

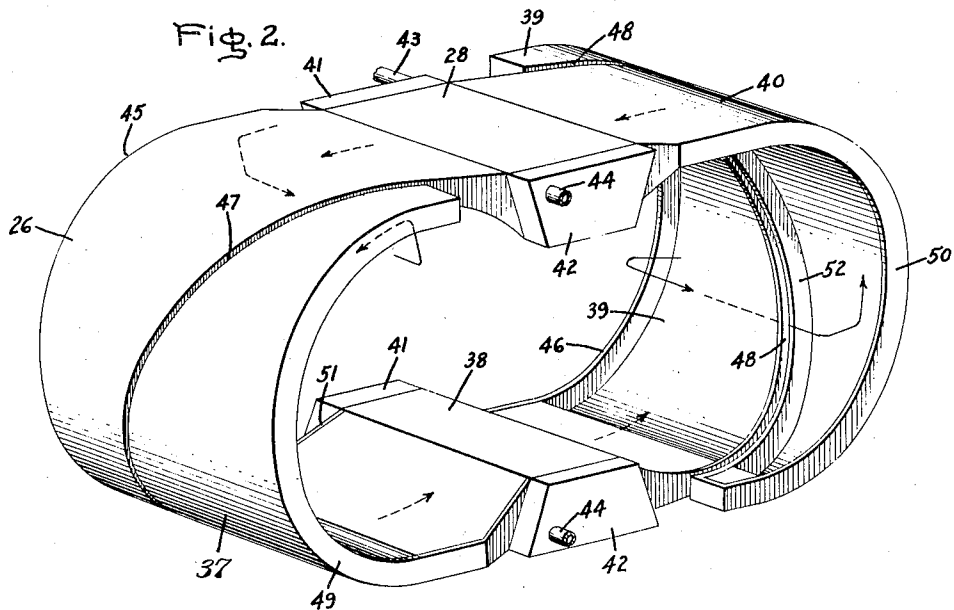
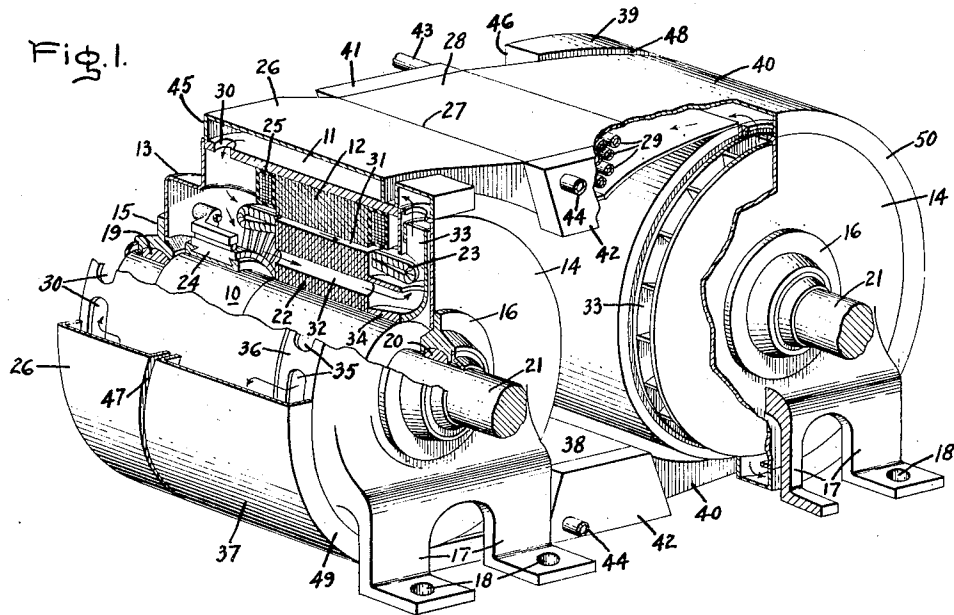
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DYNAMO-ELECTRIC MACHINE

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DYNAMO-ELECTRIC MACHINE

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5 Claims. (Cl. 171-252)

My invention relates to improvements in dynamo-electric machines.

An object of my invention is to provide an improved ventilating or cooling system for dynamo-electric machines.

Further objects and advantages of my invention will become apparent and my invention will be better understood from the following description referring to the accompanying drawing, and the features of novelty which characterize my invention will be pointed out with particularity in the claims annexed to and forming part of this specification.

