

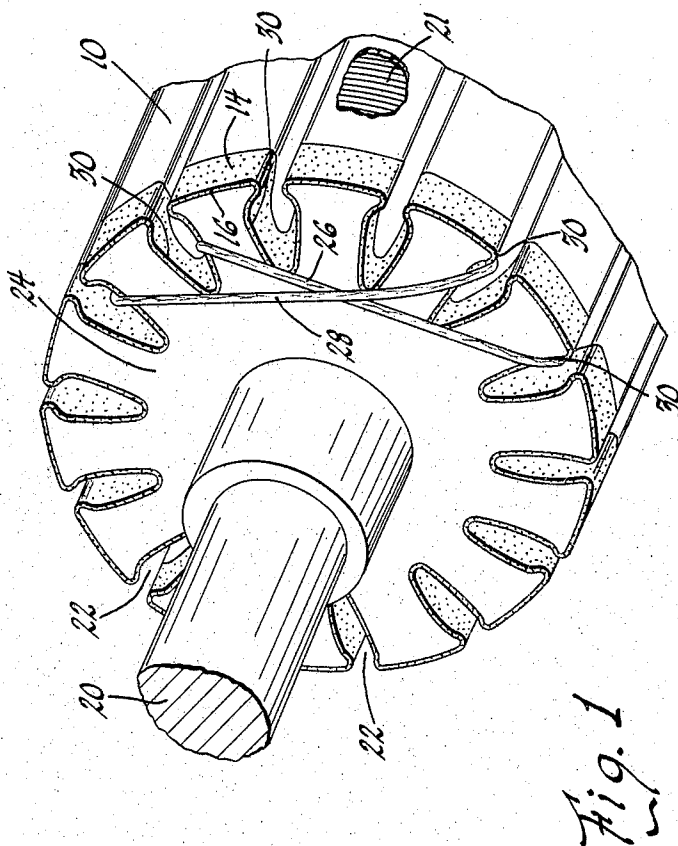
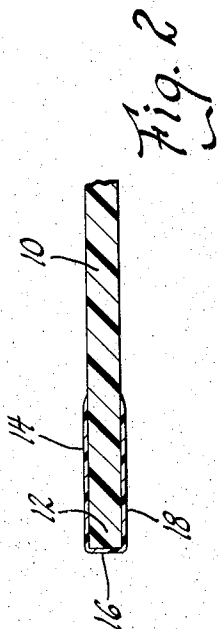
Oct. 26, 1965

E. C. QUEAR ET AL

3,214,621

ELECTRICAL INSULATION

Filed Nov. 21, 1958



INVENTORS
Pascal J. Eflin
Eugene C. Quear
John M. Sell

BY *John T. Main*
THEIR ATTORNEY

1

3,214,621

ELECTRICAL INSULATION

Eugene C. Quear, Pascal J. Efin, and John M. Sell, Anderson, Ind., assignors to General Motors Corporation, Detroit, Mich., a corporation of Delaware
Filed Nov. 21, 1958, Ser. No. 775,398
3 Claims. (Cl. 310-215)

This invention relates to electrical insulation and to the method of manufacture thereof of the type comprised of a length of insulating material having its opposite edges coated with a plastic material.

In the past dynamoelectric machine construction, a great deal of difficulty has been encountered in preventing the end turns of a winding from cutting through the slot insulation at a point located immediately adjacent the ends of the magnetic core on which the winding is wound. Where the windings are machine wound, the edges of the slot insulation are subjected to a shearing or cutting from the metal conductor and oftentimes are cut so that the conductor becomes shorted to the metal magnetic core.

In certain dynamoelectric machine constructions, the ends of the slot insulation have been strengthened by folding over a section of paper insulating material over the paper insulation and this extra layer is commonly referred to as a "cuff."

In contrast to the above described cuff construction, it is an object of this invention to provide an insulating material suitable for slot insulation that is formed from a sheet of insulating material such as kraft paper having its opposite edges coated with a plastic material such as nylon. With this construction, the paper may be applied directly to a slotted magnetic core with the plastic coating serving to prevent cutting through of the conductors and also serving to increase the over all stiffness of the paper.

Another object of this invention is to provide a slotted magnetic core structure for a dynamoelectric machine that has slot insulation which is coated at its opposite edges with a plastic coating and wherein said coated edges are positioned adjacent the ends of the magnetic core so as to prevent the cutting through of the conductors wound on the core and over the slot insulation.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein a preferred embodiment of the present invention is clearly shown.

In the drawings:

FIGURE 1 is a perspective view of an armature of a dynamoelectric machine using the slot insulation of this invention.

FIGURE 2 is a sectional view of the slot insulation of this invention.

