

Jan. 3, 1956

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2,729,728

ELECTRIC RESISTOR

Filed Sept. 21, 1953

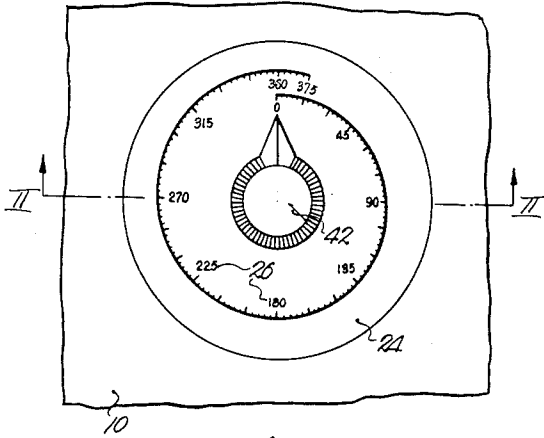


Fig. 1.

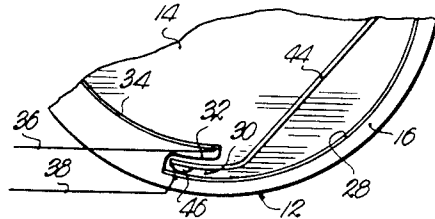


Fig. 4.

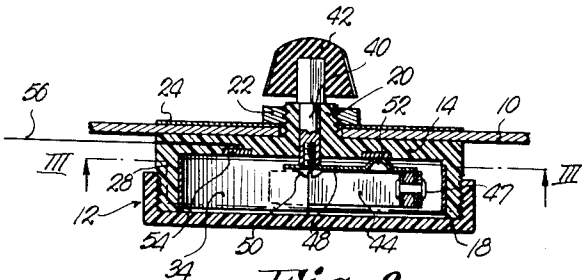


Fig. 2.

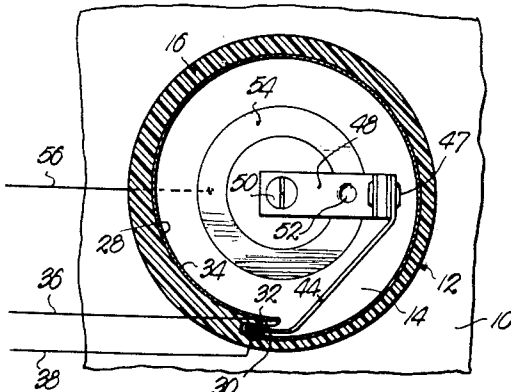


Fig. 3.

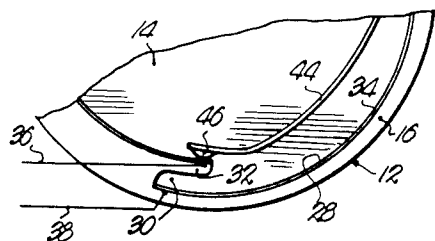


Fig. 5.

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ELECTRIC RESISTOR

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Application September 21, 1953, Serial No. 381,386

9 Claims. (Cl. 201—55)

This invention relates to improvements in electrical instruments, and particularly to devices such as potentiometers, rheostats and the like, wherein it is desired to rotate the relatively engaging conductive parts more than 360 degrees.

It is the most important object of the present invention to provide an electrical control having a conductive brush and a conductive band, interengageable and relatively rotatable, the brush being shiftable more than 360 degrees while remaining in contact with the band because of the provision of a notch within the instrument body adapted to receive one end of the brush.

Another object of the present invention is to provide a brush-type device, wherein the brush itself is in wiping engagement with a spiral conductive band mounted on an inner wall of the same configuration, there being a tongue within the body of the instrument presenting a notch into which the brush is adapted to engage.

Other objects include important details of construction, all of which will be made clear as the following specification progresses.

In the drawing:

Figure 1 is a top plan view of an electrical device having rotatable control made pursuant to the present invention.

Fig. 2 is a cross-sectional view taken on line II—II of Fig. 1.

Fig. 3 is a cross-sectional view taken on irregular line III—III of Fig. 2 looking in the direction of the arrows.

