

A. S. MULLER & L. E. CARRICO.

PUSH BUTTON SWITCH.

APPLICATION FILED MAY 17, 1909.

958,755.

Patented May 24, 1910.

2 SHEETS—SHEET 1.

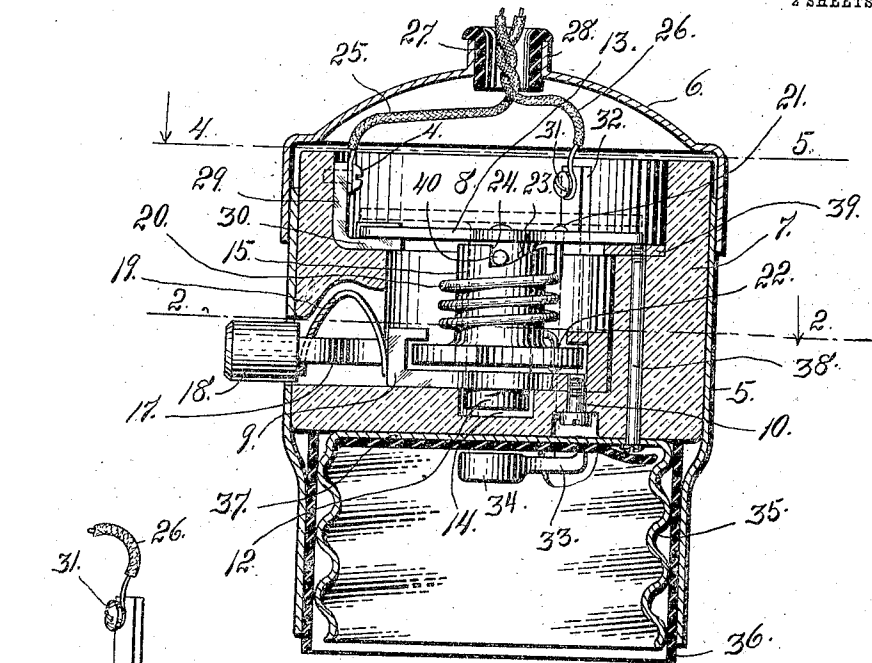


Fig. 1.

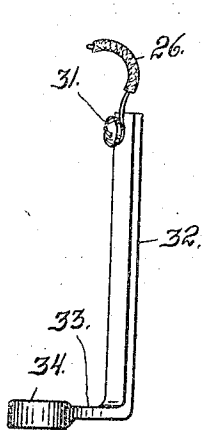


Fig. 6.

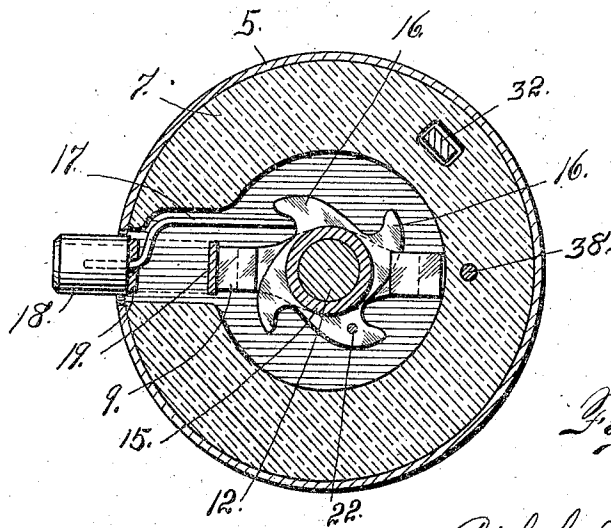


Fig. 2.

