June 16, 1925.

1,541,961

S. E. JACOBS ET AL

RHEOSTAT

Filed Sept. 3, 1924

Fig. 1.

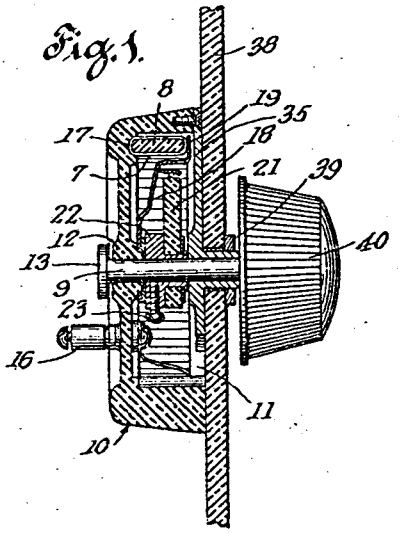


Fig. 2.

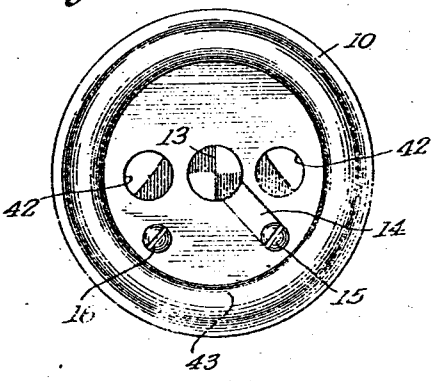


Fig. 3.

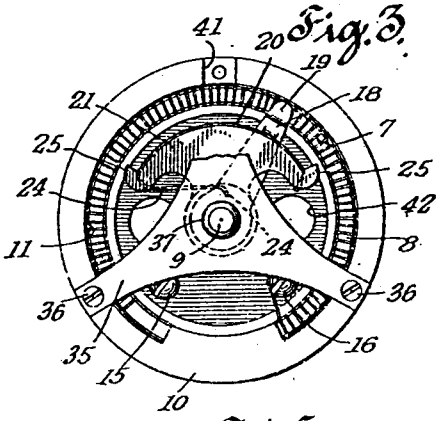


Fig. 4.

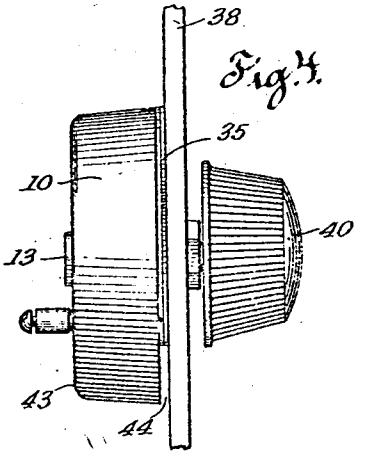


Fig. 5.

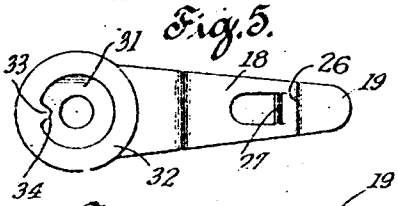


Fig. 6.

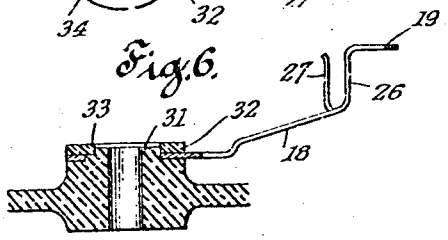
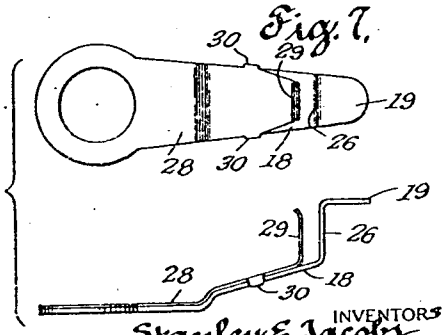


Fig. 7.



INVENTORS
Stanley E. Jacobs
Louis J. Schmehl
BY
Philip S. McKean ATTORNEY

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UNITED STATES PATENT OFFICE.

STANLEY E. JACOBS, OF BROOKLYN, AND LOUIS J. SCHMEHL, OF LARCHMONT, NEW YORK, ASSIGNORS TO STANLEY-EVERETT CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

RHEOSTAT.

