United States Patent

[11] **3,585,335**

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[54] **ROCKING CONTACT TYPE SWITCH**
3 Claims, 4 Drawing Figs.

[52] **U.S. Cl.** **200/67G**
[51] **Int. Cl.** **H01h 13/28**
[50] **Field of Search** 200/67.7, 68, 67

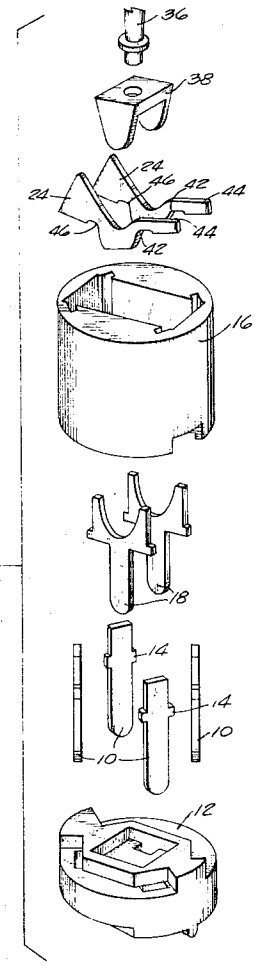
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ABSTRACT: The telescopic lever carries a spring loaded cam follower bearing against a cam contoured flipper blade pivotally supported in a center terminal to rock about a pivot point to contact an adjacent stationary contact. The contoured cam surface of the flipper blade combined with the pivot action and the direction of force application by the spring loaded follower acts to give the desired action to the toggle switch (momentary or sustained). All terminals and the flipper are stamped flat pieces which easily assemble into the base with great accuracy and low cost. Simple substitution of parts will change the characteristics of the switch while ensuring use of many common parts. A simple change can apply the concept to single pole or double pole operation. The toggle can be two or three position. Simple changes allow ten different switches. A key feature is the use of a flat center terminal and a flat flipper blade coplanar with one another whereby all necessary contours are formed in stamping operations with resultant accuracy.



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Fig. 2

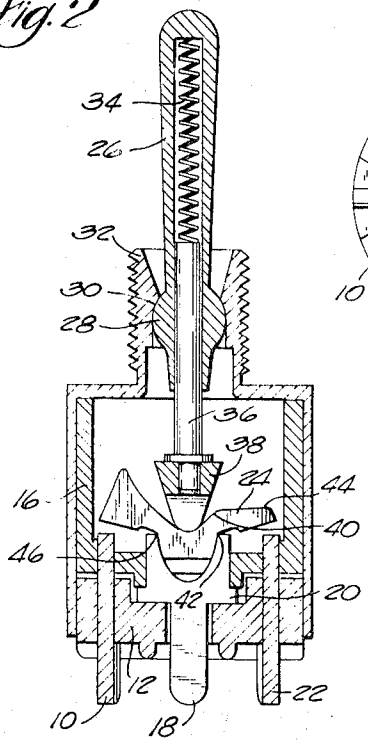


Fig. 3

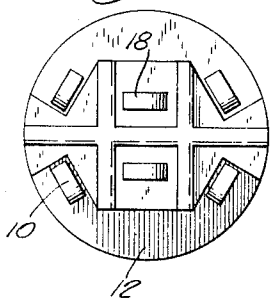


Fig. 4

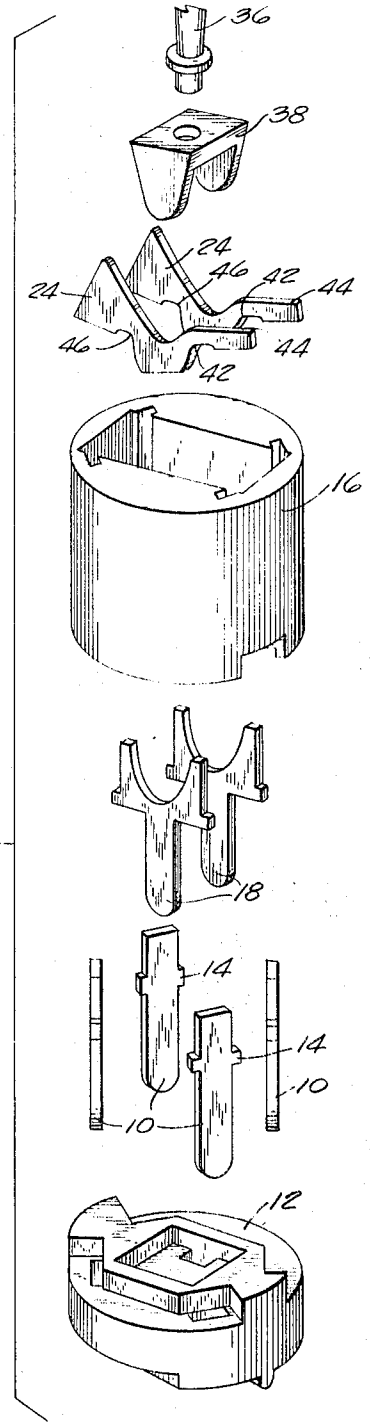
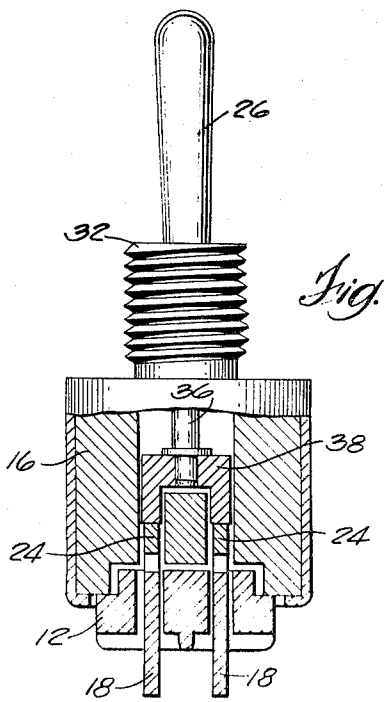


