June 11, 1929. S. F. BRIGGS 1,716,513

FILAMENT RHEOSTAT

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FIG. 2

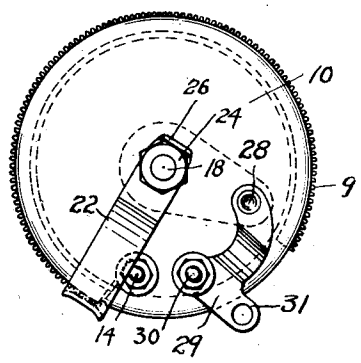


FIG. 1

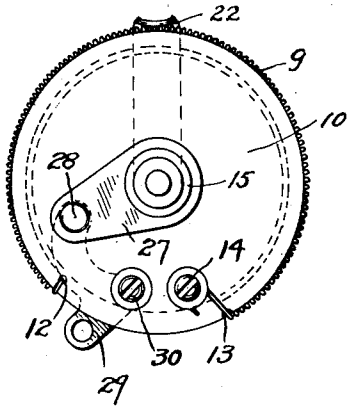


FIG. 3

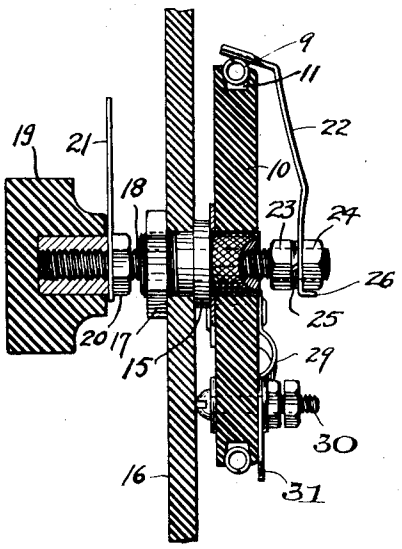


FIG. 4

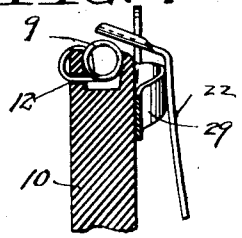
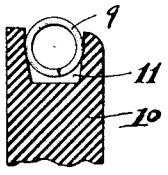


FIG. 5



WITNESSES

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June 11, 1929. S. F. BRIGGS 1,716,513

FILAMENT RHEOSTAT

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FIG. 7

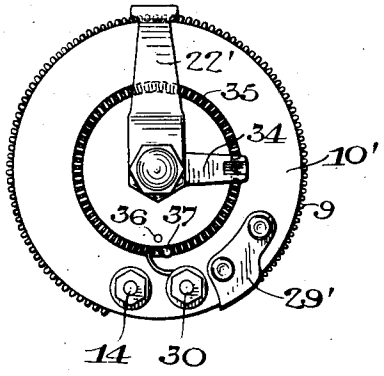


FIG. 6

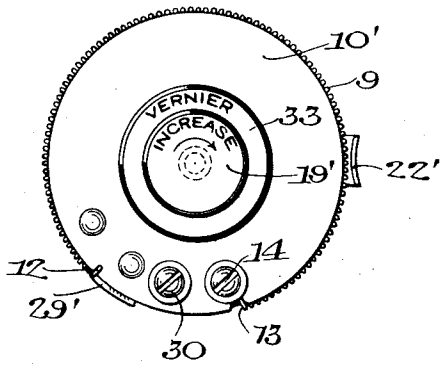


FIG. 8

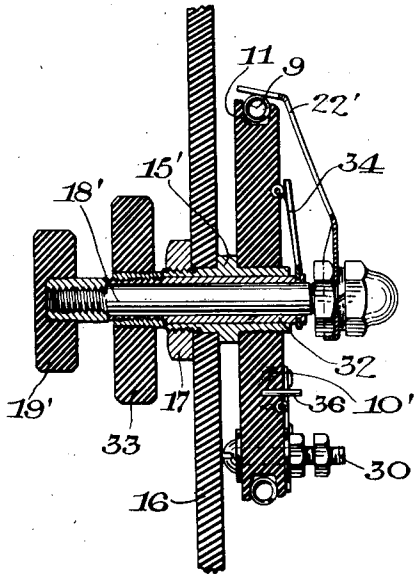
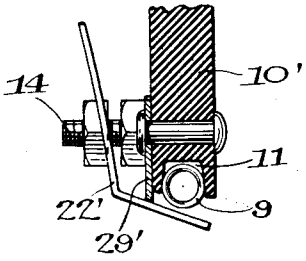


FIG. 9



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UNITED STATES PATENT OFFICE.

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FILAMENT RHEOSTAT.

Application filed January 2, 1923. Serial No. 610,244.

This invention relates to filament rheostats for radio installations and has for its object to provide for rigidly anchoring the resistance element in place to prevent dislodgment by the movements of the contact arm in engagement therewith and to maintain uniform the spacing of the convolutions of the wire coil.

