

959,651.

E. M. TINGLEY.
DYNAMO ELECTRIC MACHINE.
APPLICATION FILED AUG. 2, 1906.

Patented May 31, 1910.

2 SHEETS—SHEET 1.

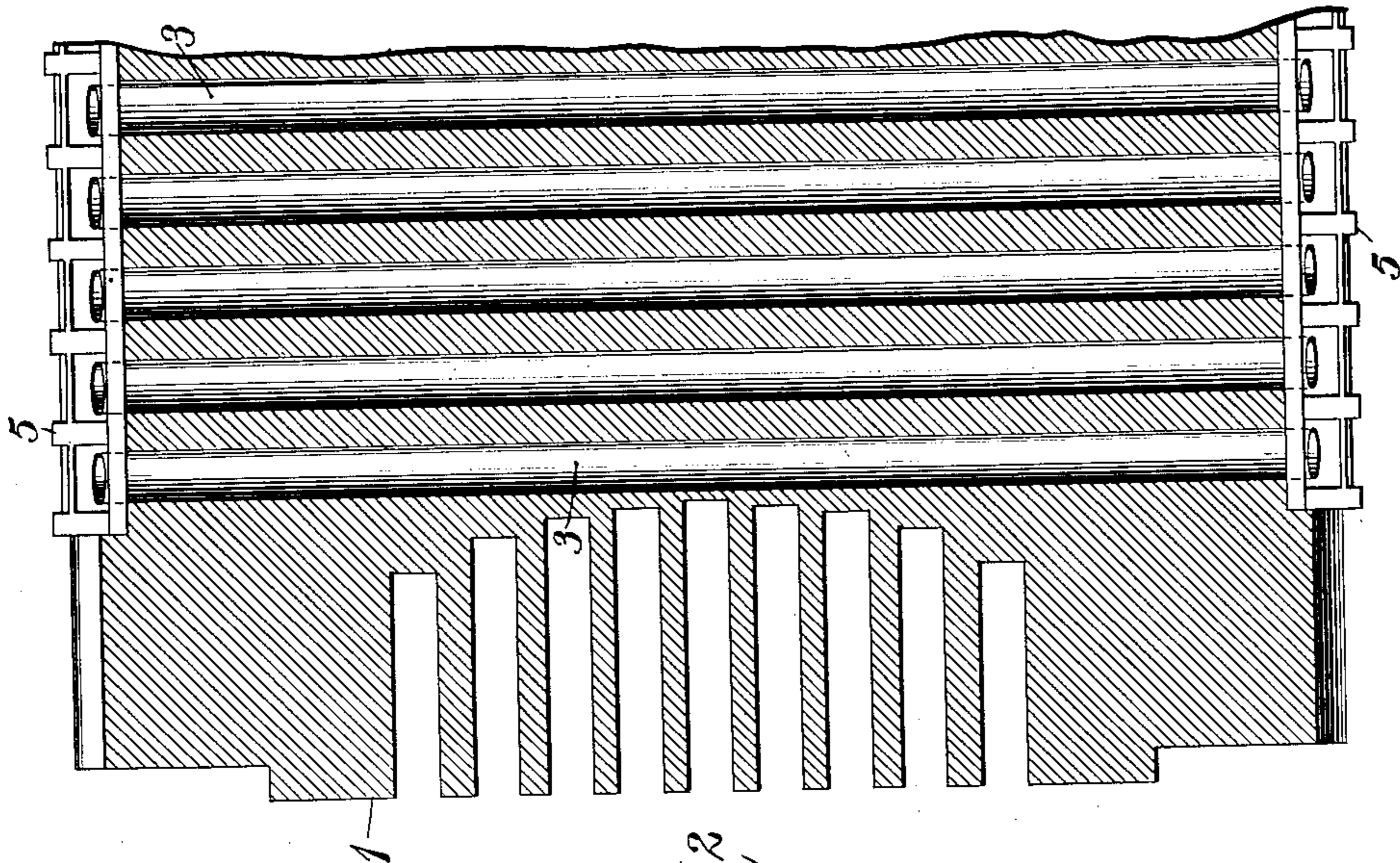


Fig. 2.

