

March 31, 1936.

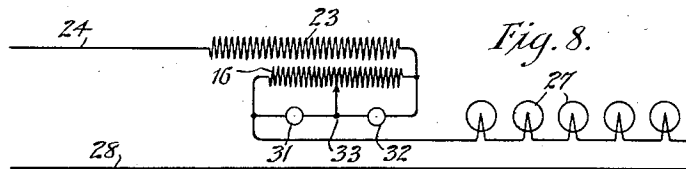
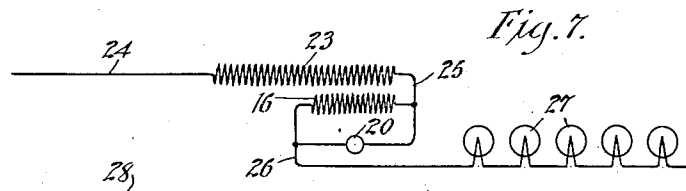
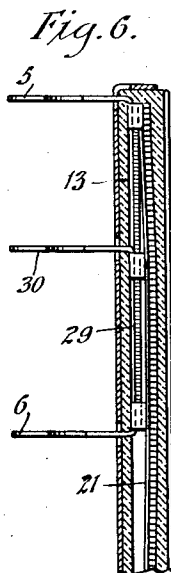
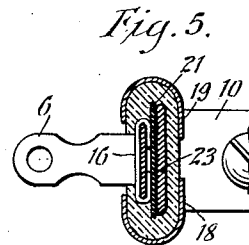
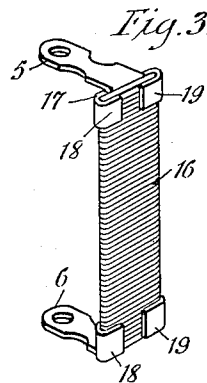
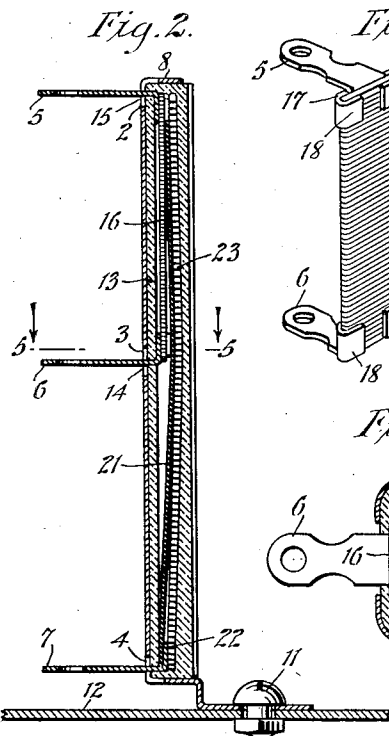
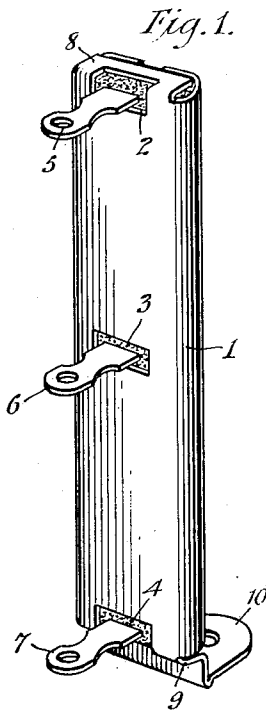
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2,036,071

RESISTANCE UNIT

Filed Oct. 4, 1934

2 Sheets-Sheet 1



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RESISTANCE UNIT

Filed Oct. 4, 1934

2 Sheets-Sheet 2

Fig. 9.

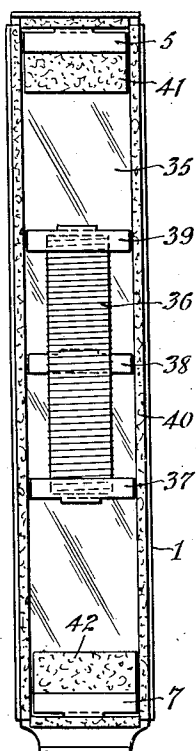


Fig. 10.

