

Nov. 26, 1968

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3,413,431

SNAP ACTION SLIDE SWITCH

Filed June 29, 1967

2 Sheets-Sheet 1

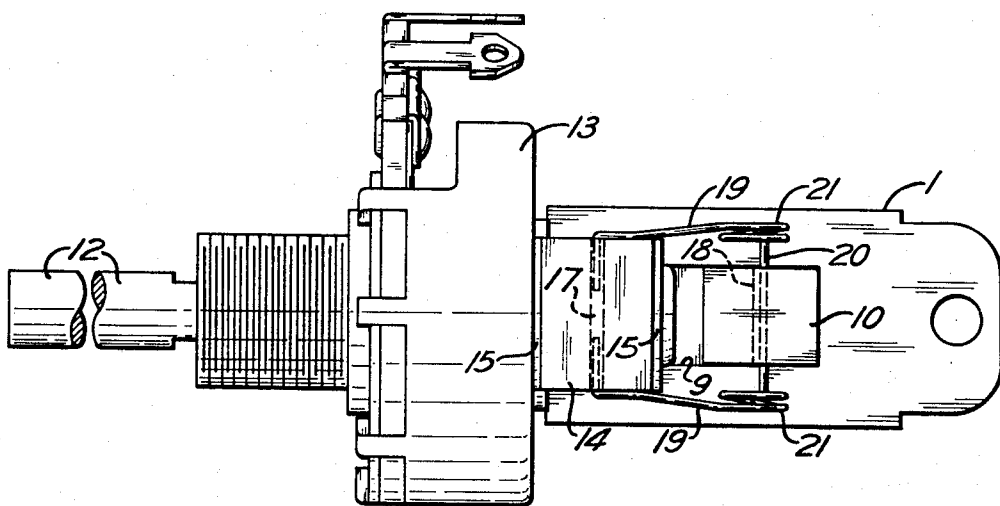


Fig. 1

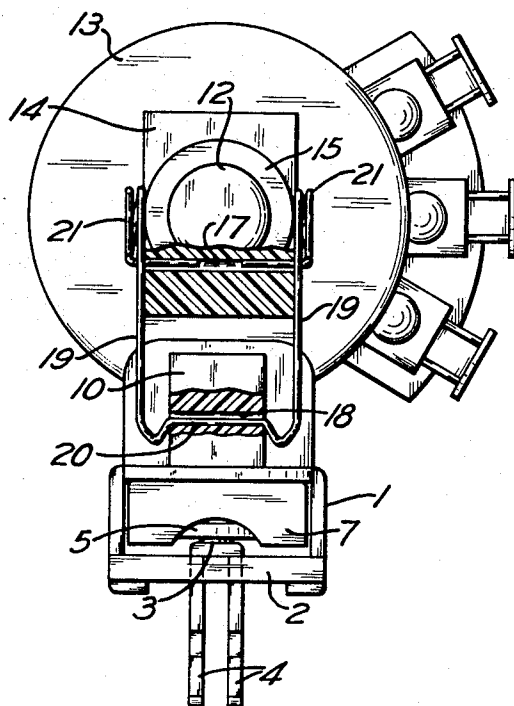


Fig. 2

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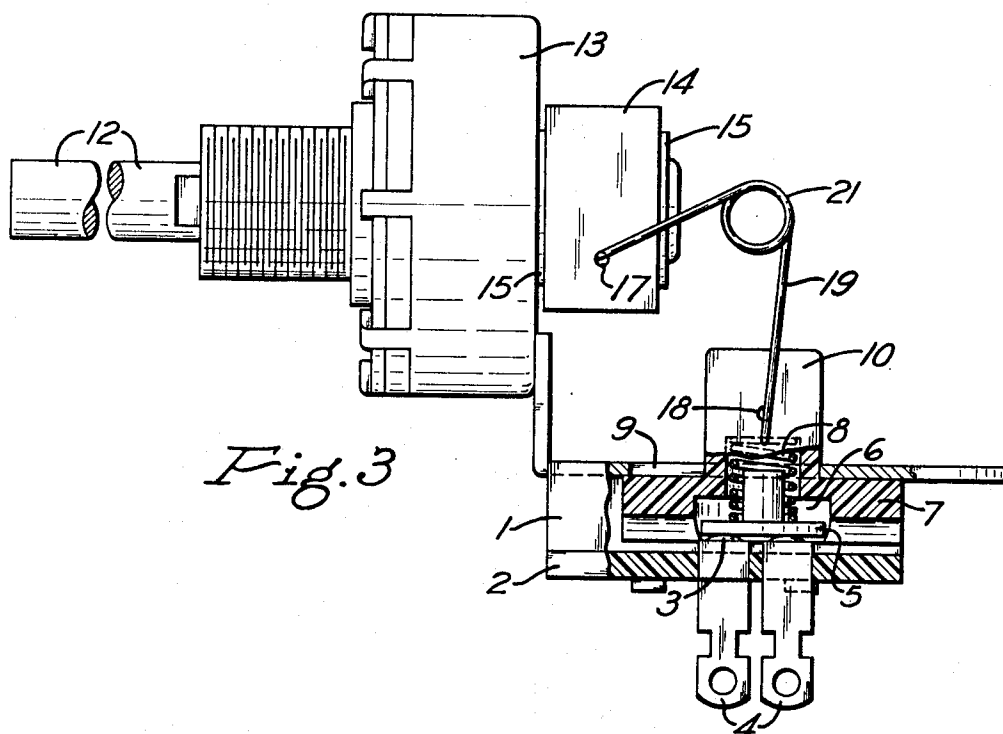


Fig. 3

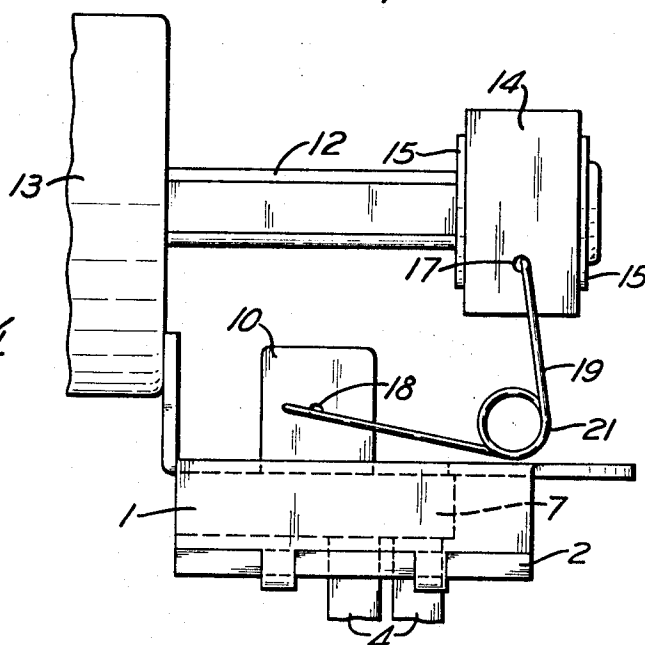


Fig. 4

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SNAP ACTION SLIDE SWITCH

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5 Claims. (Cl. 200—172)

ABSTRACT OF THE DISCLOSURE

Switch control means is mounted beside the movable contact carrier of a slide switch for movement parallel to the movement of the carrier. An over-center snap spring connected to the control means and the carrier at predetermined anchor points normally holds those points their maximum distance apart. When the control means is moved in either direction, the spring will snap the contact carrier in the opposite direction.

It is among the objects of this invention to provide a snap switch which is very inexpensive and which has a much longer life than conventional snap switches.

Referring to FIGS. 1 to 3 of the drawings, a conventional slide switch has a metal housing 1 provided with an insulating base 2 on which are mounted two or more fixed contacts 3 connected to terminals 4 projecting through the base. Slidable across these contacts in a straight line is a movable contact 5 that extends loosely up into an opening 6 in the center of a slide or carrier 7 which can move back and forth in the housing. The movable contact is pressed against the fixed contacts by a spring 8. The top of the housing is provided with a longitudinal slot 9, through which a button 10 projects from the carrier. By moving this button back and forth in the slot, the switch can be actuated.

