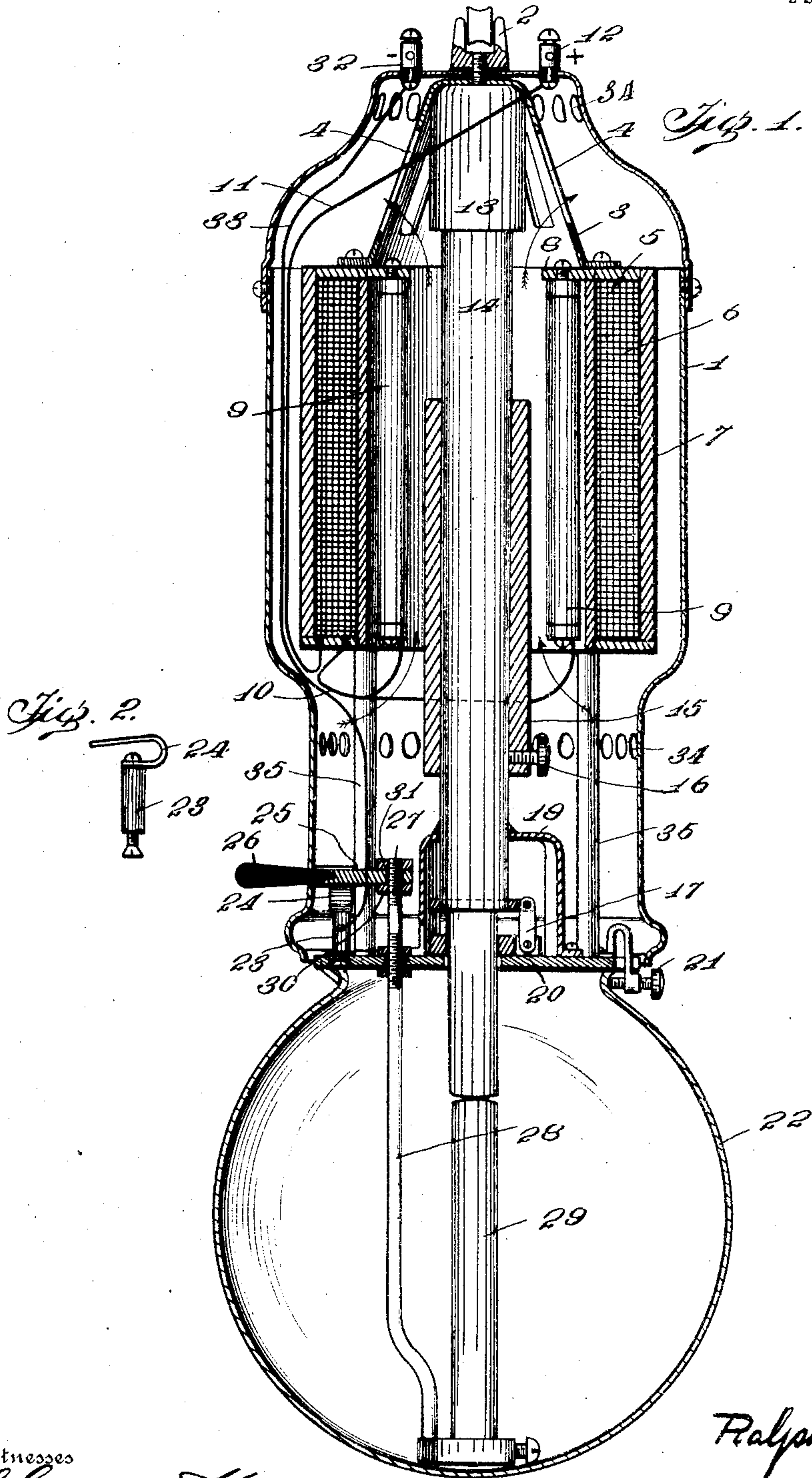


No. 785,980.

PATENTED MAR. 28, 1905.

R. SCOTT.
ELECTRIC ARC LAMP.
APPLICATION FILED OCT. 14, 1903.

2 SHEETS—SHEET 1.



Witnesses

L. Sanford Handy

Edgar M. Kitchin

Inventor

Ralph Scott.

