Sept. 22, 1959 H. R. CHAPIN ET AL 2,905,782

SNAP SWITCH BLADE

Filed Dec. 23, 1957

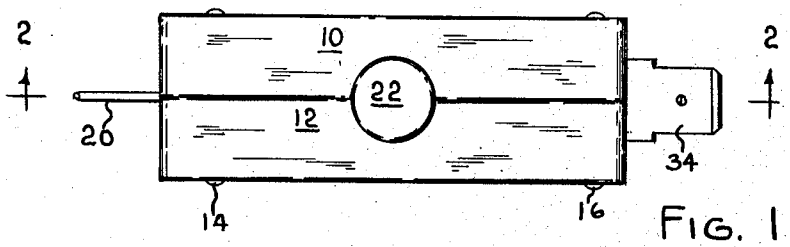


FIG. 1

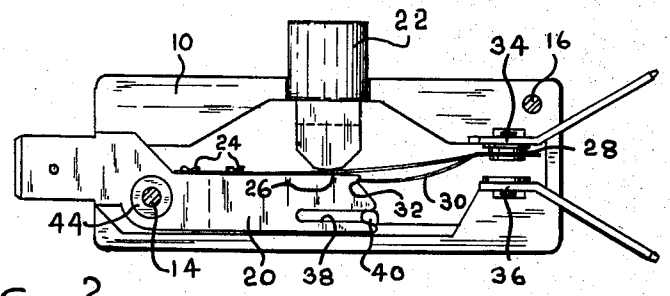


FIG. 2

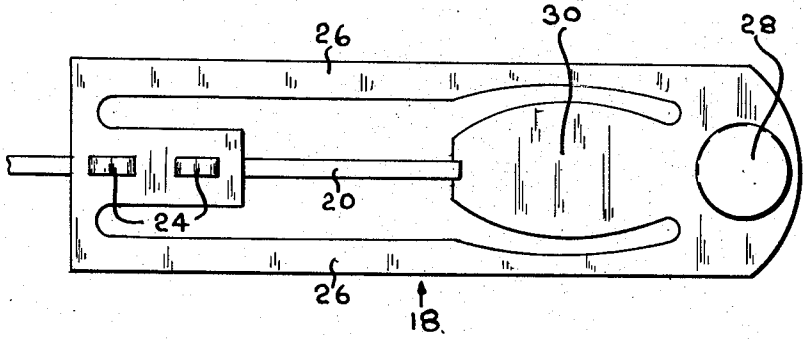


FIG. 3

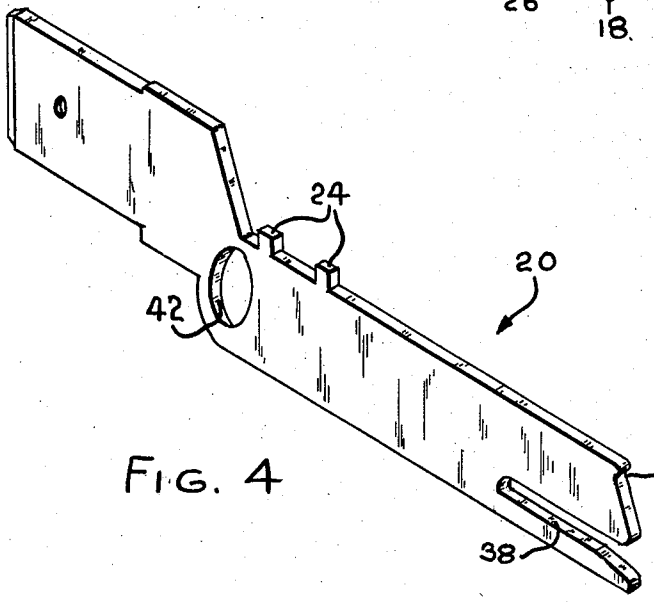


FIG. 4

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SNAP SWITCH BLADE

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Application December 23, 1957, Serial No. 704,591

2 Claims. (Cl. 200—67)

This invention relates to an improvement in precision snap switches and particularly to an improved blade design.

The object of this invention is to provide maximum electric capacity in combination with maximum mechanical life of a snap switch blade in a minimum space.

The switch shown in the drawings is the same basic type shown in McGall Patent No. 1,960,020 which was and remains the basic precision snap switch and which has not been materially improved over the years. The McGall blade is subject to fracture in the tongue portion. The present invention improves upon the blade design and permits realization of the above object.

Other objects and advantages will be pointed out in, or be apparent from, the specification and claims, as will obvious modifications of the single embodiment shown in the drawings, in which:

Figure 1 is a top plan view of the switch casing;

Figure 2 is an elevation with one-half the casing removed;

Figure 3 is an enlarged plan view of the blade and its mounting; and

Figure 4 is a perspective view of the blade mount.

