

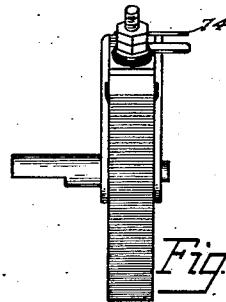
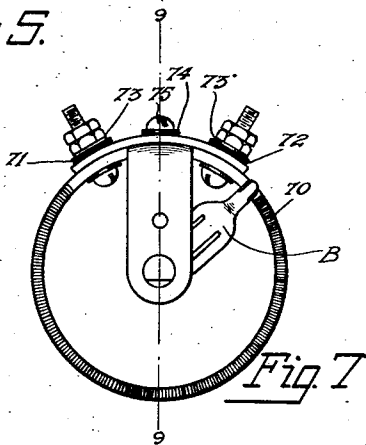
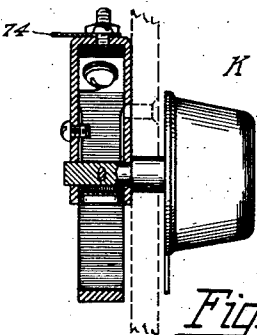
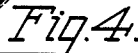
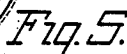
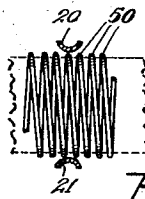
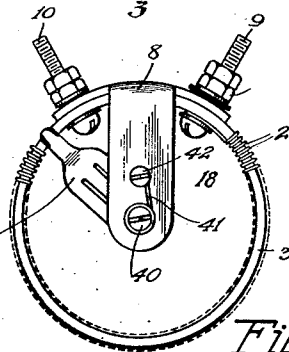
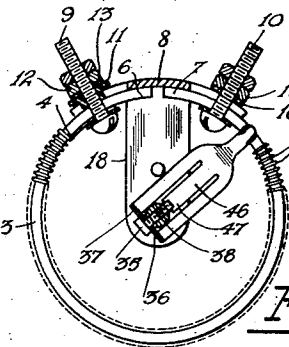
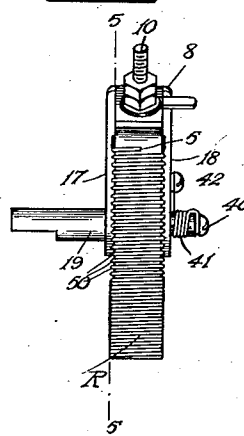
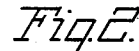
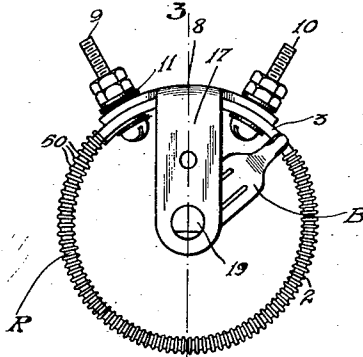
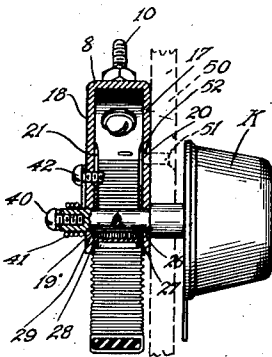
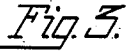
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1,607,351

W. KAISLING

RHEOSTAT

Filed Oct. 11, 1923



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UNITED STATES PATENT OFFICE.

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RHEOSTAT.

Application filed October 11, 1923. Serial No. 667,790.

My invention relates to rheostats for varying the resistance in an electric circuit, and is adapted particularly for use in controlling the current flow through the filament of an electron tube, and an object of my invention is to provide a rheostat of the above type which is simple in construction, but at the same time very durable and most efficient in operation.

A feature of my invention is the provision of a novel and improved resistance unit which is wound upon a comparatively thin strip of insulating material and then formed into a ring shaped member and secured to a suitable supporting member and adapted to be engaged by a pair of suitable wiper arms.

Another feature of my invention is the provision of a double wiper in operative association with the resistance unit, which engages respectively, the peripheral portions of the convolutions of the resistance unit so as to permit an adjustment of the resistance in an operating circuit to be made in steps of half turns of the convolutions of the resistance coil, to increase or decrease the resistance in steps of half turns, thus permitting a finer adjustment of the amount of resistance in an operating circuit.

Another feature of my invention is the provision of a pig tail connection between the wiper and one of the terminals of the rheostat to eliminate the usual friction connection.

