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think of making a coil with less than a six-inch spark. Such a coil is described in SUPPLEMENT No. 1124, price ten cents.

(8563) A. B. asks: 1. Why are magneto calls used on telephones instead of the common make and break bells? A. The magneto machine generates a current well adapted to ringing the bell. No battery is required. It is less liable to get out of order than if a battery were employed to ring the bell. 2. Is the armature of a magneto bell a permanent magnet? If not, please state what causes it to vibrate. A. The bell has a polarized armature. This is a permanent magnet, which moves the instant the current varies the magnetism around it. It works more easily than a bell with a battery could do. All such matters are fully explained in Webb's "Telephone Handbook," price \$1 by mail.

(8564) H. L. B. asks: How much No. 36 wire will it take for the secondary of a coil giving a one-inch spark, and how much and what size wire for the primary coil to be used for wireless telegraphy? A. It is a very good coil which gives an inch of spark for a pound of secondary. For primary coils from 12 to 16 wire may be used.

(8565) J. R. F. asks: 1. What amount of weight can be lifted with a pound of metal charged with lodestone as heavily as it can be charged? A. There is a great difference in the weight lifted by permanent magnets. You will do well if you lift a pound with a magnet weighing as much as a pound. Nor can you magnetize a bar magnet well with lodestone. It should be magnetized with an electric current, if you would produce a strong magnet. 2. Does the metal charged lose its power to lift in time by using it. A. No; a magnet is not injured by working. If left with a keeper on its poles and handled with care, no loss of strength need take place. 3. Can cast iron be charged as well as any other metal? A. Steel is the only metal of which a permanent magnet can be made. The best tool steel should be used.

(8566) K. S. A. asks: Is there any method known by which a picture or outline can be thrown on a screen in daylight, on the principle of the magic lantern, without making the room dark? For instance, could the outline be thrown on as a shadow? A. A lantern slide can be thrown upon a screen in a room by daylight if an electric arc lamp is used for an illuminant. It will not be as distinct as if the room were darkened, but still it can be distinctly seen.

(8567) W. E. F. asks: What would be the apparatus necessary to charge a storage battery from a trolley wire of an electric railway, and what size battery for 5 horse power motor to run say 10 hours; and about what would the outfit cost, and how long would it take to charge it? A. You will require half as many storage cells to run your motor as the volts taken by the motor, since each cell will give 2 volts. To obtain the number of amperes you will need, divide 746 by the voltage of the motor. This gives the amperes for one horse power hour. Multiply this by 5 and by 10, and you will have the amperes hours required for 5 horse power for 10 hours. Now go to the electric railway company and ask them to fit you out to charge the battery. We do not know the cost, nor do we know exactly what you will need. But the engineer of the company will know.

(8568) L. E. A. K. asks: 1. Is the current that leaves a telephone in talking the battery or an induced current? A. An induced current. The induction coil is to be seen in the box of the transmitter in many forms of apparatus. 2. Are telephone generators alternating or direct current? A. The magneto generator by which the call bell is rung is an alternating current machine. 3. Can a direct current be transformed from a higher to lower or lower to higher without going through a rotary transformer? A. Yes; by an induction coil it is transformed to a pulsatory current in one direction.

(8569) C. C. McC. asks: Do you publish a work on the construction of voltmeters and ammeters that would enable one to construct one for use on an isolated plant? A. SUPPLEMENT No. 1215, price ten cents, will give information for the construction of a voltmeter and ammeter which may answer your purpose.

(8570) S. C. asks: 1. A party of us visited an electric plant. The electrician attached to the end of the poles of the dynamo two large pieces of iron, then inserted them into a saline solution, saying he would boil water, but I thought what he called boiled was only the decomposition of the water to H₂ + O. Am I correct? A. Both decomposition and heating of water takes place, and the water is soon heated to boiling. 2. The electrician said if the two pieces of iron at the end of the poles were to touch one another, it would blow up the dynamo. In that case what would cause it to blow up? A. If the plates were brought to touch each other, the resistance would be brought so low that an enormous flow of current would take place (Ohm's law), and this would heat the dynamo so that the wire would soon melt, unless there were a fuse which would blow and cut off the current. It would not be an explosion in any ordinary sense of the term, but a burn-out. We cannot change your dates unless you send full address.

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