Nov. 10, 1925. 1,561,137

F. H. BURNS

RHEOSTAT

Filed May 20, 1922

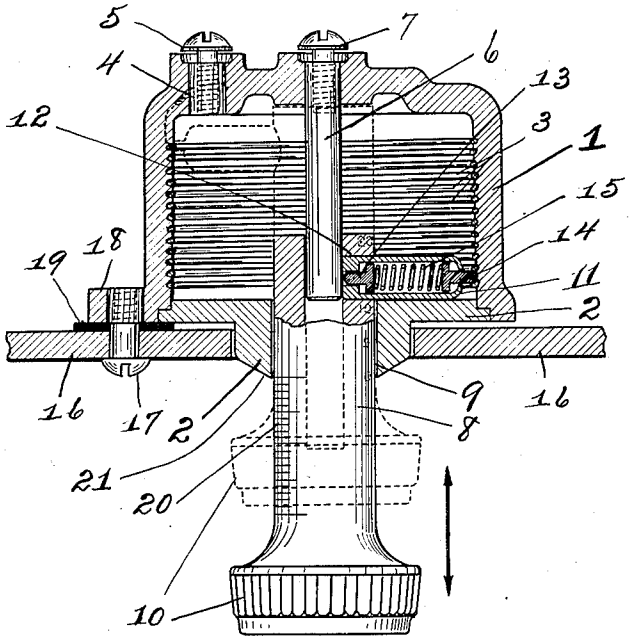



Fig. 1.

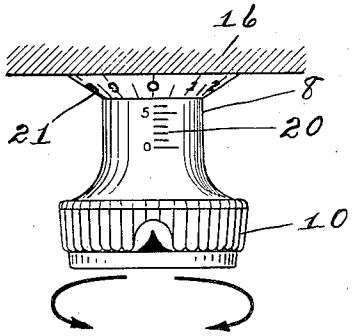



Fig. 2.

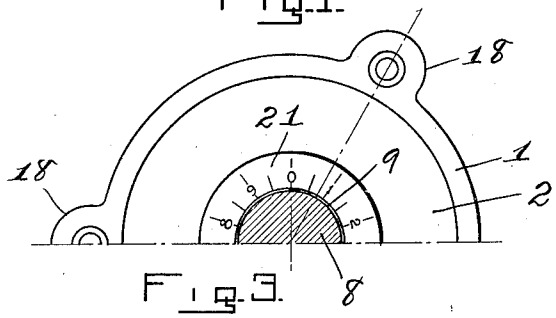



Fig. 3.

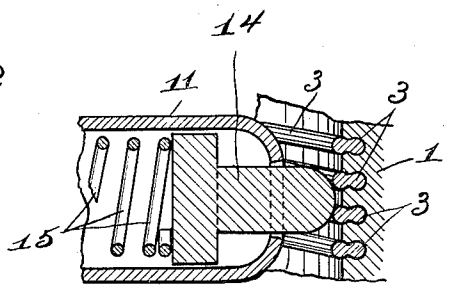



Fig. 4.

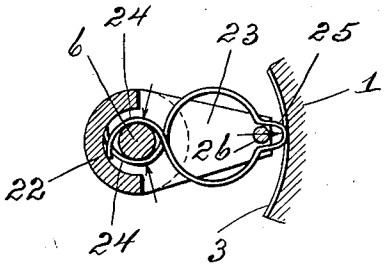



Fig. 5.

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Patented Nov. 10, 1925. 1,561,137

# UNITED STATES PATENT OFFICE.

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## RHEOSTAT.

Application filed May 20, 1922. Serial No. 562,541.

*To all whom it may concern:*

Be it known that I, FRANK H. BURNS, a citizen of the United States, residing at Hoosick Falls, in the county of Rensselaer and State of New York, have invented new and useful Improvements in Rheostats, of which the following is a specification.

Reference may be had to the accompanying drawings, and the reference characters marked thereon, which form a part of this specification. Similar characters refer to similar parts in the several figures therein.

The principal object of the invention is to provide for quick and accurate adjustment of a rheostat, whereby the resistance to the passage of an electric current therethrough can be quickly and accurately varied for various purposes.

Other objects will appear in connection with the following description.

