No. 760,086. PATENTED MAY 17, 1904.

I. E. STOREY.

DYNAMO ELECTRIC MACHINE OR MOTOR.

APPLICATION FILED SEPT. 15, 1903.

NO MODEL.

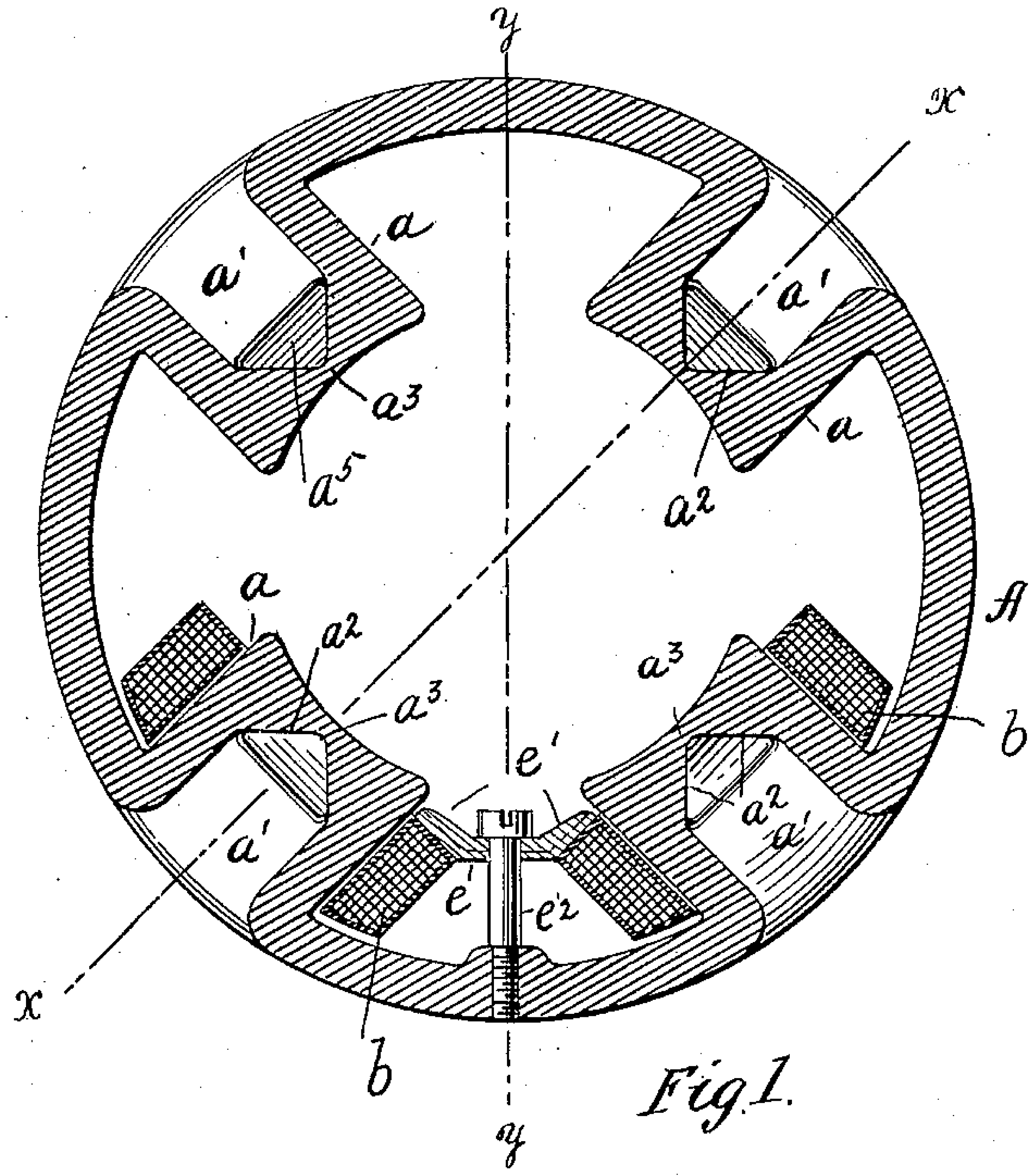

Fig. 1.

