No. 685,426. Patented Oct. 29, 1901.

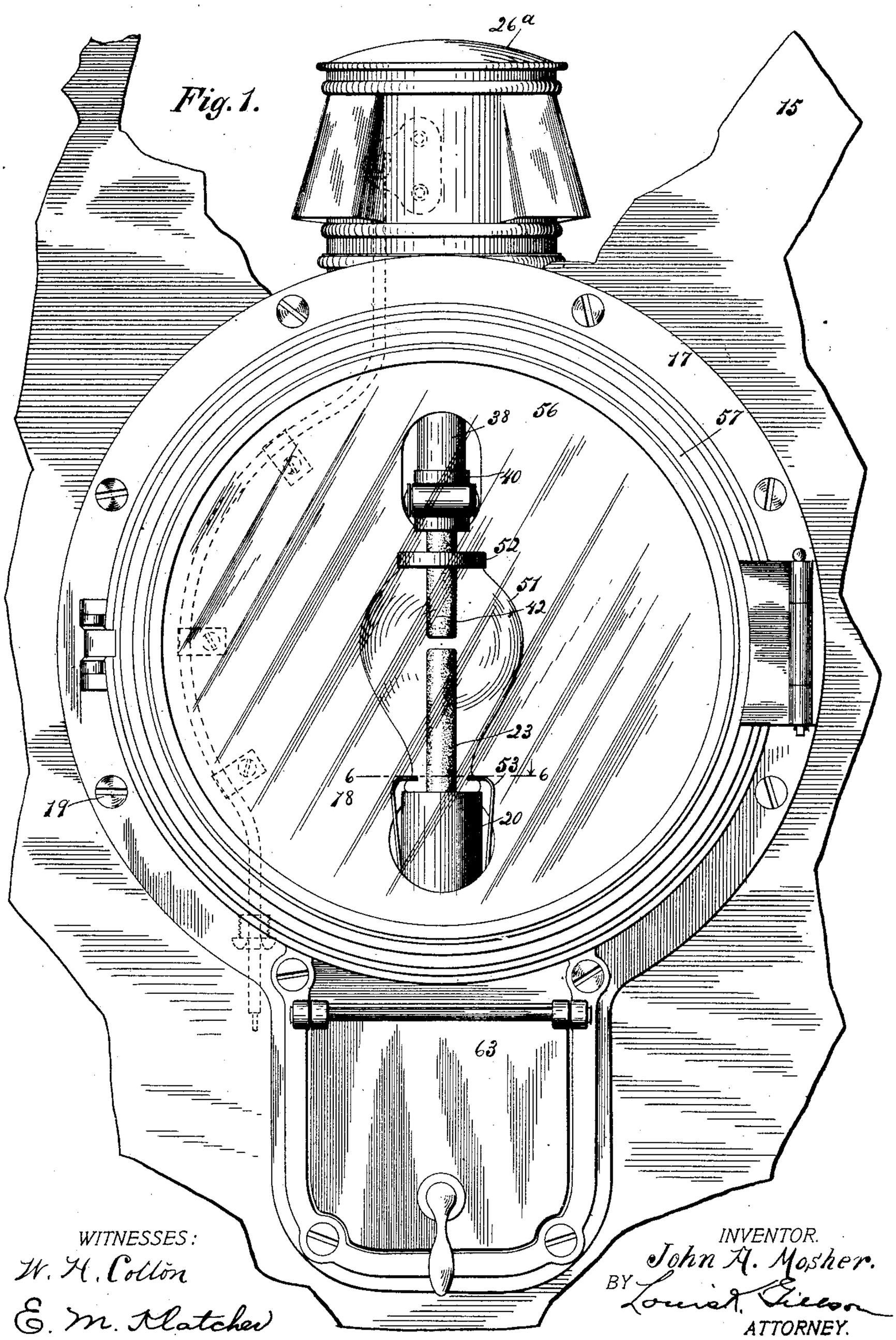
J. A. MOSHER.

ELECTRIC ARC LAMP.

(Application filed Mar. 25, 1901.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.



