

No. 868,387.

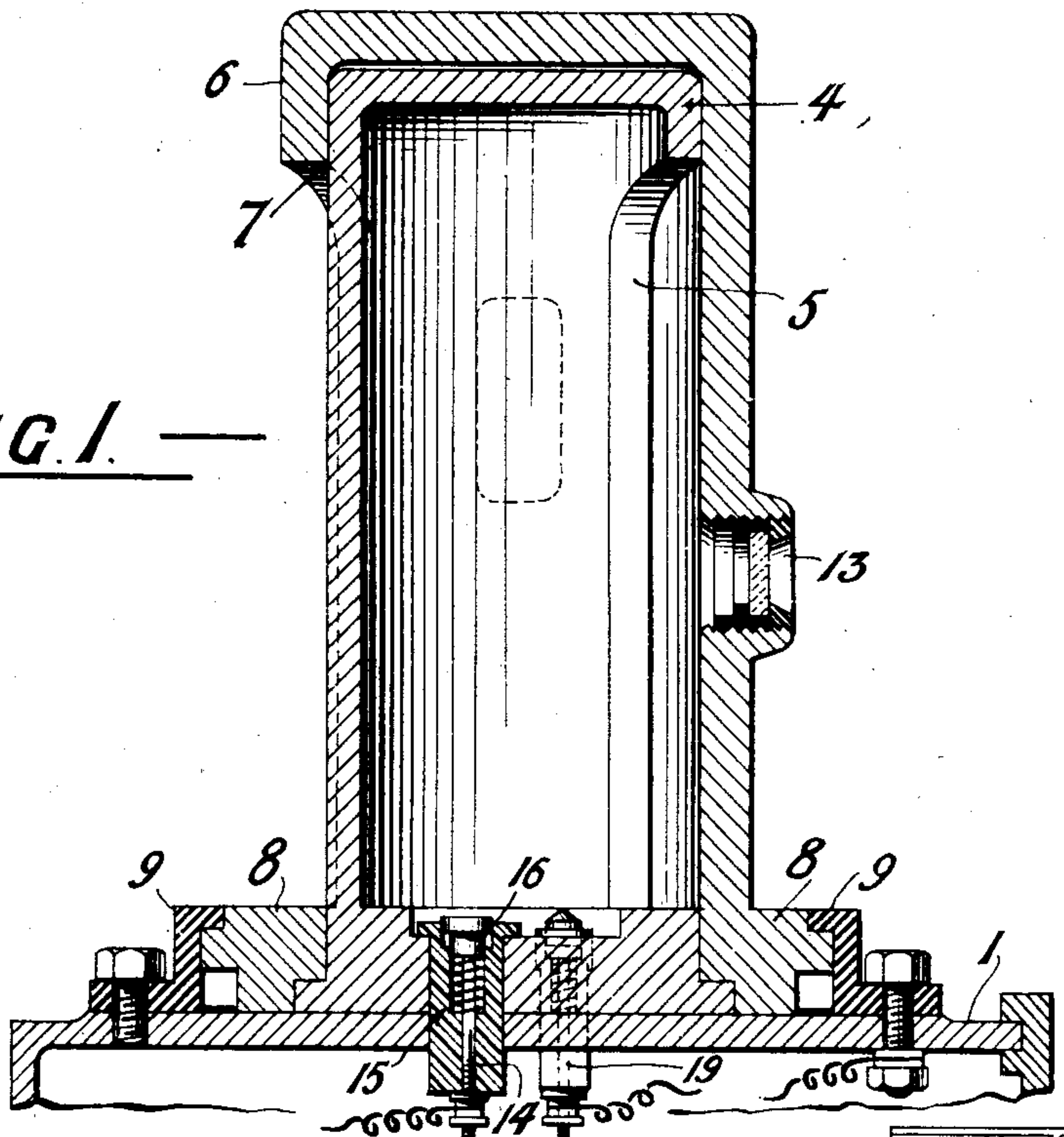
PATENTED OCT. 15, 1907.

W. ACKROYD & W., A. E. & R. O. BEST.  
 APPARATUS FOR INCLOSING AND ELECTRICALLY CONNECTING MINERS'  
 SAFETY LAMPS TO EFFECT ELECTRIC IGNITION.

