

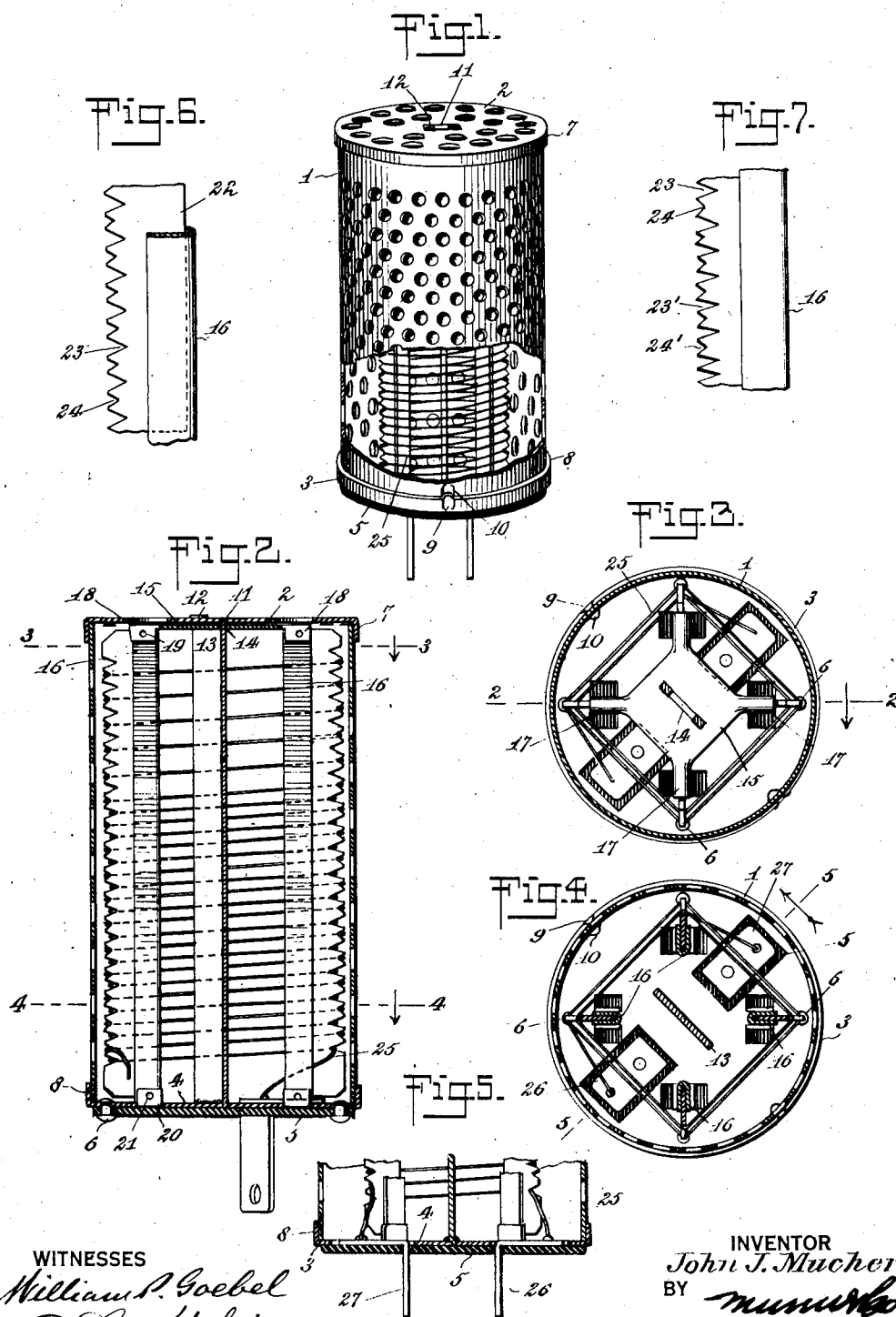
Jan. 5, 1932.

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1,840,168

BALLAST RESISTANCE

Filed April 30, 1929



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## BALLAST RESISTANCE

Application filed April 30, 1929. Serial No. 359,280.

This invention relates to a resistance unit commonly known as a ballast resistance, and has for an object to provide an improved construction particularly adapted for electrical current circuits to coact therewith and maintain a substantially constant voltage.

