

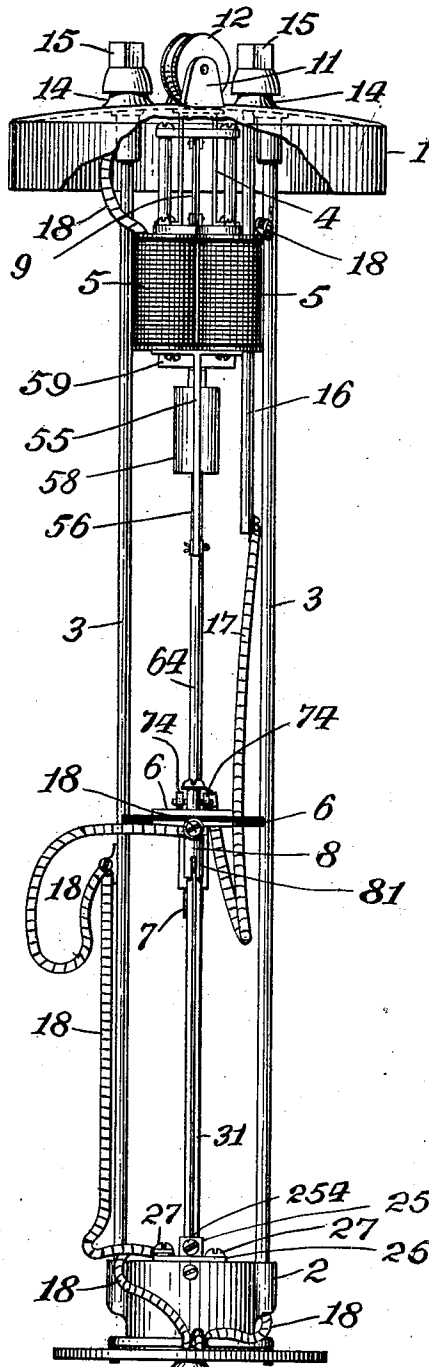
J. H. HALLBERG.
ELECTRIC ARC LAMP.
APPLICATION FILED JUNE 13, 1908.

994,834.

Patented June 13, 1911.

4 SHEETS-SHEET 1.

Fig. 1.



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Alfred C. McDonnell

by *Joseph H. Hallberg* Inventor:
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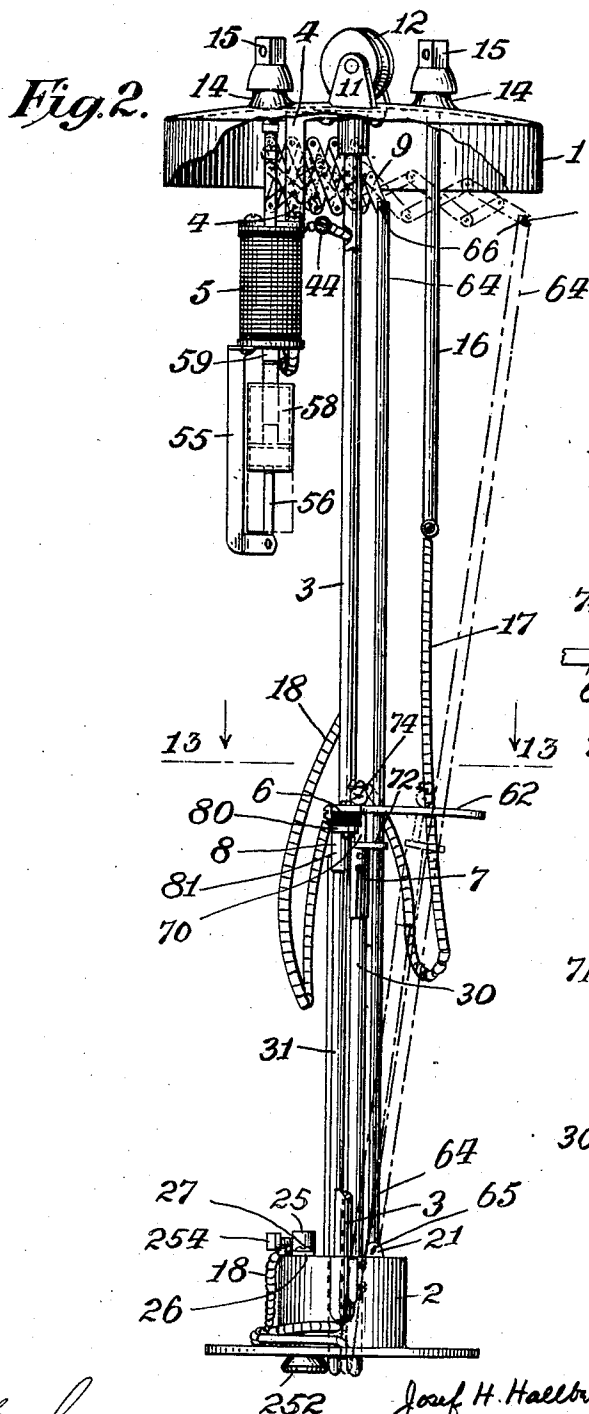


