

Business and Personal.

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600 New and Second-hand Portable and Stationary Engines and Boilers, Saw Mills, Wood Working Machines, Grist Mills, Lathes, Planers, Machine Tools, Yachts and Yacht Engines, Water Wheels, Steam Pumps, etc., etc., fully described in our No. 11 list, with prices annexed. Send stamp for copy, stating fully just what is wanted. Forsaith & Co., Machine dealers, Manchester, N. H.

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Glass Monuments, patented Sept. 7, 1875. The whole Patent or State rights for sale. For description and terms, address the inventor, A. Pfeiffer, 13 Ave. A., N. Y. For Sale.—U. S. Patent No. 187,562, for Traveling Bag Frames. F. Forbes, 65 Broadway, New York.

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For Sale.—Combined Punch and Shears, and Engine Lathes, new and second-hand. Address Lambertville Iron Works, Lambertville, N. J.

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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, New York.

Consumption Cured.—An old physician retired from active practice, having had placed in his hands by an East Indian missionary the formula of a simple vegetable remedy for the speedy and permanent cure for Consumption, Bronchitis, Catarrh, Asthma, and all Throat and Lung affections, also a positive and radical cure for Nervous 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. Actuated by this motive, and a conscientious desire to relieve human suffering, he will send, free of charge to all who desire it, this recipe, with full directions for preparing and successfully using. Sent by return mail by addressing with stamp, naming this paper, Dr. J. C. Stone, 32 North Fifth Street, Philadelphia, Pa.

Steel Castings from one lb. to five thousand lbs. Invaluable for strength and durability. Circulars free. Pittsburgh Steel Casting Co., Pittsburgh, Pa.

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

Skinner Portable Engine Improved, 2 1-2 to 10 H. P. Skinner & Wood, Erie, Pa.

Emery Grinders, Emery Wheels, Best and Cheapest. Awarded Medal and Diploma by Centennial Commission. Address American Twist Drill Co., Woonsocket, R. I.

To Clean Boiler Tubes—Use National Steel Tube Cleaner, tempered and strong. Chalmers Spence Co., N. Y.

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Articles in Light Metal Work, Fine Castings in Brass-Malleable Iron, &c., Japanning, Tinning, Galvanizing, Welles' Specialty Works, Chicago, Ill.

Split-Pulleys and Split-Collars of same price, strength and appearance as Whole-Pulleys and Whole-Collars. Yocum & Son, Drinker st., below 147 North Second st., Philadelphia, Pa.

Foot Power Scroll Saws. W. E. Lewis, Cleveland, O. Wanted.—A first-class Wood Engraver. Address Engraver, P. O. Box 271, Cincinnati, O.

Wanted.—A first-class Mould Maker on Undertakers' Hardware. Address Mould Maker, P. O. Box 387, Cincinnati, O.

Shingle Heading, and Stave Machine. See advertisement of Trevor & Co., Lockport, N. Y.

D. Frisbie & Co. manufacture the Friction Pulley—Captain—best in the World. New Haven, Conn.

Notes & Queries

G. H. will find a table of the electric conductivities of metals on p. 107, vol. 33.—J. H. will find the proper dimensions of boats in recent numbers of the SCIENTIFIC AMERICAN SUPPLEMENT.—A. W. G. will find a good recipe for brass for small castings on p. 171, vol. 30.—E. S. B. will find directions for making a concrete pavement on p. 185, vol. 33.—A. L. B.'s query as to the manufacture of postage stamps was answered on pp. 208, 277, vol. 27.—J. I. S.'s query as to the telephone is answered on p. 191, vol. 36.—J. C. E. will find a recipe for a depilatory on p. 186, vol. 34.—W. H. J. will find on p. 344, vol. 32, a recipe for cement for marble.—C. E. will find on p. 283, vol. 30, directions for polishing marble.—C. B. will find an answer to his query as to troubles with the feet on p. 123, vol. 33.—C. B. should trace his map on cloth with a pen and Indian ink.—A. E. will find directions for lead burning on p. 167, vol. 32.—E. P. H. will find something on spring power on p. 220, vol. 31.—H. T. P. will find that a remedy for mildew on cloth is described on p. 138, vol. 27.—R. H. H. will find an article on impressions on the retina on p. 193, vol. 36.—G. H. W. can polish German silver by following the directions on p. 37, vol. 34.—J. C. C. can bleach bees-wax by the method described on p. 299, vol. 31.—J. H. T. will find something on silvering glass globes on p. 267, vol. 31.—W. T. A. will find a recipe for silverplating on p. 299, vol. 31. For gold plating, see p. 116, vol. 32.—G. should try some of the boiler scale preventives advertised in our columns.—W. T. will find directions for dyeing felt hats black on p. 101, vol. 30.—A. M. P. M. will find an article on the use of compressed air as a power, for locomotive purposes, on p. 277, vol. 34.—G. E. D. will find directions for gilding picture frames on p. 90, vol. 30.—J. V. will find directions for gilding without a battery on p. 116, vol. 33.—C. E. B. will find, on p. 229, vol. 33, something about boilers for small engines. As to horse power of small engines, see p. 33, vol. 33.—J. W. C. will find directions for making soap on pp. 331, 379, vol. 31.—C. A. A. will find something on the manufacture of vinegar on p. 106, vol. 32.—N. L. R., W. C., F. J. B., C. K. W., R. B., J. F. S., J. S., W. M., J. H. N., J. F. McG., G. W. S., F. M. L., and others, who ask us to recommend books on industrial and scientific subjects, should address the booksellers who advertise in our columns, all of whom are trustworthy firms, for catalogues.

