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ELECTRICAL CONTROL INSTRUMENTALITY

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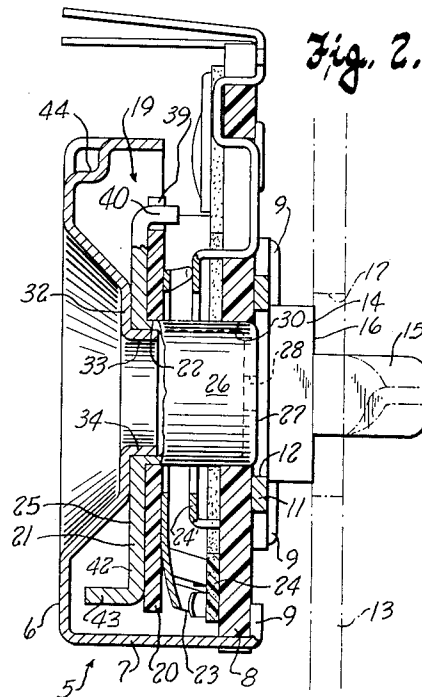
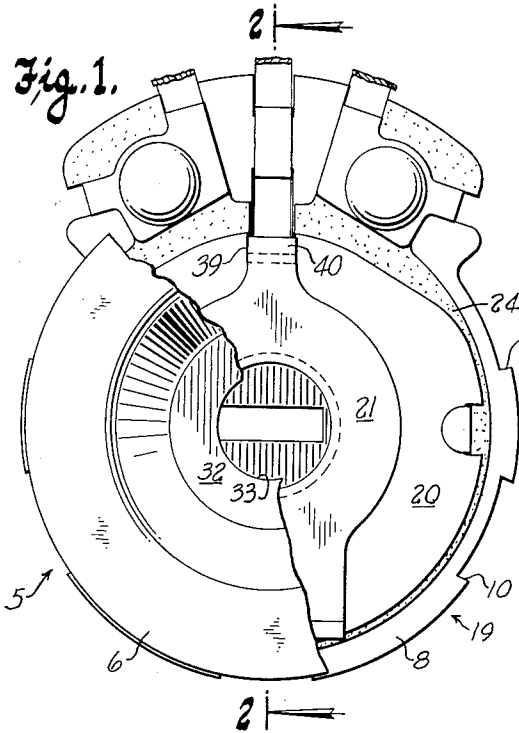
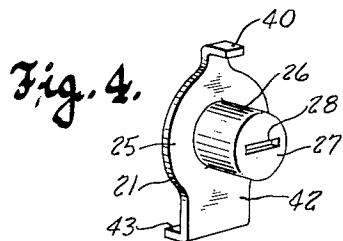
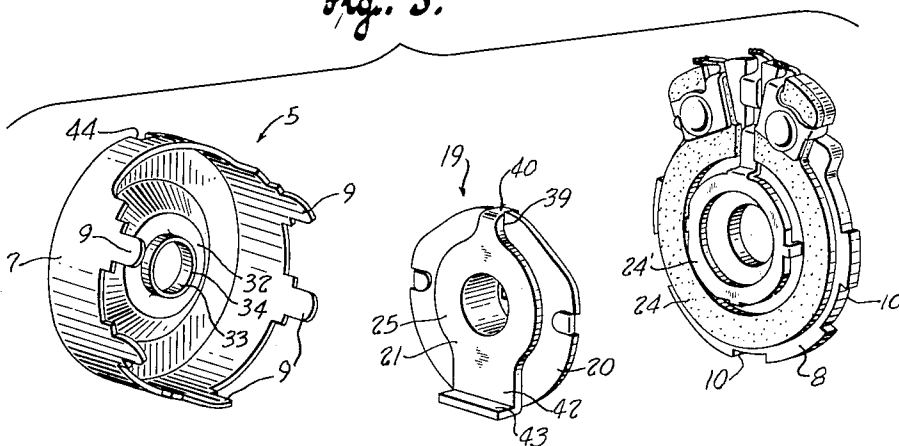


Fig. 3.



