(No Model.) 2 Sheets—Sheet 1.

W. F. MARZAHN.

DYNAMO ELECTRIC MACHINE.

No. 571,780. Patented Nov. 24, 1896.

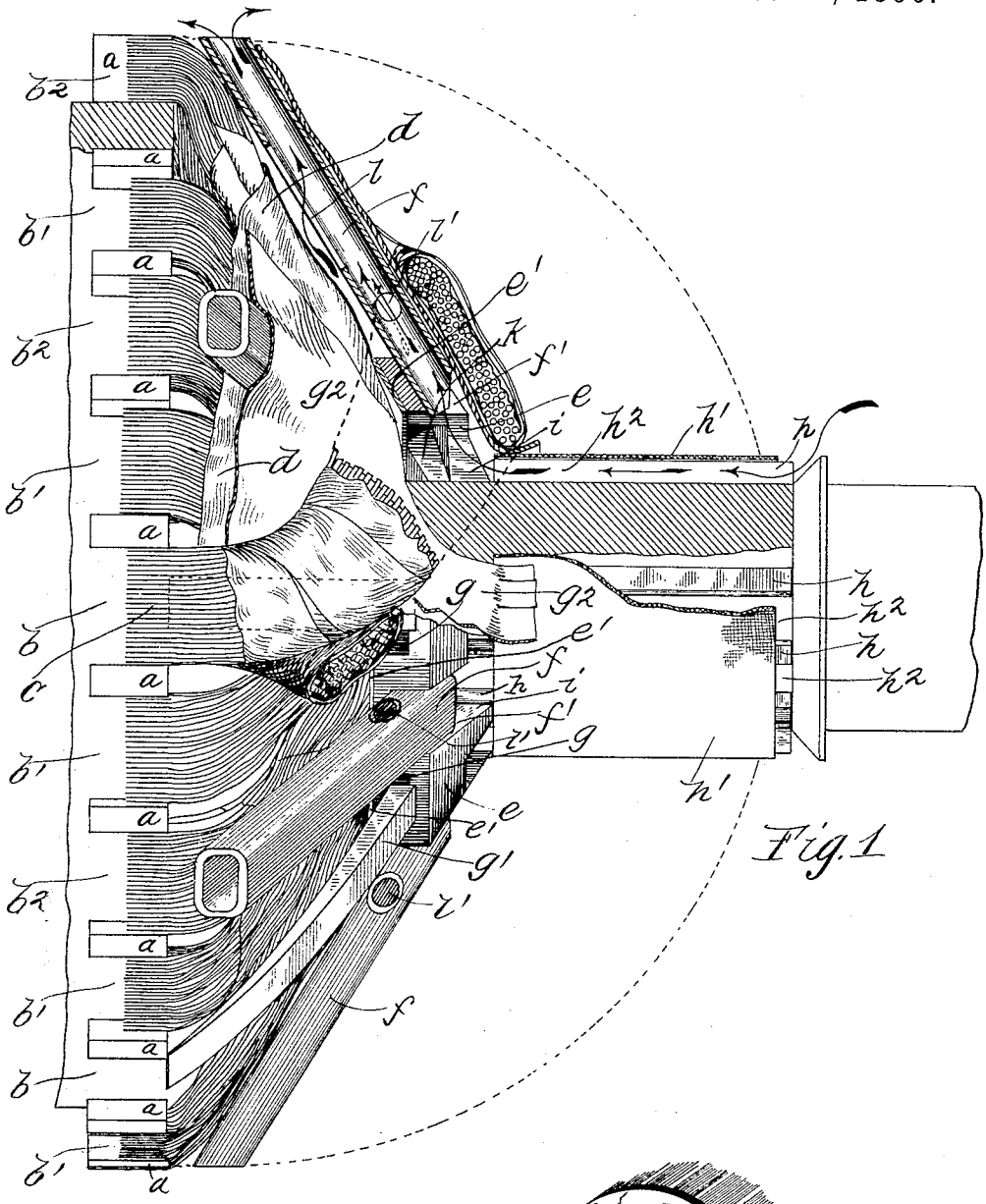

Fig. 1

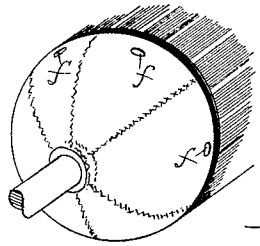

Fig. 2.

Witnesses:
D. H. C. Parker,
John H. Sinclair.

Inventor:
William F. Marzahn,
By Bosbeck & Bracon
Attorneys.

(No Model.) 2 Sheets—Sheet 2.

W. F. MARZAHN.

DYNAMO ELECTRIC MACHINE.

No. 571,780. Patented Nov. 24, 1896.

