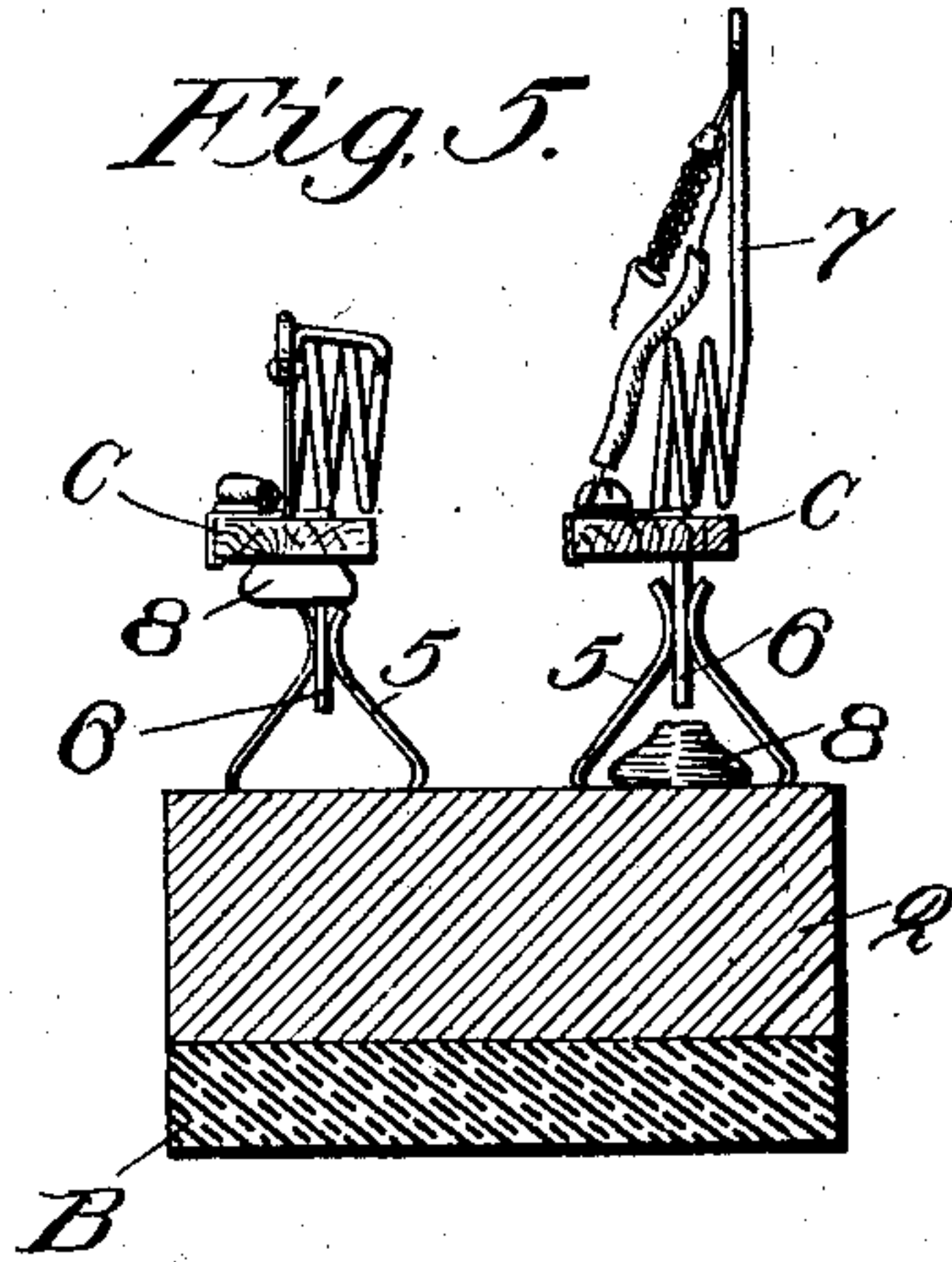
