

June 19, 1956

W. E. BROWN ET AL

2,751,468

SWITCH

Filed May 27, 1952

2 Sheets-Sheet 1

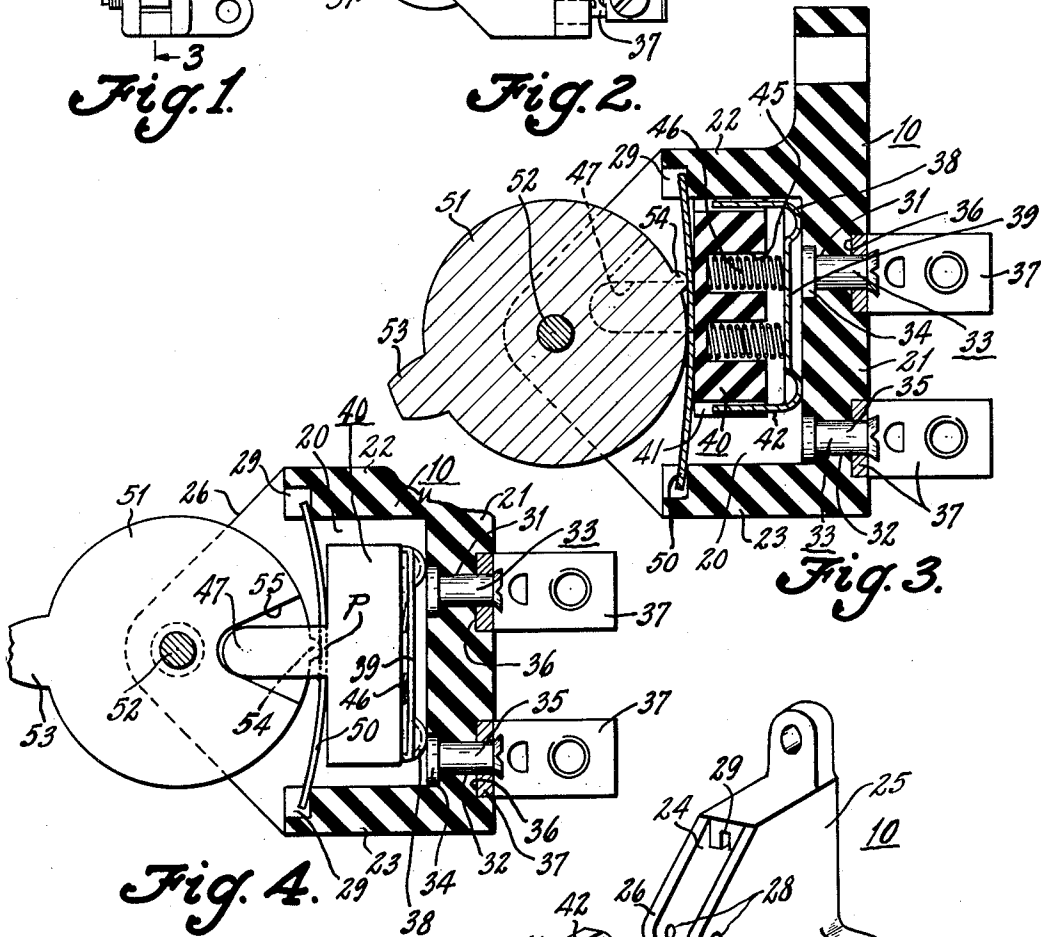
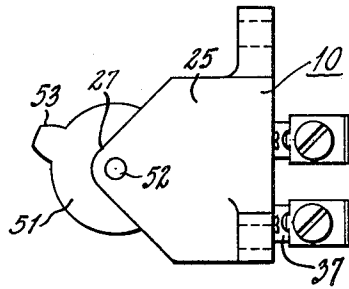
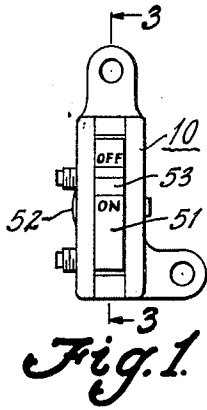


Fig. 4.

