

Oct. 7, 1969

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3,471,670

ELECTRICAL SWITCH

Filed Dec. 26, 1967

FIG. 1

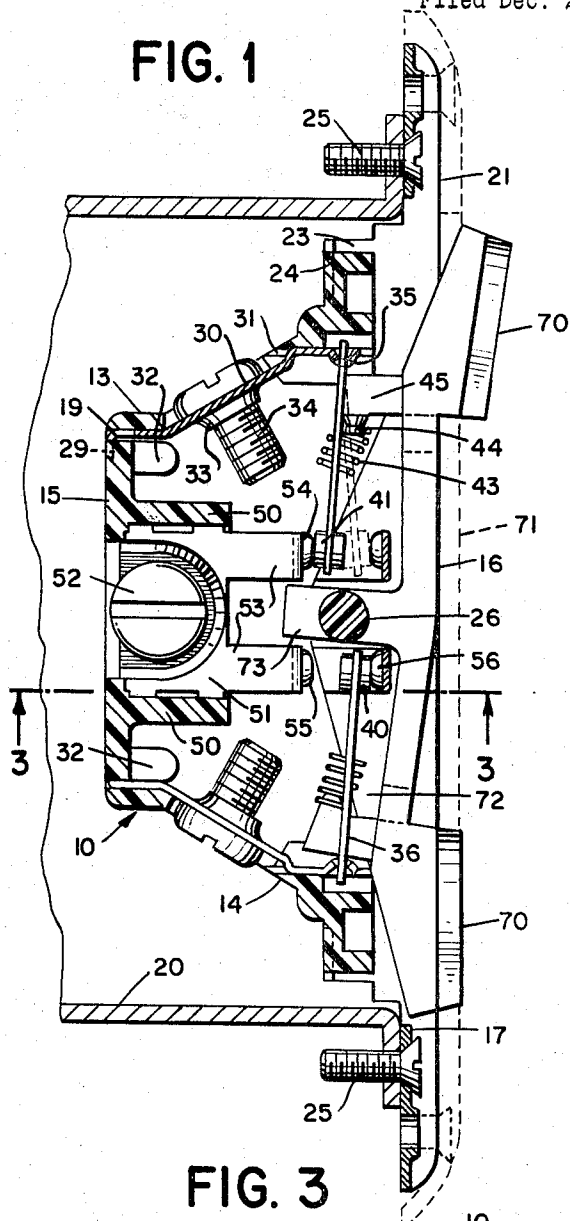


FIG. 2

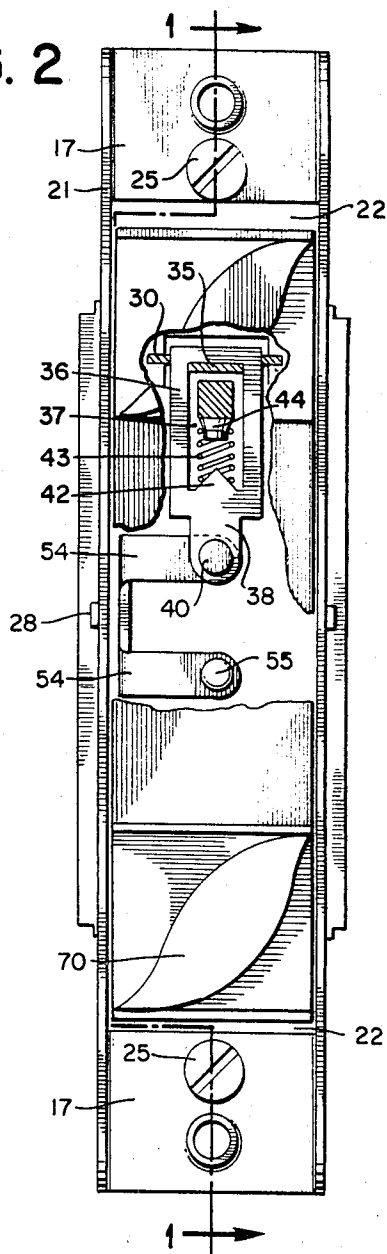
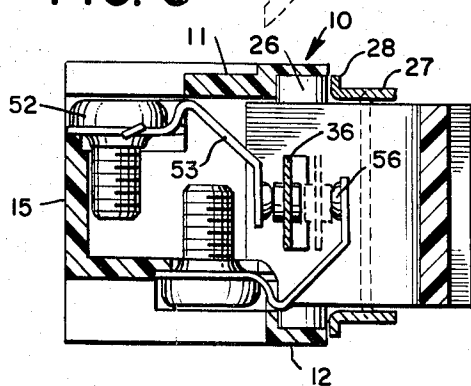