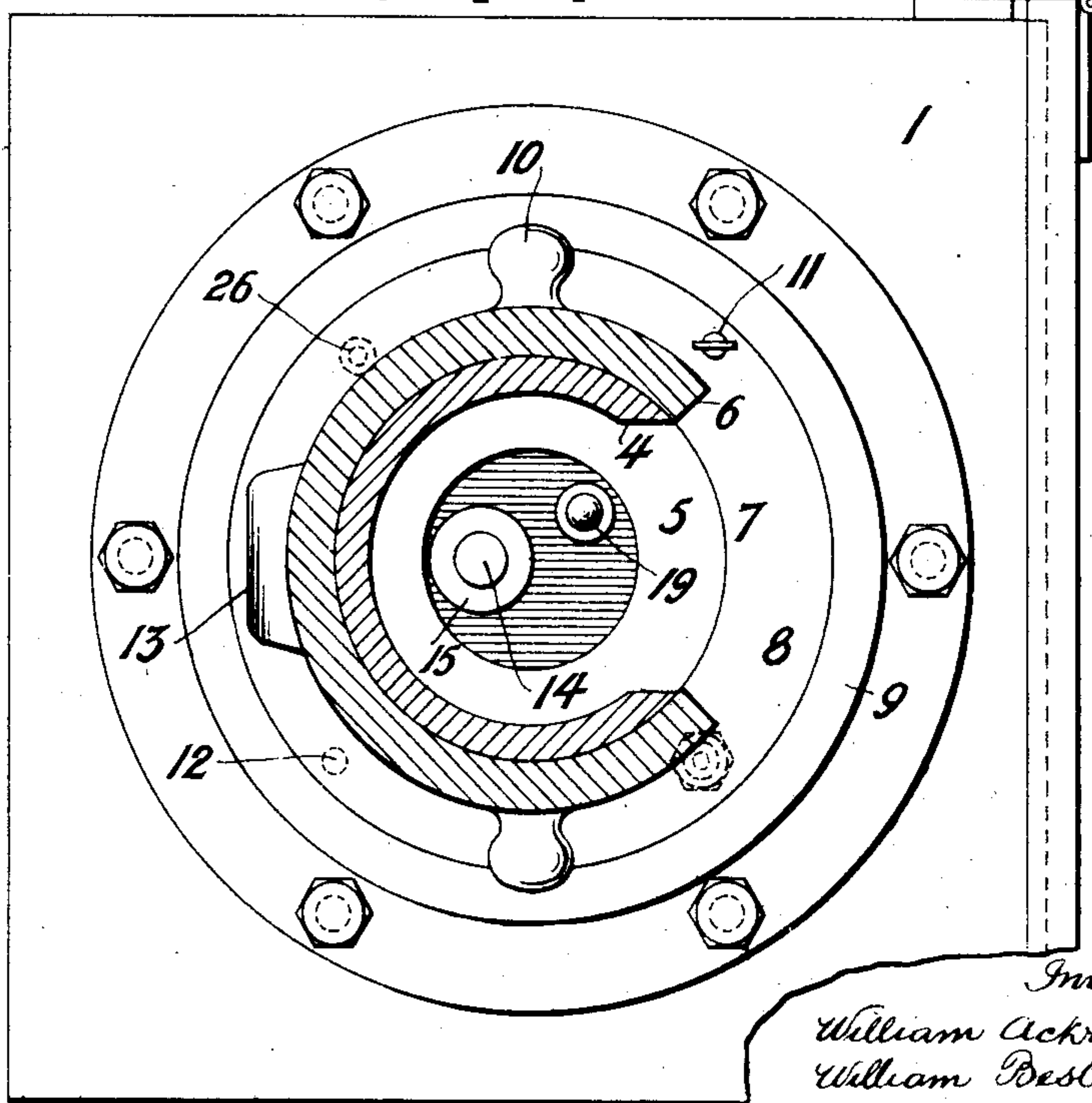
APPLICATION FILED JULY 9, 1907.

