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A. J. BLAKE ET AL

1,866,922

ELECTRIC SWITCH

Filed April 30, 1929

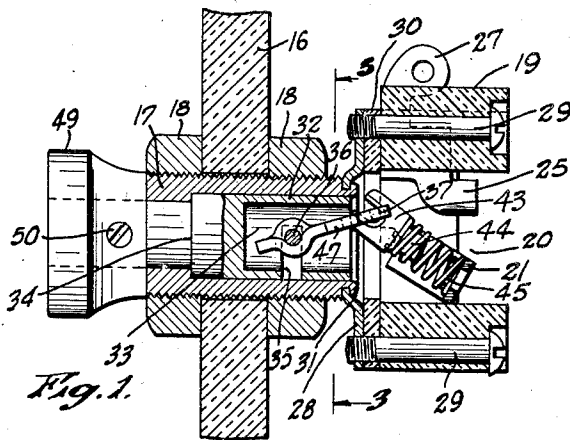


Fig. 1.

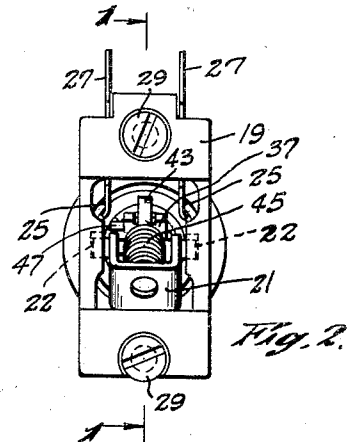


Fig. 2.

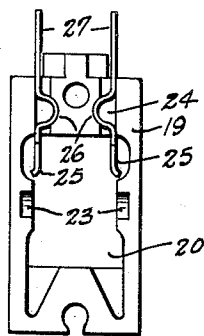


Fig. 4.

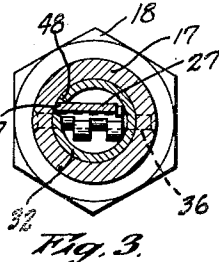


Fig. 3.

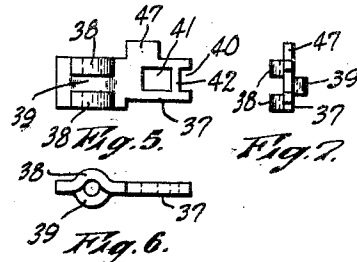


Fig. 5.



Fig. 6.

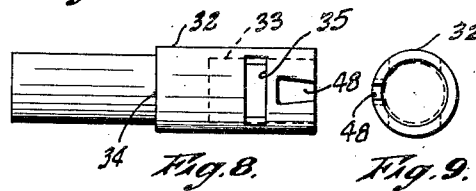


Fig. 8.

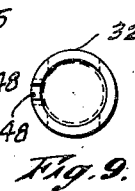


Fig. 9.

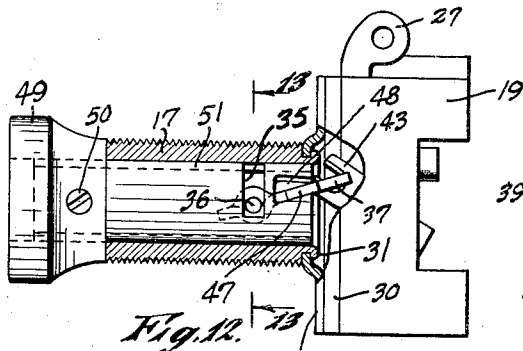


Fig. 12.

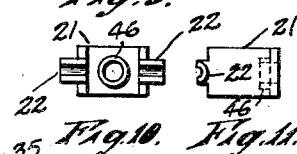


Fig. 10.

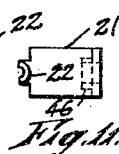


Fig. 11.

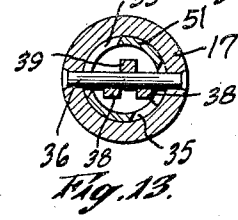


Fig. 13.

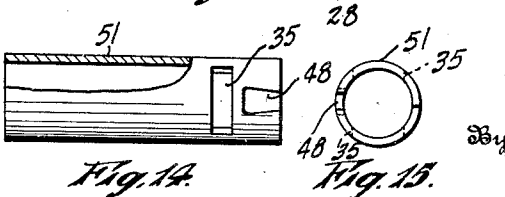


Fig. 14.

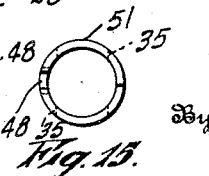


Fig. 15.

