United States Patent [19]

Beddow

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[54] **ROTARY SWITCH WITH ENLARGED SHAFT JOURNALED IN AND REMOVABLE THROUGH SWITCH COVER**

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[52] **U.S. Cl.** ..... **200/155 R,** 200/6 R, 200/11 R, 200/172 R

[51] **Int. Cl.** **H01h 19/14**

[58] **Field of Search** ..... 200/11 R, 6 R, 6 C, 200/11 G, 155 A, 155 R, 11 A, 172 R

[56] **References Cited**

UNITED STATES PATENTS

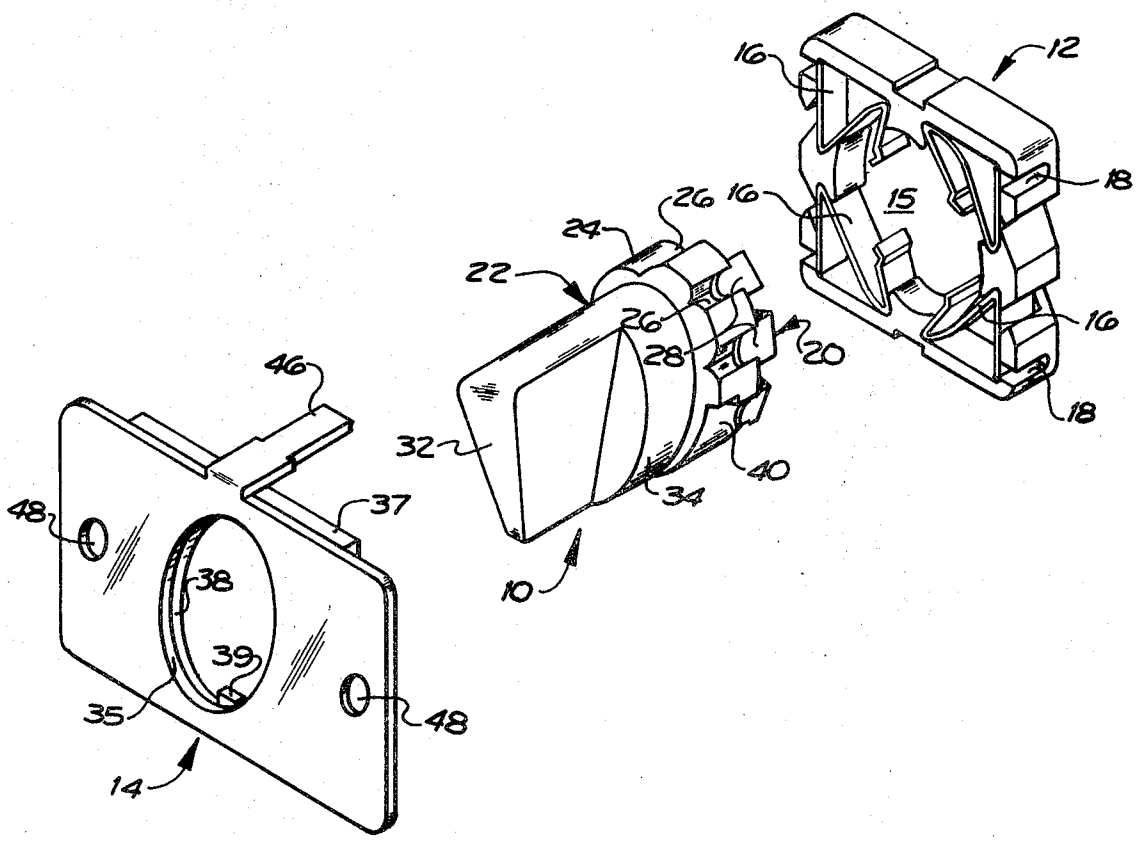
2,980,770	4/1961	Nabstedt	200/11 A
3,363,070	1/1968	Kussy	200/155 R X
2,921,147	1/1960	Hutt	200/6 R
3,309,471	3/1967	Korrell	200/11 G

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[57] **ABSTRACT**

An electrical switch characterized by a series of rotatable contacts and fixed contacts in a switch body capable of making and breaking several circuits including an integrally formed one-piece rotary contact carrier, handle and enlarged connecting shaft with the width of the handle portion being no wider than the diameter of the connecting shaft so that the handle can be passed through the opening in the switch cover plate.

