

H. ROOS.
 MEANS FOR COOLING DYNAMO ELECTRIC MACHINES.
 APPLICATION FILED DEC. 8, 1909.

1,000,846.

Patented Aug. 15, 1911.

Fig. 1.

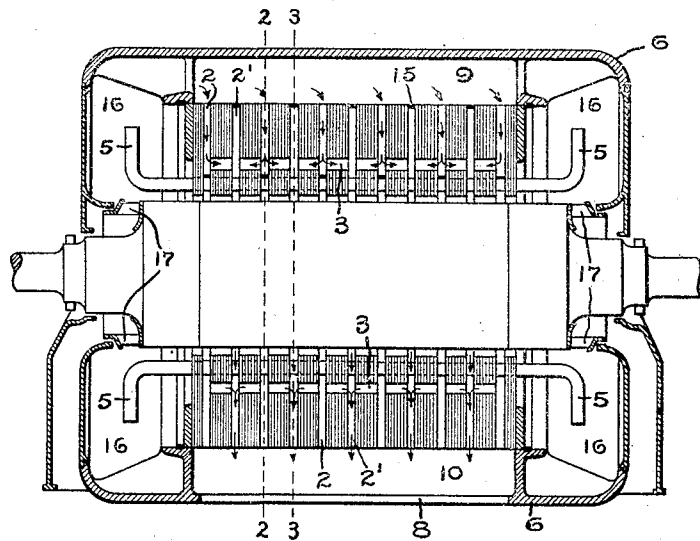


Fig. 2.

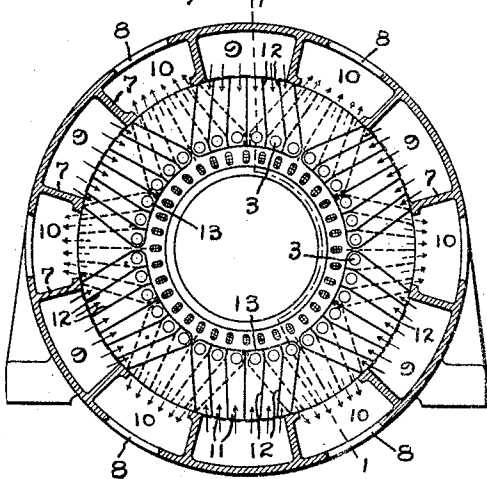
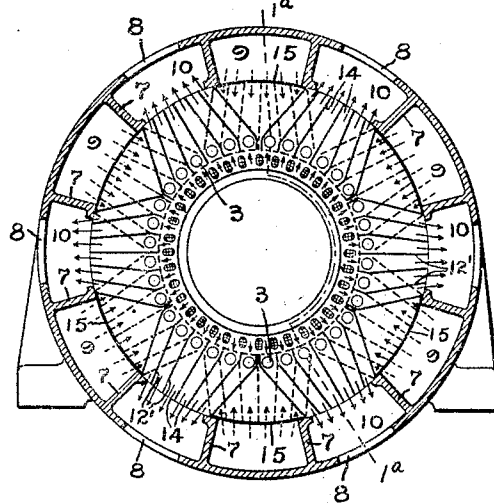


Fig. 3.



WITNESSES:

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MEANS FOR COOLING DYNAMO-ELECTRIC MACHINES.

1,000,846.

Specification of Letters Patent. Patented Aug. 15, 1911.

Application filed December 8, 1909. Serial No. 531,933.

To all whom it may concern:

Be it known that I, HERMAN ROOS, a subject of the Emperor of Germany, residing at Berlin, Germany, have invented certain new and useful Improvements in Means for Cooling Dynamo-Electric Machines, of which the following is a specification.

My invention relates to dynamo-electric machines and has for its object to provide improved cooling means for such machines whereby the heat generated during their operation may be carried away in a quick and effective manner.

My present invention relates to a cooling means for dynamo-electric machines such as that described in my Patents Nos. 957,102, and 957,103, dated May 3, 1910.

In my patents above referred to, the stator of the dynamo-electric machine has radial inlet and outlet spaces connected by axial channels, and the stream of air which is conveyed to and from each of the axial channels in the stator is not separated from the streams flowing to and from the adjacent axial channels. In certain cases this might lead to an unequal distribution of the air because of eddy currents so that certain axial channels receive a larger amount of air than others, and thus the cooling effect will not be the same in different parts of the machine.

According to my present invention the space blocks in the radial ventilating spaces form channels separated from each other so that the stream of cooling fluid in each channel in the radial spaces has a path through the axial channels which is completely closed against the other currents of cooling fluid, and consequently the different currents do not interfere with each other.

My invention further consists in certain novel features of construction which will be pointed out with particularity in the claims appended to and forming a part of this specification.

For a better understanding of my invention reference may be had to the following detailed description taken in connection with the accompanying drawing, in which—

Figure 1 is a cross-section of a dynamo-electric machine embodying my invention on the lines 1—1 and 1^a—1^a of Figs. 2 and 3, respectively; Fig. 2 is a vertical section on the line 2—2 of Fig. 1; and Fig. 3 is a simi-

lar section on the line 3—3. For the sake of clearness, in Fig. 1 the intersection of the space blocks by the lines 1—1 and 1^a—1^a has been omitted.

Referring to the drawing, the laminations are divided into bundles separated by radial inlet and outlet ventilating spaces 2 and 2'. These ventilating spaces are connected together by the axial channels 3 formed in the bundles of laminations.

5, 5 are coils of the stator windings and 6 the cast iron casing of the stator.

