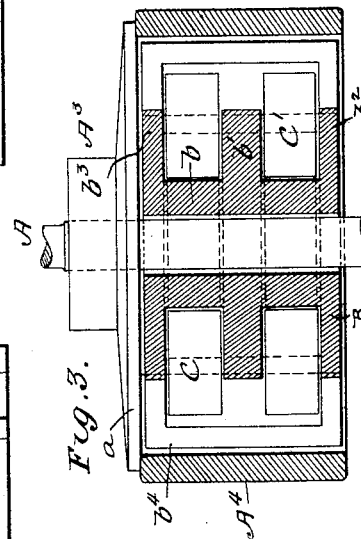
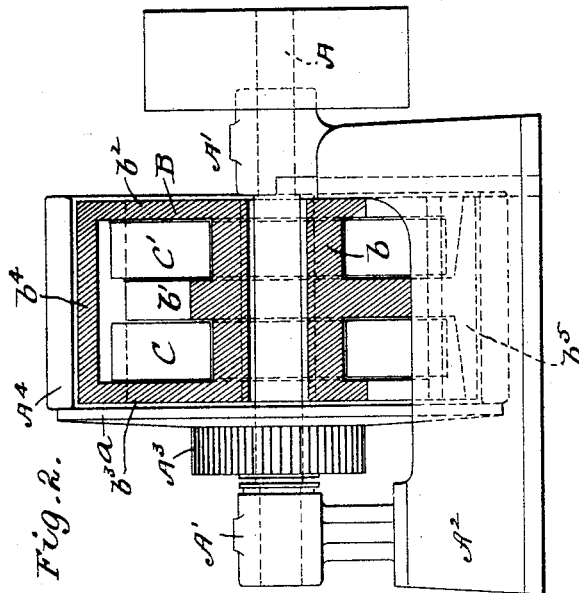
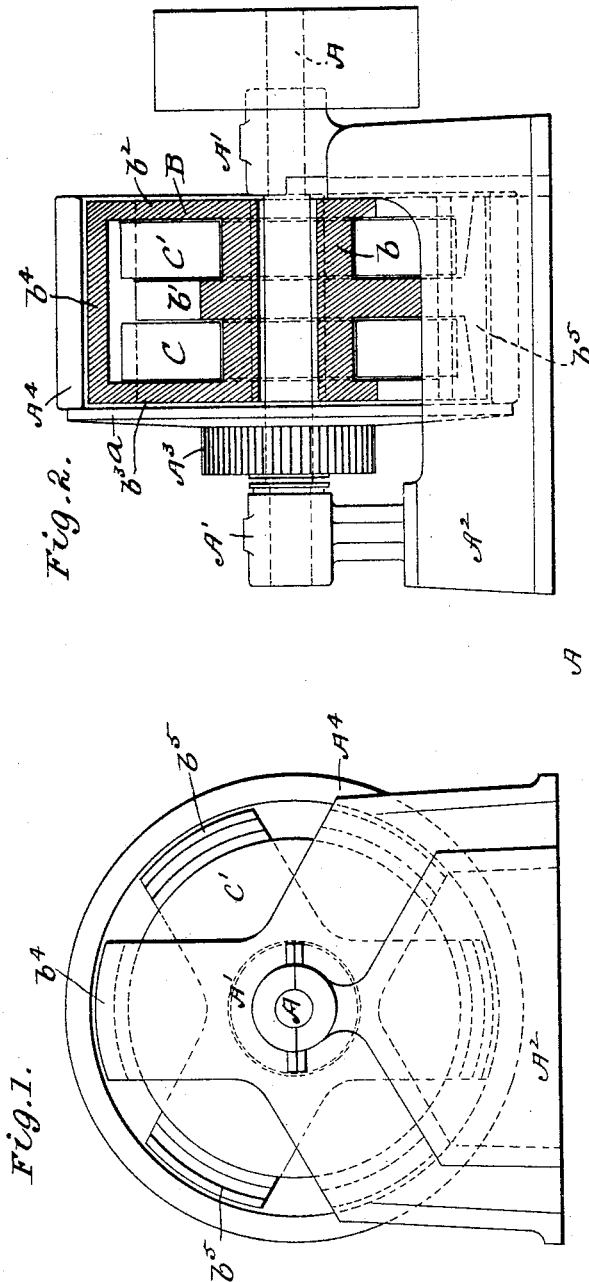


J. B. ENTZ.

DYNAMO ELECTRIC MACHINE OR MOTOR.

No. 455,790.

Patented July 14, 1891.



WITNESSES:

Frank S. Ober.

Edward A. Wagner

INVENTOR

Justus B. Entz.

