Feb. 11, 1941. LE ROY H. DEY 2,231,529

METHOD OF INCORPORATING METAL PLATES IN PANELS

Filed May 9, 1938

Fig. 1

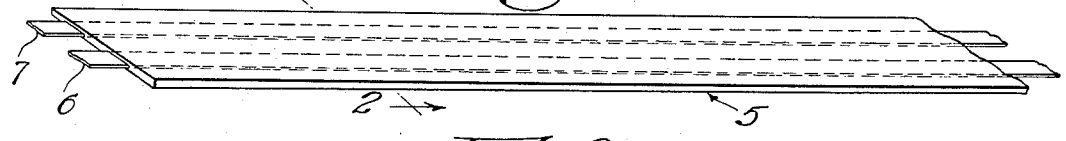


Fig. 2

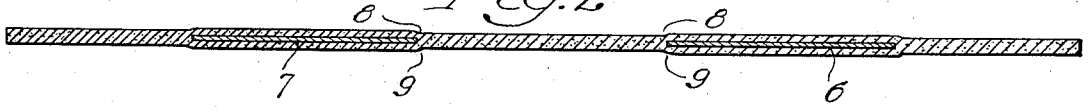


Fig. 3

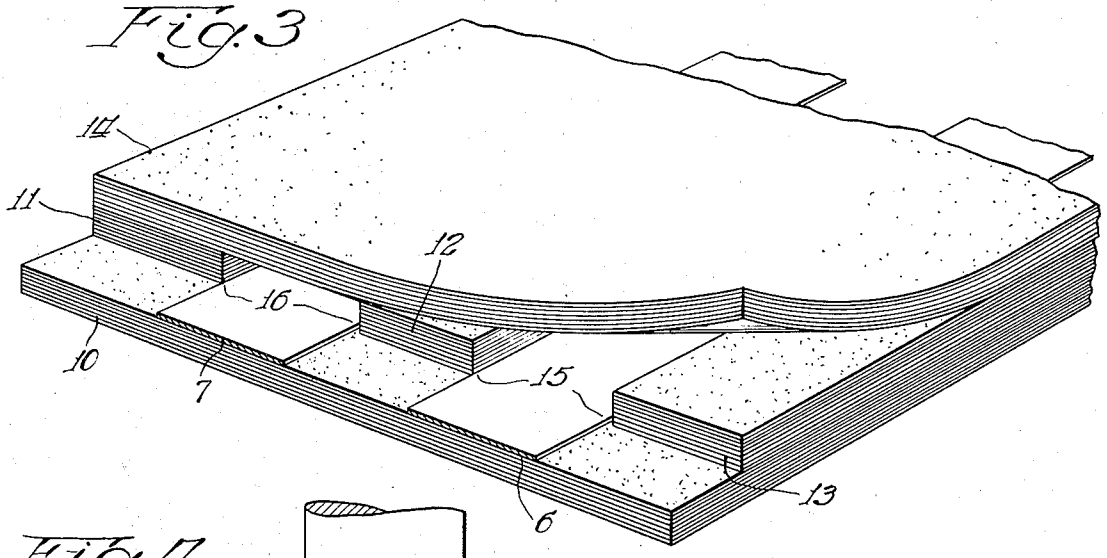
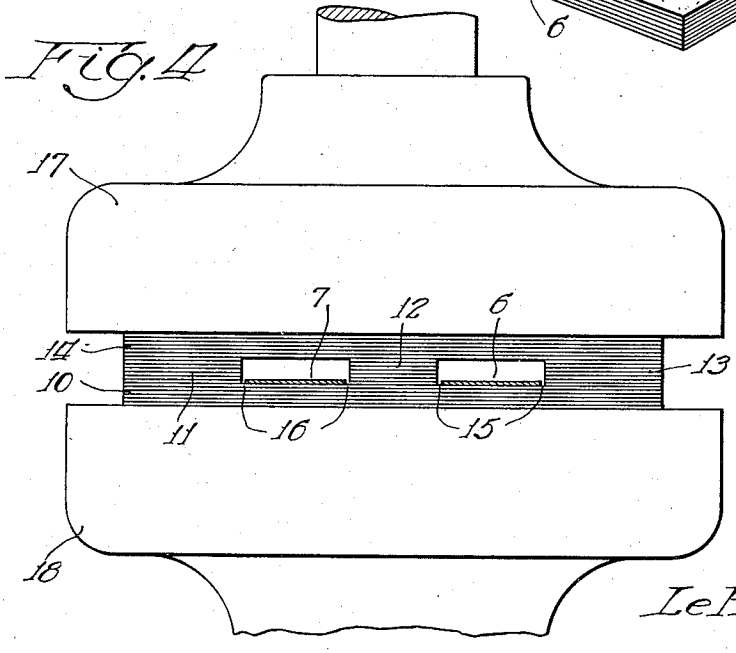


Fig. 4



Inventor:
LeRoy H. Dey

By: Isabel Carlson, Fitzpatrick & Wells

Attys.

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METHOD OF INCORPORATING METAL PLATES IN PANELS

Le Roy H. Dey, Chicago, Ill.

