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VARIABLE RESISTORS AND THE LIKE

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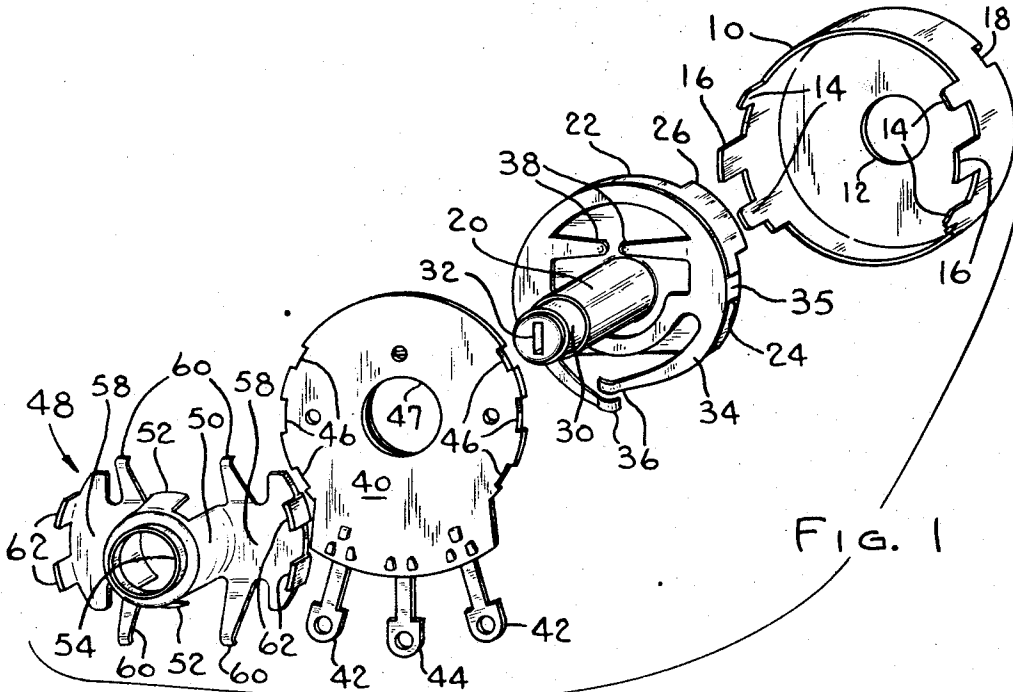


FIG. 1

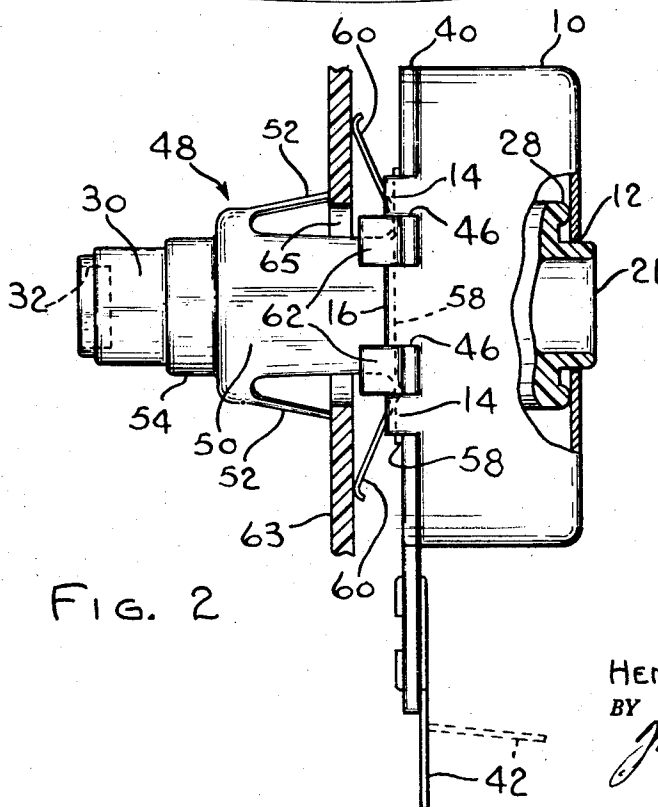


FIG. 2

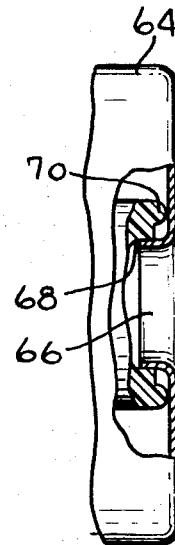


FIG. 3

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VARIABLE RESISTORS AND THE LIKE

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3 Claims. (Cl. 174—66)

This invention relates to improvements in variable resistors and particularly the ground plate, bearings, and mounting means for such resistors, rotary switches, and the like.