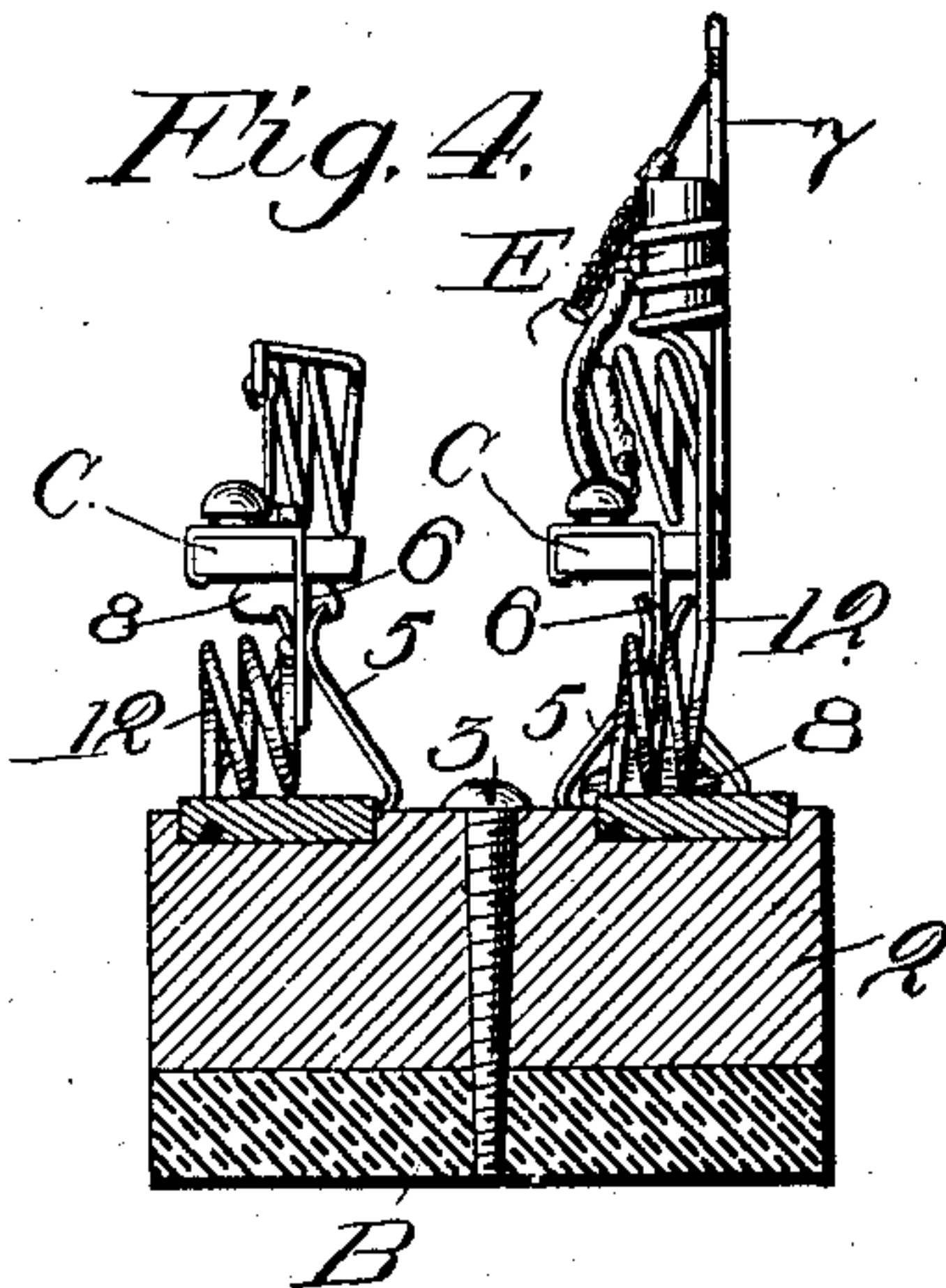