Fig. 3.

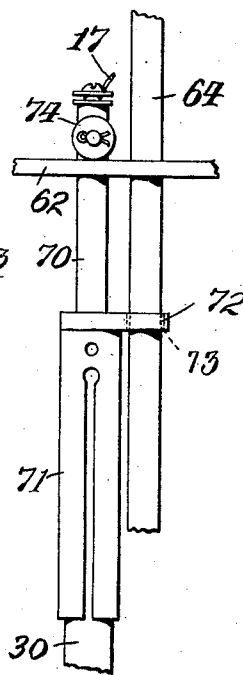
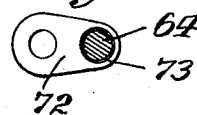


Fig. 4.



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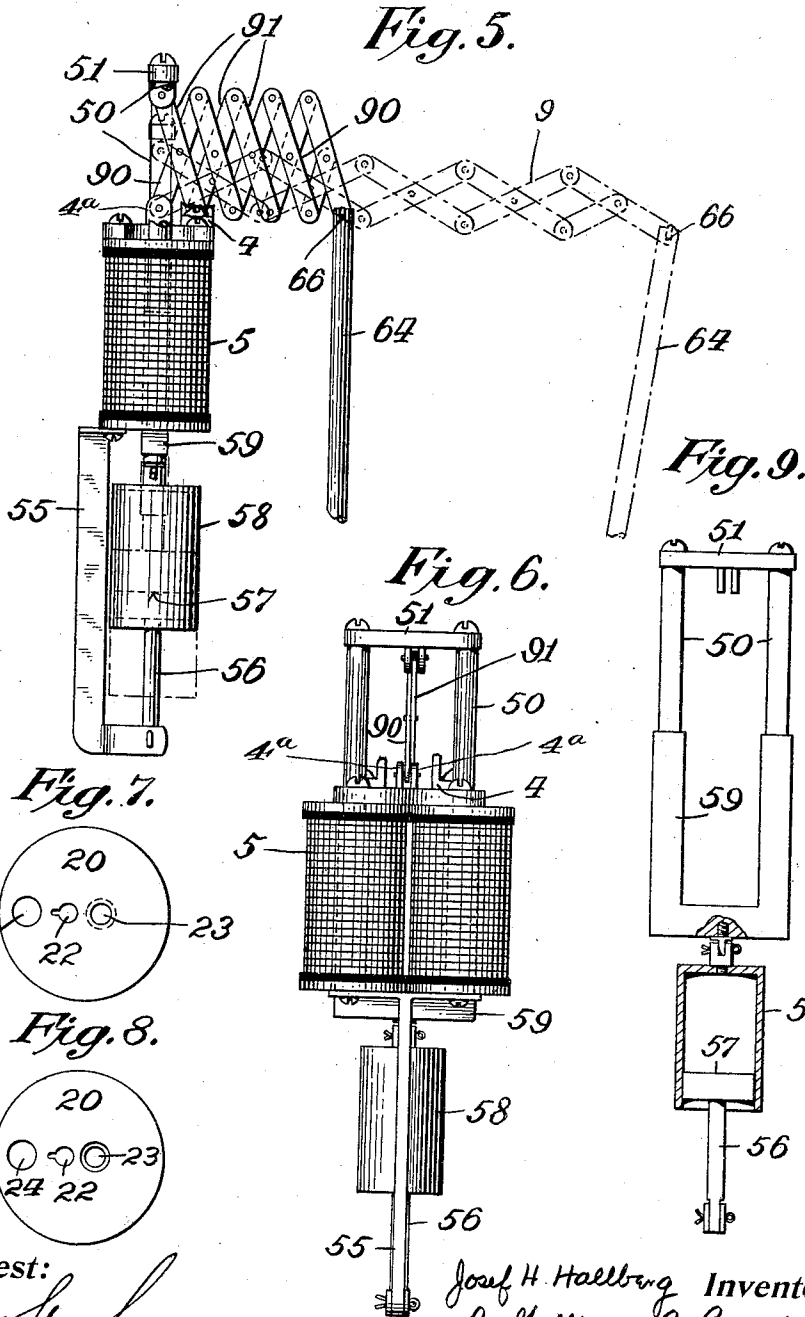
Josef H. Hallberg Inventor:
By *William R. Baird*
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4 SHEETS-SHEET 3.