2 SHEETS—SHEET 1.

—FIG. 1.—



—FIG. 2.—



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Inventors  
 William Ackroyd  
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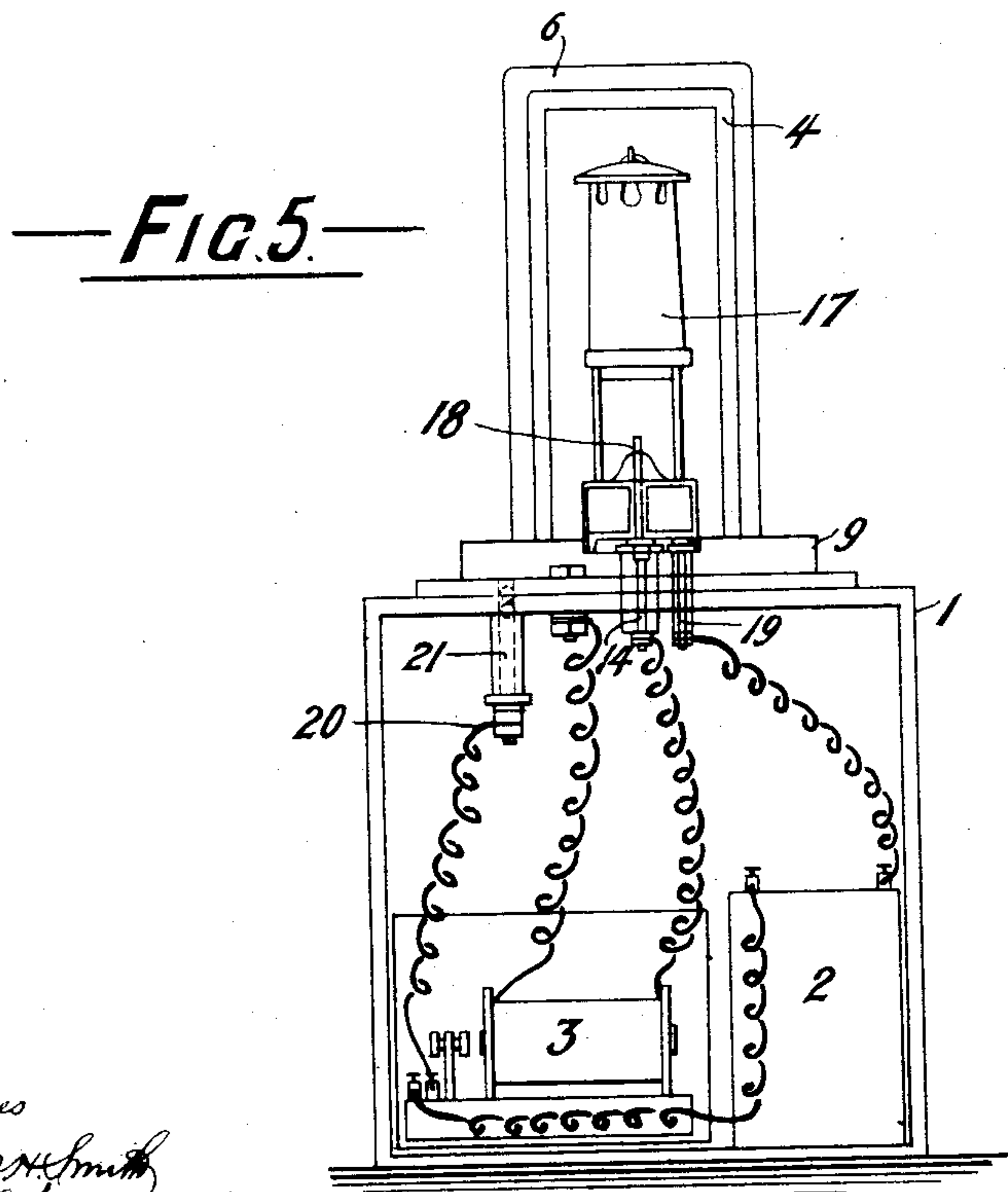
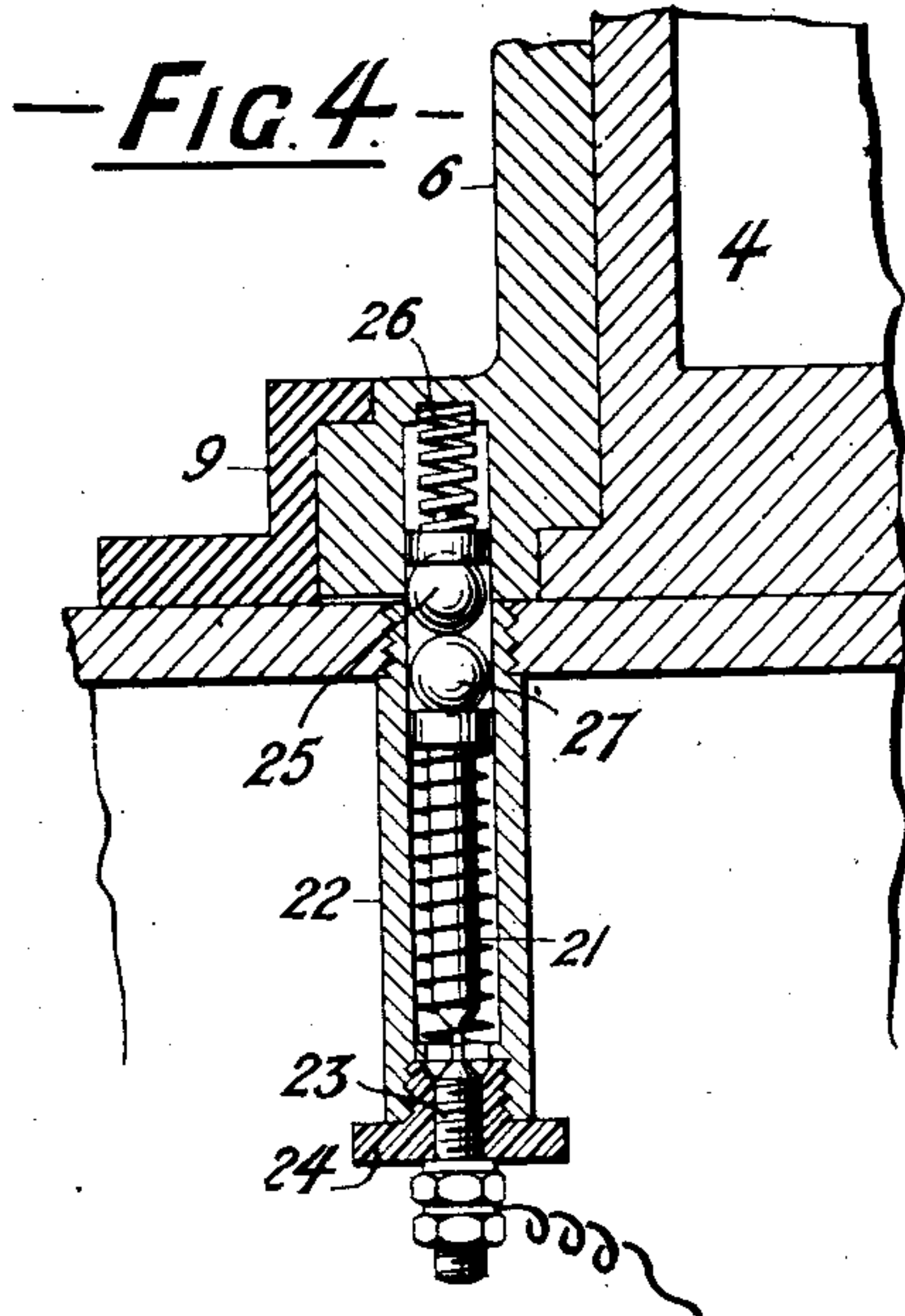
