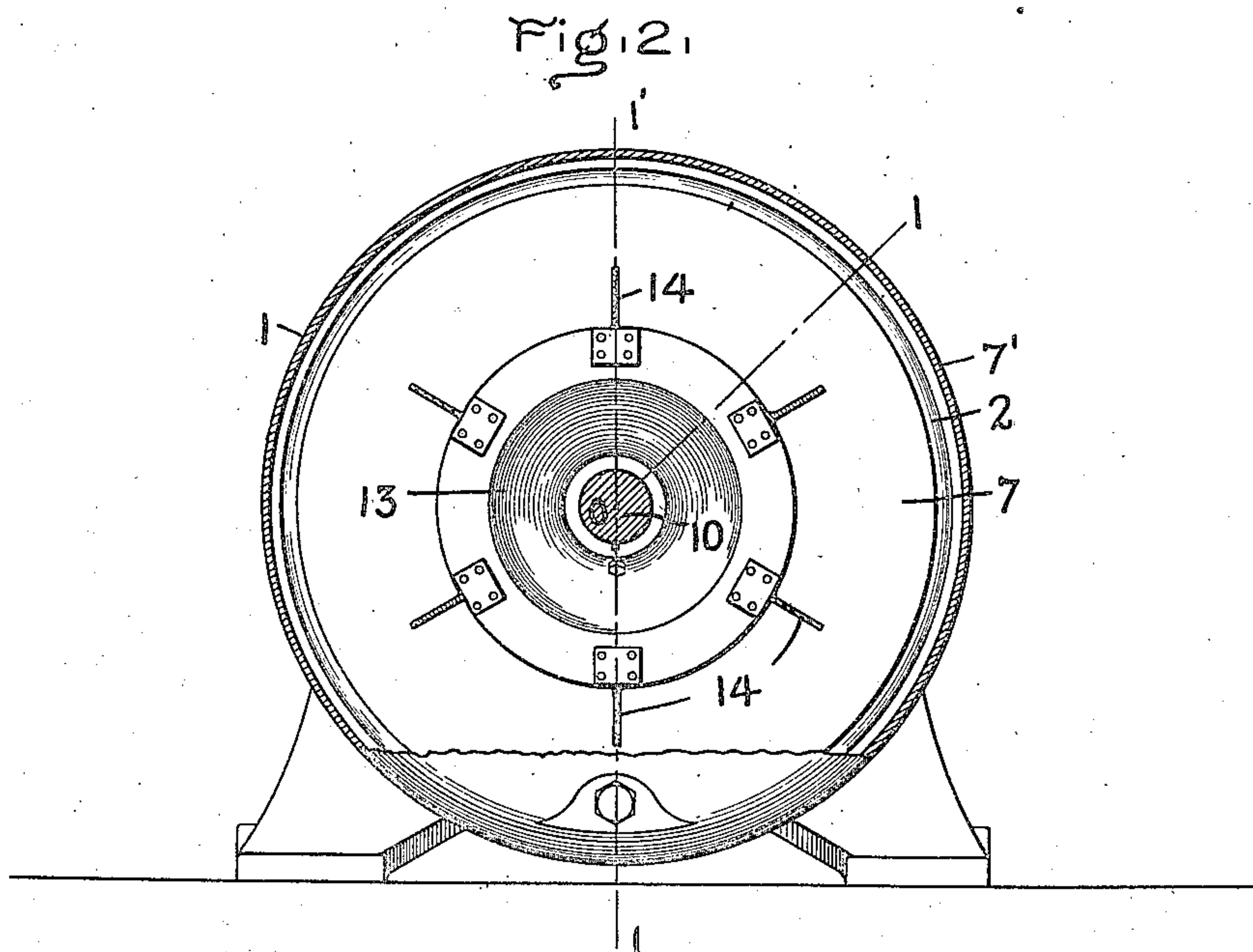
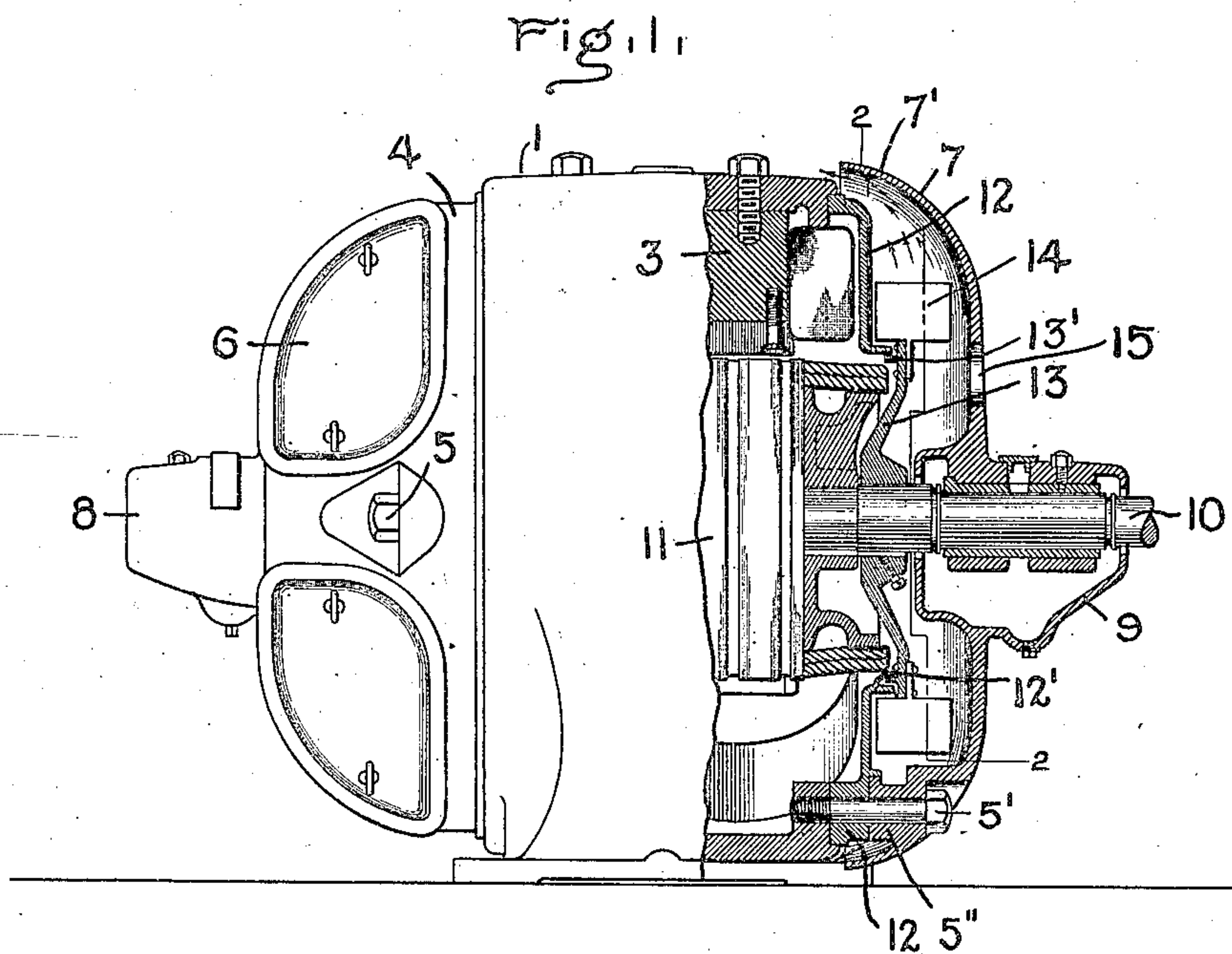


