Dec. 15, 1953 M. R. WINKLER 2,662,942

INDICATING SWITCH

Filed Jan. 27, 1949

Fig. 1.

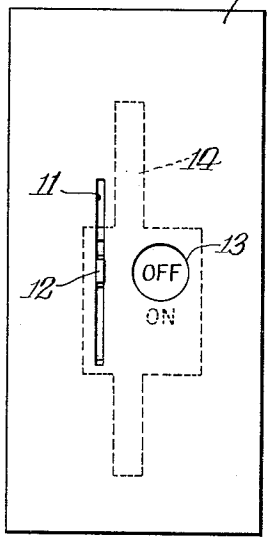


Fig. 5.

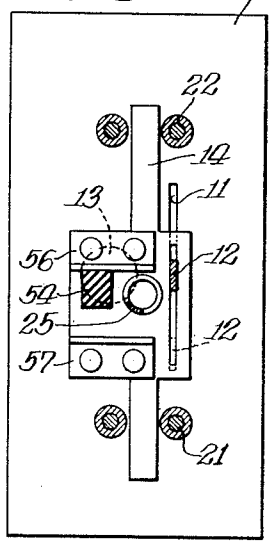


Fig. 2.

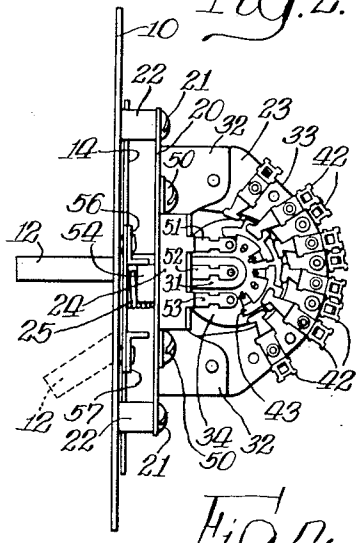


Fig. 3.

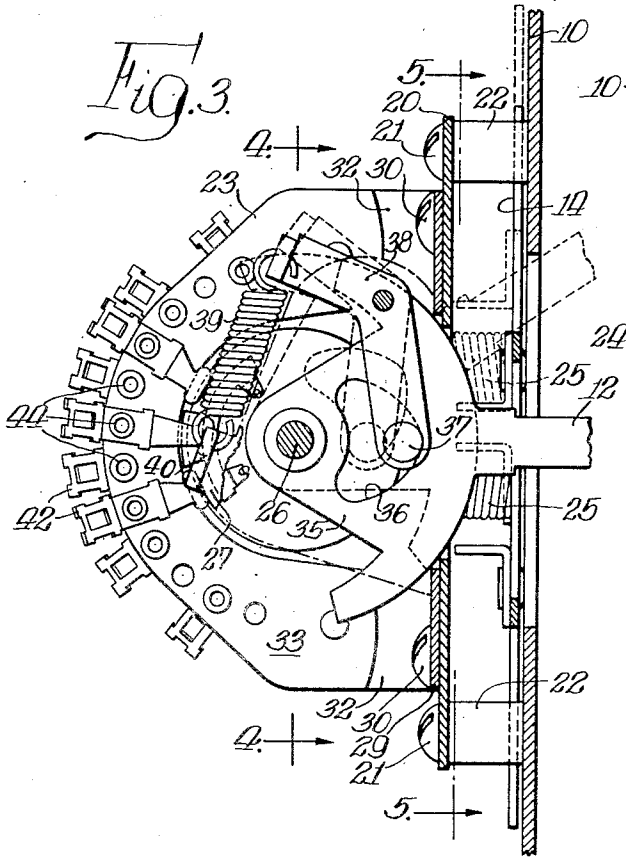
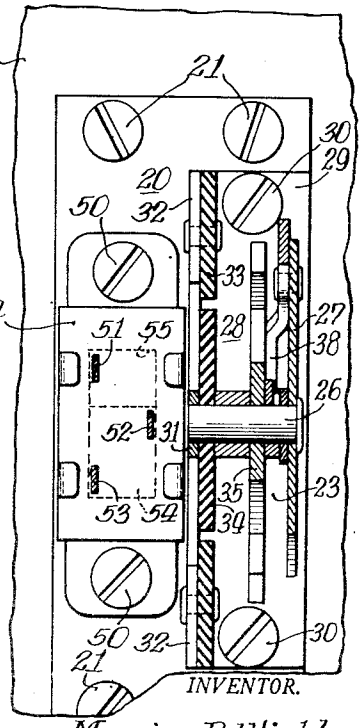


Fig. 4.



