Oct. 10, 1939. C. P. POTTER. 2,175,915

ROTOR FOR DYNAMO ELECTRIC MACHINES

Filed June 3, 1937

FIG. 1.

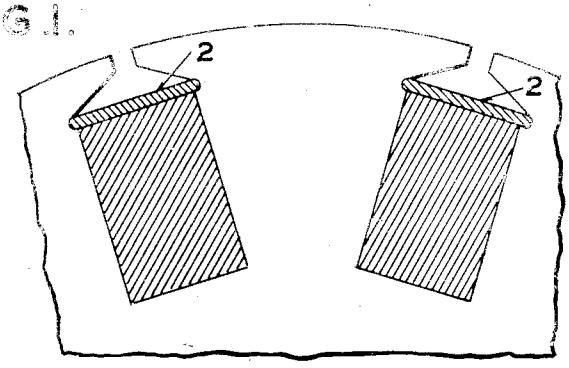


FIG. 2.

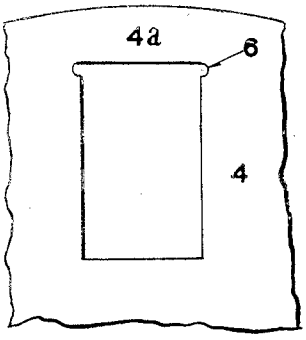


FIG. 3.

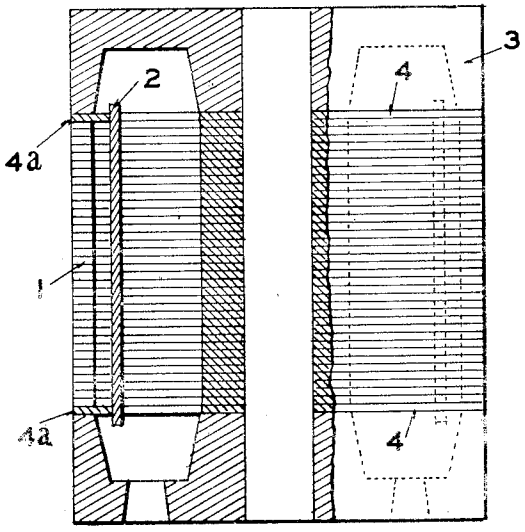


FIG. 4.

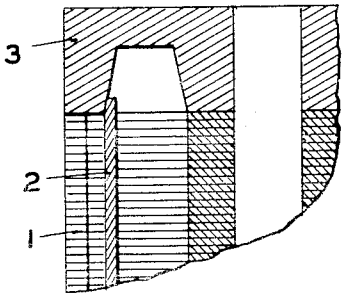


FIG. 5.

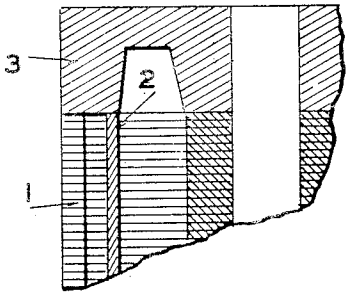
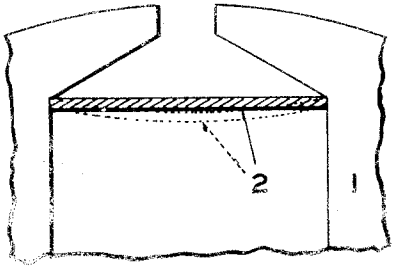


FIG. 6.



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UNITED STATES PATENT OFFICE

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ROTOR FOR DYNAMO-ELECTRIC MACHINES

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Application June 3, 1937, Serial No. 146,165

2 Claims. (Cl. 172—120)

My invention relates to a cast conductor type of rotor or stator element for dynamo-electric machines and method of forming the same. As is well known, the cast type of squirrel cage rotor for induction motors develops greater heat under specific load conditions when it is formed of aluminum than does the well known type of squirrel cage rotor formed with copper bars and end rings. The chief reason for this excessive heating of cast aluminum rotors as heretofore made is that during the casting process fluid aluminum flows to some extent out of the slots and between the laminae and toward the periphery thereof and in the subsequent finishing operation wherein the surface of the rotor is either turned or ground, a small amount of aluminum is distributed over the surface of the rotor, a condition which is conducive to the development of eddy currents. The object of my invention is to overcome the difficulty just described.

