

(No Model.)

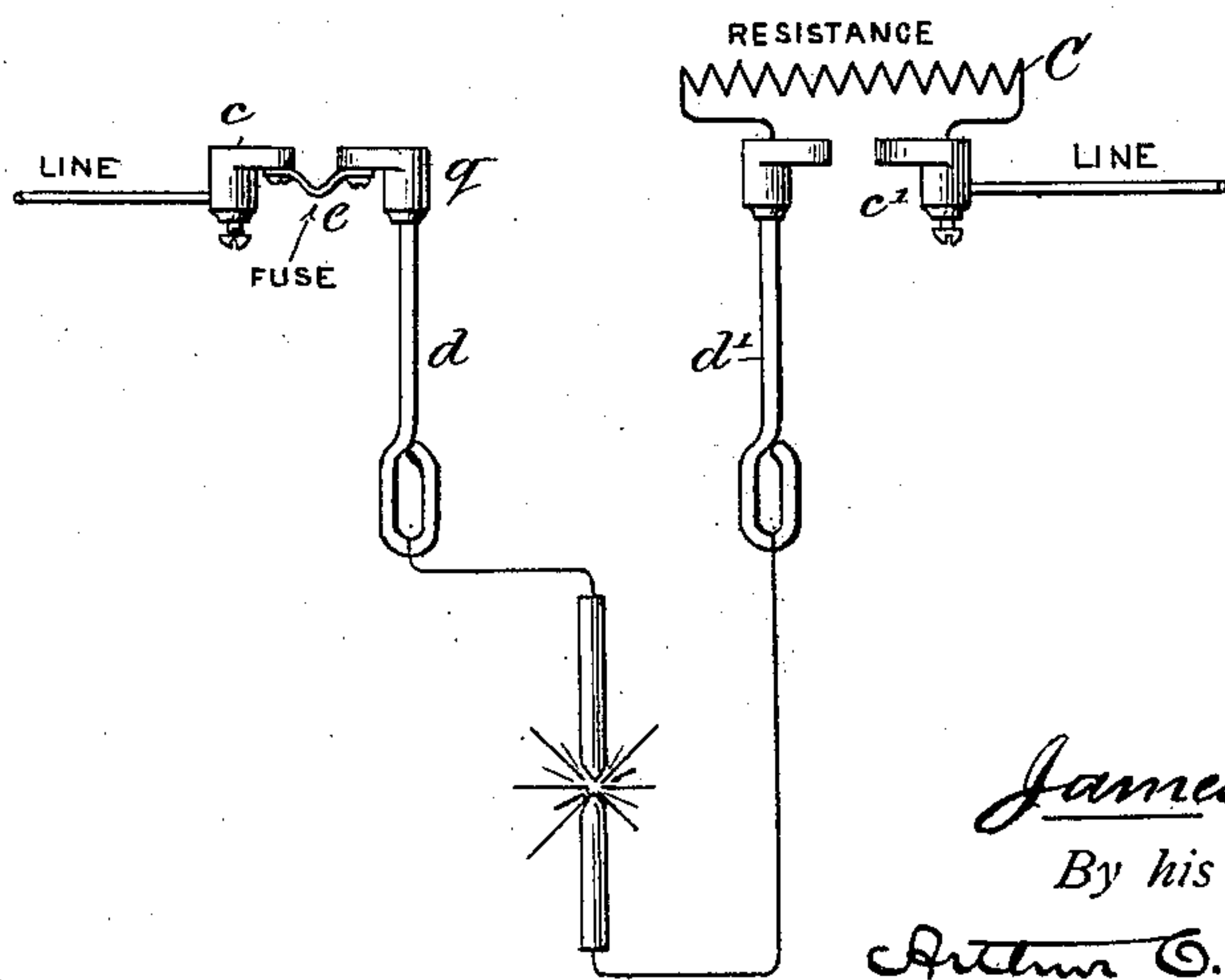