For a better understanding of my invention, reference is made to the accompanying drawing, wherein Fig. 1 is a perspective view, partly in section, of a pair of dynamo-electric machines embodying my invention, and Fig. 2 is a perspective view of the ventilating casings and coolers which are shown arranged about the dynamo-electric machines in Fig. 1.

Referring to the drawing, I have shown two similar dynamo-electric machine units having an interconnected closed ventilating system which provides a compact and efficient construction. Each machine is provided with a rotatable member 10 and a stationary member having a frame 11 and pole pieces 12 arranged to be cooled by the circulation of a cooling medium therethrough. Each of the stationary frames 11 is provided with end shields 13 and 14 secured to bearing housings 15 and 16. These end shields are provided with supporting legs 17 having openings 18 formed therein for securing them in position. The bearing housings 15 and 16 are provided with journal bearings 19 and 20 arranged to support a shaft 21 of the rotatable member of the machine. The rotatable member is of the commutating type, and includes a laminated core 22 of magnetic material in which a winding 23 is arranged connected to a commutator 24 and arranged to cooperate electro-dynamically with the pole pieces 12 of the stationary member. The excitation of the machine is provided by field exciting windings 25 arranged about the pole pieces 12 of the stationary member.

Each motor is provided with a pair of cooperating ventilating casings of substantially uniform depth arranged about a portion of the frame and forming a passage thereabout in communication with the interior of the machines for supplying and collecting cooling medium from the machine. One of these casings 26 forms a supply casing and is connected to the exhaust side 27 of a surface cooler 28 arranged between the two dynamo-electric

machines and through which air or any other suitable cooling medium is passed over cooling tubes 29 and into the supply casing 26. The cooling medium then flows through openings 30 formed in one end of the motor frame 11 over the commutator and is drawn between the pole pieces 12, and also is drawn through a series of axially extending ventilating passages 32 in the core 22 by a fan 33 provided with a hub 34 mounted upon the end of the armature shaft 21 opposite the commutator 24. This circulating fan 33 blows the cooling medium out through exhaust openings 35 formed at spaced intervals about the periphery of a cylindrical flange 36 formed on the end shield 14 adjacent the other end of the frame 11 and into an exhaust casing 37 arranged about this other end of the machine. As shown by the arrows in Fig. 2, the exhaust cooling medium then is conducted by the exhaust casing 37 to a second surface cooler 38 similar to the first cooler 28, is again cooled, and flows into a supply casing 39 for the other dynamo-electric machine. The cooling cycle is repeated in this second machine, and the cooling medium is collected in a second exhaust casing 40 and again passes through the first cooler 28. These coolers may be of any suitable type wherein the machine cooling medium is circulated over the cooling tubes 29 through which another cooling medium such as cold water or brine is circulated from an intake header 41 to an exhaust header 42 connected by intake and outlet pipes 43 and 44, respectively, to a suitable source of cooling medium supply. In order to obtain a substantially uniform supply of cooling medium around the periphery of the stationary member frame 11, the outer sides 45 and 46 of the supply casings 26 and 39, respectively, are arranged closely adjacent the outer end of the stationary member frames 11 adjacent the end shields 13, and the other sides 47 and 48 extend angularly thereto from the cooler and converge towards the other ends of the casings. This provides supply casings of decreasing width and cross-sectional area in the direction of the flow of cooling medium therethrough, so that the casings become progressively smaller as the volume of cooling medium passing therethrough becomes less. Conversely, in order to obtain a substantially uniform withdrawal and collection of cooling medium around the periphery of the stationary member frame, the outer sides 49 and 50 of the exhaust casings 37 and 60, respectively, are arranged closely adjacent the outer ends of the other end of the stationary member frame adjacent the end shields 14, and the other sides 51

and 52 extend angularly thereto from one end of the casing towards the ends of the casings which communicate with the coolers. This provides casings of increasing width and cross-sectional area in the direction of the flow of cooling medium therethrough, so that the casings become progressively larger as the volume of cooling medium passing therethrough increases. Thus, I have provided a very compact closed cooling system for a pair of dynamo-electric machines wherein their relative arrangement is advantageously used for arranging the coolers in the system and providing a uniform flow of cooling medium therethrough.