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4 SHEETS-SHEET 4.

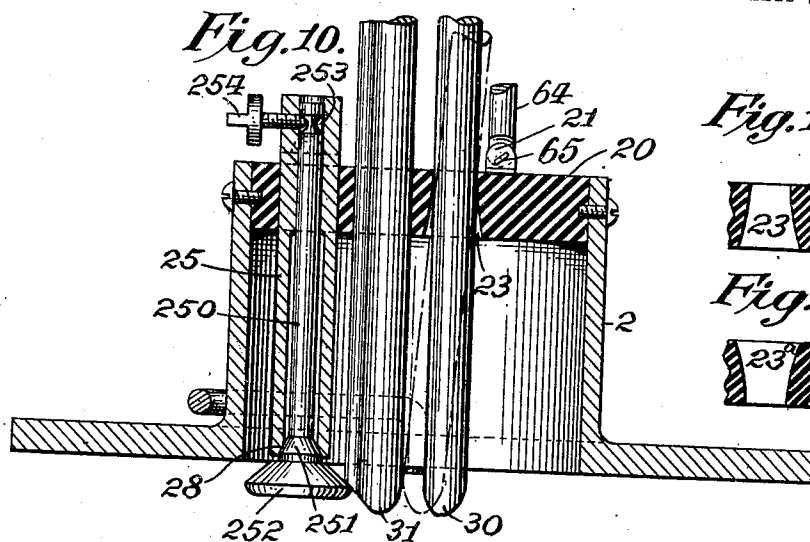


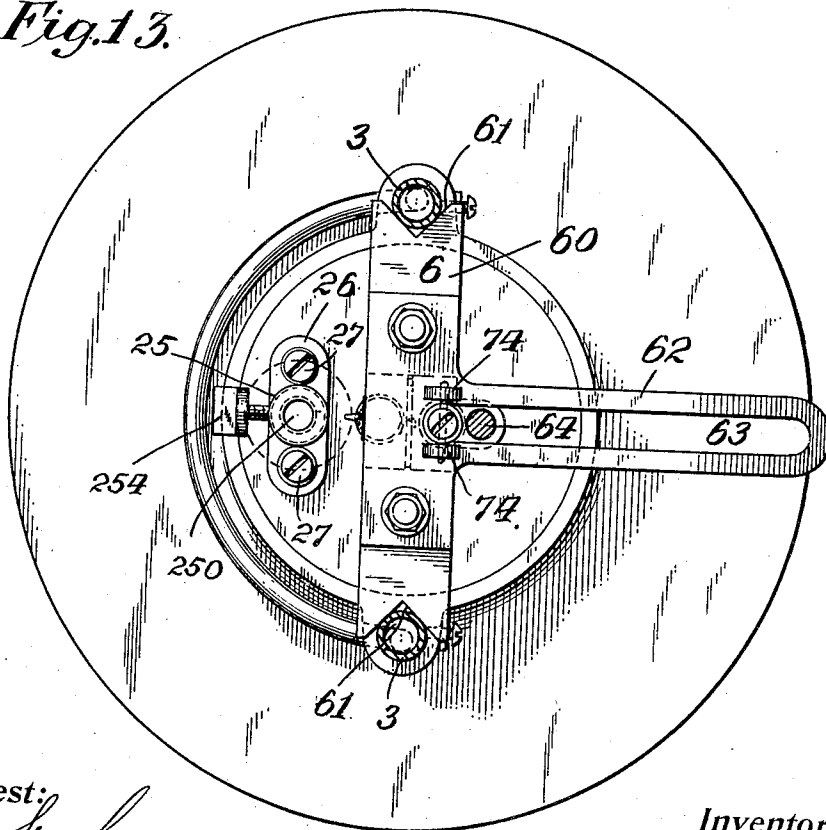
Fig. 11.