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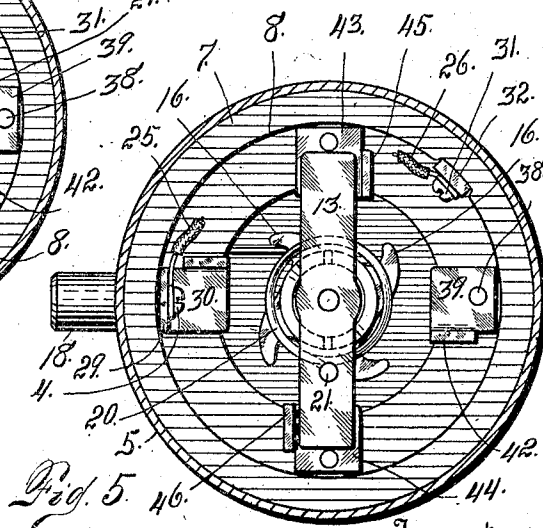
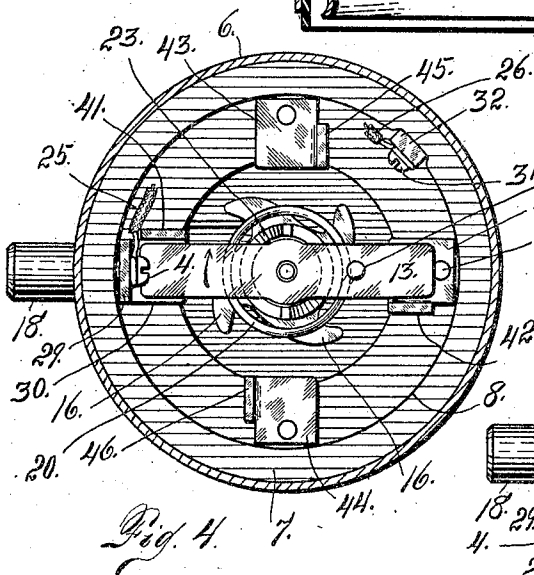
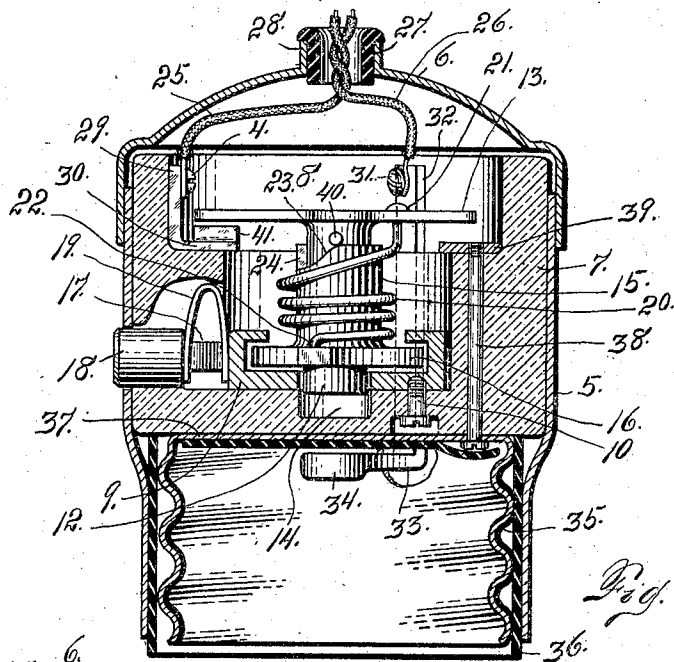
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UNITED STATES PATENT OFFICE.

ADOLPH S. MULLER AND LEO E. CARRICO, OF DENVER, COLORADO.

PUSH-BUTTON SWITCH.

958,755.

Specification of Letters Patent.

Patented May 24, 1910.

Application filed May 17, 1909. Serial No. 496,510.

To all whom it may concern:

Be it known that we, ADOLPH S. MULLER and LEO E. CARRICO, citizens of the United States, residing at Denver, in the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Push-Button Switches; and we 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 figures of reference marked thereon, which form a part of this specification.

Our invention relates to improvements in push button switches, our object being to provide a construction in which a single push button is employed for both making and breaking the circuit, and also in which the make and break is accomplished by a quick action of the bridge piece, whereby arcing is prevented.

The invention will now be described in detail, reference being made to the accompanying drawing in which is illustrated an embodiment thereof.

In this drawing, Figure 1 is a vertical section taken through the socket of an incandescent lamp equipped with our invention. Fig. 2 is a horizontal section taken on the line 2—2, Fig. 1. Fig. 3 is a section similar to Fig. 1 but showing the parts in different relative positions. Fig. 4 is a section taken on the line 4—4, Fig. 1, looking downwardly, and with the spring-actuated rotary bridge piece in the position to close the circuit. Fig. 5 is a section taken on the same plane, the bridge piece being, however, shown in the position to break the circuit. Fig. 6 is a detail view of a metal bar forming an element of the circuit.

The same reference characters indicate the same parts in all the views.

