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Notes & Queries

H. M. will find, on reference, that the denifice described on p. 72, vol. 34, is a good one.—F. J. M. is informed that there is no formula for the horse power of a boiler. Ampic boiler power for your engine is always to be recommended.—A. L. F. should use marine glue for fastening cloth or paper to wood. See p. 43, vol. 32.—C. W. F. will find directions for etching on glass on p. 409, vol. 31.—H. S. can calculate the speed of his planer by using the formula given for speeds of pulleys on p. 356, vol. 34. He should temper his molding knife to a brown color. See p. 21, vol. 31.—H. H. should cover the copper connections in his Bunsen battery as described on p. 235, vol. 34.—A. A. can temper his millpicks by the process described on p. 106, vol. 25.—W. D. Y. can calculate the lifting power of hydrogen by the formula given on p. 74, vol. 31.—W. H. S. can prevent rust on iron and steel by the method described on p. 109, vol. 33.—V. L. A. will find directions for galvanizing iron on p. 315, vol. 33.—W. L. D. will find a description of lighting gas by electricity on p. 4, vol. 29.—G. W. B. will find a recipe for a black japan on iron on p. 298, vol. 26.—W. S. R. will find a description of a process for rendering tallow on p. 439, vol. 34. To bleach tallow, see p. 27, vol. 31.—M. M. M. will find a recipe for a bug exterminating liquid on p. 21, vol. 31.—G. B. M. A. J. W., J. C., J. McC., D. R. P., K. J., L. W., 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) E. J. D. says: I use large quantities of water for irrigation; and at present I raise it by a windmill and pump, but it is very uncertain, as the wind gives out just when it is wanted. Can I compress air enough with my windmill for a two

horse power engine? A. We think you would find it more satisfactory and cheaper to pump the water by means of the windmill, and store it in a tank for use during calms. You might compress air by means of the windmill, for the purpose of driving an engine. But the air receivers would need to be larger and more expensive than the water tank.

(2) P. H. S. asks: 1. How can I granulate soft solder to about the size of common shot? A. Melt the solder and pour it in a thin stream from some height into a vessel of cold water. 2. Does common half hard brass wire in the coil suffer a loss of strength by being exposed to the air? A. The loss, if any, is very slight.

(3) R. T. S. asks: 1. What remedy can I use to destroy the insects which infest the rose bushes? A. Tobacco water. 2. How can I prevent weeds from growing? By hoeing or pulling them up.

(4) A. says: I have been trying to make nitrous oxide gas, but have not succeeded. After I have heated the ammonia for a few moments, the water from the wash bottle comes in to the chemical flask. How can I remedy it? A. Place pure nitrate of ammonia in a capacious flask, provided with a suitable perforated stopper, through which a piece of glass tubing, bent at right angles, just passes. This is to be connected by means of rubber tubing with an empty bottle, fitted in a similar manner to the ordinary wash bottle, with the exception that neither of the tubes must extend to the bottom of the bottle; they should be cut off just on the inner side of the stopper. This will serve for condensing the greater part of the moisture that comes over, and at the same time prevent the retreat of the liquid into the hot flask on the removal of the source of heat; it is well to keep this bottle immersed in cold water during the operation. The purifying bottle may consist of a tall, slender (dry) wash bottle, filled with coarsely broken lumps of protosulphate of iron (copperas). The inlet tube of the purifier must extend quite to the bottom of the vessel, so as to force the gas to pass through the entire column of copperas. When the evolution of gas ceases, the reservoir should immediately be disconnected from the purifier and the stopper removed from the generating flask, before the heat is removed. If these latter precautions be observed, there will be no danger of a retreat even if a wash bottle be employed.

(5) A. L'E. says: Please give me a good recipe for removing paint stains from white shirts. A. Moisten with benzole and cover on both sides with warm pipe clay. Place under pressure for several hours, and repeat if necessary. You should have stated, if possible, what kind of paint produced the stain, to enable us to properly answer the question.

(6) S. H. D. asks: Are the engines of Mr. Corliss at the Centennial exhibition connected on one shaft at right angles? A. Yes.

