April 18, 1961 E. WIEDEMANN 2,980,564

METHOD OF WRAPPING WINDINGS OF ELECTRIC MACHINES

Filed Aug. 21, 1956

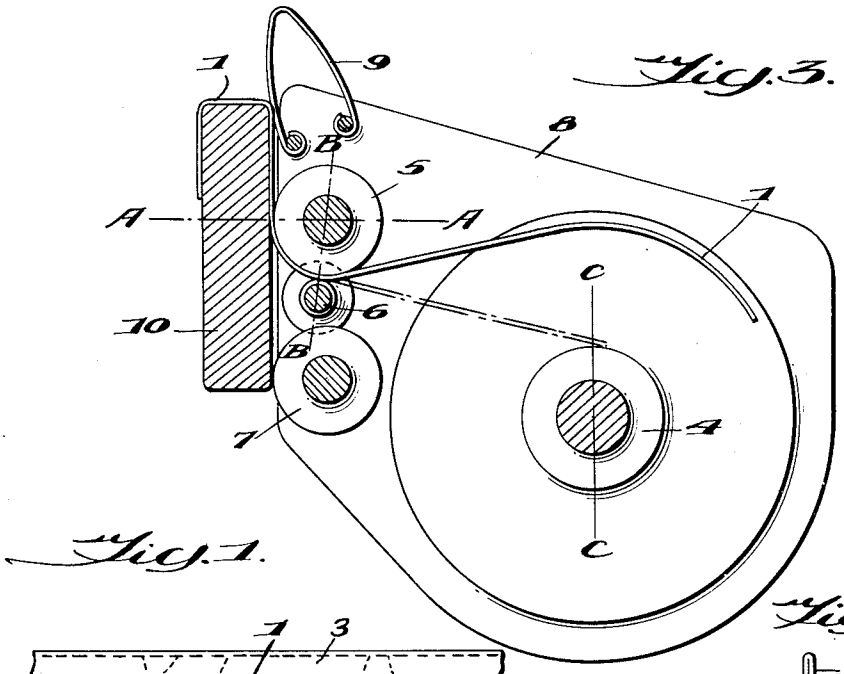


Fig. 1.

Fig. 3.

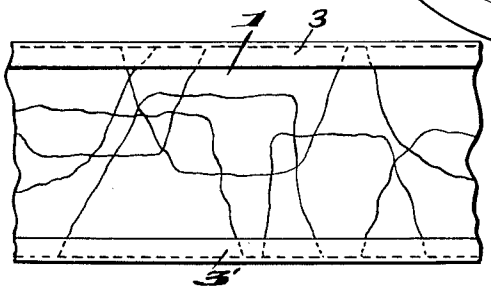


Fig. 2.

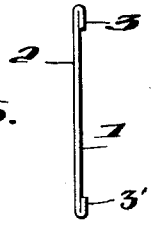


Fig. 6.

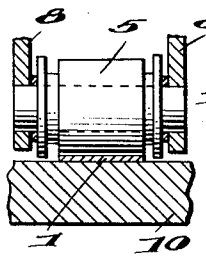


Fig. 4.

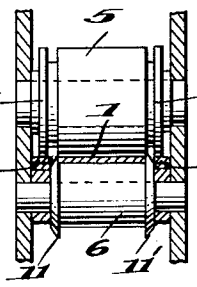
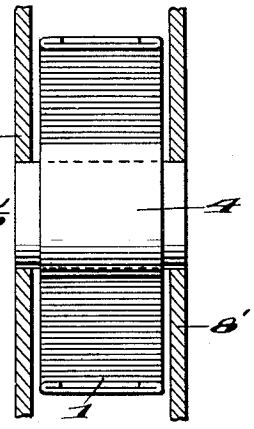


Fig. 5.



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2,980,564

METHOD OF WRAPPING WINDINGS OF ELECTRIC MACHINES

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4 Claims. (Cl. 154—2.26)

This invention relates to improvements in the art of providing parts of electric machines with insulating wrappings.