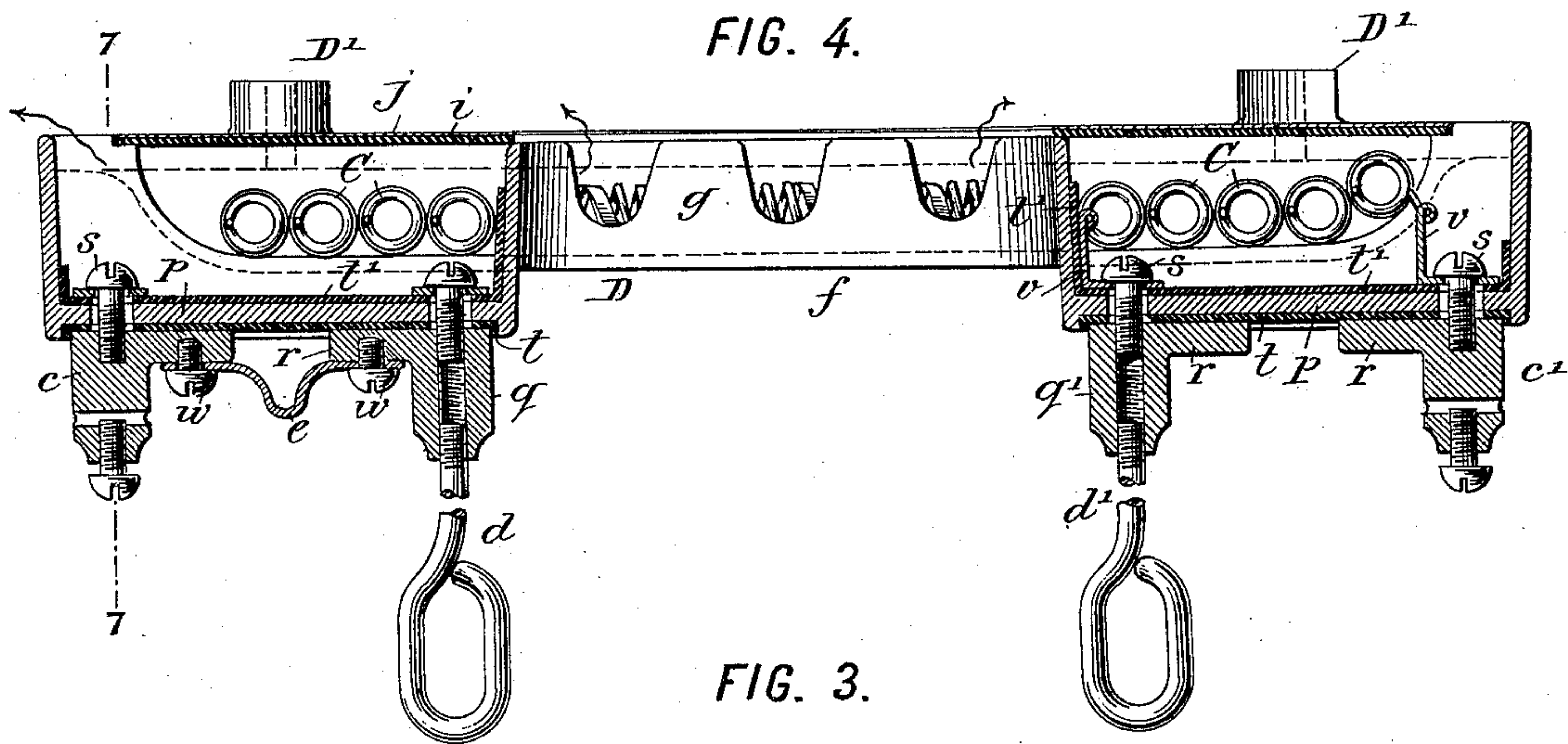
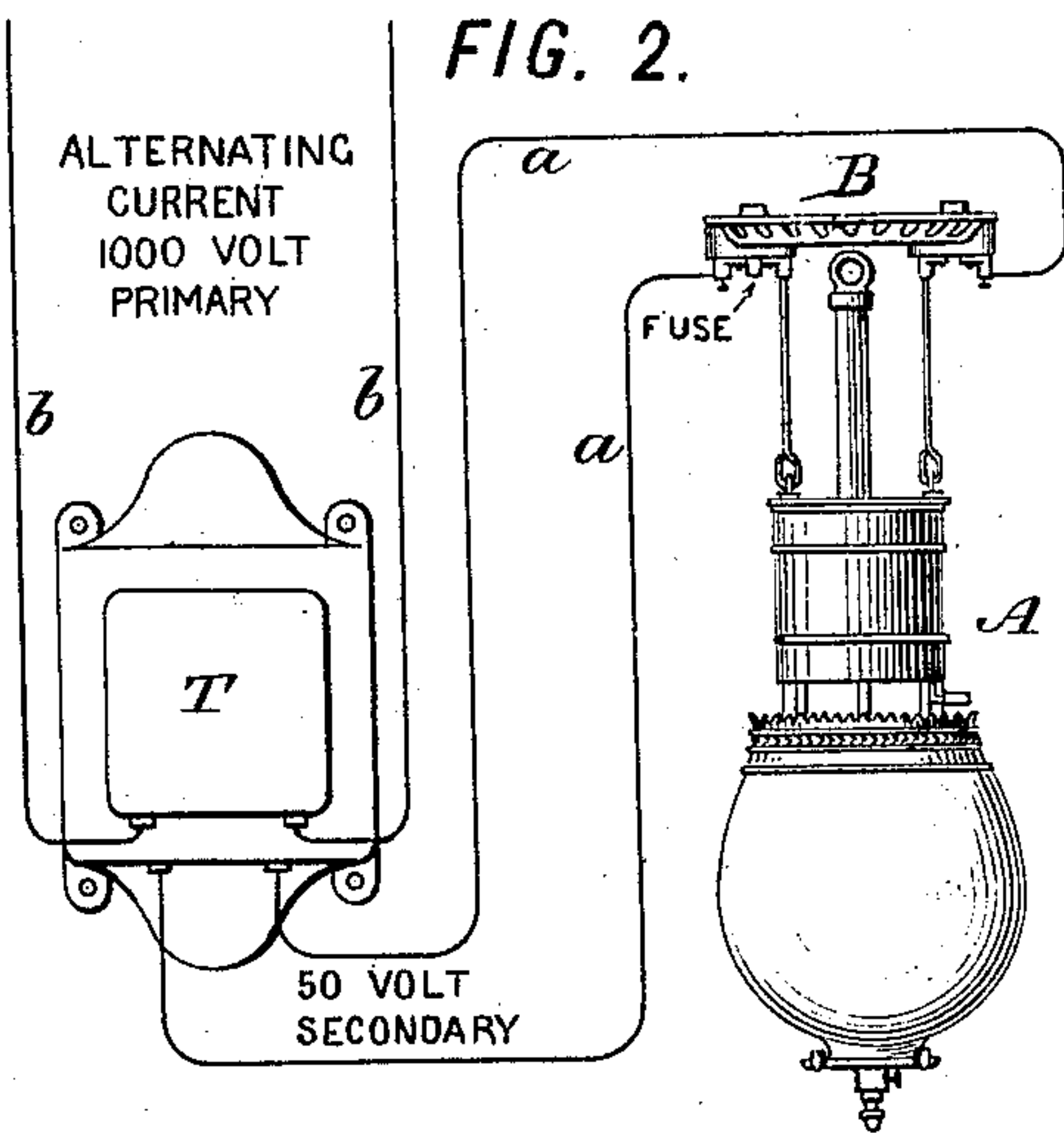
