

No. 618,950.

Patented Feb. 7, 1899.

E. C. PARHAM.  
LIGHTNING ARRESTER.

(Application filed June 26, 1897.)

(No Model.)

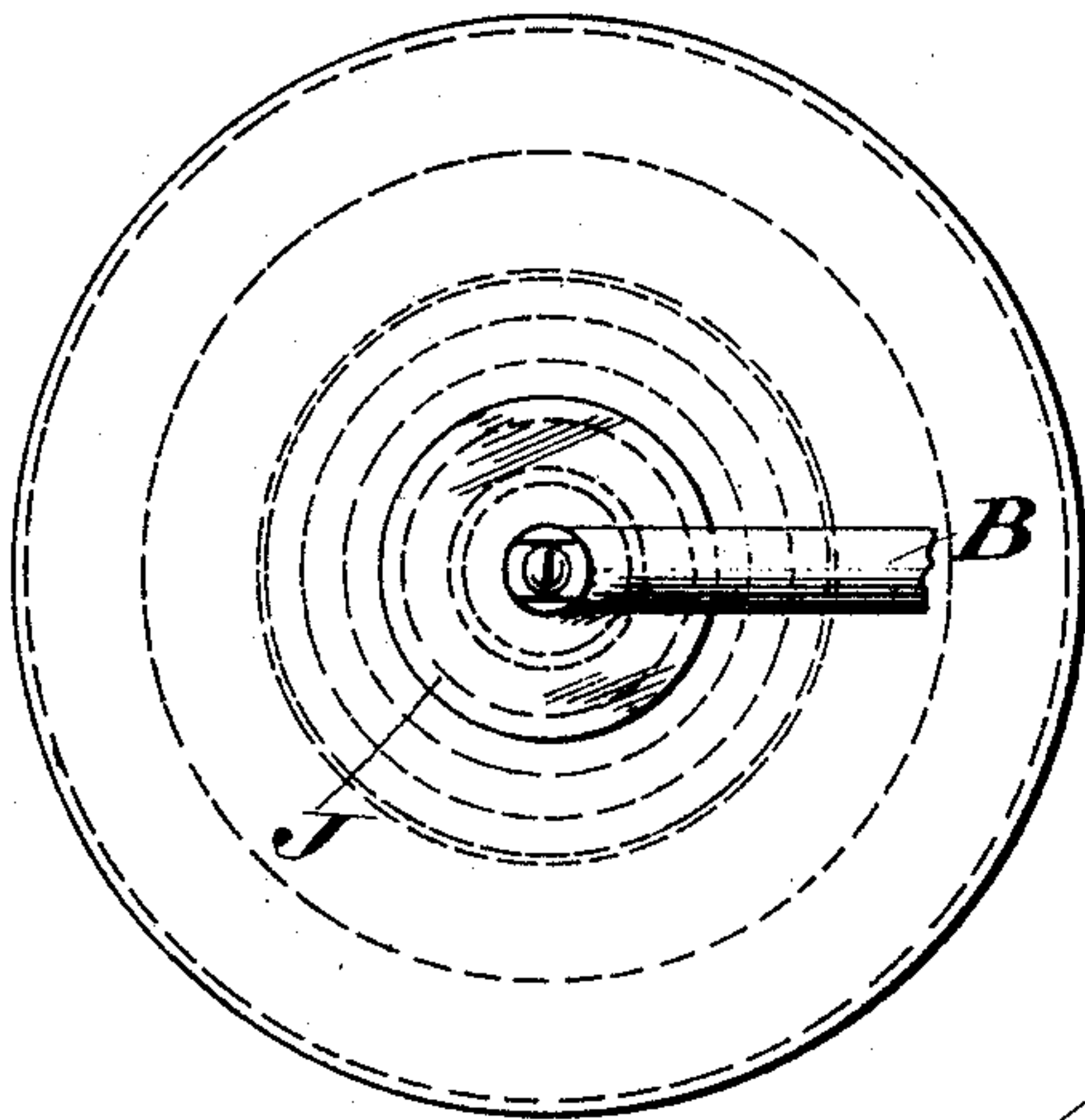


Fig. 1.

