

Sept. 10, 1963

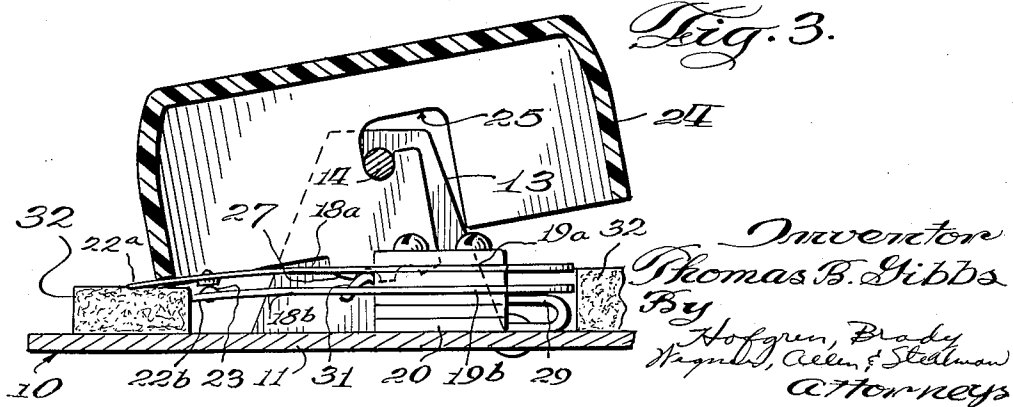
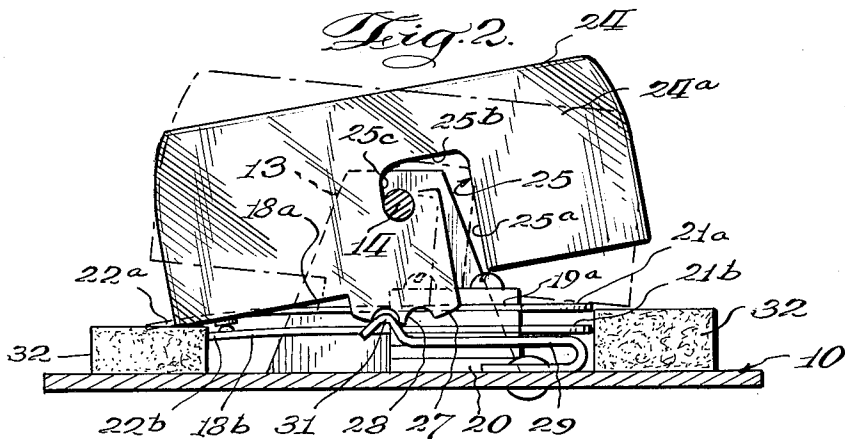
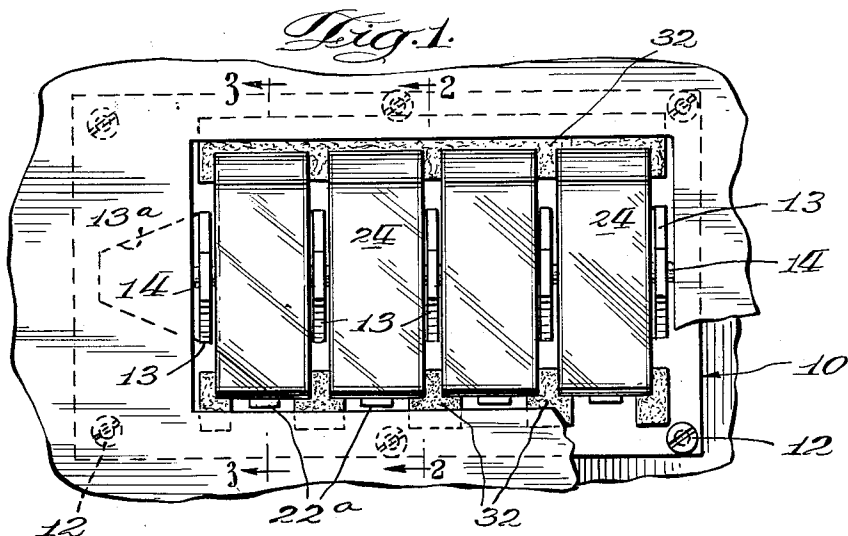
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3,103,570

STOP SWITCH

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2 Sheets-Sheet 1



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Fig. 4.