FIG. 3



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## ELECTRICAL SWITCH

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Filed Dec. 26, 1967, Ser. No. 693,264

Int. Cl. H01h 3/02

U.S. Cl. 200—172

11 Claims

### ABSTRACT OF THE DISCLOSURE

The device disclosed herein is an electrical switch of the type used in residential and industrial lighting circuits. Particularly, the disclosure sets forth a switch which is designed to have a decorative appearance, with a rocker handle actuating the switch, the handle being capable of being formed in any one of a number of geometric shapes, and being positioned so that the ends thereof are substantially flush with a wall escutcheon plate. The rocker arm is of a considerable length and the movement thereof necessarily small despite which due to the arrangement of the parts and use of a toggle arrangement, the switch is simple and positive in action. Also, the handle is so constructed that it serves as a cover for the moulded, electrically insulating, five-sided box containing the operating parts.

At the present time there are on the market a number of switches of the general type herein disclosed and which are designated "touch" switches because of the fact that the switches are operable by a slight touch requiring no considerable pressure to move the operating member from its "off" to its "on" position, or vice versa, and that the movement is through a very slight angle, leaving the operating member or handle substantially flush with the wall plate at all times. However, most of these switches are structurally complex and are frequently correspondingly unreliable. The switch of the present invention, on the other hand, is simple in construction, reliable, and positive in action. It is furthermore, adapted for use either as a single-pole switch, a three-way switch or a four-way switch.

Not only is the switch thus preferable to those of the prior art from a structural viewpoint, but it is also desirable from the viewpoint of aesthetic values, in that the operating member in the form of a pivoted lever terminates in operating buttons which may be of any desired shape, corresponding with the shape of openings in the wall or escutcheon plate supplied with the switch. Thus, pleasing designs of the wall plate and switch "buttons" are readily made and variations of the design are possible without materially altering the switch construction.

Although major features of the switch of my present invention are indicated hereinabove, other features will become apparent when the following description is considered in connection with the appended drawings, in which:

FIGURE 1 is a vertical cross-sectional view taken on the plane of the line 1—1 of FIGURE 2 showing the switch of my invention installed in the usual outlet box, with the wall or escutcheon plate being indicated in dotted lines;

FIGURE 2 is a front elevational view showing the switch of my invention, the cover plate being removed and portions of the operating handle and fixed contacts being omitted in order to more clearly show the construction of the toggle portion of the switch, and

FIGURE 3 is a horizontal cross-sectional view taken on the plane of the line 3—3, showing particularly the arrangement of the terminal screws and contact members.

Referring now to the drawings, the switch of my inven-

tion comprises a housing generally designated 10, which housing is open at the top and has the side walls 11 and 12, end walls 13 and 14, and a rear wall 15.

The housing is closed at the front by means of the switch operating member or rocker handle 16, which handle is pivotally mounted in the side walls 11 and 12 in a manner which will shortly appear. A mounting strap 17 is provided, which serves in the usual manner to mount the switch in an outlet box 20 in the manner which is indicated in FIGURE 1.

As is seen particularly in FIGURES 2 and 3, the mounting strap 17 is a narrow metallic strap having turned-up flanges 21 at either side edge thereof and having a large central opening 22 in which the operating handle 16 may move. Bent off rearwardly and inwardly from the strap 17 at each end, is a portion 23 which may be bent behind the wall portion 24 of the corresponding end wall 13 or 14 of housing 10, and may for example have a T end which enters a depression in the wall portion 24 as indicated in FIGURE 1, thus holding the strap to the housing.

The strap is, in the usual manner, provided with apertures at the ends thereof by means of which through the use of screws such as those indicated at 25, the strap and wiring device mounted thereon may be fixed to the outlet box 20.

