

Sept. 12, 1944.

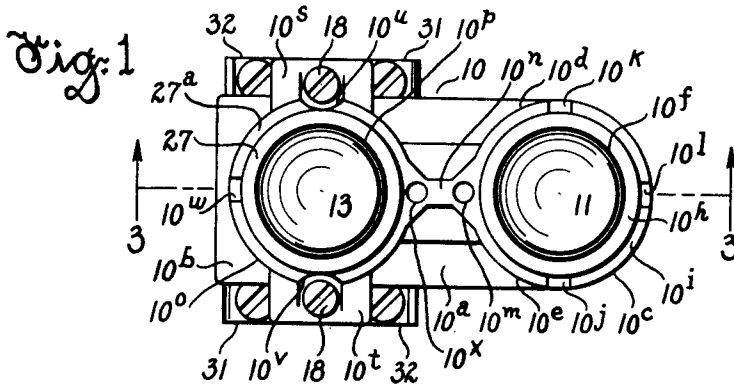
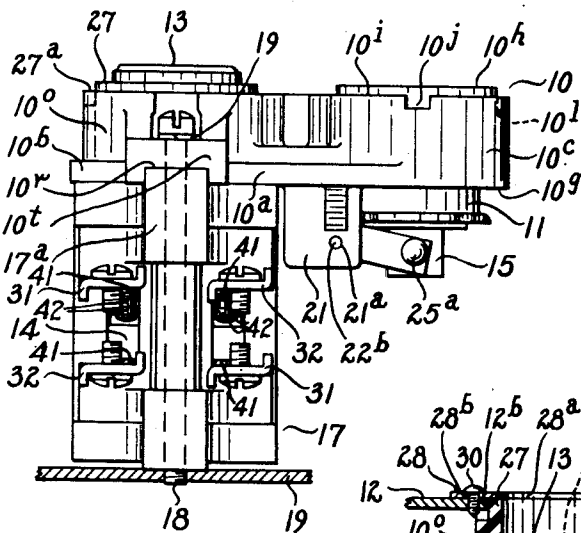
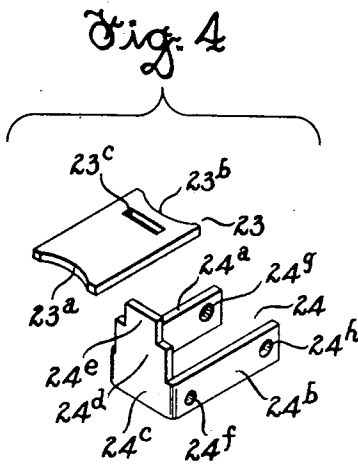
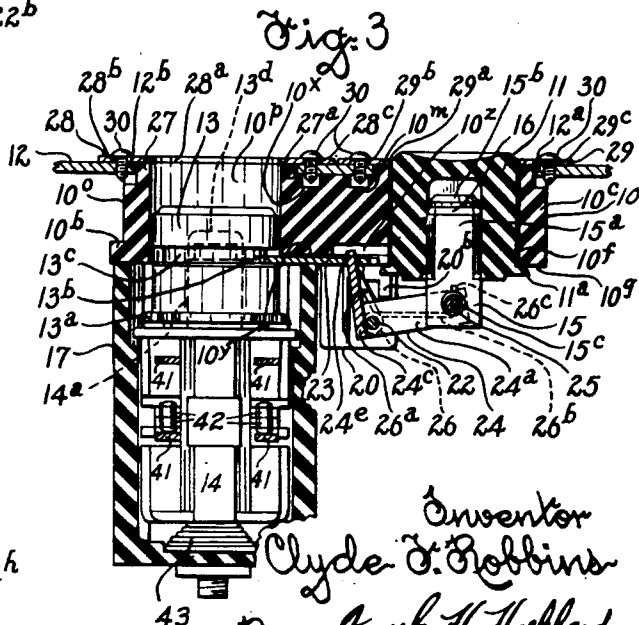
C. F. ROBBINS