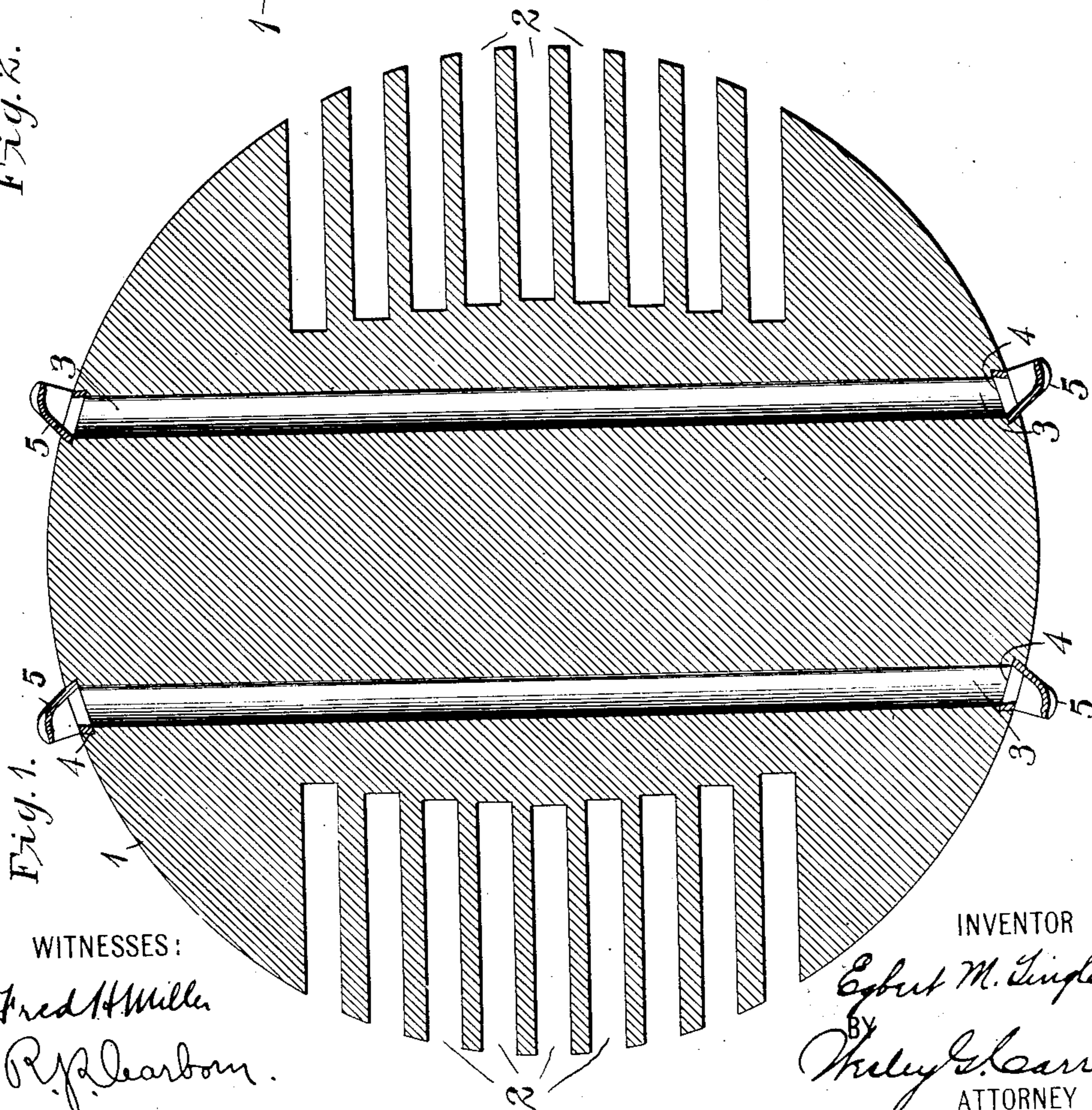


Fig. 1.

