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R. S. EDWARDS

2,169,996

PUSH-BUTTON SWITCH CONSTRUCTION

Filed June 19, 1937

Fig. 1.

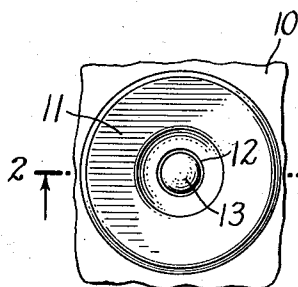


Fig. 2.

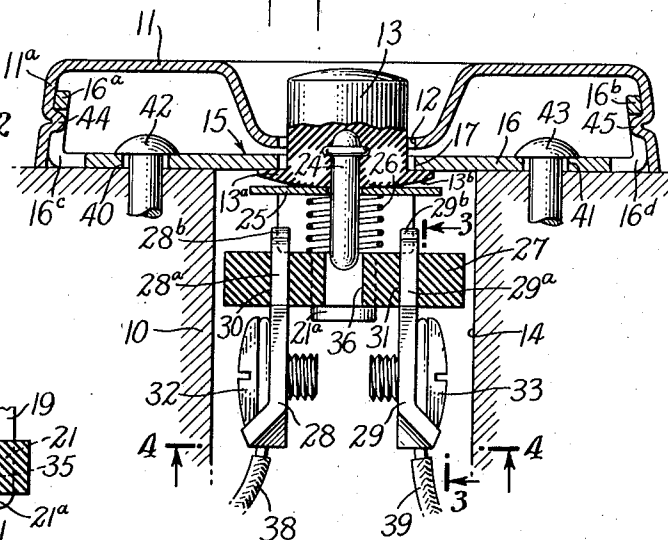


Fig. 3.

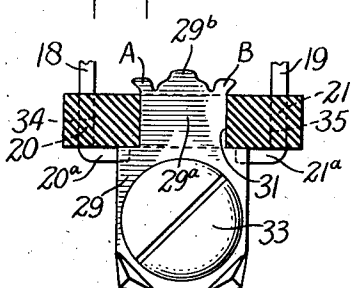


Fig. 6.

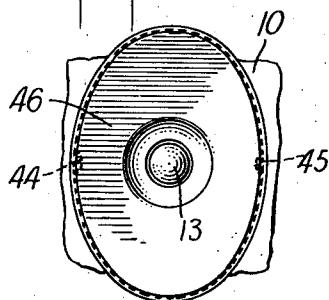


Fig. 4.

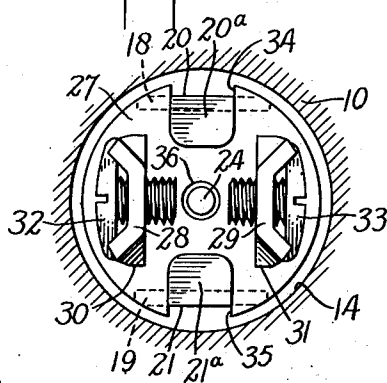
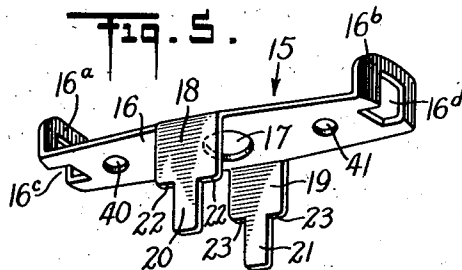


Fig. 5.



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PUSH-BUTTON SWITCH CONSTRUCTION

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3 Claims. (Cl. 200—159)

This invention relates to push button switch construction.

One of the objects of this invention is to provide a push button switch construction that will be small, compact and durable, simple in construction, inexpensive to manufacture and easy to install. Another object is to provide a push button switch construction that will eliminate certain disadvantages inherent in constructions heretofore known and used. Another object is to provide a construction of the above-mentioned character that will be of dependable mechanical and electrical action, strong, though compact, and which when installed will insure neatness of appearance and snugness and nicety of interfitting with the supporting surface in connection with which it is employed.