Another object of the invention is to provide a stop for the contact arm which will raise it out of contact with the resistance element and gently restore it to such contact at a point where it will have its normal relation to the convolutions of the resistance coil.

Another object of the invention is to provide a simple method of mounting the rheostat on the panel of the radio set.

Another object of the invention is to simplify details of construction to render the device strong and durable and efficient though inexpensive to manufacture.

With the above and other objects in view the invention consists in the rheostat as herein claimed and all equivalents.

Referring to the accompanying drawings in which like references indicate the same parts in different views,

Fig. 1 is a front view of a rheostat constructed in accordance with this invention with the handle knob and pointer removed;

Fig. 2 is a rear view thereof;

Fig. 3 is a sectional view with the handle and pointer in place;

Fig. 4 is a detail sectional view showing the manner in which the cam of the stop lifts the contact arm away from the resistance unit;

Fig. 5 is a detail sectional view on a large scale showing the manner in which convolutions of the resistance coil become wedged between the converging side walls of the groove of the insulating disk, whereby they are individually clamped in place, and

Figs. 6, 7, 8 and 9 are views of a modification of the invention which are similar to the views of Figs. 1, 2, 3 and 4, respectively.

In these drawings, 10 indicates a disk of insulating material, preferably paraffined vulcanized fiber, having an annular groove 11 around its periphery, the side walls of said groove converging inwardly to a slight degree, as shown in Fig. 5. A coil 9 of closely wound resistance wire is fitted under tension within said groove, its ends being anchored in place by one end passing through an opening 12 and bent around the edge of the disk and the other end by fitting in a notch 13 in the edge of the disk and hooked around a screw 14.

A shouldered bushing 15 has a reduced knurled end tightly fitting within a central opening of the insulating disk, preferably having a forced fit therein so as to prevent relative movement. The other reduced end of the bushing fits within an opening of the panel 16 of a radio set and has a nut 17 threaded thereon to securely clamp the device in place on the panel, the edges of the panel opening being held between the shoulder or flange of the bushing and said nut. A spindle 18, consisting of a screw preferably threaded from end to end, fits within a screw-threaded bore through the bushing and is capable of freely turning therein. A handle or knob 19 is fixed on the spindle 18, preferably by being threaded thereon with a set nut 20 clamping it in place with a pointer 21 clamped between them and this handle or knob serves as a means for turning the spindle to move the contact arm.

At the other end of the spindle is a contact arm 22 adjustably though fixedly secured thereto as by being clamped between a pair of set nuts 23 and 24 threaded on the spindle and preferably with a spring lock washer 25 between the contact arm and the inner nut 23 and with the end of the contact arm bent up to form a flange 26 fitting against one of the faces of the outer nut 24 to prevent relative movement. The contact arm 22 is bent to bear with spring pressure on the outer portion of the coil of wire forming the resistance element 9, its contacting portion being bent transversely, as seen in Fig. 1, to form a rounded bearing surface that will ride over the convolutions of the coil without catching therein when the spindle is turned. Electrical connection is made with the spindle and through it to the contact arm by means of a plate 27 on the face of the disk 10 bearing against the flange or shoulder of bushing 15 and connected by a rivet 28 passing through the disk with an arc-shaped arched metal plate 29 on the other side of the disk. One end of the arc-shaped plate 29 is fastened to the disk by means of

a rivet 28, as above, while the other end is fastened by means of a screw 30 similar to screw 14, both preferably having nuts threaded on their ends to form binding posts for connection with terminal wires, not shown. This other end of the arc-shaped plate 29 also is preferably provided with a projection 31 forming a stop for limiting the movement of the contact arm 22 in the off position thereof. As the contact arm approaches this off position it rides over the arched portion of the arc-shaped plate 29 which, acting as a cam thereon, lifts it from the resistance coil to open the circuit. When the arm is moved away from engagement with the stop the cam gradually returns it to contact with the resistance coil in such a manner that it does not abut the end of the coil to mutilate it or force it out of position. The projecting end of plate 29 which forms the stop 31 may be perforated in order to make a soldered terminal connection, if desired.

In operation the turning of the knob 19 causes the contact arm 22 to ride freely over the convolutions of the resistance coil 9 so as to include or exclude the resistance of the convolutions successively and the wedging of the tensioned coil between the converging walls of the deep containing groove together with the inward pressure of the contacting portion of the contact arm thereagainst serving to press said coil deeper into the groove assures against dislodgment of the coil so that the convolutions remain equally spaced apart and any tendency for the coil to slide or creep in its seat is effectively overcome. The shaping of the contact portion of the contact arm and the action of the cam in lifting the contact arm away from the coil and gently returning it thereto beyond the end of the coil serve to prevent distortion of the coil that might cause adjacent convolutions to contact. The mounting of the spindle is such that the end thrust is taken by the screw thread and proper adjustment is afforded for the knob, the pointer and the contact arm by the use of said screw thread. Furthermore, the manner of mounting the rheostat to the panel by the clamping action of the nut 17 avoids the necessity for screws connecting the disk with the panel.