By

Mason Fenwick and Laurence

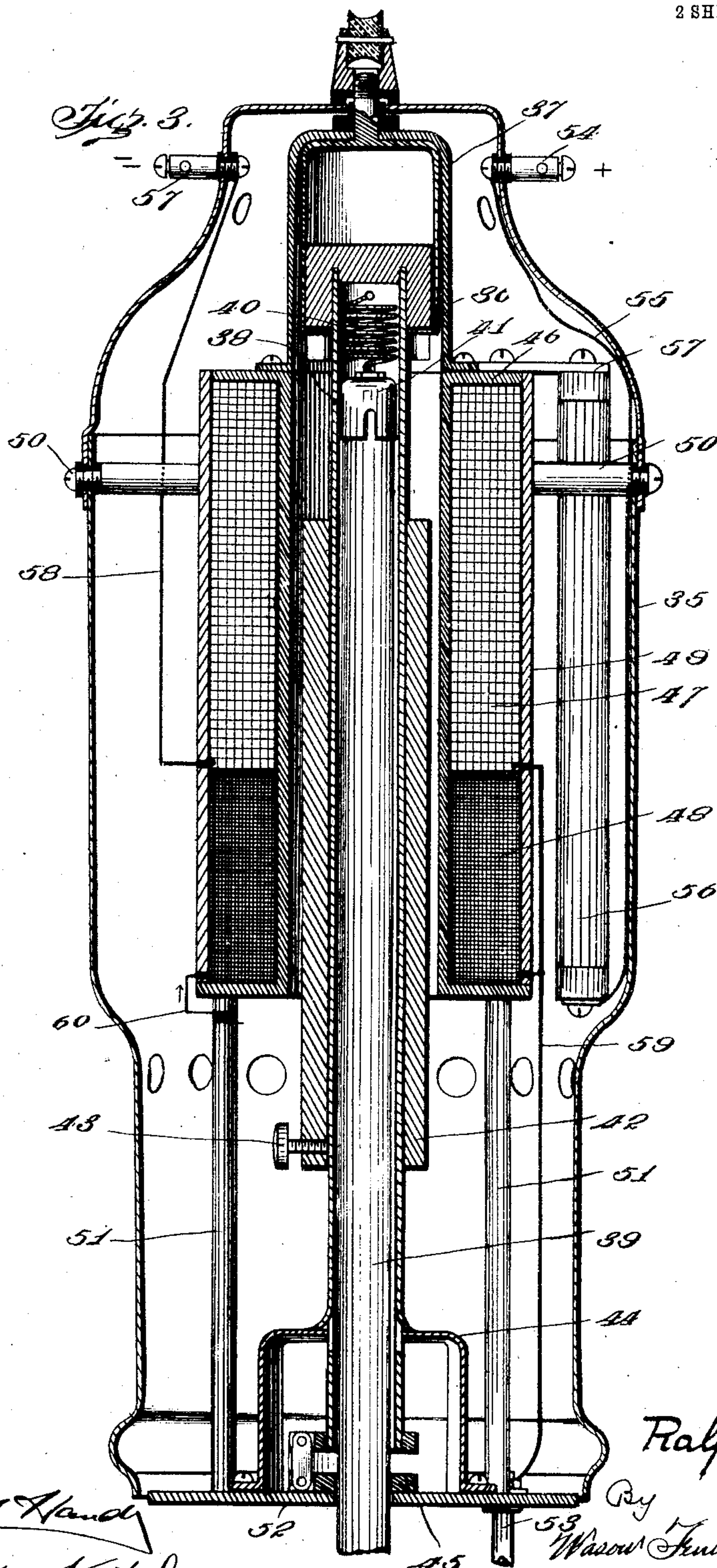
Attorneys

No. 785,980.

PATENTED MAR. 28, 1905.

R. SCOTT.
ELECTRIC ARC LAMP.
APPLICATION FILED OCT. 14, 1903.

2 SHEETS—SHEET 2.



Witnesses

L. E. Handy
Edgar M. Fitchin

Inventor
Ralph Scott.

By

Wasson Fenwick and Lawrence
Attorneys.

UNITED STATES PATENT OFFICE.

RALPH SCOTT, OF WILKESBARRE, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO MARCUS A. MILLER, OF NEW YORK, N. Y.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 785,980, dated March 28, 1905.

Application filed October 14, 1903. Serial No. 177,011.

To all whom it may concern:

Be it known that I, RALPH SCOTT, a citizen of the United States, residing at Wilkesbarre, in the county of Luzerne and State of Pennsylvania, have invented certain new and useful Improvements in Electric-Arc Lamps; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in arc-lamps, and particularly to such as are especially adapted for use in direct-current circuits; and the object in view is the provision of means for facilitating the adjustment of the arc, providing sufficient resistance for the circuit, and at the same time permitting free circulation of air about the moving system of the lamp.

With this and further objects in view the invention comprises certain novel constructions, combinations, and arrangements of parts, as will be hereinafter fully described and claimed.

In the accompanying drawings, Figure 1 represents a longitudinal vertical central section through an arc-lamp embodying the features of the present invention. Fig. 2 represents an enlarged detail view in side elevation of the contact-spring and carrying-stud for the switch. Fig. 3 represents a view similar to Fig. 1 of a slightly-modified form of lamp.

