No. 637,886. Patented Nov. 28, 1899.

G. L. MOYER.

ELECTRIC ARC LAMP.

(Application filed Feb. 13, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 9

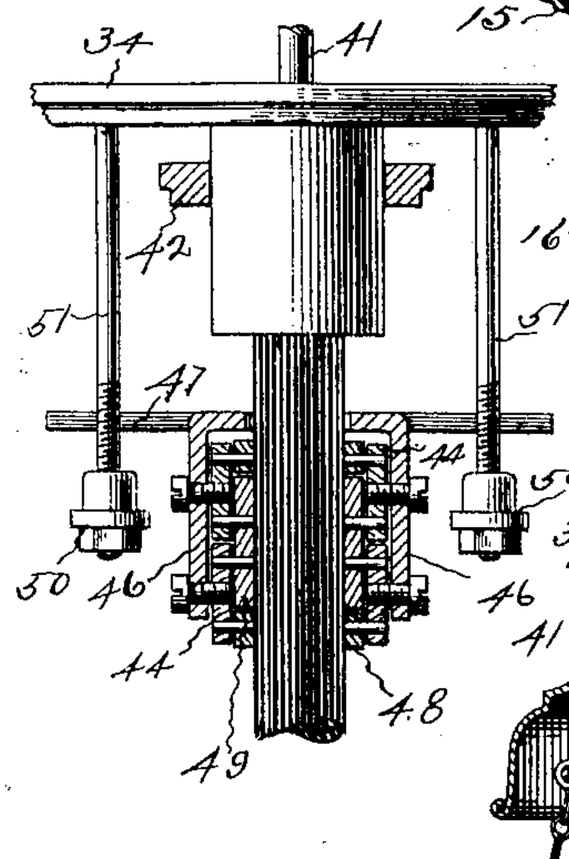

Fig. 1

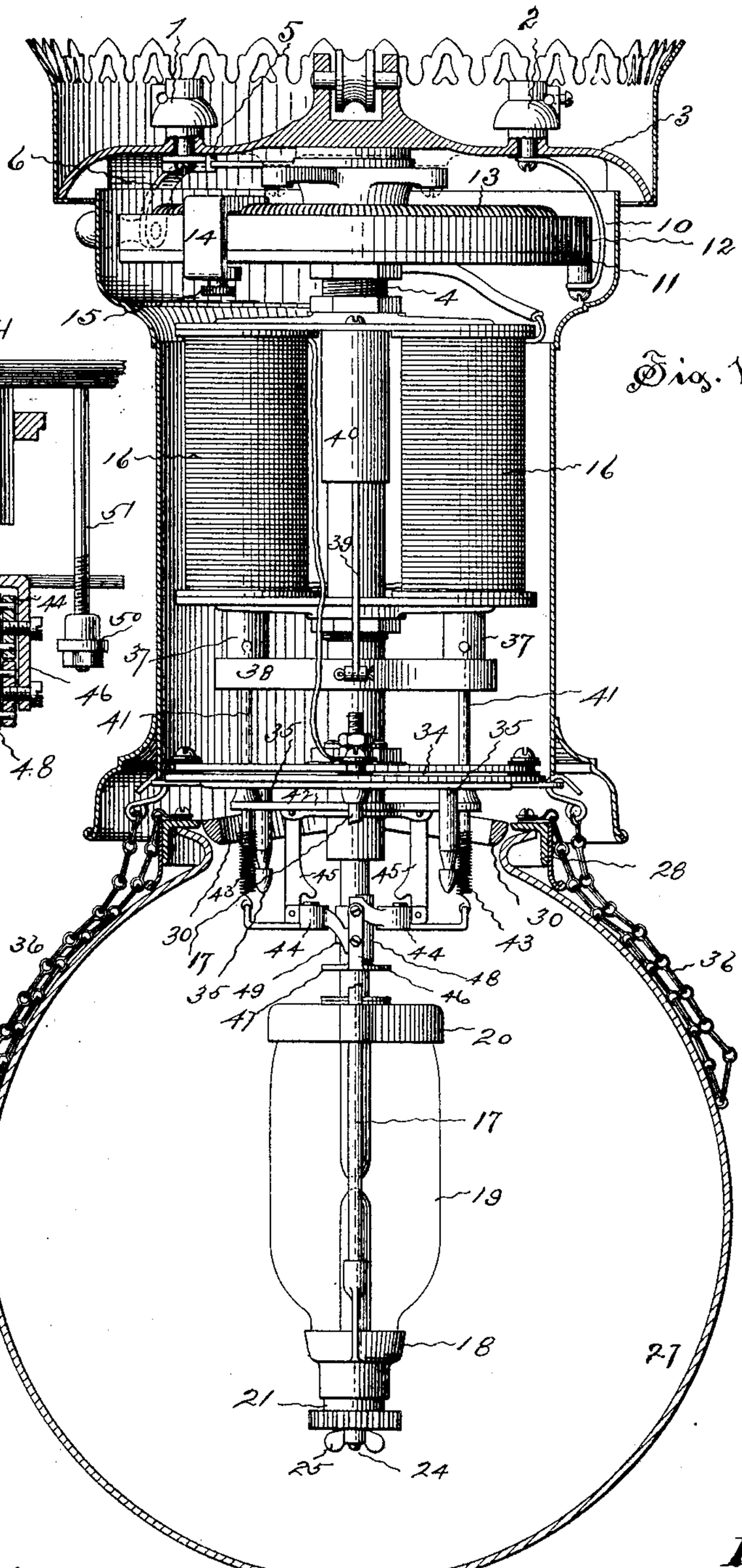

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Fig. 2

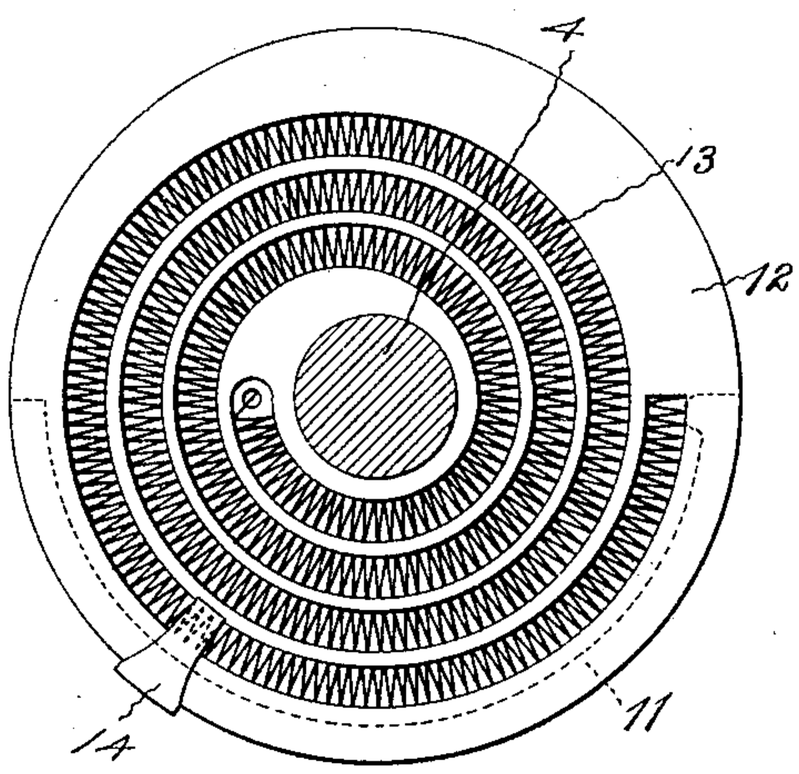


Fig. 3

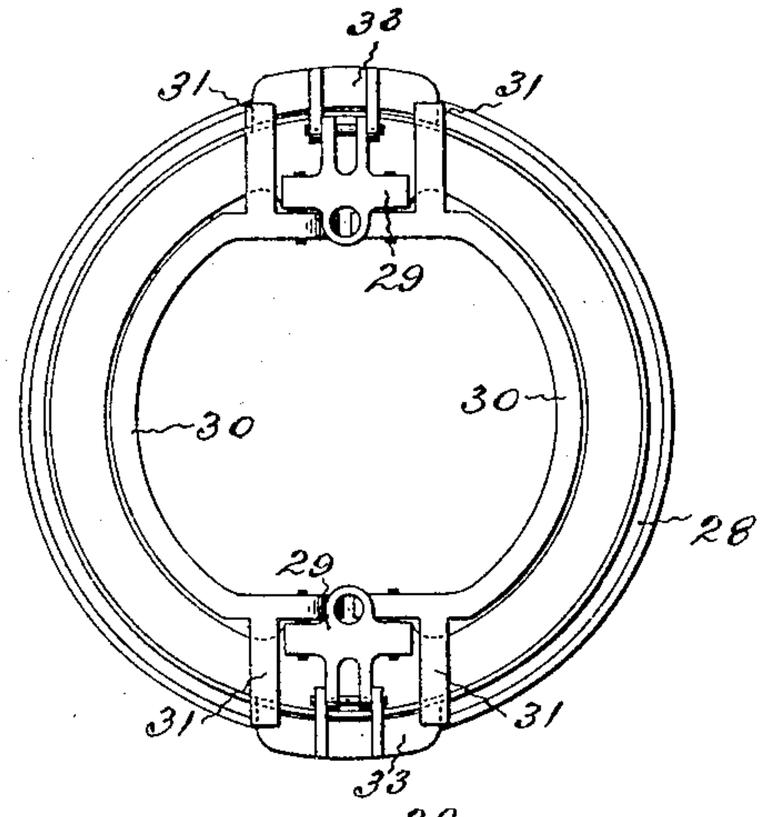


Fig. 4

