May 1, 1934. E. J. WIGGINS 1,957,188

RESISTANCE UNIT

Filed Jan. 13, 1932

Fig. 1

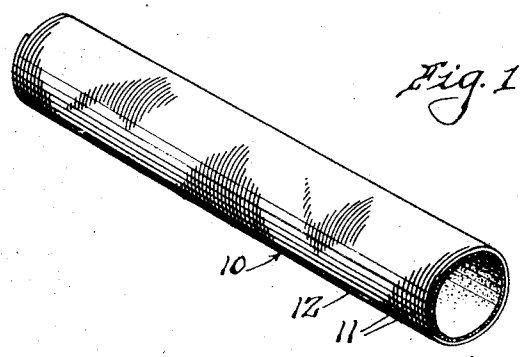


Fig. 2

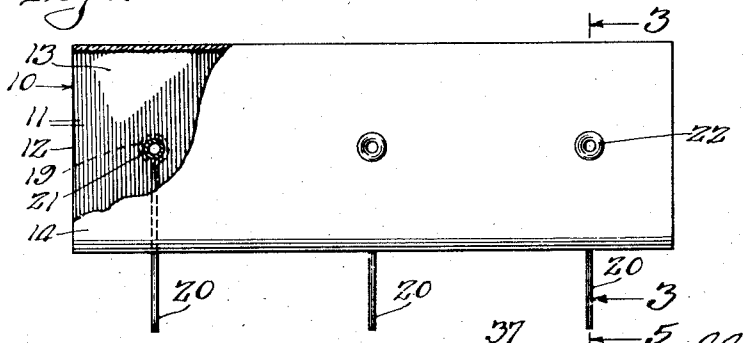
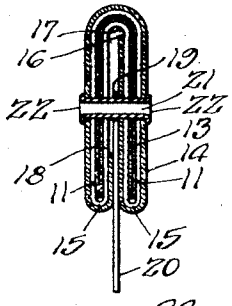


Fig. 3



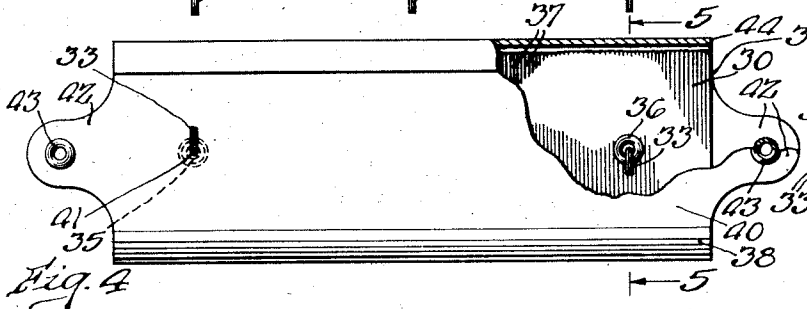


Fig. 4

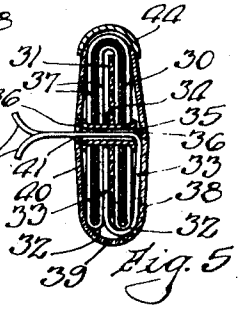


Fig. 5

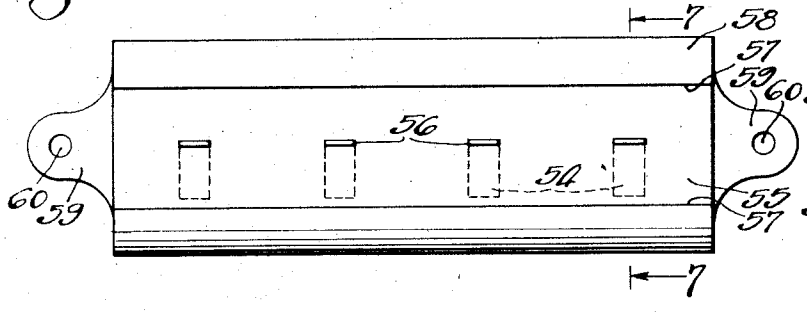


Fig. 6

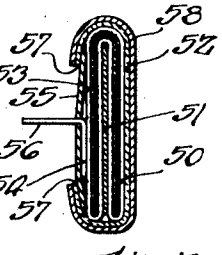


Fig. 7

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Patented May 1, 1934 1,957,188

UNITED STATES PATENT OFFICE

1,957,188

RESISTANCE UNIT

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Application January 13, 1932, Serial No. 586,326

1 Claim. (Cl. 201—67)

This invention has to do with a resistance unit and more particularly with a method of collapsing and folding a unit during the process of its manufacture.

It is one object of the present invention to provide a resistance unit requiring a minimum amount of space per unit of resistance.

A second object of the present invention is to provide a solenoidal resistance unit approaching an undulating form, thereby obtaining the least self induction for a given resistance.

Another object of the present invention is to provide a resistance unit with a novel and expedient means of assembly to insure permanent shape cojointly with the attachment of the terminal leads thereto.

A further object of the present invention is to provide a resistance unit with a removable multiple terminal plate.

Another object of the present invention is to provide a resistor embodying the above described objects and characteristics which may be produced at small cost.

These objects and other desirable objects disclosed in the disclosure to follow reside in the novel arrangement, unique construction, and improved combination of the embodied elements and as particularly set forth in the appended claim.

In the accompanying drawing comprising a part of this specification:

Figure 1 is a perspective view of a resistor unit in a preliminary state of manufacture;

Figure 2 is a fragmentary side view of one form of the invention;

Figure 3 is an orthographic sectional view taken at line 3—3 of Figure 2;

Figure 4 is a fragmentary longitudinal side view of a different embodiment of the invention;

Figure 5 is a view in cross section taken as indicated on the line 5—5 of Figure 4;

Figure 6 is an orthographic projection of a third form of the invention;

Figure 7 is a cross sectional view of the invention taken on the line 7—7 of Figure 6.

