July 7, 1942. J. J. O'CONNELL 2,288,735

METHOD OF MAKING ELECTRO-STATIC SHIELDS

Filed Nov. 8, 1939

Fig. 1.

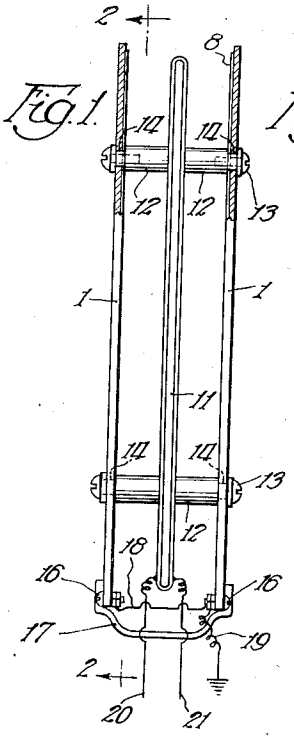



Fig. 2.

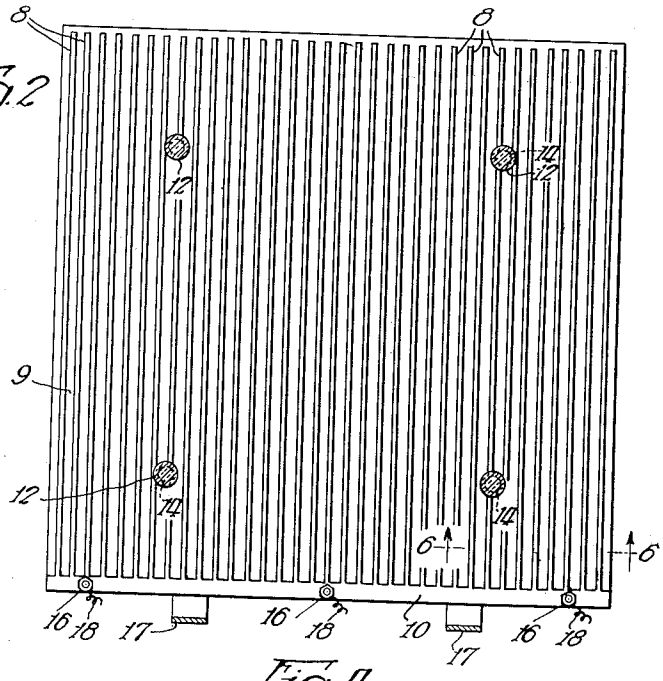



Fig. 4

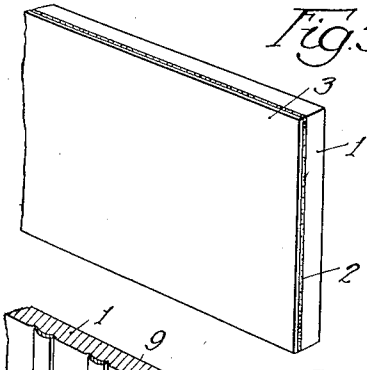



Fig. 3.

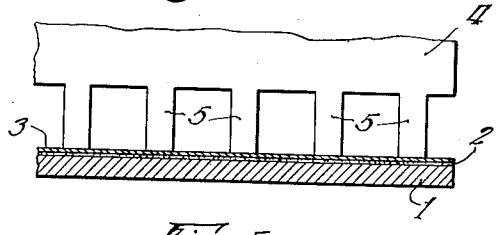



Fig. 5

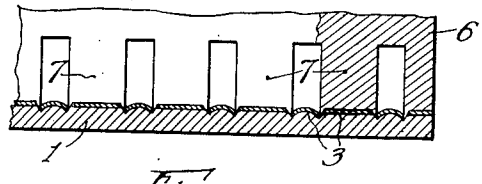
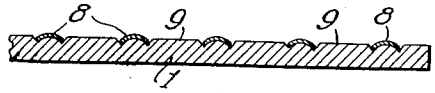



Fig. 6



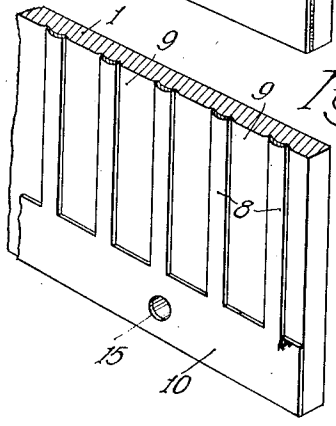




Fig. 7.