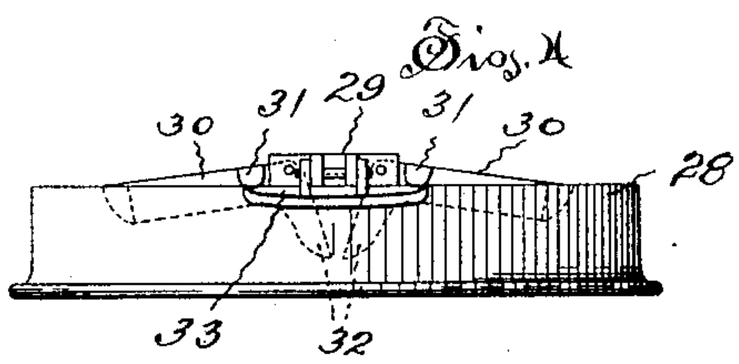


Fig. 5

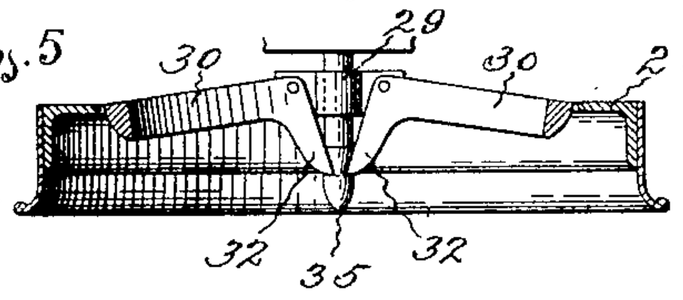


Fig. 6

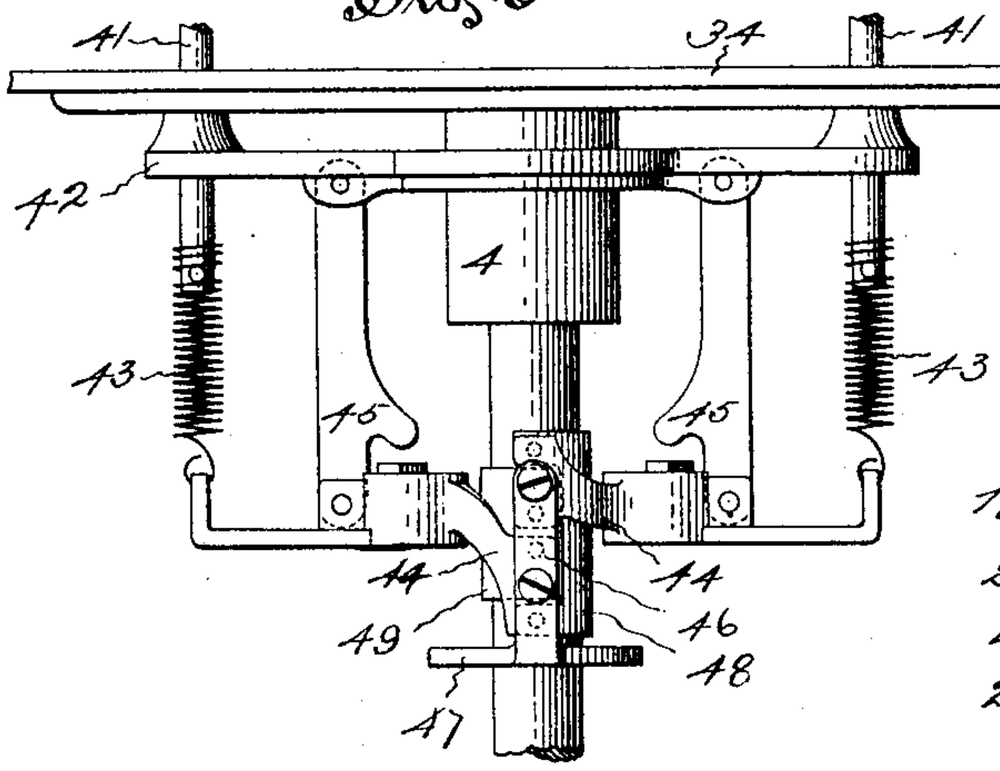


Fig. 7

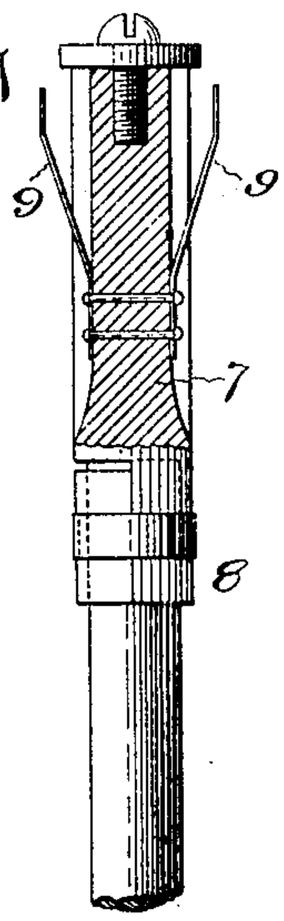
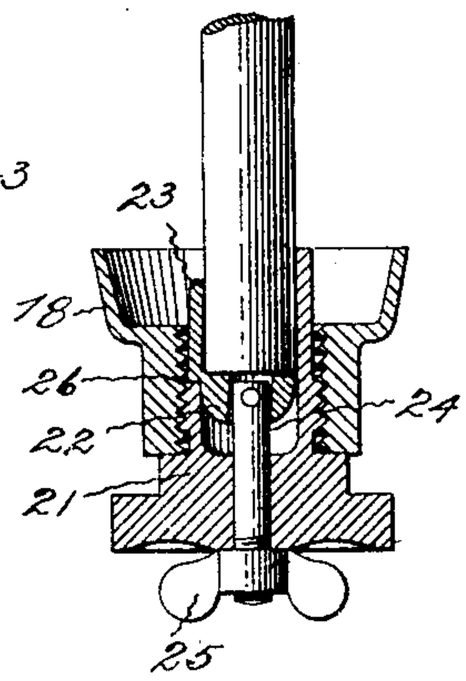


Fig. 8



Witnesses:
Chas. D. King.
E. J. Hyde.

Inventor:
Gilbert L. Moyer, by
Harry P. Williams
Atty.

UNITED STATES PATENT OFFICE.

GILBERT L. MOYER, OF HARTFORD, CONNECTICUT, ASSIGNOR TO THE PERKINS ELECTRIC SWITCH MANUFACTURING COMPANY, OF SAME PLACE.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 637,886, dated November 28, 1899.

Application filed February 13, 1899. Serial No. 705,426. (No model.)

To all whom it may concern:

Be it known that I, GILBERT L. MOYER, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Arc-Lamps, of which the following is a specification.

This invention relates to those semi incandescent lamps commonly known as "inclosed arc-lamps."

The object of the invention is to so simplify the construction and arrangement of features that an inclosed arc-lamp will result which is small and compact, convenient to trim, easy to regulate, simple to throw in and out of circuit, and in which a long efficient arc may be quickly struck without shock and uniformly maintained with an economical expenditure of energy.