Like reference characters are used to designate similar parts in the drawing and in the description of the invention which follows.

A cylindrical tube 10, illustrated in Figure 1, is formed of a very thin material, preferably dielectric. It is open at either end, and serves as a nucleus for the resistance part of the device. The tube 10 is placed on a revolving mandrel where the exterior receives a coat of shellac or other dielectric adhesive liquid and a length of resistance wire 11 is progressively wound about the tube to form a solenoid 12. Several wires of different resistance may be drawn thereabout when desired, instead of a single wire, the different wires covering different sections of the cylinder. The shellac maintains the individual turns of wire in the solenoid in the original spaced relationship so that no turns will be short circuited by others.

When the shellac has hardened sufficiently, the tube 10 and solenoid 12 are pressed into a flat strip and folded one hundred eighty degrees along the longitudinal center line to bring the two former opposed edges in juxtaposition. A quantity of glue may be introduced to the inner walls of the tube 10 to facilitate the retention of this position. However, the walls are made thin partly to overcome repercussion. The folded member thus formed is cut into lengths having a desired resistance from one end to the other and which resistance is in direct proportion to the length where a single resistance wire is wound over the cylinder. These lengths will hereafter be referred to as resistance elements as distinguished from the finished device designated either a resistance unit or a resistor.

The form of the invention illustrated in Figures 2 and 3 utilizes the resistance element 13 in combination with a sheet of fish paper or other tough insulating material 14, slightly greater in length but not of a width to circumscribed the element. The resistance element 13 has its two edges 15 spread while one edge 16 of the insulating paper 14 is inserted therebetween to lie adjacent the back fold 17. The insulating paper 14 is then articulated to conform to the exposed surface of element 13 to envelop said element and with the end 18 deposited within edges 15.

Loops 19 of a plurality of terminal leads 20 are projected into the open side of the element 13 to lie halfway the front and back edges thereof, and these are fixed in position by reception of a rivet 21 transgressing all thicknesses of the resistance unit. Rivets 21 are driven through the material removing the sections in their path. The flanges 22 of the rivets 21 are employed to draw and to hold the unit tightly together. Thus loop 19 of conductor 20 is pressed into electrical communication with the contiguous turns of element 13.

A second form of the invention is shown in Figures 4 and 5. As shown in Figure 5, a resistance element 30, similar to that before described, accommodates a single strip 31 of insulating material between folds 32. Terminal leads 33 having loops 34 at one end, and positioned interme-

diate folds 32, have a rivet 35 passed through the loop to press by means of flanges 36 the resistance wire 37 into contact with the loop and rivet. The free end of terminals 33 is carried directly to the open edge of the element 30 where it is bent sharply under the element to return and project upwardly through the axial aperture in rivet 35. At this time a fiber board casing 38 is telescoped over the element to envelop the open side thereof adjacent the gutter 39. The upper side 40 of casing 38 contains small apertures 41 to register with terminals 33 which are carried therethrough. Ears 42 at either side of either end of the casing 38 are congruent and receive eyelets 43.

Eyelets 43 coact with gutter strip 44, which is shrunk over the free ends of casing 38 to secure the casing in selected assembly. The device may be conveniently supported in a radio set or the like by insertion through eyelets 43 of a suitable fastening means.

Figures 6 and 7 conjointly illustrate a third form of the device. A folded solenoid 50, similar to that previously described, is spread slightly apart by an insulating strip 51, and the whole enclosed in a close fitting jacket 52 made of an insulating material. With a lower face riding on a confined section of turns 53 of solenoid 50, are angular lugs 54. The selected position of lugs 54 is obtained by inserting one end thereof through a layer 55 of varnished cambric or the like which permits the upright section 56 to project therethrough, said layer having its two edges locked under the edges of jacket 52.

A sheet metal can 58 having ears 59 provided with apertures 60 is compressed into position above the assembly described to firmly retain the unit in a desired compact assembled condition. Connection is readily had to electric circuits by soldering suitable leads to lugs 54. The can 58, by way of ears 59, provides means for ready attachment as well as protection for the unit.

The embodiments of the invention disclosed are especially advantageous for radio hook-ups in that the resistance element is made flat in finished form to thereby reduce the inherent self induction which is a huge factor at the frequencies employed in radio transmission. Advantage is taken, however, of the simplicity of employing a cylinder for winding the unit. Incidentally, flat resistance elements in the combinations illustrated in this specification provide sturdy devices with expedient and inexpensive manufacturing problems.

The several taps or terminals provided in the units make them adaptable for use either as straight resistances or potentiometers. A unit may have taps positioned along a resistor at equal intervals and have unequal values of resistance therebetween by winding different lengths or different size wire over those sections, as previously described.

I claim:

A resistor unit comprising a helical coil deformed into a flat strip having opposed sides, an angle clip having a flat section disposed against and in electrical contact with a relatively narrow section of one side of said coil and another section projecting outwardly and away from said coil, a strip of insulating material covering the side of the coil engaged by said angle clip said strip having an aperture therethrough for the projecting section of said clip, a sheet of insulating material covering the opposite side of said coil and having margins extending over said strip, and a blank of sheet metal folded about the insulating sheet of said unit to form a jacket therefor, opposite edges of the metal blank being in parallel spaced apart relation upon the first mentioned side of said unit to effect a longitudinal opening exposing a section of said insulating strip and the projecting section of said clip.

EDWARD J. WIGGINS.