2,357,972

ELECTRIC SWITCH

Filed Aug. 1, 1942

2 Sheets-Sheet 1



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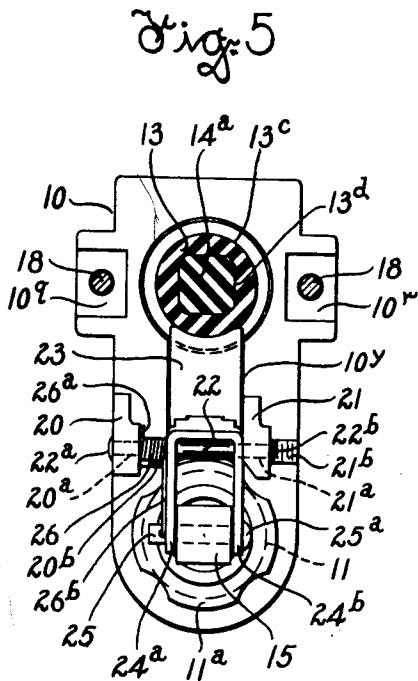
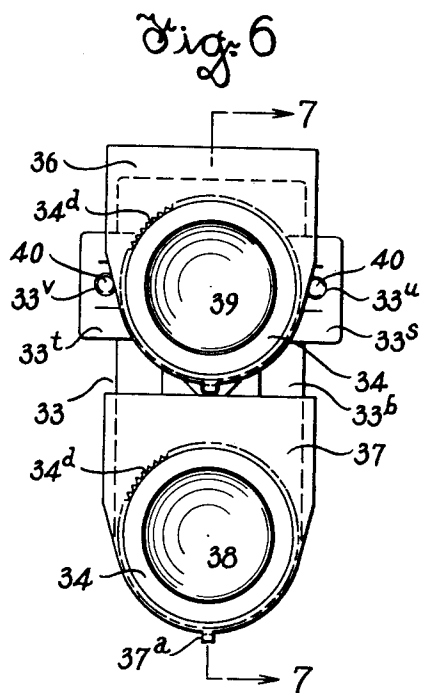
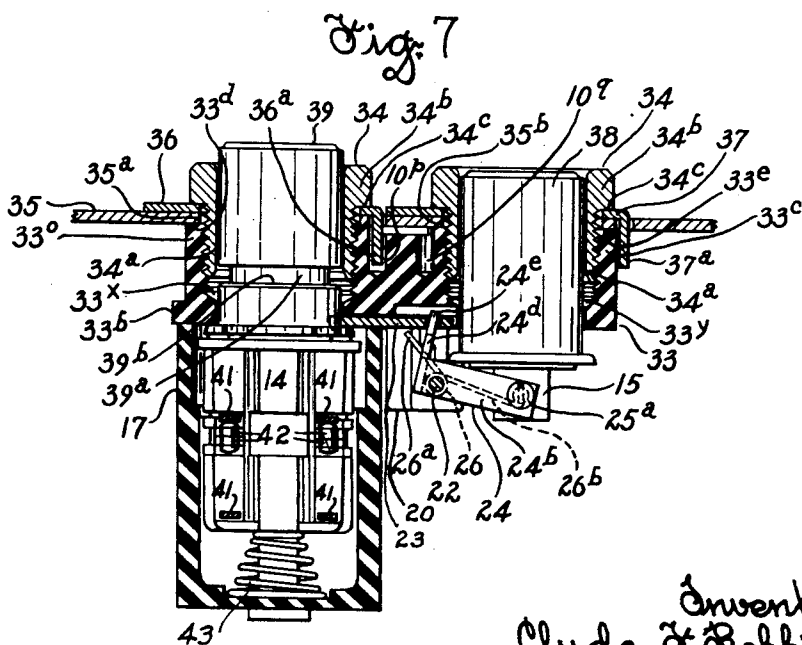
C. F. ROBBINS

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,357,972

ELECTRIC SWITCH

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Application August 1, 1942, Serial No. 453,221

12 Claims. (Cl. 200—5)

This invention relates to improvements in electric switches. The invention relates more particularly to a combined latching and releasing attachment for a pushbutton switch of the reciprocating contactor type.

A primary object of the invention is to provide a combined latching and releasing device attachable as a unit to a pushbutton switch of known form, to thereby provide a two-button switch unit of the character herein contemplated.

Another object is to provide an insulation dead-front for a two-button, latched switch mechanism of the aforementioned character.

Another object is to provide a two-button switch mechanism of the aforementioned character affording a predetermined standard spacing of the pushbuttons, to provide for interchangeability thereof with other pushbutton switch mechanisms in a preformed mounting panel or casing.

Another object is to provide two-button, latched switch mechanisms adapted for either base mounting or so-called "one-hole" mounting.

Another object is to provide for substitution of the latching attachment herein contemplated for the usual adapter member of the pushbutton switch.

Another object is to provide for rigid securement of the latching attachment to the insulating base of the switch by use of the mounting screws usually employed with the latter.

Another object is to provide an extremely simple form of latch and a correspondingly simple form of bell-crank operating lever interposed between the same and the added pushbutton.

Another object is to provide a novel form of latch mechanism which acts to retain one or the other of the pushbuttons in depressed position to properly indicate the condition of the circuit or circuits controlled by the switch.

Other objects and advantages of the invention will hereinafter appear.

The accompanying drawings illustrate certain embodiments of the invention which will now be described, it being understood that the embodiments illustrated are susceptible of modification in respect of certain structural details thereof without departing from the spirit of my invention or the scope of the appended claims.

In the drawings, Figure 1 is a top plan view of a base mounted pushbutton switch having my improved latching and releasing attachment associated therewith.

Fig. 2 is a side elevational view of the switch mechanism shown in Fig. 1, the pushbutton

switch being shown in its upper or unlatched position, and a fragment of the panel, to which the unit is base mounted, being shown in section.

Fig. 3 is a sectional view, on the line 3—3 of Fig. 1, but showing the pushbutton switch in its "latched down" position; and indicating plates being shown attached to the front panel or cover member.

Fig. 4 is a detail perspective view, in separated relation, of the slidable latch member and the bell-crank operating lever to be associated therewith.

Fig. 5 is a bottom plan view of the device shown in Figs. 1 to 4, the switch pushbutton and the securing screws being shown in section, and the insulating base and its associated parts being omitted for purposes of illustration, the parts of the device being shown in the relative positions thereof illustrated in Fig. 3.

