

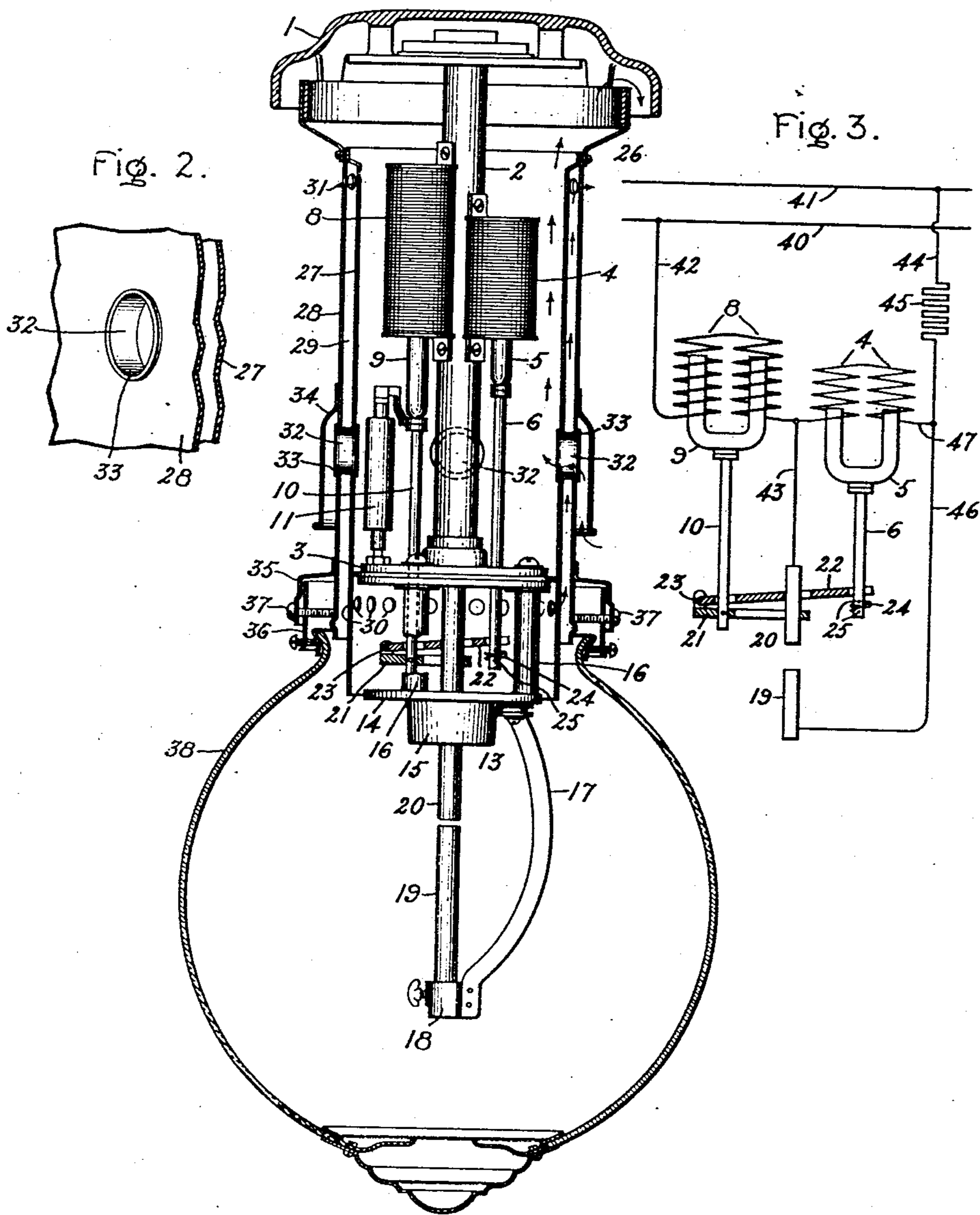
No. 890,763.

PATENTED JUNE 16, 1908.

R. FLEMING.
ARC LAMP.

APPLICATION FILED MAY 18, 1904.

Fig. 1.



Witnesses:
George M. Tilden.
Helen Orford

Inventor:
Richard Fleming,
by *Albert G. Davis*
Att'y.

UNITED STATES PATENT OFFICE.

RICHARD FLEMING, OF LYNN, MASSACHUSETTS, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

ARC-LAMP.

No. 890,763.

Specification of Letters Patent.

Patented June 16, 1908.

Application filed May 18, 1904. Serial No. 208,495.

To all whom it may concern:

Be it known that I, RICHARD FLEMING, a citizen of the United States, residing at Lynn, county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Arc-Lamps, of which the following is a specification.

