Feb. 26, 1935. W. H. COONEY 1,992,814

TRANSFORMER WINDING INSULATION

Filed Nov. 1, 1933

Fig. 1.

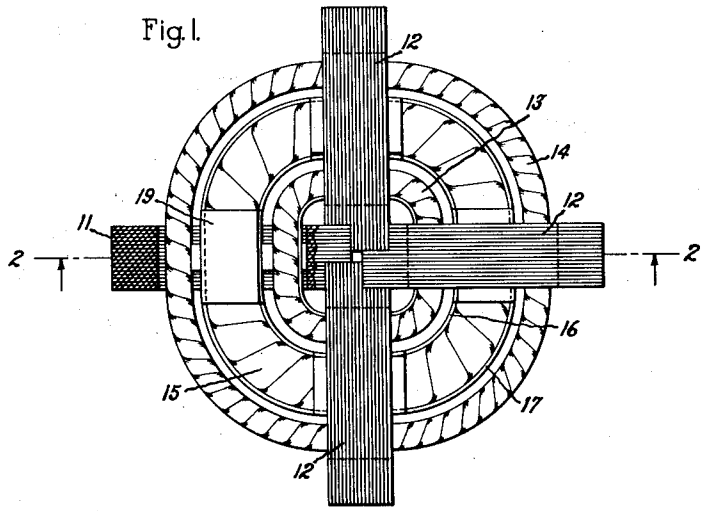


Fig. 2.

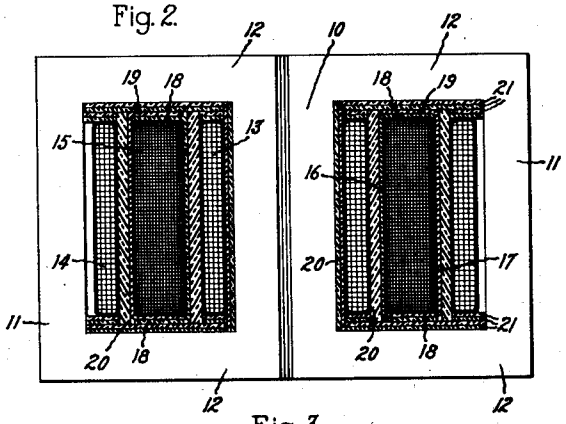
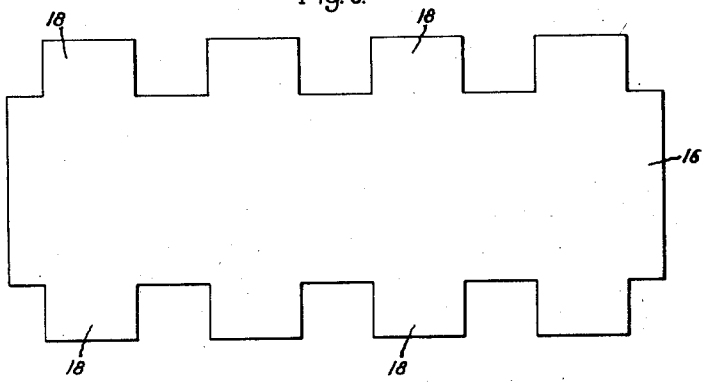


Fig. 3.



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TRANSFORMER WINDING INSULATION

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7 Claims. (Cl. 175—356)

My invention relates to transformer winding insulation and particularly to insulation between the high voltage winding and the low voltage winding and core of a transformer having windings of the cylindrical type. A high voltage cylindrical transformer winding must be insulated from the low voltage winding beside it and also from the core yokes at its ends. The general object of the invention is to provide a transformer having a high voltage cylindrical winding with an improved form of insulation and to provide an improved method for producing the insulated winding.

Further objects and advantages will be explained in the following description taken in connection with the accompanying drawing in which Fig. 1 is a plan view of a high voltage cylindrical winding transformer with the high voltage winding provided with insulating cylinders in accordance with the invention, part of the magnetic core being broken away to show the windings and insulating cylinders more clearly; Fig. 2 is a view on the line 2—2 of Fig. 1; and Fig. 3 is an explanatory view of one of the insulating cylinders opened out into a plane.