10 Claims, 4 Drawing Figures



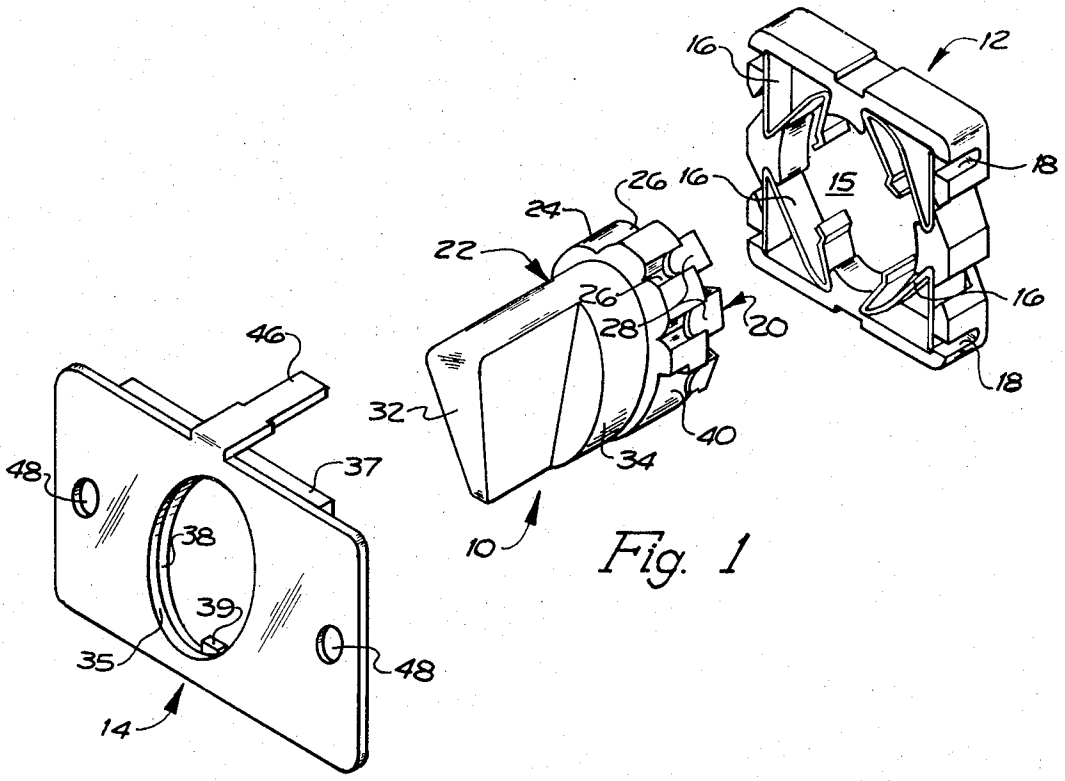


Fig. 1

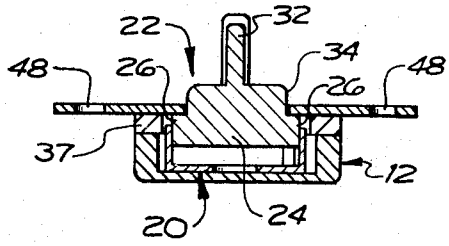


Fig. 2

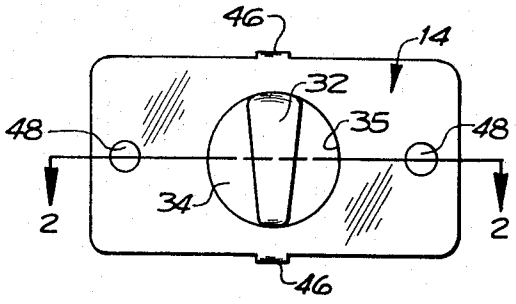


Fig. 3

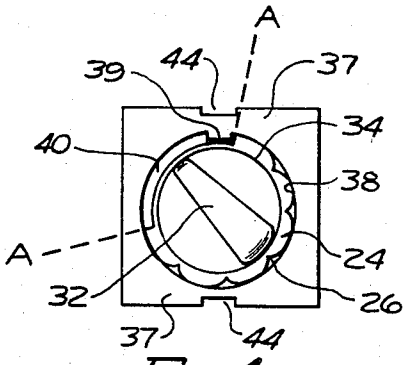


Fig. 4

ROTARY SWITCH WITH ENLARGED SHAFT JOURNALED IN AND REMOVABLE THROUGH SWITCH COVER

BACKGROUND OF THE INVENTION

The prior art rotary switches of the present type are typical of the design shown in U.S. Pat. No. 2,813,158. The rotating portions of this switch include the separate elements of rotary contacts, a rotary contact carrier and cam, a connecting shaft and a removable handle. It has been necessary to have a removable handle since the connecting shaft must pass through an opening in the cover plate which acts as a journal for the rotating shaft.

SUMMARY OF THE INVENTION

The present invention combines three of the separate elements of the prior art switch into a single molded or otherwise formed piece. The contact carrier, connecting shaft and handle are formed together with the connecting shaft having an enlarged diameter. The opening in the cover plate has an equally large journal opening for receipt of the connecting shaft. Due to the enlarged opening in the cover plate, a handle of substantial dimension can be passed through the opening which was not possible with any of the prior art switches. This allows the handle shaft and contact carrier now to be a unitary structure. Due to the increased diameter of the journal and bearing, the rotating structure of the switch no longer needs a second journal and bearing to adequately maintain its position, as required in the above mentioned prior art switches.

It is therefore the principal object of the present invention to provide an integrally formed rotating structure in a rotary switch.

Another object of the present invention is to provide an integrally formed rotating switch member which has a single journal bearing mounting.

A further object of the present invention is to provide an integrally forming rotating carrier member which is molded in a single piece and is very simple in design and economic in cost.

Another object of the present invention is to provide a rotating switch with a fixed handle.

My invention will be better understood from the following description taken in connection with the accompanying drawings, and its scope will be pointed out in the appended claims.

FIG. 1 is an exploded perspective view of the various parts which comprise the rotary switch construction embodied in the present invention;

