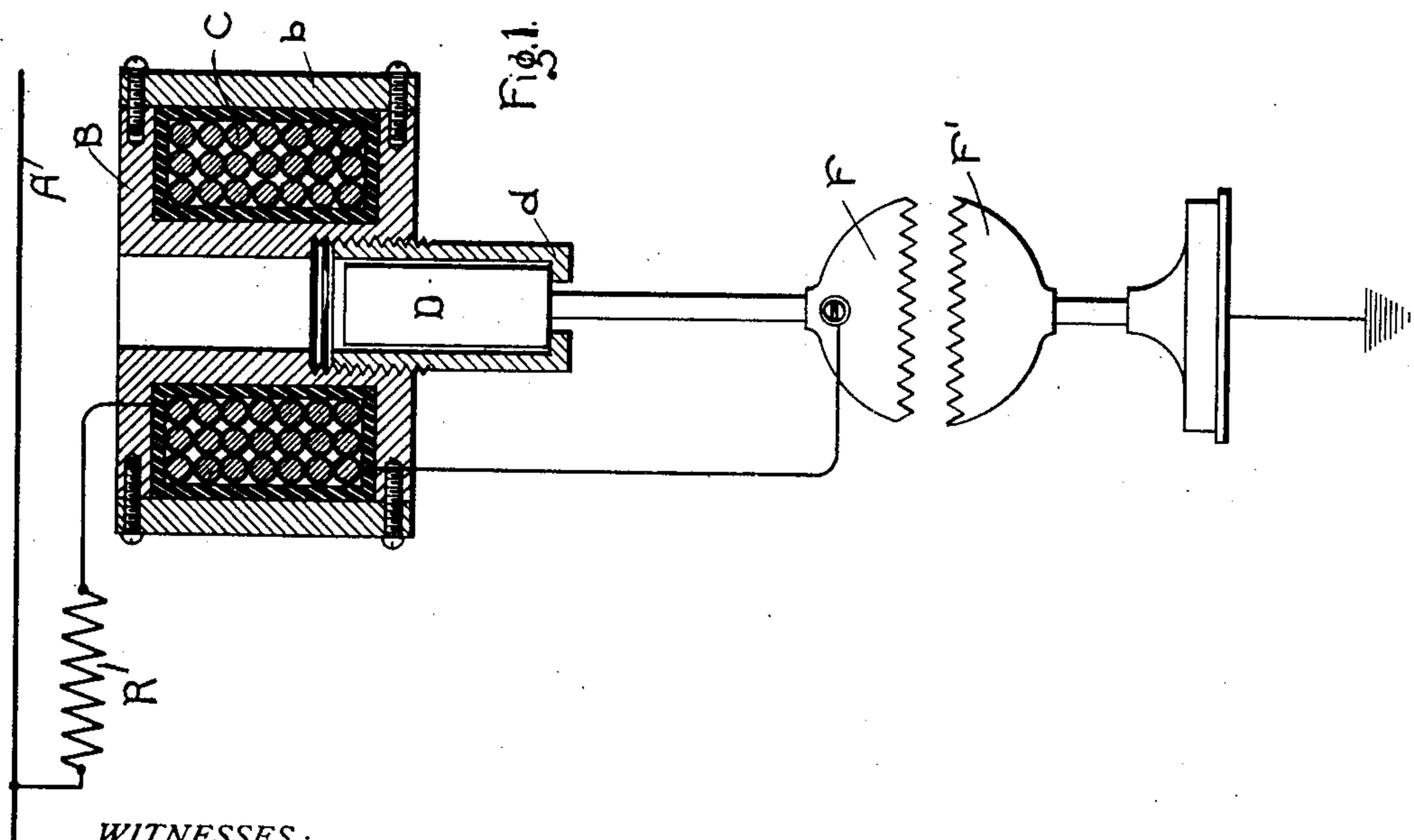