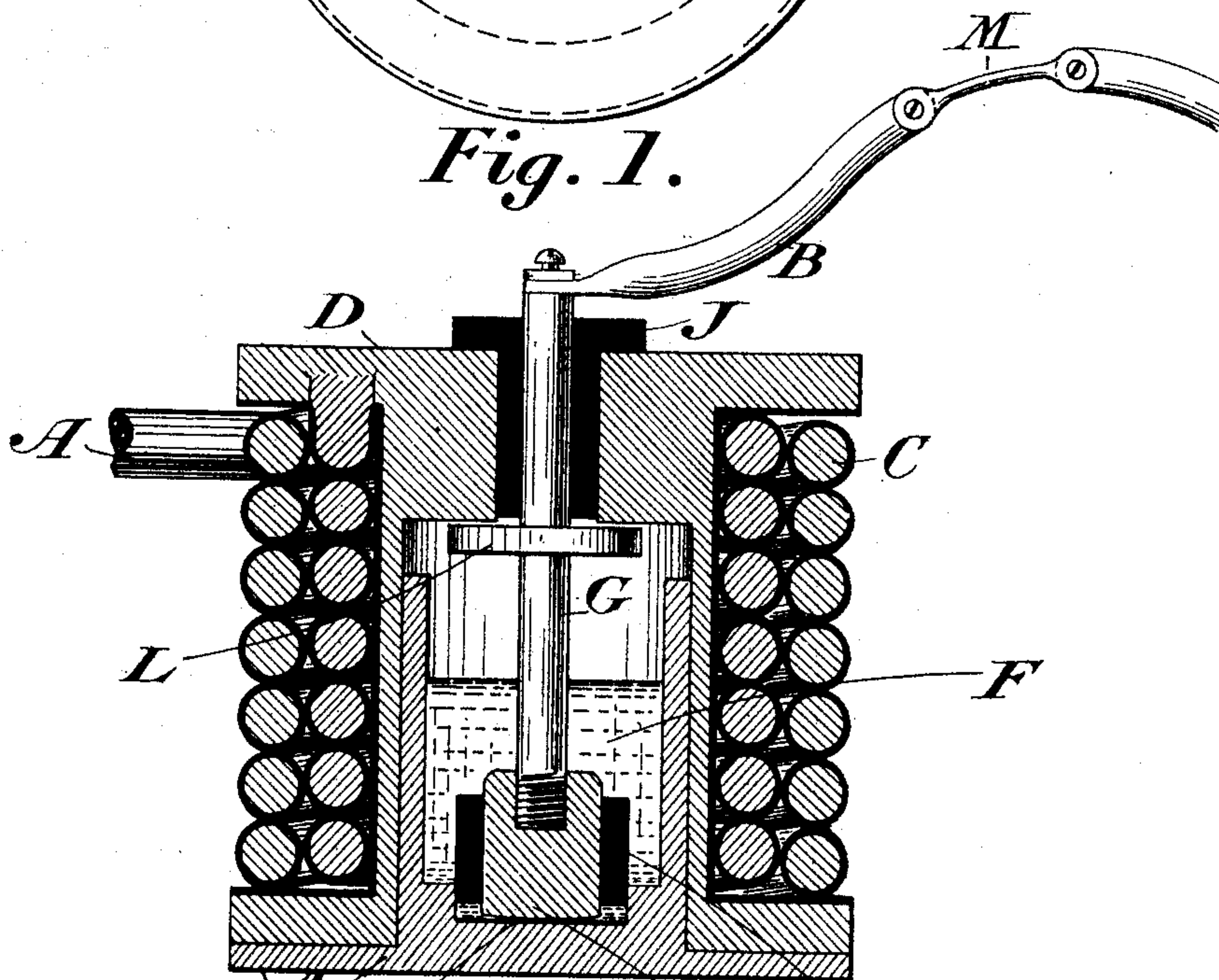


Fig. 2. H J'

WITNESSES:

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# UNITED STATES PATENT OFFICE.

EUGENE CHILTON PARHAM, OF JOHNSTOWN, PENNSYLVANIA, ASSIGNOR  
TO THE STEEL MOTOR COMPANY, OF SAME PLACE

## LIGHTNING-ARRESTER.

SPECIFICATION forming part of Letters Patent No. 618,950, dated February 7, 1899.

Application filed June 26, 1897. Serial No. 642,550. (No model.)

*To all whom it may concern:*

Be it known that I, EUGENE CHILTON PARHAM, of Johnstown, Cambria county, Pennsylvania, have invented certain new and useful Improvements in Lightning-Arresters, of which the following is a specification.

My invention relates to lightning-arresters suitable for use with electrical apparatus, such as station-generators and railway-motors; and the object of my invention is the provision of a device in which the gap for the static discharge to cross is reduced to a minimum, in which efficient means are provided for short-circuiting the arc thus formed, in which means are provided for extinguishing the said arc, and which will be reliable in operation, compact in form, and cheaply constructed.

To these ends my invention consists in providing an electromagnet, the energizing-coil of which forms part of the path for the static discharge and for the regular current which follows the said discharge.

My invention further consists in short-circuiting the arc direct to ground by means of a movable contact actuated by the said magnetic field.

My invention further consists in the means I supply for reducing the length of the gap which the static discharge is obliged to bridge.

My invention further consists in the improved arrangement, construction, and combination of parts which will now be described, due reference being had to the drawings accompanying this specification.

Referring to the said drawings, Figure 1 is a plan, and Fig. 2 a vertical cross-section, of a lightning-arrester embodying the various features of my invention.

