Feb. 17, 1931. H. N. HITE 1,793,090

VARIABLE ELECTRICAL RESISTANCE

Filed Sept. 6, 1927

Fig. 1.

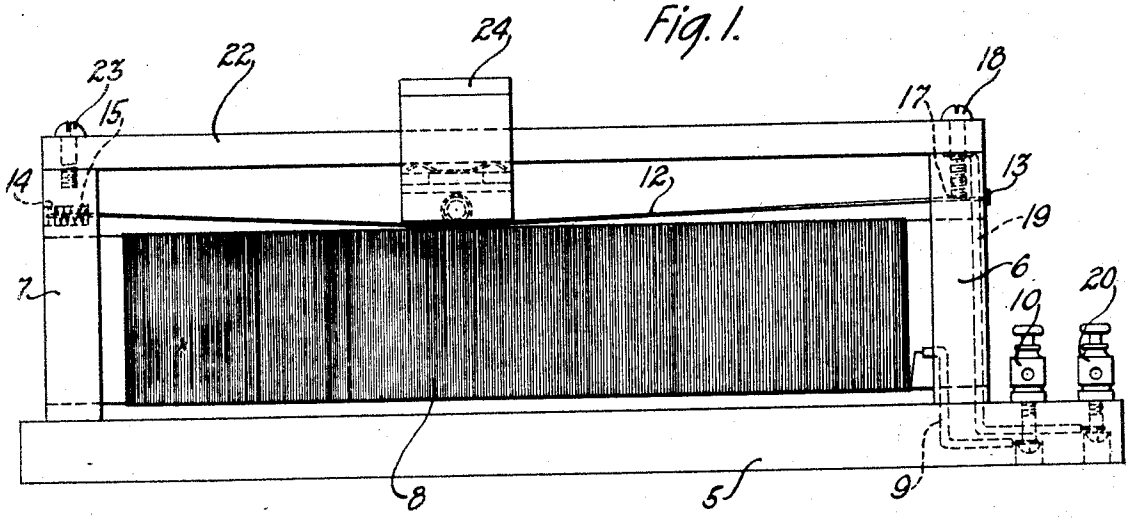


Fig. 2.

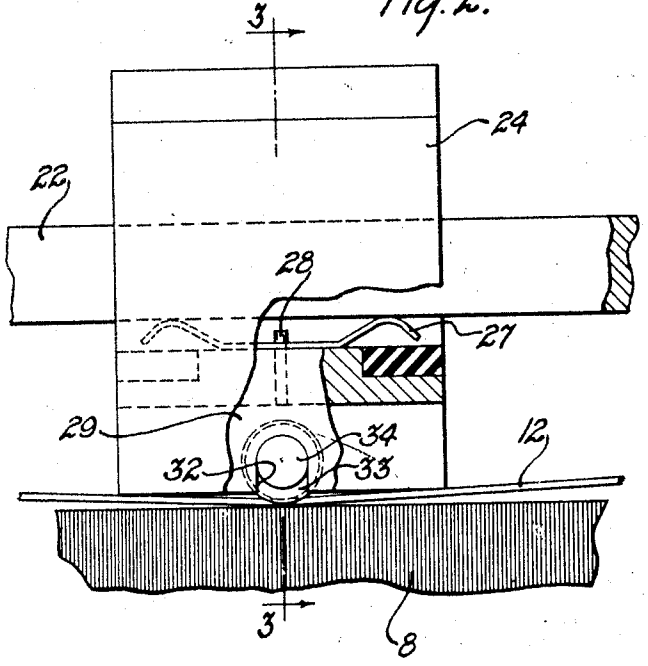
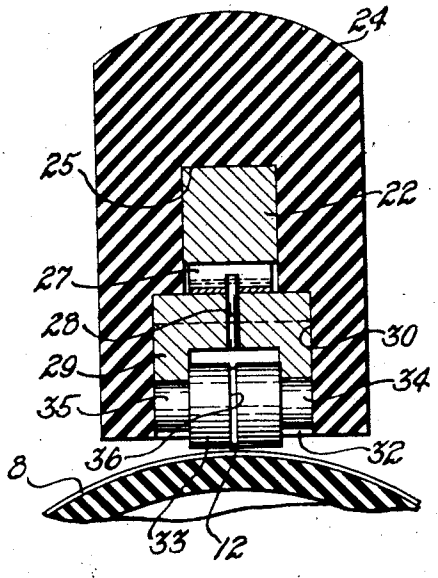


Fig. 3.



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UNITED STATES PATENT OFFICE

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VARIABLE ELECTRICAL RESISTANCE

Application filed September 6, 1927. Serial No. 217,643.

This invention relates to variable electrical resistances, and more particularly to a slide wire rheostat.

This invention is particularly directed to that class of electrical resistances made variable by sliding a contact member on a coil of wire wound on a cylinder. With that type of resistance there is a tendency for the contact member to wear the wire of the coil, and thus in some cases necessitating the rewinding or replacement of the coil or at least rotating the coil in order to provide for a new line of contact.

The object of the present invention is the provision of a simple and efficient means for varying the amount of effective resistance of a rheostat without unduly wearing the resistance element of the rheostat.