Referring now to the drawings and more particularly to FIGURES 1 and 2, the slot insulation of this invention comprises a sheet of insulating material 10 which has bonded thereto a coating of plastic material such as nylon. The plastic material coats one edge 12 of the insulating material 10 and has coated surfaces 14, 16 and 18. The insulating material 10 may be formed of any suitable electrical insulation such as kraft paper. It is noted that the insulating material 10 is coated along one edge, both on the top and bottom surfaces of the edge, and along the edge. In the sectional view of FIGURE 2, only one side of the insulating material is shown but as will become more readily apparent hereinafter, the opposite side of the insulating material 10 is coated in identical fashion with the edge shown in FIGURE 2.

Where it is desired to use the insulating material of this invention as slot insulation, other plastic materials may

2

be used as edge coating. These materials include acetal, polycarbonate resins, polyethylene, polypropylene, vinyl resins, and acrylonitrile - butadiene - styrene - copolymers (flexible). Where the insulating material is not folded in sharp angles, the plastic material may be of a more brittle character such as polystyrene, polymethyl-methacrylate, cellulose nitrate, cellulose butyrate, acrylate resins, epoxy resins, and phenol-formaldehyde resins. All of the above materials with the exception of the phenol-formaldehyde and epoxy resins are suited to be applied to the kraft paper by the extrusion method described hereinafter. The plastic material might also be applied by other methods than extrusion such as roll coating, brushing, spraying and edge dipping. Materials particularly suited to these latter methods are latices, hydrosols, organosols or solutions of plasticized vinyl, vinyl-acrylonitrile, acrylic and polyamide resins.

In FIGURE 1, an armature for a dynamoelectric machine is illustrated. This armature comprises a shaft 20 which carries a laminated core 21 formed with a plurality of slots 22. The laminated core is formed of the usual steel laminations held together in any conventional manner. The end face of the core may be fitted with a sheet of insulating material 24 which has cutaway portions conforming to the configuration of the slots. This sheet of insulation 24 may be secured to the end lamination of the metal core in any suitable fashion. The slot insulation 10 is fitted within the slots 22 of the magnetic core and it is noted that the coated edge of the slot insulation is positioned along the end of the magnetic core. Thus, when the armature is wound with a winding including metal conductors, designated by reference numerals 26 and 28, it will be readily apparent that the coated edge of the insulating material will prevent the innermost conductors from cutting through the material over the areas designated by reference numeral 30. In other words, the plastic coating on the slot insulation will prevent the conductor from cutting through the slot insulation over the area immediately adjacent the end laminations of the magnetic core. The coated surface 18 of the slot insulation 10 will, of course, contact the metal laminations of the magnetic core whereas the surfaces 14 and 16 will positively prevent the conductor from cutting through the paper insulation. It is to be appreciated that the slot insulation 10 has greater rigidity or stiffness when its opposite edges are coated with a plastic coating material. In FIGURE 1, only one end of the armature is illustrated but it is to be appreciated that the opposite end will be fabricated in a manner identical with the end illustrated in FIGURE 1, that is, the plastic coating will be positioned adjacent the end of the magnetic core of the armature in the same manner as that illustrated in FIGURE 1.

While the embodiment of the present invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted.

What is claimed is as follows:

1. In combination, a magnetic core having slots extending lengthwise of the core, a slot insulating material separate from said core positioned within slots and over said core, said slot insulating material being of a width substantially equal to the length of said core, a quantity of plastic material bonded only to opposite edges of said insulating material and positioned immediately adjacent the ends of the core, and at least one conductor wound in a pair of said slots and directly engaging said plastic insulating material, said plastic material having a U-shaped cross section whereby all surfaces of said opposite edges are covered by said plastic material.

2. An armature for a dynamoelectric machine comprising, a slotted armature core formed of laminations which are carried by a shaft, a sheet of insulating material separate from and covering the slotted core and

3

having portions conforming to the configuration of the slots in said core, said insulating material having marginal edges reinforced by a tough plastic material which extends coextensively with said marginal edges and which has a generally U-shaped cross section, said plastic material being bonded to said insulating material and extending only along its marginal edges, and conductor means wound in said slots and on said insulating material, said marginal edges conforming to the configuration of said slots and located at opposite ends of said core.

3. The combination according to claim 2 wherein the insulating material is paper.

References Cited by the Examiner

UNITED STATES PATENTS

1,488,504 4/24 Keyes ----- 154—2.6
2,173,726 9/39 Prindle ----- 310—215

4

2,252,440 8/41 Safford ----- 310—215
2,340,905 2/44 Segmund et al.
2,465,820 3/49 Sharrow et al. ----- 310—215
2,508,850 5/50 Wirth ----- 310—215
2,679,887 6/54 Doyle et al.
2,701,316 2/55 Willits et al. ----- 310—215 X
2,822,483 2/58 Jean ----- 310—45

FOREIGN PATENTS

337,256 5/21 Germany.
741,638 11/43 Germany.
924,292 3/47 France.
1,023,026 12/52 France.

15 MILTON O. HIRSHFIELD, *Primary Examiner*.

ORIS L. RADER, DAVID X. SLINNEY, *Examiners*.