

**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.*

National Steam Pump; best and cheapest. National Iron Works, New Brunswick, N. J.

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

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.

To Sell.—Canada Pat. for Burglar Alarm. Winn, 69 Barclay, N. Y.

Marine Governor.—No racing of propeller; uses no power or steam. Wanted capitalist to get patents. E. Side, Brooklyn, E. D., N. Y.

Try the new fragrant Vanity Fair Cigarettes, both plain and halves. Most exquisite of all.

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

Scroll Saws for sale cheap.—Five Moyer's patent at half cost to manufacture. Address Wood, Smith & Co., Fort Plain, N. Y.

Asbestos is now extensively used in various forms for steam packing. It possesses the advantages over all others of being indestructible by fire or acids, is self-lubricating and will wear ten times as long as the packing made of hemp or cotton. The flat packing is rapidly taking the place of all others for cylinder heads and all kinds of flange joints. Samples and reduced price lists will be sent free on application. H. W. Johns Manufacturing Company, Manufacturers of Asbestos Materials, 57 Maklen Lane, New York.

No gum! No grit! No acid! Anti-Corrosive Cylinder Oil is the best in the world, and the first and only oil that perfectly lubricates a railroad locomotive cylinder, doing it with half the quantity required of best lard or tallow, giving increased power and less wear to machinery, with entire freedom from gum, stain, or corrosion of any sort, and it is equally superior for all steam cylinders or heavy work where body or cooling qualities are indispensable. A fair trial insures its continued use. For further particulars, samples and testimonials, address E. H. Kellogg, sole manufacturer, 17 Cedar St., 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.

Wanted.—Lightest practicable 4 H. Vertical Engine and Boiler. W. S. Hull, Jackson, Miss.

For Sale cheap.—Boilers and Engines of all descriptions in thorough good condition. Send stamp for descriptive circular. E. R. Young, No. 68 and 70 Franklin St., Titusville, Pa.

For Sale.—4 H. P. Vertical Engine and Boiler (New York Safety Steam Power Co.'s make), as good, and in some respects better, than new. Address H. M. Quackenbush, Herkimer, N. Y.

Patent or State Rights for sale.—Stafford's Scroll Saw, very low, also tools and patterns, to good party, to manufacture on royalty. See SCIENTIFIC AMERICAN, April 6, 1878. N. Stafford, 66 Fulton St., New York.

Vick's Illustrated Monthly Magazine is one of the most beautiful magazines in the world. Each number contains a chromo of some group of flowers, and many fine engravings. Published monthly at \$1.25 per year. Address James Vick, Rochester, N. Y.

Wanted.—Machinery for Manufacturing Logwood Extract. Address E. Koch, Franklin, La.

A Cupola works best with forced blast from a Baker Blower. Wilbraham Bros., 2, 318 Frankford Ave., Phila.

For Sale.—Patent of the best Ice Cream Machine, the "Dexter." Any reasonable offer considered. Address C. L. Dexter, 245 S. 15th St., Philadelphia, Pa.

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.

Catalogues and Circulars of our latest Scientific Publications, mail free. E. & F. N. Spon, 446 Broome St., N. Y.

Case Hardening Preparation. Box 73, Willimantic, Ct.

H. Prentiss & Company, 14 Dey St., N. Y., Manuf. 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.

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

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.

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

Solid Emery Vulcanite Wheels.—The Solid Original Emery Wheel—no 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.

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

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

Sheet Metal Presses, Ferracite Co., Bridgeton, N. J. Band Saws, \$100; Scroll Saws, \$75; Planers, \$150; Universal Wood Workers and Hand Planers, \$150, and upwards. Bentel, Margendant & Co., Hamilton, Ohio.

Diamond Tools. J. Dickinson, 64 Nassau St., N. Y. Eagle Anvils, 9 cents per pound. Fully warranted.

The best Friction Clutch Pulley and Friction Hoisting Machinery in the world, to be seen with power applied, 95 and 97 Liberty St., New York. D. Frisbie & Co., New Haven, Conn.

Johnson's Universal Lathe Chucks; the best are the cheapest. Lambertville Iron Works, Lambertville, N. J.

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 55,000 lbs. to square in. Pittsburgh Steel Casting Co., Pittsburgh, Pa.

The only economical and practical Gas Engine in the market is the new "Otto" Silent, built by Schleicher, Schumm & Co., Philadelphia, Pa. Send for circular. Best results obtained from Success Turbine Water Wheel. References given. S. M. Smith, York, Pa. Vertical & Yacht Engines. N. W. Twiss, New Haven, Ct.

