J. PARKIN, JR.

VARIABLE RESISTANCE DEVICE.

APPLICATION FILED JULY 31, 1919.

1,342,594.

Patented June 8, 1920.

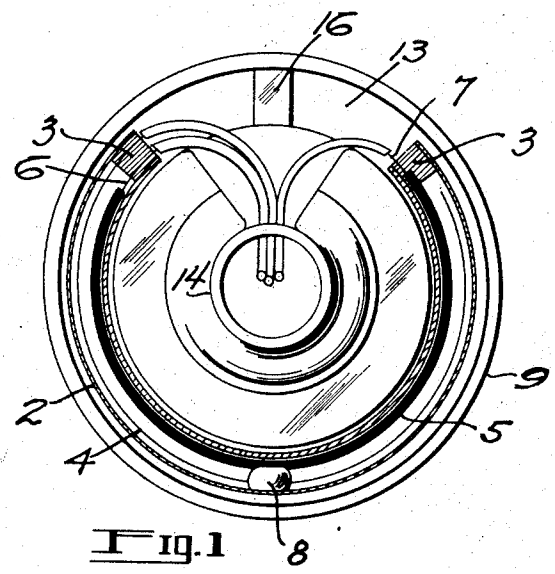


Fig. 1

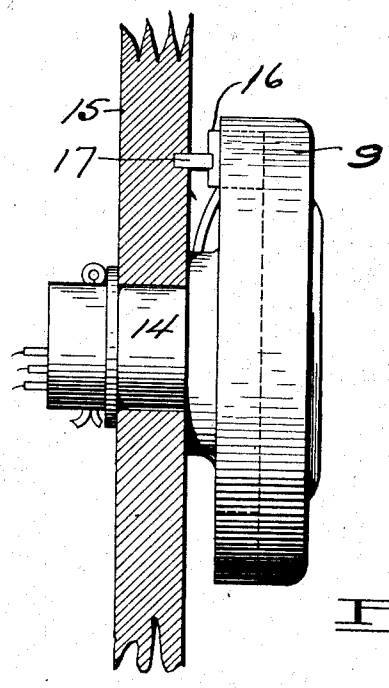


Fig. 2

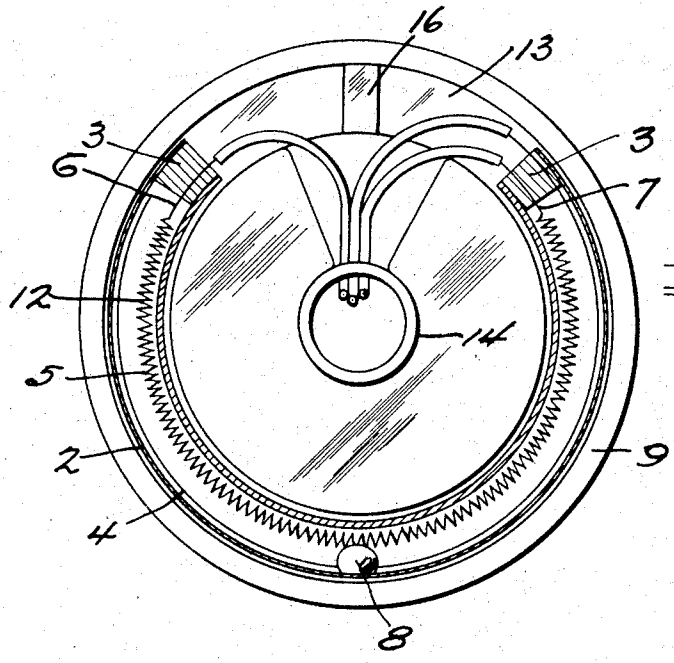


Fig. 3

Witness:
H. A. Sherburne.

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UNITED STATES PATENT OFFICE.

JOHN PARKIN, JR., OF SAN RAFAEL, CALIFORNIA.

VARIABLE-RESISTANCE DEVICE.

1,342,594. Specification of Letters Patent. Patented June 8, 1920.

Application filed July 31, 1919. Serial No. 314,518.

To all whom it may concern:

Be it known that I, JOHN PARKIN, Jr., a citizen of the United States, and a resident of San Rafael, county of Marin, and State of California, have invented a certain new and useful Variable-Resistance Device, of which the following is a specification.

The invention relates to variable resistance devices for use as rheostats and potentiometers.

An object of the invention is to provide a variable resistance device which is not subjected to wear and which may be readily manipulated to vary resistance within the limits of its capacity.

Another object of the invention is to provide a simple and cheap variable resistance device, which is particularly adapted to handle small currents.

A further object of the invention is to provide a durable high resistance element.

The invention possesses other advantageous features, some of which, with the foregoing, will be set forth at length in the following description, where I shall outline in full that form of the invention which I have selected for illustration in the drawings accompanying and forming part of the present specification. In said drawings I have shown two forms of the device of my invention, but it is to be understood that I do not limit myself to such forms, since the invention, as expressed in the claims, may be embodied in other forms.

