Jan. 14, 1964 MICHITAKA YAMAMOTO 3,118,029

SNAP SWITCHES

Filed Feb. 12, 1959

FIG.1.

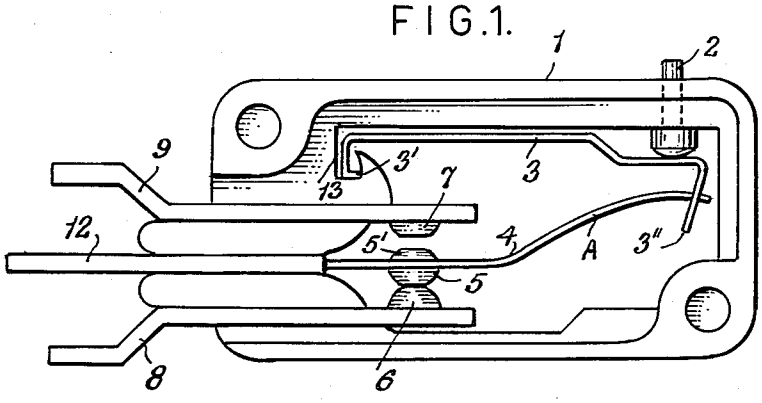


FIG.2.

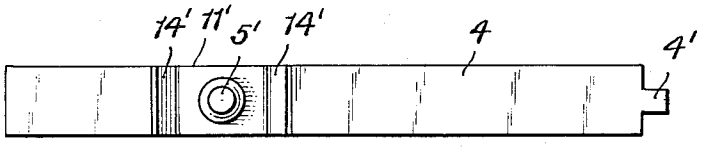


FIG.3.

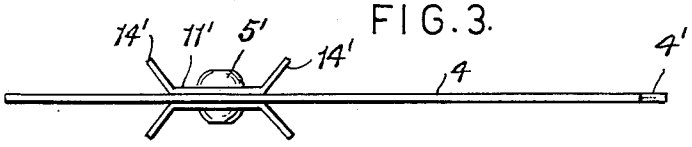
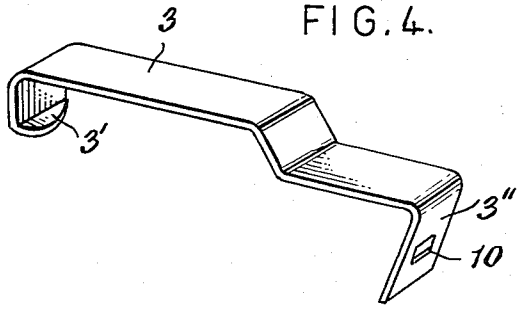


FIG.4.



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SNAP SWITCHES

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This invention relates to improvements in sensitive, precision type snap acting switches.

It is an object of this invention to provide a snap switch of improved construction and operating characteristics.

My improved snap switch consists essentially of an operating lever and a contact arm. One end of said operating lever is angularly bent and inserted in a recess formed at one corner of the housing. The other end is downwardly bent to support one end of the contact arm. The contact arm comprises a thin leaf spring carrying contacts which move between two stationary contacts or stops. The portion of said leaf spring between the contacts and the free end is forced to bow upward and engaged by the downwardly bent end of the operating lever. These parts are so arranged that the leaf spring will move upward with a snap action when the pressure is applied to the operating lever and will return by a snap action to the normal position when the pressure is removed.

The following description is to be read in conjunction with the accompanying drawings, in which

FIG. 1 is a plan view of a snap switch embodying my present invention with its lid removed;

FIG. 2 is a plan view of a modified form of the contact arm;

FIG. 3 is a side view of the above, and

FIG. 4 is a perspective view of the operating lever.

In FIG. 1, 1 is an insulating housing. 3 is an operating lever. One end of said operating lever is located in a recess 13 formed at one corner of the housing 1, and is provided with a rounded edge 3' while the other end 3'' is obliquely bent downward and is provided with a small hole 10 to receive the end 4' of the contact arm 4. A plunger 2 extending through the housing wall abuts on the operating lever 3 near its downwardly-bent end. 6 and 7 are stationary contacts or stops connected to the fixed terminals 8 and 9, respectively. The contact arm 4 is attached to a terminal 12 located between the terminals 8 and 9 and consists of a thin leaf spring carrying contacts 5 and 5'. The portion between the moving contacts and the free end 4' is compressed and is in curved or bowed form and forced to bow upward as shown at A. The free end 4' of the leaf spring 4 is inserted in the small hole 10 formed in the bend 3'' of the operating lever 3.

The operation of the snap switch is such that when the plunger 2 is depressed, it will move the operating lever 3 downward to a position which will stress the bowed portion A of the spring 4 by increasing its upward curvature between the point 4a and its free end and the further depression of the plunger 2 will cause the part of the spring carrying the contacts 5 and 5' to move upward with a snap action, disengaging the contacts 5 and 6, and engaging contacts 5' and 7; conversely, when the depressive force on the plunger 2 is released, the bowed portion

A of the spring will tend to flatten and the contact-carrying portion of the spring 4 will move downward, and the spring as well as the operating lever will be caused to return by a snap action to the normal position shown in FIG. 1.

In this snap switch, the force tending to urge the movable contacts against one of the stationary contacts is quite substantial. The number of parts of this switch being small, it is very easy to assemble and is simple to adjust. Further, since the round edge 3' abuts to the inner wall of the recess 13, the operating lever 3 can self-adjust itself freely relative to the contact arm 4 so as to operate the latter smoothly. Moreover, as no electric current flows on the bowed portion of the leaf spring 4, the effective life of the spring may be prolonged.

In the modified form of the contact arm 4 shown in FIGS. 2 and 3, metal pieces 11 and 11' having flares 14 are interposed between the contacts 5 and 5' and the leaf spring in order to reinforce the spring as well as to prevent sparks or arcs from attacking directly to the spring.

Having thus described the invention, what is claimed new is:

A snap action switch comprising a housing made of electrically insulating material, said housing having an internal recess, a generally hook-shaped projection in said recess, an operating lever comprising a main elongated portion, a first end bent to form a U-shape fitting loosely over said projection and provide a pivot thereon, a second end bent at approximately right angles to said main portion and containing a slot therein, a pair of spaced stationary contacts supported within said housing, a unitary actuator and snap spring formed as one member and having one end and another end, said one end of said member being restrainedly attached to said housing, the other end of said member penetrating said slot in said lever, said member having a relatively sharp bend which tends to define the boundary between said actuator and said snap spring, the actuator being that portion which includes said other end and which is bowed when said other end is inserted into the slot in said lever and which thereby tends to hold said lever firmly on said projection, the snap spring being that portion which includes said one end, and movable contacts mounted on either side of said snap spring portion to alternately mate with said stationary contacts, pivotal movement of said lever about said projection being transmitted to said actuator and spring to create a bending moment in said spring and cause the sudden flexing of said spring to drive one of said movable contacts toward one of said stationary contacts and the other of said movable contacts away from the other of said stationary contacts.

References Cited in the file of this patent

UNITED STATES PATENTS

2,500,476	Stoeser	Mar. 14, 1950
2,743,332	Torres	Apr. 24, 1956
2,839,629	Korsgren	June 17, 1958

FOREIGN PATENTS

536,357	Great Britain	May 12, 1941
965,364	France	Feb. 15, 1950