My present invention relates to arc lamps, more particularly of the type in which the electrodes employed are such as to insure a flaming or luminous arc.

The invention consists in certain features of construction and operation of the feeding mechanism of the lamp and in the means employed for disposing of the fumes from the arc and for ventilating the lamp mechanism.

The features of novelty which characterize my invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of my invention, however, reference may be had to the accompanying drawings and description in which I have illustrated and described one embodiment of my invention.

Of the drawings, Figure 1 is a sectional elevation of an arc lamp embodying my invention; Fig. 2 is a perspective view showing a portion of the combined lamp casing and chimney; and Fig. 3 is a diagram illustrating the circuit arrangement of the lamp.

Referring to the drawings, 1 represents a hood or top of the usual form. A hollow post 2 extends downward from the center of the hood 1 to which it is rigidly secured in any suitable manner. The lower end of the post 2 supports a disk shaped horizontal platform 3. A pair of vertical solenoid shunt coils 4 are secured to the post 2 between its ends. A rod 6 carried by the movable armature 5 cooperating with the shunt coils 4 passes through an aperture formed for the purpose in the platform 3. A pair of vertical solenoid coils 8, somewhat longer than the coils 4, are also secured to the post 2 between its ends at the side of the post 2 opposite to that upon which the shunt coils 4 are secured. A rod 10 extending through the platform 3 has its upper end secured to the movable armature 9 cooperating with the coils. One member of a dash-pot 11 is secured to the armature 9, the other member of the dash-pot being secured to the platform 3. The dash-pot 11 is arranged to prevent a rapid upward movement of the armature 9 when the coils 8 are energized.

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An annular member 13 having a radially extending portion 14 and a cylindrical portion 15 is carried below the platform 3 by posts 16. The radial portion 14 is parallel to the platform 3. A bent arm 17 secured to the under side of the radial portion 14 has a socket 18 formed in its lower end in which the lower electrode 19 of the lamp is held in line with the axis of the hollow post 2. The lower electrode of the lamp is preferably the negative electrode when the lamp is to be operated with direct current and contains or is formed of some material which yields a flaming or luminous arc, such for instance as the magnetic oxid of iron or the like.

The upper electrode 20 of the lamp, which may be formed of the same or different material from that of which the electrode 19 is composed, slides within the hollow post 2 and has its lower end projecting through the cylindrical portion 15.

The lower end of the rod 10 has secured to it an arm 21 which extends at right angles to the rod. This arm 21 has formed in it an elongated slot or passage through which the electrode 20 passes. A member 22 is pivoted to the arm 21 at the point 23. The member 22 is also formed with an elongated slot in it through which the electrode 20 passes. The openings in the arm 21 and member 22 are so proportioned and arranged that in the normal operation of the lamp the electrode 20 is rigidly held between the right hand end wall of the slot in the member 21 and the left hand end wall of the slot in the member 22. The extreme right hand end of the member 22 is bifurcated to slidably receive the lower end of the rod 6. A projection 24 which may be in the form of a pin inserted in one of a series of holes 25 in the lower end of the rod 6 serves as a means for raising the right hand end of the member 22 to release the upper electrode at a suitable stage in the operation of the lamp.

A casing 26 having its upper end secured in any suitable manner to the hood 1 surrounds the lamp mechanism. The casing comprises an inner cylindrical member 27 which closely embraces the platform 3 and which extends from a point adjacent the radial portion of the member 14 to a point near the upper end of the casing, and an outer cy-

lindrical member 28 which may be concentric with the member 27 and which is separated therefrom by an annular space or chamber 29 which extends from a point near the upper end of the casing to a point about midway between the platform 3 and the radial portion 14 of the member 13. Apertures 30 are formed in the portion of the member 27 immediately below the platform 3. Apertures 31 are formed in the member 28 near its upper end.

Passages 32 extend through the casing 26. These passages may be formed by sections of pipe 33 which extend through apertures formed in line with each other in the members 27 and 28: the ends of the pipe sections 33 may be upset or turned outwardly as shown to lock the pipe sections in place and to make tight joints between the pipe sections and the members 27 and 28. A hood or water guard 34 is carried by the member 28 in such manner as to prevent the passage of moisture or dust into the interior of the member 27.

An annular hood 35 secured to the member 28 near its lower end supports an annular member 36 in any suitable manner as by means of screws 37. The member 36 supports in turn a transparent or translucent globe 38 which surrounds the lower portion of the lamp mechanism and protects or incloses the arc.

