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[50] Field of Search..... 200/50.3,
 5E, 5B, 5, 5A, 5D, 5C, 5.6

[56] References Cited
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 2,624,809 1/1953 Sinclaire..... 200/50.3

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[54] INTERLOCK BAR FOR MEMENTARY SELECTOR SWITCH
 3 Claims, 5 Drawing Figs.

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ABSTRACT: The outer buttons of a three-position, center-off switch are interlocked by an interlock bar pivotally mounted to the movable contact under the center button. The opposite ends of the bar underlie the outer buttons wherein depression of both outer buttons drive the bar downward to open the center contact before both outer contacts will close.

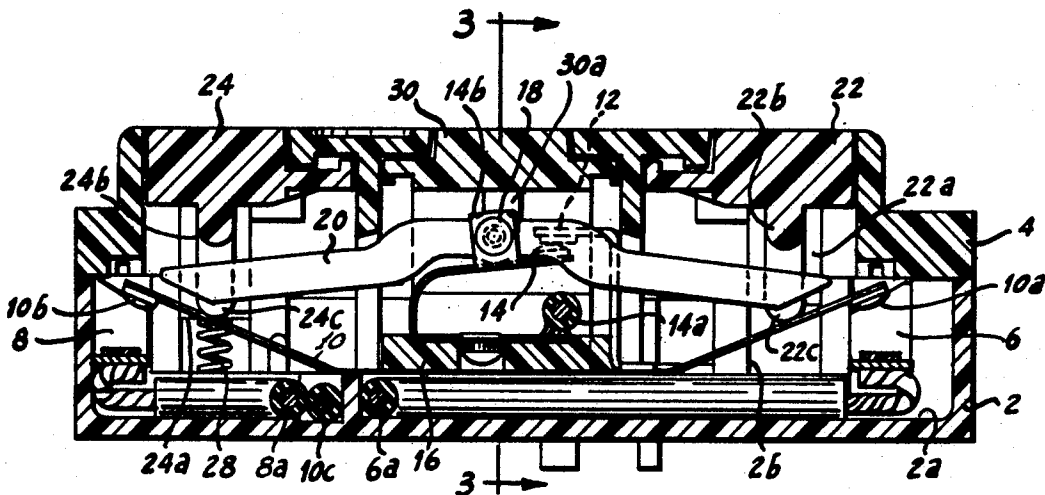


Fig. 1

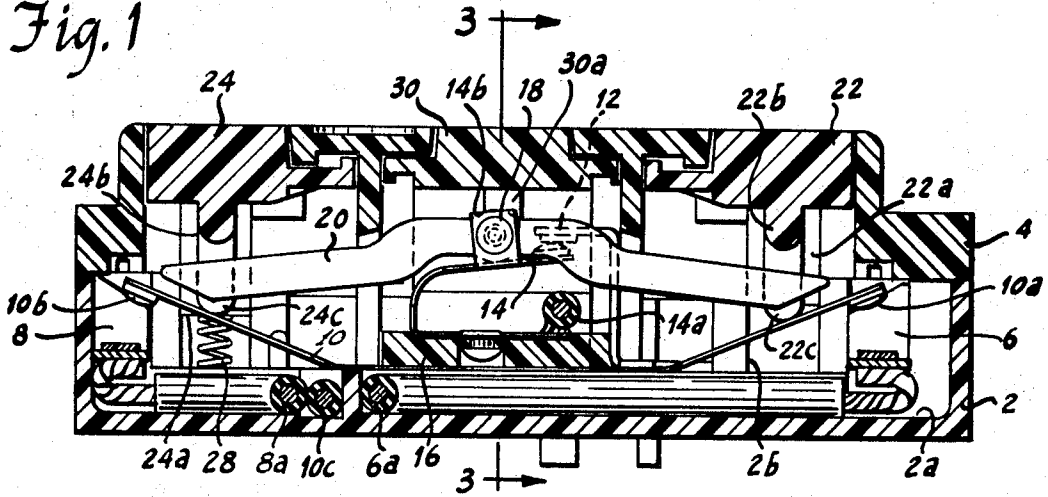


Fig. 2

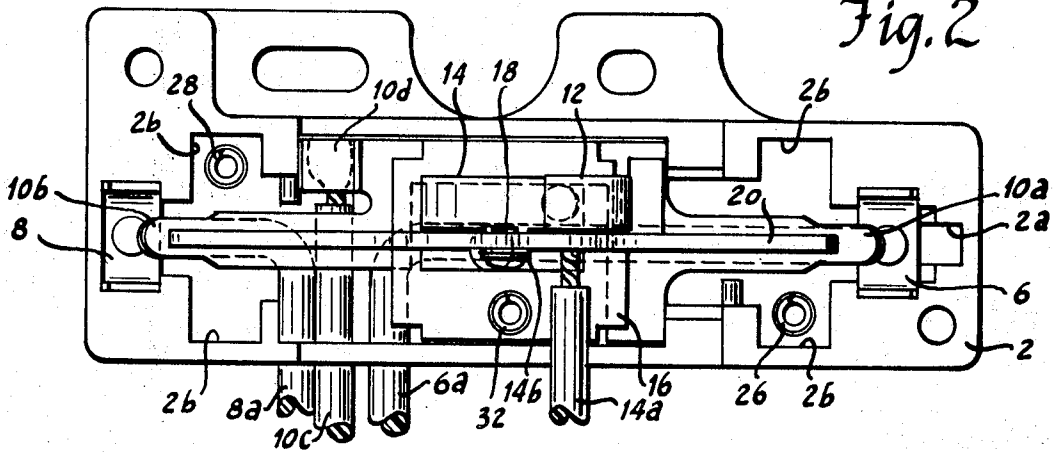
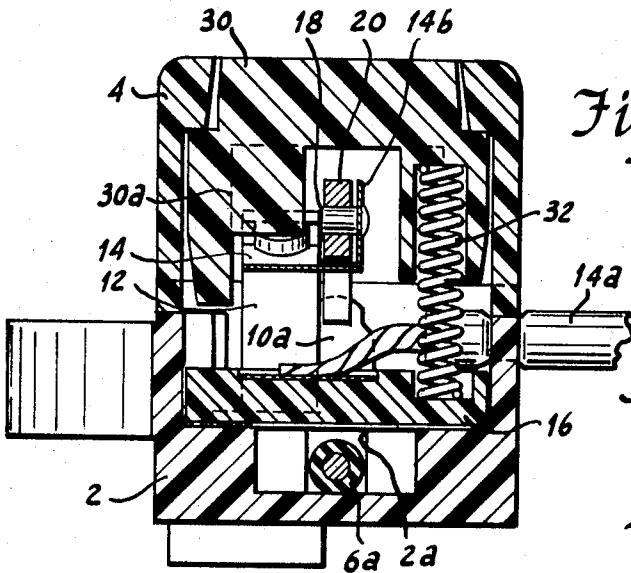


Fig. 3



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Fig. 4

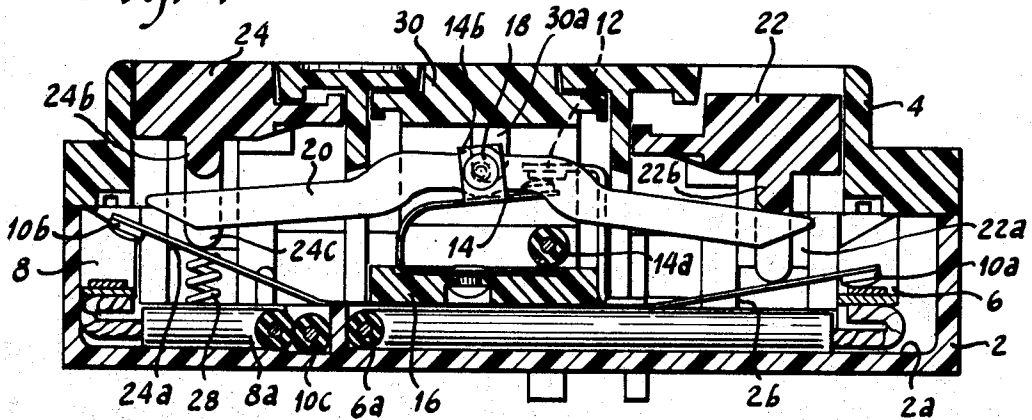
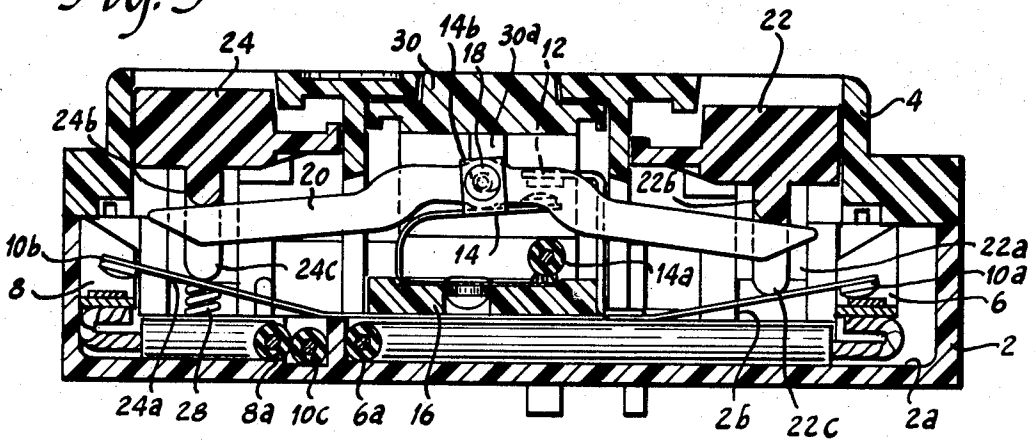