Dead Pulleys that stop the running of loose pulleys and their belts, controlled from any point. Send for catalogue. Taper Sleeve Pulley Works, Erie, Pa.

**NEW BOOKS AND PUBLICATIONS.**

THE WORKSHOP. Von J. Engelhorn, Editor and Publisher. Stuttgart, Germany.

An edition of this meritorious illustrated art monthly is now being published in English, and furnished to the American public by Messrs. Willmer & Rogers of this city. For furniture manufacturers, decorators of dwellings, and public buildings, fabricators of gas fixtures, fireplace utensils, ornamental hardware, such as door knobs, hinges, locks, etc., this publication will be found of special interest and use. Every number contains beautifully executed engravings of new patterns or copies of antique designs of various periods from the most celebrated specimens found in the continental museums. Published in monthly parts at \$6 a year (50 cents single number), and may be had at the Willmer & Rogers News Company, Beekman st., New York.

**THE ART INTERCHANGE.**

A fortnightly journal devoted to art and household decorations. The mania existing among the more refined American women for executing fine needle work, painting on china, ornamenting panels for furniture, embroidering curtains, and a variety of other work coming under the head of decorative art, has created a demand for a newspaper to be devoted to these various subjects. Under the auspices of a dozen well known ladies in this city, and under the editorial management of an energetic and talented young graduate of Princeton College, the publication of *The Art Interchange* has been commenced, with very encouraging prospects of a successful existence. It is handsomely printed on a superior quality of paper, at the moderate price of \$1.25 a year, and will be found extremely interesting to those interested in woman's art work in all its branches. Persons desiring to subscribe or to know more of the publication, should address *The Art Interchange*, No. 34 East Nineteenth street, New York.

**Notes & Queries**

(1) J. H. asks how to prepare battery salt for Grenet batteries. A. It may be prepared by triturating together in a dry atmosphere—

Potassium dichromate, about . . . . . 4 pounds.

Sulphuric acid, sp. gr. 1.8, about . . . . . 1 The dichromate should be perfectly dry, and the acid may, with advantage, be warm. The mixture should be kept from the air in glass, to preserve it in the dry state, as it is very hygroscopic. Its oxidizing action is so strong that it very quickly destroys organic matters by contact at ordinary temperatures.

(2) E. R. writes: Suppose two locomotives in which the only difference is size of drivers (one having 5 foot, the other 6 foot wheels), using the same amount

of fuel and consequently of steam. Which will pull the greater load at 30 miles an hour, friction, etc., not being considered? A. We reply that, the steam being the power, and the quantity of steam being equal in both cases, there can be no difference in the loads at 30 miles an hour. We do not, however, desire to be understood as saying that there is no difference in engines with 5 and 6 foot driving wheels. On the contrary, we believe a locomotive, properly handled, having 5 foot driving wheels, when unrestricted as to fuel and not confined to a uniform velocity, will take the largest load over an undulating track in a given time between terminal stations. Such an engine will have the advantage on grades over an engine with larger driving wheels; and the more frequent exhaust produced by the more rapid revolution of the 5 foot wheels will produce more steam, and consequently more power.—B., P., W. & Co.

(3) L. H. R., F. S., and others.—The dimensions of the great electro-magnet at the Stevens Institute, at Hoboken, N. J., are as follows: Total weight, 1,600 lbs.; coil wound on 8 spools, each 9½ ins. high by 11¼ inches external diameter; 400 lbs. of copper wire, one fifth inch in diameter, are wound on these spools, which are split and the slits filled with vulcanite; the iron cores are hollow, 6 inches in diameter, 3 feet 3 inches long. It has a lifting power of several tons; some have estimated it at 30 tons.

(4) W. C. R. asks: 1. What pressure should the air have in a sand blast apparatus? A. Sand should be driven by an air blast having a pressure of about 4 inches of water. 2. Is it made by ordinary circular fan? A. Yes. 3. Is the sand let into the air passage from a hopper of its own gravity? A. The sand is introduced into the air passage by an endless belt carrying cups or scoops.

