

J. F. CURTIS.
DYNAMO ELECTRIC MACHINE.
APPLICATION FILED FEB. 19, 1914.

1,267,983.

Patented May 28, 1918.
2 SHEETS—SHEET 1.

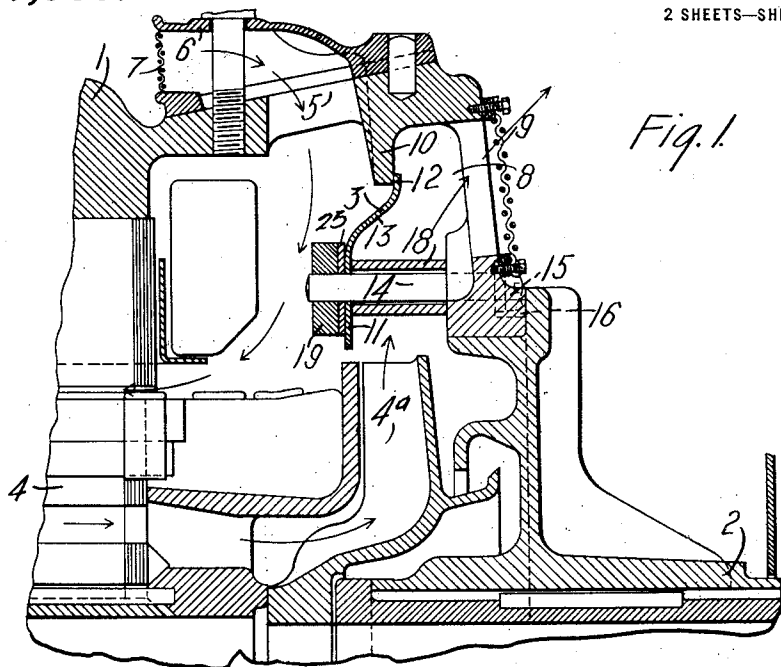


Fig. 1.

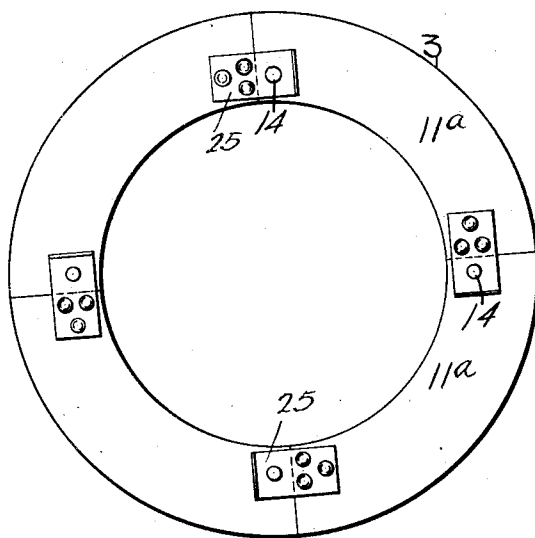


Fig. 2.

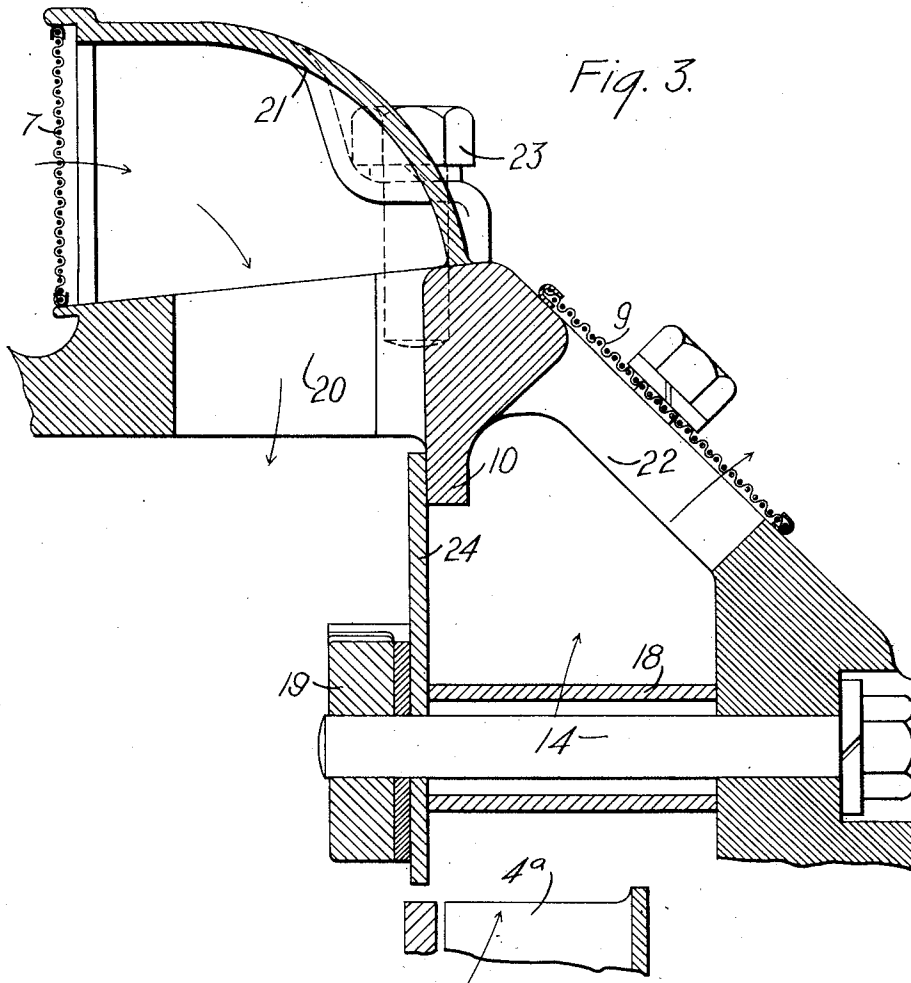
WITNESSES:
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W. R. Coley