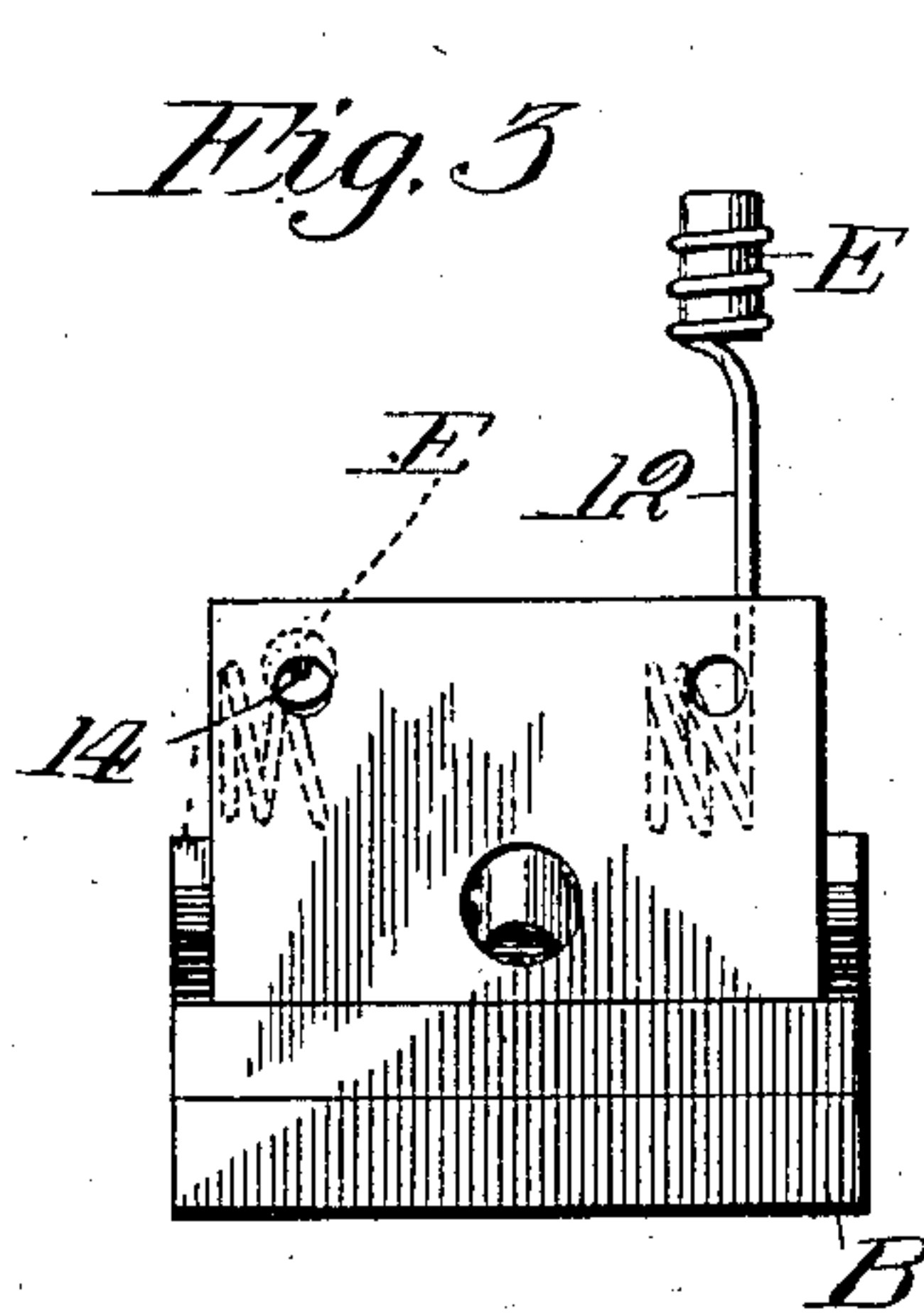
