R. FLEMING.

ARC LAMP HEADLIGHT.

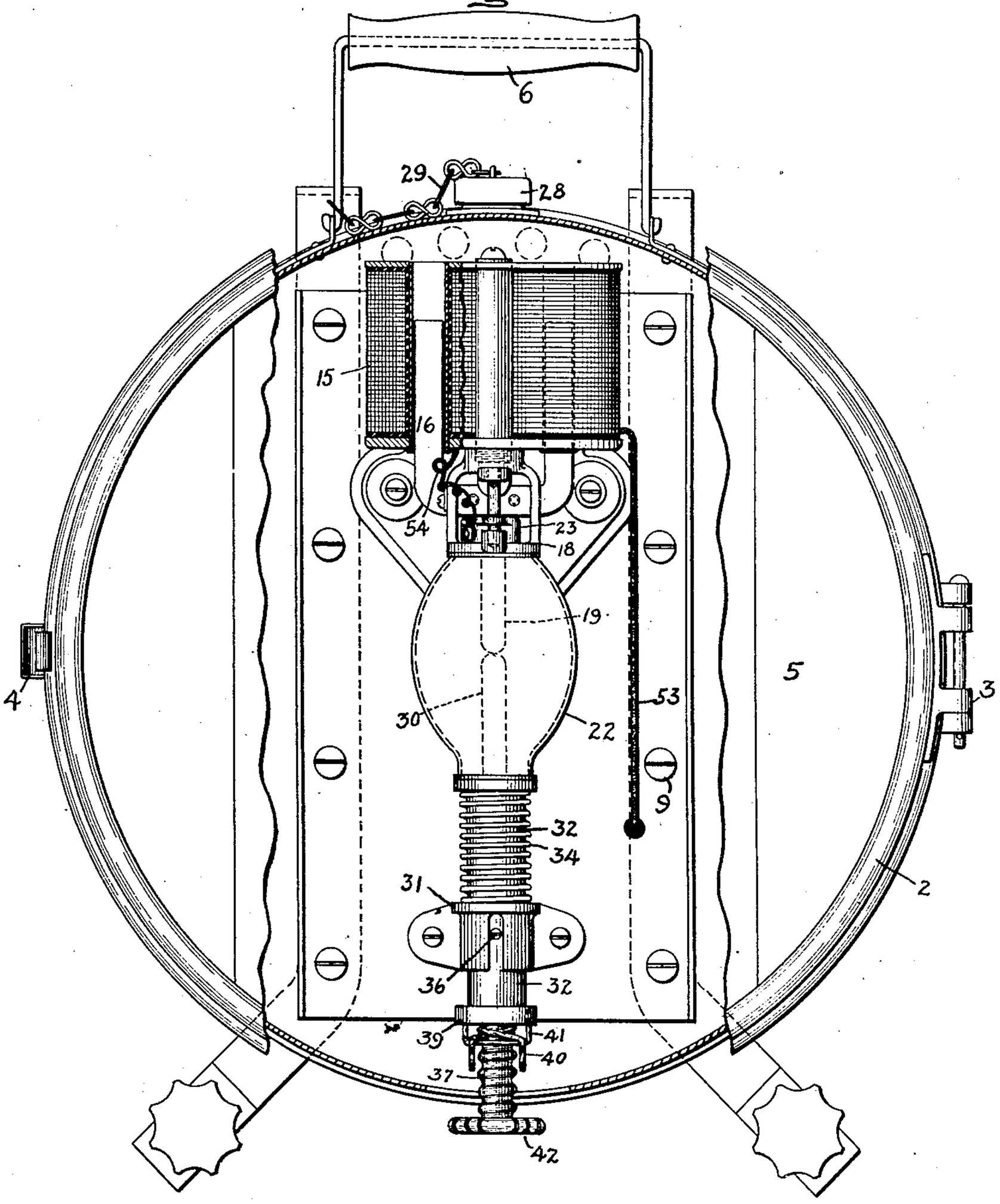
APPLICATION FILED MAY 6, 1905.

920,853.

Patented May 4, 1909.

3 SHEETS—SHEET 1.

Fig. 1.