Fig. 5



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INTERLOCK BAR FOR MOMENTARY SELECTOR SWITCH

CROSS-REFERENCE TO RELATED APPLICATION

The switch of this invention is designed to be used in motor control enclosures in place of the multiposition selector switch disclosed in U.S. Pat. No. 3,478,179 issued Nov. 11, 1969 and assigned to the assignee herein. Reference may be had thereto for certain details in and to the manner in which the switch is intended to be used with an electrical controller enclosure.

BACKGROUND OF THE INVENTION

This invention relates to pushbutton selector switches and more particularly to a means for interlocking two buttons to prevent simultaneous electrical operation thereof.

In pushbutton switches of this type it is desirable to interlock two or more buttons to prevent simultaneous operation thereof. This often is accomplished by rigid mechanical linkages which physically prevent simultaneous depression. The present invention deals with another method wherein a set of normally closed contacts are opened to cut off power to the switch before the other set of normally open contacts closes.

SUMMARY OF THE INVENTION

It is therefore a primary object of this invention to provide a pushbutton selector switch having a set of normally closed contacts through which the switch may be connected to a supply source, the contacts being opened by simultaneous depression of two pushbuttons of the switch.

It is a further object of this invention to provide a pushbutton selector switch of the aforementioned type wherein another pushbutton, separate from the two interlocked pushbuttons, is provided for opening said normally closed contacts.

These and other objects and advantages of this invention will become more apparent in the following specification and claims when read in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a longitudinal sectional view of a momentary selector switch incorporating the interlock bar of this invention;

FIG. 2 is a top view of the switch of FIG. 1 with the cover and pushbuttons removed;

FIG. 3 is a cross-sectional view taken along the line 3-3 in FIG. 1;

FIG. 4 is a longitudinal sectional view similar to FIG. 1 but showing the right-hand button of the switch depressed; and

FIG. 5 is a longitudinal sectional view similar to FIGS. 1 and 4 but showing both the right- and left-hand buttons depressed.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings, the momentary selector switch incorporating this invention is housed in a molded insulating housing comprising a base 2 and a cover 4. The base 2, shown with cover 4 removed therefrom in FIG. 2, has a large central cavity, the endmost extremes of which are formed as pockets to receive U-shaped stationary contacts 6 and 8. A channel 2a extends longitudinally in the bottom of the central cavity to receive the wire leads 6a and 8a, respectively, from contacts 6 and 8. As seen in FIG. 2, the wire leads 6a and 8a are brought outside the switch through openings in the front sidewalls of base 2.

A movable contact member 10 formed of a good electrical conducting and spring metal material such as beryllium copper alloy or the like is placed upon the bottom of the central cavity. Member 10 has upwardly formed end portions 10a and 10b which overlie the right- and left-hand stationary contacts 6 and 8, respectively. A wire lead 10c is connected to a tab 10d on member 10 and is brought outside the switch between the leads 6a and 8a. A Z-shaped stationary stop contact 12 is electrically and mechanically secured to a base portion of the movable contact member 10 to cooperate with a movable stop contact 14.

Movable stop contact 14 is secured to an insulating board 16 by riveting or any other suitable method. A wire lead 14a is electrically connected to the contact base and is brought outside the switch through an opening in the front sidewall (FIG. 2). Movable contact 14 extends under stationary contact 12 and is spring biased to be normally in electrical engagement therewith. An upstanding tab 14b is formed on movable contact 14 near the free end thereof. Tab 14b has an outwardly extending pin 18 riveted thereto to serve as a pivot member for a freely rotatable interlock bar 20.

Interlock bar 20 extends longitudinally throughout substantially the entire switch cavity. The opposite ends thereof overlie the respective ends 10a and 10b of the movable contact member 10.

The switch is provided with right- and left-hand pushbuttons 22 and 24 which are identical, but reversed in their respective positions. The buttons each have a pair of vertically depending legs 22a and 24a, respectively, (only one of which is shown) which guide the buttons for vertical movement within slots 2b in base 2 (FIG. 2) and similar slots in cover 4. The buttons 22 and 24 are further provided with a central slot for receiving the ends of interlock bar 20, the slots having rounded upper portions 22b and 24b, respectively, and depending rounded lower portions 22c and 24c, respectively. A pair of helical compression springs 26 and 28 are inserted between the bottom of the base cavity and the respective button 22 and 24 to bias the buttons outwardly of the switch.