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# UNITED STATES PATENT OFFICE

2,288,735

## METHOD OF MAKING ELECTROSTATIC SHIELDS

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Application November 8, 1939, Serial No. 303,469

6 Claims. (Cl. 250—16)

This invention relates to a device which may be termed an electrostatic shield and has for its object the interception of certain waves that are not helpful in radio reception, and to eliminate or materially reduce what is commonly called static.

It is, therefore, an object of my invention to provide a device which will eliminate or intercept certain waves which do not serve any useful purpose, but to the contrary are detrimental to radio reception.

It is a further object of my invention to provide such device that is simple in construction and which can be produced economically. Devices which have the same general purpose as the present invention have been on the market and are well known in the art, but the same are comparably expensive and less efficient. Some of these devices consist of large multitudinous strands of wires soldered together and, therefore, causing a very large expense in the manufacture thereof.

The present invention has for its object to provide an electrostatic shield which will be highly efficient but the cost of manufacture of which will be only a minor fraction of those devices which have heretofore been used and which the present invention may supplant.

My device may be made by different methods, some of them more satisfactory than others.

The objects of my invention are accomplished by the construction and arrangement of parts to be hereinafter more specifically pointed out and claimed, and said construction is produced by the methods hereinafter also set forth and particularly claimed.

In the drawing:

Figure 1 is an end view of the device installed in operative combination with a radio antenna;

Figure 2 is a plan view of the device, taken on the line 2—2 of Figure 1;

Figure 3 is a perspective view of the foil sheet attached to the cardboard base;

Figure 4 is a view of the heating die in contact with the foil sheet superimposed on the cardboard;

Figure 5 is a view of the cutting die in contact with the foil sheet;

Figure 6 is an end view of the operation performed by the cutting die showing the foil strips on the cardboard with the foil in the space therebetween removed, and is a view on the line 6—6 of Figure 2; and

Figure 7 is a perspective view of what is shown in Figure 6.

In the various drawings the same reference characters refer to similar parts of the drawing, in which 1 is the cardboard, 2 the adhesive, 3 the foil sheet, 4 the heating die having parallel contact members 5. 6 is the cutting die, having parallel cutting members 7. 8 are the parallel foil strips produced by the cutting die 6, and 9 are the spaces from which the foil has been removed. 10 is the transverse foil strip connecting the plurality of strips 8. 11 is a radio antenna, 12 are the insulator posts for mounting the shield shown in Figure 2 in the radio combination. 13 are the bolts for holding the aforesaid combination securely together, 14 are the apertures in the device through which posts 12 extend. 15 are the apertures on the bottom of the device through which bolts 16 extend for securing the wires 18 which connect the two parallel shields. 17 are mounting brackets. 19 is a wire for grounding the device, 20 and 21 are the two wires forming the circuit with the antenna 11.

My electrostatic shield may be described as follows:

The basic material used is cardboard, Masonite, laminated paper or any suitable non-conductor. In practice I have used cardboard, the size of which depends upon the radio and other considerations, but the minimum size should be about four inches high and six inches wide. I next take a sheet of metal foil. I have preferred using aluminum foil because it is produced in large quantities and the price is less than other metal foil. A sheet of approximately the same size as the cardboard piece is selected. One the back side of this foil is spread an adhesive, resinous, heat-sealing plastic. The plastic we prefer to use has a large percentage of solids, perhaps eighty per cent. Just precisely what are the chemical ingredients of this heat-sealing plastic I do not know, but it is purchased under the name of B–72 Clear, and is purchased from the Barrett Varnish Company of Chicago, Illinois. While this aforesaid resinous heat-sealing plastic may be used alone, I prefer to use a No. 419 thinner and mix it in the approximate proportions of fifty per cent thinner and fifty per cent of the aforesaid B–72 Clear.