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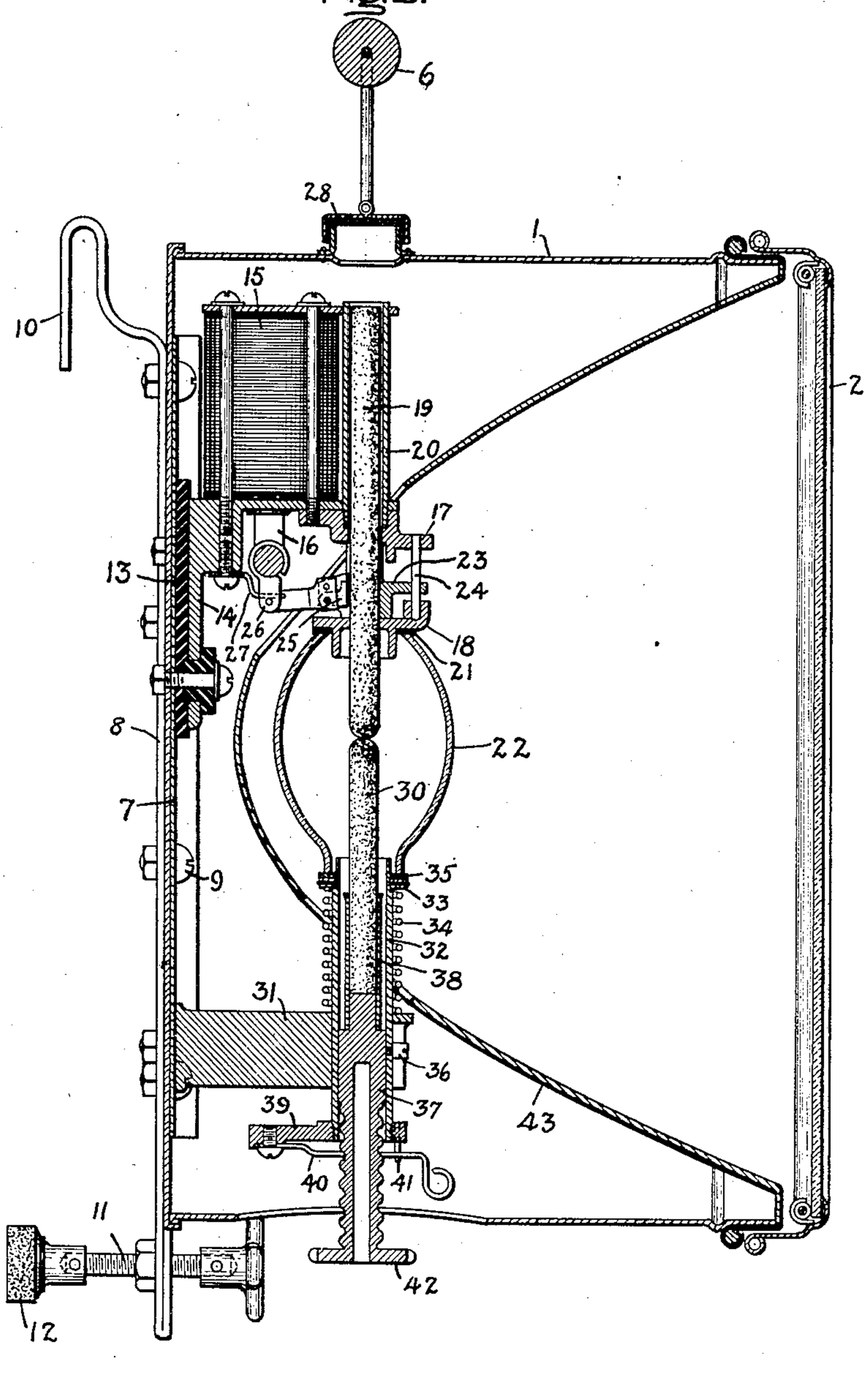
3 SHEETS—SHEET 2.

Fig. 2.



