Dec. 14, 1948. J. SHAHEEN 2,456,219

COATED INDUCTIVE DEVICE

Filed Aug. 14, 1945

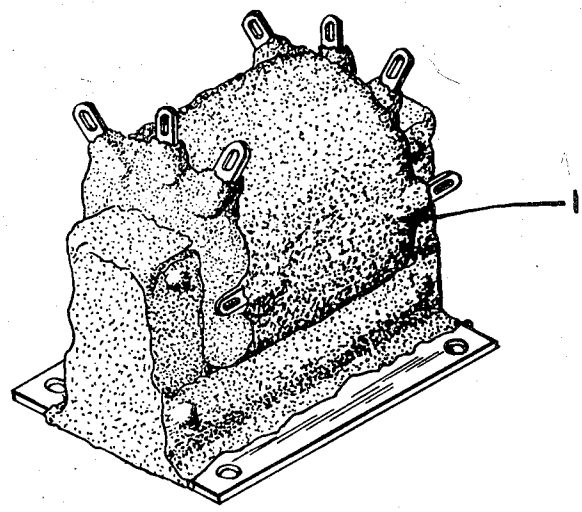


Fig. 1

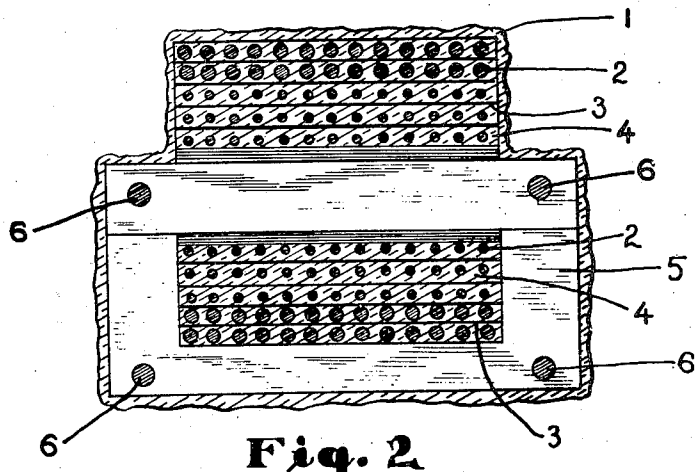


Fig. 2

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2,456,219

# UNITED STATES PATENT OFFICE

2,456,219

## COATED INDUCTIVE DEVICE

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Application August 14, 1945, Serial No. 610,851

1 Claim. (Cl. 175—21)

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This invention relates to a method of impregnating an inductive device with a substance which will seal it hermetically. More particularly, it relates to a method of impregnating and insulating an inductive device with a resinous substance which will form a protective coating thereover.

An object of this invention is to provide a waterproof coating which will hermetically seal an inductive device. Another object of this invention is to eliminate the use of a metal casing which has heretofore sealed such an inductive device. Another object of this invention is to reduce the weight of the unit by substituting a resinous waterproof impregnation for the metal casing formerly used. A further object of this invention is to make a more compact unit which will occupy a minimum of space.

A feature of this invention is the use of tetraethylene glycol dimethacrylate, hereafter referred to as a monomer, either clear or mixed with mica, waterground to a very fine mesh.

Figure 1 is a perspective view of a transformer showing the embodiment of the invention; and

Figure 2 is a cross sectional view through a transformer showing the insulation and impregnation with the resinous substance.

In the figures, 1 is the resinous coating which hermetically seals the transformer as a unit; 2 represents the cross sections of the wires of the coil in the transformer; 3 represents the layers of paper which insulate the layers of wire in the coil; 4 represents the resinous substance which permeates the unit and insulates the individual wires in the coil; 5 represents the plates or laminations in the transformer; and 6 represents the bolts which hold the plates in place.

In the process of making up the impregnating mixture, I have found that the relative proportions of monomer and mica depend upon the design and construction of the device to be impregnated. The inductive device must be dried thoroughly by heating for about two hours at a temperature in the neighborhood of 200° F. Then it is dipped in the impregnating mixture or, for quicker and more thorough results, treated with the mixture in a vacuum impregnating machine. In the latter case, as soon as the inductive device is dried thoroughly, it is placed in the evacuating tank of the vacuum impregnating machine, and the air is pumped out until a high vacuum is

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obtained. The valve is then opened and the impregnating mixture, described above, allowed to enter in sufficient quantity to cover the inductive device completely. After the valve is shut, in some cases it is found necessary to introduce dry air under pressure into the tank to force the plain monomer and/or the mixture into the coils. The unused impregnating material is removed from the tank by a suitable method and the inductive device retains a coating of the mixture. In order that this impregnation shall remain intact, the device must be removed carefully, its terminal lugs cleaned and the coated device placed in an oven and baked at a suitable temperature until the coating is hard. Polymerization will usually take place at a temperature in the neighborhood of 250° F. in approximately two hours. Usually a higher quality of impregnation can be obtained with the use of vacuum impregnating equipment although sample transformers impregnated without vacuum have been subjected to the salt water immersion test with satisfactory results.

If needed, additional coatings may be added by dipping the transformer in a mixture of suitable thickness and rebaking.

What I claim is:

An inductive device comprising a magnetizable core, a coil wound thereon, and a coating of tetraethylene glycol dimethacrylate containing insulating particles impregnating the core and coil to seal it from moisture.

JOHN SHAHEEN.

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