My invention relates to rheostats for various uses, but is more particularly adapted for rheostats for small voltages such as are used in the simpler forms of radio apparatus.

Fig. 1 of the drawing is a view partly in plan and partly in cross-section of a rheostat embodying my invention, the plane of the section being axial to the coil of the rheostat.

Fig. 2 is a horizontal section taken through the instrument-board showing in plan the calibrated members for reading the adjustment of the instrument.

Fig. 3 is a half view in front elevation of the rheostat with the projecting handle-portion of the contact-carrying member shown in cross-section.

Fig. 4 is a view on an enlarged scale of a broken-away portion of the rheostat as shown in Fig. 1 illustrating the manner in which the rheostat-coil is mounted in the casing with an exposed spiral contact-surface and the manner in which said surface is engaged by the neighboring contact-member.

Fig. 5 is a cross-section taken in a plane perpendicular to the axis of the rheostat-coil showing a modified form of contact-mechanism.

Referring to the drawings wherein the invention is shown in preferred form, the casing for the rheostat comprises a cup-shaped body, 1, and a cap, 2, fitting and closing the open end thereof, both the body and the cap being made of insulating material.

The body, 1, of the casing is preferably made of a moldable substance, and has mounted therein a rheostat-coil, 3, with an interiorly exposed spiral coil-surface as shown in Figs. 1 and 4.

The mounting of the coil in this manner within the body of the casing is preferably accomplished by more or less flattening the wire of which the coil is made and molding the insulating material of which the body of the casing is made upon the outer portion of the wire, leaving the inner portion of the wire exposed upon the inner side of the casing-body.

The inner edge portion of the wire is preferably enlarged as shown in Fig. 4, whereby the wire is firmly anchored in the insulating material.

One end of the coil, 3, is connected with a metal bushing, 4, having a binding-screw, 5, whereby a line-wire may be connected with said bushing, and thus with said end of the coil, said bushing being anchored to, or molded within, the body, 1, of the casing.

A post, 6, is mounted upon the body of the casing projecting interiorly thereof axially of the coil, 3, said post having a binding screw, 7, whereby the other line-wire may be connected with said post. The line-wires are not shown in the drawing.

A sleeve, 8, which projects freely through an aperture, 9, in the cap, 2, receives and fits the post, 6, upon which post said sleeve is adapted to move or slide both longitudinally and rotatively.

Upon the outer end of the sleeve, 8, is an operating knob or handle, 10.

Mounted upon the inner end of the sleeve, 8, is a housing, 11, projecting laterally from the sleeve at a point where the sleeve is provided with an opening, 12, through its post-receiving portion.

The housing, 11, is in fixed relation to the sleeve and partakes of not only the inward and outward sliding movement of the sleeve, but also of the rotative movement of the sleeve.

Mounted within the housing, 11, are a pair of contact-members, 13 and 14, separated by a coil-spring, 15, tending to force said contact-members.

The contact-member, 13, projects through an opening in the inner end of the housing, 11, into yielding contact with the metal post, 6, while the contact-member, 14, projects through an opening in the outer end of the housing into yielding contact with the exposed coil-surface of the rheostat-coil, 3.

The rheostat is mounted upon an instrument-board, 16, by means of bolts, 17, engageable with the respective lugs, 18, on the body of the casing, only one of said bolts being shown.

The cap, 2, is secured in place upon the rheostat by means of washers, 19, inserted between the rheostat and the instrument-board, and of a size to lap the outer side of the cap, 2.

The outer handle-portion of the sleeve, 8, is longitudinally calibrated as shown at 20, whereby the inward and outward movement of the sleeve can be accurately indicated.

The cap, 2, is formed with a central circularly calibrated boss, 21, whereby the rotative movement of the sleeve, 8, is accurately indicated.

The operation of the instrument is as follows:

When it is desired to change the resistance of the coil, 3, the sleeve, 8, is, by means of the knob or handle, 10, pushed inward or pulled outward, causing the contact-member, 14 to travel over the exposed coil surface of the rheostat coil, 3, until approximately the desired resistance of the coil is produced.

By then rotating the sleeve, 8, more or less in one direction or the other, the resistance can be further varied until the desired resistance is obtained with great exactness.