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Fig. 3.

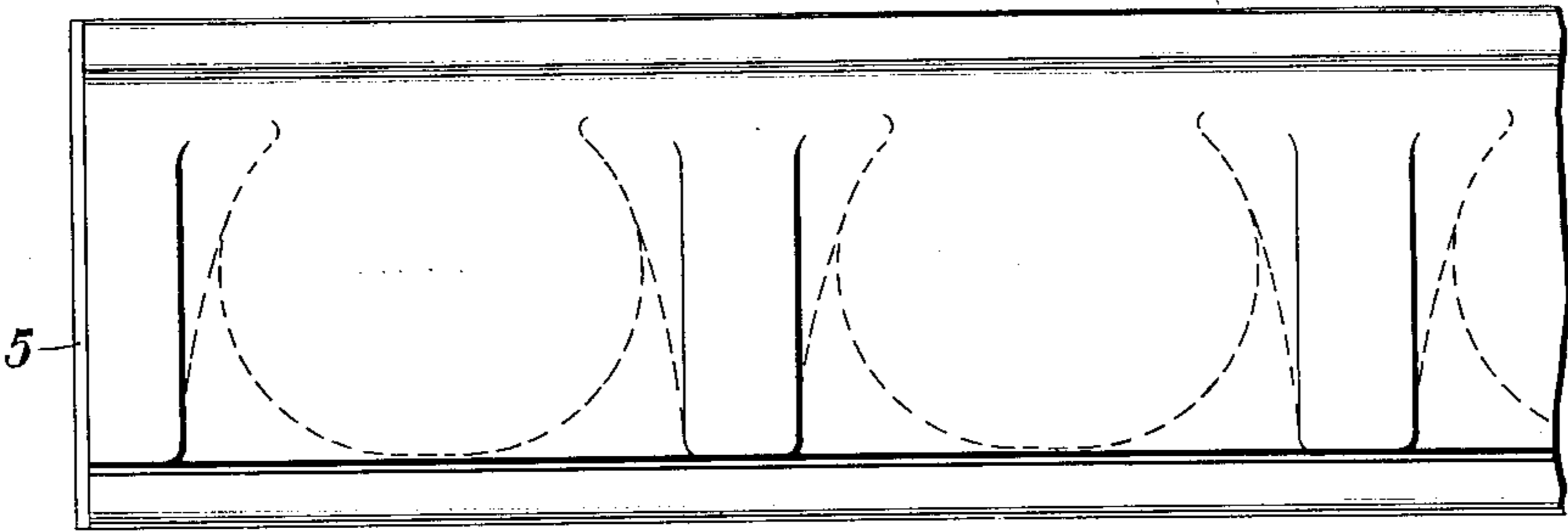


Fig. 4.