In accordance with the general features of the invention, one embodiment thereof comprises a cylindrical coil of wire and a resilient wire disposed substantially parallel and extending longitudinally to the axis of and close to the periphery of the cylinder which makes contact with the cylindrical coil at a point governed by a movable element carrying a resiliently mounted rotatable member pressing the wire against the coil.

Other features and advantages of the invention will become apparent in the following description, reference being had to the accompanying drawing, wherein

Fig. 1 is a side elevation of a variable resistance embodying the features of the invention;

Fig. 2 is an enlarged side view of the sliding element shown partly in section; and

Fig. 3 is an enlarged sectional view of the sliding element taken on line 3—3 of Fig. 2.

Referring now to the drawing generally, and more particularly to Fig. 1 thereof, the numeral 5 indicates a base of any suitable type and material on which are mounted hard rubber members 6 and 7, which support the cylindrical resistance coil 8 composed of any suitable resistance wire and having a terminal wire 9 connected to the binding post 10. Above the resistance coil 8 extends a substantially parallel conductor 12, preferably of material of a resilient and long wearing quality, specifically a phosphor bronze spring wire, mounted in the members 6 and 7 through holes drilled therein and held in place by metal discs 13 and 14 brazed thereto and maintenance in suitable tension by a tension spring 15 contained in a countersunk aperture in the member 7 and attached to one end of the conductor 12. At point 17 a screw 18 contacts with a wire 12, affording an electrical circuit from the wire 22 to a conductor 19 which leads to the binding post 20. Binding posts 10 and 20 form the two exterior connections of the variable resistance. A bar 22 extends parallel to the wire 12 and the axis of coil 8 between members 6 and 7, and is secured thereto by screws 18 and 23.

On the bar 22 is slidably mounted a movable device 24 for making a movable contact between the wire 12 and the coil 8, through an arrangement which will now be explained. In the movable device 24, which is composed of a non-conductive material such as hard rubber, is an aperture 25 surrounding the bar 22. A spring 27, preferably composed of steel, causes a resiliently controlled contact of the movable device 24 with the bar 22, and is the pressure means that holds the spring wire 12 in contact with the coil 8. The spring 27 is held in place by and is removable from a pin 28 mounted on a metal member 29 which is secured in a groove 30 of the hard rubber device 24, and which has slots 32—32 in which are placed journals 34 and 35 of a roller 33. Roller 33 has a groove 36 partially surrounding and engaging the wire 12.

In the operation of the apparatus to vary the effective resistance which may be included in any suitable circuit through the binding posts 10 and 20, movable member 24 is moved along bar 24 thus rotating the roller 33 which holds the wire 12 in continuous varying contact with the resistance coil 8. While member 24 is moved to a position to give a desired effective resistance, spring 27 affords the necessary pressure for causing continuous varying contact between spring wire 12, which is maintained in tension, and resistance coil 8, as well as effecting a sliding contact of device 24 with the bar 22.

It is obvious that after the movable device is repeatedly moved back and forth there will be little wear in the members forming the electrical circuit. There is very little friction exerted upon the coil from the contacting element, and practice shows that the effective life of the coil is greatly prolonged as compared with a purely sliding contact. The wear that arises due to the movable roller is confined almost entirely to the contacting element, which when worn can be relatively easily and economically replaced.

Although one specific embodiment of the invention has been herein illustrated and described, it is to be understood that the novel features of the invention are capable of various applications within the scope of the appended claims.

What is claimed is:

1. In a variable resistance device, a resistance coil, a conducting element, a spring for holding the conducting element in tension, a bar, a movable device provided with a slot slidably and resiliently mounted on the bar, and a roller journaled in the slot in the movable device and effecting a movable contact of the conducting element with the resistance coil.

2. In a variable resistance device, a resistance element, a conducting element disposed substantially parallel to and extending completely along the resistance element and contacting therewith at a single point, resilient means attached to one end of the conducting element for maintaining it in tension, and means movable longitudinally of the conducting element for shifting the single point of contact to vary the resistance.

3. In a variable resistance device, a cylindrical resistance coil, a bar mounted adjacent thereto and held in fixed relationship therewith, a conducting means disposed substantially parallel to the coil and the bar and extending completely along the coil, resilient means for suspending the conducting means in tension, and a device cooperating with the bar for progressively forcing successive portions of the conducting means into contact with the coil to vary the effective resistance.

4. In a variable resistance device, a cylindrical resistance coil, a bar mounted parallel and adjacent thereto, an electrical conductor suspended between the bar and the coil and disposed parallel thereto, a spring for holding the conductor in tension, a device mounted on the bar for movement therealong, a roller housed within the movable device for progressively forcing successive portions of the conductor into contact with the coil as the device is moved in order to vary the resistance, a metal member attached to the movable device for housing the roller, and a resilient member secured to the movable device and pressing against the bar.

5. In a variable resistance device, a resistance element, a conducting element disposed substantially parallel to and extending completely along the resistance element and contacting therewith at a single point, a tension spring attached to one end of the conducting element for maintaining it in tension, and means for shifting the single point of contact to vary the resistance.

In witness whereof, I hereunto subscribe my name this 25th day of August, A. D. 1927.

HAROLD NESBIT HITE.