While I have illustrated and described a particular embodiment of my invention, modifications thereof will occur to those skilled in the art. I desire it to be understood, therefore, that my invention is not to be limited to the particular arrangement disclosed, and I intend in the appended claims to cover all modifications which do not depart from the spirit and scope of my invention.

What I claim as new and desire to obtain by Letters Patent of the United States is:

1. A ventilating system for dynamo-electric machines including a plurality of dynamo-electric machines each having a frame, means for providing a substantially uniform supply of cooling medium peripherally to a portion of one end of one of said dynamo-electric machine frames, means for circulating cooling medium from said end of said dynamo-electric machine toward the other end thereof, a cooler, means for collecting the cooling medium adjacent the other end of said one dynamo-electric machine frame and for conducting cooling medium to said cooler, means for providing a substantially uniform supply of cooling medium from said cooler peripherally to an adjacent portion of one end of another dynamo-electric machine frame, a second cooler, and means for collecting cooling medium adjacent the other end of said other dynamo-electric machine frame and for conducting cooling medium to said second cooler, said second cooler being arranged in communication with said first-mentioned supply means.

2. A dynamo-electric machine having a frame, means including a supply casing of substantially uniform depth arranged about a portion of said frame forming a passage thereabout in communication with the interior of one end thereof for supplying cooling medium thereto, said supply casing having one side arranged adjacent said end of said frame and being of decreasing width in the direction of cooling medium flow therethrough, and means including an exhaust casing of substantially uniform depth arranged about a portion of said frame forming a passage thereabout in communication with the interior of the other end thereof for withdrawing cooling medium from said frame, said exhaust casing having one side arranged adjacent said other end of said frame and being of increasing width in the direction of cooling medium flow therethrough.

3. A dynamo-electric machine having a frame, means including a supply casing arranged about said frame in communication with the interior of one end thereof for supplying cooling medium thereto, said supply casing having a cross-sectional area decreasing in the direction of cool-

ing medium flow therethrough to provide a substantially uniform supply of cooling medium around the periphery of said frame, and means including an exhaust casing arranged about said frame in communication with the interior of the other end thereof for withdrawing cooling medium from said frame, said exhaust casing having a cross-sectional area increasing in the direction of cooling medium flow therethrough to provide a substantially uniform withdrawal of cooling medium from around the periphery of said frame.

4. A ventilating system for dynamo-electric machines including a plurality of dynamo-electric machines each having a frame, means including a supply casing for supplying cooling medium to one of said dynamo-electric machine frames adjacent one end thereof, a cooler, means including an exhaust casing for collecting the cooling medium adjacent the other end of said one dynamo-electric machine frame and for conducting cooling medium to said cooler, means including a second supply casing for supplying cooling medium from said cooler to adjacent one end of another dynamo-electric machine frame, both of said supply casings having one side arranged adjacent said one end of said frames and being of decreasing width in the direction of cooling medium flow therethrough, a second cooler, means including a second exhaust casing for collecting cooling medium adjacent the other end of said other dynamo-electric machine frame and for conducting cooling medium to said second cooler, said second cooler being arranged in communication with said first-mentioned supply casing, each of said casings being of substantially uniform depth, and both of said exhaust casings having one side arranged adjacent said other end of said frames and being of increasing width in the direction of cooling medium flow therethrough.

5. A ventilating system for dynamo-electric machines including a plurality of dynamo-electric machines each having a frame, means including a supply casing for supplying cooling medium to one of said dynamo-electric machine frames adjacent one end thereof, means for circulating cooling medium from said end of said dynamo-electric machine toward the other end thereof, a cooler, means including an exhaust casing for collecting the cooling medium adjacent the other end of said one dynamo-electric machine frame and for conducting cooling medium to said cooler, means including a second supply casing for supplying cooling medium from said cooler to adjacent one end of another dynamo-electric machine frame, both of said supply casings having a cross-sectional area decreasing in the direction of cooling medium flow therethrough, a second cooler, means including a second exhaust casing for collecting cooling medium adjacent the other end of said other dynamo-electric machine frame and for conducting cooling medium to said second cooler, said second cooler being arranged in communication with said first-mentioned supply casing, and both of said exhaust casings having a cross-sectional area increasing in the direction of cooling medium flow therethrough.

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