Fig. 4 is an enlarged fragmentary view similar to Fig. 3 illustrating the position of the brush at one end of its path of travel, and

Fig. 5 is a view similar to Fig. 4 showing the brush at the opposite end of its path of travel, after having moved more than 360 degrees.

The electrical instrument embodying the principles of the present invention may take many different forms but for the most part it is contemplated that the same consist of variable resistors such as potentiometers, rheostats and the like, normally adapted for mounting upon an instrument panel 10. In the form of my invention shown for illustration, a body broadly designated by the numeral 12, is hollow and includes a top wall 14, a preferably cylindrical side wall 16 and a removable closure cap 18. Wall 14 has a threaded stud 20 extending through the panel 10 and held in place thereon by a nut 22, there being a dial 24 interposed between nut 22 and one face of panel 10 and suitably calibrated as at 26. The inner face 28 of the wall 16 is spiral, presenting a notch 30 and an overhanging tongue 32 defining the notch 30. Face 28 receives a similarly shaped conductive band 34 that extends from one end thereof within the notch 30 throughout the length of the face 28 and terminates in overlapped relationship to the tongue 32. The spiral band 34 is suitably affixed to the face 28 within the hollow body 12 and may be coupled within an electric circuit by a conductor means such as wires 36 and 38 joined to the band 34 at the ends thereof.

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The stud 20 rotatably receives a spindle 40 having an indicator knob 42 on the outermost end thereof. A brush 44 of resilient material has a wiping button 46 on the outermost free end thereof in sliding engagement with the innermost face of band 34. Brush 44 is riveted or otherwise affixed at its opposite end as at 47, to radial arm 48 secured to the spindle 40 by a screw 50. Detent 52 on the arm 48 is in wiping engagement with conductor ring 54 imbedded within the innermost face of wall 14. Electrical contact is made with the ring 54 by means of a wire 56. It is understood, of course, that band 34, brush 44, arm 48 and ring 54 are all of conductive material. Accordingly it is desired that the body 12 be of insulating material or the conductive elements otherwise insulated from the knob 42 and the panel 10.

In operation, when the brush 44 is at one end of its path of travel, button 46 is disposed within the notch 30 beneath the finger 32 and between the relatively overlapping ends of the band 34, all as shown in Figs. 3 and 4 of the drawing. When the brush 44 is rotated relative to the band 34 to the opposite end of its path of travel by manipulation of pointer knob 42, it will have traveled more than 360 degrees depending upon the length of the finger 32 or the depth of notch 30 and when the button 46 is at said opposite end of its path of travel it engages the opposite end of band 34 in overlying relationship to the finger 32.

Those skilled in this field will appreciate the advantages emanating from a construction permitting rotation of a wiping element in more than a complete circle, and it is to be seen that the construction herein contemplated permits such operation without adversely affecting the normal functions of the instrument. Such construction is simple, inexpensive and easily manufactured, and while details of construction may vary within the spirit of the invention it is desired to be limited only by the scope of the appended claims.

Having thus described the invention what is claimed as new and desired to be secured by Letters Patent is:

1. In an electrical instrument, a hollow body; a conductive brush in the body; means interconnecting the brush and the body for relative rotation; a spiral conductive band in the body, the brush being in wiping engagement with the band; and conductor lines coupled with the band and the brush, said band having a pair of relatively overlapping ends, spaced to receive a portion of the brush therebetween, whereby to render the band and the brush relatively rotatable for more than 360 degrees while the brush remains in engagement with the band, said body being provided with a spiral, radially inward facing wall, the band being secured to the radially inward face of said wall.

2. In an electrical instrument, a hollow body; a conductive brush in the body; means interconnecting the brush and the body for relative rotation; a spiral conductive band in the body, the brush being in wiping engagement with the band; and conductor lines coupled with the band and the brush, said band having a pair of relatively overlapping ends, spaced to receive a portion of the brush therebetween, whereby to render the band and the brush relatively rotatable for more than 360 degrees while the brush remains in engagement with the band, said body being provided with a spiral, radially inward facing wall, the band being secured to the radially inward face of said wall, there being a notch in said body, one end of the wall face and one end of the band terminating in said notch, said body having a tongue at the opposite end of the wall face and spaced from said one end of the wall face to present said notch, the brush having a portion adapted to extend into the notch between the tongue and said one end of the band.