In the lamp illustrated as embodying the invention the upper carbon is thrust into the grasp of a small circuit-connector and is drawn up for striking and held drawn for maintaining an arc, as occasion requires, by a clutch that is lifted and caused to grasp opposite sides of the carbon itself when the armatures with which the clutch parts are connected are drawn by the magnets that are energized when the switch-lever at the top of the frame is moved horizontally to close the circuit and allow the current to flow from the main through an adjustable connection and a helically-coiled spiral resistance-wire to the magnet-coils. The magnets are arranged upon opposite sides of the frame, and their armatures, that are connected with the double clutch, are also connected with and governed in their movements by pistons traveling in two dash-pots that are on opposite sides of the frame between the magnets. The lower carbon of this lamp is grasped by a holder that has a simple positive clamp and that is removably connected with the lower end of the inner-globe support. The inner globe, which incloses the arc, is surrounded by an outer globe that is supported at its upper edge by a ring having fingers so arranged that they normally engage notches in supporting-posts which depend from the frame. When this supporting-ring is lifted by its handle-pieces, the fingers are disengaged from the supporting-posts, leaving the ring, with the outer globe, free to be lowered, so as to be out of the way when the lamp is being trimmed.

Figure 1 is a view of the lamp with the cap, shell, and outer globe cut in section, so as to show the mechanisms in side elevation. Fig. 2 is a plan of the helically-coiled spiral resistance-wire and its supporting-disk. Fig. 3 is a plan of the outer-globe-holding ring. Fig. 4 is an edge view of the holding-ring. Fig. 5 is a diametrical section of the ring. Fig. 6 is an enlarged side elevation of the upper-carbon-clutch parts. Fig. 7 shows the upper-carbon circuit-connector. Fig. 8 is a section of the lower-carbon holder, and Fig. 9 shows a sectional view of the clutch with a modified arrangement for releasing its grasp upon the upper carbon.

The circuit-mains are to be connected with binding-posts 1 and 2, secured to the cap 3, which is attached to the upper end of the tubular support 4. One binding-post is connected with contact-brushes 5, arranged in the path of a horizontally-movable switch-lever 6, that is pivotally connected with the tubular support 4. Movable in the support is a short connector 7, that has a common chuck 8 for grasping the upper carbon, and has spring-fingers 9, arranged to insure good contact between the connector and inner walls of the support. This arrangement insures a good circuit between the main and the connector holding the upper carbon when the switch that is pivoted upon the support is in contact with the brushes attached to the binding-post. The other post is connected by wire 10 with a plate 11, secured to the under side of the insulating-disk 12, that is preferably porcelain and that in a helical groove in its upper face holds the spiral resistance-wire 13. The plate 11 and the resistance 13 are connected by an adjustable yoke 14, the movement of which around the edge of the disk is utilized to regulate the amount of resistance in the circuit. When the resistance is regulated, the yoke is fastened by a set-screw 15. The inner end of the resistance-wire is connected with one end of the magnet-coils 16, and the other end of these coils

is connected with one of the frame-rods 17, that support the inner-globe-holding cup 18. The lower edge of the inner globe 19 is placed in the recess of the cup and the upper edge of the inner globe is retained by a cap 20, that is perforated for the passage of the upper carbon and the frame-rods 17. The cap 20 may be lifted sufficiently high to allow the inner globe to be placed in or removed from its supporting-cup.

The cup 18 has a threaded perforation for receiving the threaded stem of the lower-carbon holder 21. A portion of the wall of the carbon-holding recess is cut away, and loosely placed in the recess is a block 22, having a projecting part 23, that extends so as to form a portion of the wall of the recess. This block is loosely connected with a stem 24, that is threaded and provided with a thumb-nut 25. When the thumb-nut is turned so as to draw the block down into the recess and the end of the part 23 engages the shoulder 26, the block is tipped so that its upper end moves toward the fixed wall of the recess. This movement of the loose part of the holder will bind in place any piece of carbon thrust into the recess. When the thumb-nut is loosened, the bite of the movable part of the wall of the recess is released from the carbon, so that it may be removed. The lower carbon is first positively clamped in the recess of its holder between the fixed and movable parts of the wall by turning the thumb-nut, and then the holder is screwed to the threaded perforation through the inner-globe cup.

