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VENTILATING APPARATUS FOR DYNAMO ELECTRIC MACHINES

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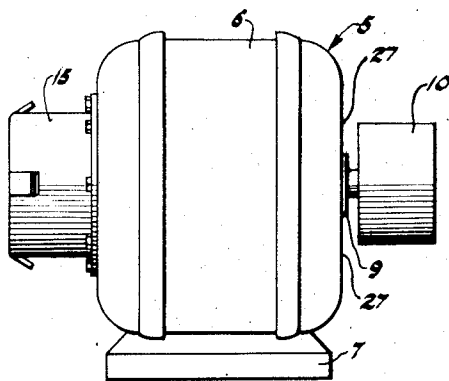


Fig. 1

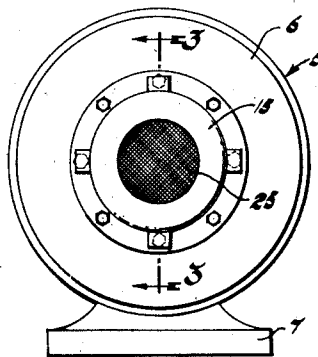


Fig. 2

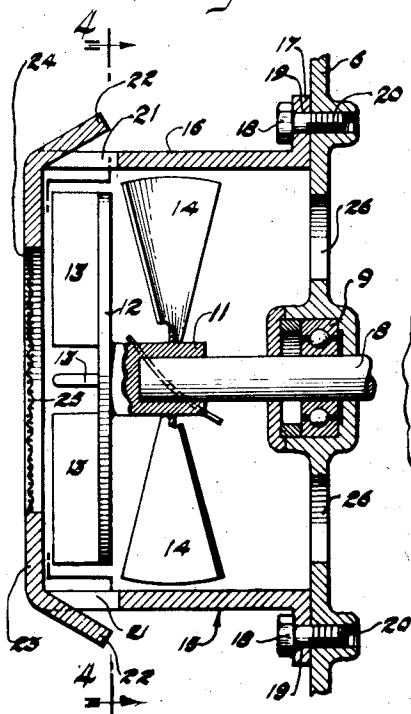


Fig. 3

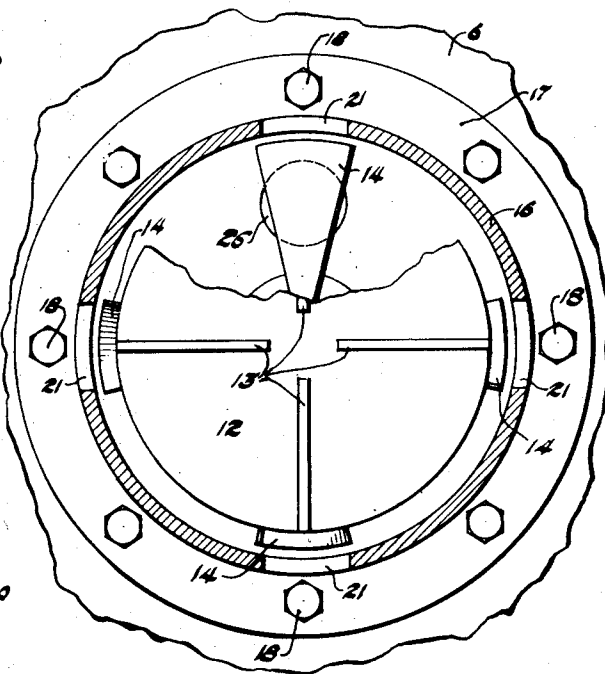


Fig. 4

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VENTILATING APPARATUS FOR DYNAMO-ELECTRIC MACHINES

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2 Claims. (Cl. 171—252)

This invention relates to apparatus for cooling the working parts of motors, generators and similar machines of the type in which the working parts are enclosed in a casing.

5 Ordinary atmospheric air contains varying proportions of dust and, if this air is circulated through the casing and over the working parts of a motor, generator or similar machine, some of the dust will be deposited on the working parts and is likely to cause sparking, short circuits and other troubles. It is an object of this invention to provide, in combination with means for circulating cooling air through the interior of the casing, over the working parts of a machine of the class described, means whereby the dirt carried by the air is removed from the air before the latter enters the casing and comes into contact with the working parts of the machine.

It is another object of the invention to provide means associated with the rotating shaft of an electric motor, generator or similar machine to clean air and circulate the cleaned air through the casing of the machine.

More specifically, it is an object of the invention to provide, in combination with an electric motor, generator or similar machine, which includes a casing and rotatable shaft within the casing and projecting at one end therethrough, a housing secured to the casing and surrounding the projecting end of the rotatable shaft, and means on said shaft within the housing to separate the dirt carried by the air from the air and circulate the cleaned air through the casing.

It is another object of the invention to provide new and improved air cleaning apparatus.

Other objects of the invention will appear in the course of the following description of the preferred embodiment of my invention which is shown in the accompanying drawing, in which:

40 Figure 1 is a side elevation of an electric motor on which is provided air-cleaning and ventilating apparatus in which is embodied my invention.

Figure 2 is an end elevation of the motor shown in Figure 1.

45 Figure 3 is an enlarged fragmentary section taken on the line 3—3 of Figure 2.

Figure 4 is a section taken on the line 4—4 of Figure 3.