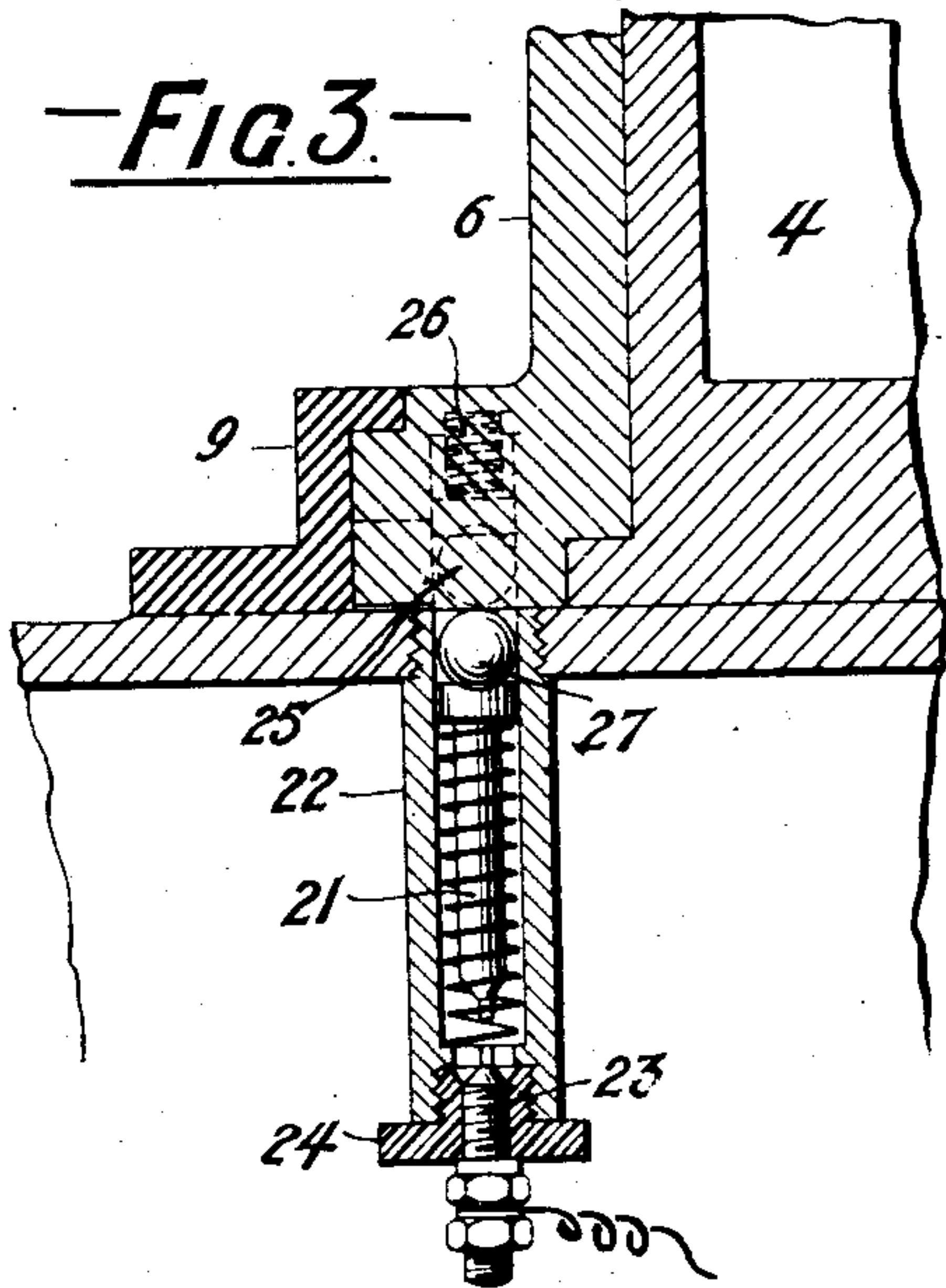
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2 SHEETS—SHEET 2.



