Nov. 26, 1957 W. I. ESHELMAN 2,814,705

CONTROL ASSEMBLY AND CONTACT

Filed April 23, 1954

Fig. 1

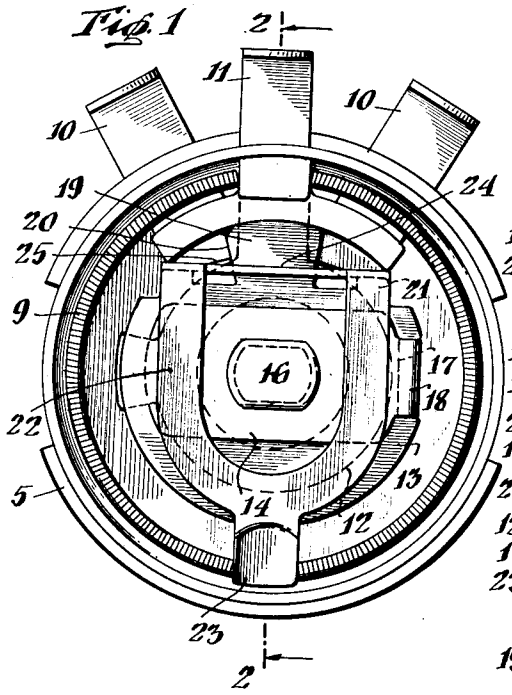
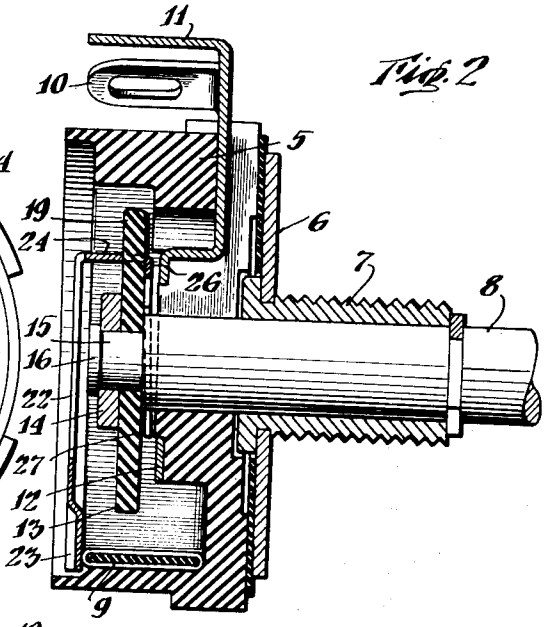


Fig. 2



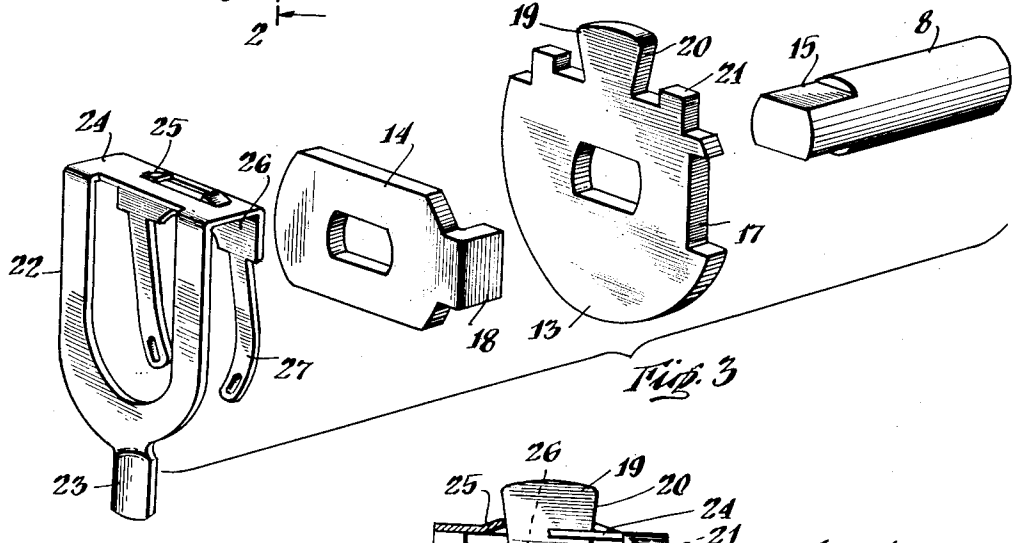


Fig. 3

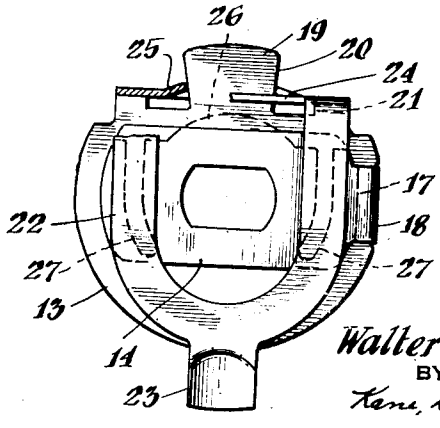


Fig. 4

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CONTROL ASSEMBLY AND CONTACT

