

No. 691,851.

Patented Jan. 28, 1902.

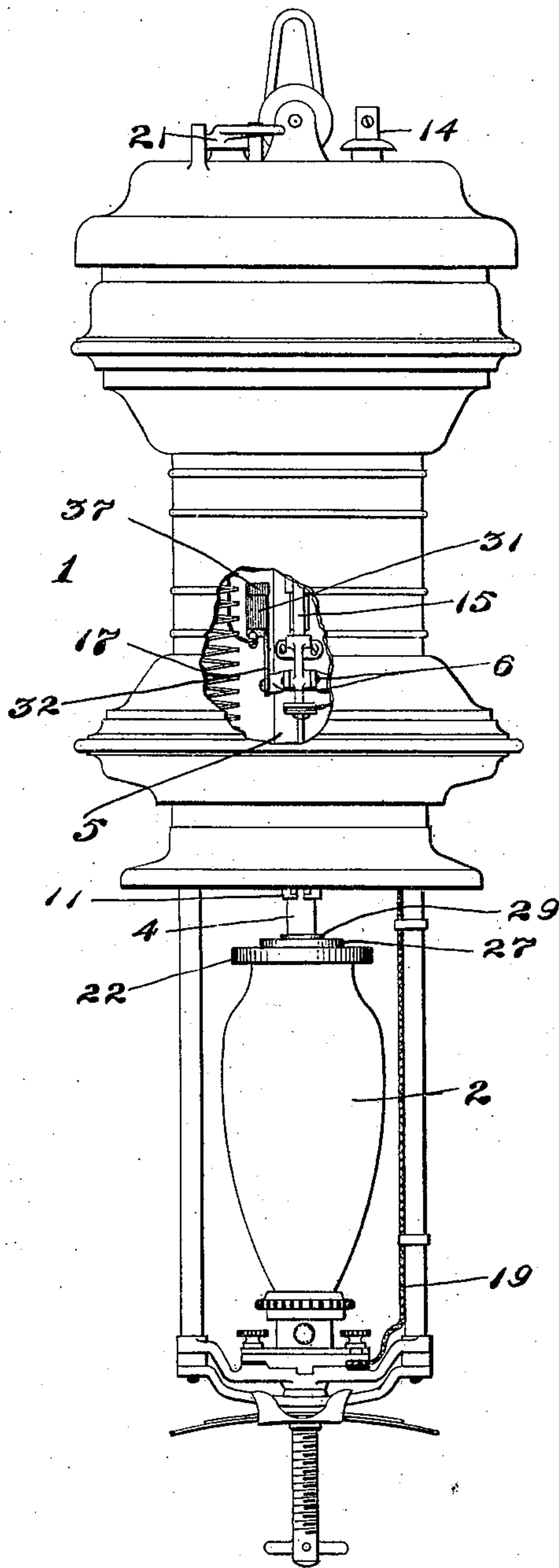
H. ETHERIDGE.
ELECTRIC ARC LAMP.

(Application filed Sept. 28, 1901.)

(No Model.)

3 Sheets—Sheet 1.

FIG. 1.



WITNESSES:

W. J. Fawcett,

A. H. Kirchner

INVENTOR

Harry Etheridge,

BY his ATTORNEY

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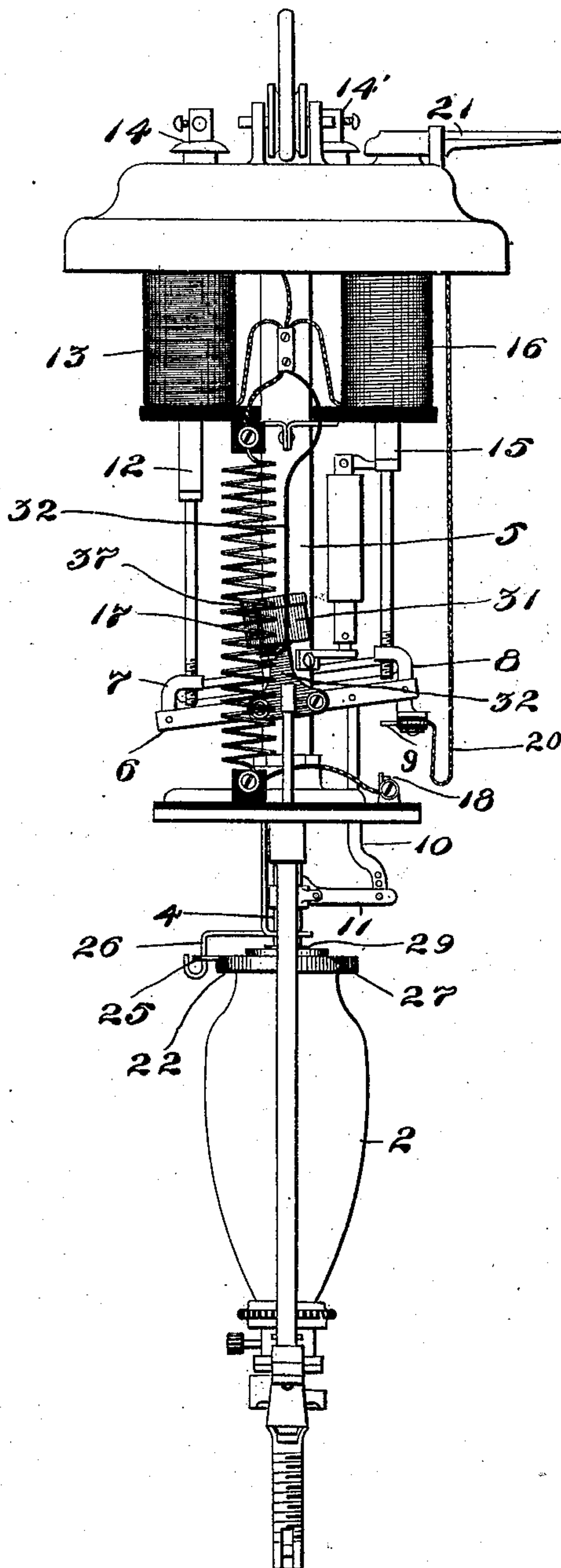
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3 Sheets—Sheet 2.