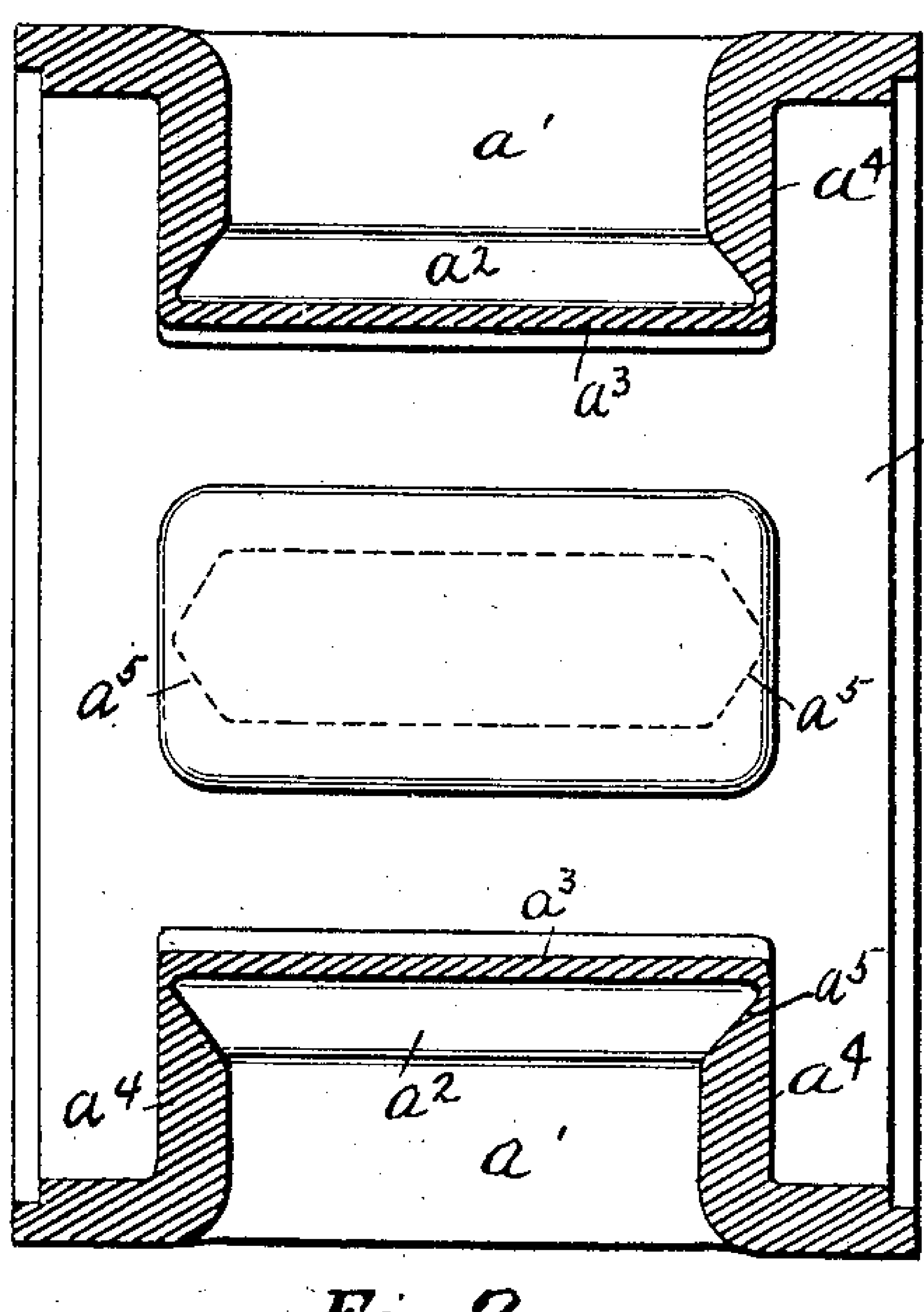

Fig. 2.

