

March 13, 1934.

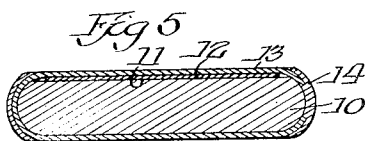
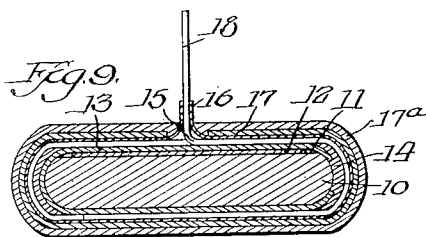
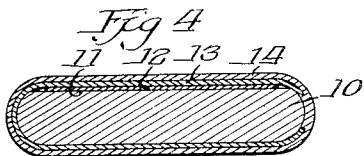
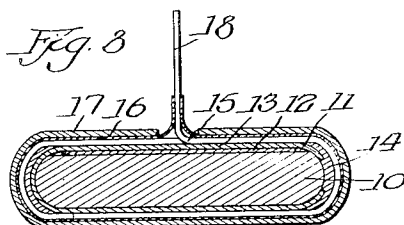
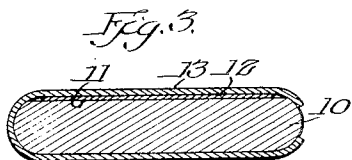
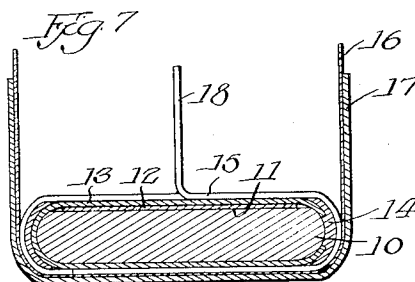
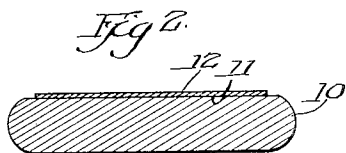
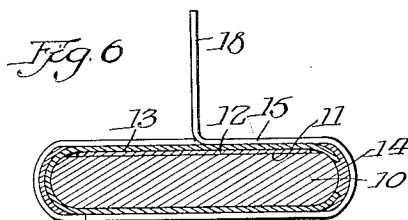
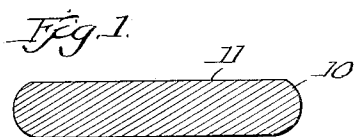
J. L. McWEENY

1,950,507

METHOD OF MAKING NONINDUCTIVE RESISTORS

Filed April 13, 1931

2 Sheets-Sheet 1



Witness:
R. B. Davison.

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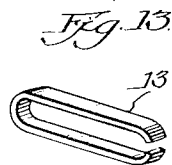
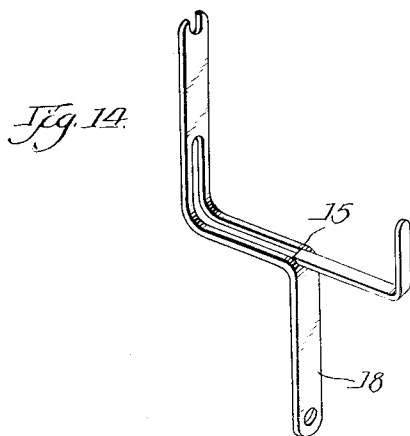
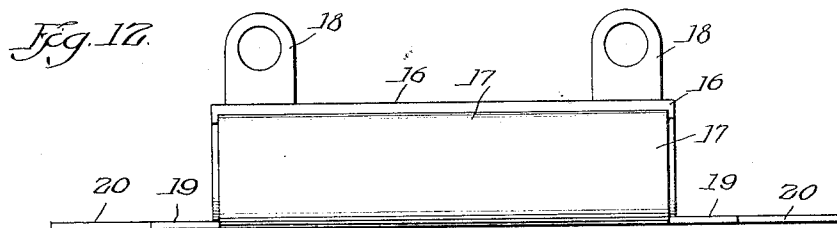
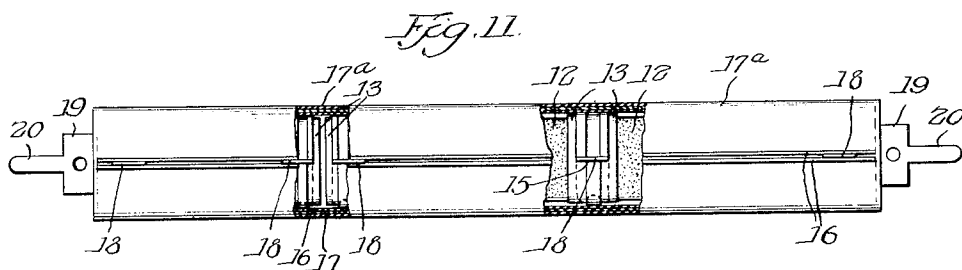
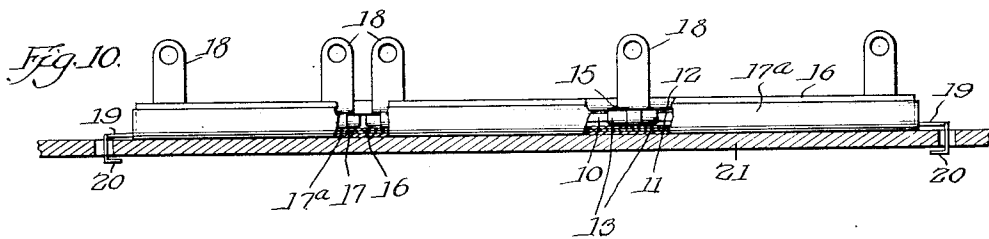
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METHOD OF MAKING NONINDUCTIVE RESISTORS