The above features, as well as others, will be more particularly pointed out in the ensuing specification, and for a complete understanding of my invention, reference may be had to the accompanying drawing in which like reference characters in the several views denote like parts, and in which:

Fig. 1 is a front view of the rheostat of my invention illustrating it in its normal position;

Fig. 2 is a right side view of Fig. 1;

Fig. 3 is a sectional view along the line 3—3 of Fig. 1, with a supporting panel shown in dotted lines;

Fig. 4 is a back plan view of the rheostat;

Fig. 5 is a sectional view along the line 5—5 of Fig. 2;

Fig. 6 is a partial view of the resistance unit and contact wipers engaging the turns or convolutions;

Fig. 7 is a front view of a modified form of my invention;

Fig. 8 is a right side view of Fig. 7, and

Fig. 9 is a sectional view along the line 9—9 of Fig. 7, and showing a supporting panel in dotted lines.

Referring now more in detail to my invention as illustrated in the accompanying drawing, the rheostat of my invention comprises a resistance coil or unit 2 of a predetermined ohmic resistance, wound upon a flat strip of insulating material 3, by suitable machine means, its ends 4 and 5 passing through suitable orifices in the strip 3 for holding purposes. The strip 3 which carries the resistance coil 2, after being wound, is then formed into a substantially ring shaped member R by means of a suitable forming operation, and its ends 6 and 7 are then secured to an arcuate shaped yoke member 8 by means of the screws 9 and 10. The screw 9 passes through a suitable orifice in the end 6 of the member R and extends through the yoke 8, but insulated therefrom by means of an insulating bushing 11, and a nut 12 has screw-threaded engagement with the screw 9 securing the end 6 to the yoke 8. One end 4 of the resistance coil 2 is secured to the screw 9 and a terminal 13, resting between the nut 12 and bushing 11, provides connecting means to the resistance coil or unit 2. The screw 10 passes through suitable orifices in the end 7 of the member R and yoke 8, and a nut 15 having screw-threaded engagement with screw 10, secures the end 7 of the member R to the yoke 8. A terminal 16 rests between the face of the yoke 8 and the nut 15 for the usual terminal connection purposes.

The arcuate yoke member 8 is provided with a pair of integrally formed depending arms 17 and 18, substantially parallel to each other, for supporting the rotatable shaft 19. I provide a U-shaped wiper member B which rests between the arms 17 and 18 and its wiper arms 20 and 21 engage respectively the peripheral portions of the convolutions 50 of the resistance unit 2 and are formed to provide a spring effect for gripping the convolutions of the coil 2, so as to insure a good contactual engagement between the wiper arms 20 and 21 and the convolutions of the coil. The rotatable shaft 19 is provided with a reduced portion

19' which passes through suitable orifices 26 and 27 in the arm 17 of the yoke 8 and wiper arm 20 of the wiper member B and orifices 28 and 29 of the wiper arm 21 of the wiper member B and arm 18 of the yoke member 8, and secured to the shaft portion 19' by means of a screw 35 which passes through a suitable orifice 36 in the bridge 37 of the wiper member B, and has screw-threaded engagement with a suitable tapped orifice 38 in the shaft portion 19'.

The wiper member B when secured to the shaft 19, as just described, holds the shaft 19 in position and prevents lateral movement of the shaft 19. The protruding end of the shaft 19 extends through the arm 18 of the yoke member 8 and is tapped to receive a screw 40 and one end of a pig tail wire 41 is secured to the shaft 19 by means of a screw 40. Several convolutions of the wire 41 are then placed loosely around the protruding shaft end, its other end being secured to the arm 18 of the yoke 8 by means of a screw 42. The convolutions of wire 41 are placed loosely around the protruding end of the shaft 19 so that as the shaft 19 is rotated, the length of wire 41 will be long enough to permit a full rotation of the wiper arms 20 and 21 from its off position to its extreme on position. A knob K is supported on the shaft 19 for rotating the wiper arms 20 and 21 over the convolutions of the resistance unit 2.

The arms 20 and 21 of the U-shaped member B are parallel to each other and engage the peripheral edges of the convolutions of the resistance unit 2, and referring now to Fig. 6 and the following description, I will point out how the wiper arms 20 and 21 when rotated over the convolutions 50 one half of a convolution of the turns of the resistance unit 2 is included between the said wiper arms 20 and 21 at a time. Now when the knob K is grasped and rotated the wiper arms 20 and 21 engage and disengage the convolutions of the resistance unit 2 in steps of half convolutions; half of the convolution 50 will be engaged by the wiper arms 20 and 21 as clearly illustrated in Fig. 6 and when further moved the wiper arms 20 and 21 will engage the other half, making a full convolution. As the wiper arms 20 and 21 are rotated it may be seen that they will successively engage $1\frac{1}{2}$, 2, $2\frac{1}{2}$ etc. convolutions until the wiper arms 20 and 21 are in the extreme advanced position. Thus it may be seen that I am able to engage a half convolution of a convolution 50 of the resistance unit 2 by means of the wiper arms 20 and 21 thus giving a finer adjustment than was heretofore possible with other rheostats.