Fig. 6 is a top plan view of a device quite similar to that shown in Figs. 1 to 5, but modified to provide the so-called "one-hole" type of mounting for the unit, a pair of indicating or legend plates being shown in assembled position, the wiring terminals being omitted, and

Fig. 7 is a sectional view, on the line 7—7 of Fig. 6.

Referring first to that form of my invention shown in Figs. 1 to 5, the numeral 10 designates a member molded from a suitable insulating material, the same preferably being hot molded from a material such as "Bakelite." Member 10 includes a relatively thin, flat portion 10^a, which is of substantially rectangular contour at one end 10^b, and at its other end merges into the substantially cylindrical upward extension 10^c, as shown at 10^d, 10^e (Figs. 1 and 2). Extension 10^c is provided with a passage therethrough of circular form in transverse cross section, as shown at 10^f (Figs. 1 and 3) to provide reciprocating clearance for the cylindrical pushbutton 11, the latter being provided adjacent its lower end with a peripheral flange 11^a, which is adapted to engage the flat lower face 10^g of member 10 to limit the degree of upward movement of pushbutton 11.

Extension 10^c is preferably provided at its upper end with a relatively short cylindrical portion 10^h, of reduced diameter, which is adapted to fit into a circular opening 12^a of corresponding size within a front panel or cover member 12, so that the upper end of portion 10^h is substantially flush with the outer surface of panel 12, as shown in Fig. 3; the substantially annular shoulder 10ⁱ (Figs. 1 and 2) being adapted to seat against, or being engaged by, the inner surface of panel 12.

Said annular shoulder 10¹ is preferably provided with a pair of diametrically opposed notches or recesses 10¹ and 10¹; and a notch 10¹ at one end of member 10, and spaced at an angle of ninety degrees from the notches 10¹, 10¹ (Figs. 1 to 3). Shoulder 10¹ is also preferably provided at a point diametrically opposite to notch 10¹ with a relatively small substantially cylindrical recess 10^m, the functions of recess 10^m and of notches 10¹, 10¹ and 10¹ being hereinafter described.

Recess 10^m is in part located within a rib or diaphragm 10ⁿ extending upwardly from the flat portion 10^a to the plane of shoulder 10¹, which diaphragm is likewise integral with another cylindrical extension 10^o, which is of the same height as, and parallel with, extension 10^c. Extension 10^o is provided with a passage 10^p of circular form in transverse cross section to provide reciprocating clearance for the pushbutton 13. Pushbutton 13 is provided adjacent to its lower end with a peripheral flange portion 13^a, which corresponds with the flange 11^a of pushbutton 11; and pushbutton 13 may be identical in other respects with pushbutton 11, except that pushbutton 13 is provided at a predetermined point in its length with an upwardly facing shoulder 13^b (Fig. 3), which is preferably provided by an annular groove 13^c milled or otherwise formed in the periphery of pushbutton 13. The pushbuttons 11 and 13 are of the same form and dimensions as the pushbuttons of normal length employed with base mounted switches of the character disclosed in my prior application, Serial No. 449,756, filed July 4, 1942. Thus pushbutton 13 is provided with a recess 13^d (Figs. 3 and 5) to accommodate the extension 14^a formed upon the contactor-carrying plunger 14 (see Fig. 3), extension 14^a being formed to accommodate the spring ring shown in dotted lines at 40 to provide a frictional connection between said parts. Similarly, pushbutton 11 is provided with a recess 11^d to accommodate the correspondingly shaped portion 15^a of a machined metal stud 15 (Figs. 2, 3 and 5). As shown in Fig. 3, stud 15 is provided with a reduced upper end portion 15^b which facilitates forcible insertion of a spring ring 16 into a peripheral groove formed between said reduced end and portion 15^a, whereby a frictional connection between pushbutton 11 and stud 15 is provided. The contactor-carrying plunger 14 is biased toward its upper extreme position by the conical compression spring 43 (Figs. 3 and 7).

As shown in Figs. 2 and 5, insulating member 10 is preferably provided in its flat lower surface with a pair of substantially rectangular recesses 10^a and 10^r to respectively accommodate the upper ends of lateral extensions formed upon the insulating base 17 of the switch, one of such lateral extensions being shown at 17^a in Fig. 2; whereby the flat lower surface of member 10 is adapted to seat against the upper end of base 17 (see Fig. 2). Moreover, I prefer to provide member 10 with lateral extensions 10^s and 10^t, within the areas of which the aforementioned recesses 10^a and 10^r are formed, to fully overlie the respective upper ends of the lateral extensions of base 17. Extensions 10^s and 10^t are provided with openings, aligned with the openings in base 17, to provide clearance for the shanks of bolts 18, 18, whose threaded lower ends take into tapped openings in a panel 19 (Fig. 2) or other suitable support, the heads of bolts 18 being seated against the upper surfaces of extensions 10^s and

10^t, preferably with interposed lockwashers 19 (see Fig. 2).

The cylindrical extension 10^o of member 10 is preferably provided at diametrically opposite points with arcuate cut away portions or recesses 10^u and 10^v to accommodate or provide clearance for the heads of screws 18. Extension 10^o is also preferably provided with an upwardly opening notch or recess 10^w (aligned with notch 10¹ on extension 10^c) and with a cylindrical recess 10^x, aligned with and corresponding to recess 10^m.