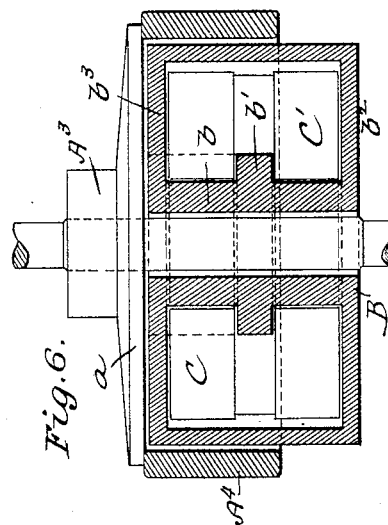
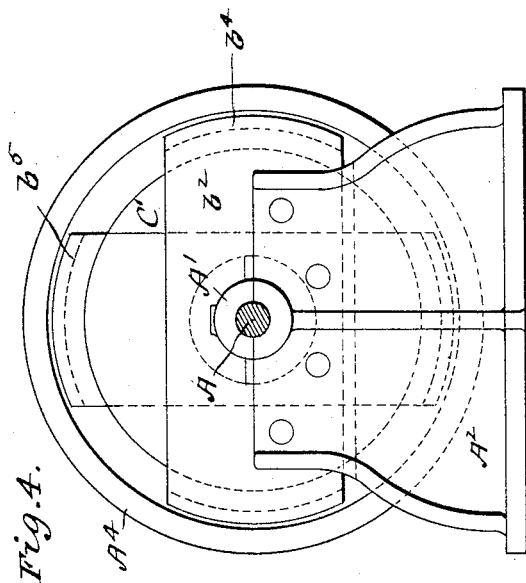
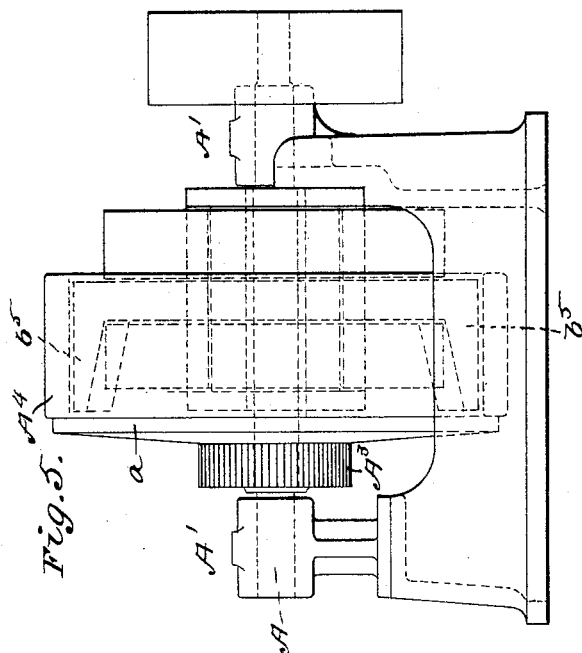
BY

W. J. Johnston
ATTORNEY.

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UNITED STATES PATENT OFFICE.

JUSTUS B. ENTZ, OF NEW YORK, N. Y.

DYNAMO-ELECTRIC MACHINE OR MOTOR.

SPECIFICATION forming part of Letters Patent No. 455,790, dated July 14, 1891.

Application filed November 24, 1890. Serial No. 372,429. (No model.)

To all whom it may concern:

Be it known that I, JUSTUS B. ENTZ, a citizen of the United States, residing in 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 Motors, of which the following is a specification.

This invention has reference to multipolar dynamo-electric machines and motors, the object being to provide a machine which shall be compact and cheap in construction and efficient in operation.

The invention is confined to that class of machines in which the field-magnet system is located within a ring armature, and in which either the field-magnets or the armature may be the rotating element.

In general terms, the invention consists of a field-magnet system embodying two coils placed upon a single core, but wound with respect to each other so that the outer ends of the core shall be of one polarity while the intermediate portion of the core is of the opposite polarity. The pole-pieces of one polarity are formed by extensions from the two ends of the core, which pass around the coils and join each other across their peripheries, and of the other polarity by radial extensions emanating from the middle of the core and passing between the two coils to the outside thereof, where they are provided with a cross-head or lateral extension projecting across the peripheries of the two coils or one of them. The extensions from the ends and middle portion of the coil are in the nature of spokes of a wheel, but somewhat flattened and broadened. The bars which pass across the peripheries of the coils and connect the extensions from the ends of the core form one set of working pole-pieces, while the cross-heads on the extensions on the intermediate portion of the core form the other set of working pole-pieces, and the pole-pieces of each set alternate with each other around the coil. This structure, in combination with a ring-armature surrounding it, constitutes the invention.

