

E. C. WRIGHT.  
DYNAMO ELECTRIC MACHINE.  
APPLICATION FILED SEPT. 30, 1904.

2 SHEETS—SHEET 1.

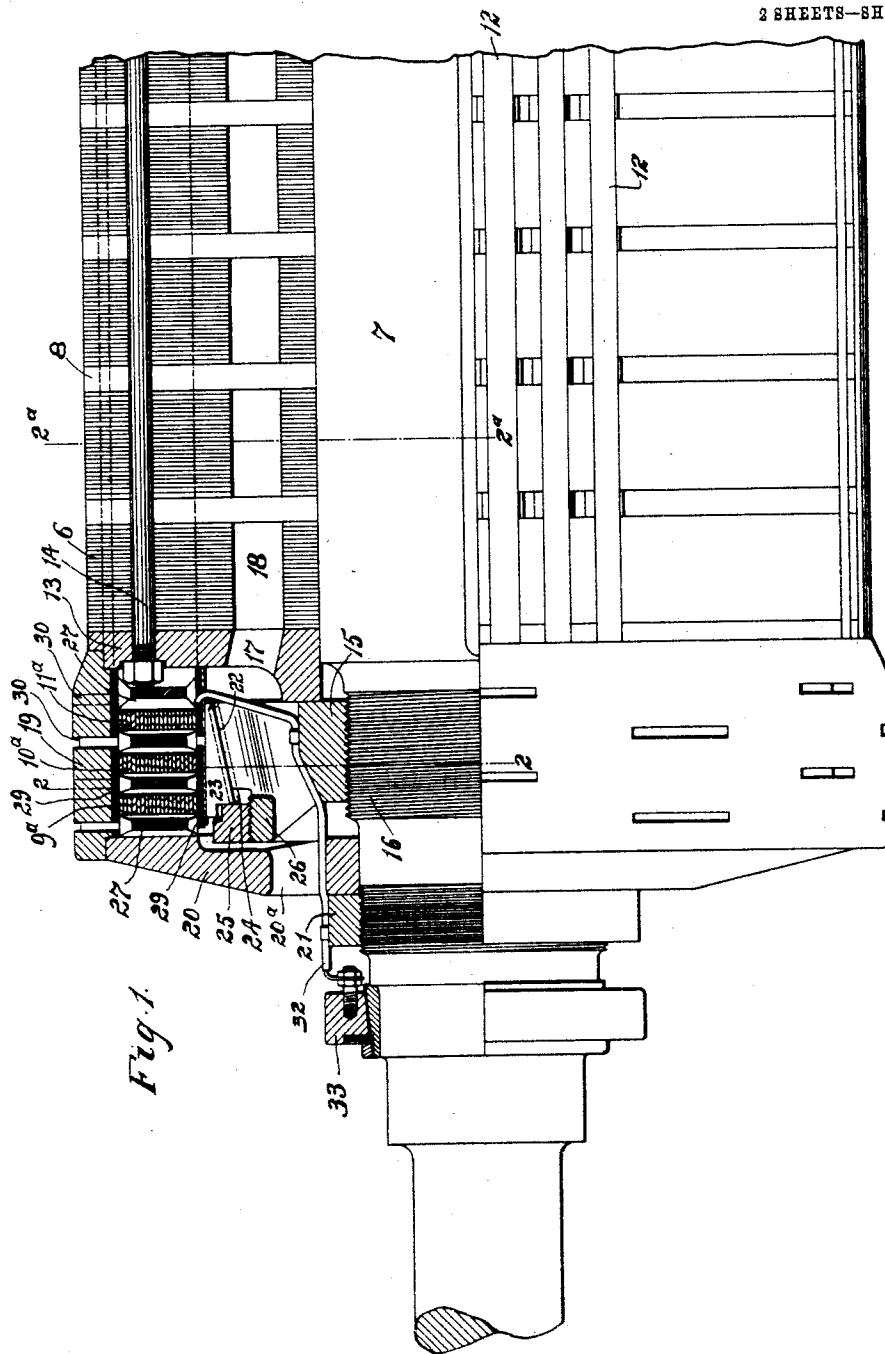


Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 2.