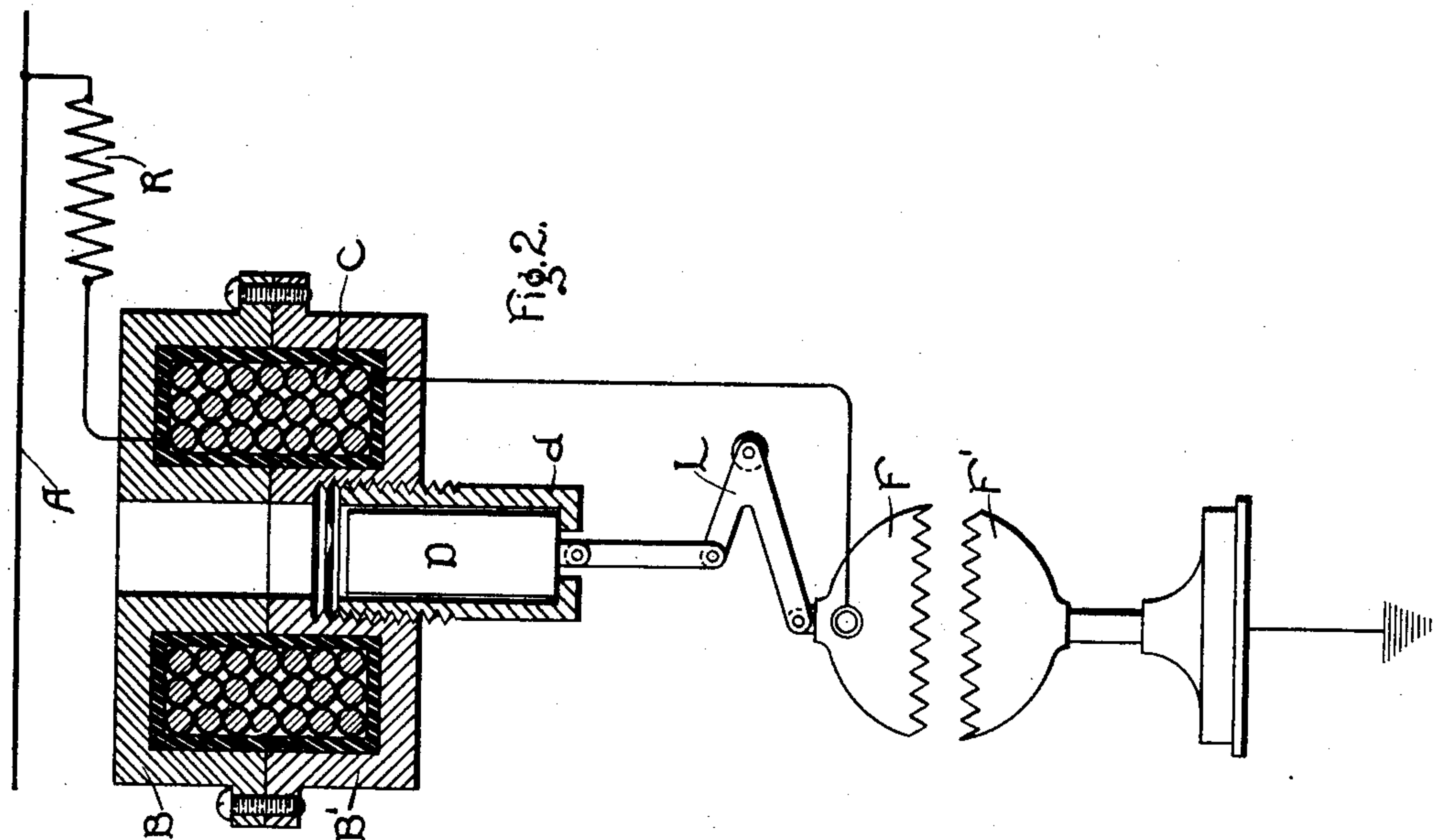


