

March 7, 1944.

H. H. SMITH

2,343,425

RHEOSTAT

Filed May 25, 1942

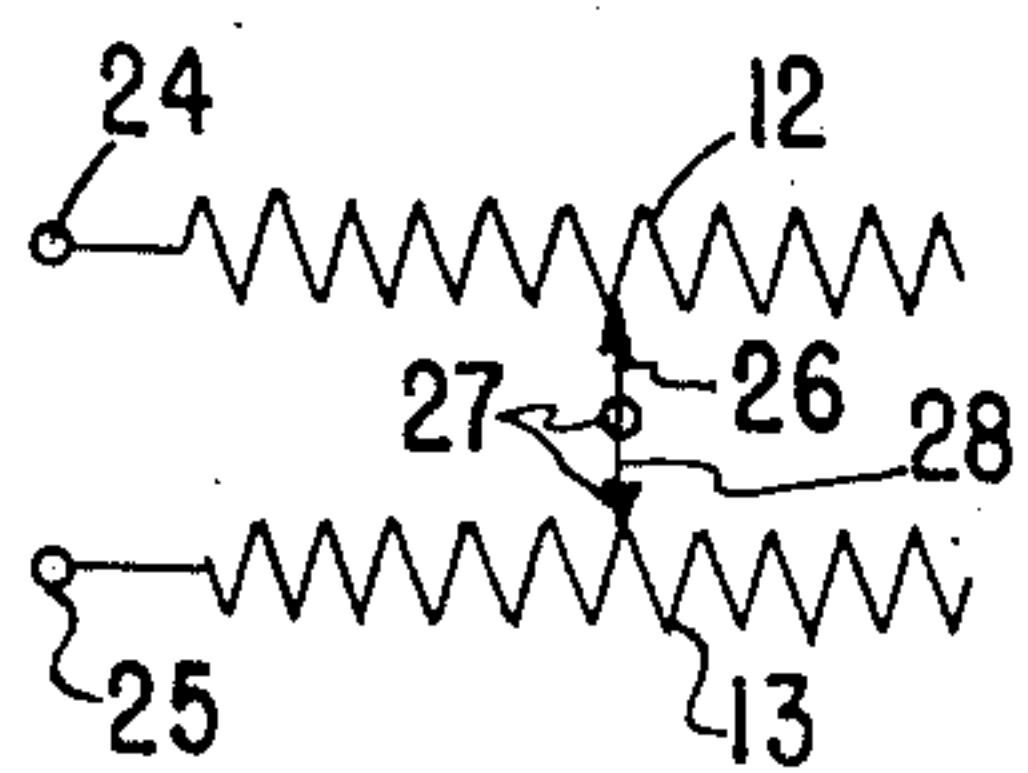


FIG. 3

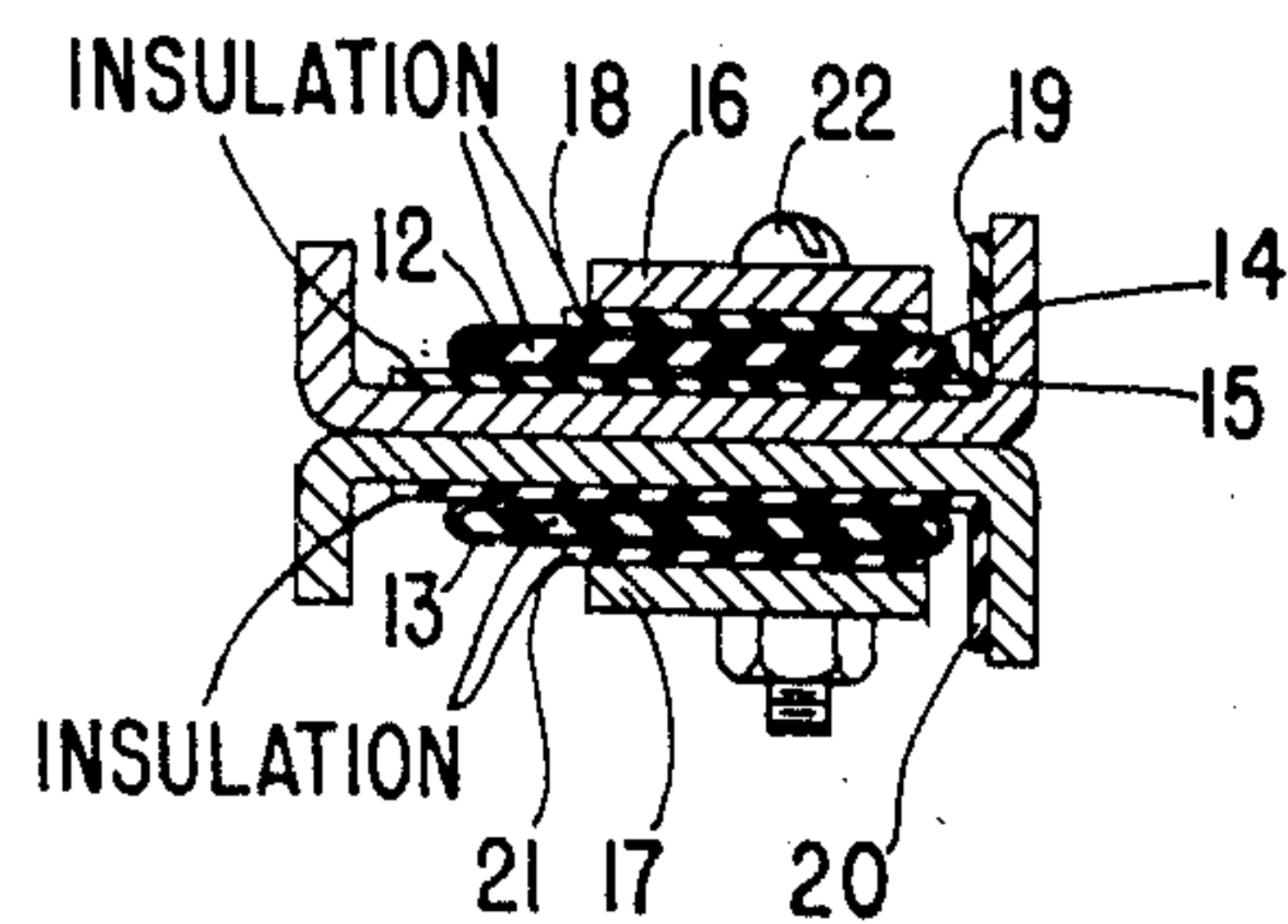


FIG. 2

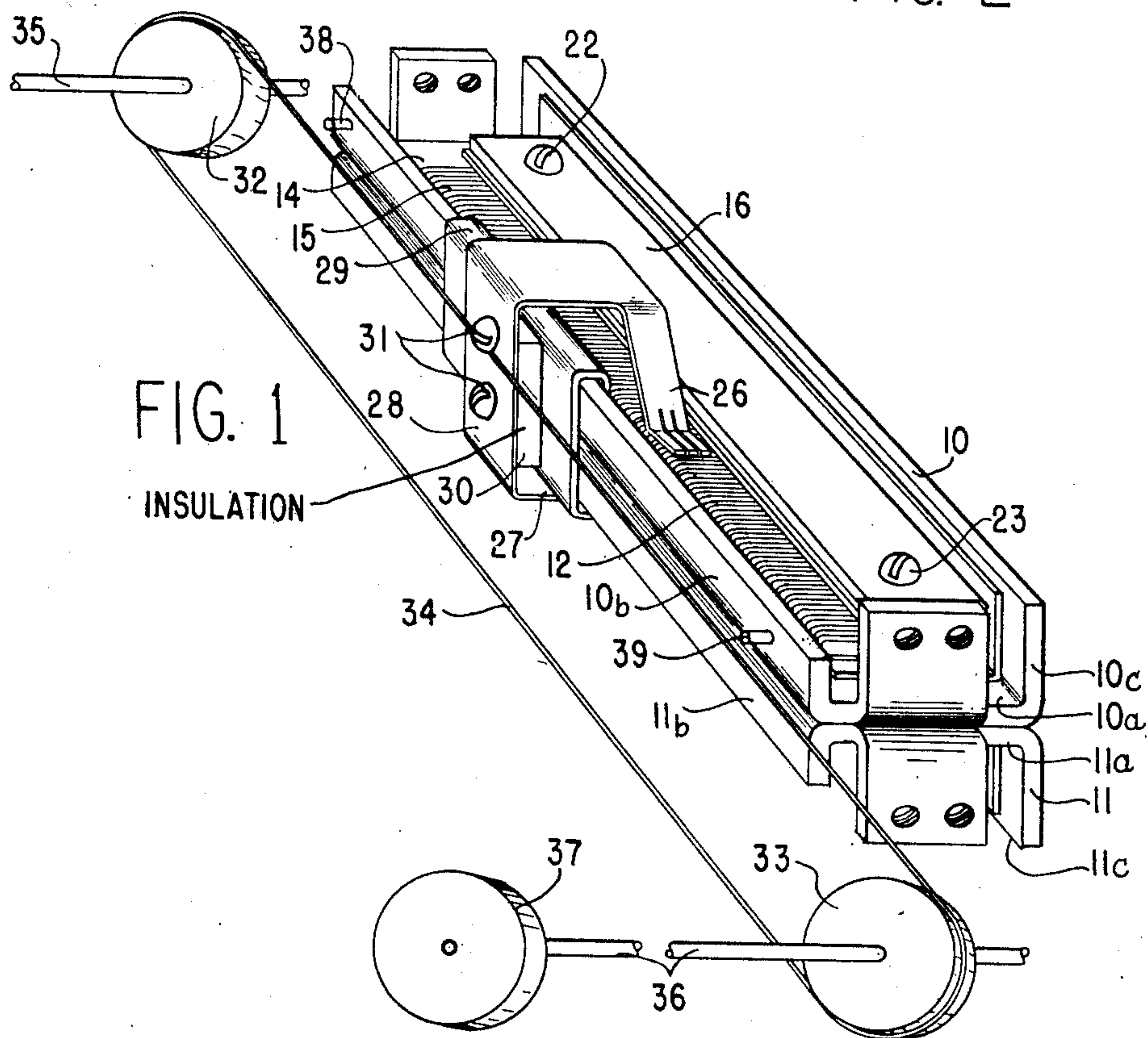


FIG. 1

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## UNITED STATES PATENT OFFICE

2,343,425

## RHEOSTAT

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Application May 25, 1942, Serial No. 444,384

8 Claims. (Cl. 201—62)

The present invention relates to rheostats and has for one of its objects the provision of an improved rheostat of simple, rugged and economical construction which is positive and reliable in operation.

It is another object of the invention to provide an improved rheostat structure which is so arranged that the resistor elements thereof are substantially fully protected against damage occasioned by careless handling.