FIG. 11.



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FIG. III.

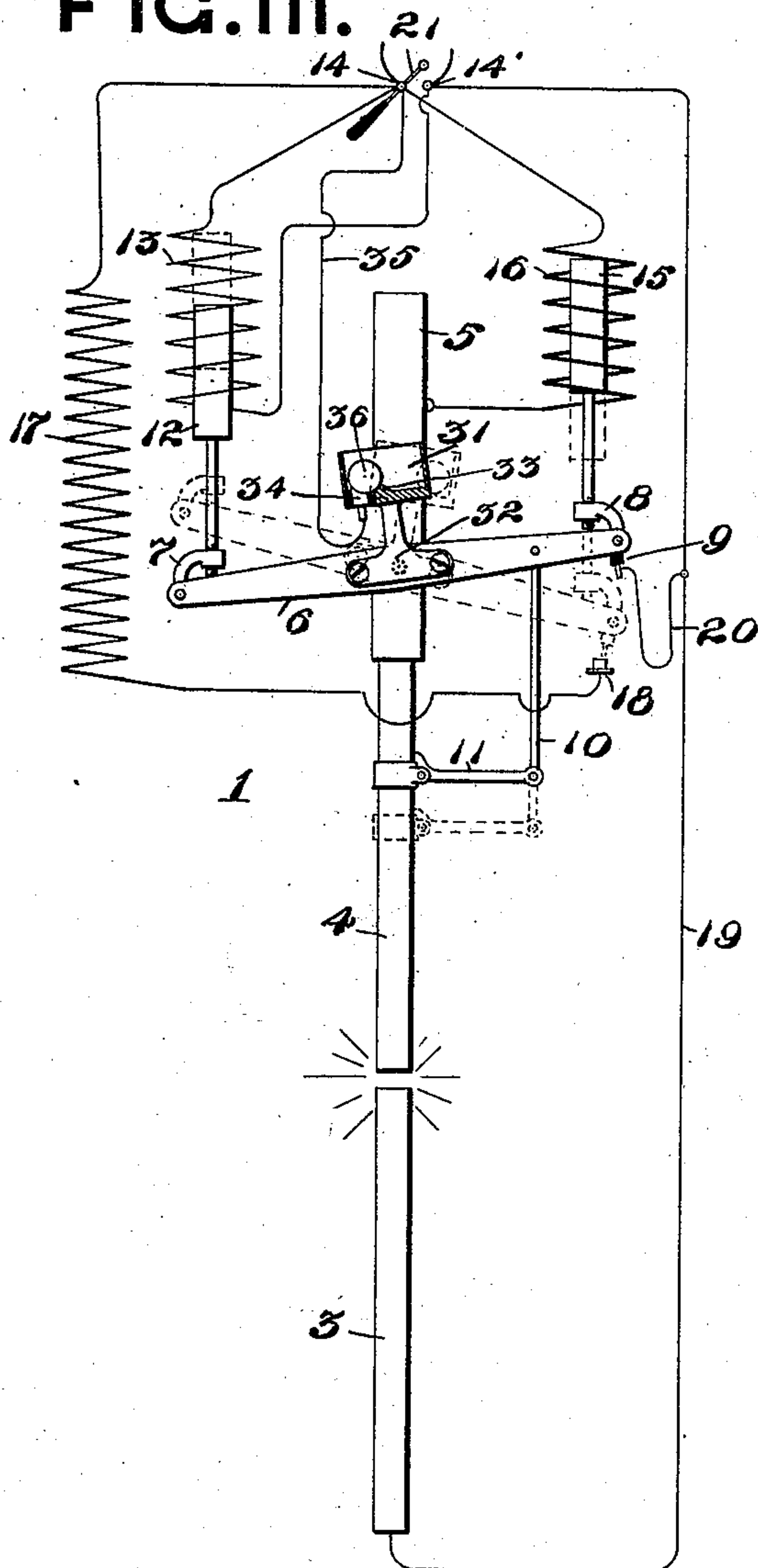


FIG. VII.