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INDICATING SWITCH

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7 Claims. (Cl. 200—18)

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This invention relates generally to switch mechanisms and more particularly to a multi-position switch assembly including means for indicating the last position to which the switch has been moved.

In remote control applications and similar uses, a plurality of switches may be provided at a control station for providing various remote operations. These switches may be adapted to apply a control signal for causing a particular operation and then be returned to a normal position until a different control operation is required. In such a system in which the control signal is sent only momentarily and the controlling switch returned to normal while the remote equipment remains in the desired condition, it is not apparent from the position of the operating member of the switch what the condition of the remote equipment may be. For example, in a system in which a remote transmitter is controlled from a central station, a switch may be provided at the central station for applying a control signal to the remote transmitter for turning the transmitter on. A lock-in arrangement may be provided at the transmitter so that the transmitter remains on until a different signal is applied thereto. In such an application, a double-throw switch may be provided which is spring biased to the normal or unoperated position and which may be moved to a first position for turning the transmitter on and to a second position for turning the transmitter off. The operating member of the switch would, therefore, be in normal position at all times except when a signal is being sent and it would not be possible to directly observe the condition of the remote transmitter.

In other systems, the switches may remain in positions which correspond to particular control functions and thereby physically indicate the condition of the remote equipment. However, such an indication may not be adequate when one operator must take care of a large amount of equipment. In addition, in many instances it is desired to indicate in a separate control room, as on a panel of lights, the condition of remotely controlled equipment without directly observing the switches which control the equipment.

It is, therefore, an object of the present invention to provide a switch assembly including provisions for indicating the last position to which the switch has been operated.

A further object of this invention is to provide a multi-position switch assembly adapted to provide a remote indication of the operation of the switch.

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A feature of this invention is the provision of a multi-position switch unit including contacts adapted to be momentarily closed for producing a control function and corresponding contacts adapted to remain closed for providing a remote indication.

A further feature of this invention is the provision of a switch having two operating positions and biased to a normal or unoperated position, with auxiliary means automatically operated with the switch which indicates the position to which the switch was last moved.

A still further feature of this invention is the provision of a switch assembly including a single operating arm for selectively momentarily closing the contacts of one set and for moving the contacts of another set to a holding position for indicating the control operation performed by the first set of contacts.

Further objects, features and advantages will be apparent from a consideration of the following description taken in connection with the accompanying drawings in which:

Fig. 1 is a view of the switch assembly in accordance with the invention installed in a control panel;

Fig. 2 is a view of one side of the switch assembly;

Fig. 3 is a view of the other side of the switch assembly; and

Figs. 4 and 5 are sectional views along the lines 4—4 and 5—5 of Fig. 3 respectively.

In practicing the invention, there is provided a toggle type spring biased double-throw switch which may be moved to either one of two operating positions by the toggle arm and which is automatically returned to the normal or unoperated position when the arm is released. Mechanically interconnected with the operating arm of the switch is an indicating member which is moved to a first position when the switch is moved to the first operating position, and to a second position when the switch is moved to the second operating position. The indicating means remains in either the first or second position, as the case may be, when the operating arm is returned to normal by the spring biasing action. Therefore, the indicating means will at all times indicate the last position to which the switch has been operated. An auxiliary double-throw switch may be associated with the indicating means so that when the main switch is moved to the first operating position, a circuit can be closed to remotely indicate this operation of the main switch. The auxiliary switch will remain in this operated position when the switch arm returns

to the normal position so that the indication will be continuous. In a similar manner, a second indicating circuit can be controlled by the auxiliary switch to indicate operation of the main switch to the second operating position.

