J. A. KUYSER.

DYNAMO ELECTRIC MACHINE.

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1,238,304.

Patented Aug. 28, 1917.

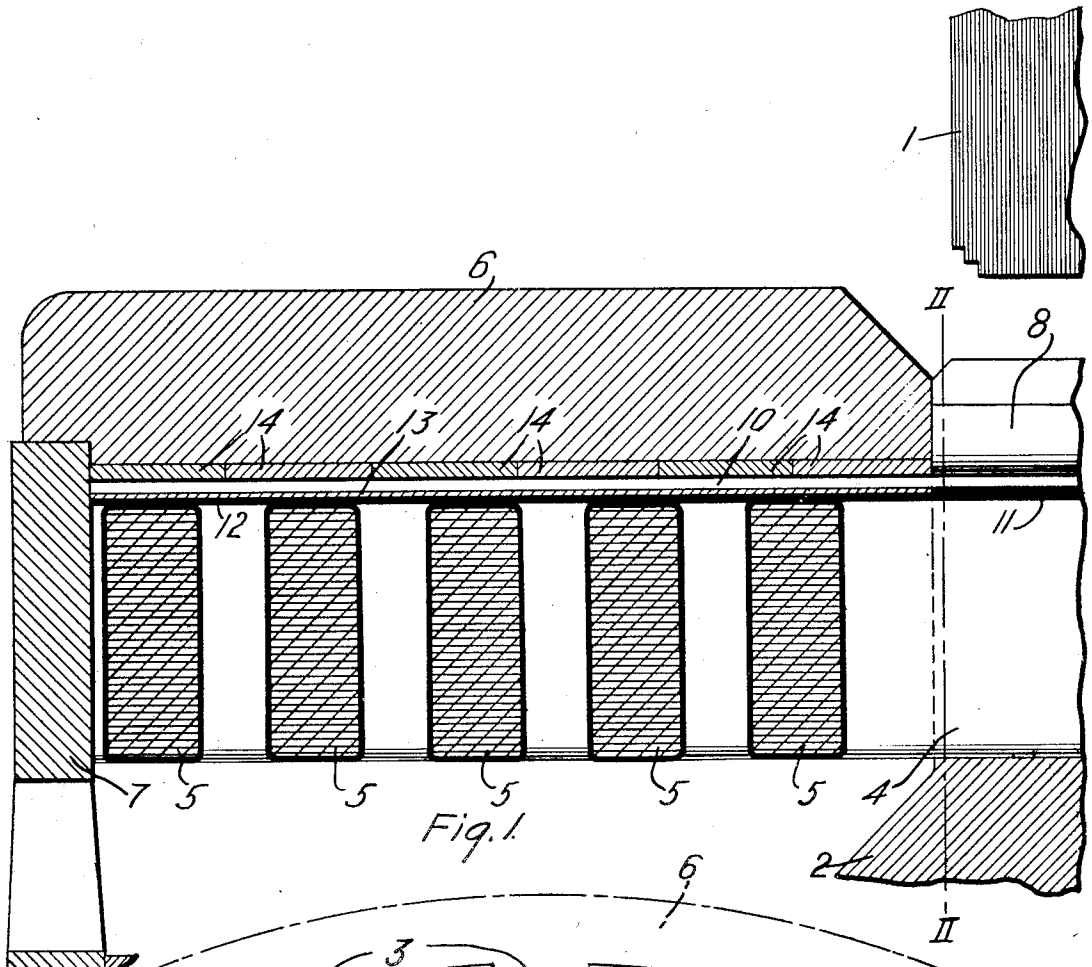


Fig. 1.

