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G. J. MUCHER

2,557,793

RESISTOR

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Fig. 1

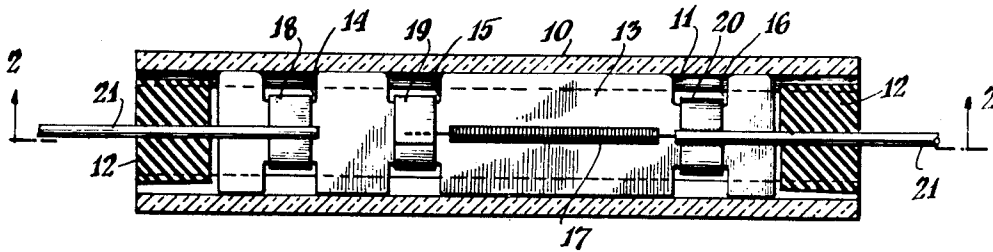


Fig. 2

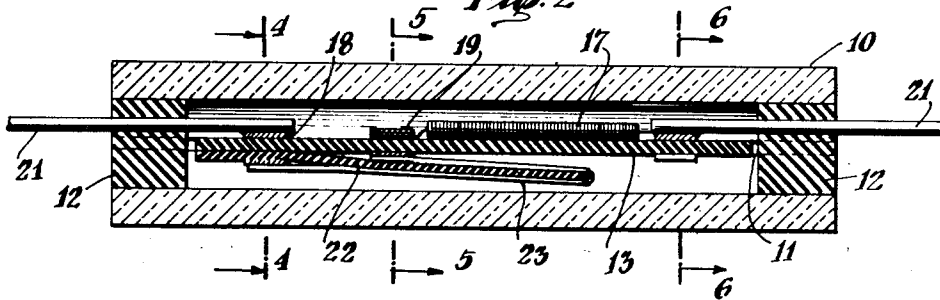


Fig. 3

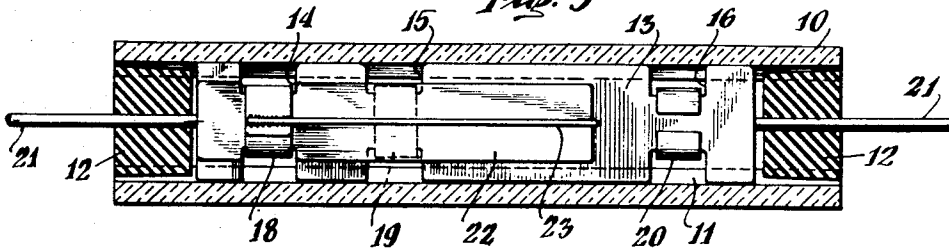


Fig. 4

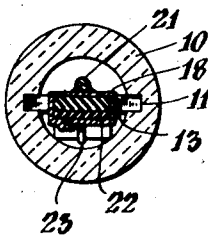


Fig. 5

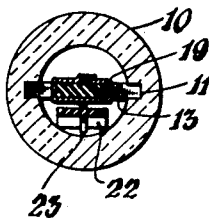
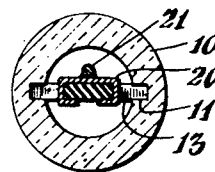


Fig. 6



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RESISTOR

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8 Claims. (Cl. 201-48)

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This invention relates to a structurally and functionally improved electrical resistor.

It is an object of the invention to furnish a unit of this type which will incorporate a structure such that it will fail to function when certain permissible current values have been exceeded; the device thus incorporating a safety provision upon which complete reliance may be placed.

A further object is that of furnishing a resistor of simple design, capable of manufacture by quantity production methods; and incorporating uniform failure characteristics; such units being capable of being sold at relatively nominal figures.

With these and other objects in mind, reference is had to the attached sheet of drawings illustrating one practical embodiment of the invention and in which:

Fig. 1 is a sectional plan view of the unit;

Fig. 2 is a longitudinal sectional view taken along the lines 2-2 and in the direction of the arrows as indicated in Fig. 1;

Fig. 3 is a bottom plan view; and

Figs. 4, 5, and 6 are transverse sectional views taken respectively along the lines 4-4, 5-5, and 6-6 and in the direction of the arrows as indicated in Fig. 2.

It is well appreciated by those skilled in the art that considerable difficulty has been experienced in connection with resistors. For example, a resistor to operate at 25 ohms and under a one watt load, should fail when a certain allowable current value is exceeded. That value may again, for example, be five watts. In resistors as now on the market, it is quite usual for them to not fail when allowable values are substantially exceeded for relatively prolonged periods of time. Thus, an extremely dangerous condition is created. The present invention overcomes this by a simple structure, incorporated in the resistor unit and by means of which definite failure of the latter—with interruptions to current flow—will occur once permissible values have been exceeded. The unit so failing may be readily located, the condition creating such failure may be corrected and a new unit may be quickly substituted for the one which has failed.

Referring to the detailed showing of the drawings, it will be seen that the numeral 10 indicates a tube of dielectric material which may be formed with a suitable number of positioning grooves 11 in its inner, or bore face. Conveniently two such grooves are provided and these are located at diametrically opposite points. The ends of the tube may be closed in any desired manner,

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such as by the use of cement or other suitable material. However, it is preferred that stoppers 12, of rubber, be utilized. These stoppers should conveniently be tapered and formed with central openings or bores through which the leads or terminals of the resistor may extend.

To furnish a mounting for the resistor element, a strip 13 of mica or other suitable material may be employed. The length of this strip will be such that it may be disposed between the stoppers or other materials closing the ends of the tube. Its maximum width should be sufficient for its side edges to extend within the grooves 11. Thus, body 13 will be anchored against movement with respect to the tube; it being understood that such anchoring is supplemented by the terminals or leads which extend through the end closures associated with the tube.