In accordance with this invention, a support is provided at one end of the switch for supporting control means for operating the switch. The control means may include a shaft 12 that is movable axially. In most cases this shaft will be the rotatable control shaft of a conventional variable resistor unit 13, which is attached to one end of the switch housing and forms the support for the shaft. The shaft extends entirely through the resistor unit and can be moved lengthwise in it. The portion of the shaft extending through the resistor unit is flattened so that it can rotate the movable contact (not shown) of the unit in order to vary the resistance. Mounted on the reduced end of the shaft adjacent the switch is a block 14 in which the shaft can turn. Axial movement of the shaft in the block is prevented by washers 15.

The block and the contact carrier button 10 are provided with parallel transverse openings 17 and 18, respectively, that serve as anchor points for an over-center snap spring. Various kinds of snap springs can be used, but the one found most suitable for this application is made from a length of spring wire which has been bent to form two side portions 19 in substantially parallel planes and connected at one end by a central portion 20 that extends through one of the openings, preferably the one in the button as shown in FIG. 2. The free ends of the wire are bent toward each other and project into the opening or openings in the block. The side portions 19 of the spring are bent into a generally V-shape contour that is nearly inverted while the block and button are in the positions shown in FIG. 3. The sides of the V are connected by an integral coil 21. The contour of the spring is such that when the block is moved back across the carrier button the spring will first be compressed and then, as block opening 17 crosses button opening 18, the

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spring will suddenly expand and snap the button forward to the position shown in FIG. 4. When the control shaft is pulled forward, the spring will be compressed until its anchor points pass each other and then the spring will expand and snap the contact carrier back to its rear position again.

It will be seen that the same shaft that operates a variable resistor unit can be used as a push-pull shaft for operating the slide switch, which the spring snaps from one position to another. Such a slide switch has been found to have a life as much as ten times greater than the usual toggle or rotatable snap switch. It also is a very inexpensive switch to make and the conversion of it from an ordinary slide switch to a snap switch likewise is inexpensive.

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. In combination with an electric slide switch having a movable switch contact slidable across laterally spaced stationary contacts in a housing, a carrier in the housing for the movable contact, and a button projecting out of the housing from the contact carrier for moving the carrier back and forth in a straight line to reciprocate the movable contact; an axially movably control shaft beside the switch parallel to said line and having one end movable back and forth across said button, means connected to the switch housing slidably supporting the shaft, an over-center snap spring outside of said housing connected to said button at a predetermined anchor point, and means connecting the spring to said end of the shaft at another anchor point, said spring normally holding said anchor points their maximum distance apart and being formed to snap the contact carrier in the opposite direction whenever said last-mentioned anchor point is moved in either direction across said button.

2. In the combination recited in claim 1, said last-mentioned means including a block mounted on said end of the control shaft, said button and block being provided with a pair of parallel openings extending transversely of the shaft to form said anchor points, and said spring being made of spring wire with its ends projecting into one of said openings and its central portion extending through the other opening, the two portions of the spring between said openings being substantially parallel and each having a central loop and legs diverging therefrom toward the button and block.

3. In the combination recited in claim 1, said shaft-supporting means including a variable resistance unit in which said shaft is rotatably as well as slidably mounted and projects from opposite sides thereof, and said connecting means including a block mounted on said end of the shaft and provided with one of said anchor points for the spring, the shaft being rotatable in said block.

4. In the combination recited in claim 1, said shaft-supporting means including a variable resistance unit in which said shaft is rotatably as well as slidably mounted and projects from opposite sides thereof, said connecting means including a block mounted on said end of the shaft, and said button and block being provided with a pair of parallel openings extending transversely of the shaft and receiving portions of said spring to form said anchor points, the shaft being rotatable in the block.

5. In a switch according to claim 4, said spring being made of spring wire having its ends projecting into one of said openings and its central portion extending through

the other opening, the portions of the spring between said openings being substantially parallel and V-shape.

References Cited

UNITED STATES PATENTS

857,186	6/1907	Mayer	-----	200—76
1,930,980	10/1933	Maibohm.		
2,849,558	8/1958	Chapman.		
3,017,471	1/1962	Karch	-----	200—76

3,196,230	7/1965	Barden et al.	-----	200—76
3,286,050	11/1966	Campbell et al.	-----	200—76

FOREIGN PATENTS

5	777,267	6/1957	Great Britain.
	1,147,613	6/1957	France.

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