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UNITED STATES PATENT OFFICE.

JAMES F. CURTIS, OF PITCAIRN, PENNSYLVANIA, ASSIGNOR TO WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

DYNAMO-ELECTRIC MACHINE.

1,267,983.

Specification of Letters Patent.

Patented May 28, 1918.

Application filed February 19, 1914. Serial No. 819,812.

To all whom it may concern:

Be it known that I, JAMES F. CURTIS, a citizen of the United States, and a resident of R. F. D. No. 1, Pitcairn, in the county of Westmoreland 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 the ventilation thereof.

The object of my invention is to provide simple and inexpensive means for producing particularly effective and reliable ventilation of certain types of dynamo-electric machines.

In the prior art, machines of the type in question have usually been provided with housings having auxiliary interior walls that were adapted to form, together with the outer supporting walls, annular discharge chambers having ventilating outlets near the machine shafts. The rotatable member of a machine of the above-mentioned character customarily had attached thereto some form of necessarily small fan for drawing in air from suitable openings in the frame and for discharging the air, after passage through certain parts of the machine, through the annular chamber and the outlets in the housings. However, such a construction inherently had rather low volumetric limitations, as will be understood by those skilled in the art. In consequence, the useful output of the machine has been restricted by reason of the operating temperatures obtained, since the admissible volume of cooling air has been relatively low.

According to my invention, I provide means for permitting the passage of an ample supply of ventilating air, thereby increasing the working capacity of the machine without any overheating. In the frame of a machine embodying my invention, I provide a plurality of openings at different distances from the axis and a sectional annular diaphragm that is capable of being readily assembled within the frame and is disposed to internally separate the spaced openings, thereby being adapted to properly direct the ventilating air through the machine. It will be evident that a relatively large fan may be employed and that a plentiful volume of cooling air may be utilized.

In the accompanying drawings, Figure 1 is a sectional view of a portion of a dynamo-electric machine constructed in accordance with my invention, Fig. 2 is a view, in front elevation and to smaller scale, of the annular diaphragm employed in the machine shown in Fig. 1, and Fig. 3 is a sectional view of a portion of a dynamo-electric machine, illustrating a modification of my invention.

Referring to the drawing, the dynamo-electric machine, a portion of which is shown, comprises a stator frame 1, a housing 2, a ventilating diaphragm 3, and a suitable rotor 4 having a plurality of fan blades 4^a of the usual, or any appropriate type, that are suitably attached thereto. It will be understood that some of the parts shown are old and familiar in the art, and it is therefore deemed necessary to describe only those portions that are new and relevant to my invention.

The frame 1 is provided with one or more suitable ventilating inlets 5 that are preferably equipped with suitable covers 6 and screens 7, and its outer end is provided with one or more suitable ventilating outlets 8 that are disposed somewhat nearer to the machine axis than the inlets 5. The outlets 8 may or may not be provided with perforated covers 9. The portion of the frame that is intermediate the openings 5 and 8 is preferably provided with an inwardly-extending flange 10 for a purpose to be hereinafter specified, although this particular construction is not essential to my invention.