An object of this invention is to provide a variable resistor or the like which may be quickly and simply attached to a panel.

Another object of this invention is to provide a variable resistor or the like which has less number of parts than usual and is relatively inexpensive to manufacture.

These objects are obtained by providing a single member which constitutes a bearing for the rotary part of the mechanism, a front or ground plate for the casing, and mounting means for the variable resistor or the like. Such member is formed from a single piece of metal and has a cylindrical section forming a bearing. Such section has locking ears projecting rearwardly and outwardly. Two flat sections extend radially outwardly from the inner end of the cylindrical section to make the front and ground plate. Spring fingers on these flat sections project radially and forwardly toward the locking ears. This single member is mounted on the resistor casing in the same manner as the customary mounting plate. The assembled unit is attached to a panel or the like by inserting the front end of the single member into a hole in the panel until the spring fingers are stressed rearwardly and the locking ears have passed through the hole and are abutting against the panel on the side opposite said fingers.

The novel features, which are considered characteristic of the invention, are set forth with particularity in the appended claims. The invention itself, however, both as to its organization and its method of operation, together with additional objects and advantages thereof, will best be understood from the following description when read in connection with the accompanying drawing, in which:

Fig. 1 is an exploded view of a variable resistor embodying the present invention;

Fig. 2 is a view in side elevation with part broken away and shown in section of the variable resistor of Fig. 1; and

Fig. 3 is a fragmentary view in side elevation with parts broken away and shown in section of an embodiment of the outer bearing for the variable resistor embodying the present invention.

The invention is embodied in a variable resistor of the type commonly used in television and radio sets. The resistance element (not shown), the collecting ring (not shown), and the wiper are of well known design and are not described in detail herein. The invention may also be embodied in any small control having a rotating shaft, such as variable capacitors, rotary switches, and the like.

In describing the unit, the term "rear" will designate the right as viewed in the drawing, and the term "front" will designate the left as so viewed.

The variable resistor has a metal housing 10 provided

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with a rear wall having a central opening 12. This opening forms a bearing for the rear end of the operating shaft. The side walls of the housing have forwardly extending tongues 14 which engage with notches on the panel 40 to hold it against rotation relative to the housing. After assembly the tongues are bent over the edge of the front plate to hold the unit assembled. There may be a pair of prongs 16, one or both of which may be left unclined to fit into a slot in the panel on which the unit is mounted and prevent the unit from rotating relative thereto. A small portion of the end wall of the housing may be punched out and turned inwardly to form a stop 18 for limiting the rotation of the control member.

A rotatable control member has a shaft 20 with a rearward projection 21. A disk-like shoe 22 provides the support for the wiper. It has notches 24 in the edge thereof to accommodate the wiper mounting lugs. Projecting rearwardly from the shoe 22 is a stop member 26 which engages the stop 18 to limit the rotation of such control member. On the rear of such shoe is a thrust ring 28 which bears against the inner wall of the housing 10 to axially locate the control member with respect to the housing. At its forward end the shaft 20 may have a knurled section 30 for direct manual operation and a slot 32 for receiving a screw driver or other instrument for intermittent adjustment. A wiper 34 is seated against the forward face of the shoe 22 and secured thereto by lugs 35 which fit in the notches 24 and are clinched against the back of the shoe 22. The wiper has spring fingers 36 which ride on a resistance element (not shown) and collecting ring contactors 38 which run on a collecting ring (not shown). The rotatable control, exclusive of the wiper, may be moulded as a single piece from any plastic material having sufficient strength and insulating properties.

An insulating panel 40 of unusual design carries terminals 42 which are connected with opposite ends of a resistance element and a central terminal 44 which is connected to a collecting ring. The edge of the panel 40 has notches 46, as shown, into which the tongues 14 and prongs 16 fit when the insulating panel is assembled to the housing. It also has a central opening 47 through which the shaft 20 projects.

