

July 22, 1969

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3,457,377

MULTIPLE PUSHBUTTON SWITCH

Filed Aug. 7, 1968

2 Sheets-Sheet 1

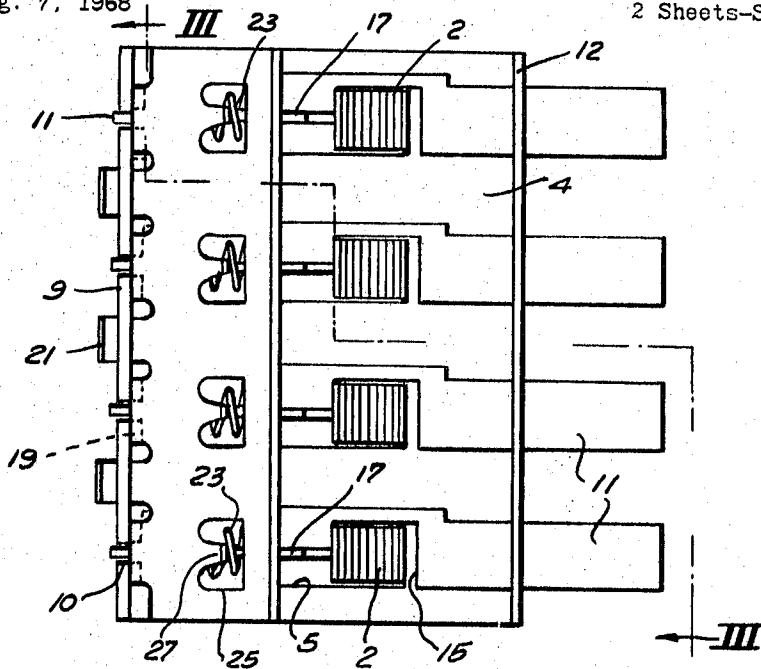


Fig. 1.

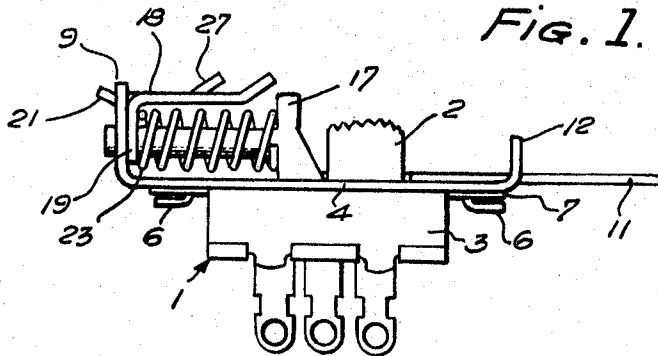


Fig. 2.

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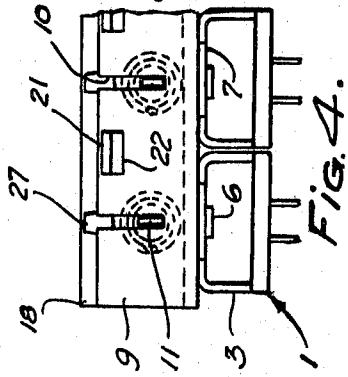


FIG. 4.

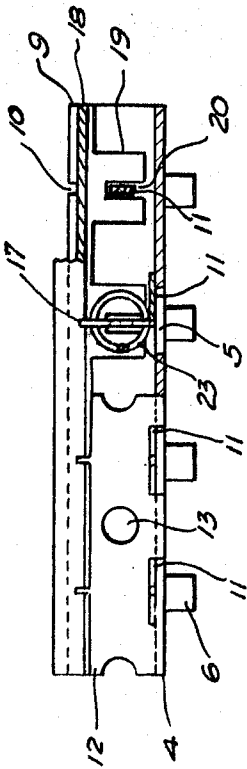


FIG. 3.

