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SNAP-ACTION SWITCHES

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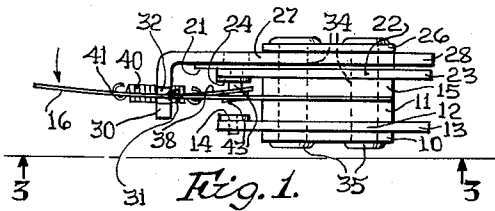


Fig. 1.

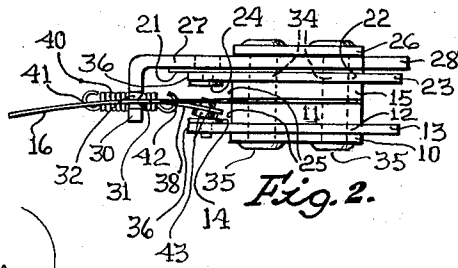


Fig. 2.

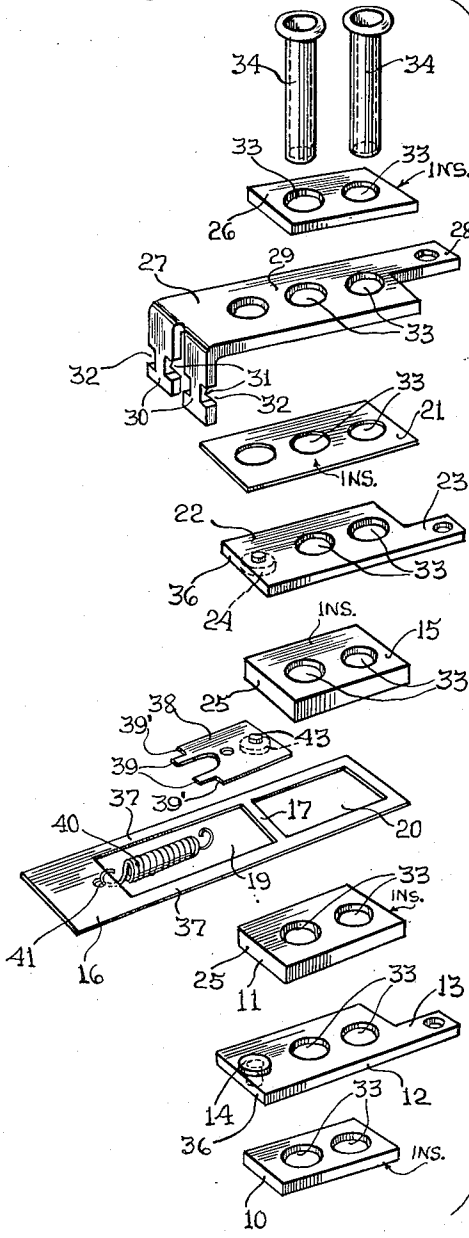


Fig. 4.

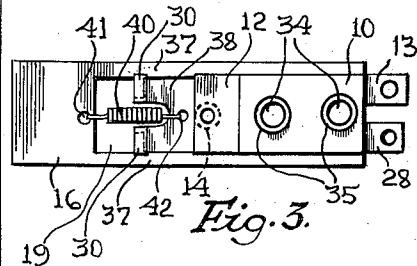


Fig. 3.

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SNAP-ACTION SWITCHES

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1 Claim. (Cl. 200—67)

This invention relates to certain new and useful improvements in snap-action switches and has for its principal object the provision of an improved construction of this character which will be highly efficient in use and economical in manufacture.

Among the several salient objects of this invention is the provision of a snap-action switch having a novel snap-action system that effects a positive engagement between movable and fixed contacts substantially instantaneously with the movement of the movable contacts between the fixed contacts, thereby reducing to a minimum delayed engagement between the movable and the fixed contacts.

Another and equally important object of this invention is the provision in a snap-action switch of a snap-action system that insures a uniform pressure between the movable and the fixed contacts.

Another and equally important object of the invention is the provision of a tension spring which is placed under tension to snap a pivotally supported switch blade into contact with the fixed contact the instant an actuator therefor crosses in either of two directions a plane parallel with the longitudinal axis of the switch and passing through the pivot point of the switch blade, therefore to assure quick and positive engagement between the movable contacts and the fixed contacts of the switch.

Another and equally important object of the invention is the provision of a snap-action switch which comprises relatively few parts, is compact and one which comprises parts which are grouped together in a manner such that they may be readily assembled.

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 side elevational view of the snap-action switch embodying my invention;

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

Fig. 3 is a bottom plan view taken on line 3—3 of Fig. 1;

Fig. 4 is a perspective view of the several parts comprising my improved snap-action switch illustrating such parts in exploded relation with respect to each other.

I prefer to accomplish all the expressly stated and other objects of my invention by a form of construction which comprises a pair of insulating plates 10 and 11 between which is arranged a contact plate 12 having a terminal 13 to which a circuit wire may be attached by means of solder or the like. On one side of the contact plate 12 is a contact head 14.

Arranged between the insulating plate 11 and an insulating plate 15 is an actuator 16. This actuator 16 is formed of substantially flat flexible material and is substantially elongated in form.

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Formed in the actuator and separated by a crossbar 17 are adjacent elongated openings 19 and 20.