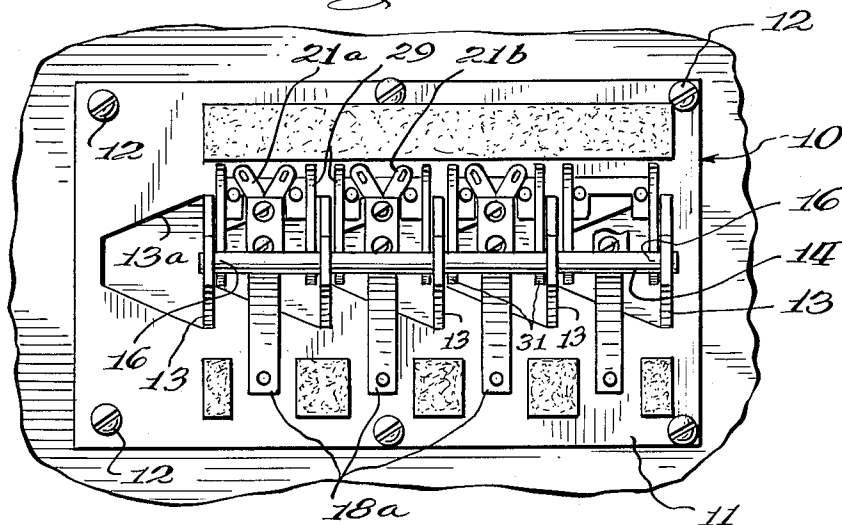


Fig. 5.

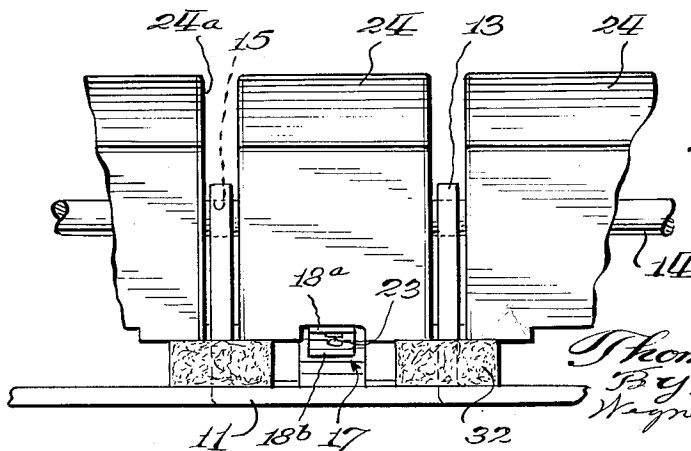
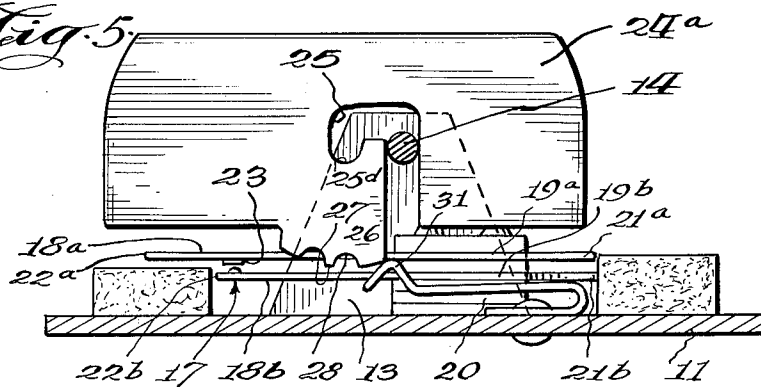


Fig. 6.

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STOP SWITCH

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3 Claims. (Cl. 200-172)

This invention relates to a switch and more particularly to a multiple switch with separately removable actuating members, as may be used in an electrical musical instrument.

In an electrical musical instrument, as an electric organ, manually operable rockers actuate switches which complete circuits that selected desired tone patterns and perform other control functions. Often six or eight switches are mounted in a bank on a panel with the actuator or rocker members mounted on a single rod which extends through holes in opposite side walls of the actuator. If one of the switches requires repair or replacement, the mounting rod must be removed and all of the actuators disassembled.

It is a principal object of this invention to provide a new and improved switch actuator mounting.

One feature of the invention is that the actuators are individually removable, having a surface with a bayonet-type slot adapted to receive the mounting rod. Spring means bear against a side of the actuator opposite to the terminating portion of the slot and retain the actuator on the rod.