The transformer shown in Figs. 1 and 2 is of the distributed core type with cylindrical windings. The core has a central winding leg 10 and four outer legs 11 connected to the winding leg by top and bottom yokes 12. The low voltage winding is formed in two concentric cylindrical sections 13 and 14 and the cylindrical high voltage winding 15 is arranged concentrically between the two sections of the low voltage winding and spaced from both the core yokes 12 and the low voltage winding sections 13 and 14.

The high voltage winding 15 is protected by insulation including an inner insulating cylinder 16 and an outer insulating cylinder 17. The inner cylinder 16 is assembled inside the high voltage winding 15 and between it and the inner low voltage winding section 13. This cylinder 16 is approximately as long as the windings and is formed with tongues spaced along its two edges. The tongues 18 are formed integrally with the cylinder 16 and after the winding and cylinder are assembled the tongues are bent across the ends of the winding 15. The integrally formed cylinder and tongues are formed of flexible insulating material so that the tongues may be bent without cracking. Fig. 3 shows the cylinder 16 and its end tongues opened out into a plane to indicate the disposition of the tongues along the edges of the cylinder. The tongues 18 are spaced and positioned along the edges of the cylinder so as to lie between the ends of the winding and the adjacent core yokes 12 as indicated in Fig. 1. Each tongue 18 is somewhat wider than the adjacent core yoke to increase the creepage distance between the yoke and the high voltage winding 15.

The outer insulating cylinder 17 is assembled outside the high voltage winding 15 and between it and the outer low voltage winding section 14. This cylinder is of greater diameter but is otherwise similar to the inner cylinder 16, having integral tongues 19 spaced along its edges. These tongues are bent across the ends of the high voltage winding 15 after the winding and cylinder are assembled. The tongues 18 and 19 overlap and provide effective insulation between the high voltage winding 15 and the core yokes 12.

The sections of the insulating cylinders 16 and 17 between oppositely disposed tongues 18 are flattened as shown in Fig. 1 so that the tongues may be bent along straight lines without wrinkling. The corresponding sections of the windings are also preferably flattened so that the cylinders and windings will fit together when assembled on the core. Additional insulation such as insulating cylinders 20 and annular insulating collars 21 may be provided between the windings and between the windings and core.

The cylinders 16 and 17 with their overlapping tongues 18 provide effective insulation between the high voltage winding and the low voltage winding and core. At the same time, the ends of the windings, and particularly the ends of the high voltage winding are freely accessible for the connection of terminal and tap connections. The insulating cylinders 16 and 17 with their integral tongues 18 may be very easily produced and assembled with the winding 15 which they protect.

The invention has been explained by describing and illustrating a particular form of transformer provided with insulation in accordance with the invention but it will be obvious that changes may be made without departing from the spirit of the invention and the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States, is,—

1. A transformer having a core with a winding leg connected to another core leg by yokes, a winding on the winding leg, and an insulating cylinder arranged concentrically with the winding, said insulating cylinder having an integral tongue bent across an end of the winding between it and an adjacent yoke.

2. A transformer having a core with a winding

leg connected to another core leg by yokes, a winding on the winding leg, an insulating cylinder arranged concentrically inside said winding, a second insulating cylinder arranged concentrically outside said winding, said cylinders having integral overlapping tongues bent across an end of the winding between it and an adjacent yoke.

3. A transformer having a core with a winding leg connected to other core legs by yokes, a winding on the winding leg, and an insulating cylinder arranged concentrically with the winding, said insulating cylinder having integral tongues spaced along one edge and bent across an end of the winding between it and an adjacent yoke.

4. A transformer having a core with a winding leg connected to another core leg by yokes, a winding on the winding leg, and an insulating cylinder arranged concentrically with the winding, said insulating cylinder having a flattened side and an integral tongue at said flattened side bent across an end of the winding between it and an adjacent yoke.

5. The method of producing an insulated transformer winding, said method including the steps of forming an insulating cylinder with an integral end tongue, concentrically assembling the winding and cylinder, and subsequently bending said tongue across an end of the winding.

6. The method of producing an insulated transformer winding, said method including the steps of forming an insulating cylinder with integral tongues spaced along one edge, concentrically assembling the winding and cylinder, and subsequently bending said spaced tongues across an end of the winding.

7. The method of producing an insulated transformer winding, said method including the steps of forming two insulating cylinders with integral end tongues, concentrically assembling the winding between the two cylinders, and subsequently bending said tongues across an end of the winding in overlapping relation.

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