FIG. 2 is a sectional view taken along lines 2 — 2 of FIG. 3;

FIG. 3 is a front view of the assembled switch; and

FIG. 4 is a front view of the switch with the cover plate removed.

Referring in detail to the drawings and in particular to the exploded view of FIG. 1, the main parts of the switch include the rotating structure generally identified by reference numeral **10**, the switch body identified by reference numeral **12** and the switch cover plate **14**. The switch body **12**, which is molded of a phenolic or another suitable insulating material, has a large recess **15** with a plurality of fixed contacts **16** located around the periphery of the recess **15**. The Z-shaped contacts **16** are conventional and well known in the art, having the dual function of quick-connect terminals for

conductors entering slots **18** as described in detail in the above mentioned prior art patent. The rotating structure **10** of the switch includes a set of rotary contacts **20** formed from a thin sheet of brass which is also old in the art and therefore not described in detail. The rotating carrier member **22**, molded of a phenolic or other suitable material, includes a rounded end portion **24** having a plurality of angularly spaced notches **26** spaced around the periphery thereof to receive the gripping fingers **28** of the flexible rotary contacts **20**. Connecting the handle portion **32** to the rounded end portion **24** is an enlarged shaft portion **34**. The opening **35** in the cover plate **14** functions as a journal for the shaft portion **34**. Sandwiched between the cover plate and the switch body is an insulating cover **37** having an opening **38** therein which is slightly larger in diameter than the opening **35** in the cover plate. Extending into the opening **38** is a tap **39** for limiting the angular rotation of the carrier member **22**. The opening **38** acts as a journal for the rounded end portion **24** of the carrier member **22**. Cut into the periphery of the rounded end portion **24** is a groove **40** which extends approximately 135° around the end portion **24**, as indicated by the line A — A in FIG. **4**. A portion of the groove **40** is also seen in FIG. **1**. Extending into groove **40** is tab **39** to limit the angular movement of the rotating structure **10** of the switch. Positioned on opposite edges of the insulating cover **37** are a pair of notches **44** which receive the bendable tabs **46** on the cover plate **14** and hold the insulating cover from any rotation once the switch is assembled.

