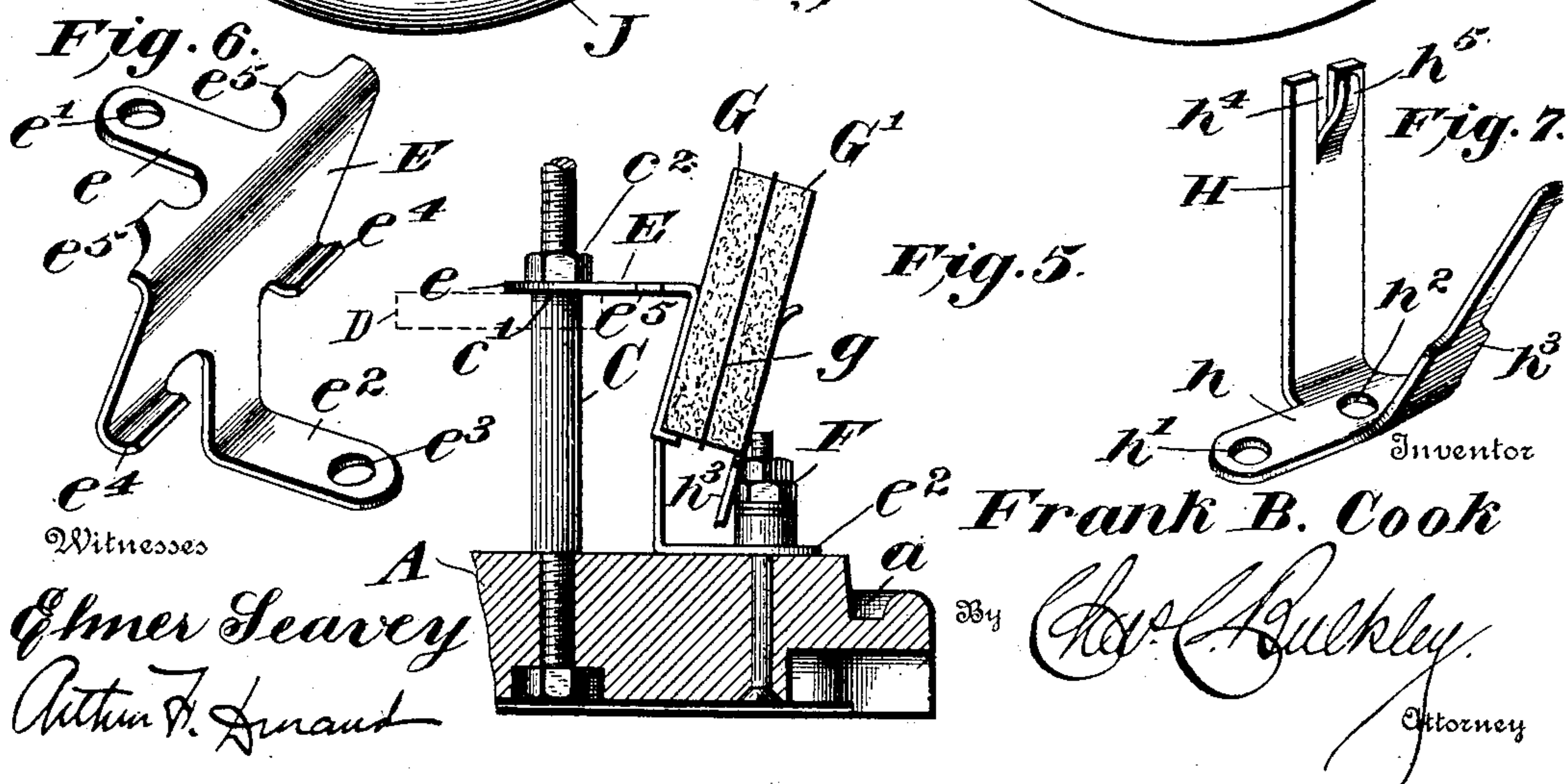