Inventors

Arthur J. Blake
Frank J. Tiffany
Worster & Davis
Attorneys

UNITED STATES PATENT OFFICE

ARTHUR J. BLAKE AND FRANK J. TIFFANY, OF BRIDGEPORT, CONNECTICUT, ASSIGNORS
TO HARVEY HUBBELL, INCORPORATED, OF BRIDGEPORT, CONNECTICUT, A CORPORATION OF CONNECTICUT

ELECTRIC SWITCH

Application filed April 30, 1929. Serial No. 359,238.

This invention relates to an electric switch, particularly to a switch for control of radio sets and like devices, although it is not necessarily limited thereto. It has for an object to provide a toggle switch or switch having a toggle action with an operating means therefor having a rotary movement.

Another object of the invention is to secure a construction which will operate a toggle switch with a rotary movement by mechanism which is very simple in construction and which will also be smooth and reliable in operation.

With the foregoing and other objects in view the invention consists in certain novel features of construction, combinations, and arrangement of parts as will be more fully disclosed in connection with the accompanying drawing.

In this drawing:

Fig. 1 is a vertical longitudinal section through our improved switch substantially on line 1—1 of Fig. 2, and showing a panel and means for mounting the switch therein.

Fig. 2 is a rear elevation of the device.

Fig. 3 is a transverse section substantially on line 3—3 of Fig. 1.

Fig. 4 is a front elevation of the insulating body member.

Fig. 5 is a side elevation of the operating member of the toggle.

Fig. 6 is an edge view thereof.

Fig. 7 is an end elevation looking from the right of Fig. 5.

Fig. 8 is a side elevation of one form of switch operating member.

Fig. 9 is an end view thereof looking from the right of Fig. 8.

Figs. 10 and 11 are an end and side elevation respectively of the pivoted switch member or contact.

Fig. 12 is a partial side elevation and a partial longitudinal section of a switch having a slightly different construction of operating member.

Fig. 13 is a transverse section substantially on line 13—13 of Fig. 12.

Fig. 14 is a partial side elevation and partial section of the operating member shown in Fig. 12, and

Fig. 15 is an end view thereof looking from the right of Fig. 14.

A mounting such as a front panel of a radio set or instrument board of an automobile is shown at 16. Our improved switch assembly includes a tubular support 17 threaded on its outer surface to receive the clamping nuts 18, this supporting member being adapted for insertion in the panel, and is secured therein by merely clamping the nuts 18 on opposite sides of the panel. The switch construction also includes a body member or block 19 of suitable insulating material having a chamber or recess 20 in which is mounted a pivoted switch member 21. In the form shown this member is of substantially U-shape with pivots 22 extending laterally from the free ends of the side portions and seating in notches 23 formed in the front surface of the block 19. This block also has spaced slots or recesses 24 leading from its front wall and passing from the chamber 20 through the end of the block, and in which are mounted the stationary contacts 25. These contacts are formed from sheet metal and are buckled laterally as shown at 26 to provide ribs for seating in transverse grooves at one side of the slots 24, so that the contacts 25 will be held in proper position in these grooves. The mounting operation merely involves sliding these contact members into the slots 24 from the front wall of the body member as will be clearly apparent from Fig. 4. These contact members have portions 27 projecting from the body block for attachment of lead wires.

This body block and associated elements is mounted on the supporting member 17. For this purpose a metal yoke or plate 28 is secured over the front surface of the block 19 by means of screws 29 passing through suitable openings in the block and threaded into tapped openings in the plate. It is separated and insulated from the contacts carried by the block by means of an insulating plate or washer 30 which is clamped between the plate and the body. These plates retain the contacts 25 in position and also retain the pivots 22 for the movable switch member 21 in the recesses 23. The body is mounted on the

supporting member 17 by reducing the diameter of the inner end of this member and inserting it to an opening in the plate 28 and then rolling over this end against the inner side of the plate as shown at 31.

