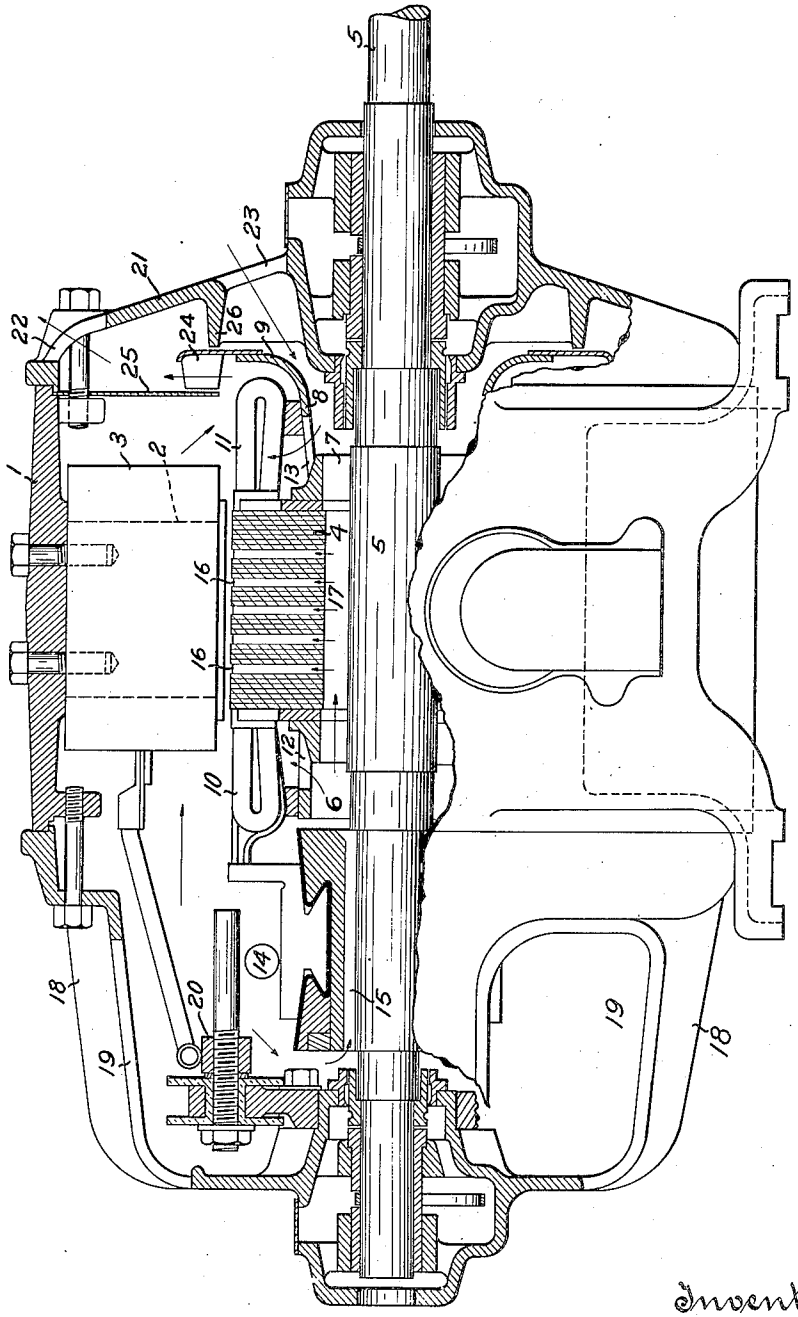
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DYNAMO ELECTRIC MACHINE AND METHOD OF VENTILATING SAME

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DYNAMO-ELECTRIC MACHINE AND METHOD OF VENTILATING SAME.

Application filed December 3, 1920. Serial No. 427,953.

To all whom it may concern:

Be it known that WILLIAM H. POWELL, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, has invented a certain new and useful Improvement in Dynamo-Electric Machines and Methods of Ventilating Same, of which the following is a specification.

This invention relates in general to dynamo-electric machines and methods of ventilating the same. One of the objects of the invention is the provision of a dynamo-electric machine which will operate at high efficiency. Another object is the provision of a method and means whereby such machines are more efficiently cooled. Still another object is the provision of a method and means whereby eddies in the ventilating fluid and recirculation of the same will be prevented. Other objects will appear hereinafter as the description of the invention proceeds.

The novel features of the invention will appear from the specification and the accompanying drawing forming a part thereof and showing one embodiment of said invention, and all these novel features are intended to be pointed out in the claims.

The single figure of the drawing is a partially sectional side view of a dynamo-electric machine embodying the features of the invention. The machine illustrated on the drawing is provided with a frame 1 carrying the field poles 2 which may be excited by field windings 3. Co-operating with the field poles is an armature having a core 4 mounted in any suitable manner on the shaft 5. In this instance the core is held by the end-heads 6, 7. The rear-end head 7 has an axially extending portion 8 and a radially extending portion 9. The core of the armature is provided with the usual slots (not shown) in which the armature conductors are disposed and of these, only the end turns 10, 11 are visible in the drawing. The end-heads 6, 7 are shown as providing a means for supporting the end turns.

The end-heads 6, 7 are provided with ventilating openings 12, 13 respectively.

The armature is shown as including a commutator 14 having an axial ventilating passage 15. This passage is here shown disposed so as to communicate with an axial ventilating passage 17 in the core. The core is also provided with radial ventilating passages 16 communicating with the axial passage 17.

