

(No Model.)

H. W. SPANG.
DYNAMO ELECTRIC MACHINE.

No. 432,577.

Patented July 22, 1890.

Fig. 1.

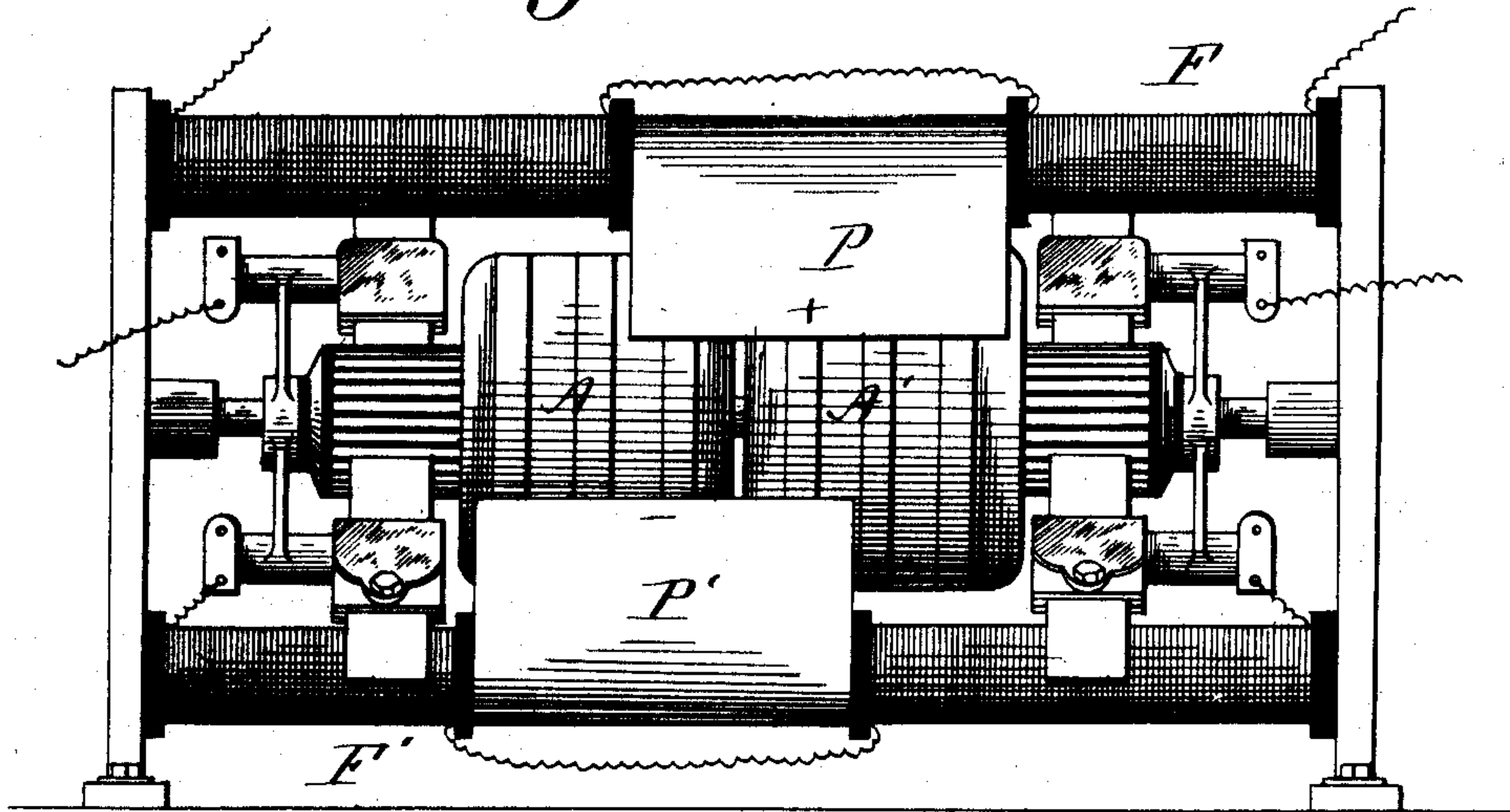


Fig. 2.

