

Oct. 12, 1926.

1,602,947

G. SCHROEDER

FRAME FOR DYNAMO ELECTRIC MACHINES

Filed Jan. 26, 1917

3 Sheets-Sheet 1

Fig. 1.

Fig. 2.

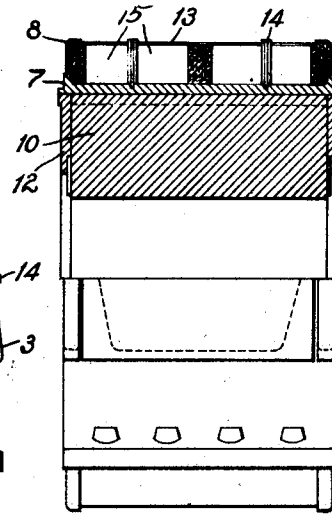
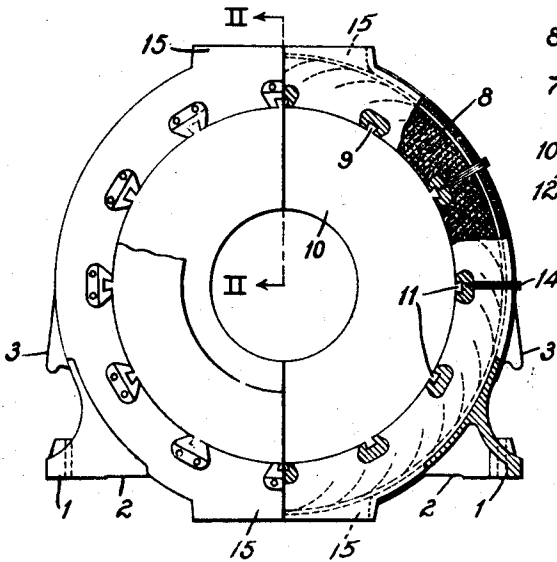
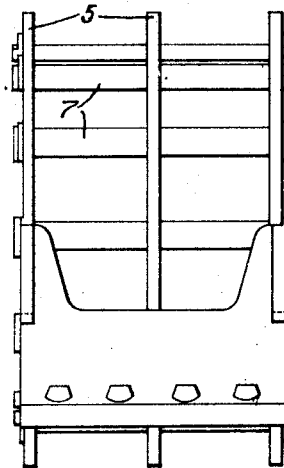
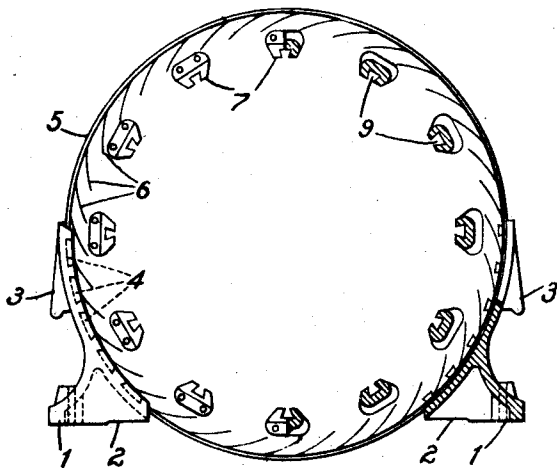


Fig. 3.

Fig. 4.



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Fig. 5.

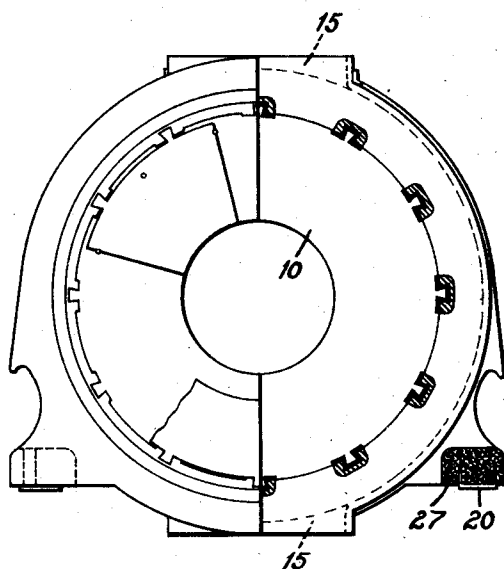


Fig. 6.