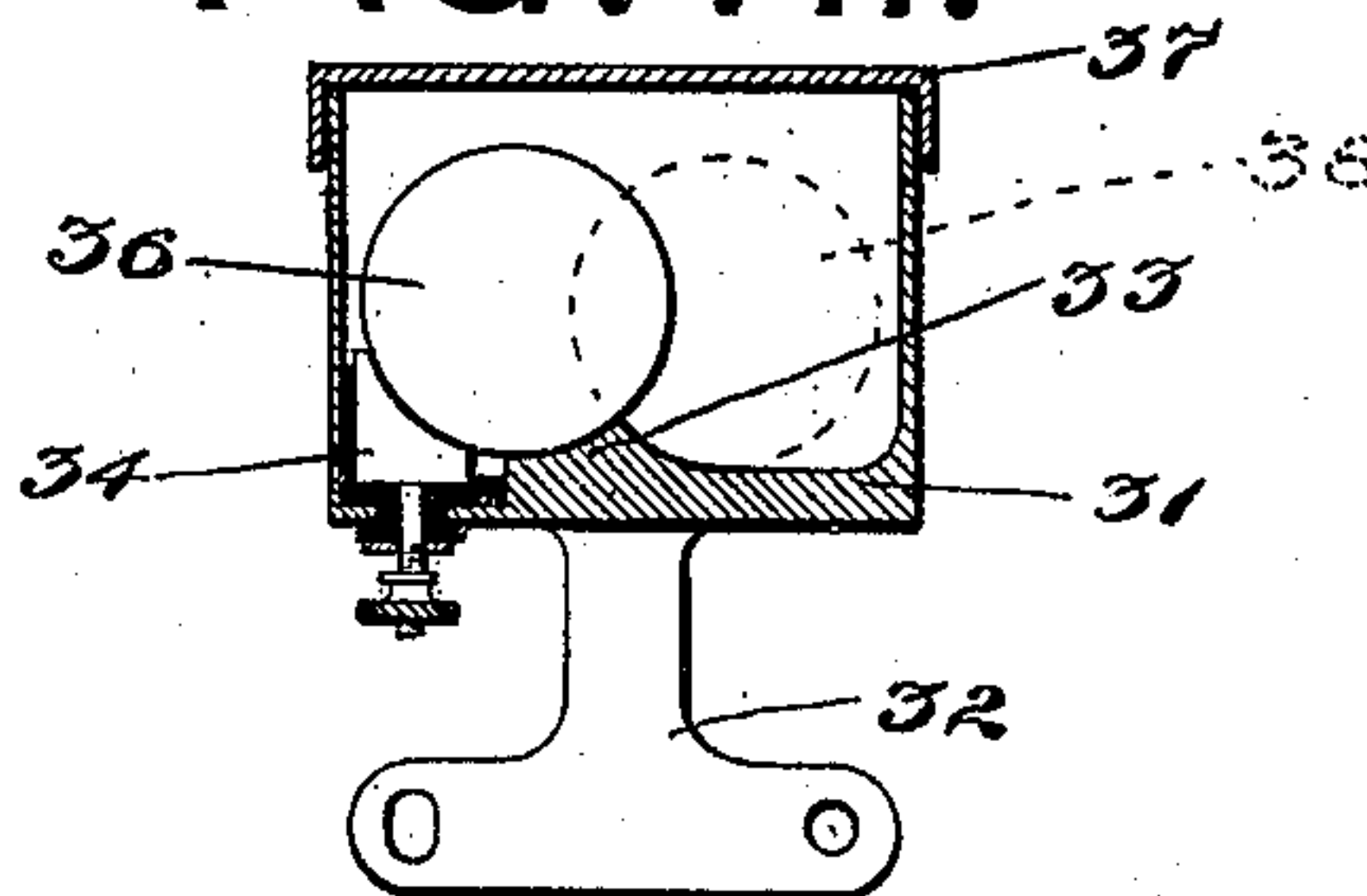


FIG. VIII.

