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TERMINAL CONSTRUCTION FOR VARIABLE RESISTORS

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2 Sheets-Sheet 1
TERMINAL CONSTRUCTION FOR VARIABLE RESISTORS

Fig. 3.

Fig. 4.

Fig. 5.

THICKNESS OF CONDUCTIVE LAYER EXAGGERATED.

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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 drawings illustrate one complete example of the physical embodiments of the invention constructed according to the best mode so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a perspective view showing the inside aspect of the stationary element or assembly of a variable resistor embodying this invention;

Figure 2 is a plan view of the front or outer face thereof;

Figure 3 is a perspective view of only the base and resistance element thereon viewed from the inside face thereof but minus the center terminal and its collector ring and with one of the end terminals removed from the assembly but shown alongside thereof;

Figure 4 is a detail sectional view through Figure 2 on the plane of the line 4—4 and;

Figure 5 is an enlarged detail sectional view through Figure 4 on the plane of the line 5—5 and illustrating in broken lines the disposition of the mounting ears before they are clinched over.

Referring now particularly to the accompanying drawings, the numeral 4 designates a base of a variable resistor which, as is customary, is die-cut from suitable insulating material to provide a generally circular body portion 5 and a radially extended terminal supporting segment 6.

Mounted upon the inner face of the base is a resistance element 7 which is generally circular but more specifically is in the form of a split ring having outwardly projecting terminal tabs 8 on the ends thereof.

The movable contactor (not shown) of the resistor sweeps across the face of the element 7 during adjustment of the instrument which adjustment is brought about by rotation of a shaft (also not shown) rotatably received in a bearing bushing 9 fixed to the base by having a part thereof entering and rolled over the edge of a hole 10 in the base.

The movable contactor or arm of the instrument has resilient collector brushes thereon which ride upon a collector ring 11 overlaying the inner face of the base concentrically within the resistance element 7. Supporting feet 12 and 13 project from the collector ring 11 to space the collector ring from the base, and a radially projecting terminal strip indicated generally by the numeral 14 extends from the foot 12.

The portion 15 of the terminal strip which joins with the foot 12 is on a level beneath the bottom of the foot 12 so that it extends down into a hole 16 in the base to provide electrical clearance between the resistance element and the collector ring terminal strip. Outwardly of its portion 15 the terminal strip is offset as at 17 to embrace the "land" between the hole 16 and a notch 18 in the outer edge of the segment 6. These interconnecting portions of the terminal strip and base plus two ears 19 which project from opposite side edges of the terminal strip close to the outer end of its offset 17 and engage over the outer face of the base as shown in Figure 2, locate the collector ring and its terminal upon the base.

The resistance element 7 is secured to the base 4 by a stamped sheet metal terminal unit indicated generally by the numeral 20 embracing each terminal tab 8 and clamping it to the base. This stamped sheet metal terminal unit has a U-shaped attaching end providing a
contact portion 21 flanked by a pair of identical parallel attaching ears 22 and a terminal strip 23 which projects from the contact portion 21. The terminal strip may be straight as shown or bent to dispose its outer extremity 24 in any position required for soldered connection with the conductors (not shown) of the circuit in which the instrument is to be connected.

As will be readily understood the U-shaped attaching end of the terminal unit straddles its respective tab 8, and its ears 22 pass through rectangular holes 25 in the base and have the ends thereof clinched over at the underside of the base at 26.

As best shown in Figure 5 the terminal units embrace the tabs 8 very snugly so that when the ends of the ears 22 are clinched over, the side edges of the tabs will be crowded down into the corners of the terminal units between the ears and the contact portion 21. This results in a good electrical connection between the terminal unit and the active surface 8' of the resistance element but as pointed out hereinbefore, the clinching over of the attaching ears has a tendency to bow the contact portion 21 outwardly and away from the active contact surface 8' of the tabs.

