

April 30, 1974

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MAGNETIC SLOT CLOSURE FOR ELECTRICAL MACHINES AND
METHOD OF MANUFACTURE THEREOF
Filed Aug. 13, 1971

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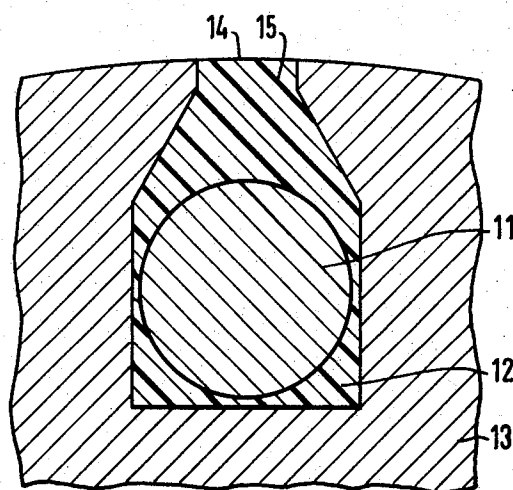


Fig. 1

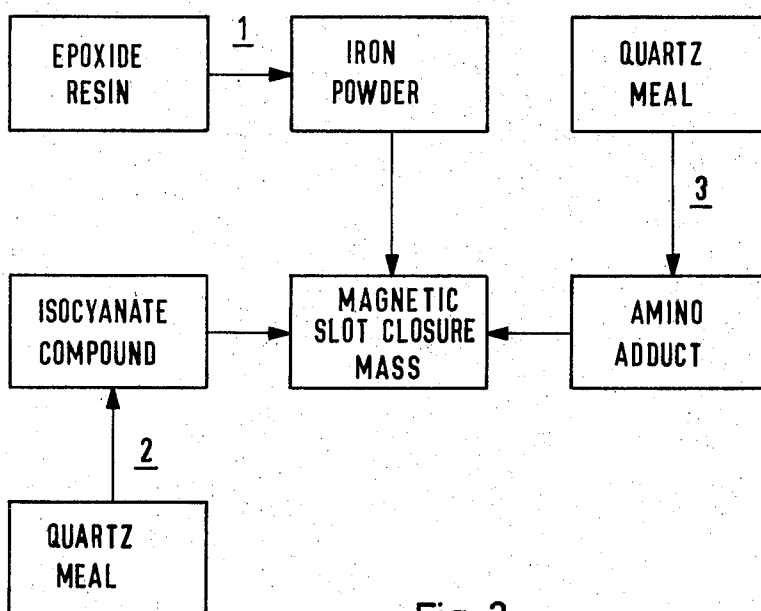


Fig. 2

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MAGNETIC SLOT CLOSURE FOR ELECTRICAL MACHINES AND METHOD OF MANUFACTURE THEREOF

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Filed Aug. 13, 1971, Ser. No. 171,616

Claims priority, application Germany, Aug. 19, 1970, P 20 41 076.8

Int. Cl. C04b 35/04; H01f 1/00, 1/26

U.S. Cl. 252-62.54

3 Claims

ABSTRACT OF THE DISCLOSURE

A slot closure comprises a mass of epoxide resin, a BF_3 amino adduct, iron powder and a stiffener, which mass is added in a pasty condition, during cold hardening, to a liquid isocyanate compound thickened with indifferent inorganic material.

The invention relates to a magnetic slot closure for electrical machines. More particularly, the invention relates to a magnetic slot closure for electrical machines having open slots and a method of manufacture thereof.

The slot closure comprises a mass of epoxide resin, a BF_3 amino adduct, iron powder and a stiffener, which mass is added in a pasty condition, during cold hardening to a liquid isocyanate compound thickened with indifferent inorganic material.

German Pat. No. 1,299,357 discloses a magnetic slot closure for electrical machines which comprises a mass of a mixture of epoxide resin, a BF_3 amino adduct, iron powder and a stiffener. The mass is inserted under pressure in a workable pasty condition through the slot opening into the free space remaining after the insertion of the winding in the slot. The free space extends from the winding up to the slot opening. The mass fills the free space in the slot and also fills the slot opening, and hardens in the slot.

The disclosed embodiment of the patent relates to masses which harden only under the influence of heat and reach adequately high hot forming stability up to 190°C .

The magnetic slot closure mass may be utilized without difficulty when the respective machines must be subjected to thermal treatment in any case such as, for example, for hardening the impregnation or encapsulation of the winding. A simpler installation of the slot closures without heat treatment is desired for machines which have not to be subjected to such thermal processing. The qualities or characteristics of the mass must correspond to those of the hot hardening masses.

An object of the invention is to provide a magnetic slot closure mass which overcomes the disadvantages of known magnetic slot closure masses.

Another object of the invention is to provide a magnetic slot closure mass which is cold hardened.

Another object of the invention is to provide a method of manufacture of a magnetic slot closure which overcomes the disadvantages of known magnetic slot closures and which is cold hardened.

In accordance with the invention, the magnetic slot closure mass in pasty condition has added to it a liquid isocyanate compound thickened with indifferent inorganic material, the mixture then being cold hardened.