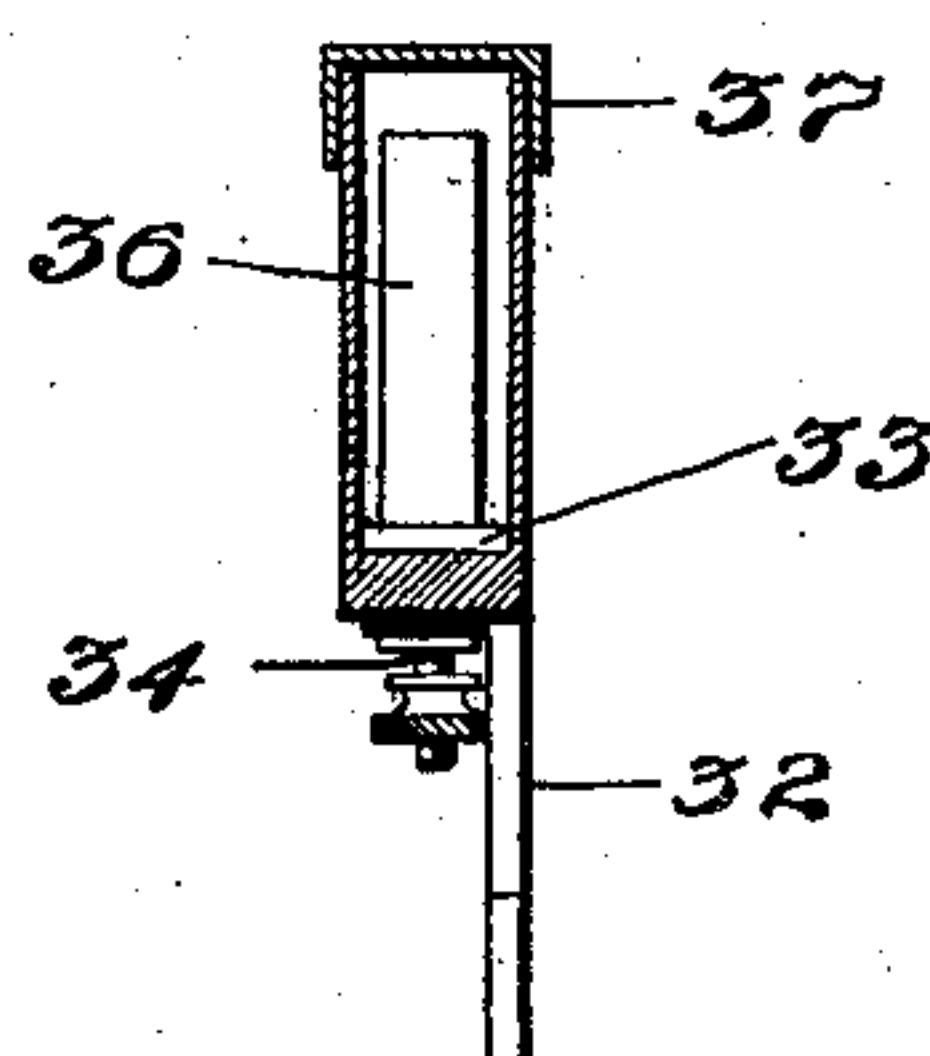


FIG. V.

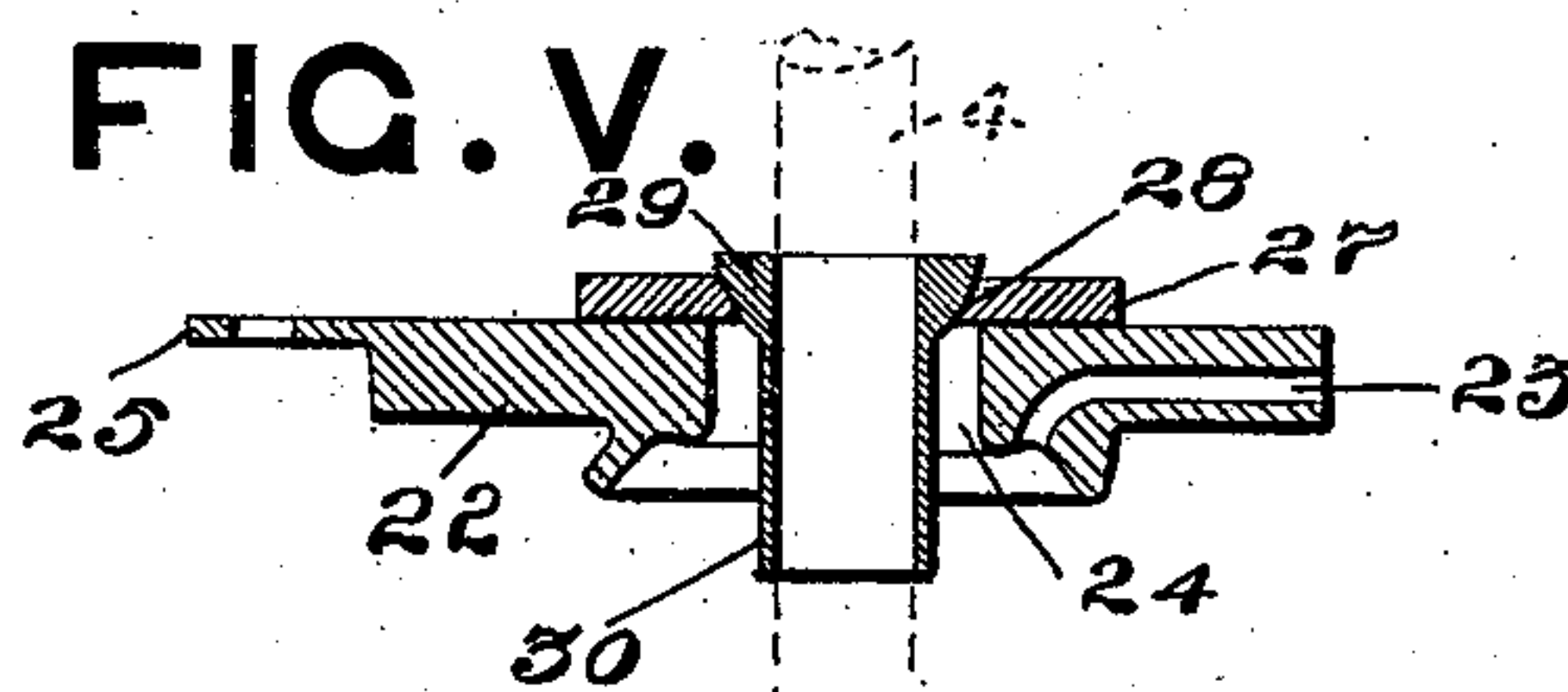


FIG. IV.

