Jan. 8, 1946. A. J. CHRISTOPHER 2,392,311

SEALING OF METALLIC MEMBERS IN MOLDED CASINGS

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FIG. 1

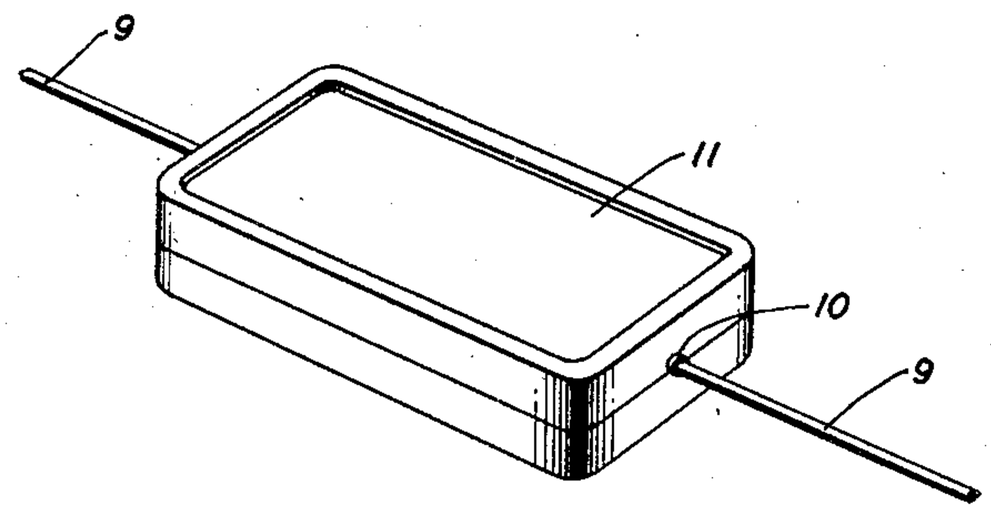
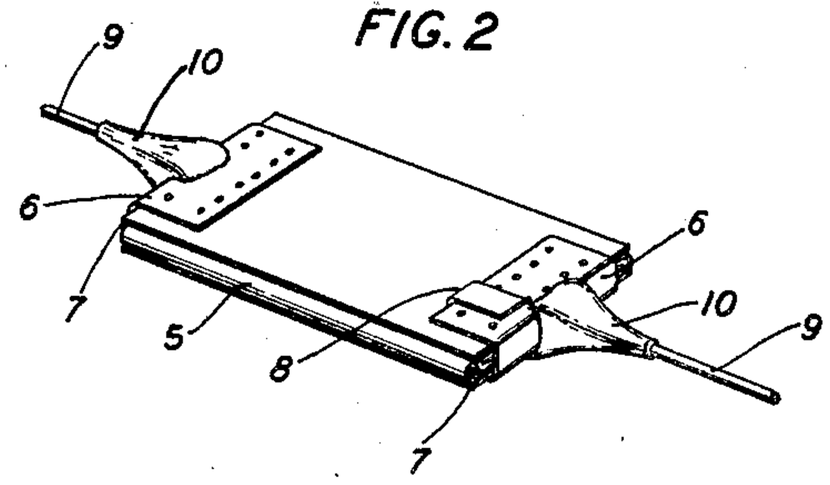


FIG. 2



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SEALING OF METALLIC MEMBERS IN MOLDED CASINGS

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2 Claims. (Cl. 174—18)

This invention relates in general to the sealing of metallic members, and more particularly to the sealing of terminal leads in molded casings for condensers and similar electrical apparatus.

It is a common practice in the design of small condensers, such as are extensively used in radio and similar circuits, to enclose the condenser unit in a molded casing through which the terminal leads extend. Such condensers are sometimes subjected to extreme temperature ranges as in the case of radio sets mounted in tanks where the apparatus may be called upon to function satisfactorily at temperatures ranging from as low as —40° F. to as high as 190° F. or even higher. In view of the difference in temperature coefficients of the molding materials and the metallic conductors, a good seal is not maintained over such wide temperature variations and moisture enters the casing along the terminal leads and deleteriously affects the electrical constants of the condenser.

It is, therefore, an object of the present invention to provide a seal for encased apparatus which will be maintained over wide temperature variations and thus prevent the entrance of moisture within the casing.

It is a further object of the invention to provide such a seal which will not be affected by mineral oil or similar materials which may be used for impregnating the condenser units.