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2 Sheets-Sheet 2



Witness:
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UNITED STATES PATENT OFFICE

1,950,507

METHOD OF MAKING NONINDUCTIVE RESISTORS

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mesne assignments, to The Muter Company,
Chicago, Ill., a corporation of Illinois

Application April 13, 1931, Serial No. 529,573

2 Claims. (Cl. 201—63)

My invention relates to resistance units and more particularly to non-inductive resistance units of a relatively small size adapted for use in radios and other electrical devices.

5 Considerable difficulty has been experienced in the trade in producing a small sized resistor of the non-inductive type in a simple and economical manner, due to the number of physical difficulties arising out of the use of the non-inductive resistance material, commonly called "carbon".

10 It is an object of my invention to produce a resistor of the type described in a number of step by step operations concluding with the insertion of the formed resistor within a fibre jacket and metal can and then closing the can. The purpose of the can is to insure greater efficiency in heat radiation than is possible by the mere exposure of the uncovered unit to the

20 air. One of the greatest difficulties arising out of attempts to manufacture non-inductive resistors is the tendency of the carbon material to absorb moisture from the air in the process of formation of the unit. Thus the resistance of a unit of given specifications will be found to vary considerably in ohmage in any number of resistors, and this inaccuracy results in the formation of units which must be tested and

25 retested to insure the accuracy thereof, thus overbalancing any previous economies that may have been practiced in the formation of the unit. My invention comprises the steps of selecting a flat strip of non-inductive material adapted for use as a base, placing the strip under a grinding wheel to provide an absolutely true plane surface, on which is placed a given amount of the resistance material, the amount of resistance material applied to the base being otherwise determined definitely by a manner not

30 herein to be disclosed. However, the amount of resistance between any two points on the plane surface can be absolutely determined by this means, and such value will remain the same for each of any number of resistors so formed. After the resistance material has hardened, a spring clip is placed thereover at suitably predetermined intervals after which the solder terminal or terminal clip is placed thereover. It is conceived that the solder terminal or terminal clip can be applied directly to the treated base without the use of the spring clip, but experience has shown that in the operation of

danger of removing a portion of the carbon lying thereunder and adjacent thereto, which would cause inaccuracy in the value of the resistor.

My invention will be more readily understood by reference to the accompany drawings, in which:

Fig. 1 is a sectional view of a strip of non-inductive material used as a base, having one face thereof formed to provide a true plane surface.

Fig. 2 is a similar view showing the application of the non-inductive material over said plane face.

Fig. 3 shows the next step comprising the application of the spring clip.

Fig. 4 shows the next step being the device of Fig. 3 after the spraying thereof with a moisture resisting fluid.

Fig. 5 shows the next step comprising the removal of the moisture resisting fluid from the faces of the spring clip.

Fig. 6 shows the application of the solder or terminal clip to the device.

Fig. 7 is a sectional view showing the insertion of the device of Fig. 6 within a fibre jacket and metal can.

Fig. 8 shows the can closed.

Fig. 9 shows the final operation of applying a coat of moisture resisting fluid to the entire device.

