March 4, 1930. T. C. BROWNE 1,749,662

RESISTOR

Filed April 26, 1926

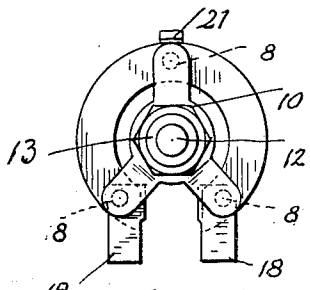


Fig. 1.

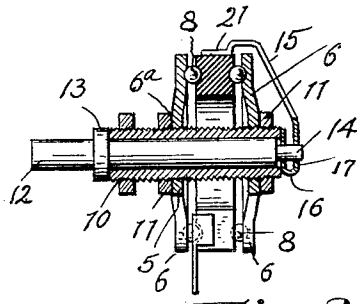


Fig. 2.

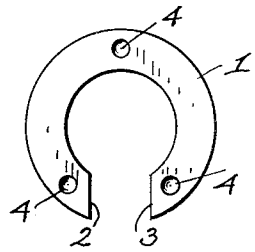


Fig. 3.

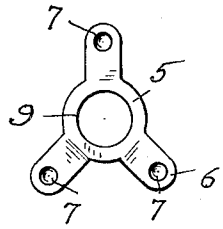


Fig. 4.

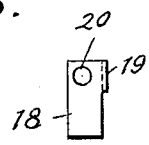


Fig. 5.

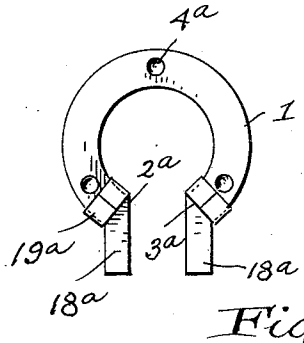


Fig. 6.

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UNITED STATES PATENT OFFICE

THEODORE C. BROWNE, OF CLEVELAND, OHIO

RESISTOR

Application filed April 26, 1926. Serial No. 104,670.

My invention relates to resistors and primarily to the type of resistors known as rheostats or potentiometers and an object of the invention is to provide such a device which can be easily and cheaply manufactured without decreasing the efficiency of the device.

A further object of the invention is to provide a resistor comprised of the fewest number of parts possible, and the cost of which will be exceedingly less than the cost of the resistors on the market at present. Because of the great number of radios in use and to be made and used in the future, and one to three of the resistors in each set ordinarily being used, the feature of cost in production is of primary interest.

It is a further object of the invention to provide a device of this character, the parts of which may be easily replaced if any should become damaged, without the necessity of throwing away the entire resistor.

A further object of the invention is to provide the simplest form of insulating means and, at the same time, to provide an air cooled resistor by constructing the device so as to permit the air to pass substantially around the entire resistance element, and further to reduce the electrostatic capacity of the device to a minimum.

It is a further object to provide a resistor which may be used as a rheostat or a potentiometer, at will, without the necessity of altering the resistor in any manner.

With the objects above indicated and other objects hereinafter explained in view, my invention consists in the construction and combination of elements hereinafter described and claimed.

Referring to the drawings:

Fig. 1 is an end view of the resistor showing the relative position of the terminals;

Fig. 2 is a longitudinal cross-sectional view of the resistor;

Fig. 3 is an end view of the resistance element;

Fig. 4 is an end view of the spider;

Fig. 5 is a plan view of one of the terminals; and

Fig. 6 is an end view of the modified form of the terminals secured to the resistance element.

In the drawings, 1 indicates a resistance element comprising a solid mass of resistance material formed into substantially a square in cross-section and which has the lower portion cut away to provide the ends 2 and 3. This resistance element is provided with depressions 4 suitably spaced around the side of the resistance element and similar depressions are provided on the opposite side thereof and spaced preferably in the same position as the depressions previously described.

A spider 5 having extensions or legs 6, three in number here shown and preferably the number to be used, is provided with depressions 7 on the inner face of the legs 6. These depressions 7 correspond in position with the depressions 4 in the face of the resistance element 1. The spider 5 has an outwardly depressed portion 6^a which is provided to afford a good clamping action between the two spiders 5 used on either side of the resistance element 1. There are two spiders 5 which are similar in construction and are positioned on each side of the resistance element 1.

Disposed within the depressions 4, formed in the resistance element 1, and the depressions 7, formed in the inner face of the legs 6, are insulating glass balls 8 of sufficient diameter to space the legs 6 of the spider 5 a substantial distance away from the resistance element 1. Three of these glass balls 8 are provided, on each side of the resistance element 1, one being adapted to reside within the depression 7 formed in each of the legs 6. The spider 5 is provided with an aperture 9 through which extends a threaded sleeve 10. To clamp these spiders 5 securely together, locking nuts 11 engage with the screw threaded sleeve 10 and are turned up tightly against the depressed portions 6^a of the spider 5. The tightening of these nuts 11 securely locks the various elements in their proper position and the insulating glass balls 8 within the depressions 4 and 7, which are formed within the resistance element 1 and the legs 6 of the spider 5, respectively.