In accordance with the invention, a magnetic slot closure for an electrical machine having a slot having a winding therein, an opening and free space above the winding up to the opening, includes a mass filling the free space in the slot and the opening thereof. The mass com-

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prises epoxide resin, a BF_3 amino adduct, iron powder and a stiffener, and a liquid isocyanate compound thickened with indifferent inorganic material added to the mass.

The mass contains at least 75 weight percent of iron powder, about 5 weight percent of highly dispersible titanium dioxide, about 5 weight percent of quartz meal, at least 10 weight percent of cycloaliphatic epoxide resin having an epoxide equivalent of 134, about half the remainder being BF_3N methylcyclohexylamine and diphenylmethane-4,4'-diisocyanate.

In accordance with the invention, a method of producing a slot closure for an electrical machine having a slot having a winding therein, an opening and free space above the winding up to the opening, comprises inserting into the slot through the opening thereof under pressure and in a workable pasty condition, a mass of a mixture of epoxide resin, a BF_3 amino adduct, iron powder and a stiffener until the mass fills the free space and the opening of the slot, and adding to the mass for cold-hardening a liquid isocyanate compound thickened with indifferent inorganic material.

The method of producing a slot closure comprises first thoroughly mixing the epoxide resin and the iron powder, then adding a mixture of quartz meal and the isocyanate compound, and then adding a mixture of an equal volume of quartz meal and the amino adduct.

In order that the invention may be readily carried into effect, it will now be described with reference to the accompanying drawing, wherein:

FIG. 1 is a sectional view of the magnetic slot closure of the invention installed in a slot of an electrical machine; and

FIG. 2 is a flow chart of the method of manufacture of the magnetic slot closure of the invention.

As shown in FIG. 1, a winding 11 is placed in a slot 12 of an electrical machine 13. The free space from the top of the winding 11 to the opening 14 of the slot is filled with the magnetic slot closure mass 15 of the invention.

In accordance with the invention, a magnetic slot closure mass having especially rapid hardening characteristics comprises at least 75 weight percent of iron powder, about 5 weight percent of highly dispersible titanium dioxide, utilized as a stiffener, about 5 weight percent of quartz meal, at least 10 weight percent cycloaliphatic epoxide resin having an epoxide equivalent of 134. The remainder comprises about half BF_3N methylcyclohexylamine and diphenylmethane-4,4'-diisocyanate.

Prior to its insertion in the slot 12, the magnetic slot closure mass is produced in accordance with the flow chart of FIG. 2. As indicated in FIG. 2, the epoxide resin is first mixed with the iron powder. Thereafter, half the amount of quartz meal is mixed with the isocyanate compound and the mixture is added to the mixture of epoxide resin and iron powder. Finally, the other half volume of quartz meal is mixed with the amino adduct and the mixture is added to the other ingredients.

At room temperature the mass attains a rigidity or bending strength of about 250 kp./cm.^2 in two days. The rigidity or bending strength increases to approximately 600 kp./cm.^2 after about sixteen hours at 80°C . The thermal expansion or stress coefficient of the cold hardening mass in accordance with the invention corresponds to that of known hot hardening masses so that a simple and reliable repair of damaged slot closures of hot hardened masses is possible.

The mass of the invention may easily be pressed into the slot and is so hardened by pressure that it will not blow out in an unhardened condition.

The foregoing stability may be increased after sixteen hours to approximately 175° C. through idling of the machine, which is accomplished by a temperature of approximately 80° C.

While the invention has been described by means of a specific example and in a specific embodiment, we do not wish to be limited thereto, for obvious modifications will occur to those skilled in the art without departing from the spirit and scope of the invention.

We claim:

1. A magnetic slot closure for an electrical machine having a slot having a winding therein, an opening and free space above the winding, said slot closure including a mass filling the free space in the slot and the opening thereof, said mass comprising at least 75 weight percent of iron powder, about 5 weight percent of highly dispersible titanium dioxide, about 5 weight percent of quartz powder, at least 10 weight percent of cycloaliphatic epoxide resin having an epoxide equivalent of 134, about half the remainder being BF₃N methylcyclohexylamine and diphenylmethane-4,4'-diisocyanate.

2. A method of producing a slot closure for an electrical machine having a slot having a winding therein, an opening and free space above the winding said method comprising inserting into the slot through the opening thereof under pressure and in a workable pasty condition, a mass of a mixture comprising at least 75 weight percent of iron powder, about 5 weight percent of highly dispersible titanium dioxide, about 5 weight percent of quartz

powder, at least 10 weight percent of cycloaliphatic epoxide resin having an epoxide equivalent of 134, about half the remainder being BF₃N methylcyclohexylamine and diphenylmethane-4,4'-diisocyanate.

3. A method of producing a slot closure as claimed in claim 2, comprising first thoroughly mixing said epoxide resin and said iron powder, then adding a mixture of quartz powder and said diphenylmethane-4,4'-diisocyanate, and then adding a mixture of an equal volume of quartz powder and said BF₃N methylcyclohexylamine.

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U.S. Cl. X.R.

29—596; 260—47; 310—214