In assembling the switch from the exploded position of FIG. **1**, the rotating structure **10** is merely introduced into the cover plate **14** through openings **35** and **38**. While the handle portion **32** illustrated in the drawing is shown with a width slightly smaller than openings **38**, it could be modified in an offset manner just as long as it has a dimension less than the diameter of opening **38** so that the handle could be passed through the cover plate **14**, as for example an L-shaped handle.

Modifications of this invention will occur to those skilled in this art, such as the one just mentioned, and it is to be understood therefore, that this invention is not limited to the particular embodiments disclosed, but that it is intended to cover all modifications which are within the true spirit and scope of this invention. The detailed structure and function of the electrical contacts **16** and **20** was not mentioned in detail since they are well known in the art.

What is claimed is:

1. A rotary switch comprising:

a recessed body with resilient fixed contacts located in the periphery of the recess;

a cover plate with an enlarged opening therein covering the recess;

means for holding the cover plate in place on the body;

a set of rotary contacts located in the recess;

a single piece integrally formed rotating carrier member including a rounded end portion having means around the circumference thereof for receipt of the rotary contacts, an enlarged shaft portion extending from the rounded end portion, journaled in the cover plate opening, and a handle portion axially extending from the shaft portion, the handle portion having a dimension substantially equal to or less than the diameter of the enlarged shaft portion

whereby when assembled or disassembled the handle portion can be passed through the cover plate opening.

2. A rotary switch as set forth in claim **1**, wherein the diameter of the shaft portion is less than the diameter of the rounded end portion.

3. A rotary switch as set forth in claim **1**, including an insulating plate positioned under the cover plate with an opening therein for receipt of the carrier member, a circumferential groove extending partially around the periphery of the carrier member, and a stationary tab means extending into said circumferential groove limiting the angular rotary movement of the carrier member.

4. A rotary switch as set forth in claim **1**, including an insulating plate positioned under the cover plate with an opening therein for receipt of the carrier member, a circumferential groove extending partially around the periphery of the rounded end portion of the carrier and a tab means extending inwardly from the opening in the insulating plate into said groove limiting the angular rotary movement of the carrier member.

5. A rotary switch as set forth in claim **1**, including an insulating plate positioned under the cover plate with an opening therein for receipt of the carrier member, a circumferential groove extending partially around the periphery of the rounded end portion of the carrier and a tab means extending inwardly from the opening in the insulating plate into said groove limiting the angular rotary movement of the carrier member, the diameter of the shaft portion being less than the diameter of the rounded end portion.

6. A rotary switch as set forth in claim **1**, including an insulating plate positioned under the cover plate with an opening therein to journally receive the rounded end portion of the carrier, a circumferential groove extending partially around a portion of the rounded end portion of the carrier, and a tab means extending inwardly from the opening in the insulating plate into said groove limiting the angular movement of the carrier member, the diameter of the shaft portion being less than the diameter of the rounded end portion.

7. A rotary switch as set forth in claim **1**, wherein the handle portion dimension is the width which is substantially equal to the diameter of the enlarged shaft position.

8. A rotary switch as set forth in claim **1**, wherein the handle portion extends along a diameter line of the enlarged shaft a diameter distance whereby the handle portion freely slides through the opening in the cover plate.

9. A rotary switch as set forth in claim **1**, including an insulating plate positioned under the cover plate with an opening therein to journally receive the rounded end portion of the carrier, a circumferential groove extending partially around a portion of the rounded end portion of the carrier, and a tab means extending inwardly from the opening in the insulating plate into said groove limiting the angular movement of the carrier member, the diameter of the shaft portion being less than the diameter of the rounded end portion, and the handle portion dimension being the width which is substantially equal to the diameter of the enlarged shaft portion.

10. A rotary switch as set forth in claim **1**, including an insulating plate positioned under the cover plate with an opening therein for receipt of the carrier member, a circumferential groove extending partially around the periphery of the carrier member, and a stationary tab means extending into said circumferential groove limiting the angular rotary movement of the carrier member, the handle portion dimension being the width which is substantially equal to the diameter of the enlarged shaft portion.

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