Jan. 15, 1924. 1,480,953

G. A. REAM

RHEOSTAT

Filed March 5, 1921

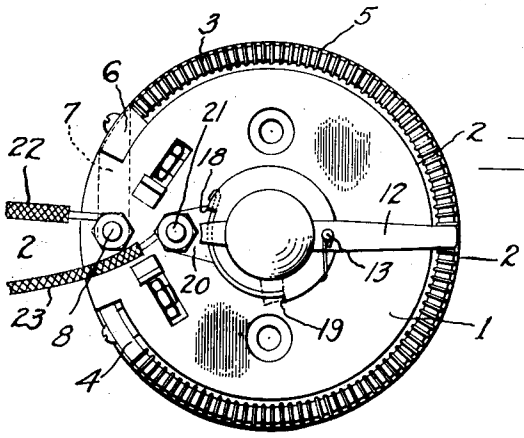


Fig. 1.

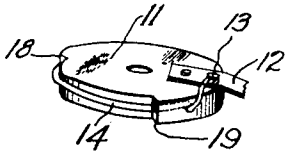


Fig. 3.

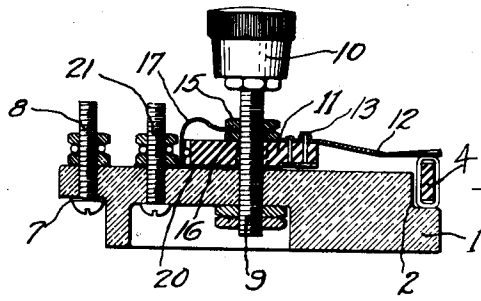


Fig. 2.

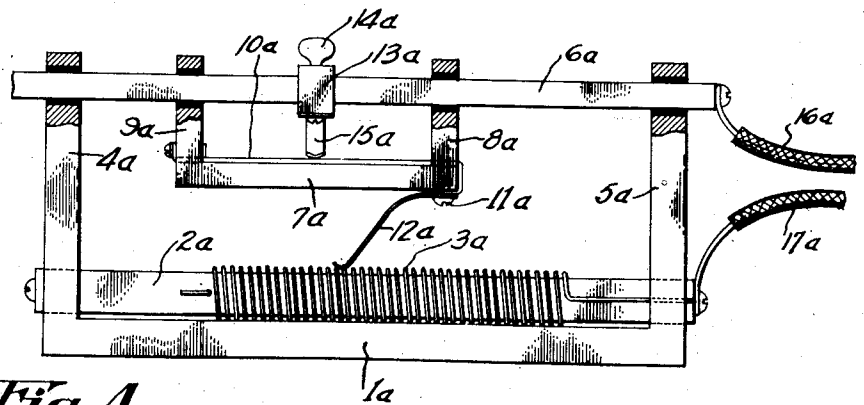


Fig. 4.

Gordon A. Ream
INVENTOR.

BY

Charles E. Wilson
ATTORNEY.

Patented Jan. 15, 1924. 1,480,953

UNITED STATES PATENT OFFICE.

GORDON A. REAM, OF DETROIT, MICHIGAN.

RHEOSTAT.

Application filed March 5, 1921. Serial No. 449,645.

To all whom it may concern:

Be it known that I, GORDON A. REAM, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Rheostats; and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to electric rheostats and the object of the invention is to provide an improved rheostat comprising two distinct, rheostatic elements, one which may be conveniently termed the main resistance element for varying the resistance in the circuit by a series of steps and the other which will be hereinafter termed the secondary resistance element by means of which the resistance between steps may be finely adjusted. A further object of the invention is to provide an electric rheostat in which the main and secondary resistance elements are arranged in two concentric circles and the movable contact members of the rheostat are pivoted on the common center of the main and secondary resistance elements. A still further object of the invention is to provide an electric rheostat in which both contact members are operable by a single knob the construction being such that upon a turn of the knob in one direction the resistance in the circuit is increased means being provided whereby the full resistance of the secondary resistance element is placed in the circuit when the main contact member is turned to increase the resistance in the circuit, means being also provided whereby the resistance of the secondary resistance element is cut out of the circuit upon actuation of the knob to decrease the resistance in the main resistance element, the resistance in the secondary resistance element being adjustable at all times without disturbing the position of the main contact member on the main resistance element. These objects and the several novel features of the invention are hereinafter more fully described and claimed and the preferred form of construction by which these objects are attained is shown in the accompanying drawings in which—

Fig. 1 is a plan view of an electric rheostat embodying my invention.