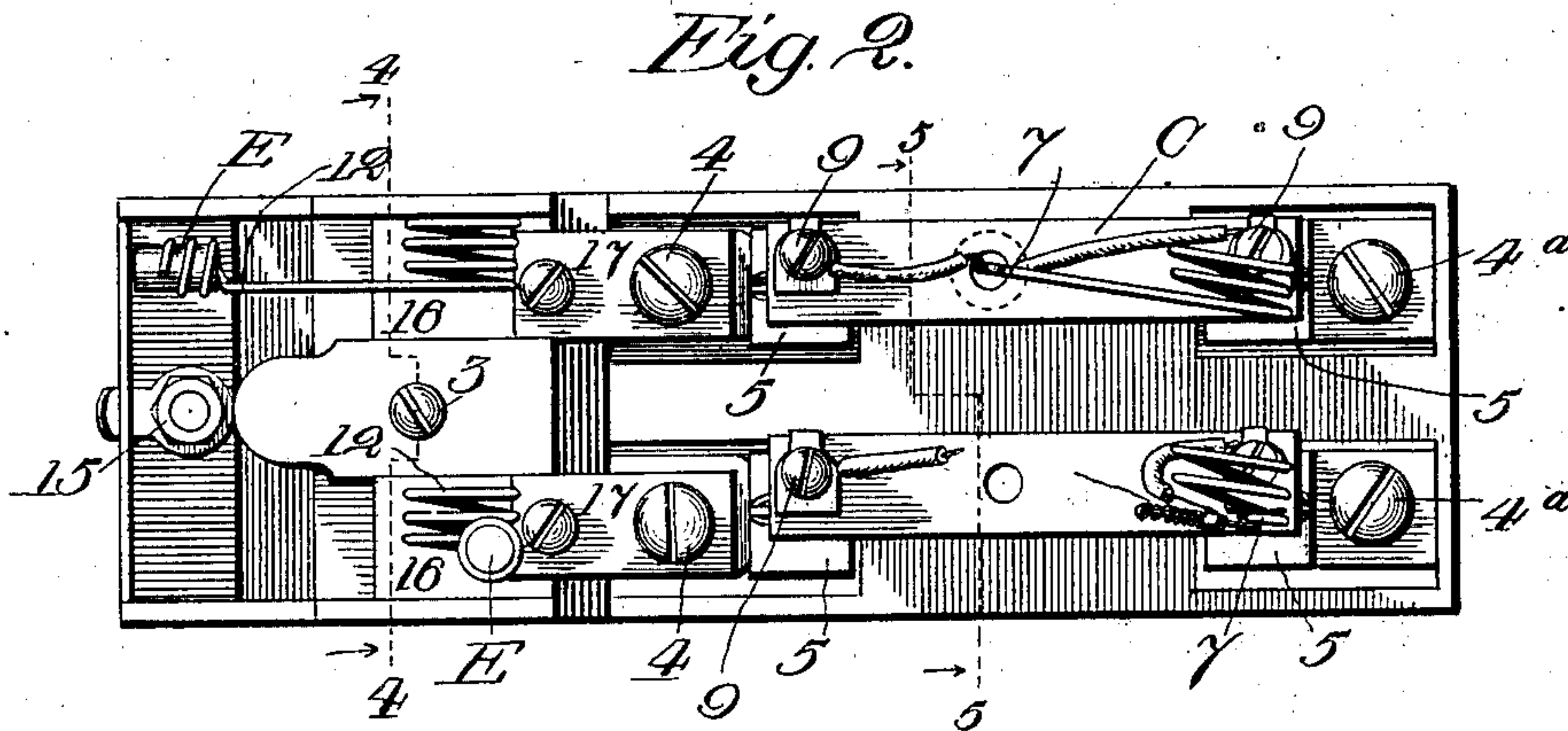
