(No Model.)

P. WINSOR.

LIGHTNING ARRESTER.

No. 417,695. Patented Dec. 17, 1889.

Fig. 2.

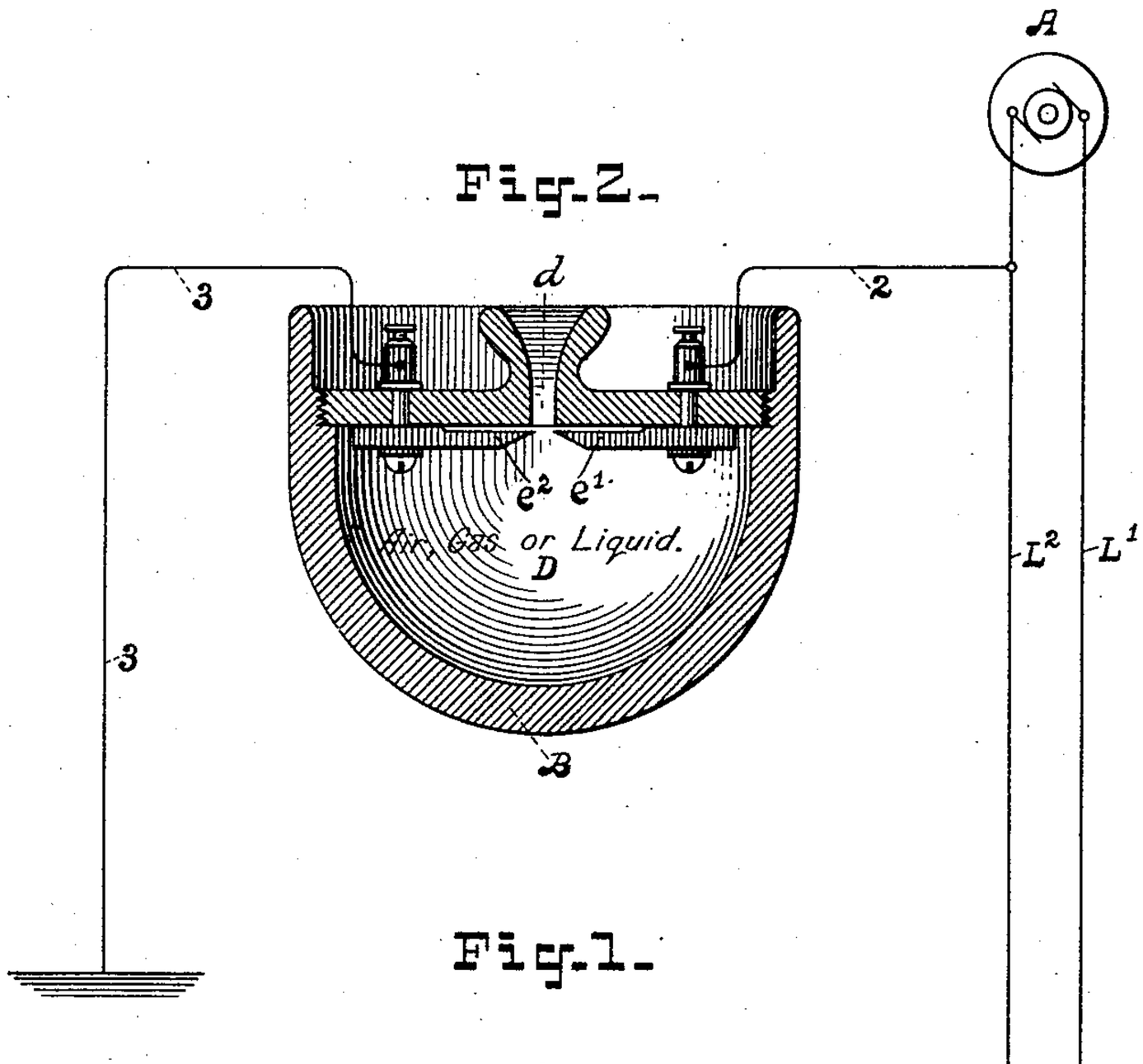
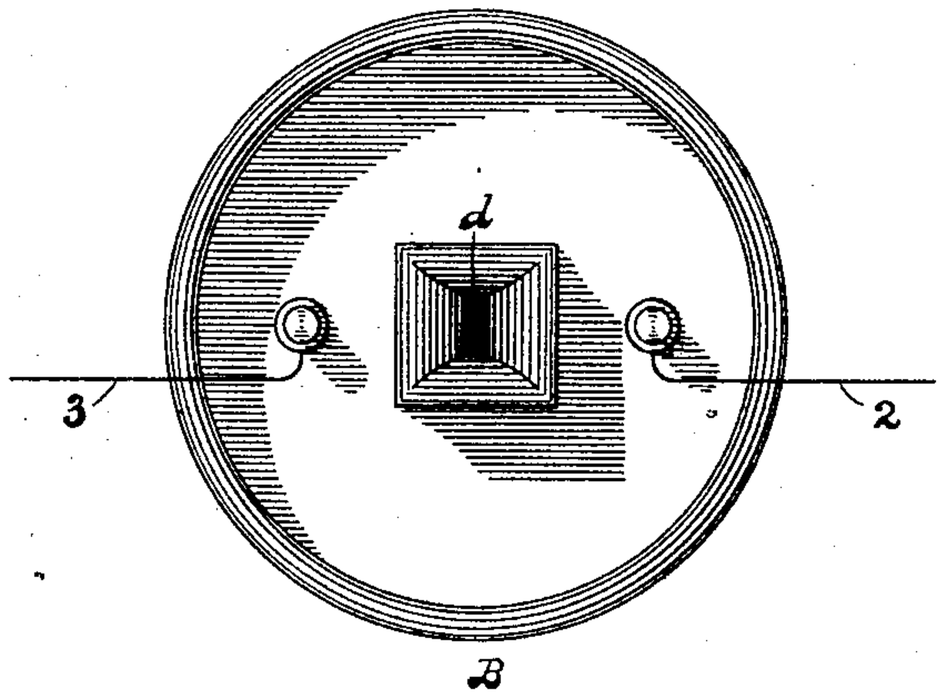


Fig. 1.



