

May 7, 1935.

M. W. KENNEY

2,000,178

RHEOSTAT

Filed May 16, 1932

FIG.1.

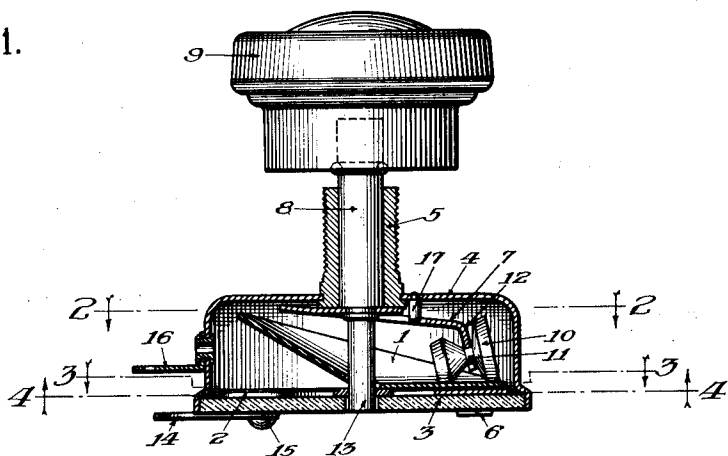


FIG.2.

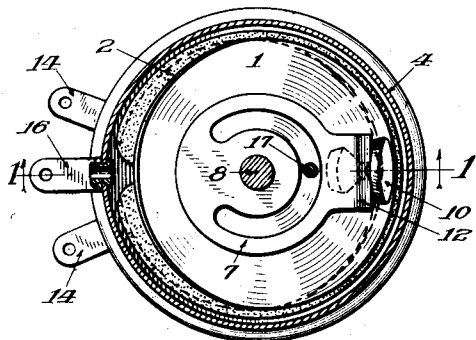


FIG.3.

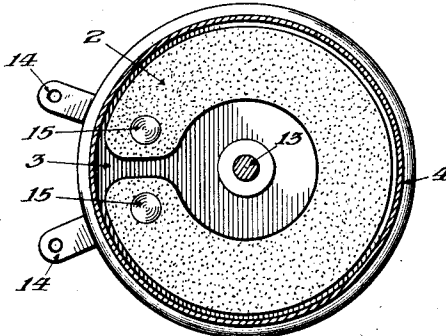


FIG.4.

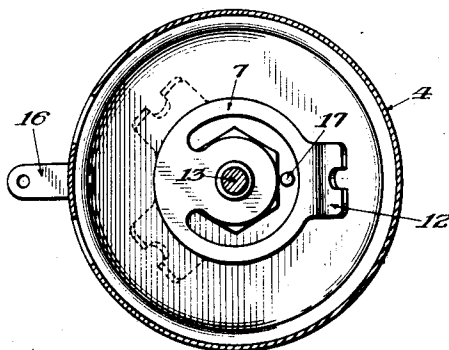
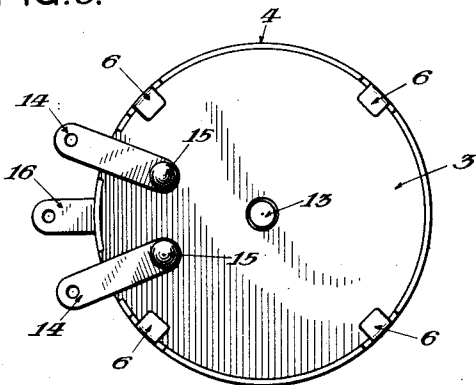


FIG.5.



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UNITED STATES PATENT OFFICE

2,000,178

RHEOSTAT

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Application May 16, 1932, Serial No. 611,625

4 Claims. (Cl. 201—55)

This invention relates to rheostats, particularly the type employed with radio apparatus, and is a modification of the invention forming the subject matter of the copending application of Mahlon W. Kenney, Serial No. 591,079, filed February 5, 1932.

As in the aforesaid application, the invention in general embodies a fixed resistor in the form of a flat circular strip over which a conical contact member is adapted to roll to effect an adjustment of resistance.