A principal feature of this invention resides in a front or mounting plate 48 for the unit. This plate is made from a single piece of metal which is formed to provide a cylindrical section 50 having two diametrically positioned spring locking ears 52. These ears are biased radially outwardly and project rearwardly. The forward end of the cylindrical section 50 is extruded and reduced in diameter to form a bearing 54 for the front end of the shaft 20. To the rear of the cylindrical section 50 there are oppositely positioned radially extending flat sections 58 which constitute a ground plate. From these sections extend spring fingers 60 biased toward the ends of the locking ears 52 and extending radially therebeyond. In order to lock the front plate against rotation relative to the housing 10 and to prevent undue distortion of the fingers 60, tabs 62 are formed on the edges of the flat sections 58 and fit in the spaces between the tongues 14 and prongs 16. The ends of these tabs abut against the panel to prevent undue stressing of the fingers 60 and keep the terminals 42 and 44 spaced from such panel. After the control member is positioned in the housing 10 the insulating panel 40 is placed on the housing and the front plate 48 seated thereon. The tongues 14 are crimped or staked over the edges of the flat sections 58 to hold the unit assembled. Thus this front or mounting plate becomes: (1) a ground plate providing a connection for the non-current carrying parts of the unit; (2) a front bearing for the shaft 20; and (3) a

mounting for the unit. The rear end of shaft 20 has a bearing provided by its extension 21 and the opening 12. The spring tension in the fingers 36 and contractors 38 continually urge the control member rearwardly so that the thrust ring 28 is in engagement with the wall of the housing.

To assemble the control unit to a panel 63 having an opening 65 of large enough diameter to receive the cylindrical portion 50, it is only necessary to insert the front end of the unit through such opening until the locking ears 52 pass through the opening and spring outwardly into engagement with the front side of the panel 63. In so doing, the spring fingers 60 will be sufficiently stressed by engagement with the rear face of the panel 63 to hold the locking ears 52 solidly against the panel. One of the prongs 16 may be left unclined so as to fit into a slot (not shown) in the panel 63 and keep the unit from rotating relative to the panel when the shaft 20 is turned for adjustment.

Referring to Fig. 3, there is shown another modification of the method of providing a bearing for the rear end of the shaft 20. In this modification the metal housing 64 has an inwardly directed flange 66 surrounding a central opening. The rotatable control member has an opening 68 in its rear end into which the flange 66 fits to provide the bearing. The control member has a thrust ring 70 which functions similarly to the thrust ring 28 of the first modification.

Although two modified forms of the embodiment of the invention are shown and described herein, it will be understood that this application is intended to cover such changes or modifications as come within the spirit of the invention or scope of the following claims:

I claim:

1. A variable control having a casing, said casing having a rear wall with a central opening forming a rear bearing, a moulded shoe in said casing having an operating shaft with a rearward projection rotatably mounted in said rear bearing, said shoe having a rearwardly projecting stop, a second stop on said rear wall cooperable with said first stop, a thrust ring projecting from the rear of said shoe, said ring encircling said rearward projection and bearing against said rear wall, and a ground plate secured to said casing, said plate having integral therewith a central section with an opening therein which constitutes a bushing for the forward end of said shaft.

2. Means for mounting an article such as a variable resistor, rotary switch or other component on one face of an apertured supporting panel comprising, a mounting

plate having a flat section secured to such article, a part attached to said section and extending therefrom through an aperture in said panel, a spring locking ear on said part having its end engaging the other face of said panel, said ear being biased laterally of said section to spring outwardly of said aperture and overlies and be in engagement with said other face of said panel as said mounting means is attached to said panel, a spring finger on said section biased into engagement with said one face of said panel to grip said panel between the end of said ear and said spring finger, and a rigid tab integral with said section projecting toward said panel and having an outer end permanently spaced from said section to abut against said panel and prevent undue stress of said spring finger upon installation of said mounting plate and to prevent said mounting plate from contacting said panel after installation.

3. For use with a part having a casing and projecting rotatable shaft, a mounting plate comprising a single stamped and formed metal piece having a formed cylindrical section with diametrically positioned spring locking ears extending rearwardly and outwardly, said section having an extruded front end providing a bearing for said shaft, there being flat sections at the rearward end of said cylindrical section extending radially outward as far as the outer peripheries of said casing to form a ground plate adapted to be attached to said casing, a plurality of spring members formed on said flat sections inwardly of the outer periphery of said flat sections and extending outwardly of and facing forwardly toward said locking ears to engage between said spring members and said ears the margins surrounding a hole in a panel, and tabs on said flat sections at the outer peripheries thereof projecting forwardly so that their ends are adapted to abut against a panel to prevent undue stress of said spring members and space said mounting plate properly from such a panel.

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