The shaft 12, having formed thereon a col-

lar 13, extends through the threaded sleeve 10 and is formed with a portion 14 of reduced diameter, on the opposite end to the collar 13. This collar 13 is adapted to engage with the end of the threaded sleeve 10 to prevent the shaft 12 from extending beyond a certain position. The shaft 12, which extends within the threaded sleeve 10, is slightly shorter in length than the length of the sleeve so that the reduced portion 14 extends slightly within the interior of the threaded sleeve.

A contact arm 15 is provided with a U-shaped spring portion 16, at one end thereof, and this portion has coaxial apertures 17 of a diameter corresponding with the diameter of the reduced portion 14. This U-shaped spring portion 16, of the contact arm 15, engages the reduced portion 14 and the end of the reduced portion is peened over slightly to form a rigid connection between the reduced portion 14 and the contact arm 15. The inner end of this reduced portion 16 is free to move longitudinally on the reduced portion 14 and the free end thereof engages the end of the sleeve 10 to exert a pressure at that point so as to draw the collar 13, of the shaft 12, tightly against the opposite end of the sleeve 10 but, at the same time, permits the free rotation of the shaft 12.

At the opposite end of the contact arm 15, there is provided a flat portion 21 which extends adjacent to the periphery of the resistance element 1 and engages the periphery to make contact therewith. This portion 21 is made relatively wide so that a larger contacting surface is afforded than is ordinarily provided in resistors of this type. The contact arm 15, with the flat portion 21 engaging the resistance element 1, is rotated by means of its connection to the reduced portion 14 upon the end of the shaft 12. As the shaft 12 is rotated, the contact arm 15 is likewise rotated and the amount of resistance introduced is determined by the distance through which the shaft 12, carrying the flat portion 21, is rotated. One of the conductors of the circuit with which the resistor is employed may be suitably attached to the extension 14 of the shaft 12 or to any other suitable point, which is in direct electrical contact with the arm 15 but insulated from the resistance element 1.

Terminal members 18 are provided with extensions 19 at right angles to the face of the terminals 18, and are further provided with depressions 20 in the upper faces of the terminals. One of these terminals 18 is required for making connection with the resistance element 1 at each of the open ends 2 and 3. The extension 19 is placed on the opposite side of the terminal 18 when the terminal is to engage the end 3 of the resistance element 1. This arrangement places the extension 19 within the ends 2 and 3 and facing each other. The terminal 18 rests upon the face of the resistance element 1 and, the depression 20 therein is adapted to register with the depressions 4 of the resistance element 1 and the resistance glass balls 8, at these two points, rest within the depression 20, and the spiders 5, with the depression 7, are adapted to engage the glass balls and when so engaging the nuts 11 cause the spiders 5 to securely hold the terminals in place. These terminals are further secured to the resistance element 1 by means of a cementing material which is introduced between the inner surface of the terminals and the surface of the resistance element 1, with which they engage.

In Fig. 6 I have shown a modified form of the resistance element 1 provided with depressions 4^a similar to the depressions 4 already referred to, the resistance element being cut away to form ends 2^a and 3^a. These ends 2^a and 3^a are cut off at substantially right angles to the periphery of the resistance element 1 and terminals 18^a are secured thereto. These terminals 18^a are provided with a cup-shaped portion 19^a the opening of which corresponds in size and shape to the cross-section of the resistance element 1. These cup-shaped portions 19^a are secured to the resitance element 1 by means of a cementing material.

While I have described the preferred construction embodying my invention, it is to be understood that I am not to be limited to that specific structure and that certain modifications may be resorted to without departing from the spirit of my invention.

Having thus described my invention, I claim:

1. In a resistor of the type described, a resistance element, means for supporting said element, beads of insulating material interposed between the supporting means and said element, means for clamping said supporting means and said element together, and a contact arm carried by said clamping means and engaging with said element.

2. In a resistor of the type described, a resistance element, spiders for supporting said element, glass beads interposed between said spiders and said element for insulating one from the other, means for clamping said spiders together, a rotatable shaft carried by said clamping means, and a contact arm secured at one end to said shaft and the other end adapted to engage with the periphery of said element.

3. In a resistor of the type described, a resistance element provided with depressions, spiders adapted to support said element and provided with depressions on the inner face thereof registering with the depression in said element, insulating members adapted to be secured within said depressions, and means for clamping said spiders together.

4. In a resistor of the type described, a resistance element provided with depressions, spiders adapted to support said element and provided with depressions on the inner face thereof registering with the depression in said element, insulating members adapted to be secured within said depressions, and means for clamping said spiders together and a contact arm carried by the clamping means having one end engaging said element.

5. In a resistor of the type described, a resistance element, spiders supporting said element, means for insulating said spiders from said element, means for clamping said spiders together, a shaft carried by said clamping means, a contact arm secured to said shaft and engaging said element, and means for securing said shaft against longitudinal movement with respect to said clamping means.

6. In a resistor of the type described, a resistance element, means for supporting said element, beads of insulating material interposed between the supporting means and said element, means for clamping said supporting means together, a contact arm carried by said clamping means and engaging with said element, and terminals secured to each end of said resistor element.

7. In a resistor of the type described, a resistance element, means for supporting said element, beads of insulating material interposed between the supporting means and said element, means for clamping said supporting means together, a contact arm carried by said clamping means and engaging with said element, and a terminal secured to each end of said resistor element between the element and said insulating means.

In testimony whereof, I hereunto affix my signature.

THEODORE C. BROWNE.