Member 10 is provided in its lower surface with a groove 10^y (Figs. 3 and 5) of inverted channel form, said groove communicating at opposite ends with the respective pushbutton passages 10¹ and 10¹; a relatively narrower groove 10^z (Fig. 3) opening to one end portion of groove 10^y and to pushbutton passage 10¹. Extending downwardly from and formed integrally with the flat lower surface of member 10 are a pair of lugs, which are designated by numerals 20 and 21, said lugs having openings 20^a and 21^a formed therein to accommodate a pin 22, whose head is shown at 22^a in Fig. 5, and whose shank end 22^b (Fig. 2) is preferably upset or otherwise deformed, as indicated in Fig. 5, to retain the same in position. Extensions 20 and 21 are preferably of the form in horizontal cross section, and in the relative positions on the flat lower surface of member 10, best illustrated in Fig. 5.

A flat, punched sheet metal latch member 23 is positioned within groove 10^y for sliding movement relatively thereto, member 23 having a concave edge 23^a at one end thereof to fit within groove 13^c and to overlap the shoulder 13^b formed by said groove, when pushbutton 13 is depressed to the position thereof shown in Fig. 3; and said edge 23^a being adapted to abut against the periphery of the lower portion of pushbutton 13 when the latter is in its upper extreme position, for a purpose hereinafter described. The member 23 is provided with an opposite end edge 23^b of concave form to provide clearance between said member and the periphery of pushbutton 11 upon depression of the latter. Member 23 is provided adjacent the edge 23^b with a relatively narrow rectangular opening 23^c.

A punched and stamped sheet metal lever member 24 is provided (see Fig. 4). Member 24 is in the form of a bell-crank lever, the same comprising a U-shaped portion having a pair of spaced parallel arms 24^a and 24^b, and a connecting portion 24^c. Portion 24^c projects upwardly to form the other arm of the bell-crank lever, as shown at 24^d, and said arm has a reduced upper end portion 24^e which loosely fits into the aforementioned opening 23^c in latch member 23 (Figs. 3 and 4). Arms 24^a and 24^b are provided with aligned openings (one of which is shown at 24^f in Fig. 4) to accommodate the pin 22 which pivotally supports lever 24; and aligned openings 24^g and 24^h, which are adapted to be aligned with a transverse opening or passage 15^c (Fig. 3) in member 15 to accommodate the shank of a pin 25, the head of which is shown at 25^a (Figs. 2 and 5).

During assembly of pin 22 with respect to the parts, as shown in Figs. 3 and 5, said pin is passed through the coiled portion of a spring 26 (Figs. 3 and 5). The aforementioned lug 20 is provided on its inner side (adjacent to and integral with the flat lower surface of member 10) with a reinforcement or fillet 20^b, and spring 26 is provided with an arm or straight end portion 26^a which is adapted to seat or press against one side

of said fillet to afford the desired degree of upward bias upon the other end portion 26^b of spring 26; said portion 26^b having an upwardly bent end 26^c (see Fig. 3) which penetrates an opening provided in the projecting shank end of pin 25, to restrain the latter against endwise displacement. The arrangement of parts and the bias of spring 26 is such that upon depression of pushbutton 13 to the position thereof shown in Fig. 3, the latch member 23 is freed to move toward the left into groove 13^c, through the action of bell-crank lever 24, as an incident to the upward bias upon pin 25, with consequent upper extreme positioning of member 15 and pushbutton 11 attached thereto. Conversely, upon manual depression of pushbutton 11 against the bias of spring 26, the bell-crank lever 24 will act to withdraw latch member 23 from groove 13^c, thus permitting pushbutton 13 to move to its normal upper extreme position (as shown in Fig. 2) under the normal spring bias of plunger 14, as described in detail in my prior application, Serial No. 449,756.

As best illustrated in Fig. 3, the aforementioned groove 10^a affords oscillatory clearance for the reduced end 24^c of bell crank lever 24. As shown in Fig. 5, a fillet 21^b is provided between the outer side of lug 21 and the flat lower surface of member 10, to reinforce or strengthen said lug.

As will be apparent from consideration of Fig. 3, when pushbutton 11 is depressed, with consequent release of pushbutton 13 to its upper extreme position, the lower cylindrical portion of pushbutton 13 will act as an abutment for the left-hand end of latch member 23, thus locking pushbutton 11 against movement to its upper extreme position under the bias of spring 26. It follows that each button when depressed is latched in depressed position, and can only be released to its normal upper extreme position as an incident to depression of the other button.

As will be apparent to those skilled in the art, in the light of the disclosure in said application, Serial No. 449,756, the insulating base 17 may have attached thereto from one to four pairs of combined stationary contact and terminal members 31 and/or 32 and from one to four bridging contactors 42 for cooperation therewith (Figs. 2, 3 and 7). Where only upper stationary contacts are employed, the pushbutton 13 when depressed will cause interruption of the circuit or circuits through all of said contacts, such circuit interrupting condition of the switch being maintained by the latch member 23 pending subsequent depression of pushbutton 11.