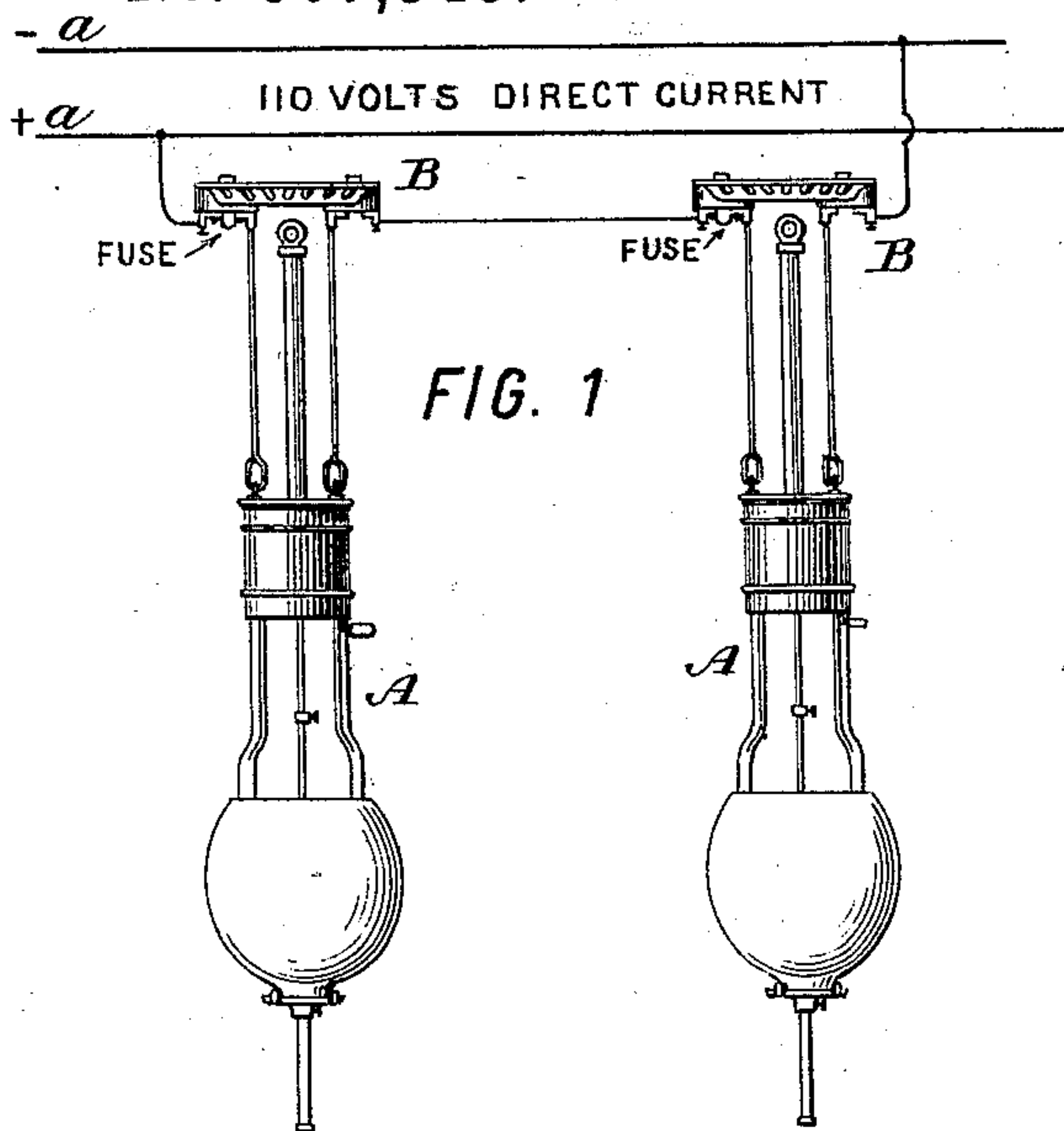
2 Sheets—Sheet 1.