The radial inlet ventilating spaces 2 are connected with the inlet chambers 9 formed in the casing and the radial exit ventilating spaces 2' are connected with the outlet chambers 10 also formed in the casing. The latter chambers have openings 8 and are separated from the inlet chambers by ribs 7. In the embodiment of my invention shown in the drawing, there are six inlet chambers 9 and six outlet chambers 10 which are distributed uniformly and alternately about the periphery of the stator in an axial direction. In each of the radial inlet spaces 2 there are formed inlet channels 11 which are separated from each other by suitably formed space blocks 12. These inlet channels 11 are closed on the inner periphery of the stator by means of space blocks 13, so that no air from the air gap or from the rotor can pass into the inlet channels and thereby cause disturbances in the flow of air. The end of each channel 11 which is closed against the rotary member communicates with one of the axial channels 3 and thus serves for supplying air to only one axial channel. After flowing through the axial channel the air passes into one of the outlet channels 14 in the outlet ventilating spaces 2'. The outlet channels 14 are separated from each other as are the inlet channels 11 by means of specially formed space blocks 12'. These exit channels 14 communicate with the outlet chambers 10.

As shown in Figs. 2 and 3, the admission channels 11 and the discharge channels 14 cross each other in two different planes, so that each admission channel 11 forms an angle with the discharge channel 14 to which it is connected by means of an axial channel 3. The vertex of each angle lies in the corresponding axial channel 3. These figures further show that the admission channels

and the discharge channels are of unequal length. Since the inlet channels 11 and outlet channels 14 are shifted into different axial planes, I connect a longer inlet channel with a shorter outlet channel and vice versa, and thereby have made the lengths of the paths of the individual air currents approximately the same. The resistance that each stream of air has to overcome in each of the different air paths may be made approximately the same in other ways, such as by varying the sections of the inlet and outlet channels. Such an arrangement may also be used in connection with an arrangement in which short and long channels are connected together. The air outlet spaces 2' and the channels 14 therein are not closed on the inner periphery of the stator, but are separated from the inlet chambers by means of members 15, which stretch over the entire arc included by the inlet chambers.

The cooling air is drawn from the exterior of the machine into entrance chambers 16 situated at both ends of the machine, by fans 17 and driven against the coils 5, from there to the inlet chambers 9, thence through the inlet channels 11 in the inlet spaces 2, through the axial channels 3, through the exit channels 14 in the exit spaces 2', and into the exit chambers 10, passing from there through the openings 8 into the open air.

The terms "stator" and "rotor" are used throughout the specification in their broad sense of stationary and rotary members.

In the particular construction shown, each inlet and outlet channel communicates with a single axial channel, but this is not necessary, and I desire it to be understood that my invention is not limited to the particular construction shown and described, and aim in the appended claims to cover all modifications which do not depart from the spirit of my invention.

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

1. In a dynamo-electric machine, a stationary laminated core body having radial inlet and outlet ventilating spaces and axial channels connecting said spaces, a casing having axially extending inlet and outlet chambers distributed alternately about the periphery of said core body, and space blocks in said ventilating spaces forming channels separated from each other, said channels in the inlet spaces connecting with the inlet chambers and said channels in the outlet spaces connecting with said outlet chambers.

2. In a dynamo-electric machine, a stationary laminated core body having inlet and outlet ventilating spaces and axial channels connecting said spaces, a casing having axially extending inlet and outlet chambers distributed alternately about the

periphery of said core body, separating blocks to close the outlet ventilating spaces against the inlet chambers; and space blocks in said ventilating spaces forming channels separated from each other, said channels in the inlet spaces connecting with the inlet chambers and said channels in the outlet spaces connecting with said outlet chambers.

3. In a dynamo-electric machine, a stationary laminated core body having inlet and outlet ventilating spaces and axial channels connecting said spaces, a casing having axially extending inlet and outlet chambers distributed alternately about the periphery of said core body, separating blocks to close the outlet ventilating spaces against the inlet chambers, space blocks for closing the inlet ventilating spaces on the inner periphery of the core body, and space blocks in said ventilating spaces forming channels separated from each other, said channels in the inlet spaces connecting with the inlet chambers and said channels in the outlet spaces connecting with said outlet chambers.

4. In a dynamo-electric machine, a casing having a plurality of inlet chambers and a plurality of outlet chambers, a stationary laminated core body having radial inlet and outlet ventilating spaces and axial channels connecting said spaces, said inlet and outlet chambers being distributed alternately about said core body, and space blocks in the ventilating spaces forming channels separated from each other, said channels in the inlet spaces communicating with the inlet chambers and said channels in the outlet spaces communicating with said outlet chambers.

5. In a dynamo-electric machine, a casing having a plurality of inlet chambers and a plurality of outlet chambers, a stationary laminated core body having radial inlet and outlet ventilating spaces and axial channels connecting said spaces, said inlet and outlet chambers being distributed alternately about said core body in an axial direction, and space blocks in the ventilating spaces forming channels separated from each other, said channels in the inlet spaces communicating with the inlet chambers and said channels in the outlet spaces communicating with said outlet chambers, said space blocks completely closing the path of the stream of cooling fluid in each channel in the radial spaces to each of the axial channels against the other currents of cooling fluid.

6. In a dynamo-electric machine, a casing having a plurality of inlet chambers and a plurality of outlet chambers, a stationary laminated core body having radial inlet and outlet ventilating spaces and axial channels connecting said spaces, said inlet and outlet chambers being distributed alternately

about said core body, and space blocks in the ventilating spaces forming inlet and outlet channels of different lengths and separated from each other, said channels in the inlet spaces communicating with the inlet chambers and said channels in the outlet spaces communicating with said outlet chambers, said axial channels connecting longer inlet channels with shorter outlet

channels and shorter inlet channels with 10 longer outlet channels.

In witness whereof, I have hereunto set my hand, this 18th day of November, 1909.

HERMAN ROOS.

Witnesses:

KARL SULZBERGER,
THEODOR SÄHRIG.