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(No Model.) 3 Sheets—Sheet 2.

Fig. 4.

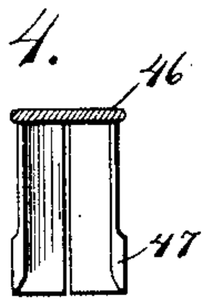


Fig. 5.

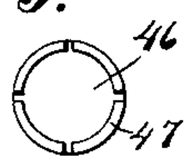


Fig. 6.

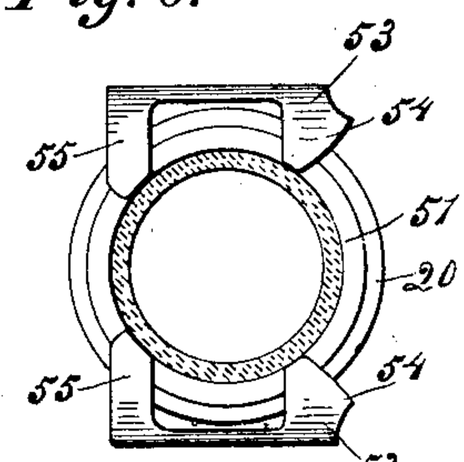


Fig. 7.

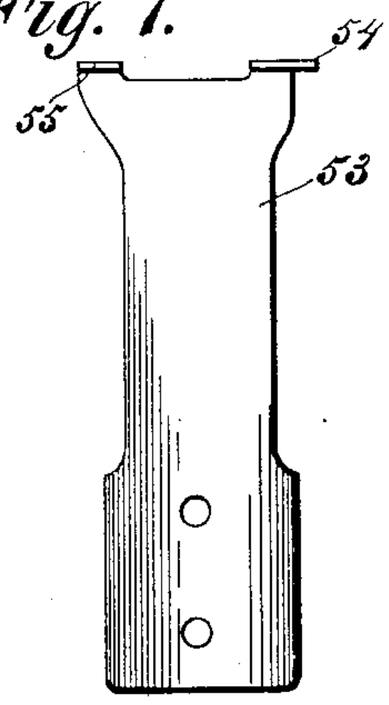


Fig. 2.

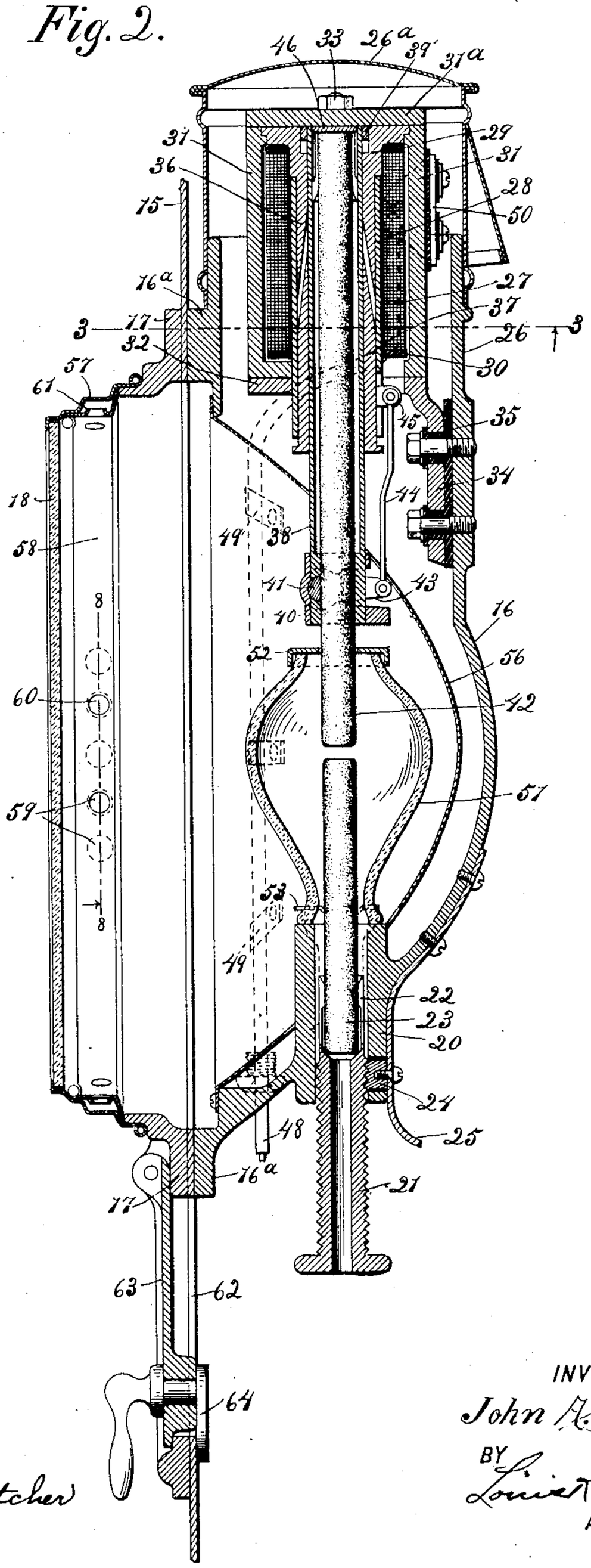
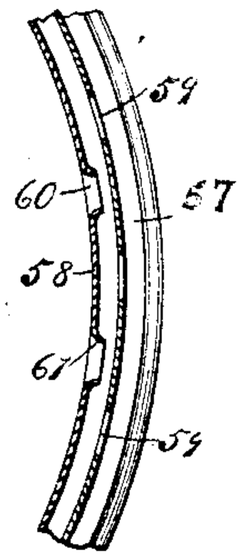