Application filed September 3, 1924. Serial No. 735,580.

To all whom it may concern:

Be it known that we, STANLEY E. JACOBS, a citizen of the United States, and a resident of Brooklyn, Kings County, and State of New York, and LOUIS J. SCHMEHL, a citizen of the United States, and a resident of Larchmont, New York, in the county of Westchester, have invented certain new and useful Improvements in Rheostats, of which the following is a specification.

This invention relates to rheostats, potentiometers and devices of like nature where variations in resistance are obtained by shifting a contact arm over the coils of a resistance winding.

The objects of the invention are to provide a device of the character referred to in which the resistance winding and the contact making elements will be fully protected from dust, moisture and the possibility of accidental short-circuiting, which will be of simple, substantial and inexpensive construction and at the same time present a better and more finished appearance and which furthermore will be of small size, compact design and have incorporated in it, simple and practical means for effecting vernier adjustments.

The novel features of construction, combination and relation of parts by which all the foregoing and other objects are attained will appear from the following specification.

In the drawing accompanying and forming part of this specification, simple and practical embodiments of the invention are illustrated, wherein Figure 1 is a vertical sectional view of one of the rheostats mounted on a supporting panel.

Figure 2 is a rear view of the rheostat.

Figure 3 is a broken front elevation of the rheostat as it appears removed from the panel.

Figure 4 is an edge view of the device mounted on a panel and of modified form in the manner in which the supporting spider serves to space the rheostat base back of the panel.

Figures 5 and 6 are sectional plan and side views respectively of the contact arm and the friction washer for retaining the same in variously adjusted relations.

Figure 7 is a combined view showing a modified form of contact arm both in plan and in side elevation.

The resistance is provided in the present disclosure by a coil of resistance wire 7 wound upon a substantially annular insulating core 8, disposed as the arc of a circle about the central operating shaft 9.

10 designates an insulating base for supporting conducting parts of the device and this base differs from the ordinary in that it is made in the form of a hollow cup or shell having an internal cavity or insulating chamber 11 for mechanically protecting and housing all of such electrical parts. The outside shape of this base is preferably of truncated conical form, as indicated particularly in Figures 2 and 3, so as to deflect and shed dust and moisture or other foreign matter and at the same time present a neat attractive appearance. At the center of the rear wall of the hollow base, a hub 12 is shown providing a bearing for the spindle, which at this end is formed with a head 13 engaging over a spring contact strip 14 held by the binding post 15. This binding post thus serves as the terminal for the adjustable switch arm and a second binding post 16 mounted like the first on the back wall of the hollow base is connected with one end of the resistance coil.

An annular resistance element is seated in a groove or channel 17 formed in the rim of the hollow base and is held in place sufficiently by being sprung into this seat and by the attachment of the one end of the resistance coil beneath the screw at the inner end of the binding post 16.

The contact arm is designated 18 and is shown constructed with an angularly bent terminus 19 to ride over the outward portions of the resistance coils.

The vernier effect is obtained in the present invention by interposing a variable length of resistance wire between the contact arm and the spindle which forms part of the circuit connections. This additional resistance element is designtaed 20 and is shown as carried by an arcuate insulating support 21 mounted on a metallic hub 22 secured on the spindle by set screw 23, one

end of such wire being caught between the insulating support and metallic hub, as indicated at 24.

The insulating support 21 is provided at opposite ends of the arcuate portion with stop shoulders 25 positioned for engagement with the upstanding portion 26 of the contact arm and the contact arm carries an upstanding spring tongue 27 for sliding engagement over the arcuate portion of the wire.

This spring contact tongue may be formed as an integral part of the contact arm by being struck up out of the material of the arm, as indicated most clearly in Figures 5 and 6, but if greater resiliency is desired, a separate piece of lighter spring metal may be mounted over the contact arm, as shown at 28 in Figure 7, said overlying spring element having an upstanding contact portion 29 and lugs 30 bent down over the edges of the contact arm so that the same will traverse said contact arm.

The contact arm is mounted within the hollow base so that it may remain at rest while the vernier arm is being adjusted by a pivotal engagement over a reduced or shouldered portion 31 of the bearing hub 12 and it is frictionally held in its adjusted positions by an overlying friction washer 32 keyed to the base by an inwardly projecting lug 33 engaging in a seat 34 in the side of the pivotal support 31. This washer is secured in this keyed relation by the hub of the vernier arm, as shown in Figure 1, which is fixed to the spindle and the spring connecting strip 14 acting on the head of the spindle serves to apply a spring tension to the vernier arm, friction washer and contact arm so that all three will be yieldingly retained in their positions of adjustment, but at the same time can be readily shifted.