Witnesses
George Brown Jr.
J. H. Smith

Inventor
Paul Winsor.
By his Attorney
Charles A. Terry.

UNITED STATES PATENT OFFICE.

PAUL WINSOR, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO THE WESTINGHOUSE ELECTRIC COMPANY, OF SAME PLACE.

LIGHTNING-ARRESTER.

SPECIFICATION forming part of Letters Patent No. 417,695, dated December 17, 1889.

Application filed November 4, 1889. Serial No. 329,149. (No model.)

To all whom it may concern:

Be it known that I, PAUL WINSOR, a citizen of the United States, residing in Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a certain new and useful Improvement in Lightning-Arresters, (Case No. 355,) of which the following is a specification.

The invention relates to a method of protecting electric circuits from injury by reason of lightning discharges, and to the construction of apparatus for such purpose. When the circuit of an electric generator receives a lightning stroke and a discharge takes place to the earth through a lightning-arrester as usually constructed, an arc is established through which the current from the generator is liable to continue to flow after the cessation of the lightning stroke. It becomes desirable, therefore, to provide means for interrupting the arc, and thus the flow of the current, immediately after the discharge has taken place.

The special object of this invention is to extinguish the arc thus formed at the lightning-discharge device or arrester as soon as the lightning discharge has taken place, and to leave the apparatus in such condition as to be in readiness for receiving succeeding lightning discharges.

The invention consists, in general terms, in causing the heat generated at the arc by the flow of current to effect such an expansion of the surrounding air, gas, or other medium as to automatically extinguish the arc. This is accomplished by inclosing the discharge-plates within or at the mouth of a closed chamber and causing the expanded air, gas, or fluid within the chamber to escape between the discharge-plates or electrodes.

The invention will be described more particularly in connection with the accompanying drawings, in which—

Figure 1 is a plan, and Fig. 2 a vertical section, of a device for carrying the invention into effect.

Referring to the figures, A represents a suitable source of electric currents, and $L' L^2$ main-line conductors leading therefrom or connected therewith. The lightning-arrester is shown at B, and it consists of two confronting points or plates $e' e^2$, separated from each other a slight distance and located at or near the mouth d of the closed chamber D. This chamber may be of spherical, cylindrical, or other convenient form, and is of such size as to contain sufficient atmosphere, gas, or fluid to allow of considerable expansion when heated and cause a considerable rush through the opening d.

The circuit-connections are as follows: The conductor 2 is connected with the plate e', and the plate e^2 is connected with the earth by the conductor 3. When a lightning discharge takes place across the plates, and an arc remains by reason of the flow of the current from the generator, the air or fluid within the chamber D is suddenly expanded by the heat generated at the arc, and more or less escapes through the opening d, passing between the points $e' e^2$. This immediately extinguishes the arc and interrupts the flow of current.

It is desirable that the opening should be of such shape that the escaping air or fluid must pass for the most part between the electrodes or points $e' e^2$. The arc having once been extinguished, there will be little or no danger of its being re-established, except by means of another lightning discharge. The apparatus will thus readjust itself for repeated lightning discharges.

It will be understood that a second lightning-discharge device of similar construction may be applied to the line L′ upon the other side of the generator, and, in general, that they may be located at such points as desired.

In an application filed by me jointly with Alex. Wurts, September 25, 1889, Serial No. 325,018, there is described and claimed an apparatus in which the heat developed at an arc formed within an inclosing-chamber is employed for interrupting the circuit at another point than at the arc.

I claim as my invention—

1. A lightning-discharge device consisting of two electrodes or discharge-plates and an inclosing-chamber having an opening, within or near which opening said plates are placed.

2. A lightning-discharge device consisting

of electrodes or discharge-plates e' e^2 and a chamber D, having an opening d, within which said plates are located.

3. The hereinbefore-described method of interrupting an electric arc, which consists in causing said arc to expand a surrounding expansible medium and in causing such expanded medium to escape between the discharge-plates.

4. The hereinbefore-described method of protecting electric circuits from lightning discharges, which consists in causing the lightning discharge to reach the earth by forming an arc through an expansible medium, in causing such medium to be expanded by reason of such arc, and in causing the expanded medium to be forced through such arc, thereby extinguishing the same.

5. The hereinbefore-described method of automatically establishing and interrupting the flow of current, which consists in establishing an arc in a normally-interrupted circuit, causing the heat developed by such an arc to produce an expansion of the surrounding air or gas, causing it to rush in a given direction, and interrupting the flow of current through the circuit, maintaining the arc by such rush of air or gas.

6. The hereinbefore-described method of protecting an electric circuit from injury from lightning discharges, which consists in causing the lightning discharges to reach the earth by forming an arc through an expansible medium, causing such medium to be expanded by the heat developed by the electric current traversing it, and interrupting the flow of current by the rush of the expanded medium from the arc.

In testimony whereof I have hereunto subscribed my name this 23d day of September, A. D. 1889.

PAUL WINSOR.

Witnesses:
JOHN F. MILLER,
CHARLES A. TERRY.