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SNAP-ACTION SWITCH

Walter L. Cherry, Jr., Highland Park, Ill., assignor to Cherry Electrical Products Corporation, Highland Park, Ill., a corporation of Illinois

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1 Claim. (Cl. 200—67)

My invention has to do with an improved and simplified form of construction of a snap-action switch which will be highly efficient in use and economical in manufacture.

Among the several objects of this invention is the provision of a snap-action switch which will be substantially "teaseproof," i. e., a switch having a switch actuating means which is quick in operation and once it is initiated in its operation is uncontrollable in that it will complete its snap-action operation, independent of any force on the part of the operator to effect the contrary.

Another and equally important object of the invention is the provision of a snap-action switch in which there is employed a floating actuator link between the actuator and the switch blade resulting in effecting the operation of the blade by the slightest pressure upon the actuator as well as maintaining the maximum contact pressure between the contacts.

Other objects will appear hereinafter.

The invention consists in the novel combination and arrangement of parts to be hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawings showing the preferred form of construction, and in which:

Fig. 1 is a typical side elevational view of the switch embodying my invention;

Fig. 2 is a side elevational view similar to Fig. 1 but showing the parts in different positions;

Fig. 3 is a sectional detail view taken substantially on line 3—3 of Fig. 1;

Fig. 4 is a perspective view of an actuator embodied in the invention;

Fig. 5 is a perspective view of an actuator link embodied in the invention;

Fig. 6 is a perspective view of the switch blade embodied in the invention; and

Fig. 7 is a perspective view of the switch blade mounting bracket embodied in the invention.

To accomplish the several objects of this invention and to provide a snap-action switch which will be substantially "teaseproof" and maintain maximum pressure between engaging contacts I prefer to construct my simplified and improved snap-action switch according to the following description:

In this connection I provide a mounting plate 10 which is formed of non-conductive material. This mounting plate 10 carries on one end portion thereof a substantially rigid arm 11 fixed to the plate as at 12 and having a horizontal portion 13 and a terminal lug 14, to which lug 14 may be attached a wire (not shown). The horizontal portion 13 extends in parallel spaced relation with respect to the adjacent side of the plate 10 and carries a contact member 15. Below the contact member 15 and carried by the plate 10 is a contact member 16 having a terminal lug 17 to which a circuit wire (not shown) is adapted to be connected.

The end portion 18 of a switch blade 19, carrying on opposite sides thereof, contacts 20 is adapted to operate

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between the contacts 15 and 16 to bring the contacts 20 thereon into alternate engagement with the contacts 15 and 16. This switch blade 19 is formed of such material as will best serve the purpose. Such blade has an open slot 21 formed in one end portion thereof to provide spaced arms 22. The ends of these arms 22 are provided with reduced fingers 23. These fingers engage in notches 24 formed in the upright portion 25 of a bracket 26. The ends 24' of the arms 22 between the fingers 23 engage in a V notch 25' formed in the upright portion 25. This bracket 26 is secured to the plate 10 as at 27. It is formed of substantially rigid material and provides a terminal lug 28 to which the circuit wire (not shown) may be attached.

Adjacent the free end 18 of the switch blade as at 30 is connected one end portion of a spring 31. This spring is positioned in the slot 21 and projects through an opening 32 formed in the bracket 26.

A substantially U-shaped link 33 formed of suitable material is arranged with its bight portion 34 to one side of the upstanding arm 25 of the bracket 26 and with the limb portions 35 extending on opposite sides of such arm 25 in the direction of the free end portion of the blade 19. To the bight portion 34 of the link 33 is connected as at 36 the opposite end portion of the spring 31.

The end portions of the limbs 35 provide fingers 37 which pivotally project into notches 38 formed in the depending arms 39 of an actuator 40. The arms 39 extend downwardly on opposite sides of the switch blade 19.

The spring 31 in one of its functions maintains the ends of the arms 22 in the V-shaped notches 25' and the pivotal connection between the link 33 and the arms 39.

