April 29, 1958 E. F. MEKELBURG 2,832,850

INTERLOCK PUSH BUTTON ELECTRIC SWITCH

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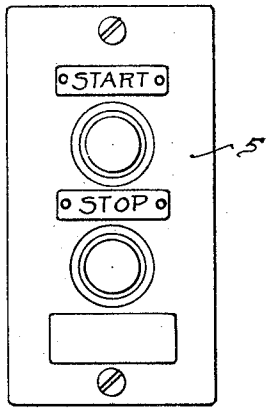


FIG. 1.

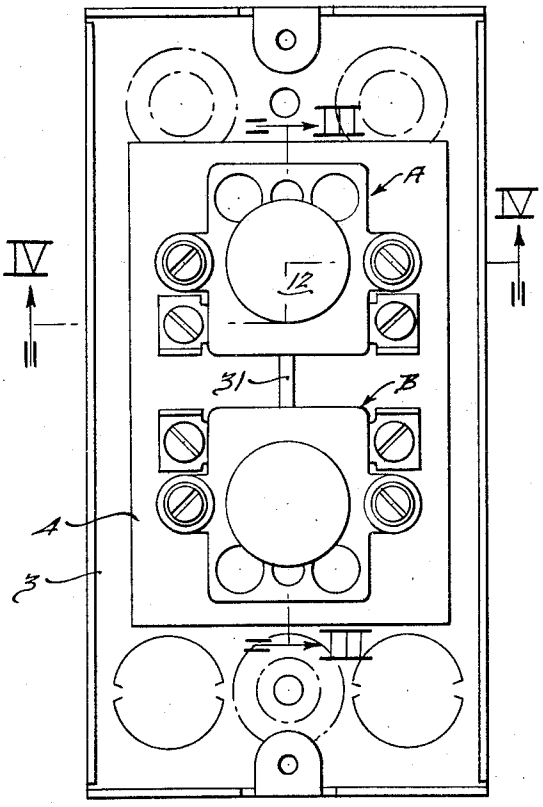


FIG. 2.

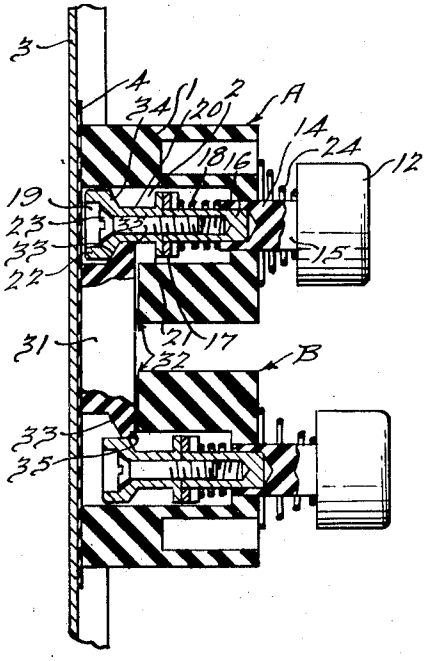


FIG. 3.

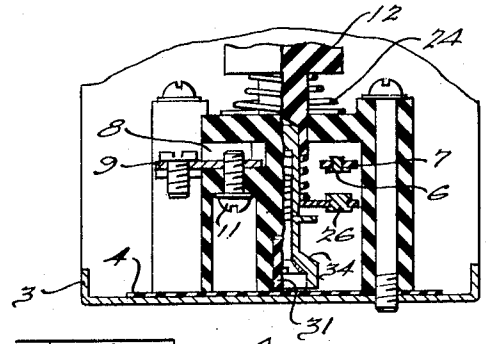


FIG. 4.

INVENTOR.
Earl F. Mekelburg.
BY Myron J. Seibold
ATTORNEY.