It will be observed that the edge of the disk at one side is rounded or beveled to facilitate the engagement of the contact arm with the resistance coil.

In that form of the invention illustrated in Figs. 6 to 9 inclusive, instead of the stem 18′ being threaded through the bushing 15′, it is rotatably mounted in a sleeve 32, which in turn is rotatably mounted in the bushing and this sleeve carries at its outer end a knob 33 by which it may be turned, and at its inner end has riveted thereto a contact arm 34 shorter than the arm 22 with its indented end bearing with spring pressure against a coil 35 of closely wound resistance wire embedded in a groove in the rear face of the insulating disk 10′.

The arm 34 is limited in its movements by a stop pin 36 and one end of the coil 35 is anchored in the groove by means of the pin 37, while the other end connects with binding post 30. The plate 29′ riveted to the insulating disk serves by its cam action to hold the contact arm 22′ away from the coil 9, as shown in Fig. 9, and the binding post 30 constitutes a stop for limiting the movements of said arm.

The nut bushing of the knob 33, which is threaded on the sleeve 32, forms a shoulder engaging the end of the sleeve to take the end thrust due to the spring action of arm 34, while the nut bushing of knob 19′ threaded on the end of stem 18′ forms a shoulder bearing on the end of sleeve 32 to take the end thrust caused by the spring action of arm 22′.

The addition of this second knob and its resistance controlling arm gives a vernier adjustment, the resistance included thereby being in series with the resistance of coil 9 as it constitutes the connection between the stem and binding post 30.

With this form of the invention, as well as the other, the closely wound groove-contained resistance coils make for very smooth action without a creeping of the coil and consequently eliminate disagreeable noises and permit of very close adjustment. The vernier knob, of larger diameter than the other, gives a further advantage in that it permits of minute angular variation necessary for detector use.

What I claim as new and desire to secure by Letters Patent is:

1. A filament rheostat comprising an insulating disk carrying a resistance element, a shouldered bushing tightly fitting within the disk up to the shoulder, a spindle passing through the bushing and carrying a contact arm for contacting with the resistance element, and a nut threaded on the bushing, said bushing being adapted to pass through an opening in an instrument panel and the nut serving to clamp the panel between it and the shoulder.

2. A filament rheostat comprising an insulating disk, a bushing within the disk, a sleeve within the bushing, a spindle passing through the sleeve and carrying a contact arm, a resistance element on the disk engaged by the contact arm, a second resistance element on the disk, a contact arm on the sleeve engaging the second resistance element, a knob on the spindle, and a knob on the sleeve.

3. A filament rheostat with vernier adjustment comprising an insulating disk having a peripheral groove, a resistance coil contained therein, a bushing within the disk, a sleeve fitting within the bushing, a spindle fitting

within the sleeve, a contact arm on the spindle engaging the resistance coil, a second resistance coil secured to the face of the disk, a second contact arm on the sleeve engaging the second resistance coil whereby electrical connection is made between the two coils through the contact arms and their connections, terminal connectors on the disk having connection with one end of each of the resistance coils, a knob on the spindle, and a knob on the sleeve.

4. A filament rheostat with vernier adjustment comprising an insulating disk having a peripheral groove, a resistance coil fitting therein, a shouldered bushing within the disk, a nut threaded thereon for clamping the disk to a panel, a sleeve fitting within the bushing, a spindle fitting within the sleeve, a contact arm carried by the spindle and bearing on the resistance coil, a second resistance coil let into the face of the insulating disk, a second contact arm on the sleeve engaging the second resistance coil, a knob threaded on the sleeve and bearing on the bushing, a knob threaded on the spindle and bearing on the sleeve, and terminal connectors on the disk having connection with one end of each of the resistance coils.

5. A filament rheostat comprising an insulating disk having a peripheral groove, a resistance coil seated therein, a shouldered bushing in the disk, a nut threaded thereon for clamping the disk to a panel, a sleeve fitting within the bushing, a spindle fitting within the sleeve, a contact arm on the spindle engaging the resistance coil, a second resistance coil let into a groove in the face of the disk, a second contact arm on the sleeve engaging the second resistance coil, a knob on the end of the sleeve, a knob on the end of the spindle, stops for limiting the movements of the contact arms, terminal connectors on the disk connected with one end of the resistance coils, and a cam plate secured to the disk and engaged by the spindle arm for holding the said arm out of contact with the resistance coil.

In testimony whereof, I affix my signature.

STEPHEN F. BRIGGS.