Fig. 8.



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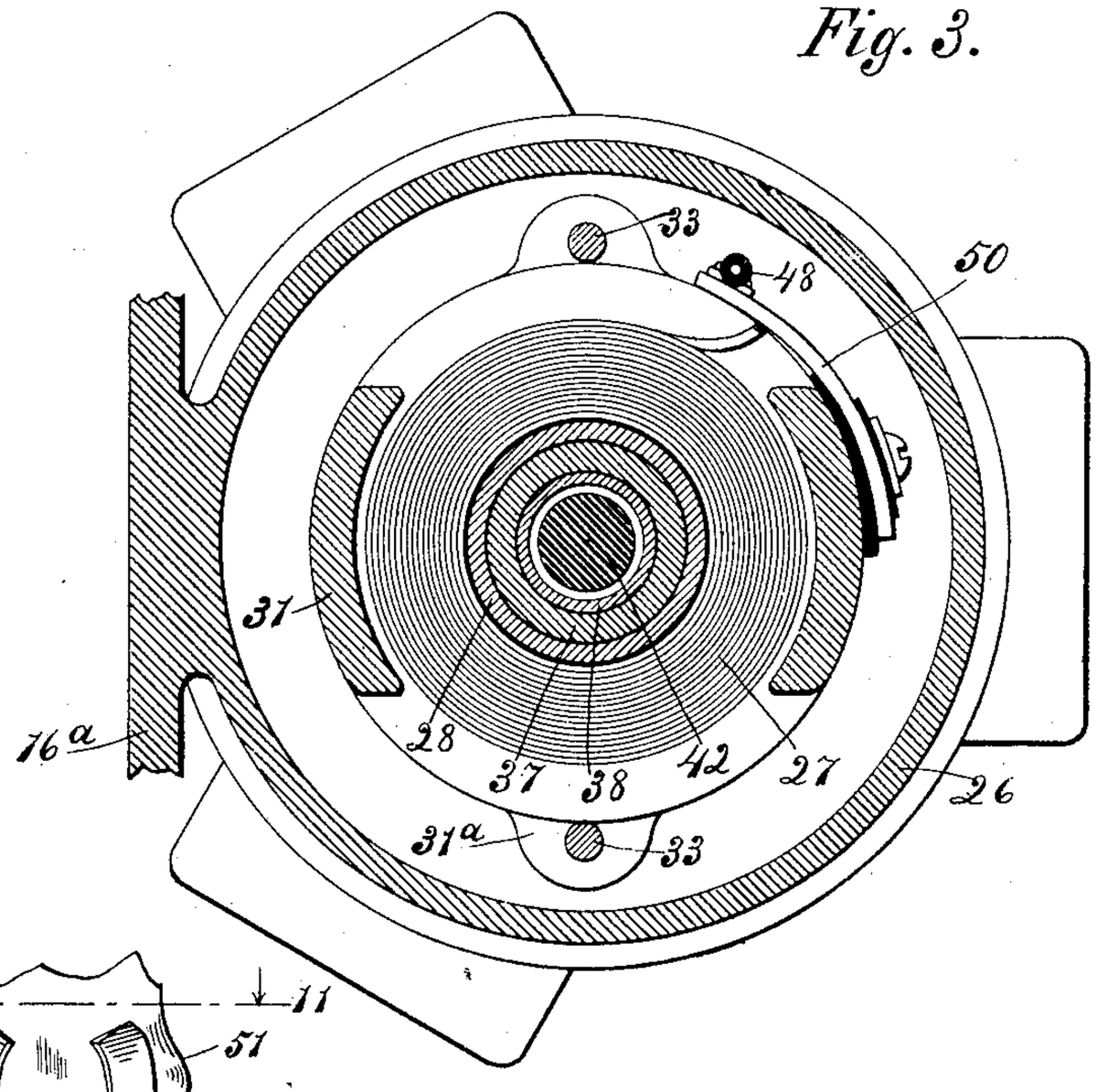
(No Model.) 3 Sheets—Sheet 3.

