May 28, 1940. T. J. MUDON 2,202,297

SWITCH

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Fig. 1

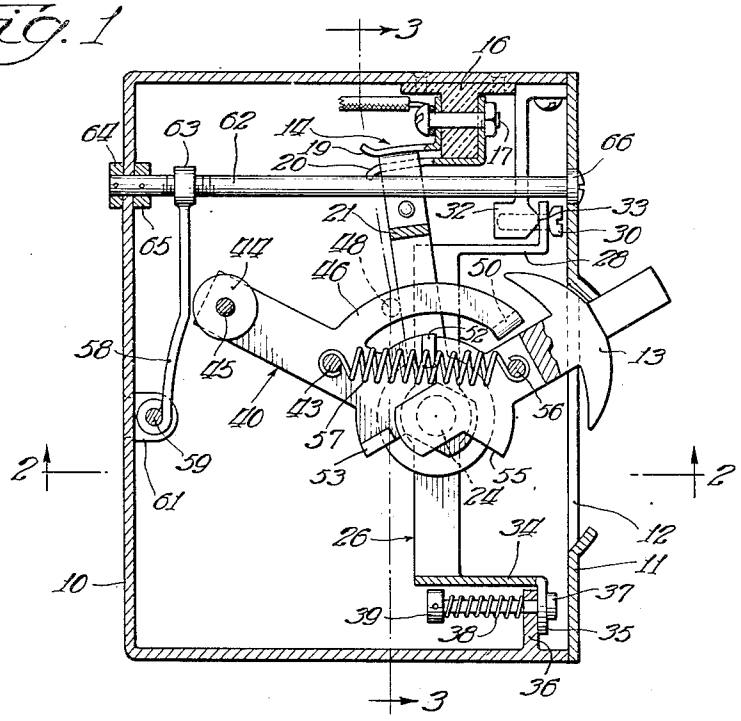
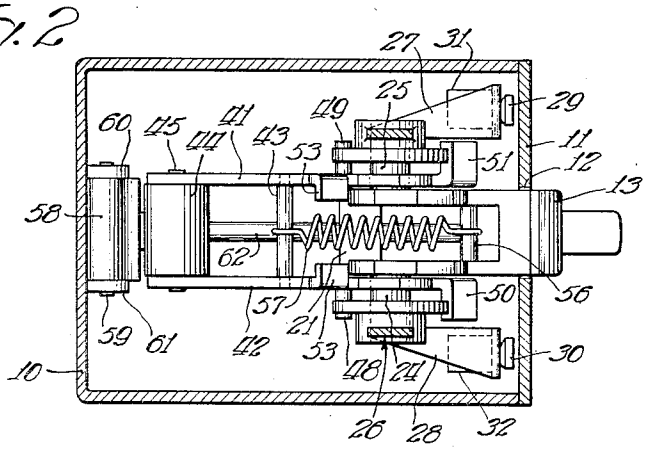