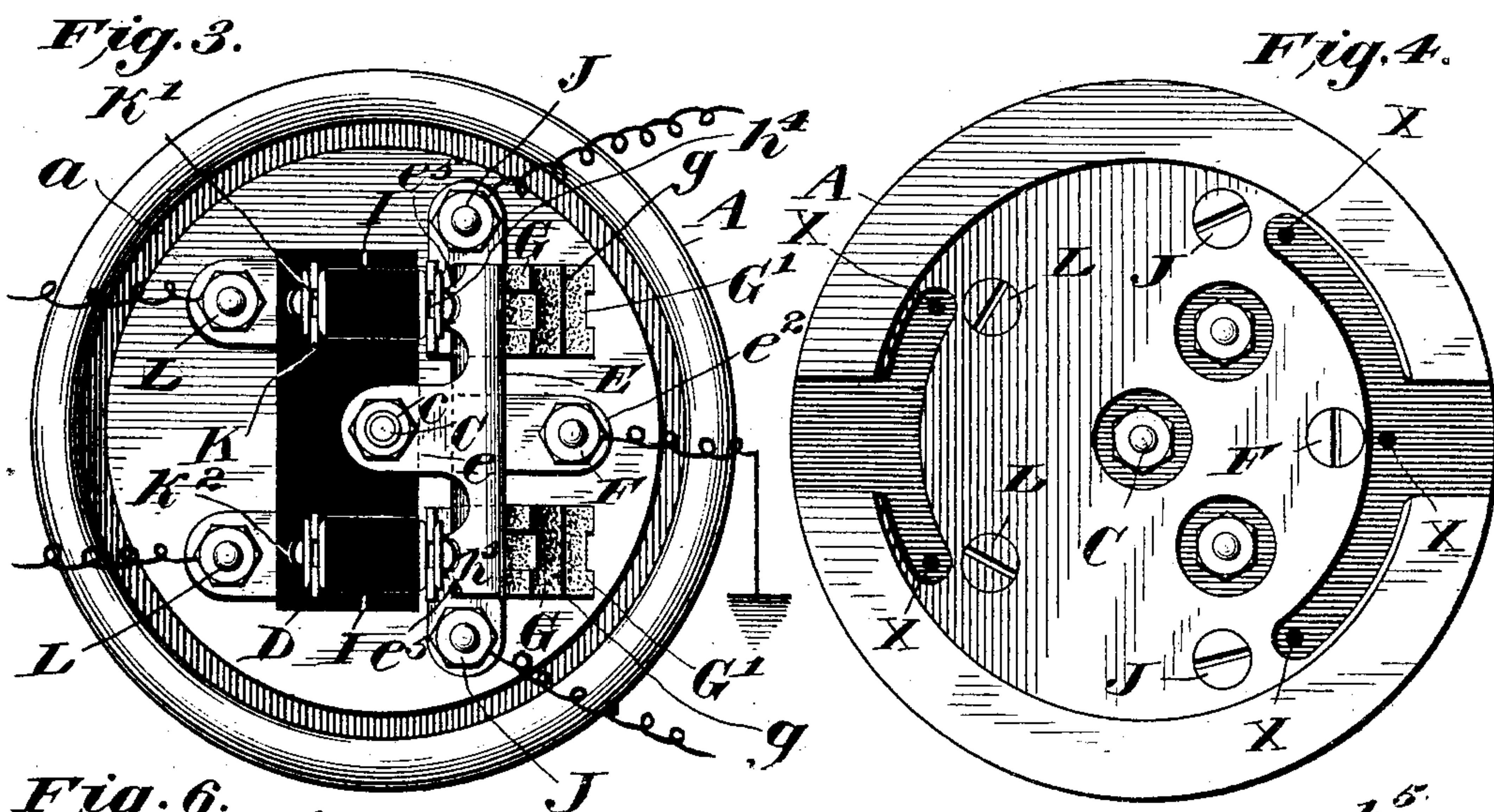