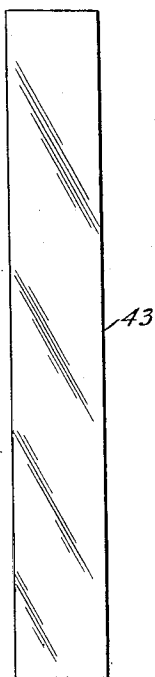


Fig. 11.

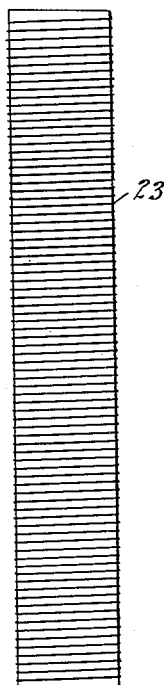


Fig. 12.

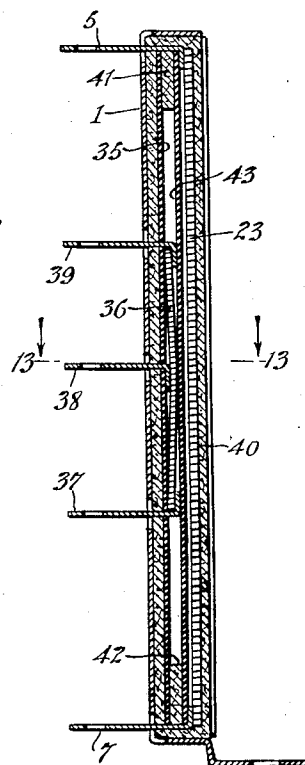


Fig. 13.

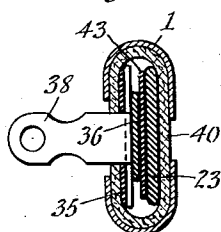
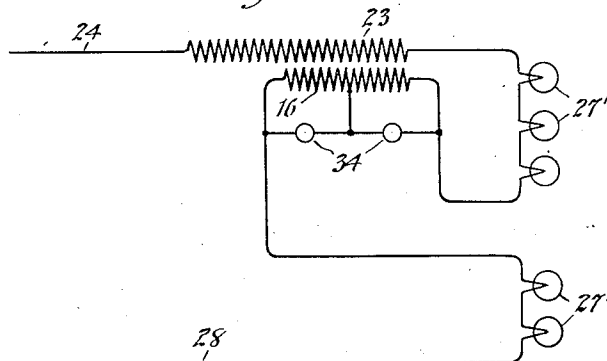


Fig. 14.



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2,036,071

RESISTANCE UNIT

John J. Mucher, Brooklyn, N. Y.

Application October 4, 1934, Serial No. 746,914

2 Claims. (Cl. 201-63)

This invention relates to resistance units, and has for an object to provide an improved construction which is an improvement over Patents No. 1,976,624, issued October 9, 1934, and No. 1,982,475, issued November 27, 1934, and also over my prior application for patent, Serial No. 739,316.

A further object of the present invention is to provide a resistance unit particularly adapted to be used in connection with a pilot light in a radio set, the structure being such that a certain part of the unit varies its resistance as it heats up.

Another object of the invention is to provide a resistance unit wherein there is provided a single metal casing with proper insulation, and a standard resistance unit associated with a temperature coefficient resistance unit, the association being such that the heat from the standard resistance will quickly heat the temperature coefficient resistance.

In the accompanying drawings—

Figure 1 is a perspective view disclosing an embodiment of the invention, the same being shown in the position in which the unit is usually used.

Figure 2 is a vertical sectional view through Figure 1, the same being illustrated as being secured to part of the chassis of a radio or other support;

Figure 3 is a perspective view of the temperature coefficient resistance shown in Figure 2;

Figure 4 is a plan view of the standard resistance shown in Figure 2;

Figure 5 is a transverse sectional view through Figure 2 approximately on the line 5-5;

Figure 6 is a view similar to the upper part of Figure 2, but showing a modified structure of temperature coefficient resistance wherein there are provided three terminals instead of two;

Figure 7 is a diagram showing how the resistance unit shown in Figure 1 is inserted into the circuit of the radio;

Figure 8 is a view similar to Figure 7 showing an additional tap or terminal to take care of two pilot lamps;