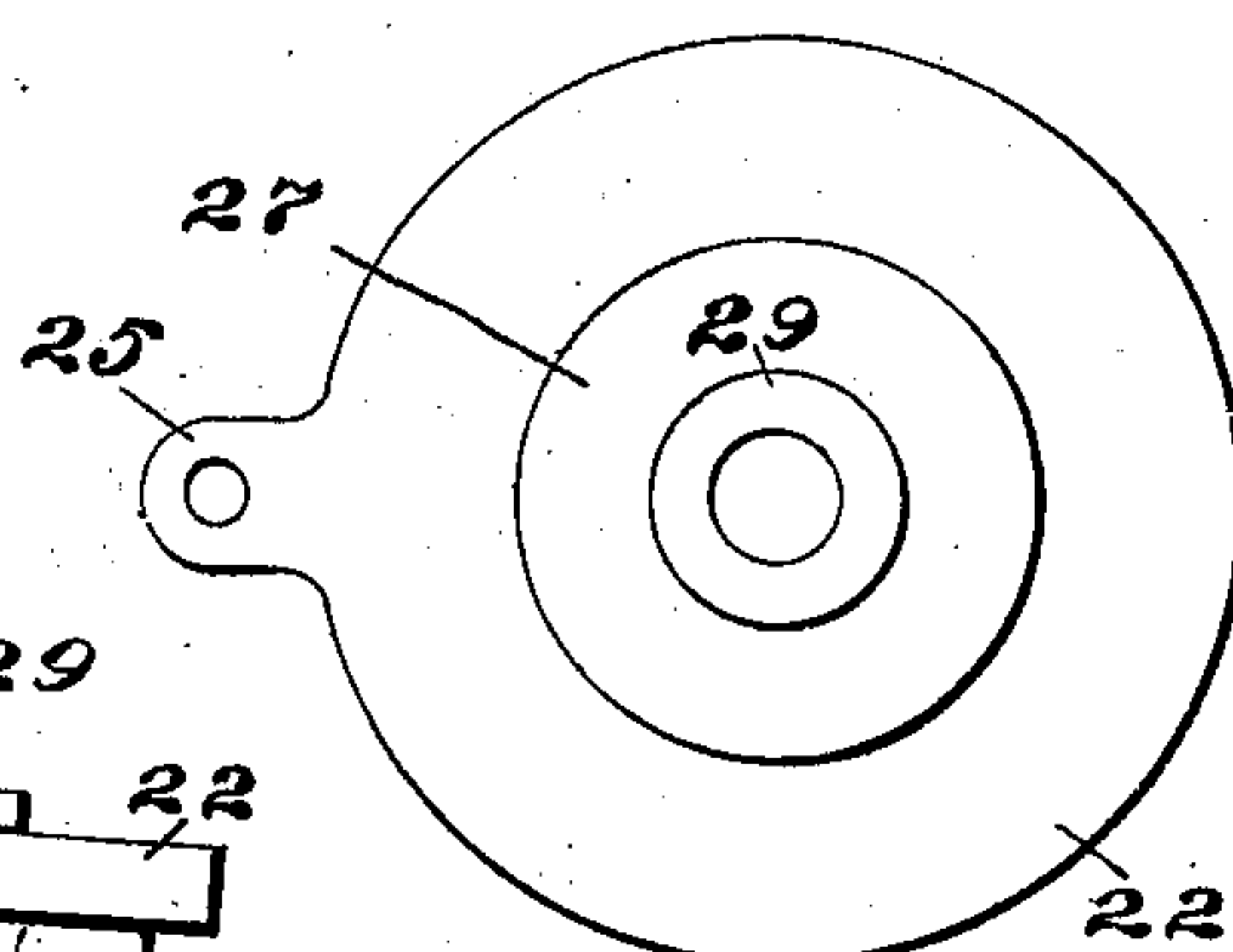
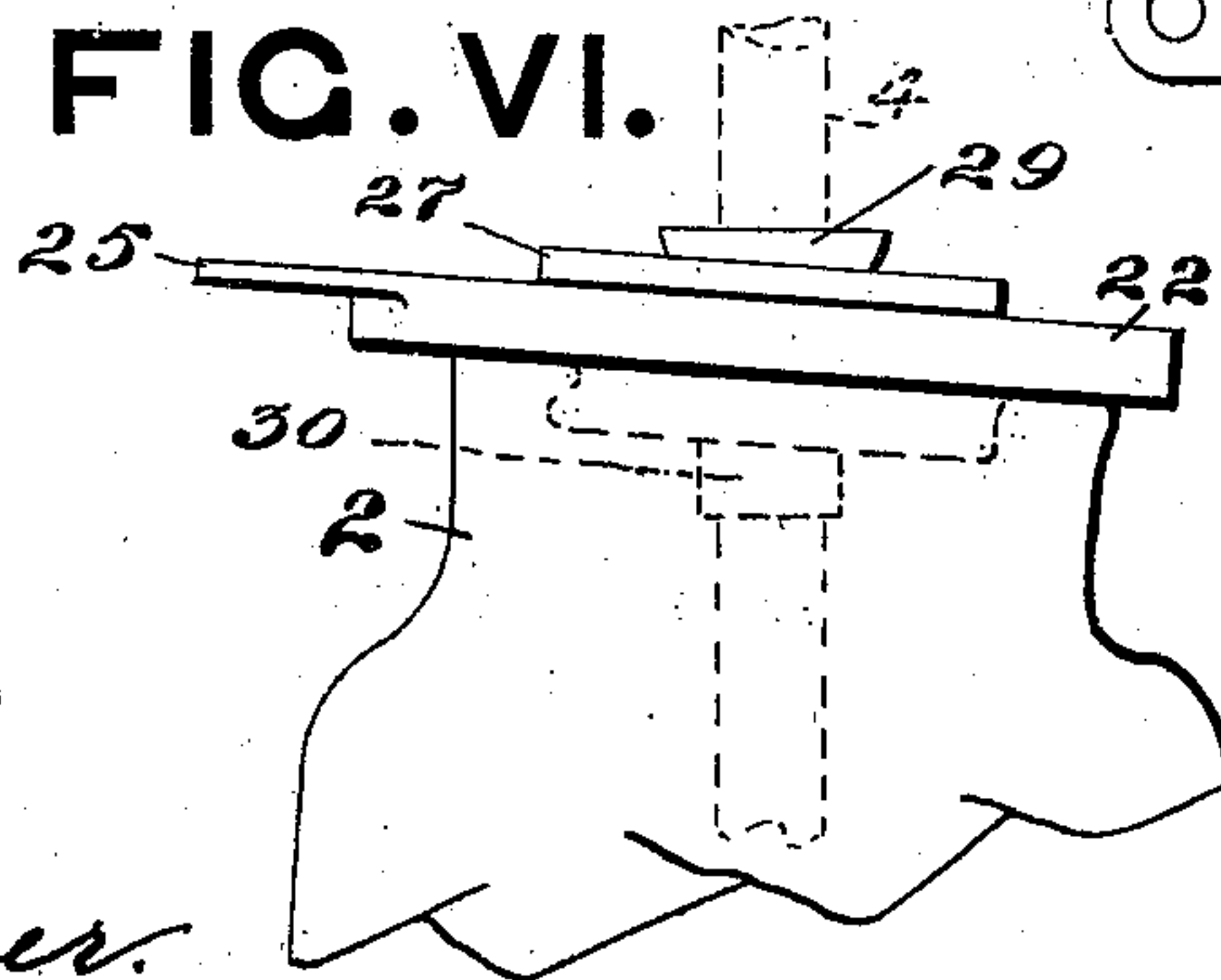


