Nov. 14, 1939. E. R. STOEKLE 2,179,566

RESISTOR

Original Filed Aug. 19, 1935

Fig. 1.

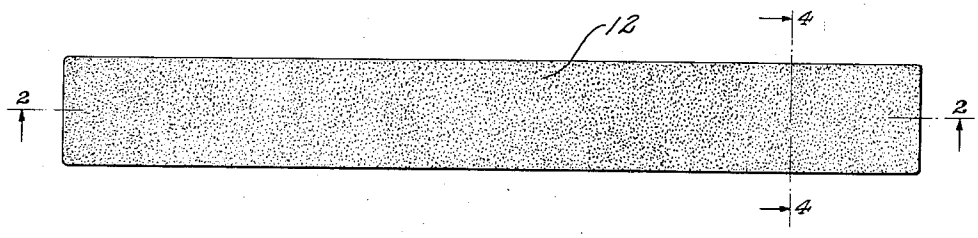
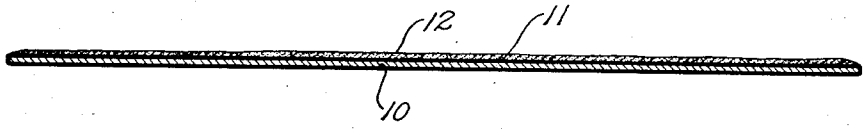


Fig. 2.



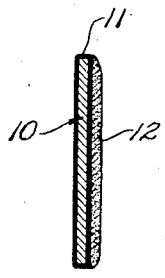


Fig. 4.

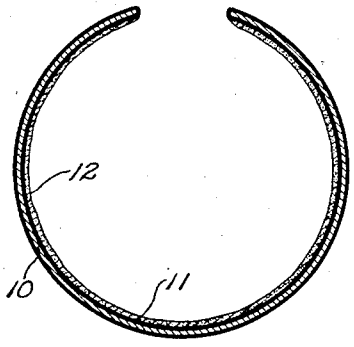


Fig. 3.

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UNITED STATES PATENT OFFICE

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RESISTOR

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Original application August 19, 1935, Serial No. 36,771. Divided and this application March 5, 1936, Serial No. 67,238

3 Claims. (Cl. 201—75)

This invention relates to an improvement in resistors especially adapted for use in adjustable resistances of the character frequently employed in radio receivers.

The present application is a division of my application for Adjustable resistances, filed August 19, 1935, Serial No. 36,771.

It has been customary to construct resistors for this type of unit in the past by coating a resistance material upon an insulating strip of paper, fiber or Bakelite. The resistance per unit length of the film on such resistors varies from rather low values to very high values in resistors of this character to meet the requirements of volume controls and tone controls in radio circuits. The results of this are that the portions of the film having high specific resistance or high resistance per unit length are required to dissipate much more energy than the portions having lower specific resistance. Using the materials for these strips which are now commonly used, such as paper and Bakelite, it is found that the electrical load-carrying capacity of these resistors is very small.

The present invention aims to overcome the disadvantages of this type of resistor by virtue of the provision of a novel resistor structure, one that is capable of carrying relatively heavy currents without disintegration or break down. In general, this advantage is realized by utilizing for the backing or mounting strip of the resistor a material of high thermal conductivity and consequently high heat dissipating properties and so intimately combining with such a mounting strip the resistive material that while the resistive material is electrically insulated from the strip it is in intimate heat interchanging relation with respect thereto.

Other objects and advantages reside in certain novel features of the construction, arrangement and combination of parts which will be hereinafter more fully described and particularly pointed out in the appended claims, reference being had to the accompanying drawing, forming a part of this specification, and in which:

Figure 1 is a plan view of a resistor constructed in accordance with the invention and while in the form of a strip, that is, before it had been rolled to the usual curved form in which it is mounted in the housing of the adjustable resistor;

Figure 2 is a view in longitudinal section taken on line 2—2 of Figure 1;

Figure 3 is a view similar to Figure 2 but illustrating the resistor bent up into its curved form; and

Figure 4 is a view in transverse section taken on line 4—4 of Figure 1.

As shown in the drawing, the resistor comprises a flexible strip 10 constructed of aluminum, copper, or similar material. Material is selected which has a high thermal conductivity and the ability to dissipate heat rapidly and yet flexible and also susceptible to the application of first an insulating and then a conducting layer. In instances where the strip is constituted of aluminum it is first treated by a process known as anodizing and then coated with an insulating japan as indicated in an exaggerated fashion at 11, and finally coated on one surface or face with a resistance film 12 which may be a carbonaceous material and a suitable binder. It will be understood that the japanning extends over the entirely exposed surface of the strip 10, that is, over both its side faces and its side and end edges. Where the strip 10 is constituted of a copper it is sufficient to japan it and thereafter coat one face with a conducting coating or film. As previously suggested, it is desirable to have different portions of the conductive coating of different specific resistances or of different resistance per unit length and the present invention lends itself admirably to this and yet produces a resistor which has a capacity to carry relatively heavy electrical loads. This advantage is mainly realized because of the ability of the metal strip of the character mentioned to rapidly dissipate the heat generated as a result of the passage of considerable current through the zone or portion of the conductive film having a relatively high resistance. In this connection is should be noted that while the conductive film is electrically insulated from the metallic carrying strip it is in intimate heat interchanging relation thereto so that the heat generated in the film of high resistance is transmitted rapidly by conduction to the adjacent portion of the metal strip and then dissipated throughout the entire strip. Hence, the portions of the resistor of relatively high resistance as well as the other portions do not have heat conditions set up therein which are likely to break down the conductive coating.

While I have shown and described one construction in which the invention may be embodied, it it to be understood that this construction has been selected merely for the purpose of illustration or example and that various changes in the size, shape and arrangement of the parts may be made without departing from the spirit of the invention or the scope of the subjoined claims.

The invention claimed is:

1. An electrical resistor of the character described but which is deformable to conform to a curved surface of a resistor housing and comprising a thin flexible strip of metal of good thermal conductivity, a thin flexible film of japan coating of high dielectric strength and of good thermal conductivity directly applied to all surfaces of said strip, and a resistance coating of graduated specific resistance along its length superimposed on the film on one side of the strip so as to be electrically insulated from but in heat interchanging relation with the strip whereby the heat generated in the parts of said resistance coating of high specific resistance will be conducted away from said parts by the underlying metal and diffused throughout the resistor to increase substantially the electrical load carrying capacity of said resistor.

2. An electrical resistor of the character described comprising a thin flexible metal strip narrow relative to its length and of good thermal conductivity, a flexible japan coating of high dielectric strength but of good thermal conductivity directly applied to the exterior surface of said strip, a resistance coating directly applied to one surface of said japan coating, said strip being then curved with said resistance coating on its concave surface and adapted to be contacted by means of an adjustable contact member supported for rotation at the center of curvature of said strip.

3. An electrical resistor of the character described comprising a thin flexible strip of anodized aluminum, a flexible japan coating of high dielectric strength but of good thermal conductivity directly applied to the exterior surface of said strip, and a resistance coating of carbonaceous material directly applied to a surface of said japan coating, said strip with the resistance coating thereon being then bent to conform to the curved wall of a resistor housing and being adapted for mounting therein.

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