J. J. WOOD.

HANGER BOARD FOR ELECTRIC ARC LAMPS.

No. 507,343.

Patented Oct. 24, 1893.



WITNESSES:

*Fred White*  
*C. K. Graser.*

INVENTOR:

*James J. Wood,*  
By his Attorneys,

*Arthur C. Fraser & Co.*



(No Model.)

2 Sheets—Sheet 2.

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FIG. 5.

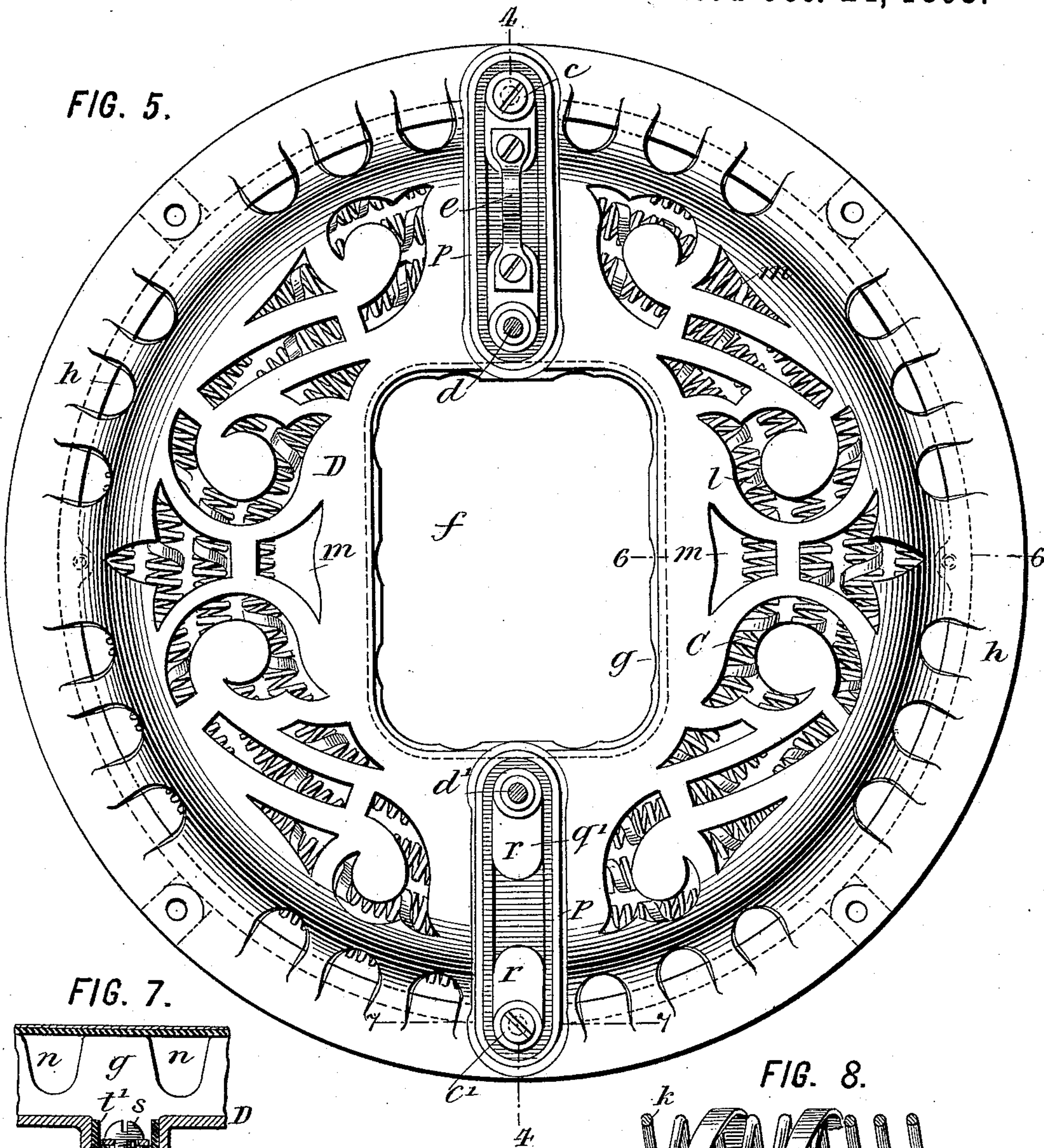


FIG. 7.