Another feature is that the rod is carried by a base plate having mounting flanges stamped therefrom and bent outwardly to provide a simple and economical construction.

Still another feature is the provision of resilient cushions on opposite sides of the key actuator to limit the rocking movement thereof.

Further features and advantages of the invention will readily be apparent from the following specification and the drawings, in which:

FIGURE 1 is a fragmentary plan view of a tone or stop selector panel of an electrical musical instrument, partially broken away and embodying the invention;

FIGURE 2 is an enlarged sectional view along line 2-2 of FIGURE 1 and showing in broken outline an alternate position of the actuator;

FIGURE 3 is an enlarged sectional view along line 3-3 of FIGURE 1;

FIGURE 4 is a fragmentary plan view similar to that of FIGURE 1 with the actuators removed;

FIGURE 5 is an enlarged sectional view of the selector keyboard similar to FIGURE 2 illustrating a position of the actuator during removal from or attachment to the mounting rod; and

FIGURE 6 is an enlarged fragmentary front elevational view of the selector panel.

The mechanism of the preferred embodiment of the invention disclosed herein may be used in many situations requiring the panel mounting of one or more rocker actuated switches. It is particularly designed for the control switch panel of an electronic organ, including the tone selection or stop switches and other control or special effect switches.

Turning to the drawings and more particularly to FIGURES 1 and 4, a stop selector panel 10 is shown, including a flat base plate 11 secured to a manual of the organ instrument by suitable fasteners 12. The base plate has truncated triangular-shaped brackets 13 stamped out from openings 13a and bent upwardly to form supports for a continuous mounting rod 14 extending through aligned openings 15 (FIGURE 6) in the upper portion of each bracket.

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A plurality of stop switches 17 are mounted on the base plate with one switch located between each pair of adjacent flanges 13. Each stop switch comprises a pair of resilient conductive switch blades 18a and 18b positioned one above the other in slightly spaced parallel relation. Adjacent ends 19a and 19b of the switch blades are secured to an insulating block 20 fastened to the base plate and have terminals 21a and 21b diverging outwardly for connection of electrical leads (not shown) connecting the switch with circuits to be controlled. The upper switch blade has a free end 22a overhanging the free end 22b of the lower blade and each has contacts 23 for engagement when the blades are brought together.

Heretofore, the switch actuators have been provided with holes in the actuator through which the mounting rod extends, preventing access to a switch without disassembling all or most of the actuators. In accordance with the invention the switch actuators 24 are separately removable. Each actuator is of a hollow, generally rectangular configuration and open at the bottom. The corners formed between the top and opposite ends of the actuators are slightly rounded to facilitate engagement by an operator's finger.

A bayonet slot 25 is formed in each side wall 24a of each actuator, the slots being aligned to receive the mounting rod 14 extending laterally therethrough. Each slot includes a position 25a extending upwardly from the bottom edge of side wall 24a, along a line offset from the center of the actuator, a portion 25b extending longitudinally of the actuator and a portion 25c extending along the center line of the actuator, generally parallel with portion 25a, toward the bottom edge of the side wall. Slot portion 25c terminates in a bearing surface 25d which fits against mounting rod 14. Extensions 26 depend from an intermediate portion of each side wall of the actuator and each has an arcuate surface 27 against which a spring 29 bears, cooperating with the bayonet slots 25, to hold the actuators on the rod. The spring 29, which is fastened to the base plate 11, has spaced spring arms 30 extending below the side walls of one actuator; each spring arm has a nose portion 31 bearing against the arcuate surface 27 or engaging one of the detents 28 in the surface to lock the actuator in a desired position.

The actuator is operated by manually pushing the upper end downwardly, reversing its position. In the full line position of FIGURE 2, the left-hand end of the actuator engages the upper switch blade 18a forcing it downward to bring together the contacts 23 and completing a desired control circuit. Resilient cushions 32, as of foam rubber are mounted on the base plate 11 at opposite ends of the actuators and limit the rocking movement of the actuators. As shown in FIGURE 2, the resilient cushions also engage the upper switch blade 18a in the depressed position.

An important feature of the present invention is the ease with which any one of the actuators may be removed and replaced providing access to a switch needing repair or replacement. To accomplish removal, the actuator is pressed downwardly against the spring as shown in FIGURE 5, causing the mounting rod to raise within the bayonet slot. Further manipulation of the actuator key will bring the mounting rod through slot 25, dismounting the actuator.