(5) J. F. B. writes: 1. There appears in your SCIENTIFIC AMERICAN SUPPLEMENT, No. 157, an article on inks, in which appears "A Brilliant Red Ink." I boiled the compound as directed, but did not succeed in getting it very bright. Would you please inform me the reason, and give a recipe for making vermilion ink or red ink (not carmine)? A. Use more or better Brazil wood, and concentrate your solution. Aqueous solutions (strong) of aniline red or scarlet make very brilliant, but, unfortunately, not very permanent red inks. Powdered cochineal, 1 oz.; hot water, ½ pint; digest, and when quite cold add ammonia water, 1 oz.; dilute this with 2 or 3 volumes of water, digest for a few days, and decant the clear liquid.

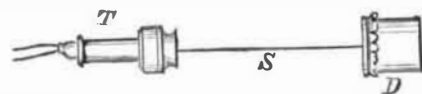
2. How to correct sour sirup. A. Heat the sirup to the boiling point, strain through a piece of linen, and stir in a little calcium sulphite; or, filter the hot sirup through fresh boneblack.

(6) Subscriber asks: Where will I find Edison's tasimeter described? A. In SCIENTIFIC AMERICAN, vol. 38, p. 385.

(7) N. T. R. asks why it is that malleable castings, heavy ones especially, are nearly always full of flaws and blow holes. A. We do not think this statement is generally true. When such flaws occur, as a rule, it is on account of some deficiency on the part of the mould, the moulder, or the material used.

(8) F. B. H. asks: What amount of Lehigh or other hard coal is necessary per day to heat 1,000 cubic feet in first-class stone building with any of the best hot air heaters? I want the average, or as near as you can give it, weather such as we have had since December 1, 1878. A. If the building has only to be heated in the day time, we think it might not require more than 100 pounds of coal in 24 hours. We should be glad to receive data on this subject from those of our readers who have kept records.

(9) J. F. B. suggests the following experiment to show that the action of a telephone diaphragm is to all appearances a mechanical pulsation. T is an



ordinary telephone, to the center of whose diaphragm is attached one end of a waxed string, S (which may be 10 or 20 feet long), by first stringing through a piece of parchment about one half inch in diameter, knotting, and then gumming on to the middle of disk, it is secured; the other end is connected with a small parchment drum, D, 2 inches in diameter; the string is kept taut. A sound now produced in the sending telephone will be distinctly heard in the drum connected with the receiving telephone, and conversation can be kept up at the drum, D, not as clear, of course, as at the receiving telephone, but the results are sufficiently conclusive, for no sound could be transmitted along the stretched string unless the telephone plate had vibrated. This I might venture to say, goes to prove that the sound at the receiving telephone is due to the attraction of the diaphragm by the magnet, in virtue of its variation of magnetism.

(10) E. B. sends the following directions for drilling glass: Take a common drill, run a little fast; do not press on, the weight of the drill press is enough. Drill from both sides, keeping the glass and drill wet with turpentine. Be very careful when the two holes meet not to let the drill catch. After a hole is made large enough for a small round file, file to the desired size, keeping the file and glass wet with turpentine.

(11) J. H. P. asks: 1. If I drop the end of a telephone wire into a well of water, or into a tub of water through which a stream is constantly running, will it constitute a sufficient ground connection? A. Yes. 2. Will fine brass or copper wire the size of a common pin answer for the line wire? A. Yes. 3. Does it require to be insulated, the distance being 400 feet? A. It should be supported on insulators. 4. Will such a wire connecting two houses be a source of danger during thunderstorms? A. It would be prudent to employ lightning arresters. 5. Are the phonograph and the carbon telephone now in the market? A. Yes. 6. Why does condensation take place in a stove pipe? A. It is usually owing to a great length of pipe between the stove and chimney, which condenses the vapors resulting from combustion before they can escape.

(12) G. S.—To prepare good cider, choose ripe, sound apples, sweat them in small heaps for a few hours, and wipe dry. Then grind them, place the pomace between layers of clean straw, or preferably hair cloth, in a suitable screw press, and apply the pressure. As the juice runs from the press strain it through a hair cloth sieve into a large open cask capable of holding all the juice to be expressed in one day. In a day, or sometimes less, the pomace will rise to the top and grow very thick. When little white bubbles break through it draw off the liquid through a spigot placed about 3 inches above the bottom, leaving the lees behind. The cider must be drawn off into very clean casks, and repeatedly racked off until the first fermentation is over, which is known by no more of the white bubbles, before mentioned, forming. Then add a gobleful of sweet oil to each cask, fill it up with cider in every respect like that contained in it, and bung up tight. Sugar or glucose is sometimes added at this stage—8 to 15 pounds to the barrel, according to the character of the apples used—sweet or sour. When the cider has attained the proper taste, add one quarter to one half pound of isinglass dissolved in some of the cider, and then about one quarter pound (not more) of freshly prepared sulphite of lime (common preserving powder), and draw off, after shaking and allowing to settle, into very clean barrels, or bottle. The sulphite (which must not be mistaken for sulphide) preserves the cider perfectly.