Inventors
 Arthur M. Daily
 Joseph G. Veitch, Jr.
 By *Walter Jones*
Attorney

1

2,745,927

ELECTRICAL CONTROL INSTRUMENTALITY

Arthur M. Daily and Joseph G. Veatch, Jr., Elkhart, Ind.,
assignors to Chicago Telephone Supply Corporation,
Elkhart, Ind., a corporation of Indiana

Application January 9, 1953, Serial No. 330,528

11 Claims. (Cl. 201—55)

This invention relates to electrical control instrumentalities and refers more particularly to improvements in variable resistance control units of the so-called preset type, such as are used extensively in television receivers, and disclosed in the copending application of Wilbert H. Budd and Arthur M. Daily, Serial No. 259,272, filed November 30, 1951, now Patent No. 2,639,358.

Like the resistance control unit of the aforesaid copending application, one of the characteristics of the control unit of this invention is that it has no permanent operating shaft such as is provided in the more conventional units. In other words, the electrical resistance control unit of this invention may be considered as of the shaftless type.

As is customary in electrical resistance control devices of this type the unit is provided with a rotatable contact assembly cooperable with stationary means on the front wall of the housing. The contact assembly includes a contact carrier having resilient contact fingers thereon, and a driver upon which the carrier is mounted for rotation therewith.

One of the purposes of this invention resides in the provision of a low cost electrical resistance control unit of the type described featuring a novel contact assembly, wherein the driver comprises a single inexpensive stamping of sheet metal having a hollow hub formed thereon to not only provide for rotatably mounting the contact assembly in the housing but to afford means accessible to a tool applied thereto from the exterior of the housing to enable rotation to be transmitted to the contact assembly.

More specifically it is an object of this invention to provide a low cost variable resistance control device of the shaftless preset type described, wherein unusual stability of the contact assembly is achieved through the provision of extremely simple bearings on both the front and rear walls of the housing of the unit, said bearings rotatably supporting the opposite ends of the hollow hub on the driver to assure against wobbling of the contact assembly, and the rear end of the hub directly engaging a portion of the rear wall of the housing to axially locate the contact assembly in the housing with its contact fingers properly tensioned.

With the above and other objects in view, which will appear as the description proceeds, this invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described, and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the hereinafter disclosed invention may be made as come within the scope of the claims.

The accompanying drawing illustrates one complete example of the physical embodiment of the invention constructed in accordance with the best mode so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a rear elevational view of the resistance control device embodying this invention, portions of the

2

housing being broken away to show the arrangement of parts in its interior;

Figure 2 is a longitudinal sectional view taken through Figure 1 along the plane of the line 2—2;

Figure 3 is a group perspective view of the contact assembly and the housing of the device with the housing sections separated from one another; and

Figure 4 is a perspective view of the driver per se.

Referring now more particularly to the accompanying drawing, the numeral 5 generally designates the housing of a variable resistance control device of the so-called shaftless preset type. The rear wall 6 of the housing comprises the bottom of a cup-like housing part stamped from sheet metal and having a cylindrical side wall 7 extending forwardly therefrom to have its rim in abutting engagement with the rear face of a disc 8 of insulating material. The disc 8, therefore, closes the housing at its front and constitutes the front wall of the housing.

The front wall 8 is fixed to the housing in spaced parallel relationship to the rear wall 6 by any suitable means, preferably by attaching tabs 9 on the side wall 7 extending forwardly from its rim through peripheral notches 10 in the front wall and bent inwardly over its front face. In the present case the tabs 9 are bent over a grounding plate 11 overlying the front wall of the housing and thus serve to hold the grounding plate securely attached to the housing of the control device.