Where only lower stationary contacts are employed, the circuit or circuits will be completed upon depression of pushbutton 13, and will be maintained closed by the action of the latch member 23 pending subsequent depression of pushbutton 11. The functioning of the switch where both upper and lower contacts are employed is believed to be obvious from the foregoing description.

As shown in Figs. 1, 2 and 3, extension 10^c is provided with an upwardly projecting portion 27 of reduced diameter, thus providing a substantially annular shoulder 27^a which seats against, or is engaged by, the inner surface of panel 12. As shown in Fig. 3, portion 27 fits into an opening 12^b provided in panel 12, so that the outer end of said extension is substantially flush with the outer surface of said panel. In

the particular arrangement shown in Fig. 3, it may be assumed that the device is mounted with the pushbuttons 11 and 13 spaced horizontally a predetermined distance from each other, as distinguished from a vertical arrangement of the pushbuttons (see Fig. 6).

Said pushbuttons 11 and 13 may have suitable legends, such as "Stop," "Start" or "Forward," "Reverse," etc., applied thereto respectively by molding into the upper ends thereof the letters of such legends, such lettering preferably being depressed and the depressed letters filled with an enamel or similar material of a contrasting color, such as white. However, when plain pushbuttons are employed, the indicating legends may be properly associated therewith, as by employing metal plates 28 and 29 (Fig. 3), which have circular openings 28^a and 29^a to provide clearance for the buttons 13 and 11, said plates having rectangular portions at one end of each of the same (not shown in Fig. 3) to have the desired legends imprinted thereon or otherwise applied thereto. Plates 28 and 29 each preferably have a pair of relatively small circular openings formed therein, as shown at 28^b, 28^c and 29^b, 29^c, said openings being aligned with corresponding openings in panel 12 (Fig. 3) to accommodate with a drive fit the shanks of drive screws 30, whereby said plates are secured in position. As shown in Fig. 3, the recesses 10^m, 10^x and notches 10^l, 10^v afford clearance for the shank ends of screws 30.

In the event that the pushbuttons 11 and 13 are to be arranged in vertical alinement with each other, the plates 28 and 29 will be positioned at rotary angles displaced ninety degrees from the positions thereof shown in Fig. 3, the panel 12 in such an arrangement having other openings to accommodate with a drive fit the shanks of drive screws 30. Under these conditions notches 10^l, 10^k and recesses 10^u, 10^v will serve to provide clearance for the shanks of screws 30.

The combined contact and terminal members (Fig. 2) may be of the so-called right-hand form 31 and the so-called left-hand form 32, or all of the combined contact and terminal members may be of identical form, if the terminal portions of alternate members are permitted to extend laterally beyond the contour of base 17, as set forth in said application, Serial No. 449,756. Each of the members 31 and 32 has a contact tip 41 of silver or the like attached thereto (Figs. 2, 3 and 7).

The device of Figs. 6 and 7 is in many respects identical with that aforescribed, and corresponding parts have been designated by like numerals of reference. Moreover, the molded insulating member 33 is generally similar, in contour and dimensions, to the member 10 aforescribed, and one of the two die members (not shown) employed to produce member 10 may likewise be employed in the production of member 33. However, a different core member is utilized in the formation of member 33, to produce the passages 33^x and 33^v which are internally threaded (preferably by the molding operation) to receive the externally threaded end portions 34^a, 34^b of like metal bushings 34, 34, whose relatively large upper end portions 34^b, 34^b provide downwardly facing annular clamping shoulders 34^c, 34^c, to provide the so-called one-hole mounting type of attachment of member 33 to a front supporting panel. Panel 35 is provided with open-

ings 35^a, 35^b to accommodate the shanks 34^a of bushings 34. The upper end portions 34^b of bushings 34 are preferably vertically milled or otherwise roughened peripherally, as shown at 34^d, Fig. 6, to facilitate tightening thereof manually or otherwise. The portion 33^b of member 33 corresponds in form and dimensions to portion 10^b of member 10, and the cylindrical extensions 33^c and 33^e have external dimensions corresponding to those of extensions 10^c and 10^e of member 10. Due to the relatively large diameter of the passages 33^a and 33^v in member 33 there are no upward extensions of reduced diameter to fit within the openings 35^a and 35^b of panel 35. However, the annular surfaces 33^d and 33^e (Fig. 7) are adapted to seat against the inner surface of panel 35.

Member 33 when molded may have recesses formed therein which correspond to the recesses 10^m and 10^x of member 10 (Figs. 1 and 3), such recesses being then drilled as shown at 10^p and 10^q in Fig. 7, one of the recesses 10^p being adapted to accommodate a lug 36^a of corresponding length formed upon an indicating plate 36. Panel 35 is provided with an opening to accommodate lug 36^a to positively restrain plate 36 against rotary displacement. Plate 36 may have a suitable or desired legend applied thereto. A second plate 37 may be identical in form with plate 36, plate 37, however, having a different desired legend applied thereto. The lug 37^a on plate 37 extends downwardly through an opening in panel 35 and is adapted to clear the exterior of extension 33^c of member 33. Plate 37 is therefore also positively restrained against rotary displacement.

