

Nov. 7, 1933.

H. W. HOUCK

1,934,192

CONDENSER

Filed Jan. 26, 1931

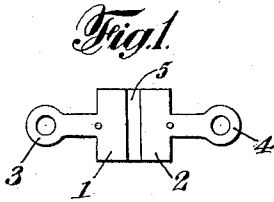


Fig. 2.

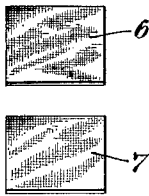


Fig. 3.

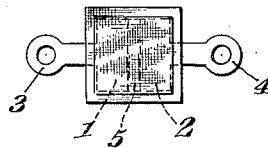


Fig. 5.

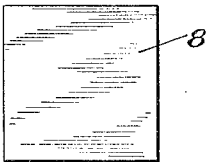


Fig. 6.

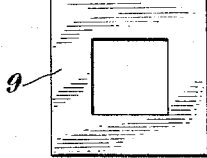


Fig. 4.



Fig. 8.

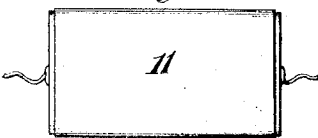


Fig. 9.

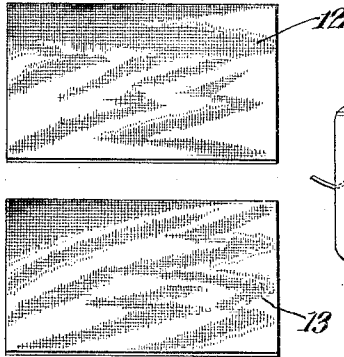


Fig. 10.

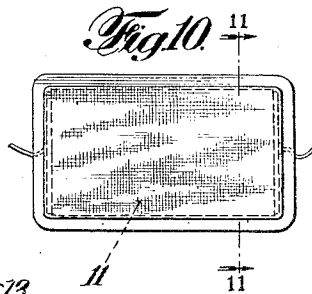


Fig. 7.

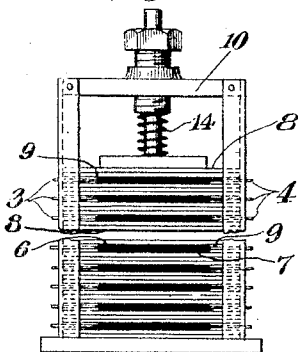


Fig. 11.



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1,934,192

CONDENSER

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Application January 26, 1931. Serial No. 511,290

4 Claims. (Cl. 175-41)

This invention relates to condensers of the type in which the condenser body is encased in a molded insulating material, such as a phenolic condensation product.

5 An object of the invention is to simplify the process of molding the covering material around the condenser body, and to reduce the cost of manufacture of molded condensers.

10 Another object is to provide a suitable method of molding the insulating covering around the condenser body in such manner as to prevent injury to the body.

15 A further object is to provide a suitable method whereby the molded covering may be applied to the condenser body in a thin layer.

20 Another object is to provide a suitable method of impregnating molded condensers.

25 An object of the invention is also to provide a molded condenser having low electrical losses; which occupies a minimum amount of space; and which is particularly adapted for quantity production methods in its manufacture.

30 The invention is described in connection with the accompanying drawing, in which:

35 Fig. 1 shows a condenser body of the stack type,

Fig. 2 shows the enclosing sheets of insulating material,

40 Figs. 3 and 4 are plan and elevational views of the completed condenser,

Figs. 5 and 6 show separator and spacer members, respectively, used in the treating process,

Fig. 7 illustrates a clamp filled with condensers for treatment,

45 Fig. 8 shows a condenser body of the paper wound type,

Fig. 9 shows enclosing sheets for the body of Fig. 8,

50 Figs. 10 and 11 are plan and sectional views of the completed wound condenser.

In Fig. 1 is shown a small mica stack condenser of the type employed for various purposes in radio receiving sets. The stack is composed of interleaved mica sheets and armature foils, the foils of one polarity being connected to the metal clamping plate 1 and the foils of opposite polarity being connected to clamping plate 2. The plates have integral tabs 3 and 4 extending therefrom for connecting the condenser in circuit. A portion of one of the mica sheets of the stack is exposed between the plates 1 and 2, but the armature foils are not seen because they are covered by the mica sheet and clamping plates.