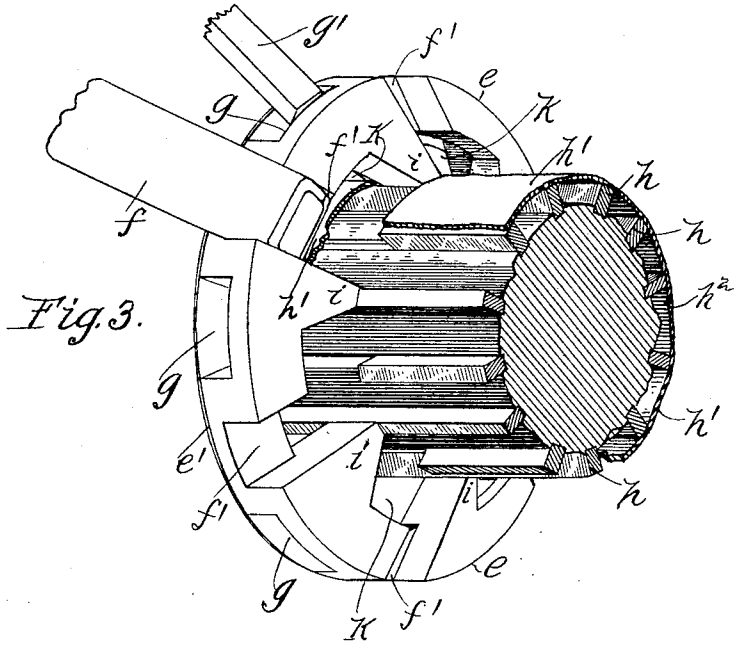

Fig. 3.

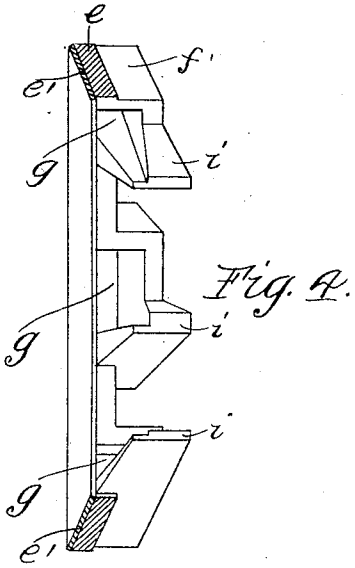

Fig. 4.

Fig. 5. Fig. 6.

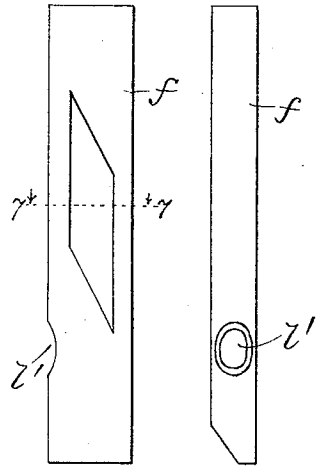

Fig. 7.

Witnesses:
D. H. C. Bowen
John W. Sinclair.

Inventor:
William F. Marzahn,
By Bartow & Brown
Attorneys.

UNITED STATES PATENT OFFICE.

WILLIAM F. MARZAHN, OF BUFFALO, NEW YORK.

DYNAMO-ELECTRIC MACHINE.

SPECIFICATION forming part of Letters Patent No. 571,780, dated November 24, 1896.

Application filed September 21, 1896. Serial No. 606,521. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM F. MARZAHN, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a certain new and useful Improvement in Dynamo-Electric Machines, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to dynamo-electric machines, and has for its object the provision of improved means for circulating cooling drafts of air among the coils of the armatures.

My invention is more particularly applicable to armatures of the drum type, and is especially adapted to the ventilation of the ends of wire-wound drums, which heretofore have been so thoroughly covered with wire and insulating material as to prevent ventilation thereof.

Speaking generally, the preferred form of my invention consists in disposing tubes constructed of thin insulating material within the ends of the armatures, so that the tubes are disposed between the coils. The tubes afford passage for cooling currents of air which are drawn in from the region of the shaft by centrifugal force and expelled at the circumference of the armature. The coils of the armature are preferably disposed to form vacant spaces between the tubes, which spaces communicate with the region about the shaft. The walls of the ventilating-tubes are provided with openings which afford communication between these spaces and the bores of the tubes whereby air may be drawn from the region of the shaft and passed through said spaces to the outer circumference of the armature.

My invention will be more readily understood by reference to the accompanying drawings, in which—

Figure 1 is an elevation of the end of a partially-completed armature to which my invention is shown as being applied, parts being removed and broken away. Fig. 2 is a perspective of the end of a completed armature embodying my invention. Figs. 3, 4, 5, and 6 are details of construction. Fig. 7 is a sectional view on line 7 7 of Fig. 5.

Like letters indicate like parts throughout the different views.