Figure 9 is a bottom plan view of a slightly modified resistance unit before the parts have been completely assembled, the same illustrating the position of the temperature coefficient resistance;

Figure 10 is a plan view of a strip of insulation adapted to be placed on top of the resistance shown in Fig. 9;

Figure 11 is a plan view of a standard resistance

element adapted to be placed on top of the insulation shown in Figure 10 when assembled;

Figure 12 is a longitudinal vertical sectional view through the completed device, illustrating all parts in proper position;

Figure 13 is a transverse sectional view through Figure 12 on the line 13-13;

Figure 14 shows a filament circuit in which a pilot resistance or temperature coefficient resistance is used, with a voltage dropping resistor, but with the parts positioned with no common connection.

The resistance unit embodying the invention and as shown in Figs. 1 and 2 may be used in a number of situations and places, but is particularly adapted for use in connection with transformerless radio receivers having pilot lights. Heretofore various means have been provided whereby a pilot light may be presented either to indicate that the current is on or to provide proper illumination. In the present invention a unit has been provided which provides a proper drop in voltage for the various radio tubes of the radio set, in which proper care is taken of the pilot light to cause the same to light up quickly and be functioning fully by the time the radio set functions, so that a person may readily tune the instrument. In utilizing the unit, which will be hereinafter fully described, the same may be arranged in various ways in the circuit of the radio receiving set as, for instance, by the arrangement shown in Figs. 7, 8 and 14. In all these arrangements the pilot light is protected and supplied at first with a comparatively low voltage which rapidly increases to maximum, so that the full illumination of the pilot lamp may be quickly secured.

Referring particularly to Figs. 1 to 4, inclusive, it will be observed that there is provided a metal casing 1 for each unit, said casing being made preferably of one piece of metal and formed in any desired shape. In forming the casing 1 openings 2, 3 and 4 are provided for the various terminals 5, 6 and 7 at the upper end of the unit. Arranged as shown in Fig. 1 there is provided a turned over flange 8 to close the end part of casing 1, and at the opposite end there is a turned over portion 9 which is bent to present a supporting bracket 10, said bracket having an aperture whereby a bolt or other securing member 11 may secure the same to a desired support 12, which may be the chassis of a radio receiving set. Arranged within casing 1 is a lining 13 of asbestos or other insulating material which is clamped firmly in place as shown in Fig. 5. This insulating lining is pro-

vided with apertures 14 and 15 through which the terminals 5 and 6 extend, said terminals also extending through the openings 2 and 3. The insulating material holds the terminals centrally of the openings 2 and 3 and out of contact with the casing 1. The terminals 5 and 6 are connected with the temperature coefficient resistance 16, as shown in Fig. 3, the inner end of the terminals being each provided with a base 17 and turned over flanges 18 and 19 which grip the resistance 16 and press against the wires thereof so as to provide a mechanical construction which is desirable, and also a good electrical connection. This resistance may be made out of suitable temperature coefficient wire as, for instance, pure nickel or iron, and when cold presents a certain resistance, but as it becomes heated the resistance increases, thus permitting more of the available current to flow through the pilot lamp which increases its illumination. This action is very desirable as it takes care of the pilot light 20 when the parts are arranged as shown in Fig. 7.

As illustrated in Fig. 2 the entire structure shown in Fig. 3 is placed in position with the terminals 5 and 6 extending through the insulation and the terminal bases pressing tightly against the insulation. A narrow strip 21 of suitable insulating material as, for instance, mica, is then mounted in position so that one end will abut against the edges of the flanges 18 and 19 but will not cover these flanges. This strip of mica extends over the flanges 18 and 19 of terminal 6 and completely covers the same. The end opposite that of the adjacent terminal 5 is placed below the base 22 of terminal 7, said base merely being a right angled flange extending from the inner end of terminal 7. By placing the insulating strip 21 in this manner terminals 5 and 7 have their bases exposed, so that when the standard resistance 23 is placed in position as shown in Fig. 2, a number of turns of the wire of resistance 23 will press against the flanges 18 and 19, and at the opposite end a number of turns of the wire will press against the base 22. After the resistance member 23 has been placed in position, the asbestos covering is then folded over and the metal casing 1 pressed tightly into the position shown in Fig. 5, whereby all the parts will be clamped together and held together, the action of the asbestos and the metal casing presenting a slightly clamping action at all times so that there will always be a good contact between the various parts. In addition the resistance member 23 is placed very close to the resistance 16, and the use of mica is desirable as it permits the heat to be quickly passed from resistance member 23 to resistance 16 to heat resistance 16 quickly and, in fact, almost simultaneously with the heating of resistance member 23. When current is turned on it will pass from wire 24 (Fig. 7) to resistance member 23, and then to wire 25. From wire 25 some of the current will pass through resistance 16 to wire 26, and the remaining part of the current will pass from wire 25 to the pilot light 20. If the pilot light 20 is a 6-volt lamp when the current is first turned on, less than six volts will be applied across the lamp and a greater percentage will pass through resistance 16, but as resistance 16 is heated by the heat from resistance member 23, more and more current will pass to pilot lamp 20 until this lamp has secured its full voltage. The current passing in the circuit just mentioned will then pass through the various radio tubes 27 of the radio receiving set and out through the return wire 28. For instance, as an