The grounding plate 11 is of conventional construction and need not be described in detail herein. For a more complete disclosure of the grounding plate reference may be had to the copending application of Arthur M. Daily, Mervin B. Arisman and Donald A. Pierce, Serial No. 330,304, filed January 8, 1953. It is sufficient to note herein that the grounding plate has a central aperture 12 therein substantially coaxial with the cup-shaped section of the housing and that it provides for mounting the control unit upon one of the walls 13, indicated in construction lines in Figure 2, of the chassis of a television receiver.

The grounding plate, of course, has legs 14 projecting forwardly from diametrically opposite portions of its periphery, and these legs terminate in reduced extensions or tongues 15 which are adapted to pass through slits (not shown) in the wall 13 and when twisted over the opposite side of the chassis wall securely hold the control unit thereon in spaced relation thereto through the abutting engagement of shoulders 16 on the legs 14, flanking their extensions 15, with the inner surface of the chassis wall.

When properly mounted on the chassis wall in this manner, the aperture 12 in the grounding plate aligns with an access hole 17 in the chassis wall intermediate the slits through which the tongues 15 project.

The control unit includes a rotatable contact assembly indicated generally by the numeral 19 and comprising a contact carrier 20 facing the front wall of the housing and a driver 21 for the contact carrier. The contact carrier is a flat disc of insulating material having a central hole 22 therein and having a pair of resilient contact fingers 23 secured to its front face for cooperation with a resistance strip 24 and a collector ring 24' on the inner face of the front wall 8.

The driver 21 is of unique construction in that it comprises a single sheet metal stamping having a relatively flat body portion 25 overlying the rear of the contact carrier, and a hollow hub 26 extruded forwardly from the center of the body portion with its cylindrical side wall perpendicular to the body portion. The hub passes forwardly through the hole 22 in the carrier and its end remote from the body portion terminates in a wall 27 normal to the hub axis. The wall 27, of course, is actually the forwardly displaced central portion of the

body 25 of the driver, and it closes the front end of the hub except for a rectangular opening 28 therein which provides a drive slot enabling rotation to be imparted to the driver by a tool engaged in said slot from either the front or the back of the housing of the unit in a manner to be described shortly.

Referring to Figure 2 it will be noted that the contact carrier is seated on the hub of the driver directly adjacent to the front of the body portion 25 of the driver, and in fact is flatwise engaged therewith.

The contact assembly is rotatably supported in the housing by bearings provided on both the front and rear walls of the housing. A hole 30 in the front wall 8 provides one of these bearings and receives the front extremity of the hub therein, with the end wall 27 of the hub terminating in a plane substantially flush with the outer face of the front wall.

Inasmuch as the axial length of the hub 26 is considerably less than the full depth of the housing, a large central portion of the rear wall 6 is indented a substantial distance inwardly into the housing, towards the driver to engage and support the same. As shown, this indentation or embossment is substantially conical but has a flat portion 32 at its bottom parallel to the front wall 8 and overlying the rear of the body portion of the driver. At the center of the flat portion 32 is a hole 33 the edge of which is turned up and projects forwardly to provide a cylindrical flange 34 in axial alignment with the hole 30 in the front wall of the housing.

The flange 34 projects into the rear of the hub 26 and thus provides a pilot bearing, on the rear wall of the housing, which cooperates with the bearing provided by the hole 30 in the front wall to rotatably mount the contact assembly in the housing in a manner which, though exceptionally simple and inexpensive, minimizes wobbling of the contact assembly. Further stability of the contact assembly is assured with this construction by reason of the fact that the flat portion 32 of the indentation or embossment provides a smooth thrust bearing surface on the rear wall of the housing which is engaged by the body portion of the driver and thus receives the rear end thrust imposed on the contact assembly by the resilient contact fingers 24.