Witnesses

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# UNITED STATES PATENT OFFICE.

WILLIAM ACKROYD, OF LEEDS, AND WILLIAM BEST, ALBERT EDWARD BEST, AND ROBERT OCTAVIUS BEST, OF MORLEY, NEAR LEEDS, ENGLAND.

## APPARATUS FOR INCLOSING AND ELECTRICALLY CONNECTING MINERS' SAFETY-LAMPS TO EFFECT ELECTRIC IGNITION.

No. 868,387.

Specification of Letters Patent.

Patented Oct. 15, 1907.

Application filed July 9, 1907. Serial No. 382,829.

*To all whom it may concern:*

Be it known that we, WILLIAM ACKROYD, residing at Leeds, in the county of York, England, WILLIAM BEST, ALBERT EDWARD BEST, and ROBERT OCTAVIUS BEST, residing, respectively, at Morley, near Leeds, in the county of York, England, all subjects of the King of Great Britain, have invented certain new and useful Improvements in Apparatus for Inclosing and Electrically Connecting Miners' Safety-Lamps to Effect Electric Ignition, and of which the following is a specification.

In electrically igniting miners' safety lamps, it is highly important that means should be provided by which the risk of explosion of gases which may be in the mine should be avoided and to this end WILLIAM BEST—one of the present applicants—has heretofore proposed to inclose the lamp to be ignited in a box, having a gas-tight hinged lid, and to provide electrical connections and a plunger switch, by which the secondary circuit of an induction coil was to be made before, and broken after, the primary circuit. This switch was located in a recess closed by a sliding door, so connected with the box lid that the switch was only exposed for operation when the lid of the box was shut. Since in this known apparatus the secondary circuit was completed by the plunger of the switch touching the metal of the lamp, the secondary circuit could never be made unless the lamp was in the box and the lid closed, but at the same time if the box was closed and no lamp was in it, the primary circuit would be completed. Beyond this disadvantage, the apparatus itself as previously constructed, was somewhat complex, because for instance the lid of the box must have mechanical connections from it for operating the slide closing the recess for the plunger switch when the lid was in an open position, and moreover the parts of the mechanism were exposed and therefore liable to accidental or wilful derangement, as for instance when the lid of the box was left open, dust and dirt were liable to fall to the bottom of the box and prevent the lamp making proper electrical contact.

Now the object of the present invention is to provide an improved apparatus in which the hinged lid and the slide are altogether dispensed with, and there is substituted therefor a stationary vertical cylinder, having an aperture in its circular side to admit the miner's safety lamp, and a cylindrical cover fitting over the stationary cylinder and revoluble thereon, the latter revoluble cylinder also having an aperture in its circular side, so that the lamp can be inserted when the apertures coincide, and inclosed when the cover cylinder is revolved; and with such an arrangement, such electrical connections are fitted, that when the outer cylindrical cover is revolved through a sufficient angle to close the box,

the primary and secondary circuits will be automatically made, but at the same time they can only be so made when a lamp is in position in the box and the box is closed, because the lamp body in this invention is made to form a part of the primary circuit, and the secondary circuit is also completed through the lamp, and through an insulated rod passing through the lamp and forming a part of its structure.

The present invention does not deal with the construction of a lamp fitted with electric ignition devices, because such is well known, that is, a lamp which is commonly employed has an insulated conductor passing up to near the wick tube and conveying the secondary current which sparks off onto some adjacent point of the lamp body and so ignites the wick.

An example of construction of the invention is shown in the accompanying drawings, whereon:—

Figures 1 and 2 are respectively a sectional elevation and a sectional plan of the stationary vertical cylinder for containing the lamp and its revoluble cover with parts of the electrical connections. Figs. 3 and 4 show vertical sections drawn to a larger scale, of a portion of the apparatus illustrating the automatic switch, and Fig. 5 is a diagram representing the complete apparatus with a lamp of ordinary construction in position.

The base of the apparatus is composed of a closed gas-tight metal box 1 (Fig. 7) containing the requisite accumulators or source of electricity 2, and an induction coil 3 with the usual condenser, and firmly fixed upon the top of the box 1 is a hollow metal cylinder 4 (Figs. 1 and 2) entirely closed excepting for the aperture 5 in the side of the cylinder, which aperture is of sufficient size to admit a miner's safety lamp.

The stationary cylinder 4 is inclosed by the outer revoluble cylinder 6, which also has an aperture 7, which, by revolving the cylinder 6, can be made to coincide with the aperture 5 of the stationary cylinder 4; the cover cylinder 6 is formed with a flange 8 held to the top of the box by a flanged ring 9 fixed thereto, and further the cover cylinder 6 has handles 10 (Fig. 2) by which it can be revolved through the necessary angle.

The angle through which the cover cylinder 6 is revolved for opening or closing the lamp receptacle is regulated by a vertical spring pin 11 extending through the flange 8, which pin enters a recess in the box 1 in the open position of the cover 6 as shown at Fig. 2, and so retains it in that position, while when the cover 6 is to be closed, the pin 11 is lifted up against the action of its spring, the cover 6 revolved, and the pin released, and when the cover 6 is in the closed position illustrated at Fig. 1, the pin 11 will be forced into a recess 12 on the top of the box 1, and so the motion of the cover is defined and it is held in either of its two positions. A



glass eye-piece 13 is fitted into a sight aperture in the side of the cover 6 opposite to the aperture 7, for the purpose of observing when the lamp wick has become ignited.

