O. M. KING.

SAFETY CUT-OUT SWITCH.

APPLICATION FILED JULY 9, 1919.

1,366,914.

Patented Feb. 1, 1921.

2 SHEETS—SHEET 1.

Fig. I

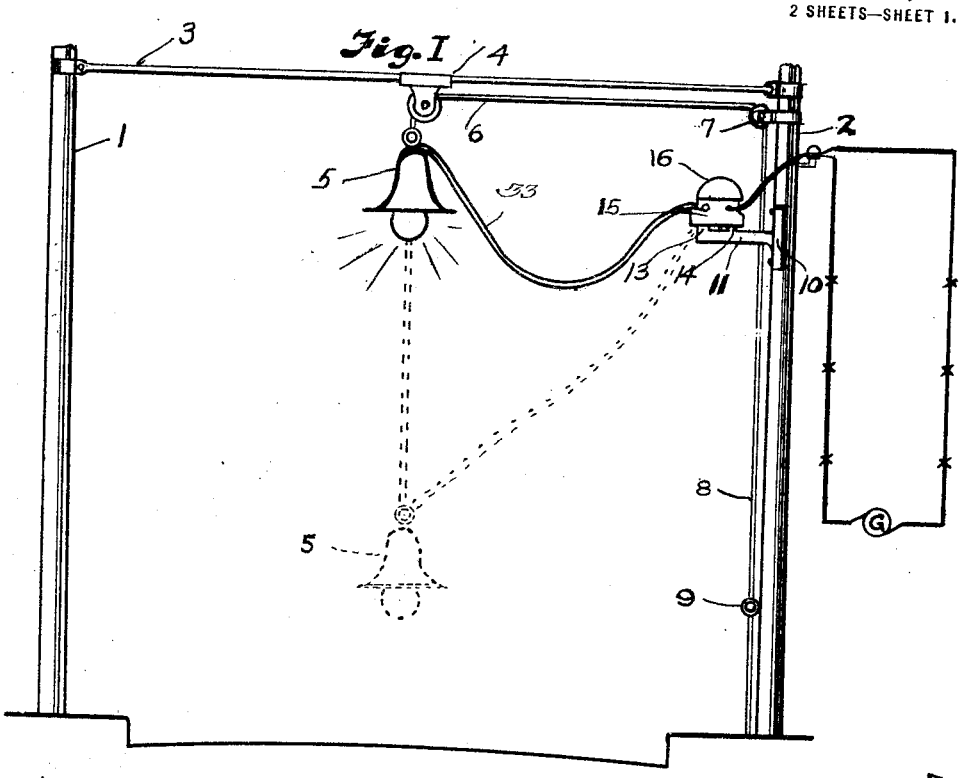


Fig. II

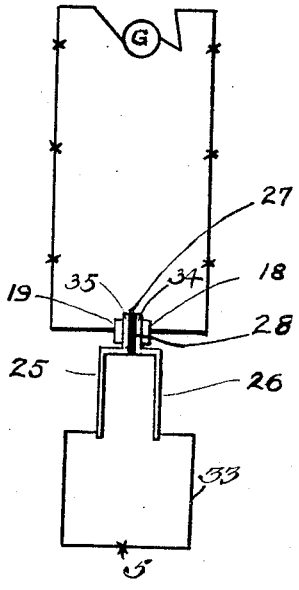
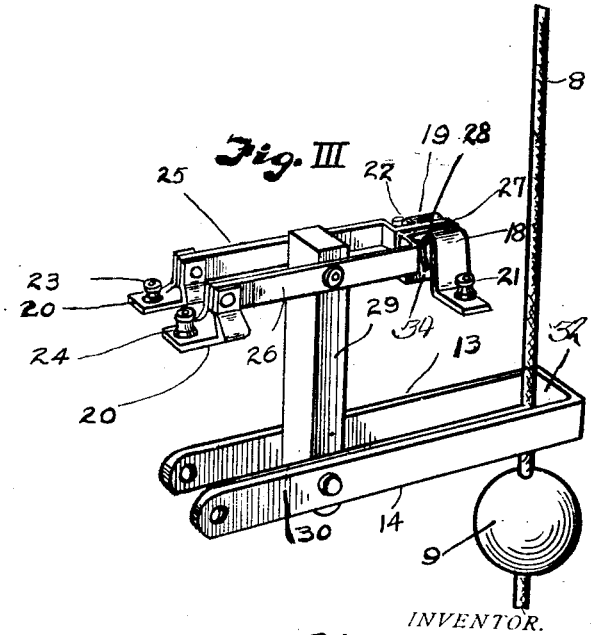


Fig. III



INVENTOR.