Referring now to the drawings, in Fig. 1 there is illustrated a panel 10 which may be a portion of the panel of a control box or other equipment. The panel includes a slot 11 through which the operating arm 12 of the switch extends. An opening 13 is also provided in the panel through which an indication as the "off" indication illustrated can be viewed. The indication is provided on a slide member 14 which is moved by the operating arm 12, as best shown in Fig. 5. The operating arm has a toggle action that will be further explained and when moved to the down position (as viewed in Fig. 5) causes the slide 14 to be moved downwardly so that the "off" indication will show through the opening 13. Likewise, when the arm 12 is moved up (as viewed in Figs. 1 and 5) the slide 14 will be moved up so that the "on" indication will be visible.

Figs. 2, 3 and 4 discloses more in detail the structure of the switch assembly. The switch structure is supported on a mounting plate 20 which is secured to the panel 10 by bolts 21 threaded into posts 22 which may be secured to the panel 10 in any desired manner. The mounting plate 20 supports the main operating switch 23 and also the auxiliary switch 24. The indicating slide 14 is held against the panel 10 by a coil spring 25 which is positioned between the mounting plate 20 and the slide. The switch operating arm 12 is pivotly mounted on a shaft 26 which is supported at each end by the frame structure including members 27 and 28. The member 28 is L-shaped having a base portion 29 secured to the mounting plate by screws 30, an upstanding support 31 supporting the shaft 26, and portions 32 supporting the fixed wafer portion 33 of the switch. The movable wafer portion 34 of the switch is secured to the shaft 26 for movement thereby in response to actuation of the arm 12.

The operating arm 12 of the switch includes an enlarged portion 35 having a heart shaped opening 36 therein in which a pin 37 operates. The pin 37 is supported on a crank arm 38 which is pivoted on the frame member 27. The other end of the crank arm is connected to a spring 39 which is secured to a projection 40 on the frame 27. A plurality of contacts 42 may be secured to the fixed wafer 33 on one side thereof (Fig. 2) to be selectively engaged by the movable contacts 43 on the movable wafer 34. Additional contacts may be provided on the other side of the wafer as indicated at 44 in Fig. 3 to be selectively engaged by movable contact means on the other side of the wafer 34 (not shown). The switch arm 12 may, therefore, be moved to one position for interconnecting the fixed contacts in one manner and to the other position for providing a different set of connections. The pin 37 biased by spring 39 will engage the opening 36 to return the operating arm to the normal or unoperated position. This action is illustrated by the dotted lines in Fig. 3. The switch structure just described is a standard switch construction and the operation thereof is well known.

The auxiliary switch 24 is secured to the mounting plate 20 by screws 50, and includes switch terminals 51, 52 and 53 which are arranged to be selectively interconnected by a movable contact operated by the control button 54. The specific construction of this switch is not shown as it is in itself a well known structure. The button 54 extends through a slot 55 in the mounting plate 20 so that it extends adjacent the slide 14. For operating the auxiliary switch, angle members 56 and 57 are secured to the slide 14. When the main switch is operated to the "off" position, as indicated in Figs. 1, 2 and 5, the angle member 56 will move the button 54 so that one pair of the contacts 51, 52 and 53 are interconnected, as for example, contacts 52 and 53. Similarly, when the switch arm 12 is operated so that the slide 14 is moved to the "on" position, the button 54 will be engaged by the member 57 so that a different pair of contacts 51, 52 and 53 will be interconnected, as contacts 51 and 52. Although the operating member 12 will be returned to normal and the contacts of the main switch disconnected, the auxiliary switch will remain in an actuated position so that an indicating circuit will show the last operated position of the switch. This may be accomplished by connecting the contacts 51, 52 and 53 in light indicating circuits so that one light is operated when the contacts 51 and 52 are closed and another light is operated when the contacts 52 and 53 are closed.

As seen from the above, there is provided a simple switch assembly in which a continuous indication is provided of the last position to which a multi-position switch has been operated. The arrangement disclosed provides a direct indication at the switch itself and/or a remote indication automatically controlled by the auxiliary switch. The indication at the switch is of particular value for use with a spring biased switch in which the operating arm returns to normal, and the remote indication provided is of equal value whether or not the operating arm of the switch is returned to normal position and the last operation thereof is apparent. The switch assembly is composed of standard switch components so that the cost thereof is a minimum. The operation of the assembly is relatively foolproof and the switch, therefore, will require a minimum of maintenance.

While there is described a single embodiment of the invention, it is obvious that various changes and modifications can be made therein without departing from the intended scope of the invention as defined in the appended claims.