A central button 30 is provided for the switch and is guided for vertical movement by projections (not shown) in the cover 4. Button 30 has a rounded depending portion 30a which overlies the movable contact 14. A helical compression spring 32 biases button 30 outwardly of the switch.

Although the switch may have several applications, a primary intended use is with a motor reversing switch. The latter switch commonly comprises two electromagnetically operated contactor switches each having a normally open set of maintaining contacts connected around its electromagnetic coil and a normally closed set of contacts connected in the line to the electromagnetic coil of the other contactor. The two contactors further have sets of normally open contacts for connecting the motor to the supply line, the contacts of one contactor being wired oppositely or in reversed phase sequence of the other contactor to cause the motor to be run in different rotational directions. In use with a motor reversing switch, the right-hand button 22 is designated the reverse switch, the left-hand button is designated the forward switch and the center button is the stop switch to turn off the motor. Electricity is supplied to the switch through lead 14a and movable contact 14 to stationary contact 12 and the movable contact member 10. Leads 8a and 6a are connected to the forward and reverse coils of the reversing switch, respectively, and lead 10c is connected to a common connection on the reversing switch leading to the maintaining contacts for each coil.

As an exemplary operation the reverse button 22 is depressed as shown in FIG. 4. The rounded lower portions engage the upper surface of right-hand end portion 10a of movable contact member 10 to depress that portion into circuit making engagement with stationary contact 6. It can be seen that the upper rounded portion 22b of the central slot in button 22 has engaged the right-hand end of the interlock bar 20 to rotate the bar clockwise a small amount.

While circuitry can be provided within the reversing switch to open the circuit to one coil whenever the other is being energized, it is a function of the controlling switch to prevent both coils from being energized at the same time by simultaneous depression of both the forward and reverse buttons. As shown in FIG. 5, the reverse button 22 is depressed to its circuit operating position as shown in FIG. 4, and forward button 24 is partially depressed without causing the left-hand portion 10b of movable contact 10 to engage the stationary contact 8. Upper rounded portion 24b of the central slot in button 24 engages the left-hand end of interlock bar 20 to pivot the bar now about the portion 22b on fully depressed button 22. This pivotal movement drives contact 14 downward, opening the

circuit to the switch and to the reversing switch to stop the motor. Thus it is to be seen that whenever one button is depressed, the other button will open the contacts 12—14 before the respective movable contact 10a or 10b will make contact with stationary contact 6 or 8.

We claim:

1. A pushbutton selector switch and interlocking means therefor comprising, in combination:

- a pair of normally open contact sets;
- a pair of pushbuttons each individually depressible to operate a respective one of said pair of normally open contact sets to a closed condition;
- a normally closed contact set;
- means electrically connecting said pair of normally open contact sets to an electrical supply source through said normally closed contact set;
- a rigid member pivotally mounted upon said normally closed contact set and extending under each of said pair of pushbuttons; and

wherein depression of one of said pair of pushbuttons to operate a respective one of said pair of normally open contact sets pivots said rigid member about its connection to said normally closed contact set and the subsequent depression of the other of said pair of pushbuttons while said first mentioned pushbutton remains depressed pivots said rigid member about its point of engagement with said first mentioned pushbutton to effect an opening operation of said normally closed contact set through the pivotal connection between said rigid member and said normally closed contact set.

2. The combination according to claim 1 together with a third pushbutton depressible to operate said normally closed

contact set to an open condition thereof independently of said rigid member.

3. A momentary pushbutton selector switch comprising, in combination:

- 5 an insulating housing;
- a pair of pushbuttons mounted within said housing and biased outwardly thereof;
- a pair of normally open contact sets each positioned adjacent a respective one of said pair of pushbuttons, said normally open contact sets being individually operable to a closed condition thereof upon depression of the respective one of said pair of pushbuttons;
- a third pushbutton located between said pair of pushbuttons and biased outwardly of said housing;
- 15 a normally closed contact set positioned adjacent said third pushbutton and being operable to an open condition thereof upon depression of said third pushbutton;
- an interlock member having a pivotal connection to the movable contact of said normally closed contact set, said interlock member extending in opposite directions within said housing to underlie each of said pair of pushbuttons; and
- 20 wherein depression of one of said pair of pushbuttons pivots said interlock member about said pivotal connection and subsequent depression of the other of said pair of pushbuttons while the first depressed pushbutton remains depressed pivots said interlock member about its point of engagement with said first depressed pushbutton to effect opening of said normally closed contact set before the other normally open contact set is closed by the other bush pushbutton.

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