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INTERLOCK PUSH BUTTON ELECTRIC SWITCH

Earl F. Mekelburg, Wauwatosa, Wis., assignor to Square D Company, Detroit, Mich., a corporation of Michigan

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10 Claims. (Cl. 200—5)

This invention relates to a maintained position pushbutton device and has for its object a restraining interlock operating between the units of a pushbutton device providing the improvement whereby an operated unit becomes interlocked when operated and may not be released until a second unit related to the first unit by the interlock has been operated.

Another object of the invention, in accordance with the preceding object, is the provision of a pushbutton operated mechanical interlock wherein the interlock is positioned and retained in its position by the biasing means of the pushbutton.

A further object of the invention is the provision of a two unit individual pushbutton device having an interlock mechanism operative therebetween with the individual units having a part cooperating with the interlock mechanism whereby the interlock is operated by the pushbuttons of the units and is operative to lock the units in an operated position.

Further objects and features of the invention will be readily apparent to those skilled in the art from the specification and appended drawings illustrating certain preferred embodiments in which:

Figure 1 is a front elevational view of the invention with the enclosing cover in place.

Figure 2 is a front elevational view of the invention with the enclosing cover removed.

Figure 3 is a sectional view taken along the line III—III of Figure 2.

Figure 4 is a sectional view taken along the lines IV—IV of Figure 2.

The present invention constitutes a pushbutton device having a pair of similar pushbutton units interconnected for interlocking operation by a slidable interlock barrier. The individual pushbutton units designated "A" and "B" constitute a molded insulating base 1 having a central cavity 2 with additional cutout and recessed portions as will become apparent with further description of the elements constituting the pushbutton unit. The unit is supported in an enclosure 3 and insulated therefrom by an insulation strip 4 and is maintained in place by suitable mounting screws threading into the base of the enclosure. The entire device is covered by an enclosing cover plate 5 adapted to be secured to portions of the base 1 and cut out to allow access to the buttons of the individual pushbutton units.

The individual units are provided with stationary contacts 6 fixed to a conducting bar 7 extending through a suitable cutout 8 in the insulating base 1 and terminating at a terminal portion 9 outwardly of the insulating base. The conducting bar 7 is secured in the insulating base by a screw 11 so that the stationary contacts 6 are thereby maintained within the central cavity 2 of the insulating base 1.

The pushbutton operating members of the present invention operate within the insulating base in the central cavity 2 and are provided with an external pushbutton operator 12 which extends through the cutout in the cover

5 provided for the pushbutton device. The outer surface of the insulating base is provided with a square hole cut therethrough at 14 through which the shaft 15 of the pushbutton passes so as to allow for permissible reciprocal movement without rotary movement. The square shaft 15 of the pushbutton has integrally fixed therein a bushing 16 having internal threads; the pushbutton 12 and shaft 15 being constructed of molded insulating material and preferably having the bushing 16 fixed therein during the molding operation.

A movable contact carrier 17 is biased by a spring 18 and slidably supported on the bushing 16 and is adapted to be maintained in place on the bushing by a spool-like retainer 19. The retainer 19 is provided with one flat shoulder at 21 for engagement with the movable contact carrier and a second shoulder at 22 with a hub 20 and an inclined surface 34 therebetween. The center of the spool-like retainer is hollow so that a headed screw 23 may pass therethrough and thread into the bushing 16 so as to retain the internal portions of the pushbutton in their desired location. A helical coil spring 24 operates between the outer surface of the insulating base 1 and the inner surface of the push button 12 about the shaft 15 and biases the pushbutton assembly outwardly into a normal position with the movable contacts 26 on the movable contact carrier 17 engaging the stationary contacts 6.

The second unit of the pushbutton device is identical with the device just described, both units being fixed to the base of the enclosure 1 and enclosed by the cover 5 with the pushbuttons extending through the cutouts in the cover for external access.

The two units in their side-by-side relation are provided with an interlocking arrangement operating to maintain one device in a raised or closed position while the other unit is in a depressed or open position. The interlocking device constitutes a slidable member 31 operating in cutout slots 32 in the adjacent faces of the units so that the ends thereof extend into the central cavity 2 and cooperate with the enlarged shoulder 22 of the spool-like retainer 19 within the units. The interlocking member 31 has a T-like configuration with the bar 35 of the T being shaped to conform with the configuration of the inclined surface 34 of the enlarged shoulder 22 of the spool-like retainer 19. The interlock is slidably operative between the units against the insulating sheet 4 within the limits as described by the slots 32 in the units A and B.