Let the numeral 5 designate the shell of an incandescent lamp socket provided with a top 6. The upper portion of the shell is provided with insulating material 7, which constitutes a filling for the socket, whereby the various parts are anchored. Within the upper part of the socket is formed a chamber 8 to permit the movable parts to operate freely. In the bottom of this chamber is located a metal bracket 9, which is secured to the filling 7 by a screw 10. Journaled in the bracket 9 is a vertically disposed spindle

12 to whose upper extremity is secured a metal bridge piece 13. The stem 12 passes through an opening formed in the bottom of the bracket 9 and protrudes into a recess 14 below the bracket. Above the bracket the spindle passes through a sleeve 15 whose lower extremity is equipped with a ratchet having teeth 16 adapted to be acted on by a pawl 17, whose inner extremity engages a tooth of the ratchet, its outer extremity being equipped with a push button 18. Interposed between the push button and the bracket is a yoke-shaped leaf spring 19, under tension to normally carry the push button to its outer limit of movement after each inward thrust.

Surrounding the sleeve 15 above the ratchet is a coil spring 20 whose upper extremity is secured to the bridge piece 13 as shown at 21, while its lower extremity is connected with the ratchet as shown at 22. The upper extremity of the sleeve 15 is equipped with two inclined cams 23, each of which has a vertical offset 24 at its lower extremity, while its upper extremity merges into the horizontal surface of the upper extremity of the sleeve.

The circuit wires 25 and 26 enter the top of the socket through an insulating sleeve 27 inserted in an eye 28 formed in the top 6. The wire 25 is connected as shown at 28, with a metal angle piece 29, whose horizontal member 30, forms a seat for one extremity of the bridge piece 13 when the latter is in the circuit-closing position. The circuit wire 26 is connected as shown at 31 with the upper extremity of a metal bar 32, whose lower extremity protrudes into the lower part of the socket where it is bent at right angles as shown at 33, and terminates in a seat 34, adapted to engage the upper extremity of an incandescent lamp, not shown.

The lower part of the socket is equipped with a screw bushing 35 which is separated from the shell 5 by a layer 36 of insulating material. The bushing 36 is closed at the top by a plate 37 which is connected with the lower extremity of a rod 38, whose upper extremity engages a metal contact piece 39.

From the foregoing description the use and operation of our improved switch will be readily understood. If it be assumed that the parts are in the relative position shown in Fig. 1,—that is to say, with the

bridge piece in the circuit-closing position, if the push button is pressed quickly against its spring 19, the pawl 17 acting on a tooth 16 of the ratchet, will impart a partial rotary movement to the sleeve 15, this movement being sufficient to cause a pin 40 with which the stem or spindle 12 is provided, to ride up the incline of one of the cams 23 until the pin reaches the upper extremity of the sleeve. The partial rotary movement imparted to the ratchet and the sleeve, places the spring 20 under tension and as soon as the pin reaches the top of the sleeve the tension of the spring, acting upon the bridge piece, imparts a quick, partial rotary movement to the latter, causing it to assume the position shown in Fig. 5 or at right angles to the circuit-closing position. The two contact members 30 and 39 are respectively equipped with upwardly projecting stops 41 and 42 which lock the bridge piece against movement in response to the spring's tension, until the extremities of the bridge piece have become disengaged from the stops 41 and 42. This occurs simultaneously with the arrival of the pin 40 at the upper extremity of the sleeve.

When the bridge piece 13 reaches the position at right angles to that shown in Fig. 1, its extremities engage seats 43 and 44 which are embedded in the insulated filling 7 of the socket. These seats are respectively equipped with upwardly projecting lips, forming stops 45 and 46. These lips engage the extremities of the bridge piece and prevent the latter from moving beyond the seats when under the influence of the spring's tension.

In order to close the circuit or shift the bridge piece from the position shown in Fig. 5, to that shown in Figs. 1 and 4, the push button 18 is given a movement similar to that employed in breaking the circuit. That is to say, it is thrust quickly against its spring 19 whereby its pawl 17 acts upon a ratchet tooth 16 to impart a partial rotary movement to the sleeve 15, whereby the pin 40 is caused to ride up the incline of the other cam 23, the bridge piece being simultaneously raised to a position above the stops 45 and 46. In this event the tension of the spring, acting on the bridge piece and its stem, gives it a quick turn and brings its opposite extremities into engagement with the contacts 30 and 39, closing the circuit.