3. In an electrical instrument, a hollow body; a con-

ductive brush in the body; means interconnecting the brush and the body for relative rotation; a spiral conductive band in the body, the brush being in wiping engagement with the band; and conductor lines coupled with the band and the brush, said band having a pair of relatively overlapping ends, spaced to receive a portion of the brush therebetween, whereby to render the band and the brush relatively rotatable for more than 360 degrees while the brush remains in engagement with the band, said body being provided with a spiral, radially inward facing wall, the band being secured to the radially inward face of said wall, there being a notch in said body, one end of the wall face and one end of the band terminating in said notch, said body having a tongue at the opposite end of the wall face and spaced from said one end of the wall face to present said notch, the brush having a portion adapted to extend into the notch between the tongue and said one end of the band, the opposite end of the band overlapping the tongue, whereby the band and the wall face are coextensive in length.

4. In an electrical instrument, a housing having an interior chamber, a conductive brush mounted for rotation within the chamber upon a pivot defining an axis, a spiral resistance element mounted in the chamber and having the ends thereof spaced radially apart to form radially inner overlapping portion, and a radially outer underlapping portion, means insulating the overlapping and underlapping portions one from the other comprising a tongue generally arcuate about said axis substantially co-extensive with said overlapping portion and forming an arcuate notch with said underlapping portion, said brush comprising a metallic strip having one end secured to said pivot and the opposite end free to engage against and in electrical wiping contact with said element, said strip being resilient and biased to exert radially outward pressure against said element, and arranged to ride upon said spiral element upon rotation of said pivot.

5. A combination as described in claim 4 in which the free end of said strip has a portion arcuate about said axis whereby to be disposed parallel with said element and enabled thereby to enter said notch without engaging said tongue or overlapping portion.

6. A combination as described in claim 4 in which the element is connected to at least one conducting lead, said housing is provided with a circular conducting element insulated from said resistance element and connected to a second conducting lead, and means are provided on said brush for electrically engaging with said circular conducting element during rotation thereof.

7. An electrical device of the character described, comprising a housing having an interior chamber of generally cylindrical formation, an arm pivotally mounted

on the housing within the chamber for rotation on an axis in the center of the chamber, the inwardly exposed chamber wall face being spiralled about said axis and having an end overlapping the other by an amount substantially less than a single revolution and radially spaced therefrom, the housing having an extension supporting the overlapping end and providing thereby a recess alongside the overlapped end, a flat resistance element strip secured to the said wall face along the length thereof and following the spiral, the ends of the resistance element being insulated one from the other and from said arm, a resilient conductive wiper mounted on the arm for rotation therewith and having a contact at its free end engaging and riding upon the resistance element, the wiper being biased to press against the resistance element, the path defined by the wiper during rotation being substantially contained within the volume encompassed by said strip and planes normal to said axis spaced therealong and containing the axially spaced edges of said strip.

8. A device as described in claim 7 in which the free end of the wiper is arcuately bent to ride substantially parallel with said strip when engaged thereagainst, and the wiper is arranged to move the bend into the recess when rotated on one direction, with the bend and wiper electrically insulated from the overlapping end while the contact engages the overlapped end.

9. An electrical device of the character described, comprising a housing, having an interior chamber of generally cylindrical formation, an arm pivotally mounted on the housing within the chamber for rotation on an axis in the center of the chamber, the inwardly exposed chamber wall face being spiralled about said axis and having an end overlapping the other by an amount substantially less than a single revolution, radially spaced and insulated therefrom and providing a recess alongside the overlapped end, a flat resistance element strip secured to the said wall face along the length thereof following the spiral with the ends of the said resistance element insulated one from the other and from said arm, a resilient conductive wiper mounted on the arm for rotation therewith and having a contact at its free end engaging and riding upon the resistance element, said wiper being secured to said arm at a point spaced substantially radially of said axis whereby the angle defined by a line between said point of securement and axis and the wiper is an acute angle.

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