FIG. VI.



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UNITED STATES PATENT OFFICE.

HARRY ETHERIDGE, OF MCKEESPORT, PENNSYLVANIA.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 691,851, dated January 28, 1902.

Application filed September 28, 1901. Serial No. 76,835. (No model.)

To all whom it may concern:

Be it known that I, HARRY ETHERIDGE, a subject of the King of Great Britain, residing at McKeesport, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Arc-Lamps, of which improvement the following is a specification.

This invention relates to certain new and useful improvements in the operation of electric-arc lamps.

In the operation of electric-arc lamps considerable trouble is experienced in the clutch failing to properly maintain a grip upon the carbon during the process of burning, in which case the carbons join together, causing the lamp to be extinguished until the operator or inspector momentarily cuts the current out of the lamp by the hand-switch, after which the carbons will be separated by the lamp mechanism and the lamp again perform its functions. Again, should the circuit through the shunt or feed-spools become broken the potential at the lamp will become abnormally high and not only consume more energy than is intended, but will interrupt the circuit at this point and occasion trouble and expense by "melting down" the inner globe, gas-check, carbon-holder, &c. The opening in the gas-check to permit the carbon to operate therethrough is necessarily neat-fitting or the "play" permissible is such that at times the carbon becomes jammed or bound in the opening, thereby retarding the movement of the carbon and causing the lamp to be extinguished. The errors responsible for this condition are the carbon-opening in the gas-check is not in true alinement with the upper-carbon guide or the upper edge of the inner globe is not resting in a horizontal plane, and consequently "tilts" the gas-check sufficient to throw the vertical axis of the carbon-opening therein out of alinement with the carbon.

My invention has for its object the provision of means whereby the above defects are remedied and also a perfect seal between the gas-check and globe maintained.

In order to make my invention thoroughly understood, I have in the accompanying drawings illustrated in several ways my improvements, both in connection with a lamp and

separate therefrom, and shall after describing said views and their parts in detail take up and set forth the operation thereof.