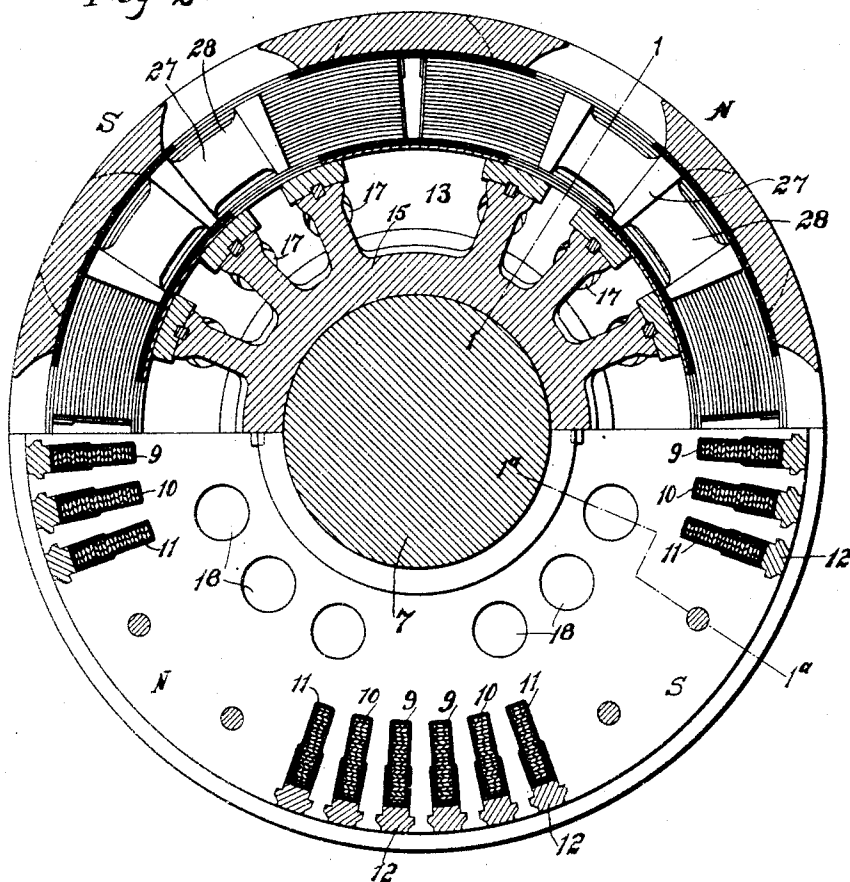


Fig. 3.



Fig. 4.

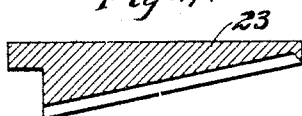
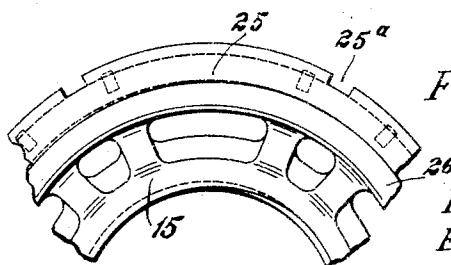


Fig. 5.



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# UNITED STATES PATENT OFFICE.

EDWIN C. WRIGHT, OF NEWPORT, KENTUCKY, ASSIGNOR TO THE  
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## DYNAMO-ELECTRIC MACHINE.

SPECIFICATION forming part of Letters Patent No. 790,471, dated May 23, 1905.

Application filed September 30, 1904. Serial No. 226,650.

*To all whom it may concern:*

Be it known that I, EDWIN C. WRIGHT, a citizen of the United States, residing at Newport, in the county of Campbell and State of Kentucky, have invented certain new and useful Improvements in Dynamo-Electric Machines, of which the following is a full, clear, and exact specification.

My invention relates to dynamo-electric machines, and more particularly to the construction and arrangement of the rotatable member of rotating field-alternators.

In the construction of rotatable elements of dynamo-electric machines especially designed for high speed, such as generators directly connected to steam-turbines, &c., it is necessary that the parts, especially the windings, be well balanced and held rigidly and firmly in place. It is also necessary that said rotatable element be well ventilated and so constructed as to reduce the objectionable noise due to air resistance which ordinarily accompanies high-speed machines.

The object of the present invention is to embody the desirable qualities above enumerated in a simplified form of rotor construction.

The invention comprises improvements in the construction and arrangement of the rotatable member and the supports for the windings thereon, which will be hereinafter described, and more specifically pointed out in the appended claims.

