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Notes & Queries

W. T. A. will find a description of rosin oil on p. 266, vol. 31.—L. H. R. and G. B. T. will find formulas for safety valves on p. 330, vol. 32.—H. J. C. will find a rule for ascertaining the increase of temperature of air by compression on p. 133, vol. 33.—A. E. B. can silver looking glass by the process given on p. 234, vol. 30.—L. M. P. will find directions for waterproofing paper on p. 146, vol. 31.—A. M. will find a recipe for a fine boot blacking on p. 283, vol. 31.—M. P. will find directions for bronzing brass castings on p. 283, vol. 31.—C. C. H. will find directions for annealing lamp chimneys on p. 42, vol. 26.—C. H. F. will find directions for photographing on wood in *Science Record* for 1874, pp. 187, 188.—B. C. will find full directions for molding rubber on p. 283, vol. 29.—H. P. B. will find directions for making a polishing starch on p. 203, vol. 31.—G. M. P. can repair rubber hose by the method described on p. 203, vol. 30.—G. A. P. can japan small iron articles by the process described on p. 208, vol. 26.—W. R. McF. can rid his house of ants by the process given on p. 319, vol. 32.—A. B. S. & S. will find that a gold lacquer for brass is described on p. 362, vol. 30.—A. G. A. will find a recipe for marine glue on p. 43, vol. 32. Fish glue is described on p. 408, vol. 24.—B. F. will find directions for gilding picture frames on p. 347, vol. 31.—R. B. R. will find a formula for ascertaining the power of a windmill on p. 241, vol. 32.—E. R., A. E. H., and E. R. will find directions for preserving natural flowers on p. 266, vol. 31.—E. C. L. Jr. will find a description of the process of cutting gears on screw-cutting lathes on p. 187, vol. 29.—W. S. H. will find directions for putting gold lacquer on tin on p. 139, vol. 32.

(1) G. B. R. asks: If the electricity generated in a Rhumkorff coil were changed into electro-motive force, would there be a greater amount than was developed in the battery used to run the coil? A. There would not.

(2) F. C. asks: 1. In a copper and zinc battery, should a wire be attached to each of the plates, and the ends of the wires be connected; or should the wire leading from the copper plate be connected to the zinc by the binding screw? A. A wire should be connected to the copper and another to the zinc. 2. How is the circuit made? A. The circuit is made by connecting the two wires together. 3. When 1 part oil of vitriol to 10 or 12 parts water is used, how long is it before such battery is ready for use? A. The battery will be ready for use as soon as it is set up. 4. If the zinc weighs 1 lb., how much should the copper plate weigh? A. A thin sheet of copper will answer. 5. Can the copper plate in a battery be used a second time? A. Yes.

(3) F. C. S. asks: How long will a well tempered compass needle retain magnetism? A. It would depend upon the quality of the steel and the care with which it was used. It is impossible to state the time without knowledge of the facts.

(4) S. W. says: My battery jars are covered with a coating that breaks off and crumbles easily. It is white in the gravity batteries, and blue in the Daniell. What are the cause and the remedy? A. The white deposit is sulphate of zinc; cause of its formation is that the solution is saturated. Remedy, dilute the solution with water. By painting or greasing the top of the jar, the tendency to creep over will be removed.

(5) A. E. P. asks: 1. I propose laying a telegraph line, 1/2 a mile long, with No. 23 wire. How many cells of Calaud's battery would it require to run it, the wire in the magnet being No. 21? A. Twelve. 2. Would it be better for that distance to use finer wire on the magnets? A. Yes. 3. What size would be best, and how much should be on each magnet, there being only two sounders in the circuit? A. Use 500 turns of No. 28.

(6) A. W. C. asks: What is the process of deodorizing alcohol? A. Spirit of wine, brandy, or alcohol distilled over soap lose their empyreumatic odors and tastes completely. At about 215° Fah. the soap retains neither alcohol nor wood spirit. The soap employed should contain no potassa; it must be a hard or soda soap, and ought to be completely free from fatty acids or fluids, otherwise it may render the product rancid and impure. Common soap made from olein and soda has satisfied all the conditions in practice. If this soap be employed, it will be better to add a little soda during the first distillation. Thirty-three pounds of soap is enough for 100 gallons of empyreumatic brandy. Attwood's patent alcohol is deodorized by distillation over permanganate of potash.

(7) J. A. asks: 1. How much (length or weight) fine wire is absolutely necessary for a machine to give a shock that can be sustained comfortably, say 200°? A. From 1 to 3 lbs. 2. Is it necessary to have two thicknesses of wire? A. Yes.

(8) L. K. Y. asks: How is wood naphtha made? A. See p. 138, vol. 33.

1. In what way is perchloride of iron made? A. Dissolve pure protoxide of iron in dilute muriatic acid, and crystallize the salt out by evaporation of the solvent. 2. How can I make nitrate of iron? A. Dissolve pure iron or its oxides in nitric acid until it will dissolve no more; filter the solution and evaporate to dryness over a water bath. The residue should be redissolved in hot water and the solution again filtered and evaporated as before, in order to remove any basic salt that may have formed, and as much of the superfluous nitric acid as possible.