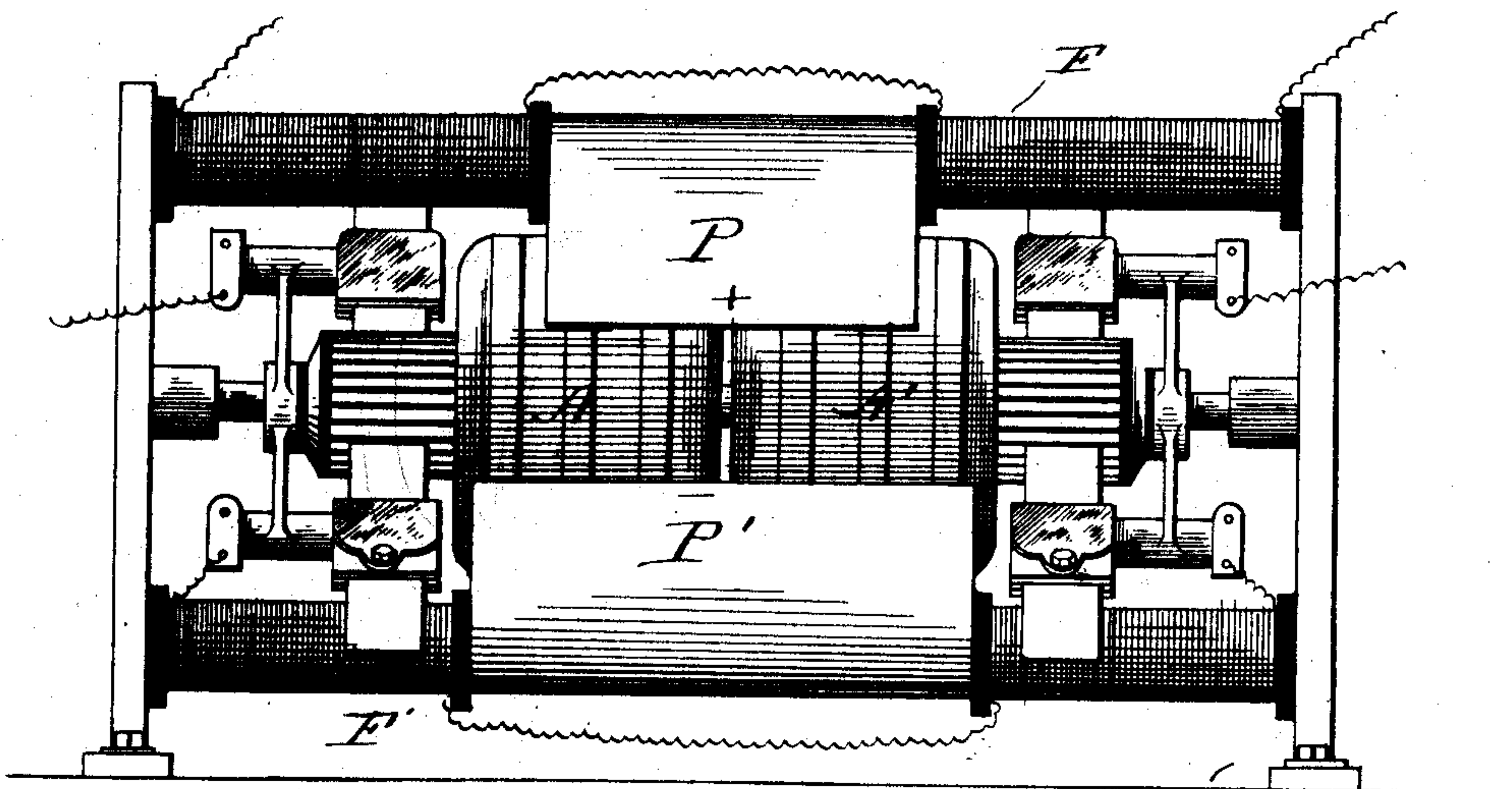