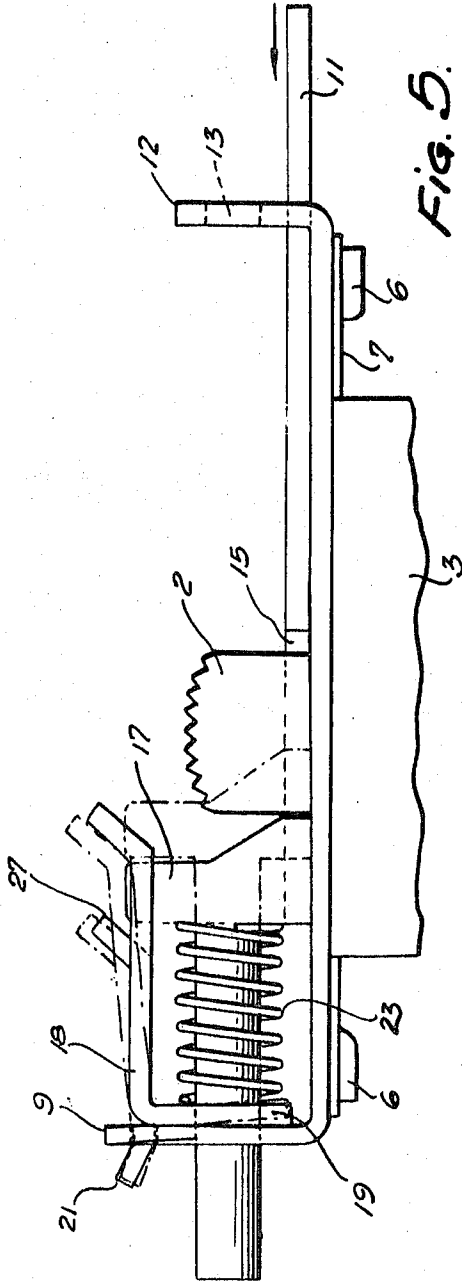


FIG. 5.

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**MULTIPLE PUSHBUTTON SWITCH**

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6 Claims

**ABSTRACT OF THE DISCLOSURE**

A bracket that supports a plurality of slide switches side by side has a back flange, in which the rear ends of switch knob actuating plungers are slidably mounted. The plungers are provided with locking tabs projecting away from the switches, and a coil spring encircles each plunger behind its tab. A tiltable latch bar behind the tabs has a locking portion extending across the springs, and rear portions extending between the springs and flange so that the springs press them toward the flange. Each of the tabs is adapted to engage the front edge of the bar and tilt it when the tab is pushed rearwardly by a plunger. When the tab reaches an opening in the bar the springs will tilt the bar back to its normal position to prevent the tab from moving forward.

It is among the objects of this invention to provide a multiple pushbutton switch, in which conventional slide switches can be used without alteration, in which a tiltable locking bar is urged toward locking position by the same springs that urge the switch-actuating members forward, and in which the pressure required to operate the switch is readily adjustable.

The preferred embodiment of the invention is illustrated in the accompanying drawings, in which

FIG. 1 is a plan view of the switch;

FIG. 2 is a side view;

FIG. 3 is a combination front view and section taken on the line III—III of FIG. 1, without the slide switches in place;

FIG. 4 is a fragmentary rear view of the switch; and

FIG. 5 is an enlarged side view showing one of the switches in its rear or on position.

Referring to FIGS. 1 to 4 of the drawings, a plurality of conventional slide switches 1 provided with upwardly projecting actuating knobs 2 that are movable lengthwise of the switch housings 3 are supported side by side in a row by means of a bracket. The slide switches, for example, may be similar to those shown in Patent 2,762,880. Preferably, the bracket has a flat body 4 provided with a row of rectangular openings 5 for receiving the knobs of the slide switches, the tops of which are firmly held against the bottom of the bracket by any suitable means, such as spot welds or lugs 6 struck down out of the bracket and extending through holes in end extensions 7 of the switch housings. The lugs are bent upwardly against the extensions to attach the switches to the bracket.