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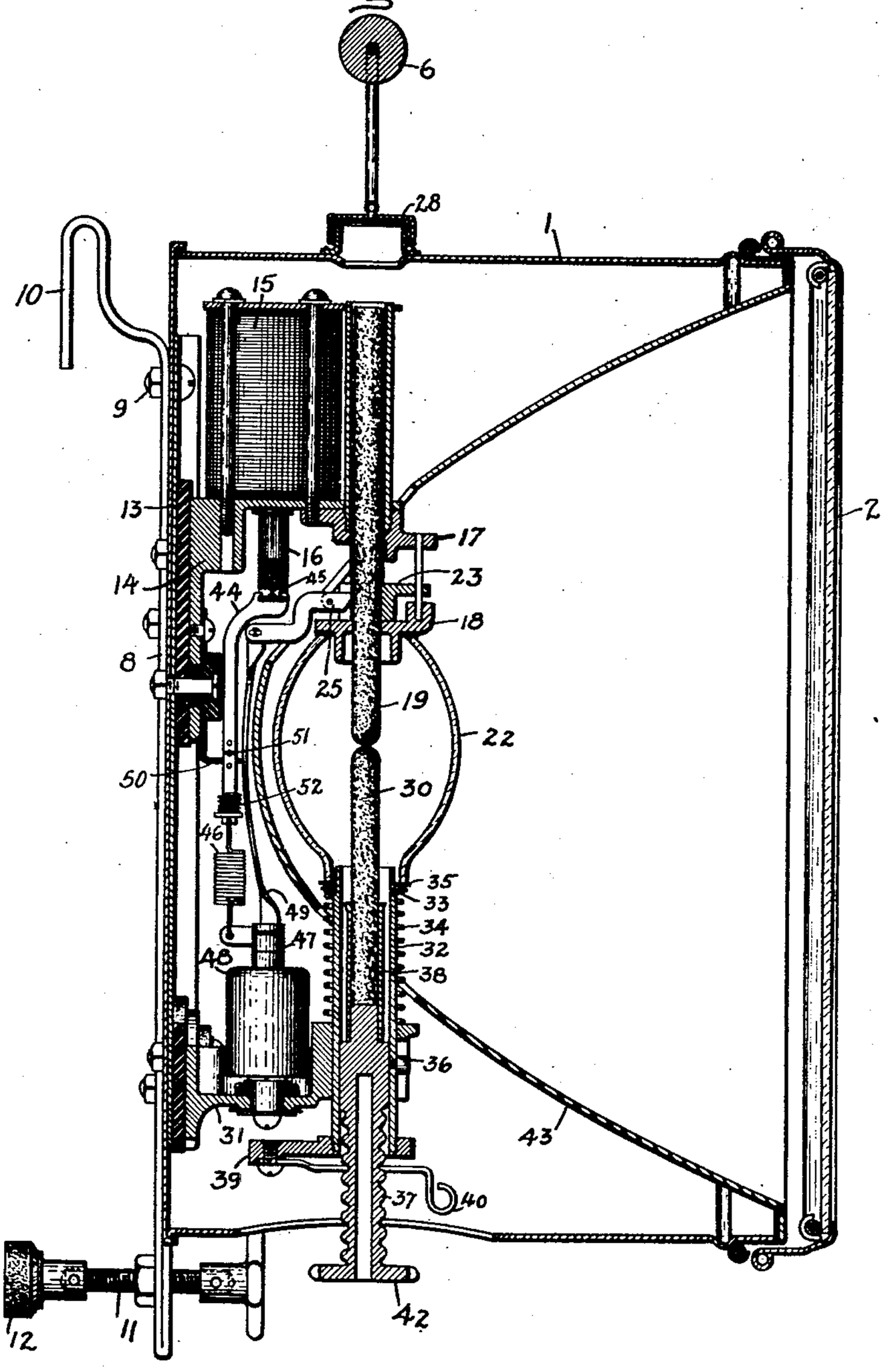
3 SHEETS—SHEET 3.

Fig. 3.



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UNITED STATES PATENT OFFICE.

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

ARC-LAMP HEADLIGHT.

No. 920,853. Specification of Letters Patent. Patented May 4, 1909.

Application filed May 6, 1905. Serial No. 259,136.

To all whom it may concern:

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

This invention relates to arc lamp headlights and its object is to provide a headlight of simple rugged construction strong enough to stand the jarring and rough handling incident to trolley car service, which is automatic in its operation, inexpensive to produce and in which the parts are adjustable and readily accessible.

A further object is to produce a headlight which with slight changes can be used on either direct or alternating-current circuits.

The novel features of my invention will be definitely indicated in the claims appended hereto.

The details of construction and method of operation of my improved arc lamp headlight will be better understood by reference to the accompanying drawings which show the preferred embodiments of my invention.

In the drawings, Figure 1 is a front view of the headlight broken away in part; Fig. 2 is a sectional elevation of the same; and Fig. 3 is a sectional elevation of the headlight as modified for use on alternating-current circuits.

Referring to the drawings, the parts of the lamp are inclosed in a suitable sheet-metal casing 1 closed at the front by a door 2 which is hinged at one side as indicated at 3 and provided with a spring 4 on the other side. The door 2 consists of a metallic rim holding a circular piece of glass 5. A handle 6 is secured to the top of the casing 1 by suitable hinges. Secured to the inner side of the back of the casing is a sheet-metal plate 7 on which the parts of the lamp are mounted. Sheet-metal strips 8 are fastened to the other side of the casing by the bolts 9 which secure the plate 7 thereto and these strips are bent at their upper ends, as indicated at 10, to form hooks for mounting the headlight upon a car. Secured in the lower ends of the strips 8 are feet 11 provided with leather buffers 12 which rest against the dashboard of the car and which are adjustable to permit of adjusting the angular position of the headlight on a car and to compensate for irregularities in the dashboard. Secured to the plate 7 but insulated therefrom by the sheet of insulating material 13, is a frame 14 on which are mounted two solenoids 15 provided with a U-shaped iron armature 16.