Another object of the invention is to provide a ballast resistance which is so formed as to be readily plugged into an ordinary socket or receptacle.

A further object, more specifically, is to provide a ballast resistance wherein the windings are mounted on notched insulating material with the notches at different distances from the center so that the windings will be in different planes.

A further object is to provide a ballast resistance wherein suitable resistance wires are used to secure the desired action and stiffening and supporting members provided including a protecting shell, whereby the wires and their immediate supports are held against strain or breakage during usage.

In the accompanying drawings, Figure 1 is a perspective view of a ballast resistance disclosing an embodiment of the invention, certain parts being broken away for better disclosing part of the wiring and mounting therefor;

Figure 2 is a view in vertical cross-section of the ballast resistance;

Figures 3 and 4 are horizontal sectional views taken on lines 3—3 and 4—4, respectively, of Fig. 2;

Figure 5 is a detail sectional view of the base of the device, taken on line 5—5 of Fig. 4;

Figure 6 is a detail view of the edge of the resistance support; and

Figure 7 is a similar view of a modified form.

Referring to the accompanying drawings by numerals, 1 indicates a tubular member forming part of the casing of a resistance, said tubular member being connected with an end cap 2 and with what may be termed a base 3. The tubular member 1 is provided with a number of apertures so as to be substantially porous or foraminous and the same is true of the end cap 2. These two members

are made of sheet metal and are comparatively stiff. The base 3 consists of a metallic end 4 provided with a plate 5 of fibre or other insulating material. The end 4 is preferably riveted to the plate 5 by suitable rivets 6. End 2 is provided with a flange 7 telescoping over the tubular member 1, as shown in Figure 1, and likewise end 4 is provided with a flange 8 telescoping over tubular member 1. Flange 8 is provided with a pressed-in portion 9 fitting into the pressed-in portion 10 of tubular member 1, whereby the parts cannot rotate independently. The end or cap 2 is provided with a slot 11 through which extension 12 projects, said extension being integral with the standard 13. This standard is rigidly secured to the end 4 by being riveted thereto or soldered, as preferred. It will be noted that the extension 12 not only extends through slot 11, but also through slot 14 in the plate 15, whereby the standard 13, plate 15, end 2 and end 4 are rigidly connected together and form a stiff frame for supporting the carrier bars 16 and certain other parts. Plate 15, as shown in Fig. 3, is illustrated as being square, though it could be of some other shape, and at each corner are provided projections 17 which have bent-down portions or ears 18 through which rivets 19 extend, whereby the carrier bars 16 are rigidly held in place. The same general arrangement is provided in respect to the end or plate 4, as this plate is formed with pressed-out turned-up ears 20 adapted to receive the rivets 21 for securing the ends of the carrier bars in position. Each carrier bar, as shown in Fig. 6, is formed substantially U-shaped and is positioned to grip the back portion of the insulating support 22, which support is preferably mica, though some other insulating material may be used, if desired. Mica is very desirable, as it will withstand heat, and in some instances where the fluctuation of the load is great there is produced an appreciable amount of heat. In the accompanying drawings four of the supports 22 are disclosed, but if desired, more or even less could be used and each one formed with a deep notch 23 and a shallow notch 24,

whereby the bottoms of these notches are in different planes. This permits the wire 25 to be wound, for instance, upwardly, as shown in Fig. 2, from the end plate 4 with the wire in the deep notches 23, and at the upper or opposite end the wire is moved over and wound into the shallow notches 24 on the return winding movement. It will thus be noted that one end of the wire is soldered or otherwise connected to the terminal 26 and extends to one of the notches 23, while the opposite end of the wire 25 extends from one of the notches 23 to the terminal 27 to which it is secured by solder or other suitable means. In this way the two layers or windings are spaced apart radially and longitudinally, whereby the heat is properly dissipated and the wires are positively held out of contact so that a highly efficient article is provided. The terminals 26 and 27 may be riveted or otherwise connected to the plate 5 but are maintained always out of contact with the plate 4. By providing the terminals 26 and 27, as shown, they may be plugged into any commercial socket now on the market or may be associated with a special socket, as preferred. This permits of quick application or removal without disturbing any of the parts. By having the outer shell or casing of comparatively stiff sheet metal the parts are not only properly protected, but an ample gripping surface is presented whereby the device may be easily held. The device is intended as a ballast resistance for electrical circuits and is designed to take care of wide variations of voltage, so that the instrument in the set to which it is connected will receive the voltage within the range of the instrument. In many radio receiving sets the vacuum tubes, or at least some of them, are constructed to receive a certain voltage with a leeway of five per cent. above or below. The ballast disclosed in the drawings is adapted to take care of this fluctuation within these limits or any other limits which may be set.

