April 9, 1957 S. G. YOUNG 2,788,419

SNAP-ACTION ELECTRIC SWITCHES

Filed Jan. 19, 1954

Fig. 1.

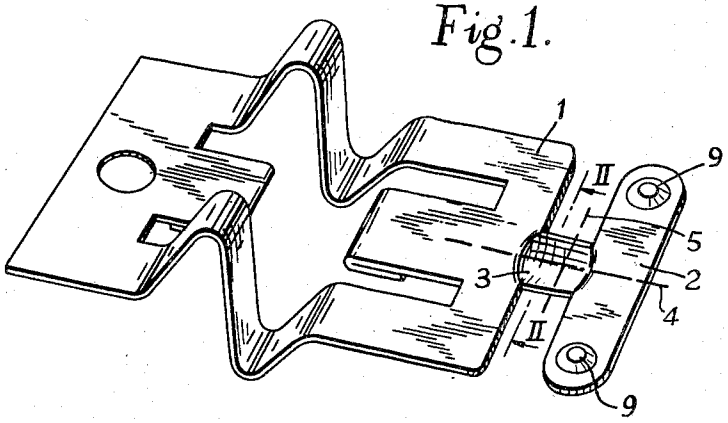


Fig. 2.

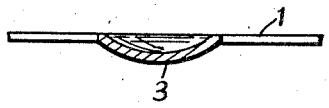
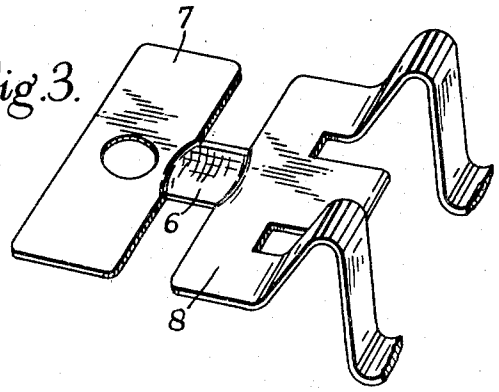


Fig. 3.



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United States Patent Office 2,788,419
Patented Apr. 9, 1957

2,788,419

SNAP-ACTION ELECTRIC SWITCHES

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Application January 19, 1954, Serial No. 405,013

5 Claims. (Cl. 200—166)

This invention relates to snap-action electric switches of the kind in which the contact-making member or snapper is formed from resilient material and is arranged so as to snap over from one side to the other of a dead-centre position when actuated. In this connection reference may be had to my Reissue Patent No. 23,412.

In such switches the contact-making member may be required in either or both of its stationary positions to bridge (and thereby make contact between) two fixed contacts. The expression "fixed contacts" means contacts which are not directly moved by the actuating member of the switch, but such contacts may be resiliently mounted, or be capable of movement for other purposes, e. g. to break the circuit in the event of an overload, as explained in my co-pending application Serial No. 405,012 filed January 19, 1954, and entitled Snap-Action Electric Switches, corresponding to British application No. 7,580/52. In such switches, particularly when made by mass production methods, it is difficult to ensure that the parts of the contact-making member which actually make simultaneous contact with the two fixed contacts lie in a plane which passes through both of such fixed contacts so that satisfactory double contact with substantially equal contact pressure is always established. It is an object of the present invention to provide simple means whereby such satisfactory double contact can be consistently obtained.

According to the invention the contact-making member, or "snapper," is so constructed with one or more resilient portions as to permit relative twisting movement between the parts actually making contact with the fixed contacts and the remaining parts of the snapper. The plane of these remaining parts is determined by the base of the switch or by the operating member. Such a freedom to twist enables the contact making parts of the snapper to make satisfactory double contact with the fixed contacts, notwithstanding that the plane of some of the parts of the contact-making member may never pass exactly through or be parallel to both the fixed contacts simultaneously.

Two embodiments of the invention are illustrated by way of example in the accompanying drawing.

Figure 1 shows a perspective view of a typical snapper for use in a snap action switch and incorporating the invention;

Figure 2 shows a section on the line II—II of Figure 1, and

Figure 3 shows a fragmentary view similar to the left hand end of Fig. 1 but showing a snapper incorporating the invention in a modified manner.