No. 849,706.

PATENTED APR. 9, 1907.

E. R. WHITNEY & L. A. TIRRILL.
COOLING DYNAMO ELECTRIC MACHINES.
APPLICATION FILED OCT. 19, 1903.



Witnesses:

Ewing Rumney.
Helen Arford

Inventors,
Eddy R. Whitney
and Leonard A. Tirrill,
By *Alberty, Davis*
Att'y

UNITED STATES PATENT OFFICE.

EDDY R. WHITNEY, OF SWAMPSCOTT, AND LEONARD A. TIRRILL, OF LYNN, MASSACHUSETTS, ASSIGNORS TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

COOLING DYNAMO-ELECTRIC MACHINES.

No. 849,706.

Specification of Letters Patent.

Patented April 9, 1907.

Application filed October 19, 1903. Serial No. 177,576.

To all whom it may concern:

Be it known that we, EDDY R. WHITNEY and LEONARD A. TIRRILL, citizens of the United States, residing at Swampscott and Lynn, respectively, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Cooling Dynamo-Electric Machines, of which the following is a specification.

The object of our present invention is the provision of improved means for artificially cooling dynamo-electric machines.

More particularly our invention relates to dynamo-electric machines which the conditions of service make it necessary or desirable to inclose in a manner to prevent the access of air into their interiors.

Our invention contemplates the use of means for directing air or other fluid against the outer surface of the casing of the machine in order to take away the heat generated in the machine, and consists in various novel features of construction and arrangement, all of which are fully pointed out in the claims annexed to and forming a part of this specification.

For a better understanding of our invention reference may be had to the accompanying drawings, in which we have illustrated one embodiment of our invention.

Figure 1 is an elevation with a portion in section on the lines 1 0 and 0 1 of Fig. 2, the section taken on the line 0 1 being revolved in Fig. 1 so that it appears to be taken on the line 0 1'. Fig. 2 is an end sectional elevation taken on the line 2 2 of Fig. 1.

Referring to the drawings, 1 represents a dynamo-electric machine of the so-called "inclosed" type provided with a field-ring 2, from which pole-pieces 3 project inwardly. The left-hand end of the machine is provided with an end piece or member 4, which is secured to the ring 2 in any suitable manner, as by a plurality of bolts 5. Caps or covers 6 may be employed to close openings formed in the end piece 4. A member which may also be secured to the ring 2 by bolts 5' is placed at the right-hand end of the machine. Boxes 8 and 9 are carried by the end members 4 and 7, respectively, in which the armature-shaft 10 may be journaled. The shaft 10 carries an armature 11, which turns in the space between the pole-pieces 3.