Oliver M. King

BY Arthur C. Brown

ATTORNEY

O. M. KING.

SAFETY CUT-OUT SWITCH.

APPLICATION FILED JULY 9, 1919.

1,366,914.

Patented Feb. 1, 1921.

2 SHEETS—SHEET 2.

Fig. IV

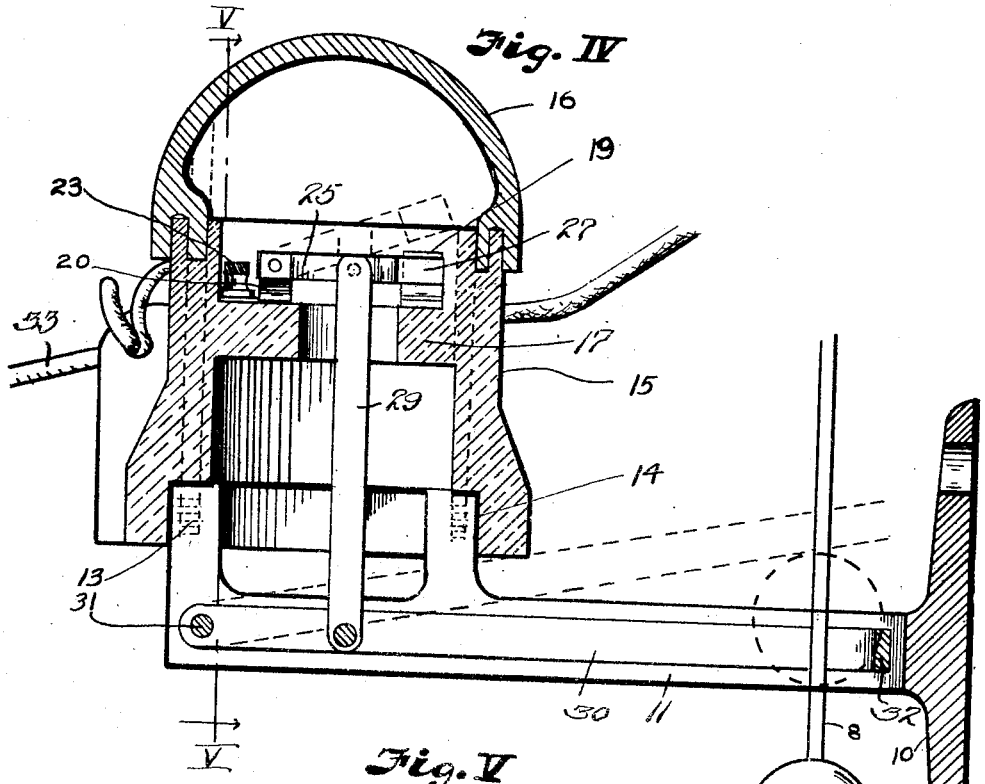
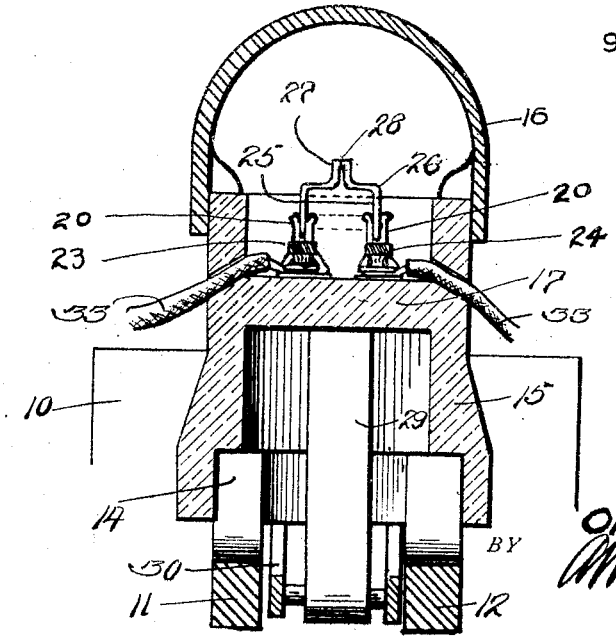


Fig. V



INVENTOR

Oliver M. King

BY

Arthur G. Brown

ATTORNEY

UNITED STATES PATENT OFFICE.

OLIVER M. KING, OF ST. JOSEPH, MISSOURI.