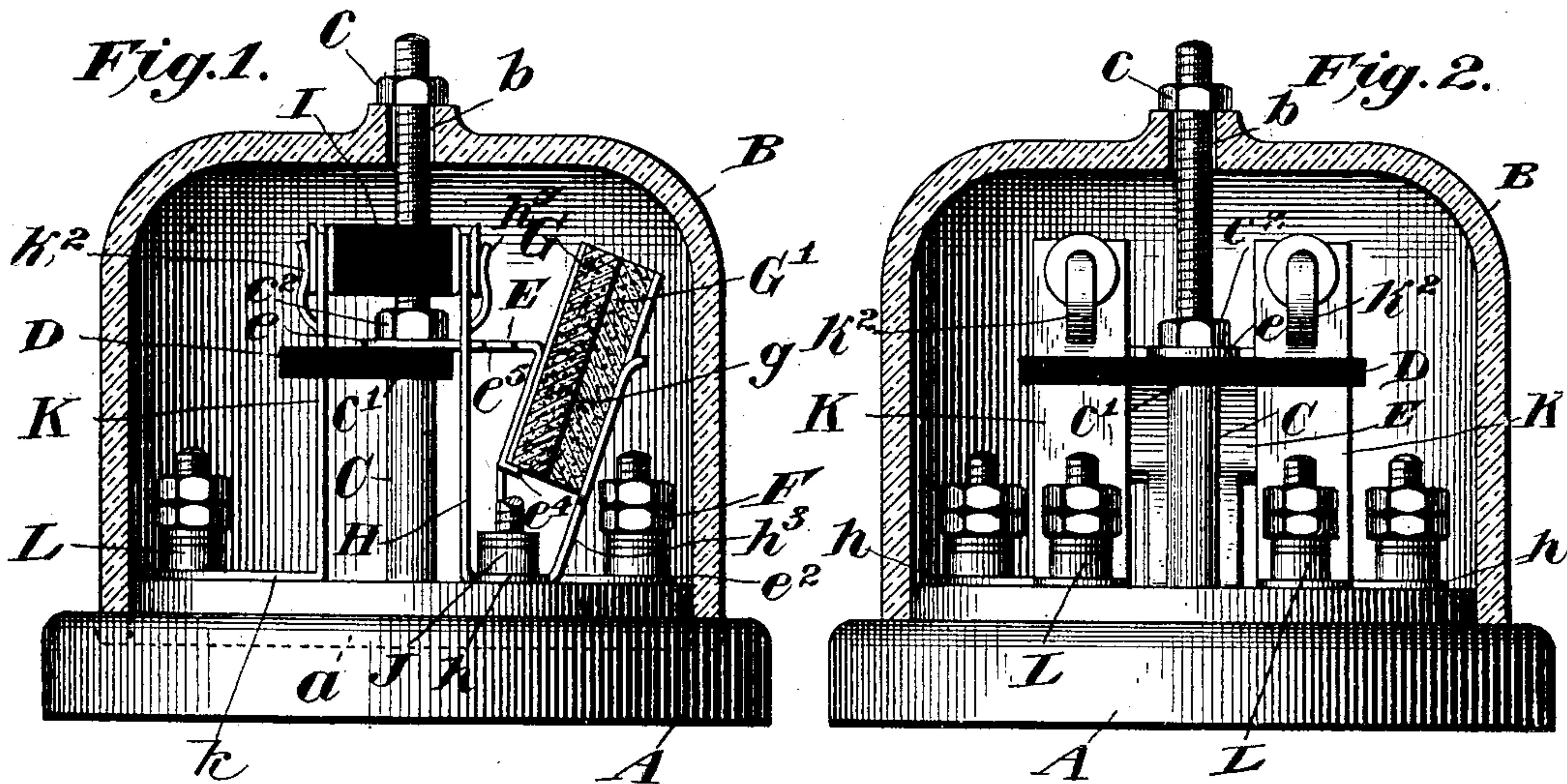