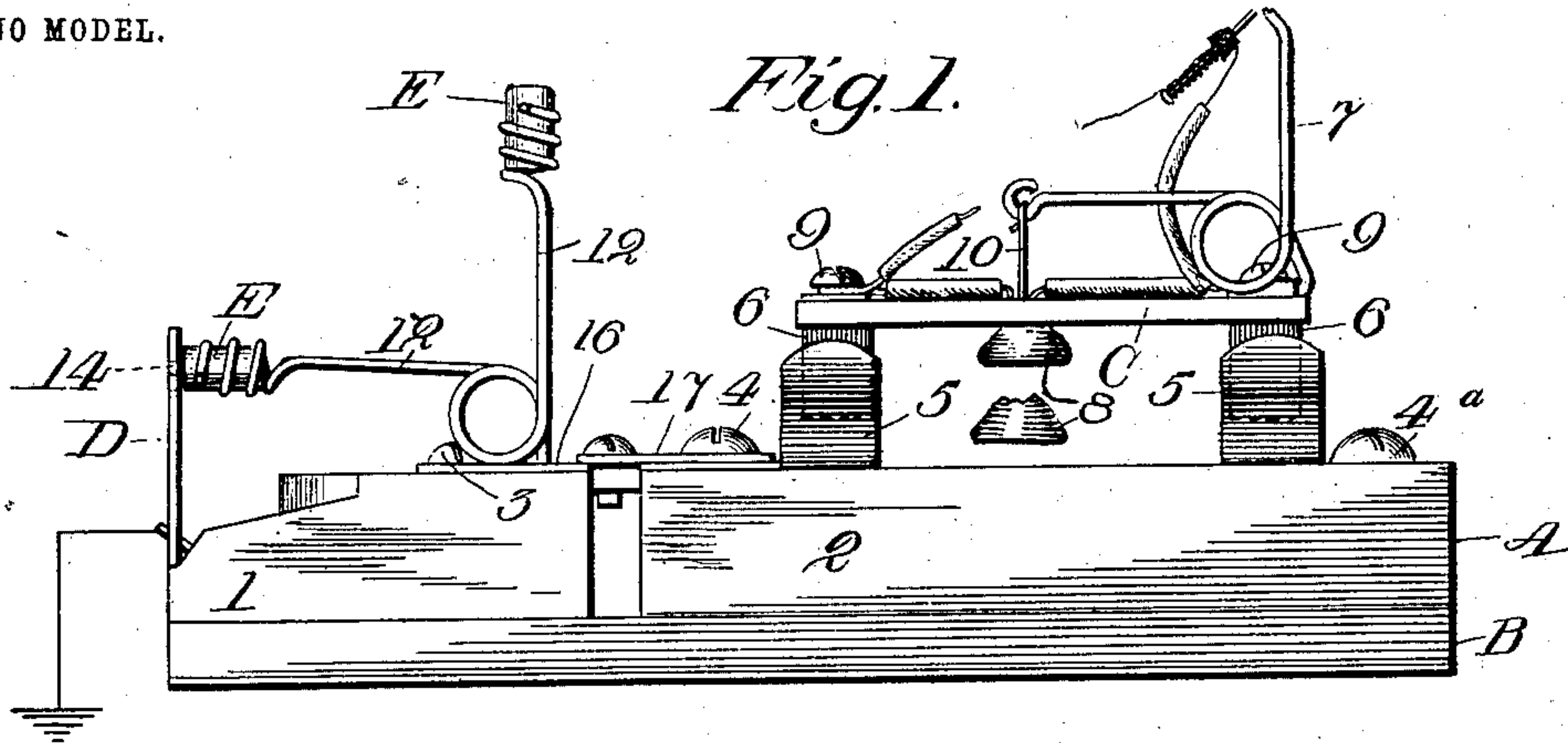