With a view to properly connecting and mounting a resistor element upon the strip 13, the latter is preferably formed with notch portions 14, 15, and 16 providing areas of reduced width. The resistor element 17 is applied to one face of the mounting strip 13. Its ends conveniently extend in line with its reduced or notched portions. Leads or terminals 21 may be suitably attached to the clips 18 and 20 and extend through the openings in the end closures of the tubes. As will be apparent, the clips or securing units 19 and 20 will serve to anchor the resistor element 17 against movement by bearing against and clamping the ends of that element, in firm contact with the face of mounting strip 13.

Now with the view to incorporating in the resistor a structure such that definite failure will occur if certain current values are exceeded, a length of fusible metal 23 is employed as shown in Figs. 2 and 3. One end of this strip is in contact with and attached to the clip 18 and the opposite end of the same is secured to the clip 19. The connection between these parts may be established in any desired manner as for example, by interposing the ends of the metal strip 23 between the clips 18 and 19 and the face of mounting 13 by soldering, or providing retaining portions in association with the clip. At this time it is to be noted that the strip 23 has a length such that it extends adjacent a substantial portion of the resistor element 17 and may be thereupon be bent upon itself and secured by clip 19.

In order to maintain the metal strip in a position adjacent the resistor element, it is preferably supported by a mounting strip 22. As shown, the latter has a configuration substantially incorporated in the left-hand portion of the mounting

strip 13. Strip 22 is maintained in position conveniently by clip 18 which encloses the adjacent parts in line with the notch 14. As illustrated, strip 22 may extend at an angle with respect to strip 13. Both of the strips being preferably of mica, it follows that radiant heat generated by the element 17 will freely act on the metal strip 23. Thus, if that heat becomes excessive, the latter strip will fail. Of course such failure will also occur incident to the passage of an excessive amount of current through the fusible strip. In any event, with radiant heat primarily acting upon strip 23 and the parts being firmly maintained in predetermined relationship, there is definite assurance of failure in the event of a flow of current occurring in excess of a predetermined amount.

As will be appreciated with a unit of this character, no excessive amount of space will be necessary in that the body of the resistor may have overall dimensions substantially identical with resistors of equal value as heretofore provided. The leads 21 may be attached to electrical connections in the usual manner and the current will flow from one of these leads through the fusible element 23, thence through the body of the resistor element 17 and so to the second lead 21. In the event one or more grooves 11 are not provided, then, the several parts will still be adequately supported. However, it is preferred to employ an anchoring structure such as has herein been suggested. If desired, the leads 21 could pass centrally through the closures 12 whether the latter were formed of rubber, cement or any other desired material. If formed of rubber, then such portions of grooves 11 as remain unobstructed by the closure will provide no detriment. At best, these would be rather minute and the air circulation therethrough would not be objectional.

Thus, among others, the several objects the invention has specifically afore-noted are achieved. Obviously, numerous changes in construction and rearrangement to the parts might be resorted to without departing from the spirit of the invention as defined by the claims.

I claim:

1. A resistor including a tubular body, a mounting strip disposed within said body, a resistor element supported upon said strip, said tube being formed with a longitudinally extending groove within which the edge of said mounting strip extends, a fusible element connected to said resistor element and means for supporting said latter mounting strip within said tube and from said first named mounting strip.

2. A resistor including a mounting strip formed with notches in its side edges, a resistance element supported upon said strip, clip members to be connected to said element and said clip members being disposed within said notches.

3. A resistor including a mounting strip, a resistor element disposed upon said strip, a fusible element connected in series with said resistor element, a second mounting strip, means for supporting both mounting strips and said fusible element being supported by said second mounting strip.

4. A resistor including a mounting strip, a re-

sistor element, a lead supporting clip secured to said strip and coupled to one end of said resistor element, a second clip connected to the opposite end of said resistor element for maintaining the latter against displacement with respect to said strip, a further lead supporting clip connected to said mounting strip at a point spaced from said second clip and a fusible element connected to and extending between said second and further clip.

5. A resistor including a mounting strip, a resistor element, a lead supporting clip secured to said strip and coupled to one end of said resistor element, a second clip connected to the opposite end of said resistor element for maintaining the latter against displacement with respect to said strip, a further lead supporting clip connected to said mounting strip at a point spaced from said second clip, a fusible element extending between said second and further clip and a second mounting strip supported by said further clip and in turn supporting said fusible element.

6. A resistor including a mounting strip, a resistor element, a lead supporting clip secured to said strip and coupled to one end of said resistor element, a second clip connected to the opposite end of said resistor element for maintaining the latter against displacement with respect to said strip, a further lead supporting clip connected to said mounting strip at a point spaced from said second clip, and said strip being formed with notches to accommodate said clips.

7. A resistor including a tubular body, means for supporting a mounting strip within said body, a resistor element disposed upon said mounting strip, a fusible element electrically connected to said resistor element and lying adjacent the same, a second mounting strip for said fusible element and clips applied to said first named mounting strip for maintaining in association with the latter the ends of the resistor element, fusible element and further mounting strip and with the latter disposed adjacent said resistor element.

8. A resistor including in combination a tubular body formed of dielectric material, a mounting strip extending within said tube and terminating short of its ends, a resistance wire supported upon said strip, a fusible element connected to one of the ends of said wire and extending adjacent said strip, closures for the ends of said tube and leads projecting through said closures and connected one to said fusible element and the other to the opposite end of said wire.

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