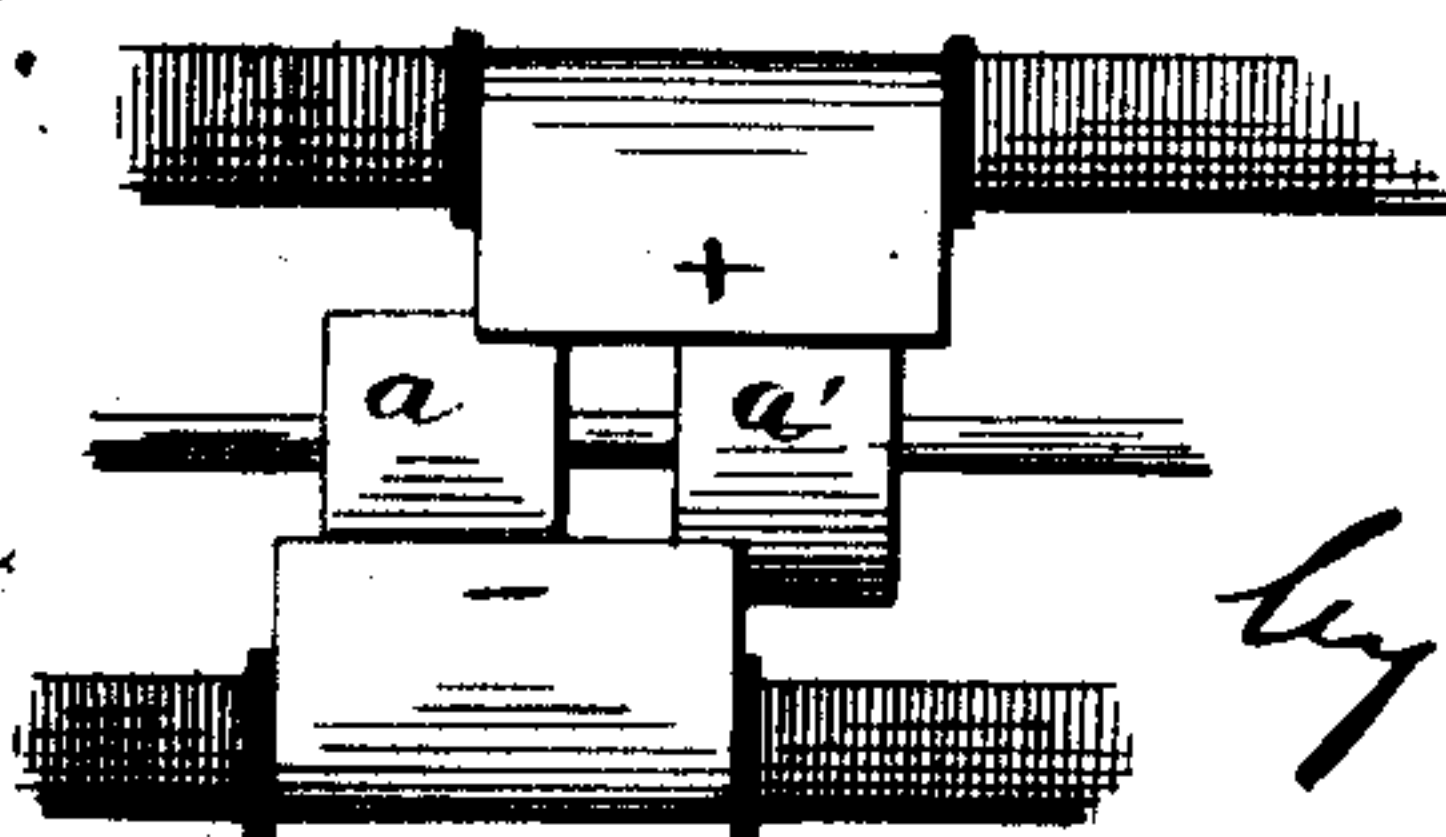