No. 751,460.

PATENTED FEB. 9, 1904.

C. C. CHESNEY.  
LIGHTNING ARRESTER.  
APPLICATION FILED AUG. 8, 1903.

NO MODEL.



WITNESSES:

*R. C. Haynes*  
*Wm. H. Jones*

INVENTOR.

Cummings C. Chesney.

BY

*L. A. Howland*

ATTORNEY.

# UNITED STATES PATENT OFFICE.

CUMMINGS C. CHESNEY, OF PITTSFIELD, MASSACHUSETTS, ASSIGNOR TO  
STANLEY ELECTRIC MANUFACTURING COMPANY, OF PITTSFIELD,  
MASSACHUSETTS, A CORPORATION OF NEW JERSEY.

## LIGHTNING-ARRESTER.

SPECIFICATION forming part of Letters Patent No. 751,460, dated February 9, 1904.

Application filed August 8, 1903. Serial No. 168,699. (No model.)

*To all whom it may concern:*

Be it known that I, CUMMINGS C. CHESNEY, a citizen of the United States, and a resident of Pittsfield, Massachusetts, have invented certain new and useful Improvements in Lightning-Arresters, of which the following is a specification.

My invention relates to lightning-arresters for electric circuits; and its object is to provide a structure in which a good path is furnished for the lightning to go to earth, together with means for preventing more efficiently and with greater certainty the line-current from following the lightning discharge and grounding the line. When an air-gap is used in the earth-circuit of the lightning-arrester, the line-current is likely to follow the lightning discharge across the gap, and thus short-circuit the line. In order to prevent this, lightning-arresters have been devised in which one of the electrodes of the air-gap is movable and is withdrawn on the passage of current by means of a solenoid in series with the gap. The introduction of the solenoid with its self-induction has introduced a new source of danger, since it chokes back the lightning discharge and may thus produce a high potential on the parts to be protected, with consequent damage to insulation. By my invention I provide a path of very low self-induction for the lightning discharge and nevertheless produce a separation of the electrodes on the flow of current.

Referring to the drawings, Figure 1 shows an arrangement embodying my invention. Fig. 2 shows a modification of the same.

In Fig. 1, A represents the line, which is connected through the series resistance R, the solenoid-winding C, and the air-gap F F' to earth. The solenoid-coil C is wound on a bobbin B, which is formed of copper or other conducting material. The bobbin is closed by the ring or cap b, thus completely surrounding coil C with a closed metallic circuit of high conductivity. D is the core of the solenoid, of iron, and is held in the position shown by the support d. d is made adjustable with reference to bobbin B, permitting the adjust-

ment of core D and of the air-gap F F'. The upper electrode F of the air-gap is supported from the core D, while the lower electrode F' is fixed and is connected to earth.

The operation is as follows: In case of a lightning discharge or abnormal increase of potential from any cause the current will leap across the air-gap F F'. The self-induction of coil C is almost completely neutralized by the short-circuited secondary formed by bobbin B, so that no resistance is offered to the sudden discharge. If, however, the line-current follows the lightning discharge across the air-gap, coil C will draw up its core D until the electrodes F F' are separated far enough to stop the flow of current. Series resistance R is for the purpose of preventing an instantaneous destructive rush of current before the solenoid-coil C has time to act upon its core D. Since electrodes F F' are made of non-arcing metal, it is evident that by my invention all damage to the lightning-arrester itself, as well as to the apparatus to be protected, is wholly avoided.

In the modification shown in Fig. 2 the short-circuited secondary for coil C is in two parts B B', which may be cast or formed. In this arrangement coil C is wound before the parts B B' are placed over it. Core D is connected to the movable electrode F through the bell-crank lever L, which multiplies the movement of core D and produces more rapid separation of the electrodes.

I do not desire to limit myself to the particular construction and arrangement of parts here shown, since changes therein which do not depart from the spirit of my invention and which are within the scope of the appended claims will be obvious to those skilled in the art.

Having thus fully described my invention, I claim as new and desire to protect by Letters Patent—

1. In combination, a line-wire, a circuit from said line-wire to earth including a solenoid and an air-gap, a closed conducting-circuit in inductive relation to the winding of said solenoid, and a core for said solenoid



adapted to vary by its movement the length of said air-gap.

2. In combination, a line-wire, a circuit from said line-wire to earth including an air-gap, an electromagnetic device in said circuit adapted to increase the length of said air-gap, and a closed conducting-circuit in inductive relation to the winding of said device.

3. In combination, a line-wire, a circuit from said line to earth including an air-gap, a solenoid in said circuit, a conducting-envelop completely inclosing the winding of said solenoid, and a core for said solenoid adapted to vary by its movement the length of said air-gap.

4. In a lightning-arrester, a solenoid-winding, a short-circuited secondary therefor, a core for said solenoid, and an air-gap in series with said solenoid having a movable electrode actuated by said core.

5. In a lightning-arrester, an air-gap, a solenoid in series therewith and adapted to vary the length thereof, and a closed conducting-circuit in inductive relation to the winding of said solenoid.

6. In a lightning-arrester, an air-gap, a solenoid adapted to vary the length thereof, and

a conducting-envelop for the winding of said solenoid completely surrounding said winding.

7. In a lightning-arrester, an air-gap, an electromagnetic device adapted to vary the length of said gap upon the passage of current, and a closed conducting-circuit in inductive relation to the winding of said device.

8. In combination, a line-wire, a circuit from said line-wire to earth, including a non-inductive resistance and an air-gap, an electromagnetic device in said circuit adapted to increase the length of said air-gap, and a closed conducting-circuit in inductive relation to the winding of said device.

9. In combination, a line-wire, a circuit from said line-wire to earth, including a series resistance, a solenoid with an air-gap, a closed conducting-circuit in inductive relation to the winding of said solenoid, and a core for said solenoid adapted to vary by its movement the length of said air-gap.

Signed at Pittsfield, Massachusetts, this 4th day of August, 1903.

CUMMINGS C. CHESNEY.

Witnesses:

L. A. HAWKINS,  
R. E. HAYNES.