Fig. 3.



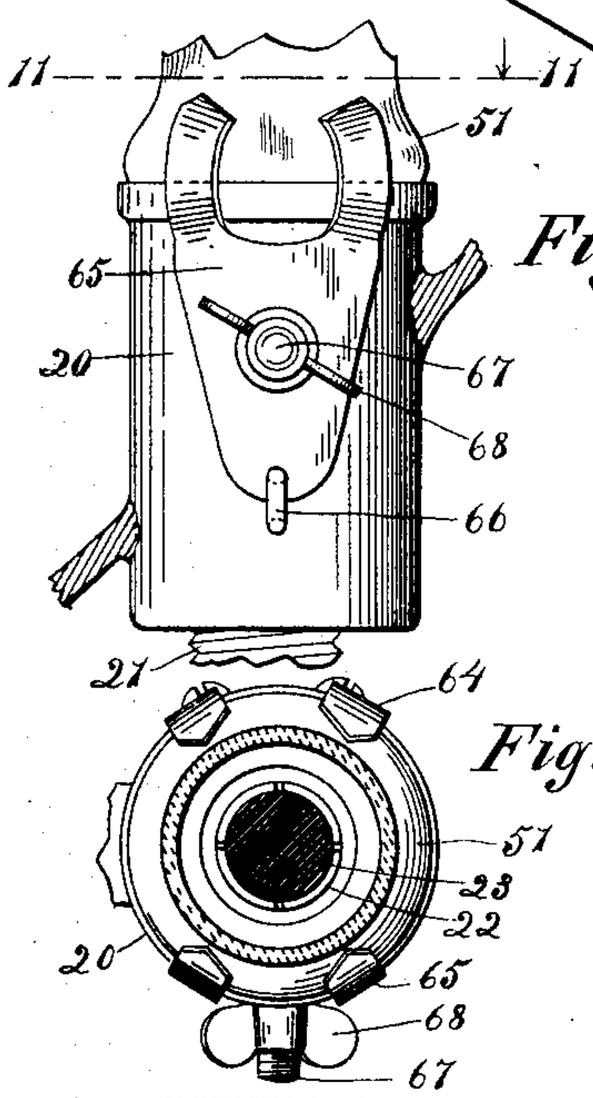


Fig. 10.

Fig. 11.

Fig. 9.