Application May 9, 1938, Serial No. 206,893

1 Claim. (Cl. 154—2)

The present invention relates to the manuracture of insulating panels embodying spaced metallic plates which extend lengthwise through the panels and project from the ends thereof. The panel and metal plate assembly is particularly adapted for use as a radiator of high frequency electric energy for the purpose of illuminating gas filled display tubes which are placed adjacent to the panel.

I am aware of course that it is not broadly new to mold metallic devices in the form of plates or rods in an insulating compound such as the synthetic resin compound sold under the trade name of "Bakelite." The molding of such materials, however, requires the making of dies and the expenditure of a considerable sum of money to produce a simple sheet material. Furthermore, it is desirable to have the additional strength and freedom from cracking that is obtainable from a plurality of laminations.

The present invention contemplates, therefore, a method of producing panels having inserts of metal from a plurality of paper sheets which have been impregnated with a suitable insulating material such as the synthetic resins.

The features and advantages of the invention will appear more fully as the description proceeds, reference being had to the accompanying drawing wherein a preferred embodiment of the invention is disclosed. It is to be understood, however, that the description and drawing are illustrated only, and are not to be taken as limiting the invention, except insofar as it is limited by the claim.

In the drawing, Fig. 1 is a perspective view of a panel unit constructed in accordance with the present invention;

Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1,

Fig. 3 is a perspective view showing the manner in which the panel is bent up before being pressed into final form, and

Fig. 4 illustrates the compression of a panel.

Referring now to the drawing, the present invention concerns itself with the construction of a panel 5 such as is shown in Fig. 1, wherein two strips 6 and 7 of a metal having high conductivity, such as copper, are imbedded in a surrounding medium of insulating material. The metal strips project from one end of the panel to provide for their attachment to a source of current. They may, however, terminate short of the opposite ends of the panel so as to be completely enclosed within the insulating material except at the point where it is desired to connect them to the source of energy.

In order to obtain the advantages of enclosing the metal strips in insulating panels without the disadvantages of high cost of molded panels utilizing synthetic resins such as "Bakelite", I endeavored to obtain such materials with the metal plates inserted from the manufacturers engaged in the business of producing sheet materials by impregnating paper and similar fibrous bases with the synthetic resins and binding the sheets together by pressure. I was informed that the metal could not be incorporated due to the fact that the sheet material and the metal would not combine under pressure so as to stick together.

I have devised a method whereby the metal and impregnated sheets may be combined under pressure so as to adhere together and produce what is in fact a solid sheet made up of a multiplicity of laminations of paper and similar fibrous materials impregnated with a synthetic resin binder such as "Bakelite." The method consists in mounting the metal plates between two outside groups of impregnated sheets of paper, which are adapted, when compressed, to give the requisite thickness over the metal plates. As a simple example of the way in which the method is carried out, I first lay the metal strips upon a stack of the requisite number of impregnated paper sheets, dipping the metal strips in a synthetic resin varnish such as that sold by the Bakelite Corporation as "Bakelite Cement No. 6052." The metal strips are thus stuck to the top sheet of the impregnated sheets by the varnish. I then place a sufficient number of filler sheets between the metal strips and between the edges of the panel and the metal strips to build up, when compressed, a thickness approximately equal to that of the metal strip itself. The spacer sheets are spaced slightly from the adjacent edges of the metal strips to allow for a certain amount of spreading and expansion which takes place upon pressure being applied for pressing the sheets together. A number of sheets equal to the sheets beneath the metal plates are next applied over the spacer sheets. Then the pressure and heat are applied in a hot press so as to compress the entire assembly down until the thickness of the spacer sheets is no greater than the thickness of the metal strips. The synthetic resin impregnation of the paper causes the several layers to become united so that they appear to be a single panel or sheet. Furthermore, the layers adjacent to the metal strips adhere directly thereto so that the panel may be handled and bent without separation occurring between the metal strips and their covering.

Owing to the fact that it is quite difficult to match the exact thickness of the metal strips with a definite number of layers of the impregnated paper, there may be some slight irregularity in thickness. It appears, however, that the compression of the material is not adversely affected by having slightly too little an amount of filler sheets between the metal strips. In Fig. 2 I have shown, in somewhat exaggerated form, the result of having too few filler sheets between the metal strips. The result is a slight bulge indicated at 8 and 9 on opposite sides of the metal strips.

In Fig. 3 the bottom impregnated sheets are shown at 10, the filler sheets are shown at 11, 12 and 13, and the top sheets are shown at 14. The spaces indicated at 15 and 16 at opposite edges of the strips 6 and 7 are to allow for any lateral expansion or spreading of the metal strips 6 and 7 and the filler sheets under the pressure to which the filler is subjected. In Fig. 4 the entire assembly is shown between upper and lower heated press-heads 17 and 18.

From the above description it is believed that the nature of the present invention will be clear to those skilled in this art. Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

A method of incorporating metal plates in insulating panels made up of a plurality of laminations of fibrous material impregnated with a synthetic resin binder, said method comprising the coating of the metal plates directly with a varnish and then adhering the metal to a stack of impregnated laminations, placing impregnated filler sheets adjacent to but slightly spaced from the edges of said metal plate, covering the filler sheets and plate with a second stack of impregnated laminations and heating and compressing the assembly to a unitary sheet.

LE ROY H. DEY.