In the drawing, the reference character 5 indicates an electric motor of which the working parts are enclosed in a casing 6 which is mounted on a base 7. The armature of the motor is carried by a shaft 8 which is journaled in bearings, such as 9, at opposite ends of the casing and projects therethrough at both ends. To one pro-

jecting end of the shaft is fixed an ordinary pulley 10 in any desired manner.

To the other projecting end of the shaft 8, is fixed, so as to rotate therewith, a head 11 carrying on its outer end a circular plate 12. To the outer surface of the plate 12 are fixed blades 13 disposed perpendicularly thereto and extending radially from the circumference toward, but ending short of, the center of the plate. Inwardly of the plate 12, the head 11 carries propeller type fan blades 14 which are fixed rigidly thereto. It will be noted that the blades 14 extend appreciably farther radially from the shaft 8 than the blades 13.

The projecting end of the shaft 8 and the head 11 and blades carried thereby are enclosed in a cylindrical housing 15 which is just large enough in diameter to insure a slight clearance between the ends of the blades 14 and the side walls 16 of the housing. There is, as can be seen in Figures 3 and 4, a considerable distance between the circumference of the plate 12 and the side walls 16 of the housing. The cylindrical housing has at one end an outwardly extending circumferential flange 17 bearing against the casing 6 and secured thereto by screws or the like 18 extending through perforations 19 in the flange and threaded into the casing, as indicated at 20. Directly opposite the ends of the blades 13, the sidewall 16 is provided with openings 21 formed by striking out tongues 22 from the sidewall. Each of these tongues is joined to the side wall of the housing at the outer edge of an opening 21 and is inclined outwardly of the housing and projects over the opening so as to act as a baffle to direct dirt that is discharged through the opening away from the outer end of the housing. On the outer end of the housing 15, there is provided an inwardly extending circumferential flange 23 which is slightly spaced longitudinally of the housing from the blades 13, and terminates radially outwardly of the axis of the housing, leaving a large circular opening 24 coaxial with the shaft 8 in the end of the housing. The opening 24 is covered by a fine mesh screen 25.

In the end of the casing 6 carrying the housing 15 and opening into the interior of the housing and the interior of the casing, there are provided openings, such as 26, through which air may pass from the interior of the housing to the interior of the casing. Similar openings, which are indicated by the reference character 27, and through which air may be discharged from the interior of the casing, are located in the end of the casing opposite that in which the openings 26 are lo-

cated. It is preferable that the casing be air tight at all other points to insure that the cooling air forced into the casing by the fan will travel the full length of the interior of the casing and pass over all of the parts within the casing before being discharged therefrom. But even if there are leaks in the casing they will not serve as a passage for dirty air to enter the casing for the air in the casing is under pressure due to the fan and air will be discharged from the casing rather than drawn into it through the leaks.

When the motor starts, the blades 13 and 14 rotate and air is drawn through the screened opening 24 into the housing, the screen 25 preventing the larger dirt particles from entering the housing with the air. After passing through the opening 24, the air impinges against the plate 12 and is caught by the blades 13 which give it a rotary motion which throws the dirt particles to the outside of the current and out of the housing through the openings 21. The cleaned air is drawn around the outside of the plate 12 by the fan 14 which then forces it through the openings 26 into the interior of the motor casing, then through the casing, during which portion of its travel it passes over and cools the brushes, commutator, field coils and armature, and finally out of the casing through the openings 27. The plate 12, it is clear, prevents the air reaching the fan 14 before it has been exposed to the centrifugal cleaning action of the blades 13. The function of the tongues 22 over the openings 21 is to direct the dirt discharged through these openings away from the intake opening 24 and thus prevent it entering the housing again.

Though I have described my combined air cleaning and ventilating apparatus as applied to an electric motor, it is not limited to such a restricted use. That it can also be used on electric generators, rotary converters and similar machines is obvious. It can furthermore also be

used in many other connections where a simple, efficient air cleaning and blowing apparatus is needed.

It is not necessary that the discharge openings in the motor casing be positioned in the end opposite to that having the intake openings. It may be desirable in some instances to position them in the sides, or in both the sides and the end of the casing.

I claim:

1. In apparatus of the class described, a substantially cylindrical housing, an air intake opening in one end of the housing, an air discharge opening in the opposite end of the housing, a dirt discharge opening in a side wall of the housing adjacent the air intake opening, means within the housing to effect an inertia separation of foreign matter from the air within the housing and to discharge foreign matter from the housing through the dirt discharge opening, means to draw air into the housing through the air intake opening and discharge it therefrom through the air discharge opening, and a baffle over the dirt discharge opening to prevent the foreign matter which is discharged from the dirt discharge opening from re-entering the housing through the air intake opening.

2. An electric machine having a casing and a rotatable shaft within the casing and projecting through one end thereof, said end having an annular portion surrounding the shaft and extending outwardly beyond the main portion of the end of the casing, said end also having an opening therein outwardly of the annular portion and spaced from the periphery of the end of the casing, means to clean air and circulate it through the casing including a baffle secured to the projecting end of the shaft, blades on the outer surface of the baffle, and a housing secured to the casing and enclosing the baffle, the blades and the openings.

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