

is made of metal and not of paper. 2. How long a spark should such a machine give when the electrode? A. About six inches. 3. How many pounds pressure to the square inch should you have in a three horse power gasoline engine to be able to get it to start? A. The gasoline engine should turn over with from 10 to 15 pounds pressure. If you start it with an explosion, you may have from 100 to 200 pounds pressure per square inch.

(8190) S. A. S. asks: 1. When magnetic storms on the earth cause electric currents to flow over telegraph wires, in what direction do the currents flow, from north to south, south to north, east to west, or west to east, and do the currents always flow in the same direction? A. The idea of direction in an electric current is wholly conventional. We say it flows from positive to negative as a convenience. No one knows in which direction it does flow. It is just as likely that it flows the other way, from negative to positive. The same is true of lightning. It may descend from the clouds to the earth or ascend, for all that we can see or know. When magnetic storms prevail it is not possible to ascribe direction to the force which works a telegraph instrument. 2. What is the average potential, and strength of current, or do such currents vary greatly in strength? A. In a magnetic storm the effect of the change of magnetic intensity is to produce an electric current in the wires of a telegraph or telephone circuit, which may be strong enough to enable messages to be sent without a battery. We have no figures of their potential at hand. The potential of the air fluctuates several hundred volts either way, and when a thunderstorm is approaching, it changes rapidly and capriciously, even reversing its sign in a few minutes. Current from such potential is a very minute quantity. 3. What is the duration of such currents? A. These phenomena may last for hours, or for a few minutes only. 4. About what is the electrical resistance of the human body? A. Anything up to perhaps 5,000 ohms, varying with the person and his condition. Under any moderate voltage the current strength which can flow through a person is very little. 5. About what strength of current is necessary to give a person a moderate shock? A. It is the voltage which determines the shock. A pressure of 100 volts will give a slight pricking sensation; 200 will be disagreeable; 500 may be dangerous; while anything above is very likely to be fatal.

(8191) E. M. J. asks: I have some hard rubber slides to photographic plate holders. I want to etch a part of the surface so as to be able to write upon it with a lead pencil and to erase the same. Can you tell me how to do it in your column? A. Rubbing the surface with fine emery paper will form a matt surface which will take a pencil mark.

(8192) D. E. G. asks: I have a 500-volt current, with which I wish to run one strong arc light. Could you advise me, in the next issue of your valuable paper, how to do this? A. Your 500 volts will suffice for 10 arc lights, and if you use it for one the remaining 450 volts above what one lamp can use must be disposed of in a rheostat. You will require about 2,200 feet of No. 12 B. & S. German silver wire for such a rheostat.

(8193) F. C. H. writes: Near here two telephone lines cross, and what is said over one can be heard on the other line. Please tell me whether the speech is transmitted through the air or through the ground. A. The electric waves act from one line across the other through the air, in the same manner as the waves are transmitted in wireless telegraphy. It is called "cross talk," and is remedied by a metallic return wire, twisted around the other wire of its own circuit.

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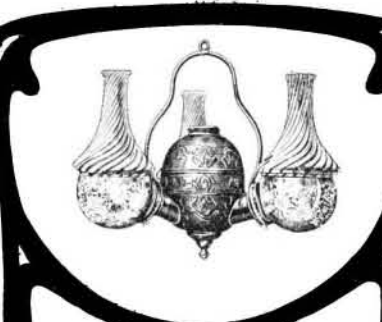
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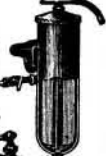
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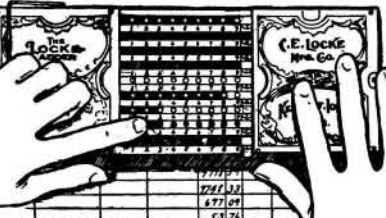
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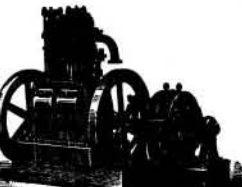
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