The housing 2 serves the usual purpose of closing the end openings in the frame 1 and of supporting the bearings of the machine. It will be noted that the housing may be of simpler construction than in the prior art, inasmuch as the old thin interior wall, hereinbefore mentioned, is preferably omitted.

The ventilating diaphragm 3 internally separates the inlets 5 from the outlets 8 and comprises an annular band of sheet metal or other suitable material having two relatively offset annular portions 11 and 12 that are disposed in substantially parallel relation and an inclined connecting portion 13. The outer annular portion 12 is preferably disposed to engage the flange 10 on the same side thereof as the outlets 8, and the inner annular portion 11 has its inner periphery

disposed in proximity to the inner edges of the fan blades 4^a. As the diaphragm 3 is of greater outside diameter than the end opening in the frame 1, it is preferably constructed of a plurality of sectional portions 11^a, for convenience in assembling. A joining plate 25 is secured to each portion 11^a and the overlapping portions of the plates 25 and the adjacent sectional portions 11^a are provided with registering openings to receive a suitable clamping member, such as a bolt 14, the head 15 of which is preferably disposed within a suitable external recess 16 in the outer end-portion of the frame 1. A suitable spacing-member, here shown as a tube 18, is disposed around the bolt 14 intermediate the frame end-portion and the portion 11 of the diaphragm 3, and a suitable nut 19 engages the bolt on the opposite side of the portion 11, thereby clamping the diaphragm in the proper position against the flange 10.

Reference may now be had to Fig. 3, in which a modification of the structure illustrated in Fig. 1 is shown. The frame 1 of the dynamo-electric machine is provided with ventilating inlets 20 that are equipped with suitable covers 21 and screens 7, and ventilating outlets 22 that are preferably provided with screens 9. A positioning bolt 23 for the cover 21 is secured to the frame intermediate the corresponding inlet and outlet, thereby permitting the unrestricted passage of cooling air.

In this form of my invention, the internal frame flange 10 is so located with respect to the fan blades 4^a, that a flat ventilating diaphragm 24 may be employed, thereby decreasing the cost of construction. The diaphragm is held in place against the flange 10 by the bolt 14 and the tube 18, as described with reference to Fig. 1.

Assuming that, during operation, the parts occupy the relative positions shown in Fig. 1, the path of ventilating air in the machine shown is as follows, and is indicated by arrows:

The revolving fan blades 4^a, by reason of their location, force an ample volume of heated air through the outlets 8 to the atmosphere. An equal volume of cool air is simultaneously drawn in through the inlets 5 and, since direct access to the outlets 8 is prevented by the diaphragm 3, the air is forced to circulate through the heated parts of the machine and back along the shaft of the rotor 4 to the fan blades 4^a, whence it is expelled as above stated. The path of the ventilating air in the construction of Fig. 2 is indicated by arrows also.

I do not wish to be restricted to the structural details and arrangement of parts herein set forth, as many modifications thereof may be made within the spirit and scope of my invention. I, therefore, desire that only such limitations shall be imposed as are indicated in the appended claims.

I claim as my invention:

1. In a dynamo-electric machine, the combination with a frame having a plurality of openings in the end thereof comprising inlet and discharge openings for ventilating fluid, and a rotatable member provided with a plurality of fan blades, of an annular member of greater outside diameter than the diameter of the largest of said openings, said member comprising a plurality of assembled segmental pieces and being adapted to cause all of the ventilating fluid to flow through portions of said rotatable member before reaching said discharge opening.

2. In a dynamo-electric machine, the combination with a frame having a plurality of ventilating openings, and a rotatable member provided with a plurality of fan blades for producing currents of air, of a sectional annular diaphragm having one periphery engaging said frame intermediate said openings and the other periphery located adjacent to said fan blades to separate the inlet openings from the discharge openings, a spacing member disposed between said frame and said diaphragm, and a clamping means associated with the spacing means for rigidly positioning said diaphragm and for securing the sections thereof together.

3. In a dynamo-electric machine, the combination with a frame having a plurality of ventilating openings and an internal annular projection intermediate said openings, and a rotatable member provided with a plurality of fan blades for producing currents of air, of an annular diaphragm having its outer periphery engaging said projection and its inner periphery located adjacent to said fan blades, a spacing member disposed between said frame and said diaphragm, a supporting member detachably associated with said frame and extending through said spacing member and said diaphragm, and clamping means adjustable on said supporting member to rigidly position said diaphragm against said projection.

In testimony whereof, I have hereunto subscribed my name this 13th day of Feb. 1914.

JAMES F. CURTIS.

Witnesses:

KARL F. FLERS,
B. B. HINES.