

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 This is for our information, and not for publication.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.

Queries 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 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.

(1) F. H. S. asks: In the dynamo described in SUPPLEMENT, No. 161, the wire of the armature is, as I understand, passed between the sections of the copper or brass ferrule of the commutator; do they touch both sections of the ferrule? A. The terminals are attached each to one section of the commutator.

2. How are they fastened—by soldering, or just laid in? A. Soldering with resin flux is best.

3. Is it necessary to alter them from the round shape to fit snug with a smooth surface, and touch the commutator springs? A. The wires do not touch the commutator springs; they need no flattening.

4. What weight of 12 cotton-covered wire would it take on the magnets for one twice the size and one four times the size of the one described? A. 20 pounds and 80 pounds, about.

5. If the machine is left in a damp place, the magnets and armature will be apt to rust; how should it be treated to prevent this? A. They will not rust much if of cast iron. Varnishing will prevent it.

6. In making a U-shaped electro magnet, what is the best wire to use for one 3 or 4 inches long, and would there be much difference if one was wound with 12 and another with 36, using the same battery power? A. It all depends on your battery, line resistance, etc. For experimental lifting magnets use No. 16 to No. 20.

(2) H. G. asks: How much will the expansion of a brass bird cage spring composed of about 6 feet of brass wire about as large as an ordinaryarning needle and subject to 100 and to 50 degrees of heat be? And will the expansion run in the wire if it is coiled into a spring as above? A. A brass wire 6 feet in length will expand lineally $\frac{1}{16}$ part of its length, or 0.074 inch, from 32° to 132° Fah.; from 152° Fah. to 182° Fah., 0.037 inch, about. The wire will expand whether coiled or not.

(3) Commander of the Electra asks where he can receive instructions in naval architecture and yacht or ship designing. A. Best with some company such as the Harland & Hollingsworth Manufacturing Company, of Wilmington, Del., or by obtaining admission to Annapolis United States Naval Academy.

2. Has any electric pumping machinery ever been invented? If so, when and where is it procurable? A. Address Edison Electric Company, 65 Fifth Avenue, New York.

3. What is the address of Professor Tuck, the inventor of a submarine torpedo system? A. The Tuck torpedo is owned, we believe, by the Submarine Torpedo Company, 20 West 23d Street, New York city. The inventor Josiah H. L. Tuck, is a resident of San Francisco, Cal.

(4) C. O. writes: 1. Will you please tell me how I can increase my weight? I am over 6 feet tall, and weigh but 150 pounds. Would like to increase it about 25 pounds. A. It will depend upon your constitution whether such increase would be possible. If you enjoy normal health, and have no obstacles in the shape of dyspepsia or other disease, you can probably gain in weight by proper attention to your diet. Milk, taken just before retiring, and slowly sipped in order to permit a thorough mixing with the gastric juices, will be very fattening. The late Dr. Ellerslie Wallace, Dean of Jefferson Medical College, Philadelphia, once recommended one of his broken down students to eat plenty of butter during the summer vacation. In the fall a stout, hearty man presented himself before the Doctor. So great was the change in his appearance, that he had to introduce himself as the invalid student of the previous spring. He had spent the summer at his home in Virginia, and had eaten three pounds of butter a week. It will be unnecessary to add that such a diet must be accompanied by plenty of exercise in the open air, or it would be apt to produce other disorders of the system.

2. Could you tell me from what books I could best learn the principles of political economy? A. We would recommend John Stuart Mill's "Principles of Political Economy" (\$3.50); "Money and the Mechanism of Exchange," by W. Stanley Jevons (\$1.75); "Physics and Politics," by Walter Bagehot (\$1.50); and a long list of others. The subject is a big one.

(5) C. C. F. desires a receipt for ink to renew a Keystone rubber stamp pad one year in use. A. All inks used on this class of pad are made from aniline colors dissolved in glycerine and thickened with gelatine. When they need renewal, the addition of a little glycerine and alcohol may soften and revivify them, but when exhausted they are intended to be thrown away.