Fig. 3.



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UNITED STATES PATENT OFFICE.

HENRY W. SPANG, OF NEW YORK, N. Y.

DYNAMO-ELECTRIC MACHINE.

SPECIFICATION forming part of Letters Patent No. 432,577, dated July 22, 1890.

Application filed November 13, 1889. Serial No. 330,188. (No model.)

To all whom it may concern:

Be it known that I, HENRY W. SPANG, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Dynamo-Electric Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, reference being had to the accompanying drawings, which form part of this specification.

In an application of even date herewith I have shown and described a certain improvement in dynamo-electric generators by which I am able to utilize to the fullest extent or extreme the induction force of the field by so proportioning the pole-pieces to the core of the armature that the latter will revolve within the influence of the lines of magnetic attraction emanating from the ends of the pole-pieces and the adjacent portions of the field-cores, as well as within the influence of those lines of attraction of force proceeding from the face of the poles. The said application relates more specifically to that type of machine in which two like pole-pieces are arranged in direct opposition to each other, as in the conventional form of Gramme machine.

My present invention has relation to generators employing two armatures and having the pole-pieces arranged in oblique relation to each other; and it consists in so constructing and arranging the armatures and pole-pieces that the former shall, as indicated with reference to the types of machine shown in the application above referred to, revolve within the inductive field developed by lines of magnetic force emanating from the ends of the pole-pieces and the adjacent regions of the field-bars.

In the drawings, Figure 1 is an elevation of the generator, having two aligned armatures and two like field pole-pieces, the latter disposed obliquely toward each other. Fig. 2 is a similar view of a modified form of generator wherein two armatures are arranged between pole-pieces of different proportions. Fig. 3 is a plan view of a naked dynamo-electric machine, showing the relation of the armature-core to the pole-pieces.

A A' designate the armatures comprising the coils *a* and a soft-iron ring or core *a'*; P P', the pole-pieces of the field, and F F' the field-magnet bars. The pole-pieces are located at medial points of the bars.

In the form shown in Fig. 1 the pole-pieces P P' are arranged to influence two separate armatures axially aligned, and each armature is in the direct influence of one entire pole-piece and about one-half of the opposite pole-piece, the pole-pieces being arranged in oblique relation to each other, a line drawn from the middle point of their faces being inclined with reference to the axis of the armatures. Inasmuch as the pole-pieces are magnetically + and -, respectively, the lines of magnetic force or attraction emanating from one pole-piece will naturally seek the other pole-piece, following the law of magnetic curvature, and as the greatest attraction is at the ends of the pole-pieces it must follow that the greatest proportion of the lines of force determined in the machine will intersect the armatures, and to those proceeding directly from the pole-pieces will be added those determined in the adjacent portions of the field-bars. Practically, therefore, there will be no leakage, as all the free magnetism will be utilized in inductively influencing the armatures.

In the form shown in Fig. 2 the pole-pieces, although directly opposite each other, are of different widths, pole-piece P' being about equal in width to the length of the two armatures, while pole-piece P is of less width; but the lines of magnetic force proceeding from the ends of the shorter pole-pieces meet those proceeding from the ends of the longer pole-pieces within the region of rotation of the armatures, and consequently exert their influence upon the same, instead of being wasted outside the armatures, as is the case wherein the armatures are subject to the influence of pole-pieces of equal or greater dimensions than the armatures.

The circuits of the machine of either type may be arranged in the most convenient or expedient manner and the machine used for generating or motor purposes. The electric strain is divided between the two armatures, and by reason of their peculiar relation to the

pole-pieces and of the pole-pieces to each other there is less distortion of the field than occurs where each armature is directly influenced by but one pole-piece, as happens in
5 the type of machine shown, for instance, in the Ball patents, Nos. 285,549 and 294,180, and consequently less sparking at the commutators.

What I claim, and desire to secure by Letters Patent, is—

In a dynamo-electric machine, the combination, with the two axially-aligned armatures and the field-magnet bars, of pole-pieces arranged in relation thereto, so that each armature will be within the inductive field and
15 subject to the magnetic effect of a pole-piece

on one side thereof and to the magnetic inductive effect of a pole-piece and the adjacent end of the field-magnet bar, to which said pole-piece is attached, on the other side, the core of each armature being prolonged with
20 reference to one pole-piece, so that it enters or penetrates the field beyond the ends of said pole-piece, or beyond one end of one pole-piece, as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 28th day of
25 October, 1889.

HENRY W. SPANG.

Witnesses:

O. F. HIBBARD,
H. A. B. KELLY.