Aug. 19, 1958 C. A. WOODWARD 2,847,754

METHOD OF MAKING A SWITCH MECHANISM

Filed March 17, 1954

FIG. 1.

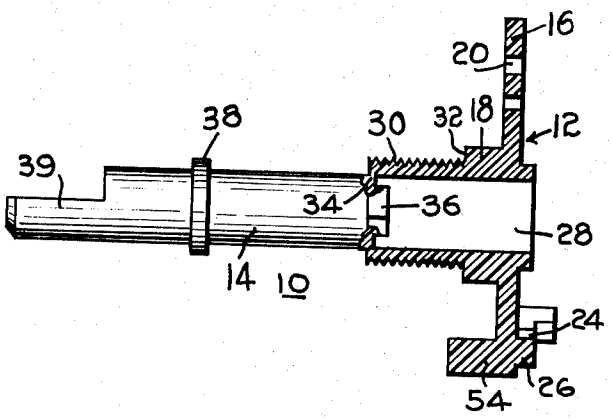


FIG. 2.

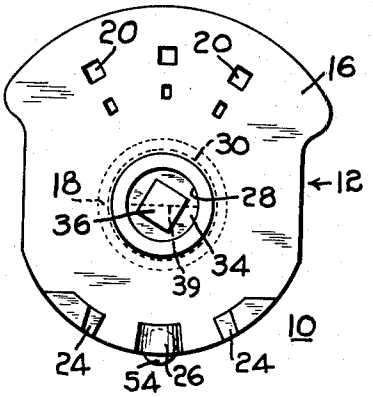


FIG. 3.

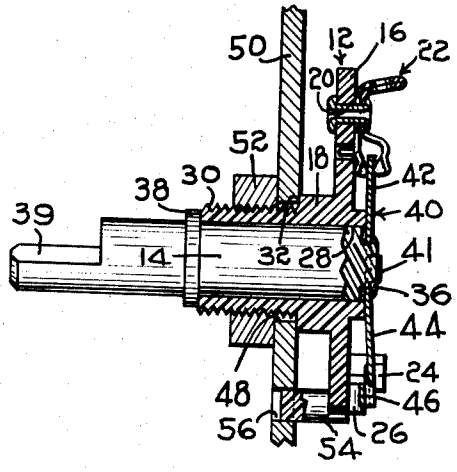


FIG. 4.

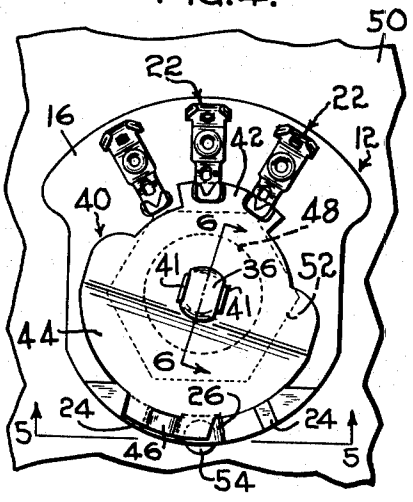


FIG. 5.

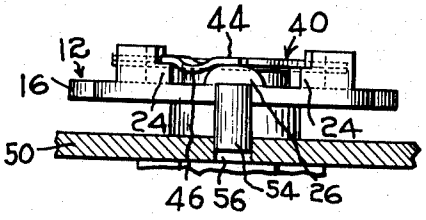
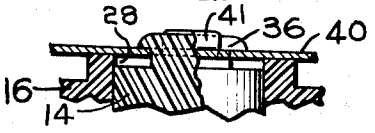


FIG. 6.



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METHOD OF MAKING A SWITCH MECHANISM

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Application March 17, 1954, Serial No. 416,889

2 Claims. (Cl. 29—411)

This invention relates generally to switches, and to a method of manufacture thereof.

In the construction of radios, phonographs, television sets, and other electronic apparatus, various selector switches are provided for changing electrical circuits during the operation of the device. Switches for this purpose commonly comprise a switch plate of wafer having a central hub with an aperture receiving an operating shaft, and a series of contact members mounted on the wafer for contact with a circuit completing member carried by the operating shaft. Since the switch is ordinarily mounted into a panel opening, a portion of the hub is externally threaded to receive a mounting nut, and the operating shaft has a D-shaped end to receive a control knob.

Such switches are relatively expensive because of the machine work involved in forming the threaded hub and shaft, and because of the assembly work necessary.

The object of this invention is to provide a method of making a switch of this type in which all machine work is eliminated and the amount of assembly work necessary is greatly reduced.

Another object of the invention is to provide a switch blank in which a switch body having an opertured hub and an operating shaft are formed as a unitary piece of molded plastic with the operating shaft being in position to be driven into the hub aperture.

Other objects of the invention will, in part, be obvious and will, in part, appear hereinafter.

In the drawing:

Fig. 1 is a view in side elevation, partly in section, of a switch blank embodying the features of the invention;

Fig. 2 is a view of the switch blank of Fig. 1 as seen from the right side;

Fig. 3 is a view in side elevation, partly in section, of a switch manufactured in accordance with the teachings of the invention;

Fig. 4 is a view of the switch of Fig. 3 as seen from the right side;

Fig. 5 is a view in section taken on line 5—5 of Fig. 4; and

Fig. 6 is a view in section taken on line 6—6 of Fig. 4.