(1) H. S. asks: How can I make a platinum chain? How can I melt platinum? A. Pure platinum can only be fused by the aid of the oxyhydrogen blowpipe. Place the metal in a small cavity cut out of a piece of pure caustic lime, and cause the flame to impinge upon it strongly until fused. The hottest part of this flame is, when the gases are properly proportioned, within a quarter of an inch of the mouth of the blowpipe.

(2) C. B. says: You give directions for removing stains of smoke from marble. I have some white marble badly stained with wine and beer. How can I clean it? A. Try the following: Take 2 parts common soda (sal soda), 1 part pumicestone, and 1 part finely powdered chalk; sift it through a fine sieve, and mix it with water into a paste. Apply this to the stained parts of the marble; and, after a short time, wash clean with water.

(3) E. H. T. says: I found on the Old Millstone Hill, in Worcester, Mass., several fine specimens of fluor spar. I can find no account of its being found before in Massachusetts. A. It has been found in considerable quantities at the Southampton lead mines, and elsewhere.

(4) C. A. F. asks: How can I test a syrup (made from starch) for dextrin or gum? I want to know when the saccharification is complete. The ordinary iodine test will not apply to this case. A. The entire conversion of the dextrin into grape sugar cannot be ascertained with certainty by the iodine test, as in some cases a purple-red tint is observed, while in others there is no change. The most reliable test is that with alcohol, founded on the known insolubility of dextrin in an alcoholic menstruum. To 1 part of the solution to be tested, there are added 6 parts absolute alcohol; if no precipitate is observed, there is no dextrin remaining, and the conversion has been entire.

(5) C. C. S. asks: 1. Why is it that the day does not increase or decrease in length at both ends, by the same number of minutes? A. Taking one half of the year from January 1 to July 2 inclusive, the days increase in length 5h. 44m.; one half, 2h. 52m., is in the morning, the other in the evening. Taking it altogether, there is as much change at one end as the other; but the motion of the earth in its orbit, in combination with its diurnal motion, makes the daily variation sometimes at one end of the day, and again at the other end. 2. Why does the number of minutes added to the day's length vary so? A. They appear to have a daily fluctuation because the seconds are not taken into account. They also have a regular increase or decrease, dependent on the earth's position in its orbit.

(6) E. A. asks: In what position between the lenses which constitute the eyepiece should the diaphragms be placed? A. In the combination at the eye end, it should be in the focus of the eye lens; in the other combination, Fraunhofer placed it in the middle. The French opticians place it about six tenths of the distance between the two lenses, toward the eye end.

(7) C. E. A. asks: Can a person receive a cold from another, under ordinary circumstances, by being in the same room? A. Probably not.

(8) R. W. S. asks: 1. What cheap chemical can be used to change ink to a deep or jet black? A. Try a little solution of extract of logwood. 2. Can aqueous water be used in place of rain water for making ink? A. Such water may be used if it is clear and not too hard.

(9) J. McC. asks: Is there anything that would answer for a condensing coil in a distillery that would be cheaper than copper, and at the same time be as durable? A. No; copper is best.

(10) A. R. T. asks: Can a drive well be driven in rock? A. Yes. Is sulphur injurious to leather? A. Sulphur alone is not injurious. A friend says that the saw does not possess any of the mechanical powers. I say that each tooth acts on the principle of the inclined plane. A. You are right.

(11) D. H. E. says: 1. Professor Silliman, in his "Chemistry," says: Put bicarbonate of soda and water in one end of a strong cylindrical vessel; and in a tube in the other end put sulphuric acid. The arrangement is such that, when the vessel is inverted, the contents mix, and carbonic acid gas is produced. Would it keep therein six months under high pressure? A. Yes. 2. Could a small vessel be made to hold it so long, with rubber or leather packing under the cap screwed on? A. Yes.