Fig. 1



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ROCKING CONTACT TYPE SWITCH

BACKGROUND OF INVENTION

Rocking contact or flipper-type switches have heretofore used parts requiring forming operations in addition to stamping in order to arrive at the requisite complex shapes. This, in turn, required complex housings. The nature of these designs generally required many different parts to accommodate the various switching actions. An example may be seen in U.S. Pat. No. 3,350,521.

SUMMARY OF INVENTION

The flipper blade or contact in this design is planar—i.e. it is a stamped part which is guided in the housing in simple molded-in slots in the housing. The stationary a contacts are also stamped parts and are located in slots and retained by the housing. The principles are illustrated in a two pole switch. To make a single pole switch the actuating cam is changed and the housing is changed since it need support and guide but one-half the contacts, etc.

DESCRIPTION OF DRAWINGS

FIG. 1 is a vertical section.

FIG. 2 is a vertical section taken at 90° to FIG. 1.

FIG. 3 is a bottom view.

FIG. 4 is an exploded perspective.

DESCRIPTION OF PREFERRED EMBODIMENTS

In the illustrated toggle switch, the stationary left-hand contacts **10** are first placed in the base **12** in cooperating slots and with the shoulders **14** resting in depressions to capture (retain) the stationary contacts when the tube **16** is placed over the base. Similarly, the center contacts **18** are positioned in the base with the shoulders **20** captured between the base and the tube and the right-hand stationary contacts **22** are positioned in the same manner as the contacts **10** with their shoulders **20** captured between the base and the tube. The base is also provided with parallel extending slots which receive the rocking blades or flippers **24**. The slots in the tube confine the flipper blades **24** to a rocking motion.

It will be noted that the flipper blades and all the contacts are flat stampings and thus capable of being manufactured to high precision at low cost. The bat lever **26** has a somewhat spherical portion **28** which is received in the seat portion **30** of the case **32**. This is assembled from the inside and the bat lever is provided with a spring **34** compressed between the upper (inside) end of the bat lever and the top of extension **36** of the bat lever. At the lower end of the extension there is a bifurcated cam **38** having cam portions riding on each of the flipper blades.

As the bat is moved towards the left, the cam will ride up the slope **40** with the blades rocking about the pivot point **42** until the forces go over center about the pivot point **42** and the spring **34** rams the cam down along the face **44** to a stable "on" condition in which the flipper blades contact the stationary contacts **22**. Going back to the center position merely

reverses the action and this is a stable center position designated "off." If the bat is moved to the right there can be no over center action and while the flipper blade rocks about pivot **46** it will merely act to move the rocker blades into engagement with the stationary terminals **10**. Thus the illustrated switch has an action designated "momentary-on"—"off"—"on." If it is desired to have both extreme (opposite) positions be "on" then the left-hand portion of the flipper blade is made the same as the right portion. Obviously if two "momentary-on" positions are desired then both ends of the flipper blade are made to correspond to the left side of the illustrated blade.

In a single pole switch the base and tube are a different molding providing support and guidance for single contacts or terminals corresponding to the double contacts at **10**, **18**, and **22** in the first modification. A single cam now acts on the centrally positioned center terminal. For "on-on" operation the flipper blade would pivot on the center terminal in a well-known manner.

In all of the configurations the flipper blade and the center terminal, which supports the blade and provides the fulcrum, are planar stampings as are the stationary contacts or terminals. in all cases the housing comprised of the base and tube provides the mounting and guidance for the planar configuration and in the case of the flipper blade constrains the blade to a rocking motion in the desired plane. In this manner simple stamped parts having great interchangeability can be utilized with significant cost savings. The assembly of the switch is a simple matter requiring no jigs or the like. The economy in manufacture and assembly results in a significant cost reduction while retaining all the desirable characteristics of a high quality switch. It will also be noted that the tube is shaped to provide a slot or raceway in which the cam is freely movable and yet is guided to move only in the proper plane.

We claim:

1. In a rocking contact-type switch,
   - a base having fixed planar terminals mounted therein and supported thereby,
   - a planar contact blade supported by one of the terminals in edge to edge relationship with interfitting curved shapes providing for rocking the contact blade, the rocking blade being coplanar with the terminal upon which it is mounted and presenting a contoured edge,
   - a cam having an edge bearing against the contoured edge of the blade and carried by a rockable bat-type lever with interposed spring means urging the cam edge against the edge of the rocking blade at all times while imparting a motion to the rocking blade in accordance with the relationship of the spring force relative to the pivot point of the rocking blade during actuation and to the pivot point of the bat lever.

2. The construction of claim 1 including means constraining motion of the cam to the plane including the rocking blade and said one terminal.

3. The construction according to claim 2 in which said one terminal supporting the rocking blade has two spaced pivot points about which the blade may rock depending upon the action imparted by the bat lever, said one terminal and the rocking blade supported thereby having cooperating generally circular surface portions constraining the rocking blade to limited motion relative to the terminal.