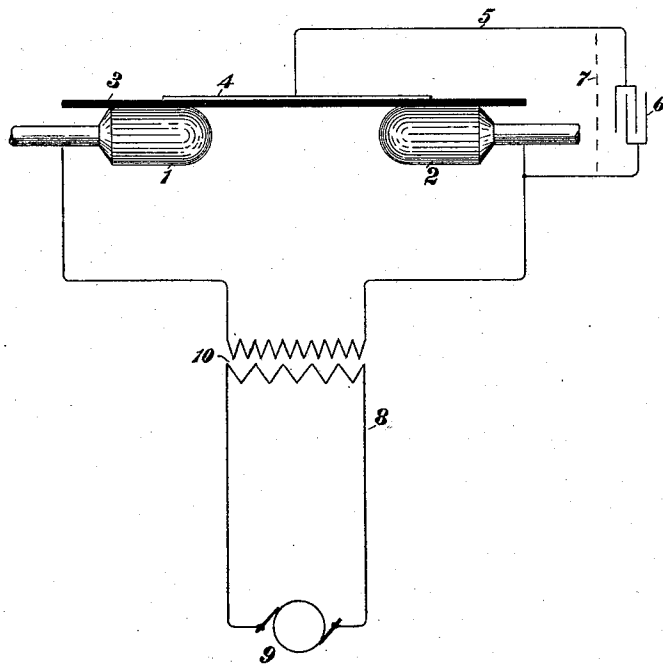


(No Model.)

C. E. SKINNER.
ELECTRICAL DISCHARGE DEVICE.

No. 571,099.

Patented Nov. 10, 1896.



WITNESSES:

Hubert C. Tenor
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INVENTOR

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BY

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UNITED STATES PATENT OFFICE.

CHARLES E. SKINNER, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO THE WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY, OF SAME PLACE.

ELECTRICAL-DISCHARGE DEVICE.

SPECIFICATION forming part of Letters Patent No. 571,099, dated November 10, 1896.

Application filed May 21, 1896. Serial No. 584,208. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. SKINNER, a citizen of the United States, residing in Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Electrical-Discharge Devices, (Case No. 694,) of which the following is a specification.

My invention relates to electrical apparatus, and particularly to such apparatus as embodies separated electrodes between which electrical discharges take place.

The object of my invention is to provide an apparatus of this character which will facilitate the passage of electrical discharges to such a degree as will permit the separation of the electrodes to a considerable distance, and thus greatly increase the length of the spark for a given electromotive force beyond that secured in connection with apparatus heretofore employed.

I have found that if the positive and negative terminals of an electric circuit be placed in conduct with or in close proximity to a body of insulating material, and if one of them be electrically connected with a conducting-body placed upon the opposite side of said insulating-body, the sparking-distance between such electrodes will be several times greater than the sparking-distance when the electrodes are separated merely by an airspace. This result is secured both with static discharges and also when the electrodes are the terminals of circuits supplied with a dynamo-current. It is well known that a static discharge will pass through an air-gap between electrodes which will prevent the passage of a dynamo-current, and this fact has heretofore been generally utilized in the construction of lightning-arresters for the protection of dynamo-circuits and the translating devices fed thereby. It follows, therefore, that the principle embodied in my invention may be advantageously employed in the construction of lightning-arresters, since it permits of a much wider separation of the electrodes than has heretofore been possible.

The invention is also applicable for use in connection with generators of static electricity, since it affords means whereby the length

of the spark which may be secured from such a machine may be increased to several times that which has heretofore been possible.

The invention may be utilized for any other purposes to which it may be adapted, and I therefore do not desire to limit it to any specific use.

It has been found that an electrical discharge between two electrodes is facilitated by placing such electrodes in contact with a solid insulated surface, and this is probably due to the fact that there is a less intimate contact between the molecules of air and the molecules of the solid material than there is between the different molecules of the air. By providing a conducting-body at the opposite side of the insulating-body and connecting the same with one of the electrodes a condenser action results, which apparently serves to repel the molecules of air on the electrode side from the surface of the insulating-body, and thus permits of the passage of the discharge along the surface of the insulating-body between the electrodes with much greater facility than obtains either when no solid body is present or when only the insulating-body is employed.

In the accompanying drawing I have illustrated diagrammatically an apparatus embodying my invention, in which—

1 and 2 are two electrodes separated a considerable distance and placed in contact with one face of a plate 3 of insulating material. This plate may be of any convenient material and thickness. I have found that glass is a suitable material, although I do not desire to limit my invention in this regard, and the thickness should be sufficient to preclude any puncturing or rupturing of the same when employed in connection with high potentials, and it must also be thin enough to secure the necessary repulsion of the air-molecules from the face in contact with the electrodes.

4 is a plate of conducting material, which may be of any suitable metal and of any convenient thickness. This plate is located upon the side of the insulating-plate opposite to that upon which the terminals 1 and 2 rest, and it may conveniently be in the form of a

sheet of metal foil. I preferably make this plate or sheet of sufficient length to bridge the space between the electrodes, but the invention is not limited as regards the length of such plate or sheet. This metal plate or sheet is electrically connected with the electrode 2, as indicated in the drawings, by means of a suitable conductor 5. A condenser 6 may be interposed between the electrode 2 and the plate 4, if desired, but I do not regard this as a necessary adjunct. The connection may be made directly, as indicated by the broken line 7. The electrodes 1 and 2 are connected with a source of electrical energy 8, which, as indicated in the drawing, comprises a dynamo 9 and a transformer 10. This source of energy may be a generator of static electricity, if desired, as will be readily understood.

If the parts 1 and 2 are the electrodes of a static machine, it is apparent that the length of the spark which may be secured from the machine for laboratory or exhibition purposes will be much longer than any that it has heretofore been possible to secure.

In case the invention is utilized as a lightning-arrester it will be understood that one of the electrodes will be connected to the line to be protected and the other will be grounded.

I do not desire to limit my invention to the particular form of apparatus shown and described, since it may be variously modified and adapted to particular purposes wherever it may be found useful without departing from the spirit and scope of my invention.

I claim as my invention—

1. An electrical-discharge device comprising a non-conducting body having a comparatively smooth surface, a pair of separated electrodes located in close proximity thereto, and means for repelling the air from said surface

whereby the passage of electrical discharges between the electrodes is facilitated.

2. An electrical-discharge device comprising a non-conducting body having a conducting-coating upon one face and two electrodes in contact with the other face one of which is electrically connected with the conducting-coating.

3. An electrical-discharge device comprising two separated electrodes, a body of conducting material electrically connected with one of said electrodes, and a body of non-conducting material interposed between said electrodes and said body of conducting material.

4. An electrical-discharge device comprising an elongated body of non-conducting material, an elongated body of metal in close proximity to one side of the non-conducting body, electrodes in engagement with the other side, one of which is electrically connected with said body of metal.

5. An electrical-discharge device comprising a non-conducting plate, a sheet of metal upon one side of the same, a pair of electrodes upon the other side and an electrical connection between one of said electrodes and said metal sheet.

6. An electrical-discharge device having widely-separated electrodes in contact with one side of a non-conducting body, a conducting-body of a length equal to or greater than the distance between said electrodes and located at the opposite side of said non-conducting body and electrically connected with one of said electrodes.

In testimony whereof I have hereunto subscribed my name this 18th day of March, 1896.

CHARLES E. SKINNER.

Witnesses:

WESLEY G. CARR,
HUBERT C. TENER.