(13) R. N. asks if ferrocyanide of potassium is made in this country, and what is the process of manufacture. A. Yes. It is usually prepared by heating to redness potassium carbonate with dried and partially carbonized horn, or other similar nitrogenous substance, and iron filings, digesting the black mass with hot water, from which the salt is afterward crystallized and purified by recrystallization. The proportions may be: 100 of potassium carbonate, 400 of nitrogenous coal, and 10 of iron filings. The furnaces used are somewhat similar to those illustrated on p. 33, Wagner's "Chemical Technology."

(14) J. B. W. writes: I wish to ask if it is a fact generally known that the sun when in partial eclipse casts shadows similar in shape to that of the sun not eclipsed; in other words, when the sun looks like a new moon all shadows are new-moonlike in shape? A. Under favorable conditions the light from the sun, shining through a small opening in an opaque body, will form an image of the sun on the surface upon which it strikes. When the sunlight falls through the foliage of a tree, multiplied images of the sun will appear. These images during an eclipse will, of course, take the form of the visible portion of the sun.

(15) C. W. G. writes: I have an old cistern (cemented) about 6 feet deep by 6 feet in diameter (round). If I pack it with ice will the ice keep, or would the heat get at it through the ground? It is mostly under ground, and in a shady place. The cement is whole and good. A. We think this arrangement would not prove very economical. You will find much useful information respecting the preservation of ice in Nos. 38, 55, 99, and 116 SCIENTIFIC AMERICAN SUPPLEMENT.

(16) H. A. M. asks: What shall I use to black brass, and so that it will not peel when bent? A. Dip the articles bright in nitric acid, rinse in clean water, and place in the following mixture until they turn black: Hydrochloric acid, 12 lbs.; ferrous sulphate (copperas), 1 lb.; arsenious acid (white arsenic), 1 lb. When taken out, rinse in cold water, dry in sawdust, and polish with blacklead or lacquer as desired.

(17) H. C. W. asks: 1. How shall I melt the paraffine to be used as a coating on the plaster of Paris cylinder for the phonograph described in SUPPLEMENT No. 133? A. Make the plaster quite warm, and rub on the paraffine as long as it will melt and soak in. 2. I wish to know whether it will make any difference in the power of common horseshoe magnets to riveta number of them together? A. A compound magnet is stronger than a single one of the same size, but its strength is not equal to the combined power of the several magnets of which it is composed when they are separated.

(18) A. M. P. asks: In transmitting messages by the telephone long distances, say 100 miles or more, is a battery with electricity used to transmit the message? A. A battery is used with Edison's telephone. Bell's requires none.

(19) A. B. asks: 1. What is the difference between the actual falling velocity of water and its theoretical falling velocity? A. Little, if any. 2. If a broad belt pass over two pulleys 12 feet apart, one above the other, and upon this belt at short intervals are fastened buckets similar to flour elevators, and 10 feet from the bottom of the lower pulley a jet of water fills these buckets as they pass, so that the combined weight of the buckets from where they are filled to the bottom of the lower pulley, where they are emptied, is 1,000 pounds, and this weight thus acting causes the upper pulley, which is 50 inches in diameter, to make 70 revolutions per minute when meeting with no resistance, what is the horse power of this pulley? Now, if the pulley is made to drive machinery, so that its speed is reduced one half, the weight remaining the same, is the horse power the same, or only one half of what it was in the first case? A. The horse power is the weight in pounds multiplied by the distance in feet it moves per minute divided by 33,000. So that, when the speed is decreased to one half, the horse power is diminished in the same proportion.

(20) T. B. L. asks: Will the temperature of the inside of a mass of ice fall much, if any, below the freezing point, notwithstanding the surrounding atmosphere may be at zero, or below zero? A. Yes. The temperature of the ice under the conditions assumed would vary with the temperature of the surrounding air in common with other solids of a similar nature, under similar conditions.

(21) M. J. H. writes: 1. I have tried the receipt given in one of your late issues for making gelatine moulds for plaster castings. The mould is a success, but the face of the cast is destroyed by the glue. Can you tell me how to overcome this difficulty? A. Coat the mould uniformly with a film of oil. 2. Could you