Referring to the accompanying drawings, Figure 1 represents an end elevation of a six-pole machine. Fig. 2 represents a vertical section of the same, parts being shown in ele-

vation. Fig. 3 represents a horizontal section of the same. Fig. 4 represents an end elevation of a four-pole machine slightly modified in construction. Fig. 5 represents a side elevation of the same, and Fig. 6 a horizontal section of the same.

A represents the driving-shaft of the machine. It is mounted in boxes A' , supported upon a frame A^2 and carrying rigidly upon it the commutator A^3 and the armature A^4 , the last mentioned being supported upon a spider or disk a , between the bearings. The shaft is surrounded by an iron casting B. This is not supported upon the shaft, but, on the contrary, is held by or forms a part of the frame A^2 , and the hole through which the shaft passes is larger than the shaft, so as to avoid all friction therewith. The casting consists of a central hub or core b , through which the shaft passes, and three sets of radial wings or arms b^1 , b^2 , and b^3 , respectively. In the form shown in Figs. 1 to 3, each set consists of three arms. The arms of the sets b^2 and b^3 are arranged in pairs, each pair being in a single radial plane and connected at their outer ends by a cross-piece b^4 , which is in the form of a segment of a cylinder. The arms of the set b^1 are of the same length as the arms of the sets b^2 b^3 , but are provided at their outer ends with cross-heads or lateral extensions b^5 , which are also in the form of segments of cylinders and are of the same size as the bars b^4 . They occupy alternate positions around a circle with the bars b^4 . This construction forms two continuous annular spaces inside the castings, and in these spaces are placed coils of wire C C' concentric with the bars b^4 and b^5 and separated by the arms b^1 . This structure constitutes the field-magnet system of the machine. When a current is passed through the coils C C' , which are wound in opposite directions, the structure B becomes a magnet, the parts b^2 , b^3 , and b^4 being of one polarity and the parts b^1 and b^5 of the other polarity. The armature is of such diameter that its coils will run close to the outer faces of the bars b^4 b^5 , and the magnetic circuit is from pole to pole of the field-magnet through the core of the armature. In the construction herein illustrated it is intended that the armature shall be the rotating element, as is usual in dy-

namo-electric machines; but I do not confine myself to this construction, as it is quite obvious that the field-magnet system, being symmetrical in shape and weight, might be made the rotating element and the armature supported stationary.

A slight modification of the form hereinbefore described is shown in Figs. 4 to 6, the difference being that the lateral extensions or cross-heads connected with the intermediate set of arms b' extend in one direction only. This construction is to be used with a short or narrow armature. These figures also illustrate a four-pole machine, and it will be seen that the extensions $b^2 b^3$ are in the shape of a rectangular frame.

I have not referred to any particular method or manner of building this machine, and I do not limit myself to any particular manner of building. As here shown, the magnetic path of the field-magnet system is in one piece of iron. It may, however, be made either by casting or forging in one or a number of pieces and secured together by bolts in any suitable manner. For convenience in adjusting the coils it may be found well to make the parts $b^2 b^3 b^4$ separate from the core and bolt them to the heads of the same in their proper positions.

Having thus described my invention, I claim—

1. In a dynamo-electric machine or motor, the field-magnet system consisting of two coils of wire on a single core and two sets of pole-pieces, one set connected with the ends of the core and the other set connected with the core at a point or points intermediate of the coils, in combination with an armature subjected to the influence of said pole-pieces.

2. In a dynamo-electric machine or motor, the field-magnet system consisting of two coils of wire on a single core and two sets of

pole-pieces, one set connected with the ends of the core and the other set connected with the core at a point or points intermediate of the coils, the pole-pieces at the ends of the coils being connected in pairs and alternating around a circle with the pole-pieces connected with the core at a point or points between the coils, in combination with an armature subjected to the influence of said pole-pieces.

3. In a dynamo-electric machine or motor, the field-magnet system consisting of two coils of wire on a single core and two sets of pole-pieces, one set connected with the ends of the core and the other set connected with the core at a point or points intermediate of the coils, the pole-pieces at the ends of the coils being connected in pairs and alternating around a circle with the pole-pieces connected with the core at a point or points between the coils, in combination with an armature exterior to the same.

4. In a dynamic-electric machine or motor, a field-magnet system consisting of two coils of wire on a single core, a series of radial arms connected with the ends of the core and another series of radial arms connected with the core at a point or points between the coils thereof, each of the last-mentioned arms having lateral extensions or pole-pieces which alternate around a circle with cross-bars connecting the ends of each pair of the first-mentioned series, in combination with an armature subjected to the influence of said pole-pieces.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JUSTUS B. ENTZ.

Witnesses:

J. A. MACHADO,
W. A. PHILLIPS.