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1,909,059

COMMUTATOR CLAMPING RING

Filed May 25, 1931

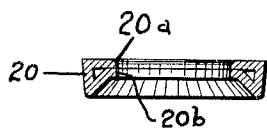
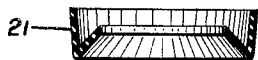


Fig. 1



Old form of V-insulating ring.

Fig. 2

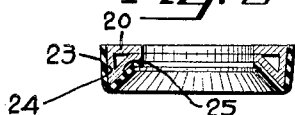


Fig. 3

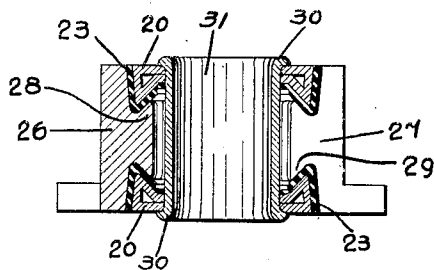


Fig. 4

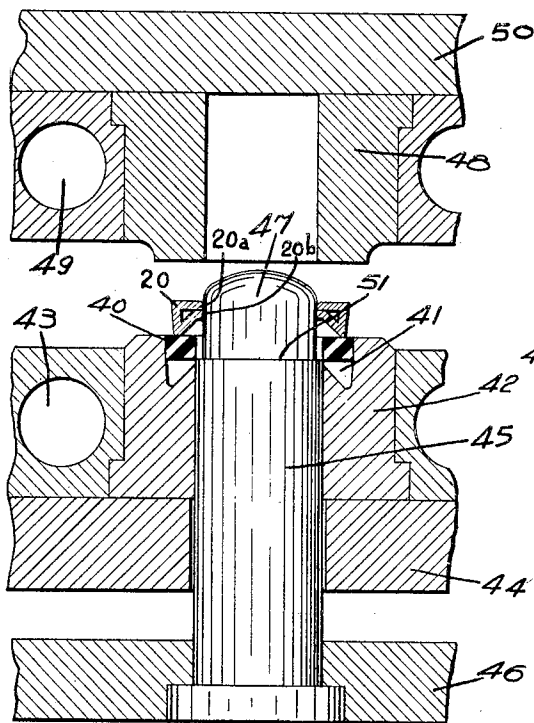


Fig. 5

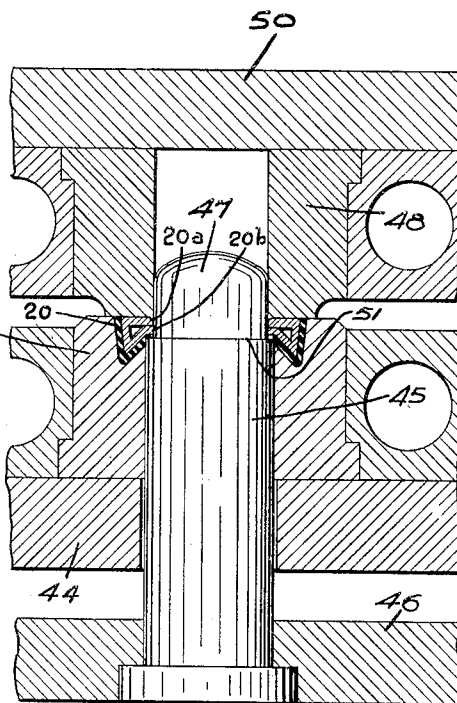


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COMMUTATOR CLAMPING RING

Application filed May 25, 1931. Serial No. 539,817.

This invention relates to the manufacture of commutators for dynamo electric machines and more particularly with the type of commutator which comprises an annulus of commutator segments alternating with non-conducting segments or spacers, the segments and spacers having dove-tail tangs projecting inwardly so as to provide anchoring means which cooperate with clamping rings one at each end of the commutator. The clamping rings are held in clamping position by a tubular core or hollow rivet which has its end peripheries spun over or swaged over the outside surfaces of the clamping rings respectively. Each clamping ring is insulated from the segments by a non-conducting ring usually known as a V-ring on account of its cross sectional contour. The cost of the V-insulating ring is a material part of the total cost of the commutator since these rings must have good insulating properties and must be sufficiently strong to withstand the high pressure to which the clamping rings are subjected during the operation of riveting over the ends of the hollow core or tubular rivet which secures the clamping rings in position. The material of the V-ring must have the property of becoming slightly plastic when heated so that during the riveting operation the V-ring will yield slightly to compensate for slight differences in dimensions of the metal segments and insulating segments to which it transmits clamping pressure from the clamping ring. The insulating V-rings are generally made of formed flake mica.

It is one of the objects of the present invention to decrease the cost of manufacture of commutators of this type. In order to accomplish this object I provide the commutator segment engaging surfaces of the V-ring with a coating of insulating material having the property of becoming slightly plastic when heated and being sufficiently strong to withstand the riveting pressure applied to the clamping rings when assembling the commutator.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawing wherein a pre-

ferred embodiment of one form of the present invention is clearly shown.