Another object is to provide a push button switch construction the component parts of which are of inexpensive manufacture and are capable of speedy, simple and inexpensive assembly. Another object is to provide a push button switch construction which will dependably lend itself to wide variation in change of front plate or other device provided for ornamentation or niceness of appearance while maintaining standardization of structure and manufacture of the remaining parts of the construction. Another object is to provide a push button switch subassembly capable of standardization of manufacture and capable of ease of installation and capable of having related thereto any one of a variety of different forms or shapes of cover plates or other outer ornamental escutcheon or the like. Another object is to provide a push button switch construction by which the bulkiness of structure and appearance of devices as heretofore known and used may be dependably and inexpensively avoided. Another object is generally to provide an improved push button switch construction. Other objects will be in part obvious or in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements, and arrangements of parts as will be exemplified in the structure to be hereinafter described and the scope of the application of which will be indicated in the following claims.

In the accompanying drawing in which is shown one of various possible embodiments of my invention,

Figure 1 is a front elevation of a push button switch construction as it appears installed;

Figure 2 is a transverse sectional view on an

enlarged scale, as seen along the line 2—2 of Figure 1;

Figure 3 is a fragmentary detached sectional view as seen along the line 3—3 of Figure 2;

Figure 4 is a bottom plan view as seen along the line 4—4 of Figure 2;

Figure 5 is a perspective view of a part of the construction shown detached and prior to assembly, and

Figure 6 is a view like that of Figure 1, showing the structure in relation to a different form or shape of front plate.

Similar reference characters refer to similar parts throughout the several views in the drawing.

Referring first to Figures 1 and 2, there is indicated at 10 a wall, or the like, such as a portion of a door frame, to which the push button switch construction is to be related and the construction preferably is such that what is exposed to view comprises an outer or cover plate 11 provided with an aperture 12 through which projects a push button 13 for manual actuation, and as is later pointed out, the cover plate 11, though preferably of small dimension in a direction at right angles to the face of the wall 10, may be of varied configuration or shape and that the remaining parts of the construction permit ready adaptation thereto of any other suitable shape or configuration of cover plate.

The switch structure is preferably of such form that it is contained within a hole 14 (Figures 2 and 4) that is bored into the wall 10 and is of less expanse than the cover plate 11. This structure preferably comprises a main supporting member generally indicated by the reference character 15 and better shown in perspective in Figure 5, being made of sheet metal and preferably constructed to be easily stamped.

Thus, the member 15 has a central generally rectangular main part 16 which at its center has a round hole 17 and which to either side of the hole 17 has two depending arms 18 and 19 whose lowermost ends are of lesser width to provide lugs or ears 20 and 21, respectively, leaving preferably squared-off shoulders 22 and 23, as shown in Figure 5.

Into the hole 17 and from the under side of the part 16, as viewed in Figures 2 and 5, is inserted the push button 13 which is flanged as at 13^a, thus to limit the extent of upward movement of the button 13 by engagement of the flange with the under side of the part 16. The button 13 is preferably round, as is also the hole 17, and depending centrally from the button 13 is a stud or pin 24; the button 13 is preferably

made of a moldable material like Bakelite, and the stud 24 may be secured thereto as by having its upper end suitably configured and anchored therein during the molding of the button 13.

5 Onto the pin 24 is strung a metal disk 25 appropriately apertured to receive the pin 24, and the member 25 may conveniently be a washer of a good electrically conductive metal, such as copper or bronze, and underneath the washer 25
10 and extending about the pin 24 is a helical spring 26 which tends normally to elongate.

With the just described parts assembled or related to the member 15, in the illustrative manner above described, the depending arms 18, 19
15 of the supporting member 15 are now ready to have related to them a sub-assembly which preferably comprises a supporting member 27 and combined connecting and contact members 28 and 29. Of this sub-assembly supporting member 27 is preferably made of insulating material,
20 such as fiber, or the like, and conveniently is in the form of a disk, being constructed so as to be easily stamped. Thus at opposed points, preferably along a diameter, the member 27 is
25 given rectangular holes 30 and 31 for snugly, and preferably with a press-fit, receiving the shank portions 28^a and 29^a, respectively, of the contact-connector members 28 and 29, shoulders of the latter, as is better shown in Figure 3, tak-
30 ing against the under side of the member 27. The parts 28, 29 are preferably made of brass, bronze, or the like, and preferably also are stampings and preferably identical in shape and form. At their lower ends they have threaded open-
35 ings for receiving binding screws 32 and 33, respectively, by which the conductors may be electrically and mechanically engaged and connected.

The shank portions are of a length sufficient
40 to project beyond the upper surface of the member 27, and they are anchored to the latter in any suitable way. Illustratively and preferably, they may be held against movement out of their respective holes as by expanding the metal of
45 the upper ends of the shank portions, as is better shown in Figure 3. Any suitable instrument may be employed, preferably a two-prong instrument, which, when forced downwardly, forces or spreads the metal laterally, as at A and B,
50 thus dependably and tightly anchoring the part in the member 27, and leaving protruding upwardly a central part 29^b for member 29 and 28^b for member 28 which, as will later appear, serve as contact members for coaction with the
55 conductive bridging member or washer 25 of Figure 2.