What do you mean by a primary coil and a secondary coil? A. See p. 115, vol. 33.

(9) W. E. E. asks: What cement or putty is best to use on a chamfered slate joint which is

exposed to the sun's heat, cold, etc.? A. The form you have adopted for the joint is not very favorable for retaining the packing; a better form would be that of a plain butt joint, and this would be still better if provided with a firm blade between to receive the packing of each slab alone, independent of the adjacent one. We know of no cement that will answer your purpose so well as one formed in great part of asbestos. Of course the composition of the best of these, such as have been proved of value in practice, is not divulged by their proprietors. We understand, however, that they are furnished as articles of commerce.

(10) H. C. B. says: We have a dispute as follows: I affirm that to make an inside chaser from a hub to chase a right hand inside thread correctly, a left hand hub must be used, or, in other words, a right hand hub will make a left hand inside chaser. I do not affirm that the thread cannot be cut with either; but, that the thread may have the correct pitch, the left hand hub must be used. Am I right or wrong? A. Right. For complete explanation, see No. IV. of "Practical Mechanism."

(11) I. H. M. Jr. asks: How can I print from a plate of bichromated glue (acted on by a photographic negative) on common paper, with printer's ink? A. Coat evenly a glass plate with a strong solution of gelatin in water, and when dry, flow over this a filtered solution of bichromate of potassa in water. Expose this to strong sunlight for a short time. Repeat this operation—with gelatin and potash bichromate, as before—several times until a good background of insoluble gelatin bichromate is obtained. Then prepare the plate in a darkened room as at first, and expose under the negative as in solar printing; an exposure, with a good light, for from fifteen to twenty minutes is usually sufficient. On removing the negative, place the bichromate plate immediately in a large quantity of clean cold water in a dark place, and allow it to remain immersed several hours. The water should be changed in the mean time, in order that all the unchanged gelatin bichromate should be completely dissolved. The film may then be removed from the glass plate, dried, and mounted on a slab of lead or zinc for printing.

(12) A. B. C. asks: How can I toughen steel tools, such as gravers, etc, to make them retain a good sharp edge for cutting gold and other metals? A. If you use any of the best grades of tool steel, and leave them hardened right out, without drawing the temper at all, your gravers will stand and cut well.

(13) F. H. of Berlin, Germany, asks: Which electromagnets will be the strongest of these two: One has one coil of thick wire, and the other has two or more coils of thin wire wound around it. The sizes of the magnets as well as the weight of the copper in the wires are supposed to be the same in both cases, as well as the current used for magnetizing. A. Probably the single coil of thick wire. It would depend, however, upon the resistance of the wire and battery. When the resistance of the wire and battery are equal, the maximum magnetic effect is secured.

(14) L. N. B. asks: 1. How can I nickel plate bars of iron 3x1 1/2 inches? A. Various solutions for nickel plating have been suggested, but perhaps one of the best, at least one highly recommended, is that containing the double salt of nickel and ammonium. This is prepared by dissolving 1 part by weight of sulphate of ammonia and 2 1/2 parts sulphate of nickel, in sufficient water to make a saturated solution, a little more water being added afterwards to prevent any tendency to crystallize. Considerable trouble is usually experienced by the amateur in his efforts to obtain a good deposit. The principal difficulty, however, consists in the management of the operation, and the necessity of employing a proper anode, which is rather hard to obtain. The anode should present a surface in excess, if anything, of that of the object to be coated, and the battery power must be carefully regulated to the work required. Unless this is done the deposit is apt to contain gas, which is always evolved in greater or less quantities with the deposition of nickel, and this is liable to make the deposit porous or flaky. A good plan is to use two or three Grove or Bunsen in series, until a slight coating is obtained, after which a single Smee cell, of proportions depending on the size of the object to be coated, should be used to complete the operation. It is well, also, to keep the solution alkaline by adding a little ammonia from time to time. 2. What battery is the best for such purposes? A. The Smee.

(15) V. C. asks: How must I proceed to repair the soldered parts of double-barreled guns, using no tools but the copper bit? A. Clean the parts to be soldered, and apply to them muriatic acid which has been killed with zinc. Warm the parts, and solder in the usual way with fine solder.

(16) G. A. says: In your paper on the slide valve, by Joshua Rose, he leads me to infer that an engine, when just beginning to take steam, should have its exhaust port about two thirds open. In looking at our valve and the ports in steam chest, I find that ours is not more than one fourth open. The engine makes a groaning noise when loaded or partly so. What had I better do to ease it a little? Would it be best to lengthen the valve? A. Your valve should be lengthened. At least 1/4 inch more lap should be added to each end; this involves the necessity of a new eccentric to increase the valve travel, which should not be less in your case than 3 1/4 inches.