F. B. COOK.

ELECTRICAL PROTECTOR SET.


(Application filed May 21, 1902.)

(No Model.)



Witnesses

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UNITED STATES PATENT OFFICE.

FRANK B. COOK, OF CHICAGO, ILLINOIS.

ELECTRICAL PROTECTOR SET.

SPECIFICATION forming part of Letters Patent No. 707,050, dated August 12, 1902.

Original application filed July 29, 1896, Serial No. 600,970. Divided and this application filed May 21, 1902. Serial No. 108,329. (No model.)

To all whom it may concern:

Be it known that I, FRANK B. COOK, a citizen of the United States of America, and a resident of Chicago, Cook county, Illinois, have
5 invented a certain new and useful Improvement in Electrical Protector Sets, of which the following is a specification.

This is a division of my application, Serial No. 600,970, filed July 29, 1896. In said application I have described and claimed an improved form of thermal protector for electrical circuits. The invention hereinafter described consists of a compact self-contained device involving a plurality of these thermal protectors. The said device is adapted more
15 particularly for use in connection with subscribers' telephone sets. It also, as will hereinafter more fully appear, involves a simple and efficient construction and arrangement whereby a plurality of the aforesaid thermal protectors may be employed in conjunction with a plurality of lightning-arresters. The thermal protectors are adapted to afford protection against the intrusion of currents only
25 slightly in excess of normal, sometimes called "sneak-currents." In this way the device, which, as stated, is of a compact and self-contained character and which preferably involves a porcelain base and a glass cover, is capable of protecting the subscriber's telephone set against the intrusion of currents of different character.

Generally stated, it is the object of my invention to provide a simple and comparatively inexpensive construction whereby a
35 plurality of electrical protectors may be combined and efficiently employed in a compact and easily-accessible structure.

A special object is to provide a construction in which the protectors are so mounted and inclosed as to be easily connected with the circuit-wires.

Another object is to provide a construction and arrangement for securing an efficient
45 cooperation between different kinds of protectors.

It is also an object to provide certain details and features of improvement tending to increase the general efficiency and service-
50 ability of a device of this character.

To the foregoing and other useful ends my

invention consists in matters hereinafter set forth and claimed.

In the accompanying drawings, Figure 1 is a side elevation of a circuit-protecting device 55 embodying the principles of my invention, the glass dome or cover being shown in section. Fig. 2 is a similar view showing another side of the device. Fig. 3 is a plan of the device illustrated by Figs. 1 and 2. Fig. 4 is a bot- 60 tom view of the said device. Fig. 5 is a detail sectional view illustrating a portion of the supporting structure for the protecting devices. Fig. 6 is a perspective of one of the metal plates involved in the structure 65 for supporting the lightning-arresters. Fig. 7 shows one of the metal plates which serves to partially support one of the lightning-arresters and also one of the heat-coils involved in the thermal protector. 70

As thus illustrated, my invention comprises a suitable base A, which may be of porcelain or any other suitable material and which is adapted to serve as a support for the various binding-posts, springs, posts, carbon blocks, 75 heat-coils, &c., involved in the structure. The said base is preferably provided with an annular groove or channel *a*, adapted to receive the circular lower edge or perimeter of the cover B. This cover is preferably of glass 80 and, as will be observed, can be in the form of a dome. The top of the said cover is preferably provided with an opening *b*, adapted to receive the upwardly-projecting post C. As illustrated, the said post rises from the 85 center of the base and its upper end portion is threaded to receive a clamping-nut *c*. This nut, it will be seen, bears upon the top of the cover B and keeps the latter properly seated in the groove or channel *a*. It will also be 90 observed that this post is formed with a shoulder *c'*, upon which rests the flat strip or block of insulation D. A metal plate E preferably rests upon this strip or block of insulation, the said plate being provided with a horizon- 95 tal portion *e*, having an opening *e'*, adapted to receive the reduced threaded portion of the post C. In this way the other nut *c*² can be arranged to clamp both the plate E and the block of insulation D firmly upon the 100 shoulder *c'*. This plate E is also preferably formed with a lower horizontal portion *e*²,

having an opening e^3 . The bolt of the binding-post F can be arranged to pass through this opening e^3 , and the said post can in this way be employed for clamping the lower portion of the plate in place upon the base A.

With respect to the use of this plate as a means for partially supporting the lightning-arresters its lower edge can be formed with shoulders or ledges e^4 , adapted to provide seats or resting-places for the lower ends of the carbon blocks G. With respect to the use of this plate as one member of a spring-switch for grounding an abnormally large current its upper edge can be provided with contact-points e^5 , adapted to make contact with the flexible posts or springs H. These posts or springs are, it will be observed, preferably provided with base portions h , having the openings h' and h^2 , and also with the upwardly-projecting portions h^3 . These portions h^3 cooperate with the plate B in holding the lightning-arresters. This will be understood more clearly by referring to Figs. 1 and 5, where it will be seen that the carbon blocks G and G' are held firmly between the said portions h^3 and the back or outer surface of the said plate E. Strips of insulation—as, for example, the layers of silk g —can be arranged between the carbon blocks, thus constituting the lightning-arresters. In this way the bent plates or spring-like members H are adapted, as will be seen, to not only partially support the heat-coils I, but to also partially support the carbon blocks of the lightning-arresters.

