

(No Model.)

J. J. O'CONNELL.

PROTECTIVE DEVICE FOR ELECTRICAL APPLIANCES.

No. 536,095.

Patented Mar. 19, 1895.

Fig. 1.

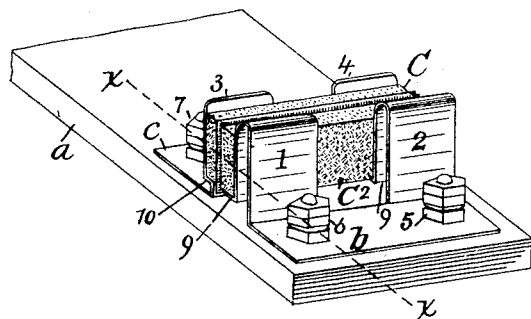


Fig. 2.

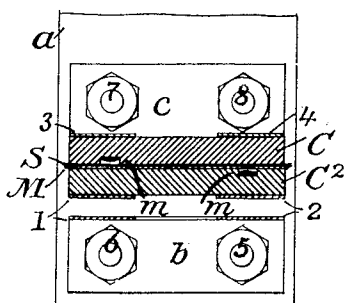


Fig. 3.

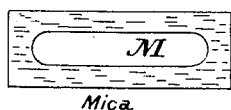
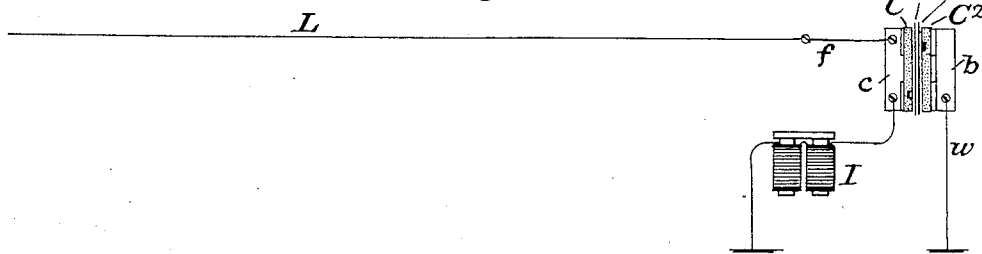


Fig. 4.



Fig. 5.



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UNITED STATES PATENT OFFICE.

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PROTECTIVE DEVICE FOR ELECTRICAL APPLIANCES.

SPECIFICATION forming part of Letters Patent No. 536,095, dated March 19, 1895.

Application filed November 23, 1894. Serial No. 529,776. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH J. O'CONNELL, residing at Chicago, in the county of Cook and State of Illinois, have invented certain
5 Improvements in Protective Devices for Electrical Appliances, of which the following is a specification.

This invention relates to appliances for the protection of apparatus connected with electric circuits from the destructive or injurious
10 effects of strong intrusive currents or charges of electricity coming upon the line wires from any source or cause; and especially to that class of protectors operating by means of a
15 disruptive discharge through a thin air gap. In apparatus of this class, usually denominated lightning arresters, two plates are employed, one of which is in the line, while the other is separated slightly from the first by
20 a thin di-electric, usually of air, and is connected to the earth to furnish a path for the escape of a disruptive discharge. The said plates are made of metal or carbon, preferably the latter, and it is usual when carbon is used,
25 to make them in the form of oblong blocks, two of which are placed together, their parallel faces being separated by a thin strip of di-electric, as mica, having its central portion cut out. The plates are mounted in supports
30 or spring clips provided with binding posts by means of which they may be connected in the circuits. In some forms of arrester, a hole is made in the face of one or both of the carbon plates and a drop of fusible metal, or
35 alloy, placed therein to assist in earthing foreign currents of a dangerous potential, as is fully set forth in United States Patent No. 438,788. It has been found when disruptive
40 discharges take place from one plate to another, that particles of the material of one plate are disintegrated therefrom, and carried to the opposite plate, and if the earth seeking charge is long continued, especially when carbon plates are used, a conductive
45 connection is established between the plates by means of these particles; and if this does not happen at once, the slight space between the plates becomes more or less filled with the particles of carbon and is liable at any
50 time to form such a cross connection. My in-

vention aims to obviate this trouble and to prevent the disintegrated particles from forming a cross connection or conductive bridge between the plates by confining them near the face of the plate from which they have be- : 5 come detached, thus preventing them from coming in contact with the opposite plate.