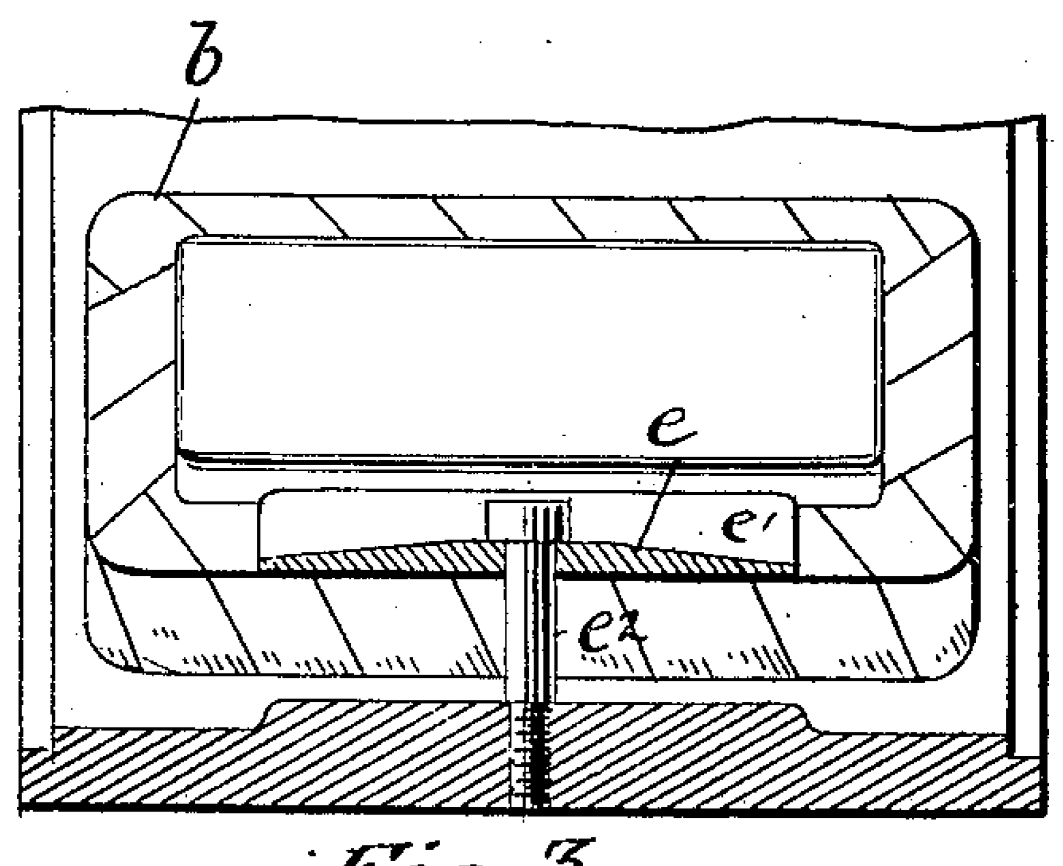

Fig. 3.

Witnesses
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UNITED STATES PATENT OFFICE.

IMLE E. STOREY, OF AMSTERDAM, NEW YORK.

DYNAMO-ELECTRIC MACHINE OR MOTOR.

SPECIFICATION forming part of Letters Patent No. 760,086, dated May 17, 1904.

Application filed September 15, 1903. Serial No. 173,228. (No model.)

To all whom it may concern:

Be it known that I, IMLE E. STOREY, a citizen of the United States, residing at Amsterdam, in the county of Montgomery and State of New York, have invented certain new and useful Improvements in Dynamo-Electric Machines or Motors, of which the following is a full, clear, and exact description.

This invention relates to dynamo-electric machines and motors, and has special reference to the construction of the cores of the field-magnet with a view to maintaining a uniform density of the lines of force throughout the air-gap to thereby prevent sparking at the commutator and increase the range of regulation. The improved construction referred to consists of a pole-piece having an internal chamber whose side walls converge at their inner ends and meet on a line very near the pole-face and extend along the middle thereof. This construction permits the lines of force which traverse the length of the pole-pieces to spread out like a fan just before they cross the air-gap; but the stricture of the magnetic material at the middle point of the pole-face formed by the converging walls prevents this spreading beyond that point, but permits the spread to occur uniformly from each side toward the center, thus giving an even distribution of the lines over the air-gap. In the operation of the machine this even distribution will be somewhat distorted by the rotation of the armature, since there will be the usual tendency of the lines to crowd toward that horn of the pole-piece from which the armature is receding. This distortion, however, will occur in each half of the air-gap, because the stricture of iron at the middle of the polar face prevents the lines in one half of the pole from crowding over into the other half, and the result will be a substantially uniformity of density of the lines throughout the air-gap.