example, if the radio tubes 27 each take six volts, it will require thirty volts to take care of all these radio tubes, and consequently, if the supply of current passing along wire 24 is 110 volts the resistors must take care of the difference between thirty and one hundred and ten volts as far as the radio tubes 27 are concerned. The parts are so proportioned that the drop in voltage gives the desired voltage to the pilot light 20 and at the same time the desired voltage to the radio tubes 27. If the pilot light 20 should at any time burn out the radio tubes 27 will still be supplied with current passing through resistance 16.

Instead of having a resistance as shown in Fig. 3, the same idea may be used but a third terminal provided. As shown in Fig. 6 there is provided a temperature coefficient resistance 29 which has terminals 5 and 6 in a similar manner to that shown in Fig. 3 and, in addition, an intermediate terminal 30 which is of the same structure as the other terminals but presenting an extra tap. Aside from the terminal 30 the construction is identical to that shown in Figs. 2 and 3, and therefore will need no additional description. However, the structure shown in Fig. 6 permits two pilot lights to be used, as shown in Fig. 8, namely, the pilot lamps 31 and 32. The terminal 30 presents a central take-off or tap 33 whereby these pilot lamps may function properly, and at the same time provide a desired amount of current to the various radio tubes or the radio receiving set.

Under some circumstances the resistance unit shown in Figs. 1 and 2 may be used in the circuit illustrated in Fig. 8, wherein the resistance members 23 and 16 are connected in a slightly different manner as far as the circuit of the radio is concerned, but are juxtapositioned so that the resistance 16 will receive heat from resistance 23, and also so that pilot lamps 31 and 32 will be properly protected. It will be noted that the unit shown in Fig. 1 is adapted to accomplish desirable results as illustrated in Figs. 7 and 8, and to produce a necessary amount of resistance when maximum heat is generated in the voltage dropping resistors. It will also be noted that the entire assemblage, except the end of the terminals, is embedded in the asbestos insulation and tightly enclosed in the metal casing. The heat generated inside this casing is practically instantaneous, which makes the temperature coefficient resistance 16 respond simultaneously and the device to become operative within a very few seconds from the time current is turned on. This condition results in efficient operation and a safeguarding of the pilot lamp to cause it to produce maximum illumination at the time the radio receiving set begins to function.

In Figs. 9 to 13, inclusive, a slightly modified construction is shown which is utilized when the circuit shown in Fig. 14 is used. As shown in these figures, there is provided an insulating strip 35 which may be mica, asbestos, or some other desired insulating material, and on top of this strip is positioned a resistance unit 36 which is a temperature coefficient resistance unit similar to Fig. 3, except for the arrangement of the terminals 37, 38 and 39. These terminals are each provided with turned over edges on one end to form laterally extending flanges which act as bases for the terminals. The base of terminal 38 fits flatwise against resistance 36 on one side, while the bases of terminals 37 and 39 fit flatwise against the opposite face, though they could all fit against the same face without departing

from the spirit of the invention. In this form of invention the casing 1 is provided with a suitable number of apertures for receiving all of the terminals. It will be evident, however, that instead of having a number of apertures there could be provided a continuous opening from substantially one end of the device to the other, so that the terminals could project therethrough without contacting therewith.