I accomplish this result by interposing between the plates (with the mica strip) a supplementary or auxiliary piece, or sheet of
60 textile fabric or similar thin sieve like material, such as silk sufficiently porous and loose in its texture to allow the passage of discharges of electricity but fine enough to prevent the disintegrated particles from falling
65 through. I use a piece of such material slightly longer and wider than the plates, and secure it between the plates so that it shall not sag down, but be perfectly straight and
70 taut, and when the plates are placed in their supports the latter not only hold the plates steady, but also maintain the sieve or sifter in proper tension, all of which will be more
specifically described in connection with the drawings, in which— 75

Figure 1 represents a perspective view of a lightning arrester embodying the invention. Fig. 2 is a section on line *xx* of Fig. 1. Fig. 3 shows the mica strip. Fig. 4 shows the sieve; and Fig. 5 shows the arrester as arranged in
80 an electric circuit.

In the drawings, *a*, is a base board of insulating material upon which are secured the supports or metal spring clips *b* and *c*, each of which has a flat part resting upon the base
85 board and secured thereto by the binding posts 5, 6, 7, 8.

The clip *b* consists of two springs 1 and 2, as shown, bent upward and downward with
90 ledges 9 9 for a plate *C*² to rest upon, and the clip *c* consists of two springs 3, 4 extending upward with a bend to form ledges 10, 10, for a plate *C* to rest upon. The distance between the clip springs 1, 3 and 2, 4 is such that the plates *C*, *C*² have to be pressed in with con-
95 siderable force.

I have shown in the drawings plates composed of long narrow blocks of carbon, each having a drop of fusible metal or alloy *m* inserted in its face.

M is a strip of mica having its central portion cut out and is slightly longer and wider than the carbon plates C C², and of a thickness to provide an air space which will permit the passage of discharges of minimum potentials, usually about thirty-five ten-thousandths (.0035) of an inch.

S represents the sieve, separator or sifter, which is preferably made of silk, slightly longer and wider than the plates C C². When the plates C C² are to be inserted between the spring clips, the silk piece and mica strip are placed between the said plates, the silk being very carefully straightened out so that it will not sag down, and the whole forced between the clips, as shown.

Should the spark caused by discharge from one plate to the other develop into an arc and continue for a sufficient length of time to heat the plate to the temperature at which the fusible material *m* melts, the fused material runs into the space between the plates C C², bridging such space and forming a direct electrical connection between them. The interstices of the piece of silk or other material are sufficiently large to permit of this direct connection taking place, and the operation of the whole device in this case is substantially as described in Letters Patent No. 438,788 before referred to.

Fig. 5 shows a line wire L extending to the clip *c* of a lightning arrester, after passing through a fuse wire *f*, and thence to earth through the instrument I, to be protected.

The clip *b* is connected to earth by wire *w*. The operation is obvious.

I claim—

1. A potential discharging protector comprising in combination two conducting plates placed with parallel surfaces closely adjacent to each other but separated for a portion of their area by a thin air space, said plates being adapted for connection respectively with an electric circuit and with the earth, and a supplementary interposed piece of textile fabric or similar sieve-like material, adapted to intercept disintegrated particles but offering no impediment to the disruptive discharge across the air-space, substantially as described.

2. A potential-discharging protector comprising in combination, two conducting plates placed with parallel surfaces closely adjacent and adapted to be connected respectively with an electric circuit and with the earth, an intermediate dielectric strip such as mica, having a portion cut away so as to present a thin air space between the two plates, and an auxiliary interposed strip of sieve-like material, such as thin silk, substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 20th day of November, 1894.

JOSEPH J. O'CONNELL.

Witnesses:

A. A. THOMAS,
A. B. RAYMOND.