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4 Claims. (Cl. 201—48)

This invention relates to a structurally and functionally improved control assembly and a contact element to be embraced in such an assembly. By means of the present teachings, a structure is provided which has primary utility when embodied in an electrical control such as a potentiometer or variable resistance.

It is an object of the invention to furnish a structure by means of which a contact may be incorporated in a control assembly after the carrier of that assembly has been secured against movement with respect to the control shaft. Accordingly, not alone is the operation of grouping the several parts together greatly simplified, but also the contact does not have to be included until just before the complete control mechanism is brought into being. Moreover, if a contact element proves to be improper or defective, it may readily be renewed. Therefore, in either event, it will not be necessary, in effect, to scrap the entire rotor assembly of a control. Manufacturing costs will be corresponding reduced.

Additionally, by means of the present teachings, no special skills or complicated tools will be required to establish the assembly; the contact when applied to the carrier moving as a unit with the latter free from all objectional play between the parts.

Still another object is that of providing a control assembly as well as a contact, the parts of which will be relatively simple in design and economical in manufacture. Moreover, when these parts are grouped together and embodied in a control, they will function over long periods of time with freedom from all difficulties.

With these and other objects in mind, reference is had to the attached sheet of drawings illustrating one practical embodiment of the invention and in which:

Fig. 1 is a face view of a control embodying the present improved structure;

Fig. 2 is a transverse sectional view taken along the line 2—2 and in the direction of the arrows as indicated in Fig. 1;

Fig. 3 is a perspective view of the parts of the rotor assembly and showing those parts in separated condition; and

Fig. 4 is a face view of the rotor and contact with certain of the parts broken away to disclose underlying construction.

Referring primarily to Figs. 1 and 2, the numeral 5 indicates the base or body of a control preferably formed of insulating material outwardly of which a plate 6 conveniently of metal is positioned. In accordance with conventional structure, a bushing 7 may extend beyond plate 6 and rotatably support a control shaft 8. An electrical resistance 9 is mounted by body 5 and has its ends connected one to each of terminals 10. These extend beyond the surface of the base and preferably adjacent a further terminal 11 which may be continued in the form of a contact ring 12 supported upon an extended portion of the base. A carrier plate 13 preferably of phenolic material is disposed within the area of base 5 and beyond

this a stop plate 14 may be disposed. To secured these parts to the shaft 8, the outer end of the latter is preferably reduced as at 15 and may be of non-circular outline. Beyond stop plate 14 the reduced end portion of the shaft 8 is preferably peened or headed as at 16 to secure both plates against movement with respect to that shaft.

As shown to best advantage in Fig. 3, carrier plate 13 may be formed with a notch 17 in its periphery. This serves to accommodate the angularly extending portion 18 of stop plate 14 when the parts are in assembled position. Moreover, a segment of plate 13 adjacent its edge is formed to provide an outwardly extending portion 19, the side edges 20 of which preferably converge toward the axis of the rotor assembly. Otherwise stated, these edges are undercut to incorporate in the projecting portion 19 a dove-tailed or wedge-shaped outline. Supporting surfaces, which may take the form of pedestals 21, exist one to each side of the projecting portion 19. These serve to provide supports for the contact element.

That element as also shown particularly in Fig. 3, is formed preferably of sheet metal having resilient qualities. The strip section from which it is provided embraces a preferably U-shaped side wall 22 from the base of which a contact arm or part 23 extends. The strip is also formed to include a base portion 24 extending in a plane normal to wall 22. At its far edge, base portion 24 is continued in the form of a strip 26 parallel to part 22 and from which there may extend contact arms 27. Tongues 25 are preferably integral with base portion 24 and are spaced from each other a distance less than the base length of the protuberance or projecting portion 19 of carrier plate 13. In conclusion it will be noted that the corners defining the zone of juncture between the outer edge of protuberance 19 and its side edges 20 are preferably rounded.

