METHOD OF MAKING A SWITCH MECHANISM

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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
side, and a 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 drawings:

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 dentet 26 disposed there-
between 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 sub-
stantially simultaneously as a single unit joined by the
shearable web.

In one method of forming the complete 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 of the 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 headng or otherwise deforming the reduced
end portion. (See Fig. 6.)

The rotor plate 40 has a contact blade portion 42 dis-
posed 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 position-
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 mold
machine. In such cases the frictional engagement be-
tween 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 re-
quire 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 posi-
tions 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 limiting sense.

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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