In describing the path of the circuit it may be assumed that it enters the socket through the conductor 25, passing thence to the contact 29, its horizontal member 30, the bridge piece 13, the rod 38, the top plate 37 and the screw bushing 35, thence to the lamp not shown, through the filament thereof and back to the contact 34, and thence through the bar 33 to the other conductor 26.

While our improved switch mechanism is

shown and described in connection with a lamp socket, it must be understood that it may be employed in all other relations where push button switches are required.

Having thus described our invention, what we claim is:

1. A push button switch comprising a ratchet sleeve mounted to rotate, a bridge piece having a stem journaled in said sleeve, the said stem having a pin adapted to engage inclined cams formed on the sleeve, a push button having a pawl adapted to engage the teeth of the ratchet, a spiral spring surrounding the sleeve and having one extremity connected with the bridge piece and the other extremity with the ratchet, and contacts located in the circuit and adapted to engage the opposite extremities of the bridge piece.

2. In a push button switch the combination of a ratchet having a sleeve, a bridge piece located above the sleeve, and having a stem passing therethrough, the sleeve adjacent the bridge piece having inclined cams and offsets at the lower extremities of the cams, the stem having a pin normally engaging one of the said offsets, a spring surrounding the sleeve and having one extremity connected with the ratchet and the other extremity with the bridge piece, and a spring-returned push button having a pawl adapted to engage the ratchet and impart a partial rotary movement thereto for the purpose set forth.

3. A push button switch comprising a ratchet mounted to rotate and having a sleeve terminating at its extremity remote from the ratchet in inclined cams, having shoulders or offsets at the lower extremities of the cams, a bridge piece having a stem passing through the sleeve, a support in which the stem is journaled, a spiral spring connecting the bridge piece with the ratchet and surrounding the sleeve, contacts arranged to engage the opposite extremities of the bridge piece and having upwardly projecting stops, seats also arranged to engage the opposite extremities of the bridge piece after the latter has made a partial turn from the circuit-closing position, and a push button having a member adapted to engage the ratchet for imparting a rotary movement thereto substantially as described.

4. In a push button switch, the combination of a ratchet member mounted to rotate, a bridge piece having a stem also mounted to rotate, the ratchet member having a sleeve through which the stem of the bridge piece passes, a spiral spring surrounding the said sleeve and connecting the ratchet member and the bridge piece, the stem having a pin and the sleeve of the ratchet member a cam, whereby as the ratchet member is rotated, the cam acting on the pin of the stem, moves the latter longitudinally, whereby the

bridge piece is pushed away from the sleeve, and suitable contacts adapted to be engaged by the extremities of the bridge piece, the said contacts having stops which lock the
 5 bridge piece against rotation until the latter has been moved away from the sleeve a predetermined distance, and means for actuating the ratchet to impart a step by step rotary movement thereto.

10 5. A push button switch comprising a ratchet member having a sleeve, a bridge piece having a stem passing through the ratchet member, the bridge piece and ratchet member being coaxially journaled, a coil
 15 spring surrounding the sleeve and connecting the bridge piece and ratchet member, a connection between the stem of the bridge piece and the sleeve of the ratchet member, whereby as the latter is given a partial rotation, the stem of the bridge piece is moved
 20 longitudinally, and contacts adapted to be engaged by the extremities of the bridge piece, and provided with stops arranged to lock the bridge piece against rotation, until the movement of the bridge piece stem as
 25 aforesaid, has been sufficient to disengage the bridge piece from the stops, substantially as described.

6. A switch comprising a ratchet member mounted to rotate, and provided with a
 30 sleeve, a bridge piece extending at right angles to the axis of the ratchet member and having a stem journaled coaxially with the said member, a spiral spring surrounding the sleeve of the ratchet member and con-
 35 necting the same with the bridge piece, means for imparting partial rotary movements to the ratchet member in a given direction, whereby the spring is placed under a tension, a connection between the sleeve
 40 of the ratchet member and the stem of the bridge piece, whereby as the ratchet member is rotated, the stem of the bridge piece is moved in the direction of its axis, and means engaging the bridge piece to prevent
 45 the rotary movement of the latter until the longitudinal movement of its stem has reached a predetermined degree, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

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 LEO E. CARRICO.

Witnesses:

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 A. EBERT O'BRIEN.