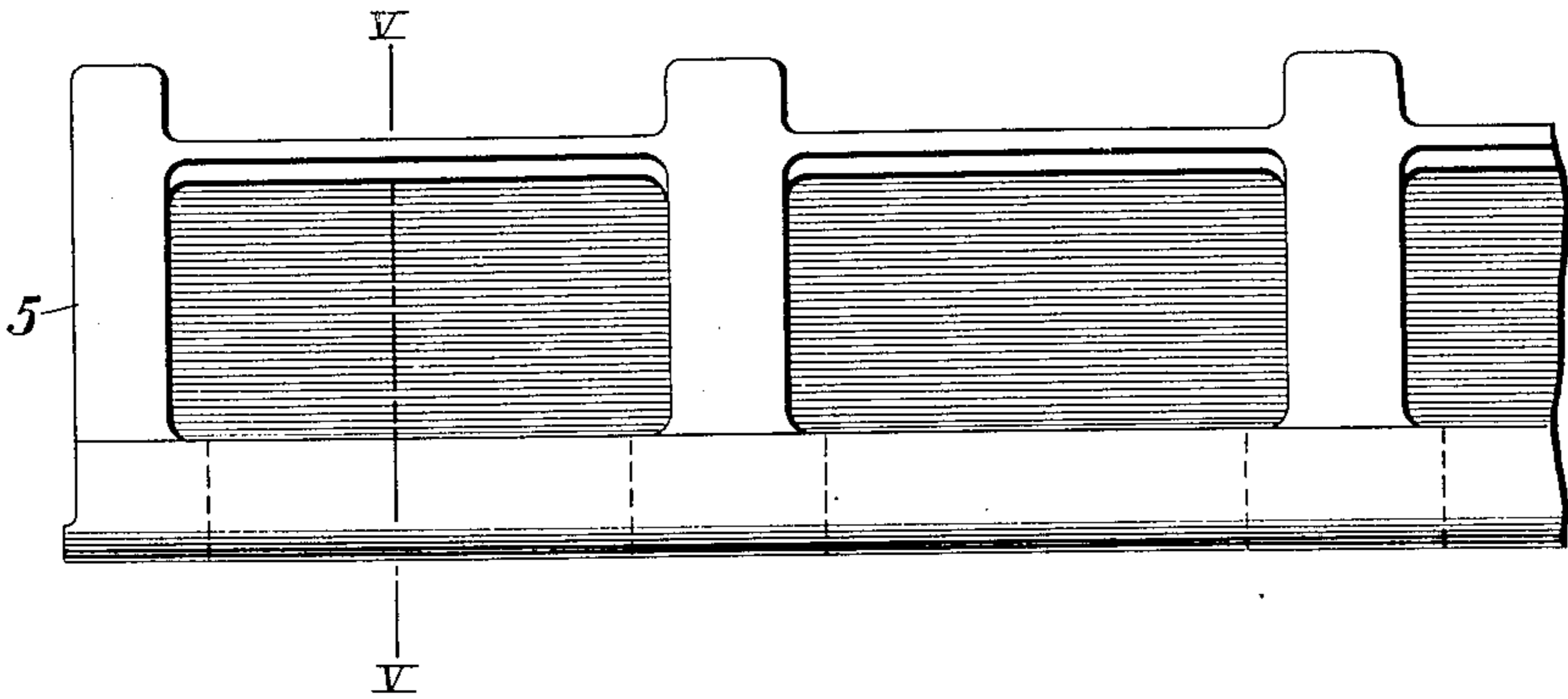
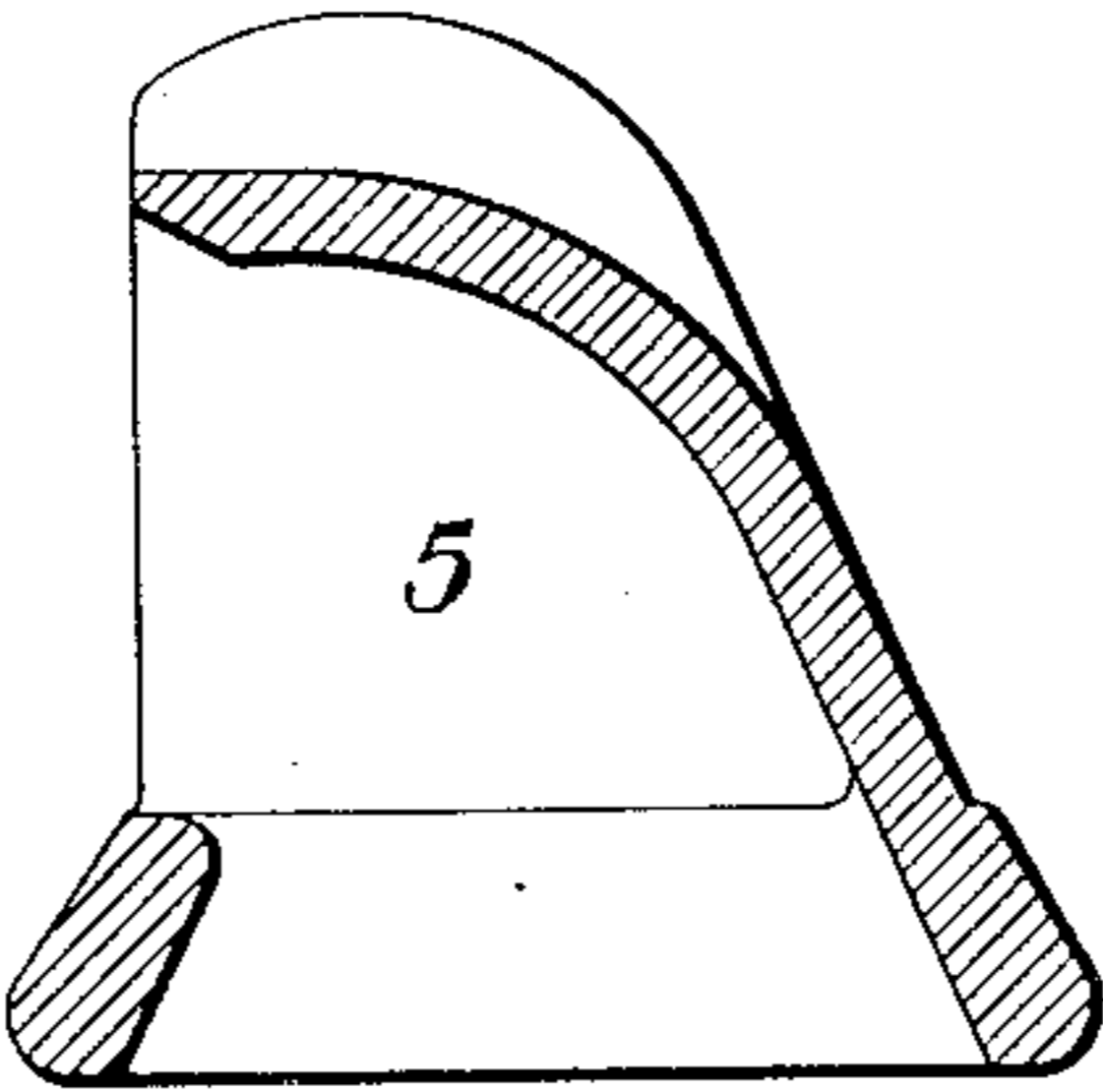