The conical contact member is in the form of an obtuse stamped metal cone and is rolled about the fixed resistor by a cone shaped roller carried by and driven by an actuator arm fixed to the usual operating spindle.

The rheostat may be connected in an electrical circuit as an ordinary rheostat or as a potentiometer, but in either case the conical contact member must be electrically connected to one of the terminals of the instrument.

In the aforesaid copending application, electrical connection to the conical contact member was made independently of the actuator arm. In the present invention current is conducted to the conical contact member through the actuator arm itself, and it is an object of this invention to provide an improved and simplified means for insuring good electrical connection between the actuator arm and the stationary terminal to which the circuit connection for the contact member is made.

More specifically, it is an object of this invention to provide a construction wherein the actuating arm at all times is yieldably maintained in firm mechanical and electrical engagement with a fixed wall of the casing so that a terminal carried by the casing has a good electrical connection with the actuating arm.

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 hereindisclosed invention may be made as come within the scope of the claims.

The accompanying drawing illustrates one complete example of the physical embodiment of the invention constructed according to the best mode so far devised for the practical application of the principles thereof, and in which:—

Fig. 1 is a sectional side view of the rheostat on the line 1—1, Fig. 2;

Fig. 2 is a front sectional view on the line 2—2, Fig. 1;

Fig. 3 is a front sectional view from above the resistor on the line 3—3, Fig. 1;

Fig. 4 is a rear sectional view on the line 4—4, Fig. 1;

Fig. 5 is a rear view.

The rheostat is provided with a conical contact disk 1 which is rollable upon its side over a circular resistor 2 to make rolling contact therewith.

The resistor is both a contact and a resistor and its resistance is ordinarily formed by carbon or other high resistance applied upon a paper ring and forming a contact face.

The contact disk is of obtuse conical shape to enable it to be readily rolled within a small space and to facilitate applying an actuator thereto.

The resistor 2 is mounted on an insulating base 3 which closes the open side of a cup shaped casing 4 in which the instrumentalities of the rheostat are housed. The bottom wall of the casing 4, which lies parallel to the base 3 in spaced relation thereto, has a central sleeve 5 attached thereto to provide a bearing for a spindle 8 and means for mounting the rheostat on a suitable support in the conventional manner.

The base 3 is held in its position closing the open side of the casing by tangs 6 projected from the rim of the casing and struck over the base as illustrated.

The actuator by which the contact disk is rolled upon the resistor is disposed within the casing and comprises a resilient actuating arm 7 attached at one end portion to the operating spindle 8. This end portion of the resilient arm 7 has a direct contact with the adjacent end of the sleeve 5 as clearly shown in Figure 1.

The operating spindle extends through the supporting sleeve and it has upon its outer end a removable operating knob or handle 9 to turn it in the supporting sleeve.

The actuating arm keeps the contact disk in firm engagement with the resistor by exerting pressure upon a tapered roller 10 which bears upon the contact disk.

The roller has an arbor 11 formed in a groove intermediate its ends and the actuating arm has formed upon its outer end a bearing flange 12 extending into the groove and having a slot to receive the arbor.

The bearing flange connects the roller to the actuating arm and keeps it in place between the actuating arm and the contact disk.

The contact disk is retained from radial displacement by a centering pin 13 passing through an aperture in its center and forming a part of the spindle.

The resistor has connected to each end thereof an electrical terminal 14 which is fastened upon the insulating base and connected to the resistor by a conducting rivet 15.

Another terminal 16 is provided for the contact disk. This terminal is fastened directly to the wall of the casing.

As brought out hereinbefore, the contact arm 7 has a direct engagement with the sleeve 5 and inasmuch as the sleeve 5 is fixed to the bottom wall of the casing 4, it follows that by confining the actuating arm 7 between the base and the sleeve 5, which is in effect the same as the adjacent bottom wall of the casing, good electrical connection is established between the contact disk and the terminal 16 fixed to the casing.