Fig. 2



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SWITCH

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Fig. 3

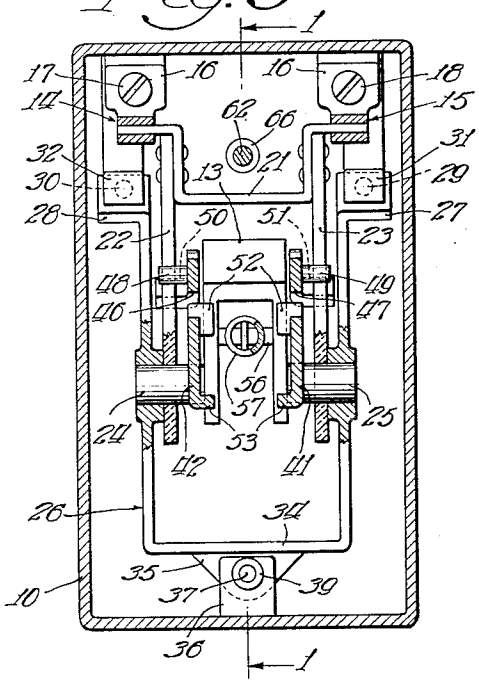


Fig. 4

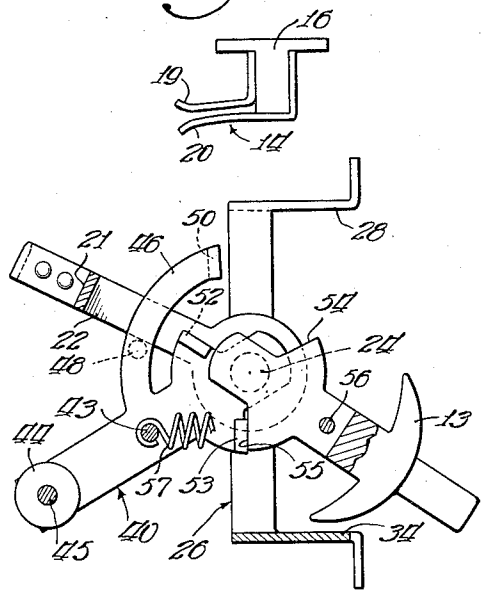


Fig. 6

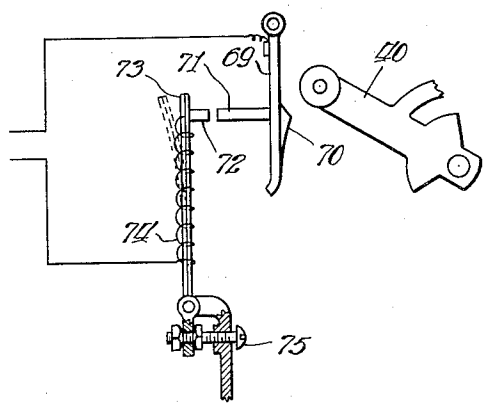


Fig. 5

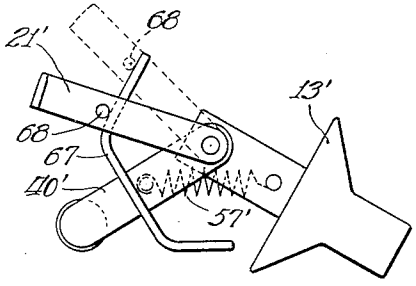


Fig. 7

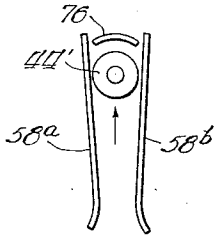
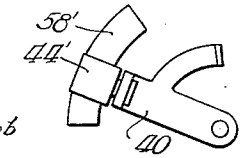


Fig. 8



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UNITED STATES PATENT OFFICE

2,202,297

SWITCH

Thomas J. Mudon, Hammond, Ind.

Application June 14, 1937, Serial No. 148,129

9 Claims. (Cl. 200—33)

The present invention relates to switches and more particularly to switch mechanisms for controlling electric circuits so as to enable the operator of the switch to actuate a switch in the circuit and thereafter have a time lag between the time the switch is actuated and the time it actually affects the circuit.

This switch mechanism is particularly applicable to house lighting systems for the purpose of giving a person who actuates the switch to open the lighting circuit a limited amount of time to reach another switch in another adjacent room or to get into bed upon retiring before the lighting circuit is actually opened.

It is the principal purpose of the present invention to provide a switch of this character which is simple in structure and economical to manufacture.

It is also a purpose of this invention to provide a switch of this character in which the time lag is obtained in such a fashion as to enable the operator of the switch to reverse the circuit connections instantaneously at any time without the necessity of making any special adjustment or performing any additional operation other than the mere actuation of the switch handle.

It is a further purpose of the invention to provide a switch of this character in which the operator may use the switch handle in such a fashion as to obtain an instantaneous opening of the light circuit if he so desires.

The features and advantages of the present invention will appear more readily as the description proceeds in connection with the accompanying drawings wherein a preferred form of the invention is shown. It is to be understood, however, that the drawings and description are illustrative only and are not to be taken as limiting the invention except in so far as it is limited by the claims.

In the drawings—

Fig. 1 is a sectional view taken substantially on the line 1—1 of Fig. 3;

Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1;

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 1;

Fig. 4 is a fragmentary view partly in section illustrating the moving parts of the switch in a different position from that shown in Fig. 1;

Fig. 5 is a view in side elevation of a modified form of switch mechanism;

Fig. 6 is a fragmentary view illustrating a modified form of retarding device;

Fig. 7 is a fragmentary view illustrating a further modified form of retarding device; and

Fig. 8 is a fragmentary view illustrating a further modification of the retarding device.

