

March 18, 1924.

1,486,874

L. T. FREDERICK

ARMATURE SLOT INSULATION AND METHOD OF MAKING THE SAME

Filed Jan. 8, 1919

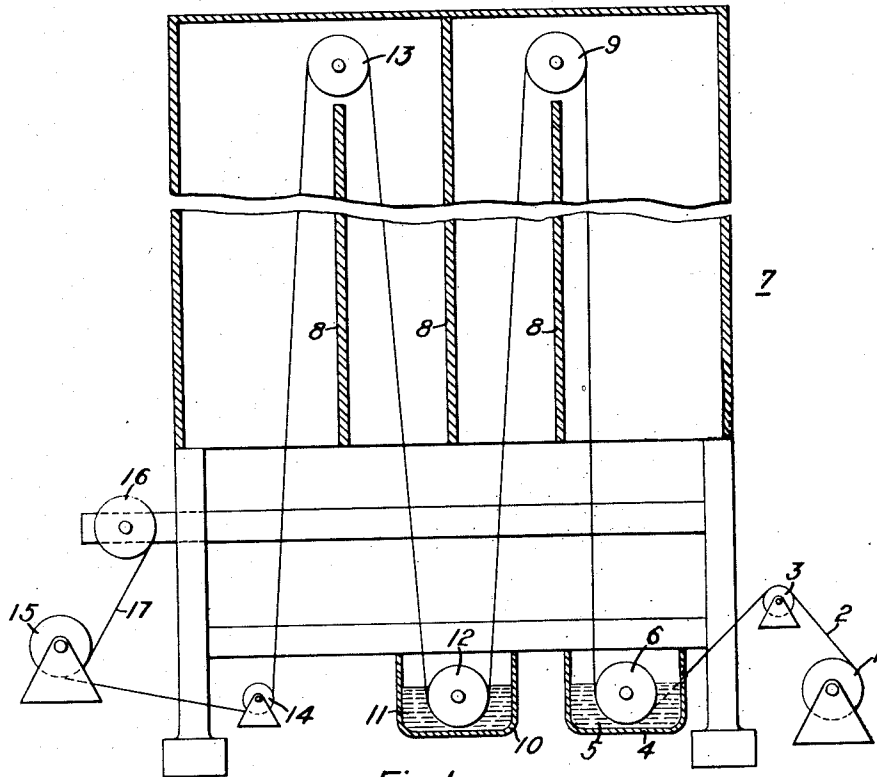


Fig. 1.

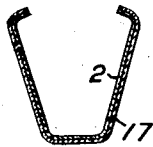


Fig. 2.

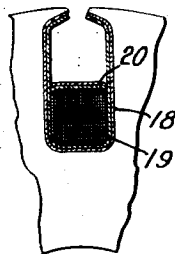


Fig. 3.

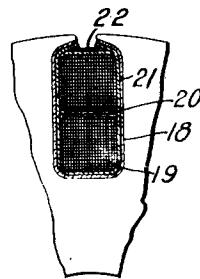


Fig. 4.

WITNESSES:

H. T. Shelhamer
O. E. Bee

INVENTOR

Louis T. Frederick

BY

Herley E. Carr
ATTORNEY

UNITED STATES PATENT OFFICE.

LOUIS T. FREDERICK, OF WILKINSBURG, PENNSYLVANIA, ASSIGNOR TO WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

ARMATURE-SLOT INSULATION AND METHOD OF MAKING THE SAME.

Application filed January 8, 1919. Serial No. 270,143.

To all whom it may concern:

Be it known that I, LOUIS T. FREDERICK, a citizen of the United States, and a resident of Wilksburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Armature-Slot Insulations and Methods of Making the Same, of which the following is a specification.

My invention relates to electric insulation and more particularly to material suitable for insulating armature slots of dynamo electric machines, and it has for its primary object the provision of insulating material which may be employed as insulation for armature slots in such manner as to realize a saving of material over methods employed heretofore.

One object of my invention is the provision of insulating material, of the character above mentioned, by employing a flexible material impregnated with a plurality of insulating adhesives and cementing thereto a reinforcing material which shall lend greater rigidity of form to the composite insulation thus provided.

Another object of my invention is to provide an insulating material especially adapted for insulating armature slots which may be more easily and efficiently applied to the armature and to thus accomplish a material saving of labor.

With these and other objects in view, my invention will be more fully described, illustrated in the drawings, in the several views of which corresponding numerals indicate like parts, and then particularly pointed out in the claims.

In the drawings, Fig. 1 is a diagrammatic view of an apparatus which may be utilized in preparing insulating material in accordance with my invention; Fig. 2 is a transverse, sectional view of a shaped strip of insulating material which is in readiness to be applied to an armature slot; Fig. 3 is an end view of a portion of an armature core showing an insulated and partially filled slot, and Fig. 4 is a view, similar to Fig. 3,

but showing a completely filled and insulated slot.

In practising my invention, I may prepare insulating material by selecting a flexible material, such as cloth, and impregnating it with a plurality of insulating adhesives, one of which is subsequently thoroughly dried while the other is partially dried. A cloth, treated in this manner, may then have a layer of reinforcing material, such as paper, which possesses a greater rigidity of form, fastened to it by the binding action of the semi-dried adhesive applied to the cloth.

In insulating an armature slot with material prepared in accordance with my invention, the layers of fibrous material may be cut into sheets of suitable size and then shaped to substantially conform to the slots to be insulated. The formed strips may then be disposed within the armature slots and the coils positioned therein in the usual manner.