Mounted for turning movements in the supporting member 17 is an operating member 32. In the form shown in Fig. 1 this member is cylindrical and has a chamber 33 extending from its inner end. It also has an angular shoulder 34 on its outer surface engaging a similar shoulder in the passage through the member 17, but this shoulder is not strictly necessary. In the body of the member 32 is a pair of slots 35 passing through the side walls thereof on diametrical opposite sides of the member for passage of the pivot pin 36, and these slots allow limited turning movements of the operating member 32 in the supporting member 17. Mounted to rock on the pivot pin 36 is the operating member 37 of a toggle. This toggle member is of metal of suitable gauge with the walls pierced laterally as shown at 38 and 39 for passage of the pin 36 and thus pivotally mount this member on the pin. Its free end has a notch 40 and an opening 41 providing a cross bar 42 to seat in the fork end of the other toggle member 43 which is of insulating material, such for example as pressed fibre. Member 43 has a reduced extension 44 braced by a compression spring 45 seated at its opposite end about a tubular flange 46 drawn on the inner wall of the connecting bar of the switch member 21. Thus by swinging the free end of the member 37 the spring will be compressed, and as the two toggle members 37 and 43 pass through the line joining the center of pin 36 and the center of the flange 46 the spring snaps the switch member 21 about its pivots 22 to either engage the contacts 25 to bridge these contacts and thus close the circuit or to move away from them and thus break the circuit. The toggle mechanism is operated in opposite directions by turning movements of the member 32 in opposite directions. For this purpose the member 37 is provided with a laterally extending lug 47 on one side edge which seats in a notch 48 in the inner end of the member 32. Thus as the member 32 is turned in opposite directions the coaction of the side walls of this notch with the opposite sides of the lug 47 swings the member 37 in opposite directions to open or close the switch. The operating member 32 may be operated by any suitable means such as a knurled head 49 secured to the outer end of the member by any suitable means such as screw 50. The shoulder 34 on the member 32 is not necessary as the member 32 will be held in proper relation to the support 17 by means of the pivot pin 36 in the slots 35, but it assists somewhat in this assembling operation. It will be noted from an inspection of the drawing that if the parts are as-

sembled as shown with the lug 47 on the right hand side or toward the observer then turning the knob 49 to the right or clockwise will close the switch, while turning it to the left or anti-clockwise will open the switch. On the other hand if the parts are assembled with the lug 47 on the left hand side or on the side away from the observer then the action is reversed and the switch is closed by turning the knob to the left and opened by turning it to the right. It can therefore, be assembled to operate in either manner desired.

In the form shown in Figs. 1, 3, 8 and 9, the operating member 32 is formed from a piece of solid rod, which in quantity production, may be made on an automatic screw machine. This member however, may be rolled up from a piece of sheet metal into a tube as shown at 51 in Figs. 12 to 15. In making this element a flat blank of sheet metal is stamped with suitable dies with the slots 35 and notch 48 cut therein. It is then rolled up to a tubular form and is mounted in the supporting member 17, the same as in the first form.

It will be apparent from the foregoing description that the device is of very simple construction with the supporting member 17 and the switch block 19 and associated elements all assembled as a unitary structure which may be mounted in a panel by merely inserting the member 17 in an opening in the panel, clamping the nuts 18 on opposite sides thereof, and then mounting the operating nut 49 on the projecting end of the operating member 32 or 51. Also this simple construction provides a toggle switch mechanism with its advantages of a quick make and break and wiping engagement between the contacts which are operated by turning movements of the operating member. It thus gives a toggle switch with a rotary control movement and gives it with a simpler mechanism than in the usual toggle switch mechanism. The device comprises a relatively small number of parts which can be easily assembled and may therefore be manufactured at relatively low cost. It is also to be observed that the axis of the operating members 32 or 51 are in the same plane with the axis of the oscillating member 37 through they are at right angles to each other. This simplifies the construction and permits the location of the switch mechanism back of the panel in its natural position while the knob 49 is at the front, and by a mere changing of the length of the sleeve 17 and members 32 and 51 the device is adapted for any thickness of panel desired.

Having thus set forth the nature of our invention, what we claim is:

1. In an electric switch, a supporting member, an insulating body member connected with said supporting member, a toggle switch carried by said body including a swinging switch member and a toggle mechanism for

operating it including a pivoted member, a rotary member mounted in the supporting member and accessible for operation at the outer end thereof and a permanent connection between the rotary member and each side of the pivoted member of the toggle mechanism to swing said member on its pivot for operating said mechanism by turning movements of the rotary member.

2. In an electric switch, a support, an insulating body member, means for securing the body to said support, stationary switch contacts carried by the body, a pivoted switch member carried by the body and movable to and from engagement with said contacts, a toggle mechanism for operating the switch member including a pivoted member, an operating member mounted for turning movements in the support, and an operative connection between said operating member and said pivoted member for operating said toggle mechanism, said operative connection including a slot in one of said members and an extension on the other member disposed in said slot.

3. In an electric switch, a tubular support, means for mounting the support in a panel, an insulating body member, means for mounting said body member on the inner end of the support, a toggle switch including a pivoted switch member carried by the body and toggle mechanism for operating it including a pivoted element carried by the support, an operating member mounted for turning movements in the support, means at the outer end of the support for turning the operating member and an operative connection from said member to the said pivoted element of the toggle mechanism.