This mixture is spread on the back side of the foil. It is then permitted to dry. A brass die of a contour conforming to the parallel strips and the comparatively large horizontal strip at the bottom thereof, as shown in Figure 2, is heated to a temperature sufficient to cause the adhesive element to melt. I use a temperature of between 170 and 180 degrees F. This brass

die is pressed down upon the cardboard with the foil side of the foil paper on top, and the gummed back side against the cardboard. The heat will cause the gum to melt and thereby cause adhesion between the foil and the cardboard where the brass die comes in contact with the foil, and the brass die in contact creates the lateral and transverse strips as shown in Figure 2. The space between the vertical strips will not be heated and, therefore, will not adhere to the cardboard. Then a steel cutting die is used to cut out the foil and the strips. The width of the strip is preferably about $\frac{1}{32}$ of an inch. The space between them is approximately $\frac{5}{32}$ of an inch. The bottom or horizontal strip is preferably about ¼ inch in width. It will be remembered that these dimensions are for the smaller radio sets. For a larger radio set to which the electrostatic shield is to be applied, the relative size of the foil strips and space between them may correspondingly be increased. The sheets of aluminum foil are quite thin, the thinnest aluminum foil prepared in commercial quantities being .00035 of an inch thick. I prefer to use a sheet .0004 and .00045 of an inch in thickness.

Extensive tests in practice have conclusively established that my device is of tremendous practical value and utility in eliminating so-called static. In fact I do not claim that I am the first inventor of a device which is intended to serve the purpose outlined herein.

Not only is the structure of my device new and novel but the method of making the same is also in and of itself new and novel. Various methods were used by me in experimentation prior to the selection of the present method for making the new device and structure and for the purpose of indicating clearly the fact that the structure may be made by various methods, I briefly refer to certain methods that because of expense or difficulty of manipulation were regarded by me as inferior to the method hereinafter set forth and claimed.

I first attempted to use a bronze foil, and I used resinous gum not having phenol properties. In this experiment, unlike the successful one, the gum was not put on the back side but on the front side of the foil. The foil may be bought commercially with a paper back. The brass die was placed against the foil with the face of the foil against the cardboard. Due to the greater adhesion of the foil to the paper than to the cardboard, except at the place where the strip forming die contacted and heated the same, upon pulling the paper back off, only the strips would remain. This was completely unsuccessful due to the fact that the so-called bronze foil was a non-conductor. I found, however, that hand beaten aluminum leaf put on in this manner is successful, but because of the expense the same is not feasible.

The second method which I attempted might be called a chemical, as distinguished from a metallic method. In this method the gum would be applied to the back side of the foil sheet and the parallel vertical lines would be printed on the sheet gummed against the cardboard with ink impervious to acid. This cardboard with the foil attached would be dipped in an acid tank and the acid would tend to eat away the foil except where it was covered with the acid resisting ink which would tend to loosen the upright, vertical lines, and the foil occupying the space between the upright lines would tend to disintegrate and wash away. Then the ink would be removed from the upright strips of the foil by means of benzine, or even with plain water. This method also produced a successful and satisfactory device, but it is more expensive and obviously involves a messy operation and is not as desirable as the method herein set forth and claimed.

I, therefore, as the first and original inventor of the apparatus and device herein set forth, desire to protect myself as to United States Letters Patent for the said apparatus and I also desire to protect myself by filing claims for the improved method devised by me for making said apparatus.

This device appears to be also useful as a substitute for the usual aerial or antenna and I distinctly want to be understood that I do not limit myself in any way to the use or application to which the device may be put, but that I propose to reserve to myself the reasonable right to use the same in any manner whatsoever.