The end of the snapper 1 shown in Figs. 1 and 2 is made in the form of a bridge-piece 2 which by means of contacts 9 establishes a circuit between fixed contacts (not shown), such bridge-piece being connected to the remainder of the snapper 1 by a neck portion 3. This neck portion 3 is sufficiently resilient to allow the bridge-piece 2 to twist slightly from the plane of the snapper 1 itself, such twisting taking place about an axis 4 extending along such

neck portion 3. At the same time however the neck portion 3 must be sufficiently stiff not to allow any substantial twisting about a transverse axis 5, so that adequate contact pressure may be maintained and transmitted through the neck portion 3 to the bridge piece 2.

Preferably, the bridge piece 2 and the neck portion 3 form part of the same piece of spring-like material from which the remainder of the snapper is made, the whole being produced preferably by a single stamping operation. In order to obtain the desired properties, as explained above, the neck portion 3 is preferably grooved, or curved, or otherwise so constructed and arranged that while it permits the bridge piece 2 to turn comparatively freely about the axis 4 into the plane passing through the fixed contacts so as to make satisfactory double contact, yet it resists the tendency for the bridge piece 2 to turn in any other direction relative to the remainder of the snapper 1, and in particular about the axis 5. For example, the neck portion 3 may be curved transversely as shown, the nature of this curving being best seen from Fig. 2. Alternatively, the neck portion 3 may be comparatively stiff and the necessary twisting of the bridge piece 2 be obtained by virtue of the resilience of the material of such bridge piece 2 itself.

In another form of the invention demonstrated by Fig. 3, a neck portion 6 may be arranged between a portion 7 of the snapper adapted to be secured to a switch base, and the remainder 8 of the snapper; that is to say, at the end of the snapper remote from the end which moves in and out of contact with the fixed contacts.

I claim:

1. A snapper for use in a snap-action electric switch, said snapper being a single piece of spring metal in the form of a frame having a pair of flexible and extensible side members linked at their ends by first and second cross-members, comparatively rigid tongues extending inwardly from said first and second cross-members respectively, to points intermediate of the flexible and extensible side members, a third cross-member integral with said frame, and an integral neck portion connecting said third cross-member to said frame, one of said cross-members being adapted to be anchored to a relatively fixed part of the switch, and another of said cross-members being adapted to bridge a pair of fixed contacts, and said neck portion being disposed in alignment with said tongues to permit relative rotational movement of said third cross-member and said frame about the axis extending through said tongues and said neck member aligned therewith to obtain equal pressure on said fixed contacts.

2. A snapper as claimed in claim 1, in which said neck portion is curved about said axis so as to permit said relative rotational movement of said third cross-member and said frame while resisting bending of said neck portion transversely of said axis.

3. A snapper as claimed in claim 1 wherein said third cross-member is the cross-member adapted to bridge the pair of fixed contacts.

4. A snapper as claimed in claim 1, wherein said third cross-member is the cross-member adapted to be anchored to a relatively fixed part of the switch.

5. A snap-action electric switch including a housing and a snapper, said snapper consisting of a single piece of spring metal in the form of a frame having a pair of flexible and extensible side members linked at their ends by first and second cross-members, comparatively rigid tongues extending inwardly from said first and second cross-members to points intermediate of the flexible and extensible side members, a third cross-member integral with said frame and an integral neck portion connecting said third cross-member to said frame, one of said cross-members being adapted to be anchored to a relatively fixed part of the switch and another of said cross-mem-

bers being adapted to bridge a pair of fixed contacts, said neck portion being disposed in alignment with said tongues to permit relative rotational movement of said third cross-member and said frame about the axis extending through said tongues and said neck member aligned therewith and being curved above said axis to permit said relative rotational movement while resisting bending of said neck portion transversely of said axis, and an operating member adapted to engage with the opposed edges of the tongues to move the bridging cross-member into and out of position in which it bridges said pair of fixed contacts.

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