Fig. 10 is an elevation partly broken away showing a resistor formed of several adjacent units formed in the manner previously illustrated.

Fig. 11 is a top plan view thereof.

Fig. 12 is a side elevation of a single unit

Fig. 13 is a perspective view of the spring clip, and

Fig. 14 is a perspective view of the terminal clip utilized herein.

By reference to the drawings it will be seen that the various steps in the formation of the non-inductive resistor herein disclosed comprise the formation of a plane surface on the non-inductive base member 10 by grinding or otherwise. Thereafter the base 10 having the plane surface 11 is treated with a pre-determined amount of non-inductive resistance material 12 by means and apparatus not shown. Thereafter the treated base shown in Fig. 2 is subjected to a baking operation in an oven not shown, to remove the moisture from the carbon material and harden the same. Immediately after the removal of the baked base from the oven, the

spring clips 13 are applied over the base at predetermined spaced intervals by the use of a template or in any other suitable manner. Thereafter while the treated base is still warm and the moisture is substantially excluded the device is subjected to a spray or bath of moisture resisting fluid 14 shown in Fig. 4.

After the treated base has been thoroughly dried and the fluid 14 hardened, the device is placed under a plurality of brushes which remove the material 14 which rests upon the faces of the spring clips 13, as shown in Fig. 5. Thereafter the terminal or solder clips 15 are applied to the spring clips 13 as shown in Fig. 6. Thereafter the device formed as shown in Fig. 6, is inserted within a fibre jacket 16 and the metal can 17, and the can is then closed, as shown in Fig. 8. Thereafter, the completed device is again inserted into a bath of moisture resisting fluid which substantially closes the device at the top where the fibre 16 contacts the upstanding portion 18 of the terminal clip, as well as the open-end portions.

In the formation of the units heretofore described in detail, I may prefer to provide merely a single length of resistance in one unit as shown in Fig. 12, or a plurality of units within a single enclosing can. As shown in Fig. 10 I have formed a combination resistor including two or more independent sections of resistance formed as heretofore described, each section having a different value of resistance for use in different circuits. It is thus possible to provide a plurality of resistors of different values in a single unit and by means of taps at different intervals therein applied in the manner herein disclosed, a large number of resistances may be had.

As shown in Fig. 10, the metal can 17 which serves not only as an enclosing medium but also as a means of radiating the heat generated within the device, is provided with a projection 19 having fingers 20 formed thereon which may be inserted in spaced apertures on a base or chassis 21, and then bent over as shown in Fig. 10. This eliminates the use of screws or rivets in attaching the resistor to the chassis.

Obviously my invention is capable of some modification, and one or more of the steps herein disclosed, eliminated, and I do not wish to be limited except as indicated in the appended claims.

I claim:

1. The method of making a unit of non-inductive resistors and which comprises the steps of providing several straight flat strips of non-conducting material, grinding one face of each strip to provide a true plane surface, applying a quantity of resistance material to each plane surface so obtained, removing moisture from said resistance material, applying contact clips to the ends of each of the treated strips and to the resistance material thereon, covering each flat strip, the resistance material thereon and said clips applied thereto with a film of moisture resisting substance, removing said film from a section of the contact clips, disposing terminal clips in electrical contact with the exposed section of said contact clips, placing a selected number of said strips in end to end relationship in an insulatory jacket comprising a thin sheet of material with the terminal clips extending therefrom and with the opposed contact clips of the respective bases in electrical connection with one another, folding a highly conductive metallic strip about said jacket and the parts enclosed thereby to protect said parts and to hold said parts in selected assembly, dipping the thus enclosed unit into a moisture excluding substance, and then drying said unit.

2. The method of making a unit of a non-inductive resistor which comprises the steps of treating flat strips of non-conductive material with a quantity of resistance material, removing moisture from such resistance material and strips, applying members to the strips to electrically contact such resistance material, covering said resistor strips and the contact members applied thereto with a film of moisture resisting substance, removing said film from a section of the contact members, disposing terminal clips in electrical contact with the exposed section of said contact members, placing a selected number of said strips in end to end relationship in an insulatory jacket comprising a thin sheet of material with the terminal clips extending therefrom and with the opposed contact members of the respective strips in electrical connection with one another, folding a highly conductive metallic strip about said jacket and the parts enclosed thereby to protect said parts and to hold said parts in selected assembly, and treating the thus enclosed unit to exclude moisture.

JOHN L. McWEENY.