I also provide means for holding the wiper arms 20 and 21 in their adjusted position and to insure good electrical contact, as will

now be described. The face of each wiper arm 20 and 21 is provided with an integrally formed tongue portion 46 which projects slightly above the face of each arm 20 and 21 so that when the wiper member B is inserted between the arms 17 and 18 of the yoke member 8 the tongues 46 of the wiper arms 20 and 21 are forced down against their normal tension, their ends 47 when the member B is in position engage the inner faces of the arms 17 and 18 thus producing frictional holding means for holding the wiper arms 20 and 21 in their adjusted position. The wiper member B is limited in movement in its off position by means of the screw 42 which secures one end of the pigtail 41 to the arm 18 of the yoke 8 and this screw 42 projects through the arm 18 and is engaged by the wiper arm 21 when the wiper member B is moved to its off position to limit its movement in that direction.

The wiper arm 21 also engages the screw 42 when the wiper member B is moved to its extreme on position to limit the movement of the wiper member B in this direction, thus the screw 42 which secures one end of the pigtail wire 41 to the arm 18 of the yoke 8 also serves as a stop for the wiper member B.

In Fig. 3 I illustrate the rheostat mounted upon a panel 50 shown in dotted lines by means of a screw 51 which extends through a suitable orifice in the panel and has screw threaded engagement with a suitable tapped orifice 52 in the arm 17 of the yoke member 8.

Referring now to Figs. 7, 8, and 9 I illustrate the rheostat of my invention modified so that it may be used as a potentiometer. The structure of the potentiometer is substantially the same as the structure used in the rheostat just described. To change the rheostat to a potentiometer a very fine wire 70 is wound upon the member R in place of the resistance unit 2 and the screws 9 and 10 are both suitably insulated from the yoke 8 by means of insulating bushings 71 and 72 with each end of the winding 70 connected respectively to the screws 9 and 10. Terminals 72 and 73 are associated with the screws 9 and 10 for the usual connection purposes. A terminal 74 is also secured to the yoke 8 by means of the screws 75 for the wiper member B and as the use of a potentiometer in an electric circuit is well known a description of its various uses is not thought necessary.

From the above description it is readily apparent that the structure of the rheostat may be readily used for a potentiometer with just a few minor changes.

While I have described a preferred embodiment of my invention it is to be understood that I do not wish to be limited to the exact structure as shown and described, as

changes will readily suggest themselves, and I therefore aim to cover all such changes and modifications as come within the spirit and scope of the appended claims.

What I claim as new and desire to secure by United States Letters Patent, is as follows:

1. A rheostat of the character described including a mounting frame having an arcuate shaped portion, a circularly shaped resistance element having only its end portions contacting with the said arcuate shaped portion of said mounting frame, and a rotary contact device having integrally formed position maintaining spring means, for engagement with the resistance element.

2. A device of the character described including a mounting frame having an arcuate shaped portion, a pair of parallel legs, a resistance element comprising a strip of insulating material around which is wound a resistance material, said strip of insulation contacting with the said arcuate shaped portion of said mounting frame only at its end portions, and a movable contact member contacting with the resistance material of said resistance element and having integrally formed spring means adapted to engage the said depending legs for maintaining the contact member in any position.

3. A device of the character described including a mounting frame having an arcuate shaped portion, a pair of depending legs for said mounting member, a strip of insulating material having only its end portions contacting with said arcuate shaped portion of said mounting frame, a resistance wire wound upon said strip of insulating material, and a contact member supported by said mounting plate for engagement with said resistance wire, said contact member having integrally formed spring means adapted to engage said depending legs to maintain the said contact member in any position.

4. A device of the character described including a supporting frame having an arcuate shaped portion, a member of insulating material having only its end portions contacting with said arcuate shaped portion of said supporting frame, a resistance wire wound upon said insulation member, a rotary shaft supported by said mounting frame, and a wiper pivoted on said shaft for engagement with said resistance wire, said wiper having integrally formed spring means adapted to engage a part of said mounting frame to maintain the said wiper in its adjusted positions.