(12) C. B. says: Will goldfish live in the water of a fountain, rain or cistern water being used? A. Yes. Sprinkle a few bread crumbs in the water every day.

(13) C. K. asks: 1. Is it injurious to health to sleep in a room containing a rather large amount of green fruit? A. If the room is properly ventilated, you will experience no injurious effects. 2. Does the fruit exhale carbonic acid at night? A. Very little.

(14) J. C. K. asks: What is the diameter of a circle whose area is 1 inch? A. 1.184 inches. Is there a dictionary of mechanical and chemical words? A. Yes; but as new names are very often coined for new articles or ideas, it is not probable that dictionaries which have been published for some years will have them all.

Why does a circular saw make marks in the lumber at every revolution? A. Because some of the teeth are set wider than the others.

(15) C. R. asks: What is the difference in temperature between the steam and the water in a boiler, under 70 lbs. pressure? A. The difference, in general, is not more than 5° or 6° Fah.

(16) W. T. says: 1. I understand that, if the safety valve of a boiler be raised when the steam pressure is high and the water low, there would be danger of an explosion. If this be so, will you have the kindness to tell me why? A. A sudden escape of steam might carry up some of the water into contact with the overheated plates. 2. In a small yacht boiler, would it be injurious to keep steam down by throwing small quantities of water into the furnace? A. It would be better to use a damper and cover the fire. 3. It is recommended to raise the safety valve to let the air out of the boiler when getting up steam. If this is not done, what would be the consequences? A. The pipes and connections fill with air, which sometimes is troublesome to expel. Considerable instruction as to the duties of an engineer is scattered throughout treatises on the steam engine, as well as through the pages of the SCIENTIFIC AMERICAN.

(17) R. H. T. says: I am running an engine of 62 horse power in connection with three breast wheels of 100 horse power. Owing to back water on the wheels, they are not able to do their work. The regulator of the wheels is disconnected, and the engine does the regulating. How much of the work ought the engine to do, to do the regulating? I claim that the engine ought to hold the balance of power. Am I right? I also contend that, if the engine and the wheels are regulated at 40 lbs. pressure, and the steam goes up to 65 lbs., it is the same as putting more back water on the wheels? Am I correct? After the engine and the wheels are regulated at a pressure of 65 lbs. (this is the amount of steam that she is intended to carry if the steam drops down to 50 lbs.), can she do her work without more water on the wheels? A. Your views, as we understand them, are generally correct. Suppose the whole power is 150, of which the wheels at most do 100, and the engine 50—but that at times the work of the wheels falls off to 88—then, in order that the power may be uniform, the engine must exert 62; and the engine will do the regulating if it can change its power promptly, within the limits of the variation in the power of the wheels.

(18) A. S. asks: What ingredients and proportions are used to produce the different shades of light so often used in theaters? A. We give below a table of the composition of the mixtures commonly employed for colored fires in tableaux, etc. These fires, however, should never be used within doors, as the gaseous products of some of them are extremely poisonous (see articles on pp. 84 and 171, vol. 36). The lime light lanterns and lenses of suitably colored glass have now been generally substituted for these fires, and give much better results.

Table with 5 columns: a, b, c, d, e. Rows include Chlorate of potash, Sulphur, Charcoal, Nitrate of barium, " " strontia, " " soda, Ammonium sulphate of copper, Saltpeter, Black sulphide of antimony, and Floury gunpowder.

It is hardly necessary to mention that great care is required in mixing these materials, and that each should be pulverized separately.

(19) R. A. asks: Does the Dipper revolve around the North Star? A. No. The Dipper and North Star are on opposite sides of the pole, and as regards each other are very nearly stationary. They both have

two apparent revolutions around the pole, one every day, which is due to the diurnal revolution of the earth on its axis, the other once a year, which is due to the annual motion of the earth in its orbit around the sun.

(20) R. N. says, in answer to H. M. C., who asked: If the three sides of a triangle be given, what is its area? Consider the longest side the base; from the square of the base take the product of the sum and difference of the other sides, and divide the remainder by twice the base; multiply the square of the base by the product of the sum and difference of the shortest side and the quotient; half the square root of the result will be the area. Example: Let the sides be 10, 7, and 5;  $\frac{100 - (12 \times 2)}{20} = 3.8$ , and  $\frac{1}{2} \sqrt{100 \times 8 \times 1 \times 2} = \frac{1}{2} \sqrt{1056} = 11.441+$ , for the area.