SAFETY CUT-OUT SWITCH.

1,366,914. Specification of Letters Patent. Patented Feb. 1, 1921.

Application filed July 9, 1919. Serial No. 309,633.

To all whom it may concern:

Be it known that I, OLIVER M. KING, a citizen of the United States, residing at St. Joseph, in the county of Buchanan and State of Missouri, have invented certain new and useful Improvements in Safety Cut-Out Switches; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to an electrical cut-out or switch and operating mechanism therefor to be used in lighting circuits. The invention is particularly applicable for circuits in which electric lamps for street lighting are included and one of the objects of the invention is to provide means whereby the circuit may be automatically opened at a predetermined point when a lamp is being lowered from a support for inspection or repairs.

Lamps for a street illumination are usually suspended over the center of a street from a cable which is stretched across the street between two poles. These lamps are usually suspended about 25 feet from the ground and are electrically connected to transmission lines by conductor wires which extend from one of the poles on the side of the street to the lamp.

It becomes necessary to clean the lamps from time to time and to make repairs, etc., and in order to have access to the lamps, each lamp is usually suspended from a pulley by means of a rope, chain or cable which passes over a second pulley mounted upon a pole at the side of the street, the cable being of sufficient length to permit the lamp to be lowered for inspection. Necessarily there is slack in the conductor cable and as a result the conductor cable swings with the wind and in some cases breaks off and if the lamps are in series, the circuit will be broken so that all the lamps in the particular circuit will be extinguished.

I have provided means whereby in the event that the cable for any particular lamp becomes broken or the circuit is interrupted at any point in the cable for a particular lamp, the circuit will be automatically restored for the other lamps thereby eliminating a source of considerable annoyance and inconvenience due to any localized break for any particular lamp.

It is also important in street lighting practice to maintain the filament or wire in the incandescent electric lamp heated when the lamp is being lowered or raised because a cold filament is more fragile than one that is hot, and I have, therefore, provided means whereby the lamp may be raised and lowered while the filament is in the circuit, there being also a provision made, however, for breaking the circuit as the lamp reaches the limit of its lowering movement, this being important to avoid danger of shock to the operator inspecting or repairing the lamp which would be liable to occur if the current remained on when the lamp reached its lowered position. The construction of the device contemplated by the invention is such, however, that the current will continue to pass through the filament while the lamp is being lowered and will be shut off just before the limit of the lowered position is reached, and as soon as the operator starts to raise the lamp, the filament will be automatically included in the circuit so that there will be a very short period in the actual raising and lowering movement of the lamp when the filament is not energized.

The preferred embodiment of my invention is illustrated in the accompanying drawings and will be referred to hereinafter; it being understood, however, that I reserve the right to make such changes in form, proportion and minor details of construction as may properly come within the scope of the appended claims and without departing from the spirit of the invention.

In the drawings,—

Figure I is a view of a lamp circuit showing one complete lamp supporting mechanism.

Fig. II is a diagrammatical view of a lamp circuit showing a circuit breaker and one local circuit.

Fig. III is a detail perspective view of the circuit breaker and the means for actuating it.

Fig. IV is a vertical longitudinal sectional view through a circuit breaker, its support and means for actuating the circuit breaker, and

Fig. V is a sectional view on the line V—V of Fig. IV, looking in the direction of the arrows.

Referring now to the drawings by numerals of reference:

1 and 2 designate poles which may be secured at opposite sides of the street, these being connected by a cross cable or wire 3. The wire 3 supports a pulley 4 from which the lamp 5 may be suspended through the medium of a cable 6, which also passes around a pulley 7 on the pole 2, the cable 6 having a depending portion 8 with an actuator or ball 9 fast thereto, as indicated in Fig. I. Secured upon the pole 2 is a bracket 10 consisting of forwardly projecting parallel arms 11 and 12 with upstanding fingers 13 and 14 upon which rests an insulating housing 15 carrying a removable cover 16, as best seen in Figs. IV and V.

Within the insulating housing 15 is a floor or partition 17 upon which rest the spring contact fingers 18 and 19 of a knife switch and upon which rest the knife supporting brackets 20, the members 18 and 19 having binding posts 21 and 22 and the members 20 having binding posts 23 and 24. Pivoted to the brackets 20 is a knife or switch lever consisting of the two bars 25 and 26, the free ends of which are bent inwardly and outwardly to form a knife 27, the members of which are separated by a film 28 of low dielectric strength, the purpose of which will be referred to hereinafter.