Now assuming that the shaft 8, carrier plate 13 and stop plate 14 have been assembled as heretofore described and it is desired to combine with this rotor structure a contact element, then a unit as generally herein identified under the numerals 22 to 27 inclusive, may be selected and arranged adjacent plate 13 to have part 22 in line with the outer face of that plate while part 26 is in line with the inner face of the same; protuberance 19 extending in line with the space defined between tongues 25. Now by moving the contact inwardly with respect to the plate, the protuberance 19 will ride between tongues 25 and the latter will flex over the rounded corner surfaces of this projection and slide in contact with the side edges 20 thereof. This action will continue until the pedestal or other supporting surfaces 21 bear against the inner face of base portion 24. Under these circumstances, tongues 25 will bite into the side edge portion 20. If desired, a deliberate pressure might be exerted upon the tongues to assure this result. In any event, the contact will now be properly supported with respect to the carrier plate and its base portion will be fixed against movement relative thereto.

Therefore, with shaft 8 extending through bushing 7 as in Figs. 1 and 2, it follows that contact arms 27 will ride in electrical engagement with ring 12. Likewise, contact arm 23 will ride over the surface of and in electrical engagement with resistance strip 9. The U-shaped side wall 22 of the contact element may, in effect, be regarded as a continuation of arm 23 and incorporating the necessary yielding support in the latter due to the spacing of the parts as shown in Fig. 2. Thus, a complete control is furnished which may be finished if desired by providing a cover plate (not shown) and securing the same against movement with respect to base 5.

It will be understood with a control assembly of this character it is not necessary to apply the contact element

to the rotor parts at the time the latter are secured to the shaft. Rather, attachments of plates **13** and **14** to shaft **8** may occur as a convenient conclusion to one step in the manufacture of the entire mechanism. The contact elements may be separately stored where they will be subjected to no damaging shocks or influences. They may be inspected prior to their application to the rotor parts and if, despite this inspection, an improper contact element is subsequently found to be included in the assembly, then that element may be detached and replaced by a perfect element.

The base, resistance strip, contact ring, etc., having been included in a proper assembly, it is obvious that by simply slipping the control shaft **8** through the bushing **7** and securing the parts against detachment in any acceptable manner, the complete unit is provided. Minimum expense will be encountered in the furnishing of the unit in this manner. In conclusion, it will be observed that part **26**, preferably extends uninterruptedly throughout the entire length of base portion **24**, and adjacent tongues **25**. By so arranging this part, a maximum rigidity is incorporated in the base portion of the contact element and this part serves as a brace incident to the strains which may be imposed by thrust forces acting in opposite directions against the tongues.

Thus, among others, the several objects of the invention as specifically aforenoted are achieved. Obviously numerous changes in construction and rearrangements of the parts might be resorted to without departing from the spirit of the invention as defined by the claims.

I claim:

1. In a electrical control, in combination, a base, a resistance fixedly mounted thereby, a shaft rotatably connected to said base, a rotor assembly comprising a plate extending transversely of and affixed to said shaft, a contact element shiftable in a direction parallel to said plate to apply the same thereto, said element comprising a generally U-shaped side wall parallel said plate, a base wall connected to said U-shaped side wall and normal thereto, a side wall connected to said base wall at an edge directed away from said U-shaped side wall and parallel thereto, a detent forming a part of said element, said detent adapted to engage a surface of said plate to prevent displacement of said element with respect to said plate and a contact arm forming a part of said contact element and extending beyond said plate to traverse said resistance as said shaft is rotated.

2. In an electrical control, in combination, a base, a resistance fixedly mounted thereby, a shaft rotatably connected to said base, a rotor assembly comprising a plate extending transversely of and affixed to said shaft, said plate being formed with an extended portion, a contact element shiftably in a direction parallel to said plate to apply the same thereto, said element comprising a generally U-shaped side wall parallel said plate, a base wall having an opening connected to said U-shaped side wall and normal thereto, said opening being adapted to house the extended portion of said plate, a detent forming a portion of said base wall adjacent said opening to engage an edge surface of the extended plate part, a side wall connected to said base wall at an edge directed away from said U-shaped side wall and parallel thereto, the walls of said element engaging opposite plate faces and a contact arm forming a part of said contact element and extending beyond said plate to traverse said resistance as said shaft is rotated.

3. A contact element for application to the rotor plate of an electrical control involving a resistance, said element comprising parallel side walls, a base wall connecting said side walls and normal thereto, a detent forming part of said base wall and extending angularly with respect to the same, said element to receive between its side walls the opposed side surfaces of a rotor plate, said detent being engageable with a surface of said rotor plate and a resistance contacting arm forming part of said element.

4. A contact element for application to the rotor plate of an electrical control involving a resistance, said element comprising parallel side walls, a base wall having an opening therein connecting said side walls and normal thereto, a detent forming a part of said base wall adjacent said opening, said element to receive between its side walls the opposed side surfaces of a rotor plate, said detent to engage a surface of the rotor plate extending through said opening and a resistance-contacting arm forming part of said element.

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