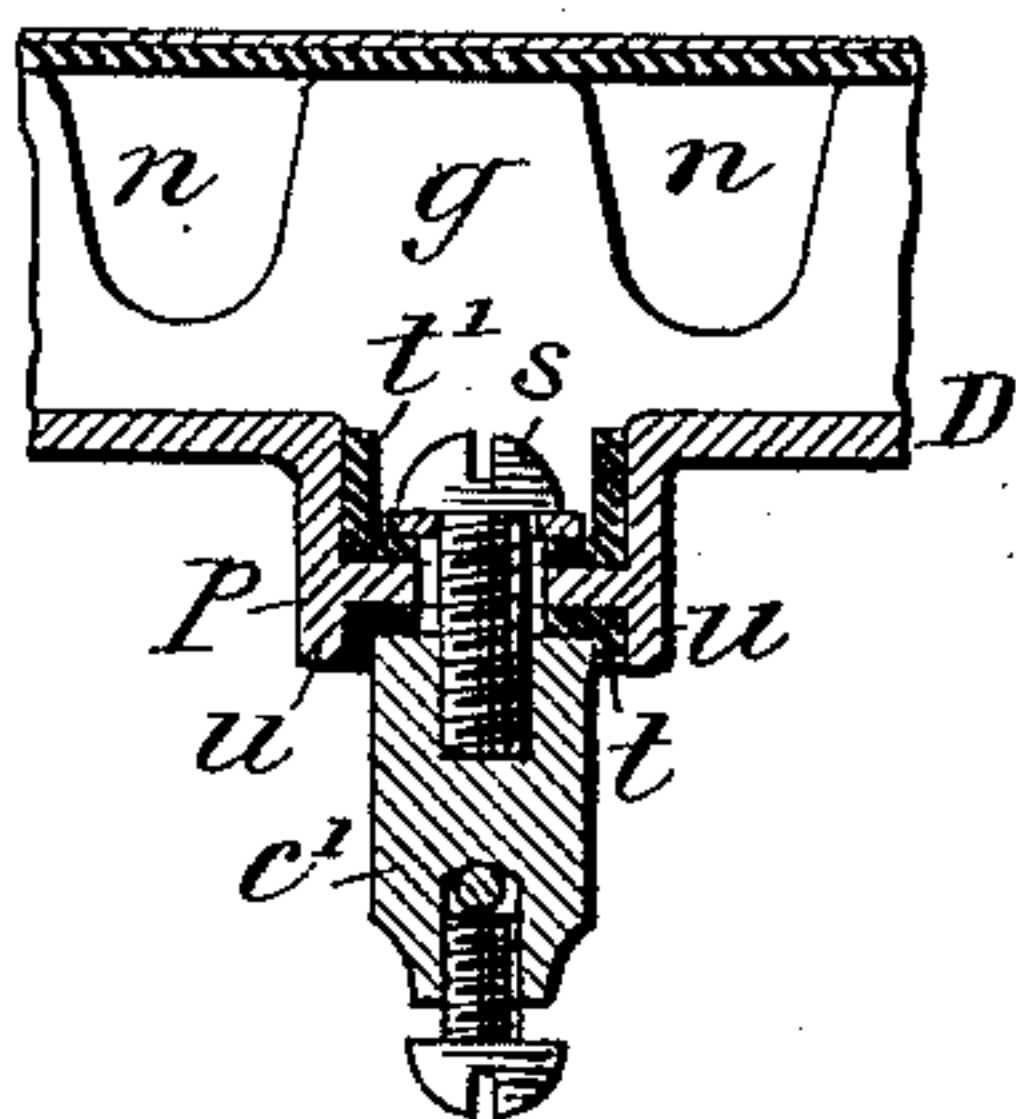
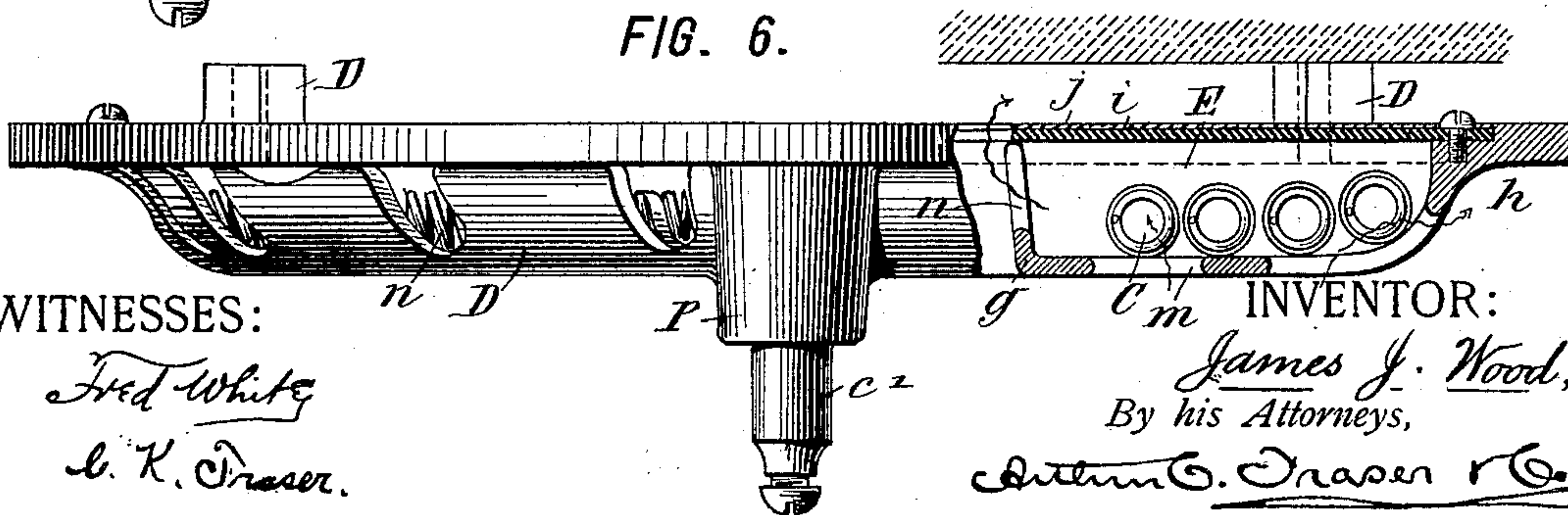