5. A device of the character described including a mounting member having an arcuate shaped portion, a circular band of insulating material having only its end portions in engagement with the said arcuate shaped portion of said mounting member

thereby forming a self supporting member, a pair of depending legs for said mounting member, resistance wire secured to said strip of insulating material, a U-shaped wiper supported by said mounting member for engagement with the said resistance wire and having integrally formed spring means adapted to engage said depending legs to maintain the wiper in any adjusted position.

6. A device of the character described including a mounting member having an arcuate shaped portion, a circular strip of insulation having only its end portions contacting with the said arcuate shaped portion of said mounting member, a resistance wire wound upon said strip of insulation, a contact member having a pair of substantially parallel contact surfaces for engagement with the resistance wire along the edges of said strip of insulating material, and spring means integrally formed with said contact member for yieldingly holding the contact member in position and for insuring electrical contact between the contact member and the mounting frame.

7. A device of the character described including a mounting member having a pair of parallel legs, a circular band of insulation secured to said mounting member, a resistance wire wound upon said strip of insulation, a U-shaped contact member fitting in between the parallel legs of said mounting member for engagement with said resistance wire along the said strip of insulation, said contact member yieldingly contacting with the inner faces of said parallel legs, and a stop pin secured to one of the legs of said mounting member for engagement with said contact member to limit the movement thereof.

8. A device of the character described including a mounting member having parallel dependent members, a circular strip of insulating material having only a relatively small portion thereof in engagement with the mounting member, a resistance element supported on said circular strip, a rotary shaft supported by the dependent members of said mounting member, and a wiper secured to said shaft for contacting along the edges of said strip of insulation, said wiper being mounted between said parallel dependent members and having electrical engagement therewith.

9. A device of the character described, including a mounting frame, a circularly shaped strip of insulating material having only a small portion thereof in engagement with said mounting frame, a resistance wire carried by said strip of insulation, a pair of dependent parallel members for said mounting member, a contact member having a pair of contact points and being mounted between the extended ends of said parallel members and for engagement with

the said resistance wire, yielding means for holding the said contact member in its adjusted position, and a pair of terminals connected to said mounting member, the one terminal being insulated therefrom and connected to one end of the resistance wire, the other terminal being in electrical engagement with said contact member through said mounting member.

10. A device of the character described including a mounting member having a radially extended portion and a pair of integrally formed dependent legs, a circularly shaped strip of insulating material secured to the radially extended portion of said mounting frame, a rotary shaft supported by the said integrally formed dependent legs, a resistance wire wound on said strip of insulating material, a U-shaped contact member contacting said resistance wire along the edges of said insulating material, said contact member being secured to said rotary shaft by a member extending through the bridge portion of said contact member.

11. A device of the character described including a mounting member having a radially extended portion and a pair of integrally formed dependent legs, a circularly shaped strip of insulating material secured to the radially extended portion of said mounting frame, a rotary shaft supported by the said integrally formed dependent legs, a resistance wire wound upon said strip of insulating material, a U-shaped contact member contacting said resistance wire along the edges of said insulating material, said contact member being secured to said rotary shaft by a member extending through the bridge portion of said contact member, and integrally formed spring members for said contact member engaging said integrally formed dependent legs.

12. A device of the character described including a mounting member having a pair of parallel dependent members, a resistance element secured to said mounting member, a double contact wiper mounted in between said dependent members and contacting therewith, the free extremities of said contact member engaging edges of said contact

element, a stop pin secured to one of said dependent members for limiting the movement of said contact member, and a pair of terminals secured to said mounting member, one of said terminals being insulated therefrom but electrically connected with one end of said resistance element, the other terminal being in electrical engagement with the mounting frame.

13. A device of the character described including a mounting frame, a resistance element secured thereto, a pair of dependent parallel members for said mounting frame, and a double contact wiper fit in between said dependent parallel members making electrical engagement with the resistance element, and spring members for said contact wiper making electrical engagement with the said parallel members.

14. A device of the character described including a mounting frame having a pair of ears, a strip of insulating material secured to the ears of said mounting frame, a pair of dependent members for said mounting frame, and a contact member adapted to snugly fit between the dependent members and making electrical contact therewith, the free extremities of said wiper being rotatable along the edge of said strip of insulating material, said wiper having integrally formed spring means adapted to engage the said depending legs to maintain the wiper in its adjusted positions.

15. A device of the character described including a mounting frame having a pair of parallel extending members, a resistance element supported by said frame, a rotary shaft supported by said frame, and a contact wiper, having integrally formed spring means adapted to engage the said parallel extending members to maintain the wiper in its adjusted positions supported by said shaft between the said parallel extending members for engaging along one edge of said resistance element.

Signed by me at Chicago, in the county of Cook and State of Illinois, this 8th day of October, 1923.

WILLIAM KAISLING.