Referring now in detail to the drawings, the switch mechanism is shown as mounted in a housing 10 such as is commonly used for a wall switch. A cover 11 is provided for the housing 10 and may be secured thereto by any suitable means not shown. The cover 11 has an opening 12 through which a switch handle 13 projects. A pair of stationary contacts 14 and 15 are mounted upon suitable insulating blocks 16 which are secured to the housing 10. The stationary contacts 14 and 15 are secured in place by terminal screws 17 and 18 in the manner shown in Fig. 1. Each stationary contact comprises a pair of spring jaws 19 and 20 which are adapted to receive one end of a bridging contact 21. The bridging contact 21 is supported by a pair of arms 22 and 23 upon pivots 24 and 25 that are carried by a frame 26.

The frame 26 is mounted in the housing 10 so as to have a limited pivotal movement therein. The frame 26 is substantially U-shaped, as shown best in Fig. 3. At one end it has upwardly extended portions 27 and 28 which portions are apertured to receive screws 29 and 30, the screws 29 and 30 being secured in brackets 31 and 32. Each bracket has a V-shaped head 33 upon which the portions 27 and 28 rest to provide a pivot point. At the other end of the frame 26, it is provided with an upstanding portion 34 which has an end 35 extending over a ledge 36 formed on the housing 10. A pin 37 extends through the portion 35 and the ledge 36. A spring 38 surrounds the pin 37 and is interposed between the ledge 36 and a head 39 on the pin 37. It will be evident that the frame 26 can be rocked about the pivot point 33 by pulling it outwardly against the tension of the spring 38.

In addition to the arms 22 and 23 which are of insulating material, the pivot members 24 and 25 also carry an actuating member 40. The actuating member 40 comprises two side plates 41 and 42. The side plates 41 and 42 are connected by a cross bar 43. They also carry at their free ends a creeping element 44 which is secured therein so as not to turn by means of a pin 45. The creeping element 44 may be composed of any suitable material such as rubber or synthetic rubber. The side plates 41 and 42 also have formed integral therewith arcuate extensions 46 and 47 which extensions are provided with pins 48 and 49 and with outturned ends 50 and 51.

The pins 48 and 49 and the ends 50 and 51 extend out far enough to engage the arms 22 and 23 so as to provide for a lost motion connection between the movable contact 21 and the actuating member 40. Each of the side plates 41 and 42 is provided also with inturned flanges 52 and 53 which flanges are adapted to engage corresponding shoulders 54 and 55 which are formed on the switch handle 13.

The switch handle 13, as shown, is in the form of a yoke which is secured to the pivot members 24 and 25. A pin 56 in the yoke part of the switch handle 13 is connected to the cross bar 43 by a spring 57. It will be evident from an inspection of Figs. 1 and 4 that, in the position shown in Fig. 1, the spring 57, which is under tension, tends to draw the actuating member 40 in a clockwise direction so as to cause the pins 48 and 49 thereon to engage the arms 22 and 23 carrying the bridging contact 21 and force the bridging contact into engagement with the stationary contacts 14 and 15. Now, when the switch handle 13 is moved to the position shown in Fig. 4, it shifts the line of the spring 57 past the center of the pivot members 24 and 25 so that the spring then exerts a yielding force upon the actuating member 40 to swing it in a counterclockwise direction. After the lost motion afforded by the distance between the pins 48 and 49 and the outturned ends 50 and 51 has been taken up by movement of the actuating member 40, the ends 50 and 51 will engage the arms 22 and 23 and move the bridging contact 21 out of engagement with the stationary contacts 14 and 15.

During the movement of the element 40 afforded by the lost motion connection, the creeping element 44 passes over a track 58 so that the movement of the actuating member 40 into position to disengage the bridging contact 21 is comparatively slow thereby giving an appreciable time interval after the switch handle 13 is thrown to "off" position before the circuit controlled by the switch is opened. The track 58 is arcuate and is pivoted by means of a pin 59 and ears 60 and 61 struck up from the housing 10. Adjustment of the track 58 is provided by means of a threaded stem 62 which is threaded through the free end 63 of the track 58 and which is rotatably mounted in the housing 10. A pair of collars 64 and 65 serve to rotatably mount the stem 62 in the housing 10. The stem 62 is provided with a screw head 66 which terminates in the cover 11 and is accessible for adjustment to vary the position of the track 58 with respect to the creeping element 44.