The member 27 is apertured or slotted at opposed and preferably diametrically opposed points, as at 34 and 35 (Figure 4) to accommo-
60 date therein, when the sub-assembly 27—28—29 is moved upwardly, the ears or lugs 20 and 21, respectively, of the supporting member 15 of Figure 5, the upper face of the member 27 coming to rest against the shoulders 22 and 23 of the depending arms 18—19 which are thus effective to aline the insulating support 27 with re-
65 spect to the main portion 16 of the member 15, preferably in parallelism with it, and thus position it at right angles to the axis along which the push button 13 is to move; the ears or lugs 20, 21 are of sufficient length so that they may be bent inwardly and upwardly against the under face of the member 27, as at 20^a and 21^a,
70 respectively, of Figure 3, thus clamping the mem-

ber 27 rigidly and solidly against shoulders 22, 23 of the depending arms 18—19.

In the course of the above-described assembly of the member 27 to the frame-like support 15, a central hole 36 in the member 27 becomes alined
5 with the lower end of the pin 24 (see Figure 2) which enters the hole, the lower end of spring 26 abutting against the upper face of the member 27 and the spring thereafter acting to hold the bridging member 25 with the button 13 and
10 its guiding pin 24 in uppermost position, as shown in Figure 2, movement of the push button 13 being thereafter guided by coaction between pin 24 and hole 36 and the upper cylindrical portion of the button 13 and the hole 17
15 in the member 16. Downward movement of the button 13 against the axis of spring 26 brings the bridging member 25 into engagement with the contact portions 28^b and 29^b of the contact-connector members 28 and 29, respectively, thus
20 to close the circuit in which these members are connected by their respective binding screws. Preferably, member 25 is springy and the under face 13^b of button 13 convex so that the former may adjust itself to and, in engaging them, bend
25 and scrape against the two contacts 28^b and 29^b, assuring a self-cleaning action.

In installing the switch construction, the hole 14 is drilled in the part or wall 10 and the sub-assembly comprising the member 15 with the
30 parts carried by it, namely, the sub-assembly 27—28—29, and the push button with the spring and washer, are related to the wall structure after the conductors 38—39, which are first drawn out through the hole 14 for that purpose, are
35 connected to the members 28 and 29, respectively; the parts of the structure below the plane of the under face of the portion 16 of the member 14 are entered into the hole 14, to bring the outer end portions of the part 16 flush against
40 the outer face of the wall 10. These portions are appropriately apertured, as at 40 and 41, whereby screws or nails 42, 43 (Figure 2) may be used to secure the construction against movement away from the wall or out of the hole 14.
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The extreme ends of the cross-piece 16 are turned upwardly as at 16^a and 16^b (Figures 1 and 5) and also apertured as at 16^c and 16^d, the apertures being thus exposed to the left and right, as viewed in Figures 2 and 5, for coaction
50 with the cover plate, or member 11.

The latter, as above noted, is preferably of sheet metal and is peripherally flanged as at 11^a (Figure 2) and at appropriate opposed points the flange 11^a is upset or pressed inwardly or
55 otherwise deformed or provided with inwardly directed projections 44 and 45 which are shaped or dimensioned to take into the apertures 16^c and 16^d, respectively. These protrusions are preferably curved or cam-shaped, as indicated in
60 Figure 2, and the coaction therebetween and the upturned end portions of the member 15 is, by reason of the resiliency of the upturned portions of the member 16 or the resiliency of the flange 11^a, or both, a yielding one, permitting the shal-
65 low cover plate 11 to be snapped into assembly, as shown in Figure 1, or to be pryed off if desired and thus easily assembled or disassembled with respect to the switch structure.

The preferred cam shape of the protrusions 44
70 and 45 in coaction with the yieldability or spring action of the part or parts preferably is such that the member 11 is drawn downwardly, as viewed in Figure 1, against the face of the wall 10 and thus the peripheral edge portions of the flange
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11 are made snugly to hug the face of the wall.

