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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 This is for our information, and not for publication.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. Special Information requests on matters of personal rather than general interest, and requests for Prompt Answers by Letter, should be accompanied with remittance of \$1 to \$5, according to the subject, as we cannot be expected to perform such service without remuneration. Scientific American Supplements referred to may be had at the office. Price 10 cents each. Minerals sent for examination should be distinctly marked or labeled.

(1) P. & M. ask if running an electric motor on a watch maker's bench would tend to magnetize watch balances, or would it be safe to operate an induction coil for the purpose of giving shocks where the above work is going on? A. Either the mo-

tor, or a watch maker's bench would tend to magnetize watch balances, or would it be safe to operate an induction coil for the purpose of giving shocks where the above work is going on? A. Either the mo-

(3) H. W.—Ordinary machinery steel is generally used for telephone magnets; they are hardened at the ends only, usually by heating to a red heat and plunging into cold water. Cast steel is no better than machinery steel, but if used its temper should be drawn to a dark straw color.

(4) P. W. B.—The north-seeking pole of a magnet is attracted by the earth's north pole, and the south seeking pole is repelled by the earth's north pole, but the "why" has never been ascertained.

(5) O. Z. writes: How is paraffine dissolved quickly? I receive tools and toys from the old country (Germany) covered with a coat of paraffine, to prevent rust I suppose. It makes them sticky to the feeling, and I want to remove the paraffine before selling the articles. A. Naphtha or gasoline dissolves paraffine; a little on a small rag, and rub the articles.

(6) W. F. L.—Fishes balance themselves in water by the muscular contraction of the air bladder. By death the muscles relax and the air bladder expands, raising the fish to the surface. The center of gravity being in the air bladder, which is located in the abdomen, brings the belly up when the fish floats.—In regard to electroplating, see SCIENTIFIC AMERICAN SUPPLEMENT, No. 310, and Wahl's Galvanoplastic Manipulations, \$7.50, Watt's Electro Metallurgy, \$1.00, which may be had through this office.—We charge for an analysis of minerals only, not for an opinion of what they are.

(7) J. L. M.—We know of no special rules or formulas for the relation of coil to size of wire in spiral springs. Their use, strength, elasticity, and amount of extension required are the special considerations in their proportions. Could not give you the recoiling force of a spiral spring. The only way is to make a trial.

(8) J. S. M. asks: 1. What are the conditions on which so many patents are issued on telephone transmitters, wherein the variation of the resistance of carbon by pressure is the principal feature? In other words, why are patents issued to Draughbaugh and others for carbon transmitters when Edison is the first inventor and patentee? A. If you will examine the patent, critically, you will find that they are not issued for the same thing, although they may contain some of the same elements. They are generally for different combinations of the elements required to produce a telephone. 2. What are the conditions on which patents on magnetic telephone receivers are issued to other parties since the invention of Graham Bell? A. The same may be said with regard to telephone receivers. 3. Is there any practical form of telephone relay in use giving good results? A. We believe not. 4. Is there any practical form of loud-

speaking magnetic telephone that can be heard through a large hall by an entire audience? A. No. 5. Would the invention of an efficient magnetic separator capable of separating 15 or 20 tons of magnetic sand per day be of any great value to the industries? A. Separators of this class are in use; any improvement will have some value. 6. Is magnetic sand used in any part of the country in the manufacture of iron and steel on a large scale? A. We believe it is used to some extent.

(9) S. B. G. writes: It is said that the magnetic needle stands at right angles to a current of electricity which encircles the earth eastward and westward. If it is so, please explain what causes the variation of the magnetic needle, or rather the variation of the magnetic current. A. We do not know that the explanation of the action of a magnetic needle is correct. We believe an explanation of the variation of the earth's magnetism is yet wanting. We regret that we are unable to supply it.

(10) H. I., Jr., asks for a mineral or substance that, when placed between a horseshoe magnet and a piece of iron, the former will not affect or draw the latter toward it. A. No substance having the properties you require has yet been discovered.

(11) E. J. R. asks how many 2 gallon cells of Bunsen battery, converted into the bichromate of potash battery described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 485, would be required to run one 6 candle incandescent lamp of 108 volts and 1.43 amperes. Also what carbon surface, and how deep, should the zinc be immersed? A. You would require 11 to 12 cells. Better use your cells as Bunsen bichromate batteries. They will be more constant than the plunging battery. If you desire to use them as plunging batteries, you may use in each cell 1 zinc plate and two carbon plates, each 4x6 inches. Place a carbon plate on each side of the zinc plate and about 1/4 inch distant. You will be obliged to plunge the elements more and more as the solution grows weaker.

(12) F. A. writes: I wish to construct a dynamo, twice as large as shown in SUPPLEMENT, No. 160. 1. Shall I use the same number of wire? A. Use the same number for the armature and No. 12 for the field magnet. 2. How much wire shall I use for the electric magnet, and for the armature? A. It would be more or less a matter of experiment; better put on about six layers on the magnet, and bring ends out so that you could connect the different coils up in series or in parallel circuit. 3. How many candle power will it give (arc lamp), how much power required to run it? A. The amount of light produced by such a machine depends entirely upon the manner in which it is constructed. It will probably require at least 1/2 horse power to drive it.

(13) J. B. W. asks: 1. How many cells of Fuller batteries will it require to light an incandescent lamp of 5 candle power? A. It depends upon the resistance of the lamp. Probably from 10 to 20. 2. What effect do large wires have for a core in an induction coil over small wires? I have made an induction coil after your SUPPLEMENT, and have heard some practitioners argue for large wire in core and some in favor of small wires in core. Please state the advantages. Mine is for a shocking machine. A. The smaller wires are preferable, because they are more readily magnetized and demagnetized. 3. What advantage is there in having a large core over a small one? Mine is 1/2 inch in diameter, and some say if I had it 1 inch it would be stronger. A. By using a large core you would be able to get a larger and stronger magnetic field. 4. Would it not be better to use No. 10 cotton covered wire for primary and No. 18 silk covered for secondary for an induction coil for a shocking machine, for street use? A. Better use No. 16 for your primary and No. 34 or 36 for your secondary.

(14) F. W. W. writes: 1. I have a hunting jacket made of common ducking. Can you tell me what preparation I can put over it to make it waterproof, and not make it stiff and uncomfortable? A. For waterproofing your duck coat, dip it in a solution containing 20 per cent of soap, and afterward into a solution containing 20 per cent of sulphate of copper. Then wash and dry. Another: 1 pound alum, 1 pound sugar of lead; pulverize both finely, and thoroughly mix dry and pour on 2 quarts boiling water. Let it stand 6 hours, when it will be ready. Sponge the coat until it is saturated, then iron dry. 2. If the muzzle of a shot gun is worn a little bell-mouthed, will it have a tendency to make the gun scatter? A. Yes. 3. When brass shells for shot gun expand, through continuous use, how can they be contracted to gauge again? A. Only by using a compressing die, which a machinist should be able to make.

(15) P. P. B.—Balloons, unless of very large size, should be made of the lightest material. Balloons of small sizes would be of little or no service with hot air if made of cotton cloth or ducking. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 127, 312, and 413 on the construction of balloons. A returning bullet increases its velocity from the turning point until it strikes the earth.

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