In addition these spring posts or members H are, as will hereinafter more fully appear, adapted to serve as a spring-switch for establishing connection between the line and the ground. The openings h' are adapted to receive the bolts of the binding-posts J. These binding-posts are in use preferably connected with the line-wires. The openings h^2 can receive small screws adapted to assist in securing these spring-like members to the base A. The upper end of each post or spring H is preferably provided with a notch h^4 and also with a small tongue or portion h^5 . Arranged opposite these posts H are a couple of similar posts K. The said posts K can be provided with base portions k , having openings adapted to receive the bolts of the binding-posts L. In this way the said binding-posts L, which are in use preferably connected with the instruments of the subscriber's telephone set, can be employed, like the other binding-posts previously described, for securing the post K firmly upon the base A. Like the springs H, the posts K preferably have their upper ends provided with notches k' and also with tongues or small portions k^2 . It will also be seen that the posts K are arranged to rise through openings in the strip or block of insulation D. In this way the posts K are practically held against movement, while the flexible posts or springs H are capable of more or less movement toward and away from the posts K. The said

heat-coils I can be of any suitable form or construction, but are preferably provided with heads or end portions adapted to engage the notches in the upper ends of the posts H and K. If desired, the internal construction of these heat-coils can be similar to that described in my aforesaid application. For this reason and in view of the fact that these heat-coils have attained a definite status in the art I have not shown or described any particular form or construction.

As thus constructed the device is adapted to serve as a protector in a complete metallic circuit. With one line-wire connected to one of the binding-posts J and with the other line-wire connected with the other binding-post J the heat-coils I will constitute part of the circuit and will serve as medium of electrical connection between the instruments and the line conductors. In this way all currents traversing the circuit pass through the heat-coils, it being observed that each heat-coil is connected up in series with the two posts upon which it is supported. The binding-post F can, as stated, be connected with the grounded conductor. With this arrangement a current only slightly in excess of normal will cause either one or both of the heat-coils I to operate and to produce a break or gap in the circuit. Either heat-coil in releasing one of the springs H will establish connection with the ground, inasmuch as either of said springs when released will make contact with the plate E. This plate being grounded, the abnormally large current will then be conducted to earth. Should the trespassing current be of a different character, however—as, for example, such as would result from a lightning-stroke or severe electrical storm—then the carbon blocks involved in the two lightning-arresters shown will serve as the medium of electrical connection between the line and the earth. In other words, the presence of the high-potential current on the line will cause the insulation or silk dielectric G in either arrester to burn away, and thereby allow the two carbon plates to come together. If the current is only transient, the momentary arcing from one carbon plate to the other will leave the silk practically intact; but, as explained, if the current is sufficiently strong it will burn out the silk and allow the two carbon blocks to come together. Thus it will be seen that the heat-coils and lightning-arresters are arranged in a compact and readily-accessible manner. The post C serves not only as a means of clamping the dome-shaped cover B in place, but also as a partial support for the protecting devices. The springs H are normally held under tension by the heat-coils, but when released make contact with the plate E. In this way the post C may also serve as a means for resisting the pressure of the springs H upon the plate E. The wires to be connected with the binding-posts can be inserted through the openings X in the base. After a heat-coil has been operated by

an abnormally large current the glass cover can be readily removed, and a new heat-coil can then be substituted for the old one.

The portions h^3 are springy in character and hold the carbon blocks firmly in contact with the plate E. Thus the post C, it will be seen, also serves to resist the spring tension of the said portion h^3 . In fact, the said post C not only serves as a means of clamping the cover in place, but also as a means of centering the various plates, springs, &c., and of holding the same against any displacement which might be due to the spring tension or to accidental bending of the different parts.

I claim as my invention—

1. A self-contained protecting device for complete metallic circuits, comprising a base composed of insulation, a post rising from said base, a dome-shaped glass cover clamped upon said base by a nut screwed upon the said post, and a plurality of protecting devices mounted upon said base and partially supported by said post.

2. A self-contained protector device for subscribers' stations, consisting of a plurality of heat-coil protectors, conductor-holders therefor and spring-contacts adapted to disrupt the circuit or circuits, together with high-tension protectors and holding-plate of insulating material secured by a central standard and serving to hold one side of contact-springs without movement in either direction, and a holding-plate for the high-tension protectors connected with the said central standard, the contact-points of which plate are held in the same position relative to the movable spring-contacts by the connection aforesaid.