The core of the armature illustrated in Fig. 1 is provided with a series of radially-projecting lugs a a, which secure the coils in position. After the armature has been half wound spaces b b, intervening between these lugs, will be free of windings, spaces b' b' will each contain one winding, and spaces b^2 b^2 will each contain two windings, while after the second half of the armature-winding has been completed spaces b b will each contain two windings, as indicated at c, spaces b' b' will each have one winding added to the winding already present, while the spaces b^2 b^2, which each previously had two windings, will receive none in addition. Each of the spaces b b' b^2 is thus provided with two windings when the armature is complete and none, one, and two, respectively, when the armature is half complete. The spaces b b' b^2 are disposed at regular intervals about the armature-core. As this method of armature-winding is familiar to those skilled in the art I do not deem a further description thereof essential.

After the armature has been half wound a layer of cloth d, which is removed from the lower portion of the armature, (illustrated in Fig. 1 for the sake of clearness,) is placed upon the coils and pressed closely about the same. A collar e is then slipped upon the shaft and placed against the coils of the armature, this collar being adapted to secure the ventilating-tubes in position, as will be described.

Referring to Figs. 1, 3, and 4, the collar e is provided with a series of radial recesses f' f', in which are disposed the ventilating-tubes f f, which rest upon the two windings contained in the spaces b^2, the windings being depressed, as shown most clearly in Fig. 1, to afford a space beneath and between said tubes. Radial recesses g are also provided in the collar e, in which rest ends of the strips g', the other ends whereof are placed upon the armature-core near the spaces b, these strips being placed in position after the armature is half wound, the function whereof being to prevent the coils of the second half of the winding from filling the spaces inter-

vening between the ventilating-tubes. The ends of the strips g' g' that rest within the recesses g g cover about one-third of the opening only of said recesses, whereby air may be passed through the same to the space beneath and between the ventilating-tubes, as will be described. The collar e is provided with an annular strip e', which covers the recesses g g and serves to secure the strips g' g' in position and to prevent said recesses from being filled by the windings or cloth of the armature.

After the first half of the armature has been wound and the ventilating-tubes and strips g' g' have been placed in position a layer of press-board g^2 is placed over the ventilating-tubes, &c., as shown in Fig. 1, after which the remaining half of the winding is put upon the armature. The press-board is thoroughly saturated with water before it is applied, so that it may be shaped to conform to the superimposed winding.

Longitudinal strips h h are embedded in the armature-shaft and extend beyond the periphery thereof. A wrapping h' of canvas is placed about the shaft and strips, whereby ventilating-passages h^2 h^2 are formed. The canvas h' and the alternate strips h h are cut away from that portion of the shaft surrounded by the collar e to afford communication between the passages h^2 h^2 and the recesses f' f' and g g. The collar e is provided with inward projections i i, which rest upon the remaining continuous strips h h, spaces k k being thus provided, which are in direct communication with the passages h^2 h^2. The ventilating-tubes and recesses g g in turn are in direct communication with the spaces k k.

The ventilating-tubes are provided with openings l upon the bottom and l' l' upon the sides, whereby communication is afforded between the bores of said tubes and the space beneath and between the same, whereby air may find passage from said space through the bores of the tubes to the outer circumference of the armature.

The armature upon being rotated draws the air by centrifugal force through the ventilating-passages h^2 h^2 to the spaces k k, from which the air is passed out in two streams, one passing through the ventilating-tubes to the circumference of the armature, while the other passes through the recesses g g to the space intervening between and beneath the ventilating-tubes, from which space the air is passed to the outer circumference of the armature by way of the openings l l' and the bores of said tubes.

Modifications may be readily made from the form of my invention set forth herein without departing from its spirit, and I do not therefore desire to be limited to the precise construction shown; but,

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a dynamo-electric machine, the combination of a drum-armature, with ventilating-tubes disposed in the end or ends thereof, substantially as described.

2. In a dynamo-electric machine, the combination of an armature, with ventilating-tubes disposed among the windings thereof adapted to convey air from the region of the shaft to the outer circumference of the armature, substantially as described.

3. In a dynamo-electric machine, the combination of an armature, with ventilating-tubes of insulating material disposed among the windings thereof adapted to convey air from the region of the shaft to the outer circumference of the armature, substantially as described.

4. In a dynamo-electric machine, the combination of an armature, with ventilating-tubes radially disposed among the windings thereof, substantially as described.

5. In a dynamo-electric machine, the combination with ventilating-tubes disposed among the windings thereof, said tubes having ventilating-openings between their ends, substantially as described.

6. In a dynamo-electric machine, the combination with an armature, of ventilating-tubes disposed among the windings thereof adapted to convey air from the region of the shaft to the outer circumference of the armature, said tubes being provided with openings adapted to convey air from among the windings of the armature to said tubes, substantially as described.

In witness whereof I hereunto subscribe my name this 1st day of September, A. D. 1896.

WILLIAM F. MARZAHN.

Witnesses:
EDWARD M. SHELDON,
EUGENE L. DOMINICK.