To preclude the objectionable consequences of such outward displacement of the contact portion a pimple 27 is formed therein, which, upon application of the terminal unit to the assembled resistance element and base, enters a hole 28 in the tab. The diameter of this hole is less than the base or maximum diameter of the pimple, and the pimple is generally conical and has an altitude sufficient to insure its entry into the hole a substantial distance but not far enough to prevent the formation of a complete seal as is evidenced by the contact portion 21 being flush with the tab. This connection along with the connections at the side edges of the tabs assures the desired low resistance junction between the terminal units and the resistance element, especially since the engagement of the sides of the pimple with the rim of the hole places the sight or contact portion 21 under tension.

Also, since the conical pimple is drawn into the hole during the clinching of the ears there is a slight crowding of the active contact surface of the tab between the pimple and the inner faces of the attaching ears which further assures a good stable connection between the terminal and the tab.

The entry of the pimpls into the holes 28 has another important function. It locates the resistance element on the base. To this end the ears 22 are of a width to closely fit the length of the holes 25 and the distance between the ears is the same as between the holes. Consequently, upon insertion of the ears into the holes 25 the terminal units are fixed against shifting laterally upon the base and the pimpls 27, upon entering their respective holes in the tabs draw the tabs radially in or out as required to properly locate the resistance element upon the base.

From the foregoing description taken in connection with the accompanying drawings it will be readily apparent to those skilled in the art that this invention provides an extremely simple but very effective manner of simultaneously securing the resistance element to the mounting base and providing solder terminals for the resistance element; and that its unprecedented simplicity flows from the fact that the invention makes possible for the first time using what might be considered the normal way of fastening a terminal such as this in place since it not only eliminates the possibility of having the contact portion of the terminal bowed away from and out of contact with the contact surface of the tab but actually improves the electrical connection between the terminal and the contact surface of the tab.

What I claim as my invention is:

1. In a variable resistor having a base and a flat, split ring-shaped resistance element with a flat terminal tab projecting from each end thereof flatwise overlying the base, common means for securing the resistance element to the base and for providing terminals for the ends of the resistance element, comprising: a sheet metal stamping clamping each terminal tab to the base, said stamping having a U-shaped attaching end, the bight of which provides a contact portion and the legs of which provide a pair of opposed attaching ears, said U-shaped attaching end straddling the terminal tab with its contact portion contiguous to the top face of the terminal tab and its attaching ears passing through holes in the base, the ends of said attaching ears being clinched over the underside of the base; each terminal tab having a hole opening to its top face and a pimple-like protrusion on the contact portion provided by the bight of the attaching end of the stamping projecting into and pressing against the rim of said hole in the terminal tab.

2. In a variable resistor, the structure set forth in claim 1 further characterized by the fact that the pimple-like protrusion is substantially conical and has an altitude sufficient to penetrate a substantial distance into the hole but not all the way therethrough, and wherein the base diameter of the pimple-like protrusion is sufficiently larger than the hole to assure that the rim of the hole engages the side of the pimple-like protrusion at an elevation sufficient to place the bight of the U-shaped attaching end under tension.

3. In a variable resistor of the type set forth in claim 1, the structure defined therein further characterized by the fact that the attaching ears so fit the holes in the base that the stamping is firmly held against shifting laterally on the base, and that except for the engagement of the pimple-like protrusions with the rims of the holes in the terminal tabs said tabs would be movable radially of the resistance element so that the pimple-like protrusions serve to locate the resistance element on the base.

4. A combination terminal and anchoring unit for variable resistors in which a flat split ring-shaped resistance element flatwise overlies the base of the resistor, comprising: a sheet metal stamping having a U-shaped attaching portion and a terminal portion extending from the bight of the attaching portion, the legs of said U-shaped attaching portion providing attaching ears by which the unit may be clinched to the base of the resistor with the attaching portion straddling a terminal tab on the resistance element; and a pimple-like protrusion on the bight of the attaching portion facing inwardly to press against a portion of the terminal tab.

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