Referring to the drawings by numerals, 1 indicates an inclosing casing adapted to be supported by any suitable means of attachment and carrying within its upper end a cap 3, apertured, as at 4 4, for purposes hereinafter mentioned. The cap 4 carries at its lower end a depending spool 5, of brass or other suitable non-magnetic substance, upon which is wound a coil 6, inclosed by a soft-iron cylinder or casing 7. The spool 5 is provided at its upper end with an internal annular flange 8, from which depend bars 9 9 of any preferred contour and formed of a non-metallic conductive substance of high specific resistance. The bars 9 are connected in multiple with one end of winding 6 by conductor

10, and the other end of said winding connects with a conductor 11, leading to line-wire binding-post 12, carried by and insulated from the casing 1.

Within the cap 3 is arranged a suitable dash-pot 13, whose plunger is formed from the head of a carbon-pencil tube 14, positioned to play vertically within the casing 1 and extending down through the spool 5. The tube 14 is provided with a soft-iron plunger 15, which surrounds said tube and is provided with a set-screw 16 for securing the plunger at any given point in the length of the tube. The lower end of tube 14 is provided with suitable clutch mechanism 17, adapted to engage the carbon pencil 18, arranged within the tube, said tube being guided in its vertical movement by a spider 19, carried by a plate 20, arranged in the lower end of casing 1. The plate 20 is provided with any suitable clamping device 21 for engaging the globe 22, inclosing the arc of the present improved lamp. The plate 20 also carries a stud 23, insulated from such plate and carrying at its upper end a contact-spring 24, adapted to be engaged by a knife-switch 25, designed to be operated manually by means of any suitable handle 26, said switch 25 surrounding the end 27 of bracket 28, carried by and insulated from plate 20. The bracket 28 extends beneath the tube 14 and is designed to carry the carbon pencil 29, adapted to complete the arc with the pencil 18. The end 27 is preferably threaded for receiving nuts 30 and 31, one of said nuts being positioned on each side of the switch 25, the end of which surrounds the end portion of bracket 28, said switch being adapted to swing upon said bracket as a pivot, contact being made between the switch and nuts 30 and 31 for establishing electrical connection between such switch and the bracket. A line-wire binding-post 32 is carried by and insulated from the casing 1 and is connected with a conductor 33, which is in turn connected with stud 23.

The casing 1 consists, preferably, of an inclosing housing surrounding the elements just described and is provided at suitable points along its length with apertures 34 34 for permitting circulation of air about the mov-

ing system about the lamp, such air passing, as indicated by the arrows, longitudinally through the spool 5 and through the apertures 4 in cap 3, so as to prevent any of the parts becoming heated. Any suitable standards or posts 35 may be employed to connect the spool 5 with the plate 20 for supporting such plate.

In operation current flows from post 12 through conductor 11, coil 6, conductor 10, resistances 9, a portion of spool 5, cap 4, dash-pot 13, tube 14, carbon 18 to carbon 29, forming the arc, through bracket 28, switch 25, spring 24, stud 23, conductor 33 to binding-post 32. When the current starts to flow, the carbons 18 and 29 being in contact, the flux from coil 6 will lift plunger 15 and through the action of clutch 17 will raise the carbon 18 for forming the arc of proper length, such arc varying with the movement of the carbon under the influence of the flux according to any variations of the current, the current taken by the lamp depending upon the position of the plunger 15 upon the tube 14. When it is desired to extinguish the lamp, all that is necessary is to bring handle 26 to one side for breaking contact with spring 24, and when it is desired to start the lamp again the handle need only to be swung to its former position for effecting such contact, the casing 2 being preferably formed with a horizontal slot for permitting the handle 26 to extend beyond the same for facilitating such operation.

It will be observed that among the many advantages gained by the present improved structure is the fact that the heat naturally occasioned by the flowing of a current through the resistances 9 will cause the air within the casing 1 to rise and pass out the uppermost apertures 34, cool air following the air thus discharged through lower apertures 34 and reducing the temperature of said resistances.

In Fig. 3 I have illustrated a slightly-modified form of the present improved structure and adapted the same for use in series, the principal difference between the two lamps illustrated being the presence of a high-resistance shunt-coil in the series lamp. As illustrated in Fig. 3, the particular form of lamp consists of a casing 35, inclosing a cap 36, carried centrally thereof at the upper end. Within the cap 36 is arranged a dash-pot 37, whose plunger is carried by the upper end of a vertically-movable carbon-pencil tube 38, which tube 38 is adapted to inclose a suitable carbon 39, electrically connected with tube 38 by means of a coiled or folded conductor 40 and a cap 41 or in any other common or preferred manner. Surrounding the tube 38 is a plunger 42, adjustably connected with said tube by means of a set-screw 43, carried by said plunger. The lower end of the tube 38 extends into a guiding-spider 44 and carries a clutch mechanism 45, adapted to engage the