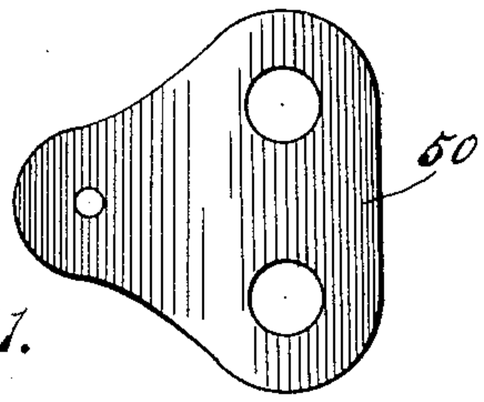
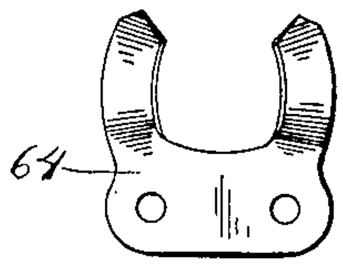


Fig. 12.



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UNITED STATES PATENT OFFICE.

JOHN A. MOSHER, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE ADAMS & WESTLAKE COMPANY, A CORPORATION OF ILLINOIS.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 685,426, dated October 29, 1901.

Application filed March 25, 1901. Serial No. 52,859. (No model.)

To all whom it may concern:

Be it known that I, JOHN A. MOSHER, a citizen of the United States, and a resident of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Arc-Headlights, of which the following is a specification, and which are illustrated in the accompanying drawings, forming a part thereof.

This invention relates to arc-headlights, particularly to such as are adapted for use on street-cars; and its objects are to adapt such a light for attachment back of the dashboard of a street-car and to generally improve its construction, the invention consisting in the various parts and arrangement of parts, as hereinafter fully described and as illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation of the lamp as applied to the dashboard of a car. Fig. 2 is a central vertical section of the same. Fig. 3 is a section on the line 3 3 of Fig. 2. Figs. 4, 5, 6, 7, 8, and 9 are details of the lamp, and Figs. 10, 11, and 12 are details of a modification of the bulb-holder.

A portion of the dashboard of a car is shown at 15 and is apertured, so that the body of the lamp may be located back of it and the front of the lamp in front of it.

The body of the lamp consists of a generally-concave casting, as 16, having a ring 16^a, adapted to rest against the dashboard and surround its aperture. The front portion of the lamp consists of a ring 17, adapted to be applied to the front of the dashboard and inclose its aperture and to carry the glass plate 18, the two rings 16^a and 17 being secured together and to the dashboard by means of screw-bolts, such as 19.

The body 16 of the lamp is provided in its lower portion with a vertical socket 20 for the lower carbon, and within this socket there plays a threaded rod 21, having its upper end socketed and longitudinally split, as shown at 22, to provide a spring-clamp for holding the lower carbon 23. The rod 21 coöperates with the block 24, fitting loosely within a lateral aperture in the socket-block 20 and having its inner face crossed by screw-threads and being carried by a leaf-spring 25, secured to the lamp-body 16. The screw-threads of the rod 21 and block 24 are of such pitch that by the application of force the rod may be reciprocated without being turned, the block 24 serving simply as means for frictionally holding the rod, but its threads also admitting of the adjustment of the rod by turning. The rod is tubular in order to permit carbon-dust and particles to drop therethrough, and its carbon-receiving socket is formed by counterboring its aperture.

An upward tubular extension 26 of the lamp-body 16 is provided for receiving the works of the lamp and is closed by a cap 26^a, having suitably-protected ventilating-apertures. A solenoid-coil 27 is wound upon a brass tube 28, forming the body of the spool, the head or end members of which are shown at 29 30. The coil is secured within the frame 31, held between an upper plate 31^a and a lower plate 32, which plates are secured together by the screw-rods 33, and the whole is supported by means of a bracket 34, secured to the rear wall of the extension 26 by means of screws, but insulated therefrom, as shown at 35. The upper head or end 29 of the spool is provided with a central annular projection 36, which extends partly through the solenoid-core, the lower end of its bore being flaring and on a long taper, this projection constituting a fixed portion of the solenoid-core and being, of course, of iron. The movable member 37 of the solenoid-core is also tubular and has its upper end tapering to correspond with the taper of the bore of the member 36. A carbon-receiving tube 38, of brass, projects loosely through the two members of the solenoid-core and is provided at its upper end with a collar 39, which plays within a counterbore of the upper spool end 29, such counterbore and the plate 31^a defining the limits of its vertical movement.