It will be noted that, in movement of the switch handle 13 from "on" position shown in Fig. 1 to "off" position shown in Fig. 3, the force employed to move the switch handle is in such a direction as to tend to turn the frame 26 in a clockwise direction about its pivot 33. The flange 35 resting upon the ledge 36 prevents any such movement, however, so that, upon the opening of the switch, the frame 26 is not moved to cause any change in position of the pivot pins 24 and 25. It is evident that the operator may, if he desires to prevent the time lag occasioned by the creeping element 44 moving over the track 58, pull outward upon the switch handle 13 enough to prevent the element 44 from engaging the track. In that case, the actuating member 40 will be free to snap over as soon as the spring 57 is moved past the center line of the pivot pins 24 and 25. A substantially instantaneous opening of the circuit may thus be obtained by the operator if he desires.

When the switch is being closed, however, and the handle 13 is being lifted, the force necessary to lift the handle against the tension of the spring 57 is sufficient to overcome the pressure exerted by the spring 38 so that this spring is compressed somewhat and the frame 26 swings in a counterclockwise direction as the handle 13 is moved upwardly. The creeping element 44 is, therefore, moved out of the way of the track 58 at the beginning of the closing movement of the actuating member 40. The actuating member 40 is thus given a snap movement toward position to close the bridging contact, and, despite the fact that there is a tendency of the spring 38 to return the frame 26 to the position shown in Fig. 1, the frame 26 is held out long enough to enable the creeping element 44 to clear the member 58 in the closing movement of the actuating element 40.

It is believed to be evident from the foregoing description that the mechanism shown and described provides a simple and economical switch which has the advantages of providing a time lag between the manual operation necessary to open a circuit and the actual opening of the circuit. The time lag may be adjusted within limits at the convenience of the operator. Furthermore, the operator is able to open and close a switch in the usual accepted manner and without the necessity of performing any additional operations over what he would perform with the ordinary wall switch. The feature of taking advantage of the force necessary to move the switch handle from one position to another in order to prevent retardation when the switch is being closed eliminates all necessity for special mechanisms to get the retarding device out of operation when the switch is closed.

In Fig. 5, there is shown a slightly modified form of switch operating mechanism in which the bridging contact 21' is opened and closed by means of a bar 67 mounted on the actuating member 40' and engaging a cross pin 68 carried by the bridging contact 21'. The switch handle 13' and the spring 57', as well as the other mechanism not shown, remain unchanged in the modified form.

The operation of the modification shown in Fig. 5 is substantially as follows: When the handle 13' is moved in a direction to close the switch from the position shown in Fig. 5, the initial movement does nothing until the line of the spring 57 crosses the pivotal axis of the handle 13. At that point, the actuating member 40' swings with the bridging contact 21' in a clockwise direction, thus forcing the bridging contact into closed position. Now on the return movement, the initial movement of the actuating member 40' merely results in a movement of the member 67 with respect to the pin 68 until the pin 68 occupies the dotted position on the member 67. When this position is reached, the member 67 presses against the pin 68 and opens the bridging contact.

In Fig. 6, a modified form of retarding mechanism is shown. In this case, the actuating member 40 engages a hanging arm 69 which takes the place of the track 58. This hanging arm has a stop 70 thereon so positioned as to stop and hold the actuating member 40 while at the same time the arm 69 swings over to cause a contact 71 thereon to engage a contact 72 on a bimetallic thermostat element 73. When cold, the element

73 holds the contact 72 in such position as to have an open circuit between 71 and 72, but close enough to 71 to prevent the element 40 from passing the stop 70. When the contacts 71 and 72 are closed, current from a suitable source passes through a heat coil 74 on the element 73, and, after a short time, the element 73 will be caused to snap over into the dotted line position shown thus permitting the arm 69 to swing out of the way of the element 40 which then continues to move to open the switch contacts. After the element 40 has passed, the arm 69 swings away and breaks contact between the contacts 71 and 72 so that the bimetallic element 73 returns to its original position. On the reverse movement of the arm 40 to close the switch, the arm 69 and the stop 70 are so sloped as to enable the element 40 to swing past them without stopping. There is a momentary closure of the contacts 71 and 72, but this does not harm anything. The bimetallic element 73 may be positioned, as desired, by means of an adjusting screw 75.