In the accompanying drawings, which illustrate the preferred embodiment of my invention, Figure 1 represents a part-sectional and part side view of one end of a rotating field-magnet, the upper part of said figure being a composite section on the lines 1-1 and 1'-1' of Fig. 2. Fig. 2 is a composite sectional view of the field-magnet on the lines 2-2 and 2'-2' on Fig. 1. Figs. 3 and 4 are enlarged end view and longitudinal section of one of the wedge-supports for the end turns or connections, and Fig. 5 is an end view of part of the winged nut and clamping-ring for the supporting-wedges.

Referring now to the drawings, the core of the rotatable member is built up of a plurality of laminæ 6, mounted on the shaft 7 and divided into sections spaced apart by the separators 8. The core is of the slotted type, and the shape of the laminations in the four-pole field-magnet here shown is best illustrated in the lower half of Fig. 2. The windings on the core consist of three coils 9, 10, and 11, arranged substantially concentrically about each of the four poles. These windings are preferably connected in series, so as to produce north poles at N and south poles at S, the coils being held in the slots by means of wedges 12, made of phosphor-bronze or other non-magnetic material, having their outer surface so finished as to give a perfectly smooth periphery to the rotating element. The laminæ are held in position on the shaft 7 by being clamped between the end plates 13, which are held by bolts 14 and the winged nut 15, screwed on the shaft 7 at 16. It will of course be understood that the opposite end of the rotating field is similar to the end shown in Fig. 1. The clamping-plates 13 have substantially the same outline as the laminæ of the core and are provided with slots for the winding and also with the ventilating-openings 17, which register with the ventilating passage-ways 18, formed in the laminæ and running longitudinally of the field-magnet. The openings or passage-ways 18 communicate with the radial openings between the separators 8.

The means for supporting the end connections 9<sup>a</sup>, 10<sup>a</sup>, and 11<sup>a</sup> of the winding on the core will now be described. These end connections are surrounded by a cylindrical piece or cover 19, of nickel-steel or some other metal having great mechanical strength. This cylinder not only serves to protect the coil connections against injury from exterior sources, but holds said end connections in position against the enormous centrifugal forces exerted upon them when they are rotated at high speed. This cylinder 19 is supported on the end plate 13 and the end cover 20, the lat-

ter being mounted on shaft 7 and held in position thereon by nut 21. This end cover 20 also acts to force the end connections against the core in a direction parallel to the longitudinal axis of the rotatable member. The said cover-plate 20 is provided with ventilating-openings 20<sup>a</sup>, which register with the openings between the wings of the winged nut 15.

Mounted on the outer inclined ends 22 of the wings of winged nut 15 are the wedges 23, guided by splines 24 and forced into position beneath the end connections by means of the nut 25, screwed on the ring 26, the latter being preferably formed integral with the winged nut 15. The inner surface of each wedge 23 and the outer surface 22 of each wing of the winged nut have the same inclination, so that the outer surface of the wedge remains parallel to the axis of shaft 7 regardless of the position of said wedge. This arrangement provides means for forcing the end connections radially against the cylindrical cover 19, which means is entirely independent of the end cover 20. The end connections 9<sup>a</sup>, 10<sup>a</sup>, and 11<sup>a</sup> are separated from each other and from the end cover 20 and clamping-plate 13 and are held a predetermined distance apart by the spacing-blocks 27. These spacing-blocks are preferably made of insulating material, such as vulcabeston, and are provided with radial ribs and contracted portions 28 between said ribs. The blocks assist in retaining the shape of the end connections when the latter are subjected to the pressure of the end cover and wedges 23, while at the same time, due to their contracted portions, do not materially obstruct the ventilating passage-ways between said end connections. Strips 29 of insulating material are provided between the coil end connections and the wedges 23 and also between said end connections and the cylindrical cover 19. Said strips 29 are formed with ventilating-openings which register with the openings between the end connections and also with the openings 30, formed in the cylinder 19. It will thus be seen that the winged nut 15 is employed for the double purpose of clamping the laminæ in place and for sustaining the end-connection radial clamping means. When the winged nut is in position, the wedges 22 are driven home by tightening up on the nut 25, this being accomplished by inserting a wrench in the notches 25<sup>a</sup>, Fig. 5, and rotating said nut 25. The coil ends are thereby firmly clamped between the outer surfaces of the wedges 23 and the inner surface of the cylindrical cover 19. This radial clamping is entirely independent of the longitudinal or endwise clamping accomplished by means of the end cover 20.