To mount or reinstall an actuator on the mounting rod, it is manipulated so that the rod enters the slot and travels therethrough toward the closed slot end. The actuator should be manipulated so that the arcuate surfaces of the actuator side walls may engage the spring before the rod reaches the end of the slot. Pressing of the actuator against the spring with some side movement will cause the rod to trace the remainder of the slot and

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engage the slot end. Upon release of the actuator, the spring will urge the actuator so that the end of the slot will be maintained against the rod and held in mounted position.

While I have shown and described certain embodiments of my invention, it is to be understood that it is capable of many modifications. Changes, therefore, in the construction and arrangement may be made without departing from the spirit and scope of the invention as disclosed in the appended claims.

I claim:

1. An electric switch comprising a base, switch means mounted upon said base, said switch means being of the type which changes its contact relationship when an element is depressed and which changes back to the original contact relationship when said element is released, pin means spaced from said base and secured thereto and defining a pivoting axis, a switch cover having a top and downwardly extending end and side walls, the side walls of said cover being formed to provide aligned slots, each slot having a long generally upwardly extending portion extending from an intersection with the side wall lower edge and joined to a longitudinally extending portion joined in turn to a short downwardly extending portion, each of said slots throughout its length being of a width to loosely slide over said pin means and the short downwardly extending portions having closed ends at approximately the center of said side walls in a front-to-back direction, spring means secured to said base in a position adjacent said switch means, said spring means having a free portion adjacent the normal plane through the axis of said pin means, said free portion being adapted to bear against said cover to urge said cover in an outward direction away from said switch means to hold said closed ends against said pin means, means for limiting fore and aft rocking motion of said cover about said pin means, and said cover having a portion adapted to engage and depress said switch element when said cover is rocked to its limit in one direction and to release said switch element when rocked to its limit in the other direction.

2. An electric switch comprising a base, switch means mounted upon said base, said switch means being of the type which changes its contact relationship when an element is depressed and which changes back to the original contact relationship when said element is released, pin means spaced from said base and secured thereto and defining a pivoting axis, a switch cover having a top and downwardly extending end and side walls, the side walls of said cover being formed to provide aligned slots, each slot having a long generally upwardly extending portion extending from an intersection with the side wall lower edge and joined to a longitudinally extending portion joined in turn to a short downwardly extending portion, each of said slots throughout its length being of a width to loosely slide over said pin means and the short downwardly extending portions having closed ends at approximately the center of said side walls in a front-to-back direction, spring means secured to said base in a position

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adjacent said switch means, said spring means having a free portion adjacent the normal plane through the axis of said pin means, said free portion being adapted to bear against said cover to urge said cover in an outward direction away from said switch means to hold said closed ends against said pin means, means for limiting fore and aft rocking motion of said cover about said pin means, said cover having a portion adapted to engage and depress said switch element when said cover is rocked to its limit in one direction and to release said switch element when rocked to its limit in the other direction, and detent means having an over-center action for resiliently retaining said cover in the two limiting positions.

3. An electric switch comprising a base, switch means mounted upon said base, said switch means being of the type which changes its contact relationship when an element is depressed and which changes back to the original contact relationship when said element is released, pin means spaced from said base and secured thereto and defining a pivoting axis, a switch cover having a top and downwardly extending end and side walls, the side walls of said cover being formed to provide aligned slots, each slot having a long generally upwardly extending portion extending from an intersection with the side wall lower edge and joined to a longitudinally extending portion joined in turn to a short downwardly extending portion, each of said slots throughout its length being of a width to loosely slide over said pin means and the short downwardly extending portions having closed ends at approximately the center of said side walls in a front-to-back direction, spring means secured to said base in a position adjacent said switch means, said spring means having a free portion adjacent the normal plane through the axis of said pin means, said free portion being adapted to bear against said cover to urge said cover in an outward direction away from said switch means to hold said closed ends against said pin means, means for limiting fore and aft rocking motion of said cover about said pin means, said cover having a portion adapted to engage and depress said switch element when said cover is rocked to its limit in one direction and to release said switch element when rocked to its limit in the other direction, said cover being adapted to slide across the free end of said spring as said cover is rocked, and said cover being formed to provide a hump over which said free end slides so that an over-center action is provided to retain said cover at its rocking limits.

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