The forward end of the frame 14 is formed to provide two circular portions 17 and 18 one above the other, both of which have openings therethrough for the upper movable electrode 19. The opening in the upper circular portion 17 of frame 14 is threaded and a tube 20 is secured therein and forms a guide for the electrode 19. The lower circular portion 18 of frame 14 forms the gas cap for the arc-inclosure and a washer 21 of asbestos or other suitable material is secured to its under side against which the upper end of the arc-inclosing globe 22 is held. The clutch 23 for positioning the movable electrode 19 is arranged to move between the two portions 17 and 18 of the forward end of the frame 14 and is guided by a rod 24 extending between them and through an opening in the clutch. The pawl 25 of the clutch is pivoted in ears formed in the clutch ring and pivotally connected to a link 26 secured to the armature 16. A finger 27 depending from the frame 14 extends under the armature 16 to support it when the solenoids 15 are deënergized. In the top of the casing and directly over the tube 20 is an opening through which the movable electrode 19 can be inserted. This opening is normally closed by a cap 28 secured to the handle 6 by a chain 29. The interior of the cap is lined with mica, or other insulating material, as indicated in Figs. 2 and 3, to prevent grounding of the movable electrode when raised by the clutch.

The holder for the lower carbon 30 and the arc-inclosing globe 22 consists of a frame 31 secured to the plate 7 and provided with an opening near its forward end in which a sleeve 32 is rotatable and vertically movable. Secured to the sleeve 32 near its upper end is a washer 33 and a spring 34 is coiled about the sleeve between the frame 31 and the washer 33. The upper surface of washer 33 may be covered with asbestos 35 or other suitable material and the lower end of the arc-inclosing globe 22 rests thereon. The spring 34 thus presses the sleeve 32 and globe 22 upward holding the upper end of the globe tightly against the rigidly-supported gas cap. In the front of the frame 31

is a vertical slot and a screw 36 extends through this slot and into the sleeve 32. Within the sleeve 32 is a rod 37 which may either slide vertically or rotate in the sleeve and on the upper end of the rod is secured a split sleeve 38 in which the lower carbon 30 is held. A coarse thread is cast in the lower portion of the rod 37 and a handle 42 is formed on the lower end. Secured to the lower end of sleeve 32 is a plate 39 to which are secured two springs 40 which extend partly around the threaded end of rod 37 on opposite sides thereof and through a bail 41 and at their outer ends are bent to provide finger-holds. A reflector 43, preferably of parabolic conformation, is mounted within the casing with the arc in the focus thereof. Openings are provided in the reflector in vertical alinement for entrance of the carbons and other parts of the lamp mechanism.

The positive lead 53 extends through a bushed opening in the back of the casing to the solenoids 15 and from the other side of the solenoids connection is made by a lead 54 to the clutch 23 which carries the current to the upper carbon 19. The frame 14 is insulated from the casing as indicated at 13 to permit of carrying the current to the upper carbon in this way. The lower carbon is electrically connected through its holder and the frame 31 to the casing of the lamp and is thus grounded on the dashboard of the car. When circuit through the lamp is closed the solenoids 15 are energized and draw up the armature 16 which lifts the clutch and the carbon 19 held thereby till the clutch ring engages the upper portion 17 of frame 14 which serves as a clutch stop. The breaking of the circuit at the trolley wheel deënergizes the solenoids 15 and thus causes feeding sufficiently often to insure good operation and prevent the arc from becoming too long. If the arc gets out of the focus of the reflector the rod 37 may be adjusted vertically in the sleeve 32 to restore it to its proper position. By pressing the ends of the springs 40 together the rod 37 is released and may be moved freely up and down in the sleeve to approximate the proper position. When released springs 40 engage the threads on the lower end of rod 37 and finer adjustment of the lower carbon can then be obtained by turning the handle 42 on the lower end of the rod. An opening in the bottom of the lamp casing permits of making this adjustment without opening the lamp casing. In case it is necessary to take out the reflector, the sleeve 32 and all the parts carried thereby may be drawn down against the tension of spring 34 until the pin 36 has reached the end of the slot in the frame 31 and then turned enough to carry the pin away from the slot so that it will hold the parts in this position; the lower carbon should then be drawn down within sleeve 32 and the globe 22 removed. With the parts in this relation, the reflector can be readily withdrawn from the lamp.