In the illustrative form shown in Figure 1, the cover plate or escutcheon 11 is circular in shape, but it may be given any other desired or suitable configuration or outline and, so long as provided with appropriate parts for coaction with the end portions of the member 16 may be assembled or disassembled in the manner above-described. For example, the cover plate may be oval in outline, as indicated at 46 in Figure 6; appropriately provided with inward protrusions 44 and 45 member 46 may be related to the switch structure and wall 10 in the manner already above described. Thus, it will be seen that there has been provided in this invention a construction in which the various objects together with many advantages are successfully achieved. For example, it will be seen that a single sub-assembly or switch structure may be manufactured as a standard in combination with as large a variety of different shapes or outlines of cover plates as may be desired, assembly of any one of the latter to the former being easily and quickly achieved. Furthermore, it will be seen that the portions of the structure that are exposed outwardly of the front face of the wall 10 may be made unobtrusive in appearance and may, as in the illustrative form of Figure 2, be constructed quite shallow, leaving the face of the wall free from ugly or bulky and protruding parts, shells, or casings, such as are common in constructions heretofore employed. Furthermore, the construction will be seen to be thoroughly practical and well adapted to meet the varying conditions of hard practical use.

As many possible embodiments may be made of the above invention and as many changes might be made in the embodiment above set forth, it is to be understood that all matter hereinbefore set forth or shown in the accompanying drawing, is to be interpreted as illustrative and not in a limiting sense.

I claim:

1. A push button switch construction for assembly to a wall or the like comprising two parts, one of which is a unitary sub-assembly that comprises a substantially flat sheet metal member having a central portion to take over a hole in the wall and opposed end portions to rest against the face of said wall on opposite sides of said hole, said central portion having an aperture, said member having depending from its central portion, so as to be received within said hole, opposed supporting parts provided at their lower ends with deformable lugs, an insulating member carrying connector-contact means having the connector elements thereof exposed at the under face of said insulating member and the contact elements thereof exposed at the upper face, said insulating member having means coacting with said lugs for holding it assembled to said depending supporting parts, a spring-opposed push button structure having a button projecting upwardly through the aperture in said central portion and flange means to engage against the under face of the latter to limit upward movement of said button and having conductive means

adapted upon movement of said button to engage said contact elements, whereby said sub-assembly, as a unit, may be assembled to the wall to bring said depending supporting parts and the parts carried thereby into said hole and to bring said opposed end portions of said sheet metal member against the face of said wall on opposite sides of said hole, said opposed end portions having aperture means for securing said sub-assembly, as by screws, in position on said wall, and the other of said two parts comprising an apertured cover plate having a peripheral flange to engage the wall surface about said hole and an aperture through which said button is exposed there-through, whereby said cover plate covers over said sub-assembly and said screws, excepting said button, said flange and said opposed end portions of said sheet metal member having means for detachably interengaging and thereby holding said cover plate in position.

2. A construction as claimed in claim 1 in which said depending supporting parts comprise lateral extensions of the central portion of said sheet metal member and are bent downwardly into substantial parallelism to be received within the wall in said hole and to bring their respective lugs into coacting relationship with said insulating member.

3. A push button switch construction for assembly to a wall or the like comprising two parts one of which is a unitary sub-assembly that comprises a supporting frame to bridge across a hole in the said wall and thereby bring opposed portions of said frame to rest against the face of said wall on opposite sides of said hole, said frame having a central opening with depending means that enter into said hole, said depending means supporting insulating means carrying connector-contact means having the connector elements thereof exposed at the under side for connection with conductors in said hole, there being circuit-closing means coacting with said connector-contact means including a spring opposed push button having a portion projecting upwardly through said opening in said frame and having means for preventing it from passing through said opening, whereby said sub-assembly may be assembled to said wall with said supporting frame resting against the face of the latter and said push button projecting outwardly therefrom, those portions of said frame resting against said wall face having means for securing said sub-assembly to said wall, and the other of said two parts comprising a cover plate of an expanse sufficient to cover over said supporting frame and said securing means and having an opening substantially registering with said first-mentioned opening to expose said push button externally of said cover plate, said supporting frame and said cover plate having interengaging means for holding the cover plate assembled to said supporting frame, whereby said cover plate can be assembled after installation of said sub-assembly.

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CERTIFICATE OF CORRECTION.

Patent No. 2,169,996.

August 22, 1939.

ROBERT S. EDWARDS.

It is hereby certified that error appears in the above numbered patent requiring correction as follows: In the grant, line 3, and in the heading to the printed specification, line 5, for "a corporation of Connecticut" read a corporation of New York, as shown by the record of assignments in this office; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 26th day of September, A. D. 1939.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents.