

No. 669,575.

Patented Mar. 12, 1901.

D. M. BLISS.
DYNAMO ELECTRIC MACHINE.

(Application filed July 9, 1900.)

(No Model.)

Fig. 2.

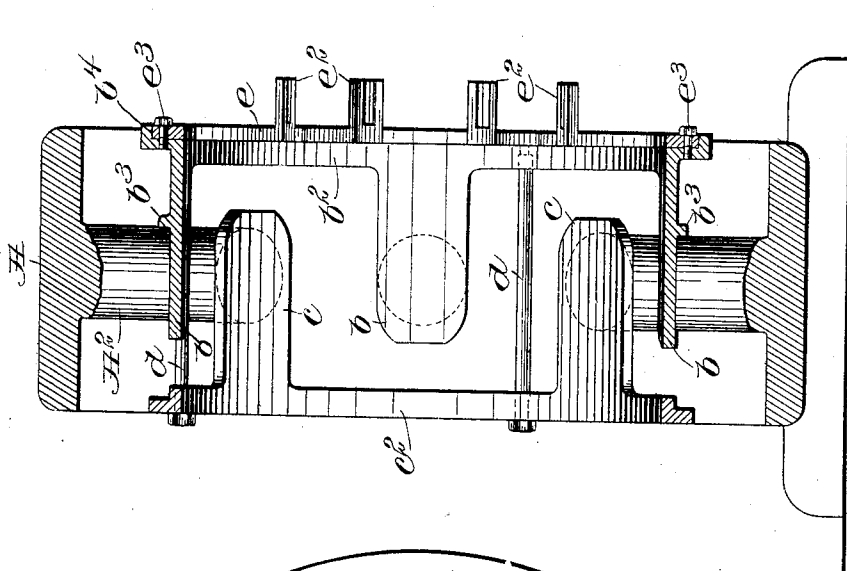
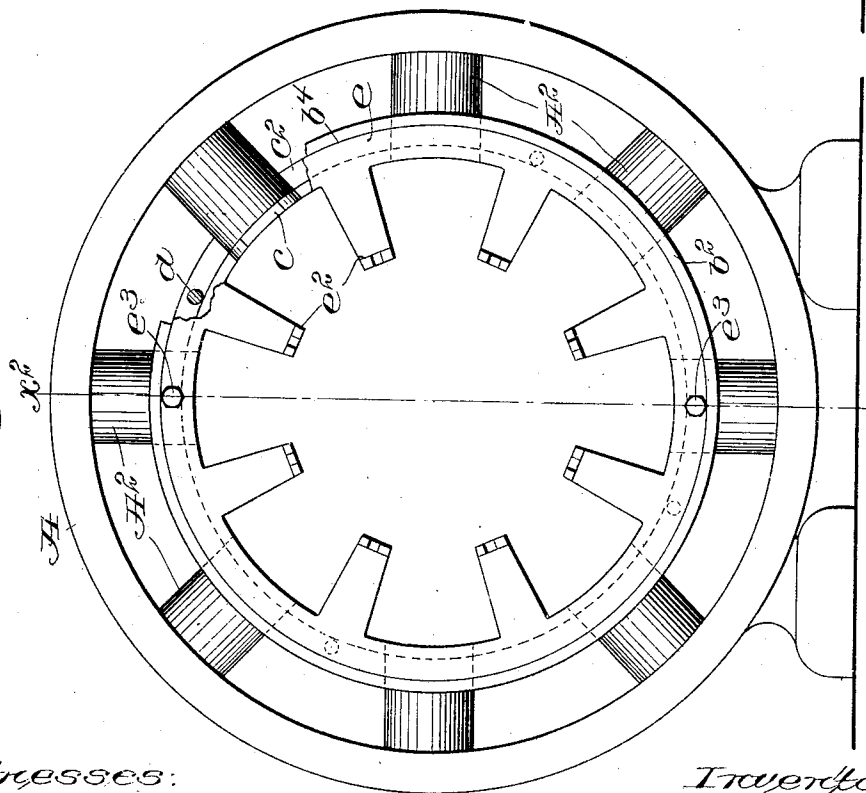


Fig. 1.



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UNITED STATES PATENT OFFICE.

DONALD M. BLISS, OF LOWELL, MASSACHUSETTS, ASSIGNOR TO THE NEW ENGLAND MOTOR COMPANY, OF MASSACHUSETTS.

DYNAMO-ELECTRIC MACHINE.

SPECIFICATION forming part of Letters Patent No. 669,575, dated March 12, 1901.

Application filed July 9, 1900. Serial No. 22,967. (No model.)

To all whom it may concern:

Be it known that I, DONALD M. BLISS, a citizen of Canada, residing in Lowell, county of Middlesex, and State of Massachusetts, have
5 invented an Improvement in Dynamo-Electric Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

10 The present invention relates to a dynamo-electric machine, one object of the invention being to simplify the construction of multipolar machines, reducing the number of the parts and rendering the fitting and assembling of the parts easier of accomplishment.

15 A further object of the invention is to equalize the magnetic field and to afford means for adjusting the pole-shoes at a single operation when it is necessary to move the said pole-shoes in one direction or the other with relation to the armature. As heretofore commonly constructed the field-magnet poles have been provided with pole-shoes separately or individually attached thereto in various ways, it being obvious that if it is desired to change the position of the pole-shoes with relation to the pole-pieces each pole-shoe must be separately adjusted, it being further desirable that these several adjustments should
20 be the same, this being a matter of some difficulty to accomplish. Furthermore, in motors in which the armature-winding is arranged with a number of parallel circuits or groups it is necessary, in order to secure perfect operation under varying loads, not only that the several groups of coils in parallel on the armature be balanced electrically, but also that the magnetic flux from each pole should be equal in strength and amount. In
25 this case an unequal distribution of the flux around the armature tends to throw the armature out of balance electrically, which results in defective operation and a reduced output, and such unequal distribution of the magnetic flux into the armature from the several poles may be caused by imperfect joints, variation in section of the pole shoes or cores, or a difference in the length of the cores. These objections are overcome in the machine
30 embodying the present invention, in which

the pole-shoes belonging to the cores of one polarity are formed in a single piece of metal or casting and the pole-shoes belonging to the cores of opposite polarity are formed in another single casting. By this construction
35 the pole-shoes of like polarity are connected together magnetically, and if any difference in magnetic flux is present in the poles of like polarity it will tend to be equalized by lines of force flowing from the stronger to the weaker pole. The pole-shoes may be in the form of wings or projections connected together by a ring or annular connecting part, so that when the said ring is placed parallel to the armature the projections will overlie the pole-faces to constitute the necessary pole-shoes.
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By turning the outer surface of the annular connecting parts and its projecting portions to a diameter equal to that of the pole-faces and boring the inner surface thereof to the right diameter the pole-shoes will perfectly fit the pole-faces and will all be of equal thickness. Furthermore, all of the pole-shoes may be adjusted at one operation by turning the rings with which they are connected in
45 one direction or the other, if it is desired to have the pole-shoe project from the polar extremity more or less with relation to the direction of movement of the armature.

The rings carrying the pole-shoes may be set on opposite sides of the machine, the shoes of one polarity projecting inward from one side and the shoes of the other polarity alternating therewith and projecting inward from the other side, and the rings may be supported directly by the polar extremities and connected together, if necessary, by bolts of non-magnetic material.
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A further feature of the invention consists in connecting with one of the rings a brush-holding device, thus rendering the construction of the machine as a whole extremely simple and the parts interchangeable throughout.