Behind the switch the bracket has an upwardly extending back flange 9 that is provided with a downwardly extending slot 10. Behind each switch knob slidably mounted in each of those slots is the rear end of a plunger 11 that extends forward across the bracket and away from its front. Preferably, the bracket also is provided with a front flange 12 having openings therein, through which the front ends of the plungers extend. The front flange also may be provided with holes 13 to receive fasteners for attaching the bracket to a support.

Each plunger is provided with a recess 15 that receives one of the switch knobs, as shown in FIG. 1. The portion of each plunger in front of its recess rests flat on the body

of the bracket and is adapted to carry a pushbutton (not shown) on its front end. The plunger extends rearwardly past one side of the knob and then inwardly part way across the back of the knob. This forms the recess, through which the knob extends. Behind the knob the plunger is bent upwardly on a longitudinal axis to form a vertical portion that extends on back through a slot 10 in the back flange of the bracket. Consequently, the front and rear portions of the plunger lie in planes that are at right angles to each other.

Directly behind the knobs each plunger is provided with an upwardly projecting locking tab 17, behind which there is a latch bar that has a locking portion 18 above the plungers and substantially parallel to the bracket body, except that the front edge of the bar is inclined upwardly away from the plungers. The bar also has downwardly bent rear portions 19 that normally are in flat engagement with the back flange of the bracket. These portions are provided with upwardly extending slots 20 so that they can straddle the plungers. Between the tops of these rear portions of the latch bar there are rearwardly extending tongues 21 that extend back through openings 22 in the back flange and then upwardly to pivotally connect the bar to the flange so that it can be tilted up and down.

It is a feature of this invention that coil springs 23 encircle the plungers between the slotted portions 19 of the latch bar and the locking tabs 17 on the plungers. The springs therefore urge the plungers and knobs forward to their front position and simultaneously press the slotted rear portions of the bar against the back flange of the bracket to hold the front edge of the bar in its normal lower position.

To assemble this pushbutton switch after the slide switches have been attached to the bracket, the coil springs are slipped over the rear ends of the plungers, the latch bar is placed over the springs with its slots receiving the plungers, and then the front ends of the plungers are inserted on a slant in the openings in the front flange of the bracket. The plungers then are swung down to fit them around the switch knobs and into bracket slots 10 while the latch bar is pressed forward so that its tongues 21 can be inserted in back flange openings 22. As soon as the tongues are in position to enter those openings the latch bar is released and the springs will move it back to connect it to the flange behind it. The bar then holds the plungers in slots 10.

When any one of the plungers is pushed rearwardly by pressure applied to its front end, its locking tab 17 first engages the inclined front edge of the latch bar and then slides rearwardly under it, which tilts up the front edge of the bar as shown in dotted lines in FIG. 5. At the same time, the plunger pushes the associated switch knob rearwardly to its rear position. By the time the knob has reached that position, the locking tab has reached an opening 25 in the latch bar, which permits the coil springs to expand and swing the front edge of the latch bar back down with the locking tab projecting up through the bar opening as shown in FIG. 5. The front wall of this opening prevents the tab and plunger from moving forward.

When another plunger is pushed rearwardly, its locking tab will tilt up the latch bar again and allow the locking tab that was in an opening 25 to escape and be moved forward as the underlying coil spring expands. This will return the switch knob to its original forward position. Thus, every time a switch knob is locked in its rear position by a depressed plunger, another locked knob is released and allowed to return to its front position.

Inclined forward and upward from the back of each of the openings 25 in the latch bar is a release tongue 27. Ordinarily, these tongues will not be used. They are useful only in case someone pushes all of the plungers back at the same time so that all of them are locked in their rear

position, leaving none to engage the front edge of the latch bar in order to tilt it and release the other depressed plungers. In such an emergency, any one of the depressed plungers can be pushed back still farther to cause its locking tab to engage the release tongue behind it and tilt the latch bar so that the other locking tabs can escape from openings 25 and move forward.