According to another object of the invention, edge wound resistor strips are used in the structure and provisions are made for securely clamping the resistance wire in place to prevent the convolutions thereof from slipping along the supporting strips.

According to still another object of the invention, provisions are made whereby the supporting structure itself is used to provide guide rails over which a wiper carrying runner may be slidably moved.

The invention, both as to its organization and method of operation, together with further objects and advantages thereof, will best be understood by reference to the specification taken in connection with the accompanying drawing in which Fig. 1 is an end perspective view of an improved rheostat characterized by the features of the present invention; Fig. 2 is an end sectional view of the rheostat structure shown in Fig. 1; and Fig. 3 is a circuit diagram illustrating the manner of connecting the resistor strips and wipers forming a part of the rheostat shown in Fig. 1.

Referring now more particularly to the drawing, the rheostat there illustrated comprises a supporting structure formed of two elongated rigid metal members 10 and 11. Preferably, these pieces are die stamped from flat metal stock and each thereof comprises a central web and two spaced-apart edge flanges defining a channel therebetween. Thus the member 10 comprises a central web 10a, a front edge flange 10b, and a rear edge flange 10c. The other member 11 similarly comprises a central web 11a, a front edge flange 11b, and a rear edge flange 11c. At opposite ends of each of these members two integrally formed mounting lugs are provided which, if desired, may be drilled and tapped to receive assembly screws. In the assembly of the structure, the two channel-shaped members 10 and 11 are placed back to back so that the edge flanges thereof extend in opposite directions. A pair of flat elongated resistor elements 12 and 13 are disposed flatwise within the channels de-