In said drawings, Figure I is a vertical side elevation or a complete arc-lamp with a portion of its casing broken away to disclose the interior mechanism and improved parts. Fig. II is a vertical side elevation of the same viewed at right angles from the former position and having a portion of its casing removed. Fig. III is a diagram of the lamp-circuits and mechanism controlled thereby. Fig. IV is a plan view of the improved gas-check or seal enlarged and removed from the lamp. Fig. V is a longitudinal sectional side view of the same. Fig. VI is a side view showing the operative position assumed by the gas-check on a deformed inner globe. Fig. VII is an enlarged vertical sectional side view of my improved automatic switch for causing a reclutching of the carbon. Fig. VIII is a vertical sectional end view of the same.

Further reference being had to said views for a detailed description of the lamp parts, the numeral 1 indicates a complete lamp, of which 2 is the inner globe; 3, the lower carbon; 4, the upper carbon, slidably fitted within a fixed tube 5; 6, a lever fulcrumed on said tube and having at one end a pivoted bracket 7 and at its opposite end a similar bracket 8, carrying an insulated contact 9.

10 is a rod pivotally connected to the fulcrumed lever and carbon-clutch 11.

12 is a vertical core attached at one end to said bracket 7 to operate in the shunt-coil 13, said shunt-coil connecting at its ends to the main terminals 14 and 14'. 15 is a similar core attached to the aforesaid bracket 8 to operate in the main coil 16, said main coil being attached at one end to the main terminal 14 and at its opposite end to said tube 5.

17 is the resistance-coil, connected at one end to the terminal 14 and at its opposite end to a fixed contact 18. From the terminal 14' to the lower carbon extends a wire 19, and from this wire to the insulated contact 9 of the fulcrumed lever is attached a wire 20.

The numeral 21 indicates the switch for cutting out the lamp.

All of the above-described parts are arranged as heretofore in many forms of lamps

and are therefore but briefly alluded to for the purpose of clearly describing my improvements in connection therewith.

In my improvement we will first consider the detailed construction of the "gas-check" or seal for the inner globe, comprehending a circular plate 22, adapted to rest upon the top of the inner globe and having therein the gas-conducting part 23 and enlarged central orifice 24. A lug 25 is formed upon the outer periphery of this plate for engagement with a hook 26, carried by the lamp mechanism. Resting upon this plate is a disk 27, having a central concave orifice 28. Slidably fitted over the upper carbon 4 is the sleeve 30, having an annular convexed shoulder 29 at its upper end to seat within the orifice of said disk.

The automatic switch for causing carbon reclutching consists of a box or receptacle 31, adjustably attached to the fulcrumed lever 6 by means of the extension 32. This receptacle has a slight elevation 33, formed upon the bottom and insulatedly secured at one end to a contact 34, which is connected by a wire 35 with the main terminal 14, said elevation and contact presenting concaved surfaces to engage the roller 36 when in its normal or circuit-closing position. To exclude dirt and prevent possible loss of the contact-roller during handling of the lamp, a lid 37 is fitted thereover.

In the gas-check or seal the disk 27 being in practice constructed of light metal is capable of sliding laterally over the gas-check proper and adjusting the vertical axis of its opening to suit the position of the carbon in the upper-carbon guide, the sleeve 30 being provided with a convex shoulder at its upper end and freely resting in the concave opening of said disk, and as the opening in the gas-check proper is quite large it permits said sleeve to move and adjust itself to whatever position the carbon may assume, thereby preventing binding or allowing the carbon to freely operate therein. Furthermore, should irregularities occur in the setting of the inner globe or in its formation or deformities due to heat in the lamp, wherein the gas-check would assume a position at an inclination, as shown at Fig. VI, the sleeve would adjust itself in alinement with the carbon and, as before stated, permit the carbon to freely operate therein.

In the operation of the automatic switch we will assume that the lamp-carbons have been separated by the current acting upon the mechanism in the usual way and the lamp in service. Now if the clutch should fail to maintain the difference of potential at the arc by allowing the carbon to slide through and join with the other the feed-spools will become demagnetized. The armature will be drawn up into the main or series spools to such extent that the roller 36 will by its own gravity roll into engagement with the elevation or contact 33 and insulated contact 34, as shown by

full lines at Fig. III, and divert the current from the series spool. The armature will then be released and by its own gravity return to the normal position of rest on the lamp-cut-out contacts 9 and 18. In this position the said roller will by reason of its own gravity roll off the contacts, as shown by dotted lines at Fig. III, permitting the current to again circulate the series spool. The armature will be again drawn up and cause the carbons to be again separated. This reclutching of the carbon will be repeated as often as the clutch fails to operate. Another function of the contact is that should the shunt or feed-coil circuit become open-circuited or cut out in any way, so as to cause the coil to lose its energy or become inoperative, the roller-contact will operate to prevent an abnormally long arc at its carbon-points, and thereby prevent the globe, gas-check, carbon-holder, &c., from being melted and destroyed and also save the loss of energy due to such abnormal difference of potential at the arc. By these improvements such inconveniences, loss of revenue, &c., as previously set forth are saved.