The electrical conductor or lead 32, through which current may be conducted to the field-magnet winding, is connected to the collector-

ring 33, mounted on shaft 7, it being understood that a similar collector-ring and lead are located at the other end of said field-magnet.

In the operation of the rotatable member there is a free circulation of air through the openings 20<sup>a</sup> in the end cover, thence through the openings between the wings of the winged nut 15, through openings 17 in the end plate 13, thence through the passage-ways 18, and out through the radial openings between the separators 8. There is also a free circulation of air through the openings between the wings of the winged nut 15 and through the spaces between the coil end connections and also between said connections and end plate 13 and end cover 20 and out through the registering openings 30 in the cylindrical cover 19.

Although I have shown my invention as applied to a rotating field-magnet of a dynamo-electric machine, I do not care to be so limited, but aim to cover in the appended claims all modifications and changes which do not involve a departure from the spirit and scope of my invention.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In the rotatable member of a dynamo-electric machine, the combination of a core, a winding thereon having end turns or connections, an end cover for forcing said end turns against the core in a direction parallel to the longitudinal axis of the rotatable member, and spacing-blocks for the purpose of maintaining said end connections at a predetermined distance apart, said blocks being provided with radial ribs and contracted portions between said ribs to allow ventilating-spaces between the end connections.

2. In the rotatable member of a dynamo-electric machine the combination of a core, a winding thereon, and means for supporting the end turns or connections of said winding, comprising an end cover, an outside cylindrical cover, a supporting member mounted on the shaft of said core and having an inclined surface, wedges mounted on said inclined surface, and means also mounted on said supporting member and independent of said cover for moving said wedges to clamp the end turns against the cylindrical cover.

3. In the rotatable member of a dynamo-electric machine, the combination of a core, a winding thereon, and means for supporting the end turns or connections of said winding, comprising an end cover, an outside cylindrical cover, a winged supporting member, adjustable wedges mounted on the wings of said winged member, and means also mounted on said winged member for forcing said wedges outwardly to clamp the end turns against said cylindrical cover.

4. In the rotatable element of a dynamo-electric machine, the combination of a core

built up of laminae, windings thereon, and means for supporting the end turns or connections of said windings, comprising an outside cylindrical cover, a nut for clamping the laminae in position, independently-adjustable wedges mounted on said nut, and means also mounted on said nut for forcing the wedges outwardly to clamp the end connections against the cylindrical cover.

5. In the rotatable element of a dynamo-electric machine, the combination of a core built up of laminae, windings thereon, a winged nut for fastening the laminae in position, and means for supporting the end turns or connections of said windings, comprising an outside cylindrical cover, wedges mounted on the wings of said nut, and means also carried by said nut for forcing the wedges outwardly to clamp the end connections against said cylindrical cover.

6. In the rotatable element of a dynamo-electric machine, the combination of a core built up of laminae, windings thereon, and means for supporting the end turns or connections of said windings, comprising an end cover for clamping said end connections against the core in a direction parallel to the longitudinal axis of said rotatable member, an outside cylindrical cover, a nut for clamping the laminae in position, adjustable wedges mounted on said nut, and means also mounted

on said nut independent of the end cover for forcing the wedges outwardly to clamp the end connections against the cylindrical cover.

7. In the rotatable element of a dynamo-electric machine, the combination of a core built up of laminae, windings thereon, and means for supporting the end turns or connections of said windings, comprising an end cover for clamping the end connections against the core in a direction parallel to the longitudinal axis of said rotatable member, an outside cylindrical cover, a nut for clamping the laminae in position, said nut and laminae being provided with communicating passage-ways, adjustable wedges mounted on said nut, and means independent of the end cover for forcing the wedges outwardly to clamp the end connections against the cylindrical cover, said cylindrical cover and end cover being provided with openings communicating with the spaces between the end connections and the longitudinal passage-ways through the core and nut, for the purpose of permitting the passage of air to ventilate the core and the windings thereon.

In testimony whereof I affix my signature in the presence of two witnesses.

EDWIN C. WRIGHT.

Witnesses:

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