To the lower end of the tube 38 there is fixed a block 40, which carries an oscillating clutch 41, adapted to grip the upper carbon 42 and being provided with a crank-arm 43, connected, by means of a link 44, with a lug 45, formed upon the lower member 37 of the solenoid-core. Upward movement of this

member of the core locks the clutch 41, gripping the carbon 42 and binding it against the head 40, further movement of the core raising both the carbon and the tube 38. The movable member of the solenoid-core, the tube 38, and carbon 42 will descend together until the collar 39 strikes the bottom of the counterbore of the spool end 29. Further downward movement of the core will turn the clutch 41 and release the carbon, allowing it to fall.

Loosely playing within the tube 38 is a cap 46, longitudinally slotted to form the spring-fingers 47, between which the carbon 42 may be forced in trimming the lamp. The bore of the block 40 is somewhat less than that of the tube 38, so that the cap 46, while free to move within the latter, will not pass through the former, thereby preventing the remnant of the carbon from falling entirely out of the tube.

The current is led to the lamp through the wire 48, coming up from below and passing through the lamp-body 16, being held by suitable clips 49 and passing up into the lamp-head, where it is secured to a brass plate 50, attached to but insulated from the frame 31, and to which plate one end of the coil 27 is also electrically connected. The opposite end of the coil 27 is electrically connected with the tube 28, so that the current will pass into the upper carbon and to the ground through the lower carbon, the lamp-body, and the car.

The lamp is of the focused-arc type, and a diaphanous bulb 51 is therefore provided for inclosing the arc, the upper end of the bulb being closed by a loose-fitting cap 52, through which the upper carbon 42 is free to play, and its lower end resting upon the socket-block 20 and being clamped by the spring-fingers 53 53, which are secured to the sides of the socket-block 20. Each of the spring-fingers 53 is provided with two inwardly-extending projections 54 55, the projections 54 having their outer faces beveled, so that in placing the bulb 51 its neck may simply be forced in between them. A suitable concave reflector-plate 56 is placed back of the arc and may be secured to the ring 16^a of the lamp-body.

The glass front 18 of the lamp is carried by a ventilating-ring comprising the two members 57 58, one within the other, the body portions of the two being spaced somewhat apart and each being radially perforated, as shown at 59 and 60, the perforations of the two alternating, so that rain will not beat directly into the lamp-chamber. The apertures of the inner member 58 of the glass-holding ring are surrounded by outstanding flanges 61, so that any wet finding its way into the chamber between these two bands will follow down the outer surface of the inner one and drip out through the apertures at the bottom of the outer one.

A hand-hole is formed in the dashboard below the lamp, as indicated at 62, for convenience in trimming. This hole is preferably covered by a door 63, pivoted to the ring 17 and secured by a hand-controlled catch 64. Preferably the ring 17 is provided with a downward extension for inclosing the hand-hole 62 and forming a seat for the door 63.

In trimming the lamp the rod 21 is entirely withdrawn and the lower carbon fitted within its socket. The upper carbon having been inserted through the socket-block 20, the lower carbon is now entered therein, being pushed upwardly until it forces the upper carbon into the cap 46, the lower carbon being now withdrawn by turning the rod 21 until the descent of the upper carbon is arrested by the collar 39 reaching the bottom of the aperture within which it plays. When the current is turned on, the movable member 37 of the solenoid-core is drawn up, actuating the clutch 41, and thus binding the core member, the carbon, and the tube 38 together and drawing the arc. The carbon-feed is intermittent and caused by the rupture of the arc by the too wide separation of the carbon pencils. The current being thus interrupted, the upper carbon, the tube 38, and the core member 37 instantly drop, the arrest of the tube 38 by the agency of the collar 39 causing the release of the clutch, so that there is a slight downward feeding of the carbon relatively as to its containing-tube. The current being again established, the arc is instantly redrawn, and the whole operation of feeding the carbon has taken place in such a short time that the interruption of the light is scarcely noticeable.