Fig. 12.



Fig. 13.



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UNITED STATES PATENT OFFICE.

JOSEF H. HALLBERG, OF NEW YORK, N. Y., ASSIGNOR TO THE BECK FLAMING LAMP COMPANY, OF CANTON, NEW YORK, A CORPORATION OF NEW YORK.

ELECTRIC-ARC LAMP.

994,834.

Specification of Letters Patent. **Patented June 13, 1911.**

Application filed June 13, 1908. Serial No. 438,277.

To all whom it may concern:

Be it known that I, JOSEF H. HALLBERG, a citizen of the United States, and a resident of New York, in the county and State of New York, have invented certain new and useful Improvements in Electric-Arc Lamps, of which the following is a specification.

My invention relates to flaming arc lamps and its novelty consists in the construction and adaptation of the parts.

In the drawings, Figure 1 is a side elevation of the operative parts of the lamp, part of the upper plate being shown broken away to show concealed parts; Fig. 2 is a side elevation of the same parts taken from another point of view, showing in full lines the position of the parts when the lamp is energized and in dotted lines the position thereof when the lamp is out of service, or deenergized; Fig. 3 is an enlarged detail of one of the electrode holders and its guiding and supporting mechanism; Fig. 4 is a detail of the same electrode holder bracket; Fig. 5 is an enlarged view of the solenoid, dash pot and means connecting the solenoid with the upper part of the rod which moves one of the electrodes; Fig. 6 is a side elevation of the parts shown in Fig. 5; Fig. 7 is a top plan view and Fig. 8 is a bottom plan view of the transverse base plate; Fig. 9 is a detail of the dash pot and frame; Fig. 10 is an enlarged vertical central section through the base of the lamp; Fig. 11 is a detailed section of a part of the transverse base plate, showing the form of aperture for the electrode 30 illustrated in Fig. 10; Fig. 12 is a similar view showing a modified form of the aperture; and Fig. 13 is a top plan view of the parts below the plane of the line 13-13 in Fig. 2.

In the drawings, 1 is the upper plate of the lamp and 2 is its base, and these are connected together by vertically arranged rods or tubes 3 secured in position in any desired manner. Secured to the upper plate and depending therefrom is a bracket 4 on which in turn are mounted two solenoids 5. At a convenient point between the upper plate and the base there is arranged a transverse plate 6, preferably made of insulating material and adapted to move freely vertically between the rods tubes or other suitable members 3. The electrode holders 7 and 8 are arranged beneath this plate. Generally speaking, these parts comprise the op-

erative mechanism of the lamp, and in use are inclosed in a casing of light flexible metal from which depends a glass globe (not shown).

The upper plate of the lamp is provided with means whereby the lamp may be suspended comprising two centrally arranged ears 11, between which is mounted a grooved insulator 12 of usual form. It is also provided with means for conducting the current into the lamp, consisting of two upwardly projecting tubular posts 14, each provided with caps 15 to which are attached the conductors (not shown) leading to a suitable source of electrical energy.

Within the lamp are suitable conductors for conveying the current. One of said conductors, 17, is here shown as leading to the electrode holder 7 from a conducting rod 16 the upper end of which is threaded to engage with a threaded aperture in one of the caps 15 and is insulated from the post 14 thereof. The other conductor, 18, leads first to the solenoid 5 and thence to the other electrode holder 8. It may be similarly connected to a rod (not shown) having a threaded engagement with the other cap 15 and insulated from the contiguous post 14 as in my previous application No. 361,465 filed March 9, 1907.