While the hub 26 of the driver may have a snug fit in the hole 22 of the contact carrier, the carrier is not necessarily drivingly connected to the driver in this way. The carrier has a notch 39 in its periphery to receive a tongue 40 bent forwardly from the periphery of the driver, and it is preferably through this connection that the carrier is constrained to rotate with the driver. Thus, even though the hub 26 of the driver may have a relatively loose fit in the central hole of the carrier, the rearward thrust of the contact fingers 24 on the contact carrier can be relied upon to hold the carrier engaged with the front face of the body portion of the driver and thus rotatively coupled with the driver through the engagement of its tongue 40 in the notch 39 of the carrier.

From the above it will be seen that the front and rear walls 8 and 6, respectively, of the housing have aligning holes therein which permit a tool such as a screw driver or the like to be engaged in the drive slot 28 either from the front or the rear of the housing for the transmission of rotation to the contact assembly. This feature is advantageous in that it provides for adjustment of the contact assembly either from the inside or the outside of the chassis upon which the control unit is mounted.

Another feature of the invention is that the novel driver for the contact carrier also constitutes a stop plate, and for this purpose has a radially outwardly extending arm 42 formed integrally therewith, diametrically opposite the tongue 40. The outer end of this arm is bent rearwardly to provide a lug or finger 43 which is adapted to engage one side or the other of an indentation 44 in the rear wall of the housing at its junction with the side wall

7 thereof to thus limit the rotation of the contact assembly.

From the foregoing description taken together with the accompanying drawing it will be readily apparent to those skilled in the art that this invention provides a resistance control device of the shaftless preset type featuring an improved manner of rotatably mounting the contact assembly of the device in its housing by which unusual stability of the contact assembly is achieved without increasing manufacturing costs.

What we claim as our invention is:

1. In an electrical control instrumentality of the character described: a housing having opposing front and rear walls in fixed space apart relationship, the front wall having a central aperture therein providing a bearing; flange means on the rear wall of the housing providing another bearing coaxial with said aperture; a contact assembly rotatably carried by said bearings and including a driver having a hollow hub, one end portion of said hub being rotatably supported by said flange means on the rear wall of the housing and the opposite end portion of the hub being rotatably journaled in the bearing provided by said aperture in the front wall of the housing; and means on the hub of the driver defining a drive slot accessible from the exterior of the housing at its front to enable rotation to be transmitted to the contact assembly by a tool engaged in said drive slot.

2. The electrical control instrumentality set forth in claim 1 further characterized by the fact that the rear wall of the housing is provided with an aperture aligning with the interior of the hollow hub on the driver to also provide access to said drive slot from the rear of the housing.

3. The electrical control instrumentality set forth in claim 1 wherein said flange means is formed on an inwardly indented central portion of the rear wall of the housing, the bottom of said indentation providing a thrust bearing engaged by the rear of the driver to hold the contact assembly against rearward motion in the housing.

4. The electrical control instrumentality set forth in claim 3 further characterized by the fact that the bottom of said centrally indented portion of the rear wall of the housing has a hole therein aligning with the interior of the hollow hub on the driver to provide access to said drive slot from the rear of the housing.

5. In an electrical control instrumentality of the character described: a housing having opposing front and rear walls in fixed spaced apart relationship, the front wall having a central aperture therein providing a bearing; a rotatable contact assembly in the housing including a driver having a hollow hub, the front end portion of which is rotatably journaled in the bearing provided by said aperture in the front wall of the housing; means on the rear wall of the housing providing a pilot bearing engaged with wall portions of the hub at the rear end thereof and cooperating with the bearing on the front wall to provide axially spaced supports for the contact assembly; and means on the hub of the driver defining a drive slot accessible from the exterior of the housing at its front to enable rotation to be transmitted to the contact assembly by a tool engaged with said drive slot.