From Figs. 2 and 3 it will be noted particularly that the windings when formed are begun at the bottom end of the device and wound in one series of notches to the opposite end of the device and then the direction of winding is reversed and brought down in the other series of notches, thus forming a non-inductive winding without danger of crossing one turn over the other. By this method of winding both ends of the windings are at the same end of the unit, whereby they may be readily connected to the terminals 26 and 27 without any additional leads.

In addition, instead of having an even winding, as shown in Figs. 2 and 6, special windings may be used, as shown in Fig. 7, in order to get a special heating effect. By having a number of lower turns close together

more even heating for all turns is had, because normally lower windings accumulate less heat than the ones above. This is due to the fact that the heat developed by the lower turns rises and is added to the heat of the upper turns. Therefore, when all turns are equally spaced, as shown in Figs. 2 and 6, the lower windings operate at a much lower temperature than the upper windings. By winding several of the lower turns closer together, as shown in Fig. 7, more heat is accumulated here and the temperature rise throughout the unit is more uniform. As indicated in Fig. 7, the various notches 23' and 24' are closer together than the notches 23 and 24 at a point higher up. It is to be understood that preferably the instrument is mounted for use with the end 2 uppermost, but of course, it could be mounted in some other position without departing from the spirit of the invention.

The arrangement above described showing how the heating effect can be changed is desirable in many cases, but if preferred, this can be varied by spacing the wire differently, as for instance, the lower part of the unit may be provided with wire in the top and bottom notches, while the upper part of the unit may have wires only in the top notches. In this way the heating effect would be changed without changing the distance of the notches. By thus making a different combination of windings different desirable heating effects may be secured. The device is especially adapted for use on radios but may be used to balance any electrical circuit where steady voltages are essential. Also, the non-inductive winding is very desirable, but under some circumstances it could be wound with an inductive winding but with a desired resistance.

What I claim is:—

1. A resistance, comprising a foraminous metal casing, means acting as a tree mounted in the casing, said means including a plurality of notched heat-resisting insulating members formed with half of the notches in one plane and the other half in a second plane, a pair of terminals, and a winding of resistance wire carried by said tree in said notches and connected with said terminals.

2. A resistance, including a foraminous metallic casing, a frame mounted in said casing and connected thereto, said frame having a plurality of holding bars, mica plates carried by each of said holding bars each of said plates being formed with two series of notches, one series being positioned radially further from the center than the other, a single wire wound around said plates with the loops positioned in said notches, whereby the respective windings are in different planes, and means connected with the respective ends of said wire, said means acting as terminals.

3. A resistance, including a casing, a frame in the casing provided with a central post or standard, a plurality of holding bars, a plate at one end of said standard connected  
5 to the standard and to one end of the respective holding bars, means at the opposite end of the holding bars for connecting the holding bars to the casing, notched mica strips mounted in each of said holding bars half  
10 the notches being in one plane and half in a second plane, and a single wire wound in one direction over said strips from one end to the other and then back to the starting point so as to produce a non-inductive resistance element, said winding being placed in  
15 the notches of said strips, the winding in one direction being in one set of said notches and the winding in the opposite direction being in the other set of said notches and  
20 means connected to the ends of said wires acting as terminals.

4. A resistance including a frame having a plurality of holding bars, insulating plates carried by each of said holding bars, each  
25 of said plates being formed with two series of notches, one series being positioned radially further from the center than the other, a single wire wound around said plates with the loops positioned in said notches where-  
30 by the resistance windings are in different planes, and means connected with the respective ends of said wire, said means acting as terminals.

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