The outer globe 27 is secured by common means to a ring 28, that has perforated ears 29. Pivoted between these ears are bails 30, each of which has at both ends an outwardly-extending arm 31 and a downwardly-extending finger 32. The bails are so pivoted that the fingers incline toward each other in pairs below and in line with the perforations through the ears. Finger-plates 33 are hinged to the ring in such position that when they are lifted they will engage the arms 31 and through them oscillate the bails. When the bails are thus oscillated, the ends of the fingers move from each other out of line of the perforations through the ears. As the finger-plates return to their normal positions gravity causes the bails to swing downwardly and the ends of the fingers to move toward each other.

Secured to and projecting downwardly from the frame-plate 34, that is attached to the tubular support, are posts 35, that have notches in their lower ends. These posts are so located as to extend through the perforations in the ears on the outer-globe-holding ring. When the outer globe is lifted, these posts pass through the perforations in the ears and between the fingers projecting from the bails until the fingers engage the shoulders formed by the notches near the ends of the posts. When the fingers engage the shoulders of these notches, gravity swings the bails so that the fingers will remain engaged with the notches and support the ring in place on the posts. The outer globe may be removed from this position by lifting the finger-plates 33, which, as explained, oscillate the bails and move the fingers from the notches of the posts, leaving the ring, with the globe, free to be lowered. Chains 36 are usually attached to the globe-holding ring and to the frame-plate for supporting the outer globe when it is lowered, so that the lamp may be conveniently trimmed

The armatures 37 of the magnets are joined by a bar 38, connected with which are piston-rods 39, attached to pistons movable in dash-pots 40, supported upon opposite sides of the post between the magnets. The rods 41, secured to the bar 38, are joined by a plate 42, and by springs 43 they are connected with the outer ends of the clutch-yokes 44, that are pivoted to links 45, depending from the plate 42. The inner ends of the clutch-yokes are pivotally connected with arms 46, to which the releasing-plate 47 is attached.

The clutch-block 48 on one side of the upper carbon is loosely connected by pins with the upper parts of the inner ends of the upper yoke that is on the same side of the upper carbon and the lower parts of the inner ends of the lower yoke that is on the other side, while the clutch-block 49 on the opposite side of the upper carbon is loosely connected by pins with the lower parts of the inner ends of the upper yoke on the opposite side and the upper parts of the inner ends of the lower yoke that is on the same side of the upper carbon as itself. The points of connection of the clutch-yokes with the block 49 are inside of the points of connection of the yokes with the arms 46, while the points of connection of the yokes with the block 48 are outside of the points of connection of the yokes with the arms 46. The clutch-blocks are by these connections moved bodily toward each other with great force when the outer ends of the yokes are raised, for the upper yoke pushes the upper part of one block and pulls the upper part of the other block, while the lower yoke pulls the lower part of one block and pushes the lower part of the other block. As the distance between the connections of the blocks with the yokes and the pivot-points, which are the connections between the yokes and the arms 46, is very short the leverage exercised in forcing these blocks toward each other for grasping the upper carbon is strong.

When the switch is closed and current passes through the lamp, the magnets are energized and the armatures drawn and cause the clutch to grasp and lift the upper carbon. The two dash-pots on opposite sides between the magnets control, to a certain extent, the rapidity of movement of the armatures and the striking of the arc. Even with these dash-pots the movements of the armatures are very

sudden; but the springs 43 yield sufficiently to prevent the carbon from being clutched violently and broken or caused to jump.

When the current flowing through the lamp is cut off by throwing the switch or is diminished by the increase of resistance of the arc and the magnet-armatures are lowered, the plate 47 makes contact with the upper face of the cap 20 of the inner globe. When the downward movement of the plate is arrested, the clutch-blocks are loosened, so that the carbon may feed downwardly by gravity.

The plate 47 may be made to make contact with adjustable stop-nuts 50, mounted upon rods 51, arranged to depend from the frame-plate 34, as shown in Fig. 9, instead of making contact with the upper part of the cap 20, as shown in the other views.