Fig. 5.



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UNITED STATES PATENT OFFICE.

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DYNAMO-ELECTRIC MACHINE.

959,651.

Specification of Letters Patent.

Patented May 31, 1910.

Application filed August 2, 1906. Serial No. 328,884.

To all whom it may concern:

Be it known that I, EGBERT M. TINGLEY, a citizen of the United States, and a resident of Pittsburg, in the county of Allegheny 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 has special reference to the rotating members of machines which normally operate at relatively high speeds.

The object of my invention is to provide such means for improving the ventilation of rotatable core members by materially increasing the surface exposed to cooling air with a slight reduction of its useful section, as shall be simple and durable in construction and effective in operation.

Field magnet members for turbo-generators, or other high speed dynamo-electric machines, are frequently constructed of magnetizable castings or forgings which are suitably slotted to receive the magnetizing windings. In order to ventilate such a core structure, longitudinal holes have been bored through it and narrow circumferential slots have sometimes been provided at frequent intervals, intermediate its ends, through which cooling air has been circulated by centrifugal force. Longitudinal holes bored in such a core structure are necessarily limited in number in order to avoid both interference with the slots in which the winding is located and excessive weakening of the structure, while the circumferential slots are objectionable because they materially reduce the core section and intersect the winding slots. In order to materially increase the ventilating surface and only slightly reduce the core section, I provide a series of straight, preferably round, holes which extend through the core structure and lie in planes substantially parallel to its axis with both ends terminating at the periphery. There is no tendency for air to circulate therethrough by reason of centrifugal action. On the surface of the core structure and at the ends of the ventilating holes, I provide projections which are so arranged as to create a circulation of air through the holes as the core member rotates. These holes do not interfere with the slots in which the winding is located and are of relatively small bore so that a large area is ex-