In Fig. 3, I have shown my improved arc lamp headlight as adapted for use on alternating-current trolley circuits. The frequency of such circuits is usually quite low and vibrations of the parts of the lamp due to the alternations of the current are quite noticeable unless means are provided for cushioning the movements of the parts and absorbing vibrations. I employ a flexible connection between the regulating armature and the clutch and a dash-pot acting directly on the clutch so as to lag its movements behind those of the armature. I also employ springs for absorbing the vibrations of the armature. In this lamp the armature 16 consists of a bundle of U-shaped laminations as is usual in alternating-current lamps. Instead of connecting the armature directly with the pawl of the clutch I employ a rod 44 connected at its upper end to the armature 16 by a spring 45 and at its lower end to the end of a coiled spring 46 the other end of which is connected to the piston 47 of a dash-pot. The cylinder 48 of the dash-pot is secured to the frame 31 but insulated therefrom. The piston 47 is connected by a rod 49 with the pawl 25 of the clutch. The spring 46 is of such strength that when extended by the movement of the armature 16 it has just sufficient power to raise the piston of the dash-pot. When the solenoids 15 are energized, the armature 16 and rod 44 are raised but the piston 47 of the dash-pot and the clutch 23 are not raised immediately; instead the spring 46 is extended and when extended it slowly raises the piston 47, rod 49, the clutch and the movable electrode 19 and thus strikes the arc. In this type of headlight I provide a finger 50 extending downward from frame 14 and coöperating with a pin 51 in the rod 44 to limit the downward movement of the rod and the armature 16. A spring 52 is coiled about rod 44 and when the armature 16 is raised engages finger 50 to assist in preventing vibration of the armature and parts connected thereto as the current in the solenoids 15 alternates.

I have illustrated and described herein the construction of headlight which I prefer to employ, but I wish it understood that I am not limited to the precise construction shown, since this may be modified in various ways without departing from the spirit of my invention. Such modifications I aim to cover in the claims appended hereto.

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

1. In an arc-lamp headlight, the combination of a casing and a reflector removably supported therein, with an arc-lamp having

a pair of electrodes entering openings in said reflector, an inclosing globe for the ends of said electrodes, supports for said globe one of which enters one of the openings in the reflector, and means for retracting said latter support from the reflector independently of the other support.

2. In an arc lamp headlight, a stationary member, a globe, a frame, a globe support slidingly mounted thereon, a spring forcing the globe support against one end of the globe to hold its other end firmly against said stationary member, a holder for an electrode carried by and within the globe support adjustable from outside the arc-inclosure in the direction of the axis of the globe, and a casing for the parts.

3. In an arc lamp headlight, a rigidly supported gas cap, an arc-inclosing globe open at both ends, a frame, a globe support slidingly mounted thereon, a spring forcing the globe support upward against the lower end of the arc-inclosing globe to hold its upper end firmly against the gas cap, a holder for an electrode carried by and within the globe support adjustable from outside the arc-inclosure toward and from the gas-cap, and a casing for the parts.

4. In an arc lamp headlight, a gas cap, an arc-inclosing globe, a frame, a globe support slidingly mounted thereon, a spring forcing the globe support against one end of the arc-inclosing globe to hold its other end firmly against the gas cap, a holder for an electrode slidingly mounted in and supported by said globe support, means to lock the holder in any position to which it is moved, and a casing for the parts.

5. In an arc lamp headlight, a casing, a globe support therein, a spring arranged to force the globe support in one direction, a holder for an electrode carried by and within the globe support, means permitting a rough adjustment of the position of the holder to approximate the desired position, and means for effecting a finer adjustment of the holder.

6. In an arc lamp headlight, a casing, a globe support therein, a spring arranged to force the globe support in one direction, means for locking the globe support in a retracted position, and a holder for an electrode mounted on and supported by said globe support for adjustment relative thereto in a direction parallel to the direction in which the globe support moves.

7. An arc lamp headlight having a casing, means for supporting an arc-inclosing globe therein comprising a frame having an opening therein, a globe-holder mounted to slide longitudinally and to rotate in said opening, a slot in the frame, and a pin extending through the slot and into the holder, an electrode holder arranged for adjustment longitudinally of the globe holder, and means for locking the electrode holder to the globe holder.

In witness whereof, I have hereunto set my hand this fourth day of May, 1905.

RICHARD FLEMING.

Witnesses:

JOHN A. MCMANUS, Jr.,

HENRY O. WESTENDARP.