UNITED STATES PATENT OFFICE.

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RHEOSTAT.

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To all whom it may concern:

Be it known that I, FLETCHER D. HALLOCK, a citizen of the United States, and a resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Rheostats, of which the following is a specification.

My invention relates to improvements in rheostats and particularly to supporting means for resistance elements of the type in which the resistance conductor is wound upon the exterior of an insulating tube.

The object of my invention is to provide supporting means for resistance elements of the character described which shall be simple and inexpensive in construction and shall permit of expansion and contraction of the elements, as well as of rough handling of the rheostat, without subjecting the elements to undue strain and breakage. When the present structure is used, the resistance conductor is also effectively insulated from other parts.

Figure 1 of the accompanying drawing is a plan and sectional view of a portion of a rheostat embodying my invention. Fig. 2 is a sectional view of a portion of another form of rheostat that also embodies my invention, and Fig. 3 is a face view of one of the washers that constitute parts of the supporting means.

The resistance element in connection with which the present invention is employed consists of a porcelain or other suitable insulating tube 1, on the exterior of which a resistance conductor 2 is wound and secured in any convenient manner.

In Fig. 1, the resistance element is shown suspended between two members 3 and 4, which may be the sides or other parts of a rheostat casing, and between which any desired number of the resistance elements may be suspended side by side or in any other relation. At each end of the resistance element is a support consisting of a rod 5 that extends substantially axially into the end thereof, the outer end portion of the rod being threaded and the inner end portion being reduced to provide a shoulder at a suitable distance from its extremity. Upon the inner end of the rod are two spaced sets of washers 6—7 and 8—9, respectively, the washers 6 and 7 being adjacent to the shoulder provided by the reduction of the rod, and the washers 8 and 9 being at or near the extremity of the rod. The washers are spaced apart by means of a sleeve 10 that surrounds the reduced portion of the rod, and the parts are secured together by riveting the end of the rod upon the washer 9. The washers 6 and 8 are of slightly larger diameter than the inner circumference of the tube 1, and are resilient, being preferably provided with radial slots in order to render them somewhat more flexible than they would otherwise be. Thus, when the support is inserted in the end of the tube, the washers 6 and 8 tightly engage the inner walls thereof and are rendered somewhat concave so that it is substantially impossible to withdraw the support from the tube. The provision of a plurality of spaced resilient washers upon the rod 5 is for the purpose of maintaining the rod substantially centrally within the insulating tube. The washers 7 and 9 are of slightly less diameter than the inner diameter of the tube 1, and, being comparatively rigid, serve as limiting and reinforcing means for the resilient washers to prevent them from being bent beyond their elastic limits and given a permanent set. Thus, the resilient washers 6 and 8, which support the tube directly cannot be rendered inactive or ineffective, and the device is rendered more rigid, strong and durable by the presence of the washers 7 and 9.

It will be noted that the supporting device of the present invention is applied to the interior of the insulating tube, rather than to the exterior thereof, and is thus considerably removed from the resistance conductor, the insulation of which is rendered even more effective by leaving a suitable space between the ends of the tube and the sides and other parts of the rheostat casing. The device is also simple and inexpensive and permits of readily removing any resistance elements from a rheostat without disturbing or removing other adjacent elements. The support also possesses a certain degree of resiliency, and rheostats provided therewith can, accordingly, withstand considerable jar and rough usage without danger of breaking the insulating tubes or of displacing the same.

Instead of suspending the resistance elements between the sides or other parts of the rheostat, it may be desirable, when in-