No. 724,507.

PATENTED APR. 7, 1903.

C. A. ROLFE.  
ELECTRICAL PROTECTOR.  
APPLICATION FILED JUNE 6, 1900.

NO MODEL.



Witnesses:  
Harry S. Gauthier.  
May W. Label.

Inventor:  
Charles A. Rolfe:  
By Charles A. Brown & Cragg,  
Atty's.



# UNITED STATES PATENT OFFICE.

CHARLES A. ROLFE, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE ROLFE ELECTRIC COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

## ELECTRICAL PROTECTOR.

SPECIFICATION forming part of Letters Patent No. 724,507, dated April 7, 1903.

Application filed June 6, 1900. Serial No. 19,294. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES A. ROLFE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Electrical Protectors, (Case No. 2,) of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to devices for protecting low-tension instruments and circuits from the effects of exceedingly high potentials and excessively strong currents.

Prominent objects of my invention are to provide an exceedingly simple and inexpensive protective device for guarding against both sneak-currents and unduly strong currents and to arrange for the prevention of injurious effects of the discharge of lightning and other high potentials.

To the attainment of the foregoing and other desired ends my invention consists in matters hereinafter set forth.

In the accompanying drawings, Figure 1 is a side elevation of a protective device embodying my invention. Fig. 2 is a plan view of the same. Fig. 3 is an end elevation of the device; and Figs. 4 and 5 are sections taken on lines 4-4 and 5-5, respectively, in Fig. 2.

The device illustrated in the drawings is provided with an insulating-base A, which may be of any suitable material, preferably porcelain or slate. This is generally made in two parts 1 and 2, the former being for that portion of the device which is to protect against sneak and unduly strong currents and the latter being for that portion which is to protect against lightning or like discharges.

The two portions of the insulating-base are desirably mounted upon a strip B, which can be of any suitable material. In practice it is generally made of ebonite. When large numbers of the devices are used in one locality, they are all mounted upon a single strip B, which serves as a suitable support for them. The base portions 1 and 2 are secured to the strip B in any suitable way, as by screws 3 4 4 and 4<sup>a</sup> 4<sup>a</sup>.

The portion of the instrument for guard-

ing against unduly strong currents comprises a couple of removable holders C C, which are desirably mounted upon the base portion 1, a simple arrangement being to provide the base portion with a couple of pairs of spring-contact jaws 5 5 and to provide the holders with blades or shanks 6 6, adapted to slide into and out of the jaws 5 5. The holders C C each consist of a straight strip or piece of insulating material, such as hard rubber or fiber. The blades or shanks 6 6 are secured to the ends of the holders C C, as by bending them over the top surfaces of the holder, as shown in Fig. 4, and fastening the bent-over parts by screws. Each holder C is provided with a spring 7, secured at one end of the holder and extending lengthwise of the same to about the middle thereof. The free end of each spring 7 is held under tension by a device responsive to unduly strong currents—such, for instance, as the fusible or softenable button 8. This fusible button contains a coil of fine or high-resistance wire, whose ends extend and are connected to the blades or shanks 6 6, as by the screws 9 9. The holder C is provided with an aperture into which the top portion of the fusible button 8 can fit and through which a hook 10 can extend. The hook 10 has its upper end engaged with the free end of the spring 7. The holder C thus acts both as a support for the spring 7 and as means for holding the fusible button 8 against the tension of the spring.

It will be understood that the line is connected to the contact-screws 4 4 and the instrument to the contact-screws 4<sup>a</sup> 4<sup>a</sup> and the latter with the spring-jaws, so that the fine-wire heat-coils of the fusible buttons 8 8 are respectively connected in opposite sides of the circuit.

In the operation and use of the device the fusible or softenable buttons will normally hold the springs 7 7 against their tendency to spring upward, and the circuit will be complete or closed through such heat-coils. When a sneak or an unduly strong current intrudes upon the lines, however, the heat which is generated in the fine-wire heat-coil will operate to fuse or soften one or both of the buttons 8 8, which will thereupon release



the corresponding spring or springs 7 7, and these in operating will tear the fine-wire coil from the button and sever or break it, thereby opening or breaking one or both sides of the circuit, according as one or both of the buttons are operated.

Certain of the broader features of this construction of device for protecting against unduly strong currents are shown, described, and claimed in Patent No. 445,217, of January 27, 1891, to Albert Barrett, the construction herein shown being intended principally as an improvement in specific arrangement and construction of the spring and responsive device normally holding the spring under tension. In regard to the difference between the construction of this application and that of the said Barrett patent it will be observed that in my arrangement the holder C itself acts as a holder for the fusible button 8, as well as a holder or support for the spring 7, whereas in the Barrett patent a separate holder for the heat-coil is employed and secured to the holder for the spring. It will be further noticed that in the form of my arrangement illustrated in the drawings the spring is arranged on one side of the holder C and the fusible button 8 on the other side thereof and that the spring and button are connected by a hook 10 or like connection extending through a hole in the holder smaller than the fusible button.