I do not wish to confine myself to the particular structure or arrangement of parts to effect my objects, as alterations, substitution of equivalents, &c., may be made without departing from the principle of my invention.

Having thus fully shown and described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an arc-lamp, the combination with the seal, or gas-check for closure of the inner-globe top, of means provided therein adapted to both automatically aline with the carbon and laterally adjust itself to permit the carbon to freely operate therethrough.

2. In an arc-lamp, the combination with the seal, or gas-check for closure of the inner-globe top, of means therein whereby said seal may assume a horizontal or inclined position to permit the carbon to freely operate therethrough, and means permitting said seal to laterally adjust itself to such positions.

3. In an arc-lamp, the combination with the seal, or gas-check for closure of the inner-globe top, of a sleeve carried by said seal to engage over the carbon, and means permitting said seal to assume a horizontal or inclined position without effecting the free operation of the carbon through said sleeve.

4. In an arc-lamp, the combination with the seal, or gas-check for closure of the inner-globe top, of a sleeve carried by said seal to engage over the carbon, and means permitting said seal to assume a horizontal or inclined position, and adjust itself laterally on said globe without effecting the free operation of the carbon through said sleeve.

5. In an arc-lamp, the combination with the seal, or gas-check for closure of the inner-globe top, of a sleeve carried by said seal to engage over the carbon, means permitting said seal to assume a horizontal or inclined position without effecting the free operation

of the carbon through said sleeve, and a gas-exhaust port in said seal.

6. In an arc-lamp, the combination with the seal, or gas-check for closure of the inner-globe top, of a sleeve carried by said seal to engage over the carbon, means permitting said seal to assume a horizontal or inclined position and adjust itself laterally on said globe without effecting the free operation of the carbon through said sleeve, and a gas-exhaust port in said seal.

7. In an arc-lamp, the combination with the seal, or gas-check for closure of the inner-globe top, of means therein whereby said seal may assume a horizontal or inclined position, and permit the carbon to freely operate there-through, and means of conducting the gas from said globe through said seal.

8. In an arc-lamp, the combination with the seal, or gas-check for closure of the inner-globe top, of means therein whereby said seal may assume a horizontal or inclined position, and adjust itself laterally on said globe-top and permit the carbon to freely operate there-through, and means of conducting the gas from said globe through said seal.

9. In an arc-lamp, a seal, or gas-check for closure of the inner-globe top, comprising a plate having an opening therethrough, an apertured disk resting upon said plate, over the opening thereof, and a shouldered carbon-guide sleeve engaging in said disk-aperture.

10. In an arc-lamp, a seal, or gas-check for closure of the inner-globe top, comprising a plate having an opening therethrough, an apertured disk resting upon said plate over the opening thereof, a shouldered carbon-guide sleeve engaging in said disk-aperture, and a gas-port in said plate.

11. In an arc-lamp, a seal, or gas-check for closure of the inner-globe top, comprising a plate having an opening therethrough, a concaved apertured disk resting upon said plate over the opening thereof, and a carbon-guide sleeve having a convexed shoulder thereon to engage in the aperture of said disk.

12. In an arc-lamp, a seal, or gas-check for closure of the inner-globe top, comprising a plate having an opening therethrough, a concaved apertured disk resting upon said plate over the opening thereof, a carbon-guide sleeve having a convexed shoulder thereon to engage in the aperture of said disk, and a gas-port in said plate.

13. In an arc-lamp, the combination of a

branch circuit in shunt relation with the series coil, and in series relation with the arc, adapted to deprive and restore the energy of said coil.

14. In an arc-lamp, the combination of a branch circuit in shunt relation with the series coil, and in series relation with the arc, means in said circuit operated by the clutch mechanism to automatically close and open the same to deprive and restore the energy of said coil.

15. In an arc-lamp, the combination of a branch circuit in shunt relation with the series coil, and in series relation with the arc, and having contacts therein carried by the rocker-lever, and a circuit make and break device arranged to automatically operate with said contacts to deprive and restore energy to said coil.

16. In an arc-lamp, the combination of a branch circuit in shunt relation with the series coil, and in series relation with the arc, means in said circuit operated by the rocking lever of the clutch mechanism whereby said circuit is automatically closed and opened to deprive and restore energy to said coil.

17. In an arc-lamp, the combination of a branch circuit in shunt relation with the series coil and in series relation with the arc, and having contacts therein which are carried by the rocker-lever, and a circuit make and break device carried by said lever to automatically operate on said contacts to deprive and restore energy to said coil.

18. In an arc-lamp, the combination of a branch circuit in shunt relation with the series coil, and in series relation with the arc, means for automatically closing and opening said circuit to prevent a long arc when the feed-spool becomes inoperative.

19. In an arc-lamp, the combination of a branch circuit in shunt relation with the series coil, and in series relation with the arc, contact members carried by the rocker-arm and in said circuit, and a gravitating circuit make and break device adapted to automatically engage said members and close said circuit when said coil becomes inoperative.

In testimony whereof I have hereunto signed my name in the presence of two subscribing witnesses.

HARRY ETHERIDGE.

Witnesses:

ARTHUR R. MAY,
H. W. GIBSON.