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F. P. LAUFFER ET AL

ROTOR FOR INDUCTION MOTORS

Filed March 29, 1924

Fig. 2.

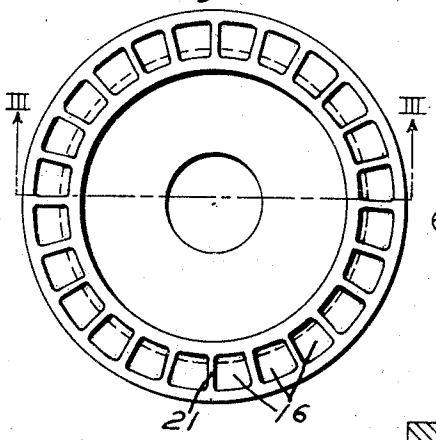


Fig. 3.

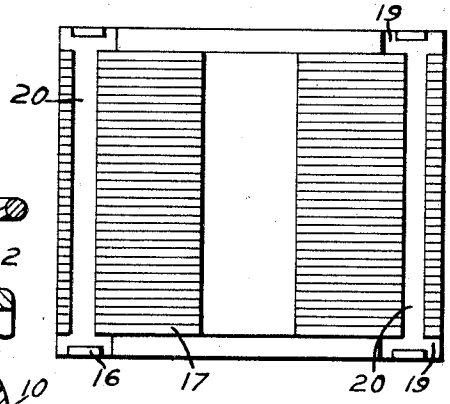
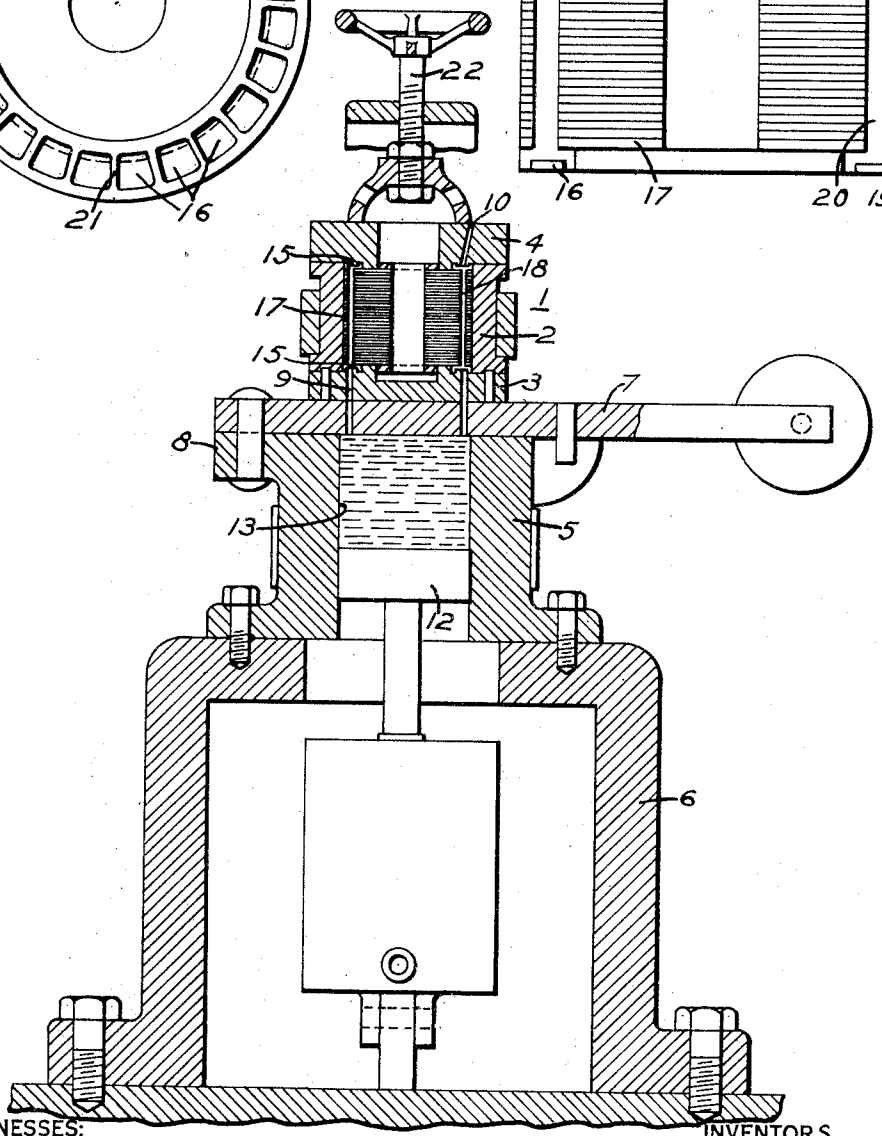


Fig. 1.



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UNITED STATES PATENT OFFICE.

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ROTOR FOR INDUCTION MOTORS.