(21) C. asks: What is the best cement for rubber bags, to be used for hot water? A. Dissolve caoutchouc, cut into small fragments, in naphtha, by heat and agitation. Strain this solution through a linen cloth and concentrate to the consistency of a thin paste. The cement is best applied slightly warm, and the joint strongly clamped between strips of wood for 24 hours before using.

(22) G. S. asks: What will take the smell out of porpoise oil? A. Agitate the oil with about 3 per cent of sulphuric acid, and then with 10 per cent of chloride of lime (hypochlorite of lime) while moderately hot. Finally wash thoroughly with hot water and allow to settle. This treatment will not completely deodorize the oil, but it will correct all rancidity.

(23) L. H. says: 1. I have an engine of ¼ horse power, which I would like to put into a boat 30 feet long of 5 feet beam. Is it powerful enough to propel said boat at the rate of 8 miles an hour? A. No. 2. How can I learn the signals of the steamboat whistle, such as the pilots use? A. We advise you to interview a boatman.

(24) S. S. C. asks: 1. In a silver-plating bath, should the surface of anode immersed equal the surface of cathode? A. They should be about alike. 2. Is there any way of testing the amount of free cyanide in a plating solution? A. Yes. See Sprague's "Electricity; its Theory, Sources, and Applications." 3. In a nickel ammonia sulphate solution, does the ammonia or acid act upon the nickel anode to keep the strength of the solution up? A. The acid.

(25) D. A. R. says, in answer to E. L., who asked of what diameter should drills be to fit ¼, ⅜, etc., pipe taps, I send you a table and rule for computation. The outside diameters are from Morris and Tasker's table of standard sizes.

Table with 4 columns: Inside diameter, Outside diameter, Outside allowing for the taper, Diameter at bottom of thread = size of drill in inches. Rows include 1/8, 1/4, 3/8, 1/2, 5/8, 3/4, 7/8, 1, 1 1/8, 1 1/4, 1 1/2, 1 3/4, 2, 2 1/4, 2 1/2, 3, 3 1/2, 4.

The taper used in calculating is that given by Pratt and Whitney, 1 inch to foot and the length of threads on ¼ to ½ is ¼ inch, ½ to 1 is ⅜, 1 ¼ to 2 is ½, and 2 ½ to 4 inches is 1 ¼ inches. The rule for computing size of drills is: Subtract from the outside diameter (after allowing for the taper) the product of the pitch by 1.732, which gives the diameter at the bottom of the thread, or the size of the required drill.

(26) M. C. H. says: I am building a time regulator and want to make a mercurial compensating pendulum to beat seconds. The rod is to be of steel, and the bob a glass tube filled with mercury. At what height must the mercury stand in the tube to compensate correctly? A. You will have to determine the exact height by experiment. It will probably be between 6 ¼ and 6 ¾ inches.

(27) G. W. J. says: I have been making a plain cylindrical boiler, without flues. It is 9 inches in diameter and 20 inches long, of No. 18 galvanized iron. The seam is lapped 1 ¼ inches, and riveted with 2 rows of iron rivets, ⅓ of an inch in diameter, 35 in each row, and the rows are ½ inch apart; the edges of the iron are soldered inside and out. The heads are of cast iron ¼ inch thick, with flange ¼ inch thick and ¾ inch wide, to receive rivets. Each is riveted with 56 iron rivets ⅜ inch in diameter. Where is the weakest point, and at what pressure would it be safe to run it for a small engine? A. The heads are probably the weakest parts. Working pressure, 20 lbs. per square inch.

(28) J. R. S. says: I claim that, when the gauge on a steam boiler shows a pressure of 10 lbs. or upwards to the square inch, that the pressure is equal on all parts of the boiler. A friend claims that it is not. Who is right? A. The one who claims that the pressure is not the same on all parts of the boiler, is correct.

(29) J. W. P. asks: 1. If a wind wheel be put at the mouth of a bellows, will it not have power enough to replace more air into the bellows than it takes to turn the wheel? A. No. 2. If the wheel is to be 2 feet in diameter and a pulley on its axle be 6 inches in diameter, will it not run the lever to work the bellows? A. No.

(30) I. says: An inventor of a steam boiler states that he has used his boiler for eighteen months with muddy water, and that on inspection he finds no scale or sediment, although the boiler has never been blown off. He claims that all sediment and scale-forming impurities of the water pass off with the steam into the cylinder of the engine. He states that his boiler primes less than two per cent. What experience have you that makes it credible that a boiler that will not prime will carry the sediment into the cylinder? A chemist has told him that the scale-forming impurities, both of salt and fresh water, will not injure the cylinder, but will act as lubricators. Is this true of all scale-forming impurities? A. These statements are not verified, in general, by experience.