(17) L. says: I have a lathe, the spindle of which revolves in a very soft and fusible alloy. As the bearing has worn out of true, I wish to cast a new one. What is a good alloy? A. You cannot do better than use the best grade of Babbitt metal; or mix and use the following: Zinc 17 parts, copper 1 part, antimony 1 1/2 parts.

(18) H. S. asks: What is the pressure of water per foot of current of a river 10 feet deep, moving at 5 miles per hour? A. The pressure will vary with the depth, and may be best ascertained by making a piece of board a foot square, and suspending it like a swinging sign in the river current. A cord attached to opposite points of its surface and to a spring balance will practically answer your query.

(19) G. H. W. asks: Please give me the proper size of propeller, engine, and boiler for a boat 36 feet long, 6 feet wide, drawing 1 1/2 or 2 feet of water. I want the boat to go at a speed of 16 miles an hour. A. Most builders would hesitate to guarantee such a speed for so small a boat, at least without the inducement of an extraordinary price.

(20) E. P. says: In your issue of August 28 you say: "Ice boats very frequently travel faster than the wind that drives them." I, with several other engineers, would be glad if you would give us the facts or philosophy on which this statement is founded. In our view, it is plain that, if a boat moves faster than the air around it, its sails must displace the air in front of them. Nowhere does it get the force to do this? The proposition that a moving body which gets and retains its force and motion only from the moving air can do this, involving as it does the corollary that the pressure of the air in front of the sails is greater than the pressure behind them, appears to us to be an absurd idea which we cannot for a moment believe that you would entertain. A. This boat question has been frequently discussed in our columns, and explanations given with diagrams showing the lines of the forces and why the boat moves faster than the wind. Our esteemed correspondents are referred thereto. Consult, for one example, page 170, vol. 28. But if any of them are unable by a study of the theory to satisfy themselves of the fact, we advise them to construct an ice boat this winter and try the experiment practically. They will find that, with a properly constructed machine, skilfully steered, in a wind moving say thirty miles an hour, they can travel from forty to fifty miles an hour, or more, according to the state of the ice. If prevented from experimenting, let them read the New York daily papers which in winter contain frequent accounts of ice boat regattas on the Hudson river, giving the velocity of the wind and the increased speed of the boats over the wind.

(21) J. M. G. asks: How can we Texas farmers destroy the countless swarms of rabbits which nearly destroy our growing crops of wheat, and make sad havoc among our garden stuff? A. Enclose a space with wire netting, leaving room for the rabbits to enter, and bait it with carrots. In the winter, large numbers can be attracted to a spot by this means.

(22) J. E. P. asks: Do you know of any preparation to cover a rough laid brick wall with in place of mastic? A. To stucco a rough brick wall, make a mortar consisting of 1 part lime to 2 parts sand; add water and work it up thoroughly. But to make reliable work, the lime and sand must be of the best, and properly prepared before being mixed. Take a good fresh stone lime; slake it just sufficient to make a fine dry powder and not a paste. Throw this powder against a 1/4 inch mesh wire screen; what passes through is fit for use, the remainder should be rejected. The sand must be of the sharpest, screened to a uniformity of size, and washed thoroughly clean of all mud and dirt. Clean the wall of all loose dirt, mortar, etc., with a stiff broom. Then apply the mortar in two coats; the first a rough coat to bring the wall to a fair surface, and the second a finishing coat. Put on the second coat before the first is entirely dry. Also, put in a little cream water color, to as to set with the stucco. The wall should be protected at top by a projecting roof.

(23) J. V. H. says: I find that the lead pipe carrying off water from my bath and washstands is becoming clogged up. Can you tell me of a remedy? A. Pour a little strong ammonia down the pipe.

(24) F. L. says: 1. I have an engine 3 x 6 inches, and intend to run a propeller 30 inches in diameter. What size of boiler would be suitable? A. A tubular boiler 28 inches diameter by 4 feet high would probably be large enough. 2. I have an awning for a boat. How can I make it waterproof? A. Cover it first with a solution of soap, then with a solution of alum.

(25) E. G. A. says: I am continually seeing statements to the effect that, during a thunderstorm, the electricity passed down the lightning rod, escaping into the ground. Is not the reverse the case? Does not the electricity pass from the earth up the rod and neutralize the electricity of the cloud overhead? If not, why not put a ball on the upper end of the rod and point the lower, for has not experiment demonstrated that electricity will flow off a point with more rapidity than off a round surface, and the reverse in passing on? If this be not the case, what is the necessity of placing balls on the posts of an electrical machine and points on the ends of the spokes of an electrical wheel? A. It is conventionally assumed that the current always passes from positively to negatively electrified bodies, so that what we call its direction depends altogether upon which is the positive and which the negative body. As a matter of fact, the atmosphere is usually positive relatively to the earth; but it is evident that the action of the clouds upon each other, under the influence of different currents of air, may result in charging them with opposite electricities. When the conditions are favorable, they then act inductively on the earth, the positive cloud inducing a negative charge in the portion directly under its influence, and the negative cloud a positive charge. If a rod is present or the degree of electrification is sufficiently great, a discharge takes place from the earth to the cloud in one case, and vice versa