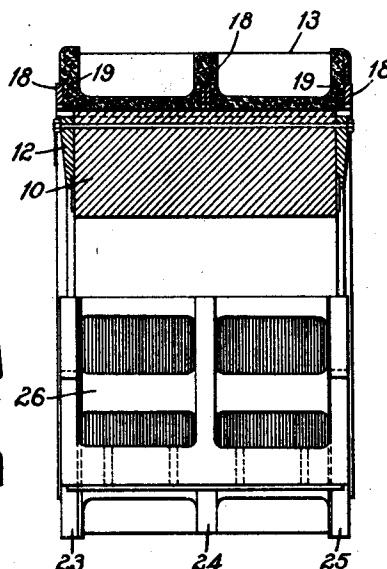


Fig. 7.

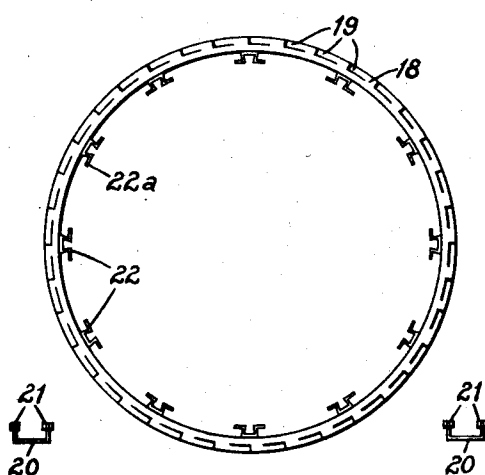
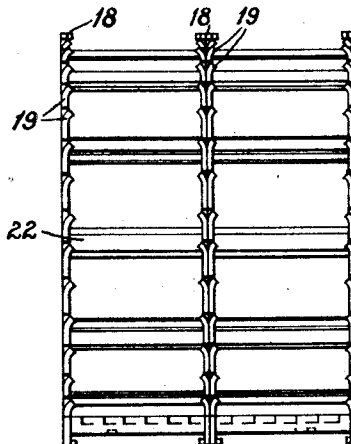


Fig. 8.



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Fig. 9.

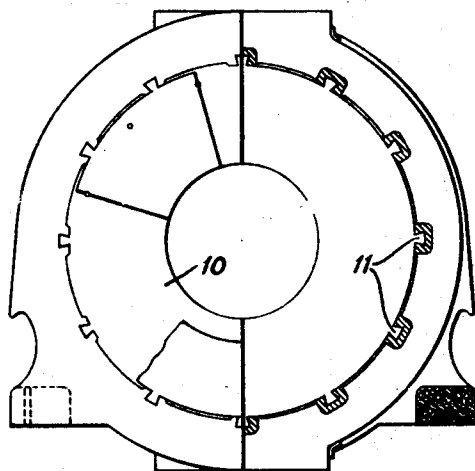
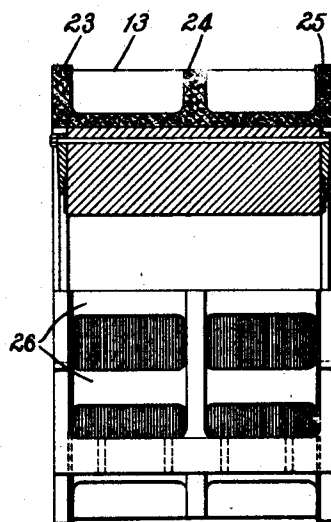


Fig. 10.



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UNITED STATES PATENT OFFICE.

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FRAME FOR DYNAMO-ELECTRIC MACHINES.