For mounting the rheostat on the back of a panel or the like, a three armed spider or plate 35 is shown secured at 36 across the open front of the hollow base and provided with a hollow screw stud 37 providing a front bearing for the spindle and adapted when extended through the panel 38 to receive a lock nut 39. After mounting the rheostat in this way, a suitable knob or operating handle 40 may be secured on the projecting end of the spindle.

In Figures 1 to 3 the ends of the spider or mounting plate are shown as seated in notches 41 formed in the rim of the base so as to lie flush with the rim and thus permit the hollow base to be drawn up tight against the back of the panel. The front of the rheostat then becomes closed against the access of dust and the like, so that the contacting parts are kept clean and all possibility of accidental short-circuiting by dropping wires or the like is positively prevented.

To prevent overheating of the resistance wire when the hollow base is thus entirely closed at the front, a ventilating opening or openings 42 may be provided in the back wall of the base, which wall is shown in Figures 1 and 2 as sunk forwardly into the base and protected by a raised rim 43 which acts as a guard for such openings.

In Figure 4 the ventilation or additional ventilation is afforded by spacing the rim of the hollow base back of the panel to leave an opening or openings 44 between the rear of the panel and the edge of the base. This effect is obtained in the illustration by simply securing the supporting plate 35 over the face of the rim instead of seating it in the rim as in the first views.

The structure is simple, relatively inexpensive and can be easily assembled without the exercising of any special skill. After assembly, the parts can be readily inspected at the open side of the cup shaped base, but when the rheostat is mounted in position for use, all the active parts are covered and fully protected, while at the same time proper ventilation is afforded to prevent overheating.

This feature of protection is particularly important when the device is used for radio purposes as it has been found that dust and other foreign matter lodging on the resistance coils introduces variations and materially affects operation of the tubes controlled by the rheostat. The spindle being held under spring tension acts to yieldingly hold the vernier and contact arms in any set relation and when adjustments are required these are made smoothly and easily by simply turning the one knob which serves through the lost motion or "pick-up" connection to shift both the vernier arm and main contact arm. Usually the vernier wire 20 will have a resistance substantially equal to one turn of the resistance coil so that the finest possible adjustments are attainable.

What is claimed is:

1. In a device of the character disclosed, a hollow cup shaped base of insulating material open at the front and comprising a back wall with a forwardly extending annular rim, an annular resistance element seated in the hollow of the base enclosed and covered by the forwardly extending rim, a contact arm for engagement with the resistance element mounted within the hollow of the base and also enclosed and protected by the annular rim and means at said open front of the base for supporting the device on the back of a panel or the like, including a substantially centrally located supporting bushing secured to the hollow insulating base and a spindle for actuating the contact arm journaled in said supporting bushing.

2. In a device of the character disclosed,

a hollow cup shaped base of insulating material open at the front and comprising a back wall with a forwardly extending annular rim, an annular resistance element seated in the hollow of the base enclosed and covered by the forwardly extending rim, a contact arm for engagement with the resistance element mounted within the hollow of the base and also enclosed and protected by the annular rim and means at said open front of the base for supporting the device on the back of a panel or the like, said means including a plate secured across the open front of the base and provided with a screw bushing for seating in an opening in the panel or other support.

3. In a device of the character disclosed, a hollow cup shaped base of insulating material open at the front and comprising a back wall with a forwardly extending annular rim, an annular resistance element seated in the hollow of the base enclosed and covered by the forwardly extending rim, a contact arm for engagement with the resistance element mounted within the hollow of the base and also enclosed and protected by the annular rim, means at the open front of the base for supporting the device on the back of a panel or the like, said means including a plate secured across the open front of the base and provided with a screw bushing for seating in an opening in the panel or other support and a spindle for actuating the contact arm journaled in said screw bushing and in the back wall of the hollow base.

4. A unitary device of the character disclosed comprising a hollow cup shaped base, a supporting plate for said base secured across the open front of the same, an annular resistance element seated within the hollow base behind said supporting plate, a spindle journaled in the base and projecting through said supporting plate and a contact arm for engagement with the resistance element mounted within the hollow base and adapted to be actuated from the spindle, the supporting plate being seated flush in the rim of the hollow base to thereby enable the rim of the base to engage the back of a panel for completely closing the front of the base.