Because of the height of portions 34^b of bushings 34 the pushbuttons 38 and 39 are made substantially longer than the corresponding pushbuttons 11 and 13 of the device of Figs. 1 to 5. The pushbutton 39 is provided at a predetermined distance from the lower end thereof with a peripheral groove 39^a, which provides the upwardly facing shoulder 39^b which is engaged by latch member 23, upon depression of pushbutton 39, to retain said pushbutton in depressed position pending subsequent depression of pushbutton 38.

The laterally extending portions 33^a and 33^v of member 33 correspond with portions 10^a and 10^v of member 10. However, said portions 33^a and 33^v are respectively provided with tapped openings 33^u, 33^v (Fig. 6) for cooperation with the shanks of a pair of bolts 40, 40, the heads of which (not shown) are positioned within the countersunk recesses in the lower surface of base 17, in a manner similar to the one-hole mounting device disclosed in said application, Serial No. 449,756.

The device of Figs. 6 and 7 is adapted to operate in the same manner, and to perform the same functions, as the device of Figs. 1 to 5.

I claim:

1. In combination, a pushbutton switch of the reciprocating contactor type comprising, a molded insulating base having a recess, a molded insulating plunger slidable within said recess, at least one pair of stationary contacts positioned within said recess and aligned with each other transversely of said base, at least one contactor carried by said plunger and movable by the latter into and out of bridging engagement with said contacts, a coiled compression spring engaged with the lower end of said plunger to bias the latter and said contactor outwardly to a

given normal position relatively to said contacts, a pushbutton attached to the outer end of said plunger and movable therewith, said pushbutton having an exterior outwardly facing shoulder formed thereon intermediate the length thereof, a slidable latch member, spring means for normally biasing said latch member to a position wherein it overlies said shoulder as an incident to a given degree of inward movement of said pushbutton, to thereby latch said contactor out of said normal position thereof, and means comprising a second pushbutton reciprocable in a plane parallel to said first pushbutton and having a permanent driving connection with said latch member to provide for release of said first pushbutton to its normal biased position as an incident to depression of said second pushbutton.

2. In combination, a pushbutton switch of the reciprocating contactor type comprising, a molded insulating base having a recess, a molded insulating plunger slidable within said recess, at least one pair of stationary contacts positioned within said recess and aligned with each other transversely of said base, at least one contactor carried by said plunger and movable by the latter into and out of bridging engagement with said contacts, a coiled compression spring engaged with the lower end of said plunger to bias the latter and said contactor outwardly to a given normal position relatively to said contacts, a pushbutton attached to the outer end of said plunger and movable therewith, said pushbutton having an exterior outwardly facing shoulder formed thereon intermediate the length thereof, a slidable latch member, spring means for normally biasing said latch member to a position wherein it overlies said shoulder as an incident to a given degree of inward movement of said pushbutton, to thereby latch said contactor out of said normal position thereof, means comprising a second pushbutton reciprocable in a plane parallel to said first pushbutton and having a permanent driving connection with said latch member to provide for movement of the latter, against its bias, in a direction to effect release of said first pushbutton to its normal biased position as an incident to a given degree of depression of said second pushbutton, and said first pushbutton when released cooperating with said latch member to retain said second pushbutton in a depressed position pending subsequent depression of said first pushbutton.

3. In combination, a pushbutton switch of the reciprocating contactor type comprising, a molded insulating base having a recess, a molded insulating plunger slidable within said recess, at least one pair of stationary contacts positioned within said recess and aligned with each other transversely of said base, at least one contactor carried by said plunger and movable by the latter into and out of bridging engagement with said contacts, a coiled compression spring interposed between the bottom wall of said recess and said plunger to bias the latter and said contactor outwardly to a given normal position relatively to said contacts, a pushbutton attached to the outer end of said plunger and movable therewith, said pushbutton having an exterior outwardly facing shoulder formed thereon intermediate the length thereof, a slidable latch member, spring means for normally biasing said latch member to a position wherein it overlies said shoulder as an incident to a given degree of inward movement of said pushbutton, to thereby latch said contactor out of said normal position

thereof, means comprising a second pushbutton reciprocable in a plane parallel to said first pushbutton and having a permanent driving connection with said latch member, the biasing spring of said latch also normally tending to move said second pushbutton to its outer extreme position, said second pushbutton when manually depressed being adapted to effect movement of said latch to thereby release said first pushbutton for return of the latter to said normal position thereof, and said first pushbutton when so released coacting with said latch member to retain said second pushbutton in its depressed position, to thereby indicate the circuit controlling condition of the switch.

4. As an article of manufacture, a latching attachment for a pushbutton switch of the reciprocating contactor type, said attachment comprising an insulating member having an opening formed therein to provide reciprocating clearance for the spring-biased pushbutton of the switch, said member having a second opening formed therein in spaced parallel relation to said first opening, said member having a groove formed in the substantially flat lower surface thereof and communicating with said openings, a flat, punched sheet metal plate slidably seated flatwise within said groove in a substantially flush relationship to said lower surface, said insulating member having a pair of perforated lugs formed integrally therewith and extending downwardly therefrom on opposite sides of said groove, a pivot pin supported by said perforated lugs, a bell-crank lever pivotally supported by said pin, said metal plate having an opening formed therein adjacent one end thereof, one arm of said lever having its free end engaging the walls of said plate opening to provide a driving connection between said parts, a second pushbutton reciprocable within said second opening in said member, the other arm of said lever having a pivotal connection with said second pushbutton, and spring means for biasing said second pushbutton toward its outer extreme position, whereby said plate is biased into the area of said first mentioned opening.