The switch lever consisting of the members 25 and 26 is connected to a link 29 fastened to a switch actuating arm 30 pivoted to the forward end of the bracket 10, as indicated at 31. By reference to Fig. III it will be observed that the arm 30 is in the form of a loop and its closed end 32 is adapted to be engaged by an actuator or ball 9 on the cable 6 so that when the ball or actuator 9 is raised, the free end of the arm 30 will be raised, as indicated in dotted lines in Fig. IV, to throw the knife switch out of engagement with the contact members 18 and 19, the arm 30 and link 29 being of sufficient weight to cause the knife switch to close contact when the actuator or ball 9 is moved out of engagement with the end 32. The conductors of the main circuit may be connected to the binding posts 21 and 22 and a local circuit or conductor cord 33 may be connected to the binding posts 23 and 24 and to the lamp 5. It will be observed that the conductor 33 has considerable slack so that the lamp can be lowered in the position shown in Fig. I.

When the parts are assembled as indicated in Fig. I in full lines, and it becomes necessary to inspect or repair the lamp 5, the operator may actuate the cord 6 to overcome its counter-balancing weight and permit the lamp 5 to be lowered into the position shown in dotted lines in Fig. I. Since the ball or actuator 9 is normally considerably lower than the arm 30, the lowering of the lamp will not interfere with the energization of the filament therein. By the time, however, that the lamp has about reached the limit of its lowering movement, the ball 9 will contact with arm 30 and thereby raise it into the position shown in dotted lines in Fig. IV, this being effective in raising the knife switch away from the contacts 18 and 19 so that the circuit will be broken and will remain broken while the lamp is in its lowermost position. In this manner liability of accident to the operator by shock will be eliminated.

When it is desired to raise the lamp, a downward pull on the portion 8 of the cord 6 will start to raise the lamp and at the same time move the ball 9 away from the arm 30 so that the knife switch will immediately drop into contact with the spring fingers 18 and 19 and the circuit for the lamp will be closed, thereby heating the filament so as to reduce liability of breakage because a heated filament is less fragile than a cold one. The lamp may continue to be raised to the position shown in Fig. I to remain there until it is desirable to again lower it, when the operation just described will again take place.

It sometimes happens that the swinging cord or cable 33 becomes broken and ordinarily this would cut out all the lamps in the circuit. According to my invention, however, the finger ends 34 and 35 of the extension 27, while normally insulated by a dielectric 28, will remain insulated only so long as the lamp 5 is in circuit. If the cable 33 becomes broken, however, the dielectric 28 will break down under the influence of the current so that the fingers 34 and 35 may be caused to contact under the influence of the spring fingers 18 and 19 and the circuit will then be completed through the switch so that although the lamp in that particular circuit will not be energized, the remaining lamps in the circuit will be energized. This, I consider, an important feature since the elimination of one lamp in the circuit will not be effective in dimming the filaments of the other lamps in the circuit.

The switch contacts may be readily inspected by removing the cap or cover 16 which, by reference to Fig. IV, has a tongue and grooved connection with the housing 15.

From the foregoing it will be apparent that a device constructed in accordance with my invention may be readily installed, that it will be easy of operation and that liability of accident due to lowering or raising the lamp for inspection or repairs will be eliminated.

What I claim and desire to secure by Letters-Patent is:

1. In combination, a post, a lamp, a flexible support carried by the post for raising

and lowering the lamp, a cut-out switch having a looped actuating arm, lead wires from the cut-out switch to the lamp, means for supplying current to the switch, and means carried by the flexible support for engagement with the looped actuating arm when the lamp is lowered, whereby the cut-out switch will be rendered effective to break the circuit.

2. In combination, a post, a lamp, a flexible suspending means for raising and lowering the lamp, a cut-out switch, lead wires from the switch to the lamp independent of the suspending means, an actuating member for the switch comprising a pivoted loop, means for supplying current to the cut-out switch, and means on the flexible suspending means for engagement with the pivoted loop when the lamp is lowered whereby the cut-out switch will be actuated to break the circuit.

3. In combination, a post, a lamp, suspending means connected to the post for raising and lowering the lamp, a source of electrical supply, a switch connected to said source of supply, lead wires from the switch to the lamp independent of the suspending means, a link connected to the switch, a pivoted actuator connected to the link, and means on the flexible suspending means for engagement with the actuator when the lamp is lowered whereby the switch will be opened through movement of the actuator and the link.

In testimony whereof I affix my signature.

OLIVER M. KING