55 Relatively thin carrier sheets of fabric or paper which have been impregnated with a phenolic

condensation product in a semicured state, such as an artificial resin, are used to apply a thin coating of the molded insulating material to the condenser stack to encase the same. These sheets are cut into small squares 6 and 7 slightly larger 60 in area than the condenser stack, and are placed on both sides of the stack. A number of such stacks with sheets on each side are then placed in a clamp or press 10, such as shown in Fig. 7, having a spring 14 by which suitable pressure may 65 be applied to the condensers during the treating process. Thin metal spacers 9, shown in detail in Fig. 6, are placed next to the impregnated sheets, which spacers have openings slightly larger 70 than the condenser body, and serve to press the edges of the two sheets of each condenser together during treatment. One or more plain metal separator sheets 8 are placed between adjacent condenser assemblies to prevent the treated sheets 75 of the different condensers (which would otherwise be in contact with each other through the openings in the spacers 9) from adhering to each other.

When the press has been loaded with the desired number of condensers, as shown in Fig. 7, 80 it is immersed in paraffin or oil which is heated to a temperature of approximately 275° F. This treatment impregnates the condenser bodies and drives out all air and moisture, and also softens the semicured molding material which causes the material of the two sheets on the opposite sides 85 of each condenser stack to flow together around the edges of the sheets and thus seal the stack within. The temperature of the treating compound continues to cure the resin, and after a 90 relatively short period the resin is completely cured and no further change takes place. In practice it has been found that three quarters of an hour is sufficient to impregnate small condensers of the stack type and complete the cure. 95 At this time the condensers may be removed from the clamp and will be found to be completely surrounded by a thin insulating shell. Figs. 3 and 4 show one of the condensers thus covered.

The above process of applying the covering 100 simplifies and reduces the cost of manufacture of molded condensers since it is not necessary to employ large molding machines and molds, nor is it necessary to apply the high heat and pressure used with such molding machines, and 105 a large number of condensers may be covered in one operation. Also the curing operation takes place simultaneously with the impregnation of the condenser stack, and this materially shortens the process. Furthermore, where the condenser 110

body is impregnated and the insulating coating is cured at the same time, a more thorough impregnation of the condenser is obtained.

The phenolic condensation product in a molded condenser causes appreciable electrical losses in the condenser, and therefore reduces its efficiency, but since the enclosing shell may be made very thin, depending upon the thickness of the carrier sheets, these losses are reduced to a negligible value by the process of the invention. The very thin shell of molded material obtainable also results in a reduction of the over-all dimensions of a molded condenser, and this is an item of considerable importance in radio condensers because a considerable number of these condensers are used in each receiving set and the available space is necessarily restricted to give the desired compactness to the set.

An important advantage of the invention lies in the fact that it permits the use of paper wound sections in a molded condenser because relatively low values of heat and pressure are sufficient to seal and complete the curing of the molded material. Thus a temperature of 275° F. which is sufficient for curing the molded material will not char or injure the paper of the condenser. Fig. 8 shows a condenser body 11 of the paper wound type which has been compressed to the proper shape. This body is placed between impregnated carrier sheets 12 and 13 of Fig. 9 with relatively thick spacers inserted between the respective condenser assemblies, and the edges of the sheets are sealed together when a press of the condensers is heated in oil, in the same manner as that of the stack type condensers. Figs. 10 and 11 show a completed condenser.

It may be found preferable in certain types of condensers to impregnate the condenser body prior to the application of the covering material, but the reimpregnation at the time of applying and curing the covering material insures a thorough impregnation of any spaces between the body and its covering and also seals the condenser where the terminals extend through the covering to prevent the entrance of air or moisture.

It is not necessary that both sides of the condenser covering be made of the phenolic condensation product since the same may be used on one side only if desired, another insulating material being used on the other side. It is also possible to use several pieces of the semi-cured material on each side of the body to form a heavier protecting covering for the condenser if desired.

I claim:

1. A condenser comprising a body of armature and dielectric elements encased by fibrous sheets impregnated with a moldable insulating compound, the sheets having edge portions thereof conforming to the edges of said body and sealed together by said compound.

2. The method of making a condenser which comprises the steps of disposing substantially flat fibrous sheets impregnated with semicured insulating material on opposite sides of a condenser body, forming the sheets around the edges of the body until portions of said sheets near the edges thereof are in contact with each other, and applying heat and pressure to cause the adherence of said edge portions and further curing of the impregnating material thereby sealing the condenser between the fibrous sheets.

3. A condenser comprising a body of armature and dielectric elements sealed between a pair of fibrous sheets impregnated with insulating compound, said sheets having edge portions thereof conforming to the edges of said body and secured together by said compound, and terminals for said body projecting from the condenser between said sheets.

4. A condenser comprising a body of armature and dielectric elements and a casing therefor consisting of a pair of fibrous sheets impregnated with a moldable insulating compound, said sheets having edge portions extending beyond said body and engaging each other, the said edge portions being held together by said compound.

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