Application filed January 26, 1917, Serial No. 144,666, and in Great Britain February 11, 1916.

My invention relates to dynamo-electric machines and particularly to supporting or enclosing frames for the stationary magnetizable core members of machines of large capacity, such as turbo-generators.

In machines of the above-mentioned type, the armature frames or yokes have heretofore been composed of cast-iron and, while the frame is not required to carry any magnetizing flux, nevertheless, considerable energy losses occur therein because of eddy currents and hysteresis. Consequently, if the material used for the frame be substantially non-magnetic and a non-conductor of electric currents, no energy losses, due to stray magnetic lines of force, will be generated in the frame structure.

According to the present invention, I construct either all or part of the frame or yoke of plastic non-conducting material such as concrete which may, if necessary, be strengthened by metal, preferably steel, in a manner similar to the ordinary reinforced or ferro-concrete. By this means, the energy losses in the frame, which are liable to be particularly large in the case of modern high speed machines having cast-iron frames or yokes, are very considerably reduced or entirely eliminated.

In the accompanying drawings, Fig. 1 is a view, partially in section and partially in end elevation, of a dynamo-electric machine constructed in accordance with my invention; Fig. 2 is a view, in side elevation, the upper part being a section along the line II—II of Fig. 1; Fig. 3 is a view, in end elevation, and Fig. 4 is a view, in side elevation, of the skeleton frame-work of Figs. 1 and 2 assembled in position before pouring the concrete; Figs. 5 and 6 are views similar to Figs. 1 and 2, respectively, showing a modification of my invention; Figs. 7 and 8 are views similar to Figs. 3 and 4, respectively, showing the skeleton steelwork of Figs. 5 and 6 in position before pouring the concrete; and Figs. 9 and 10 are views similar to Figs. 1 and 2, respectively, showing a further modification of my invention.

Referring now to Figs. 3 and 4, the skeleton frame comprises feet 1 that are machined on their under sides to provide seats 2 for a suitable bed plate and are respectively provided with upwardly extending curved portions 3. The concave surfaces of

the portions 3 are provided with wedge shaped recesses 4, for a purpose to be hereinafter described. A plurality of metallic rings 5, preferably formed from soft bar steel bent to the desired diameter and with their edges serrated and bent inwardly to form prongs 6, are secured in spaced relation to the feet 1. Longitudinal ribs 7 are circumferentially arranged within the rings 5 and are maintained in spaced relation therefrom and from each other by means of a suitable jig, (not shown).

Suitable molds are then placed around the rings 5 and the portions of the ribs 7 adjacent thereto and concrete or any other similar plastic material is poured therein. The molds being then removed, the final structure shown in Figs. 1 and 2 is provided, wherein the rings 5 and the prongs 6 are completely surrounded by concrete 8, and the respective ends and side portions of the ribs 7 are embedded in the inner circumferential portions of the solid rings of concrete, thereby forming a substantially unitary structure. The ribs 7 are respectively provided with dove-tail shaped grooves 9 within which are seated corresponding projections 11 that are formed on the outer surface of an annular magnetizable core member 10. The core member 10 is provided with end plates 12 which are located within the ribs 7 and are secured thereto by any suitable means. A sheet-metal enclosing casing 13 is secured to the feet 1 and to the ribs 7 by radially-extending supporting members 14. The casing is provided with openings 15 at the top and bottom thereof by means of which a cooling medium may circulate in the enclosed spaces between the solid rings of concrete and between the outer surface of the core member 10 and the casing 13.

Referring now to Figs. 7 and 8, the skeleton frame comprises rings 18 having their outer edges serrated and bent outwardly to form prongs 19, channel-shaped reinforcing members 20 for the feet, the flanges of which are serrated to form prongs 21 and dove-tail shaped ribs 22 having oppositely disposed flanges 22^a extending longitudinally between the rings 18 and secured to the inner peripheries thereof.