5. In a device of the character disclosed, a hollow cup shaped insulating base having a back wall with a forwardly extending annular rim, a spindle slidingly and rotatably mounted in said back wall and having an externally located head, external terminal posts on said back wall, a spring conducting strip extending from one of said terminal posts beneath the head of the spindle, an annular resistance coil seated within the hollow base and having one end connected with the other terminal post, a contact arm for engagement with the resistance coil mounted within the hollow base and means on the spindle for operating said contact arm.

6. In a device of the character disclosed, a hollow cup shaped insulating base having a back wall with a forwardly extending annular rim, a spindle slidingly and rotatably mounted in said back wall and having an externally located head, external terminal posts on said back wall, a spring conducting strip extending from one of said terminal posts beneath the head of the spindle, an annular resistance coil seated within the hollow base and having one end connected with the other terminal post, a contact arm for engagement with the resistance coil mounted within the hollow base and means on the spindle for operating said contact arm, said means including a vernier arm fixed to the spindle and having a pick-up connection with the contact arm.

7. In a device of the character disclosed, a hollow cup shaped insulating base having a back wall with a forwardly extending annular rim, a spindle slidingly and rotatably mounted in said back wall and having an externally located head, external terminal posts on said back wall, a spring conducting strip extending from one of said terminal posts beneath the head of the spindle, an annular resistance coil seated within the hollow base and having one end connected with the other terminal post, a contact arm for engagement with the resistance coil mounted within the hollow base and means on the spindle for operating said contact arm, said means including a vernier arm fixed to the spindle and having a pick-up connection with the contact arm, said contact arm being journaled on the back wall of the base and a friction washer interposed between the contact arm and vernier arm and held nonrotatably to the base.

8. In a device of the character disclosed, an annular resistance element, a swinging contact arm engaging the same, a concentrically mounted vernier arm having an arcuate portion and shoulders at opposite ends of the same for pick-up engagement with the contact arm, a resistance element on the arcuate portion of the vernier arm, a spring element on the contact arm having sliding engagement with the arcuate vernier resistance and a nonrotatable separator between the contact and vernier arms.

9. In a device of the character disclosed, a hollow base comprising a back wall with a forwardly extending annular rim, a spindle journaled in the back wall, a projection on the back wall surrounding said spindle and forming a bearing with a key slot in one side of the same, a contact arm journaled on said bearing, a friction washer engaged on said bearing and provided with a key entered in the key slot, a vernier arm

having a bushing fixed on the spindle, a vernier element carried by said vernier arm and in electrical circuit with the contact arm and a resistance element in the base engaged by the contact arm.

10. In a device of the character disclosed, a supporting plate provided with a screw bushing by which the same may be mounted on a panel, a hollow insulating base secured to said plate, a spindle extending through the screw bushing into the base, a resistance element mounted within the hollow base, a contact arm for engagement with said resistance element and also mounted within the base and means on said spindle for actuating said contact arm.

11. In a device of the character disclosed, a supporting plate provided with a screw bushing by which the same may be mounted on a panel, a hollow insulating base secured to said plate, a spindle extending through the screw bushing into the base, a resistance element mounted within the hollow base, a contact arm for engagement with said resistance element and also mounted within the base and means on said spindle for actuating said contact arm, including a vernier arm in electrical contact with and having a pick-up connection with the contact arm.

12. In a device of the character disclosed, a base comprising a back wall of insulating material and an annular wall extending forwardly therefrom to form a hollow enclosing structure and an annular resistance element seated in said hollow base and enclosed by the forwardly extending rim, a support for the base connected with said forwardly extending rim, a shaft extending through said support into the hollow base, a movable contact connected with said shaft within the hollow base in cooperating relation to the annular resistance element and terminals on the insulating back wall connected with the resistance element within the base and exposed on the back of the hollow base for wiring purposes.

13. In a device of the character disclosed, an insulating base, an annular resistance element seated in said base, wiring terminals for said resistance element exposed at the back of said insulating base for wiring purposes, a plate attached to the front of the insulating base and provided with a screw bushing for seating in a panel or other support, a shaft journaled in said screw bushing and a contact arm actuated by said shaft for cooperation with the annular resistance element.

In witness whereof, we have hereunto set our hands this 28th day of August, 1924.

STANLEY E. JACOBS.
LOUIS J. SCHMEHL.