Having thus described my invention what I claim and desire to cover by United States Letters Patent is:

1. The herein described method of making a device of the character described which consists in selecting a relatively rigid sheet of electrically non-conductive material, then selecting a sheet of metal foil of approximately the same size as the first named sheet, spreading an adhesive, resinous, heat-sealing plastic having a large percentage of phenol on the back side of said foil sheet, placing the said foil sheet with its back side upon said non-conductor sheet, causing said adhesive to dry, heating a brass die to a relatively high temperature, said die having the contour of a plurality of parallel strips, pressing the same against the foil side of the two associated sheets, then removing the said brass die and bringing a second die in contact with said sheet, said die being of such design that it will cut away the foil between the aforesaid plurality of strips and sever said foil from the edge of a transverse foil strip connecting the said plurality of strips.

2. The herein described method of forming electrostatic shields comprising the selection of a non-conductive base of a predetermined size, obtaining a sheet of metal foil, spreading a coating of a resinous, heat-sealing plastic on the back side of said foil sheet, placing the said foil sheet against said base with the adhesive therebetween, fashioning a brass die having the contour for forming a plurality of parallel strips projecting from a transverse strip and connecting said plurality of strips, heating said brass die to a relatively high degree, pressing said die against the face of said metal foil, selecting a steel die having substantially the same contour as said heating die and designed to cut said metal foil from said base and leaving a plurality of metal foil strips delineated by said brass die attached to said base, and a transverse strip from which the said plurality of foil strips extend.

3. The herein described method of preparing an electrostatic shield which consists in spreading a coating of an adhesive, resinous, heat-sealing plastic on the back side of a metal foil sheet, placing this sheet with the adhesive downward upon a relatively rigid, electrically non-conductive base, heating a die to a relatively high degree, pressing said heated die against said sheet to cause the adhesive to melt and cause the same to adhere securely to the said base, placing

said heated die upon said sheet, said die having a contour of a plurality of relatively narrow parallel strips projecting from a transverse strip, then applying a second non-heated die having substantially the same contour as the first die on said sheet and designed to cut away metallic foil to form parallel foil strips delineated by said first die leaving a plurality of said delineated parallel strips projecting from said transverse strip securely adhered to said base.

4. The herein described method of making a device of the character described which consists in selecting a die of electrically non-conductive material, then selecting a sheet of metal foil, spreading an adhesive, heat sealing platsic on the back side of said foil, placing the said foil sheet with its back side upon the first mentioned sheet, causing said adhesive to dry, heating a die to a relatively high temperature, said die having the contour of a plurality of parallel strips extending from a transverse strip, pressing the same against the foil side of the two associated sheets, then removing the said die and bringing a second die in contact with said sheet, said last mentioned die being of such design that it will cut away the foil between the aforesaid plurality of strips and leaving the said parallel strips and a transverse strip projecting from the same.

5. The herein described method of forming electrostatic shields comprising the selection of a non-conductive base of a predetermined size, obtaining a sheet of metal foil, spreading a coat of heat sealing plastic on the back side of said foil sheet, placing the said foil sheet against said base with the adhesive therebetween, fashioning a die having the contour for forming a plurality of parallel strips projecting from a transverse strip and connecting said plurality of strips, heating said die to a relatively high degree, pressing said die against the face of said metal, selecting a second die having substantially the same contour as said first mentioned die and designed to cut away metal foil from said base and leaving a plurality of metal foil strips delineated by said die attached to said base and a transverse strip from which the said plurality of foil strips extend.

6. The herein described method of preparing an electrostatic shield which consists in spreading a coating of an adhesive, heat sealing plastic on the back side of a metal foil sheet, placing this sheet with the adhesive downward upon a relatively rigid electrically non-conductive base, heating a die to a relatively high degree, pressing said heated die against said sheet to cause the adhesive to melt and to cause the same to adhere securely to the said base, placing said heated die upon said sheet, said die having a contour of relatively narrow parallel strips projecting from a transverse strip, then applying a second die having substantially the same contour as the first die on said sheet and designed to cut away metallic foil to form parallel foil strips delineated by said first die, leaving a plurality of said parallel strips projecting from a transverse strip securely adhered to said base.

JOHN J. O'CONNELL.