In operation, and as shown in Figure 3, the interlocking member 31 cooperates with the spool-like retainer 19 with the separate units so spaced that the dimension of the bar 35 of the interlocking member 31 is greater than the spacing between operating surfaces of the enlarged retainers 22 of the units A and B by substantially the difference in radius between the hub 20 and the enlarged shoulder 22 of the retainer. With the dimensions as described, the interlocking member prohibits the positioning of both of the pushbutton devices in their raised position simultaneously. The interlocking member is further provided with an inclined surface at 33 cooperating with the similarly inclined surface 34 on the retainer 19 so that, with a pushbutton in the depressed position, the two inclined surfaces are touching and in the raised position of the pushbutton the cross bar 35 of the T of the interlocking member 31 is engaged by the enlarged shoulder 22 of the retainer 19. It may be visualized by reference to Figure 3 that as the push buttons are initially depressed, their respective inclined surfaces and enlarged shoulders provide for sliding and limiting movement of the interlocking member from one adjusted position to the other to alternately lock one pushbutton up and the other down.

The pushbuttons are continuously biased outwardly of

their respective insulating bases 1 by the helical coil spring 24 associated therewith so that as a push button in the then raised position is depressed its enlarged shoulder 22, then cooperating with the bar 35 of the interlocking member and maintaining the other pushbutton depressed by such engagement, is moved from interlocking engagement to permit the interlocking member 31 to travel along the retainer inclined surface 34. The interlocking member 31 will be positively biased in this movement by the force of the spring 24 of the opposite pushbutton biasing that pushbutton outwardly of its casing. The released pushbutton is now permitted to move, in that the depressed pushbutton has been moved from its blocking alignment with the bar 35 of the interlocking member 31 and the movement of the released pushbutton along its axis causes movement of the interlocking member 31 in its plane perpendicular thereto. Under the bias of the helical spring 24 the interlocking member will be moved to a position where the inclined surface 33 of the B unit which was formerly blocked by the enlarged shoulder 22 of the retainer 19 will now be engaged with the inclined surface 34 of the retainer 19 and the bar 35 of the T of the interlocking member 31 at the A unit formerly having inclined surfaces 33 and 34 aligned will now be engaged by the enlarged shoulder 22 of its associated retainer 19. It may now be seen that the interlocking pushbutton device of the present invention provides an arrangement whereby the individual pushbuttons of the device may be locked in their adjusted position and may be released only by the operation of the opposite pushbutton and wherein such operation will cause the operated pushbutton to be retained in its operated position.

While certain preferred embodiments of the invention have been specifically disclosed, it is understood that the invention is not limited thereto, as many variations will be readily apparent to those skilled in the art and the invention is to be given its broadest possible interpretation within the terms of the following claims:

What is claimed is:

1. An interlocking pushbutton switch comprising; an enclosure, at least a pair of individual unitary switching devices supported within said enclosure, resilient means biasing each of said switching devices to one of two alternative positions, and movable means operative within said enclosure and engageable with portions of both of said switching devices, said resilient means of each switching device operating said movable means through parts of the associated switching devices for maintaining a positioning of both of said switching devices in either of said two alternative positions.

2. An interlocking pushbutton switch comprising; an enclosure, a plurality of switching devices supported within said enclosure, individual resilient means associated with each of said switching devices for biasing said switching devices to a normal position of two adjustably alternative positions, slidable means within said enclosure engageable with portions of each of said switching devices, each of said resilient means being operative through said switching device with which it is associated to slide said slidable means upon adjustment of another of said switching devices between said alternative positions, and means including a cam surface on said slidable means and a cam surface on each of the devices for maintaining each of said switching devices in either of said alternative positions.