FIG. 8.



FIG. 6.



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# UNITED STATES PATENT OFFICE.

JAMES J. WOOD, OF FORT WAYNE, INDIANA.

## HANGER-BOARD FOR ELECTRIC-ARC LAMPS.

SPECIFICATION forming part of Letters Patent No. 507,343, dated October 24, 1893.

Application filed June 7, 1893. Serial No. 476,853. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES J. WOOD, a citizen of the United States, residing in Fort Wayne, in the county of Allen and State of Indiana, have invented certain new and useful Improvements in Hanger-Boards for Arc Lamps, of which the following is a specification.

This invention provides an improved construction of hanger board designed more particularly for use with arc lamps applied on low tension circuits. It is well understood that in introducing an arc lamp between two leads or conductors maintaining a uniform difference of potential whether on a direct current or alternating current, it is necessary to introduce a resistance coil or rheostat in series with the lamp between the opposite conductors, in order that the electro-magnetic feed mechanism of the lamp shall be made operative to properly control the feed of the lamp in proportion as the carbons are consumed. The application of such resistance coil has heretofore involved considerable inconvenience, which it is one object of my invention to obviate.

To this end my invention introduces a combined hanger board and resistance box, the resistance coil being mounted on or in the hanger board with its terminals connected between the terminals of the hanger board so as to introduce the coil serially with the lamp, and thereby avoid not only the necessity of separately mounting the resistance box, but also the trouble of separately connecting it in the circuit. The hanger board is made with a metal base-plate so as to be fire-proof, this plate being formed with ventilating openings, and having the binding posts and lamp suspenders, for connection with the line circuit and with the lamp terminals, properly insulated from the metal base plate, and the latter being preferably made hollow or dished to form a suitable cavity within which the resistance coil is supported and housed. It is also well understood that in installing an arc lamp between conductors or leads between which is maintained a constant difference of potential, it is practically necessary to introduce a fuse serially with the lamp, in order that in case of the formation of a short-circuit, the

excessive current passing shall destroy or "blow" the fuse and thereby sever the connection. My invention provides for combining this fuse with the hanger board by mounting it beneath the board on insulated terminals connected serially in circuit with the lamp, and constructed by preference as elongated bases or feet projecting from a binding post and a lamp suspender respectively. By this means the separate mounting and connection of a fuse block is avoided, and the greatest simplicity and convenience is insured.

My invention provides also an improved construction of resistance coil, and also other novel features of detail applicable to hanger boards and resistance boxes.