To attain these objects and in accordance with the features of the invention, the terminal leads are provided with a coating of a resilient insulating material over that portion of the leads which is later in contact with the molded casing, this coating being placed under compression by the molding operation. Preferably, this coating as applied should have a thickness of not less than ten mils, it should be resistant to temperatures as high as 300° F., and not affected by mineral oil or grease. A material which has been found particularly satisfactory for this use is the polymerized chloroprene, commonly known under the trade-name of Neoprene. Other materials which are satisfactory under certain conditions are Resistoflex, supplied by E. I. du Pont de Nemours & Co., Inc., and Ameripol, supplied by the B. F. Goodrich Company.

The invention may be more clearly understood by reference to the accompanying drawing, in which:

Fig. 1 is a view in perspective of a molded condenser embodying the features of the invention; and

Fig. 2 is a perspective view of the condenser unit of Fig. 1 before molding the casing thereabout.

Referring to the drawing, the unit 5 as disclosed is a paper-wound unit comprising conducting foils or electrodes interleaved with sheets of insulating material, such as paper, and wound in the shape of a flat coil. This unit, however, so far as the invention is concerned, may be of the stacked type consisting of alternate plates or electrodes of conducting material and insulating material, such as mica. Secured to either end of the unit 5 is a metallic clamping member 6 which is crimped to the outer insulating sheets or backing plates 7, 7. The clamping members are electrically connected to the conducting sheets or electrodes of the condenser unit by means of thin metallic strips 8, 8 which extend from the electrodes to the clamping plates and are secured thereto by soldering. The terminal leads 9, 9 are firmly secured to the clamping plates 6, 6, preferably by butt-welding. After the unit is thus assembled the portions of the terminal leads 9, 9 where they are connected to the clamping plates 6, 6 are provided with a relatively thick coating 10 of a resilient insulating material capable of maintaining its characteristics when subjected to molding temperatures as high as 300° F. and operating temperatures up to 200° F. Preferably this material is a Neoprene cement, such as is extensively used, and comprises a polymerized chloroprene compounded with a vulcanizer and suitable solvents. In place of Neoprene other synthetic rubbers having suitable characteristics may be employed, such as, for example, Resistoflex and Ameripol. This coating preferably covers the joint of the terminal leads with the clamping plates and extends outward for a distance of a quarter of an inch or more.

The completed unit is thoroughly dried as, for example, by subjecting it to a temperature of 275° F. for a period of several hours and is impregnated with a suitable insulating material, such as mineral oil. During the drying process the solvents are driven out of the coating material and it is properly cured. The impregnated unit is then placed in a suitable mold and provided with a molded casing 11 through which the terminal leads 9, 9 extend. During this operation the coating material is subjected to a temperature of from 300° F. to 330° F. Due to the pressure exerted in the molding operation, the coatings 10, 10 are compressed and thus serve as a resilient gasket to insure a moisture-proof seal between the terminal leads and the casing over the wide temperature ranges to which the

apparatus may be subjected. Any action which might take place due to difference in temperature coefficients of the molding material and the terminal leads is compensated for by the resiliency of the coatings and moisture is prevented from entering the casing along the terminal leads.

When a mica stacked unit is employed, the unit with the Neoprene-coated terminals is subjected to a temperature of 300° for a period of one and one-half hours thus properly curing the material without affecting its resiliency.

While the invention is particularly advantageous for use with molded condensers, it will be obvious that it may equally well be used in other types of apparatus for sealing terminal leads or metallic inserts or parts which are brought out through a molded casing.

What is claimed is:

1. In an electrical device, a rigid molded casing of insulating material, an electrical unit impregnated in oil completely surrounded by said rigid casing, a terminal lead extending through said casing and a coating of synthetic rubber resistant to oils and temperatures up to 300° F. closely surrounding that portion of said terminal lead which extends through and is contiguous with said casing, said coating being maintained under compression at a pressure substantially equal to the molding pressure of said rigid casing.

2. In an electrical device, a rigid molded casing of insulating material, an electrical unit impregnated in oil completely surrounded by said rigid casing, a terminal lead extending through said casing and a coating of polymerized chloroprene closely surrounding that portion of said terminal lead which extends through and is contiguious with said casing, said coating extending over the joint between said terminal lead and said unit and being under compression at a pressure substantially equal to the molding pressure of said rigid casing.

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