Referring to said drawings:

Figure 1 is a rear elevation of one form of device of my invention, part thereof being shown in section to disclose the construction.

Fig. 2 is a side elevation of the device shown in Fig. 1, mounted on a panel.

Fig. 3 is a rear elevation, partly in section of a modified form of the device.

The device of my invention is primarily adapted for handling small currents, but it may be constructed to handle larger currents when desired. It is particularly adapted for use as a rheostat or a potentiometer, and finds utility in radio signaling apparatus, as a potentiometer for varying the plate potential in a vacuum tube or as a grid leak for a vacuum tube, or in other uses. While its construction renders it particularly adaptable for use in radio signaling apparatus, its utility is not confined to such, but it may be employed in all instances where it is desired to vary the resistance of an electric circuit.

The device comprises a circular or curved tube 2, preferably made of insulating material, and which is preferably closed at the ends, as by the plugs 3, of insulating material. Arranged in the tube and extending longitudinally thereof is a wire or conducting element 4, of relatively low resistance, one end of which extends through the plug at the end of the tube. Disposed within the tube and spaced from the conducting element 4, is a relatively high resistance element 5, which is substantially parallel to the wire 4. The high resistance element 5 is preferably connected at its ends and within the tube with wires 6 and 7 of low resistance, such as iron wires, and these wires extend through the plugs at the ends of the tube. Disposed in the tube and forming contact with the conductor 4 and the resistance element 5, is a rolling contact device, which may be a steel ball, but which is preferably a drop of mercury 8. By turning or rocking the curved tube, the position of the mercury varies, thereby varying the amount of resistance in circuit, and this resistance can be adjusted very closely by a careful turning of the curved tube.

In the drawings I have shown the tube as being circular in form and have provided means so that the tube may be turned on the axis of the circle, to vary the amount of resistance in circuit, but any curved tube may be employed in which the moving contact is shifted by rocking or tipping the tube. The iron wire 6 extends into the tube so that the mercury can contact with the wire, thereby cutting out all resistance when desired.

The tube is preferably seated in an annular groove 13 formed in a knob 9 of bakelite or other comparable material, and the knob is provided with an axially disposed stem 14 which projects through a panel 15 or other supporting element. By rotating the knob, the position of the tube is shifted and the mercury flows to a different position, varying the resistance. The rotation is limited by a stop 16 on the back of the knob which engages a projection or stop 17 on the panel. The stem 14 is hollow and is provided on its side with an aperture, through which the lead wires from the tube, properly insulated, pass into the stem.

The resistance element may be a helix 12 of resistance wire, as shown in Fig. 3. I

have obtained excellent results employing a resistance element consisting of a piece of cotton or other fabric, cord or string, soaked in a mixture which when dry has a high resistance. For this purpose I have employed a mixture of hot glue and lamp black, in which the string is soaked and then dried. This resistance element possesses many advantageous features. It is more or less flexible and will not break due to expansion or contraction or shocks, and is much more durable than rigid carbon resistance elements which have heretofore been largely used.

I claim:—

1. A variable resistance device, comprising a curved tube, a conducting element in said tube, a resistance element in said tube insulated from and disposed in substantial parallelism with said element, and a rolling contact engaging said conducting element and resistance element.

2. A variable resistance device, comprising a curved tube, a conducting element in said tube, a resistance element in said tube insulated from and disposed in substantial parallelism with said element, and a drop of mercury contacting with said conducting element and said resistance element.

3. A variable resistance device comprising a curved tube of insulating material, a conducting element disposed within and extending longitudinally of said tube, a resistance element in said tube spaced from and in substantial parallelism with said conducting element, and a drop of mercury contacting with said conducting element and said resistance element.

4. A variable resistance device comprising a circularly bent tube of insulating material closed at the ends, a conducting element disposed within said tube and extending longitudinally thereof, a resistance element in said tube in substantial parallelism with said conducting element, a rolling contact in said tube contacting with said conducting element and said resistance element, and a mount for said tube whereby said tube may be turned about its axis to cause said contact to roll.

5. A variable resistance device comprising a curved tube, a conducting element disposed longitudinally in said tube, a fabric string impregnated with resistance material disposed in said tube in substantial parallelism with said element and insulated therefrom, and a drop of mercury in the tube making contact with the element and the string.

6. A variable resistance device comprising a curved tube of insulating material closed at the ends, a conducting element disposed longitudinally in said tube, a resistance element in said tube spaced from and in substantial parallelism with said conducting element, a drop of mercury in said tube contacting with said elements, a mount in which said tube is arranged and a stem on said mount for supporting the mount and about the axis of which the mount is adapted to be rotated to cause the mercury to roll in the tube.

In testimony whereof, I have hereunto set my hand at San Francisco, California, this 23rd day of July, 1919.

JOHN PARKIN, JR.

In presence of—
W. W. HEALEY,
C. S. EVANS.