finied by the edge flanges of the two supporting members 10 and 11. Each of these elements is of the edge wound resistance wire type. Thus the resistor element 12 is shown as comprising a flat strip of mica or other insulating material 14, around which are tightly wound the convolutions 15 of resistance wire which may, for example, be German silver wire. The structure further comprises a pair of elongated metal cover strips 16 and 17 which are disposed to overlies the outer surfaces of the resistor elements 12 and 13. In order to insulate the exposed resistance wire from the supporting members 10 and 11 and the cover strips 16 and 17, insulating strips 18, 19, 20 and 21 are provided which are respectively inserted between the surfaces of the resistor elements and the adjacent surfaces of the supporting members and cover strips. The assembly is completed by providing two clamping screws 22 and 23 which extend through registering openings provided in the cover strips, the insulating strips and the webs of the supporting members, and are suitably insulated from the convolutions of resistance wire by means of insulating sleeves or the like. The two terminal ends of the resistance wire convolutions, as brought out at the same end of the supporting members 10 and 11, may be connected to terminals 24 and 25 which are suitably mounted upon one of the rear edge flanges 10c and 11c of either of the two supporting members 10 and 11.

It will be noted that when the assembly is completed, a rigid structure is formed in which the edges of the resistor elements are protected against contact with other objects by the four edge flanges of the two supporting members 10 and 11. It will also be noted that the outer surfaces of the resistor elements are, to a large extent, protected by the cover strips 16 and 17. These strips also serve to clamp resistance wire against the supporting strips upon which they are wound, and thus prevent longitudinal shifting of the convolutions thereof. More specifically, the only exposed surfaces of the resistor elements 12 and 13 are those which lie between the left edges of the elements as shown in Fig. 2 and the left edges of the cover strips 16 and 17. These exposed surfaces of the resistor elements 12 and 13 are arranged to be traversed by the wipers 26 and 27, respectively, of a wiper element 28 which is carried by a substantially C-shaped runner 29. More specifically considered, the runner 29 is shaped snugly to envelop the oppositely directed front edge flanges 10b and 11b of the two supporting members 10 and 11 and is freely slidable



therealong. This runner is of sufficient length to preclude any possibility of its binding against the flanges 10b and 11b as it is slid back and forth along these flanges. The wiper element 28 is substantially U-shaped in configuration and is formed of a resilient conductive material, such, for example, as brass. It is provided at its free ends with the inwardly disposed wipers 26 and 27 which extend in opposite directions along the longitudinal axis of the supporting members 10 and 11 and are biased to engage the resistance wire convolutions of the two resistor elements 12 and 13. Preferably, each of the wipers 26 and 27 is slotted in the manner shown to provide a plurality of contact fingers each of which is more or less independently biased to engage the resistance wire convolutions, thereby to increase the effective contact area between these wipers and the resistance wire. The fingers thus formed are bent away from the resistance wire at their extremities in order to present a rounded surface for contacting the resistance wire. The possibility of the finger ends becoming hooked under one or more convolutions of the resistance wire is thus precluded. The wiper element 28 is spaced apart and insulated from the runner 29 by means of a block of insulating material 30. Assembly screws 31, which are suitably insulated from the wiper element 28 and are threaded into the runner 29, are provided for maintaining the runner and the wiper element in assembled relationship.

An actuating mechanism of the cord and pulley type is provided for sliding the assembled runner 29 and wiper element 28 back and forth along the front edge flanges 10b and 11b of the two supporting members 10 and 11 in order to change the setting of the two wipers 26 and 27 and thus alter the series resistance included between the terminals 24 and 25. Briefly considered, this mechanism comprises an idler pulley 32, a driving pulley 33, and an endless cord 34 which extends around the two pulleys and is looped around the upper assembly screw 31 to be clamped against the surface of the wiper element 28. The idler pulley 32 is carried by and rotatable with a shaft 35 which may be suitably journaled in the structure upon which the rheostat is mounted. Similarly, the driving pulley 33 is rigidly mounted upon a shaft 36 which is journaled in bearings provided in the rheostat supporting structure and is provided with an extension upon which an actuating knob 37 may be mounted. With this arrangement, as the knob 37 is manually rotated in the counterclockwise direction, for example, the cord 34 is drawn around the idler pulley 32 by the driving pulley 33 in a direction such that the runner 29 and the wiper element 28 are moved toward the upper or left end of the supporting members 10 and 11, as illustrated in Fig. 1 of the drawing. The reverse movement of the runner 29 and the wiper element 28 obviously occurs when the knob 37 is rotated in the clockwise direction. In order to limit the movement of the runner 29 and the wiper element 28, stops 38 and 39 may be provided at either end of the edge flange 10b of the supporting member 10 in the path of movement of the runner 29. These stops are preferably in the form of screws, threaded into the edge flange 10b at the correct points therealong to prevent the wipers 26 and 27 from being actuated into engagement with the mounting lugs provided at the two ends of the two supporting members.