The construction of the lamp-head is especially convenient for the purpose of repairs. By loosening the bolts which pass through the top plate 31^a the latter, together with the works of the lamp, may be lifted out without necessitating the disconnecting of the lamp-body from the dashboard.

In lieu of the spring-fingers 53 for holding the diaphanous bulb 51 I may use a fixed plate 64, having a pair of inturned projections for engaging the bulb, and a movable plate 65. The latter plate is secured loosely to the socket-block 20 by a staple 66 or similar device, setting through a suitable aperture in the plate and fixed in the socket-block, and by a wing-nut 68, applied to a threaded stud 67, fixed in the socket-block and projecting through a suitable aperture in the plate 65. This latter plate is also provided with inturned projections for engaging the bulb 51, and the latter is placed by first turning back the nut 68 to release the plate 65 and then turning the nut up to force the plate against the bulb. The projections of the two plates are sufficiently resilient to compensate for any expansion and contraction of the bulb due to heat. In this last-described modification the nut and bolt constitute the means for clamping the bulb, while in the

previously-described form of bulb-securing mechanism the spring-fingers 53 provide the clamping pressure.

I claim as my invention—

1. In an electric-arc headlight, in combination, a car-dashboard having an aperture, and a lamp comprising two sections one of which contains the works of the lamp and the other, or front, the glass, the two sections being secured together upon and to the opposite faces of the dashboard and around the aperture.

2. In an electric-arc lamp, in combination, a socket-block for receiving a carbon pencil, a diaphanous bulb for inclosing the arc, yielding clamping-fingers secured to the socket-block and projecting upwardly and having inturned projections for engaging the bulb, and a screw for forcing the fingers into engagement with the bulb.

3. In an electric-arc headlight, in combination, a lamp-casing having a passage through the wall thereof, a threaded carbon-holder adapted to reciprocate in the passage, and a threaded friction-block held in engagement with the threads of the carbon-holder to provide for a screw adjustment of the same, the threads of the block and carbon-holder being inclined on both sides.

4. In an electric-arc headlight, in combination, a lamp-body having a socket through the wall thereof, a threaded carbon-holder adapted to reciprocate in the socket, a threaded friction-block, and a spring for holding the block in engagement with the holder to provide for a screw adjustment of the same, but allowing the block to yield in order to permit of the reciprocation of the holder without turning.

5. In an electric-arc headlight, in combination, a lamp-body having a socket through the wall thereof, a threaded carbon-holder adapted to reciprocate in the socket and having its upper end provided with spring-fingers for grasping the carbon, a threaded block engaging the threads of the carbon-holder, and a spring for holding the block in engagement with the threads of the holder, in order to provide for a screw adjustment of the same, but allowing the block to yield to permit of the reciprocation of the holder without turning.

6. In an electric-arc headlight, in combination, a lamp-body, a support within the body, a diaphanous bulb carried by the support and into which project the conducting-carbons, and a pair of spring-fingers carried by the support and having inturned projections at their upper ends for engaging the bulb, two of the oppositely-disposed projections being beveled to permit the bulb to be forced past them.

7. In an electric-arc headlight, in combination, a lamp-body, a support within the body, a diaphanous bulb carried by the support and having a contracted portion, and a pair of spring-fingers for holding the bulb secured to the lamp-support and each of which is provided with inwardly-extending projections, one pair of the projections having their outer faces beveled so as to permit of the ready insertion of the lamp-bulb.

8. In an electric-arc headlight, in combination, a lamp-body, a diaphanous bulb having openings through which the conducting-carbons project, a support for the bulb having an aperture for the passage of the lower carbon, a pair of spring-fingers secured to the support and having projections for engaging the bulb to hold the same in position, two of the projections having their outer faces beveled to permit of the ready insertion of the bulb, and a cap for the upper opening of the bulb having an aperture through which the upper carbon passes.