The member 7, which has a concave inner face, as is clearly shown in Fig. 1 of the drawings, is so proportioned that its extreme outer edge 7' projects slightly beyond the outer periphery of the member 2, and the inner surface of the outer projecting portion 7' of the member 7 is nearly parallel with the outer surface of the ring 2. The member 7 does not abut directly against the end of the ring 2, but is separated therefrom by a space. The annular member 12 is placed against the right-hand end of the ring 2 and partially fills the space between the ring and the member 7. Space-blocks of any suitable character, such as bosses 5'', formed on the inner side of the member, serve to separate the members 12 and 7. The ends of the bosses 5'' bear against the ring or member 12. Fastening-bolts 5' pass through these bosses and through the ring or member 12, forming a means for clamping the members 7 and 12 to the ring 2. By the use of the construction described an annular space is formed between the members 7 and 12 for a purpose to be hereinafter described.

The annular member 12 is proportioned so that its inner periphery, which terminates in an outwardly-extended cylindrical flange 12', is adjacent to the periphery of the armature. A disk or spider 13 is placed on the armature-shaft between the end of the armature and the bearing-box 9. The diameter of this disk or spider is shown as slightly greater than the diameter of the flange 12'. The member 13 is placed with its inner surface closely adjacent to the outer edge of the flange 12', only the necessary clearance between the two members being allowed. A cylindrical flange 13' may be formed, as shown on the inner side of the spider 13, in such manner as to telescope with the flange 12'. This still further restricts the passage between the members 12 and 13. It will be seen that the ring 2, end member 4, with its covers 6, and members 7 and 13 form a casing in which the parts of the machine which are liable to be injured by dust or the like are completely inclosed.

A number of radial fan-blades or vanes 14 are secured at the outer edge of the member 13 in any suitable manner, as by riveting. These blades, which are located in the space between the end member 7 and the annular

member 12, together with their supporting member 13, turn with the armature and form a fan which generates currents of air moving in the direction indicated by the arrows in Fig. 1. The air-currents so generated pass through the space between the edges of the members 12 and 7 with such a direction of motion that they flow along the outer surface of the field-ring 2 in a direction substantially parallel to the armature-shaft 10. This direction is obtained by the concave shape of the member 7. Apertures 15 are formed in the end member 7 through which the air passes to the blades 14.

It has been found that currents of air or other similar medium forced along the end and periphery of a dynamo-machine in the manner described assist materially in keeping down the temperature of the machine. The construction employed insures neat, compact, and efficient means for securing the flow of the cooling fluid. As the blades 14 are placed beyond the junction between the members 12' and 13, there is no tendency to force the cooling fluid into the interior of the machine. This feature becomes highly important when the machines are intended to be located in flour-mills, mines, or other localities where the air is filled with particles of dust or the like. The member 7 is not only so placed as to form an excellent means for giving the cooling-currents the proper direction, but so that it forms an excellent mechanical shield or guard for the fan-blades 14.

While our invention is particularly adapted for use in connection with machines of the so-called "inclosed" type, it will be readily apparent to those skilled in the art that all of its features are not limited to such use. It is equally obvious that our invention is not limited to use in connection with dynamo-electric machines of the particular type illustrated.

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

1. In combination, a dynamo-electric machine provided with an inclosing casing, a shaft having a portion projecting out from said casing, a fan mounted on the projecting portion of said shaft, and a member for direct-

ing the current generated by said fan along said inclosing casing.

2. In combination, a dynamo-electric machine provided with an inclosing casing, a shaft having a portion projecting out of said casing, a fan mounted on said projecting portion, and a shield for protecting the fan having a portion arranged to deflect the current against the casing.

3. In combination, a dynamo-electric machine provided with an external field-ring, a rotating armature-shaft, a fan carried thereby, and a member for directing the current generated by said fan against the outer periphery of the field-ring.

4. In a dynamo-electric machine, an armature-shaft, a fan mounted thereon, and a shield for protecting the fan from injury and for directing the current generated by the fan against the exterior surface of the machine.

5. In a dynamo-electric machine, a field-ring, an armature, end members connected to the field-ring and provided with bearings in which the armature-shaft is journaled, one of said end members being separated from the ring by a passage, and means for causing currents of air to pass through said passage and against the outer surface of said ring.

6. In a dynamo-electric machine comprising a stationary member and a rotary member, one of said members being located outside the other member, means carried by the rotating member for generating a cooling-current, and a member for directing said current against the outer periphery of the outer member.

7. In an inclosed dynamo-electric machine, means for generating a cooling-current within the motor structure and for causing such current to flow over a considerable portion of the outer surface of the machine.

In witness whereof we have hereunto set our hands this 2d day of October, 1903.

EDDY R. WHITNEY.
LEONARD A. TIRRILL.

Witnesses:

DUGALD MCK. MCKILLOP,
JOHN A. McMANUS.