The transverse plate 6, (best seen in Fig. 13) comprises a main member 60 provided with grooves 61 whereby it is adapted to engage the tubes 3 along which it slides. It is provided with an extending bracket or tongue 62 provided with a slot 63 in which there is adapted to be moved a rod 64 secured at its lower extremity by a cotter pin, or other suitable means, 65 to a projection 21 on the transverse plate 20 of the base so that it can swing on said pin as a hinge. At its upper extremity the rod 64 is similarly secured by a cotter pin, or other suitable means, 66 to a longitudinally extensible and contractible adjusting device here shown as lazy tongs 9. One member 90 of this lazy tongs is hinged to a relatively fixed part, as the ears 4^a, and another member 91 is hinged to the upper piece 51 of a movable frame 50 actuated from the solenoids in a manner presently to be described.

The electrode holder 7 consists of a rod 70, to which is secured one end of the conductor 17 and a slitted tube 71 adapted to receive an electrode 30 and provided with a

laterally extending flange 72 having an aperture 73 whereby it is adapted loosely to embrace the rod 64 so that it will freely slide thereon. Two small wheels 74 placed on each side of the rod 70 and adapted to roll along the upper surface of the bracket 62 serve to reduce the friction induced during such movement. It is obvious that by the manipulation of the lazy tongs 9 the rod 64 is swung to and fro on its hinge 65 and moves the electrode holder 7 and the electrode therein to and from the other electrode, the electrode holder 7 being guided and limited in such movement by the slot in the bracket 62.

The electrode holder 8 comprises an upper cross piece 80 by which it is secured to the plate 6 by any suitable means and a depending slitted sleeve 81 adapted to receive the second electrode 31. As the plate 6 moves vertically between the tubes 3, and the holder 8 moves with it, it is obvious that the electrode 31 must move vertically also.

The base 2 is provided with a transverse plate 20 of insulating material, for instance, statite. It is provided with an upwardly extending bracket 21 to which is hinged the swinging rod 64. It is also provided with two apertures adapted to receive the electrodes 30 and 31 and to permit them to pass. As the electrode 31 is provided with a rear rib, the aperture 22 through which it passes is made of corresponding shape in cross section to serve as a guide for the electrode, having a narrowed extension for the rib. The electrode 30 is preferably round but the aperture 23, through which it passes, is made flaring as shown in Figs. 11 and 12 to allow the electrode 30 to be moved to a slanting position. I prefer the downwardly flaring form shown at 23 in Fig. 11 but the form shown at 23^a in Fig. 12 may be used, if desired. The base 2 has a third aperture 24 adapted to receive a vertically arranged sleeve 25 secured in place by means of an apertured flange 26 secured to the plate 20 by screws 27 or other suitable means. This sleeve extends practically to the bottom of the base 2, and the inside edge at its mouth is provided with a bevel 28. Inside of the sleeve is a vertical rod 250 of sufficiently lesser diameter than the interior of the sleeve at and above the mouth thereof to provide an air space around the rod and within the sleeve. This rod is provided or formed near its bottom with a conical member 251 and beneath this conical member it is formed or provided with a conical support 252 for the rib of the electrode 31. The rod 250 is provided with an annular groove 253 having beveled walls adapted to be engaged by the point of a supporting device, here shown as a thumb screw 254 provided for that purpose and moving in a threaded aperture in the sleeve 25. By means of this arrangement the

shoe 252 can readily be adjusted and a dead air space may be inclosed between the rod 250 and the sleeve 25, which is effective to prevent the overheating and warping of the several parts of the support under the heat emitted from the electrodes and the arc. By virtue of the conical member 251 and the conical seat formed by the beveled wall 20 of the sleeve, some range of adjustment of the rod 250 longitudinally is permitted without affecting the operation of the dead air space as such, as distinguished from the possibilities of adjustment in a construction in which the planes of the faces of the seat and closure are at right angles to the axes of the sleeve and rod, respectively. The conical member 251 also fixes the position of the shoe when the former is tightly held against the bevel 28. The beveled surfaces of the groove 253 and screw 254 cooperate to cause the rod to be raised or lowered when the screw is turned in opposite directions, respectively, and also permits the rod 250 to be turned rotatively to bring a different portion of the support 252 into engagement with the rib of the electrode 31.

A bracket 55 is secured to the lower end of the solenoids 5. It is provided with an upwardly extending rod 56 to the upper end of which is secured a piston 57 adapted closely to fit within a cylinder 58 and forming with it a dash pot. The cylinder is secured to the lower end of the U-shaped core 59 of the solenoid and this in turn is connected to the movable frame 50, so that when this frame is moved upward the piston prevents a rapid movement of the frame.

