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Notes & Queries

HINTS TO CORRESPONDENTS.

Names and Address must accompany al 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 This is for our information and not for publication.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.

Buyers wishing to purchase any article not advertised in our columns will be furnished with addresses of houses manufacturing or carrying the same.

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.

(5927) Littleton asks the correct solution to "the reason that a top stands up while spinning." A. Gyroscopic force is the cause. A rotating body always tends to rotate about the axis giving the highest moment of inertia. The mathematical investigation is difficult. If you consider that a high moment of inertia means high centrifugal force, you can reach some conception of the subject.

(5928) S. S. G. asks what quicksilver is and what it is used for. A. Quicksilver is a metal that is fluid at ordinary temperatures. It is solid and ductile when frozen. 2. And is there any fluid that can be permanently magnetized? A. No. 3. How can I make a good battery out of carbon sticks, trimmings of the electric light? A. If the carbons are copper, the copper should be removed by means of nitric acid, and the carbons washed and dried. The upper ends of the carbons are to be heated sufficiently to melt paraffine. Paraffine is applied to the ends and allowed to saturate them for a distance of about an inch. Upon these saturated ends of the carbons are cast lead caps. Use about 8 or 10 rods to each battery and connect the carbons to the wire. Insert the rods in a glass or glazed earthenware vessel. They should be arranged in the outer part of the vessel, and in the center of the series of carbon rods insert an amalgamated zinc rod or plate. The cell used in this battery is the bichromate formed by making a saturated solution of bichromate of soda in water, and slowly adding to it one-fifth its weight of commercia sulphuric acid. It is used in the manufacturing of thermometers and barometers, in silvering looking glasses, in amalgamating precious metals in mining. A so for mercurial air pumps and in batteries. Its salts are used in medicine and in the arts. 4. What makes a compass needle stand north and south? A. The earth may be considered a great magnet, having north and south poles. It acts upon a magnetized needle in the same manner as any magnet. 5. What would be a good work for me to get on electrometallurgy? "Electro-Deposition of Metals," by A. W. Watt, price $3.50.

(5929) L. D. G. asks: 1. What is the smallest size boiler that will, in the most economical way and without noise, raise the temperature of 40,000 gallons of sea water from about 40° to 70° and keep it at that temperature, notwithstanding 10,000 gallons of water are pumped in and ont every twenty-four hours? The sides and bottom of the tank to be bricked and cemented, and the whole inclosed in a brick building. A. You will require a twenty horse power boiler to heat the 40,000 gallons in a day or a 10 horse power boiler to heat in two days and keepnp the supply. The only way without noise is to connect the top and bottom of the boiler directly to the tank in the same manner as a kitchen hot water boiler, and heat by circulating the water. 2. How does aluminum rank as an electrical conductor? A. The electric conductivity of aluminum is 0·51, copper 1·00, or 0·33, silver 1·00. 3. Can either temporary or permanent magnet be made out of aluminum? If not, what percentage of iron or steel would be necessary to use with it? A. Aluminum is very feebly magnetic. Have no data as to alloys. It will probably decrease the efficiency of iron or steel in magnetic force. 4. Does electricity travel on the exterior or center of a conductor? A. Electricity is supposed to travel on the surface of metals. 5. Is there any difference in the resistance between bare copper wire and either annealed iron, lead, or steel wire, each of the last three to be heavily plated, and of the same size as the copper wire? If so, how do they compare, also in cost? A. There is probably no perceptible difference in the conductivity of a solid copper wire and any other metal heavily plated with copper. We judge that the plated wire will cost more than solid copper wire. 6. Where can I get a catalogue of amateurs' chemical apparatus? A. Address Eimer & Amend, New York, for chemical apparatus.

(5930) W. D. F. asks: 1. Is a license that has been issued to an engineer in Missouri good for this State? A. No, unless issued by a United States inspector, when it is good for the district. 2. Where shall I apply to obtain an engineer's license, either first or second class, and what are the necessary requisites? A. If a marine license, apply to United States inspector at Chicago. If for stationary engine, apply to local inspectors where inspection laws are in force. Otherwise no license is required. 3. Do I need a different license to run a locomotive from a steamboat, or to run a stationary engine? A. Where a license is required, the kind of engine is specified. 4. What are the best books for an engineer to study for good solid information on steam? A. Among the many excellent works on steam engineering in our catalogue, which we mail free, are "Locomotive Engine Running and Management," by Sinclair, $2; "Locomotive Catechism," by Grimshaw $2; A larger catechism, by Forney, $5; "Stationary Engine Driving," by Reynolds, $1.75; "The Modern Steam Engine," by Colyer, $5; "The Triple Expansion Engine," by Wingate, $1; "Marine Engines, Boilers, and Propellers," by Edwards, $5; "Manual of Marine Engineering," by Seaton, $5, by mail. 5. Is the examination for a second class license difficult, that is, will it involve technical points not easily understood by experience and not book knowledge? A. You will require some experience, together with a study of the catechism and familiarity with engineering names, to give you a passable license.