5. As an article of manufacture, a latching attachment for a pushbutton switch of the reciprocating contactor type, said attachment comprising an insulating member having an opening formed therein to provide reciprocating clearance for the spring-biased pushbutton of the switch, said member having a second opening formed therein in spaced parallel relation to said first opening, said member having a groove formed in the substantially flat lower surface thereof and communicating with said openings, a flat, punched sheet metal plate slidably seated flatwise within said groove in a substantially flush relationship to said lower surface, said insulating member having a pair of perforated lugs formed integrally therewith and extending downwardly therefrom on opposite sides of said groove, a pivot pin supported by said perforated lugs, a bell-crank lever pivotally supported by said pin, said metal plate having an opening formed therein adjacent one end thereof, one arm of said lever having its free end engaging the walls of said plate opening to provide a driving connection between said parts, a second pushbutton reciprocable within said second opening in said member, the other arm of said lever having a pivotal connection with said second pushbutton, spring means for biasing said second pushbutton toward its outer extreme position, whereby said plate

is biased into the area of said first mentioned opening, and said plate when freed to move under its bias being adapted to overlie an outwardly facing shoulder on said switch pushbutton, as an incident to depression of the latter, whereby said switch pushbutton is retained in its depressed position.

6. As an article of manufacture, a latching attachment for a pushbutton switch of the reciprocating contactor type, said attachment comprising an insulating member having an opening formed therein to provide reciprocating clearance for the spring-biased pushbutton of the switch, said member having a second opening formed therein in spaced parallel relation to said first opening, said member having a groove formed in the substantially flat lower surface thereof and communicating with said openings, a flat, punched sheet metal plate slidably seated flatwise within said groove in a substantially flush relationship to said lower surface, said insulating member having a pair of perforated lugs formed integrally therewith and extending downwardly therefrom on opposite sides of said groove, a pivot pin supported by said perforated lugs, a bell-crank lever pivotally supported by said pin, said metal plate having an opening formed therein adjacent one end thereof, one arm of said lever having its free end engaging the walls of said plate opening to provide a driving connection between said parts, a second pushbutton reciprocable within said second opening in said member, the other arm of said lever having a pivotal connection with said second pushbutton, spring means for biasing said second pushbutton toward its outer extreme position, whereby said plate is biased into the area of said first mentioned opening, said plate when freed to move under its bias being adapted to overlie an outwardly facing shoulder on said switch pushbutton, as an incident to depression of the latter, whereby said switch pushbutton is retained in its depressed position, and said second pushbutton when depressed being adapted to effect withdrawal of said plate from said first mentioned opening to provide for normal positioning of said first pushbutton under the influence of its spring-bias.

7. In combination, a pushbutton switch of the reciprocating contactor type comprising, a molded insulating base having a recess, a molded insulating plunger slidable within said recess, at least one pair of upper stationary contacts and one pair of lower stationary contacts positioned within said recess, the contacts of each pair being aligned with each other transversely of said base, at least one upper contactor and one lower contactor carried by said plunger and selectively movable by the latter into and out of bridging engagement with the respective upper and lower pairs of contacts, a spring biasing said plunger outwardly whereby the upper contactor is engaged with said upper pair of contacts, a pushbutton attached to the outer end of said plunger and movable therewith, said pushbutton having a peripheral groove formed therein at a predetermined point above the lower end thereof to provide an exterior outwardly facing shoulder, a punched sheet metal latch member bodily slidable flatwise into and out of said groove, spring means for normally biasing said latch member toward a position wherein it will overlie said shoulder upon a given degree of inward movement of said pushbutton to thereby latch said upper contactor out of engagement with its as-

sociated contacts and said lower contactor in engagement with its associated contacts, and means comprising a second pushbutton reciprocable in a line parallel to said first pushbutton and having a permanent driving connection with said latch member, said second pushbutton when depressed being adapted to effect release of said first pushbutton, whereby said plunger is free to move under its bias to effect re-engagement of said upper contactor with its associated contacts and disengagement of said lower contactor from its associated contacts.

8. In combination, a pushbutton switch of the reciprocating contactor type comprising, a molded insulating base having a recess, a molded insulating plunger slidable within said recess, at least one pair of upper stationary contacts and one pair of lower stationary contacts positioned within said recess, the contacts of each pair being aligned with each other transversely of said base, at least one upper contactor and one lower contactor carried by said plunger and selectively movable by the latter into and out of bridging engagement with the respective upper and lower pairs of contacts, a spring biasing said plunger outwardly whereby the upper contactor is engaged with said upper pair of contacts, a pushbutton attached to the outer end of said plunger and movable therewith, said pushbutton having a peripheral groove formed therein at a predetermined point above the lower end thereof to provide an exterior outwardly facing shoulder, a latch member slidable into and out of said groove, spring means for normally biasing said latch member toward a position wherein it will overlie said shoulder upon a given degree of inward movement of said pushbutton to thereby latch said upper contactor out of engagement with its associated contacts and said lower contactor in engagement with its associated contacts, means comprising a second pushbutton reciprocable in a line parallel to said first pushbutton and having a permanent driving connection with said latch member, said second pushbutton when depressed being adapted to effect release of said first pushbutton, whereby said plunger is free to move under its bias to effect re-engagement of said upper contactor with its associated contacts and disengagement of said lower contactor from its associated contacts, and said first pushbutton when released coacting with said latch member to retain said second pushbutton in a depressed position pending subsequent depression of said first pushbutton.