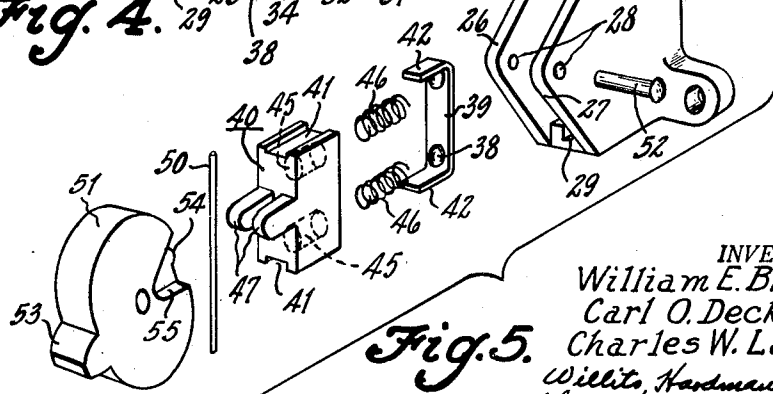


Fig. 5.

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2 Sheets-Sheet 2

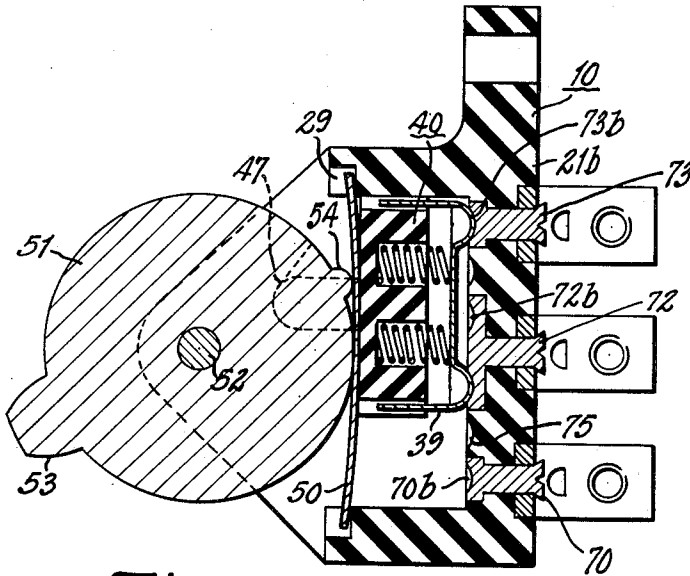


Fig. 8.

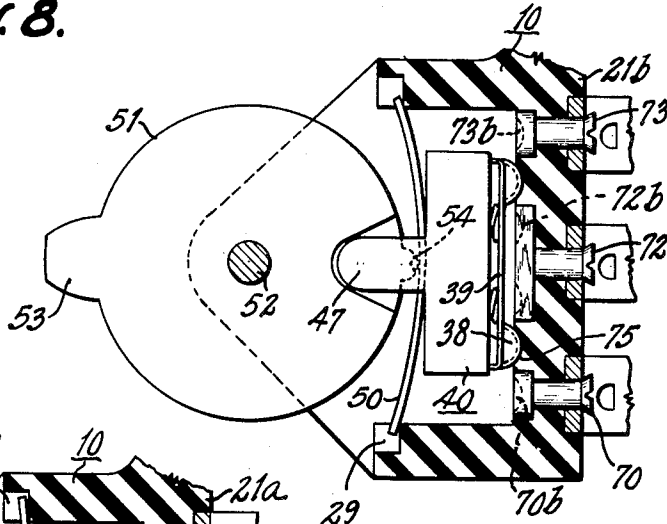


Fig. 7.

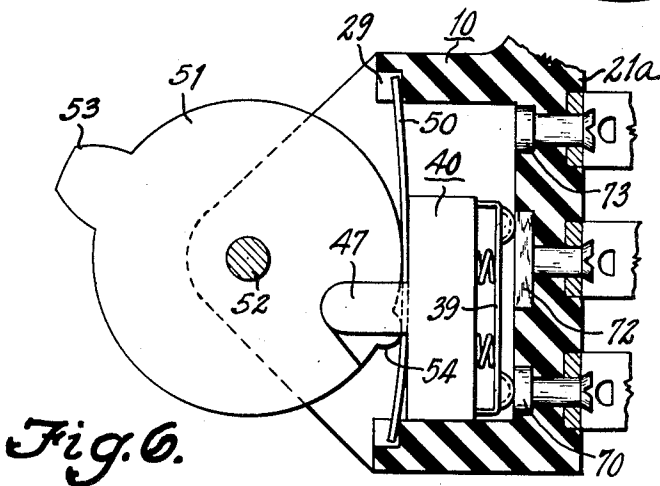


Fig. 6.