In order to illustrate the method of preparing insulating material in accordance with my invention, I have shown, diagrammatically, in Fig. 1 an apparatus by means of which the material may be prepared. As here shown, a feed roll 1, having wound thereon a suitable amount of woven material 2 such, for example, as muslin, supplies such material to be led over an idler roll 3 into a vat or tank 4 containing a body of drying adhesive 5, such as an oil varnish. The cloth 2 is led through the adhesive 5 under a guide roll 6 and into a drying tower 7 which has suitable dividing partitions 8. The cloth 2 is drawn into the drying tower 7 and passed over a roll 9 and emerges therefrom thoroughly dried, after which it is led to another tank or vat 10 containing another adhesive 11 of greater viscosity than the adhesive 5. The material passes through the adhesive 11, under a roll 12, and is again directed into the drying tower 7 and over another guide roll 13 and emerges from the tower with the adhesive last applied in a partially dried state on account of the ad-

hesive being less easily dried than the first-applied varnish. The adhesive 11, last applied to the cloth, is, preferably, a slow-drying liquid, such as an asphalt-gum varnish. The cloth, upon emerging from the tower, after the second application of adhesive, is led under an idler roll 14 to a collecting roll 15. A roll 16 may be provided, carrying a suitable quantity of material 17 of greater rigidity than cloth, such as paper, and the paper may be supplied to the roll 15 along with the treated cloth 2. The adhesive, last applied to the cloth, being in a partially wet state, cements the paper to the cloth as they are rolled simultaneously upon the collecting roll. Waxed paper may be interposed between the layers of material upon the roll 15.

A roll of material, prepared as above described, may be cut into sheets of suitable width and disposed in dies in order to shape the sheets to conform substantially to the shape of the walls of the armature slots to be insulated. A strip thus formed is shown in Fig. 2 in which the paper 17 constitutes the exterior and the treated cloth 2 the interior of the composite body. Since the paper possesses greater rigidity of form than the cloth, it allows the body to be shaped and, at the same time, it supplements the insulating qualities possessed by the treated cloth. A strip of material, such as shown in Fig. 2, may be applied to an armature slot by merely slightly compressing the sides of the strip and by sliding it into place in the slot after which the coils, to be carried by the slot, may be positioned therein.

In the case of a slot which is to carry one side of each of two coils, as is shown in Fig. 3, the slot may be insulated by placing the strip of insulating material, comprising the cloth 2 and the paper 17, within the slot 18 and one of the coils 19 may then be disposed within the slot, after which a substantially straight strip 20 of insulating material, embodying my invention, may be placed on the coil. The slot is then in readiness to receive one side of a second coil 21, which may be positioned therein and another wedge of insulating material 22 may be disposed on the coil 21 to substantially close the slot.

Insulating material prepared in accordance with my invention is sufficiently flexible, when applied to a slot, to allow for slight irregularities in the surface of the coils contained therein and to insure close adhesion to the coils and thorough insulation of them from the armature-core. Paper employed to reinforce the treated cloth is preferably so disposed as to engage the walls of the armature slot to facilitate disposing the several strips in place by exposing an untreated surface to sliding contact with the walls. The cloth also insures efficient insu-

lation, even though the paper may have slight crevices after being bent to shape, preparatory to being placed in a slot.

A saving of material is accomplished by employing insulation constructed in accordance with my invention on account of the fact that, heretofore, armature slots have been insulated by employing a suitable woven material or cloth which necessitated providing a piece or strip of such width that the sides of the material might be held above the armature while the first coil was being disposed in place. When the first coil was disposed in place, the material or cloth projecting above the armature slot was then cut off and a second similar strip was disposed in the slot with its ends also projecting therefrom, and a second coil was then disposed in the slot, after which the material, projecting above the armature, was cut off and a wedge was driven home into the remaining space above the last coil. The employment of cloth in this manner resulted in a waste of sufficient material to insulate an armature slot with a composite insulation prepared in accordance with my invention. The non-reinforced cloth, having no rigidity of form, must be held in position while the coils are being positioned in the armature slot as, if not so held, a wrinkling or bunching of material sufficient to prevent properly placing the coil would result. By my invention, an exact amount of insulating material may be positioned in the slot in readiness to receive the coil or coils to be carried therein.

It is obvious that various methods of applying adhesives to cloth may be utilized and a variety of adhesives may be employed to prepare insulating material in accordance with my invention and, furthermore, it will be apparent that many uses may be found for insulating material constructed in accordance therewith, and I desire, therefore, that no limitations shall be imposed except such as are indicated in the appended claims.

I claim is my invention:

1. A method of making composite insulating material that comprises impregnating cloth with an adhesive, subjecting the treated material to heat to harden the adhesive, subjecting the cloth to further treatment in a bath of another adhesive of greater viscosity than the first, partially drying the second adhesive on the cloth and applying paper to one side of the treated cloth.

2. A method of making composite insulating material that comprises impregnating cloth with an oil varnish, subjecting the cloth to heat to harden the varnish, subjecting the cloth to further treatment in a bath of an asphalt-gum varnish, partially drying the second varnish on the cloth and apply-

ing a layer of paper to one side of the treated cloth.

3. An insulating material for armature slots comprising superimposed layers of
5 fibrous material of substantially U-shape in cross-section and one layer of which is impregnated with a hardened adhesive.

4. An insulating material for armature

slots comprising a layer of cloth treated with a plurality of adhesives and a layer of 10 paper cemented thereto, both layers being of substantially U-shape in cross-section.

In testimony whereof, I have hereunto subscribed my name this 21st day of Dec., 1918.

LOUIS T. FREDERICK.