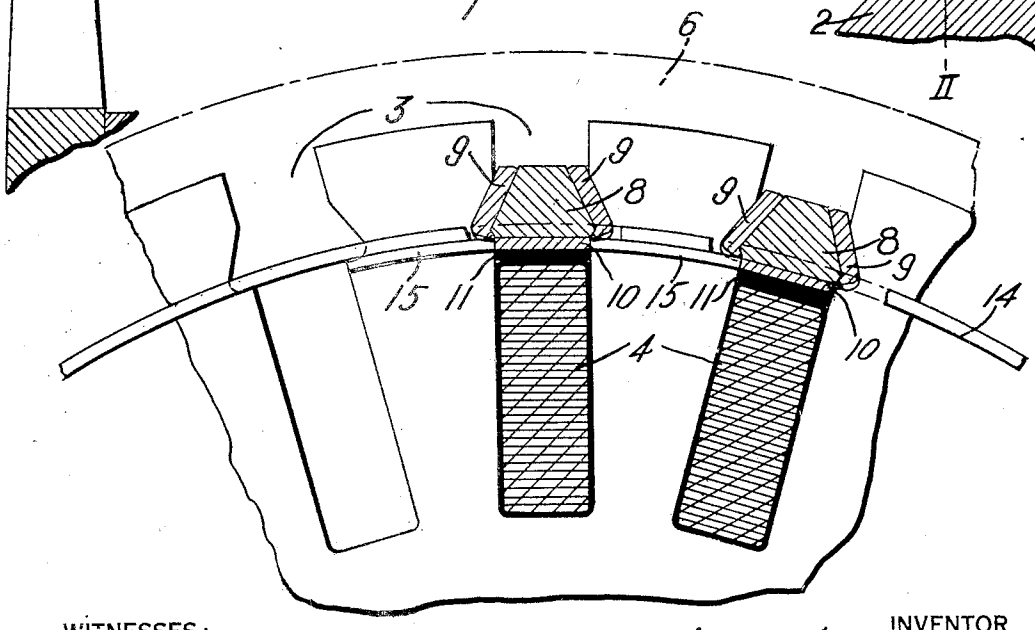


Fig. 2.

WITNESSES:

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DYNAMO-ELECTRIC MACHINE.

1,238,304. Specification of Letters Patent. **Patented Aug. 28, 1917.**

Application filed March 3, 1914. Serial No. 822,211.

To all whom it may concern:

Be it known that I, JAN ARTHUR KUYSER, a subject of the Queen of Holland, and a resident of Edgewood, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Dynamo-Electric Machines, of which the following is a specification.

My invention relates to dynamo-electric machines, and it has special reference to damping and coil-retaining means adapted for use particularly in connection with the overhanging end portions of the coils in rotors of high-capacity turbo-generators and similar machines that carry unbalanced electrical loads.

The object of my invention is to provide a single short-circuited damping grid, cooperating both with the rotor core proper, with the usual damper bars, and with the coil-retaining end rings, whereby I produce a mechanically efficient device that effectively fulfils the well known magnetic requirements of damper windings.

In the accompanying drawing, Figure 1 is a longitudinal central sectional view of a portion of a dynamo-electric machine embodying my invention, and Fig. 2 is a transverse sectional view of the structure shown in Fig. 1, the section being taken approximately along the line II—II in Fig. 1.

Referring to Fig. 1 of the drawing, the portion of a dynamo-electric machine here shown comprises a stator 1 and a rotor core 2 having slots 3 in which coils 4, arranged with the usual overhanging end portions 5, are suitably disposed. A coil-retaining ring 6, which may be formed of steel, encircles and peripherally supports the end portions 5 and is held in place by an apertured end plate 7, secured in any convenient manner to the shaft of the machine.

The structural details thus far described are well known in the art, and it is to be understood that the application of my invention is not limited thereto, but that they are shown merely to facilitate a clearer understanding of my invention.

The coils 4 are held in place by wedges 8, of copper or other conducting but non-magnetizable material. These wedges 8 constitute parts of a damping grid for the rotor, and are held in place by plates 9, shown in Fig. 2, which may be of steel or other suitable material.

Between the wedges 8 and the coils 4, and extending the whole length of the rotor, are copper straps 10. Each of the straps 10 is in direct contact with the wedge 8, but is separated from the coils 4 by a layer 11 of any suitable insulating material.

The end turns 5 of the coils 4 are surrounded by an insulating ring, which may be conveniently formed of a layer 12, of mica or other insulating material, formed on the inner surface of a cylinder 13, which may be of sheet steel. The extensions of the copper straps 10 rest upon this insulating ring, and are short-circuited by damper rings 14 which may be formed of copper straps, arranged with staggered or overlapping joints. The coil-retaining ring 6 rests directly upon the end rings 14, and its inner end is also in intimate contact, as shown, with the wedges 8.