The machine is here shown as provided with a front bearing-bracket 18 having openings 19. The bearing-bracket serves as a support for the brush rigging 20. The brushes for co-operating with the commutator are not shown in the drawing but may be supported by the usual brush rods forming part of the brush rigging. The rear bearing-bracket 21 has openings 22 provided near the periphery of said bracket. Additional openings 23 are provided near the bearing housing.

The machine is provided with a fan 24 having any desired number of fan blades, which fan is here shown as carried by the radially extending portion of the rear end-head.

It will be seen that the frame 1, along with the front and rear bearing-bracket, form a housing for the machine. A baffle 25 of substantially annular form extends radially inward from the inner periphery of the housing at the front side of the peripheral openings to a point a suitable distance to the front of the fan 24. The baffle 25 is here shown as held in place and clamped between a surface on the frame and the surface on the rear bearing-bracket. In the machine disclosed, a baffle 26 is provided extending axially inward from the inclined wall of the rear bearing at a point above the openings near the bearing-housing. This baffle is also disposed a suitable distance from the fan 24. Under certain conditions the baffle 26 might be omitted depending on the configuration of the rear bracket. It will be noted that a chamber is formed about the outer periphery of the fan whereby air expelled by the fan blades is blown directly out of the openings 22. This produces a strong suction action at the inner periphery of the fan whereby air will be drawn into the machine through the openings 19 in the front bearing-bracket. Some of this air finds its way around the field windings 3 and from thence into the fan; another part

of it passes over and through the commutator and also through the axial passage in the core and from thence outwardly through the radial passages in the core to the air gap between the pole pieces and core from where it passes to the suction side of the fan. Some of the air also passes through the ventilating openings in the front end-head 6 thereby cooling the end-turns 10. The air may assume other paths than those mentioned but generally speaking, there is a general passage of air from the front end of the machine to the rear end. It should be understood that the terms front and rear ends are not used in a limiting sense but simply to distinguish the relative location of the parts. In view of the fact that the air is expelled from the machine in a substantially radially outward direction and at considerable velocity and is taken in at the other end of the machine, there is no chance for any of the heated expelled air to be re-circulated through the machine, which is a feature which in itself makes for very efficient cooling of the machine. In order to more efficiently cool the end turns 11, provision is made for introducing a fresh supply of cool air, which has not already been heated up by passage through the armature, for example. The means for carrying out this step in the system of cooling, includes the openings 23 through which air is drawn into the inside of the rear end-head 8 and passes from there out of the openings 13 in said end-head around and through the end turns 11 into the suction side of the fan.

It should be understood that it is not desired that the invention claimed be limited to the exact details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

It is claimed and desired to secure by Letters Patent:

1. In a dynamo-electric machine, an armature, a rear end-turn support having a radial portion and an axial portion said axial portion having openings, a fan carried by said radial portion, a housing for said machine, a baffle extending radially inward from said housing to the front side of said fan and a baffle extending axially inward from said housing to the rear of said fan, said housing having openings radially within said axial baffle communicating with the openings in said end-turn support, and openings between said baffles.

2. A dynamo-electric machine comprising a stator including field poles and windings thereon, an armature co-operable with said poles, said armature including a core having an axial ventilating passage and radial passages communicating therewith, a front bearing-bracket having openings, a rear bearing-bracket having openings near the periphery and near the bearing-housing, a rear end-turn support having radial openings communicating with the openings near the bearing-housing, a fan associated with said rear end-turn support and adapted to blow air out of said peripheral openings, a baffle extending radially inward from the front side of said peripheral openings to the front side of said fan, and a baffle extending axially frontwards from the radially outer side of the openings near the bearing-housing to the rear side of the fan.

3. A dynamo-electric machine comprising a stator including field poles and windings thereon, an armature co-operable with said poles, said armature including a core and commutator, and having an axial ventilating passage, said core having radial ventilating passages communicating with said axial ventilating passage in said armature, a front bearing-bracket having openings, a rear bearing-bracket having openings near the periphery and near the bearing-housing, a rear end-turn support having radial openings communicating with the openings near the bearing-housing, a fan associated with said rear end-turn support and adapted to blow air out of said peripheral openings, a baffle extending radially inward from the front side of said peripheral openings to the front side of said fan, and a baffle extending axially frontwards from the radially outer side of the openings near the bearing-housing to the rear side of the fan.

4. A dynamo-electric machine including a housing having peripheral openings and an opening near the axis at one end, an armature having an end-head, having radial openings, for supporting the end-turns of the armature winding, said end-head having a radially extending portion, a fan including fan blades carried by said portion and extending transversely of said portion toward said end-turns, said fan being disposed in the end of said housing having said peripheral openings, whereby when said fan is in operation air will be drawn into said opening near the axis, thence through said radial openings in said end-head, through said end-turns, and will be then expelled through said peripheral openings.

5. A dynamo-electric machine including a housing having peripheral openings and an opening near the axis at one end, an armature having an end-head, having radial openings, for supporting the end-turns of the armature winding, said end-head having a radially extending portion, a fan including transversely extending fan blades mounted on said portion, said fan being disposed in the end of said housing having said peripheral openings, whereby when said fan is in operation air will be drawn

into said opening near the axis, thence through said radial openings in said end-head, through said end-turns, and will be then expelled through said peripheral openings.

6. In combination with a dynamo-electric machine of the type having an armature with end-turns at the ends thereof, of means for causing a flow of ventilating fluid from one end of the machine to the other including a fan at said other end for expelling said fluid radially out of said machine at said other end, and means for taking in a fresh supply of ventilating fluid and causing it to pass radially through the end-turns at said other end.

In testimony whereof, the signature of the inventor is affixed hereto.

WILLIAM H. POWELL.