Suitable molds are then placed around the rings 18, the channels 20 and the ribs 22 and the concrete or other suitable plastic

material is poured therein. The completed structure is best shown in Figs. 5 and 6 wherein the rings 18 and the prongs 19 are imbedded in solid concrete rings 23, 24 and 25 which are connected by concrete cross pieces 26 that are supported by the flanges 22^a of the ribs 22. The concrete rings are further connected by concrete feet 27 within which are imbedded the channel shaped members 20. An annular magnetizable core member 10, provided with end plates 12, is secured to the ribs 22 by means of suitable peripheral projections coacting with the dove-tail slots of the ribs. An enclosing casing 13 is secured to the rings 23, 24 and 25 in any suitable manner and is provided with openings 15 whereby a cooling medium may be forced over the outer surface of the core member 10, as described with reference to Figs. 1 and 2.

In the modifications shown in Figs. 9 and 10, the core member 10 is surrounded by suitable molds, and the concrete is cast around it to form solid concrete rings 23, 24 and 25 and cross-pieces 26, as described with reference to Figs. 5 and 6, the concrete cross pieces 26 completely imbedding the dove-tail projections that are provided around the periphery of the core member. The completed concrete frame is provided with an enclosing casing 13 and the passage of a cooling medium between the casing 13 and the outer surface of the core member 10 may be effected as described with reference to Figs. 1 and 2.

While I have shown my invention in several preferred forms, it is not so limited, as other arrangements of the reinforcing frame may be provided and I desire that only such limitations shall be placed thereupon as come within the scope of the appended claims.

I claim as my invention:

1. A frame for the magnetizable stator core member of a dynamo-electric machine composed of reinforced concrete.

2. A frame for the magnetizable stator core member of a dynamo-electric machine comprising a metallic skeleton structure embedded in non-conducting material.

3. A frame for the magnetizable stator core member of a dynamo-electric machine comprising a metallic skeleton structure embedded in concrete.

4. A frame for the magnetizable stator core member of a dynamo-electric machine comprising a plurality of spaced rings and a plurality of circumferentially arranged longitudinal ribs embedded in non-conducting material.

5. In a dynamo-electric machine, the com-

bination with a magnetizable stator member, of a plurality of longitudinal ribs for supporting said member, the said ribs being embedded in non-conducting material.

6. In a dynamo-electric machine, the combination with an annular magnetizable stator member, of a plurality of circumferentially arranged longitudinal ribs for supporting said member, the said ribs being embedded in concrete.

7. In a dynamo-electric machine, the combination with an annular magnetizable member, of a plurality of circumferentially arranged longitudinal ribs for supporting said member, the said ribs being embedded in concrete and being united by spaced annular members also of concrete.

8. In a dynamo-electric machine, the combination with an annular magnetizable member, of a plurality of circumferentially arranged longitudinal ribs for supporting said member, and a plurality of spaced rings surrounding said ribs, the said ribs and the said rings being embedded in concrete to form a unitary structure.

9. An article of manufacture comprising the flux-carrying parts of the stator member of a dynamo-electric machine, and auxiliary members secured thereto and adapted to serve as reinforcing members in a surrounding supporting structure to be made of a moldable supporting material.

10. A stator member for a dynamo-electric machine, comprising a magnetizable yoke member designed for good electrical characteristics and a supporting concrete structure designed for good mechanical characteristics, as required for supporting said yoke member, said supporting structure including ventilating ducts adapted to conduct a cooling fluid into operative relation to said yoke member.

11. In a dynamo-electric machine, a concrete supporting structure having air passages, the stator comprising a core and a supporting frame therefor, said frame being substantially embedded in said concrete structure and having openings to coact with said air passages.

12. In a dynamo-electric machine, a concrete supporting structure having air passages, a stator comprising a portion embedded in said concrete structure and having gaps coacting with said air passages.

13. A dynamo-electric machine comprising a stator formed partly of concrete, said concrete having ventilating passages therein.

In testimony whereof, I have hereunto subscribed my name this tenth day of January, 1917.

GIULIO SCHROEDER.