3. The combination with a support, of a plurality of lines, carbon-holders mounted on said support, carbons in said holders, an earth branch connected with said holders, carbon-holders having carbons therein also mounted on said base, line branches connected with said last-named holders, and line-springs and heat-coils in series in the lines, the conducting earth branch being normally out of contact with said springs but adapted to contact therewith in the operation of the heat-coils, substantially as described.

4. The combination with a support, of a plurality of sets of opposing carbon-holders with normally separated carbons therein, sets of opposing line-springs also mounted on said support, heat-coils between the ends of said opposing springs, and a strip adjacent the free ends of one of said opposing sets of line-springs normally out of contact therewith but adapted to be engaged by any of said adjacent springs when the heat-coil in circuit therewith is operated by an abnormal current.

5. The combination with a base, of opposing carbon-holding spring-strips having normally separated blocks of carbon between their free ends, opposing line spring-strips in line with the other strips, one member of each pair of line-strips being electrically connected with one of the holding-strips, heat-

coils between the free ends of the line-strips, a stationary bar or strip mounted adjacent the free ends of one set of the line-strips with which they contact when the heat-coils are operated to release said free ends.

6. A device for protecting circuits against excessive current, consisting of a base, a post rising from said base, a cover resting upon said base, a nut applied to the outer end of said post and holding said cover upon said base, springs mounted upon said base, a stop arranged to limit the movement of said springs, said stop having an opening through which the said post extends, a nut clamping a portion of said stop upon a shoulder on said post, suitable connections for grounding said stop, one or more electric circuits including one or more of said springs, suitable connections for normally holding said springs away from said stop, one or more heat-concentrating members arranged to cause said last-mentioned connections to weaken or break upon the passage of excessive current through said circuit or circuits, said spring or springs, when released, operating to break said circuit or circuits and to establish connection with the ground through said stop.

7. The combination of a base having an annular groove, a post rising from said base, a glass cover seated in said groove, a nut applied to the outer end of said post for clamping said cover in place, automatic cut-out devices mounted upon said base and inclosed by said cover, and a member suitably connected with said post and arranged to cooperate with said cut-out devices in establishing connection with the ground.

8. The combination of a suitable base, a centrally-located post rising from said base, a cover and nut applied to the outer end of said post for clamping said cover upon the base, circuit connections mounted upon said base and including one or more springs held under tension, a stop connected with said post and adapted to limit the movement of said spring or springs, a binding-post for connecting said stop with a grounded conductor, heat-coil devices connected and arranged to release the connections holding said spring or springs under tension, the said spring or springs, when released as a result of the passage of excessive current through said heat-coils, operating to automatically establish connection with the ground through said stop.

9. The combination of a suitable base, a post rising from said base, a suitable cover, a nut applied to the outer end of said post for clamping said cover upon said base, suitable binding-posts mounted upon said base and inclosed by said cover, and automatic cut-out devices connected with said binding-posts and partially supported by said post.

10. A circuit-protector comprising a suitable base, a cover, a post rising from the base, a nut applied to the outer end of said post for clamping the cover upon the base, a stop mounted upon the base, a nut for clamping

a portion of said stop upon a shoulder on the post, a plurality of springs, carbon blocks interposed between said springs and said stop, other springs held normally away from said stop, a binding-post for connecting said stop with the grounded conductor, suitable binding-posts for including said last-mentioned springs in one or more circuits, and means for automatically releasing said last-mentioned springs upon the passage of excessive current through said circuit or circuits, the springs, when released, establishing connection with the ground through said stop.

11. In a protector set for electrical circuits, the combination of a suitable base, a metal plate mounted thereon and adapted to be connected with a grounded conductor, a pair of carbon blocks suitably held against said plate, a binding-post adapted to be connected with a line conductor, the carbon blocks being normally separated but adapted to come together and establish connection between the line and the grounded conductor through the

medium of said plate, a quantitative protector mounted to form part of the line-circuit, a member which when released by said quantitative protector establishes connection between the line conductor and the said plate, a post rising from said base, and a dome-shaped glass cover held in place upon said base by a nut screwed onto the threaded upper end portion of said base.

12. In a protector set for electrical circuits, the combination of a quantitative protector, an intensity-protector, means whereby the quantitative protector when operated produces a break in the circuit, and means whereby either protector when operated establishes connection between the line and a grounded member.

Signed by me at Chicago, Cook county, Illinois, this 14th day of May, 1902.

FRANK B. COOK.

Witnesses:

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