As will readily be seen this lamp is of very simple construction and has but few parts. It is economically made and does not easily get out of order. When the lamp is not in use the electrode 31 rests upon the support 252 and the point of the electrode 30 rests against that of the electrode 31. When the current is turned on the solenoids are energized and the frame 50 is moved upward, the dash pot governing and controlling such movement. The lazy tongs 9 is thus contracted and the rod 64 is brought inwardly and the electrode 30 caused to swing against the sides of the aperture 23 in the plate 20 until the electrodes 30 and 31 stand in a substantially vertical and parallel position. The rib of the electrode 31 as it is consumed permits this electrode to move downward by gravity and the plate 6 and electrode 30 therefore moves with it, the support of the latter electrode being suspended from the plate 6 as shown. When the current is turned off the frame 50 drops, the lazy tongs 9 is expanded, the rod 64 is swung over and the electrode holder 7 and electrode 30 again assume a slanting position.

It is obvious that wide modifications may

be made in the details of the lamp without departing from its essential principles. It is the normal angularity of the electrodes when not in operation and their substantial parallelism when in operation which is important. It is the means for swinging the electrode which is essential and not the use of a lazy tongs. It is essential that the electrodes come together quickly when the current is turned off and separate slowly when it is turned on. The use of cotter pins and similar connections permits a quick assembly and dismemberment of the parts.

While I have described the lamp in the illustrated form and this is preferred in the present state of my experience, it is obvious that the electrodes may be inclined at an angle to the horizon or the lamp entirely reversed without changing its essential features.

What I claim as new is:—

1. In an electric arc lamp, two electrodes and means for moving the same relatively to each other into and out of substantially parallel relation, comprising a pivoted member having connection with one of the electrodes, an electro-magnet, its armature and a connection between the armature and pivoted member, said connection arranged at substantially a right angle with said member and longitudinally expanded and contracted by the movement of the armature in one and the other direction respectively to thereby rock the same.
2. In an electric arc lamp, two electrodes and means for moving the same relatively to each other into and out of substantially parallel relation, comprising a pivoted member having connection with one of the electrodes, an electro-magnet, its armature, and lazy-tongs arranged at an angle with said member and interposed between the same and the armature and operated by the latter to move the member pivotally.
3. In an electric arc lamp, two electrodes, and means for moving the same relatively to each other into and out of substantially parallel relation, comprising a pivoted member having connection with one of the electrodes, a solenoid, lazy-tongs disposed between the core of the solenoid and said member substantially at right angles therewith and connected at one end to the member and at the other end to the solenoid core.
4. In an electric arc lamp, two electrodes and means for moving the same relatively to each other into and out of substantially parallel relation, comprising a pivoted member having connection with one of the electrodes, a solenoid, lazy-tongs disposed between the core of the solenoid and the pivoted member, substantially at right angles therewith and connected at one end to said member, and a reciprocatory frame which is connected to the solenoid core and to

which one member at the other end of the lazy-tongs is attached.

5. In an electric arc lamp, an electrode, a second electrode, a pivoted member connected with one of the electrodes and means for turning the pivoted member on its pivot to bring its electrode into and out of substantially parallel relation with the other electrode, comprising an extensible and contractible member connected to said pivoted member and arranged substantially at right angles therewith, and electrically controlled means having a member movable in a direction substantially at right angles with the extensible and contractible member, and connected therewith to expand and contract the same longitudinally.

6. In an electric arc lamp, two electrodes and means for moving the same relatively to each other into and out of substantially parallel relation, comprising a solenoid, a pivoted member connected with one of the electrodes, a connection between the pivoted member and solenoid core, comprising a means which is disposed substantially at right angles with the solenoid core and member and is connected with each of the same so as to be elongated and contracted by movements of the core, and a governor embodying a cylinder which is carried by the solenoid core and a piston in said cylinder.

7. In an electric arc lamp, longitudinally arranged frame members, a transverse plate provided with grooves adapted to engage said members, and a slotted tongue projecting substantially at a right angle to the plate, an electrode support secured to the plate, a second electrode support supported from and guided by the slotted tongue, and means for moving the second electrode support relatively to the first one, including a pivoted member extending through the slot in the tongue.