While one embodiment of the invention has been disclosed, it will be understood that various

modifications may be made therein which are within the true spirit and scope of the invention.

What is claimed is:

1. A rheostat comprising a supporting structure provided with a central web and a pair of oppositely directed edge flanges, a pair of resistor elements, one of said resistor elements being disposed on either side of said web, means securing said elements to said web, a runner slidably carried by said edge flanges and movable therealong, and wiping contacts carried by said runner and engaging said resistor elements.

2. A rheostat comprising an elongated supporting structure provided with a central web and a pair of oppositely directed flanges, a pair of flat elongated resistor elements, one of said resistor elements being disposed flatwise on either side of said web, flat cover strips overlying the outer surfaces of said resistor elements, means securing said cover strips and said resistor elements to said web so that only the outer surfaces of said resistor elements which are adjacent said flanges are exposed, a runner slidably carried by said flanges and movable therealong, and wiping contacts carried by said runner and engaging the exposed surfaces of said resistor elements.

3. A rheostat comprising an elongated supporting structure provided with a central web and a pair of oppositely directed edge flanges, a pair of resistor elements, one of said resistor elements being disposed on either side of said web, means securing said resistor elements to said web, a runner enveloping said edge flanges and slidable therealong, and wiping contacts carried by said runner and engaging said resistor elements.

4. A rheostat comprising an elongated supporting structure provided with a central web and a pair of oppositely directed edge flanges, a pair of flat elongated resistor elements, one of said resistor elements being disposed flatwise on either side of said web, flat cover strips overlying the outer surfaces of said resistor elements, means securing said cover strips and said resistor elements to said web so that only the outer surfaces of said resistor elements which are adjacent said edge flanges are exposed, a runner enveloping said edge flanges and slidable therealong, and wiping contacts carried by said runner and engaging the exposed surfaces of said resistor elements.

5. A rheostat comprising an elongated metallic supporting structure provided with a central web and a pair of oppositely directed flanges, a pair of flat elongated resistor elements, one of said resistor elements being disposed flatwise on either side of said web, flat metal cover strips overlying the outer surfaces of said resistor elements, insulating strips disposed to insulate said resistor elements from said web and said cover strips and means securing said cover strips, said resistor elements and said insulating strips to said web so that only the outer surfaces of said resistor elements which are adjacent said flanges are exposed, a runner slidably carried by said flanges and movable therealong, and wiping contacts carried by said runner and engaging the exposed surfaces of said resistor elements.

6. A rheostat comprising an elongated supporting structure provided with a central web and two spaced apart pairs of oppositely directed flanges defining a channel on either side of said



web, a resistor element disposed in each of said channels, means securing said resistor elements to said web, a runner slidably carried by one pair of said flanges and movable therealong, and wiping contacts carried by said runner and engaging said resistor elements.

7. A rheostat comprising an elongated supporting structure provided with a central web and two spaced-apart pairs of oppositely directed flanges defining a channel on either side of said web, a flat elongated resistor element disposed flatwise in each of said channels, a flat cover strip overlying the outer surface of said resistor element, means securing said cover strips and said resistor elements to said web so that only the outer surfaces of said resistor elements which are adjacent one pair of said flanges are exposed, a runner slidably carried by said one pair of flanges and movable therealong, and wiping contacts carried by said runner and engaging the exposed surfaces of said resistor elements.

8. A rheostat comprising an elongated metallic supporting structure provided with a central web and two spaced-apart pairs of oppositely directed flanges defining a channel on either side of said web, a flat elongated resistor element disposed flatwise in each of said channels, flat metal cover plates overlying the outer surfaces of said resistor elements, insulating strips disposed to insulate said resistor elements from said web and said cover plates, means securing said cover strips and said resistor elements and said insulating strips to said web so that only the outer surfaces of said resistor elements which are adjacent one pair of said flanges are exposed, a runner slidably carried by said one pair of flanges and movable therealong, and wiping contacts carried by said runner and engaging the exposed surfaces of said resistor elements.

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