In Fig. 7, I have shown a slightly modified form of track in which two track elements 58*a* and 58*b* receive the friction element 44' therebetween. A metallic guard 76 may be used to shield the friction element 44' on the closing movement thereof which is in the direction of the arrow.

In the form shown in Fig. 8, the friction element 44' engages a track 58' which is arranged at the side of the actuating member 40 instead of at the end thereof.

From the above description, it is believed that the construction and operation of this device will be readily apparent to those skilled in this art.

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

1. A switch of the character described comprising stationary contacts and a movable bridge contact movable into and out of position to connect said stationary contacts, and means for moving said bridge contact comprising an actuating member having a lost motion connection with said bridge contact, manually operable means for moving said actuating member between a position where it holds the bridging contact in position to connect the stationary contacts and a position where it holds the bridging contact away from the stationary contacts, and retarding means for said actuating member adapted to retard its movement during the lost motion between it and the bridging contact as the actuating member is moved from the first named position to the position where it holds the bridging contact out of engagement with the stationary contact, said retarding means comprising a track and a creeping element on the actuating member for engaging said track.

2. A switch having a movable circuit closing member, an actuating member having a lost motion connection with said circuit closing member, manually operable means for moving said actuating member, and means for causing a substantial time lag in the movement of said actuating member relative to the circuit closing member afforded by said lost motion connection upon circuit opening movement, said time lag means being rendered functionally inoperative by actuation of said manually operable means to effect circuit closing movement of the actuating member, said time lag means comprising a creeping element carried by the actuating member, and a track in the path of said element.

3. A switch having a movable circuit closing member, an actuating member having a lost motion connection with said circuit closing member, manually operable means for moving said actuating member, and means for causing a substantial time lag in the movement of said actuating member relative to the circuit closing member afforded by said lost motion connection upon circuit opening movement, said time lag means being rendered functionally inoperative by actuation of said manually operable means to effect circuit closing movement of the actuating member, said time lag means comprising a creeping element carried by the actuating member, and a track in the path of said element, and means for adjusting said track to vary the pressure between it and the creeping element.

4. A switch having a movable circuit closing member, a pivotally mounted frame supporting said member, an actuating member having a lost motion connection with said circuit closing member, manually operable means including a spring for moving said actuating member between circuit closing position and circuit opening position, said manually operable means and said actuating member being carried by said frame, stop means limiting movement of the frame by the manually operable means when the actuating member is moved toward circuit closing position, said frame being movable in the other direction when the manually operable means is operated to move the actuating member toward circuit closing position, and means for causing a substantial time lag in the movement of said actuating member relative to the circuit closing member upon the circuit opening movement thereof, said time lag means being rendered functionally inoperative by the aforesaid movement of the frame.

5. A time delay switch comprising a control handle, an electrical switch and a time lag mechanism connected with said switch, and means cooperating with said handle operable to make said time lag mechanism effective, by movement of said handle to "off" position, to delay the time of breaking connections, said means being operable by movement of said handle to "on" position, to make said time lag mechanism ineffective to delay the time of making connections.

6. A time delay switch comprising a control handle, an electrical switch, a time lag mechanism, and means controlled by said control handle adapted selectively to cause the time lag mechanism to delay the switch operation or cause the switch operation without the delay.

7. A switch having a movable circuit closing member, an actuating member having a lost motion connection with said circuit closing member, manually operable means for moving said actuating member, and means for causing a substantial time lag in the movement of said actuating member relative to the circuit closing member afforded by said lost motion connection upon circuit opening movement, and control mechanism connected with and actuated by said manually operable means to release the actuating member from said time lag means.

8. A switch having a movable circuit closing member, manually operable means having a lost motion connection with said circuit closing member, time lag means connected with said manually operable means for causing a delay between movement of the manually operable means and consequent movement of the circuit closing member, and means controlled by said manually oper-

able means to render said time lag means functionally inoperative to delay circuit closing movement of said member.

9. A time delay switch comprising a control handle, an electrical switch, a time lag mechanism, and means controlled by said control handle adapted selectively to cause the time lag mechanism to delay the switch operation or cause the switch operation without the delay, said time lag mechanism comprising a creeping element, and a track in the path of said element.

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