As seen particularly in FIGURES 1 and 3, the operating member 16 is provided with laterally extending stub shafts 26, which shafts are journaled in notches formed in the side walls 11 and 12, thus mounting the operating handle 16 for pivotal movement. Bent off from the strap 17 midway of each side of the opening 22, is a rearwardly extending flange 27 having a laterally extending termination 28. These lateral terminations of the flange portions 27 overlie the stub shafts 26 and thus hold the operating member in position.

Mounted in each end wall 13 and 14 of the housing is a terminal strip 30, which terminal strip is held in position by means of slots 31 in the side walls 11 and 12, and by being inserted in a space between the end wall and an upwardly extending rib 32 formed on the rear wall 15. As clearly shown in the drawings, the end walls are formed with openings providing access to a screw threaded in the terminal strip 30, thus forming a connection for an external conductor which is, in the usual manner, wrapped about the screw under the head thereof and held against the terminal strip as the screw is tightened. The terminal 30 is held in position by bending a portion 19 of the rim thereof into a recess 29 formed in the rear wall 15 beneath the rib 32. In the customary manner, the terminal strip 30 is punched out to form a rim portion 33, in order to provide sufficient thread for securely holding the screw 34.

At its upper end, the terminal strip 30 is provided with a centrally located hook portion 35, which portion forms the pivotal mounting for a toggle and contact-carrying member 36.

As clearly seen in FIGURE 2, the contact member 36 is generally rectangular in shape, having a central rectangular opening 37 and having also an extension 38 carrying a contact 40 on one side and contact 41 on the opposite. In addition, the member 36 has a pointed internal tongue 42 which enters the end of and holds a compression spring 43 which extends between the contact member 36 and the right angle extension portion 44 of a rearward extension 45 of the handle member 16.

As will readily be seen, the arrangement just above described constitutes a toggle so that when handle 16 is in one of its operative positions, the spring 43 urges the upper contact member 36 rearwardly or to the left, as seen in FIGURE 1, whereas when the handle member

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is operated into its alternate position, the spring 43 urges that contact member forwardly or to the right.

Mounted in oppositely facing grooves formed in ribs 50 is a terminal member 51. This terminal member is provided with a threaded aperture at the lower end thereof, into which a screw 52 is threaded, which screw is accessible through an opening in the side wall 11, so that a conductor may be connected to the terminal strip 50.

The terminal strip 51 is provided with two forwardly extending portions 53, which are in turn bent at right angles to form the inwardly extending portions 54. Each of the portions 54 carries adjacent the end thereof, a contact 55, the contacts being positioned to engage with the movable contacts 41.

The terminal member just described is mounted in the side wall 11. An exactly similar member is mounted in the side wall 12, the access opening being placed forward of that just described and the contacts being designated 56 and being carried on the rearward faces of portions 54.

The operating handle member 16 is preferably formed with the two outwardly extending button-like portions 70 which extend through correspondingly shaped openings in the wall plate 71. Also, the switch member may be provided with integrally extending flanges 72 as shown particularly in FIGURE 1 and if desired, with rearwardly extending flanges adjacent the end walls of the housing to thus substantially completely close the gap between the insulating housing and the insulating handle or operating member.

As clearly seen in FIGURE 1, the operating member stub shafts 26 are carried by a rearwardly extending projection 73 which extends beyond the shafts and forms a separation between the two halves of the housing, thus providing an arc shield between the two sets of contacts.

It will be noted that the switch arrangement is such that when contact 41 on the upper movable contact member 38 is in engagement with one of the contacts 55, i.e., when the rocker handle has been oscillated in a clockwise direction as seen in FIGURE 1, contact 40 of the lower movable contact member 38 is in engagement with the cooperating contact 56 and that the reverse is also true, namely that when the lower movable contact 41 is in contact with the contact 55, the upper movable contact 40 is in contact with the contact 56.

It will be appreciated by those skilled in the art that the switch above described constitutes a four-way switch which may be adapted for use as a simple single-pole, single-throw switch (by omission of all of the contact members, save for a single contact button 56 and a single movable contact 40 and the addition of an insulating stop for portion 38 of member 36), or as a three-way switch (by omission of one of the movable contact members 36 and the cooperating contacts 55 and 56). When the components discussed above are omitted to simplify the switch, either to serve the purpose of a three-way switch, or that of a single-pole, single-throw, it will be understood that the terminal members not necessary for the particular usage may be supplied or may be omitted and that if omitted, the openings will be closed by the use of insulating strips or the like.