Mounted between the insulating plate 15 and an insulating plate 21 is a contact plate 22 similar in construction to the contact plate 12 and, like the latter, providing a terminal 23 to which a circuit wire is adapted to be attached by means of solder or the like. On one side of this contact plate 22 is carried a contact head 24. The contact plates 12 and 22 are preferably of the same shape and design to permit interchangeability thereof and the ends thereof carrying the contact heads 14 and 24 respectively, project beyond the adjacent ends 25 of the insulating plates 11 and 15 with the contacts 14 and 24 in facial relation with respect to each other.

Disposed between the insulating plate 21 and an outer insulating plate 26 is a bracket 27. This bracket 27 at one end portion provides a terminal 28 to which a circuit wire is attached by means of solder or the like. The opposite end portion of the bracket 27 is bent substantially at right angles with respect to the major body portion 29 of the bracket 27 and bifurcated to provide parallel extending fingers 30. The fingers 30 in corresponding faces are provided with V-shaped grooves 31. From opposite side edges of each of the fingers 30 are provided notches 32.

The parts thus far described are assembled in a unitary structure and are provided with spaced openings 33 arranged in aligned registration with respect to each other for passage of rivets 34 which when projected through the openings 33 as well as the opening 20 of the actuator, with the parts arranged in stacked relation with respect to each other as shown in Fig. 1, have their end portions rolled over upon the contact plate 10 as at 35 to rigidly hold the parts in assembled relation with respect to each other.

When the parts thus described are thus arranged together in such form by the rivets 34, the fingers 30 as seen in Figs. 1 and 2 will be disposed in spaced relation with respect to the adjacent end portions 36 of the contact plates 12 and 22, with the fingers 30 projecting through the opening 19 of the actuator 16. In such position of the fingers 30, the side bars 37 of the actuator 16 will be disposed in the notches 32, which notches are of sufficient size to permit the actuator 16 to flex in opposite directions with respect to its long axis for reasons hereinafter made apparent. In this respect, the fingers 30 of the bracket 27 serve to limit the distance of lateral flexing of the actuator, the fingers 30 maintaining that portion of the actuator 16 extending beyond the insulating plates 11 and 15 in longitudinal relationship with respect to its length.

To complete the invention, I provide a switch blade 38. This blade 38 is formed of a relatively flat piece of conductive material and at one end portion provides parallel extending fingers 39 which have engagement in the slots 32 of the fingers 30. By reason of the relative thinness of the blade 38, engagement between the edge 39' and the grooves 31 is substantially knife-edge to permit the switch blade to pivot relative to the fingers upon the slightest pressure exerted on the blade. The switch blade is held in its pivotal engagement with respect to the fingers 30 by means of the spring 40 which is positioned in the opening 19 of the actuator 16 with one end portion connected as at 41 to the outer end portion of such actuator 16 and the opposite end extending between the fingers 30 with such end portion connected as at 42 to the switch blade 38.

An actuating means (not shown) is intended to engage the outer end of the actuator 16 at a point substantially indicated by the arrow in Fig. 1. As the actuator 16 is flexed to a point where the portion thereof at the point 41 of connection with the spring 40 crosses

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the plane of the switch blade 38, the spring 40 will have been placed under tension to exert a pull on the switch blade 38 in the direction of movement of the actuator, to snap the switch blade 38 from the position shown in Fig. 1 to the position shown in Fig. 2, in snap-like action.

The end portion of the switch blade opposite the fingers 39 carries on opposite sides thereof contacts 43 which are adapted to alternately engage the contacts 14 and 24 and be held in such engagement by the spring 40. Thus, in the construction shown I have utilized the spring 40 for two purposes, namely, that of effecting movement of the switch blade in either direction across the plane at the point of connection between the switch blade 38 and its supporting fingers 30 and for maintaining the engaging contacts in positive engagement. In this manner, the engaging contacts will not be accidentally separated by reason of vibration, shock, or the like.

From the foregoing description, it is apparent that my improved snap-action switch comprises relatively few parts, is substantially compact, thereby resulting in occupying a minimum of space when installed, and is highly efficient in operation, requiring the minimum degree of pressure or other force to effect instantaneous operation thereof.

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

A snap-action switch comprising a substantially rigid bracket and an elongated relatively flat actuator being connected together at corresponding ends and adapted to having their free ends extending in a parallel spaced relation with respect to each other, said actuator having adjacent its free end an elongated opening formed in the direction of its longitudinal length, said bracket having its free end terminating into spaced apart depending members extending at right angles with respect to the bracket and projecting transversely through the opening formed in said actuator, said members having formed in their outer corresponding edges horizontally aligned notches into which projects portions of said actuator

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adjacent the opening therein and through which said actuator is adapted to flex in opposite directions with respect to its long axis, said members on inner corresponding faces thereof having horizontally aligned V-grooves formed therein, a flat flexible switch blade within the opening formed in said actuator and extending in the same horizontal plane with respect thereto, said switch blade having one end portion providing spaced apart horizontally extending fingers pivotally engaging said V-grooves formed in said members, a tension spring within the opening formed in said actuator and extending between said members and in the same horizontal plane with respect to said switch blade and said actuator, one end of said spring connected to the actuator at one side of said members adjacent its outer end portion and with the other end portion of said spring connected to said switch blade intermediate its end portions on the opposite side of said members, said spring adapted to maintain pivotal connection between said switch blade and said members and to pivot said switch blade to opposite sides of the long axis of said actuator upon flexing of the latter about its pivotal connection to said members, and stationary contact members in parallel relation with respect to said bracket and insulated therefrom and arranged on opposite sides of said switch blade and adapted for alternate engagement with the end of said switch blade opposite its pivotal connection with said members.

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