6. In an electrical control instrumentality of the character described: a housing having opposing front and rear walls in fixed spaced apart relationship, the front wall having a central aperture therein providing a bearing; means on the rear wall of the housing providing another bearing coaxial with said aperture in the front wall of the housing; a rotatable contact assembly in the housing including a driver having a hollow hub extending axially between said bearings and having its opposite ends rotatably supported thereby, and a contact carrier on the hub having resilient contact means thereon which react against the front wall of the housing to impose a rearward thrust on the driver; means on the rear wall of the housing defining a thrust bearing engaged by the rear end of the hub to support the same against the rearward thrust

5

of said resilient contact means; and means on the hub of the driver defining a drive slot accessible from the exterior of the housing at its front to enable rotation to be transmitted to the contact assembly by a tool engaged with said drive slot.

7. The electrical control instrumentality set forth in claim 6 wherein the driver comprises a relatively flat body portion overlying the rear of the contact carrier and wherein said hollow hub is an integral part of the driver extruded forwardly from the body portion thereof; and a driving connection between the driver and the contact carrier comprising a notch in the periphery of the contact carrier and a tongue on the body portion of the driver bent forwardly therefrom and received in said notch to constrain the contact carrier to rotate with the driver.

8. The electrical control instrumentality set forth in claim 6 further characterized by the fact that said means which provides the thrust bearing comprises the bottom of an inwardly indented central portion of the rear wall of the housing against which the rear of the body portion of the driver bears.

9. The electrical control instrumentality set forth in claim 8 further characterized by the fact that the contact carrier has a central aperture therein to receive the hub on the driver, and wherein said driving connection between the body portion of the driver and the contact carrier is maintained operative by the rearward thrust imposed on the carrier by said resilient contact means.

10. In an electrical control instrumentality of the character described: a housing having opposing front and rear walls in fixed spaced apart relationship, the front wall having a central aperture therein providing a bearing, and the rear wall having an inwardly indented central portion, the bottom of which extends a substantial distance into the interior of the housing and provides an offset wall parallel to the plane of the unindented portion of the rear wall, said offset wall having a central opening therein and portions thereof adjacent to the opening being directed forwardly to provide a cylindrical flange coaxial with the aperture in the front wall of the housing; a rotatable contact assembly in the housing including a contact carrying disc facing the front wall of the housing and having resilient contact means thereon which react against the front wall of the housing to impose a rearward thrust on the contact carrying disc, a driver having a flat body portion interposed between said offset wall and the contact carrying disc and engaged with both under the rearward thrust of said contact means so that said thrust is borne

6

by the offset wall of the housing, and a hollow hub on the driver having its front end rotatably supported in the aperture in the front wall of the housing and its rear end rotatably supported by said flange on the offset wall of the housing to mount the contact assembly for rotation in the housing, said hub passing forwardly through a central aperture in the contact carrying disc; a rotation transmitting connection between the driver and the contact carrying disc at a location remote from the hub of the driver; and means on the hub of the driver defining a drive slot accessible from the exterior of the housing at either its front or its rear to enable rotation to be transmitted to the contact assembly by a tool engaged in said slot.

11. A variable resistor, comprising: a flat base of insulating material having a resistance element mounted thereon and having a hole therethrough; a rotatable contact assembly for the resistor, including a spring contact finger riding on the resistance element, and a part journaled in the hole in the base and accessible for manipulation from in front of the base, the reaction of the spring contact finger against the resistance element imposing an inward end thrust upon the rotatable contact assembly; a cup-shaped metal shell having an end wall and a side wall, said shell being inverted over the base and the side wall of the shell being connected to the base so that the base coacts with the shell to provide a housing for the instrumentalities of the resistor; a substantially conical central inward embossment in the end wall of the shell providing a smooth inwardly facing surface spaced from the end wall; means on the rotatable contact assembly providing a smooth surface facing the inward embossment and seated on said smooth inwardly facing surface on the embossment so that inward end thrust imposed upon the rotatable contact assembly is carried by said embossment; and cooperating means on the embossment at the center thereof and on the rotatable contact assembly providing a side thrust bearing so that the rotatable contact assembly is supported against side thrust jointly by the base and the embossment in the end wall of the cup-shaped metal shell.

References Cited in the file of this patent

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