I claim:

1. A switch assembly comprising, a first switch having first and second operated positions and a normal position, said first switch including a movable actuating arm and means for biasing said arm to said normal position, a second switch having first and second positions, and auxiliary means linking said arm and said second switch for moving said second switch to said first and second positions when said arm is moved to said first and second operated positions respectively, said auxiliary means remaining stationary when said arm returns to said normal position so that said second switch remains in the position to which it was moved.

2. A switch assembly comprising, a first switch having a toggle arm biased to an unoperated position and movable to first and second operated positions, a second switch having an operating button for moving the same to first and second positions, and auxiliary means linking said arm and said button for moving said second switch to said first and second positions when said toggle arm is moved to said first and second operated positions respectively, said auxiliary means re-

maining stationary when said toggle arm returns to said normal position so that said second switch remains in the position to which it was moved.

3. A switch assembly comprising first and second switches, said first switch having a normal position and first and second operated positions, an arm for operating said first switch and biasing means tending to hold said arm in said normal position, said second switch having first and second operated positions and a button for operating the same, and means interconnecting said arm and said botton for moving said second switch to said first and second positions when said arm is moved to said first and second operated positions respectively, said interconnecting means being inoperative when said arm returns to said normal position so that said second switch remains in the position to which it was moved.

4. A switch assembly comprising first and second switches each having first and second operated positions, said first switch including an arm for operating the same to said first and second positions and to a normal unoperated position, biasing means tending to hold said arm in said normal position, said second switch having a member for operating the same to said first and second positions, and means interconnecting said arm and said member for moving said second switch to said first and second positions when said arm is moved to said first and second operated positions respectively, said interconnecting means being inoperative when said arm returns from said first and second operated positions to said normal position so that said second switch remains in the position to which it was moved.

5. A switch assembly including in combination supporting means on which a plurality of fixed contacts are mounted, a movable arm having contact means thereon adapted to selectively engage said fixed contacts, said movable arm having a normal position and first and second operated positions on opposite sides of said normal position for selectively engaging said fixed contacts, biasing means tending to hold said arm in said normal position, and auxiliary means having portions positioned to be engaged by said arm and moved thereby to first and second positions when said arm is moved to said first and second operated positions respectively, said portions of said auxiliary means being clear of said arm when said arm moves from said actuated positions to said normal position so that it remains in the position to which it was last moved when said arm returns to said normal position.

6. A switch assembly including in combination, a supporting panel, movable switch means supported on said panel having contacts and a switch actuating member extending through said panel, said actuating member being movable from a normal position to first and second operated positions on opposite sides of said normal position, spring means biasing said member to said normal position, and slide means positioned adjacent said panel to be engaged by said movable switch means for movement to first and second positions when said switch means is moved to

said first and second operated positions respectively, said supporting panel having an opening therein, said slide means having first and second indications spaced thereon so that said first indication is visible through said opening when said slide means is in said first position and said second indication is visible through said opening when said slide means is in said second position, said slide means being clear of said movable switch means during movement thereof from said operated positions to said normal position and thereby remaining stationary when said movable switch means returns to said normal position, so that the indication which is visible corresponds to the position to which said switch was last actuated.

7. A switch assembly including in combination, a supporting panel, first switch means supported on said panel having contacts and a switch actuating member extending through said panel, said actuating member being movable from a normal position to first and second operated positions on opposite sides of said normal position, spring means biasing said member to said normal position, second switch means having an operating member movable between first and second operated positions, and slide means adjacent said panel positioned to be engaged by said first switch means for movement to first and second positions when said first switch means is moved to said first and second operated positions respectively, said supporting panel having an opening therein, said slide means having first and second indications spaced thereon so that said first indication is visible through said opening when said slide means is in said first position and said second indication is visible through said opening when said slide means is in said second position, said slide means being clear of said first switch means during movement thereof from said operated positions to said normal position and thereby remaining stationary when said first switch means returns to said normal position, said slide means having a portion engaging said operating member of said first switch means for operating the same to said first and second positions thereof when said slide means is moved to said first and second positions respectively, so that the indication on said slide means which is visible and the operated position of said second switch means correspond to the position to which said first switch means was last operated.

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