(7) H. W. asks: What liquid must I add to your mixtures for colored fires in No. 13, vol. 34? I have tried the liquid given in the same number with the result that it will not harden or burn. A. Colored stars may be made by using any of the recipes for colored fires with a mixture of isinglass (pure gelatin) ½ oz., camphor ½ oz., and alcohol ¾ oz. Make into balls of the requisite size, roll in gunpowder, and dry in the sun.

(8) W. L. S. says: The packing box around the stem of the slide valve on my engine has got stuck fast with old tallow and perhaps iron rust, so that I cannot move it either way, and the box needs new packing. How can I loosen it with out taking off the steam chest? The box is of the usual form, set up by two bolts. A. Try driving wedges behind the flange.

(9) W. H. W. asks: What can I add to aniline black so as to keep it black, in dyeing leather? When dissolved in water or spirits, it turns to a brown color. A. Try the addition of a small quantity of sulphate of copper to the liquor; and after dyeing, pass between warm copper rollers.

(10) J. R. C. asks: Is there any known simple and cheap method or process for forming, dissolving, and retaining in perfect solution the protocarbonate of iron, in a common mineral fountain? A. The protocarbonate of iron is by no means a rare salt. It dissolves as completely as bicarbonate in carbonic acid water. Large quantities of the pure carbonate are employed in the preparation of artificial mineral waters. On exposure to the air, the iron is finally deposited as an ochery deposit of the hydrated peroxide.

(11) J. A. W. asks: A friend and myself have had an argument about a vacuum. My friend states that, if we take a cylinder that will stand an external pressure of 25 lbs. to the square inch, we can collapse it with an air pump that is strong enough for the work. I claim that 15 lbs. per square inch is the limit. Who is right? A. The atmospheric pressure upon each square inch of surface equals 15 lbs., so that a boiler capable of resisting this pressure would not collapse under the circumstances you mention.

(12) B. F. G. asks: How is pyrolignite of iron or iron liquor made? A. It is obtained by dissolving scrap iron in pyroligneous acid (crude wood vinegar) and evaporating down until of the required strength.

(13) R. W. C. asks: Is there any way to clear the smoke from a mine with a 100 feet perpendicular shaft, and about the same length of horizontal tunnel at the bottom? A. The usual way is to improve the ventilation by a suitable shaft.

(14) R. W. asks: Can you inform me how to color fabrics to a yellow or fawn color? A. Wash several times in dilute solutions of carbonate of soda and soap, rinse thoroughly in clean water, and bleach with sulphurous acid.

(15) J. S. asks: I cannot get a fine line on tracing cloth. Please tell me how to work it, and how to color plans on tracing cloth. A. Use tracing cloth with one side glazed. The other side has a dead finish, and the cloth will take as fine an ink line as desired on the glazed surface. To color, use the brush only damp with the color, and apply on the back or dead finished side, and the color will show through. Do not get the brush too wet with color, and you will succeed.

(16) H. S. J. says: We are using three boilers for steam heating, and we find a great deal of unconsumed material is wasted with the ashes. We use Illinois soft coal on grate bars with 1½ inch openings. A. Decrease the width of openings as much as possible.

(17) A. E. asks: When cold water is suddenly brought into contact with red hot iron plates, as in the case of many boiler explosions, does it become decomposed into hydrogen and oxygen, or is it merely converted into steam? A. It is not at once converted into hydrogen. A small portion of it is converted into steam of a high tension, which buoys up the remaining water and prevents actual contact with the hot iron.

(18) C. W. J. says: Home made potash soap with us will not keep. It has a tendency to spoil, and in a short time it smells badly. We therefore do not put up at a melting as much as we wish. Please inform me what will preserve such soap from this tendency. A. The trouble is probably due to the fact that the conversion of the fat into soap is not complete, either from an insufficiency of the alkali, or that the boiling is not continued long enough.

(19) H. P. J. asks: Will you give me the proportions of the smallest steamboat that can be built for practical working, to make 10 miles per hour in still water? A. Probably it could be made as short as 25 feet. See p. 185, vol. 29.