5 Extending through the base of the stationary cylinder 4 and into the box 1 is a conducting pin 14, passing through a sleeve 15 of insulating material, and fitted with a spring 16 to hold the head of the pin at the necessary elevation to contact with the bottom of the lamp  
10 17 (Fig. 5); and this pin 14 is electrically connected to one end of the secondary winding of the coil, and when the lamp is placed in position, the said pin 14 contacts with the usual conducting rod 18 (Fig. 5) which passes through the lamp but is insulated therefrom and terminates at the top of the wick to be ignited. The other  
15 end of the secondary winding of the coil 3 is electrically connected, as shown at Fig. 5, to the box, and consequently to the stationary cylinder 4. Passing also through the base of the stationary cylinder 4 is a second  
20 pin 19 upheld by a spring, as with the pin 14, and also insulated by an insulating sleeve from the cylinder 4 and box 1, and this pin 19 is connected, as shown at Fig. 5, to one end of the primary circuit, while the other  
25 end 20 of the primary circuit is connected to an automatic switch which we will now describe. This switch is shown in detail at Figs. 3 and 4, Fig. 3 showing the switch open, and Fig. 4 the switch closed for the passage of the current. The switch consists of a plunger 21  
30 vertically movable in the cylindrical sleeve 22 fixed to the box 1, and the plunger 21 is adapted to contact with the end of a conducting screw 23 carried by an insulating cap 24 fixed at the end of the cylindrical sleeve 22, and to the conducting screw 23 the one end  
35 20 of the primary circuit is fixed. Carried in the flange 8 of the cover cylinder 6 is a ball 25 pressed downwards by a spring 26, the ball 25 normally rolling in contact with the surface of the box 1 during the revolution of the cover 6, but upon the  
40 ball arriving opposite the open end of the sleeve 22, it contacts with another ball 27 located in the top of the said sleeve and contacting with the end of the plunger 21. When the ball 25 comes over the ball 27, the latter and the plunger 21 will be depressed and electrical contact made, because the spring 26 pressing the ball 25  
45 down, is stronger than the spring holding the plunger 21 up. The throw of the plunger is such that upon the cover 6 being turned from the contacting position shown at Fig. 4, the ball 25 will leave the mouth of the sleeve 22. It will now be observed that when the cover  
50 6 is placed in position as shown at Fig. 2, the lamp can be placed within the cylinder 4 as shown at Fig. 5, so that the head of the conducting pin 14 will contact with the lower end of the conducting rod 18 carried by the lamp, and the head of the conducting pin 19 will con-  
55 tact with the base or frame of the lamp. In this position, however, no current will pass because the primary circuit is not made. Upon the cover 6 being revolved, however, into the position shown at Figs. 1 and 4, the primary circuit will be completed. If, however, a  
60 lamp is not inserted into the stationary cylinder 4 but the cover 6 is revolved, the primary circuit will not be completed because it has to pass through the body of the lamp. On the wick having become ignited by the passing of the secondary current, the spring pin 11 is  
65 raised out of its recess in the stationary part, and the

cover 6 is then rotated into the position shown at Fig. 2, thereby first breaking the primary circuit, and so causing the secondary current to cease, prior to the removal of the lamp from the stationary cylinder 4.

What we claim as our invention and desire to secure 70 by Patent is—

1. In apparatus for inclosing and effecting the ignition of a miners' safety lamp fitted with an electric ignition device; the combination with a closed base box, an electric battery and an induction coil in said box, and a vertical 75 stationary hollow cylinder fixed upon the top of said box and having a side aperture to permit said lamp being placed in said cylinder; of a revoluble cylindrical cover surrounding and closely fitting over said stationary cylinder and having a side aperture corresponding with the side 80 aperture of said stationary cylinder, means for retaining said cylindrical cover in position on said stationary cylinder during its revolution, a spring-pressed plunger carried by the cylindrical cover and acting on the top of the base box, a switch located in the box and calculated to be closed 85 by said spring-pressed plunger when the cylindrical cover is in a position to close the stationary cylinder containing the lamp, and electric connections whereby the secondary circuit of the coil is closed through the lamp to be lighted 90 when in position, and the primary circuit is closed also through the base of the lamp and through said switch when the latter is acted upon by said plunger.