In the accompanying drawing Figure 1 is a fragmentary view, partly in elevation and partly in section, showing two laminae slots and contained conductor bars and barrier of a rotor constructed in accordance with my invention; Figure 2 illustrates a type of slot formed in the end laminae under one modification; Figure 3 is a laminae assembly and associated mold elements for forming a cast aluminum squirrel cage thereon; Figures 4 and 5 show modifications in means for eliminating casting metal from the outer portions of the slots; and Figure 6 illustrates a method of applying the non-magnetic barriers to the slots prior to the casting operation.

As illustrated in plan view in Figures 1 and 6, I have shown laminae punchings for forming semi-open type conductor slots. The purpose of my invention is to provide a plurality of laminae of this kind assembled as shown in Figure 3. After assembly, barriers 2 are passed through each slot of the assembly at a point inwardly spaced from the periphery thereof. These barriers are of non-magnetic material and are applied to form a sufficiently close joint with the slot walls to prevent flow of conductor casting material from the part of the slots radially inward from the barriers into the outer ends of the slots.

The parts indicated by the numeral 3 in Figures 3, 4 and 5 are ring molds to be applied at each end of the assembly and provided with cavities for forming the cast end rings integral with the conductor bars.

I have illustrated three different means for preventing flow of casting material into the outer portions of the slot during the casting operation. In Figure 3 a special form of laminae punching 4 is used at each end of the assembly, said punching being provided with closed slots, as illustrated in Figure 2, and the bridge portions 4a of these slots being so dimensioned that they cooperate with the barriers 2 to prevent flow of casting metal from the end ring cavities of the molds into the outer portions of the slots formed by the assembled laminae.

In the modification illustrated in Figure 4, the ring mold cavity is so proportioned that the extensions of the barriers 2 contact with the walls thereof to accomplish the purpose just described, and Figure 5 illustrates a structure in which the ends of the barriers bear upon the face of the ring mold.

The laminae punchings can be provided with opposed recesses 6 for the reception of the edges of the barriers or, in the alternative construction illustrated in Figure 6, a slightly over-size non-magnetic barrier can be distorted into the shape indicated in dotted lines for application to the slots and then forced to plane conformation, this straightening operation producing enough pressure between the edges of the barriers and the rotor laminae to make a tight joint.

In completing the rotor, the parts as illustrated, for example in Figure 3, are clamped together and molten aluminum applied to fill the mold cavities and the portions of the closed passages through the laminae assembly formed by means of the barriers 2.

By the means and method described I am enabled to form a cast aluminum squirrel cage rotor which compares favorably, from the standpoint of heat developed in operation, with copper squirrel cages.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. A laminae assembly, for use in forming a cast conductor type of rotor or stator element of a dynamo-electric machine, which comprises a plurality of assembled laminae having aligned conductor receiving slots, a barrier of non-magnetic material extending across each assembly slot at a position displaced inwardly from the periphery of the assembly, said barriers functioning with the slot walls radially inward of the barriers to form closed passages extending through the assembly for receiving and retaining molten conductive material.

2. A laminae assembly, for use in forming a

cast conductor type of rotor or stator element of a dynamo-electric machine, which comprises a plurality of assembled laminae having aligned open type conductor receiving slots, a barrier of non-magnetic material extending across each assembly slot at a position displaced inwardly from the periphery of the assembly, said barriers functioning with the slot walls radially inward of the barriers to form closed passages extending through the assembly for the reception of molten conductive material, each end lamina of the assembly having closed type slots so proportioned that the lamina material between them and the periphery of the lamina forms a barrier during the casting operation against flow of molten material from the end ring forming elements of the mold into the portions of the slots outward of the first mentioned barriers.

CHARLES P. POTTER.