(20) W. A. H. asks: 1. Is there any metallic compound softer than lead, and that has as high or higher a point of fusion? A. We do not know of such a metal or alloy. 2. What would be the amount of wear upon small steel dies used for stamping lead? A. This could best be determined by experiment.

(21) W. O'H. says: If you take two vessels of equal size, fill one with water and the other ½ full of very finely sifted coal ashes, you will find that all the water in one vessel can be poured into the vessel containing the ashes without any overflow; also that all the ashes in one vessel may be slowly transposed into the vessel containing the water without the latter overflowing. Do the facts prove that ½ of the body of ashes is composed of air cells? A. If you place the same quantity of water in a tube, having about a quarter inch bore, mark the center of the meniscus at the top of the liquid, and finally add the quantity of a he mentioned. You will find that every grain of ashes introduced will cause a corresponding displacement of the surface mark.

(22) E. C. N. asks: 1. In two water tanks of the same dimensions, the temperature of both and the amount of water drawn from each being alike, in which will a 10 lbs. cake of ice last the longer, the one in which the ice is cut in small pieces, or the one in which it is put in in a large piece? A. Other conditions being the same, the ice in the tank containing the fragments will melt the quicker. 2. Why? A. Because it exposes a larger surface of contact with the water.

(23) F. J. asks: Will an engine 1½ x 3 inches have sufficient power to run a screw-cutting lathe of 12 inches swing, 3 feet between centers? A. No.

(24) N. W. H. asks: How can I soften small castings of gray iron, so as to drill them with twist drills? They are chilled in cooling. A. If you use carbolic acid with your drills, you need not soften the iron.

(25) G. E. H. asks: 1. What is a pitman rod? A. A pitman has a reciprocating motion at each end. 2. Is the connecting rod of an engine a pitman rod? A. A connecting rod performs a rotary motion at one end.

(26) T. F. M. asks: Please give me a rule for calculating the horse power of a rotary engine. A. There are no known rules applicable to the horse power of rotary engines.

(27) G. E. B. asks: Please give me a recipe for making a face on a fine polishing wheel for steel and iron. A. Use a leather-faced wooden wheel and Vienna lime.

(28) R. C. M. asks: How can I set black carbons in steel cutters, and fasten them immovably? A. Make holes a trifle larger than the carbons; then insert them, and rivet the metal round them with a small set and hammer.

(29) S. A. B. says: How can I make a nice smooth finish on the barrels of cannon stoves? A. Use Albany or Waterford sand, or a facing sand composed of 1 part of coal dust to 8 or 10 of Albany sand.

(30) H. H. says: Please give me a recipe for a cleansing composition or mixture that could be rubbed upon bright steel tools, which can be best heated in lead and, after being hardened in water, will still be bright. A. We know of no method of accomplishing your object.

(31) H. M. A. asks: 1. Can you tell me how to make a cheap and simple battery, or a magneto-electric machine? A. You can construct a gravity battery, one of the cheapest forms, in the following manner: Place a copper disk at the bottom of a jar filled to within one or two inches of the top with water; dissolve a little sulphate of zinc in the water and suspend a zinc disk from the top of the jar. The wire leading from the copper disk should be covered with gutta serena. A handful of sulphate of copper crystals dropped in is sufficient to put the battery in action. Any

desired strength of current can be obtained by properly regulating the number and size of the elements. 2. In Mr. M. Alfred Naudet's machine, illustrated on the first page of your SUPPLEMENT, No. 9, what size and how long should the iron for the electro-magnets be? A. They can be made of almost any dimensions desired; from 1½ to 2 inches long and ¼ inch in diameter will be found convenient. 3. What sized wire should they be wound with? A. No. 23 will answer for currents capable of overcoming considerable resistance. The size is varied to suit particular requirements. 4. What should the wire be covered with? A. Silk is best, though cotton will do. 5. What should the radial connecting pieces be made of? A. Brass or copper. 6. Is quantity, or high tension and small quantity, better for shocking purposes? A. High tension currents are best for producing shocks.