posed for a given reduction in the core section. Furthermore, the ventilating holes are close to the windings to be cooled so that the heat has only a short distance to flow through the metal to a cooling surface. The projections on the surface of the core may have the form of scoops that face in opposite directions, relative to the rotation of the core member, at opposite ends of a single ventilating hole. The scoops are not essentially detachable or of any specific form and it may be feasible to so form the surface of the core member as to force the air through the holes.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a view, partially in elevation and partially in section, of a portion of a rotatable core member ventilated in accordance therewith, and Fig. 2 is a sectional view, in a plane perpendicular to its axis, of the core member shown in Fig. 1. Figs. 3, 4, and 5 are detail views of ventilating scoops such as are outlined in Figs. 1 and 2.

Referring to the drawings, a substantially cylindrical core member 1 is provided with a plurality of longitudinal slots 2, in which a suitable winding may be located, and a series of ventilating holes 3. The ventilating holes 3, as illustrated, are divided into two groups which are disposed in planes parallel to the axis of the core near the bottoms of the slots 2, but they may be disposed in more than two planes or in any manner best adapted to the form of core with which they are employed. The surface of the cylindrical core member, near the ends of the holes 3, is provided with slots 4 in which the air propellers or scoops 5 are located. The scoops 5 may comprise a plurality of units corresponding in number to the holes with which they are used, or they may comprise members which are in the form of a series of scoops as illustrated in Figs. 3 and 4. Since the scoops at the extremities of each ventilating hole face in opposite directions relative to the rotation of the core member air will be forced into one end of the hole and allowed to escape from the other end as the core member rotates. The scoops 5 may project a material distance from the surface of the cylindrical core member since a considerable air gap is usually provided in high speed machines employing core members of the character described, and they

are made relatively heavy and substantial to avoid injury when the core is assembled or transported.

Although I have shown the ventilating arrangement of my invention only in connection with a cylindrical core member which is adapted for use with a bipolar machine, I desire that its use shall not be restricted thereto since it may be readily applied to various other forms of rotatable core members for two or more poles, within the scope of my invention.

I claim as my invention:

1. In a dynamo-electric machine, the combination with a rotatable member having ventilating holes which extend therethrough substantially perpendicular to its axis, of deflectors at the ends of each hole which project laterally therefrom and have openings at the same side.

2. In a dynamo-electric machine, the combination with a rotatable member having a series of ventilating holes disposed in one or more planes substantially perpendicular to its axis, of guides at the opposite ends of each hole which have a similar inclination with reference to the center line of the hole in order to direct the air into one end of the hole and out of the opposite end, when the member rotates in either direction.

3. In a dynamo-electric machine, the combination with a rotatable member having holes for ventilation which are transverse to its axis, of scoops which project from the member near the ends of the holes with their openings oppositely disposed relative to the direction of rotation of the member.

4. In a dynamo-electric machine, the combination with a rotatable core member hav-

ing a plurality of longitudinal slots, and a series of ventilating holes extending through the core member and substantially perpendicular to its axis, of a plurality of scoop projections located on the surface of the core member near the ends of the ventilating holes, and means for holding the scoop projections in position.

5. In a dynamo-electric machine, the combination with a rotatable core member having ventilating holes which extend transversely therethrough and terminate at its periphery, of scoops at the opposite ends of each hole that project oppositely with reference to the direction of rotation, for creating a circulation of air through the holes as the core member rotates.

6. In a dynamo-electric machine, the combination with a rotatable core member having transverse ventilating holes which terminate at its periphery, of deflectors which project oppositely from the ends of the respective holes, with respect to the direction of rotation.

7. In a dynamo-electric machine, the combination with a rotatable core member having transverse ventilating holes which terminate at its periphery, of deflectors which project from the surface of the core member near the ends of the holes and face in opposite directions relative to the rotation of said core member.

In testimony whereof, I have hereunto subscribed my name this 31st day of July 1906.

EGBERT M. TINGLEY.

Witnesses:

JOHN M. FITZTHUM,
BIRNEY HINES.