There are four big advantages to the switch disclosed herein. One is that ordinary slide switches can be used, so that special slide switches suitable only for this use are not required. A second advantage is that only one spring per slide switch is needed, instead of a switch for urging the switch slide forward and another spring for resisting tilting of the latch bar. The third advantage is that the coil springs, by holding latch bar tongues 21 in the bracket openings 22, serve to connect the bar and plungers and springs to the bracket without additional fastening means. The remaining advantage is that without changing the springs, the pressure required to push in the plungers can be varied. This is done by omitting or removing one or more of the slotted rear portions 19 of the locking bar so that less than the total number of springs are effective in resisting tilting of the locking bar, with the result that it requires less pressure to push the plungers. Another phase of the same advantage is that the switch can be made responsive to the same actuating force, regardless of the number of slide switches used, because the number of slotted portions 19 do not need to be increased as slide switches are added, so the added coil springs do not increase the resistance of the locking bar to tilting. These four advantages result in a simpler, less expensive and more adaptable pushbutton switch than known heretofore.

According to the provisions of the patent statutes, I have explained the principle of my invention and have illustrated and described what I now consider to represent its best embodiment. However, I desire to have it understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

I claim:

1. A multiple pushbutton switch comprising a plurality of slide switches disposed side by side in a row, each switch having a projecting actuating knob movable forward and backward and normally located in its forward position, a bracket rigidly supporting the switches and having a back flange behind said knobs, a knob-actuating plunger for each switch provided with a recess receiving the switch knob, the plungers having rear ends slidably mounted in said flange and having front ends extending forward from the switches, each plunger also being provided with a locking tab projecting away from the associated switch, a coil spring encircling each plunger behind its locking tab, and a tiltable latch bar behind said tabs having a locking portion extending across the side of the springs farthest from the bracket, the bar having rear portions extending between said flange and at least some

of the springs and provided with openings through which the plungers extend, said springs pressing said rear portions toward the flange, the latch bar having behind its front edge a tab-receiving opening behind each locking tab, and each of said tabs being adapted to engage said front edge of the bar and tilt the bar when the tab is pushed rearwardly by its plunger, whereby when the tab reaches the adjacent tab-receiving opening the springs will tilt the bar back to its normal position to prevent the tab from moving forward until another tab tilts the bar.

2. A multiple pushbutton switch according to claim 1, in which said bracket covers the switches and has openings therethrough for said knobs, the bracket is provided with a front flange substantially parallel to said back flange, and the front flange is provided with openings slidably receiving the front ends of the plungers.

3. A multiple pushbutton switch according to claim 1, in which said rear portions of the latch bar are substantially perpendicular to its locking portion and normally are pressed flat against said bracket flange by the coil springs.

4. A multiple pushbutton switch according to claim 1, in which said bracket flange is provided with openings behind said locking portion of the latch bar, and the latch bar has tongues extending loosely through said flange openings to pivotally connect the bar to the flange.

5. A multiple pushbutton switch according to claim 4, in which said bracket flange is provided with slots receiving the plungers, said slots being open at the free edge of the flange to permit insertion of the plungers laterally.

6. A multiple pushbutton switch according to claim 1, in which said bracket is provided with a front flange substantially parallel to said back flange and having openings therethrough slidably receiving the front ends of the plungers, the bracket between its flanges is provided with openings receiving said knobs, the back flange is provided with slots slidably receiving the rear ends of the plungers, said slots are open at the free edge of the back flange, the back flange is provided between said slots with openings behind said locking portion of the latch bar, and the latch bar has tongues extending loosely through said last-mentioned openings to pivotally connect the bar to the back flange and thereby lock the plungers in said slots.

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