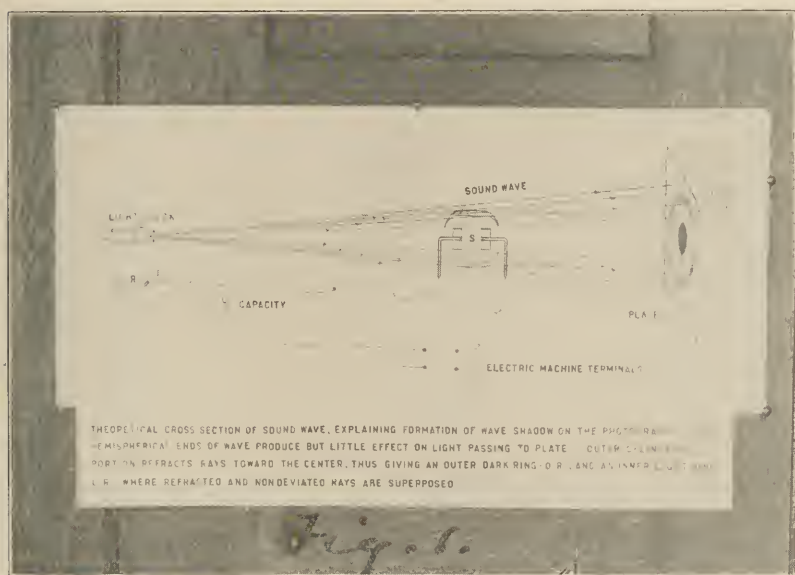


A SIMPLE METHOD OF HARMONIZING LEYDEN JAR DISCHARGES.

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In the photography of sound waves¹ one of the chief difficulties is to secure the proper time interval between the sound producing spark and the illuminating spark which pictures the wave. A spark gap is always apparently more or less erratic. When one places two gaps in series, Figure 1, and en-



deavors to adjust the condenser C to make the spark L, occur at a definite time after the spark S, he finds that the time interval is far from constant. The interval varies, not merely because of variations in the spark gaps themselves, but because of the charge remaining in the capacity C after a spark

¹A New Method of Photographing Sound Waves. *Physical Review*, Vol. XXXV, No. 5, November, 1912.

has taken place. This spark is due to two causes. One is the tendency of the Leyden jars forming the capacity C to take on what is known as a residual charge. The other results from the oscillatory character of a Leyden jar discharge, the jars having a charge after each spark depending on the direction of the last oscillation. With a charge on the capacity C varying as to both sign and magnitude, one can not expect a constant time interval between the sparks L and S . In my later experiments I have been able to eliminate much of this trouble by short-circuiting the terminals of the capacity C through a high resistance R and an inductance L . The resistance R is merely a tube of water with wires passing through corks at either end of the tube. The inductance L is an electromagnet of about a thousand turns of wire. The result may be obtained with either a resistance or an inductance, if sufficiently large. Using both one can, without reducing the intensity of the illuminating spark, reduce the resistance R by shortening the water resistance until the jars discharge themselves completely very soon after every spark. Thus the condenser is brought into the same electrical condition before every spark and consequently the time required to charge it to sparking potential is made constant.

The arrangement here described does not completely eliminate all variations in the time interval between the sparks because much of the variation is due to change in the effective resistance of the spark gaps themselves, something the writer has been unable to control. The arrangement does, however, reduce the variation about 50 per cent.

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