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2,751,468

SWITCH

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2 Claims. (Cl. 200—154)

This invention relates to improvements in selector electric switches.

An object of the present invention is to provide a novel switch mechanism of the character set forth wherein the switch actuating means is spring biased to either one of two side positions.

In carrying out the above object it is a further object of the invention to provide a switch employing a housing, a plurality of contacts mounted on the housing and an actuator pivotally mounted on the housing to swing from either one of two opposite side positions through a medial or neutral position to establish different circuit connections. Sometimes it is desirable to have the switch remain in the neutral position wherein the actuator has to be moved from either side position to the medial position, and then the actuator is automatically moved to a side position after the actuator is moved slightly beyond the medial position.

Another object of the invention is to design and construct a one-piece switch housing, a one-piece contact carrier and a one-piece actuator, preferably consisting of insulating material, the said housing being designed and constructed whereby the actuator is pivotally supported by the housing and said housing limits the distance the carrier travels in each direction.

Another object of the present invention is to provide a switch in which wiping action takes place when the switch is closed or opened.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawing, wherein a preferred embodiment of the present invention is clearly shown.

In the drawings:

Fig. 1 is an end view of the switch embodying the present invention.

Fig. 2 is a side view of the switch shown in Fig. 1.

Fig. 3 is an enlarged sectional view of the switch taken on line 3—3 of Fig. 1.

Fig. 4 is a view similar to Fig. 3 but showing the actuator of the switch in an intermediate position.

Fig. 5 is a detail projection, in perspective, of the switch elements.

Fig. 6 is a sectional view of another embodiment of the invention.

Fig. 7 is a sectional view corresponding to Fig. 6, but showing another embodiment of the invention and showing the switch in off position.

Fig. 8 is the same as Fig. 7 with the switch in one of its contacting positions.

Referring to Figs. 1 through 5, 10 designates a switch case preferably formed with a rectangular recess 20 to provide a bottom wall 21, integral end walls 22 and 23, and integral with side walls 24 and 25 having extensions 26 and 27, respectively, formed with openings 28. The end walls 22 and 23 are formed with diametrically opposed notches 29. The bottom wall is formed with a

pair of spaced counterbored openings 31 and 32, each opening receives a terminal 33 having a head 34 and a shank 35. The outer face of the wall 27 is formed with a pair of recesses 36 to receive L-shaped outer terminals 37 which are electrically secured to the terminals 33 by upsetting or expanding the shanks thereover, as shown in Figs. 3 and 4.

The inner face of the heads 34 of the terminals are flush with an inner face of the bottom wall 21 in order to provide stationary contacts which are adapted to be engaged by spherical bosses 38 formed in a bridging member 39. The recess 20 receives a carrier or support 40 provided with notches 41 each for receiving one of the tongues 42 with which the bridging member 39 and the carrier are operatively connected when these parts move within the recess 20, the connection is such as to permit relative movement therebetween. The carrier 40 is provided with a pocket 45 each for receiving a spring 46 having one end bearing against the bottom of the pocket and having the other end bearing against the bridging member 39. The springs serve to urge the bosses 38 against the bottom wall of the case. The carrier is provided with spaced integral arms 47 each terminating in a rounded end. These arms are preferably located midway between the ends of the carrier.

An energy storing member 50, comprising a length of tough, spring metal such, for example as music wire, spring bronze or other similar metal or shaped lengths, has its opposite ends supported in the notches 29 with the intermediate portion thereof disposed between the arms 47. The purpose of the member 50 is to initially resist movement of an actuator 51, and then, move the actuator with a snap action after the actuator has been rotated a predetermined angular distance from one side position past a center or medial position.