Figure 1 of the accompanying drawings is an elevation of two lamps and hanger boards with a diagram illustrating their connection between the leads of an incandescent lamp circuit. Fig. 2 is a similar diagram showing a different form of lamp and hanger board and illustrating its connection with the secondary of a transformer. Fig. 3 is a diagrammatic view showing the electrical connections of the hanger board. Fig. 4 is a vertical transverse section of the hanger board on the line 4—4 in Fig. 5. Fig. 5 is an underneath plan of the hanger board, the lamp suspender rods being in section. Fig. 6 is an elevation of Fig. 5 partly in section on the line 6—6 therein. Fig. 7 is a fragmentary transverse section through one of the binding posts on the line 7—7 in Figs. 4 and 5. Fig. 8 is a fragmentary view showing the construction of the resistance coil.

In Figs. 1 and 2, let A designate an arc lamp of any suitable construction, and B my improved hanger board. *a a* are the opposite leads or conductors between which the lamp or lamps are connected. In Fig. 2, T is a transformer, and *b b* the wires of a high tension primary or line circuit entering the transformer, while the wires *a a* are in the secondary circuit from the transformer. These two figures illustrate two methods of connecting arc lamps for low tension circuits, of which, however, there are numerous methods depending upon the nature of the current and voltage of the circuit.

Fig. 3 shows the electrical connections pe-



cular to the hanger board. The line wires connect with binding posts  $c\ c'$ , while the lamp is hung from lamp suspenders or pendant rods  $d\ d'$ . A fuse  $e$  forms the circuit connection between the binding post  $c$  and the base of the suspender  $d$ . Between the suspender  $d'$  and the opposite binding post  $c'$  there is introduced the resistance coil C.

The hanger board is constructed with a base plate D of metal, preferably cast iron, to which on diametrically opposite sides are connected the lamp suspenders  $d\ d'$ , and beyond them the binding posts  $c\ c'$ , all thoroughly insulated from the base plate and from each other. The base plate is formed with a central opening  $f$  into which may project the upper tube or tubes of the arc lamp which house the feed rod or rods whenever the lamp is to be hung high with its upper tubes projecting up between the rafters of a ceiling. The base plate D is formed preferably of circular or approximately circular outline, and is made hollow or dished, having an upwardly projecting flange bounding the central opening  $f$ , while on its outer edge it is extended upwardly and terminates in a marginal flange  $h$ . Its construction thus affords a hollow or recess E, in which is placed the resistance coil C, as shown in Figs. 4 and 6. This resistance coil rests on the bottom of the base plate D, being coiled in spiral convolutions within the flat annular chamber E. The top of this chamber is closed by applying a disk or plate  $i$  of insulating material, over which is a sheet  $j$  of iron or other metal, fastened by screws as shown at the right in Fig. 6.

The resistance coil C is of the construction shown best in Fig. 8. German silver wire of suitable size is first coiled around a mandrel into an open helix or loose coil  $k$ , that is to say, one the convolutions of which are sufficiently separated to be out of contact. Around this is wound an insulating tape  $l$ , preferably of asbestos, being wound on in a spiral of considerably steeper pitch than that of the resistance wire, so as to form an open helix around the resistance coil and afford ample ventilating spaces. The insulated resistance coil thus made is itself coiled into a flat spiral and placed in the hollow or chamber E of the base plate. The base plate has ventilating openings  $m\ m$  formed through it at frequent intervals, through which air may enter and circulate upward between the open convolutions of the resistance coil in the manner shown in Fig. 6. The air thus entering the chamber E escapes from it through openings  $n\ n$  in the flange  $g$ . The base plate D is held away from the ceiling to which it is fastened, by legs  $D'$  having sufficient projection for the purpose, in order to afford an ample space for circulation of air heated by the resistance coil so that the coil shall be constantly and efficiently cooled. The construction and the mounting of the coil is consequently such that it is thoroughly ventilated, ample opportunity

being afforded for the circulation of air into the chamber of the base plate D which constitutes the resistance box, and through the spaces between the convolutions of the coil, and out from the box through the openings in the middle and at the upper and outer edge.

The base plate D is formed on diametrically opposite sides with dropped seats  $p\ p$  (Figs. 5 and 6) which extend radially as shown in Fig. 5, from the central opening  $f$  to the outer margin, as shown in Fig. 4, which is a diametrical section through these seats. The seats are dropped thus low enough to bring them considerably below the plane of the under side of the resistance coils C. To the under sides of these seats, the binding posts  $c\ c'$  and lamp suspender rods  $d\ d'$  are fastened, the latter through the medium of metal socket pieces  $q\ q'$ . These metal socket pieces are constructed preferably of substantially the same shape as the binding posts, both having a post, pillar or socket, and a flange, foot or base  $r$  extending to one side thereof. Both are fastened to the seat by one or more screws  $s$ . The binding posts and socket pieces are insulated from the base plate by means of an interposed layer of insulating material  $t$ , while their screws  $s$  are insulated therefrom by a layer  $t'$  of insulating material placed within the seats and under the washers of the screws. The insulating layer  $t'$  has its edges turned up as shown in Fig. 7, so as to partly inclose the screw-heads, while the lower insulating layer  $t$  has its edges turned down so as to closely embrace the outer sides of the bases  $r$  of the socket pieces and binding posts, being confined between these bases and downwardly projecting flanges  $u\ u$  on the seats, in the manner shown in Fig. 7. The seats consequently are formed with trough-like lower sides to receive the binding posts and socket pieces, so that as the latter are drawn into place by tightening their screws, the interposed insulating layer  $t$  is crimped into the trough so that its edges are turned up and squeezed into the spaces between the sides of the trough and the outer parallel sides of the binding posts or socket pieces. By means of this construction the working loose of the latter is prevented, since their radial displacement is guarded against, and a single screw is sufficient for their attachment.