2. In apparatus for inclosing and effecting the ignition of a miners' safety lamp fitted with an electric ignition device; the combination with a closed base box, an electric battery and an induction coil in said box, and a vertical 95 stationary hollow cylinder fixed upon the top of said box and having a side aperture to permit said lamp being placed in said cylinder; of a revoluble cylindrical cover surrounding and closely fitting over said stationary cylinder 100 and having a side aperture corresponding with the side aperture of said stationary cylinder and having a sight aperture opposite said side aperture and an eye-glass in said sight aperture, means for revolving the cylindrical cover through the necessary angle to close said cylinder, 105 and means for retaining said cylindrical cover in position on said cylinder during its revolution, a seating for the lamp in the base of the stationary cylinder, electrical conducting pins passing from the interior of the base box to the lamp seating in the stationary cylinder, and insulating 110 sleeves around said pins to insulate the latter from the surrounding parts, a spring-pressed plunger carried by the cylindrical cover and acting on the top of the base box, a switch located in the box and calculated to be closed by 115 said spring-pressed plunger when the cylindrical cover is in its closed position, and electrical connections whereby the secondary circuit of the coil is completed through the usual insulated conducting rod of the lamp contacting with one of the insulated pins entering the stationary cylinder, 120 and the primary circuit is closed through the base of the lamp and through the switch operated by the spring-pressed plunger substantially as set forth.

3. In apparatus for inclosing and effecting the ignition of a miners' safety lamp fitted with an electric ignition device; the combination with a closed base box, an electric 125 battery and an induction coil in said box, and a vertical stationary hollow cylinder fixed upon the top of said box and having a side aperture to permit said lamp being placed in said cylinder; of a revoluble cylindrical cover surrounding and closely fitting over said stationary cylinder 130 and having a side aperture corresponding with the side aperture of said stationary cylinder, an external flange at the base of said cylindrical cover having a vertical boring opening on its under surface, a flanged ring on the top of the base box to hold said cover flange in position, a ball in 135 said boring and a spring above said ball to press the latter normally onto the surface of the base box, a cylindrical sleeve in the base box opening onto the surface thereof, a spring-upheld metal plunger in said sleeve, a ball above the head of said plunger calculated to contact with the 140 spring-pressed ball in the boring of the revoluble cover when the latter is in its closed position to depress said plunger, and an insulated contact screw with which the plunger contacts when depressed, and electrical connec-



5 tions whereby the secondary circuit of the coil is closed through the usual conducting rod of the lamp to be lighted when in position, and the primary circuit is closed also through the base of the lamp and through the plunger switch when the latter is acted upon by the spring-pressed ball carried by the revoluble cover substantially as set forth.

10 4. In apparatus for inclosing and effecting the ignition of a miners' safety lamp fitted with an electric ignition device, the combination with a closed base box, an electric battery and an induction coil in said box, and a vertical stationary hollow cylinder fixed upon the top of said box and having a side aperture to permit said lamp being placed in said cylinder; of a revoluble cylindrical cover surrounding and closely fitting over said stationary cylinder 15 and having a side aperture corresponding with the side aperture of said stationary cylinder, an external flange at the base of said cylindrical cover, a flanged ring on the top of the base box to hold said cylindrical cover flange in position, two insulated electrically conducting pins passing 20 from the interior of said base box to the interior of the stationary cylinder, the first to contact with the usual insu-

lated rod of the lamp and the second to contact with the base of said lamp when placed therein, and electric conductors connecting the first pin with one end of the secondary circuit of the coil, and the second pin with one end of the primary circuit of the coil, and an electric conductor connecting the other end of the secondary circuit of said coil to the base of the said stationary cylinder, a switch fixed on the underside of the top of said base box, an electric conductor connecting said switch with the other end of the primary circuit a spring-pressed plunger carried in the flange of the revoluble cover to act upon said switch and close said primary circuit through the lamp base when said revoluble cover arrives at its closed position, and means 35 for limiting and fixing the position of said revoluble cover substantially as set forth.

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