The actuator in this instance is operatively connected with the carrier and comprises a circular rotatable member or rotor that is pivotally mounted upon a pin 52 mounted in the apertures 28 in the extensions of the side walls. This rotatable member has a radial projection 53 and a radial nose or extension 54 extending from its outer edge and are substantially opposite each other. The rotor is formed with depressions on opposite faces thereof. These depressions are shaped to provide abutments 55 between which the arms 47 of carrier 40 extend. The abutments 55 cooperate with the arms 47 to actuate the carrier longitudinally back and forth within the recess 20. The radius of the rotor or in other words the length of the rotor extending from the pivot point 52 is such that the member 50 is flexed or slightly bent into a concave convex formation to increase the internal stresses in the energy storing member 50, as shown in Fig. 3, to exert a compressive force upon the carrier 40 and thus compress the springs 46 so as to maintain a firm contact engagement between spherical bosses 38 and the terminal 33.

Referring to Fig. 3 wherein the switch is shown in its off position, it is pointed out that in this instance the end walls 22 and 23 act as stops for the carrier 40. The carrier is so shaped that its sides, including the arms 47 will be relatively close to the interior of side walls of the switch case in order that the side walls will serve as guides for limiting the movement of the carrier to linear or longitudinal movements.

Fig. 6 shows a modified form of the switch. In this instance the housing 10 supports three stationary contacts 70, 71 and 72 which are supported in the bottom wall 21a and positioned in a straight line. In this instance the center contact 71 has its contact surface elongated. The feature of this modified form of the invention is that

3

two adjacent terminals are bridged by the bridging members 51 in each side position of the carrier.

In the modified form of the switch shown in Figs. 7 and 8, the bottom wall 21b is formed with concave depressions 75 and the terminals 70, 72 and 73 in this instance are formed respectively with concave depressions 70b, 72b and 73b to receive one of the spherical bosses with which the movable contact is provided. By this arrangement the switch can be yieldingly held in an "off" position as shown in Fig. 7.

The operation of the switches is substantially the same. When the rotor 51 is moved back and forth by the projection 53 the member 50 will be flexed by the nose 54, as it slides over the member 50, to a greater degree to store greater energy in the member and thereby increase the pressure on the bridging member as the bosses 38 slide over the terminals. As the carrier moves longitudinally within the case the bosses 38 move relative to the stationary contacts 34 to produce a wiping action therebetween. Thus any foreign matter which tends to interfere with good contact engagement will be wiped away. The instant the nose 54 passes the center position which is the point P, shown in Fig. 3, the increased stresses or the energy stored in the member 50 is released and will cause the rotatable member 51 to snap to its other position as the member 50 tends to return to its normal state. When the member 50 engages the rotatable member on one side of the boss 54, see Fig. 3, the member 50 will maintain a concave formation and bear against the mid portion of the carrier to prevent rocking of the carrier within the housing. It is pointed out that Fig. 4 shows the operation of one of the switches as it is moved from the "on" position toward the "off" position, thus the rotor is being shown as moving in a counterclockwise direction. When the nose 54 of rotor is once moved past dead center into "off" position it is frictionally held in said positions by the member 50 so that it will not accidentally move to the "on" position and vice versa.

While the embodiment of the present invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted.

What is claimed is as follows:

1. An electric switch comprising a one-piece molded

4

rectangular box shaped housing of electrical insulating material having an open side, said box having the wall opposite the open side provided with two spaced contacts, a bridging contact means slidably mounted within said housing for sliding movement into and out of bridging contact with said two spaced contacts, a pivoted actuator extending through said open side and located partially within said housing, a pivot pin extending through said actuator and being mounted in portions of said housing on opposite sides of the open side, a wire spring extending transversely to said pivot pin across the opening in said housing over said bridging contact means and being supported at its ends by said housing, and operating connections extending on opposite sides of said wire spring between said actuator and said bridging contact means.

2. An electric switch comprising a one-piece molded rectangular box shaped housing of electrical insulating material having an open side, said box having the wall opposite the open side provided with two spaced contacts, a bridging contact means slidably mounted within said housing for sliding movement into and out of bridging contact with said two spaced contacts, a pivoted actuator extending through said open side and located partially within said housing, a pivot pin extending through said actuator and being mounted in portions of said housing on opposite sides of the open side, a wire spring extending transversely to said pivot pin across the opening in said housing over said bridging contact means and being supported at its ends by said housing, and operating connections extending on opposite sides of said wire spring between said actuator and said bridging contact means, said actuator having a projection extending into contact with and deflecting intermediate portions of said spring.

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