In the drawing:

Fig. 1 is a cross sectional view of a commutator segment clamping ring formerly used in the manufacture of commutators.

Fig. 2 is a cross sectional view of an insulating V-ring formerly used in the manufacture of commutators.

Fig. 3 is a cross sectional view of a clamping ring provided with a coating of insulating material according to the present invention.

Fig. 4 is a cross sectional view of a commutator using two of the insulated clamping rings shown in Fig. 3.

Fig. 5 is a cross sectional view showing in open position the molding press for receiving the clamping ring in a quantity of molding material.

Fig. 6 is a view similar to Fig. 5 showing the press in closed position and the molding material molded around certain surfaces of the clamping ring.

The clamping ring 20 shown in Fig. 1 is one which has been made according to the process disclosed in J. J. Carter's Patent #1,673,800 issued June 19, 1928. In the manufacture of commutators the ring 20 was associated with a V-insulating ring 21 shown in Fig. 2. I find that the ring 20 is adapted for use in the present invention since it is made by deforming sheet metal and therefore its surfaces are sufficiently rough to assist in the bond of molding material to the clamping ring. Fig. 3 shows the clamping ring 20 with the molding material 23 bonded with the commutator segment clamping surfaces 24 and 25 of the ring. Fig. 4 shows a commutator comprising an annulus of commutator segments 26 and insulating segments 27 alternating with the metal segments 26 and insulating segments 27 alternating with the metal segments. The metal segments have dove-tail segments 28 and the insulating segments have dove-tail tangs 29 which provide anchoring means cooperating with the clamping ring 20 which hold the segments in position when clamping pressure is applied to the clamping rings 20 by riveting over the

ends 30 of a tubular rivet or core 31. The commutator is manufactured preferably according to the process described in the patent to O. F. Conklin #1,503,484, issued August 5, 1924. This process includes the step of heating the assembled commutator before the final riveting pressure is applied to the peripheral edges of the core 30. The commutator assembled is heated sufficiently to cause the insulation 21 to become relatively plastic so that during the final riveting operation the walls of the insulation 21 will yield to allow for irregularities in the dimensions of the segments 26 and 27 while the clamping rings 20 are being forced into final position as the riveting of the ends of the core 30 is completed as shown in Fig. 4.

In order to provide the clamping rings 20 with a coating or lining of insulating material 23 I have provided a molding compound consisting of a moldable powder of bakelite or other phenolic condensation product mixed with coarse fibrous material. I have found that this fibrous material may be shredded wood fiber, small bits of cloth, chopped rope, stringy hair fibers, asbestos for example. What is needed for this process is a reenforcing material which will permit softening of the bakelite sufficiently so that the insulation will yield without cracking during the final riveting operation.

An annular pill 40 of this material is pressed in the cavity 41 of a suitable mold 42 surrounded by a heating chamber 43 and supported by a plate 44. The mold 42 slidably receives an ejector pilot 45 supported by an ejector plate 46. The pilot 45 is provided by an upward portion 47 of reduced diameter adapted to be received by an opening within the upper mold member 48 which is surrounded by a heating chamber 49 and supported by a plate 50. The portion 47 of pilot 45 is slightly less in diameter than the internal diameter of the ring 20 so that it provides a pilot for the ring 20 while the ring is being forced downwardly into the molded material 40 as the upper mold 48 moves downwardly from the lower mold 42 as shown in Fig. 6. As the molding material 40 quickly becomes plastic in the heated mold 42 while the material is being compressed between the ring 20 and the mold 42, the molding material tends to hold the ring 20 against the upper surfaces of mold 48. Hence, the upper surfaces of the ring 20 will not be coated with molding material. The shoulder 51 of the pilot 45 is located during the molding operation a distance below the upper surface of the mold 42 which is greater than the thickness of the two flanges 20a and 20b of the ring 20. There is provided a clearance between the shoulder 51 and the lower surface of the mold 48 when in position shown in Fig. 6. This space will be occupied by some of the molding material. After the molding

operation, the plate 50 is elevated and then the plate 46 in order to elevate the pilot 45 with respect to the mold 42 the shoulder 51 of the pilot 45 ejects the insulation coating ring 20 from the mold. Since the mold 42 has highly polished surfaces the molded insulation does not adhere to it but does adhere to the ring 20 which has a relatively rough surface resulting from forming it of ordinary sheet material.

While the form of embodiment of the present invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. A commutator clamping ring having insulating material bonded thereon.
2. A commutator clamping ring having insulating material comprising reenforcing fibrous material imbedded in said insulating material and bonded to said ring.
3. A commutator clamping ring formed of steel having a coating of reenforced nonconducting material bonded thereon.
4. A commutator clamping ring formed of sheet metal having a coating of artificial resinous molding powder mixed with nonconducting fibrous material bonded thereon.

In testimony whereof I hereto affix my signature.

EDWARD A. KAEGI.