It should be noted that the blade mount shown herein is also novel and forms the subject matter of our copending application, Serial No. 704,590.

The switch is housed in a split casing having left and right halves **10**, **12** secured together by rivets **14**, **16**. Switch blade **18** is stamped from resilient material and is mounted on the combined terminal and mounting base **20** for actuation by plunger **22**. The blade includes a central mounting tongue in which rectangular holes are stamped to fit over the mounting lugs **24**, **24** which are then stacked or swedged securely to fix the blade on base **20**. The left end of the blade is connected to the right end by side rails **26**, **26**. As is well known in the art the rails could originate at the right end of the tongue (in effect eliminating the slot between the tongue and rails) but at some sacrifice in operating performance. The right end of the blade carries the contact **28** and has the actuating tongue or rocker spring **30** extending back towards the center of the blade. It will be noted that the sides of the rocker **30** are bowed outwardly and that the rails are correspondingly reduced. The configuration of the rocker spring **30** and the side rails is of great importance.

Every time the switch is actuated the rocker spring is flexed and the width added to the spring by bowing provides more uniform stress distribution which results in longer mechanical life and increased contact force. The bowing permits increasing the width without increasing the overall blade width. In order to effect this result it is necessary to neck-down or reduce the rails adjacent the bowed rocker spring. By reducing the rails only adjacent the spring the rail width can be kept sufficiently wide over the major portion of its length to insure low electrical resistance. Further, the reduced rail width transmits less actuating force to the contact end so

higher contact forces are available at any given plunger position before the trip point. Therefore, without increasing the overall width of the blade or sacrificing desirable rail width over the major portion of the rail length the mechanical life and performance are increased. If this type blade had a conventional straight sided rocker spring, failure of the blade normally would occur in the rocker spring. In the present design such failure is virtually eliminated and the life of the switch is greatly increased.

As can be seen in the drawings, the free end of the rocker spring is engaged in the groove or notch **32** on the end of base **20** to form the pivot point of the spring. When so engaged the normal position of contact **28** is against the upper fixed contact **34** and when the plunger is depressed the bifurcated end bearing against each rail **26** actuates the blade to snap to contact **36**.

Attention should now be given to base **20** which is a flat stamped part which makes possible considerable cost savings. Heretofore, the part corresponding to base **20** has been stamped and formed to provide the blade support and pivot point for the rocker spring. At the outset a cost saving is realized with the present design through elimination of the forming operation and its associated tooling. In the forming employed in the art the spring pivot point drifts with respect to the blade mount as the dies wear and eventually results in unsatisfactory switches since the mount and pivot must be accurately located with respect to each other. When the dies are worn they must be replaced and another cost factor is encountered. With the present arrangement the tool life is greatly increased and the accuracy of the switch is more consistent.

Further cost savings are realized in the present design through easier assembly procedures. The combined contacts and terminals **34**, **36** and the plunger are placed in grooves in the left casing half **10**. The blade is fully assembled to the base **20** before installation in case **10**. To install the base the deep notch **38** is aligned with lug **40** molded in the case and the base is then pushed to the right until hole **42** can drop over molded bushing **44**. When this has been done the base must necessarily be positioned so the blade contact **28** is properly related to the fixed contacts and the plunger will act on the blade rails at the proper point. The right case **12** is now positioned and the rivets **14**, **16** are headed. The assembly is quicker and more accurate than assembly of the prior art switches. Savings are realized both in tooling costs (and retooling) and assembly while resulting in a highly accurate assembly.

Although but one embodiment of the present invention has been illustrated and described, it will be apparent to those skilled in the art that various changes and modifications may be made therein without departing from the spirit of the invention or from the scope of the appended claims.

We claim:

1. A snap switch comprising, a blade having one end fixed and the other end free for movement between first and second positions, side rails extending between the ends of the blade, an actuating tongue or rocker spring extending from the free end of the blade towards the middle of the blade between the side rails, the end of the spring remote from the blade end being pivoted in a fixed support, the sides of the spring facing the rails being bowed outwardly to increase the spring width towards the center of the spring and the inside edges of the side rails facing the bowed sides of the spring being bowed outwardly adjacent the bowed spring sides while the outside edges of the rails are straight.

2. A snap switch comprising, a switch blade having one end fixed and the other end free for movement be-

tween first and second positions, side rails interconnecting the blade ends, an integral actuating tongue or rocker spring extending from the free end of the blade between the rails toward the middle of the blade, a fixed pivot, the free end of the tongue being pivoted on the pivot, the sides of the tongue facing the rails being bowed towards the rails to provide better stress distribution in the tongue, and the edges of the side rails facing the bowed sides of the tongue being bowed outwardly adjacent the

bowed spring sides while the outside edges of the rails are straight.

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