The winding rods and coils of electric machines are frequently wrapped with an insulating material, for example mica, and then impregnated, in a vacuum, with an impregnating lacquer in an attempt to avoid air occlusions which are detrimental to the dielectric strength of the wrapping. Heretofore the insulating mica tape has been produced by gluing small mica plates on a supporting tape (for example, paper, glass cloth or silk) by means of an adhesive. However, the adhesive made a complete subsequent penetration of the insulating wrapping with an impregnating agent very difficult. This has had the result that an insulation produced in this manner frequently does not meet the very high requirements, particularly as to dielectric and mechanical aspects, for such insulating windings, so that special measures must be taken to completely eliminate the above mentioned air occlusions.

A known measure consists in using an easily removable adhesive which eventually is evaporated or thermally decomposed. Another possibility consists in using an adhesive which dissolves in the impregnating agent and which thus enhances penetration by the latter. Finally, it has also been suggested not to glue the mica plates completely on the supporting tape by means of a binding lacquer, but rather to secure them at certain points, only, by sewing or gluing.

The present invention relates to a method for wrapping windings of electric machines with an insulating tape consisting of mica and a supporting material, where all air occlusion formed during the production of the insulation are eliminated in a very simple manner. This is achieved, according to the invention, in that the mica plates are not glued completely on the supporting tape by means of a bind-lacquer, but are put on a band-like support and retained within longitudinal folds of the band-like supporting material along the opposite edges of the band, and that during the wrapping of the winding part, by means of a winding device, the folds at both sides of the insulating tape are cut off, after which the wrapped winding portion is impregnated in a vacuum.

The invention will be better understood on the basis of the attached drawing, in which:

Fig. 1 is a top plan view of a portion of an insulating tape embodying principles of the present invention;

Fig. 2 is a cross-sectional view of the insulating tape shown in Fig. 1;

Fig. 3 diagrammatically illustrates a winding device adapted for use of the insulating tape of the present invention;

Fig. 4 is a sectional view along the plane A—A in Fig. 3;

Fig. 5 is a sectional view along the plane B—B in Fig. 3; and

Fig. 6 is a sectional view along the plane C—C in Fig. 3.

The insulating material consists of small mica plates 1, which are inserted in a tape 2, for example of glass cloth, paper, silk, etc., folded on both long sides and secured in the reach of range of the folds 3, 3' by sewing or gluing.

For the wrapping of winding rods, coils, etc., there can be used a winding device such as shown in Figs. 3 to 6 inclusive. This device comprises a stock roll 4 on which the insulating tape 2 is wound, a guide roller 5 with lateral pressure plates 15, 15', a cutting roller 6 and a second roller 7, all of which are rotatably mounted between the two side plates 8, 8'. A slide spring is designated at 9, which spring serves to press the insulating tape against a winding rod 10 to be wrapped.

During the wrapping of the winding rod 10, the winding device turns about the rod so that the latter is enveloped with insulating tape 2. During the winding operation the folds 3 of the insulating tape are cut off on both sides by the knives 11, 11' which constitute the outwardly flanged ends of the cutting roller 6, so that the winding rod 10 is wrapped only with mica and the mica support, without any binding agent. The wrapped rod is subsequently treated, in the vacuum with conventional impregnating agent, the structure of the wound insulation permitting a very good, uniform and thorough penetration of the insulating agent so that all air occlusions are eliminated.

Instead of the winding device represented in the attached drawing there can also be used a conventional wrapping machine which must be provided with an additional cutting roller for cutting off the folded edges of the insulating tape.

What I claim is:

1. The method of insulating elements of electrical apparatus which comprises the steps of contiguously placing a layer of mica plates upon the surface of a band of supporting material, folding small edge portions of the band at each longitudinal edge thereof back over the band and over a portion of the mica plate layer thereon, said mica plate layer being secured to said band solely by the folded over edge portions of the band, feeding the folded band to the element to be wound, simultaneously cutting off the folded-over portions of the band at each side thereof and winding upon the electrical element the remaining central flat band portion with the mica plates loosely positioned thereon, and finally impregnating the tape and mica plates wound upon the element with an insulating agent.

2. The method as defined in claim 1 and including the step of sewing the portions of the mica plates extending inside the folds of the band of supporting material to said band.

3. The method as defined in claim 1 and including the step of gluing the portions of the mica plates extending inside the folds of the band of supporting material to said band.

4. The method as defined in claim 1 wherein the impregnation of the tape wound upon the element is conducted in a vacuum.

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