

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 the following week's issue.

"U. S." metal polish. Indianapolis. Samples free. Handle turning machinery. Trevor Mfg. Co., Lockport, N. Y.

Air compressors for every possible duty. Clayton Air Compressor Works, 26 Cortlandt Street, New York.

The Improved Hydraulic Jacks, Punches, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York.

Nickel-in-slot machines perfected and manufactured Electrical supplies, Waite Mfg. Co., Bridgeport, Conn.

Cheapest Water Power.—See top of 1st column, page 170. Also top of 2d column, page 230. Look, it will pay.

Centrifugal Pumps for paper and pulp mills. Irrigating and sand pumping plants. Irvin Van Wie, Syracuse, N. Y.

Screw machines, milling machines, and drill presses. The Garvin Mach. Co., Laight and Canal Sts., New York.

Electric Bargains—Magnet wire, castings, carbons, battery materials. Imperial Elec. Co., Box 15, Cleveland, O.

Emerson, Smith & Co., Ltd., Beaver Falls, Pa., will send Sawyer's Hand Book on Circulars and Band Saws free to any address.

Inventors wishing to bring their inventions to the public notice should confer with H. Pittcock, Room 61, 1 Beacon St., Boston, Mass.

Split Pulleys at Low prices, and of same strength and appearance as Whole Pulleys. Yocum & Son's Shafting Works, Drinker St., Philadelphia, Pa.

The best book for electricians and beginners in electricity is "Experimental Science," by Geo. M. Hopkins. By mail, \$4; Munn & Co., publishers, 361 Broadway, N. Y.

Patent Electric Vise. What is claimed, is time saving. No turning of handle to bring jaws to the work, simply one sliding movement. Capital Mach. Tool Co., Auburn, N. Y.

Competent persons who desire agencies for a new popular book, of ready sale, with handsome profit, may apply to Munn & Co., Scientific American office, 361 Broadway, New York.

Send for new and complete catalogue of Scientific and other Books for sale by Munn & Co., 361 Broadway, New York. Free on application.

Notes & Queries

HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters, or no attention will be paid thereto. This is for our information and not for publication.

References to former articles or answers should give date of paper and page or number of question. Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and though we endeavor to reply to all either by letter or in this department, each must take his turn.

Buyers wishing to purchase any article not advertised in our columns will be furnished with addresses of houses manufacturing or carrying the same.

Special Written Information on matters of personal rather than general interest cannot be expected without remuneration.

Scientific American Supplements referred to may be had at the office. Price 10 cents each.

Books referred to promptly supplied on receipt of price.

Minerals sent for examination should be distinctly marked or labeled.

(6037) R. R. says: Will you please give a good formula for a shoe dressing for ladies shoes? A. 1. French dressing for shoes: Logwood extract, 3 ounces; dissolve in 2 quarts of water; borax, 3 ounces; dissolve in soft water, 2 quarts; and add 3/4 ounce shellac, boil to dissolve; bichromate of potash, 1/2 ounce; dissolve in soft water, 1/4 pint; and add 3 ounces ammonia water, mix all together. 2. The following is a German recipe: Dissolve 3 1/2 ounces of shellac in half a pint of alcohol. Rub smooth 25 grains of lampblack with 6 drachms of cod liver oil and mix. A few drops are to be applied to the leather with a sponge.

(6038) D. S. S. writes: In the diagram, query 5985, page 269, current volume SCIENTIFIC AMERICAN, I think there is an error. When the switch arm is moved to b, it forms two circuits, one over the line and one short circuit through the telephone. Also at the other end of the line the current would divide, part going through the bell and part through the telephone, and I think the bell would fail to ring. By arranging two cut-outs to cut out the telephones, I think it would work better. A. The high resistance of the telephones is relied upon to cause the current to pass through the bells. If the telephones have a low resistance, the plan will not work without considerable battery.

(6039) L. R. S. asks: Will you please answer the following questions in Notes and Queries: What is the cause of rust that forms on zinc etc ing plates? The only use that has been made of them has been to mould from for electro plates, and pull a few proofs of them on the press, and then clean off with gasoline. The plates are kept in a vault and steam heat is on all the time to keep it dry. Can this corrosion be prevented? How? And can the plates be cleaned without injury to them? A. The rust or corrosion is generally caused by moisture. In some cases galvanic action may be set up. Vaseline would probably protect the plates without injuring them, but it must be entirely removed before the plates can be used for printing. Benzine can be used for removing ink from the plates.

(6040) J. E. B. writes: The question having arisen to what depth a foundered iron vessel would sink, A. claims that it will only sink a certain distance, and then remain there, suspended, as it were, while B says that it will go clear to the bottom and lie there, no matter how deep, as the pressure increases equally on all sides as it sinks. The question of currents is not to be taken into consideration. The writer would also be pleased if you could inform him how the great

depths of the oceans are determined? A. Everything that sinks beneath the surface of the ocean goes to the bottom at whatever depth. Even the silt and mud carried into the ocean from the rivers finds its way to the bottom of the ocean. Although the pressure at great depths is immense, 0.43 of a pound for every foot in depth, the density of water, owing to its slight compressibility under great pressure, is but very little greater at the bottom of the deep ocean than at the surface. Fish, shell fish, and the minute life organisms of the sea live at the greatest depths. B is correct. Steel sounding lines and iron balls are used for the greatest depths. To facilitate the operation of sounding, the ball is disengaged when it strikes the bottom and the line measured back on the reel.

(6041) J. H. asks: Would it affect the running of the simple electric motor described in "Experimental Science" if the core were not one continuous wire, but three pieces hooked together? A. It is immaterial whether the iron wire of the armature core is in one piece or not. It is not necessary to fasten the pieces together.