The portion of the device for protecting against lightning consists of a ground-electrode D and two line-electrodes E E for the opposite sides of the line. The form of ground-electrode shown consists of a vertically-arranged iron plate or strip having a lateral flange, by which it is secured to the base portion 2. The line-electrodes E E are illustrated as cylindrical carbon blocks, and these are arranged so that their end surfaces are in position opposite and close to the upper portion of the ground-electrode D. All of the electrodes D and E E are coated with an adhesive insulating substance, in accordance with the invention of my application, Serial No. 723,754, filed January 13, 1899, for lightning-arrester. As a specific arrangement and matter of improvement over the invention of said application I first coat the carbons with shellac and while this is still in a liquid state sprinkle upon it finely-powdered glass.

The line-carbons E E are respectively carried by springs 12 12, which tend to swing upward and hold the carbons in a position away from the ground-electrode D, as shown in Figs. 1, 2, and 3. The springs 12 12 are held under tension, so as to keep the carbons E E in proximity to the ground-electrode D, by small pegs or pins 14 14, inserted in the ends of the carbons E E and arranged to extend through apertures in the ground-electrode D. These pins 14 are made of hard rubber or like slowly-softenable insulating material. The action of the lightning-ar-

rester is that lightning under ordinary circumstances may discharge between one of the electrodes E and the electrode D without changing or interfering with the condition of the device; but should the discharge become of considerable volume, as when augmented by a trolley-current, so as to form a continuous and injurious arc, the pin 14 will be softened to such an extent that the spring will break it, whereupon the spring will be released and will fly upwardly, thereby separating the line-electrode E widely from the ground-electrode D. This forms such a wide gap between electrodes that the lightning can no longer jump across this space, and all future trouble is avoided.

In place of the pins 14 14 any suitable device holding the carbons E E in proximity to the ground-electrode D and responsive to an arc across the space between said carbons, so as to release the springs, can be employed.

The ground-electrode D is of course understood to be connected to ground, as by a wire extending from the contact or binding post 15, and the line-carbons E E are understood to be connected with the opposite sides of the line, a simple arrangement being to secure the springs 12 12 to metallic blocks or pieces 16 16 and to connect the latter with the adjacent spring-jacks 5 5 by metallic strips 17 17.

From the foregoing it will be seen that the device not only affords protection against sneak and unduly strong currents, but also against lightning, and also that the ground connection for the lightning will be entirely separated or opened when the discharge to ground becomes sufficiently great in volume to form an arc. This latter feature, it should be understood, I consider now in its broad conception, as well as in the specific construction herein set forth for carrying that conception into effect.

The instrument thus embodying a heat-responsive device for sneak-currents in combination with a lightning-arrester provided with means for rendering it inoperative upon the passage of an arc not only provides for the opening of the line upon the intrusion of a sneak or unduly strong current upon it, but also protects against the backing up of that current upon the lightning-arrester, and thereby doing damage there and upon the ground-circuit.

It will be understood that either one of the separate features herein set forth can be used alone as well, as in combination, as herein described.

What I claim as my invention is—

1. The combination of a spring carrying an electrode at its free end, a fixed electrode, and a pin of softenable material engaging said electrodes and holding the spring against action, substantially as described.

2. The combination of a spring 12 having a graphite electrode E at its free end, a pin of softenable material projecting from said



electrode, and a second electrode D having an aperture adapted to receive the pin in the electrode E, substantially as described.

3. In a lightning-arrester, an electrode  
5 coated with an adhesive insulating substance and small particles of insulating material, substantially as set forth.

4. In a lightning-arrester, an electrode

coated with shellac, and also with a finely ground or powdered insulator, such as glass. 10

In witness whereof I hereunto subscribe my name this 19th day of May, A. D. 1900.

CHARLES A. ROLFE.

Witnesses:

A. MILLER BELFIELD,  
HARVEY L. HANSON.