The rheostat is connected in circuit to vary resistance by connecting either or both the resistor terminals and the casing terminal in circuit in any suitable relation to vary resistance upon the contact disk being rolled upon the resistor.

When the spindle is turned by its knob 9 the actuating arm rolls the roller 10 upon the contact disk and revolves it around the center of the rheostat to roll the contact disk in a circle over the top of the resistor and thereby effect an adjustment of resistance. Rotation of the actuator arm is limited by a stop pin 17 attached to the casing and extending into a circular slot in the actuating arm.

From the foregoing description taken in connection with the accompanying drawing, it will be readily apparent to those skilled in the art to which this invention appertains that this invention affords a novel rheostat construction and particularly provides a simple and efficient manner of establishing electric continuity from a movable contact to its stationary terminal through the medium of a movable actuating arm.

The invention which is described in the foregoing specification is hereby claimed as follows:

1. In a rheostat, a housing having spaced walls, one of which provides a base, a resistor mounted on the base and having a circular contacting surface facing the other wall, a contact disk having a conical portion in rolling engagement with the contacting surface of the resistor, an actuating shaft journaled in said other wall, a resilient arm non-rotatably connected with the shaft, a roller carried by the free end of the arm and engaging the contact disk to hold its conical portion in engagement with the resistor contacting surface at a location determined by the position of rotation of said arm, a terminal carried by the base and permanently electrically connected with the resistor, a second terminal permanently electrically connected with the said other wall, and said resilient arm having direct contact with a permanent part of said other wall maintained by the resiliency of the arm which also holds the roller down onto the contact disk with spring tension.

2. In a rheostat, a housing having spaced walls, one of which provides a base, a resistor

mounted on the base and having a circular contacting surface facing the other wall, a contact member having a conical portion in rolling engagement with the resistor, an actuating shaft journaled in a bearing carried by said other wall, a resilient arm having one end portion non-rotatably connected with the shaft and directly engaging the adjacent end of the bearing, anti-friction means carried by the other end of the resilient arm and bearing down on the contact member to hold its conical contact portion in engagement with the resistor at a location determined by the position of rotation of the arm, the spring tension of the arm being opposed directly by the two spaced walls of the housing so as to maintain good electrical connection between the arm and the bearing and between the contact member and the resistor, a first terminal for the rheostat permanently electrically connected with the resistor, and a second terminal for the rheostat permanently electrically connected with the said other wall to have good electrical connection through the bearing with the resilient arm.

3. In a rheostat, a substantially cup shaped casing, an insulated base closing the open side of the cup shaped casing, a circular resistor mounted on the inner face of the base and having a contact surface facing the bottom of the cup shaped casing, a shaft rotatably mounted by said bottom wall of the casing with an extension thereof projecting through the casing and into the base, a conical contact member having a hole at its apex through which said extension projects whereby the contact member is held by said extension in a position with its peripheral portion arranged to traverse the contacting surface of the resistor in a circle, a resilient arm non-rotatably connected with the shaft and having anti-friction means riding on the contact member, the spring tension of the arm pressing part of the arm against the bottom of the cup shaped casing so as to insure good electrical connection between the arm and the casing, and pressing its anti-friction means down onto the contact member to firmly engage the contact member with the resistor, a first terminal for the rheostat carried by the base and permanently electrically connected with the resistor, and a second terminal for the rheostat carried by the casing to have good electrical connection with the resilient arm.

4. In a rheostat, a rotatable shaft, a spring arm non-rotatably connected with the shaft and having terminal portions yieldably urged apart in a direction axial to the shaft, a stationary wall in which the shaft is journaled and directly engaged by one terminal portion of the arm, a rollable conical contact member engaged by the other terminal portion of the arm through an anti-friction connection, a circular resistor on which the contact member is adapted to roll, a second stationary wall fixed with respect to the first mentioned stationary wall and supporting the resistor whereby the spring force of the arm is opposed by said stationary walls and good electrical connection between the first mentioned wall and the arm and between the arm and the resistor are assured, and terminals for the rheostat, one connected with the first mentioned wall and the other connected with the resistor.

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