(6) R. L. P. asks: What will dissolve gold chloride? I have about eight or twelve grains dissolved in HCl and HNO₃; then I precipitated with hydrogen sulphide, and tried to dissolve the precipitate in a half ounce of cyanide of potassium, with no result. I heated the mixture. What is the trouble? A. Before passing hydrogen sulphide through the gold solution, you had the chloride in solution, and you should have added the cyanide to it. You have precipitated sulphide of gold. Dissolve it in nitric and hydrochloric acids as before.

(7) T. B. asks: 1. How many candle power Edison lamp will the dynamo referred to in

161 supply with electricity? A. Five to ten candles.

2. What horse power is required to run it? A. About one-sixth horse power.

3. How many cells of the Daniell battery, 4 inches diameter and 6 inches high, would supply a four candle lamp? A. Twenty to thirty cells.

4. Who manufactures small dynamos? A. Consult our advertising columns.

(8) J. A. M. asks the best thing to clean a locomotive smokestack, and make it look as black and bright as possible. A. Often wipe down with oil and lampblack. A little plumbago makes the good appearance more durable.

(9) W. H. B. desires a reliable cement for fastening metal to glass—one that will resist the action of water and acids, especially acetic acid. A. Finely powdered litharge, fine dry white sand, and plaster of Paris, each 3 parts by measure, finely pulverized resin 1 part. Mix and make into a paste with boiled linseed oil, to which a little drier has been added, and let it stand four or five hours before using. After fifteen hours' standing, it loses strength. This cement is said to have long been successfully used in the Zoological Gardens, London.

(10) R. S. D. asks: 1. What chemicals are used in Robert's permanganate battery? Give formula. A. Permanganate of potash, bichromate of potash, and an alkali chloride. It is described in United States patents numbers 311,852, 311,853, and 317,206, which we can send you for 25 cents each.

2. Can cast iron that is a little hard, but not so hard but that it can be readily worked, be softened by annealing so as to be as good for electrical purposes as though it was cast very soft? Will it injure a finished piece if it is covered with air-slaked lime and heated to a white heat? A. The proposed annealing of cast iron would tend to improve it, especially if you heated it hot enough to start with.

3. Why is a magnet placed so as to curve around a telephone bell? A. The curved magnet or magnets polarize the armature, so that the intermittent currents passed through the electro-magnets cause it to vibrate.

4. Can you furnish working drawings of a larger dynamo of a different style from the one in SUPPLEMENT, No. 161? A. We hope soon to publish an article on such a dynamo.

(11) W. C., Jr., asks: 1. What is the safe working pressure of a boiler 60 inches diameter by 14 feet long, made of wrought iron $\frac{1}{2}$ inch thick, and one of the sheets exposed to the fire having scaled off $\frac{1}{8}$ of an inch thickness for a space of 12 inches diameter, longitudinal seams double riveted? I carry 90 pounds pressure; the boilers are eight years old. Number of tubes 51, $3\frac{1}{2}$ inch. A. If the blister is not disposed to run in deeper, the boiler should still be good for 90 pounds steam pressure. Half inch is very heavy iron for a 60 in. shell; a $\frac{1}{2}$ in. blister still leaves the iron as thick as most boilers are made of that size. All that is necessary to do is to watch the blister, as it may still spread and become deeper.

2. The best method of preserving this boiler when we do not run but four months in a year. Would you advise me to put lye in the boiler to take scales from tubes while idle? Would it be a good plan to use $\frac{1}{2}$ ounce crude rock oil in boiler while running to prevent scale? A. Lay up your boiler full of water that has been boiled, after having cleaned it. The boiling discharges the air, when it can be shut tight to keep out air. A little carbonate of soda, say 1 pound, put in when the boiler is filled to lie up, will help loosen the scale during the season of lying up. So small a quantity of crude oil will do no harm, and may facilitate the loosening of the scale. The boiler should be cleaned often when oil is used, as it is apt to gather scale and dirt and form an oil cake, which is dangerous when lodged on a fire sheet.

3. Is not plumbago used with piston packing? A. Plumbago is good on piston packing.

(12) C. R. R.—The plan of connecting a battery of 5 boilers with a cross steam dome riveted to the boilers is not good practice, and is the cause of all your trouble. The unequal expansion and contraction strains the necks, and sets the weakest points to leaking. Any cement that can be put in such a place will only be a temporary contrivance; besides, we cannot see how you could insert the cement without taking the joint apart, which would require a disturbance of all the other joints. We cannot recommend any other plan than riveting and calking, or to change the method of connection for the whole battery, so as to make it elastic enough to meet the requirements of expansion. Iron pipe connections arranged to take up displacement by heat between the boilers are preferable to the dome.