The resistance-wire arranged in the manner shown permits of a wide variation and close regulation of the resistance without materially increasing the length of the lamp. The double dash-pots on opposite sides desirably control the movements of the armatures and so balance the force that there is no binding or straining of the parts. The double clutch grasps the carbon evenly and firmly without danger of breaking it off and it lifts the carbon, which, although uneven or bent, will be raised without binding or undue friction, so that the feed and regulation will respond to all slight variation of resistance of the arc. The springs relieve the gripping action of the clutch parts, so that the arc will not be struck violently and so that the upper carbon will not be jumped up too far. The lower carbon can be quickly and securely placed in position, and the inner and outer globes are easily removed from and replaced in position for trimming or cleaning when necessary or desirable.

I claim as my invention—

1. In combination with the arc-striking mechanisms of an arc-lamp, a circular disk of insulating material having a helical groove in its upper face, a plate attached to its under face, a continuous spiral resistance-wire located in said groove, a yoke movable along the periphery of the insulating-disk in contact with the conducting-plate on one face and the resistance-wire in the groove in the other face, and connections between the plate and the circuit and between the resistance-wire and the circuit through the lamp, substantially as specified.

2. In combination in an arc-lamp, a supporting-post, a pair of magnets held by a fixed frame upon opposite sides of the posts, a pair of dash-pots held by the fixed frame upon opposite sides of the posts and between the magnets, an armature-bar located below the magnets, pistons located in the dash-pots and connected with the armature-bar, a plate connected with the armature-bar, links loosely connected with the plate, clutch-blocks supported by the links, and springs connecting the clutch-block yokes with the plate, substantially as specified.

3. In combination in an arc-lamp, a supporting-post, a pair of magnets held by a frame upon opposite sides of the post, a pair of dash-pots held by the frame upon opposite sides of the post, an armature-bar, pistons in the dash-pots connected with the armature-bar, clutch-blocks arranged on opposite sides of the upper carbon, yokes connected with both of the clutch-blocks, and a spring and link loosely connecting each yoke with the armature-bar, substantially as specified.

4. In combination in an arc-lamp, a supporting-post, a pair of magnets held by a frame upon opposite sides of the post, a pair of dash-pots held by the frame upon opposite sides of the post, an armature-bar, pistons in the dash-pots connected with the armature-bar, clutch-blocks arranged on opposite sides of the upper carbon, yokes connected with both of the clutch-blocks, a spring and link loosely connecting each yoke with the armature-bar, and an annular releasing-plate connected with the yokes, substantially as specified.

5. In combination with the arc-striking mechanism of an arc-lamp, a carbon-clutch having clutch-blocks upon opposite sides of the upper carbon, clutch-yokes one of which is connected with the upper parts of the blocks and the other of which is connected with the lower parts of the blocks, clutch-connecting arms, and a releasing-plate connected with the arms, substantially as specified.

6. In combination with the arc-striking mechanisms of an arc-lamp, a carbon-clutch having clutch-blocks upon opposite sides of the upper carbon, clutch-yokes one of which is connected with the upper parts of the blocks and the other of which is connected with the lower parts of the blocks, clutch-connecting arms, a releasing-plate, supporting-rods connected with the magnet-armatures, elastic connections between the yokes and the supporting-rods, a plate connecting the supporting-rods, and links connecting the yokes with the plate, substantially as specified.

7. In combination with the supports and the feeding mechanisms of an arc-lamp, a globe-holding ring having means for the attachment of a globe, bails pivotally connected with the ring, fingers projecting downwardly from the bails and adapted to swing toward each other as the bails move downwardly, and shouldered posts connected with the lamp-frame and adapted to extend between the fingers, substantially as specified.

8. In combination with the supports and feeding mechanisms of an arc-lamp, a globe-holding ring having means for the attachment of a globe, bails pivotally connected with the ring, fingers projecting downwardly from the bails, arms projecting outwardly from the bails, finger-plates pivoted to the

ring and adapted when lifted to engage the bail-fingers and swing the bails, and shouldered posts depending from the lamp-frame and adapted to extend between the fingers, substantially as specified.

9. In combination with the supports and the feeding mechanisms of an arc-lamp, a cylindrical carbon-holder having a portion of the wall of the carbon-recess fixed and a portion of the wall movable, an edge of the movable portion resting loosely on an edge of the fixed portion, a block projecting inwardly from the movable portion of the wall of the carbon-recess, a threaded stem loosely attached to the block and extending through the end of the carbon-holder, and a thumb-nut turning upon the threaded stem, substantially as specified.

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Witnesses:
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