As illustrated in Figs. 5 and 13 the casing 1 is provided with an opening 40 extending for the full length of the device and, if desired, the casing could be turned over so that its opening would accommodate the various terminals. When this is done the various openings for the terminals could be eliminated, as shown in Figs. 2 and 12. However, the construction as shown in Fig. 12 is very desirable as it presents a strong efficient construction that will not get out of order with long usage. On top of or on one face of the insulation 35 are arranged spacing blocks 41 and 42 which may be of any suitable insulation as, for instance, asbestos, and on top of these blocks is a strip 43 of insulation which may be mica, asbestos, or some other insulating material. The strip 43 contacts with the blocks just mentioned and also presses against the resistance 36 and the bases of terminals 37 and 39. The end terminals 5 and 7 in this form of the invention have their bases overlapping the insulating strip 43 and pressing against these terminals is the standard resistance 23. It will be understood that the standard resistance 23 and also the resistance 16 consist of suitable wire wound on a suitable insulating member which will resist heat as, for instance, mica or asbestos. It will also be noted from an examination of Fig. 2 that the standard resistance 23 is in electrical engagement with the terminals 5 and 7 but is not anywhere in contact with the resistance 36, but the heat from the standard resistance quickly heats up resistance 36 and causes the same to function in the desired manner.

The resistance unit may have devices connected to the terminals 5 and 7 without in any way being connected to the resistance 36, and in turn the resistance 36 could be connected to one or two members without being in the circuit of the element 23. However, in certain types of radio sets the wiring is arranged as shown in Fig. 14. From this it will be observed that two lamps 34 are tapped off from the various terminals 37, 38 and 39, and that the tubes 27 are arranged in a slightly different manner from that shown in Fig. 7, the same receiving current which has passed through resistance 23. While the arrangement shown in Fig. 14 is desirable in many circumstances it will be evident that the resistance unit shown in Fig. 12 could be connected to other circuits without departing from the spirit of the invention and the heating of the temperature coefficient resistance 36 would take place as above described. It will, therefore, be seen that if desired it is not necessary for the current passing through the resistance to also pass through

resistance 36, but as shown in Fig. 12, the resistance 23 may act, as far as resistance 36 is concerned, merely as a heater.

As the complete resistance units illustrated in Figs. 1 and 9 are simple and strong in construction, they readily lend themselves to adoption in the manufacture of radio receiving sets and other devices; the cost of production is comparatively low, and in most instances not more than a single voltage dropping resistor ordinarily employed in transformerless receivers now in use.

I claim:

1. A resistance unit including a secondary resistance, a primary terminal arranged at one end of said secondary resistance, an auxiliary terminal connected with said secondary resistance at the other end, a third terminal spaced from said secondary resistance, a strip of insulating material extending from a point in front of said third terminal past said auxiliary terminal in back thereof and to a point near said primary terminal, a primary resistance of a length to have one end portion fitted against said primary terminal and the opposite end portion against said third terminal, an insulating member surrounding both of said resistances, and a metal casing substantially surrounding said insulating member for clamping all the parts together whereby there will be a good electrical contact between the respective terminals and the resistances, and the primary resistance held so that heat generated thereby will heat the secondary resistance.

2. A resistance unit, comprising a flat primary resistance element appreciably longer than it is wide, a sheet of insulating material of substantially the same width as said primary resistance unit arranged on top of said element and extending from one end to near the other end, a flat secondary resistance element of substantially the same width as said primary resistance element but of less length, arranged on top of said sheet of insulating material so that one end thereof will extend over said other end of said primary resistance element, a pair of terminals permanently secured to said flat secondary resistance element at the ends thereof, said terminals having portions extending beneath said flat secondary resistance element with one of said portions contacting with said other end of said primary resistance element, a single terminal for said primary resistance element positioned at the end thereof opposite said other end, said last-mentioned terminal having a base extending beneath said sheet of insulating material and into contact with said primary resistance element, an insulating enclosure for both of said resistance elements and the bases of all of said terminals, and a metal casing enclosing said insulating enclosure, said metal casing acting to protect said resistance elements and also to press the same toward each other whereby the primary resistance element will continuously and firmly engage one of the terminals on said flat secondary resistance element.

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