Fig. 2 is a section taken on line 2—2 of Fig. 1.

Fig. 3 is a perspective view of the auxiliary resistance element and the insulating block to which it is secured.

Fig. 4 is an elevation of my invention as applied to the sliding type of rheostat.

As shown in Figs. 1 and 2, a base 1 is provided which is a non-conductor of electricity such as porcelain, hard rubber or the like. This base 1 is provided with an arcuate groove 2 in which is mounted the main resistance element 3. The main resistance element consists of a core 4 which is made of insulating material and wound about this core is a resistance coil 5. The resistance element 3 is provided with a metal contact 6 which is connected to the resistance coil 5 and is also connected by a metal strip 7 to the terminal 8. As shown more particularly in Fig. 2, pivotally mounted in the center of the base 1 is a shaft 9 having a knob 10 on the upper end thereof. Rotatably mounted on the shaft 9 is an insulator block 11, shown more particularly in Fig. 3, which is provided with a main contact member 12 secured thereto and adapted to contact the different turns of the resistance coil 5. Connected at 13 to the contact member 12 is a secondary resistance element 14, the exposed face of which is equal in resistance to a single turn of the resistance coil 5. Secured to the shaft 9 by the nuts 15 and 16 is a secondary contact member 17 adapted to contact the secondary resistance element 14. It will be noted more particularly in Figs. 1 and 3 that the insulator block 11 is provided with a cut-away portion providing shoulders 18 and 19 limiting the movement of the contact member 17 about the periphery of the insulator block. Beneath the insulator block 11 and in contact with the shaft 9 is a metal plate 20 which extends and contacts the terminal 21 of the rheostat.

In operation a pair of lines 22 and 23 are provided from a suitable source of current supply and are connected to the terminals 8 and 21. With the device in the

position shown in Fig. 1 it will be seen that the current flow is through the wire 22, terminal 8, metal strip 7, contact member 6, resistance coil 5, thence through the main contact member 12, through the secondary resistance element 14, secondary contact member 17, shaft 9 and through the plate 20 to the terminal 21. To set the device to provide a certain amount of resistance in the circuit the knob 10 is turned to the right which causes the secondary contact member 17 to engage the shoulder 18 of the insulator block 11 and thus move the main contact member 12 over the resistance coil 5. This member 12 is to be turned until slightly too much resistance is placed in the circuit whereupon by turning the knob 10 to the left the resistance of the auxiliary resistance element is reduced until the desired amount of resistance is placed in the circuit. To further reduce the resistance in the circuit the knob 10 is turned to the left until the secondary contact member 17 engages the shoulder 19 of the member 11 at which time the secondary resistance is cut out of the circuit and by further turning the knob 10 to the left the main contact member 12 is turned to lessen the resistance in the subdivided resistance element. In this case the member 12 is to be turned until there is less resistance than desired in the circuit at which time by again turning the knob 10 to the right the secondary contact member 17 is moved over the secondary resistance element 14 towards the shoulder 18 until the correct amount of resistance is placed in the circuit. It can thus be seen that when the knob 10 is turned to increase the resistance, the full resistance of the secondary resistance element is thrown into the circuit and on this account it is necessary to place the contact member 12 so that slightly more resistance is included in the circuit than required and then reduce the resistance to the desired amount by moving the contact member 17 to reduce the resistance of the secondary resistance element. It can also be seen that to reduce the resistance in the circuit to any appreciable extent it is necessary with this device to first cut out the secondary resistance and then turn the pointer until slightly less resistance than is necessary is included in the circuit at which time the secondary resistance may be increased by moving the secondary contact member over the secondary resistance element. By this construction the main contact member may be positioned on the main resistance element to include approximately the resistance required at which time the exact resistance required may be included in the circuit by adjustment of the secondary contact member on the secondary resistance element, the secondary resistance element being equal to the resistance between the turns or steps of the main resistance element.