Referring to the drawing, there is illustrated a switch blank **10** which comprises generally a switch body **12** and a switch operating shaft **14** molded as a single unit from an insulating material such as a synthetic organic plastic for example, a polyamide or a cellulose acetate butyrate resin. The switch body **12** comprises generally a wafer or plate portion **16** and a central hub **18** which protrudes a substantial distance from one side of the plate.

The plate **16**, on one side of the hub, is provided with a series of apertures **20** to receive contacts **22**, and on the other side of the hub is provided with a pair of spaced stop members **24** and a detent **26** disposed therebetween for a purpose to appear hereinafter.

The hub **18** has a central shaft receiving aperture **28**, an externally threaded end portion **30** a shoulder portion **32** disposed between the threaded portion and the plate

16, and an outer end **39** which may be D-shaped to receive a control knob (not shown).

The operating shaft **14** is disposed in alignment with the aperture **28**, and is joined to the threaded end of the hub by a shearable web **34**. The shaft **14** is provided with an end portion **36** of reduced size and preferably of non-circular cross-section which protrudes into the aperture **28**, and also has a peripheral shoulder portion **38** disposed in spaced relation to the hub.

The switch blank **10** is preferably formed by injection molding of the switch body and the operating shaft substantially simultaneously as a single unit joined by the shearable web.

In one method of completing the forming of the switch, the blank **10** may then be discharged from the mold in the usual manner and the shaft **14** is subsequently driven into the aperture, thereby shearing the connecting web **34** so that the shoulder **38** bears against the adjacent end of the hub and the reduced end portion **36** protrudes from the other end of the hub. Thereafter, to retain the shaft in assembly in the aperture a rotor plate **40** having a central aperture with side flanges **41** is assembled onto the reduced end portion **36** of the shaft and retained thereon by heading or otherwise deforming the reduced end portion. (See Fig. 6.)

The rotor plate **40** has a contact blade portion **42** disposed on one side of the shaft and an indexing blade portion **44** disposed on the opposite side of the shaft, with an embossed bump **46** disposed therein to operate in a manner to appear hereinafter.

The contacts **22** may be assembled onto the plate **16** at any convenient point in the manufacturing process, preferably after the rotor plate has been assembled. In the illustrated embodiment three contacts are mounted on the plate portion **16** and the contact blade is designed to make contact between the center contact and either outer contact.

The indexing blade portion **44** confines the rotation of the contact plate to the proper limits by engagement with the stop member **24**, and the embossed bump **46** in cooperation with the detent **26** retains the contact blade in either position.

The completed switch may be mounted into an opening **48** in a panel **50** by means of the mounting nut **52** in the usual manner, and to prevent rotation of the switch in relation to the panel, the plate **16** may be provided with a forwardly projecting lug **54** to enter a positioning opening **56** in the panel.

In another method of completing the manufacture of the switch after injection molding the blank **10**, after the plastic has partially or completely solidified, and while still in the mold the operating shaft **14** may be pushed partly or completely into the aperture **28** by moving appropriate mold portions together thereby shearing the web **34** before the blank **10** is discharged from the molding machine. In such cases the frictional engagement between the shaft and the walls of the aperture retains the shaft therein until the rotor plate can be assembled onto the end of the shaft. This method of forming a switch or similar device is more fully described in my copending application Serial Number 416,890 filed March 17, 1954.

The switch herein described is particularly adapted for rapid and economical manufacture, since the mechanism, not including the contacts, has been reduced from about eight separate parts to three parts, none of which require expensive machinery operations.

Although the illustrated switch shows three contacts with two possible positions, it will be understood that the number of contacts or the number of switch positions may be changed without departing from the scope of the invention.

Since certain other obvious modifications may be made in the device without departing from the scope of the invention, it is intended that all matter contained herein be interpreted in an illustrative and not in a liimting sense.

I claim:

1. The method of making a switch mechanism which comprises the steps of molding as a unit a switch body having a shaft receiving aperture axially extending through said body and an operating shaft in aligned relation with the aperture and joined to said body at one end of the opening by a shearable web, said operating shaft having a peripheral shoulder at a point rearwardly from the shearable web substantially equal to the length of said body, driving said shaft into the aperture, thereby shearing the web, until the peripheral shoulder abuts one end of the body with the end of said shaft protruding from the other end of the aperture in said body, and assembling means in the said end of the shaft to retain it in assembly in the opening.

2. The method of making a switch mechanism which comprises the steps of molding as a unit a switch body having a shaft receiving aperture axially extending through said body and an operating shaft in aligned relation with the aperture and joined to said body at one end of the opening by a shearable web, and having

a reduced end portion projecting into the opening, said operating shaft having a peripheral shoulder at a point rearwardly from the shearable web substantially equal to the length of said body, driving said shaft into the aperture, thereby shearing the web, until the peripheral shoulder abuts one end of the body with the reduced end portion of said shaft protruding from the other end of the aperture in said body, and assembling means onto said reduced end to retain said shaft in assembly in the opening.

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