9. As an article of manufacture, a latching device adapted for rigid attachment to the upper end of the molded insulating base of a pushbutton switch of the reciprocating contactor type, said device comprising a one-piece molded insulating member having a passage extending therethrough to provide reciprocating clearance for the upwardly spring-biased pushbutton of the switch, said member having a second passage extending therethrough in spaced parallel relation to said first passage, a flat, punched sheet metal latch member slidably mounted upon the lower surface of said insulating member, spring means normally biasing said latch member for movement into said first mentioned passage, manual means for effecting movement of said latch member out of said first mentioned passage, said manual means comprising a pushbutton reciprocable within said second mentioned passage, and a bell-crank lever pivotally supported upon said insulating member and afford-

ing a driving connection between said last mentioned pushbutton and said latch member.

10. As an article of manufacture, a latching device adapted for rigid attachment to the upper end of the molded insulating base of a pushbutton switch of the reciprocating contactor type, said device comprising a one-piece molded insulating member having a passage extending therethrough to provide reciprocating clearance for the upwardly spring-biased pushbutton of the switch, said member having a second passage extending therethrough in spaced parallel relation to said first passage, a flat, punched sheet metal latch member slidably mounted upon the lower surface of said insulating member, spring means normally biasing said latch member for movement into said first mentioned passage, manual means for effecting movement of said latch member out of said first mentioned passage, said manual means comprising a pushbutton reciprocable within said second mentioned passage, a bell-crank lever pivotally supported upon said insulating member and affording a driving connection between said last mentioned pushbutton and said latch member, said latch member being adapted to coact with the switch pushbutton when depressed to retain the latter in depressed position, said second pushbutton when depressed being adapted to effect release of the switch pushbutton, and said switch pushbutton when released coacting with said latch member to retain said second pushbutton in its depressed position.

11. In a device of the character described, in combination, a pushbutton switch of the reciprocating contactor type comprising, a one-piece molded insulating base having a recess, a one-piece molded insulating plunger slidable within said recess, a pair of stationary contacts positioned within said recess, a contactor carried by said plunger and movable by the latter into and out of bridging engagement with said pair of contacts, a coiled compression spring interposed between the bottom wall of said recess and said plunger to bias the latter toward a given normal position, a pushbutton attached to the outer end of said plunger, said pushbutton having a peripheral groove formed therein to provide an upwardly facing shoulder at a predetermined distance from the lower end thereof, a one-piece molded insulating member rigidly attached to the upper end of said base, said insulating member having a passage extending therethrough to afford reciprocating clearance for said pushbutton, said insulating member having a second passage extending therethrough, a pushbutton reciprocable within said second passage, a flat, punched sheet metal latch member slidably interposed between the lower surface of said insulating member and the upper surface of said base, a pivoted bell-crank lever one arm of which has a driving connection with said latch member and the other arm of which has a driving connection with said second pushbutton, a coiled torsion spring biasing said second pushbutton upwardly whereby said latch member is biased toward a position wherein it overlies said shoulder in the lower extreme position of said first pushbutton to retain the latter in such position, and said second pushbutton when depressed against the bias of said torsion spring being adapted to withdraw said latch to release said first pushbutton for movement to its upper extreme position.

12. In a device of the character described, in combination, a pushbutton switch of the recip-

roccating contactor type comprising, a one-piece molded insulating base having a recess, a one-piece molded insulating plunger slidable within said recess, a pair of stationary contacts positioned within said recess, a contactor carried by said plunger and movable by the latter into and out of bridging engagement with said pair of contacts, a coiled compression spring interposed between the bottom wall of said recess and said plunger to bias the latter toward a given normal position, a pushbutton attached to the outer end of said plunger, said pushbutton having a peripheral groove formed therein to provide an upwardly facing shoulder at a predetermined distance from the lower end thereof, a one-piece molded insulating member rigidly attached to the upper end of said base, said insulating member having a passage extending therethrough to afford reciprocating clearance for said pushbutton, said insulating member having a second passage extending therethrough, a pushbutton reciprocable within said second passage, a flat, punched sheet metal latch member slidably interposed between the lower surface of said in-

5 sulating member and the upper surface of said base, a pivoted bell-crank lever one arm of which has a driving connection with said latch member and the other arm of which has a driving connection with said second pushbutton, a coiled torsion spring biasing said second pushbutton upwardly whereby said latch member is biased toward a position wherein it overlies said shoulder in the lower extreme position of said first
10 pushbutton to retain the latter in such position, said second pushbutton when depressed against the bias of said torsion spring being adapted to withdraw said latch to release said first pushbutton for movement to its upper extreme position,
15 said passages in said insulating member having screw threads formed therein by the molding operation, and a pair of hollow metal bushings having peripheral flanges at the upper ends thereof, the lower end portions of said bushings
20 being externally threaded for cooperative engagement with the threaded walls of said passages.

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