8. In an electric arc lamp, longitudinally arranged frame members, a transverse plate provided with grooves adapted to engage said members, and a slotted tongue projecting substantially at a right angle to the plate, an electrode support secured to the plate, a second electrode support carried by the plate and provided with a rolling member adapted to move along the upper surface of the tongue, and means for moving the second electrode, including a pivoted member extending through the slot in the tongue.

9. In an electric arc lamp, longitudinally arranged frame members, a transverse plate provided with grooves adapted to engage said members, and a slotted tongue projecting substantially at a right angle to the plate, an electrode support secured to the plate and a second electrode support supported from and guided by the slotted tongue, including a longitudinal member adapted to move in said slot.

10. In an electric arc lamp, longitudinally arranged frame members, a transverse plate provided with grooves adapted to engage said members, and a slotted tongue projecting substantially at a right angle to the plate, an electrode support secured to the plate and a second electrode support including a rolling member adapted to move along the adjacent surface of the tongue and a longitudinal member adapted to move in said slot and means for moving the second electrode, including a pivoted member extending through the slot in the tongue.

11. In an electric arc lamp, a pair of electrodes one of which is movable pivotally with relation to the other, and means for moving the movable electrode, comprising a pivoted member, an electrode holder having an element by which it is connected to the pivoted member and a guided plate which moves downward with the electrodes and is provided with a slotted extension in which said member is movable, the holder also provided with an element which moves in the slot in said extension.

12. In an electric arc lamp, a pair of electrodes one of which is movable pivotally with relation to the other, and means for moving the movable electrode, comprising a pivoted member, a member having rotatable supporting and friction reducing means, an electrode holder having an element by which it is connected with said members, and a guided plate which moves downward with the electrodes and is provided with an extension having a slot traversed by said members, the surface of the extension being traversed by said rotatable means.

13. In an electric arc lamp, a pair of downwardly movable electrodes, one of which is movable pivotally with relation to the other, guide members, a plate engaging the guide members and movable downward thereon, an electrode holder carried by the plate, a slotted extension from the plate, a holder for the second electrode supported by said extension and having an element which traverses the slot in the extension, a pivoted member which also traverses said slot and has connection with the second-electrode holder for moving the same, and means controlled by the energizing and de-energizing of the lamp for moving the pivoted member pivotally.

14. In an electric arc lamp, means for supporting the electrodes thereof, comprising an element to engage one of the electrodes near the arcing end thereof, an adjustable positioning member for said element, a sleeve surrounding said member and having a portion of its bore of sufficiently greater

diameter than the same to provide an air space between them, and means movable with the member for sealing said space.

15. In an electric arc lamp, chambered base having a wall of insulatory material, a pair of electrodes extending into the chamber through said wall, a sleeve also extending into the chamber through said wall, an adjustable member extending through the sleeve, a support carried by one end of the adjustable member and engaging one of the electrodes near the arcing end thereof, said sleeve having an internal bore of a diameter such as to provide within it an air space around said member, and said member having means for closing the entrance to said space.

16. In an electric arc lamp, a pair of electrodes, a support engaging one of the electrodes near the arcing end thereof, a member carrying said support, a sleeve surrounding the member and having its mouth of greater diameter than the same to provide an air space between them, means movable with said member to seat upon said mouth and thereby seal said space, and means carried by the sleeve for adjusting said member longitudinally.

17. In an electric arc lamp, a pair of electrodes, a support engaging one of the electrodes near the arcing end thereof, a member carrying said support, a sleeve surrounding said member and having a portion of its bore of greater diameter than the same to provide an air space between them, means movable with said member for sealing said space, said member having a groove with beveled walls and an adjustable device having a beveled point which engages this groove.

18. In an electric arc lamp, a pair of electrodes, a support engaging one of the electrodes near the arcing end thereof, a member carrying said support, a sleeve surrounding said member and having its mouth of greater diameter than the same to provide an air space between them, said mouth having a beveled wall, a conical valve carried by said member and seated upon said wall and sealing said space, said member also having a groove with beveled walls, and a screw having threaded engagement with the sleeve and provided with a beveled point to engage said groove.

Witness my hand this 11th day of June 1908.

JOSEF H. HALLBERG.

Witnesses:

MAY HUGHES,
ALAN C. McDONNELL.