In order to provide a continuous confining surface for the end turns 5, filling pieces 15, which may be formed of any suitable material and which are of the same thickness as are the copper straps 10, are disposed between the copper straps and above the end turns.

It will be readily understood from the foregoing description, and from the drawing, that an efficient damper winding is produced by the copper straps 10, in coöperation with the end rings 14, the wedges 8, and the coil-retaining rings 6. It will, of course, be understood that the structure shown and described is duplicated at the other end of the rotor.

The theory of operation of the damping grid, associated with the coil-retaining ring, in obviating, or reducing to a negligible value, the stray power losses that would otherwise develop in the body of a rotating field core, is deemed to be sufficiently well known to those skilled in the art to render unnecessary any explanation here.

Furthermore, a damping grid constructed in accordance with my invention will be most desirable from a mechanical standpoint, as will be readily understood from the following discussion. The steel retaining ring 6 has a relatively high tensile strength, as compared with the portions of the damping grid which are composed of strap copper, so that any distortion of the rings, due to the stresses set up therein by centrifugal force during the operation of the machine, will

only serve to force the overhanging portions of the damping grid into closer engagement with the steel retaining ring. It is also well known that the coefficient of expansion of copper is considerably higher than that of steel, therefore, any elongation of the rings 14 caused by the heat generated in the damping grid will also serve to bring the rings into closer engagement. It is apparent then that the overhanging portions of the damping grid will be held rigid by the retaining ring under all conditions of operation.

I do not wish to be restricted to the precise structural details which I have shown and described, but I desire that only such limitations shall be imposed upon my invention as are indicated in the appended claims.

I claim as my invention:

1. In a dynamo-electric machine, the combination with a core member provided with a plurality of coils having overhanging end portions, a plurality of coil-retaining devices coacting with said core member, and an annular member surrounding said end portions, of means located entirely within, and supported by, the said annular member and the said coil-retaining devices for reducing stray power losses in said machine.

2. In a dynamo-electric machine, the combination with a core member provided with a plurality of coils having overhanging end portions, a plurality of coil-retaining devices coacting with said core member, and an annular member surrounding said end portions, of an independent damping device located entirely within and beneath the said annular member and the said coil-retaining devices.

3. In a dynamo-electric machine, the combination with a core member provided with a plurality of coils having overhanging end portions, a plurality of coil-retaining devices coacting with said core member, and an annular member surrounding said end portions, of an independent damping grid having one portion thereof located within, and supported by, said annular member and other portions interposed between the said coil-retaining devices and the said coils.

4. In a dynamo-electric machine, the combination with a core member provided with a plurality of coils having overhanging end portions, a plurality of coil-retaining devices coacting with said core member, and an annular member surrounding said end portions, the said annular member being of relatively high tensile strength, of an independent damping grid having portions thereof located beneath said coil-retaining devices and another portion of relatively low tensile strength located within said annular member and in engagement therewith.

5. In a dynamo-electric machine, the combination of a core member having a plurality of peripheral slots and a plurality of coils severally disposed in the said slots, the said coils having overhanging end portions, a plurality of wedges of conducting but non-magnetizable material also disposed in the said slots and serving to retain the coils therein, an annular member for peripherally supporting the said end portions of the coils, and a damping grid intimately associated with the said wedges and with the said annular member.

6. In a dynamo-electric machine, the combination of a core member having a plurality of peripheral slots and a plurality of coils severally disposed in the said slots, the said coils having overhanging end portions, a plurality of wedges of conducting but non-magnetizable material also disposed in said slots and serving to retain the coils therein, an annular member for peripherally supporting the said end portions of the coils, and a damping grid, intimately associated with the said wedges and with the said annular member, comprising straps of conducting but non-magnetizable material disposed between the said wedges and said coils, and insulated from the said coils, and damper rings in electrical contact with the said straps and with the said annular member.

7. In a dynamo-electric machine, the combination with a core member provided with a plurality of coils having overhanging end portions, and a supporting ring of relatively high tensile strength surrounding said end portions, of a damping grid having portions thereof embedded in said core member and another portion of relatively low tensile strength located within said supporting ring and in close engagement therewith.

In testimony whereof, I have hereunto subscribed my name this 20th day of Feb., 1914.

JAN ARTHUR KUYSER.

Witnesses:
R. D. BROWN,
B. B. HINES.