(13) J. H. asks how to grind brass water valves. I have ground them together with flour of emery and oil, but cannot do good work; it leaves the valves full of creases inside and out. A. The flour of emery used should be very fine, and the work finished with ground pumice stone. If the valve seats are not badly cut, emery should not be used at all, only the fine pumice.

(14) T. C. J. asks: What kind of a pyrometer is used for registering about 4,000° of heat, as the highest graduated pyrometer that I have seen is 1,500°? A. There are no pyrometers made for so high temperature. The Wedgwood pyrometers, made of clay, registered to 2,500°, but were not reliable. They were in use in England. Pyrometers of platinum rods inclosed in a plumbago tube are probably the most reliable up to 3,000°.

(15) C. W. C. desires (1) a recipe for a stain to imitate mahogany on white birch wood, that will not raise the grain of the wood. A. A dark mahogany stain is made as follows: Boil half a pound of madder and 2 ounces of logwood chips in 1 gallon of water, and brush well over the wood while hot; when dry, go over the whole with pearlash solution, 2 drachms to the quart.

2. Can you give recipe for making the acid stain? A. In the acid stain you take nitric acid, and dilute with 10 parts of water, and wash the wood with it.

3. Are there any books which give full directions for imitating the different woods? A. We would recommend for your purpose Spon's Workshop Receipts (second series), which we can send you, postpaid, for \$2.00.

(16) A. R. sends samples of tin and sheet iron finished in colors and figured, and asks how the work is done. A. It is a kind of marbling that is effected much in the same manner as the marbling on book edges, and then varnished. The process requires considerable experience and ingenuity in its artistic accomplishment.

(17) J. R. asks: Is there any preparation that will effectually take out ink from paper without discoloring it? A. A solution of oxalic acid, citric acid, and tartaric acid is attended with the least risk, and may be applied upon the paper without fear of damage. Chloride of lime is also used.

(18) W. M. S. asks: In a photographic lens, where do the rays actually cross to reverse the image on the ground glass? A. The rays from the object cross at the optical axis of the lens between the front and back combinations. It is in the vertical plane of the optical axis that the diaphragms are usually placed.

(19) W. H. P. desires a receipt for citrate of magnesia. A. The citrate of magnesia sold in drug stores is made as follows: Calcined magnesia (magnesium oxide) $1\frac{1}{2}$ pounds (or carbonate, 2 pounds), powdered tartaric acid $1\frac{1}{2}$ pounds, bicarbonate of sodium 1 pound; dry each article by a gentle heat, then mix them; pass the mixture through a fine sieve in a warm dry room, and keep it in well corked bottles. A few drops of essence of lemon and 3 pounds of finely powdered sugar are generally added to the above quantity. This makes it more agreeable. A small quantity of the bicarbonate of soda is added in powder immediately before corking.

(20) C. N. V. C. asks: 1. In what way and to what extent are cigarettes injurious to smokers, especially to inhalers? A. The injury done by cigarettes is much greater than that from the use of cigars. The difference is caused apparently by the fact that the smoke of the cigars is not allowed to enter the lungs, while that from the cigarettes is inhaled, reaching of course a greatly more extended as well as more vital part of the mucous membrane.

2. A remedy for pimples on the face, also for blackheads. A. See article on Face Worms in SUPPLEMENT, 542, of May 22.

3. What is the value of sulphur as a cosmetic wash? A. The value is almost absolutely nothing.

(21) A. E. S. asks: 1. How can I make one of those batteries that workmen use in the streets for blasting? All that I see of the machine is a box, two thumb-screws, and a handle to set it off with. A. What you have seen is probably some form of induction electric machine or of dynamo. See SUPPLEMENT, Nos. 70, 161, 278, 279, 282.

2. Is Atlas powder another name for dynamite? A. It is a brand of dynamite.

TO INVENTORS.

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June 15, 1886,

AND EACH BEARING THAT DATE.

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