Application filed March 29, 1924. Serial No. 702,733.

Our invention relates to rotors or armatures of dynamo-electric machines, more especially to die-cast rotors in which the end rings and conductor bars are formed integrally with the laminated body portion of the rotor member.

It is among the objects of our invention to provide a rotor having specially formed end ring portions for the purpose of expediting manufacture and producing such rotors in relatively large quantities with uniform results.

In a copending application, Serial No. 651,222, filed July 13, 1923, is described a process and apparatus for die casing the conductor members of squirrel-cage rotors which utilizes insert metal strips for the end ring portions to produce a uniform shrinkage of the cast metal, for the purpose of eliminating the formation of bubbles and fallen surfaces.

Our present invention is directed to means for accomplishing this result with greater simplicity and in a more positive manner, in that we eliminate the metal strip inserts in the end rings and thereby all variable factors that were introduced by the use thereof and caused by the differences in size and characteristics of the metal.

We accomplish this result by utilizing a special jig or mold, having a reservoir for molten metal associated therewith, in which the end portions are formed in such manner as to produce a rotor casting having a plurality of equally spaced recesses corresponding to a channel section having radially extending reinforcing ribs. The channel section comprises an end ring of uniform cross-section, which assures uniform cooling and setting of the molten metal, thereby eliminating irregularities.

In the accompanying drawing constituting a part hereof and in which like reference characters designate like parts,

Fig. 1 is a vertical sectional view of a die-casting mechanism for forming rotors in accordance with our invention.

Fig. 2 is an end elevational view of a rotor made in accordance therewith, and

Fig. 3 is a cross-sectional view thereof taken along the line III—III of Fig. 2.

Referring to Fig. 1, the illustrated casting device, which is shown for the purpose of making clear the method of making a rotor, comprises a jig or die member 1 having a cylindrical matrix portion 2, a base plate 3 and a pressure ring 4, the base plate 3 being mounted upon a cylinder 5 that is supported on a base 6. A lever 7 is pivotally mounted upon an extending lug 8 on the member 5, and a plurality of communicating port holes 9 are provided in the lever 7 and the base plate 3. Vent holes 10 are provided in the pressure ring 4 to permit the escape of trapped gases during the casting of the metal. A piston 12 is adapted to move vertically in the center opening 13 of the cylinder 5, which constitutes a reservoir for molten metal that is forced through the ports 9 into the die 1.

The base plate and pressure ring 3 and 4, respectively, are each provided with projections 15 corresponding in shape to the recesses 16 in the end rings of the rotor shown in Figs. 2 and 3 to produce a channel section in the cast metal formed in the die.

The rotor embodying the invention is cast by suitably positioning the laminated portion or body 17 in the die between the base plate 3 and pressure ring 4, as shown in Fig. 1, whereby channel-shape spaces between the laminated body and the die member, in direct communication with the respective ends of vertical slots or openings 18 of the body 17, are provided. These spaces are filled by suitably actuating the piston 12 to force the molten metal into the cylinder 5 upwardly through the port holes 9; and the resultant casting, as shown in Figs. 2 and 3, represents a complete squirrel-cage rotor having end rings 19 and integral conductor bars 20.

The end rings 19 are of substantially channel-shaped cross-section having uniformly spaced radial reinforcing ribs 21. This method of construction produces a homogeneous grain structure in the metal, as there is a uniform setting of the metal through the channel section and the casting pressure exerted by the piston member 12 assures a uniformly dense structure of the conductor bars 20.

After the casting is formed, the lever 7 is actuated in a suitable manner to break off the sprues formed in the ports 9, and the rotor may be removed by unscrewing the hand-wheel-operated screw shaft 22. Another rotor is then inserted and the operation repeated.

It is evident from the foregoing description of our invention that die-cast rotors made

in accordance therewith may be formed expeditiously and in production quantities with uniform results and that such process is especially applicable to the manufacture of small rotors of the squirrel-cage type.

Although we have described a specific embodiment of our invention it will be obvious to those skilled in the art that various modifications may be made in the design and proportions of the rotor structure without departing from the principles herein set forth.

We claim as our invention:—

1. A rotor having its end rings and conductor bars integral therewith, said end rings being of substantially channel-shape in cross-section and provided with re-inforcing ribs.

2. A rotor having its end rings and conductor bars integral therewith, said end rings being of substantially channel-shape in cross-section and provided with radial re-inforcing ribs in the channel portions.

3. A rotor having its end rings and conductor bars integral therewith, said end rings being of substantially channel-shape in cross-section and provided with uniformly spaced radial re-inforcing ribs.

4. A die-cast rotor having molecularly integral conductor bars and end rings, said end rings being provided with a plurality of recesses in their outer sides at points opposite the ends of the conductor bars and having outer peripheries substantially uniform in cross-section.

In testimony whereof, we have hereunto subscribed our names this 20th day of March, 1924.

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