once or twice. Unless you have abundance of ice, however, we do not think this plan is advisable.

(16) M. B. asks: 1. What thickness of granite should be used in a bank vault to make it fire-proof? The building is a two story brick, situated on a corner. A. From 18 to 24 inches. 2. Is there any other stone that furnishes more fireproof protection than granite? If so, what is it? A. We think not.

(17) A. C. G. asks how India rubber hand stamps are manufactured. A. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 83.

(18) S. B. G. asks: 1. How is it determined whether snakes can hear? A. By observation. 2. If they can hear, do they heed? A. Yes. 3. It is said that the birds of the northern climate go south in the fall; if they do, are there not more birds in the south in the winter than in the summer? A. Yes. 4. Which is proper, eighteen hundred and seventy-nine, or eighteen hundred seventy-nine? A. Both.

(19) H. J. B. asks: What kind of black paint is on the ordinary tin thermometers, and how is it put on? A. Asphaltum, one half pound; melt, then add hot balsam of copaiba, 1 pound; thin with turpentine oil, apply with a soft brush, and bake for some time in a japanner's oven. Repeat the operation several times if necessary, and finally rub with a soft cloth and a trace of oil.

(20) B. F. M. asks for a formula for preparing a good mucilage for pasting papers. Can you recommend anything better than gum arabic mucilage for pasting manifests and way bills into scrap books made of manila paper? A. Rice or starch paste is better. The following is well recommended: 4 parts (by weight) of fine glue are allowed to soften in 15 parts of cold water, and then moderately heated until the solution becomes quite clear; 65 parts of boiling water are now added, with constant stirring. In another vessel 30 parts of starch paste are stirred up with 20 parts of cold water, so that a thin, milky fluid is obtained without lumps. Into this the boiling glue solution is gradually stirred, and the whole kept at a boiling temperature for a short time. After cooling, a few drops of carbolic acid are added to the paste. This paste is exceedingly adhesive, and may be used for leather as well as for paper and cardboard. It should be preserved in corked bottles to prevent evaporation, and in this way will keep good for years.

(21) E. R. T. writes: I use an Argand burner, and though the wick fits apparently tight, when I suddenly turn it up or down, while burning, a blue blaze appears in the bowl of the lamp, though no explosion has ever occurred. This happens when the lamp is half full. I never allow it to get any lower. By moving the lamp backward and forward quickly, the oil extinguishes the blaze, though I consider this a dangerous experiment. Sometimes the blaze will shoot out the top of the chimney, and at the same time go down the wick into the bowl of the lamp, on turning it down quickly. A. From your statements it would appear that the oil used is not safe. Place the bulb of a good thermometer in a small cup nearly filled with a sample of the oil, and suspended in a large vessel containing water. Gradually heat the water, apply a lighted taper to the oil, and note on the thermometer at what degree the oil flashes (i. e., the temperature of the oil at the moment it begins to give off inflammable vapors). Good oil under these conditions should not flash below 120° Fah.

(22) N. O. M. asks: 1. Which of the various "Stubs" or "Stubbs" firms is the standard one, as there seem to be at least two or three concerns of that name? I would like to know the "original." A.—P. S. Stubbs, we believe. 2. Also, what will remove paint or varnish stains from ground glass doors? A. Warm concentrated alcoholic solution of caustic potash will quickly soften paint or varnish so that it may be readily removed by washing with warm water. Remove as much of the paint as possible with the knife blade before applying the alkali. The latter must not, of course, be allowed to come in contact with the woodwork or hands.

(23) A. M. D. asks: 1. For an easy and cheap way of tracing patterns for scroll or net work, without using a pencil. A. Place carbon paper between the pattern and the wood, and trace the design with a stylus. 2. Also to prevent the fret saws from breaking easily when working in the machine. A. Use a good machine, good saws, and exercise care.

(24) F. W. I. asks: Does a rapidly moving train cause a greater strain on a bridge than one moving slow. If so, why? A. Yes, because the motion of a train produces a series of blows on the rails.

(25) A. N. M. writes: I am preparing to construct a dynamo-electric machine according to the drawings in No. 161, SCIENTIFIC AMERICAN SUPPLEMENT. Will you answer the following questions, namely: 1. Should the brass caps at the ends of the armature play just within the electro-magnets, or just without? A. Just without. 2. What amount of each of the Nos. 14, 16, and 18 wire will be needed? A. 2 or 3 feet of No. 14, about 5 lbs. of No. 16, and 1/2 lb. of No. 18. 3. Should the vulcanite for the commutator be hard, or soft and yielding? A. It should be hard. 4. Can the electro-magnets be wound with separate wires and the wires united with a joint, or should they be wound with the same wire without a break? A. You can wind the two parts of the magnet separately, and unite them after they are fixed to the base. 5. Again, what is the force of the word "excess" as used in chemistry and medicine? I consider that it means a little more than enough of an acid to neutralize an alkali, or the reverse. Am I correct? A. Yes. 6. What is the meaning of gtt. of ss. and A in medicine or chemistry? A. Gtt. or gtt., gutta or gutte, drop or drops; ss., semis, half; A or a, Ana (Greek ἀνά), of each the same quantity. The expressions are not used in chemistry, but in medicine.

(26) W. N. C. asks what there is (other than sal soda) that can be held in solution with water,