3. An interlocking pushbutton switch comprising; an enclosure, at least a pair of switching devices supported within said enclosure, resilient means for each of the devices biasing each of said switching devices to a normal position of two alternative positions, portions on each of said devices having a major and a minor dimensioned surface and an inclined surface therebetween, slidable means within said enclosure, and means including a cam surface on said slidable means adapted to cooperate with said major and minor dimensioned surfaces and inclined surface for maintaining either one of said switching devices in either of said alternative positions.

4. An interlocking pushbutton switch comprising an enclosure, switching devices supported within said enclosure, resilient means biasing said switching devices to a normal position of two adjustably alternative positions, slidable means within said enclosure, said slidable means having a major and a minor dimensioned surface and an inclined surface therebetween, said major and minor surfaces adapted to cooperate with portions of said switching device to maintain said switching device in either of said adjustably alternative positions.

5. An interlocking pushbutton switch comprising an enclosure, switching devices supported within said enclosure, resilient means biasing portions of said switching devices to a normal position of two alternative positions, said portions having a major and a minor dimensioned surface and an inclined surface therebetween, slidable means within said enclosure, said slidable means having a major and minor dimensioned surface and an inclined surface therebetween, said major and minor dimensioned surfaces of said slidable means adapted to cooperate with said major and minor dimensioned surfaces of said portions of said switching devices to maintain said switching device in said adjustably alternative positions.

6. An interlocking pushbutton switch comprising an enclosure, switching devices supported within said enclosure, resilient means biasing said switching devices to a normal position of two alternative positions, said switching devices having a major and minor dimensioned surface and an inclined surface therebetween, slidable means within said enclosure, said slidable means having a major and minor dimensioned surface and an inclined surface therebetween, said inclined surface of said slidable means adapted to cooperate with said inclined surface of said switching devices to slide said slidable means under the bias of said biasing means upon adjustment of said switching devices between said alternative positions.

7. An interlocking pushbutton switch comprising an enclosure, switching devices supported within said enclosure, resilient means biasing said switching devices to a normal position of two alternative positions, said switching devices having a major and minor dimension surface and an inclined surface therebetween, slidable means within said enclosure, said slidable means having a major and a minor dimensioned surface and an inclined surface therebetween, said major dimensioned surfaces of said slidable means adapted to alternatively cooperate with said major and minor dimensioned surfaces of said switching devices to maintain said switching devices in either of said adjustably alternative positions.

8. An interlocking pushbutton switch comprising an enclosure, switching devices supported within said enclosure, resilient means biasing portions of said switching devices to a normal position of two alternative positions, said portions having a major and a minor dimensioned surface and an inclined surface therebetween, slidable means within said enclosure, said slidable means having a major and minor dimensioned surface and an inclined surface therebetween, said major and minor dimensioned surfaces of said slidable means adapted to cooperate with said major and minor dimensioned surfaces of said portions of said switching devices to maintain one of said switching devices in one of said alternative positions, and said major surface of said slidable means adapted to cooperate with said major surface of said portions of said switching device to maintain the other of said switching devices in the other of said alternative positions.

9. An interlocking pushbutton switch comprising; an enclosure, a pair of spaced switching devices supported within the enclosure and longitudinally movable between two alternative positions, resilient means for each of the devices normally biasing said devices toward one of said positions, a locking means movable with a sliding reciprocal motion in the enclosure independently of the

movement of the devices and means including cooperating cam surfaces on the locking means and both devices for reciprocating the locking means and locking either one of said devices in the other position.

10. In an electric switch the combination comprising; an enclosure, a pair of switching devices individually movable between two positions within the enclosure, an interlocking member slidable within the enclosure, cooperating surfaces on both of the devices and interlocking member for alternately selectively holding either of the devices in one of the positions, and resilient means for each of the devices for constantly biasing the devices to the other of the positions and for causing relative movement between the cooperating surfaces and thereby effecting

movement of the interlocking member to release either of the devices when the other device is moved between the other and one positions.

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