pencil 39 when the tube 38 is lifted and to release such pencil when the tube is lowered. Surrounding the plunger 42 is a spool 46 of brass or other suitable non-magnetic material. Wound upon the spool 46 is a coil 47 of comparatively coarse wire and of but few convolutions, and beneath said coil 7 is wound a coil 48 of comparatively fine wire and of a great number of convolutions. Incasing the coils 47 and 48 is a cylinder 49 of soft iron, which extends throughout the length of the spool and is supported in place and spaced from casing 35 by any suitable bolts or blocks 50 50, carried by said casing. Depending from the lower end of spool 46 are standards or supports 51 51, carrying a plate 52 at the lower end of the casing 35. A bracket 53, corresponding in all respects to bracket 28, depends from plate 52, said bracket 53 being illustrated as broken away. A line-wire binding-post 54 is carried by and insulated from frame 35 and is provided with a conductor 55, leading to and connected with the lower end of the bar 56, of non-metallic conductive material of comparatively high specific resistance, said bar being connected to a finger 57 at its upper end, said finger being carried by cap 36. A line-wire binding-post 57 is carried by and insulated from casing 35 and connected by a conductor 58 to one end of coil 47, a conductor 59 leading from the other end of said coil and connecting with bracket 53. One end of coil 48 is connected by a conductor 60 with one of the posts 51, and the other end of said coil is connected to a conductor 59. The circuit of the present lamp may be traced as follows: Starting with post 54, current flows through conductor 55, resistance 56, finger 57, cap 36, dash-pot 37, tube 38, conductor 40, cap 41, carbon pencil 39, the carbon pencil carried by bracket 53, (not illustrated,) conductor 59, coil 47, conductor 58, and binding-post 57. The shunt-coil 48 is connected across the arc in such manner that current may flow from spool 46 through post 51, conductor 60, the coil 48, and conductor 59, the said coil being thus connected in shunt across the arc and subjected to the voltage across the arc. It will be observed that the current within the shunt-coil is adapted to maintain the plunger 42 in approximately the position indicated in the drawings, while the flux from a current in the coil 47 is designed to lift said plunger, whereby when the circuit is closed the carbon 39 will be lifted for forming the arc. The two coils thus exert a differential action upon the plunger 42.

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

1. In an arc-lamp, the combination with a plurality of carbon-supports and means for spacing the same apart, of a circuit for said supports, a helix interposed in said circuit for

controlling said spacing means, and a resistance-bar interposed in the circuit and inclosed by said helix and spaced therefrom.

2. In an arc-lamp, the combination with a
5 movable carbon-support and a fixed carbon-support, of a plunger on said movable support, a circuit for said carbon-supports, a helix interposed in said circuit and surrounding said plunger for controlling the position of
10 the same, and a non-metallic resistance interposed in said circuit and positioned between said plunger and helix.

3. In an arc-lamp, the combination with a
15 movable carbon-support and a fixed carbon-support, of a plunger carried by said movable support, a circuit for said support, a helix interposed in said circuit and surrounding said plunger for controlling the position of the
20 same, and a bar of resistance material interposed in the circuit and arranged between said helix and plunger.

4. In an arc-lamp, the combination with a
25 movably-mounted carbon-tube and a carbon-support beneath the same, of a circuit for said tube and support, a spool surrounding said tube, an internal, annular flange formed on said spool, a coil surrounding said spool and interposed in said circuit, and a non-metallic
30 resistance carried by said flange interposed in the circuit.

5. In an arc-lamp, the combination with a

movably-mounted carbon-tube and a carbon-support beneath the same, of a circuit for said tube and support, a spool surrounding said tube, an internal, annular flange upon the up- 35 per end of said spool, a bar of non-metallic, conductive material of high specific resistance secured to and depending from said flange and interposed in said circuit, and a coil surrounding said tube and also interposed in the 40 circuit.

6. In an arc-lamp, the combination with a
movably-mounted carbon-tube and a carbon-support beneath the same, of a circuit for said tube and support, a spool surrounding said 45 tube, a flange formed on said spool, a coil surrounding said spool and interposed in said circuit, and a resistance interposed in the said circuit and carried by said flange.

7. In an arc-lamp, the combination with a 50
movably-mounted carbon-support and a fixed carbon-support, of a circuit for said supports, a spool surrounding said movable support, a coil carried by said spool and interposed in said circuit, and a resistance interposed in the 55 circuit and arranged within the spool.

In testimony whereof I hereunto affix my signature in presence of two witnesses.

RALPH SCOTT.

Witnesses:

ALICE M. MEYNES,

CASELL SEVERANCE.