(6042) C. T. W. asks: At what temperature would water boil in a perfect vacuum? A. Water boils in a vacuum at 86° Fah.

(6043) E. H. S. asks: 1. How many pounds pressure must 70° air be subjected to, to have a temperature of 35° when allowed to expand? A receptacle holding 10 cubic feet of air naturally, how many cubic feet will be forced into it when it is compressed to 15 pounds per square inch? How many at 30 pounds per square inch? A. Air at a pressure of 5 pounds at 75° will drop to 35° when expanded. Practically there is a small loss in effect that requires about 8 pounds pressure for practical operation; 10 cubic feet in addition to the air already in the cylinder will produce 15 pounds gauge pressure; 20 cubic feet for 30 pounds pressure. By compression the air becomes warmer and will show the pressures named on the gauge before the above quantities are compressed. The figures are for isothermal conditions.

(6044) A. A. S. asks: Can a vessel used to measure the rainfall be bought? If so, at about what price? I am told that a good carpenter can make one. Please give me a few pointers on the subject. Never having seen one, anything concerning them will be appreciated by your subscriber. A. Rain gauges with instructions may be purchased from Queen & Co., Philadelphia, Pa., for a few dollars, or any tinsmith can make a rain gauge as follows: Make a common tin funnel such as used in every household and by liquor dealers, 6 inches in diameter at the top, and place a cylindrical rim around the top with a sharp edge at the top exactly 6 inches in diameter and 1 1/2 inches high. Also a rim on the outside of the cone 3 inches in diameter and 1 inch high to just slip into a tin cylinder 3 inches in diameter on the inside by 10 inches in height, with a flat bottom. Place the funnel and cylinder together and set 2 feet above the ground, fastened to prevent movement by the wind. The measurement of the depth of rainfall caught in the funnel and deposited in the cylinder will be just four times the depth of the rainfall. Use a tin slip of wood marked with inches and tenths for a measure.

(6045) W. P. A. says: We are considering the advisability of burning shavings, sawdust, and small kindling in our boiler furnaces instead of coal, as heretofore. Which is the best way of feeding this into the furnaces, by hand or automatically, and if automatically, what device is the best? A. Automatic feeders have been made for blowing sawdust and shavings into the fire under boilers. We do not advise its use, on account of its want of reliability and safety. The setting of boilers and furnaces for sawdust, bagasse, shavings and dust fuel are illustrated and described in SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 501, 624, 625, 10 cents each mailed. We have no record of parties making the automatic feeders.

(6046) S. B. W. asks whether the atmosphere surrounding the earth is heated by convection or radiation. A. The atmosphere is heated by both radiation and convection. It not only absorbs the radiant heat of the sun as it passes to the earth, it also absorbs the heat of the warm earth surface by contact and circulation, which is the mode of convection.

(6047) J. S. says: Will you please inform me what kind of fluid I can use to write on glass? A. Diamond ink.—Diamond ink is made by mixing with hydrofluoric acid enough barium sulphate to give it consistency, so that it will not spread, and show well on the glass. Ammonium fluoride may also be added. After the writing has stood some time it is washed or dusted off, and the etching appears. Use a glass pen.

(6048) L. L. M. asks a good and inexpensive way to make a small aquarium, about 15x10x8 inches. A. A small and well proportioned aquarium might be about 20 inches long by 4 inches wide by 14 inches deep. Make the frame of stout tin; cut eight strips 14 inches long and four strips 20 inches long. They may all be about 1 1/2 inches wide; now angle them in pair of clamps, and you have the required number for the frame, i. e., four uprights at 14 inches, a piece across top and bottom at each end, 14 inches; and four pieces, 20 inches, for top and bottom at sides; solder them firmly together, being careful to get the frame square. You had better strengthen the corners by angling some short pieces and soldering firmly over them; these will also hide the joints. These pieces may be fancifully cut, unless you intend to case the frame afterward. Having put the frame together, you should have a hanger round the inside of the bottom part. Cut a piece of galvanized sheet iron, rather stout in substance, to fit. Bed it firmly in with red lead cement, red and white lead mixed like putty. Tack it here and there with solder to the frame. Before putting in the bottom, make the holes and arrangements for fountain and waste, also runaway, and whatever you require. You may now put in the glass, 28 ounces, or even 21 ounces will stand the pressure very well; but an accidental knock would be fatal. If you can use plate, it will be much better. Bed it firmly in with lead, solder tabs of tin or copper close up at top and bottom. Clear away the superfluous lead, which will squeeze out between the frame and glass neatly, and let it set hard.

TO INVENTORS.

An experience of forty-four years, and the preparation of more than one hundred thousand applications for patents at home and abroad, enable us to understand the claims of inventors, and to possess unequalled facilities for procuring patents everywhere. A synopsis of the patent laws of the United States and all foreign countries may be had on application, and persons contemplating the securing of patents, either at home or abroad, are invited to write to this office for prices which are low in accordance with the times and our extensive facilities for conducting the business. Address MUNN & CO. office SCIENTIFIC AMERICAN, 361 Broadway, New York.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

May 8, 1894, AND EACH BEARING THAT DATE.

[See note at end of list about copies of these patents.]

Table listing various inventions and their patent numbers, including items like 'Adding machine, F. Sweet', 'Aerated liquids, apparatus for producing and containing, C. Hutton', 'Air brake apparatus, J. H. O'Hara', etc.

Table listing various inventions and their patent numbers, including items like 'Furnaces, promoting combustion in, J. B. Davids', 'Gauge, See Micrometer gauge', 'Gauge for blast engines, N. Stearns', etc.