Figure 1 is a side elevation of the field-magnet frame of a machine embodying the invention, the armature being omitted to prevent confusion; and Fig. 2 is a vertical cross-section on the line x^2 of Fig. 1.
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The field-magnet frame A, which may be of any suitable construction and arrange-
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ment, is provided with the inwardly-projecting pole-pieces A^2 , which alternate in polarity. The faces of the several pole-pieces may be symmetrically shaped by boring or otherwise, so as to receive the pole-shoes b and c , which comprise wings or projections formed integral with annular supports b^2 and c^2 , the outer surfaces of the projections being so shaped as to fit the faces of the pole-pieces A^2 . Each of the annular supports is provided with half the number of projections needed, these projections being so spaced as to engage alternate polar extremities, so that the wings b will all lie in contact with polar extremities of one polarity and the wings c will all lie in contact with the polar extremities of the opposite polarity. Since these wings are arranged in this way, it is obvious that both the outer and inner surfaces thereof can be turned to the proper diameter so that the several wings will be equal in thickness and will also properly fit the pole-faces.

As best shown in Fig. 2, the supports b^2 and c^2 are placed on opposite sides of the machine, the shoes and annular supports being held in position by the polar extremities themselves. The said rings or annular supports are also shown as connected together by means of bolts d , of non-magnetic material, and are properly centered by means of shoulders adapted to engage the sides of the pole-pieces, two of the said shoulders being shown in Fig. 2 and indicated by the reference-letter b^3 . The pole-shoes are firmly held in position by the grip of the shoulders against the pole-pieces, but may be readily adjusted when the bolts are loosened. It is obvious, however, that any other suitable fastening means may be employed.

The brush-holding ring e , which is provided with brush-holders e^2 , may be advantageously connected with one of the annular supports, and is shown in Fig. 2 as connected by means of bolts e^3 with the support b^2 , which is provided with an annular channel b^4 to properly hold and center the brush-holder.

From the foregoing description it will be seen that while there is no magnetic connection between pole-shoes of opposite polarity the pole-shoes of like polarity are magnetically connected, and, furthermore, that the whole system of pole-shoes is embodied in a structure substantially independent of the rest of the machine and capable of adjustment as a whole with relation to the pole-pieces and armature.

It is not intended to limit the invention to the specific construction and arrangement shown and described, since modifications may

be made without departing from the invention.

I claim—

1. In a multipolar dynamo-electric machine, a field-magnet frame provided with radial pole-pieces; pole-shoes for said pole-pieces; and a pole-shoe ring or support having connected therewith all the pole-shoes of like polarity, whereby said pole-shoes of like polarity are magnetically connected, as set forth.

2. In a multipolar dynamo-electric machine, a field-magnet frame provided with radial pole-pieces; pole-shoes for said pole-pieces; and a pole-shoe system comprising two annular supports, each provided with half of the pole-shoes required, the pole-shoes of one polarity being all connected with one of the said annular supports, and the pole-shoes of the other polarity all being connected with the other annular support, as set forth.

3. In a multipolar dynamo-electric machine, the combination with the field-magnet frame provided with radial pole-pieces; of two annular supports at opposite sides of the field-magnet frame, each of said supports having pole-shoes projecting inwardly therefrom to engage the faces of half the pole-pieces, the pole-shoes projecting inward from one support alternating with the pole-shoes projecting inward from the other support, as set forth.

4. In a multipolar dynamo-electric machine, a support having connected therewith all the pole-shoes of like polarity; and means for adjusting the said support and the said shoes with relation to the pole-pieces and armature, as set forth.

5. In a dynamo-electric machine, the combination with the pole-pieces; of pole-shoes therefor, the pole-shoes of like polarity being magnetically connected together; and means for non-magnetically connecting together pole-shoes of unlike polarity, the set of pole-shoes being an independent structure adapted to be connected with the field-magnet frame, as set forth.

6. In a multipolar dynamo-electric machine, a support of magnetic material having connected therewith all the pole-shoes of like polarity; and a brush-holding ring connected with said support, as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

DONALD M. BLISS.

Witnesses:

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