9. In an electric-arc headlight, in combination, a solenoid the top of which is counterbored, a tubular movable core working in the solenoid and through which projects loosely a carbon-receiving tube having longitudinal movement relatively as to the core, and means operated by the movable core for feeding the carbon, the receiving-tube having a collar adapted to play in the counterbore in the solenoid to limit the movement of the receiving-tube.

10. In an electric-arc headlight, in combination, a solenoid, the spool of which is provided with a counterbore, a plate closing the counterbore, a movable core working in the solenoid, a carbon-receiving tube, a clutch, and means actuated by the movable core for operating the clutch to advance and retract the carbon-receiving tube, the receiving-tube having a collar adapted to play in the counterbore in the solenoid-spool and its movement being limited by the counterbore and the plate closing the same.

11. In an electric-arc headlight, in combination, a lamp-body having a tubular extension, a frame for carrying the works of the lamp, a bracket to which the frame is removably secured, and a removable cap for the tubular extension.

12. In an electric-arc headlight, in combination, a solenoid, the spool of which is counterbored, a cap closing the counterbore, a movable tubular core working in the solenoid, a carbon-receiving tube, a clutch carried by the receiving-tube adapted to grip the carbon pencil, and a connection between the clutch and the movable core, the receiving-tube being provided with a collar adapted to play between the counterbore and the plate closing the same, to limit the movement of the receiving-tube and thereby, through the connection, the movable core.

13. In an electric-arc headlight, in combination, a lamp-body having a tubular extension, a frame, a solenoid located within and a carbon-receiving tube carried by the frame, a bracket for the frame, and a removable cap for the tubular extension, the frame being

removably secured in place to permit of the removal of the works of the lamp through the extension.

14. In an electric-arc headlight, in combination, a lamp-body, having an upward tubular extension, a frame disposed within the extension, a solenoid located within and a carbon-receiving tube carried by the frame, and a bracket for the frame secured to but insulated from the body of the lamp, the frame being removably secured in place to permit of the removal of the works of the lamp.

15. In an electric-arc headlight, in combination, a lamp-body having an upward tubular extension, a frame consisting of a top and bottom and two side members, and disposed within the extension, a solenoid located within and a carbon-receiving tube carried by the frame, a bracket for the frame secured to but insulated from the body of the lamp, and a plate carried by but insulated from one of the side members of the frame through which the current is conducted to the one end of the solenoid-core, the other end of the coil being connected to the spool of the solenoid to conduct the current to the carbon pencil.

16. In an electric-arc headlight, in combination, a solenoid, a carbon-receiving tube, means operated by the solenoid for feeding the carbon, and a cap secured to the end of the carbon and adapted to prevent the remnant of the carbon from falling out of the tube.

17. In an electric-arc headlight, in combination, a solenoid, a carbon-receiving tube having a contracted outlet, means operated by the solenoid for feeding the carbon, and a cap having spring-fingers by which it is secured to the end of the carbon, the cap engaging the contracted end of the receiving-tube to prevent the remnant of the carbon from falling entirely therefrom.

18. In a headlight having a glazed light-emitting aperture, a ventilating-ring surrounding such aperture and consisting of an outer and an inner perforated member, the perforations of the two members being out of alinement, and those in the upper portion of the inner member being surrounded by upstanding flanges, and those in the lower portion of the outer member being without upstanding flanges and serving as drainage-openings.

19. In an electric-arc headlight, in combination, a solenoid, a tubular movable core playing therein, a carbon-receiving tube projecting through the core, an oscillating clutch carried by the receiving-tube and adapted to grip the upper carbon of the lamp, a crank-arm secured to the clutch, a link connecting the crank-arm with the movable core, and means for limiting the movement of the receiving-tube, the travel of the core being governed by that of the receiving-tube but is allowed a greater play in order to permit of the operation of the clutch.

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