Referring to Fig. 3 of the drawings, 40 and 41 represent conductors which supply current to the lamp terminals. A conductor 42 leads from the conductor 40 to one terminal of the series coils 8. The other terminal of the series coils 8 is connected to the upper electrode 20 of the lamp by a conductor 43. A conductor 44 connects the line 41 to one terminal of the resistance coil 45 (not shown in the other figures of the drawings). The other terminal of the resistance coil 45 is connected to the lower electrode of the lamp by a conductor 46. A conductor 47 connects the conductor 46 with one terminal of the shunt coils 4. The other terminal of the shunt coils 4 is connected to the conductor 43.

Assuming the position of the electrodes of the lamp to be that shown in Fig. 1, in which it is seen they are separated by a short distance, upon connecting the lamp in circuit the shunt coils 4 will be energized and the armature 5 will raise the rod 6. The engagement of the member 22 by the projection 24 and consequent upward movement of the member 22 will release the electrode 20 which will thereupon drop into contact with the electrode 19. Upon contact between the electrodes current will begin to flow between them. This will energize the series coils and will at the same time so decrease the voltage on the shunt coils that they will be practically deenergized and the armature 5 will drop. When the series coils 8 are energized

the armature 9 and rod 10 will be raised. As the deenergization of the shunt coils occurs simultaneously with the energization of the series coils, and as a rapid movement of the armature 9 is prevented by the dash-pot 11, the electrode 20 will be immediately clamped between the members 21 and 22 and will be raised by the upward movement of the armature 9 to draw an arc of the proper length between the electrodes 19 and 20.

When by reason of the consumption of the electrodes, or from other causes, the voltage of the arc increases sufficiently beyond its original value the shunt coils 5 will cause a feeding from time to time of the upper electrode by means of the engagement between the projection 24 and the member 22. When the lamp is thrown out of circuit the coils 4 and 8 will, of course, become entirely deenergized and the armatures will both descend to their original position. Inasmuch, however, as the electrodes when running long enough to become hot will necessarily be consumed somewhat, the downward movement of the armature 9 will not be great enough to allow the lower end of the electrodes 20 to engage the end of the electrode 19, and the electrodes will therefore be separated as shown in Fig. 1. This is an important feature, as when the electrodes are allowed to come together while hot they are apt to stick or weld together.

The gases or vapors produced by the arc mixed with suitable amounts of air which may enter the interior of the globe between its upper end and the member 36 will pass through the apertures 30 into the space 29 and then out of the chamber through the apertures 31, as indicated by the small arrows in Fig. 1. The distance between the apertures 30 and 31 and the dimensions of the space or chamber 29 are such as to insure a natural draft ample for the purpose. The platform 3 forms a partition which prevents any of the arc products from entering the chamber above the platform in which the lamp mechanism is located.

More or less solid material is condensed upon the inner walls of the chamber 29 from the vapor passing into the chamber through the aperture 30. This may be removed from time to time by jarring the casing or in any other suitable manner. To facilitate the removal of the condensed material the casing may be removed from the lamp if desired, though this is not usually necessary. The air for cooling the coils and other mechanism located within the casing member 27 passes in through the passages 32 and out between the upper end of the casing and the hood 1, as indicated by the small arrows in the drawings.

Changes may be made in the form and proportion of the parts comprising the construction illustrated without departing from the

spirit of my invention, and I do not intend the claims hereinafter made to be limited to the construction shown more than is made necessary by the state of the art.

5 What I claim as new and desire to secure by Letters Patent of the United States, is,—

1. In an arc lamp, a movable electrode and mechanism for moving it, a casing surrounding said mechanism, a second casing surrounding the first but separated therefrom by a space through which the arc products can pass, and a member connecting said casings, said member being formed with a passage through it by means of which the ventilation of the mechanism is secured.

2 In an arc lamp, a movable electrode and mechanism for moving it, a casing inclosing said mechanism, a second casing surrounding the first but separated therefrom to form a space through which the arc products can pass from the lamp, both of said casings having apertures formed in them, and a pipe or conduit connecting said apertures.

3: In an arc lamp, the combination with a horizontal partition, of a double-walled vertical annular casing through which the vapors are drawn by natural draft and in which they condense before their escape from the lamp, suitable openings being provided for the ventilation of the interior of the lamp and the cooling of the inner wall of the annular casing.

4. In combination in an arc lamp with a horizontal partition above the arc, a double-walled annular casing through which the vapors generated are forced to pass before escaping from the lamp, perforations in the lower and upper parts of said casing for said vapors, and tubular lateral passages through the wall of the casing to admit fresh air.

In witness whereof, I have hereunto set my hand this 16th day of May, 1904.

RICHARD FLEMING.

Witnesses:

DUGALD McK. McKILLOP,
JOHN A. McMANUS.