In Fig. 4 I have illustrated my invention as applied to the sliding type of rheostat and have provided a base 1^a of insulating material such as hard rubber, porcelain or the like on which is mounted a core 2^a of the main resistance coil 3^a. The member 1^a is provided with uprights 4^a and 5^a which are of the same material as the base 1^a and mounted in these supports is a rod or shaft 6^a formed of material through which electric current may easily pass. Mounted on the rod 6^a is a member 7^a which is a non-conductor of electricity and which is provided with uprights 8^a and 9^a provided with apertures through which the rod 6^a extends. This member 7^a supports a secondary resistance element 10^a which is equal in resistance to one of the turns or steps of the main resistance coil 3^a. Connected to this resistance element 10^a at 11^a is a main contact member 12^a which is adapted to contact different turns of the main resistance element 3^a. Mounted on the bar 6^a and in electrical contact therewith is a member 13^a having a knob 14^a by which the member 13^a may be moved along the rod 6^a, between the uprights 8^a and 9^a of the member 7^a. This member 13^a is provided with a secondary contact member 15^a which is in contact with the secondary resistance element 10^a at all times. A pair of wires 16^a and 17^a are provided, and connected with a suitable source of current supply, the wire 17^a being connected to the resistance coil 3^a and the wire 16^a being connected to the rod 6^a as shown.

In this device the current passes through the wire 17^a, coil 3^a, main contact member 12^a, secondary resistance element 10^a, secondary contact member 15^a, member 13^a and through the rod 6^a to the wire 16^a. In operation to increase the resistance the member 13^a is moved by means of the knob 14^a to engage the upright 9^a of the member 7^a which throws the resistance of the secondary resistance element 10^a into the circuit. To further increase the resistance the member 13^a is moved further to the left which moves the member 7^a and main contact member 12^a until a slightly greater amount of resistance than necessary is placed in the circuit at which time by moving the block 13^a to the right the resistance of the secondary resistance element may be decreased so that the total resistance is the amount required. To reduce the resistance the block 13^a is moved to the right of Fig. 4 at which time the member 13^a engages the upright 8^a and the secondary resistance element is cut out of the circuit. By further moving the member 13^a to the right, the member 7^a and main contact member 12^a are moved to the right until a slightly less amount of resistance than required is concluded in the

circuit at which time by moving the member 13^a to the left the total amount of resistance may be increased by the member 15^a on the secondary resistance element 10^a to the required amount. It can thus be seen that the operation of either of the devices shown in Figs. 1 or 4 is fundamentally the same the difference being more particularly in the adaptation of the invention to the different types of rheostats.

From the foregoing description it becomes evident that the device is very simple and efficient in operation, of comparatively low manufacturing cost and provides a rheostat of very fine adjustability, which will not easily get out of order and which accomplishes the objects desired.

Having thus fully described my invention, its utility and mode of operation, what I claim and desire to secure by Letters Patent of the United States is—

1. In a rheostat, a main resistance element, a secondary resistance element, an insulator block on which the secondary resistance element is carried, a contact member for the main resistance element carried on the said block, a shaft on which the block is mounted, a contact member for the secondary resistance element supported on the said shaft.

2. In a rheostat, a main resistance element, a secondary resistance element, an insulating block on which the secondary resistance element is mounted, a contact member for the main resistance element secured to the said block and electrically connected to the said secondary resistance element, and a contact member for the said secondary resistance element movable thereover.

3. In a rheostat, a subdivided resistance element, a contact member adapted to make connection with the points of subdivision thereof, secondary resistance element electrically connected with the first named contact member, a contact member for the secondary resistance adapted to be moved forward or back over the element in continuous connection therewith, and means limiting the extent of movement of the secondary contact member in either direction, said limiting means providing means for moving the first named contact member.

4. In a rheostat, a base, a sub-divided resistance element arranged in the form of an arc thereon, a shaft rotatably mounted in the base concentric to the said arc, a knob for turning the shaft, a block rotatably mounted on the said shaft, a contact member for the sub-divided resistance element carried thereby, a secondary resistance element carried on the said block and in electrical contact with the contact member for the sub-divided resistance element, the said block being notched on one side, the secondary resistance element being exposed in the said notch, and a contact member secured to the said shaft and engaging the exposed portion of the secondary resistance element.

5. In a rheostat, a base, a sub-divided resistance element mounted thereon, a contact member for making circuit connections to the points of sub-division thereof, a shaft rotatably mounted in the base concentric to the sub-divided resistance element, an insulator block rotatably mounted on the said shaft and providing a mounting for the contact member, a cut-away portion on the said block, a secondary resistance element electrically connected to the contact member and exposed to the said cut-away portion, the exposed portion of the secondary resistance member being substantially equal in resistance to one of the sub-divisions of the sub-divided resistance element, and a second contact member secured to the said shaft and making continuous circuit connection to the secondary resistance element, and extending into the cut-away portion of said block providing a turning means therefor at the limit of movement of the contact member in either direction.

In testimony whereof, I sign this specification.

GORDON A. REAM.