(5931) R. W. asks: 1. Will a tank of water empty as fast through a simple hole in the bottom of the tank one inch in diameter as through another hole in bottom of the same diameter with 20 feet of pipe attached perpendicularly of exactly the same area as hole? A. The tank will empty fastest through the 1 inch pipe by the force of gravity through the additional head. 2. Will a basin at the top of a perpendicular pipe with only ½ inch opening into 2 inch pipe discharge as quickly as if the discharge pipe was all ½ inch, both pipes open at bottom? A. The basin will empty fastest through the ½ inch pipe for the above reason. The stream is broken in the 2 inch pipe and has very little pull due to gravity as in the solid column of the ½ inch pipe. 3. Will a tank empty more quickly through the same opening 1 foot from the ground than if it was raised 6 feet, free discharge in both cases? A. The difference in gravity is too small in a difference of feet, in elevation to be observed, although there is a difference in favor of the lower position.

(5932) C. A. W. writes: 1. I have a shunt-wound dynamo which gives 10 volts and 43 amperes, which it was built for. Can I reduce it in any way so it can be used for nickel plating? I mean, connect it with bath, so I can reduce the current down to say 1 to 4 volts, and still have current enough to nickel plate with in a bath of about 20 gallons. I have tried it with reduced speed, but the minute I connect the bath up the current runs down to nothing. A. It is possible by changing the strength of your field to plate small articles with your dynamo; but it will be at a great disadvantage. It should be rewound. If you try to use it without rewinding, work your system by ampere meter, not by volt meter. 2. What voltage and current is required for nickel plating? A. At starting, use 0·1 ampere per square inch of electrode, at 5 volts. Reduce 0·02 ampere at 2 volts. 3. What battery would plate well? A. A large plunge, or, better, porous cup bichromate battery. For plating dynamo, we refer you to our SUPPLEMENT, Nos. 720 and 793.

(5933) R. W. says: Will you kindly print in your "Notes and Queries" column a formula for writing fluid? A. 1. Black Writing Fluid.—Digest ¼ pound logwood in fine chips for twelve hours in 3 pints boiling water, then simmer down gently to 1 quart, carefully avoiding dust, grease, and smoke. When cold, decant the decoction and dissolve in it by agitation 20 grains yellow chromate of potash; it will then be fit for use. 2. Blue Writing Fluid (Mohr).—Pure Prussian blue, 9 parts; oxalic acid, 1½ parts. Triturate to a smooth paste with a little water. Dilute with sufficient soft water to make it fluid.

(5934) W. C. V. asks: 1. Will the electric motors described in No. 641, SCIENTIFIC AMERICAN SUPPLEMENT, develop as much power from a given battery as any kind of motor manufactured? A. No; this is designed as a simply constructed motor, and is not supposed to give the highest efficiency. 2. Do the motors that have compound widening develop greater power than others? A. The efficiency of a motor is independent of this. 3. Is it more economical to use a primary battery directly with a motor or to charge a secondary battery with a primary and then use the secondary battery with the motor where it is only necessary to use a motor a few hours at a time? A. It is better to use the primary battery directly.

(5935) M. S. P. asks: Will two cells of storage battery be sufficient to run the motor described in SUPPLEMENT, No. 641, each cell having six plates, 8 by 10; also if the same cells can be formed and charged by using 4 cells of gravity battery to one of storage battery? A. Yes. For charging use at least 5 gravity cells. The charging with them will be very slow.

(5936) G. F. H. asks: Why is it that the wire with which an electric light (incandescent) is suspended is made up of two insulated bunches of very fine wires, of about 15 wires in a bunch? Would not two solid wires of same size as each bunch be just as good? A. The construction is adopted to secure flexibility. Solid wires would be just as good otherwise.

(5937) A. E. S. writes: 1. In the office where I work there is a slow-moving belt, which when running is charged with electricity, so that I can draw sparks from it with my knuckles. I out of curiosity placed the bulb of an incandescent electric light near it. To my surprise I had the northern lights in miniature, but when I placed the light back in the socket it immediately burned out; still, when placed back near the belt, the same phenomena would occur. A. The phenomena displayed by the incandescent lamp have no connection with the presence or absence of the carbon. 2. If black is the absence of color, what is the color of a small quantity of air? A. Black is better defined as the absence of light. Air is without color or transparent in small quantity.

(5938) R. E. W. asks: 1. Will cotton-covered wire (No. 34) answer nearly as well as silk-covered for a small induction cell? A. Yes. 2. Would best quality tool steel be fine enough to make the compound magnet in Bell telephone receiver? A. Tool steel will answer very well. Shear steel is better. 3. I have a Kidder magneto machine which does not generate as powerful a current as when it was new. Is there any way to increase the current? A. Better send the machine to the manufacturers. Without a personal examination of it we will be unable to suggest any remedy for the difficulty. 4. Will No. 12 galvanized iron wire be the right kind for a two or three mile telephone line? A. Yes.

TO INVENTORS.

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