As has been discussed hereinabove, the switch of this invention provides a "touch" switch which despite movement of the operating handle thereof through a very small angle, yields a positive switch action while at the same time providing a compact structure which does not occupy undue space in the outlet box. Heretofore, switches having a decorative effect which is possible with such a "touch" switch have been both bulky and complicated and as a result, not only more difficult to wire in an outlet box, but likewise more expensive.

Moreover, the switch arrangement eliminates the usual housing cover since the operating handle serves also as a cover. The operating handle also is adapted to have "buttons" shaped as is desired even to the extent that the entire face of the operating member or handle may be

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exposed to constitute a pair of buttons comprising rectangles joined together along a common side with their surfaces at a slight angle to each other.

Although I have described a preferred form of my invention, it will be understood that many other forms are possible. I wish therefore to be limited not by the foregoing description, but solely by the claims granted to me.

What is claimed is:

1. In an electrical switch, in combination, a housing having a rear wall, a pair of side walls and a pair of end walls, fixed contacts in said housing, movable contacts also within said housing, a unitary operating member for moving said movable contacts into and out of engagement with said fixed contacts, said operating member constituting a sixth side of said housing and closing said housing, and means mounting said operating member for pivotal movement relative to said housing.

2. An electrical switch as claimed in claim 1 wherein said operating member has rearwardly extending flanges terminating within said housing, said flanges substantially closing the gap between said housing and said operating member.

3. An electrical switch as claimed in claim 1 wherein said means mounting said operating member comprises an integral rearwardly extending projection of substantially the width of said housing, said projection having stub shafts at the sides thereof and said housing sides having recesses receiving said shafts and wherein said projection extends substantially into said housing, effectively dividing said housing into two parts electrically isolated from each other.

4. A switch as claimed in claim 1 wherein said operating member has shaped projections on the face thereof, said projections being adapted to extend through correspondingly shaped openings in a wall plate.

5. An electrical switch as claimed in claim 1 wherein there is at least one toggle member mounted in said housing, said toggle member lying in a plane generally parallel to said operating member and at one side of the transverse center line thereof, oppositely facing projections on said toggle member and said operating members, said projections extending generally parallel to said operating member and being in alignment when said toggle member and operating members are in their central position of oscillation, a spring extending between said projections urging said operating and toggle members into corresponding end positions due to over-center action of said spring, a first contact carried by said toggle member, means for connecting an external circuit conductor to said contact, a second contact mounted in fixed position in the path of movement of said first contact and means for connecting an external conductor to said second contact.

6. A switch as claimed in claim 5 wherein a third contact is fixed in said housing in the path of movement of said first contact on the side opposite said second contact.

7. A switch as claimed in claim 5 having a mounting strap with a central opening corresponding to said open housing front, said strap being fixed to said housing at opposite ends thereof, said strap having rearwardly extending flange portions, said pivotal mounting for said operating member comprising laterally extending shafts on said operating member and slots in thickened side wall portions of said housing receiving said shafts, said rearwardly extending strap flanges seating against said shafts and holding said operating members in position, said operating member extending through a central strap aperture.

8. A switch as claimed in claim 5 wherein a toggle member and associated projections, spring, toggle contact and fixed contacts are provided at each side of the center of said operating member.

9. A switch as claimed in claim 8 wherein said second contacts are mounted on a common terminal strip and

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fixed third contacts are also mounted on a common terminal strip positioned in said housing walls.

10. A switch as claimed in claim 8 wherein one of said movable contacts engages the corresponding one of said fixed second contacts when the other of said movable contacts engages the corresponding one of said fixed third contacts.

11. An electrical switch as claimed in claim 8, wherein said means mounting said operating member comprises an integral rearwardly extending projection of substantially the width of said housing, said projection extending centrally of said operating member and projecting into said housing by substantial distance effectively dividing said housing into two electrically isolated parts, each

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said isolated part containing one of said toggle members, projections, toggle movable contacts and fixed contacts.

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U.S. Cl. X.R.

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