4. In an electric switch, a tubular support, an insulating body member, means for mounting the body member at the inner end of the support, a pivoted switch member mounted in the body, a toggle mechanism for operating the switch including a member pivoted to the support, an operating member mounted for turning movements in the support, and means on the outer end of said member for operating it, said operating member being provided with a recess at its inner end and said toggle member having a portion in said recess whereby said toggle member is swung on its pivot by turning movements of the operating member.

5. In an electric switch, a tubular support, an insulating body member, means for mounting the body member on the inner end of said support, a movable switch member pivoted in the body member, an operating member pivoted in said support and connected with the switch member, a rotary member mounted in the support, an operative connection from the rotary member to the operating member, and means at the outer end of the rotary member for operating it.

6. In an electric switch, a tubular support, an insulating body member, means for mounting the body member on the inner end of said support, a movable switch member pivoted in the body member, a toggle member pivoted in the support and having a laterally extending lug, a compression spring connected with the switch member and the free end of the toggle member, an operating member mounted to turn in the support and having a notch in its inner end to receive said lug, and means at the outer end of the operating member for turning it.

7. In an electric switch, a body member of insulating material having a chamber extending from a wall thereof and provided with recesses on opposite sides of said chamber opening through said wall, a switch member having laterally extending pivots in said recesses, said body being also provided with a pair of spaced recesses leading from said wall and extending from said chamber to the outside of the body, contacts in said recesses having extensions forming stationary contacts in the chamber in position to be bridged by said switch member, means for securing leads to said contacts, an insulating plate secured against said wall to retain said pivots and the contacts in the recesses, and means for swinging the switch member on its pivots.

8. In an electric switch, spaced stationary contacts, a pivoted switch member movable to and from engagement with said contacts, a toggle mechanism for operating the switch member including a pivoted oscillating member, and an operating member connected to said oscillating member mounted to turn about an axis in the same plane as the pivoted axis of the oscillating member and at substantially right angles thereto.

9. In an electric switch, a pair of contacts, a switch element pivoted intermediate its ends, a member pivoted on an axis parallel with the axis of the switch element, and turnable means connected with said member, said means adapted for oscillating movement and limited in said movement by the pivot of the member, said member connected with said switch element, and said means adapted on being turned to move said switch element to one side or the other of the pivot of the switch element to open or close the switch.

10. In an electric switch, a pair of contacts, a switch element pivoted intermediate its ends, a member pivoted on an axis parallel with the axis of the switch element and loosely connected thereto, a tubular turnable means surrounding said member and loosely connected thereto whereby on turning movement of said means the member is rocked on its pivot to throw the switch element to one side or the other of the pivot of the switch element.

11. In an electric switch, a pair of contacts, a switch element pivoted intermediate

its ends, a member pivoted on an axis parallel with the axis of the switch element and loosely connected thereto, a turnable means surrounding said member and loosely connected thereto whereby on turning movement of said means the member is rocked on its pivot to throw the switch element to one side or the other of the pivot of the switch element, and said member having a lateral extension and the turnable means having a slot receiving said extension.

12. In an electric switch, spaced stationary contacts, a pivoted switch member movable to and from engagement with said contacts, a toggle mechanism for operating the switch member including a pivoted oscillating member, an operating member connected to said oscillating member mounted to turn about an axis in the same plane as the pivoted axis of the oscillating member and at substantially right angles thereto, and said operating member mounted for oscillating movement and limited in said movement by the pivot of the pivoted oscillating member.

13. In an electric switch, a support, means for mounting the support on a mounting, an insulating body member, means for securing the body to the support so that it is carried by the support, stationary switch contacts carried by the body, a pivoted switch member carried by the body and movable to and from engagement with said contacts, a toggle mechanism for operating the switch member including a pivoted member, an operating member mounted for turning movements in the support, and an operative connection between said operating member and said pivoted member for operating said toggle mechanism.

14. In an electric switch, a pair of contacts, a switch element pivoted intermediate its ends, a member pivoted on an axis parallel with the axis of the switch element and loosely connected thereto, a tubular turnable means surrounding said member, said means adapted for oscillating movement and limited in said movement by the pivot of the member, said means being loosely connected to the member whereby on turning movement of said means the member is rocked on its pivot to throw the switch element to one side or the other of the pivot of the switch element.

In testimony whereof we affix our signatures.

ARTHUR J. BLAKE.
FRANK J. TIFFANY.