The actuator 40 is preferably formed of spring material and in the form shown in Fig. 4 one end portion 41 thereof is reversely bent to provide an attaching flange 42 secured to the plate 10 by means 27. Such construction supports the medial portion of the actuator in spaced relation to the plate 10. As the reversely bent end portion 41 is an integral part of the actuator and formed of the same material, the actuator's flexibility is greatly increased, thereby requiring a minimum of applied force to flex the same. The free end of the actuator is formed to provide the aforementioned depending arms 39, which are arranged in parallel spaced relation with respect to each other.

It will be noted (Figs. 1 and 2) that the actuator link 33 is floatingly supported from the arms 39 of an actuator 40 and yieldably held in pivotal relation thereto by the spring 31. By this arrangement, as soon as the switch blade 19 is substantially initiated in its movement by the movement of the actuator link 33, there is no way to interrupt the completion of the movement of such blade or materially affect its movement in any degree. This results in transmitting through the spring 31 the snap-action movement to the switch blade 19, which blade under the action of spring 31 will complete its operation of moving the upper contact of the contacts 20 into engagement with the contact 15 and will not return to its initial position until after it has completed such operation.

To initiate movement of the floating link 33 to effect snap action of the blade 19, it requires but the slightest pressure on the actuator 40. Such pressure may be applied by any one of the many known means, such for example, a push-button plunger, cam or the like. When the actuator 40 is in the position shown in Fig. 1, the tension of the spring 31 will flex the switch blade 19 in a direction to engage the lower contact of the contacts 20 with the contact 16. These contacts will remain in engagement until pressure is applied to the actuator 40 to pivot the link 33.

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As the actuator 40 approaches the long axis of the spring 31, the tension of the spring 31 is increased to exert a pull upon the link 33, compressing the same in a direction toward its pivotal connection with the actuator 40. At the same time the switch blade 19 is compressed by the spring 31 against its pivotal connection with the bracket 26. As the link 33 is pivoted across the long axis of the spring 31, the resulting compression of the link 33 and switch blade 19 causes them to move in snap-like action, bringing the upper contact of the contacts 20 into engagement with the contact 15 where it will remain until the actuator returns to its initial position, at which time, as the link 33 recrosses the long axis of the spring 31, blade 19 is fixed to its initial position, moving the lower contact of contacts 20 into bearing engagement with the contact 16.

The flexing of the blade in either of its two directions is uncontrollable and uninterrupted as soon as the spring 31 is placed under sufficient tension by the movement of the link 33, to effect flexing of the blade. Such an arrangement prevents what is known as "teasing" the switch.

A switch constructed in accordance with the description herein set forth is compact, comprises relatively few parts, and may therefore be manufactured at an economical cost.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of variation and modification without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claim.

Having thus described my invention, what I claim as new and desire to protect by Letters Patent is:

A snap-action switch comprising a mounting plate formed of non-conductive material, a substantially rigid arm carried by the plate and having an integral end portion bent to extend in parallel spaced relation with

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respect to one side of said plate, confronting contact members, one carried by said end portion and the other by said plate, a substantially rigid bracket carried by said plate and bent to provide an arm extending laterally from said one side of the plate and in spaced relation to said end portion of the first-mentioned arm, a flexible blade extending between said arms along said one side of the plate, means supportingly connecting one end portion of the blade to said laterally extending arm, said blade having a free end portion located between said contact members and having contact elements adapted for alternate engagement with said contact members, a flexible actuating member having an integral reversely bent end portion providing a flange for attachment to said rigid bracket to support the medial portion of said actuating member in spaced parallel relation with respect to said plate, said actuating member having a free end portion extending downwardly substantially midway between said arms, a substantially U-shaped link having a bight portion having pivotal bearing relation with respect to the arm of said bracket and having spaced apart parallelly extending limbs extending from opposite sides of said arm of said rigid bracket, with the outer end portions of said limbs pivotally connected to the free end portion of said actuating member, and spring tension means having connection with the bight portion of said link and with the blade at its free end portion.

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