My invention also includes a detail of construction relating to the manner of holding the field-magnet coils in place.

In the accompanying drawings, Figure 1 is a section through a four-pole field-magnet, taken on a plane at right angles to the armature-shaft and showing only two of the field-magnet coils in position. Fig. 2 is a longitudinal section of the same structure, taken on line $x\ x$ of Fig. 1; and Fig. 3 is a section on line $y\ y$ of Fig. 1 through only one-half of the structure.

A represents a cylinder or ring field-magnet frame having a width or length in the direction of the armature-shaft substantially equal to or a little greater than the armature. As shown, this ring has four inwardly-projecting pole-pieces a. These pole-pieces are made hollow, the chambers a' therein being of substantially the same shape as the pole-pieces in the cross-section—that is, rectangular; but the two walls of the chamber opposite each other in the direction of rotation converge toward each other at equal angles, as shown at $a^2\ a^2$, to a point very near the pole-face, where only a thin web a^3 of the metal is left. Substantially the same results will be obtained if the converging walls of the chamber are on curved lines. I prefer, however, to make them straight, so that the stricture at a^3 will occur only at the middle point of the pole-face and will quickly thicken out in each direction therefrom.

b indicates the field-magnet coils, which are ordinary rectangular coils of wire slipped over the rectangular pole-pieces in the position shown. To support them in place in such a manner that they can be readily removed and replaced when necessary, I employ four plates e, having two wings e' angularly disposed and adapted to rest against one side of the heads of two adjacent coils. The plate is placed against the coils in the position shown and secured by means of a single bolt e^2, passing through its center and threaded into the field-magnet ring. By removing this bolt the plates, and consequently the field-coils, can be taken off and replaced.

In the operation of the machines the lines of force created in the magnet-cores a travel in parallel relation through the major part of the core; but when they reach the points where the walls of the chamber in the core converge they spread out in the form of a fan through the triangular portion of iron, entirely filling each corner or horn of the pole-piece and flowing with uniform density across the air-gap.

With the armature in motion there will be the usual tendency of the lines to crowd toward that corner or horn of the pole-piece from which the armature-surface recedes, and there will in practice be a somewhat greater density of the lines in one half of the pole adjacent to the stricture a^3 and in the other half adjacent to the point of the horn; but the lines which crowd toward the stricture cannot spread into the opposite half on account of the magnetic resistance of the stricture. Hence the total number of lines of force traversing the field-magnet is divided into two groups, and each group, though varying slightly in density, does not present that wide variation of density which occurs in the ordinary solid pole-pieces or those which have a substantially uniform thickness of metal along the polar face.

I am aware that it has heretofore been proposed to regulate a motor by removing a portion of the core and pole-face of the magnet; but it is pointed out that the removal of the pole-face robs a portion of the air-gap of its lines of force, whereas with my construction the lines of force always traverse all parts of the air-gap, the integrity of the pole-face being maintained.

In order to prevent the lines of force which traverse the end portions a^4 of the pole-pieces from spreading beyond the center line of the face of the pole, I carry the trough-shaped bottom of the chamber outward, as seen at a^5, to make the restriction equal to that at a^3.

Having described my invention, I claim—

1. In a dynamo-electric machine or motor, a field-magnet core and pole-piece having a chamber whose opposite walls converge to a point near the pole-face and form a stricture in the magnetic path at that point.

2. In a dynamo-electric machine or motor, a field-magnet having a core and a continuous pole-face, said core having a rectangular chamber whose walls opposite each other in the direction of armature rotation converge at their inner ends until they meet on a line very near the pole-face, for the purpose set forth.

3. In a dynamo-electric machine or motor, a field-magnet consisting of a ring having inwardly-projecting radial pole-pieces, coils of wire on each pole-piece, retaining-plates arranged between adjacent coils and resting against the heads thereof and a bolt securing the plate to the ring, substantially as described.

In witness whereof I subscribe my signature in presence of two witnesses.

IMLE E. STOREY.

Witnesses:

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