The socket piece  $q'$  and binding post  $c'$  afford the means for making connection with the opposite terminals of the resistance coil C in the manner clearly shown in Fig. 4. The screws  $s$  instead of being provided with simple washers, have angle plates  $v\ v$  of conducting metal connected to them, the ends of these plates being turned up and soldered to the opposite ends of the German silver wire of the resistance coil C. The current thus passes from the lamp, through the suspender rod  $d'$  and socket piece  $q'$  to screw  $s$  and angle plate  $v$  to the coil C, and from the latter



through the other angle plate *v* and screw *s* into the binding post *c'*, and thence to the line.

The fuse *e* is connected between the binding post *c* and socket piece *g*, as best shown in Fig. 3. The bases or feet *rr* of these parts by projecting toward each other, serve as seats for the attachment of the fuse, the ends of which rest on these bases and are fastened thereto by screws *ww* screwing into the bases. The fuse is thus very easily and simply attached without introducing any further complication into the construction, but on the contrary utilizing the connections otherwise necessarily provided.

My invention combines in one structure parts that have hitherto been separate and distinct and require to be independently mounted and separately connected electrically with one another, namely, the hanger board for the arc lamp, the fuse block, and the resistance coil. According to my invention the hanger board serves also as an iron-clad ventilated resistance-box, and as the base for the fuse, and this without increasing or complicating the connections otherwise necessary.

My invention is attended by the further advantage that by placing the resistance for each lamp in its own hanger board the heat developed is divided between the several hanger boards in circuit, and the final temperature is less than if all the resistances were in one box or frame.

The construction shown may be modified in matters of detail without departing from the features that are essential to my invention, and which are hereinafter defined in the claims.

I claim as my invention the following-defined novel features, substantially as hereinbefore specified, namely:

1. A combined arc-lamp hanger-board and resistance-box consisting of a metal base-plate formed with a hollow or cavity in its upper side for holding the coil and having ventilating openings into said cavity, and insulated binding posts and insulated lamp suspenders, with the resistance coil connected permanently between one binding post and one suspender, so as to be introduced in series with a lamp hung from the board.

2. A combined arc-lamp hanger-board and resistance-box consisting of a metal base plate having ventilating openings and a central aperture, with the resistance-coil insulated and coiled upon said plate around said aperture, and insulated binding posts and lamp suspenders, with said coil connected between one binding post and one suspender.

3. A combined arc-lamp hanger-board and resistance-box consisting of a metal base plate having ventilating openings, with a resistance coil insulated and coiled upon said plate, and said plate formed with opposite dropped seats for the attachment of the insulated binding posts and lamp suspenders, whereby the attachment of these parts is brought below the plane of the coil.

4. A combined arc-lamp hanger-board and resistance-box consisting of a metal base plate having ventilating openings and opposite dropped seats for the attachment of the insulated binding posts and lamp suspenders, with a resistance coil insulated and coiled upon said plate, conducting plates *vv* to which the opposite ends of the coil are connected, and screws *ss* for fastening the lamp suspender socket and binding post respectively, engaging said plates, whereby the opposite terminals of the coil are electrically connected between the lamp suspender and binding post.

5. The combination with a resistance-box consisting of a metal plate having ventilating openings, of a resistance-coil consisting of loose-coiled resistant wire, with an insulating tape wound in an open helix around the coil to leave ventilating spaces, and the insulated coil coiled into a flat spiral resting on said plate.

6. The combination to form a hanger-board of a metal base-plate adapted for attachment to a ceiling, formed with opposite seats and insulated lamp-suspenders and binding-posts fixed to said seats.

7. The combination to form a hanger-board of a metal base-plate adapted for attachment to a ceiling, formed with opposite seats having raised side-flanges, and binding posts and lamp-suspenders having elongated bases narrower than the width of said seats between said flanges, and fastened to said seats with an intervening insulating layer bent up at the sides between said bases and flanges, whereby the bases are held against lateral displacement.

8. An arc-lamp hanger-board consisting of a base plate with opposite insulated binding posts and lamp suspenders arranged adjacent to each other and formed with projecting bases, and a fuse with its ends fastened to the base of one binding post and the base of one suspender.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JAMES J. WOOD.

Witnesses:

CHAS. C. MILLER,  
R. F. HARDING.