In moving the contact-member inwardly and outwardly by direct longitudinal movement of the sleeve, 8, the contact-member, 14, will pass directly from one loop to another of the coil, 3, eliminating or adding at each step the resistance of a complete loop of the coil.

By the rotative movement of the sleeve, 8, however, the contact-member, 14, is caused to traverse the entire length of a complete loop in the coil in passing from one loop to another, and by imparting to the sleeve less than a complete rotative movement the resultant change in resistance of the coil can be made as slight as desired.

In Fig. 5 I have shown a portion of the body, 1, of the casing with a portion of the exposed spiral coil-surface of the coil, 3, and have also shown the post, 6, and a portion of the sleeve, 8, here designated 22. This portion of the sleeve is interiorly enlarged and has an offset, 23.

Carried by the offset, 23, and the sleeve, 8, is a contact-spring in the form of the figure 8, the inner loop, 24, of which embraces the post, 6, while its outer loop, 25, makes contact with the exposed coil-surface of the coil, 3.

The outer loop, 25, is held against lateral displacement by means of a pin, 26, on the offset, 23.

The operation of this form of the device is substantially the same as the above described operation of the construction shown in the other figures of the drawing.

What I claim as new and desire to secure by Letter Patent is—

1. A rheostat having a hollow cylindrical body, an exposed coil spiral surface within and secured to the inner cylindrical surface of said hollow body, and a contact member rotatively and longitudinally movable with respect to the axis of said body and in contact with the exposed spiral surface of the coil.

2. In a rheostat and in combination, a hollow cylindrical casing of insulating material having a rheostat-coil with an exposed spiral coil surface mounted on the inner cylindrical surface of said hollow casing, a plunger mounted upon the casing axially of said coil and casing with provisions for longitudinal and rotative movement with respect to the axis of said coil and casing, and a contact member carried by said plunger in contact with the exposed spiral surface.

3. In a rheostat and in combination, a hollow cylindrical casing of insulating material having a rheostat-coil with an exposed spiral coil surface mounted on the inner cylindrical surface of said hollow casing, a plunger mounted upon the casing axially of said coil and casing with provisions for longitudinal and rotative movement within the casing and with respect to the axis of said coil and casing, and a contact member yieldingly mounted and carried by said plunger in contact with the exposed spiral coil surface.

4. In a rheostat and in combination, a hollow cylindrical casing of insulating mat[illegible] having a rheostat-coil with an exposed spiral coil surface mounted on the inner cylindrical surface of said hollow casing, a plunger mounted axially and movable within the casing with provisions for longitudinal and rotative movement with respect to the axis of said casing and coil and having an exteriorly projecting handle, a housing mounted upon said plunger projecting laterally therefrom within said casing, a spring within said housing, and a spring actuated contact member upon said housing and held by said spring in yielding contact with the exposed coil surface of said rheostat-coil.

5. In a rheostat and in combination, a casing of insulating material having a rheostat-coil mounted therein with an exposed spiral coil-surface; a post of conductive material mounted upon one end of the casing axially of said coil; a sleeve fitting said post and movable longitudinally and rotatively thereupon. said sleeve having a handle-portion projecting outside the casing, and being pro-

vided with an opening through its post-receiving portion; a housing mounted upon the sleeve opposite said opening; and a pair of spring-separated contact-members within said housing, one yieldingly engageable with said post through said opening and the other yieldingly engageable with the exposed spiral coil-surface of said rheostat-coil.

6. In a rheostat and in combination, a hollow cylindrical casing of insulating material having a rheostat coil with an exposed spiral coil surface mounted on the interior cylindrical surface of said hollow casing, a plunger mounted axially within the casing with provisions for longitudinal and rotative movement with respect to the axis of said casing and coil and having calibrations arranged along the longitudinal axis to indicate the amplitude or extent with which said plunger is inserted within said casing and coil, a contact member carried by said plunger in contact with the exposed spiral coil surface of said coil, an exteriorly projecting circularly calibrated handle portion on said plunger to indicate the amplitude of rotative movement of said plunger.

In testimony whereof, I have hereunto set my hand this 29th day of April, 1922.

FRANK H. BURNS.