A is the wire leading from one side of the circuit, and B is the wire connecting with the other side of the circuit.

C is a coil of wire connected at one end to A and at the other end to the member D, preferably made of brass, which is encircled by said coil. E is a base, also preferably of brass, which fits the upper member D, so as to make a closed cavity in which is placed the oil F. Through the center of the cavity passes the vertically-movable plunger G, carrying at its lower end an armature H of mag-

netizable material, which rests on a sheet I of perforated mica, which is placed in the bottom of the receptacle. The upper end of the post G passes through the member D and is connected by B with one side of the circuit.

J and J' are insulators, the latter being so arranged as not to prevent communication between the lower and upper parts of the oil-chamber, either by making it fit loosely or by making it more or less porous, or, if desired, providing a special passage through it.

L is a collar secured about the post B at a short distance from the top of the cavity.

The action of my device is as follows: In case a current of very high potential, such as that caused by a static discharge, flows through the circuit it will pass through the coil C, through D and E, bridge the perforations in the mica I, passing directly through the post G to ground. The regular current will of course follow the path thus made by the current of higher potential and in so doing will energize the coils A, so that they will act as the coil of a solenoid and raise the armature H until the collar L comes into engagement with the member D. This will at once provide a short path to ground for the static discharge or for the regular working current which follows the static discharge. Any suitable safety device, such as a fuse M or a magnetic circuit-breaker which is provided in the circuit, will then be opened, and the moment that this is opened the armature H will again fall back to its normal position. The safety device may then be closed and the working circuit again be established. As the armature H rises the arc between H and D will be lengthened and thereby to some extent weakened, and at the same time the arc will receive the well-known arc-extinguishing effect of the oil by which it is surrounded. As soon as the short circuit between L and D is formed the current will tend to take this path as being the path of least resistance. This tendency therefore coöperates with the oil to rapidly extinguish the arc.

I prefer to surround my device with a suitable protecting-box; but this is not here shown, as it is not material to my invention.

I do not limit myself to the specific embodiment of my invention which I have



shown and described, for my invention has a broader scope and could be modified in many ways without departing outside the scope of my invention.

5 Having thus described my invention, what I claim, and desire to protect by Letters Patent, is—

1. The combination, in a lightning-arrester, of a coil, a movable plunger therein having  
10 a magnetizable electrode at its end, a second electrode adjacent to and separated from the magnetizable electrode, a contact member, as L, carried by said plunger, and a contact member, as D, in the line of movement of said con-  
15 tact member L, each of the said contact members being in electrical connection with one of the electrodes.

2. The combination, in a lightning-arrester, of two pairs of normally-separated electrodes,  
20 and means for simultaneously increasing the gap between one of said pairs and closing the gap between the other of said pairs, when current is flowing through the device.

3. In a lightning-arrester, the combination  
25 with a pair of separated electrodes for the current to bridge, of a coil in circuit with the gap between said electrodes, a standard carrying one of said electrodes and adapted to be moved when current is passing through  
30 the said coil, and a pair of contacts which are made to engage each other when the plunger is moved and adapted by their engagement to establish a short circuit about said gap.

4. The combination, in a lightning-arrester,  
35 of a coil, an electrode within the coil and adapted to be moved when the same is energized, a second electrode adjacent to but separated from said movable electrode, a connection from one side of the circuit, through  
40 the coil, to said second electrode, a connection from the first-mentioned electrode to the opposite side of the circuit, and a pair of

contacts adapted to be brought into engagement with each other by the movement of the first-mentioned electrode and thereby estab- 45  
lish a short circuit about the electrodes.

5. The combination, in a lightning-arrester, of a coil, a plunger within and adapted to be actuated by the same, a pair of electrodes  
50 carried by the plunger and electrically connected together and to one side of the circuit, a pair of stationary electrodes located respectively above and below the aforesaid electrodes, said stationary electrodes being electrically connected to each other and through  
55 the said coil to the opposite side of the circuit.

6. The combination of a closed metallic vessel in connection with one side of the circuit through a coil surrounding said vessel, 60  
a movable plunger within said vessel connected with the opposite side of the circuit, an armature carried by said plunger adjacent to the bottom of the vessel, and an arc-extinguishing medium within said vessel. 65

7. In a lightning-arrester, the combination of a metallic vessel containing an arc-extinguishing medium, surrounded by a coil, and in electrical connection therethrough with  
70 one side of the circuit, a vertically-movable standard within said vessel and in electrical connection with the opposite side of the circuit, a magnetizable member carried by said standard and normally resting upon a perforated insulator in the bottom of said vessel, 75  
and a contact member also carried by said standard so that in the upward movement thereof, it will engage a portion of said vessel.

In testimony whereof I have affixed my signature in presence of two witnesses.

EUGENE CHILTON PARHAM.

Witnesses:

W. MILT. BROWN,  
RICHARD EYRE.