(32) O. A. W. asks: Is there any substance that, when rubbed on a person's hand, will enable him to hold hot iron and molten lead without being burnt? A. Yes, water.

How can I prepare phosphorus so that it will, when rubbed on a person's hands, remain luminous for 10 or 15 minutes? A. Make the solution in hot olive oil.

(33) D. G. asks: Does the piston of an inclined engine cause less friction on the cylinder than that of a horizontal engine? A. There is no practical difference.

(34) V. W. asks: Do you know of some cheap substance that can be molten and put in around the box in a hub to fasten it after it has been trued? Glue would do if there were some way of solidifying it. A. Red lead mixed with your glue will solidify and harden, and will probably answer your purpose.

(35) S. B. says: It has been asserted that strychnine is used in making whisky, and that traces of the poison may be discovered after the liquor emerges from the distilling process. I applied to Dr. J. R. Nichols, Boston, and he stated that he had never in a single instance found a trace of strychnine in whisky, and that "it is a vulgar notion to suppose that it is ever used by distillers." Is he not right? A. There is no better authority on the subject than Dr. Nichols. If, after examining so many samples, he failed to detect traces of the poison, his statements with regard to the matter are undoubtedly well founded.

(36) E. B. asks: How can I produce chloride of sulphur? A. Chloride of sulphur is prepared by passing chlorine gas over sulphur heated to about 257° to 260° Fah. The product is rectified by distillation.

(37) J. J. says: 1. A friend says that the Corliss engine is always a high pressure engine. He is wrong. 2. Also, that it is not used on any large steam vessels. A. He is right. 3. Also, that a cut-off is never used on low pressure engines. A. He is wrong.

(38) H. J. S. says: I have a glass cylinder fitted with crank, and a silk pad, for an electrical machine. How can I complete the apparatus? A. Mount a tin conductor of two or three inches in diameter, with rounded ends, on a glass rod, and place it in front of the large cylinder. The conductor must be provided with projecting points to collect the electricity. Then make a leather cushion, stuff with horsehair, and attach it to the board mentioned. Attach also, to the upper part of the cushion, a piece of silk which may be long enough to nearly reach the projecting points on the conductor. Better buy the required amalgam for the cushion from an electrical instrument maker.

(39) X. asks: What is the strength of a current of electricity from a small thermo-electric pile, supposing the difference of temperatures between the electrodes to be about 100°, compared with that from a Bunsen pile? A. The value of the current depends upon the resistance in circuit. If this is small, 100 bismuth-antimony pairs may be made to give a current equal to that from an ordinary Bunsen element.

(40) R. R. asks: Which is the cheapest, steam or water, to raise a load of one ton through a shaft 100 or 200 feet deep? A. Water power, if conveniently at hand, would be the cheaper motor.

(41) C. M. B. asks: 1. Please give me the rule for finding the angle for the teeth of a worm gear, the diameter at pitch line and pitch of screw being given. A. You will find it explained in Rankine's "Machinery and Mill Work." 2. Where should a crowned pulley be measured, in the center or on the edge of rim? A. In the center, for determining velocity ratio. 3. Is a cathead that part of a sliding or self-feeding boring bar to which the cutters are fastened, or is it a piece of cast or wrought iron pipe with set screws at each end, to be slipped on small shafting, trued up by means of the set screws, and then held in the jaws of a back rest? A. So far as we know, the term has no meaning that is generally agreed upon. We would be pleased to hear from mechanics in reference to the matter.

(42) F. A. asks: How far will an injector for feeding water to steam boilers draw water perpendicularly? Do you know of any injector which will draw twenty feet? A. An ordinary lifting injector will raise water from 6 to 8 feet. It might be possible to make one lift 20 feet.

(43) M. asks: Why is it that a carriage with large wheels draws easier than one with small wheels? Is it a question of leverage or friction, or both? A. Both.

(44) L. D. M. asks: Is the effect of falling water calculated by the effect that each cubic foot would have, falling the given distance? A. Yes. At what temperature does the combustion of coal take place? A. It begins at about 1000° Fah. Why does amalgamation protect zinc when